Introduction

This display adapter kit provides a simple way to connect a range of Hitachi TFT displays to a VM2D Application Board. The displays currently known to be covered by this adapter are:

- TX14D12VM1CPC
- TX14D16VM1CPC

This adapter can drive the touch screen using a built in Touch Controller (TSC2003), and it can control the LED back-light (On/Off or Brightness control) using a Digital or PWM output on the VM2D.

Unpacking

This kit contains
- Display adapter board 5908
- FFC (Flat Flexible Cable)
- Ribbon cable with connectors at each end
- Fastener pack

The fastener pack contains these items to fix the display to the adapter:
- 4 off thread forming screws
- 4 off 5mm spacers

and these items to fix the adapter to the Application Board:
- 8 off M3 screws
- 4 off M3x12mm pillars

Tools

To assemble the kit you will need a small cross head screwdriver.

Connecting the Display to the Adapter

1. Turn the display on it's back and fit the FFC (Flat Flexible Cable) to the fine pitch 40-way connector on the back of the display. In current models you need to lift the locking tab on the connector using a fingernail, insert the FFC under the metal retaining finger (contacts down), and then press the locking tab back down.
2. Feed the FFC through the hole in the display adapter board, position the display adapter board over the display, and then fit the FFC into the connector on the display adapter board. This is similar to the connector on the display.
3. Using the thread forming screws and 5mm spacers provided, fix the display adapter board to the display. Take care to use the smaller, 'inner' set of holes on the adapter board.
4. Depending on the length of FFC we supply you may have to fold the FFC to make a tidy assembly.
5. Plug the display's back-light connector into the socket provided

Connecting the Adapter to the Application Board

Use the supplied 40-way ribbon cable to connect the two boards.

If necessary, you can use the M3 screws and 12mm pillars provided to fix the display to the back of the application board.

Note that we have fitted the strain relief to the ribbon cable connector to make it easier to remove. However this means it sits proud of the display by a few millimetres, which will interfere with panel mounting. If this is a problem you can cut off the strain relief or make you own cable.

(There may be a maximum length for this ribbon cable. This has not been established yet but a cable length of 250mm has been used successfully with a QVGA display)

Mounting options

This adapter is intended to be used in two physical orientations relative to the 5902 Application Board.

1. During development it may be laid to one side of the Application Board, allowing you to see the display and at the same time access the Application Board, VM2, etc.
2. When mounted in a panel, the adapter can fold round to the back of the Application Board and be fixed to it with screws and pillars to form one unit.

Power supply

You must power the Application Board from 12VDC when using this adapter in its default configuration.

The display adapter normally draws its power for the LED back-light from a 12VDC supply via the Application Board it is connected to.

Many Application Boards use a series Silicon diode to guard against accidentally connecting the supply voltage in reverse. This will cause a slight dimming of the back-light. You can short this diode if you want to (D2 on the 5902), or drive the Application Board from a slightly higher voltage.

24V supply option

It is possible to power this adapter (and so the Application Board) from higher voltages, such as 24V, by fitting a Switch Mode Regulator to the display adapter. A suitable device is an R-7812-0.5, fitted to position U3. You should unlink LK2 if you fit U3.

Mechanical

The adapter mounting holes are exactly the same as the standard application board:
4 off 3.5mm diameter on a 140mm x 90mm rectangular pitch.
The diagram below shows the relationship between the TFT module mounting holes and the adapter mounting holes.

1.4mm

8.5mm
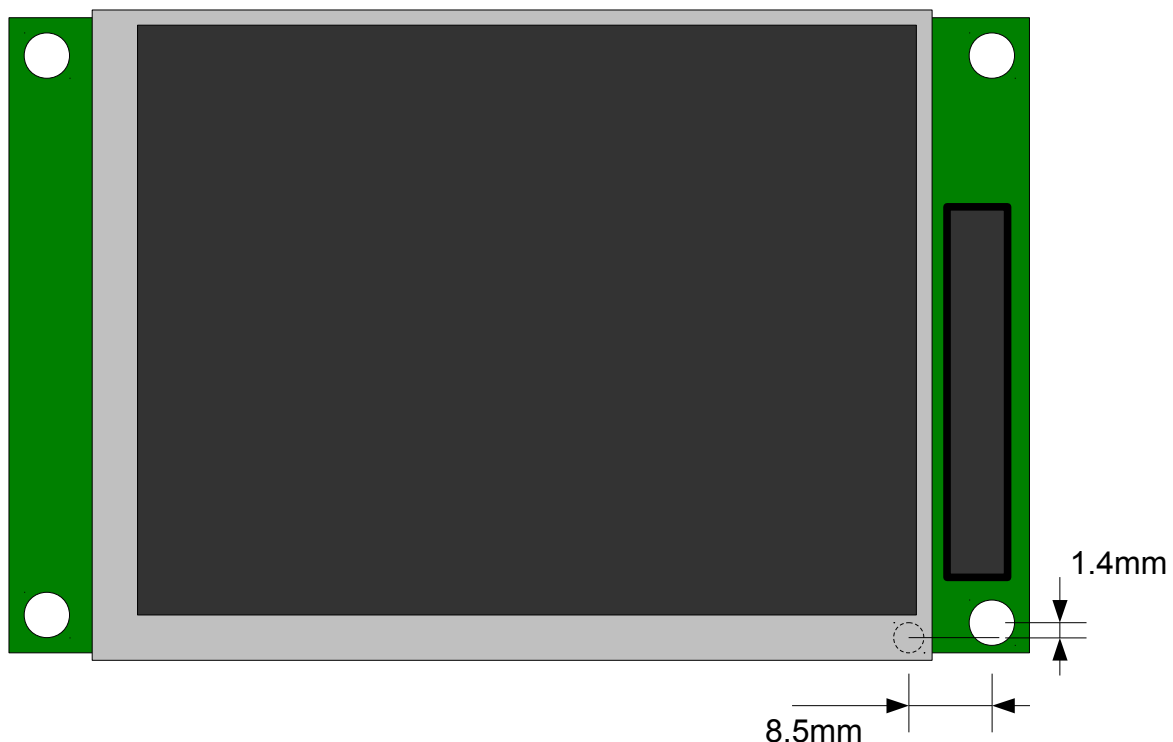
Test Code

The following short Venom2 program should show if the display, touch-screen and back-light are working. See our website for more extensive code examples.

```
TO init
 MAKE g GraphicsLCD(1)
  MAKE t TouchScreen(0,1,144)
  MAKE eeprom SafeData (1,1,162)
  MAKE backlight Digital($26,%11)
END

TO main
  START EVERY 100 g.Update
  backlight . On
  calibrate
  line_to_touch
END

TO line_to_touch
  AWAIT t.Asserted IsFalse
  PRINT TO g, FONT 1, CLS, CENTRE, "Touch the panel to draw lines."
  EVERY 10
  [
   AWAIT t.Asserted ; Touchscreen pressed?
   g.Line(t.XPos,t.YPos) ; Draw line to the touch position.
  ]
END

TO calibrate
  ; Do we need to recalibrate?
  IF t.Asserted ; If operator touching screen...
  OrElse t.Adjust(0, g, eeprom, 0) IsFalse ; ...OR Stored data corrupt.
  [
    PRINT TO g, FONT 1, CLS, "Touchscreen calibration",cr,"Press on each cross."
    t.Adjust(1, g, eeprom, 0)
    PRINT TO g, CLS, "Calibration Done"
    WAIT 500
  ]
END
```