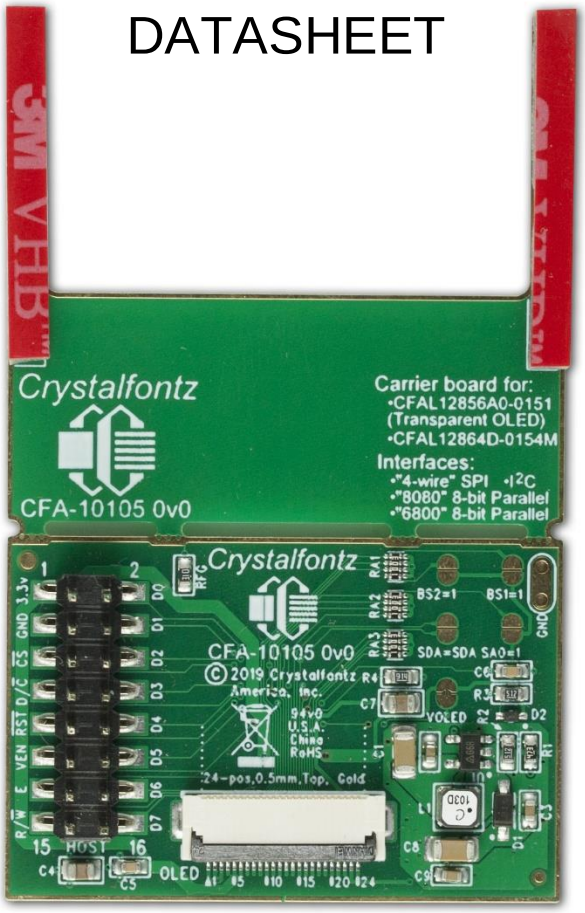
OLED BREAKOUT BOARD DATASHEET



CFA10105

Datasheet Release: 2023-04-20

Compatible with:
CFAL12856A0-0151B
CFAL12864D-0154MW
CFAL12864D1-0154MY

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Table of Contents

1. General Information

Datasheet Revision History
Datasheet Release: 2023-04-20 Datasheet for the CFA10105 breakout board

Product Change Notifications
You can check for or subscribe to Part Change Notices for this display module on our website.

Variations
Slight variations between lots are normal (e.g., contrast, color, or intensity).

Volatility
This display module has volatile memory.

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2. Introduction

This adapter board simplifies the process of bringing up some of our OLED displays including the transparent OLED and the 1.54" OLED in white and yellow. With this adapter board, these OLEDs can be powered and run by a 3.3v microprocessor without a separate backlight power supply. That means all you need is this board and a Seeeduino to run the displays - no extra components, no extra power supply. This board provides easy to use 0.1-in header pins ideal for testing, prototyping and use in projects of all kinds.

This board supports interfacing with the display using SPI, I2C, 6800, and 8080. Two jumpers on the board control the interface. They ship open for communication using SPI but can easily be closed with solder or external wires.

There are two options for mounting an OLED to this board, and tape is included on the board for whichever option you choose. The first option is to mount the display on the goal posts - this is a score for the transparent so you don't lose any of its wow-factor. The other option is piggyback the board onto the display. This makes a nice small form factor, but unfortunately, the board itself isn't transparent, so we recommend this option for the non-transparent OLEDs only.

The back of the board is printed with a quick guide and handy for the different interfaces.

Example source-code and datasheets for the OLEDs are available on their product pages:

www.crystalfontz.com/product/cfal12864d0154mw-128x64-white-graphic-oled

https://www.crystalfontz.com/product/cfal12864d10154my-128x64-yellow-graphic-oled-ssd1309

www.crystalfontz.com/product/cfal12856a00151b-128x56-transparent-oled-screen

www.crystalfontz.com/product/CFA-10105

www.crystalfontz.com/controllers/SolomonSystech/SSD1309/

3. Key Features

- Single 3.3v required to power the OLED, both logic and backlight
  - Includes a voltage regulator for the 12.5v rail
- On-board jumpers control the interface: parallel / SPI / I2C
- two mounting options
  - Mounting tape included
- Silkscreen connection guide

4. Header and Jumper Locations and Functions

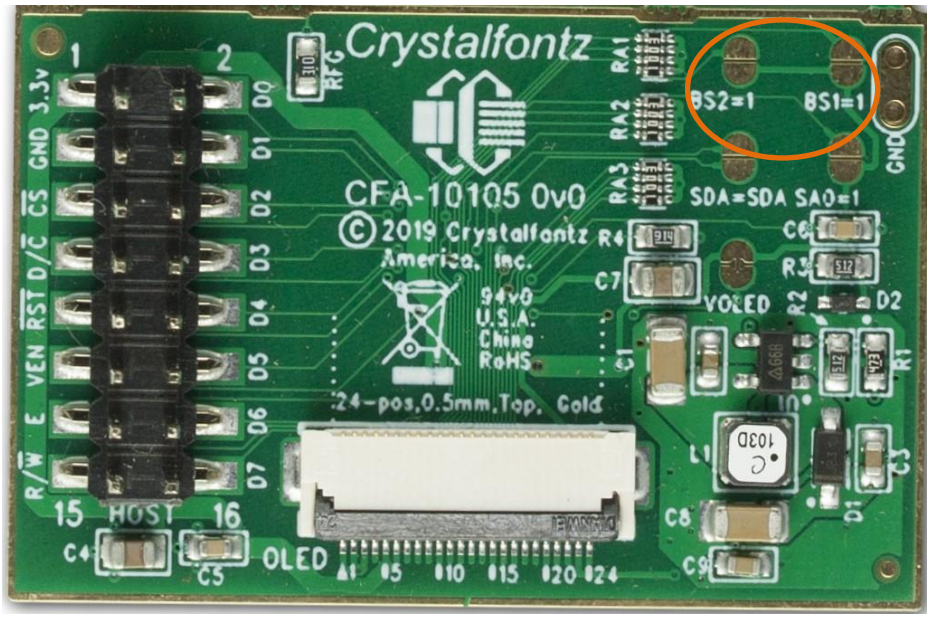
4.1. HOST – Main header

HOST is the main header on the left of the breakout board. This header provides 16 pins to connect the breakout board (and thus the display) to a microcontroller, such as a Seeeduino (an Arduino Uno clone that switches to 3.3v). Please note that connecting the board to 5v may permanently damage both the display and the board.

HOST Connection		
Pin	**Symbol**	**Function**
1	3V3	3V power
2	D0	**SPI** – SCK, clock **I2C** – SCL, clock **8080 and 6800** – D0
3	GND	Ground
4	D1	**SPI** – MOSI, Master Out Slave In **I2C** – SDA, tie to D2 using jumper **8080 and 6800** – D1
5	$\overline{CS}$	Chip Select
6	D2	**SPI** – No connection **I2C** – SDA, tie to D1 using jumper **8080 and 6800** – D2
7	D/$\overline{C}$	**SPI, 6800, and 8080** - Data/Command **I2C** – SA0
8	D3	**SPI and I2C** – Tie LOW **8080 and 6800** – D3
9	$\overline{RST}$	Reset
10	D4	**SPI and I2C** – Tie LOW **8080 and 6800** – D4
11	VEN	V_{OLED} Enable – No Connection (see VOLED)
12	D5	**SPI and I2C** – Tie LOW **8080 and 6800** – D5
13	E	**SPI and I2C** – Tie LOW **6800** – Enable **8080** – Write – active low
14	D6	**SPI and I2C** – Tie LOW **8080 and 6800** – D6
15	R/ $\overline{W}$	**SPI and I2C** – Tie LOW **6800** – Read/Write - Read high, write low **8080** – Read – active low
16	D7	**SPI and I2C** – Tie LOW **8080 and 6800** – D7

4.2. Interface Selection – BS1 and BS2

BS1 and BS2 allow for changing between the different available interface modes per the table below.



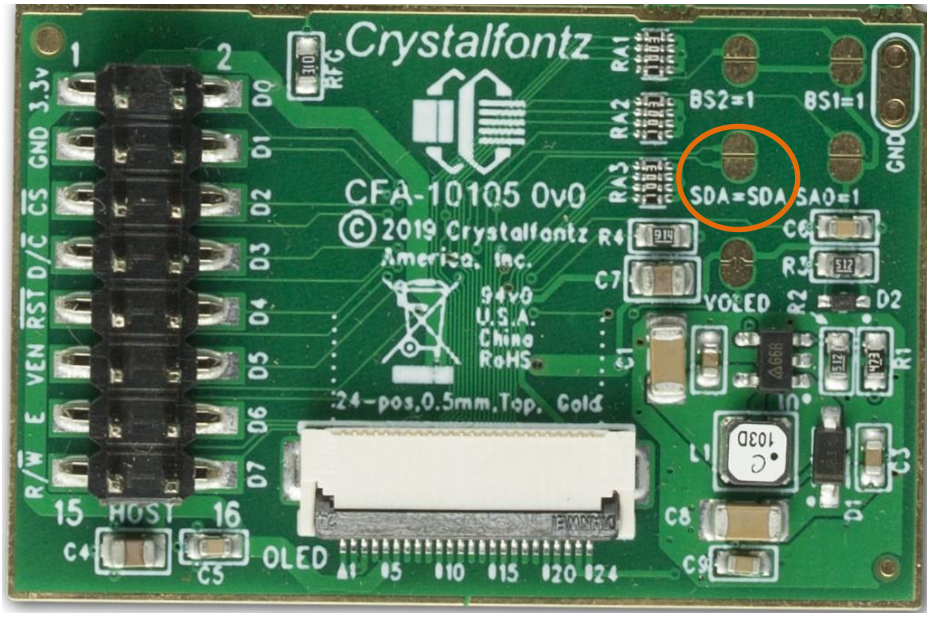
BS2	BS1	Interface	D7-D3*	D2	D1	D0	E(RD)	R/W(RW)	CS	D/C
0	0	4-Wire SPI	Tie Low	NC	MOSI	SCK	Tie Low		$\overline{CS}$	D/$\overline{C}$
0	1	I2C*	Tie Low	SDA=SDA		SCL	Tie Low			SA0
1	0	8-bit Par (E, W/R)	D7-D3	D2	D1	D0	E	R/ $\overline{W}$	$\overline{CS}$	D/$\overline{C}$
1	1	8-bit Par (RD, WR)	D7-D3	D2	D1	D0	$\overline{WR}$	$\overline{RD}$	$\overline{CS}$	D/$\overline{C}$

BS1, BS2, $\overline{CS}$, D/$\overline{C}$, R/ $\overline{W}$ ($\overline{WR}$), E ($\overline{RD}$), and D7-D3 have 100kΩ pull down resistors.

In I2C, SDA and SCL need external pull up resistors.

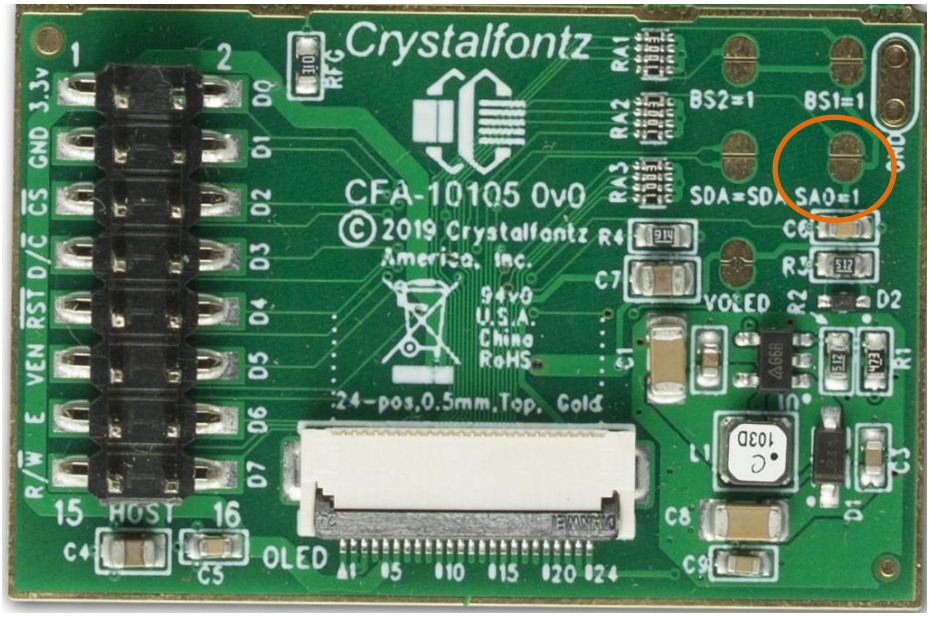
4.3. SDA=SDA

This jumper is for operating in I2C, and ties D1 and D2 together. By closing this jumper on the chip, an external wire jumper can be avoided.



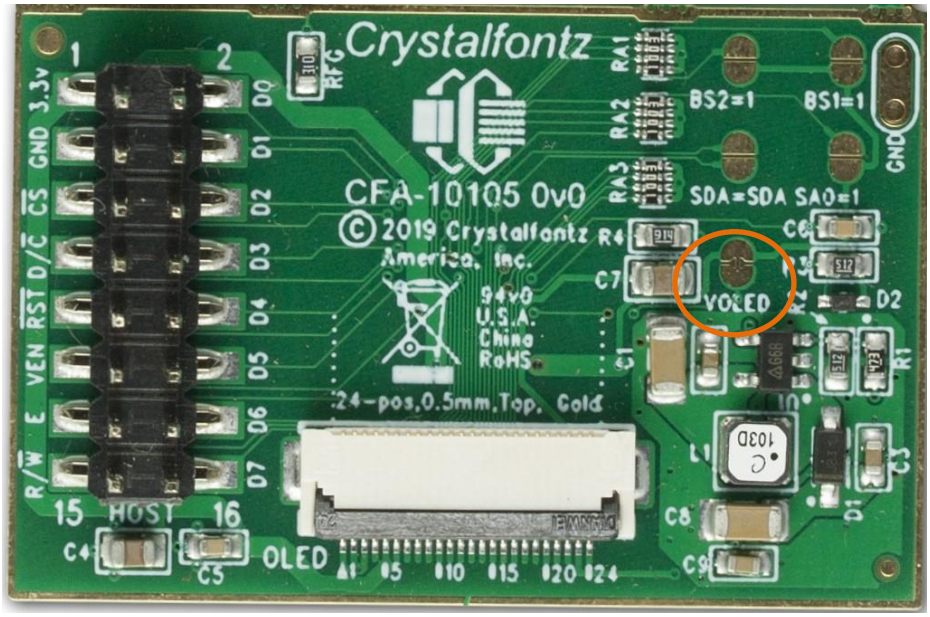
4.4. SA0=1

Slave address bit, this allows control of two displays on the same I2C bus.

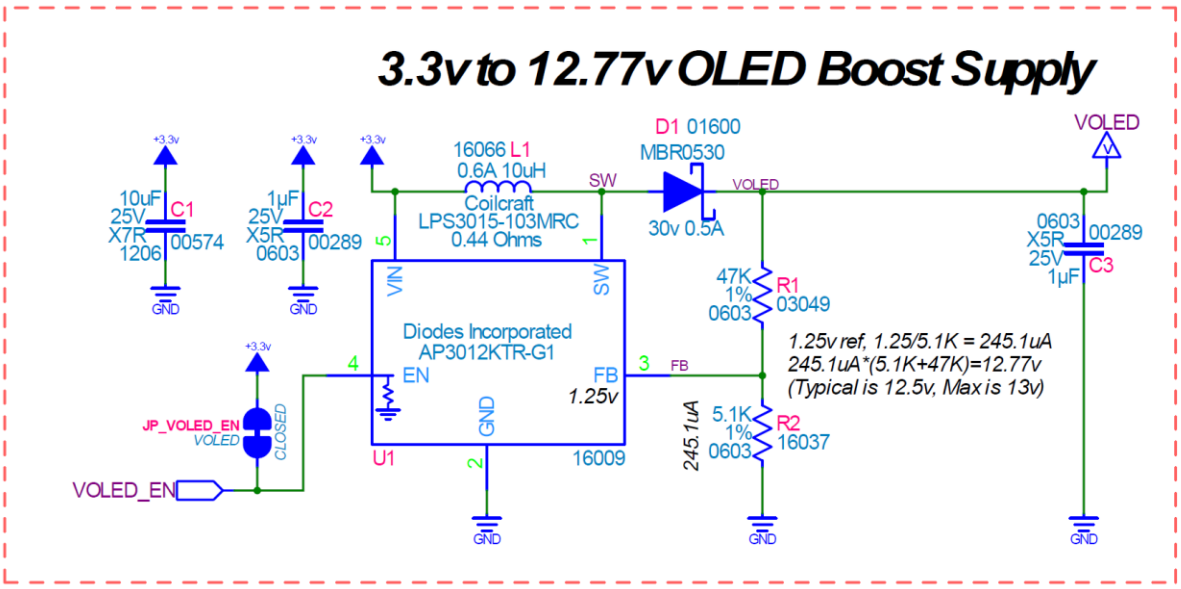


SA	Write	Read	R/W
0	0x78	0x70	0x3C
1	0x7A	9x7B	0x3D

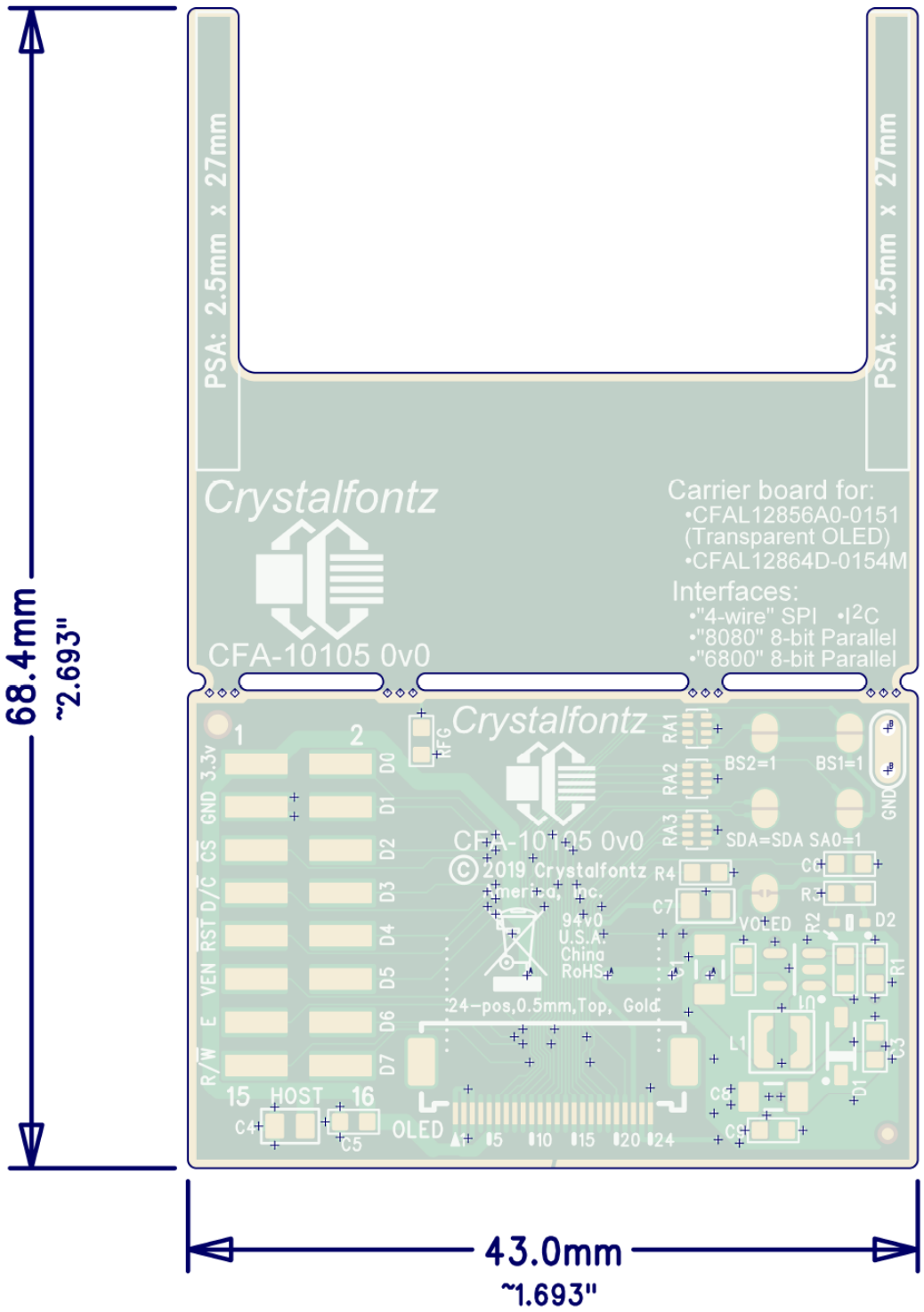
4.5. VOLED



This jumper is shipped closed, tying V_{OLED} high and thus enabled. To manually control V_{OLED} Enable, open this jumper. Once open, Pin 11, VEN, on HOST will control V_{OLED} Enable.



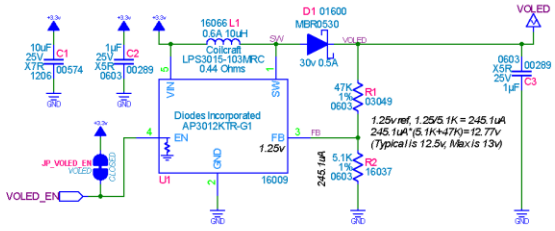
5. Dimensions



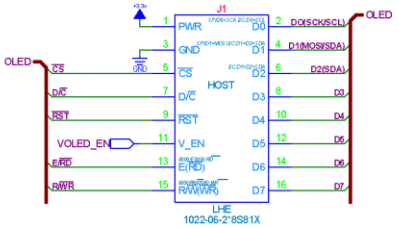
6. Schematics

REV	ENGINEER	DATE	REMARKS
0v0	BAC	2019-11-11	Initial Creation
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

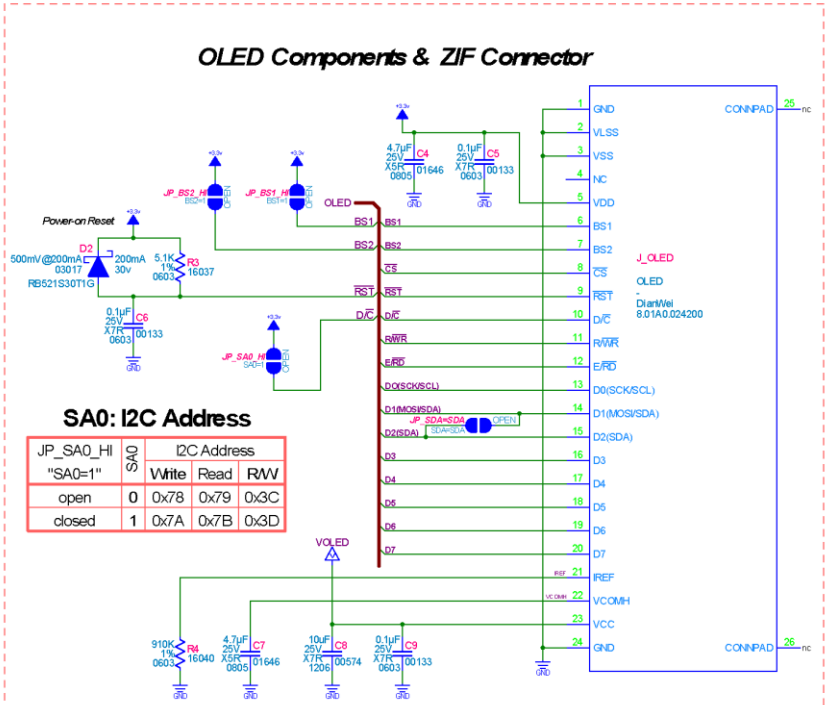
3.3v to 12.77v OLED Boost Supply



Host Connector



OLED Components & ZIF Connector



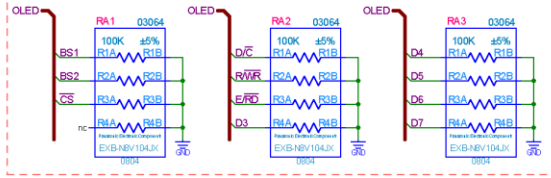
SA0: I2C Address

JP_SA0_HI "SA0=1"	SA0	I2C Address		
		Write	Read	R/W
open	0	0x78	0x79	0x3C
closed	1	0x7A	0x7B	0x3D

Jumper Setting for Interface Selection

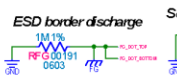
JP_BS2_HI "BS2=1"	JP_BS1_HI "BS1=1"	BS2	BS1	Interface	Pin Functions								
					D7 D6 D5 D4 D3	D2	D1	D0	E(RD)	R/W(WR)	CS	D/C	
open	open	0	0	"4-wire" 8-bit SPI (default)	Tie Low*	NC	MOSI	SCK	Tie Low*		CS	D/C	
open	closed	0	1	I2C	Tie Low*	SDA=SDA (close SJ1)	SCL	Tie Low*				SA0	
closed	open	1	0	"6800" 8-bit Parallel (E, R/W)	D7 D6 D5 D4 D3	D2	D1	D0	E	R/W	CS	D/C	
closed	closed	1	1	"8080" 8-bit Parallel (RD, WR)	D7 D6 D5 D4 D3	D2	D1	D0	RD	WR	CS	D/C	

* Pull "Tie Low" & Strapping lines down



Perforations for break-away

ESD border discharge



Scope Ground

Crystalfontz America, Inc.

CFA-10105: Transparent OLED Carrier Board

Page 1/1: Host and Device Connections

PRODUCT NAME:	PRODUCT REVISION:	PCB NUMBER:	PCB REVISION:
CFA-10105	0v0	PCB10105	0v0

7. CFA-10105 - Quick Start Guide

7.1. What You Need

- **CFA-10105**
- Your **OLED** display – either the transparent, the white, or the yellow
- **Seeeduino** board (3.3/5v switchable Arduino Clone – 3.3v is necessary)
- **USB cable** WR-USB-27
- **Jumper cables** such as WR-JMP-Y40 or WR-JMP-41
- Headers such as CFAPN01855
- Some **code**! You can use our demo code available on the product pages.

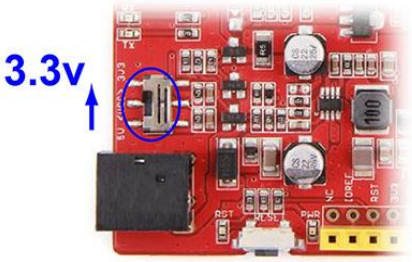
7.2. Quick Start

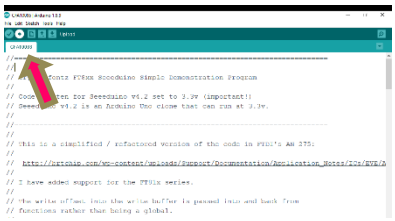
In this guide, we'll be showing how to bring up the transparent display in SPI. Connection information for other interfaces is available in the full datasheet for the CFA-10105 available on the product page.

Step 1 - Ensure the voltage selection switch on the **Seeeduino** is set to 3v3. Using 5v can permanently damage your display.

Step 2 - Wire it up! Using the table below, connect the **CFA-10105** to the **Seeeduino** using the **headers** and **jumper cables**. All the jumpers on the board should be left open.

CFA-10105	Color	Arduino	Function
3.3V	Red	3V3	Power
GND	Black	GND	Ground
CS	Purple	D8	Chip Select
D/C	Brown	A0	Data/Command
RST	Grey	D9	Reset
D0	Green	D13	SCK, clock
D1	Blue	D11	MOSI, Data
D2, VEN, E, R/W	N/A	NC	Not connected
D3-D7	Not shown	Pull High	





Step 3 - Connect the **Seeeduino** to your computer using a **USB cable**, and load your code to the Seeeduino.

Step 4 - With power disconnected, insert the **OLED tail** with the shiny pins face up into the ZIF connector on the **CFA-10105**. Reapply power, and the demo will begin.

7.3. Further Information

See the Crystalfontz website for further information including full product datasheets and programming examples:

https://www.crystalfontz.com/product/cfal12864d0154mw-128x64-white-graphic-oled

https://www.crystalfontz.com/product/cfal12864d10154my-128x64-yellow-graphic-oled-ssd1309

https://www.crystalfontz.com/product/cfal12856a00151b-128x56-transparent-oled-screen

www.crystalfontz.com/product/CFA-10105

We're here to help! Reach out via our forum at forum.crystalfontz.com or email support@crystalfontz.com

We'd love to hear about your project! Tag us on Facebook, Instagram, LinkedIn, Twitter, or YouTube, or send us a link to your project on the web

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