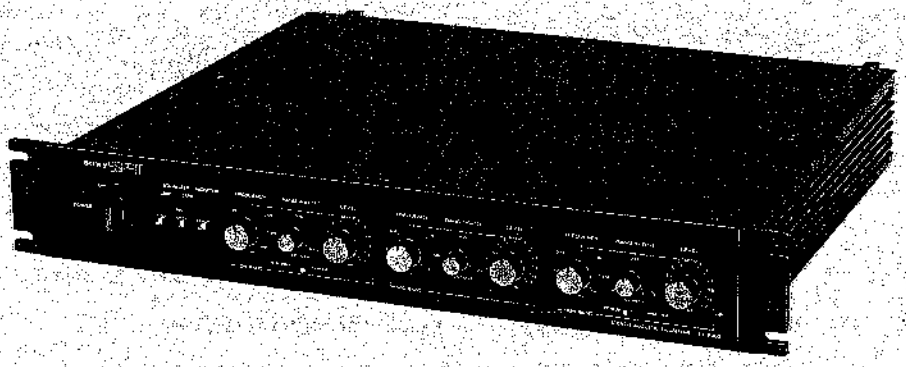
453

SE-P900

US Model
AEP Model
UK Model



STEREO ACOUSTIC EQUALIZER

SPECIFICATIONS

System	Variable state filter (unit amp : 2-stage differential amp + SEPP output)
Inputs	Sensitivity 150 mV, Impedance 50 kilohms (for rated output)
Maximum input level	7.0 volts
Outputs	Rated output 150 mV, Impedance 100 ohms (Gain 0 dB)
Harmonic distortion	less than 0.01% at 1 volt output
Frequency response	5 Hz – 100 kHz $^{+0}_{-3}$ dB (with all LEVEL controls at DEFEAT position)
Signal-to-noise ratio	Greater than 84 dB (at 150 mV input, closed circuit, IHF-A network) Greater than 100 dB (at 1 volt input, closed circuit, IHF-A network)
Power requirements	US model : 120 V ac, 60 Hz AEP, UK models : 110, 120, 220, or 240 V ac selectable, 50/60 Hz
Power consumption	11 watts
Dimensions	Approx. 480 × 80 × 400 mm (w/h/d) (18⁷/₈ × 3¹/₈ × 15⁷/₈ inches) including projecting parts and controls
Weight	Approx. 8.1 kg (17 lbs 14 oz), net Approx. 10 kg (22 lbs), in shipping carton
Functions	
Peaking	Center frequencies LOW 30 – 600 Hz MID 200 – 5,300 Hz HIGH 800 – 15,000 Hz Bandwidth 0.15 – 1.0 octave Level ±12 dB
Shelving	Turn over frequencies (frequency point at 3 dB from the level set) LOW 30 – 600 Hz HIGH 800 – 15,000 Hz Level ±12 dB

SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY SHADING AND MARK ⚠ ON THE SCHEMATIC DIAGRAMS, EXPLODED VIEWS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

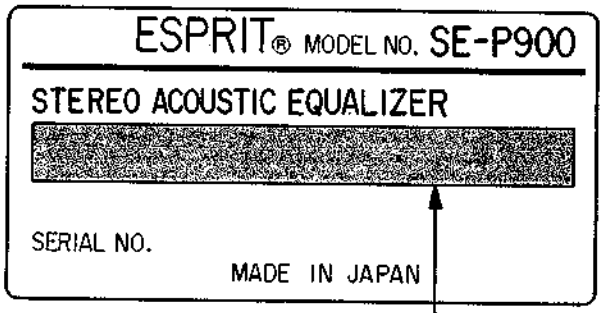
MICROFILM

SONY®
SERVICE MANUAL

2241

MODEL IDENTIFICATION

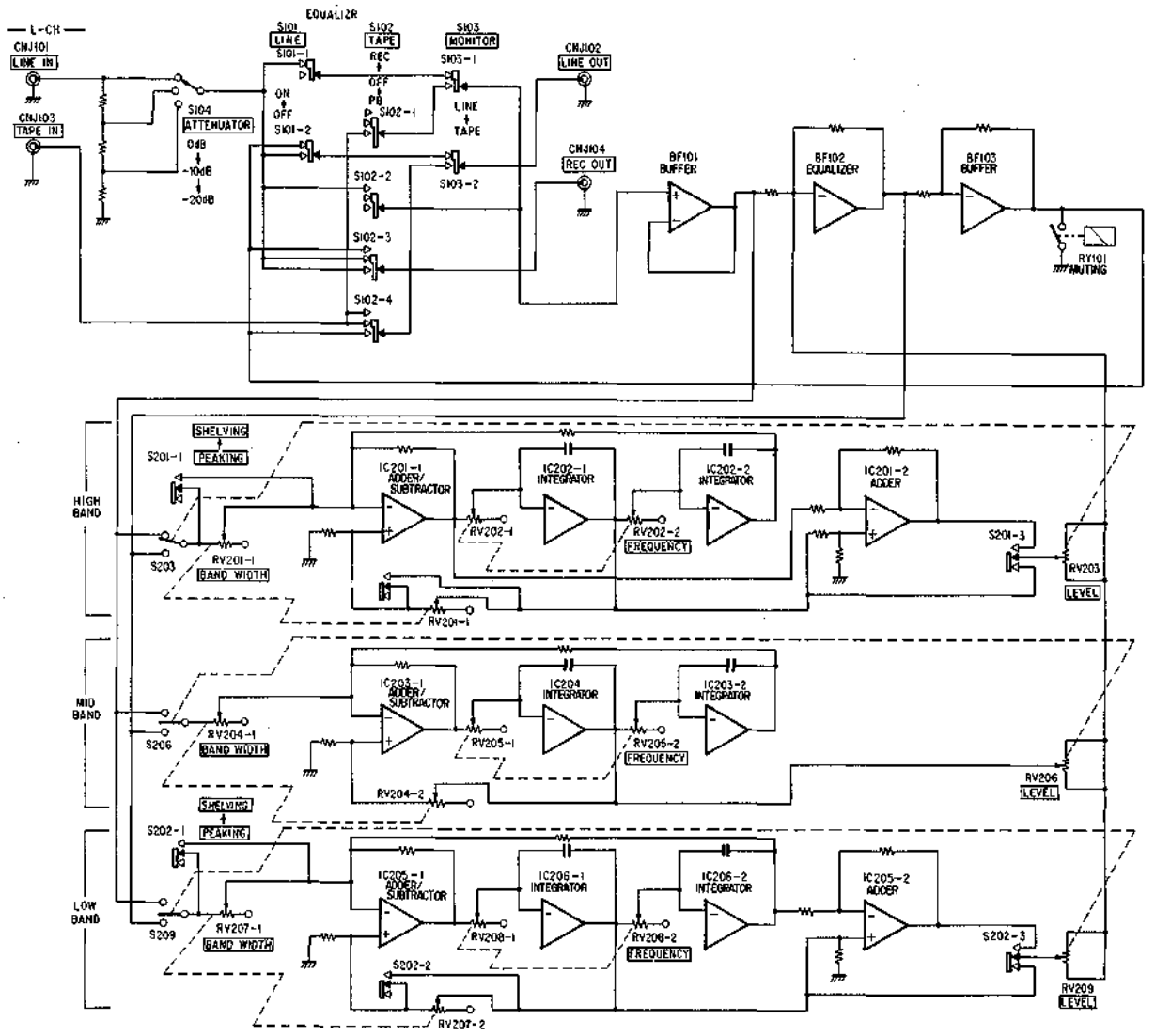
– Specification Label –

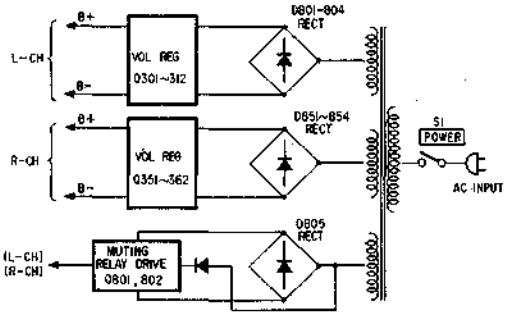


US model:	AC: 120V	60Hz	11W
AEP model:	AC: 220V	50/60Hz	11W
UK model:	AC: 240V	50/60Hz	11W

SECTION 1
OUTLINE

1-1. BLOCK DIAGRAM





1-2. CIRCUIT DESCRIPTION

ACOUSTIC EQUALIZER

The device commonly used to improve on acoustic response is a graphic equalizer. This divides the audio frequency range into 8–24 narrow bands, and raises and lowers the response curve at each point in order to obtain a flat overall response at the listening position. In other words, with a graphic equalizer, there are many adjustment positions established, some of which are assigned to correcting specified bands, leaving idle those not assigned to correction, resulting in poor efficiency.

However, if a great many adjustment positions are not established, frequency points which should be corrected will not match with an adjustment position, and proper correction cannot be performed.

The SE-P900 acoustic equalizer has only 3 adjustment positions: LOW, MID and HIGH. However, the center frequency with peaking characteristic can be adjusted continuously over a wide frequency range (LOW: 30 – 600Hz, MID: 200 – 5.3kHz, HIGH: 800 – 15kHz) so the frequency to be corrected can be accurately matched to adjustment points. In addition, the three bands overlap each other, so it is easier to adjust frequencies between the bands, near the edges.

Level adjustment and band width adjustment can also be performed at each position. In the same way as frequency adjustment, level and band width adjustment can be changed continuously within the range. Also, each adjustment can be operated completely independently. This prevents an unrelated value of the parameter from changing when performing another adjustment. Therefore, by using these 3 adjustment functions, a free correction curve can be created.

One other feature is that in the LOW and HIGH bands, shelving characteristic and peaking characteristic can be switched. This is a butterfly curve which is the same as tone control in conventional amps, and allows much more distinct shading because of the frequency adjustment feature.

VARIABLE STATE FILTER

SE-P900 employs an active filter called the variable state filter. The variable state filter consists of three operational amplifiers with add-subtract and integrator circuits. The block diagram is shown in Figure 1. With this circuit, the 2nd degree function outputs of the HPF (High Pass Filter), BPF (Band Pass Filter) and LPF (Low Pass Filter) can be used to establish the center frequency of (cut-off frequency in the case of HPF, LPF) and Q simply by changing the specified resistance value.

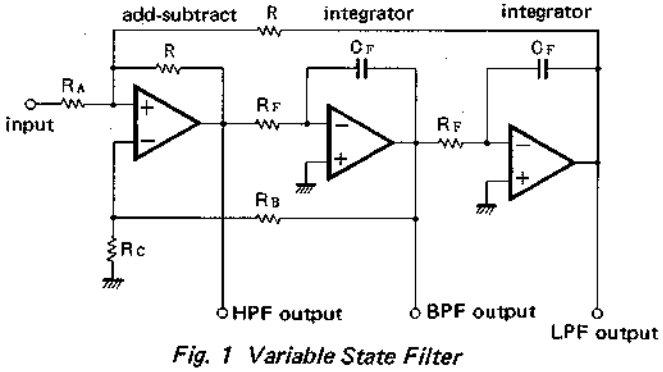


Fig. 1 Variable State Filter

In SE-P900, one variable state filter is incorporated in each section – HIGH BAND, MID BAND and LOW BAND. Also, a filter is inserted in the input and NF circuits of the equalizer stage to obtain the desired response.

FREQUENCY ADJUSTMENT

Frequency adjustment changes the response of the center frequency fo in the variable state filter. fo is given as $fo = \frac{1}{2\pi \cdot C_F \cdot R_F}$ and the 2 R_Fs are changed by the interlocking control knobs.

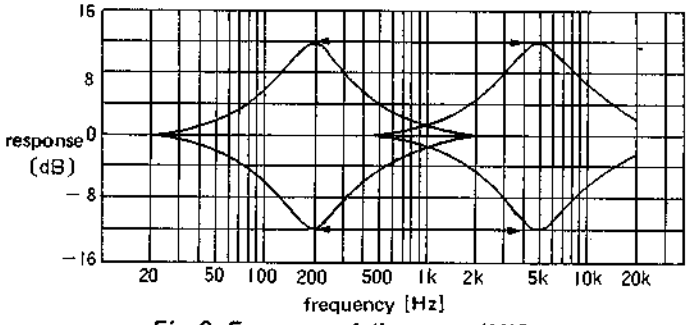


Fig. 2 Frequency Adjustment (MID BAND)

BAND WIDTH ADJUSTMENT

Band width adjustment changes the Q response of the variable state filter.

Q is given as $Q = \frac{R_A}{R}$ when $\begin{cases} R_A = R_B \\ R_C = R/2 \end{cases}$ and R_A and R_B are changed by interlocking control.

The band width (3dB from the peak) in this model can be adjusted between 0.15 – 1.0 octave.

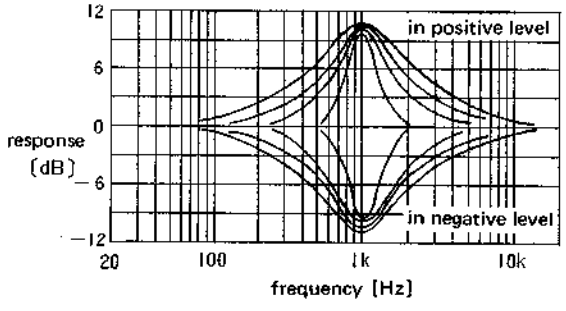


Fig. 3 Band Width Adjustment

LEVEL ADJUSTMENT

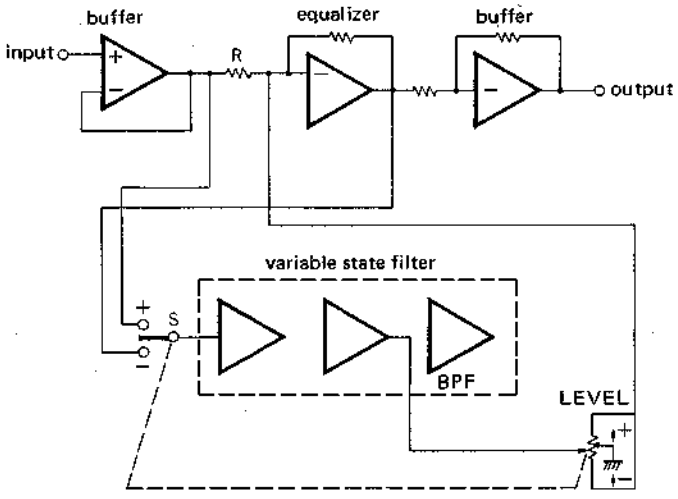


Fig. 4 Level Control Circuit

The LEVEL control knob is linked with switch S. As shown in Figure 4, when the LEVEL control knob is at the center (DEFEAT) the BPF output is grounded and S is neutral. At this time the equalizer stage separates from the filter and response becomes flat. When the control knob is on the positive side, S connects to the positive side and the filter becomes an input circuit and boosted according to the control knob position. When the control knob is on the negative side, S is connected to the negative side, the filter becomes an NF circuit and NF is applied and the output level is decreased according to the control knob position.

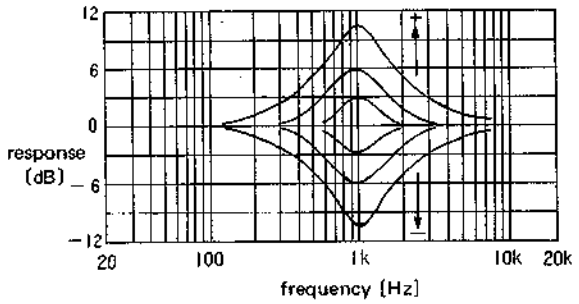


Fig. 5 Level Adjustment

SHELVING CHARACTERISTIC

For HIGH BAND, the SHELVING characteristic is composed of the addition of BPF response output from the Variable State Filter and the HPF response output (LPF response for LOW BAND). (See Figure 6)

The BPF response output results in smooth coupling with the MID BAND, and the HPF response output creates a flat response at the high end. For SHELVING characteristic the level and the frequency can be changed continuously, the same as for PEAKING characteristic, but BAND WIDTH is fixed at the appropriate value.

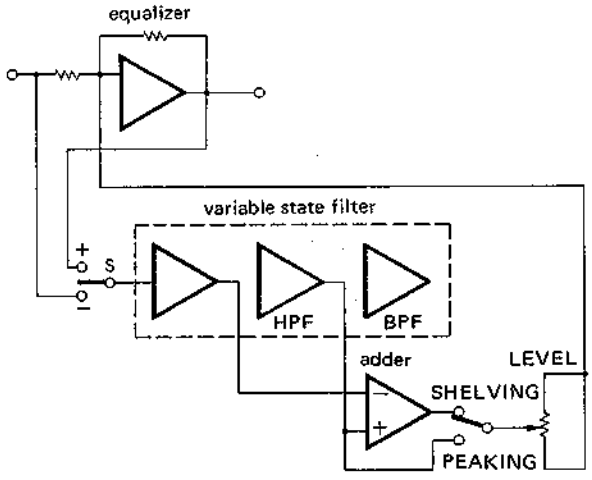


Fig. 6 Shelving Response Circuit (HIGH BAND)

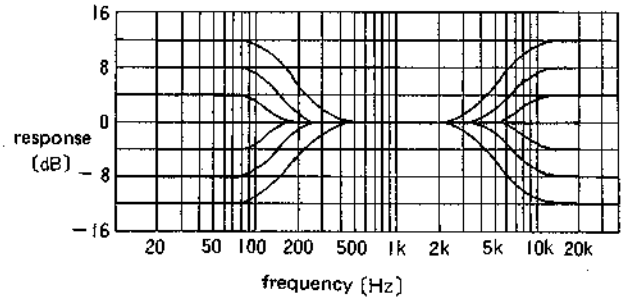


Fig. 7 Shelving Response

BUFFER UNIT (BF)

A great deal of effort has gone into the SE-P900, so as to prevent poor S/N and deterioration in sound quality when using a graphic equalizer in an audio system.

One result is the buffer unit employed in the buffer and equalizer stages. The circuitry of the buffer unit is shown in Figure 8.

The initial stage is a junction FET cascode connection differential amp with constant currect source. It reduces the high range distortion resulting from nonlinearity in the FET feedback capacity, because of the high input impedance and the cascode connection. The FET uses a dual cascode connection with excellent pair response to suppress temperature drift.

The second stage is a Miller current loaded differential amp composed of bipolar transistors, which provides high linearity response and power rejection response.

The final stage is a pure complementary emitter-follower SEPP output which provides low impedance output and high linearity response.

The buffer unit circuit allows 100% NF, and is employed as gain 1 (during DEFEAT in the equalizer stage) so there is almost no deterioration in sound quality.

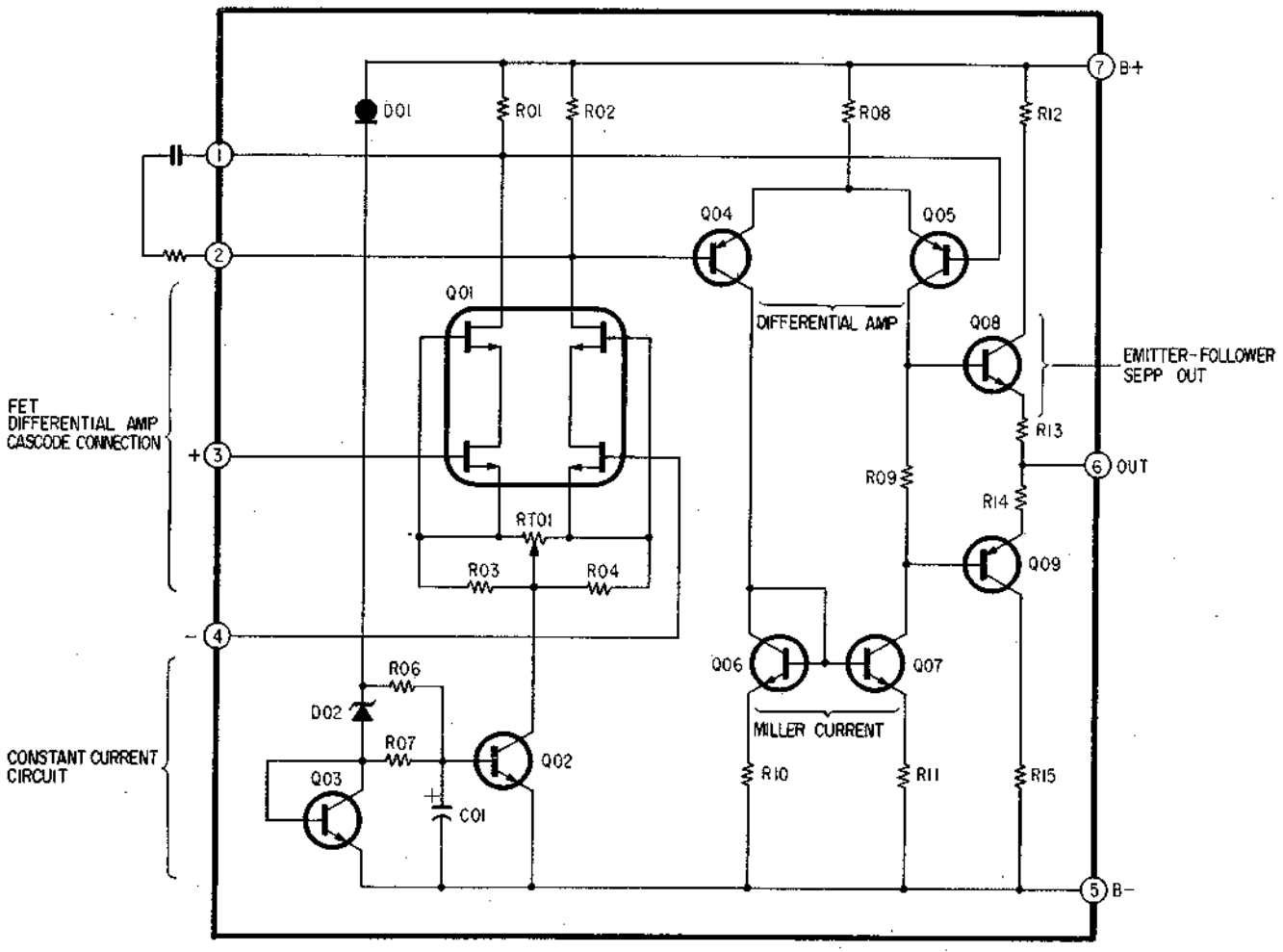
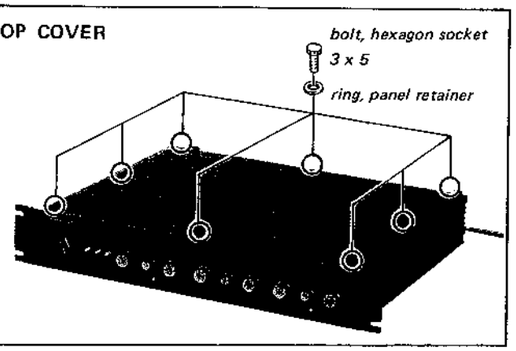


Fig. 8 Buffer Unit Circuit

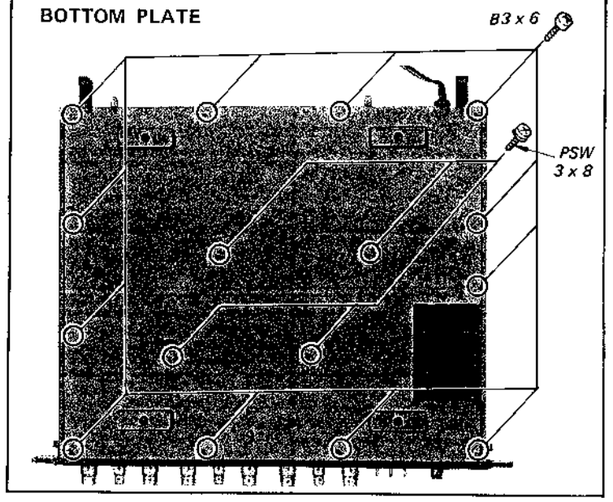
SECTION 2
DISASSEMBLY

Note: Follow the disassembly procedure in the numerical order given.

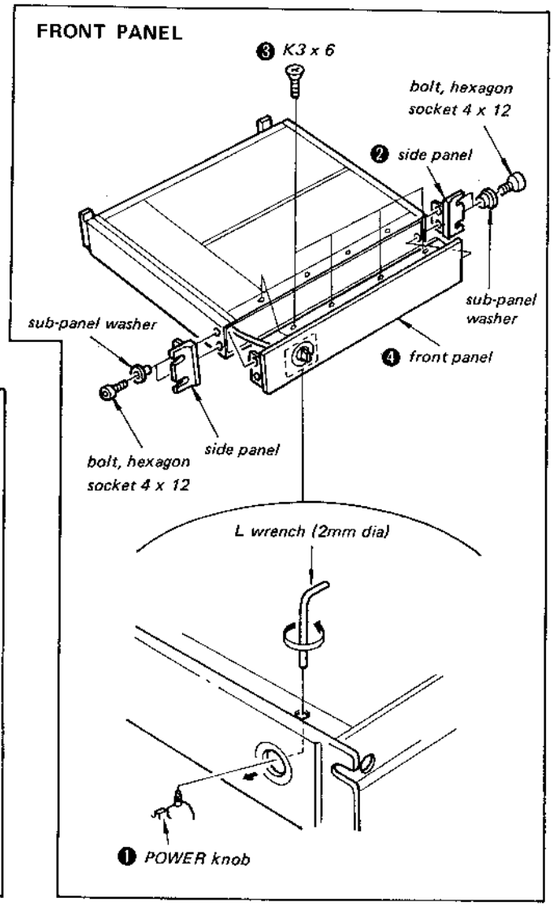
TOP COVER



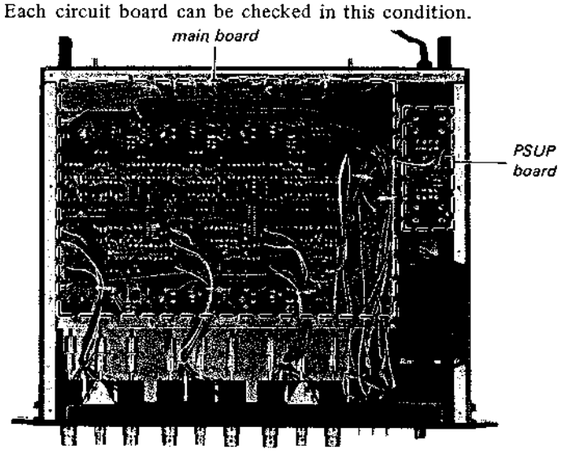
BOTTOM PLATE



FRONT PANEL

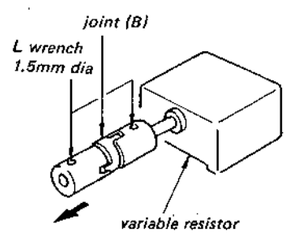


Each circuit board can be checked in this condition.



Precaution in removing joint (B)

Take care not to pull the end of the joint (B) in the direction shown by the arrow.



SECTION 3
ADJUSTMENTS

Offset Adjustment

Setting:

POWER switch:	ON
EQUALIZER LINE:	ON
EQUALIZER TAPE:	OFF
MONITOR:	LINE
LEVEL:	DEFEAT

Procedure:

1. Short the LINE IN jack.
2. Adjust the adjustable resistors (BF101–103, 151–153) in the numerical order given to obtain 0V reading at each test point (TP1–3, 51–53).
   Specification: 0 ±3mV

L-CH	R-CH
❶ BF101 (TP1)	❶ BF151 (TP51)
❷ BF102 (TP2)	❷ BF152 (TP52)
❸ BF103 (TP3)	❸ BF153 (TP53)

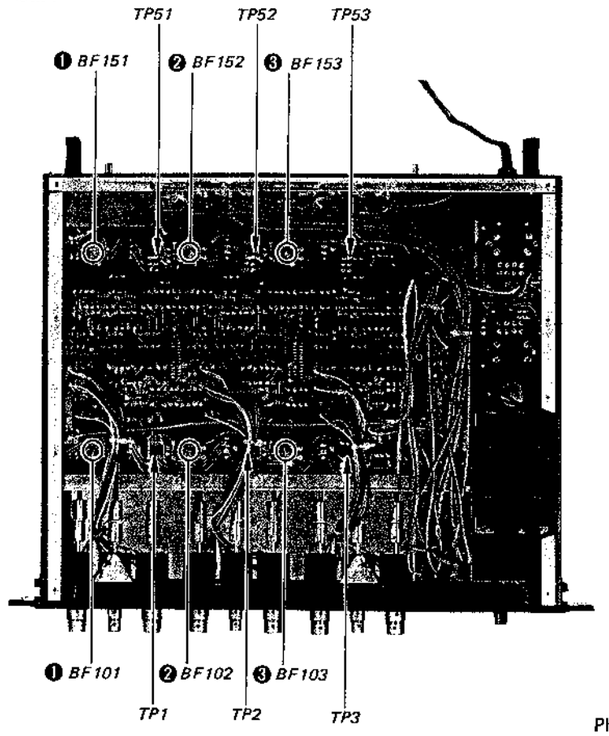


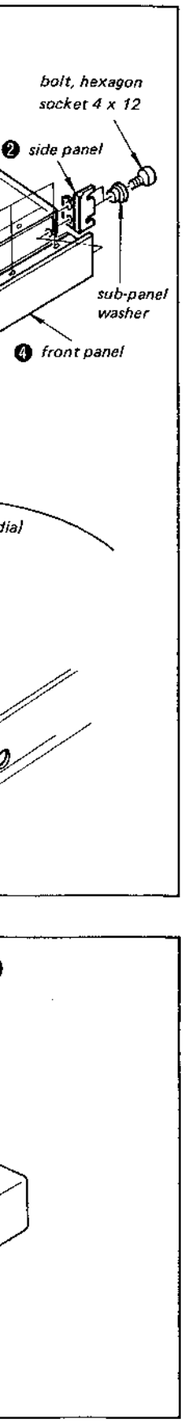
Photo : US model

Muting Time Confirmation

Make sure of the operation of the relays.
The adjustment is not necessary.

1. Power switch: ON
   The relays RY101, 151 should operate 2 or 3 seconds after power switch is turned on.
2. Power switch: OFF
   The relays RY101, 151 should operate at the instant power switch is turned on.

SECTION 3
ADJUSTMENTS



Offset Adjustment

Setting:

POWER switch:	ON
EQUALIZER LINE:	ON
EQUALIZER TAPE:	OFF
MONITOR:	LINE
LEVEL:	DEFEAT

Procedure:

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   Specification: 0 ±3mV

L-CH	R-CH
❶ BF101 (TP1)	❶ BF151 (TP51)
❷ BF102 (TP2)	❷ BF152 (TP52)
❸ BF103 (TP3)	❸ BF153 (TP53)

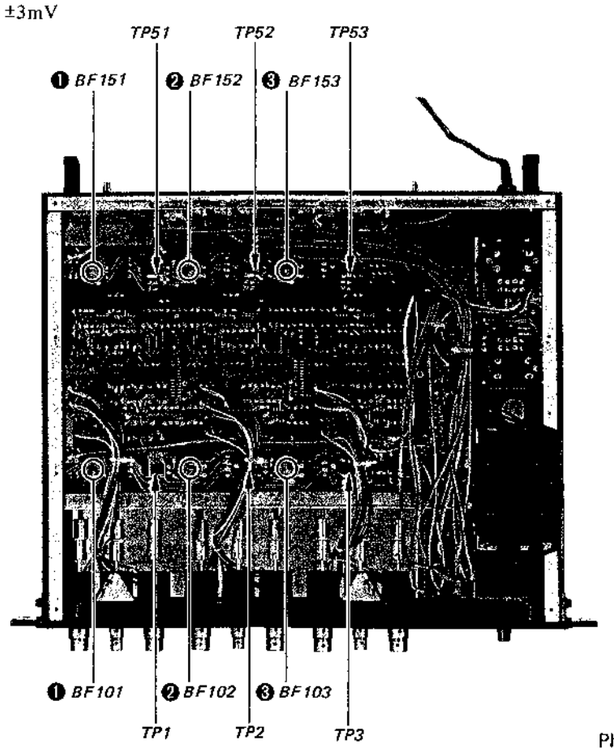


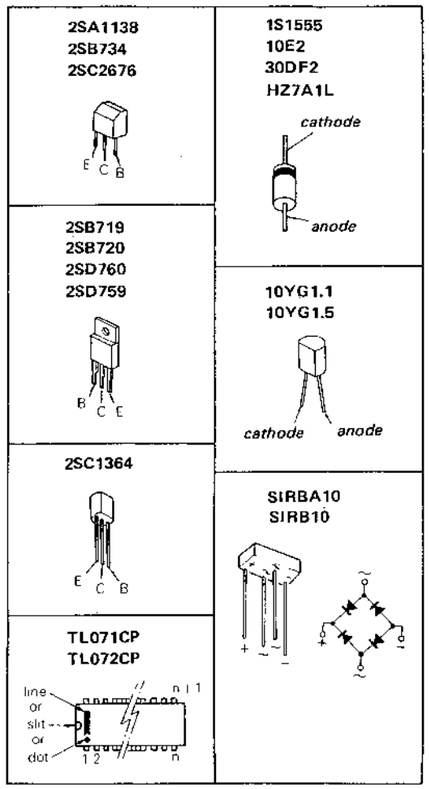
Photo : US model

Muting Time Confirmation

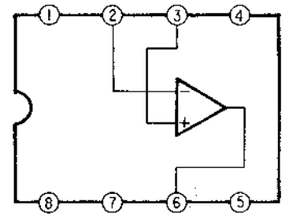
Make sure of the operation of the relays.
The adjustment is not necessary.

1. Power switch: ON
   The relays RY101, 151 should operate 2 or 3 seconds after power switch is turned on.
2. Power switch: OFF
   The relays RY101, 151 should operate at the instant power switch is turned on.

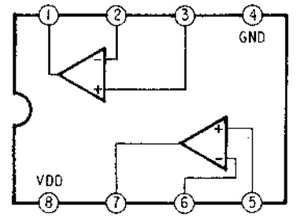
Semiconductor Lead Layouts



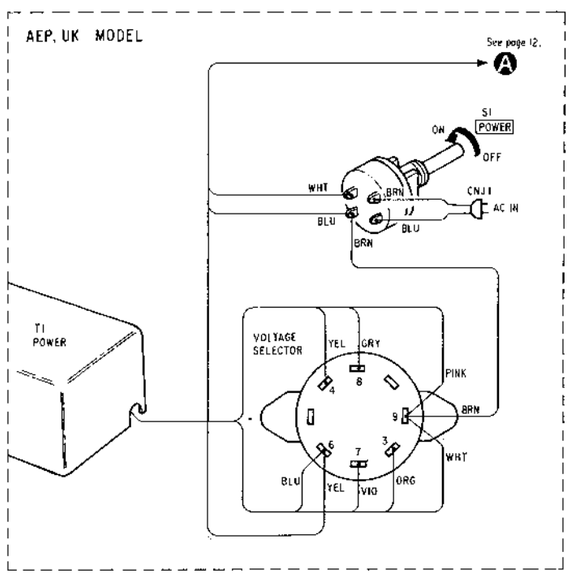
IC204,254 TL071CP



IC201, 202, 203, 205, 206
251, 252, 253, 255, 256
TL072CP



Power Transformer Section



RV	RV253 RV203	RV251 RV201	RV252 RV202	RV256 RV206	RV254 RV204	RV255 RV205	RV25 RV20

【ATTENUATOR BOARD】

【PIN JACK BOARD】

【MAIN BOARD】

: SOLDERING CONNECTION

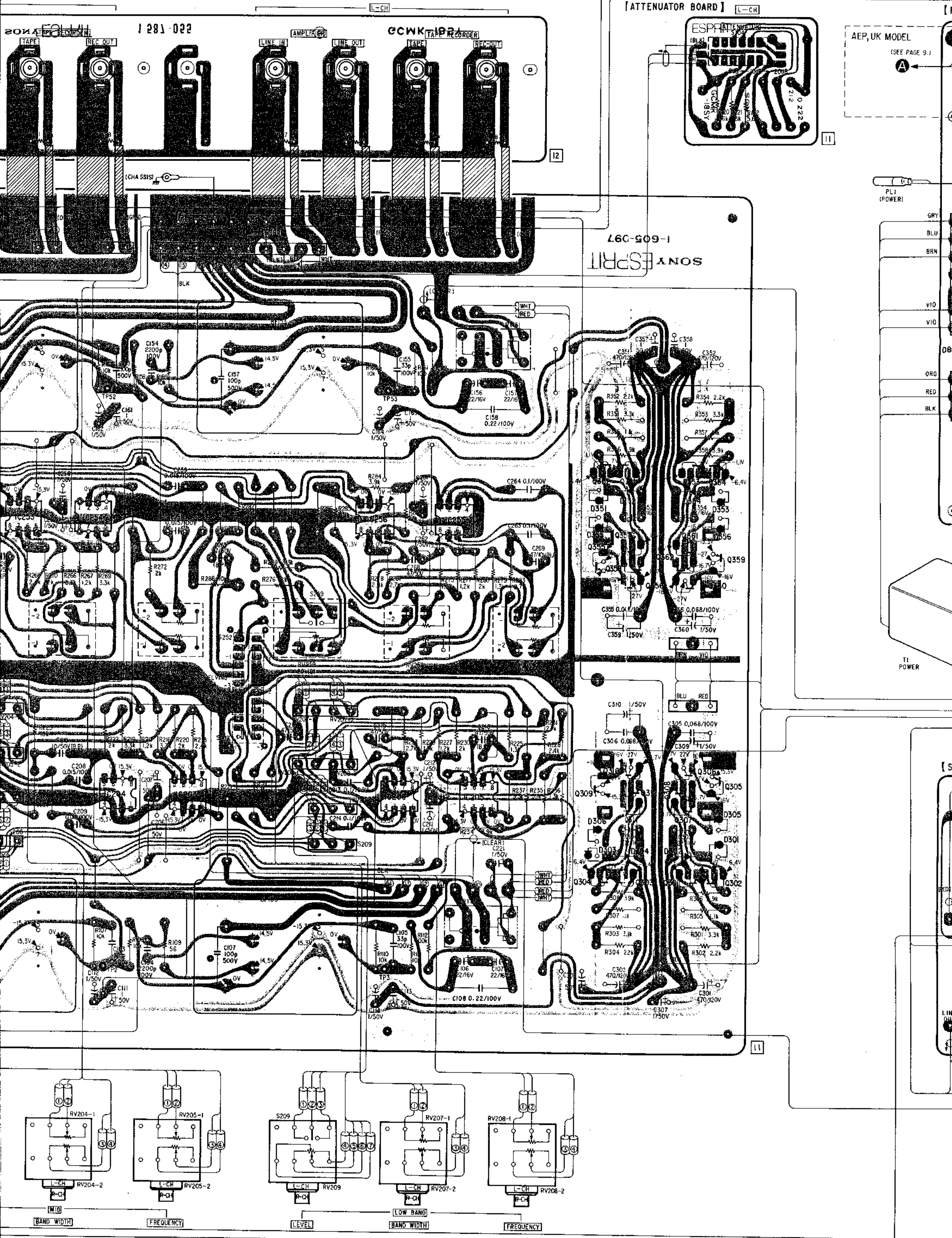
RV254
RV204

RV255
RV205

RV259
RV209

RV257
RV207

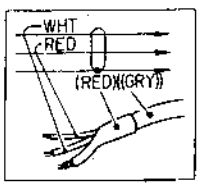
RV258
RV208



RV257 RV207	RV258 RV208	RV

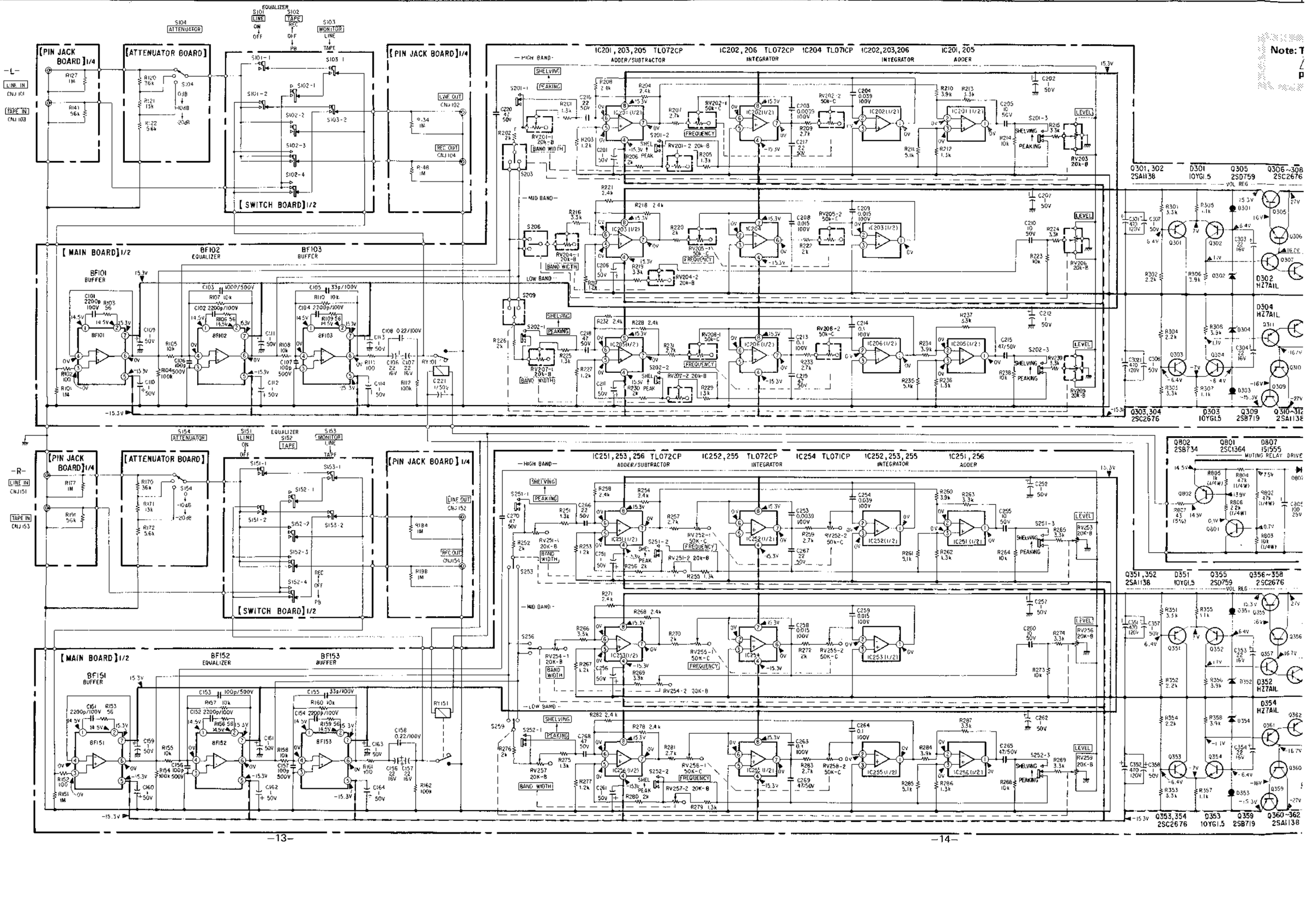
Note:

- Color code of sleeving over the end of the jacket.



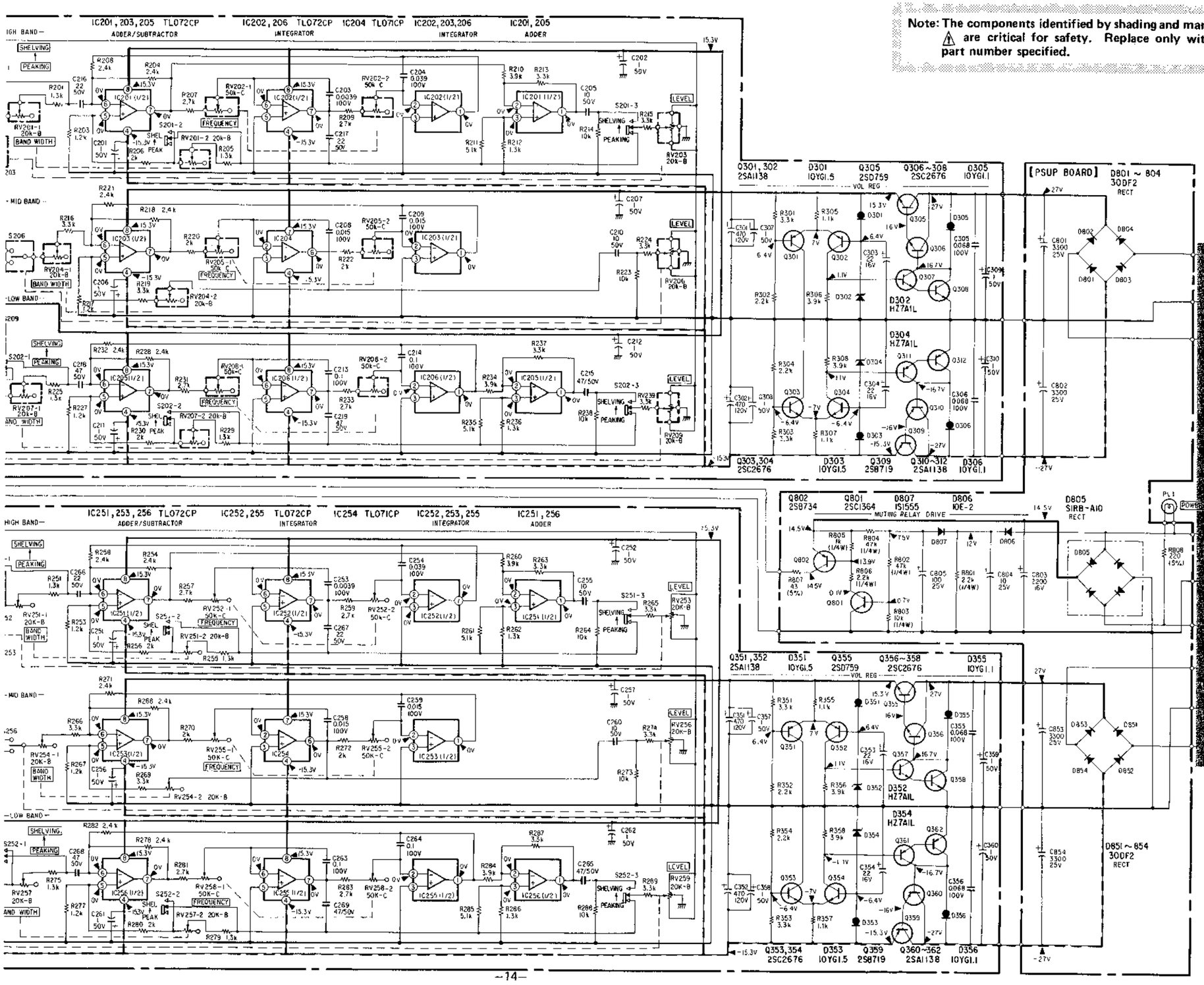
- : B + pattern

4-2. SCHEMATIC DIAGRAM



D E F G H I J K

1 2 3 4 5



Note: The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

Note:

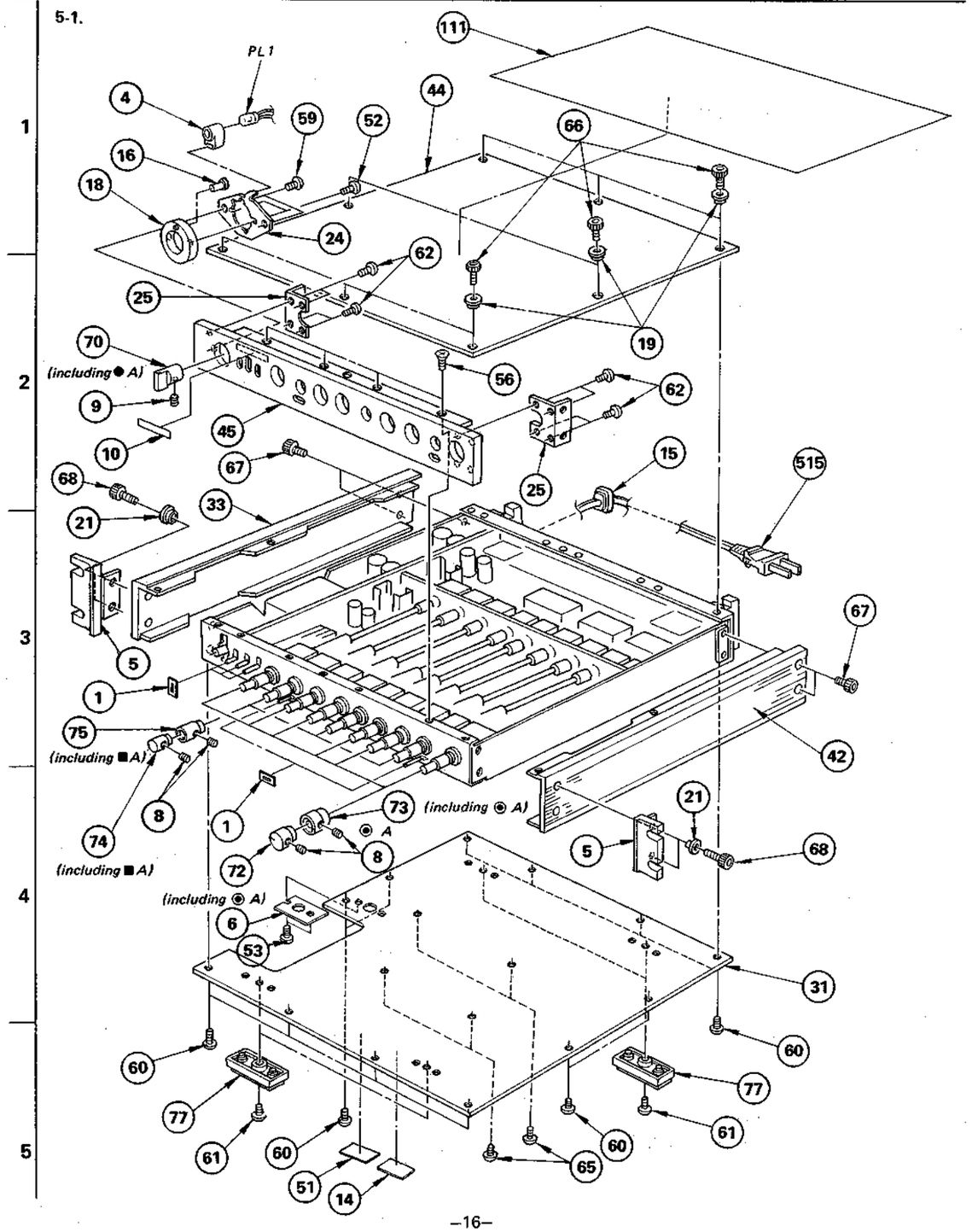
- All resistors tolerance are 1% unless otherwise noted.
- All capacitors are in μF unless otherwise noted. pF : μμF 50WV or less are not indicated except for electrolytics and tantalums.
- All resistors are in ohms, ½W unless otherwise noted. kΩ : 1000 Ω, MΩ : 1000 kΩ
- ▭ : panel designation.
- ——— : B+ bus.
- – – – : B- bus.
- Voltages are dc with respect to ground unless otherwise noted.
- Readings are taken under no-signal conditions.
- Switch

Ref. No.	Switch	Position
S101, 151	EQUALIZER LINE	ON
S102, 152	EQUALIZER TAPE	OFF
S103, 153	MONITOR	LINE
S104, 154	ATTENUATOR	0dB
S201, 251	PEAKING — SHELVING	PEAKING
S203, 253	HIGH BAND LEVEL	DEFEAT
S206, 256	MID BAND LEVEL	DEFEAT
S209, 259	LOW BAND LEVEL	DEFEAT

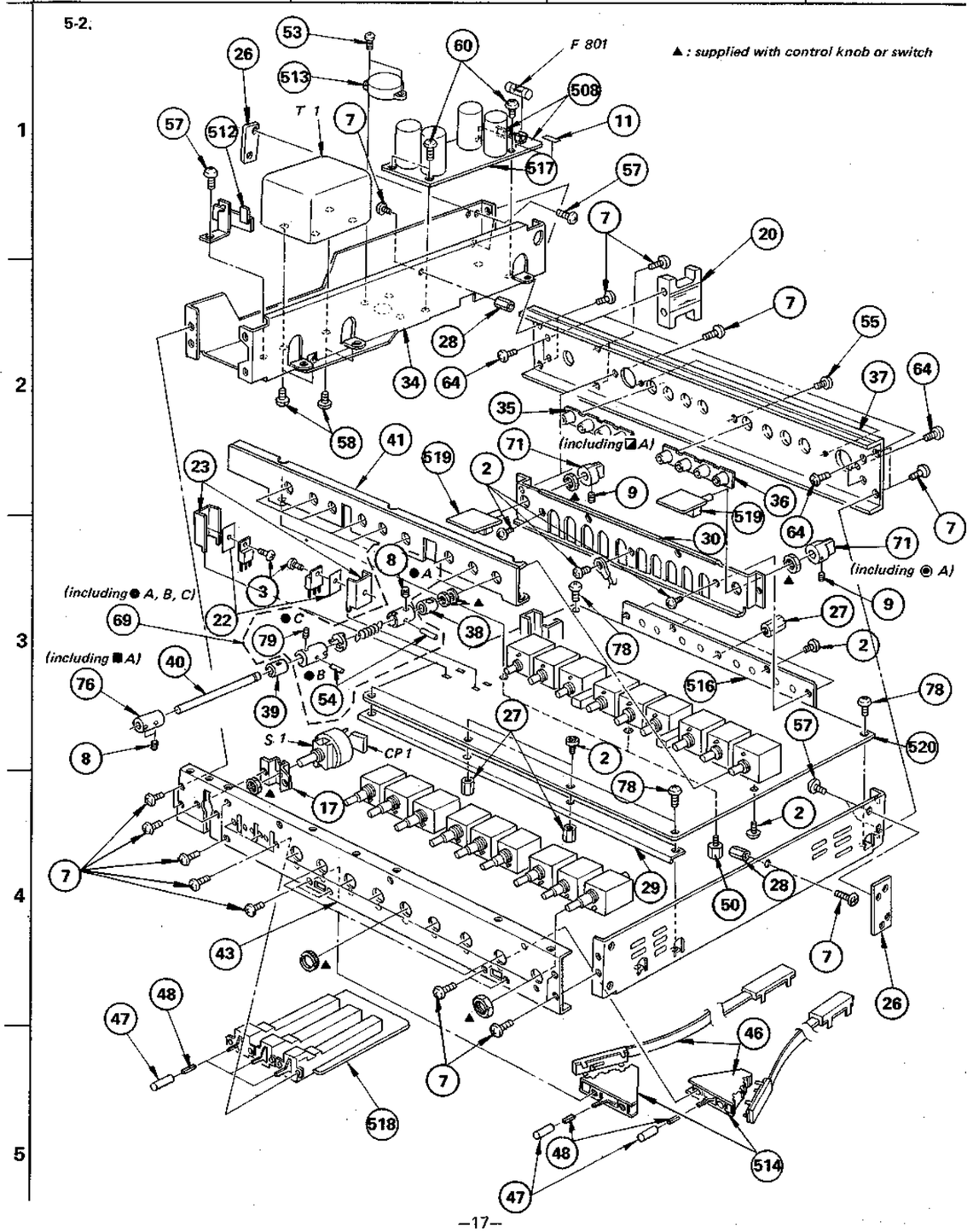
Note: Voltages are measured with a VOM (50kΩ/V).

SECTION 5
EXPLODED VIEWS AND PARTS LIST

5-1.



5-2.



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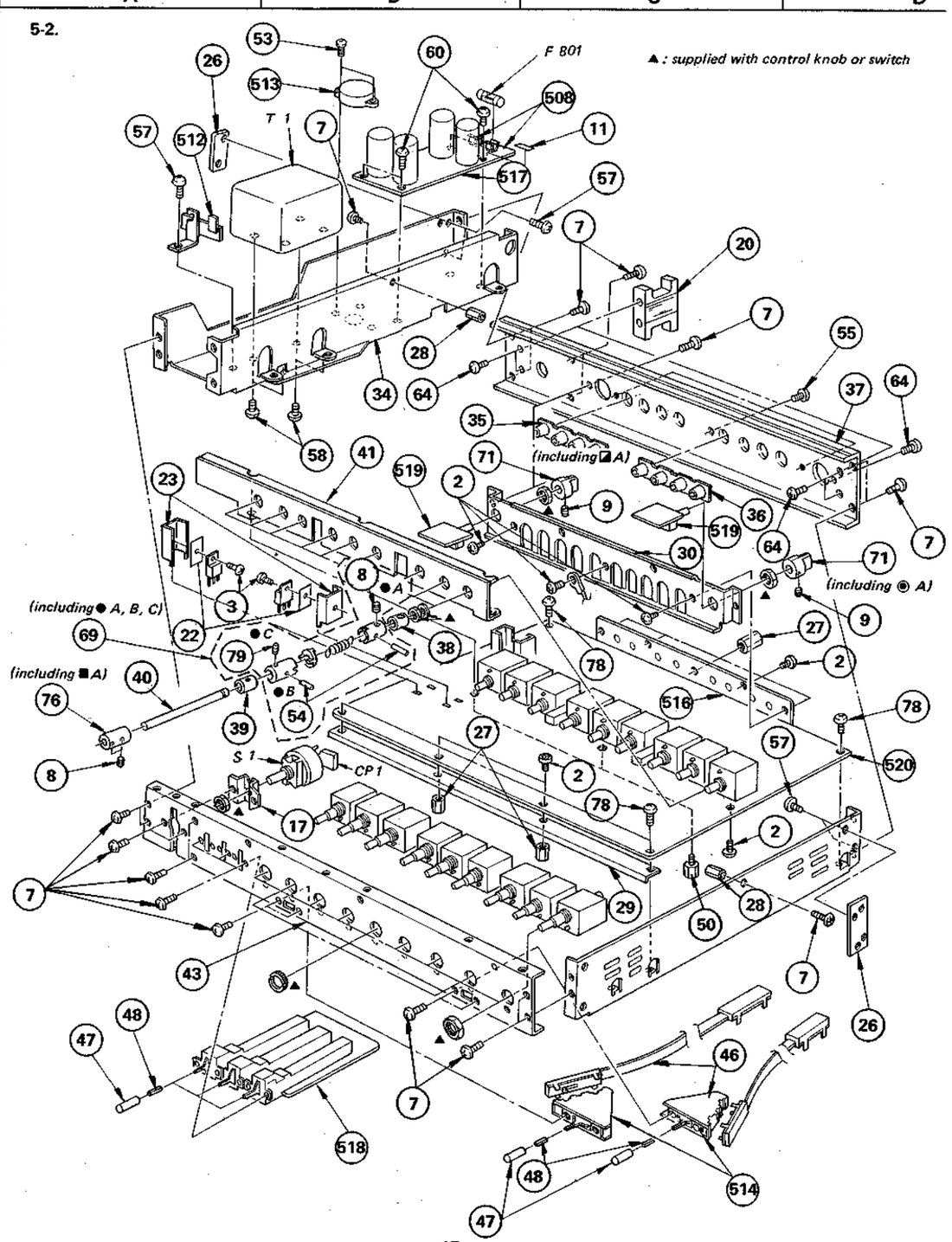
5-2.



GENERAL SECTION

No.	Part No.	Description
1	2-047-106-00	SHADE
2	2-259-121-00	SCREW, TR
3	2-259-121-11	SCREW, TR
4	3-534-276-11	HOLDER, LAMP
5	3-565-754-21	PANEL, SIDE
6 ♦	3-565-791-00	(AEP,UK)...SCALE, DIAL, VOLTAGE SELECTION
7	3-701-429-21	SCREW, +B 3X5, PAWL
8	3-701-505-00	SET SCREW, DOUBLE POINT 3X3
9	3-701-510-00	SET SCREW, DOUBLE POINT 4X4
10	3-701-690-00	(UK)...LABEL (MADE IN JAPAN)
11	3-701-948-14	(AEP,UK)...LABEL, FUSE
12	.....	
13	.....	
14	3-703-114-01	(US).....LABEL, CAUTION
14	3-703-043-21	(UK).....LABEL, CAUTION
15	3-701-280-00	(US).....STOPPER, CORD
15	4-849-786-00	(AEP,UK)...STOPPER, CORD
16	4-852-925-00	LENS, POWER LAMP
17 ♦	4-854-407-00	BRACKET, PSW
18	4-870-204-00	ORNAMENT, SWITCH (B)
19	4-870-210-00	RING, PANEL RETAINER
20	4-870-213-00	BLOCK, GUARD
21	4-870-232-00	WASHER, SUB PANEL
22	4-870-272-00	HEAT SINK
23 ♦	4-870-273-00	HEAT SINK (E)
24 ♦	4-876-601-00	STOPPER, RING
25 ♦	4-876-602-00	BRACKET, PANEL
26 ♦	4-876-603-00	CLAMP
27 ♦	4-876-607-00	COLLAR (E), PLATE, JACK
28 ♦	4-876-607-11	COLLAR (E), PLATE, JACK
29 ♦	4-876-610-00	HOLDER (B), PC BOARD
30 ♦	4-876-611-00	RETAINER (B), JACK
31 ♦	4-876-617-00	(US).....PLATE, BOTTOM
31 ♦	4-876-617-11	(AEP,UK)...PLATE, BOTTOM
32 ♦	4-876-620-11	PLATE, SIDE
33	4-876-621-00	PANEL (L), SIDE
34 ♦	4-876-623-11	CHASSIS, POWER
35	4-876-628-01	ORNAMENT, JACK (WHITE)
36	4-876-628-11	ORNAMENT, JACK (RED)
37	4-876-626-11	(US).....PLATE, JACK
37	4-876-639-11	(AEP,UK)....PLATE, JACK
38	4-877-607-00	SPACER, JOINT
39	4-877-607-11	SPACER, JOINT
40 ♦	4-877-608-00	SHAFT (A), JOINT
41 ♦	4-877-609-00	BRACKET (P), CONTROL
42	4-877-611-00	PANEL (R), SIDE
43 ♦	4-877-612-00	CHASSIS (P), SUB
44	4-877-613-00	PLATE, TOP
45	4-877-614-00	PANEL, FRONT

GENERAL SECTION

No.	Part No.	Description
46	4-877-615-00	WIRE
47 ♦	4-877-616-00	CAP, KNOB
48 ♦	4-877-617-00	SPACER, FIXED, KNOB
49	.....	
50	4-877-620-00	SUPPORT (P)
51	4-877-623-00	(AEP)...LABEL, MODEL NUMBER
51	4-877-621-00	(US)....LABEL, MODEL NUMBER
51	4-877-624-00	(UK)....LABEL, MODEL NUMBER
52	7-621-284-00	SCREW +P 2.6X4
53	7-621-775-20	(AEP,UK).....SCREW +B 2.6X5
54	7-626-308-41	SPRING-PIN 1.4X10
55	7-682-147-15	SCREW +P 3X6
56	7-682-247-09	SCREW +K 3X6
57	7-682-544-09	SCREW +B 3X3
58	7-682-545-09	SCREW +B 3X4
59	7-682-546-09	SCREW +B 3X5
60	7-682-547-09	SCREW +B 3X6
61	7-682-548-09	SCREW +B 3X8
62	7-682-559-09	SCREW +B 4X5
63	.....	
64	7-682-662-09	SCREW +PS 4X10
65	7-682-948-09	SCREW +PSW 3X8
66	7-683-402-04	BOLT,HEXAGON SOCKET 3X5
67	7-683-418-04	BOLT,HEXAGON SOCKET 4X6
68	7-683-421-04	BOLT,HEXAGON SOCKET 4X12
69	X-4854-708-0	JOINT (B) ASSY
70	X-4870-208-0	KNOB ASSY
71	X-4870-209-0	KNOB ASSY, F
72	X-4877-602-0	KNOB (A) ASSY, CONTROL
73	X-4877-603-0	KNOB (B) ASSY, CONTROL
74	X-4877-604-0	KNOB (C) ASSY, CONTROL
75	X-4877-605-0	KNOB (D) ASSY, CONTROL
76	X-4877-606-0	BOSS (A) ASSY, JOINT
77	X-4852-903-0	FOOT ASSY
78	7-685-871-09	SCREW +BV 3X6
79	3-701-506-00	SET SCREW, DOUBLE POINT 3X4

ACCESSORY & PACKING MATERIAL

No.	Part No.	Description
101	3-701-616-00	BAG, POLYETHYLENE
102	3-701-623-00	BAG, POLYETHYLENE
103	3-701-630-00	BAG, POLYETHYLENE
104	.....	
105	3-783-606-11	MANUAL, INSTRUCTION
106	4-809-251-00	BAG, POLYETHYLENE
107	4-876-631-00	CUSHION (FRONT)
108	4-876-632-00	CUSHION (REAR)
109	4-876-634-00	INDIVIDUAL CARTON
110	4-877-618-00	LABEL, INDIVIDUAL CARTON
111	4-877-619-00	LABEL, BOARD, TOP
112	7-721-140-60	L-WRENCH (3.0)
113	3-795-279-11	MANUAL, INSTRUCTION

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- 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 numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH

ELECTRICAL PARTS

Ref.No.	Part No.	Description
501	.....	
502	♦;1-508-809-00	BASE POST (14MM) 2P
503	♦;1-508-810-00	14MM BASE POST
504	♦;1-508-811-00	BASE POST (14MM) 4P
505	♦;1-508-812-00	BASE POST (14MM) 5P
506	♦;1-508-815-00	14MM BASE POST
507	♦;1-508-817-00	14MM BASE POST
508	1-533-131-00	(AEP,UK).....HOLDER, FUSE
509	♦;1-535-116-00	TERMINAL
510	♦;1-535-120-00	TERMINAL
511	♦;1-535-364-00	PIN, W RAPPING
512	1-536-392-XX	(US).....L-TYPE TERMINAL STRIP
513	⚠1-552-963-00	(AEP,UK)...SWITCH, POWER/VOLTAGE SELECT
514	1-553-795-00	SWITCH, LEVER SLIDE (REMOTE)
515	⚠1-555-795-00	(AEP,UK)...CORD, POWER
515	⚠1-555-386-00	(US).....CORD, POWER
516	♦;1-587-055-00	PC BOARD, PIN JACK
517	♦;1-605-094-00	PC BOARD, PSUP
518	♦;1-605-098-00	PC BOARD, SWITCH
519	♦;1-605-100-00	PC BOARD, ATTENUATOR
520	♦;A-4375-144-A	MOUNTED PCB, MAIN
BF101	A-4375-145-A	UNIT ASSY, B.F
BF102	A-4375-145-A	UNIT ASSY, B.F
BF103	A-4375-145-A	UNIT ASSY, B.F
BF151	A-4375-145-A	UNIT ASSY, B.F
BF152	A-4375-145-A	UNIT ASSY, B.F
BF153	A-4375-145-A	UNIT ASSY, B.F

C101	1-130-826-00	FILM	2200PF	5%	100V
C102	1-130-826-00	FILM	2200PF	5%	100V
C103	1-107-309-00	MICA	100PF	5%	500V
C104	1-130-826-00	FILM	2200PF	5%	100V
C105	1-107-288-00	MICA	33PF	5%	100V
C106	1-131-520-00	TANTALUM	22MF	20%	16V
C107	1-131-520-00	TANTALUM	22MF	20%	16V
C108	1-130-662-00	FILM	0.22MF	10%	100V
C109	1-131-450-00	TANTALUM	1MF	20%	50V
C110	1-131-450-00	TANTALUM	1MF	20%	50V
C111	1-131-450-00	TANTALUM	1MF	20%	50V
C112	1-131-450-00	TANTALUM	1MF	20%	50V
C113	1-131-450-00	TANTALUM	1MF	20%	50V
C114	1-131-450-00	TANTALUM	1MF	20%	50V
C115	1-107-309-00	MICA	100PF	5%	500V
C116	1-107-309-00	MICA	100PF	5%	500V
C151	1-130-826-00	FILM	2200PF	5%	100V
C152	1-130-826-00	FILM	2200PF	5%	100V
C153	1-107-309-00	MICA	100PF	5%	500V
C154	1-130-826-00	FILM	2200PF	5%	100V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C155	1-107-288-00	MICA	33PF	5%	100V
C156	1-131-520-00	TANTALUM	22MF	20%	16V
C157	1-131-520-00	TANTALUM	22MF	20%	16V
C158	1-130-662-00	FILM	0.22MF	10%	100V
C159	1-131-450-00	TANTALUM	1MF	20%	50V
C160	1-131-450-00	TANTALUM	1MF	20%	50V
C161	1-131-450-00	TANTALUM	1MF	20%	50V
C162	1-131-450-00	TANTALUM	1MF	20%	50V
C163	1-131-450-00	TANTALUM	1MF	20%	50V
C164	1-131-450-00	TANTALUM	1MF	20%	50V
C165	1-107-309-00	MICA	100PF	5%	500V
C166	1-107-309-00	MICA	100PF	5%	500V
C201	1-123-709-00	ELECT	1MF	20%	50V
C202	1-123-709-00	ELECT	1MF	20%	50V
C203	1-130-827-00	FILM	3900PF	5%	100V
C204	1-130-827-00	FILM	3900PF	5%	100V
C205	1-123-831-00	ELECT	10MF	20%	50V
C206	1-123-709-00	ELECT	1MF	20%	50V
C207	1-123-709-00	ELECT	1MF	20%	50V
C208	1-130-828-00	FILM	0.015MF	5%	100V
C209	1-130-828-00	FILM	0.015MF	5%	100V
C210	1-123-831-00	ELECT	10MF	20%	50V
C211	1-123-709-00	ELECT	1MF	20%	50V
C212	1-123-709-00	ELECT	1MF	20%	50V
C213	1-130-830-00	FILM	0.1MF	5%	100V
C214	1-130-830-00	FILM	0.1MF	5%	100V
C215	1-123-643-00	ELECT	47MF	20%	50V
C216	1-123-357-00	ELECT	22MF	20%	50V
C217	1-123-357-00	ELECT	22MF	20%	50V
C218	1-123-643-00	ELECT	47MF	20%	50V
C219	1-123-643-00	ELECT	47MF	20%	50V
C220	1-123-643-00	ELECT	47MF	20%	50V
C221	1-123-709-00	ELECT	1MF	20%	50V
C251	1-123-709-00	ELECT	1MF	20%	50V
C252	1-123-709-00	ELECT	1MF	20%	50V
C253	1-130-827-00	FILM	3900PF	5%	100V
C254	1-130-827-00	FILM	3900PF	5%	100V
C255	1-123-831-00	ELECT	10MF	20%	50V
C256	1-123-709-00	ELECT	1MF	20%	50V
C257	1-123-709-00	ELECT	1MF	20%	50V
C258	1-130-828-00	FILM	0.015MF	5%	100V
C259	1-130-828-00	FILM	0.015MF	5%	100V
C260	1-123-831-00	ELECT	10MF	20%	50V
C261	1-123-709-00	ELECT	1MF	20%	50V
C262	1-123-709-00	ELECT	1MF	20%	50V
C263	1-130-830-00	FILM	0.1MF	5%	100V
C264	1-130-830-00	FILM	0.1MF	5%	100V
C265	1-123-643-00	ELECT	47MF	20%	50V
C266	1-123-357-00	ELECT	22MF	20%	50V
C267	1-123-357-00	ELECT	22MF	20%	50V

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
C268	1-123-643-00	ELECT	47MF	20%	50V
C269	1-123-643-00	ELECT	47MF	20%	50V
C270	1-123-643-00	ELECT	47MF	20%	50V
C301	1-123-624-00	ELECT	470MF	20%	120V
C302	1-123-624-00	ELECT	470MF	20%	120V
C303	1-131-520-00	TANTALUM	22MF	20%	16V
C304	1-131-520-00	TANTALUM	22MF	20%	16V
C305	1-130-829-00	FILM	0.068	5%	100V
C306	1-130-829-00	FILM	0.068	5%	100V
C307	1-131-450-00	TANTALUM	1MF	20%	50V
C308	1-131-450-00	TANTALUM	1MF	20%	50V
C309	1-123-709-00	ELECT	1MF	20%	50V
C310	1-123-709-00	ELECT	1MF	20%	50V
C351	1-123-624-00	ELECT	470MF	20%	120V
C352	1-123-624-00	ELECT	470MF	20%	120V
C353	1-131-520-00	TANTALUM	22MF	20%	16V
C354	1-131-520-00	TANTALUM	22MF	20%	16V
C355	1-130-829-00	FILM	0.068MF	5%	100V
C356	1-130-829-00	FILM	0.068MF	5%	100V
C357	1-131-450-00	TANTALUM	1MF	20%	50V
C358	1-131-450-00	TANTALUM	1MF	20%	50V
C359	1-123-709-00	ELECT	1MF	20%	50V
C360	1-123-709-00	ELECT	1MF	20%	50V
C801	1-123-842-00	ELECT	3300MF	20%	25V
C802	1-123-842-00	ELECT	3300MF	20%	25V
C803	1-123-489-00	ELECT	2200MF	20%	16V
C804	1-121-398-00	ELECT	10MF		25V
C805	1-123-504-00	ELECT	100MF	20%	25V
C806	⚠1-130-232-00	(AEP,UK)...FILM	0.022MF	20%	300V
C853	1-123-842-00	ELECT	3300MF	20%	25V
C854	1-123-842-00	ELECT	3300MF	20%	25V

CNJ101	1-507-567-00	PIN JACK 1P	
CNJ102	1-507-567-00	PIN JACK 1P	
CNJ103	1-507-567-00	PIN JACK 1P	
CNJ104	1-507-567-00	PIN JACK 1P	
CNJ151	1-507-567-00	PIN JACK 1P	
CNJ152	1-507-567-00	PIN JACK 1P	
CNJ153	1-507-567-00	PIN JACK 1P	
CNJ154	1-507-567-00	PIN JACK 1P	
CP1	⚠1-231-326-00	(US)...ENCAPSULATED COMPONENT	
D301	8-719-210-15	DIODE 1OYG1.5	
D302	8-719-910-71	DIODE HZ7A1L	
D303	8-719-210-15	DIODE 1OYG1.5	
D304	8-719-910-71	DIODE HZ7A1L	
D305	8-719-201-11	DIODE 1OYG1.1	
D306	8-719-201-11	DIODE 1OYG1.1	
D351	8-719-210-15	DIODE 1OYG1.5	
D352	8-719-910-71	DIODE HZ7A1L	
D353	8-719-210-15	DIODE 1OYG1.5	
D354	8-719-910-71	DIODE HZ7A1L	

ELECTRICAL PARTS

Ref.No.	Part No.	Description
D355	8-719-201-11	DIODE 1OYG1.1
D356	8-719-201-11	DIODE 1OYG1.1
D801	8-719-230-02	DIODE 30DF2
D802	8-719-230-02	DIODE 30DF2
D803	8-719-230-02	DIODE 30DF2
D804	8-719-230-02	DIODE 30DF2
D805	8-719-510-10	DIODE S1RB10
D806	8-719-200-02	DIODE 10E-2
D807	8-719-815-55	DIODE 1S1555
D851	8-719-230-02	DIODE 30DF2
D852	8-719-230-02	DIODE 30DF2
D853	8-719-230-02	DIODE 30DF2
D854	8-719-230-02	DIODE 30DF2
F801	⚠1-532-078-00	(AEP,UK)...FUSE 1A, TIME-LAG
IC201	8-759-990-72	IC TL072CP
IC202	8-759-990-72	IC TL072CP
IC203	8-759-990-72	IC TL072CP
IC204	8-759-907-01	IC TL071CP
IC205	8-759-990-72	IC TL072CP
IC206	8-759-990-72	IC TL072CP
IC251	8-759-990-72	IC TL072CP
IC252	8-759-990-72	IC TL072CP
IC253	8-759-990-72	IC TL072CP
IC254	8-759-907-01	IC TL071CP
IC255	8-759-990-72	IC TL072CP
IC256	8-759-990-72	IC TL072CP
PL1	1-518-331-81	LAMP, PILOT
Q301	8-729-113-82	TRANSISTOR 2SA1138
Q302	8-729-113-82	TRANSISTOR 2SA1138
Q303	8-729-167-62	TRANSISTOR 2SC2676
Q304	8-729-167-62	TRANSISTOR 2SC2676
Q305	8-729-376-02	TRANSISTOR 2SD760
Q306	8-729-167-62	TRANSISTOR 2SC2676
Q307	8-729-167-62	TRANSISTOR 2SC2676
Q308	8-729-167-62	TRANSISTOR 2SC2676
Q309	8-729-372-02	TRANSISTOR 2SB720
Q310	8-729-113-82	TRANSISTOR 2SA1138
Q311	8-729-113-82	TRANSISTOR 2SA1138
Q312	8-729-113-82	TRANSISTOR 2SA1138
Q351	8-729-113-82	TRANSISTOR 2SA1138
Q352	8-729-113-82	TRANSISTOR 2SA1138
Q353	8-729-167-62	TRANSISTOR 2SC2676
Q354	8-729-167-62	TRANSISTOR 2SC2676
Q355	8-729-376-02	TRANSISTOR 2SD760
Q356	8-729-167-62	TRANSISTOR 2SC2676
Q357	8-729-167-62	TRANSISTOR 2SC2676
Q358	8-729-167-62	TRANSISTOR 2SC2676

NOTE:
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- 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 numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH

NOTE:
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CAPACITORS:
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The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
Q359	8-729-372-02	TRANSISTOR 2SB720			
Q360	8-729-113-82	TRANSISTOR 2SA1138			
Q361	8-729-113-82	TRANSISTOR 2SA1138			
Q362	8-729-113-82	TRANSISTOR 2SA1138			
Q801	8-729-663-47	TRANSISTOR 2SC1364			
Q802	8-729-103-43	TRANSISTOR 2SB734			
R101	1-214-937-00	METAL	1M	1%	1/2W
R102	1-214-840-00	METAL	100	1%	1/2W
R103	1-214-834-00	METAL	56	1%	1/2W
R104	1-214-913-00	METAL	100K	1%	1/2W
R105	1-214-888-00	METAL	10K	1%	1/2W
R106	1-214-834-00	METAL	56	1%	1/2W
R107	1-214-888-00	METAL	10K	1%	1/2W
R108	1-214-888-00	METAL	10K	1%	1/2W
R109	1-214-834-00	METAL	56	1%	1/2W
R110	1-214-888-00	METAL	10K	1%	1/2W
R111	1-214-840-00	METAL	100	1%	1/2W
R112	1-214-913-00	METAL	100K	1%	1/2W
R120	1-214-902-00	METAL	36K	1%	1/2W
R121	1-214-891-00	METAL	13K	1%	1/2W
R122	1-214-882-00	METAL	5.6K	1%	1/2W
R127	1-214-937-00	METAL	1M	1%	1/2W
R134	1-214-937-00	METAL	1M	1%	1/2W
R141	1-214-907-00	METAL	56K	1%	1/2W
R148	1-214-937-00	METAL	1M	1%	1/2W
R151	1-214-937-00	METAL	1M	1%	1/2W
R152	1-214-840-00	METAL	100	1%	1/2W
R153	1-214-834-00	METAL	56	1%	1/2W
R154	1-214-913-00	METAL	100K	1%	1/2W
R155	1-214-888-00	METAL	10K	1%	1/2W
R156	1-214-834-00	METAL	56	1%	1/2W
R157	1-214-888-00	METAL	10K	1%	1/2W
R158	1-214-888-00	METAL	10K	1%	1/2W
R159	1-214-834-00	METAL	56	1%	1/2W
R160	1-214-888-00	METAL	10K	1%	1/2W
R161	1-214-840-00	METAL	100	1%	1/2W
R162	1-214-913-00	METAL	100K	1%	1/2W
R170	1-214-902-00	METAL	36K	1%	1/2W
R171	1-214-891-00	METAL	13K	1%	1/2W
R172	1-214-882-00	METAL	5.6K	1%	1/2W
R177	1-214-937-00	METAL	1M	1%	1/2W
R184	1-214-937-00	METAL	1M	1%	1/2W
R191	1-214-907-00	METAL	56K	1%	1/2W
R198	1-214-937-00	METAL	1M	1%	1/2W
R201	1-214-867-00	METAL	1.3K	1%	1/2W
R202	1-214-871-00	METAL	2K	1%	1/2W
R203	1-214-866-00	METAL	1.2K	1%	1/2W
R204	1-214-873-00	METAL	2.4K	1%	1/2W
R205	1-214-867-00	METAL	1.3K	1%	1/2W
R206	1-214-871-00	METAL	2K	1%	1/2W
R207	1-214-874-00	METAL	2.7K	1%	1/2W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R208	1-214-873-00	METAL	2.4K	1%	1/2W
R209	1-214-874-00	METAL	2.7K	1%	1/2W
R210	1-214-878-00	METAL	3.9K	1%	1/2W
R211	1-214-881-00	METAL	5.1K	1%	1/2W
R212	1-214-867-00	METAL	1.3K	1%	1/2W
R213	1-214-876-00	METAL	3.3K	1%	1/2W
R214	1-214-888-00	METAL	10K	1%	1/2W
R215	1-214-876-00	METAL	3.3K	1%	1/2W
R216	1-214-876-00	METAL	3.3K	1%	1/2W
R217	1-214-866-00	METAL	1.2K	1%	1/2W
R218	1-214-873-00	METAL	2.4K	1%	1/2W
R219	1-214-876-00	METAL	3.3K	1%	1/2W
R220	1-214-871-00	METAL	2K	1%	1/2W
R221	1-214-873-00	METAL	2.4K	1%	1/2W
R222	1-214-871-00	METAL	2K	1%	1/2W
R223	1-214-888-00	METAL	10K	1%	1/2W
R224	1-214-876-00	METAL	3.3K	1%	1/2W
R225	1-214-867-00	METAL	1.3K	1%	1/2W
R226	1-214-871-00	METAL	2K	1%	1/2W
R227	1-214-866-00	METAL	1.2K	1%	1/2W
R228	1-214-873-00	METAL	2.4K	1%	1/2W
R229	1-214-867-00	METAL	1.3K	1%	1/2W
R230	1-214-871-00	METAL	2K	1%	1/2W
R231	1-214-874-00	METAL	2.7K	1%	1/2W
R232	1-214-873-00	METAL	2.4K	1%	1/2W
R233	1-214-874-00	METAL	2.7K	1%	1/2W
R234	1-214-878-00	METAL	3.9K	1%	1/2W
R235	1-214-881-00	METAL	5.1K	1%	1/2W
R236	1-214-867-00	METAL	1.3K	1%	1/2W
R237	1-214-876-00	METAL	3.3K	1%	1/2W
R238	1-214-888-00	METAL	10K	1%	1/2W
R239	1-214-876-00	METAL	3.3K	1%	1/2W
R251	1-214-867-00	METAL	1.3K	1%	1/2W
R252	1-214-871-00	METAL	2K	1%	1/2W
R253	1-214-866-00	METAL	1.2K	1%	1/2W
R254	1-214-873-00	METAL	2.4K	1%	1/2W
R255	1-214-867-00	METAL	1.3K	1%	1/2W
R256	1-214-871-00	METAL	2K	1%	1/2W
R257	1-214-874-00	METAL	2.7K	1%	1/2W
R258	1-214-873-00	METAL	2.4K	1%	1/2W
R259	1-214-874-00	METAL	2.7K	1%	1/2W
R260	1-214-878-00	METAL	3.9K	1%	1/2W
R261	1-214-881-00	METAL	5.1K	1%	1/2W
R262	1-214-867-00	METAL	1.3K	1%	1/2W
R263	1-214-876-00	METAL	3.3K	1%	1/2W
R264	1-214-888-00	METAL	10K	1%	1/2W
R265	1-214-876-00	METAL	3.3K	1%	1/2W
R266	1-214-876-00	METAL	3.3K	1%	1/2W
R267	1-214-866-00	METAL	1.2K	1%	1/2W
R268	1-214-873-00	METAL	2.4K	1%	1/2W

ELECTRICAL PARTS

Ref.No.	Part No.	Description			
R269	1-214-876-00	METAL	3.3K	1%	1/2W
R270	1-214-871-00	METAL	2K	1%	1/2W
R271	1-214-873-00	METAL	2.4K	1%	1/2W
R272	1-214-871-00	METAL	2K	1%	1/2W
R273	1-214-888-00	METAL	10K	1%	1/2W
R274	1-214-876-00	METAL	3.3K	1%	1/2W
R275	1-214-867-00	METAL	1.3K	1%	1/2W
R276	1-214-871-00	METAL	2K	1%	1/2W
R277	1-214-866-00	METAL	1.2K	1%	1/2W
R278	1-214-873-00	METAL	2.4K	1%	1/2W
R279	1-214-867-00	METAL	1.3K	1%	1/2W
R280	1-214-871-00	METAL	2K	1%	1/2W
R281	1-214-874-00	METAL	2.7K	1%	1/2W
R282	1-214-873-00	METAL	2.4K	1%	1/2W
R283	1-214-874-00	METAL	2.7K	1%	1/2W
R284	1-214-878-00	METAL	3.9K	1%	1/2W
R285	1-214-881-00	METAL	5.1K	1%	1/2W
R286	1-214-867-00	METAL	1.3K	1%	1/2W
R287	1-214-876-00	METAL	3.3K	1%	1/2W
R288	1-214-888-00	METAL	10K	1%	1/2W
R289	1-214-876-00	METAL	3.3K	1%	1/2W
R301	1-214-876-00	METAL	3.3K	1%	1/2W
R302	1-214-872-00	METAL	2.2K	1%	1/2W
R303	1-214-876-00	METAL	3.3K	1%	1/2W
R304	1-214-872-00	METAL	2.2K	1%	1/2W
R305	1-214-865-00	METAL	1.1K	1%	1/2W
R306	1-214-878-00	METAL	3.9K	1%	1/2W
R307	1-214-865-00	METAL	1.1K	1%	1/2W
R308	1-214-878-00	METAL	3.9K	1%	1/2W
R351	1-214-876-00	METAL	3.3K	1%	1/2W
R352	1-214-872-00	METAL	2.2K	1%	1/2W
R353	1-214-876-00	METAL	3.3K	1%	1/2W
R354	1-214-872-00	METAL	2.2K	1%	1/2W
R355	1-214-865-00	METAL	1.1K	1%	1/2W
R356	1-214-878-00	METAL	3.9K	1%	1/2W
R357	1-214-865-00	METAL	1.1K	1%	1/2W
R358	1-214-878-00	METAL	3.9K	1%	1/2W
R801	1-214-140-00	METAL	2.2K	1%	1/4W
R802	1-214-172-00	METAL	47K	1%	1/4W
R803	1-214-156-00	METAL	10K	1%	1/4W
R804	1-214-172-00	METAL	47K	1%	1/4W
R805	1-214-132-00	METAL	1K	1%	1/4W
R806	1-214-140-00	METAL	2.2K	1%	1/4W
R807	1-244-840-00	CARBON	43	5%	1/2W
R808	1-244-857-00	CARBON	220	5%	1/2W
RV201	1-228-331-00	RES, VAR, CARBON 20K/20K			
RV202	1-228-329-00	RES, VAR, CARBON 50K/50K			
RV203	1-228-333-00	RES, VAR, CARBON 20K (WITH S203)			
RV204	1-228-331-00	RES, VAR, CARBON 20K/20K			
RV205	1-228-329-00	RES, VAR, CARBON 50K/50K			

ELECTRICAL PARTS

Ref.No.	Part No.	Description
RV206	1-228-333-00	RES, VAR, CARBON 20K (WITH S206)
RV207	1-228-331-00	RES, VAR, CARBON 20K/20K
RV208	1-228-329-00	RES, VAR, CARBON 50K/50K
RV209	1-228-333-00	RES, VAR, CARBON 20K (WITH S209)
RV251	1-228-332-00	RES, VAR, CARBON 20K/20K
RV252	1-228-330-00	RES, VAR, CARBON 50K/50K
RV253	1-228-334-00	RES, VAR, CARBON 20K (WITH S253)
RV254	1-228-332-00	RES, VAR, CARBON 20K/20K
RV255	1-228-330-00	RES, VAR, CARBON 50K/50K
RV256	1-228-334-00	RES, VAR, CARBON 20K (WITH S256)
RV257	1-228-332-00	RES, VAR, CARBON 20K/20K
RV258	1-228-330-00	RES, VAR, CARBON 50K/50K
RV259	1-228-334-00	RES, VAR, CARBON 20K (WITH S259)
RY101	1-515-323-00	RELAY
RY151	1-515-323-00	RELAY
S1	⚠1-552-974-00	(US).....SWITCH, AC
S1	⚠1-552-975-00	(AEP,UK).....SWITCH, AC
S101	1-553-792-00	SWITCH, LEVER SLIDE
S102	1-553-793-00	SWITCH, LEVER SLIDE
S103	1-553-792-00	SWITCH, LEVER SLIDE
S104	1-553-796-00	SWITCH, ROTARY
S151	1-553-792-00	SWITCH, LEVER SLIDE
S152	1-553-793-00	SWITCH, LEVER SLIDE
S153	1-553-792-00	SWITCH, LEVER SLIDE
S154	1-553-796-00	SWITCH, ROTARY
S201	1-553-794-00	SWITCH, SLIDE (REMOTE TYPE)
S202	1-553-794-00	SWITCH, SLIDE (REMOTE TYPE)
S251	1-553-794-00	SWITCH, SLIDE (REMOTE TYPE)
S252	1-553-794-00	SWITCH, SLIDE (REMOTE TYPE)
T1	⚠1-447-055-00	(US).....TRANSFORMER, POWER
T1	⚠1-447-056-00	(AEP,UK)...TRANSFORMER, POWER

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- 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 numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH

NOTE:
- Items with no part number and no description are not stocked because they are seldom required for routine service.
- 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 numbers (Δ-ΔΔΔ-ΔΔΔ-XX or Δ-ΔΔΔΔ-ΔΔΔ-X) may be different from those used in the set.

9-950-626-11

CAPACITORS:
- All capacitors are in μF. Common capacitors are omitted. Refer to the following lists for their part numbers. MF:μF, PF:μμF.

RESISTORS
- All resistors are in ohms. Common 1/4W, 1/8W and 1/16W carbon resistors are omitted. Refer to the following lists for their part numbers.
- F : nonflammable

The components identified by shading and mark ⚠ are critical for safety. Replace only with part number specified.

COILS
- MMH : mH, UH : μH

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