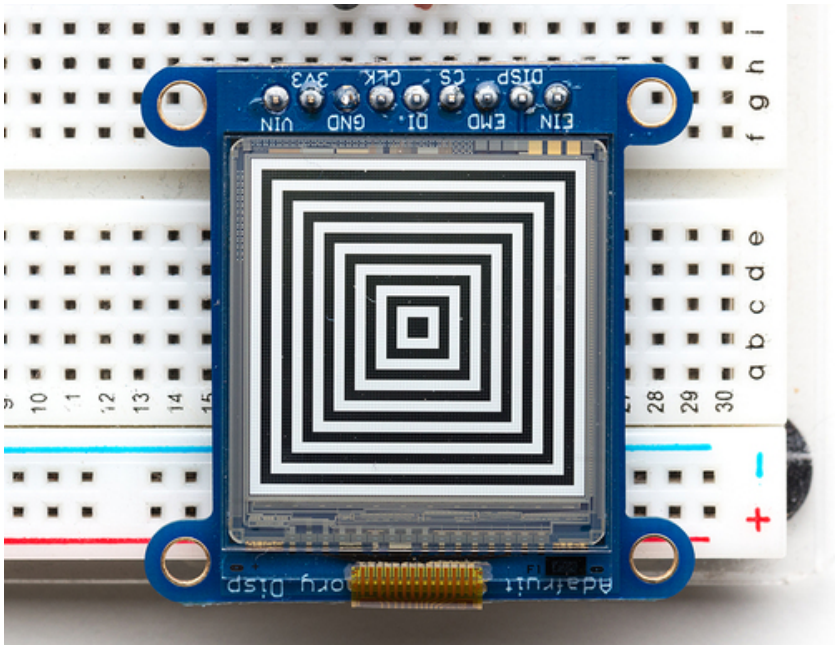
adafruit learning system

Adafruit Sharp Memory Display Breakout

Created by Bill Earl



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Guide Contents

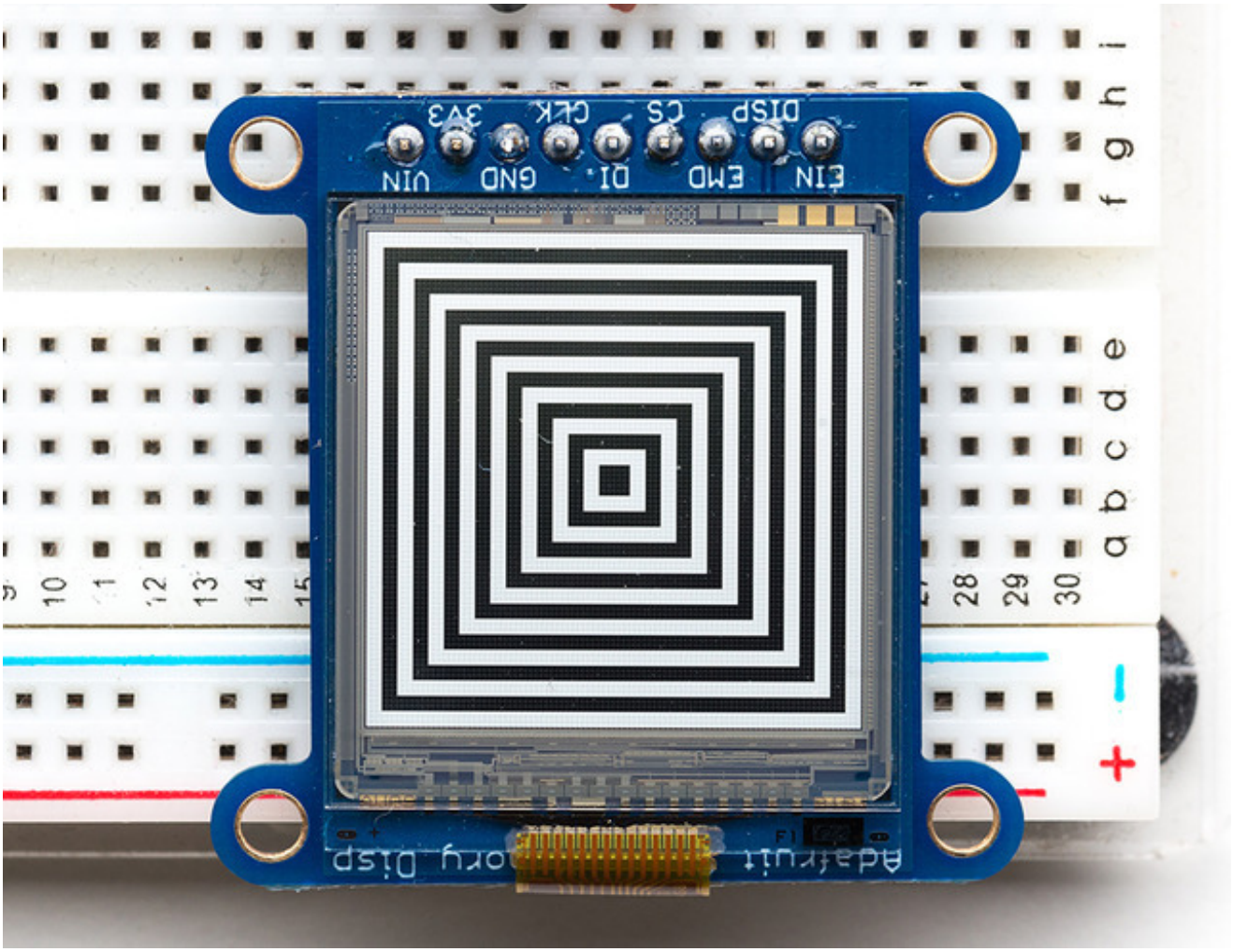
Guide Contents 2
Overview 3
Assembly and Wiring 5
Installing the Header: 5
- Position the header 5
- Position the display 6
- Solder! 7
- Remove the Protective Film 7

Wiring to the Arduino: 8
Programming 10
Download the Libraries 10
Run the Example Code 10
- Programming GFX Graphics 10

Downloads and Links 12
- Libraries: 12
- Files 12
- Library Reference 12

Schematic & Fabrication Print 13

Overview



The 1.3" SHARP Memory LCD display is a cross between an eInk (e-paper) display and an LCD. It has the ultra-low power usage of eInk and the fast-refresh rates of an LCD. This model has a matt silver background, and pixels show up as little mirrors for a silver-reflective display, a really beautiful and unique look. It does not have a backlight, but it is daylight readable. For dark/night reading you may need to illuminate the LCD area with external LEDs.

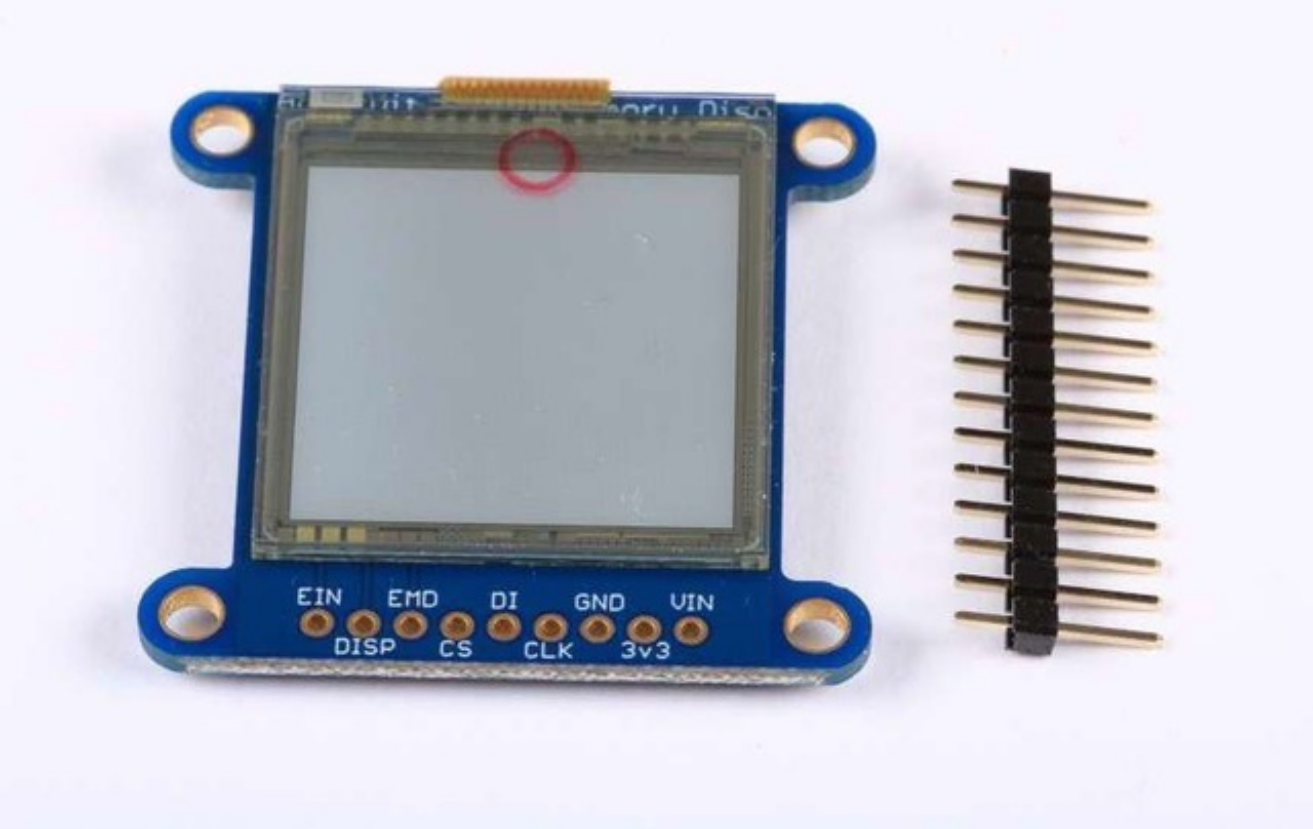
The display is 3V powered and 3V logic, so we placed it on a fully assembled & tested breakout board with a 3V regulator and level shifting circuitry. The display slots into a ZIF socket on board and we use a piece of double-sided tape to adhere it onto one side. There are four mounting holes so you can easily attach it to a box.

The display is 'write only' which means that it only needs 3 pins to send data. The downside of a write-only display is that the entire memory must be buffered by the microcontroller driver.

If you have one of the older 96x96 pixel versions, then 96x96 bits = 1,152 bytes. On an Arduino Uno/Leonardo that's half the RAM available and so it might not be possible to run this display with other RAM-heavy libraries like SD interfacing.

If you have one of the newer 168x144 pixel versions, then 168x144 bits = 3,024 bytes.**That won't fit on an Arduino Uno or Leonardo!** You must use a chip with more RAM like a Metro or Feather M0 or ESP8266.

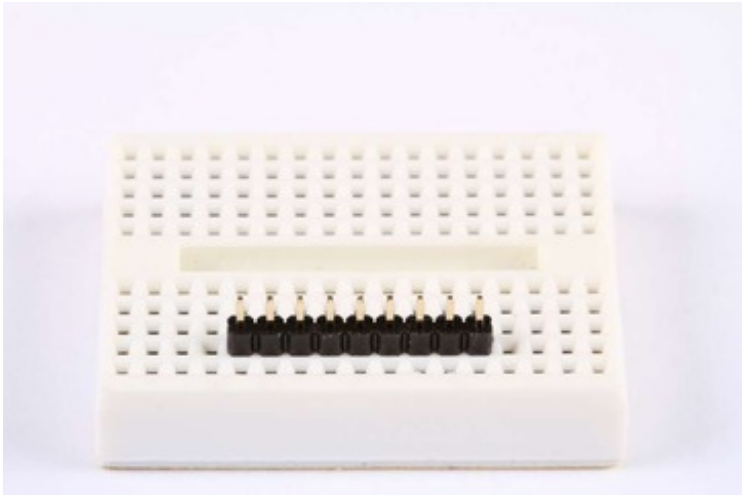
The Sharp Memory Display breakout board ships with optional headers for use in a breadboard.



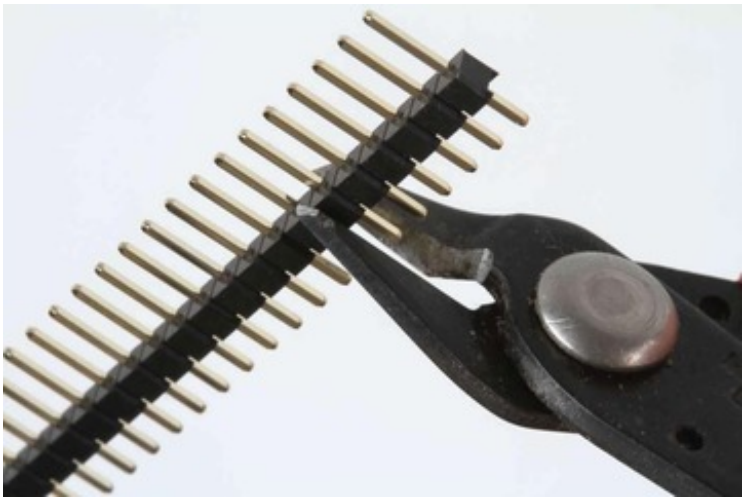
Assembly and Wiring

The display and support circuitry come pre-assembled and fully tested on a handy breakout board. For use in a breadboard, you will want to install the included 0.1" header strip:

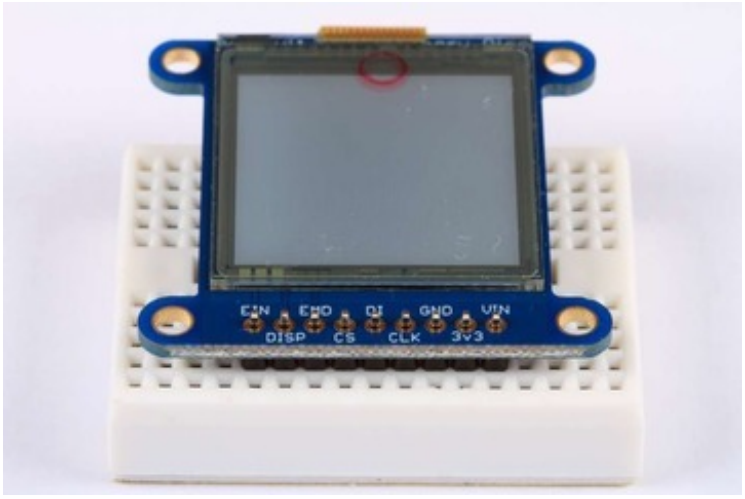
Installing the Header:

- 

Position the header

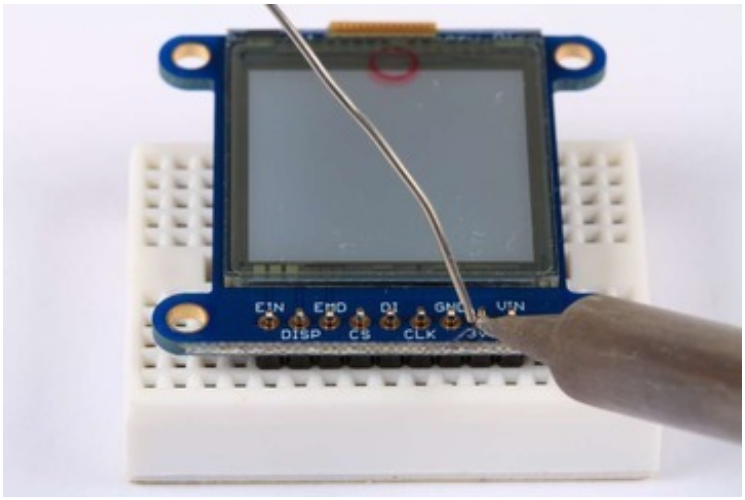
- 

Trim the header to length if necessary and place it long pins down in your breadboard.

- 

Position the display

Place the Sharp Memory Display over the pins on the breadboard.

- 

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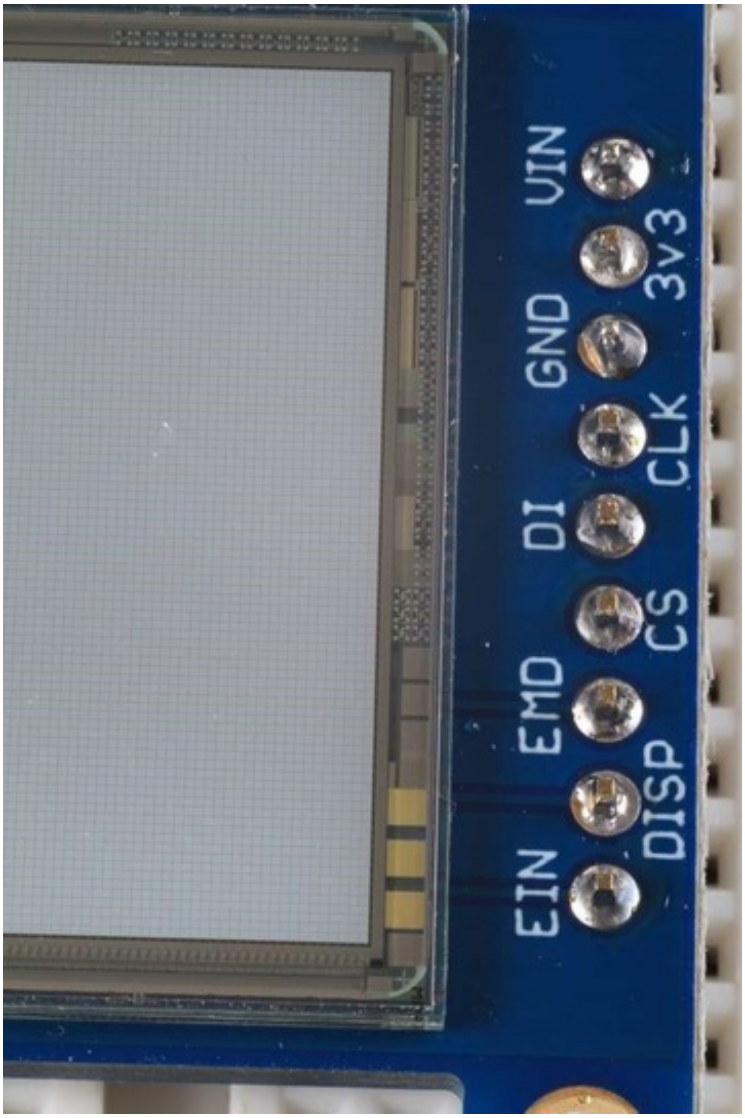
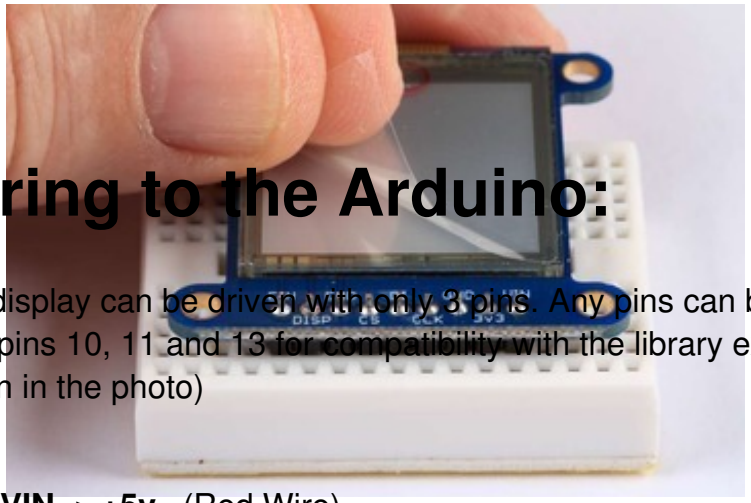
- 

Solder!

Solder each pin to assure good electrical conductivity.

Remove the Protective Film

After soldering is complete. Gently peel the film from the display.

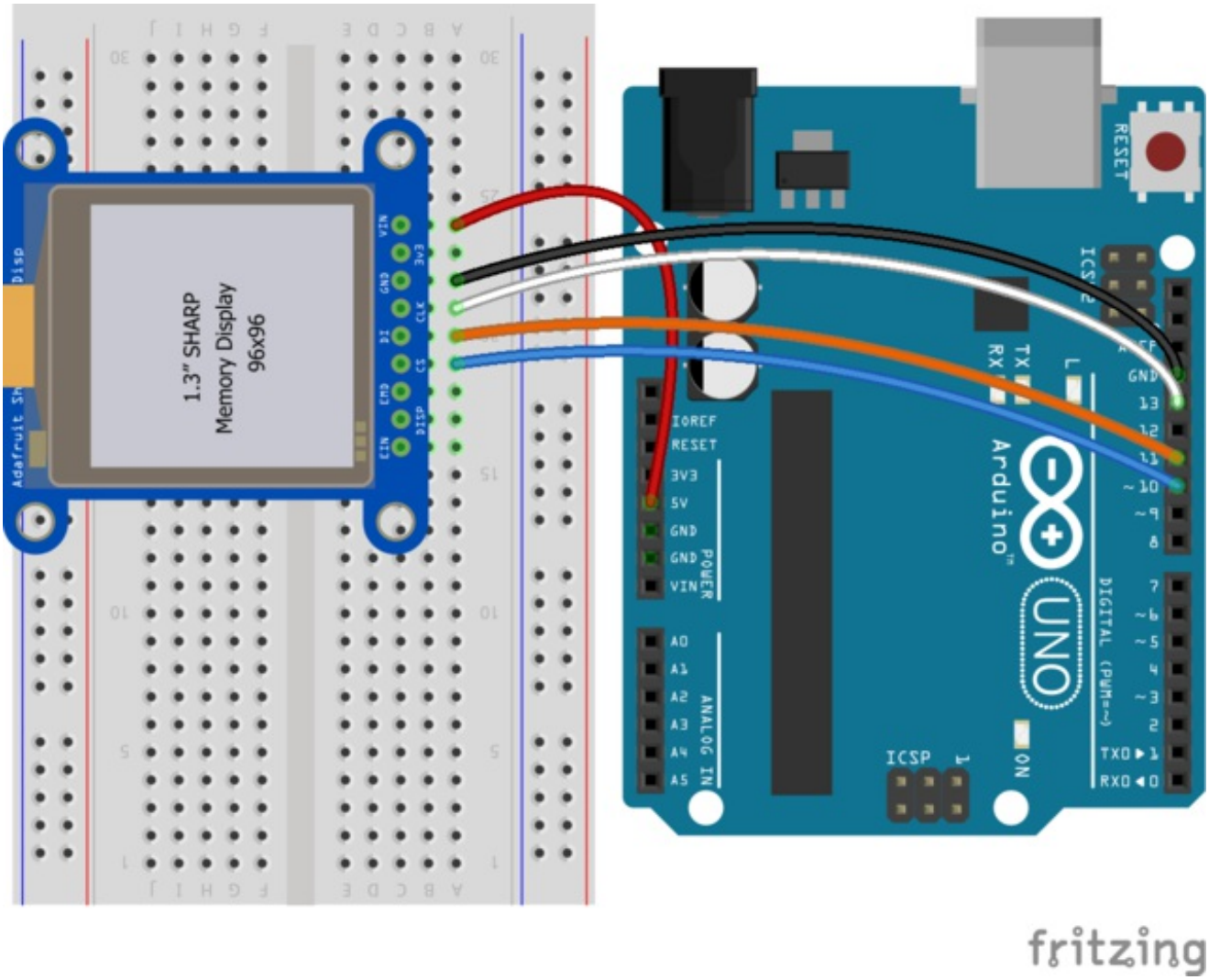


Wiring to the Arduino:

This display can be driven with only 3 pins. Any pins can be used. The wiring we show here uses pins 10, 11 and 13 for compatibility with the library example code. (Wire colors are as shown in the photo)

- **VIN** -> **+5v -** (Red Wire)
- **GND** -> **GND -** (Black Wire)
- **CLK** -> **Pin 13 -** (White WIre)
- **DI** -> **Pin 11 -** (Orange Wire)
- **CS** -> **Pin 10 -** (Blue Wire)

The other wires are optional, and connect directly to the Memory Display for more advanced uses. Check the raw display datasheet (in the downloads area) for details



[Diagram Fritzing object](http://adafru.it/wmA)

Programming

Download the Libraries

To use the Sharp Memory Display with your Arduino, you will need to download and install 2 libraries:

- Sharp Memory Display Library (http://adafru.it/cgJ)
- Adafruit GFX Library (http://adafru.it/aJa)

For details on how to install libraries, see this guide:All About Arduino Libraries (http://adafru.it/aYM).

Run the Example Code

Once your libraries are installed, open the Arduino IDE and select:

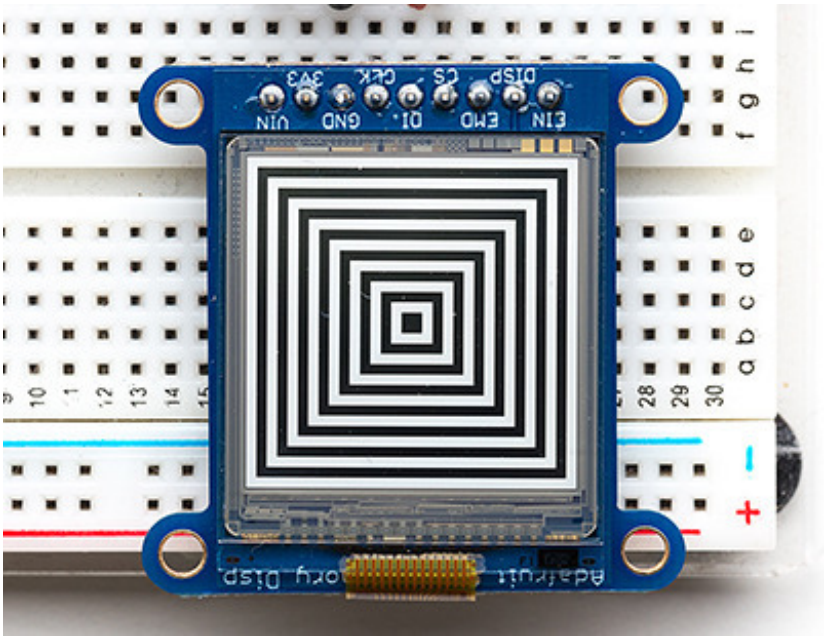
File->Examples->Adafruit_SHARP_Memory_Display->sharpmemtest

Upload the example code to your Arduino and you should see the test graphics drawn on the screen.

Programming GFX Graphics

The Sharp Memory Display is part of the growing family of Adafruit graphical displays that use the Adafruit GFX Library. This library lets you use a common set of graphical drawing functions on a whole variety of displays including.LED matrices, OLEDs, TFT LCDs, eInk and the Sharp Memory Display!

For more details about programming with GFX, see ourAdafruit GFX Graphics Library Guide (http://adafru.it/aPx).


VIN
GND
DI
CS
CLK
3V3
DISP
EMD
EIN

Downloads and Links

Libraries:

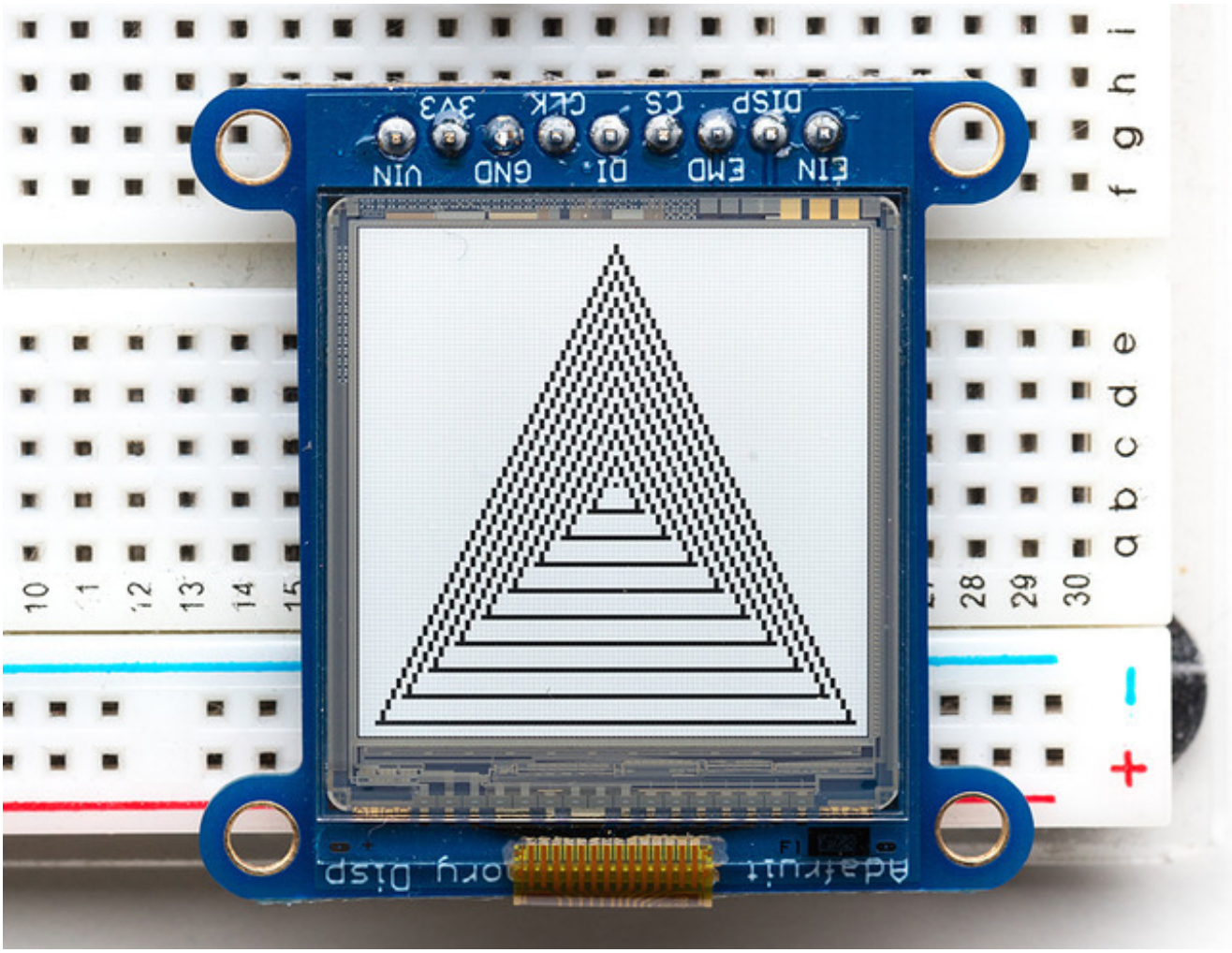
- Sharp Memory Display Library (http://adafru.it/cgJ)
- Adafruit GFX Library (http://adafru.it/aJa)

Files

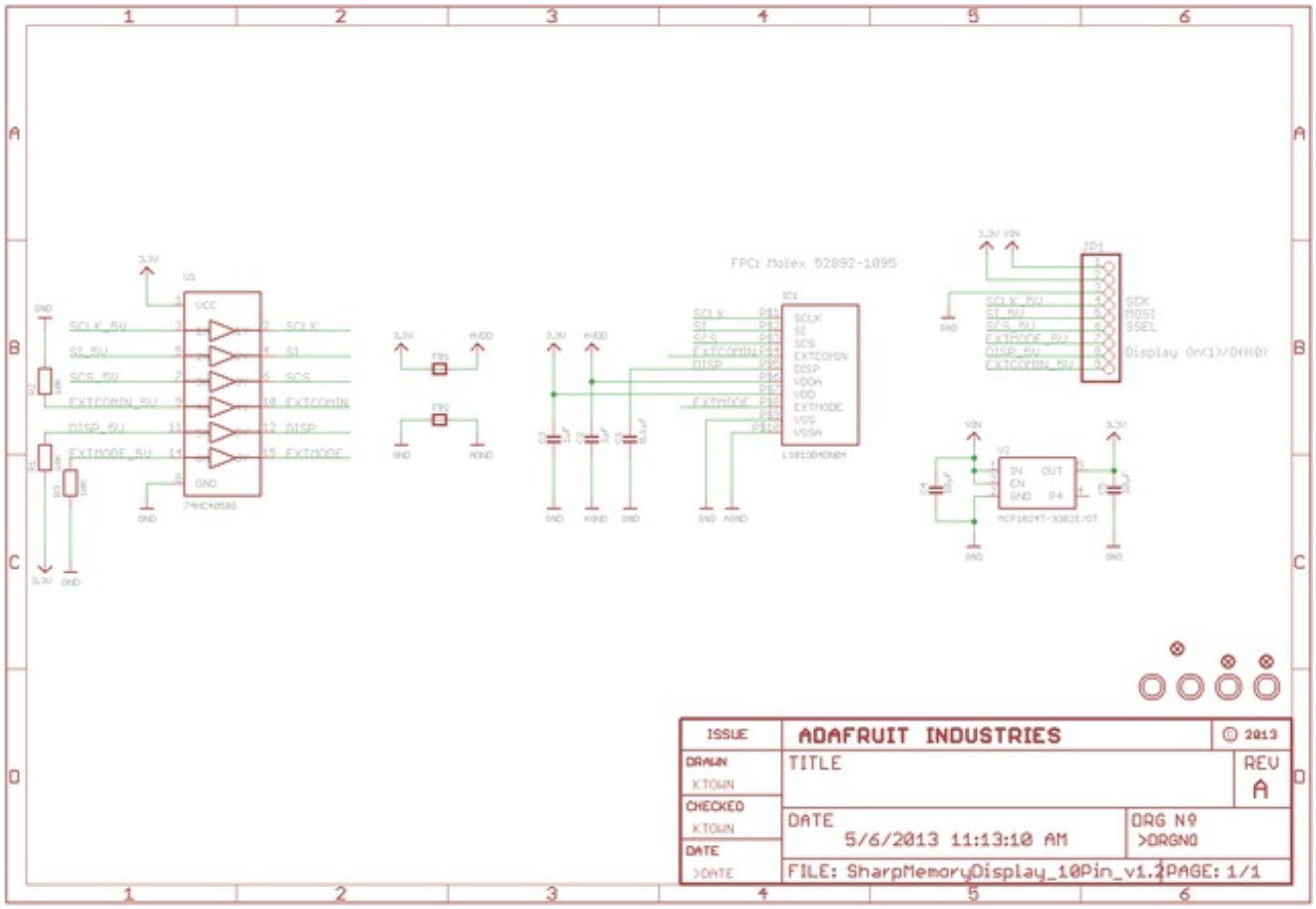
- Datasheet for the LS013B4DN04 LCD Module (http://adafru.it/cgK)
- Fritzing object in Adafruit Fritzing Library (http://adafru.it/aP3)
- EagleCAD PCB files on GitHub (http://adafru.it/rHE)

Library Reference

- Adafruit GFX Library (http://adafru.it/aPe)



Schematic & Fabrication Print


ADAFRUIT INDUSTRIES
2013
ISSUE
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CHECKED
K.TOWN
DATE
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TITLE
REV
A
DATE
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DRG N0
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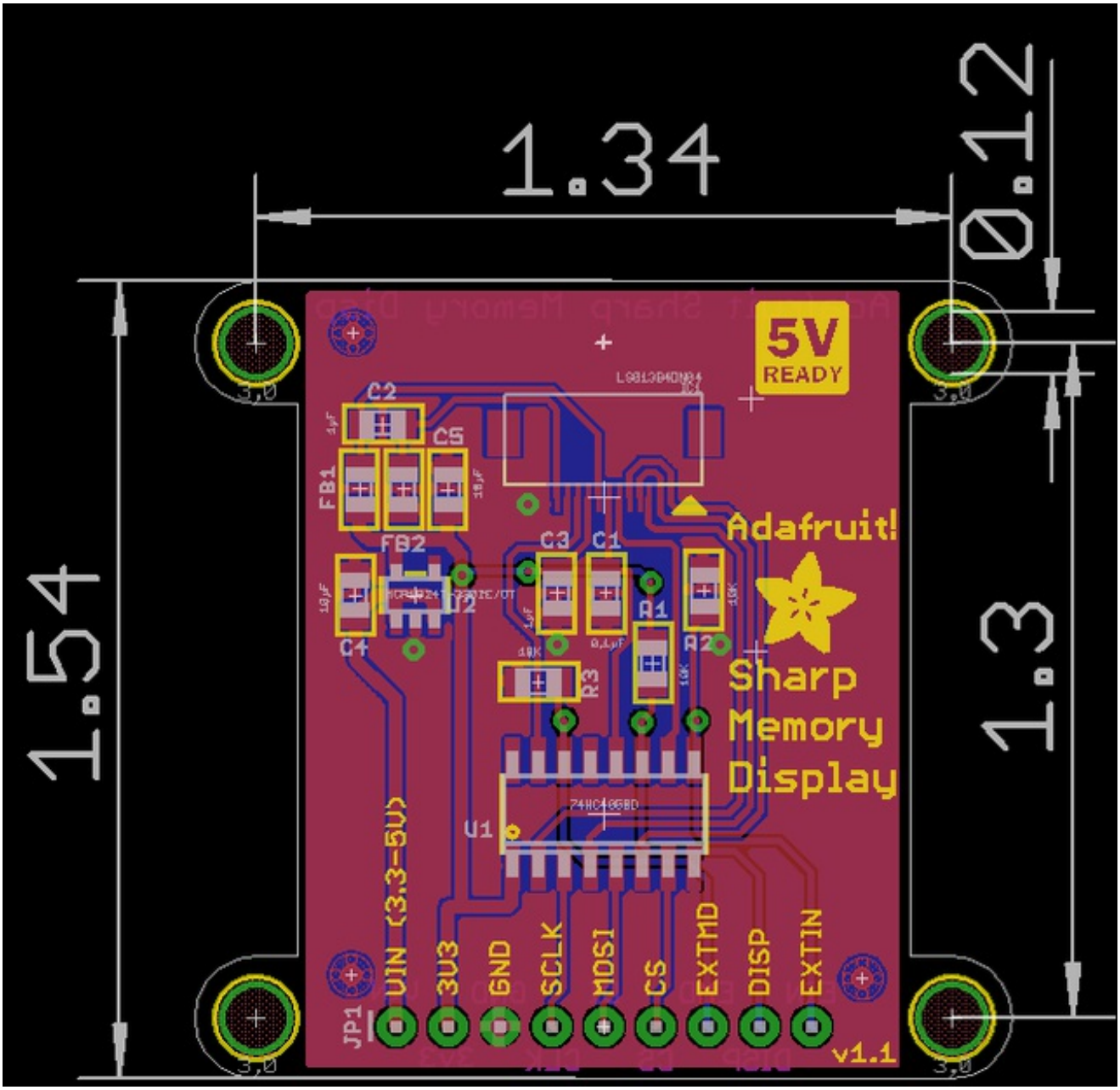
FILE: SharpMemoryDisplay_10Pin_v1.2
PAGE: 1/1
FPC: Molex 52892-1095
SCLK_5V
SI_5V
SCS_5V
EXTCOMIN_5V
DISP_5V
EXTMODE_5V
SCLK
SI
SCS
EXTCOMIN
DISP
EXTMODE
SCK
MOSI
SSEL
Display On(1)/Off(0)


1.34
0.12
1.54
1.3
5V
READY
Adafruit!
Sharp
Memory
Display
C2
C5
FB1
FB2
C3
C1
C4
A1
R2
R3
U1
74HC4050BD
JP1
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3V3
GND
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MOSI
CS
EXTMD
DISP
EXTIN
v1.1
3.0