

CPU C167 Test Board v1.01.

This pcb plugs into the top of a C167 CPU board and allows all of the I/O signals to be monitored or changed. It allows ports to be set to low or high, analog inputs to be set between 0 and 5 volts, and also shows the status of all digital output pins via banks of leds.

The following ports have leds and switches connected to them.

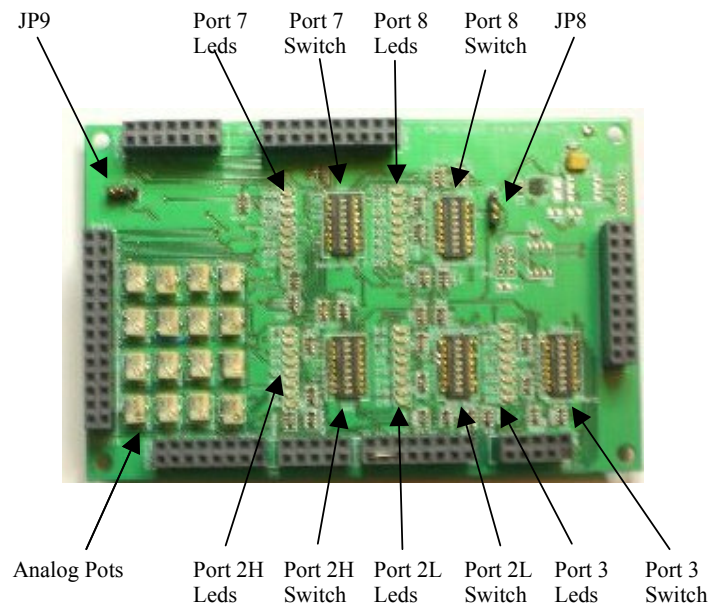
Port-7 , Port-8, Port-2 High, Port-2 Low. Port 3

Analog inputs 0-15 are connected to potentiometers which allow the setting of all analog input voltages.

Each ports status is monitored via a transistor and led , so the port status can be monitored whether it is set as input or output. If the port is set to output mode with push/pull software then the switch will not be able to set a zero level. Output port software should use open drain to be monitored correctly. Some of the smart skid outputs are push/pull mode so the switch will have little effect on these signals.

There is no danger of shorting the output if they are set to the wrong mode as the switches pull the output to zero volts through a 330 ohm protection resistor.

The board layout is shown below.



When plugging board into the cpu on a baseboard all of the analog pots should be set close to their centre position to minimise crosstalk from external analog inputs. This will prevent potential damage to any patch board outputs. These pots are 50kohm value to minimise effect when connected onto a live cpu board.

The switches should also be set to the off position so inputs from external sources reflect the actual state. The switches pull the input low through a 330 ohm resistor and will not damage the external patch board signal outputs.

JP9 Sets the pullup or pulldown voltage for the 22k pullup resistors on the output of each port. These are normally set to 5 volt supply.

JP8 sets the voltage to be used by the switches to change the led status. This is normally connected to 0 volts.

All ports with the exception of P3, P7 and P8 have the leds in order (i.e. 0,1,2,3,4,5,6,7) from top to bottom of pcb (port 8 is held at top left looking down of board switch side).

Port 3 pin led order is 0,1,2,6,7,8,9,13
 Port 7 pin led order is 1,0,3,2,5,4,7,6
 Port 8 pin led order is 3,1,4,2,5,6,7,0
 Port 2L pin led order is 0,1,2,3,4,5,6,7
 Port 2H pin led order is 8,9,10,11,12,13,14,15

The analog channel pots are ordered (from left to right, top to bottom
 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15

Layout of port bits for led and switches on test pcb.

				LED	SWITCH	LED	SWITCH				
				P7.1	P7.1	P8.3	P8.0				
				P7.0	P7.0	P8.1	P8.1				
				P7.3	P7.3	P8.4	P8.2				
				P7.2	P7.2	P8.2	P8.3				
				P7.5	P7.5	P8.5	P8.4				
				P7.4	P7.4	P8.6	P8.5				
				P7.7	P7.7	P8.7	P8.6				
				P7.6	P7.6	P8.0	P8.7				
AN0	AN1	AN2	AN3	LED	SWITCH	LED	SWITCH	LED	SWITCH		
				P2H.8	P2H.8	P2L.0	P2L0	P3.0	P3.0		
				P2H.9	P2H.9	P2L.1	P2L1	P3.1	P3.1		
AN4	AN5	AN6	AN7	P2H.10	P2H.10	P2L.2	P2L2	P3.2	P3.2		
				P2H.11	P2H.11	P2L.3	P2L3	P3.6	P3.6		
AN8	AN9	AN10	AN11	P2H.12	P2H.12	P2L.4	P2L4	P3.7	P3.7		
				P2H.13	P2H.13	P2L.5	P2L5	P3.8	P3.8		
AN12	AN13	AN14	AN15	P2H.14	P2H.14	P2L.6	P2L6	P3.9	P3.9		
				P2H.15	P2H.15	P2L.7	P2L7	P3.13	P3.13		

The test program c167test can be loaded into the c167 processor to exercise all I/O on the test board. It cycles through all outputs a few times before going into analog mode.

Analog mode displays the output of each analog channel on one of the four port output p7,p8,p2l,p2h.

The four ports displayed can be selected by switching port 3 pins 8 and 9 low in the following manner.

Port 3 Channels 8,9

11	0-3
01	4-7
10	8-11
00	12-15

On port 3 a zero is represented with the switch in the on position. The full range (0-5volts) of the a/d inputs are mapped to the 255 bit possibilities of each 8 bit channel.

The processor can be reset by grounding port 3 idc connector pin 11. The bootstrap pin is on pin 13 and this can be grounded before powering up to enter bootstrap mode.

The ground is accessible on the lcd connector pins 1 and 2 and also on CON8 pin 9.

The test program H86 file is available at www.abletech.eu downloads page.

Note:

When using the test board and a cpu board only.

Please ensure a jumper is placed in pins P25 and P25Key on connector PORT-3 as this routes the P25 signal to the P25 signal. This signal is used on some systems for a keyboard based power on signal and does not connect directly to the cpu from PORT-2 connector. These signals are on pins 7 and 9.