

# PIC Project Board

## Assembly Notes

The PIC Project Board is a printed circuit board for small PIC-based projects where the standard components needed for every circuit have been included. The board has been designed to be as versatile as possible in terms of power supply and oscillator options. Only certain components will be used depending on the options chosen.

A section of the board has been left free for the user circuit. This area consists of a 'sea of holes' on a 0.1" grid for mounting additional components. Some of the holes are connected together and these are marked by lines on the component side of the board.

All the PIC I/O pins are fed to the user area. The PIC16F62X has 16 I/O pins, but other PICs have less and A5, A6 & A7 (OSC1, OSC2, MCLR) are not available as I/O pins for these PICs.

A PIC programmer such as MadLab PICLAB Programmer ([www.madlab.org/piclab/](http://www.madlab.org/piclab/)) can be used to program PICs for this board.

For technical documentation on PICs, see the Microchip website ([www.microchip.com](http://www.microchip.com)).

In the following, Rapid Electronics part numbers have been given for components (phone 01206 751166 in the UK or see [www.rapidonline.co.uk](http://www.rapidonline.co.uk)).

Solder the wire link first of all (LINK) (RAPID 62-0470 for a box of 1000).

Solder an 18-pin IC socket (RAPID 22-0165) to IC1. Match the notch in the socket to the notch on the board.

The power supply can be either:

- (a) 2.1mm dc power socket (RAPID 20-0970) to an external power supply (6-15V dc, centre positive)
- (b) choc block (RAPID 21-0460) to an external power supply
- (c) PP3 battery snap (RAPID 18-0092). Feed the leads through the support holes from the metal side of the board before soldering to the BATTERY + and - holes.
- (d) PP3 battery connectors (RAPID 18-3510 & 18-3515). Solder the connectors (BATT+ and BATT-) matching the shape to the symbol on the board (the hexagonal connector is positive, the circular negative). Make sure the connectors are pushed fully into the board.

Diode D1 (1N4001 RAPID 47-3130) protects the board from reversed polarity power. It can be omitted if protection is not required and bypassed with a wire link. If it is used then match the stripe on one end of the diode to the + sign on the board.

A miniature slide switch (ON/OFF) (RAPID 76-0265) can be used to control power to the board. An external power switch can also be used and support holes are provided for the trailing wires. If a switch is not required it can be bypassed with a wire link between the two switch holes with tracks leading to them.

A 5V regulator (REG) (78L05 RAPID 47-3278) can be used to control the voltage fed to the PIC. Match the half-circle shape of the regulator to the half-circle shape on the board (flat side against flat side). If a supply voltage within the PIC's supply range is used then the regulator can be bypassed by soldering a wire link between its outer holes. If the user circuit draws a large current (more than 100mA) or a high supply voltage is used, then a bigger regulator may be required.

Required. C1 and C2 are electrolytic capacitors which smooth the power supply (2 x 10uF 25V RAPID 11-0220). Put the shorter leg of a capacitor (the leg nearer the stripe on the body) into the hole with the - sign.

The power rails are fed to the sea of holes. 0V is marked GROUND or VSS-, the regulated supply (5V) is marked VDD+, and the unregulated supply is fed to the hole marked +VE.

The PIC oscillator can be either:

- (a) 3-pin ceramic resonator (RES) (4MHz RAPID 90-0625), soldered either way around. R1, R2, C3 & C4 are not used.
- (b) crystal (XTAL) (4MHz RAPID 90-0145) and two 22pF ceramic capacitors C3 & C4 (2 x RAPID 08-1218), soldered either way around. R1 & R2 are not used.
- (c) RC mode. Lower accuracy than a crystal or resonator. Use C4 (typically 22pF ceramic capacitor) and R2 (about 4k7 for 4MHz). RES/XTAL, R1 & C3 are not used.
- (d) PIC16F62X internal oscillator. RES/XTAL, R1, R2, C3 & C4 are not used.
- (e) PIC16F62X external R mode. Pin A7 is connected to ground via resistor R1. RES/XTAL, R2, C3 & C4 are not used.

A reset pushbutton (RESET) can be used (RAPID 78-0621). It needs a 47k pull-up resistor R3 (RAPID 62-0413 for a box of 1000). If a reset button is not required it can be omitted and MCLR tied high with a 47k pull-up resistor or a wire link in R3. Note that the PIC16F62X can use MCLR as an I/O pin, so in that case omit R3. IMPORTANT - if a reset button is not connected then a wire link must be soldered between the two pushbutton holes connected by a line. This carries ground to the oscillator components.

Corner holes (4mm diameter) are provided for mounting the board in a box, or for rubber feet.

Choc or terminal blocks (on a 0.1" pitch, RAPID 21-0460 etc.) can be fitted to the edge of the board for external connections.

## **Component List**

### Resistors

R1, R3                    47k (yellow, purple, orange, gold)  
R2                        4k7 (yellow, purple, red, gold)

### Capacitors

C1, C2                    10u electrolytic  
C3, C4                    22p ceramic

### Semiconductors

D1                        1N4001 diode  
REG                      78L05 regulator (5V, 100mA)  
IC1                       18-pin socket

### Miscellaneous

LINK etc.                6 x wire links  
RES                       4MHz ceramic resonator  
XTAL                      4MHz crystal  
ON/OFF                  miniature slide switch  
RESET                    miniature pushbutton  
BATTERY                PP3 battery snap / 2-way terminal block  
BATT+/BATT-            PP3 battery connectors  
6-15V dc                2.1mm dc power socket

### PCB

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