

DA

power amplifier service manual

This manual is a guide to adjustment methods, diagrams and parts list for DA-80 and DA-80M.

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STAX

SUMMARY OF CIRCUITRY

The input is fed, via an attenuator, to the gate of the first stage dual FET differential amplifier (3). The diode connected between the two gates is the protective circuit for input overloads (1).

The NFB signal (8) is applied to the gate shown. The dual FET differential amplifier functions under ideal conditions due to the connection of the constant current supply (4) to the common source.

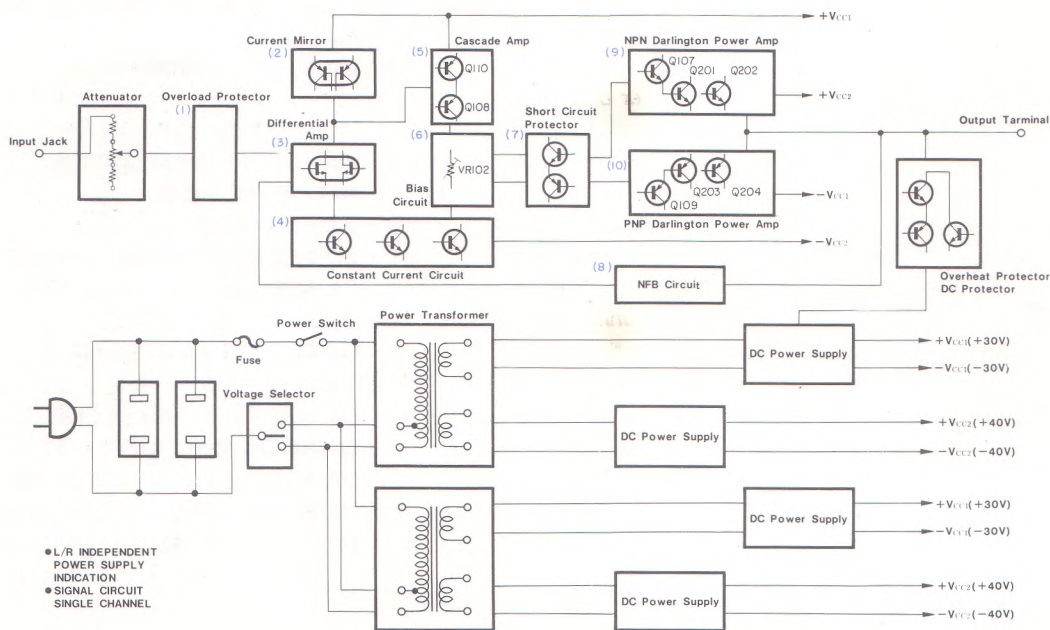
The current is reversed in the current mirror circuit (2), driving Q110 in the cascade amplifier (5) and Q108, which

form the push-pull configuration, at constant current. A pair of transistors with common bases and symmetrical emitters are enclosed to the same can in the current mirror circuit. This ensures that the current flowing in each transistor is the same, independent of the ambient temperature. Q110 and Q108 are cascade connected, consisting of transistors with extremely good high frequency characteristics and equivalent characteristics.

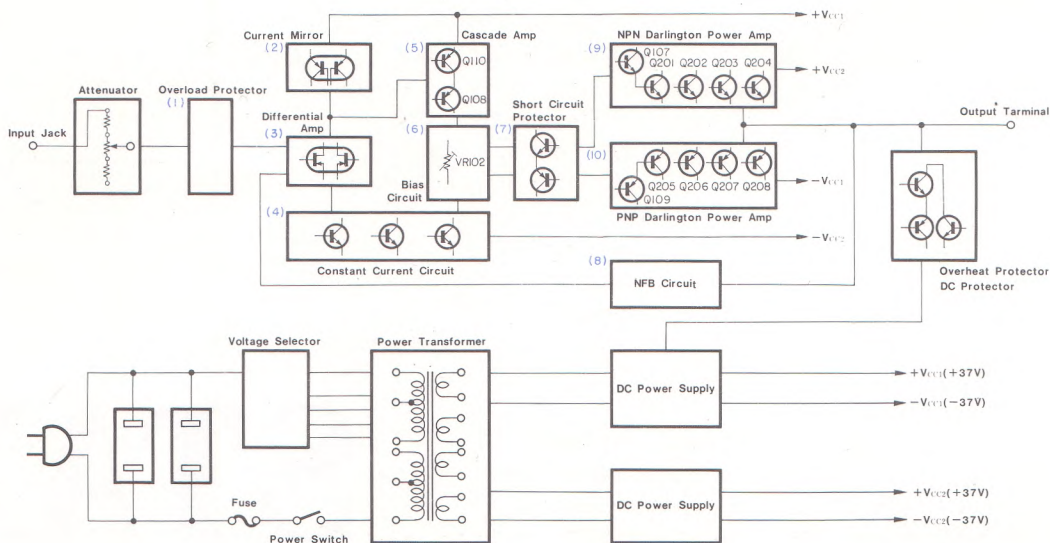
The bias circuit (6) gives the optimum bias as set by VR102, passes through the short-circuit protector (7), then

through Q107, Q109, the drive-stage transistors for the Darlington power amplifier (9) (10), then to the power transistors Q201~Q204, and Q205~Q208, of the Darlington-connected power output stage. The configuration adopted for the Darlington power amplifier has NPN (9) and PNP (10) transistors in a fully complementary single-ended push-pull class A output stage. The circuitry has ample stability for class A DC amplifier operation, with all possible circuit elements that could cause degradation of sound quality eliminated.

DA-80



DA-80M



(1) Location in use

This amplifier features class-A operation, and special care should be taken with respect to heat radiation. Avoid locations exposed to direct sunlight, and place the unit, as far as possible, where there is a good circulation of air. Leave a clearance of at least 5 cm (2") above the amplifier. Also you should avoid places where dust is liable to be attracted.

(2) Protective circuits

Four different kinds of protective circuit are used to protect either the amplifier or the speakers from damage or loss.

1. Overload (input) protection: The input needed for maximum output is 0.89 V. Should this reach 50 V, a 'clip' circuit operates to prevent the amp. from being driven to full output.
2. PC limiter: This circuit limits the current which flows through the output transistors to prevent them from being destroyed by the extremely large current which would otherwise flow if the speaker terminals were short-circuited.
3. Temperature protection: This circuit was designed to cut off the electrical power supply to the amplifier as soon as exceptionally high temperatures are reached. It prevents the amp. from being damaged by rises in the ambient temperature.
4. Speaker protection: The speakers will be protected from direct current signals greater than ± 5 V appearing at the amplifier output terminals in the face of direct current signals from the pre-amplifier or from switching transient noise. Protection is by cutting off the amp. electrical power supply, and is effective even if the amp. itself is damaged.

The above protective circuits built into the amplifier provide protection against the most unlikely eventualities, but you should take care to use the amp. so that the

protective circuits are not caused to operate.

If, for the causes detailed in 3 and 4, the protective circuits cut off the electrical power supply, switch the amplifier off, determine the cause, and remove it before switching the electrical power on again. If the protective circuit functions in the same way again, cutting off the power a second time, please read the TROUBLESHOOTING GUIDE on the 7 page.

(3) When using condenser-type speakers

Since condenser-type (or electrostatic) speakers only have a DC impedance of the order of one ohm, near-DC signals arising from eccentric or warped records, or from external vibration, will cause the short-circuit protection to operate, which will be heard as a 'clicking' or 'popping' noise. If this situation should arise, you should insert a one or two-ohm resistor (rated 30 Watts) between the speaker and the amplifier output terminal as shown, and set the AC/DC switch to AC.

(4) When using the DA-80/80M as the mid- or high-frequency amplifier in a multi-amplifier configuration

When the DA-80/80M is used for the mid/high frequency amplifier, the channel divider cuts out the low frequency component of the signal, so that there is no possibility of DC or other very low frequency signal of very high amplitude being applied to the speakers. The possibility does remain, however, of the speakers being damaged by the switching noise from the channel divider or by mistakenly pulling out an input jack plug. The AC/DC switch should therefore be set to AC, and a non-polar capacitor of 10 μ F inserted in the case of driving a tweeter, and of 100 μ F for a squawker.

(5) Measurements

This amplifier boasts extremely high quality circuitry, and if meaningful measurements are to be taken of its

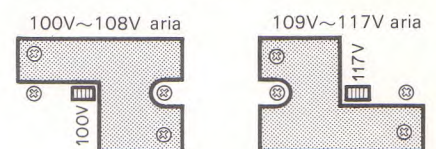
exceptionally good performance, only correspondingly high quality measuring instruments and sophisticated measuring techniques should be used.

(6) Others

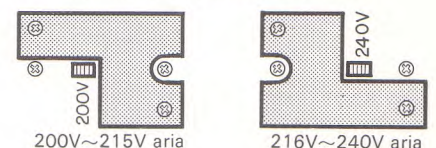
DA-80

*The AC Outlets are not linked to the amplifier power switch.

*There are two models of the DA-80, one intended for 100~117V operation and the other for 200~230 V operation. In both models the switch for selection of the actual operating voltage to be used is to be found on the underside of the amplifier.

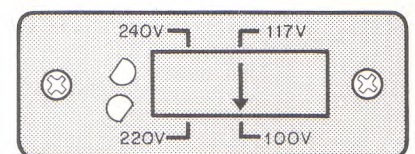


To comply with the voltage where this equipment is used, this plate has to be removed and re-set after switched to the required voltage.



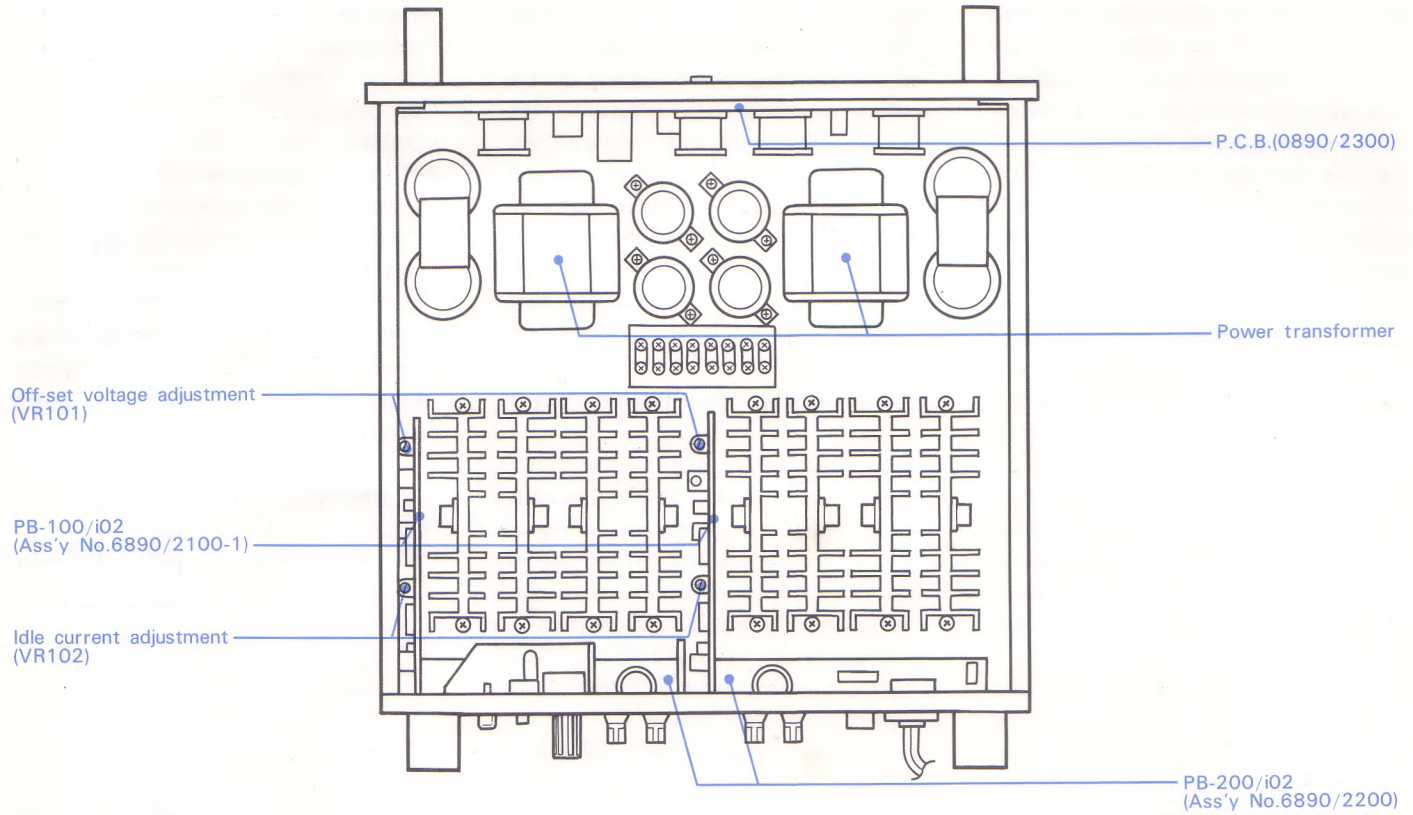
DA-80M

A choice of mains supply voltages for the DA-80M is given by the voltage selector under the chassis. This offers a choice of 100V, 117V, 220V, and 240V. If you need to change the operating voltage, first remove the protective metal device, and then set the arrow so that it points to the voltage closest to that which you will use.

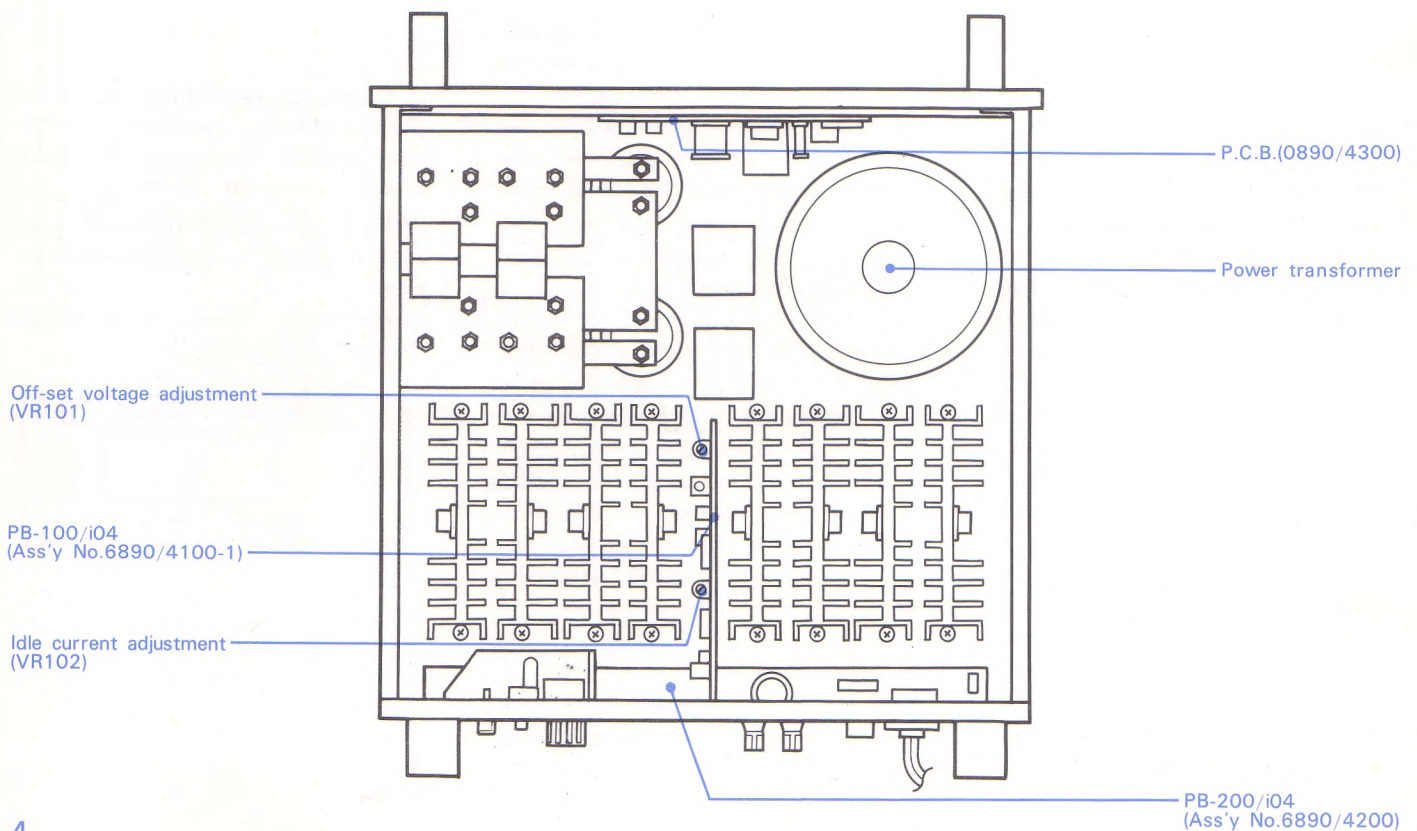


INTERNAL VIEW

DA-80



DA-80M



DA-80

* Idle Current Adjustment

1. Switch the voltmeter range over to DC 0.5V.
2. Switch the power on and exemplifyingly measure the voltage of R201 at the both ends. Then adjust VR102 to make this voltage $400\text{mV} \pm 40\text{mV}$.
3. 30 minutes later, measure the voltage of R201 at the both ends and readjust VR102 to make this voltage $350\text{mV} \pm 35\text{mV}$.

* Off-set Voltage Adjustment

(To be performed after completing the idle current adjustment)

1. Leave the voltmeter range at 0.5V.
2. Connect the voltmeter to the output terminals, and adjust VR101 to reduce the voltage to 0V. Then switch the voltmeter over to the 0.25V range, and fine adjust until a 0V reading is obtained.
3. Measure again 30 minutes later, fine adjusting to 0V if necessary.

The above procedure refers to the adjustment of the one channel only. The other channel is also adjusted by the same procedure.

DA-80M

* Idle Current Adjustment

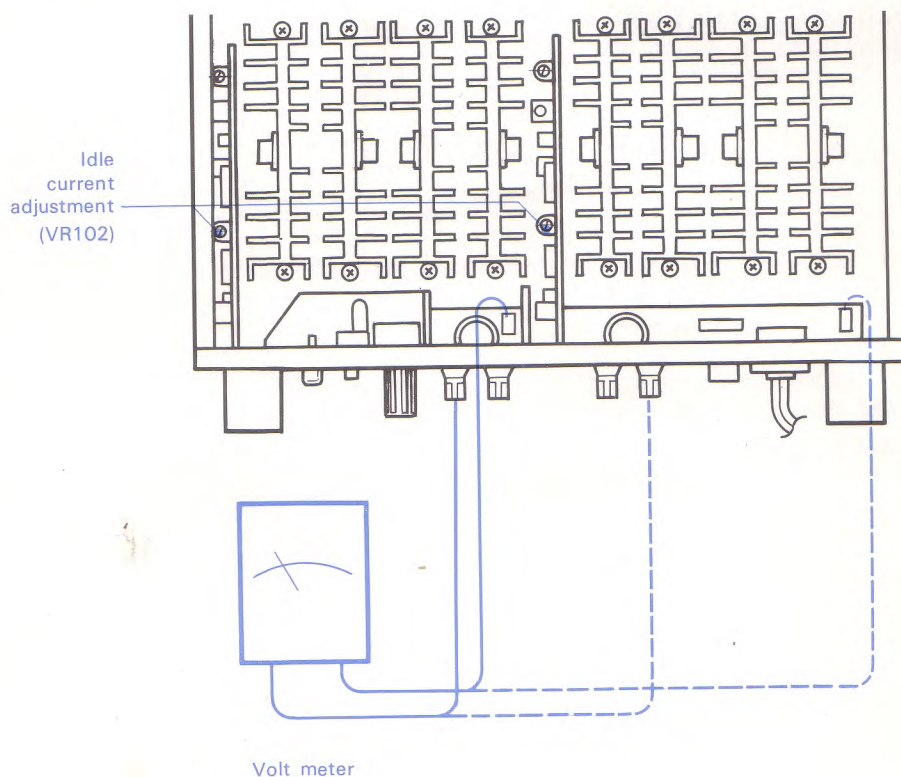
1. Switch the voltmeter range over to 0.5V.
2. Switch the power on and exemplifyingly measure the voltage of R201 at the both ends. Then adjust VR102 to make this voltage $250\text{mV} \pm 25\text{mV}$.
3. 30 minutes later, measure the voltage of R201 at the both ends and readjust VR102 to make this voltage $230\text{mV} \pm 23\text{mV}$.

* Off-set Voltage Adjustment

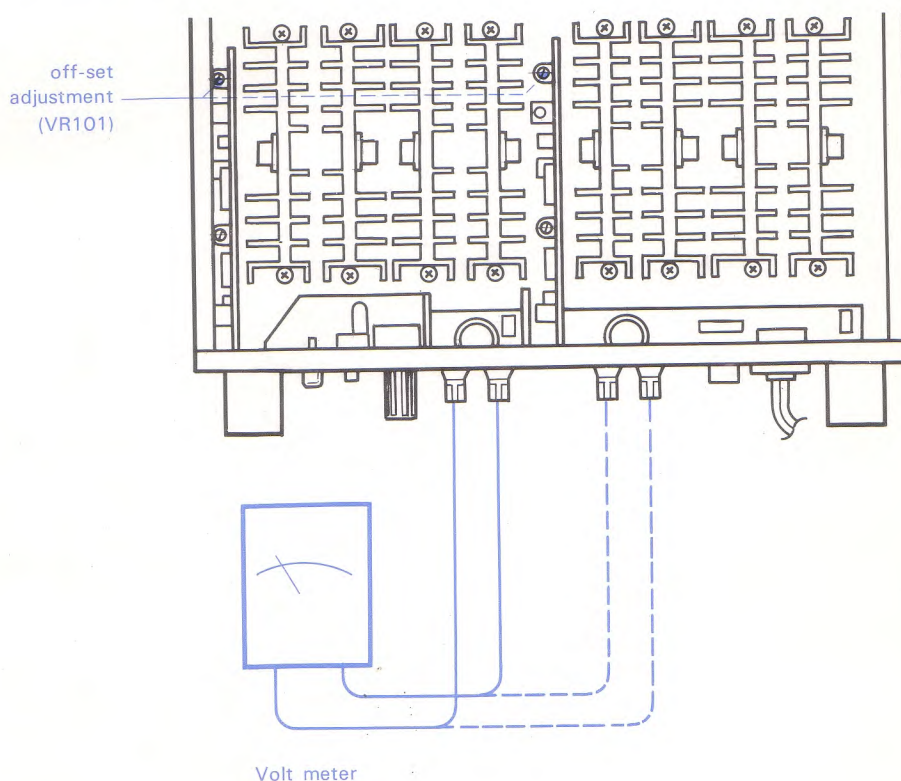
(To be performed after completing the idle current adjustment)

1. Leave the voltmeter range at 0.5V.
2. Connect the voltmeter to the output terminals, and adjust VR101 to reduce the voltage to 0V. Then switch the voltmeter over to the 0.25V range, and fine adjust until a 0V reading is obtained.
3. Measure again 30 minutes later, fine adjusting to 0V if necessary.

Idle Current Adjustment

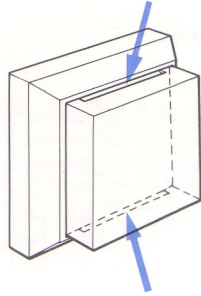


Off-set Voltage Adjustment

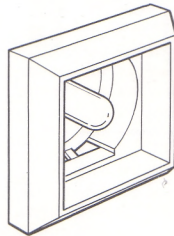


POWER LAMP REPLACEMENT

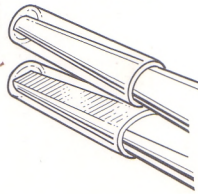
1. Hold concave part of the white plastic cover firmly with nails leaving the power switch off and pull inside to detach the cover.



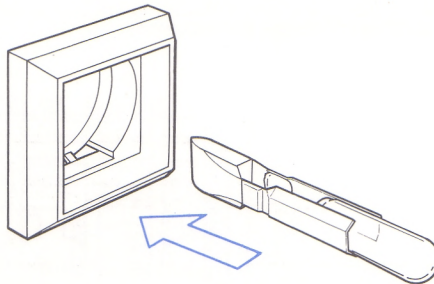
2. Hold the lamp lightly with a plier or any else and pull inside to remove.



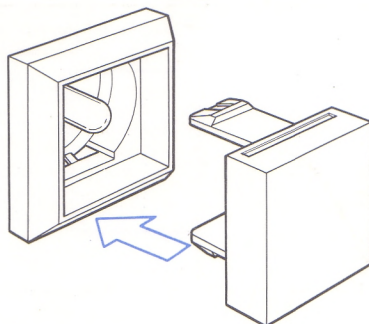
This will be better to cover with rubber tube.



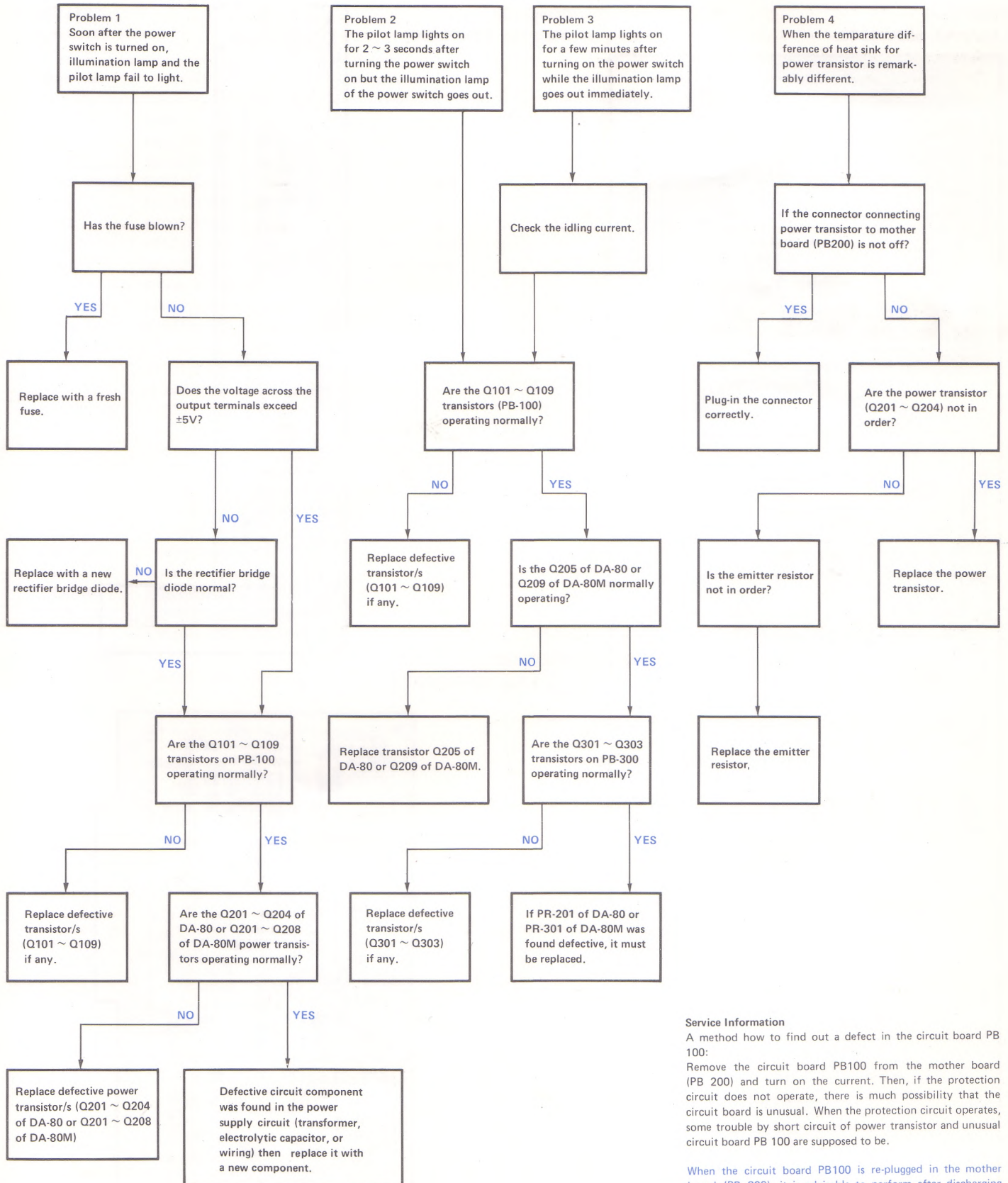
3. Push-into a fresh lamp with fingers.



4. Place the cover back as was before.



TROUBLESHOOTING GUIDE



Service Information

A method how to find out a defect in the circuit board PB 100:

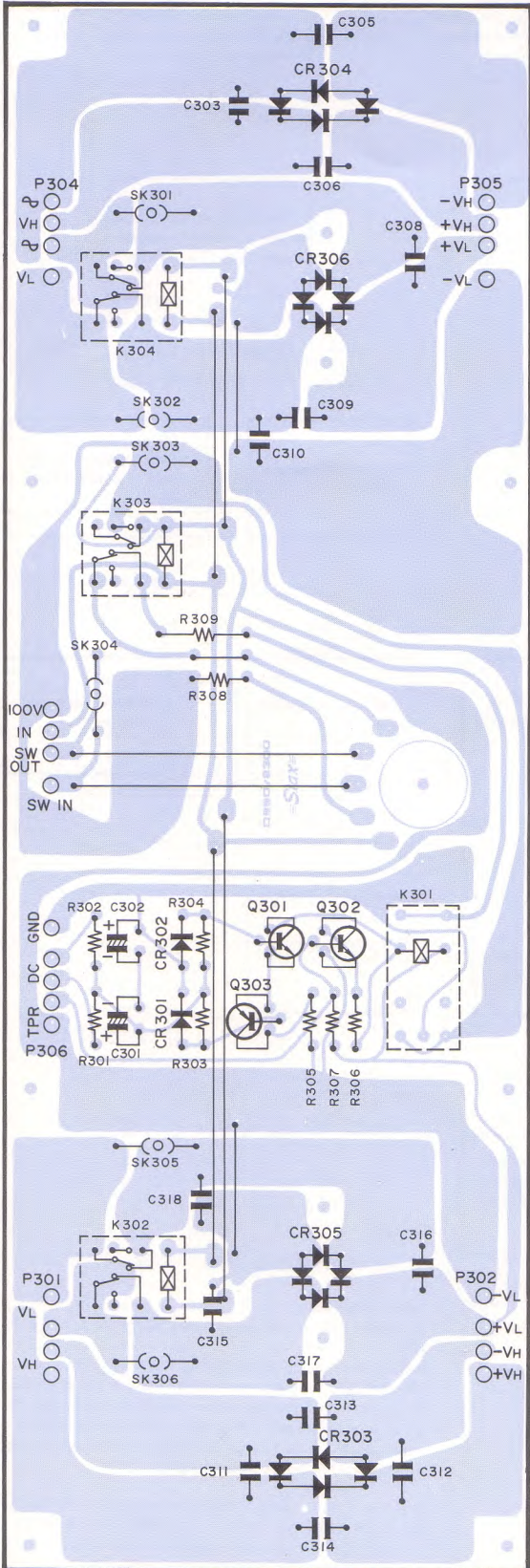
Remove the circuit board PB100 from the mother board (PB 200) and turn on the current. Then, if the protection circuit does not operate, there is much possibility that the circuit board is unusual. When the protection circuit operates, some trouble by short circuit of power transistor and unusual circuit board PB 100 are supposed to be.

When the circuit board PB100 is re-plugged in the mother board (PB 200), it is advisable to perform after discharging the electric charge of power balancing electrolytic condenser with some dummy resistors etc.

DA-80 P.C.B.

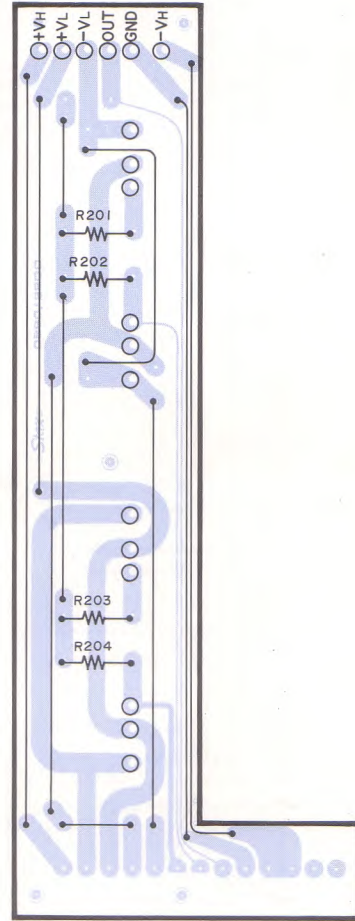
0890/2300

(Ass'y No. 6890/2300)



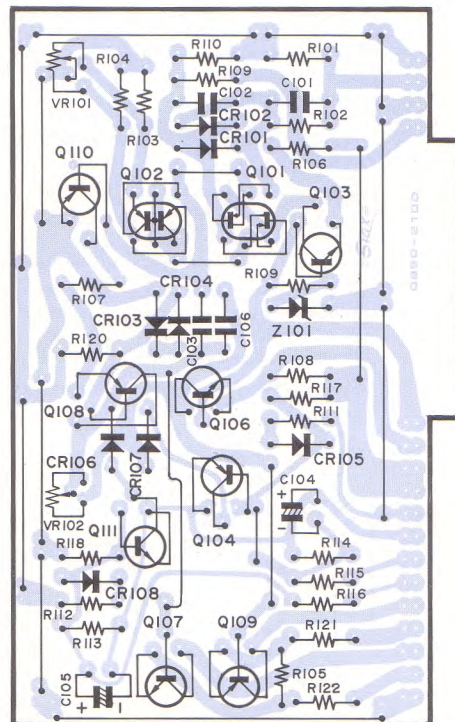
0890/2200

(Ass'y No. 6890/2200)



0890/2100

(Ass'y No. 6890/2100)



DA-80 P.C.B. PARTS LIST

6890/2100

P.C.B. Ass'y [Driver]

Ref. NO.	Part NO.	Description
PB-100/i02	0890210020	P.C.B. Driver
R-101	0681225410	Resistor 2.2M Ω 1/4W Carbon
R-102	0673332229	Resistor 3.3K Ω 1/2W Metal Film
R-103~R105	0683101216	Resistor 100 Ω 1/4W Metal Film
R-106	0683471215	Resistor 470 Ω 1/4W Metal Film
R-107	0683820210	Resistor 82 Ω 1/4W Metal Film
R-108	0683151217	Resistor 150 Ω 1/4W Metal Film
R-109	0683303218	Resistor 30K Ω 1/4W Metal Film
R-110	0673511218	Resistor 510 Ω 1/2W Metal Film
R-111, 112	0683123210	Resistor 12K Ω 1/4W Metal Film
R-113~116	0683122216	Resistor 1.2K Ω 1/4W Metal Film
R-117, 118	0683104217	Resistor 100K Ω 1/4W Metal Film
R-119	0673103223	Resistor 10K Ω 1/2W Metal Film
R-121, 122	0673519217	Resistor 5.1 Ω 1/2W Metal Film
VR-101, 102	2273202205	Variable Resistor 2K Ω -B
C-101	0121031016	Capacitor 0.01 μ F/630V M.F.
C-102	0142412010	Capacitor 250PF Styrol
C-103	0143002019	Capacitor 30PF Styrol
C-104, 105	0112271014	Capacitor 220 μ F/6.3V Electrolytic
Q-101	1868000109	FET 2N3922 or IT-503
Q-102	1857000107	μ PA49A
Q-103, 111	1853000830	2SC1279
Q-104	1851000120	2SA640 (F)
Q106, 107	1853000447	2SC484 (Y)
Q-108, 109	1851000444	2SC484 (Y)
Q-110	1851000120	2SA640 (F)
CR-101~108	1930000504	1S1553
Z-101	1950000600	02Z12A

6890/2200

P.C.B. Ass'y [Mother]

Ref. NO.	Part NO.	Description
PB-200/i02	0890220028	P.C.B. Mother
PB-250/i02,i04	0890225026	P.C.B. Sub
R-201~204	0655059310	Resistor 0.47 Ω 2W Cement
Q-201, 202	1853000709	2SC1116A
Q-203, 204	1851000800	2SA747A
Q-205	1853000541	2SC496 (Y)

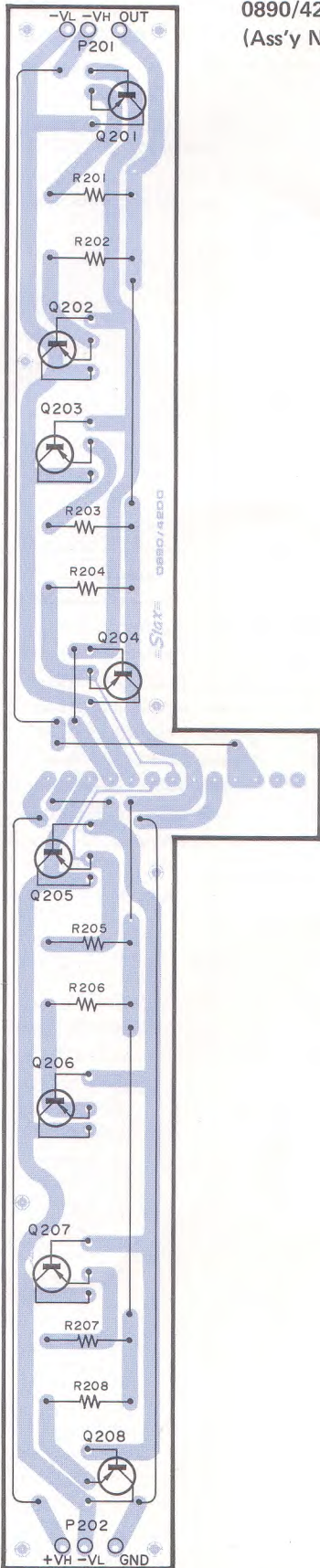
6890/2300

P.C.B. Ass'y [Protection & S.P.S.]

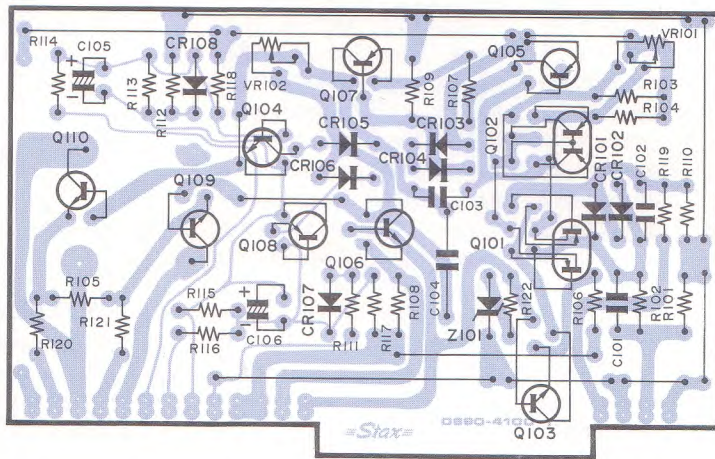
Ref. NO.	Part NO.	Description
PB-300-1/i02	0890230010	P.C.B. Protection & S.P.S.
R-301	0681103315	Resistor 10K Ω 1/4W Carbon
R-302	0681123311	Resistor 12K Ω 1/4W Carbon
R-303, 304	0681333314	Resistor 33K Ω 1/4W Carbon
R-305, 306	0681202319	Resistor 2K Ω 1/4W Carbon
R-307	0681224312	Resistor 220K Ω 1/4W Carbon
R-308	0674301316	Resistor 300 Ω 1/2W Metal Film
R-309	0681104319	Resistor 100K Ω 1/4W Carbon (for 100V input)
	0681274313	Resistor 270K Ω 1/4W Carbon (for 200V input)
CR-301, 302 303	1930000504	1S1553
CR304, 305	1930000703	S2HB20
C-303~318	0121031016	Capacitor 0.01 μ F/630V M.F.
C-301, 302	0112271014	Capacitor 220 μ F/6.3V Electrolytic
SK301~307	1700110001	Spark Killer (0.1 μ F+120 Ω)
Q-301, 302	1863000107	1A17
Q-303	1861000104	1A02
K-301	0401024121	NF-2-24V-DC (AE1324)
K-302-1, 303-1, 304-1	0402100229	HC-2-AC100V (AP-3324)
K-302-2, 303-2, 304-2	0402200226	HC-2-AC200V (AP-3325)

DA-80M P.C.B.

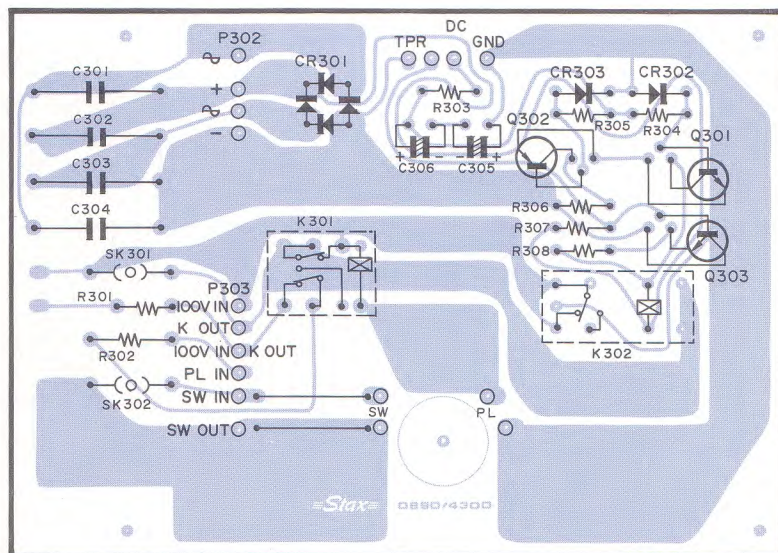
0890/4200
(Ass'y No. 6890/4200)



0890/4100-1
(Ass'y No. 6890/4100-1)



0890/4300
(Ass'y No. 6890/4300)



DA-80M P.C.B. PARTS LIST

6890/4100-1

P.C.B. Ass'y [Driver]

Ref. NO.	Part NO.	Description
PB-100/i04	0890410024	P.C.B. Driver
R-101	0681225410	Resistor 2.2M Ω 1/4W Carbon
R-102	0673332229	Resistor 3.3K Ω 1/2W Metal Film
R-103~105	0683101216	Resistor 100 Ω 1/4W Metal Film
R-106	0683471215	Resistor 470 Ω 1/4W Metal Film
R-107	0683820210	Resistor 82 Ω 1/4W Metal Film
R-108	0683151217	Resistor 150 Ω 1/4W Metal Film
R-109, 122	0683303218	Resistor 30K Ω 1/4W Metal Film
R-110	0673511218	Resistor 510 Ω 1/2W Metal Film
R-111, 112	0683123210	Resistor 12K Ω 1/4W Metal Film
R-113~116	0683122216	Resistor 1.2K Ω 1/4W Metal Film
R-117, 118	0683104217	Resistor 100K Ω 1/4W Metal Film
R-119	0673103223	Resistor 10K 1/2W Metal Film
R-120, 121	0673519217	Resistor 5.1 Ω 1/4W Metal Film
VR-101, 102	2273202205	Variable Resistor 2K Ω -B
C-101	0121031016	Capacitor 0.01 μ F/630V M.F.
C-102	0142412010	Capacitor 240PF Styrol
C-103	0143002019	Capacitor 30PF Styrol
C-104	0121051012	Capacitor 1 μ F/250V M.F.
C-105, 106	0112271014	Capacitor 220 μ F/6.3V Electrolytic
Q-101	1868000109	2N3922 or 1T-503
Q-102	1857000107	μ PA49A
Q-103	1853000830	2SC1279 (H)
Q-104, 105 108	1851000120	2SA640 (F)
Q-106	1851000444	2SC484 (Y) (BL)
Q-107	1853000447	2SC484 (Y) (BL)
Q-109	1852000126	2SB537 (hFE 120~250)
Q-110	1854000129	2SD382 (hFE 120~150)
CR101~108	1930000504	1S1553
Z-101	1950000600	02Z12A

6890/4200

P.C.B. Ass'y [Mother]

Ref. NO.	Part NO.	Description
PB-200/i04	0890420022	P.C.B. Mother
PB-250/i02,i04	0890225026	P.C.B. Sub
R-201~208	0655059310	Resistor 0.47 Ω 2W Cement
Q201~204	1851000800	2SA747 (A)
Q205~208	1853000709	2SC1116 (A)
Q209	1853000541	2SC496 (Y)

6890/4300

P.C.B. Ass'y [Protector & S.P.S.]

Ref. NO.	Part NO.	Description
PB-300/i04	0890430020	P.C.B. Protector & S.P.S.
R-301	0681104319	Resistor 100K Ω 1/4W Carbon
R-302	0661102310	Resistor 1K Ω 1W Carbon
R-303	0681103315	Resistor 10K Ω 1/4W Carbon
R-304, 305	0681333314	Resistor 33K Ω 1/4W Carbon
R-306, 308	0681202319	Resistor 2K Ω 1/4W Carbon
R-307	0681224312	Resistor 220K Ω 1/4W Carbon
C-301~304	0181032012	Capacitor 0.01 μ /630V Oil
SK-301, 302	1700110001	Spark Killer (0.1 μ F+120 Ω)
CR-301	1930000703	S2HB20
CR-302, 303	1930000504	1S1553
Q-301, 303	1863000107	1A17
Q-302	1861000104	1A02
K-301, 303	0402100229	HC-2-P-AC100V (AP3324)
K-302	0401024121	NF2-24VDC (AE1324)
C-014, 015	0152262011	Capacitor 22 μ F/63V Polycarbonate
C-016, 017 020, 021	0162241017	Capacitor 0.47 μ F Polypropylene
C-018, 019 022, 023	0144732010	Capacitor 0.047 μ F/125V Styrol

DA-80/DA-80M PARTS LIST

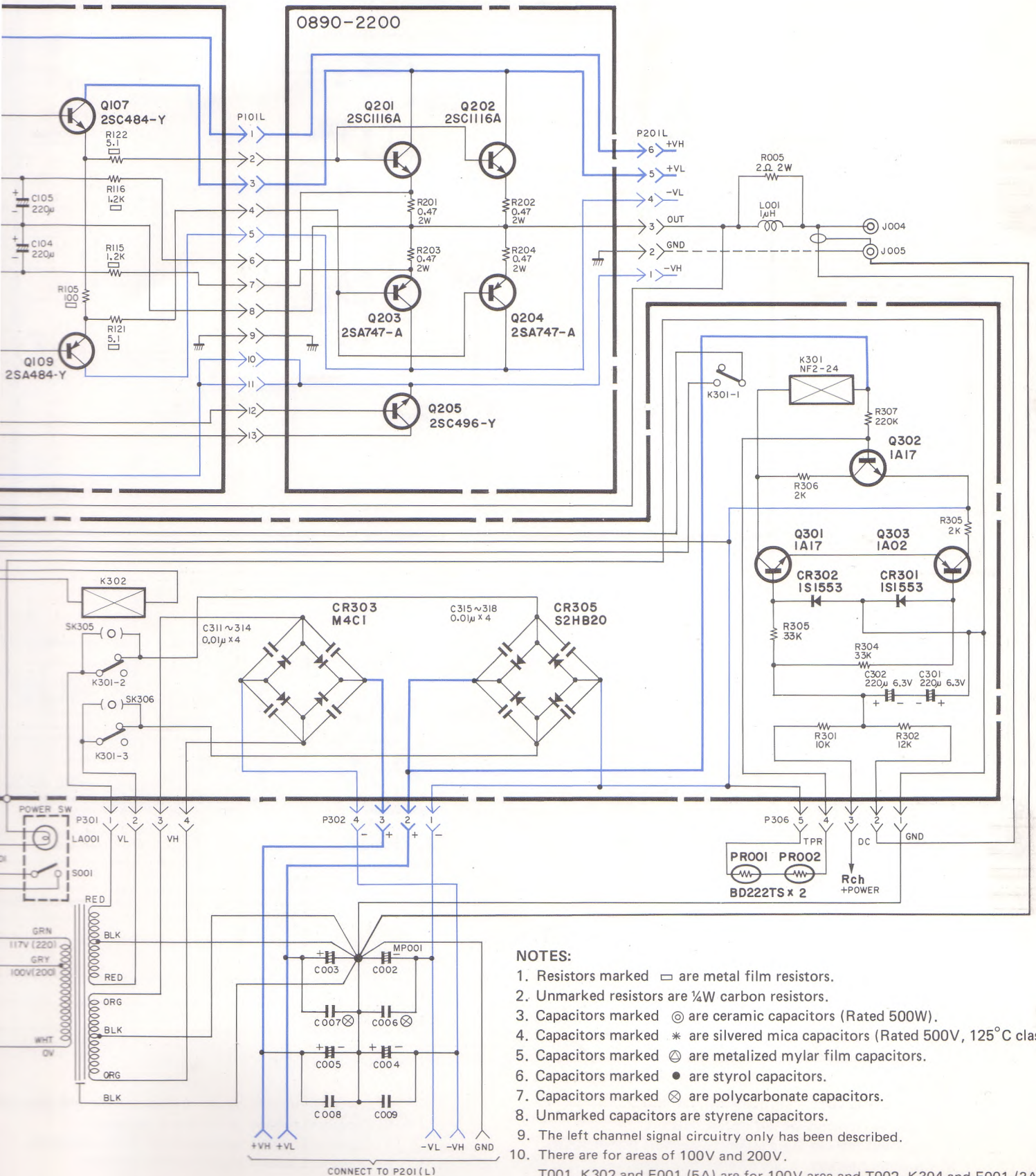
DA-80

Ref. NO.	Part NO.	Description
R-001	0681225410	Resistor 2.2MΩ ¼W Carbon
R-002	0683683215	Resistor 68KΩ ¼W Metal Film
R-003	0683223217	Resistor 22KΩ ¼W Metal Film
R-004	0683103213	Resistor 10KΩ ¼W Metal Film
R-005	0645229314	Resistor 2Ω 2W
C-001	0124751012	Capacitor 0.47μF Mylar
C-002, 003	0113393011	Capacitor 33,000μF/35V Electrolytic
C-004, 005	0116884012	Capacitor 6,800μF/35V Electrolytic
C-006, 007	0152262011	Capacitor 22μF/63V Polycarbonate
C-008, 009	0181032012	Capacitor 0.01μF/500V Oil
PR001, 002	0700331018	Posistor PTH487A01 BD222TS
S-001	3190200015	Push Switch (with Lamp cover)
S-002	3100060210	Slide Switch (AC/DC)
S-003 L/R	3100030414	Rotary Switch (ATT)
S-004	3190111114	Slide Switch (AC VOLT)
L-001	9160210108	Coil 1μH
NE-001	2122010010	Neon Lamp with Cord
LA-001	2115002405	Lamp 24V
J-001, 002	1200090101	Pin Jack
J-003, 004	1200120007	AC Socket
J-005, 006	1200050109	Binding Post (Red)
J-007, 008	1200050114	Binding Post (Black)
PT-100-1	9190200132	Power Transformer (100V~120V)
PT-100-2	9190200237	Power Transformer (200V~240V)
XF-001	4110020001	Fuse Holder
F-001	2101005049	Fuse 5A (100V~120V)
F-001	2101003036	Fuse 3A (200V~240V)
	8132780015	AC Cord (For U.S.A)
	8132780020	AC Cord (For Europe)
	8132780036	AC Cord (For Australia)
	5190200651	Top Cover
	5190201000	Front Panel
	5190201105	Rear Plate
	5190202308	Handle
	5190202203	Rear Foot
	3340012505	Foot
	3290218017	Knob (ATT) 18φ

DA-80M

Ref. NO.	Part NO.	Description
R-001	0681225410	Resistor 2.2MΩ ¼W Carbon
R-002	0683683215	Resistor 68KΩ ¼W Metal Film
R-003	0683223217	Resistor 22KΩ ¼W Metal Film
R-004	0683103213	Resistor 10KΩ ¼W Metal Film
R-005	0645229314	Resistor 2Ω 2W
C-016, 017	0162241017	Capacitor 0.22μF/200V Polypropylen
020, 021		
C-018, 019	0144732010	Capacitor 0.047μF Styrol
022, 023		
C-001	0124751012	Capacitor 0.47μF Mylar
C-002~007	0112293018	Capacitor 22000μF/50V Electrolytic
C-008, 009	0152262011	Capacitor 22μF/63V Polycarbonate
C-010~013	0181032012	Capacitor 0.01μF/600V Oil
C-014, 015	0152262011	Capacitor 22μF/63V Polycarbonate
PR001, 002	0700331018	Posistor PTH487A01 BD222TS
SK-001, 002	1700110001	Spark Killer (0.1μF+120Ω)
K-001	0403100225	HG-2-AC100V
KX-001	1200180907	Socket (For K001)
CR-001	1930000609	S15VB40
S-001	3190200015	Push Switch (with Lamp cover)
S-002	3190111114	Slide Switch (AC/DC)
S-003	3100030414	Rotary Switch (ATT)
NE-001	2122010010	Neon Lamp with Cord
LA-001	2115002405	Lamp 24V
J-001	1200090101	Input Jack
J-002~003	1200120007	AC Socket
J-004	1200050109	Binding Post (Red)
J-005	1200050114	Binding Post (Black)
PT-100-1	9190400142	Power Transformer (100V~240V)
XF-001	4110020001	Fuse Holder (100V~240V)
F-001	2101010033	Fuse 10A Slow Blow (100V~120V)
F-001	2101005049	Fuse 5A Slow Blow (200V~240V)
L-001	9160210108	Coil 1μH
	8132780015	AC Cord (For U.S.A.)
	8132780020	AC Cord (For Europe)
	8132780036	AC Cord (For Australia)
	5190200651	Top Cover
	5190401005	Front Panel
	5190401100	Rear Plate
	5190202308	Handle
	5190202203	Rear Foot
	3340012505	Foot
	3290422018	Knob (ATT) 22φ

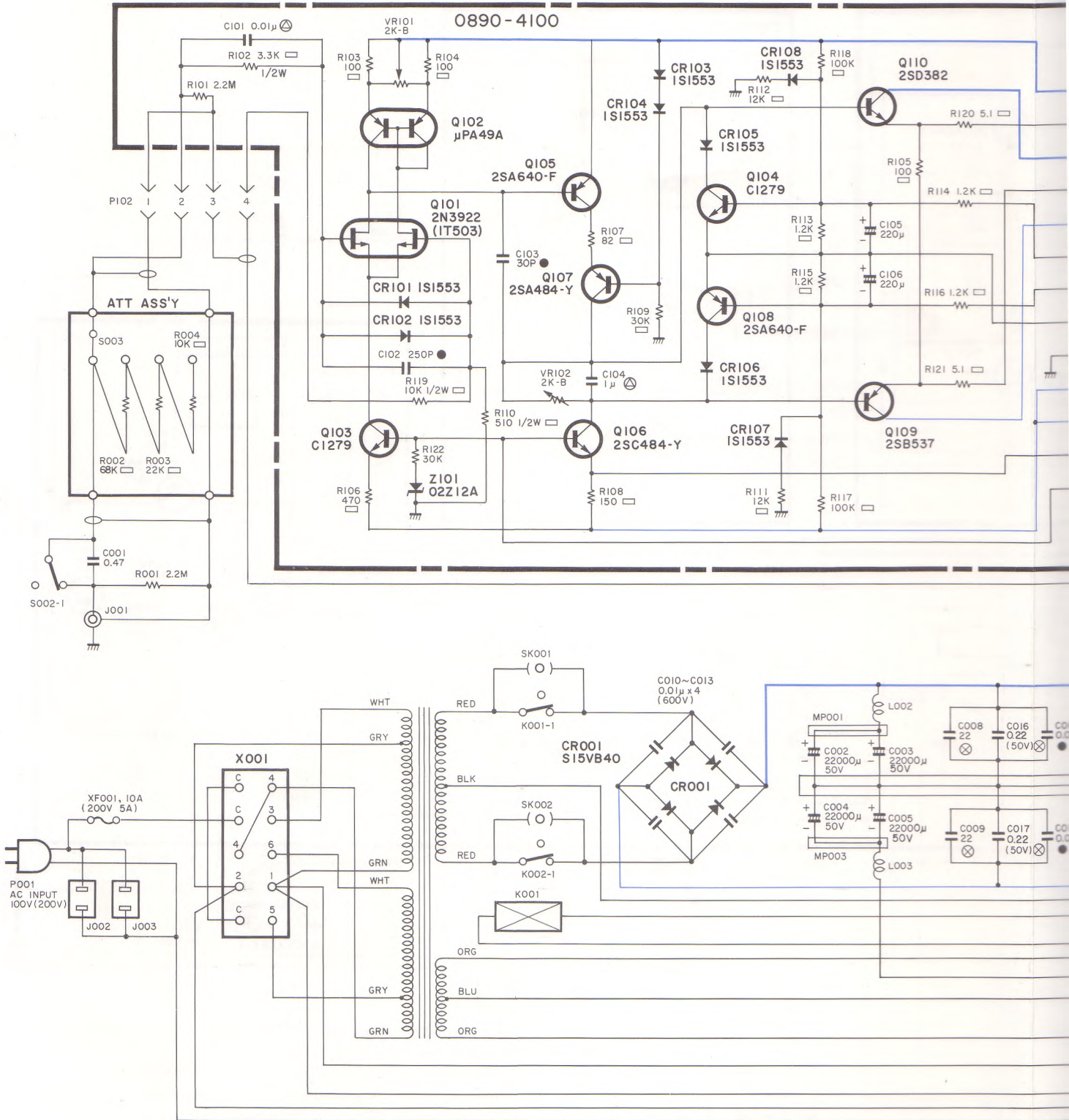
DA-80 SCHEMATIC DIAGRAM



NOTES:

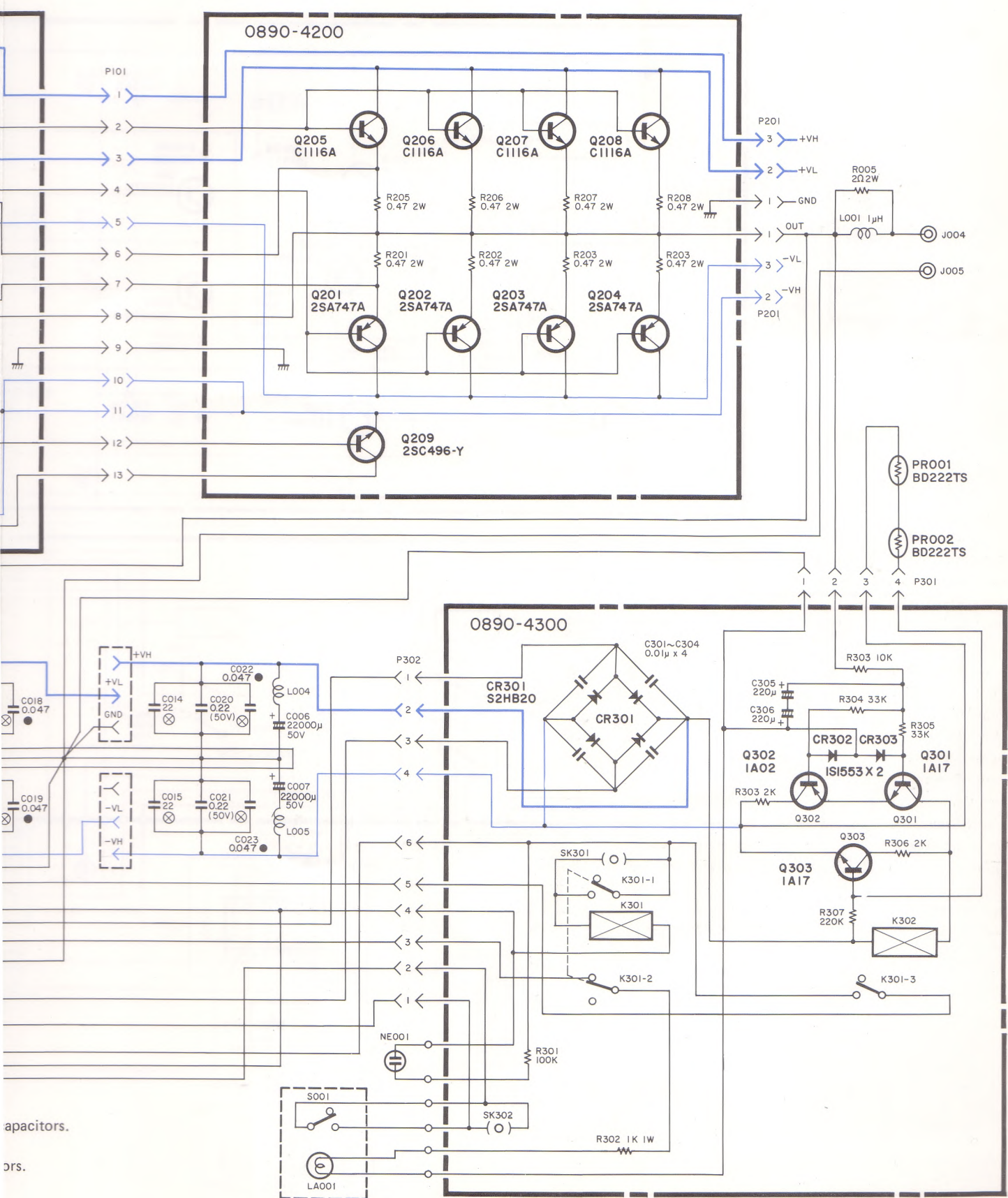
1. Resistors marked \square are metal film resistors.
2. Unmarked resistors are $\frac{1}{4}$ W carbon resistors.
3. Capacitors marked \odot are ceramic capacitors (Rated 500W).
4. Capacitors marked $*$ are silvered mica capacitors (Rated 500V, 125°C class).
5. Capacitors marked \ominus are metalized mylar film capacitors.
6. Capacitors marked \bullet are styrol capacitors.
7. Capacitors marked \otimes are polycarbonate capacitors.
8. Unmarked capacitors are styrene capacitors.
9. The left channel signal circuitry only has been described.
10. There are for areas of 100V and 200V.
T001, K302 and F001 (5A) are for 100V area and T002, K304 and F001 (3A) are for 200V area.

DA-80M SCHEMATIC DIAGRAM



NOTES:

1. Resistors marked \square are metal film resistors.
2. Unmarked resistors are $\frac{1}{4}$ W carbon resistors.
3. Capacitors marked \odot are ceramic capacitors (Rated 500V).
4. Capacitors marked $*$ are silvered mica capacitors (Rated 500V, 125°C class).
5. Capacitors marked \triangle are metalized mylar film capacitors.
6. Capacitors marked \bullet are styrol capacitors.
7. Capacitors marked \otimes are polycarbonate capacitors.
8. Unmarked capacitors are styrene capacitors.



apacitors.
 Drs.

SPECIFICATIONS

	DA-80	DA-80M
Equipment Type	All Silicon Transistor Stereo Power Amplifier	All Silicon Transistor Monaural Power Amplifier
Circuitry Type	Class-A Operation DC Amp. ± 8 electric source. Top stage FET input, pure complementary. Left/Right independent construction.	Class-A Operation DC Amp. ± 4 electric sources. Top Stage FET input, pure complementary
Transistors	31, including 2 dual FET and 2 dual Transistors	21, including 1 dual FET and 1 dual Transistors
Diodes	24, including 4 bridge diodes	13, including 2 bridge diodes
Maximum Output	45W + 45W	90W
Power Bandwidth	5Hz ~ 50KHz/THD Less than 0.1%/20W	5 ~ 35KHz/THD Less than 0.1%/40W
Total Harmonic Distortion	Less than 0.005%/8 Ω /at 45W Less than 0.01%/8 Ω /at 1W	Less than 0.005%/8 Ω /at 80W Less than 0.01%/8 Ω /at 1W
Damping Factor	600/8 Ω , 1KHz	600/8 Ω 1 KHz
S/N Ratio	More than 100dB	More than 100 dB
Cross-talk	-70dB/20KHz	
Input Sensitivity	0.89V/Maximum output	1.26V/Maximum output
Input Impedance	100K Ω /100pF	100 K Ω /100 pF
Frequency Characteristic	+0, -3dB DC ~ 500KHz/DC Mode +0, -3dB 3Hz ~ 500KHz/AC Mode	+0, -3 dB DC ~ 500 KHz/DC Mode +0, -3 dB 3 ~ 500 KHz/AC Mode
Gain	26.3dB	26.3dB
Load	More than 2 Ω /Music reproduction, More than 4 Ω /Testing	More than 2 Ω /Music reproduction, More than 4 Ω /Testing
Thru-Rate	20V/ μ sec	20V/ μ sec
Phase Transient	+0 $^\circ$ ~ -3 $^\circ$ /10KHz +0 $^\circ$ ~ -10 $^\circ$ /100KHz	+0 $^\circ$ ~ -3 $^\circ$ /10 KHz +0 $^\circ$ ~ -10 $^\circ$ /100 KHz
Maximum Input Voltage	50V (AC/DC)	50V (AC/DC)
Operative Temperature Range	0 ~ 40 $^\circ$ C	0 ~ 40 $^\circ$ C
Short-circuit Protective Circuit	Activates at less than 2 Ω	Activates at less than 2 Ω
Speaker Protective Circuit	Activates at approx. ± 5 V	Activates at approx. ± 5 V
Overheat Protective Circuit	Activates at approx. 120 $^\circ$ C of transistor cases	Activates at approx. 120 $^\circ$ C of transistor cases
Idling Current Drift	Approx. 130% at SW-on, 100% 10 min. after SW-on	Approx. 130% at SW-on, 100% 10 min, after SW-on
Signal Source Drift	Undetectable	Undetectable
Temperature Drift	± 10 mV 0 ~ 40 $^\circ$ C	± 10 mV 0 ~ 40 $^\circ$ C
Time Drift	± 25 mV, Stabilizes 10 minutes after SW on.	± 25 mV, Stabilizes 10 minutes after SW-on
Electric Source Drift	± 3 mV $\pm 10\%$	± 3 mV $\pm 10\%$
Attenuator	0dB/-10dB/-20dB/- ∞	0 dB/-10 dB/-20 dB/- ∞
Power Consumption	320 W	280W
Line Voltage	100V/117V or 200V/230V $\pm 10\%$	100V/117V/220V/240V $\pm 10\%$
Source Frequency	48 ~ 62Hz	48 ~ 62Hz
Dimensions WxHxD	437 x 166 x 407 mm	437 x 166 x 407 mm
Weight	19.5kg (43 lbs.)	20 kg (44 lbs.)
ACCESSORIES	(1) Standard 5A fuse (100 ~ 120V) or 3A fuse (200 ~ 240V) (2) Connector cable (1 set)	(1) Standard 10A Slow-blow fuse (100 ~ 120V) or 5A Slow-blow fuse (200 ~ 240V) (2) Connector cable (1 set)

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