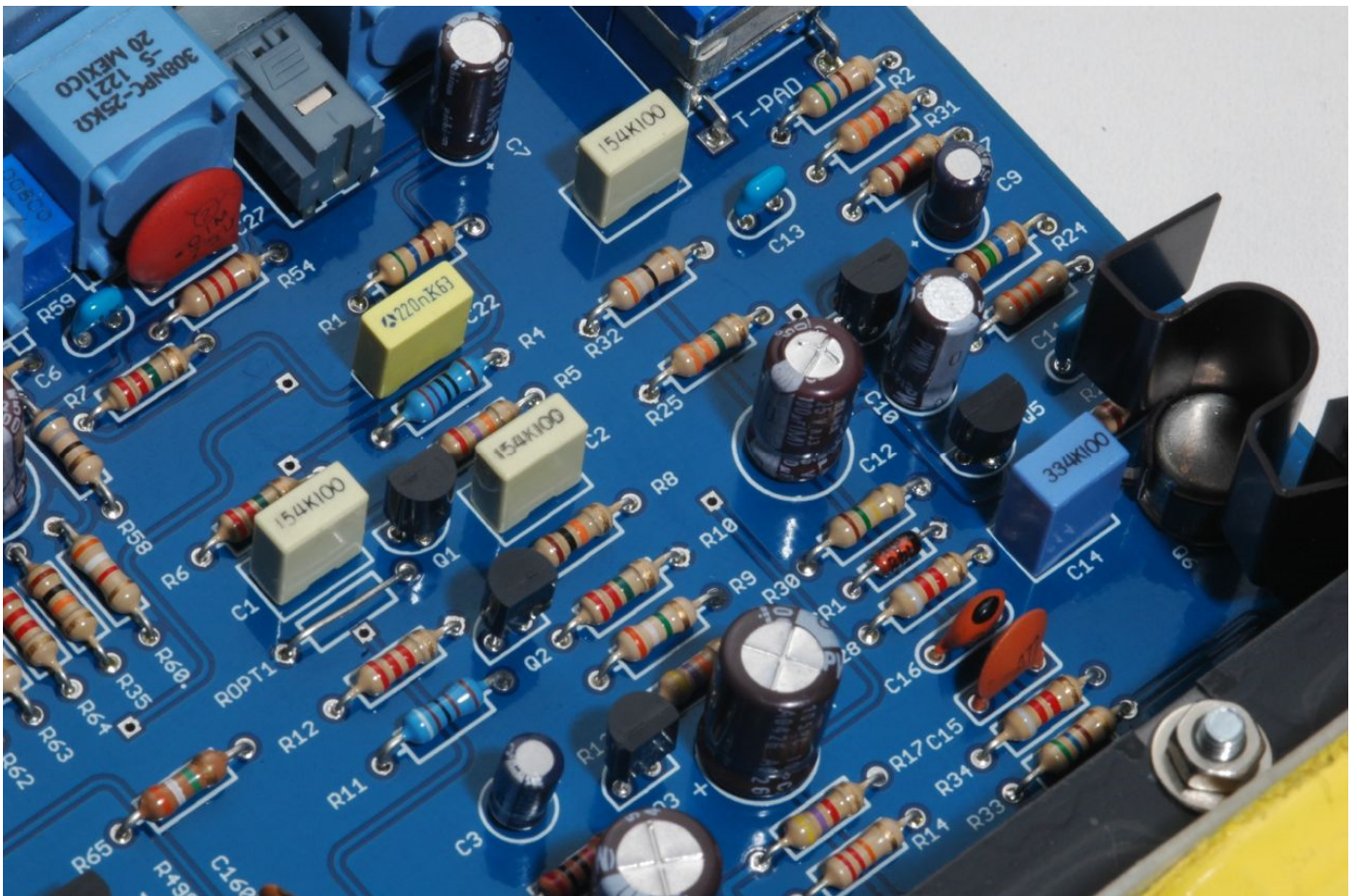
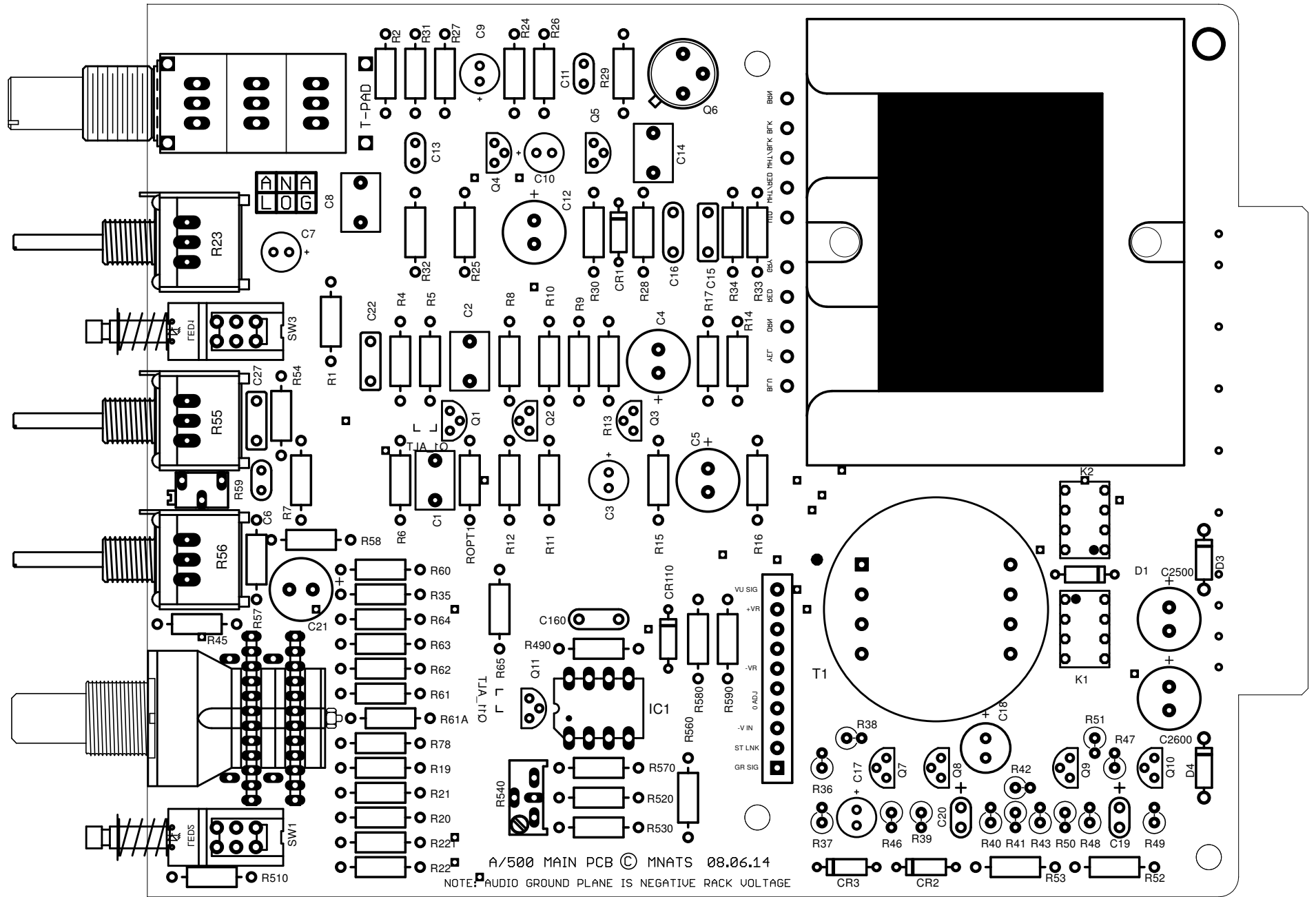




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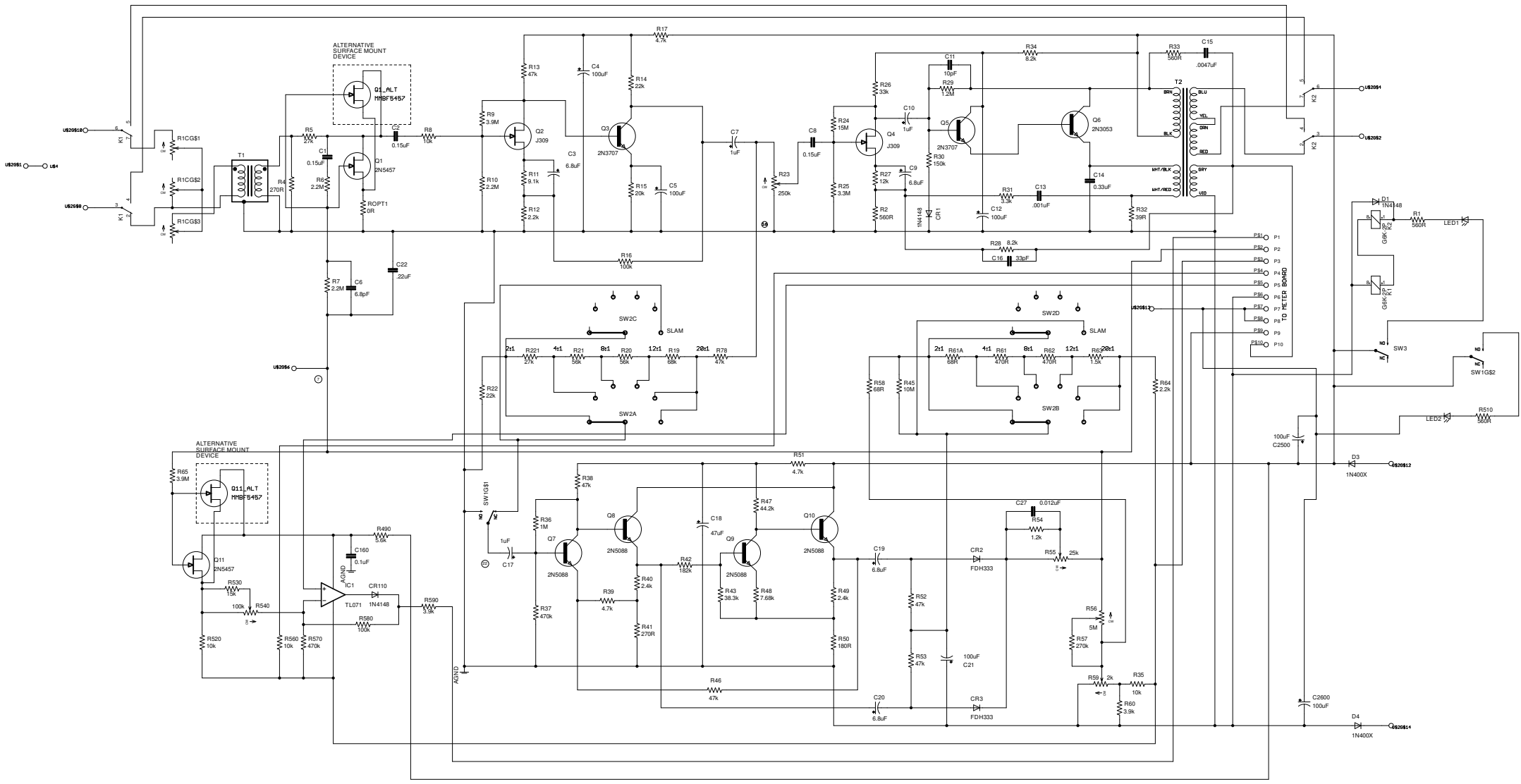


A/500 FET Limiter
PCB Overlay, Schematic and Bill of Materials



A/500 MAIN PCB © MNATS 08.06.14

NOTE: AUDIO GROUND PLANE IS NEGATIVE RACK VOLTAGE



A/500 Main PCB Bill of Materials

| Quantity | Part | Value | Device | Part Number | Package | Notes |
|----------|-------|-----------|---------------------------------|------------------------|-----------------|----------------------------------|
| 1 | C13 | .001uF | CAPACITOR, CERAMIC | | CAP2 | OBSERVE PACKAGE |
| 1 | C15 | .0047uF | CAPACITOR, FILM | | CAP2_RECT | DIMENSIONS WHEN |
| 1 | C1 | .15uF | CAPACITOR, FILM | | CAP2_RECT | SELECTING CAPS |
| 1 | C22 | .22uF | CAPACITOR, FILM | | CAP2_RECT | CAP2 = 0.2" PITCH |
| 1 | C27 | 0.012uF | CAPACITOR, FILM | | CAP2_RECT | |
| 1 | C2 | 0.15uF | CAPACITOR, FILM | | CAP_FILM_5X7.2 | |
| 1 | C8 | 0.15uF | CAPACITOR, FILM | | CAP_FILM_5X7.2 | |
| 1 | C160 | 0.1uF | CAPACITOR, CERAMIC | | CAP2 | |
| 1 | C14 | 0.033uF | CAPACITOR, FILM | | CAP2_RECT | |
| 1 | C4 | 100uF | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | 8mm DIA 3.5mm PITCH |
| 1 | C5 | 100uF | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | |
| 1 | C12 | 100uF | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | |
| 1 | C21 | 100uF | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | |
| 1 | C2500 | 100uF/50V | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | |
| 1 | C2600 | 100uF/50V | CAPACITOR, ELECTROLYTIC | | RAD8/3.5 | |
| 1 | C11 | 10pF | CAPACITOR, CERAMIC | | CAP1 | CAP1 = 0.1" PITCH |
| 1 | C7 | 1uF | CAPACITOR, ELECTROLYTIC | | RAD5/2 | 5mm DIA 2mm PITCH |
| 1 | C10 | 1uF | CAPACITOR, ELECTROLYTIC | | RAD5/2 | |
| 1 | C17 | 1uF | CAPACITOR, ELECTROLYTIC | | RAD5/2 | |
| 1 | C16 | 33pF | CAPACITOR, CERAMIC | | CAP1 | |
| 1 | C18 | 47uF | CAPACITOR, ELECTROLYTIC | | RAD6.3/2.5 | |
| 1 | C6 | 6.8pF | CAPACITOR, CERAMIC | | CAP2 | |
| 1 | C3 | 6.8uF | CAPACITOR, ELECTROLYTIC | | RAD5/2 | |
| 1 | C9 | 6.8uF | CAPACITOR, ELECTROLYTIC | | RAD5/2 | |
| 1 | C19 | 6.8uF | CAPACITOR, TANTALUM | | CAP1_POL | |
| 1 | C20 | 6.8uF | CAPACITOR, TANTALUM | | CAP1_POL | |
| 1 | CN100 | | HEADER 10 TERMINAL 0.1" PITCH | | 10PIN_1_HEADER | |
| 1 | D3 | | DIODE | 1N4004 | DO-41 | |
| 1 | D4 | | DIODE | 1N4004 | DO-41 | |
| 1 | CR1 | | DIODE | 1N4148 | DO-35 | |
| 1 | CR110 | | DIODE | 1N4148 | DO-35 | |
| 1 | D1 | | DIODE | 1N4148 | DO-35 | |
| 1 | CR2 | | DIODE, LOW LEAKAGE | FDH333 | DO-35 | |
| 1 | CR3 | | DIODE, LOW LEAKAGE | FDH333 | DO-35 | |
| 1 | IC1 | | OPERATIONAL AMPLIFIER, SINGLE | TL071 | DIP-8 | SINGLE OP AMP ONLY, NOT DUAL |
| 1 | K1 | | RELAY, LOW SIGNAL | G6K-2P-DC12 | G6K-2P | |
| 1 | K2 | | RELAY, LOW SIGNAL | G6K-2P-DC12 | G6K-2P | |
| 1 | LED1 | | LED 3MM, RED | | LED_3MM | USE STANDARD |
| 1 | LED2 | | LED 3MM, YELLOW | | LED_3MM | BRIGHTNESS TYPES |
| 1 | Q6 | | TRANSISTOR, BIPOLAR | 2N3053 | TO-39 | |
| 1 | Q3 | | TRANSISTOR, BIPOLAR | 2N3707 | TO-92 | |
| 1 | Q5 | | TRANSISTOR, BIPOLAR | 2N3707 | TO-92 | |
| 1 | Q7 | | TRANSISTOR, BIPOLAR | 2N5088 | TO-92 | WATCH PINOUT IF USING |
| 1 | Q8 | | TRANSISTOR, BIPOLAR | 2N5088 | TO-92 | SUBSTITUTE DEVICES |
| 1 | Q9 | | TRANSISTOR, BIPOLAR | 2N5088 | TO-92 | |
| 1 | Q10 | | TRANSISTOR, BIPOLAR | 2N5088 | TO-92 | |
| 1 | Q1 | | TRANSISTOR, BIPOLAR | 2N5457 | TO-92 | |
| 1 | Q11 | | TRANSISTOR, FET | 2N5457 | TO-92 | |
| 1 | Q2 | | TRANSISTOR, FET | J309 | TO-92 | |
| 1 | Q4 | | TRANSISTOR, FET | J309 | TO-92 | |
| 1 | R1C | 600Ω | T-PAD | B51 T-Pad | BOURNS_MODEL_51 | HAIRBALL AUDIO |
| 1 | R56 | 5M | POTENTIOMETER | 308N5MEG | SERIES_308 | |
| 1 | R55 | 25k | POTENTIOMETER | 308NPC25K | SERIES_308 | |
| 1 | R23 | 250k | POTENTIOMETER | 308NPC250K OR 308N250K | SERIES_308 | LOG TAPER PREFERRED IF AVAILABLE |
| 1 | ROPT1 | 0R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R54 | 1.2k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R29 | 1.2M | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R63 | 1.5k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R16 | 100k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R580 | 100k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R8 | 10k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R35 | 10k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R520 | 10k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R560 | 10k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R45 | 10M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 | R27 | 12k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R30 | 150k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R530 | 15k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R24 | 15M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 | R50 | 180R | RESISTOR, 1/4 WATT | | RESISTOR_VERT | VERTICALLY MOUNTED RESISTORS |
| 1 | R42 | 182k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | ARE IN GR CONTROL AMP STAGE |
| 1 | R36 | 1M | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 | R12 | 2.2k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R64 | 2.2k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 | R6 | 2.2M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 | R7 | 2.2M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 | R10 | 2.2M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 | R40 | 2.4k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 | R49 | 2.4k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 | R15 | 20k | RESISTOR, 1/4 WATT | | MF1/4 | |

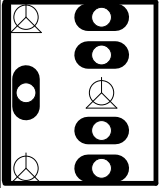
| | | | | | |
|--------|-------------------|------------------------------------|-------------------------------|------------------------|---|
| 1 R14 | 22k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R22 | 22k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R57 | 270k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R4 | 270R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R41 | 270R | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R5 | 27k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R221 | 27k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R31 | 3.3k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R25 | 3.3M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 R60. | 3.9k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R590 | 3.9k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R9 | 3.9M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 R65 | 3.9M | RESISTOR, CARBON FILM, 1/4 WATT | | MF1/4 | |
| 1 R26 | 33k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R43 | 38.3k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R32 | 39R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R17 | 4.7k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R39 | 4.7k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R51 | 4.7k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R47 | 44.2k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R37 | 470k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R570 | 470k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R61 | 470R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R62 | 470R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R13 | 47k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R38 | 47k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R46 | 47k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R52 | 47k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R53 | 47k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R78 | 47k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R490 | 5.6k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R1 | 560R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R2 | 560R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R33 | 560R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R510 | 560R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R20 | 56k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R21 | 56k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R19 | 68k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R58 | 68R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R61A | 68R | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R48 | 7.68k | RESISTOR, 1/4 WATT | | RESISTOR_VERT | |
| 1 R28 | 8.2k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R34 | 8.2k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R11 | 9.1k | RESISTOR, 1/4 WATT | | MF1/4 | |
| 1 R540 | 100k | POTENTIOMETER, TRIMMER | | 3296Y | |
| 1 R59 | 2k | POTENTIOMETER, TRIMMER | 3266X-1-202LF | 3266X | |
| 1 S2A | | SWITCH, ROTARY | 71ADF30-02-2-AJS (1/8" SHAFT) | 71BDF30-02-AJN | 71BDF30-02QAJN (1/4" SHAFT, NON SHORTING) |
| 1 SW1 | | SWITCH, PUSH BUTTON | PBH2UEENAGX | PBH_2U | |
| 1 SW3 | | SWITCH, PUSH BUTTON | PBH2UEENAGX | PBH_2U | |
| 2 | | SWITCH CAPS FOR PUSH BUTTONS | 1RBLK | | SELECT COLOR AS DESIRED |
| 1 T1 | 500Ω:200Ω | INPUT TRANSFORMER | C-3837-1 | INPUT_TRANSFORMER_1.13 | HAIRBALL AUDIO |
| 1 T2 | 50Ω+50Ω:150Ω+150Ω | OUTPUT TRANSFORMER | EA-5002 | EA-5002 | HAIRBALL AUDIO |
| ? | | KNOB .50"DIA .125"SHAFT | OEJL-50-1-6 or OEDL-50-1-6 | | SELECT FOR SHAFT DIA OF |
| ? | | KNOB .50"DIA .250"SHAFT | OEJL-50-1-5 or OEDL-50-1-5 | | SELECTED CONTROLS |
| 2 | | 20mm/0.79" Nylon Standoff | | | FOR METER BOARD |
| 2 | | SCREWS/NUTS/LOCK WASHERS FOR ABOVE | | | |
| 2 | | 25mm/1" SCREWS/NUTS/LOCK WASHERS | | | TO SECURE OUTPUT TRANSFORMER |
| 1 | | TO-39 HEATSINK FOR 2N3053 | | | |



3E90 AD1

FET/500 METER BOARD © MNATS 25.05.14

- LED200
- LED201
- LED202
- LED203
- LED204
- LED205
- LED206
- LED207
- LED208
- LED209
- LED210
- LED211
- LED212
- LED213
- LED214
- LED215
- LED216
- LED217
- LED218
- LED219
- LED220

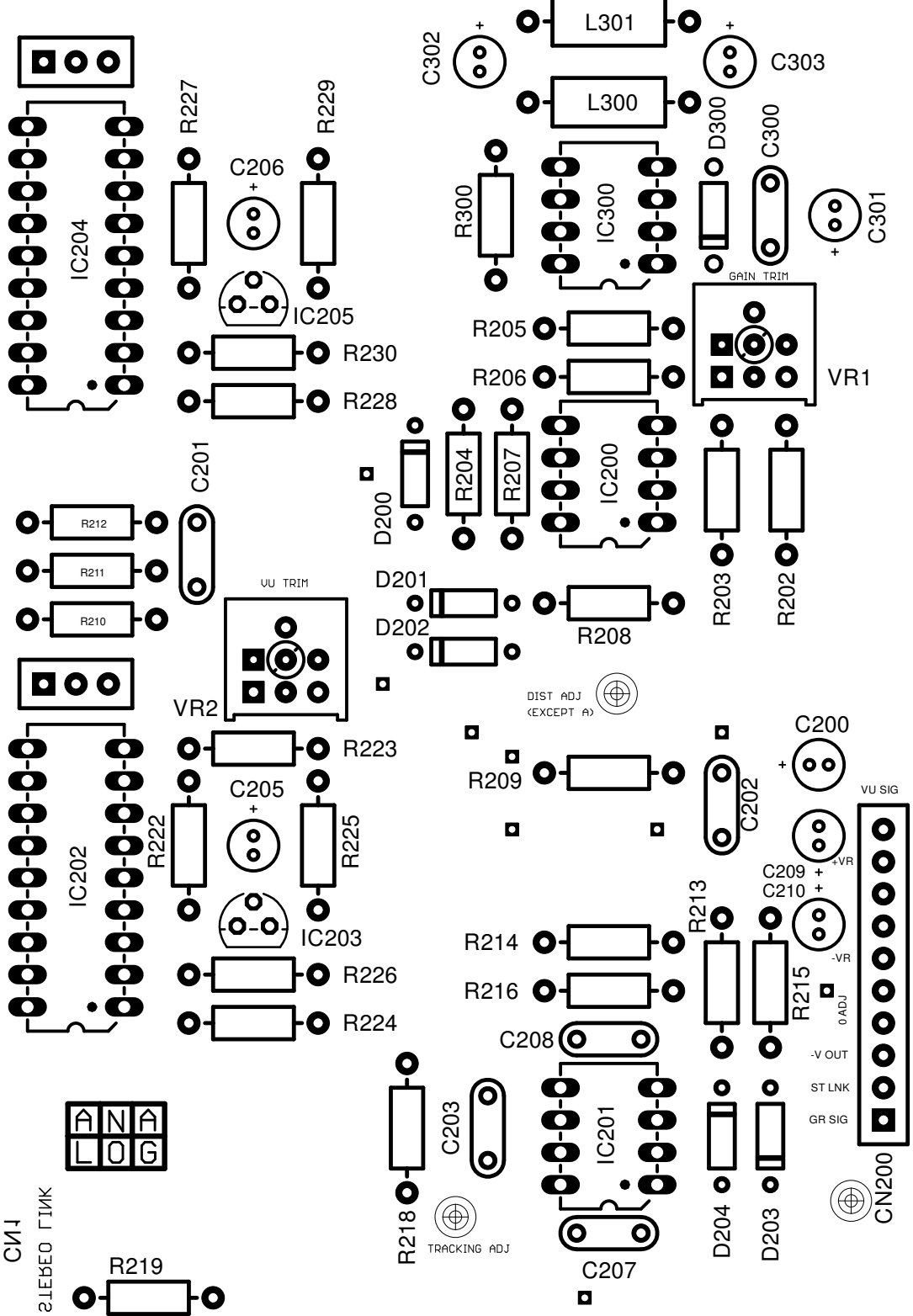


CN1

2-LEBEO ΓΙΑΚ

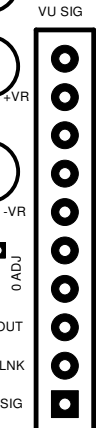


R219

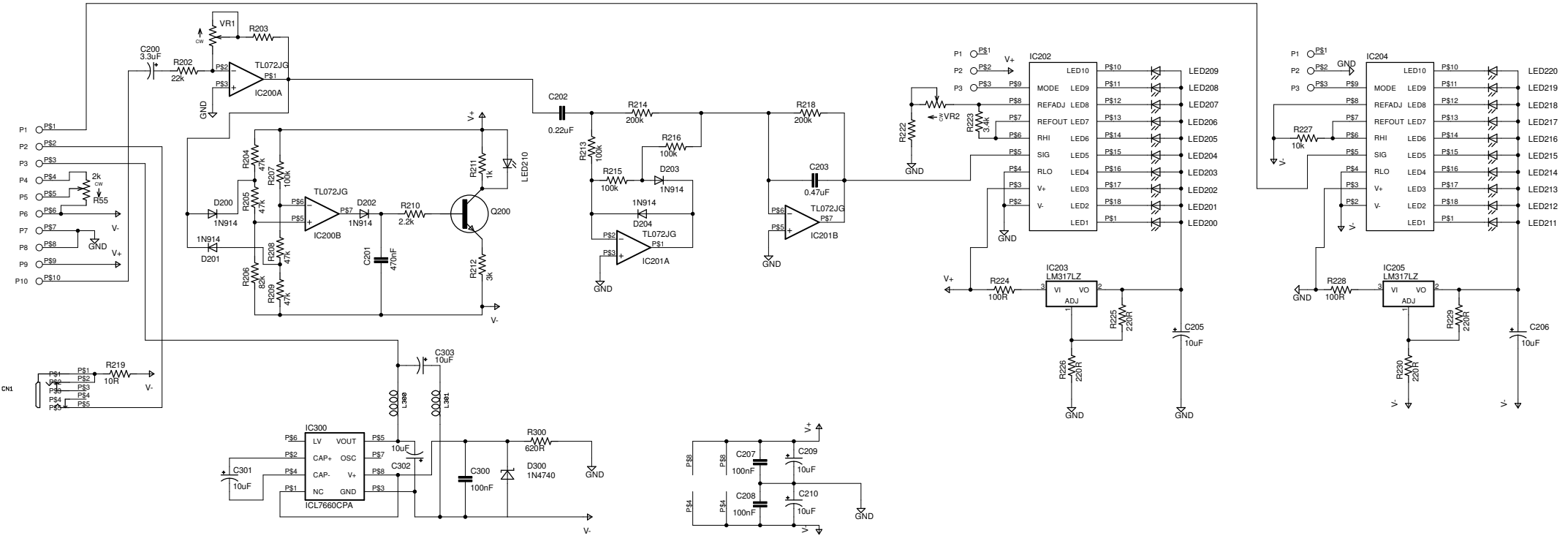


DIST ADJ (EXCEPT A)

TRACKING ADJ



CN200



| A/500 Meter Board Bill of Materials | | | | | | |
|-------------------------------------|--------|--------|------------------------------|------------------|-----------------|---------------------|
| For Average Level Meter Response | | | | | | |
| Quantity | Part | Value | Device | Part Number | Package | Notes |
| 1 | C202 | 0.22uF | Capacitor, MLCC | | CAP2 | |
| 1 | C207 | 100nF | Capacitor, MLCC | | CAP2 | Multi-Layer Ceramic |
| 1 | C208 | 100nF | Capacitor, MLCC | | CAP2 | |
| 1 | C300 | 100nF | Capacitor, MLCC | | CAP2 | |
| 1 | C205 | 10uF | Capacitor, Electrolytic | ECE-A1VKS100 | RAD4/1.5 | 5mm height |
| 1 | C206 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C209 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C210 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C301 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C302 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C303 | 10uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C200 | 3.3uF | Capacitor, Electrolytic | | RAD4/1.5 | 5mm height |
| 1 | C201 | 470nF | Capacitor, MLCC | | CAP2 | |
| 1 | C203 | 470nF | Capacitor, MLCC | | CAP2 | |
| 1 | CN1 | | 1/8" (3.5mm) Connector | STX-3120-5B | STX-3120-5B | |
| 1 | CN200 | | 10 Terminal 0.1" Long Pins | | 10PIN_.1_HEADER | 21mm Total Length |
| 1 | D200 | | Diode | 1N914/1N4148 | DO-35 | |
| 1 | D201 | | Diode | 1N914/1N4148 | DO-35 | |
| 1 | D202 | | Diode | 1N914/1N4148 | DO-35 | |
| 1 | D203 | | Diode | 1N914/1N4148 | DO-35 | |
| 1 | D204 | | Diode | 1N914/1N4148 | DO-35 | |
| 1 | D300 | | Diode, Zener 10V | 1N4740 | DO-35Z | |
| 1 | IC202 | | LED Display Driver | LM3916 | DIP-18 | |
| 1 | IC204 | | LED Display Driver | LM3916 | DIP-18 | |
| 1 | IC200 | | Operational Amplifier, Dual | TLO72 | DIP-8 | |
| 1 | IC201 | | Operational Amplifier, Dual | TLO72 | DIP-8 | |
| 1 | IC300 | | Voltage Converter | MAX1044/ICL7660A | DIP-8 | MAX1044 Preferred |
| 1 | IC203 | | Voltage Regulator | LM317LZ | TO92 | |
| 1 | IC205 | | Voltage Regulator | LM317LZ | TO92 | |
| 1 | L300 | 1000uH | Inductor | | SMCC_INDUCTOR | |
| 1 | L301 | 1000uH | Inductor | | SMCC_INDUCTOR | |
| 1 | LED200 | | Light Emitting Diode, Green | | LED_3MM_FLAT | Use Standard |
| 1 | LED201 | | Light Emitting Diode, Green | | LED_3MM_FLAT | Brightness Types |
| 1 | LED202 | | Light Emitting Diode, Green | | LED_3MM_FLAT | For All LEDs |
| 1 | LED203 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED204 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED205 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED206 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED207 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED208 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED209 | | Light Emitting Diode, Yellow | | LED_3MM_FLAT | |
| 1 | LED210 | | Light Emitting Diode, Red | | LED_3MM_FLAT | Peak |
| 1 | LED211 | | Light Emitting Diode, Red | | LED_3MM_FLAT | |
| 1 | LED212 | | Light Emitting Diode, Red | | LED_3MM_FLAT | |
| 1 | LED213 | | Light Emitting Diode, Yellow | | LED_3MM_FLAT | |
| 1 | LED214 | | Light Emitting Diode, Yellow | | LED_3MM_FLAT | |
| 1 | LED215 | | Light Emitting Diode, Yellow | | LED_3MM_FLAT | |
| 1 | LED216 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED217 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED218 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED219 | | Light Emitting Diode, Green | | LED_3MM_FLAT | |
| 1 | LED220 | | Light Emitting Diode, Red | | LED_3MM_FLAT | Slam |
| 1 | Q200 | | Transistor, Bipolar | 2N5088 | TO-92 | General Purpose NPN |
| 1 | R55 | 2k | Potentiometer, Trimmer | 3266X-1-202LF | 3266X | Do Not Substitute |
| 1 | R203 | 22k | Resistor, Metal Film | | MF1/4 | |
| 1 | R207 | 100k | Resistor, Metal Film | | MF1/4 | |
| 1 | R216 | 100k | Resistor, Metal Film | | MF1/4 | |
| 1 | R213 | 100k | Resistor, Metal Film | | MF1/4 | |
| 1 | R215 | 100k | Resistor, Metal Film | | MF1/4 | |
| 1 | R224 | 100R | Resistor, Metal Film | | MF1/4 | |
| 1 | R228 | 100R | Resistor, Metal Film | | MF1/4 | |
| 1 | R227 | 10k | Resistor, Metal Film | | MF1/4 | |
| 1 | R219 | | Resetable Fuse | RXEF010 | MF1/4 | |

| | | | | | | |
|---|------|------|------------------------|--|----------|------------|
| 1 | R211 | 1k | Resistor, Metal Film | | MF1/4 | |
| 1 | R210 | 2.2k | Resistor, Metal Film | | MF1/4 | |
| 1 | R218 | 200k | Resistor, Metal Film | | MF1/4 | |
| 1 | R214 | 200k | Resistor, Metal Film | | MF1/4 | |
| 1 | R225 | 220R | Resistor, Metal Film | | MF1/4 | |
| 1 | R226 | 220R | Resistor, Metal Film | | MF1/4 | |
| 1 | R229 | 220R | Resistor, Metal Film | | MF1/4 | |
| 1 | R230 | 220R | Resistor, Metal Film | | MF1/4 | |
| 1 | R202 | 22k | Resistor, Metal Film | | MF1/4 | |
| 1 | R223 | 3.4k | Resistor, Metal Film | | MF1/4 | |
| 1 | R212 | 3k | Resistor, Metal Film | | MF1/4 | |
| 1 | R204 | 47k | Resistor, Metal Film | | MF1/4 | |
| 1 | R205 | 47k | Resistor, Metal Film | | MF1/4 | |
| 1 | R208 | 47k | Resistor, Metal Film | | MF1/4 | |
| 1 | R209 | 47k | Resistor, Metal Film | | MF1/4 | |
| 1 | R222 | 1.2k | Resistor, Metal Film | | MF1/4 | |
| 1 | R300 | 620R | Resistor, Metal Film | | MF1/4 | |
| 1 | R206 | 82k | Resistor, Metal Film | | MF1/4 | |
| 1 | VR1 | 10k | Potentiometer, Trimmer | | 3386_TOP | Top Adjust |
| 1 | VR2 | 1k | Potentiometer, Trimmer | | 3386_TOP | Top Adjust |