



Service Manual

MOSCONI

AS 200.4

Version 2010

Rev. 1.0
Date: 25/01/2010

CEA-2006-A SPECIFICATIONS

POWER RATING: 200 Watt per channel @ 4 Ohm < 1% THD+N
SN RATIO: >86 dBA (reference: 1 Watt into 4 Ohm)

MOS SPECIFICATIONS (*T_{case} = 25 °C / 4 Ohm stereo / 0.2V input level @ 14.4 Volt if not otherwise specified*)

TARGET POWERS:
200 Watt per channel @ 4 Ohm
320 Watt per channel @ 2 Ohm
640 Watt BTL mode @ 4 Ohm
950 Watt BTL mode @ 2 Ohm (*)

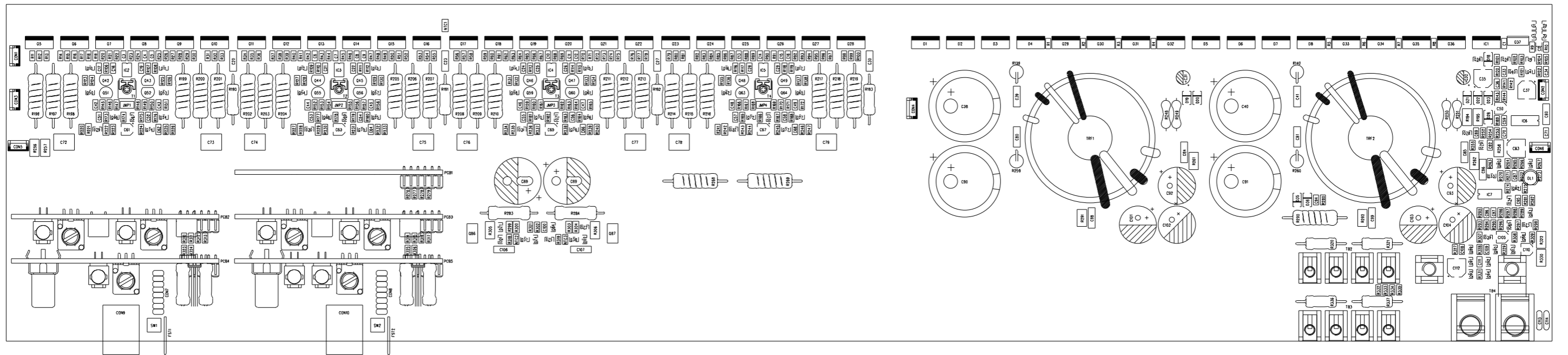
EFFECTIVE POWERS:
210 Watt (160 Watt @12V6) x 4 87.9 A ($\eta = 66.3\%$) @ 4 Ohm / ST mode / 1% THD / 1KHz
326 Watt (252 Watt @12V6) x 4 151.2 A ($\eta = 60.0\%$) @ 2 Ohm / ST mode / 1% THD / 1KHz
652 Watt (504 Watt @12V6) x 2 151.2 A ($\eta = 60.0\%$) @ 4 Ohm / BTL mode / 1% THD / 1KHz

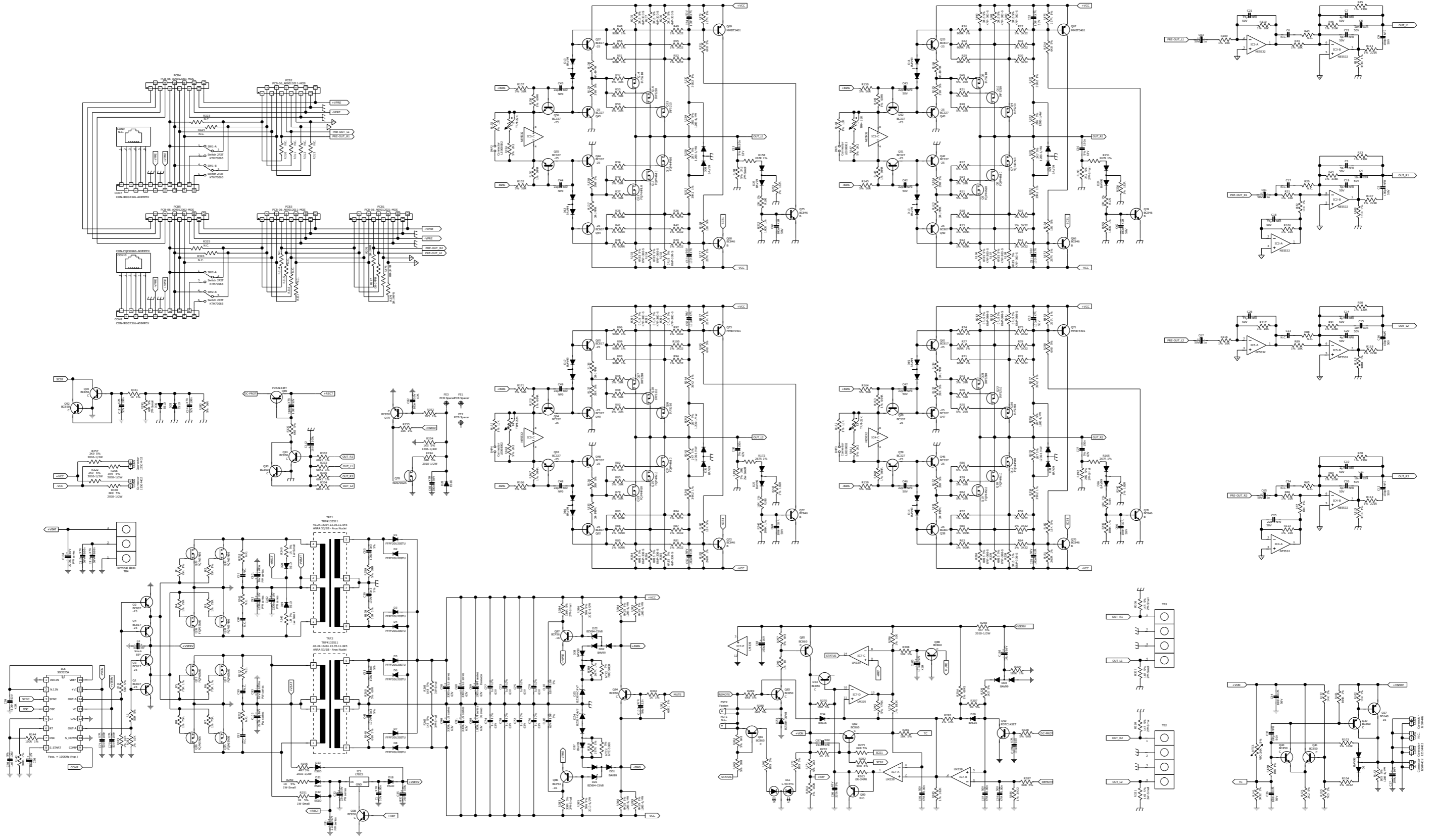
THD @ 4 Ohm / ST mode: < **0.03 %** (1KHz / 90% Power rating ref)
THD @ 2 Ohm / ST mode: < **0.035 %** (1KHz / 90% Power rating ref)
DIM @ 4 Ohm / ST mode: < ----- % (Power rating ref)
DIM @ 2 Ohm / ST mode: < ----- % (Power rating ref)

DC-DC converter typology: **Unregulated**
Conversion frequency: **50 KHz** ($\pm 6\%$)
Absolute maximum operation supply voltage range: **10 V ÷ 16 V**
Recommended operation supply voltage range: **11 V ÷ 14.4 V**
Power-on/Power-off Voltage Threshold: **9 V / 7.5 V**
Mute delay time: **3 secs**
Secondary voltages (Amp. / Driver / Pre.): **±46.8 V / ±7.5 V / ±13.5 V**
Max output offset voltage (each channel): **±15 mV**
Standby current: **1.8 mA (typical)**
Quiescent consumption @ 12V / 14V4: **1.22 A / 1.38 A** (no idle current regulation)
Idle current regulation (no signal): **0.08 A** (each channel)
Quiescent consumption @ 12V / 14V4: **1.54 A / 1.70 A** (with idle current setted)
Thermal protection consumption: **1.7 A**
Battery ground vs secondary ground decoupling: **125 Ohm**
Body ground vs battery ground decoupling: **65 Ohm**
Bandwidth (-3dB ÷ 1 Watt): **< 5 Hz ÷ 150 KHz**
Input sensitivity (Power rating ref): **0.2 V ÷ 5 V**
Input impedance @ 1 KHz (STEREO input): **11 KOhm**
Input capacitance @ 1 KHz (STEREO input): **220 pF**
Input ground decoupling: **15R**
S/N ratio (AP filter 10 Hz - 500 KHz) – Power rating ref: **87 dB**
S/N ratio (AP filter 10 Hz - 22 KHz) – Power rating ref: **109 dB** (“A” weighted)
Eq. Input noise (AP filter 10 Hz - 500 KHz): **10 uV**
Eq. Input noise (AP filter 10 Hz - 22 KHz): **0.79 uV** (“A” weighted)
Channel separation@ 100Hz / 1KHz / 10KHz – 10 Watt ref: **83 dB / 73 dB / 56 dB**
Xover functions: **HIGH Pass & LOW Pass** (BAND Pass allowed)
 (20 ÷ 175Hz) & (50 ÷ 300Hz)
Filter slope - Filter "Q": **12 dB/oct - 0.7** (Stereo & Mono)
Thermal cutoff Threshold: **88 °C** ($\pm 5^{\circ}\text{C}$)
ProSPEED® Fan Controller Threshold: **55 °C** ($\pm 5^{\circ}\text{C}$)
Damping factor @ 100 Hz - 10 Watt ref (Right / Left): **83 / 91** [Front] - **116 / 137** [Rear]
Damping factor @ 1 KHz - 10 Watt ref (Right / Left): **82 / 99** [Front] - **113 / 137** [Rear]
Damping factor @ 10 KHz - 10 Watt ref (Right / Left): **75 / 89** [Front] - **93 / 119** [Rear]
Output impedance @ 1 KHz - 10 Watt ref (Right / Left): **40.3 mOhm / 48.9 mOhm** [Front] - **35.4 mOhm / 29.2 mOhm** [Rear]
Load drive limitations (*): **1 Ohm / 2 Ohm** (Stereo / Bridged)
Suggested fuse: **150 A** (Internal)

(*) VERY IMPORTANT NOTE - READ CAREFULLY

4 Ohm ST or 8 Ohm BTL – CONTINUOUS SINEWAVE SIGNAL – pure resistive load or speaker load
2 Ohm ST or 4 Ohm BTL – MUSICAL SIGNAL – pure resistive load or speaker load
1 Ohm ST or 2 Ohm BTL – MUSICAL SIGNAL – speaker load only





INTEGRATED CIRCUITS

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
4	NE5532	DX	SOP8	Dual Low Noise Operational Amplifier		Fairchild	IC2-5
1	LM339	AD	SO14	Low Power Quad Voltage Comparator		ST	IC7
1	L7815	CV	TO220	1.5A Positive Voltage Regulator	15V	ST	IC1
1	SG3525A	DW	SOIC-16L	PWM Controller IC		ON Semiconductor	IC6

TRANSISTORS & MOSFETS

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
6	BC817	-25	SOT23	NPN General Purpose Switching Transistor	45V	Philips	Q3-4 Q53 Q57 Q61 Q65
8	BC846	B	SOT23	NPN General Purpose Transistor	65V	ON	Q66 Q68 Q70 Q72 Q74-77
1	PDTC143ET		SOT23	NPN Digital Transistor (Built-in Resistor)	50V	Philips	Q90
1	BCP56	-16	SOT223	NPN Medium Power Transistor	80V	Siemens	Q87
8	BC337	-25	TO92	NPN Amplifier Transistor	45V	ON	Q42 Q44 Q46 Q48 Q52 Q56 Q60 Q64
4	MMBT5401		SOT23	PNP General Purpose Transistor	150V	Fairchild	Q67 Q69 Q71 Q73
6	BC807	-25	SOT23	PNP General Purpose Switching Transistor	45V	Philips	Q1-2 Q50 Q54 Q58 Q62
5	BC860	C	SOT23	PNP General Purpose Transistor	45V	Philips	Q39 Q81-82 Q85 Q88
1	PDTA143ET		SOT23	PNP Digital Transistor (Built-in Resistor)	50V	Philips	Q89
1	BCP53	-16	SOT223	PNP Medium Power Transistor	80V	Siemens	Q86
8	BC327	-25	TO92	PNP Amplifier Transistor	45V	ON	Q43 Q45 Q47 Q49 Q51 Q55 Q59 Q63
1	BD140	-16	TO126	PNP Medium Power Transistor	80V	Fairchild	Q37
12	FQP44N10		TO220	N Channel Mosfet Rds(on)=0.039	100V	Fairchild	Q5-7 Q11-13 Q17-19 Q23-25
8	FQP65N06		TO220	N Channel Mosfet Rds(on)=0.012	60V	Fairchild	Q29-36
12	IRF5210		TO220	P Channel Mosfet Rds(on)=0.06	100V	IR	Q8-10 Q14-16 Q20-22 Q26-28
1	NDS7002A		SOT23	N-Channel Field Effect Transistor	65V	Fairchild	Q78

DIODES

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
3	BZX84-C6V8	C	SOT23	250mW Voltage Regulator Diode	6V8	Philips	DZ1-3
2	BZX84-C4V7	C	SOT23	250mW Voltage Regulator Diode	4V7	Philips	DZ4-5
22	BAV99		SOT23	200mA Silicon Switching Diode Array	70V	Infineon	D9-17 D24-27 D29-32 D37-38 DD1-3
2	BAS16		SOT23	215mA High-Speed Diode	75V	Philips	D34 D39
9	ES1D		DO-214AC	1A Fast Rectifier Diode	200V	Fairchild	D18-23 D28 D35-36
8	FFPF20U20STU		TO220F	20A Ultra Fast Recovery Rectifier Diode	200V	Fairchild	D1-8
11	BC850	C	SOT23	NPN General Purpose Transistor	45V	Philips	D33 Q38 Q40-41 Q79 Q83-84 Q91-94

RESISTORS

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
8	75R	1%	0805-1/8W	Chip Resistor			R1-8
1	100R	1%	0805-1/8W	Chip Resistor			R144
5	182R	1%	0805-1/8W	Chip Resistor			R226 R233 R240 R247 R264
4	221R	1%	0805-1/8W	Chip Resistor			R107 R111 R114 R118
14	267R	1%	0805-1/8W	Chip Resistor			R151 R158 R165 R172-173 R175 R177 R179 R181 R183 R185 R187 R318-319
4	301R	1%	0805-1/8W	Chip Resistor			R108 R112 R115 R119
8	604R	1%	0805-1/8W	Chip Resistor			R146 R149 R153 R156 R160 R163 R167 R170
24	909R	1%	0805-1/8W	Chip Resistor			R12 R15 R18 R26 R29 R32 R35 R38 R41 R48 R51 R54 R57 R60 R63 R71 R74 R77 R80 R83 R86 R93 R96 R99
4	1K	1%	0805-1/8W	Chip Resistor			R272 R298 R302 R331
27	3K32	1%	0805-1/8W	Chip Resistor			R13 R16 R19 R27 R30 R33 R36 R39 R42 R49 R52 R55 R58 R61 R64 R72 R75 R78 R81 R84 R87 R94 R97 R100 R104 R141 R286
2	7K5	1%	0805-1/8W	Chip Resistor			R105 R252
1	8K08	1%	0805-1/8W	Chip Resistor			R143
27	10K	1%	0805-1/8W	Chip Resistor			R21-22 R44 R66-67 R89 R102 R106 R109-110 R113 R116-117 R120 R148 R155 R162 R169 R176 R180 R184 R188-189 R253 R255 R296 R308
2	14K	1%	0805-1/8W	Chip Resistor			R122 R293
8	39K2	1%	0805-1/8W	Chip Resistor			R220 R223 R227 R230 R234 R237 R241 R244
6	68K1	1%	0805-1/8W	Chip Resistor			R294 R301 R332-335
6	100K	1%	0805-1/8W	Chip Resistor			R101 R103 R225 R232 R239 R246
Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
4	130K	1%	0805-1/8W	Chip Resistor			R23 R45 R68 R90
3	182K	1%	0805-1/8W	Chip Resistor			R274 R285 R309
4	316K	1%	0805-1/8W	Chip Resistor			R24 R46 R69 R91
4	8K25	1%	1206-1/4W	Chip Resistor			R299-300 R303-304
32	39R	5%	0805-1/8W	Chip Resistor			R11 R14 R17 R25 R28 R31 R34 R37 R40 R47 R50 R53 R56 R59 R62 R70 R73 R76 R79 R82 R85 R92 R95 R98 R124-125 R128-129 R132-133 R136-137
11	56R	5%	0805-1/8W	Chip Resistor			R9-10 R145 R150 R152 R157 R159 R164 R166 R171 R280
3	1K5	5%	0805-1/8W	Chip Resistor			R267 R273 R329
6	2K2	5%	0805-1/8W	Chip Resistor			R121 R147 R154 R161 R168 R271
14	6K8	5%	0805-1/8W	Chip Resistor			R224 R231 R238 R245 R265-266 R275 R282 R287-289 R297 R327-328
5	18K	5%	0805-1/8W	Chip Resistor			R174 R178 R182 R186 R281
1	470K	5%	0805-1/8W	Chip Resistor			R295
1	1M	5%	0805-1/8W	Chip Resistor			R307
1	10M	5%	0805-1/8W	Chip Resistor			R270
2	1K5	5%	1206-1/4W	Chip Resistor			R142 R254
8	2K7	5%	1206-1/4W	Chip Resistor			R221-222 R228-229 R235-236 R242-243
2	4R7	5%	2010-1/2W	Chip Resistor			R195 R258
1	68R	5%	2010-1/2W	Chip Resistor			R194
4	3K9	5%	2010-1/2W	Chip Resistor			R256-257 R322 R330
2	5K6	5%	2010-1/2W	Chip Resistor			R305-306
4	1R	5%	1W-Small	Metal Oxide Film Resistor			R248-251

4	2R2	5%	2W-Small	Metal Oxide Film Resistor		R190-193
4	68R	5%	2W-Small	Metal Oxide Film Resistor		R139-140 R259-260
2	330R	5%	2W-Small	Metal Oxide Film Resistor		R283-284
4	1K5	5%	2W-Small	Metal Oxide Film Resistor		R320-321 R336-337
24	0R15	5%	KNP-300-S	Wire Wound Resistor	Royal Ohm	R196-219
1	68R	5%	3W-Small	Metal Oxide Film Resistor		R290
2	1K8	5%	3W-Small	Metal Oxide Film Resistor		R268-269
13	0R-JMPR		0805-1/8W	Chip Resistor		R123 R126-127 R130-131 R134-135 R138 R263 R276-279

CAPACITORS

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
4	10n	X7R	0805	Ceramic Chip Capacitor	50V	AVX	C4 C8 C11 C15
2	22n	X7R	0805	Ceramic Chip Capacitor	50V	AVX	C87 C100
28	100n	X7R	0805	Ceramic Chip Capacitor	50V	AVX	C1 C34 C36 C51-59 C62 C64 C66 C68-71 C82 C94-97 C105 C108-109 C111
8	4p7	NP0	0805	Ceramic Chip Capacitor	50V	AVX	C3 C7 C10 C14 C19 C22 C26 C29
12	22p	NP0	0805	Ceramic Chip Capacitor	50V	AVX	C18 C21 C25 C28 C42-49
5	100p	NP0	0805	Ceramic Chip Capacitor	50V	AVX	C5 C9 C12 C16 C33
4	1u	85°	D4 mm	Chip Type Electrolytic Capacitor	50V	NIC	C61 C63 C65 C67
2	10u	85°	D4 mm	Chip Type Electrolytic Capacitor	16V	NIC	C50 C110
4	100u	85°	D6.3 mm	Chip Type Electrolytic Capacitor	16V	NIC	C35 C37 C83 C112
1	1u	85°	Size A	Chip Type Tantalum Capacitor	16V		C2
2	100n	X7R	Step 5 mm	Multilayer Ceramic Leaded Capacitor	50V		C113-114
1	1n8	5%	Step 5 mm	Polyester Film Capacitor	100V	TPC	C60
4	3n3	5%	Step 5 mm	Polyester Film Capacitor	100V	TPC	C39 C41 C80-81
6	150n	5%	Step 5 mm	Polyester Film Capacitor	63V	TPC	C20 C23 C27 C30 C106-107
1	220n	5%	Step 5 mm	Polyester Film Capacitor	63V	TPC	C86
8	1u	10%	Step 5 mm	Polyester Film Capacitor	63V	TPC	C72-79
2	22u	PW series	D5 / H11 mm	105° C - Low Impedance	50V	Nichicon	C31-32
2	1000u	RM series	D16 / H25 mm	85° C - Standard	63V	Daewoo	C88-89
6	2200u	PW series	D12.5 / H25 mm	105° C - Low Impedance	16V	Nichicon	C92-93 C101-104
4	3300u	LS series	D25 / H30 mm	Large Capacitance Aluminium Electrolytic Capacitor	63V	Jamicon	C38 C40 C90-91
33	N.C.			N.C.			C6 C13 C17 C24 C84-85 C98-99 CON2 CON9 FST1 PCB1 Q80 R20 R43 R65 R88 R261-262 R291-292 R310-317 R323-326

MISCELLANEOUS

Pcs	Component	Selection	Power/Case	Description	Volt	Manufacturer	Reference Number
1	NTC-20K	5%	1206	Rectangular Chip Thermistors P/N:NSM1203J400J		HDK	NTC1
2	NTC-500R	5%	0805	Rectangular Chip Thermistors P/N:NSM2501J325J		HDK	NTC2-3
1	LED	L-59 EYC	5mm	Bi-Color LED Yellow/Red		Adimpex	DL1
4	TRM-22K	10%	6 mm Snap In	Horizontal Mounting Trimmer COD:CA6V5		ACP	T1-4
2	Switch 2P2T			Non-Lock Push Switch		Adimpex	SW1-2
5	Connector	J2504402	2 x 2.5 mm Pitch	Board to Wire Crimp Style Connector COD:J2504402		Adimpex	CON1 CON3-6
2	Connector	IR002316	8+8 x 2 mm Pitch	Pin Header Strip Connector P/N:IR002316		Adimpex	CON7-8
1	Connector	FQ159966		Low Profile Type Modular Jack COD:FQ159966		Adimpex	CON10
4	Connector	LE008002	2 x 2.54 mm Pitch	Pin Header Strip Connector P/N:LE008002		Adimpex	JMP1-4
1	Faston		2.8 mm Right Angle	Faston for PCB P/N:VA528040		Micomp	FST2
1	Terminal Block			Terminal Block Output High		MOS	TB2
1	Terminal Block			Terminal Block Output Low		MOS	TB3
1	Terminal Block			Terminal Block Supply + Fuse Holder		MOS	TB4
2	TRF4133511	ANRA 53/1B - Aros Nuclei	40/24/16	40.24.16.04.13.35.11.045		MOS	TRF1-2
3	PCB Spacer	ADS	D6 / H3.5 mm	Aluminium Ferrule		MOS	FE1-3
2	PCB			LP/HP Filter		MOS	PCB2-3
1	PCB			Preamplifier 2CH		MOS	PCB4
1	PCB			Preamplifier 4CH		MOS	PCB5
16	Ferrite Tube	K5A	4 x 2 x 6	Cylindrical EMI Suppression		Core-Tech	For D1-8 Q29-36