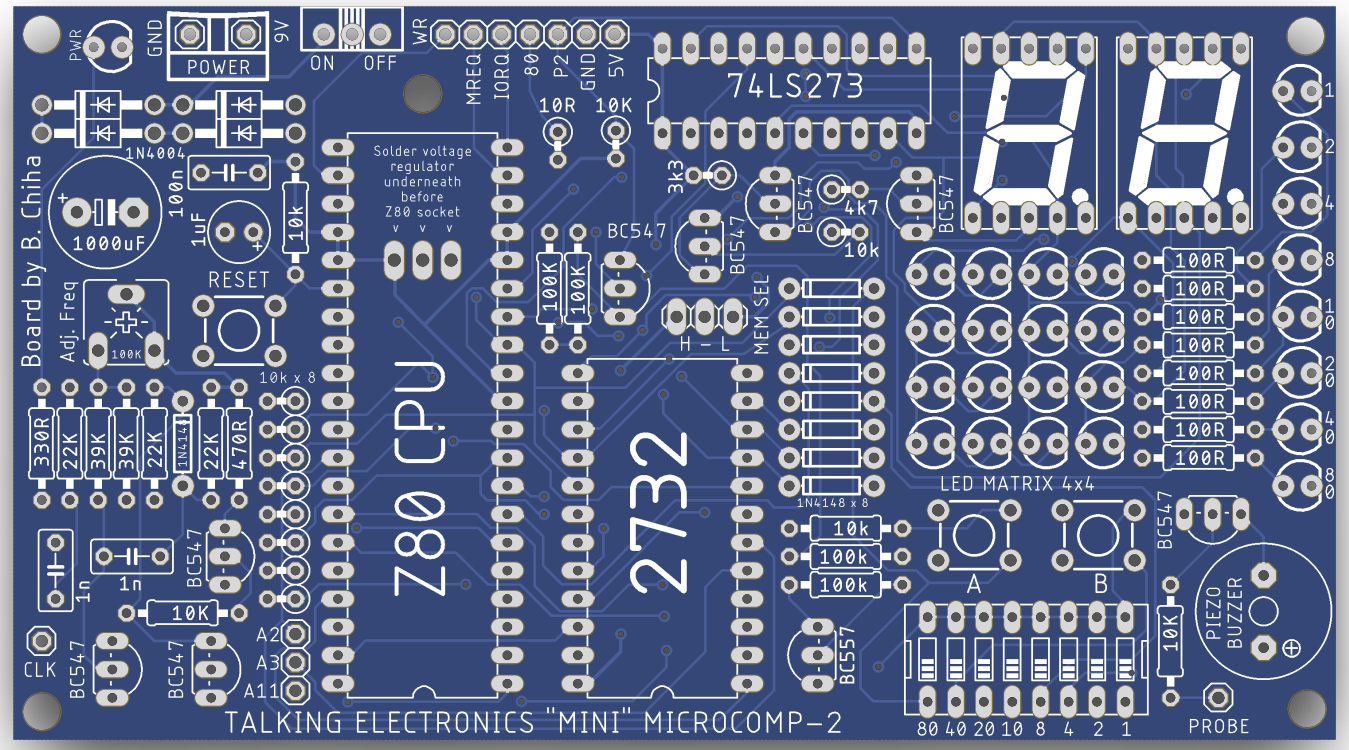
MICROCOMP-2 Project build

Thank you for your interest in building the
Talking Electronics Micro Computer v2.
Project website: https://github.com/bchiha/microcomp



Package contents

1 x Microcomp-2 PCB, 1 x 27C32 fully programmed EPROM, 1 x 74LS273 D-Flip Flop latch, Some loose components and build notes.

Construction notes

Use a smaller soldering iron head if possible. When inserting some components be careful of the polarity. Optionally use 4 x M3 Screws/Nuts/Spacers to raise the board.

- All LED's have their cathode (short leg) on the right. A small 'k' is printed on the back for reference.
- The Electrolytic Capacitors have their Anode (long leg) '+' pin marked.
- All diodes have their cathode (bar) to the left and one diode has it to the top. Note the white bar on the symbol.
- The 8 diodes to the right of the ROM are 1N4148. The 4 diodes in the top left corner are 1N4004.
- The sole BC557 PNP transistor is on the left side of the DIP switch. Maybe insert it first as to not mix it up.
- 4x4 Matrix and Binary LEDs can be replaced with Yellow, but not Blue, Green or White.
- The 8 upright resistors to the left of the CPU are 10KΩ in value.
- Ensure that the 7805 Voltage regulator (TO-220 package) is soldered underneath the board flat side down first before soldering the Z80 IC Socket. Pin positions are marked. Use an M3 Screw/Nut to secure. A heatsink is not required.
- To match the DIP Switch positions with the tutorials in the TE magazine, ensure the 'closed' or 'on' position is down. The DIP Switch might need to be flipped (optional).
- Memory selection (MEM SEL) headers and jumper can be replaced with an SPDT mini slide switch.

The board has been designed for beginners with all components being through-hole and easily sourced. There's a bit of soldering to be done and some pads are near each other, go easy on the amount of solder used and take your time. Components have been marked on the PCB as to their value and position. Refer to the PCB picture on this sheet for the component value after insertion as some values get covered.

Fault finding

The board has been tested and is fault-free. The IC's in this package have been tested before sending. If it doesn't work, go through basic fault finding ie: solder joints and component position. Look for help in Issue 13 or the onboard Probe to assist.

Powering

9V/GND from the screw terminal connection, or 5V/GND from a pin header at the top of the board. The 5V connection is unregulated, be careful!

Using

The 4kb EPROM provided has the original 2k code in the lower half and 5 larger programs in the upper half. To swap between the upper/lower ROM, use a 2-pin header jumper placed on the 'MEM SEL' three-pin header (the centre pin is always connected). The headers can be replaced with an SPDT mini slide switch which will make ROM selection easier. For instructions on how to use the lower ROM and upper ROM, please refer to TE magazine Issue 13 and 14 and Part 3 on the project Github address.
See https://github.com/bchiha/microcomp for all project-related material.

Parts List

IC's	
Part	**#**
Z80 CPU	1
2732 / 2816 (E)EPROM	1
74LS273 D-Flip Flop	1
7805 Voltage Regulator	1

Transistors	
Part	**#**
BC547 NPN	8
BC557 PNP	1

Diodes	
Part	**#**
1N4004	4
1N4148	9

Connectors	
Part	**#**
5mm 2 pin screw terminal	1
Header pins	15

Resistors	
Part	**#**
10 Ω	1
100 Ω	8
330 Ω	1
470 Ω	1
3.3 kΩ	1
4.7 kΩ	1
10 kΩ	14
22 kΩ	3
39 kΩ	2
100 kΩ	4
100 kΩ Horizontal Trimpot	1

LED's	
Part	**#**
FND 560 RED Seven Segment module	2
3mm RED	17
3mm YELLOW/RED	8

Capacitors	
Part	**#**
1µF 50v Electrolytic	1
1000µF 25v Electrolytic	1
1nF Polyester or MKT	2
100nF Polyester or MKT	1

Switches	
Part	**#**
6mm Tactile	3
SPDT mini Slide Switch	1 or 2
8 Way SPST DIP Switch	1

Other	
Part	**#**
Piezo 6.5mm Pitch Buzzer	1
2 pin header jumper	1
20 pin IC socket	1
24 pin IC socket	1
40 pin IC socket	1

Lower ROM

Here is a summary of the programs on the Lower ROM. Refer to TE Magazines for more info.

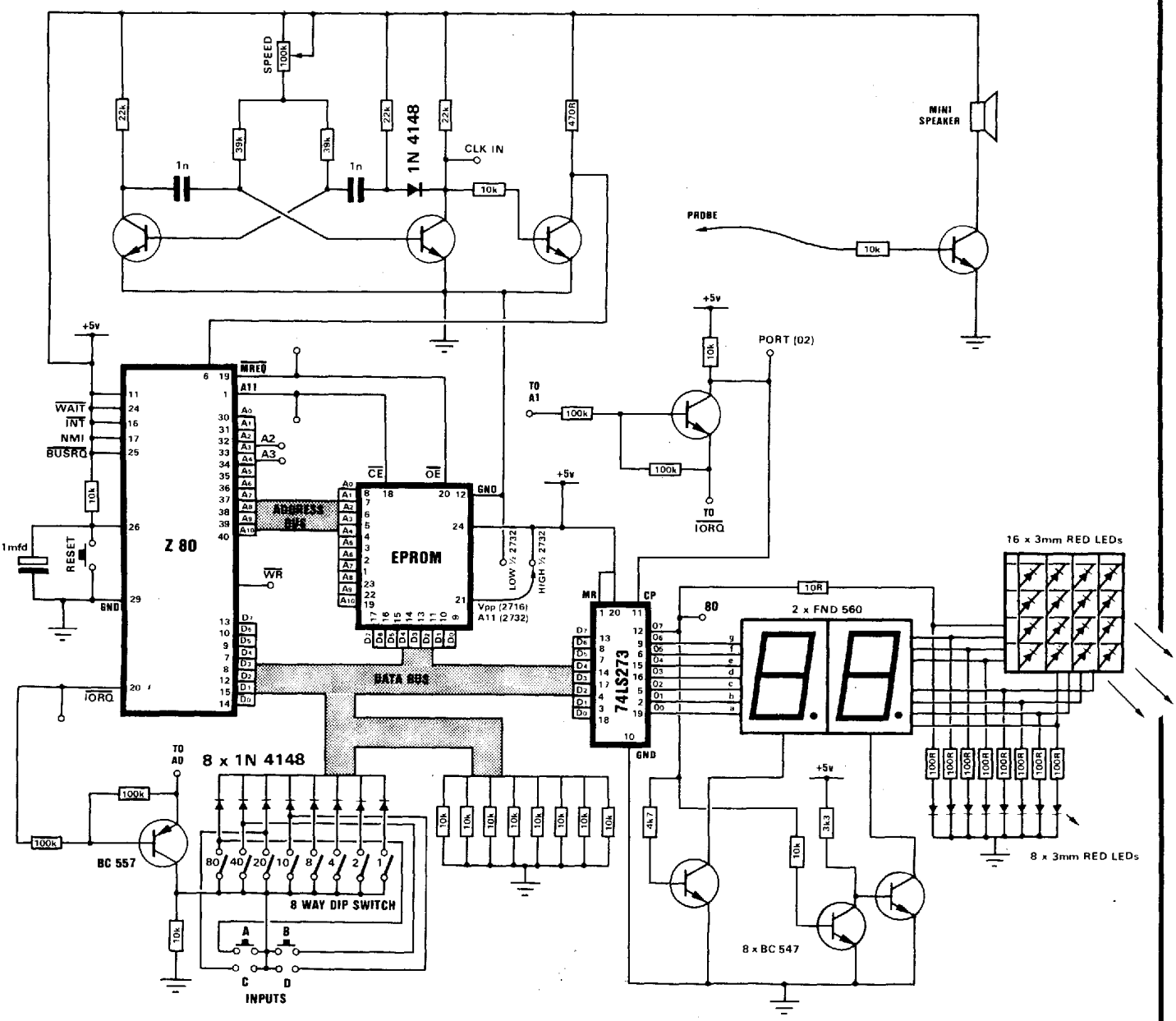
DIP	Program	DIP	Program	DIP	Program
00	Jump Routine	2D	Auto Increment (Variable)	47	Dice
01	Tone	2E	Auto Decrement	52	ROM in Binary
02	Quick Draw	2F	Auto Decrement (Variable)	53	Poker
08	Running Names	30	4x4 LED Effects	63	Binary Clock
20	Looking at Data	37	0-9 Counter	6C	One Minute Timer
29	Input to LED's	39	0-F Counter	6D	3 Minute Timer
2A	Increment Via Button	3A	A-Z,0-F Counter	6E	1 Hour Timer
2C	Auto Increment (fast)	40	00-99 Counter	6F	Adjustable Timer
7A	Final Message				

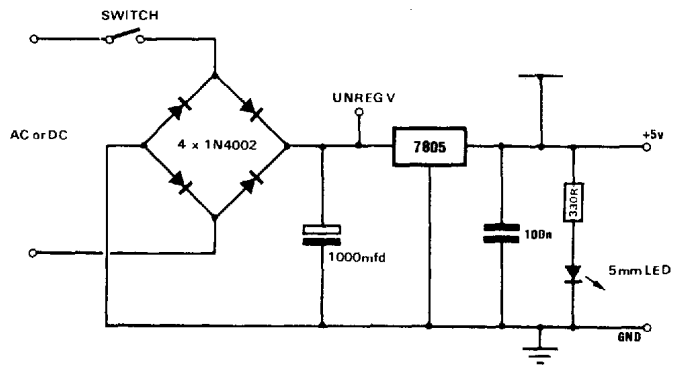
Upper ROM

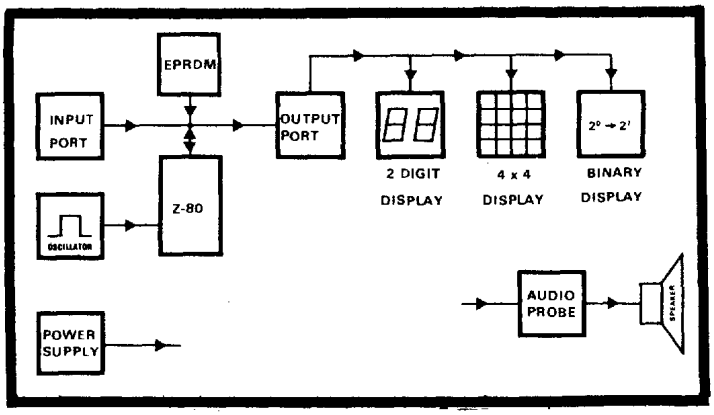
The programs in the Upper ROM are selected by a 'Menu Driver' that removes the need to use the DIP Switch to select programs. Cool hey! To use the menu, Button 'A' rotates through menu items, Button 'B' selects the programs. The menu items are displayed using scrolling Seven Segment. Ensure the DIP switch is set to off (0x00) for the menu to work.

The programs included are:

- Blackjack -- Select playing cards, try to reach a total of 21. When two dashes appear '– –' on the segments, press button 'B' to select a card, A card total appears, if the total is under 21, then another card must be selected. If the total is over 21, you are bust and the game starts over. If the total is 21, you win and '21' flashes on the segments. Refer to issue 14.
- Master Mind -- Try to guess 4 numbers in the correct sequence. There are three phases of this game:
  1. Start. Press button 'A' to select a random sequence. LED's will be randomly flashing during this time.
  2. Number select. Two '– –' will appear to indicate a new round has started. Button 'A' cycles through the numbers to pick. Once a number is chosen, press button 'B' to register it.
  3. When all 4 numbers have been selected, they are repeated back and a score is displayed. The left-hand segment shows the number of correct values in the correct position and the right-hand segment shows the number of correct values in the incorrect position. To start a new round press button 'A' when the score is being shown. To give up, press both buttons at the same time and the actual sequence will be shown. You can still press the button 'A' and continue with the game.
- NIM -- Pick up Match game. Press Button 'A' to take a Match. Up to 3 matches can be taken. Press Button 'B' for the computer to pick up matches. Player to pick up the last match loses. You can possibly cheat, I'll leave you to work this out.
- Tug 'O War -- Two players continually press the 'A' and 'B' buttons. First player to reach '9' presses wins. The player presses reduces the opposition score. Refer to Issue 14.
- LED Demonstration -- This is a series of LED output sequences that uses the 4x4 Matrix, Binary LEDs and the two Seven Segment displays.







BLOCK DIAGRAM OF MICROCOMP