

I2C LCD Blue Board Manual

For Arduino

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New! Update New Version :

- Revise Arduino Software from "Arduino 1.0.3" to "Arduino 1.0.5-r2 (Latest version)"

Chapter1. Overview and Board Description

Introduction

I2C LCD Blue Board for arduino based on microchip MCP23008 provides 8bit I/O port expander with serial interface which can interface to several devices up to 8 devices on one bus. Each device must have a different address, three address pins, high-speed I2C interface 3400KHZ, and including LCD 16characters x 2lines with LCD-STN negative blue type is white character on blue background. LCD text & numeric display interface to I2C bus are SCL and SDA and support LCD contrast adjustment with fine adjustment of a trimpot to any desired contrast setting and support LED backlight-white to turn on or turn off the LED backlight with program control LED backlight to save power and including pull-up resistors to "pull-up" the signals to prevent SCL line & SDA line from floating. Pull-up resistors set default value when there is no signal at the input and including I2C bus cable to connect other boards on I2C bus and including JP6 Jumper to write data to LCD or read data from LCD.

User can learn I2C LCD Blue Board with example programs as follows :

- Autoscroll_I2C program
- Blink_I2C program
- Cursor_I2C program
- Display_I2C program
- HelloWorld_I2C program
- Scroll_I2C program
- SerialDisplay_I2C program
- setCursor_I2C program
- TextDirection_I2C program



Figure 1.





Figure 2.

- 1. *LCD 16characters x 2lines* : LCD-STN negative blue type is white character on blue background. LCD text & numeric display interface to I2C bus are SCL and SDA.
- 2. *Including Microchip MCP23008* : 8bit I/O port expander with serial interface which can interface to several devices up to 8 devices on one bus. Each device must have a different address, three address pins, high-speed I2C interface 3400KHZ, voltage supply 1.8V to 5.5V, current 1mA.
- 3. *Support LCD Contrast Adjustment* with fine adjustment of a trimpot to any desired contrast setting.
- 4. Support LED Backlight-White to turn on or turn off LED backlight with program control LED backlight to save power.
- 5. Including Pull-up Resistors to "pull-up" the signals to prevent SCL line & SDA line from floating. Pull-up resistors set default value (5Vdc) when there is no signal at the input.
- 6. *Including Libraries and Examples* for learning quickly.
- 7. Including a I2C Bus Connector to connect other boards on I2C bus are SCL line and SDA line. I2C bus connector consists of +5V, SCL, SDA and GND pin.
- 8. *Including I2C Bus Cable* to connect other boards on I2C bus.
- 9. Including JP6 Jumper to write data to LCD or read data from LCD.
- 10. Operating voltage of I2C LCD Blue Board is 5Vdc.
- 11. Board Dimension is 36.0mm(Width) * 80.0mm(Long) * 23.0mm(High).

Board Description



Figure 3.

- **No1.** is a Trimpot Variable Resistor $10K\Omega \pm 10\%$, 0.5w to fine adjust LCD contrast to any desired contrast setting.
- No2. is JP4 Jumper & JP5 Jumper (Default) connect to pull up resistors for enable pull up resistors to "pull-up" the signals to prevent SCL line & SDA line and set default value (5Vdc) when there is no signal at the input.
 * If your another board have I2C bus system is pull up resistors that recommend you should be de-solder JP4 jumper and JP5 jumper to disable

pull up resistors of I2C LCD Blue Board.

* SCL is a serial clock line and SDA is a serial data line.

No3. is microchip MCP23008 provides 8bit I/O port expander with serial interface which can interface to several devices up to 8 devices on one bus. Each device must have a different address, three address pins, parallel I/O expansion for I2C bus or SPI applications, high-speed I2C interface 3400Khz, voltage supply 1.8V to 5.5V, current 1mA. No4. is A2, A1, A0 Jumpers will be set device address to interface your device. This I2C LCD Blue Board sets address = 0 (Default). A2, A1, A0 jumpers are disable.

* If you must have interface to several devices up to 8 devices on one bus. Each device must have a different address and must solder A2, A1, A0 jumbers (Optional address = 0 to 7).

A2, A1, A0 jumpers are enable.

- No5. is a I2C Bus Connector to connect other boards on I2C bus are SCL line and SDA line. I2C bus connector consists of +5V, SCL, SDA and GND pin.
- No6. Is JP6 Jumper will be set RW pin to write data to LCD or read data from LCD This I2C LCD Blue Board sets default to write data to LCD by solder JP6 jumper to connect GND. RW pin is cleared (0).
 * Optional is set RW pin to read data from LCD by de-solder JP6 jumper to

disconnect GND. RW pin is (1).

- **No7.** is Pin Header 16pins connect between I2C and LCD.
- No8. is LCD 16characters x 2lines, LCD-STN negative blue type is white character on blue background, transmissive rear polarizer, 16x2 display format, 5x8 character format, 2.95x5.55mm. character size, LED backlight-white backlight, 62.2x17.9mm. viewing area, -20 ℃ to +70 ℃ operating temperature, 5Vdc voltage supply, 0.55x0.65mm. dot size, parallel Interface, white dot/blue background power on appearance. LCD text & numeric display interface to I2C bus are SCL and SDA.





Chapter2. Getting Started

Safety Instruction

Observe the following safety guideline when connection and using I2C LCD Blue Board as following :

- Place I2C LCD Blue Board on insulation surface and treat it carefully. It can be damaged if dropped.
- Put I2C LCD Blue Board in a location with low humidity and a minimum of dust.
- Never use I2C LCD Blue Board has been damaged. Do not allow anything to rest on it and keep it away from where people could trip over it.
- Never insert anything metallic into I2C LCD Blue Board. Doing so may create the danger of electric shock.
- To avoid electric shock, never touch the inside of the I2C LCD Blue Board.
- I2C LCD Blue Board is provided for ventilation. To prevent overheating, these openings should not be blocked or covered. Also, avoid using I2C LCD Blue Board on a bed, sofa, rug, or other soft surface.
- Do not expose I2C LCD Blue Board to rain or use it near water. If It accidentally gets wet, unplug it and you can clean the exterior of the I2C LCD Blue Board with a dry cloth when necessary, but be sure to unplug I2C LCD Blue Board first.

Install Arduino Software

Software to development is contained in a free CD. If user want to more informations or latest version of program that you can be downloaded on website www.mlt-group.com to download manual latest version and etc.

New! Update New Version :

- Revise Arduino Software from "Arduino 1.0.3" to "Arduino 1.0.5-r2 (Latest version)"
- 1. Insert a free CD into the CD-ROM Drive.
- 2. Copy Arduino Software from a free CD is choose folder "Arduino Software\Windows\arduino-1.0.3" into drive "C:\Program Files" as figure 5.



Figure 5.

3. After already copied this folder "arduino-1.0.3" then create shortcut of this program "arduino-1.0.3" on your desktop is right-click on icon



Figure 6.

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4. After already created the shortcut then it will be shown

shortcut to arduino" on your desktop.

5. Then copy example programs of the I2C LCD Blue Board from a free CD is choose folder "Libraries Examples> LiquidCrystal_I2C" into drive "C:\Program Files\ arduino-1.0.3\ libraries" as figure 8.

Organize 🔻 Include	in library 🔻 Share with 👻 Burn	New folder	
🔆 Favorites	Name	Date modified	Туре
🧮 Desktop	EEPROM	7/27/2012 6:28 PM	File folde
\rm Downloads	\mu Ethernet	7/27/2012 6:28 PM	File fold
🔚 Recent Places	\mu Firmata	7/27/2012 6:28 PM	File fold
🔲 Recorded TV	\mu LiquidCrystal	7/27/2012 6:28 PM	File fold
	LiquidCrystal_I2C	7/27/2012 6:43 PM	File fold
🗃 Libraries	J SD	7/27/2012 6:28 PM	File fold
Documents	퉬 Servo	7/27/2012 6:28 PM	File fold
J Music	퉬 SoftwareSerial	7/27/2012 6:28 PM	File fold
E Pictures	퉬 SPI	7/27/2012 6:28 PM	File fold
📑 Videos	퉬 Stepper	7/27/2012 6:28 PM	File fold
	퉬 Wire	7/27/2012 6:28 PM	File fold
💺 Computer			
🏭 WIN7 (C:)			
Contraction WORK (D:)			
👝 DATA1 (E:)			
👝 DATA2 (F:)			

Figure 8.

Starting I2C LCD Blue Board for Arduino

Example to development is contained in a free CD. If user want to more informations or latest version of program that you can be downloaded on website <u>www.mlt-group.com</u> to download manual latest version and etc.

1. Connect this I2C LCD Blue Board to your arduino motherboard with I2C bus cable as figure 9.

* If you have our product is "SD Card Shield Plus for arduino" you can connect I2C LCD Blue Board to SD Card Shield Plus with I2C bus cable as figure 10.

Figure 9.

Figure 10.

- 2. Double click on icon "Arduino ^{arduino}" program (Or double click "Shortcut to arduino" on your desktop) to open "arduino-1.0.3" on your computer which this version includes LiquidCrystal_I2C libraries and example programs.
- 3. Open an example program is "HelloWorld_I2C program" to will be tested this I2C LCD Blue Board is choose

"File>Examples> LiquidCrystal_I2C > HelloWorld_I2C" as figure 11.

oo si	etch_jul25a Arduino 1.0.1				
File	Edit Sketch Tools Help				
	New	Ctrl+N			
	Open	Ctrl+0			
	Sketchbook	۱.			
	Examples	F	01.Basics	•	
	Close	Ctrl+W	02.Digital	•	
	Save	Ctrl+S	03.Analog	۲.	
	Save As	Ctrl+Shift+S	04.Communication	E	
	Upload	Ctrl+U	05.Control	•	
	Upload Using Programmer	Ctrl+Shift+U	06.Sensors	•	
	Page Setup	Ctrl+Shift+P	07.Display	•	
	Print	Ctrl+P	08.Strings	Þ.	
		curr	09.USB(Leonardo)	•	
	Preferences	Ctrl+Comma	ArduinoISP		
	Quit	Ctrl+Q	Examples_SD_Shield	•	
5			EEPROM	F.	
			Ethernet	E.	
			Firmata	F	
			LiquidCrystal	•	
			LiquidCrystal_I2C	•	Autoscroll_I2C
			SD	E.	Blink_I2C
			Servo	•	Cursor_I2C
			SoftwareSerial	•	Display_I2C
			SPI	•	HelloWorld_I2C
			Stepper	۱.	Scroll_I2C
			Wire	•	SerialDisplay_I2C
					setCursor_I2C
					TextDirection_I2C

Figure 11.

4. After opened an example program is "HelloWorld_I2C program" will be shown detail of the C language code as figure 12.

5. Choose "Sketch>Verify/Compile" or click icon as figure 13. to verify and compile C language code.

6. If C language code is correct and not found data error then information will be shown "Done compiling" and "Binary sketch size" as figure 14.

7. Choose "File > Upload to I/O Board" or click icon as figure 15. to upload program into your arduino motherboard.

8. If completely uploaded an example program (ReadWrite program) then information will be shown "Done uploading" and "Binary sketch size" as figure 16.

 Upload an example program is "LiquidCrystal_I2C>HelloWorld_I2C" into this I2C LCD Blue Board. If completely uploaded an example program is HelloWorld_I2C program then LCD Displaying of text & numeric character will be shown "hello, world! I2C LCD" as figure 17.

hel	lo,	worl	d	
120	LCD)		

Figure 17.

Author : www.mlt-group.com

Chapter3. Index

Arduino Software Versions :

- New Arduino 1.0.5-r2 version (Latest version includes in a Free CD) support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 1.0.5 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 1.0.4 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 1.0.3 version support Windows, Mac OS X, Linux (32 bit, 64 bit)
- Arduino 1.0.2 version support Windows, Mac OS X, Linux (32 bit, 64 bit)
- Arduino 1.0.1 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 1.0 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 0023 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 0022 version support Windows, Mac OS X, Linux (32 bit/64 bit)
- Arduino 0021 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0020 version support Windows, Mac OS X
- Arduino 0019 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0018 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0017 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0016 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0015 version support Windows, Mac OS X, Linux (32 bit)
- Arduino 0014 version support Windows, Mac OS X
- Arduino 0013 version support Windows, Mac OS X, Linux (32bit)
- Arduino 0012 version support Windows, Mac OS X, Linux (32bit), Linux (AMD 64bit)
- Arduino 0011 version support Mac OS X, Windows, Linux
- Arduino 0010 version support Mac OS X, Windows, Linux
- Arduino 0009 version support Mac OS X (>= 10.3.9): PPC (10.4, 10.3.9), Intel. Windows. Linux
- Arduino 0008 version support Mac OS X (>= 10.3.9) PPC, Intel. Windows
- Arduino 0007 version support Mac OS X (>= 10.3.9): PPC, Intel. Windows, Linux
- Arduino 0006 version support Mac OS X (>= 10.3.9): PPC, Intel. Windows
- Arduino 0005 version support Mac OS X (>= 10.3.9), PPC, Intel. Windows
- Arduino 0004 version support Mac OS X (>= 10.3.9). Windows

- Arduino 0003 version support Mac OS X PPC / Mac OS X Intel, Windows
- Arduino 0002 version support Mac OS X, Windows
- Arduino 0001 version support Mac OS X, Windows (with Java / without Java)

Example Programs :

- Autoscroll_I2C program
- Blink_I2C program
- Cursor_I2C program
- Display_I2C program
- HelloWorld_I2C program
- Scroll_I2C program
- SerialDisplay_I2C program
- setCursor_I2C program
- TextDirection_I2C program

All example programs includes in a Free CD.

References :

- www.mlt-group.com
- www.mltelectronic.com
- www.arduino.cc

Contact Us :

1. MLT sells products on Ebay. If you will buy our product via Ebay.

Seller ID is mlt-group

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