


# WM-AF67 / BF67

## SERVICE MANUAL



US Model  
Canadian Model  
WM-AF67  
AEP Model  
UK Model  
E Model  
WM-BF67

Dolby noise reduction manufactured under license from  
Dolby Laboratories Licensing Corporation.  
"DOLBY" and the double-D symbol  are trademarks of  
Dolby Laboratories Licensing Corporation.

This photo is BF-67.

Model Name Using Similar Mechanism	New
Tape Transport Mechanism Type	WMF-67-80

### SPECIFICATIONS

#### Radio section

##### Frequency range

- FM: 87.6-107MHz (West Germany model)
- 87.6-108MHz (EXCEPT FOR West Germany model)
- AM: 531-1,602kHz (West Germany model)
- 530-1,605kHz (EXCEPT FOR West Germany model)

##### Antenna

- FM: Headphone cord antenna or earphone cord antenna
- AM: Built-in ferrite bar antenna

#### Recording section

##### Recording system

- 4-track 2-channel stereo

##### Input

- Microphone input jack (stereo minijack) (PLUG IN POWER)
- sensitivity 0.26 mV for low impedance microphone

#### Tape player section

##### Frequency response (Dolby NR off)

- 30 - 15,000 Hz

##### Power output

- 5 mW + 5 mW load impedance 16 ohms at DC operation

##### Power requirements

- 3 V DC

- Two R6 (size AA) batteries

##### DC IN 3 V jack accepts:

- Optional Sony EBP-500B battery case for use with two R20 (size D) batteries
- Optional Sony AC-D2L AC power adaptor for use on 120V AC, 60Hz (US, Canadian model) for use on 240V AC, 50Hz (UK model) for use on 220V AC, 50Hz (AEP, West Germany model) for use on 120V AC, 60Hz or 220V AC, 50Hz (E model)
- Optional Sony DCC-70 car battery cord for use with 12 V car battery

##### Battery life (Dolby NR off)

	Sony alkaline battery AM 3 (N)
Playback	Approx. 6 hours
FM reception	Approx. 23 hours
Recording	Approx. 5.5 hours

#### Dimensions

- Approx. 115.9 x 93.2 x 39.3 mm (w/h/d)
- (4 5/8 x 3 3/4 x 1 5/8 inches)
- incl. projecting parts and controls

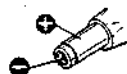
#### Weight

- Approx. 280 g (9.9 oz) incl. batteries

#### Accessories supplied

- Belt clip (1)
- Microphone (1)
- Microphone stand (1)
- For WM-AF67
- Stereo headphones (open-air type, 1)
- For WM-BF67
- UK, E model: Stereo headphones (open-air type, 1)
- AEP, West Germany model: Stereo earphones (open-air type, 1)

Note: If an AC power adaptor or a car battery cord not manufactured by Sony is used, a fuse must be installed in the AC power adaptor or the car battery cord and the polarity of the plug must be as illustrated.



RADIO CASSETTE-CORDER  
**SONY**®



# SECTION 1 DISASSEMBLY

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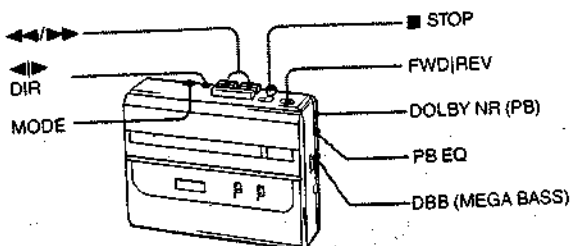
### Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270°C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

### Notes on chip component replacement

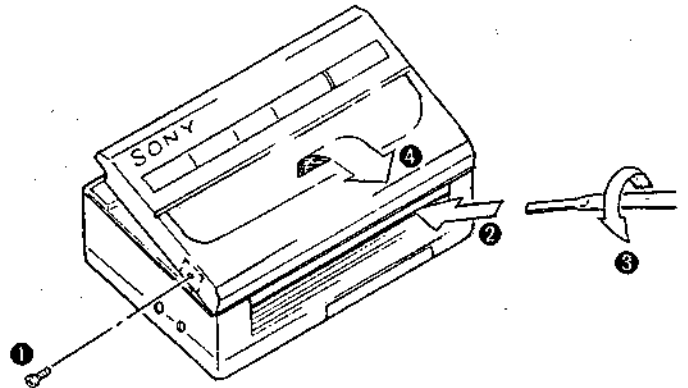
- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

### PARTS IDENTIFICATION

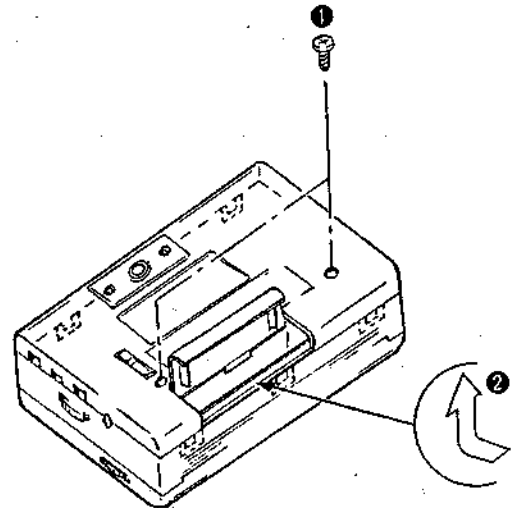


Note: Follow the disassembly procedure the numerical order given.

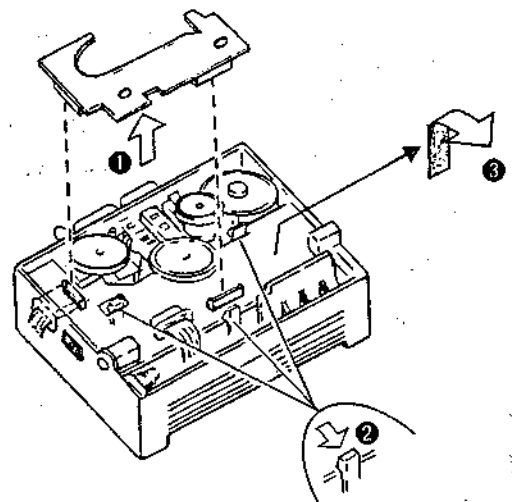
#### 1-1. CASSETTE HOLDER



#### 1-2. REAR CABINET

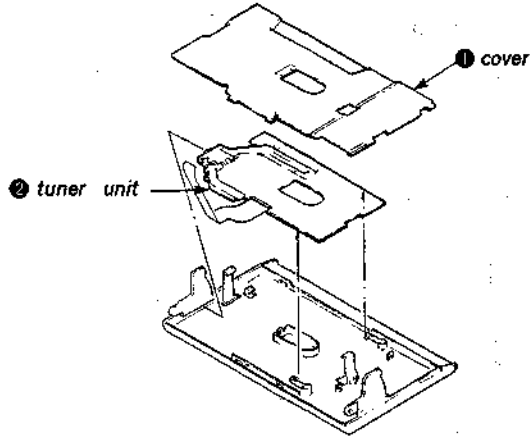


#### 1-3. MECHANISM DECK

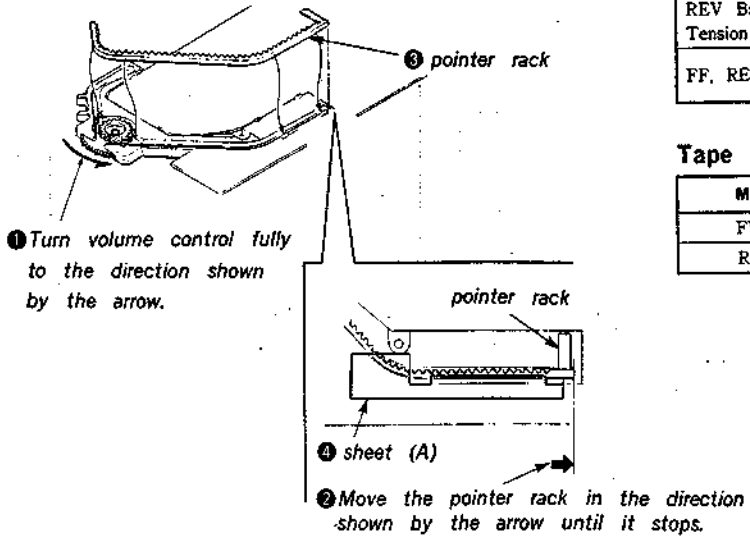


### SECTION 2 MECHANICAL MEASUREMENTS

#### 1-4. TUNER UNIT



#### 1-5. POINTER RACK SETTING



#### PRECAUTION

- Clean the following parts with a denatured alcohol-moistened swab:
  - playback head
  - pinch roller
  - capstan
  - rubber belts
- Demagnetize the playback head with a head demagnetizer.
- Do not use a magnetized screwdriver for the adjustments.
- After the adjustments, apply suitable locking compound to the parts adjusted.
- The adjustments should be performed with the rated power supply voltage (2.5V) unless otherwise noted.

#### Torque Measurement

Mode	Torque Meter	Meter Reading
FWD	CQ-102C	25-55g·cm (0.30-0.76oz·inch)
FWD Back Tension		less than 3g·cm (less than 0.04oz·inch)
REV	CQ-102RB	22-55g·cm (0.30-0.76oz·inch)
REV Back Tension		less than 3g·cm (less than 0.04oz·inch)
FF, REW	CQ-201B	more than 60g·cm (more than 0.83oz·inch)

#### Tape Tension Measurement

Mode	Torque meter	Meter reading
FWD	CQ-403A	more than 55g·cm (more than 0.76oz·inch)
REV	CQ-403R	more than 55g·cm (more than 0.76oz·inch)

### SECTION 3 ELECTRICAL ADJUSTMENTS

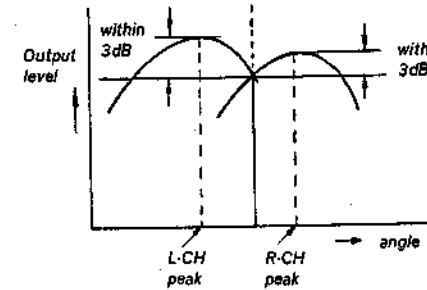
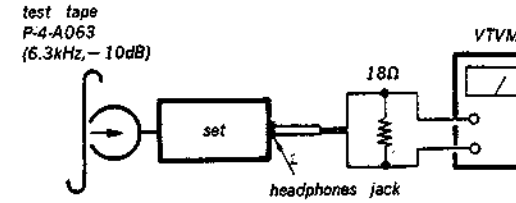
#### 3-1. CASSETTE SECTION

##### Playback Head Azimuth Check

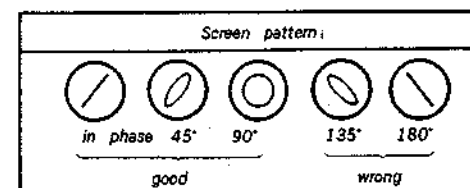
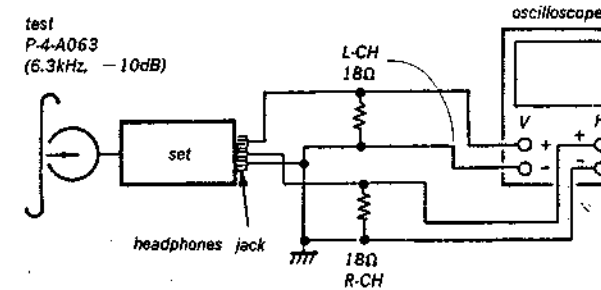
- perform this check both in FWD and REV mode.

**Note:** This set is not featured the head azimuth adjustment. When replacing the head, check the both L-ch and R-ch output levels and also those phases.

- Procedure:**
- Level Check  
Mode: playback

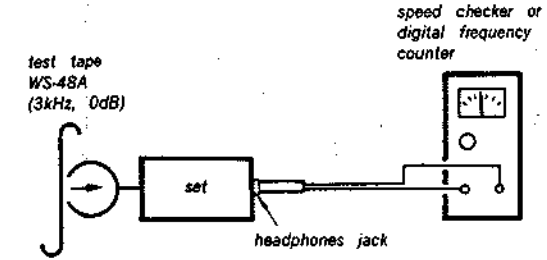


- Phase Check  
Mode: playback



##### Tape Speed Adjustment

- Procedure:**  
Mode: playback

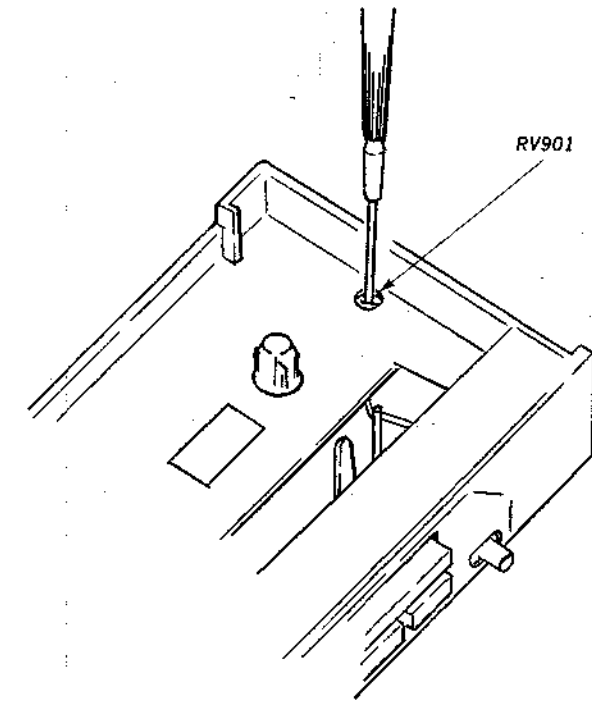


##### Specification:

Speed checker	Digital frequency counter
±1%	2,970-3,030Hz

Frequency difference between the beginning and the end of the tape should be within ±2.5% (±75Hz).

**Adjustment Location:** RV901



3-2. RADIO  
Note: DC Su

AM

Setting  
Function:  
BAND:

AM R  
30%  
module  
400 H

AM TR/  
Adjust for  
on VTVM  
T6  
CT2

AM FR/  
Adjust for  
on VTVM  
T3  
CT3

AM  
Adjust for  
on VTVM  
T4

Repeat t  
and the  
should t  
WG: Wc

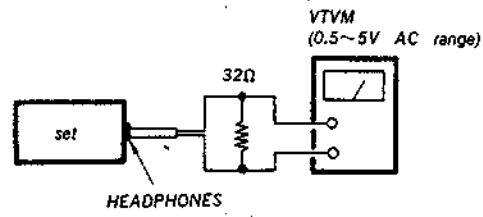
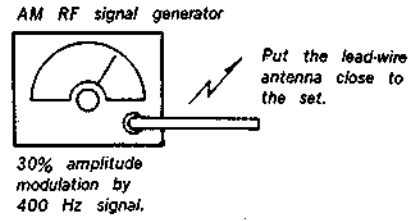
3-2. RADIEO SECTION

Note: DC Supply Voltage 2.5V

**AM**

Setting

Function: RADIO  
BAND: AM



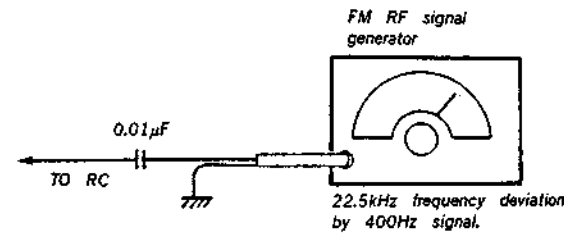
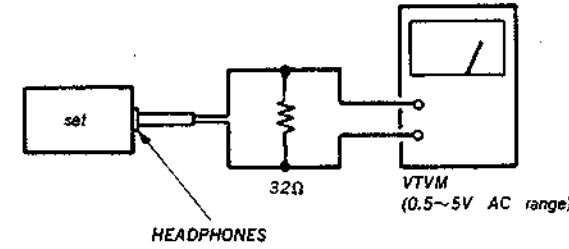
AM TRACKING ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T6	620kHz
CT2	1,400kHz
AM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T3	525kHz (526.5kHz)
CT3	1,650kHz (1606.5kHz)
( ) : BF 67 WG Model	
AM IF ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T4	455kHz (468kHz)
( ) : BF 67 UK Model	

- Repeat the procedures in each adjustment several times, and the frequency coverage and tracking adjustments should be finally done by the trimmer capacitors.
- WG: West Germany model

**FM**

Setting:

FUNCTION: RADIO  
BAND FM (DX): WM-AF67  
FM (ST): WM-BF67

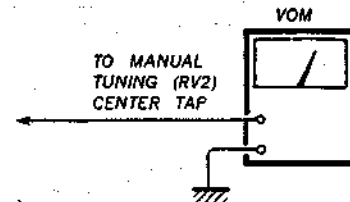


- Repeat the procedures in each adjustment several times, and the adjustments should be finally done by the trimmer capacitors.
- \* FM frequency coverage adjustment should be done after frequency control voltage adjustment.

FM FREQUENCY COVERAGE ADJUSTMENT	
Adjust for a maximum reading on VTVM.	
T2	85MHz (87.35MHz)
CT1	118.5MHz (107.8MHz)
( ) : BF 67 WG Model	

FREQUENCY CONTROL VOLTAGE ADJUSTMENT

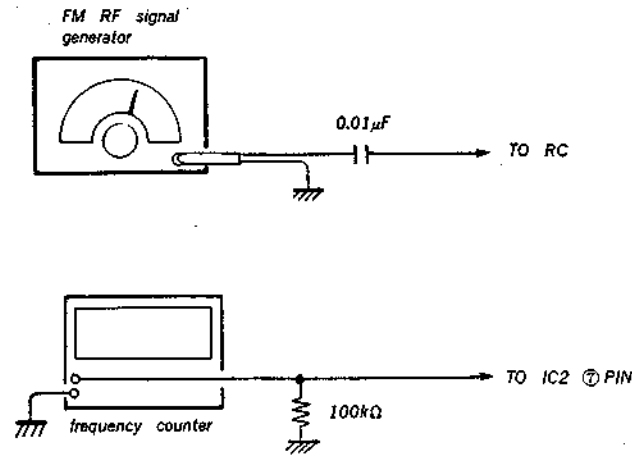
- \*This adjustment should be done before FM frequency coverage adjustment.



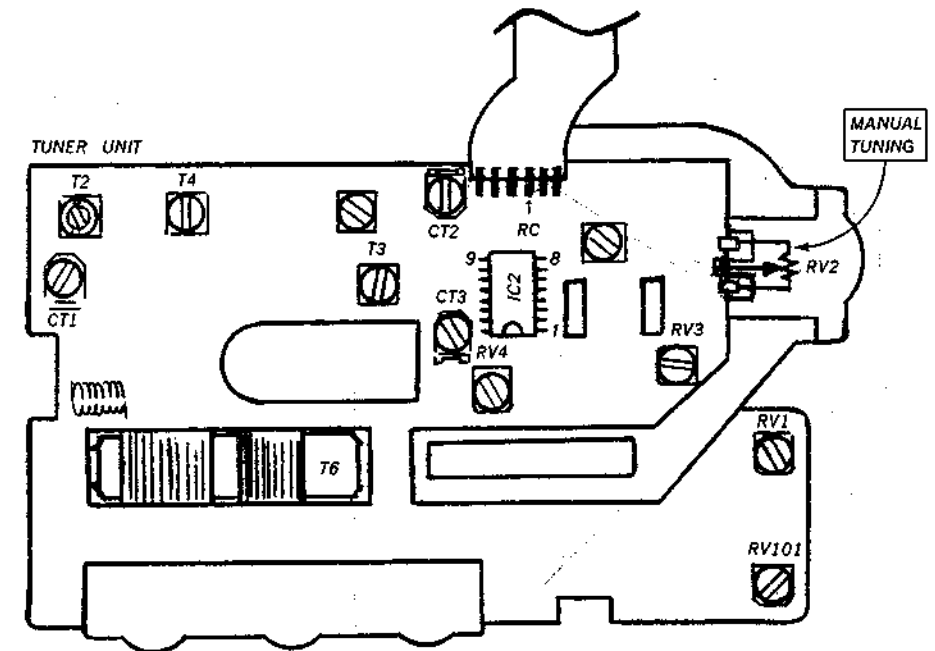
to be adjusted	RV3 (PRESET RV101)	RV1
readings	1V ± 0.1V	9V ± 0.1V
tuning dial	f min	f max

VCO Adjustment

procedure: Carrier frequency: 98MHz  
Modulation: 1kHz deviation (30%)



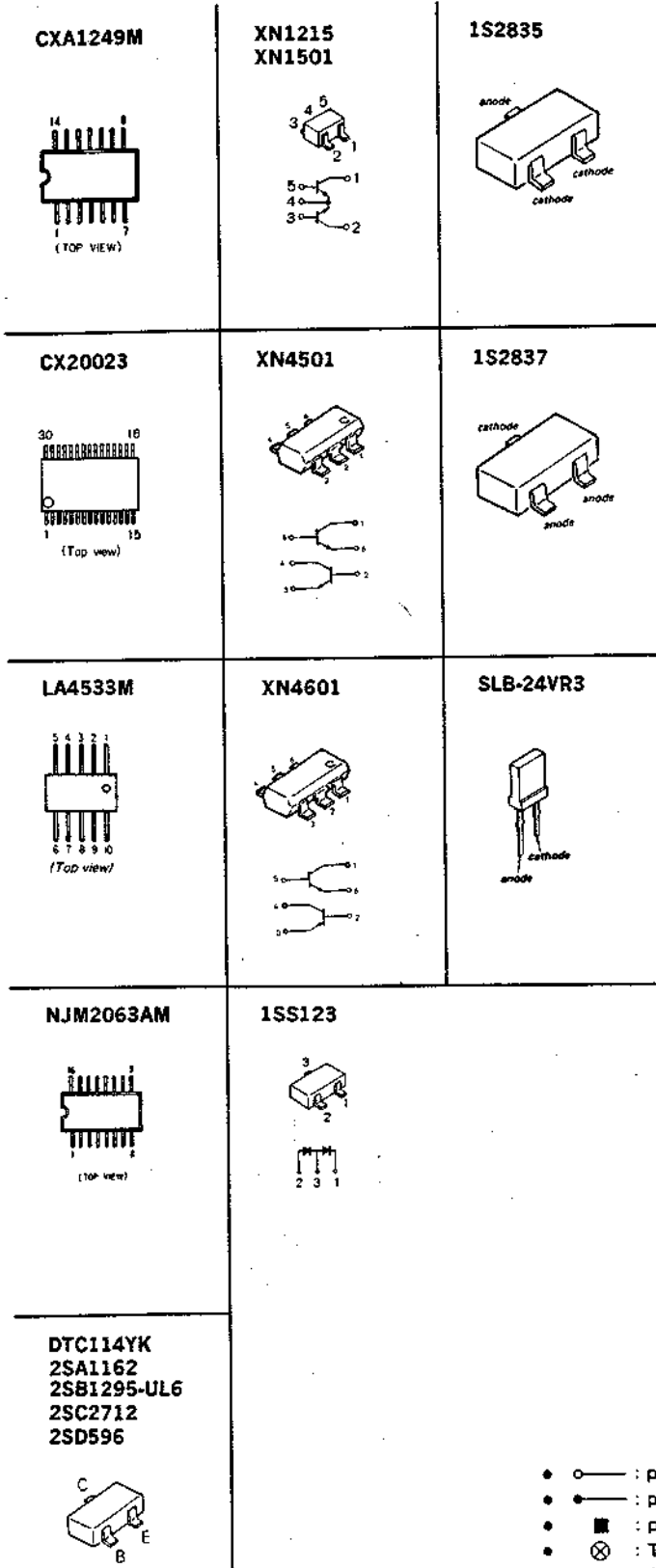
- Tune the set to 98MHz.
- Adjust RV4 for 38kHz ± 200Hz on the counter.



SECTION 4  
DIAGRAMS

• SEMICONDUCTOR LEAD LAYOUTS

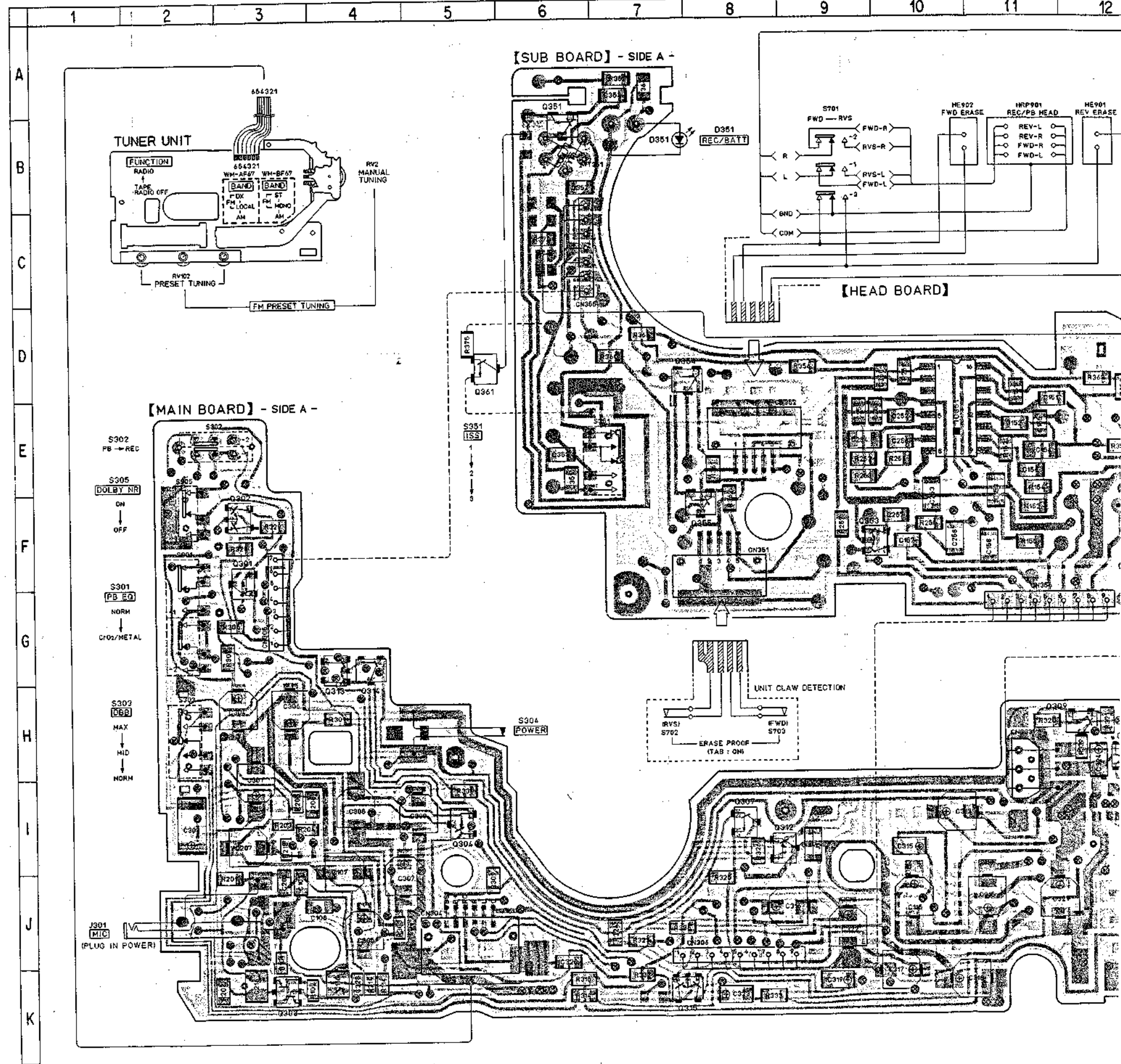
• Semiconductor Location



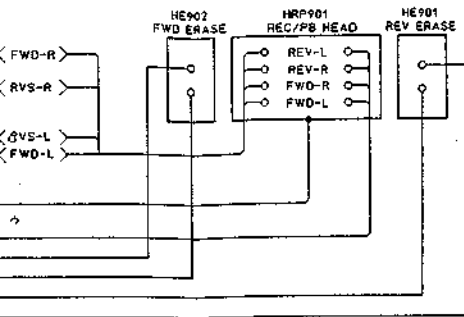
Ref. No.	Location
D301	I-15
D302	F-25
D303	I-23
D304	I-23
D305	K-24
D351	B-7
D352	F-20
IC301	I-24
IC302	J-18
IC303	J-19
IC351	E-10
Q301	F-3
Q302	F-3
Q303	K-3
Q304	I-5
Q305	I-24
Q306	J-20
Q307	I-8
Q308	H-12
Q309	H-12
Q310	H-16
Q311	J-24
Q312	I-8
Q313	G-4
Q314	G-4
Q315	K-7
Q351	B-6
Q352	F-18
Q353	F-9
Q354	D-7
Q355	F-8
Q356	D-19
Q357	E-20
Q358	D-20
Q359	F-12
Q360	F-18
Q361	D-5

- : parts extracted from the component side.
- : parts extracted from the conductor side.
- : parts mounted on the conductor side.
- ⊗ : Through hole.
- ▨ : Pattern on the side which is seen.
- ▩ : Pattern of the rear side.

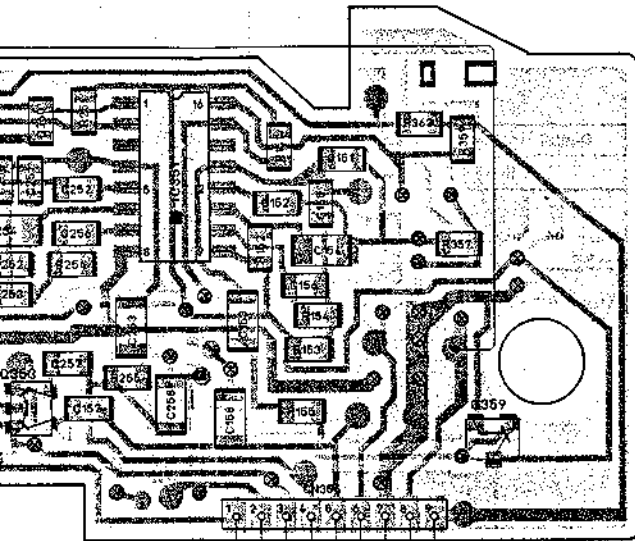
4-1. PRINTED WIRING BOARDS



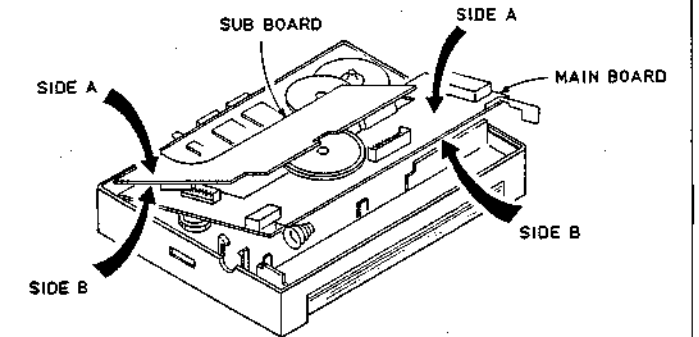
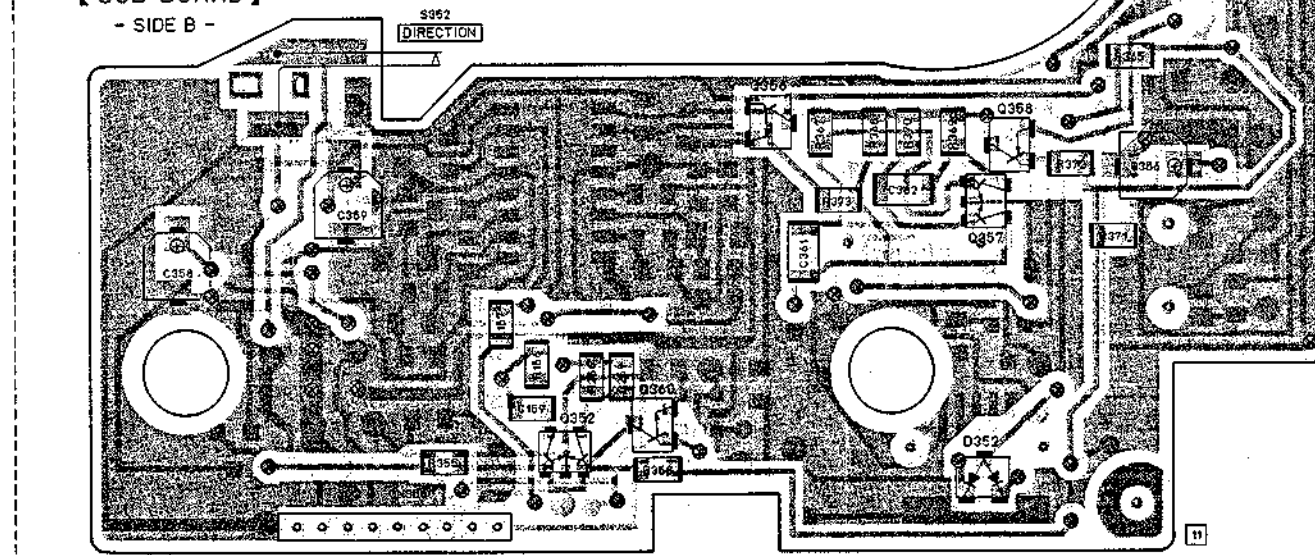
10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27



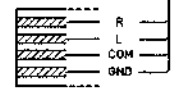
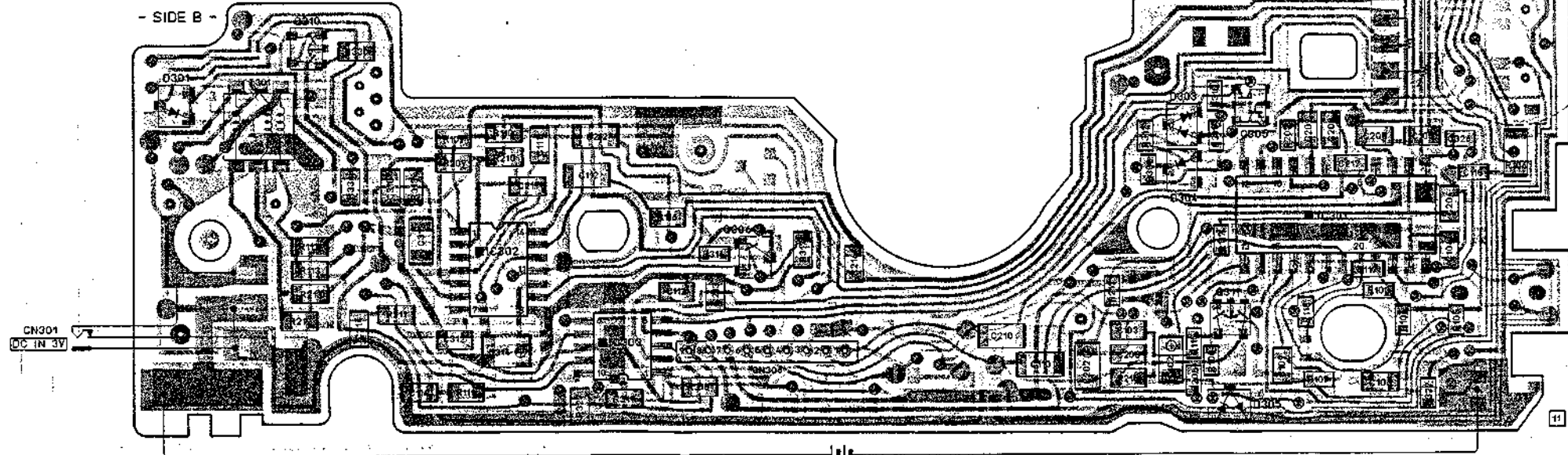
HEAD BOARD]



【SUB BOARD】  
- SIDE B -



【MAIN BOARD】  
- SIDE B -

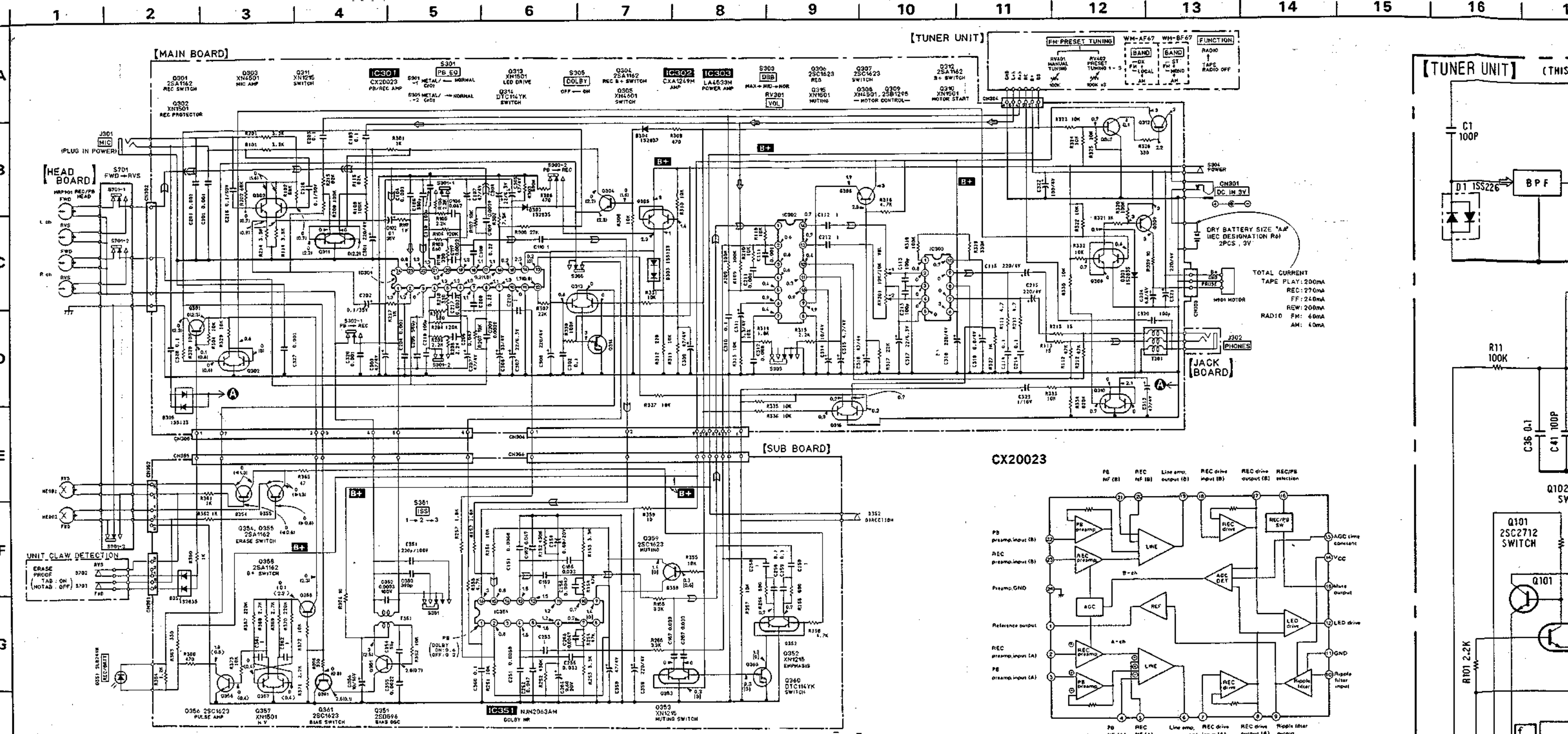


DRY BATTERY SIZE "AA" ( IEC DESIGNATION R6 )  
2PCS 3V

4-2. SCHEMATIC DIAGRAMS —TAPE RECORDER SECTION—

WM-AF67/BF67 WM-AF67/BF67

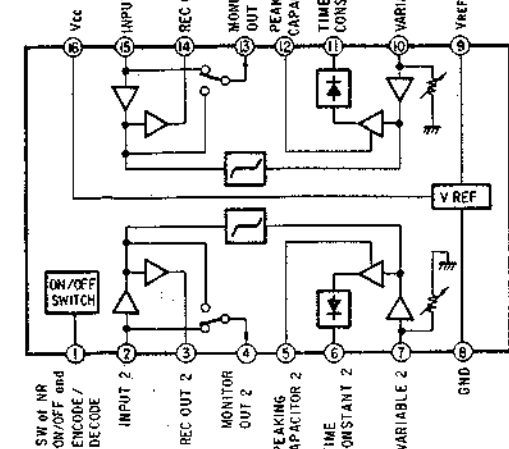
4-3. SCHEMATIC DIAGRAM



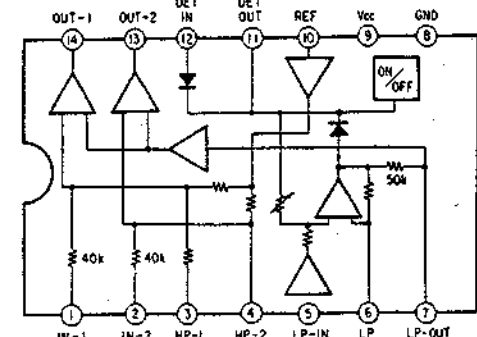
- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$  50WV or less are not indicated except for electrolytics and tantalums.
  - All resistors are in  $\Omega$  and  $1/10\text{W}$  or less unless otherwise specified.
  - Switch
- | Ref. No. | Switch    | Position |
|----------|-----------|----------|
| S301     | PB. EQ    | NORMAL   |
| S302     | REC/PB    | PB       |
| S303     | DBB       | MAX      |
| S304     | POWER     | OFF      |
| S305     | DOLBY     | ON       |
| S351     | ISS       | 1        |
| S352     | DIRECTION | OFF      |
| S701     | FWD/REV   | FWD      |

- **B+**: B+ Line
- **□**: adjustment for repair.
- Total current is measured with no cassette installed.
- Power voltage is dc 3V and fed with regulated dc power supply from external power voltage jack.
- Voltage and waveforms are dc with respect to ground under no-signal conditions.
- no mark: PB
- ( ): REC
- < >: ERASE PROOF (TAB OFF)
- Voltages are taken with a VOM (50 k $\Omega$ /V).
- Voltage variations may be noted due to normal production tolerances.
- Signal path.
- $\curvearrowright$ : FM
- $\curvearrowleft$ : PB
- $\curvearrowright$ : REC

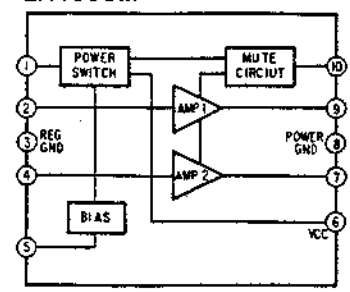
NJM2063AM



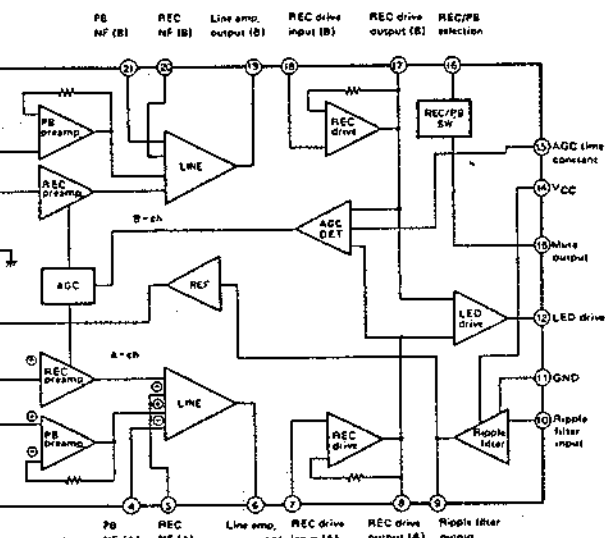
CXA-1249M



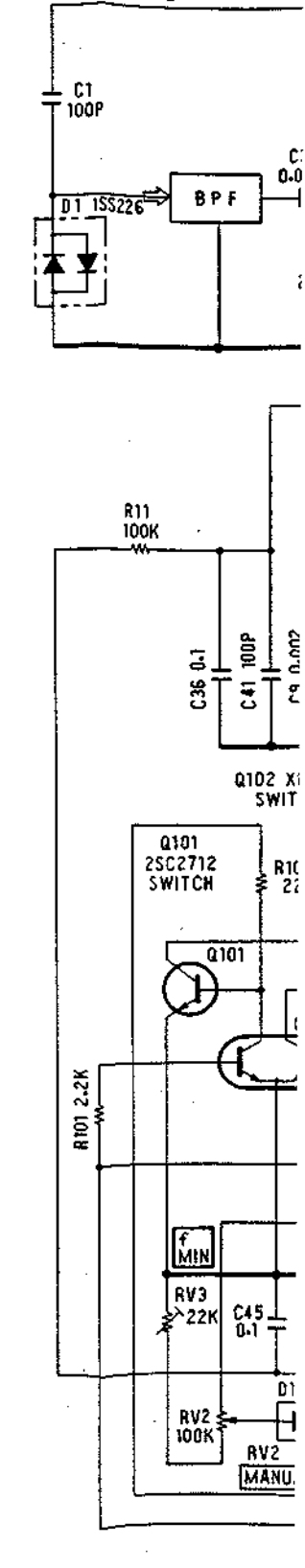
LA4533M



CX20023

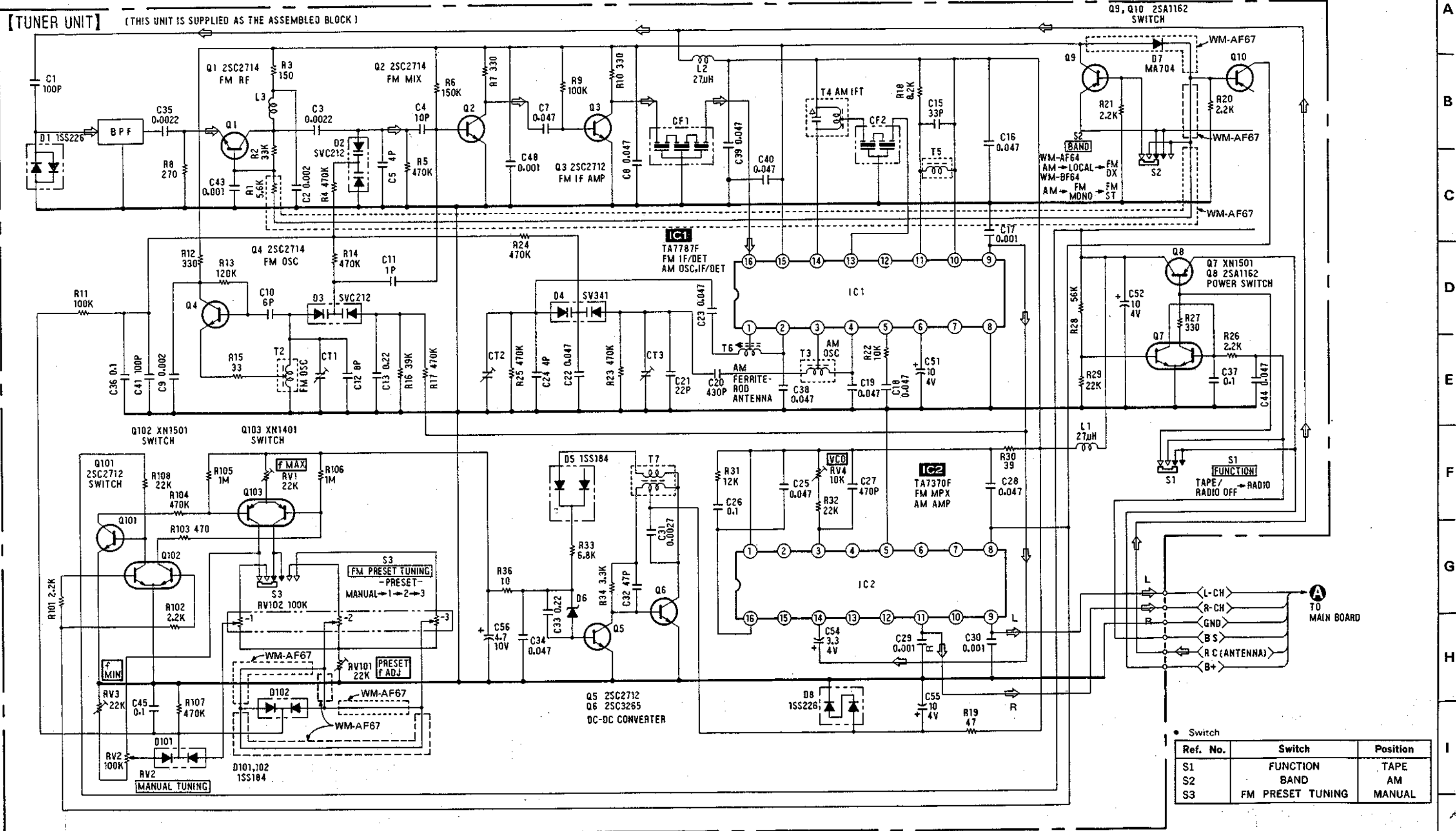


[TUNER UNIT] (THIS UNIT)



4-3. SCHEMATIC DIAGRAM —TUNER UNIT—

15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31



• Switch

Ref. No.	Switch	Position
S1	FUNCTION	TAPE
S2	BAND	AM
S3	FM PRESET TUNING	MANUAL



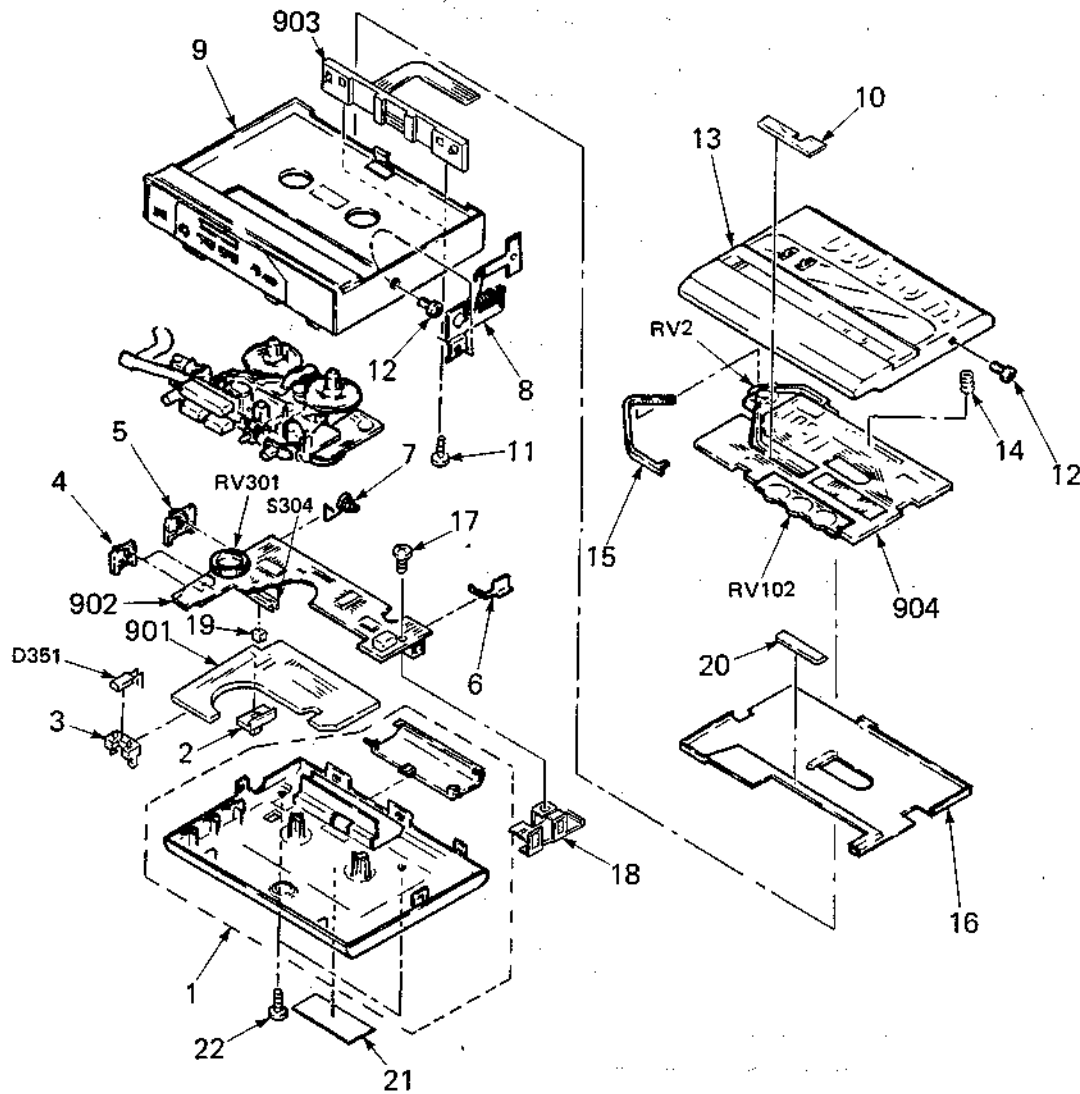
**SECTION 5  
EXPLODED VIEWS**

**NOTE:**

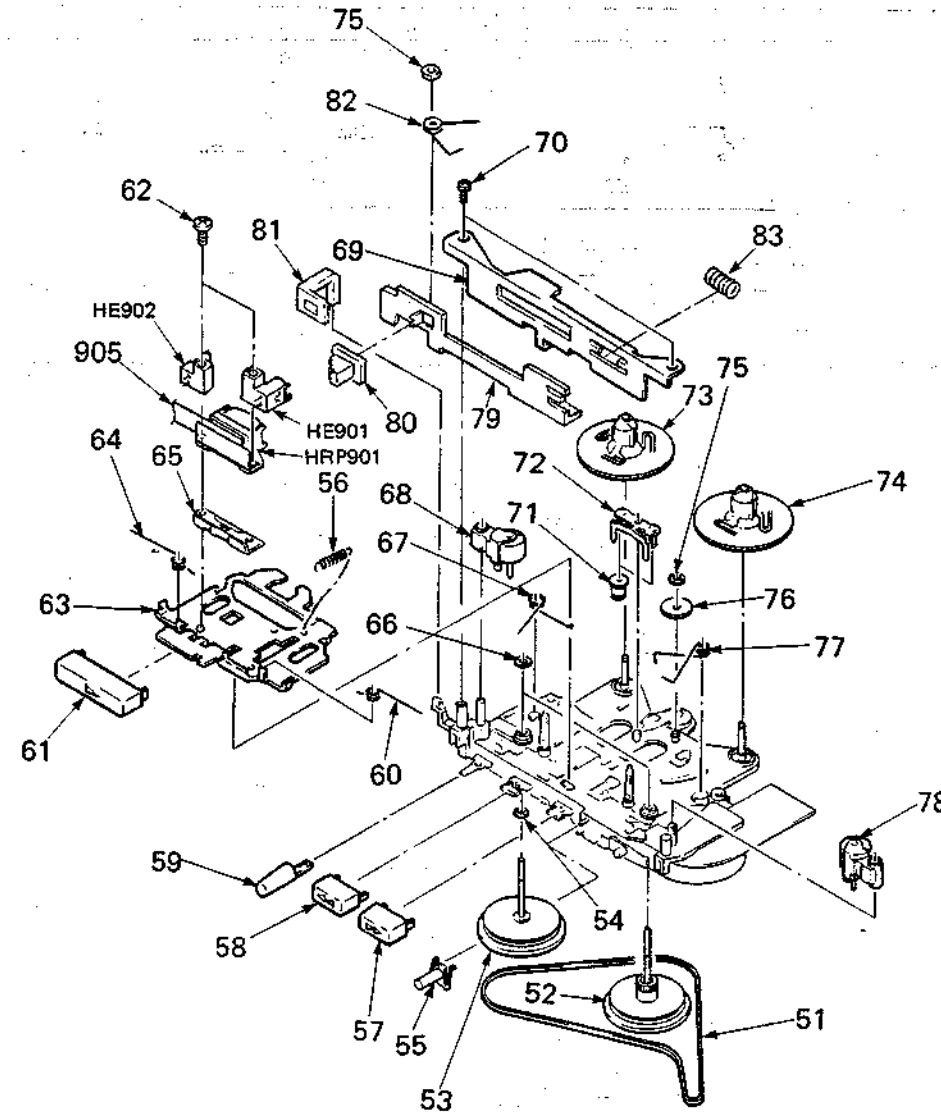
- The mechanical parts with no reference number in the exploded views are not supplied.
- The construction parts of an assembled part are indicated with a collation number in the remark column.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.

- Due to standardization, parts with part number suffix -XX and -X may be different from the parts specified in the components used on the set.
- Color Indication of Appearance Parts  
Example:  
(RED) ... KNOB, BALANCE (WHITE)  
↑ Cabinet's Color      ↑ Parts' Color

**5-1. CABINET, CASSETTE HOLDER SECTION**



**5-2. MECHANISM (1)**



**5-3. MECHANISM (2)**

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Ref.No	Part No.	Description	Remarks
1	X-3336-710-1	CABINET (REAR) ASSY	
2	3-347-874-01	KNOB (ISS)	
3	*3-347-878-01	HOLDER, LED	
4	3-346-725-01	KNOB (DOLBY NR) (PB EQ)	
5	3-346-726-01	KNOB (DBB)	
6	3-341-954-01	TERMINAL BOARD, BATTERY	
7	3-341-953-01	SPRING	
8	X-3346-546-1	BRACKET ASSY	
9	X-3336-707-1	(BF67) ... CABINET (FRONT) ASSY	
9	X-3336-712-1	(AF67) ... CABINET (FRONT) ASSY	
10	*3-346-798-01	SHEET (POINTER)	
11	3-318-382-21	SCREW (1.7X3), TAPPING	
12	3-704-197-31	SCREW (M1.4X3.0), LOCKING	
13	X-3336-708-1	(BF67; WG) ... HOLDER ASSY, CASSETTE	
13	X-3336-709-1	(BF67; UK, E, IT) ... HOLDER ASSY, CASSETTE	
13	X-3336-711-1	(AF67) ... HOLDER ASSY, CASSETTE	

Ref.No	Part No.	Description	Remarks
14	3-346-799-01	SPRING, COMPRESSION	
15	3-336-708-01	RACK, POINTER	
16	*3-346-737-01	COVER	
17	3-704-197-01	SCREW (M1.4X2), TOOTHED LOCK	
18	*3-347-877-01	REINFORCEMENT	
19	*3-341-947-01	RUBBER, LEAF SW	
20	9-911-863-XX	SPACER (G)	
21	*3-347-873-01	(BF67; WG) ... LABEL, MODEL NUMBER	
22	3-318-203-81	SCREW (B1.7X7), TAPPING	
901	A-3216-654-A	MOUNTED PCB, SUB	
902	A-3216-655-A	MOUNTED PCB, MAIN	
903	1-466-056-11	UNIT, CLAW DETECTION	
904	1-465-012-11	(AF67) ... TUNER UNIT (WITH PRESET)	
904	1-465-012-21	(BF67; WG) ... TUNER UNIT (WITH PRESET)	
904	1-465-012-31	(BF67; AEP) ... TUNER UNIT (WITH PRESET)	
904	1-465-012-41	(BF67; UK) ... TUNER UNIT (WITH PRESET)	

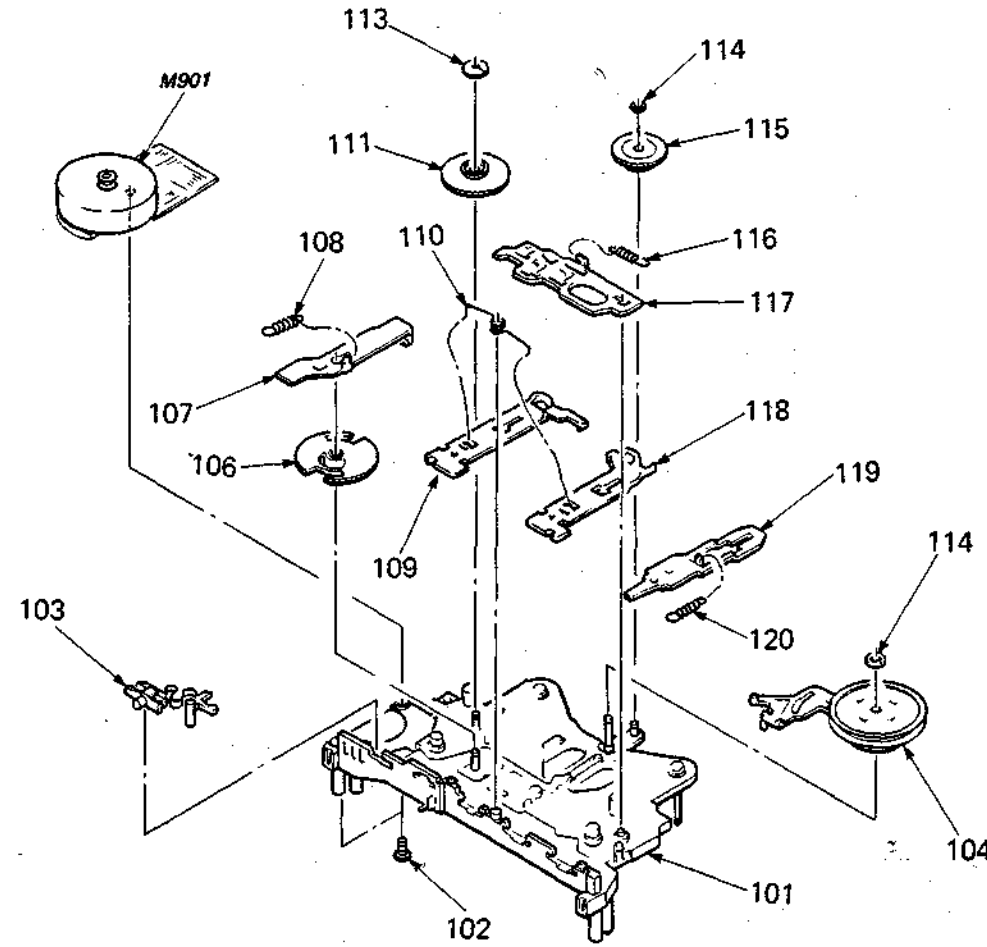
Ref.No	Part No.	Description	Remarks
51	3-341-267-01	BELT, CAPSTAN	
52	X-3335-635-1	FLYWHEEL (T) ASSY	
53	X-3335-636-1	FLYWHEEL ASSY	
54	3-701-437-11	WASHER (24T), TEFLON	
55	3-341-294-01	BUTTON, DIR	
56	3-341-271-01	SPRING, TENSION	
57	3-346-587-01	BUTTON (FF)	
58	3-346-588-01	BUTTON (REW)	
59	3-341-961-01	BUTTON (STOP)	
60	3-341-276-21	SPRING (N)	
61	3-346-586-01	BUTTON (PLAY)	
62	3-347-868-01	SCREW (M1.4), SPECIAL HEAD PAN	
63	3-341-711-01	LEVER, PLAY	
64	3-341-277-21	SPRING (R)	
65	*3-347-869-01	BASE, HEAD	
66	3-321-483-11	RING, RETAINING	
67	3-341-270-01	SPRING (R)	
68	X-3335-694-2	PINCH LEVER (R) ASSY	
69	*3-347-859-01	HOLDER (R)	

Ref.No	Part No.	Description	Remarks
70	3-893-942-61	SCREW (1.7X3), TAPPING (B)	
71	3-341-275-01	GEAR, FR	
72	3-341-701-01	LEVER, FR	
73	3-341-291-01	GEAR, S REEL	
74	3-341-290-01	GEAR, T REEL	
75	3-341-752-11	WASHER, POLYETHYLENE (t=0.25)	
76	3-341-265-01	GEAR, R	
77	3-341-763-01	SPRING	
78	X-3335-693-1	PINCH LEVER (N) ASSY	
79	X-3336-705-1	SLIDER (R) ASSY	
80	3-347-870-01	KNOB (REC)	
81	3-347-871-01	PLATE (DIR), INDICATION	
82	3-347-867-01	SPRING (R LOCK), TORSION	
83	3-347-866-01	SPRING, COMPRESSION	
905	1-628-471-11	PC BOARD, HEAD	
HE901	1-543-582-11	HEAD, MAGNETIC (ERASE)	
HE902	1-543-582-11	HEAD, MAGNETIC (ERASE)	
HRP901	1-543-583-11	HEAD, MAGNETIC (REC/PB)	

Ref.No	Part No.	Description
101	A-3153-159-A	CHA
102	3-345-648-01	SCR
103	3-341-293-01	LEVI
104	A-3239-894-A	WHI
106	3-341-292-01	GEA
107	3-341-299-11	LEVI
108	3-341-274-01	SPR
109	3-341-295-01	LEVI
110	3-341-268-01	SPR
111	3-341-289-01	GEA

SECTION 6  
ELECTRICAL PARTS LIST

5-3. MECHANISM (2)



Remarks	Ref.No	Part No.	Description	Remarks	Ref.No	Part No.	Description	Remarks
	101	A-3163-159-A	CHASSIS ASSY		113	3-341-752-11	WASHER, POLYETHYLENE (t=0.25)	
	102	3-345-648-01	SCREW (M1.4X3.0), TOOTHED LOCK		114	3-341-753-11	WASHER, POLYETHYLENE (t=0.25)	
	103	3-341-293-01	LEVER, MODE		115	3-341-266-01	GEAR, T	
	104	A-3239-894-A	WHEEL ASSY, MIDWAY		116	3-341-272-01	SPRING, TENSION	
	106	3-341-292-01	GEAR, CAM		117	3-341-298-01	PLATE, LOCK	
	107	3-341-299-11	LEVER, DIR		118	3-341-296-01	LEVER, REW	
	108	3-341-274-01	SPRING (POWER TENSION), TENSION		119	3-341-297-01	LEVER, STOP	
	109	3-341-295-01	LEVER, FF		120	3-341-273-01	SPRING, TENSION	
	110	3-341-268-01	SPRING		M901	8-835-339-01	MOTOR, DC U-24A	
	111	3-341-289-01	GEAR, DECELERATION					

NOTE:

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- Items marked "\*" are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- If there are two or more same circuits in a set such as a stereophonic machine, only typical circuit parts may be indicated and capacitors and resistors in other same circuits may be omitted.

CAPACITORS:  
MF:  $\mu F$ , PF:  $\mu P F$ .

RESISTORS  
• All resistors are in ohms.  
• F: nonflammable

COILS  
• MMH: mH, UH:  $\mu H$

SEMICONDUCTORS  
In each case, U:  $\mu$ , for example:  
UA...:  $\mu A$ ..., UPA...:  $\mu P A$ ...,  
UPC...:  $\mu P C$ ..., UPD...:  $\mu P D$ ...

Ref.No	Part No.	Description	Ref.No	Part No.	Description						
901	A-3216-654-A	MOUNTED PCB, SUB	C216	1-124-766-00	ELECT	0.1MF	20%	50V			
902	A-3216-655-A	MOUNTED PCB, MAIN	C217	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V			
903	1-466-056-11	UNIT, CLAW DETECTION	C218	1-162-953-11	CERAMIC CHIP	100PF	5%	50V			
904	1-465-012-11	(AF67)....TUNER UNIT (WITH PRESET)	C251	1-163-019-00	CERAMIC CHIP	0.0068MF		50V			
904	1-465-012-21	(BF67: WG)....TUNER UNIT (WITH PRESET)	C252	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V			
904	1-465-012-31	(BF67: AEP)....TUNER UNIT (WITH PRESET)	C253	1-162-638-11	CERAMIC CHIP	1MF		16V			
904	1-465-012-41	(BF67: UK)....TUNER UNIT (WITH PRESET)	C254	1-135-087-21	TANTAL. CHIP	0.68MF	10%	20V			
905	1-628-471-11	PC BOARD HEAD	C255	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V			
CAPACITOR											
C101	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C256	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V
C102	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V	C257	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V
C103	1-163-038-00	CERAMIC CHIP	0.1MF		25V	C258	1-162-638-11	CERAMIC CHIP	1MF		16V
C104	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C259	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C105	1-163-135-00	CERAMIC CHIP	560PF	10%	50V	C301	1-126-246-11	ELECT	220MF	20%	4V
C106	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V	C302	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C107	1-126-208-11	ELECT	47MF	20%	4V	C303	1-135-163-81	TANTAL. CHIP	47MF	20%	4V
C108	1-164-222-91	CERAMIC CHIP	0.22MF		25V	C304	1-124-778-00	ELECT	22MF	20%	6.3V
C109	1-163-016-00	CERAMIC CHIP	0.0039MF	10%	50V	C305	1-126-208-11	ELECT	47MF	20%	4V
C110	1-162-638-11	CERAMIC CHIP	1MF		16V	C306	1-126-207-11	ELECT	33MF	20%	4V
C111	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C307	1-124-778-00	ELECT	22MF	20%	6.3V
C112	1-162-638-11	CERAMIC CHIP	1MF		16V	C308	1-126-246-11	ELECT	220MF	20%	4V
C113	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	C309	1-126-208-11	ELECT	47MF	20%	4V
C114	1-163-038-00	CERAMIC CHIP	0.1MF		25V	C310	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C115	1-126-246-11	CAP. ELECT	220MF	20%	4V	C311	1-135-103-00	TANTAL. CHIP	3.3MF	10%	4V
C116	1-124-766-00	ELECT	0.1MF	20%	50V	C312	1-163-833-00	CERAMIC CHIP	0.068MF		25V
C117	1-162-966-11	CERAMIC CHIP	0.0022MF	10%	50V	C313	1-126-208-11	ELECT	47MF	20%	4V
C118	1-162-953-11	CERAMIC CHIP	100PF	5%	50V	C314	1-135-157-21	TANTAL. CHIP	10MF	20%	4V
C151	1-163-019-00	CERAMIC CHIP	0.0068MF		50V	C315	1-135-151-21	TANTAL. CHIP	4.7MF	20%	4V
C152	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V	C316	1-126-208-11	ELECT	47MF	20%	4V
C153	1-162-638-11	CERAMIC CHIP	1MF		16V	C317	1-124-778-00	ELECT	22MF	20%	6.3V
C154	1-135-087-21	TANTAL. CHIP	0.68MF	10%	20V	C318	1-126-246-11	ELECT	220MF	20%	4V
C155	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V	C319	1-135-170-21	TANTAL. CHIP	6.8MF	20%	4V
C156	1-163-017-00	CERAMIC CHIP	0.0047MF	10%	50V	C320	1-163-117-00	CERAMIC CHIP	100PF	5%	50V
C157	1-163-989-11	CERAMIC CHIP	0.033MF	10%	25V	C321	1-126-246-11	ELECT	220MF	20%	4V
C158	1-162-638-11	CERAMIC CHIP	1MF		16V	C322	1-126-209-11	ELECT	100MF	20%	4V
C159	1-163-038-00	CERAMIC CHIP	0.1MF		25V	C323	1-135-091-00	TANTAL. CHIP	1MF	20%	16V
C201	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C324	1-135-170-21	TANTAL. CHIP	6.8MF	20%	4V
C202	1-135-070-00	TANTAL. CHIP	0.1MF	20%	35V	C326	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C203	1-163-038-00	CERAMIC CHIP	0.1MF		25V	C327	1-162-964-11	CERAMIC CHIP	0.001MF	10%	50V
C204	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C328	1-164-156-11	CERAMIC CHIP	0.1MF		25V
C205	1-163-135-00	CERAMIC CHIP	560PF	10%	50V	C351	1-164-163-11	CERAMIC CHIP	220PF	5%	100V
C206	1-163-809-11	CERAMIC CHIP	0.047MF	10%	25V	C352	1-164-182-11	CERAMIC CHIP	0.0033MF	10%	100V
C207	1-126-208-11	ELECT	47MF	20%	4V	C353	1-163-131-00	CERAMIC CHIP	390PF	10%	50V
C208	1-164-222-91	CERAMIC CHIP	0.22MF		25V	C354	1-163-111-00	CERAMIC CHIP	56PF	5%	50V
C209	1-163-016-00	CERAMIC CHIP	0.0039MF	10%	50V	C355	1-164-161-11	CERAMIC CHIP	0.0022MF	10%	50V
C210	1-162-638-11	CERAMIC CHIP	1MF		16V	C356	1-124-779-00	ELECT	10MF	20%	16V
C211	1-163-009-11	CERAMIC CHIP	0.001MF	10%	50V	C358	1-126-208-11	ELECT	47MF	20%	4V
C212	1-162-638-11	CERAMIC CHIP	1MF		16V	C359	1-126-246-11	ELECT	220MF	20%	4V
C213	1-163-117-00	CERAMIC CHIP	100PF	5%	50V	C360	1-163-038-00	CERAMIC CHIP	0.1MF		25V
C214	1-163-038-00	CERAMIC CHIP	0.1MF		25V	C361	1-162-638-11	CERAMIC CHIP	1MF		16V
C215	1-126-246-11	ELECT	220MF	20%	4V	C362	1-162-638-11	CERAMIC CHIP	1MF		16V
CN301	1-507-951-11	JACK, EXTERNAL POWER (DC IN 3V)									

Ref.No	Part No.	Description	Ref.No	Part No.	Description
CN302	1-565-663-11	HOUSING, CONNECTOR (FPC) 4P	R108	1-216-845-11	METAL GLAZE 100K 5% 1/16W
CN303	*1-565-369-11	SOCKET, CONNECTOR 3P	R109	1-216-097-00	METAL GLAZE 100K 5% 1/10W
CN304	1-566-682-11	HOUSING, CONNECTOR 6P	R110	1-216-073-00	METAL GLAZE 10K 5% 1/10W
CN305	*1-568-048-11	PIN, CONNECTOR (PC BOARD) 7P	R111	1-216-308-00	METAL GLAZE 4.7 5% 1/10W
CN306	*1-568-050-11	PIN, CONNECTOR (PC BOARD) 9P	R112	1-216-089-00	METAL GLAZE 47K 5% 1/10W
CN351	*1-565-370-11	HOUSING, CONNECTOR 5P	R113	1-216-005-00	METAL GLAZE 15 5% 1/10W
CN352	*1-565-370-11	HOUSING, CONNECTOR 5P	R114	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W
CN355	*1-568-039-11	HOUSING, CONNECTOR 7P	R115	1-216-844-11	METAL GLAZE 82K 5% 1/16W
CN356	*1-568-041-11	HOUSING, CONNECTOR 9P	R116	1-216-295-00	METAL GLAZE 0 5% 1/10W
D301	8-719-100-03	DIODE 1S2835	R117	1-216-821-11	METAL GLAZE 1K 5% 1/16W
D302	8-719-100-03	DIODE 1S2835	R118	1-216-815-11	METAL GLAZE 330 5% 1/16W
D303	8-719-101-23	DIODE 1SS123	R151	1-216-073-00	METAL GLAZE 10K 5% 1/10W
D304	8-719-100-05	DIODE 1S2837	R152	1-216-112-00	METAL GLAZE 430K 5% 1/10W
D305	8-719-101-23	DIODE 1SS123	R153	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W
D351	8-719-951-48	DIODE SLB-24VR3 (REC/BATT)	R154	1-216-089-00	METAL GLAZE 47K 5% 1/10W
D352	8-719-100-03	DIODE 1S2835	R155	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W
HE901	1-543-582-11	HEAD, MAGNETIC (ERASE)	R156	1-216-045-00	METAL GLAZE 680 5% 1/10W
HE902	1-543-582-11	HEAD, MAGNETIC (ERASE)	R157	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W
HRP901	1-543-583-11	HEAD, MAGNETIC (REC/PB)	R201	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W
IC301	8-759-915-90	IC CX20023	R202	1-216-093-00	METAL GLAZE 68K 5% 1/10W
IC302	8-759-805-09	IC CXA1249M	R203	1-216-818-11	METAL GLAZE 560 5% 1/16W
IC303	8-759-802-75	IC LA4533M	R204	1-216-846-11	METAL GLAZE 120K 5% 1/16W
IC351	8-759-701-07	IC NJM2063AM	R205	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W
J1	1-216-296-00	METAL GLAZE 0 5% 1/8W	R206	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
J301	1-566-800-31	JACK (MIC)	R207	1-216-833-11	METAL GLAZE 10K 5% 1/16W
J302	1-562-974-11	JACK (PHONES)	R208	1-216-845-11	METAL GLAZE 100K 5% 1/16W
M901	8-835-339-01	MOTOR, DC U-24A	R209	1-216-097-00	METAL GLAZE 100K 5% 1/10W
Q301	8-729-216-22	TRANSISTOR 2SA1162	R210	1-216-073-00	METAL GLAZE 10K 5% 1/10W
Q302	8-729-402-13	TRANSISTOR XN1501	R211	1-216-308-00	METAL GLAZE 4.7 5% 1/10W
Q303	8-729-402-81	TRANSISTOR XN4501	R212	1-216-089-00	METAL GLAZE 47K 5% 1/10W
Q304	8-729-216-22	TRANSISTOR 2SA1162	R213	1-216-005-00	METAL GLAZE 15 5% 1/10W
Q305	8-729-402-84	TRANSISTOR XN4601	R214	1-216-827-11	METAL GLAZE 3.3K 5% 1/16W
Q306	8-729-271-23	TRANSISTOR 2SC2712	R215	1-216-095-00	METAL GLAZE 82K 5% 1/10W
Q307	8-729-271-23	TRANSISTOR 2SC2712	R216	1-216-295-00	METAL GLAZE 0 5% 1/10W
Q308	8-729-402-81	TRANSISTOR XN4501	R217	1-216-821-11	METAL GLAZE 1K 5% 1/16W
Q309	8-729-807-87	TRANSISTOR 2SB1295-UL6	R218	1-216-815-11	METAL GLAZE 330 5% 1/16W
Q310	8-729-402-13	TRANSISTOR XN1501	R251	1-216-073-00	METAL GLAZE 10K 5% 1/10W
Q311	8-729-403-17	TRANSISTOR XN1215	R252	1-216-112-00	METAL GLAZE 430K 5% 1/10W
Q312	8-729-216-22	TRANSISTOR 2SA1162	R253	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W
Q313	8-729-402-13	TRANSISTOR XN1501	R254	1-216-089-00	METAL GLAZE 47K 5% 1/10W
Q314	8-729-900-52	TRANSISTOR DTC114YK	R255	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W
Q315	8-729-402-13	TRANSISTOR XN1501	R256	1-216-045-00	METAL GLAZE 680 5% 1/10W
Q351	8-729-159-64	TRANSISTOR 2SD596	R257	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W
Q352	8-729-403-17	TRANSISTOR XN1215	R301	1-216-049-00	METAL GLAZE 1K 5% 1/10W
Q353	8-729-403-17	TRANSISTOR XN1215	R302	1-216-070-00	METAL GLAZE 7.5K 5% 1/10W
Q354	8-729-216-22	TRANSISTOR 2SA1162	R303	1-216-855-11	METAL GLAZE 680K 5% 1/16W
Q355	8-729-216-22	TRANSISTOR 2SA1162	R304	1-216-073-00	METAL GLAZE 10K 5% 1/10W
Q356	8-729-271-23	TRANSISTOR 2SC2712	R305	1-216-083-00	METAL GLAZE 27K 5% 1/10W
Q357	8-729-402-13	TRANSISTOR XN1501	R306	1-216-041-00	METAL GLAZE 470 5% 1/10W
Q358	8-729-216-22	TRANSISTOR 2SA1162	R307	1-216-837-11	METAL GLAZE 22K 5% 1/16W
Q359	8-729-271-23	TRANSISTOR 2SC2712	R308	1-216-833-11	METAL GLAZE 10K 5% 1/16W
Q360	8-729-900-52	TRANSISTOR DTC114YK	R309	1-216-041-00	METAL GLAZE 470 5% 1/10W
Q361	8-729-216-22	TRANSISTOR 2SC2712	R310	1-216-833-11	METAL GLAZE 10K 5% 1/16W
		<u>RESISTOR</u>	R311	1-216-833-11	METAL GLAZE 10K 5% 1/16W
R101	1-216-061-00	METAL GLAZE 3.3K 5% 1/10W	R312	1-216-813-11	METAL GLAZE 220 5% 1/16W
R102	1-216-843-11	METAL GLAZE 68K 5% 1/16W	R313	1-216-073-00	METAL GLAZE 10K 5% 1/10W
R103	1-216-818-11	METAL GLAZE 560 5% 1/16W	R314	1-216-055-00	METAL GLAZE 1.8K 5% 1/10W
R104	1-216-846-11	METAL GLAZE 120K 5% 1/16W	R315	1-216-057-00	METAL GLAZE 2.2K 5% 1/10W
R105	1-216-825-11	METAL GLAZE 2.2K 5% 1/16W	R316	1-216-829-11	METAL GLAZE 4.7K 5% 1/16W
R106	1-216-206-00	METAL GLAZE 2.2K 5% 1/8W	R317	1-216-081-00	METAL GLAZE 22K 5% 1/10W
R107	1-216-833-11	METAL GLAZE 10K 5% 1/16W	R318	1-216-097-00	METAL GLAZE 100K 5% 1/10W
			R319	1-216-109-00	METAL GLAZE 330K 5% 1/10W
			R320	1-216-097-00	METAL GLAZE 100K 5% 1/10W
			R321	1-216-049-00	METAL GLAZE 1K 5% 1/10W
			R322	1-216-073-00	METAL GLAZE 10K 5% 1/10W

Ref.No	Part No.	Description			
R323	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R324	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R325	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R326	1-216-037-00	METAL GLAZE	330	5%	1/10W
R327	1-216-121-00	METAL GLAZE	1M	5%	1/10W
R328	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R329	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R330	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R331	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R332	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R333	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R334	1-216-119-00	METAL GLAZE	820K	5%	1/10W
R336	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R337	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R338	1-216-845-11	METAL GLAZE	100K	5%	1/16W
R339	1-216-797-11	METAL GLAZE	10	5%	1/16W
R352	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R355	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R356	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R357	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R358	1-216-065-00	METAL GLAZE	4.7K	5%	1/10W
R359	1-216-001-00	METAL GLAZE	10	5%	1/10W
R360	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R361	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R362	1-216-049-00	METAL GLAZE	1K	5%	1/10W
R363	1-216-037-00	METAL GLAZE	330	5%	1/10W
R364	1-216-051-00	METAL GLAZE	1.2K	5%	1/10W
R365	1-216-017-00	METAL GLAZE	47	5%	1/10W
R366	1-216-041-00	METAL GLAZE	470	5%	1/10W
R367	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R368	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R369	1-216-059-00	METAL GLAZE	2.7K	5%	1/10W
R370	1-216-105-00	METAL GLAZE	220K	5%	1/10W
R371	1-216-057-00	METAL GLAZE	2.2K	5%	1/10W
R372	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R373	1-216-073-00	METAL GLAZE	10K	5%	1/10W
R374	1-216-001-00	METAL GLAZE	10	5%	1/10W
R375	1-216-186-00	METAL GLAZE	330	5%	1/8W
RV2	1-230-979-11	RES. VAR. CARBON (MANUAL TUNING)	100K		
RV102	1-238-147-11	RES. VAR. CARBON	100K/100K/100K (PRESET)		
RV301	1-238-172-11	RES. VAR. CARBON	10K/10K (VOL)		
S301	1-571-277-11	SWITCH, SLIDE (PB EQ)			
S302	1-570-259-11	SWITCH, SLIDE			
S303	1-571-506-21	SWITCH, SLIDE (DBB)			
S304	1-571-149-11	SWITCH, LEAF			
S305	1-571-275-11	SWITCH, SLIDE (DOLBY)			
S351	1-571-506-21	SWITCH, SLIDE (ISS)			
S352	1-571-149-11	SWITCH, LEAF			
S701	1-571-759-11	SWITCH, SLIDE			
T301	1-409-445-11	COIL, TRAP			
T351	1-433-249-00	TRANSFORMER, BIAS OSCILLATOR			

Ref.No	Part No.	Description
ACCESSORY & PACKING MATERIAL		
X-3346-549-1		CASE ASSY, CARRYING
1-542-116-11		MICROPHONE
3-341-755-01		CARDBOARD
*3-347-883-01		(AF67 ; US)....INDIVIDUAL CARTON
*3-347-887-01		(AF67, canadian)....INDIVIDUAL CARTON
*3-347-888-01		(BF67)....INDIVIDUAL CARTON
3-347-892-01		STAND, MICROPHONE
3-701-622-00		(AF67 ; US/BF67 ; WG)....BAG, POLYETHYLENE
3-786-677-11		(AF67 ; Canadian/BF67)....MANUAL, INSTRUCTION
3-786-677-21		(AF67 ; US)....MANUAL, INSTRUCTION
3-786-677-41		(BF67 ; WG, IT)....MANUAL, INSTRUCTION
8-952-260-91		(AF67/BF67 ; UK, AEP)....HEADPHONE MDR-W10L/B SET
8-952-350-90		(BF67 ; E)....HEADPHONE MOR-E454 SET