ControlSpace® ESP-00 II Engineered Sound Processor, CC-16 and CC-64 Controllers (US and non-US units)

CC-64 Control Center

CC-16 Zone Controller

Service Manual

Reference Number 370610-SM Rev. 00

CONTENTS

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. Refer to the Hi-Pot and Ground Bond test information located on pages 81 and 82 of this service manual.

The Hi-Pot test MUST be performed on any unit where the repair required removal of the amplifier's top cover.

The ground bond test MUST be performed on any unit where the repair affects the ground wire connection inside the chassis.

These tests MUST be performed to ensure that the product is safe to return to the customer after a repair.

CAUTION: The Bose® ControlSpace® ESP-00 II System and CC-16 / CC-64 Controllers contains no user-serviceable parts. To prevent warranty infractions, refer servicing to warranty service stations or factory service.

WARRANTY

The Bose ControlSpace ESP-00 II System and CC-16 / CC-64 Controllers are covered by a limited 5-year transferable warranty.

PRODUCT DESCRIPTION

Overview

The Bose® ControlSpace® ESP-00 Series II engineered sound processor is a powerful audio DSP delivering high quality signal processing and control using flexible card-slot architecture. Up to 8 cards can be inserted for support of up to 64 channels of audio.

ControlSpace Designer™ software, available as a free download from pro.Bose.com, enables PC setup, control, and monitoring of Bose ControlSpace ESP processors, controls, and PowerMatch® amplifiers over standard Ethernet networks. A crossover network cable is supplied in the box with the processor for direct-connection from the PC to the ESP-00 II processor. Details on making a network connection to the ESP-00 II processor can be found on page x of this manual.

For information on how to install and use the ControlSpace Designer software, the ControlSpace Designer Software Guide can be downloaded as a PDF from pro.Bose.com or can be found inside the ControlSpace Designer software help system.

Online Resources

pro.Bose.com - Main resource for product information, downloads, tech data sheets.
proForum.Bose.com - Register and participate in forum user groups to post questions, interface with Bose staff, and share application information on this product.

Product Features

• **Flexible I/O** through a customizable card-frame design. With a powerful DSP core, the ESP-00 II processer accommodates up to 64 channels of audio over 8 open card slots, and general purpose I/O (GPIO) expansion up to 16 control inputs and 16 control outputs.

• **High-quality, open-architecture DSP** supports 48 kHz sample rate/24-bit conversion, uses a floating-point DSP and operates at low latency for sound system precision.

• **I/O expansion cards** cover a number of audio channel requirements from mic/line analog to Dante™ networking. These cards offer different audio options to populate the 8 open card slots.

• **Support for popular network protocols.** Allowing integrators more flexibility in selection, the ESP-00 II processor supports popular audio networking protocols today – Dante and CobraNet® – for interconnection with compatible products.

• **A large suite of signal processing algorithms** is available, such as automatic mic mixing, multiband graphic and parametric EQs, Bose loudspeaker EQ libraries, signal generators, routers, mixers, AGCs, duckers, gates, compressors, source selectors and delays.

• **A variety of control options.** The ControlSpace ESP-00 II processor is compatible with elegant Bose CC-64, CC-16 and CC-4 user control interfaces and can integrate with industry-standard control systems using a comprehensive serial protocol through the onboard RS-232 and Ethernet ports.

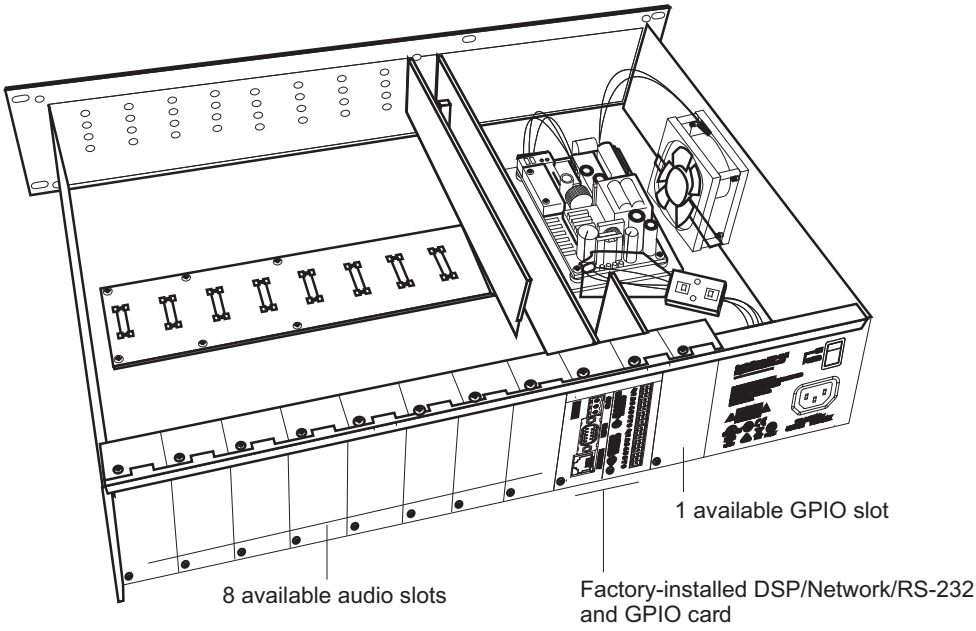
• **ControlSpace Designer software** is used to configure both the signal processing and control capabilities of ControlSpace ESP processors. With ControlSpace Designer software, it is now possible to design, configure, control and monitor all Bose networked system electronics from a single software application.

PRODUCT DESCRIPTION

Available Accessories

Accessory Cards

The ControlSpace® ESP-00 Series II processor has eight available audio expansion slots and supports up to 64 audio channels (up to 32 analog audio channels). 8 control inputs and 8 control outputs are supplied with the ESP-00 II processor and can be doubled to 16 inputs and 16 outputs by installing an optional GPIO Expansion card into the open GPIO 2 slot. Four DSP processors are employed and cannot be expanded further in this model.



Open card slots, ESP-00 II processor, cover removed

Note: No audio cards are pre-installed in the ESP-00 II processor so the unit can be custom-configured to meet the needs of the appli-cation. Please order accessory cards as needed for your application.

At time of print, the following expansion cards are available. For further information on these cards, and to view new cards that are available, please visit pro.Bose.com where an online interactive configurator tool provides technical details, assistance in populating expansion cards, and additional information about user controls.

- Dante™ network card (PC 359843-0020)
- CobraNet® I/O expansion card (PC 311506)
- ESPLink 8-Channel output card (PC 350513-0010)
- 4x4 mic/line input/output card series II (PC 041915)
- SDR 4-Ch mic/line input card (PC 041917)
- SDR 4-Ch line output card (PC 041916)
- EDR line-level input card (PC 041764)
- EDR line-level output card (PC 041763)
- AES3 eight-channel input card (PC 041765)
- AES3 eight-channel line output card (PC 041766)
- Surround sound decoder input card (PC 302210)
- GPIO Expansion card (PC 041768)

PRODUCT DESCRIPTION

CC-16 Zone Controller

The Bose® ControlSpace® CC-16 zone controller is an elegant wall-mounted device designed to provide end-user control of ControlSpace systems. Custom programming allows the CC-16 to control a variety of the system elements, from switching audio sources to selecting “scenes” or system configurations. The CC-16 features a bitmap LCD and four buttons for displaying and controlling the system settings.

The CC-16 connects to the ControlSpace Engineered Sound Processor (ESP-00 II) at the RS-485 port. Up to fifteen CC-16 units can be used per each ESP-88 to provide localized control of the system. The maximum distance from ESP-00 II to CC-16 is 2000 feet. As a networked device, remote reprogramming is possible at any time.

Features and Functions
- 122 x 32 pixel backlit blue LCD
- LCD displays volume level and source/scene/preset setting
- Select up/down buttons for selecting sources or scenes
- Volume up/down buttons for controlling one or more gain controls
- IR receiver (for IR remote controls)
- RS-485 network supports up to fifteen CC-16 units per ESP-88
- DIP-switch for specifying network address and termination
- Universal mounting bracket
- UL and CE listed

CC-64 Control Center

The Bose ControlSpace CC-64 control center is an elegant, programmable, networked controller that provides users with a simple and logical interface to their ControlSpace system. Because the controller is completely programmable, you can customize the ControlSpace system, making only certain controls available, and simplifying user interaction with the system.

The CC-64 provides four rotary encoders with circular LED arrays for a userfriendly method of managing gain settings or scene selections. A fifth encoder provides control over programmed “scenes” or presets. Four bank switch buttons redefine the four Gain/Selector control knobs, providing quick access for up to 16 system gain controls or selectors. A large, 2-line by 40-character backlit LCD provides the user with the names of the system elements they are controlling (gains, presets, etc.).

Using custom programming, the CC-64 can manage a variety of system elements, including audio sources, scene selection settings, and specific system configurations. Each gain control can be ganged so that a single control can be mapped to as many as sixteen system gains. The CC-64 also supports a “custom mode” – intended for installers, not end users – in which any parameter in the system can be viewed and changed using the LCD display and control knobs.

PRODUCT DESCRIPTION

CC-64 Control Center (continued)

The CC-64 is a 10Base-T Ethernet device. Up to sixteen CC-64s can be used per ControlSpace® system.

Features

- 2-line by 40-character backlit LCD
- Sixteen Gain/Selector controls (four banks of four)
  - Four rotary encoders for changing the gain level or selecting scenes/sources
  - Each encoder includes a 15-segment LED array for indicating the control's current level or state
  - The encoders feature push buttons for muting gain controls or making selections
  - Ten character descriptions of the gain controls appear on the LCD above the encoder
- Four bank switch buttons with label area
- Lock function in software prevents local changes
- 10Base-T Ethernet network based
- Sixteen CC-64s per ControlSpace system
- Power over Ethernet cable or separate cable
- LEDs for status, link and network transmit/receive
- Fits standard 5-gang electrical box
- UL6500 listed and CE approved

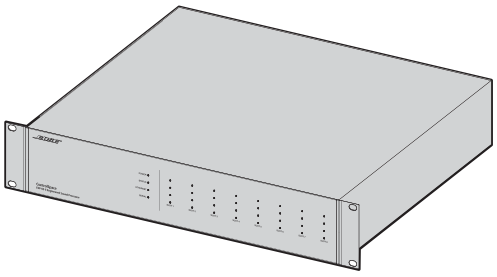
Functions

1. LCD
2. Preset/Scene selector
   - Rotate to view presets. Push to select.
   - Push and hold for 5 seconds to enter Custom mode.
3. Network link indicator
4. Network receive indicator
5. Network transmit indicator
6. Bank select buttons (4). Press to select one of four bank controls
7. Bank select indicators (4). Indicates the currently selected bank
8. Bank select label area. 1.25" (31.75 mm) x .35" (9 mm) area for custom labels.
   - Accepts standard 3/8" (9 mm) label stock.
9. Gain/Selector control knob. Rotary encoder (no stops). Push to mute.
10. Gain/Selector level indicators (15 levels/selections)

SPECIFICATIONS

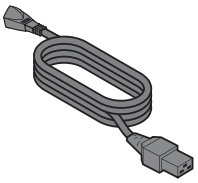
Integrated DSP	ESP-00 Series II
Signal Processor	Four 32-bit floating-point digital signal processors, 200 MHz
Maximum Calculation	6.4 GIPS / 4.8 GFLOPS
Delay	288 s
Audio Latency	860 µs (analog in to analog out)
A/D and D/A Converters	24-bit
Sample Rate	48 kHz
Control Inputs	
Inputs (Control)	8 analog or digital inputs, 5.1 k internal pull-up resistor to 5 V, 3.81 mm Euroblock, 9-pin
Analog Input Voltage Range	0 V to 3.3 V (maximum 5 V)
Digital Input Voltage Range	0 V to 3.3 V (threshold voltage = 1.6 V)
Control Outputs	
Outputs (Control)	8 digital outputs, 10 k Ω internal pull-up resistor to 5 V, 3.81 mm Euroblock, 9-pin
Output Voltage	High: 5 V @ 0.5 mA Low: < 1 V @ 10 mA, open collector
Indicators and Controls	
LED Status Indicators	Power, Status, Ethernet/Serial (RS-232 + CC-16)
Audio Signal Indication	Green (-60 to -21 dBFS), Yellow (-20 to -7 dBFS), Red (-6 dBFS to Clip)
Electrical Specifications	
Mains Voltage	85 VAC-264 VAC 50/60 Hz with PFC
AC Power Consumption	< 35 VA typical / < 70 VA max at < 95°F (35 °C) ambient
Mains Connector	IEC 60320-C14 (Inlet)
Power Dissipation	70 W (239 BTU, 60 kcal)
Physical	
Dimensions	3.5" H x 19.0" W x 13.0" D (88 mm x 483 mm x 331 mm)
Net Weight	10.8 lb (4.9 kg)
Operating Temperature	32 °F - 104 °F (0 °C - 40 °C)
Cooling System	Internal fan
General	
PC Configuration Software	ControlSpace® Designer™ software
Network Control	Ethernet (RJ-45), 10Base-T
Communication Ports	RS-232 (DB9M, DTE), Bose CC-16 (5.08 mm Euroblock 3-pin)
Expansion Slots	8 analog/digital audio, 2 GPIO (1 occupied)
Audio Channel Capacity	64 (bi-directional, digital and/or analog)

Carton Contents

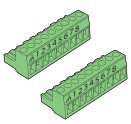


ESP-00 II processor

Installation Guide

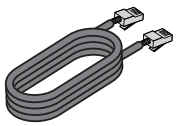


Power cord



Control I/O connectors (2)

CC-16 connector



F/UTP Cat5e crossover network cable

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. The individual parts located on the PCBs are listed in the Electrical Part List.

2. 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.

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.

PACKAGING PART LIST

ControlSpace® ESP-00 II Chassis

Item Number	Description	Vendor Part Number	Bose® Part Number	Qty.	Note
1	CARTON	BSET5141-01161	370969-0010	1	
2	CARTON SHEET, L430X160MM	BSET5111-01021	370904-0010	2	
3	EPE FOAM	BSET5741-01021	312474	2	
4	POLY BAG, W217XL320X0.05MM	BSET5542100112	-	3	
5	TERMINAL BLOCK, P5.08MM, 3 POS, 2ESDL-03P	BSET4013-00419	305536	9	
6	TERMINAL BLOCK, P5.08MM, 3 POS, 2ESDL-03P-OR	BSET4013-00519	305535	8	
7	PLUG FOR TERMINAL BLOCK, 9 POS, P3.81, EC381V-09P	BSET4019-00119	305532	2	
8	CAT-5 ETHERNET COMPUTER CABLE	BSET3881-01161	-	1	
9	POLY BAG, L300XW150MM, SELF LOCK	BSET5541500112	-	1	
10	POLY BAG, W600X550MM	BSET5546000212	-	1	
11	INSTALLATION MANUAL	BSET535E101162	372645-0010	1	
12	POLY BAG, W217XL320X0.05MM	BSET5542100112	-	1	
-	POWER CORD, 120V, US/CAN POWER CORD, 220V, EURO POWER CORD, 100V, JAPAN POWER CORD, 240V, UK POWER CORD, 240V, AUS	(GPE) 701A-0090+0 (GPE) 701A-0070+0 (GPE) 701A-0100+0 (GPE) 701A-0060+0 (GPE) 701A-0080+0	350745-0010 350747-0010 350749-0010 350748-0010 350746-0010	1	3 ⚠
-	SHEET, WARRANTY	-	373988-0010	1	
-	AU/NZ WARR SLIP SHEET 8.5 X 5.5	-	355731-0010	1	

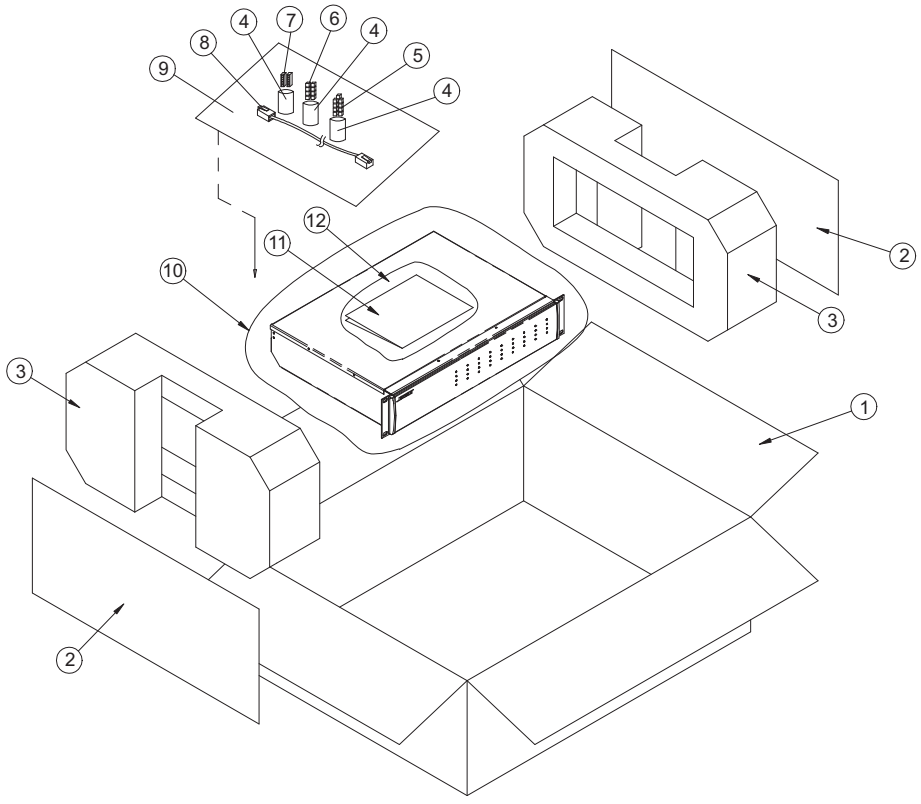


Figure 1. ESP-00 II Chassis Packing View

PACKAGING PART LIST

ControlSpace® CC-16 Controller

Item Number	Description	Qty.	Part Number	Note
1	Foam, White EPE	1	-	4
2	CC-16 Controller	1	041761	2
3	Anti-static bag, 150 x 180 x 0.03MM	1	-	4
4	Paper Tray	1	-	4
5	Installation Manual, English Language	1	285042	
6	White box	1	-	4
7	Screw, #6-32x0.7", Phillips, ZINC (US/Japan)	4	-	4
8	Bag, Poly, 40 x 60MM	2	-	4
9	Screw, M4.0x18, Phillips, ZINC (Europe)	4	-	4
-	Power Supply, 15VDC, 5W, 100-240VAC Input (not packaged w/CC-16)	1	041762	3 ⚠

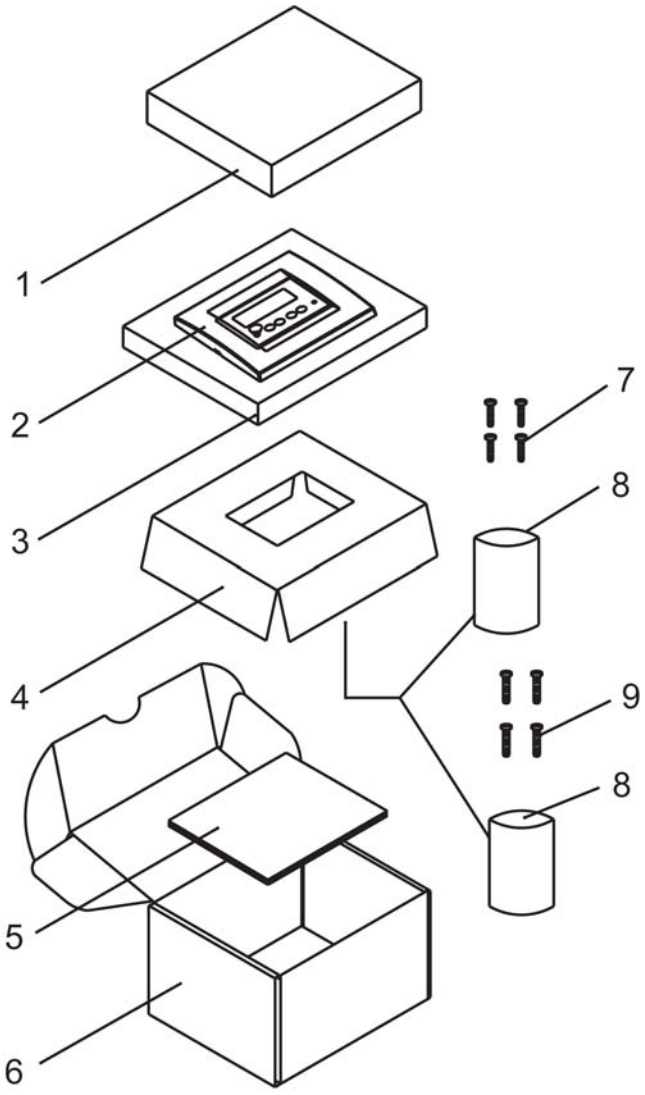


Figure 2. CC-16 Controller Packing View

PACKAGING PART LIST

ControlSpace® CC-64 Controller

Item Number	Description	Qty.	Part Number	Note
1	Install Guide, CC-64	1	285041	
2	EPE Foam, 330X180X15MM	1	-	4
3	Bag, PE, Anti-Static, 330X180X0.03MM	1	-	4
4	CC-64 Controller	1	041760	2
5	Screw, US, MSF, #6-32X0.7, MS, ZN-WH	4	-	4
6	Bag, Poly, 40X60MM	1	-	4
7	Tray, Foam, EPE, 330x180x45MM	1	-	4
8	Terminal Block, 2P, P5.08, 2ESDV-02P	1	-	4
9	Bag, Poly, 100X60MM	1	-	4
10	White Box, W9B	1	-	4
11	Computer UTP LAN Cable, 2M, CAT 5	1	-	4
-	Power Supply, 15VDC, 5W, 100-240VAC Input (not packaged w/CC-64)	1	041762	3 ⚠

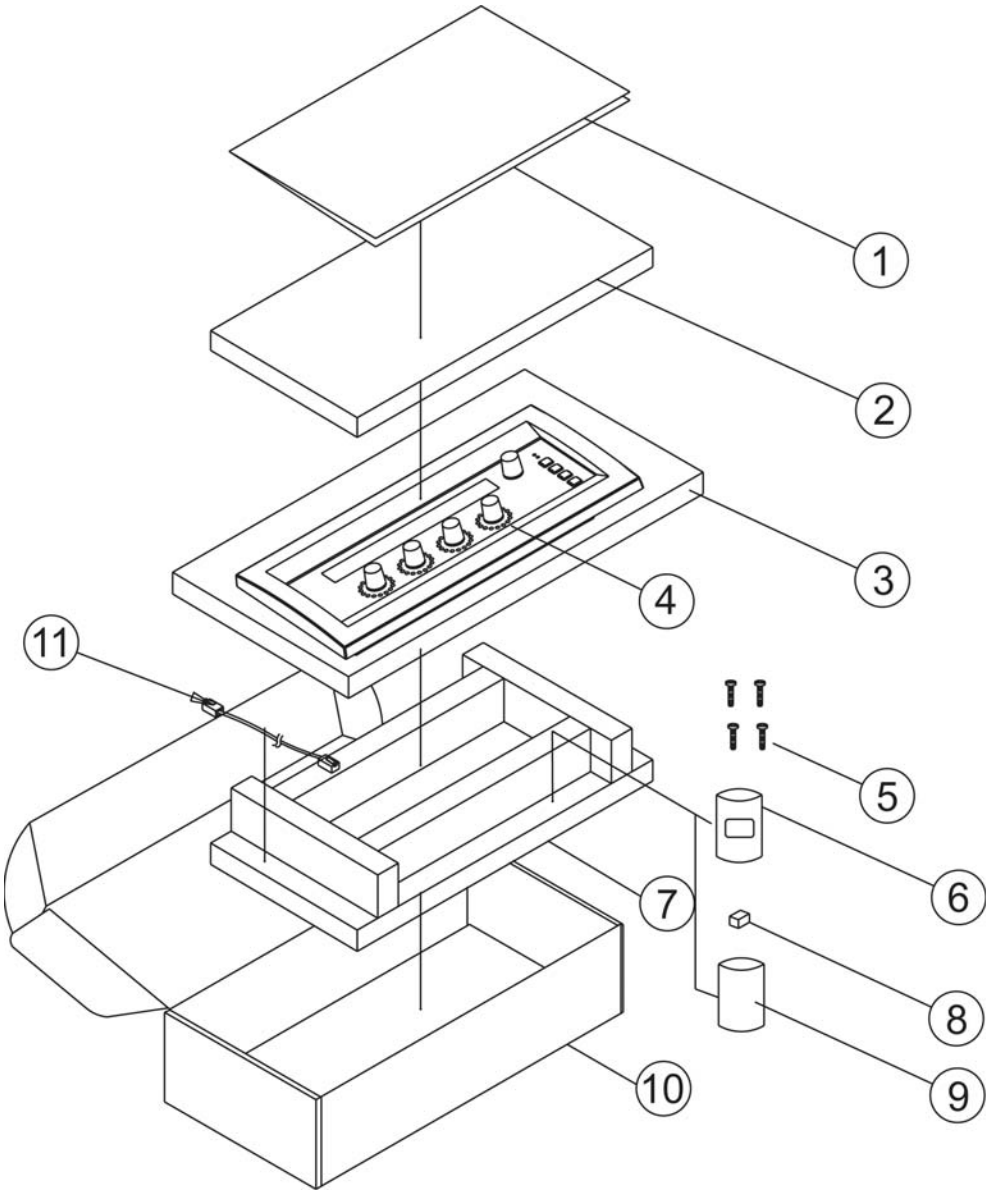


Figure 3. CC-64 Controller Packing View

MAIN PART LIST

ControlSpace® ESP-00 II Chassis (see Figure 4)

Item Number	Description	Vendor Part Number	Bose® Part Number	Qty.	Note
1	FRONT PANEL, ALUMINUM	BSET8571-01162	369714-0010	1	
2	LIGHT PIPE	BSET70G1-01162	369716-0010	9	
3	LIGHT GUIDE, SLEEVE	BSET7211-01162	369717-0110	11	
4	FRONT PANEL, STEEL	BSET8571-01161	369715-0110	1	
5	RACK EAR, METAL BRKT, 2U	BSET8222-01163	361005-0110	2	
6	SCREW, RACK EAR, M4X12PH	BSET6512E00111	370494-0110	4	
7	SCREW, FRONT PANEL, M3X4-MSF	BSET6532D00111	370495-0110	4	
8	SCREW, M3.5, BTITE, SELF TAPPING	BSET6552C00211	-	6	2
9	CHASSIS	BSET8341-01162	-	1	2
10	PCB FIXED STICK, BELOW	BSET71A1-01021	278504-001	1	
11	DSP HI-PERF EXPANSION PCB	-	720112-001S	1	
12	DSP PCB ASSY, STD PERF.	-	720111-001S	1	
13	CABLE CLAMP, NYL, 6.2MM	BSET7.31-01021	-	1	2
14	CABLE CLAMP, NYL, 3.0MM	BSET7031-02021	-	1	2
15	RUBBER RIVET, BLK	BSET7141-01022	331160-0010	4	
16	FAN, DC, LOW NOISE	BSET24CS101022	331159-0100	1	3 ⚠
17	SCREW, MSB, M3X4	BSET6512E00311	-	56	2
18	POWER SUPPLY PCB ASSY	BSET80A1-01021	331162-001S	1	3 ⚠
19	GPIO PCB ASSY, 8 IN, 8 OUT	BSE11A1	299005	1	
20	AC POWER SWITCH, ROCKER, SPST, 125V/15A	BSET2241100112	-	1	2,3 ⚠
21	SOCKET, AC INLET, IEC, 250V/10A	BSET4013-0011C	-	1	2,3 ⚠
22	REAR PANEL, GIO	BSET8221-03021	278516-0110	1	
23	REAR PANEL, DSP	BSET8221-04021	278515-0110	1	
24	METAL COVER	BSET8331-01162	278505-0110	1	
25	STAY	BSET8331-02021	278508-001	1	
26	BLANK PANEL	BSET8221-06021	278518-0110	9	
27	PCB FIXED STICK, ABOVE	BSET71A1-02021	278503-001	2	
28	MOTHERBOARD PCB ASSY, REV. C	-	720110-001S	1	
29	WASHER	BSET6335-00111	-	12	2
30	SCREW, MSF, M3X4	BSET6532E00111	-	4	2
31	STANDOFF, M3X18.5MM	BSET67G-C00111	-	4	2
32	HEX NUT W/NYLON INSERT, SI, M3MM	BSET8925F00111	-	2	2
33	SCREW, SI, MSB, M3X6MM	BSET6512E00211	-	6	2
34	SCREW, SI, MSB, M3X8MM	BSET6512E00411	-	2	2
35	WIRE ASSY W/2HSG, 20 AWG (ASTEC POWER SUPPLY WIRING HARNESS)	BSET3721-04022	318935-001S	1	3
36	WIRE HSG/TER, 20 AWG, L=160MM	BSET37D1-02021	-	1	2
37	WIRE, 2 TER, 18 AWG, L=160MM, Y/G	BSET37C1-02022	-	1	2
38	WIRE ASSY W/2 TER, 18 AWG	BSET37C1-01022	-	1	2
39	WIRE ASSY W/FEMALE, 20 AWG, L=80MM	BSET37A1-01021	-	1	2
40	WIRE W/2HSG, 26 AWG, GIO	BSET3721-05022	-	1	2

MAIN PART LIST

ControlSpace® ESP-88C/ESP-00 Chassis (continued)

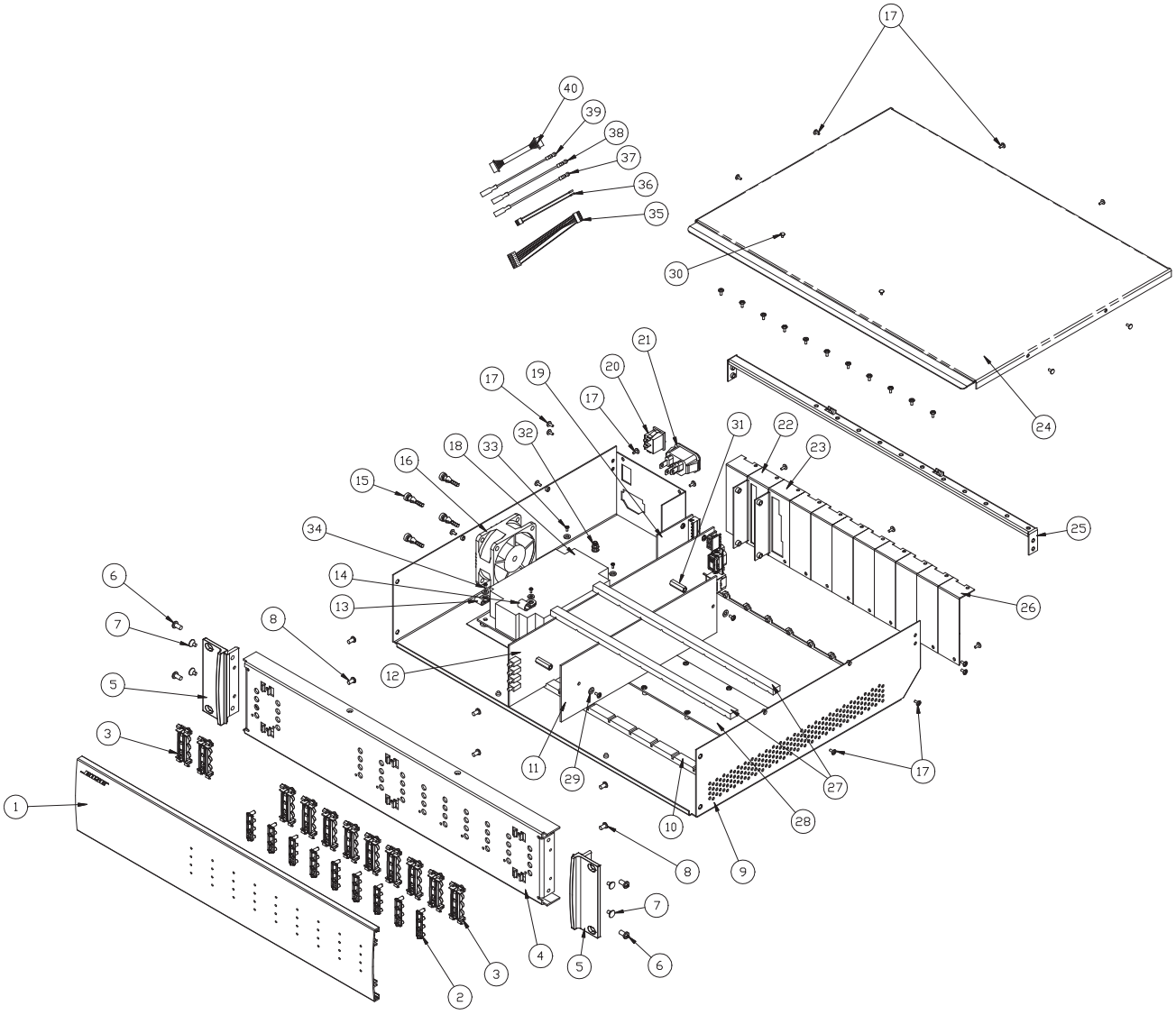


Figure 4. ControlSpace ESP-00 II Chassis Exploded View

MAIN PART LIST

ControlSpace® CC-16 Controller

Item Number	Description	Qty.	Part Number	Note
1	Front plate, PC, GE, LEXAN, 241R, White	1	275432	
2	Overlay, PC sheet, w/adhesive, 0.18mm	1	277488	
3	Insert, plate, PC, GE, LEXAN, 241R, White	1	275434	2
4	LCD PCB Assembly	1	275817-002	
5	Mounting Frame, PC, GE, LEXAN, 241R, White	1	275433	2
6	Main PCB Assembly	1	275817-001	

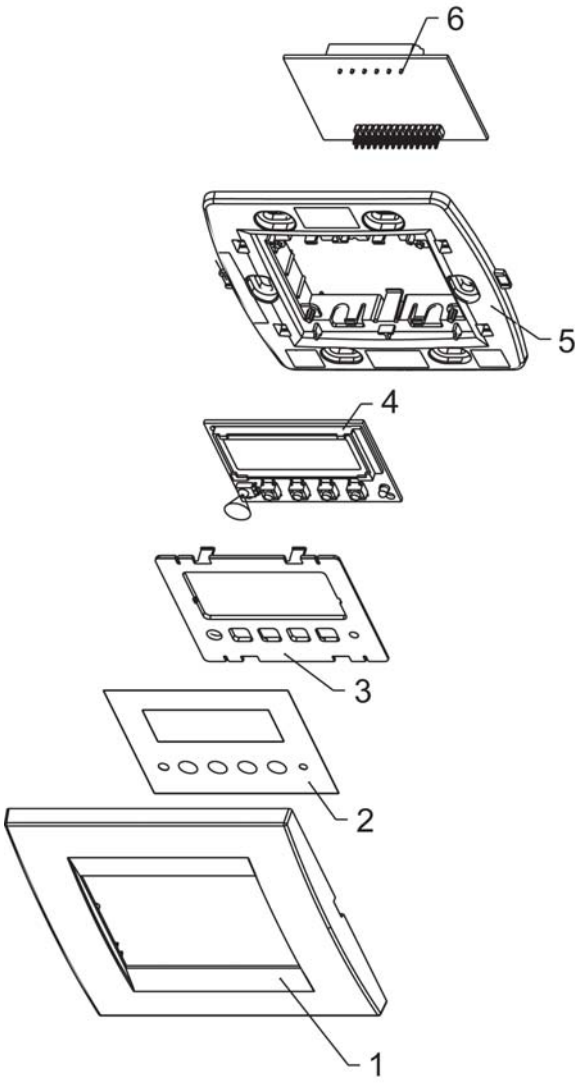


Figure 5. ControlSpace CC-16 Controller Exploded View

MAIN PART LIST

ControlSpace® CC-64 Controller

Item Number	Description	Qty	Part Number	Note
1	Metal EMC Shield, Case, SECC-T1, T=0.50MM	1	275816	2
2	Front Panel	1	275814	2
3	Knob	5	278523-002	
4	Nylon Washer, OD=6.1MM, ID=2.95MM, T=2MM	6	-	2
5	Keyboard Overlay, Plastic, W/S, Adhesive	1	277485	
6	LCM Module, STN, Blue, 12 Clock, YMC402-11AAABUCL	1	323977-001S	
7	LED PCB Assembly	1	278524-001	
8	Main PCB Assembly	1	278523-001	
9	Metal Panel, Aluminum	1	275815	2
10	Screw, SI, MSP, M3X11.5MM	4	-	2
11	Screw, MSB, M3X6, NI	14	-	2
12	Spacer, Support, K33-7	4	-	2
13	Sponge	1	-	2
14	PVC Washer, ID=3.1MM, T=0.3MM	4	-	2

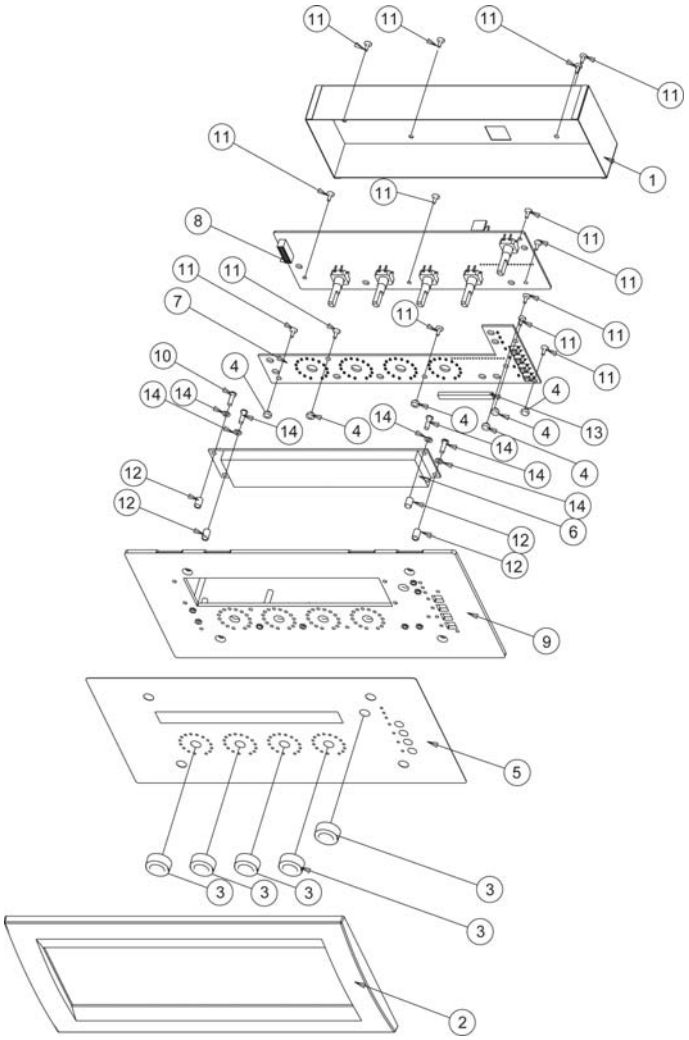


Figure 6. ControlSpace CC-64 Controller Exploded View

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Resistors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R100	10k	RK73H1JTD10KF	KOA	
R101	1k	RK73H1JTD1KF	KOA	
R102	0 Ohm	RK73Z1JTD 0RJ	KOA	
R103	0 Ohm	RK73Z1JTD 0RJ	KOA	
R104	0 Ohm	RK73Z1JTD 0RJ	KOA	
R105	0 Ohm	RK73Z1JTD 0RJ	KOA	
R106	10k	RK73H1JTD10KF	KOA	
R107	10k	RK73H1JTD10KF	KOA	
R108	10k	RK73H1JTD10KF	KOA	
R109	10k	RK73H1JTD10KF	KOA	
R110	10k	RK73H1JTD10KF	KOA	
R111	0 Ohm	RK73Z1JTD 0RJ	KOA	
R112	0 Ohm	RK73Z1JTD 0RJ	KOA	
R113	0 Ohm	RK73Z1JTD 0RJ	KOA	
R114	0 Ohm	RK73Z1JTD 0RJ	KOA	
R115	68 Ohm	RK73H1JTD68RF	KOA	
R116	68 Ohm	RK73H1JTD68RF	KOA	
R117	68 Ohm	RK73H1JTD68RF	KOA	
R118	0 Ohm	RK73Z1JTD 0RJ	KOA	
R119	0 Ohm	RK73Z1JTD 0RJ	KOA	
R120	0 Ohm	RK73Z1JTD 0RJ	KOA	
R200	220k	RK73H1JTD220kF	KOA	
R201	8.2k	RK73H1JTD8.2KF	KOA	
R202	12k	RK73H1JTD12KF	KOA	
R203	OPEN	NOT USED	NOT USED	
R204	10k	RK73H1JTD10KF	KOA	
R205	2.2k	RK73H1JTD2.2KF	KOA	
R211	1k	RK73H1JTD1KF	KOA	
R213	1k	RK73H1JTD1KF	KOA	
R214	10k	RK73H1JTD10KF	KOA	
R215	10k	RK73H1JTD10KF	KOA	
R216	10k	RK73H1JTD10KF	KOA	
R220	2.2k	RK73H1JTD2.2KF	KOA	
R221	2.2k	RK73H1JTD2.2KF	KOA	
R222	33 Ohm	RK73H1JTD33RF	KOA	
R223	33 Ohm	RK73H1JTD33RF	KOA	
R236	220k	RK73H1JTD220kF	KOA	
R237	OPEN	NOT USED	NOT USED	
R238	10k	RK73H1JTD10KF	KOA	
R239	2.2k	RK73H1JTD2.2KF	KOA	
R240	8.2k	RK73H1JTD8.2KF	KOA	
R241	12k	RK73H1JTD12KF	KOA	
R300	68 Ohm	RK73H1JTD68RF	KOA	
R301	68 Ohm	RK73H1JTD68RF	KOA	
R302	68 Ohm	RK73H1JTD68RF	KOA	
R303	33 Ohm	RK73H1JTD33RF	KOA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R304	33 Ohm	RK73H1JTD33RF	KOA	
R305	33 Ohm	RK73H1JTD33RF	KOA	
R306	33 Ohm	RK73H1JTD33RF	KOA	
R307	33 Ohm	RK73H1JTD33RF	KOA	
R308	33 Ohm	RK73H1JTD33RF	KOA	
R309	33 Ohm	RK73H1JTD33RF	KOA	
R310	330 Ohm	RK73H1JTD330RF	KOA	
R311	33 Ohm	RK73H1JTD33RF	KOA	
R312	33 Ohm	RK73H1JTD33RF	KOA	
R313	33 Ohm	RK73H1JTD33RF	KOA	
R314	33 Ohm	RK73H1JTD33RF	KOA	
R315	33 Ohm	RK73H1JTD33RF	KOA	
R316	330 Ohm	RK73H1JTD330RF	KOA	
R319	33 Ohm	RK73H1JTD33RF	KOA	
R320	33 Ohm	RK73H1JTD33RF	KOA	
R321	33 Ohm	RK73H1JTD33RF	KOA	
R322	33 Ohm	RK73H1JTD33RF	KOA	
R323	33 Ohm	RK73H1JTD33RF	KOA	
R326	33 Ohm	RK73H1JTD33RF	KOA	
R327	33 Ohm	RK73H1JTD33RF	KOA	
R328	33 Ohm	RK73H1JTD33RF	KOA	
R329	33 Ohm	RK73H1JTD33RF	KOA	
R330	33 Ohm	RK73H1JTD33RF	KOA	
R331	33 Ohm	RK73H1JTD33RF	KOA	
R333	33 Ohm	RK73H1JTD33RF	KOA	
R334	33 Ohm	RK73H1JTD33RF	KOA	
R335	33 Ohm	RK73H1JTD33RF	KOA	
R336	33 Ohm	RK73H1JTD33RF	KOA	
R337	33 Ohm	RK73H1JTD33RF	KOA	
R338	33 Ohm	RK73H1JTD33RF	KOA	
R339	33 Ohm	RK73H1JTD33RF	KOA	
R340	33 Ohm	RK73H1JTD33RF	KOA	
R343	33 Ohm	RK73H1JTD33RF	KOA	
R344	33 Ohm	RK73H1JTD33RF	KOA	
R345	33 Ohm	RK73H1JTD33RF	KOA	
R346	33 Ohm	RK73H1JTD33RF	KOA	
R347	33 Ohm	RK73H1JTD33RF	KOA	
R348	33 Ohm	RK73H1JTD33RF	KOA	
R349	33 Ohm	RK73H1JTD33RF	KOA	
R351	33 Ohm	RK73H1JTD33RF	KOA	
R352	33 Ohm	RK73H1JTD33RF	KOA	
R353	33 Ohm	RK73H1JTD33RF	KOA	
R354	33 Ohm	RK73H1JTD33RF	KOA	
R355	33 Ohm	RK73H1JTD33RF	KOA	
R358	33 Ohm	RK73H1JTD33RF	KOA	
R359	33 Ohm	RK73H1JTD33RF	KOA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R360	33 Ohm	RK73H1JTD33RF	KOA	
R361	33 Ohm	RK73H1JTD33RF	KOA	
R362	33 Ohm	RK73H1JTD33RF	KOA	
R363	33 Ohm	RK73H1JTD33RF	KOA	
R364	33 Ohm	RK73H1JTD33RF	KOA	
R365	33 Ohm	RK73H1JTD33RF	KOA	
R366	33 Ohm	RK73H1JTD33RF	KOA	
R367	33 Ohm	RK73H1JTD33RF	KOA	
R368	33 Ohm	RK73H1JTD33RF	KOA	
R369	33 Ohm	RK73H1JTD33RF	KOA	
R370	33 Ohm	RK73H1JTD33RF	KOA	
R371	33 Ohm	RK73H1JTD33RF	KOA	
R372	33 Ohm	RK73H1JTD33RF	KOA	
R373	33 Ohm	RK73H1JTD33RF	KOA	
R374	33 Ohm	RK73H1JTD33RF	KOA	
R375	33 Ohm	RK73H1JTD33RF	KOA	
R376	33 Ohm	RK73H1JTD33RF	KOA	
R377	33 Ohm	RK73H1JTD33RF	KOA	
R378	33 Ohm	RK73H1JTD33RF	KOA	
R379	33 Ohm	RK73H1JTD33RF	KOA	
R380	33 Ohm	RK73H1JTD33RF	KOA	
R381	33 Ohm	RK73H1JTD33RF	KOA	
R382	33 Ohm	RK73H1JTD33RF	KOA	
R383	33 Ohm	RK73H1JTD33RF	KOA	
R384	33 Ohm	RK73H1JTD33RF	KOA	
R385	33 Ohm	RK73H1JTD33RF	KOA	
R386	33 Ohm	RK73H1JTD33RF	KOA	
R387	33 Ohm	RK73H1JTD33RF	KOA	
R388	33 Ohm	RK73H1JTD33RF	KOA	
R389	33 Ohm	RK73H1JTD33RF	KOA	
R390	33 Ohm	RK73H1JTD33RF	KOA	
R391	33 Ohm	RK73H1JTD33RF	KOA	
R392	33 Ohm	RK73H1JTD33RF	KOA	
R393	33 Ohm	RK73H1JTD33RF	KOA	
R394	33 Ohm	RK73H1JTD33RF	KOA	
R395	33 Ohm	RK73H1JTD33RF	KOA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Capacitors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C101	0.1uF	GRM188F11E104ZA01D	MURATA	
C102	0.1uF	GRM188F11E104ZA01D	MURATA	
C103	0.1uF	GRM188F11E104ZA01D	MURATA	
C104	0.1uF	GRM188F11E104ZA01D	MURATA	
C105	0.1uF	GRM188F11E104ZA01D	MURATA	
C106	0.1uF	GRM188F11E104ZA01D	MURATA	
C107	0.1uF	GRM188F11E104ZA01D	MURATA	
C108	0.1uF	GRM188F11E104ZA01D	MURATA	
C109	0.1uF	GRM188F11E104ZA01D	MURATA	
C110	0.1uF	GRM188F11E104ZA01D	MURATA	
C111	0.1uF	GRM188F11E104ZA01D	MURATA	
C112	0.1uF	GRM188F11E104ZA01D	MURATA	
C113	0.1uF	GRM188F11E104ZA01D	MURATA	
C114	0.1uF	GRM188F11E104ZA01D	MURATA	
C115	0.1uF	GRM188F11E104ZA01D	MURATA	
C116	0.1uF	GRM188F11E104ZA01D	MURATA	
C117	0.1uF	GRM188F11E104ZA01D	MURATA	
C118	0.1uF	GRM188F11E104ZA01D	MURATA	
C119	0.1uF	GRM188F11E104ZA01D	MURATA	
C120	0.1uF	GRM188F11E104ZA01D	MURATA	
C121	0.1uF	GRM188F11E104ZA01D	MURATA	
C122	0.1uF	GRM188F11E104ZA01D	MURATA	
C123	0.1uF	GRM188F11E104ZA01D	MURATA	
C124	0.1uF	GRM188F11E104ZA01D	MURATA	
C125	0.1uF	GRM188F11E104ZA01D	MURATA	
C126	0.1uF	GRM188F11E104ZA01D	MURATA	
C127	0.1uF	GRM188F11E104ZA01D	MURATA	
C128	0.1uF	GRM188F11E104ZA01D	MURATA	
C129	0.1uF	GRM188F11E104ZA01D	MURATA	
C130	0.1uF	GRM188F11E104ZA01D	MURATA	
C131	0.1uF	GRM188F11E104ZA01D	MURATA	
C132	0.1uF	GRM188F11E104ZA01D	MURATA	
C133	0.1uF	GRM188F11E104ZA01D	MURATA	
C134	0.1uF	GRM188F11E104ZA01D	MURATA	
C135	0.1uF	GRM188F11E104ZA01D	MURATA	
C136	0.1uF	GRM188F11E104ZA01D	MURATA	
C137	0.1uF	GRM188F11E104ZA01D	MURATA	
C138	0.1uF	GRM188F11E104ZA01D	MURATA	
C139	0.1uF	GRM188F11E104ZA01D	MURATA	
C140	0.1uF	GRM188F11E104ZA01D	MURATA	
C141	0.1uF	GRM188F11E104ZA01D	MURATA	
C142	0.1uF	GRM188F11E104ZA01D	MURATA	
C143	0.1uF	GRM188F11E104ZA01D	MURATA	
C144	0.1uF	GRM188F11E104ZA01D	MURATA	
C145	0.1uF	GRM188F11E104ZA01D	MURATA	
C146	0.1uF	GRM188F11E104ZA01D	MURATA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C147	12pF	GRM1882C1H120JA01D	MURATA	
C148	12pF	GRM1882C1H120JA01D	MURATA	
C149	12pF	GRM1882C1H120JA01D	MURATA	
C150	47pF	GRM1882C1H470JZ01D	MURATA	
C151	47pF	GRM1882C1H470JZ01D	MURATA	
C152	47pF	GRM1882C1H470JZ01D	MURATA	
C153	47pF	GRM1882C1H470JZ01D	MURATA	
C154	47pF	GRM1882C1H470JZ01D	MURATA	
C155	47pF	GRM1882C1H470JZ01D	MURATA	
C156	47pF	GRM1882C1H470JZ01D	MURATA	
C157	47pF	GRM1882C1H470JZ01D	MURATA	
C158	47pF	GRM1882C1H470JZ01D	MURATA	
C159	47pF	GRM1882C1H470JZ01D	MURATA	
C160	47pF	GRM1882C1H470JZ01D	MURATA	
C161	47pF	GRM1882C1H470JZ01D	MURATA	
C162	47pF	GRM1882C1H470JZ01D	MURATA	
C163	47pF	GRM1882C1H470JZ01D	MURATA	
C164	47pF	GRM1882C1H470JZ01D	MURATA	
C165	47pF	GRM1882C1H470JZ01D	MURATA	
C200	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C201	0.1uF	GRM188F11E104ZA01D	MURATA	
C202	0.1uF	GRM188F11E104ZA01D	MURATA	
C203	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C204	0.1uF	GRM188F11E104ZA01D	MURATA	
C205	0.1uF	GRM188F11E104ZA01D	MURATA	
C206	0.1uF	GRM188F11E104ZA01D	MURATA	
C207	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C208	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C209	0.1uF	GRM188F11E104ZA01D	MURATA	
C210	0.1uF	GRM188F11E104ZA01D	MURATA	
C211	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C212	0.1uF	GRM188F11E104ZA01D	MURATA	
C213	0.1uF	GRM188F11E104ZA01D	MURATA	
C214	0.1uF	GRM188F11E104ZA01D	MURATA	
C215	0.1uF	GRM188F11E104ZA01D	MURATA	
C216	0.1uF	GRM188F11E104ZA01D	MURATA	
C217	47pF	GRM1882C1H470JZ01D	MURATA	
C218	47pF	GRM1882C1H470JZ01D	MURATA	
C220	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C221	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C222	0.1uF	GRM188F11E104ZA01D	MURATA	
C223	0.1uF	GRM188F11E104ZA01D	MURATA	
C300	12pF	GRM1882C1H120JA01D	MURATA	
C301	12pF	GRM1882C1H120JA01D	MURATA	
C302	12pF	GRM1882C1H120JA01D	MURATA	
C303	47pF	GRM1882C1H470JZ01D	MURATA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C304	47pF	GRM1882C1H470JZ01D	MURATA	
C305	47pF	GRM1882C1H470JZ01D	MURATA	
C306	47pF	GRM1882C1H470JZ01D	MURATA	
C307	47pF	GRM1882C1H470JZ01D	MURATA	
C308	47pF	GRM1882C1H470JZ01D	MURATA	
C309	47pF	GRM1882C1H470JZ01D	MURATA	
C310	47pF	GRM1882C1H470JZ01D	MURATA	
C311	47pF	GRM1882C1H470JZ01D	MURATA	
C312	47pF	GRM1882C1H470JZ01D	MURATA	
C313	47pF	GRM1882C1H470JZ01D	MURATA	
C314	47pF	GRM1882C1H470JZ01D	MURATA	
C315	47pF	GRM1882C1H470JZ01D	MURATA	
C316	47pF	GRM1882C1H470JZ01D	MURATA	
C319	47pF	GRM1882C1H470JZ01D	MURATA	
C320	47pF	GRM1882C1H470JZ01D	MURATA	
C321	47pF	GRM1882C1H470JZ01D	MURATA	
C322	47pF	GRM1882C1H470JZ01D	MURATA	
C323	47pF	GRM1882C1H470JZ01D	MURATA	
C326	47pF	GRM1882C1H470JZ01D	MURATA	
C327	47pF	GRM1882C1H470JZ01D	MURATA	
C328	47pF	GRM1882C1H470JZ01D	MURATA	
C329	47pF	GRM1882C1H470JZ01D	MURATA	
C330	47pF	GRM1882C1H470JZ01D	MURATA	
C331	47pF	GRM1882C1H470JZ01D	MURATA	
C332	47pF	GRM1882C1H470JZ01D	MURATA	
C333	47pF	GRM1882C1H470JZ01D	MURATA	
C334	47pF	GRM1882C1H470JZ01D	MURATA	
C335	47pF	GRM1882C1H470JZ01D	MURATA	
C336	47pF	GRM1882C1H470JZ01D	MURATA	
C337	47pF	GRM1882C1H470JZ01D	MURATA	
C338	47pF	GRM1882C1H470JZ01D	MURATA	
C339	47pF	GRM1882C1H470JZ01D	MURATA	
C340	47pF	GRM1882C1H470JZ01D	MURATA	
C343	47pF	GRM1882C1H470JZ01D	MURATA	
C344	47pF	GRM1882C1H470JZ01D	MURATA	
C345	47pF	GRM1882C1H470JZ01D	MURATA	
C346	47pF	GRM1882C1H470JZ01D	MURATA	
C347	47pF	GRM1882C1H470JZ01D	MURATA	
C348	47pF	GRM1882C1H470JZ01D	MURATA	
C349	47pF	GRM1882C1H470JZ01D	MURATA	
C350	47pF	GRM1882C1H470JZ01D	MURATA	
C351	47pF	GRM1882C1H470JZ01D	MURATA	
C352	47pF	GRM1882C1H470JZ01D	MURATA	
C353	47pF	GRM1882C1H470JZ01D	MURATA	
C354	47pF	GRM1882C1H470JZ01D	MURATA	
C355	47pF	GRM1882C1H470JZ01D	MURATA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C356	47pF	GRM1882C1H470JZ01D	MURATA	
C358	47pF	GRM1882C1H470JZ01D	MURATA	
C359	47pF	GRM1882C1H470JZ01D	MURATA	
C360	47pF	GRM1882C1H470JZ01D	MURATA	
C361	47pF	GRM1882C1H470JZ01D	MURATA	
C362	47pF	GRM1882C1H470JZ01D	MURATA	
C363	47pF	GRM1882C1H470JZ01D	MURATA	
C364	47pF	GRM1882C1H470JZ01D	MURATA	
C365	47pF	GRM1882C1H470JZ01D	MURATA	
C366	47pF	GRM1882C1H470JZ01D	MURATA	
C367	47pF	GRM1882C1H470JZ01D	MURATA	
C368	47pF	GRM1882C1H470JZ01D	MURATA	
C369	47pF	GRM1882C1H470JZ01D	MURATA	
C370	47pF	GRM1882C1H470JZ01D	MURATA	
C371	47pF	GRM1882C1H470JZ01D	MURATA	
C372	47pF	GRM1882C1H470JZ01D	MURATA	
C373	47pF	GRM1882C1H470JZ01D	MURATA	
C374	47pF	GRM1882C1H470JZ01D	MURATA	
C375	47pF	GRM1882C1H470JZ01D	MURATA	
C376	47pF	GRM1882C1H470JZ01D	MURATA	
C377	47pF	GRM1882C1H470JZ01D	MURATA	
C378	47pF	GRM1882C1H470JZ01D	MURATA	
C379	47pF	GRM1882C1H470JZ01D	MURATA	
C380	47pF	GRM1882C1H470JZ01D	MURATA	
C381	47pF	GRM1882C1H470JZ01D	MURATA	
C382	47pF	GRM1882C1H470JZ01D	MURATA	
C383	47pF	GRM1882C1H470JZ01D	MURATA	
C384	47pF	GRM1882C1H470JZ01D	MURATA	
C385	47pF	GRM1882C1H470JZ01D	MURATA	
C386	47pF	GRM1882C1H470JZ01D	MURATA	
C387	47pF	GRM1882C1H470JZ01D	MURATA	
C388	47pF	GRM1882C1H470JZ01D	MURATA	
C389	47pF	GRM1882C1H470JZ01D	MURATA	
C390	47pF	GRM1882C1H470JZ01D	MURATA	
C391	47pF	GRM1882C1H470JZ01D	MURATA	
C392	47pF	GRM1882C1H470JZ01D	MURATA	
C393	47pF	GRM1882C1H470JZ01D	MURATA	
C394	47pF	GRM1882C1H470JZ01D	MURATA	
C395	47pF	GRM1882C1H470JZ01D	MURATA	

ELECTRICAL PART LIST

ESP-00 II Motherboard PCB Assembly (Rev. B)

Diodes

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
D201	OPEN	NOT USED	NOT USED	
D202	1SR154-400	1SR154-400	RHOM	
D207	1SR154-400	1SR154-400	RHOM	
D208	1SR154-400	1SR154-400	RHOM	

Transistors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
Q100	DTA114EKA	DTA114EKA	RHOM	
Q101	OPEN	NOT USED	NOT USED	
Q202	2SB1122S	2SB1122S	SANYO	
Q203	DTC114EKA	DTC114EKA	RHOM	
Q205	DTC114EKA	DTC114EKA	RHOM	
Q211	DTA114EKA	DTA114EKA	RHOM	

Integrated Circuits

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
M100	74VHC138A	TC74VHC138FT	TOSHIBA	
M104	74VHC138A	TC74VHC138FT	TOSHIBA	
M200	uPC2933T	uPC2933T	NEC	

Miscellaneous

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
CN100	87BMN-030SF	87BMN-030S	KEL	
CN101	87BMN-030SF	87BMN-030S	KEL	
CN102	87BMN-030SF	87BMN-030S	KEL	
CN103	87BMN-030SF	87BMN-030S	KEL	
CN104	87BMN-030SF	87BMN-030S	KEL	
CN105	87BMN-030SF	87BMN-030S	KEL	
CN106	87BMN-030SF	87BMN-030S	KEL	
CN107	87BMN-030SF	87BMN-030S	KEL	
CN108	87BMN100S	87BMN-100S	KEL	
CN200	B6P-VH	B6P-VH	NICHIATSU	
CN202	B8B-XH	B8B-XH	NICHIATSU	
CN203	B8B-XH	B8B-XH	NICHIATSU	
CN204	B8B-XH	B8B-XH	NICHIATSU	
CN205	B3B-XH	B3B-XH	NICHIATSU	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R100	100k	RK73H1JTD100kF	KOA	
R101	100 Ohm	RK73H1JTD100RF	KOA	
R102	100 Ohm	RK73H1JTD100RF	KOA	
R103	100k	RK73H1JTD100kF	KOA	
R104	OPEN	NOT USED	NOT USED	
R105	6.8k	RK73H1JTD6.8KF	KOA	
R106	6.8k	RK73H1JTD6.8KF	KOA	
R107	OPEN	NOT USED	NOT USED	
R108	6.8k	RK73H1JTD6.8KF	KOA	
R109	6.8k	RK73H1JTD6.8KF	KOA	
R110	1.3k	RK73H1JTD1.3KF	KOA	
R111	OPEN	NOT USED	NOT USED	
R112	5.1k	RK73H1JTD5.1KF	KOA	
R113	OPEN	NOT USED	NOT USED	
R114	OPEN	NOT USED	NOT USED	
R115	82 Ohm	RK73H1JTD82RF	KOA	
R116	OPEN	NOT USED	NOT USED	
R117	68 Ohm	RK73H1JTD68RF	KOA	
R118	OPEN	NOT USED	NOT USED	
R119	OPEN	NOT USED	NOT USED	
R120	1.3k	RK73H1JTD1.3KF	KOA	
R121	OPEN	NOT USED	NOT USED	
R122	5.1k	RK73H1JTD5.1KF	KOA	
R123	OPEN	NOT USED	NOT USED	
R124	OPEN	NOT USED	NOT USED	
R125	82 Ohm	RK73H1JTD82RF	KOA	
R126	OPEN	NOT USED	NOT USED	
R127	68 Ohm	RK73H1JTD68RF	KOA	
R128	560 Ohm	RK73H1JTD560RF	KOA	
R129	240 Ohm	RK73H1JTD240RF	KOA	
R131	680 Ohm	RK73H1JTD680RF	KOA	
R132	680 Ohm	RK73H1JTD680RF	KOA	
R133	680 Ohm	RK73H1JTD680RF	KOA	
R134	680 Ohm	RK73H1JTD680RF	KOA	
R135	680 Ohm	RK73H1JTD680RF	KOA	
R136	680 Ohm	RK73H1JTD680RF	KOA	
R137	680 Ohm	RK73H1JTD680RF	KOA	
R138	680 Ohm	RK73H1JTD680RF	KOA	
R139	560 Ohm	RK73H1JTD560RF	KOA	
R140	240 Ohm	RK73H1JTD240RF	KOA	
R141	39k	RK73H1JTD39KF	KOA	
R142	39k	RK73H1JTD39KF	KOA	
R143	39k	RK73H1JTD39KF	KOA	
R144	10k	RK73H1JTD10KF	KOA	
R145	10k	RK73H1JTD10KF	KOA	
R146	6.8k	RK73H1JTD6.8KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R147	12k	RK73H1JTD12KF	KOA	
R148	6.8k	RK73H1JTD6.8KF	KOA	
R149	12k	RK73H1JTD12KF	KOA	
R150	12k	RK73H1JTD12KF	KOA	
R151	6.8k	RK73H1JTD6.8KF	KOA	
R152	6.8k	RK73H1JTD6.8KF	KOA	
R153	12k	RK73H1JTD12KF	KOA	
R156	12k	RK73H1JTD12KF	KOA	
R157	6.8k	RK73H1JTD6.8KF	KOA	
R158	6.8k	RK73H1JTD6.8KF	KOA	
R159	12k	RK73H1JTD12KF	KOA	
R160	12k	RK73H1JTD12KF	KOA	
R161	6.8k	RK73H1JTD6.8KF	KOA	
R162	12k	RK73H1JTD12KF	KOA	
R163	6.8k	RK73H1JTD6.8KF	KOA	
R164	10k	RK73H1JTD10KF	KOA	
R165	10k	RK73H1JTD10KF	KOA	
R166	39k	RK73H1JTD39KF	KOA	
R167	39k	RK73H1JTD39KF	KOA	
R168	39k	RK73H1JTD39KF	KOA	
R169	4.7k	RK73H1JTD4.7KF	KOA	
R170	1.8k	RK73H1JTD1.8KF	KOA	
R171	1.2k	RK73H1JTD1.2KF	KOA	
R172	4.7k	RK73H1JTD4.7KF	KOA	
R173	4.7k	RK73H1JTD4.7KF	KOA	
R174	1.8k	RK73H1JTD1.8KF	KOA	
R175	1.2k	RK73H1JTD1.2KF	KOA	
R176	4.7k	RK73H1JTD4.7KF	KOA	
R200	100k	RK73H1JTD100kF	KOA	
R201	100 Ohm	RK73H1JTD100RF	KOA	
R202	100 Ohm	RK73H1JTD100RF	KOA	
R203	100k	RK73H1JTD100kF	KOA	
R204	OPEN	NOT USED	NOT USED	
R205	6.8k	RK73H1JTD6.8KF	KOA	
R206	6.8k	RK73H1JTD6.8KF	KOA	
R207	OPEN	NOT USED	NOT USED	
R208	6.8k	RK73H1JTD6.8KF	KOA	
R209	6.8k	RK73H1JTD6.8KF	KOA	
R210	1.3k	RK73H1JTD1.3KF	KOA	
R211	OPEN	NOT USED	NOT USED	
R212	5.1k	RK73H1JTD5.1KF	KOA	
R213	OPEN	NOT USED	NOT USED	
R214	OPEN	NOT USED	NOT USED	
R215	82 Ohm	RK73H1JTD82RF	KOA	
R216	OPEN	NOT USED	NOT USED	
R217	68 Ohm	RK73H1JTD68RF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R218	OPEN	NOT USED	NOT USED	
R219	OPEN	NOT USED	NOT USED	
R220	1.3k	RK73H1JTD1.3KF	KOA	
R221	OPEN	NOT USED	NOT USED	
R222	5.1k	RK73H1JTD5.1KF	KOA	
R223	OPEN	NOT USED	NOT USED	
R224	OPEN	NOT USED	NOT USED	
R225	82 Ohm	RK73H1JTD82RF	KOA	
R226	OPEN	NOT USED	NOT USED	
R227	68 Ohm	RK73H1JTD68RF	KOA	
R228	560 Ohm	RK73H1JTD560RF	KOA	
R229	240 Ohm	RK73H1JTD240RF	KOA	
R231	680 Ohm	RK73H1JTD680RF	KOA	
R232	680 Ohm	RK73H1JTD680RF	KOA	
R233	680 Ohm	RK73H1JTD680RF	KOA	
R234	680 Ohm	RK73H1JTD680RF	KOA	
R235	680 Ohm	RK73H1JTD680RF	KOA	
R236	680 Ohm	RK73H1JTD680RF	KOA	
R237	680 Ohm	RK73H1JTD680RF	KOA	
R238	680 Ohm	RK73H1JTD680RF	KOA	
R239	560 Ohm	RK73H1JTD560RF	KOA	
R240	240 Ohm	RK73H1JTD240RF	KOA	
R241	39k	RK73H1JTD39KF	KOA	
R242	39k	RK73H1JTD39KF	KOA	
R243	39k	RK73H1JTD39KF	KOA	
R244	10k	RK73H1JTD10KF	KOA	
R245	10k	RK73H1JTD10KF	KOA	
R246	6.8k	RK73H1JTD6.8KF	KOA	
R247	12k	RK73H1JTD12KF	KOA	
R248	6.8k	RK73H1JTD6.8KF	KOA	
R249	12k	RK73H1JTD12KF	KOA	
R250	12k	RK73H1JTD12KF	KOA	
R251	6.8k	RK73H1JTD6.8KF	KOA	
R252	6.8k	RK73H1JTD6.8KF	KOA	
R253	12k	RK73H1JTD12KF	KOA	
R256	12k	RK73H1JTD12KF	KOA	
R257	6.8k	RK73H1JTD6.8KF	KOA	
R258	6.8k	RK73H1JTD6.8KF	KOA	
R259	12k	RK73H1JTD12KF	KOA	
R260	12k	RK73H1JTD12KF	KOA	
R261	6.8k	RK73H1JTD6.8KF	KOA	
R262	12k	RK73H1JTD12KF	KOA	
R263	6.8k	RK73H1JTD6.8KF	KOA	
R264	10k	RK73H1JTD10KF	KOA	
R265	10k	RK73H1JTD10KF	KOA	
R266	39k	RK73H1JTD39KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R267	39k	RK73H1JTD39KF	KOA	
R268	39k	RK73H1JTD39KF	KOA	
R269	4.7k	RK73H1JTD4.7KF	KOA	
R270	1.8k	RK73H1JTD1.8KF	KOA	
R271	1.2k	RK73H1JTD1.2KF	KOA	
R272	4.7k	RK73H1JTD4.7KF	KOA	
R273	4.7k	RK73H1JTD4.7KF	KOA	
R274	1.8k	RK73H1JTD1.8KF	KOA	
R275	1.2k	RK73H1JTD1.2KF	KOA	
R276	4.7k	RK73H1JTD4.7KF	KOA	
R300	OPEN	NOT USED	NOT USED	
R301	OPEN	NOT USED	NOT USED	
R302	0 Ohm	RK73Z1JTD 0RJ	KOA	
R303	10k	RK73H1JTD10KF	KOA	
R304	4.7k	RK73H1JTD4.7KF	KOA	
R305	OPEN	NOT USED	NOT USED	
R306	OPEN	NOT USED	NOT USED	
R307	OPEN	NOT USED	NOT USED	
R308	OPEN	NOT USED	NOT USED	
R309	15k	RK73H1JTD15KF	KOA	
R310	15k	RK73H1JTD15KF	KOA	
R311	15k	RK73H1JTD15KF	KOA	
R312	15k	RK73H1JTD15KF	KOA	
R313	2.2k	RK73H1JTD2.2KF	KOA	
R314	1k	RK73H1JTD1KF	KOA	
R315	1k	RK73H1JTD1KF	KOA	
R316	2.2k	RK73H1JTD2.2KF	KOA	
R317	47 Ohm	RK73H1JTD47RF	RHOM	
R318	47 Ohm	RK73H1JTD47RF	RHOM	
R319	10 Ohm	RK73H1JTD10RF	KOA	
R320	10 Ohm	RK73H1JTD10RF	KOA	
R321	10k	RK73H1JTD10KF	KOA	
R322	10k	RK73H1JTD10KF	KOA	
R323	10k	RK73H1JTD10KF	KOA	
R324	6.8k	RK73H1JTD6.8KF	KOA	
R325	10k	RK73H1JTD10KF	KOA	
R326	6.8k	RK73H1JTD6.8KF	KOA	
R327	6.8k	RK73H1JTD6.8KF	KOA	
R328	10k	RK73H1JTD10KF	KOA	
R329	6.8k	RK73H1JTD6.8KF	KOA	
R330	10k	RK73H1JTD10KF	KOA	
R331	4.7k	RK73H1JTD4.7KF	KOA	
R332	4.7k	RK73H1JTD4.7KF	KOA	
R333	33 Ohm	RK73H1JTD33RF	KOA	
R334	33 Ohm	RK73H1JTD33RF	KOA	
R335	2.2k	RK73H1JTD2.2KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R336	10k	RK73H1JTD10KF	KOA	4
R337	1.8k	RK73H1JTD1.8KF	KOA	
R338	10k	RK73H1JTD10KF	KOA	
R339	2.2k	RK73H1JTD2.2KF	KOA	
R340	1.8k	RK73H1JTD1.8KF	KOA	
R341	1.5k	RK73H1JTD1.5KF	KOA	
R342	1.5k	RK73H1JTD1.5KF	KOA	
R343	2.2k	RK73H1JTD2.2KF	KOA	
R344	1k	RK73H1JTD1KF	KOA	
R345	1k	RK73H1JTD1KF	KOA	
R346	2.2k	RK73H1JTD2.2KF	KOA	
R347	10k	RK73H1JTD10KF	KOA	
R348	6.8k	RK73H1JTD6.8KF	KOA	
R349	10k	RK73H1JTD10KF	KOA	
R350	6.8k	RK73H1JTD6.8KF	KOA	
R351	6.8k	RK73H1JTD6.8KF	KOA	
R352	10k	RK73H1JTD10KF	KOA	
R353	6.8k	RK73H1JTD6.8KF	KOA	
R354	10k	RK73H1JTD10KF	KOA	
R355	10k	RK73H1JTD10KF	KOA	
R356	10k	RK73H1JTD10KF	KOA	
R357	10 Ohm	RK73H1JTD10RF	KOA	
R358	10 Ohm	RK73H1JTD10RF	KOA	
R359	47 Ohm	RK73H1JTD47RF	RHOM	
R360	47 Ohm	RK73H1JTD47RF	RHOM	
R361	4.7k	RK73H1JTD4.7KF	KOA	
R362	4.7k	RK73H1JTD4.7KF	KOA	
R363	33 Ohm	RK73H1JTD33RF	KOA	
R364	33 Ohm	RK73H1JTD33RF	KOA	
R365	1.5k	RK73H1JTD1.5KF	KOA	
R366	1.5k	RK73H1JTD1.5KF	KOA	
R367	1.8k	RK73H1JTD1.8KF	KOA	
R368	2.2k	RK73H1JTD2.2KF	KOA	
R369	10k	RK73H1JTD10KF	KOA	
R370	1.8k	RK73H1JTD1.8KF	KOA	
R371	10k	RK73H1JTD10KF	KOA	
R372	2.2k	RK73H1JTD2.2KF	KOA	
R373	4.7k	RK73H1JTD4.7KF	KOA	
R374	10k	RK73H1JTD10KF	KOA	
R375	100 Ohm	RK73H1JTD100RF	KOA	
R376	100 Ohm	RK73H1JTD100RF	KOA	
R377	12k	RK73H1JTD12KF	KOA	
R378	2.2k	RK73H1JTD2.2KF	KOA	
R379	100 Ohm	RK73H1JTD100RF	KOA	
R380	100 Ohm	RK73H1JTD100RF	KOA	
R381	12k	RK73H1JTD12KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R382	2.2k	RK73H1JTD2.2KF	KOA	
R403	10k	RK73H1JTD10KF	KOA	
R404	4.7k	RK73H1JTD4.7KF	KOA	
R405	OPEN	NOT USED	NOT USED	
R406	OPEN	NOT USED	NOT USED	
R407	OPEN	NOT USED	NOT USED	
R408	OPEN	NOT USED	NOT USED	
R409	15k	RK73H1JTD15KF	KOA	
R410	15k	RK73H1JTD15KF	KOA	
R411	15k	RK73H1JTD15KF	KOA	
R412	15k	RK73H1JTD15KF	KOA	
R413	2.2k	RK73H1JTD2.2KF	KOA	
R414	1k	RK73H1JTD1KF	KOA	
R415	1k	RK73H1JTD1KF	KOA	
R416	2.2k	RK73H1JTD2.2KF	KOA	
R417	47 Ohm	RK73H1JTD47RF	RHOM	
R418	47 Ohm	RK73H1JTD47RF	RHOM	
R419	10 Ohm	RK73H1JTD10RF	KOA	
R420	10 Ohm	RK73H1JTD10RF	KOA	
R421	10k	RK73H1JTD10KF	KOA	
R422	10k	RK73H1JTD10KF	KOA	
R423	10k	RK73H1JTD10KF	KOA	
R424	6.8k	RK73H1JTD6.8KF	KOA	
R425	10k	RK73H1JTD10KF	KOA	
R426	6.8k	RK73H1JTD6.8KF	KOA	
R427	6.8k	RK73H1JTD6.8KF	KOA	
R428	10k	RK73H1JTD10KF	KOA	
R429	6.8k	RK73H1JTD6.8KF	KOA	
R430	10k	RK73H1JTD10KF	KOA	
R431	4.7k	RK73H1JTD4.7KF	KOA	
R432	4.7k	RK73H1JTD4.7KF	KOA	
R433	33 Ohm	RK73H1JTD33RF	KOA	
R434	33 Ohm	RK73H1JTD33RF	KOA	
R435	2.2k	RK73H1JTD2.2KF	KOA	
R436	10k	RK73H1JTD10KF	KOA	
R437	1.8k	RK73H1JTD1.8KF	KOA	
R438	10k	RK73H1JTD10KF	KOA	
R439	2.2k	RK73H1JTD2.2KF	KOA	
R440	1.8k	RK73H1JTD1.8KF	KOA	
R441	1.5k	RK73H1JTD1.5KF	KOA	
R442	1.5k	RK73H1JTD1.5KF	KOA	
R443	2.2k	RK73H1JTD2.2KF	KOA	
R444	1k	RK73H1JTD1KF	KOA	
R445	1k	RK73H1JTD1KF	KOA	
R446	2.2k	RK73H1JTD2.2KF	KOA	
R447	10k	RK73H1JTD10KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R448	6.8k	RK73H1JTD6.8KF	KOA	
R449	10k	RK73H1JTD10KF	KOA	
R450	6.8k	RK73H1JTD6.8KF	KOA	
R451	6.8k	RK73H1JTD6.8KF	KOA	
R452	10k	RK73H1JTD10KF	KOA	
R453	6.8k	RK73H1JTD6.8KF	KOA	
R454	10k	RK73H1JTD10KF	KOA	
R455	10k	RK73H1JTD10KF	KOA	
R456	10k	RK73H1JTD10KF	KOA	
R457	10 Ohm	RK73H1JTD10RF	KOA	
R458	10 Ohm	RK73H1JTD10RF	KOA	
R459	47 Ohm	RK73H1JTD47RF	RHOM	
R460	47 Ohm	RK73H1JTD47RF	RHOM	
R461	4.7k	RK73H1JTD4.7KF	KOA	
R462	4.7k	RK73H1JTD4.7KF	KOA	
R463	33 Ohm	RK73H1JTD33RF	KOA	
R464	33 Ohm	RK73H1JTD33RF	KOA	
R465	1.5k	RK73H1JTD1.5KF	KOA	
R466	1.5k	RK73H1JTD1.5KF	KOA	
R467	1.8k	RK73H1JTD1.8KF	KOA	
R468	2.2k	RK73H1JTD2.2KF	KOA	
R469	10k	RK73H1JTD10KF	KOA	
R470	1.8k	RK73H1JTD1.8KF	KOA	
R471	10k	RK73H1JTD10KF	KOA	
R472	2.2k	RK73H1JTD2.2KF	KOA	
R473	4.7k	RK73H1JTD4.7KF	KOA	
R474	10k	RK73H1JTD10KF	KOA	
R475	100 Ohm	RK73H1JTD100RF	KOA	
R476	100 Ohm	RK73H1JTD100RF	KOA	
R477	12k	RK73H1JTD12KF	KOA	
R478	2.2k	RK73H1JTD2.2KF	KOA	
R479	100 Ohm	RK73H1JTD100RF	KOA	
R480	100 Ohm	RK73H1JTD100RF	KOA	
R481	12k	RK73H1JTD12KF	KOA	
R482	2.2k	RK73H1JTD2.2KF	KOA	
R501	0 Ohm	RK73Z1JTD 0RJ	KOA	
R502	OPEN	NOT USED	NOT USED	
R503	OPEN	NOT USED	NOT USED	
R504	10k	RK73H1JTD10KF	KOA	
R505	10k	RK73H1JTD10KF	KOA	
R506	470 Ohm	RK73H1JTD470RF	KOA	
R507	470 Ohm	RK73H1JTD470RF	KOA	
R508	470 Ohm	RK73H1JTD470RF	KOA	
R509	470 Ohm	RK73H1JTD470RF	KOA	
R510	2.7k	RK73H1JTD2.7KF	KOA	
R511	2.7k	RK73H1JTD2.7KF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R512	5.1 Ohm	RK73H1JTD5.1RF	KOA	
R513	OPEN	NOT USED	NOT USED	
R514	OPEN	NOT USED	NOT USED	
R515	5.1 Ohm	RK73H1JTD5.1RF	KOA	
R516	2.7k	RK73H1JTD2.7KF	KOA	
R517	2.7k	RK73H1JTD2.7KF	KOA	
R518	470 Ohm	RK73H1JTD470RF	KOA	
R519	470 Ohm	RK73H1JTD470RF	KOA	
R520	470 Ohm	RK73H1JTD470RF	KOA	
R521	470 Ohm	RK73H1JTD470RF	KOA	
R522	33 Ohm	RK73H1JTD33RF	KOA	
R523	330 Ohm	RK73H1JTD330RF	KOA	
R524	330 Ohm	RK73H1JTD330RF	KOA	
R525	0 Ohm	RK73Z1JTD 0RJ	KOA	
R550	10k	RK73H1JTD10KF	KOA	
R551	10k	RK73H1JTD10KF	KOA	
R552	0 Ohm	RK73Z1JTD 0RJ	KOA	
R553	0 Ohm	RK73Z1JTD 0RJ	KOA	
R554	10k	RK73H1JTD10KF	KOA	
R555	0 Ohm	RK73Z1JTD 0RJ	KOA	
R556	33 Ohm	RK73H1JTD33RF	KOA	
R557	180 Ohm	RK73H1JTD180RF	KOA	
R558	180 Ohm	RK73H1JTD180RF	KOA	
R559	180 Ohm	RK73H1JTD180RF	KOA	
R560	10k	RK73H1JTD10KF	KOA	
R561	10k	RK73H1JTD10KF	KOA	
R562	OPEN	NOT USED	NOT USED	
R563	180 Ohm	RK73H1JTD180RF	KOA	
R564	OPEN	NOT USED	NOT USED	
R565	OPEN	NOT USED	NOT USED	
R566	0 Ohm	RK73Z1JTD 0RJ	KOA	
R600	OPEN	NOT USED	NOT USED	
R601	OPEN	NOT USED	NOT USED	
R602	0 Ohm	RK73Z1JTD 0RJ	KOA	
R603	0 Ohm	RK73Z1JTD 0RJ	KOA	
R604	0 Ohm	RK73Z1JTD 0RJ	KOA	
R605	0 Ohm	RK73Z1JTD 0RJ	KOA	
R606	0 Ohm	RK73Z1JTD 0RJ	KOA	
R607	0 Ohm	RK73Z1JTD 0RJ	KOA	
R608	0 Ohm	RK73Z1JTD 0RJ	KOA	
R609	0 Ohm	RK73Z1JTD 0RJ	KOA	
R610	OPEN	NOT USED	NOT USED	
R611	OPEN	NOT USED	NOT USED	
R612	0 Ohm	RK73Z1JTD 0RJ	KOA	
R613	0 Ohm	RK73Z1JTD 0RJ	KOA	
R614	0 Ohm	RK73Z1JTD 0RJ	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R615	0 Ohm	RK73Z1JTD 0RJ	KOA	
R616	0 Ohm	RK73Z1JTD 0RJ	KOA	
R617	0 Ohm	RK73Z1JTD 0RJ	KOA	
R618	0 Ohm	RK73Z1JTD 0RJ	KOA	
R619	0 Ohm	RK73Z1JTD 0RJ	KOA	
R620	OPEN	NOT USED	NOT USED	
R621	OPEN	NOT USED	NOT USED	
R622	0 Ohm	RK73Z1JTD 0RJ	KOA	
R623	0 Ohm	RK73Z1JTD 0RJ	KOA	
R624	0 Ohm	RK73Z1JTD 0RJ	KOA	
R625	0 Ohm	RK73Z1JTD 0RJ	KOA	
R626	0 Ohm	RK73Z1JTD 0RJ	KOA	
R627	0 Ohm	RK73Z1JTD 0RJ	KOA	
R628	0 Ohm	RK73Z1JTD 0RJ	KOA	
R629	0 Ohm	RK73Z1JTD 0RJ	KOA	
R630	0 Ohm	RK73Z1JTD 0RJ	KOA	
R631	0 Ohm	RK73Z1JTD 0RJ	KOA	
R632	0 Ohm	RK73Z1JTD 0RJ	KOA	
R633	0 Ohm	RK73Z1JTD 0RJ	KOA	
R634	0 Ohm	RK73Z1JTD 0RJ	KOA	
R635	0 Ohm	RK73Z1JTD 0RJ	KOA	
R636	0 Ohm	RK73Z1JTD 0RJ	KOA	
R637	0 Ohm	RK73Z1JTD 0RJ	KOA	
R638	OPEN	NOT USED	NOT USED	
R639	OPEN	NOT USED	NOT USED	
R700	0 Ohm	RK73Z1JTD 0RJ	KOA	
R701	OPEN	NOT USED	NOT USED	
R702	OPEN	NOT USED	NOT USED	
R703	OPEN	NOT USED	NOT USED	
R704	33 Ohm	RK73H1JTD33RF	KOA	
R705	33 Ohm	RK73H1JTD33RF	KOA	
R706	330 Ohm	RK73H1JTD330RF	KOA	
R707	330 Ohm	RK73H1JTD330RF	KOA	
R708	330 Ohm	RK73H1JTD330RF	KOA	
R709	330 Ohm	RK73H1JTD330RF	KOA	
R710	330 Ohm	RK73H1JTD330RF	KOA	
R711	330 Ohm	RK73H1JTD330RF	KOA	
R712	330 Ohm	RK73H1JTD330RF	KOA	
R713	330 Ohm	RK73H1JTD330RF	KOA	
R714	10k	RK73H1JTD10KF	KOA	
R716	10k	RK73H1JTD10KF	KOA	
R717	33 Ohm	RK73H1JTD33RF	KOA	
R718	33 Ohm	RK73H1JTD33RF	KOA	
R719	330 Ohm	RK73H1JTD330RF	KOA	
R720	330 Ohm	RK73H1JTD330RF	KOA	
R721	330 Ohm	RK73H1JTD330RF	KOA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Resistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
R722	330 Ohm	RK73H1JTD330RF	KOA	
R723	330 Ohm	RK73H1JTD330RF	KOA	
R724	330 Ohm	RK73H1JTD330RF	KOA	
R725	330 Ohm	RK73H1JTD330RF	KOA	
R726	330 Ohm	RK73H1JTD330RF	KOA	
R727	OPEN	NOT USED	NOT USED	
R728	0 Ohm	RK73Z1JTD 0RJ	KOA	
R729	OPEN	NOT USED	NOT USED	
R730	10k	RK73H1JTD10KF	KOA	
R731	10k	RK73H1JTD10KF	KOA	
R732	10k	RK73H1JTD10KF	KOA	
R733	10k	RK73H1JTD10KF	KOA	
R734	10k	RK73H1JTD10KF	KOA	
R735	OPEN	NOT USED	NOT USED	
R736	33 Ohm	RK73H1JTD33RF	KOA	
R737	33 Ohm	RK73H1JTD33RF	KOA	
R738	OPEN	NOT USED	NOT USED	
R739	OPEN	NOT USED	NOT USED	
R740	0 Ohm	RK73Z1JTD 0RJ	KOA	
R741	330 Ohm	RK73H1JTD330RF	KOA	
R742	330 Ohm	RK73H1JTD330RF	KOA	
R743	0 Ohm	RK73Z1JTD 0RJ	KOA	
R744	OPEN	NOT USED	NOT USED	
R745	OPEN	NOT USED	NOT USED	
R746	4.7k	RK73H1JTD4.7KF	KOA	
R747	33 Ohm	RK73H1JTD33RF	KOA	
R748	33 Ohm	RK73H1JTD33RF	KOA	
R749	OPEN	NOT USED	NOT USED	
R750	OPEN	NOT USED	NOT USED	
R751	0 Ohm	RK73Z1JTD 0RJ	KOA	
RA703	RES ARRAY, 33 Ohm	CN1J4KTD33RJ	KOA	
RA704	RES ARRAY, 33 Ohm	CN1J4KTD33RJ	KOA	
RA705	RES ARRAY, 33 Ohm	CN1J4KTD33RJ	KOA	
RA706	RES ARRAY, 10k	MNR15E0RPJ103	RHOM	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C100	0.1uF	GRM188F11E104ZA01D	MURATA	
C101	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C102	0.1uF	GRM188F11E104ZA01D	MURATA	
C103	0.1uF	GRM188F11E104ZA01D	MURATA	
C104	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C105	0.1uF	GRM188F11E104ZA01D	MURATA	
C106	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C107	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C108	0.1uF	GRM188F11E104ZA01D	MURATA	
C109	0.1uF	GRM188F11E104ZA01D	MURATA	
C110	0.1uF	GRM188F11E104ZA01D	MURATA	
C111	0.1uF	GRM188F11E104ZA01D	MURATA	
C112	0.1uF	GRM188F11E104ZA01D	MURATA	
C113	0.1uF	GRM188F11E104ZA01D	MURATA	
C114	0.1uF	GRM188F11E104ZA01D	MURATA	
C115	0.1uF	GRM188F11E104ZA01D	MURATA	
C116	0.1uF	GRM188F11E104ZA01D	MURATA	
C117	0.1uF	GRM188F11E104ZA01D	MURATA	
C118	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C119	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C120	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C121	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C122	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C123	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C124	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C125	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C126	10uF, 16V, BP	RVB16V100M-R	ELNA	
C127	100pF	GRM39CH101JZ01D	MURATA	
C128	100pF	GRM39CH101JZ01D	MURATA	
C129	100pF	GRM39CH101JZ01D	MURATA	
C130	10uF, 16V, BP	RVB16V100M-R	ELNA	
C131	47pF	GRM39CH470JZ01D	MURATA	
C132	47pF	GRM39CH470JZ01D	MURATA	
C133	47pF	GRM39CH470JZ01D	MURATA	
C134	47pF	GRM39CH470JZ01D	MURATA	
C135	47pF	GRM39CH470JZ01D	MURATA	
C136	47pF	GRM39CH470JZ01D	MURATA	
C137	0.1uF	GRM188F11E104ZA01D	MURATA	
C138	0.1uF	GRM188F11E104ZA01D	MURATA	
C139	47pF	GRM39CH470JZ01D	MURATA	
C140	47pF	GRM39CH470JZ01D	MURATA	
C141	47pF	GRM39CH470JZ01D	MURATA	
C142	47pF	GRM39CH470JZ01D	MURATA	
C143	47pF	GRM39CH470JZ01D	MURATA	
C144	47pF	GRM39CH470JZ01D	MURATA	
C145	10uF, 16V, BP	RVB16V100M-R	ELNA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C146	100pF	GRM39CH101JZ01D	MURATA	
C147	100pF	GRM39CH101JZ01D	MURATA	
C148	100pF	GRM39CH101JZ01D	MURATA	
C149	10uF, 16V, BP	RVB16V100M-R	ELNA	
C200	0.1uF	GRM188F11E104ZA01D	MURATA	
C201	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C202	0.1uF	GRM188F11E104ZA01D	MURATA	
C203	0.1uF	GRM188F11E104ZA01D	MURATA	
C204	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C205	0.1uF	GRM188F11E104ZA01D	MURATA	
C206	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C207	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C208	0.1uF	GRM188F11E104ZA01D	MURATA	
C209	0.1uF	GRM188F11E104ZA01D	MURATA	
C210	0.1uF	GRM188F11E104ZA01D	MURATA	
C211	0.1uF	GRM188F11E104ZA01D	MURATA	
C212	0.1uF	GRM188F11E104ZA01D	MURATA	
C213	0.1uF	GRM188F11E104ZA01D	MURATA	
C214	0.1uF	GRM188F11E104ZA01D	MURATA	
C215	0.1uF	GRM188F11E104ZA01D	MURATA	
C216	0.1uF	GRM188F11E104ZA01D	MURATA	
C217	0.1uF	GRM188F11E104ZA01D	MURATA	
C218	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C219	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C220	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C221	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C222	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C223	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C224	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C225	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C226	10uF, 16V, BP	RVB16V100M-R	ELNA	
C227	100pF	GRM39CH101JZ01D	MURATA	
C228	100pF	GRM39CH101JZ01D	MURATA	
C229	100pF	GRM39CH101JZ01D	MURATA	
C230	10uF, 16V, BP	RVB16V100M-R	ELNA	
C231	47pF	GRM39CH470JZ01D	MURATA	
C232	47pF	GRM39CH470JZ01D	MURATA	
C233	47pF	GRM39CH470JZ01D	MURATA	
C234	47pF	GRM39CH470JZ01D	MURATA	
C235	47pF	GRM39CH470JZ01D	MURATA	
C236	47pF	GRM39CH470JZ01D	MURATA	
C237	0.1uF	GRM188F11E104ZA01D	MURATA	
C238	0.1uF	GRM188F11E104ZA01D	MURATA	
C239	47pF	GRM39CH470JZ01D	MURATA	
C240	47pF	GRM39CH470JZ01D	MURATA	
C241	47pF	GRM39CH470JZ01D	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C242	47pF	GRM39CH470JZ01D	MURATA	
C243	47pF	GRM39CH470JZ01D	MURATA	
C244	47pF	GRM39CH470JZ01D	MURATA	
C245	10uF, 16V, BP	RVB16V100M-R	ELNA	
C246	100pF	GRM39CH101JZ01D	MURATA	
C247	100pF	GRM39CH101JZ01D	MURATA	
C248	100pF	GRM39CH101JZ01D	MURATA	
C249	10uF, 16V, BP	RVB16V100M-R	ELNA	
C300	10uF, 16V, BP	RVB16V100M-R	ELNA	
C301	10uF, 16V, BP	RVB16V100M-R	ELNA	
C302	0.1uF	GRM188F11E104ZA01D	MURATA	
C303	0.1uF	GRM188F11E104ZA01D	MURATA	
C304	0.1uF	GRM188F11E104ZA01D	MURATA	
C305	0.1uF	GRM188F11E104ZA01D	MURATA	
C306	0.1uF	GRM188F11E104ZA01D	MURATA	
C307	0.1uF	GRM188F11E104ZA01D	MURATA	
C308	0.1uF	GRM188F11E104ZA01D	MURATA	
C309	0.1uF	GRM188F11E104ZA01D	MURATA	
C310	0.1uF	GRM188F11E104ZA01D	MURATA	
C311	0.1uF	GRM188F11E104ZA01D	MURATA	
C312	10uF, 16V, BP	RVB16V100M-R	ELNA	
C313	22pF	GRM39CH220J50PB	MURATA	
C314	22pF	GRM39CH220J50PB	MURATA	
C315	10uF, 16V, BP	RVB16V100M-R	ELNA	
C316	0.01uF	GRM39B103K50PT	MURATA	
C317	0.01uF	GRM39B103K50PT	MURATA	
C318	22pF	GRM39CH220J50PB	MURATA	
C319	22pF	GRM39CH220J50PB	MURATA	
C320	22pF	GRM39CH220J50PB	MURATA	
C321	22pF	GRM39CH220J50PB	MURATA	
C322	22pF	GRM39CH220J50PB	MURATA	
C323	22pF	GRM39CH220J50PB	MURATA	
C324	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C325	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C326	1500pF	P-GRM39B152K-50	MURATA	
C327	2700pF	GRM188B11H272KA01D	MURATA	
C328	2700pF	GRM188B11H272KA01D	MURATA	
C329	1500pF	P-GRM39B152K-50	MURATA	
C330	4700pF	GRM188B11H472KA01D	MURATA	
C331	4700pF	GRM188B11H472KA01D	MURATA	
C332	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C333	10uF, 16V, BP	RVB16V100M-R	ELNA	
C334	22pF	GRM39CH220J50PB	MURATA	
C335	22pF	GRM39CH220J50PB	MURATA	
C336	10uF, 16V, BP	RVB16V100M-R	ELNA	
C337	22pF	GRM39CH220J50PB	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C338	22pF	GRM39CH220J50PB	MURATA	
C339	22pF	GRM39CH220J50PB	MURATA	
C340	22pF	GRM39CH220J50PB	MURATA	
C341	22pF	GRM39CH220J50PB	MURATA	
C342	22pF	GRM39CH220J50PB	MURATA	
C343	0.01uF	GRM39B103K50PT	MURATA	
C344	0.01uF	GRM39B103K50PT	MURATA	
C345	1500pF	P-GRM39B152K-50	MURATA	
C346	2700pF	GRM188B11H272KA01D	MURATA	
C347	2700pF	GRM188B11H272KA01D	MURATA	
C348	1500pF	P-GRM39B152K-50	MURATA	
C349	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C350	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C351	4700pF	GRM188B11H472KA01D	MURATA	
C352	4700pF	GRM188B11H472KA01D	MURATA	
C353	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C354	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C355	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C400	10uF, 16V, BP	RVB16V100M-R	ELNA	
C401	10uF, 16V, BP	RVB16V100M-R	ELNA	
C402	0.1uF	GRM188F11E104ZA01D	MURATA	
C403	0.1uF	GRM188F11E104ZA01D	MURATA	
C404	0.1uF	GRM188F11E104ZA01D	MURATA	
C405	0.1uF	GRM188F11E104ZA01D	MURATA	
C406	0.1uF	GRM188F11E104ZA01D	MURATA	
C407	0.1uF	GRM188F11E104ZA01D	MURATA	
C408	0.1uF	GRM188F11E104ZA01D	MURATA	
C409	0.1uF	GRM188F11E104ZA01D	MURATA	
C410	0.1uF	GRM188F11E104ZA01D	MURATA	
C411	0.1uF	GRM188F11E104ZA01D	MURATA	
C412	10uF, 16V, BP	RVB16V100M-R	ELNA	
C413	22pF	GRM39CH220J50PB	MURATA	
C414	22pF	GRM39CH220J50PB	MURATA	
C415	10uF, 16V, BP	RVB16V100M-R	ELNA	
C416	0.01uF	GRM39B103K50PT	MURATA	
C417	0.01uF	GRM39B103K50PT	MURATA	
C418	22pF	GRM39CH220J50PB	MURATA	
C419	22pF	GRM39CH220J50PB	MURATA	
C420	22pF	GRM39CH220J50PB	MURATA	
C421	22pF	GRM39CH220J50PB	MURATA	
C422	22pF	GRM39CH220J50PB	MURATA	
C423	22pF	GRM39CH220J50PB	MURATA	
C424	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C425	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C426	1500pF	P-GRM39B152K-50	MURATA	
C427	2700pF	GRM188B11H272KA01D	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C428	2700pF	GRM188B11H272KA01D	MURATA	
C429	1500pF	P-GRM39B152K-50	MURATA	
C430	4700pF	GRM188B11H472KA01D	MURATA	
C431	4700pF	GRM188B11H472KA01D	MURATA	
C432	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C433	10uF, 16V, BP	RVB16V100M-R	ELNA	
C434	22pF	GRM39CH220J50PB	MURATA	
C435	22pF	GRM39CH220J50PB	MURATA	
C436	10uF, 16V, BP	RVB16V100M-R	ELNA	
C437	22pF	GRM39CH220J50PB	MURATA	
C438	22pF	GRM39CH220J50PB	MURATA	
C439	22pF	GRM39CH220J50PB	MURATA	
C440	22pF	GRM39CH220J50PB	MURATA	
C441	22pF	GRM39CH220J50PB	MURATA	
C442	22pF	GRM39CH220J50PB	MURATA	
C443	0.01uF	GRM39B103K50PT	MURATA	
C444	0.01uF	GRM39B103K50PT	MURATA	
C445	1500pF	P-GRM39B152K-50	MURATA	
C446	2700pF	GRM188B11H272KA01D	MURATA	
C447	2700pF	GRM188B11H272KA01D	MURATA	
C448	1500pF	P-GRM39B152K-50	MURATA	
C449	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C450	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C451	4700pF	GRM188B11H472KA01D	MURATA	
C452	4700pF	GRM188B11H472KA01D	MURATA	
C453	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C454	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C455	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C500	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C501	0.1uF	GRM188F11E104ZA01D	MURATA	
C502	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C503	0.1uF	GRM188F11E104ZA01D	MURATA	
C504	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C505	0.1uF	GRM188F11E104ZA01D	MURATA	
C506	560pF	GRM188B11H561KA01D	MURATA	
C507	560pF	GRM188B11H561KA01D	MURATA	
C508	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C509	0.1uF	GRM188F11E104ZA01D	MURATA	
C510	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C511	0.1uF	GRM188F11E104ZA01D	MURATA	
C512	0.1uF	GRM188F11E104ZA01D	MURATA	
C513	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C514	0.1uF	GRM188F11E104ZA01D	MURATA	
C515	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C516	560pF	GRM188B11H561KA01D	MURATA	
C517	560pF	GRM188B11H561KA01D	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C518	0.1uF	GRM188F11E104ZA01D	MURATA	
C519	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C520	0.1uF	GRM188F11E104ZA01D	MURATA	
C521	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C522	0.1uF	GRM188F11E104ZA01D	MURATA	
C523	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C524	47pF	GRM39CH470JZ01D	MURATA	
C525	47pF	GRM39CH470JZ01D	MURATA	
C526	47pF	GRM39CH470JZ01D	MURATA	
C527	0.1uF	GRM188F11E104ZA01D	MURATA	
C528	0.1uF	GRM188F11E104ZA01D	MURATA	
C550	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C551	0.1uF	GRM188F11E104ZA01D	MURATA	
C552	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C553	0.1uF	GRM188F11E104ZA01D	MURATA	
C554	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C555	0.1uF	GRM188F11E104ZA01D	MURATA	
C556	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C557	0.1uF	GRM188F11E104ZA01D	MURATA	
C558	0.1uF	GRM188F11E104ZA01D	MURATA	
C559	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C560	0.1uF	GRM188F11E104ZA01D	MURATA	
C561	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C562	0.1uF	GRM188F11E104ZA01D	MURATA	
C563	47uF, 16V	MVK16VC47MF55	NICHIKEMI	
C564	0.1uF	GRM188F11E104ZA01D	MURATA	
C565	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C566	47pF	GRM39CH470JZ01D	MURATA	
C567	47pF	GRM39CH470JZ01D	MURATA	
C568	47pF	GRM39CH470JZ01D	MURATA	
C569	47pF	GRM39CH470JZ01D	MURATA	
C570	0.1uF	GRM188F11E104ZA01D	MURATA	
C571	0.1uF	GRM188F11E104ZA01D	MURATA	
C572	47pF	GRM39CH470JZ01D	MURATA	
C600	OPEN	NOT USED	NOT USED	
C601	OPEN	NOT USED	NOT USED	
C602	OPEN	NOT USED	NOT USED	
C603	OPEN	NOT USED	NOT USED	
C604	0.1uF	GRM188F11E104ZA01D	MURATA	
C605	0.1uF	GRM188F11E104ZA01D	MURATA	
C606	0.1uF	GRM188F11E104ZA01D	MURATA	
C607	0.1uF	GRM188F11E104ZA01D	MURATA	
C608	0.1uF	GRM188F11E104ZA01D	MURATA	
C609	0.1uF	GRM188F11E104ZA01D	MURATA	
C610	0.1uF	GRM188F11E104ZA01D	MURATA	
C611	0.1uF	GRM188F11E104ZA01D	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Capacitors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
C612	0.1uF	GRM188F11E104ZA01D	MURATA	
C613	0.1uF	GRM188F11E104ZA01D	MURATA	
C614	0.1uF	GRM188F11E104ZA01D	MURATA	
C615	0.1uF	GRM188F11E104ZA01D	MURATA	
C616	0.1uF	GRM188F11E104ZA01D	MURATA	
C617	0.1uF	GRM188F11E104ZA01D	MURATA	
C618	0.1uF	GRM188F11E104ZA01D	MURATA	
C700	0.1uF	GRM188F11E104ZA01D	MURATA	
C701	0.1uF	GRM188F11E104ZA01D	MURATA	
C702	0.1uF	GRM188F11E104ZA01D	MURATA	
C703	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C704	0.1uF	GRM188F11E104ZA01D	MURATA	
C705	0.1uF	GRM188F11E104ZA01D	MURATA	
C706	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C707	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C708	0.1uF	GRM188F11E104ZA01D	MURATA	
C709	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C710	0.1uF	GRM188F11E104ZA01D	MURATA	
C711	12pF	P-GRM39CH120J-50	MURATA	
C712	12pF	P-GRM39CH120J-50	MURATA	
C713	0.1uF	GRM188F11E104ZA01D	MURATA	
C714	0.1uF	GRM188F11E104ZA01D	MURATA	
C715	10uF, 16V	MVK16VC10MD55	NICHIKEMI	
C716	0.1uF	GRM188F11E104ZA01D	MURATA	
C717	0.1uF	GRM188F11E104ZA01D	MURATA	
C718	0.1uF	GRM188F11E104ZA01D	MURATA	
C719	0.1uF	GRM188F11E104ZA01D	MURATA	
C720	47pF	GRM39CH470JZ01D	MURATA	
C721	47pF	GRM39CH470JZ01D	MURATA	
C722	47pF	GRM39CH470JZ01D	MURATA	
C723	47pF	GRM39CH470JZ01D	MURATA	

Inductors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
L600	NFM39R12C223	NFM39R12C223	MURATA	
L601	BK2125HM102	BK2125HM102	Taiyoyuden	
L602	BK2125HM102	BK2125HM102	Taiyoyuden	
L603	NFM39R12C223	NFM39R12C223	MURATA	
L604	BK2125HM102	BK2125HM102	Taiyoyuden	
L605	BK2125HM102	BK2125HM102	Taiyoyuden	
L606	BK2125HM102	BK2125HM102	Taiyoyuden	
L607	BK2125HM102	BK2125HM102	Taiyoyuden	
L608	NFM39R12C223	NFM39R12C223	MURATA	
L609	BK2125HM102	BK2125HM102	Taiyoyuden	
L610	BK2125HM102	BK2125HM102	Taiyoyuden	
L611	NFM39R12C223	NFM39R12C223	MURATA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Diodes

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
D500	1SS396	1SS396	TOSHIBA	
D501	1SS396	1SS396	TOSHIBA	
D502	1SS396	1SS396	TOSHIBA	
D503	1SS396	1SS396	TOSHIBA	
D504	1SS396	1SS396	TOSHIBA	
D505	1SS396	1SS396	TOSHIBA	
D506	1SS396	1SS396	TOSHIBA	
D507	1SS396	1SS396	TOSHIBA	
D600	DAN217	DAN217	RHOM	
D601	DAN217	DAN217	RHOM	
D602	DAN217	DAN217	RHOM	
D603	DAN217	DAN217	RHOM	
D604	DAN217	DAN217	RHOM	
D605	DAN217	DAN217	RHOM	
D606	DAN217	DAN217	RHOM	
D607	DAN217	DAN217	RHOM	
D608	OPEN	NOT USED	NOT USED	
D700	1SR154-400	1SR154-400	RHOM	
D701	1SR154-400	1SR154-400	RHOM	
D702	OPEN	NOT USED	NOT USED	
D703	OPEN	NOT USED	NOT USED	
D704	OPEN	NOT USED	NOT USED	
D705	OPEN	NOT USED	NOT USED	

Transistors

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
Q100	DTC114EKA	DTC114EKA	RHOM	
Q101	DTC114EKA	DTC114EKA	RHOM	
Q102	DTA114EKA	DTA114EKA	RHOM	
Q103	DTA114EKA	DTA114EKA	RHOM	
Q200	DTC114EKA	DTC114EKA	RHOM	
Q201	DTC114EKA	DTC114EKA	RHOM	
Q202	DTA114EKA	DTA114EKA	RHOM	
Q203	DTA114EKA	DTA114EKA	RHOM	
Q300	DTC114EKA	DTC114EKA	RHOM	
Q301	DTA114EKA	DTA114EKA	RHOM	
Q302	DTC114EKA	DTC114EKA	RHOM	
Q303	2SC3326	2SC3326	TOSHIBA	
Q304	2SC3326	2SC3326	TOSHIBA	
Q305	2SC3326	2SC3326	TOSHIBA	
Q306	2SC3326	2SC3326	TOSHIBA	
Q307	DTC114EKA	DTC114EKA	RHOM	
Q308	DTA114EKA	DTA114EKA	RHOM	
Q309	DTC114EKA	DTC114EKA	RHOM	
Q400	DTC114EKA	DTC114EKA	RHOM	
Q401	DTA114EKA	DTA114EKA	RHOM	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Transistors (continued)

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
Q402	DTC114EKA	DTC114EKA	RHOM	
Q403	2SC3326	2SC3326	TOSHIBA	
Q404	2SC3326	2SC3326	TOSHIBA	
Q405	2SC3326	2SC3326	TOSHIBA	
Q406	2SC3326	2SC3326	TOSHIBA	
Q407	DTC114EKA	DTC114EKA	RHOM	
Q408	DTA114EKA	DTA114EKA	RHOM	
Q409	DTC114EKA	DTC114EKA	RHOM	
Q700	DTC114EKA	DTC114EKA	RHOM	
Q701	DTC114EKA	DTC114EKA	RHOM	
Q702	DTC114EKA	DTC114EKA	RHOM	
Q703	DTC114EKA	DTC114EKA	RHOM	
Q704	DTC114EKA	DTC114EKA	RHOM	
Q705	DTC114EKA	DTC114EKA	RHOM	
Q706	DTC114EKA	DTC114EKA	RHOM	

Integrated Circuits

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
M100	TC9164CFG	TC9164CFG	TOSHIBA	
M101	NJM4580E	NJM4580ETE2(JRC)	JRC	
M102	NJM4580E	NJM4580ETE2(JRC)	JRC	
M103	NJM4580E	NJM4580ETE2(JRC)	JRC	
M104	NJM4580E	NJM4580ETE2(JRC)	JRC	
M200	TC9164CFG	TC9164CFG	TOSHIBA	
M201	NJM4580E	NJM4580ETE2(JRC)	JRC	
M202	NJM4580E	NJM4580ETE2(JRC)	JRC	
M203	NJM4580E	NJM4580ETE2(JRC)	JRC	
M204	NJM4580E	NJM4580ETE2(JRC)	JRC	
M300	NJM4580E	NJM4580ETE2(JRC)	JRC	
M301	NJM4580E	NJM4580ETE2(JRC)	JRC	
M302	NJM4580E	NJM4580ETE2(JRC)	JRC	
M303	NJM4580E	NJM4580ETE2(JRC)	JRC	
M400	NJM4580E	NJM4580ETE2(JRC)	JRC	
M401	NJM4580E	NJM4580ETE2(JRC)	JRC	
M402	NJM4580E	NJM4580ETE2(JRC)	JRC	
M403	NJM4580E	NJM4580ETE2(JRC)	JRC	
M500	CS5361-KZ	CS5361-KZ	CIRRUS	
M501	CS5361-KZ	CS5361-KZ	CIRRUS	
M550	CS4392-KZ	CS4392-KZ	CIRRUS	
M551	CS4392-KZ	CS4392-KZ	CIRRUS	
M700	74VHC541	TC74VHC541FT	TOSHIBA	
M701	74VHC541	TC74VHC541FT	TOSHIBA	
M702	74AC273	TC74AC273FT	TOSHIBA	
M703	S-80947CNMC-G9H	S-80947CNMC-G9H	SEIKO	
M704	TA48033F	uPC2933T	TOSHIBA	
M705	TA7805F	uPC2905AT	TOSHIBA	
M707	74AC273	TC74AC273FT	TOSHIBA	

ELECTRICAL PART LIST

4x4 Series II PCB Assembly (optional on ESP-00 II)

Miscellaneous

Reference Designator	Description	Vendor Part Number	Vendor Name	Note
CN600	B9B-XH	B9B-XH	NICHIATSU	
CN601	2EHDRC-03P(GRN)	2EHDRC-03P(GRN)	DINKL	
CN602	2EHDRC-03P(GRN)	2EHDRC-03P(GRN)	DINKL	
CN603	2EHDRC-03P(GRN)	2EHDRC-03P(GRN)	DINKL	
CN604	2EHDRC-03P(GRN)	2EHDRC-03P(GRN)	DINKL	
CN700	87BFN-030R	87BFN-030R	KEL	
CN701	OPEN	NOT USED	NOT USED	
CN702	OPEN	NOT USED	NOT USED	
CN703	OPEN	NOT USED	NOT USED	
CN704	OPEN	NOT USED	NOT USED	
FG600	OG-363040	OG-363040	KITAGAWA INDUSTRIES	
FG601	OG-363040	OG-363040	KITAGAWA INDUSTRIES	
FG602	OG-363040	OG-363040	KITAGAWA INDUSTRIES	
P700	OPEN	NOT USED	NOT USED	
XTAL700	10.000 MHZ	HC49/S310.000MHZ	KYISHYUDENTSU	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistors

Reference Designator	Description	Vendor	Vendor Part Number	Note
R100	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R101	1K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K	
R102	1K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K	
R103	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R104	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R105	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R106	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R107	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R108	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R109	110 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07110R	
R110	110 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07110R	
R111	110 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07110R	
R200	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R201	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R202	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R203	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R204	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R205	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R206	1K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K	
R208	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R210	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R211	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R212	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R213	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R214	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R215	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R216	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R219	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R220	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R300	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R301	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R302	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R303	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R306	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R307	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R309	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R310	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R311	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R312	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R313	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R316	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R318	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R321	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R401	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R402	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R403	8.2 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-078R2	
R404	8.2 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-078R2	
R407	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R408	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
R409	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R410	220K, 0603, 1/10W, 1%	Yageo	RC0603FR-07220K	
R450	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R451	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R452	560K, 0603, 1/10W, 1%	Yageo	RC0603FR-07560K	
R457	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R458	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R459	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R460	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R461	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R462	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R463	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R464	180 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07180R	
R465	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R466	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R467	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R468	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R469	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R470	68K, 0603, 1/10W, 1%	Yageo	RC0603FR-0768K	
R475	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R476	820 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07820R	
R477	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R478	390 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07390R	
R479	820 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07820R	
R480	12K, 0603, 1/10W, 1%	Yageo	RC0603FR-0712K	
R481	1.2K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K2	
R482	120 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07120R	
R483	1.2K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K2	
R535	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R536	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R537	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R538	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R539	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R540	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R541	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	
R542	33 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-0733R	

Resistor Arrays

Reference Designator	Description	Vendor	Vendor Part Number	Note
RA100	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA101	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA102	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA103	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA104	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA105	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA106	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA107	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA108	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistor Arrays (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
RA109	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA110	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA111	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA200	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA201	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA202	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA203	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA204	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA205	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA206	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA207	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA208	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA209	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA210	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA211	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA212	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA213	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA214	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA215	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA216	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA217	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA218	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA219	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA220	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA221	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA222	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA223	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA224	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA300	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA301	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA302	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA303	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA304	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA305	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA306	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA307	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA308	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA309	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA310	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA311	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA312	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA313	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA314	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA315	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA316	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA317	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA318	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA319	33 OHM, ARRAY, 8 PIN, 5%	Yageo	YC164-JR-0733R	
RA400	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Resistor Arrays (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
RA401	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA450	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA530	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA531	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA532	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	
RA533	10K, ARRAY, 10 PIN, 8R, 5%	Yageo	YC158TJR-0710K	

Capacitors

Reference Designator	Description	Vendor	Vendor Part Number	Note
C100	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C101	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C102	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C103	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C104	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C105	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C106	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C107	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C108	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C109	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C110	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C111	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C112	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C113	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C114	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C115	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C116	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C117	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C118	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C119	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C120	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C121	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C122	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C123	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C124	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C125	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C126	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C127	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C128	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C129	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C130	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C131	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C132	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C133	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C134	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C135	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C136	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C137	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C138	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
C139	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C140	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C141	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C142	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C143	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C144	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C145	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C146	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C147	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C148	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C149	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C150	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C151	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C152	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C153	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C154	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C155	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C156	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C157	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C158	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C159	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C160	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C161	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C162	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C163	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C164	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C165	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C166	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C167	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C168	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C169	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C170	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C171	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C172	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C173	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C174	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C175	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C176	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C200	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C201	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C202	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C203	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C204	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C205	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C206	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C207	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C208	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C209	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C210	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
C211	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C212	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C213	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C214	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C215	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C216	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C217	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C218	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C219	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C220	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C221	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C222	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C223	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C224	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C225	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C226	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C227	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C228	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C229	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C230	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C231	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C232	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C233	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C234	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C235	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C236	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C300	22pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C220JBNC	
C301	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C302	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C303	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C304	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C305	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C306	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C307	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C308	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C309	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C310	22pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C220JBNC	
C311	22pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C220JBNC	
C312	22pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C220JBNC	
C313	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C314	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C315	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C316	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C317	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C318	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C319	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C320	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C321	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C322	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
C323	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C324	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C325	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C326	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C327	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C328	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C329	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C330	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C331	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C332	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C333	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B471KBNC	
C334	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C335	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B471KBNC	
C336	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C337	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C338	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C339	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C340	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C341	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C342	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C343	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C345	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C346	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C348	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C349	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C350	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C351	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C352	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C353	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C354	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C400	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B103KBNC	
C402	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B561KBNC	
C404	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C405	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C406	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C407	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C408	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C409	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C410	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C411	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C412	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C413	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C414	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C450	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C451	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C452	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C453	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C454	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C455	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
C456	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B471KBNC	
C457	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C458	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C459	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C460	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C461	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C462	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C463	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C464	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C465	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C466	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C467	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C468	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C469	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C470	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C471	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C472	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C473	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C474	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C478	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C479	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C480	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C481	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C482	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C483	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C484	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C485	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C486	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C487	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C488	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C489	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C490	10uF, ELEC, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C492	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C493	100uF, ELEC, 16V, 40C, 20%	NICHICON	UWX1C101MCR1GB	
C493	100uF, ELEC, 16V, 55C, 20%	NICHICON	UWT1C101MCR1GB	
C494	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C495	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B473KBNC	
C496	0.047uF, 0603, X7R, 50V, 10%	Samsung	CL10B102KBNC	
C497	470uF, TANT, 4V, 55C, 20%	NICHICON	F930G477MNC	
C498	100uF, ELEC, 16V, 40C, 20%	NICHICON	UWX1C101MCR1GB	
C498	100uF, ELEC, 16V, 55C, 20%	NICHICON	UWT1C101MCR1GB	
C499	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C500	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C501	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C502	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C503	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C504	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C505	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C506	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Capacitors (continued)

Reference Designator	Description	Vendor	Vendor Part Number	Note
C507	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C531	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C532	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C533	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C534	47pF, 0603, 50V, NPO, 55C, 5%	Samsung	CL10C470JBNC	
C535	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C536	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C537	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C538	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C539	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	
C540	0.1uF, 0603, Y5V, 50V, 20%	Samsung	CL10F104ZBNC	

Inductors

Reference Designator	Description	Vendor	Vendor Part Number	Note
L100	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L300	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L301	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L302	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L400	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L401	XFMR, 10BASE-T, SOIC-16	E&E	821-M0542	
L402	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L403	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L404	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L405	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L450	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L451	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L452	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L453	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L454	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L455	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC102R1H3D	
L456	POWER IND, 5.2uH, 30%	SUMIDA	CDRH104R-5R2NC	
L457	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	
L458	EMI FILTER, 50V, 300mA, 20%	Murata	NFM21CC223R1H3D	

Diodes

Reference Designator	Description	Vendor	Vendor Part Number	Note
D450	SCHOTTKY, SC59	Toshiba	1SS396	
D451	SCHOTTKY, SC59	Toshiba	1SS396	
D453	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	
D454	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	
D455	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	
D456	SCHOTTKY, SC59	Toshiba	1SS396	
D457	SCHOTTKY, SC59	Toshiba	1SS396	
D458	SCHOTTKY, SC59	Toshiba	1SS396	
D459	SCHOTTKY, SC59	Toshiba	1SS396	
D461	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	
D462	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	
D463	RECT, 400V, 1A, SOD-106	ROHM	1SR154-400	

ELECTRICAL PART LIST

Digital Signal Processor (DSP) PCB Assembly

Transistors

Reference Designator	Description	Vendor	Vendor Part Number	Note
Q450	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q451	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q452	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q453	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q454	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q455	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q456	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q457	PNP, 50V, 100Ma, SOT-23	KEC	KRA102S	
Q458	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	

Integrated Circuits

Reference Designator	Description	Vendor	Vendor Part Number	Note
M100	SDRAM, TSOP-54	ELPIDA	EDS1216AATA-75	
M101	DSP, QFP-208	TI	TMS320C6713BPYP	
M200	PROG GATE ARRAY, QFP-208	XILINX	XC2S150E6PQ208C	
M201	OCTAL BUFFER DR, TSSOP20	ONSemi	MC74VHC541DT	
M202	OCTAL BUFFER DR, TSSOP20	ONSemi	MC74VHC541DT	
M300	MICROPROCESSOR, QFP-176	Renases	HD6417706F133	
M301	SDRAM, TSOP-54	ELPIDA	EDS1216AATA-75	
M302	FLASH MEMORY, TSOP-48	SPANSION	S29GL064M90TAIR	
M400	HEX INVERTER, TSSOP-14	ONSEMI	MC74VHC04DT	
M401	ETHER LAN CONT, TQFP-100	Cirrus	CS8900A-CQ3	
M450	TRANSCEIVER, SOIC-16	Harris/Intersil	HIN202ECB	
M452	OCTAL BUFFER DR, TSSOP20	ONSemi	MC74VHC541DT	
M453	VOLT DET, SOT-23-5	SEIKO	S-80947CNMC-G9H-T2	
M454	VOLT DET, TSOP-5	ONSEMI	NCP303LSN11T1	
M455	VOLT DET, SOT-23-5	SEIKO	S-80917CNMC-G8M-T2	
M456	VOLT DET, SOT-23-5	SEIKO	S-80917CNMC-G8M-T2	
M457	VOLT DET, Vd=3.0V	SEIKO	S-80930CNMC-G80-T2	
M458	VOLT DET, SOT-23-5	SEIKO	S-80940CNMC-G9A-T2	
M460	REG, 3.3V, 1A, TO-252	NEC	UPC2933T	
M461	REG, SOT-223, TI	NEC	LM317DCY	
M462	REG, SOT-223, TI	NEC	LM317DCY	
M463	PWM SWITCHER	TI	TPS54312PWP	

Miscellaneous

Reference Designator	Description	Vendor	Vendor Part Number	Note
CN452	CONN, SMT, 1.0MM, 100 PIN	KEL	87BFN-100R	
CN530	CONN, SMT, 100P	Molex	52584-1079	
X200	50.000MHz, 100ppm, 50pF	KDS	DSO531SVL 50MHz	
X201	24.576MHz, 100ppm, 50pF	KDS	DSO531SVL 24.576MHz	

ELECTRICAL PART LIST

General Input/Output (GIO) PCB Assembly

Resistors

Reference Designator	Description	Vendor	Vendor Part Number	Note
R100	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R101	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R102	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R103	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R104	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R105	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R106	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R107	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R108	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R109	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R110	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R111	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R112	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R113	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R114	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R115	5.1K, 0603, 1/10W, 1%	Yageo	RC0603FR-075K1	
R116	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R117	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R118	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R119	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R120	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R121	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R122	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R123	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R125	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R126	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R129	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R130	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R132	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R133	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R134	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R135	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R136	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R137	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R138	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R139	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R140	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R141	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R142	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R144	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R145	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R146	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	

ELECTRICAL PART LIST

General Input/Output (GIO) PCB Assembly

Capacitors

Reference Designator	Description	Vendor	Vendor Part Number	Note
C100	10uF, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C101	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C102	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C103	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C104	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C105	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C106	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C107	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C108	0.01uF, 0603, X7R, 50V, 55C, 10%	Samsung	CL10B103KBNC	
C109	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C110	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C111	10uF, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C112	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C113	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C114	10uF, 16V, 40C, 20%	NICHICON	UZT1C100MCR1GB	
C115	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C116	12pF, 0603, 50V, 55C, NPO, 5%	Samsung	CL10C120JBNC	
C117	12pF, 0603, 50V, 55C, NPO, 5%	Samsung	CL10C120JBNC	
C118	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C119	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C120	47uF, 16V, 40C, 20%	NICHICON	UZT1C470MCR1GB	
C121	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C122	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C123	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C124	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C125	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C126	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C127	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C128	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C129	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C130	0.1uF, 0603, Y5V, 50V, -30C, 20%	Samsung	CL10F104ZBNC	
C131	47pF, 0603, 50V, 55C, NPO, 5%	Samsung	CL10C470JBNC	
C132	47pF, 0603, 50V, 55C, NPO, 5%	Samsung	CL10C470JBNC	
C403	1000pF, CER, Y5P, 2KV, 55C, 10%	Panasonic	ECKD3D102KBP	

ELECTRICAL PART LIST

General Input/Output (GIO) PCB Assembly

Inductors

Reference Designator	Description	Vendor	Vendor Part Number	Note
L100	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L101	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L102	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L103	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L104	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L105	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L106	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L107	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L108	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L109	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L110	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L111	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L112	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L113	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L114	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L115	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L116	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L117	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	
L118	EMI FILTER, SMD 300mA, 20%	Murata	NFM21CC223R1H3D	

Diodes

Reference Designator	Description	Vendor	Vendor Part Number	Note
D108	RECTIFIER, 400V, 1A, SOD-106	ROHM	1SR154-400	
D464	LED, RIGHT ANGLE, RED/GREEN	KINGBRIGHT	W42WUM/EGW	
D465	LED, RIGHT ANGLE, RED/GREEN	KINGBRIGHT	W42WUM/EGW	
D466	LED, RIGHT ANGLE, RED/GREEN	KINGBRIGHT	W42WUM/EGW	
D467	LED, RIGHT ANGLE, RED/GREEN	KINGBRIGHT	W42WUM/EGW	

Transistors

Reference Designator	Description	Vendor	Vendor Part Number	Note
Q100	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q101	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q102	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q103	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q104	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q105	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q106	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q107	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q109	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q110	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q111	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q112	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	
Q113	NPN, 50V, 100mA, SOT-23	KEC	KRC102S	

ELECTRICAL PART LIST

General Input/Output (GIO) PCB Assembly

Integrated Circuits

Reference Designator	Description	Vendor	Vendor Part Number	Note
M100	VOLTAGE DETECTOR, TSOP-5	ONSEMI	NCP303LSN30T1	
M100	VOLTAGE DETECTOR, SOT-23-5	SEIKO	S-80930CNMC-G80-T2	
M101	REGULATOR, 3.3V, 1A, TO-252	NEC	UPC2933T	
M102	FLASH, MCU, 32K, LQFP64	RENASES	HD64F3664FP	
M451	TRANSCEIVER, PDIP-8	TI	SN75176BP	

Miscellaneous

Reference Designator	Description	Vendor	Vendor Part Number	Note
CN100	HEADER, RT ANG, 9 POS, P3.81	Dinkle	ECH381R-09P	
CN101	HEADER, RT ANG, 9 POS, P3.81	Dinkle	ECH381R-09P	
CN102	SHROUDED HEADER, TOP ENTRY, 8 CKT, P=2.5	Neltron	2317SJ-08	
CN400	JACK, MODULAR, TM5RJ2-88	HIROSE	TM5RJ2-88	
CN450	HEADER, RIGHT ANGLE, P2.74MM, 9 PINS	Omron	XM2C-0912-112	
CN450	HEADER, RIGHT ANGLE, P2.74MM, 9 PINS	WIESON	3170-09MANS4DW	
CN451	HEADER, RIGHT ANGLE, P5.08MM, 3 POLES, 2EHDRC-03P	DINKLE	2EHDRC-03P	
XTAL300	32.768KHz, 20ppm, 12.5pF, D3X8MM	Raltron	R38-32.768-12.5	
XTAL301	16.000MHz, 30ppm, 20pF, HC-49/S	Raltron	AS-16.000-20	
XTAL400	20.000MHz, 30ppm, 20pF, HC-49/S	Raltron	AS-20.000-20	
XTAL100	CRYSTAL, 10.000MHz, 30ppm, 20pF, HC-49/S	Raltron	AS-10.000-20	
BT450	COIN CELL, LITHIUM BATTERY WITH SOLDERING TAB, BR2325	PANASONIC	BR2325-1HCE	3 ⚠

ELECTRICAL PART LIST

Output PCB Assembly

Inductors

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
L900	NFM39R12C223	MURATA	NFM39R12C223	
L901	NFM39R12C223	MURATA	NFM39R12C223	
L902	NFM39R12C223	MURATA	NFM39R12C223	
L903	NFM39R12C223	MURATA	NFM39R12C223	
L904	NFM39R12C223	MURATA	NFM39R12C223	
L905	NFM39R12C223	MURATA	NFM39R12C223	
L906	NFM39R12C223	MURATA	NFM39R12C223	
L907	NFM39R12C223	MURATA	NFM39R12C223	
L908	NFM39R12C223	MURATA	NFM39R12C223	
L909	NFM39R12C223	MURATA	NFM39R12C223	
L910	NFM39R12C223	MURATA	NFM39R12C223	
L911	NFM39R12C223	MURATA	NFM39R12C223	

Miscellaneous

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
CN900	STLZ950/3G-5.08	FENIX-CONTACT	STLZ950/3G-5.08	
CN901	STLZ950/3G-5.08	FENIX-CONTACT	STLZ950/3G-5.08	
CN902	STLZ950/3G-5.08	FENIX-CONTACT	STLZ950/3G-5.08	
CN903	STLZ950/3G-5.08	FENIX-CONTACT	STLZ950/3G-5.08	
CN904	0T1-400334	CT	0T1-400334	

LED PCB Assembly

Diodes

Reference Designator	Description	Vendor	Vendor Part Number	Note
D920	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D921	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D922	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D923	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D924	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D925	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D926	LED, RED/GREEN	SHARP	GL3ED8(R/G)	
D927	LED, RED/GREEN	SHARP	GL3ED8(R/G)	

ELECTRICAL PART LIST

CC-64 Control Center

Resistors

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
RA100	NETWORK, 10K, 10 PIN/8R, 5%	Yageo	YC158TJR-0710K	
RA400	NETWORK, 10K, 10 PIN/8R, 5%	Yageo	YC158TJR-0710K	
RA401	NETWORK, 10K, 10 PIN/8R, 5%	Yageo	YC158TJR-0710K	
RA500	NETWORK, 10K, 10 PIN/8R, 5%	Yageo	YC158TJR-0710K	
R100	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R101	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R102	47 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-0747R	
R103	47 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-0747R	
R104	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R105	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R106	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R107	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R108	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R109	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R200	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R201	47 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-0747R	
R202	47 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-0747R	
R203	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R204	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R205	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R206	100 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07100R	
R208	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R209	4.7K, 0603, 1/10W, 1%	Yageo	RC0603FR-074K7	
R210	330 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07330R	
R212	47 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-0747R	
R216	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R300	56K, 0603, 1/10W, 1%	Yageo	RC0603FR-0756K	
R400	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R401	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R402	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R403	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R404	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R500	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R501	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R502	0 OHM, 0603, 1/10W, 5%	Yageo	RC0603JR-07R00	
R505	10K, 0603, 1/10W, 1%	Yageo	RC0603FR-0710K	
R506	1K, 0603, 1/10W, 1%	Yageo	RC0603FR-071K	
R509	680 OHM, 0603, 1/10W, 1%	Yageo	RC0603FR-07680R	

Capacitors

Reference Designator	Description	Vendor Name	Vendor Part Number	
C100	12pF, 0603, NPO, 50V, 125C, 5%	Samsung	CL10C120JBNC	
C101	12pF, 0603, NPO, 50V, 125C, 5%	Samsung	CL10C120JBNC	
C102	10uF, SMD E CAP, 16V, 105C, 20%	Nichicon	UZT1C100MCR1GB	
C103	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C104	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	

ELECTRICAL PART LIST

CC-64 Control Center

Capacitors (continued)

Reference Designator	Description	Vendor Name	Vendor Part Number	
C105	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C106	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C107	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C108	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C109	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C110	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C200	1000pF, CER, Y5P, 2KV, 125C, 10%	Panasonic	ECKD3D102KBP	
C201	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C202	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C203	12pF, 0603, NPO, 50V, 125C, 5%	Samsung	CL10C120JBNC	
C204	12pF, 0603, NPO, 50V, 125C, 5%	Samsung	CL10C120JBNC	
C205	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C206	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C207	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C208	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C209	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C210	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C211	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C213	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C214	1000pF, CER, Y5P, 2KV, 125C, 10%	Panasonic	ECKD3D102KBP	
C300	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C301	22pF, 0603, NPO, 50V, 125C, 5%	Samsung	CL10C220JBNC	
C302	10uF, SMD E CAP, 16V, 105C, 20%	Nichicon	UZT1C100MCR1GB	
C400	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C401	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C402	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C403	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C404	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C405	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C406	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C407	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C408	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C409	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C410	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C411	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C412	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C413	0.01uF, 0603, X7R, 50V, 125C, 10%	Samsung	CL10B103KBNC	
C500	220uF, SMD E CAP, 10V, 105C, 20%	Nichicon	UWT1A221MCL1GS	
C501	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C502	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C503	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C504	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C505	220uF, SMD E CAP, 10V, 105C, 20%	Nichicon	UWT1A221MCL1GS	
C507	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C508	0.1uF, 0603, Y5V, 50V, 85C, 20%	Samsung	CL10F104ZBNC	
C509	10uF, E CAP, 16V, 105C, 20%	Nichicon	UZT1C100MCR1GB	

ELECTRICAL PART LIST

CC-64 Control Center

Diodes

Reference Designator	Description	Vendor Name	Vendor Part Number	
D100	SWITCHING, KDS181, SOT-23	KEC	KDS181	
D101	SWITCHING, KDS181, SOT-23	KEC	KDS181	
D102	SWITCHING, KDS181, SOT-23	KEC	KDS181	
D200	LED, YELLOW, SMD, 0805	Everlight	17-21 UYC/S530-A2/TR8	
D201	LED, AMBER, SMD, 0805	Everlight	17-21 UYOC/S530-A2/TR8	
D202	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D300	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D301	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D302	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D303	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D304	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D305	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D306	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D307	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D308	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D309	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D310	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D311	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D312	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D313	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D314	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D315	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D316	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D317	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D318	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D319	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D320	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D321	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D322	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D323	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D324	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D325	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D326	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D327	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D328	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D329	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D330	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D331	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D332	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D333	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D334	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D335	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D336	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D337	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D338	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	

ELECTRICAL PART LIST

CC-64 Control Center

Diodes (continued)

Reference Designator	Description	Vendor Name	Vendor Part Number	
D339	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D340	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D341	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D342	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D343	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D344	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D345	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D346	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D347	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D348	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D349	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D350	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D351	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D352	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D353	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D354	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D355	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D356	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D357	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D358	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D359	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D400	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D401	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D402	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D403	LED, GREEN, SMD, 0805	Everlight	17-21 VGC/TR8	
D500	TVSSMAJ5.0CA-TR, SMA, ST	ST	SMAJ5.0CA-TR	
D501	TVSSMAJ5.0CA-TR, SMA, ST	ST	SMAJ5.0CA-TR	

Inductors

Reference Designator	Description	Vendor Name	Vendor Part Number	
L200	10-BASE T LOW PASS FILTER	YCL	20F001N	
L200	10-BASE T LOW PASS FILTER	BEL-FUSE	A556-2006-02	
L201	CHIP, EMI FILTER, 50V/2A, 20%	Panasonic	EXCCET103U	
L202	CHIP, EMI FILTER, 50V/2A, 20%	Panasonic	EXCCET103U	
L502	CHIP, EMI FILTER, 50V/2A, 20%	Panasonic	EXCCET103U	
L503	CHIP, EMI FILTER, 50V/2A, 20%	Panasonic	EXCCET103U	

Transistors

Reference Designator	Description	Vendor Name	Vendor Part Number	
Q100	PNP, 50V, 100mA, SOT-23	KEC	KRA102S	
Q101	PNP, 50V, 100mA, SOT-23	KEC	KRA102S	
Q102	PNP, 50V, 100mA, SOT-23	KEC	KRC102S	
Q103	PNP, 50V, 100mA, SOT-23	KEC	KRA102S	
Q202	PNP, 60V, 1A, SOT-89, KTA1668	KEC	KTA1668Y	
Q500	PNP, 50V, 100mA, SOT-23	KEC	KRC102S	

ELECTRICAL PART LIST

CC-64 Control Center

Integrated Circuits

Reference Designator	Description	Vendor Name	Vendor Part Number	
M100	QUAD 2-INPUT AND, TSSOP14	ON Semi	MC74VHC08DT	
M101	CMOS, SRAM, TSOP44	Samsung	K6R1016C1D-TC10	
M102	MCU, FLASH, UNPROG, FP-100B	Hitachi	HD64F3069RF25	
M200	HEX INVERTER, TSSOP14	ON Semi	MC74VHC04DT	
M201	EEPROM, DIP8, ATMEL	ATMEL	AT93C46-10PI-2.7	
M202	ETHERNET CONT, PQFP-100	Realtek	RTL8019AS	
M300	LED DISPLAY DRIVER, QSOP16	MAXIM	MAX6951CEE	
M400	DECODER, TSSOP16	ONSEMI	MC74VHC138DT	
M401	OCTAL BUFFER DRIVER, TSSOP20	ON Semi	MC74VHC541DT	
M402	OCTAL BUFFER DRIVER, TSSOP20	ON Semi	MC74VHC541DT	
M403	OCTAL D-TYPE F-F, TSSOP20	ON Semi	MC74VHC574DT	
M404	IDENTITY COMP, TSSOP20	Fairchild	74ACT521MTC	
M500	DC/DC CONVERTER, DIP-24	Cincon Elec	EC5A-12S05	
M501	VOLTAGE DETECTOR, TSOP-5	ONSemi	NCP303LSN47T1	
M501	VOLTAGE DETECTOR, SOT-23-5	Seiko	S80947CNMC-G9H-T2	
M503	OCTAL BUFFER DRIVER, TSSOP20	ON Semi	MC74VHC541DT	
M504	OCTAL D-TYPE FLIP-FLIP, TSSOP20	ON Semi	MC74VHC574DT	

Miscellaneous

Reference Designator	Description	Vendor Name	Vendor Part Number	
CN100	CONNECTOR, 6POLE, P2.5MM	Neltron	2317SJ-06	
CN200	MODULAR JACK, 7006-8P8C-M-01	Neltron	7006-8P8C-M-01	
CN501	WIRE TO BOARD HEADER, P5.08MM, 2POLE, 2EHDVC-02P	Dinkle	2EHDVC-02P	
CN503	PCB SOCKET, DUAL ROW, P2.54MM, 16POLE, H=7.1MM	Neltron	2214S-16G	
E400	ENCODER, SW, 5P, 5V/10mA	ALPS	EC11E15244EF	
E401	ENCODER, SW, 5P, 5V/10mA	ALPS	EC11E15244EF	
E402	ENCODER, SW, 5P, 5V/10mA	ALPS	EC11E15244EF	
E403	ENCODER, SW, 5P, 5V/10mA	ALPS	EC11E15244EF	
E404	ENCODER, SW, 5P, 5V/10mA	ALPS	EC11E15244EF	
JP500	HEADER, P2.54MM, 3PIN, H=6.0MM	Neltron	2211S-03G	
JP501	HEADER, P2.54MM, 3PIN, H=6.0MM	Neltron	2211S-03G	
LCM	HEADER, P2.54MM, 16PIN, H=6.0MM	Neltron	2213S-16G	
SW400 SW401 SW402 SW403	TACT SW, SMT, 12V/50mA, 160g, H=5MM, TD-06XA	Wealth Metal	TD-06XAX	
XTAL100	20.000MHz +/-30ppm, 20pF, HC-49/S	Raltron	AS-20.000-20	
XTAL200	20.000MHz +/-30ppm, 20pF, HC-49/S	Raltron	AS-20.000-20	
/JP500	JUMPER, CAP, 2 PIN, 6MM	Computime	22Z02-0611	
/JP501	JUMPER, CAP, 2 PIN, 6MM	Computime	22Z02-0611	
/LED PCB	FLAT CABLE, 18P, 2651, #26AWG, L=39MM, GREY, UL&CSA	Computime	3618BA00396K0Z04	

ELECTRICAL PART LIST

CC-16 Zone Controller

Resistors

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
R1	715 OHM, 0603, 1/10W, 1%	Yageo Corporation	RC0603FR-07715R	
R2	240 OHM, 0603, 1/10W, 1%	Yageo Corporation	RC0603FR-07240R	
R3	100K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-07100K	
R4	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R5	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R8	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R6	120 OHM, 1206, 1/4W, 5%	Yageo Corporation	RC1206JR-07120R	
R7	1.2K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-071K2	
R9	1.2K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-071K2	
R11	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R12	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R13	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R14	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R15	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R16	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R17	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R18	10K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0710K	
R10	47K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-0747K	
R22	4.7K, 0603, 1/10W, 5%	Yageo Corporation	RC0603JR-074K7	

Capacitors

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
C1	47uF, 50V, SMD, ECAP, +105/-55C, 20%, D6.3x7.7	Nichicon Corp	UUD1H470MCR1GS	
C2	100uF, 16V, SMD, ECAP, +105/-55C, 20%, D6.3X5.4	Nichicon Corp	UWT1C101MCR1GB	
C3	20pF, 0603, 50V, NPO, 5%	Teamyoung Corp	0603N200J500BB	
C4	20pF, 0603, 50V, NPO, 5%	Teamyoung Corp	0603N200J500BB	
C5	220pF, 0603, 50V, NPO, 5%	Teamyoung Corp	0603N221J500BB	
C6	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C7	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C8	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C9	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C10	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C11	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	
C12	0.1uF, 0603, X7R, 16V, 10%	Teamyoung Corp	0603B104K160BB	

Diodes

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
D1	SCHOTTKY BARR, SOD-80C	Philips Semi	BAS85	
D2	SCHOTTKY BARR, SOD-80C	Philips Semi	BAS85	
D3	SCHOTTKY BARR, SOD-80C	Philips Semi	BAS85	
D4	SCHOTTKY BARR, SOD-80C	Philips Semi	BAS85	
-	RECT, 400V/1A, SOD-106	Rohm Semi	1SR154-400	

ELECTRICAL PART LIST

CC-16 Zone Controller

Integrated Circuits

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
U1	REG, 1.5A, TO-263 NS	National Semi	LM317S	
U2	XCVR, SO-8, MAXIM	Maxim Integrated	MAX485ECSA	
U3	EEPROM, 16Kx8, MSOP-8	Microchip Tech Inc	24LC128-I/MS	
U4	MCU, SSOP28, 10MHz	Microchip Tech Inc	PIC16F873A-I/SS	

Miscellaneous

Reference Designator	Description	Vendor Name	Vendor Part Number	Note
LCM	LCD MODULE, BSE002A, 122X32 DOT	ShanTou Goworld Co Ltd	SM4353	
CN1	TERMINAL BLOCK, 6P, ELK508A-06P, P=5.08MM	Dinkle Enterprise Co Ltd	ELK508A-06P	
CN2	HEADER, P2.54MM, DUAL, 20PIN, H7.5MM	Neltron Industrial Co Ltd	2213S-20G	
SW1	DIP SWITCH, 8 POLE, SPST, ON/OFF, DS-08B	Diptronics Manufacturing Inc.	DS-08B	
X1	CRYSTAL, 9.8304MHz +/- 30ppm, 20pF, HC-49/S	Raltron Electronics	AS-9.8304-20	

DISASSEMBLY PROCEDURES

ControlSpace® ESP-00 II Chassis

Refer to Figure 4 for the following procedures

1. Top Cover Removal

1.1 Remove the eight screws (2, 3) that secure the top cover (1). There are six around the back and side edges of the cover and two at the front lip.

1.2 Lift off the top cover.

2. Switch Mode Power Supply (SMPS) Removal

2.1 Perform procedure 1.

2.2 Disconnect the power supply AC wiring harness located toward the rear of the chassis (22). Disconnect the green/yellow ground wire from the GND terminal on the power supply. Disconnect the DC output connector located toward the front of the chassis. This cable harness connects to the motherboard.

2.3 Remove the four screws that secure the power supply to the chassis. These screws are located on the bottom of the chassis. Lift out the power supply.

3. DC Fan Removal

3.1 Perform procedure 2.

3.2 Unplug the DC fan wiring harness from the motherboard at CN205.

3.3 Remove the four screws (27) that secure the DC fan (28) to the chassis (22). Lift out the fan. Take care to not lose the nylon locknuts (29).

4. GPIO Board Removal

4.1 Perform procedure 1.

4.2 Unplug the wire harness at CN102. Lift out the GPIO card.

4.3 Remove the two screws (3) that secure the GPIO card (31) to the back of the chassis (22).
Note: The chassis can support up to two GPIO cards at the end of the chassis nearest the power supply.

5. DSP PCB Removal

5.1 Perform procedure 1.

5.2 Using a Phillips-head screwdriver, remove the two screws (3) that secure the DSP card (30) to the back of the chassis (22).

5.3 Lift up on the back of the DSP card until it unplugs from the motherboard (12) connector. Lift out the DSP card.
Re-assembly Note: When re-installing the card, ensure that the LEDs at the front edge of the card align with the openings in the front panel.

6. Mic/Line Input PCB Removal

6.1 Perform procedure 1.

6.2 Remove the one screw (3) that secures the LED PCB (25) to the front panel (21). This screw is located in the middle of the LED PCB at the front end of the Mic/Line Input PCB (10).

6.3 Remove the two screws (3) that secure the back of the Mic/Line PCB to the chassis (22). These screws are located at the back of the chassis.

DISASSEMBLY PROCEDURES

6.4 Lift out the Mic/Line PCB assembly. Unplug the wiring harness for the Line Output PCB.
Re-assembly Note: When re-installing the Mic/Line PCB assembly, ensure that the LEDs located on the front of the LED PCB are aligned with the openings in the front panel.

7. Line Output PCB Removal

7.1 Perform procedure 1.

7.2 Lift out the Mic/Line PCB assembly. Unplug the wiring harness for the Line Output PCB.

7.3 Remove the two screws (3) that secure the Line Output PCB assembly (9) to the chassis (22). Lift out the PCB assembly.

8. Motherboard PCB Removal

8.1 Perform procedure 1.

8.2 Remove all installed cards that plug into the motherboard (12) using the applicable disassembly procedures.

8.3 Disconnect all GPIO and DC Switching Power Supply wiring harnesses from the motherboard PCB.

8.4 Remove the twelve screws (3) that secure the motherboard to the chassis (22).

ControlSpace® CC-16 Control Center

Refer to Figure 5 for the following procedures.

1. Front Plate Removal

1.1 Grasp the edge of the front plate (1) and pull it away from the rest of the unit. The snaps should release and the front panel should come off easily.

2. Main PCB Removal

2.1 On the back of the unit, release the two white clasps that secure the main PCB (5) in place and gently pull off it off the mounting frame (6).

3. LCD PCB Removal

3.1 Perform procedure 2.

3.2 If necessary, remove the front plate (1) using procedure 1.

3.3 On the back of the mounting frame (5), release the two white plastic clips that secure the insert plate (3) and lift it off.

3.4 On the front of the mounting frame, release the four white plastic clips that secure the LCD PCB (4) in place. Lift out the PCB.

DISASSEMBLY PROCEDURES

ControlSpace® CC-64 Control Center

Refer to Figure 6 for the following procedures.

1. Front Panel Removal

1.1 Grasp the edge of the front panel (2) and pull it away from the rest of the unit. The snaps should release and the front panel should come off easily.

2. EMC Shield Removal

2.1 Place the unit face down onto a soft surface.

2.2 Using a Phillips-head screwdriver, remove the four screws (11) that secure the EMC shield (1).

2.3 Lift off the EMC shield.

3. Main PCB Removal

3.1 Pull off the five control knobs (3) from the front of the unit.

3.2 Perform procedure 2.

3.3 Unsolder the ribbon cable connections located at the left side of the main PCB (8) near the RJ-45 connector.

3.4 Remove the four screws (11) that secure the Main PCB.

3.5 Slide the Main PCB off of the posts and lift it off.

4. LED PCB Removal

4.1 Perform procedure 3.

4.2 Remove the five screws (11) that secure the LED PCB (7) to the front panel (9).

4.3 Slide the PCB off of the posts and lift it off.

5. LCM Display Module Removal

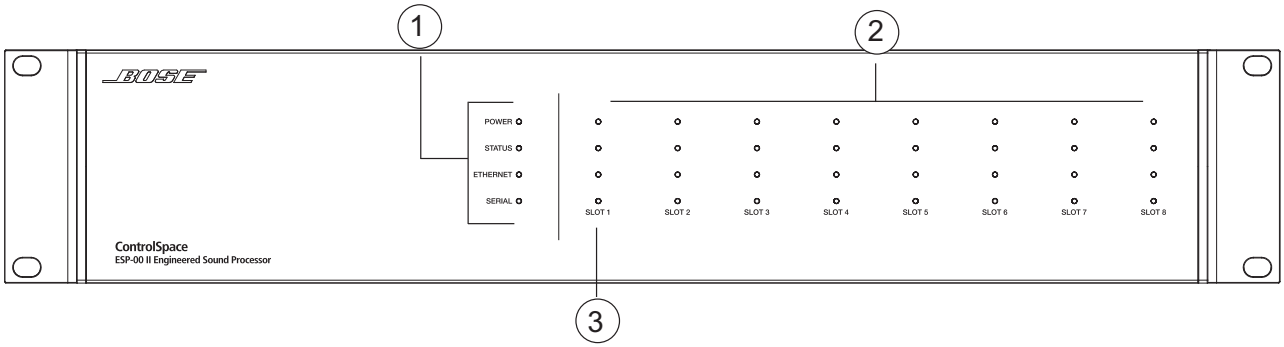
5.1 Perform procedure 3, but do not unsolder the ribbon cable connection to the Main PCB (8). You can swing the Main PCB out of the way to allow access to the LCM display module (6) screws.

5.2 Remove the four screws (10) that secure the LCM display module in place.

5.3 Lift off the LCM display module. Take care to not lose the four nylon washers (12) on the screws or the four nylon spacers under the LCM display module.

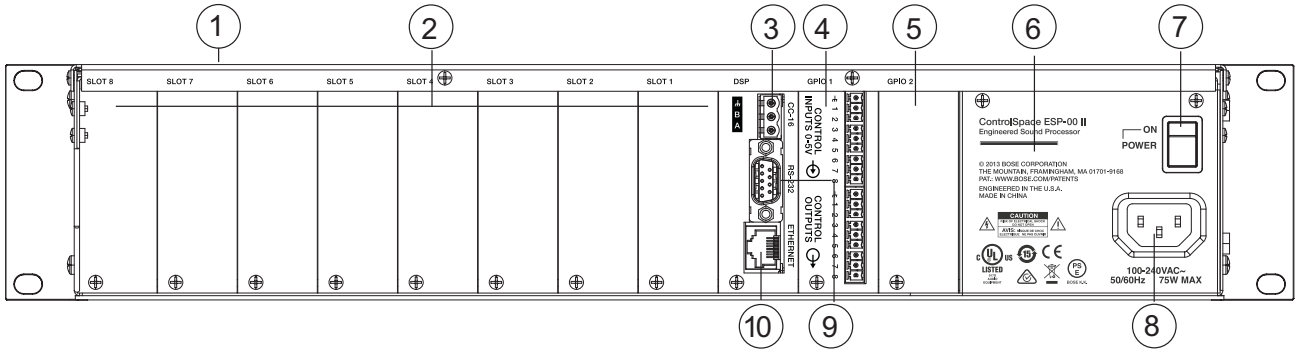
ESP-00 II Indicators and Features

Front Panel



1. LED Indicators: Power, Status, Ethernet and Serial indication.
2. Channel signal indicators: 32 LED windows for channel status from each installed expansion card.
3. Slot labels: Numbered expansion card location with corresponding signal indicators.

Rear Panel



1. Top panel: With the removal of eight screws, lid removes to allow installation of expansion cards.
2. Card slot panels: Removable panels, houses up to eight expansion cards.
3. CC-16 connector: Allows Bose CC-16 zone controller connections.
4. GPIO slot 1: Pre-loaded GPIO card which provides eight general purpose control inputs and eight general-purpose control outputs.
5. GPIO slot 2: For optional 2nd GPIO card.
6. Chassis serial number: Location for unit serial number.
7. POWER switch: AC power switch.
8. AC mains receptacle: Power cord connection (IEC 60320-C-14 Inlet).
9. RS-232: 5-wire, RS-232-C (DTE) serial data interface connection.
10. Ethernet connector: RJ-45 jack for network connectivity.

ESP-00 II Indicators and Features (cont.)

Front Panel LED Indicators

POWER - Power on or fault-state indication
- Green: Power on, normal operation
- Red: Fatal Error.

STATUS - Operating condition of the unit.
- Green: Config loaded, operating normally
- Yellow: DSP resource shortage
- Red: Config error • Off: No config loaded

ETHERNET - Connection status indication of the Ethernet control network
- Green: Link established
- Yellow: Tx activity
- Red: Rx activity

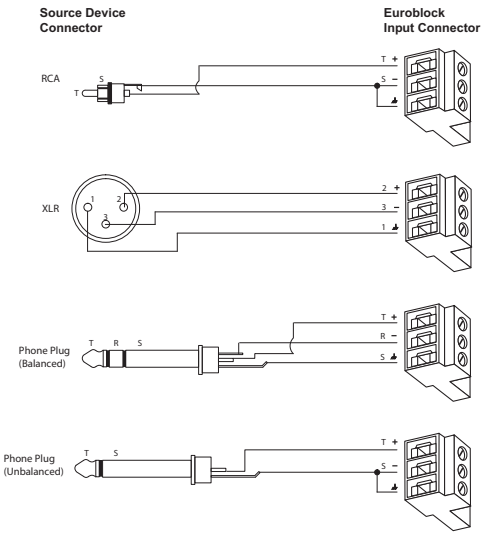
SERIAL - RS-232 or CC-16 serial command status indication. (Does not indicate Serial over Ethernet activity)
- Green: CC-16 command transmitted
- Yellow: CC-16 command received
- Red: RS-232 Rx/Tx activity

Rear Panel Controls and Connections

Mic/Line Inputs

One 4x4 Mic/Line card will be required to perform the test procedures in this service manual.

Each 4x4 Mic/Line card occupies two slots. The input connectors (green) and the input LEDs appear in the first slot. The output connectors (orange) and LEDs appear in the second slot. A microphone or line level audio source can be connected to the Mic/Line inputs using one of the following cable types. Refer to the diagram below.



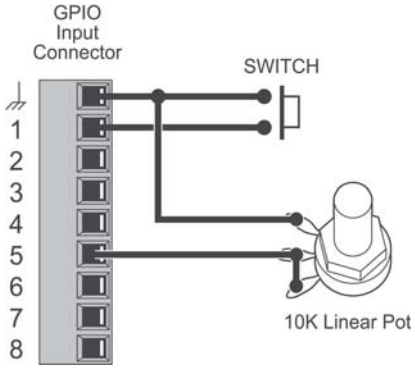
General Purpose Inputs/Outputs

The ESP-00 II includes one GPIO card in slot 1 providing eight control inputs and eight control outputs. A second card can be added to GPIO slot 2.

Inputs

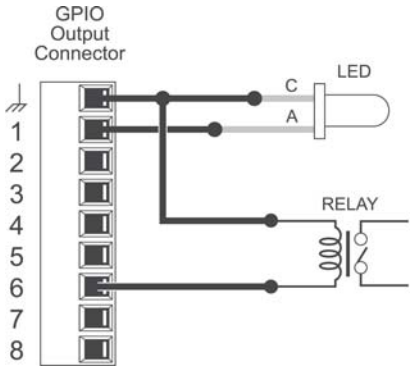
Switches and potentiometers can be connected to the control inputs to control various functions in the system. For example, simple ON/OFF switches can be connected and then programmed to invoke presets, select scenes, or invoke a snapshot of a control. Likewise, 10k linear potentiometers can be connected to control gains in the system.

Inputs contain a 5k ohm pull-up resistor allowing SPST switches to be wired from input to ground. Potentiometers can be wired in series from the control input to ground.



Outputs

LEDs and relays can be connected to general purpose outputs to indicate state changes in the system (e.g. preset or scene changes).



TEST PROCEDURES

Audio Processor ESP-00 II Standard Version Chassis

1. Electrical Tests

Required Items

- Audio Precision ATS-2 test station
- Bose® CC-16 or CC-64 controller
- IBM Compatible PC with Microsoft® Windows® XP or later
- LAN Ethernet crossover cable
- DB9F to DB9F Null Modem cable
- Bose® ControlSpace® software
- ATS-2 test station software

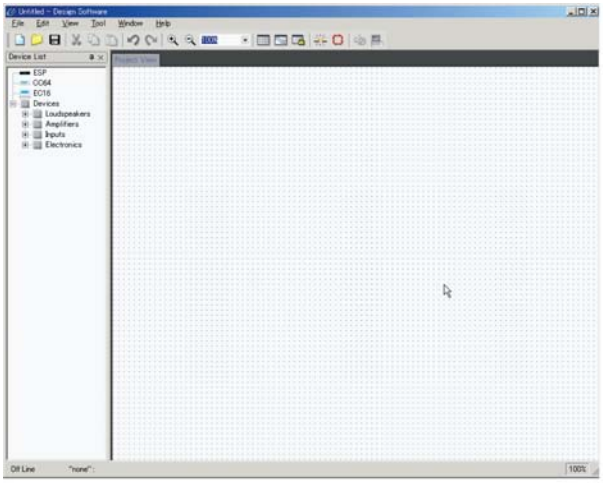
Test Setup Procedures

1. Ensure that the PC has a valid IP address [192.168.0.1 – 192.168.0.99]. To set your IP address, click on START go to the CONTROL PANEL and click on NETWORK & DIAL UP CONNECTIONS. Click on MAKE NEW CONNECTION. Make a LAN connection. Click on PROPERTIES, then click on INTERNET PROTOCOL TCP/IP. Set the IP address to be between 192.168.0.1 and 192.168.0.99. The subnet mask will remain 255.255.255.0 and leave DNS settings window blank. Click OK.

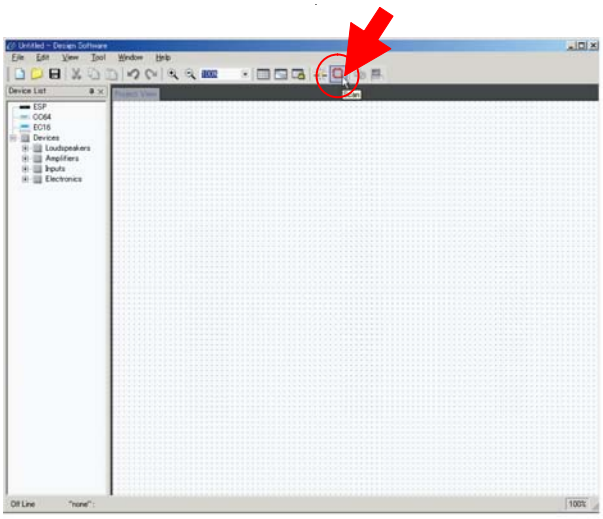
2. If not installed on the PC, install the Bose ControlSpace Designer software. Once the software is installed, click on the icon to start the program.

3. Once the software opens, load the ESP-00 II TEST connection.csp file. This is a test file that has the chassis pre-configured as a straight pass-through to allow test.

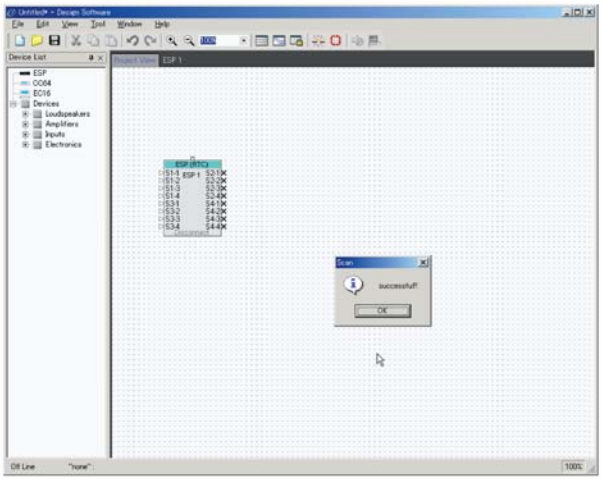
Once you open the ControlSpace software, you should see a blank project window like the one shown below.



Click on “Scan”.

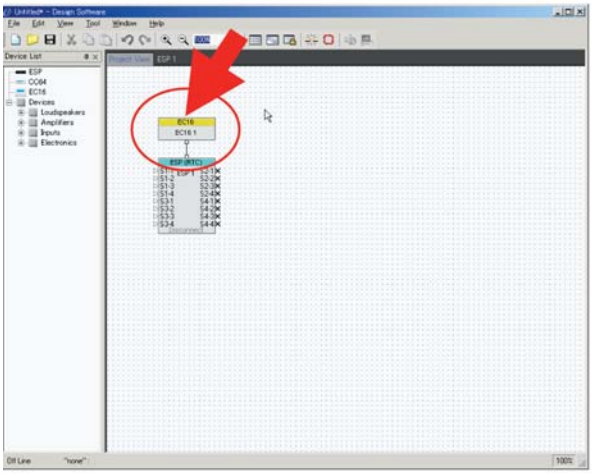


The connected ESP will appear on “Project view”. This case has no CC-16.

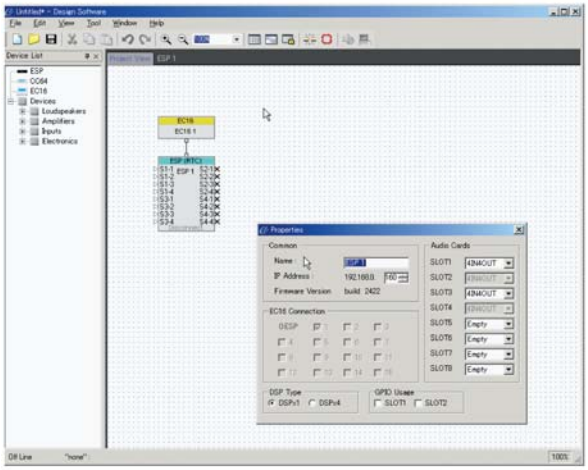


TEST PROCEDURES

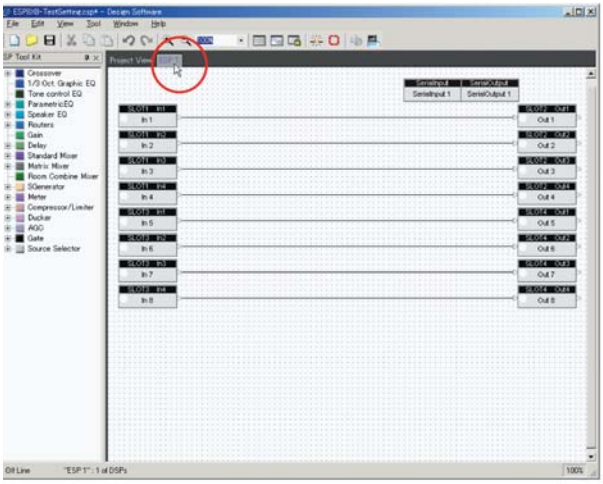
If there is no CC-16 or CC64 controller connected, connect it now. You will also need the power supply for the controller.



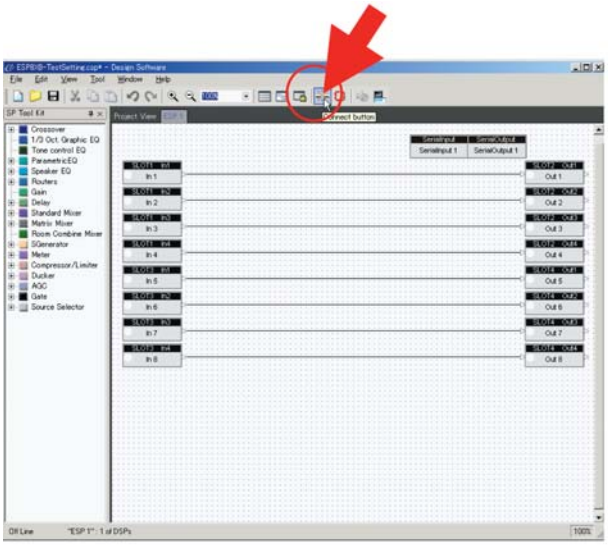
Click on the Properties view
.



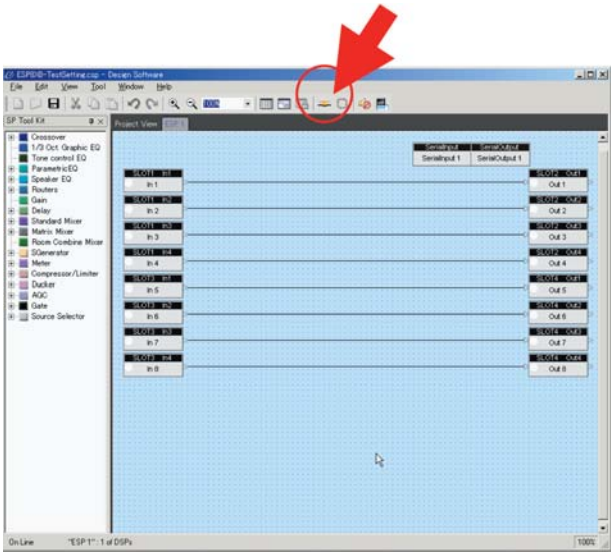
Check Firmware Version on properties dialog box. Select ESP 1 view.



This setup is a straight-through connection for this test. Click the connect icon.



When the connection is completed, the background color will change.



Click the connect icon again. At this point the ESP is set to the proper configuration for this test.

After disconnect, the ESP-00 II chassis must be powered off and powered on again.

TEST PROCEDURES

Audio Processor ESP-00 II Standard Version Chassis

Test Description

This procedure will cover the ControlSpace® ESP-00 II chassis. This same test can also be used for the ESP-88, 88C and ESP-00 chassis.

This procedure will provide a step-by-step process to performing a product hardware validation test on analog audio quality at varying power levels, digital audio quality, and throughput. It is the focus of this procedure to test the ESP-xx base system only. A known good 4x4 Mic/Line card is used as part of the test setup to provide audio input and output paths.

- The analog portion of this test will utilize an analog audio generator as input to the device under test (DUT) and an audio analyzer to provide the data recovery and test results.
- The test operator will be required to manually switch the input and outputs of the test signals and adjust the varying gain levels and frequencies used to exercise the product.
- The digital portion of the hardware will be tested by directing the analog input signals through the Digital Signal Processor (DSP) and back through to the analog output. This will effectively test the ESP Backplane.

IMPORTANT NOTE: The setup detailed in this document is the recommended method of test and should be followed where equipment availability allows.

This document may be used as a guide to performing the validation tests where some equipment may be absent. The basic steps may be derived from the steps detailed in this document with some variation required dependent on the type of equipment available.

1. Electrical Tests

Required Hardware

- Audio Precision ATS-2 Audio Test Set or equivalent and associated cabling
- PC with ControlSpace Designer software, V4.0 or later, and Audio Precision ATS v1.60 or later
- 1 - XLR Female to 3-Pin Phoenix (green) connector
- 1 - XLR Male to 3-Pin Phoenix (orange) connector
- 1 - GPIO Loopback cable
- 1 - Phantom LED Indicator board
- 1 - CC-16 with cable and power supply
- 1 - Ethernet Switch
- 2 - CAT5 ethernet cables
- 1 - USB Serial cable
- 1 - DB9F to DB9F Null Modem cable
- 1 - 4x4 Mic/Line Input/Output card, Series II (PC 041915)

1. Hardware Setup

1.1 In the device under test (DUT), remove the top cover and install a known good 4x4 Mic/Line Input/Output card, Series II into chassis slots 7 and 8. This will allow analog testing of the unit.

TEST PROCEDURES

1.2 Refer to Figure A at right. It illustrates the cabling connections to the ESP-00 II and the Audio Precision ATS-2 (AP). This is the standard test gear for performing the test. Other audio signal generators and analyzers may be used instead.

1.3 Connect the XLR Input and Output cables to the AP using XLR to Phoenix connectors. See Figure A.

1.4 Connect a CAT5 Ethernet cable to the DUT Ethernet jack of the DSP board and to any port of the Ethernet Switch. See Figure B, orange cable.

Figure A

1.5 Connect the DB9 Null Modem Cable to the DUT DB9 connector on the rear panel of the ESP DUT and to the USB serial adapter. Connect the USB serial adaptor to any USB port of the PC. See Figure B.

Figure B

1.6 Using a 3-pin Phoenix connector, connect the CC-16 to the RS-485 port on the rear of the DUT. See Figure B.

1.7 Connect the AP Analog Output to the DUT using the XLR Female to green Phoenix connector cable, and to the Analog Input CH1 of the DUT. Connect the XLR Male to Orange Phoenix Connector cable to the Analog Input of the AP and to the Analog Output CH1 of the DUT. See Figure C.

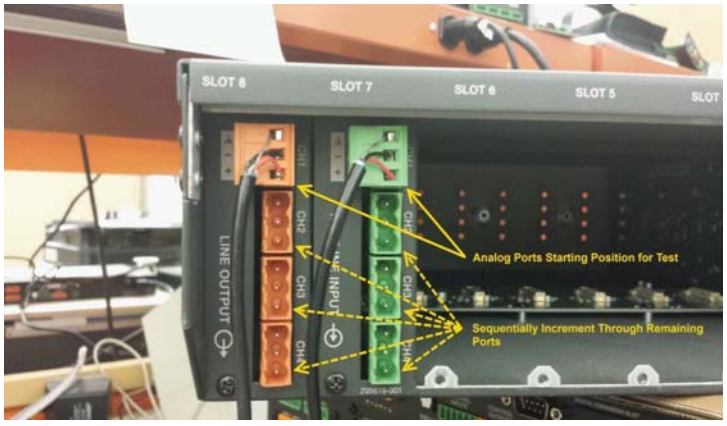


Figure C

IMPORTANT NOTE: You MUST connect a 600 ohm resistor across the + and - pins on the orange Phoenix connector. This is to ensure proper output loading in order to get the correct readings during test.

Test Process

2. ControlSpace® Designer™ (CSD) Settings:

This test process utilizes a .csp configuration file within ControlSpace Designer. To re-create this file, refer to Addendum A. You can also download this configuration file from the Bose® Service web page on the ESP-00 II product page.

2.1 Double click on the ControlSpace Designer.exe Icon located on the desktop (may be in the taskbar on some PCs). This will launch the ControlSpace Designer program.

TEST PROCEDURES

2.2 Select File -> Open ->. In the Project Files Folder, Select the Configuration file for the Model Type ESP-00 II DUT. ex: ESP-00 II DUT Test Config Basic.csp. See Figures D & E.

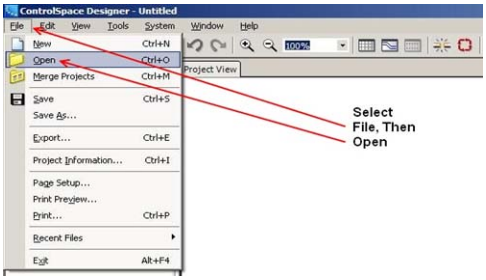


Figure D

2.3 Push the Config file to the DUT by selecting 'Online' and clicking on 'Send to Devices'. See Figure F. This will setup the DUT for audio paths required for test.

2.4 Go Offline.

Note: This action (sending the design file to the DUT) may verify the integrity of the ethernet connection but will not be adequate for testing throughput capacity as needed for passing audio over IP. It does verify that the communication path is open and working.

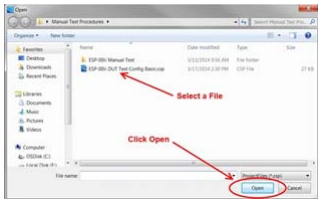


Figure E

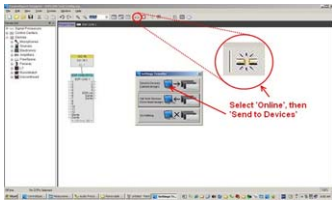


Figure F

2.5 Set-up the GPIO parameters by opening the ESP-00 II tab at the top of the ControlSpace Designer (CSD) Workspace. See Figure G for setup steps.

2.6 Double click on the GPI1 Block (1). GPSLOT1 GPI Control should open.

2.7 Click Window (2), Click Project Directory (3) which opens to the left side of CSD.

2.8 Click GPSLOT1 GPO + to Expand the tree (4).

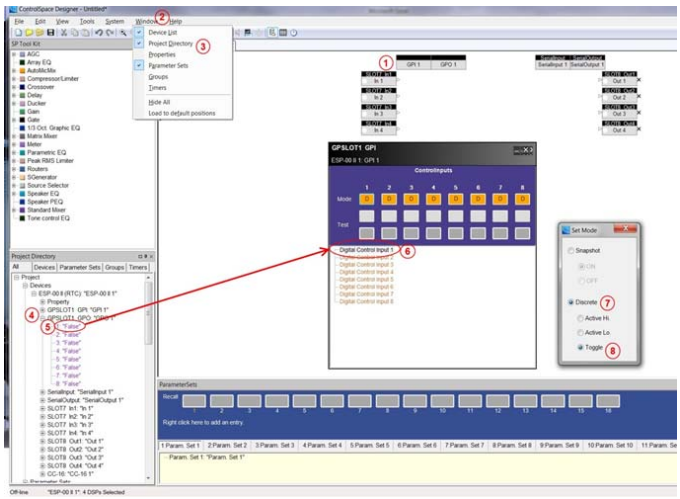


Figure G

2.9 Click and Drag the Port '1 False' (5) and drop into the Digital Control Input 1 (6).

2.10 On the Set Mode Box, Select Discrete (7), Select Toggle (8), and close the dialog box.

2.11 Repeat Steps 2.9 and 2.10 for the remaining Ports 2 thru 8.

2.12 Click 'Go Online', Figure F, and 'Send to Devices'.

3.0 Audio Precision ATS-2 Settings

NOTE: These tests utilize the Audio Precision ATS-2. Although the test equipment used may vary, the settings described as follows should be used.

TEST PROCEDURES

3.1 Double click on the ATS.exe icon located on the Desktop (may be in the taskbar on some PCs). This will launch the Audio Precision ATS-2 program window.

3.2 Select Panels -> Analog Generator. This will display the Audio Generator panel and all of the associated functions. See Figure H.

3.3 Select Panels -> Analog Input. This will display the Analog input tools. See Figure I.

3.4 Select Panels -> Analyzer. This will display the Audio Analyzer panel. See Figure J.

3.5 The ATS-2 program window should look like Figure K at right. **Note:** The following settings are 'preliminary' and will be changed throughout the course of testing.

3.6 Note the Orange rectangle in Figure L. Set the Waveform (Wfm) Fields on the Analog Generator panel to 'Sine' wave and 'Normal'. Set the Frequency to '1.000 kHz' (Kilohertz). Use the dropdown menu to select the types. The Frequency field values may be input directly.

3.7 Note the Blue rectangle in Figure L. 'Auto On' should be unchecked. 'CHA' should be depressed (do not worry about CHB at this time). 'Track A' should be unchecked. Amplitude should be in dBu units. Use the dropdown menu to select.

3.8 Note the Violet rectangle in Figure L. Verify that the settings are as shown in the Figure. 'Configuration' should be 'Bal XLR'. 'Z-out' should be '40' ohms. Frequency Reference = 1.00000kHz. 'dBr' = '387.3' mV. 'Watts' = '8.000' ohms. 'dBm' = '600.0' ohms.

3.9 Note the Red rectangle in Figure L. Verify that the settings for Channel A and Channel B are as shown. 'Source' should be 'XLR-Bal'. 'Peak Mon' should be dBu units. Use the dropdown menu to select the correct values for these fields.

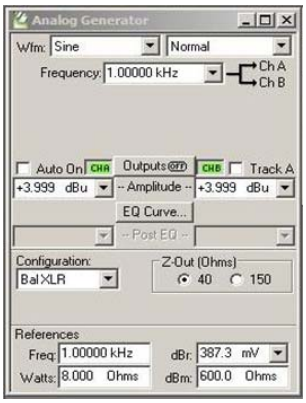


Figure H

Figure I

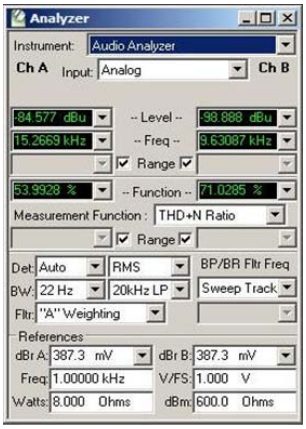


Figure J

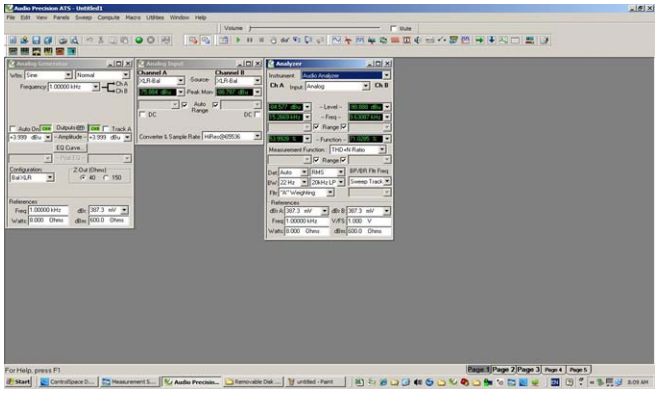


Figure K

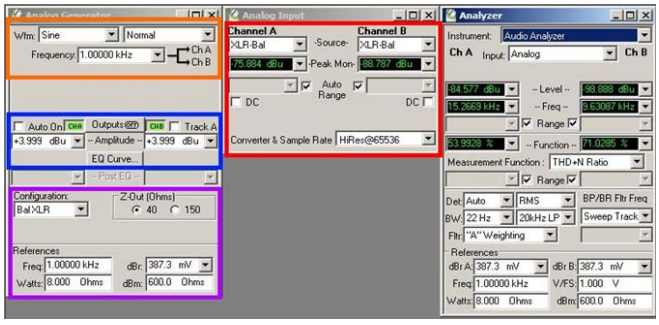


Figure L

TEST PROCEDURES

Note: The Generator fields that will be altered dynamically throughout the test are as follows:

-- Generator Frequency
-- Generator Amplitude

3.10 Note the Analyzer dialog box in Figure M. There will be several adjustments to the values in this panel throughout the test and close attention must be paid to the process steps.

3.11 Note the Yellow rectangle in Figure M. Set the Analyzer Instrument to 'Audio Analyzer'. Set the Input to 'Analog'. Set the 'Level' to 'dBu' units. Set the 'Freq' to 'kHz'. 'Range' should be checked in both boxes.

3.12 Note the Green rectangle in Figure M. 'Function' should be set to 'dBu' units. 'Measurement Function' should be set to 'Amplitude' (THD+N Ratio is shown in this example). "Range should be checked in both boxes.

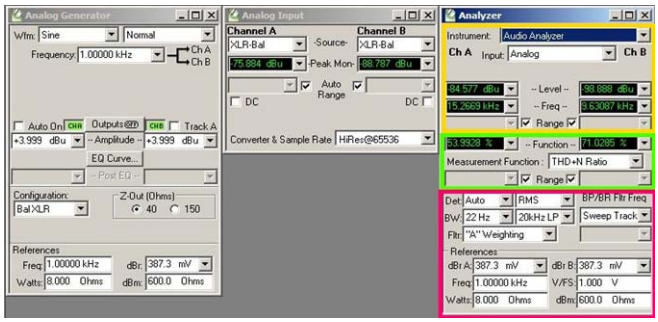


Figure M

3.13 Note the Red rectangle in Figure M. Set 'Det' to 'Auto' & 'RMS'. Set 'BW' to '<10Hz' & 'FS/2'. Set 'BP/BR Filt Freq' to 'Sweep Track'. Set 'Fltr' to 'None'. References should be as follows; 'dBrA & dBrB' should be set to '387.3 mV'. 'Freq' should be '1.00000kHz'. 'V/FS' should be '1.000 V'. 'Watts' should be '8.000 Ohms'. 'dBm' should be '600.0 Ohms'.

Note: The Generator fields that will be altered dynamically throughout the test are as follows:

-- Analyzer Level
-- Analyzer Frequency
-- Analyzer Function
-- Analyzer Measurement Function
-- Analyzer BW (Bandwidth)
-- Analyzer Fltr (Filter)

4.0 Test Instructions. (See Addendum B - Process Summary)

4.1 On the Analog Generator Panel, click on the 'Outputs' button and verify that the output has switched to 'ON'.

4.2 Switch your view to the Analyzer Panel, Read and Record the 'Level' value. It should be between +2.5 and +5.5 dBu for a passing condition. Note that the Frequency is 1.000kHz ±20Hz. See Figure N.

4.3 Set the 'Outputs to OFF' on the Analog Generator and verify that the Measured level drops to below <-77 dBu.

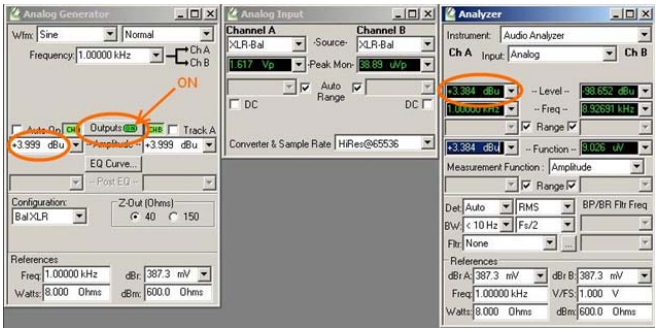


Figure N

TEST PROCEDURES

4.4 On the 'Analyzer' Panel, set the 'BW' to '22Hz' and '20kHz LP'. Set the 'Fltr' to 'A-Weighting'.

4.5 Allow a few seconds for equipment settling time and read and record the value in the 'Function' window. See Figure P. The recorded value should be <-84 dBu (between -84 dBu and -200dBu).

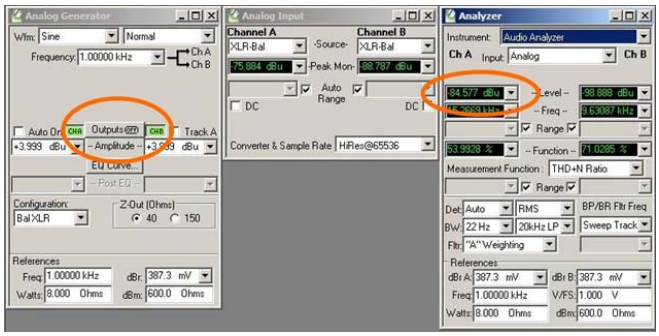


Figure P

Note: The noise measurement is made with no input signal and is indicative of the systems white noise level. This level may be close to the threshold of -84dBu and a stable test environment is essential. There should not be any poor quality cables or loose connections in the system as this will manifest itself in an increased noise level, possibly failing this test.

4.6 On the 'Analyzer' Panel, Reset the 'BW' to '<10Hz' and 'FS/2'. Set the 'Fltr to 'None'.

4.7 On the Generator Panel, Set the 'Freq' to '20.000 kHz' and Turn the 'Outputs' ON. See Figure Q.

4.8 On the Analyzer Panel, Read and Record the 'Level' value. It should be within +/-1.5 dBu of the 1kHz level to pass. Note that the Frequency is 20.000kHz ±20Hz.

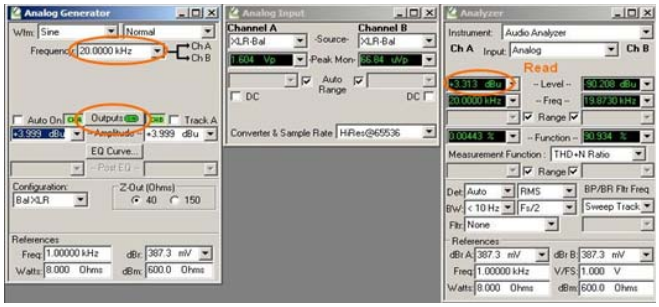


Figure Q

4.9 Change the 'Freq' to '20Hz'.

4.10 Read and Record the 'Level' and 'Freq' on the 'Analyzer' panel. The values should be +0.0 and +3.0 dBu and 20hz ±1Hz

4.11 Reset the 'Freq' value to 1.00000kHz.

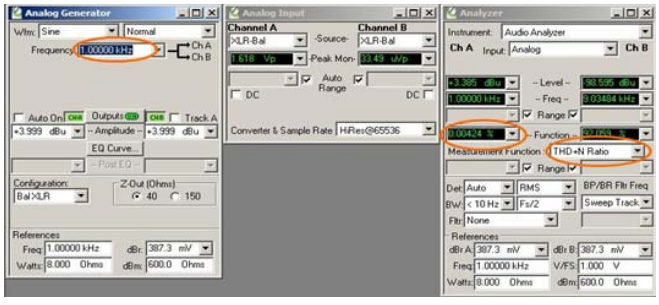


Figure R

4.12 On the 'Analyzer' panel, set the 'Function' to '%' and Set the 'Measurement Function' to 'THD+N Ratio'

4.13 Allow a few seconds for settling and Read and Record the 'Function' value. A passing value is ≤0.015%.

4.14 Change the 'Amplitude' to +19.5dBu.

4.15 Read and record the 'Function' value. A passing value is ≤2.0%.

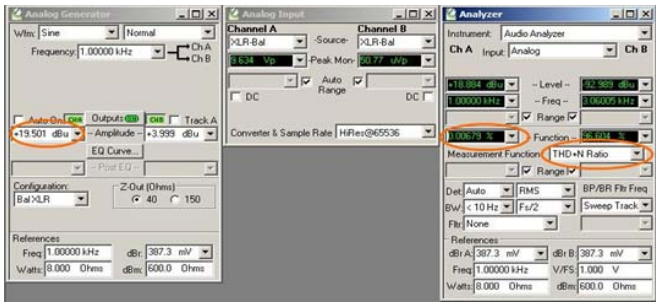


Figure S

4.16 Move the XLR Phoenix I/O connectors to the next sequential I/O ports.

4.17 Reset the 'Generator' and 'Analyzer' to the start up settings.

4.18 Repeat steps 4.0 to 4.17 until all I/O ports have been tested. See Addendum C - Analog Port Mapping.

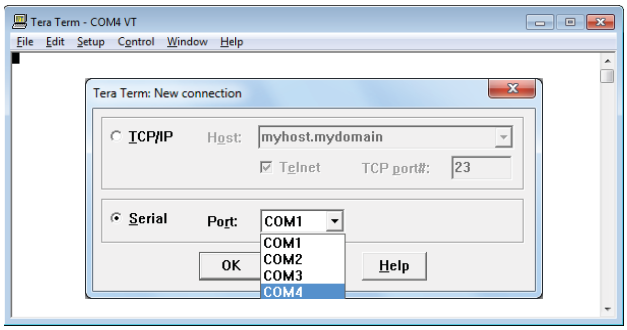
5.0 Serial Port Verification Test

Note: The purpose of this test is to verify that the RS-232 serial port operates by passing information in both directions by receiving a sent command and responding to it with an output on the terminal emulator screen. Tera Term is used for this test.

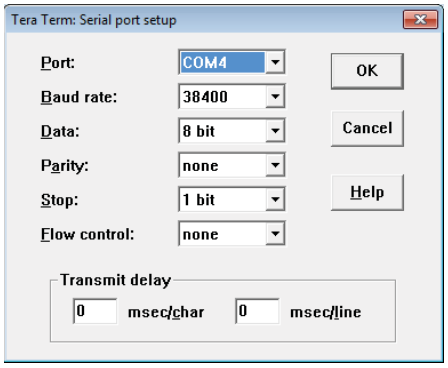
5.1 Connect the serial data cable to an open COM port on your PC. You may need to use a USB to serial port adapter if you do not have a DB9 COM port on your computer.

5.2 Connect the other end of the serial data cable to the DSP card's RS-232 DB9 connector on the rear of the ESP-00 II chassis. **Note:** Do not use an RS232 to TTL level shifter for this test.

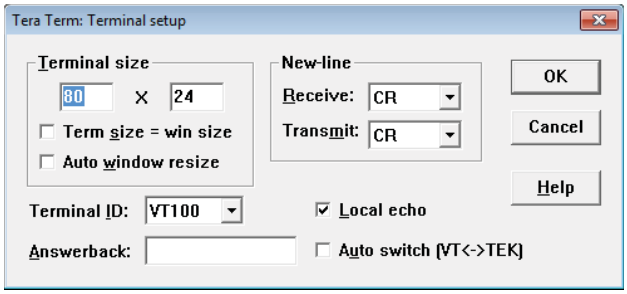
5.3 Open the Tera Term terminal emulator. Select the serial port you want to use. Click OK.



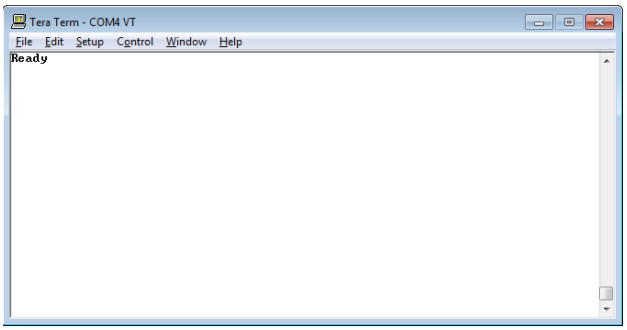
5.4 In the Tera Term window, select Setup / Serial Port. Set to 38400, 8-bit, N, 1. See figure at right. Click OK.



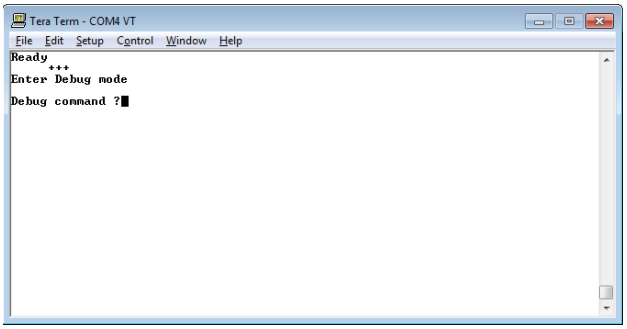
5.5 In the Tera Term window, select Setup / Terminal. Set as shown at right. Click the Local Echo checkbox. Click OK.
See Figure U.



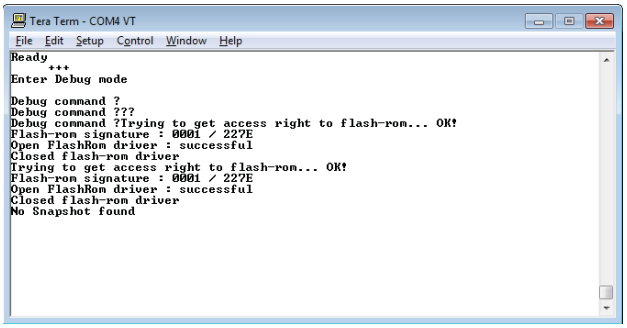
5.5 Power Cycle the DUT and watch the Terminal Emulator for the 'Ready' prompt.



5.6 On the PC Keyboard, Type '+++' (without the quotes). Do not hit Enter. Observe that the terminal window now indicates that the unit is in 'Debug Mode'.



5.7 Type '?' (without the quotes) and observe the response from the DUT. Exit debug mode by typing '+++' again.



NOTE: The RS-232 Serial Port will have been adequately tested by the previous steps. Perform the below steps to test other DUT functions using the open Tera Term window.

6. Hi-Pot Test

THIS IS A MANDATORY TEST

Note: If a repair requires removal of the top cover, the unit MUST be Hi-Pot tested before being returned to the customer to ensure that there is no potential shock hazard.

This test requires a Hi-Pot tester with a ground bond attachment to perform this test.

Test Connections:
The Hi-Pot tester connects to the unit under test by means of a wiring harness. The AC line cord of the product plugs into the Hi-Pot tester AC adapter box. The return line connects to an accessible chassis ground using an alligator clip. There are no special cables required for this test.

Hi-Pot Tester Settings:

All units - 2.120 KVDC, rise time = 1 sec., dwell = 1 to 4 seconds, current limit = 1.2 mA

6.1 Connect the AC mains cord to the back of the unit under test. Turn on the AC power switch on the back of the unit under test. Plug the other end of the AC cord into the Hi-Pot tester adapter box that connects to the HV connection on the tester.

6.2 With the tester set to the above parameters, perform the test. If the unit fails, remove the top cover and repair the problem. Once the unit is repaired, repeat the Hi-Pot and the ground bond test to ensure the unit is safe to return to the customer.

7. Ground Bond Test

Note: This test only needs to be performed if the ground wire to the chassis from the AC IEC connector or the power supply on the inside of the chassis of the unit has been removed or disturbed as part of a repair. If it has not, this test does not need to be performed.

This test measures current handling capability between the ground blade on the AC inlet or mains plug and the earth bond point on the rear of the chassis.

Test Parameters:
10A, ≤ 12VAC open circuit, ≤ 0.1 Ohms from AC earth terminal on IEC connector in chassis, to earth bond point on rear of chassis.

7.1 Connect the AC mains cord to the back of the unit under test. Plug the other end of the AC cord into the ground bond test box.

7.2 With the tester set to the above parameters, perform the test. If the unit fails, remove the top cover and repair the problem. Once the unit is repaired, repeat the Hi-Pot and the ground bond tests to ensure the unit is safe to return to the customer.

ADDENDUM A - CSD Configuration Setup

8.0 CSD Project File Configuration Setup

8.1 Open ControlSpace® Designer™ 4.0 or Later

8.2 Expand the Signal Processors and Control Centers drop-down menus by clicking the + sign next to the name.

8.3 Create the New design file including one ESP-00 II and one CC-16. Drag and Drop the components as shown in Figures A1 and A2.

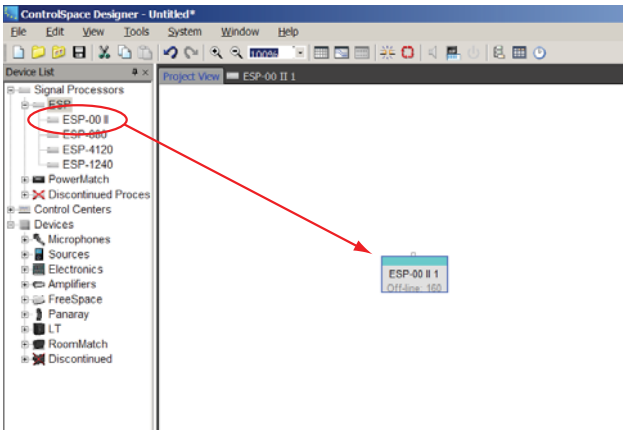


Figure A1

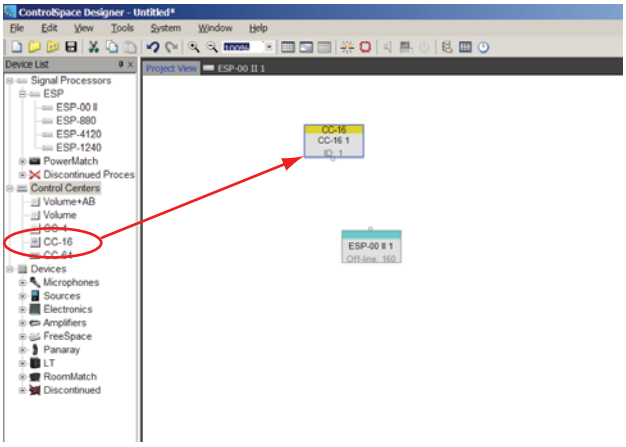


Figure A2

8.4 Drag a wire between the CC16 and ESP-00 II as shown in Figure A3.

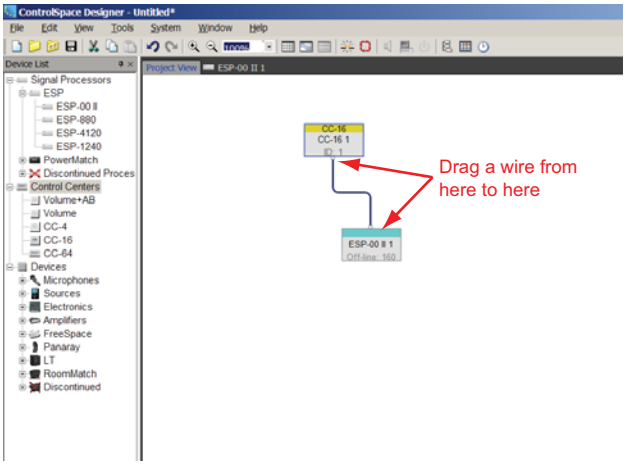


Figure A3

ADDENDUM A - CSD Configuration Setup

8.5 Add a 4x4 Mic/Line Card as shown in Figure A4. Right Click the ESP-00 II and Select Properties. Select the 'Slot 7' Drop-Down Menu and Select '4X4 Mic/Line'. Close Properties.

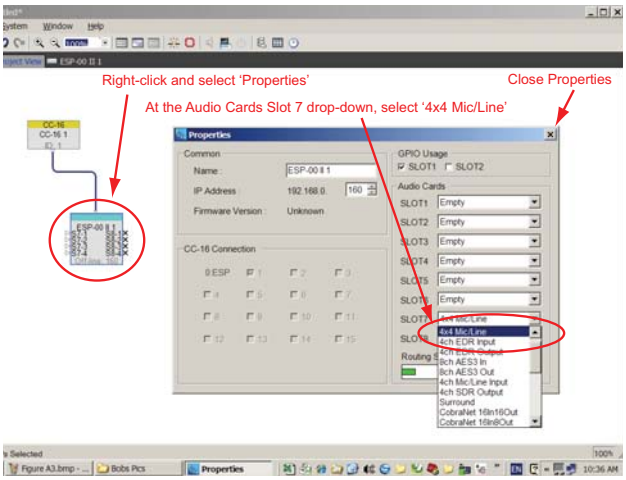


Figure A4

8.6 The 'Project View' tab should look like Figure A5.

8.7 Select the ESP-00 II tab to view the internal hardware configuration of the ESP-00 II.

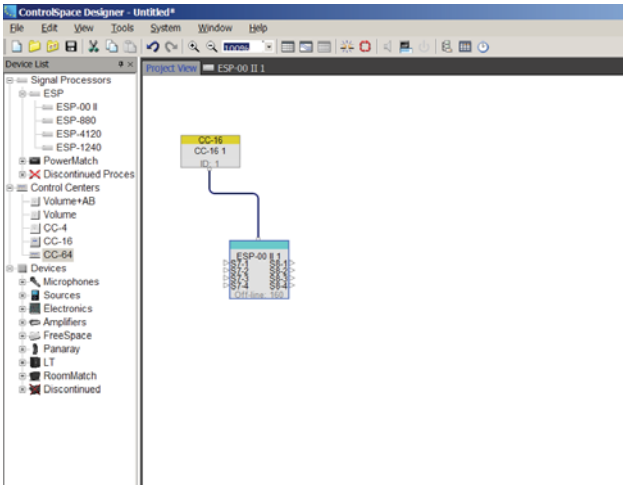


Figure A5

8.8 Wire the Inputs to Outputs as shown in Figure A6 by dragging from each input to each output.

8.9 Save the file by clicking File>SaveAs>'ESP-00 II DUT Test Config Basic.csp' and click Save.

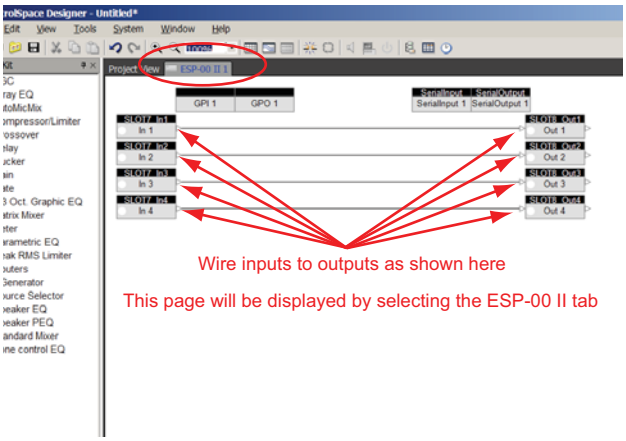


Figure A6

ADDENDUM B - Process Summary

9.0 Process Summary

9.1 Launch the ControlSpace® Designer™ application and open the appropriate .csp file for the DUT. Push the Project file to the DUT. See 'ControlSpace Designer Settings' for details.

9.2 Launch the AP ATS-2 Application. See 'Audio Precision ATS-2 Settings' for details.

9.3 Insure that the cabling and loopback is in starting position. See Setup 'Hardware Setup' for details.

9.4 Set the Generator for 1kHz Sine and +4.000dBu amplitude. Set the Analyzer Level to dBu units and Read and Record the value. +2.5 - +5.5 dBu to PASS.

9.5 Unplug the analog input on the DUT and Read and Record the noise level on the analyzer dBu. <77dBu to PASS. Plug the analog input back into the DUT.

9.6 Set the Generator Freq to 20kHz. Read and Record the Analyzer amplitude. +/- 1.5dBu of 1kHz to PASS.

9.7 Set the Generator Freq to 20Hz. Read and Record the Analyzer amplitude. 0 - +3 dBu of 1kHz to PASS.

9.8 Set the Generator Freq to 1kHz. Set Measurement Function to THD+N Ratio. Read and Record the Analyzer Function. <.015% to PASS.

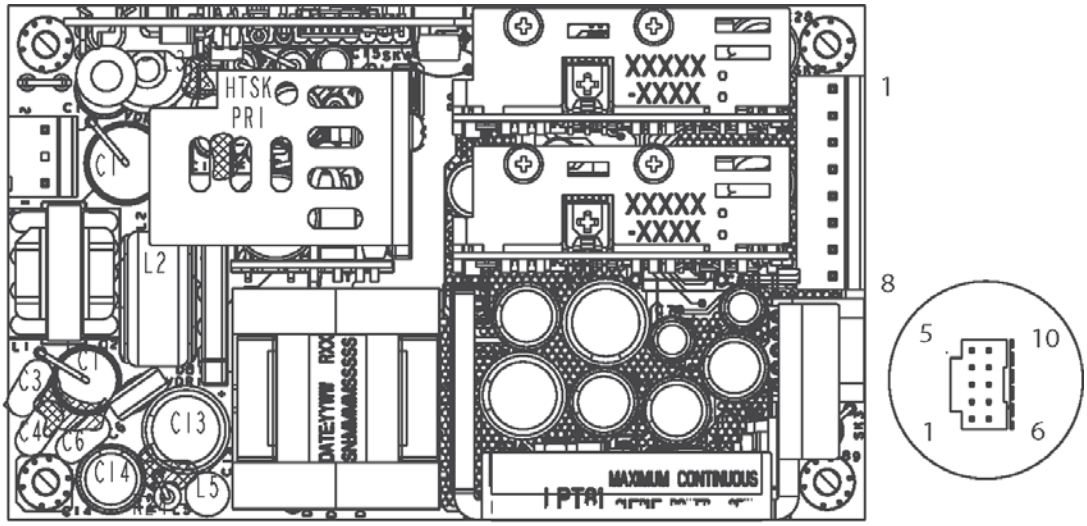
9.9 Set the Generator to 19.5dBu. Read and Record the Analyzer Function. <2.0% to PASS. Repeat this Section for all inputs and Outputs.

ADDENDUM C - Analog I/O Mapping

10.0 Analog I/O Mapping

Note: The following is a description of the paths required for testing the analog I/Os on the ESP-00 II chassis.

10.1 The Analog I/Os of the ESP-00 II can be matched one for one when testing the I/Os. That is, input channel 1 will map to output channel 1, input channel 2 to output channel 2, and so on....



Pin Assignments

Connector		LPT82/83
SK1	Pin1	Neutral
	Pin3	Line
SK2	Pin1	V1 (5 V)
	Pin2	V1 (5 V)
	Pin3	Common
	Pin4	Common
	Pin5	Common
	Pin6	V2 (12/15V)
	Pin7	V2 (12/15V)
	Pin8	V3 (-12V/15)
SK3	Pin1	+V1 Remote sense
	Pin2	-V1 Remote sense
	Pin3	+Remote inhibit
	Pin4	-Remote inhibit
	Pin5	+Power fail
	Pin6	Common
	Pin7	No connection
	Pin8	No connection
	Pin9	No connection
	Pin10	No connection

Mating Connectors

(SK1)AC Input:	Molex 09-50-8031 (USA) 09-91-0300 (UK) PINS: 08-58-0111
(SK2)DC Outputs:	Molex 09-50-8081 (USA) 09-91-0800 (UK) PINS: 08-58-0111
(SK3) Control Signals:	Molex 90142-0010 (USA) PINS: 90119-2110 or Amp: 87977-3 PINS: 87309-8
Astec connector kit:	#70-841-018 includes all the above

Figure 7. Astec LPT83 Switch Mode Power Supply

DC Power Supply +5V Adjustment Procedures

Astec Power Supply +5VDC Voltage Adjustment Procedure

CAUTION: Dangerous voltages are present when the chassis is powered up and the top cover is off. Use care when performing the below procedure.

Note: This procedure is to be performed when replacing the Astec power supply used in the ESP-00 II chassis.

The Astec power supply is set to +5Vdc at the factory. The ESP-00 II chassis requires +5.2Vdc to operate properly. Measure the DC voltage level using the following procedure. Adjust the 5 volt level if needed.

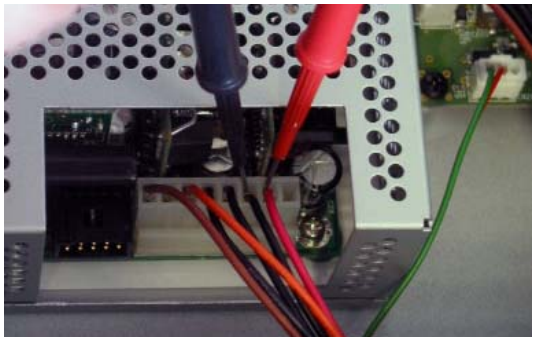
1. Remove the chassis top cover.

Remove the four screws located on the sides of the power supply that secure the top half of the power supply cage. Lift off the cage top.

Astec Power Supply

Note: Production units may not have the cage that is shown in the photo.

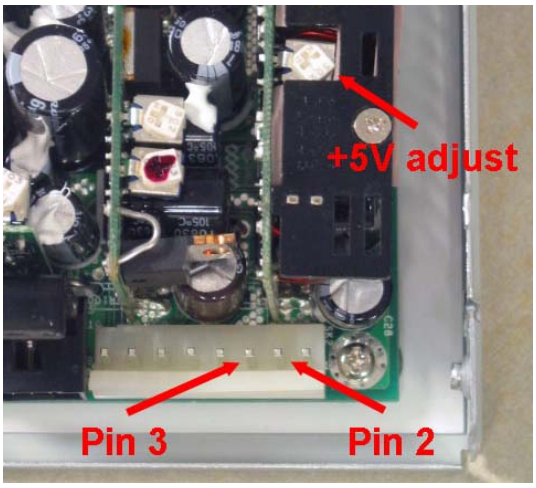
2. With AC mains voltage applied, measure the +5Vdc level at the DC output connector on the power supply. Place the positive (+) probe on the red wire at the pin 2 location. Place the negative (-) probe on the black wire at the pin 3 location.



3. If the DC voltage level reads less than +5.2Vdc, adjust the +5 Volt potentiometer clockwise until the meter reads +5.2Vdc.

4. Turn off AC mains to the chassis.

5. Re-assemble the power supply and replace the chassis top cover.



TROUBLESHOOTING

Symptom	Possible Solution
No Power	• Turn power on, plug in power cord.
Power is on, but no sound	• Verify that there is an input signal from the source. The audio input indicator should be green (or yellow). • Verify that there is an output signal. The audio output signal indicator should be green (or yellow). • If there is an input signal (indicator green) and no output signal (indicators off), the ESP-88/-00/-00 II may be muted, output levels may be down, or the unit may be completely un-programmed. Run ControlSpace™ Designer software and connect to the ESP chassis and verify. Signals should be passing from inputs to outputs.
Power is on, but sound is low	• Verify that the audio input indicator is green. If it is off, increase the source output or use the Designer software to increase the input gain. • If the audio input indicator is green and the audio output signal indicator is green, verify there is enough gain on the amplifier.
Sound is distorted	• Verify that the audio input signal indicators are not solid red or flashing red. If they are, reduce the source output level or use the Designer software to reduce the input gain. • Verify that the audio output signal indicators are not solid red or flashing red. If they are, and the input indicators are green, use the Designer software to reduce the output gain or any intermediary gain in the signal path. • If the input source signal is clean when it enters the ESP system, and the input and output indicators are green, verify that the loudspeakers are not being overdriven and are not damaged.
Unnatural sound	• Verify that the correct EQ and/or crossover is used in the signal path.
Status LED is off	• Power is off or netlist is not loaded. Use ControlSpace Designer software to load a netlist/configuration.
Ethernet LED is off	• Verify that the ESP LAN port is connected to a PC with a crossover cable. • Verify that the Ethernet LAN connection on the PC is enabled. If it is not enabled, the link LED on the PC will probably be off. • If connected to a hub or switch, check that device's Link LED. • If connected to a hub or switch, verify that the ESP and PC are connected with straight-through cables to the hub or switch.
Ethernet LED is on, but cannot communicate with the ESP-88 / ESP-00 / ESP-00 II chassis	• Verify that the LAN settings on the Ethernet device you are using on the PC are set correctly: – Internet Protocol (PCP/IP) is installed as a protocol on this device – IP address is set to 192.168.0.1 – Subnet mask is set to 255.255.255.0 • Verify that there is not another LAN connection enabled. • Verify there is not another ESP connected with the same address. If unsure, disconnect one, scan for the remaining unit, and change its address. Repeat with the second unit.

SERVICE MANUAL REVISION HISTORY

Date	Revision Level	Description of Change	Change Driven By	Pages Affected
8/14	00	Document released at revision 00.	Service manual release	All

SPECIFICATIONS AND FEATURES SUBJECT TO CHANGE WITHOUT NOTICE

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P/N: 370610-SM Rev. 00 8/2014 (P)
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