

ILI9163 LCD Driver

This is an embedded C routine which will add the ability to drive an ILI9163 based LCD panel to a Micromite. It was written and is maintained by Peter Mather (matherp) on The Back Shed forum.

Note that this requires a standard 28 or 44-pin Micromite running MMBasic V5.0 or greater. It will not work on a 64 or 100-pin Micromite Plus (this version already includes a driver for this display).

When this driver is loaded all the display orientated features of the Micromite (drawing lines, circles, text, fonts, etc) will operate on this display (just like the MMBasic built in driver).

ILI9163 based displays

ILI9163 based displays use an SPI interface and have the following basic specifications:

- A 1.44 inch display
- Resolution of 128 x 128 pixels
- A ILI9163 controller with a SPI serial interface

A typical ILI9163 based display is illustrated on the right. On eBay you can find suitable displays by searching for the controller name (ILI9163). Be warned, apparently some displays with a red PCB have a fault and will not work with the Micromite. So, you should choose a display with a black PCB (as illustrated) as these have been tested and work correctly.



Connecting the LCD Panel

The ILI9163 SPI display controller shares the Micromite's SPI interface with the BASIC program running on the Micromite. Sharing the SPI channel is essentially transparent to the BASIC program. See the description of the SPI communications function (Appendix D in the “Micromite Manual”) for a description of how to do this.

The following table lists the connections required between the LCD panel and the Micromite:

ILI9163 Display	Description	28-pin Micromite	44-pin Micromite
LED	Power supply for the backlight (see below)		
SCK	Display SPI Clock	Pin 25	Pin 14
SDA	Display Data In (MOSI)	Pin 3	Pin 20
A0	Display Data/Command Control	Configurable – see below	
RESET	Display Reset (when pulled low)	Configurable – see below	
CS	Display Chip Select	Configurable – see below	
GND	Ground		
VCC	5V supply (the controller draws less than 10mA)		

The backlight power (the LED connection) should be supplied from the main 5V supply via a current limiting resistor. A typical value for this resistor is 39Ω although this can be varied to reduce the power consumption or to provide a brighter display.

Configuring the Driver

Before the driver is loaded you need to change the I/O pins allocated to A0, RESET and CS to reflect your circuit. This is done by editing the file "ILI9163-Driver.bas" (the ILI9163 driver).

The I/O pin allocations are set in the call to the subroutine ILI9163 in the first few lines of the driver. The syntax is:

```
ILI9163 A0-Pin, RESET-Pin, CS-Pin, Orientation
```

Where:

- A0-Pin is the I/O pin to use for the LCD display A0 signal.
- RESET-Pin is the I/O pin to use for the LCD display RESET signal.
- CS-Pin is the I/O pin to use for the LCD display CS signal.
- Orientation is the orientation of the display (1 = landscape, 2 = portrait, 3 = reverse landscape, 4 = reverse portrait).

A typical configuration for the 28-pin Micromite would be:

```
ILI9163 2, 23, 6, 1
```

Note that you do not need to run the `OPTION LCDPANEL` command to setup this display; these configuration details are taken care of by the edits described above. Also, because the call to the ILI9163 driver is contained in the subroutine `MM.Startup` MMBasic will automatically initialise the driver every time the Micromite is powered up or reset.

Loading the Driver

To add the driver to MMBasic you must load the code contained in the file "ILI9163-Driver.bas" into the Micromite and cycle the power. You can then test the display by entering `GUI TEST LCDPANEL` at the command prompt. You should see a series of coloured circles being rapidly drawn on top of each other.

If you are happy with the operation of the driver (ie, `GUI TEST LCDPANEL` works as expected) you can then run the command `LIBRARY SAVE` at the command prompt. This will transfer the driver (and any other routines in program memory) to a part of flash memory where they will be available to MMBasic but they will not show when the `LIST` command is used and will not be deleted when a program is loaded or `NEW` is used.

Restart the Micromite again and, for all intents and purposes, the driver is part of MMBasic. You can load, edit, run and delete programs as per normal and the driver will remain in memory. The only way that it can be removed is with the `LIBRARY DELETE` command or if the Micromite is reset to its original default configuration as described in the User Manual.