

Service Manual

STEREO AMPLIFIER

SA-800 / FVW, KUW, KCW

NOTE

MODEL SA-800 COMES IN THREE VERSIONS DISTINGUISHED AS FOLLOWS:

Round label on rear panel	Voltages	Type
KUW FVW KCW	120V only 5-position selector 120V only	UL approved (U.S.A.) General export model CSA approved (Canada)

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1 • SPECIFICATIONS

SEMICONDUCTORS

FETs	2
Transistors	35
Diodes	20

POWER AMPLIFIER SECTION

Music Power Output (IHF)	165 Watts (4 Ω) 108 Watts (8 Ω)
Continuous Power Output (each channel driven)	53W/53W (4 Ω) 41W/41W (8 Ω)
Continuous Power Output (both channel driven)	39W + 39W (4 Ω) 34W + 34W (8 Ω)
Power Output in the range of 20Hz to 20kHz (both channel driven)	26W + 26W (8 Ω , Harmonic Distortion Less than 0.5%)
Harmonic Distortion	Less than 0.5% (Continuous power output)
Intermodulation Distortion	Less than 0.5% (Continuous power output)
Power Bandwidth (IHF)	5Hz to 50kHz (8 Ω , Harmonic Distortion Less than 0.5%)
Frequency Response	5Hz to 80kHz, \pm 1dB
Input Sensitivity/Impedance (1kHz, Continuous power output)	560mV/100k Ω
Speakers	4 to 16 Ω
Damping Factor	More than 65 (8 Ω , 1kHz)
Center Channel Output	500mV

PREAMPLIFIER SECTION

Output Voltage	3V (Rated output), 5V (Max.)
Harmonic Distortion	Less than 0.1%
Frequency Response	20Hz to 60kHz, \pm 1dB
Input Sensitivity/Impedance (1kHz, for rated output)	PHONO 1. MAG 3mV/50k Ω CER 56mV/100k Ω PHONO 2. MM 3mV/50k Ω MC 110 μ V/30 Ω (with PHONO INPUT TRANSFORMER "PP-402")
Recording Output	MIC 2.3mV/50k Ω TUNER 230mV/200k Ω AUX 1, 2 230mV/200k Ω TAPE MONITOR 1, 2 230mV/200k Ω TAPE REC 1, 2 (Pin jack) 230mV TAPE REC (DIN connector) 35mV
BASS Control (3dB step)	-9dB, +12dB (100Hz)
TREBLE Control (3dB step)	-12dB, +9dB (10kHz)
LOW Filter	-3.5dB/60Hz (12dB/oct.)
HIGH Filter	-3dB/6kHz (12dB/oct.)

Equalization Curve	PHONO: RIAA	
Loudness Contour	+11.5dB/100Hz, +6.5dB/10kHz with Volume Control set at -40dB position.	
Muting	-20dB	
Hum and Noise (IHF)	PHONO	More than 80dB
	TUNER, AUX	More than 100dB
Channel Separation (1kHz)	PHONO	More than 50dB
	TUNER, AUX	More than 55dB

MISCELLANEOUS

Power Requirements	120V, 60Hz (KUW, KCW)	
	110V, 120V, 130V, 220V and 240V. 50 to 60Hz (FVW)	
Power Consumption	230W (Max.)	
Dimensions (overall)	16- $\frac{15}{16}$ in./430mm (width)	
	5- $\frac{11}{16}$ in./145mm (height)	
	13- $\frac{1}{4}$ in./337mm (depth)	
Weight:	Without package	23lb/10.3kg
	With package	27lb/12.3kg

NOTE: Specification and the design subject to possible modification without notice due to improvements.



2 • FRONT PANEL FACILITIES

■ POWER SWITCH

Controls power to the unit. Setting it to ON will apply power to the unit.

■ SPEAKER SWITCH

Selects the speaker system to be used.
OFF No sound comes from any speaker system. Useful when listening through headphones.
A Sound comes through the speaker system connected to the A speaker terminals.
B Sound comes through the speaker system connected to the B speaker terminals.
A + B Both A and B speaker systems are energized.

■ PHONES JACK

Use this to plug in stereo headphones. A full selection of high-performance headphones is available from Pioneer.

■ BASS CONTROLS

Operation is the same as for the TREBLE controls.

■ FILTER SWITCHES

LOW Setting to ON will eliminate low frequency noises, such as record rumble, hum, or other interference. The switch is normally set to OFF, unless the filter is required.
HIGH Setting to ON will eliminate high frequency noises, such as record scratch, hiss, static noise from fluorescent lamps, or other interference. The switch is normally set to OFF, unless the filter is required.

■ TREBLE CONTROLS

Turn them to the right (clockwise) from the FLAT position to boost the high tone, and turn them to the left (counterclockwise) to diminish it. The scale markings in dB (decibels) enable the listener to read the actual settings.

■ VOLUME CONTROL

To increase the volume, turn it to the right (clockwise).

■ MUTING SWITCH

Pressing this switch down to the -20dB position decreases the volume by 20dB instantly. Setting it to the OFF position restores the volume to normal.

■ LOUDNESS SWITCH

To listen to quieter sound, set this to the ON position. This emphasizes the low and high notes. For normal listening, set it to the OFF position.

■ BALANCE CONTROL

This control balances the volume of the left and right speaker systems. Where the volume from the right-hand speakers is too low, turn it to the right (clockwise). Where the volume from the left-hand speakers is too low, turn it to the left (counterclockwise).

■ PHONO 2 MM/MC SWITCH

Set this switch according to the type of cartridge used in the turntable connected to the PHONO 2 terminals.

MM For a moving magnet (MM) cartridge.
MC For a moving coil (MC) cartridge.

■ MODE SWITCH

This selects mode sound reproduction.
STEREO REV Stereo with the left and right channels reversed.
STEREO NORM Normal stereo
MONO L Input signals of the left channel through speakers.
MONO R Input signals of the right channel through speakers.
MONO L + R Input signals of left and right channels are mixed and reproduced through both speakers. (Monophonic sound)

■ SELECTOR SWITCH

This selects the program source.
MIC Microphone sound can be reproduced through the speakers or recorded on tape.
PHONO 1 To use the turntable connected to the PHONO 1 terminals.
PHONO 2 To use the turntable connected to the PHONO 2 terminals.
TUNER To use a tuner connected to the TUNER terminals.
AUX 1 To use a cassette or cartridge tape player or other program source connected to the AUX 1 terminals.
AUX 2 To play TV sound track or another program source connected to the AUX 2 terminals.

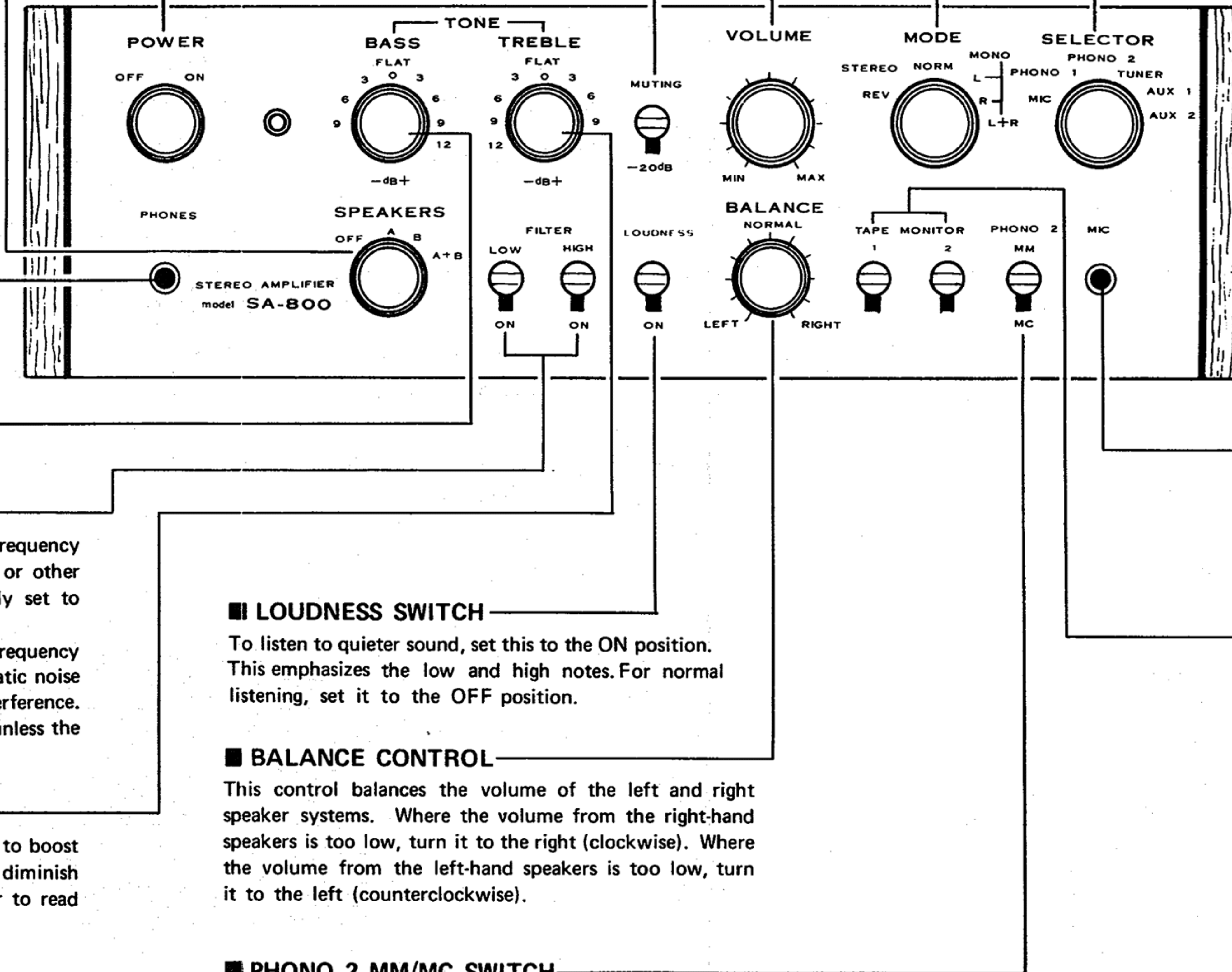
■ MIC JACK

Connect the plug attached to the microphone lead to this jack. A high-impedance, dynamic-type microphone with a standard plug should be used. A selection of high-performance dynamic microphone is available from Pioneer.

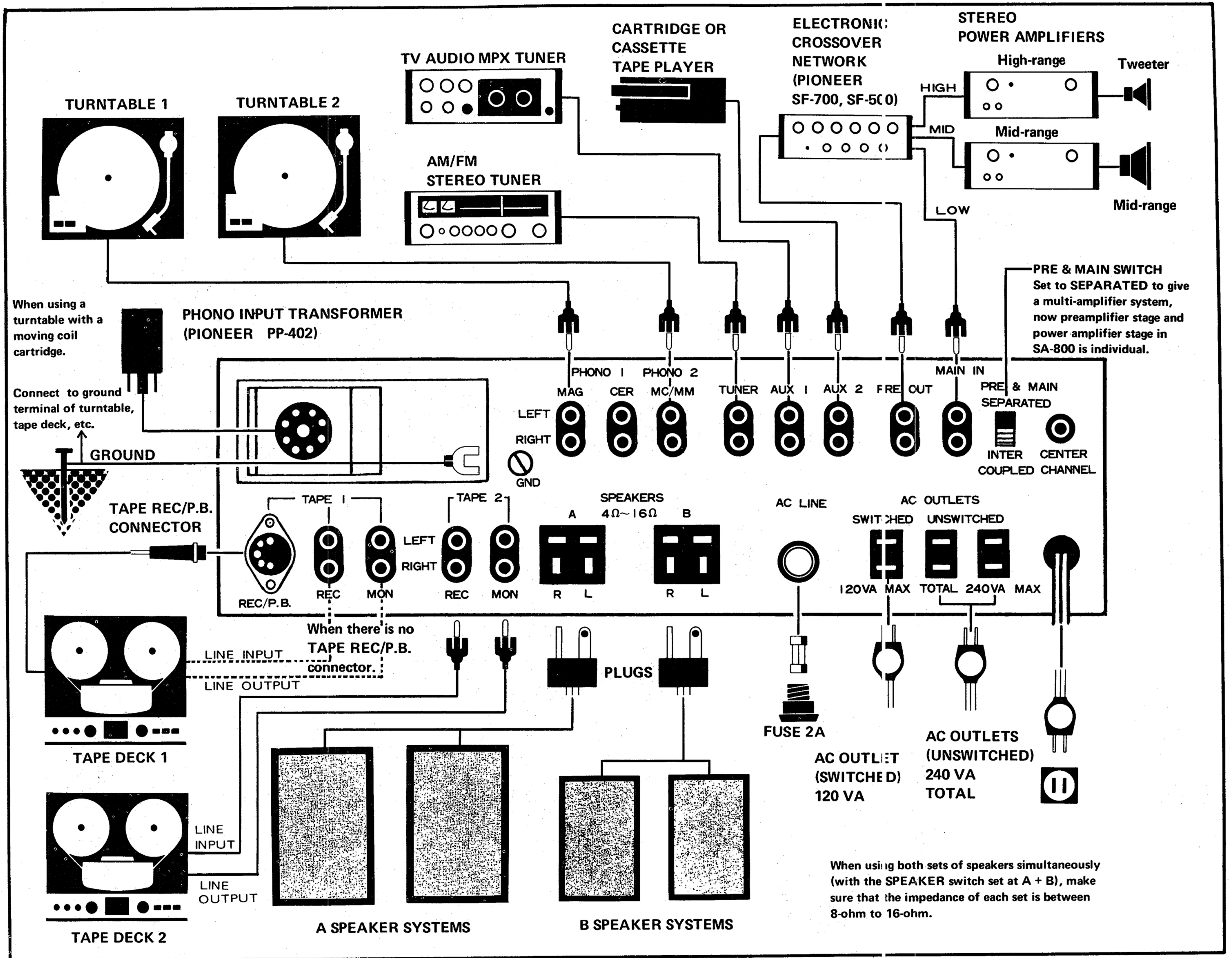
■ TAPE MONITOR SWITCHES (1 and 2)

These switches are set to ON for test-listening of recording in progress or playback of recorded tapes with tape decks.
1 This switch is set to ON for using a tape deck connected to TAPE 1 MON terminals and TAPE 1 REC terminals or TAPE REC/P.B. connector.
2 This switch is set to ON for using a tape deck connected to TAPE 2 MON terminals and TAPE 2 REC terminals.

NOTE: For a normal playback function except for tape playback, leave these switches set to the upper position (OFF position). If the switches are set to ON, sound does not come out from speakers.



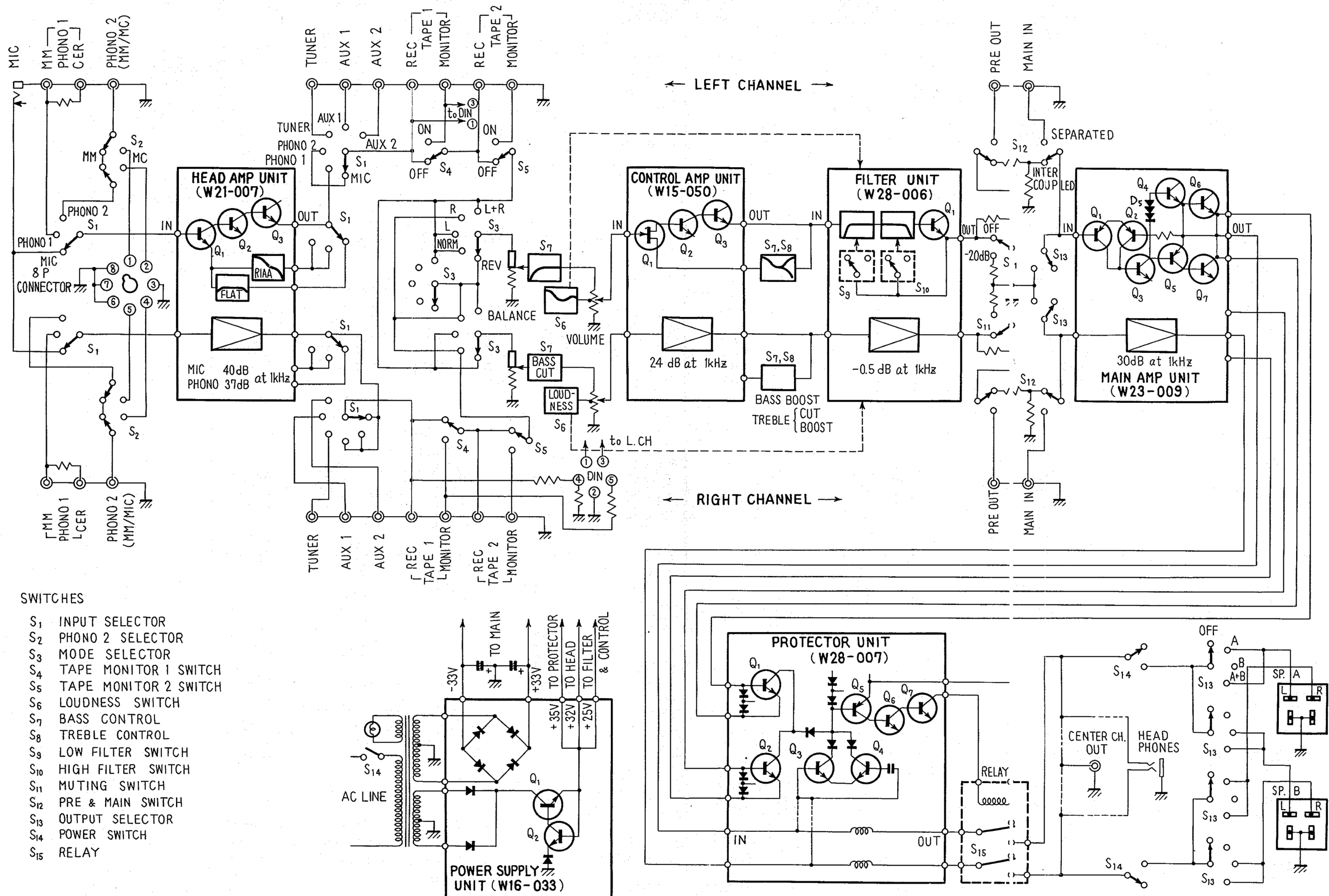
3 • CONNECTION DIAGRAM



4 • CIRCUIT DESCRIPTION

4-1 BLOCK DIAGRAM

The block diagram shows the signal path in the SA-800 as well as the auxiliary circuits such as the overload protector and power supply.



4.2 LOW LEVEL INPUT CIRCUITS

Low level signals such as from phono cartridge or microphone are supplied into the PHONO 1 and 2 or MIC input jacks. S2 selects between moving coil (MC) and moving magnet (MM) cartridge.

Low output MC cartridges can be accommodated with the help of an optional step-up transformer (Pioneer model PP-402) which can be plugged into the 8P connector.

Program sources are selected by the input selector, S1.

4.3 HEAD AMPLIFIER

The complete head amplifier is contained on the W21-007 PCB, consisting of two voltage amplifiers and directly coupled emitter-follower circuitry. The overall negative feedback loop circuit for equalization is connected between the emitters of Q1 and Q3.

Equalization characteristics are: RIAA playback for PHONO, flat response for microphone.

4.4 HIGH LEVEL INPUTS AND CONTROL CIRCUITS

High level inputs such as AUX 1, 2 and TUNER are also selected by S1. Input from tape deck and recording output signal (a head amplifier output or a direct output from a high level input) are switched by S4 and S5, respectively. The selected signal then passes to mode switch S3, balance and volume controls through the RC network which establishes the characteristic of the tone control bass cut side. This characteristic can be switched by part of S7.

4.5 CONTROL AMPLIFIER

This stage, consisting of one FET and two transistors, is embodied on PCB No. W15-050. The FET is used in the top amplifier to obtain stable, high impedance under all conditions; the Q3 emitter-follower circuit maintains good negative feedback conditions for the tone control circuits.

The output from this stage passes to the next filter stage and the switched RC network which determines the tone control characteristics, i.e. treble boost and cut and bass boost.

4.6 FILTER

The filter stage is embodied on PCB No. W28-006.

Filter design uses switchable RC factors with emitter-follower transistors. Basically, this filter operates according to the active filter principle; it features a steep-slope, 12dB/oct. characteristic.

4.7 POWER AMPLIFIER CIRCUIT

The power stereo amplifier stage consists of 4 power transistors mounted on PCB No. W23-009. Of the seven transistors in each channel, Q1 and Q2 operate in pairs, forming a differential amplifier. This eliminates DC voltage and current drift caused by ambient temperature changes, thereby stabilizing the amplifier's total performance.

In the above-mentioned differential amplifier, the base of Q1 receives the signal input while the overall NFB voltage is applied to the base of Q2. The output from the Q2 emitter is applied to the emitter of Q1. On the other hand, an inverted emitter input is also applied to the base of Q1 so that Q1 amplifies the sum total of these input values.

The output from Q1 drives the quasi-complementary Darlington output stage consisting of transistor pairs Q4/Q6 and Q5/Q7. D5 works to stabilize the bias of Q4, Q5, Q6 and Q7 against temperature fluctuations.

4.8 PROTECTOR CIRCUIT

The protector consists of two types of detectors and a DC amplifier, all assembled on PCB No. W28-007.

Q1 (Q2) is a detector for static overload exceeding the rated collector current limit and caused by thermal running of the power transistors or trouble in some part, and for dynamic overload caused by a drop in the output load impedance below 2Ω . Q1 protects the left channel, Q2 the right channel. Q3 and Q4 form a differential amplifier which detects DC drift voltages present at the output terminal of the power amplifier.

It serves both channels simultaneously. Q5 - Q7 form a trigger circuit for the relay at the DC amplifier. In normal operation, the relay contacts are closed by the collector current of Q7 and the output signal is fed to the speakers. If the detector discovers some trouble, the relay opens and disconnects the output terminals from the original output point in the circuit.

4.9 POWER SUPPLY CIRCUIT

Q1 and Q2 are voltage regulator, supplying low-ripple rectified current to the preamplifier. The balanced voltage supply for the power amplifier is obtained from other power transformer taps via a bridge rectifier. All parts except the filter capacitor and power transformer are located on PCB No. W16-033.

5 • DISASSEMBLY

5-1 WOODEN CASE

Remove the 4 screws from the side of the wooden case. Pull the case backward off the amplifier housing.

5-2 FRONT PANEL

Pull off all knobs, then remove nuts and washers from shafts as illustrated in Fig. 1. The front panel can be removed.

5-3 BOTTOM PLATE

The bottom plate can be removed after loosening the 10 screws.

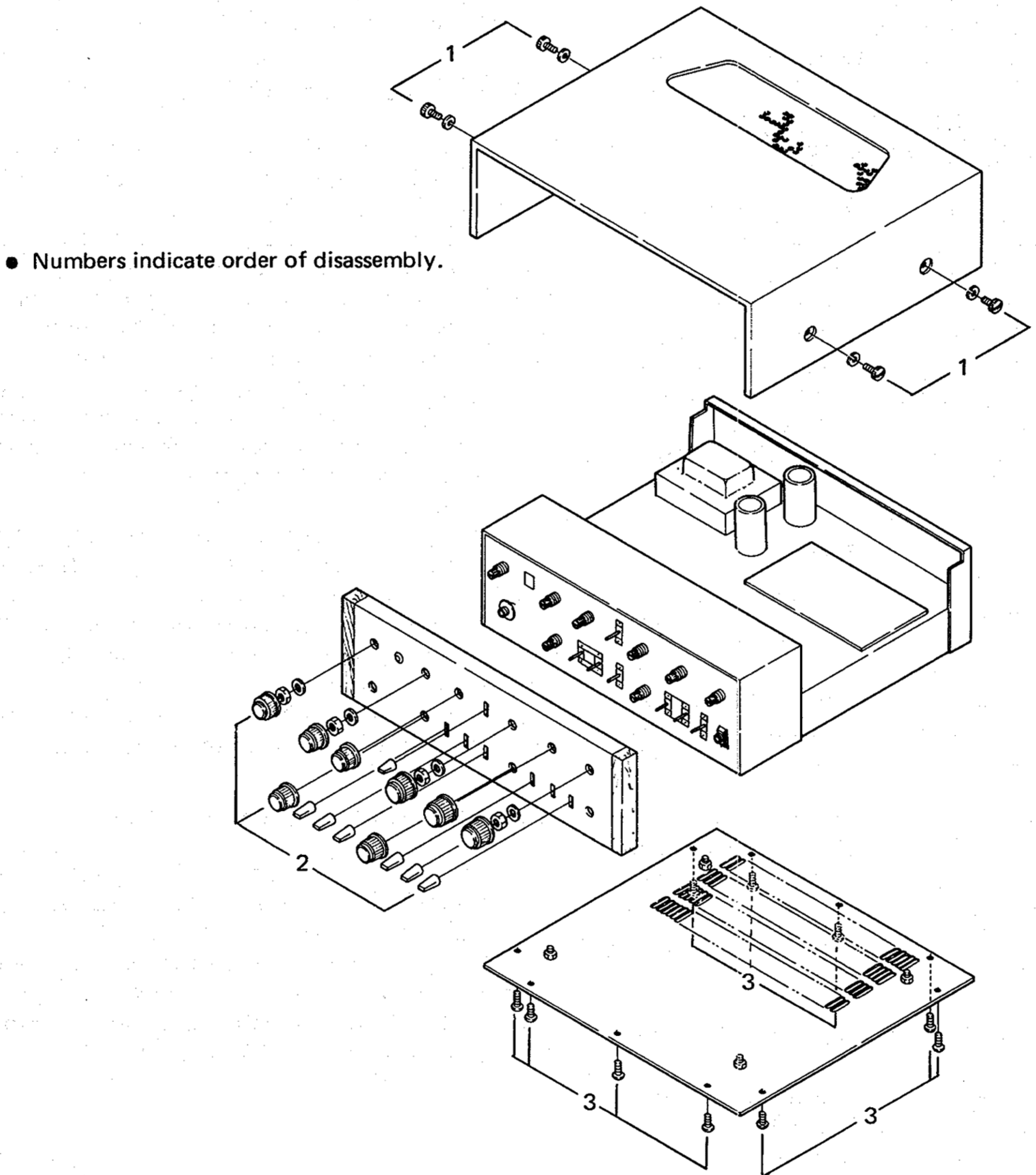
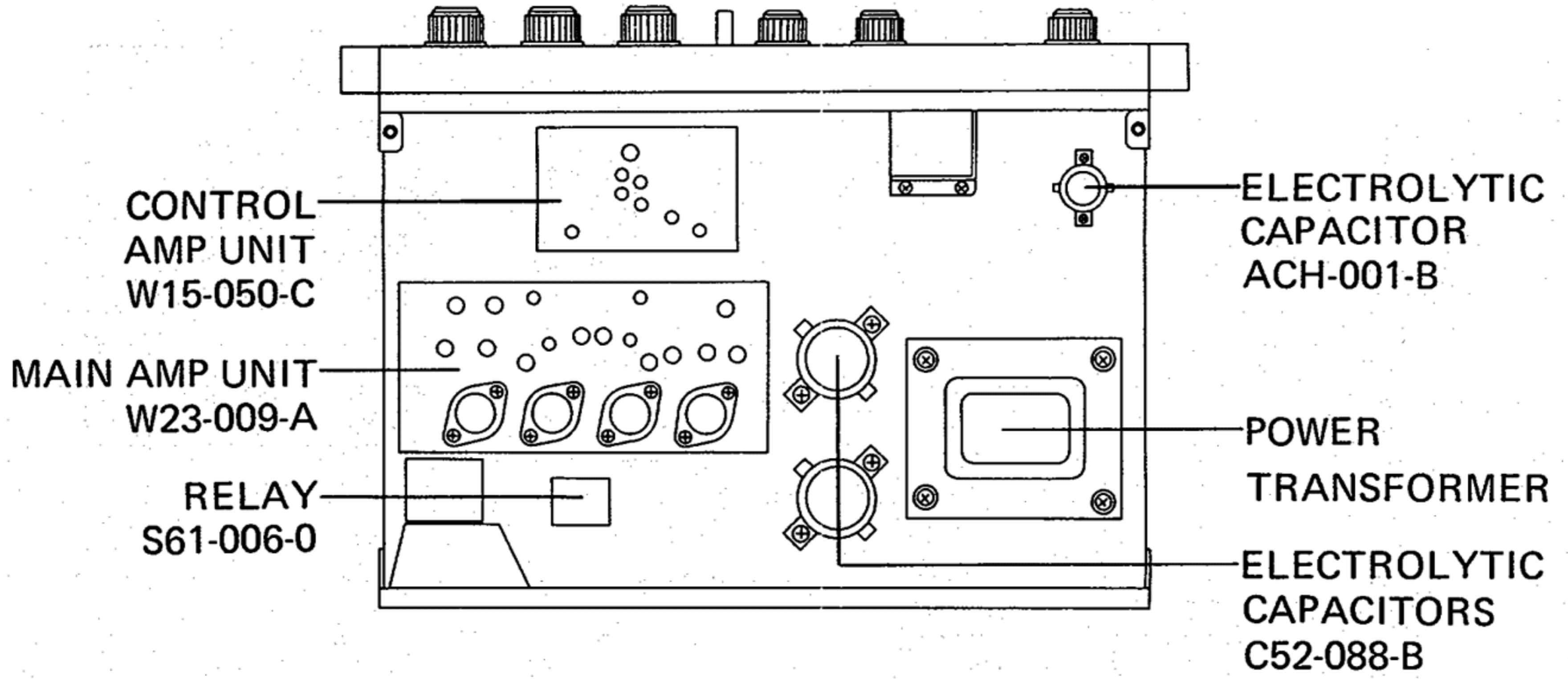


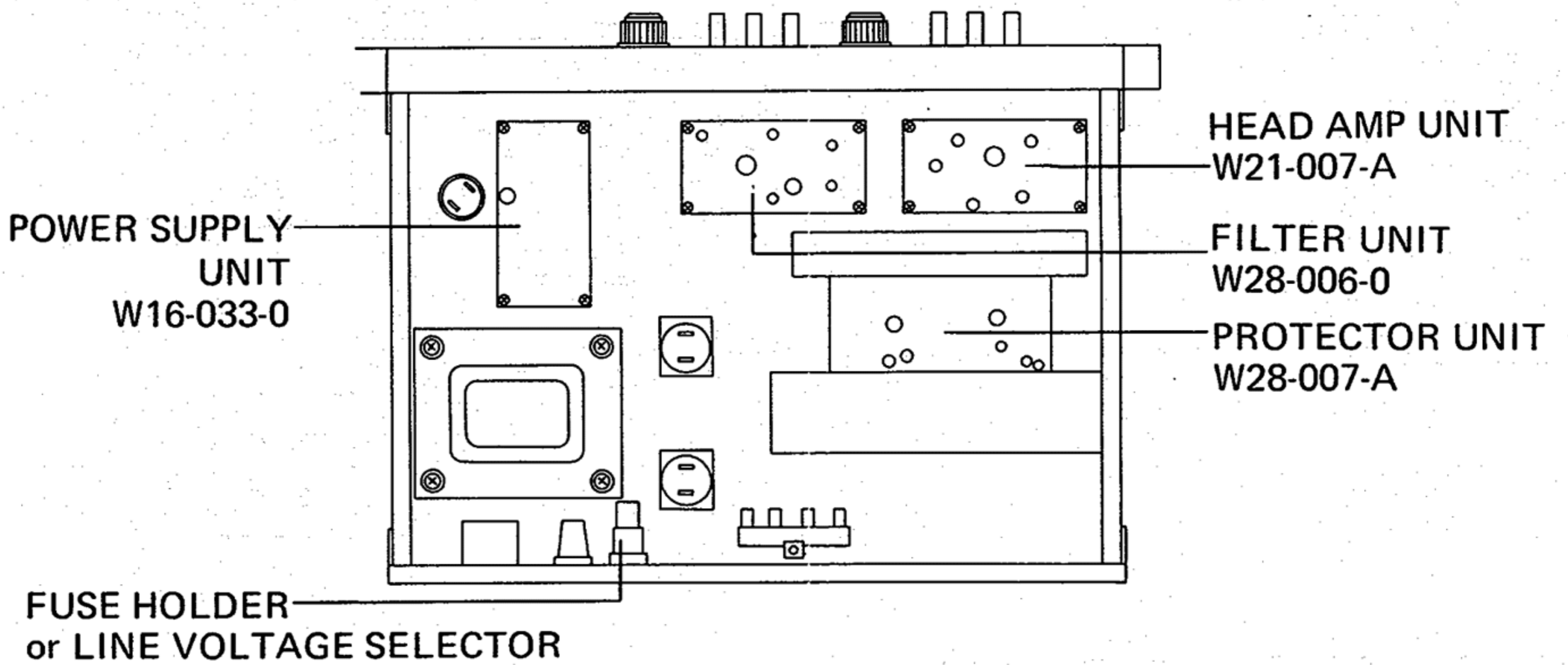
Fig. 1

5-4 PARTS AND PCB LOCATIONS

TOP VIEW



BOTTOM VIEW



6 • ALIGNMENT PROCEDURES

6.1 DC NEUTRAL VOLTAGE & DETECTOR CIRCUIT ADJUSTMENT

The following adjustments are effective in case such as

1. protector cuts off output immediately when power is turned on, without obvious reason,
 2. clipping distortion at volume peaks,
 3. smothered sound at low volume levels, although preamplifier output is clean.
- a) Set all controls as follows:
- | | | |
|---------------------------|-------|-------------|
| INPUT SELECTOR | | AUX 1 |
| MODE SELECTOR | | STEREO NORM |
| PHONO 2 SELECTOR | | MM |
| TAPE MONITOR SWITCHES | | off |
| BASS, TREBLE CONTROLS | | FLAT |
| LOUDNESS SWITCH | | off |
| LOW, HIGH FILTER SWITCHES | ... | off |
| MUTING SWITCH | | off (0dB) |
| PRE & MAIN SWITCH | | SEPARATED |
| BALANCE CONTROL | | NORMAL |
| POWER & SPEAKER SWITCHES | ... | off |
- b) Observe relay located at top of chassis.
Turn power on. Relay should be activated, without chattering, about 3 to 5 seconds later.
- c) Disconnect lead wires from pins 2 and 4 on PCB W28-007.
- d) Connect voltmeter between TP1 and TP2 on PCB W28-007.
- e) Adjust VR1 on PCB W28-007 for 0V meter reading.
- f) Re-connect lead wires to pin 2.
- g) Adjust VR1 on main amplifier W23-009 for 0V meter reading.
- h) Re-connect lead wire to pin 4.
- i) Adjust VR2 on main amplifier PCB W23-009 to obtain 0V meter reading.

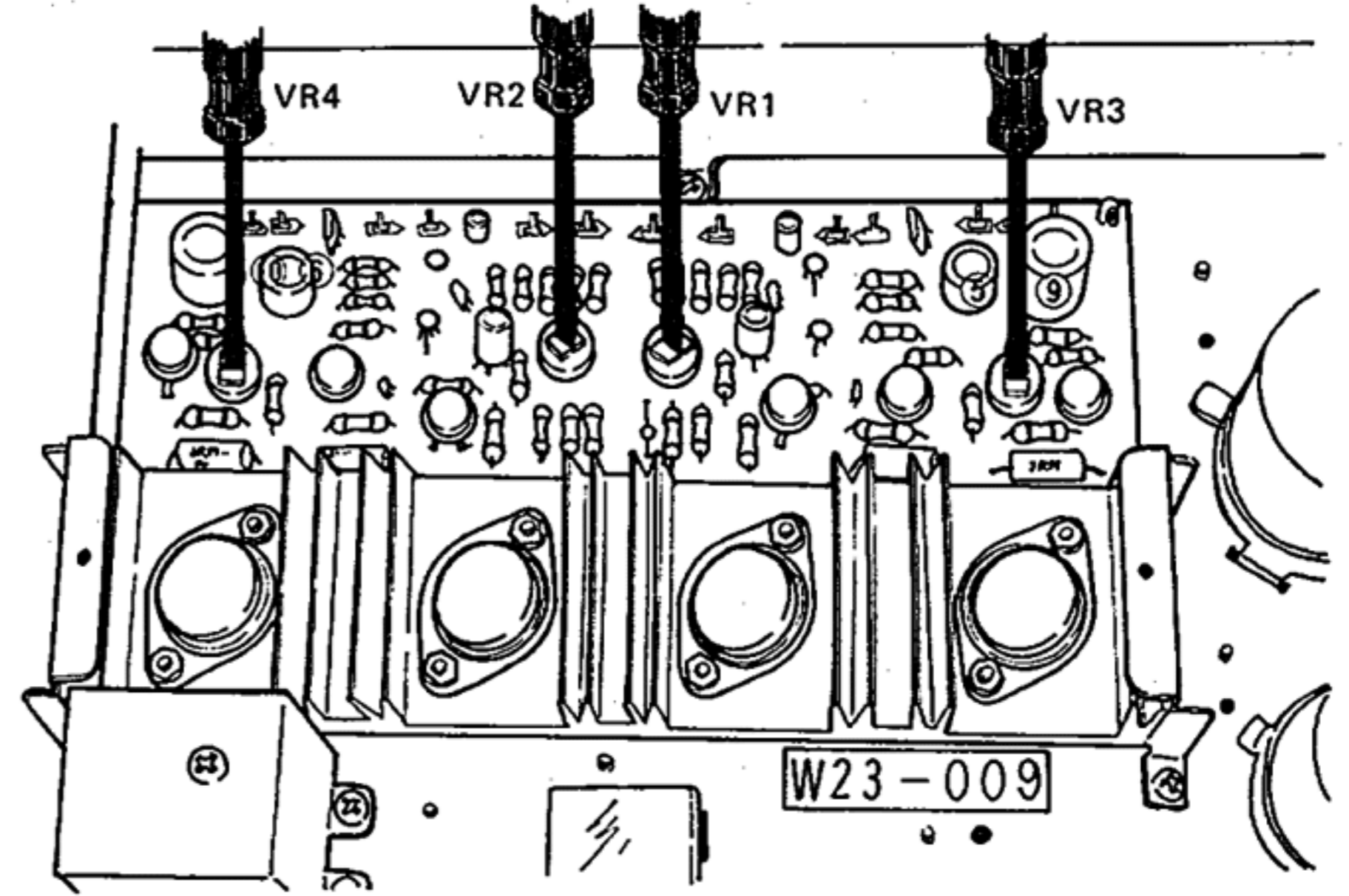


Fig. 2

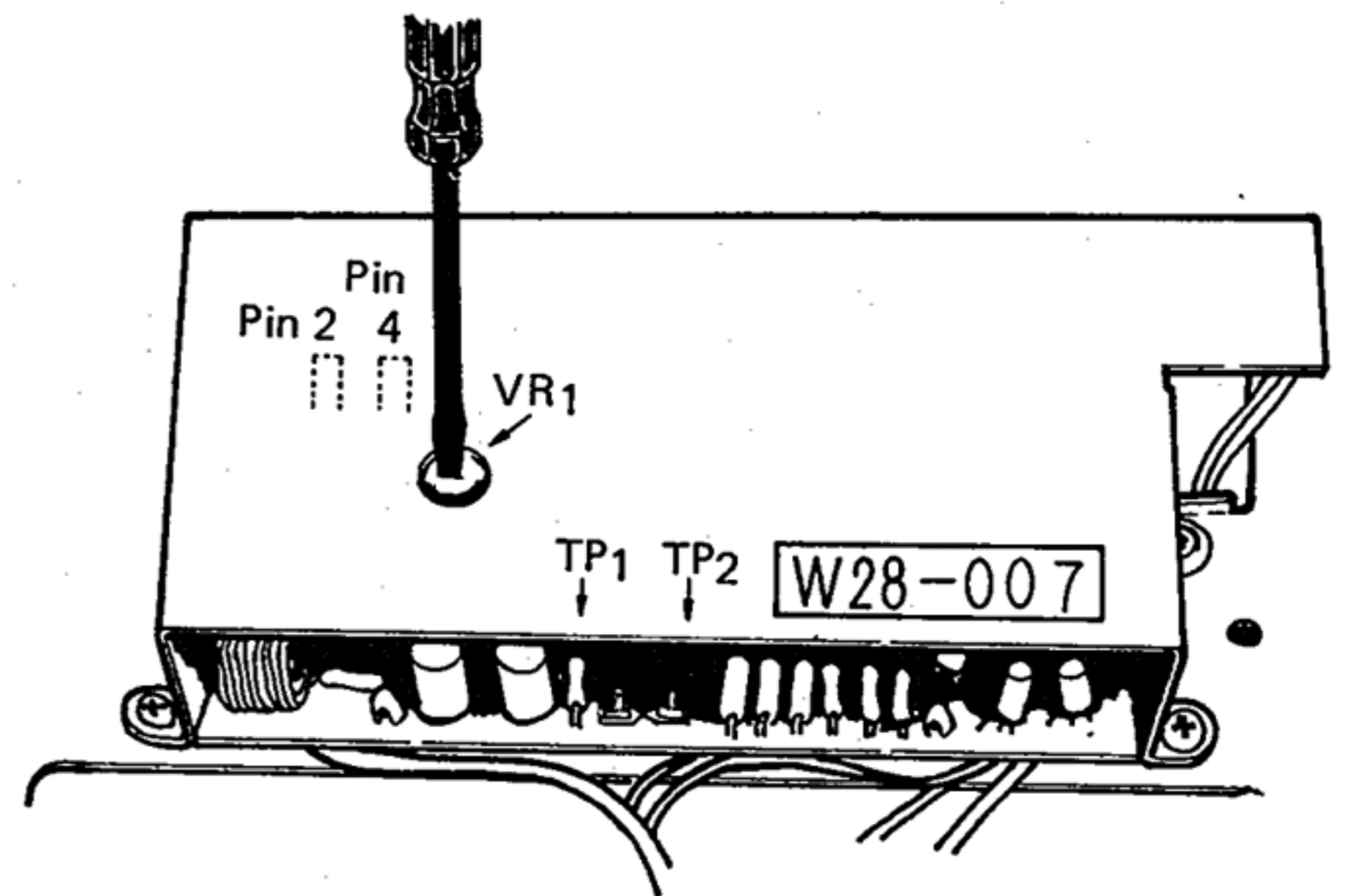


Fig. 3

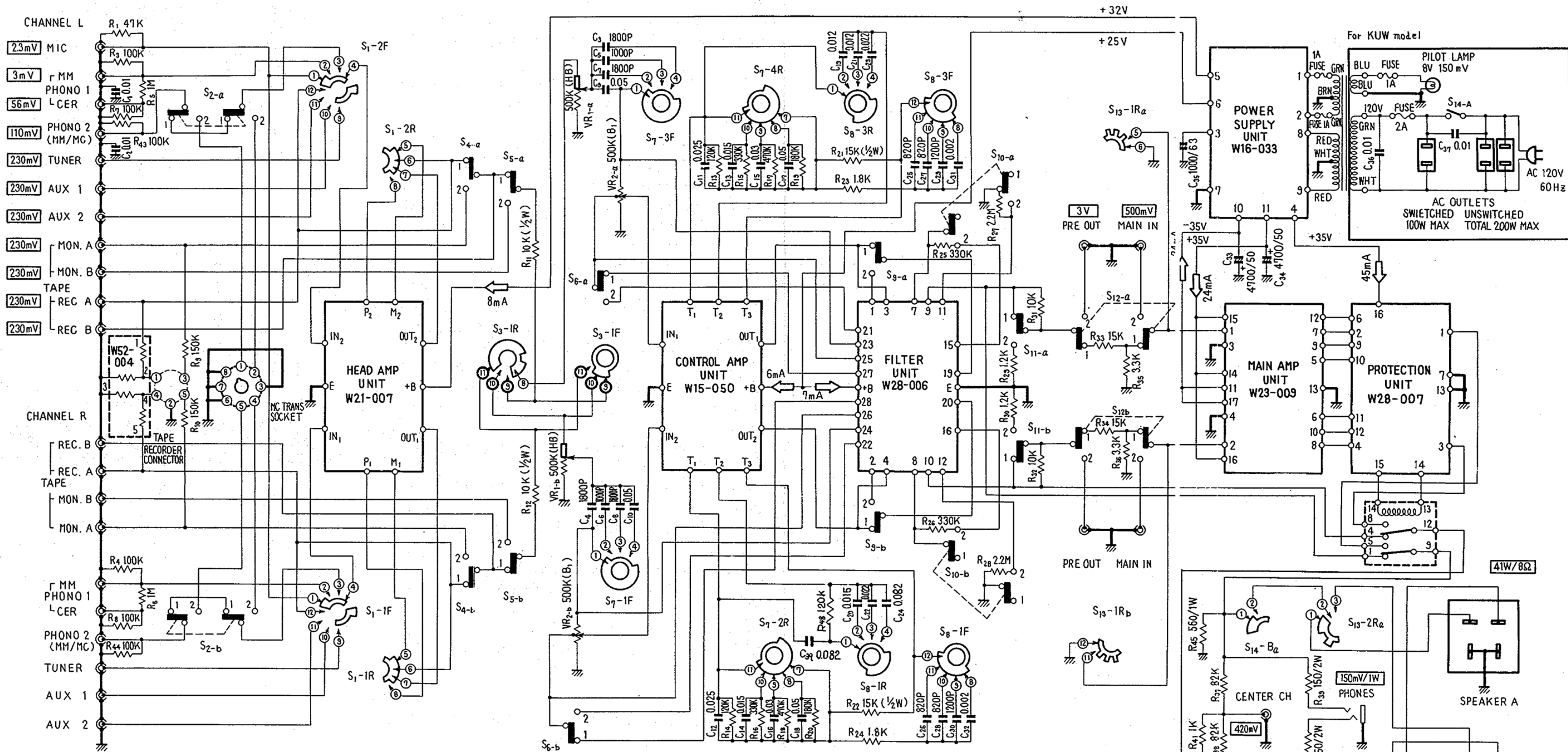
6.2 IDLE CURRENT ADJUSTMENT

- a) Set all controls as in 6.1 (a). Then:
- Connect AC cord to AC outlet.
 - Set POWER on and SPEAKER SELECTOR to SPKR A position.
 - Allow a few minutes for amplifier to warm up.
- b) Set voltmeter near 0.5V full scale range, connect between pins 5 and 9 on PCB W23-009.
- c) Adjust VR3 to obtain meter reading of 0.1V $\pm 20\%$.
- d) Connect voltmeter between pins 6 and 10.
- e) Adjust VR4 as in step (c).

7 • SCHEMATIC DIAGRAMS AND PCB PATTERNS

UNIT CONNECTION DIAGRAM

SA-800



SWITCHES

- S₁ INPUT SELECTOR
1. MIC 2. PHONO 1 3. PHONO 2 4. TUNER 5. AUX 1 6. AUX 2
- S₂ PHONO 2 SELECTOR
1. MM 2. MC
- S₃ MODE SELECTOR
1. REV 2. NORM 3. L 4. R 5. L+R
- S₄ TAPE MONITOR 1 SW. 1. OFF 2. ON
- S₅ TAPE MONITOR 2 SW. 1. OFF 2. ON
- S₆ LOUDNESS SW. 1. OFF 2. ON
- S₇ BASS CONTROL -3dB~+12dB (at 100Hz)
- S₈ TREBLE CONTROL -12dB~+9dB (at 10kHz)
- S₉ LOW FILTER SW. 1. OFF 2. ON
- S₁₀ HIGH FILTER SW. 1. OFF 2. ON
- S₁₁ MUTING SW. 1. OFF 2. -20dB
- S₁₂ PRE & MAIN SW. 1. INTERCOUPLED 2. SEPARATED
- S₁₃ OUTPUT SELECTOR
1. OFF 2. A 3. B 4. A+B
- S₁₄ POWER SW. 1. OFF 2. ON
- S₁₅ RELAY 1. OFF 2. ON

POTENTIOMETERS

- VR₁ BALANCE CONTROL
- VR₂ VOLUME CONTROL

RESISTORS

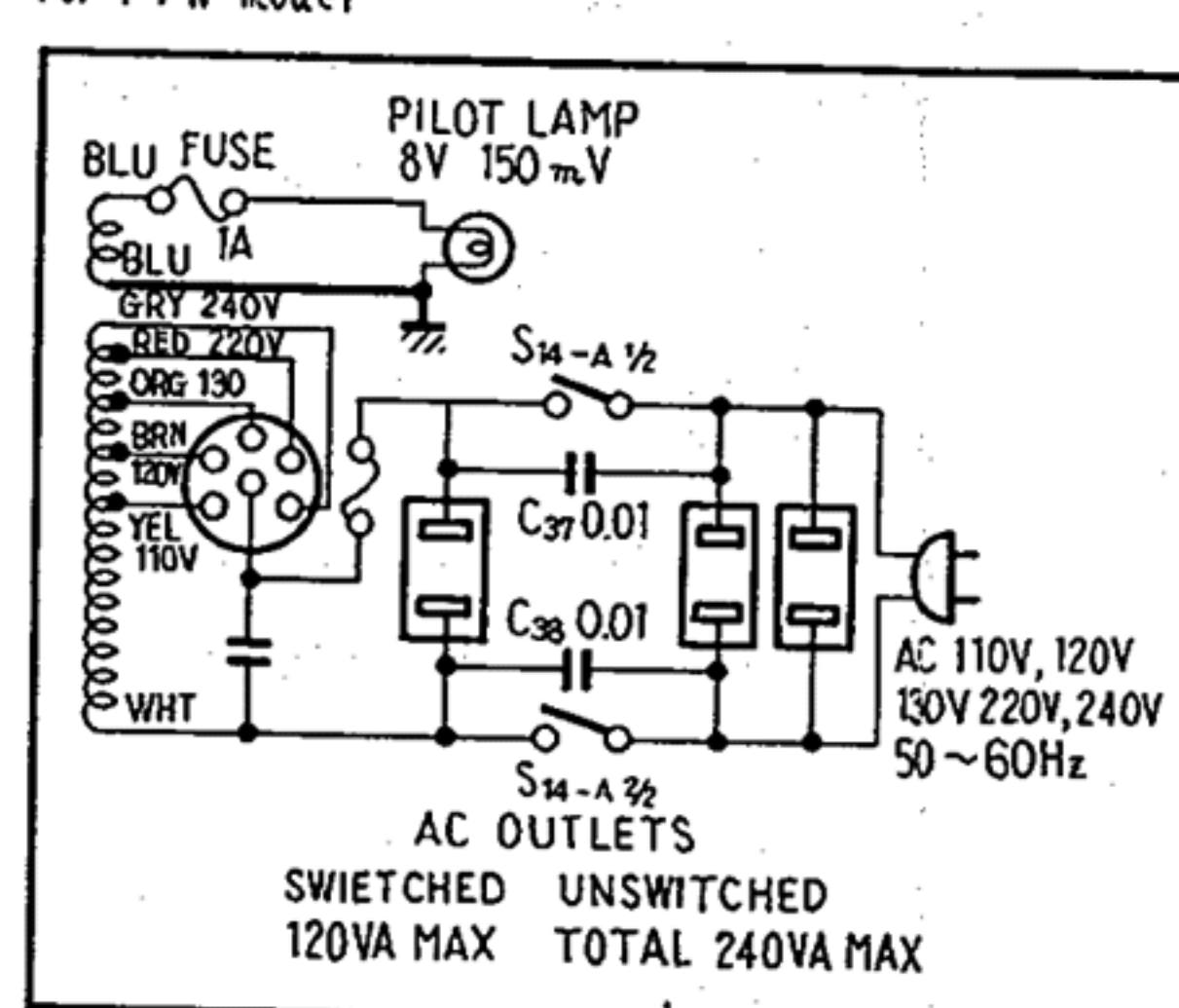
- NON MARK: OHM
- K : KILOHM
- M : MEGOHM

CAPACITORS

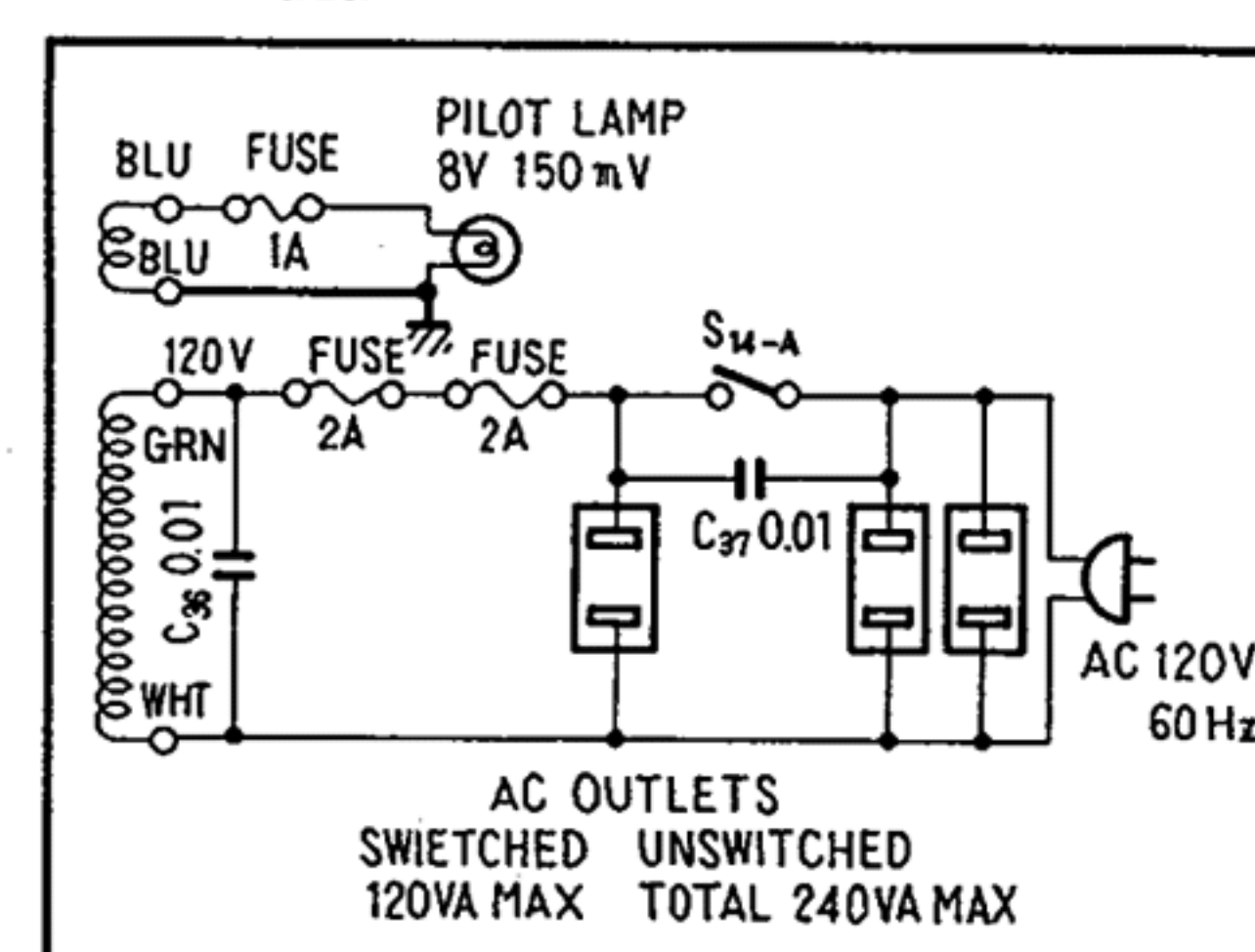
- NON MARK: μF
- P : μμF

- ⎓ : SIGNAL VOLTAGE AT 41W/8Ω (at 1kHz)
- V : DC VOLTAGE AT NO INPUT SIGNAL
- : DC CURRENT AT NO INPUT SIGNAL

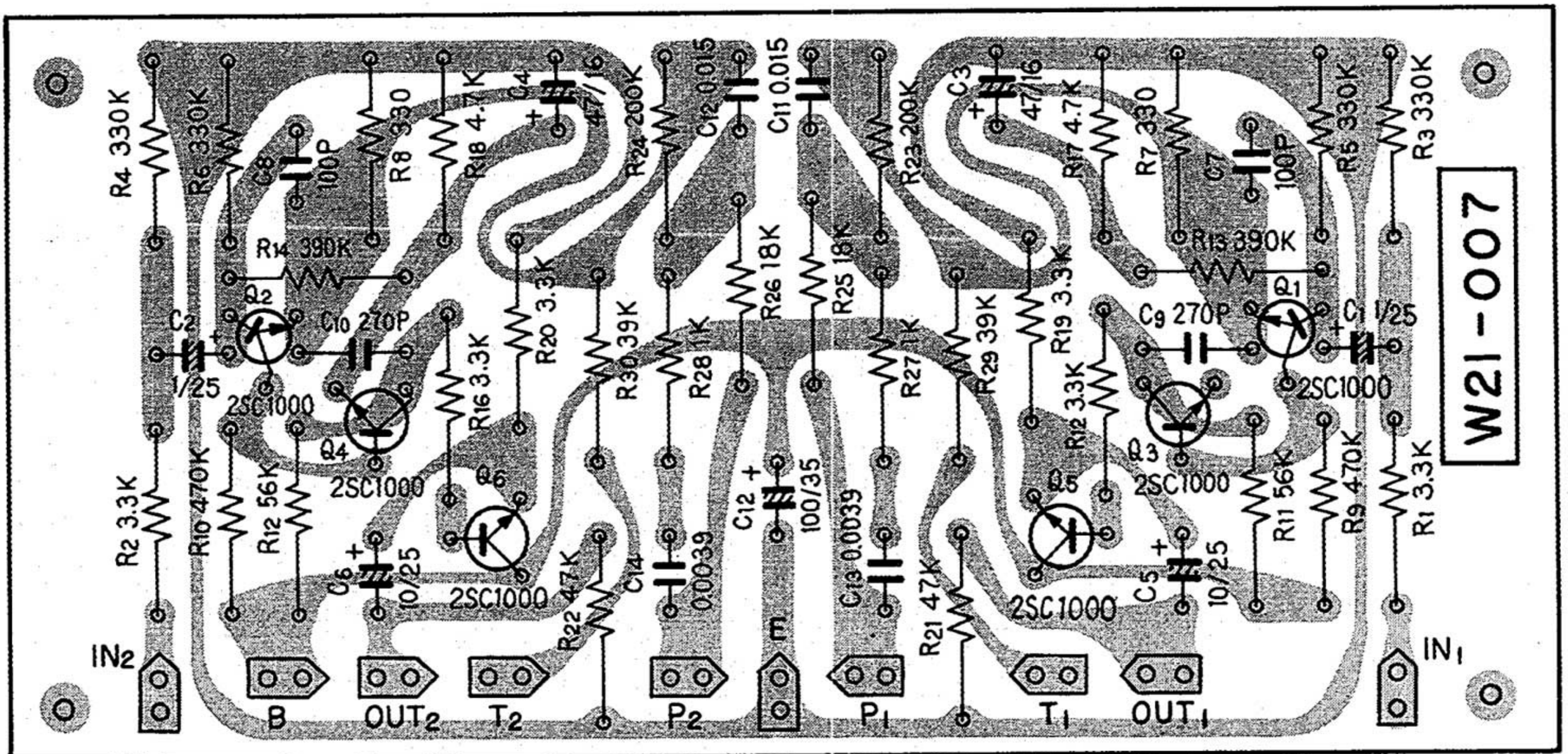
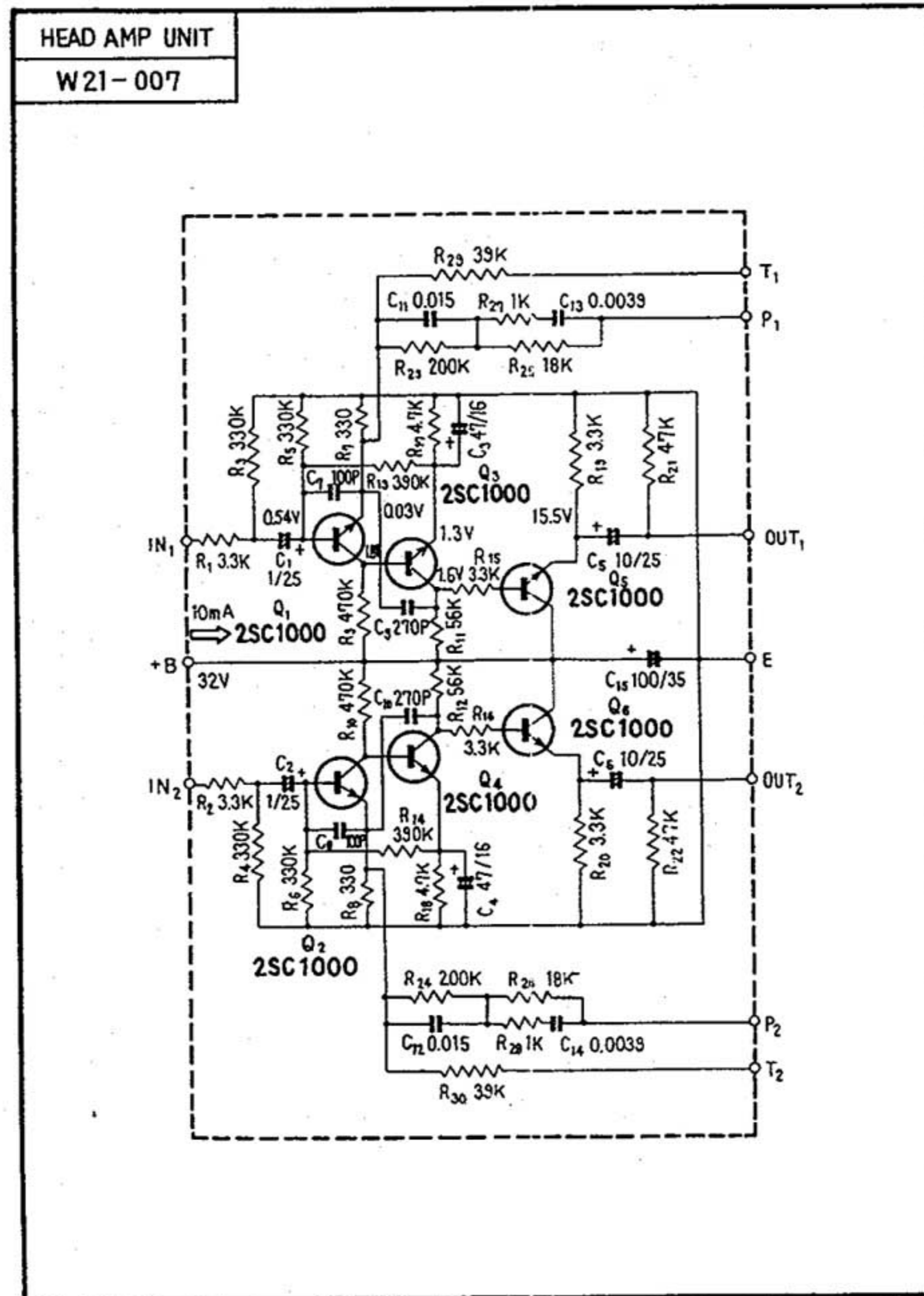
POWER SUPPLY CIRCUITS



For KCW model

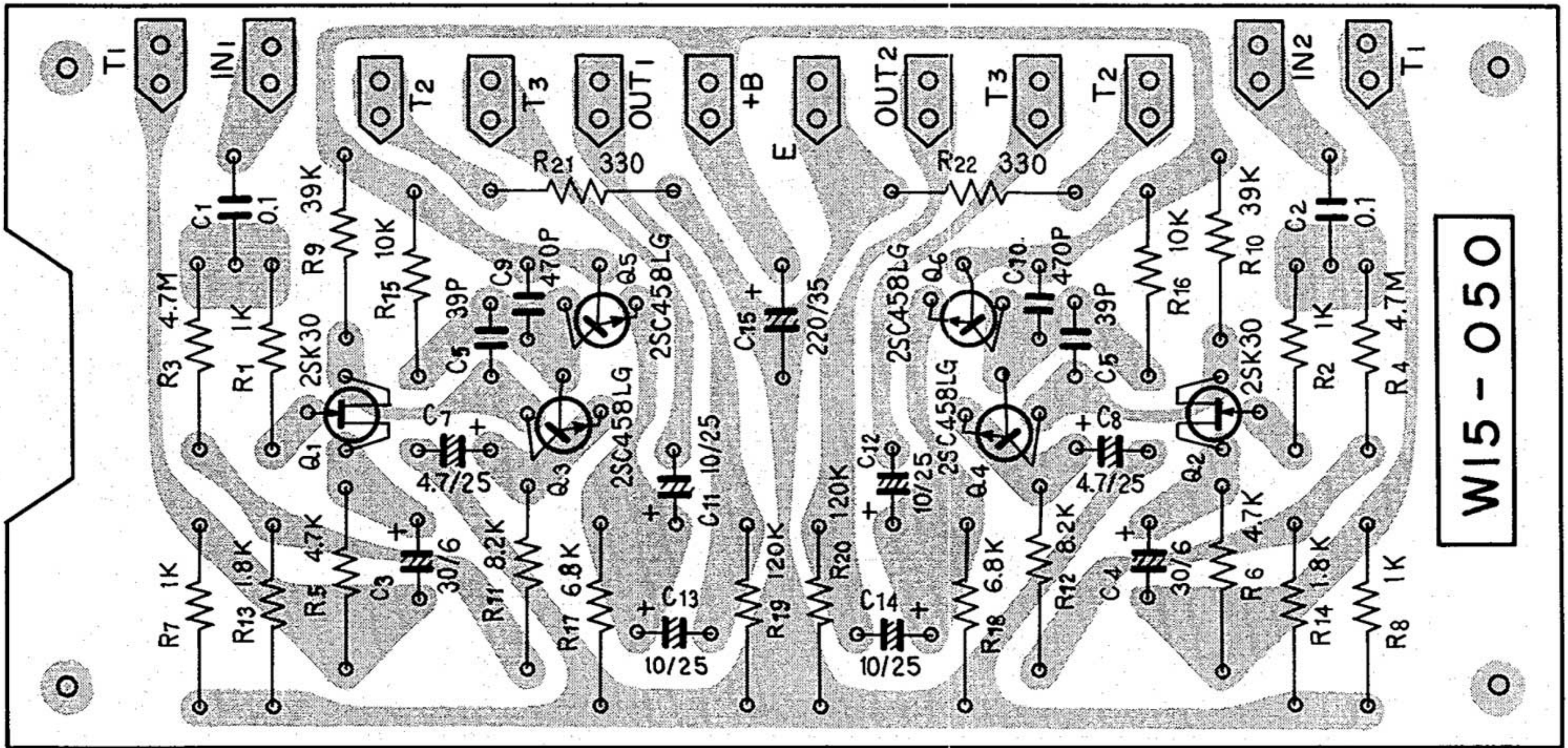
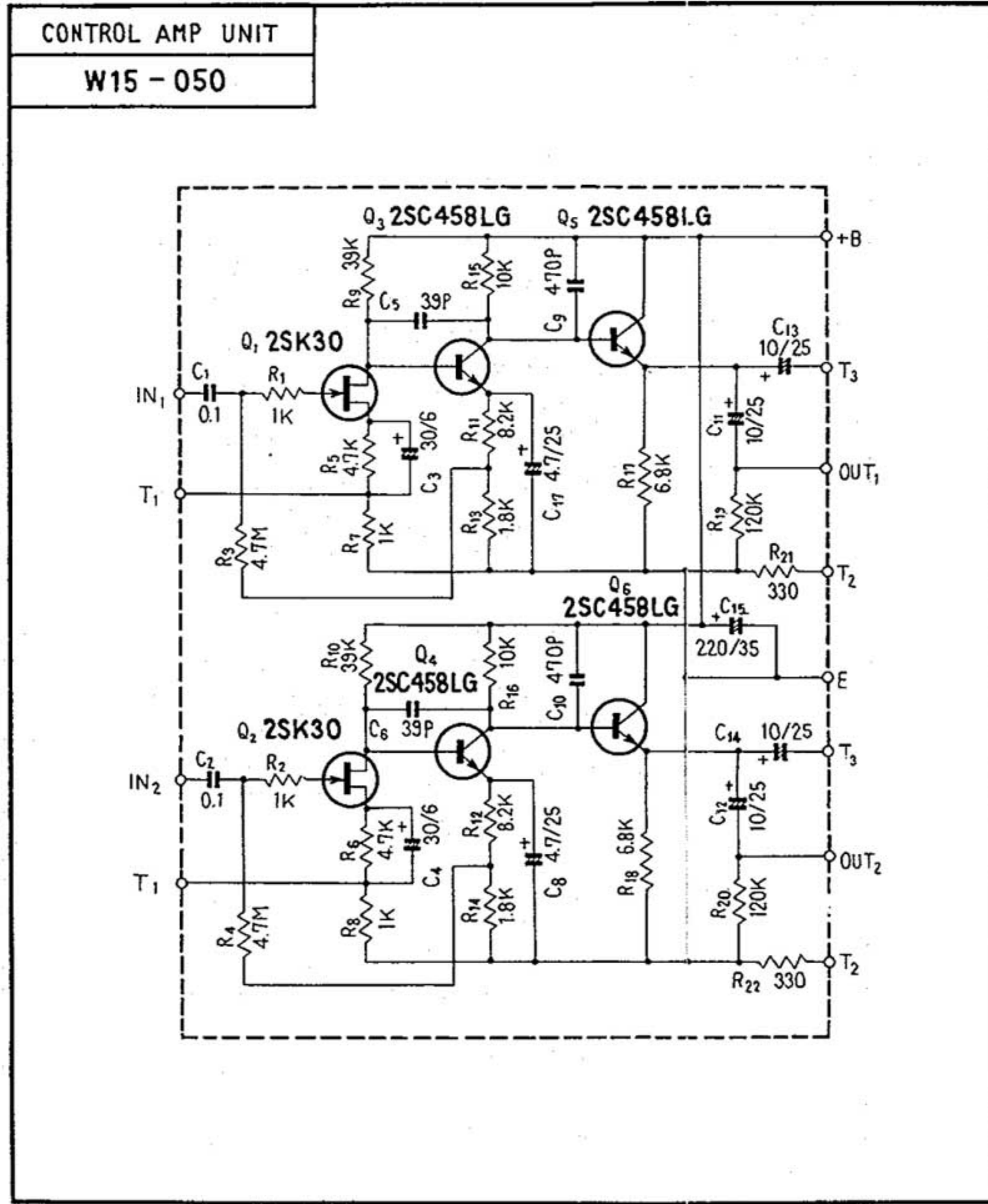


HEAD AMP UNIT (W21-007)



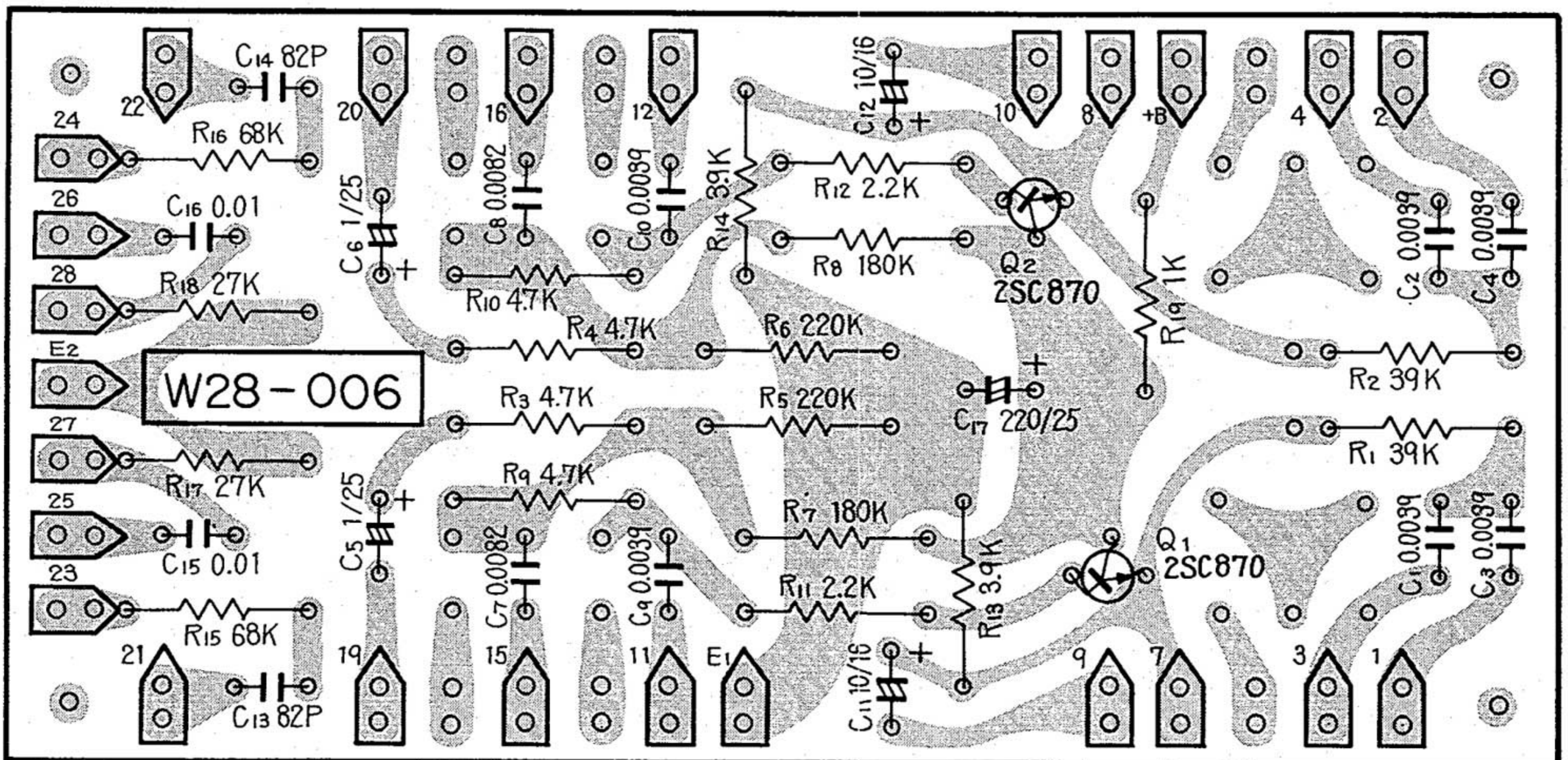
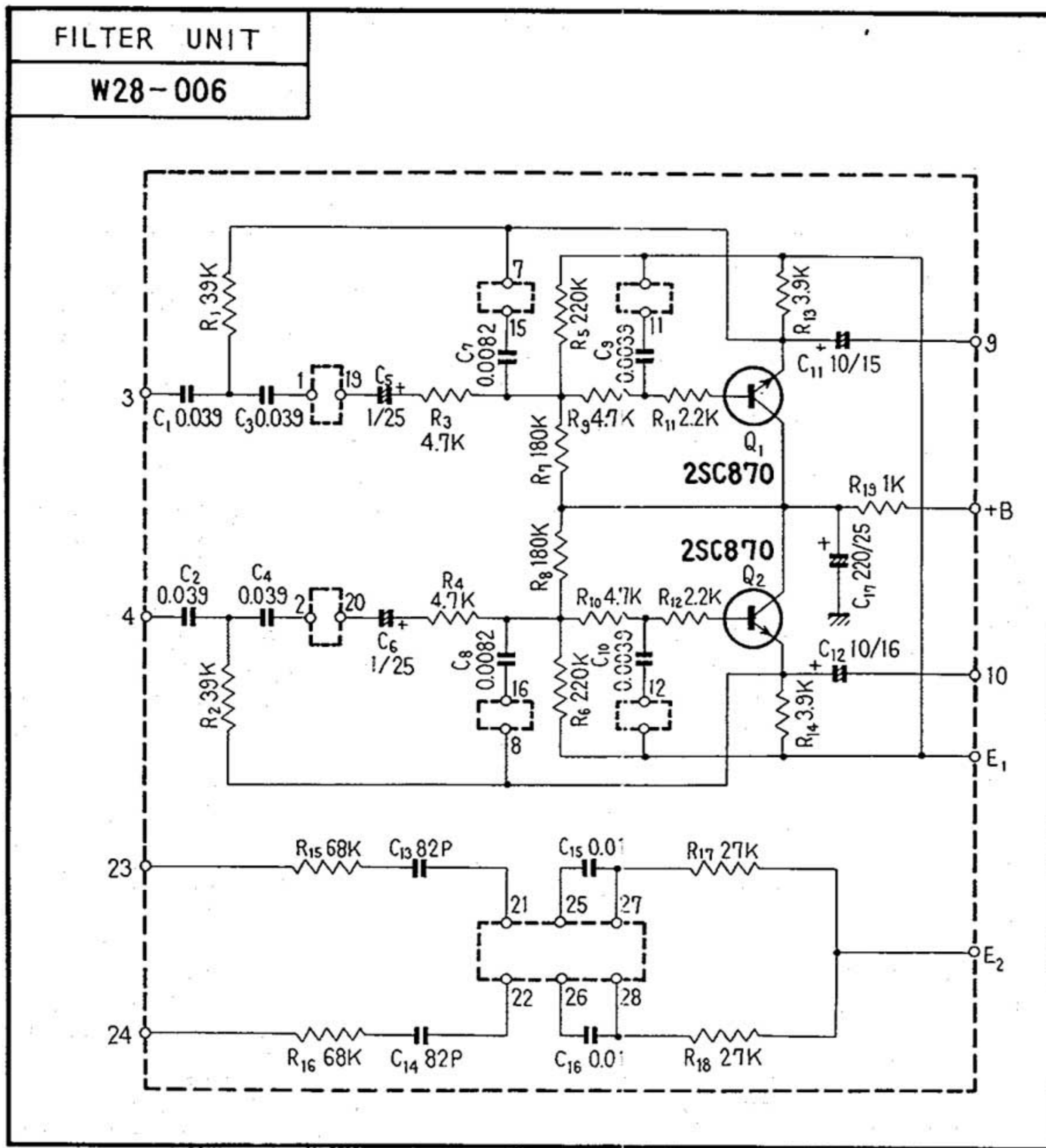
W21-007

CONTROL AMP UNIT (W15-050)



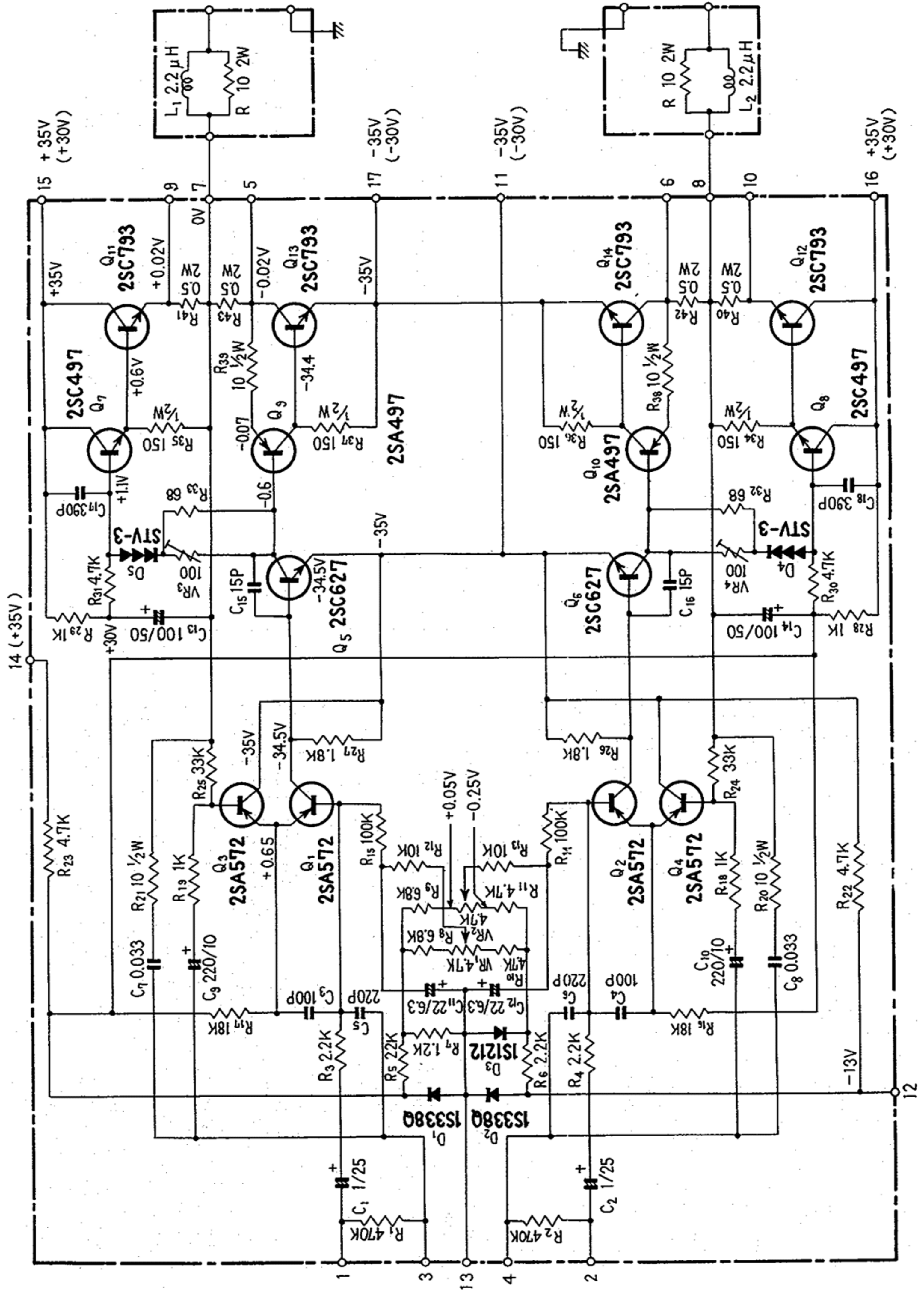
W15 - 050

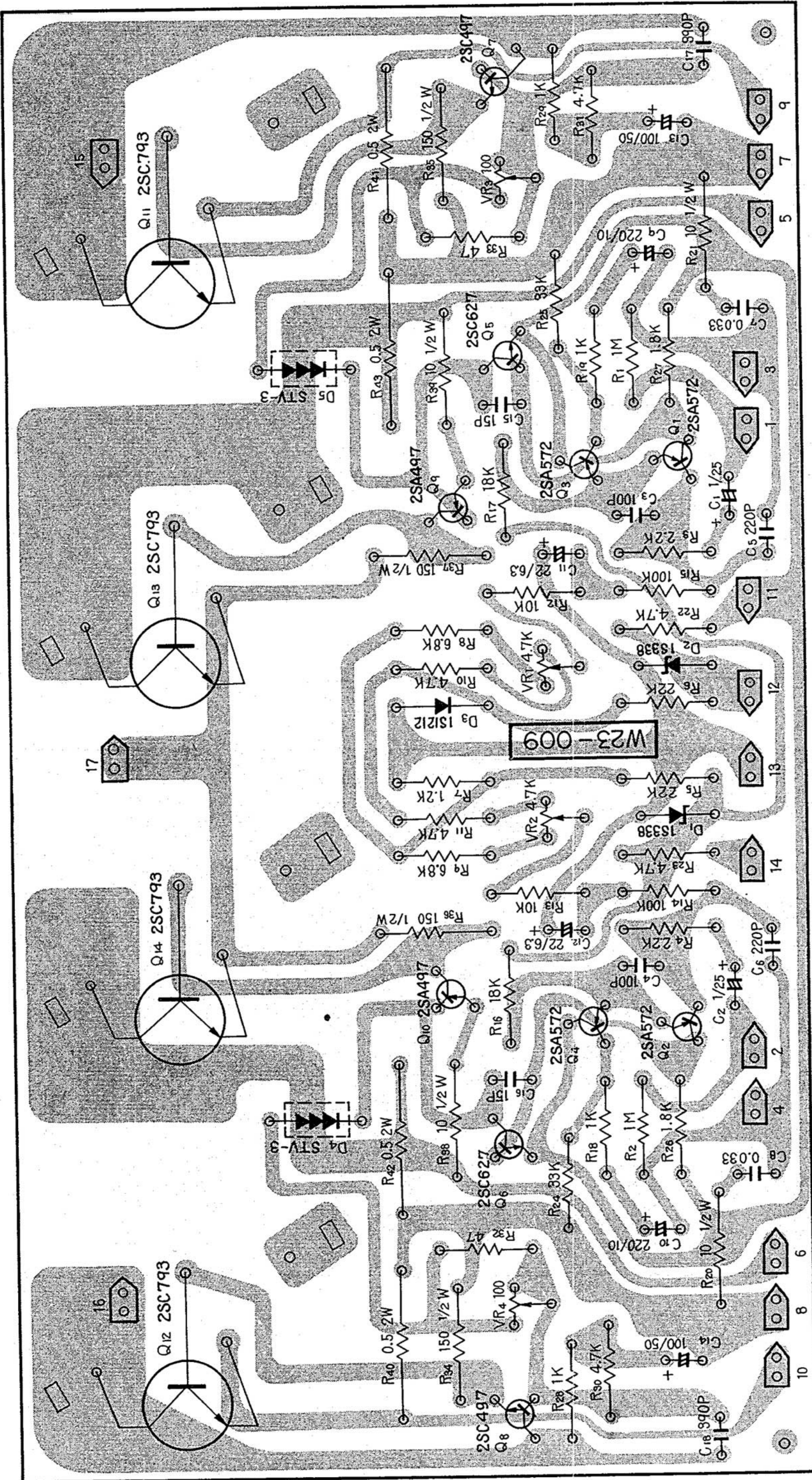
FILTER UNIT (W28-006)



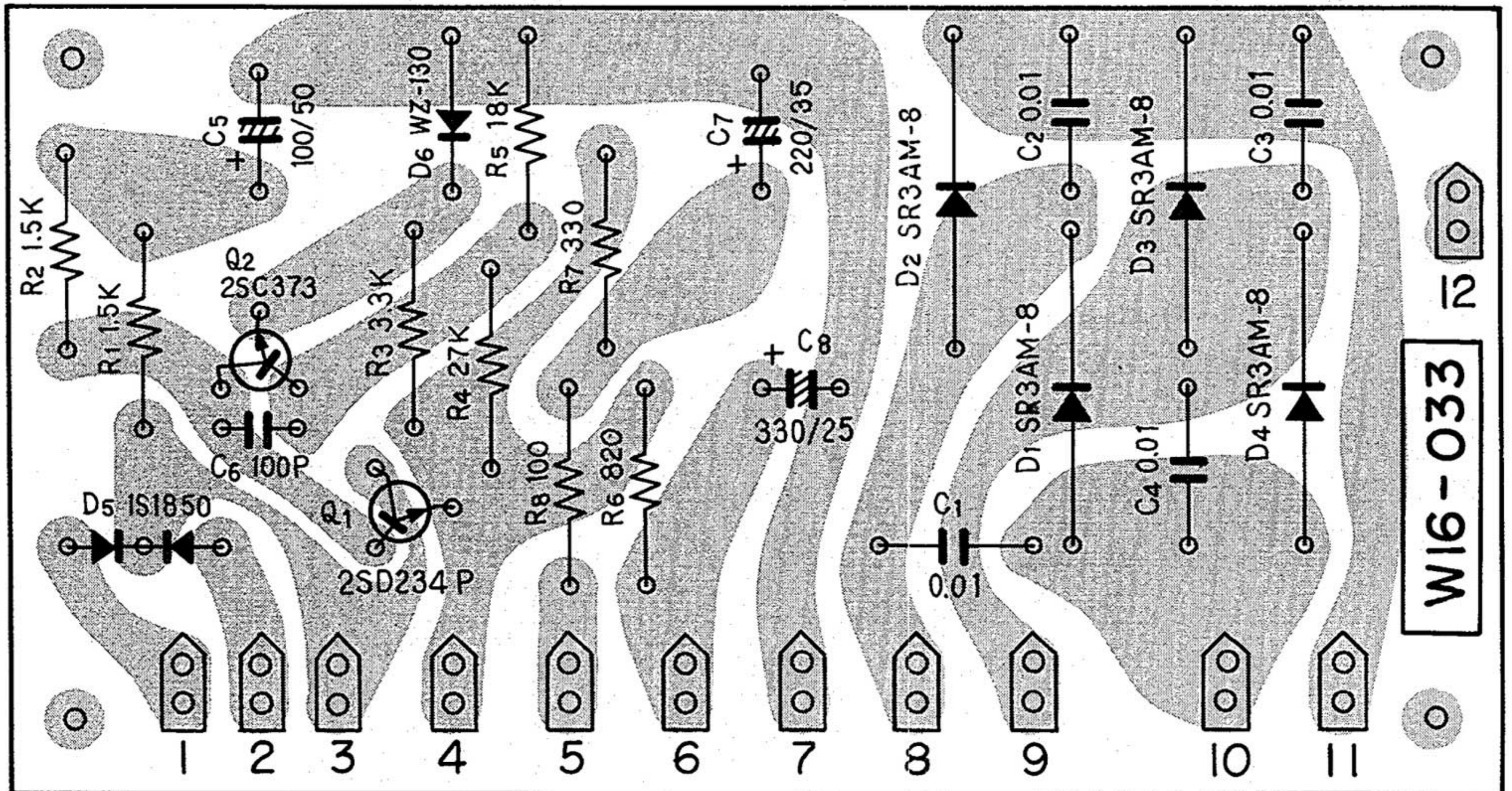
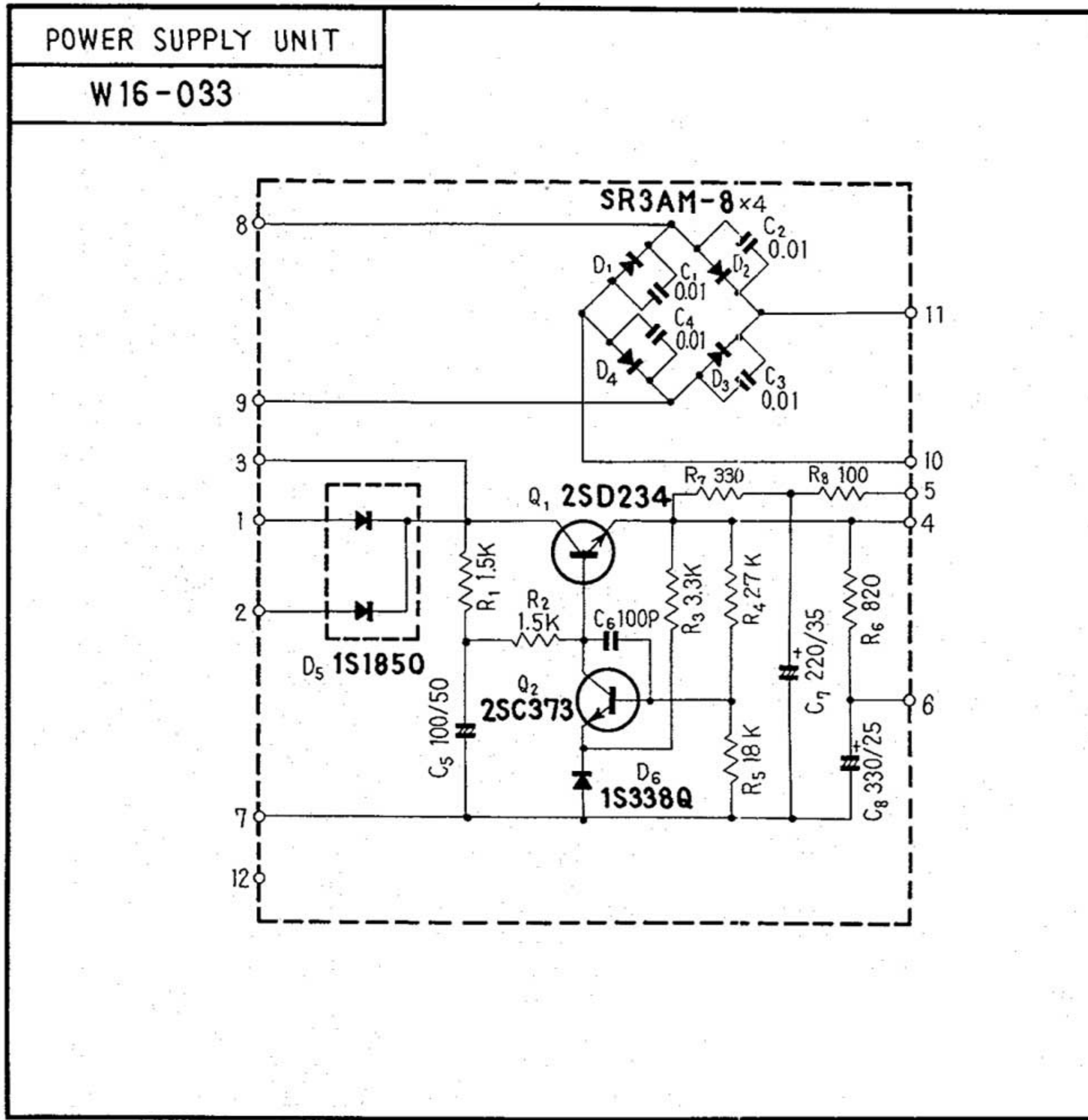
MAIN AMP UNIT (W23-009)

MAIN AMP UNIT
W23 - 009

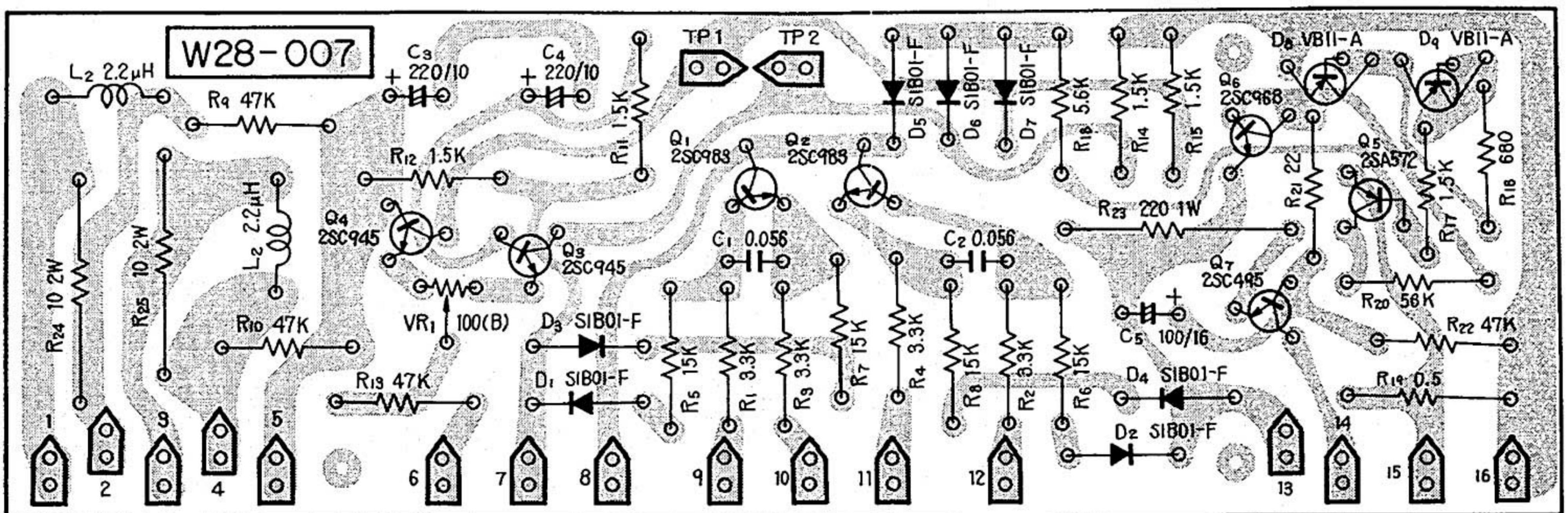
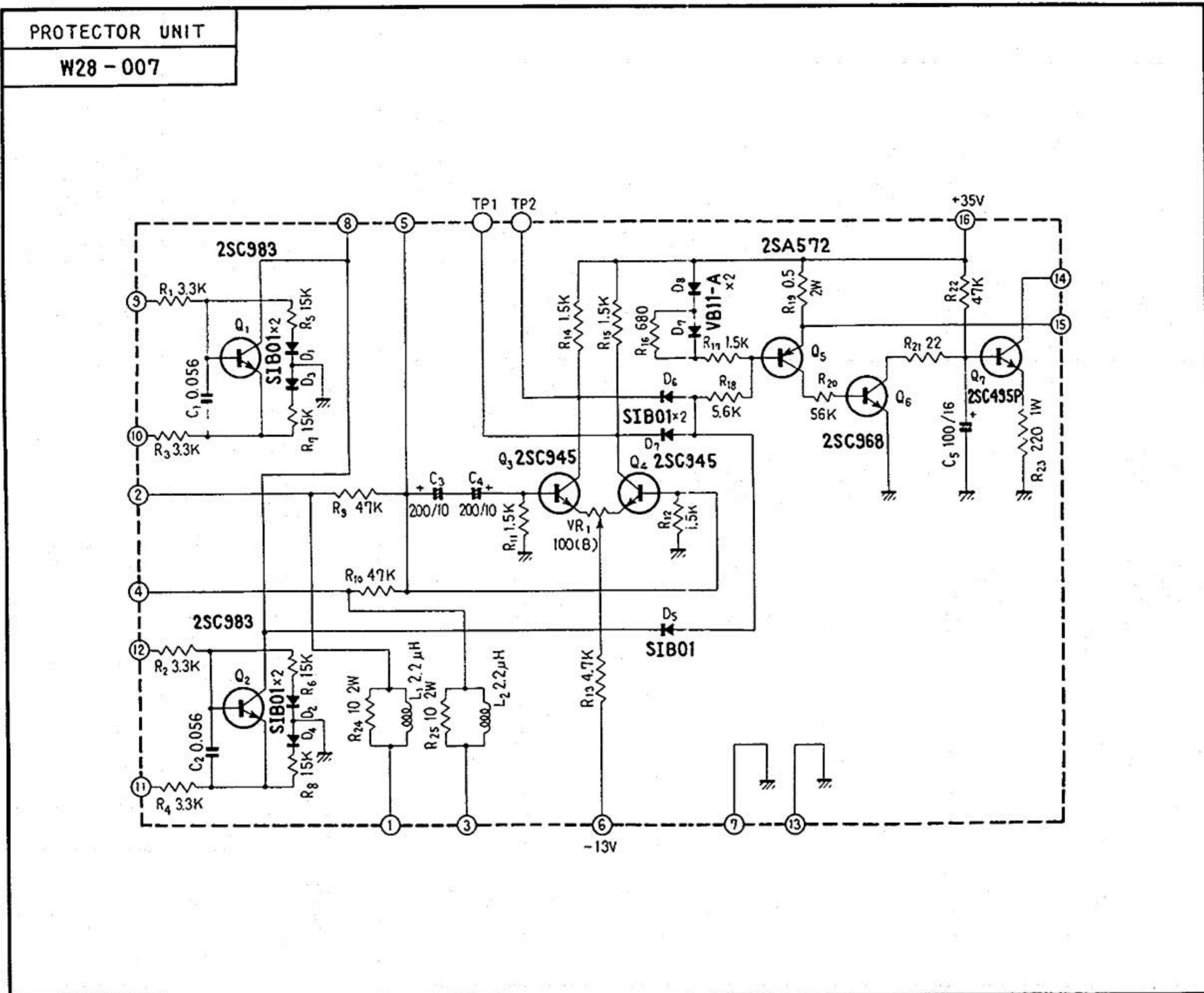




POWER SUPPLY UNIT (W16-033)



PROTECTOR UNIT (W28-007)



8 • PARTS LIST

MISCELLANEOUS

NOTE

This parts list is for the FVW model, the KUW or KCW model uses some different parts as following pages:

for KUW model page 25

for KCW model page 28

CAPACITORS

IN μ F UNLESS OTHERWISE NOTED, p: μ F.

Symbol	Description	Part No.
C1	Ceramic 0.01 50V	CKDYF 103Z 50
C2	Ceramic 0.01 50V	CKDYF 103Z 50
C3	Styrol 0.0018 50V	CQSA 182K 50
C4	Styrol 0.0018 50V	CQSA 182K 50
C5	Styrol 0.001 50V	CQSA 102K 50
C6	Styrol 0.001 50V	CQSA 102K 50
C7	Styrol 0.0018 50V	CQSA 182K 50
C8	Styrol 0.0018 50V	CQSA 182K 50
C9	Mylar 0.05 50V	CQMA 503K 50
C10	Mylar 0.05 50V	CQMA 503K 50
C11	Mylar 0.025 50V	CQMA 253K 50
C12	Mylar 0.025 50V	CQMA 253K 50
C13	Mylar 0.015 50V	CQMA 153K 50
C14	Mylar 0.015 50V	CQMA 153K 50
C15	Mylar 0.03 50V	CQMA 303K 50
C16	Mylar 0.03 50V	CQMA 303K 50
C17	Mylar 0.05 50V	CQMA 503K 50
C18	Mylar 0.05 50V	CQMA 503K 50
C19	Mylar 0.015 50V	CQMA 153K 50
C20	Mylar 0.015 50V	CQMA 153K 50

Symbol	Description	Part No.
C21	Mylar 0.022 50V	CQMA 223K 50
C22	Mylar 0.022 50V	CQMA 223K 50
C23	Mylar 0.082 50V	CQMA 823K 50
C24	Mylar 0.082 50V	CQMA 823K 50
C25	Styrol 820p 50V	CQSA 821K 50
C26	Styrol 820p 50V	CQSA 821K 50
C27	Styrol 820p 50V	CQSA 821K 50
C28	Styrol 820p 50V	CQSA 821K 50
C29	Styrol 0.0012 50V	CQSA 122K 50
C30	Styrol 0.0012 50V	CQSA 122K 50
C31	Mylar 0.002 50V	CQMA 202K 50
C32	Mylar 0.002 50V	CQMA 202K 50
C33	Electrolytic 4700 50V	C52-088-B
C34	Electrolytic 4700 50V	C52-088-B
C35	Electrolytic 1000 63V	ACH-001-B
C36	Ceramic 0.01 DC 1.4kV	C43-003-0
C37	Ceramic 0.01 DC 1.4kV	C43-003-0
C38	Ceramic 0.01 DC 1.4kV	C43-003-0
C39	Mylar 0.082 50V	CQMA 823K 50
C40	Mylar 0.082 50V	CQMA 823K 50

RESISTORS

IN Ω , $\frac{1}{4}$ W UNLESS OTHERWISE NOTED, k: k Ω , M: M Ω .

Symbol	Description	Part No.
R1	Carbon film 47k	RD $\frac{1}{4}$ PS 473K
R3	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R4	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R5	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R6	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R7	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R8	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R9	Carbon film 150k	RD $\frac{1}{4}$ PS 154K
R10	Carbon film 150k	RD $\frac{1}{4}$ PS 154K
R11	Carbon film 10k $\frac{1}{2}$ W	RD $\frac{1}{2}$ PW 103K

Symbol	Description	Part No.
R45	Metal oxide 560 1W	RS1P 561K
R46	Metal oxide 560 1W	RS1P 561K
R47	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R48	Carbon film 120k	RD $\frac{1}{4}$ PS 124K

SWITCHES

Symbol	Description	Part No.
S1	SELECTOR Switch	S13-045-0
S2	PHONO 2 SELECTOR	S42-016-A
S3	MODE Switch	S14-035-0
S4	TAPE MONITOR 1 Switch	S42-011-A
S5	TAPE MONITOR 2 Switch	S42-011-A
S6	LOUDNESS Switch	S42-012-A
S7	BASS Switch	S16-054-A
S8	TREBLE Switch	S16-046-A
S9	LOW FILTER	S42-012-A
S10	HIGH FILTER	S42-016-A
S11	MUTING Switch	S42-012-A
S12	PRE & MAIN Switch	S41-025-0
S13	OUTPUT SELECTOR	S12-011-B
S14	POWER Switch	S11-024-B
S15	Relay	S61-006-0

POTENTIOMETERS

Symbol	Description	Part No.
VR1	500k dual, BALANCE	C85-048-B
VR2	500k dual, VOLUME	C85-054-0

Symbol	Description	Part No.
R12	Carbon film 10k	RD $\frac{1}{2}$ PW 103K
R13	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R14	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R15	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R16	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R17	Carbon film 470k	RD $\frac{1}{4}$ PS 474K
R18	Carbon film 470k	RD $\frac{1}{4}$ PS 474K
R19	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R20	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R21	Carbon film 15k	RD $\frac{1}{2}$ PW 153K
R22	Carbon film 15k	RD $\frac{1}{2}$ PW 153K
R23	Carbon film 1.8k	RD $\frac{1}{2}$ PW 182K
R24	Carbon film 1.8k	RD $\frac{1}{2}$ PW 182K
R25	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R26	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R27	Carbon film 2.2M	RD $\frac{1}{4}$ PS 225K
R28	Carbon film 2.2M	RD $\frac{1}{4}$ PS 225K
R29	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R30	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R31	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R32	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R33	Carbon film 15k	RD $\frac{1}{4}$ PS 153K
R34	Carbon film 15k	RD $\frac{1}{4}$ PS 153K
R35	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R36	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R37	Carbon film 82k	RD $\frac{1}{4}$ PS 823K
R38	Carbon film 82k	RD $\frac{1}{4}$ PS 823K
R39	Wire wound 150 2W	RM2P 151K
R40	Wire wound 150 2W	RM2P 151K
R41	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R43	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R44	Carbon film 100k	RD $\frac{1}{4}$ PS 104K

Symbol	Description	Part No.
	Pilot lamp	E22-020-0
	Fuse 1A	E21-004-0
	Fuse 1A, for protection	E21-020-0
	4P Ground terminal	K13-047-0
	Screw, to fix wooden case	B11-015-B
	AC Power cord	D11-002-B
	Operating instructions	ARB-010-0
	Pin Plug	K72-018-0
	Speaker Plug	K72-007-0
	Packing case	AHD-019-0
	Protector for packing	H11-070-B
	Connection cord (white)	D51-003-B
	Connection cord (red)	D51-004-B

Symbol	Description	Part No.
	Head amp unit	W21-007-A
	Control amp unit	W15-050-C
	Filter unit	W28-006-A
	Main amp unit	W23-009-A
	Power supply unit	W16-033-A
	Protector unit	W28-007-A
	Front panel Ass'y	ANB-062-0
	Wooden case	M52-139-C
	Foot	AEC-012-0
	Knob for VOLUME, MODE and SELECTOR	A12-229-A
	Knob for POWER, BASS, TREBLE, SPEAKERS and BALANCE	A12-232-A
	Knob for MUTING, FILTERS, TAPE MONITORS and PHONO 2	A19-095-A
	1P Input terminal board	K21-005-C
	4P Input terminal board	K21-010-E
	6P Input terminal board	K22-013-D
	Power transformer	ATT-020-A
	Compound part for REC terminal	W52-004-0
	5P Connector (DIN type)	K93-003-B
	Speaker socket	K72-031-0
	Pilot lamp socket	K42-003-A
	Headphones jack	K72-026-0
	Microphone jack	K72-024-0
	8P Socket for MC transformer	K24-002-A
	Fuse holder	AKR-001-0
	Spare AC outlet	K82-012-A
	Spare AC outlet (2P)	K82-014-0

for KUW model

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic	CKDYF 103Z 50
C2	Ceramic	CKDYF 103Z 50
C3	Styrol	CQSA 182K 50
C4	Styrol	CQSA 182K 50
C5	Styrol	CQSA 102K 50
C6	Styrol	CQSA 102K 50
C7	Styrol	CQSA 182K 50
C8	Styrol	CQSA 182K 50
C9	Mylar	CQMA 503K 50
C10	Mylar	CQMA 503K 50
C11	Mylar	CQMA 253K 50
C12	Mylar	CQMA 253K 50
C13	Mylar	CQMA 153K 50
C14	Mylar	CQMA 153K 50
C15	Mylar	CQMA 303K 50
C16	Mylar	CQMA 303K 50
C17	Mylar	CQMA 503K 50
C18	Mylar	CQMA 503K 50
C19	Mylar	CQMA 153K 50
C20	Mylar	CQMA 153K 50
C21	Mylar	CQMA 223K 50
C22	Mylar	CQMA 223K 50
C23	Mylar	CQMA 823K 50
C24	Mylar	CQMA 823K 50
C25	Styrol	CQSA 821K 50

Symbol	Description	Part No.
C26	Styrol	COSA 821K 50
C27	Styrol	COSA 821K 50
C28	Styrol	COSA 821K 50
C29	Styrol	COSA 122K 50
C30	Styrol	COSA 122K 50
C31	Mylar	CQMA 202K 50
C32	Mylar	CQMA 202K 50
C33	Electrolytic	C52-088-B
C34	Electrolytic	C52-088-B
C35	Electrolytic	ACH-001-B
C36	Oil	ACE-001-A
C37	Ceramic	C43-003-0

RESISTORS

Symbol	Description	Part No.
R1	Carbon film	RD $\frac{1}{4}$ PS 473K
R3	Carbon film	RD $\frac{1}{4}$ PS 104K
R4	Carbon film	RD $\frac{1}{4}$ PS 104K
R5	Carbon film	RD $\frac{1}{4}$ PS 105K
R6	Carbon film	RD $\frac{1}{4}$ PS 105K
R7	Carbon film	RD $\frac{1}{4}$ PS 104K
R8	Carbon film	RD $\frac{1}{4}$ PS 104K
R9	Carbon film	RD $\frac{1}{4}$ PS 154K
R10	Carbon film	RD $\frac{1}{4}$ PS 154K
R11	Carbon film	RD $\frac{1}{2}$ PW 103K
R12	Carbon film	RD $\frac{1}{2}$ PW 103K
R13	Carbon film	RD $\frac{1}{4}$ PS 124K
R14	Carbon film	RD $\frac{1}{4}$ PS 124K
R15	Carbon film	RD $\frac{1}{4}$ PS 334K
R16	Carbon film	RD $\frac{1}{4}$ PS 334K

SWITCHES

Symbol	Description	Part No.
S1	SELECTOR Switch	S13-045-0
S2	PHONO 2 SELECTOR	S42-016-A
S3	MODE Switch	S14-035-0
S4	TAPE MONITOR 1 Switch	S42-011-A
S5	TAPE MONITOR 2 Switch	S42-011-A
S6	LOUDNESS Switch	S42-012-A
S7	BASS Switch	S16-054-A
S8	TREBLE Switch	S16-046-A
S9	LOW FILTER	S42-012-A
S10	HIGH FILTER	S42-016-A
S11	MUTING Switch	S42-012-A
S12	PRE & MAIN Switch	S41-025-0
S13	OUTPUT SELECTOR	S12-011-B
S14	POWER Switch	ASA-007-0
S15	Relay	S61-006-0

POTENTIOMETERS

Symbol	Description	Part No.
VR1	500k dual, BALANCE	C85-048-B
VR2	500k dual, VOLUME	C85-054-0

Symbol	Description	Part No.
R17	Carbon film	RD $\frac{1}{4}$ PS 474K
R18	Carbon film	RD $\frac{1}{4}$ PS 474K
R19	Carbon film	RD $\frac{1}{4}$ PS 184K
R20	Carbon film	RD $\frac{1}{4}$ PS 184K
R21	Carbon film	RD $\frac{1}{2}$ PW 153K
R22	Carbon film	RD $\frac{1}{2}$ PW 153K
R23	Carbon film	RD $\frac{1}{2}$ PW 182K
R24	Carbon film	RD $\frac{1}{2}$ PW 182K
R25	Carbon film	RD $\frac{1}{4}$ PS 334K
R26	Carbon film	RD $\frac{1}{4}$ PS 334K
R27	Carbon film	RD $\frac{1}{4}$ PS 225K
R28	Carbon film	RD $\frac{1}{4}$ PS 225K
R29	Carbon film	RD $\frac{1}{4}$ PS 122K
R30	Carbon film	RD $\frac{1}{4}$ PS 122K
R31	Carbon film	RD $\frac{1}{4}$ PS 103K
R32	Carbon film	RD $\frac{1}{4}$ PS 103K
R33	Carbon film	RD $\frac{1}{4}$ PS 153K
R34	Carbon film	RD $\frac{1}{4}$ PS 153K
R35	Carbon film	RD $\frac{1}{4}$ PS 332K
R36	Carbon film	RD $\frac{1}{4}$ PS 332K
R37	Carbon film	RD $\frac{1}{4}$ PS 823K
R38	Carbon film	RD $\frac{1}{4}$ PS 823K
R39	Wire wound	RM2P 151K
R40	Wire wound	RM2P 151K
R41	Carbon film	RD $\frac{1}{4}$ PS 102K
R43	Carbon film	RD $\frac{1}{4}$ PS 104K
R44	Carbon film	RD $\frac{1}{4}$ PS 104K
R45	Wire wound	RS1P 561K
R46	Wire wound	RS1P 561K
R47	Carbon film	RD $\frac{1}{4}$ PS 124K
R48	Carbon film	RD $\frac{1}{4}$ PS 124K

OTHERS

Symbol	Description	Part No.
	Head amp unit	W21-007-A
	Control amp unit	W15-050-C
	Filter unit	W28-006-A
	Main amp unit	W23-009-A
	Power supply unit	W16-033-A
	Protector unit	W28-007-A
	Front panel Ass'y	ANB-062-0
	Wooden case	M52-139-C
	Foot	AEC-012-0
	Knob for VOLUME, MODE and SELECTOR	A12-229-A
	Knob for POWER, BASS, TREBLE, SPEAKERS and BALANCE	A12-232-A
	Knob for MUTING, FILTERS, TAPE MONITORS and PHONO 2	A19-095-A
	1P Input terminal board	K21-005-C
	4P Input terminal board	K21-010-E
	6P Input terminal board	K22-013-D
	Power transformer	ATT-019-A
	Compound part for REC terminal	W52-004-0
	5P Connector (DIN type)	K93-003-B
	Speaker socket	K72-031-0
	Pilot lamp socket	K42-003-A
	Headphones jack	K72-026-0
	Microphone jack	K72-024-0
	8P Socket for MC transformer	K24-002-A
	Fuse holder	K96-007-B
	Spare AC outlet	AKP-002-0
	Pilot lamp	E22-020-0

Symbol	Description	Part No.
	Fuse 2A	E21-027-0
	Fuse 1A, for protection	AEK-004-0
	Fuse 3A	E21-006-0
	Screw, to fix wooden case	B11-015-B
	AC Power cord	D11-003-E
	Operating instructions	ARB-011-0
	Pin plug	K72-015-A
	Speaker plug	K72-007-B
	Packing case	AHD-029-0
	Protector for packing	H11-070-B
	4P Ground terminal	K13-047-0
	Washer (Square)	M52-010-0
	Connection cord (white)	D51-003-B
	Connection cord (red)	D51-004-B

for KCW model CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 0.01 50V	CKDYF 103Z 50
C2	Ceramic 0.01 50V	CKDYF 103Z 50
C3	Styrol 0.0018 50V	CQSA 182K 50
C4	Styrol 0.0018 50V	CQSA 182K 50
C5	Styrol 0.001 50V	CQSA 102K 50
C6	Styrol 0.001 50V	CQSA 102K 50
C7	Styrol 0.0018 50V	CQSA 182K 50
C8	Styrol 0.0018 50V	CQSA 182K 50
C9	Mylar 0.05 50V	CQMA 503K 50
C10	Mylar 0.05 50V	CQMA 503K 50
C11	Mylar 0.025 50V	CQMA 253K 50
C12	Mylar 0.025 50V	CQMA 253K 50
C13	Mylar 0.015 50V	CQMA 153K 50
C14	Mylar 0.015 50V	CQMA 153K 50
C15	Mylar 0.03 50V	CQMA 303K 50
C16	Mylar 0.03 50V	CQMA 303K 50
C17	Mylar 0.05 50V	CQMA 503K 50
C18	Mylar 0.05 50V	CQMA 503K 50
C19	Mylar 0.015 50V	CQMA 153K 50
C20	Mylar 0.015 50V	CQMA 153K 50
C21	Mylar 0.022 50V	CQMA 223K 50
C22	Mylar 0.022 50V	CQMA 223K 50
C23	Mylar 0.082 50V	CQMA 823K 50
C24	Mylar 0.082 50V	CQMA 823K 50
C25	Styrol 820p 50V	CQSA 821K 50

Symbol	Description	Part No.
C26	Styrol 820p 50V	CQSA 821K 50
C27	Styrol 820p 50V	CQSA 821K 50
C28	Styrol 820p 50V	CQSA 821K 50
C29	Styrol 0.0012 50V	CQSA 122K 50
C30	Styrol 0.0012 50V	CQSA 122K 50
C31	Mylar 0.002 50V	CQMA 202K 50
C32	Mylar 0.002 50V	CQMA 202K 50
C33	Electrolytic 4700 50V	C52-088-B
C34	Electrolytic 4700 50V	C52-088-B
C35	Electrolytic 1000 63V	ACH-001-B
C36	Oil paper 0.01 800V	C15-001-0
C37	Ceramic 0.01 DC 1.4kV	C43-003-0
C38	Mylar 0.082 50V	CQMA 823K 50
C39	Mylar 0.082 50V	CQMA 823K 50

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 47k	RD $\frac{1}{4}$ PS 473K
R3	Carbon film 100K	RD $\frac{1}{4}$ PS 104K
R4	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R5	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R6	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R7	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R8	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R9	Carbon film 150k	RD $\frac{1}{4}$ PS 154K
R10	Carbon film 150k	RD $\frac{1}{4}$ PS 154K
R11	Carbon film 10k $\frac{1}{2}W$	RD $\frac{1}{2}$ PW 103K

Symbol	Description	Part No.
R43	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R44	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R45	Metal oxide 560 1W	RS1P 561K
R46	Metal oxide 560 1W	RS1P 561K
R47	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R48	Carbon film 120k	RD $\frac{1}{4}$ PW 124K

SWITCHES

Symbol	Description	Part No.
S1	SELECTOR Switch	S13-045-0
S2	PHONO 2 SELECTOR	S42-016-A
S3	MODE Switch	S14-035-0
S4	TAPE MONITOR 1 Switch	S42-011-A
S5	TAPE MONITOR 2 Switch	S42-011-A
S6	LOUDNESS Switch	S42-012-A
S7	BASS Switch	S16-054-A
S8	TREBLE Switch	S16-046-A
S9	LOW FILTER	S42-012-A
S10	HIGH FILTER	S42-016-A
S11	MUTING Switch	S42-012-A
S12	PRE & MAIN Switch	S41-025-0
S13	OUTPUT SELECTOR	S12-011-B
S14	POWER Switch	S11-023-B
S15	Relay	S61-006-0

Symbol	Description	Part No.
R12	Carbon film 10k	RD $\frac{1}{2}$ PW 103K
R13	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R14	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R15	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R16	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R17	Carbon film 470k	RD $\frac{1}{4}$ PS 474K
R18	Carbon film 470k	RD $\frac{1}{4}$ PS 474K
R19	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R20	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R21	Carbon film 15k	RD $\frac{1}{2}$ PW 153K
R22	Carbon film 15k	RD $\frac{1}{2}$ PW 153K
R23	Carbon film 1.8k	RD $\frac{1}{2}$ PW 182K
R24	Carbon film 1.8k	RD $\frac{1}{2}$ PW 182K
R25	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R26	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R27	Carbon film 2.2M	RD $\frac{1}{4}$ PS 225K
R28	Carbon film 2.2M	RD $\frac{1}{4}$ PS 225K
R29	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R30	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R31	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R32	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R33	Carbon film 15k	RD $\frac{1}{4}$ PS 153K
R34	Carbon film 15k	RD $\frac{1}{4}$ PS 153K
R35	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R36	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R37	Carbon film 82k	RD $\frac{1}{4}$ PS 823K
R38	Carbon film 82k	RD $\frac{1}{4}$ PS 823K
R39	Metal oxide 150 2W	RS2P 151K
R40	Metal oxide 150 2W	RS2P 151K
R41	Carbon film 1k	RD $\frac{1}{4}$ PS 102K

OTHERS

Symbol	Description	Part No.
	Head Amp Unit	W21-007-A
	Control Amp Unit	W15-050-C
	Filter Unit	W28-006-A
	Main Amp Unit	W23-009-A
	Power Supply Unit	W16-033-A
	Protector Unit	W28-007-A
	Front Panel Ass'y	ANB-062-0
	Wooden Case	M52-139-C
	Foot	AEC-012-0
	Knob for VOLUME, MODE and SELECTOR	A12-229-A
	Knob for POWER, BASS, TREBLE, SPEAKERS and BALANCE	A12-232-A
	Knob for MUTING, FILTERS, TAPE MONITORS and PHONO 2	A19-095-A
	1P Input Terminal Board	K21-005-C
	4P Input Terminal Board	K21-010-E
	6P Input Terminal Board	K22-013-D
	4P Ground Terminal	K13-047-0
	Power Transformer	ATT-019-A
	Compound Part for REC Terminal	W52-004-0
	5P Connector (DIN type)	K93-003-B
	Speaker Socket	K72-031-0
	Pilot Lamp Socket	K42-003-A
	Headphones Jack	K72-026-0
	Microphone Jack	K72-024-0
	8P Socket for MC Transformer	K24-002-A
	Spare AC Outlet	AKP-002-0

Symbol	Description	Part No.
	Spare AC Outlet (2P)	K82-014-0
	Fuse Holder	K96-007-C
	Pilot Lamp	E22-020-0
	Fuse 2A	E21-005-0
	Fuse 1A for Protection	E21-020-0
	Fuse 2A for Protection	E21-026-0
	Screw for Grounding	B11-012-A
	Screw to fix Wooden Case	B11-015-B
	AC Power Cord	D11-003-E
	Operating Instructions	ARB-011-0
	Connection Cord (white)	D51-003-B
	Connection Cord (red)	D51-004-B
	Pin Plug	K72-015-A
	Speaker Plug	K71-032-0
	Packing Case	AHD-062-0
	Protector for Packing	H11-070-B

POTENTIOMETERS

Symbol	Description	Part No.
VR1	500k dual, BALANCE	C85-048-B
VR2	500k dual, VOLUME	C85-054-0

HEAD AMP UNIT (W21-007)

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 1	CSSA 010X 25
C2	Electrolytic 1	CSSA 010X 25
C3	Electrolytic 47	CEA 470P 25
C4	Electrolytic 47	CEA 470P 25
C5	Electrolytic 10	CEA 100P 25
C6	Electrolytic 10	CEA 100P 25
C7	Ceramic 100p	CCDSL 101K 50
C8	Ceramic 100p	CCDSL 101K 50
C9	Ceramic 270p	CCDSL 271K 50
C10	Ceramic 270p	CCDSL 271K 50
C11	Mylar 0.015	CQMA 153J 50
C12	Mylar 0.015	CQMA 153J 50
C13	Mylar 0.0039	CQMA 392K 50
C14	Mylar 0.0039	CQMA 392K 50
C15	Electrolytic 100	CEA 101P 35

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R2	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R3	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R4	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R5	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R6	Carbon film 330k	RD $\frac{1}{4}$ PS 334K
R7	Carbon film 330	RD $\frac{1}{4}$ PS 331J
R8	Carbon film 330	RD $\frac{1}{4}$ PS 331J
R9	Carbon film 470k	RD $\frac{1}{4}$ PS 474K
R10	Carbon film 470k	RD $\frac{1}{4}$ PS 474K

Symbol	Description	Part No.
R11	Carbon film 56k	RD $\frac{1}{4}$ PS 563K
R12	Carbon film 56k	RD $\frac{1}{4}$ PS 563K
R13	Carbon film 390k	RD $\frac{1}{4}$ PS 394K
R14	Carbon film 390k	RD $\frac{1}{4}$ PS 394K
R15	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R16	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R17	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R18	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R19	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R20	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R21	Carbon film 47k	RD $\frac{1}{4}$ PS 473K
R22	Carbon film 47k	RD $\frac{1}{4}$ PS 473K
R23	Carbon film 200k	RD $\frac{1}{4}$ PS 204K
R24	Carbon film 200k	RD $\frac{1}{4}$ PS 204K
R25	Carbon film 18k	RD $\frac{1}{4}$ PS 183J
R26	Carbon film 18k	RD $\frac{1}{4}$ PS 183J
R27	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R28	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R29	Carbon film 39k	RD $\frac{1}{4}$ PS 393K
R30	Carbon film 39k	RD $\frac{1}{4}$ PS 393K

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor 2SC1000-BL	
Q2	Transistor 2SC1000-BL	
Q3	Transistor 2SC1000-BL, GR	
Q4	Transistor 2SC1000-BL, GR	
Q5	Transistor 2SC1000-BL, GR	
Q6	Transistor 2SC1000-BL, GR	

CONTROL AMP UNIT (W15-050)

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 0.1	25V CSYA 0R1M 25
C2	Electrolytic 0.1	25V CSYA 0R1M 25
C3	Electrolytic 30	6V CEA 300P 6
C4	Electrolytic 30	6V CEA 300P 6
C5	Ceramic 39p	50V CCDSL 390K 50
C6	Ceramic 39p	50V CCDSL 390K 50
C7	Electrolytic 30	6V CEA 300P 6
C8	Electrolytic 30	6V CEA 300P 6
C9	Ceramic 470p	50V CCDSL 471K 50
C10	Ceramic 470p	50V CCDSL 471K 50
C11	Electrolytic 10	25V CEA 100P 25
C12	Electrolytic 10	25V CEA 100P 25
C13	Electrolytic 10	25V CEA 100P 25
C14	Electrolytic 10	25V CEA 100P 25
C15	Electrolytic 50	25V CEA 500P 25

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R2	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R3	Carbon film 4.7M	RD $\frac{1}{4}$ PS 475K
R4	Carbon film 4.7M	RD $\frac{1}{4}$ PS 475K
R5	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K

Symbol	Description	Part No.
R6	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R7	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R8	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R9	Carbon film 39k	RD $\frac{1}{4}$ PS 393K
R10	Carbon film 39k	RD $\frac{1}{4}$ PS 393K
R11	Carbon film 8.2k	RD $\frac{1}{4}$ PS 822K
R12	Carbon film 8.2k	RD $\frac{1}{4}$ PS 822K
R13	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R14	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R15	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R16	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R17	Carbon film 6.8k	RD $\frac{1}{4}$ PS 682K
R18	Carbon film 6.8k	RD $\frac{1}{4}$ PS 682K
R19	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R20	Carbon film 120k	RD $\frac{1}{4}$ PS 124K
R21	Carbon film 330	RD $\frac{1}{4}$ PS 331K
R22	Carbon film 330	RD $\frac{1}{4}$ PS 331K

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	FET	2SK30-Y
Q2	FET	2SK30-Y
Q3	Transistor	2SC458LG
Q4	Transistor	2SC458LG
Q5	Transistor	2SC458LG
Q6	Transistor	2SC458LG

FILTER UNIT (W28-006)

CAPACITORS

Symbol	Description	Part No.
C1	Mylar 0.039 50V	CQMA 393K 50
C2	Mylar 0.039 50V	CQMA 393K 50
C3	Mylar 0.039 50V	CQMA 393K 50
C4	Mylar 0.039 50V	CQMA 393K 50
C5	Electrolytic 1 25V	CEA 010P 25
C6	Electrolytic 1 25V	CEA 010P 25
C7	Mylar 0.0082 50V	CQMA 822K 50
C8	Mylar 0.0082 50V	CQMA 822K 50
C9	Mylar 0.0039 50V	CQMA 392K 50
C10	Mylar 0.0039 50V	CQMA 392K 50
C11	Electrolytic 10 16V	CEA 100P 16
C12	Electrolytic 10 16V	CEA 100P 16
C13	Ceramic 82p 50V	CCDSL 820K 50
C14	Ceramic 82p 50V	CCDSL 820K 50
C15	Mylar 0.01 50V	CQMA 103K 50
C16	Mylar 0.01 50V	CQMA 103K 50
C17	Electrolytic 220 25V	CEA 221P 25

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 39k	RD $\frac{1}{4}$ PS 393K
R2	Carbon film 39k	RD $\frac{1}{4}$ PS 393K
R3	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R4	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R5	Carbon film 220k	RD $\frac{1}{4}$ PS 224K
R6	Carbon film 220k	RD $\frac{1}{4}$ PS 224K
R7	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R8	Carbon film 180k	RD $\frac{1}{4}$ PS 184K
R9	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R10	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R11	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222K
R12	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222K
R13	Carbon film 3.9k	RD $\frac{1}{4}$ PS 392K
R14	Carbon film 3.9k	RD $\frac{1}{4}$ PS 392K
R15	Carbon film 68k	RD $\frac{1}{4}$ PS 683K
R16	Carbon film 68k	RD $\frac{1}{4}$ PS 683K
R17	Carbon film 27k	RD $\frac{1}{4}$ PS 273K
R18	Carbon film 27k	RD $\frac{1}{4}$ PS 273K
R19	Carbon film 1k	RD $\frac{1}{4}$ PS 102K

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor 2SC870-E or F	
Q2	Transistor 2SC870-E or F	

MAIN AMP UNIT (W23-009)

CAPACITORS

Symbol	Description	Part No.
C1	Electrolytic 1	CSSA 010X 25
C2	Electrolytic 1	CSSA 010X 25
C3	Ceramic 100p	CCDSL 101K 50
C4	Ceramic 100p	CCDSL 101K 50
C5	Ceramic 220p	CCDSL 221K 50
C6	Ceramic 220p	CCDSL 221K 50
C7	Mylar 0.033	QOMA 333M 50
C8	Mylar 0.033	QOMA 333M 50
C9	Electrolytic 220	CEA 221P 10
C10	Electrolytic 220	CEA 221P 10
C11	Electrolytic 22	CEA 220P 6
C12	Electrolytic 22	CEA 220P 6
C13	Electrolytic 100	CEA 101P 50
C14	Electrolytic 100	CEA 101P 50
C15	Ceramic 15p	CCDSL 150K 50
C16	Ceramic 15p	CCDSL 150K 50
C17	Ceramic 390p	CKDYB 391K 50
C18	Ceramic 390p	CKDYB 391K 50

RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R2	Carbon film 1M	RD $\frac{1}{4}$ PS 105K
R3	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222K
R4	Carbon film 2.2k	RD $\frac{1}{4}$ PS 222K
R5	Carbon film 22k	RD $\frac{1}{4}$ PS 223K

Symbol	Description	Part No.
R6	Carbon film 22k	RD $\frac{1}{4}$ PS 223K
R7	Carbon film 1.2k	RD $\frac{1}{4}$ PS 122K
R8	Carbon film 6.8k	RD $\frac{1}{4}$ PS 682K
R9	Carbon film 6.8k	RD $\frac{1}{4}$ PS 682K
R10	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R11	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R12	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R13	Carbon film 10k	RD $\frac{1}{4}$ PS 103K
R14	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R15	Carbon film 100k	RD $\frac{1}{4}$ PS 104K
R16	Carbon film 18k	RD $\frac{1}{4}$ PS 183K
R17	Carbon film 18k	RD $\frac{1}{4}$ PS 183K
R18	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R19	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R20	Carbon film 10 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 100K
R21	Carbon film 10 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 100K
R22	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R23	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R24	Carbon film 33k	RD $\frac{1}{4}$ PS 333K
R25	Carbon film 33k	RD $\frac{1}{4}$ PS 333K
R26	Carbon film 1.8k	RD $\frac{1}{4}$ PS 182K
R27	Carbon film 1.8k	RD $\frac{1}{4}$ PS 182K
R28	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R29	Carbon film 1k	RD $\frac{1}{4}$ PS 102K
R30	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R31	Carbon film 4.7k	RD $\frac{1}{4}$ PS 472K
R32	Carbon film 47	RD $\frac{1}{4}$ PS 470K
R33	Carbon film 47	RD $\frac{1}{4}$ PS 470K
R34	Carbon film 150 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 151K
R35	Carbon film 150 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 151K
R36	Carbon film 150 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 151K
R37	Carbon film 150 $\frac{1}{2}$ W	RD $\frac{1}{2}$ PS 151K

POTENTIOMETERS

Symbol	Description	Part No.
VR1	Semi-fixed	C92-051-0
VR2	Semi-fixed	C92-051-0
VR3	Semi-fixed	C92-063-0
VR4	Semi-fixed	C92-063-0

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SA572-4B
Q2	Transistor	2SA572-4B
Q3	Transistor	2SA572-4B
Q4	Transistor	2SA572-4B
Q5	Transistor	2SC627-1
Q6	Transistor	2SC627-1
Q7	Transistor	2SC497-0
Q8	Transistor	2SC497-0
Q9	Transistor	2SA497-0
Q10	Transistor	2SA497-0
Q11	Transistor	2SC793-Y
Q12	Transistor	2SC793-Y
Q13	Transistor	2SC793-Y
Q14	Transistor	2SC793-Y
D1	Zener Diode	1S338Q
D2	Zener Diode	1S338Q
D3	Diode	1S1212
D4	Varistor	STV-3-0
D5	Varistor	STV-3-0

PROTECTOR UNIT (W28-007)

CAPACITORS

Symbol	Description	Part No.
C1	Mylar	CQMA 563K 50
C2	Mylar	CQMA 563K 50
C3	Electrolytic	CEA 221P 10
C4	Electrolytic	CEA 221P 10
C5	Electrolytic	CEA 101P 16

RESISTORS

Symbol	Description	Part No.
R1	Carbon film	RD $\frac{1}{4}$ PS 332K
R2	Carbon film	RD $\frac{1}{4}$ PS 332K
R3	Carbon film	RD $\frac{1}{4}$ PS 332K
R4	Carbon film	RD $\frac{1}{4}$ PS 332K
R5	Carbon film	RD $\frac{1}{4}$ PS 153K
R6	Carbon film	RD $\frac{1}{4}$ PS 153K
R7	Carbon film	RD $\frac{1}{4}$ PS 153K
R8	Carbon film	RD $\frac{1}{4}$ PS 153K
R9	Carbon film	RD $\frac{1}{4}$ PS 473K
R10	Carbon film	RD $\frac{1}{4}$ PS 473K
R11	Carbon film	RD $\frac{1}{4}$ PS 152K
R12	Carbon film	RD $\frac{1}{4}$ PS 152K
R13	Carbon film	RD $\frac{1}{4}$ PS 472J
R14	Carbon film	RD $\frac{1}{4}$ PS 152J
R15	Carbon film	RD $\frac{1}{4}$ PS 152J

Symbol	Description	Part No.
R16	Carbon film	RD $\frac{1}{4}$ PS 681J
R17	Carbon film	RD $\frac{1}{4}$ PS 152J
R18	Carbon film	RD $\frac{1}{4}$ PS 562J
R19	Wire wound	RT2P 0R5K
R20	Carbon film	RD $\frac{1}{4}$ PS 563K
R21	Carbon film	RD $\frac{1}{4}$ PS 220K
R22	Carbon film	RD $\frac{1}{4}$ PS 473K
R23	Metal oxide	RS1P 221K
R24	Metal oxide	RS2P 100K
R25	Metal oxide	RS2P 100K

POTENTIOMETER

Symbol	Description	Part No.
VR1	Semi-fixed	C92-063-0

COILS

Symbol	Description	Part No.
L1	AF Choke Coil	T63-009-0
L2	AF Choke Coil	T63-009-0

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor	2SC983-0
Q2	Transistor	2SC983-0
Q3	Transistor	2SC945-R
Q4	Transistor	2SC945-R
Q5	Transistor	2SA572-4
Q6	Transistor	2SC968-2
Q7	Transistor	2SC495P-Y
D1	Diode	SIB01-F
D2	Diode	SIB01-F
D3	Diode	SIB01-F
D4	Diode	SIB01-F
D5	Diode	SIB01-F
D6	Diode	SIB01-F
D7	Diode	SIB01-F
D8	Diode	VB-11A
D9	Diode	VB-11A

POWER SUPPLY UNIT (W16-033)

CAPACITORS

Symbol	Description	Part No.
C1	Ceramic 0.01 DC 1.4kV	C43-003-0
C2	Ceramic 0.01 DC 1.4kV	C43-003-0
C3	Ceramic 0.01 DC 1.4kV	C43-003-0
C4	Ceramic 0.01 DC 1.4kV	C43-003-0
C5	Electrolytic 100 50V	CEA 101P 50
C6	Ceramic 100p 50V	CCDSL 101K 50
C7	Electrolytic 220 35V	CEA 221P 35
C8	Electrolytic 330 25V	CEA 331P 25

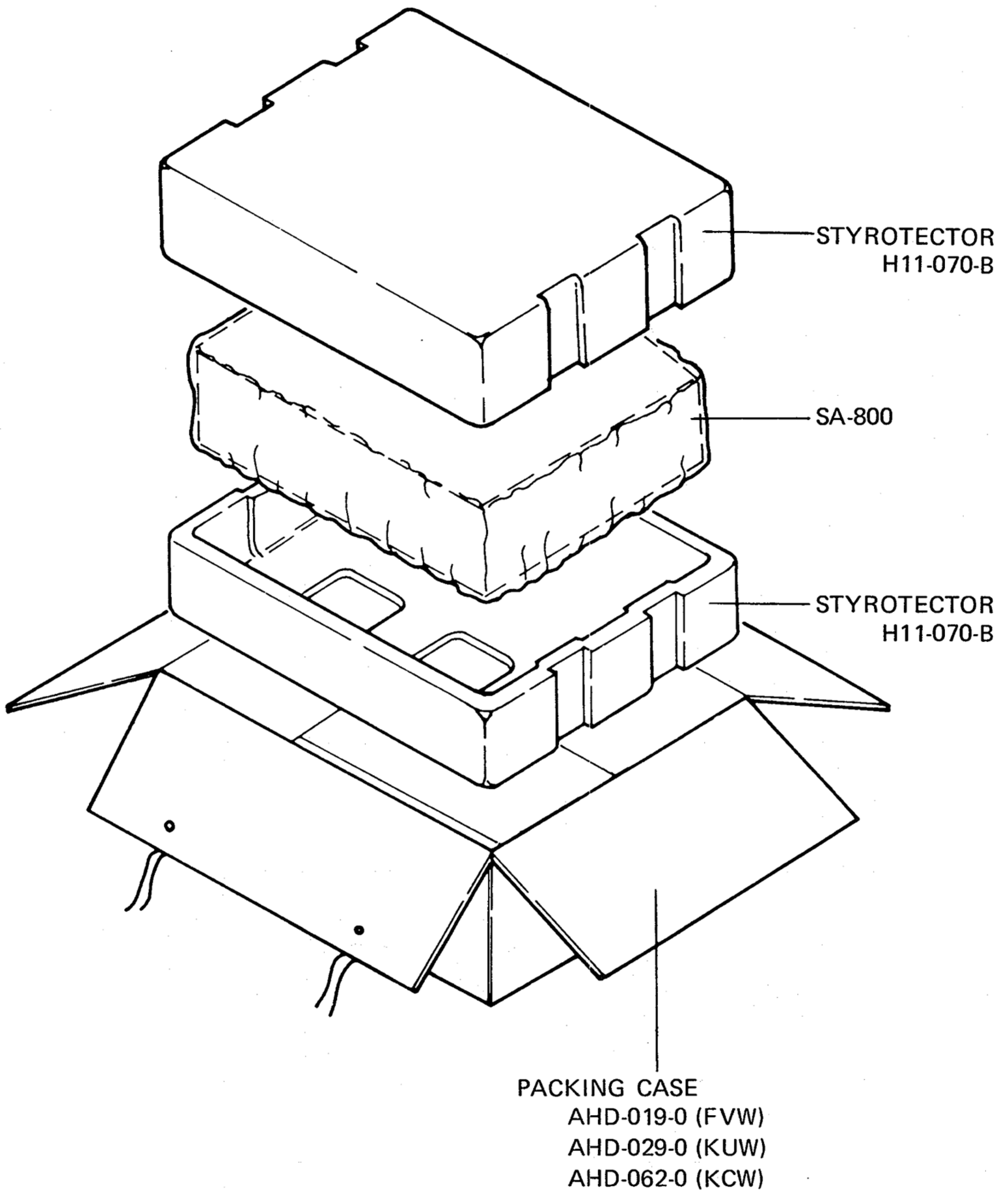
RESISTORS

Symbol	Description	Part No.
R1	Carbon film 1.5k	RD $\frac{1}{4}$ PS 152K
R2	Carbon film 1.5k	RD $\frac{1}{4}$ PS 152K
R3	Carbon film 3.3k	RD $\frac{1}{4}$ PS 332K
R4	Carbon film 18k	RD $\frac{1}{4}$ PS 183K
R5	Carbon film 12k	RD $\frac{1}{4}$ PS 123K
R6	Carbon film 820	RD $\frac{1}{4}$ PS 821K

SEMICONDUCTORS

Symbol	Description	Part No.
Q1	Transistor 2SD234-0	
Q2	Transistor 2SC373	
D1	Diode SR3AM-8	
D2	Diode SR3AM-8	
D3	Diode SR3AM-8	
D4	Diode SR3AM-8	
D5	Diode 1S1850	
D6	Zener Diode 1S338Q	

9 • PACKING METHOD AND PARTS



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