Crystalfontz

GRAPHIC LCD BREAKOUT BOARD DATASHEET

CFA10110

Datasheet Release: 2022-12-12

Compatible with:
CFAG12864T3-NFH
CFAG12864T3-TFH
CFAG12864U3-NFH
CFAG12864U3-TFH
CFAG240128U0-NFH
CFAG240128U0-TFH

Crystalfontz America, Inc.

Table of Contents

1. General Information

Datasheet Revision History
Datasheet Release: 2022-12-12 Datasheet for the CFA10110 breakout board

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

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

Volatility
This board has volatile memory.

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2. Introduction

This breakout board helps bring up a family of monochrome graphic LCDs. By breaking the ZIF tail of the compatible displays out to a 16-position 0.1" header connecting the display is a breeze. Simply use 0.1" jumper wires to connect into your project.

The board also includes two 2-56 threaded standoffs for mounting the display and board to a final design.

This breakout board is compatible with the following displays:

- 1.1" Small Transflective Graphic LCD (CFAG12864T3-NFH)
- 1.1" Small Backlit Sunlight Readable LCD (CFAG12864T3-TFH)
- 2.2" Low Power 128x64 Graphic LCD (CFAG12864U3-NFH)
- 2.2" 128x64 Backlit Low Power LCD (CFAG12864U3-TFH)
- 2.2" 240x128 Low Power Grayscale Graphic LCD (CFAG240128U0-NFH)
- 2.2" 240x128 Backlit Grayscale Graphic LCD (CFAG240128U0-TFH)

3. Header and Jumper Locations and Functions

3.1. J2 – Main header for CFAG12864T3/U3

J2 is the main header on 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.

Additionally, note that the even and odd columns are flipped. Refer to the silkscreen on the board.

J2 Connection – For CFAG12864T3/U3		
Pin	**Symbol**	**Function**
1	GND	Ground
2	3v3	Supply Voltage
3	RES	Hardware Reset (active low)
4	NC	No connection
5	DC	Data Command (Register select). Data high, command low.
6	CS	Chip select, selected when low.
7	RD/E	**SPI** – No connection **6800** – Read/Write Enable **8080 –** Read enable (active low)
8	WR/RW	**SPI** – No connection **6800** – Read/Write **8080 –** Write enable (active low)
9	D0	
10	D1	
11	D2	**SPI** – No connection **8080 and 6800** – D0-D5
12	D3	
13	D4	
14	D5	
15	D6	**SPI** – Serial Clock **8080 and 6800** – D6
16	D7	**SPI** – Serial Data **8080 and 6800** – D7

3.2. J2 – Main header for CFAG240128U0

J2 is the main header on 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.

Additionally, note that the even and odd columns are flipped. Refer to the silkscreen on the board.

Pin	Symbol	Function
		J2 Connection – For CFAG240128U0
1	GND	Ground
2	3v3	Supply Voltage
3	RES	Hardware Reset (active low)
4	NC	No connection
5	DC	Data Command (Register select). Data high, command low.
6	CS	Chip select, selected when low.
7	RD/E	**SPI** – No connection **6800** – Read/Write Enable **8080 –** Read enable (active low)
8	WR/RW	**SPI** – No connection **6800** – Read/Write **8080 –** Write enable (active low)
9	D0	**SPI and I2C** – Serial Clock **8080 and 6800** – D0
10	D1	
11	D2	**SPI and I2C** – Serial Data. Tie together **8080 and 6800** – D1-3
12	D3	
13	D4	**SPI and I2C** – No Connection **8080 and 6800** – D4-5
14	D5	
15	D6	**SPI** – No Connection **I2C –** SA[0] I2C address bit **8080 and 6800** – D6
16	D7	**SPI** – No Connection **I2C –** SA[1] I2C address bit **8080 and 6800** – D7

3.3. P/S-> 3v3 and C86->3v3

These jumpers control the interface selection for the display. When both jumpers are open, as shipped, the display will communicate using SPI.

The CFAG12864T3/U3 displays support SPI, and 6800 and 8080 parallel. The CFAG240128U0 displays additionally support I2C.
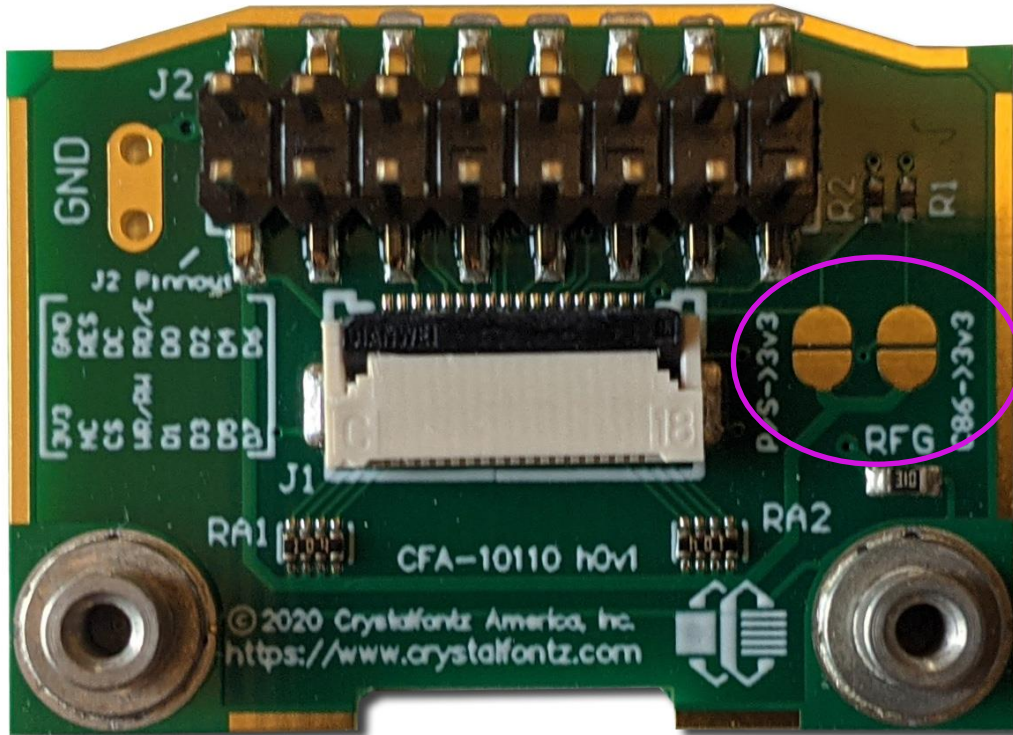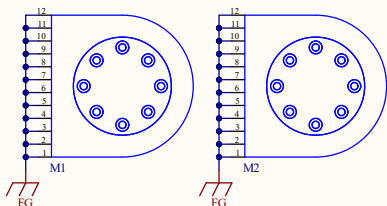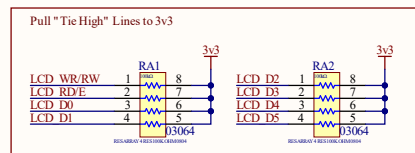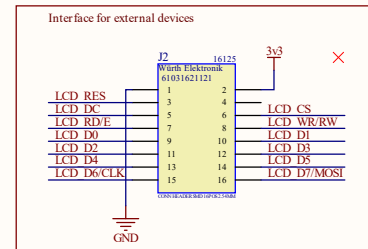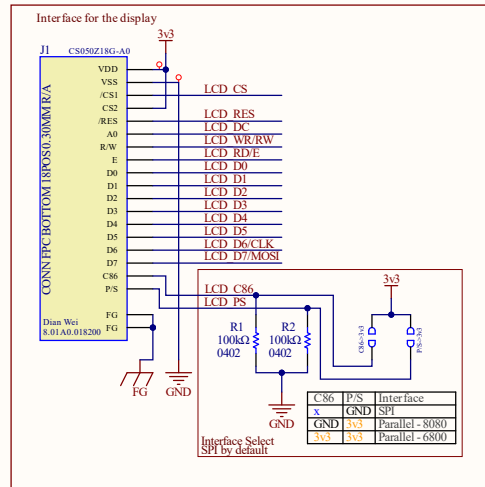

	SPI	**I2C (CFAG240128U0 only)**	**8080 parallel**	**6800 parallel**
C86-> 3v3	Open	Closed	Open	Closed
P/S-> 3v3	Open	Open	Closed	Closed

The P/S jumper selects between parallel and serial. When it is closed, parallel is selected. The C86 jumper selects which of the parallel and serial options is used. When the P/S jumper is open (serial is selected), closing the C86 jumper changes the interface from SPI to I2C. When the P/S jumper is closed (parallel is selected), closing the C86 jumper changes the interface from 8080 to 6800.
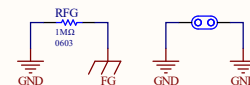
4. Schematic

Interface for the display

J1   CS050Z18G-A0

VDD	
VSS	LCD_CS
/CS1	
CS2	LCD_RES
/RES	LCD_DC
A0	LCD_WR/RW
R/W	LCD_RD/E
E	LCD_D0
D0	LCD_D1
D1	LCD_D2
D2	LCD_D3
D3	LCD_D4
D4	LCD_D5
D5	LCD_D6/CLK
D6	LCD_D7/MOSI
D7	
C86	LCD_C86
P/S	LCD_PS
FG	
FG	

CONN FPC BOTTOM 18POS 0.30MM R/A

Dian Wei
8.01A0.018200

R1 100kΩ 0402
R2 100kΩ 0402

C86	P/S	Interface
x	GND	SPI
GND	3v3	Parallel - 8080
3v3	3v3	Parallel - 6800

Interface Select
SPI by default

Interface for external devices

J2   16125
Würth Elektronik
61031621121

LCD_RES	1	2	
LCD_DC	3	4	LCD_CS
LCD_RD/E	5	6	LCD_WR/RW
LCD_D0	7	8	LCD_D1
LCD_D2	9	10	LCD_D3
LCD_D4	11	12	LCD_D5
LCD_D6/CLK	13	14	LCD_D7/MOSI
	15	16	

CONN HEADER SMD 16POS 2.54MM

Pull "Tie High" Lines to 3v3

RA1

LCD_WR/RW	1		8
LCD_RD/E	2		7
LCD_D0	3		6
LCD_D1	4		5

03064
RES ARRAY 4 RES 100K OHM 0804

RA2

LCD_D2	1		8
LCD_D3	2		7
LCD_D4	3		6
LCD_D5	4		5

03064
RES ARRAY 4 RES 100K OHM 0804

ESD border discharge
RFG
1MΩ
0603
GND   FG

Scope Grounds
GND   GND

M1

M2

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CFA-10110: CFAG12864U3/T3 Adapter Board

Page 1 / 1 : Full Schematic

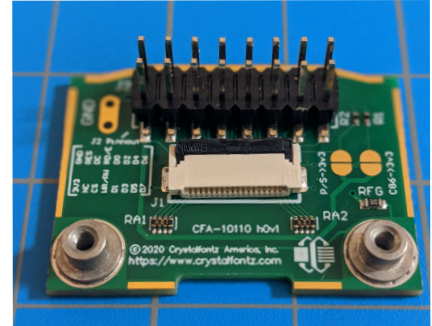| PCB NUMBER:	PCB REVISION:	
CFA10110	h0v1	Size: B

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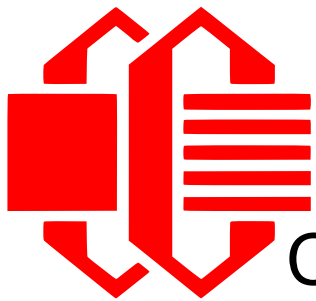
Getting Started Guide
## CFAG12864[U3|T3] and Adapter Board

1. What You Need

- Your display with CFA10110 adapter board
- 3.3v microcontroller (e.g., Seeeduino v4.2)
- USB cable (e.g., WR-USB-27)
- Jumper cables (e.g., WR-JMP-Y40 or WR-JMP-41)
- Headers (e.g., CFAPN01855)
- A sketch
 (e.g., https://github.com/crystalfontz/CFAG12864T3_and_U3)

2. Wiring

Using the jumper wires, connect the CFA10110 board to the microcontroller. We're using an Arduino clone, thus "ARD".

```
//   ARD  | LCD  | Color
// ---------+--------+-------
// 3v3    | 3v3  | Red
// GND    | GND  | Black
// D8     | DC   | Green
// D9     | RES  | Blue
// D10    | CS   | Purple
// D11    | D7   | Gray
// D13    | D6   | Orange
```
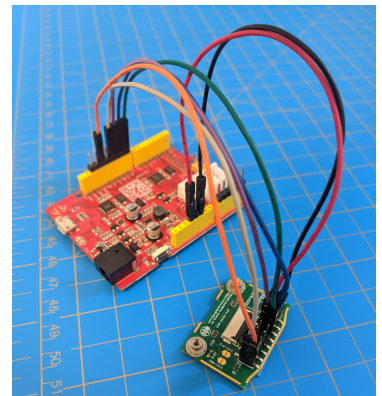

3. Connect the Display Tail to the CFA10110

If you ordered a kit (PN ending in E1-1 or E1-2), this will be done for you. Insert the tail, shiny pins down, into the connector and close the connector by pressing down on the black latch.
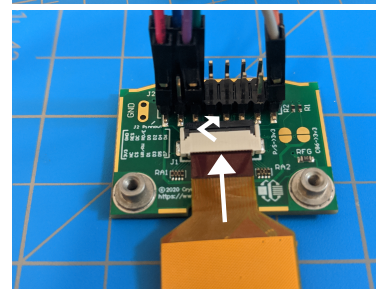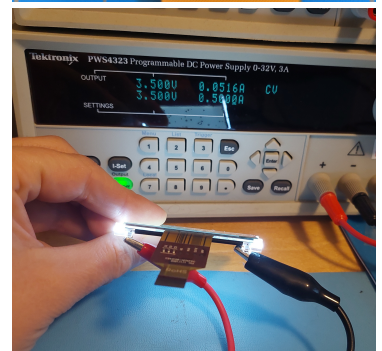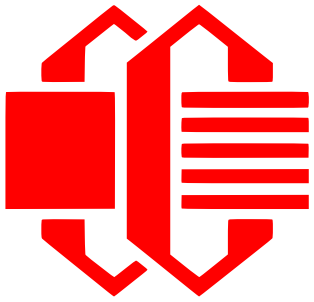

4. Backlight Power

The TFH version includes a backlight. It must be powered from the backlight tabs on the back of the display.

5. Upload Sketch

Upload your sketch, such as our demo code. If you're using our demo code, check that the correct display is defined in LCD_Low.h

Questions? Check out our blog , forum.crystalfontz.com, or email us at support@crystalfontz.com
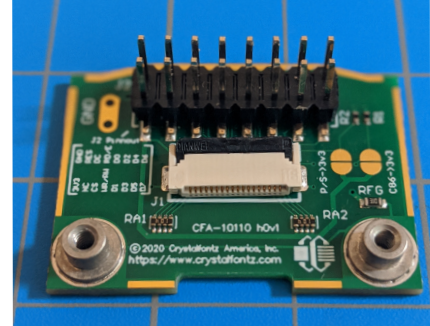
Getting Started Guide
CFAG240128U0 and Adapter Board

1. What You Need

- Your display with CFA10110 adapter board
- 3.3v microcontroller (e.g., Seeeduino v4.2)
- USB cable (e.g., WR-USB-27)
- Jumper cables (e.g., WR-JMP-Y40 or WR-JMP-41)
- Headers (e.g., CFAPN01855)
- A sketch
  (e.g., https://github.com/crystalfontz/CFAG240128U0)

2. Wiring

Using the jumper wires, connect the CFA10110 board to the microcontroller. We're using an Arduino clone, thus "ARD".

```
//  ARD  | LCD  | Color
// ---------+--------+-------
// 3v3   | 3v3   | Orange
// GND   | GND   | Black
// D8    | DC    | Red
// D9    | RES   | White
// D10   | CS    | Green
// D11   | D1    | Gray
// D13   | D0    | Brown
```
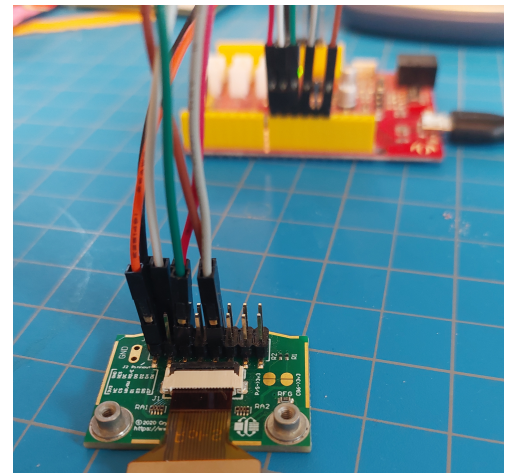
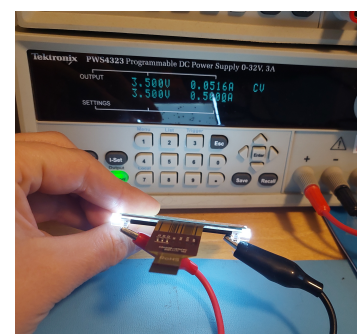## 3. Connect the Display Tail to the CFA10110

If you ordered a kit (PN ending in E1 or E1-2), this will be done for you. Insert the tail, shiny pins down, into the connector and close the connector by pressing down on the black latch.

4. Backlight Power

The TFH version includes a backlight. It must be powered from the backlight tabs on the back of the display.

5. Upload Sketch

Connect your microcontroller to you computer and upload a sketch, such as our demo code available on Github.

Questions? Check out our blog, forum.crystalfontz.com, or email us at support@crystalfontz.com