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FT800 Display Controller Board.	
Part Number:	MCIB-15
Version:	2
Date:	25/02/2016
Revision History	
Date	**Description of change**
25/02/2016	First draft
20/05/2016	Added #Reset to #PD connection

RoHS 2011/65/EU

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MCIB-15 FT800 Display Controller Board

Overview & Features

The MCIB-15 is a display controller board based on the FT800 IC. Designed to mount on the back of a Raspberry Pi computer, the board is ideal for connecting a range of Midas TFT displays.

Features

- FT800 Display controller IC. (For FT801 CapTouch version contact Midas).
- Built in display memory, character fonts and dynamic widgets.
- 40 way 0.5mm pitch FFC TFT display connector.
- Resistive touch interface (FT801 for Capacitive touch)
- Serial SPI or I2C interface selectable via solder jumpers.
- On board adjustable constant current LED backlight driver 20mA and 40mA.
- Integrated PWM control of backlight brightness.
- Mechanical dimensions 33 x 33.5 x 3.1 mm.
- Pin compatible with the following Midas displays:

MCT035S	3.5”	320 x 240
MCT043J	4.3”	480 x 272

Other Midas TFT displays can be connected using a simple interface board.

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Connections

J1 26 POSITION 0.1" PITCH SOLDER PADS	Symbol	Description
1	3.3V	3.3V Supply to FT800 circuit
2	5.0V	5.0V Supply for LED Backlight circuit
3	SDA1	RPI-SDA1 I2C data
4	NC	Not Connected
5	SCL1	RPI-SCL1 I2C clock
6	GND	0V / ground
7	NC	Not Connected
8	NC	Not Connected
9	NC	Not Connected
10	NC	Not Connected
11	NC	Not Connected
12	NC	Not Connected
13	NC	Not Connected
14	NC	Not Connected
15	NC	Not Connected
16	NC	Not Connected
17	NC	Not Connected
18	#PD	FT800 power down
19	MOSI	RPI-MOSI SPI Data (FT800 input)
20	NC	Not Connected
21	MISO	RPI-MISO SPI Data (FT800 output)
22	#INT	FT800 interrupt output
23	CLK	RPI-CLK SPI clock (FT800 input)
24	CE0	RPI-CE0 SPI chip select (FT800 input)
25	GND	0V / ground
26	NC	Not Connected

J2 40Pin 0.5mm pitch Display Connector (Top contact)	Symbol	Description
1	K	LED Backlight -
2	A	LED Backlight +
3	NC	(NC)
4	VDD	+3.3V supply
5	R0	Red Data 0
6	R1	Red Data 1
7	R2	Red Data 2
8	R3	Red Data 3
9	R4	Red Data 4
10	R5	Red Data 5
11	R6	Red Data 6
12	R7	Red Data 7
13	G0	Green Data 0
14	G1	Green Data 1
15	G2	Green Data 2
16	G3	Green Data 3
17	G4	Green Data 4
18	G5	Green Data 5
19	G6	Green Data 6
20	G7	Green Data 7
21	B0	Blue Data 0
22	B1	Blue Data 1
23	B2	Blue Data 2
24	B3	Blue Data 3
25	B4	Blue Data 4
26	B5	Blue Data 5
27	B6	Blue Data 6
28	B7	Blue Data 7
29	GND	Ground
30	PCLK	Pixel Clock
31	DISP	Display On
32	HSYNC	Horizontal Sync
33	VSYNC	Vertical Sync
34	DEN	Display Enable
35	NC	(NC)
36	#RESET	#Reset (#PD)
37	XR	Touch XR
38	YD	Touch YD
39	XL	Touch XL
40	YU	Touch YU

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Electrical Specifications

Absolute Maximum Ratings		
Operating temperature	-20 to +85	°C
Storage temperature	-40 to +125	°C
3.3V input	4.0	V
5.0V input	6.0	V
CN2 inputs and outputs w.r.t VSS	–0.3 to VIN+0.3	V

Typical Electrical Characteristics				
Parameter	**Min**	**Typ**	**Max**	**Unit**
Supply Voltage 3.3V	3.0	3.3	3.6	V
Supply Voltage 5.0V	4.75	5.0	5.5	V
Supply Current 3.3V (board only)	-	24	-	mA
Supply Current 5.0V (Backlight current set to 20mA at 19V)	-	95	-	mA
LED Backlight voltage	-	-	34	V
LED Backlight current	-	-	40	mA

LED Backlight Current

The LED Backlight is driven by a constant current circuit which can be set for various currents using LK1 and LK2. Below is a Table showing the LED Backlight currents available:

LED Backlight Current selection 0=open 1=linked	
LINK	**Current mA**
LK1 =1 LK2=0	20
LK1=1 LK2=1	40

Note: Backlight current = 0.095mV/R1 or R2 or R1//R2

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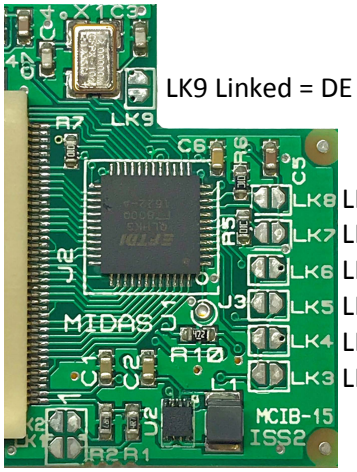
Solder Links on PCB

There are 9 solder links on the PCB to set various options.



LK9 Linked = DE connected. Open = DE 100K to GND.

LK8 Linked = I2C Mode. Open = SPI Mode.
LK7 Linked = I2C Address SA2 = 1. Open = SA2 = 0.
LK6 Linked = SPI. Open = I2C.
LK5 Linked = I2C. Open = SPI.
LK4 Linked = SPI. Open = I2C.
LK3 Linked = I2C. Open = SPI.

LK1 & LK2 see LED Backlight table.

4.3" TFT Connection Example

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Raspberry Pi Application

Below is an example of a two C functions for writing text and numbers .
Please Visit FTDIs web site for further information on the FT800.
http://www.ftdichip.com/Products/ICs/FT800.html

Note: I2C address = 0,0,1,0,0,A2,A1,A0 default = 0x22.

```
/* Send CMD TEXT routine  19/1/16
 * Enter with STRING, X position, Y position, OPTION, FONT, colour
 * OPTION: CenteredX=512, CenteredY=1024, CenteredXY=1536, RightX=2048.
 * FONT: 0 to 14 = UDF, 15 = Reserved for buttons etc, 16 to 31 = Font.
 * Assumes cmdOffset already defined.
 */
//Enter with STRING, X position, Y position, OPTION, FONT, Colour

send_cmd_text(char *text, int x, int y, int opt, int font, long colour)
{
        int p;
        int l=strlen(text);

        ft800memWrite32(RAM_CMD + cmdOffset, (DL_COLOR_RGB | colour));
        cmdOffset = incCMDOffset(cmdOffset, 4);                 // Update the command pointer

        ft800memWrite32(RAM_CMD + cmdOffset, (CMD_TEXT));       //Send TEXT command.
        cmdOffset = incCMDOffset(cmdOffset,4);
        ft800memWrite32(RAM_CMD + cmdOffset, (y<<16)+x);        //As little endian send yyyyxxxx.
        cmdOffset = incCMDOffset(cmdOffset,4);
        ft800memWrite32(RAM_CMD + cmdOffset, (opt<<16)+font);   //option then font
        cmdOffset = incCMDOffset(cmdOffset,4);

        for(p=0;p<l;p++)
         {
                ft800memWrite8(RAM_CMD + cmdOffset,text[p]);    //output string
                cmdOffset = incCMDOffset(cmdOffset,1);
         }
        switch(l%4)
         {
                case    1:      ft800memWrite8(RAM_CMD + cmdOffset,0x00);       //Pack zeros into remaining memory
                                cmdOffset = incCMDOffset(cmdOffset,1);
                case    2:      ft800memWrite8(RAM_CMD + cmdOffset,0x00);       //to fill up to a 4 byte boundary
                                cmdOffset = incCMDOffset(cmdOffset,1);
                case    3:      ft800memWrite8(RAM_CMD + cmdOffset,0x00);
                                cmdOffset = incCMDOffset(cmdOffset,1);
                                break;
                case    0:      ft800memWrite32(RAM_CMD + cmdOffset,0x00);      //Then send a 4 byte null to terminate string.
                                cmdOffset = incCMDOffset(cmdOffset,4);
                default:        break;
         }


}
```

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```
/* Send CMD NUMBER routine 19/1/16
 * Enter with NUMBER, X position, Y position, OPTION, FONT, colour
 * OPTION: CenteredX=512, CenteredY=1024, CenteredXY=1536, RightX=2048.
 * FONT: 0 to 14 = UDF, 15 = Reserved for buttons etc, 16 to 31 = Font.
 * Assumes cmdOffset already defined.
 */
//Enter with STRING, X position, Y position, OPTION, FONT, Colour

send_cmd_number(long num, int x, int y, int opt, int font, long colour)
{
        ft800memWrite32(RAM_CMD + cmdOffset, (DL_COLOR_RGB | colour));
        cmdOffset = incCMDOffset(cmdOffset, 4);                    // Update the command pointer

        ft800memWrite32(RAM_CMD + cmdOffset, (CMD_NUMBER));        //Send TEXT command.
        cmdOffset = incCMDOffset(cmdOffset,4);
        ft800memWrite32(RAM_CMD + cmdOffset, (y<<16)+x);           //As little endian send yyyyxxxx.
        cmdOffset = incCMDOffset(cmdOffset,4);
        ft800memWrite32(RAM_CMD + cmdOffset, (opt<<16)+font);      //option then font
        cmdOffset = incCMDOffset(cmdOffset,4);
        ft800memWrite32(RAM_CMD + cmdOffset, num);                 //number
        cmdOffset = incCMDOffset(cmdOffset,4);

}
```

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Mechanical (Dimensions in mm)