Tynemouth Software

TYNEMOUTH MINSTREL EXPANSION BUS BACKPLANE

OVERVIEW

This is a host powered four slot expansion bus for the Minstrel 2, Minstrel 3, ZX81 or TS1000.

It provides four 2x23 way pin header slots, as found on later Minstrel 2 and 3 main boards, and one pass-through edge connector as found on all these machines.

The expansion slots are powered from the host.

PARTS LIST

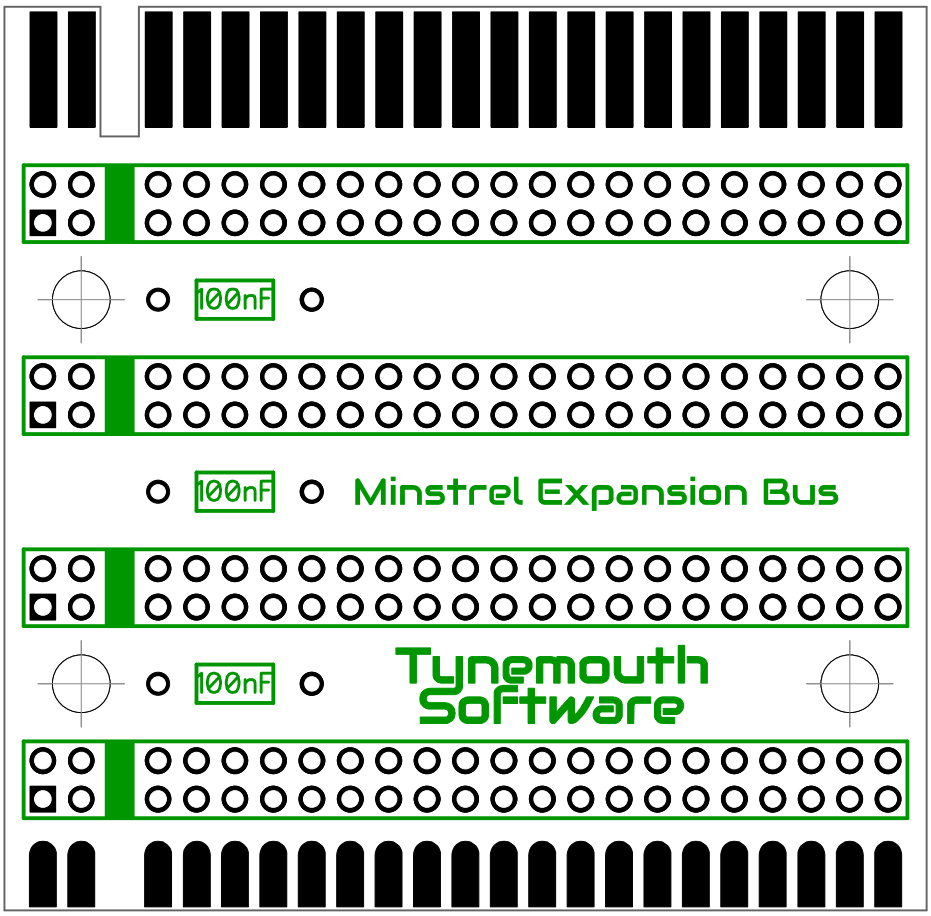
CAPACITORS – CERAMIC RATED 16V OR HIGHER

3 x 100nF axial *(usually marked 100n or 104)*

CONNECTORS / JUMPERS

4 x bus connectors, 2x23 way or 2x2 and 2x20 0.1” vertical socket
2x23 pin 0.1” pin header or 2x23 way 0.1” edge connector (open ended)

COMPONENT PLACEMENT



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ASSEMBLY

Start with the capacitors, then the host pin header or edge connector, and finally the bus connectors.

It is advisable to solder the host connector before the bus connectors; otherwise it can be difficult to reach the solder pads on the top side of the board.

EXPANSION BUS PINOUT

The expansion bus pinout is identical to that used on the Minstrel 2 and 3 and the ZX81. The ZX80 is the same but without the /ROM_CS pin, but you aren't using this on a ZX80, are you?

Signal (Top / Front)	Pin		Signal (Bottom / Rear)
D7	B1	A1	**5V**
/RAM_CS	B2	A2	**9V**
-			**-**
D0	B4	A4	**0V**
D1	B5	A5	**0V**
D2	B6	A6	**3.25MHz**
D6	B7	A7	**A0**
D5	B8	A8	**A1**
D3	B9	A9	**A2**
D4	B10	A10	**A3**
/INT	B11	A11	**A15**
/NMI	B12	A12	**A14**
/HALT	B13	A13	**A13**
/MREQ	B14	A14	**A12**
/IORQ	B15	A15	**A11**
/RD	B16	A16	**A10**
/WR	B17	A17	**A9**
/BUSAK	B18	A18	**A8**
/WAIT	B19	A19	**A7**
/BUSRQ	B20	A20	**A6**
/RESET	B21	A21	**A5**
/M1	B22	A22	**A4**
/REFRESH	B23	A23	**/ROM_CS**

NOTES:

/INT is hard wired to **A6** inside all of the machines, and is integral to the display mechanism.

/NMI is likewise integral to the display on the ZX81. Neither are therefore easily available for reuse.

/ROM_CS is not connected on the ZX80, but is present on the Minstrel 2 and 3 and the ZX81. It can be used to disable the system ROM to replace code and data (to add commands to BASIC for example), but not the character font, as the display circuitry cannot access a ROM on the expansion bus.

/RAM_CS can be used to disable the system RAM.