TYNEMOUTH SOFTWARE MINSTREL ZX80 CLONE ISSUE 2 PARTS LIST

CAPACITORS – AXIAL CERAMIC RATED 16V OR HIGHER

4 x 47pF *(usually marked 47 or 470)*
1 x 10nF *(usually marked 10n or 103)*
2 x 47nF *(usually marked 47n or 473)*
13 x 100nF *(usually marked 100n or 104)*
1 x 1uF *(usually marked 1u or 105)*
1 x 22µF *(axial electrolytic rated 25V)*

RESISTORS – ALL ¼W 5% OR BETTER (4 BAND RESISTOR COLOUR CODES SHOWN)

1 x 75Ω
1 x 180Ω
1 x 330Ω
2 x 470Ω
1 x 680Ω
17 x 1KΩ
2 x 2.2KΩ
1 x 2.7KΩ
1 x 4.7KΩ
6 x 47KΩ
1 x 220KΩ
1 x 1MΩ

SEMICONDUCTORS (NEW TEXAS INSTRUMPENTS 74LS CHIPS RECOMMENDED)

10 x 1N4148 diode
1 x BC548B or similar NPN transistor
2 x 74LS00
1 x 74LS04
2 x 74LS05
1 x 74LS08
1 x 74LS10
1 x 74LS32
2 x 74LS74
1 x 74LS86
1 x 74LS93
3 x 74LS157
1 x 74LS165
1 x 74LS365
1 x 74LS373
1 x Z80 CPU / NEC D780 / Zilog Z84C0006PEG / Z84C0008PEG / Z84C0010PEG (4MHz or higher rated)
1 x 7805 or 7805 switching replacement (rated 250mA minimum for board only, more if using expansion port)
1 x 27C64 – 27C512 EPROM (or original ZX81 ROM – see notes on jumpers)
1 x 62256 32K SRAM (e.g. Alliance AS6C62256 or Cyprus CY62256)
1 x 6.5 MHz Crystal

CONNECTORS / SWITCHES

1 x 5 way, 1 x 8 way 0.1" FFC connector (for ZX81 membrane) *(e.g. TE Connectivity 5-520315-5, 5-520315-8)*
2 x Stereo 3.5mm Jack *(e.g. CUI SJ1-3525N – Digi-Key SJ1-3525N)*
1 x Phono jack *(e.g. CUI RCJ-011 – Digi-Key CP-1400-ND)*
1 x 2.1 mm DC Jack
1 x miniature tactile switch 6x6mm *(e.g. Diptronics DTS-61N)*
3 x 2 way and 4 x 3 way headers with jumper *(optional or wire links)*
2 x 28pin, 1 x 40pin IC sockets *(turned pin recommended)*
12 x 14pin, 5 x 16pin, 1 x 20pin IC sockets *(optional, turned pin recommended)*

COMPONENT PLACEMENT
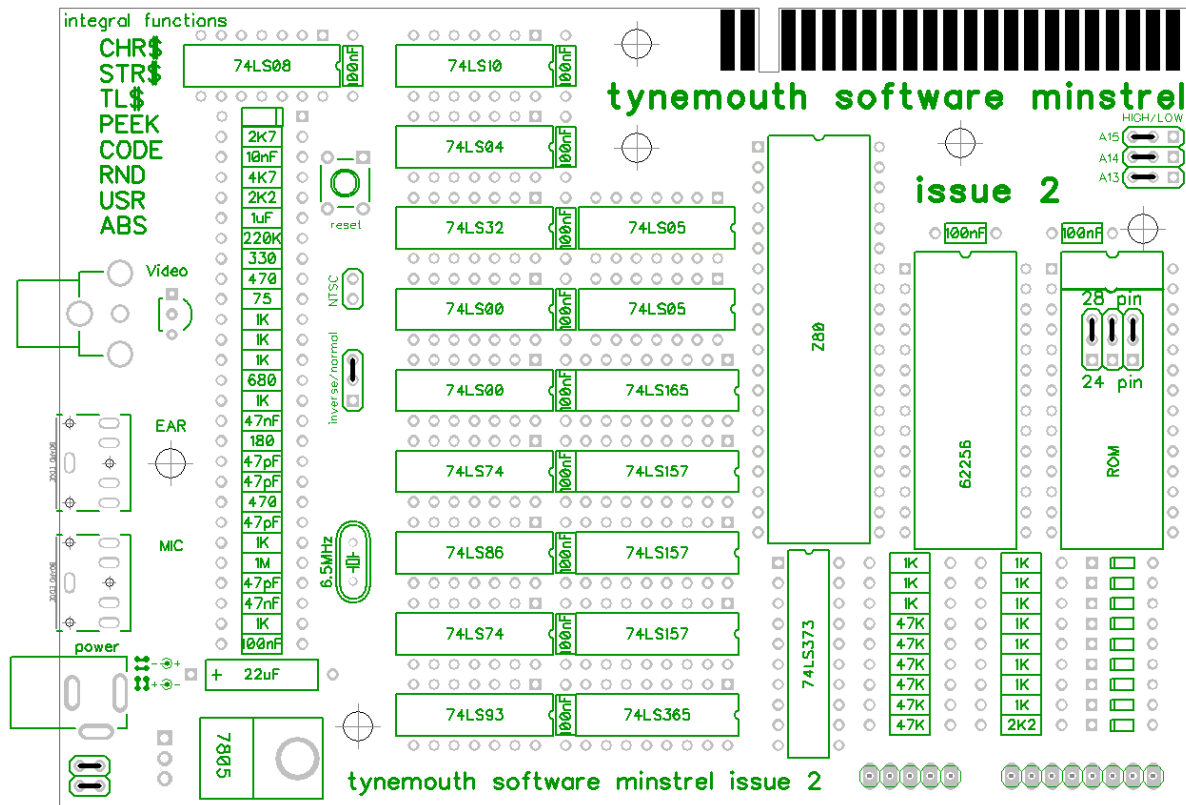
JUMPERS

Jumpers or link wires need to be fitted to the positions marked with black lines above, these are shown in the default configuration of centre negative supply, normal PAL video, top ROM address and 28 pin ROM.

The jumpers near the power connector set the polarity of the power input

■■●+	Centre negative, used by Included supply (also Spectrum and Commodore 16 computers)
■■+●−	Centre positive, used by pretty much every other power supply

Power requirements are around 9V DC. Current consumption is around 200mA for the board alone, more if you plan to use the expansion port.

The NTSC jumper sets video standard

○○	PAL if left open
●	NTSC if closed

The Inverse/Normal jumper selects video mode

●○	Normal = black text on a white background.
○●	Inverse = white text on a black background

When using a ROM chip larger than 8K, the jumpers near the ROM chip select a ROM image. These should be set to the left, 'High' unless you have multiple images on your EPROM. The jumpers select Low (0V) or High (5V) for the following pins

A13	Pin 26
A14	Pin 27
A15	Pin 1

An example dual 4K/8K ROM could be set as follows:

| A15	A14	A13	ROM selected
HIGH	HIGH	LOW	ZX80 4K BASIC
HIGH	HIGH	HIGH	ZX80 8K BASIC

All 'high' will select the topmost 8K segment in the ROM chip. All low will select the first 8K of the ROM chip. The default is all high as some smaller ROM chips need the unused higher address lines tied high for normal use.
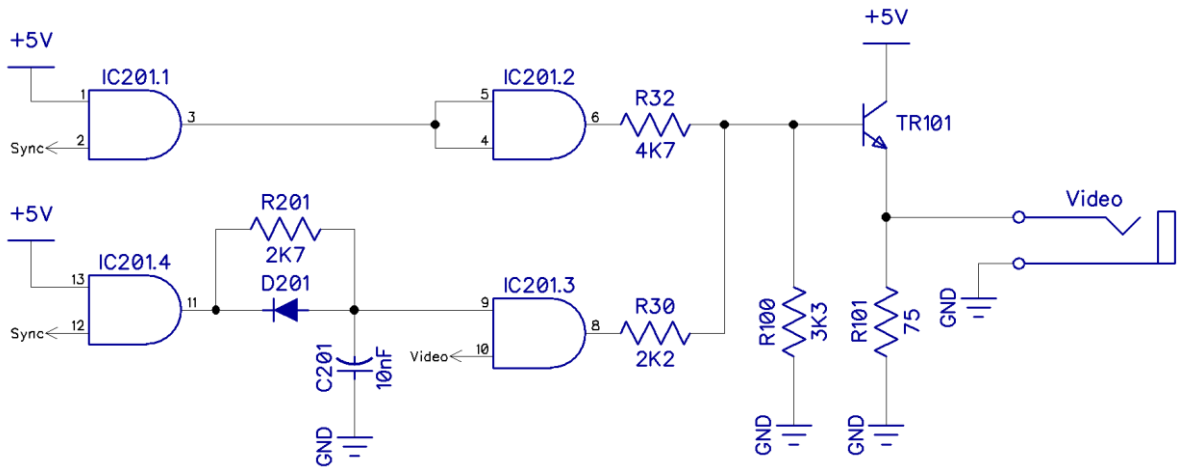
The jumpers under the ROM socket select either a 28 pin EPROM (27C64-27C512) or if they are all changed to the 24 pin setting, an original ZX81 ROM chip can be used. When using a 24 pin chip, the upper 4 pins of the socket are not used.

BOARD LAYOUT WITH PART NUMBERS
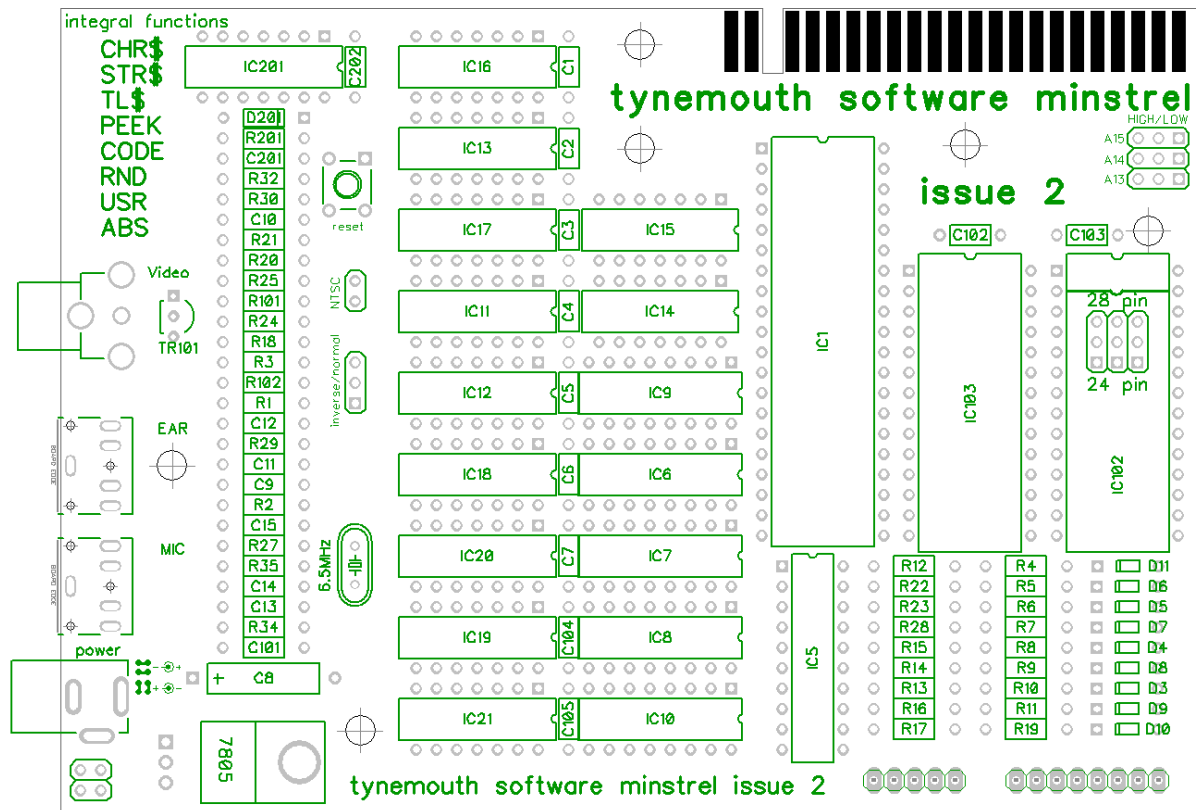

ADDITIONAL CIRCUITRY OVER ZX80 SCHEMATIC

ADDITIONAL PARTS OVER ZX80 SCHEMATIC

IC102 = 62256 (wired up to A13 for 16K RAM)

IC103 = 2764 EPROM (wired up to A12 for 8K ROM. A13-A15 jumper selectable if 27128-27512 used)

IC201 = 74LS08

TR101 = BC548B

C101-C105, C202 = 100nF

R100 is optional, fit on rear to reduce video signal level, can help with some TV SCART inputs

ZX80 SCHEMATIC

Redrawn by Grant Searle http://searle.hostei.com/grant/zx80/zx80.html
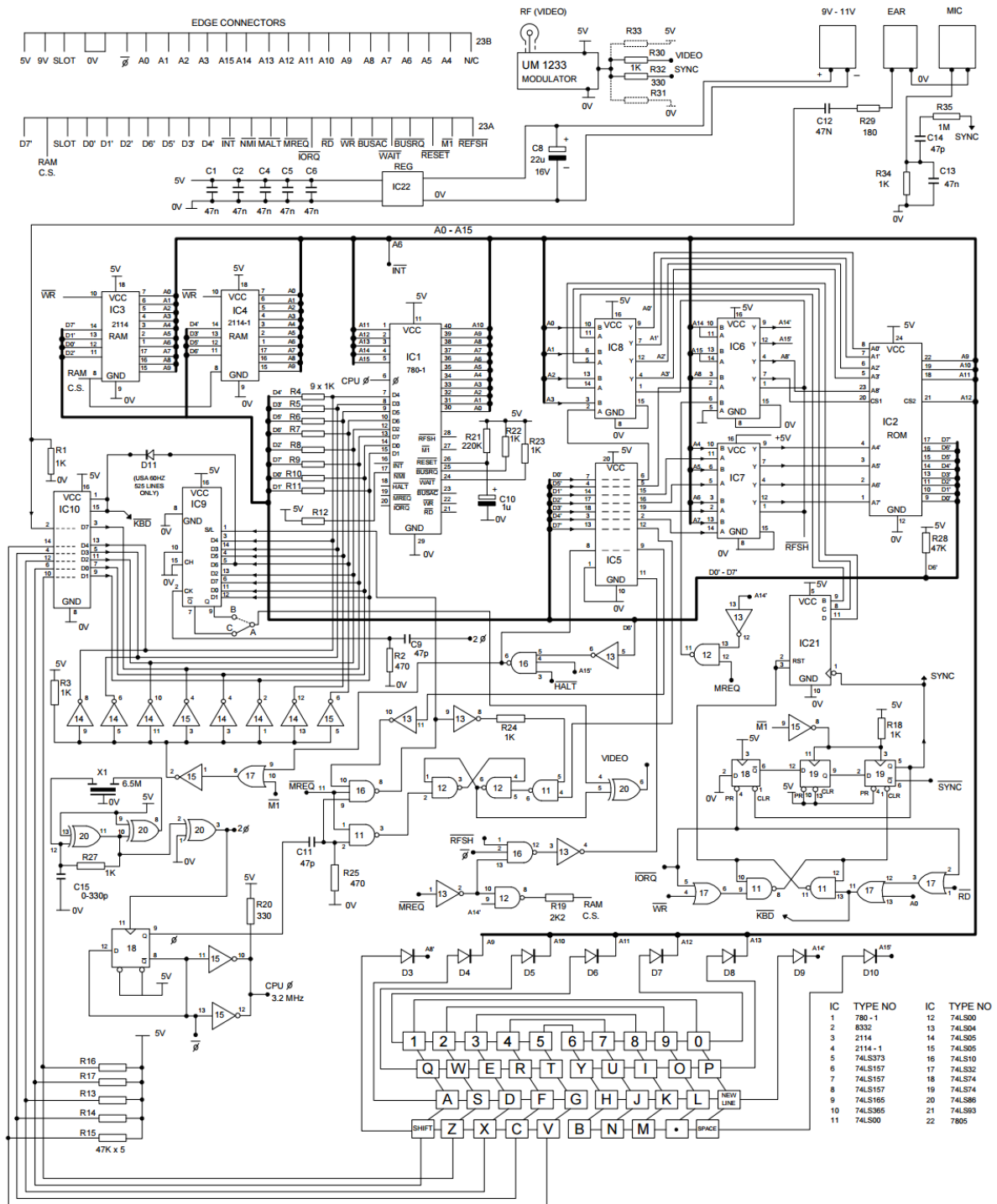
Edge connector pin 23B marked N/C is wired as $\overline{ROM\_CS}$. R102 (680Ω) is inserted between IC6 pin7 and the $\overline{ROM\_CS}$ line on the IC103 and the edge connector, so it can be overridden by an external device. This matches the ZX81 implementation.