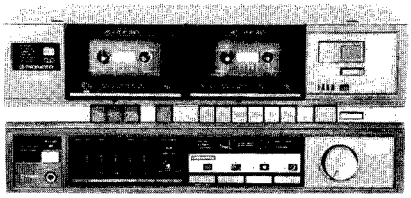
PIONEER

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS



ORDER NO.
ARP-811-0

STEREO DOUBLE CASSETTE TAPE DECK AMPLIFIER

DC-221Z
DC-220Z

(Silver Version of DC-221Z)

- DC-221Z is the same as the DC-220Z except for the exterior design (color).
- Models DC-221Z and DC-220Z come in seven versions distinguished as follows:

Type	Applicable model		Power requirement	Destination
	DC-221Z	DC-220Z		
KU	O	—	AC120V only	U.S.A
HE	O	O	AC220V (240V)*	European continent
HB	O	—	AC240V (220V)*	United Kingdom
S	O	O	AC110V/120V/220V/240V (Switchable)	General market
YP	O	—	AC240V (220V)*	Australia
HEZ	O	O	AC220V (240V)*	West Germany
KC	O	—	AC120V only	Canada

*Change the primary wiring of the power transformer.

- This service manual is applicable to the KU, HB, HE, S and YP types.
- For servicing of the HEZ type, please refer to the additional service manual (ARP-812).
- For servicing of the KC type, please refer to the additional service manual (ARP-813).
- For servicing the HE, HB, S, and YP types, please see page 57-58.
- Ce manuel d'instruction se refère au mode de réglage, en français. (P45-P50)
- Este manual de servicio trata del método de ajuste escrito en español. (P51-P56)

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

CONTENTS

1. SPECIFICATIONS

AMPLIFIER SECTION

Continous Average Power Output is 40 Watts* per channel, min., at 8 ohms from 40 Hertz to 20,000 Hertz, with no more than 0.3% total harmonic distortion.

**Measured pursuant to the Federal Trade Commission's Trade Regulation rules on Power Output Claims for Amplifiers.*

Continuous Power Output
- 40 to 20,000Hz ..... 40 W + 40 W (T.H.D. 0.3% 8 ohms)
- 1 kHz (DIN) ..... 50 W + 50 W (T.H.D. 1% 8 ohms)
- 1 kHz (DIN music power) ..... 70 W + 70 W (T.H.D. 1% 8 ohms)

Hum and Noise (IHF, short-circuited, A network)
- PHONO ..... 72 dB

Hum and Noise (DIN continous Power/50 mV)
- PHONO ..... 68 dB/60 dB

Total Harmonic Distortion (40 Hz to 20,000 Hz, 8 ohms), from CD/VIDEO
- 20 Watts per channel power output ..... No more than 0.2%

Tape Deck Section

Systems ..... 4 track, 2-channel stereo
Heads ..... "Hard Permalloy" recording/playback head x 1
"Hard Permalloy" playback head x 1
"Ferrite" erasing head x 1
Dummy head x 1
Motor ..... DC servo 2 speed motor x 2
Wow and Flutter ..... No more than 0.08% (WRMS)
No more than ±0.20% (DIN)
Fast Winding Time ..... Approximately 115 seconds (C-60 tape)
Frequency Response
- −20 dB recording:
- Normal tape ..... 35 to 13,000 Hz
- Metal tape ..... 35 to 15,000Hz

Signal-to-Noise Ratio
- Dolby NR OFF ..... More than 55 dB

Noise Reduction Effect
- Dolby NR ON ..... More than 10 dB (at 5 kHz)

Furnished Parts

Operating Instructions 1

Miscellaneous

Power requirements
KU and KC models ..... AC 120 V, 60 Hz
HE model ..... AC 220 V, 50/60Hz
HB and YP models ..... AC 240 V, 50/60 Hz
S and S/G models ..... AC 110 V/120 V/220 V/240 V, 50/60 Hz (switchable)

Power Consumption

KU model ..... 199 W
KC model ..... 199 W
HE, HB, and YP models ..... 300 W
S and S/G models ..... 199 W
Dimensions ..... 420(W) x 188(H) x 224(D) mm
16-9/16(W) x 7-6/16(H) x 8-13/16(D) in
Weight (without package) ..... 7 kg (15 lb 7 oz)

QUESTIONNAIRE

MODEL _____

One Model per questionnaire

Dear Servicer,

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

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

PIONEER ELECTRONIC CORP.

T. Nakagawa, Manager, Service Section, International Division

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

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

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

2. SERVICE MANUAL EVALUATION

a. Circuit & Mechanism Description

b. Circuit Diagram

3. OTHER

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

Completed by : Date :

Company Name :

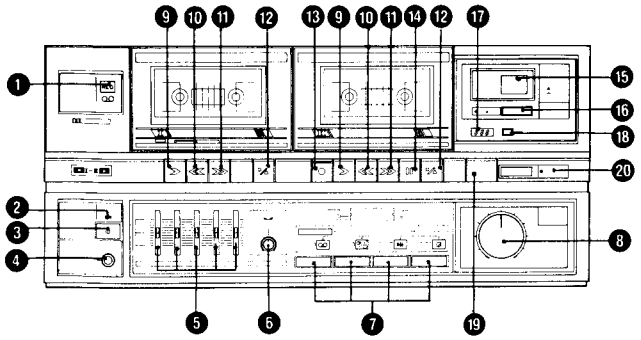
Address :

City/State/Zip :

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

2. FRONT PANEL FACILITIES

Deck I (Only for playback) Deck II (Recording/Playback)



❶ **REC indicator**
This lights during the recording mode.

❷ **POWER indicator**

❸ **POWER switch**

❹ **HEADPHONES jack**

❺ **GRAPHIC EQUALIZER controls**
By operating these five controls, equalization effects can be added to program source or tape playback sounds.

❻ **BALANCE control**

❼ **FUNCTION switches**
TAPE (∞): Push when playing back tapes.
CD/VIDEO (⟳○): Push when listening to a component connected to the CD/VIDEO terminals.
TUNER (ᵠ): Push when listening to broadcasts on the tuner.
PHONO (♂): Push when playing records on the turntable.

❽ **VOLUME control**

❾ **PLAY switch** (▷)

❿ **REW switch** (◁◁)

⓬ **STOP/ EJECT switch** (▽▲)

⓭ **REC switch** (○)

⓮ **PAUSE switch** (▯▯)

⓯ **HIGH SPEED COPY switch**
OFF (■): Tapes are copied at the normal speed.
ON (▬): Tapes are copied at twice the normal speed.

NOTE:
- *Do not change the switch position during tape copying.*
- *When this switch is set to the ON position, recording of an external source (equipment connected to the CD/VIDEO terminals, a turntable or tuner) is not possible. When not performing high speed tape copying, always leave in the OFF position.*

⓰ ***DOLBY NR switch**
Push this switch to ON when recording with the built-in Dolby noise reduction system (B type), and when playing back tapes which have been recorded using the system.

*Noise Reduction manufactured under license from Dolby Laboratories Licensing Corporation.
"Dolby" and the double-D symbol are trademarks of the Dolby Laboratories Licensing Corporation.

⓱ **TAPE COUNTER**
This indicates the transport position of the tape loaded in Deck II with a three-digit number.

⓲ **RESET button**
Push this button to reset the tape counter display to 000.

⓳ **SYNCHRO REC START switch**
When this switch is pressed, Deck I will enter the playback mode, and Deck II will simultaneously begin recording.

⓴ **REC MUTE switch**
Use for creating non-recorded blank spaces on the tape.

3. DISASSEMBLY

CASSETTE REPLACEMENT PROCEDURES

1. Remove 7 pieces of screw ①.
2. Remove Bonnet case.
3. Remove 2 pieces of screw ②, and 1 piece of nut ②.
4. Push the claw at the bottom of chassis, remove the Front panel assembly, and pull out toward you. Remove the LED assembly from the Front panel assembly.
5. Remove 6 pieces of screw ③, and enable the Power amplifier assembly to move upward (See Fig. 3-2)
6. Remove connectors J7, J11, J14, J15, and J19 of the wiring coming out of the Tape transport unit. (Separate the front panel from the main body.)
7. Remove 7 pieces of screw ④, and remove Deck holder (with Synchro plate).
8. Open Cassette door. (See Fig. 3-3)
9. Remove 4 individual pieces of screw ⑤.
10. Remove Counter belt from Tape counter, and hook onto the Tape transport unit 2.
11. Remove the Tape transport unit 1 and 2 from the Front panel assembly.

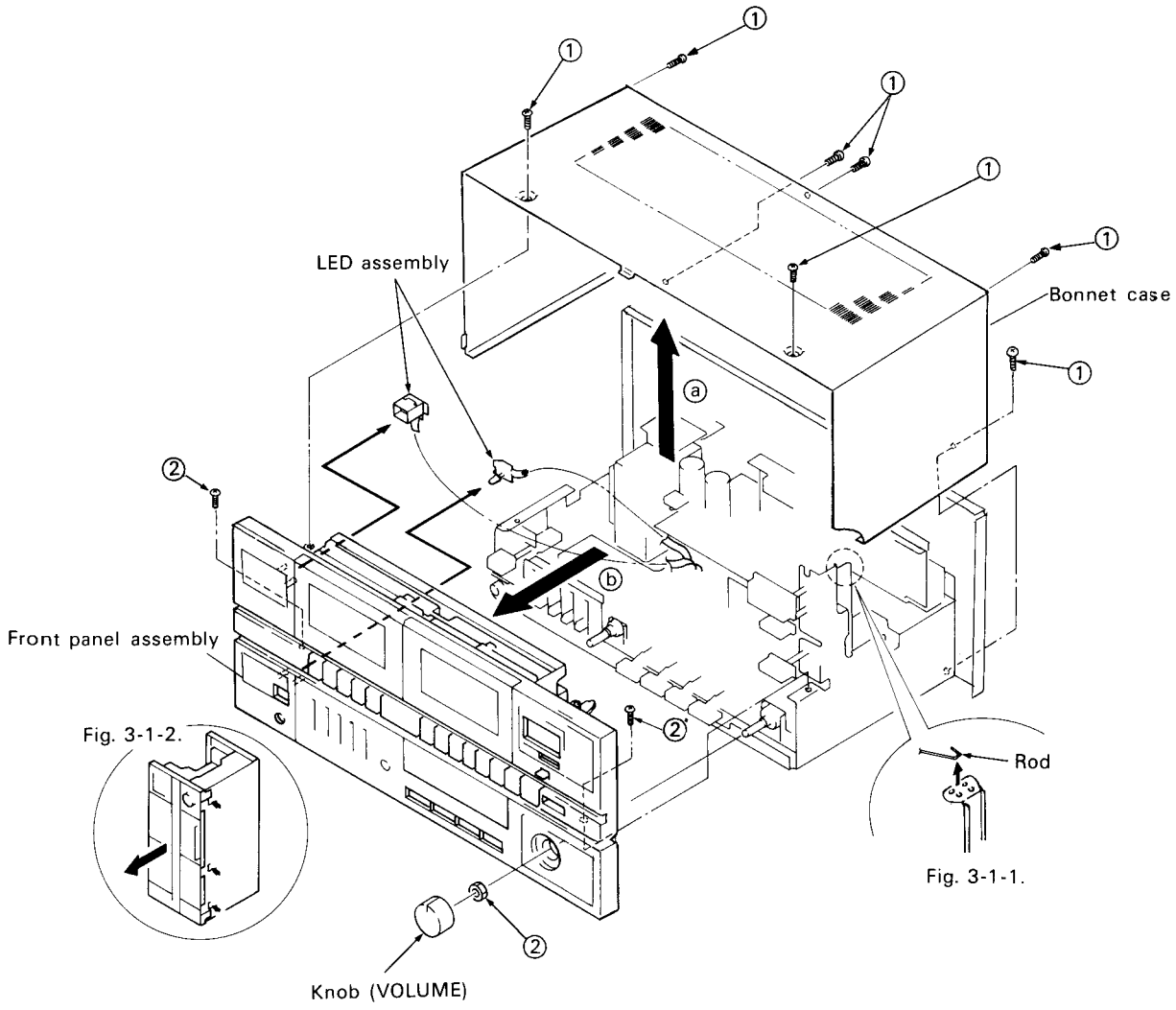


Fig. 3-1

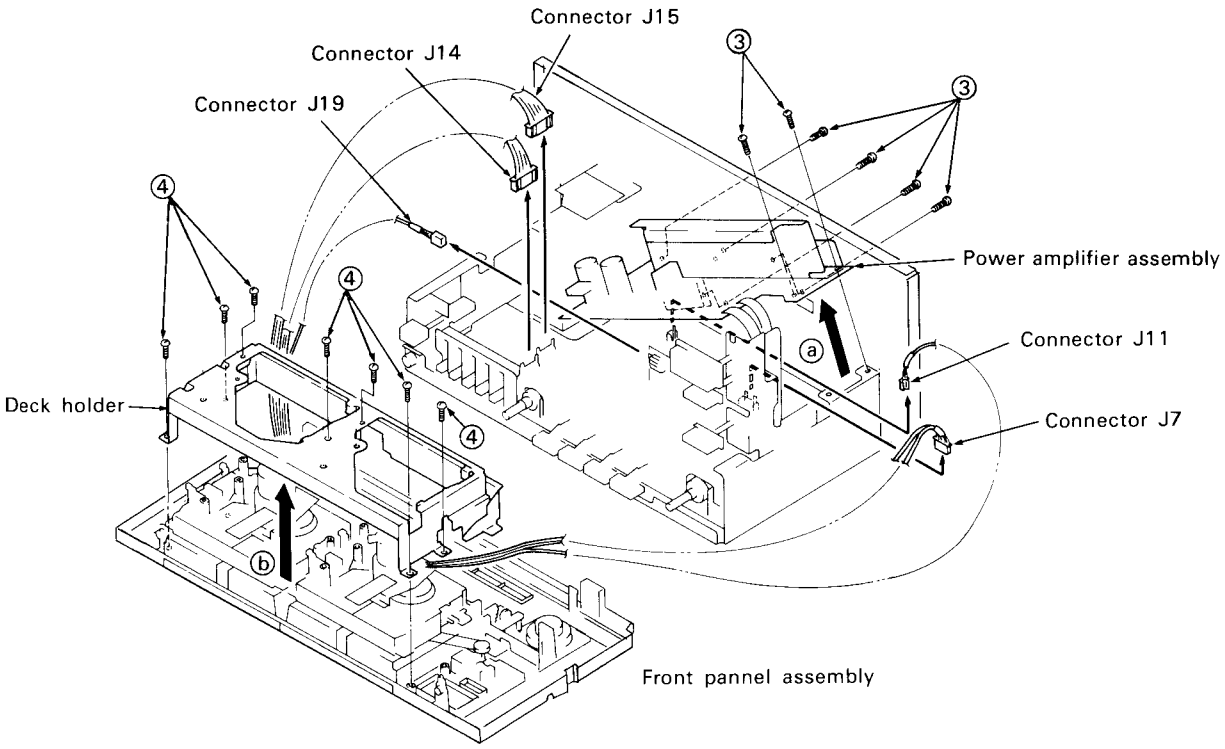

Connector J15
Connector J14
Connector J19
Power amplifier assembly
Connector J11
Connector J7
Deck holder
Front pannel assembly

Fig. 3-2

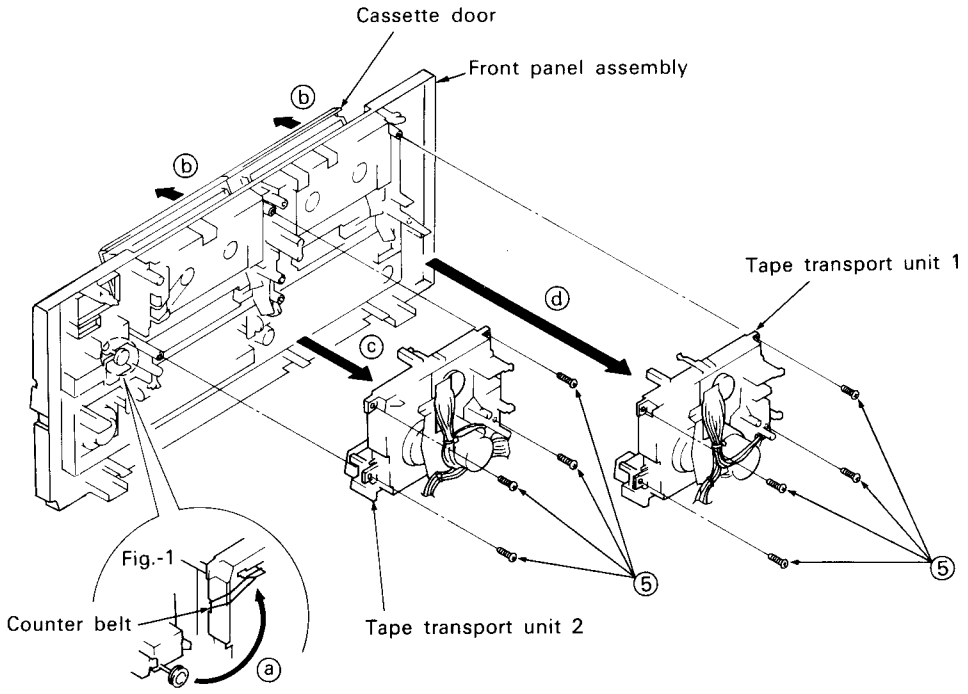

Cassette door
Front panel assembly
Tape transport unit 1
Fig.-1
Counter belt
Tape transport unit 2

Fig. 3-3

COMPONENT PARTS REPLACEMENT PROCEDURES

Replacement of Motor

1. Remove lead wire of motor terminal. (See Fig. 3-5)
2. Remove set screw ①, and detach Relay board.
3. Remove set screw ②, and detach Motor holder. (See Fig. 3-4)
4. Remove 2 set screws ③ of Motor, and detach Motor.
5. Pull out Motor pulley from Motor.
6. Attach Motor pulley to new Motor.
7. Adjust the height of Motor pulley. (See Fig. 3-4-1).
8. Attach Motor to Motor holder.
9. While applying the Belt on the flywheel side, attach Motor holder to Tape transport unit.
10. Apply Belt to driving pulley and pulley.
11. Attach Relay board with screw ①.
12. Solder lead wire to motor terminal.
13. Fasten securely head lead and control lead with binder.
14. Adjust the tape speed.

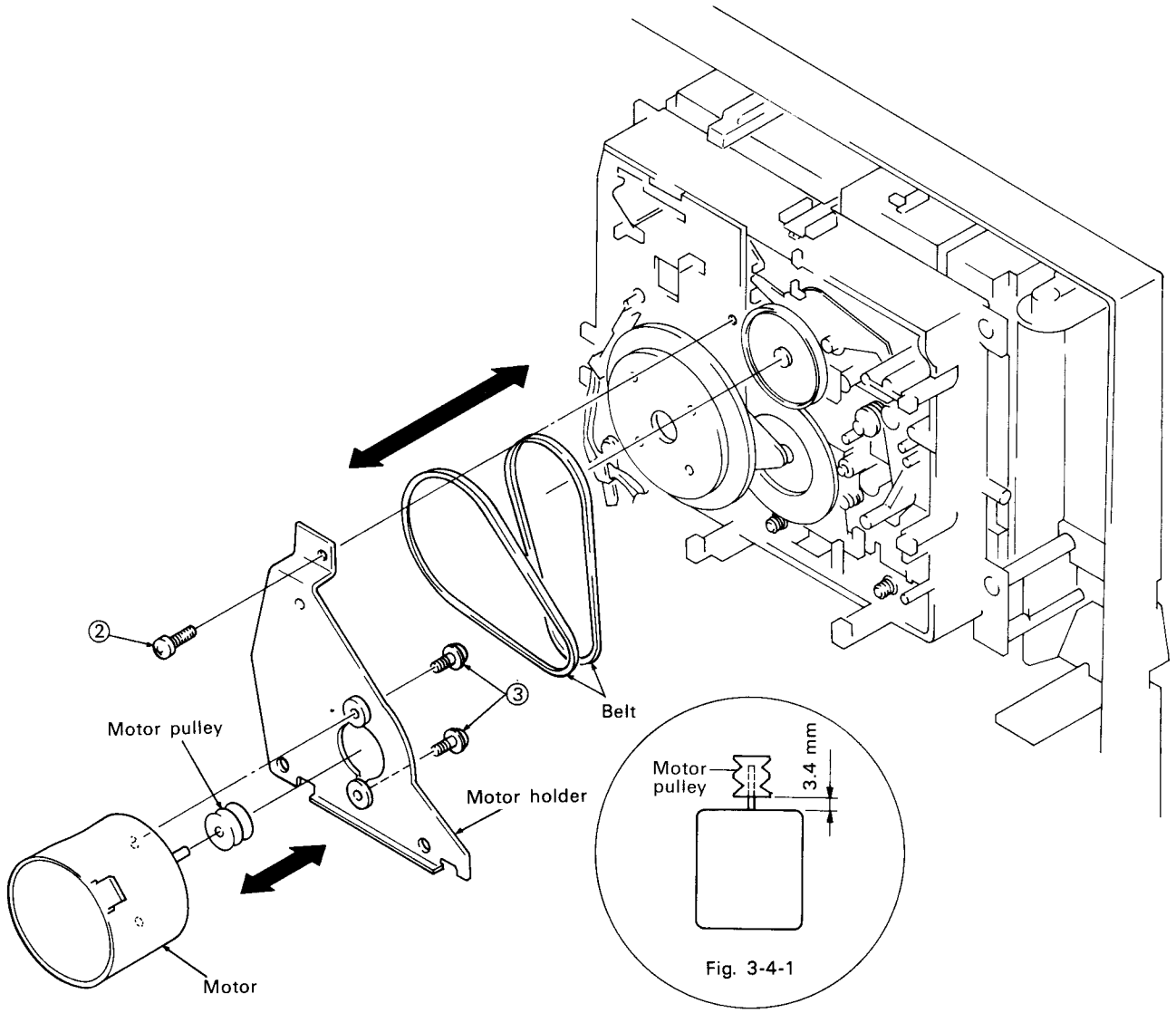


Fig. 3-4-1

Fig. 3-4

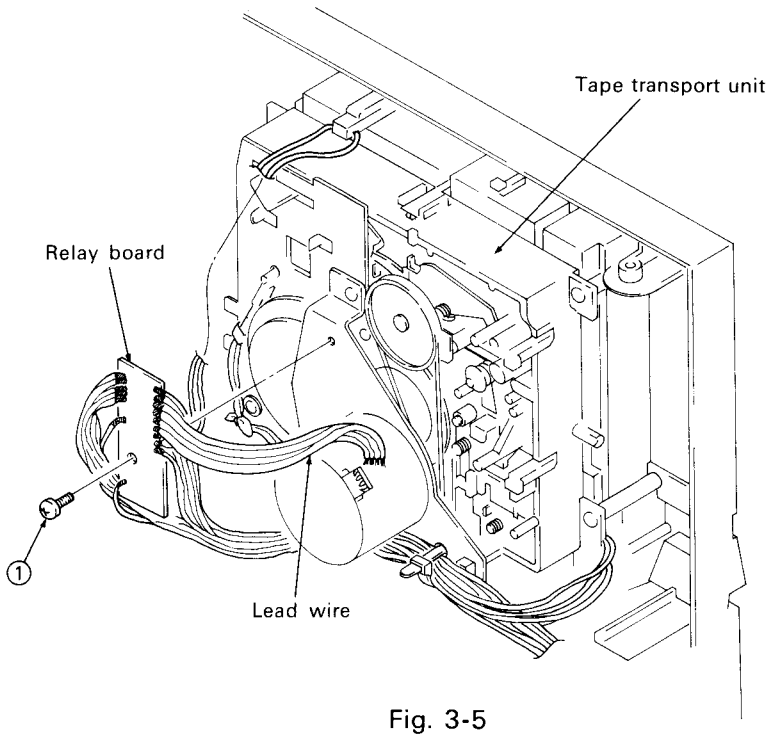


Fig. 3-5

Replacement of Belt

1. Remove set screw ①, and detach Relay board.
2. Remove set screw ②, and detach Motor holder from the Tape transport unit.
3. Replace the old belt with a new one.
4. While applying the belt on the flywheel side, attach Motor holder to the Tape transport unit.
5. Apply belt to driving pulley and pulley.
6. Fasten Relay board with screw ①.
7. Fasten securely head lead and control lead with binder.
8. Adjust the tape speed.

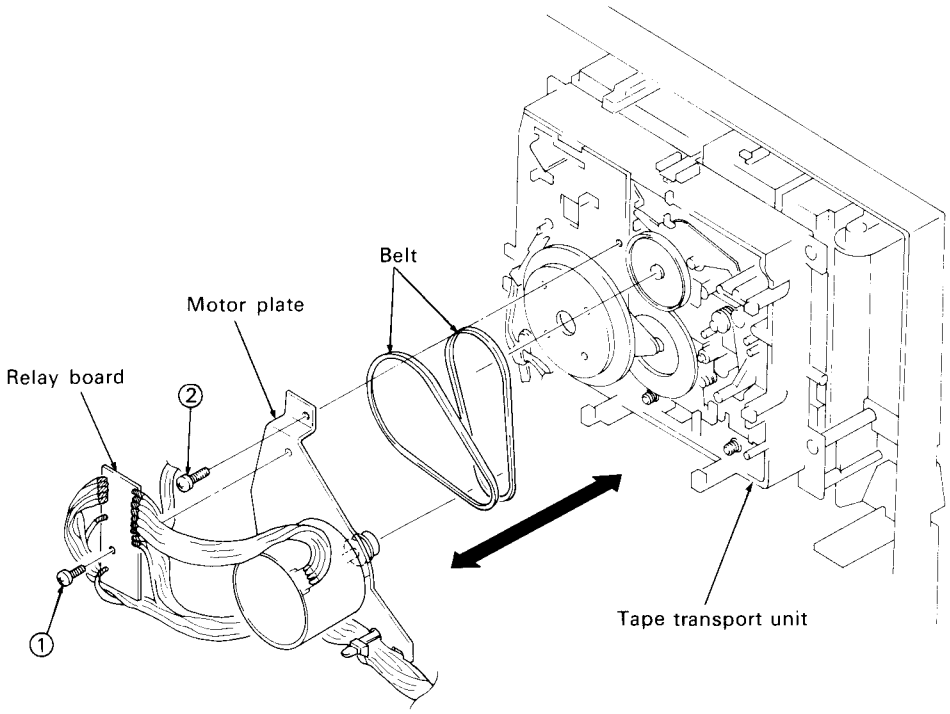
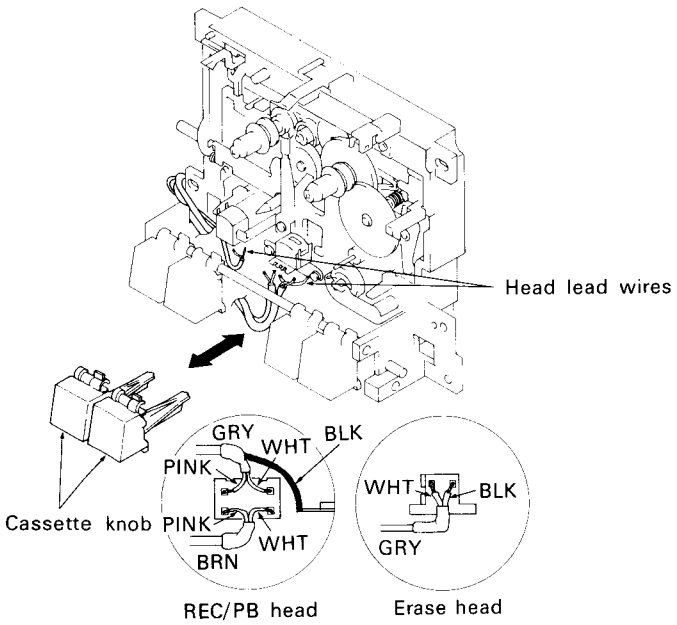


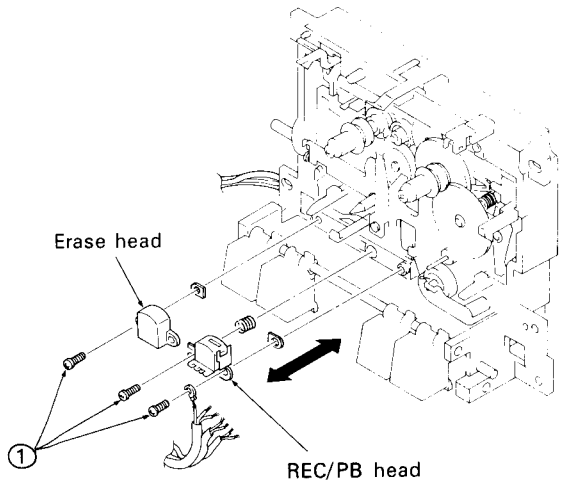
Fig. 3-6

Replacement of Head

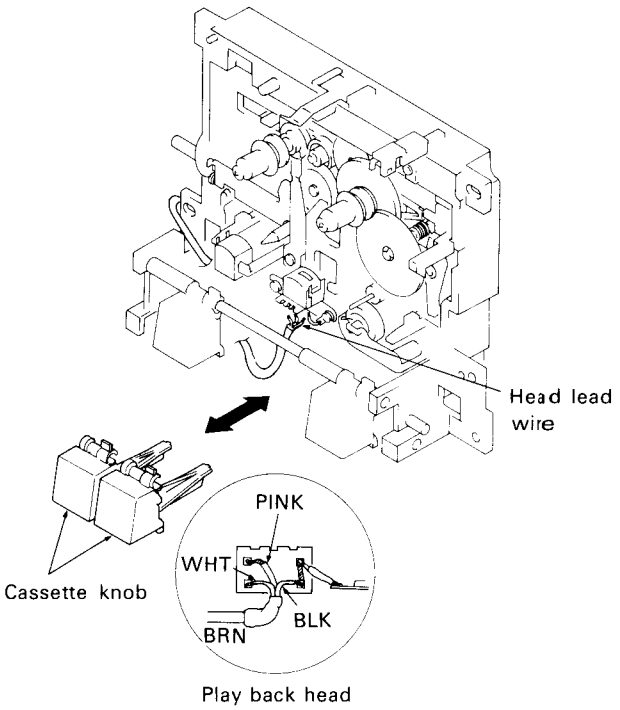
1. Detach cassette knob.
2. Remove head lead from head.
3. Remove set screw ① of head.
4. Remove former head and install a new one.
5. Solder head lead while taking precaution not to touch the wirings.
6. Attach cassette knob.
7. Check the running of tape.
8. Perform azimuth adjustment.
9. Perform bias adjustment.

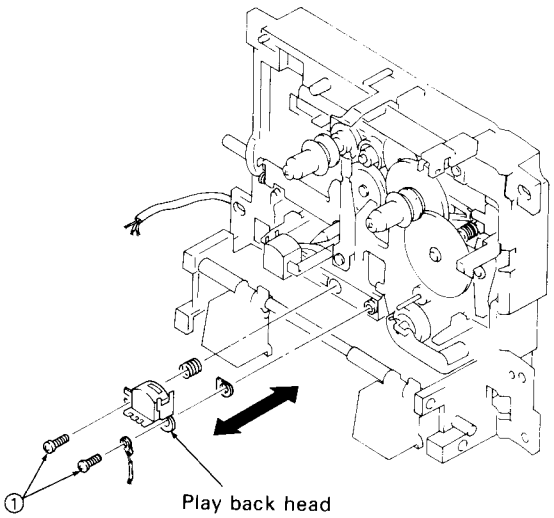
Tape transport unit 2





Tape transport unit 1



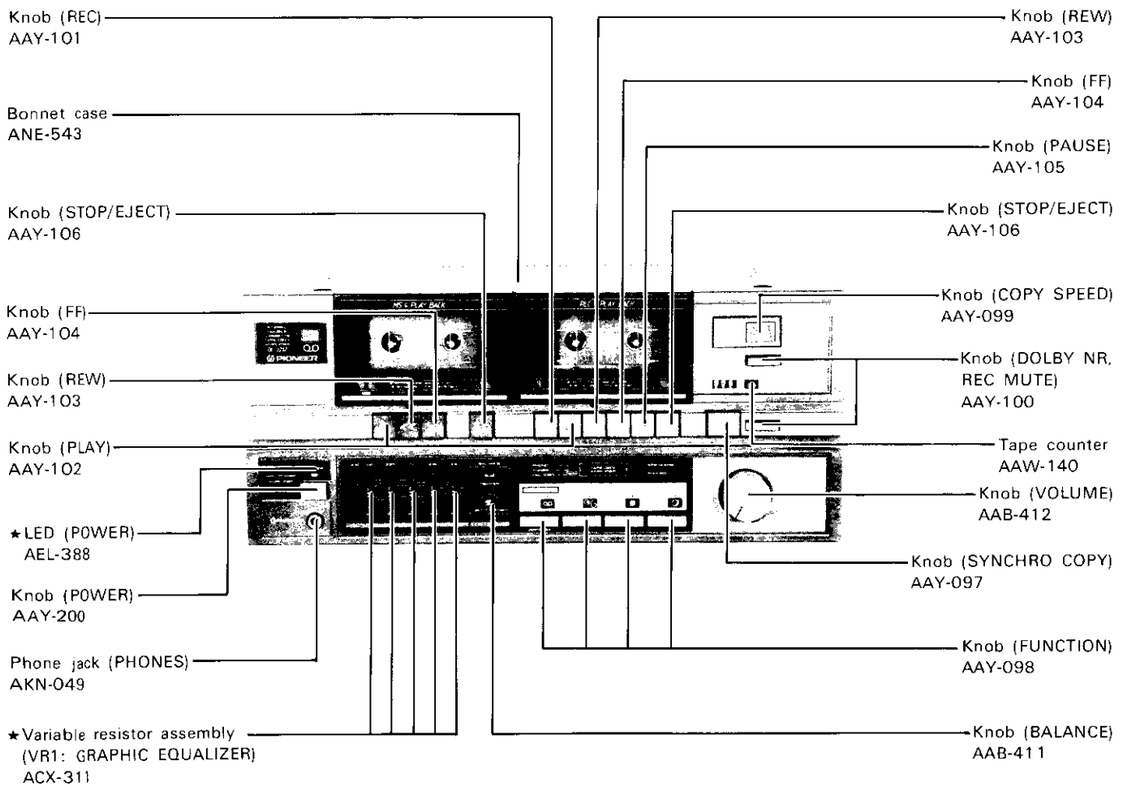


4. PARTS LOCATION

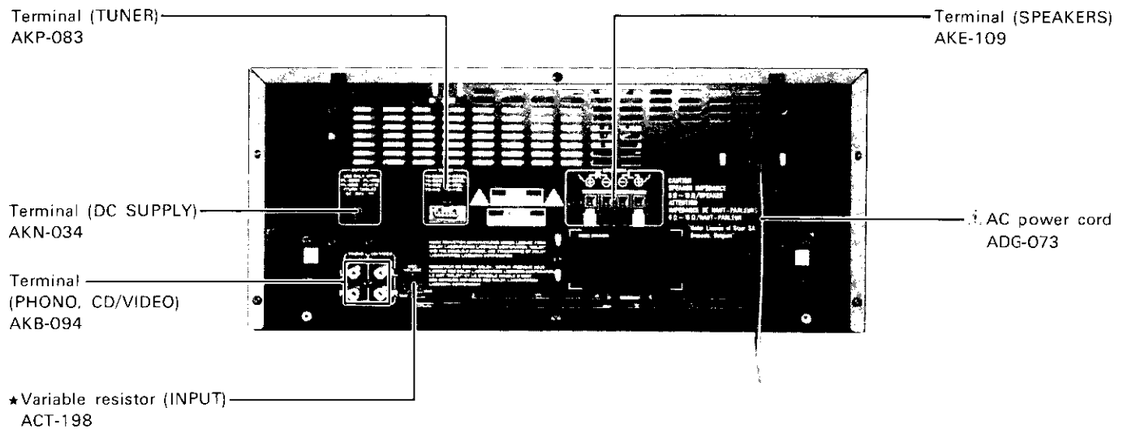
NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.
- *See P12 on DC-220Z.*

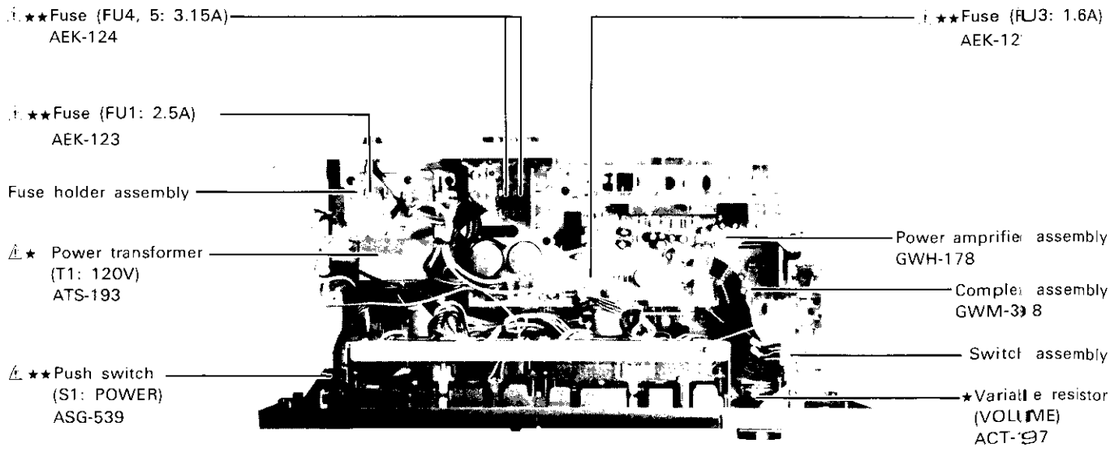
Front Panel View (DC-221Z)



Rear Panel View (DC-221Z)



Top View (DC-221Z)



5. EXPLODED VIEW

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.***
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Parts List of Exterior (DC-221Z)

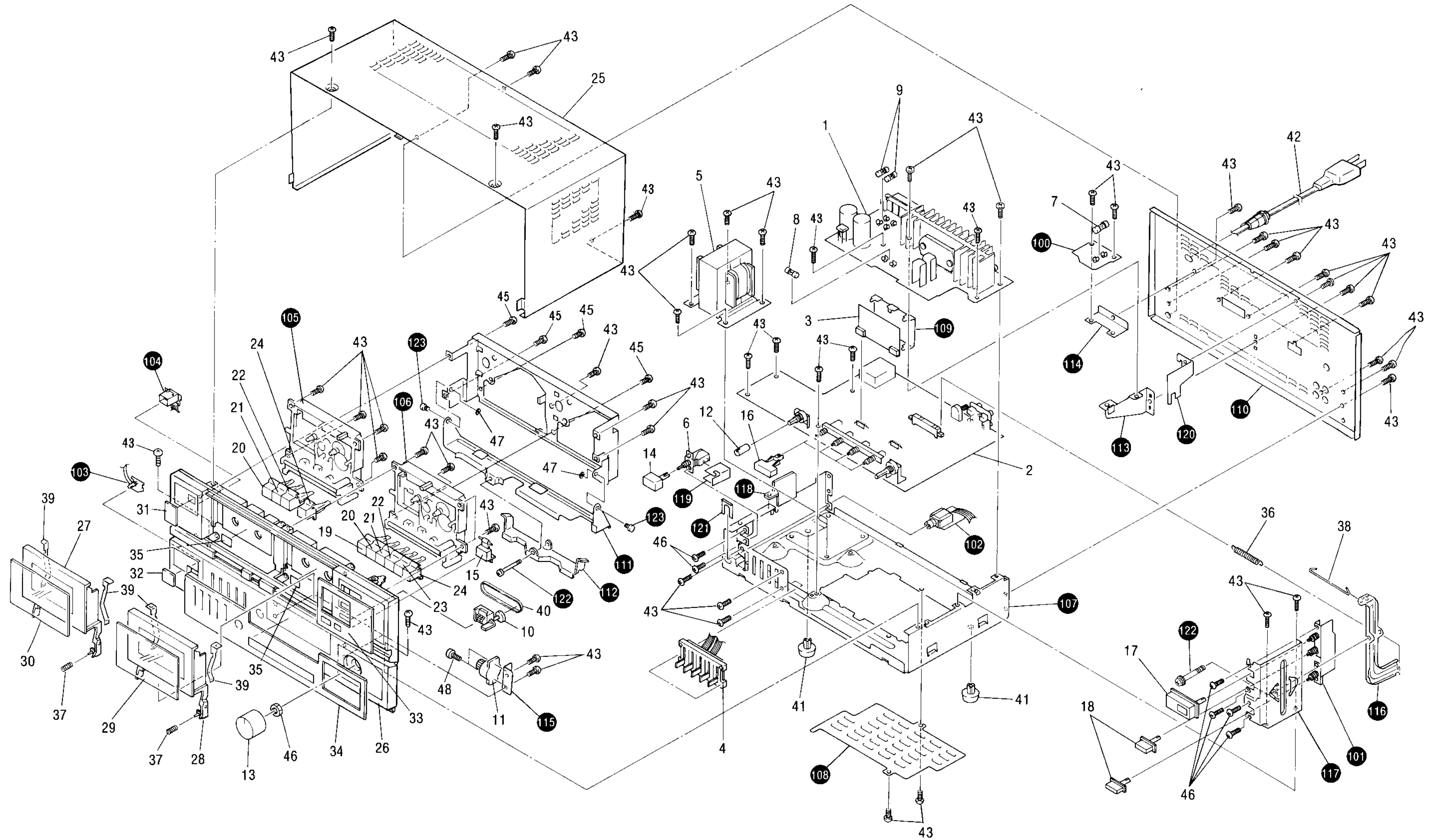
Mark	No.	Part No.	Description
	1	GWH-178	Power amplifier assembly
	2	GWM-398	Complex assembly
	3	GWY-187	PB.EQ assembly
★	4	ACX-311	Variable resistor assembly
⚠ ★	5	ATS-193	Power transformer (AC120V)
⚠ ★★	6	ASG-539	Push switch (POWER)
⚠ ★★	7	AEK-123	Fuse (2.5A)
⚠ ★★	8	AEK-121	Fuse (1.6A)
⚠ ★★	9	AEK-124	Fuse (3.15A)
	10	AAW-140	Tape counter
	11	ANZ-044	Damper assembly
	12	AAB-411	Knob (BALANCE)
	13	AAB-412	Knob (VOLUME)
	14	AAY-200	Knob (POWER)
	15	AAY-097	Knob (SYNCHRO COPY)
	16	AAY-098	Knob (FUNCTION)
	17	AAY-099	Knob (COPY SPEED)
	18	AAY-100	Knob (DOLBY NR, REC MUTE)
	19	AAY-101	Knob (REC)
	20	AAY-102	Knob (PLAY)
	21	AAY-103	Knob (REW)
	22	AAY-104	Knob (FF)
	23	AAY-105	Knob (PAUSE)
	24	AAY-106	Knob (STOP/EJECT)
	25	ANE-543	Bonnet case
	26	ANM-887	Front panel
★★	27	ANR-964	Door (L)
★★	28	ANR-965	Door (R)
	29	ANZ-034	Door panel R
	30	ANZ-033	Door panel L
	31	ANZ-035	Name panel
	32	ANZ-032	POWER panel
	33	ANZ-031	Deck panel
	34	ANZ-036	Amp panel
	35	AAX-444	Shine paper
	36	ABH-156	REC spring
	37	ABH-147	Coiled spring
	38	ABH-148	Rod
	39	ABK-012	Keep plate
★★	40	AEB-197	Counter belt
	41	AEC-847	Leg assembly
⚠	42	ADG-073	AC power cord
	43	BPZ30P080FZK	Screw 3×8
	44	NK90FUC	Nut
	45	PBZ26P060FMC	Screw 2.6×6
	46	VMZ30P060FMC	Screw 3×6
	47	YE30FUC	Washer E-type
	48	PBZ20P040FMC	Screw 2×4
	49	ABN-091	Boss
	100		Fuse holder Assembly
	101		Switch assembly
	102		Headphone jack assembly
	103		LED assembly (A)
	104		LED assembly (B)
	105		Tape transport unit 1
	106		Tape transport unit 2
	107		Chassis
	108		Bottom plate
	109		Shield plate
	110		Rear panel
	111		Synchro plate
	112		Balance plate
	113		Heat sink holder
	114		P.C.B holder
	115		Damper holder
	116		REC lever
	117		REC base
	118		Transformer barrier
	119		Switch barrier
	120		Heat sink stopper
	121		Clamp plate
	122		Screw
	123		Binder

Contrast of Miscellaneous Parts

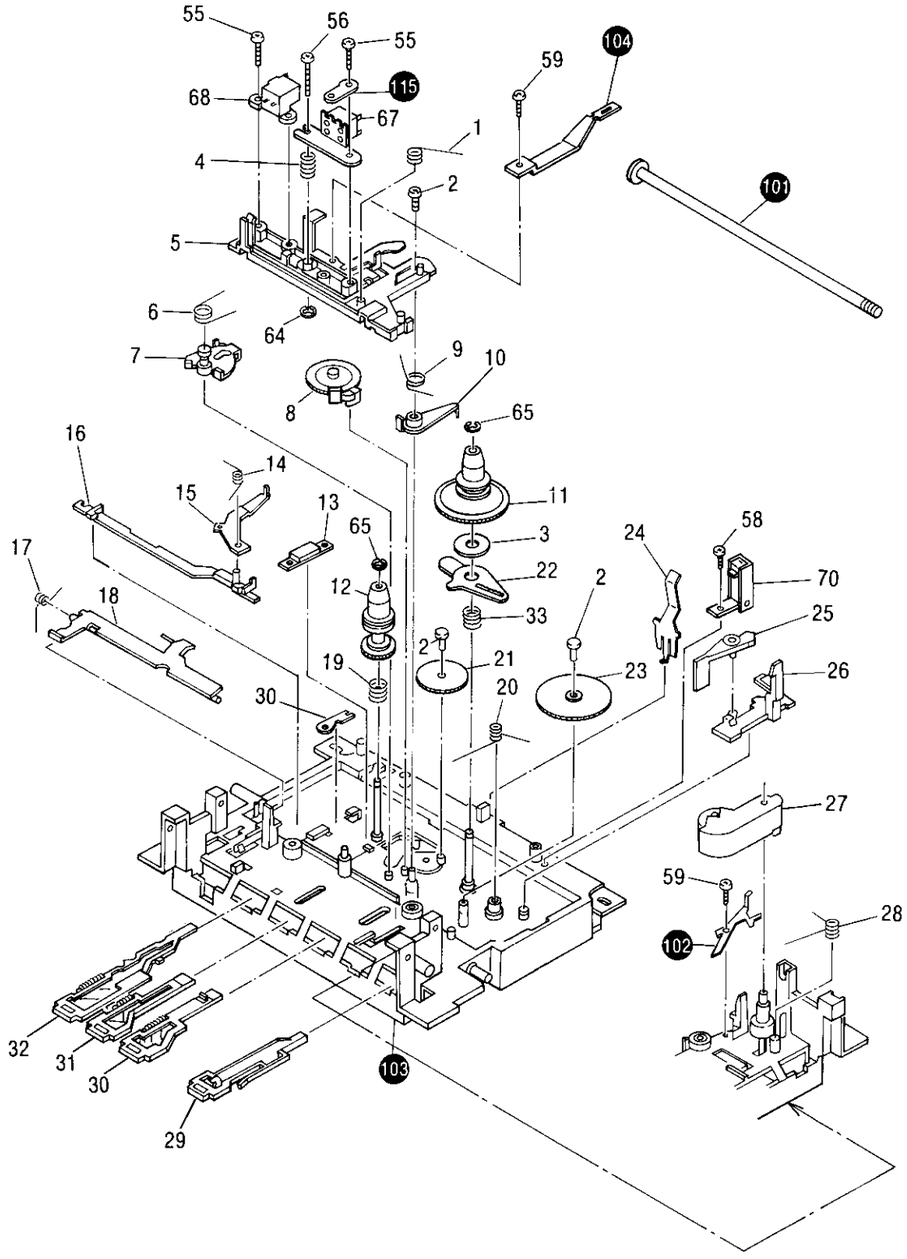
Key No.	Symbol & Description	Part No. DC-221Z	Part No. DC-220Z	Remarks
15	Knob (Black) (SYNCHRO COPY)	AAY-097	.....	
	Knob (Silver) (SYNCHRO COPY)	.....	AAY-072	
18	Knob (Black) (REC MUTE)	AAY-100	.....	
	Knob (Silver) (REC MUTE)	.....	AAY-076	
19	Knob A (Black) (REC)	AAY-101	.....	
	Knob A (Silver) (REC)	.....	AAY-085	
20	Knob B (Black) (PLAY)	AAY-102	.....	
	Knob B (Silver) (PLAY)	.....	AAY-086	
21	Knob C (Black) (REW)	AAY-103	.....	
	Knob C (Silver) (REW)	.....	AAY-087	
22	Knob D (Black) (FF)	AAY-104	.....	
	Knob D (Silver) (FF)	.....	AAY-088	
23	Knob E (Black) (PUASE)	AAY-105	.....	
	Knob E (Silver) (PAUSE)	.....	AAY-089	
24	Knob F (Black) (STOP/EJECT)	AAY-106	.....	
	Knob F (Silver) (STOP/EJECT)	.....	AAY-090	
18	Knob (Black) (DOLBY NR, REC MUTE)	AAY-100	AAY-100	
26	Front panel (Black)	ANM-887	.....	
	Front panel (Silver)	.....	ANM-948	
31	Name panel (Black)	ANZ-035	.....	
	Name panel (Silver)	.....	ANZ-040	
34	Amp panel (Black)	ANZ-036	.....	
	Amp panel (Silver)	.....	ANZ-041	

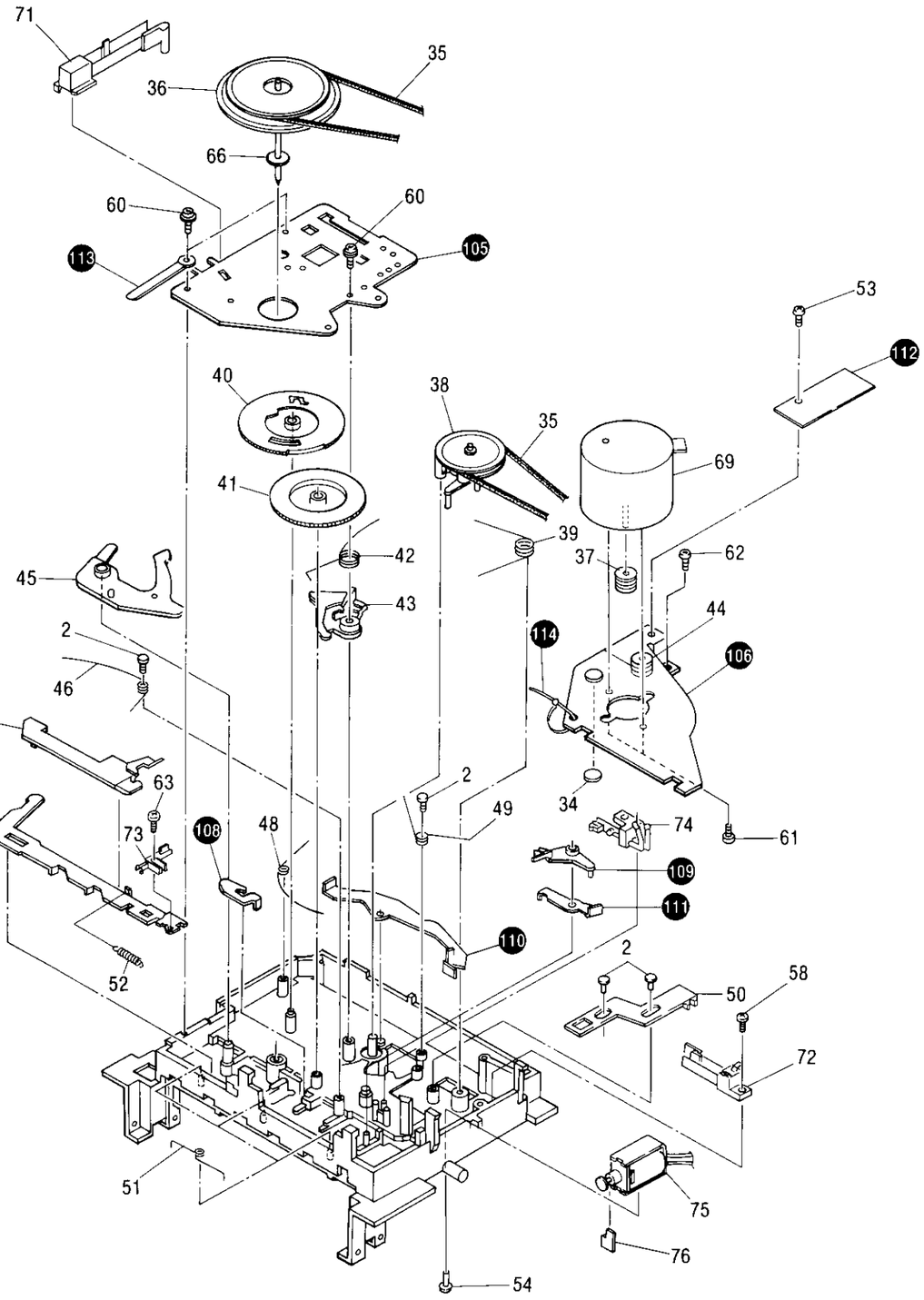
Exterior

A B C D



Tape Transport Unit 1





NOTES:

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

Parts List of Tape Transport Unit 1

Mark	No.	Part No.	Description
	1	AXV-087	Torsion spring
	2	AXT-007	Bush
	3	AXW-037	Felt
	4	AXV-064	Compression spring
	5	AXS-078	Head base
	6	AXV-088	Torsion spring
	7	AXS-079	FR arm
★★	8	AXP-037	P idler assembly
	9	AXV-089	Torsion spring
	10	AXS-080	Reset lever
★★	11	AXP-038	T reel assembly
★★	12	AXP-039	S reel assembly
	13	AXS-081	FR release lever
	14	AXV-090	Torsion spring
	15	AXS-082	P release lever
	16	AXS-083	PL plate
	17	AXV-091	Torsion spring
	18	AXS-099	FR plate
	19	AXV-092	S brake spring
	20	AXV-093	Torsion spring
	21	AXS-084	F idler gear
	22	AXS-085	Sensor cam
	23	AXS-086	AS gear
	24	AXV-094	Cassette holder
	25	AXS-087	Eject cam
	26	AXS-088	Latch lever
★★	27	AXP-040	Pinch arm assembly
	28	AXV-095	Torsion spring
	29	AXS-089	SE lever
	30	AXS-091	FF lever
	31	AXS-092	REW lever
	32	AXS-093	PL lever B
	33	AXV-096	Torsion spring
	34	AXW-035	Thrust receptacle
★★	35	AXW-037	Belt
	36	AXP-041	Flywheel assembly
	37	AXS-103	Motor pulley
★★	38	AXP-042	FR idler arm assembly
	39	AXV-104	Torsion spring
	40	AXS-094	Assist gear A
	41	AXS-107	Assist gear C
	42	AXV-098	Torsion spring
	43	AXS-096	P cam lever
	44	AXW-024	Rubber grommet
	45	AXS-108	CR cam lever

Mark	No.	Part No.	Description
	46	AXV-099	Torsion spring
	47	AXS-098	FR start lever
	48	AXV-100	Torsion spring
	49	AXV-101	Torsion spring
	50	AXS-104	Assistance plate
	51	AXV-102	Torsion spring
	52	AXV-105	Torsion spring
	53	BDZ26P050FMC	Screw 2.6×5
	54	BMZ20P050FMC	Screw 2×5
	55	BTZ20P080FMC	Screw 2×8
	56	BMZ20P100FMC	Screw 2×10
	57	BDZ17P070FMC	Screw 1.7×7
	58	PTZ26P060FMC	Screw 2.6×6
	59	BTZ20P050FMC	Screw 2×5
	60	BTZ26P060FMC	Screw 2.6×6
	61	AXT-009	Motor set screw
	62	PDZ26P040FMC	Screw 2.6×4
	63	BMZ20P060FMC	Screw 2×6
	64	NA20FMC	Nut M2
	65	WA16D040D020	Washer 1.6×4×O.2
	66	WA21D040D030	Washer 2.1×4×O.3
★★	67	AXN-033	Playback head
	68	AXN-016	Dummy head
★★	69	AXM-013	Motor
★★	70	AXN-024	Spring switch (S22, CrO_2)
★★	71	AXN-025	Spring switch (S21, MUTE)
★★	72	AXN-026	Spring switch (S23, PLAY)
★★	73	AXN-027	Spring switch (S25, MS)
★★	74	AXN-030	Spring switch (S24, MAIN)
★	75	AXN-028	Solenoid (PM1, MS)
	76	AXS-105	FR stopper
	101		Button shaft
	102		Grounding lug
	103		Chassis
	104		REV plate
	105		Gear holder
	106		Motor holder
	107		FR S lever
	108		Protector
	109		MS W lever
	110		PL start lever
	111		CR S lever
	112		Relay board
	113		Cord fixer
	114		Wire tie
	115		Lug

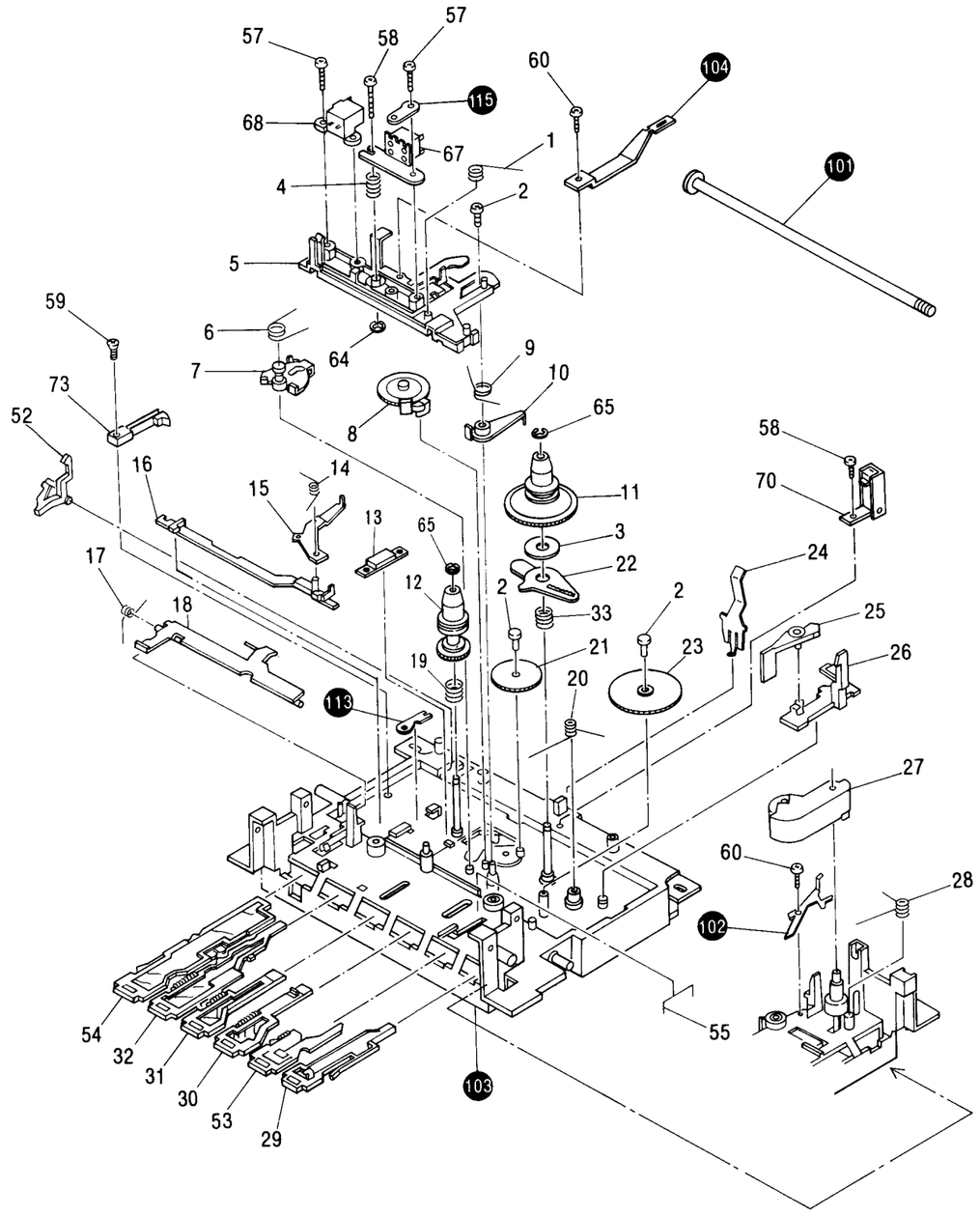
NOTES:

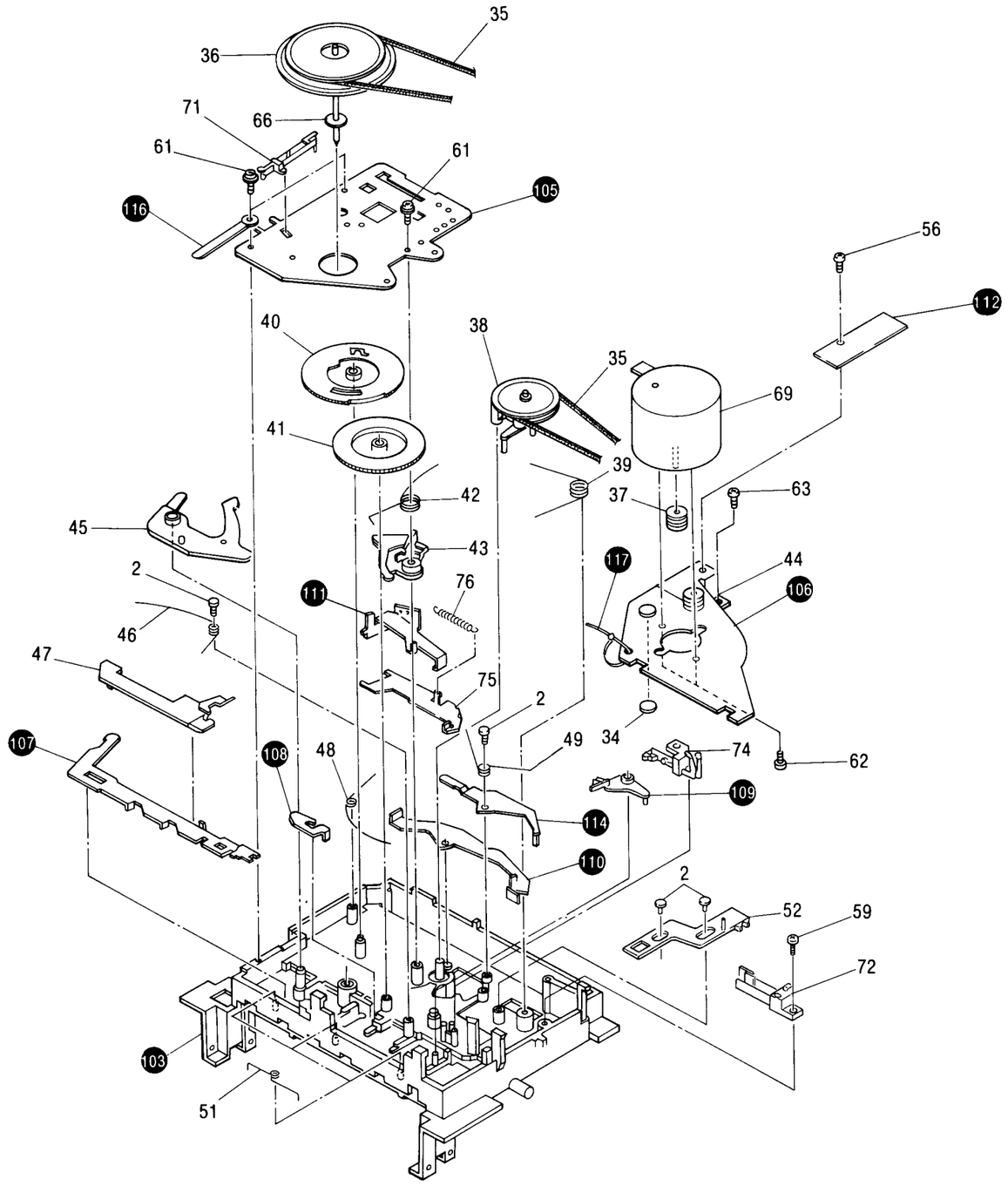
- ***Parts without part number cannot be supplied.***
- ***The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.***
- ***For your Parts Stock Control, the fast moving items are indicated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

Parts List of Tape Transport Unit 2

Mark	No.	Part No.	Description
	1	AXV-087	Torsion spring
	2	AXT-007	Bush
	3	AXW-034	Felt
	4	AXV-064	Compression spring
	5	AXS-078	Head base
	6	AXV-088	Torsion spring
	7	AXS-079	FR arm
★★	8	AXP-037	P idler assembly
	9	AXV-089	Torsion spring
	10	AXS-080	Reset lever
★★	11	AXP-038	T reel assembly
★★	12	AXP-039	S reel assembly
	13	AXS-081	FR release lever
	14	AXV-090	Torsion spring
	15	AXS-082	P release lever
	16	AXS-083	PL plate
	17	AXV-091	Torsion spring
	18	AXS-099	FR plate
	19	AXV-092	S brake spring
	20	AXV-093	Torsion spring
	21	AXS-084	F idler gear
	22	AXS-085	Sensor cam
	23	AXS-086	AS gear
	24	AXV-094	Cassette holder
	25	AXS-087	Eject cam
	26	AXS-088	Latch lever
★★	27	AXP-040	Pinch arm assembly
	28	AXV-095	Torsion spring
	29	AXS-089	SE lever
	30	AXS-091	FF lever
	31	AXS-092	REW lever
	32	AXS-093	PL lever B
	33	AXV-096	Torsion spring
	34	AXW-035	Thrust receptacle
★★	35	AXW-037	Belt
	36	AXP-041	Flywheel assembly
	37	AXS-103	Motor pulley
★★	38	AXP-042	FR idler arm assembly
	39	AXV-104	Torsion spring
	40	AXS-094	Assist gear A
	41	AXS-107	Assist gear C
	42	AXV-098	Torsion spring
	43	AXS-096	P cam lever
	44	AXW-024	Rubber grommet
	45	AXS-108	CR cam lever
	46	AXV-099	Torsion spring
	47	AXS-098	FR start lever
	48	AXV-100	Torsion spring
	49	AXV-101	Torsion spring
	50	AXS-104	Assistance plate
	51	AXV-102	Torsion spring
	52	AXS-098	Interlock plate
	53	AXS-090	Pause lever
	54	AXS-100	REC lever
	55	AXV-103	Lock pin
	56	BDZ26P050FMC	Screw 2.6×5
	57	BTZ20P080FMC	Screw 2×8
	58	BMZ20P100FMC	Screw 2×10
	59	PTZ26P060FMC	Screw 2.6×6
	60	BTZ20P050FMC	Screw 2×5
	61	BTZ26P060FMC	Screw 2.6×6
	62	AXT-009	Motor set screw
	63	PDZ26P040FMC	Screw 2.6×4
	64	NA20FMC	Nut M2
	65	WA16D040D020	Washer 1.6×4×0.2
	66	WA21D040D030	Washer 2.1×4×0.3
★★	67	AXN-031	REC/PB head
★	68	AXN-032	Erase head
★★	69	AXM-013	Motor
★★	70	AXN-024	Spring switch (S32, METAL)
★★	71	AXN-025	Spring switch (S31, MUTE)
★★	72	AXN-026	Spring switch (S33, PLAY)
★★	73	AXN-029	Spring switch (S36, REC KNOB)
★★	74	AXN-030	Spring switch (S34, MAIN)
	75	AXS-102	REC link lever
	76	AXV-106	Tension spring
	101		Button shaft
	102		Grounding lug
	103		Chassis
	104		REV plate
	105		Gear holder
	106		Motor holder
	107		FR S lever
	108		Protector
	109		MS W lever
	110		PL start lever
	111		RSW lever
	112		Relay board
	113		REC protector
	114		REC change plate
	115		Lug
	116		Cord fixer
	117		Wire tie

Tape Transport Unit 2





6. ELECTRICAL PARTS LIST

NOTES:

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

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

560Ω	*56 × 10¹*	*561 . . . . .*	*RD¼PS 5 6 1 J*
47kΩ	*47 × 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 × 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	Symbol & Description	Part No.
	Power amplifier assembly	GWH-178
	Complex assembly	GWM-398
	PB. EQ assembly	GWY-187
	Switch assembly	non supply
	Headphone jack assembly	non supply
	Fuse holder assembly	non supply
	LED assembly (B)	non supply
	LED assembly (A)	non supply

SWITCH

Mark	Symbol & Description	Part No.
⚠ ★★	S1 Push switch (POWER)	ASG-539

TRANSFORMER

Mark	Symbol & Description	Part No.
⚠ ★	T1 Power transformer (AC120V)	ATS-193

CAPACITORS

Mark	Symbol & Description	Part No.
⚠	C1 Ceramic capacitor	ACG-502
	C872 Electric capacitor	CEAS101M16

RESISTOR

Mark	Symbol & Description	Part No.
★	VR1 Variable resistor assembly (GRAPHIC EQUALIZER)	ACX-311

FUSES

Mark	Symbol & Description	Part No.
⚠ ★★	FU1 Fuse (2.5A)	AEK-123
⚠ ★★	FU4, FU5 Fuse (3.15A)	AEK-124
⚠ ★★	FU3 Fuse (1.6A)	AEK-121

OTHERS

Mark	Symbol & Description	Part No.
⚠	AC Power cord	ADG-073

Complex Assembly (GWM-398)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC701, IC702	BA3812L
★★	IC401	HA12045
★★	IC501	M5218L
★★	IC601	M5218P
★★	IC301	M5220L
★★	IC801	TA7341P
★★	Q803, Q806	DTA124ES (RN2203)
★★	Q842	DTA143ES (RN2201)
★★	Q805, Q809, Q810, Q811, Q841	DTC124ES (RN1203)
★★	Q802, Q807	DTC143ES (RN1201)
★★	Q801	2SA933S (2SA1048)
★★	Q804	2SB560
★★	Q303, Q304, Q401—Q409, Q501—Q510, Q846	2SC1740S (2SC2458)
★★	Q843	2SC2603 (2SC2458)
★★	Q844, Q845, Q851	2SD438
★★	Q301, Q302	2SC2878
★	D832, D833	RD5.6EB (HZ5.6EB)
★	D831	RD6.8EB (HZ6.8EB)
★	D821	S5566 (11E2)
★	D401, D402, D501, D801—D804, D806—D818, D820, D822—D826, D829, D830, D834—D840	1SS131
★	D851	US1035

SWITCHES

Mark	Symbol & Description	Part No.
★★	S401 Slide switch (REC/PB)	ASH-105
★★	S701 Push switch (FUNCTION)	SUJ6L4B2B2B2LF

COILS AND TRANSFORMERS

Mark	Symbol & Description	Part No.
	F401, F402 MPX filter	ATF-167
	L801 Inductor	ATH-094
	L501, L502 Inductor	ATH-117
	L401, L402 Trap coil	ATM-034
	L503, L504 Trap coil	ATM-035
	T801 Oscillator transformer	ATX-035

CAPACITORS

Mark	Symbol & Description	Part No.
	C804 Polypropylene (680p/630V)	ACE-134
	C723, C724 Ceramic (330p/50V)	ACG-028
	C417, C418 Electrolytic (0.27/50V)	ACH-387
	C419, C420 Electrolytic (0.82/50V)	ACH-388
	C305, C306, C605—C608	CCCSL101J50 (CCDSL101J50)
	C802, C803	CCCSL101K500 (CCDSL101K500)
	C403, C404, C429, C430	CCCSL470J50 (CCDSL470J50)
	C709, C710	CEASR15M50
	C801	CEASR47M50
	C705, C706	CEASR68M50
	C303, C304, C423, C424, C517, C518, C615, C616, C813	CEAS010M50
	C311, C312, C407, C408, C425, C426, C501, C502, C519, C520, C701, C702, C727, C728, C814, C853	CEAS100M25
	C453, C725, C726	CEAS101M10
	C401, C402, C405, C406, C427, C428, C452, C603, C604	CEAS2R2M50
	C451, C454	CEAS221M16
	C307, C308, C505, C506	CEAS330M16
	C415, C416	CEAS4R7M50
	C609, C610	CEAS470M10
	C351, C352, C651, C652, C751, C809, C810	CEAS470M16
	C715, C716	CKCYB182K50 (CKDYB182K50)
	C719, C720	CKCYB391K50 (CKDYB391K50)
	C711, C712	CKCYB392K50 (CKDYB392K50)
	C301, C302	CKCYB471K50 (CKDYB471K50)
	C521—C524	CKCYB681K50 (CKDYB681K50)
	C721, C722	CKCYB682K50 (CKDYB682K50)
	C717, C718	CKCYX153M25 (CKDYX153M25)
	C707, C708	CKCYX183M25 (CKDYX183M25)
	C703, C704	CKCYX393M25 (CKDYX393M25)
	C713, C714	CKCYX683M25 (CKDYX683M25)
	C507, C508, C806, C808, C852	CQMA103J50
	C509, C510	CQMA123J50
	C805, C807	CQMA153J50
	C503, C504	CQMA182J50
	C421, C422	CQMA183J50
	C313, C314, C851	CQMA223J50
	C611, C612	CQMA242J50
	C411, C412, C513, C514	CQMA333J50
	C511, C512	CQMA393J50
	C413, C414	CQMA472J50
	C309, C310	CQMA562J50
	C515, C516	CQMA682J50
	C613, C614	CQMA822J50

RESISTORS

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

Mark	Symbol & Description	Part No.
★	VR701 Variable (BALANCE)	ACT-057
★	VR702 Variable (VOLUME)	ACT-197
★	VR601 Variable (INPUT)	ACT-198
★	VR801, VR803 Semi-fixed 10k	VRTB6VS103
★	VR841, VR842 Semi-fixed 100k	VRTB6VS104
★	VR301, VR302, VR501, VR502, VR802, VR804 Semi-fixed 22k	VRTB6VS223
	R842	RD1/2PM271J
	R319, R320	RD1/4PM105J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (PHONO, CD/VIDEO)	AKB-094

Switch Assembly

SWITCHES

Mark	Symbol & Description	Part No.
★★	S902 Push switch (HIGH SPEED COPY)	SUJL2NF
★★	S901 Push switch (DOLBY NR, REC MUTE)	SUJ8L24SF

RESISTORS

Mark	Symbol & Description	Part No.
	R821	RD1/8PM427J
	R822	RD1/8PM622J

PB.EQ Assembly (GWY-187)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC901	M5220L
★★	Q901—Q906	2SC1740S (2SC2458)
★★	Q907, Q908	2SC2878

CAPACITORS

Mark	Symbol & Description	Part No.
	C901, C902, C907, C908	CCCSL151J50 (CCDSL151J50)
	C905, C906	CEAS010M50
	C913, C914	CEAS100M25
	C909, C910	CEAS330M16
	C951, C952	CEAS470M16
	C903, C904	CKCYB331K50 (CKDYB331K50)
	C919	CKCYX473K25 (CKDYX473K25)
	C917, C918	CQMA183J50
	C915, C916	CQMA223J50
	C911, C912	CQMA562J50

RESISTORS

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

Mark	Symbol & Description	Part No.
★	VR901, VR902 Semi-fixed 20k	VRTM6H203
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal	AKP-045

Headphone Jack Assembly

RESISTORS

Mark	Symbol & Description	Part No.
	R829, R830	RD1/2PM331J

OTHERS

Mark	Symbol & Description	Part No.
	Phone jack (PHONES)	AKN-049

LED Assembly (A)

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★	D828 LED (REC)	AEL-443

LED Assembly (B)

SEMICONDUCTOR

Mark	Symbol & Description	Part No.
★	D827 LED (POWER)	AEL-388

Power Amplifier Assembly (GWH-178)

SEMICONDUCTORS

Mark		Symbol & Description	Part No.
⚠	★★	IC101	STK4171-2S
	★★	IC102, IC103	μPC78M12H
	★★	Q104	2SB834
	★★	Q101—Q103	2SC1740S (2SC2603)
	★	D101	KZL150
⚠	★	D106	RB402
	★	D105	RD13EB (HZ13EB)
⚠	★	D103, D104, D107—D110	S5566 (11E2)
	★	D102	1S2471

RELAY

Mark	Symbol & Description	Part No.
★★	RY101 Ralay	ASR-111

COILS

Mark	Symbol & Description	Part No.
	L103, L104 AF choke coil	ATH-053

CAPACITORS

Mark	Symbol & Description	Part No.
	C131, C132 Ceramic (0.01/AC150V)	ACG-019
	C128, C129 Electrolytic (4700/50V)	ACH-252
	C105, C106	CCCSL470J50 (CCDSL470J50)
	C101, C102	CCCSL271J50 (CCDSL271J50)
	C119	CEASR47M100
	C113, C115, C116	CEAS100M50
	C107, C108	CEAS101M10
	C118	CEAS101M25
	C114	CEAS101M50
	C103, C104	CEAS2R2M50
	C127	CEAS330M25
	C130	CEAS332M25
	C109—C112, C124, C125	CEAS470M25
	C133	CEAS470M50
	C117	CEAS471M6
	C120, C121	CKCYF473Z50 (CKDYF473Z50)

RESISTORS

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

Mark	Symbol & Description	Part No.
⚠	R129, R130	RD1/2PMF100J
	R133, R137, R138	RD1/2PM□□□J
⚠	R125, R126, R141, R142, R120, R136, R134, R118, R119	RD1/4PMF□□□J
	R124	RS1LMF821J
	R131, R132	RS2LMF271J
	R139	RS2LMF4R7J
	Other resistors	RD1/4PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (SPEAKERS)	AKE-109
	Terminal (DC SUPPLY)	AKN-034
	Terminal (TO TUNER)	AKP-083
	Screw	ABA-271
	Heat proof rivet	AEC-940
	Screw 3×8	BBZ30P080FZK
	Screw 3×6	PBZ30P060FMC

Fuse Holder Assembly

RESISTOR

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

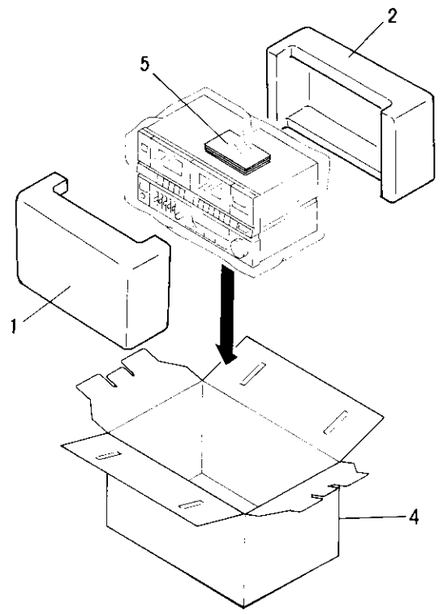
Mark	Symbol & Description	Part No.
⚠	R140 Carbon composition (2.2M1/2W)	ACN-209

7. PA

onvert the resistance value
write the part no. as before.

	Part No.
n	ACN-209

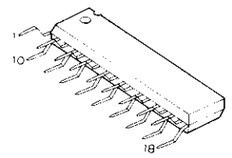
7. PACKING



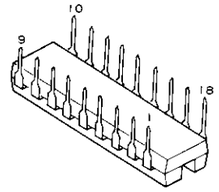
Mark	No.	Part No.	Description
	1	AHA-400	Front pad
	2	AHA-401	Rear pad
	3	·····	·····
	4	AHE-525	Packing case (DC-221Z)
	5	ARB-678	Operating instructions (English)

External Appearance of Transistors and ICs

BA3812L



HA12045



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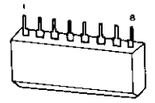

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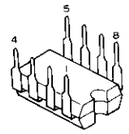

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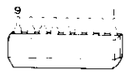

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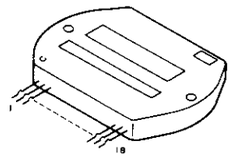

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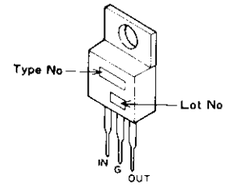

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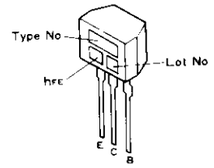
2SC1740S



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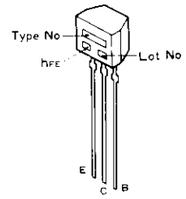

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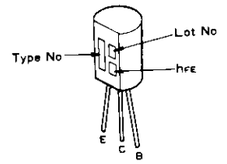
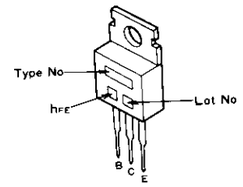
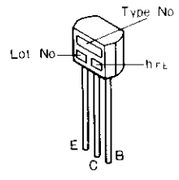


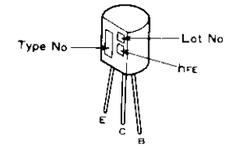
2SB834



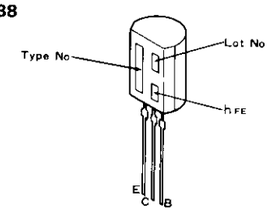
2SC2603



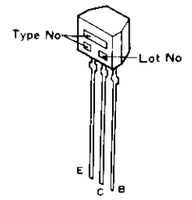
2SC2878



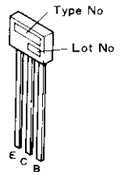
2SD438



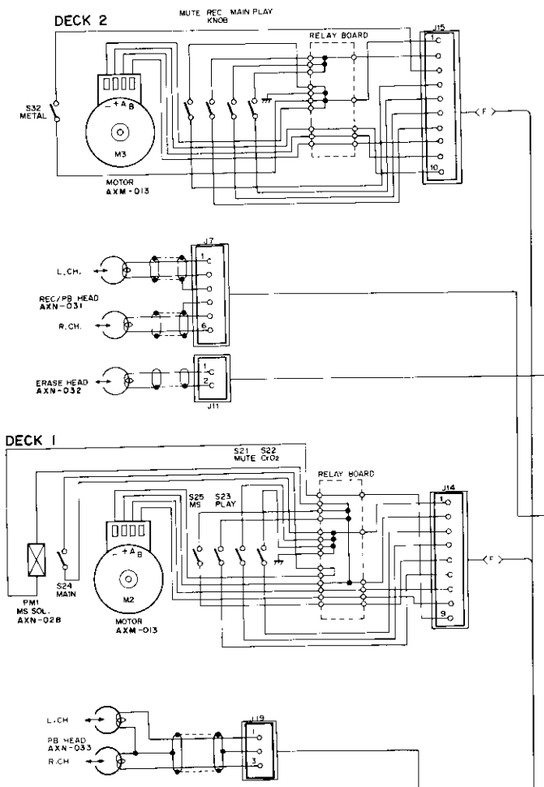
DTA124ES
DTA143ES
DTC124ES
DTC143ES

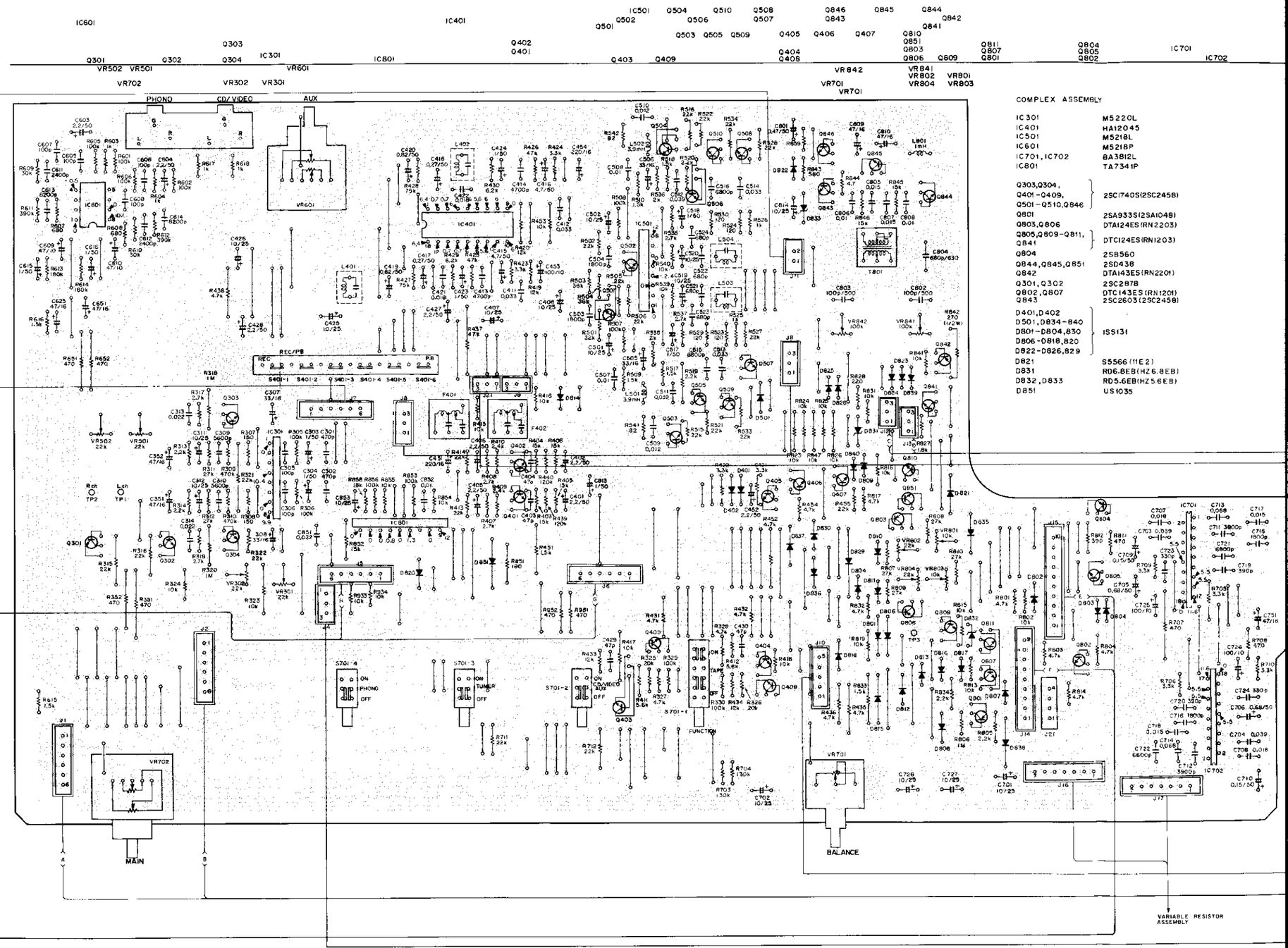


RN1201
RN1203
RN2201
RN2203



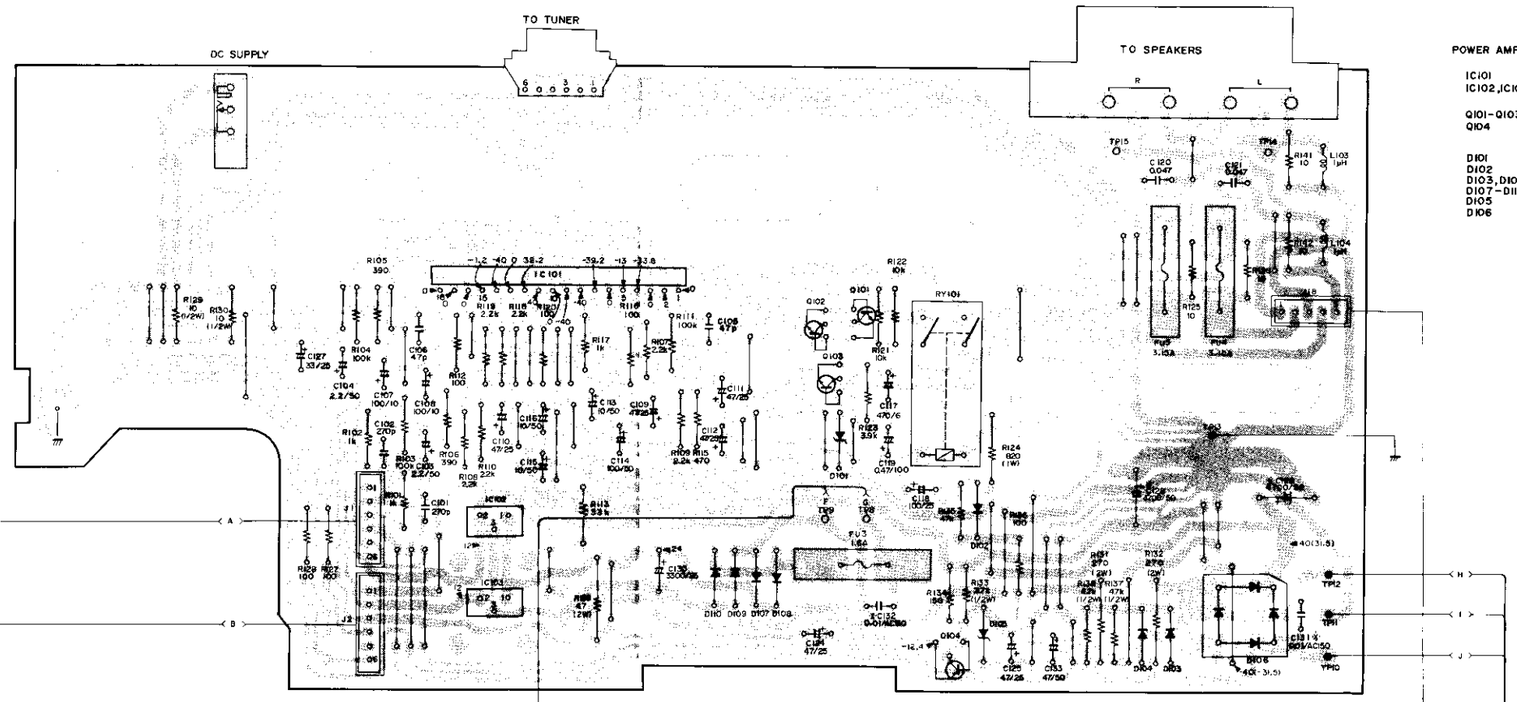
8. P.C. BOARDS CONNECTION DIAGRAM





COMPLEX ASSEMBLY

IC 301	M5220L
IC401	HA12045
IC501	M5218L
IC601	M5218P
IC701, IC702	BA3812L
IC801	TA7341P
Q303, Q304, Q401 - Q409, Q501 - Q510, Q846	2SC1740S(2SC2458)
Q801	2SA933S(2SA1048)
Q803, Q806	DTA124ES(RN2203)
Q805, Q809 - Q811, Q841	DTC124ES(RN1203)
Q804	2SB560
Q844, Q845, Q851	2SD438
Q842	DTA143ES(RN2201)
Q301, Q302	2SC2878
Q802, Q807	DTC143ES(RN1201)
Q843	2SC2603(2SC2458)
D401, D402 D501, D834 - 840 D801 - D804, 830 D806 - D818, 820 D822 - D826, 829	ISS131
D821	S5566(11E2)
D831	RD6.8EB(HZ6.8EB)
D832, D833	RD5.6EB(HZ5.6EB)
D851	US1035



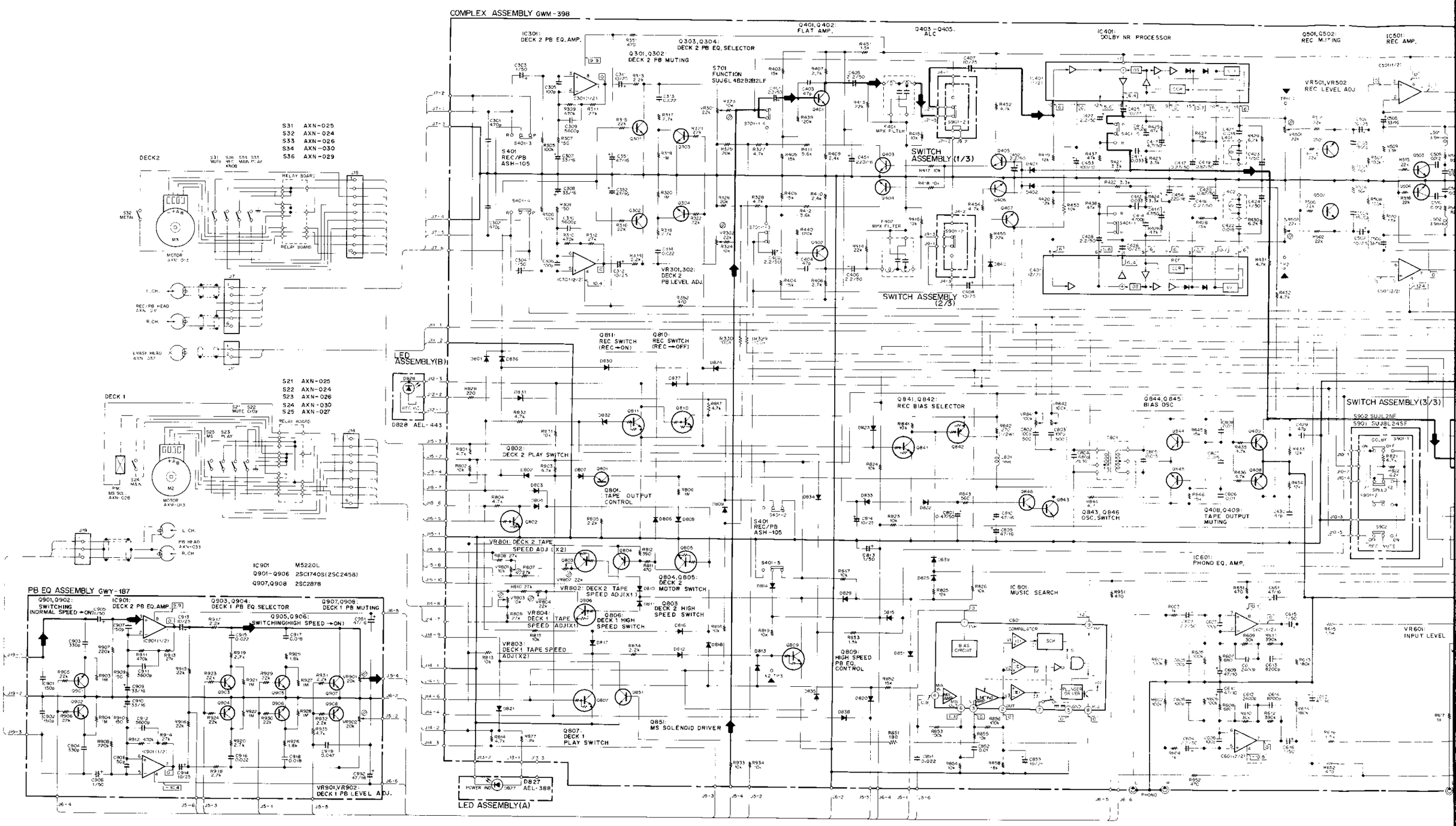
COMPLEX ASSEMBLY

IC301	M5220L
IC401	HA12045
IC501	M5218L
IC601	M5218P
IC701, IC702	BA3812L
IC801	TA7341P
Q303, Q304, Q401-Q409, Q501-Q510, Q846	2SC1740S(2SC2458)
Q801	2SA933S(2SA1048)
Q803, Q806	DTA124ES(RN2203)
Q805, Q809-Q811, Q841	DTC124ES(RN1203)
Q804	2SB560
Q844, Q845, Q851	2SD438
Q842	DTA143ES(RN2201)
Q301, Q302	2SC2878
Q802, Q807	DTC143ES(RN1201)
Q843	2SC2603(2SC2458)
D401, D402 D501, D834-840 D801-D804, 830 D806-D818, 820 D822-D826, 829	ISS131
D821	S5566(11E2)
D831	RD6.8EB(HZ6.8EB)
D832, D833	RD5.6EB(HZ5.6EB)
D851	US1035

POWER AMP ASSEMBLY

IC101	STK4171-2S
IC102, IC103	μPC78M12H
Q101-Q103	2SC1740S(2SC2603)
Q104	2SB834
D101	KZL150
D102	IS2471
D103, D104, D107-D110	S5566(11E2)
D105	RD13EB(HZ13EB)
D106	RB402

9. SCHEMATIC DIAGRAM



Q501,Q502:
REC MUTING

IC501:
REC AMP.

Q503–Q510:
REC EQ. SELECTOR

VR501,VR502
REC LEVEL ADJ

SWITCH ASSEMBLY(3/3)

S962 SUJL2NF
S901 SUJBL24SF

Q408,Q409:
TAPE OUTPUT
MUTING

IC601:
PHONO EQ. AMP.

VR601
INPUT LEVEL

IC702
5-POLE
GRAPHIC EQ.

IC701: 5-POLE GRAPHIC EQ.

VR703
VOLUME

VR702
VOLUME

VR701
BALANCE

CD/VIDEO

IC301	M5220L	VR601	ACT-198	VR301,302,501, VR502,802,804	VRT86VS223
IC401	HA12045	VR701	ACT-057		
IC501	M5218L	VR702	ACT-197	VR801,803	VRT86VS103
IC601	M5218P			VR841,842	VRT86VS104
IC701,IC702	BA3812L	C417,C418	ACH-387		
IC801	TA7341P	C419,C420	ACH-388		
		C723,C724	ACG-028		
Q303,Q304, Q401–Q409, Q501–Q510,Q846	2SC1740S(2SC2458)	C804	ACE-134		
Q801	2SA933S(2SA1048)	F401,F402	ATF-167		
Q803,Q806	DTA124ES(RN2203)	L401,L402	ATM-034		
Q805,Q809–Q811, Q841	DTC124ES(RN1203)	L501,L502	ATH-117		
Q804	2SB560	L503,L504	ATM-035		
Q844,Q845,Q851	2SD438	L801	ATH-094		
Q842	DTA143ES(RN2201)	T801	ATX-035		
Q301,Q302	2SC2878				
Q802,Q807	DTC143ES(RN1201)				
Q843	2SC2603(2SC2458)				
D401,D402					
D501,D834–840	ISS131				
D801–D804,830					
D806–D818,820					
D822–D826,829					
D821	S5566(11E2)				
D831	RD6.8EB(HZ6.8EB)				
D832,D833	RD5.6EB(HZ5.6EB)				
D851	US1035				
S401	ASH-105				
S701	SJJ6L4B2B2B2LF				

1 RESISTORS:
Indicated in Ω, 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k, ±(L: 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
(V) Signal voltage at 40 W + 40 W 8Ω output (1 kHz)
( ) DC voltage (V) at no input signal Value in ( ) is DC voltage at rated power
⟨⟩ 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.

HEADPHONE JACK ASSEMBLY

POWER AMPLIFIER ASSEMBLY GWH-178

IC101 2-CHANNEL POWER AMP

Q101,102: DC VOLTAGE DETECTOR
Q103: RELAY DRIVER

SPEAKERS
17.8V/8Ω

AKE-109

Q104, IC102, 103
VOLTAGE REGULATOR

IC101	STK4171-25	D101	KZL150	C131,C132	ACG-019
IC102,IC103	μPC78M12H	D102	1S2471	C126,C129	ACH-252
		D103,D104, D107–D110	S5566(11E2) RD13EB(HZ13EB)	L103, L104	ATH-053
Q101–Q103	2SC1740S (2SC2603)	D105	RB402	RY101	ASR-111
Q104	2SB834	D106		FU3	AEK-121
				FU4,FU5	AEK-124

FUI AEK-123
R140 ACN-209

FUSE HOLDER ASSEMBLY

AC POWER CORD ADV-073

AC120V 50/60Hz

AKP-083

AKN-034

VARIABLE RESISTOR ASSEMBLY

VR1 ACX-311

5 SWITCHES

OUTSIDE OF P.C.BOARDS

S1: POWER	ON—OFF

TAPE TRANSPORT UNIT 1

S21: MUTE	ON—OFF
S22: TAPE TYPE CrO2	ON—OFF
S23: PLAY	ON—OFF
S24: MS	ON—OFF

TAPE TRANSPORT UNIT 2

S31: MUTE	ON—OFF
S32: TAPE TYPE METAL	ON—OFF
S33: PLAY	ON—OFF
S34: MAIN	ON—OFF
S36: REC KNOB	ON—OFF

COMPLEX ASSEMBLY

S401: REC/PB SELECTOR	REC—PLAY
S701: FUNCTION	
S701-1: TAPE	ON—OFF
S701-2: CD/AUX	ON—OFF
S701-3: TUNER	ON—OFF
S701-4: PHONO	ON—OFF

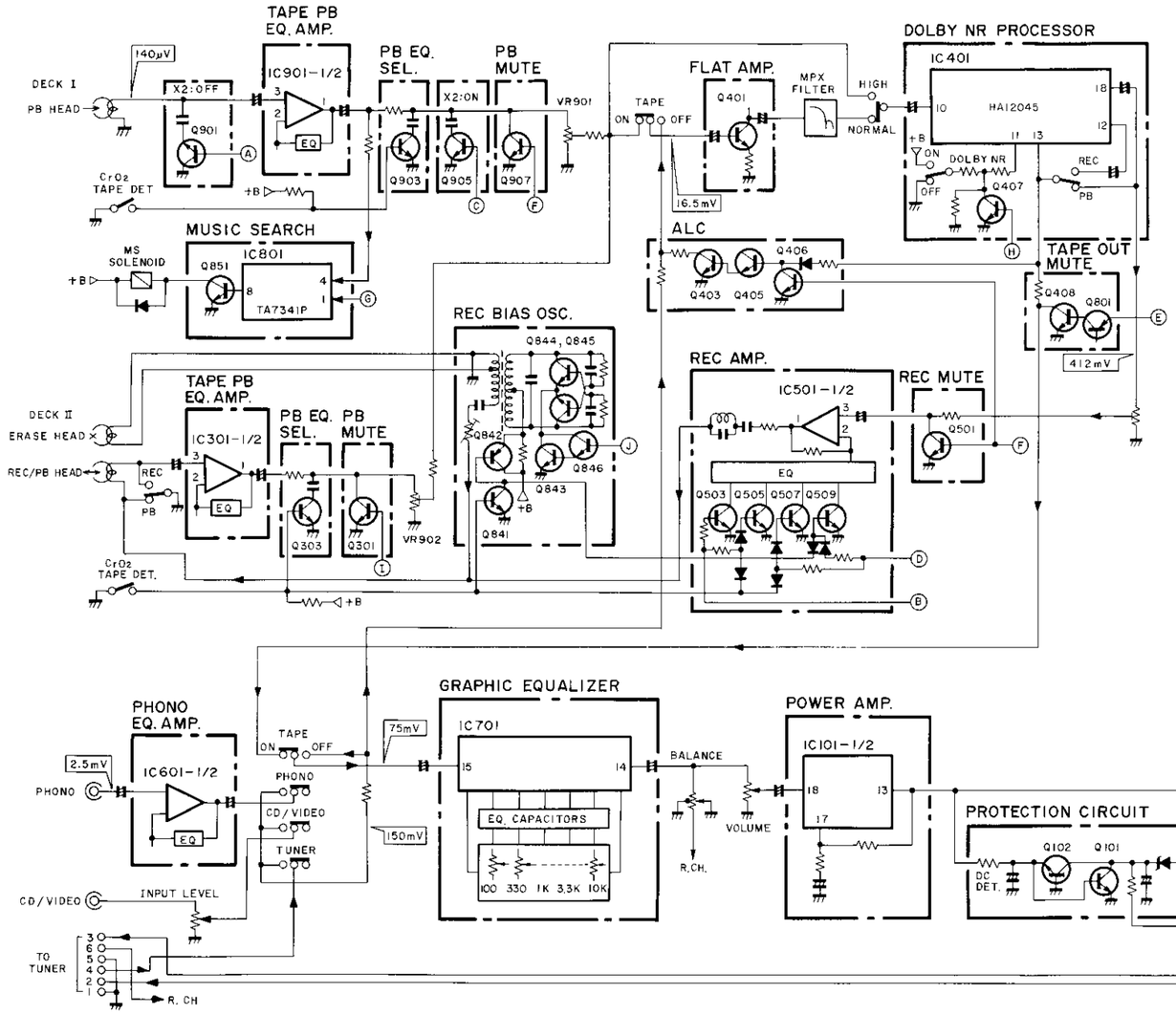
SWITCH ASSEMBLY

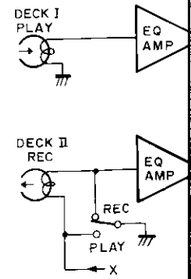
S901-1: DOLBY NR	ON—OFF
S901-2: HIGH SPEED COPY	X1—X2
S902: REC MUTE	ON—OFF

The underlined indicates the switch position.

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

10. BLOCK DIAGRAM





11. CIRCU

The DC-221Z/220
incorporates doubl
exclusive playback
playback unit (Dec

11-1. Cassette
DOLBY NR Sectio

The DOLBY NR
incorporates Type B
L and R channels.
During the COPY m
II is set to REC),
independent of the D
signals of Deck I ar
being DOLBY NR

MS (Music Searc

Music interval detec
section. When Deck
operation), the INH
starts the music inte
playback signals due
specified time length
terminal. Due to t
operated to turn
mode.

11. CIRCUIT DESCRIPTIONS

The DC-221Z/220Z is a stereo amplifier which incorporates double cassette tape decks, namely; an exclusive playback unit (Deck I) and a recording and playback unit (Deck II).

11-1. Cassette Tape Deck Section

DOLBY NR Section

The DOLBY NR section employs HA12045 which incorporates Type B DOLBY NR Encoder/Decoder in its L and R channels.

During the COPY mode (Deck I is set to PLAY and Deck II is set to REC), the DOLBY NR operation stops independent of the DOLBY NR switch, and the playback signals of Deck I are recorded into the Deck II without being DOLBY NR decorded or encoded. (Fig. 11-1)

MS (Music Search) Section

Music interval detecting IC TA7341P is used in the MS section. When Deck I becomes into MS mode (CUE operation), the INH terminal becomes H level, and it starts the music interval detection operation. When the playback signals due to CUE operation are stopped for a specified time length, pulse signal is output from the P0 terminal. Due to this pulse signal, MS solenoid is operated to turn MECHANICAL mode into PLAY mode.

Automatic Tape Selector

The automatic tape selector is designed for both metal tape and normal tape uses by detecting the CrO_2 tape discrimination hole of the cassette half, and it enables to perform simultaneous switching of both record/playback equalizers and recording bias.

Accordingly, when CrO_2 tape is used in playback, no particular problems will occur; however, when recording, the frequency characteristics tend to become over-bias. This results in much reduction of frequency characteristics in the higher ranges.

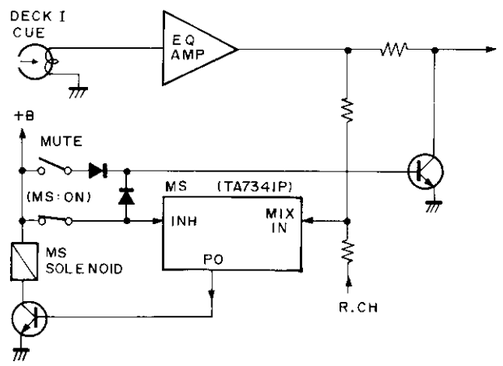


Fig. 11-2 Music Search circuit

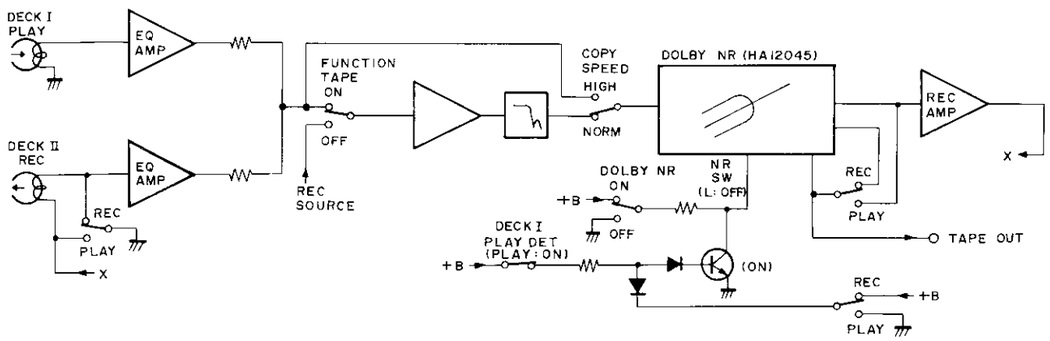


Fig. 11-1 Signal route in COPY mode

11-2. Integrated Amplifier Section

Phono Equalizer Amplifier

It uses a low noise operation amplifier IC (M5218P).

Graphic Equalizer Section

In order to vary the frequency characteristics, it provides five resonance circuits (to obtain equalized inductance by the transistors) in the feedback loop of the operation amplifier, and creates five poles in its playback signal frequency band.

In each of these circuits, IC (BA3812L) is used. The IC (BA3812L) forms a five-pole graphic equalilzer by adding a capacitor for resonace circuit and a variable resistor to it.

Power Amplifier Section

It uses IC (STK4171-2S) which incorporates a power amplifier for 2 channels and gains of 40W×2 THD 0.3% at 1 kHz.

Protection Circuit

It uses a relay to switch the output cirucit of the power amplifier ON and OFF, and prevents the transient noise output due to cutoff by the DC voltage detection at the center of the output, and the delayed connection when the power is turned ON and cutoff when the power is turned OFF.

12. ADJUSTMENTS

12-1. MECHANICAL ADJUSTMENTS

Prior to Adjustment

Clean the both reel base, the capstan and the pinch roller with an alcohol moistened swab.

Pinch Roller Pressure Adjustment

1. Put the deck in to the play back mode.
2. Gently push against the pinch roller arm with the tension gauge and separate the pinch roller slightly from the capstan.
3. Then the pinch roller back onto the capstan, and read the value when the pinch roller starts to rotate. If the reading fails to lie within 300 — 500g, replace the pinch roller pressure spring.

Reel Base Torque Check

Measure the torque with the torque meter during playback, fast forward (FF) and rewind (REW) modes. The measured values should normally lie within the allowable ranges listed in the table 1.

If the measured values lie outside the relevant ranges, replace the T reel assembly, and/or S reel assembly or P idler assembly.

Table 1

	T reel base (R side)	S reel base (L side)
PLAY mode	35g·cm — 70g·cm	*1g·cm — 5g·cm
FF mode	70g·cm — 140g·cm	*1g·cm — 5g·cm
REW mode	*1g·cm — 5g·cm	70g·cm — 140g·cm

*back-tension torque

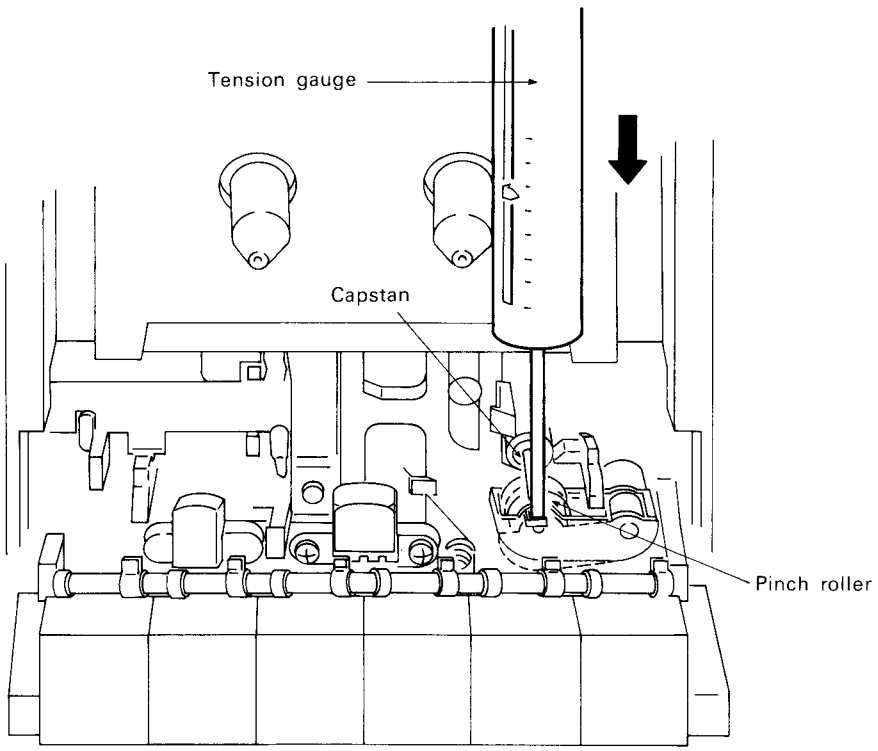


Fig. 12-1 Pressure adjustment of pinch roller

Tape Speed Adjustment

1. Connect the frequency counter to the TP1 terminal on the complex assembly.
2. Set the TAPE switch to the ON position.
3. Load the STD-301 test tape into the deck I.
4. Short circuit the TP3 (×2) terminal on the complex assembly, and play the STD-301 test tape at double speed.
5. Check that the deck I playback signal frequency is 6020Hz±10Hz. If the frequency reading lies outside this range, adjust VR803 to obtain the 6020Hz±10Hz.
6. Open circuit the TP3 (×2) terminal.
7. Play the STD-301 test tape, and check that the deck I playback signal frequency is 3010Hz±5Hz. If the frequency reading lies outside this range, adjust VR804 to obtain the 3010Hz±5Hz.
8. Load the STD-301 test tape into the deck II.
9. Short circuit the TP3 (×2) terminal, and play the STD-301 test tape at double speed.
10. Adjust VR801 to obtain a double speed playback frequency reading within ±20Hz of the deck I reading.
11. Open circuit the TP3 (×2) terminal, and play the STD-301 test tape.
12. Adjust VR802 to obtain playback frequency reading withing ±10Hz of the deck I reading.

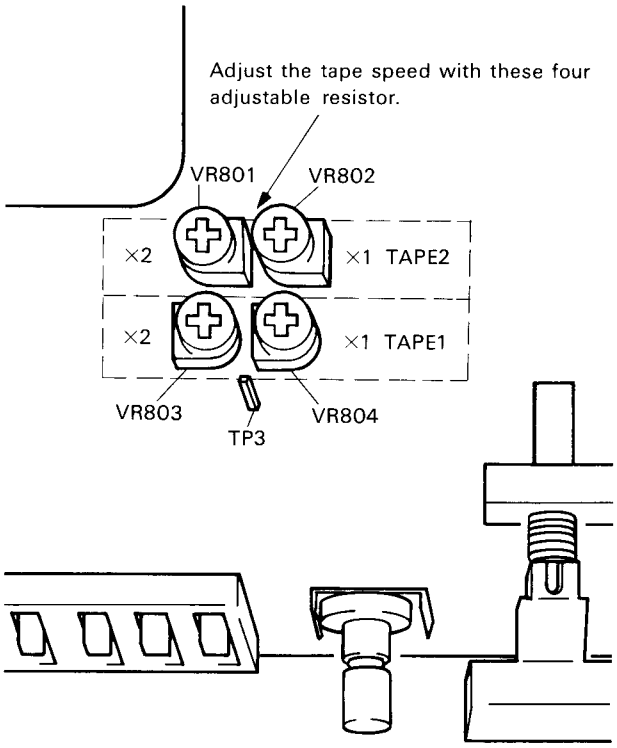


Fig. 12-2 Arrangement diagram of adjusting parts

REC Joint Check

1. Check that the slide switch is fully switched when the tape transport unit 2 (deck II) is in the recording mode.
2. Move the REC joint mechanism catching position if the slide switch is not fully switched.

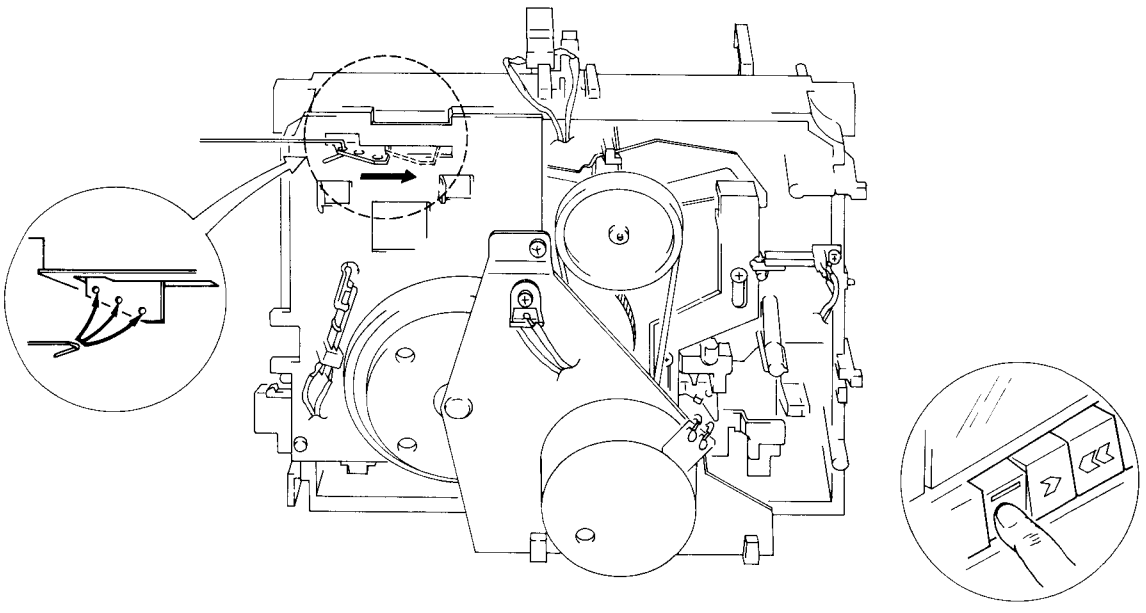


Fig. 12-3 REC joint adjustment

12-2. ELECTRICAL ADJUSTMENTS

■ Before commencing any electrical adjustments, make sure the following checked/completed.

1. All mechanical adjustments must have been completed.
2. The heads must be clean and demagnetized.
3. 0 dB=1V during level measurements.
4. Use the specified tapes for each adjustment.
   Although test tapes have both A and B sides, only use side A where the label is attached.
   STD-331B: Playback adjustment
   STD-608A: NORMAL blank tape
   STD-610: METAL blank tape
5. Prepare the following measuring equipment.
   AC millivoltmeter, audio generator, attenuator, oscilloscope.
6. Adjust both left and right channels unless otherwise specified.
7. And unless indicated otherwise, leave the DOLBY NR switch in the OFF position.
8. Let the set warm up for at least a few minutes before commencing adjustments. And before commencing the record/playback frequency response adjustent, let the set "age" for three to five minutes.
9. Always adjust the set in the given adjustments order. If the order is changed, proper adjustment will not be possible, and this may result in loss of performance.

Adjustment Procedure

Deck I

1. Head azimuth adjustment
2. Playback level adjustment

Deck II

1. Head azimuth adjustment
2. Playback level adjustment
3. Recording/Playback frequency response
4. Recording level adjustment

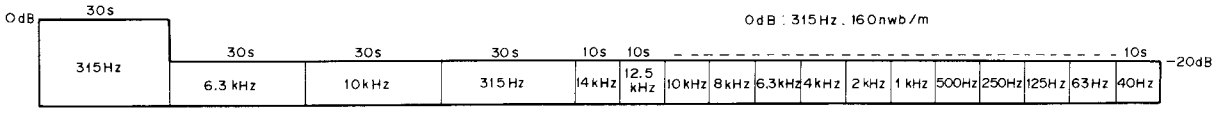


Fig. 12-4 Test tape STD-331B

• DECK I ADJUSTMENT (with auto tape selector function)

1. Head Azimuth Adjustment • Set VR901 and VR902 (playback level adjustment) to MAX positions (turn fully clockwise)

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play 10kHz—20dB portion of STD-331B test tape.	Head azimuth adjustment screw. (Fig. 12-6)	TP1 (L) TP2 (R)	Maximum playback signal level.	Apply "screw-lock" after Completing adjustment.

2. Playback Level Adjustment • Adjust precisely since this adjustment sets the playback Dolby level.

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play the 315Hz 0dB portion of the STD-331B test tape.	VR901 (L) VR902 (R)	TP1 (L) TP2 (R)	−7.7dBv (412mV)	

• DECK II ADJUSTMENT (with auto tape selector function)

1. Head Azimuth Adjustment • Set VR301 and VR302 (playback level adjustment) to MAX positions (turn fully clockwise)

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play 10kHz—20dB portion of STD-331B test tape.	Head azimuth adjustment screw. (Fig. 12-6)	TP1 (L) TP2 (R)	Maximum playback signal level.	Apply "screw-lock" after completing adjustment.

2. Playback Level Adjustment • Adjust precisely since this adjustment sets the playback Dolby level.

Tape selector	Mode	Input signal/test tape	Adjustment location	Measuring location	Adjustment value	Remarks
NORM	PLAY	Play the 315 Hz 0dB portion of the STD-331B test tape.	VR301 (L) VR302 (R)	TP1 (L) TP2 (R)	−7.7dBv (412mV)	

3. Recording/Playback Frequency Response Adjustment

Tape selector	Mode	Input signal/test tape		Adjustment location	Measuring location	Adjustment value	Remarks
NORM	REC	Apply a 315Hz signal to the CD/VIDEO terminals. Set the CD/VIDEO switch to ON.	1	Input signal level to be applied to the CD/VIDEO terminals.	TP1 (L) TP2 (R)	−27.7dBv (41mV)	Set the INPUT level control to the maximum position (rear panel).
NORM	REC/PLAY	Record 315Hz and 6.3kHz signals on the STD-608A test tape, and then playback signals.	2	VR841 (L) VR842 (R)	TP1 (L) TP2 (R)	Repeat the recording and palyback processes and adjust accordingly until the 6.3kHz playback level is within 0 ± 0.5dB of the 315Hz level.	

• Change the test tape and the DOLBY NR switch position and check that the frequency response zone indicated in Fig. 12-8, 9 is satisfied.

4. Recording Level Adjustment

Tape selector	Mode	Input signal/test tape		Adjustment location	Measuring location	Adjustment value	Remarks
NORM	REC	Apply a 315Hz signal to the CD/VIDEO terminals. Set the CD/VIDEO switch to ON.	1	Input signal level to be applied to the CD/VIDEO terminals.	TP1 (L) TP2 (R)	−7.7dBv (412mV)	Set the INPUT level control to the maximum position (rear panel).
NORM	REC/PLAY	Record the 315Hz signal onto the STD-608A test tape, and then paly the signal back.	2	VR501 (L) VR502 (R)	TP1 (L) TP2 (R)	Repeat the recording the playback processes, and adjust accordingly until a playback level of −7.7dBv (412mV) is obtained.	
METAL	REC/PLAY	Record the 315Hz signal onto the STD-610 test tape, and then play the signal back.	3		TP1 (L) TP2 (R)	Check that the 315Hz playback level is −7.7dBv ± 1.5dB.	

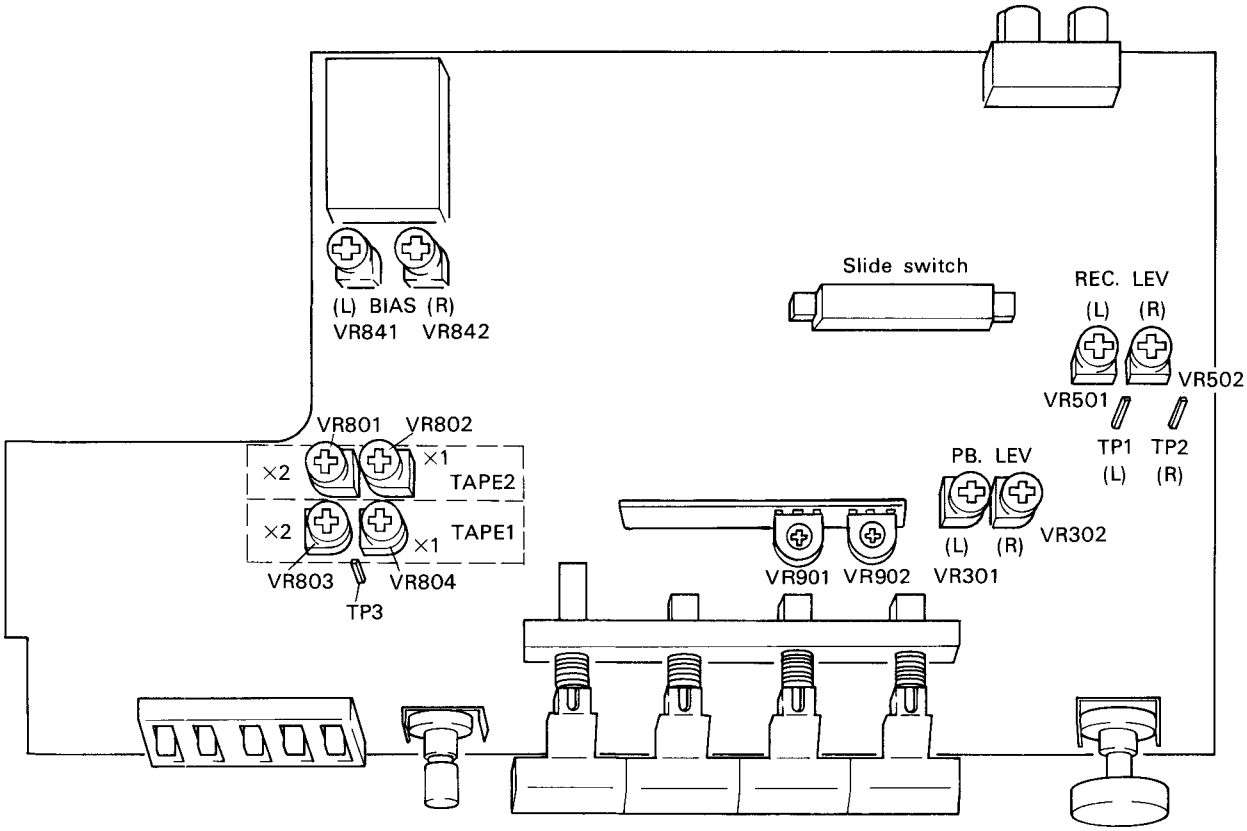


Fig. 12-5 Arrangement diagram of adjusting parts

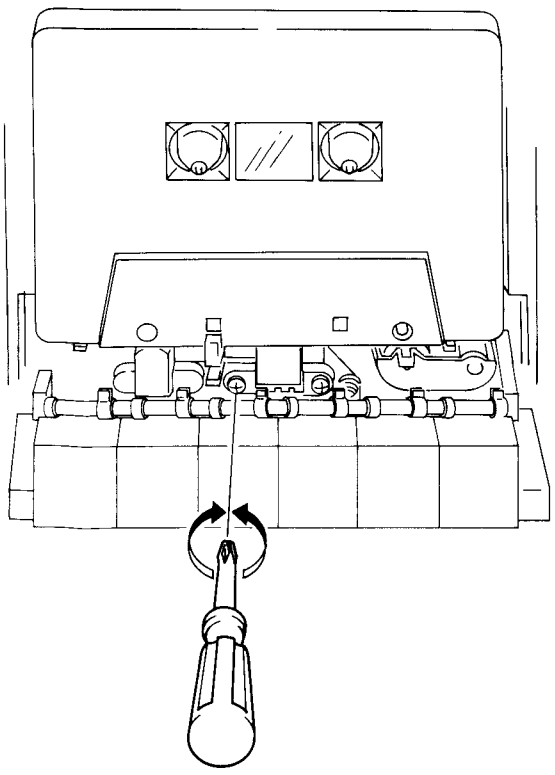


Fig. 12-6 Head azimuth adjustment

Test tape	STD-331B
DOLBY NR switch position	OFF

- The right channel is corrected by −0.5 at 125 Hz and −1 dB at 63 Hz to compensate for edge effect.

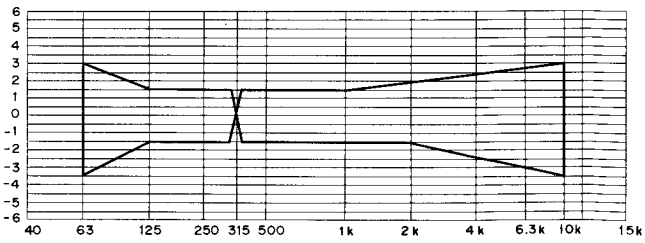


Fig. 12-7 Playback frequency response tolerance zone

Test tape	STD-608A	Test tape	STD-608A
DOLBY NR switch	OFF	DOLBY NR switch	ON

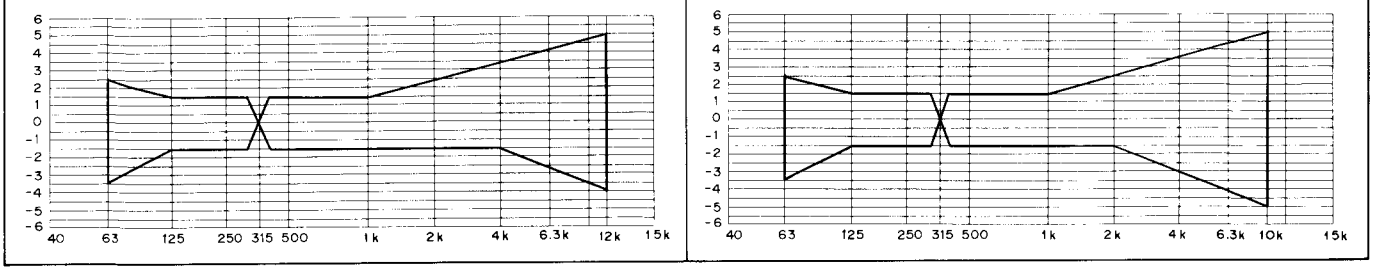


Fig. 12-8 Recording & playback frequency response tolerance zone (NORM)

Test tape	STD-610	Test tape	STD-610
DOLBY NR switch	OFF	DOLBY NR switch	ON

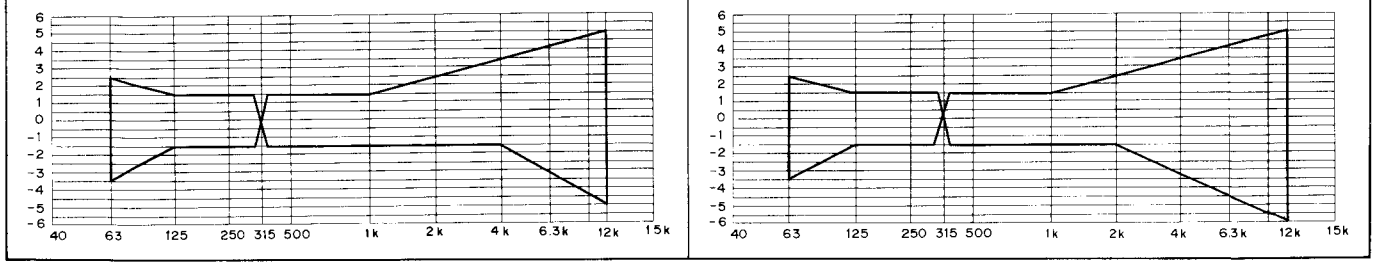
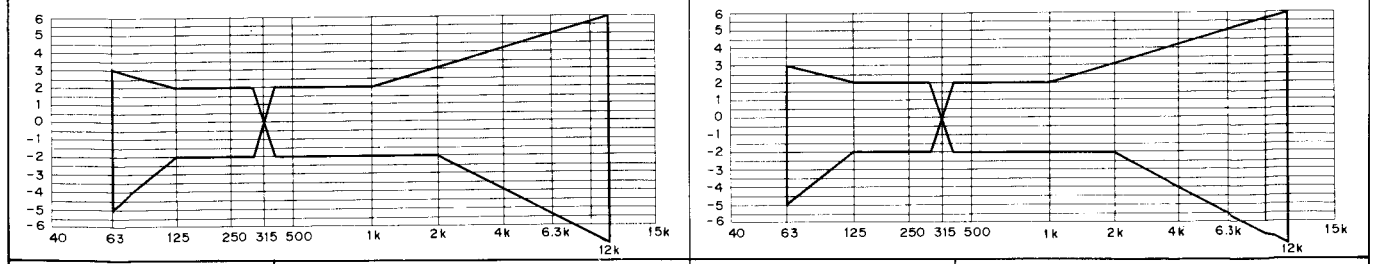


Fig. 12-9 Recording & playback frequency response tolerance zone (METAL)

Test tape	STD-608A	Test tape	STD-610
DOLBY NR switch	OFF	DOLBY NR switch	OFF



Test tape	STD-608A (HIGH SPEED COPY)	Test tape	STD-610 (HIGH SPEED COPY)
DOLBY NR switch	OFF	DOLBY NR switch	OFF

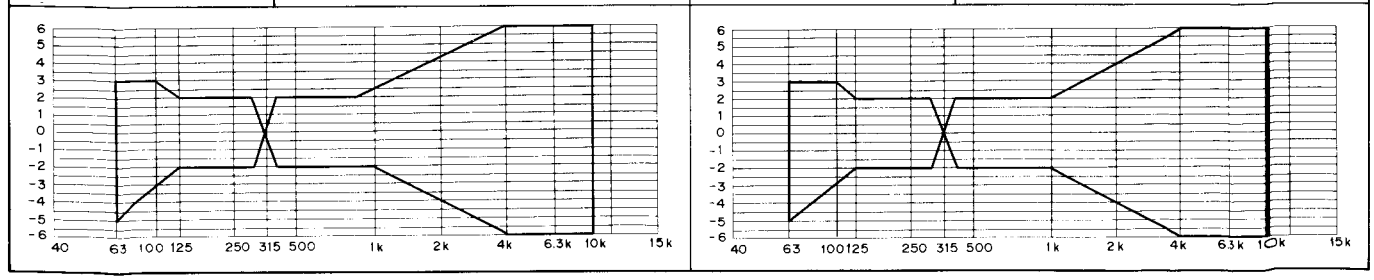


Fig. 12-10 Copy mode recording & playback frequency response (for reference purposes)

12. RÉGLAGE

12-1. RÉGLAGES MECANIQUES

Avant le réglage

Nettoyer les deux embases de bobine, le cabestan et le rouleau presseur avec un tissu imbibé d'alcool.

Réglage du rouleau presseur

1. Placer la platine en mode play back (lecture).
2. Pousser doucement la jauge de tension contre le bras du rouleau presseur et séparer légèrement le rouleau presseur du cabestan.
3. Puis, replacer le rouleau presseur contre le cabestan, et lire la valeur indiquée lorsque le rouleau presseur se met à tourner. Si la lecture est dans la plage 300 — 500g, replacer le ressort du rouleau presseur.

Vérification du couple d'embase de bobine

Mesurer le couple torsiomètre en modes, lecture, avance rapide (FF) et rembobinage (REW). Les valeurs mesurées devraient être comprises dans les plages indiquées dans le Tableau 1.

Si les valeurs mesurées ne sont pas comprises dans ces plages, remplacer le montage de bobine T, et/ou le montage de bobine S ou le montage de poulie intermédiaire P.

Tableau 1

	Embase de bobine T (côté droit)	Embase de bobine S (côté gauche)
Mode PLAY	35g · cm—70g · cm	*1g · cm—5g · cm
Mode FF	70g · cm—140g · cm	*1g · cm—5g · cm
Mode REW	*1g · cm—5g · cm	70g · cm—140g · cm

* Couple tension arrière

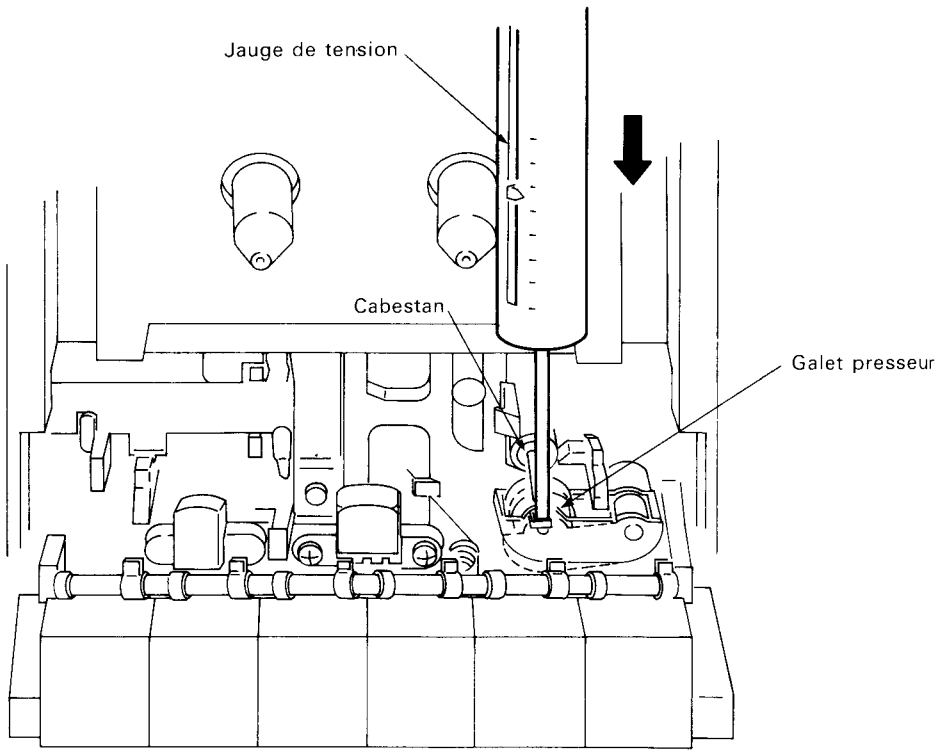


Fig. 12-1 Réglage du roulean presseur

Réglage de la vitesse de la bande

1. Connecter le fréquencemètre à la borne TP1 de l'ensemble.
2. Régler le commutateur TAPE en position ON.
3. Placer la bande-test STD-301 sur la platine I.
4. Court-circuiter la borne TP3 (×2) de l'ensemble complexe, et faire passer la bande test STD-301 à double vitesse.
5. Vérifier si la fréquence de signal de lecture de la platine I est de 6020 Hz±10 Hz. Si la fréquence lue est en dehors de cette marge, régler VR803 de manière à obtenir cette lecture.
6. Mettre la borne TP3 (×2) en circuit ouvert.
7. Faire passer la bande test STD-301, et vérifier si la fréquence de signal de lecture de la platine I est de 3010 Hz±5 Hz. Si la fréquence lue est en dehors de cette marge, régler VR804 de manière à obtenir cette lecture.
8. Placer la bande test STD-301 sur la platine II.
9. Court-circuiter la borne TP3 (×2), et faire passer la bande test STD-301 à double vitesse.
10. Régler VR801 de manière à obtenir une lecture de fréquence à double vitesse dans la marge de ±20 Hz dans la lecture de la platine I.
11. Mettre la borne TP3 (×2) en circuit ouvert, et faire passer la bande test STD-301.
12. Régler VR802 de manière à obtenir une lecture de fréquence de lecture dans la marge de ±10 Hz dans la lecture de la platine I.

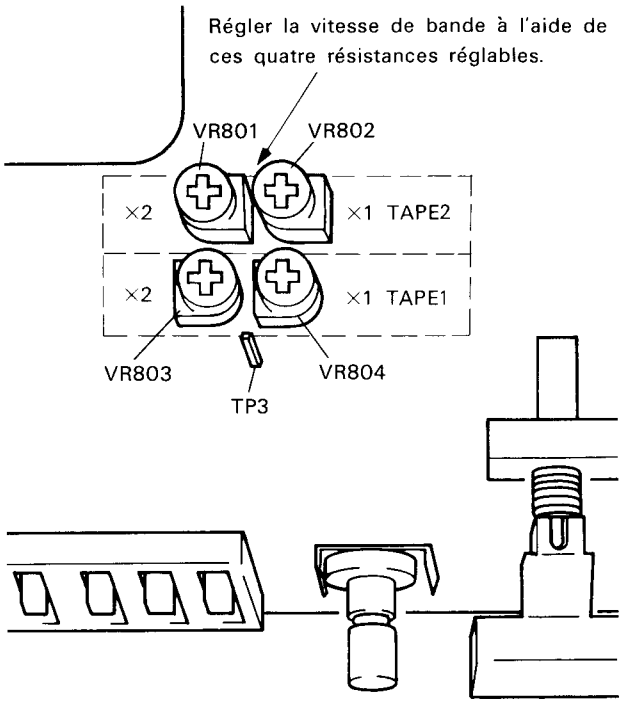


Fig. 12-2 Shéma de localisation des pièces de réglage

Platine combinée REC

1. Vérifer que le commutateur coulissant est correctement en contact lorsque l'unité 2 de transport (platine II) de bande est en mode enregistrement.
2. Déplacer la position depride du mécanisme combiné REC si le commutateur coulissant n'est pas correctement en contact.

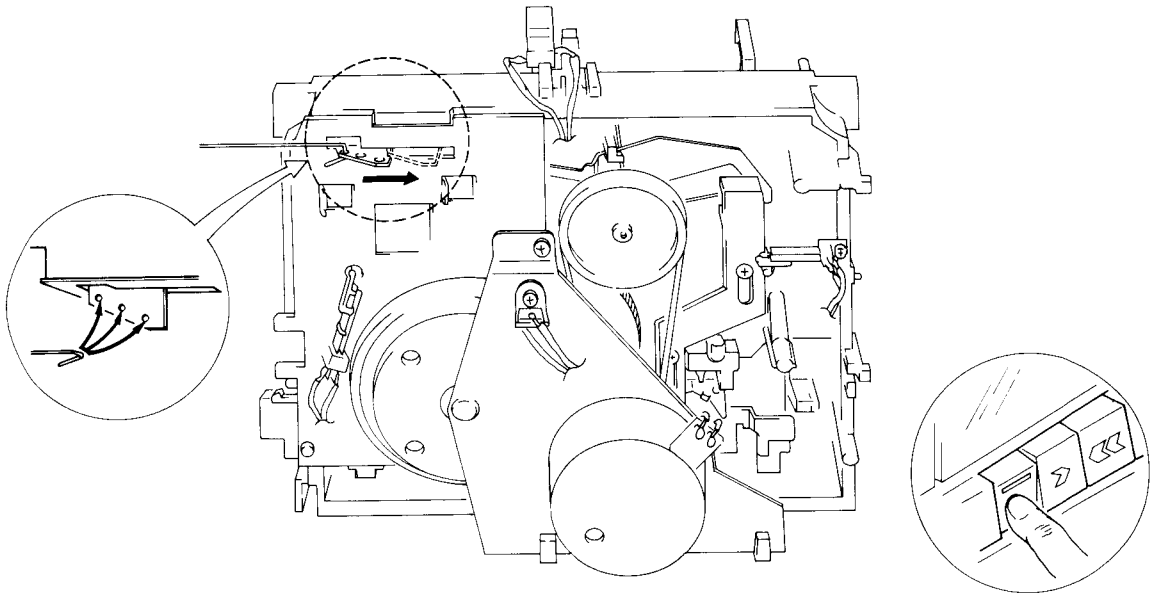


Fig. 12-3 Réglage mixte dénregistrement

12-2. RÉGLAGES ÉLECTRIQUES

■ Avant de commencer à procéder aux réglages électriques, bien effectuer les vérifications suivantes.

1. Tous les réglages mécaniques ont été effectués.
2. Les têtes doivent être propres et démagnétisées.
3. 0 dB=1V pendant les mesures de niveau.
4. Utiliser les bandes spécifiées pour chaque réglage. Bien que les bandes d'essai aient à la fois une face A et une face B, n'utiliser que la face A sur laquelle est attachée l'étiquette.
   STD-331B: Réglage de la reproduction.
   STD-608A: Bande vierge ordinaire. (NORMAL)
   STD-610: Bande vierge au métal (METAL)
5. Préparer les équipements e mesure ci-après: millivoltmètre CA, générateur audio, atténuateur, oscilloscope.
6. Régler à la fois le canal gauche et le canal droit, sauf spécification contraire.
7. Sauf spécification contraire, laisser le commutateur de réduction de bruit DOLBY en position arrêt (OFF).
8. Laisser l'appareil chauffer pendant au moins quelques minutes avant de commencer les réglages. Avant de commencer le réglage de la réponse en fréquences enregistrement/reproduction, laisser l'appareil fonctionner de trois à cinq minutes.
9. Toujours procéder aux réglages dans l'ordre indiqué. Si cet ordre est modifié, il ne sera plus possible d'effectuer des réglages correctement, et cela pourait entraîner une dégradation des performances.

Procédure de réglage

Platine I

1. Réglage de l'azimutage de la tête.
2. Réglage du niveau de reproduction.

Platine II

1. Réglage de l'azimutage de la tête.
2. Réglage du niveau de reproduction.
3. Réponse en fréquences enregistrement/reproduction.
4. Réglage du niveau d'enregistrement.

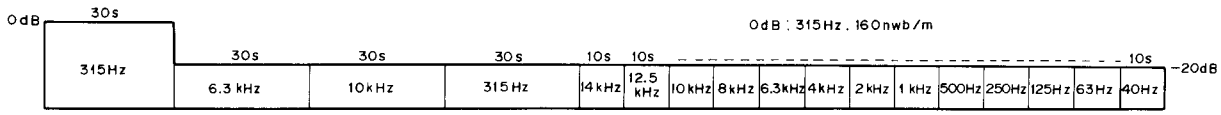


Fig. 12-4 Band d'essai STD-331B

• RÉGLAGE DE LA PLATINE I • (Avec sélecteur automatique de bande)

1. Réglage de l'azimutage de la tête • Placer le VR901 et le VR902 (Réglage du niveau de reproduction) sur la position maximale MAX (tourner complètement dans le sens des aiguilles d'une montre).

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 10kHz −20dB de la bande d'essai STD-331B.	Vis de réglage de l'azimutage de la tête. (Fig. 12-6)	TP1 (L) TP2 (R)	Niveau de signal de reproduction maximal.	Mettre en place "l'arrêt de vis" après avoir terminé ce réglage.

2. Réglage du niveau de reproduction • Procéder à cet réglage avec précision car celui-ci détermine le niveau de reproduction du DOLBY.

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 315Hz 0dB de la bande d'essai STD-331B.	VR901 gauche (L) VR902 droit (R)	TP1 (L) TP2 (R)	−7,7dB (412mV)	

• RÉGLAGE DE LA PLATINE II (Avec sélecteur automatique de bande)

1. Réglage de l'azimutage de la tête • Placer le VR301 et le VR302 (Réglage de niveau de reproduction) sur la position maximale (tourner complètement dans le sens des aiguilles d'une montre).

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 10kHz −20dB de la bande d'essai STD-331B.	Vis de réglage de l'azimutage de la tête. (Fig. 12-6)	TP1 (L) TP2 (R)	Niveau de signal de reproduction maximal.	Mettre en place "l'arrêt de vis" après avoir effectué ce réglage.

2. Réglage du niveau de reproduction • Procéder à ce réglage avec précision car celui-ci détermine le niveau de reproduction du DOLBY.

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai	Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Reproduction (PLAY)	Reproduire la portion 315Hz 0dB de la bande d'essai STD-331B.	VR301 gauche (L) VR302 droit (R)	TP1 (L) TP2 (R)	−7,7dBv (412mV)	

3. Réglage de la réponse en fréquences d'enregistrement et de reproduction

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai		Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Enregistrement (REC)	Appliquer un signal 315Hz aux bornes CD/VIDEO. Mettez le commutateur CD/VIDEO sur ON.	1	Entrer le signal de niveau à appliquer aux bornes de CD/VIDEO.	TP1 (L) TP2 (R)	−27,7dBv (41mV)	Amener la commande de niveau INPUT sur la position maximale (panneau arrière).
Normal (NORM)	Enregistrement/reproduction (REC/PLAY)	Enregistrer des signaux de 315Hz et 6,3kHz sur la bande d'essai STD-608A, et reproduire ensuite les signaux.	2	VR841 gauche (L) VR842 droit (R)	TP1 (L) TP2 (R)	Recommencer les procédures d'enregistrement et de reproduction, et procéder au réglage en conséquence jusqu'à ce que le niveau de reproduction du 6,3kHz soit compris entre 0 ±0,5dB du niveau du 315Hz.	

• Changer la bande d'essai et la position du commutateur de réducteur de bruit DOLBY, et vérifier que la courbe de réponse en fréquences indiquée sur la Fig. 12-8,9 est respectée.

4. Réglage du niveau d'enregistrement

Sélecteur de bande	Mode	Signal d'entrée/bande d'essai		Emplacement du réglage	Emplacement de mesure	Valeur de réglage	Remarques
Normal (NORM)	Enregistrement (REC)	Appliquer un signal 315Hz aux bornes CD/VIDEO. Mettez le commutateur CD/VIDEO sur ON.	1	Entrer le signal de niveau à appliquer aux bornes de CD/VIDEO.	TP1 (L) TP2 (R)	−7,7dBv (412mV)	Amener la commande de niveau INPUT sur la position maximale (panneau arrière).
Normal (NORM)	Enregistrement/reproduction (REC/PLAY)	Enregistrer le signal de 315Hz sur la bande d'essai STD-608A, puis reproduire le signal.	2	VR501 gauche (L) VR502 droit (R)	TP1 (L) TP2 (R)	Recommencer les procédures d'enregistrement et de reproduction, et procéder au réglage jusqu'à ce que un niveau de reproduction de −7,7dBv (412mV) soit obtenu.	
Métal (METAL)	Enregistrrement/reproduction (REC/PLAY)	Enregistrer le signal de 315Hz sur la bande d'essai STD-610, puis reproduire le signal.	3		TP1 (L) TP2 (R)	Vérifier que le niveau de reproduction du 315Hz est à −7,7dBv ± 1,5dB.	

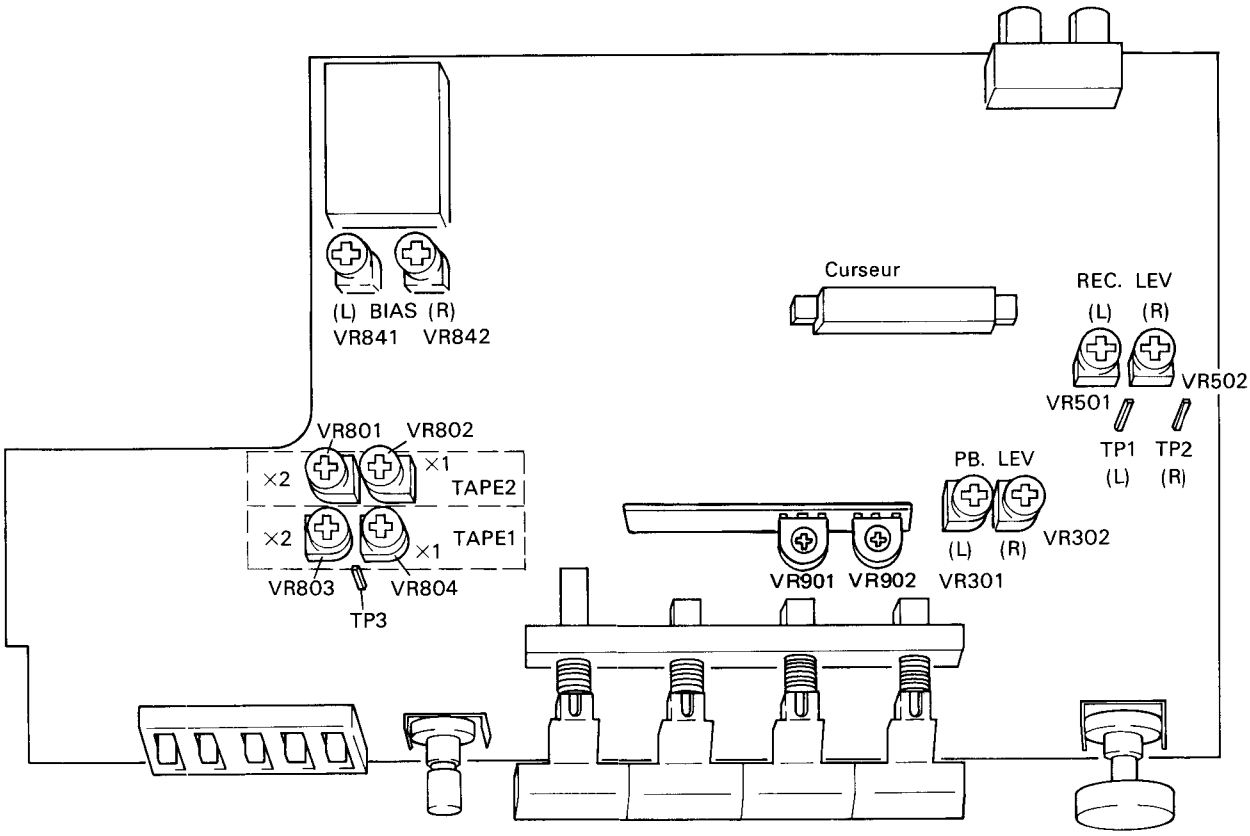


Fig. 12-5 Shéma de localisation des piéces de réglage

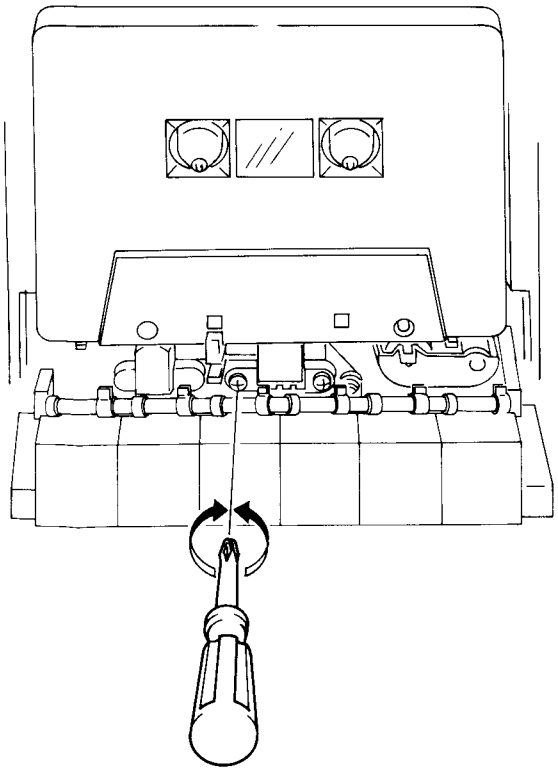


Fig. 12-6 Réglage dázimuth de la tête

Bande d'essai	STD-331B
Position du commutateur DOLBY NR	OFF

- Le canal de droite se corrige de −0,5 dB á 125 Hz, et de −1 dB à 63 dB afin de compenser l'effet de bordure.

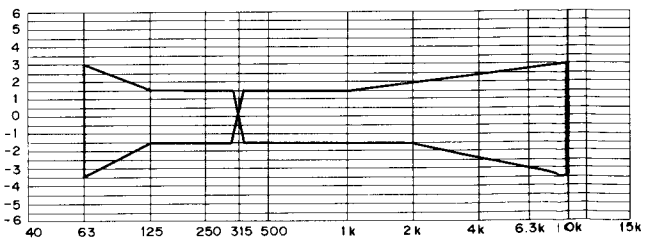


Fig. 12-7 Zone de tolérance de la réponse de fréquence de lecture

Bande d'essai	STD-608A	Bande d'essai	STD-608A
Commutateur DOLBY NR	OFF	Commutateur DOLBY NR	ON

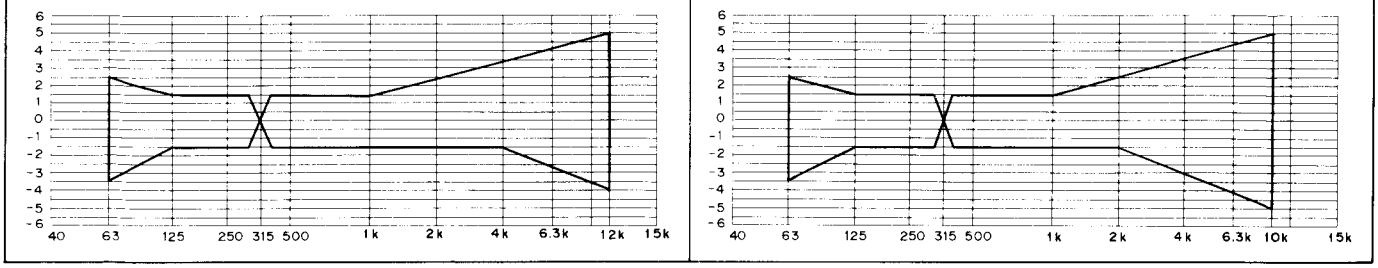


Fig. 12-8 Zone de tolérance de la réponse de fréquence d'enregistrement et de lecture (NORM)

Bande d'essai	STD-610	Bande d'essai	STD-610
Commutateur DOLBY NR	OFF	Commutateur DOLBY NR	ON

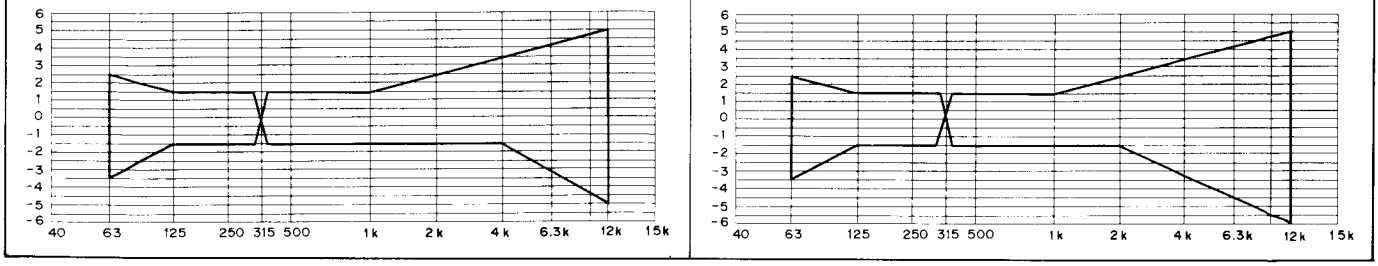
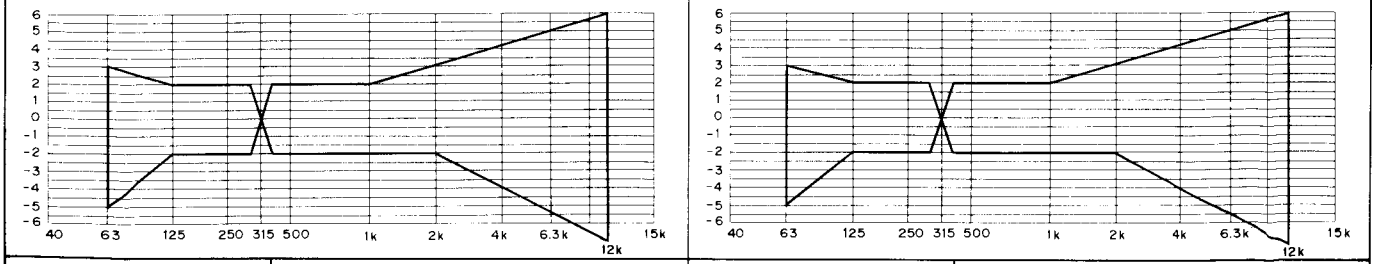


Fig. 12-9 Zone de tolérance de la réponse de fréquence d'enregistrement et de lecture (METAL)

Bande d'essai	STD-608A	Bande d'essai	STD-610
Commutateur DOLBY NR	OFF	Commutateur DOLBY NR	OFF



Bande d'essai	(Copiage à vitesse rapide)	Bande d'essai	(Copiage à vitesse rapide)
Commutateur DOLBY NR	OFF	Commutateur DOLBY NR	OFF

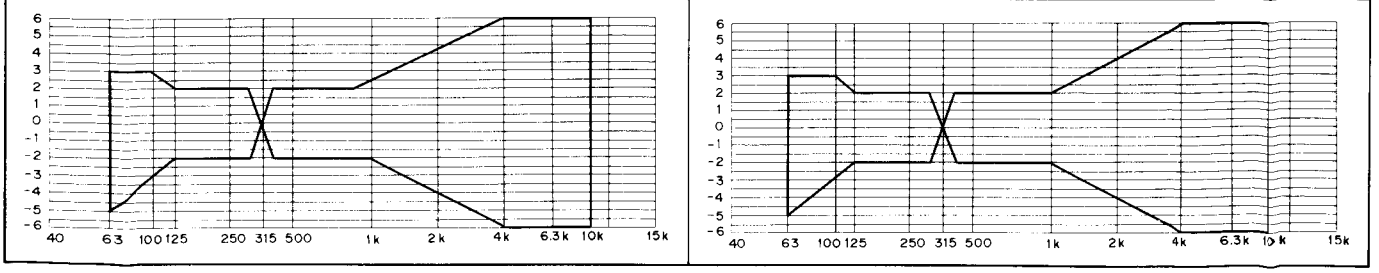


Fig. 12-10 Réponse de fréquence d'enregistrement et de lecture du mode de copiage (à des fins de référence)

12. AJUSTE

12-1. AJUSTES MECANICOS

Antes del ajuste

Limpie ambas bases del carrete, el cabrestante y el rodillo de prensado con una escobillón humedecido en alcohol.

Ajuste de la presión del rodillo de prensado

1. Ponga el magnetofóno en el modo de reproducción.
2. Suavemente empuje en contra del brazo del rodillo de prensado con el indicador de tensión y separe el rodillo de prensado ligeramente del cabrestante.
3. Luego ponga de nuevo el rodillo de prensado en el cabrestante, y lea la lectura cuando el rodillo de prensado empieze a girar. Si la lectura mo está dentro de 300 a 500g, cambie el resorte de presión del rodillo de prensado.

Inspección del par de torsión de la base de carrete

Mida el par de torsión con un medidor de par de torsión durante la reproducción, en los modos de avance rapido (FF) y rebobinado (REW). Los valores medidos deberan normalmente estar dentro de los rangos permesibles enlistados en la table 1.

Si los valores medidos están fuera de los rangos pertinentes, cambie el conjunto del carrete T, y/o el conjunto del carrete S o el conjunto de la rueda loca P.

Table 1

	Base del carrete T (lado R)	Base del carrete S (lado L)
Mode PLAY	35g·cm—70g·cm	*1g·cm—5g·cm
Mode FF	70g·cm—140g·cm	*1g·cm—5g·cm
Mode REW	*1g·cm—5g·cm	70g·cm—140g·cm

* Par de contra tensión

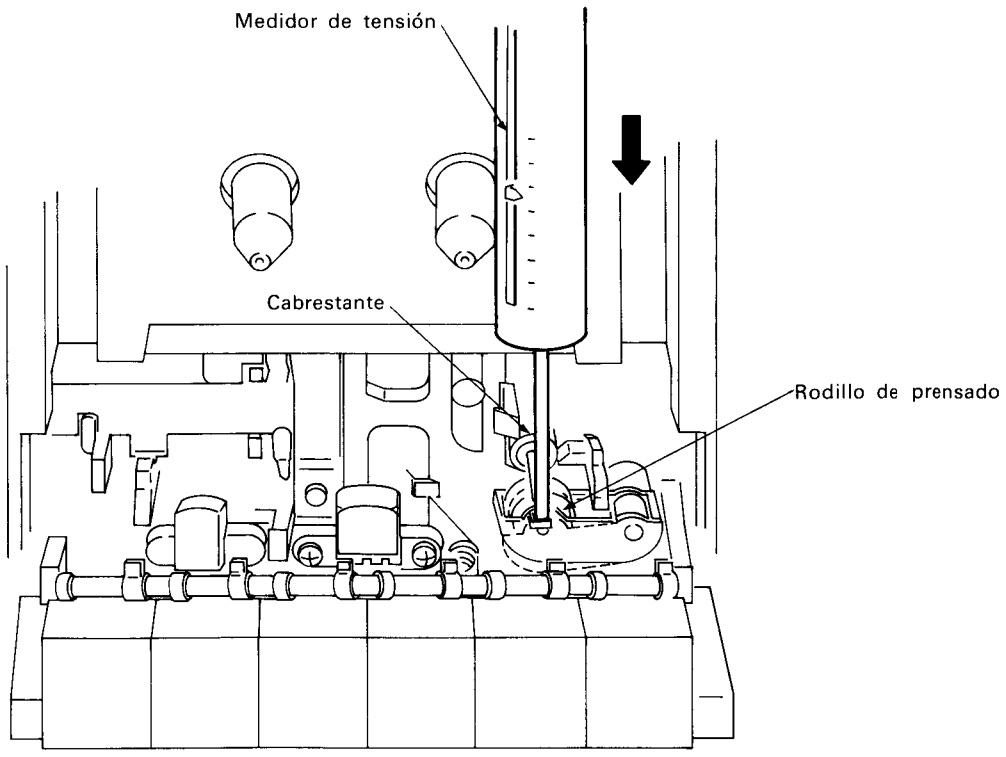


Fig. 12-1 Ajuste de la presión del rodillo de prensado

Ajuste de la velocidad de cinta

1. Conecte el frecuencimetro a la terminal TP1 en el conjunto compuesto.
2. Fije el interruptor de TAPE a la posición ON.
3. Introduzca la cinta de prueba STD-301 en el magnetofóno I.
4. Ponga en cortocircuito la terminal TP3 (×2) en el conjunto compuesto, y reproduzca la cinta de prueba STD-301 a doble velocidad.
5. Inspeccione que la frecuencia de señal de reproduccion I del megatofóno sea de 6020 Hz±10 Hz. Si la lectura de reproducción está fuera de este rango, ajuste VR803 para obtener 6020 Hz±10 Hz.
6. Circuito abierto de la terminal TP3 (×2).
7. Reproduzca la cinta de prueba STD-301, e inspeccione que la frecuencia de señal de reproducción I sea de 3010 Hz±5 Hz.
   Si la lectura de la frecuencia está fuera de este rango, ajuste VR804 para obtener 3010 Hz±5 Hz.
8. Carge la cinta de prueba STD-301 en el magnetofóno II.
9. Ponga en cortocircuito la terminal TP3 (×2), y reproduzca la cinta de prueba STD-301 a doble velocidad.
10. Ajuste VR801 para obtener una lectura de frecuencia de reproducción de velocidad deble dentro de ±20 Hz, de la lectura del magnetofóno I.
11. Circuito abierto de la terminal TP3 (×2), y reproduzca la cinta de prueba STD-301.
12. Ajuste VR802 para obtenea la lectura de frecuencia de reproducción dentro de ±10 Hz de la lectura del magnetofóno I.

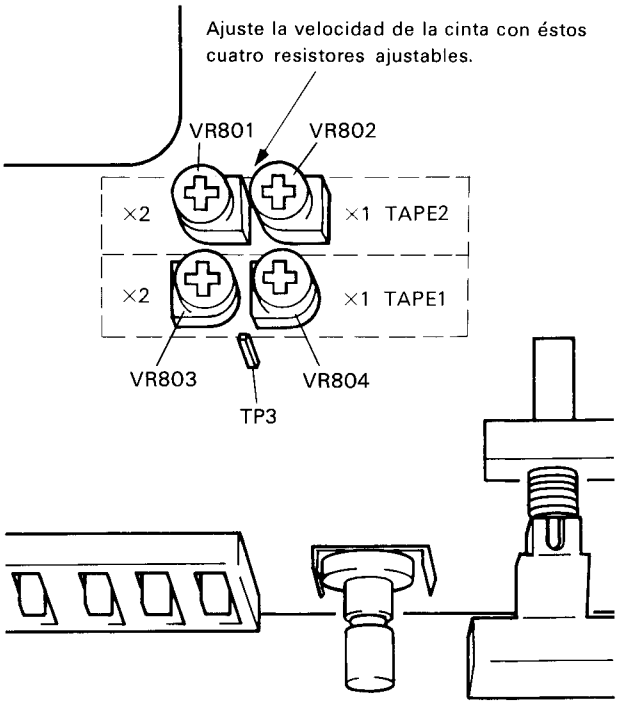


Fig. 12-2 Diagrama de disposición de las partes de ajuste

Inspección de la unión REC

1. Inspeccione que el interruptor deslizable este cambiado completamente cuando la unidad 2 de transporte (magnetofóno II) de la cinta está en el modo de grabación.
2. Mueva la posición de trabado del mecanismo de unión REC si el interruptor deslizable no esta completamente cambiado.

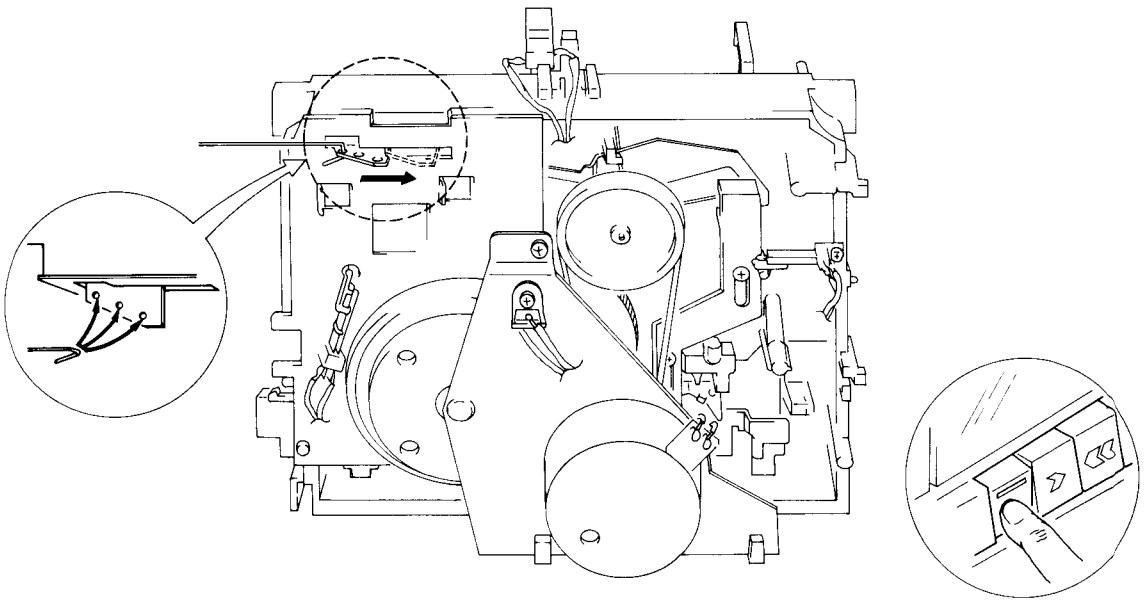


Fig. 12-3 Ajuste de la unión de REC

12-2. ADJUSTES ELECTRICOS

■ Antes de iniciar cualquier ajuste, cerciorarse de haber completado y comprobado lo siguiente.

1. Deben haberse completo todos los ajustes mecánicos.
2. Las cabezas deben ester limpias y desmagnetizadas.
3. 0 dB=1V durante las mediciones del nivel.
4. Emplear las cintas especificadas para cada ajuste. Aunque estas cintas están provistas de ambos lados, A y B, emplear sólo el lado A, donde está la etiqueta.
   STD-331B: Adjuste de reproducción.
   STD-608A: Cinta en blanco NORMAL.
   STD-610: Cinta en blanco de METAL.
5. Preparar el siguiente equipo de medición: Un voltimetro de CA, un generador de sonido, un atenuador y un osciloscopio.
6. Ajustar los canales izquierdo y derecho a menos que se especifique lo contrario.
7. Y a menos que se diga lo contrario, dejar el interruptor DOLBY NR en la posición OFF.
8. Dejar que se precaliente el aparato durante algunos minutos antes de iniciar los ajustes.
   Y antes de empezar el ajuste de la respuesta en frecuencia para reproducción y grabación, dejar que se precaliente de tres a cinco minutors.
9. Ajustar siempre el aparato en el orden de ajuste dado. Si se cambia el orden, no son posibles los ajustes adecuados, lo cual puede ocasionar pérdida del rendimiento.

Procedimientos de ajuste

Magnetófono I

1. Ajuste del acimut de la cabeza.
2. Ajuste del nivel de reproducción.

Magnetófono II

1. Ajuste del acimut de la cabeza.
2. Ajuste del nivel de repoducción.
3. Respuesta en frecuencia de grabación/reproducción.
4. Ajuste del nivel de grabación.

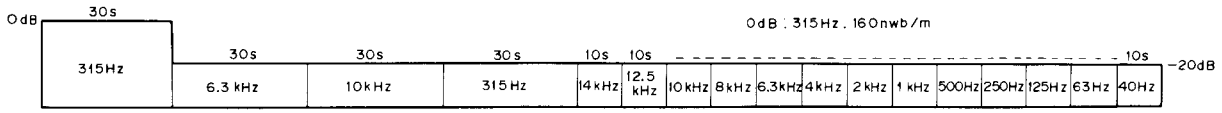


Fig. 12-4. Cinta de prueba STD-331B

• AJUSTE DEL MAGNETOFONO I (Sin la función del selector automático de cintas)

1. Ajuste del acimut de la cabeza • Ajustar VR901 y VR902 (Ajuste del nivel de reproducción) a las posiciones MAX (Girados completamente a la derecha)

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 10kHz −20dB de la cinta de prueba STD-331B.	Tornillo de ajuste del acimut de la cabeza. (Fig. 12-6)	TP1 (L) TP2 (R)	Nivel máximo de señal de reproducción.	Aplicar el "enclavamiento del tornillo" después de finalizar el ajuste.

2. Ajuste del nivel de reproducción • Ajustar con precisión porque este ajuste establece el nivel del sistema Dolby para reproducción.

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 315Hz 0dB de la cinta de prueba STD-331B.	VR901 (L) VR902 (R)	TP1 (L) TP2 (R)	−7,7dBv (412mV)	

• AJUSTE DEL MAGNETOFONO II (Con la función del selector automático de cintas)

1. Ajuste del acimut de la cabeza • Ajustar VR301 y VR302 (Ajuste del nivel de reproducción) a las posiciones MAX (Girados completamente a la derecha)

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 10kHz −20dB de la cinta de prueba STD-331B.	Tornillo de ajuste del acimut de la cabeza. (Fig. 12-6)	TP1 (L) TP2 (R)	Nivel máximo de la señal de reproducción.	Aplicar el "enclavamiento del tornillo "después de terminar el ajuste.

2. Ajuste del nivel de reproducción • Ajustar con precisión porque este aduste establece el nivel del sistema Dolby de reproducción.

Selector de cintas	Modo	Señal de entrada/cinta de prueba	Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	PLAY	Reproducir la parte de 315Hz 0dBv de la cinta de prueba STD-331B.	VR301 (L) VR302 (R)	TP1 (L) TP2 (R)	−7,7dBv (412mV)	

3. Ajuste de la respuesta en frecuencia para grabación/reproducción

Selector de cintas	Modo	Señal de entrada/cinta de prueba		Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	REC	Aplique una señal de 315Hz a las terminales CD/VIDEO. Fije el interruptor de CD/VIDEO a ON.	1	Nivel de señal de entrada a ser aplicada a las terminales CD/VIDEO.	TP1 (L) TP2 (R)	−27,7dBv (41mV)	Fije el control de nivel de INPUT (entrada) a la posición máxima (panel trasero).
NORM	REC/PLAY	Grabar las señales de 315Hz y de 6,3kHz en la cinta de prueba STD-608A, y luego reproducirlas.	2	VR841 (L) VR842 (R)	TP1 (L) TP2 (R)	Repetir los procesos de grabación y reproducción y ajustar consecuentemente hasta que el nivel de reproducción de 6,3kHz esté dentro de 0 ± 0,5dB del nivel de 315Hz.	

• Cambiar la cinta de prueba y la posición del interruptor DOLBY NR y comprobar que la zona de respuesta en frecuencia indicada en la Fig. 12-8,9 se satisfaga.

4. Ajuste del nivel de grabación

Selector de cintas	Modo	Señal de entrada/cinta de prueba		Lugar de ajuste	Lugar de medición	Valor de ajuste	Observaciones
NORM	REC	Aplique una señal de 315Hz a las terminales CD/VIDEO. Fije el interruptor de CD/VIDEO a ON.	1	Nivel de señal de entrada a ser aplicada a las trminales CD/VIDEO.	TP1 (L) TP2 (R)	−7,7dBv (412mV)	Fije el control de nivel de INPUT (entrada) a la posición máxima (panel trasero).
NORM	REC/PLAY	Grabar la señal de 315Hz en la cinta de prueba STD-608A y reproducirlas.	2	VR501 (L) VR502 (R)	TP1 (L) TP2 (R)	Repetir los procesos de grabaación y ajustar coinsecuentemente hasta que se obtenga un nevel de reproducción de −7,7dBV (412mV).	
METAL	REC/PLAY	Grabar la señal de 315Hz en la cinta de prueba STD-610 y reproducirla.	3		TP1 (L) TP2 (R)	Comprobar que el nivel de reproducción de 315Hz sea de −7,7dBv ± 1,5dB.	

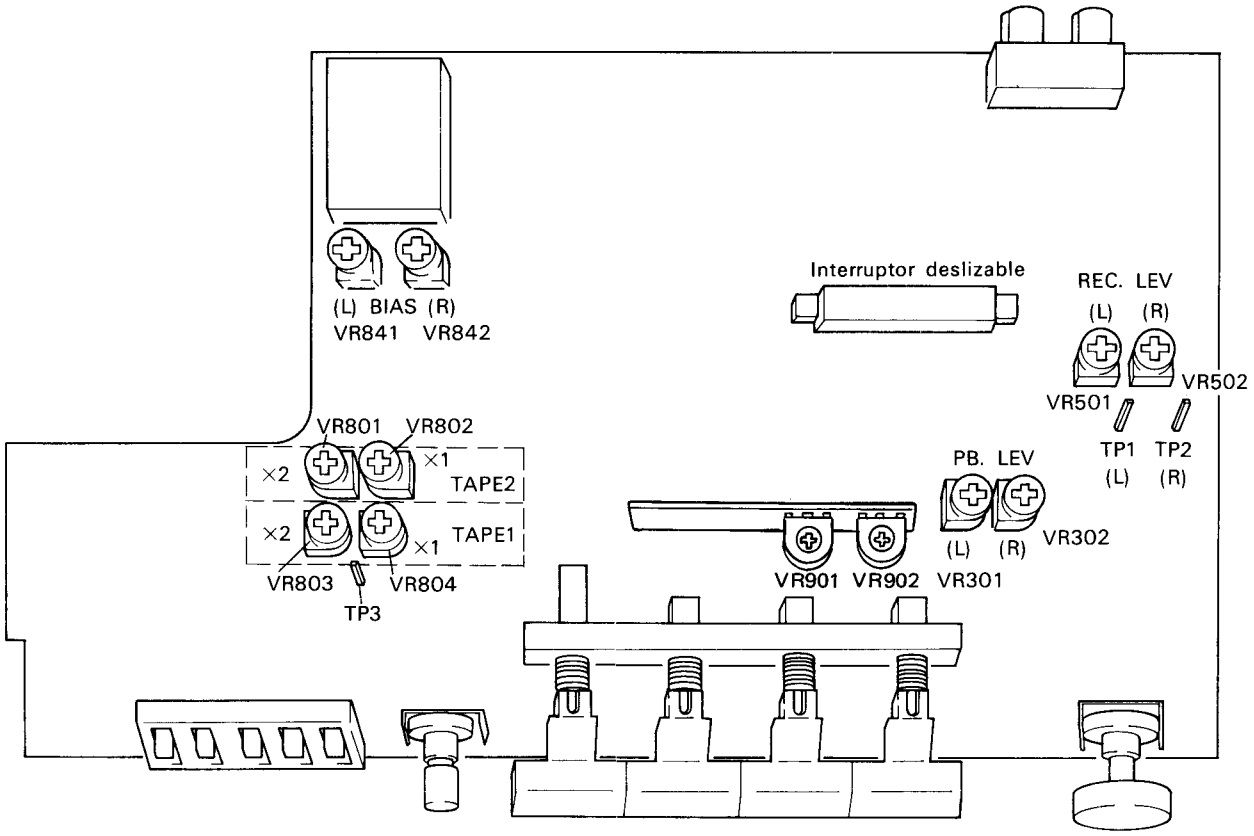


Fig. 12-5 Diagrama de disposición de las partes de ajuste

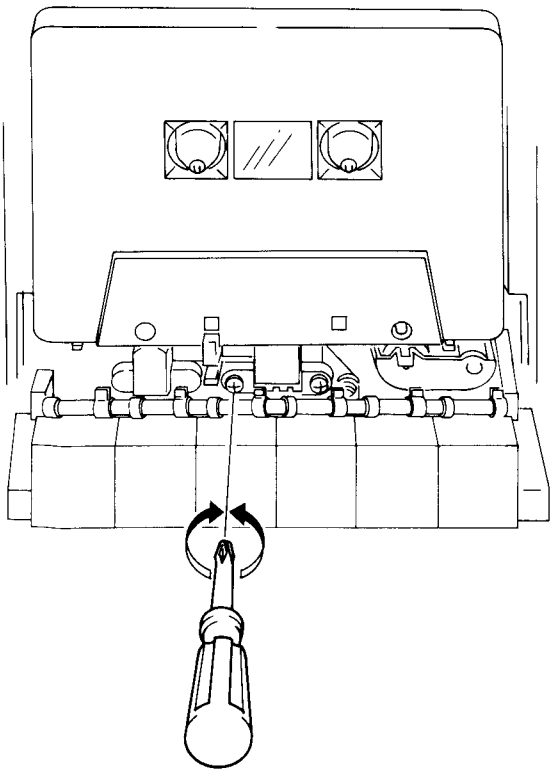


Fig. 12-6 Ajuste del acimut de la cabeza

Cinta de prueba	STD-331B
Posición del interruptor DOLBY NR	OFF

- El canal derecho se corrige en −0,5 dB a 125 Hz y −1 dB a 63 Hz para compensar el efecto de los bordes.

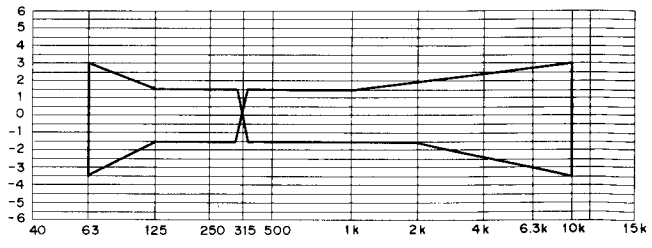


Fig. 12-7 Zona de tolerancia de respuesta de frecuencia de reproducción

Cinta de prueba	STD-608A	Cinta de prueba	STD-608A
Interruptor DOLBY NR	OFF	Interruptor DOLBY NR	ON

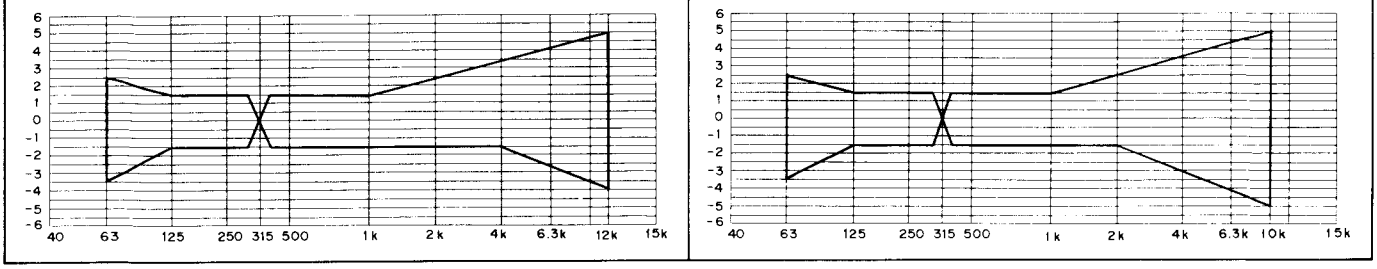


Fig. 12-8 Zona de tolerancia de copia y respuesta de frecuencia de reproducción (NORM)

Cinta de prueba	STD-610	Cinta de prueba	STD-610
Interruptor DOLBY NR	OFF	Interruptor DOLBY NR	ON

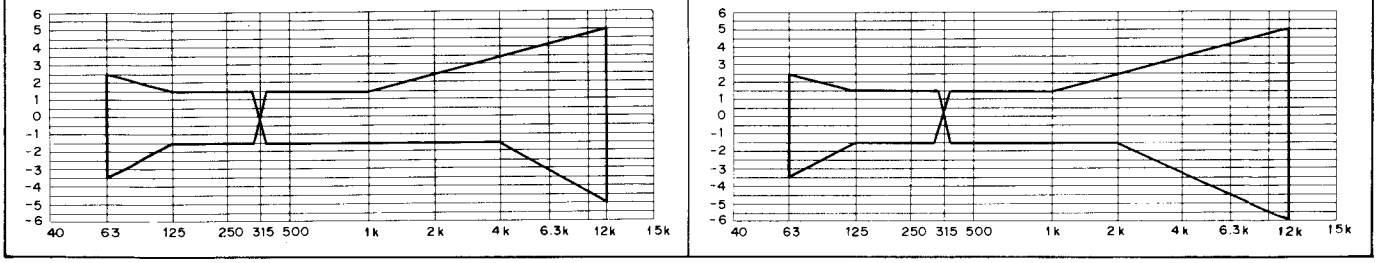
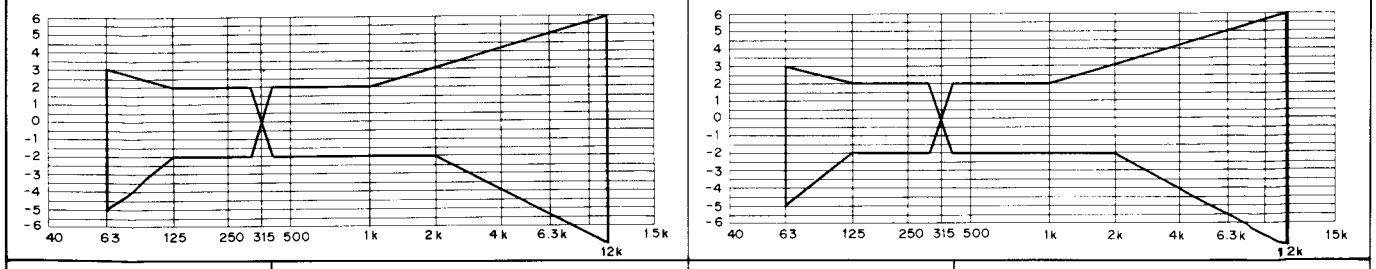


Fig. 12-9 Zona de tolerancia de copia y respuesta de frecuencia de reproducción (METAL)

Cinta de prueba	STD-608A	Cinta de prueba	STD-610
Interruptor DOLBY NR	OFF	Interruptor DOLBY NR	OFF



Cinta de prueba	STD-608A (Copia de alta velocidad)	Cinta de prueba	STD-610 (Copia de alta velocidad)
Interruptor DOLBY NR	OFF	Interruptor DOLBY NR	OFF

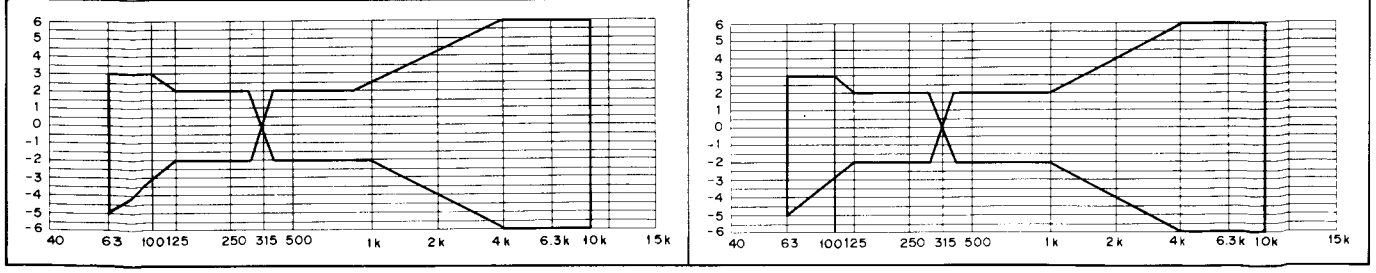


Fig. 12-10 Grabación de modo de copia y respuesta de frecuencia de reproducción (para referencia propuesta)

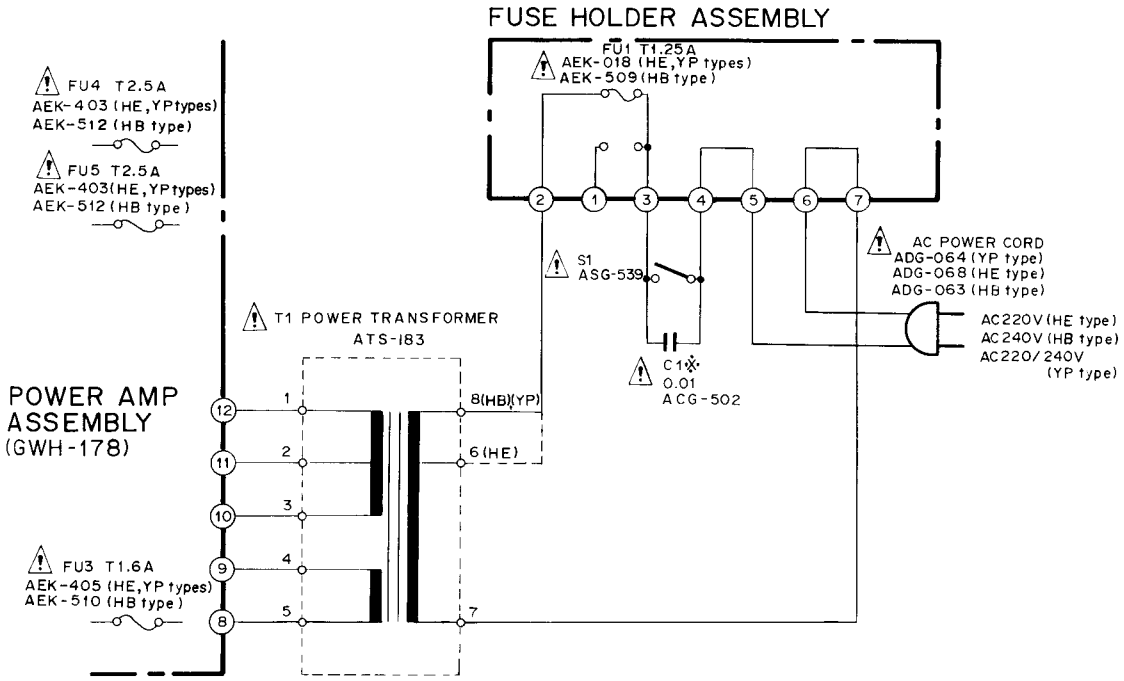
13. FOR HE, HB, S, YP TYPES

The HE, HB, S and YP types are the same as the KU type with the exception of the following sections.

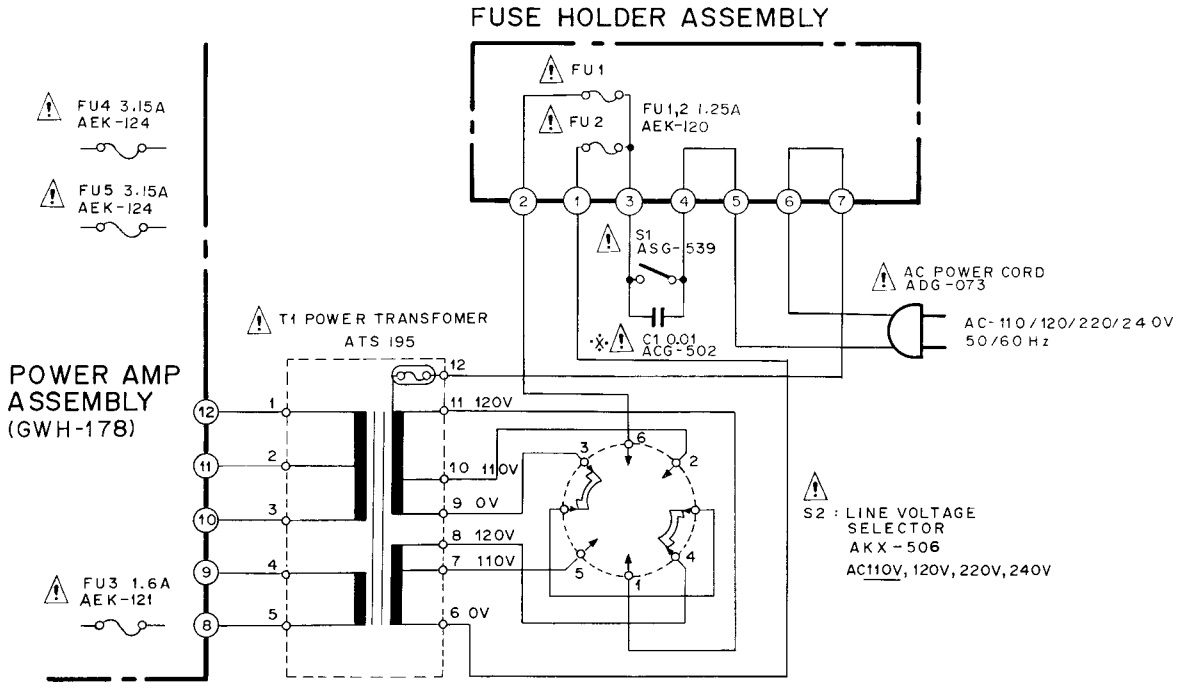
Contrast of Miscellaneous Parts

Mark	Symbol & Description	Part No.				
		KU type	HE type	HB type	S type	YP type
⚠ ★	T1 Power transformer					
	(AC 120V)	ATS-193	....	....	....	....
	(AC220V/240V)	....	ATS-183	ATS-183	....	ATS-183
	(AC110V/120V/220V/240V)	....	....	....	ATS-195	....
⚠ ★★	S2 Line voltage selecter	....	....	....	AKX-506	....
⚠ ★★	FU1 Fuse (2.5A)	AEK-123	....	....	....	....
	FU1 Fuse (T1.25A)	....	AEK-018	AEK-509	....	AEK-018
	FU1 Fuse (1.25A)	....	....	....	AEK-120	....
⚠ ★★	FU2 Fuse (1.25A)	....	....	....	AEK-120	....
⚠ ★★	FU3 Fuse (1.6A)	AEK-121	....	....	AEK-121	....
	FU3 Fuse (T1.6A)	....	AEK-405	....	....	AEK-405
	FU3 Fuse (T1.6A)	....	....	AEK-510	....	....
⚠ ★★	FU4 Fuse (3.15A)	AEK-124	....	....	AEK-124	....
	FU4 Fuse (T2.5A)	....	AEK-403	....	....	AEK-403
	FU4 Fuse (T2.5A)	....	....	AEK-512	....	....
⚠ ★★	FU5 Fuse (3.15A)	AEK-124	....	....	AEK-124	....
	FU5 Fuse (T2.5A)	....	AEK-403	....	....	AEK-403
	FU5 Fuse (T2.5A)	....	....	AEK-512	....	....
⚠	AC power cord	ADG-073	ADG-068	ADG-063	ADG-073	ADG-064
	Operating instruction					
	(English)	ARB-678	....	ARB-678	ARB-678	ARB-678
	(English/French/German/Italian)	....	ARE-129	....	....	....
	(Spanish)	....	....	....	ARC-087	....
	Packing case DC221Z	AHE-525	AHE-525	AHE-525	AHE-525	AHE-525
	DC220Z	....	AHE-526	....	AHE-526	....

Power Supply Circuit for HE, HB and YP Types.



Power Supply Circuit for S Type



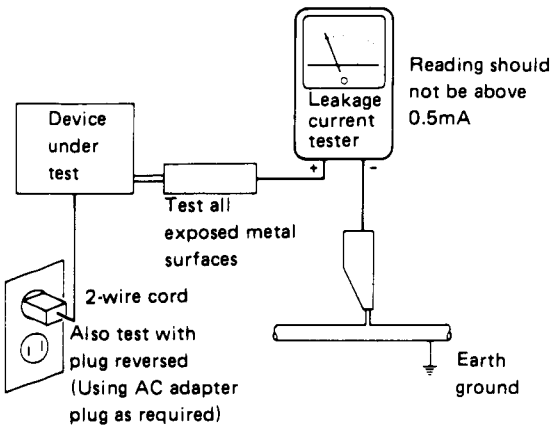
14. SAFETY INFORMATION

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.

Line voltage selection for HE,YP and HB Types

1. Disconnect the AC power cord.
2. Remove the bonnet case.
3. Change the connection of the power transformer primary lead wire as follows:
   - 220V: Disconnect the terminal no.2 on the fuse holder assembly to the terminal no.8 of the power transformer, and connect the terminal no.2 on the fuse holder assembly to the terminal no.6 of the power transformer.
   - 240V: Disconnect the terminal no.2 on the fuse holder assembly to the terminal no.6 of the power transformer, and connect the terminal no.2 on the fuse holder assembly to the terminal no.8 of the power transformer.
4. Stick the line voltage label on the rear panel.

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