dbx

DYNAMIC-RANGE CONTROLLER

Model 1BX-DS

Service Manual

CONTENTS

SPECIFICATIONS

• ELECTRICAL

Frequency response(20 Hz to 20 kHz).....	+/-0.5 dB(no expansion)
Total harmonic distortion	0.15% any setting
Intermodulation distortion	0.1% any setting(IHF)
	0.1% any setting(SMPTE)
Dynamic range(below 1V).....	Variable 101 dBV to 115 dBV
Equivalent input noise	-90 dBV(no compression or expansion)
Maximum input	6 Vrms
Maximum output	6 Vrms
Expansion(to 50% increase)	12 dB upward and 20 dB downward(maximum)
Impact recovery(to potential +10 dB)....	Program-dependent
Compression(overeasy, from none to 2:1).	6 dB of gain(maximum)
Ambience(at around 1 kHz)	Adds or subtracts L-R/R-L, with decreasing effect toward bass and treble
Transition level(set at 200 mV).....	Ranges from 70 mV to 600 mV

• 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.

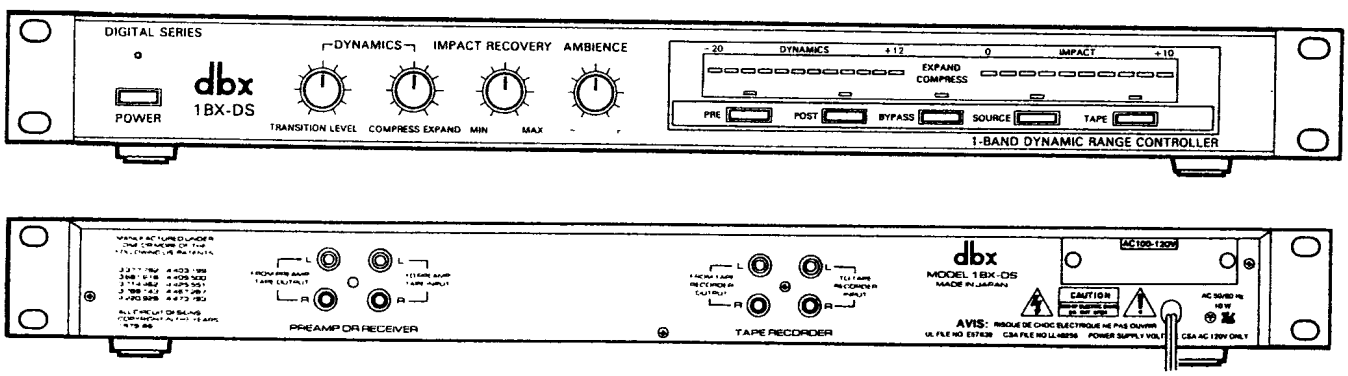
ALIGNMENT PROCEDURE

BEFORE ADJUTMENT

- 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
- Oscilloscope
- Digital voltmeter
- Distortion meter
- VTVM (Vacuum tube voltmeter)
- Frequency counter
- Toneburst generator



• POWER SUPPLY TEST

1. Verify the following power-supply conditions:

	Probe location	Test condition	Tolerance
1	TP 21	+12.0 V	+/-0.6 V
2	TP 20	-12.0 V	+/-0.6 V

• LED TEST

1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

ADJUSTMENT PROCEDURE

2. Depress the power switch and verify that the POWER, PRE, SOURCE LEDs light.
3. Depress the BYPASS button and verify that the BYPASS LED lights when the switch is IN.
4. Depress the POST and TAPE buttons and verify that their respective LEDs light and PRE and SOURCE LEDs are extinguished when the switches are IN.
5. Rotate the COMPRESS - EXPAND knob rightward and verify that the indicator "EXPAND" illuminates.
6. Rotate the COMPRESS - EXPAND knob leftward and verify that the indicator "COMPRESS" illuminates and "EXPAND" turns off.
   (Indicators "COMPRESS and EXPAND" will not illuminate when the "BYPASS" button is IN or "COMPRESS - EXPAND" knob is its middle.
7. Rotate the "TRANSITION LEVEL" and "COMPRESS - EXPAND" knobs rightward fully.
8. Apply a 1 kHz, 4 dBV(1.6 V rms) sinewave to both L and R inputs designated "FROM PREAMP TAPE OUTPUT", verify that the all red LEDs on the "DYNAMICS" LED row are illuminated.
9. Vary the "COMPRESS - EXPAND" knob from rightward fully to its middle, verify that the "DYNAMICS" display goes from all LEDs on to all LEDs off in one LED step.
10. Continuously rotate the knob leftward and verify that the orange LEDs go on, one at a time, in ascending order.
    (5 LEDs illuminate at leftward fully)

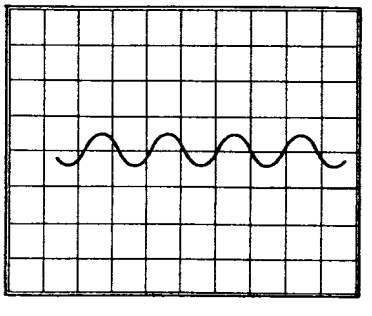
• VCA SYMMETRY ADJUSTMENT

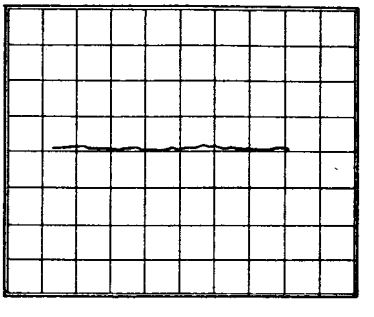
1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Short the "FROM PREAMP TAPE OUTPUT" inputs to ground.
3. Connect the signal generator to TP 5 and apply a 100 Hz, -20 dBV(100 mV rms).
4. Connect the oscilloscope to TP 19(U703R, pin 1), and set it to 20 mV/div and 50 ms/div.
5. Adjust a potentiometer VR702L for minimum control voltage feedthrough.
6. Reconnect the signal generator to TP 6.
7. Reconnect the oscilloscopt to TP 18(U703R, pin 7).
8. Adjust a potentiometer VR702R for minimum control voltage feedthrough.

fig





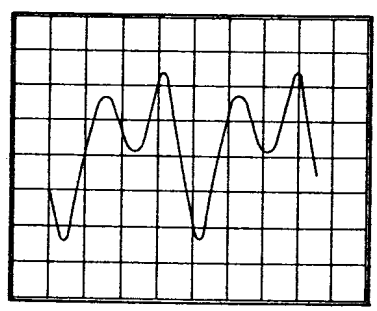
ALIGNMENT PROCEDURE

• RMS SYMMETRY ADJUSTMENT

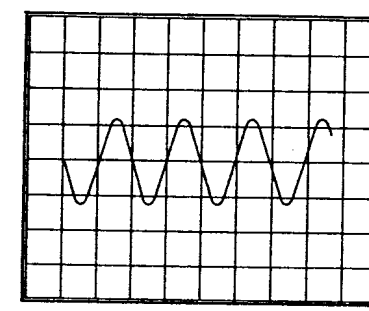
1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Maximum
IMPACT RECOVERY	Maximum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to both L and R inputs of "FROM PREAMP TAPE OUTPUT" and apply a 100 Hz, -14.5 dBV(190 mV rms).
3. Connect the oscilloscope to TP12(U711, pin 7), and set it to 10 mV/div and 50 ms/div.
4. Observe the output on the scope.
5. Adjust a potentiometer VR706 for the output becomes symmetrical and clear.



Wrong



Right

6. Monitor the following points and verify the following conditions:

TP 11	output of U708 --- 0 V +/-12 mV
D721 cathode	output of U714 --- 0 V +/-36 mV
D709 cathode	output of U716 --- 0 V +/-36 mV

• UNITY GAIN ADJUSTMENT

1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to the L and R input of "FROM PREAMP TAPE OUTPUT".
3. Apply a 100 Hz, 0 dBV(1.0 V rms).
4. Adjust VR711 for L channel unity gain.(output voltage should be 0 dBV +/-0.1 dB)
5. Adjust VR712 for R channel unity gain.

PERFORMANCE TESTS

• UNITY GAIN TEST

1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

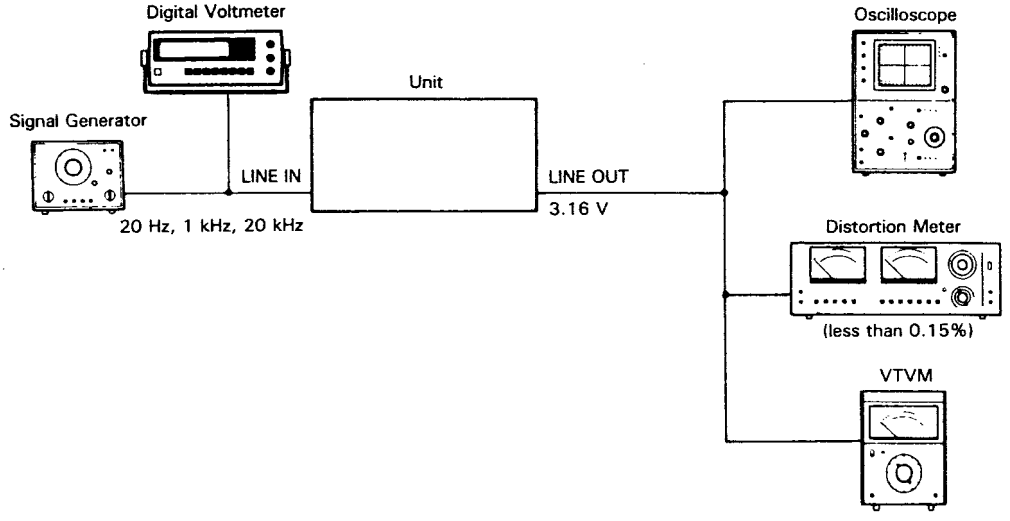
2. Connect a signal generator to both L and R "FROM PEAMP" input jacks.
3. Apply a 0 dBV(1.0V rms), 1 kHz sinewave.
4. Check that the output voltage at the "TO PREAMP TAPE INPUT" output jacks is 0 dBV +/-0.5 dB.

• FREQUENCY RESPONSE TEST

1. Apply a 0 dBV(1.0V rms) sinewave to both "FROM PREAMP TAPE OUTPUT" input jacks and sweep the input frequency from 20 Hz to 20 kHz.
2. Verify that the putput voltage at the "TO PREAMP TAPE INPUT" output jacks is 0 dBV -1.0/+0.5 dB over this frequency range.

• THD TEST

1. Rotate the "COMPRESS - EXPAND" knob rightward fully.
2. Set the input signal generator to frequencies of 100 Hz, 1 kHz, 10 kHz and an output voltage of +10 dBV(3.16 V rms).
3. Verify that it does not exceed the limit of 0.15%.



PERFORMANCE TESTS

• EXPANSION EFFECIENCY TEST

1. Set the controls as follows:

COMPRESS - EXPAND	Rightward fully
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to the L and R "FROM PREAMP TAPE OUTPUT" inputs.
3. Connect the output of one channel to an ac voltmeter.(digital voltmeter)
4. Apply a 0 dBV(1.0 V rms), 1 kHz sinewave.
5. Adjust the "TRANSITION LEVEL" control for 0 dBV at the "TO PREAMP TAPE INPUT" output.
6. Reduce the signal generator output to -10 dBV(316 mV rms).
7. Verify that the "TO PREAMP TAPE INPUT" output level decreases to -15 dBV(178 mV rms) +/-1 dB.
8. Increase the signal generator output to +10 dBV(3.16 V rms).
9. Verify that the "TO PREAMP TAPE INPUT" output level increases to +15 dBV(5.63 V rms) +/-1 dB.
10. Repeat for the 100 Hz and 10 kHz.

• COMPRESSION EFFECIENCY TEST

1. Set the controls as follows:

COMPRESS - EXPAND	Leftward fully
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to the L and R "FROM PREAMP TAPE OUTPUT" inputs.
3. Connect the output of one channel to an ac voltmeter.
4. Apply a 0 dBV(1.0 V rms), 1kHz sinewave.
5. Adjust the "TRANSITION LEVEL" control for 0 dBV at the "TO PREAMP TAPE INPUT" output.
6. Reduce the signal generator output to -10 dBV(316 mV rms).
7. Verify that the "TO PREAMP TAPE INPUT" output level decreases to -6 dBV(500 mV rms) +/-2 dB.
8. Increase the signal generator output to +10 dBV(3.16 V rms).
9. Verify that the "TO PREAMP TAPE INPUT" output level increases to +5 dBV(1.8 V rms) +/-1 dB.
10. Repeat for the 100 Hz and 10 kHz.

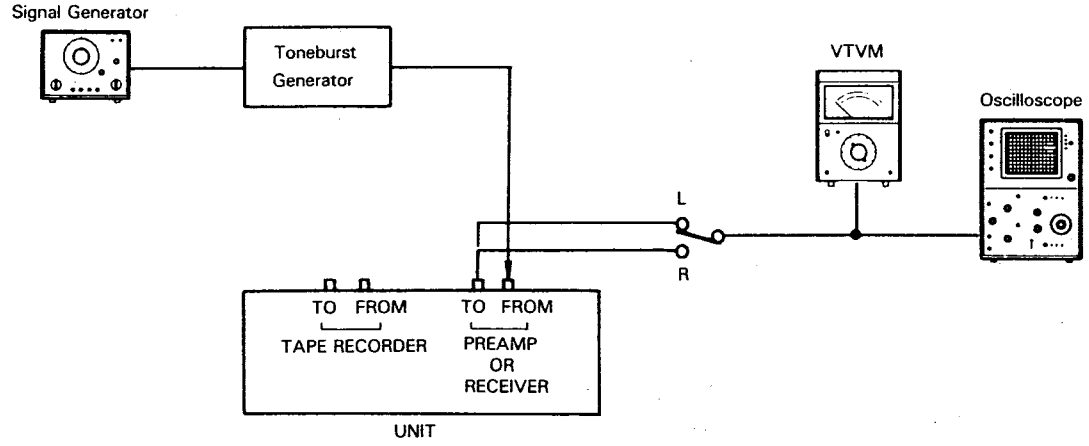
PERFORMANCE TESTS

• IMPACT RESTORATION TEST

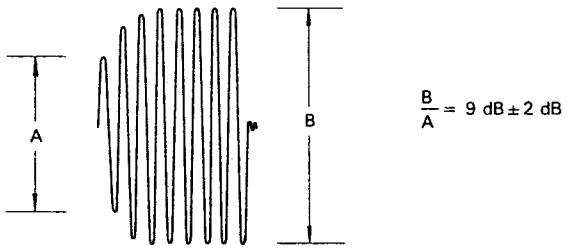
1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Rightward fully
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to the toneburst generator, and connect the toneburst generator output to the L and R "FROM PREAMP TAPE OUTPUT" inputs.
3. Connect the oscilloscope to the output of one channel of "TO PREAMP TAPE INPUT".



4. Set the oscillator to 1 kHz at 0 dBV(1.0 V rms) and the toneburst oscillator to produce approximately a 50-ms burst(10 cycles) followed by a approximately 500-ms(100 cycles) of silence.
5. Observe the output on the scope, verify that the wave shape is substantially as shown below.



6. Verify for the other channel.
7. Observe that the "IMPACT" LED row lights at least 8 out of the 10 LEDs. (8 LEDs at 7 dB, 10 LEDs at 9 dB)

PERFORMANCE TESTS

• SIGNAL PATH TEST

1. Set the controls as the above.
2. Connect the signal generator to the toneburst generator, and connect the toneburst generator output to the L and R "FROM PREAMP TAPE OUTPUT" inputs.
3. Connect the oscilloscope to the output of one channel of "TO PREAMP TAPE INPUT".
4. Set the oscillator to 1 kHz at 0 dBV(1.0 V rms) and the tonenurst oscillator to produce approximately a 50-ms burst(10 cycles) followed by a approximately 500-ms(100 cycles) of silence.
5. Connect the signal generator output to the L and R "FROM TAPE RECORDER OUTPUT" inputs, and apply a 1 kHz 0 dBV.
6. Verify that the output wave shape at both "TO PREAMP TAPE INPUT" and "TO TAPE RECORDER INPUT" output is varied wave shape of toneburst.
7. Depress the "BYPASS" button and verify that the output wave shape at both "TO PREAMP" and "TO TAPE RECORDER INPUT" output is unchanged wave shape of toneburst.
   Verify that all LEDs of "IMPACT" extinguish.
8. Depress the "TAPE" button.
9. Verify the output wave shape at "TO PREAMP TAPE INPUT" is wave shape of continuous 1 kHz and at "TO TAPE RECORDER INPUT" is wave shape of toneburst unchanged.
10. Release the "BYPASS" button and verify the wave shape at both "TO PREAMP TAPE INPUT" and "TO TAPE RECORDER INPUT".
    One is continuous 1 kHz wave shape and another is of varied toneburst wave shape.
11. Depress the "POST" button and verify that the wave shape at both "TO PREAMP TAPE INPUT" and "TO TAPE RECORDER INPUT" is toneburst unchanged.
12. Rotate the "COMPRESS - EXPAND" knob rightward fully and verify that the output wave shape at both channels is varied continuous 1 kHz(+8 dBV +/-3 dB).

• TRANSITION LEVEL TEST

1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Rightward fully
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Connect the signal generator to the L and R "FROM PREAMP TAPE OUTPUT" inputs.
3. Connect the oscilloscope to the output of one channel of "TO PREAMP TAPE INPUT".
4. Set the input signal generator to a frequency of 1 kHz and an output magnitude of -14 dBV(0.2 V rms) at "TO PREAMP TAPE INPUT".
5. Rotate the "TRANSITION" knob from minimum to its maximum position.
6. Verify that the output magnitude changes from -24 dBV(68.5 mV rms) to -4 dBV(630 mV rms).

PERFORMANCE TESTS

• AMBIENCE TEST

1. Set the controls as follows:

TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Remoe all leads and input connections and connect the signal generator to L channel of "FROM PREAMP TAPE OUTPUT" and input a 1 kHz, 0 dBV(1.0 V rms) sinewave.
3. Terminate the R channel input of "FROM PREAMP TAPE OUTPUT" to the ground.
4. Rotate the "AMBIENCE" knob rightward fully and verify that the L channel output of "TO PREAMP" is +3 dBV(1.4 V rms) +/-1 dB.
5. Rotate the "AMBIENCE" knob to its minimum position.
   Verify that the L channel output is -6 dBV(501 mV rms) +/-1 dB.
6. Rotate the "AMBIENCE" knob to maximum position again.
7. Verify that the R channel output is -6 dBV +/-1.5 dB.
8. Adjust the "AMBIENCE" knob to its middle position.
9. Verify that the R channel output is less than approximately -26 dBV(50 mV).

• MAXIMUM OUTPUT LEVEL TEST

1. Set the controls as follows:

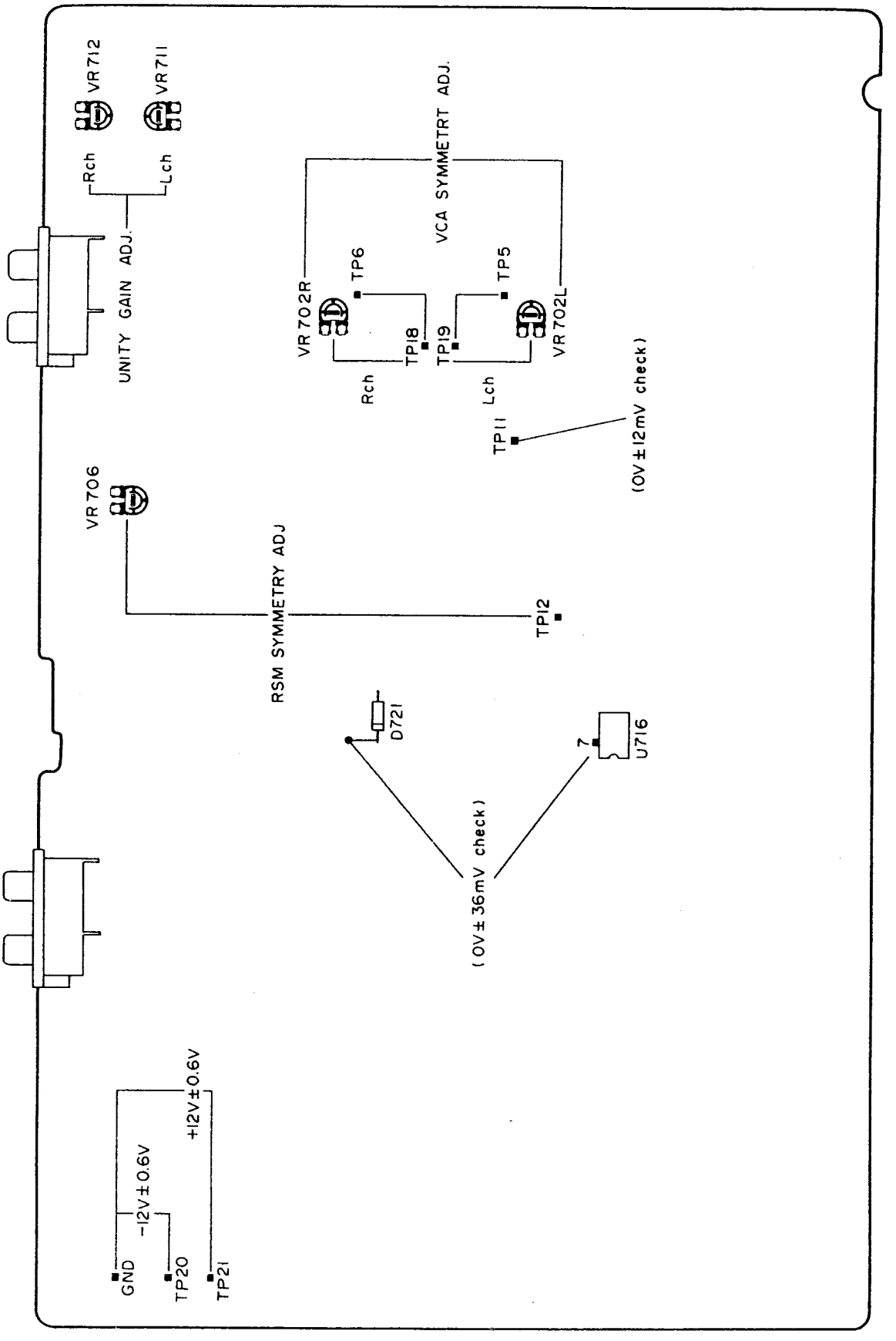
TRANSITION LEVEL	Middle
COMPRESS - EXPAND	Middle
IMPACT RECOVERY	Minimum
AMBIENCE	Middle
PRE/POST	PRE
BYPASS	Out
SOURCE/TAPE	SOURCE

2. Apply a 1 kHz sinewave to "FROM PREAMP TAPE OUTPUT" and measure the output voltage at "TO PREAMP".
3. Verify that the output voltage is greater than approximately +16 dBV(6.5 V rms) at 1% THD.

• NOISE TEST

1. Set the controls as the above.
2. Terminate the "FROM PREAMP TAPE OUTPUT" and "FROM TATE RECORDER" inputs with 1K-ohm resistor in parallel with 1000 pF to ground.
3. Verify that the noise level is less than -87 dBV.(with DIN audio filter)

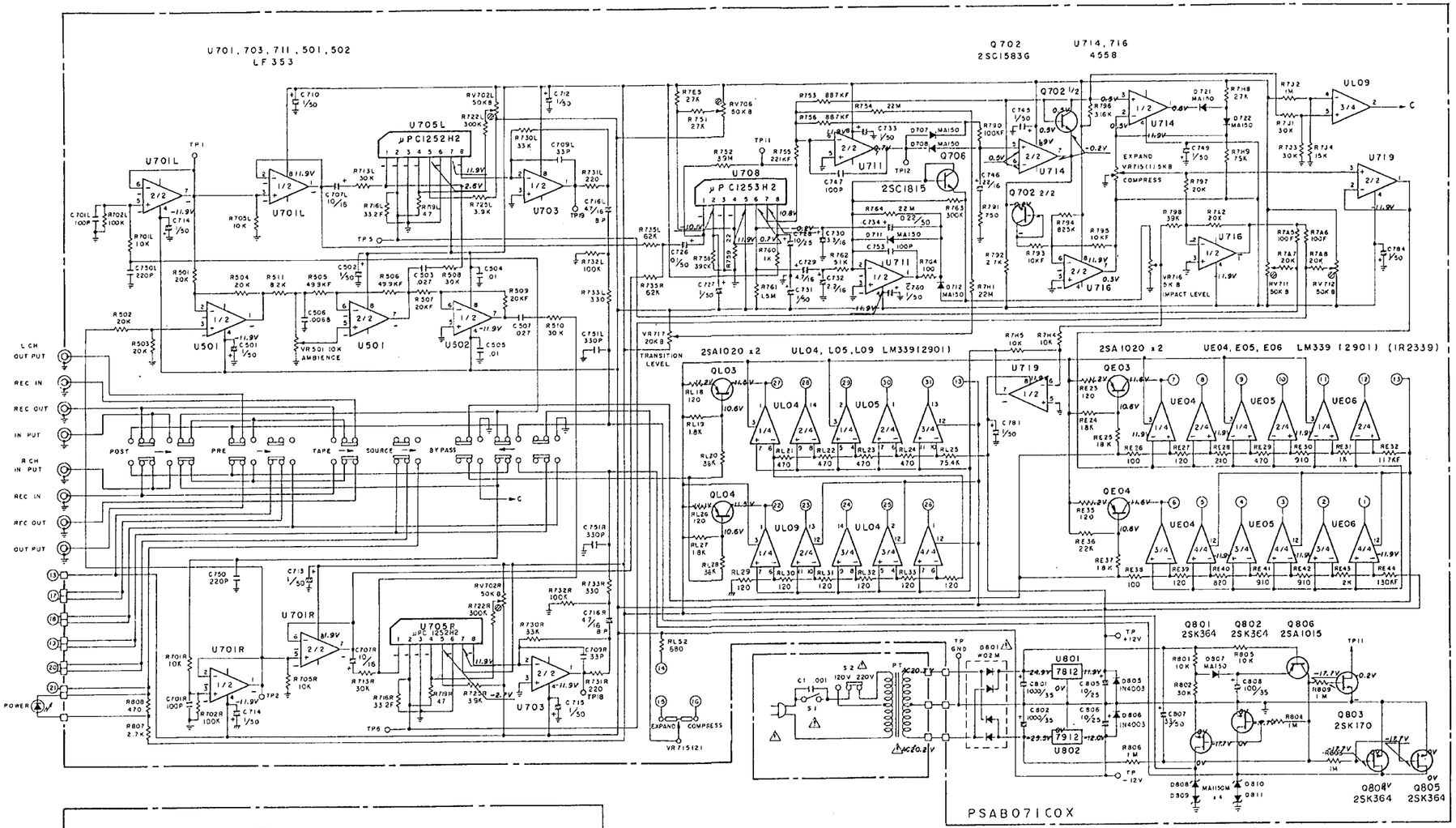
ADJUSTMENT POINTS

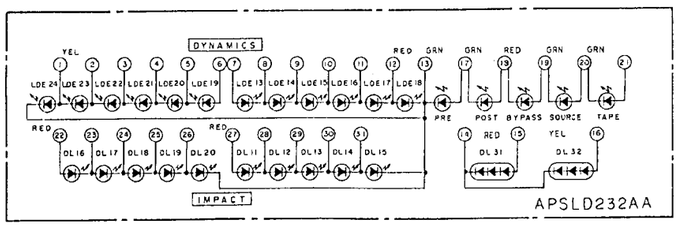


BLOCK DIAGRAM

SCHEMATIC DIAGRAM

NOTE: This is a stadard circuit but is subject to change without notice.





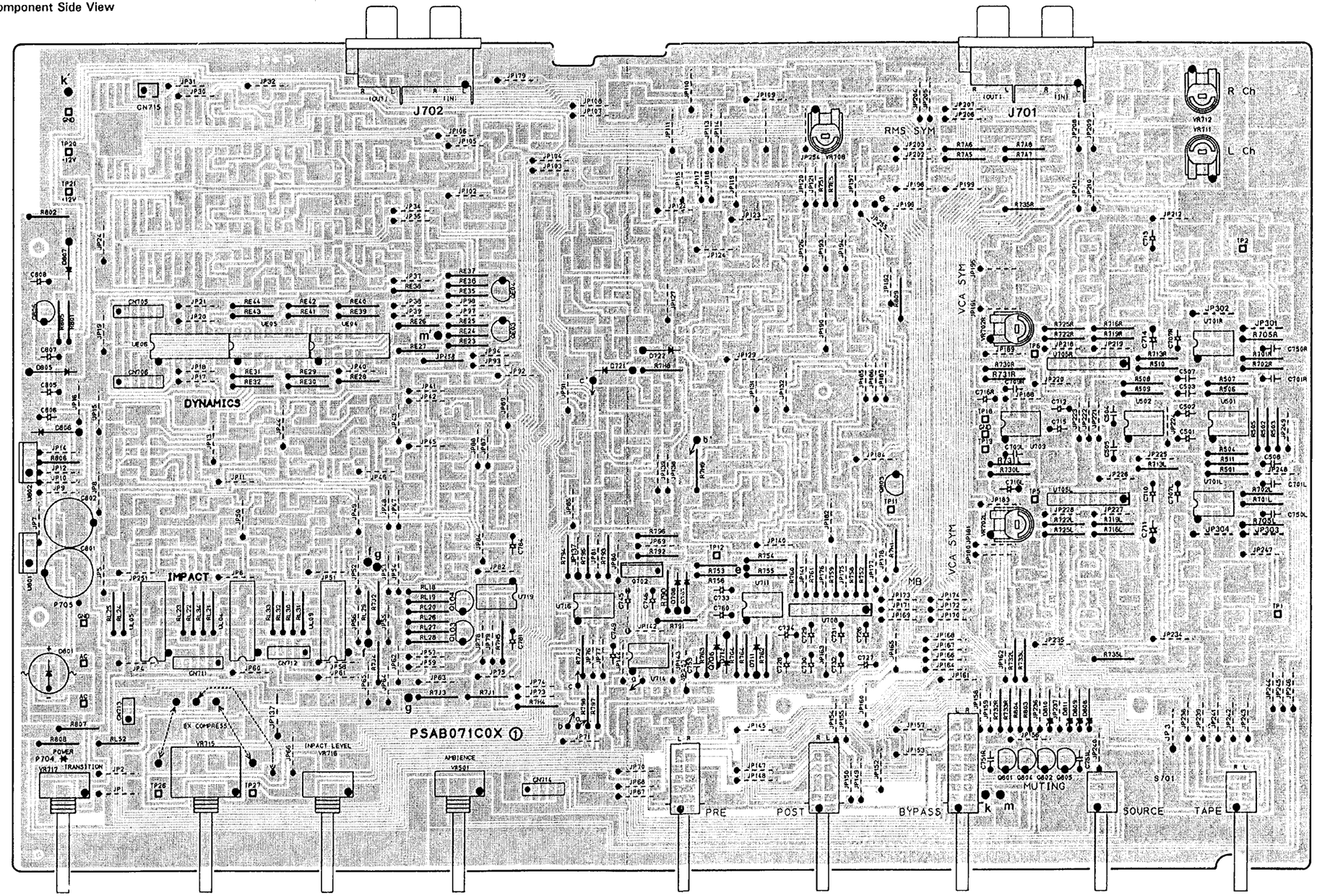
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
UL04	-11.9V	-11.9V	11.9V	0.1V	–	0.1V	–	0.2V	–	0.1V	–	-11.9V	-11.5V	-11.9V
UL05	-11.9V	-11.9V	11.9V	0.2V	–	0.3V	–	–	–	0.4V	–	-11.9V	-11.9V	–
UL09	-11.5V	-11.9V	11.9V	0.5V	0.2V	–	–	–	–	–	–	-11.9V	-11.9V	-11.9V
U502	-10.3V	–	0.1V	-11.9V	–	–	0.1V	11.9V						
U703	–	–	–	-11.9V	–	–	–	11.9V						

NOTES 1
UNLESS OTHERWISE SPECIFIED
(1) RESISTORS ARE 1/4 (1/8W(†)) AND IN OHMS (K=1000), ±5%(J).
(2) RATED VOLTAGE OF STYROL, MYLAR AND DISK CAPACITORS ARE D/C 50V.
TOLERANCE ARE AS MENTIONED BELOW.
MYLAR, CERAMIC AND STYROL ±5%
DISK CERAMIC ±0.25 PF (LESS THAN 5PF).
±0.5 PF (6PF 9PF) ±5%(10PF 820PF)
% (GREATER THAN 1000PF)

NOTES 2
UNLESS OTHERWISE SPECIFIED
(1) VOLTAGE ARE MEASURED TO CHASSIS GROUND WITH A VOLTMETER
NO SIGNAL, AND SHOULD HOLD WITHIN ±15% AT RATED SUPPLY VOLTAGE
(2) COMPONENTS MARKED WITH A (⚠) HAVE SPECIAL CHARACTERISTICS
IMPORTANT TO SAFETY.
(3) THIS IS STANDARD CIRCUIT BUT IS SUBJECT TO
CHANGE WITHOUT NOTICE.

WIRING BOARD LAYOUT (1)

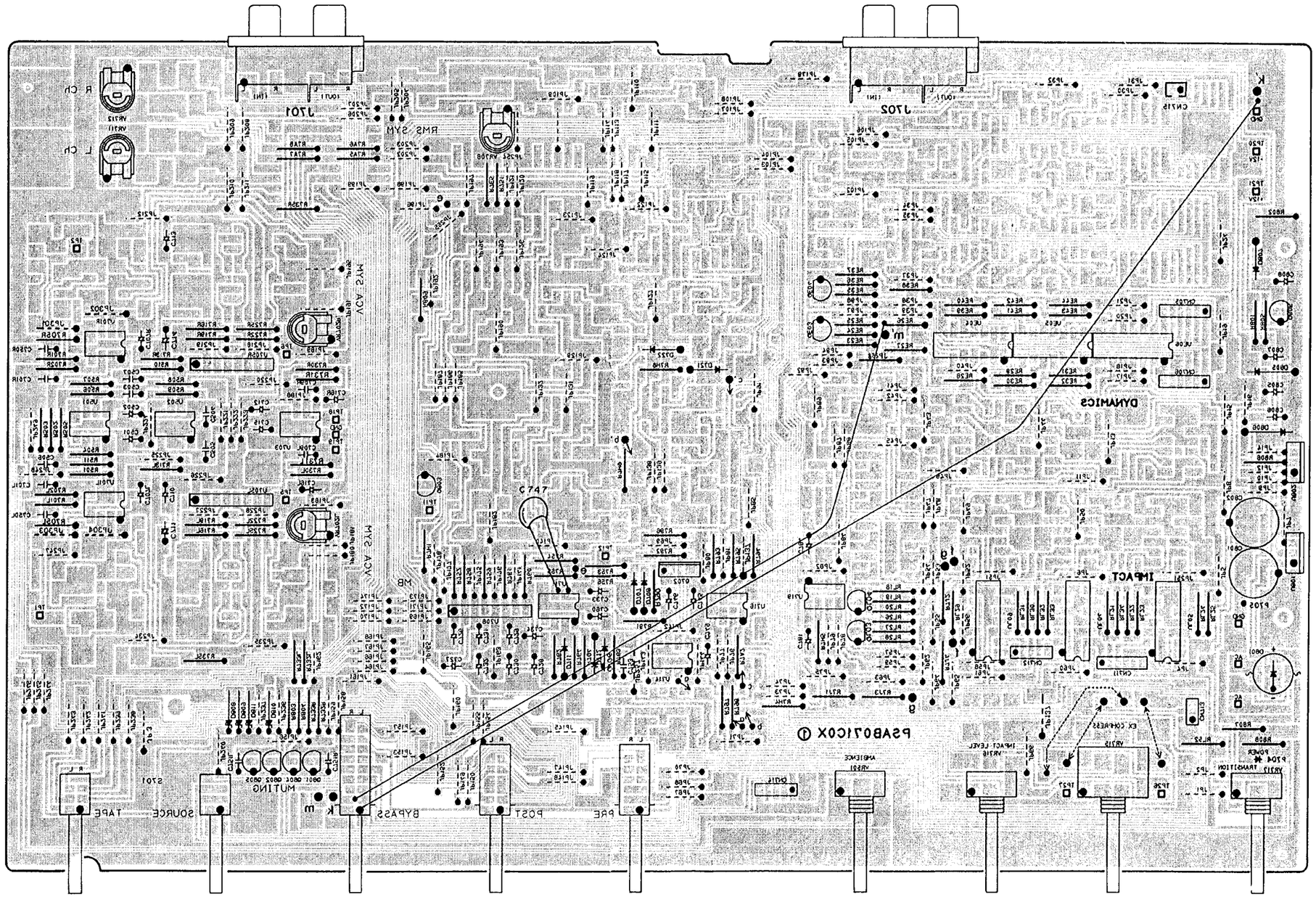
Component Side View



(AP12) APSAB071AH

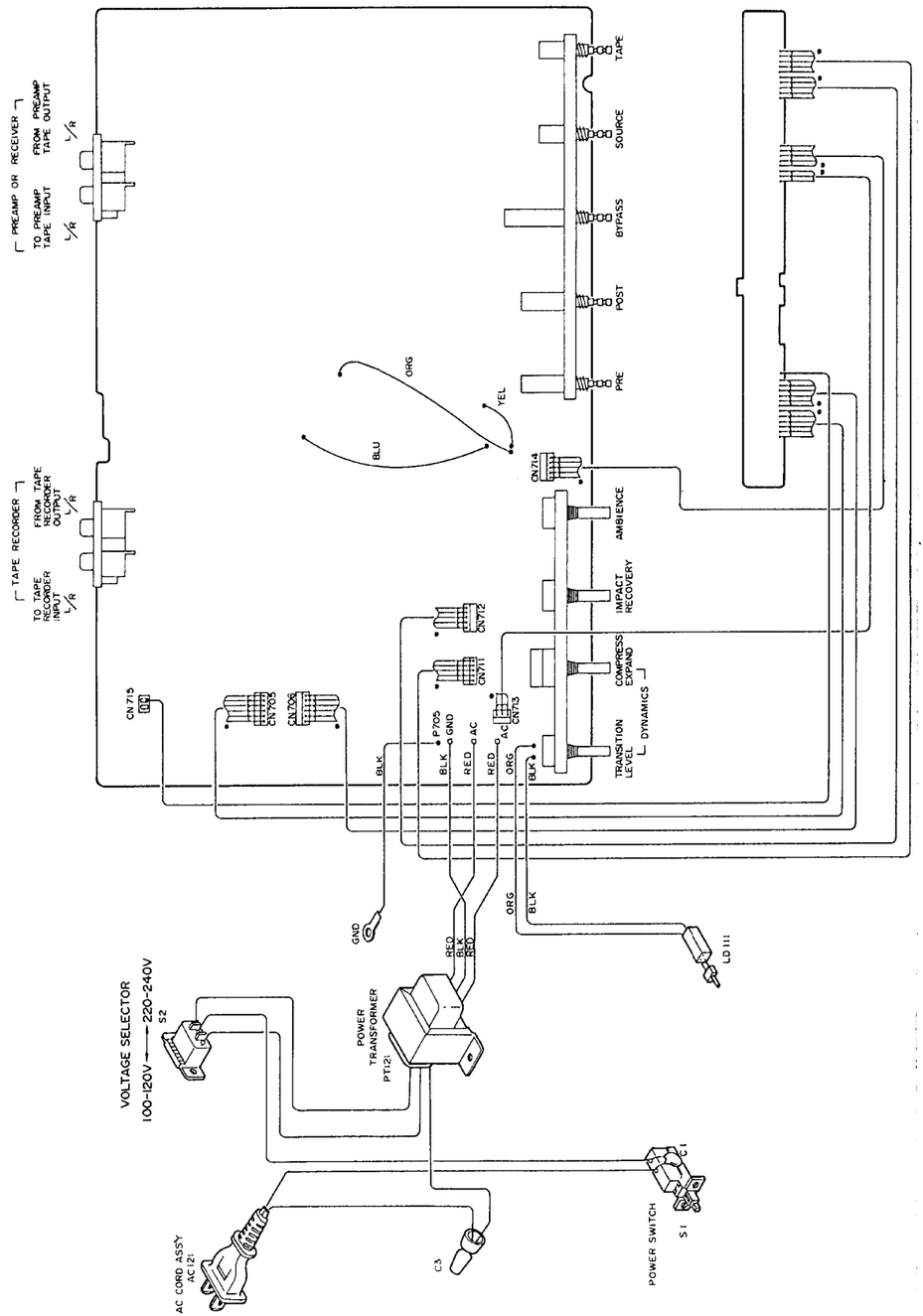
WIRING BOARD LAYOUT (2)

Foil Side View

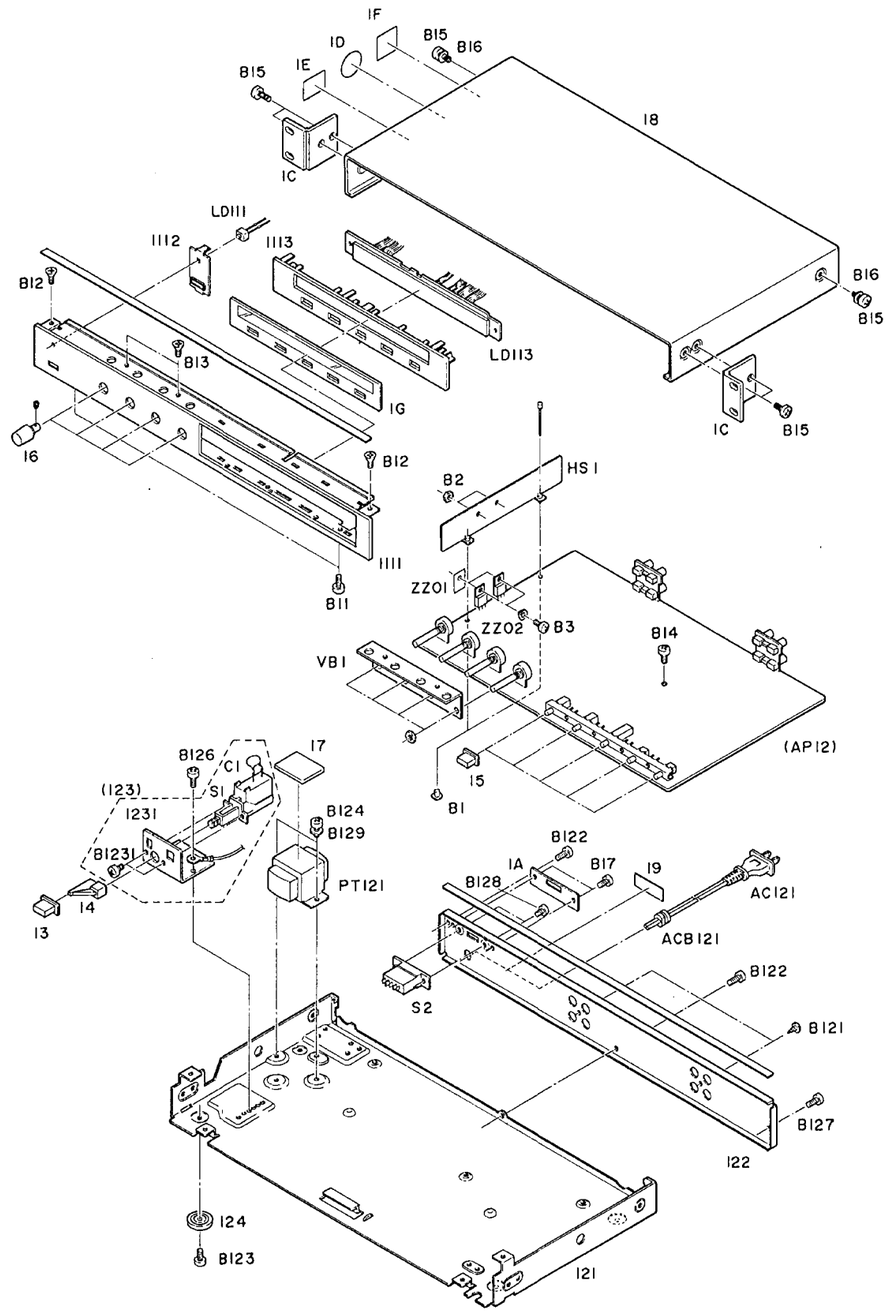


(AP12) APSAB071AH

WIRING LAYOUT



EXPLODED VIEW



REPLACEMENT PARTS LIST

Table of Part Structure

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┌--List 1. (Set Assy Element) ---┬--(11) Front Panel Assy ------(111) Escutcheon Assy
│                                ├--(12) Chassis Assy ----------(123) Switch Bracket Assy
│                                └--(AP12) APSAB071AH
│
├--List 3. (Printed Materials)
│
├--List 4. (Packing Materials)
│
├--List 5. (Accessories)
│
└--List 6. (Shipping Materials)
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LIST 1. SET ASSY ELEMENTS

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

Ref.No.	MFR's Part No.	Description	Remarks
(11)	AY1BXDS*01	Front Panel Assy	
(12)	AY1BXDS*02	Chassis Assy	
(AP12)	APSAB071AH	P.W.Board Assy	
1A	MS625AA002	Switch Cover	
1C	ML543AA003	Rack Mount Adaptor	
1G	VS736CF001	Window Sheet	
13,15	NBR1255258	Push Knob	
14	VK321SB001	Joint	
16	AVKN0B*183	Volume Knob E	
17	VS547XB001	Transformer Sheet	
18	MU985SX005	Cover	
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	

1/1

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)	AM1BXDS*01	Escutcheon Assy	
LD111	QLBLN222RN	LED (red) LN222RP	
LD113	APSLD233AA	LED Assy	
P1	ACCNZ92ULA	Connection Cord Assy	
P2	ACRW109ULA	Ribbon Wire Assy	
P3	ACRW110ULA	Ribbon Wire Assy	
P4	ACRW111ULA	Ribbon Wire Assy	
P5	ACRW112ULA	Ribbon Wire Assy	
P6	ACRW113ULA	Ribbon Wire Assy	
P7	ACRW114ULA	Ribbon Wire Assy	
			1/1

12. Chassis Assy

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

Ref.No.	MFR's Part No.	Description	Remarks
121	MU984SL004	Chassis	
122	MB951SL009	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 T.T Screw M3 x 5	
B123,124,126,128	BTPB3005TZ	Bind T.T Screw M3 x 5	
B127	BTPL3006TB	Round Head Wood Screw M3 x 6	
B129	BWM30705SN	Flat Washer M3 x 7 x 0.5	
PT121	TPL41A001K	Power Transformer	
S2	SS010226AJ	Slide Switch	
			1/1

111. Escutcheon Assy

Ref.No.	MFR's Part No.	Description	Remarks
1111	ME95EAA048	Escutcheon	
1112	VF132SB004	Button Guide	
1113	VS847SM001	Frame	
			1/1

REPLACEMENT PARTS LIST

123. Switch Bracket Assy

Ref.No.	MFR's Part No.	Description	Remarks
1231	ML544SD004	Switch Bracket	
B1231	BTPB3005TZ	Bind T.T Screw M3 x 5	
C1	CKDU102KBM	Ceramic 1000 pF 125V	
S1	SP01AAW07A	Push Switch	

1/1

AP12. P.W.Board Assy (APSAB071AH)

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

Ref.No.	MFR's Part No.	Description	Remarks
	PSAB071C0X	P.W.Board (without parts)	
B1	BRU3280XAJ	Rivet M3.2 x 8	
B2	BNHCL30NSZ	Nut	
B3	BSPP3008NZ	Pan Head Screw M3 x 8	
BP1	VS533VF002	PCB Barrier	
C501,502,707L/R 710,711,712,713 714,715,727,731 733,745,749,760 781,784	CEVG010ALX	Electrolytic 1 uF 50V	
C503,507	CQ8B273JTN	Film 0.027 uF 50V +/-5%	
C504,505	CKFB103ZFT	Ceramic 0.01 uF 50V -20,+80%	
C506	CQ8B562JTN	Film 5600 pF 50V +/-5%	
C701L/R	CCGB101J0T	Ceramic 100 pF 50V +/-5%	
C709L/R	CCGB330J0T	Ceramic 33 pF 50V +/-5%	
C716L/R	CEVE4R7NAN	Electrolytic 4.7 uF 25V	
C726	CEVG0R1ZMN	Electrolytic 0.1 uF 50V	
C728,805,806	CEVE100ALX	Electrolytic 10 uF 25V	
C729	CEVF4R7ALX	Electrolytic 4.7 uF 35V	
C730,807	CEVG3R3ALX	Electrolytic 3.3 uF 50V	
C732	CEVG2R2ALX	Electrolytic 2.2 uF 50V	
C734	CEVGR22ZMN	Electrolytic 0.22 uF 50V	
C746	CEVD220ALX	Electrolytic 22 uF 16V	
C747	CCDB101K0T	Ceramic 100 pF 50V +/-10%	
C750L/R	CCFB221J0T	Ceramic 220 pF 50V +/-5%	
C751L/R	CCFB331K0T	Ceramic 330 pF 50V +/-10%	
C753	CCFB101J0T	Ceramic 100 pF 50V +/-5%	
C801,802	CEAF102ALX	Electrolytic 1000 uF 35V	
C808	CEVF101ALX	Electrolytic 100 uF 35V	
CN705,706	YJF06S270Z	Connector	
CN711,712,714	YJF05S270Z	Connector	
CN713	YJF03S270Z	Connector	
CN715	YJF02S077Z	Junction Jack	

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REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
D707,708,709,711 712,721,722,807	QDSMA150XN	Diode MA150	
D801	QDSW02MXXG	Diode W02M	
D805,806	QDSN4003XZ	Diode IN4003	
D808,809,810,811	QDZ1150M#N	Diode (zener) MA1150	
HS1	MS736AD001	Heat Sink	
J701,702	YJP04S023U	Jack (4P)	
Q702	QTC1583XCE	Transistor 2SC1583 (G)	
Q706	QTC1815XAT	Transistor 2SC1815 (Y,GR)	
Q801,802,803,804 805	QTK0364XTT	Transistor 2SK364 (BL,GR)	
Q806	QTA1015XTT	Transistor 2SA1015 (Y,GR)	
QE03,E04,L03,L04	QTA1020XTT	Transistor 2SA1020 (O,Y)	
R501,502,503,504 797,7A2,7A7,7A8	RD25PJ203X	Carbon 1/4W 20K ohm +/-5%	
R505,506	RQBPF4992X	Metal-oxide 1/4W 49.9K ohm	
R507,509	RQBPF2002X	Metal-oxide 1/4W 20.0K ohm	
R508,510,713L/R 7J1,7J3,802	RD25PJ303X	Carbon 1/4W 30K ohm +/-5%	
R511	RD25PJ822X	Carbon 1/4W 8.2K ohm +/-5%	
R701L/R,705L/R,7H4 7H5,801,805	RD25PJ103X	Carbon 1/4W 10K ohm +/-5%	
R702L/R	RD25PJ104X	Carbon 1/4W 100K ohm +/-5%	
R716L/R	RQBPF33R2X	Metal-oxide 1/4W 33.2 ohm	
R719L/R	RD25PJ470X	Carbon 1/4W 47 ohm +/-5%	
R722L/R,763	RD25PJ304X	Carbon 1/4W 300K ohm +/-5%	
R725L/R	RD25PJ392X	Carbon 1/4W 3.9K ohm +/-5%	
R730L/R	RD25PJ333X	Carbon 1/4W 33K ohm +/-5%	
R731L/R	RD25PJ221X	Carbon 1/4W 220 ohm +/-5%	
R732L/R	RD25PJ223X	Carbon 1/4W 22K ohm +/-5%	
R733L/R	RD25PJ331X	Carbon 1/4W 330 ohm +/-5%	
R735L/R	RD25PJ623X	Carbon 1/4W 62K ohm +/-5%	
R751,7E5,7H8	RD25PJ273X	Carbon 1/4W 27K ohm +/-5%	
R752	RGQCPJ395X	Metal-oxide 1/4W 3.9M ohm +/-5%	
R753,756	RQBPF8873X	Metal-oxide 1/4W 887K ohm	
R754,764	RGQANJ226K	Metal-oxide 1/4W 22M ohm +/-5%	
R755	RQBPF2213X	Metal-oxide 1/4W 221K ohm	
R758	RD25PJ394X	Carbon 1/4W 390K ohm +/-5%	
R759	RD25PJ220X	Carbon 1/4W 22 ohm +/-5%	
R760,E31	RD25PJ102X	Carbon 1/4W 1K ohm +/-5%	
R761	RD25PJ155X	Carbon 1/4W 1.5M ohm +/-5%	
R762	RD25PJ513X	Carbon 1/4W 51K ohm +/-5%	
R790	RQBPF1003X	Metal-oxide 1/4W 100K ohm	
R791	RD25PJ751X	Carbon 1/4W 750 ohm +/-5%	
R792,807	RD25PJ272X	Carbon 1/4W 2.7K ohm +/-5%	
R793,795	RQBPF1002X	Metal-oxide 1/4W 10.0K ohm	
R794	RQBPF8253X	Metal-oxide 1/4W 825K ohm	

REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
R796	RQBPF3161X	Metal-oxide 1/4W 3.16K ohm	
R798	RD25PJ393X	Carbon 1/4W 39K ohm +/-5%	
R7A5,7A6	RQBPF1000X	Metal-oxide 1/4W 100 ohm	
R7G5	RD25PJ124X	Carbon 1/4W 120K ohm +/-5%	
R7H1	RGQCPJ226X	Metal-oxide 1/4W 22M ohm +/-5%	
R7H9	RD25PJ753X	Carbon 1/4W 75K ohm +/-5%	
R7J2	RD25PJ334X	Carbon 1/4W 330K ohm +/-5%	
R7J4	RD25PJ153X	Carbon 1/4W 15K ohm +/-5%	
R803,804,806,809	RD25PJ105X	Carbon 1/4W 1M ohm +/-5%	
R808,E29,L21,L22 L23,L24	RD25PJ471X	Carbon 1/4W 470 ohm +/-5%	
RE23,E27,E35,E39 L18,L26,L29,L30 L31,L32,L33,L34	RD25PJ121X	Carbon 1/4W 120 ohm +/-5%	
RE24,L19,L27	RD25PJ182X	Carbon 1/4W 1.8K ohm +/-5%	
RE25,E37	RD25PJ183X	Carbon 1/4W 18K ohm +/-5%	
RE26,E38,7G4	RD25PJ101X	Carbon 1/4W 100 ohm +/-5%	
RE28	RD25PJ241X	Carbon 1/4W 240 ohm +/-5%	
RE30,E41,E42	RD25PJ911X	Carbon 1/4W 910 ohm +/-5%	
RE32	RQBPF1173X	Metal-oxide 1/4W 117K ohm	
RE36	RD25PJ222X	Carbon 1/4W 2.2K ohm +/-5%	
RE40	RD25PJ821X	Carbon 1/4W 820 ohm +/-5%	
RE43	RD25PJ202X	Carbon 1/4W 2K ohm +/-5%	
RE44	RQBPF1303X	Metal-oxide 1/4W 130K ohm	
RL20,L28	RD25PJ363X	Carbon 1/4W 36K ohm +/-5%	
RL25	RQBPF7542X	Metal-oxide 1/4W 75.4K ohm	
RL52	RD25PJ162X	Carbon 1/4W 1.6K ohm +/-5%	
RV702L/R,706,711 712	RPJNB50309	Potentiometer 50K ohm-B	
S701	SP05YFX03A	Push Switch	
U501,502,701L/R 703,711	QQM0353NSL	IC LF353N (selected)	
U705L/R	QQM01252AA	IC uPC1252H2	
U708	QQM01253AA	IC uPC1253H2	
U714,716,719	QQM04558A&	IC 4558	
U801	QQM07812CJ	IC NJM7812A	
U802	QQM07912BJ	IC NJM7912A	
UE04,E05,E06,L04 L05,L09	QQM00339A&	IC 339	
VB1	ML733SD001	Volunme Bracket	
VR501	RVNA103B43	Volume 10K ohm-B	
VR715B	RVQZ502B01	Volume 5K ohm-B	
VR716B	RVNA502B07	Volume 5K ohm-B	
VR717	RVNA203B14	Volume 20K ohm-B	

REPLACEMENT PARTS LIST

Ref.No.	MFR's Part No.	Description	Remarks
W701	WUF007EECC	Hi-Wrap Wire	
W702	WUF307EECC	Hi-Wrap Wire	
W703	WUF207EECC	Hi-Wrap Wire	
W704	WUF030AAXX	Hi-Wrap Wire	
W705	WUF420AAXX	Hi-Wrap Wire	
W7A1	WUF407EECC	Hi-Wrap Wire	
W7B4	WUF313EECC	Hi-Wrap Wire	
W7C5	WUF613EECC	Hi-Wrap Wire	
W7F2	WUF107EECC	Hi-Wrap Wire	
W7G3	WUF607EECC	Hi-Wrap Wire	
ZZ01	VS223RH002	Silicon Sheet	
ZZ02	VF164DN003	Bushing	
ZZ03	VVL511GE30	Serial No. Plate	
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LIST 3. PRINTED MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
31	KT1BXDSPXX	Owner's Manual	
32	KW000341AX	Warranty Card	
35	KF243400E4	Polyethylene Bag	
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LIST 4. PACKING MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
41	KP1BXDS*01	Inner Carton	
42	KS1BXDS*01	Outer Carton	
43	KN1BX3**03	Partitioner L	
44	KN1BX3**04	Partitioner R	
45	KF604200E2	Polyethylene Bag	
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LIST 5. ACCESSORIES

Ref.No.	MFR's Part No.	Description	Remarks
51	ACSP0023GEA	Stereo Audio Cable	
			1/1

REPLACEMENT PARTS LIST

LIST 6. SHIPPING MATERIALS

Ref.No.	MFR's Part No.	Description	Remarks
61	KM1BXDSP01	Master Carton	

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