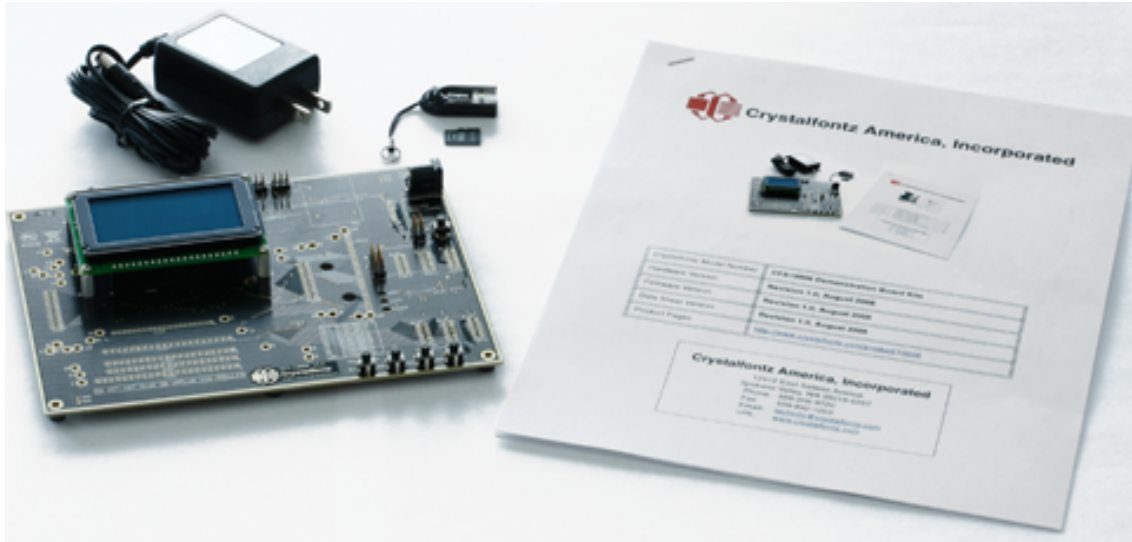




# Crystalfontz America, Incorporated

## CFA10009 Demonstration Board Kits User Guide



Crystalfontz Model Number	<b>CFA10009 Demonstration Board Kits (for OLEDs)</b>
Hardware Version	<b>Revision 1.1, June 2009</b>
Firmware Version	<b>Revision 1.0, June 2009</b>
Data Sheet Version	<b>Revision 1.1, December 2010</b>
Product Pages	<a href="http://www.crystalfontz.com/product/CFA10009.html">www.crystalfontz.com/product/CFA10009.html</a>

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## REVISION HISTORY

CFA10009 DEMONSTATION BOARD	
2009/06/25	Current demonstration board version: <b>v1.1</b> New demonstration board.

CFA10009 DEMONSTRATION BOARD KITS FIRMWARE	
2009/06/25	Current firmware version (series): <b>v1.0</b> Initial release.

CFA10009 DEMONSTRATION BOARD KITS USER GUIDE	
2010/12/10	Current Data Sheet version: <b>v1.1</b> In the table listing <a href="#">CFA10009 Kit Configurations (Pg. 3)</a> , <ul style="list-style-type: none"><li>● Added CFAL12832C-B-B1.</li><li>● Deleted modules in the series CFAL12864Z-xxx-B6xx. These modules are not available and/or do not work with the CFA10009 Demonstration Board.</li></ul>
2009/06/25	Data Sheet version: v1.0 New Data Sheet.

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## QUICK START

The CFA10009 demonstration board is shipped with a compatible OLED module of your choice installed and tested. Simply plug the power supply (included) into an AC outlet. The CFA10009 will initialize and turn on the display, then run the demonstration script from the included microSD card.

## INTRODUCTION

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The CFA10009 Demonstration Board Kit has everything you need to easily demonstrate and experiment with one compatible CrystalFontz OLED module. The kit can also be used as a reference for your designs that use a CrystalFontz OLED module listed in the table on the next page.

You can easily modify the miniBASIC scripts and bitmaps on the microSD card to make your own test screens, or even to 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 a simple, open-source format conversion utility ([Image2Code](#)) that we offer free of charge.

Beyond demonstrations, the CFA10009 allows you to easily measure current of the different portions of the circuit under operation.

The schematic, bill of materials, and even the PCB layout is available for download from our site. (As always, no registration is required.) Since the design materials are available before purchase, there is no risk of being "surprised" late in the design.

The CFA10009 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 CFA10009's versatile Atmel [ATMEGA2561](#) microcontroller using [AVR 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 CFA10009 is so versatile that you may want to use it as a base development platform for your projects.



## CFA10009 KIT CONFIGURATIONS

FOR OLED MODULE	WITH THIS CONTROLLER	ORDER THIS DEMONSTRATION BOARD KIT	BLOCK DIAGRAM
<a href="#">CFAL12822A-Y-B</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12822AYB</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12822A-Y-B1</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12822AYB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12832C-B-B1</a>	<a href="#">Sino Wealth SH1101A</a>	<a href="#">DMO-L12832CBB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12832C-W-B1</a>	<a href="#">Sino Wealth SH1101A</a>	<a href="#">DMO-L12832CWB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12864C-Y-B1</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864CYB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12864L-G-B2</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LGB2</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864L-Y-B2</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LYB2</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864L-G-B2TS</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LGB2TS</a>	<a href="#">Figure 4.</a>
<a href="#">CFAL12864L-Y-B2TS</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LYB2TS</a>	<a href="#">Figure 4.</a>
<a href="#">CFAL12864L-G-B4</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LGB4</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864L-Y-B4</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LYB4</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864L-G-B6</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LGB6</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864L-G- B6TS</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LGB6TS</a>	<a href="#">Figure 3.</a>
<a href="#">CFAL12864L-Y- B6TS</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LYB6TS</a>	<a href="#">Figure 3.</a>
<a href="#">CFAL12864L-W- B6TS</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L12864LWB6TS</a>	<a href="#">Figure 3.</a>
<a href="#">CFAL12864N-A-B1</a>	<a href="#">Sino Wealth SH1101A</a>	<a href="#">DMO-L12864NAB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12864S-Y-B1</a>	<a href="#">Solomon SSD1303</a>	<a href="#">DMO-L12864SYB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12864U-W-B1</a>	<a href="#">Solomon SSD1303</a>	<a href="#">DMO-L12864UWB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL12864Z-G-B2</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864ZGB2</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864Z-Y-B2</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864ZYB2</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864Z-G-B2TS</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864ZGB2TS</a>	<a href="#">Figure 4.</a>
<a href="#">CFAL12864Z-Y-B2TS</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864YB2TS</a>	<a href="#">Figure 4.</a>
<a href="#">CFAL12864Z-G-B4</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864ZGB4</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL12864Z-Y-B4</a>	<a href="#">Solomon SSD1325</a>	<a href="#">DMO-L12864ZYB4</a>	<a href="#">Figure 2.</a>
<a href="#">CFAL25664A-Y-B1</a>	<a href="#">ST STV8105</a>	<a href="#">DMO-L25664AYB1</a>	<a href="#">Figure 1.</a>
<a href="#">CFAL9664A-W-B1</a>	<a href="#">Solomon SSD1305</a>	<a href="#">DMO-L9664AWB1</a>	<a href="#">Figure 1.</a>



## CONTENTS OF DEMONSTRATION BOARD KIT

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- CFA10009 Demonstration Board (PCB).
- Installed OLED module of your choice. (Selected at time of ordering. See choices in the table above.)
- 110 VAC Power adapter.
- MicroSD memory card loaded with BASIC demonstration program and bitmap images.
- USB reader for the microSD memory card.

In addition to the kit contents, a zipped folder of hardware design and program files is available at <http://www.crystalfontz.com/product/CFA10009.html>. (Free download.)

## HOW TO MAKE A CUSTOM DEMONSTRATION

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The CFA10009 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 OLED module. The BASIC program can also read the four demonstration board buttons and change the brightness settings.

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

For the most recent version of the graphic conversion utility, sample scripts, and sample images for customizing the demonstration, download the zipped folder at <http://www.crystalfontz.com/product/CFA10009.html>.

## LOADING A CUSTOM HEX FILE

The CFA10009 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 "cfa10009.hex" and copy it into the root the directory of the microSD card. When the CFA10009 boots, the boot loader will program the ATMEGA2561's flash with "cfa10009.hex" and then execute it.

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



# HARDWARE DESIGN INFORMATION

## BLOCK DIAGRAM

Here are block diagrams of the CFA10009 Demonstration Board with different types of installed modules:

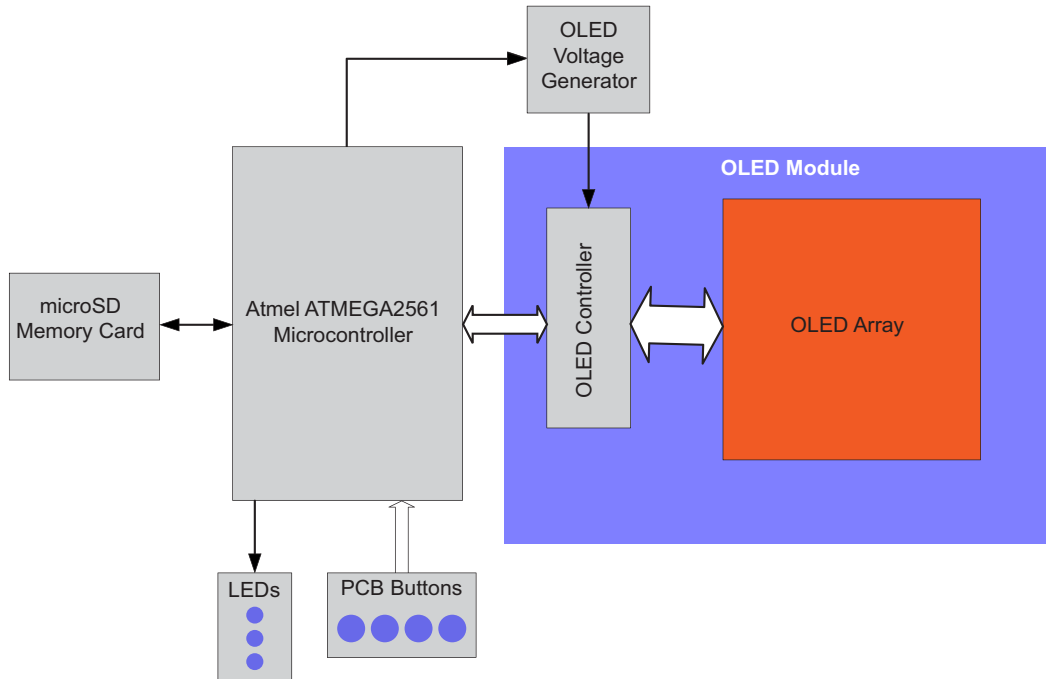


Figure 1. For kits with CFAL12822A-Y-B1, CFAL12832C-C-B1, CFAL12832C-W-B1, CFAL12864C-Y-B1, CFAL12864N-A-B1, CFAL12864S-Y-B1, CFAL25664A-Y-B1, and CFAL9664A-W-B1

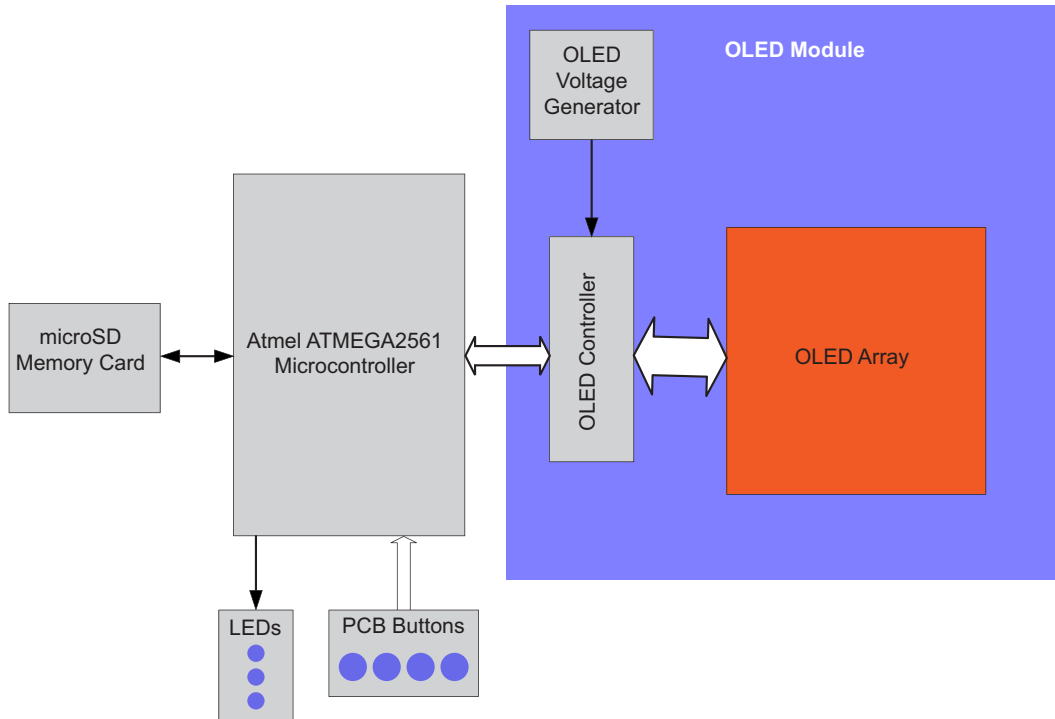


Figure 2. For kits with CFAL12822A-Y-B, CFAL12864L-G-B2, CFAL12864L-Y-B2, CFAL12864L-G-B4, CFAL12864L-Y-B4, CFAL12864L-G-B6, CFAL12864Z-G-B2, CFAL12864Z-Y-B2, CFAL12864Z-G-B4, CFAL12864Z-Y-B4, CFAL12864Z-G-B6, CFAL12864Z-W-B6, and CFAL12864Z-Y-B6

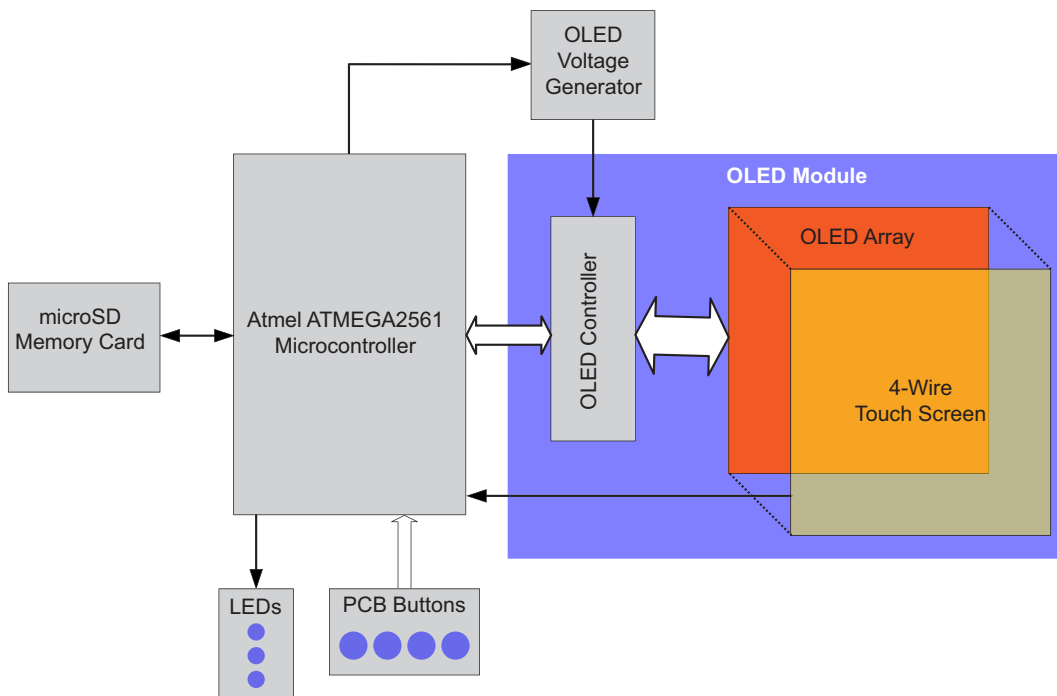


Figure 3. For kits with CFAL12864L-G- B6TS, CFAL12864L-Y- B6TS, and CFAL12864L-W- B6TS

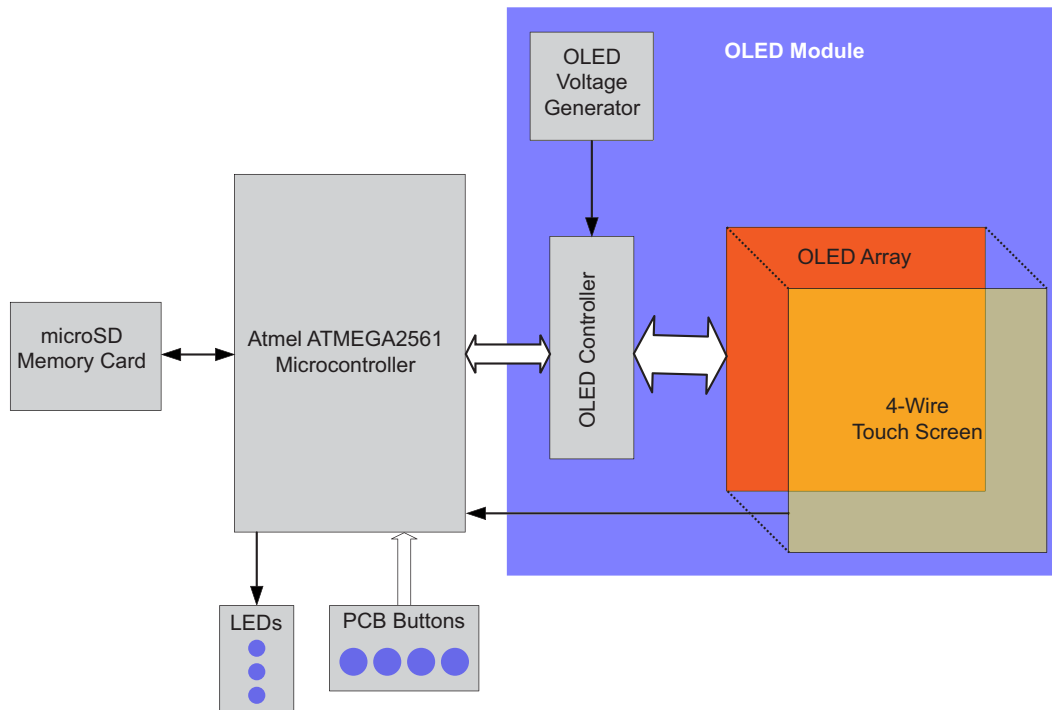


Figure 4. CFAL12864L-G-B2TS, CFAL12864L-Y-B2TS, CFAL12864L-G-B6TS, CFAL12864L-Y-B6TS, CFAL12864Z-G-B2TS, CFAL12864Z-Y-B2TS, CFAL12864Z-G-B6TS, CFAL12864Z-W-B6TS, and CFAL12864Z-Y-B6TS

## CONTENTS OF HARDWARE DESIGN FOLDER

The zipped folder at <http://www.crystalfontz.com/product/CFA10009.html> includes the complete hardware design of the CFA10009 Demonstration Board.

- Schematic.
- PCB layout.
- Bill Of Materials (BOM) as an XLS spreadsheet.
- Simple OLED initialization code and bitmap display code.

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 <http://www.cadsoft.de/> to load, view, and print the schematic and layout files.





## 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 CFA10009 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.

### 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.