

SERVICE MANUAL

ALPHA 1
POWER AMPLIFIER

NIKKO



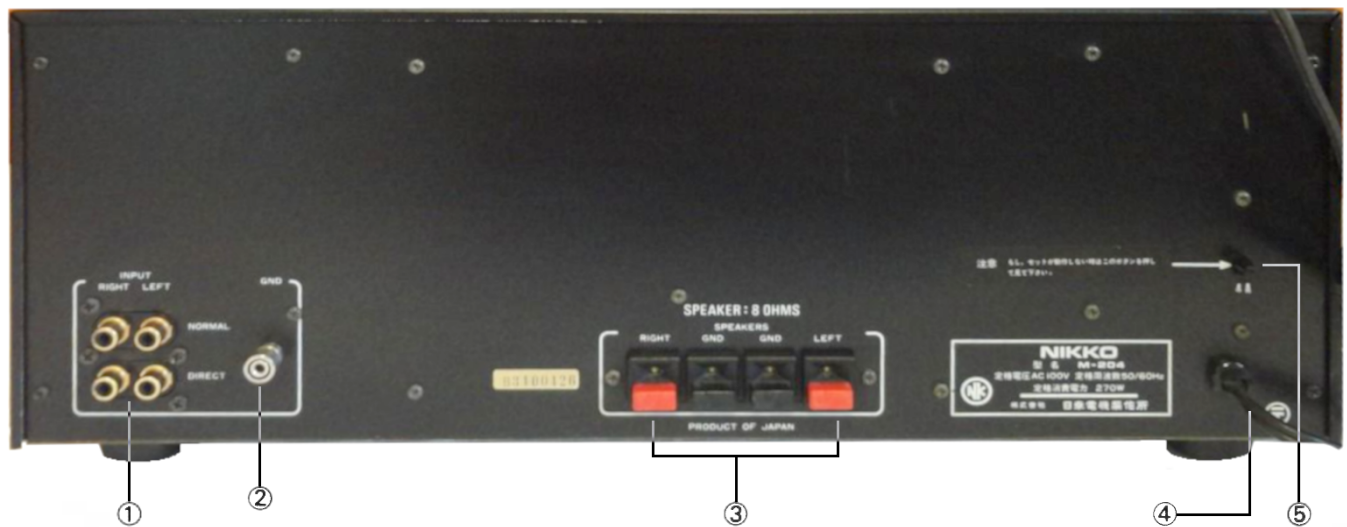
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SPECIFICATION

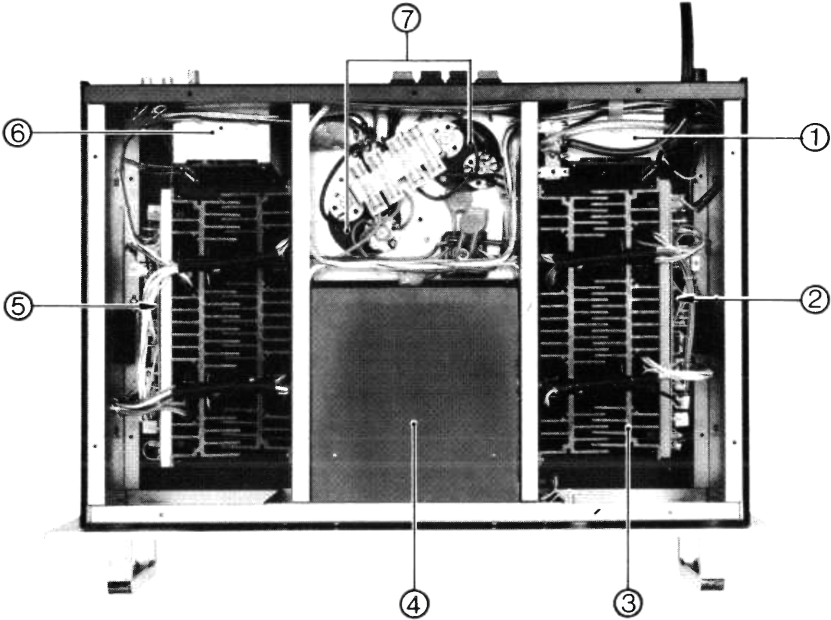
	NOMINAL	LIMIT
Continuous power output (T.H.D 0.08%)		
2CH DRIVEN (8 ohm) 20HZ~20KHZ	240Wx2	220Wx2
2CH DRIVEN (8 ohm) 1KHZ	270Wx2	240Wx2
Harmonic distortion		
2CH DRIVEN (8 ohm) at 1W		less than 0.04%
Intermodulation distortion		
2CH DRIVEN (8 ohm) at 240W		less than 0.08%
2CH DRIVEN (8 ohm) at 1W		less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

EXTERNAL VIEW

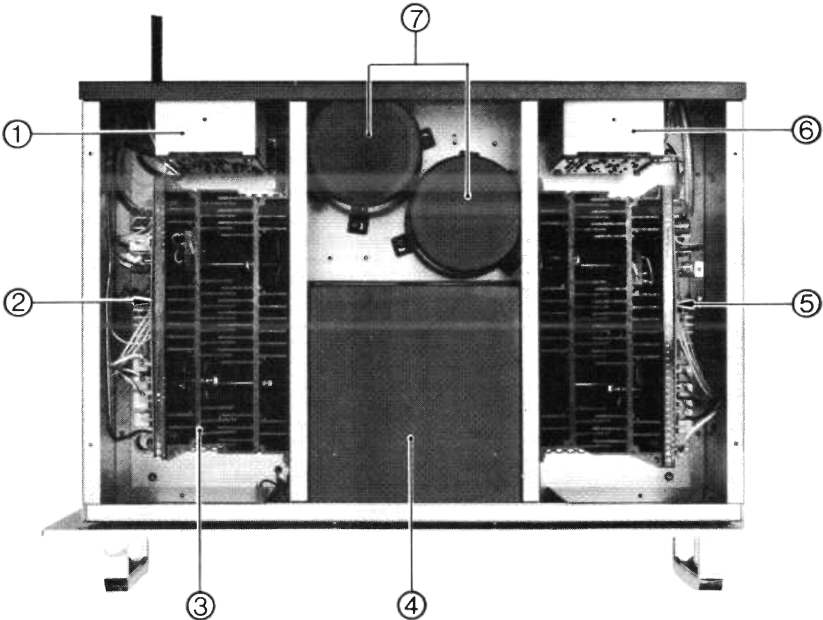


1. INPUT TERMINALS
2. GND TERMINAL
3. SPEAKER TERMINALS
4. AC CORD
5. FUSE HOLDER

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 μ F 100VV)



MEASUREMENT AND ADJUSTMENT

1: Adjustment of Center Voltage

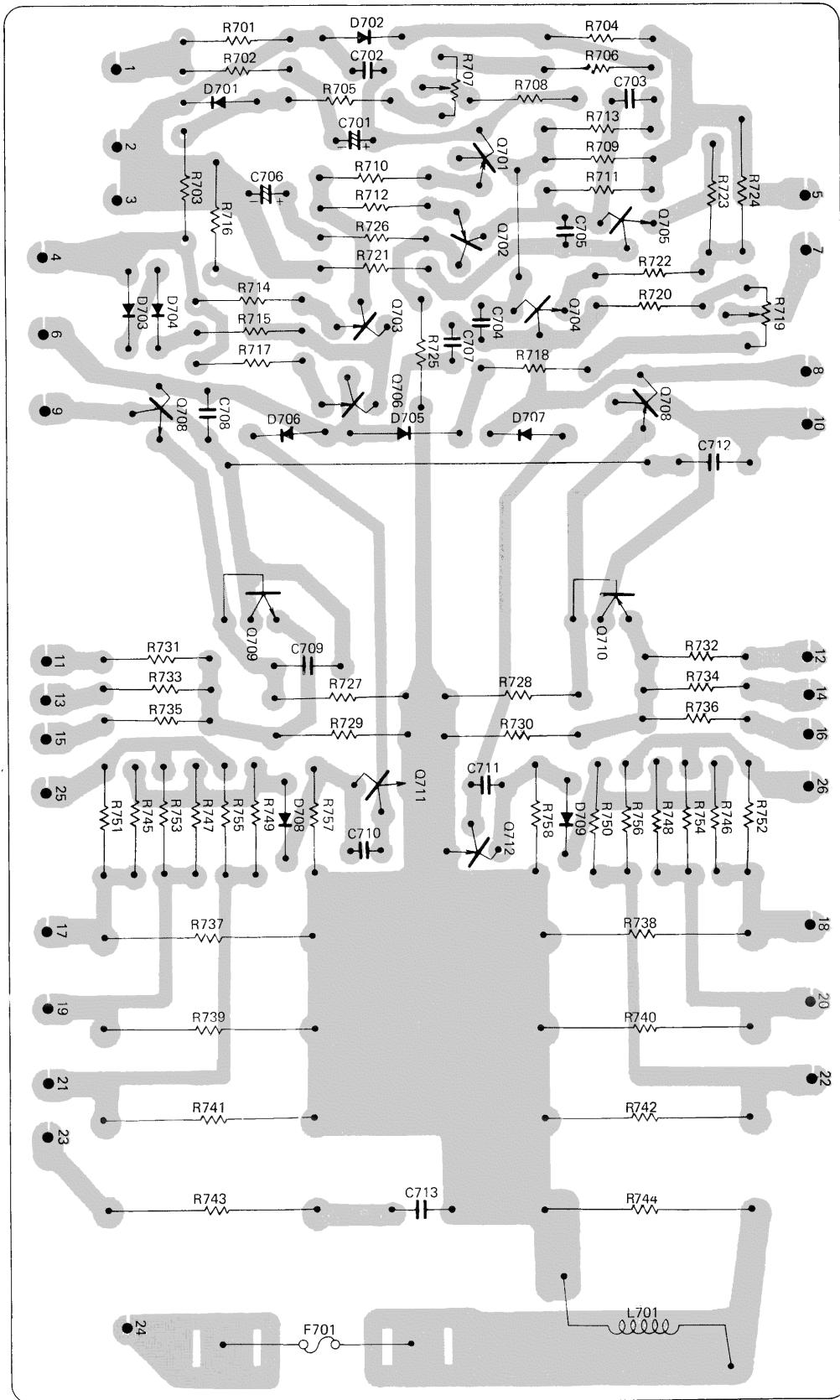
With input terminals short-circuited, connect a high sensitive DC voltmeter to the output terminals and adjust the semi-fixed resistor R707 on the main amplifier PCB assembly until the voltmeter indication leads less than +30mV.

2. Adjustment of Idling Current

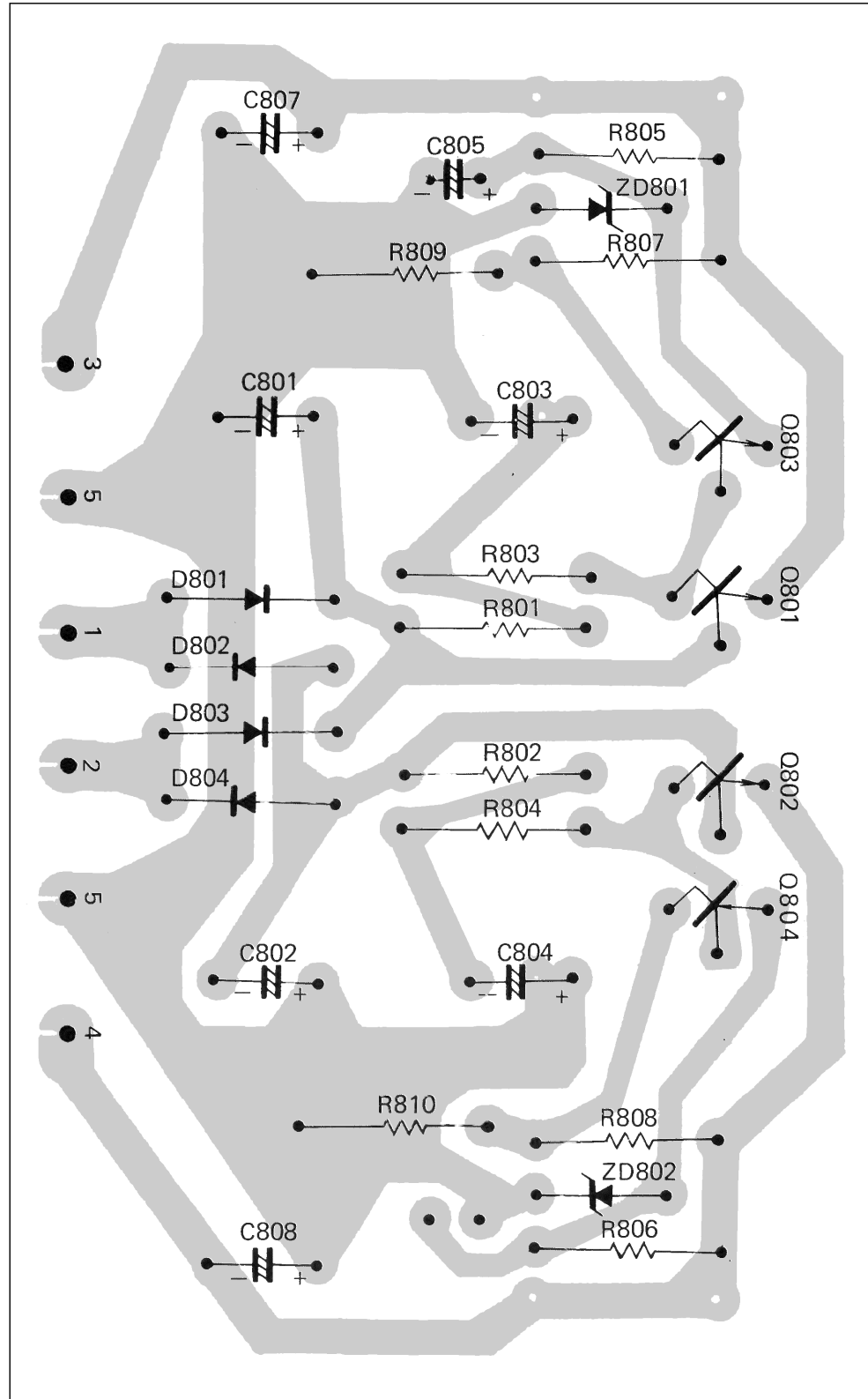
Connect a high-sensitive DC voltmeter between pin No.24 and 17 on the main amplifier PCB assembly and adjust the semi-fixed resistor R719 until an idling current ranges from 25 mA to 50 mA. However, since the output stage is a triple push type, connect the DC voltmeter to the pins having the largest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

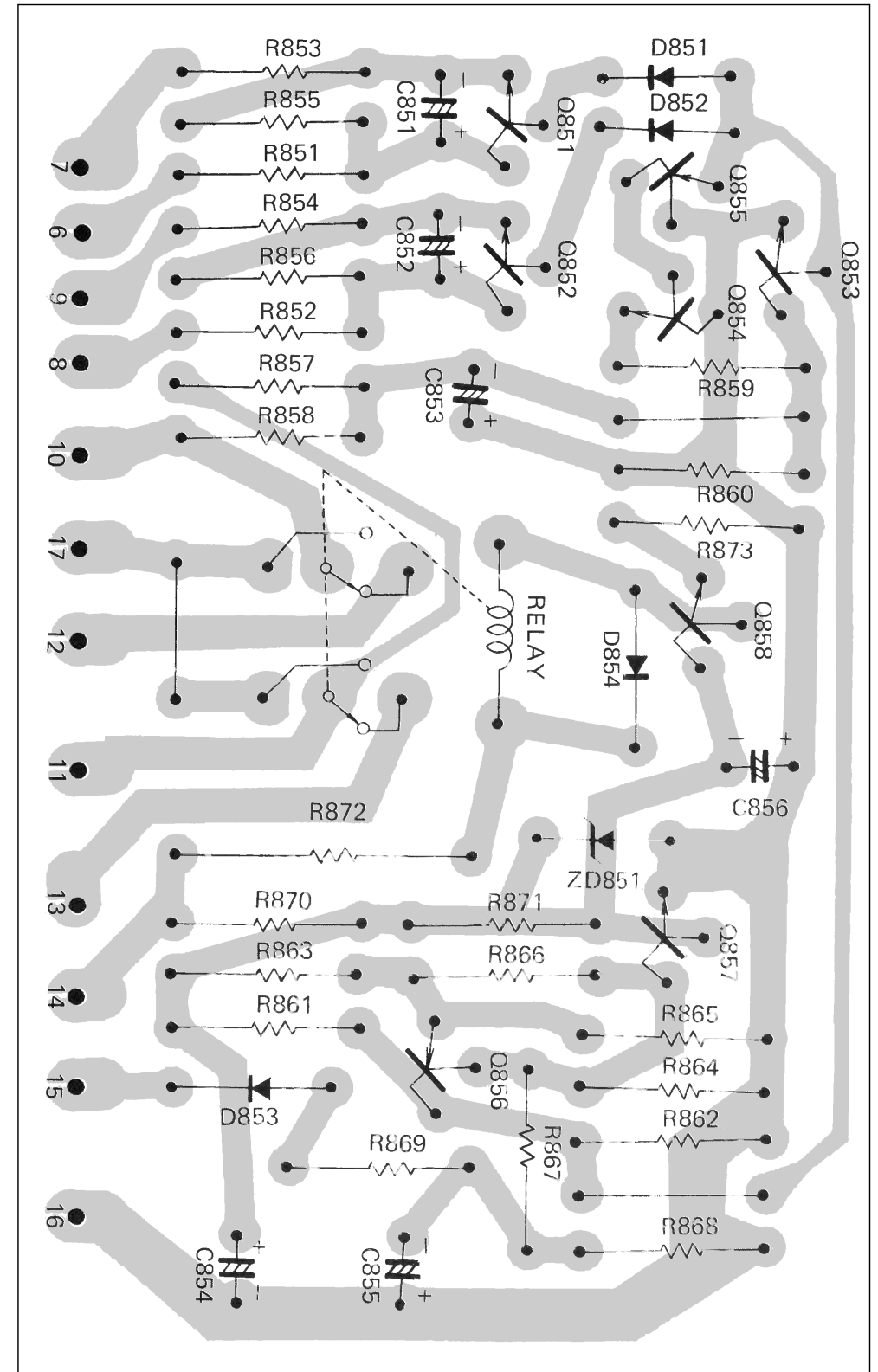
POWER AMP P.C.B ASSEMBLY



REGULATOR P. C. B ASSEMBLY

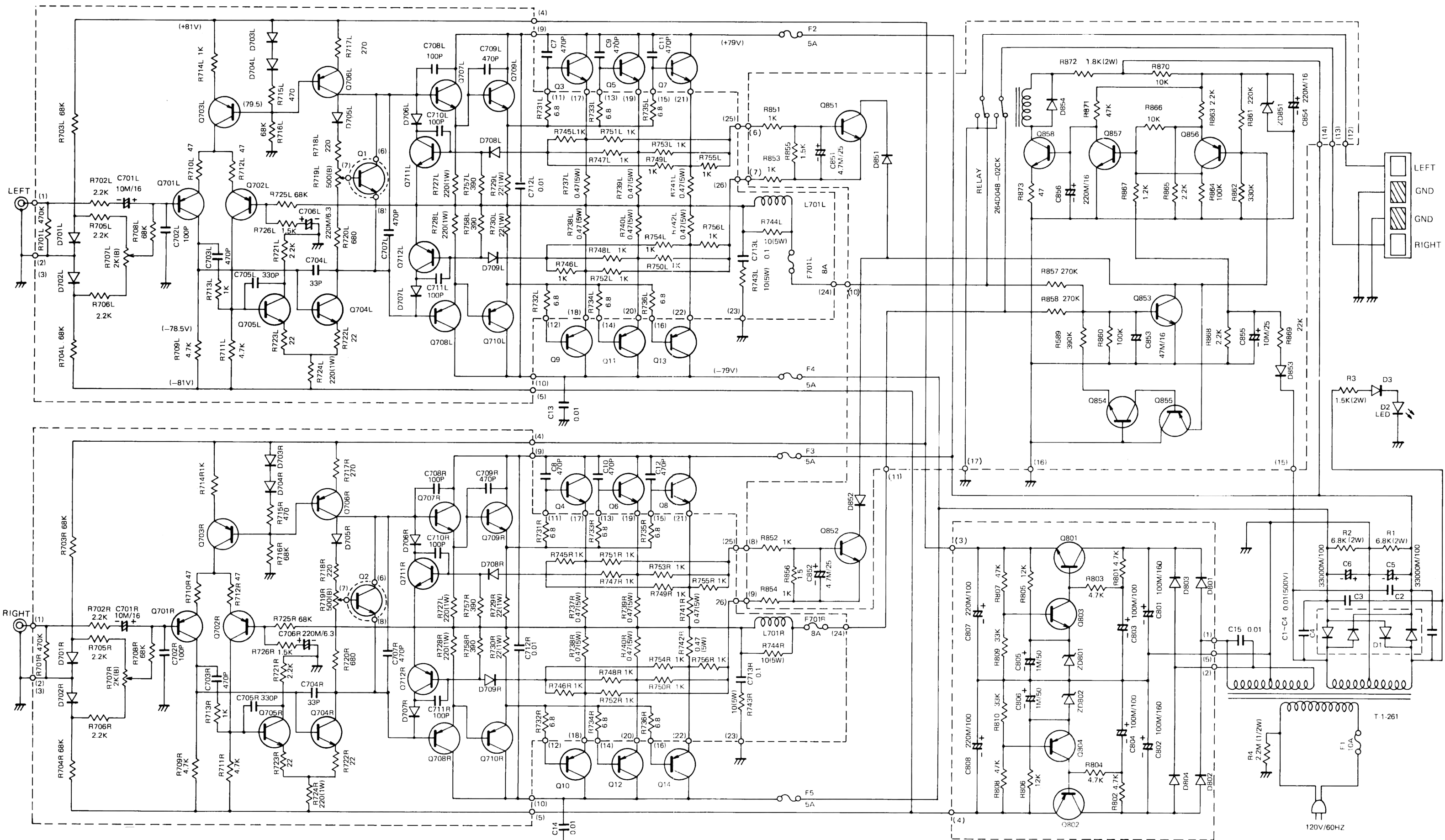


PROTECT P. C. B ASSEMBLY



OVERALL DIAGRAM

ALPHA-1

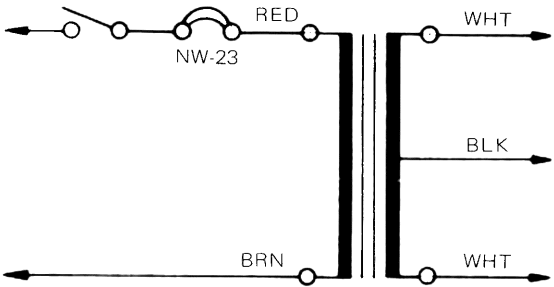


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|-------------|------------------|--------------|------------------------------------|--------|---------------------------------|
| 2SA872A | : Q701LR~Q703LR | 2SC945 L | : Q711LR, Q853, Q854, Q857, Q1, Q2 | 1S2076 | : D701LR~D704LR, D708LP, D709LR |
| 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 |

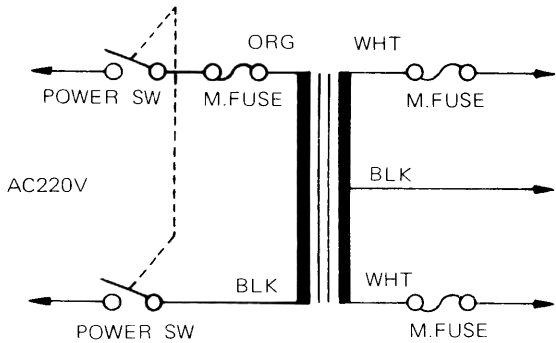
961133E

PARTIAL CHANGES MADE ACCORDING DESTINATION

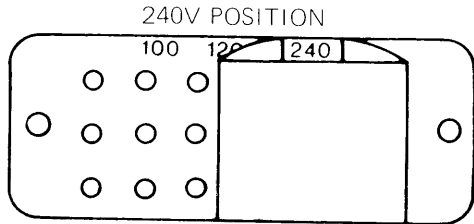
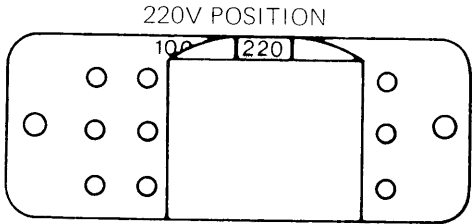
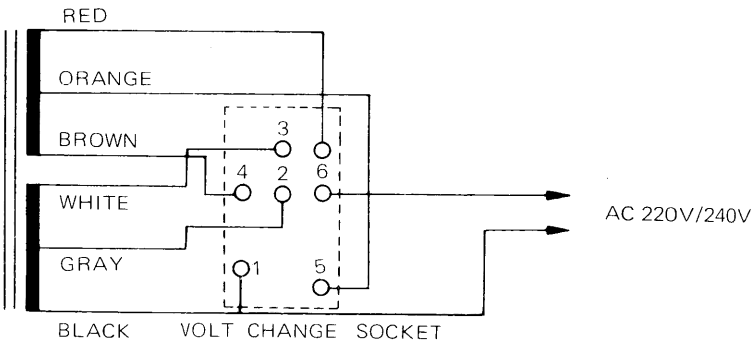
120V	U.S.A.	CANADA
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220V	SWEDEN	WEST-GERMANY
	DENMARK	



220V/240V	EUROPE
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VOLT CHANGE PLUG/SOCKET

PARTS LIST

Parts No.	Description	Symbol (Note)	Parts No.	Description	Symbol (Note)
FINAL ASSEMBLY			234471K	CERAMIC CAPACITOR 470 PF ($\pm 10\%$) 500V	C ₇ , C ₉ , C ₁₁ , C ₈ , C ₁₀ , C ₁₂
CHASS ASSEMBLY			POWER AMP PCB ASSEMBLY		
9825130	CARTON BOX		7280280	HEAT SINK	
9640660	POLY SACK		510042S	TRANSISTOR 2SB630	Q _{708L} , Q _{708R} , Q _{710L} , Q _{710R}
9440320	POLY SACK #13		511014S	TRANSISTOR 2SD610	Q _{707L} , Q _{707R} , Q _{709L} , Q _{709R}
960174E	OWNER'S MANUAL		4700340	FUSE 8A	F _{701L} , F _{701R}
962012J	PIN PLUG CORD		514091S	TRANSISTOR 2SA-899-100	Q _{706L} , Q _{706R}
967004A	WARRANTY CARD		515088S	TRANSISTOR 2SC-1904-100	Q _{704L} , Q _{704R} , Q _{705L} , Q _{705R}
9690040	POLY CLOTH		510044S	TRANSISTOR 2SA872A	Q _{701L} , Q _{701R} , Q _{702L} , Q _{702R} , Q _{703L} , Q _{703R}
9690010	SILICA GEL		514074S	TRANSISTOR 2SA733	Q _{712L} , Q _{712R}
7883390	FRONT PANEL		515077S	TRANSISTOR 2SC945 L	Q _{711L} , Q _{711R}
506001S	POWER INDICATOR (LED 3 ϕ x4.5)	D ₂	501019S	SILICON DIODE 1S2076	D _{701L} , D _{701R} , D _{702L} , D _{702R} , D _{703L} , D _{703R} , D _{704L} , D _{704R} , D _{708L} , D _{708R} , D _{709L} , D _{709R}
7890130	CARY HANDLE		500001G	GE DIODE 1N60P	D _{706L} , D _{706R} , D _{707L} , D _{707R}
7820680	COVER		505017S	DIODE SV-04	D _{705L} , D _{705R}
7324330	BOTTOM PLATE		1210810	INDUCTANCE	L _{701L} , L _{701R}
BACK PLATE ASSEMBLY			4300530	SEMI-FIXED RESISTOR 500 OHM-B	R _{719L} , R _{719R}
213451Q	ELECTROLYTIC CAPACITOR 33000F 100WV	C ₁ , C ₂	4300550	SEMI-FIXED RESISTOR 2K OHM-B	R _{707L} , R _{707R}
362682B	METAL OXIED RESISTOR 6.8K OHM 2W	R ₁ , R ₂	384479K	CEMENT RESISTOR 0.47 OHM 5W	R _{737L} ~ R _{742L} R _{737R} ~ R _{742R}
560039S	RECT DIODE S25VB2	D ₁	384100K	CEMENT RESISTOR 10 OHM 5W	R _{743L} , R _{743R} , R _{744L} , R _{744R}
238103P	CERAMIC CAPACITOR 0.01 μ F ($\frac{+100}{-0}$ %) 500V	C ₁ , C ₂ , C ₃ , C ₄ , C ₁₃ , C ₁₄	361220B	METAL OXIED RESISTOR 22 OHM 1W	R _{729L} , R _{729R} , R _{730L} , R _{730R}
7401090	SNAP BUSHING (B500-375)		361221B	METAL OXIED RESISTOR 220 OHM 1W	R _{724L} , R _{724R} , R _{727L} , R _{727R} , R _{728L} , R _{728R}
7401100	SNAP BUSHING (B321-250)		324688J	CARBON RESISTOR 6.8 OHM 1/4W	R _{734L} ~ R _{736L} R _{734R} ~ R _{736R} R _{731L} ~ R _{733L} R _{731R} ~ R _{733R}
1102610	POWER TRANSFORMER (T-1-261)		324220J	CARBON RESISTOR 22 OHM 1/4W	R _{722L} , R _{722R} , R _{723L} , R _{723R}
325225D	CARBON RESISTOR 2.2M OHM 1/2W	R ₄	324470J	CARBON RESISTOR 47 OHM 1/4W	R _{710L} , R _{710R} , R _{712L} , R _{712R}
4510090	POWER INDICATOR SOCKET (3021-2-N)		324221J	CARBON RESISTOR 220 OHM 1/4W	R _{718L} , R _{718R}
560032S	SILICON DIODE 1S1885	D ₃	324271J	CARBON RESISTOR 270 OHM 1/4W	R _{717L} , R _{717R}
362152B	METAL OXIED RESISTOR 1.5K OHM 2W	R ₃	324471J	CARBON RESISTOR 470 OHM 1/4W	R _{715L} , R _{715R}
4581540	FUSE HOLDER (YHS-408P)		324391J	CARBON RESISTOR 390 OHM 1/4W	R _{757L} , R _{757R} , R _{758L} , R _{758R}
4710020	FUSE 5A	F ₂ , F ₃ , F ₄ , F ₅	324681J	CARBON RESISTOR 680 OHM 1/4W	R _{720L} , R _{720R}
POWER AMP ASSEMBLY			324102J	CARBON RESISTOR 1K OHM 1/4W	R _{745L} ~ R _{756L} R _{745R} ~ R _{756R} R _{713L} ~ R _{714L} R _{713R} ~ R _{714R}
7480230	HEAT SINK		324152J	CARBON RESISTOR 1.5K OHM 1/4W	R _{726L} , R _{726R}
4510100	POWER TRANSISTOR SOCKET		324222J	CARBON RESISTOR 2.2K OHM 1/4W	R _{721L} , R _{721R} , R _{702L} , R _{702R} , R _{705L} , R _{705R} , R _{706L} , R _{706R}
513067S	TRANSISTOR 2SB600	Q ₄ , Q ₆ , Q ₈ , Q ₁₀ , Q ₁₂ , Q ₁₄			
513068S	TRANSISTOR 2SD555	Q ₃ , Q ₅ , Q ₇ , Q ₉ , Q ₁₁ , Q ₁₃			
515077S	TRANSISTOR 2SC945 L	Q ₁ , Q ₂			

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

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 V _{CBO} (V)	Emitter to Base Voltage V _{EBO} (V)	Collector Current I _C (mA)	Collector Dissipation P _C (mW)	Junction Temperature T _J (°C)	Emitter Current I _E (mA)	Condition of Measurement		h _{FE} (hFE)	NF (dB)	f _β (f _T) (MHz)	C _{ob} (PF)	h _{ie} (real) (Ω)	Collector Cut off Current		Emitter Cut off Current		
									V _{CE} (V)	I _E (mA)						I _{CBO} (μA)	V _{CB} (V)	I _E (μA)		V _{EB} (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	Maximum Ratings (TA = 25°C)						Electrical Characteristics (Typical Value) TA = 25°C						Manufacture	
		Peak Inverse Voltage (V)	Dissipation (mW)	Out put Current (mA)	Inverse Current (μA)	Surge Current (A)	Jenction Temperature (°C)	Condition		Condition		Condition			
								I _F	V _F	V _R	f	I _F	V _F		I _Z
1S2076	Si DIODE	35	250	150	1.0	450mA	175	I _F =10mA	MAX. V _F =0.8V	V _R =1A	f=1MHZ	MAX. Ca=3pF	I _F =-I _R =10mA	t _{rr} =3.5μS	HITACHI
1N60P	Ge DIODE	25		50		500mA	70	V _F =1V	MIN. I _F =4mA						HITACHI
1S1885	Si DIODE	100		1A	0.4mA	60	150	I _F =1.5A	MAX. V _F =1.2V						TOSHIBA
1S1886	Si DIODE	200		1A	0.4mA	60	150	I _F =1.5A	V _F =1.2V						TOSHIBA
SV-04	Si VARISTOR	100		100	10		130	I _F =1mA	2.35V ±0.25V						SANKEN
XZ-122	Si ZENER DIODE		500		V _R =10V 1μA			I _Z =5mA	V _Z =11.9~12.6	I _Z =5mA		ZZ=MAX. 15Ω			JRC
WZ-320	Si ZENER-DIODE		500		V _R =28V MAX.1μA		175	I _Z =5mA	V _Z =30.6~33.4V	I _Z =5mA		ZZ=MAX. 80Ω			JRC

NIKKO ELECTRIC CORP.OF AMERICA

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