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Specification Issue 1 17/8/2011

MCCMDB-16SIL

LCD / OLED Character display interface board with USB connection

Date	Description of change
17/8/11	Initial creation
24/8/11	Added EEprom configuration byte information and PID and VID details.

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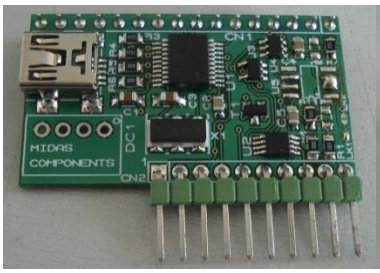
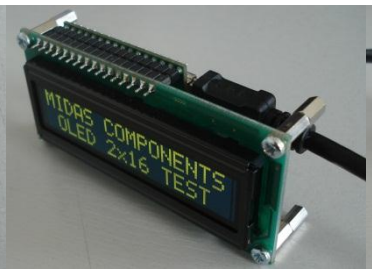
Overview & Features

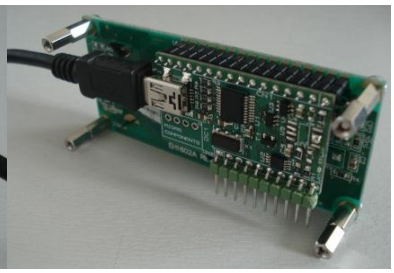
The MCCMDB-16SIL board provides a user friendly USB interface for LCD and OLED character displays. The straightforward protocol allows full control of all the displays features with the addition of digital contrast adjustment, temperature measurement, LED backlight control and general purpose input output connections. Ideal for adding a display to your product or for exploring all the features of LCD and OLED character displays.



Product



Example

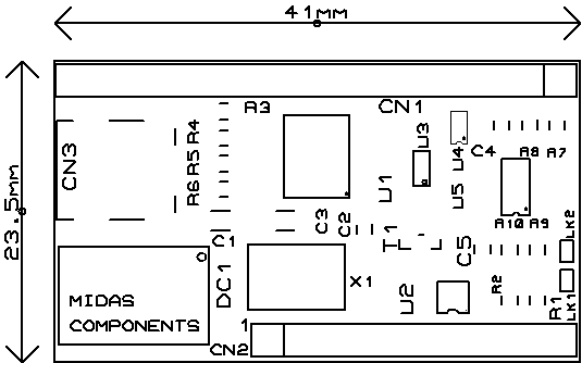


Example

Features

Pin compatible with OLED / LCD 16 pin single in line (SIL) connectors.
Powered form USB port or separate 5V supply.
On board temperature measurement.
On board digital LCD contrast voltage adjustment.
On board digital LED backlight switch.
On board LED backlight current limiting resistors.
EEprom for configuration and general storage.
Re-programmable via USB port or directly using Microchip ICSP.
Two general purpose Input Output (IO) ports.
Windows application for display evaluation.
Dimensions: 41.0 mm x 23.5 mm

Mechanical



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Connections

CN1 16PIN 0.1" PITCH SIL.	Symbol	Description
1	VSS	Supply 0 volts
2	VDD	Supply +5 volts
3	VO	LCD contrast adjustment voltage 0 to 5v
4	RS	RS=0 Command. RS=1 Data
5	R/#W	R/#W=0 Write, R/#W=1 Read
6	E	Enable
7	D0	Data 0
8	D1	Data 1
9	D2	Data 2
10	D3	Data 3
11	D4	Data 4
12	D5	Data 5
13	D6	Data 6
14	D7	Data 7
15	LED+	Switched to +5v via T1 (FET) and R5
16	LED-	Connected to VSS via R6

CN2 10PIN 0.1" PITCH SIL.	Symbol	Description
1	VPP	RA3/#MCLR/VPP
2	VDD	Supply +5 volts
3	VSS	Supply 0 volts
4	D+	RA0/D+/PGD
5	D-	RA1/D-/PGC
6	NC	Not Connected
7	IO1	General IO bit 1
8	IO2	General IO bit 2
9	VSS	Supply 0 volts
10	BOOT	Set low for boot mode

CN3 Micro USB.	Symbol	Description
1	VDD	Supply +5 volts
2	D-	USB-
3	D+	USB+
4	NC	Not Connected
5,6,7,8,9	VSS	Supply 0 volts

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Command Summary

Commands are sent to the board via the USB connection which appears to the host as a serial com port i.e. CDC (Communication Device Class) USB to RS232 emulation. All data is interpreted as display data unless preceded with an ESC (1b hex) character.

Name	Byte 1	Byte 2	Byte 3	Byte 4	Description
1b Data	1b	1b	-	-	Send 1b as data.
Display Command	1b	80	CMD	-	Send CMD (command) to display.
Set Contrast	1b	a0	High	Low	Set Contrast voltage (12 bit).
Request Temperature	1b	c0	-	-	5 bytes of ASCII Temperature returned. i.e. sign,hundreds,tens,.,units
Backlight ON	1b	d0	-	-	Turns Backlight ON
Backlight OFF	1b	d1	-	-	Turns Backlight OFF
Set Port IO direction	1b	e0	DIR	-	IO1=bit0, IO2=bit1. Set to 0 for output. Set to 1 for input (default).
Write Port IO	1b	e1	OP	-	IO1=bit0, IO2=bit1. Set to 0 or 1 as required.
Read Port IO	1b	e2	-	-	Ascii number returned representing I/P state. i.e. 0=both low 1=IO1 high 2=IO2 high 3=both high
Set EEprom Address	1b	f0	Add	-	Set EEprom address. Range from 0 to 255 (0x00 to 0xff).
Write EEprom data	1b	f1	EED	-	Writes date EED to EEprom. At address previously set.
Read EEprom data	1b	f2	-	-	Byte returned from EEprom. From address previously set.

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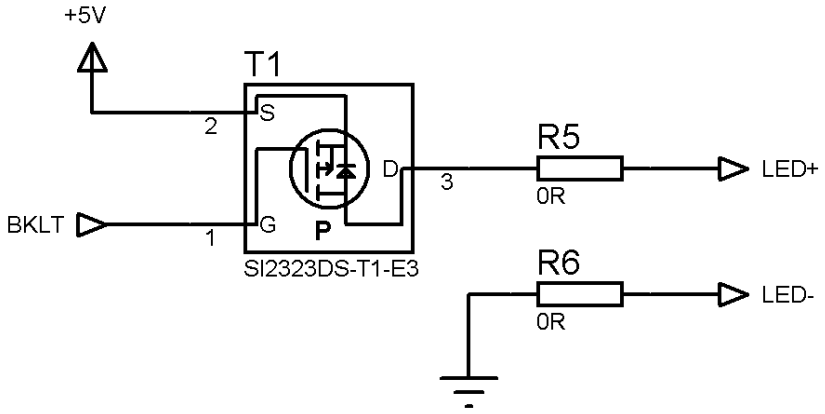
Electrical Specifications

Absolute Maximum Ratings		
Operating temperature	-30 to +85	°C
Storage temperature	-40 to +125	°C
VDD	6.0	V
All inputs and outputs w.r.t VSS	–0.3 to VDD+0.3	V
Max current source and sunk at OP1&OP2	50	mA

Typical Electrical Characteristics				
Parameter	**Min**	**Typ**	**Max**	**Unit**
Supply Voltage VDD	2.7	-	5.5	V
Supply Current IDD (board only)	-	16	-	mA
VDD rise time	0.05	-	-	V/ms
LED Backlight voltage	-	-	VDD	V
LED Backlight current	-	-	300	mA
IO Port input low	-	-	0.8	V
IO Port input high	2.0	-	-	V
Contrast Voltage Range	VSS	-	VDD	V
Contrast Voltage Resolution	-	-	4096	Steps
Temperature Measurement Range	-55	-	+125	°C
Temperature Measurement Resolution	9	-	12	Bit

LED Backlight Connection

The LED Backlight is driven as shown in the circuit below. BKLT is controlled by the on board microcontroller and provides a means of switching the backlight on and off. The LED backlight current is determined by the values of R5 and R6 and by the LCD module (if there are current limiting resistors fitted). These need to be calculated according to the LCD module being driven.



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Configuration byte

On power up the board reads EEprom location 0x00 and applies the following configurations:

Bit 0 = Display Logo on power up. 0=off, 1=on.

Bit 1= LCD / OLED mode. 0=OLED, 1=LCD.

USB Vendor and Product ID codes

VID = 0x04D8

PID = 0xF9C3

Notes:

Anti-static precautions should be observed whilst handling this product.

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