


Panaray[®] System Digital Controller II (US and non-US units)



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SAFETY INFORMATION

1. Parts that have special safety characteristics are identified by the  symbol on schematics or by special notes on the parts list. Use only replacement parts that have critical characteristics recommended by the manufacturer.
2. Make leakage current or resistance measurements to determine that exposed parts are acceptably insulated from the supply circuit before returning the unit to the customer. Use the following checks to perform these measurements:

A. Leakage Current Hot Check-With the unit completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 "Leakage Current for Appliances" and Underwriters Laboratories (UL) UL6500 / UL60065 / IEC 60065 paragraph 9.1.1. With the unit AC switch first in the ON position and then in OFF position, measure from a known earth ground (metal waterpipe, conduit, etc.) to all exposed metal parts of the unit (antennas, handle bracket, metal cabinet, screwheads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milliamp. Reverse the unit power cord plug in the outlet and repeat test. ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE UNIT TO THE CUSTOMER.

B. Insulation Resistance Test Cold Check-(1) Unplug the power supply and connect a jumper wire between the two prongs of the plug. (2) Turn on the power switch of the unit. (3) Measure the resistance with an ohmmeter between the jumpered AC plug and each exposed metallic cabinet part on the unit. When testing 3 wire products, the resistance measured to the product enclosure should be between 2 and infinite MOhms. Also, the resistance measured to exposed input/output connectors should be between 4 and infinite MOhms. When testing 2 wire products, the resistance measured to exposed input/output connectors should be between 4 and infinite MOhms. If it is not within the limits specified, there is the possibility of a shock hazard, and the unit must be repaired and rechecked before it is returned to the customer.

CAUTION: The Bose® Panaray® System Digital Controller II contains no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

PROPRIETARY INFORMATION

THIS DOCUMENT CONTAINS PROPRIETARY INFORMATION OF BOSE CORPORATION WHICH IS BEING FURNISHED ONLY FOR THE PURPOSE OF SERVICING THE IDENTIFIED BOSE PRODUCT BY AN AUTHORIZED BOSE SERVICE CENTER OR OWNER OF THE BOSE PRODUCT, AND SHALL NOT BE REPRODUCED OR USED FOR ANY OTHER PURPOSE.

WARRANTY

The Bose Panaray System Digital Controller II is covered by a limited 1-year transferable limited warranty. Warranty period for Europe is 2 years.

Product Description

The Bose® Panaray® System Digital Controller II is the next generation of the Bose Panaray Digital Controller. It is a 1U rack mount controller with 2 inputs and 4 outputs, and its primary purpose is to provide selectable loudspeaker EQ. It utilizes a TI TMS320D707RPF digital signal processor to provide Bose speaker equalizer curves for all current and future speaker products. The unit's firmware is field upgradeable via a serial port and will not support dual mono preset operation.

The controller is a world-wide product that utilizes a switch-mode power supply, allowing it to operate on any line voltage from 100V to 240VAC, 50/60Hz. The Controller II is also RoHS and WEEE compliant.

The Panaray System Digital Controller II replaces the Panaray System Digital Controller.

The controller utilizes a digital signal processing (DSP) architecture to provide Bose speaker equalizer curves for all current and future loudspeakers.

The DSP engine has the capability to run the following operations simultaneously:

- Parametric EQ: One stereo (or mono) seven band parametric equalizer capable of the following
 - Seven band parametric
 - Six band parametric with high pass
 - Six band parametric with low pass
 - Five band parametric with a high pass and low pass

- Crossover: Two mono or a single stereo crossover
 - Choice of Butterworth, Linkwitz Riley, and Bessel Filters
 - These support 1st, 2nd, 3rd and 4th order slopes.
 - Output Limiter: Four mono or two stereo output limiters capable of being assigned to any of the four outputs.

- Routing: Independent routing of input program material to any of the four outputs.

- Line Delay: Delay is available only to presets located in the Bass Array bank
 - None of these settings are user programmable.
 - The controller has the ability to accommodate up to 180 ROM presets capable of supporting all combinations of Bose speakers products. The speaker presets are not editable by the end user.

SPECIFICATIONS

Front Panel Controls

Standby	Power ON/OFF
Input/Output LEDs	Signal (present) LED - green Range is -40dB to -3dB 1 x LEDs for CH1 and CH2 Signal (clip) LED - red Range is 0dB 1 x LEDs for CH1 and CH2
Display	2 x 16 backlit LCD display - blue background with white characters
Up/Down/Left/Right Buttons	Navigate EQ and utility menus
Select/Load Button	Selects Bose® EQ for speakers selected

Rear Panel Connectors

Analog Inputs	Two analog, balanced, differential XLR
Analog Outputs	Four analog, balanced, differential, XLR
Communication Port	DB-9 serial connector, RS232 (for updates only)
IEC Power	IEC power cord input

Electrical Specifications


Analog Inputs	Two balanced XLR connectors, CH1 and CH2
Input Impedance, Differential	2k Ohm
Maximum Input Level	+18 dBu
Sensitivity Range at Full Scale	Selectable 0/+6/+12/+18 dBu
A to D Conversion	24 bit, 128x oversampling bitstream
Dynamic Range	103 dB (typical)
THD	0.003% (typical)
Frequency Response	20Hz to 20kHz, +0/-1dB
Crosstalk	100 dB (typical)
Analog Outputs	Four balanced, differential XLR connectors
Output Impedance, Differential	200 Ohms
Maximum Output Level (balanced)	+18 dBu
Output Ranges, Balanced	Selectable 0/+6/+12/+18 dBu
Throughput Delay	1.52ms
Conversion	44.1kHz
Mains Voltage	100 to 240VAC, 50 to 60Hz (auto-select)
Power Consumption	< 15 Watts
Environmental	Operating temperature: 32 - 104 degrees F (0 - 40 C) Storage temperature: -4 -122 degrees F (-20 - 50 C) Humidity: 95% relative humidity
Dimensions	19"W x 8.27"D x 1.77"H (483 x 210 x 45mm)
System Weight	Product: 5.9lb (2.7kg) Shipping: 7.8lb (3.5kg)

ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICE HANDLING

This unit contains ESDS devices. We recommend the following precautions when repairing, replacing or transporting ESDS devices:


- Perform work at an electrically grounded work station.
- Wear wrist straps that connect to the station or heel straps that connect to conductive floor mats.
- Avoid touching the leads or contacts of ESDS devices or PC boards even if properly grounded. Handle boards by the edges only.
- Transport or store ESDS devices in ESD protective bags, bins, or totes. Do not insert unprotected devices into materials such as plastic, polystyrene foam, clear plastic bags, bubble wrap or plastic trays.

PART LIST NOTES

1. This part is not normally available from Customer Service. Approval from the Field Service Manager is required before ordering.
2. The individual parts located on the PCBs are listed in the Electrical Part List.
3.  This part is critical for safety purposes. Failure to use a substitute replacement with the same safety characteristics as the recommended replacement part might create shock, fire and/or other hazards.
4. This part is referenced for informational purposes only. It is not stocked as a repair part. Refer to the next higher assembly for a replacement part.

PACKAGING PART LIST

Panaray® Digital Controller II (see Figure 1)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	POLYBAG 475X335X0.1	-	1497-7802+0	1	
2	OWNERS MANUAL	298164	4301-7227+0	1	
3	LINE CORD, 120V, US/CA LINE CORD, 230V, EURO LINE CORD, 100V, JAPAN LINE CORD, 240V, UK/SING LINE CORD, 240V, AUS	298165 298166 298167 298168 298169	7012-7340+0 7012-6601+0 7012-5530+0 7012-6603+0 7012-5430+0	1	3 
4	PE BAG 350X120X0.05	-	1497-7762+0	1	
5	CARTON	298162	1480-9201+1	1	
6	CARTON PACKAGING	298163	1490-4621+0	1	
7	POLYBAG	-	-	1	

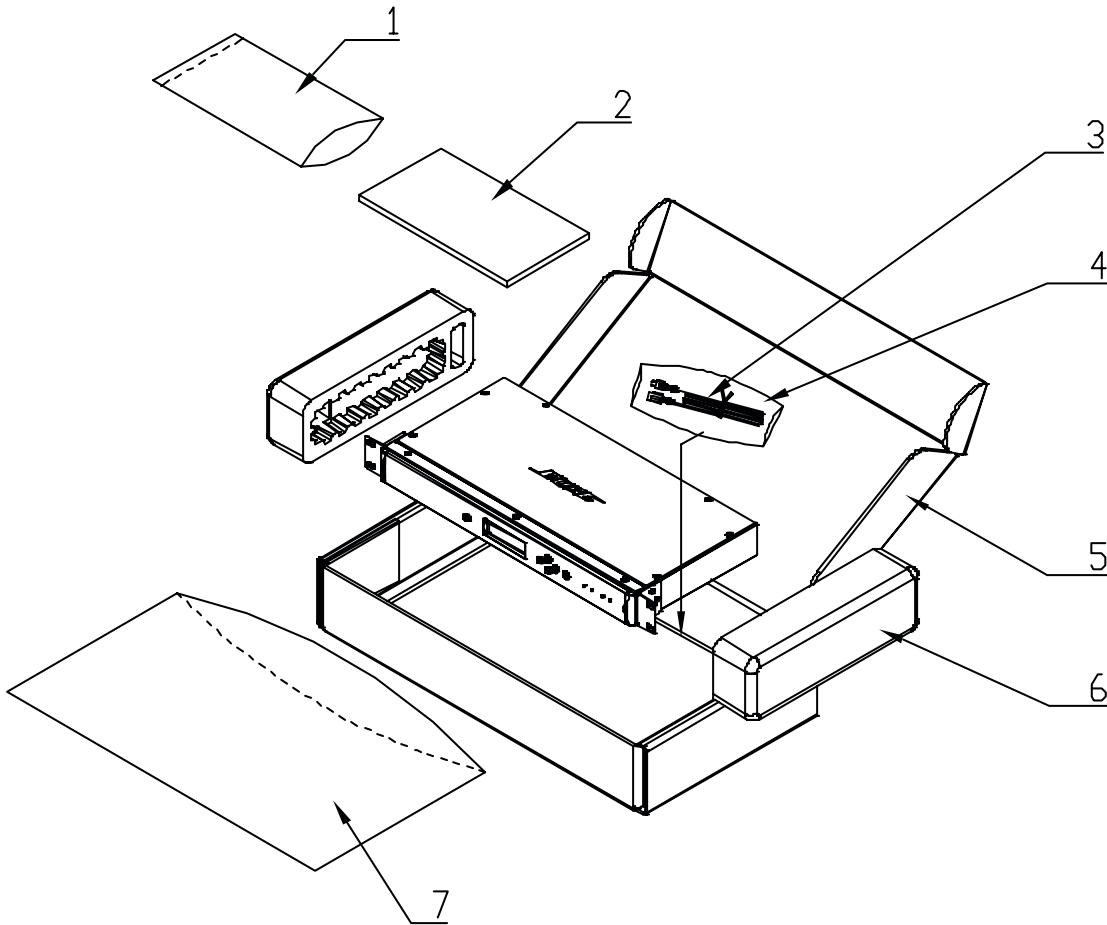






Figure 1. Panaray Digital Controller II Packaging View

MAIN PART LIST

Panaray® System Digital Controller II (see Figure 2)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
1	SCREW, MACHINE, CS, M3X6	-	2901-3006+3000	9	4
2	COVER, TOP	298519	1405-9901+0	1	4
-	FRONT PANEL ASSEMBLY, CONSISTS OF ITEMS 3 – 10	299033	SVC-BASIC14+FPAN	1	
3	KNOB, POWER	-	2447-3502+0	1	4
4	COVER, FRONT, ALUMINUM	298157	1405-9801+0	1	
5	PANEL, FRONT	-	1467-6801+0	1	4
6	SCREW, B-TITE, M3X8, BZ	-	2954-3008+3000	5	4
7	LIGHT PIPE	298517	4155-1861+0	4	
8	ARROW AND LOAD BUTTONS	298518	2447-3201+0	1	
9	LENS, LCD, 72X26X1	-	3717-3006+0	1	4
10	SPONGE, LCD, 71.6X25.6X2.0	-	4149-0991+0	1	4
11	LCD DISPLAY, 3.3V, WHT SEG/BLUE BKGND, LMB162A	298159	8902-0005+0	1	
12	POWER SWITCH PCB ASSY	298158	SVC-BASIC14+SW	1	2, 3 
13	SCREW, B-TITE, PAN, M2.3X8	-	2950-2308+3000	13	4
14	CHASSIS	-	1405-9601+0	1	4
15	SCREW, MACHINE, M3X8, BZ	-	2904-3008+3000	8	4
16	SWITCH-MODE P/S, AC100-240V, O/P, 15W	298155	8902-0009+0	1	2, 3 
17	RACK EARS	298161	1405-9701+0	2	
18	NUT, M4, BLK	-	2640-4030+0703	1	4
19	WASHER, SPRING, M4X1X7	-	2607-4010+0703	1	4
20	WASHER, METAL, M4X0.8X10	-	2600-4008+1003	1	4
21	CHOKE, EARTH, TOROIDAL, 200uH, #18 WIRE, GREEN / YELLOW	-	1806-3917+0	1	3, 4 
22	NUT, M3, NI	-	2640-3022+0544	2	4
23	SCREW, M3X8, C'SINK, BLK	-	2901-3008+3000	2	4
24	INLET, AC, UL/CSA/VDE, 250V, 10A (Rong Feng Industrial Co., SS-7B, 250V, 10A VDE, 15A UL/CSA)	298153	2113-1144+0	1	3 
25	SCREW, M3X6, BINDING, BLK	-	2904-3006+3000	2	4
26	WASHER, SPRING, M3X0.9X5.5, BZ	-	2607-3009+0553	10	4
27	INPUT/OUTPUT PCB ASSY	298152	SVC-BASIC14+I/O	1	2
28	SCREW, 3X8, TAPPING	-	2950-3008+3000	12	4
29	DSP PCB ASSY	298154	SVC-BASIC14+DSP	1	2
30	SCREW, MACHINE, CS, M3X6	-	2901-3006+3000	6	4
31	BUTTON AND LED PCB ASSY	298160	SVC-BASIC14+KEY	1	2

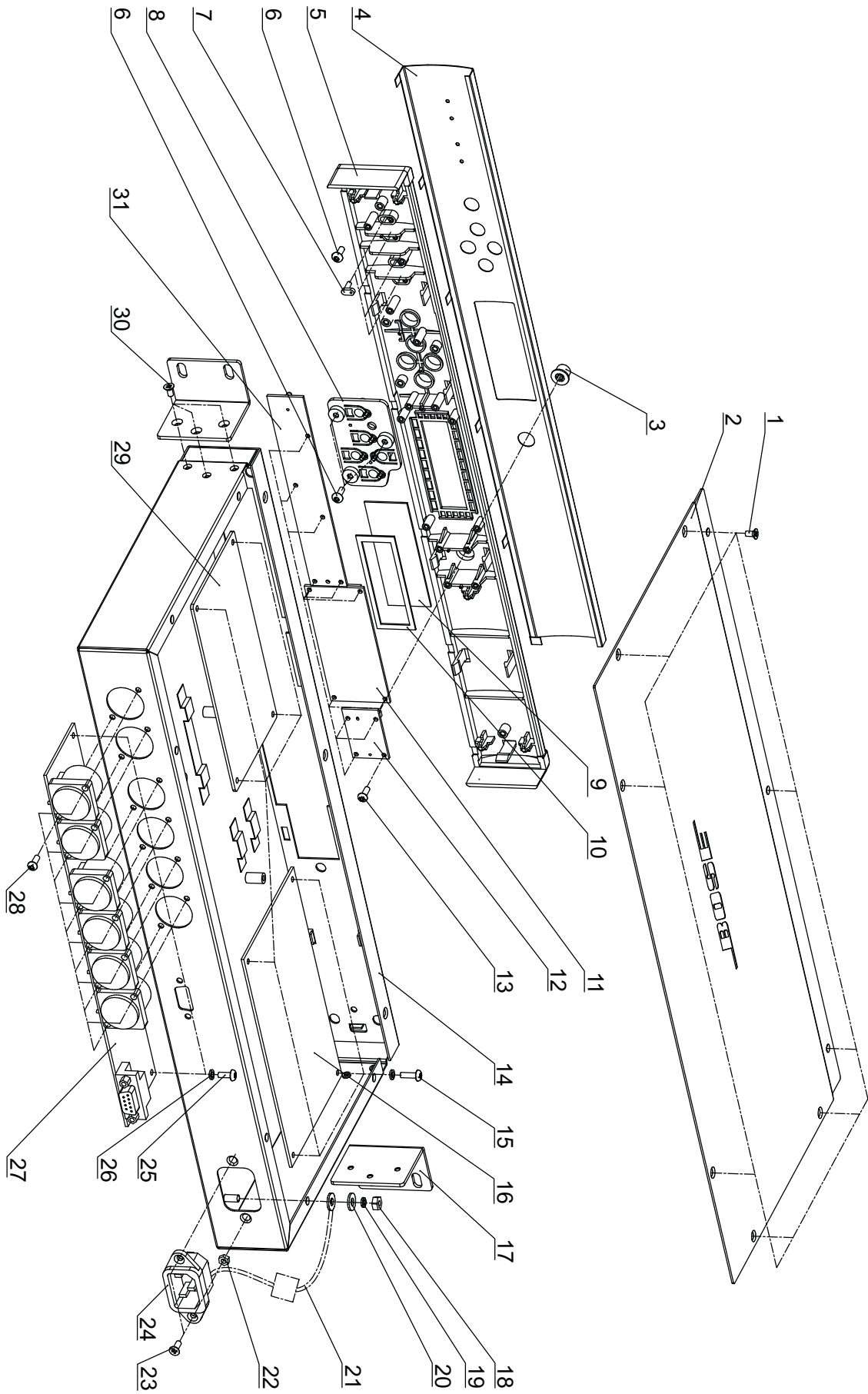


Figure 2. Panaray System Digital Controller II Exploded View

MAIN PART LIST

Front Panel Sub-assembly (see Figure 3)

Item Number	Description	Bose® Part Number	Vendor Part Number	Qty.	Note
-	FRONT PANEL SUBASSEMBLY CONSISTS OF:	299033	SVC-BASIC14+FPAN	1	
1	COVER, FRONT, ALUMINUM	298157	1405-9801+0	1	4
2	PANEL, FRONT	-	1467-6801+0	1	4
3	LED LIGHT PIPE	298517	4155-1861+0	4	4
4	ARROW AND LOAD BUTTONS	298518	2447-3201+0	1	4
5	SPONGE FRAME, LCD	-	4149-0991+0	1	4
6	LENS, LCD	-	3717-3006+0	1	4
7	BUTTON, POWER	-	2447-3502+0	1	4

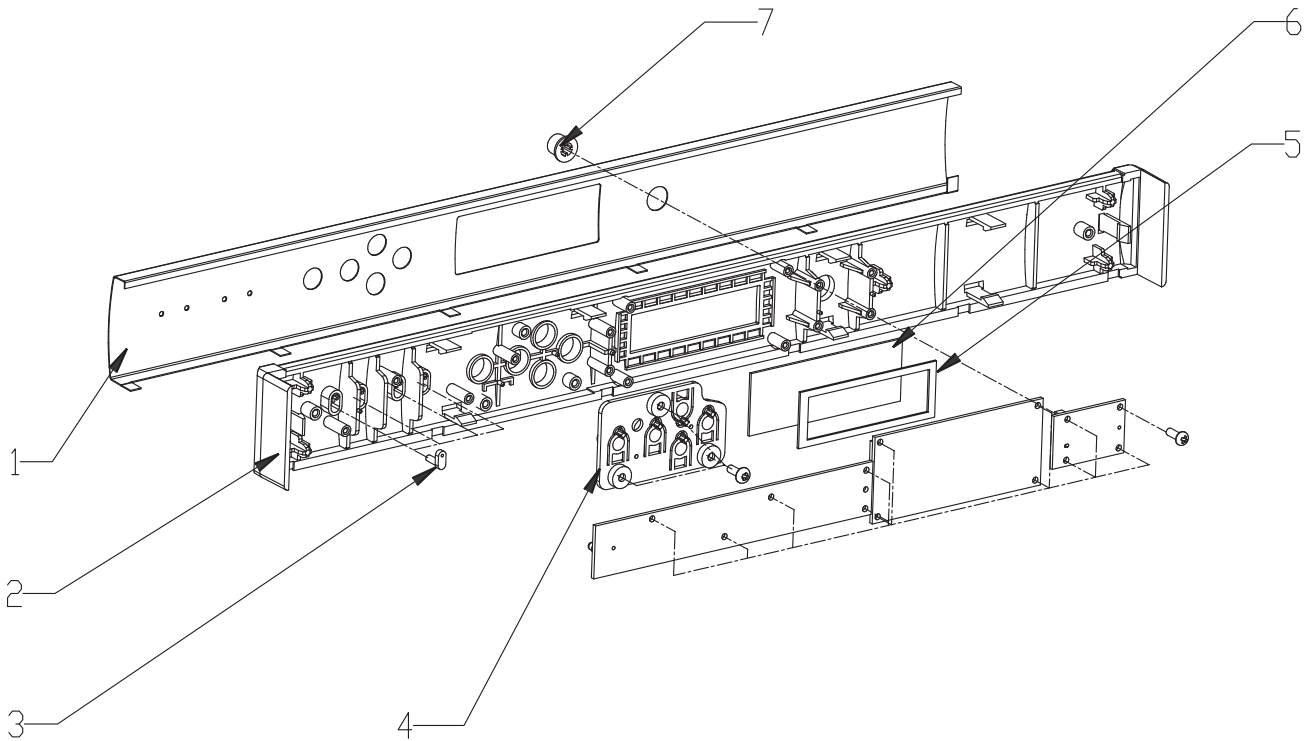


Figure 3. Front Panel Sub-assembly Exploded View

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistors

Reference Designator	Description	Vendor Part Number	Note
R101	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R102	220RX4, RCFA, 0603, 1/16W, 5%	4703-221J+P-04	4
R103	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R104	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R105	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R106	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R107	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R108	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R109	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R110	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R111	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R112	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R113	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R114	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R115	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R116	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R117	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R118	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R119	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R120	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R121	10KX4, RCFA, 0603, 1/16W, 5%	4703-103J+P-04	4
R124	10KX4, RCFA, 0603, 1/16W, 5%	4703-103J+P-04	4
R125	10KX4, RCFA, 0603, 1/16W, 5%	4703-103J+P-04	4
R126	1KX4, RCFA, 0603, 1/16W, 5%	4703-102J+P-04	4
R127	220RX4, RCFA, 0603, 1/16W, 5%	4703-221J+P-04	4
R128	10KX4, RCFA, 0603, 1/16W, 5%	4703-103J+P-04	4
R129	33RX4, RCFA, 0603, 1/16W, 5%	4703-330J+P-04	4
R500	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R501	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R502	33 OHM, 0603, RMG, 1/16W, 1%	4723-330A+P	4
R503	33 OHM, 0603, RMG, 1/16W, 1%	4723-330A+P	4
R504	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R505	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R506	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R507	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R508	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R509	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R510	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R511	200 OHM, 0603, RMG, 1/16W, 1%	4723-201A+P	4
R512	100 OHM, 0603, RMG, 1/16W, 1%	4723-101A+P	4
R513	10 OHM, 0603, RMG, 1/16W, 1%	4723-100A+P-R	4
R514	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R515	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R516	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R517	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R518	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R519	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Note
R520	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R521	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R522	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R523	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R524	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R525	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R526	330 OHM, 0603, RMG, 1/16W, 1%	4723-331A+P	4
R527	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R528	330 OHM, 0603, RMG, 1/16W, 1%	4723-331A+P	4
R529	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R530	330 OHM, 0603, RMG, 1/16W, 1%	4723-331A+P	4
R531	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R532	330 OHM, 0603, RMG, 1/16W, 1%	4723-331A+P	4
R533	2.2K, 0603/1608, RMG, 1/16W, 1%	4723-222A+P	4
R534	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R535	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R536	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R537	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R538	40.2 OHM, 0603, RMG, 1/16W, 1%	4723-40R2+P	4
R539	40.2 OHM, 0603, RMG, 1/16W, 1%	4723-40R2+P	4
R540	40.2 OHM, 0603, RMG, 1/16W, 1%	4723-40R2+P	4
R541	40.2 OHM, 0603, RMG, 1/16W, 1%	4723-40R2+P	4
R542	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R543	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R544	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R545	270 OHM, 0603/1608, RMG, 1/16W, 1%	4723-271A+P	4
R546	2K, 0603/1608, RMG, 1/16W, 1%	4723-202A+P	4
R547	2K, 0603/1608, RMG, 1/16W, 1%	4723-202A+P	4
R548	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R549	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R550	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R551	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R552	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R553	1K, 0603/1608, RMG, 1/16W, 1%	4723-102A+P	4
R554	33K, 0603/1608, RMG, 1/16W, 5%	4723-333J+P	4
R555	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R556	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R557	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R710	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R810	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R902	33 OHM, 0603, RMG, 1/16W, 1%	4723-330A+P	4
R903	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R904	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R905	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R906	220 OHM, 0603/1608, RMG, 1/16W, 1%	4723-221A+P	4
R907	150 OHM, 0603, RMG, 1/16W, 1%	4723-151A+P	4

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors

Reference Designator	Description	Vendor Part Number	Note
C500	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C501	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C502	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C503	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C504	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C505	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C506	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C507	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C508	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C509	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C510	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C511	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C512	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C513	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C514	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C515	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C516	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C518	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C520	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C521	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C522	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C523	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C524	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C525	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C526	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C527	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C528	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C529	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C530	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C531	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C532	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C533	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C534	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C535	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C536	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C537	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C538	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C539	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C540	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C541	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C542	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C543	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C544	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C545	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C546	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C547	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C548	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C549	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Note
C550	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C551	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C552	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C553	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C554	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C555	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C556	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C557	1uF, CC, 0805, 50V, +80/-20%	150F-105Z+J-BD	4
C558	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C559	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C560	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C561	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C562	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C563	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C564	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C565	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C566	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C567	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C568	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C569	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C570	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C571	0.22uF, CC, 0603, 50V, +80/-20%	150F-224Z+P-AC	4
C572	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C573	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C574	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C575	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C576	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C577	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C578	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C579	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C580	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C583	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4
C584	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4
C748	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C749	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C750	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C751	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C752	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
CT500	10uF, SM, CE, 16V, 20%, 4X5.4, PSI, VS	157D-106M+3-GJK	4
CT501	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT502	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT503	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT504	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT505	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT506	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT507	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT508	10uF, SM, CE, 16V, 20%, 4X5.4, PSI, VS	157D-106M+3-GJK	4
CT509	10uF, SM, CE, 16V, 20%, 4X5.4, PSI, VS	157D-106M+3-GJK	4

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Note
CT510	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT511	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT512	10uF, SM, CT, 25V, 20%, 3.2x6	154E-106M+3-FK	4
CT513	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT514	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT515	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT516	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT517	10uF, SM, CT, 25V, 20%, 3.2x6	154E-106M+3-FK	4
CT518	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT519	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT521	10uF, SM, CT, 25V, 20%, 3.2x6	154E-106M+3-FK	4
CT522	10uF, SM, CT, 25V, 20%, 3.2x6	154E-106M+3-FK	4
CT531	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT532	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4
CT533	1uF, SM, CT, 16V, 20%, 1.6X3.2	154D-105M+3-CF	4
CT534	1uF, SM, CT, 16V, 20%, 1.6X3.2	154D-105M+3-CF	4
CT535	10uF, SM, CE, 16V, 20%, 4X5.4, PSI, VS	157D-106M+3-GJK	4
CT720	10uF, SMD, CT, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4

Inductors and Ferrite Beads

Reference Designator	Description	Vendor Part Number	Note
L500	EMI FILTER, FERRITE, CHIP, EXCCET103U, SMD, PANASONIC	2705-0020+0	4
L501	INDUCTOR, CHIP, 10uH, LEMF3225T100K	1803-0055+0	4
L502	INDUCTOR, CHIP, 10uH, LEMF3225T100K	1803-0055+0	4
FB500	FERRITE BEAD, SEBW201209U121MT, 0805	1808-0872+0	4
FB501	FERRITE BEAD, 4.5X1.6X1.6, BLM41PG102SN1L	1808-0871+0	4
FB505	FERRITE BEAD, 4.5X1.6X1.6, BLM41PG102SN1L	1808-0871+0	4

Diodes

Reference Designator	Description	Vendor Part Number	Note
D500	BAV99, SOT23, PHILIPS	4840-8970+3	4
D501	BAV99, SOT23, PHILIPS	4840-8970+3	4
D502	BAV99, SOT23, PHILIPS	4840-8970+3	4
D503	BAV99, SOT23, PHILIPS	4840-8970+3	4

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Transistors

Reference Designator	Description	Vendor Part Number	Note
Q500	RN2402,(T5L/F/T), SMD2214530R2, TOSHIBA	4852-4020+3	4
Q501	RN2402,(T5L/F/T), SMD2214530R2, TOSHIBA	4852-4020+3	4
Q502	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4
Q503	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4
Q504	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4
Q505	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4

Integrated Circuits

Reference Designator	Description	Vendor Part Number	Note
U500	4M FLASH, S29AL004D-90TFI02, STANDARD, TSOP48	3132-3571+0	4
U501	DSP, TMS320D707RFP/S, PQFP144, TI	3132-3381+0	4
U502	PLD, EPM3064A-10, TQPF44, ALTERA	3132-3331+0	4
U503	SUPPLY VOLTAGE SUPERVISOR, TL7705BCD, SOP-8, TI	3132-3401+0	4
U504	LOW-DROP LINEAR REGULATOR, TPS726126DCQ, SOT223-5, TI	3132-3391+0	4
U505	SN74LV245ADWR, OCTAL B TRANSCEIVER, SOT163-1/SO	3132-0680+0	4
U507	OCTAL BUFFER, SMD, SN74LVC541ADWR, TI	3132-3341+0	4
U508	24BIT DAC W/VOL, CTRL, 20P, CS4392-KZZ, TSSOP	3132-0730+0	4
U509	24BIT DAC W/VOL CTRL, 20P, CS4392-KZZ, TSSOP	3132-0730+0	4
U511	NJM5532M-#ZZZB, DUAL OP AMP	3131-4850+0	4
U512	STEREO A/D CONVERTER, PCM1804DB, 24BIT, SSOP28	3132-3311+0	4
U513	LC2MOS, 5 OHM, RON, SPST, SW, ADG452BRZ, SOIC16, ADI	3132-3361+0	4
U514	LC2MOS, 5 OHM, RON, SPST, SW, ADG452BRZ, SOIC16, ADI	3132-3361+0	4
U515	AUDIO OP AMP, OPA1632D, SO-8, TI	3132-3321+0	4
U516	AUDIO OP AMP, OPA1632D, SO-8, TI	3132-3321+0	4

Miscellaneous

Reference Designator	Description	Vendor Part Number	Note
Y500	CRYSTAL, 22.5792MHZ +/-50 PPM, 3.3V, 7X5X1.8, SMD7050	2300-3279+0	4
J500	HEADER, 2X5P, P2.54, ST, MALE	2101-3121+0	4
CON500	2P, ST,.WAFER, P=2.5	2102-021S+004	4
CN500	HEADER, IDC, 24P, 2XP2.54, 3510 SERIES	2101-3123+0	4
CN501	WIRE-CONN, 8P, P2.5, #26, UL1007, L=260, F/M	7012-7651+0	4
CN502	HEADER, IDC, 30P, 2XP2.54, 3510 SERIES	2101-3122+0	4

ELECTRICAL PART LIST

Input/Output PCB Assembly

Resistors

Reference Designator	Description	Vendor Part Number	Note
R316	0 OHM, RMG, 0603, 1/16W, 5%	4723-000J+P	4
R317	0 OHM, RMG, 0603, 1/16W, 5%	4723-000J+P	4
R318	10 OHM, RMG, 0603/1608, 1/16W, 5%	4723-100J+P	4
R601	100 OHM, RMG, 0603, 1/16W, 1%	4723-101A+P	4
R602	100 OHM, RMG, 0603, 1/16W, 1%	4723-101A+P	4
R612	100 OHM, RMG, 0603, 1/16W, 1%	4723-101A+P	4
R613	100 OHM, RMG, 0603, 1/16W, 1%	4723-101A+P	4
R701	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R702	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R703	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R704	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R705	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R706	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R707	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R708	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R709	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R710	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R711	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R712	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R713	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R714	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R715	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R716	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R717	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R718	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R719	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R720	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R721	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R722	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R723	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R724	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R725	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R726	330 OHM, RMG, 0603, 1/16W, 1%	4723-331A+P	4
R727	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R728	499 OHM, RMG, 0603, 1/16W, 1%	4723-4990+P	4
R729	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R730	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R731	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R732	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R733	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R734	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R735	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R736	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R737	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R738	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R739	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R740	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R751N	8.2K, RMG, 0603/1608, 1/16W, 1%	4723-822A+P	4

ELECTRICAL PART LIST

Input/Output PCB Assembly

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Note
R752N	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R753N	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R758N	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R780	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R782	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R783	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R784	2K, RMG, 0603/1608, 1/16W, 1%	4723-202A+P	4
R785	2.7K, RMG, 0603/1608, 1/16W, 5%	4723-272J+P	4
R786	2.7K, RMG, 0603/1608, 1/16W, 5%	4723-272J+P	4
R789	10K, RMG, 0603/1608, 1/16W, 1%	4723-103A+P	4
R790	2.7K, RMG, 0603/1608, 1/16W, 5%	4723-272J+P	4
R800	10 OHM, RMG, 0603/1608, 1/16W, 5%	4723-100J+P	4
R801	10 OHM, RMG, 0603/1608, 1/16W, 5%	4723-100J+P	4
R802	10 OHM, RMG, 0603/1608, 1/16W, 5%	4723-100J+P	4
R803	10 OHM, RMG, 0603/1608, 1/16W, 5%	4723-100J+P	4
R812	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R813	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R814	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R815	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R816	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R817	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R818	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4
R819	51 OHM, RMG, 0603, 1/16W, 1%	4723-510A+P	4

Capacitors

Reference Designator	Description	Vendor Part Number	Note
C210	0.047uF, CC, 0603, 16V, 10%, 0.8x1.6	150D-473K+P-AC	4
C211	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C212	0.33uF, CC, 0603, 16V, 10%	150D-334K+P-AC	4
C213	0.33uF, CC, 0603, 16V, 10%	150D-334K+P-AC	4
C214	0.33uF, CC, 0603, 16V, 10%	150D-334K+P-AC	4
C312	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C313	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C314	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C315	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C316	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C317	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C318	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C319	1000pF, CC, 0603/1608, 50V, 10%, 1X2	150F-102K+P-AC	4
C701	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4
C702	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C703	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C704	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C705	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C706	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C707	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C708	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4

ELECTRICAL PART LIST

Input/Output PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Note
C709	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C710	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C711	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C712	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C713	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C714	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C715	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4
C716	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C717	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C718	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C719	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C720	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C721	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C722	2700pF, CC, 0603/1608, 50V, 10%	150F-272K+P-AC	4
C723	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C724	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C725	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C726	560pF, CC, 0603/1608, 50V, 10%, 1X2	150F-561K+P-AC	4
C727	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C728	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C729	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C730	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C731	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C732	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C733	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C734	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C743	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C744	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C745	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
C746	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C747	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
C748	0.01uF, CC, 0603, 50V, 10%, 1x2	150F-103K+P-AC	4
CE215	100uF, CE, 25V, 20%, GS, RLT, 6.3X11, JAM/MAN	157E-107M+K-LUG	4
CT501	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT502	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT503	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT504	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT505	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT506	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT507	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT508	100uF, CE, 25V, 20%, 5X11, RLT, RUBYCON, YK	157E-107M+K-IUY	4
CT701	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT702	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT703	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT704	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT705	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT706	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4

ELECTRICAL PART LIST

Input/Output PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Note
CT707	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT708	10uF, CT, 25V, 20%, 3.2x6, SM	154E-106M+3-FK	4
CT717	100uF, CE, 25V, 20%, GS, RLT, 6.3X11, JAM/MAN	157E-107M+K-LUG	4
CT718	100uF, CE, 25V, 20%, GS, RLT, 6.3X11, JAM/MAN	157E-107M+K-LUG	4
CT719	100uF, CE, 25V, 20%, GS, RLT, 6.3X11, JAM/MAN	157E-107M+K-LUG	4

Inductors and Ferrite Beads

Reference Designator	Description	Vendor Part Number	Note
L701	FERRITE BEAD INDUCTOR, BL01RN1A1F1J	1808-0680+0	4
L702	FERRITE BEAD INDUCTOR, BL01RN1A1F1J	1808-0680+0	4
L703	FERRITE BEAD INDUCTOR, BL01RN1A1F1J	1808-0680+0	4
FB701	WIRE JUMPER, ROLLER FORM, D=0.6MM	635N-0002+0	4
FB702	WIRE JUMPER, ROLLER FORM, D=0.6MM	635N-0002+0	4
FB703	WIRE JUMPER, ROLLER FORM, D=0.6MM	635N-0002+0	4
FB704	WIRE JUMPER, ROLLER FORM, D=0.6MM	635N-0002+0	4

Diodes

Reference Designator	Description	Vendor Part Number	Note
D601	BAV99, SOT23, PHILIPS	4840-8970+3	4
D602	BAV99, SOT23, PHILIPS	4840-8970+3	4
D603	BAV99, SOT23, PHILIPS	4840-8970+3	4
D604	BAV99, SOT23, PHILIPS	4840-8970+3	4
D701	BAV99, SOT23, PHILIPS	4840-8970+3	4
D702	BAV99, SOT23, PHILIPS	4840-8970+3	4
D703	BAV99, SOT23, PHILIPS	4840-8970+3	4
D704	BAV99, SOT23, PHILIPS	4840-8970+3	4
D705	BAV99, SOT23, PHILIPS	4840-8970+3	4
D706	BAV99, SOT23, PHILIPS	4840-8970+3	4
D707	BAV99, SOT23, PHILIPS	4840-8970+3	4
D708	BAV99, SOT23, PHILIPS	4840-8970+3	4
D800	LL4148, SM	4804-1480+3	4
D801	LL4148, SM	4804-1480+3	4
D802	LL4148, SM	4804-1480+3	4
D803	LL4148, SM	4804-1480+3	4

ELECTRICAL PART LIST

Input/Output PCB Assembly

Transistors

Reference Designator	Description	Vendor Part Number	Note
Q701N	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q702N	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q704	MPSA06, VCE, 80V, NS, RLT	4860-8890+K	4
Q705	MPS, A56, VCE, 80V, NS, RLT	4860-8910+K	4
Q706	MPSA06, VCE, 80V, NS, RLT	4860-8890+K	4
Q707	MPS, A56, VCE, 80V, NS, RLT	4860-8910+K	4
Q708	MPSA06, VCE, 80V, NS, RLT	4860-8890+K	4
Q709N	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q800	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q801	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q802	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q803	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4
Q804	MPSA06, VCE, 80V, NS, RLT	4860-8890+K	4
Q805	MPS, A56, VCE, 80V, NS, RLT	4860-8910+K	4

Integrated Circuits

Reference Designator	Description	Vendor Part Number	Note
U202	MAX3232ECWE+, RS232, TX, SO16, MAXIM	3132-2521+0	4
U701	NJM2068M-#ZZZB, DUAL OP AMP	3130-6890+0	4
U702	NJM2068M-#ZZZB, DUAL OP AMP	3130-6890+0	4
U703	NJM2068M-#ZZZB, DUAL OP AMP	3130-6890+0	4
U704	NJM2068M-#ZZZB, DUAL OP AMP	3130-6890+0	4

Miscellaneous

Reference Designator	Description	Vendor Part Number	Note
K1	RELAY, 2P2T, 12V, 140MM, A-12W-K, TAKAMISAWA	4500-0490+0	4
K2	RELAY, 2P2T, 12V, 140MM, A-12W-K, TAKAMISAWA	4500-0490+0	4
K3	RELAY, 2P2T, 12V, 140MM, A-12W-K, TAKAMISAWA	4500-0490+0	4
K4	RELAY, 2P2T, 12V, 140MM, A-12W-K, TAKAMISAWA	4500-0490+0	4
J202	WIRE-CONN, 2P, P2.5, #26, UL1007, L=300, F/M	7012-7541+0	4
J601	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3158+0	4
J602	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3158+0	4
J701	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3159+0	4
J702	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3159+0	4
J703	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3159+0	4
J704	SOCKET, XLR, 3P, FEMALE, AC3FAH2-AU, AMP	2113-3159+0	4
J705	HEADER, IDC, 30P, 2XP2.54, 3510 SERIES	2101-3122+0	4
J706	WIRE-CONN, 6P, P2.5, #26, UL1007, L=150, F/M	7012-7550+0	4
J707	2P, ST. WAFER, P=2.5, COULOMB	2102-021S+004	4
JP601	WAFER, 2 PIN, P=2.54, ST, 6MM	2101-1494+0	4
JP602	WAFER, 2 PIN, P=2.54, ST, 6MM	2101-1494+0	4
P301	SOCKET, DB9, D SUB, RA, FEMALE	2113-1749+0	4

ELECTRICAL PART LIST

Button and LED PCB Assembly

Resistors

Reference Designator	Description	Vendor Part Number	Note
R0	100 OHM, RCF, 1W, 5%, AL	4708-101J+1	4
R101	470 OHM, 0603/1608, RMG, 1/16W, 1%	4723-471A+P	4
R102	910 OHM, 0603/1608, RMG, 1/16W, 1%	4723-911A+P	4
R103	470 OHM, 0603/1608, RMG, 1/16W, 1%	4723-471A+P	4
R104	910 OHM, 0603/1608, RMG, 1/16W, 1%	4723-911A+P	4
R105	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R106	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R107	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R108	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R109	10K, 0603/1608, RMG, 1/16W, 1%	4723-103A+P	4
R112	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R113	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4
R115	0 OHM, 0603, RMG, 1/16W, 5%	4723-000J+P	4

Capacitors

Reference Designator	Description	Vendor Part Number	Note
C102	100uF, CE, 16V, 20%, RLT, 5X11, SHOEI	157D-107M+K-IUI	4
C105	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4

Diodes

Reference Designator	Description	Vendor Part Number	Note
D101	SIL, 3144D, GREEN LED, 3MM	3700-9509+0	4
D103	SIL, 3144D, GREEN LED, 3MM	3700-9509+0	4
D102	LED, SIL-3143D, 3MM, RED	3700-9516+0	4
D104	LED, SIL-3143D, 3MM, RED	3700-9516+0	4

Transistors

Reference Designator	Description	Vendor Part Number	Note
Q101	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4
Q102	RN2402,(T5L/F/T), SMD2214530R2, TOSHIBA	4852-4020+3	4

Miscellaneous

Reference Designator	Description	Vendor Part Number	Note
SW101	SW, TACT, SPST, SKQNAED010, H=5, ALPS	5200-4847+0-01	4
SW102	SW, TACT, SPST, SKQNAED010, H=5, ALPS	5200-4847+0-01	4
SW103	SW, TACT, SPST, SKQNAED010, H=5, ALPS	5200-4847+0-01	4
SW104	SW, TACT, SPST, SKQNAED010, H=5, ALPS	5200-4847+0-01	4
SW105	SW, TACT, SPST, SKQNAED010, H=5, ALPS	5200-4847+0-01	4
J301	WIRE-CONN, 2P, P2.5, #26, UL1007, L=150, RD/BK, F/M	7012-7542+0	4
J302	HEADER, IDC, 24P, 2XP2.54, 3510 SERIES	2101-3123+0	4
J303	16P, ST, WAFER, P=2.0	2102-160S+003	4

ELECTRICAL PART LIST

Switch PCB Assembly

Resistors

Reference Designator	Description	Vendor Part Number	Note
R910	30K, RMG, 0603/1608, 1/16W, 1%	4723-303A+P	4
R911	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4
R912	10 OHM, RMG, 0603/1608, 1/16W, 1%	4723-100A+P	4
R913	1K, RMG, 0603/1608, 1/16W, 1%	4723-102A+P	4

Capacitors

Reference Designator	Description	Vendor Part Number	Note
C572	0.1uF, CC, 0603/1608, 50V, 10%, 1x2	150F-104K+P-AC	4
CT102	10uF, CT, SMD, 16V, 20%, 1.6X3.2	154D-106M+3-CF	4

Transistors

Reference Designator	Description	Vendor Part Number	Note
Q503	NPN, RN1402,(T5L/F/T), SMD, TOSHIBA, 2214470R2	4851-4020+3	4
Q702N	MOSFET, N-CHANNEL, 2N7002MTF, SOT-23	4902-MTF0+3	4



Miscellaneous

Reference Designator	Description	Vendor Part Number	Note
SW106	SW, PUSH, 2P2T, L=9.6, SFPC12MA02-GK	5200-4920+0-11	4
J104	WIRE-CONN, 2P, P2.5, #26, UL1007, L=100, RD/BK, F/M	7012-7540+0	4
J105	WIRE-SHIELD, 2P, UL1007, L=195, RD/BK, F/M	7010-2105+1.V	4





ELECTRICAL PART LIST

Switch Mode Power Supply (SMPS) PCB Assembly

Resistors

Reference Designator	Description	Vendor Part Number	Note
RJ1	0 OHM, 0805, SMD, +/-5%	15B-000J81	4
R1	1M, 1206, SMD, +/-5%	15S-105J41	3, 4 
R2	1M, 1206, SMD, +/-5%	15S-105J41	3, 4 
R3	2M, 1206, SMD, +/-5%	15S-205J41	4
R4	2M, 1206, SMD, +/-5%	15S-205J41	4
R5	51 OHM, 1206, SMD, +/-5%	15S-510J41	4
R6	100 OHM, 0805, SMD, +/-5%	15B-101J81	4
R7	15K, 0805, SMD, +/-5%	15B-153J81	4
R8	2.2K, 1206, SMD, +/-5%	15S-222J41	4
R9	0.51 OHM, 1W, +/-5%	15N-518J01	4
R10	100K, 1W, +/-5%	15N-104J0S	4
R12	4.7K, 1206, SMD, +/-5%	15S-472J41	4
R14	1.2K, 0805, SMD, +/-5%	15B-122J81	4
R15	1K, 0805, SMD, +/-5%	15B-102J81	4
R16	2.2K, 0805, SMD, +/-5%	15M-220181	4
R17	2.74K, 0805, SMD, +/-5%	15M-274181	4
R18	100 OHM, 0805, SMD, +/-5%	15B-101J81	4
R18	22K, 1206, SMD, +/-5%	15S-223J41	4
R19	10K, 1206, SMD, +/-5%	15B-103J41	4
R20	75 OHM, 1206, SMD, +/-5%	15S-750J41	4
R21	75 OHM, 1206, SMD, +/-5%	15S-750J41	4
R22	2.2 OHM, 2W, +/-5%	15N-518J01	4
R23	0 OHM, 0805, SMD, +/-5%	15B-000J81	4
R25	2.2 OHM, 2W, +/-5%	15N-518J01	4
R26	270 OHM, 2W, +/-5%	-	4

Capacitors

Reference Designator	Description	Vendor Part Number	Note
CX1	0.47uF, 275VAC (Liow Gu type GS-L or Shenzhen type MEX-X2 or Tenta type MEX or Various Rated 250, 275 or 280V)	17T-474KEU	3, 4 
CY1	152pF, 400VAC (Pan Overseas type AH or Guangdong South Hongming type F or Various)	17N-152KHT	3, 4 
CY2	152pF, 400VAC (Pan Overseas type AH or Guangdong South Hongming type F or Various)	17N-152KHT	3, 4 
CY4	102pF, 400VAC (Pan Overseas type AH or Guangdong South Hongming type F or Various)	17N-102MHT	3, 4 
C1	47uF, 400V, 18x25, +/-20%	17A-680MH1	4
C2	103M, 1KV, PIN=5	17C-103KLA	4

ELECTRICAL PART LIST

Switch Mode Power Supply (SMPS) PCB Assembly


Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Note
C3	222M, 1KV, PIN=5	17C-222KLA	4
C4	22uF, 50V, 5x11, +/-20%	17A-220M7B	4
C5	100nF, 50V, 1206, X7R	17S-104M72	4
C6	68pF, 50V, 0805, X7R	17B-680J71	4
C7	1nF, 0805, SMD, 50V, X7R	17B-102K71	4
C8	1nF, 1206, SMD, 250V, X7R	17S-102KD1	4
C9	680uF, 25V, 10x16, +/-20%, Low ESR	17A-681M4B	4
C10	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C11	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C12	1000pF, 1206, SMD, 630V, X7R	17S-101KK1	4
C13	100nF, 0805, SMD, X7R	17B-104K71	4
C14	1nF, 1206, SMD, 250V, X7R	17S-102KD1	4
C15	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C16	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C17	680uF, 25V, 10x16, +/-20%, Low ESR	17A-681M4B	4
C18	680uF, 25V, 10x16, +/-20%, Low ESR	17A-681M4B	4
C19	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C20	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C21	1000uF, 16V, 10x16, +/-20%, Low ESR	17A-102M3B	4
C22	1000uF, 16V, 10x16, +/-20%, Low ESR	17A-102M3B	4
C23	680uF, 25V, 10x16, +/-20%, Low ESR	17A-681M4B	4
C24	47uF, 50V, 6x12, +/-20%	17A-470M7B	4
C25	1nF, 0805, SMD, 50V, X7R	17B-102K71	4
C26	100nF, 0805, SMD, X7R	17B-104K71	4
C27	1000pF, 1206, X7R, SMD, 630V	17S-101KK1	4
C28	100nF, 0805, X7R, SMD	17B-104K71	4
C29	100nF, 0805, X7R, SMD	17B-104K71	4
C30	100nF, 0805, X7R, SMD	17B-104K71	4
C31	100nF, 0805, X7R, SMD	17B-104K71	4
C32	100nF, 0805, X7R, SMD	17B-104K71	4
C33	100nF, 0805, X7R, SMD	17B-104K71	4
C34	47nF, 0805, X7R, SMD, 50V	17B-473M4B	4
C35	100nF, 0805, X7R, SMD	17B-104K71	4
C36	100nF, 0805, X7R, SMD	17B-104K71	4
C37	100nF, 0805, X7R, SMD	17B-104K71	4
C38	1nF, 1206, X7R, SMD, 250V	17S-102KD1	4
C39	100nF, 0805, X7R, SMD	17B-104K71	4
C40	100nF, 0805, X7R, SMD	17B-104K71	4
C41	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C42	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4
C43	220uF, 25V, 8x12, +/-20%, Low ESR	17A-221M4B	4


ELECTRICAL PART LIST

Switch Mode Power Supply (SMPS) PCB Assembly

Inductors

Reference Designator	Description	Vendor Part Number	Note
LF1	25mH (Vdson (HZ) Electronics Co. model VD0880)	UD0880	3, 4 
L1	22U _h	GL0603-220J	4
L2	4.7uH, 3A	DR0710-4R7M-D180	4
L3	4.7uH, 3A	DR0710-4R7M-D180	4
L5	10uH, 1A	DR0608-100M-D182	4
L6	3.3uH, 3A	ISO-359K01-L01	4

Diodes

Reference Designator	Description	Vendor Part Number	Note
ZD1	SMD, 15V, 1/2W, SOD-8	12S-15V02E	4
ZV1	7N471K	15V-07N471	3, 4 
D1	UF108, 1A, 800V, D0-41	12H-UF108E	4
D2	UF108, 1A, 800V, D0-41	12H-UF108E	4
D3	UF108, 1A, 800V, D0-41	12H-UF108E	4
D4	UF108, 1A, 800V, D0-41	12H-UF108E	4
D5	FR104, 1A, 400V, D0-41	12H-FR104E	4
D6	UF108, 1A, 800V, D0-41	12H-UF108E	4
D7	FR104, 1A, 400V, D0-41	12H-FR104E	4
D8	SMD, 1N4148, SOD-8	12S-41480E	4
D9	UF204, 2A, 400V, D0-201AD	12H-UF204E	4
D10	UF204, 2A, 400V, D0-201AD	12H-UF204E	4
D11	FR104, 1A, 400V, D0-41	12H-FR104E	4
D12	SR1660CT, 16A, 60V, T0-220AB	12B-R1660P	4
D12	23.2x16x25mm	53E-000601	4
D12	3mm	62S-000100	4
D12	3x8mm	60M-B0308N	4
D13	1N4148, D0-35	12T-41480E	4
D14	FR104, 1A, 400V, D0-41	12H-FR104E	4

Transistors

Reference Designator	Description	Vendor Part Number	Note
Q1	MOSFET, SSS4N60, 4A, 600V, T0-220F, FAIRCHILD	13M-S4N60C	4
Q2	2N5551, T0-92	13T-2N555D	4






ELECTRICAL PART LIST

Switch Mode Power Supply (SMPS) PCB Assembly

Integrated Circuits

Reference Designator	Description	Vendor Part Number	Note
U1	NCP1200DR2, f=60KH, SOP-8	11S-P1200G	4
U2	KIA431B, 2.5V +/-1%, T0-220, KEC	11W-A431BA	4
U3	LM7812, 12V, T0-220, FAIRCHILD	11W-M7812B	4
U4	KA7912, 12V, T0-220, FAIRCHILD	11W-A7912B	4
U5	LDO, LM1084, 5V, T0-220, FAIRCHILD	11W-N1084B	4
U6	LDO, LM1084, 5V, T0-220, FAIRCHILD	11W-N1084B	4

Miscellaneous

Reference Designator	Description	Vendor Part Number	Note
MCR1	MCR100-6, T0-92	13K-R1006E	4
NTC1	5D-9 (5 Ohms)	15H-5D900M	3, 4 
PC1	EL817, DIP-4 (Sharp type PC817, Everlight type EL817or Lite-on type LTV-817)	11B-EL817Y	3, 4 
T1	ER28H (Vdson (HZ) Electronics Co., VD0935, ER28. Model VP330A (North America only)	22P-VD0935-L1	3, 4 
F1	T1.6A, 250V, WICKMANN (Wickman type 372 or Ever Island type 2000)	31T-130JTA	3, 4 
J1	0.6x15	32L-006150	4
J2	0.6x10	32L-006100	4
J3	0.6x7.5	32L-006075	4
J4	0.6x7.5	32L-006075	4
J5	0.6x18	32L-006180	4
J6	0.6x18	32L-006180	4
J7	0.6x10	32L-006100	4
J8	0.6x10	32L-006100	4
XS1	2 PIN, 7.92mm, VH (EI Dupont 101F or Kolon Industries KN3321V0)	33U-027921	3, 4 
XS2	2 PIN, 2.54mm, PH	33U-022540	4
XS3	2 PIN, 2.54mm, PH	33U-022540	4
XS4	8 PIN, 2.54mm, PH	33U-082540	4
XS5	6 PIN, 2.54mm, PH	33U-062540	4

DISASSEMBLY PROCEDURES

Note: Refer to Figure 2 for the following information.

CAUTION: Be sure AC mains power is removed before disassembling the unit.

1. Top Cover Removal

1.1 Using a Phillips-head screwdriver, remove the nine screws (22) that secure the top cover (23) to the chassis (15). Lift up the back edge of the top cover and slide it off the chassis.

2. DSP PCB Removal

2.1 Perform procedure 1.

2.2 Unplug the wire harnesses at connectors CN500, CN502 and CON500.

2.3 Locate the wire harness that connects to CN501. Follow the wire harness to the ferrite bead. Cut the nylon tie-wrap that secures the ferrite bead to the chassis. Unplug the wire harness from the switch-mode power supply PCB (13) at XS4.

Re-assembly Note: Be sure to re-secure the ferrite bead to the chassis using a nylon tie-wrap when replacing the DSP PCB.

2.4 Using a Phillips-head screwdriver, remove the four screws (14) that secure the DSP PCB (31) to the chassis (15).

2.5 Lift out the DSP PCB.

3. Input / Output PCB Removal

3.1 Perform procedure 1.

3.2 Unplug the ribbon cable at J705. Locate the wire harness that connects to J202. Follow the wire harness to the ferrite bead. Cut the nylon tie-wrap that secures the ferrite bead to the chassis. Unplug the wire harness from the DSP PCB (31) at CON500.

Re-assembly Note: Be sure to re-secure the ferrite bead to the chassis using a nylon tie-wrap when replacing the DSP PCB.

3.3 Locate the wire harness at J706. Follow the wire harness to the switch-mode power supply PCB (13) and unplug it from the connector at XS5.

3.4 Using a Phillips-head screwdriver, remove the twelve screws (1) that secure the XLR jacks to the back of the chassis (15). Use a 3/8" nut driver to remove the two jackscrews that secure the 9-pin D-Sub connector to the chassis.

3.5 Remove the two screws (4) that secure the Input / Output PCB (2) to the chassis.

3.6 Slide the I/O PCB toward the front of the chassis and lift it out.

4. Switch-Mode Power Supply PCB Removal

4.1 Perform procedure 1.

4.2 Unplug the cable harnesses from the AC line input at XS1, from the DSP PCB (31) at XS4 and the Input/Output PCB (2) at XS5.

4.3 Unplug the wire harness that runs from the Button/LED PCB (29) at XS3 and the AC Power Switch PCB (17) at XS2.

4.4 Using a Phillips-head screwdriver, remove the four screws (14) that secure the switch-mode power supply PCB (13) to the chassis (15). Lift out the PCB assembly.

5. Button/LED PCB Removal

5.1 Perform procedure 1.

5.2 Unplug the ribbon cable from J302. Unplug the ribbon cable from J303. Unplug the wire harness from the switch-mode power supply (13) at XS3.

5.3 Using a right-angle Phillips-head screwdriver, remove the five screws (16) that secure the PCB to the front panel (19).

5.4 Slide the PCB toward the rear of the chassis and lift it out.

DISASSEMBLY PROCEDURES

6. Display PCB Removal

6.1 Perform procedure 1.

6.2 Unplug the Display PCB's (18) ribbon cable from the Button/LED PCB (29) at J303.

6.3 Using a right-angle Phillips-head screwdriver, remove the four screws (16) that secure the Display PCB (18) to the plastic front panel (19).

6.4 Lift out the Display PCB.

Re-assembly Note: Be sure to properly align the Display PCB with the front panel when re-installing it. The ribbon cable should be located near the top of the front panel.

7. Power Switch PCB Removal

7.1 Perform procedure 1.

7.2 Unplug the Power Switch PCB (17) wire harness from the switch-mode power supply PCB (13) at XS2.

7.3 Using a right-angle Phillips-head screwdriver, remove the four screws (14) that secure the PCB to the plastic front panel (19). Lift out the PCB.

7.4 Pull the ON/OFF power button (24) off of the power switch SW106. You will need to re-use this button with the new switch.

Re-assembly Note: Attach the power ON/OFF button to the new switch using a small amount of general purpose adhesive approved for use on plastic. Be sure that the vertical line on the power button faces toward the top of the front panel.

8. Front Panel Removal

8.1 Perform procedure 1.

8.2 Using a right-angle Phillips head screwdriver, remove the screws (14) that secure the Button/LED PCB (29), Display PCB (18) and the Power Switch PCB (17) to the plastic front panel (19).

8.3 Using a Phillips-head screwdriver, remove the two screws (26) that secure the plastic front panel to the metal chassis (15).

8.4 Using a small flat-tip screwdriver, release the nine plastic tabs that secure the front panel to the chassis. It is easiest to start at one end of the chassis and work your way across, gently pulling the front panel away from the chassis as you go.

9. Front Panel End Cap Removal

9.1 Perform procedure 8.

9.2 Once you have the plastic front panel (19) assembly removed from the chassis (15), grasp the end cap you wish to remove and slide it off of the front panel.

10. Arrow and Select/Load Button Removal

10.1 Perform procedure 1.

10.2 Remove the Button/LED PCB (29) using procedure 5.

10.3 Using a Phillips-head screwdriver, remove the three screws (26) that secure the plastic arrow and select/load button assembly (28) to the front panel (19).

TEST PROCEDURES

Test Conditions

All AC audio measurements should be band limited to 30 KHz. AC power is to be applied to product variants as follows:

Country	VAC
US/Canada	120VAC/60Hz
Europe	230VAC/50Hz
Japan	100VAC/60Hz
UK/Singapore	230VAC/50Hz
Australia	240VAC/50Hz

1. Idle Current Test

Apply AC mains voltage to the unit and verify the idle current as follows:

Country	Max Current
US/Canada	120 mA
Europe	60 mA
Japan	120 mA
UK/Sing	60 mA
Australia	60 mA

2. Power switch and On-Pop Test

Turn the unit on by pressing the power switch on the front panel and verify the correct firmware revision (i.e., 1.4.4).

When the units powers on, verify that there is no audible on-pop when connected to an amplifier with 36 dBG, and a loudspeaker.

3. Front panel LED Test

Verify that the "Signal" and "Clip" LEDs operate as follows.

Note: The mode should be 'stereo neutral' with the system input gain set to 0 dB.

3.1 Apply a 1kHz, -50dBu signal to Input 1. Apply a 1kHz, +3dBu signal to Input 2. Verify that the Signal 1 LED and the Clip 1 LED are OFF. Verify that the Signal 2 LED is GREEN and that the Clip 2 LED is RED.

3.2 Apply a 1kHz, -39dBu signal to Input 1. Apply a 1kHz, -50dBu signal to Input 2. Verify that the Signal 1 LED is GREEN. Verify that the Clip 1 LED is OFF. Verify that the Signal 2 LED and the Clip 2 LED are OFF.

3.3 Apply a 1kHz, +3dBu signal to Input 1. Apply a 1kHz, -39dBu signal to Input 2. Verify that the Signal 1 LED is GREEN. Verify that the Clip 1 LED is RED. Verify that the Signal 2 LED is GREEN and the Clip 2 LED is OFF.

4. Front Panel PCB Test

4.1 Verify that the front panel LCD and buttons are operational. This can be done visually by looking at the display and pressing the five up/down/left/right and select/load buttons.

4.2 Verify that you can navigate through the various EQ selection menus and the unit's utility menus.

5. Output Noise Test

5.1 Terminate all inputs with 600 Ohms, each leg to ground and undriven. Terminate all outputs with 400 Ohms, each leg to ground.

5.2 Set the unit's input sensitivity to +6dBu and the output level to +6dBu. Set the mode to MONO and the EQ to NONE.

5.3 Measure the output noise levels at the four XLR output connectors. The noise level should be <-82dBu (20Hz - 22kHz).

TEST PROCEDURES

6. Maximum Input Signal and Frequency Response Test

6.1 Terminate all inputs with 600 Ohms, each leg to ground and undriven. Terminate all outputs with 400 Ohms, each leg to ground.

6.2 Set the unit's input sensitivity to +18dBu and the output level to +18dBu. Set the mode to STEREO and the EQ to NONE.

6.3 Apply a 1kHz, +18dBu signal to Input 1 and Input 2.

6.4 Measure the output levels at the output XLR connectors, outputs 1, 2, 3 and 4. The output level should be +17dBu +0.1dB with <0.01% THD+N (20Hz - 30kHz).

6.5 Apply a 20Hz, +18dBu signal to Input 1 and Input 2.

6.6 Measure the output levels at the output XLR connectors, outputs 1, 2, 3 and 4. The output level should be +17dBu +0.1dB with <0.01% THD+N (20Hz - 30kHz).

6.7 Apply a 20kHz, +18dBu signal to Input 1 and Input 2.

6.8 Measure the output levels at the output XLR connectors, outputs 1, 2, 3 and 4. The output level should be +17dBu +0.1dB with <0.01% THD+N (20Hz - 30kHz).

7. Maximum Output Signal and THD+N Test

7.1 Terminate all inputs with 600 Ohms, each leg to ground and undriven. Terminate all outputs with 400 Ohms, each leg to ground.

7.2 Set the unit's input sensitivity to 0dBu and the output level to +18dBu. Set the mode to STEREO and the EQ to NONE.

7.3 Apply a 1kHz, 0dBu signal to Input 1 and Input 2.

7.4 Measure the output levels at the output XLR connectors, outputs 1, 2, 3 and 4. The output level should be +17dBu +0.1dB with <0.01% THD+N (20Hz - 30kHz).

8. Turn-off Pop Test

8.1 Turn the unit OFF by pressing the power switch on the front panel. Verify that there is no audible off-pop when connected to an amplifier with 36dBG and a loudspeaker.

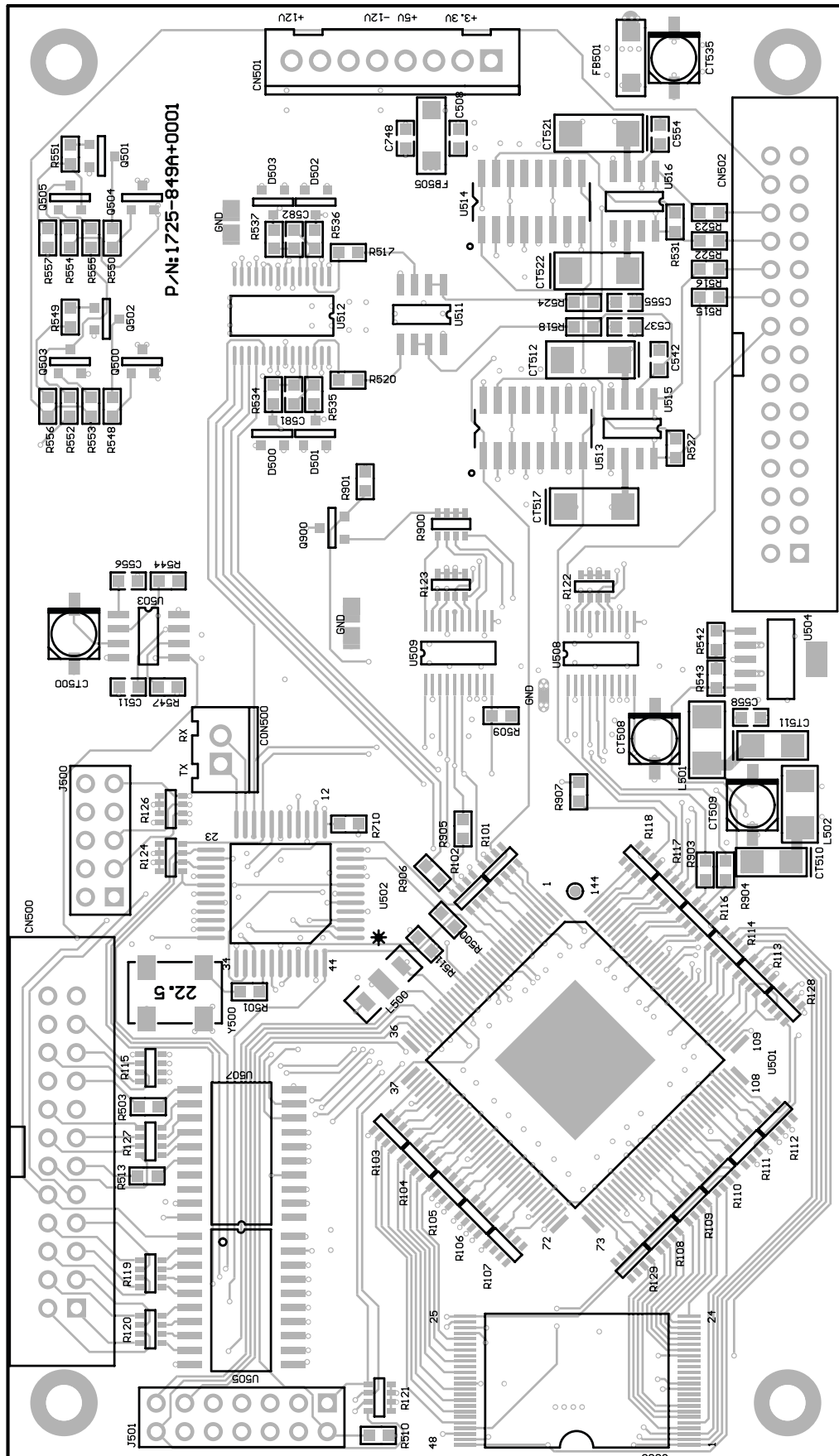


Figure 4. DSP PCB Top Etch Layer and Component Layout

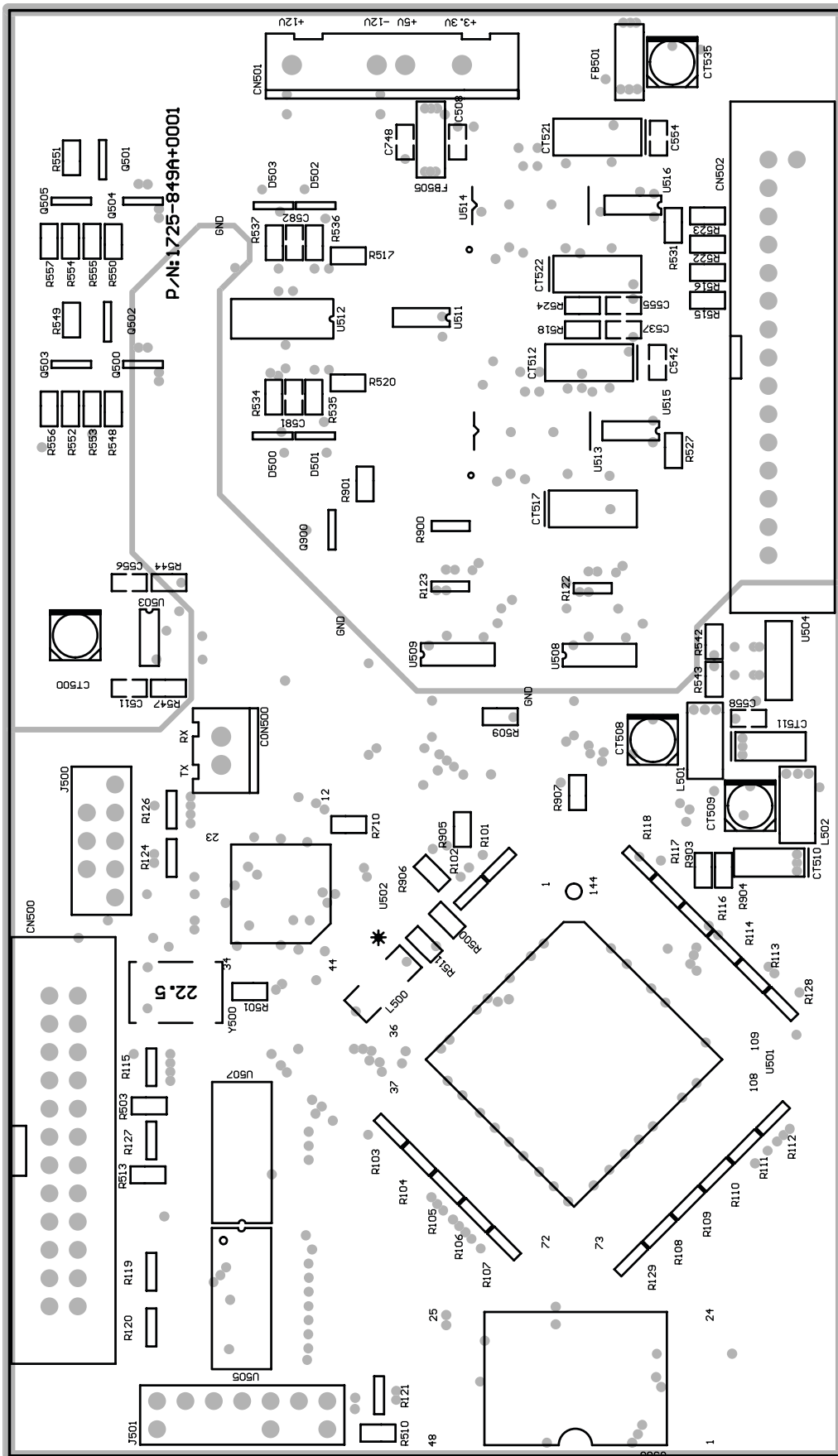


Figure 5. DSP PCB Internal Etch Layer 1 and Component Layout

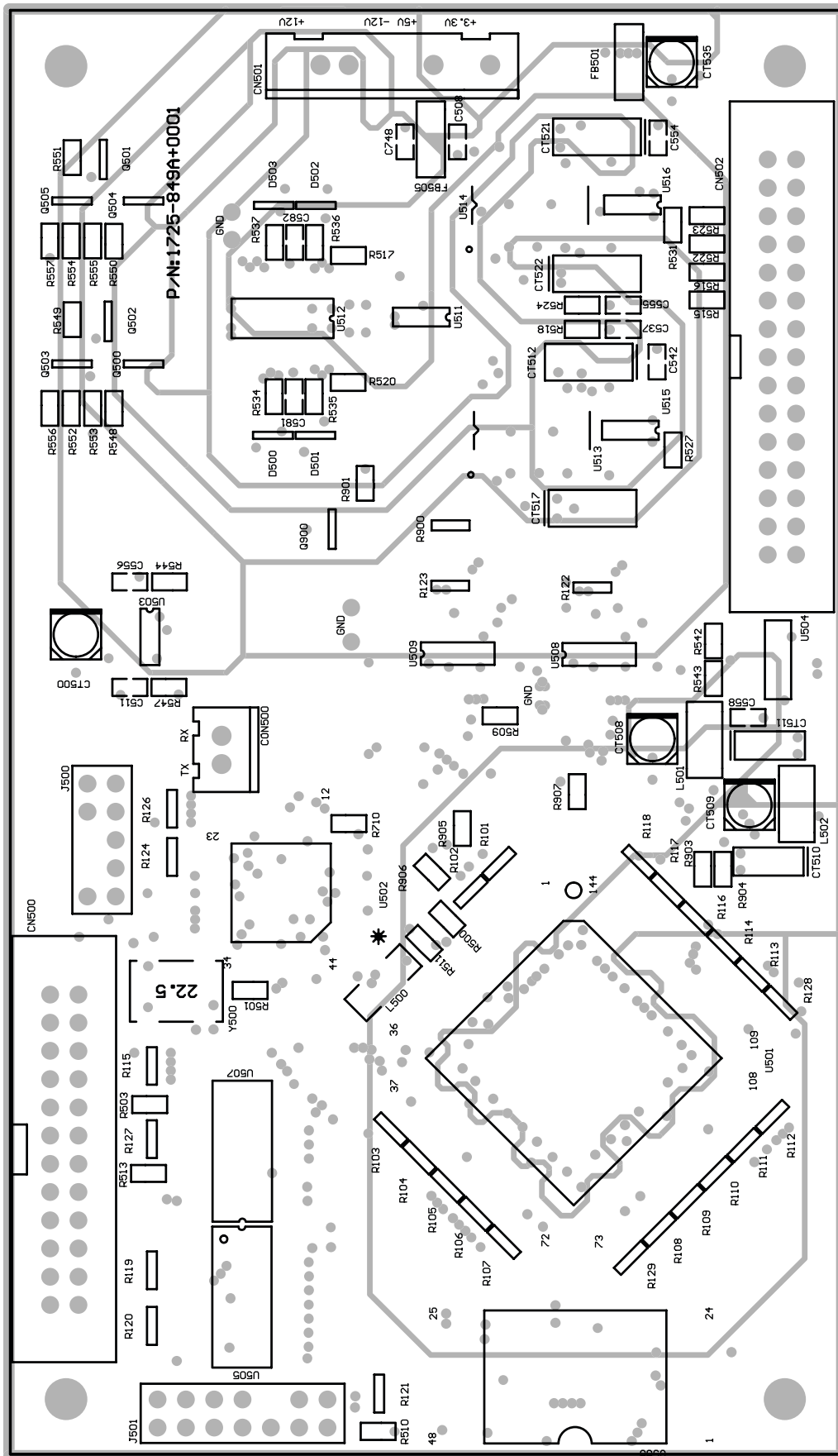


Figure 6. DSP PCB Internal Etch Layer 2 and Component Layout

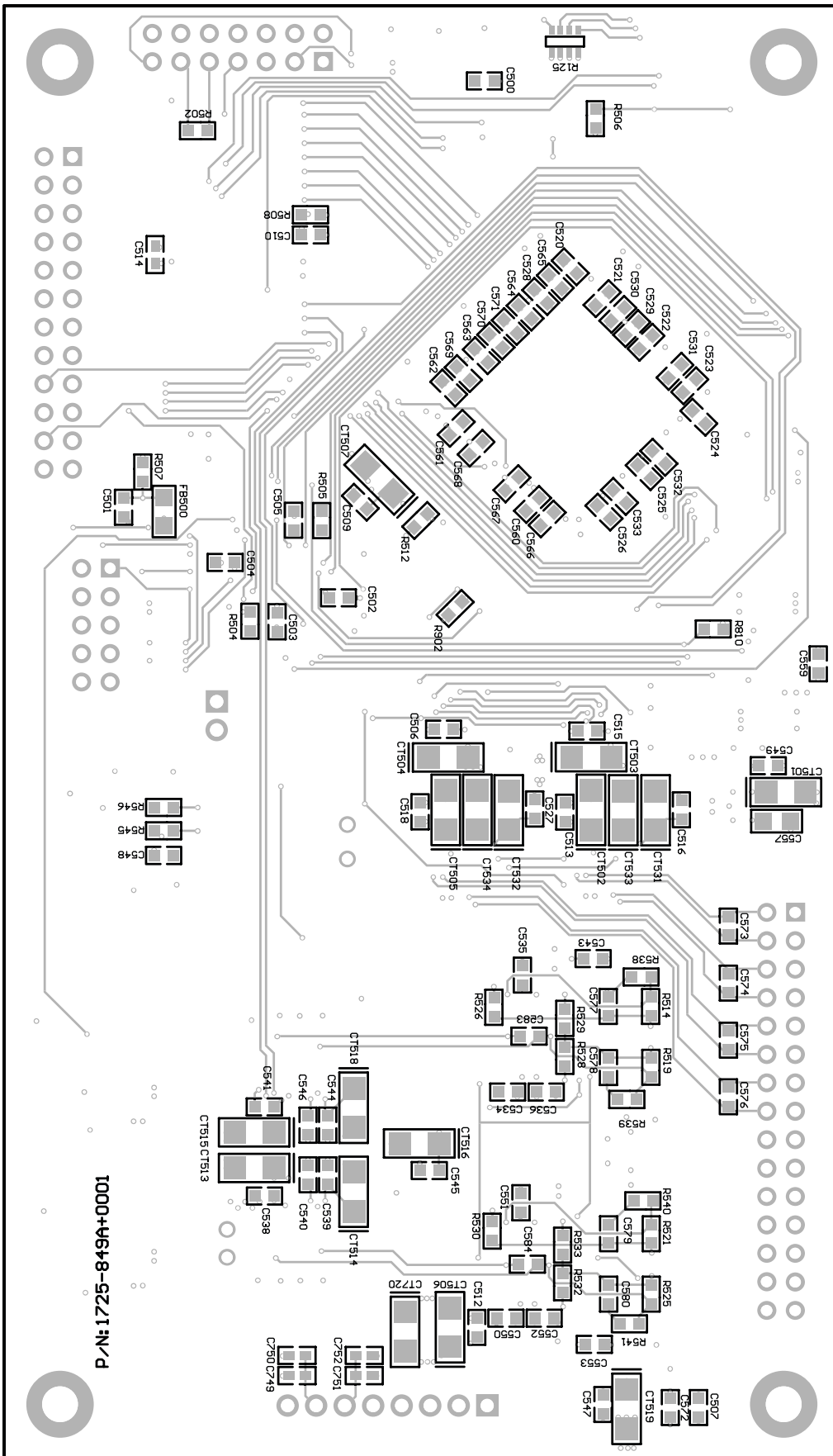


Figure 7. DSP PCB Bottom Etch Layer and Component Layout

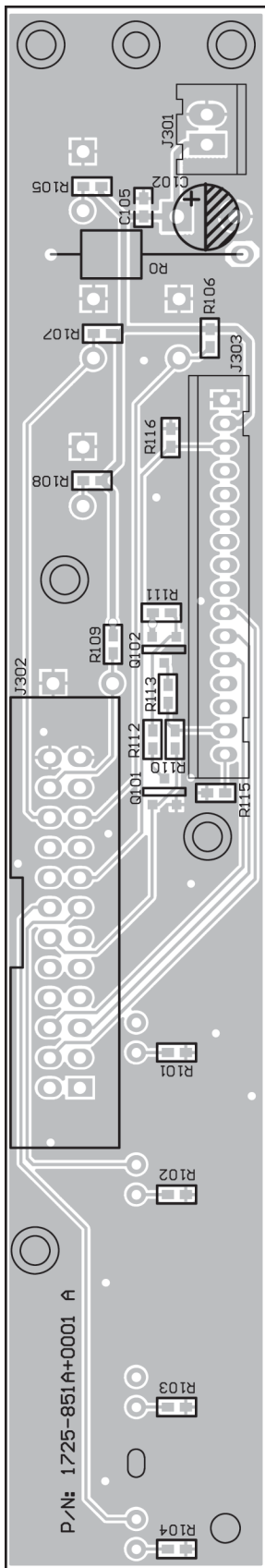


Figure 10. Button and LED PCB Top Etch and Component Layout

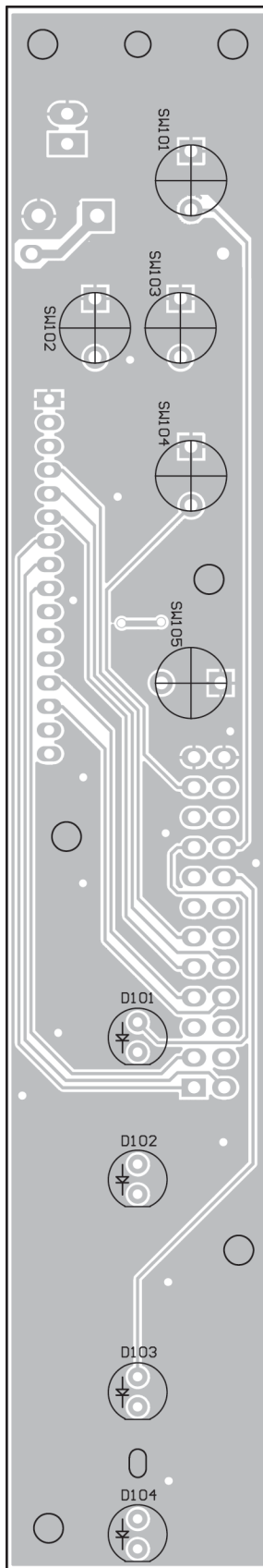


Figure 11. Button and LED PCB Top Etch and Component Layout

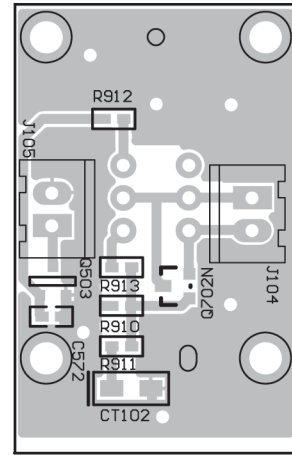


Figure 12. Standby Switch PCB Top Etch and Component Layout

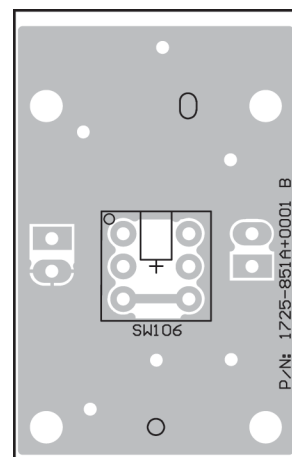


Figure 13. Standby Switch PCB Bottom Etch and Component Layout

Software Update Installation Procedure

Items Required:

- PC with Microsoft® Windows® 2000 or XP
- 9 pin serial data cable, Male to Female
- Panaray® Digital Controller II software update

Overview:

The firmware on the Panaray Digital Controller II can be updated to the latest features and EQ curves for Bose® Professional loudspeakers by using a serial data cable and the 9 pin D-sub connector labeled COM, located on the back panel of the unit. To perform this update, you will use Hyperterminal, which is a communications program that is included as part of Microsoft Windows.

Note: This procedure can be used to update your Panaray Digital Controller II to the latest software revision, or to downgrade it to a previous version to allow the unit to be used with older Bose Professional loudspeakers that might not be covered by later versions of software.

Update Instructions:

1. Download the Panaray Digital Controller II update files to a folder on your PC's desktop. These files can be found on the Bose Professional Products web site at <http://www.pro.bose.com> on the Panaray Digital Controller II web page.
2. Connect the serial data cable to the COM1 serial data port on your PC. Connect the other end of the cable to the 9-pin D-sub connector labeled COM port located on the back of the Panaray Digital Controller II unit. **Note:** DO NOT use a null modem cable. This procedure will not work with a null modem cable.
3. Connect the unit's AC line cord to AC mains. Do not turn on the unit at this time.
4. Set up the Microsoft® Windows® Hyperterminal program to allow the PC to communicate with the Panaray Controller. On the PC, go to START/PROGRAMS/ACCESSORIES/COMMUNICATIONS/HYPERTERMINAL. A dialog box will appear for a new connection. Name the connection and click OK.

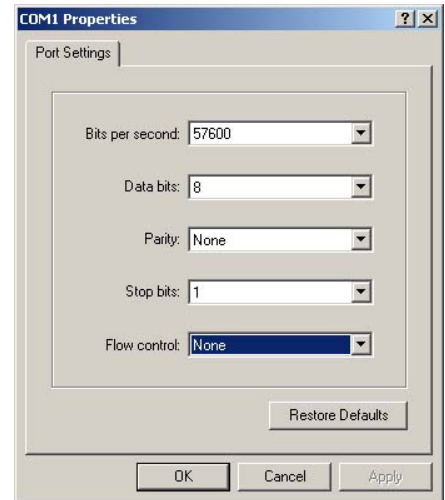


5. When the dialog box shown at right opens, select COM1. Click OK.

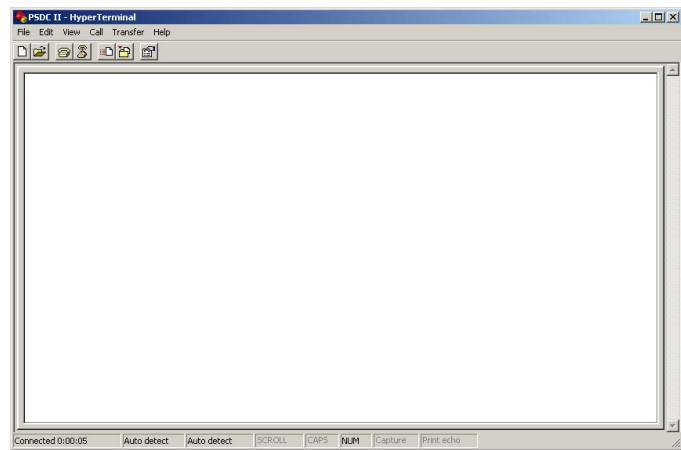


Software Update Installation Procedure (continued)

6. A dialog box for COM1 properties will open. Select the options as shown at right. Click OK.



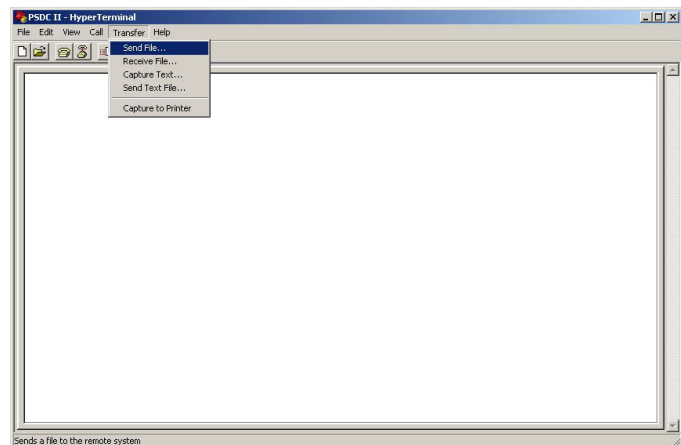
Once you click OK, a terminal window like the one at right will open.



7. On the front panel of the controller, press and hold the LEFT ARROW and the SELECT/LOAD buttons. While holding down these buttons, press the POWER button to turn on the unit. You should see the words PSDC II SOFTWARE UPDATE on the unit's LCD display. The controller is now ready to receive the update files.

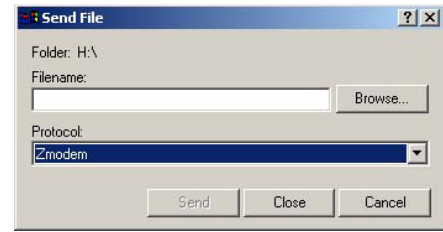
8. On your PC, ensure that the Hyperterminal window for your connection indicates that it is connected. This information is displayed in the bottom left section of the terminal window border. If it is not connected, click the CALL radio button on the window's toolbar or go to CALL/CALL. You should now be connected.

9. In the terminal window, click TRANSFER/SEND FILE.

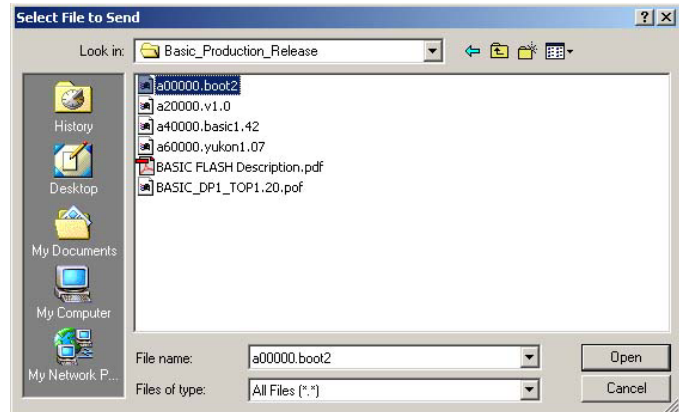


Software Update Installation Procedure (continued)

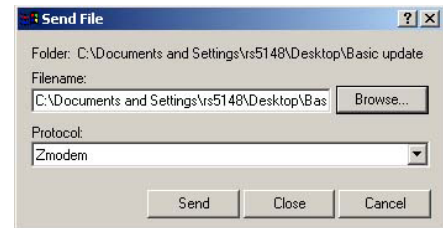
A send file dialog box will open. Click on the Protocol pull-down menu. Select ZMODEM. Click the BROWSE button next to the file name box.



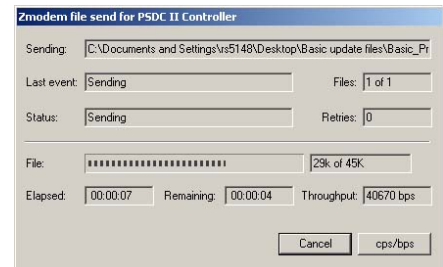
Navigate to the folder on your PC that contains the update files. Select the first update file in the list. Click OPEN.



Click SEND.



The dialog box shown at right should open and the file transfer to the controller should begin. Once that file has completed transfer, repeat step 9 of this procedure for the other three update files.



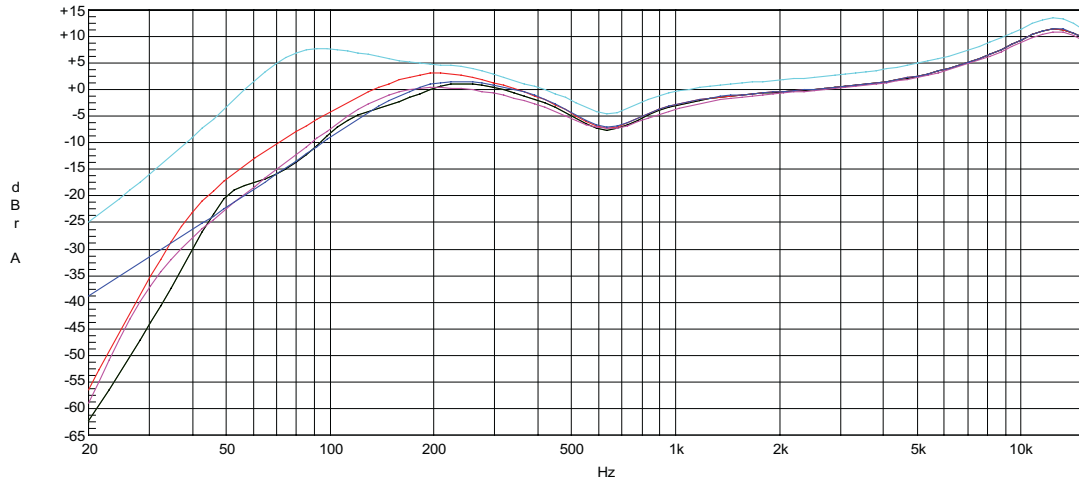
10. Once all of the update files have completed transfer, turn off the Panaray Digital Controller II using the POWER button. While holding down the RIGHT ARROW button, turn the controller back on. This will initialize the unit to the factory presets. This completes the software update procedure.

Note: If you want to verify that the software has been updated. Turn on the Panaray Digital Controller II while looking at the display on the LCD panel. It will show the software revision when the unit is first turned on.

Panaray® Digital Controller II EQ Curves

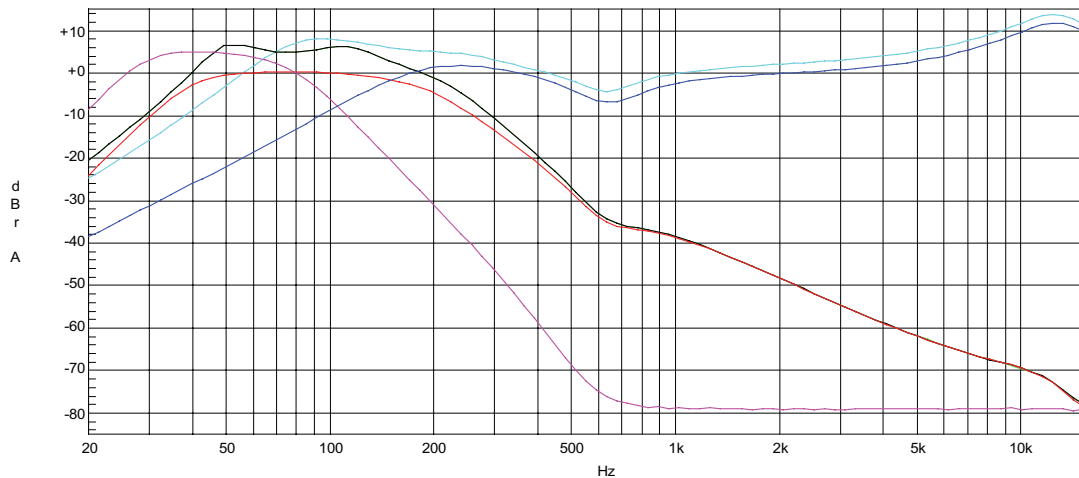
Measured using an Audio Precision ATS-2 analyzer. 0 dBr calibrated to signal level at 1 KHz in neutral mode. 10-20kHz AE17 bandpass filter applied.

Settings: Input Sensitivity: 12dB
 Output Sensitivity: 12dB
 Output Level: 0dB
 Input Signal Level: -12dBu



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	402II
2	1	Green	Solid	1	Anlr.Ampl	Left	402II+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	402II+502BEX
4	1	Red	Solid	1	Anlr.Ampl	Left	402II+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	402II+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	402II HF

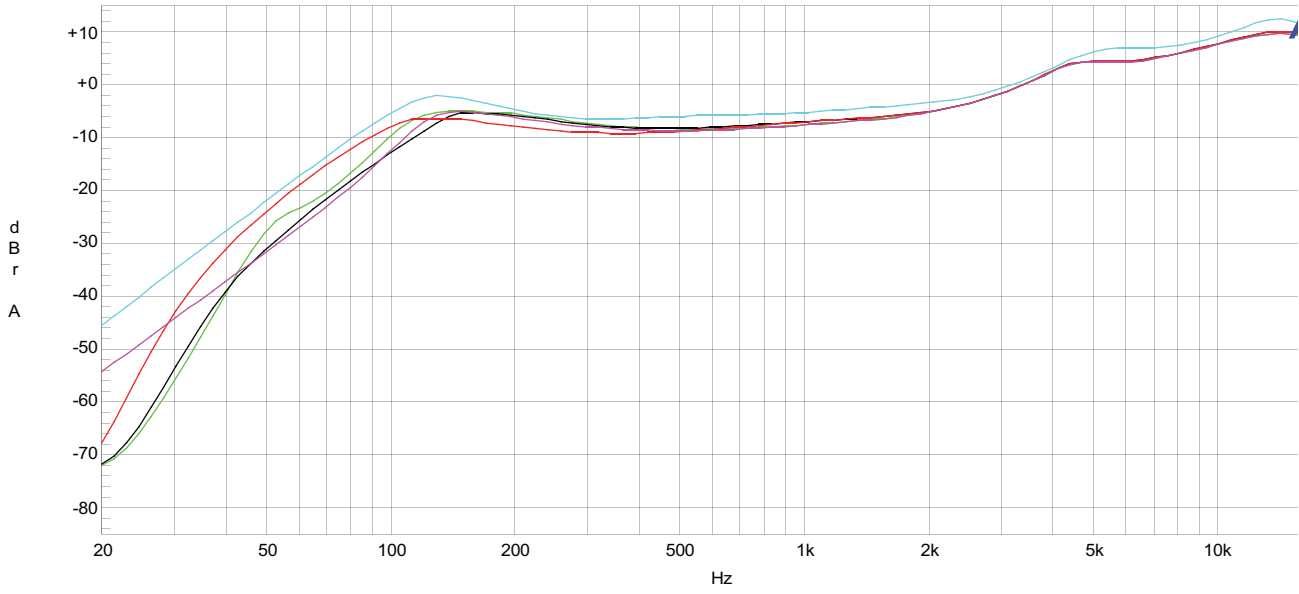
402II CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	402II
2	1	Green	Solid	1	Anlr.Ampl	Left	402II+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	402II+502BEX
4	1	Red	Solid	1	Anlr.Ampl	Left	402II+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	402II+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	402II HF

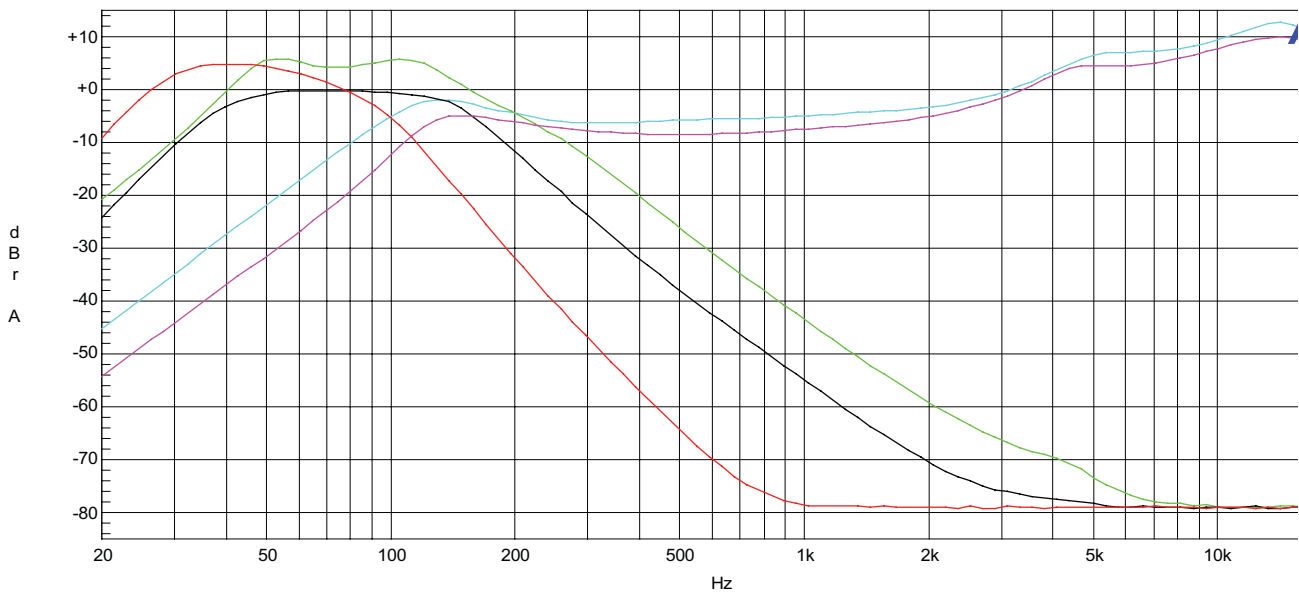
402II CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	502A
2	1	Green	Solid	1	Anlr.Ampl	Left	502A+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	502A+MB
4	1	Red	Solid	1	Anlr.Ampl	Left	502A+AWCS
5	1	Magenta	Solid	1	Anlr.Ampl	Left	502A HF

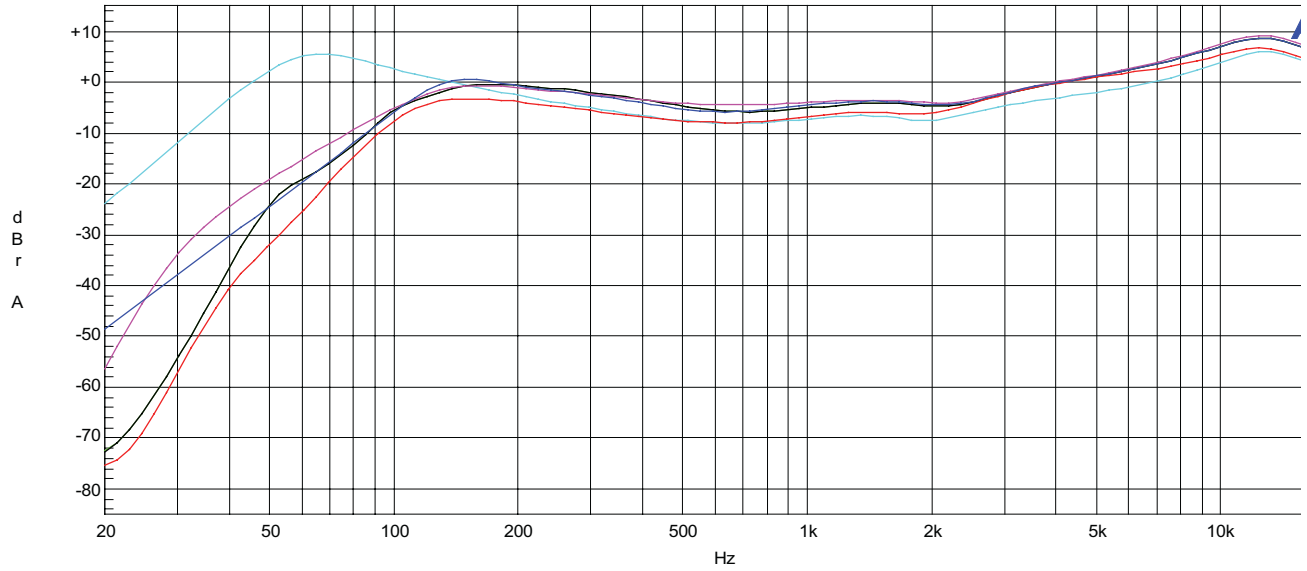
502A CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	502A
2	1	Green	Solid	1	Anlr.Ampl	Left	502A+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	502A+MB
4	1	Red	Solid	1	Anlr.Ampl	Left	502A+AWCS
5	1	Magenta	Solid	1	Anlr.Ampl	Left	502A HF

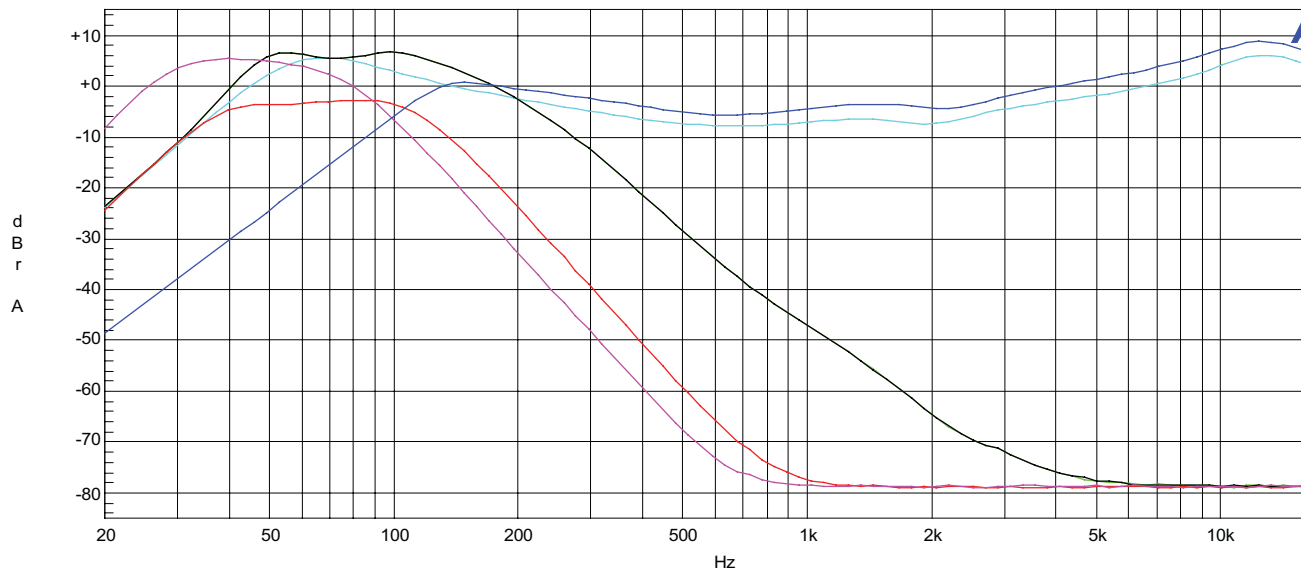
502A CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	802III
2	1	Green	Solid	1	Anlr.Ampl	Left	802II+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	802III+502BEX
4	1	Red	Solid	1	Anlr.Ampl	Left	802III+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	802III+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	802III HF

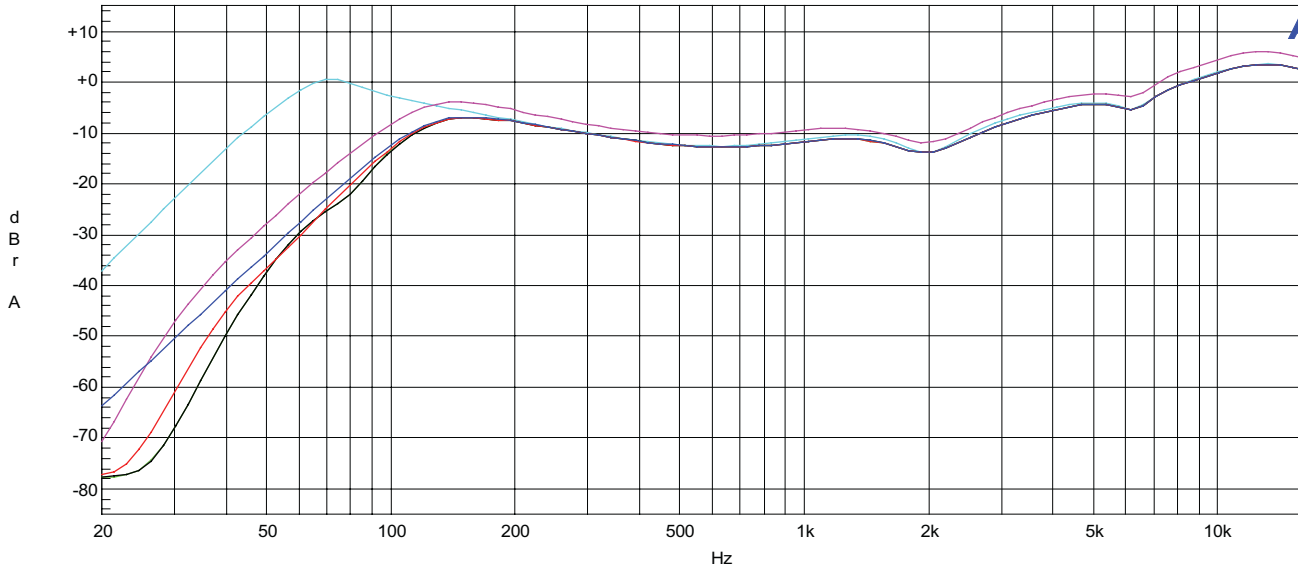
802III CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	802III
2	1	Green	Solid	1	Anlr.Ampl	Left	802III+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	802III+502BEX
4	1	Red	Solid	1	Anlr.Ampl	Left	802III+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	802III+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	802III HF

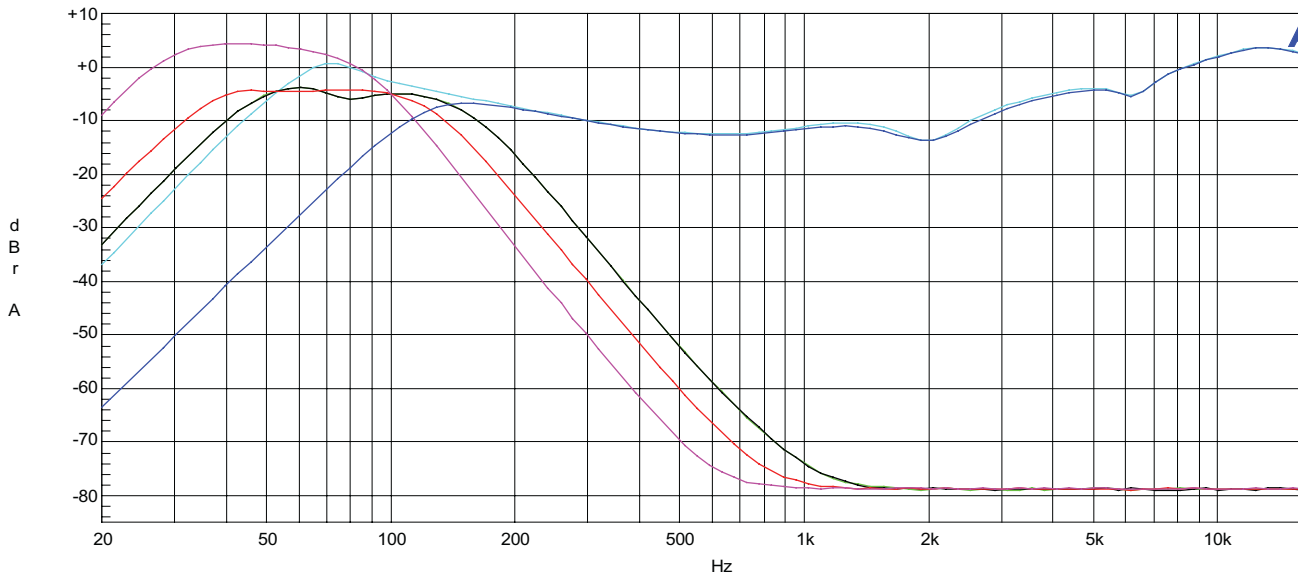
802III CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	802IIISTK
2	1	Green	Solid	1	Anlr.Ampl	Left	802IIIST+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	802IIIST+502X
4	1	Red	Solid	1	Anlr.Ampl	Left	802IIISTK+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	802IIIST+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	802IIISTK HF

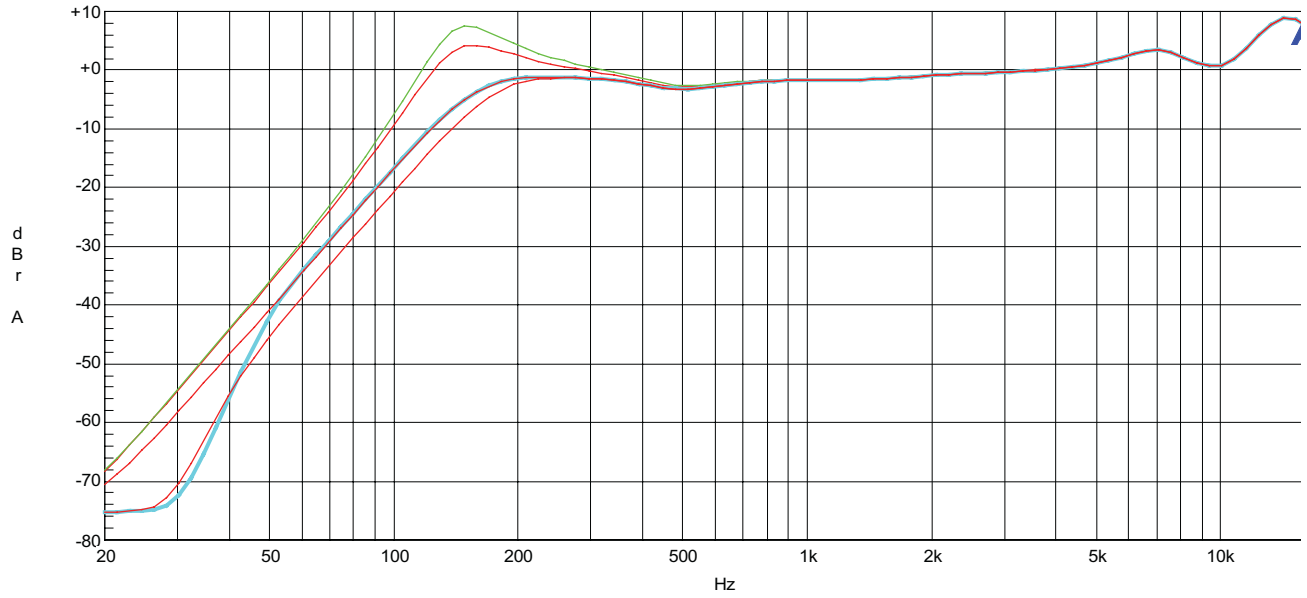
802IIIST CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	802IIISTK
2	1	Green	Solid	1	Anlr.Ampl	Left	802IIIST+502B
3	1	Black	Solid	1	Anlr.Ampl	Left	802IIIST+502X
4	1	Red	Solid	1	Anlr.Ampl	Left	802IIISTK+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	802IIIST+AWCS
6	1	Blue	Solid	1	Anlr.Ampl	Left	802IIISTK HF

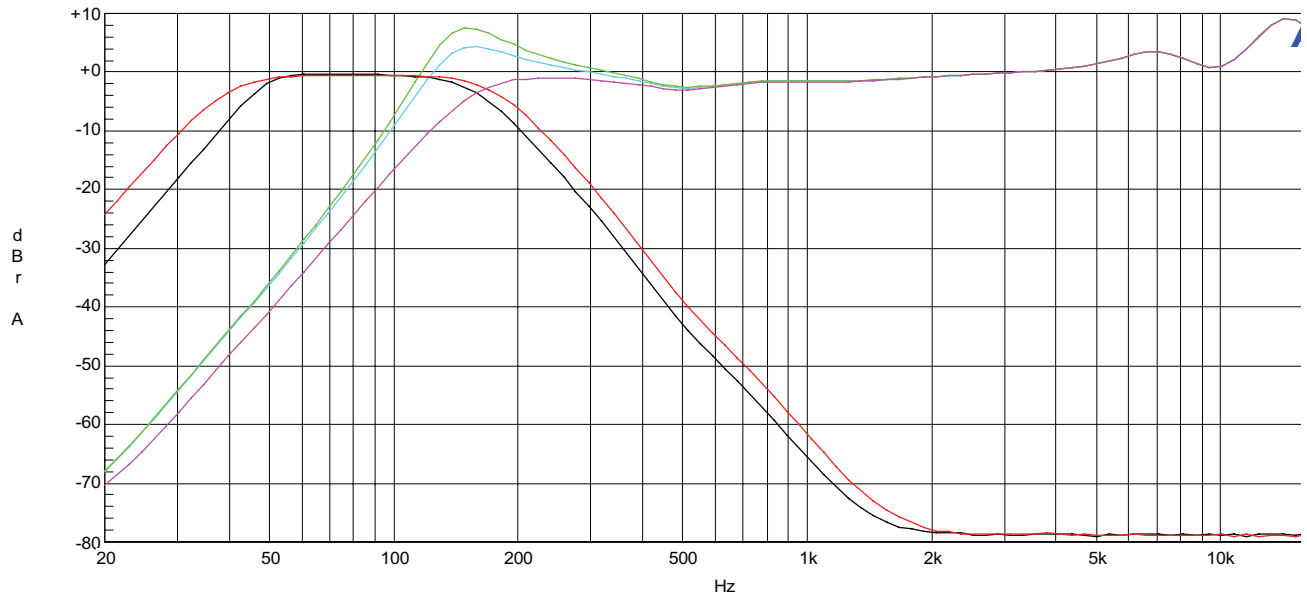
802IIIST CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Red	Solid	1	Anlr.Ampl	Left	MA12 WALL
2	1	Green	Solid	1	Anlr.Ampl	Left	MA12 FREE
3	1	Cyan	Solid	3	Anlr.Ampl	Left	MA12+502B
4	1	Red	Solid	1	Anlr.Ampl	Left	MA12+MB
5	1	Red	Solid	1	Anlr.Ampl	Left	MA12 HF

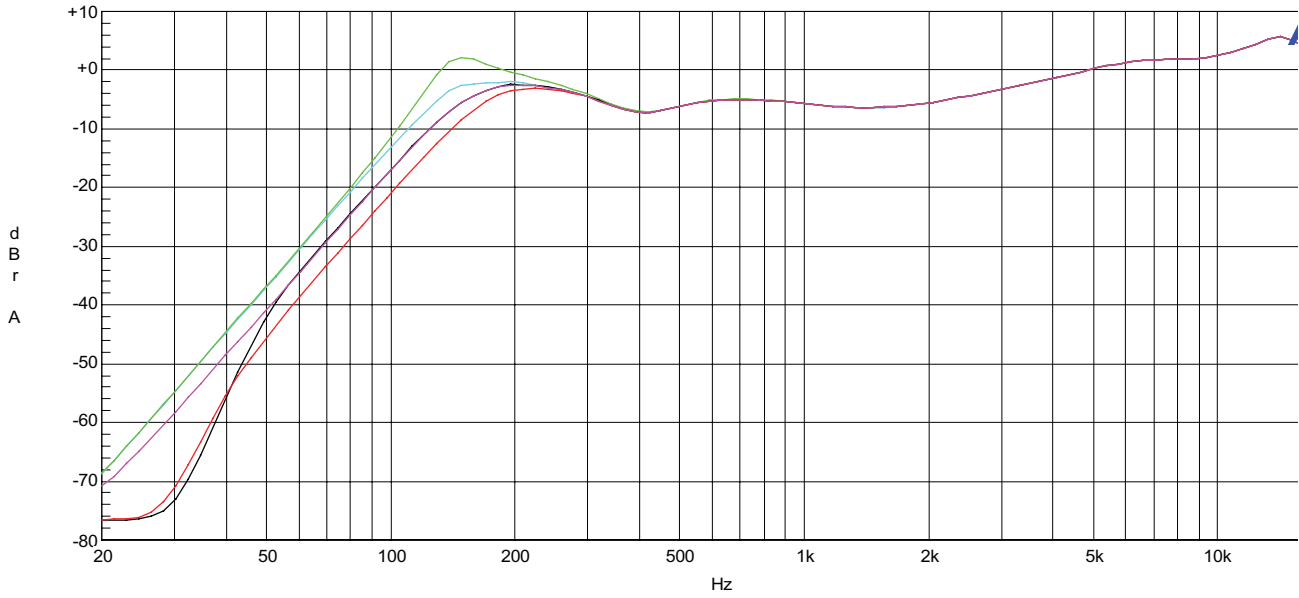
MA12 CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	MA12 WALL
2	1	Green	Solid	1	Anlr.Ampl	Left	MA12 FREE
3	1	Black	Solid	1	Anlr.Ampl	Left	MA12+502B
4	1	Red	Solid	1	Anlr.Ampl	Left	MA12+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	MA12 HF

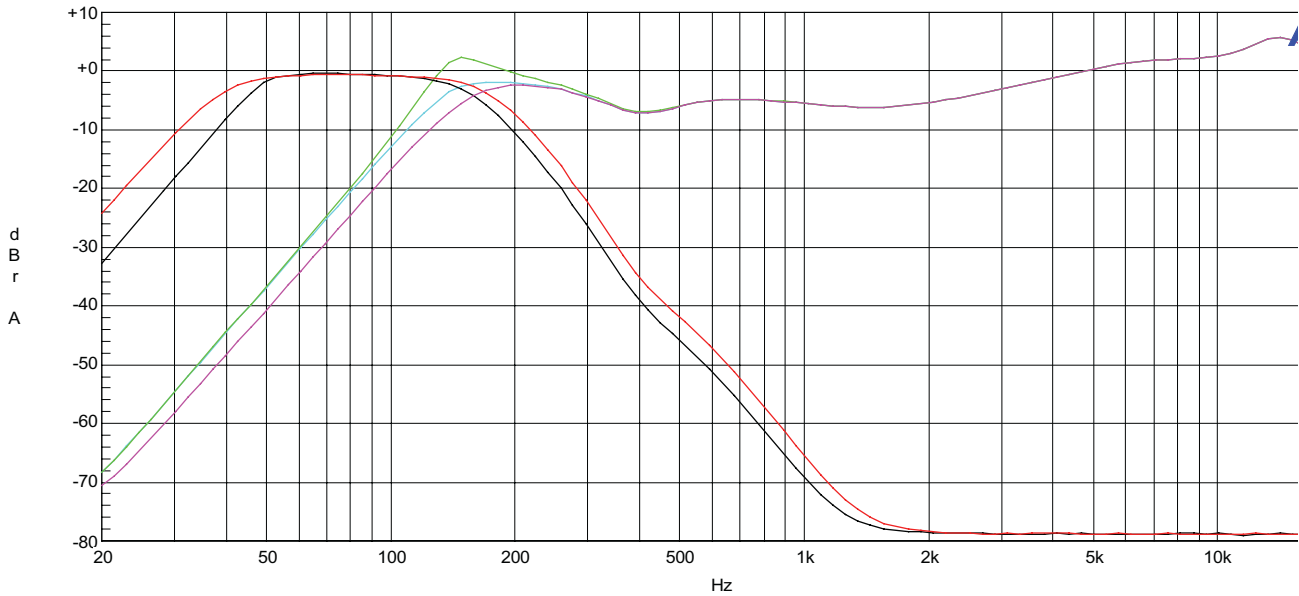
MA12 CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	MA12STK WALL
2	1	Green	Solid	1	Anlr.Ampl	Left	MA12STK FREE
3	1	Black	Solid	1	Anlr.Ampl	Left	MA12STK+502B
4	1	Red	Solid	1	Anlr.Ampl	Left	MA12STK+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	MA12STK HF

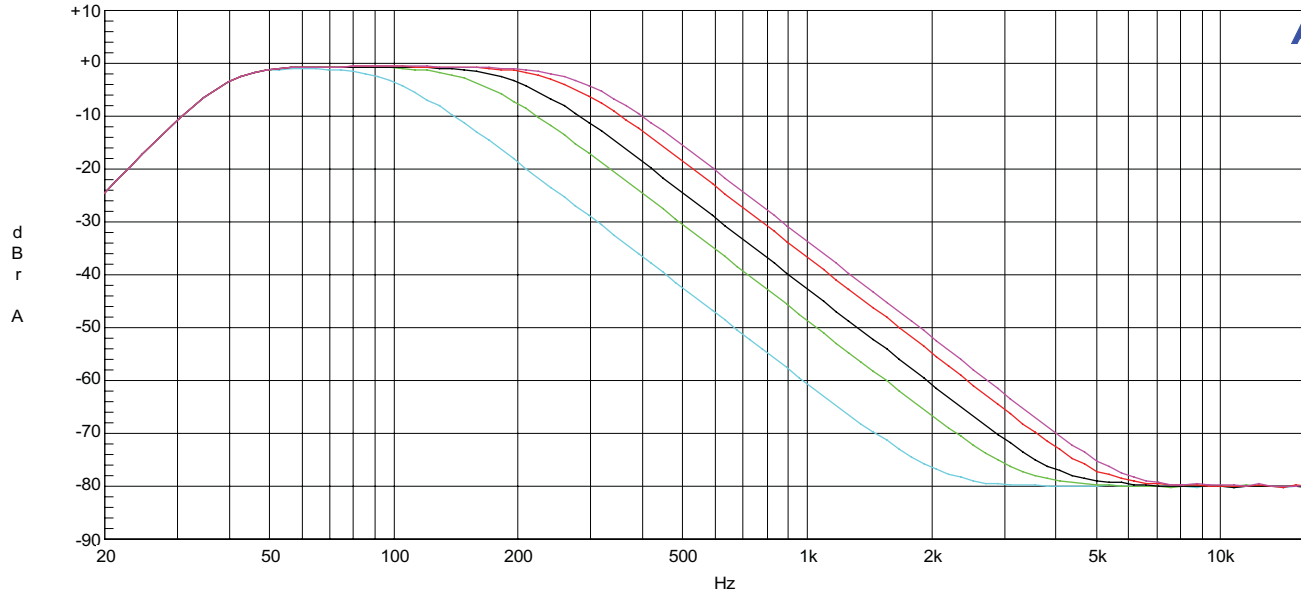
MA12STK CH1, 2



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	MA12STK WALL
2	1	Green	Solid	1	Anlr.Ampl	Left	MA12STK FREE
3	1	Black	Solid	1	Anlr.Ampl	Left	MA12STK+502B
4	1	Red	Solid	1	Anlr.Ampl	Left	MA12STK+MB
5	1	Magenta	Solid	1	Anlr.Ampl	Left	MA12STK HF

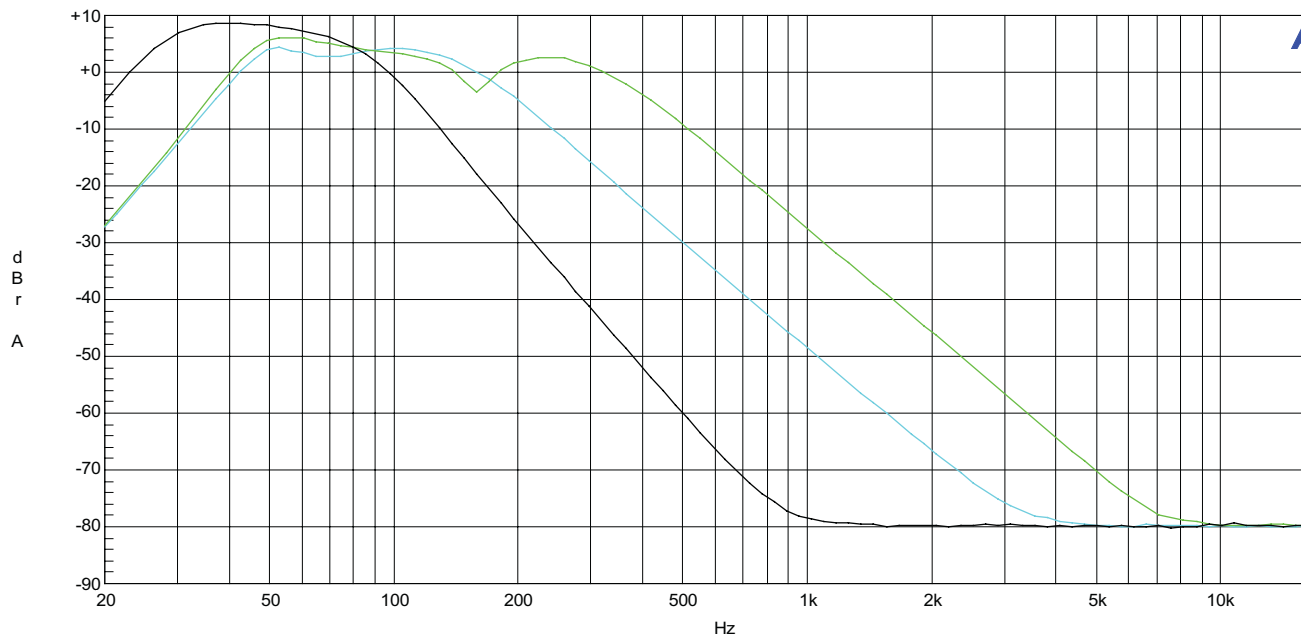
MA12STK CH3, 4

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	MB 100HZ LP
2	1	Green	Solid	1	Anlr.Ampl	Left	MB 160HZ LP
3	1	Black	Solid	1	Anlr.Ampl	Left	MB 200HZ LP
4	1	Red	Solid	1	Anlr.Ampl	Left	MB 250HZ LP
5	1	Magenta	Solid	1	Anlr.Ampl	Left	MB4 280HZ LP

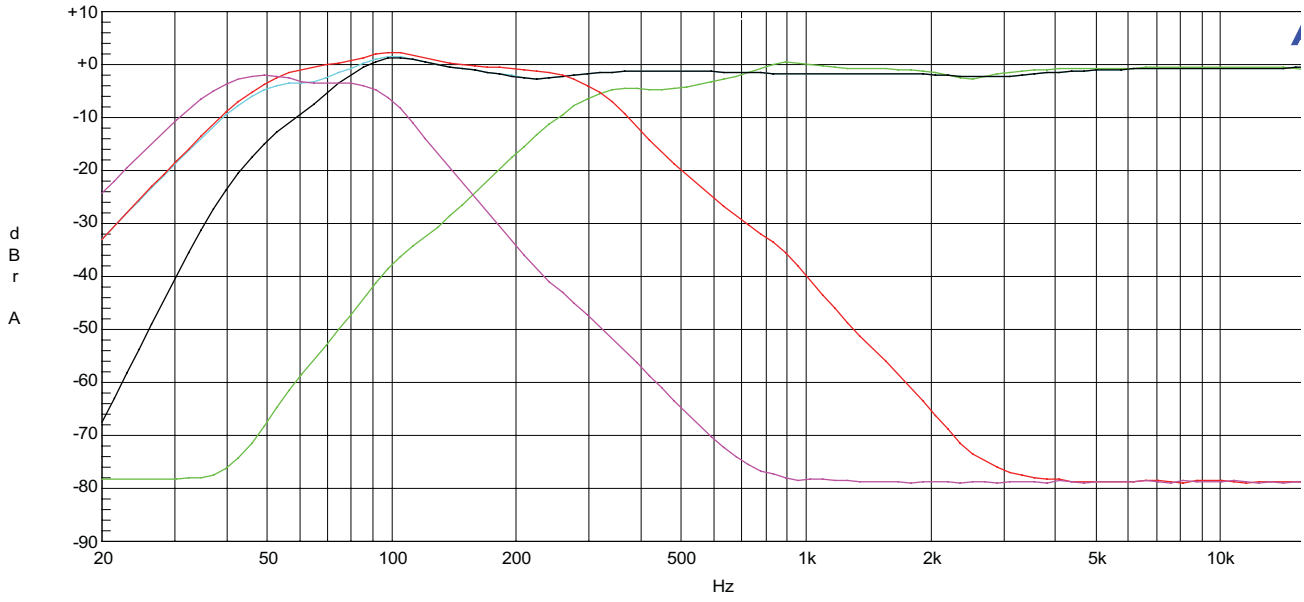
MB



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	502B
2	1	Green	Solid	1	Anlr.Ampl	Left	502BEX
3	1	Black	Solid	1	Anlr.Ampl	Left	AWCS

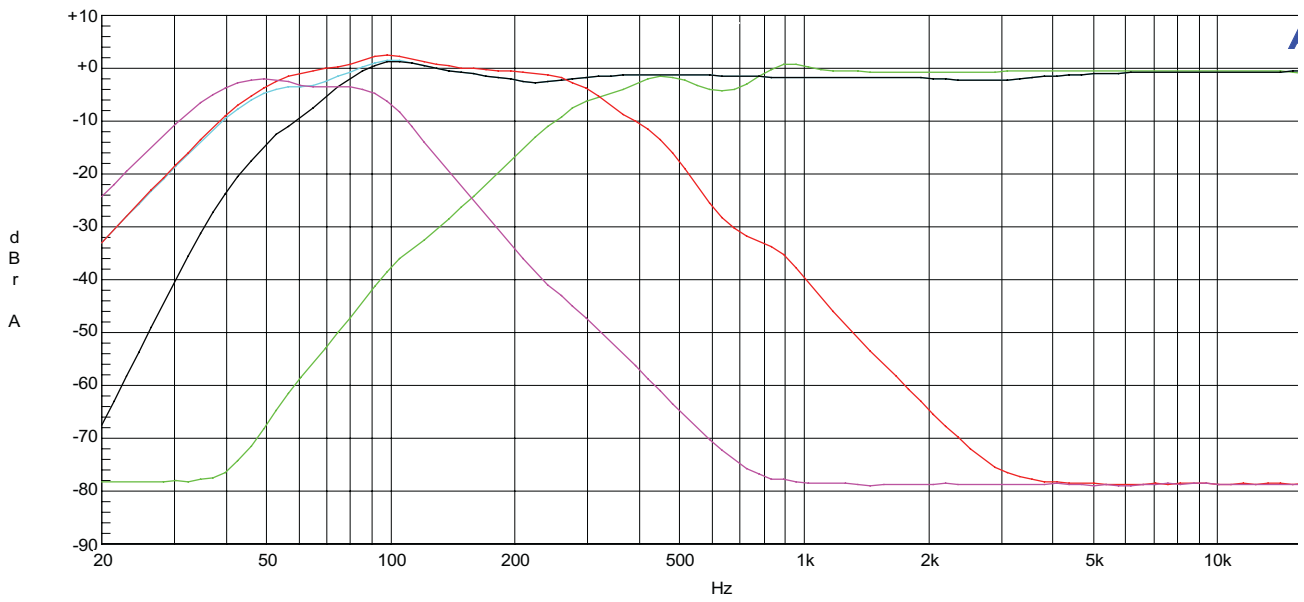
502B, 502BEX, AWCS

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT9403
2	1	Green	Solid	1	Anlr.Ampl	Left	LT9403 BIAMP CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT9403+MB CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT9403 BIAMP CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT9403+MB CH3

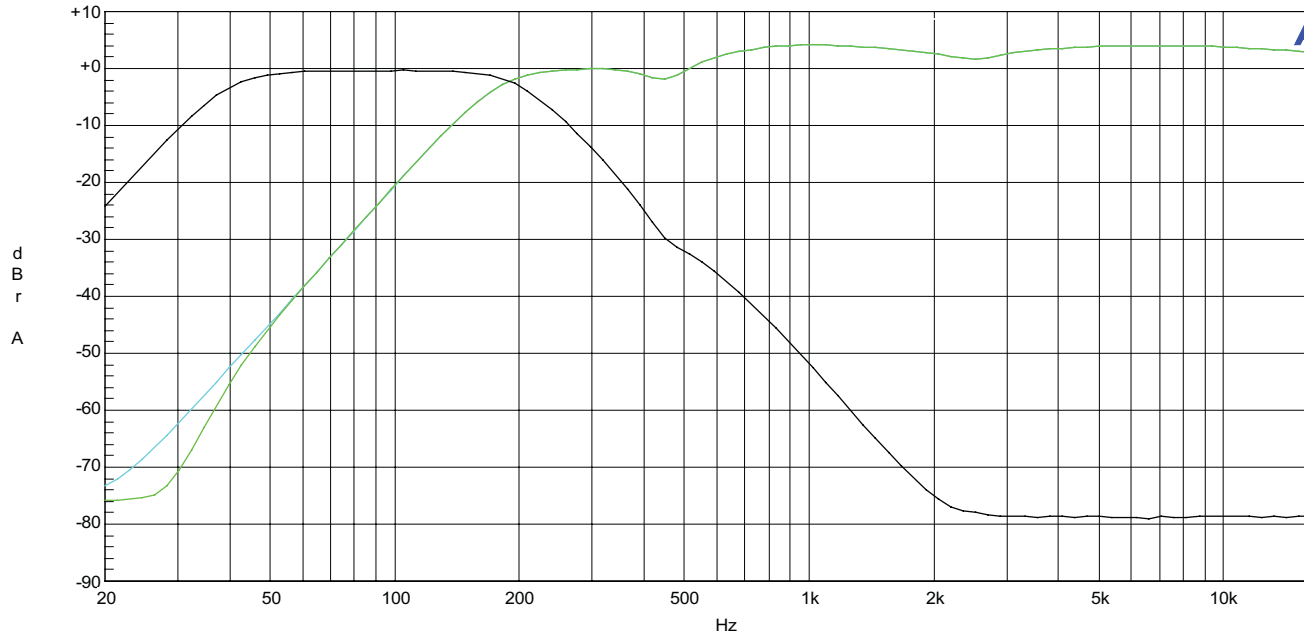
LT9403



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT6403
2	1	Green	Solid	1	Anlr.Ampl	Left	LT6403 BIAMP CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT6403+MB CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT6403 BIAMP CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT6403+MB CH3

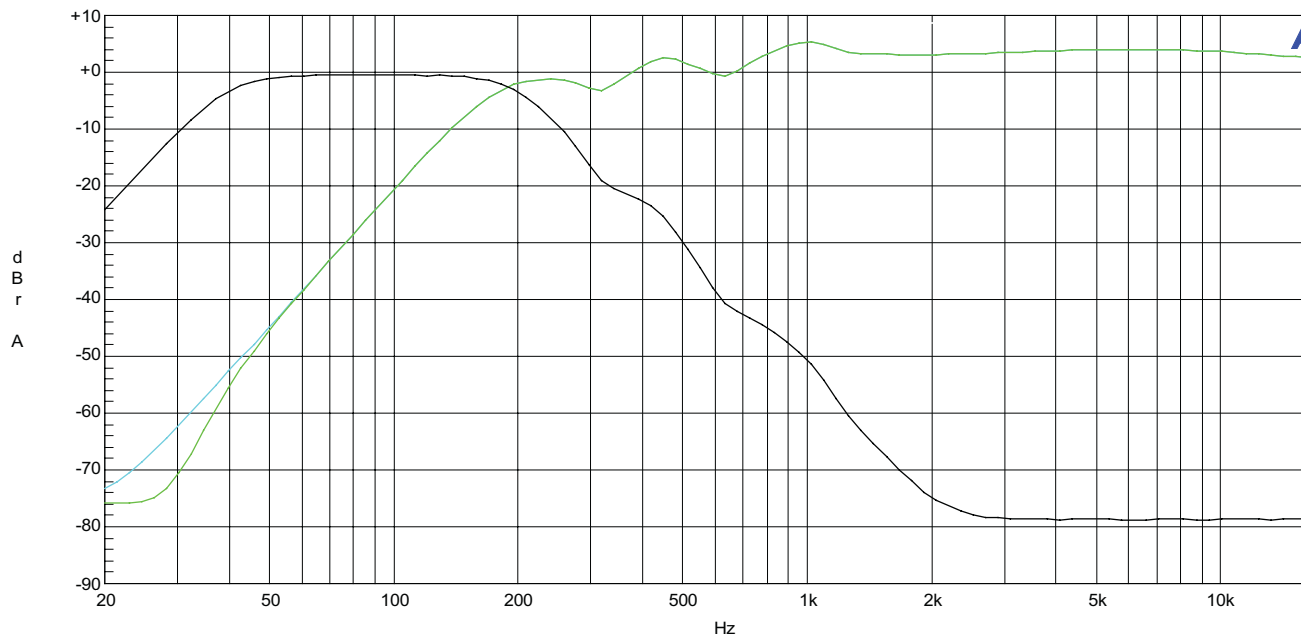
LT6403

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT9400
2	1	Green	Solid	1	Anlr.Ampl	Left	LT9400+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT9400+MB CH3

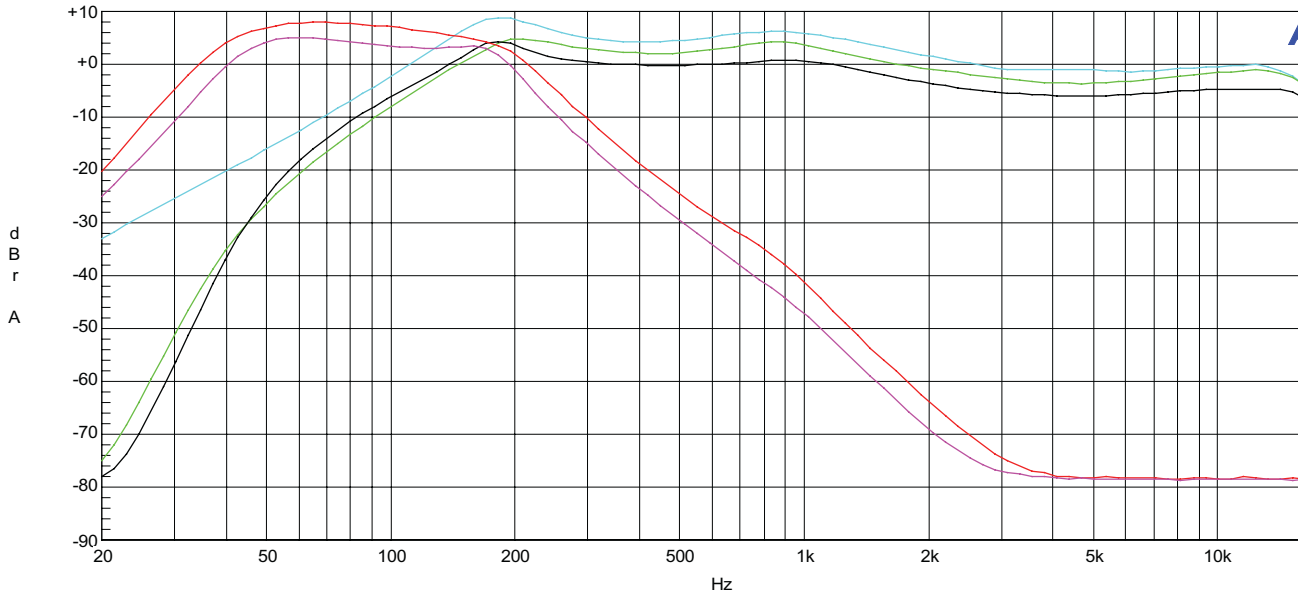
LT9400



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT6400
2	1	Green	Solid	1	Anlr.Ampl	Left	LT6400+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT6400+MB CH3

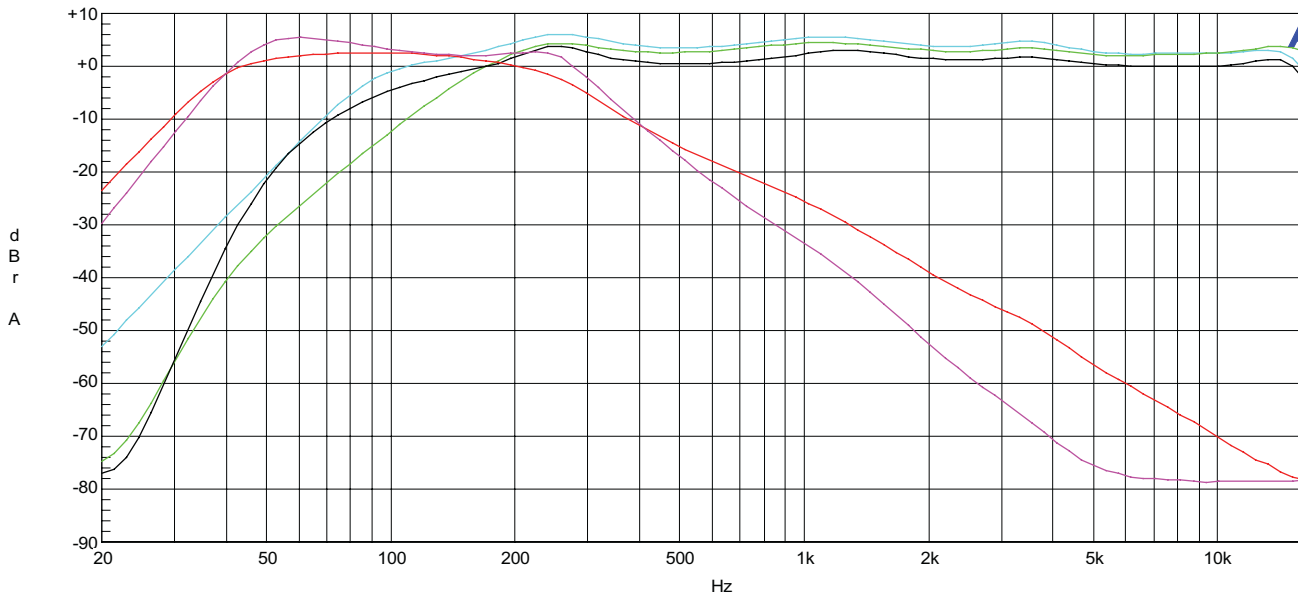
LT6400

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT3202
2	1	Green	Solid	1	Anlr.Ampl	Left	LT3202+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT3202+502BEX CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT3202+MB CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT3202+502BEX CH3

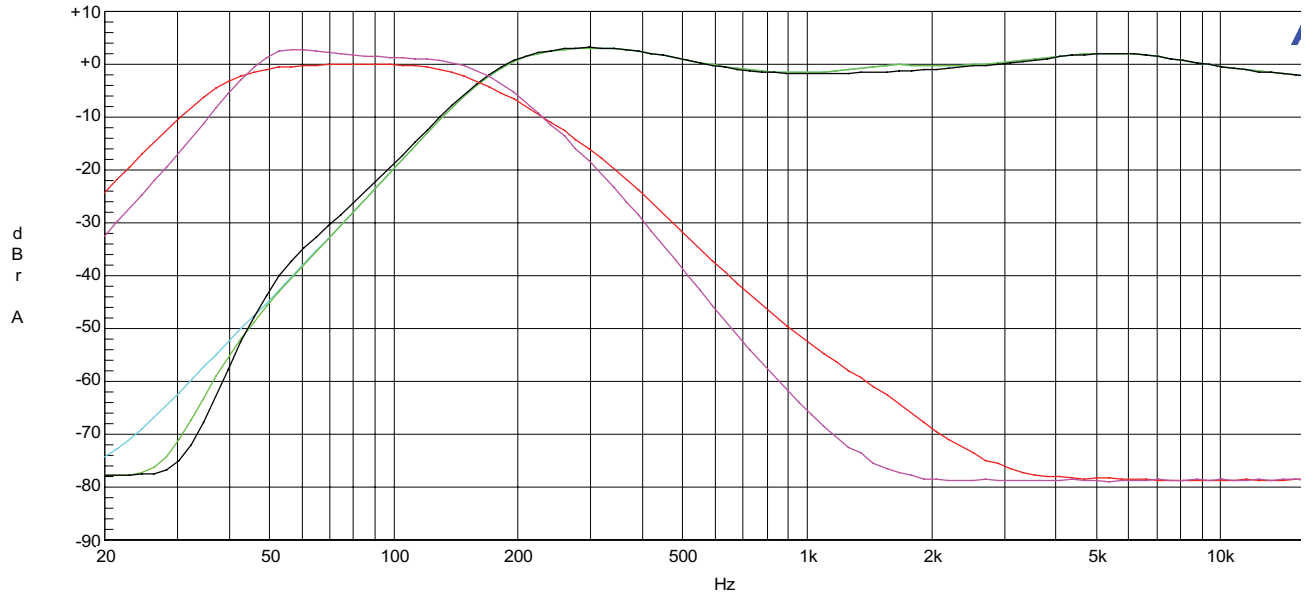
LT3202



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT4402
2	1	Green	Solid	1	Anlr.Ampl	Left	LT4402+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT4402+502BEX CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT4402+MB CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT4402+502BEX CH3

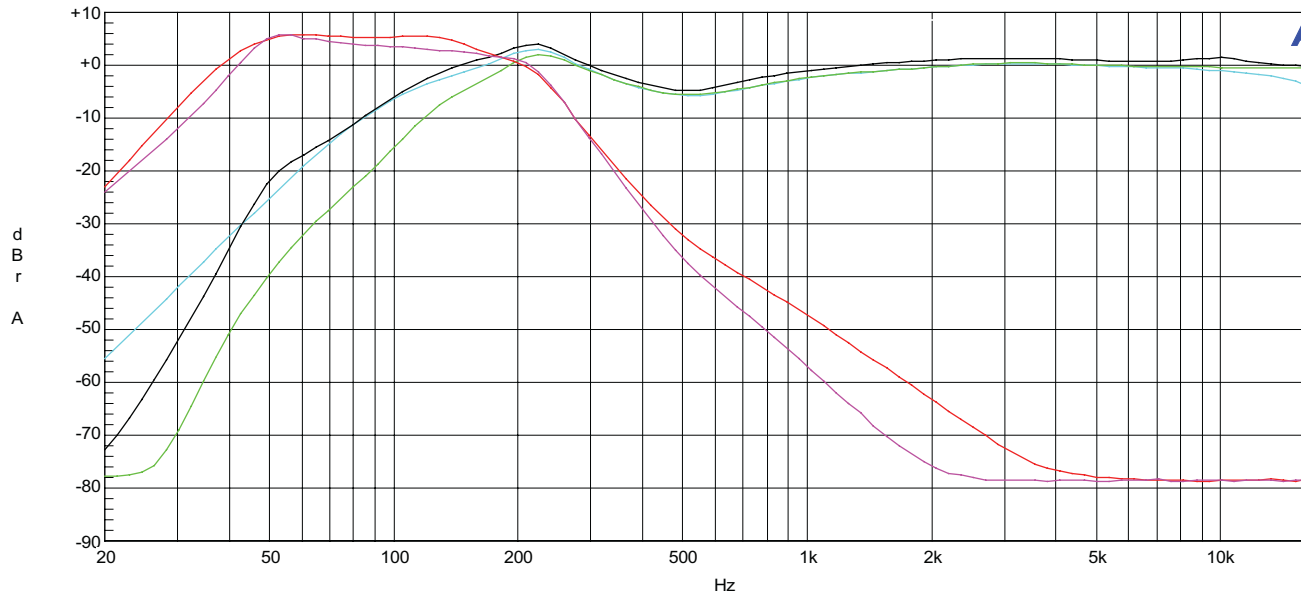
LT4402

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT9402
2	1	Green	Solid	1	Anlr.Ampl	Left	LT9402+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT9402+502BEX CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT9402+MB CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT9402+502BEX CH3

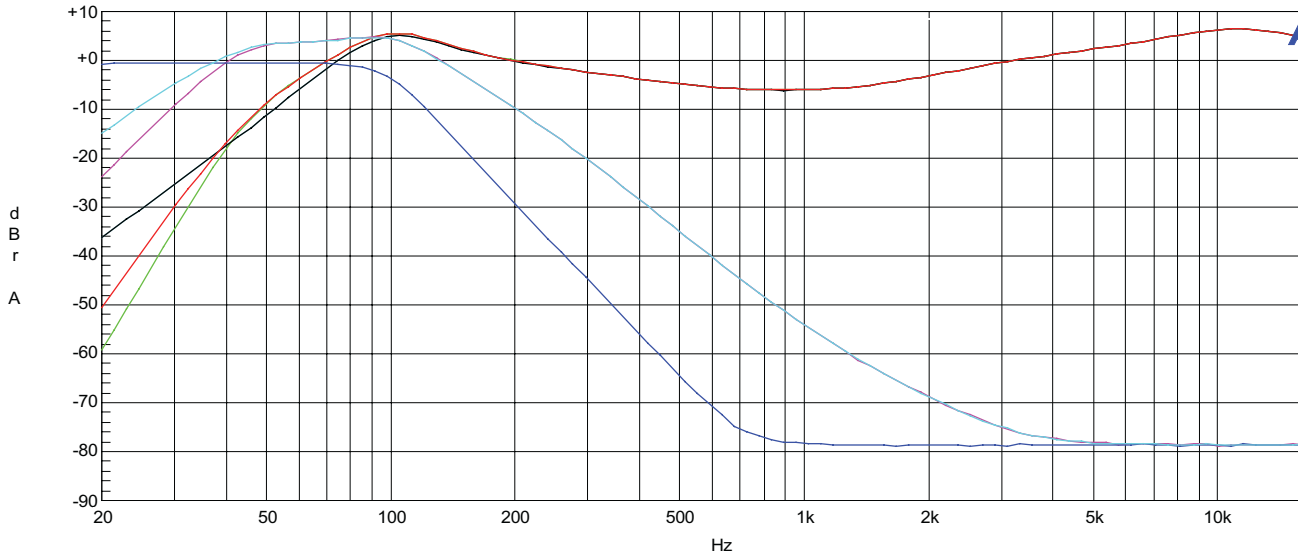
LT9402



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	LT9702
2	1	Green	Solid	1	Anlr.Ampl	Left	LT9702+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	LT9702+502BEX CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	LT9702+MB CH3
5	1	Magenta	Solid	1	Anlr.Ampl	Left	LT9702+502BEX CH3

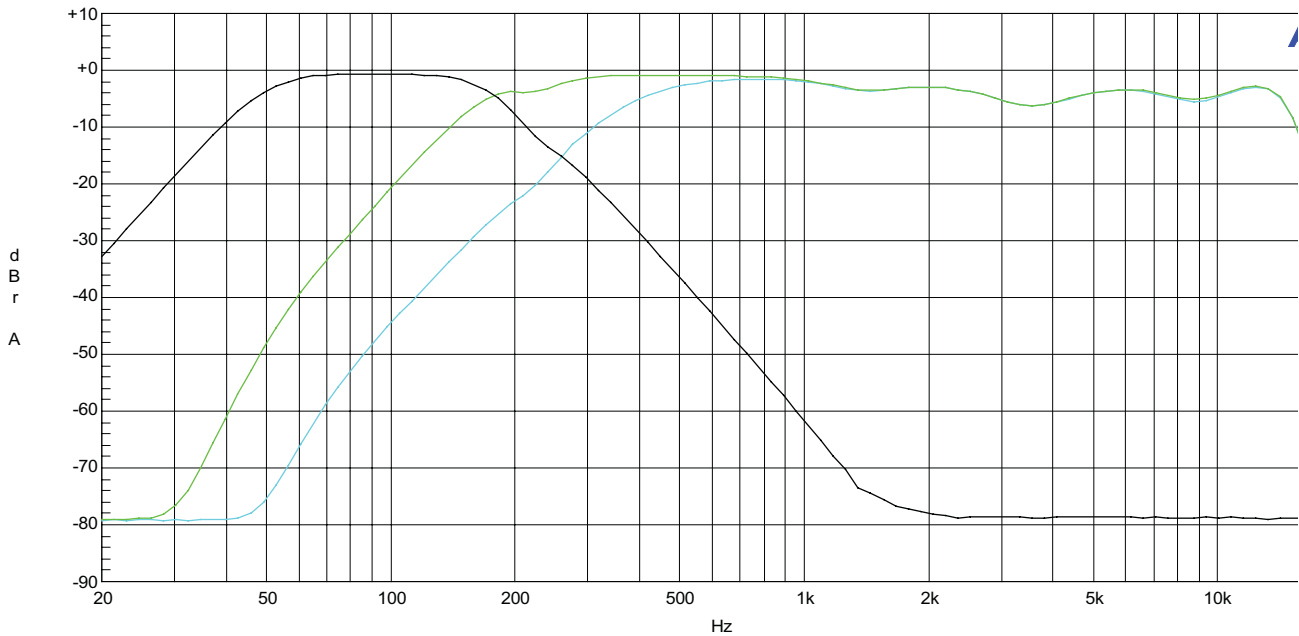
LT9702

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	M8
2	1	Green	Solid	1	Anlr.Ampl	Left	M8+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	M8+FS3 CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	M8+FS1B CH1
5	1	Magenta	Solid	1	Anlr.Ampl	Left	M8+MB CH3
6	1	Blue	Solid	1	Anlr.Ampl	Left	M8+FS3 CH3
7	1	Cyan	Solid	1	Anlr.Ampl	Left	M8+FS1B CH3

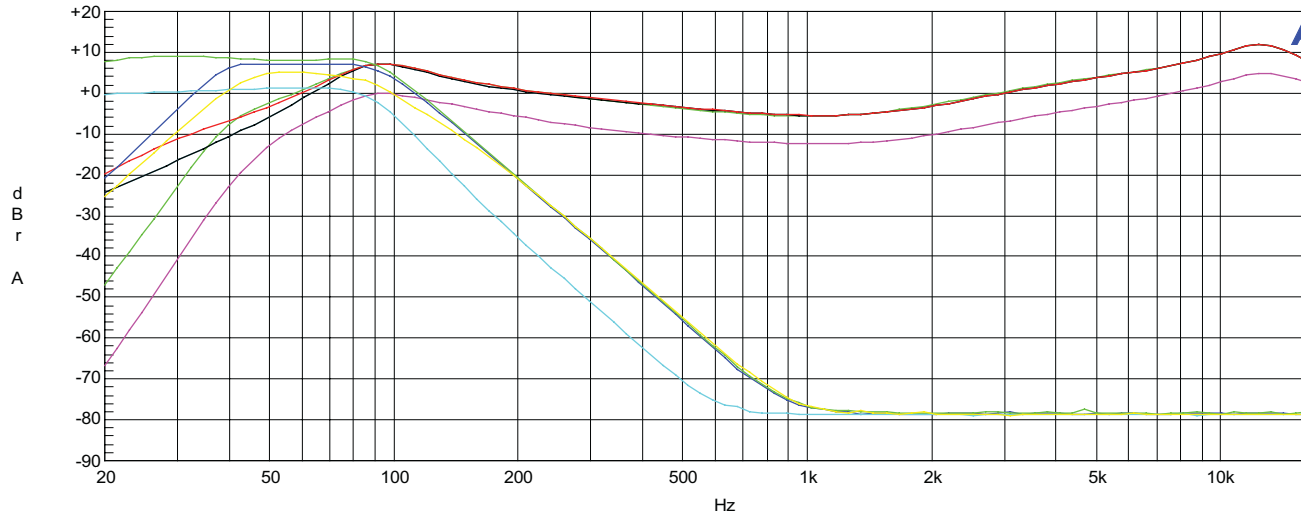
M8



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	M16
2	1	Green	Solid	1	Anlr.Ampl	Left	M16+FS3B CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	M16+FS3B CH3

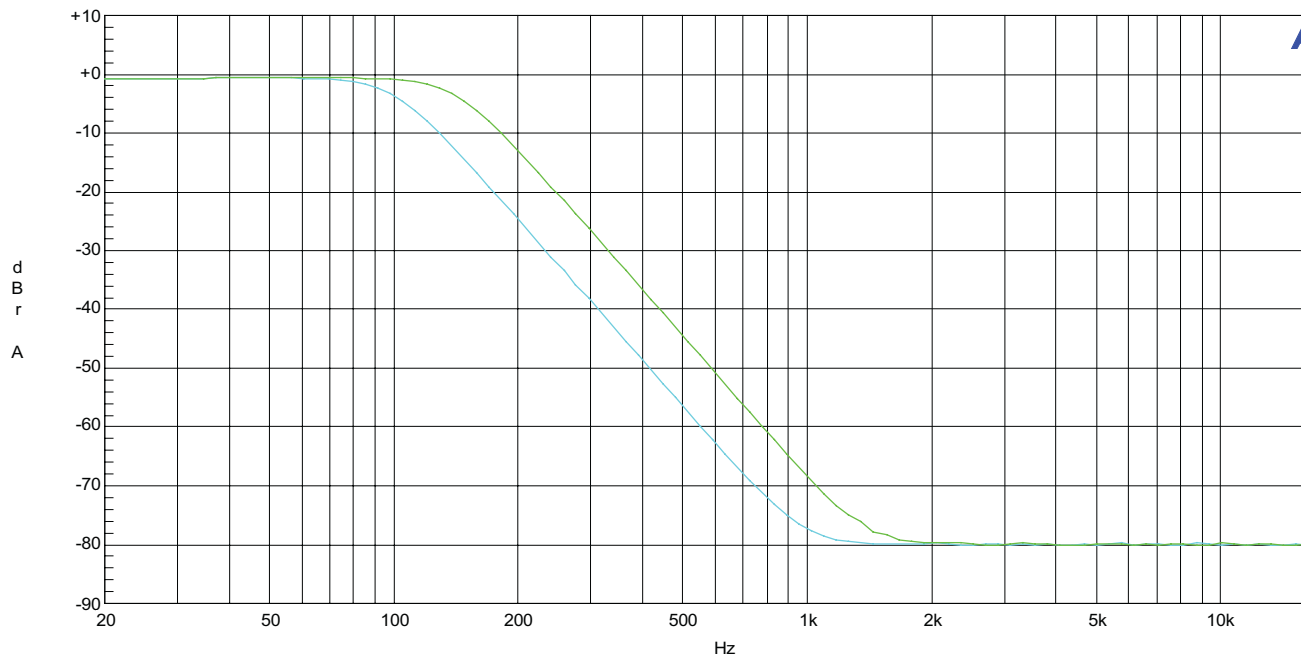
M16

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	M32
2	1	Green	Solid	1	Anlr.Ampl	Left	M32+MB CH1
3	1	Black	Solid	1	Anlr.Ampl	Left	M32+FS3 CH1
4	1	Red	Solid	1	Anlr.Ampl	Left	M32+FS1B CH1
5	1	Magenta	Solid	1	Anlr.Ampl	Left	M32+502BEX CH1
6	1	Blue	Solid	1	Anlr.Ampl	Left	M32+MB CH3
7	1	Cyan	Solid	1	Anlr.Ampl	Left	M32+FS3 CH3
8	1	Green	Solid	1	Anlr.Ampl	Left	M32+FS1B CH3
9	1	Yellow	Solid	1	Anlr.Ampl	Left	M32+502BEX CH3

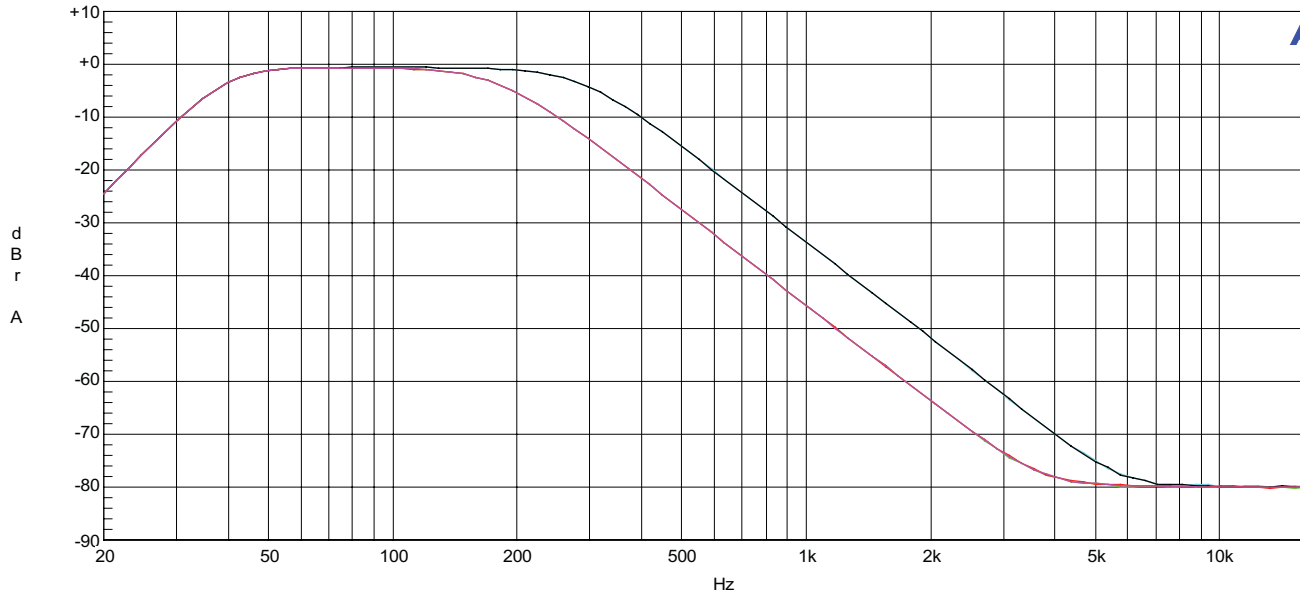
M32



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	FS3 100HZ LP
2	1	Green	Solid	1	Anlr.Ampl	Left	FS3 150HZ LP

FS3

Panaray® Digital Controller II EQ Curves



Sweep	Trace	Color	Line Style	Thick	Data	Axis	Comment
1	1	Cyan	Solid	1	Anlr.Ampl	Left	MB4 2XEF 280HZ
2	1	Green	Solid	1	Anlr.Ampl	Left	MB4 2XEF 180HZ
3	1	Black	Solid	1	Anlr.Ampl	Left	MB4 4XEF 280HZ
4	1	Red	Solid	1	Anlr.Ampl	Left	MB4 4XEF 180HZ
5	1	Magenta	Solid	1	Anlr.Ampl	Left	MB12/24 2XEF

Bass Array

Theory of Operation

The Panaray® System Digital Controller II is a 1RU chassis with two XLR audio inputs, and four XLR audio outputs. It incorporates an LCD display on the front panel for setup. Setup and menu navigation are accessed by using four directional push buttons, and a Select/Load button. Signal present (green) and Clip (red) indicators are visible on the front panel. The PSDC-II incorporates a universal switch-mode power supply and an IEC AC receptacle is on the rear panel. The rear panel includes an RS232 serial connection to facilitate software upgrades.

The following is a brief functional description of the PSDC-II PCB assemblies.

Main Power supply (switch-mode):

- Universal mains input, accepts 100-240VAC, 50/60Hz
- Generates +12VDC, -12VDC, +5V, and +3.3V
- Includes Standby mode that is controlled by the front panel Standby switch

Rear Panel PCB:

- Two analog XLR audio inputs
- Four analog XLR audio outputs
- RS232 serial port (DB9 connector)
- Output relays for On/Off pop control

Front Panel PCBs:

- LCD display module
- Navigation buttons
- Signal Present/Clip indicators
- Standby button

DSP PCB:

- DSP for audio processing with associated memory
- A/D and D/A conversion
- CPLD for miscellaneous logic, mute, LED drive, and transceiver functions
- Local voltage regulation for DSP Core
- Selectable analog gain circuitry

Switch-Mode Power Supply

Refer to the schematic sheet for the Switch Mode Power Supply PCB, part number 298155, for the following information. The information inside the brackets [] are the component's grid coordinates on the schematic sheet.

The power supply is a primary switch mode power supply (SMPS) that generates DC voltages for the other PCB's. It can be put into a standby mode using the on/off header XS2 [C6] on the SMPS.

Theory of Operation

Switch-Mode Power Supply (continued)

Digital circuits run on 5VDC and 3.3VDC to minimize power consumption. The DSP core voltage is 1.2V, and uses a separate regulator (U504) on the DSP PCB. All analog audio circuits are powered at +/- 12VDC to maintain a large dynamic range. Total power consumption is less than 15W. The power supply is non-repairable.

Input/Output PCB

Refer to the schematic sheet for the Input/Output PCB, part number 298152, for the following information. The information inside the brackets [] are the component's grid coordinates on the schematic sheet.

The Input/Output PCB contains the input and output XLR connections, signal conditioning circuits, On/Off pop control circuits, and the RS232 transceiver. The two balanced inputs from J601 and J602 [D2 and D4] are passed to the DSP PCB for Gain Control and A/D conversion. The four output signals, DAC CH1 to CH4, come from the DSP PCB, and the differential drive buffers connect to the output XLR connectors J701 [A5], J702 [B5], J703 [A11] and J704 [B11] through output relays K1 [A4], K2 [A10], K3 [B4] and K4 [B10] that are controlled by anti-pop circuits at turn-on and turn-off.

The DB9 connector P301 [D11] located on the rear panel, labeled COM, is also mounted on the input/output PCB. This connector is used to update the firmware/DSP code in the PSDC II. Refer to the software update procedure located in this manual for instructions.

Button and LED, Standby Switch and LCD Display PCBs

Refer to the schematic sheet for the Button and LED PCB and the Standby Switch PCB, part number 298160, for the following information. The information inside the brackets [] are the component's grid coordinates on the schematic sheet.

The front panel has three separate PCBs attached; the Button and LED PCB, the On/Off Switch PCB and the LCD Display PCB.

The first is the Button and LED PCB, which contains the five push buttons for menu navigation, and the signal present/Clip LEDs. The navigation and Select/load button are scanned by the DSP (U501) [DSP schematic sheet, location A/B 5/6]. The signal present and clip LEDs are driven by the DSP through U507 [DSP schematic sheet, B3].

The second PCB located on the front panel is the LCD Display PCB. This is a separate PCB because it incorporates chip-on-board technology that is non-repairable. This PCB assembly is bought as a module from a third-party vendor. If the display fails, the entire PCB assembly must be replaced. The display is a blue backlit LCD module that is controlled through the CPLD IC U502 [DSP schematic sheet, A10]. The Display PCB is fed from J303 [Button and LED PCB schematic sheet, C/D1] located on the Button and LED PCB. The control and display signals for the Display PCB are fed to the Button and LED PCB at J302 [Button and LED PCB schematic sheet, A/B1] from the DSP PCB at CN500 [DSP schematic sheet, B2].

Theory of Operation

Button and LED, Standby Switch and LCD Display PCBs (continued)

The third PCB assembly located on the front panel is the standby switch PCB. This is a 2PST switch (SW106, [D4]) that controls the remote On/Off feature on the SMPS and is used to put the unit into Standby mode when not in use. The remote On/Off feature on the SMPS is also used by the anti-pop circuit on the Input/Output PCB. J105 [C2] connects to the I/O board, carrying the relay power enable/disable signal to control relays K1 – K4.

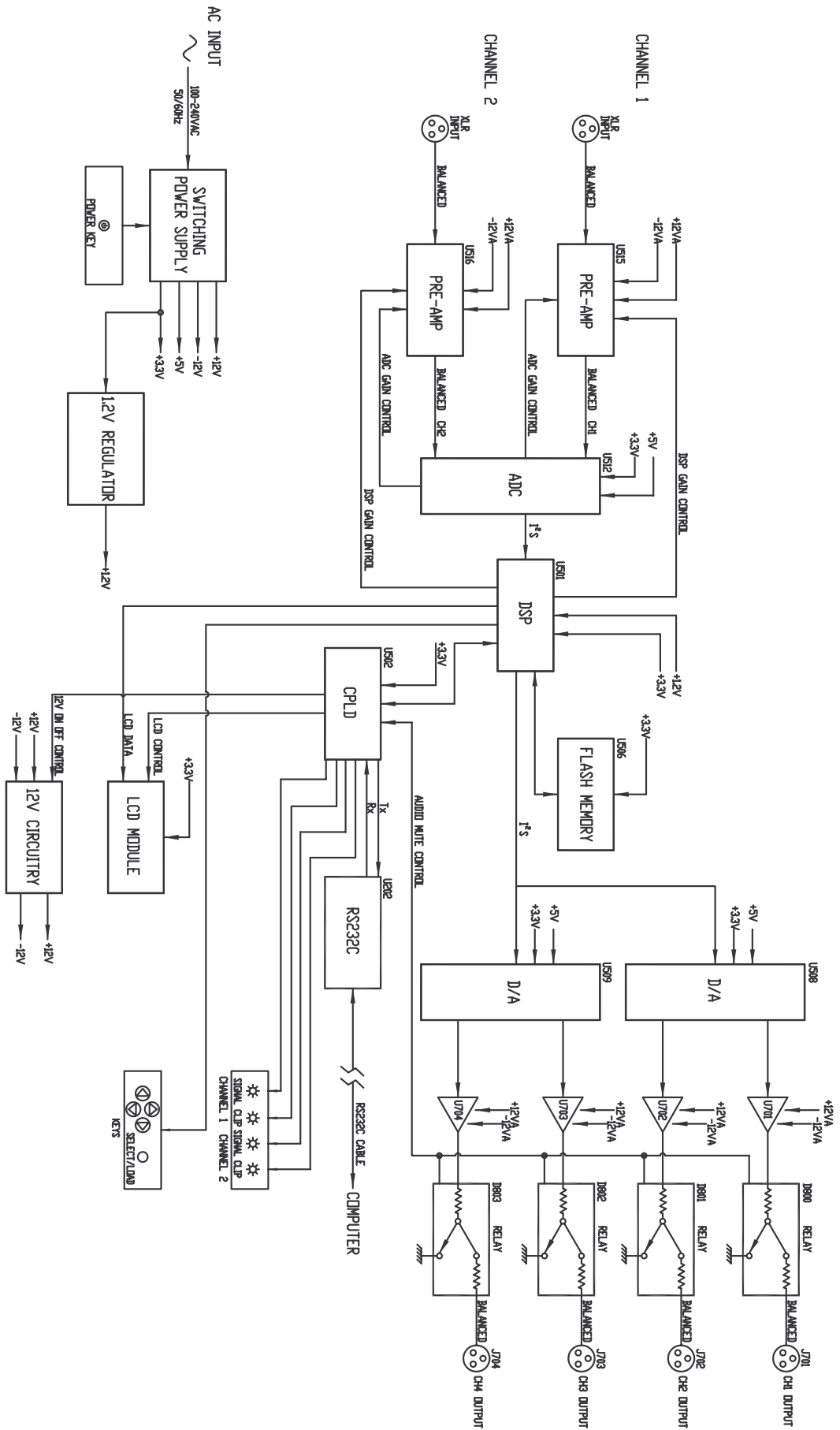
Digital Signal Processor PCB

Refer to the schematic sheet for the Digital Signal Processor PCB, part number 298154, for the following information. The information inside the brackets [] are the component's grid coordinates on the schematic sheet.

The DSP PCB contains the signal processing subsystem, the heart of which is the TI TMS320D707 microprocessor IC U501 [A/B 5/6]. The two differential audio inputs from J601 and J602 come from the Input/Output PCB, and travel through a software selectable differential gain circuit using the OPA1632 U516 [C/D3] and ADG452 U514 [C/D5]. From there, they enter U512 [C10] (the PCM1804 high performance differential A/D converter). Signal processing is done at 44.1 kHz, 24 Bit within the DSP subsystem. Once processed, the four output signals are sent to U508 [B9] and U509 [C9] (the differential D/A converters) and then over to the Input/Output PCB via CN502 [C11]. J501 [A8] accepts a JTAG header for interrogating the DSP chip. J500 [A9] is used to program the CPLD (U502, [A10]) on the production line. The system uses a 4Mbit flash memory (U500 [A2]). All code (except the CPLD) is up-loadable over the serial port to facilitate field upgrades.

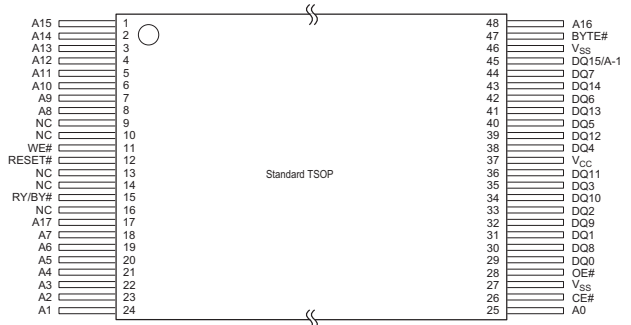
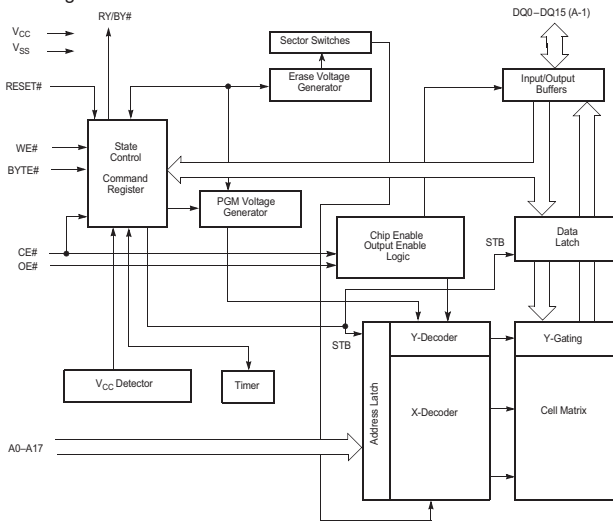
The main system oscillator is 22.5792MHZ Y500, [B9]. It is conditioned by the CPLD, and presented to the DSP which in-turn generates the necessary clocks for the system (A/D, D/A, LCD).

Panaray® Digital Controller II Block Diagram



Integrated Circuit Diagrams

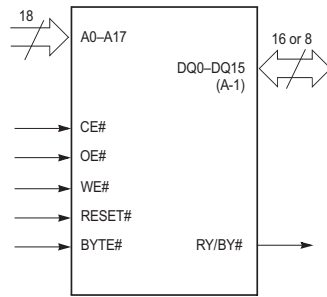
Block Diagram



Pin Configuration

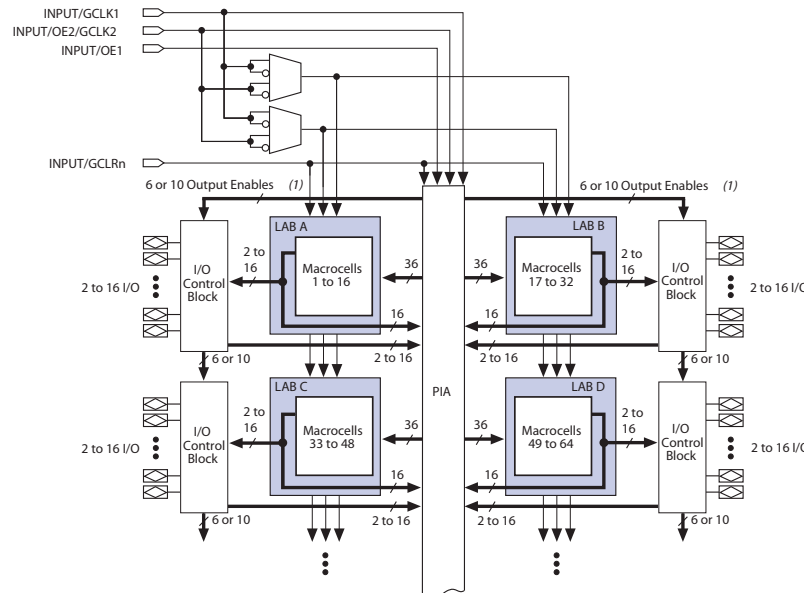
- A0-A17 = 18 addresses
- DQ0-DQ14 = 15 data inputs/outputs
- DQ15/A-1 = DQ15 (data input/output, word mode), A-1 (LSB address input, byte mode)
- BYTE# = Selects 8-bit or 16-bit mode
- CE# = Chip enable
- OE# = Output enable
- WE# = Write enable
- RESET# = Hardware reset pin, active low
- RY/BY# = Ready/Busy# output
- V_{CC} = 3.0 volt-only single power supply (see Product Selector Guide for speed options and voltage supply tolerances)
- V_{SS} = Device ground
- NC = Pin not connected internally

Logic Symbol

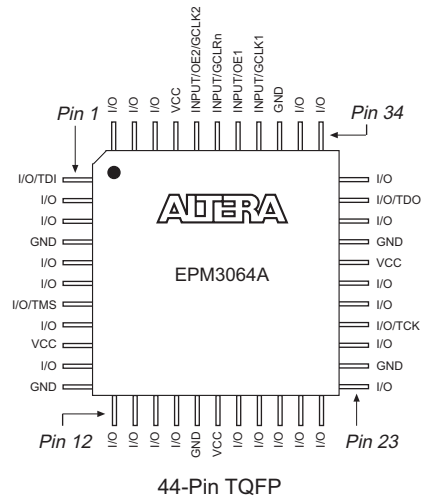


U500 S29AI004D, 4MB Flash Memory IC

Block Diagram



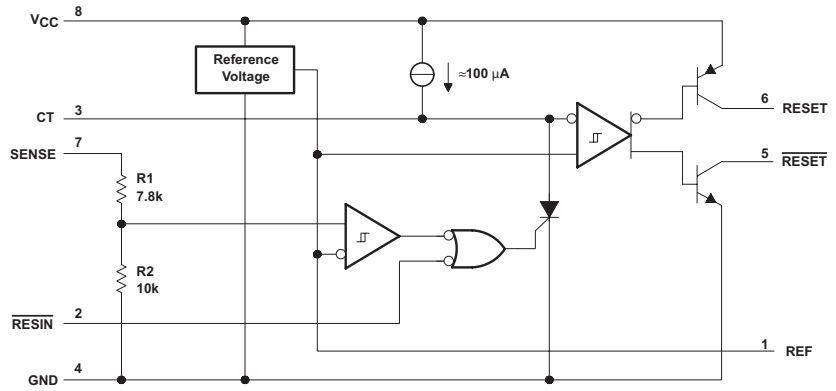
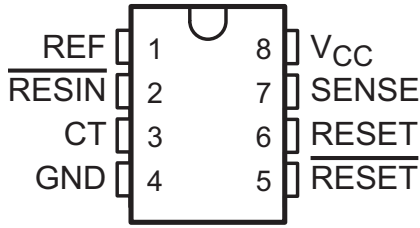
(1) The EPM3064A device has six output enables.



U502 EPM3064A-10 PLD IC

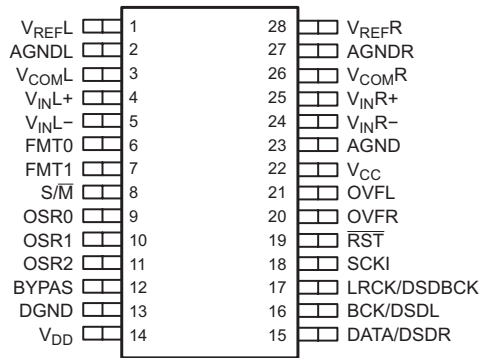
Integrated Circuit Diagrams

(TOP VIEW)

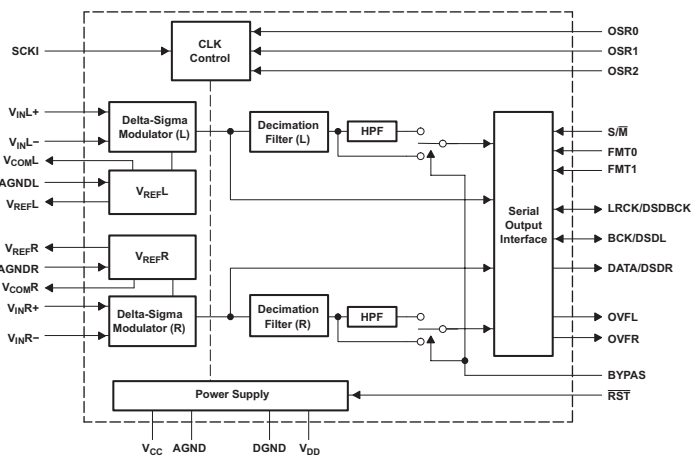


U503, TL7705BCD Supply Voltage Supervisor IC

PIN ASSIGNMENTS
(TOP VIEW)



FUNCTIONAL BLOCK DIAGRAM

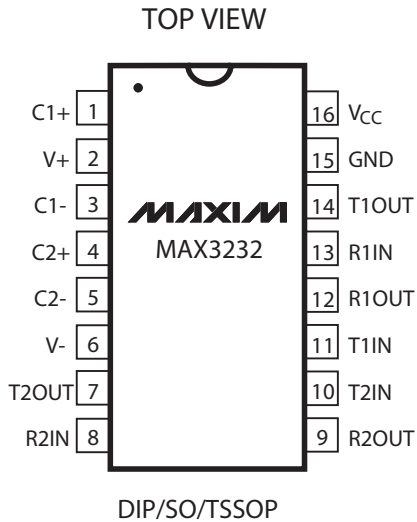


Terminal Functions

TERMINAL NAME	PIN	I/O	DESCRIPTIONS
AGND	23	-	Analog ground
AGNDL	2	-	Analog ground for V _{REFL}
AGNDR	27	-	Analog ground for V _{REFR}
BCK/DSDL	16	I/O	Bit clock input/output in PCM mode. L-channel audio data output in DSD mode.
BYPAS	12	I	HPF bypass control. High: HPF disabled, Low: HPF enabled ⁽¹⁾
DATA/DSDR	15	O	L-channel and R-channel audio data output in PCM mode. R-channel audio data output in DSD mode. (DSD output, when in DSD mode)
DGND	13	-	Digital ground
FMT0	6	I	Audio data format 0.
FMT1	7	I	Audio data format 1.
LRCK/DSDBCK	17	I/O	Sampling clock input/output in PCM and DSD modes.
OSR0	9	I	Oversampling ratio 0.
OSR1	10	I	Oversampling ratio 1.
OSR2	11	I	Oversampling ratio 2.
OVFL	21	O	Overflow signal of L-channel in PCM mode. This is available in PCM mode only.
OVFR	20	O	Overflow signal of R-channel in PCM mode. This is available in PCM mode only.
RST	19	I	Reset, power-down input, active-low ⁽²⁾
SCKI	18	I	System clock input; 128 f _S , 256 f _S , 384 f _S , 512 f _S , or 768 f _S .
S/M	8	I	Slave/master mode selection.
V _{CC}	22	-	Analog power supply
V _{COML}	3	-	L-channel analog common-mode voltage (2.5 V)
V _{COMR}	26	-	R-channel analog common-mode voltage (2.5 V)
V _{DD}	14	-	Digital power supply
V _{INL-}	5	I	L-channel analog input, negative pin
V _{INL+}	4	I	L-channel analog input, positive pin
V _{INR-}	24	I	R-channel analog input, negative pin
V _{INR+}	25	I	R-channel analog input, positive pin
V _{REFL}	1	-	L-channel voltage reference output, requires capacitors for decoupling to AGND
V _{REFR}	28	-	R-channel voltage reference output, requires capacitors for decoupling to AGND

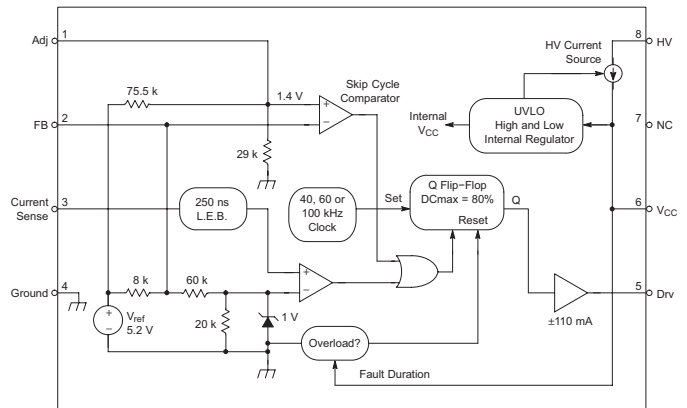
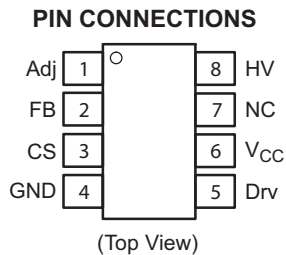
U512, 24-bit Stereo A/D Converter IC

Integrated Circuit Diagrams



PIN	NAME	FUNCTION
MAX3232		
—	EN	Receiver Enable. Active low.
1	C1+	Positive Terminal of Voltage-Doubler Charge-Pump Capacitor
2	V+	+5.5V Generated by the Charge Pump
3	C1-	Negative Terminal of Voltage-Doubler Charge-Pump Capacitor
4	C2+	Positive Terminal of Inverting Charge-Pump Capacitor
5	C2-	Negative Terminal of Inverting Charge-Pump Capacitor
6	V-	-5.5V Generated by the Charge Pump
7, 14	T_OUT	RS-232 Transmitter Outputs
8, 13	R_IN	RS-232 Receiver Inputs
9, 12	R_OUT	TTL/CMOS Receiver Outputs
10, 11	T_IN	TTL/CMOS Transmitter Inputs
15	GND	Ground
16	V _{CC}	+3.0V to +5.5V Supply Voltage
—	SHDN	Shutdown Control. Active low.
—	N.C.	No Connection
—	MBAUD	MegaBaud Control Input. Connect to GND for normal operation; connect to V _{CC} for 1Mbps transmission rates.
—	R_OUTB	Noninverting Complementary Receiver Outputs. Always active.

U202, MAX3232 RS232 Transceiver IC



NCP1200

PIN FUNCTION DESCRIPTION

Pin No.	Pin Name	Function	Description
1	Adj	Adjust the Skipping Peak Current	This pin lets you adjust the level at which the cycle skipping process takes place.
2	FB	Sets the Peak Current Setpoint	By connecting an Optocoupler to this pin, the peak current setpoint is adjusted accordingly to the output power demand.
3	CS	Current Sense Input	This pin senses the primary current and routes it to the internal comparator via an L.E.B.
4	GND	The IC Ground	
5	Drv	Driving Pulses	The driver's output to an external MOSFET.
6	V _{CC}	Supplies the IC	This pin is connected to an external bulk capacitor of typically 10 μF.
7	NC	No Connection	This un-connected pin ensures adequate creepage distance.
8	HV	Generates the V _{CC} from the Line	Connected to the high-voltage rail, this pin injects a constant current into the V _{CC} bulk capacitor.

U1, NCP1200 PWM Current Mode Controller IC

Service Manual Revision History

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
10/06	00	Document released at revision 00.	Service manual release	All

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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