

# SERVICE MANUAL

**ALPHA 1**  
POWER AMPLIFIER

# NIKKO



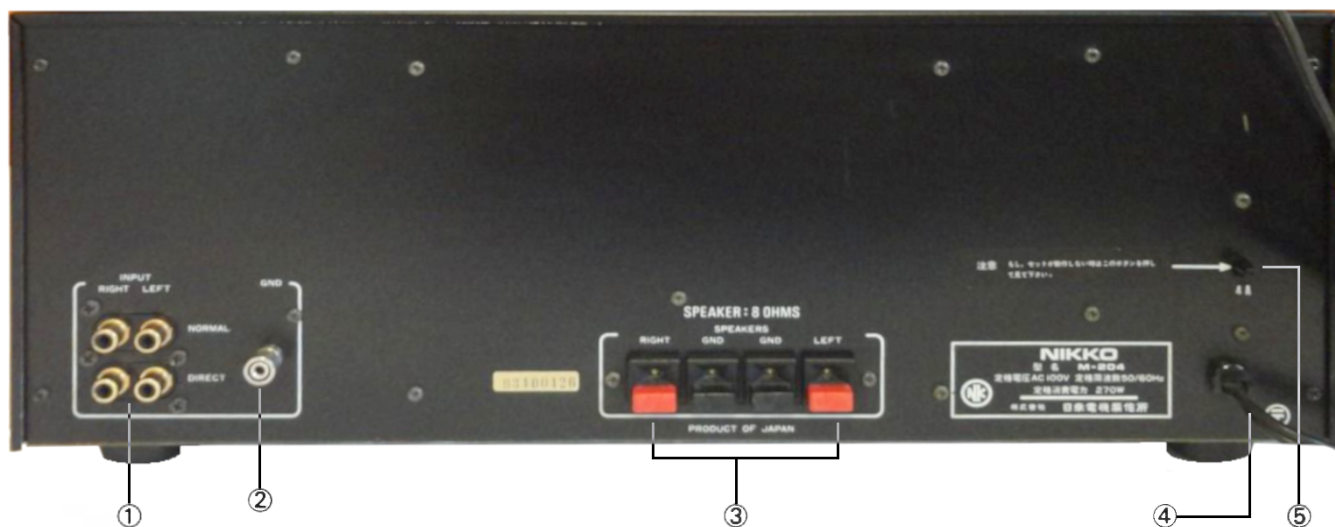
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# SPECIFICATION

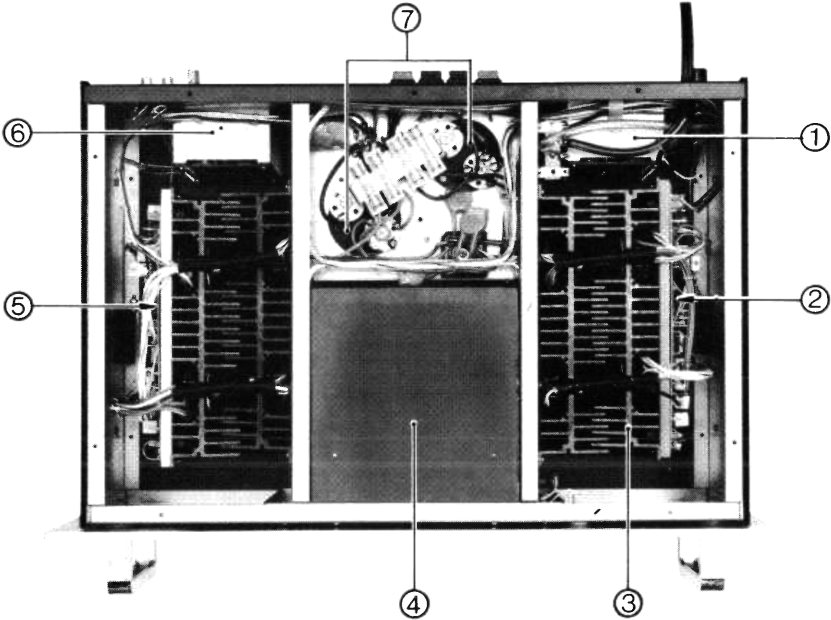
	NOMINAL	LIMIT
<b>Continuous power output (T.H.D 0.08%)</b>		
2CH DRIVEN (8 ohm) 20HZ~20KHZ	240Wx2	220Wx2
2CH DRIVEN (8 ohm) 1KHZ	270Wx2	240Wx2
<b>Harmonic distortion</b>		
2CH DRIVEN (8 ohm) at 1W		less than 0.04%
<b>Intermodulation distortion</b>		
2CH DRIVEN (8 ohm) at 240W		less than 0.08%
2CH DRIVEN (8 ohm) at 1W		less than 0.04%
Frequency response at 1W	10HZ~100KHZ	±1dB
Input sensitivity	1V	±1.5dB
Input inpedance	60K ohm.	±10K ohm
Cross talk (at 220W 10KHZ)	61dB.	58dB
Idling current.		25mA~50mA
Muting delay time		1~4 sec
Center voltage	0mV	± 30mV
Damping Factor (1KHZ 8 ohm).	100	50
Residual Hum & Noise	0.22mV.	0.3mV

# EXTERNAL VIEW

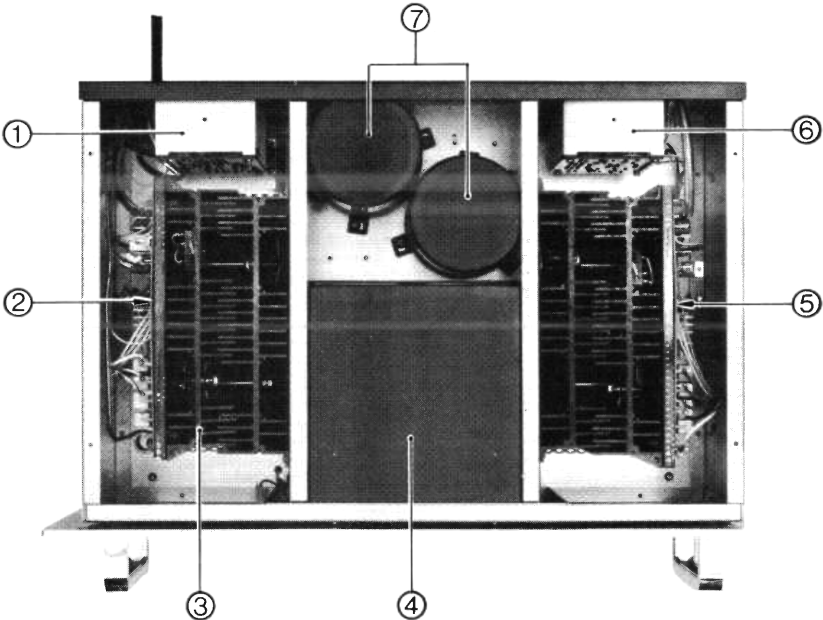


1. INPUT TERMINALS
2. GND TERMINAL
3. SPEAKER TERMINALS
4. AC CORD
5. FUSE HOLDER

# INTERNAL VIEW



- 1. PROTECT P.C.B ASSEMBLY
- 2. MAIN AMP P.C.B ASSEMBLY (LEFT CHANNEL)
- 3. HEAT SINK
- 4. POWER TRANSFORMER
- 5. MAIN AMP P.C.B ASSEMBLY (RIGHT CHANNEL)
- 6. REGULATOR P.C.B ASSEMBLY
- 7. ELECTROLYTIC CAPACITOR (33000 $\mu$ F 100VV)



# MEASUREMENT AND ADJUSTMENT

## 1: Adjustment of Center Voltage

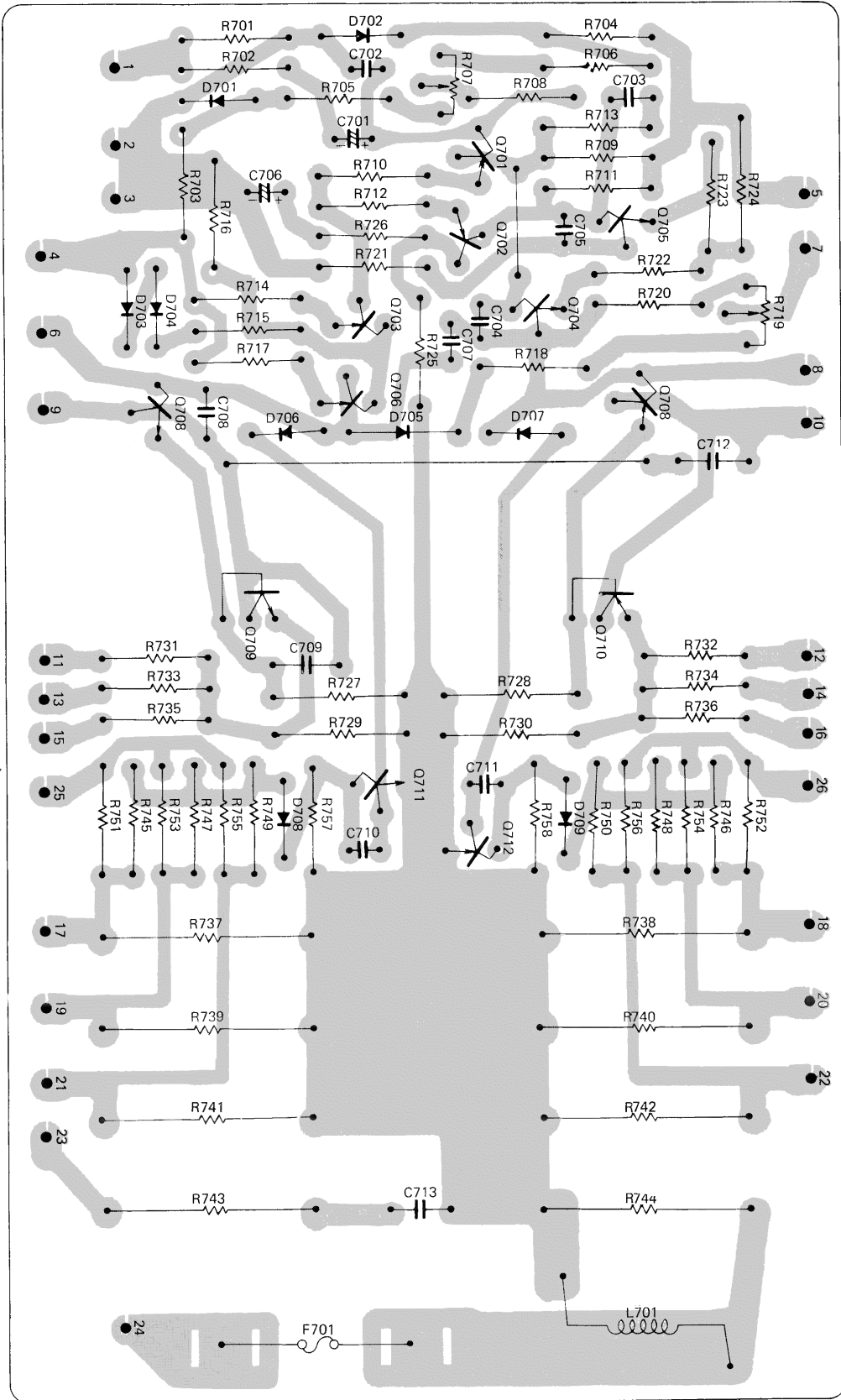
With input terminals short-circuited, connect a high sensitive DC voltmeter to the output terminals and adjust the semi-fixed resistor R707 on the main amplifier PCB assembly until the voltmeter indication leads less than +30mV.

## 2. Adjustment of Idling Current

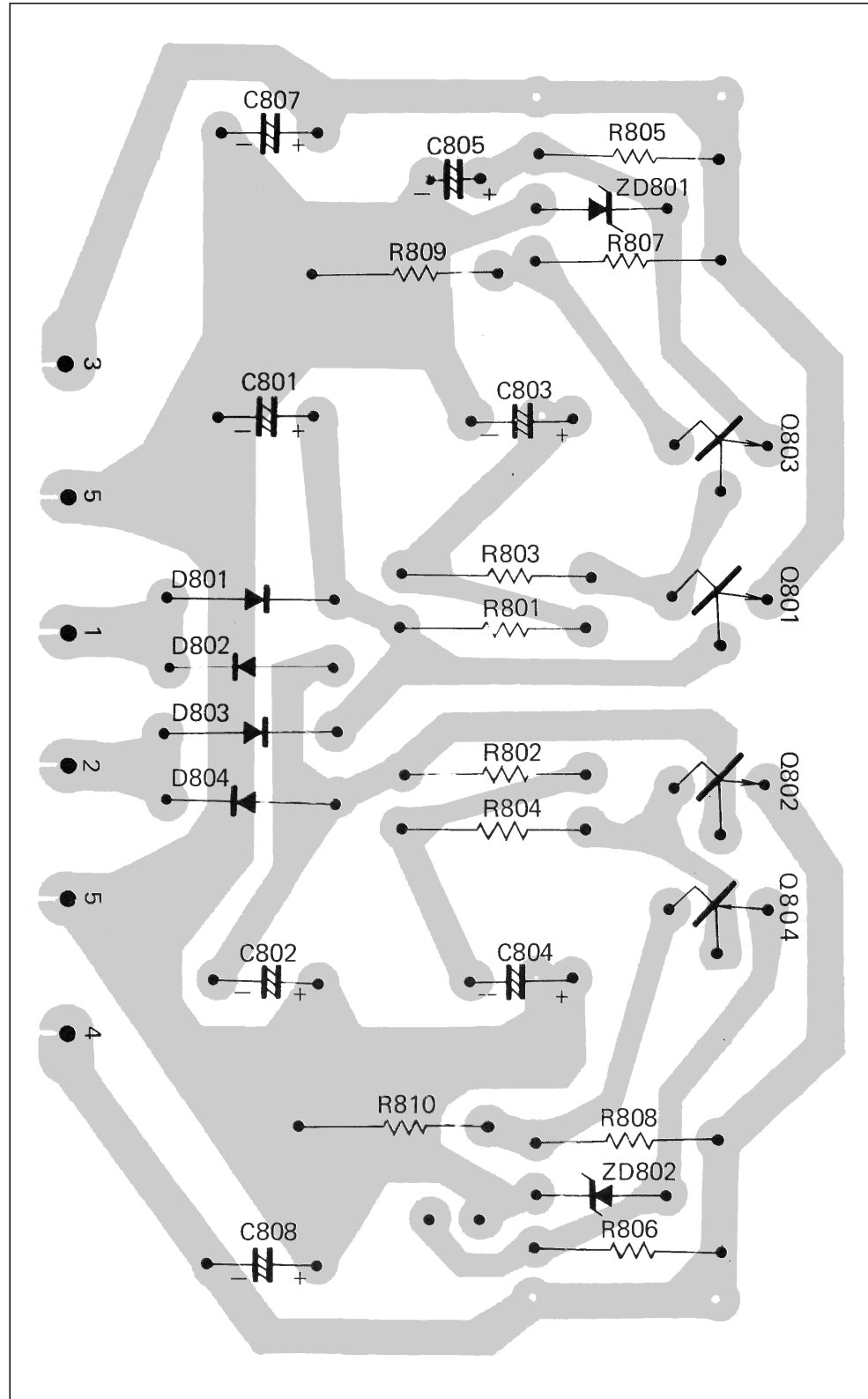
Connect a high-sensitive DC voltmeter between pin No.24 and 17 on the main amplifier PCB assembly and adjust the semi-fixed resistor R719 until an idling current ranges from 25 mA to 50 mA. However, since the output stage is a triple push type, connect the DC voltmeter to the pins having the largest idling current between No.24 and 17, No.24 and 19, or No.24 and 21 to set up the correct idling current.

Note: This idling current adjustment must be performed 4 to 50 minutes after the power switch has been turned on.

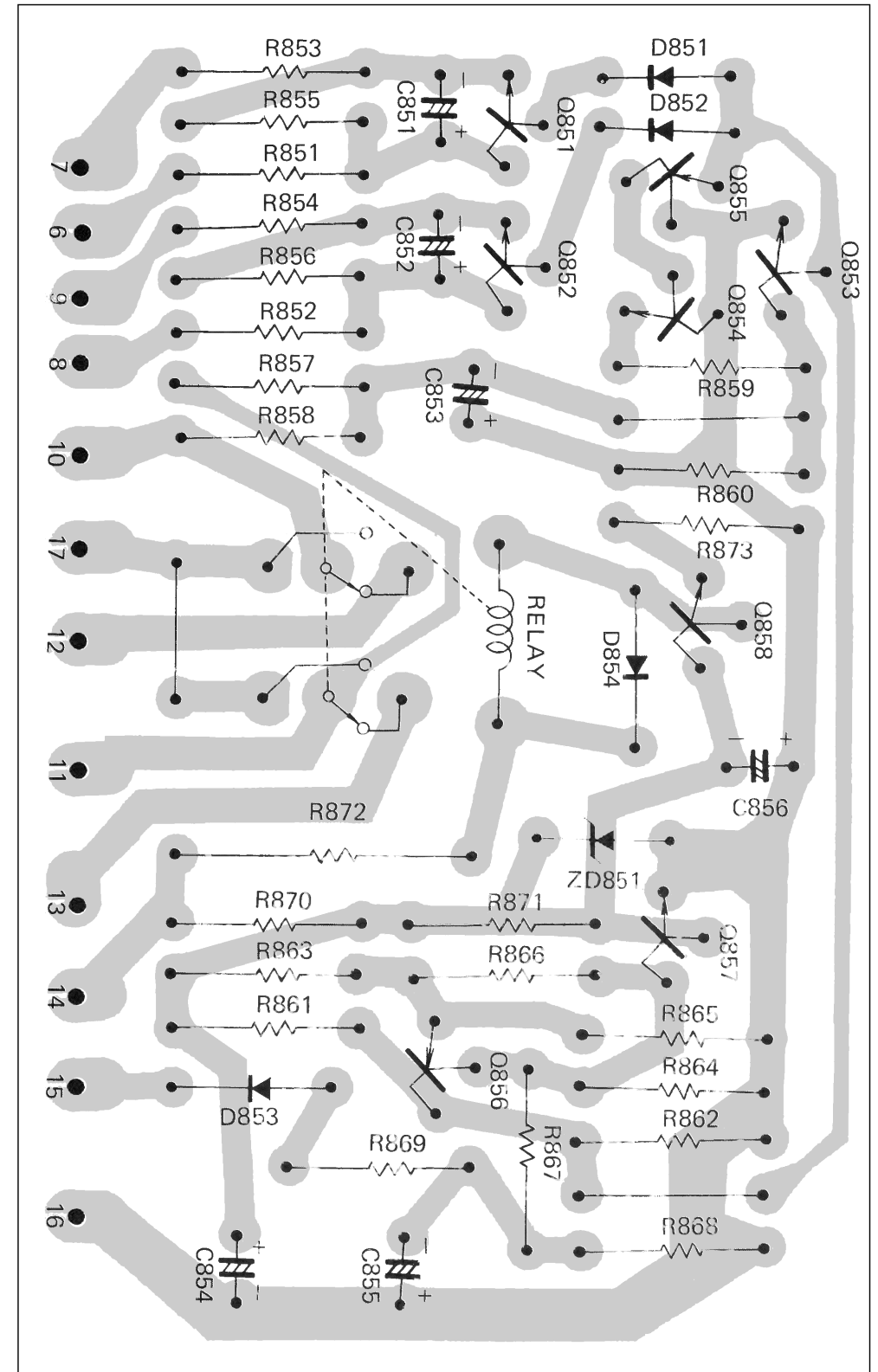
# POWER AMP P. C. B ASSEMBLY



# REGULATOR P. C. B ASSEMBLY



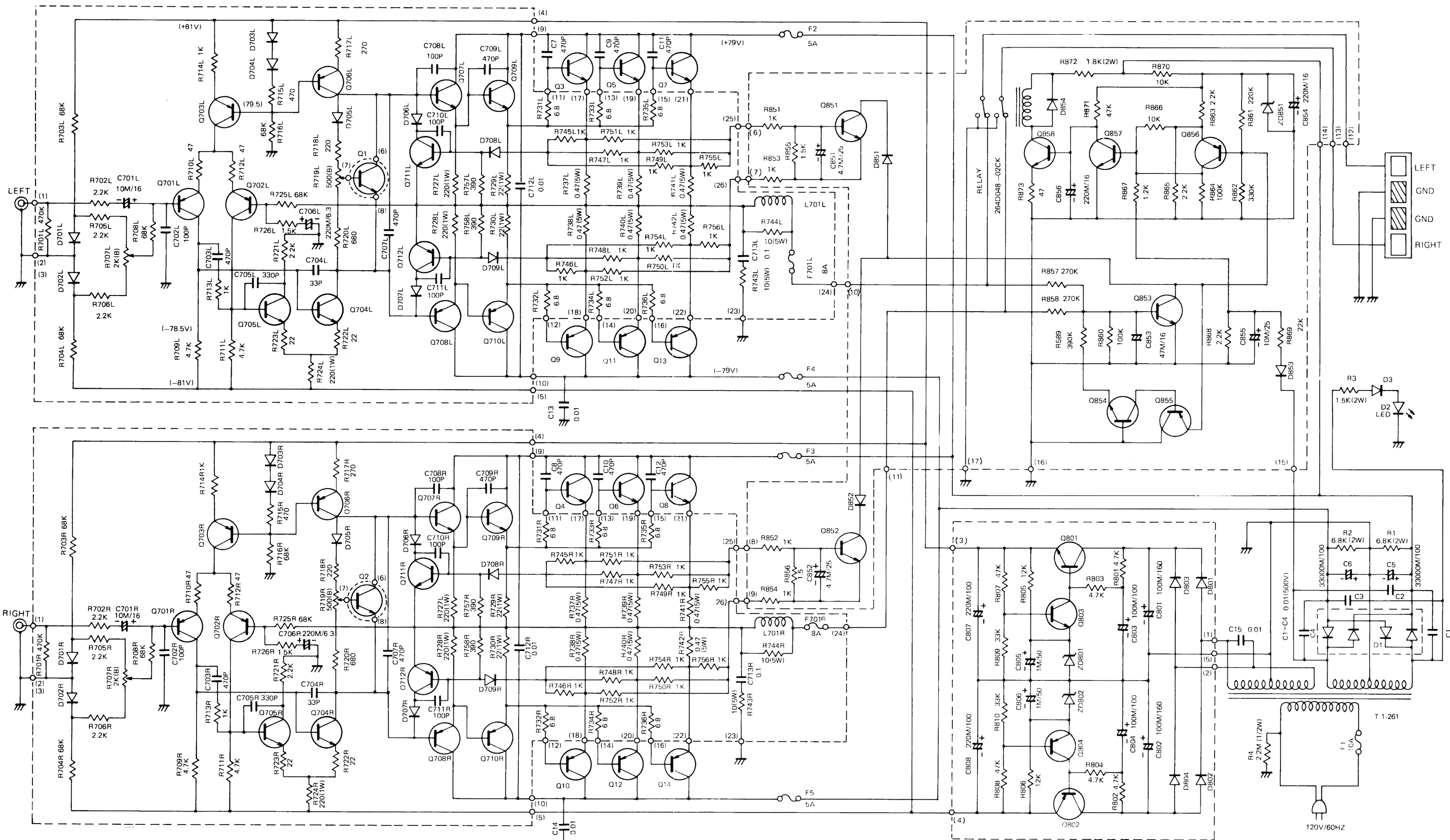
# PROTECT P. C. B ASSEMBLY





# OVERALL DIAGRAM

# ALPHA-1

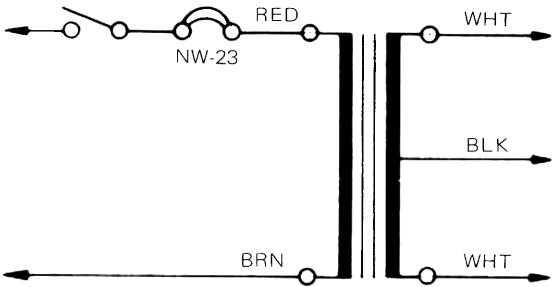


- |             |                  |              |                                    |        |                                 |
|-------------|------------------|--------------|------------------------------------|--------|---------------------------------|
| 2SA872A     | : Q701LR~Q703LR  | 2SC945 L     | : Q711LR, Q853, Q854, Q857, Q1, Q2 | 1S2076 | : D701LR~D704LR, D708LP, D709LR |
| 2SC1904-100 | : Q704LR, Q705LR | 2SA733       | : Q712LR, Q855, Q856               | 1N60P  | : D706LR, D707LF                |
| 2SA899-100  | : Q706LR         | 2SB546A      | : Q802                             | 1S1885 | : D853~D854, D851, D852         |
| 2SB630      | : Q708LR, Q710LR | 2SD401A      | : Q801                             | 1S1886 | : D801~D804                     |
| 2SD610      | : Q707LR, Q709LR | 2SA858       | : Q804                             | S25VB  | : D1                            |
| 2SB600      | : Q9~Q14         | 2SC1438      | : Q803                             | SV-04  | : D705LR                        |
| 2SD555      | : Q3~Q8          | 2SC1567(K)   | : Q858                             | XZ-122 | : ZD851                         |
|             |                  | 2SC1775(D.E) | : Q851, Q852                       | WX-320 | : ZD801, ZD802                  |
- ( V ) : DC VOLTAGE AT NO. SIGNAL

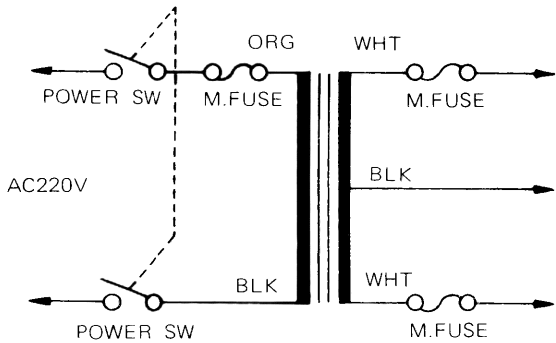
961133E

# PARTIAL CHANGES MADE ACCORDING DESTINATION

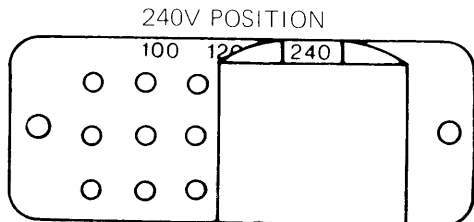
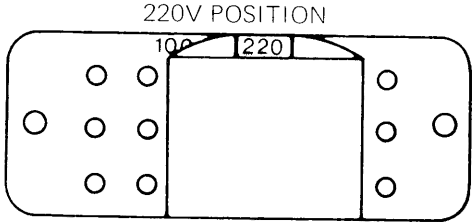
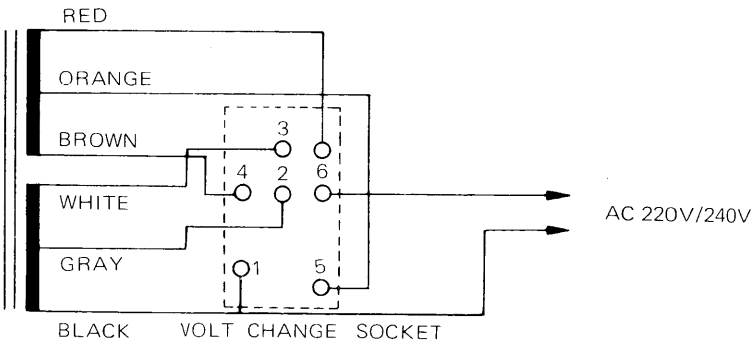
120V	U.S.A.	CANADA
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220V	SWEDEN	WEST-GERMANY
	DENMARK	



220V/240V	EUROPE
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VOLT CHANGE PLUG/SOCKET

# PARTS LIST

Parts No.	Description	Symbol (Note)	Parts No.	Description	Symbol (Note)
<b>FINAL ASSEMBLY</b>			234471K	CERAMIC CAPACITOR 470 PF (±10%) 500V	C <sub>7</sub> , C <sub>9</sub> , C <sub>11</sub> , C <sub>8</sub> , C <sub>10</sub> , C <sub>12</sub>
9825130	CARTON BOX		<b>POWER AMP PCB ASSEMBLY</b>		
9640660	POLY SACK		7280280	HEAT SINK	
9440320	POLY SACK #13		510042S	TRANSISTOR 2SB630	Q <sub>708L</sub> , Q <sub>708R</sub> , Q <sub>710L</sub> , Q <sub>710R</sub>
960174E	OWNER'S MANUAL		511014S	TRANSISTOR 2SD610	Q <sub>707L</sub> , Q <sub>707R</sub> , Q <sub>709L</sub> , Q <sub>709R</sub>
962012J	PIN PLUG CORD		4700340	FUSE 8A	F <sub>701L</sub> , F <sub>701R</sub>
967004A	WARRANTY CARD		514091S	TRANSISTOR 2SA-899-100	Q <sub>706L</sub> , Q <sub>706R</sub>
9690040	POLY CLOTH		515088S	TRANSISTOR 2SC-1904-100	Q <sub>704L</sub> , Q <sub>704R</sub> , Q <sub>705L</sub> , Q <sub>705R</sub>
9690010	SILICA GEL		510044S	TRANSISTOR 2SA872A	Q <sub>701L</sub> , Q <sub>701R</sub> , Q <sub>702L</sub> , Q <sub>702R</sub> , Q <sub>703L</sub> , Q <sub>703R</sub>
7883390	FRONT PANEL		514074S	TRANSISTOR 2SA733	Q <sub>712L</sub> , Q <sub>712R</sub>
506001S	POWER INDICATOR (LED 3φx4.5)	D <sub>2</sub>	515077S	TRANSISTOR 2SC945 L	Q <sub>711L</sub> , Q <sub>711R</sub>
7890130	CARY HANDLE		501019S	SILICON DIODE 1S2076	D <sub>701L</sub> , D <sub>701R</sub> , D <sub>702L</sub> , D <sub>702R</sub> , D <sub>703L</sub> , D <sub>703R</sub> , D <sub>704L</sub> , D <sub>704R</sub> , D <sub>708L</sub> , D <sub>708R</sub> , D <sub>709L</sub> , D <sub>709R</sub>
7820680	COVER		500001G	GE DIODE 1N60P	D <sub>706L</sub> , D <sub>706R</sub> , D <sub>707L</sub> , D <sub>707R</sub>
7324330	BOTTOM PLATE		505017S	DIODE SV-04	D <sub>705L</sub> , D <sub>705R</sub>
<b>CHASS ASSEMBLY</b>			1210810	INDUCTANCE	L <sub>701L</sub> , L <sub>701R</sub>
213451Q	ELECTROLYTIC CAPACITOR 33000F 100WV	C <sub>1</sub> , C <sub>2</sub>	4300530	SEMI-FIXED RESISTOR 500 OHM-B	R <sub>719L</sub> , R <sub>719R</sub>
362682B	METAL OXIED RESISTOR 6.8K OHM 2W	R <sub>1</sub> , R <sub>2</sub>	4300550	SEMI-FIXED RESISTOR 2K OHM-B	R <sub>707L</sub> , R <sub>707R</sub>
560039S	RECT DIODE S25VB2	D <sub>1</sub>	384479K	CEMENT RESISTOR 0.47 OHM 5W	R <sub>737L</sub> ~ R <sub>742L</sub> R <sub>737R</sub> ~ R <sub>742R</sub>
238103P	CERAMIC CAPACITOR 0.01μF (+100 - 0 %) 500V	C <sub>1</sub> , C <sub>2</sub> , C <sub>3</sub> , C <sub>4</sub> , C <sub>13</sub> , C <sub>14</sub>	384100K	CEMENT RESISTOR 10 OHM 5W	R <sub>743L</sub> , R <sub>743R</sub> , R <sub>744L</sub> , R <sub>744R</sub>
7401090	SNAP BUSHING (B500-375)		361220B	METAL OXIED RESISTOR 22 OHM 1W	R <sub>729L</sub> , R <sub>729R</sub> , R <sub>730L</sub> , R <sub>730R</sub>
7401100	SNAP BUSHING (B321-250)		361221B	METAL OXIED RESISTOR 220 OHM 1W	R <sub>724L</sub> , R <sub>724R</sub> , R <sub>727L</sub> , R <sub>727R</sub> , R <sub>728L</sub> , R <sub>728R</sub>
1102610	POWER TRANSFORMER (T-1-261)		324688J	CARBON RESISTOR 6.8 OHM 1/4W	R <sub>734L</sub> ~ R <sub>736L</sub> R <sub>734R</sub> ~ R <sub>736R</sub> R <sub>731L</sub> ~ R <sub>733L</sub> R <sub>731R</sub> ~ R <sub>733R</sub>
325225D	CARBON RESISTOR 2.2M OHM 1/2W	R <sub>4</sub>	324220J	CARBON RESISTOR 22 OHM 1/4W	R <sub>722L</sub> , R <sub>722R</sub> , R <sub>723L</sub> , R <sub>723R</sub>
4510090	POWER INDICATOR SOCKET (3021-2-N)		324470J	CARBON RESISTOR 47 OHM 1/4W	R <sub>710L</sub> , R <sub>710R</sub> , R <sub>712L</sub> , R <sub>712R</sub>
560032S	SILICON DIODE 1S1885	D <sub>3</sub>	324221J	CARBON RESISTOR 220 OHM 1/4W	R <sub>718L</sub> , R <sub>718R</sub>
362152B	METAL OXIED RESISTOR 1.5K OHM 2W	R <sub>3</sub>	324271J	CARBON RESISTOR 270 OHM 1/4W	R <sub>717L</sub> , R <sub>717R</sub>
4581540	FUSE HOLDER (YHS-408P)		324471J	CARBON RESISTOR 470 OHM 1/4W	R <sub>715L</sub> , R <sub>715R</sub>
4710020	FUSE 5A	F <sub>2</sub> , F <sub>3</sub> , F <sub>4</sub> , F <sub>5</sub>	324391J	CARBON RESISTOR 390 OHM 1/4W	R <sub>757L</sub> , R <sub>757R</sub> , R <sub>758L</sub> , R <sub>758R</sub>
<b>BACK PLATE ASSEMBLY</b>			324681J	CARBON RESISTOR 680 OHM 1/4W	R <sub>720L</sub> , R <sub>720R</sub>
606205J	AC SUPPLY CORD		324102J	CARBON RESISTOR 1K OHM 1/4W	R <sub>745L</sub> ~ R <sub>756L</sub> R <sub>745R</sub> ~ R <sub>756R</sub> R <sub>713L</sub> ~ R <sub>714L</sub> R <sub>713R</sub> ~ R <sub>714R</sub>
7400690	CARD STOPPER (SR-4N-4)		324152J	CARBON RESISTOR 1.5K OHM 1/4W	R <sub>726L</sub> , R <sub>726R</sub>
4581710	FUSE HOLDER (FM-032)		324222J	CARBON RESISTOR 2.2K OHM 1/4W	R <sub>721L</sub> , R <sub>721R</sub> , R <sub>702L</sub> , R <sub>702R</sub> , R <sub>705L</sub> , R <sub>705R</sub> , R <sub>706L</sub> , R <sub>706R</sub>
4700350	FUSE 10A				
4460480	OUTPUT TERMINAL				
4444010	INPUT TERMINAL				
7152050	GND TERMINAL SHAFT				
7152060	GND TERMINAL NUT				
<b>POWER AMP ASSEMBLY</b>					
7480230	HEAT SINK				
4510100	POWER TRANSISTOR SOCKET				
513067S	TRANSISTOR 2SB600	Q <sub>4</sub> , Q <sub>6</sub> , Q <sub>8</sub> , Q <sub>10</sub> , Q <sub>12</sub> , Q <sub>14</sub>			
513068S	TRANSISTOR 2SD555	Q <sub>3</sub> , Q <sub>5</sub> , Q <sub>7</sub> , Q <sub>9</sub> , Q <sub>11</sub> , Q <sub>13</sub>			
515077S	TRANSISTOR 2SC945 L	Q <sub>1</sub> , Q <sub>2</sub>			

Parts No.	Description	Symbol (Note)	Parts No.	Description	Symbol (Note)
324472J	CARBON RESISTOR 4.7K OHM 1/4W	R <sub>709L</sub> , R <sub>709R</sub> , R <sub>711L</sub> , R <sub>711R</sub>	515092S	TRANSISTOR 2SC1567 R	Q <sub>858</sub>
324683J	CARBON RESISTOR 68K OHM 1/4W	R <sub>716L</sub> , R <sub>716R</sub> , R <sub>725L</sub> , R <sub>725R</sub> , R <sub>703L</sub> , R <sub>703R</sub> , R <sub>704L</sub> , R <sub>704R</sub> , R <sub>708L</sub> , R <sub>708R</sub>	511015S	TRANSISTOR 2SC1775	Q <sub>851</sub> , Q <sub>852</sub>
324474J	CARBON RESISTOR 470K OHM 1/4W	R <sub>701L</sub> , R <sub>701R</sub>	502020S	ZENER DIODE XZ-122	ZD <sub>851</sub>
211220L	ELECTROLYTIC CAPACITOR 10μF 16WV	C <sub>701L</sub> , C <sub>701R</sub>	560032S	DIODE 1S1885	D <sub>853</sub> , D <sub>854</sub>
211032Q	ELECTROLYTIC CAPACITOR 220μF 6.3WV	C <sub>706L</sub> , C <sub>706R</sub>	362182B	METAL OXIED RESISTOR 1.8K OHM 2W	R <sub>872</sub>
226104M	MYLAR CAPACITOR 0.1μF (+20%) 100V	C <sub>713L</sub> , C <sub>713R</sub>	324470J	CARBON RESISTOR 47 OHM 1/4W	R <sub>873</sub>
238103P	CERAMIC CAPACITOR 0.01μF ( $\frac{+100}{-0}$ %) 50V	C <sub>712L</sub> , C <sub>712R</sub>	324122J	CARBON RESISTOR 1.2K OHM 1/4	R <sub>867</sub>
234330K	CERAMIC CAPACITOR 33 PF (±10%) 500V	C <sub>704L</sub> , C <sub>704R</sub>	324222J	CARBON RESISTOR 2.2K OHM 1/4W	R <sub>863</sub> , R <sub>865</sub> , R <sub>868</sub>
232101K	CERAMIC CAPACITOR 100 PF (±10%) 50V	C <sub>702L</sub> , C <sub>702R</sub> , C <sub>710L</sub> , C <sub>710R</sub> , C <sub>711L</sub> , C <sub>711R</sub>	324102J	CARBON RESISTOR 1K OHM 1/4W	R <sub>851</sub> ~ R <sub>854</sub>
234331K	CERAMIC CAPACITOR 330 PF (±10%) 500V	C <sub>705L</sub> , C <sub>705R</sub>	324152J	CARBON RESISTOR 1.5K OHM 1/4W	R <sub>855</sub> , R <sub>856</sub>
232471K	CERAMIC CAPACITOR 470 PF (±10%) 50V	C <sub>703L</sub> , C <sub>703R</sub> , C <sub>707L</sub> , C <sub>707R</sub>	324103J	CARBON RESISTOR 10K OHM 1/4W	R <sub>866</sub> , R <sub>870</sub>
234101K	CERAMIC CAPACITOR 100 PF (±10%) 500V	C <sub>708L</sub> , C <sub>708R</sub>	324223J	CARBON RESISTOR 22K OHM 1/4W	R <sub>869</sub>
234471K	CERAMIC CAPACITOR 470 PF (±10%) 500V	C <sub>709L</sub> , C <sub>709R</sub>	324473J	CARBON RESISTOR 47K OHM 1/4W	R <sub>871</sub>
<b>REGULATOR PCB ASSEMBLY</b>			324104J	CARBON RESISTOR 100K OHM 1/4W	R <sub>864</sub> , R <sub>860</sub>
4630750	REGULATOR PCB		324154J	CARBON RESISTOR 150K OHM 1/4W	R <sub>857</sub> , R <sub>858</sub>
513069S	TRANSISTOR 2SB546A	Q <sub>802</sub>	324224J	CARBON RESISTOR 220K OHM 1/4W	R <sub>861</sub>
513070S	TRANSISTOR 2SD401A	Q <sub>801</sub>	324334J	CARBON RESISTOR 330K OHM 1/4W	R <sub>862</sub>
514092S	TRANSISTOR 2SA858	Q <sub>804</sub>	324394J	CARBON RESISTOR 390K OHM 1/4W	R <sub>859</sub>
515089S	TRANSISTOR 2SC1439	Q <sub>803</sub>	211315Q	ELECTROLYTIC CAPACITOR 4.7μF 25WV	C <sub>851</sub> , C <sub>852</sub>
502026S	ZENER DIODE WZ-320	ZD <sub>801</sub> , ZD <sub>802</sub>	211320Q	ELECTROLYTIC CAPACITOR 10μF 25WV	C <sub>855</sub>
560033S	DIODE 1S1886	D <sub>801</sub> ~ D <sub>804</sub>	211233Q	ELECTROLYTIC CAPACITOR 220μF 16WV	C <sub>854</sub> , C <sub>856</sub>
324472J	CARBON RESISTOR 4.7K OHM 1/4W	R <sub>801</sub> ~ R <sub>804</sub>	215225N	NON POLE CAPACITOR 47μF 16WV	C <sub>853</sub>
324123J	CARBON RESISTOR 12K OHM 1/4W	R <sub>805</sub> , R <sub>806</sub>	1700150	RELAY (264D048-02CK)	
324333J	CARBON RESISTOR 33K OHM 1/4W	R <sub>809</sub> , R <sub>810</sub>			
324473J	CARBON RESISTOR 47K OHM 1/4W	R <sub>807</sub> , R <sub>808</sub>			
211510Q	ELECTROLYTIC CAPACITOR 1μF 50WV	C <sub>805</sub> , C <sub>806</sub>			
211830Q	ELECTROLYTIC CAPACITOR 100μF 100WV	C <sub>803</sub> , C <sub>804</sub>			
261130Q	ELECTROLYTIC CAPACITOR 100μF 160WV	C <sub>801</sub> , C <sub>802</sub>			
211832Q	ELECTROLYTIC CAPACITOR 220μF 100WV	C <sub>807</sub> , C <sub>808</sub>			
238103P	CERAMIC CAPACITOR 0.01μF ( $\frac{+100}{-0}$ %) 500V	C <sub>15</sub>			
<b>PROTECTOR PCB ASSEMBLY</b>					
4630740	PROTECTOR PCB				
514074S	TRANSISTOR 2SA733	Q <sub>855</sub> , Q <sub>856</sub>			
515077S	TRANSISTOR 2SC945 L	Q <sub>853</sub> , Q <sub>854</sub> , Q <sub>857</sub>			

# SEMICONDUCTOR SPECIFICATION

## TRANSISTOR COMPLEMENT

\* Note      Si-P        :    Silicon Planar Transistor  
               Si-EP       :    Silicon Eptaxial Planar Transistor  
               Si-D-J       :    Silicon Diffused Junction Transistor  
               Si-E        :    Silicon Eptaxial Transistor  
               Si-T-D       :    Silicon Triple Diffused Transistor  
               Si-T-D-M   :    Silicon Triple Duffued Mesa Transistor

Type	Description * Note	Class of Service	Maximum Ratings (TA=25°C) Absolute Values						Electrical Characteristics (Typical TA=25°C)										Manufacture	
			Collector to Base Voltage VCBO (V)	Emitter to Base Voltage VEBO (V)	Collector Current IC (mA)	Collector Dissipation PC (mW)	Junction Temperature TJ (°C)	Emitter Current IE (mA)	Condition of Measurement		hfe (hFE)	NF (dB)	f <sub>β</sub> (f <sub>T</sub> ) (MHz)	Cob (PF)	hie (real) (Ω)	Collector Cut off Current		Emitter Cut off Current		
									VCE (V)	IE (mA)						ICBO (μA)	VCE (V)	IE (μA)		VEB (V)
2SB600	PNP Si-T-D	AF. Power. AMP	-200	-5	10A	200W	150°	-5	-2A	40 ~200		4	400		0.1	-200	0.1	-3	NEC	
2SD555	NPN Si-T-D	AF. Power. AMP	250	5	10A	200W	150°	5	2A	40 ~200		6	300		0.1	200	0.1	3	NEC	
2SD610	NPN Si-T-D	AF. Power. AMP	250	5	2A	1.5W	150°	10	500	40 ~200		5	45		1.0	150	1.0	3	NEC	
2SB630	PNP Si-T-D	AF. Power. AMP	-200	-5	-2A	1.5W	150°	-10	-500	40 ~200		5	65		-1.0	-150	-1.0	-3	NEC	
2SA899-100	PNP Si-EP	RF. AMP	-180	-5	-50	1000	150°	-5	-10	100 ~350		100	3		-1.0	-140	-1.0	-2	FUJITSU	
2SC1904-100	NPN Si-EP	RF. AMP	180	5	50	1000	150°	5	10	100 ~350		130	2		1.0	140	1.0	2	FUJITSU	
2SA872A	PNP Si-E	AF. AMP (Low Noise)	-120	-5	-50	300	125°	-12	-2	250 ~800	1.5dB				0.5	-100			HITACHI	
2SC945	NPN Si-E	AF. AMP	60	5	100	250	125°	6	1	135 ~400	2	300	3.5		0.1	60	0.1	5	NEC	
2SA733	PNP Si-E	AF. AMP	-50	-5	-100	250	125°	-6	-1	40 ~600	6	180	8.0		-0.1	-40	-0.1	-5	NEC	
2SB546A	PNP Si-T-D		-200	-5	-2A	1.2W	150°	-10	-400	40 ~200					-50	-200	-0.05	-4	NEC	
2SD401A	NPN Si-T-D		200	5	2A	1.2W	150°	10	400	40 ~200					50	200	0.05	4	NEC	
2SA858	PNP Si-EP	RF. AMP	-150	-5	-50	500	150°	-5	-10	100 ~350		100	3		-1.0	-140	-1.0	-2	FUJITSU	
2SC1438	NPN Si-EP	RF. AMP	150	5	50	500	150°	5	10	100 ~350		130	2		1.0	140	1.0	2	FUJITSU	
2SC1567	NPN Si-EP	AF. AMP	100	5	500	1.2	150°	5	500	130 ~220		120	11						NATIONAL	
2SC1775	NPN Si-E	AF. AMP (Low Noise)	90	5	50	300	125°	12	2	250 ~800	1.5dB				0.5	75			HITACHI	

## RECTIFIER, DIODE, ZENER-DIODE COMPLEMENT

Type	Description	Peak Inverse Voltage (V)	Maximum Ratings (TA = 25°C)					Electrical Characteristics (Typical Value) TA = 25°C							Manufacture
			Dissipation (mW)	Out put Current (mA)	Inverse Current (μA)	Surge Current (A)	Jenction Temperature (°C)	Condition	Condition	Condition	Condition	Condition			
													IF=10mA	MAX. VF=0.8V	
1S2076	Si DIODE	35	250	150	1.0	450mA	175	IF=10mA	MAX. VF=0.8V	VR=1A f=1MHZ	MAX. Ca=3pF	IF=-IR=10mA	trr=3.5μS	HITACHI	
1N60P	Ge DIODE	25		50		500mA	70	VF=1V	MIN. IF=4mA					HITACHI	
1S1885	Si DIODE	100		1A	0.4mA	60	150	IFM=1.5A	MAX. VF=1.2V					TOSHIBA	
1S1886	Si DIODE	200		1A	0.4mA	60	150	IFM=1.5A	VF=1.2V					TOSHIBA	
SV-04	Si VARISTOR	100		100	10		130	IF=1mA	2.35V ±0.25V					SANKEN	
XZ-122	Si ZENER DIODE		500		VR=10V 1μA			IZ=5mA	VZ=11.9 ~12.6	IZ=5mA	ZZ= MAX. 15Ω			JRC	
WZ-320	Si ZENER-DIODE		500		VR=28V MAX. 1μA		175	IZ=5mA	VZ= 30.6 ~33.4V	IZ=5mA	ZZ= MAX. 80Ω			JRC	

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