dbx

SUBHARMONIC SYNTHESIZER

Model 120X-DS

Service Manual

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SPECIFICATIONS

● ELECTRICAL

Frequency response, 25 Hz to 20 kHz (no synthesis, full-range mode)	±1.0 dB
Dynamic range	105 dB
Total harmonic distortion (no synthesis, either output)	0.05%
Intermodulation distortion (no synthesis, either output)	0.05% (IHF) 0.05% (SMPTE)
Output noise (either output, controls at max.)	–90 dBV
Equivalent input noise	–95 dBV
Maximum input	6 Vrms
Maximum output	6 Vrms
Synthesis frequency range (from 55 Hz to 110 Hz input signal)	27.5 Hz to 55 Hz
Cross over	12 dB/oct high-pass(–3 dB at 120 Hz) 6 dB/oct derived lowpass phase-coherent(unity-sum); variable 50 Hz to 210 Hz

● GENERAL

Dimensions(W x H x D)	19"(17-1/8") x 1-31/32" x 8-3/4" 483mm(435mm) x 50mm x 222mm (without rack mounting bracket)
Weight	5.95 lbs. 2.7 kg.
Power consumption	10 W
Power requirement	100–120 V/220–240V, 50/60 Hz

Notes : IHF IMD is measured with 19 kHz and 20 kHz mixed 1:1, output 1 V.
SMPTE IMD is measured with 60 Hz and 7 kHz mixed 4:1, output 1 V.

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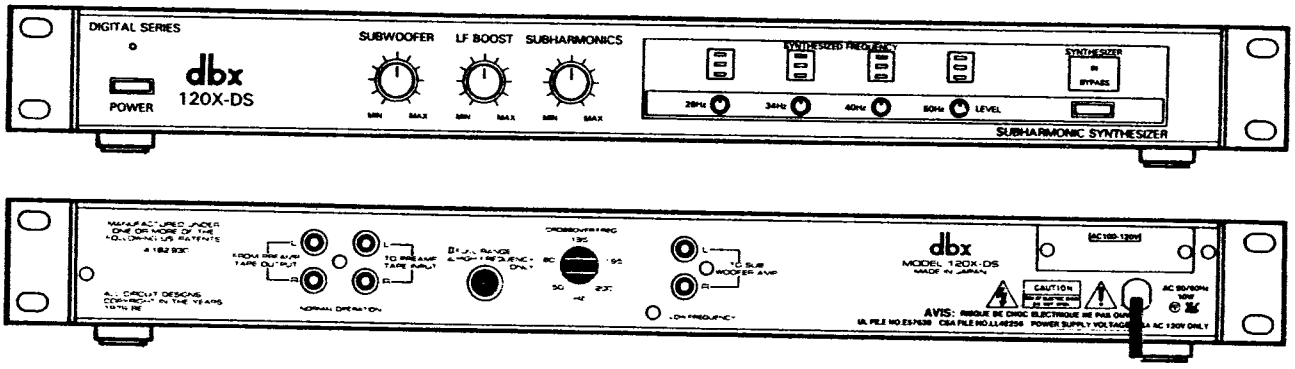
PERFORMANCE TESTS

BEFORE TEST

- Confirm that the voltage-selector switch is in the proper position.
- Inspect the unit to be tested and verify that all interconnect cables are properly installed.
- Allow a minimum of 10 minutes warm-up for the test equipments and the unit under test.

INSTRUMENTS REQUIRED

- Audio signal generator
- AC voltmeter
- DC voltmeter
- Oscilloscope
- Digital voltmeter
- Frequency counter



● POWER SUPPLY VOLTAGE CHECK

1. Depress the power switch and verify that the power LED lights.
2. Monitor the following points (with respect to ground) and verify the following power supply conditions:

	Probe location	Test condition	Tolerance
1	Output of U801	+12.0 V	±0.6 V
2	Output of U802	−12.0 V	±0.6 V

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PERFORMANCE TESTS

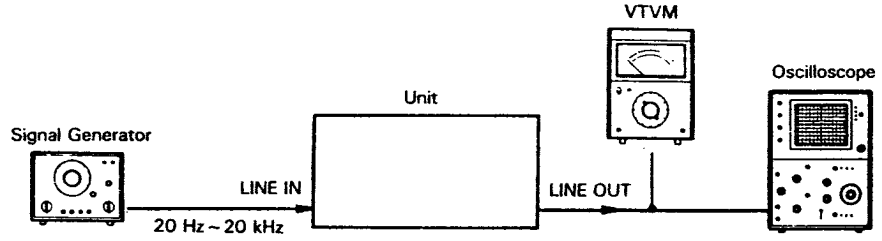
● LED TEST

1. Set the controls and switch as follows:

SYNTHESIZER switch	BYPASS position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position

2. Depress the power switch and verify that the POWER, synthesizer BYPASS LEDs light.
3. Depress the BYPASS switch and verify that the BYPASS LED is extinguished and IN LED lights.
4. Connect the audio signal generator to "FROM PREAMP/TAPE OUTPUT", apply a 56 Hz sine wave, and vary the signal generator output level from –40 dB to –10 dB.
5. Verify that the 28 Hz LEDs go on in one LED step in ascending order.
6. Repeat for the 80 Hz(40 Hz LED) and 100 Hz(50 Hz LED).

● TEST INSTRUMENTS CONNECTION



● FREQUENCY RESPONSE TEST-1

1. Set the controls and switch as follows:

SYNTHESIZER switch	BYPASS position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
3. Apply a –20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.
4. Verify that the output voltage at the "TO PREAMP/TAPE INPUT" is –20 dBV ±0.5 dB.
5. Repeat for the other channel.

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PERFORMANCE TESTS

● FREQUENCY RESPONSE TEST-2

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
3. Apply a −20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.
4. Verify that the output voltage at the "TO PREAMP/TAPE INPUT" is −20 dBV ±0.5 dB(from 100 Hz to 20 kHz), −21.2 dBV ±0.5 dB(20 Hz).
5. Repeat for the other channel.

● FREQUENCY RESPONSE TEST-3

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	HIGH FREQ. ONLY position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
3. Apply a −20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.
4. Verify that the output voltage at the "TO PREAMP/TAPE INPUT" is −20 dBV ±0.5 dB(from 1 kHz to 20 kHz), −23.8 dBV ±1.0 dB(50 Hz), −12 dB/oct(below 50 Hz).
5. Repeat for the other channel.

● FREQUENCY RESPONSE TEST-4

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully clockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully counterclockwise(50 Hz) position (rear panel)

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO SUBWOOFER AMP" jacks.
3. Apply a −20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.

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4. Verify that the output voltage at the "TO SUBWOOFER AMP" is –18 dBV ±1.2 dB(at 50 Hz), –6 dB/oct(over 50 Hz).
5. Repeat for the other channel.

● FREQUENCY RESPONSE TEST–5

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	HIGH FREQ. ONLY position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully clockwise(200 Hz) position (rear panel)

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
3. Apply a –20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.
4. Verify that the output voltage at the "TO PREAMP/TAPE INPUT" is –20 dBV ±0.5 dB(form 1 kHz to 20 kHz), –23.5 dBV ±1.0 dB(at 200 Hz), –12 dB/oct(below 200 Hz).
5. Repeat for the other channel.

● FREQUENCY RESPONSE TEST–6

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully clockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully clockwise(200 Hz) position (rear panel)

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO SUBWOOFER AMP" jacks.
3. Apply a –20 dBV sinewave and sweep frequency from 20 Hz to 20 kHz.
4. Verify that the output voltage at the "TO SUBWOOFER AMP" is –18 dBV ±1.2 dB(at 200 Hz), –6 dB/oct(over 200 Hz).
5. Repeat for the other channel.

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PERFORMANCE TESTS

● FREQUENCY RESPONSE TEST-7

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully counterclockwise(50 Hz) position (rear panel)

2. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
3. Apply a −20 dBV 56 Hz.
4. Rotate the "SUBHARMONICS" control on the front panel from its minimum position to maximum, and verify that the magnitude of boosted level at the "TO PREAMP/TAPE INPUT" is more than 4 dB.
5. Repeat for the frequencies 68 Hz, 80 Hz, 100 Hz.

● THD CHECK-1

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully counterclockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully counterclockwise(50 Hz) position (rear panel)

2. Terminate both left and right channels of "FROM PREAMP/TAPE OUTPUT" with 10 k-ohm in paralleled with 1000 pF to ground.
3. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO PREAMP/TAPE INPUT" jacks.
4. Apply a 0 dBV sinewave at 100 Hz, 1 kHz, 20 kHz.
5. Verify that it does not exceed the limit of 0.05 %.

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PERFORMANCE TESTS

● THD CHECK–2

1. Set the controls and switch as follows:

SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully clockwise position
LOW FREQ. BOOST LEVEL	fully counterclockwise position
SUBHARMONICS LEVEL	fully counterclockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully clockwise(200 Hz) position (rear panel)

2. Terminate both left and right channels of "FROM PREAMP/TAPE OUTPUT" with 10 k–ohm in paralleled with 1000 pF to ground.
3. Connect the signal generator to left channel of "FROM PREAMP/TAPE OUTPUT" jack, oscilloscope to "TO SUBWOOFER AMP" jacks.
4. Apply a 0 dBV sinewave at 50 Hz.
5. Verify that it does not exceed the limit of 0.05 %.

● NOISE TEST

1. Set the controls and switch as follows:

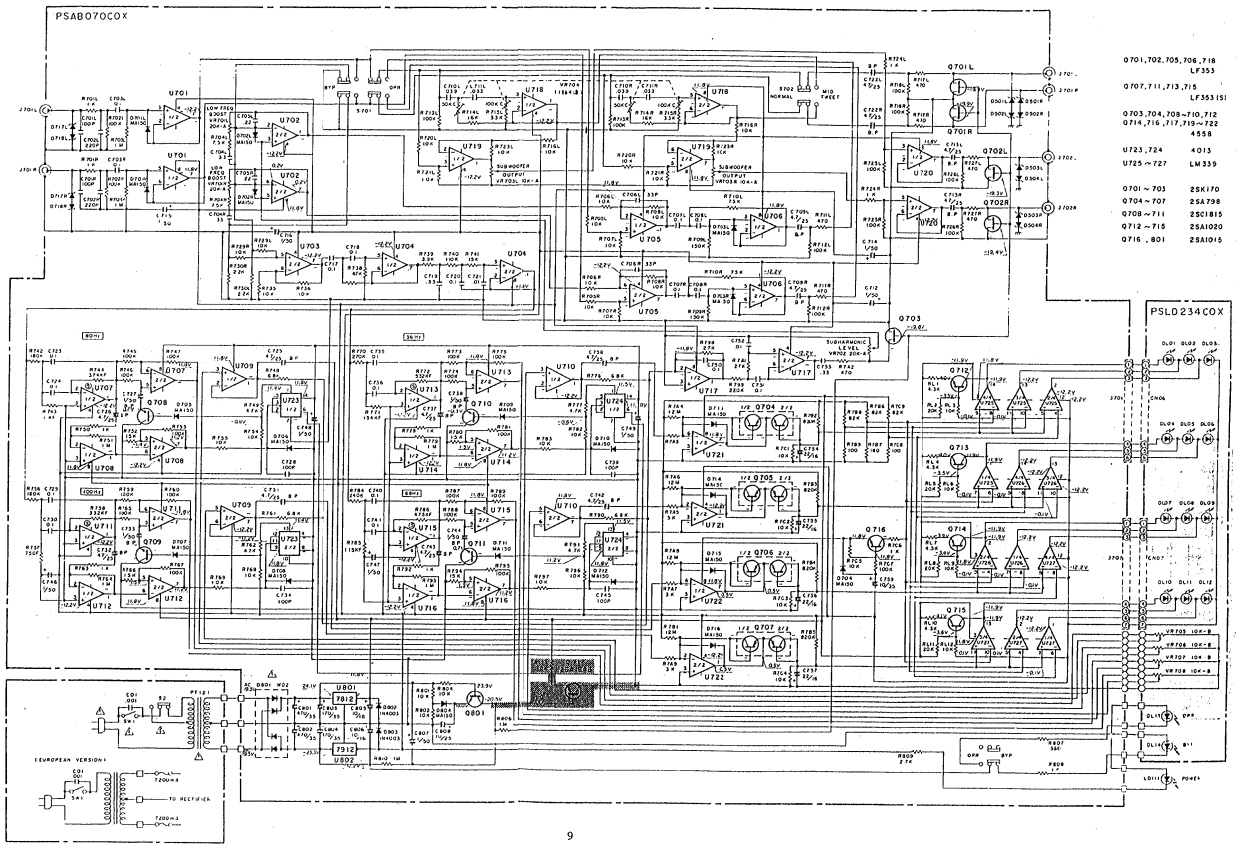
SYNTHESIZER switch	IN position
FULL RANGE/HIGH FREQ. ONLY switch	FULL RANGE position (rear panel)
SUBWOOFER LEVEL	fully clockwise position
LOW FREQ. BOOST LEVEL	fully clockwise position
SUBHARMONICS LEVEL	fully clockwise position
SYNTHESIZED FREQUENCY	fully clockwise position
CROSSOVER FREQ	fully clockwise(200 Hz) position (rear panel)

2. Terminate both left and right channels of "FROM PREAMP/TAPE OUTPUT" with 1 k–ohm in paralleled with 1000 pF to ground.
3. Connect the oscilloscope to "TO PREAMP/TAPE INPUT" or "TO SUBWOOFER AMP" jacks.
4. Verify that the noise level is less than –87 dBV.(with A NETWORK).

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SCHEMATIC DIAGRAM

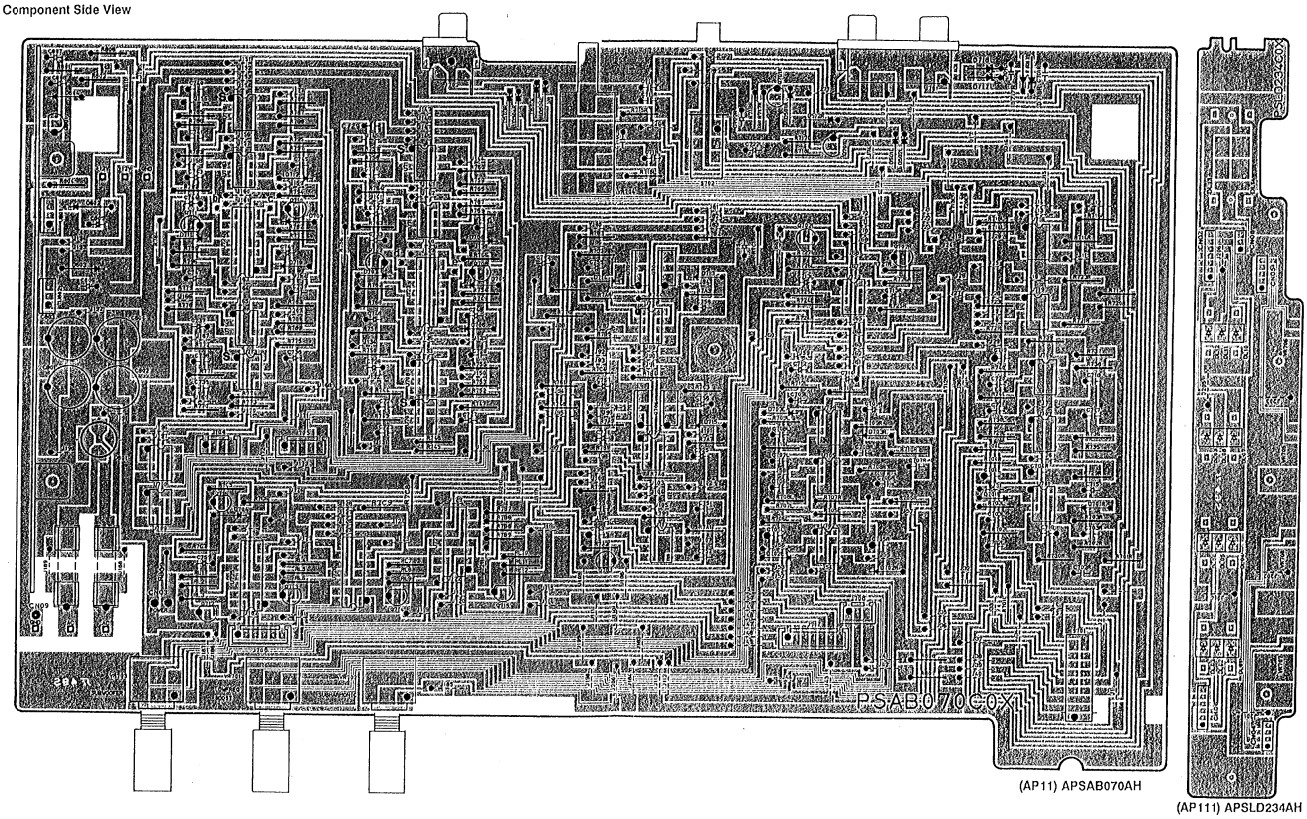
applicable serial No. 60400001 – 60401000
applicable serial No. from 60501001 (additional parts : Q717,RL13,RL14)



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WIRING BOARD LAYOUT (1) applicable serial No. 60400001 – 60401000

Component Side View

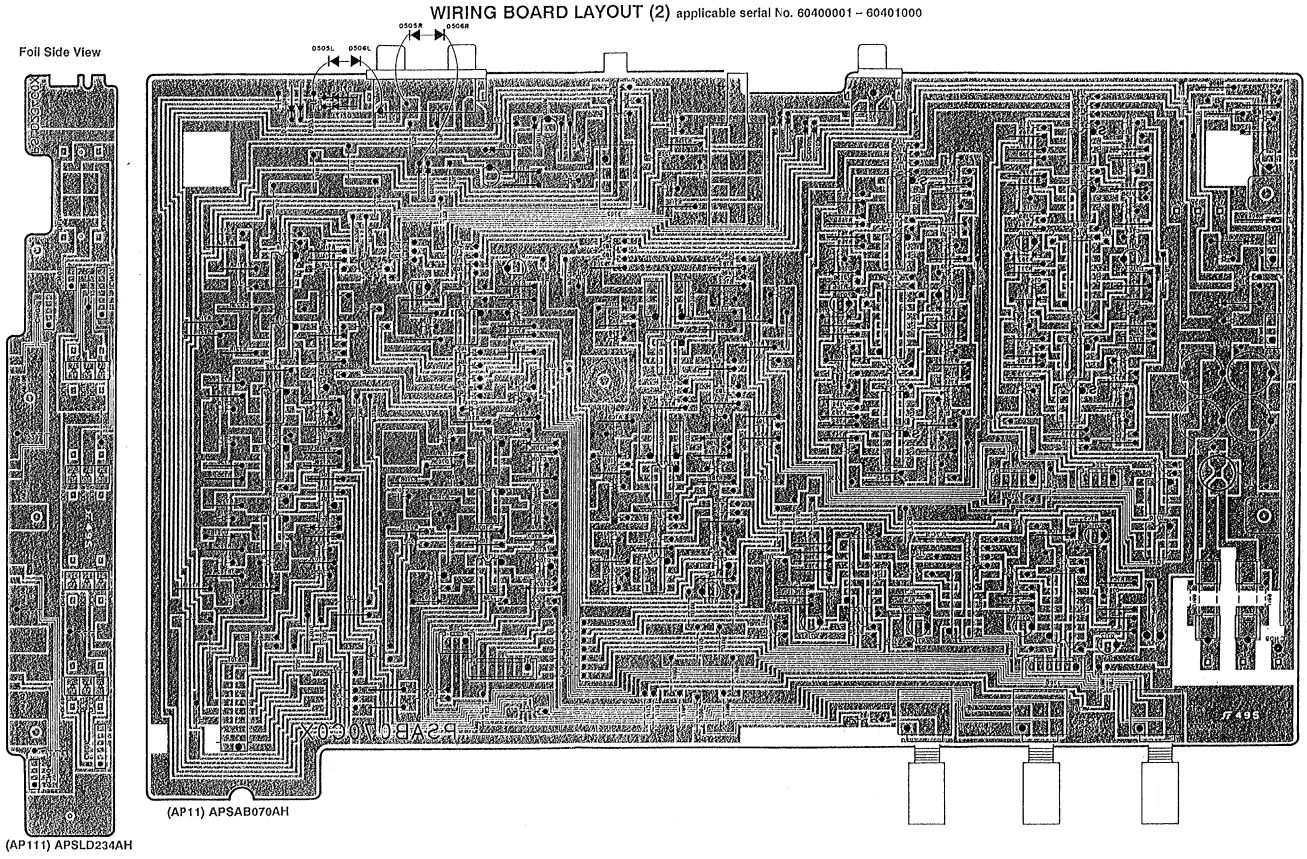


(AP11) APSAB070AH

(AP111) APSLD234AH

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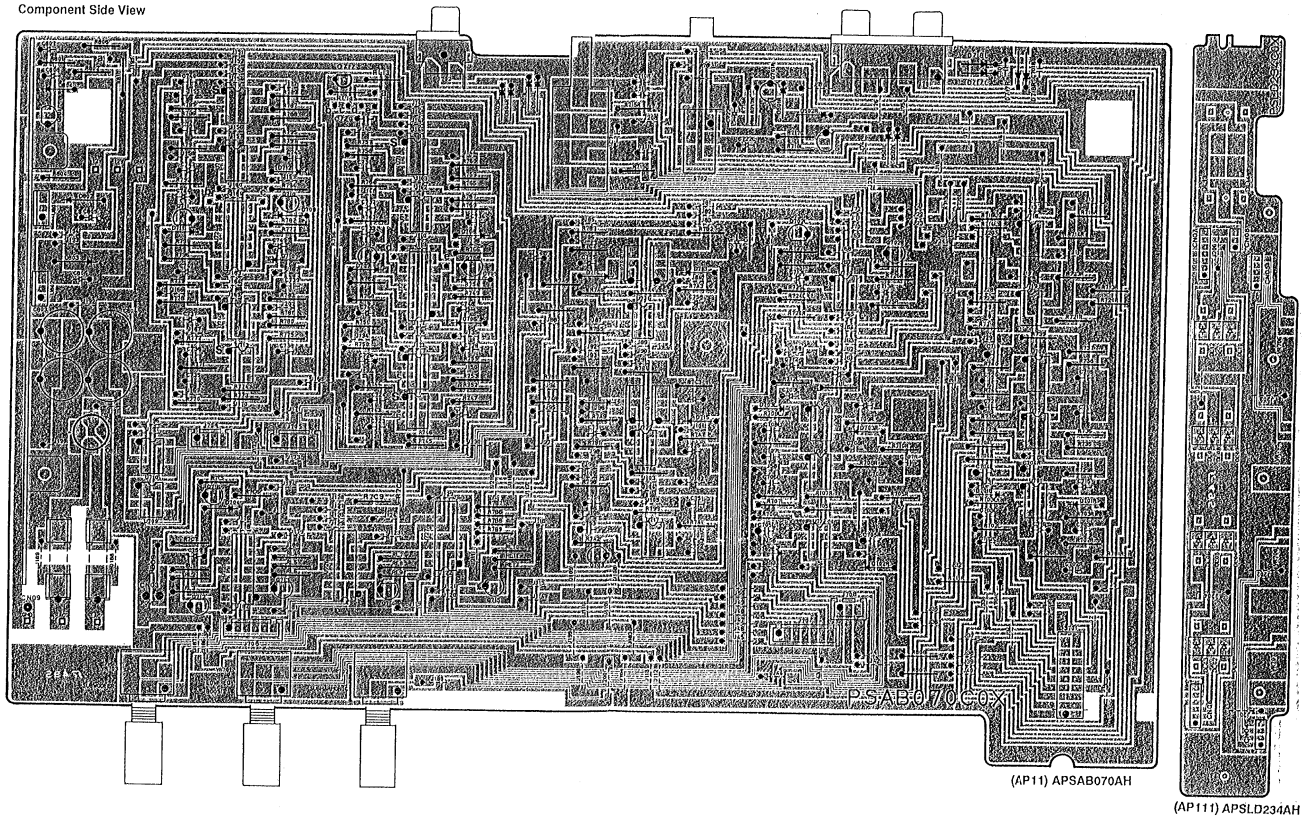
WIRING BOARD LAYOUT (2) applicable serial No. 60400001 – 60401000



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WIRING BOARD LAYOUT (3) applicable serial No. from 60501001

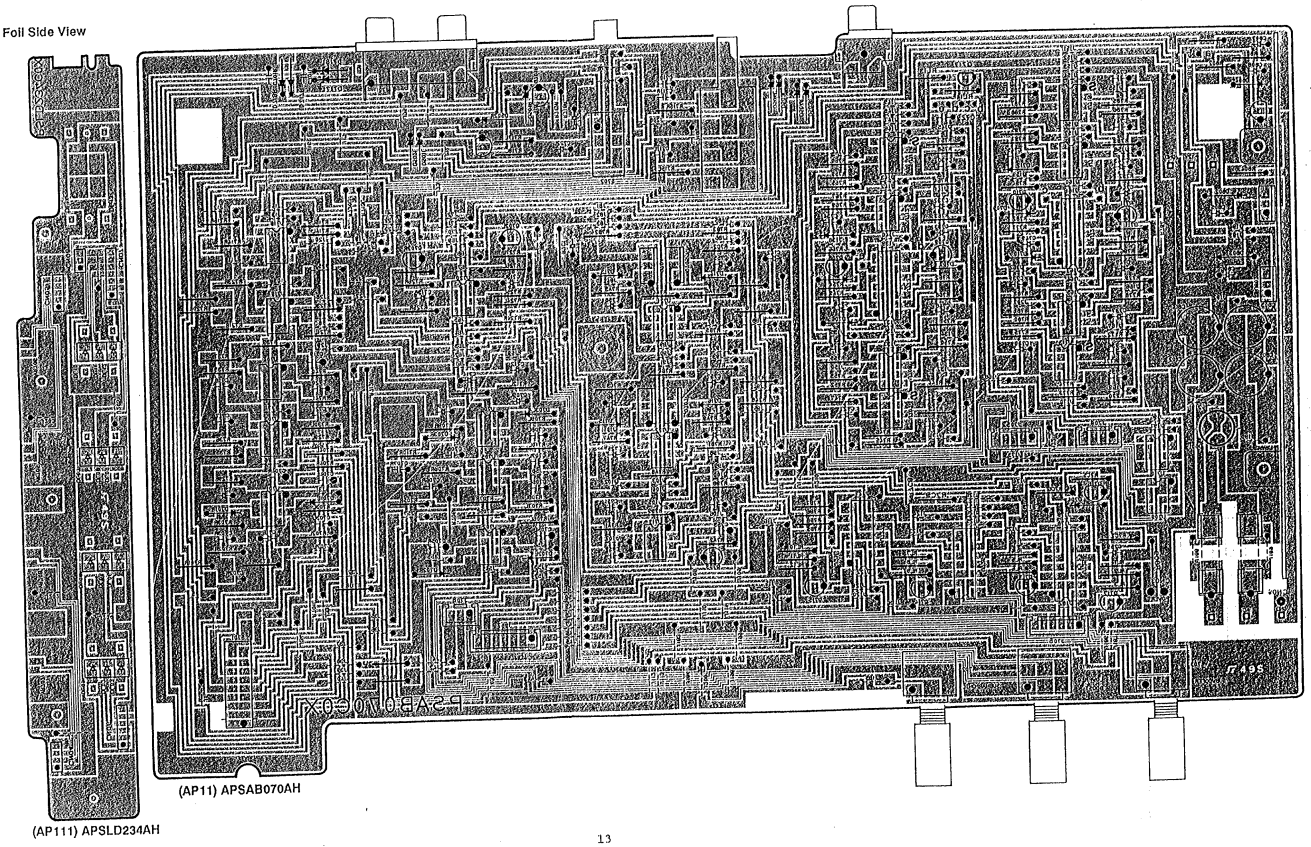
Component Side View



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WIRING BOARD LAYOUT (4) applicable serial No. from 60501001

Foil Side View

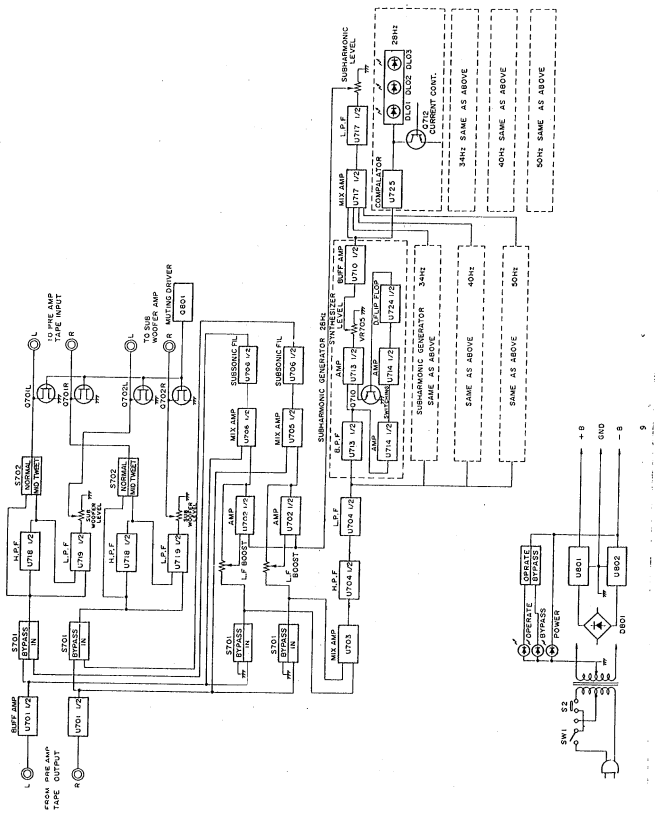


(AP11) APSAB070AH

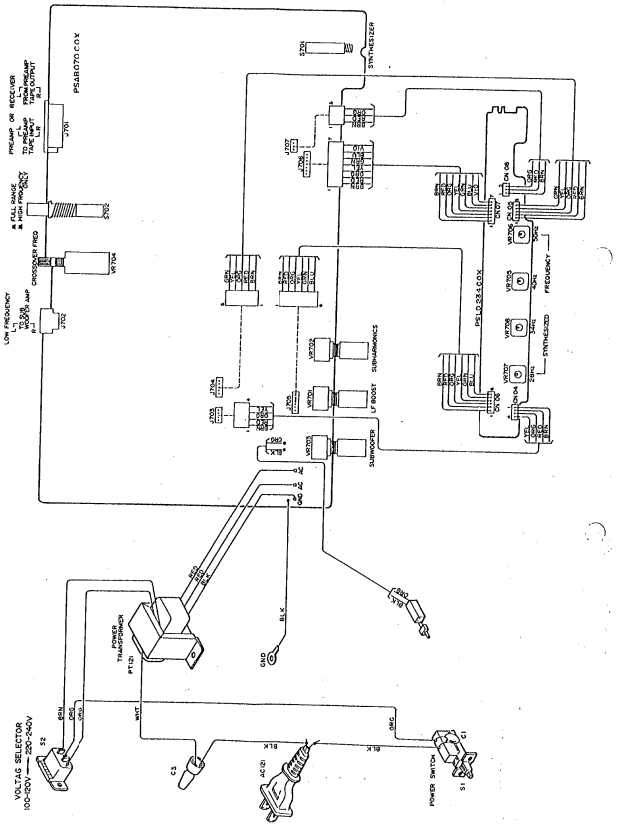
(AP111) APSLD234AH

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BLOCK DIAGRAM

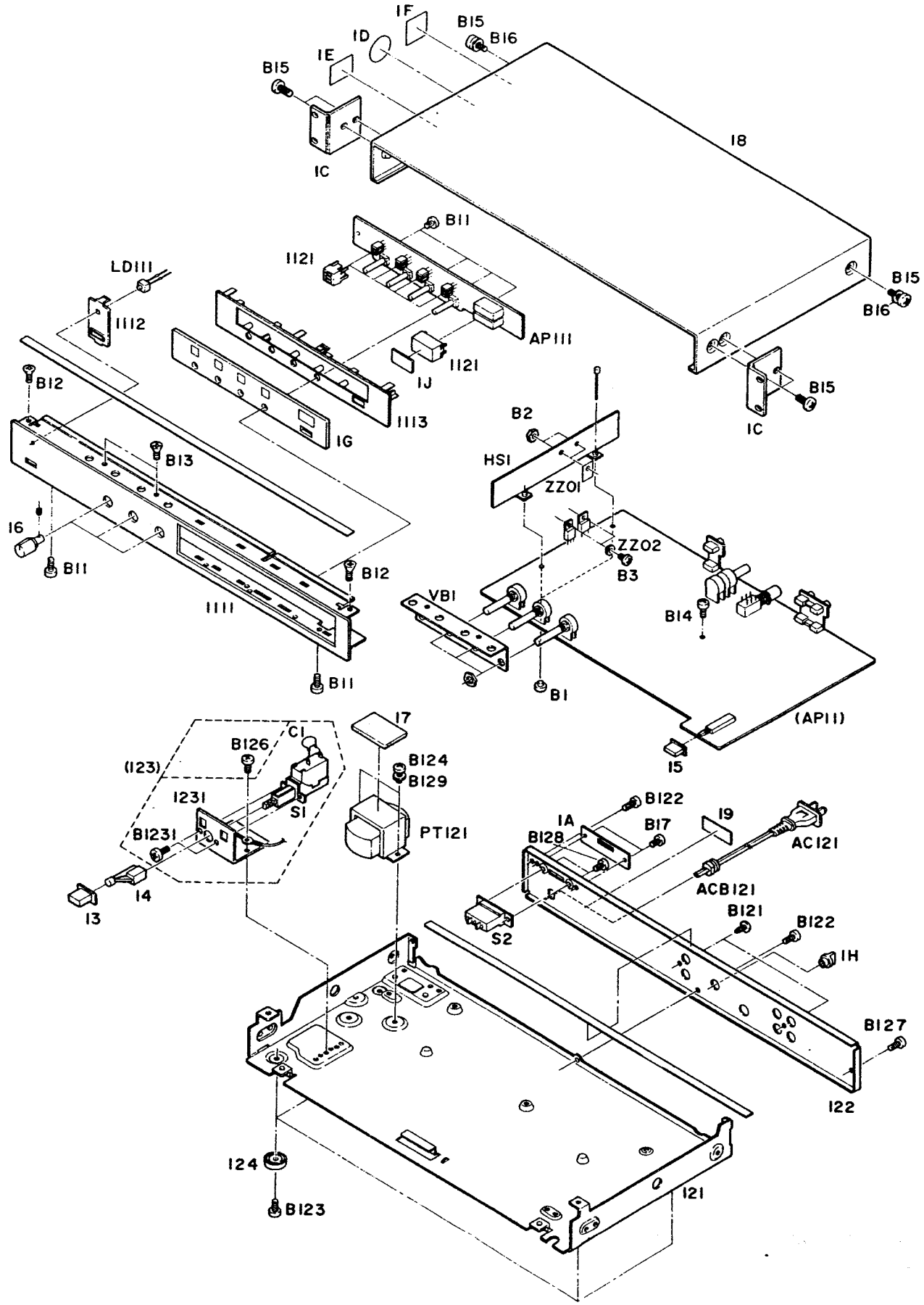


WIRING LAYOUT



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EXPLODED VIEW



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REPLACEMENT PARTS LIST

Table of Part Structure

- List 1. (Set Assy Element)
  - (11) Front Panel Assy
    - (111) Escutcheon Assy
    - (AP111) APSLD234AH
  - (12) Chassis Assy
    - (123) Switch Bracket Assy
    - (AP11) APSAB070AH
- List 3. (Printed Materials)
- List 4. (Packing Materials)
- List 5. (Accessories)
- List 6. (Shipping Materials)

LIST 1. SET ASSY ELEMENTS

Numbers with ( ) listed in Ref.No. has exploded details.

Ref.No.	MFR's Part No.	Description	Remarks
(11)	AY120DS*01	Front Panel Assy	
(12)	AY120DS*02	Chassis Assy	
(AP11)	APSAB070AH	P.W.Board Assy	
1A	MS625AA002	Switch Cover	
1C	ML543AA003	Rack Mount	PX
1G	VS736CF003	Window Sheet	
1H	VN276SB033	Volume Knob	
1J	VS326CF001	Display Sheet	
13,15	NBR1255258	Push Knob	
14	VK321SB001	Joint	
16	AVKN0B*183	Volume Knob E	
17	VS547XB001	Transformer Sheet	
18	MU985SX001	Cover	PX
18	MU985SX006	Cover	USA, CANADA
19	VVL511GE30	Serial No. Label	
B11,17	BTPB3005TB	Bind Tap Screw M3 x 5	
B12,13	BTPS3006TZ	Flat Tap Screw M3 x 6	
B14	BTPB3005TZ	Bind Tap Screw M3 x 5	
B15	BTPB4012TB	Bind Tap Screw M4 x 12	
B16	BWU40855SB	Lock Washer	

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REPLACEMENT PARTS LIST

11. Front Panel Assy

Numbers with ( ) listed in Ref.No. has exploded details.

Ref.No.	MFR's Part No.	Description	Remarks
(111)	AM120XDS01	Escutcheon Assy	
(AP111)	APSLD234AH	P.W.Board Assy	
B111	BTPP2606PZ	Pan Tap Screw M2.6 x 6	
LD111	QLBLN222RN	LED (red) LN222RN	

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12. Chassis Assy

Numbers with ( ) listed in Ref.No. has exploded details.

Ref.No.	MFR's Part No.	Description	Remarks
121	MU984SL004	Chassis	
122	MB951SL011	Rear Panel	
(123)	AY1BXDS*03	Switch Bracket Assy	
124	NBR9227577	Foot Assy	
AC121	ACAC029ULA	AC Cord Assy	
ACB121	VM270NB001	Bushing	
B121	BTPW3008AB	Bras Tap Screw M3 x 8	
B122	BTPB3005TB	Bind Tap Screw M3 x 5	
B123,124,126,128	BTPB3005TZ	Bind Tap Screw M3 x 5	
B127	BTPL3006TB	Round Head Wood Screw M3 x 6	
B129	BWM30705SN	Washer M3 x 7 x 0.5	
PT121	TPL41A001K	Power Transformer	
S2	SS010226AJ	Slide Switch	

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111. Escutcheon Assy

Ref.No.	MFR's Part No.	Description	Remarks
1111	ME95EAA058	Escutcheon	
1112	VF132SB004	Button Guide	
1113	VS847SM002	Frame	

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REPLACEMENT PARTS LIST

123. Switch Bracket Assy

Ref.No.	MFR's Part No.	Description	Remarks
1231	ML544SD004	Switch Bracket	
B123I	BTPB3005TZ	Bind Tap Screw M3 x 5	
C1	CKDU102KBM	Ceramic 1000p/125V ±10%	
S1	SP01AAW07A	Push Switch	

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AP11. P.W.Board Assy (APSAB070AH)

Ref.No.	MFR's Part No.	Description	Remarks
	PSAB070C0X	P.W.Board (without parts)	
B1	BRU3280XAJ	Rivet	
B2	BNHCL30NSZ	Nut	
B3	BSPP3008NZ	Pan Head Screw M3 x 8	
C701L/R,728,734 739,745	CCGB101J0T	Ceramic 100 pF 50V ±5%	
C702L/R	CCFB221J0T	Ceramic 220 pF 50V ±5%	
C703L/R,707L/R 708L/R,717,718 720,723,724,729 730,735,736,740 741,750,751	CQVB104JTN	Film 0.1 uF 50V ±5%	
C704L/R,719,753	CQVB334JTN	Film 0.33 uF 50V ±5%	
C705L/R	CQVB224JTN	Film 0.22 uF 50V ±5%	
C706L/R	CCGB330J0T	Ceramic 33 pF 50V ±5%	
C709L/R,713L/R 722L/R,725,726 731,732,737,742 743,758	CEVE4R7NAN	Electrolytic 4.7 uF 25V	
C710L/R	CQVB393JTN	Film 0.039 uF 50V ±5%	
C711L/R	CQVB333JTN	Film 0.033 uF 50V ±5%	
C712,714,715,716 746,747,748,749 807	CEVG010ALX	Electrolytic 1 uF 50V	
C721,752	CQVB103JTN	Film 0.01 uF 50V ±5%	
C727,733,738,744	CEVG010NAN	Electrolytic 1 uF 50V BP	
C754,755,756,757	CEVD220ALX	Electrolytic 22 uF 16V	
C759,805,806	CEVF100ALX	Electrolytic 10 uF 35V	
C801,802,803,804	CEAF471ALX	Electrolytic 470 uF 35V	
C808	CEVE100ALX	Electrolytic 10 uF 25V	
CN03	ACCNL73ULA	Connection Cord Assy	Power LED
CN09	ACZZ460ULA	Connection Cord Assy	GND
D501L/R,502L/R 503L/R,504L/R	QDZ1120M#N	Diode MA1120M	

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REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
D701L/R,702L/R 703L/R,704,705 706,707,708,709 710,711,712,713 714,715,716 804	QDSMA150XN	Diode MA150	
D801	QDSW02MXXG	Diode W02M	
D802,803	QDSN4003AZ	Diode IN4003	
HS1	MS736AD001	Heat Sink	
J701	YJP04S023U	RCA type Pin Jack (4P)	
J702	YJP02S034Z	RCA type Pin Jack (2P)	
J704	YJF04A043Z	Connector (4P)	
J705	YJF05S021Z	Connector (5P)	
J706	YJF06S035Z	Connector (6P)	
J707	YJF07S018Z	Connector (7P)	
J708	YJF03S042Z	Connector (3P)	
Q701L/R,702L/R,703	QTK0364XTT	Transistor 2SK364 (BL,GR)	
Q704,705,706,707	QTA0798XBE	Transistor 2SA798	
Q708,709,710,711	QTC1815XTT	Transistor 2SC1815 (Y,GR)	
Q712,713,714,715	QTA1020XTT	Transistor 2SA1020 (O,Y)	
Q716,801	QTA1015XTT	Transistor 2SA1015 (Y,GR)	
Q717	QT2SA1246**01	Transistor 2SA1246	
R701L/R,724L/R,750 763,778,792,7C6 808	RD25PJ102X	Carbon 1/4W 1K ohm ±5%	
R702L/R,712L/R 713L/R,718L/R 725L/R,726L/R 745,746,747,753 759,760,765,767 773,774,775,781 787,788,789,795 7C7	RD25PJ104X	Carbon 1/4W 100K ohm ±5%	
R703L/R,751,764 779,793,806,810 L14	RD25PJ105X	Carbon 1/4W 1M ohm ±5%	
R704L/R	RD25PJ752X	Carbon 1/4W 7.5K ohm ±5%	
R705L/R,706L/R 707L/R,708L/R 716L/R,720L/R 721L/R,723L/R 729L/R,735,736 754,755,768,769 782,783,796,797 7C1,7C2,7C3,7C4 7C5,801,804,L03 L06,L09,L12,L13	RD25PJ103X	Carbon 1/4W 10K ohm ±5%	

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REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
R709L/R	RD25PJ154X	Carbon 1/4W 150K ohm ±5%	
R710L/R	RD25PJ753X	Carbon 1/4W 75K ohm ±5%	
R711L/R,717L/R 727L/R,7A2	RD25PJ471X	Carbon 1/4W 470 ohm ±5%	
R714L/R	RD25PJ163X	Carbon 1/4W 16K ohm ±5%	
R715L/R	RD25PJ333X	Carbon 1/4W 33K ohm ±5%	
R730L/R	RD25PJ223X	Carbon 1/4W 22K ohm ±5%	
R737	RD25PJ243X	Carbon 1/4W 24K ohm ±5%	
R738	RD25PJ473X	Carbon 1/4W 47K ohm ±5%	
R739	RD25PJ392X	Carbon 1/4W 3.9K ohm ±5%	
R740	RD25PJ114X	Carbon 1/4W 110K ohm ±5%	
R741,752,766,780 794	RD25PJ153X	Carbon 1/4W 15K ohm ±5%	
R742	RD25PJ184X	Carbon 1/4W 180K ohm ±5%	
R743	RQBPF1001X	Metal-oxide 1/4W 1K ohm ±1%	
R744	RQBPF3743X	Metal-oxide 1/4W 374K ohm ±1%	
R748,761,776,790	RD25PJ682X	Carbon 1/4W 6.8K ohm ±5%	
R749,762,777,791	RD25PJ472X	Carbon 1/4W 4.7K ohm ±5%	
R756	RD25PJ164X	Carbon 1/4W 160K ohm ±5%	
R757	RQBPF7500X	Metal-oxide 1/4W 750 ohm ±1%	
R758	RQBPF3323X	Metal-oxide 1/4W 332K ohm ±1%	
R770	RD25PJ274X	Carbon 1/4W 270K ohm ±5%	
R771	RQBPF1541X	Metal-oxide 1/4W 1.54K ohm ±1%	
R772	RQBPF5323X	Metal-oxide 1/4W 532K ohm ±1%	
R784	RD25PJ244X	Carbon 1/4W 240K ohm ±5%	
R785	RQBPF1151X	Metal-oxide 1/4W 1.15K ohm ±1%	
R786	RQBPF4753X	Metal-oxide 1/4W 475K ohm ±1%	
R798,7A1	RD25PJ273X	Carbon 1/4W 27K ohm ±5%	
R799	RD25PJ224X	Carbon 1/4W 220K ohm ±5%	
R7A3,7A5,7A7,7A9	RD25PJ302X	Carbon 1/4W 3K ohm ±5%	
R7A4,7A6,7A8,7B1	RGQCNJ126X	Metal-oxide 1/4W 12M ohm ±5%	
R7B2,7B3,7B4,7B5	RD25PJ824X	Carbon 1/4W 820K ohm ±5%	
R7B6,7B8,7C9	RD25PJ823X	Carbon 1/4W 82K ohm ±5%	
R7B7	RD25PJ181X	Carbon 1/4W 180 ohm ±5%	
R7B9,7C8	RD25PJ101X	Carbon 1/4W 100 ohm ±5%	
R802	RD25PJ303X	Carbon 1/4W 30K ohm ±5%	
R807	RD25PJ561X	Carbon 1/4W 560 ohm ±5%	
R809	RD25PJ272X	Carbon 1/4W 2.7K ohm ±5%	
RL01,L04,L07,L10	RD25PJ432X	Carbon 1/4W 4.3K ohm ±5%	
RL02,L05,L08,L11	RD25PJ203X	Carbon 1/4W 20K ohm ±5%	
S701	SP01AAXB0A	Push Switch	
S702	SP01AAX95A	Push Switch	
U701,702,705,706 718	QQM00353NL	IC LF353N	
U703,704,708,709 710,712,714,716 717,719,720,721 722	QQM04558Aμ	IC 4558	
U707,711,713,715	QQM0353NSL	IC LF353N (selected)	

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REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
U723,724	QQ004013AA	IC uPD4013C	
U725,726,727	QQM00339Aμ	IC LM339	
U801	QQM07812CJ	IC NJM7812	
U802	QQM07912BJ	IC NJM7912	
VB1	ML733SD001	Volume Bracket	
VR701,702	RVQA203A05	Volume 20K ohm-A x 2	
VR703	RVQA103A17	Volume 10K ohm-A x 2	
VR704	RVSA503C01	Volume 50K ohm-B x 4	
ZZ01	VS223RH002	Silicon Sheet	
ZZ02	VF164DN003	Bushing	

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AP111. P.W.Board Assy (APSLD234AH)

Ref.No.	MFR's Part No.	Description	Remarks
	PSLD234C0X	P.W.Board (without parts)	
1121	VB222SB003	LED Holder S	
1122	VB322SB003	LED Holder L	
CN04	ACCNZ87ULA	Connection Cord Assy (4P)	
CN05	ACCNZ88ULA	Connection Cord Assy (5P)	
CN06	ACCNZ89ULA	Connection Cord Assy (6P)	
CN07	ACCNZ90ULA	Connection Cord Assy (7P)	
CN08	ACCNZ91ULA	Connection Cord Assy (3P)	
DL01,02,03,04,05 06,07,08,09,10 11,12	QLAGL9PR23	LED (red) GL9PR12	
DL13	QLML9101N3	LED (green) LT-9101N	
DL14	QLML9101D3	LED (red) LT-9101D	
VR705,706,707,708	RV9A103B04	Volume 10K ohm-B	

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REPLACEMENT PARTS LIST

List 3. PRINTED MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
31	KT120DSPXX	Owner's Manual	
32	KW000341AX	Warranty Card	
35	KF243400E4	Polyethylene Bag	
36	VVL311GEA0	Serial No. Label	

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List 4. PACKING MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
41	KP120DS*01	Inner Carton	
42	KS120DS*01	Outer Carton	
43	KN1BX3**03	Partitioner L	
44	KN1BX3**04	Partitioner R	
45	KF604200E2	Polyethylene Bag	
47	VVL311GEA0	Serial No. Label	
49	KN1BXDS*01	Pad A	

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List 5. ACCESSORIES

Ref.No.	MFR's Part No.	Description	Remarks
	ACSP023GEA	Stereo Audio Cable	

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LIST 6. SHIPPING MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
61	KM120DSP01	Master Carton	

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dbx, Incorporated
[redacted] Newton
Massachusetts 02195
617/[redacted]

Raymond's Electronic Service
5462 Buchanan PL
Fremont, CA 94538
510-490-1622

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