

REALTIME PROCESSED DC POWER AMPLIFIER

**LABORATORY
REFERENCE
SERIES**

5M21/5M20

SERVICE MANUAL

5M21/5M20 Alignment Procedure

The 5M21 and the 5M20 are of DC amplifier configuration unlike conventional AC amplifiers. Therefore, the following items should be noted in case of the alignment procedure. Don't think the same procedure as that for the AC amplifier can be followed.

- (1) To apply AC mains power source with loads connected will cause blow-off of power transistors if connections or wirings are imperfectly soldered. Therefore, check all the wirings to printed circuit boards before turning on the AC mains power.
- (2) This power amplifier amplifies even DC. Slight DC ingredients are often present in old testing equipments or in DC amplified ones. In case such DC voltage is fed to the amplifier, the DC is amplified enough to give damage to the amplifier. Therefore, set the "INPUT CAPACITOR" switch provided at the back panel to the "IN" position before operating the amplifier.
- (3) $\pm 60V$ - $\pm 70V$ DC voltage is applied at the final stage amplifier board, the driver stage board and the constant voltage board. Especially at the "B" power supply, giant electrolytic capacitors are employed, and it takes a long time to finish discharging. When you proceed to disconnect printed circuit board, do it after perfect discharge by use of a resistor or an electric bulb.
- (4) The power transistors' section at the final stage is driven in class "AB" operation, which is different from our conventional amplifiers driven purely in class "B" operation. Therefore, check the idling current as soon as possible after turning the power switch on, to protect power transistors from breakage by excessive current.
- (5) Our original FET hybrid I.C. (Dual Monolithic Linear I.C.) is used in the pre-driver stage. This I.C. contains differential stage, constant current circuit and cascode circuit. Check if the pins of the I.C. are correctly and perfectly connected before turning the AC mains power on.
- (6) The output terminals for Peak Indicator are provided in this amplifier. These are taken from the Speaker Terminals through 1k ohm resistor, therefore it might be possible that the resistor burns out or the amplifier itself is damaged, in case short-pins etc. are mistakenly inserted to these terminals to cause short-circuit. Note that these are not input terminals.

Position of knobs before alignment

- | | |
|--|---|
| (1) Attenuator Volume: | MIN. |
| (2) Speaker Terminals: | Connect oscilloscope and milivoltmeter. Do not connect loads. |
| (3) AC Mains Switch, Meter
Sensitivity Selector Switch: | OFF |
| (4) Input Capacitor Switch: | ON |

Position of knobs at the time of delivery

- | | |
|--|------|
| (1) Attenuator Volume: | MAX. |
| (2) Input Capacitor Switch: | ON |
| (3) AC Mains Switch, Meter
Sensitivity Selector Switch: | OFF |

- (1) Connect a DC ammeter to power board PB-1080 for Idling Current Alignment.
- (2) Connect AC cord to the output of variable transformer, then slowly increase AC voltage to confirm gradual movement of the ammeter.
- (3) Set the AC voltage to the rated AC mains voltage.
- (4) Adjust the Bias VR to obtain 150mA idling current.
- (5) Check the output voltage of PB-1082 (power supply for driver) to be $\pm 68V \pm 10\%$ DC. (This can be done at the print terminal on PB-1079.)
- (6) Adjust trimmer potentiometer on the driver board to obtain 0V DC output voltage.
- (7) Check if the normal voltage is obtained at the Speaker Protection Circuit, the DC Offset Circuit and the Meter Circuit respectively. (Check the voltage listed on the circuit diagram.)
- (8) Check if the Stand-by lamp blinks.
By depressing the power switch, the LED for the Stand-by lamp begins blinking, then muting for speaker relay and relay for meter are turned on after 3 - 15 seconds, and when the blinking stops the pilot lamp lights on.
(Note: with the 5M20, only the pilot lamp light up.)
- (9) Adjust the trimmer potentiometer on the driver board again to obtain 140mA idling current. This alignment should be done 5 minutes after finishing step 4.
- (10) Check the voltage at the output terminal to be 0V DC. If shifted, readjust it. This also should be done 5 minutes after finishing step 6.
- (11) Set the voltage of variable transformer down to 0V. Wind and solder plated wire around the print terminals for adjustment of idling current.
- (12) Gradually increase voltage of variable transformer up to 80% of the rated AC mains voltage, where power relay starts to operate. Set AC voltage to the rated AC mains voltage.
- (13) Turn off the power switch.
- (14) Both of Speaker Muting Relay and Meter Relay (DC Offset Relay for the 5M20) break at the same time.
- (15) Turn on the power switch. (AC voltage at the rated AC mains voltage.)
- (16) Confirm the Stand-by lamp begins blinking, and 3 - 15 seconds later the muting-relay and the meter-relay are turned on to switch on the pilot lamp.
- (17) Apply 1kHz sine-wave to the amplifier, and check the output voltage comes out smoothly up to 29V.
- (18) Apply 1kHz sine-wave, and check the attenuator volume operates normally.

Alignment of Main Amp Section

- (1) Turn off the power switch.
- (2) Connect 8-ohm load-resistor to the output terminal.
- (3) Set AC power supply to the rated AC mains voltage, and turn on the power switch.
- (4) After finishing the muting-period, gradually apply 10kHz sine-wave signal. Set the attenuator to MAX. Hereafter, the attenuator should be in the "MAX." position unless otherwise specified. Operation shall be with "both channels driven".

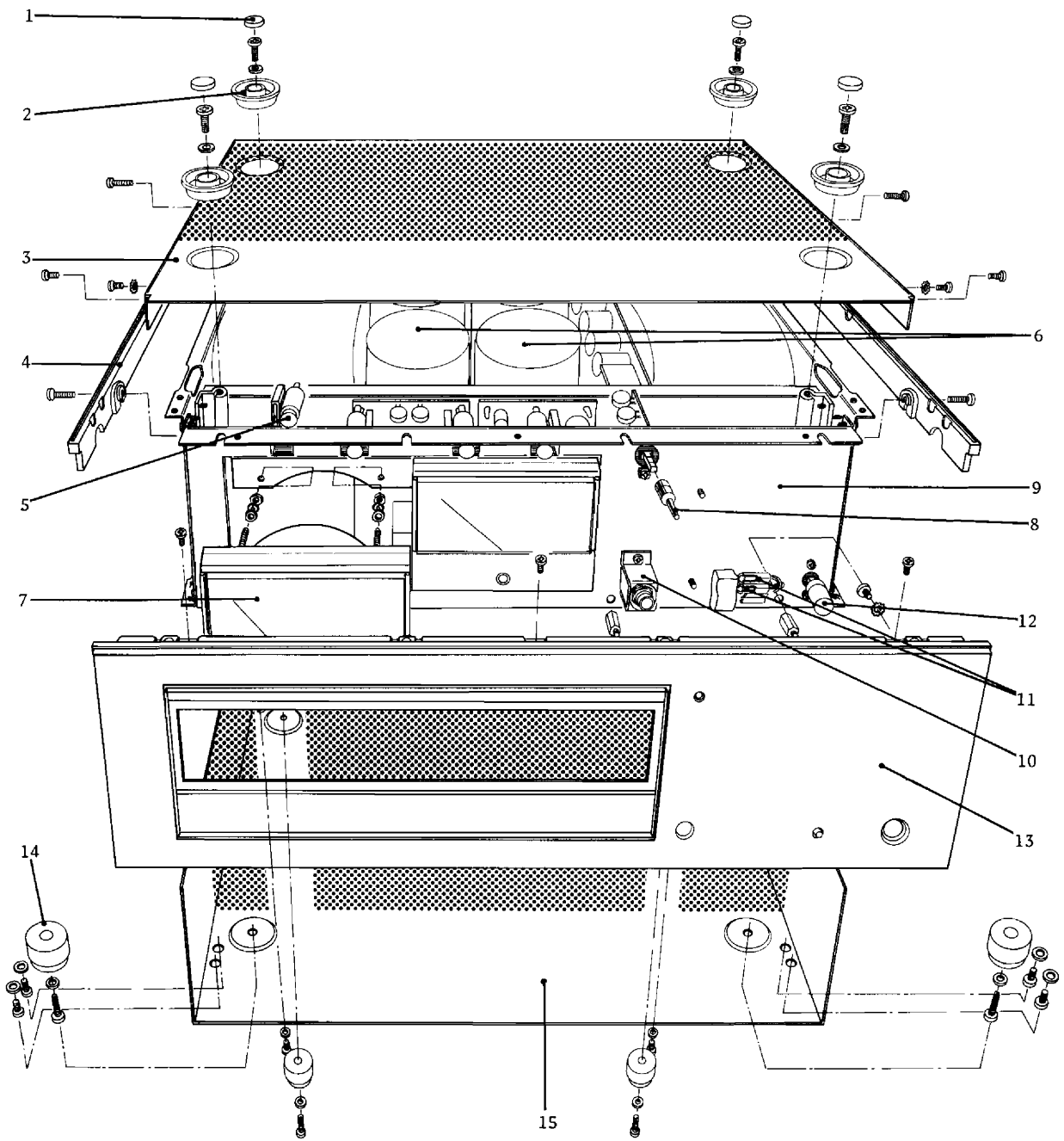
- (5) Distortion should be no more than 0.005% at 1kHz with 28.3V load-voltage.
- (6) At this time the input voltage should be 0.89V $\pm 10\%$.
- (7) Then apply 20Hz and 20kHz sine-wave, and check the distortion is no more than 0.008% with 28.3V load-voltage.
- (8) Distortion should be no more than 0.008% at 20kHz with 20V load-voltage.
- (9) Distortion should be no more than 0.008% at 30kHz with 20V load-voltage.
- (10) Crosstalk should be no more than -70dB at 10kHz. At this time, the channel with no input signal should be short-circuited at the input terminals.
- (11) Short-circuit at the input pin-jack of both channels, and check if the noise level is no more than 0.1mV. At the same time, confirm the wave-form does not contain large amount of 'spike' or 'pulse' products. Also the noise level at the time of input-open (vol; MAX, MIN) should not be larger than that under other conditions.
- (12) When a headphone is inserted to the headphone jack, check if signals are switched to the headphone from the speaker terminals. At the same time, check L-ch and R-ch.

Protection Circuit

- (1) When 5Hz sine-wave is applied to the input of amplifier and as the output of oscillator increases, the DC drift sensing circuit operates in the vicinity of 22 - 29V output to shut off the speaker relay (into STAND-BY condition), or it repeats ON-OFF operation.
Load; 8 ohms Attenuator; Max.
- (2) DC Offset Test
Confirm the pilot lamp turns from blue to red in case DC voltage of 20mV ± 5 mV is applied to the input terminal, or in case 500mV ± 200 mV voltage appears at the output terminal. Note that only when DC voltage is fed to the input terminal, the pilot lamp turns back to blue in 2 or 3 seconds after setting the Input Capacitor Switch to "ON" (which shows the DC offset is recovered.)
- (3) Check the muting relay breaks when DC 3 - 5V appears at the output terminal.

Meter Circuit

- (1) Adjust the trimmer potentiometer on PB-1085 to obtain 0dB indication on the meter, when 1kHz sine-wave is applied to the input of the amplifier and the output voltage is set to 28.3V.
- (2) Set the output voltage to 8.9V for the model whose meter sensitivity is -10dB, while set it to 2.83V for the -20dB model.
- (3) Adjust trimmer potentiometer on PB-1083 to obtain 0dB reading on the meter. Repeat steps (2) (3).
(It is advisable to connect attenuator outside.)
- (4) When the Meter Sensitivity Selector Switch is turned on, applying 10Hz and 10kHz sine-waves with 8.9V load-voltage for the -10dB model, while 2.83V for the -20dB model, frequency response should be within ± 1 dB and mutual deviation should be within 0.5dB.



- | | | | | | |
|-----------|------------------|------------|-------------------|------------|--------------|
| 1. UW1073 | spacer | 6. CE1404 | 15000uF 63V x 2 | 11. AL0002 | lamp PL-38 |
| 2. UW1072 | spacer | CE1407 | 15000uF 63V#2 x 2 | 12. WJ1073 | mould knob |
| 3. UG1001 | bonnet | 7. AM0028 | meter KL3H | 13. WA1074 | front panel |
| 4. WC1029 | side mould plate | 8. WK0191 | metal knob | 14. WN1010 | leg |
| 5. AL0013 | lamp No.3006 | 9. UB1027 | sub panel | 15. UE1087 | bottom plate |
| AH0008U | lamp socket | 10. AJ0016 | headphone jack | | |

5M21 REPLACEMENT PARTS LIST

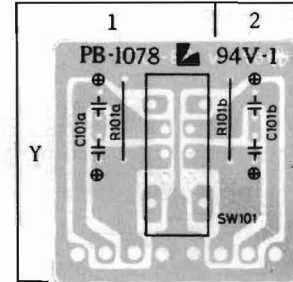
Resistors: 1/4 watts, [±]5% unless otherwise specified. MF...metal film

Capacitors: C.....ceramic, T.....tantalum, E.....electrolytic, M.....mylar, MI.....mica
S.....styrol,

PB-1078

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R101a	RD0004	1M	1Y
101b	RD0004	1M	2Y
C101a	CS0138	1uF T	1Y
101b	CS0138	1uF T	2Y
SW101	SS0013	slide sw.	1Y

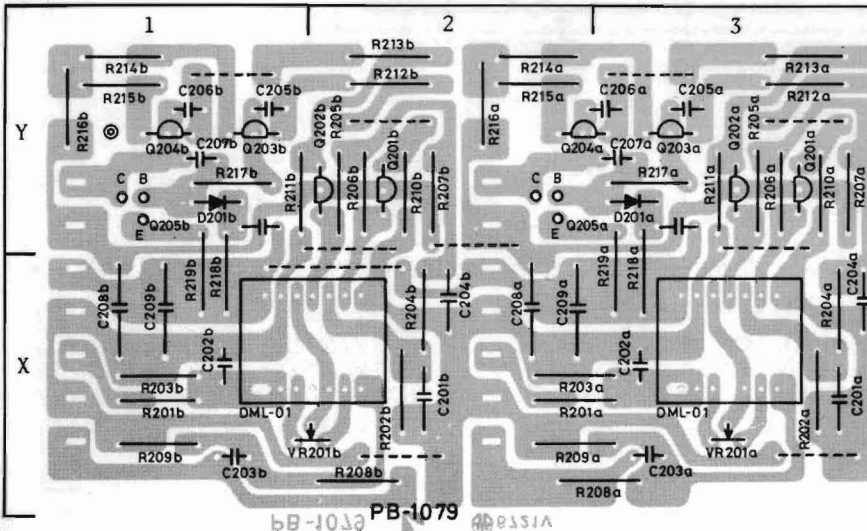
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PB-1079

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R201a	RD0050	330	2X	R211a	RD0028	15k 1/2W	3Y
201b	RD0050	330	3X	211b	RD0028	15k 1/2W	1Y
202a	RD0028	15k	3X	212a	RD0069	10	3Y
202b	RD0028	15k	2X	212b	RD0069	10	2Y
203a	RD0009	470k	2X	213a	RD0046	680	3Y
203b	RD0009	470k	1X	213b	RD0046	680	2Y
204a	RD0020	68k	3X	214a	RD0141	22	2Y
204b	RD0020	68k	2X	214b	RD0141	22 1/2W	1Y
205a	RD0028	15k	3Y	215a	RD0141	22 1/2W	2Y
205b	RD0028	15k	2Y	215b	RD0141	22 1/2W	1Y
206a	RD0028	15k	3Y	216a	RD0132	680 1/2W	2Y
206b	RD0028	15k	2Y	216b	RD0132	680 1/2W	1Y
207a	RD0240	56	3Y	217a	RD0026	22k	3Y
207b	RD0240	56	2Y	217b	RD0026	22k	1Y
208a	RD0009	47k	2X	218a	RD0134	470 1/2W	3Y
208b	RD0009	47k	2X	218b	RD0134	470 1/2W	1Y
209a	RN0386	1.5k MF 1%	3Y	219a	RD0134	470 1/2W	2Y
209b	RN0386	1.5k MF 1%	1X	219b	RD0134	470 1/2W	1Y
210a	RD0028	15k 1/2W	3Y				
210b	RD0028	15k 1/2W	2Y				

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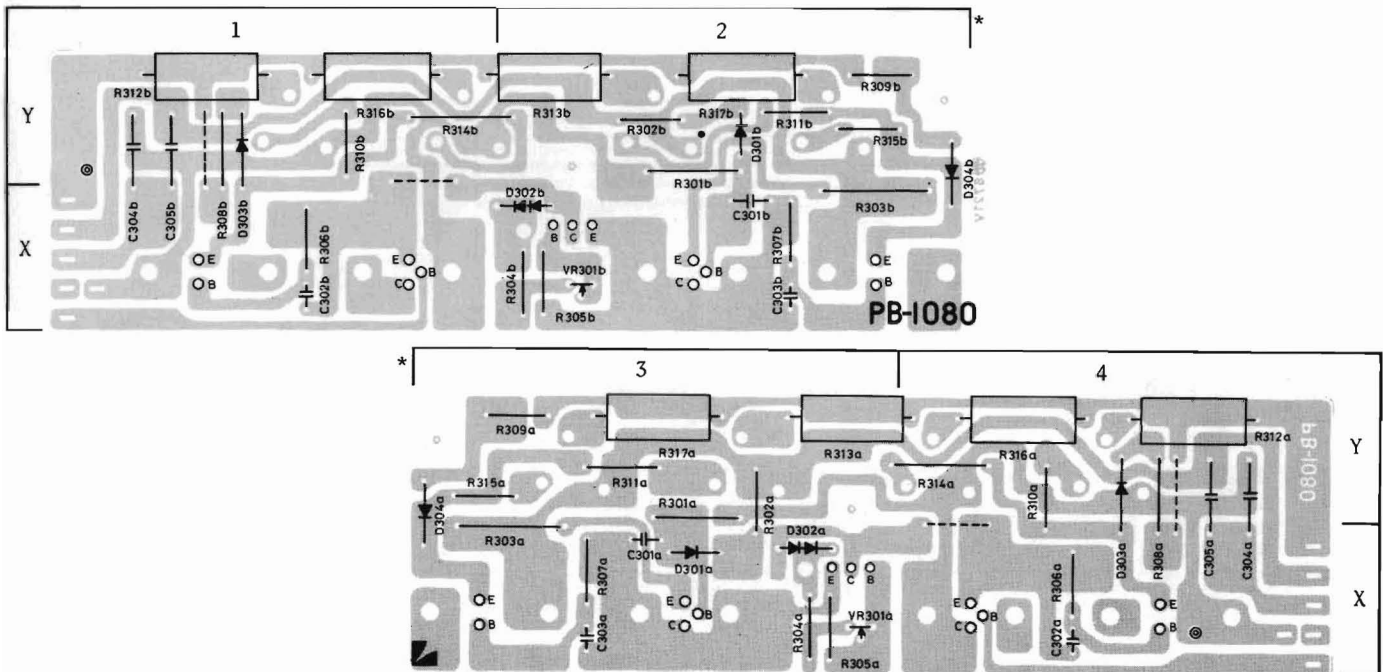
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C201a	CQ0009	0.047uF M	3X
201b	CQ0009	0.047uF M	2X
202a	CQ0267	100pF S	3X
202b	CQ0267	100pF S	1X
203a	CC0001	2.2pF C	3X
203b	CC0001	2.2pF C	1X
204a	CQ0929	0.1uF M	3X
204b	CQ0929	0.1uF M	2X
205a	CM0023	33pF MI	3Y
205b	CM0023	33pF MI	1Y
206a	CM0023	33pF MI	3Y
206b	CM0023	33pF MI	1Y
207a	CQ0173	150pF S	3Y
207b	CQ0173	150pF S	1Y
208a	CQ0929	0.1uF M	2X
208b	CQ0929	0.1uF M	1X
209a	CQ0929	0.1uF M	2X
209b	CQ0929	0.1uF M	1X

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
Q201a	TR0165	2SC1775A	3Y
201b	TR0165	2SC1775A	2Y
202a	TR0165	2SC1775A	3Y
202b	TR0165	2SC1775A	2Y
203a	TR0168	2SA896-1	3Y
203b	TR0168	2SA896-1	1Y
204a	TR0168	2SA896-1	2Y
204b	TR0168	2SA896-1	1Y
205a	TR0116	2SC805A	2Y
205b	TR0116	2SC805A	1Y
D201a	TD0073	WG713	3Y
201b	TD0073	WG713	2Y
VR201a	RT0059	500-ohm	3X
201b	RT0059	500-ohm	1X

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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R301a	RD0146	22k 1W	3Y	R310a	RD0407	15 1/2W	4Y
301b	RD0146	22k 1W	2Y	310b	RD0407	15 1/2W	1Y
302a	RD0362	220 1/2W	3Y	311a	RD0407	15 1/2W	3Y
302b	RD0362	220 1/2W	2Y	311b	RD0407	15 1/2W	1Y
203a	RD0155	68 1W	3Y	312a	RG0032	0.18 5W	4Y
303b	RD0155	68 1W	2X	312b	RG0032	0.18 5W	1Y
304a	RD0139	100 1/2W	3X	313a	RG0032	0.18 5W	3Y
304b	RD0139	100 1/2W	2X	313b	RG0032	0.18 5W	2Y
305a	RD0127	2.2k 1/2W	3X	314a	RD0407	15 1/2W	4Y
305b	RD0127	2.2k 1/2W	2X	314b	RD0407	15 1/2W	1Y
306a	RD0362	220 1/2W	4X	315a	RD0407	15 1/2W	3Y
306b	RD0362	220 1/2W	1X	315b	RD0407	15 1/2W	2Y
307a	RD0362	220 1/2W	3X	316a	RG0032	0.18 5W	4Y
307b	RD0362	220 1/2W	2X	316b	RG0032	0.18 5W	1Y
308a	RD0134	470 1/2W	4Y	317a	RG0032	0.18 5W	3Y
308b	RD0134	470 1/2W	1Y	317b	RG0032	0.18 5W	2Y
309a	RD0134	470 1/2W	3Y				
309b	RD0134	470 1/2W	2Y				

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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C301a	CM0023	33pF MI	3X
301b	CM0023	33pF MI	2X
302a	CQ0053	220pF S	4X
302b	CQ0053	220pF S	1X
303a	CQ0053	220pF S	3X
303b	CQ0053	220pF S	2X
304a	CQ0929	0.1uF M	4Y
304b	CQ0929	0.1uF M	1Y
305a	CQ0929	0.1uF M	4Y
305b	CQ0929	0.1uF M	1Y

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
D301a	TD0073	WG713	3X
301b	TD0073	WG713	2Y
302a	TV0020	STV-3H	3X
302b	TV0020	STV-3H	2X
303a			4Y
303b			1Y
304a			1Y
304b			2Y

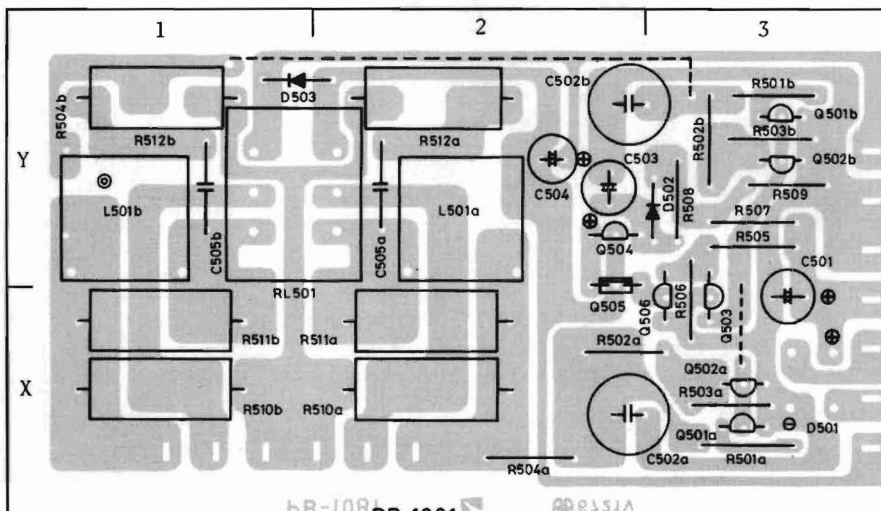
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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R501a	RD0030	10k	3X	R507	RD0032	8.2k	3Y
501b	RD0030	10k	3Y	508	RD0012	270k	3Y
502a	RD0038	2.7k	2X	509	RD0041	1.5k	3Y
502b	RD0038	2.7k	3Y	510a	RG0066	1k 5W	2X
503a	RD0036	3.9k	3X	510b	RG0066	1k 5W	1X
503b	RD0036	3.9k	3Y	511a	RG0068	10 5W	2X
504a	RD0027	18k	2X	511b	RG0068	10 5W	1X
504b	RD0027	18k	1Y	512a	RG0067	4.7 5W	2Y
505	RD0032	8.2k	3Y	512b	RG0067	4.7 5W	1Y
506	RD0043	1k	3X				

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C501	CE0095	100uF 35V E	3X	Q501a	TR0001	2SC734	1X
502a	CE0315	100uF 25V E	2X	501b	TR0001	2SC734	3Y
502b	CE0315	100uF 25V E	2Y	502a	TR0001	2SC734	1X
503	CE0069	100uF 10V E	2Y	502b	TR0001	2SC734	3Y
504	CE0100	10uF 50V E	2Y	503	TR0007	2SA561	3Y
505a	CQ0115	0.22uF MI	2Y	504	TR0001	2SC734	2Y
505b	CQ0115	0.22uF MI	1Y	505	TR0118	2SD234	2Y
				506	TR0001	2SC734	1X

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
L501a	LA1015	choke LUX1081	2Y	D501	TD0072	S2RB10	3X
501b	LA1015	choke LUX1081	1Y	502	TD0073	WG713	3Y
				503	TD0002	1N4002	1Y

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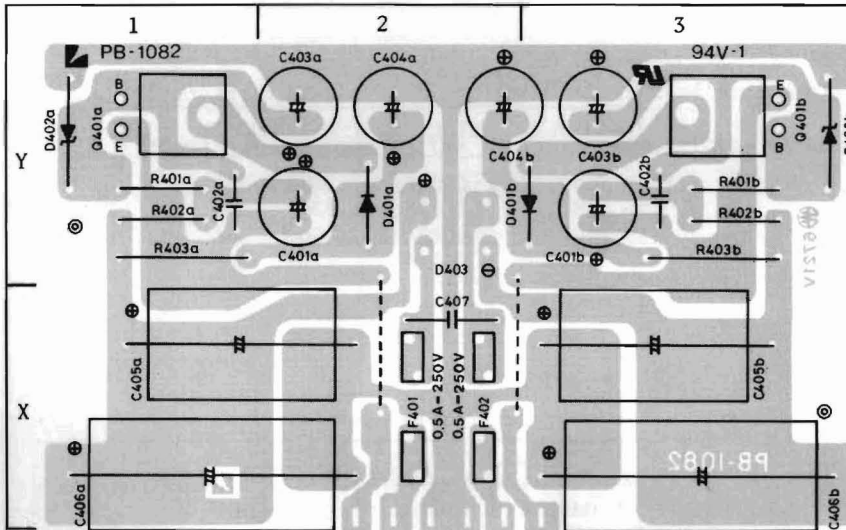
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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R401a	RD0354	1k 1/2W	1Y	R402b	RD0117	4.7k 1/2W	3Y
401b	RD0354	1k 1/2W	3Y	403a	RD0334	150 1W	1Y
402a	RD0117	4.7k 1/2W	1Y	403b	RD0334	150 1W	3Y

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C401a	CE0080	470uF 16V E	2Y	D401a	TD0002	1N4002	2Y
401b	CE0080	470uF 16V E	3Y	401b	TD0002	1N4002	3Y
402a	CQ0005	0.1uF M	1Y	402a	TD0070	1N4760A	1Y
402b	CQ0005	0.1uF M	3Y	402b	TD0070	1N4760A	3Y
403a	CE0109	33uF 100V E	2Y	403	TD0010	W04	2Y
403b	CE0109	33uF 100V E	3Y	F401			2X
404a	CE0109	33uF 100V E	2Y	402			2X
404b	CE0109	33uF 100V E	2Y	Q401a	TR0167	2SC1669	1Y
405a	CE0127	100uF 100V E	1X	401b	TR0138	2SA839	3Y
405b	CE0127	100uF 100V E	3X				
406a	CE0273	220uF 100V E	1X				
406b	CE0273	220uF 100V E	3X				
407	CU0012	0.01uF C	2X				

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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION	SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R701a	RD0024	33k	1Y	R705a	RD0040	1.8k	2Y
701b	RD0024	33k	1X	705b	RD0040	1.8k	2X
702a	RD0021	56k	1Y	706a	RD0056	100	2Y
702b	RD0021	56k	1X	706b	RD0056	100	2X
703a	RD0026	22k	2Y	707a	RD0026	22k	2Y
703b	RD0026	22k	2X	707b	RD0026	22k	2X
704a	RD0030	10k	2Y				
704b	RD0030	10k	2X				

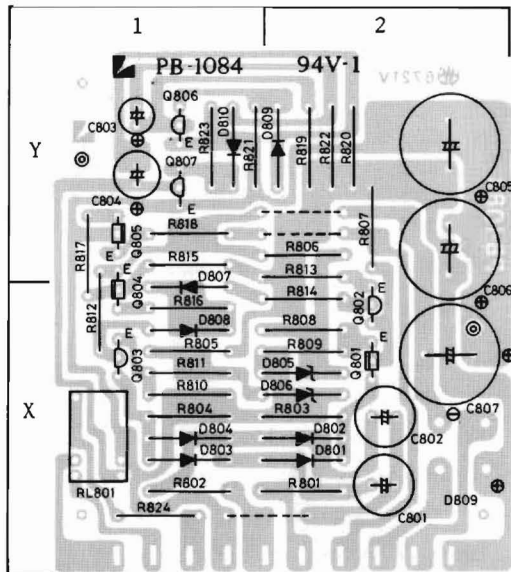
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C701a	CS0009	4.7uF 25V T	1Y
701b	CS0009	4.7uF 25V T	1X
702a	CE0100	10uF 50V E	2Y
702b	CE0100	10uF 50V E	2X
703a	CS0009	4.7uF 25V T	2Y
703b	CS0009	4.7uF 25V T	2X

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
Q701a	TR0001	2SC734	2Y
701b	TR0001	2SC734	2X
702a	TR0001	2SC734	2Y
702b	TR0001	2SC734	2X

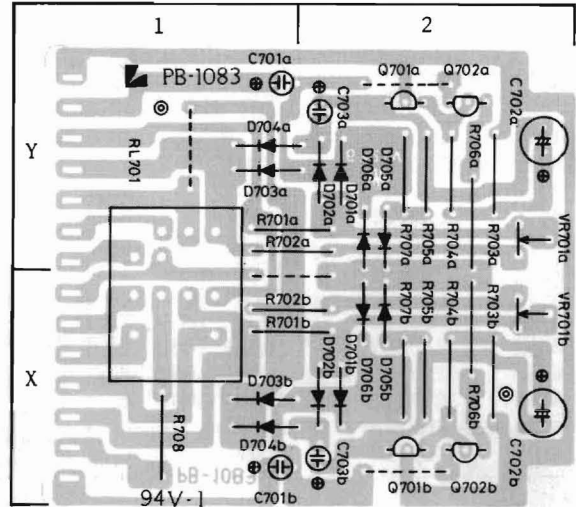
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
D701a	TD0073	WG713	2Y
701b	TD0073	WG713	2X
702a	TD0073	WG713	2Y
702b	TD0073	WG713	2X
703a	TD0073	WG713	1Y
703b	TD0073	WG713	1X
704a	TD0073	WG713	1Y
704b	TD0073	WG713	1X

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
RL701	AY0002	relay MAT4BCR	1XY

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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R801	RD0020	68k	2X
802	RD0020	68k	1X
803	RD0017	100k	2X
804	RD0017	100k	1X
805	RD0035	4.7k	1X
806	RD0035	4.7k	2Y
807	RD0022	47k	2Y
808	RD0039	2.2k	2X
809	RD0035	4.7k	2X
810	RD0035	4.7k	1X
811	RD0039	2.2k	1X
812	RD0022	47k	1X
813	RD0030	10k	2Y
814	RD0241	33 1/2W	2X
815	RD0030	10k	1Y
816	RD0030	10k	1X
817	RD0043	1k	1Y
818	RD0388	6.8	1Y
819	RD0042	1.2k	2Y
820	RD0026	22k	2Y
821	RD0255	12M	1Y
822	RD0028	15k	2Y
823	RD0255	12M	1Y
824	RD1538	39 1/2W	1X

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
C801	CE0318	33uF 25V E	2X
802	CE0318	33uF 25V E	2X
803	CE0086	10uF 25V E	1Y
804	CE0144	22uF 25V E	1Y
805	CE0089	470uF 25V E	2Y
806	CE0089	470uF 25V E	2Y
807	CE0089	470uF 25V E	2X

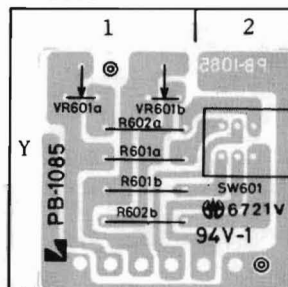
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
Q801	TR0025	2SC1345	2X
802	TR0125	2SA836	2X
803	TR0125	2SA836	1X
804	TR0025	2SC1345	1X
805	TR0153	2SA915	1Y
806	TR0001	2SC734	1Y
807	TR0001	2SC734	1Y

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
D801	TD0073	WG713	2X
802	TD0073	WG713	2X
803	TD0073	WG713	1X
804	TD0073	WG713	1X
805	TR0025	2SC1345	2X
806	TR0025	2SC1345	2X
807	TD0073	WG713	1X
808	TD0073	WG713	1X
809	TD0073	WG713	2Y
810	TD0073	WG713	1Y
811	TD0099	W02	2X

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SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R601a	RD0019	82k (-10dB) 27k (-20dB)	1Y
601b	RD0019	82k (-10dB) 27k (-20dB)	1Y
602a	RD0013	220k	1Y
602b	RD0013	220k	1Y
SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
VR601a	RT0018	100k-B(SR29R)	1Y
601b	RT0018	100k-B(SR29R)	1Y
SW601	SP0062	multi sw.	2Y

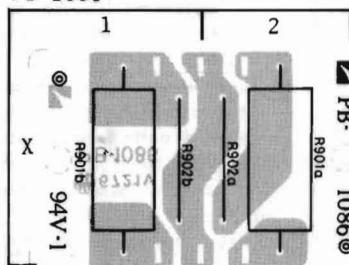
PB-1085



PB-1086

SYMBOL NO.	STOCK NO.	DESCRIPTION	LOCATION
R901a	RG0066	1k 5W	2X
901b	RG0066	1k 5W	1X
902a	RD0151	2.2k 1W	2X
902b	RD0151	2.2k 1W	1X

PB-1086



CHASSIS UNIT

AC0013	AC Selector Socket M-1625	UE1087	Bottom Plate 1087
AC0014	AC Selector Plug P-2120	UG1001	Bonnet 1001
AH0019	Fuse Holder X-N1153	WA1074	Panel 1074
BF0031	Miset Fuse 1A	WJ1073	Mould Knob 1073
BF0034	Miset Fuse 3A	WK1091	Metal Knob 1091
BF0082	Fuse UL-MF61ML-5A	WN1010	Leg
BF0212	Fuse 5x20 3.15A(T) [AG,AK,AY]	BF0082	Fuse UL-MF61ML-5A
BF0215	Fuse 5x20 6.3A(T) [AZ,J,U]		
BK0014	AC Cord #8632 [AK]		
BK0019	AC Cord UP-057-001 [AZ,U]		
BK0020	AC Cord 1263R [AY]		
BK0023	AC Cord SAA Miniture [AG]		
BK0035	AC Cord 1.25mm2-VFF [AR,J]		
PT0114	P-2086 [A]		
PT2117	P-2117 [U]		
RS0092	Resistor 4.7k 2W		
TD0110	Diode S5VB40-F		
WJ0001	Setting Knob		

SUB-PANEL UNIT

STOCK NO.	DESCRIPTION
AH0008U	Lamp Socket No.2505-UL
AJ0016	Phone Jack LJ261-1-6
AL0002	Lamp PL-38
AL0013	Lamp No.3600
AL0041	Lamp 12V-75MA
AM0028	Meter LK3H-1
AY0021	Relay MAT2-CRJ
SPO037	Push Switch (power)
UB1027	Sub Panel
WZ1038	LRS Lamp Holder 1038

REAR-PANEL UNIT

STOCK NO.	DESCRIPTION
AG0073	AC socket MD-40
AH0001	Fuse Holder S-N1301
AT0013	2P Pin Jack
AT0065	SP Terminal T-5572
RD0026	Resistor 22k
RD0354	Resistor 1k 1/2W
RV0140	VR 50k-B(15KC)
UC1047	Back Panel 1047

SPECIFICATIONS

[5M21]

Power Output:	100W minimum continuous per channel into 8-ohm loads, both channels driven at any frequency from 10Hz to 20,000Hz with no more than 0.008% total harmonic distortion
Rated I.M.:	no more than 0.008% (8-ohm, 60 : 7KHz = 4 : 1)
Frequency Response:	DC~100,000Hz (-1dB)
Input Sensitivity:	890mV
Input Impedance:	50k ohms
Signal to Noise Ratio:	120dB (IHF A-curve, input short-circuit)
Residual Noise:	no more than 0.1mV (input short-circuit)
Crosstalk:	no more than -100dB (100Hz) no more than -70dB (20 - 20kHz)
Damping Factor:	80 (8-ohm, 1kHz)
Other Features:	VU meter for left & right channels, Meter sensitivity selector switch (0dB, -10dB) Input capacitor IN/OUT switch Audio attenuator for both channels Connection terminal for Peak indicator Extra AC outlet (unswitched)
Protection Circuits:	DC offset sensor, DC-drift sensing circuit, Abnormal temperature sensing circuit, Excessive current protection circuit
Semiconductors:	DML-IC (2), transistors (49), Diodes (43)
Power Consumption:	450W (8-ohm, at maximum output)
Dimensions:	442(W) x 400(D) x 146(H) mm (17-13/32 x 15-3/4 x 5-3/4")
Weight:	Net 19kgs (41.8 lbs.) Gross 21kgs (46.2 lbs.)

[5M20]

Power Output:	100W minimum continuous per channel into 8-ohm loads, both channels driven at any frequency from 10Hz to 20,000Hz with no more than 0.008% total harmonic distortion
Rated I.M.:	no more than 0.008% (8-ohm, 60 : 7KHz = 4 : 1)
Frequency Response:	DC~100,000Hz (-1dB)
Input Sensitivity:	890mV
Input Impedance:	50k ohms
Signal to Noise Ratio:	120dB (IHF A-curve, input short-circuit)
Residual Noise:	no more than 0.1mV (input short-circuit)
Crosstalk:	no more than -100dB (100Hz) no more than -70dB (20 - 20kHz)
Damping Factor:	80 (8-ohm, 1kHz)
Other Features:	Input capacitor IN/OUT switch Audio attenuator for both channels Connection terminal for Peak indicator Extra AC outlet (unswitched)
Protection Circuits:	DC offset sensor, DC-drift sensing circuit, Abnormal temperature sensing circuit, Excessive current protection circuit
Semiconductors:	DML-IC (2), transistors (45), Diodes (31)
Power Consumption:	450W (8-ohm, at maximum output)
Dimensions:	442(W) x 400(D) x 146(H) mm (17-13/32 x 15-3/4 x 5-3/4")
Weight:	Net 18.8kgs (41.4 lbs.) Gross 20.8kgs (45.8 lbs.)

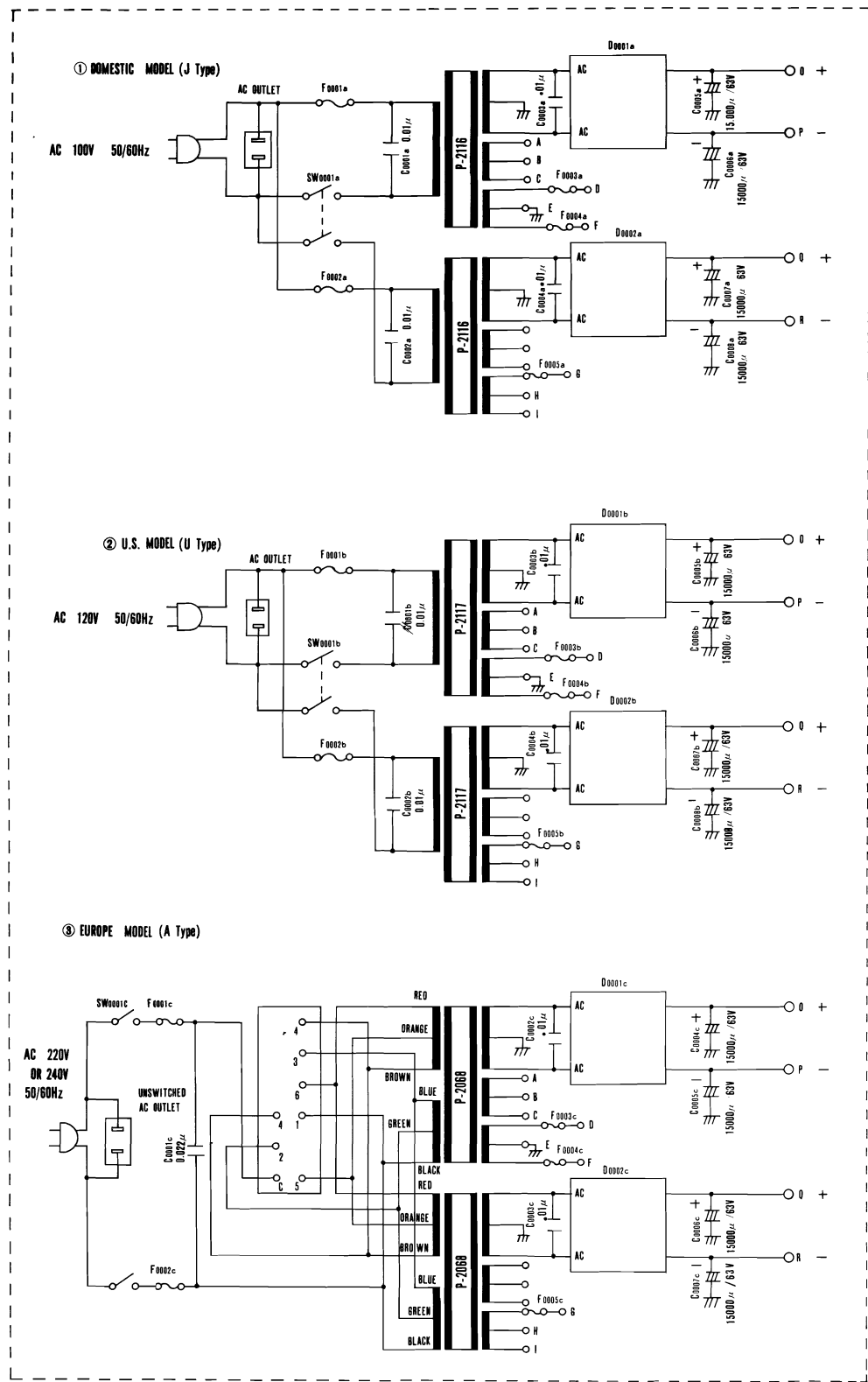
*Specification and appearance design are subject to possible change without notice.

LUX CORPORATION, JAPAN

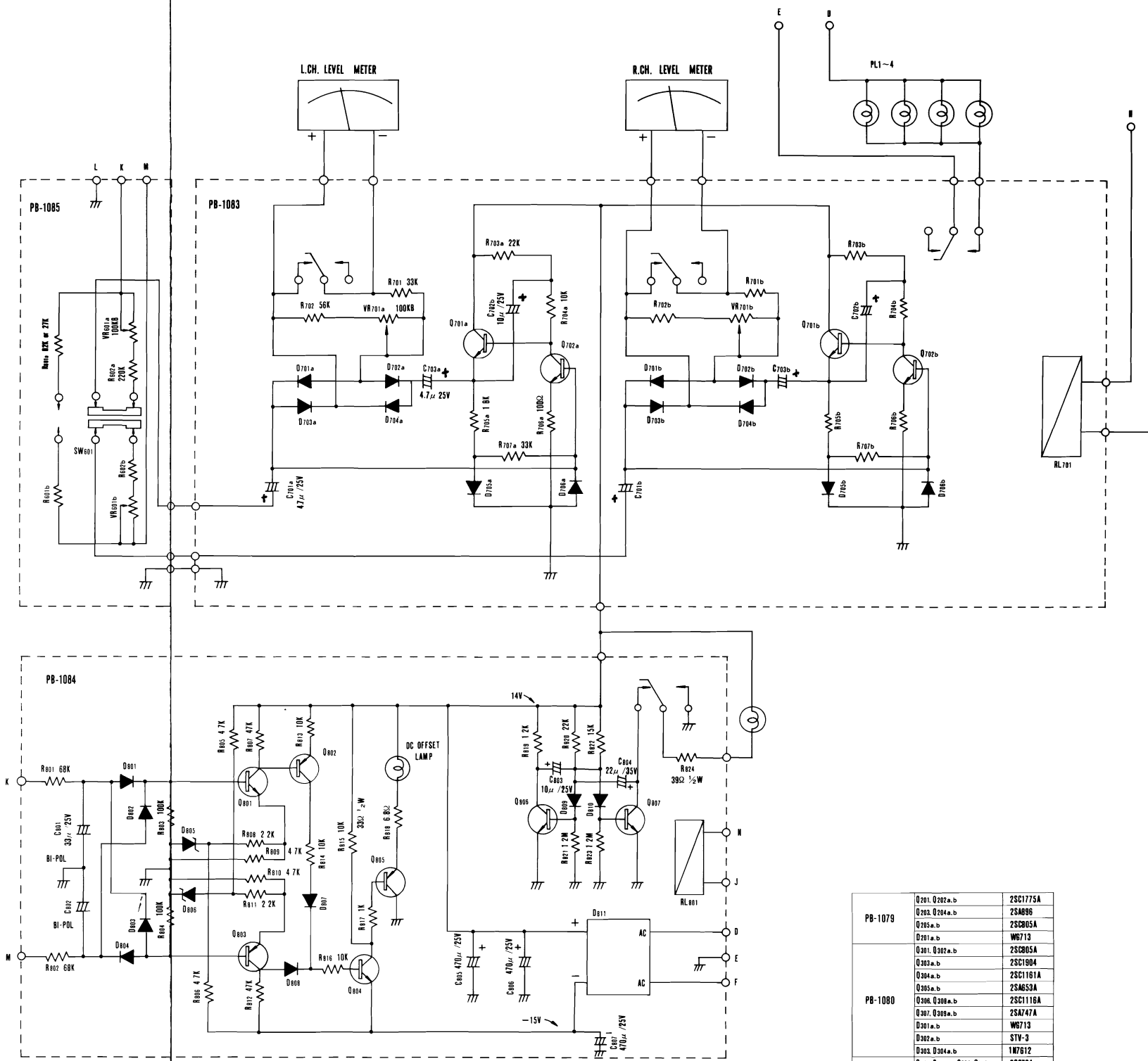
1-1, 1-CHOME, SHINSENRI-NISHIMACHI, TOYONAKASHI, OSAKA
PHONES:06-834-2222 CABLE:LUXELECT OSAKA TELEX:J63694

LUX AUDIO OF AMERICA, LTD.

160 DUPONT STREET PLAINVIEW N.Y. 11803, U.S.A.
PHONE: (516)822-7070



- 1 UNLESS OTHERWISE SPECIFIED, ALL RESISTORS ARE IN OHM
¼ WATT ALL CAPACITORS ARE IN FAPAD.
- 2 TRANSISTORS AND DIODES MAY BE REPLACED WITH ANY
TYPES HAVING COMPARABLE RATINGS.
- 3 DUE TO CONTINUED IMPROVEMENTS LUX RESERVE THE
RIGHT TO ALTER THE CIRCUIT OR SPECIFICATIONS.



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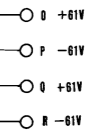
5M21

PB-1079	Q201, Q202a, b	2SC1775A
	Q203, Q204a, b	2SA896
	Q205a, b	2SC805A
	D701a, b	WG713
PB-1080	Q301, Q302a, b	2SC805A
	Q303a, b	2SC1904
	Q304a, b	2SC1161A
	Q305a, b	2SA853A
	Q306, Q308a, b	2SC1116A
	Q307, Q309a, b	2SA747A
	D301a, b	WG713
	D302a, b	STV-3
	D303, D304a, b, Q304, Q308	1M7612
	Q501	2SC734
PB-1081	Q502	2SA561
	Q503	2SC234
	D501	S2NB10
	D502	WG713
PB-1082	D503	1M4002
	Q401a	2SC1689
	Q401b	2SA839
	Q401a, b	1M4002
PB-1083	Q701, Q702a, b	2SC734
	D701 - D706a, b	WG713
	Q801, Q804	2SC1345
	Q802, Q803	2SA836
PB-1084	Q805	2SA815
	Q806, Q807	2SC734
	D801 - D804, D807 - D810	WG713
	D805, D806	2SC1345
D811	WQ2M	

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 "LABORATORY REFERENCE SERIES"

5M21



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