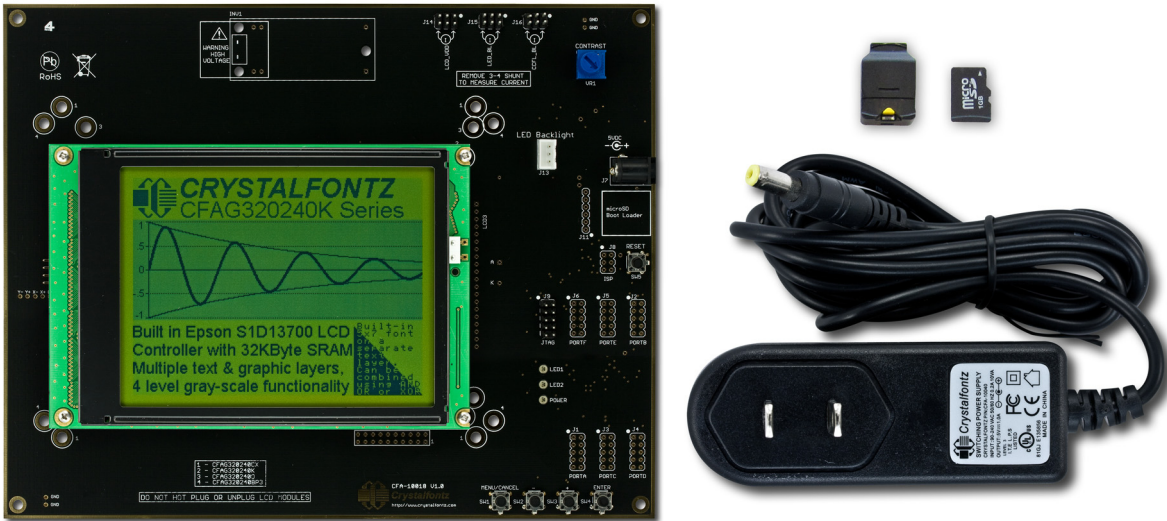




# Crystalfontz America, Incorporated

## Development Kit/Demonstration Board User Guide for CFA-10018 Demonstration Board



*Photo shows kit with display module CFAG320240K-YYH-TZ.  
Kit components are not to scale.*

**Development Kit/Demonstration Board User Guide for CFA-10018  
Demonstration Board using CFAG320240CX or CFAG320240K series  
modules**

[www.crystalfontz.com/product/CFA10018.html](http://www.crystalfontz.com/product/CFA10018.html)

**Hardware v1.0**

**Firmware v.6234**

**Data Sheet Release 2012/11/01**

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**REVISION HISTORY**  
**DEVELOPMENT KIT/DEMONSTRATION BOARD USER GUIDE FOR CFA-10018**

Data Sheet Release: **2012/11/01**  
New Data Sheet.

**The Fine Print**

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## QUICK START

When you order the CFA-10018 development kit/demonstration board, the CFA-10018 demonstration board is shipped with a compatible module of your choice installed and tested. Simply plug the power supply (included) into an AC outlet. The CFA-10018 will initialize and turn on the display, then run the demonstration script from the included microSD card.

## INTRODUCTION

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The CFA-10018 Demonstration Board Kit has everything you need to easily demonstrate and experiment with one compatible CrystalFontz graphic LCD module. A list of compatible modules is on the next page. The kit can be used as a reference for your designs that use one of these modules. Since the hardware design materials are available before purchase, there is no risk of being "surprised" late in the design. An additional use is that the CFA-10018 allows you to easily measure current of the different portions of the circuit under operation.

You can easily modify the miniBASIC scripts and bitmaps on the microSD card to make your own test screens and model user interface functions. All that is needed is the included microSD USB reader, a [text editor](#) (Notepad will do), an [image editor](#) (MS Paint will do), and [Image2Code](#) which is a free, simple, open-source format conversion utility. Note: Image2Code will support grayscale in a future version.

The CFA-10018 is preprogrammed with a microSD boot loader. You can load our simple C example code, the miniBASIC interpreter, or build your own application for the CFA-10018's versatile [Atmel ATmega2561](#) microcontroller using [Atmel Studio](#) and [WinAVR](#) (both free).

The board has a JTAG port for more advanced programming and debugging. All the ports are on 0.1" centers so you can connect them to anything you need. The CFA-10018 is so versatile that you may want to use it as a base development platform for your projects.

The module has an [Epson S1D13700](#) controller. All kits are RoHS compliant.



## CFA-10018 KIT CONFIGURATIONS

All of the modules listed below have a [Epson S1D13700](#) controller.

If you want this display module	Order this demo kit	STN Blue	STN Yellow-Green	FSTN Neutral	Touch Screen	No Backlight	White LED Backlight	High Output White LED Backlight	Yellow-Green LED Backlight	White CCFL Backlight
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**CFAG320240CX Product Family**  
 Active Area 115.18 (W) x 86.38 (H) millimeters

<a href="#">CFAG320240CX-FMI-T</a>	<a href="#">DMOGQ320240CX-FMI-T</a>	X					X			X
<a href="#">CFAG320240CX-TFH-T</a>	<a href="#">DMOG320240CX-TFH-T</a>			X			X			
<a href="#">CFAG320240CX-YYH-T</a>	<a href="#">DMOGQ320240CX-YYH-T</a>		X						X	
<a href="#">CFAG320240CX-TMI-T</a>	<a href="#">DMOGQ320240CX-TMI-T</a>	X					X			
<a href="#">CFAG320240CX-YMI-T</a>	<a href="#">DMOGQ320240CX-YMI-T</a>		X						X	
<a href="#">CFAG320240CX-TTI-T</a>	<a href="#">DMOGQ320240CX-TTI-T</a>			X			X			
<a href="#">CFAG320240CX-TFH-T-TS</a>	<a href="#">DMOGQ320240CX-TFH-T-TS</a>			X	X		X		X	

**CFAG320240K Product Family**  
 Active Area 95.97 (W) x 71.97 (H) millimeters

<a href="#">CFAG320240K-STI-TZ</a>	<a href="#">DMOGQ320240K-STI-TZ</a>			X				X		
<a href="#">CFAG320240K-TMI-TZ</a>	<a href="#">DMOGQ320240K-TMI-TZ</a>	X					X			
<a href="#">CFAG320240K-YYH-TZ</a>	<a href="#">DMOGQ320240K-YYH-TZ</a>		X						X	



## KIT CONTENTS

- Demonstration Board (PCB) programmed with firmware that will read a BASIC program file from the microSD memory card.
- Mounted compatible graphic LCD module of your choice. Select the module when you order. See choices in the previous table.
- 110 VAC Power adapter.
- MicroSD memory card loaded with BASIC demonstration program and bitmap images.
- USB reader for the microSD memory card.

Demonstration code (simple initialization code and bitmap display code) can be found on our website under the Doc/Files tab for the kit's part number.

The hardware design including schematic, bill of materials, and the PCB layout can also be found on our website under the Doc/Files tab for the kit's part number.

## HOW TO MAKE A CUSTOM DEMONSTRATION

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The CFA-10018 is programmed with firmware that will read a BASIC program file from the microSD memory card. The BASIC program can read bitmap image files from the microSD memory card and display them on the graphic LCD module. The BASIC program can also read the four switches on the demonstration board and change the brightness settings.

By using the USB reader, a text editor, and a graphic conversion utility, you can customize the demonstration to include your own bitmap images. The large capacity of the microSD card allows you to create complex demonstrations.

## LOADING A CUSTOM HEX FILE

The CFA-10018 Demonstration Board Kit is shipped with the miniBasic-AVR interpreter loaded into the microcontroller Atmel ATmega2561's flash memory.

If you want to load our simple demonstration or your own program, simply name the hex file "cfa10018.hex" and copy it into the root the directory of the microSD card. When the CFA-10018 boots, the boot loader will program the ATMEGA2561's flash with "cfa10018.hex" and execute it.

*Acknowledgement Note:* The miniBASIC-AVR is a derivative of <http://www.personal.leeds.ac.uk/~bgy1mm/Minibasic/MiniBasicHome.html> (accessed 2010/12/10). The miniBASIC-AVR also includes the [EFSL embedded filesystems library](#).



# HARDWARE DESIGN INFORMATION

## BLOCK DIAGRAM

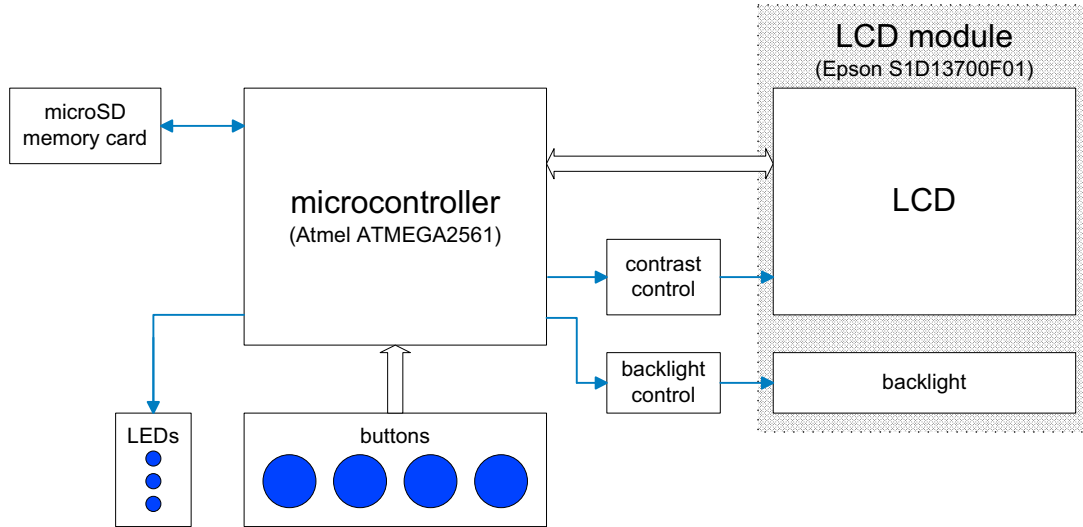


Figure 1. Block Diagram

## CONTENTS OF HARDWARE DESIGN FOLDER (FREE DOWNLOAD)

The hardware design can be found on our website under the Doc/Files tab for the kit's part number. It includes:

- Schematic.
- PCB layout files.
- Gerber files for production.
- Bill Of Materials (BOM) in a spreadsheet (.xls file format).

The schematic and PCB layout were created with CadSoft EAGLE. EAGLE is a capable and low-cost electrical CAD system. You can download a freeware light edition of EAGLE from [www.cadsoftusa.com](http://www.cadsoftusa.com) to load, view, and print the schematic and layout files.



# EPSON S1D13700 CONTROLLER

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The complete Epson *S1D13700F02 Embedded Memory Graphics LCD Controller Hardware Functional Specification* document number X42D-A-001-01, revision 1.4, issue date 2011/01/14 (134 pages) can be found here: [Epson S1D13700](#).

## CARE AND HANDLING PRECAUTIONS

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The kit is sold with a module mounted on it. If you attempt to modify the board to work with other modules, the warranty is void. Do not disassemble or modify the CFA-10018 Demonstration Board Kit.

For optimum operation of the module and demonstration board and to prolong their life, please follow the precautions below.

### ESD (ELECTRO-STATIC DISCHARGE)

The circuitry is industry standard CMOS logic and susceptible to ESD damage. Please use industry standard antistatic precautions as you would for any other PCB such as expansion cards or motherboards. Ground your body, work surfaces, and equipment.

### AVOID SHOCK, IMPACT, TORQUE, OR TENSION

- Do not expose the demonstration board and module to strong mechanical shock, impact, torque, or tension.
- Do not drop, toss, bend, or twist the demonstration board and module.
- Do not place weight or pressure on the demonstration board and module.

### OPERATION

- The module ships with a protective film over the display. Please peel off the protective film slowly. Peeling off the protective film abruptly may generate static electricity.
- Use only the included AC adapter to power the board.
- Observe the operating temperature limitations for the module: from -20°C minimum to +70°C maximum with minimal fluctuations. Operation outside of these limits may shorten the life and/or harm the display.
- Operate away from dust, moisture, and direct sunlight.

### CAUTION

All electronics may contain harmful substances. Avoid contamination by using care to avoid damage during handling. If any residues, gases, powders, liquids, or broken fragments come in contact with your skin, eyes, mouth, or lungs, immediately contact your local poison control or emergency medical center.

### CLEANING

- The polarizer (laminated to the glass) is soft plastic. The soft plastic is easily scratched or damaged. Be very careful when you clean the polarizer.
- Do not clean the polarizer with liquids. Do not wipe the polarizer with any type of cloth or swab (for example, Q-tips).



- Use the removable protective film to remove smudges (for example, fingerprints) and any foreign matter. If you no longer have the protective film, use standard transparent office tape (for example, Scotch® brand “Crystal Clear Tape”). If the polarizer is dusty, you may carefully blow it off with clean, dry, oil-free compressed air.

## STORAGE AND RECYCLING

- Store in an ESD-approved container away from dust, moisture, and direct sunlight.
- Observe the storage temperature limitations: from -30°C minimum to +80°C maximum with minimal fluctuations. Rapid temperature changes can cause moisture to form, resulting in permanent damage.
- Do not allow weight to be placed on the modules while they are in storage.
- Please recycle the demonstration board and module at an approved facility.