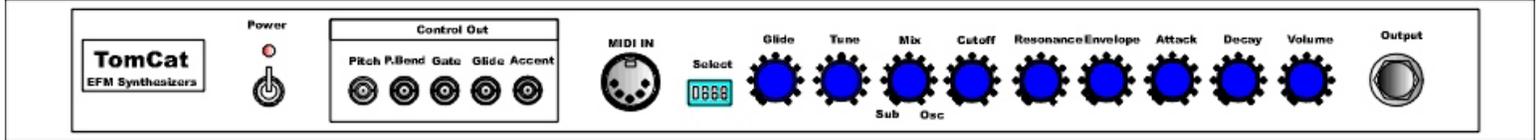


TomCat Midi Synthesizer



The TomCat is specifically designed to be built by anyone with a little kit building experience. It features simple single board construction with no wire flying to the board. Minimum parts make it a breeze to assemble. All connections to the board are made through three headers, a 1/4" output jack and a AC power jack.

The control package is much like the TB except I swapped a keyed AD envelope generator for the TB's decay generator and accent functions. This particular change in design allows the TomCat to be much more playable using a keyboard controller.

If I had to declare lineage, I would say it's based on the ARP Axxe however I didn't use any of the original circuitry. It all starts out about the same place but ends up somewhere completely different.

The Controls

- Glide - Is keyboard controlled and activated by holding down any two keys.
- Tune - Raises or lowers the pitch.
- Mix - Mixes Sub-generator and VCO output to the VCF.
- Cutoff - Sets the initial VCF cutoff frequency.
- Res - Adjusts the amount of ringing - it will self oscillate.
- Env - Sets the AD envelope generators level to the VCF.
- Attack - Adjust the time it takes for the envelope generator to charge.
- Decay - Adjust the time it takes for the envelope generator to discharge.
- Volume - Overall level.

Midi Select - switch settings

- 0000 = 1 1000 = 9
- 0001 = 2 1001 = 10
- 0010 = 3 1010 = 11
- 0011 = 4 1011 = 12
- 0100 = 5 1100 = 13
- 0101 = 6 1101 = 14
- 0110 = 7 1110 = 15
- 0111 = 8 1111 = 16

Header 1 is power switch/LED LED1

- LED1
- SW1
- SW1

Header 2 is control-out/DAC scalePitch

- Gate
- Glide
- Accent
- V-Ref
- P.Bend

Header 3 is DC power -12V

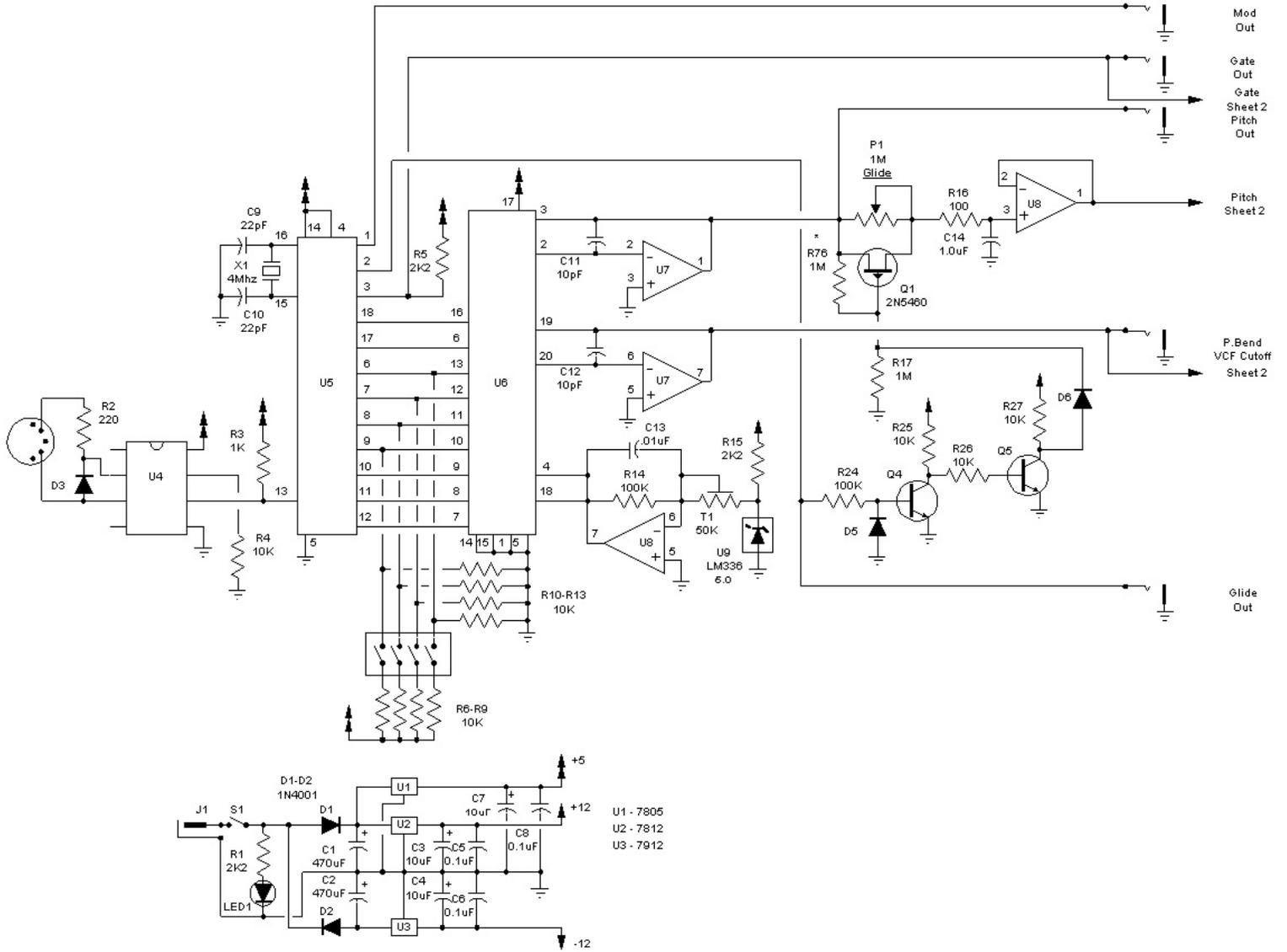
- GND
- +5V
- +12V

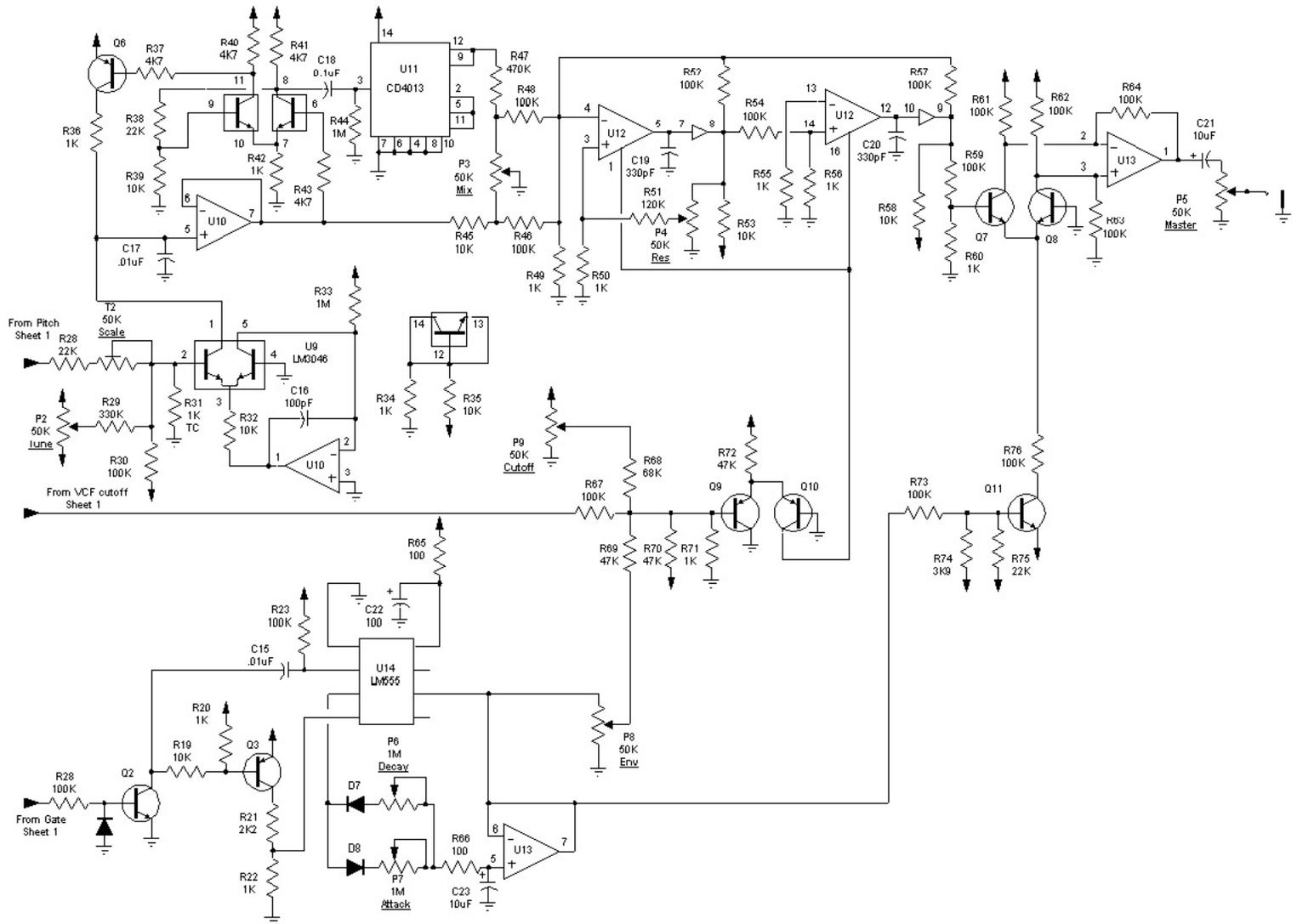
Header 4 is audio out

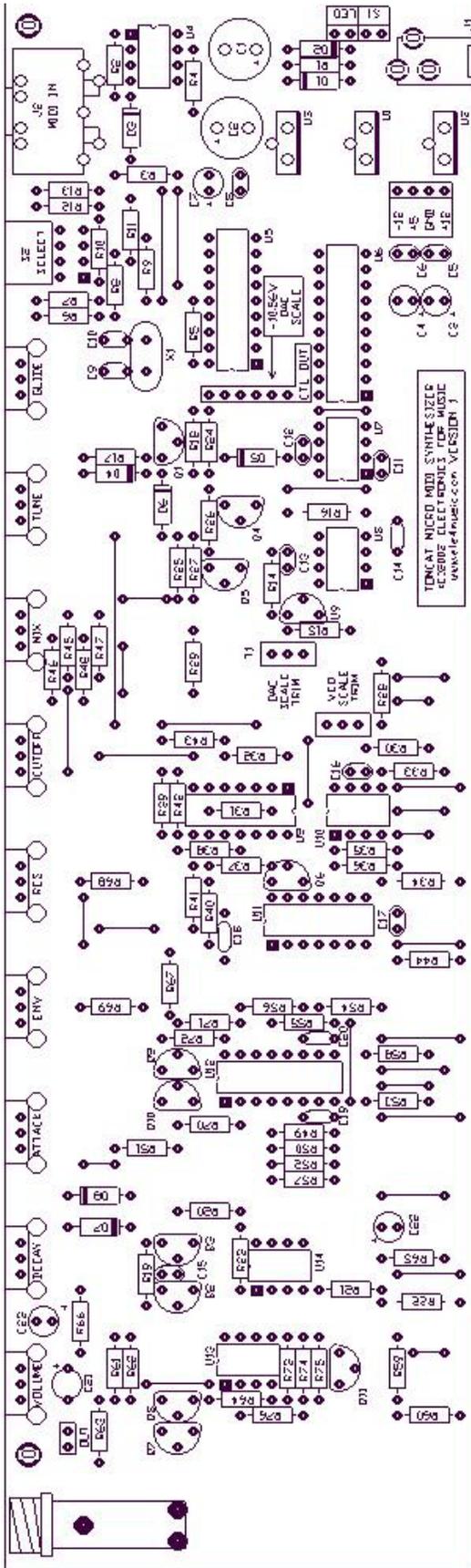
- GND
- Output
-

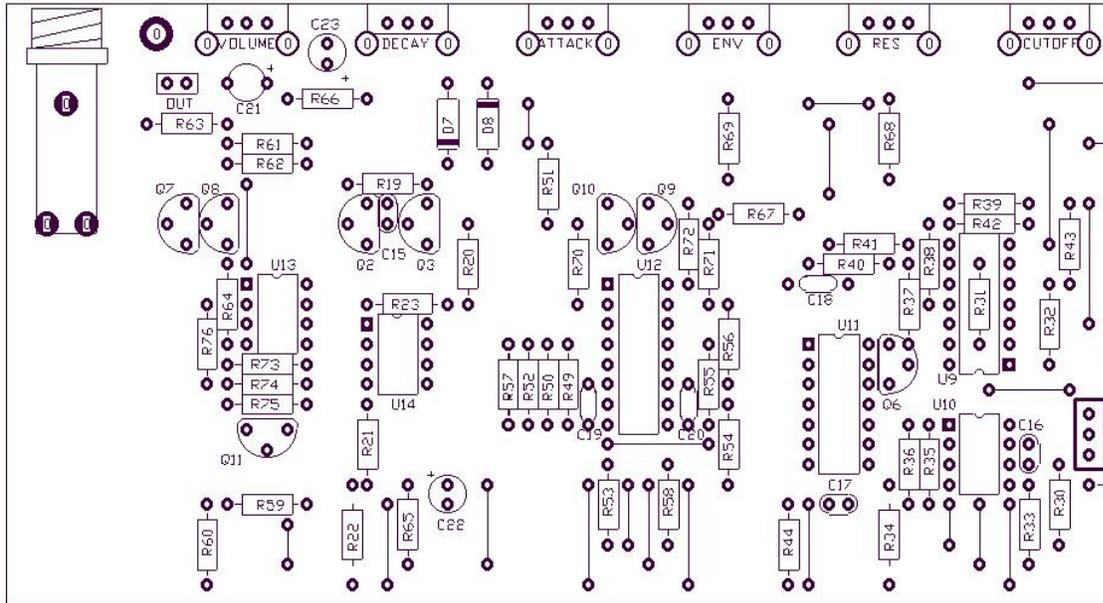
Assembly is a simple matter of soldering the parts on the board and adjusting two trimmers.

- Install the jumpers shown as thin black lines on the overlay.
- Solder the resistors in place and then the diodes
- If you decide to use IC sockets solder them in now. You should always use a socket for the PIC (U5). I prefer to install semiconductors last. It's a good policy.
- Install the capacitors.
- Install all remaining solder mounted parts. Including jacks, pots, switches, transistors, and ICs. The regulators barely get warm and do not require heat sinks.
- Plug the ICs into their sockets.
- Once the parts are installed on the board it's time to do the setup.
- Use a test clip or computer type jumper block to connect the two header pins labelled SW1 on header 1.
- **SMOKE TEST!** Be ready to pull the power plug if anything smokes or feels hot to the touch. Plug the transformer into the wall and then plug the power plug into the power jack. If nothing smokes gently touch the tops of the ICs to see if anything is running hot. **BE CAREFUL!** A hot running IC can easily cause 1st degree burns or blister your fingers.
- If you have any problems unplug the unit and check your work for solder bridges or unsoldered pads.
- If everything looks good so far set your meter to DC volts and check for +/- 12VDC at header 3.
- If you have the correct voltages, connect your meter to header 2 V-Ref. Adjust trimmer T1 for -10.56VDC. Pull the power plug to turn the unit off.
- Attach your midi controller to the midi jack. Make sure all 4 switches on S2 are off (open) and that the controller is set to midi channel 1.
- Plug the output jack into your monitor amplifier making sure the levels on both the amp and the synthesiser are turned down. **WARNING!** This synthesiser puts out very high audio levels and could damage your speakers if the amplifier is turned up too loud.
- Set the unit to it's basic patch.
- Plug the power plug back in.
- Play a few keys you should hear the output through your monitor amp.
- Press C5 and then C6 to hear the octave. Adjust T2 until the octave scale is correct.
- Let the unit warm up for 5-10 minutes and readjust T2.
- Play around with the controls to make sure all functions work correctly.
- Congratulations! You have built a working synthesiser. Attach the board to your panel or case using 4-40 screws and nuts. Use header plugs to attach the power switch and LED header 1. If you decide to use them connect the CV outputs header 2 to output jacks.

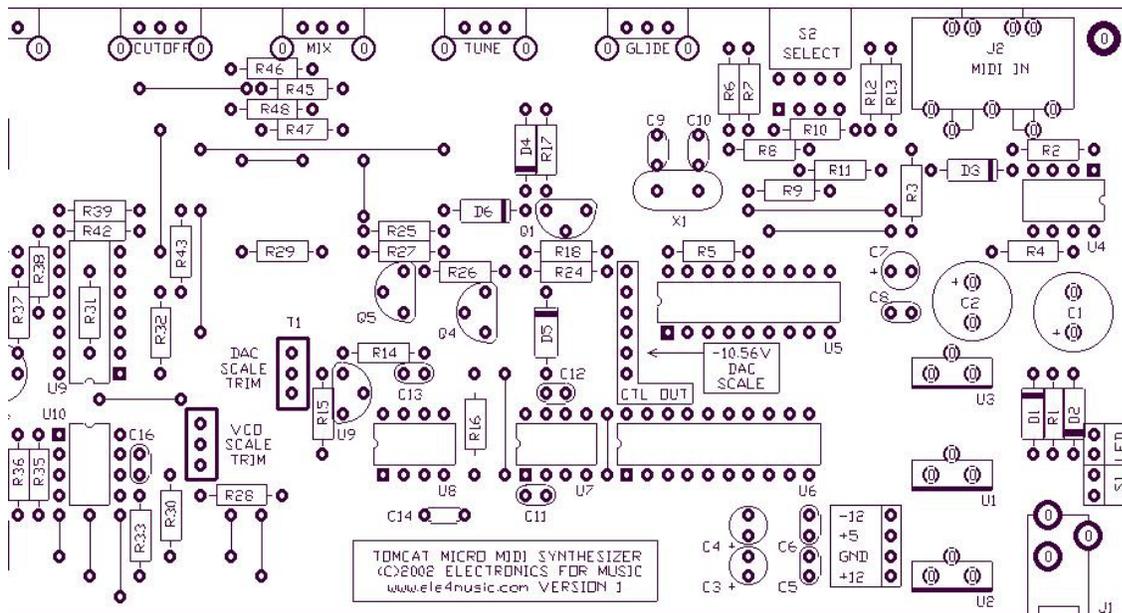








- T1 18VAC @ 500mw wall transformer 1
- J1 PC Mount Power Jack 2.1mm 1
- J2 Jack - DIN 5 pin PC Mount 1
- S1/LED1 Spot Rocker Switch w/LED 1
- S2 Switch - 8 pin DIP 1
- D1,2 1N4001 Rectifier 2
- D3,4,5,6,7,8 1N4148 6
- Q1 2N5460 1
- Q2,4,5,7,8,9 2N3904 5
- Q3,6,9,10 2N3906 4
- U1 IC - Voltage Regulator +5V/1A 1
- U2 IC - Voltage Regulator +12V/1A 1
- U3 IC - Voltage Regulator -12V/1A 1
- U4 IC - Opto Coupler - 6N138 1
- U5 IC - PIC - 16F84-10 1
- U6 IC - DAC - TLC7528CN 1
- U7,10,13 IC - Opamp - BiFet - Dual - TLO72 4
- U8 IC - Opamp - Dual - LM358 1
- U9 IC - Transistor Array - LM3046 1
- U11 IC - CMOS - CD4013 1
- U12 IC - OTA - Dual - NJM13600D 1
- U14 IC - Timer - LM555 1
- C1,2 Capacitor - Ele - 470uF/35V 2
- C3,4,7,21,23 Capacitor - Ele - 10uf/16V 5
- C5,6,8,18 Capacitor - Ceramic - 0.1uf 4
- C9,10 Capacitor - Ceramic - 22pF 2
- C11,12 Capacitor - Ceramic - 10pF 2
- C13,15,17 Capacitor - Polyester - 0.01uF 3
- C14 Capacitor - Mono - 1.0uF 1
- C16 Capacitor - Ceramic - 100pF 1
- C19,20 Capacitor - Ceramic - 330pF 2
- C22 Capacitor - Ele - 100uf/35V 1



- R1,15,21 Resistor - 1% Metal Film - 2K2 3
- R2 Resistor - 1% Metal Film - 220R 1
- R3,20,22,34,36 Resistor - 1% Metal Film - 1K 42,49,50,55,56 60,71 12
- R4,5,6,7,8,9,10 Resistor - 1% Metal Film - 10K 11,12,13,19,25 26,27,32,35,39 45,53,58 21
- R14,18,23,24 Resistor - 1% Metal Film - 100K 30,51,52,54,57 59,61,62,63,64 ,73,74 16
- R16,65,66 Resistor - 1% Metal Film - 100R 4
- R17,33,44,R76 Resistor - 1% Metal Film - 1M 3
- R28,38 Resistor - 1% Metal Film - 22K 2
- R29 Resistor - 1% Metal Film - 330K 1
- R31 Resistor - Tempco - 1K 1
- R37,40,41,R43 Resistor - 1% Metal Film - 4K7 3
- R46,47,48 Resistor - 1% Metal Film - 470K 3
- R51 Resistor - 1% Metal Film - 120K 3
- R68 Resistor - 1% Metal Film - 68K 1
- R69,70,72,75 Resistor - 1% Metal Film - 47K 4
- T1,2 Trimmer - 10T - 50K 2
- P1,6,7 Pot - Horizontal mount - 1M 3
- P2,3,4,5,8,9 Pot - Horizontal mount - 50K 6

