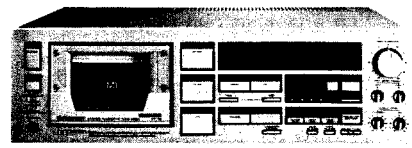
PIONEER®

Service Manual

REPAIR & ADJUSTMENTS



ORDER NO.
ARP-449-0

STEREO CASSETTE TAPE DECK

CT-A9

MODEL CT-A9 COMES IN SEVEN VERSIONS DISTINGUISHED AS FOLLOWS:

Type	Voltage	Remarks
KU	AC120V only	U.S.A. model
KC	AC120V only	Canada model
HEM	AC220V (240V)	European continent model
HB	AC240V (220V)	United Kingdom model
HP	AC240V (220V)	Australia model
D	AC120V, 220V, 240V (switchable)	General export model
D/G	AC120V, 220V, 240V (switchable)	U.S. Military model

- **This service manual is applicable to the KU type. For servicing of the other types, please refer to pp. 72~79.**
- **For the circuit and mechanism descriptions, please refer to the CT-A9 service manual (ARP-462-0).**
- **Ce manuel d'instruction se refère au mode de réglage, en français.**
- **Este manual de servicio trata del método de ajuste escrito en español.**

CONTENTS

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS [USA] INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia

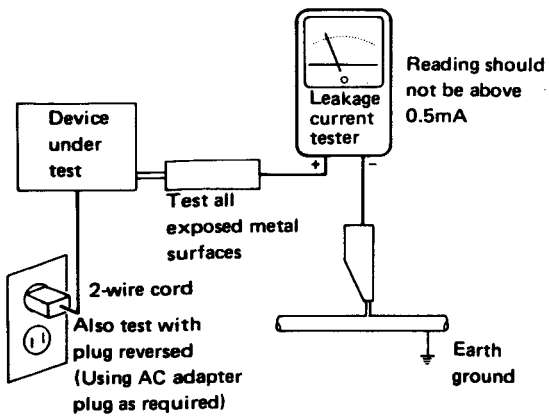
1. SAFETY INFORMATION

1. SAFETY PRECAUTIONS

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

LEAKAGE CURRENT CHECK

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



AC Leakage Test

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

2. PRODUCT SAFETY NOTICE

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

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

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

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

2. SPECIFICATIONS

System ..... 4 track, 2 channel stereo
Heads ..... "Ribbon Sendust" recording/playback combination head x 1, Erasing head x 1
Motor ..... Quartz PLL D.D. capstan motor x 1
Coreless reel motor x 1
Wow/Flutter ..... No more than 0.018% (WRMS)
No more than ± 0.048% (DIN)
Fast Winding Time ..... Approx. 80 seconds (C-60 tape)
Frequency Response
–20 dB recording:
Normal tape ..... 20 to 21,000 Hz (30 to 19,000 Hz ± 3 dB)
Chrome tape ..... 20 to 22,000 Hz (25 to 20,000 Hz ± 3 dB)
Metal tape ..... 20 to 23,000 Hz (25 to 21,000 Hz ± 3 dB)
0 dB recording:
Chrome tape ..... 20 to 11,000 Hz
Metal tape ..... 20 to 16,000 Hz
Signal-to-Noise Ratio
Dolby NR OFF ..... More than 58 dB
Noise Reduction Effect
Dolby type B NR ON ..... More than 10 dB (at 5 kHz)
Dolby type C NR ON ..... More than 19 dB (at 5 kHz)
Harmonic Distortion ..... No more than 0.8% (0 dB)
Input (Sensitivity)
LINE (INPUT) ..... 63 mV (Input impedance 100 kΩ)
Output (Reference level)
LINE (OUTPUT) ..... 0,63 V (Output impedance 7 kΩ)
Headphone ..... 0,45 mW (Load impedance 8 Ω)

MISCELLANEOUS

Power Requirements
KU, KC models ..... AC 120 V, 60 Hz
HEM model ..... AC 220 V, 50/60 Hz
HB, HP models ..... AC 240 V, 50/60 Hz
D, D/G models ..... AC 120/220/240V, 50/60 Hz (switchable)
Power Consumption
KU, KC models ..... 52 watts
HEM, HB, HP models ..... 57 watts
D, D/G models ..... 46 watts
Dimensions ..... 420 (W) x 130 (H) x 374 (D) mm
16-9/16 (W) x 5-1/8 (H) x 14-12/16 (D) in
Weight (without packaging) ..... 10 Kg (22 lb 1 oz)

FURNISHED PARTS

Operating instructions 1
Connection cord with pin plug 2

SUBFUNCTIONS

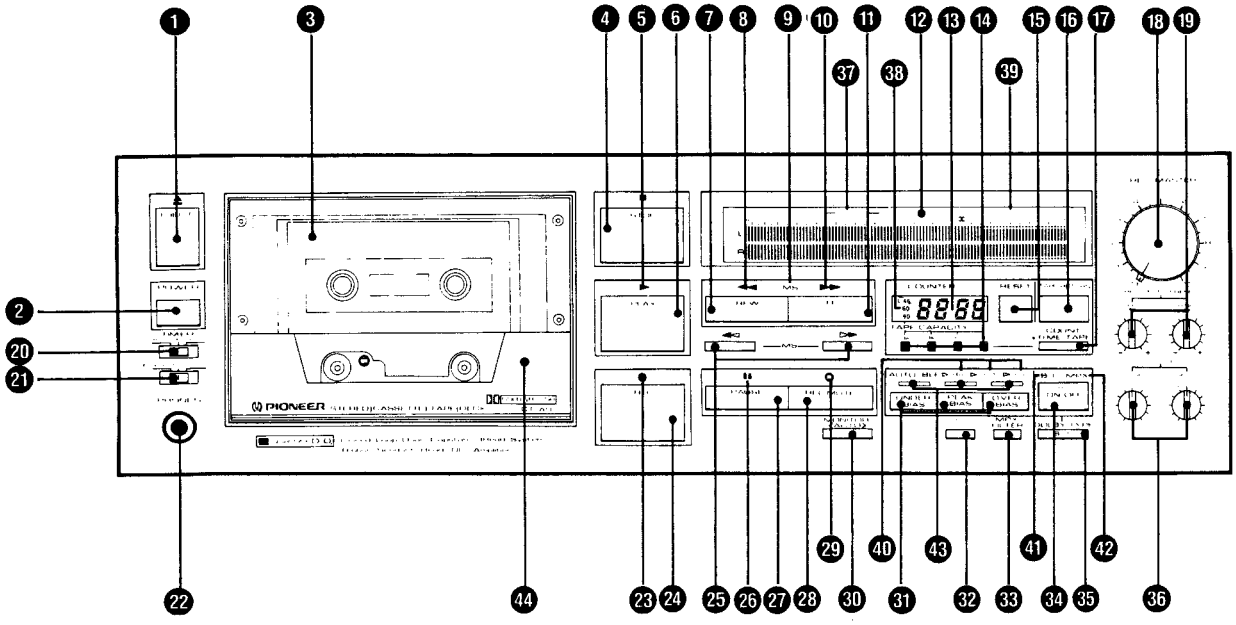
- MOL balance control type AUTO BLE
- Dolby NR system (type B and C)
- Quartz PLL D.D. capstan motor
- Closed loop dual capstan
- One touch MS, one touch tape return
- Auto monitor
- Auto tape selector function
- Dual mode counter
- Auto rec mute
- Recording level warning zone switch
- Auto loading/power eject
- Timer standby function

NOTES:

1. Reference Tapes:
   Normal and LH: DIN 45513/BLATT6 or equiv.
   CrO_2 DIN 45513/BLATT7 (CrO_2) or equiv.
2. Reference Recording Level: Meter 0 dB indicating level (160 nwb/m magnetic level = Philips cassette reference level)
3. Reference Signal: 315 Hz
4. Wow and Flutter: • JIS (3 kHz, with acoustic compensation (weighted) rms value); DIN 3,150Hz with acoustic compensation tion (weighted) PEAK value DIN 45507
5. Frequency Response: • Measured at – 20 dB level, DOLBY NR OFF, level deviation is ± 6 dB without indication.
6. Signal-to-Noise Ratio: • Measured at 3rd harmonic distortion 3% level, weighted (DIN 45513/BLATT7)
7. Sensitivity: Input level (mV) required for reference recording level with input (REC) level control set to maximum
8. Maximum Allowable Input: While decreasing settings of input (REC) level controls and increasing level at input jacks, this is the maximum input level (mV) at the point where recording amplifier OUTPUT waveform becomes clipped.
9. Reference Output Level: Playback output level when meter indicates 0 dB.
10. This model does not employ a recording/playback connector (DIN-type).

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

3. FRONT PANEL FACILITIES



❶ EJECT BUTTON

Press this button to open the cassette door. Whenever inserting or removing a cassette tape, be sure that the power is turned ON.

❷ POWER SWITCH

When this switch is depressed power is turned ON, and when it is depressed again, power is turned OFF. After the power is turned ON, the unit will not operate for a duration of 4 seconds which is the neccesary time for the unit to become stable.

❸ CASSETTE DOOR

This door opens when the EJECT button is pressed. Insert cassette tapes with the visible part of the tape downward. When a cassette tape is inserted, the cassette door will automatically close. The cassette door will also close if it is lightly pressed. Unless the unit is powered, the door can not be opened.

NOTE:
If the cassette door is closed after turning the power off, the next time the power is turned ON and an operating switch is pressed, the cassette door will open and close once. This is in order to reset the microprocessor to the correct condition, and is not a malfunction.

❹ STOP SWITCH

Depress this switch to stop the tape travel and to release the operating switches.

❺ PLAY INDICATOR (►)

This indicator lights when the PLAY switch is pressed. It also lights when the REC switch is pressed to set the unit in the recording mode.

❻ PLAY SWITCH

Depress this switch to playback a tape.

❼ REW SWITCH

Depress this switch to rewind the tape. (The tape will travel from right to left.)

❽ REWIND INDICATOR (◄◄)

This indicator lights when the rewind switch (REW) is pressed. The indicator lights also when the music search (MS) ◄◄ switch is pressed.

❾ MUSIC SEARCH INDICATOR (MS)

This indicator lights when either of the music search switches (◄◄ or ►►) is pressed.

❿ FAST FORWARD INDICATOR (►►)

This lights when the fast forward (FF) switch is pressed. When the music search (MS) switch ►► is pressed, the indicator also lights.

⓫ FF SWITCH

Depress this switch to send the tape forward. (The tape will travel from left to right.)

⓬ LEVEL METER

This indicates the recording level during recording and the output level during playback. The top part is for the left (L) channel and the bottom part for the right (R) channel.

⓭ DUAL MODE COUNTER (COUNTER)

This counter has two functions, "tape counter" and "real time counter," depending on the position of the counter mode switch (● TIME/TAPE).

When used as a "tape counter," the figures change as the tape travels and its transport position is indicated by a 4-digit number. When the RESET button is pressed, the counter is reset to "0000."

When the power is switched on, the counter functions as a "tape counter."

When used as a "real time counter," the remaining time on the tape during recording or playback is indicated. Set the TAPE CAPACITY switch to the position corresponding to the type of tape (length, hub diameter) being used.

⓮ TAPE CAPACITY SWITCH (TAPE CAPACITY)

When the dual mode counter is used as a real time counter, this switch is set in accordance with the tape type (tape length, hub diameter).

L46 ..... For C-46 large hub diameter tapes.
46 ..... For C-46 tapes.
60 ..... For C-60 tapes.
90 ..... For C-90 tapes.

NOTE:
For tapes other than those listed above, set to the position nearest to the actual length of the tape used. In those cases, there may be some difference in the time displayed.

⓯ RESET BUTTON (RESET)

Press this to reset the tape counter to "0000." Before recording or playback, press this button to reset the tape counter to "0000." It will then be easy to find programs on the tape if a note is made of the tape counter numbers and of the recording or playback contents. The numbers provide you with a guideline for finding programs afterward which you want to listen to. The tape counter can be reset while being used as a real time counter, however "0000" is displayed only while the RESET button is depressed.

⓰ TAPE RETURN SWITCH (TAPE RETURN)

When this switch is pressed, the fast forward or rewind functions will begin, sending the tape to the "0000" position, where it will automatically stop. This is a convenient function when you wish to listen immediately to a program you have just recorded, or when you wish to perform repeat play of a certain program.

⓱ COUNTER MODE SWITCH (● TIME/TAPE)

Push this switch to select the dual mode counter function.

⓲ REC MASTER VOLUME CONTROL (REC MASTER)

This control is for adjusting general recording levels. The recording level increases when the control is turned clockwise, and decreases when turned counter-clockwise. The control is equipped with a memory marker useful for remembering a predetermined volume level, for example when performing fade-in.

⓳ REC LEVEL PRESET VOLUME CONTROLS (REC LEVEL PRESET)

These are normally set in the click position (▼). After setting the general recording level with the recording master volume control, these controls can be used to finely tune the R and L channels' volume levels. The recording level is increased when the controls are turned in the (+) direction, and reduced when the controls are turned in the (−) direction.

⓴ TIMER SWITCH (TIMER)

This switch is used when an optional audio timer is utilized for unattended recording or wakeup playback.

NOTE:
The timer switch should always be in the OFF position when not performing timer recording or playback. If a cassette tape is inserted and the switch is set to the REC or PLAY position, the unit will automatically enter the recording or playback mode whenever the power switch is turned on.

㉑ BIAS SWITCH (Connected to TIMER SWITCH)

Depending on the program source to be recorded, this switch can be set in 3 positions to adjust the peak bias in a ± 15% range. When you wish to emphasize high ranges or low ranges, you can choose a setting with deeper (more) or shallower (less) bias. When bias is shallow, the high ranges are extended, but distortion increases in proportion. Conversely when bias is deepened, the high ranges fall off, but distortion is lessened.

UNDER : Set to this position for recording music such as rock music with wide dynamic range in the high ranges, and substantial modulation of sounds.
PEAK : For recording most general kinds of music.
OVER : Set to this position when you wish to record classic and other similar music with increased middle and low range MOL, and low distortion.

NOTE:
This switch operates when the TIMER switch is set to the REC position.

㉒ PHONES JACK

This is the output jack for the stereo headphones.

㉓ RECORDING INDICATOR (●)

This lights when the unit is set to the recording mode.

㉔ REC SWITCH

This switch is pressed for recording. When the switch is pressed, the tape deck is placed in the recording standby mode, and the pause indicator (■■), play indicator (►) and recording indicator (●) will light. To begin recording, press the PAUSE switch to release from the recording standby mode.

NOTE:
- *The switch cannot be placed in the ON position if the accidental erasure prevention tab on the cassette have been broken off, or if no cassette is in the unit.*
- *To release the tape deck from the recording mode, press the STOP switch.*

㉕ MUSIC SEARCH SWITCH (MS)

This switch is pressed when searching for the beginning of programs.

㉖ PAUSE INDICATOR (■■)

This indicator lights when the PAUSE switch is pressed. It also lights when the REC switch is pressed.

㉗ PAUSE SWITCH

Depress this switch to stop the tape travel temporarily during recording or playback. Depress this switch again to allow the tape to continue to travel.
The tape does not stop during fast forward or rewind operations even when the PAUSE switch is depressed.

㉘ REC MUTE SWITCH (REC MUTE)

When the unit is in the recording mode, if this switch is pressed, 4 seconds of non-recorded interval will be created automatically. This can be used for eliminating unwanted portions during recording, or for producing an appropriate non-recorded interval between programs.
Be careful not to press this swich except when necessary.

㉙ RECORDING MUTE INDICATOR (●)

This indicator flashes when the REC MUTE switch is pressed to create an automatic 4 second non-recorded portion. When a non-recorded portion longer than 4 seconds is created, the indicator changes from flashing to steadily lighted.

㉚ AUTO MONITOR SWITCH (AUTO MONITOR)

This unit is equipped with an automatic monitor function. This means that when the unit is in the recording standby mode, SOURCE MONITOR, or when in the playback mode, TAPE MONITOR is automatically selected. However, when you wish to select TAPE/SOURCE monitoring manually, this switch can be pressed. When the switch is pressed, the unit will switch to the mode opposite to that of prior to pressing the switch. For example, if the unit is in the TAPE MONITOR mode before the switch is pressed, it will switch to the SOURCE MONITOR.
The [TAPE] —MONITOR— [SOURCE] indicators in the level meter will light to show the monitoring mode.

㉛ BIAS SWITCHES (UNDER BIAS, PEAK BIAS, OVER BIAS)

These switches are used when adjusting the AUTO BLE to choose an under, peak, or over bias point. When these switches are pressed, the AUTO BLE operation begins. During BLE adjustment, the indicators above the switches flash as appropriate. When BLE adjustment is completed, the indicator for the appropriate switch lights steadily.
In order to protect against mistaken operation, the BLE operation will not start even if the switches are pressed unless the unit is in the stop condition.

㉜ AUTO BLE CLEAR SWITCH (CLEAR)

When this switch is pressed, the data set by the AUTO BLE system are cleared. After clearing, the bias, level and equalization are all set to the standard values selected by the auto tape selector.

NOTE:
When the unit is in the recording, playback, recording standby, or playback standby mode, data will not be cleared even if the clear switch is pressed. To clear data, perform this operation with the unit in the stop mode.

㉝ MULTIPLEX FILTER SWITCH (MPX FILTER)

Push this switch when recording FM stereo broadcasts or TV programs using the Dolby noise reduction system.
Contained among the FM stereo signals are a 19 kHz pilot signal and the 38 kHz subcarrier. The MPX FILTER switch is pressed in order to safeguard against incorrect operation of the Dolby circuit due to these signals. Release the switch for any other recording. The switch does not function during playback.

㉞ DOLBY NR SWITCH (DOLBY NR ON/OFF)

Press this switch ON when using the Dolby NR system for recording or playback. When the Dolby NR system is ON, the Dolby indicator B or C lights.

㉟ DOLBY B/C SELECTOR SWITCH (DOLBY NR B/C)

This deck is equipped both type B and type C Dolby noise reduction systems. After the DOLBY NR ON/OFF switch is pressed, select type B or C using this switch. The Dolby indicator corresponding to the switch position lights.

㊱ OUTPUT LEVEL VOLUME CONTROLS (OUTPUT LEVEL)

These controls are for adjusting the deck's output level. When the controls are turned clockwise, output level is increased.

PHONES ... Adjusts output level at headphones jack.

LINE OUT ... Adjusts output level at LINE OUTPUT (PLAY) terminals on the rear panel.

NOTE:
- *The movement of the level meters is not affected by rotation of the output level volume controls.*
- *If the output level control is set at the minimum "0" position, no sound will be heard, even if the amplifier's volume control is rotated.*
- *If the PHONES volume control is set at the minimum "0" position, no sound will be heard from headphones.*

㊲ MONITOR INDICATOR (MONITOR)

This indicator shows the monitoring mode selected by the automatic monitoring function.

㊳ TAPE CAPACITY INDICATOR

This indicator shows the type of tape selected with the TAPE CAPACITY switch.

㊴ TAPE INDICATORS (NORM/CrO_2/METAL)

This mechanism uses the sensor holes on the cassette to detect the type of tape being used. It then automatically adjusts the proper recording bias and equalization for the tape. The type of tape is then shown on the tape indicator.

NORM: This indicator lights when normal tapes are used.
CrO_2: This indicator lights when CrO_2 tapes are used.
METAL: This indicator lights when metal tapes are used.

NOTE:
When using metal tapes without sensor holes, the tape selector will be set on the CrO_2 position. In this case, optimum recording and erasure may not be possible. We thus recommend that you use metal tapes with sensor holes. Pre-recorded metal tapes can be played as is on this unit.

㊵ BIAS, LEVEL, EQ ADJUSTMENT INDICATORS

The AUTO BLE performs adjustments in the order bias ➡ level ➡ equalizer. The BIAS, LEVEL, and EQ indicators light in order together with the adjustment process. When the equalizer adjustment is completed, the indicators go out.

㊶ DOLBY INDICATORS (DOLBY NR)

These light when the DOLBY NR switch is set to ON .
[B]: This lights when the B type Dolby noise reduction system is operating.
[C]: This lights when the C type Dolby noise reduction system is operating.

㊷ MULTIPLEX INDICATOR (MPX)

This indicator lights when the Multiplex filter (MPX FILTER) switch is pressed ON.

㊸ BIAS INDICATORS

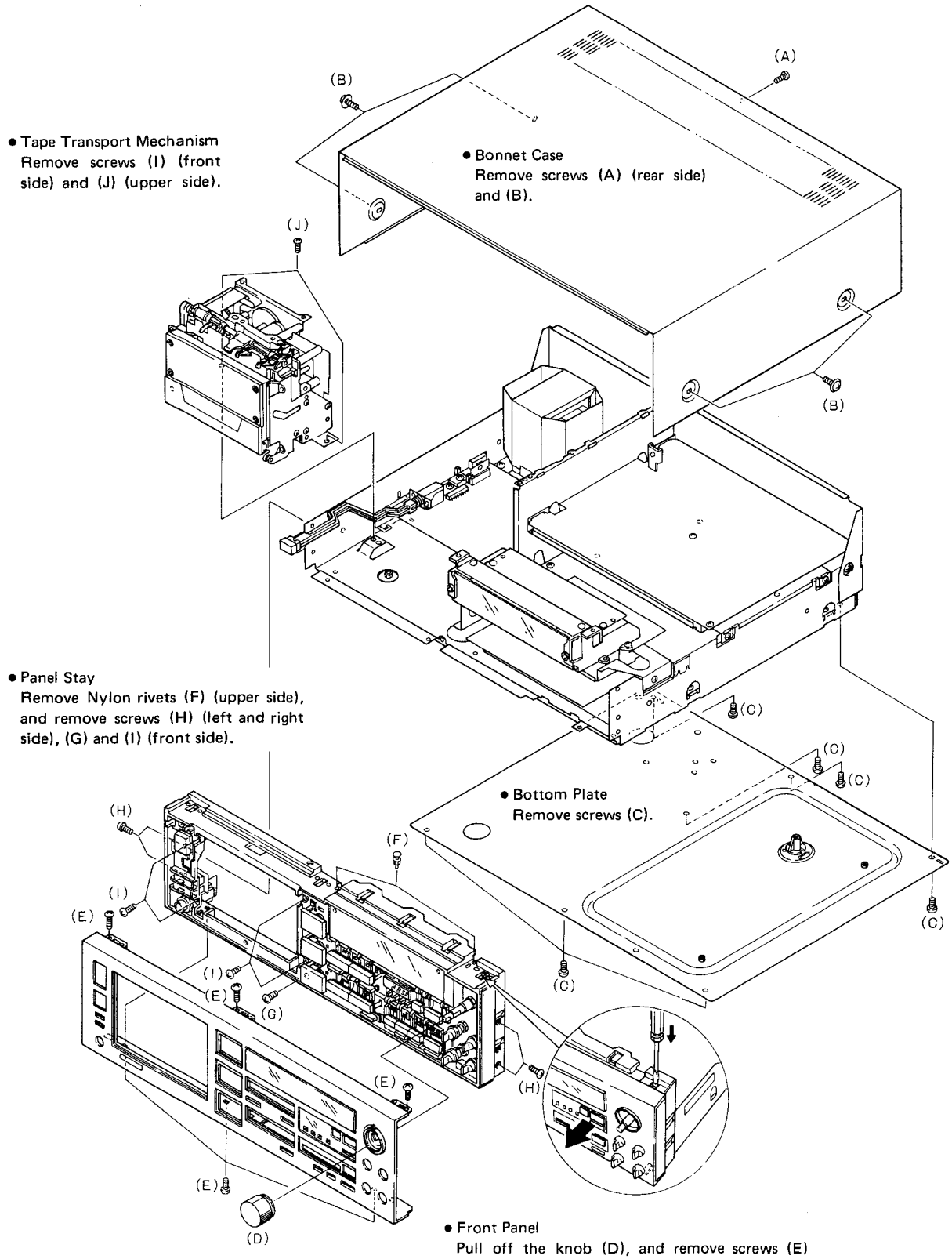
In accordance with the setting of the bias switches, these indicators flash during AUTO BLE adjustment, and light steadily when adjustment is completed.

㊹ HEAD CLEANING ACCESS PORT

About Transparent Tape Cassettes

This unit is equipped with an automatic loading device which optically detects the presence of a tape cassette in the cassette holder, thus causing the cassette door to automatically close.
- Some tape cassettes are made from a transparent plastic material. The unit's auto loading device may not operate properly when these transparent tape cassettes are used.
- In this event, press the cassette door slightly with your finger, or use one of the direct operating switches (recording switch or playback switch) to close the cassette door.

4. DISASSEMBLY



- Tape Transport Mechanism
  Remove screws (I) (front side) and (J) (upper side).

- Bonnet Case
  Remove screws (A) (rear side) and (B).

- Panel Stay
  Remove Nylon rivets (F) (upper side), and remove screws (H) (left and right side), (G) and (I) (front side).

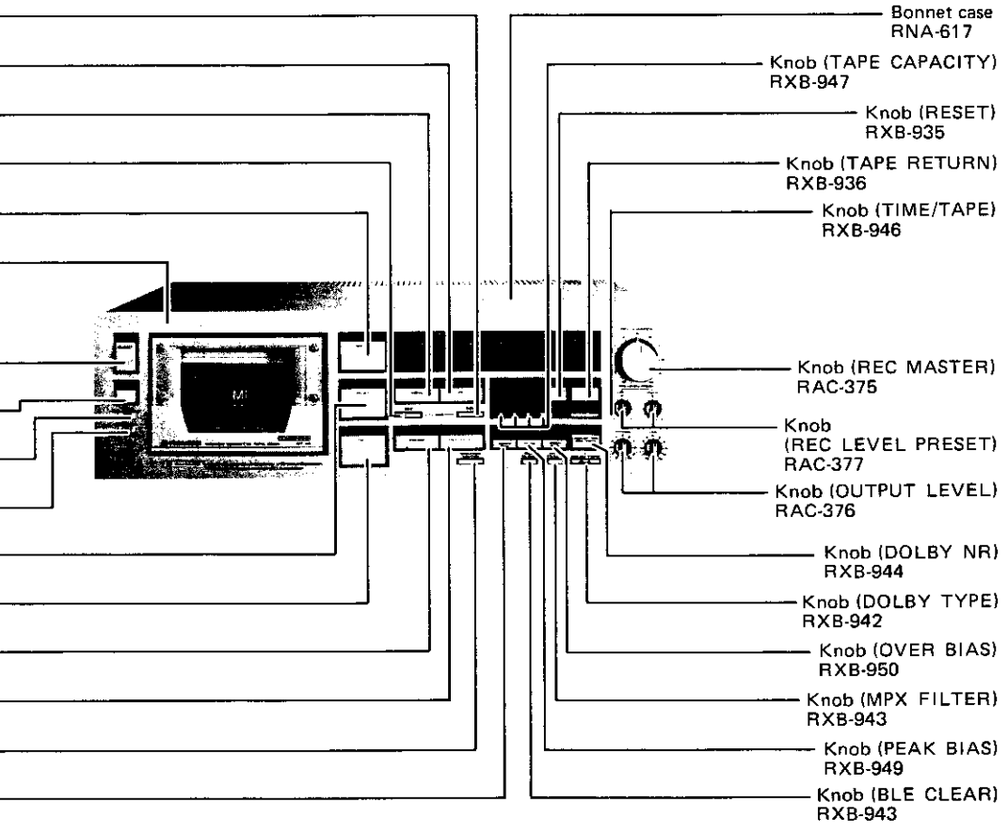
- Bottom Plate
  Remove screws (C).

- Front Panel
  Pull off the knob (D), and remove screws (E) (upper and bottom side), and remove the upper and lower retaining hooks.

LOCATION

NOTES:

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



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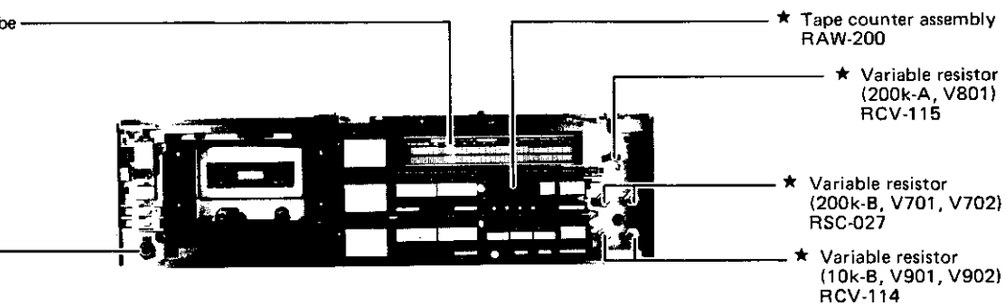
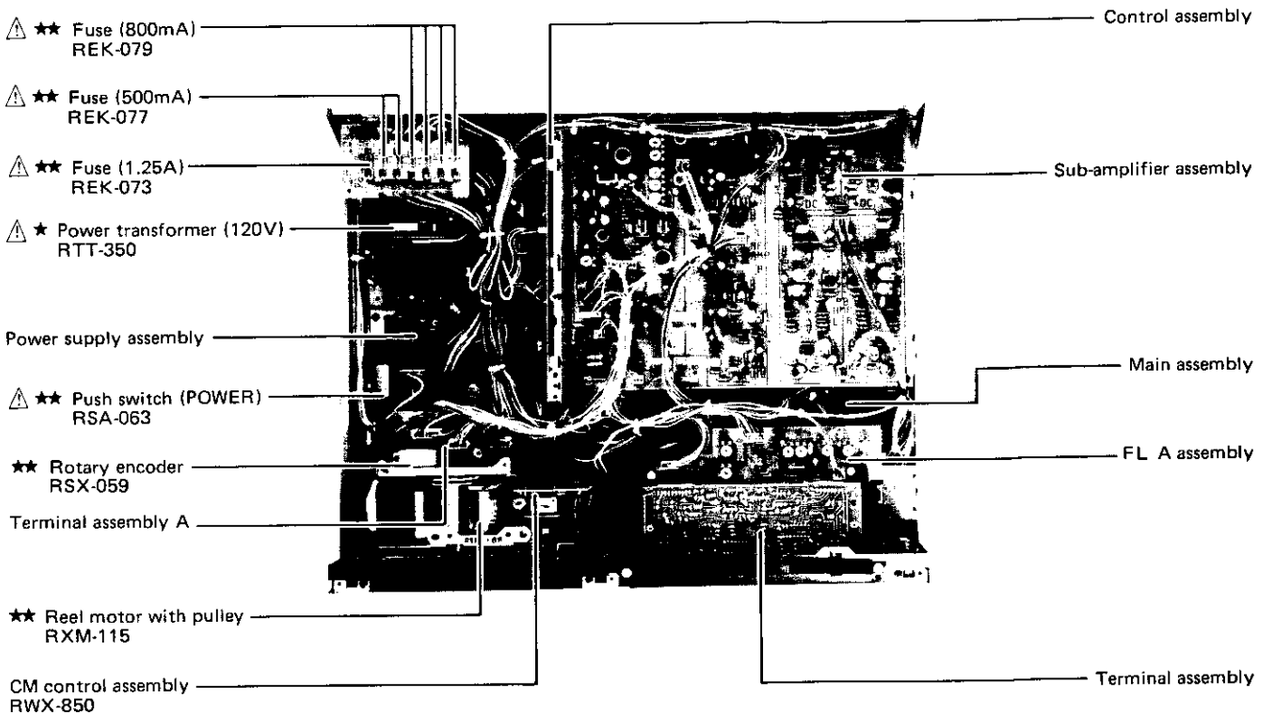


Top View



VIEWS

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  ★★ GENERALLY MOVES FASTER THAN ★.
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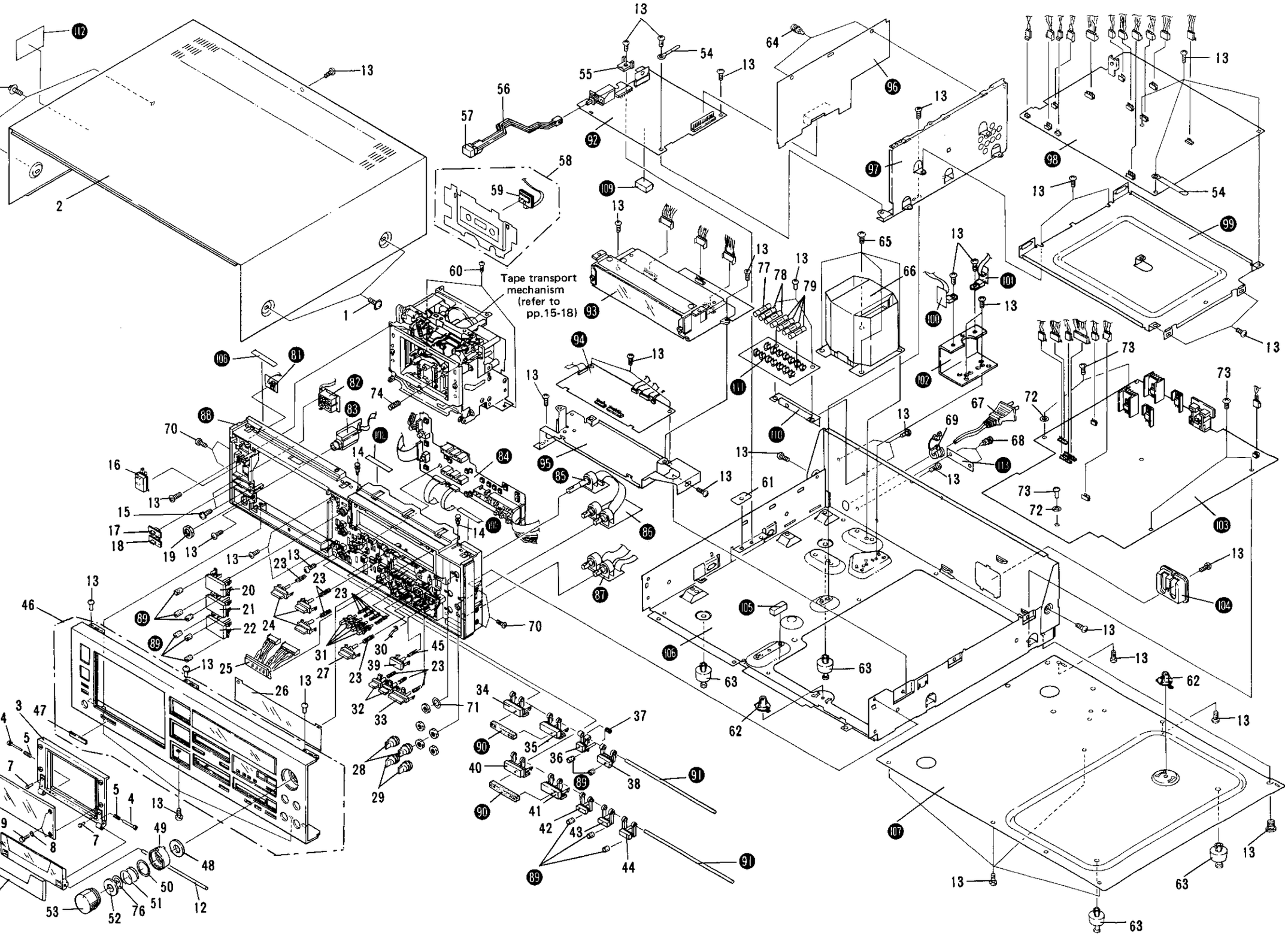
Description	Mark	No.	Part No.	Description
Screw 4 x 8		41	RXB-934	Knob (REC MUTE)
Bonnet case		42	RXB-948	Knob (UNDER BIAS)
Door frame		43	RXB-949	Knob (PEAK BIAS)
Door shaft		44	RXB-950	Knob (OVER BIAS)
Door spring		45	RBL-060	Knob spring B
Door A		46	RXX-426	Front panel assembly
Door cushion		47	RAH-482	Name plate
Washer		48	RED-203	Friction felt
Dressing screw		49	RAC-371	Marker ring
Door B		50	RBF-072	Marker washer
Inscription plate		51	RBL-054	Marker spring
Door shaft		52	RNL-764	Ring with hook
Screw 3 x 8		53	RAC-375	Knob (REC MASTER)
Nylon rivet 3 x 8		54	RNH-184	Cord fixer
Screw 2.6 x 6		55	RNK-511	Upper guide
Knob (EJECT)		56	RNL-766	Rod
Knob (TIMER)		57	RAD-213	Knob (POWER)
Knob (TIMER BLE)		58	RXX-427	Cassette plate assmbly
Nut	★	59	SLF-201C	LED
Knob (SOTP)		60	VBT30P060FMC	Screw 3 x 6
Knob (PLAY)		61	REB-508	Insulator
Knob (REC)		62	RNL-792	Stud
Knob spring A		63	REC-369	Foot assembly
Knob (MS, MONITOR)		64	RBM-003	Nylon rivet 3 x 4.5
Tape counter assembly		65	VBZ40P080FMC	Screw 4 x 8
Meter screen	⚠ ★	66	RTT-350	Power transformer (120V)
Knob (COUNTER)	⚠	67	RDG-048	AC power cord
Knob (REC LEVEL PRESET)		68	RBM-001	Plastic rivet
Knob (OUTPUT LEVEL)	⚠	69	REC-395	Strain relief
Ground spring		70	BBZ30P060FMC	Screw 3 x 6
Knob (TAPE CAPACITY)		71	RBF-078	VR washer
Knob (BLE CLEAR, MPX FILTER)		72	WA30W120R100	Washer
		73	ATZ30P080FMC	Screw 3 x 8
Knob (DOLBY TYPE)		74	RBL-059	Grounding spring
Knob (REW)		75	.....	
Knob (FF)		76	RBF-080	Washer
Knob (RESET)	⚠★★	77	REK-073	Fuse (1.25A)
Grounding spring	⚠★★	78	REK-077	Fuse (500mA)
Knob (TAPE RETURN)	⚠★★	79	REK-079	Fuse (800mA)
Knob (DOLBY NR)		80	.....	
Knob (PAUSE)		81		Eject switch assembly
		82		Timer switch assembly
		83		Headphones jack assembly
		84		Operation switch assembly
		85		Master VR assembly
		86		Preset VR assembly
		87		Output VR assembly
		88		Panel stay assembly
		89		Knob cushion A
		90		Knob cushion B
		91		Main shaft
		92		Power supply assembly
		93		FL full assembly (FL A, FL, Terminal)
		94		Counter driver assembly
		95		Shield plate
		96		Control assembly
		97		P.C. board holder
		98		Sub-amplifier assembly
		99		Shield plate A
		100		Transistor A assembly
		101		Transistor B assembly
		102		Heat sink
		103		Main assembly
		104		Phono jack spacer
		105		Cushion
		106		Chassis
		107		Bottom plate
		108		Cushion
		109		Cushion D
		110		P.C. board holder
		111		Fuse A assembly
		112		Caution label
		113		Serial number plate



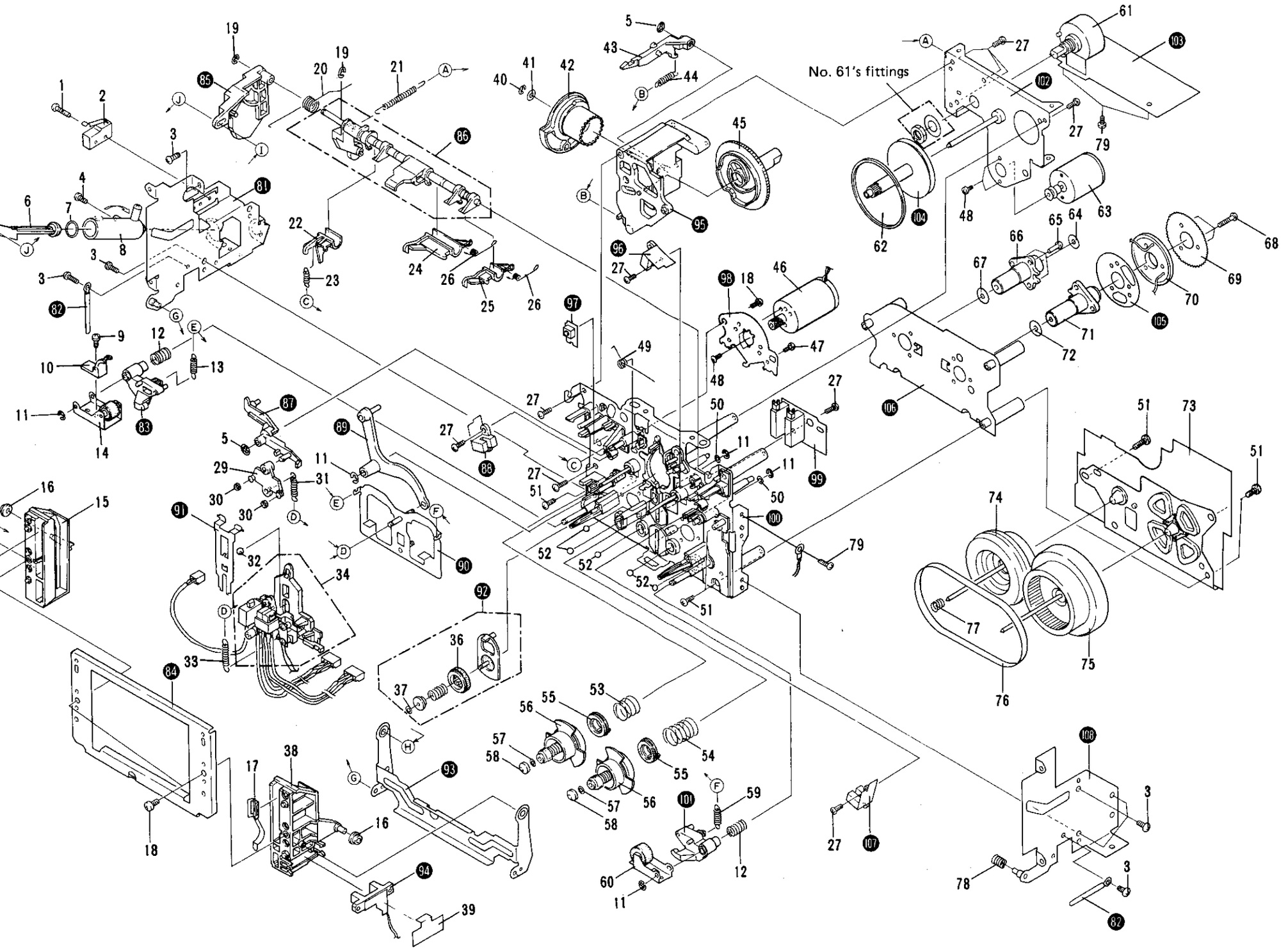
A

B

C

D

1 2 3 4 5 6



A

B

C

D

2 3 4 5 6

- *Parts without part number cannot be supplied.*
- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★.
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *Precaution when replacing heads (*1)*
  Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (RXX-430) be disassembled.

e Transport Mechanism

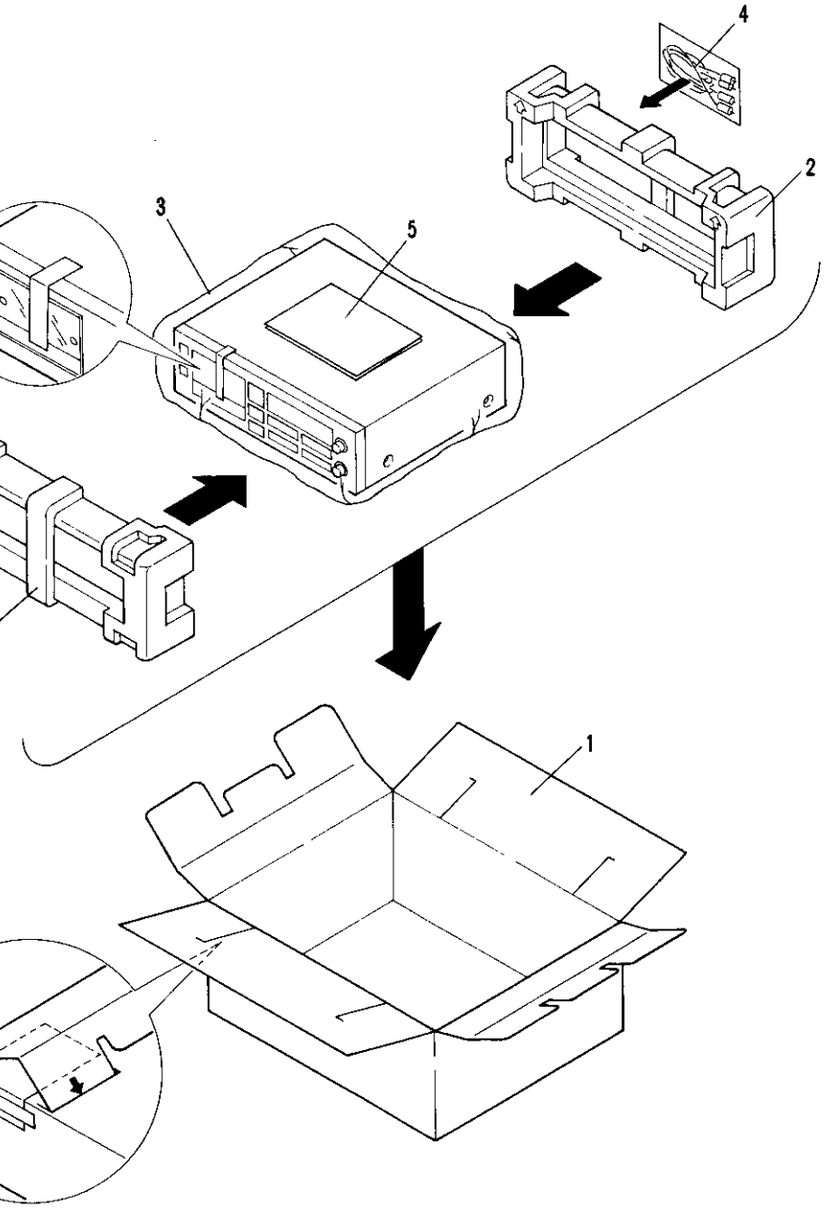
No.	Description
23P100FZK	Screw 2.3 x 10
031	Microswitch (S084)
30P060FZK	Screw 3 x 6
26P080FMC	Screw 2.6 x 8
4FBT	Washer C-type
-739	Piston
-447	O-ring
-740	Cylinder
26P060FZK	Screw 2.6 x 6
-016	Tape guide
5FUC	Washer E-type
-030	Pinch thrust spring
-029	Sub-pinch spring
-877	Pinch roller arm L assembly
-800	Pocket L
-742	Collar
-027	Pocket spring
30P080FZK	Screw 3 x 8
DFUC	Washer E-type
-039	Eject spring
-040	Half hold spring
-733	REC detector arm
-041	REC detector arm spring
-735	METAL detector arm
-734	CrO_2 detector arm
-042	Detector arm spring
26P080FZK	Screw 2.6 x 8
.	
-723	Brake
-511	Brake shoe
-038	Brake spring
-022	Steel ball (ϕ 3)
-037	Head base spring
-430 (*1)	Head base assembly
.	

Mark	No.	Part No.	Description
	36	RNL-549	Take-up idler
	37	WA15D030D050	Washer
	38	RNL-801	Pocket R
	39	REC-419	Cover
	40	YE20FUC	Washer E-type
	41	WA26N070W040	Washer
	42	RXB-884	Side cam gear assembly
	43	RNL-741	Lock lever
	44	RBL-043	Lock lever spring
	45	RNL-729	Cam gear
★★	46	RXM-115	Reel motor with pulley
	47	BMZ30P080FZK	Screw 3 x 8
	48	BMZ20P030FZK	Screw 2 x 3
	49	RBL-033	Idler pressure spring
	50	WA32D080D050	Washer
	51	BMZ30P060FZK	Screw 3 x 6
	52	REF-023	Steel ball (ϕ 4)
	53	RBL-031	BT spring A
	54	RBL-032	BT spring B
	55	RXB-751	BT disk assembly
	56	RXB-874	Reel base assembly
	57	RBF-079	Washer
	58	RNK-815	Cap B
	59	RBL-028	Pinch spring
	60	RXB-876	Pinch roller arm R assembly
★★	61	RSX-059	Rotary encoder
★★	62	REB-502	Drive belt
★★	63	RXM-113	Assist motor with pulley
	64	RBF-070	Thrust washer B
	65	BMZ26P060FZK	Screw 2.6 x 6
	66	RXB-893	Capstan holder B
	67	RBF-077	Oil stopper washer
	68	BMZ26P120BNN	Screw 2.6 x 12
	69	RNF-828	FG plate
	70	RXX-429	FG coil assembly

Mark	No.	Part No.	Description
	71	RXB-892	Capstan holder A
	72	RBF-030	Oil stopper washer
	73	RWX-850	CM control assembly
	74	RXB-889	Sub-flywheel assembly
	75	RXX-428	Rotor assembly
★★	76	REB-509	Capstan belt
	77	RBL-044	Thrust spring
	78	RBL-045	Spring
	79	VCZ30P060FMC	Screw 3 x 6
	80	.....	
	81		Door frame L assembly
	82		Cord fixer
	83		Pressure arm L
	84		Pocket frame
	85		Eject lever
	86		Shift shaft
	87		Brake lever
	88		Rotation sensor assembly C
	89		Pinch lever assembly
	90		Pinch base assembly
	91		Head base hold spring
	92		Take-up idler assembly
	93		Door arm
	94		Cassette half sensor assembly
	95		Gear base assembly
	96		Rotation sensor assembly B
	97		REC detector assembly
	98		Reel motor base
	99		Tape selector assembly
	100		Chassis
	101		Pressure arm R
	102		Gear chassis
	103		Terminal assembly A
	104		Second pulley assembly
	105		FG shield plate
	106		Motor chassis
	107		Rotation sensor assembly A
	108		Door frame R assembly

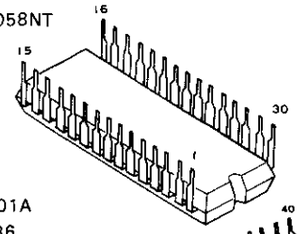
Description

Packing case
Pad
Sheet
Connection cord
Operating instructions
(English)



External Appearance of Transistors and ICs

HA12058NT



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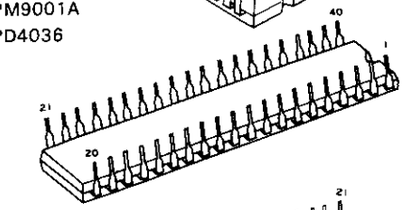

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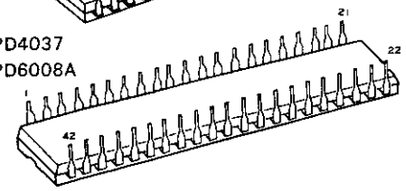

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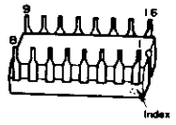

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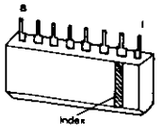
M5218L



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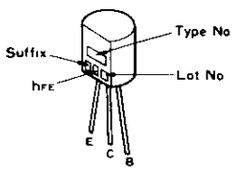

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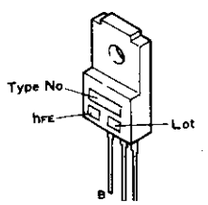
2SD1265
2SD1406



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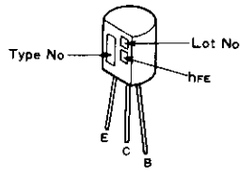

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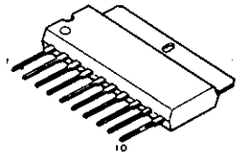
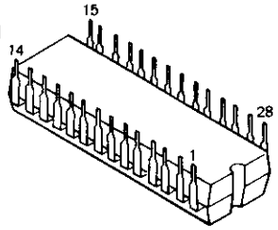


LC7800



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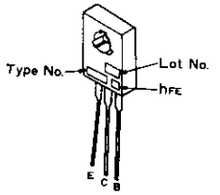

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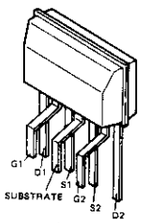

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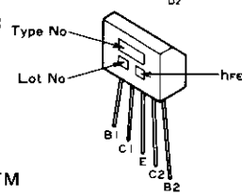

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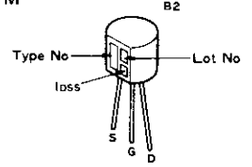

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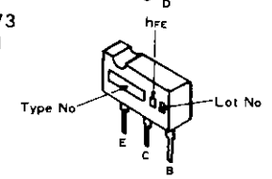

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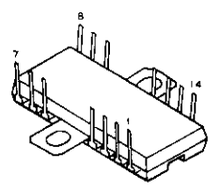

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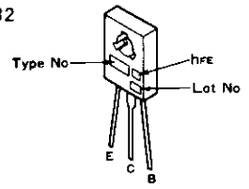

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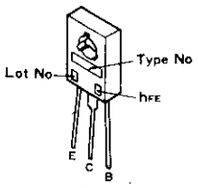

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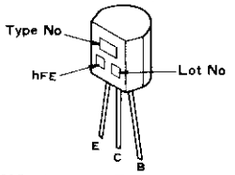

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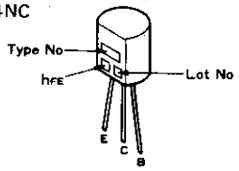

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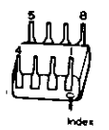

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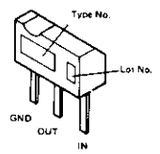

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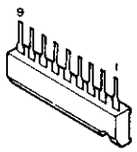
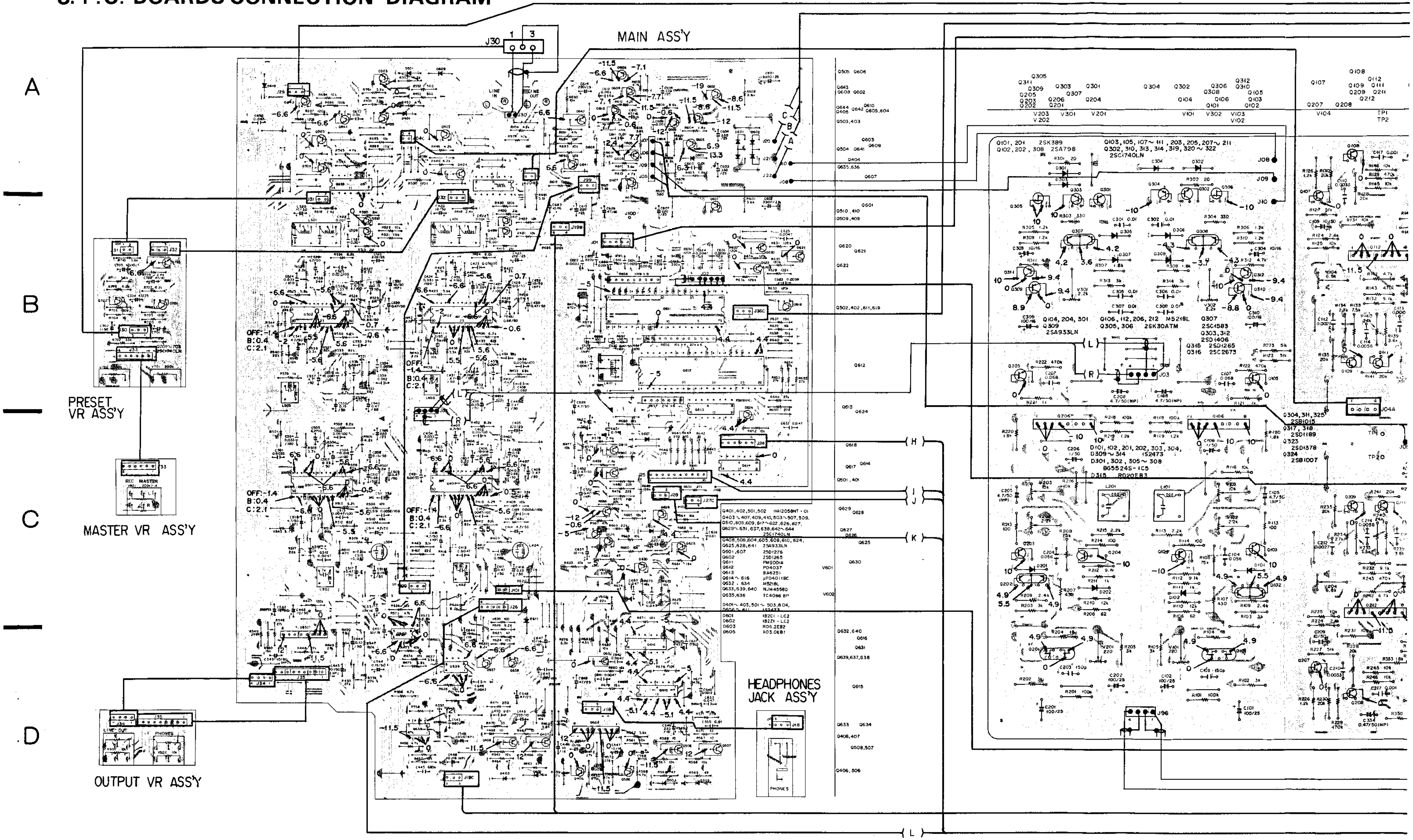


8. P.C. BOARDS CONNECTION DIAGRAM



SUB-AMPLIFIER ASS'Y

TAPE TRANSPORT UNIT (1/2)

L CH

REC HEAD RPB-107

R CH

ERASE HEAD RPB-110

L CH

P.B HEAD RPB-107

R CH

FL(A) ASS'Y

FL(B) ASS'Y

TERMINAL ASS'Y

7 8 9 10 11 12

A B C D

CONTROL ASS'Y

TRANSISTOR (B) ASS'Y

TIMER SWITCH ASS'Y

EJECT SWITCH ASS'Y

COUNTER DRIVER ASS'Y

COUNTER DRIVER ASS'Y RAW-200

PSA

FU

POWER

TI RTT-350

GRY
PNK
GRY
OR
BLK
OR
RED
VLT
RED
BRN
BRN
BLU
GRN
BLU
OR
WHT

6 | 7 | 8 | 9 | 10 | 11 | 12

A

B

C

D

POWER SUPPLY ASS'Y

TRANSISTOR (A) ASS'Y

AC 120V 60Hz

AC POWER CORD RDG-048

FUSE ASS'Y

CM CONTROL ASS'Y

FG COIL ASS'Y (FG) RXX-429

OPERATION SWITCH ASS'Y

TERMINAL ASS'Y (A)

CASSETTE HALF SENSOR ASS'Y

ROTATION SENSOR ASS'Y (A)

ROTATION SENSOR ASS'Y (B)

ROTATION SENSOR ASS'Y (C)

ASSIST MOTOR ASS'Y RXM-113

REEL MOTOR ASS'Y RXM-115

S084 : DOOR SWITCH RSF-031

TAPE TRANSPORT UNIT (2/2)

TAPE SELECTOR ASS'Y

REC DETECTOR ASS'Y

REC INHIBIT HOLE DETECTOR

28

9. ELECTRICAL PARTS LIST

NOTES:

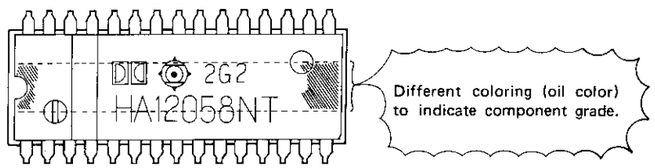
*(*1) Precaution when replacing the Dolby NR IC in CT-A9*

Because the CT-A7 and CT-A9 tape decks are 3-head decks, it is necessary to use select Dolby NR ICs in pairs in the recording and playback circuits to ensure that performance is maintained.

• Pair-grading ranks (Six ranks)

HA12058NT-01	→	HA12058NT-R	(Red)
		HA12058NT-V	(Violet)
		HA12058NT-G	(Green)
		HA12058NT-Y	(Yellow)
Denotes pair-graded component.		HA12058NT-O	(Orange)
		HA12058NT-B	(Blue)

• Pair-grading rank indication



Hence, when replacing Dolby NR ICs, use the same grade (same color) components for recording/playback.

*(*2) Precaution when replacing heads*

Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (RXX-430) be disassembled.

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 x 10¹*	*561*	.....	*RD¼PS 5 6 1 J*
47kΩ	*47 x 10³*	*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 x 10¹*	*5621*	.....	*RN¼SR 5 6 2 1 F*

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

  ★★ GENERALLY MOVES FASTER THAN ★.

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

Miscellaneous Parts

P. C. BOARD ASSEMBLIES

Mark	Part No.	Symbol & Description
	RWX-850	CM control assembly
	Non supply	Terminal assembly A
	Non supply	REC detector assembly
	Non supply	Tape selector assembly
	Non supply	Cassette half sensor assembly
	Non supply	Rotation sensor assembly A
	Non supply	Rotation sensor assembly B
	Non supply	Rotation sensor assembly C
	Non supply	Fuse A assembly
	Non supply	Main assembly
	Non supply	Output VR assembly
	Non supply	Master VR assembly
	Non supply	Preset VR assembly
	Non supply	Headphones jack assembly
	Non supply	Power supply assembly
	Non supply	Control assembly
	Non supply	Operation switch assembly
	Non supply	Counter driver assembly
	Non supply	Timer switch assembly
	Non supply	Eject switch assembly
	Non supply	Transistor A assembly
	Non supply	Transistor B assembly
	Non supply	Sub-amplifier assembly
	Non supply	FL A assembly
	Non supply	FL assembly
	Non supply	Terminal assembly

FUSES

Mark	Part No.	Symbol & Description	
⚠★★	REK-073	FU1901	Fuse (1.25A)
⚠★★	REK-077	FU1902, FU1903	Fuse (500mA)
⚠★★	REK-079	FU1904–FU1907	Fuse (800mA)

OTHERS

Mark	Part No.	Symbol & Description	
⚠ ★	RTT-350	T1	Power transformer
⚠	RDG-048		AC power cord
★	SLF-201C	D1	LED (Tape illumination)
★★	RXX-430 (*2)		Tape head assembly
	RAW-200		Tape counter assembly
★★	RXM-113	PM	Assist motor with pulley
★★	RXM-115	RM	Reel motor with pulley
★★	RSF-031	S084	Microswitch (Door)
★★	RSX-059		Rotary encoder
	RXX-428		Rotor assembly
	RXX-429		FG coil assembly

Main Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	HA12058NT-01 (*1)	Q401, Q402, Q501, Q502
★★	PM9001A	Q611
★★	PD4037	Q612
★★	BA6251	Q613
★★	μPD4011BC	Q614 – Q616
★★	M5218L	Q632, Q634
★★	NJM4558D	Q633, Q639, Q640
★★	TC4066BP	Q635, Q636
★★	2SC1740LN	Q403 – Q407, Q409, Q410, Q503–Q507, Q509, Q510, Q603, Q609, Q617–Q622, Q626, Q627, Q629–Q631, Q637, Q638, Q642–Q644
★★	2SA933LN	Q408, Q508, Q604, Q605, Q608, Q610, Q624, Q625, Q628, Q641
⚠★★	2SD1276	Q601, Q607
⚠★★	2SD1265	Q602
⚠★★	2SB1015	Q606
⚠ ★	1B2C1-LC2	D601
⚠ ★	1B2Z1-LC2	D602
⚠ ★	RD6 · 2EB2	D603
⚠ ★	RD3 · 0EB1 (RD3 · 0EB2)	D605
★	1S2473	D401–D403, D501–D503, D604, D606–D611

COILS, FILTERS

Mark	Part No.	Symbol & Description	
	RTF-158	L401, L501	MPX filter
	RTF-159	L402, L403, L502, L503	SS coil
	RTF-163	L404, L504	Trap coil
	RTD-031	L601	Oscillator coil

CAPACITORS

Mark	Part No.	Symbol & Description
	CQMA 332J 50	C401, C501, C621, C622
	CEA R15M 50	C408, C416, C429, C439, C444, C508, C516, C529 C539, C544
	CEA R33M 50	C407, C428, C507, C528
	CEA R47M 50	C409, C417, C430, C440, C509, C517, C530, C540
	CEA R68M 50	C410, C431, C510, C531
	CEA 4R7M 50	C403, C414, C426, C437, C503, C514, C526, C537, C627, C628
	CEA 100M 16	C447, C448, C451, C548, C551, C635, C643
	CEA 470M 16	C609, C610
	CEA 101M 16	C644
	CEA 221M 10	C449, C549, C634
	CEA 331M 25	C603, C604
	RCH-058	C601, C602 Electrolytic (3300/25)

Mark	Part No.	Symbol & Description
	CEAXA 221M 25	C405, C423, C505, C523, C607, C608, C613, C614
	CEANP R47M 50	C452, C552, C629, C630
	CEANP 100M 16	C446, C546, C647
	CEXANP 4R7M 50	C418, C441, C518, C541
	CEXANP 100M 50	C432, C443, C532, C543
	CEXA 100M 50	C420, C442, C520, C542
	CEXA 470M 25	C648, C649
	CQMA 102J 50	C421, C422, C521, C522, C606, C612
	CQMA 122J 50	C640
	CQMA 152J 50	C619, C620
	CQMA 392J 50	C623, C626
	CQMA 472J 50	C624, C625
	CQMA 472K 50	C412, C435, C512, C535, C631, C641, C642, C646
	CQMA 103K 50	C450, C550, C605, C611, C636
	CQMA 123J 50	C637
	CQMA 473K 50	C638, C639, C645
	CQMA 823J 50	C415, C438, C515, C538
	CCPSL 390J 50	C411, C433, C511, C533
	CKDYB 681K 50	C445, C545
	CKDYF 473Z 50	C632, C633, C650, C651
	CQPA 472G 100	C413, C436, C513, C536
	CQPA 562G 100	C419, C434, C519, C534
	CQPA 103G 100	C402, C425, C502, C525
	CQPA 333G 100	C404, C424, C504, C524
	CQSA 391J 50	C615, C616
	CQSA 821J 50	C617, C618
	CKDYF 103Z 50	C652

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCP-151	V601	Semi-fixed 33k-B
★	RCP-150	V602	Semi-fixed 22k-B
	RYY-012	R656	Resistor array 12-P
	RM6-273J	R657	Resistor array 27k x 6
	RM8-104J	R658	Resistor array 100k x 8
	RD1/4PM □□□J	Other resistors	

OTHERS

Mark	Part No.	Symbol & Description
	RK8-021	Phono jack 4-P

Output VR Assembly

Mark	Part No.	Symbol & Description	
★	RCV-114	V901, V902	Variable 10k x 2 (LINE OUT, PHONES)

Master VR Assembly

Mark	Part No.	Symbol & Description	
★	RCV-115	V801	Variable 200k x 2 (REC MASTER)

Preset VR Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC1740LN	Q701 – 703

CAPACITORS

Mark	Part No.	Symbol & Description
	CEXA 010M 50	C701, C702
	CEA 470M 10	C703, C705
	CEXA 470M 25	C704

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCS-027	V701, V702	Variable 200k
	RD1/4M □□□J	R701 – R711	

Counter Driver Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	PD6008A	Q1211
★★	M54517P	Q1212
★★	BA843	Q1215
★★	2SC1740LN	Q1201 – Q1206, Q1213, Q1214
★★	2SA881	Q1207 – Q1210
★	1S2473	D1201 – D1207

CAPACITORS

Mark	Part No.	Symbol & Description
	CKDYF 103Z 50	C1201 – C1204
	CEA 470M 10	C1205

RESISTORS

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

Mark	Part No.	Symbol & Description
	RD1/4PM □□□J	All resistors

OTHERS

Mark	Part No.	Symbol & Description	
★	RSS-033	X1201/C1206	Ceramic resonator (with capacitor)

Timer Switch Assembly

SWITCHES

Mark	Part No.	Symbol & Description	
★★	RSH-064	S1701, S1702	Push switch (TIMER)

Eject Switch Assembly

Mark	Part No.	Symbol & Description	
★★	RSG-155	S1601	Push switch (EJECT)

Transistor A Assembly

Mark	Part No.	Symbol & Description
⚠★★	2SD1406	Q1501

Transistor B Assembly

Mark	Part No.	Symbol & Description
⚠★★	2SD1406	Q1401

Headphones Jack Assembly

Mark	Part No.	Symbol & Description
	RKN-081	Phone jack (PHONES)

Power Supply Assembly

SENUCONDUCTORS

Mark	Part No.	Symbol & Description
★★	BA6109	Q1108, Q1110
★★	2SC1740LN	Q1101, Q1102, Q1104, Q1105, Q1109
⚠★★	2SB1015	Q1103
★★	2SA933LN	Q1106, Q1107
★	1S2473	D1101, D1102, D1116 – D1119
⚠★	1B2C1-LC2	D1103, D1107, D1110
⚠★	1B2Z1-LC2	D1104, D1108, D1111
⚠★	RD3 · 0EB1	D1105
⚠★	RD5 · 6EB2 (RD5 · 6EB3)	D1106
⚠★	RD6 · 2EB2	D1109
⚠★	1SR35-100A	D1112, D1115
⚠★	RD5 · 1EB2 (RD5 · 1EB3)	D1113
⚠★	RD3 · 9FB	D1114

SWITCHES

Mark	Part No.	Symbol & Description	
⚠★★	RSA-063	S1101	Push switch (POWER)

CAPACITORS

Mark	Part No.	Symbol & Description	
⚠	RCG-008	C1121	Ceramic (0.01/AC250)
	RCH-057	C1101	Electrolytic (2200/16)
	RCH-055 (RCH-056)	C1111	Electrolytic (10000/25)
	CEA 102M 25	C1110	
	CEA 102M 50	C1105	
	CEA 101M 50	C1109	
	CEA 471M 16	C1120	
	CEA 471M 35	C1106	
	CEA 101M 25	C1107	
	CEA 101M 10	C1104, C1122	
	CEA 470M 16	C1102	
	CEA 470M 10	C1112, C1123	
	CEA 330M 16	C1116	
	CKDYF 103Z 50	C1103, C1113, C1118, C1119	
	CEA 3R3M 50	C1124	
	CEA R22M 50	C1115	
	CKDYF 473Z 50	C1117	
	CEANP 4R7M 50	C1114	

RESISTORS

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

Mark	Part No.	Symbol & Description
⚠	RS1LF 010J	R1116
⚠	RS1LF 4R7J	R1112
⚠	RS1LF 151J	R1114
⚠	RD1/2PMF 331	R1107
	RD1/4PM □□□J	Other resistors

Control Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	BA335	Q1001
★★	PD4036	Q1002
★★	LC7800	Q1003
★★	BA6251	Q1004
★★	M51209P	Q1005
★★	2SA933LN	Q1006 – Q1009, Q1014, Q1016, Q1017
★★	2SC1740LN	Q1010 – Q1013, Q1015
★	1S2473	D1002 – D1010

CAPACITORS

Mark	Part No.	Symbol & Description
	CEA R10M 50	C1001, C1003
	CEA 471M 6R3	C1004
	CEA 470M 10	C1005, C1009
	CEA 2R2M 50	C1010, C1011
	CQMA 104J 50	C1002
	CQMA 223K 50	C1007, C1008, C1013
	CCDCH 330J 50	C1006
	CKDYF 473Z 50	C1012

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCP-154	V1001	Semi-fixed (100k-B)
	RM4-103J	R1049	
	RM4-473J	R1047	
	RM7-273J	R1048	
	RD1/4PM □□□J	Other resistors	

Operation Switch Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★	BG5524S-1C5	D1301, D1302, D1304, D1307, D1309, D1310
★	AA5524S-1C5	D1303, D1308
★	PR5524S-1C5	D1305, D1306
★	1S2473	D1311 – D1316, D1326, D1327
★	AA3422S-1C5	D1317 – D1322
★	PR3422S-1C5	D1323 – D1325

SWITCHES

Mark	Part No.	Symbol & Description	
★★	RSG-155	S1301, S1304, S1307, S1314 – S1316	Push switch
★★	RSG-143	S1302, S1303, S1305, S1306, S1308, S1309, S1317 – S1324	Push switch
★★	RSG-149	S1310 – S1312	Push switch
★★	RSG-156	S1313	

RESISTORS

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

Mark	Part No.	Symbol & Description
	RD1/4PM □□□J	R1301 – R1310

Sub-Amplifier Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	M5218L	Q106, Q112, Q206, Q212
★★	2SK389	Q101, Q201
★★	2SC1740LN	Q103, Q105, Q107 – Q111, Q203, Q205, Q207 – Q211, Q302, Q310, Q313, Q314, Q319 – Q322
★★	2SA933LN	Q104, Q204, Q301, Q309
⚠★★	2SD1406	Q303, Q312
⚠★★	2SB1015	Q304, Q311, Q325
★★	2SK30ATM	Q305, Q306
★★	2SC1583	Q307
★★	2SA798	Q102, Q202, Q308
⚠★★	2SD1265	Q315
★★	2SC2673	Q316
★★	2SD1189	Q317, Q318
★★	2SD1378	Q323
★★	2SB1007	Q324
★	1S2473	D101, D102, D201, D202, D303, D304, D309 – D314
★	BG5524S-1C5	D301, D302, D305 – D308
⚠★	RD20EB3	D315

COILS, TRANSFORMERS

Mark	Part No.	Symbol & Description	
	RTF-161	L101,L201	Trap coi
	RTF-127	L102, L202	Peaking coil 8.2mH
	RTF-157	L103, L203	Trap coil
	RTF-101	L301	Line coil
	RTD-030	L302	Oscillator transformer
	RTD-018	L303	Step-up transformer

CAPACITORS

Mark	Part No.	Symbol & Description
	CEXA 101M 25	C101, C102, C201, C202
	CEXA 010M 50	C106, C206
	CEXA 100M 50	C109, C116, C209, C216
	CEXANP 4R7M 50	C105, C108, C119, C205, C208, C219
	CEXANP 100M 50	C115, C215
	CEA R22M 50	C118, C218
	CEANP R47M 50	C334
	CEA 010M 50	C326, C328
	CEA 100M 16	C111, C211, C303, C304
	CEA 100M 25	C327
	CEA 470M 10	C319
	CEA 470M 25	C316
	CEA 101M 16	C309, C310, C314, C315, C332, C333
	CEA 101M 25	C335, C336
	CEA 221M 16	C312, C313
	CEA 221M 25	C311, C335
	CQMA 102J 50	C117, C217
	CQMA 332J 50	C110, C210
	CQMA 332K 50	C320, C321
	CQMA 152J 50	C113, C213
	CQMA 272J 50	C112, C212
	CQMA 682K 50	C323, C329
	CQMA 562J 50	C114, C214
	CQMA 103J 50	C325
	CQMA 103K 50	C301, C302, C305 – C308, C337
	CQMA 223J 50	C322
	CQMA 683J 50	C107, C207
	CQMA 563K 50	C104, C204
	CQPA 682J 100	C324
	CKDYF 473Z 50	C317, C318

Mark	Part No.	Symbol & Description
	CKDYF 103Z 50	C339
	CKDYB 102K 50	C338
	CQSF 151J 125	C103, C203
	CQSA 181K 125	C330, C331

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCP-161	V101, V201	Semi-fixed 220-B
★	RCP-166	V102, V202	Semi-fixed 2.2k-B
★	RCP-170	V103, V203	Semi-fixed 10k-B
★	RCP-148	V104, V204	Semi-fixed 6.8k-B
★	RCP-145	V301, V302	Semi-fixed 2.2k-B
★	RCP-146	V303	Semi-fixed 3.3k-B
★	RCP-154	V304 – V309	Semi-fixed 100k-B
⚠	RS1LF □□□J	R315, R316, R351	
	RN1/4PQ □□□F	R101 – R115, R118, R121, R124, R132, R149, R201 – R215, R218, R221, R224, R232, R249, R313, R314, R322, R329, R331, R336, R342, R344, R350, R354 – R356	
	RD1/4PM □□□J	Other resistors	

OTHERS

Mark	Part No.	Symbol & Description	
★★	RSR-037	RL01, RL02	Miniature relay

CM Control Assembly (RWX-850)

SEMICONDUCTORS

Mark	Part No.	Symbol & Description	
★★	PD1003 (PD1007)	Q051	
★★	PA2011	Q052	
★★	PA2012	Q053	
★★	2SD882 (2SC2497-R) (2SD1189)	Q054	
★★	2SA934	Q055	
★★	2SC1815 (2SC2634NC) (2SC1740LN)	Q056, Q057	
★	PCX-010 (PCX-012)	H051, H052	Hall element A (Hall element B)

CAPACITORS

Mark	Part No.	Symbol & Description	
	CCDCH 330J 50	C051	
	CCDCH 560J 50	C052	
	CEA R47M 50	C059, C064	
	CEA 100M 16	C061, C065	
	CEA 100M 25	C063	
	CEA 2R2M 50	C066	
	CQMA 273K 50	C055	
	RCE-230	C056	PP capacitor (5600p/50)
	RCE-231	C054	Film capacitor (2200p/50)
	CKDYF 102Z 50	C060	
	CKDYF 103Z 50	C053, C057, C058, C062, C067	
	RCE-229	C068	Film capacitor (2700p/50)

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCP-117	V051	Semi-fixed 15k-B
	RD1/2PS 2R7J	R064	
	RN1/4PQ 203F	R053	
	RD1/4PM □□□J	R062, R063	
	RD1/6PM □□□J	Other resistors	

OTHER

Mark	Part No.	Symbol & Description	
★	RSS-032	X051	Crystal resonator

Terminal Assembly A

RESISTORS

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

Mark	Part No.	Symbol & Description	
★	RCP-190	V081	Semi-fixed 3.3k-B
	RD1/6PM □□□J	R081 – R085	

REC Detector Assembly

SWITCH

Mark	Part No.	Symbol & Description	
★★	RSG-143	S083	Push switch

Tape Selector Assembly

SWITCHES

Mark	Part No.	Symbol & Description	
★★	RSH-070	S081, S082	Slide switch

Cassette Half Sensor Assembly

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
★	GP-3S20	D081

Rotation Sensor Assembly A

SEMICONDUCTOR

Mark	Part No.	Symbol & Description
★	GP-1S03	D082

Rotation Sensor Assembly B

Mark	Part No.	Symbol & Description
★	GP-1S03	D083

Rotation Sensor Assembly C

Mark	Part No.	Symbol & Description
★	GP-1S03	D084

FL A Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC1583	Q2001
★★	2SC1740LN	Q2002, Q2003
★★	NJM4558D	Q2004 – Q2006
★★	DTC114YF	Q2007, Q2009
★★	DTA114YF	Q2008, Q2010
★★	HA12010	Q2011 – Q2013
★	1K60AUF	D2001 – D2004
★	1S2473	D2005 – D2008
★	RD6 · 2EB	D2009

CAPACITORS

Mark	Part No.	Symbol & Description
	CQMA 473K 50	C2001, C2002
	CKDYB 271K 50	C2003, C2004
	CEA 100M 16	C2005, C2006
	CEA R10M 50	C2007
	CEA 470M 16	C2008, C2009
	CEA 101M 25	C2010

RESISOTRS

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

Mark	Part No.	Symbol & Description
★	RCP-149	V2001, V2002, V2006, V2007 Semi-fixed 10k-B
★	RCP-145	V2003, V2004 Semi-fixed 2.2k-B
★	RCP-155	V2005 Semi-fixed 150k-B
	RN1/4PQ □□□F	R2015, R2016, R2018
	RD1/4PM □□□J	R2038
	RD1/6PM □□□J	Other resistors

OTHER

Mark	Part No.	Symbol & Description
★	FIP101AW19YS	FL2201 Fluorescent indicator tube

FL Assembly

SEMICONDUCTORS

Mark	Part No.	Symbol & Description
★★	2SC1583	Q2101
★★	2SC1740LN	Q2102, Q2103
★★	NJM4558D	Q2104, Q2105
★★	HA12010	Q2106 – Q2108
★	1S2473	D2101 – D2105
★	RD6 · 2EB	D2106

CAPACITORS

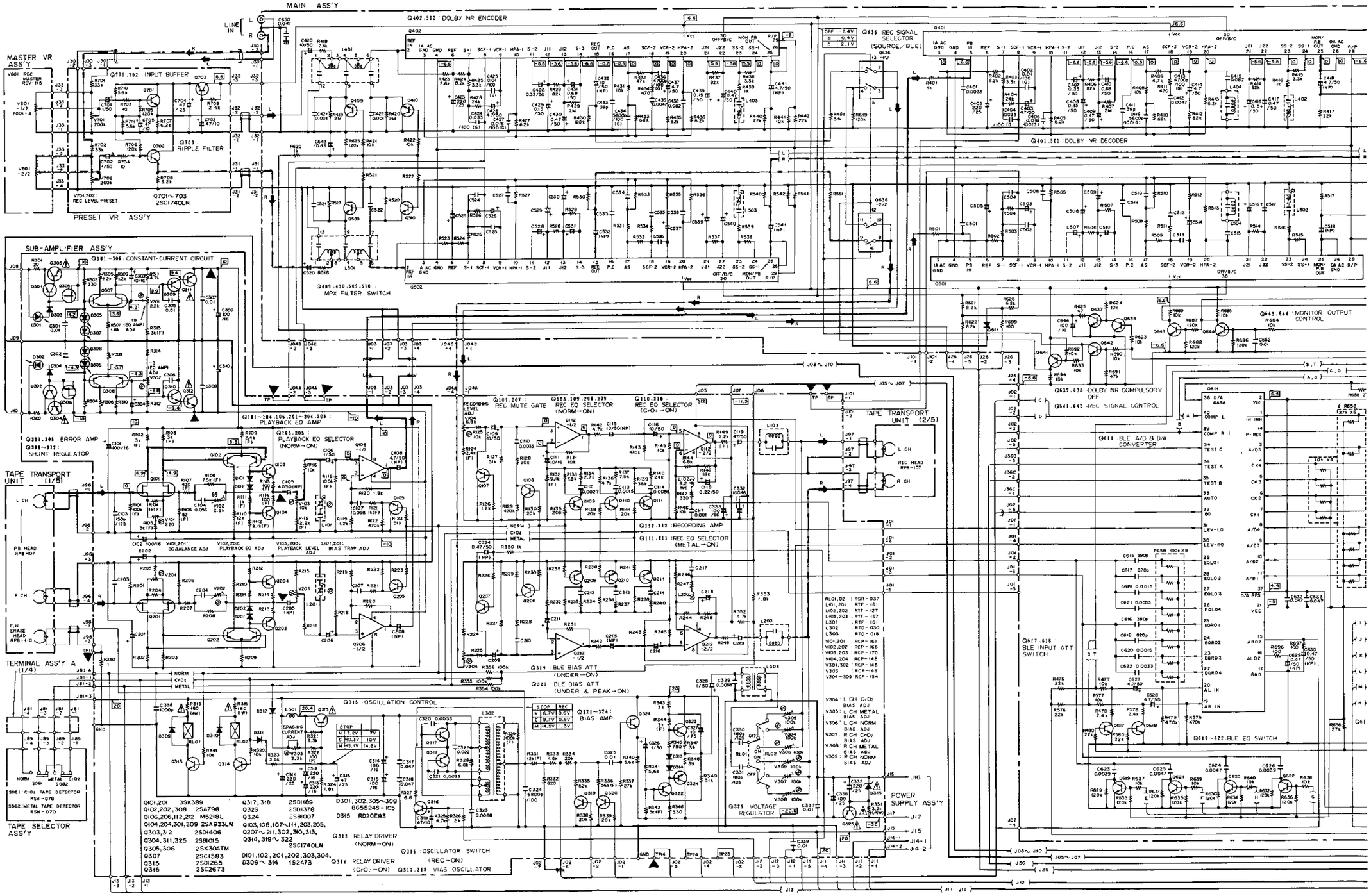
Mark	Part No.	Symbol & Description
	CKDYB 271K 50	C2101, C2102
	CEA 100M 16	C2103
	CEA R10M 50	C2104

RESISTORS

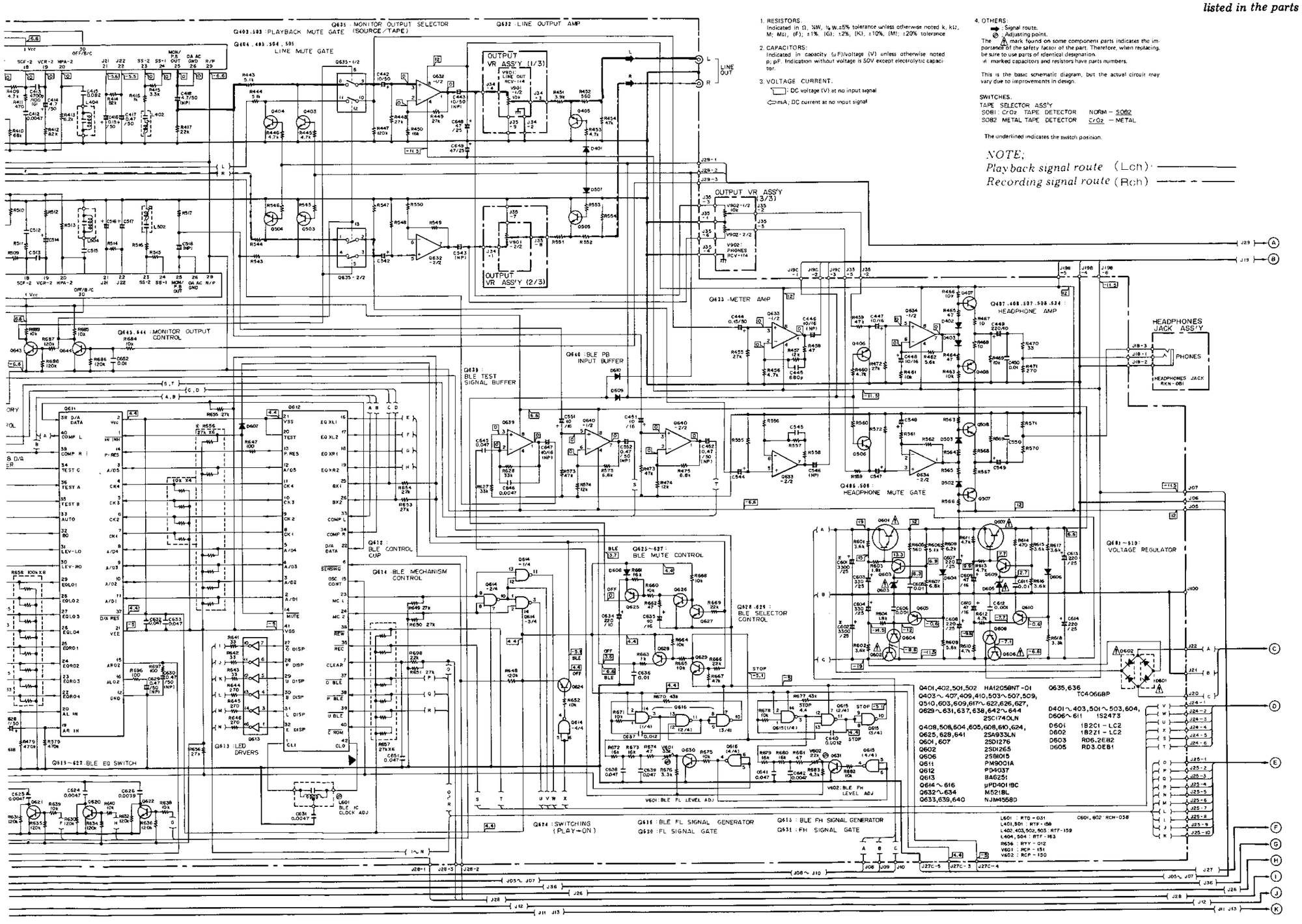
Note: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Part No.	Symbol & Description
	RN1/4PQ □□□J	R2103, R2104, R2106
	RD1/4PM □□□J	R2121
	RD1/6PM □□□J	Other resistor

10. SCHEMATIC DIAGRAM



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



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

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

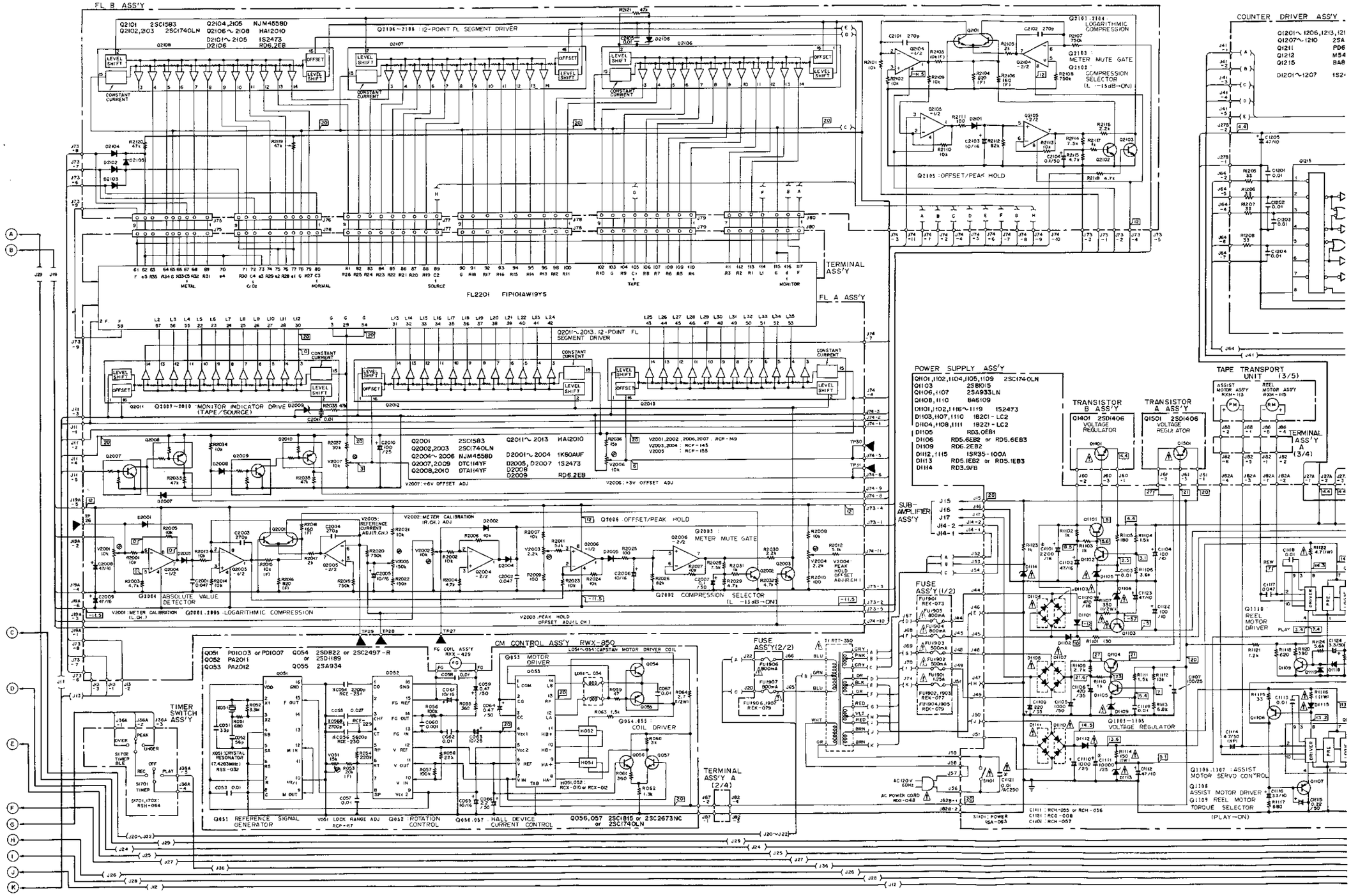
3. VOLTAGE CURRENT.
: DC voltage (V) at no input signal
: mA; DC current at no input signal

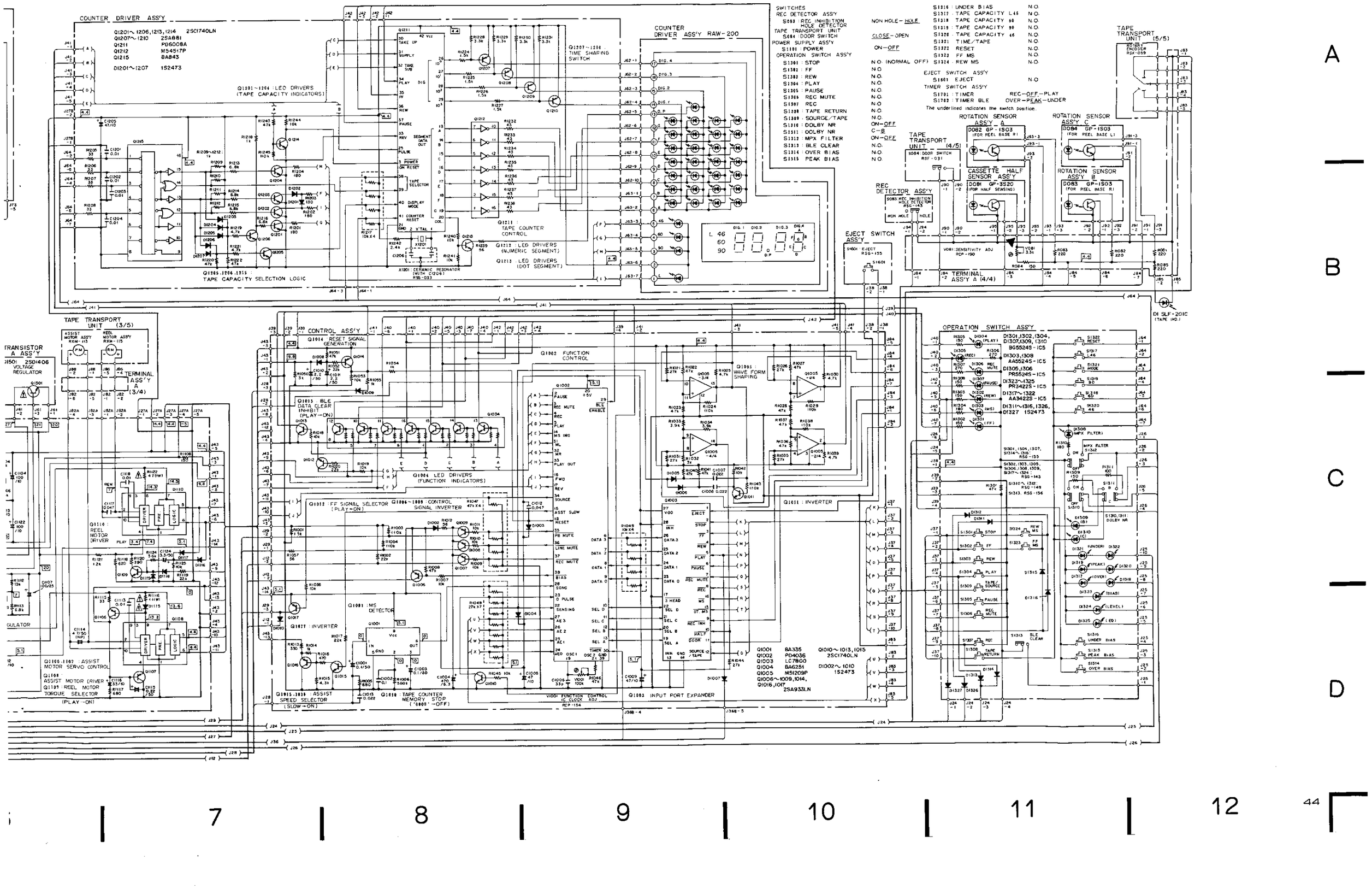
4. OTHERS:
: Signal route.
: Adjusting point.
The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
※ marked capacitors and resistors have parts numbers.

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

SWITCHES.
TAPE SELECTOR ASS'Y
S081 : CrO2 TAPE DETECTOR NORM - S082
S082 METAL TAPE DETECTOR CrO2 - METAL

The underlined indicates the switch position.


FL B ASS'Y
Q2101 2SC1583
Q2102,2103 2SC1740LN
Q2104,2105 NJM4558D
Q2106~2108 HA12010
D2101~2105 1S2473
D2106 RD6.2EB
Q2106~2108 : 12-POINT FL SEGMENT DRIVER
LEVEL SHIFT
OFFSET
CONSTANT CURRENT
METAL
GRID
NORMAL
SOURCE
TAPE
MONITOR
FL220I FIP10AW19YS
TERMINAL ASS'Y
FL A ASS'Y
Q2011~2013 : 12-POINT FL SEGMENT DRIVER
Q2001 : MONITOR INDICATOR DRIVE (TAPE/SOURCE)
Q2001 2SC1583
Q2002,2003 2SC1740LN
Q2004~2006 NJM4558D
Q2007,2009 DTC114YF
Q2008,2010 DTA114YF
Q2011~2013 HA12010
D2001~2004 1K60AUF
D2005, D2007 1S2473
D2008 D2009 RD6.2EB
V2001,2002,2006,2007 : RCP-149
V2003,2004 : RCP-145
V2005 : RCP-155
V2007: +6V OFFSET ADJ
V2006: +3V OFFSET ADJ
V2002: METER CALIBRATION (R.CH.) ADJ
V2005: REFERENCE CURRENT ADJ(R.CH.)
V2001: METER CALIBRATION (L.CH.)
V2003: PEAK HOLD OFFSET ADJ(L.CH.)
Q2001.2005 : LOGARITHMIC COMPRESSION
Q2004 : ABSOLUTE VALUE DETECTOR
Q2006 : OFFSET/PEAK HOLD
Q2007 : METER MUTE GATE
Q2008 : COMPRESSION SELECTOR (L -15dB→ON)
Q2161~2164 : LOGARITHMIC COMPRESSION
Q2163 : METER MUTE GATE
Q2107 : COMPRESSION SELECTOR (L -15dB→ON)
Q2105 : OFFSET/PEAK HOLD
COUNTER DRIVER ASS'Y
Q1201~1206,1213,121
Q1207~1210 2SA
Q1211 PD6
Q1212 M54
Q1215 BA8
D1201~1207 1S2
POWER SUPPLY ASS'Y
Q101,102,104,105,1109 2SC1740LN
Q1103 2SB1015
Q106,1107 2SA933LN
Q108,1110 BA6109
D1101,102,1116~1119 1S2473
D1103,1107,1110 1B2CI-LC2
D1104,1108,1111 1B2ZI-LC2
D1105 RD3.0EB1
D1106 RD5.6EB2 or RD5.6EB3
D1109 RD6.2EB2
D1112,1115 1SR35-100A
D1113 RD5.1EB2 or RD5.1EB3
D1114 RD3.9FB
TRANSISTOR B ASS'Y
Q1401 2SD1406
VOLTAGE REGULATOR
TRANSISTOR A ASS'Y
Q1501 2SD1406
VOLTAGE REGULATOR
TAPE TRANSPORT UNIT (3/5)
ASSIST MOTOR ASS'Y RXM-113
REEL MOTOR ASS'Y RXM-115
TERMINAL ASS'Y A (3/4)
SUB-AMPLIFIER ASS'Y
FUSE ASS'Y(1/2)
FUSE ASS'Y(2/2)
TERMINAL ASS'Y A (2/4)
CM CONTROL ASS'Y RWX-850
Q051 PD1003 or PD1007
Q052 PA2011
Q053 PA2012
Q054 2SD822 or 2SC2497-R
or 2SD189
Q055 2SA934
Q051 : REFERENCE SIGNAL GENERATOR
Q052 : ROTATION CONTROL
Q053 : MOTOR DRIVER
Q054,055 : COIL DRIVER
Q056,057 : HALL DEVICE CURRENT CONTROL
Q056,057 2SC1815 or 2SC2673NC
or 2SC1740LN
FG COIL ASS'Y RXX-429
CAPSTAN MOTOR DRIVER COIL
TIMER SWITCH ASS'Y
S1701 TIMER
S1701,1702 : RSH-064
Q1101~1105 : VOLTAGE REGULATOR
Q1106 : REEL MOTOR DRIVER
Q1107 : ASSIST MOTOR SERVO CONTROL
Q1108 ASSIST MOTOR DRIVER
Q1109 REEL MOTOR TORQUE SELECTOR
(PLAY→ON)
S1101 : POWER RSA-063
AC POWER CORD RDG-048
C1111 : RCH-055 or RCH-056
C1101 : RCH-057


COUNTER DRIVER ASS'Y
Q1201~1206,1213,1214 2SC1740LN
Q1207~1210 2SA881
Q1211 PD6008A
Q1212 M54517P
Q1215 8A843
D1201~1207 1S2473
Q1301~1304 : LED DRIVERS (TAPE CAPACITY INDICATORS)
Q1305,1306,1315 : TAPE CAPACITY SELECTION LOGIC
Q1207~1210 : TIME SHARING SWITCH
Q1211 : TAPE COUNTER CONTROL
Q1212 : LED DRIVERS (NUMERIC SEGMENT)
Q1213 : LED DRIVERS (DOT SEGMENT)
X1201 : CERAMIC RESONATOR (WITH C1206) RSS-033
COUNTER DRIVER ASS'Y RAW-200
SWITCHES
REC DETECTOR ASS'Y
S1083 : REC INHIBITION HOLE DETECTOR
TAPE TRANSPORT UNIT
S1084 : DOOR SWITCH
POWER SUPPLY ASS'Y
S1101 : POWER
OPERATION SWITCH ASS'Y
S1301 : STOP
S1302 : FF
S1303 : REW
S1304 : PLAY
S1305 : PAUSE
S1306 : REC MUTE
S1307 : REC
S1308 : TAPE RETURN
S1309 : SOURCE/-TAPE
S1310 : DOLBY NR
S1311 : DOLBY NR
S1312 : MPX FILTER
S1313 : BLE CLEAR
S1314 : OVER BIAS
S1315 : PEAK BIAS
S1316 : UNDER BIAS N.O.
S1317 : TAPE CAPACITY 46 N.O.
S1318 : TAPE CAPACITY 60 N.O.
S1319 : TAPE CAPACITY 90 N.O.
S1320 : TAPE CAPACITY 46 N.O.
S1321 : TIME/TAPE N.O.
S1322 : RESET N.O.
S1323 : FF MS N.O.
S1324 : REW MS N.O.
NON HOLE-HOLE
CLOSE-OPEN
ON-OFF
N.O. (NORMAL OFF)
N.O.
ON-OFF
C-B
ON-OFF
N.O.
N.O.
N.O.
EJECT SWITCH ASS'Y
S1601 EJECT N.O
TIMER SWITCH ASS'Y
S1701 : TIMER REC-OFF-PLAY
S1702 : TIMER BLE OVER-PEAK-UNDER
The underlined indicates the switch position.
TAPE TRANSPORT UNIT (5/5)
ROTARY ENCODER RSX-059
ROTATION SENSOR ASS'Y A
D082 GP-1S03 (FOR REEL BASE R)
ROTATION SENSOR ASS'Y C
D084 GP-1S03 (FOR REEL BASE L)
ROTATION SENSOR ASS'Y B
D083 GP-1S03 (FOR REEL BASE R)
CASSETTE HALF SENSOR ASS'Y
D081 GP-3S20 (FOR HALF SENSING)
TAPE TRANSPORT UNIT (4/5)
S084 : DOOR SWITCH RSF-031
REC DETECTOR ASS'Y
S083 : REC INHIBITION HOLE DETECTOR RSG-143
EJECT SWITCH ASS'Y
S1601 : EJECT RSG-155
TERMINAL ASS'Y A (4/4)
VOB1 : SENSITIVITY ADJ RCP-190
D1 SLF-201C (TAPE IND.)
TAPE TRANSPORT UNIT (3/5)
ASSIST MOTOR ASS'Y RXM-113
REEL MOTOR ASS'Y RXM-115
TERMINAL ASS'Y A (3/4)
TRANSISTOR A ASS'Y
D150 : 2SD1406
VOLTAGE REGULATOR
Q1150
CONTROL ASS'Y
Q1014 : RESET SIGNAL GENERATION
Q1002 : FUNCTION CONTROL
Q1013 : BLE DATA CLEAR INHIBIT (PLAY-ON)
Q1004 : LED DRIVERS (FUNCTION INDICATORS)
Q1012 : FF SIGNAL SELECTOR (PLAY-ON)
Q1006~1009 : CONTROL SIGNAL INVERTER
Q1007 : INVERTER
Q1001 : MS DETECTOR
Q1015~1019 : ASSIST SPEED SELECTOR (SLOW-ON)
Q1010 : TAPE COUNTER MEMORY STOP (*0000*-OFF)
Q1005 : WAVE FORM SHAPING
Q1011 : INVERTER
Q1003 : INPUT PORT EXPANDER
VIOD1 : FUNCTION CONTROL IC CLOCK ADJ RCP-154
Q1116 : REEL MOTOR DRIVER
Q1105~1107 : ASSIST MOTOR SERVO CONTROL
Q1108 : ASSIST MOTOR DRIVER
Q1109 : REEL MOTOR TORQUE SELECTOR (PLAY-ON)
Q1001 BA335
Q1002 P04036
Q1003 LC7800
Q1004 BA6251
Q1005 M51209P
Q1006~1009,1014, Q1016,1017 2SA933LN
Q1010~1013,1015 2SC1740LN
D1002~1010 1S2473
OPERATION SWITCH ASS'Y
D1301,1302,1304, D1307,1309,1310 BG5524S-IC5
D1303,1308 AA5524S-IC5
D1305,1306 PR5524S-IC5
D1323~1325 PR3422S-IC5
D1317~1322 AA3422S-IC5
D1311~1316,1326, D1327 1S2473
D1312 D1311
D1301 : STOP
D1302 : FF
D1303 : REW
D1304 : PLAY
D1305 : TAPE/SOURCE
D1306 : PAUSE
D1307 : REC MUTE
D1308 : TAPE RETURN
D1309 : REC
D1310 : (C)
D1321 : UNDER
D1322 : (PEAK)
D1319 : (OVER)
D1320 : (BIAS)
D1323 : (LEVEL)
D1324 : (EQ)
D1325 : BLE CLEAR
D1315 : MPX FILTER
S1301 : STOP
S1302 : FF
S1303 : REW
S1304 : PLAY
S1309 : TAPE/SOURCE
S1305 : PAUSE
S1306 : REC MUTE
S1307 : REC
S1308 : TAPE RETURN
S1313 : BLE CLEAR
S1316 : UNDER BIAS
S1315 : PEAK BIAS
S1314 : OVER BIAS
S1322 : RESET
S1317 : L46
S1321 : MODE
S1318 : 60
S1319 : 90
S1320 : 46
S1312 : MPX FILTER
S1311 : DOLBY NR
S1310 : (C)
S1301,1304,1307, S1314,1316: RSG-155
S1302,1303,1305, S1306,1308,1309, S1317~1324: RSG-143
S1310~1312: RSG-149
S1313, RSG-156
S1310,1311: DOLBY NR

11. ADJUSTMENTS

11.1 MECHANICAL ADJUSTMENTS

11.1.1 Tape Speed Adjustment

*Use a frequency counter

Mode	Adjustment location	Specifications
PLAY	V051 (CM control assembly)	Playback frequency should be within the 3005 ± 10Hz range at the beginning of the STD-301 test tape.
PLAY	Check	Playback frequency should be within the 3000 ± 30Hz range at the beginning of the STD-301 test tape.

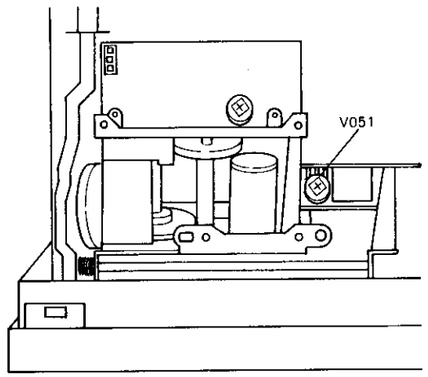


Fig. 11-1 Tape speed adjustment

11.1.2 Air Damper Adjustment

Adjustment location	Specifications
Cylinder adjustment screw	The door should open smoothly (with no jerking etc.), and should not "bounce" back when fully opened.

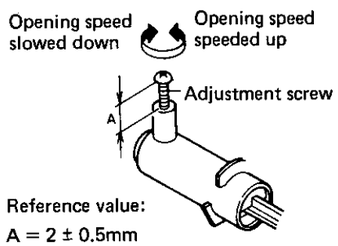


Fig. 11-2 Air damper adjustment

11.1.3 Door Position Adjustment

Check 1	When seen from the front, the ratios between dimensions A and B, and between dimentions C and D should be within the 0.5 to 2 range.
Check 2	When seen from the front, the difference between E and G should not exceed ± 0.4mm, and E, F, and G should all exceed 0.5mm.

If the above specifications are not met, loosen the screws and readjust the door position.

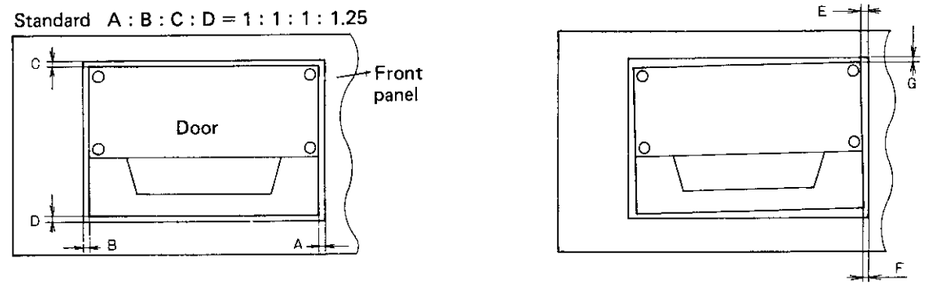


Fig. 11-3 Door position adjustment

11.2 ELECTRICAL ADJUSTMENTS

Adjustment Conditions

1. The mechanical adjustments must be completed first.
2. The heads 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 level is 0dBv = 1Vrms.
5. Connect a 50 kilo-ohm (or between 47 to 52 kilo-ohm) load resistance to the OUTPUT terminals.
6. Unless otherwise specified, leave the OUTPUT level control at the position of maximum level.
7. Likewise, the other switches listed below are to be left in the positions indicated unless otherwise specified.

TIMER : OFF
DOLBY NR : OFF
MPX FILTER : OFF
AUTO-BLE : CLEAR (DATA SET indicator off)

Test Tapes

STD-331B* : Playback adjustments (see Fig. 11-4)
STD-608A : NORMAL blank tape
STD-603 : CrO_2 blank tape
STD-604 : METAL blank tape

* Whereas the reference recording level for STD-331A is 333Hz, 250nwb/m, the same level for STD-331B is 315Hz, 160nwb/m.

List of Adjustments

1. Shunt regulator output voltage adjustment (Excluding KC, HEM, HB and HP types)
2. DC amplifier DC balance adjustment
3. Control IC clock adjustment
4. BLE IC clock adjustment
5. Cassette half detector sensitivity adjustment
6. Tape transport and head azimuth adjustment
7. Playback equalizer adjustment
8. Playback level adjustment
9. Level meter adjustment
10. METAL erasure current adjustment
11. Bias trap adjustment
12. Recording bias adjustment
13. Recording level adjustment
14. Recording and playback frequency response adjustment
15. AUTO-BLE adjustment

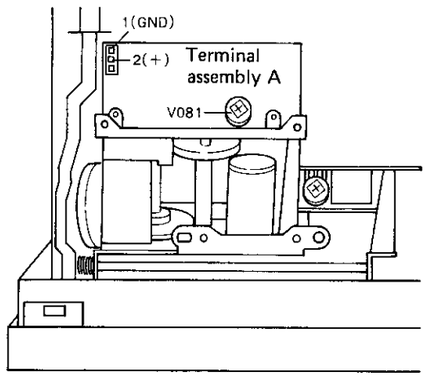


Fig. 11-5 Cassette half detector sensivitity adjustment

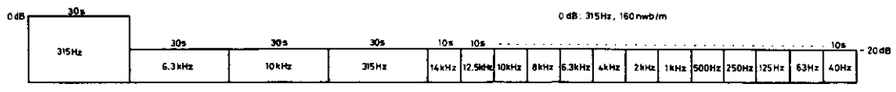


Fig. 11-4 STD-331B test tape

1. Shunt Regulator Output Voltage Adjustment
- Excluding KC, HEM, HB and HP types

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	No input	V301	Q311 emitter	+10V±0.5V DC	+DC ADJ.
2			V302	Q312 emitter	−10V±0.5V DC	−DC ADJ.

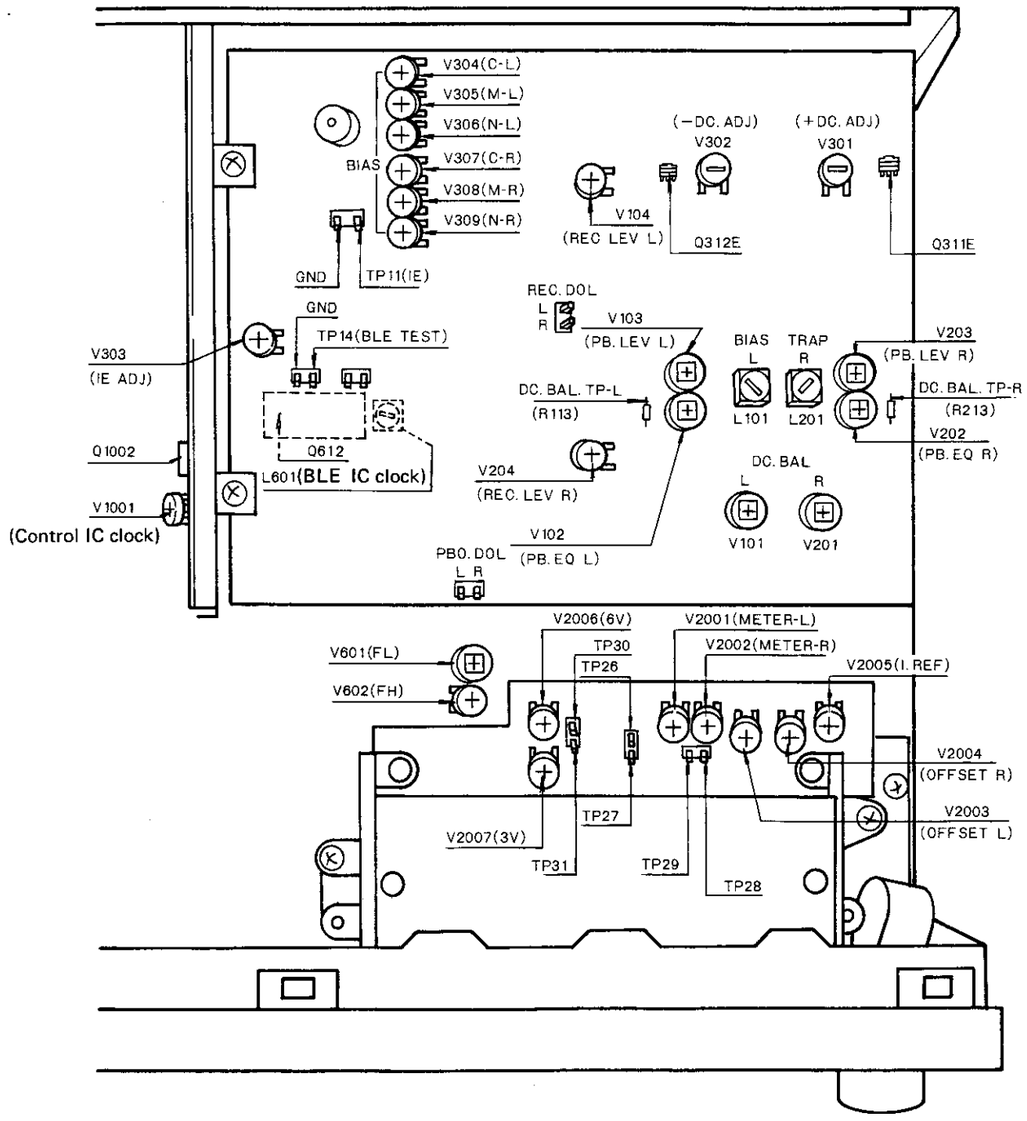


Fig. 11-6 Adjustment locations

2. DC Amplifier DC Balance Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	No input	V101 (left channel)	DC.BAL.TP-L	0±0.2V DC	Measure at the R113 lead facing the rear panel
2			V201 (right channel)	DC.BAL.TP-R	0±0.2V DC	Measure at the R213 lead facing the rear panel

3. Control IC Clock Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	STOP	No input	V1001 (Control assembly)	Pin 21 of Q1002 (Control assembly)	200kHz±5kHz	Insert a capacitor of a few pF and measure by frequency counter.

4. BLE IC Clock Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	STOP	No input	L601 (Main assembly)	Pin 42 of Q612 (Main assembly)	294kHz±2kHz	Insert a capacitor of a few pF and measure by frequency counter.

5. Cassette Half Detector Sensitivity

- Measure with a DC voltmeter of high input impedance (of about 1 Mega-ohm).
- Connect 5.1 kilo-ohm in parallel with R1031 in the control assembly for the adjustment, and remove it after the adjustment has been completed.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	STOP	No input (cassette half not insert)	V081 (see Fig. 11-5) (Terminal assembly A)	Between 2 (+) and 1 (GND)(Terminal assembly A)	2.5V±0.1V DC	Prevent strong illumination being beamed onto the photo-interrupter.

6. Tape Transport and Head Azimuth Adjustment

	Mode	Input signal & Test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	PLAY	Mirror-equipped cassette half	Height adjustment nut (see Fig. 11-7)	Tape guide (see Fig. 11-7)	No tape curling at the tape guide	Tape curling and floating up to 1/5 of the tape width is permissible.
2	PLAY	Play the 10kHz/−20dB section of the STD-331B test tape	Head azimuth adjustment screw (see Fig. 11-8)	Left and right OUTPUT terminals	Zero phase difference between left and right channels at maximum playback signal level (Playback level fluctuation 1.0dB max.).	
3	Check step 1, and readjust if necessary. Always perform step 2 after performing step 1.					

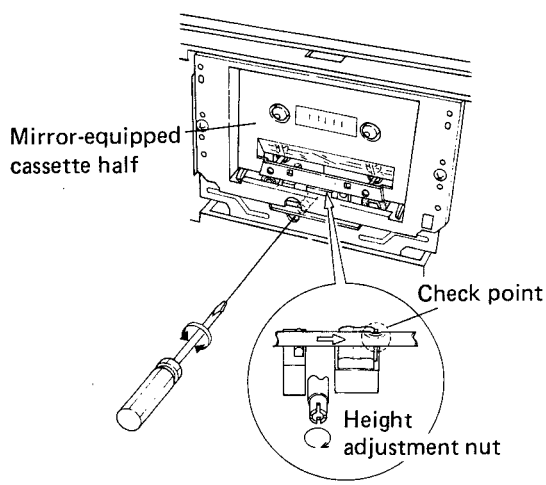


Fig. 11-7 Tape transport adjustment

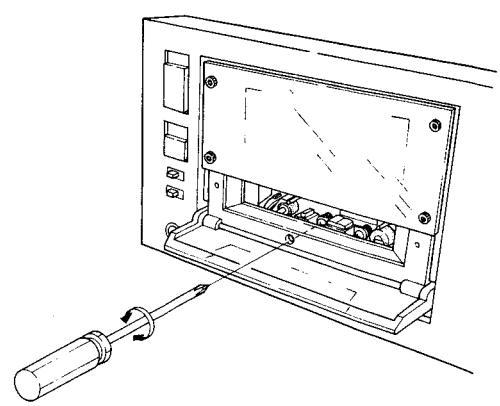


Fig. 11-8 Head azimuth adjustment

7. Playback Equalizer Adjustment

- Set V103 and V203 (playback level ADJ.) to maximum level, and V102 and V202 (playback EQ.ADJ.) to the mechanical center positions.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	PLAY	Play the 315Hz/−20dB and 10kHz/−20dB sections of the STD-331B test tape	V102 (left channel) V202 (right channel)	Left and right OUTPUT terminals	Playback level at 10kHz to be +0.2 dB higher than the playback level at 315Hz	Check that the frequency response lies inside the allowable playback frequency response zone (see Fig. 11-9)

8. Playback Level Adjustment

- This adjustment must be performed accurately since it also sets the playback Dolby NR level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	PLAY	Play the 315Hz/0dB section of the STD-331B test tape	V103 (left channel) V203 (right channel)	PBO.DOL-L PBO.DOL-R	−7.7dBv (412.1mV)	Leave the DOLBY NR switch off.

9. Level Meter Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP	Apply a 315Hz/−10dBv (316mV) signal to the INPUT terminals	V2005 (I.REF)	TP28 (+)−TP29(−)	+7.5V±0.2V DC	
2			V2006 (6V)	TP30 (+)−GND	$+6V^{+0.1V}_{-0V}$ DC	
3			V2007 (3V)	TP31 (+)−GND	$+3V^{+0.1V}_{-0V}$ DC	
4			MASTER REC level control	REC.DOL-L REC.DOL-R	−7.7dBv (412.1mV)	REC LEVEL PRESET control is at click-stop position
5		Set the input signal level to −20dBv (100mV)	Set the MONITOR switch to the SOURCE position.			
6			V2001 (left channel) V2002 (right channel)	TP26−GND TP27−GND	−14dBv (199.5mV)	
7			V2003 (left channel) V2004 (right channel)	Turn V2003 and V2004 fully clockwise, and turn slowly counter-clockwise and stop when the "−10dB" segments go out.		
8		Set the input signal level to −43dBv (7.08mV)	Confirm	The "−40dB" segments go out	If the "−40dB" segments go out, proceed to step 10.	
9		Set the input signal level to −42dBv (7.94mV)	V2003 (left channel) V2004 (right channel)	If the "−40dB" segments are on, readjust that the "−40dB" segments go out.		
10		Set the input signal level to −20dBv (100mV)	If the "−11dB" segments go out (less than "−12dB"), change the adjustment value of step 6 to −13.5dBv (211.3mV), and readjust step 6.			
11		Set the input signal level to −43dBv (7.08mV)	Confirm	The "−40dB" segments go out	If the "−40dB" segments are on, readjust from step 9	
12		Vary the input signal level	Confirm	Meter display "0dB"	Comes on at input level of −10±1dBv	
13			Confirm	Meter display "+10dB"	Comes on at input level of 0±1dBv	
14		Switch the input signal off when the "0dB" segments are on, and check that the "−30dB" segment for one channel is gone out when the other channel gose out. (meter recovery timing check)				

10. Metal Erasure Current Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	REC	No input, STD-604 test tape	V303	TP11–GND	175mV AC	

11. Bias Trap Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
	REC	No input, STD-604 test tape	L101 (left channel) L201 (right channel)	Left and right OUTPUT terminals	Minimum bias leak	Measure with AC voltmeter and oscilloscope

12. Recording Bias Adjustment

- Set the MONITOR switch to the SOURCE position, and adjust the OUTPUT level control to maximum level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 6.3kHz/–20dBv (100mV) signal to the INPUT terminals	MASTER REC level control	Left and right OUTPUT terminals	–13.5dBv (211.3mV)	REC LEVEL PRESET control at click stop position
2	REC	Record the above signal onto the STD-608A test tape, and monitor playback simultaneously	V306 (left channel) V309 (right channel)	Lef and right OUTPUT terminals (and MONITOR in the TAPE position)	After first turning V306 and V309 fully counter-clockwise, turn back clockwise and stop at a position where the level drops 3dB below the maximum playback level after passing through that maximum level position.	
3	REC	Record the above signal onto the STD-603 test tape, and monitor playback simultaneously	V304 (left channel) V307 (right channel)		After first turning V304 and V307 fully counter-clockwise, turn back clockwise and stop at a position where the level drops 2.5dB below the maximum playback level after passing through that maximum level position.	
4	REC	Record the above signal onto the STD-604 test tape, and monitor playback simultaneously	V305 (left channel) V308 (right channel)		After first turning V305 and V308 fully counter-clockwise, turn back clockwise and stop at a position where the level drops 2.5dB below the maximum playback level after passing through that maximum level position.	

13. Recording Level Adjustment

- Leave the DOLBY NR switch off.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 315Hz/–10dBv (316mV) signal to the INPUT terminals	MASTER REC level control	REC.DOL-L REC.DOL-R	–7.7dBv (412.1mV)	REC LEVEL PRESET control at click stop position
2	REC	Record the above signal onto the STD-608A test tape, and monitor playback simultaneously	V104 (left channel) V204 (right channel)	PBO.DOL-L PBO.DOL-R	–7.7dBv (412.1mV)	
3	Repeat the above steps using the STD-603 and STD-604 test tapes, adjusting to –7.7±1.5dBv.					

Test tape: STD-331B, DOLBY NR: OFF

The right channel value is obtained by correcting the actual values measured at 40Hz and 63Hz by –1dB.

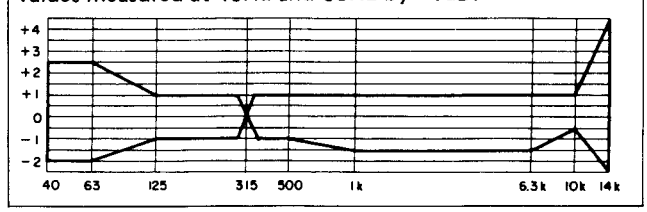


Fig. 11-9 Allowable playback frequency response zone

14. Recording and Playback Frequency Response Adjustment

- Leave the DOLBY NR switch off, and set the OUTPUT level control to maximum level.

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	REC-PAUSE	Apply a 315Hz/–30dBv (31.6mV) signal to the INPUT terminals	MASTER REC level control	Left and right OUTPUT terminals	–23.5dBv (66.8mV)	REC LEVEL PRESET control is at click-stop position
2	REC	Record the 315Hz and 10kHz signals onto the STD-608A test tape at the above level and monitor the playback simultaneously	V306 (left channel) V309 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to +0.5dB higher than the 315Hz level	
3	Record and playback signals up to 15kHz onto the STD-608A test tape, and check that the allowable frequency response zone shown in Fig. 11-10 is satisfied (for DOLBY NR OFF, and B and C).					
4	REC	Likewise, record and playback the same signal onto the STD-603 test tape	V304 (left channel) V307 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to +0.5dB in respect to the 315Hz level	
5	Record and playback signals up to 15Hz onto the STD-603 test tape, and check that the allowable frequency response zone shown in Fig. 11-12 is satisfied (for DOLBY NR OFF, and B and C).					
6	REC	Likewise, record and playback the same signal onto the STD-604 test tape	V305 (left channel) V308 (right channel)	Left and right OUTPUT terminals	Adjust the 10kHz playback level to +0.5dB in respect to the 315Hz level	
7	Record and playback signals up to 15kHz onto the STD-604 test tape, and check that the allowable frequency response zone shown in Fig. 11-11 is satisfied (for DOLBY NR OFF, and B and C).					

15. AUTO-BLE Adjustment

	Mode	Input signal & test tape	Adjustment location	Measuring location	Adjustment value	Remarks
1	STOP (REC)	Load the STD-608A tape, and short TP14 momentarily to GND	V601 (FL ADJ)	Adjust so that the AUTO-BLE indicator "LEVEL" lighgs up (level measurement at PBO.DOL-R)		Shorting TP14 to GND activates AUTO-BLE test mode
2	Press the STOP button to put tape transport into STOP mode, and then press the PEAK BIAS button.					
3	(REC)	Load the STD-608A tape	V602 (FH ADJ.)	Adjust so that the AUTO-BLE indicator "LEVEL" blinks.		
4	Press the DATA CLEAR button with the deck in STOP mode. Then load the STD-608A tape and press the PEAK BIAS button (Proceed to step 5 after completion of AUTO-BLE operation).					
5	REC	Record a 1kHz signal at 0VU onto the STD-608A tape, and monitor the playback simultaneously	Check	PBO.DOL-R	–7.7dBv±0.3dB	
			If the above specifications are not met, return to step 1 and compensate for level deviation by adjusting V601.			
6	Press the DATA CLEAR button with the deck in STOP mode. Then load the STD-608A tape and press the PEAK BIAS button (Proceed to step 7 after completion of AUTO-BLE operation).					
7	REC	Record signals from 315Hz to 10kHz at –20VU onto the STD-608A tape, and monitor the playback simultaneously	Check	Left and right OUTPUT terminals	Check that the zone specifications shown in Fig. 11-13 are satisfied for DOLBY NR OFF/B/C.	
8	Repeat steps 6 and 7 with STD-603 and STD-604 test tapes, and check that the Fig. 11-13 specifications are satisfied.					
9	Press the DATA CLEAR button with the deck in STOP mode.					
10	Repeat the above procedre for UNDER BIAS and OVER BIAS, and again check that the zone specifications shown in Fig. 11-13 are satisfied.					

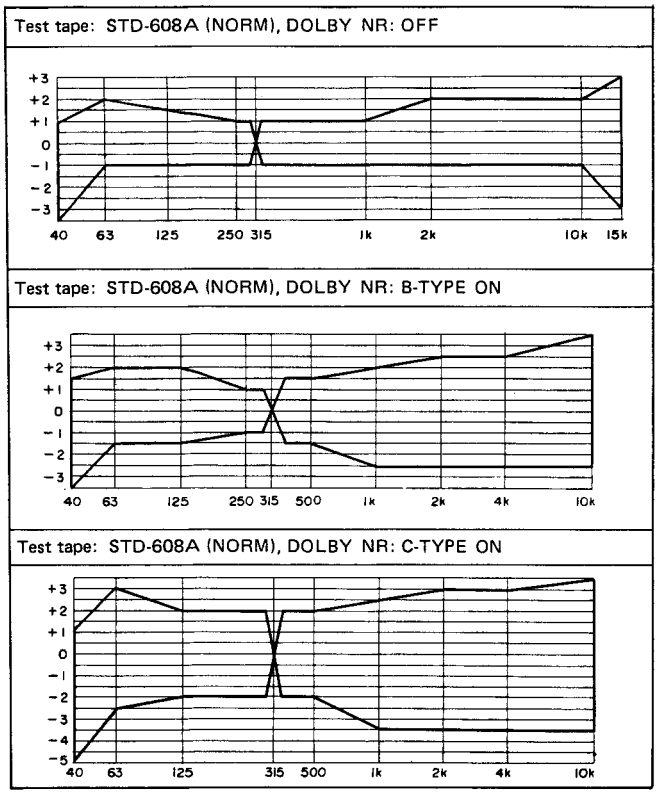


Fig. 11-10 Allowable recording/playback frequency response zone (NORM)

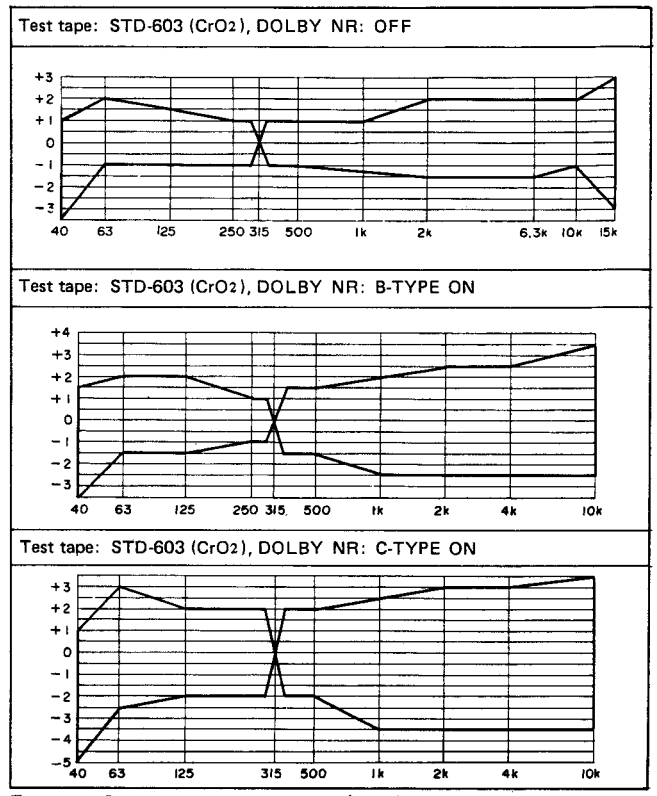


Fig. 11-12 Allowable recording/playback frequency response zone (CrO2)

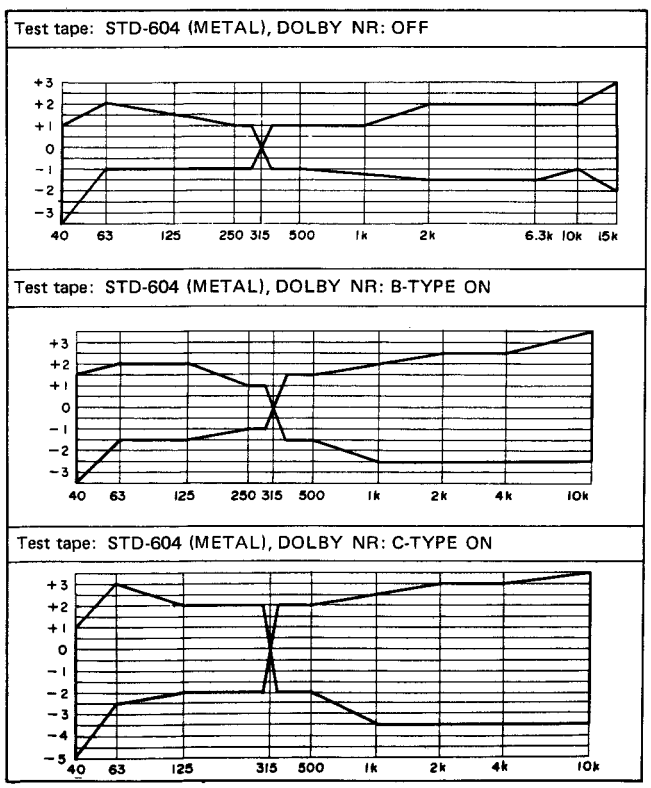


Fig. 11-11 Allowable recording/playback frequency response zone (METAL)

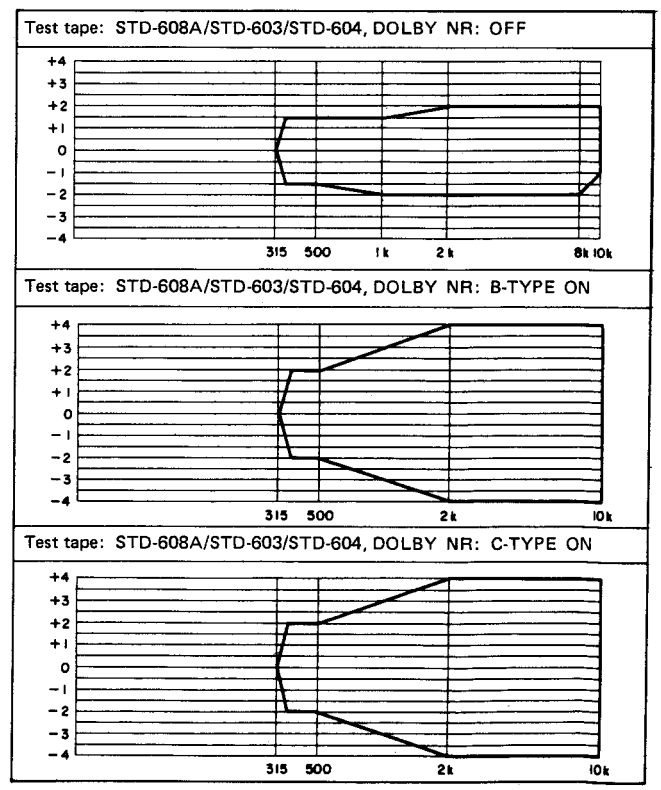


Fig. 11-13 Allowable recording/playback frequency response zone (NORM, AUTO-BLE)

11. RÉGLAGE

11.1 REGLAGES MECANIQUES

11.1.1 Réglage de la vitesse de la bande

* Utiliser un fréquencemètre

Mode	Point du réglage	Spécifications
PLAY (repro-duction)	V051 (Unité de commande CM)	Lafréquence de reproduction doit se situer dans une plage 3005 ±10Hz au début de la bande d'essai STD-301.
PLAY	Point de réglage	Lafréquence de reproduction doit se situer dans une plage 3000 ±30Hz au début de la bande d'essai STD-301.

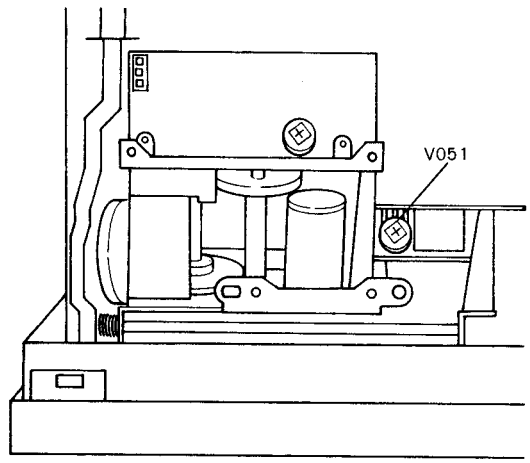


Fig. 11-1 Réglage de la vitesse de la bande

11.1.2 Réglage du clapet d'entrée d'air

Point du réglage	Spécifications
Vis de réglage du cylindre	La porte doit s'ouvrir en douceur (sans à-coups) et ne doit pas revenir d'un coup sec en arrière lorsqu'on l'ouvre à fond.

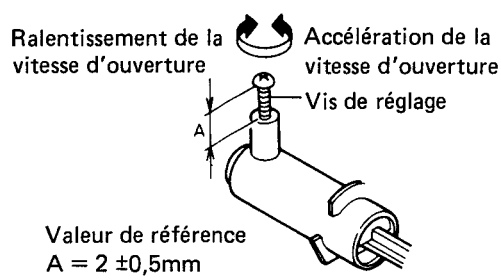


Fig. 11-2 Réglage du clapet d'entrée d'air

11.1.3 Réglage de la position de la porte

Point de réglage 1	Vu de face, les rapports entre les dimensions A et B, et entre les dimensions C et D doivent se situer entre 0,5 et 2.
Point de réglage 2	Vu de face, la différence entre E et G ne doit pas excéder ±0,4mm, et E, F, et G doivent toutes dépasser 0,5mm.

Si les spécifications ci-dessus ne sont respectées, desserrer les vis et rerégler la position de la porte.

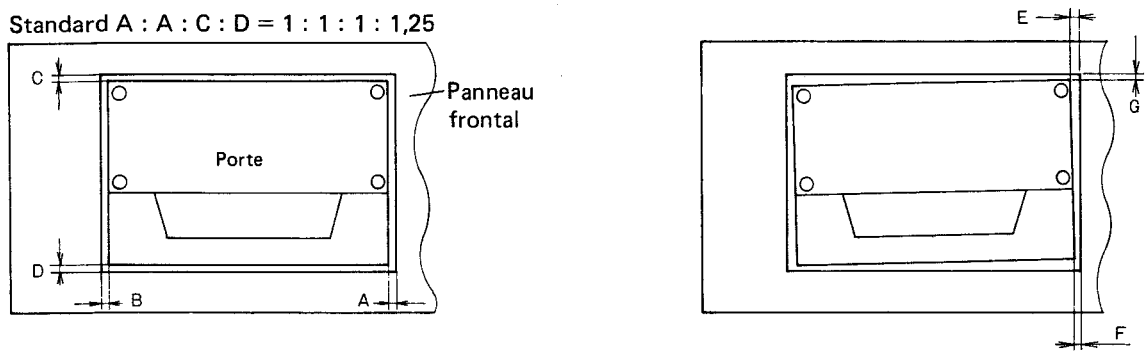


Fig. 11-3 Réglage de la position de la porte

11.2 REGLAGES ELECTRIQUES

Conditions de réglages

1. Les réglages mécaniques doit être d'abord terminés.
2. Les têtes doivent être nettoyées et démagnétisées.
3. Laisser chauffer la platine pendant quelques minutes au moins avant de commencer un quelconque réglage électrique.
4. Le niveau de référence du signal est 0dBv= 1V rms.
5. Brancher une résistance de charge de 50 kohm (ou entre 47 et 52 kohm) sur les bornes de sortie (OUTPUT).
6. Sauf spécification contraire, laisser le contrôle de niveau de sortie (OUTPUT) sur la position maximum.
7. De la même manière, les autres commutateurs cités cidessous doivent être laissés dans la position indiquée sauf spécification contraire.

TIMER (minuteur)	: OFF (arrêt)
DOLBY NR	: OFF (arrêt)
FILTRE MPX	: OFF (arrêt)
AUTO-BLE	: CLEAR (indicateur DATA SET désenclenché)

Bandes d'essai

STD-331B*	: Réglages de reproduction (se référer à la Fig. 11-4).
STD-608A	: Bande vierge NORMALE
STD-603	: Bande vierge à l'oxyde de chrome CrO_2
STD-604	: Bande vierge METAL

* Le niveau de référence d'enregistrement pour la STD-331A est 333Hz, 250nwb/m, pour la STD-331B, 315Hz, 160nwb/m.

Liste des réglages

1. Réglage de la tension de sortie du régulateur shunt (sauf pour les types KC, HEM, HB et HP).
2. Réglage de la balance DC de l'amplificateur DC.
3. Réglage de base du circuit intégré de commande.
4. Réglage de base du circuit intégré BLE.
5. Réglage de la sensibilité du détecteur de cassette.
6. Réglage de l'azimutage de la tête et du transport de la bande.
7. Réglage de l'égaliseur de reproduction.
8. Réglage du niveau de reproduction.
9. Réglage de l'indicateur de niveau.
10. Réglage du courant d'effacement METAL.
11. Réglage du circuit de polarisation.
12. Réglage de la polarisation d'enregistrement.
13. Réglage du niveau d'enregistrement.
14. Réglage de la réponse en fréquence et de reproduction.
15. Réglage AUTO-BLE.

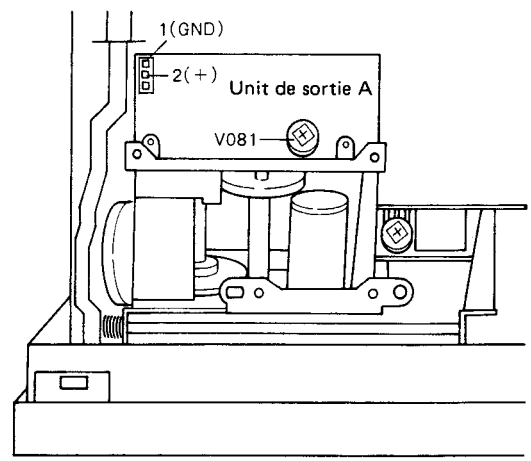


Fig. 11-5 Réglage de la sensibilité du détecteur de cassette

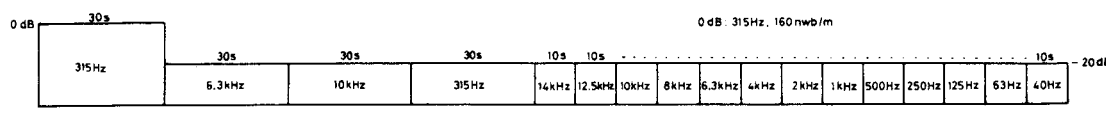


Fig. 11-4 Bande d'essai STD-331B

1. Réglage de la tension de sortie du régulateur shunt
- A l'exclusion des types KC, HEM, HB et HP

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur du réglage	Remarques
1	STOP	Pas d'entrée	V301	Q311 Emetteur	+10V ± 0,5V CC	Réglage +CC
2			V302	Q312 Emetteur	−10V ± 0,5V CC	Réglage −CC

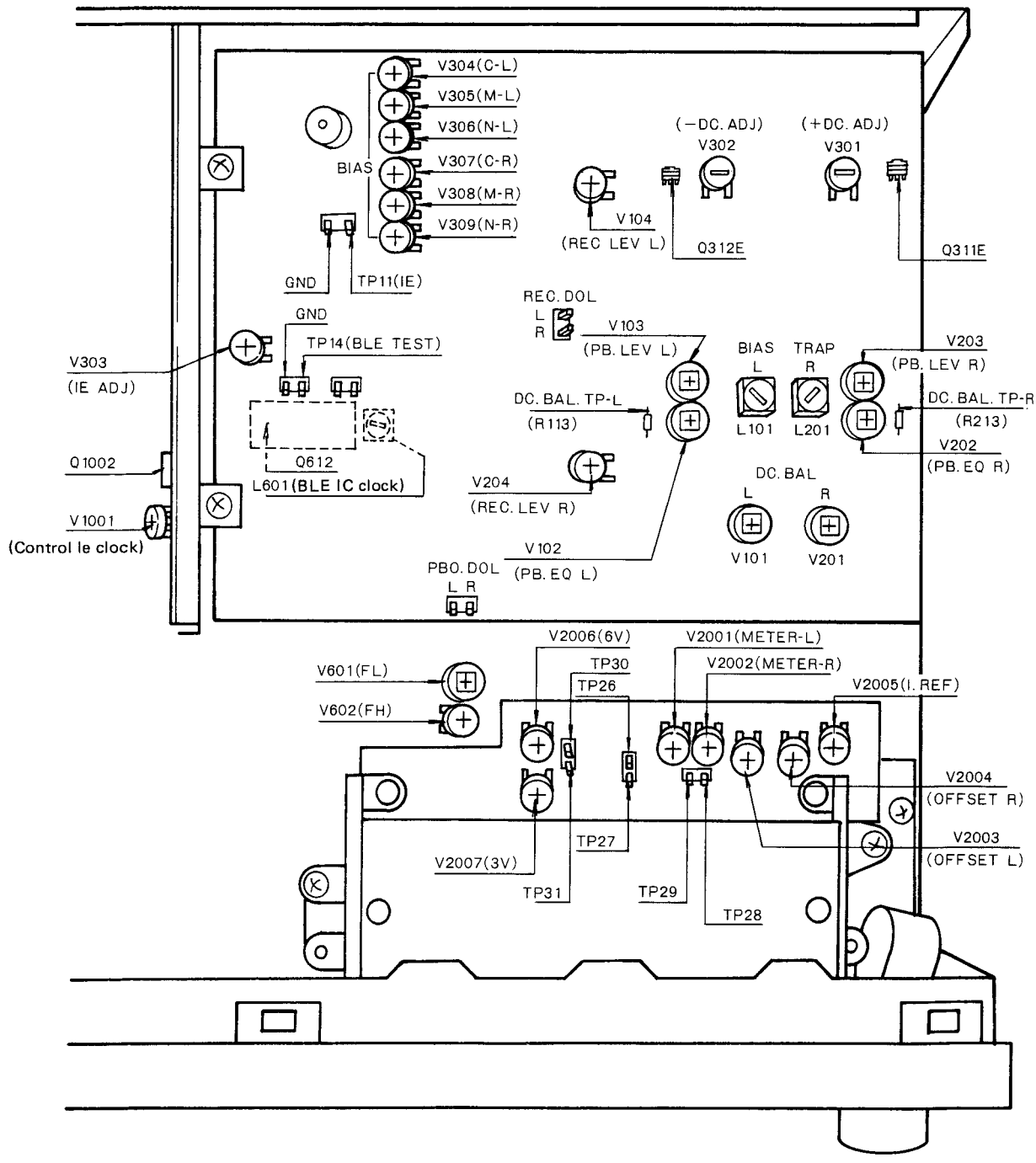


Fig. 11-6 Points des réglages

2. Réglage de la balance CC de l'amplificateur CC

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
1	STOP	Pas d'entrée	V101 (canal gauche)	DC.BAL.TP-L	0±0,2V CC	Faire une mesure au fil R113 en face du panneau arrière
2			V201 (canal droit)	DC.BAL.TP-R	0±0,2V CC	Faire une mesure au fil R123 en face du panneau arrière

3. Réglage de base du circuit intégré de commande

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	STOP	Pas d'entrée	V1001 (unité de commande)	Fiche 21 de Q1002 (unité de commande)	200kHz ± 5kHz	Insérer un condensateur de quelques pF et faire une mesure à l'aide d'un fréquencemètre

4. Réglage de base du circuit intégré ELE.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	STOP	Pas d'ntrée	L601 (unité principale)	Fiche 42 de Q612 (unité principale)	294kHz ± 2kHz	Insérer un condensateur de quelques pF et faire une mesure à l'aide d'un fréquencemètre

5. Sensibilité du détecteur de cassette

- Faire une mesurer à l'aide d'un voltmètre CC à impédance d'entrée élevée (d'environ 1 mega-ohm).
- Brancher 5,1kohm en parallèle avec le R1301 dans l'unité de commande pour le réglage, et l'enlever après la fin du réglage.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de régalge	Remarques
	STOP	Pas d'entrée (cassette non insérée)	V081 (voir Fig. 11-5) (unité de sortie A)	Entre 2 (+) et 1 (masse) (unité de sortie A)	2,5V ± 0,1V CC	Eviter qu'un éclairage intense ne vienne frapper l'interrupteur photo-électrique.

6. Réglage de l'azimuthage de la tête et du transport de la bande

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	PLAY (reproduction)	Cassette équipée d'un miroir	Ecrou de réglage de hauteur (se référer à la Fig. 11-7)	Guide de la bande (se référer à la Fig. 11-7)	Pas d'ondulation de la bande au niveau du guide de la bande	Un mouvement et une ondulation égals à 1/5 de la largeur de la bande sont acceptables.
2	PLAY (reproduction)	Reproduire la partie 10kHz/–20dB de la bande d'essai STD-331B	Vis de réglage de l'azimutage de la tête (Se référer à la Fig. 11-8)	Bornes de sortie (OUTPUT) droit et gauche	Différence de phase nulle entre les canaux droit et gauche au niveau maximal de reproduction (fluctuation du niveau de reproduction, 1,0dB au maximum).	
3	Vérifier l'étape 1, et rerégler si nécessaire. Veiller à toujours effectuer l'étape 2 après l'étape 1.					

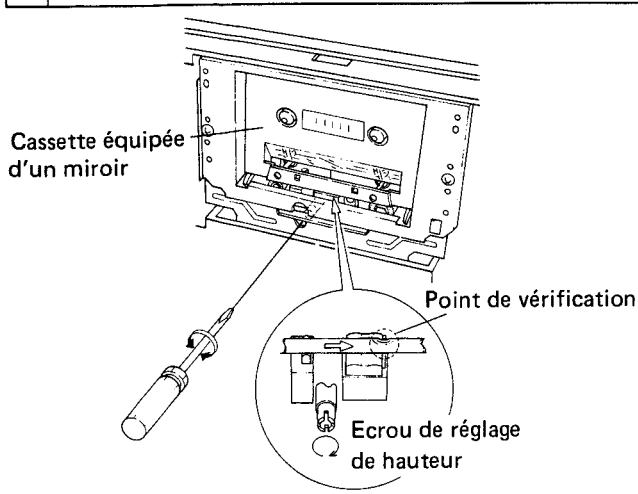


Fig. 11-7 Réglage du transport de la bande

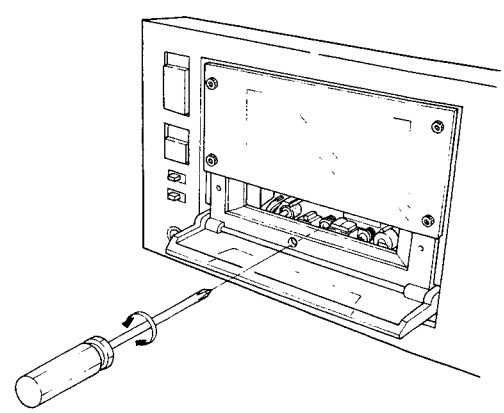


Fig. 11-8 Réglage de l'azimutage de la tête

7. Réglage de l'égaliseur de reproduction

- Régler V103 et V203 (réglage du niveau de reproduction) au niveau maximal et les V102 et V202 sur la position mécanique médiane.

	Mode	Signal d'entrée et bande d'essai	Point de réglage	Point de mesure	Valeur de réglage	Remarques
	PLAY (reproduction)	Reproduire les parties 315Hz/–20dB et 10kHz/–20dB de la bande d'essai STD-331B	V102 (canal gauche) V202 (canal droit)	Bornes de sortie (OUTPUT) droit et gauche	Le niveau de reproduction à 10kHz doit être de +0,2dB supérieur au niveau de reproduction à 315Hz	Vérifier que la réponse en fréquence est située à l'intérieur de la zone de réponse en fréquence admissible (se référer à la Fig. 11-9)

8. Réglage du niveau de reproduction

- Ce réglage doit être effectué avec précision dans la mesure où il conditionne également le niveau de reproduction du réducteur de bruit DOLBY.

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
	PLAY (reproduction)	Reproduire la partie 315Hz/0dB de la d'essai STD-331B	V103 (canal gauche) V203 (canal droit)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	Laisser le commutateur du réducteur de bruit DOLBY désenclenché.

9. Réglage de l'indicateur de niveau

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur deréglage	Remarques
1	STOP	Appliquer un signal de 315Hz/–10dBv (316mV) sur les bornes d'entrée	V2005 (I.REF)	TP28(+)–TP29(–)	+7,5V ± 0,2V CC	
2			V2006 (V)	TP30(+)–GND (MASSE)	$+6V^{+0,1V}_{-0V}$ CC	
3			V2007 (3V)	TP31(+)–GND (MASSE)	$+3V^{+0,1}_{-0V}$V CC	
4			Contrôle du niveau MASTER REC	REC.DOL-L REC.DOL-R	–7,7dBv (412,1mV)	Le contrôle REC LEVEL PRESET (préréglage du niveau d'enregistrement) est sur la position d'arêt mécanique
5		Régler le niveau du signal d'entrée sur –20dB (100mV)	Placer le commutateur MONITOR (contrôle d'enregistrement) sur la position SOURCE.			
6			V2001 (canal gauche) V2002 (canal droit)	TP26–GND (masse) TP27–GND (masse)	–14dBv (199,5mV)	
7			V2003 (canal gauche) V2004 (canal droit)	Tourner V2003 et V2004 à fond dans le sens des aiguilles d'une montre, puis tourner lentement dans le sens contraire des aiguilles d'une montre, et s'arrêter lorsque les segments "–10dB" disparaissent.		
8		Régler le signal d'entrée à –43dBv (7,08mV).	Confirmation	Les segments "–40dB" disparaîssent.	Si les segments "–40dB" disparaîssent, procéder à l'étape 10.	
9		Régler le signal d'entrée à –42dBv (7,94mV).	V2003 (canal gauche) V2004 (canal droit)	Si les segments "–40dB" apparaîssent, refaire le réglage de façon à les faire disparaître.		
10		Régler le signal d'entrée à –20dBv (100mV).	Si les segments "–11dB" (moins de "–12dB") disparaîssent, changer la valeur de réglage de l'étape 6 à –13,5 dBv (211,3mV) et refaire un réglage au niveau de l'étape 6.			
11		Régler le signal d'entrée à –43dBv (7,08mV).	Confirmation	Les segments "–40dB" disparaîssent.	Si les segments "–40dB" apparaîssent, procéder à l'étape 9.	
12		Faire varier le niveau du signal d'entrée	Confirmation	Affichage de l'indicateur "0dB"	Activé pour un signal d'entrée de –10dB±10dBv.	
13			Confirmation	Affichage de l'indicateur "+10dB"	Activé pour un signal d'entrée de 0dB±1dBv.	
14	Fermer le signal d'entrée lorsque les segments "0dB" apparaissent, et vérifier que le segment "–30dB" pour un canal disparaît lorsque l'autre canal est fermé (vérification de la durée de réactivation des indicateurs).					

Bande d'essai: STD-331B, réducteur de bruit DOLBY: OFF (arrêt)

La valeur du canal droit est obtenue est corrigeant les valeurs réelles mesurées à 40 et 63Hz à –1dB.

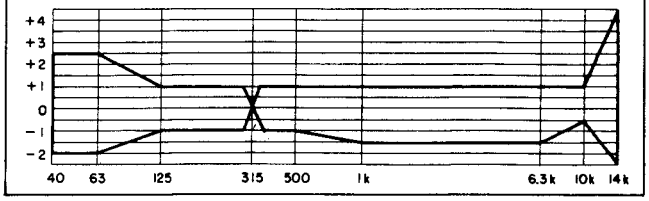


Fig. 11-9 Zone de réponse en fréquence de reproduction admissible

10. Réglage du courant d'effacement métal

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
	REC (enregistrement)	Pas d'entrée, bande d'essai STD-604	V303	TP11-GND (masse)	175mV CA	

11. Réglage du circuit de polarisation

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
	REC (enregistrement)	Pas d'entrée, bande d'essai STD-604	L101 (canal gauche) L201 (canal droit)	Bornes de sortie (OUTPUT) gauche et droit	Dispersion minimale de polarisation courant alternatif	Faire les mesures à l'aide d'un voltmètre et d'un oscilloscope

12. Réglage de la polarisation d'enregistrement

- Placer le commutateur de contrôle d'enregistrement (MONITOR) sur la position SOURCE, et régler le niveau de sortie (OUTPUT) au maximum.

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 6,3kHz/–20dB (100mV) sur les bornes d'entrée (INPUT)	Commande de niveau MASTER REC	Bornes de sortie (OUTPUT) droit et gauche	–13,5dBv (211,3mV)	La commande REC LEVEL PRESET sur la position d'arrêt mécanique
2	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-608A et faire une vérification d'écoute immédiate	V306 (canal gauche) V309 (canal droit)	Les bornes de sortie (OUTPUT) droite et gauche (et MONITOR sur la position TAPE)	Après avoir tourné V306 et V309 à fond dans le sens des aiguilles d'une montre, tourner inversement dans le sens contraire des aiguilles d'une montre, et s'arrêter sur la position où le niveau s'abaisse de 3dB au dessous du niveau maximal de reproduction après être passé par ce niveau maximal de reproduction.	
3	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-603 et faire une vérification d'écoute immédiate	V304 (canal gauche) V307 (canal droit)		Après avoir tourné V304 et V307 à fond dans le sens des aiguilles d'une montre, tourner inversement dans le sens contraire des aiguilles d'une montre, et s'arrêter sur la position où le niveau s'abaisse de 2,5dB au dessous du niveau maximal de reproduction après être passé par ce niveau maximal de reproduction.	
4	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-604 et faire une vérification d'écoute immédiate	V305 (canal gauche) V308 (canal droit)		Après avoir tourné V305 et V308 à fond dans le sens des aiguilles d'une montre, tourner inversement dans le sens contraire des aiguilles d'une montre, et s'arrêter sur la position où le niveau s'abaisse de 2,5dB au dessous du niveau maximal de reproduction après être passé par ce niveau maximal de reproduction.	

13. Réglage du niveau d'enregistrement

- Laisser le réducteur de bruit DOLBY désenclenché.

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 315Hz/–10dB (316mV) sur les bornes d'entrée (INPUT)	Commande de niveau MASTER REC	REC.DOL-L REC.DOL-R	–7,7dBv (412,1mV)	La commande REC LEVEL PRESET sur la position d'arrêt mécanique
2	REC	Enregistrer le signal ci-dessus sur la bande d'essai STD-608A et faire une vérification d'écoute immédiate	V104 (canal gauche) V204 (canal droit)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	
3	Recommencer les étapes ci-dessus en utilisant les bandes d'èssai STD-603 et STD-604, en réglant à –7,7±1,5dBv.					

14. Réglage de la réponse en fréquence d'enregistrement et de reproduction

- Laisser le réducteur de bruit DOLBY désenclenché, et régler le niveau de sortie (OUTPUT) au maximum.

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
1	REC-PAUSE	Appliquer un signal de 315Hz/–30dB (31,6mV) aux bornes d'entrée (INPUT)	Commande de niveau MASTER REC	Bornes de sortie (OUTPUT) gauche et droite	–23,5dBv (66,8mV)	Le contrôle REC LEVEL PRESET sur la position d'arrêt mécanique
2	REC	Enregistrer les signaux de 315Hz et 10kHz sur la bande d'essai STD-608A au niveau ci-dessus et faire un contrôle de reproduction simultané	V306 (canal gauche) V309 (canal droit)	Bornes de sortie (OUTPUT) droite et gauche	Régler le niveau de reproduction du 10kHz à +0,5dB plus élevé que le niveau du 315Hz	
3	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bande d'essai STD-608A, et vérifier que la zone admissible de réponse en fréquence indiqué sur la Fig. 11-10 est respectée (pour le DOLBY désenclenché, B et C).					
4	REC	De la même manière, enregistrer et reproduire le même signal sur la bande d'essai STD-603	V304 (canal gauche) V307 (canal droit)	Bornes de sortie (OUTPUT) droite et gauche	Régler le niveau de reproduction du 10kHz à +0,5dB plus élevé que le niveau du 315Hz	
5	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bande d'essai STD-603, et vérifier que la zone admissible de réponse en fréquence indiqué sur la Fig. 11-12 est respectée (pour le DOLBY désenclenché, B et C).					
6	REC	De la même manière, enregistrer et reproduire le même signal sur la bande d'essai STD-604	V305 (canal gauche) V308 (canal droit)	Bornes de sortie (OUTPUT) droit et gauche	Régler le niveau de reproduction du 10kHz à +0,5dB plus élevé que le niveau du 315Hz	
7	Enregistrer et reproduire les signaux jusqu'à 15kHz sur la bonde d'essai STD-604, et vérifier que la zone admissible de réponse en fréquence indiqué sur la Fig. 11-11 est respectée (pour le DOLBY désenclenché, B et C).					

15. Réglage AUTO-BLE

	Mode	Signal d'entrée et bande d'essai	Point du réglage	Point de mesure	Valeur de réglage	Remarques
1	STOP (REC)	Charger la bande STD-608A, et court-circuiter TP14 sur GND (masse)	V601 (FL ADJ)	Faire le réglage de la façon à ce que l'indicateur "LEVEL" AUTO-BLE s'illumine (mesure de niveau à PBO.DOL-R)		Le fait de mettre TP14 en court-circuit avec GND (masse) active le mode de test AUTO-BLE
2	Appuyer sur le bouton STOP pour faire passer le transport de la bande en mode STOP. Appuyer sur le bouton PEAK BIAS.					
3	(REC)	Charger la bande STD-608A	V602 (FH ADJ)	Faire le réglage de façon à ce que l'indicateur "LEVEL" AUTO-BLE s'illumine.		
4	Appuyer sur le bouton DATA CLEAR, la platine étant en mode STOP. Puis charger la bande STD-608A et appuyer sur le bouton PEAK BIAS (passer à l'étape 5 aprés avoir terminé l'opération de AUTO-BLE).					
5	REC	Enregistrer un signal de 1kHz à 0VU sur la bande d'essai STD-608A, et faire un contrôle de reproduction simultané	Vérification	PBO.DOL-R	–7,7dB ± 0,3dB	
			Si les spécifications ci-dessus ne sont pas respectées, revenir à l'étape 1 et compenser la déviation de niveau en réglant V601.			
6	Appuyer sur le bouton DATA CLEAR, la platine étant en mode STOP. Puis charger la bande STD-608A et appuyer sur le bouton PEAK BIAS (passer à l'étape 7 après avoir terminé l'opération de AUTO-BLE)					
7	REC	Enregistrer des signaux de 315Hz à 10kHz à +20VU sur la bande d'essai STD-608A, et faire un contrôle de reproduction simultané	Vérifier	Bornes de sortie (OUTPUT) droite et gauche	Vérifier que les spécifications de zone indiquées sur la Fig. 11-13 sont respectées pour DOLBY OFF (désenclenché)/B/C.	
8	Répéter les étapes 6 et 7 avec les bandes d'essai STD-603 et STD-604, et vérifier que les spécifications de la Fig. 11-13 sont respectées.					
9	Appuyer sur le bouton DATA CLEAR, la platine étant en mode STOP.					
10	Répéter les opérations ci-dessus pour UNDER BIAS et OVER BIAS, et vérifier de nouveau que les spécifications de zone indiquées sur la Fig. 11-13 sont respectées.					

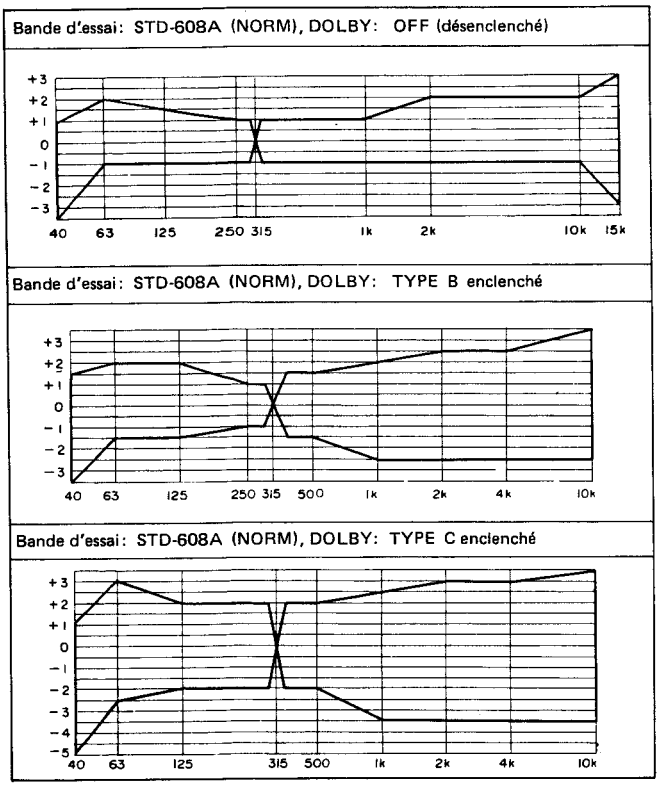


Fig. 11-10 Zone admissible de réponse en fréquence d'enregistrement/reproduction (NORM)

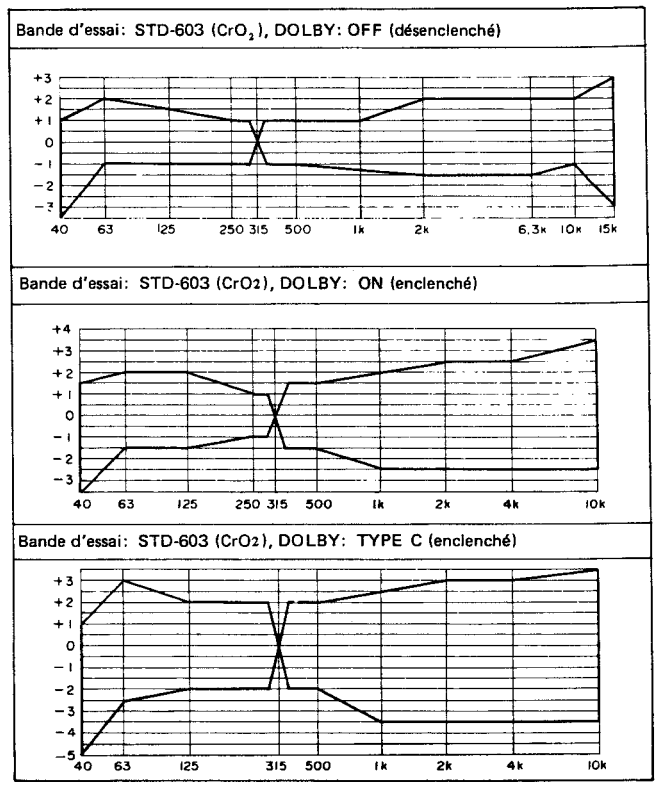


Fig. 11-12 Zone admissible de réponse en fréquence d'enregistrement/reproduction (CrO_2)

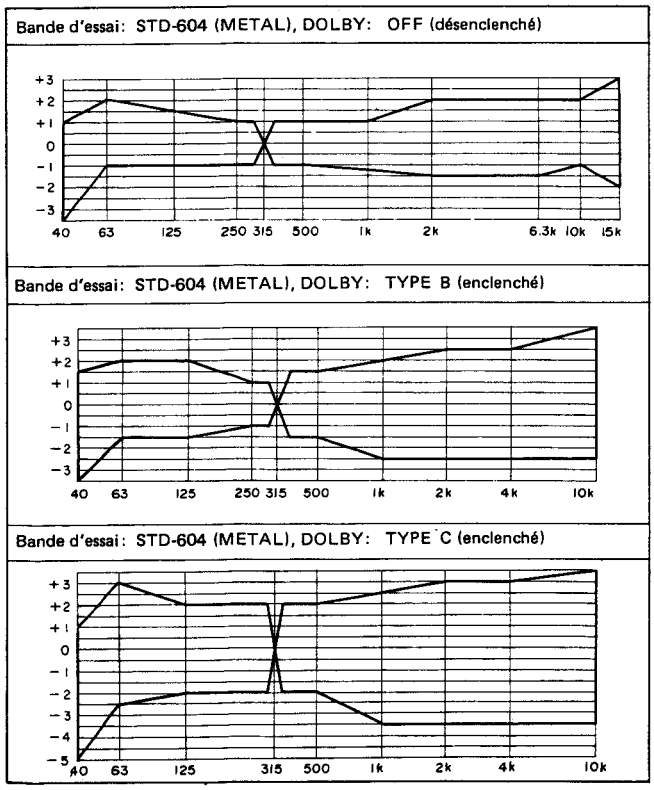


Fig. 11-11 Zone admissible de réponse en fréquence d'enregistrement/reproduction (METAL)

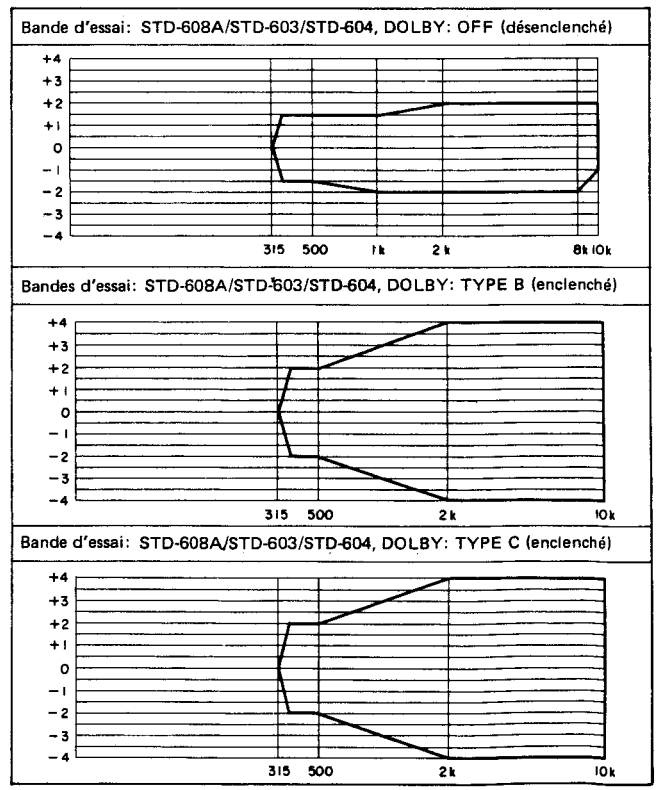


Fig. 11-13 Zone admissible de réponse en fréquence d'enregistrement/reproduction (NORM, AUTO-BI

11. AJUSTE

11.1 AJUSTES MECANICOS

11.1.1 Ajuste de la velocidad de la cinta

*Emplear un frecuencímetro

Modo	Lugar de ajuste	Especificaciones
PLAY	V051 (conjunto de control CM)	La frecuencia de reproducción debe estar dentro del margen de 3005 ± 10Hz al principio de la cinta de prueba STD-301.
PLAY	Comprobación	La frecuencia de reproducción debe estar dentro del margen de 3000 ± 30Hz al principio de la cinta de prueba STD-301.

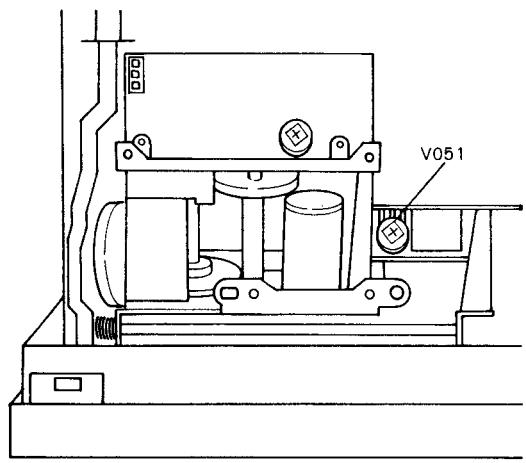


Fig. 11-1 Ajuste de la velocidad de la cinta

11.1.2 Ajuste del amortiquador neumático

Lugar de ajuste	Especificaciones
Tornillo de ajuste del cilindro	La puerta debe abrirse suavemente (sin chirridos, etc.) y no debe "retroceder" una vez abierta.

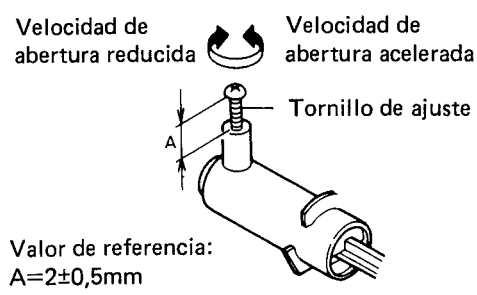


Fig. 11-2 Ajuste del amortiguador neumático

11.1.3 Ajuste de la posición de la puerta

Comprobación 1	Mirando desde delante, los radios entre las dimensiones A y B, y entre las dimensiones C y D deben estar dentro del margen de 0,5 a 2.
Comprobación 2	Mirando desde delante, la diferencia entre E y G no debe exceder de ±0,4mm, y E, F y G deben exceder de 0,5mm.

Si no se satisfacen las especificaciones de arriba, aflojar los tornillos y volver a ajustar la posición de la puerta.

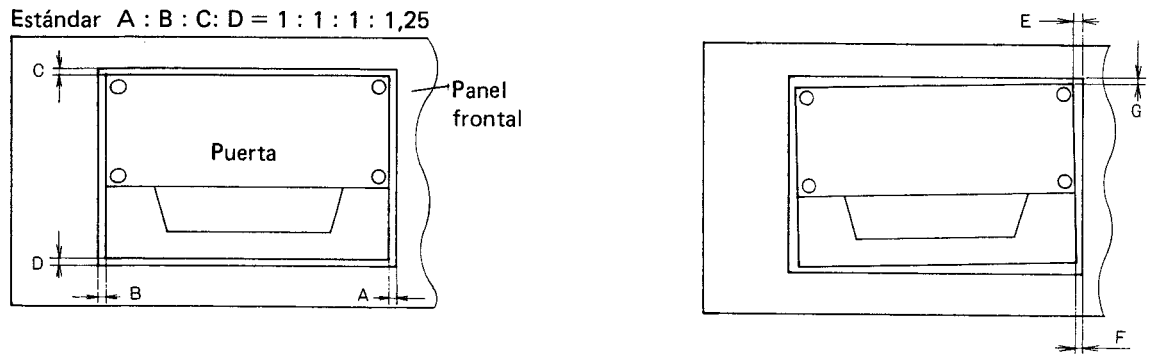


Fig. 11-3 Ajuste de la posición de la puerta

11.2 AJUSTES ELECTRICOS

Condiciones para los ajustes

1. En primer lugar deben completarse los ajustes mecánicos.
2. Las cabezas deben limpiarse y desmagnetizarse.
3. Dejar precalentarse el magnetófono por lo menos durante algunos minutos antes de comenzar cualquier ajuste eléctrico.
4. El nivel de la señal de referencia es de 0dBv= 1Vrms.
5. Conectar una resistencia de carga de 50 Kohmios (o entre 47 a 52 Kohmiso) a los terminales OUTPUT.
6. A menos que se especifique lo contrario, dejar el control del nivel OUTPUT en la posición de nivel máximo.
7. Del mismo modo, los demás interruptores abajo enumerados se tienen que dejar en las posiciones indicadas a menos que se especifique lo contrario.

TIMER	: OFF
DOLBY NR	: OFF
MPX FILTER	: OFF
AUTO-BLE	: CLEAR (el indicador DATA SET apagado)

Cintas de prueba

STD-331B*	: Ajustes de reproducción (Ver la Fig. 11-4)
STD-608A	: Cinta virgen NORMAL
STD-603	: Cinta virgen de CrO_2
STD-604	: Cirta virgen de METAL

* Mientras que el nivel de grabación de referencia para la STD-331A es de 333Hz, 250nwb/m, el mismo nivel para la STD-331B es de 315Hz, 160nwb/m.

Lista de ajustes

1. Ajuste de la tensión de salida del regulado de derivación (excluyendo los tipos KC, HEM, HB y HP)
2. Ajuste del balance de CC del amplificador de CC
3. Ajuste del reloj de IC de control
4. Ajuste del reloj de BLE IC
5. Ajuste de la sensibilidad del detector de casetes
6. Ajuste del transporte de la cinta y acimut de la cabeza
7. Ajuste del ecualizador de reproducción
8. Ajuste del nivel de reproducción
9. Ajuste del medidor de nivel
10. Ajuste de la corriente de borrado para METAL
11. Ajuste de la trampa de polarización
12. Ajuste de la polarización de grabación
13. Ajuste del nivel de grabación
14. Ajuste de la respuesta en frecuencia de grabación y reproducción
15. Ajuste de AUTO-BLE

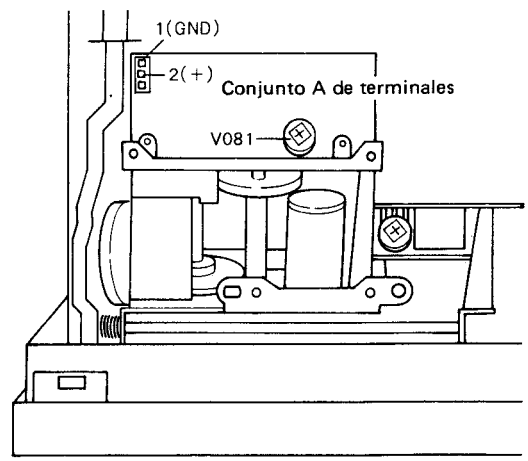


Fig. 11-5 Ajuste de la sensibilidad del detector de casetes

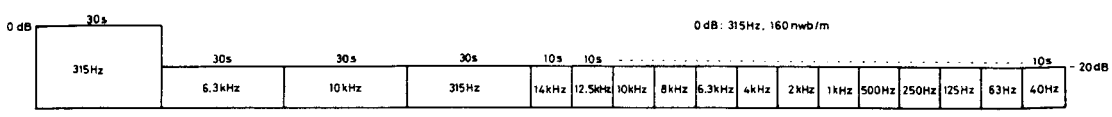


Fig. 11-4 Cinta de prueba STD-331B

1. Ajuste de la tensión de salida del regulador de derivación
- Excluyendo los tipos KC, HEM, HB y HP

	Modo	Seña de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP	Sin entrada	V301	Emisor Q311	+10V±0,5V CC	+DC ADJ.
			V302	Emisor Q312	−10V±0,5V CC	−DC ADJ.

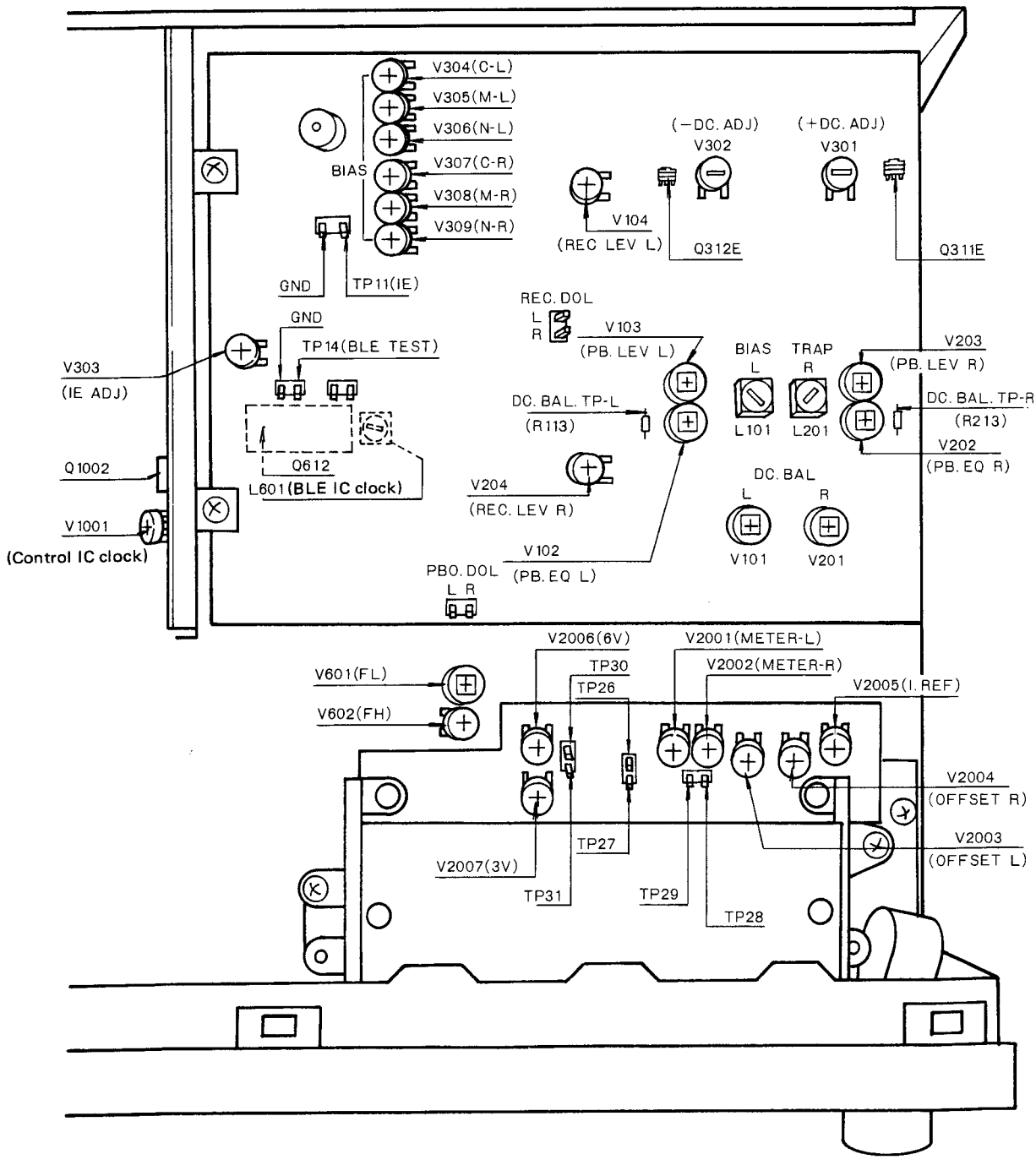


Fig. 11-6 Lugares de ajuste

2. Ajuste del balance de CC del amplificador de CC

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP	Sin entrada	V101 (canal izquierdo)	DC.BAL.TP-L	0±0,2V CC	Medir en el conductor de R113 encarado al panel posterior
2			V201 (canal derecho)	DC.BAL.TP-R	0±0,2V CC	Medir en el conductor de R213 encarado al panel posterior

3. Ajuste del reloj de IC de control

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	STOP	Sin entrada	V1001 (Conjunto de control)	Pin 21 of Q1002 (Conjunto de control)	200kHz±5kHz	Insertar un condensador de algunos pF y medir con el frecuencímetro

4. Ajuste del reloj de BLE IC

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	STOP	Sin entrada	L601 (Conjunto principal)	Pin 42 of Q612 (Conjunto principal)	294kHz±2kHz	Insertar un condensador de pocos pF y medir con el frecuencímetro

5. Sensibilidad del detector de casetes

- Medir con un voltímetro de CC de alta impedancia de entrada (de aprox. 1M ohmio).
- Conectar una resistencia de 5,1K ohmios en paralelo con R1031 del conjunto de control para el ajuste, y sacarla después de haber completado el ajuste.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	STOP	Sin entrada (sin casete insertado)	V081 (ver la Fig. 11-5) (conjunto A de terminales)	Entre 2(+) y 1 (GND) (conjunto A de terminales)	2,5V±0,1V CC	Evitar que iluminación potente dé de lleno en el fotointerruptor

6. Ajuste del transporte de la cinta y del acimut de la cabeza

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	PLAY	Casete provisto de espejo	Tuerca de ajuste de la altura (ver la Fig. 11-7)	Guía de la cinta (ver la Fig. 11-7)	Sin bucle de cinta en la guía de cinta	Bucle de cinta y flotación hasta 1/5 de la anchura de cinta permisibles
2	PLAY	Reproducir la parte de 10kHz/–20dB de la cinta de prueba STD-331B	Tornillo de ajuste del acimut de la cabeza (ver la Fig. 11-8)	Terminales OUTPUT izquierdo y derecho	Diferencia de fase cero entre los canales izquierdo y derecho al nivel máximo de reproducción (fluctuación máx. del nivel de reproducción de 1,0dB)	
3	Verificar el paso 1, y reajustar si fuera necesario. Efectuar siempre el paso 2 después del paso 1.					

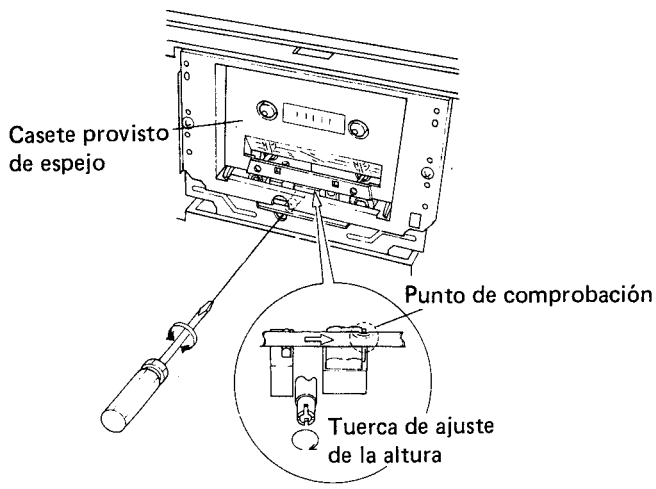


Fig. 11-7 Ajuste del transporte de la cinta

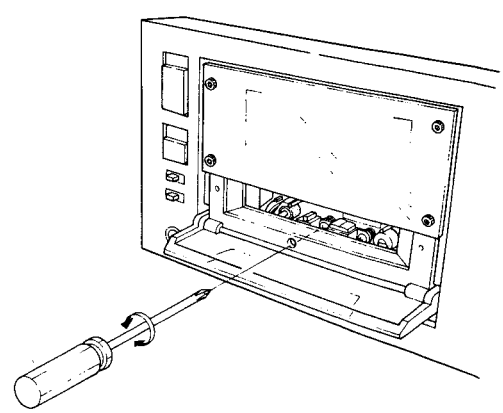


Fig. 11-8 Ajuste del acimut de la cabeza

7. Ajuste del ecualizador de reproducción

- Ajustar V103 y V203 (ADJ. del nivel de reproducción) al nivel máximo, y V102 y V202 (EQ. ADJ. de reproducción) a las posiciones del centro mecánico.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	PLAY	Reproducir las partes de 315Hz/ −20dB y de 10kHz/ −20dB de la cinta de prueba 331B	V102 (canal izquierdo) V202 (canal derecho)	Terminales OUTPUT izquierdo y derecho	El nivel de reproducción a 10kHz tiene que ser +0,2dB más alto que el nivel de reproducción a 315Hz	Comprobar que la respuesta en frecuencia caiga dentro de la zona permisible de respuesta en frecuencia de reproducción (ver la Fig. 11-9)

8. Ajuste del nivel de reproducción

- Este ajuste debe efectuarse con precisión porque ajusta también el nivel de reducción de ruido Dolby de reproducción.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	PLAY	Reproducción la parte de 315Hz/ 0dB de la cinta de prueba STD-331B	V103 (canal izquierdo)	PBO.DOL-L	−7,7dBv (412,1mV	Dejar el interruptor DOLBY NR en la posición OFF
			V203 (canal derecho)	PBO.DOL-R		

9. Ajuste del medidor de nivel

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP	Aplicar la señal de 315Hz/−10dB (316mV) a los terminales INPUT	V2005 (I.REF)	TP28(+)−TP29(−)	+7,5V±0,2V CC	
2			V2006 (6V)	TP30(+)−GND	$+6V^{+0,1V}_{-0V}$ CC	
3			V2007 (3V)	TP31(+)−GND	$+3V^{+0,1V}_{-0V}$ CC	
4			Control del nivel MASTER REC	REC.DOL-L REC.DOL-R	−7.7dBv (412.1mV)	El control REC LEVEL PRESET está en la posición con parada
5		Ajustar el nivel de la señal de entrada a −20dBv (100mV)	Poner el conmutador MONITOR en la posición SOURCE.			
6			V2001 (canal izquierdo) V2002 (canal derecho)	TP26−GND TP27−GND	−14dBv (199,5mV)	
7			V2003 (canal izquierdo) V2004 (canal derecho)	Girar V2003 y V2004 totalmente hacia la derecha, y girarlos lentamente hacia la izquierda y parar cuando desaparezcan los segmentos de "−10dB".		
8		Ajustar el nivel de la señal de entrada a −43dBv (7,08mV)	Confirmar	Se apagan los segmentos de "−40dB"	Si se apagan los segmentos de "−40dB", proceder con el paso 10.	
9		Ajustar el nivel de la señal de entrada a −42dBv (7,94mV)	(Canal izquierdo) (Canal derecho)	Si los segmentos de "−40dB" están iluminados, reajustar de modo que se apaguen los segmentos de "−40dB".		
10		Ajustar el nivel de la señal de entrada a −20dBv (100mV)	Si se apagan los segmentos de "−11dB" (menos de "−12dB"), cambiar el valor de ajuste del paso 6 a −13,5dBv (211,3 mV) y reajustar con el paso 6.			
11		Ajustar el nivel de la señal de entrada a −43dBv (7,08mV)	Confirmar	Se apagan los segmentos de "−40dB".	Si los segmentos de "−40dB" están iluminados, reajustar a partir del paso 9.	
12		Variar el nivel del la señal de entrada	Confirmar	Indicación "0dB" en el medidor	Sale en el nivel de entrada de −10±1dBv.	
13			Confirmar	Indicación de "+10dB" en el medidor	Sale en el nivel de entrada de 0±1dBv.	
14		Desactivar la señal de entrada cuando los segmentos de "0dB" se enciendan, y comprobar que el segmento de "−30dB" para un canal se apaga cuando se apaga el otro canal. (Comprobación de la sincronización de recuperación del medidor)				

Cinta de prueba:

El valor del canal derecho se obtiene corrigiendo los calores reales medidos a 40Hz y 63Hz en −1dB.

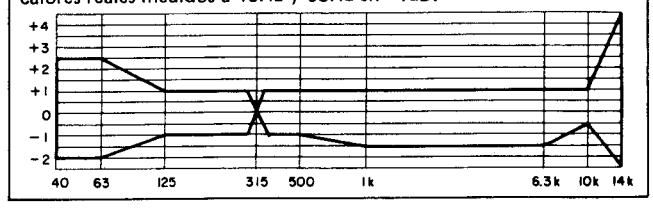


Fig. 11-9 Zona de respuesta en frecuencia de reproducción permisible

10. Ajuste de la corriente de borrado para metal

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	REC	Sin señal, cinta de prueba STD-604	V303	TP11-GND	175mV CA	

11. Ajuste de trampa de polarización

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
	REC	Sin entrada, cinta de prueba STD-604	L101 (canal izquierdo) L201 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Fuga de polarización mínima	Medir con un voltímetro de CA y un osciloscopio

12. Ajuste de la polarización de grabación

- Poner el conmutador MONITOR en la posición SOURCE y ajustar el control de nivel de OUTPUT al nivel máximo.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	REC-PAUSE	Aplicar una señal de 6,3kHz/–20dBv (100mV) a los terminales INPUT	Control del nivel MASTER REC	Terminales OUTPUT izquierdo y derecho	–13,5dBv (211,3mV)	Control REC LEVEL PRESET en la posición con parada
2	REC	Grabar la señal de arriba en la cinta de prueba STD-608A y monitorizar simultáneamente la producción	V306 (canal izquierdo) V309 (canal derecho)	Terminales OUTPUT izquierdo y derecho (y MONITOR en la posición TAPE)	Depués de girar en primer lugar V306 y V309 completamente hacia la izquierda, girar hacia la derecha y detenerse en la posizión donde el nivel caiga 3dB por debajo del nivel de reproducción máximo después de pasar por la posición del nivel máximo.	
3	REC	Grabar la señal de arriba en la cinta de prueba STD-603 y monitorizar simultáneamente la reproducción	V304 (canal izquierdo) V307 (canal derecho)		Después de girar en primer lugar V304 y V307 completamente hacia la izquierda, girar hacia la derecha y detenerse en la posición donde el nivel caiga 2,5dB por debajo del nivel de reproducción máximo después de pasar por la posición del nivel máximo.	
4	REC	Grabar la señal de arriba en la cinta de prueba STD-604 y monitorizar simultáneamente la reproducción	V305 (canal izquierdo) V308 (canal derecho)		Después de girar en primer lugar V305 y V308 completamente hacia la izquierda, girar hacia la derecha y detenerse en la posición donde el nivel caiga 2,5dB por debajo del nivel de reproducción máximo después de pasar por la posición del nivel máximo.	

13. Ajuste del nivel de grabación

- Dejar el interruptor DOLBY NR en la posición OFF.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	REC-PAUSE	Aplicar una señal de 315Hz/–10dBv (316mV) a los terminales INPUT	Control de nivel MASTER REC	REC.DOL-L REC.DOL-R	–7,7dBv (412,1mV)	Control REC LEVEL PRESET en la posición con parada
2	REC	Grabar la señal de arriba en la cinta de prueba STD-608A y monitorizar simultáneamente la reproducción	V104 (canal izquierdo) V204 (canal derecho)	PBO.DOL-L PBO.DOL-R	–7,7dBv (412,1mV)	
3	Repetir los pasos de arriba empleando las cintas de prueba STD-603 y STD-604, ajustando a –7,7±1,5dBv.					

14. Ajuste de la respuesta en frecuencia de grabación y reproducción

- Dejar el interruptor DOLBY NR en la posición OFF, y ajustar el control de nivel OUTPUT al nivel máximo.

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	REC-PAUSE	Aplicar una señal de 315Hz/−30dBv (31,6mV) a los terminales INPUT	Control del nivel MASTER REC	Terminales OUTPUT izquierdo y derecho	−23,5dBv (66,8mV)	Control REC LEVEL PRESET en la posición con parada
2	REC	Grabar las señales de 315Hz y de 10kHz en la cinta de prueba STD-608A al nivel de arriba y monitorizar simultáneamente la reproducción	V306 (canal izquierdo) V309 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajuster el nivel de reproducción de 10kHz a +0,5dB más alto que el nivel de la señal de 315Hz	
3	Grabar y reproducir las señales hasta 15kHz en la cinta de prueba STD-608A, y comprobar que la zona de respuesta en frecuencia permisible, mostrada en la Fig. 11-10, se satisfaga (para DOLBY NR OFF, y B y C).					
4	REC	Del mismo modo, grabar y reproducir la misma señal en la cinta de prueba STD-603	V304 (canal izquierdo) V307 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajustar el nivel de reproducción de 10kHz a +0,5dB con respecto al nivel de 315Hz	
5	Grabar y reproducir señales hasta 15kHz en la cinta de prueba STD-603 y comprobar que la zona de respuesta en frecuena permisible, mostrada en la Fig. 11-12, se satisfaga (para DOLBY NR OFF, y B y C)					
6	REC	Del mismo modo, grabar y reproducir la misma señal en la cinta de prueba STD-604	V305 (canal izquierdo) V308 (canal derecho)	Terminales OUTPUT izquierdo y derecho	Ajustar el nivel de reproducción de 10kHz a +0,5dB con respecto al nivel de 315Hz	
7	Grabar y reproducir señales hasta de 15kHz en la cinta de prueba STD-604 y comprobar que la zona de respuesta en frecuencia permisible, mostrada en la Fig. 11-11, se satisfaga (para DOLBY NR OFF, y B y C).					

15. Ajuste de AUTO-BLE

	Modo	Señal de entrada y cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
1	STOP (REC)	Cargar la cinta de prueba STD-608A y cortocircuitar momentáneamente TP14 a GND	V601 (FL ADJ)	Ajustar de modo que el indicador "LEVEL" de AUTO-BLE se ilumine (medición del nuvel en PBO.DOL-R)		Al cortocircuitar TP14 a GND se activa el modo de prueba de AUTO-BLE
2	Presionar el botón STOP para establecer el transporte de la cinta en el modo STOP, y luego presionar el botón PEAK BIAS.					
3	(REC)	Cargar la cinta STD-608A	V602 (FH ADJ.)	Ajustar de modo que el nidicador "LEVEL" de AUTO-BLE se ilumine.		
4	Presionar el botón DATA CEAR con el magnetófono en el modo STOP. Entonces, cargar la cinta STD-608A y presionar el botón PEAK BIAS (proceder con el paso 5 después de haber completado la operación del AUTO-BLE).					
5	REC	Grabar una señal de 1kHz a 0VU en la cinta de prueba STD-608A y monitorizar simultanéamente la reproducción	Comprobar	PBO.DOL-R	−7,7dBv±0,3dB	
			Si no se satisfacen las especificaciones de arriba, volver al paso 1 y compensar la desviación del nivel ajustando V601.			
6	Presionar el botón DATA CLEAR con el magnetófono en el modo STOP. Luego, cargar la cinta STD-608A y presionar el botón PEAK BIAS (proceder con el paso 7 después de haber completado la operación del AUTO-BLE)					
7	REC	Grabar señales de 315Hz a 10kHz a −20VU en la cinta de prueba STD-608A y monitorizar simultáneamente la reproducción	Comprobar	Terminales OUTPUT izquierdo y derecho	Comprobar que las especificaciones de la zona mostrada en la Fig. 11-13 se satisfacen para DOLBY NR OFF/B/C.	
8	Repetir los pasos 6 y 7 con las cintas de prueba STD-603 y STD-604 y comprobar que se satisfacen las especificaciones de la Fig. 11-13.					
9	Presionar el botón DATA CLEAR con el magnetófono en el modo STOP.					
10	Repetir los procedimientos de arriba para UNDER BIAS y OVER BIAS, y comprobar de nuevo que las especificaciones de la zona mostrada en la Fig. 11-13 se satisfagan.					

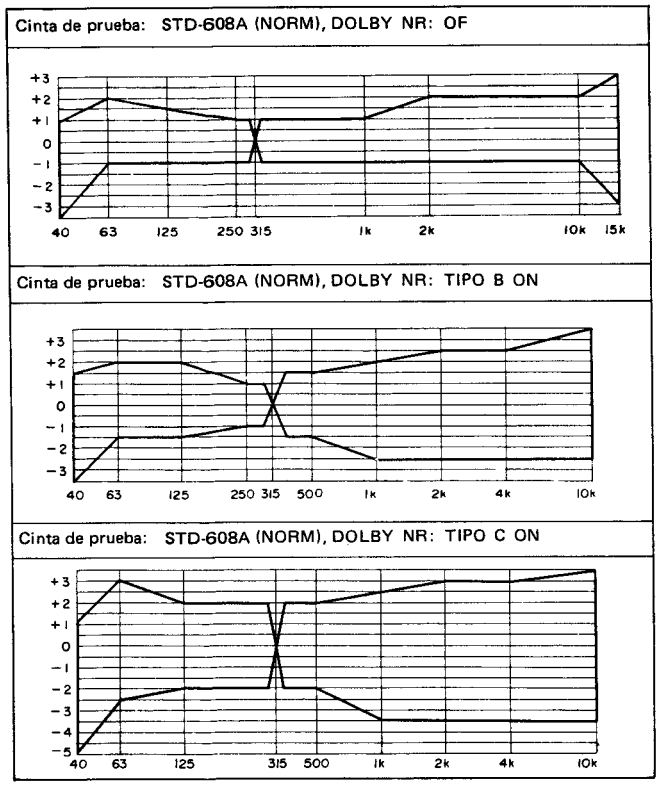


Fig. 11-10 Zona de respuesta en frecuencia permisible para grabación/reproducción (NORM)

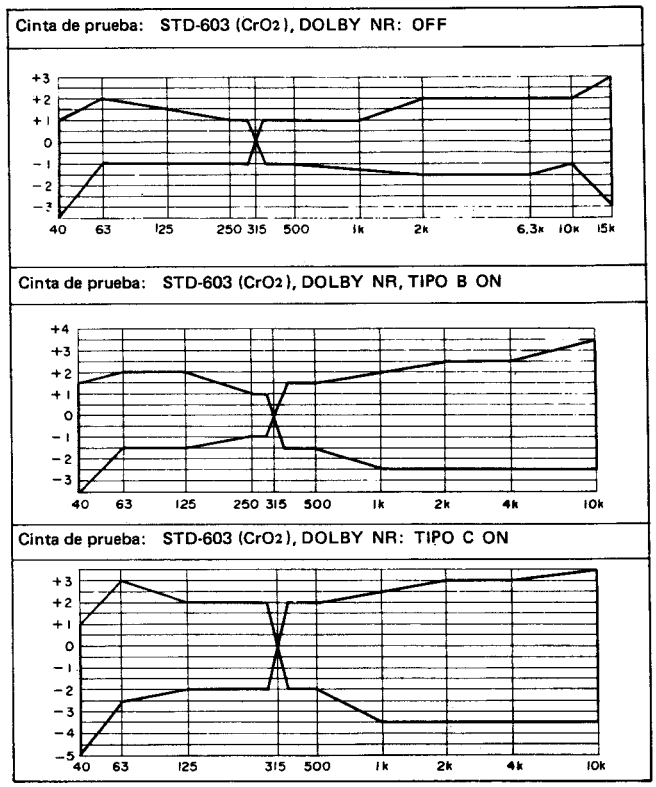


Fig. 11-12 Zona de respuesta en frecuencia permisible para grabación/reproducción (CrO_2)

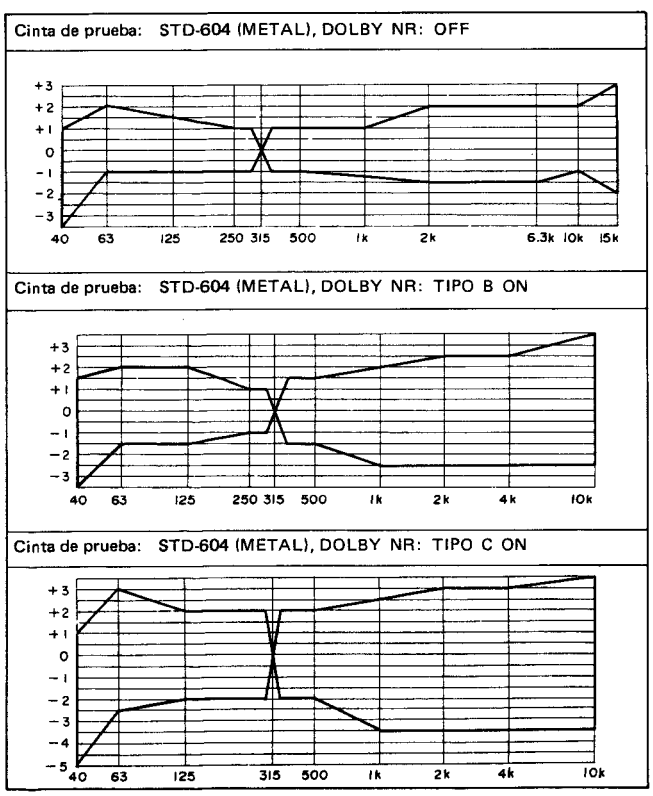


Fig. 11-11 Zona de respuesta en frecuencia permissible para grabación/reproducción (METAL)

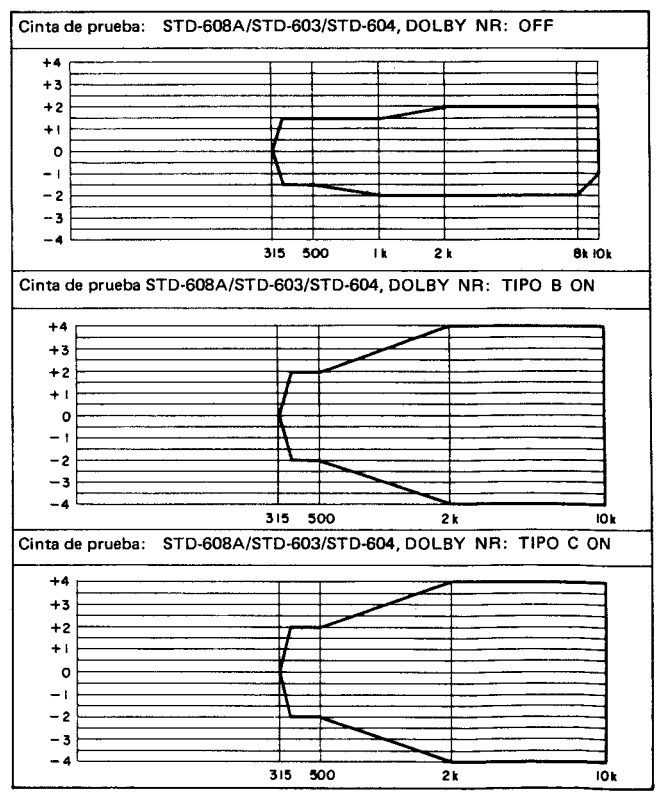


Fig. 11-13 Zona de respuesta en frecuencia permisible para grabación/reproducción (NORM, AUTO-BLE)

12. SUPPLEMENTS FOR KC, D, HEM, HB AND HP TYPES

Models CT-A9/KC (Canada model), HEM (European continent model), HB (United Kingdom model), HP (Australia model), and D (General export model) are the same as the CT-A9/KU (U.S.A. model) with the exception of this supplement.

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 x 10^1	561	RD¼PS 5 6 1 J
47kΩ	47 x 10^3	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 x 10^1	5621.....	RN¼SR 5 6 2 1 F

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

Contrast of Miscellaneous Parts

Mark	Symbol & Description		Part No.					
			KU type	KC type	HEM type	HB type	HP type	D type
⚠ ★★	FU1901	Fuse (1.25A)	REK-073	REK-073	.....	.....	.....	.....
		Fuse (T800mA)	.....	.....	REK-064	REK-064	REK-064	.....
⚠ ★★	FU1902, FU1903	Fuse (500mA)	REK-077	REK-077	.....	.....	.....	.....
		Fuse (T315mA)	.....	.....	REK-052	REK-052	REK-052	.....
⚠ ★★	FU1904, FU1905	Fuse (800mA)	REK-079	REK-079	.....	.....	.....	.....
		Fuse (T500mA)	.....	.....	REK-049	REK-049	REK-049	.....
⚠ ★★	FU1906, FU1907	Fuse (800mA)	REK-079	REK-079	.....	.....	.....	.....
		Fuse (T630mA)	.....	.....	REK-061	REK-061	REK-061	.....
⚠ ★★	FU1801	Fuse (T315mA)	.....	.....	REK-052	REK-052	REK-052	.....
⚠ ★★	S1	Line voltage selector	.....	.....	.....	.....	.....	RSX-057
⚠ ★	T1	Power transformer (120V)	RTT-350	RTT-352	.....	.....	.....	.....
		(220V/240V)	.....	.....	RTT-354	RTT-354	RTT-354	.....
		(120V/220V/240V)	.....	.....	.....	.....	.....	RTT-356
⚠	AC power cord		RDG-048	RDG-048	RDG-027	RDG-032	RDG-029	RDG-050
⚠	Strain relief (for AC power cord)		REC-395	REC-395	REC-396	REC-396	REC-396	REC-395
	Operating instructions (English)		RRB-225	RRB-225	.....	RRB-225	RRB-225	RRB-225
	(English/German/French/Italian)		.....	.....	RRE-055	.....	.....	.....

Contrast of P.C. Board Assemblies

Mark	Symbol & Description	Part No.					
		KU type	KC type	HEM type	HB type	HP type	D type
	Fuse A assembly	no supply	same as KU	no supply	same as HEM	same as HEM	.....
	Fuse B assembly	.....	.....	no supply	same as HEM	same as HEM	.....
	Power supply assembly	no supply	same as KU	no supply	same as HEM	same as HEM	no supply
	Sub-amplifier assembly	no supply	no supply	same as KC	same as KC	same as KC	same as KU

Fuse A Assembly

- Fuse A assembly is mounted the fuse holders for FU1901 – FU1907.
- For KU type and for HEM type differ in the size of the fuse holders.

Fuse B Assembly (for HEM, HB, and HP types)

- Fuse B assembly is mounted the fuse holder for FU1801.

Power Supply Assembly for D Type

- Power supply assembly for D type is the same as the KU type with the exception of the indications on te P.C. board.

Power Supply Assembly for HEM, HB, and HP Types

- Power supply assembly for HEM type is the same as the KU type with the exception of the following parts.

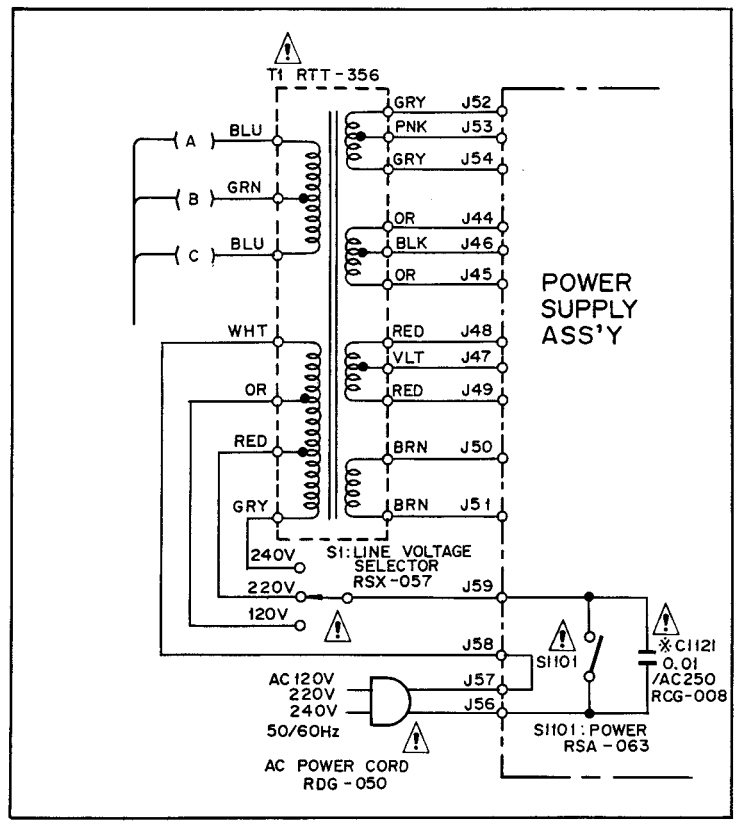
Mark	Symbol & Description	Part No.		Remarks
		for KU type	for HEM type	
⚠	C1121 Ceramic capacitor	RCG-008	.....	0.01/AC250V
		.....	RCG-009	0.01/AC400V
	C1125, C1127	.....	CKDYF 473Z 50	
	C1126	.....	CQMA 183K 160	

Sub-Amplifier Assembly for KC, HEM, HB, and HP Types

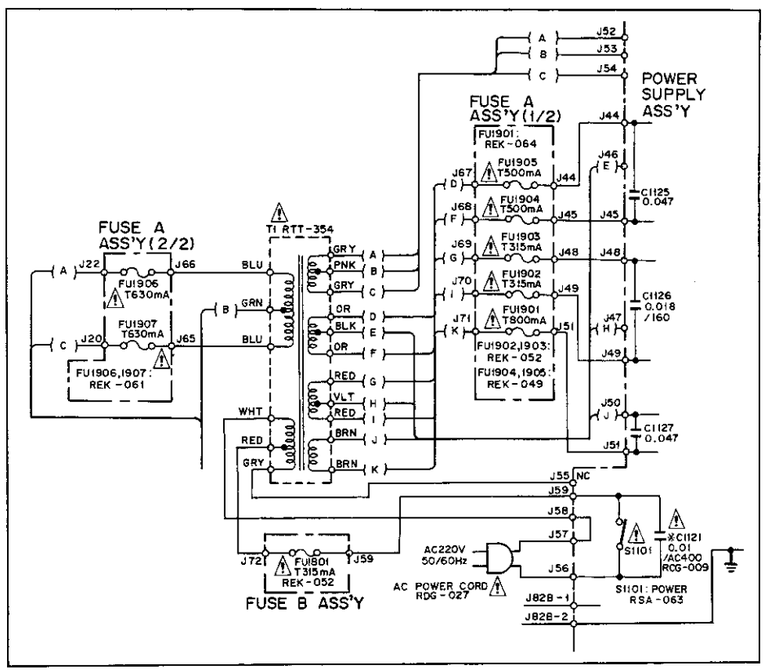
- Sub-amplifier assembly for KC, HEM, HB and HP types is the same as the KU type with the exception of the following parts.

Mark	Symbol & Description	Part No.		Remarks
		for KU type	for HEM type	
⚠	R301, R302	RD1/4PM 200J	RS2PF 200J	
★	V301, V302 Semi-fixed resistor	RCP-145	.....	
	R357 – R360	.....	RD1/4PM 112J	
★★	Q309	2SA933LN	2SA937LN	
★★	Q310	2SC1740LN	2SC2021LN	
⚠ ★★	Q311	2SB1015	2SB834	
⚠ ★★	Q312	2SD1406	2SD880	

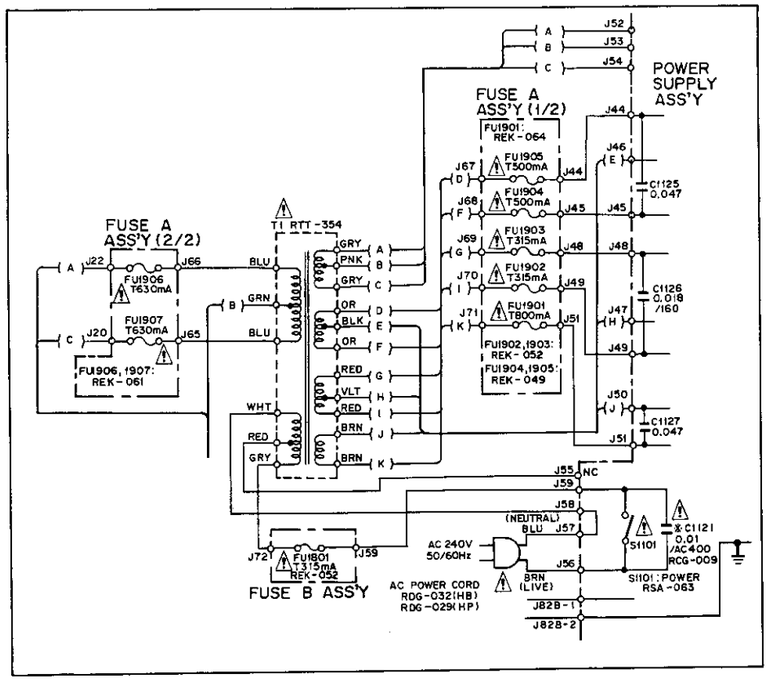
Power Supply Circuit for D Type



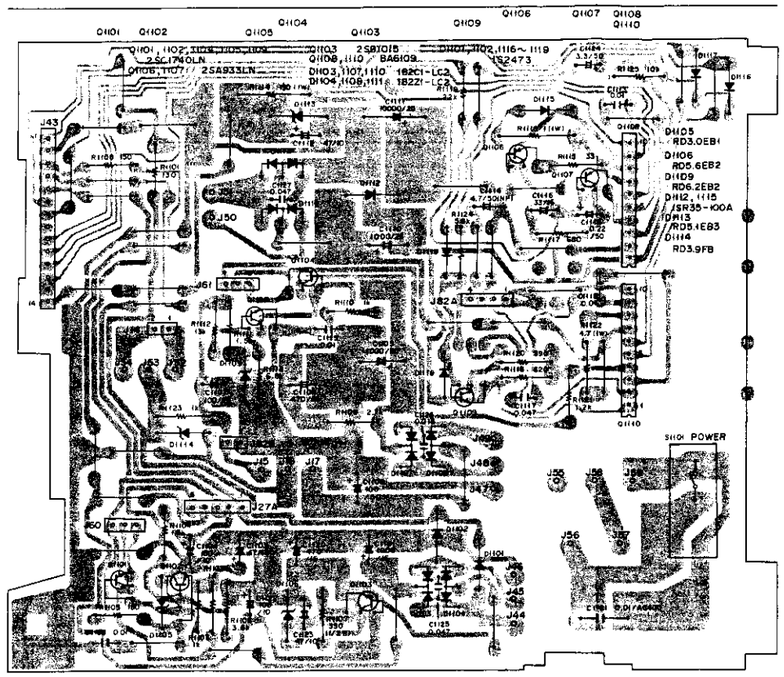
Power Supply Circuit for HEM Type



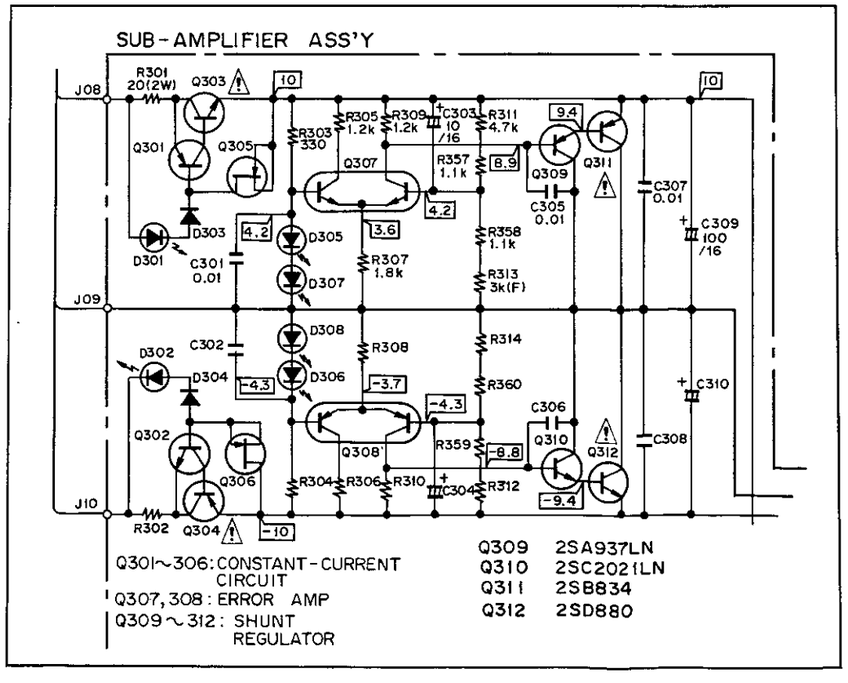
Power Supply Circuit for HB and HP Types



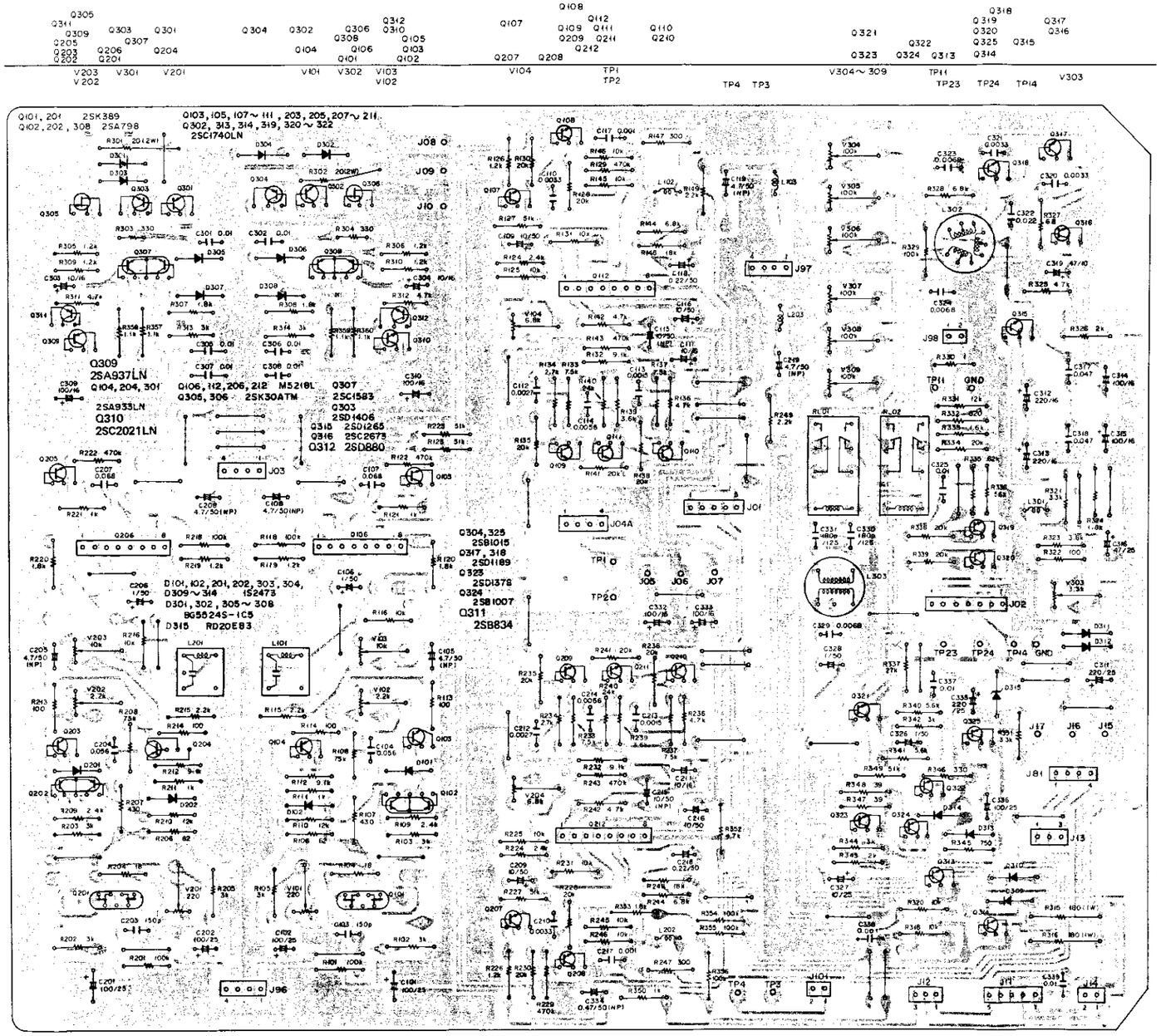
Power Supply Assembly for HEM, HB and HP Types



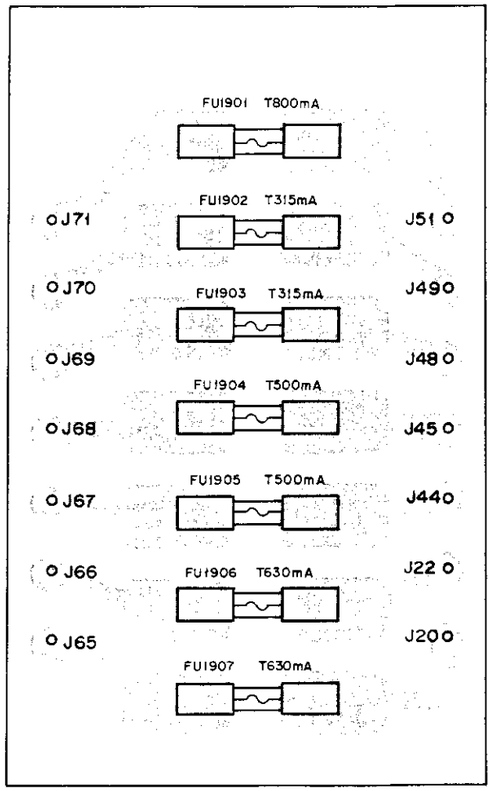
Sub-Amplifier Assembly for KC, HEM, HB and HP Types



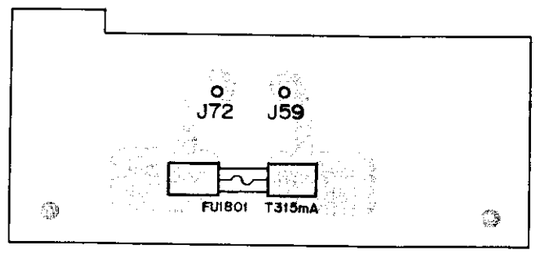
Sub-Amplifier Assembly for KC, HEM, HB and HP Types



Fuse A Assembly for HEM, HB and HP Types



Fuse B Assembly for HEM, HB and HP Types



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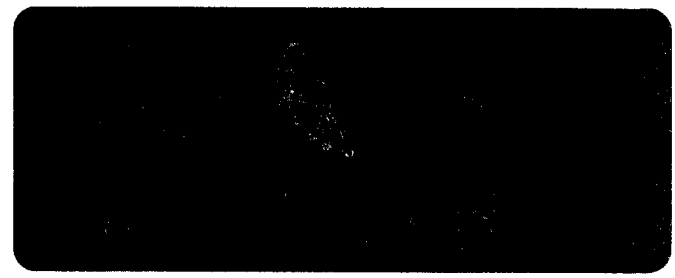
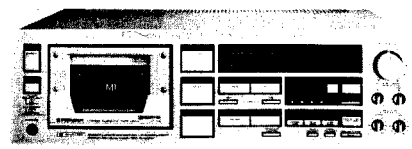


CIRCUIT & MECHANISM DESCRIPTIONS



ORDER NO. ARP-462-0

STEREO CASSETTE TAPE DECK

CT-A9

CT-A7

PIONEER ELECTRONIC CORPORATION 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan
PIONEER ELECTRONICS [USA] INC. P.O. Box 1760, Long Beach, California 90801 U.S.A.
TEL: [800] 421-1404, [213] 420-5914
PIONEER ELECTRONIC [EUROPE] N.V. Keetberglaan 1, 2740 Beveren, Belgium TEL: 03/775.28.08
PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia
TEL: [03] 580-9911

1078

1. MECHANICAL SECTION OPERATION

Mechanical mode switching in the CT-A7 and CT-A9 is motor driven. The degree of rotational movement in the cam controlling the mechanical modes is fed back to a microcomputer in 4-bit digital code form by a rotary encoder (absolute encoder), thereby forming a loop which controls an assist motor (for mechanical mode switching) to achieve extremely stable and reliable control of the mechanical operations. (See Fig. 1-1).

The capstan motor in the CT-A9 is a quartz PLL DD motor (while the CT-A7 employs a DC servo motor belt drive mechanism). In this closed-loop dual capstan system, the sub-flywheel (left hand capstan) is belt-driven.

The reel motor is controlled by microcomputer commands corresponding to play, record/play, FF, rewind, cue (FF MS — music search), and review rewind MS) modes.

Basic Mechanical Operations

Fig. 1-2 outlines the main drive mechanism in stop mode as seen from the front. The six mechanical modes are (1) eject, (2) FF/rewind, (3) stop, (4) MS (music search), (5) pause, and (6) play.

If the mechanism is in eject or stop mode when the power is switched on, that mode is maintained. If in any other mode, however, the mechanism is returned to stop mode. All mechanical modes are switched in succession in the same order. That is, there is no jumping of the next mode (although in practice, the mechanism is switched to the next mode before operation is started for any unwanted mode).

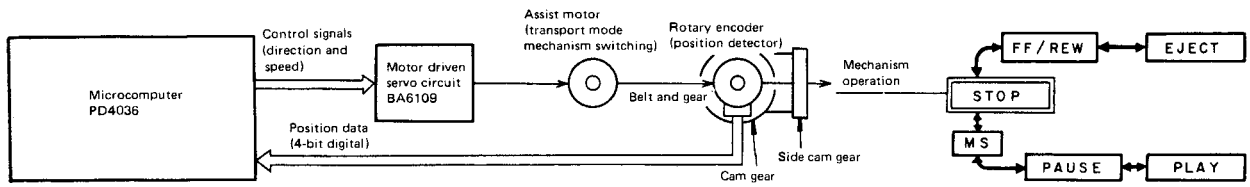


Fig. 1-1 Assist motor control circuit

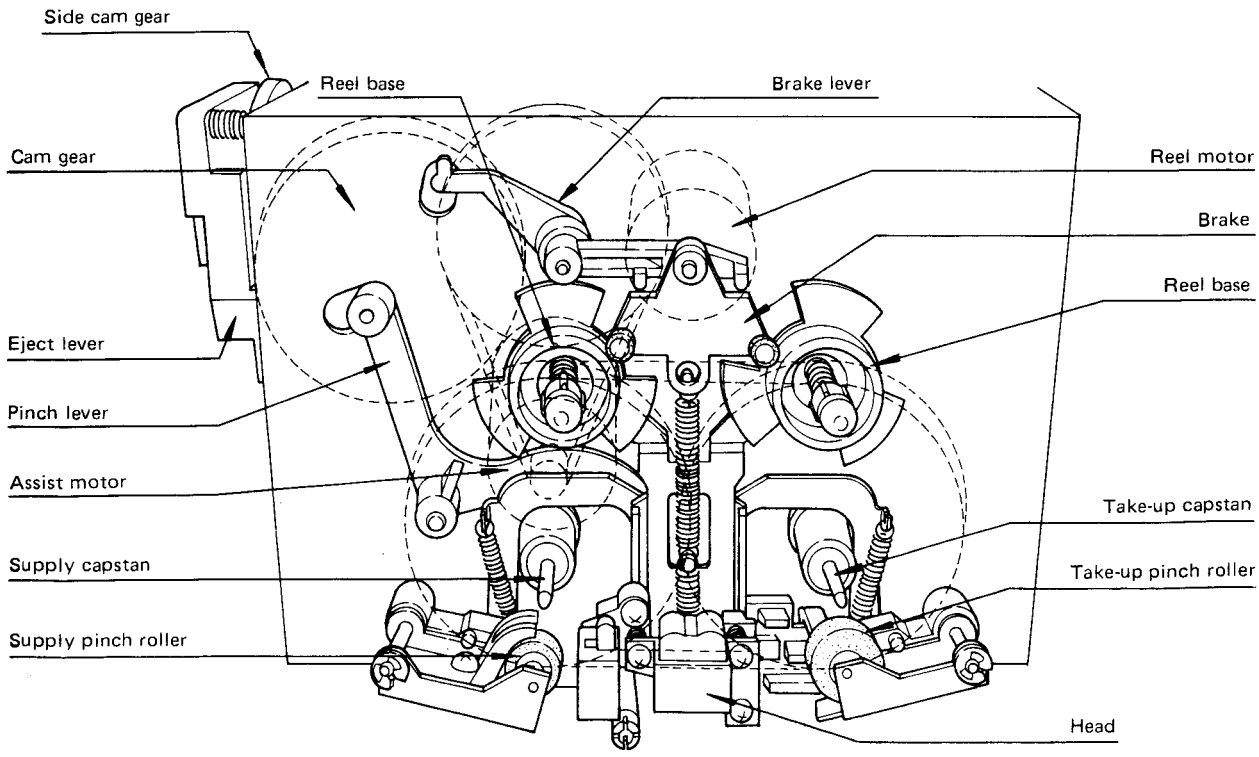
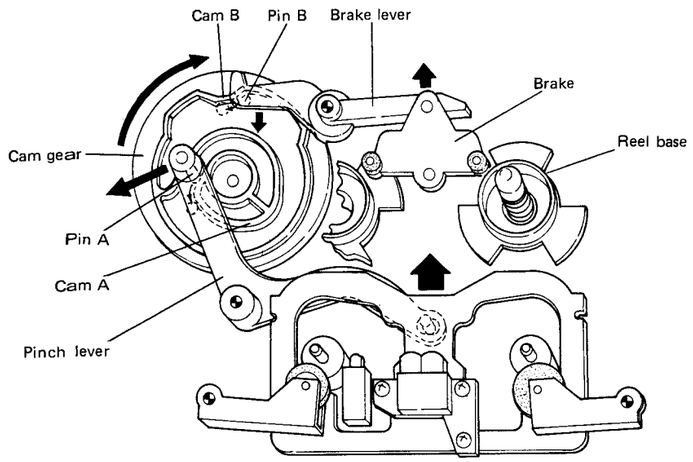
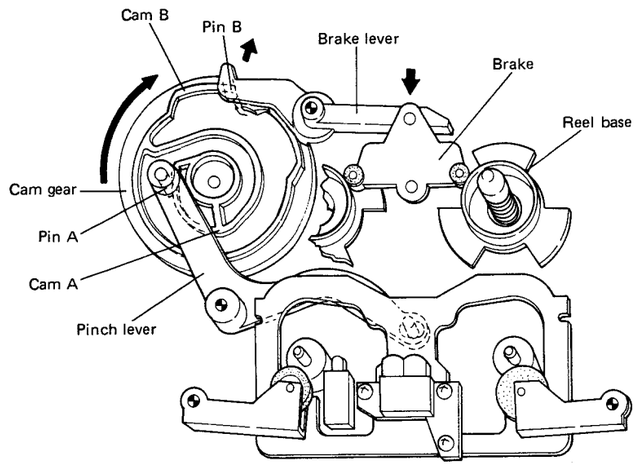


Fig. 1-2 Major mechanical components
(Stop mode, frontal view)

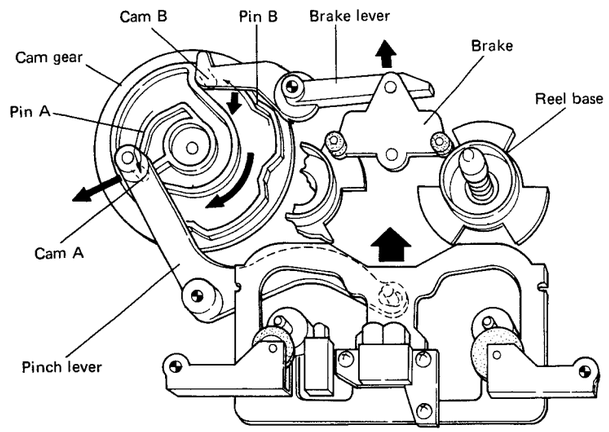
STOP → MS (Music search)
- **Head raised**
- **Brake disengaged (off)**



MS → PAUSE
- **Brake engaged (on)**



PAUSE → PLAY
- **Pinch roller engaged**
- **Brake disengaged**



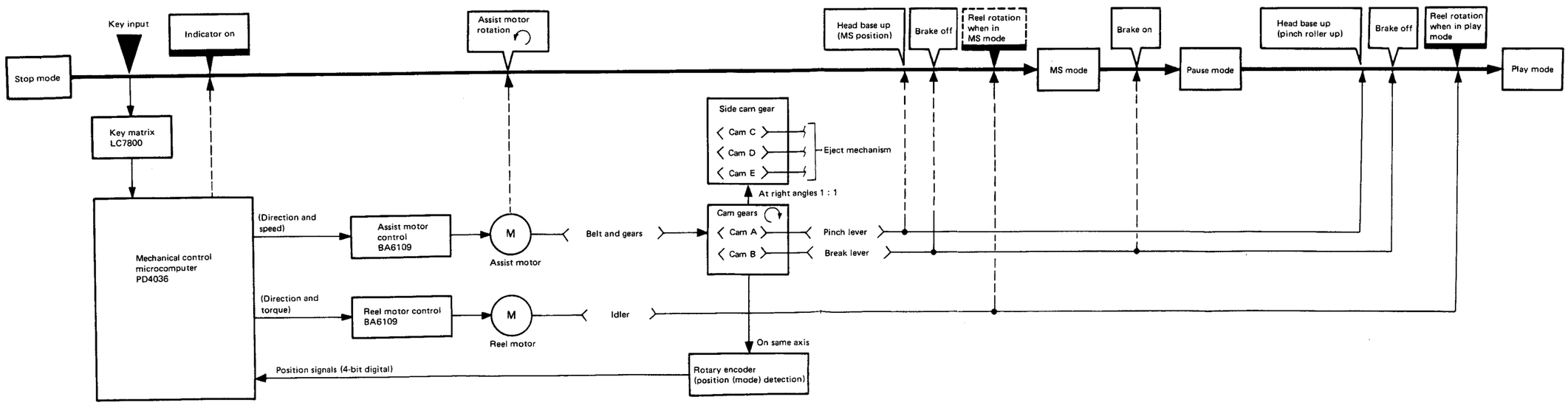
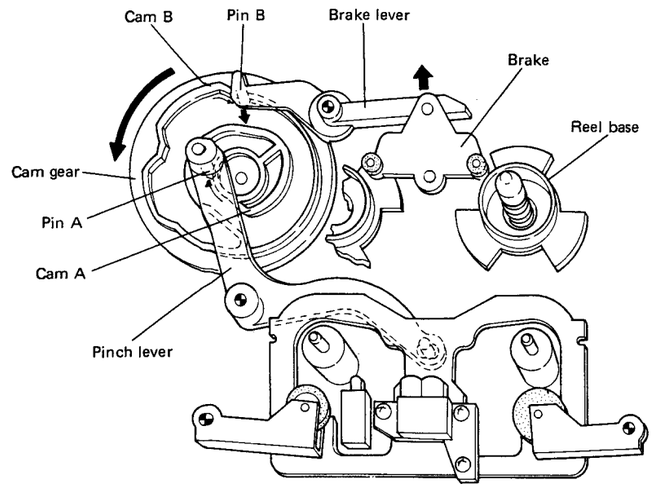
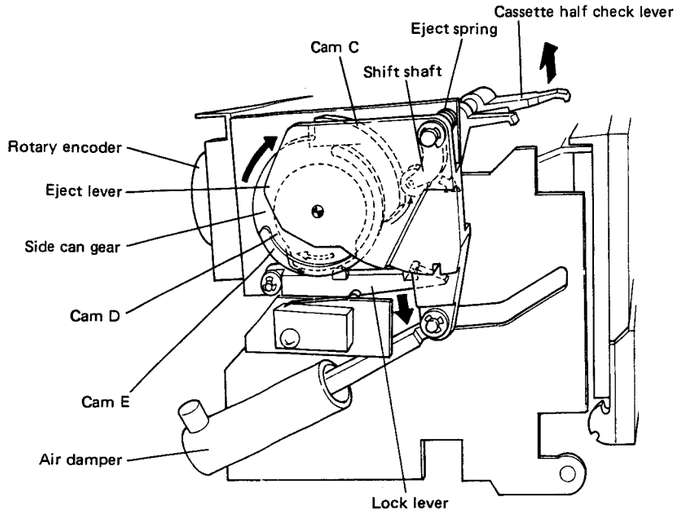


Fig. 1-3 Assist motor forward modes (Stop → MS → Pause → Play)

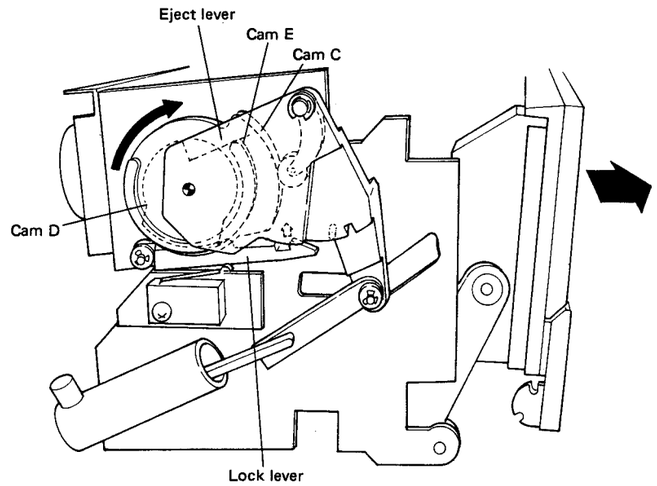
STOP → FF/REW
- **Brake disengaged (off)**



EJECT 1/3
- **Cassette half check lever and detector arm moved back**
- **Eject lever unlocked**



EJECT 2/3
- **Eject action started**



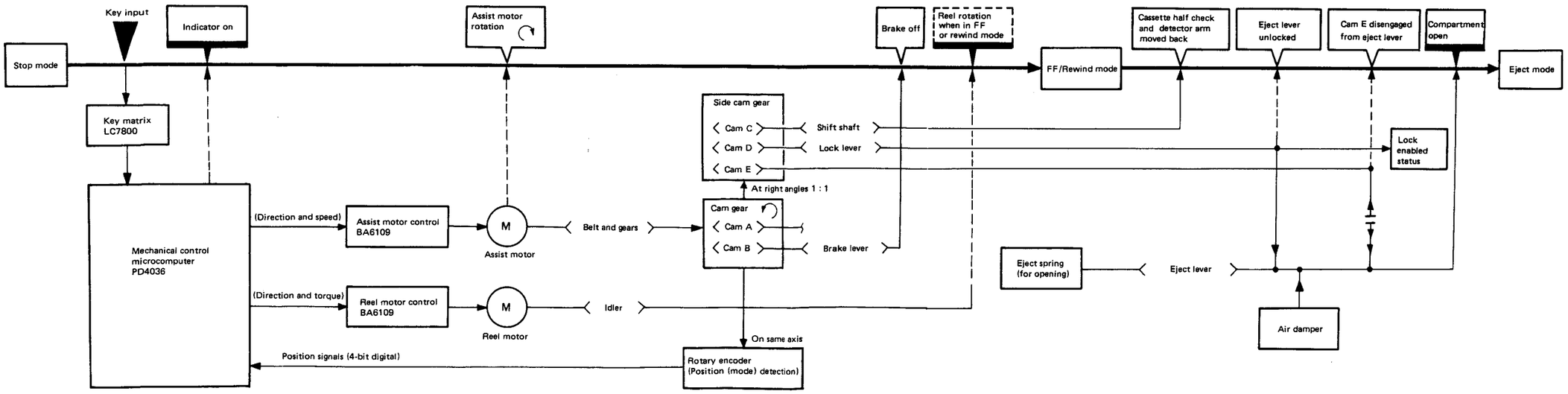
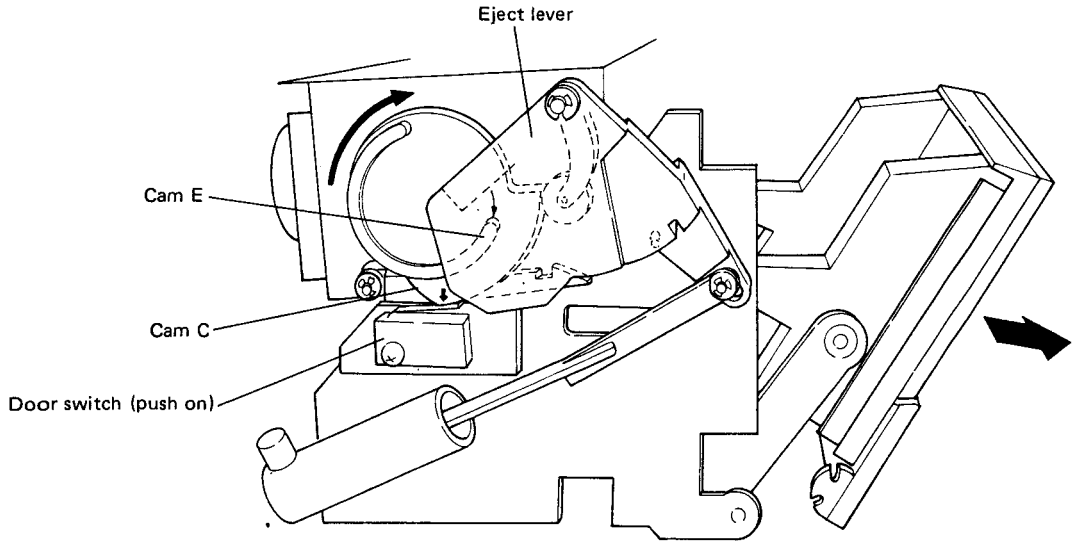


Fig. 1-4 Assist motor reverse modes (Stop → FF/rewind → eject)

EJECT 3/3

- **Cam E disengaged from eject lever**
- **Door switch on**

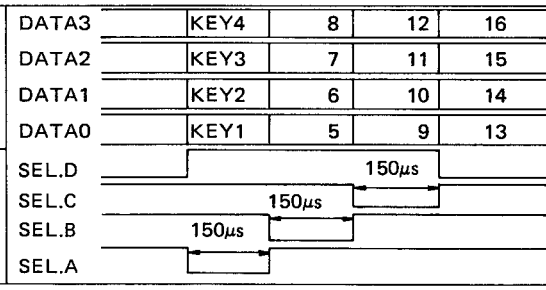


- *Precaution when replaceing heads*
  Because of the very high precision requirements in tape heads, replacement components are supplied as assembly which also include the head base. Under no circumstances must this tape head assembly (CT-A9: RX X-430, CT-A7: RXX-433) be disassembled.

2. IC TECHNICAL DATA

PD4036 (Function control)

Pin No.	Pin Name	I/O	Description
1	X2		
2	PAUSE	Output	PAUSE indicator output. H level during pause mode.
3	REC MUTE	Output	REC MUTE indicator output. H level during normal space mute mode, H/L levels alternated in 640ms cycles during space mute.
4	REC	Output	REC indicator output. H level during this mode.
5	PLAY	Output	PLAY indicator output. H level during this mode.
6	DATA 3	Input	Data input from LC7800
7	DATA 2	Input	
8	DATA 1	Input	
9	DATA 0	Input	
10	SEL.D	Output	Data select output passed to LC7800
11	SEL.C	Output	
12	SEL.B	Output	
13	SEL.A	Output	



* Key scan every 20ms.
* Data reading executed 50μs after SEL switching.

14	MS IND.	Output	MS indicator output. H level during MS mode.
15	ASST SLOW	Output	Assist speed control. Low speed at H level. High speed at L level.
16	FWD	Output	Assist motor control
17	REV	Output	Assist motor control

Motor stopped when FWD is H and REV is H, Eject mode direction when FWD is L and REV is H, Playback mode direction when FWD is H and REV is L

18	RESET	Input	CPU reset input. Reset by H level; normal when L level
19	OSC 1		Pin for connecting external circuit to internal clock oscillator. f = 200kHz.
20	VDD		+5V power supply
21	OSC 2		Pin for connecting external circuit to internal clock oscillator.
22	SENSING	Input	Sensing input When reel is rotating → (Pulse wave height 3.5V min.)
23	0 PULSE	Input	Counter memory pin. Detection by leading edge of input.
24	AE 0	Input	Absolute encoder inputs
25	AE 1	Input	
26	AE 2	Input	
27	AE 3	Input	

	EJECT	FF/REW	STOP	MS	PAUSE	PLAY
AE 0	H	H	L	H	L	L
AE 1	L	L	L	H	H	L
AE 2	L	H	H	H	L	L
AE 3	H	H	L	L	L	L

28	SONG	Input	Blank portion detector pulse input from pin 6 of BA335.
29	$\overline{\text{BLE ENABLE}}$	Output	BLE operation enable signal output. H level when enabled, L level when disabled.
30	$\overline{\text{TIMER}}$	Output	Timer recording and playback start output 4 seconds after power is switched on → ← 100ms
31	ML	Output	Reel motor control. H level during left signal output (rewind) operation.
32	MR	Output	Reel motor control. H level during right signal output (FF, playback) operation.
33	PLAY OUT	Output	Reel motor torque control. H level: playback torque, L level: FF/rewind torque.
34	SOURCE	Output	Automatic TAPE/SOURCE switching output. H level when in SOURCE position.
35	$\overline{\text{PB MUTE}}$	Output	Playback mute output. L level during playback muting.
36	$\overline{\text{LINE MUTE}}$	Output	Line mute output. L level during line muting.
37	$\overline{\text{REC MUTE}}$	Output	Record mute output. L level during recording muting.
38	$\overline{\text{BIAS}}$	Output	Bias oscillator control output. L level during bias oscillation.
39	GND		Ground
40	X1		

Fig. 2-1 PD4036 pin description

LC7800 (Output port expander)

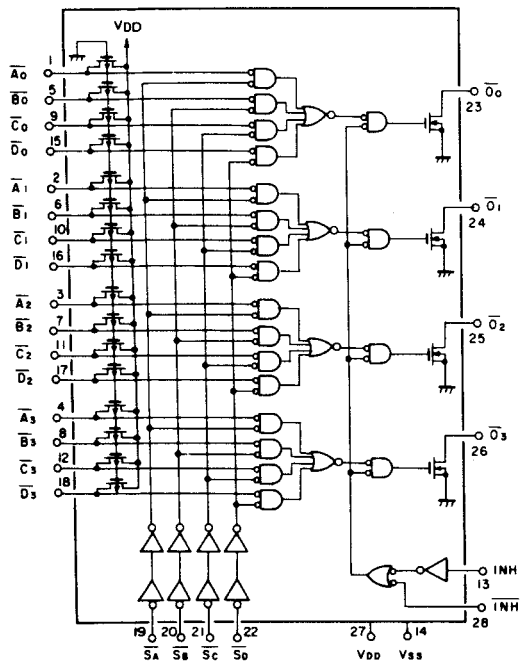


Fig. 2-2 Equivalent circuit of LC7800

INPUT																				OUTPUT			
DATA INPUT																SELECT INPUT				INHIBIT INPUT			
A				B				C				D											
A0	A1	A2	A3	B0	B1	B2	B3	C0	C1	C2	C3	D0	D1	D2	D3	SA	SB	SC	SD	INH	INH	O0	O1	O2	O3
0																0				0		0			
	0															0				0			0		
		0														0				0				0	
			0														0			0		0			0
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															0				0	0					0
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	1	0				
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0				
*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	0	0				

NOTE : 1 : [H] LEVEL / 0 : [L] LEVEL / * : DON'T CARE

Fig. 2-3 Truth table of LC7800

BA335 (MS detector)

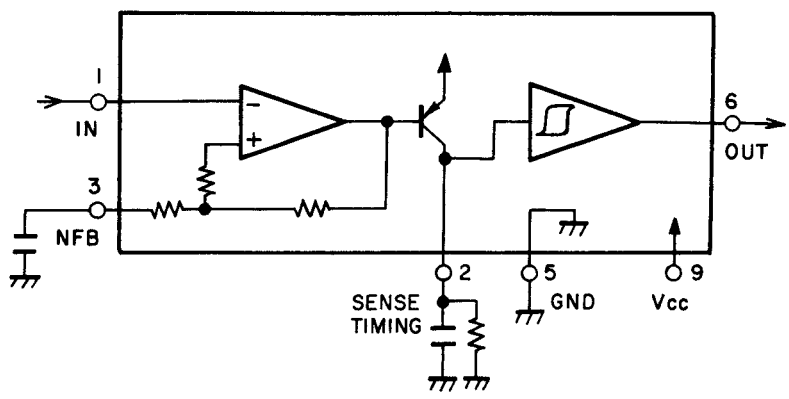


Fig. 2-4 Block diagram of BA335

BA6109 (Motor control)

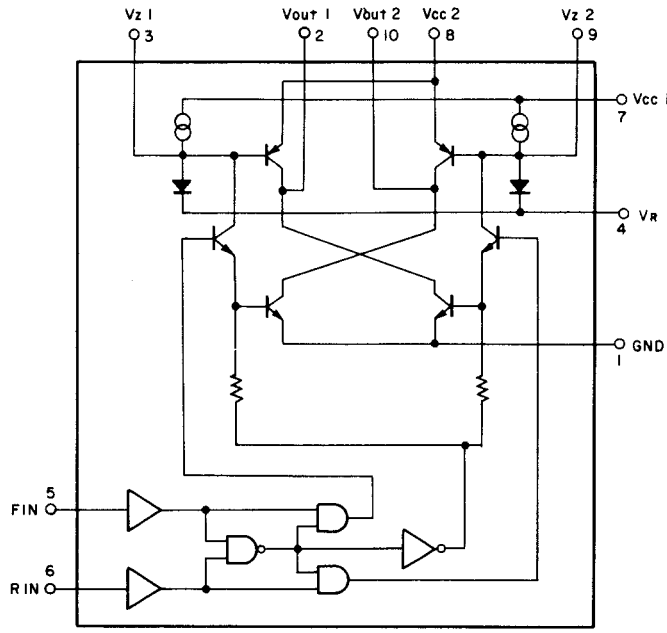


Fig. 2-5 Equivalent circuit of BA6109

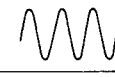
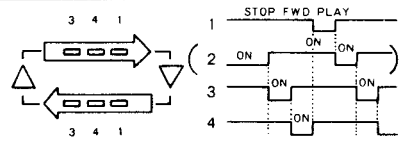
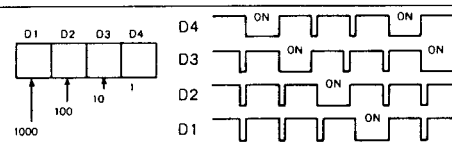
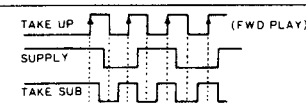
Pin No.	Symbol	I/O	Description	
1	GND		GND	
2	VOUT1	OUT	Motor output (1)	
3	Vz1		Output drive (1)	
4	VR		Output voltage setting	
5	F IN	IN	Input which sets V OUT 1 to "H"	"L" → 0.7V or less
6	R IN	IN	Input which sets V OUT 2 to "H"	"H" → 2V or greater
7	VCC1		+B	
8	VCC2		Power supply	
9	Vz2		Output drive (2)	
10	VOUT2	OUT	Motor output (2)	

Fig. 2-6 BA6109 pin description

Motor Current Direction	INPUT		OUTPUT			
	FIN	RIN	VZ1	OUT1	VZ2	V OUT2
No current flow	H	H	H	L	H	L
⑩ → ②	L	H	H	L	L	H
② → ⑩	H	L	L	H	H	L
No current flow	L	L	H	L	H	L

Fig. 2-7 Truth table of BA6109

PD6008A (Tape counter driver in CT-A9)

Pin No.	Symbol	I/O Status	Description	Use
1	Extal		Pins for connecting external circuit for built-in clock generator. f=3.58MHz. Waveform obtained between pin 2 ground. 	O
2	Xtal			O
3	$\overline{\text{RESET}}$	Input	CPU reset input — reset by L level. Normally at H level.	O
4	IRQ		Not used.	X
5	SO			X
6	SI			X
7	$\overline{\text{SC/TO}}$			X
8	$\overline{\text{TC}}$			X
9	TAPE RUN OUT 1	Output	Tape travel indicator 1. 	X
10	TAPE RUN OUT 2	Output	Tape travel indicator 2.	X
11	TAPE RUN OUT 3	Output	Tape travel indicator 3.	X
12	TAPE RUN OUT 4	Outpur	Tape travel indicator 4.	X
13	SEGMENT DATA a	Output	Segment data a. ON at H level. 	O
14	SEGMENT DATA b	Output	Segment data b. ON at H level.	O
15	SEGMENT DATA c	Output	Segment data c. ON at H level.	O
16	SEGMENT DATA d	Output	Segment data d. ON at H level.	O
17	SEGMENT DATA e	Output	Segment data e. ON at H level.	O
18	SEGMENT DATA f	Output	Segment data f. ON at H level.	O
19	SEGMENT DATA g	Output	Segment data g. ON at H level.	O
20	—"— —"— DOT	Output	Segment data dot. ON at H level.	O
21	GND		Ground.	O
22	Rϕ		Not used.	X
23	RI	Input	CPU test program input. Fixed to H level.	X
24	TAPE RUN SELECT	Input	Tape transport indicated speed switching. H: low speed. L: high speed. Fixed to H level.	X
25	COUNTER ϕ PULSE	Output	L level output when tape counter at 0000. Normally at H level. These otuputs are obtained irrespective of the indicated mode. (for TAPE RETURN operation).	O
26	DIGIT 4	Output	DIGIT output 4. 	O
27	DIGIT 3	Output	DIGIT output 3.	O
28	DIDIT 2	Output	DIGIT output 2.	O
29	DIGIT 1	Output	DIGIT output 1.	O
30	TAKE-UP	Input	Reel rotation sensing pulse input. 	O
31	SUPPLY	Input	Reel rotation sensing pulse input.	O
32	TAKE SUB	Input	Reel rotation sensing pulse input.	O
33	$\overline{\text{FWD}}$/REV	Input	H level when mechanical mode is REV, and L leval when FWD.	O
34	$\overline{\text{PLAY}}$	Input	L level when mechanical mode is PLAY, REC, PLAY-PAUSE, or REC-PAUSE.	O
35	$\overline{\text{FF}}$	Input	L level when mechanical mode is FF.	O
36	$\overline{\text{REW}}$	Input	L level when mechanical mode is REW.	O
37	$\overline{\text{PAUSE}}$	Input	L level when mechanical mode is PLAY-PAUSE, REC-PAUSE, or PAUSE.	O
38	TAPE SELECTOR 1	Input	Tape time selector switch input 1.	O
39	TAPE SELECTOR 2	Input	Tape time selector switch input 2.	O
40	DISPLAY MODE	Input	Counter display mode selector switch input. L level when switch in ON. Real-time counter ⟷ tape counter.	O
41	COUNTER RESET	Input	Tape counter reset switch input. L level when switch in ON.	O
42	Vcc		+5V power supply.	O

	C-46L	C-46	C-60	C-90
Pin 38	L	L	H	H
Pin 39	L	H	L	H

Fig. 2-8 PD6008A pin description

PD4037 (BLE control in CT-A9)

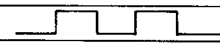
Pin No.	Pin Name	I/O	Description
1	CL1		Pin for connecting external LC tank circuit to internal clock oscillator.
2	A/D1	In/Out	A/D converter data output/Operation mode command input.
3	A/D2	In/Out	
4	A/D3	In/Out	
5	A/D4	In/Out	
6	$\overline{\text{SENSING}}$	Input	Take-up reel pulse input (tape transport detector) 
7	CLEAR	Input	BLE data reset pin. Reset by H, normal at L
8	CK 1	Output	Bias data transfer clock output (H)
9	CK 2	Output	Recording level data transfer clock output (H)
10	CK 3	Output	Left channel recording equalizer data transfer clock output (H)
11	CK 4	Output	Right channel recording equalizer data transfer clock output (H)
12	A/D5	Output	A/D converter data output
13	P RES	Output	A/D converter peak hold reset pulse output (H)
14	$\overline{\text{MUTE}}$	Output	BLE muting output. L level during BLE (line output muting, test tone on, PM9001A operation mode command input inhibited).
15	OSC CONT	Output	Test tone switching control. H: 1kHz, L: 10kHz
16	EQXL 1	Output	Left channel equalizer adjustment range extension output (H)
17	EQXL 2	Output	Left channel equalizer adjustment range extension output (H)
18	EQXR 1	Output	Right channel equalizer adjustment range extension output (H)
19	EQXR 2	Output	Right channel equalizer adjustment range extension output (H)
20	TEST		CPU test input (fixed to H)
21	Vss		Positive power supply (+5V)
22	D/A DATA	Output	Bias, level, and equalizer data outputs (synchronized with CK1 thru CK4)
23	MC 1	Output	Mechanical control output: H = STOP; H = REW; L = REC; L = Normal
24	MC 2	Output	Mechanical control output: H = STOP; L = REW; H = REC; L = Normal
25	BX 1	Output	Bias control output: H = UNDER BIAS; H = PEAK BIAS; L = Not used; L = OVER BIAS
26	BX 2	Output	Bias control output: H = UNDER BIAS; L = PEAK BIAS; H = Not used; L = OVER BIAS
27	O DISP	Output	Over BIAS indicator output (H). H/L alternated during OVER BIAS BLE operation.
28	P DISP	Output	PEAK BIAS indicator output (H). H/L alternated during PEAK BIAS BLE operation.
29	U DISP	Output	UNDER BIAS indicator output (H). H/L alternated during UNDER BIAS BLE operation.
30	B DISP	Output	BIAS adjustment indicator output. H level while BLE bias is being adjusted.
31	L DISP	Output	LEVEL adjustment indicator output. H level while BLE level is being adjusted.
32	E DISP	Output	EQ adjustment indicator output. H level while BLE equalization is being adjusted.
33	COMP L	Input	Input pin for A/D converter comparator output (left channel)
34	COMP R	Input	Input pin for A/D converter comparator output (right channel)
35	$\overline{\text{REC}}$	Input	Recording operation check input (L)
36	$\overline{\text{REW}}$	Input	Rewind operation check input (L)
37	$\overline{\text{O BLE}}$	Input	OVER BIAS BLE start input (L)
38	$\overline{\text{P BLE}}$	Input	PEAK BIAS BLE start input (L)
39	$\overline{\text{U BLE}}$	Input	UNDER BIAS BLE start input (L)
40	$\overline{\text{CROM}}$	Input	Tape type input.
41	V_{GG}		Negative power supply (–5V)
42	CLO		Pin for connecting external LC tank circuit to internal clock oscillator

Fig. 2-9 PD4037 pin description

PM9001A (BLE input/output extension D/A & A/D conversion in CT-A9)

Pin No.	Pin Name	I/O	Description
1	$\overline{\text{IN INH}}$	Input	Input pins for A/D1 thru A/D4 transfer data control. Data input for "L" → A/D conversion (AUTO and TEST A thru C pin inputs inhibited).
2	Vcc		Positive power supply (+5V)
3	A/D5	Input	A/D conversion data input MSB
4	CK 4	Input	Clock input for right channel recording equalizer setting — Clock inputs for D/A data (serial data) time sharing latching
5	CK 3	Input	Clock input for left channel recording equalizer setting
6	CK 2	Input	Clock input for recording level setting
7	CK 1	Input	Clock input for bias current setting
8	A/D3	In/Out	A/D conversion data input/Operation indicator data output (LSB)
9	A/D3	In/Out	
10	A/D2	In/Out	
11	A/D1	In/Out	
12	GND		Ground
13	A-M		A/D conversion offset setting pin
14	P-RES	Input	A/D conversion playback input signal peak hold reset input. "H" → Reset
15	ARO2		Peak hold element connector pins
16	ALO2		
17	ARO1		
18	ALO1		
19	AR IN	Input	Right channel playback signal input pin
20	AL IN	Input	Left channel playback signal input pin
21	V_{EE}		Negative power supply (−5V)
22	EQ RO4		Right channel recording equalizer variable capacitor connector pin (MSB … LSB)
23	EQ RO3		
24	EQ RO2		
25	EQ RO1		
26	EQ RO4		Left channel recording equalizer variable capacitor connector pin (MSB … LSB)
27	EQ LO3		
28	EQ LO2		
29	EQ LO1		
30	LEVEL RO		Right channel recording level variable programmable attenuator
31	LEVEL LO		Left channel recording level variable programmable attenuator
32	BIAS 0		Recording bias variable programmable attenuator
33	$\overline{\text{AUTO}}$	Input	Timer recording OVER BIAS BLE start input "L" active
34	TEST C	Input	Test mode start input "L" active
35	$\overline{\text{TEST B}}$	Input	Timer recording PEAK BIAS BLE start input "L" active
36	$\overline{\text{TEST A}}$	Input	Timer recording UNDER BIAS BLE start input "L" active
37	$\overline{\text{D/A RES}}$	Input	Latch data clear input "L" active
38	D/A DATA	Input	BLE setting serial data input
39	COMP R	Output	Right channel A/D conversion comparator output
40	COMP L	Output	Left channel A/D conversion comparator output

Fig. 2-10 PM9001A pin description

AN6870N (Level meter driver in CT-A7)

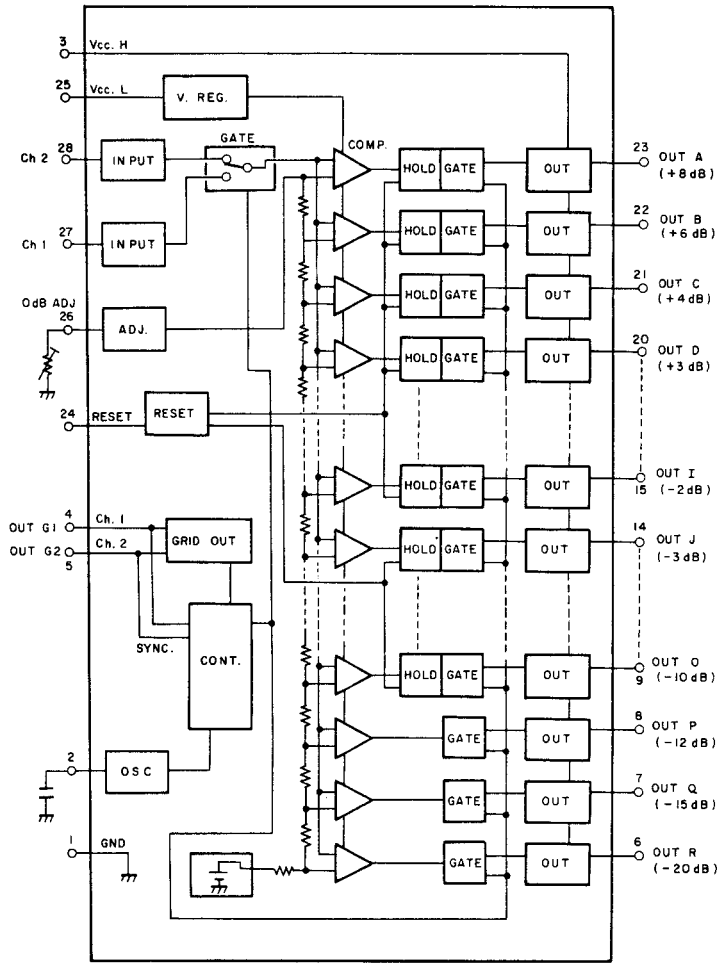


Fig. 2-11 Equivalent circuit of AN6870N

HA12010 (Level meter driver in CT-A9)

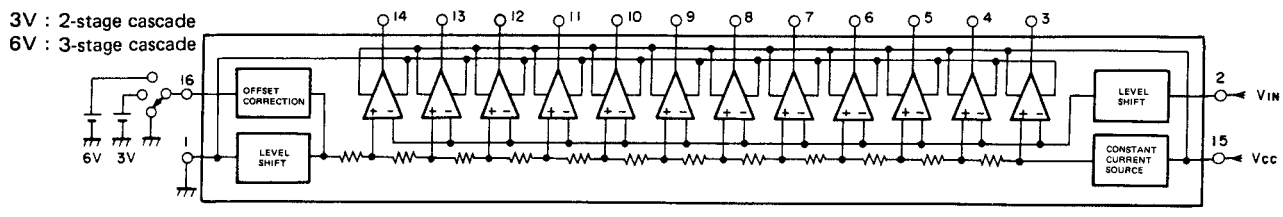


Fig. 2-12 Equivalent circuit of HA12010

3. BLOCK DIAGRAM

CT-A7

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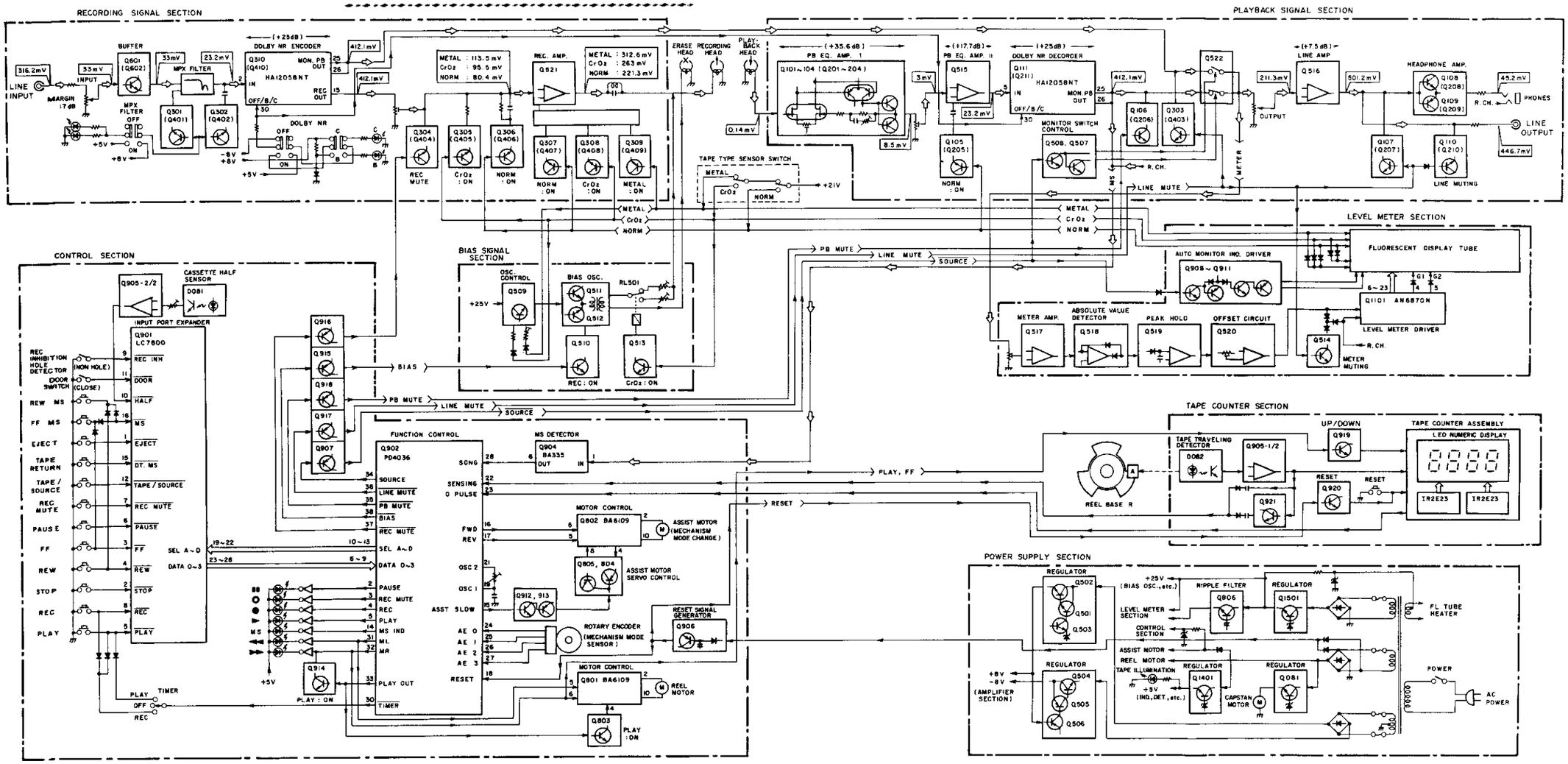
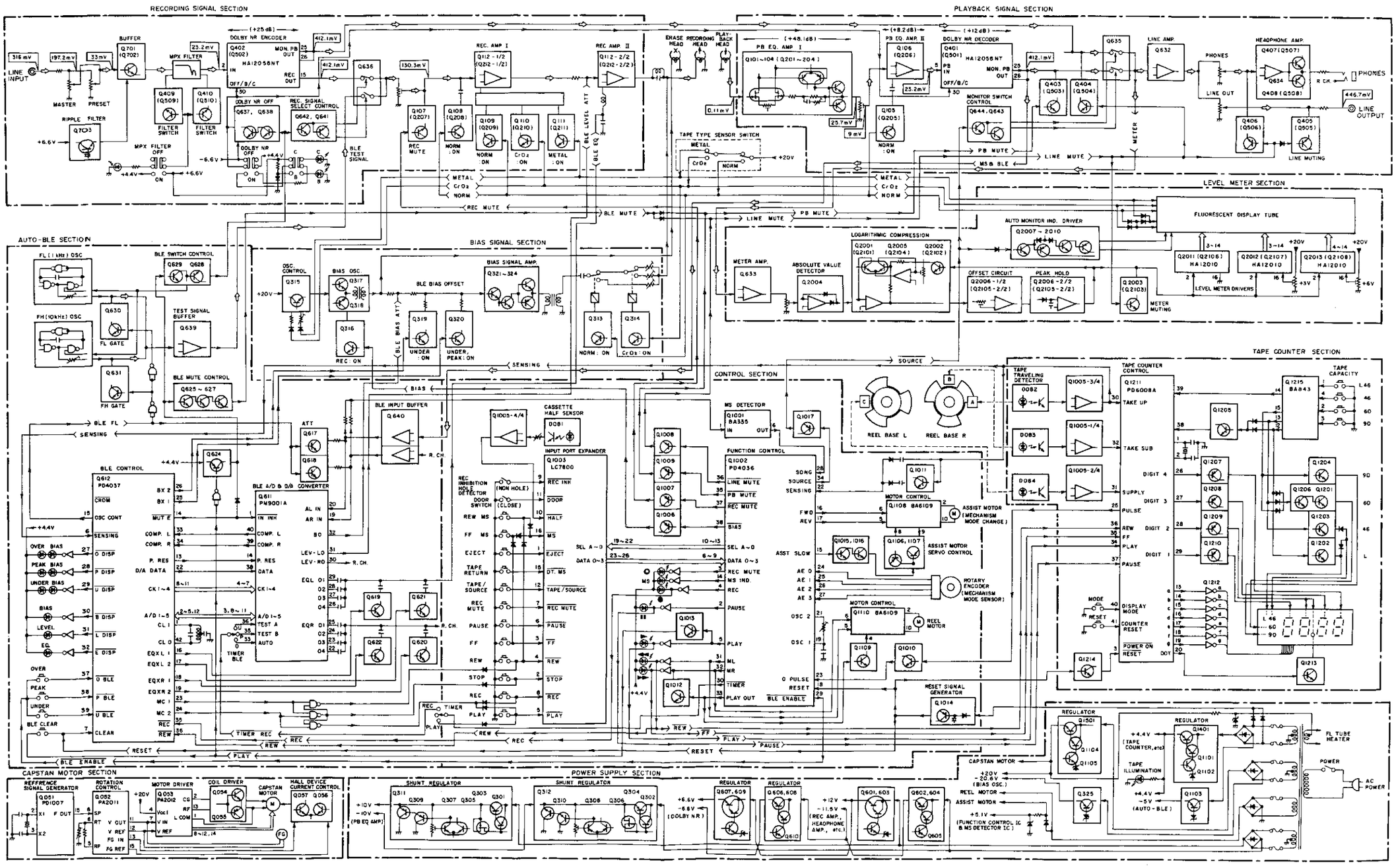
Noise Reduction manufactured under license from Dolby Laboratories Licensing Corporation.



CT-A9


RECORDING SIGNAL SECTION
PLAYBACK SIGNAL SECTION
AUTO-BLE SECTION
BIAS SIGNAL SECTION
LEVEL METER SECTION
TAPE COUNTER SECTION
CONTROL SECTION
CAPSTAN MOTOR SECTION
POWER SUPPLY SECTION
LINE INPUT
MASTER
PRESET
BUFFER
MPX FILTER
RIPPLE FILTER
DOLBY NR ENCODER
DOLBY NR OFF
REC SIGNAL SELECT CONTROL
REC AMP. I
REC AMP. II
ERASE HEAD
RECORDING HEAD
PLAY-BACK HEAD
PB EQ. AMP I
PB EQ. AMP II
DOLBY NR DECODER
MONITOR SWITCH CONTROL
LINE AMP.
PHONES
HEADPHONE AMP.
LINE OUTPUT
TAPE TYPE SENSOR SWITCH
REC MUTE
BLE MUTE
PB MUTE
LINE MUTE
METER
FLUORESCENT DISPLAY TUBE
AUTO MONITOR IND. DRIVER
LOGARITHMIC COMPRESSION
METER AMP.
ABSOLUTE VALUE DETECTOR
OFFSET CIRCUIT
PEAK HOLD
METER MUTING
FL (1 MHz) OSC
FH (10kHz) OSC
BLE SWITCH CONTROL
TEST SIGNAL BUFFER
BLE MUTE CONTROL
BLE CONTROL
BLE A/D & D/A CONVERTER
BLE INPUT BUFFER
ATT
OSC. CONTROL
BIAS OSC.
BLE BIAS OFFSET
BIAS SIGNAL AMP.
SENSING
BIAS
CASSETTE HALF SENSOR
INPUT PORT EXPANDER
REC INHIBITION HOLE DETECTOR
FUNCTION CONTROL
MS DETECTOR
REEL BASE L
REEL BASE R
MOTOR CONTROL
ASSIST MOTOR (MECHANISM MODE CHANGE)
ASSIST MOTOR SERVO CONTROL
ROTARY ENCODER (MECHANISM MODE SENSOR)
RESET SIGNAL GENERATOR
TAPE TRAVELING DETECTOR
TAPE COUNTER CONTROL
TAPE CAPACITY
REFFRENCE SIGNAL GENERATOR
ROTATION CONTROL
MOTOR DRIVER
COIL DRIVER
CAPSTAN MOTOR
HALL DEVICE CURRENT CONTROL
SHUNT REGULATOR
REGULATOR
FL TUBE HEATER
POWER
AC POWER

4. CIRCUIT DESCRIPTIONS

The basic circuitry in both CT-A9 and CT-A7 is much the same. The main difference in the mechanism is that where the CT-A9 is equipped with a quartz PLL DD capstan motor and a coreless reel motor, the CT-A7 is belt-driven by a DC servo motor and DC reel motor. In both decks, tape transport is controlled by a closed-loop dual capstan system. The electrical differences lie in the additional functions. The CT-A9 features MOL balance control type AUTO BLE and a real-time tape counter, and includes 35 steps in the level meter display where the CT-A7 has 18.

4.1 OUTLINE OF SIGNAL PATHS

Playback Equalizer Amplifier I (Q101~104, Q201~204)

Dual-FET dual-transistor two-stage differential amplifier, SEPP output stage, and 70μs equalizer time constant.

Playback Equalizer Amplifier II (Q515, 105, 205)

Incorporating low-noise operational amplifiers, this circuit handles playback sensitivity compensation, Dolby NR stage matching, and 120μs equalizer time constant switching (for NORM tapes).

*** Shunt regulator (used in the CT-A9 playback equalizer amplifier power supply).**

This shunt regulator contains a constant current circuit used in parallel control to maintain the current at a constant level when the load current is changed. The power supply impedance is therefore very low, while distortion and crosstalk from other circuits via the power supply are also greatly reduced.

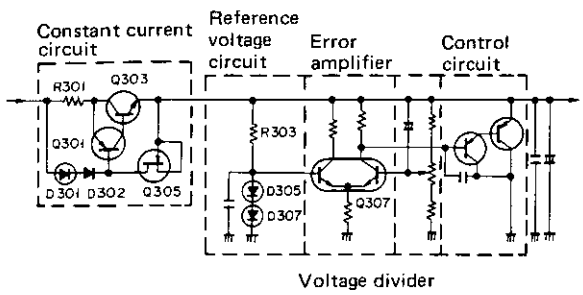


Fig. 4-1 Shunt regulator

Playback Dolby NR Section (Q401 & Q501 in CT-A9, and Q111 and Q211 in CT-A7)

HA12058NT-01 (Note) is used as the Dolby NR B/C IC, and operation is in conformity with PA3012.

NOTE:
Since encoding and decoding are executed in separate ICs, operational characteristics must be organized selectively. There are six specific ranks.

Line Output Amplifier (Q632 in CT-A9, and Q516 in CT-A7)

Low-noise operational amplifiers.

Headphone Amplifier

*** CT-A9 (Q634, 407, 408, 507, 508)**

Operational amplifiers in the input stage, and SEPP composition in the output stage. Separate level controls.

*** CT-A7 (Q108, 109, 208, 209)**

The same circuitry is used in CT-A9 with the exception of the level control.

Lind Input Buffer (Q701 and Q702 in CT-A9, and Q601 and Q602 in CT-A7)

Emitter-follower buffer amplifier. Changes in input impedance at different REC level control positions prevented. Buffering to next stage MPX filter.

Recording Dolby NR Section (Q402 and Q502 in CT-A9, and Q310 and Q410 in CT-A7)

HA12058NT-01 (Note) is used as the Dolby NR B/C IC, and operation is in conformity with PA3012.

Recording Amplifier

*** CT-A9 (Q112 and Q212)**

2-stage operational amplifier composition with separate recording equalizer amplifiers for each tape type.

*** CT-A7 (Q521)**

Operational amplifiers with separate recording equalizer amplifiers for each tape type.

Bias Oscillator Circuit (Q317 and Q318 in CT-A9, and Q512 and Q512 in CT-A7)

Two-transistor push-pull type where oscillator strength is changed by power supply voltage switching. Different bias currents for each tape type.

Automatic Switching of Tape Monitor Output

The function control microcomputer (PD4036) includes one KEY input and one control output (SOURCE) for switching the tape monitor output. The signal path is switched by electronic switch (TC4066BP). In addition to automatic switching to source monitor during recording standby mode and tape monitor during recording and playback modes, manual switching (cyclic) by KEY input is also possible. The PD4036 generates a line muting output signal 0.2ms to 0.5ms prior to switching of the monitor output switching control signal, and cancels the muting 20ms after the monitor output has been switched, thereby blocking the output of any switching noise.

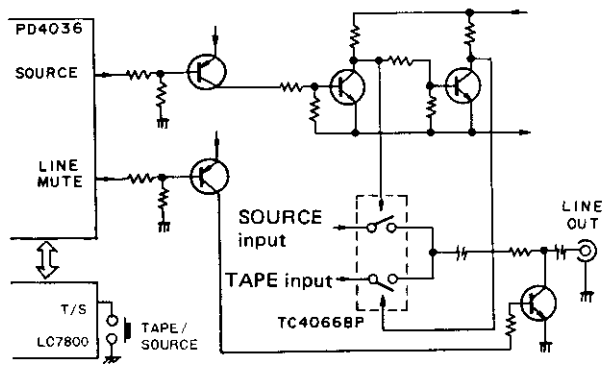


Fig. 4-2 Automatic tape monitor output switching circuit

Level Meter Circuit

*** CT-A9**

1. Line output signal is amplified by Q633.
2. Full-wave rectification (absolute value detection) is achieved by Q2004 and D2001 thru D2004.
3. The signal is compressed by a logarithmic compression circuit by using the transistor's non-linearity.
4. Signal offset is achieved in the offset circuit for level meter matching purposes.
5. Meter attack characteristics are determined by R2025 and C2006 (or R2111 and C2103) while the recovery characteristics are determined by C2006 and R2026 (or C2103 and R2112).
6. The signal compression characteristics are largely determined by the R2015 to R2016 (or R2103 to R2104) ratio. And since meter display is changed in 5dB steps below -15dB and in 1dB steps above -15dB, the compression characteristics are changed below -15dB by turning Q2002 (Q2102) on.
7. The 35-segment FL meter drive involves a 3-stage cascade connection of the 12-segment IC HA12010, and 0V, 3V, and 6V offset of pin 16 which determines the minimum indicated level. (11 segments are covered by Q2013 and Q2108).

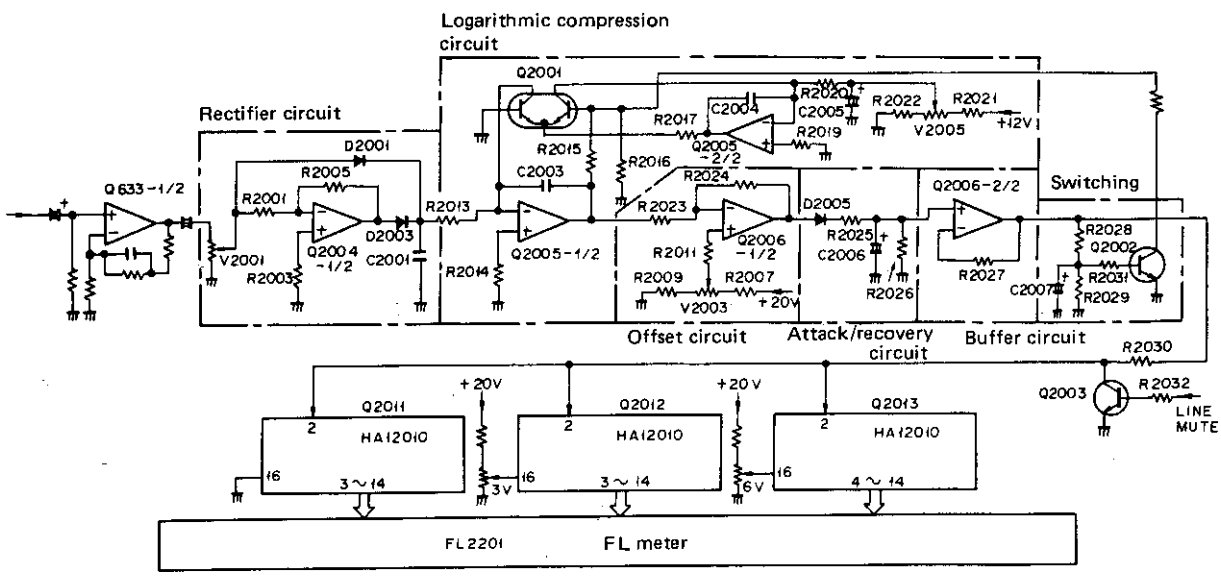


Fig. 4-3 Level meter circuit (CT-A9)

*** CT-A7**

1. Line output signal is amplified by Q517.
2. Full-wave rectification (absolute value detection) is achieved by Q518, D106, and D107, resulting in a negative DC voltage.
3. Meter attack characteristics are determined by R167 and C136 while the recovery characteristics are determined by R168 and C136. Q519 is a buffer amplifier.
4. Q520 is for phase inversion and signal offset to enable level matching of the meter.
5. The FL meter is driven by the level meter drive IC AN6870N. This IC is a two-channel dynamic type which incorporates an 18-point logarithmic scale generator comparator. A single basis to drive the left and right channels.

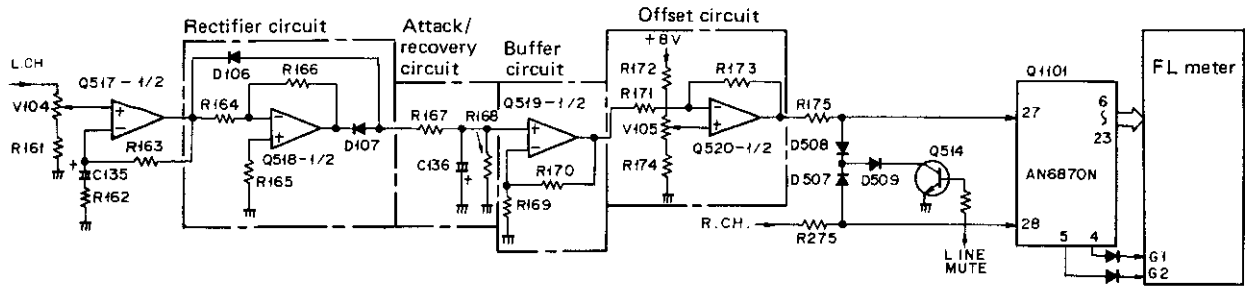


Fig. 4-4 Level meter circuit (CT-A7)

4.2 CONTROL FUNCTION CIRCUITS

Reset Circuit

The reset output signal generated by the reset circuit shown in Fig. 4-5 is generated when the power is switched on and off. This signal is used to reset the function control IC (PD4036) and the tape counter (to 0000), and also to clear the BLE data (CT-A9).

An AC voltage (secondary coil of the power transformer) is applied across A and A' (see diagram), resulting in a +5V power supply with a more rapid trailing edge than the PD4036 power supply being connected to point E.

When the power is switched on, the potential at point C drops sharply (small R1·C1 time constant), resulting in D1 being cut off, and the potential at point D increasing at a slow rate (due to the R3·C2 time constant). Q1 remains on until the potential difference between points D and E is less than 0.6V, and the voltage generated in R4 by the Q1 collector current becomes the reset signal.

When the power is switched off, the potential at point D drops due to the R2·C1/C2 time constant, Q1 being turned on when the potential drops to more than 0.6V below the potential at point E, again resulting in the output of a reset signal from point F. Although the potentials at points E and F decrease because of the falling power supply, the decrease in the PD4036 power supply is relatively more gradual, thereby permitting the generation of the reset signal.

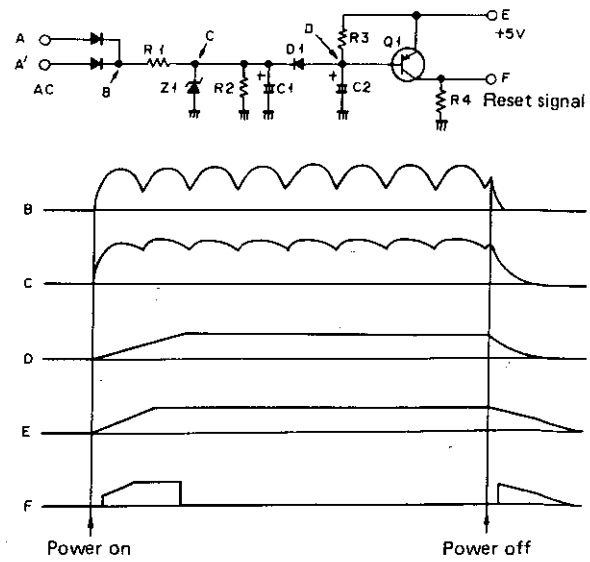


Fig. 4-5 Reset circuit

Mechanical Mode Detector Section

In both the CT-A7 and CT-A9, mechanical operation modes are switched by a special motor (the assist motor) where precise control is achieved by a digital feedback servo control mechanism.

Changes in the degree of rotation of the cam gear which governs the tape transport mechanism modes are converted into 4-bit digital data by a rotary encoder (absolute encoder — see Fig. 4-6) mounted on the same axis as the cam. This data is then fed back to a control microcomputer.

Reel Motor Control Circuit

Rotational direction is determined by control signals applied to pins 5 and 6 of the motor drive control IC BA6109. And by reducing the voltage at pin 4 during playback mode, the take-up torque is decreased. Since the PD4036 is not equipped with pins for FF and rewind (cue and review) mode indication, these signals are obtained from the above reel motor control signals. And in the CT-A9, as the care-less reel motor is started sharply, the take-up torque is decreased by C1124 for a very short time.

Assist Motor (Mechanical Mode Switching) Drive Circuit

Constant speed rotation (two switchable speeds) is obtained by bridge servo control employing the motor drive control IC BA6109. Normal mechanical mode changes are made at high speed (L level output at pin 15 of PD4036). And during eject operations, FF/rewind mode is executed at high speed, while the change to eject mode is made at low speed (H level output at pin 15). The tape loading operation is also executed at low speed.

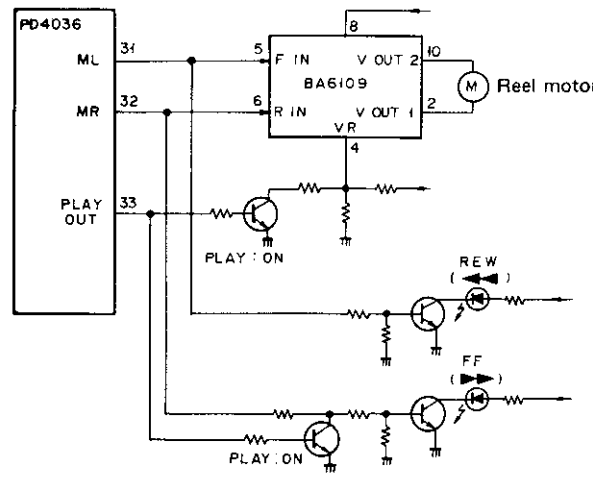


Fig. 4-7 Reel motor drive circuit

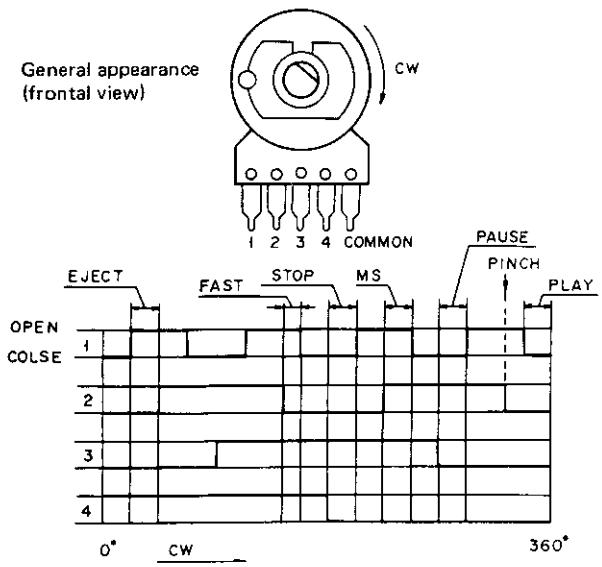


Fig. 4-6 Rotary encoder

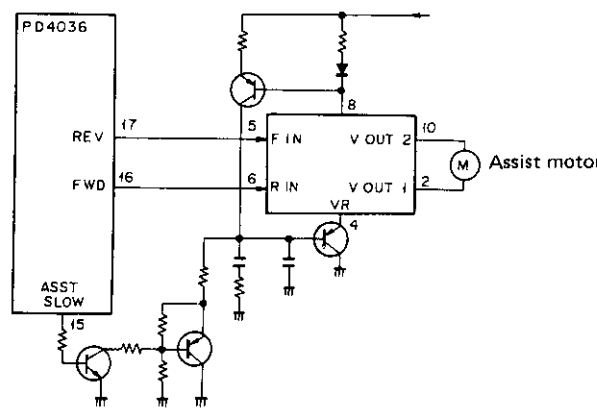


Fig. 4-8 Assist motor drive circuit

Tape Transport Detector Circuit

This detector circuit is used for tape end operations (auto stop) and ATLC operations (automatic tape slack control). Using a photo-interrupter in the detector section, rotation of three blades mounted on the reel base (right hand reel) interrupts the photo-coupling between an LED and phototransistor in an intermittent fashion. The electric signals obtained from this action are subsequently used to form pulse signals which are applied to pin 22 of PD4036. If input of these pulse signals is stopped for more than three seconds, tape transport mechanism is switched to stop mode.

And in the CT-A7, these pulse signals are counted and used to operate the tape counter. The CT-A9 is equipped with an additional two photo-interrupters (one on the left hand reel and one on the right) to operate the real-time tape counter.

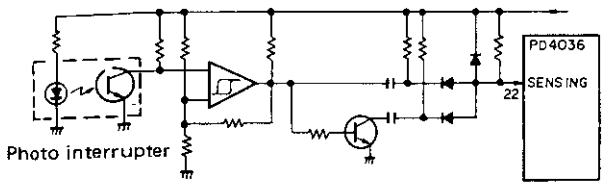


Fig. 4-9 Tape transport detector circuit

Blank Portion Detector Circuit

The blank tape portion detector IC (BA335) is used in MS (music search) operations. A CUE or REVIEW playback signal is applied to pin 1 of BA335 where it is selected by comparator, resulting in Tr1 being turned on and capacitor C connected to pin 2 being charged up. Pin 6 is at H level at this time.

Tr1 is turned off when the input signal is stopped, resulting in capacitor C being discharged and pin 6 being switched to L level about 70ms later.

The MS FF and MS REW buttons activate the MS key input together with the FF key or REW key input, thereby enabling MS operations to be started by single push-button operations.

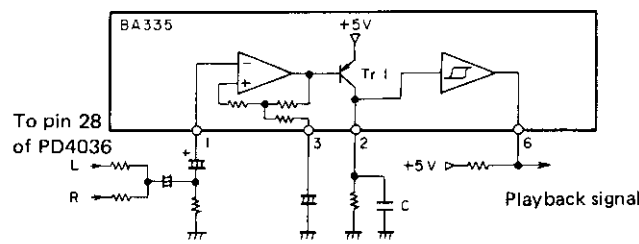


Fig. 4-10 Blank portion detector circuit

Cassette Half Detector

A photo-interrupter is mounted in the bottom right hand corner of the cassette compartment. When a cassette half is loaded, the photo-coupling between a phototransistor and LED is disconnected, thereby detecting the presence of the cassette half. If the cassette half is almost transparent, however, detecting its presence may not be possible.

Door Detector (Eject Detector)

A switch located on the left hand side of the mechanism is switched on by the cam action of the side cam gear when switching to eject mode, thereby detecting the change to eject mode. Since the input applied to PD4036 is generated from the key input matrix via LC7800, it is applied every 20ms.

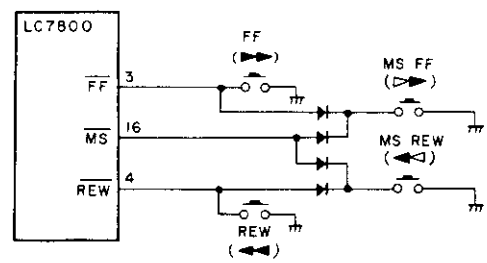


Fig. 4-11 MS key input circuit

the recording level, and the recording equalization to obtain optimum recording conditions for the cassette tape to be used. This function is also capable of offsetting the bias adjustment point by about ±1.5dB in respect to the source signal. The three separate conditions which can be achieved are referred to as UNDER BIAS BLE, PEAK BIAS BLE, and OVER BIAS BLE respectively.

The recording equalization and level in these conditions are adjusted so as to obtain a flat frequency response and the specified recording level at the specified bias point.

The circuit consists of PD4037 (4-bit microcomputer) and PM9001A (AUTO-BLE IC) where various control operations and decision required for automatic adjustment are executed in addition to storage of data. (See Fig. 4-14). The A/D circuit is used during adjustment operations to convert playback signal levels into digital signals capable of being processed by the microcomputer. The variable recording bias current circuit can vary the bias current in 16 steps by using a programmable attenuator in the bias oscillator output circuit. And with an additional attenuator circuit, UNDER, PEAK, and OVER BIAS settings can be made. The variable recording level circuit can vary the recording level in 16 steps by using a programmable attenuator in the pre-stage of the recording amplifier. The variable recording equalization circuit exchanges the programmable attenuator resistor for a capacitor to change the LC resonance frequency in the recording amplifier feedback circuit, thereby achieving 64-step equalization characteristics. (Although the PM9001A is based on 4-bits internally, 2 additional bits are obtained from PD4037 to enable 6-bit control).

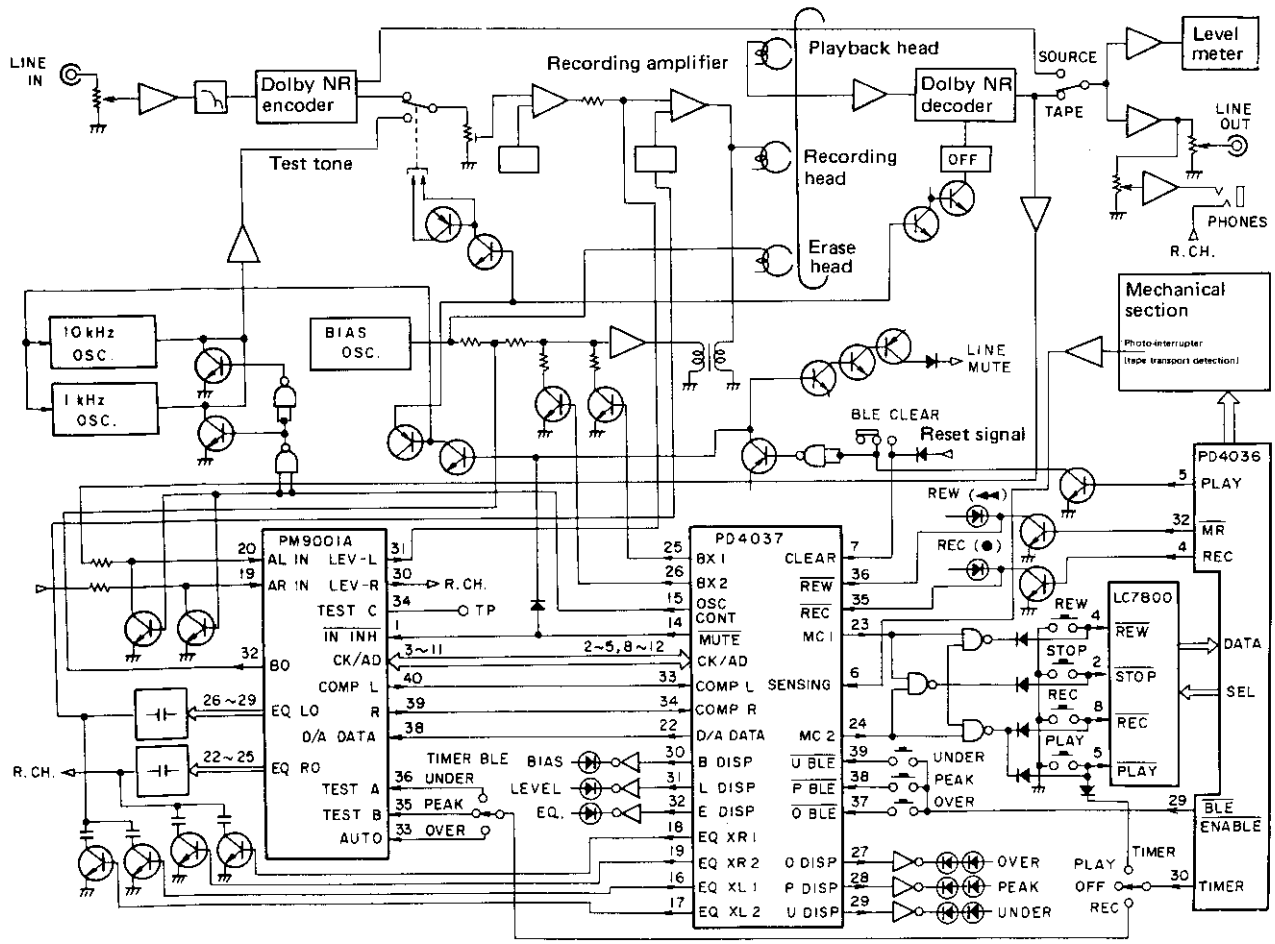


Fig. 4-15 AUTO-BLE circuit

AUTO-BLE Operation

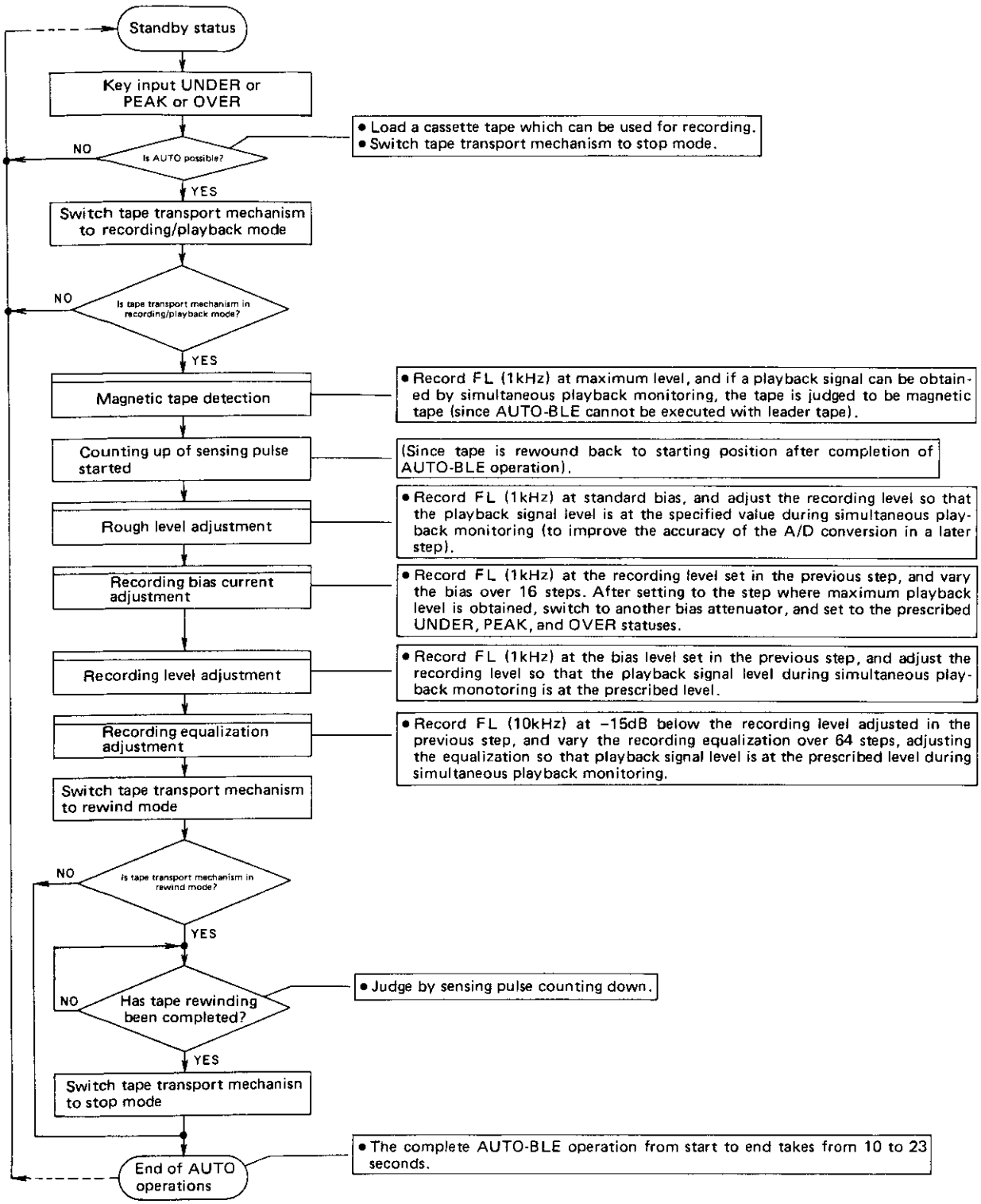


Fig. 4-16 AUTO-BLE operation flowchart

4.5 CAPSTAN MOTOR CIRCUIT (CT-A9)

Speed Detector

When the DD (direct drive) motor is running at a constant rpm, a 726Hz output signal is obtained from an FG coil incorporated in that motor. This signal is passed to PA2011 where it is amplified in an FG amplifier stage before being passed to an F-V converter. Then following waveform rectification by a Schmidt trigger, the frequency is converted into a voltage by the Ct, Co, and Rt time constant circuit.

Reference Phase Generator

A 7.4283MHz signal generated by a crystal resonator in PD1007 is divided by 5120 to obtain a 1450.8Hz output. Then after the frequency of this signal is halved in PA2011, the signal phase is converted into a voltage by a P-V converter, and the voltage signal is passed to an F-V converter via Rp.

Rotational Control

The voltage obtained from the F-V and P-V converters are converted by sample hold circuit into a DC voltage which is passed via a buffer amplifier to PA2012. This voltage is compared by a differential amplifier in PA2012 with a reference voltage output from pin 12 of PD2011, the resultant differential voltage being used to determine the current passed through the motor coil. If the motor speed is slow, the input voltage is lower than the reference voltage, and a current corresponding to the differential voltage is passed. And if the motor speed is fast, the input voltage is higher than the reference voltage, resulting in the current being cut off.

Drive Circuit

Hall elements Ha and Hb are mounted in a way that produces a 90° phase difference in the respective output voltages. Voltage waveform signals (see Fig. 4-17) generated by a position signal synthesizer circuit are passed to the drive circuit. The respective switching of L_A, Ls, and L_{COM}, and the subsequent motor drive operations are dependent on these signals. The coil current at this time is proportional to the PA2012 differential amplifier input potential difference.

Although a large torque is required when starting the motor, the torque required when running at a constant speed is not so large. For this reason, whereas the waveform of the current passed through the Hall elements when starting up is as shown by the full lines in Fig. 4-17, the waveform is smoothed out as shown by the dotted lines once constant speed is reached. This results in further reduction of motor vibration.

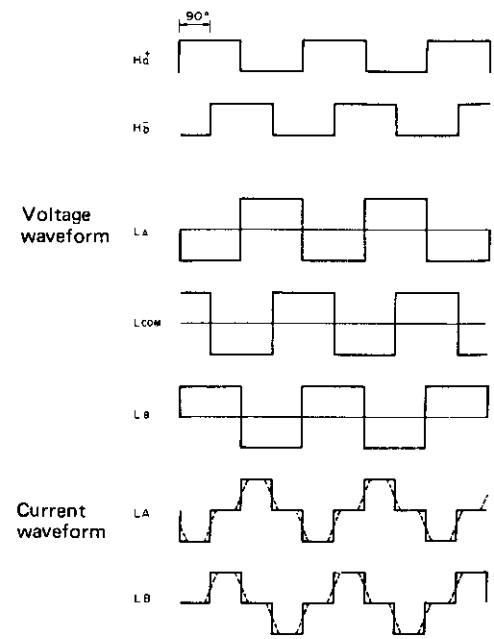
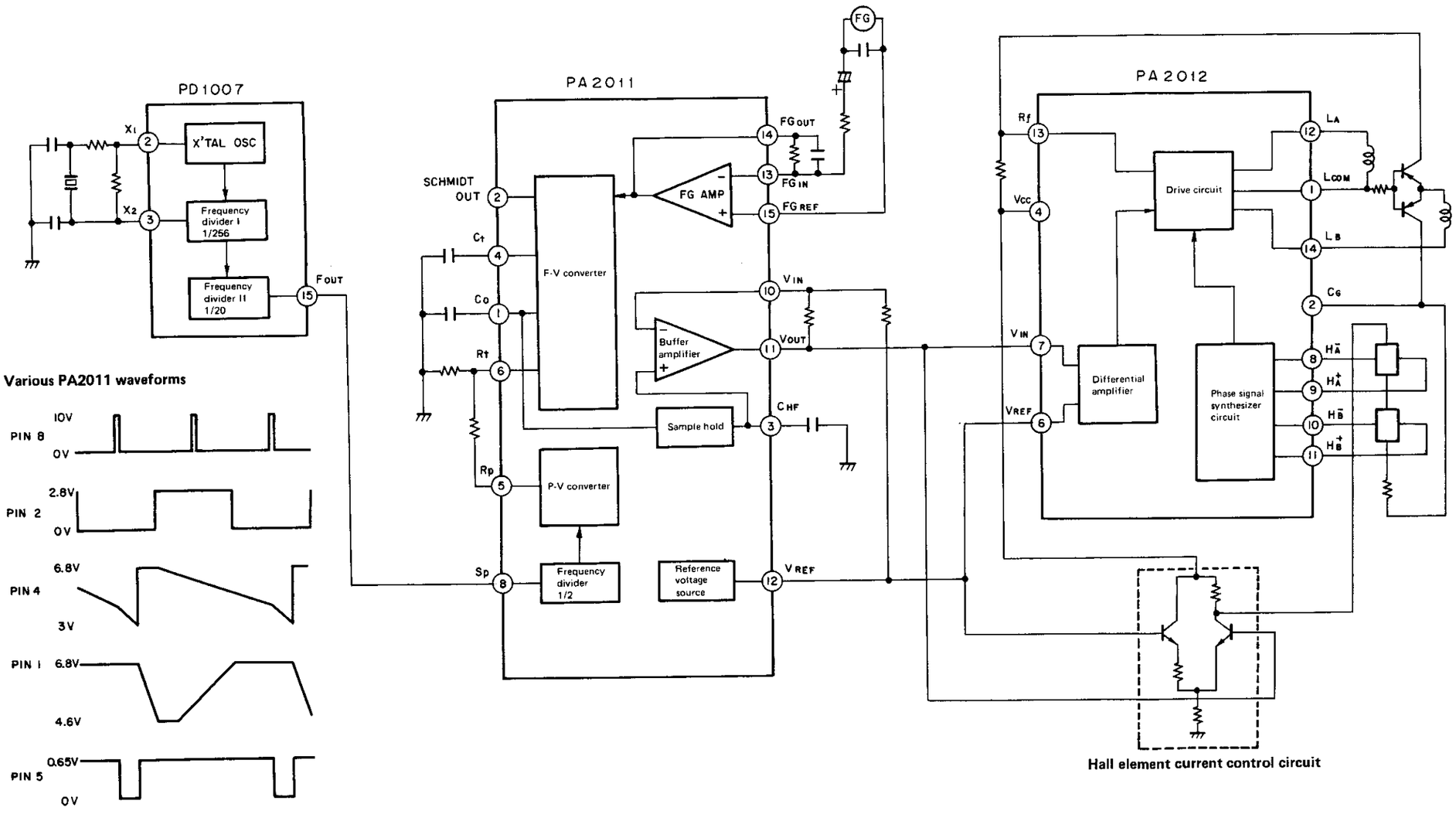


Fig. 4-17 Motor drive circuit waveforms



Various PA2011 waveforms

Fig. 4-18 Capstan motor circuit (CT-A9)

4.6 OUTLINE OF CONTROL SYSTEM OPERATIONS

When Power is Switched On

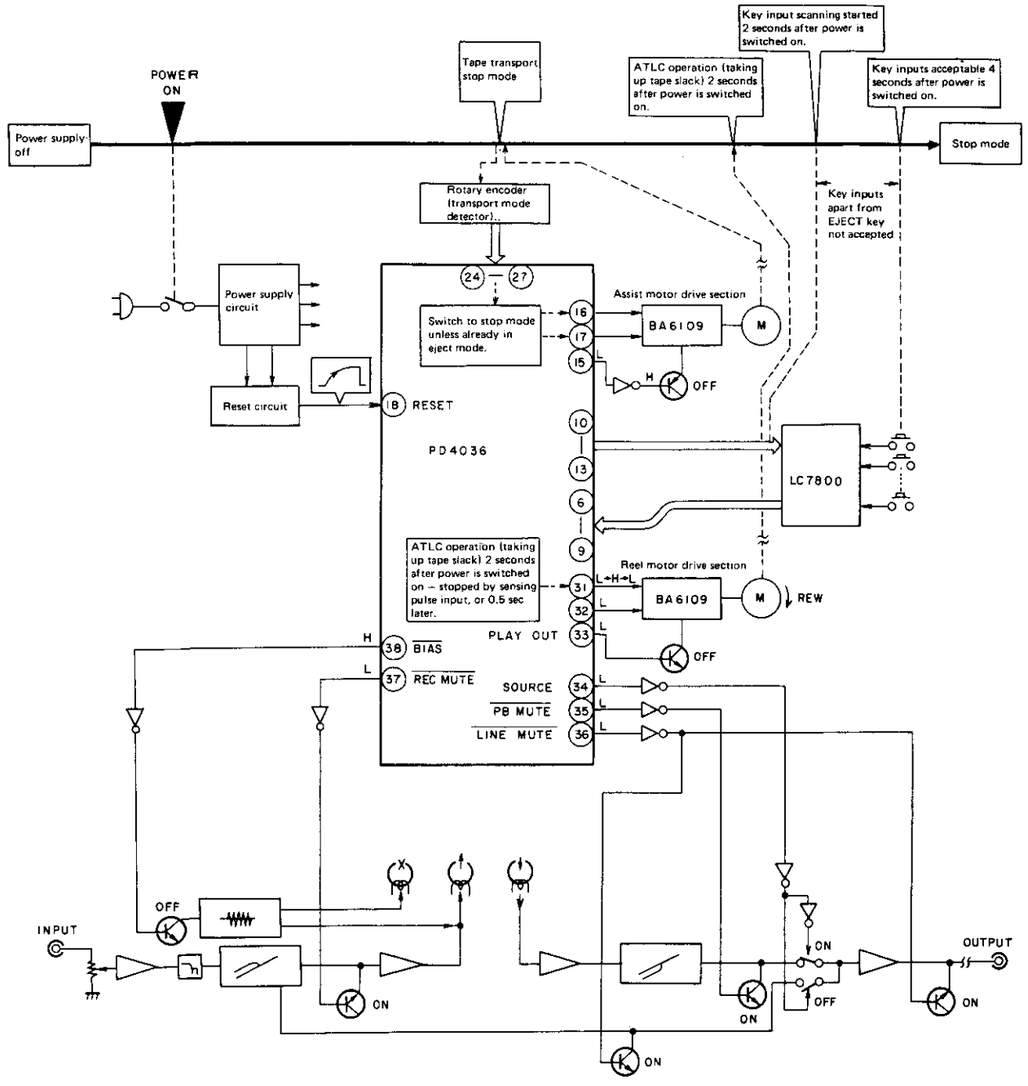


Fig. 4-19 When power supply is switched on

When Cassette Tape is Loaded

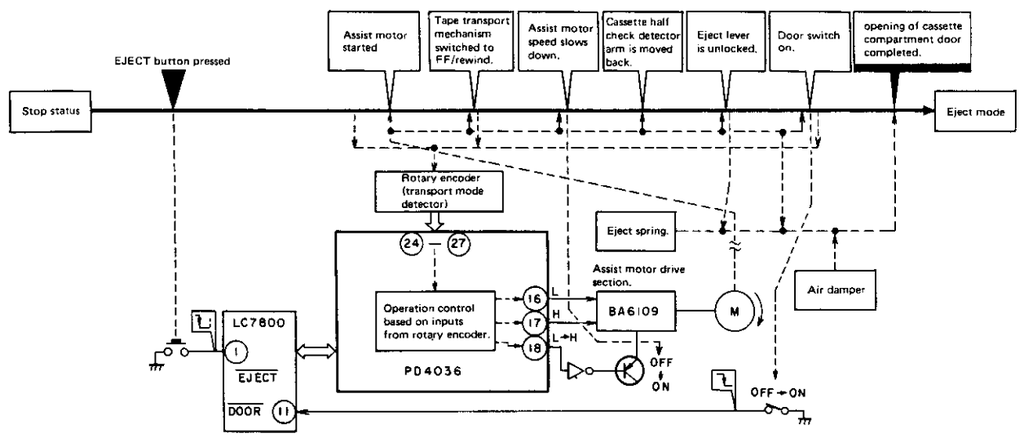


Fig. 4-20 Powered eject operation

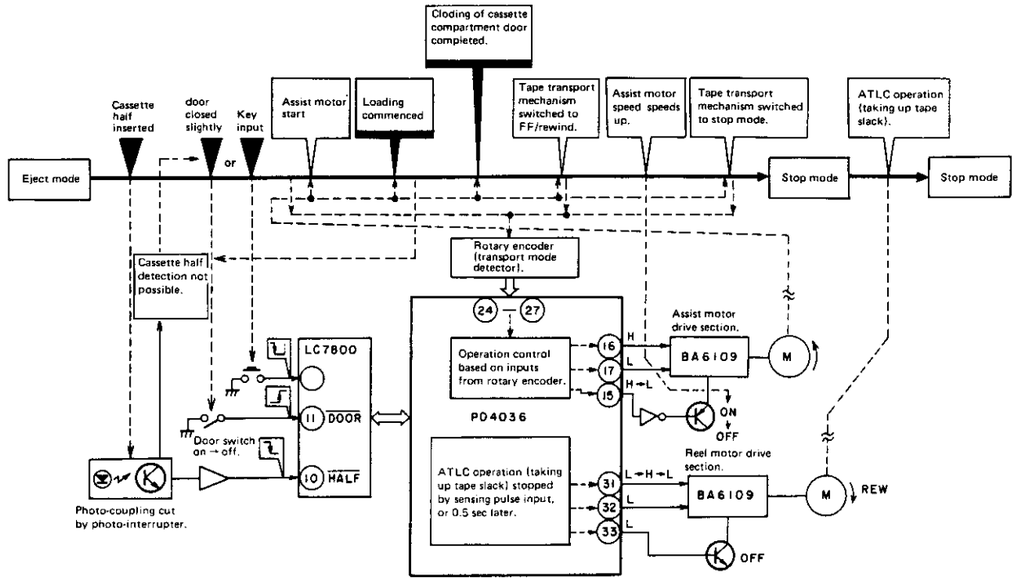


Fig. 4-21 Tape loading operation

Playback Mode

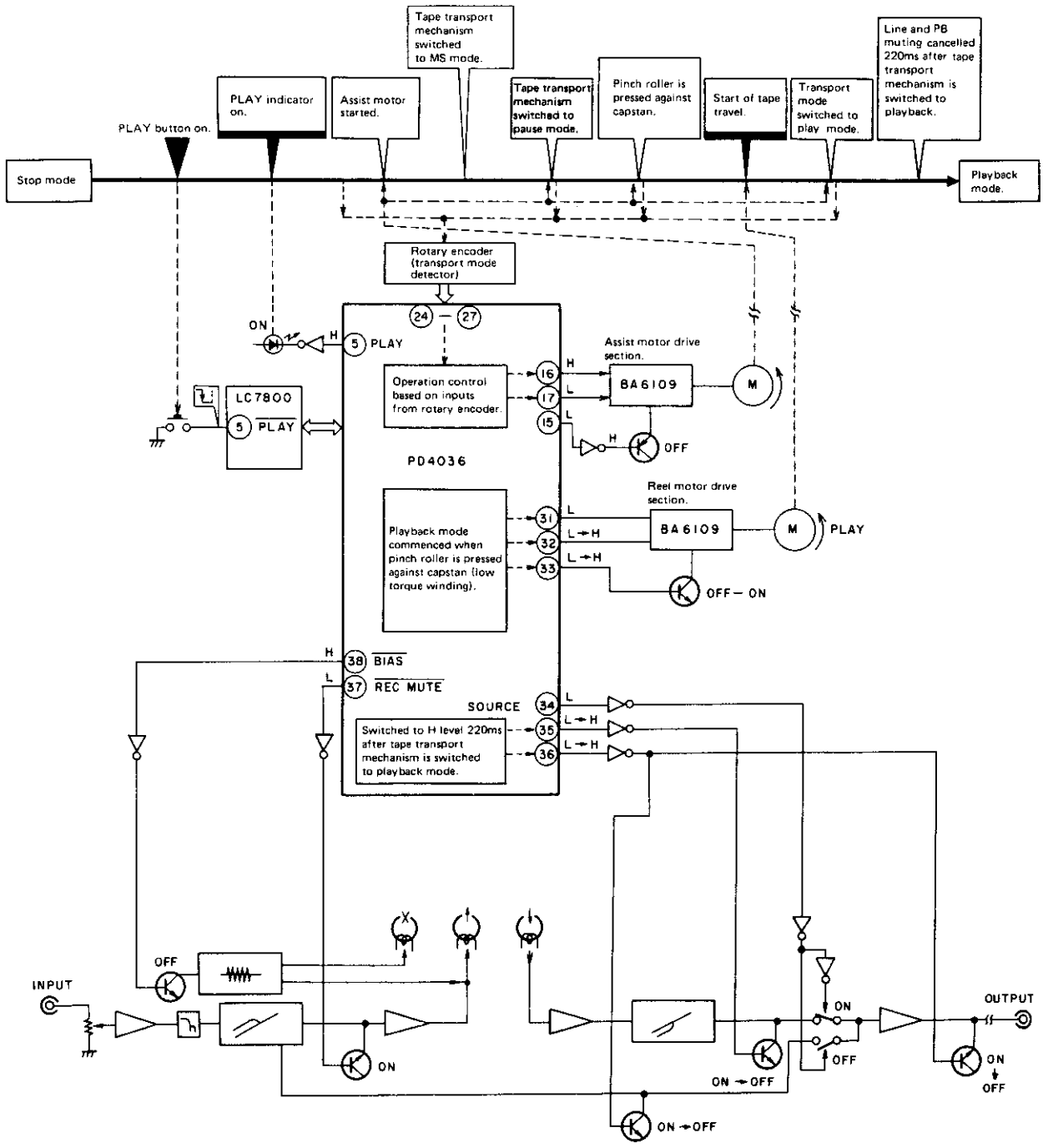


Fig. 4-22 From stop to playback mode

Recording Mode

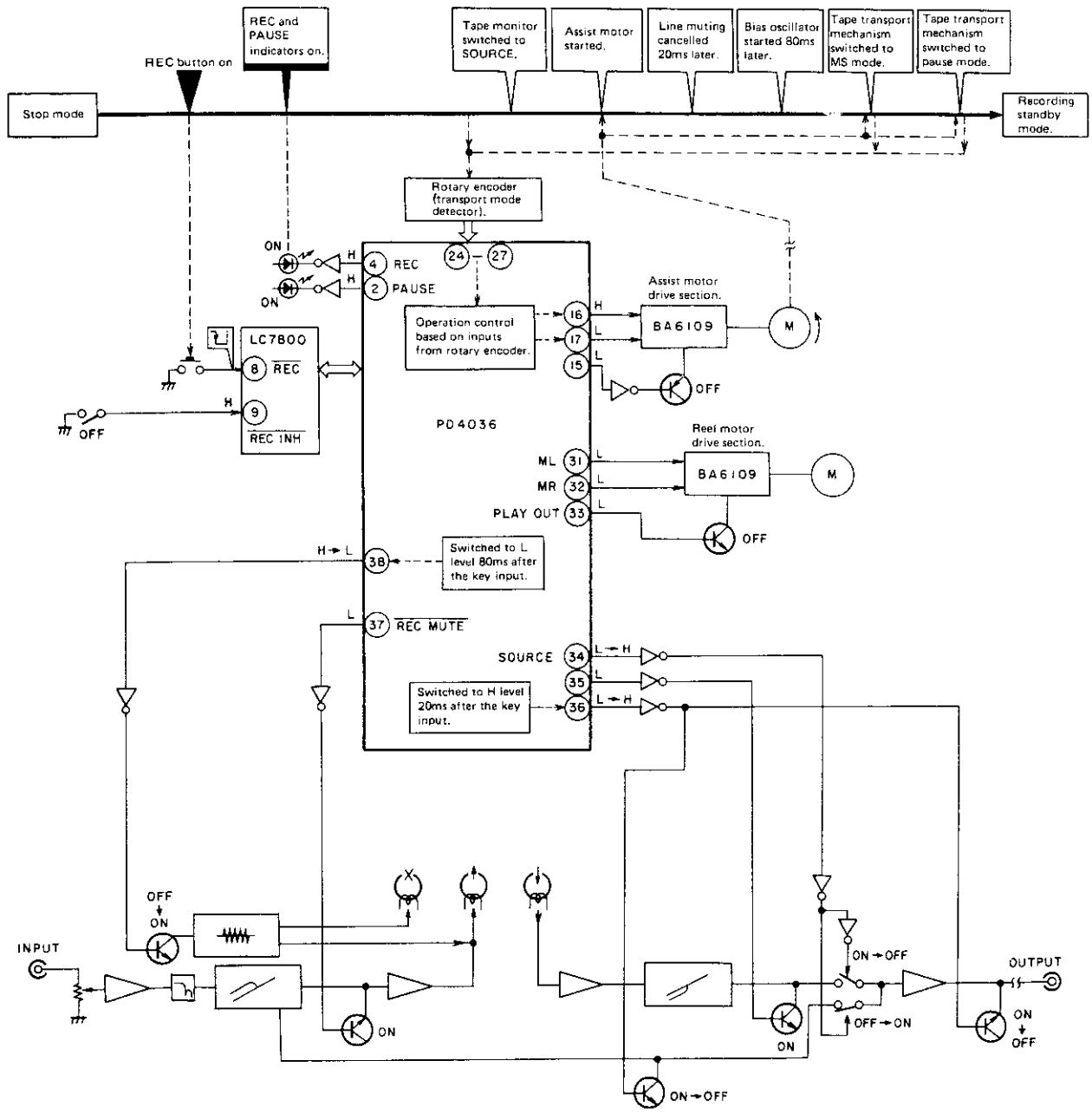


Fig. 4-23 From stop to recording-pause mode

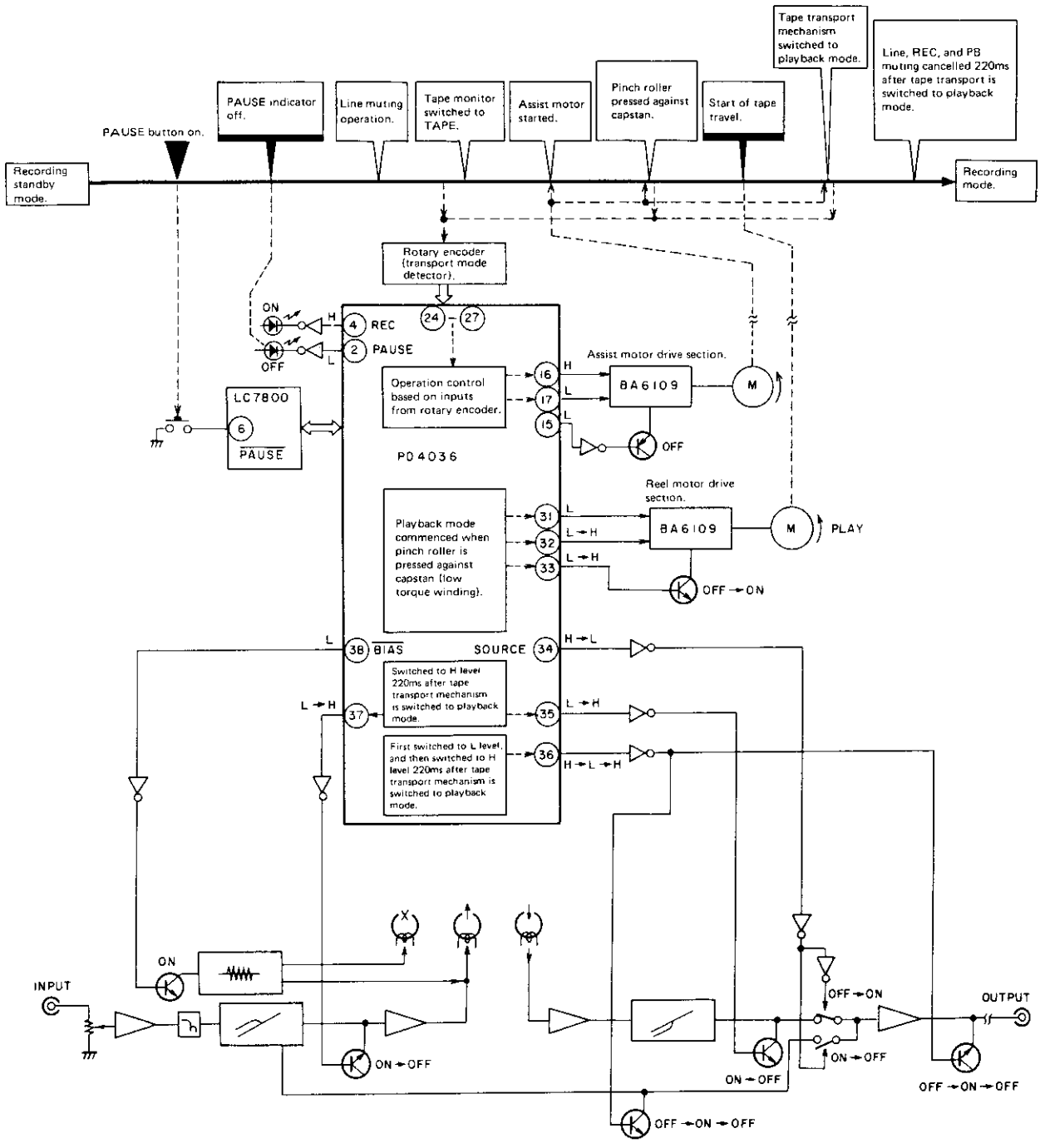


Fig. 4-24 From recording-pause to recording mode

REC MUTE Operation

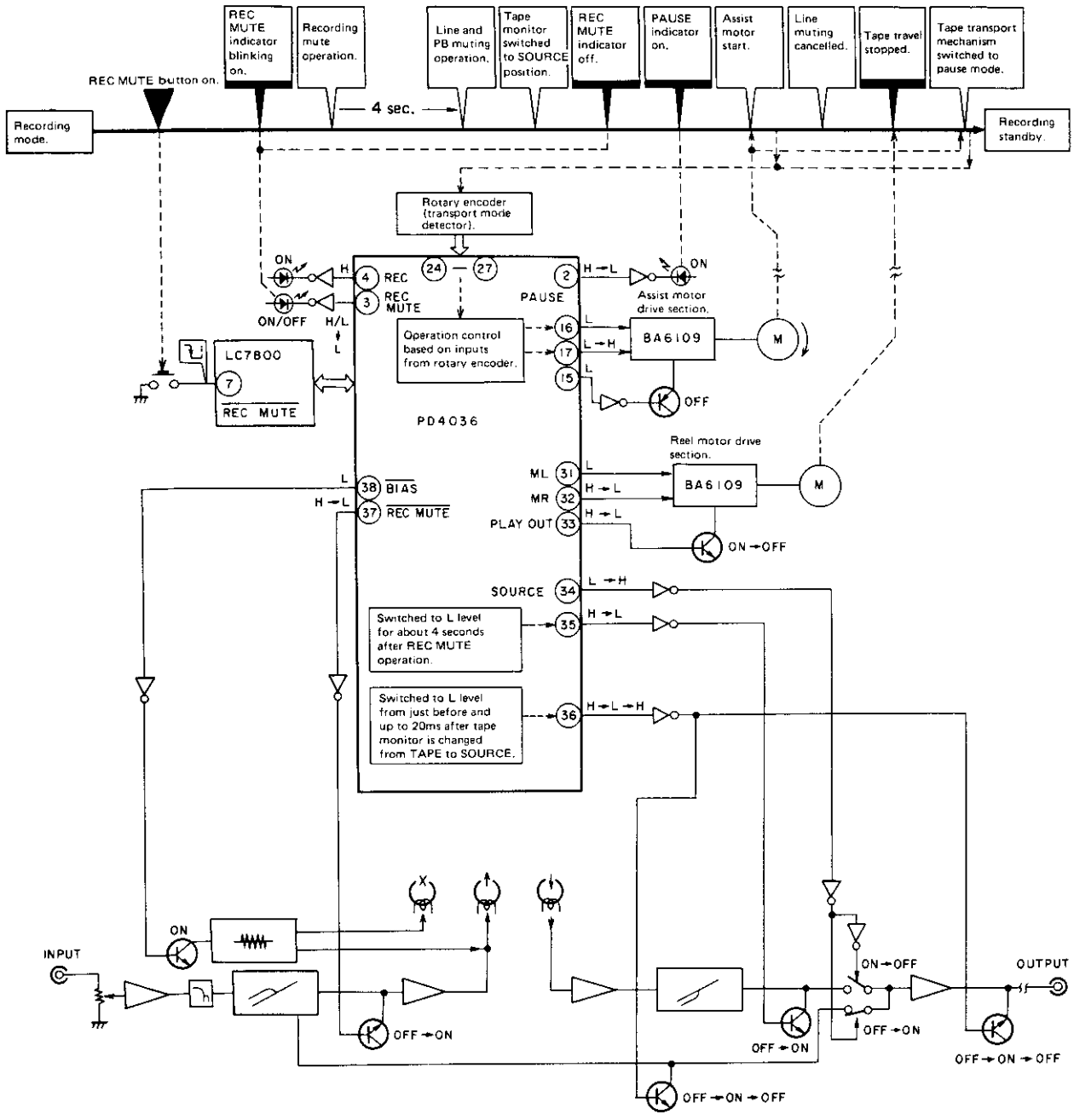


Fig. 4-25 REC MUTE operation

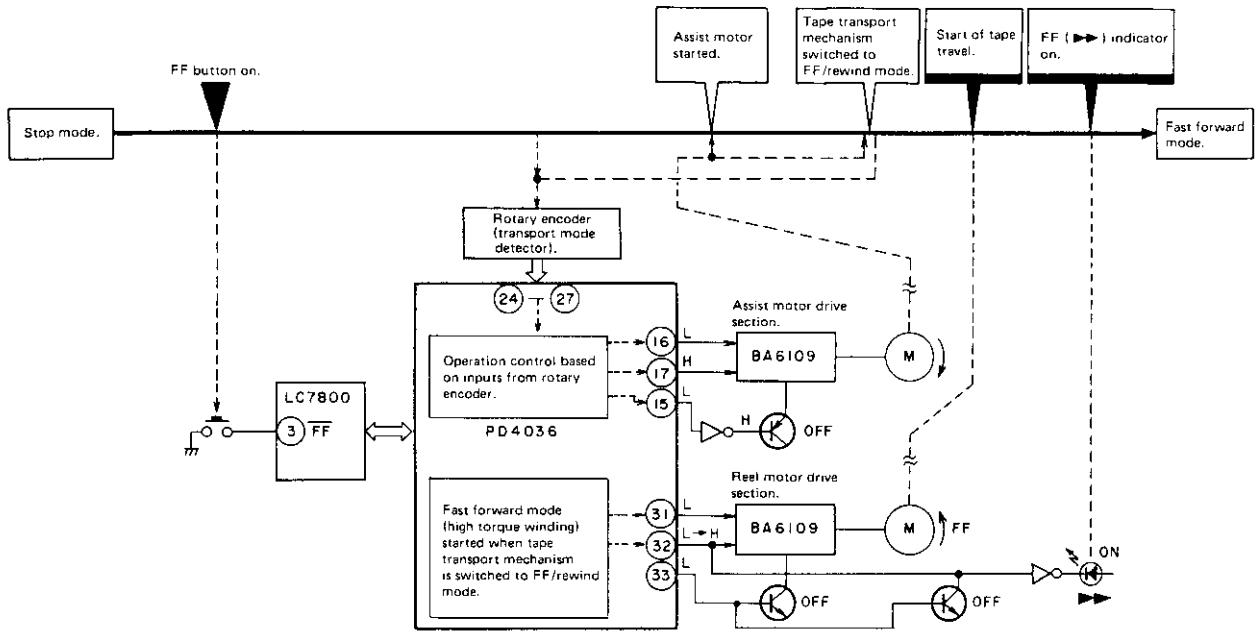


Fig. 4-26 From stop to fast forward mode

Rewing Mode Operation

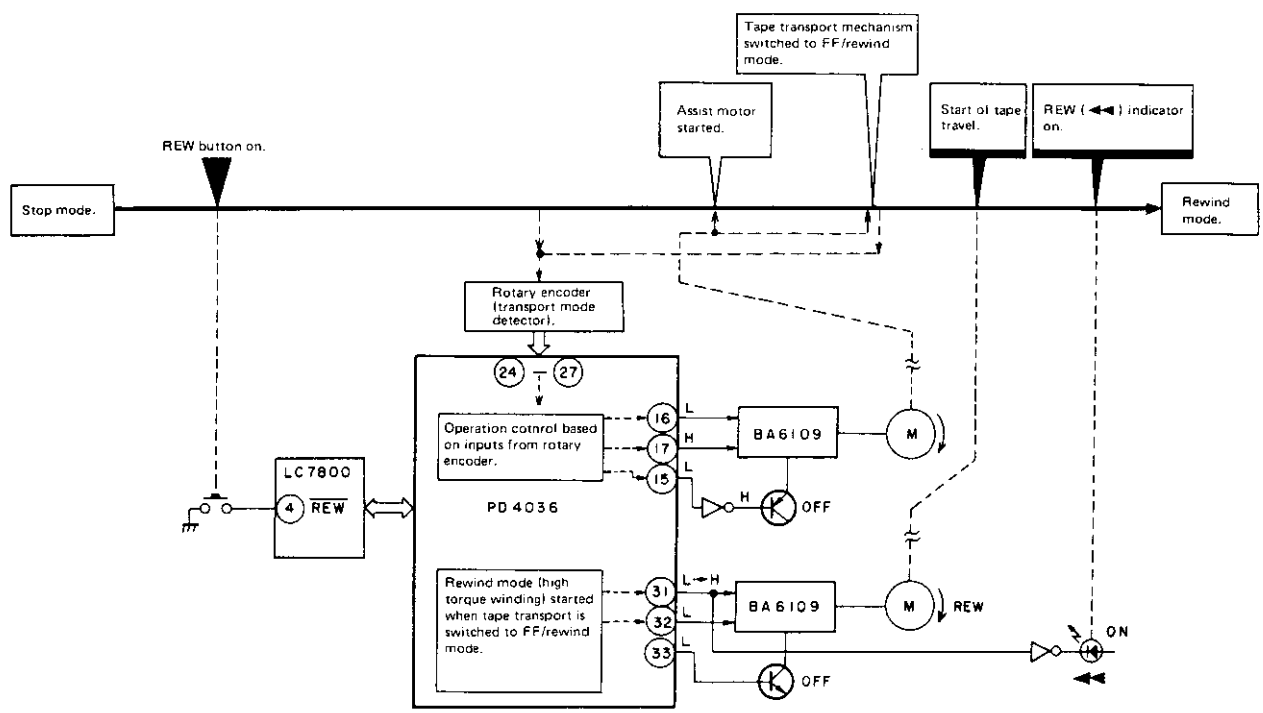


Fig. 4-27 From stop to rewind mode

MS Operation

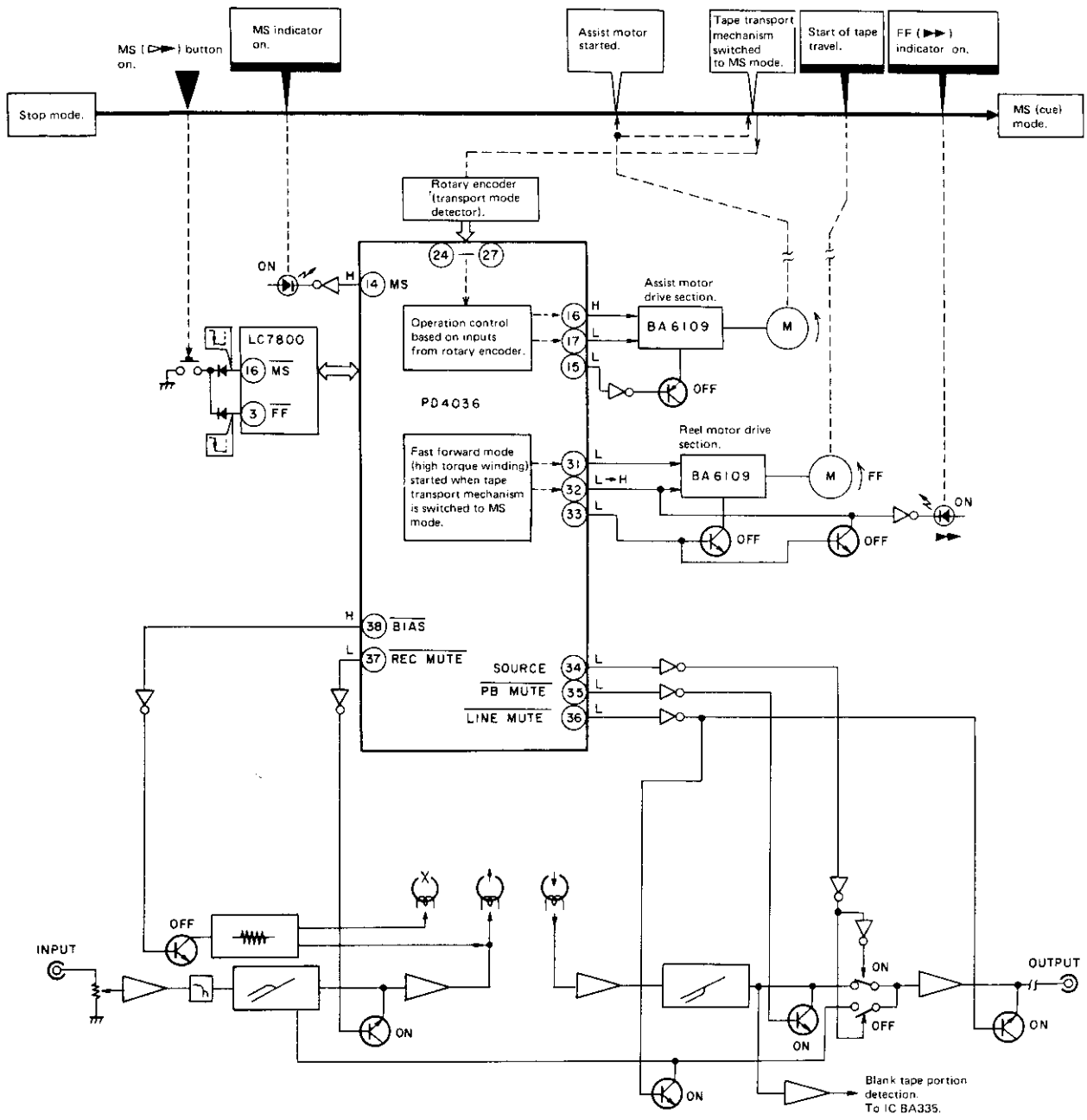


Fig. 4-28 From stop to cue mode

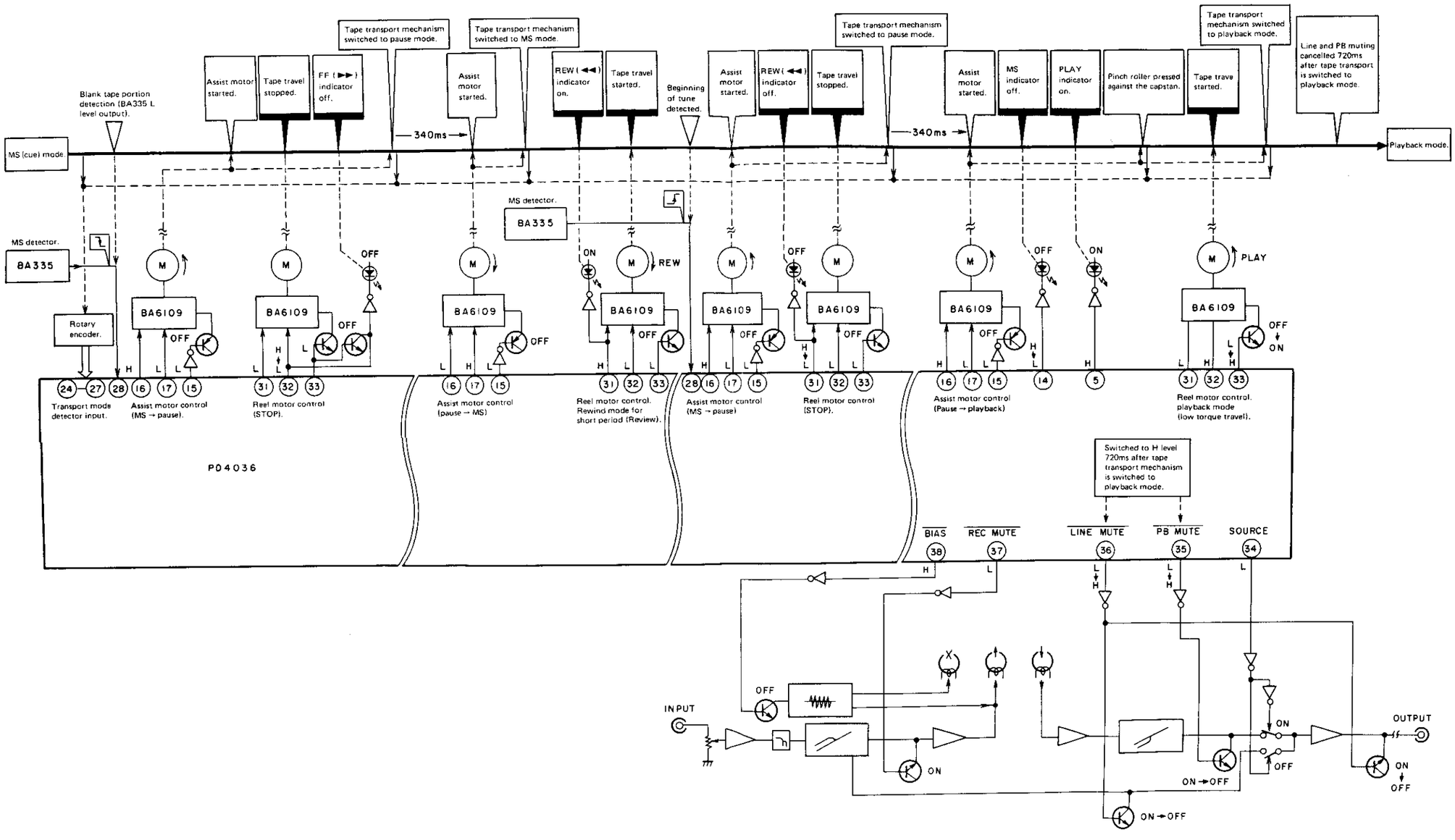
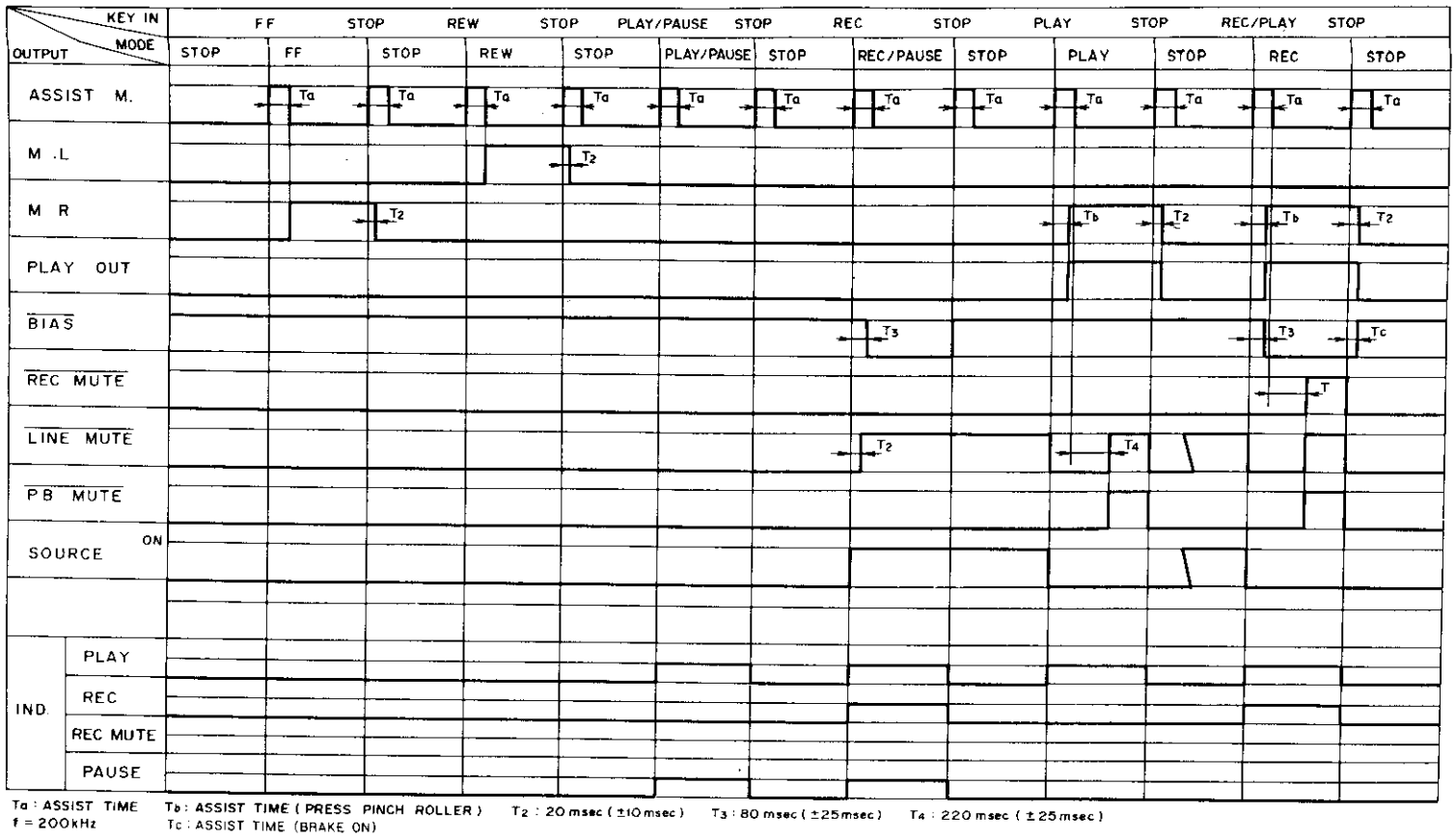


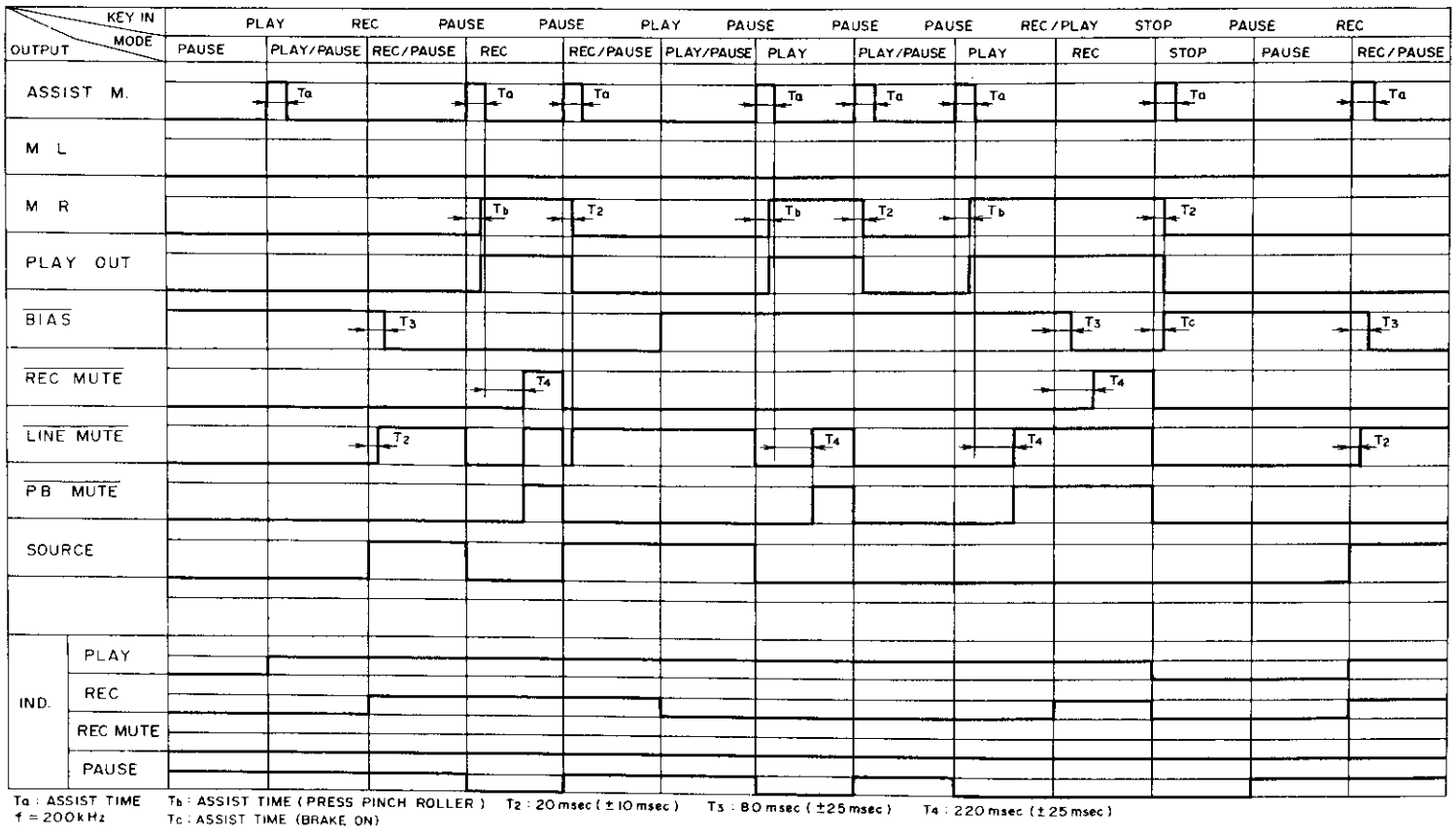
Fig. 4-29 From cue to playback mode

4.7 MECHANISM CONTROL TIMING CHART



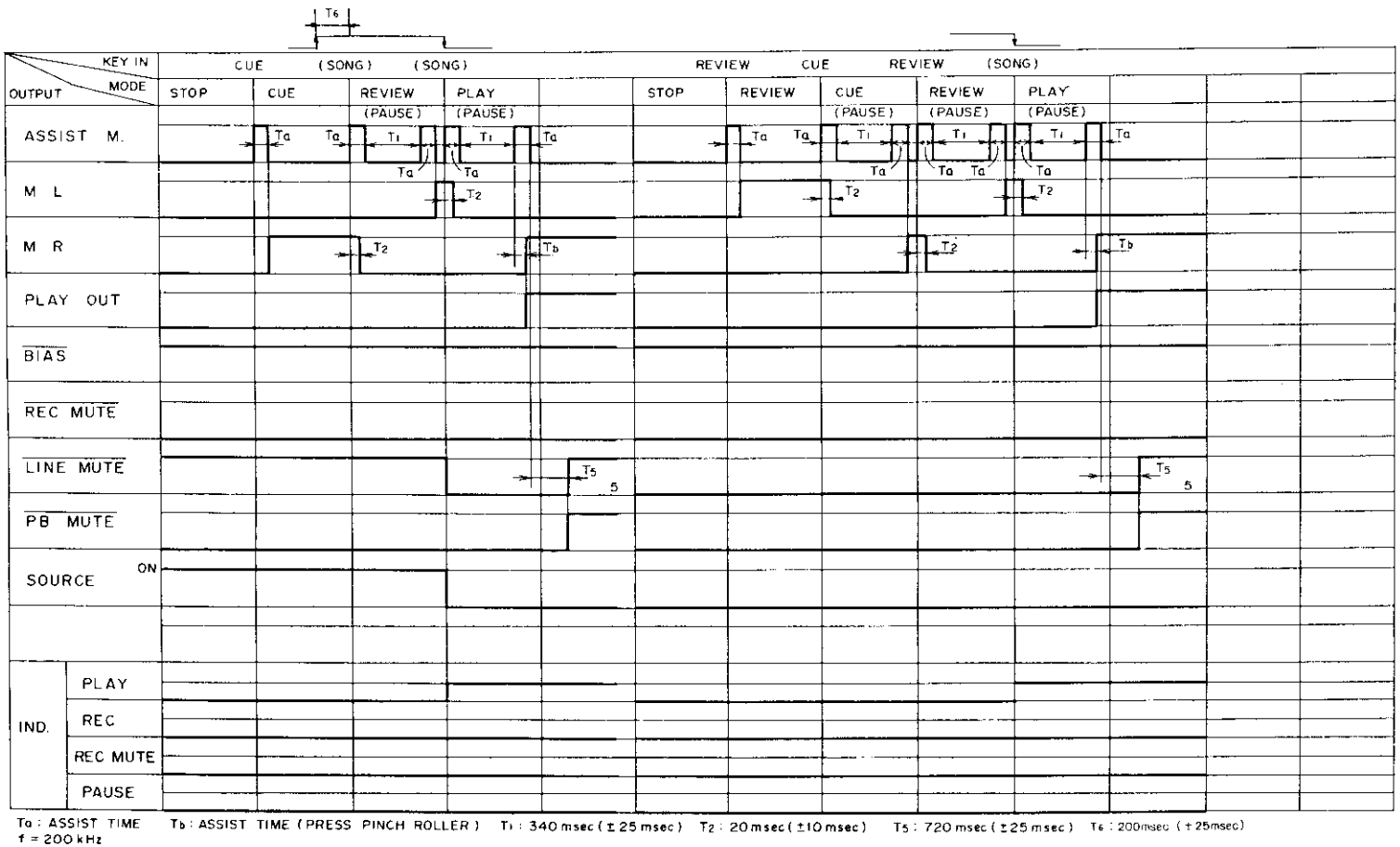
Ta : ASSIST TIME
f = 200kHz
Tb : ASSIST TIME (PRESS PINCH ROLLER)
Tc : ASSIST TIME (BRAKE ON)
T2 : 20 msec (±10 msec)
T3 : 80 msec (±25 msec)
T4 : 220 msec (±25 msec)

Fig. 4-30 Timing chart 1



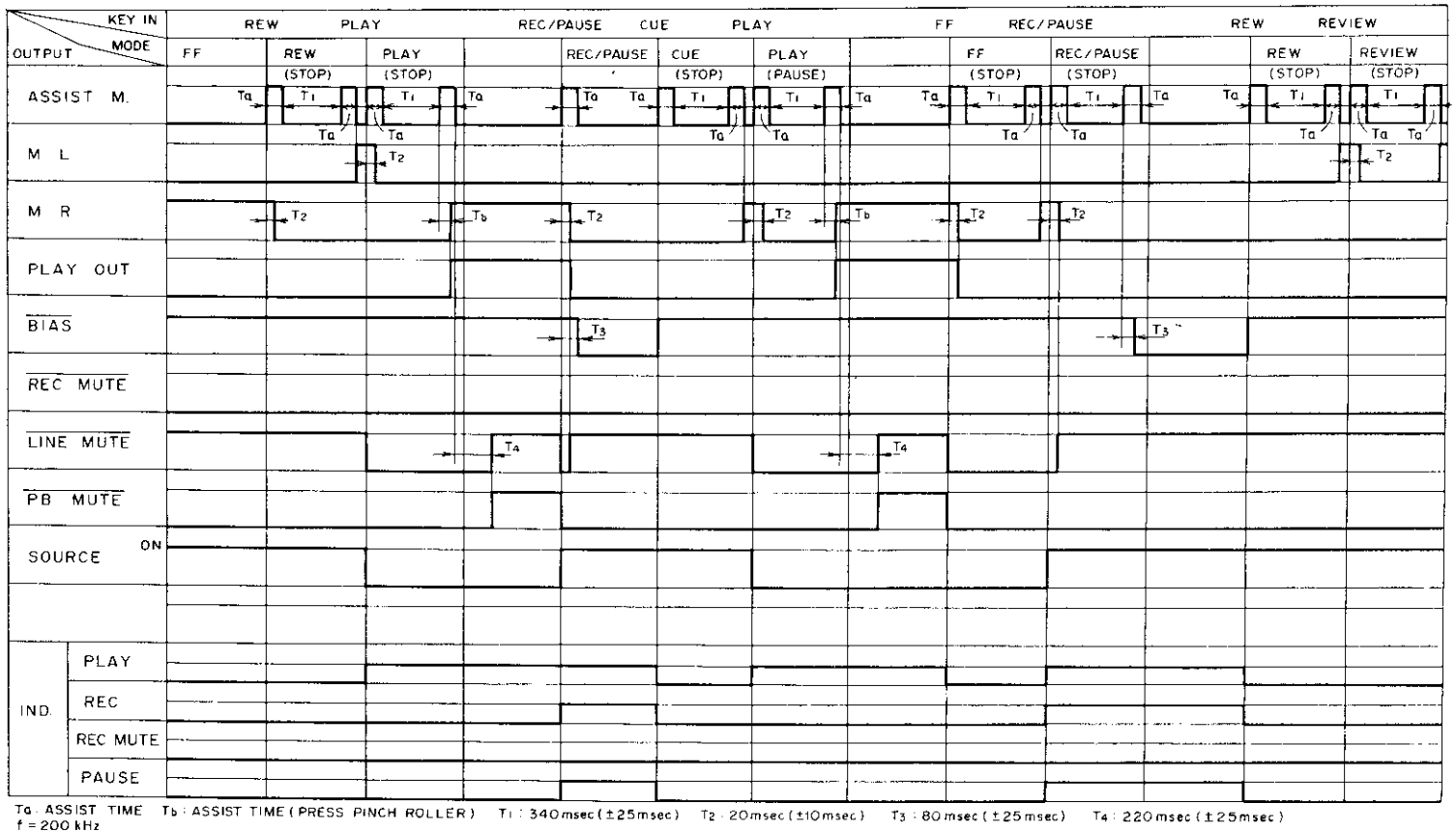
Ta : ASSIST TIME
f = 200kHz
Tb : ASSIST TIME (PRESS PINCH ROLLER)
Tc : ASSIST TIME (BRAKE ON)
T2 : 20 msec (±10 msec)
T3 : 80 msec (±25 msec)
T4 : 220 msec (±25 msec)

Fig. 4-31 Timing chart 2



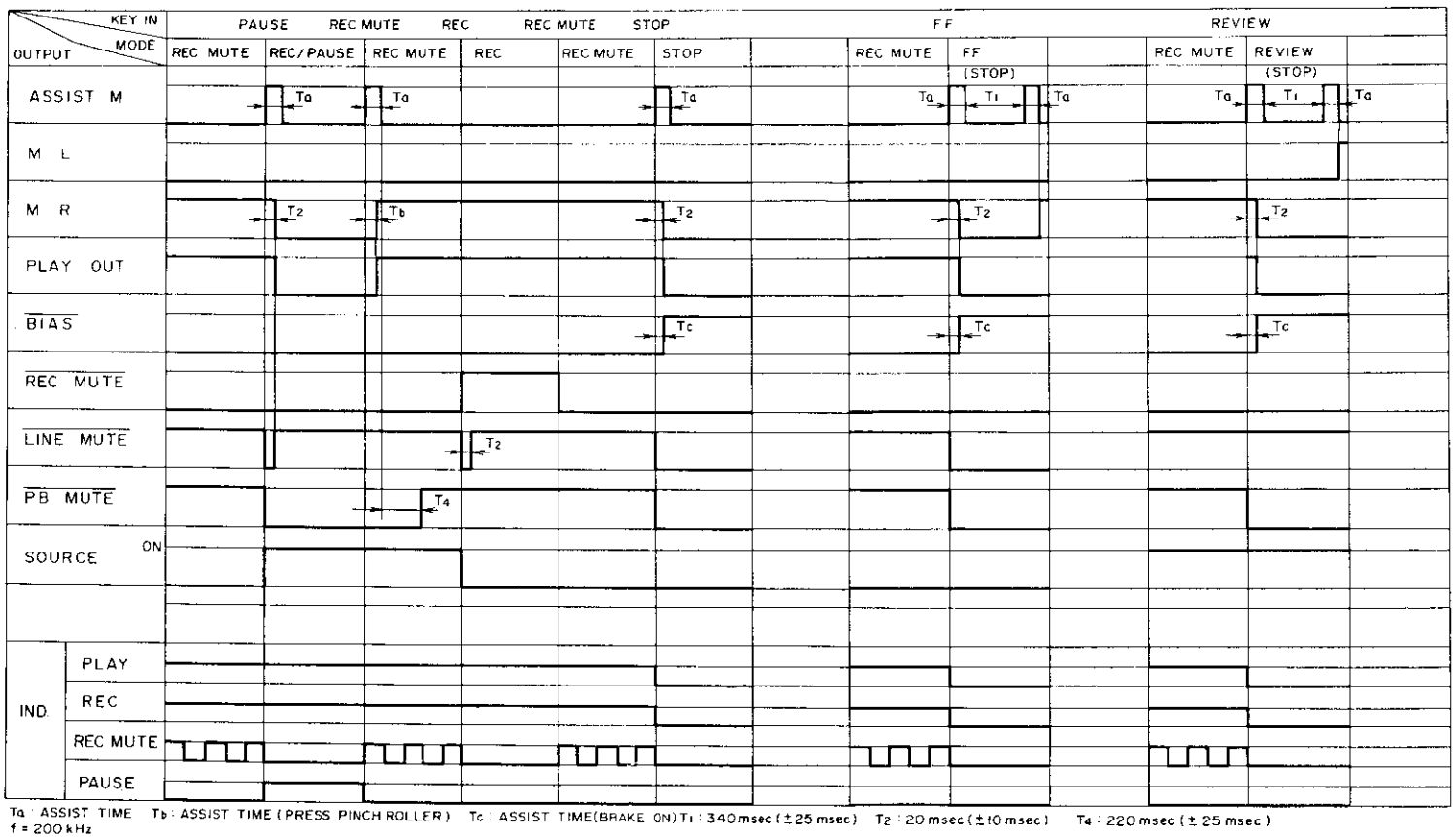
Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) T1 : 340 msec (±25 msec) T2 : 20 msec (±10 msec) T5 : 720 msec (±25 msec) T6 : 200msec (±25msec)
f = 200 kHz

Fig. 4-32 Timing chart 3



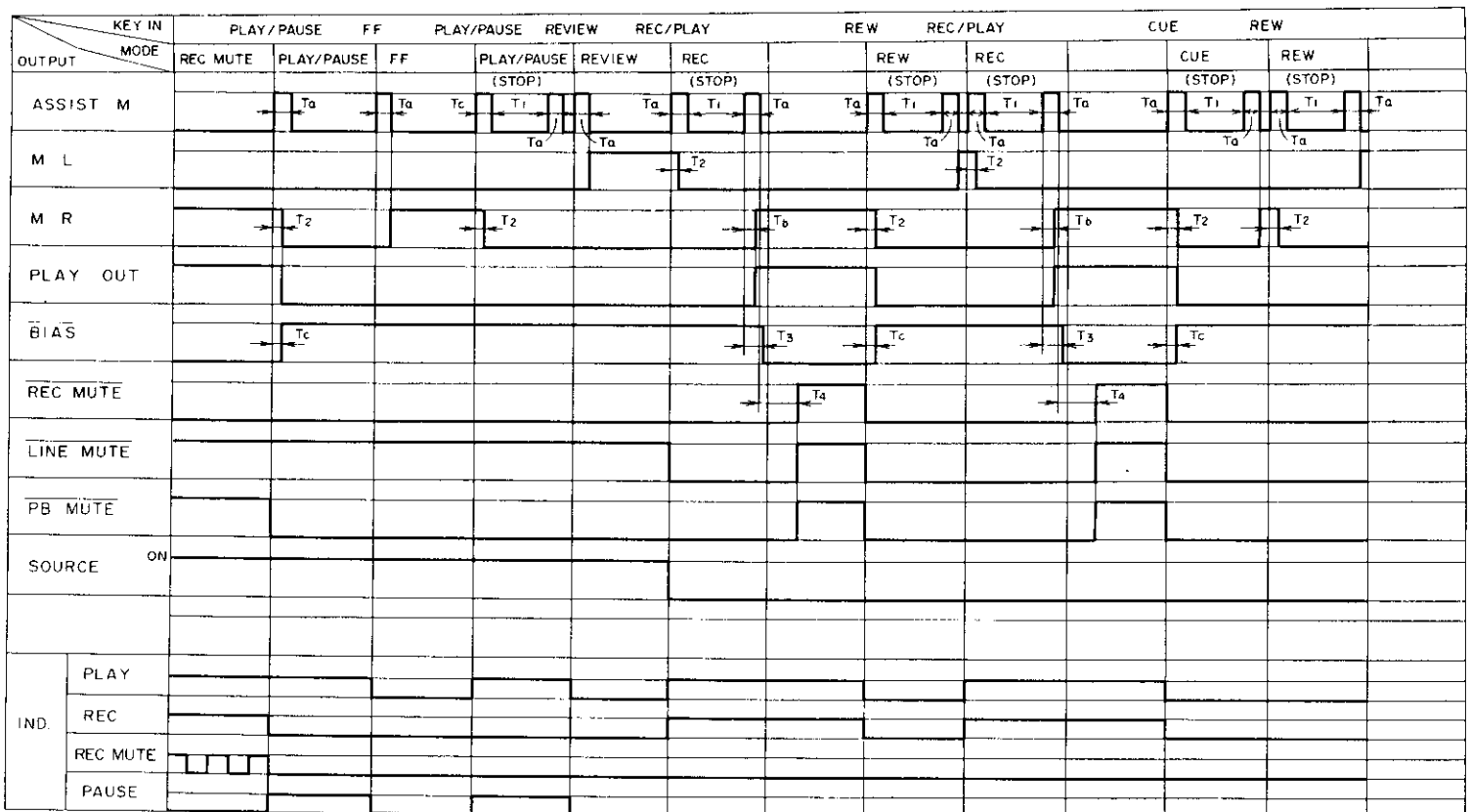
Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) T1 : 340msec (±25msec) T2 : 20msec (±10msec) T3 : 80msec (±25msec) T4 : 220msec (±25msec)
f = 200 kHz

Fig. 4-33 Timing chart 4



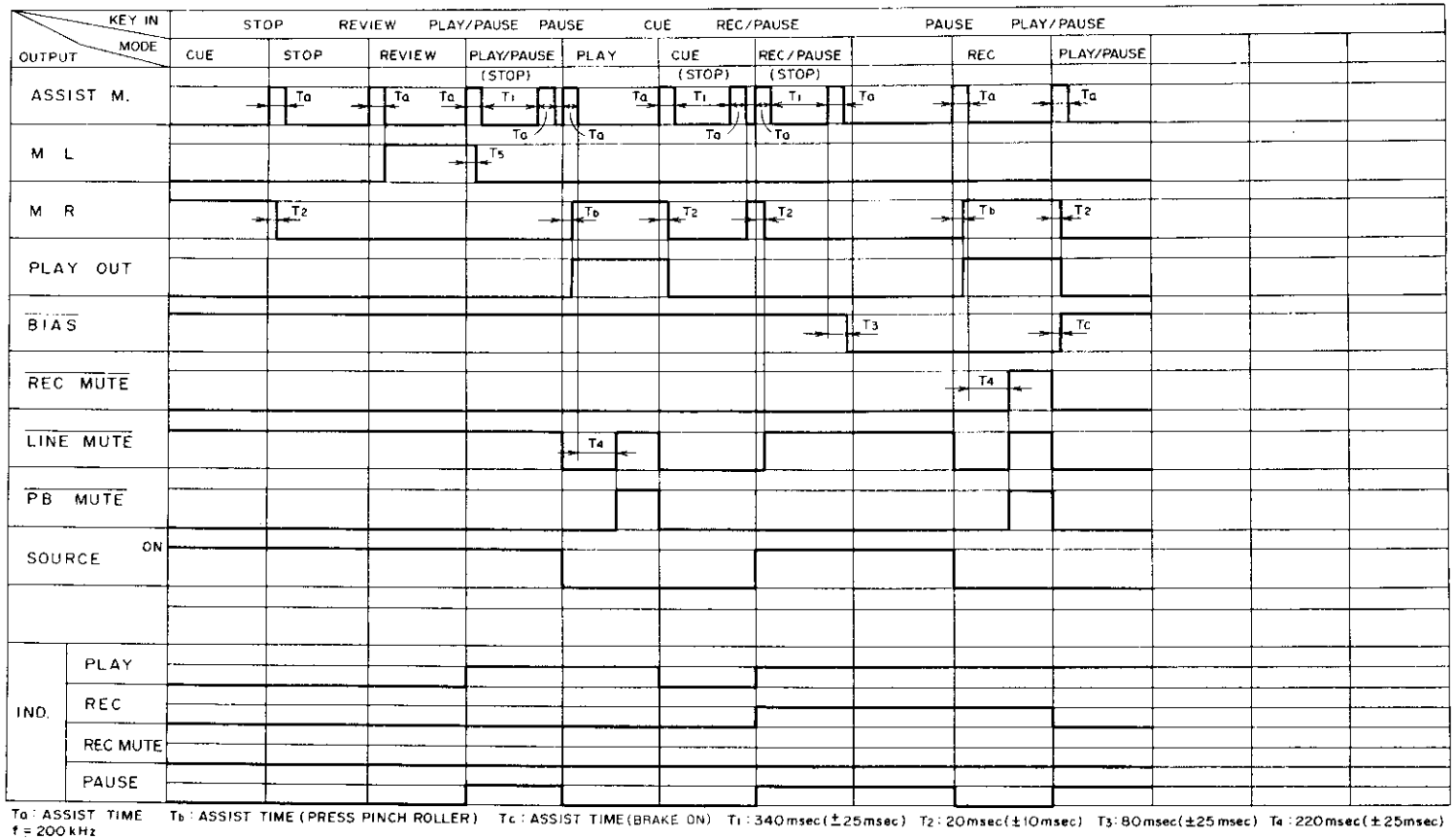
Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) Tc : ASSIST TIME(BRAKE ON) T1 : 340 msec (± 25 msec) T2 : 20 msec (± 10 msec) T4 : 220 msec (± 25 msec)
f = 200 kHz

Fig. 4-34 Timing chart 5



Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) Tc : ASSIST TIME (BRAKE ON) T1 : 340 msec (±25 msec) T2 : 20 msec (±10 msec) T3 : 80 msec (±25 msec) T4 : 220 msec (±25 msec)
f = 200 kHz

Fig. 4-35 Timing chart 6



Ta : ASSIST TIME Tb : ASSIST TIME (PRESS PINCH ROLLER) Tc : ASSIST TIME (BRAKE ON) T1 : 340msec(±25msec) T2 : 20msec(±10msec) T3 : 80msec(±25msec) Ta : 220msec(±25msec)
f = 200kHz

Fig. 4-36 Timing chart 7