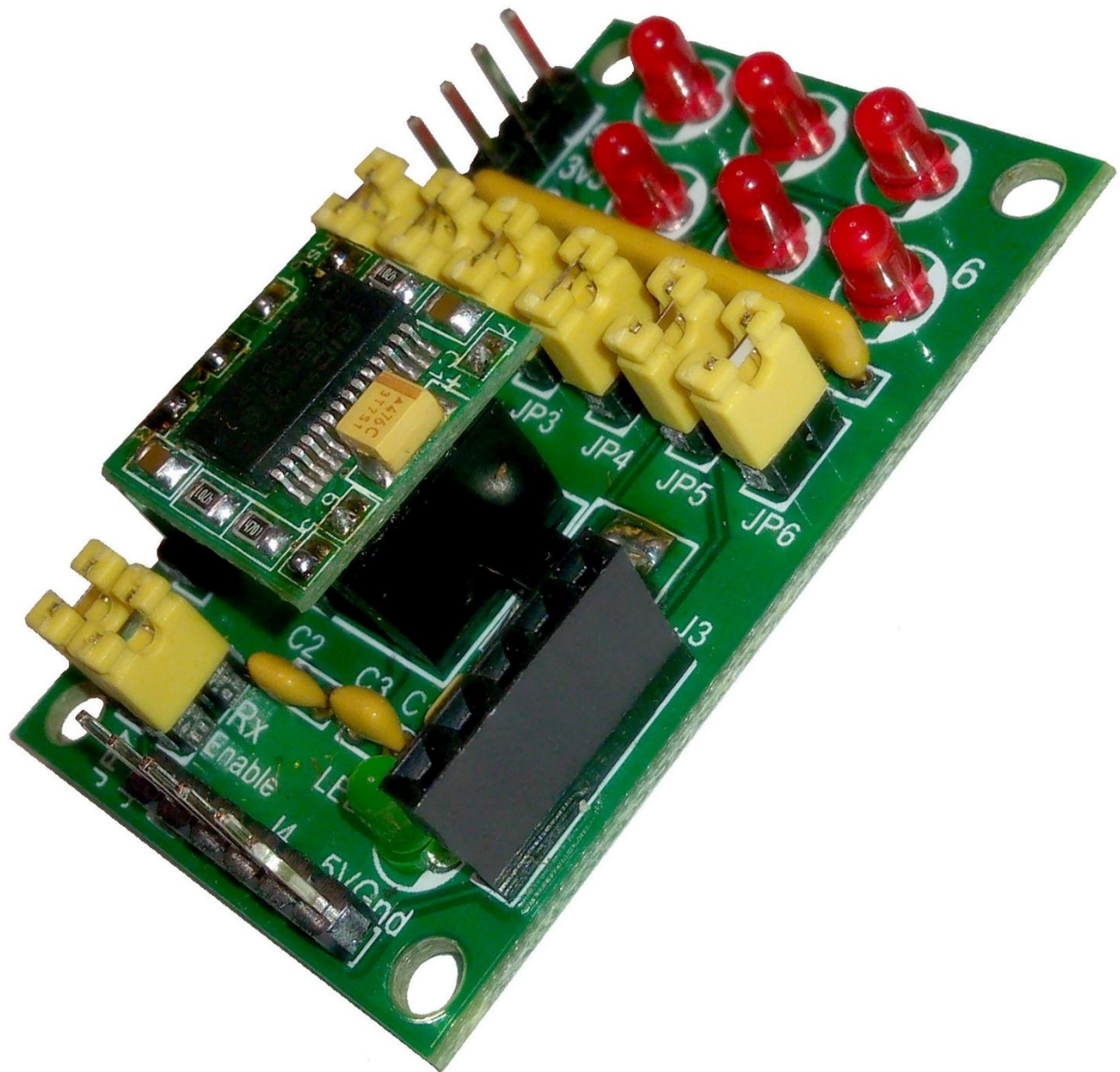


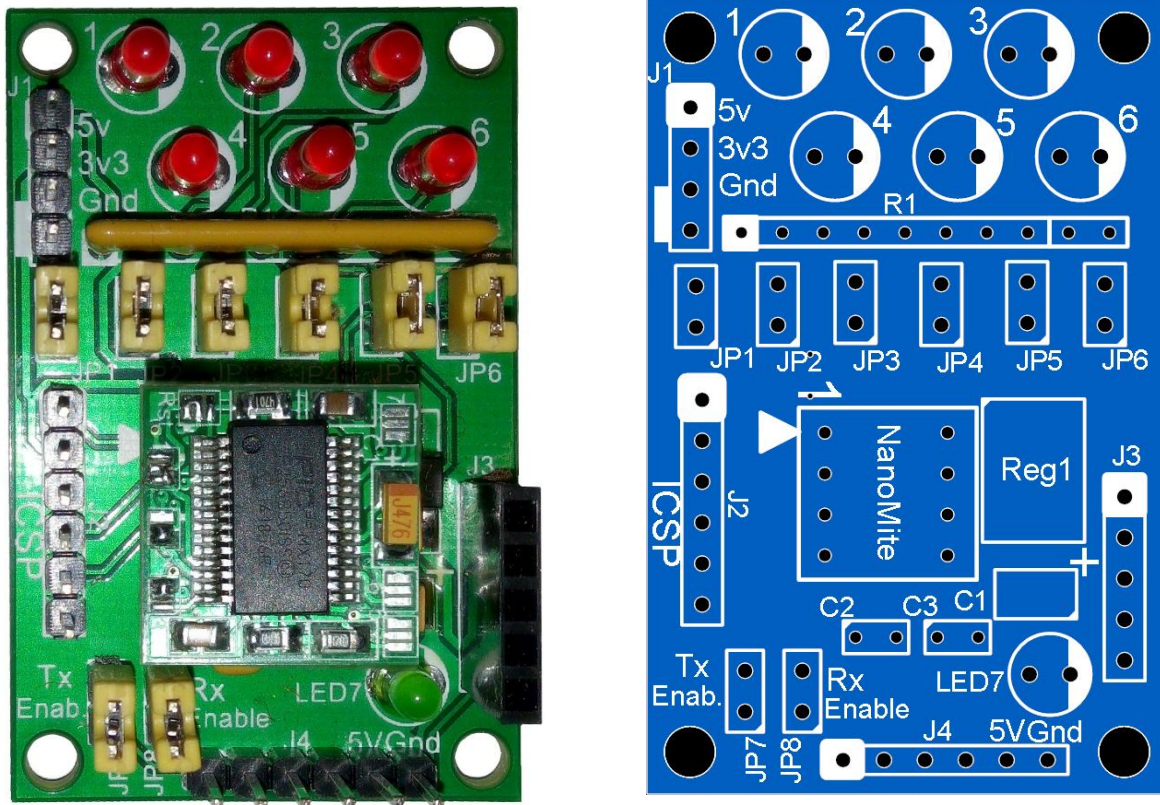
NanoMite Motherboard



The **NanoMite** is a very small (15mm x 15mm) board with a DIP8 footprint that contains a PIC32MX170F256B microprocessor that is configurable in a variety of options. Full details on the NanoMite can be found here:

<http://www.dontronics.com/micks-mite/files/index.php?dir=06+NanoMite%2F>

The **NanoMite motherboard** is designed to assist in flashing the Nanomite and can also be used to develop and test your code before committing the NanoMite to its final purpose.



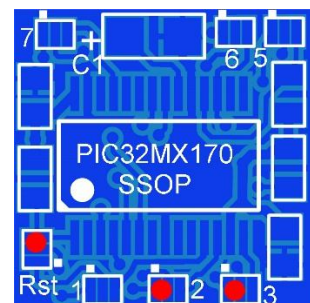
The NanoMite mother board fulfills 3 basic purposes.

1.
Allows the NanoMite to be Flashed via a PicKit3 or other suitable programmer.
2.
Allows the NanoMite to communicate, via the console, to a PC using a TTL-USB adapter on either J3 (designed to suit WhiteWizards Adapter) or J4 (MuP standard pinout). See Appendix-A for details.
3.
Using link optioned LEDs, test each of the 6 DIP pins (set them as outputs) to ensure that there are no soldering issues with the NanoMite.

1.
To flash the NanoMite using a PicKit3 or similar the ***NanoMite*** needs to be optioned such that the following pins are available to the PicKit3.

NOTE!! ***These Links are made on the NanoMite NOT the NanoMite Motherboard!***

MCLR on Dip Pin 1.	Link the `Rst' Solder pad pins 2-3
PGD on Dip Pin 2.	Link the `#2' Solder pad pins 1-2
PCC on Dip Pin 3.	Link the `#3' Solder pad pins 1-2



Insert the NanoMite into the Socket on the NanoMite Motherboard (noting the Pin 1 location – See Pictures above).

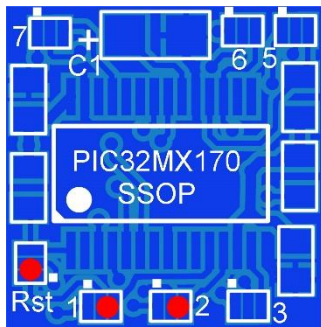
I have found that I generally need to supply power to the NanoMite Motherboard whilst programming using a PicKit3. Do this via the USB TTL adapter on J3 or J4 and REMOVE the links for `Tx and Rx enables' so that the USB adapters are essentially only being used to supply power to the NanoMite.

Connect the PicKit3 to the ICSP (J2) header and flash your MMBasic HEX file as per usual into the NanoMite.

2.

After you have Flashed the NanoMite, change the **NanoMite's** Solder links as follows:

- `Rst' link Solder pads to pins 1-2. (This removes MCLR from DIP Pin 1 and allows link #1 to be optioned).
- `#1' Solder pad pins 2-3 (This connects Console Tx (out) onto DIP Pin 1).
- `#2' Solder pad pins 2-3 (This connects Console Rx (in) onto DIP Pin 2).



Reconnect the `Rx and Tx Enable' links on the NanoMite Motherboard and you should be able to communicate to MMBasic, via your USB TTL adapter, from your PC.

3.

The Links JP1 through JP6 enable the LEDs (1-6) to be connected to the 6 DIP pins, and thus be controlled via the NanoMite, these are just used to test that all is functioning correctly with your NanoMite.

Using the Console (I recommend using TassyJim's great MMEdit program to send this to your NanoMite), and the NanoMite linked as in section 2 above, program the following code into your NanoMite.

```
setpin 3,dout
setpin 4,dout
setpin 5,dout
setpin 22,dout
setpin 21,dout
setpin 26,dout
```

```
StartLoop:
  pin(3)=1
  pause 50
  pin(3)=0
  pause 200
```

```
pin(4)=1
pause 50
pin(4)=0
pause 200
```

```
pin(5)=1
pause 50
pin(5)=0
pause 200
```

```
pin(22)=1
pause 50
pin(22)=0
pause 200
```

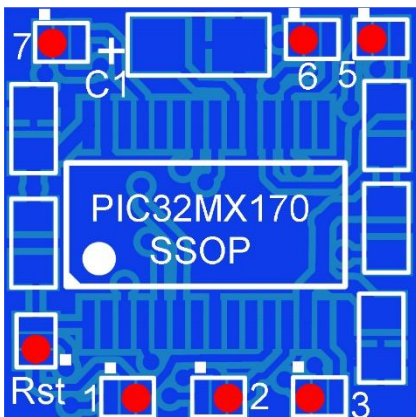
```
pin(21)=1
pause 50
pin(21)=0
pause 200
```

```
pin(26)=1
pause 50
pin(26)=0
pause 200
```

```
goto StartLoop:
```

If you link the **NanoMite** solder pads as follows, you will be able to run this code and see LEDs 3-6 flashing on and off in sequence and still have control via the Console. (LEDs 1 and 2 will be permanently ON at this stage as these show the Console Tx and Rx status).

- `Rst' link Solder pads to pins 1-2. (This removes MCLR from DIP Pin 1 and allows link #1 to be optioned).
- `#1' Solder pad pins 2-3 (This connects Console Tx (out) onto DIP Pin 1).
- `#2' Solder pad pins 2-3 (This connects Console Rx (in) onto DIP Pin 2).
- `#3' link Solder pads to pins 1-2. (This connects MX170 Pin 5 to Dip Pin 3).
- `#5' Solder pad pins 1-2 (This connects MX170 Pin 22 to Dip Pin 5).
- `#6' Solder pad pins 1-2 (This connects MX170 Pin 21 to Dip Pin 6).
- `#7' Solder pad pins 1-2 (This connects MX170 Pin 26 to Dip Pin 7).



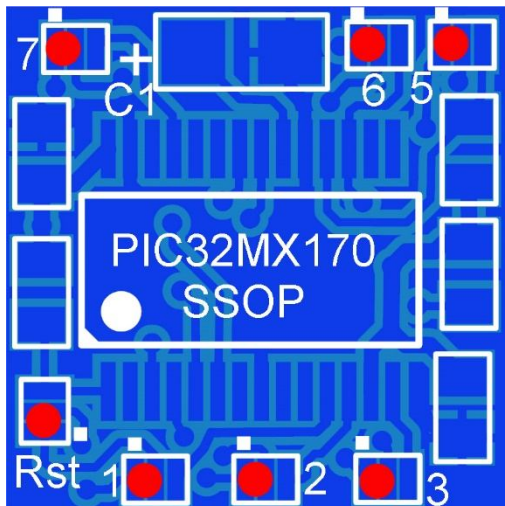
If you are happy that all is working you can test the other 2 LEDs by typing at the command prompt:

OPTION AUTORUN ON

Then by linking the following solder pads on the **NanoMite**, and removing the jumpers for the 'Rx and Tx Enable' pins on the **NanoMite Motherboard**.

`#1' link Solder pads to pins 1-2. (This connects MX170 Pin 3 to Dip Pin 1).

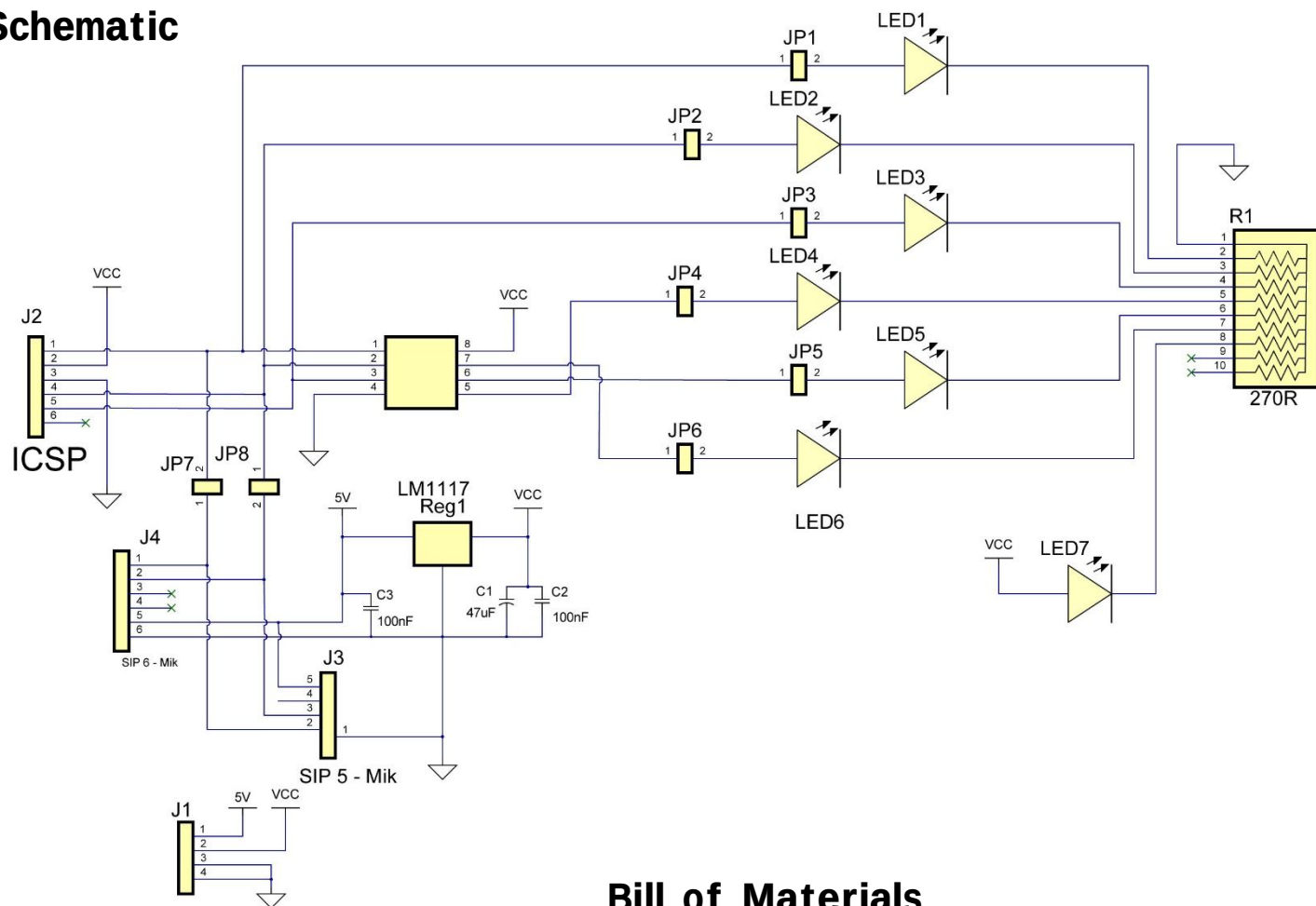
`#2' Solder pad pins 1-2 (This connects MX170 Pin 4 to Dip Pin 2).



Re applying power to the NanoMite Motherboard should autorun the code and blink all 6 LEDs in sequence. To stop the Autorun feature reconfigure the NanoMite as per section 2 to regain console function, Press 'Ctrl-C' and then at the prompt type:

OPTION AUTORUN OFF

Schematic

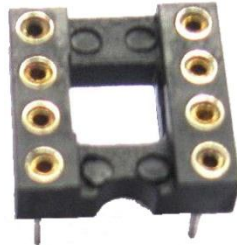
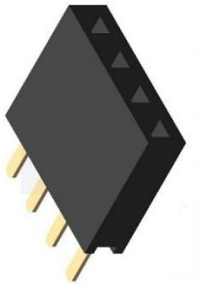


Bill of Materials

Ref	Type	Comments
J1	4 pin Male Header	
J2	6 pin Male Header	
J3	5 pin Female Header	
J4	6 pin Male Header	
JP1	2 pin Male Header	
JP2	2 pin Male Header	
JP3	2 pin Male Header	
JP4	2 pin Male Header	
JP5	2 pin Male Header	
JP6	2 pin Male Header	
JP7	2 pin Male Header	
JP8	2 pin Male Header	
R1	270R type A Resistor pack	pin 1 Common 8-10pins (only 7 resistors used)
NanoMite	8Pin IC socket or Female Headers	Wiper type IC socket or Female headers
Reg1	LM1117-3v3 SOT-23	
C1	47uf 6v3 SMD 3225 Tantalum	OPTIONAL.. Can be omitted if smooth power source
C2	100nf	
C3	100nf	
LED 1	RED 3mm LED	
LED 2	RED 3mm LED	
LED 3	RED 3mm LED	
LED 4	RED 3mm LED	
LED 5	RED 3mm LED	
LED 6	RED 3mm LED	
LED 7	GREEN 3mm LED	Power indicator

Construction Caveat

There is not much to say about building the NanoMite motherboard, so much so that if you cant work out how to build it then you probably don't have a NanoMite in the first place. There is just one `gotcha' that could rear its ugly head and that is because the design of the NanoMite uses surface mount 0.025" square pins as its interface to external circuitry and as such these pins do NOT plug into Machined pin sockets. I recommend using either IC sockets that have the Wiper type of clamping action to the pins or, preferably, use female socket headers (as I have done in the unit in the photos above) as these are designed to be inserted many times over.



APPENDIX A



If you wish to use of the FTDI 3v3 cables similar to the ones available from *DONTRONICS.COM*

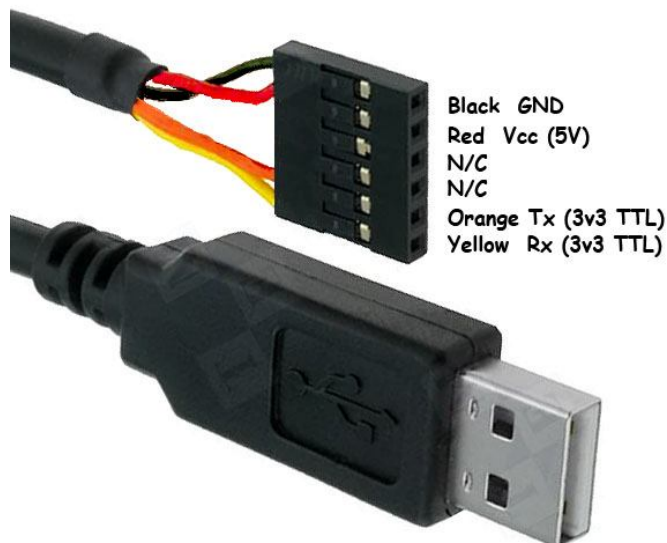
<https://www.shop-dontronics.com/ftdi-usb-to-serial-ttl-level-3.3v-converter-cable>

You will have to modify the pinout of the female header as shown below..

Original Pinout

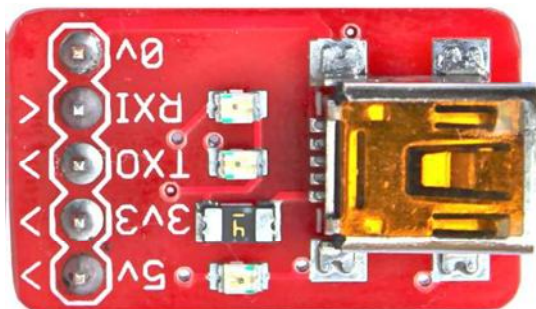


Modified Pinout



The Green (RTS) and Brown (CTS) wires may be simply cut off or taped back out of the way so that they don't short with other connections.

It is a very simple process to remove a wire from the plastic connector, simply use a sharp blade to gently lift the small plastic locking tab and pull the terminal out of the connector. To fit a terminal into another position simply push it in until it clicks.



WhiteWizard's USB Module Plugs directly into J3 (shown rotated as it would plug into J3)

For more details see:

<http://micromite.org/shop/development-tools/usb-to-serial-module/>

NanoMite Link Configuration

DIP8 Pin #	Link Pads 1-2		Link Pads 2-3	
	Pin Function	PIC32 Pin #	Pin Function	PIC32 Pin#
1	SPI Out/Dig/INT/Alog	3	Console Tx (Out)	11
2	PWM 1A/Dig/INT/Alog	4	Console Rx (In)	12
3	PWM 1B/Dig/INT/Alog	5	SPI In/Dig	14
4	GND			
5	Dig/Com1 Rx	22	Dig/Count/I ² C Data	18
6	Dig/Com1 Tx	21	Dig/Count/I ² C Clock	17
7	PWM 1C/Dig/INT/Alog	6	Alog/Dig/SPI Clock	25
8	Vcc (2.3-3.6V)			

NOTE! The Rst Link Overrides The Selected Function of DIP8 Pin #1
This Enables PIC32 Pin 1 (MCLR) to be connected to DIP8 Pin #1

Useful Links:

Geoff Graham's MicroMite

<http://geoffg.net/micromite.html>

NanoMite user Manual

<http://www.dontronics.com/micks-mite/files/06%20NanoMite/NanoMite.pdf>

The Back Shed Microcontroller Forum

http://www.thebackshed.com/forum/forum_topics.asp?FID=16

The thread where NanoMite was originally conceived

http://www.thebackshed.com/forum/forum_posts.asp?TID=6952&PN=7

[MicroMite.org](http://www.micromite.org) (They stock a wide range of other MicroMite goodies including my products)

A shameless plug of other Products and offerings I have to offer

http://www.thebackshed.com/forum/forum_posts.asp?TID=6992&KW=***

Or

<http://www.dontronics.com/micks-mite/files/>