



## 7-inch Zed Touch Display Kit Getting Started Guide

**Version 4.0**

## Document Control

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1.0	8/5/2013	Initial Release
2.0	9/12/2013	Added section on MicroZed. Updated product page links.
3.0	6/16/2015	Revised to cover ALI3 display kit. Added section on new MicroZed Carriers and Zynq Mini-ITX platform. Updated product page links.
4.0	9/18/2015	Revised to cover 2015.2 updated software.

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# Avnet Design Kit Technical Support Files and Downloads

## Web Access Instructions

Thank you for purchasing an Avnet design kit. The technical support documents associated with this kit, including the User Guide, Bill of Materials, Schematics, Source Code and Application Notes, are available online. You, the Customer, can access these documents at any time by visiting Avnet's Design Resource Center ("DRC") at: [avnet.com/us/drc/support](http://avnet.com/us/drc/support)

On your first visit to the DRC, You will be required to site register before you can download the documents. To get started, select the name of the manufacturer associated with your design kit from the drop down menu. A complete listing of available design kits will appear. Select the kit you purchased. Scroll to the bottom of the design kit page to access the support files. Before you download a file, you will be prompted to login. If you are an existing user, please login. If you are a new user, click on the "Need to sign-up?" text. Please complete the short registration form. Upon completion, be sure to retain your login and password information for future visits to Avnet's DRC. Logging in once, gives you unlimited access to all technical support files and downloads. You will also have the chance to request e-mail notifications whenever there are updates to your design kit.

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# 1 INTRODUCTION

This guide provides detailed information for getting started with the Avnet's 7-inch Zed Touch Display Kit attached to ZedBoard™, MicroZed™ (with a supported Carrier Card), or Zynq® Mini-ITX platform. This kit provides engineers with everything needed to develop products with interactive GUIs and touchscreen capabilities. The kit combines an 800 x 480 WVGA TFT-LCD display with an industrial projective capacitive touch sensor, I2C-based touch controller, LED backlight supply and all the necessary cables. The projected capacitive touch overlay provides enhanced touch ruggedness which is suitable for outdoor or industrial environments.

This Getting Started Guide will proceed through the steps to setup the 7-inch Zed Touch Display Kit attached to ZedBoard, MicroZed (with a supported Carrier Card), or Zynq Mini-ITX platform and run the out-of-box demonstration.

## **Additional Documentation**

Additional information and documentation on Xilinx's Zynq®-7000 All Programmable SoCs can be found at [www.xilinx.com/zynq](http://www.xilinx.com/zynq). Additional information and documentation on ZedBoard can be found at [www.zedboard.org](http://www.zedboard.org). Additional information and documentation on MicroZed (with a supported Carrier Card) or Zynq Mini-ITX platform can be found at [www.microzed.org](http://www.microzed.org).

## 1.1 What's Inside the Box



- 7-inch LCD display assembly
  - Sharp LQ070Y3LG4A LVDS 7-inch WVGA TFT-LCD with LED backlight
  - Avnet 7-inch Projected Capacitive (PCAP) touch overlay
  - PCAP controller board
  - ALI3 Sharp7 adapter
- Zed LCD interface
- Standard DisplayPort to Mini DisplayPort cable
- 12V power supply
- Mechanical mounting enclosure and stands
- Quick Start instructions

## 1.2 What's Available Online

- Development Kit Home Page - <http://www.microzed.org>
  - Reference Designs
  - Reference Software source files
  - Schematics
  - BOMs
  - White Papers
  - Technical Documentation
- Technical Support Forum - <http://www.microzed.org>

## 2 GETTING STARTED

This 7-inch Zed Touch Display Kit uses “Quick Start” demonstration applications for ZedBoard, MicroZed, or Zynq Mini- ITX targets, which is included in the Web download documentation package. You can run this demo by following the directions below for the appropriate target board.

### 2.1 Booting the 7-inch Zed Touch Display Kit attached to ZedBoard™

1. Download the Quick Start Demo SD Image from the website <http://www.zedboard.org>.
2. Un-zip, copy and paste the /ZEDBOARD/BOOT.bin file onto your SD Card. Plug the SD Card into the SD card slot (J12) on ZedBoard.
3. If not previously done, use the instructions available on <http://www.zedboard.org> to download and install the Cypress CY7C64225 USB-to-UART driver.
4. Connect the UART port of ZedBoard (J14) to a PC using the MicroUSB cable.
5. Ensure the following ZedBoard jumper settings are set.

MIO6	MIO5	MIO4	MIO3	MIO2	VADJ	JP6	JP2	OTHERS
GND	3V3	3V3	GND	GND	1V8	SHORTED	SHORTED	OPEN

6. Attach the Zed LCD Interface into JC1 and JD1 on ZedBoard.
7. Attach the provided DisplayPort cable from the Zed LCD Interface to the ALI3 Sharp7 Adapter on the back of the LCD assembly.
8. Connect 12V power to the ALI3 Sharp7 Adapter on the back of the LCD assembly. Make sure the ZedBoard power switch (SW8) is off. Connect 12V power supply to ZedBoard.



9. Verify cable connections and jumper positions.
10. Turn ZedBoard power switch (SW8) ON. The green POWER LED (LD13) on ZedBoard should illuminate.



11. After about 2 seconds, the blue DONE LED (LD12) on ZedBoard should illuminate and the “Configuring System Please Wait” screen should appear.



12. Wait approximately 10 seconds for the system configuration to complete and for the touch screen to calibrate its internal DAC.
13. When booting for the first time, you will be asked to calibrate the touch panel on the LCD Assembly. Calibration is performed by pressing on the sequence of three target images (shown below). The calibration data will be saved to QSPI flash on ZedBoard.



14. After calibration, the LCD Assembly should display this image.



15. You will be able to draw black dots on the panel by touching the LCD Assembly with your finger.



## 2.2 Running the Display Kit Demo on ZedBoard

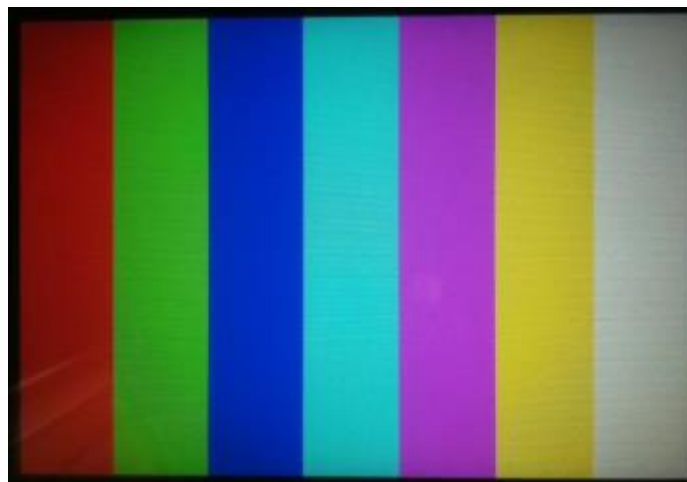
1. Use Device Manager to determine the COM Port. Open a Terminal Program and configure to 115200/8/n/1/n.
2. Reset the Zynq SoC on ZedBoard by pressing and releasing the PS-RST button (BTN7).
3. In the Terminal Window, a simple standalone image (shown below) should boot with functionality that demonstrates the basic capabilities of the 7-inch Zed Touch Display Kit attached to ZedBoard.

```
COM7:115200baud - Tera Term VT
File Edit Setup Control Window Help
-----
                ZedBoard Display Kit                --
                ALI3 Controller Demonstration        --
                Standalone Application                --
                -----
Video DMA (Output Side) Initialization ...
FlashID=0x1 0x2 0x19
I2C Touch Controller Initialization ...
Clicktouch slave device discovered at address 0x1F
-----
                +/+
                NNm
                oNm
                :+o/:
                :++-  -///:
                :+o/oy+
                /ymmmmdmy+//
                hm/
                mmdo/-..//hdmNNNNNNNNNNNNNNmdds/:
                NNNNmmmNNNNNNNNNNNNNNNNNNNNNd
                smNNNNNNNNNNNNNNhssssshhNNNNNNNy
                sshNNNNNNhss/
                .-oydso
                :+
                :ohhhhhhhhy+:::++hhhNNNNNNNN
                :/hdNNNNNNNNNNNNNNNNNNNNNNNNNNh+
                :+hNNNNNNNNNNNNNNNNNNNNNNNNNNyy
                .ohNNNNNNNNNNNNNNdhyyydNNNNNNNNmyy-
                hNNNNNNNNNNNNNd+y+
                dNNNNNNNNh+
                +hNNNNdh+
                :shNh-
                :+o+sy:-
                ://oooso/---
                :ooy+
                :yNy
                :NN-
                oNNy
                NNNs
                NNNN
                -NNNN
                'NNNNN
                +NNNNNN
                oNNNNs
                oNNNNdo-
                -o hNNNNNNmy
                +mNNNNNNNNNNNNNNNNNNNNm-
                /mNNNNNNNNNNNNNNNNNNNNm+
                ++dmmNNNNNNNNmmd++
                .++++++
oddddNNN          dNN  dNNdddms-          dNN+
-mh:              NN   NN  oNN              NN+
hNo              /yyyyo  :yyyyyNN  /yyyy:  /yyyyyy  yyy'-yy -yyyyNN+
:hd+             dNooooNy hN:--sNN  NN---:Nd/ dN---:Ny hN---yNN  -NNdy+-yNy---NN+
/Ny.' dd-  NNs--/s+ mN: /NN  NN'':NNh NN: /Ny NN. /NN'  NN.  dN/  .NN+
oNNmmmmNN-  'oNddm/  'omddmNN  NNmmmNs+  'odddd+  'omdddNNm  mN  /hddmhN+
-----
                Zed Display Kit Demonstration
-----
AUNET>
```

4. Type "help" to see the command options available. You should see this:

```
AUNET>help
-----
                        Text-based Console for
                        Zed Display Kit Demonstration
-----
General Commands:
colorbars  Display colorbars pattern to display
control    Display control panel
calibrate  Calibrate touch
delay      Wait for specified delay
help       Print the Top-Level menu Help Screen
iic        IIC accesses on Zed Display Kit
vdma       Display UDMA status
logo       Display logo to display
men        Memory accesses
pcap       Display status of last PCAP touch event
quit       Exit console <if applicable>
verbose    Toggle verbosity on/off
-----
AUNET>
```

5. Type the "colorbars" command. You should see this on the LCD Assembly.



6. Type the "logo" command. You should see the original image shown at startup.



7. Type the “control start” command. The image shown below allows the user to control the status of LED0-LED7 on ZedBoard while monitoring the status of SW0-SW7 and BTNU, BTNC, BTND, BTNR and BTNL on ZedBoard.



8. Users can switch between the “control” and “colorbars” by pressing the following BTN8 or BTN9 on ZedBoard.
9. When you are done, run the command “quit” and then disconnect the USB cable from ZedBoard.

### **Congratulations!**

You have now run the 7-inch Zed Touch Display Kit reference design through ZedBoard to exercise the LCD Assembly’s capabilities. Using this fully functional standalone reference design, you can leverage the underlying low level design to accelerate your own Zynq application development.

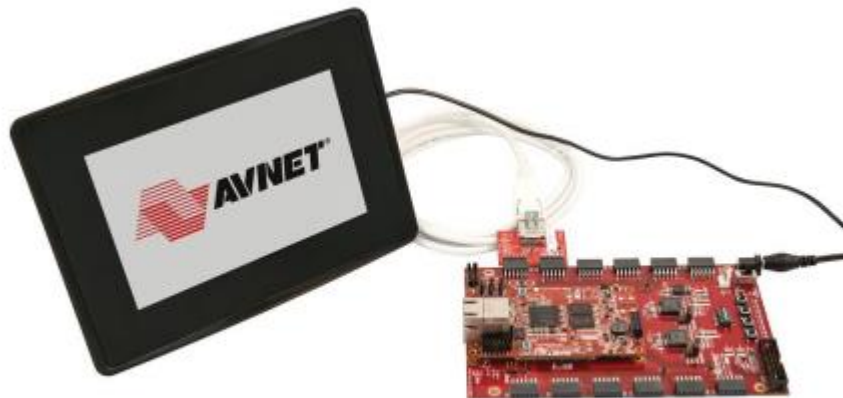
## 2.3 Booting the 7-inch Zed Touch Display Kit with MicroZed with I/O Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the I/O Carrier Card. More information on the I/O Carrier Card can be found at <http://www.microzed.org>.*

1. Download the Quick Start Demo SD Image from the website <http://www.microzed.org>.
2. Un-zip, copy and paste the **/MZ7010\_IOCC/BOOT.bin** file onto your microSD card. (If you are using the MicroZed 7020 SOM rather than the 7010 version, use the **/MZ7020\_IOCC/BOOT.bin** file instead) Plug the microSD card into the microSD card slot (J6) on MicroZed.
3. Ensure the following MicroZed jumper settings are set for microSD booting.

JP1	JP2	JP3
1-2	2-3	2-3

4. Attach the MicroZed to the I/O Carrier Card.
5. Set the I/O Carrier Card VADJ select jumper (CON4) to 1-2 position to select the 3.3V setting.
6. Attach the Zed LCD Interface into JA and JB on the I/O Carrier Card.
7. Attach the DisplayPort cable from the Zed LCD Interface to the ALI3 Sharp7 Adapter on the back of the LCD assembly.
8. Make sure the I/O Carrier Card power switch (SW5) is off. Connect the **5V** power supply to the I/O Carrier Card.
9. Connect **12V** power supply to the ALI3 Sharp7 Adapter (CON4) on the back of the LCD assembly.
10. Verify cable connections and jumper positions.



11. Turn I/O Carrier Card power switch (SW5) ON. The green Power Good LED (D5) on MicroZed and the green Power Good LED (LED10) should illuminate.

12. After about 2 seconds, the blue Done LED (D2) on MicroZed and the blue DONE LED (LED9) on the I/O Carrier Card should illuminate and the “Configuring System Please Wait” screen should appear.



13. Wait approximately 10 seconds for the system configuration to complete and for the touch screen to calibrate its internal DAC.
14. When booting for the first time, you will be asked to calibrate the touch panel on the LCD Assembly. Calibration is performed by pressing on the sequence of three target images (shown below). The calibration data will be saved to the MicroZed’s QSPI flash.



15. After calibration, the LCD Assembly should display this image.



16. You will be able to draw black dots on the panel by pressing the LCD Assembly with your finger.





## 2.4 Running the Display Kit Demo on MicroZed with I/O Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the I/O Carrier Card. More information on the I/O Carrier Card can be found at <http://www.microzed.org>.*

1. If not previously done, use the instructions available on <http://www.microzed.org> to download and install the Silicon Labs CP2104 USB-to-UART driver.
2. Connect the UART port of MicroZed (J2) to a PC using the MicroUSB cable.
3. Use Device Manager to determine the COM Port. Open a Terminal Program and configure to 115200/8/n/1/n.
4. Reset the Zynq SoC on MicroZed by pressing and releasing the RST button (SW2) on the MicroZed SOM.
5. In the Terminal Window, a simple standalone image (shown below) should boot with functionality that demonstrates the basic capabilities of the 7-inch Zed Touch Display Kit attached to MicroZed (with I/O Carrier Card).

```
COM14:115200baud - Tera Term VT
File Edit Setup Control Window Help
-----
                Zed Display Kit
                ALI3 Controller Demonstration
                Standalone Application
                -----

Video DMA <Output Side> Initialization ...
FlashID=0x1 0x20 0x18
I2C Touch Controller Initialization ...
Clicktouch slave device discovered at address 0x1F

-----
                :2HBA3i;          ir:
                rH002;:::r5h93Xsr, G000s
                9002::S3hH00000000000#i r000r
                30#:r2AH#00000000000H#000#r X00h
                ;00; shr i00##B&&&&H#000000& r00X
                .90X ;#0;          s#BM0X.    .ACM s00r
                AEi ;000s          SG.         r05 009.
                AE2 i0MAB0#;.i0000000#r      r00  A0M:
                r; r#00AB00000000M;r;r      r0000 &0#;
                00AA005 .#00     2h&AAAHAM00M#h #0A.
                00AH3          .#00000000000#A0M, 00i
                .00#i          .B0000000#000Xs20002 .H00,
                00##2          ..S000ii,    02 B00s
                r0r ;0000r i0HG25;         22 i003
                h00 r000000000000000000i      rH
                :000 .00000000#####00000   #0
                ;000;.H00000##000000000;      900s
                ,0000;.2A####AXr. ;#0000000;
                i0000H:          :.h#MS.
                ;&000000#HAAB0000000s
                .:rs2hAHBBH&35s;:.

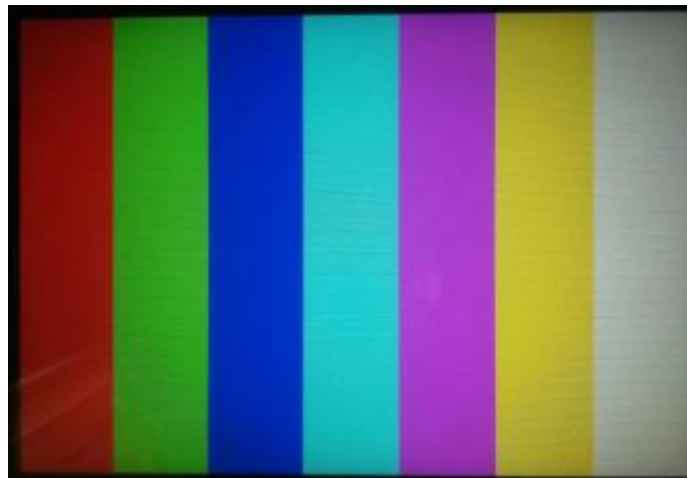
                :.000000r      :.00h,
                :.000.          :.00.
                ;.i;          ;SS; .ir. :s, ,sSir      r#r      ;ri5; .r;0A,
                :00X 002:0H .B0#000r,0000009B00M000r .#0r      M00sM00. A000003,
                .0000000;.0G 30: .r. 00S: ;0& s00 200. :00Hix00Sic: 0H,
                ,0# 00A 0s 0A s05 .0G ,0& :00i 00M;00i A05.A0r ,SX s02 :0M:
                ,#2 02.0# A00000i ,00 H000#. #0000000i h0000h #000002:

-----
                Zed Display Kit Demonstration
                -----
AUNET>
```

6. Type "help" to see the command options available. You should see this:

```
AUNET>help
-----
                        Text-based Console for
                        Zed Display Kit Demonstration
-----
General Commands:
colorbars  Display colorbars pattern to display
control    Display control panel
calibrate  Calibrate touch
delay      Wait for specified delay
help       Print the Top-Level menu Help Screen
iic        IIC accesses on Zed Display Kit
udma       Display UDMA status
logo       Display logo to display
mem        Memory accesses
pcap       Display status of last PCAP touch event
quit       Exit console (if applicable)
verbose    Toggle verbosity on/off
-----
AUNET>
```

7. Type the "colorbars" command. You should see this on the LCD Assembly.



8. Type the "logo" command. You should see the original image shown at startup



9. Type the “control start” command. The image shown below allows the user to control the status of LED1-LED8 on the I/O Carrier Card while monitoring the status of SW1 and BTN1-BTN4 on the I/O Carrier Card.



10. Users can switch between the “control” and “colorbars” by pressing SW1 button on MicroZed SOM.
11. When you are done, run the command “quit” and then disconnect the USB cable from MicroZed. Turn power off

### **Congratulations!**

You have now run the 7-inch Zed Touch Display Kit reference design through MicroZed (with I/O Carrier Card) to exercise the LCD Assembly’s capabilities. Using this fully functional standalone reference design, you can leverage the underlying low level design to accelerate your own Zynq application development.

## 2.5 Booting the 7-inch Zed Touch Display Kit with MicroZed with FMC Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the FMC Carrier Card. More information on the FMC Carrier Card can be found at <http://www.microzed.org>.*

1. Download the Quick Start Demo SD Image from the website <http://www.microzed.org>.
2. Un-zip, copy and paste the **/MZ7010\_FMCCC/BOOT.bin** file onto your microSD card. (If you are using the MicroZed 7020 SOM rather than the 7010 version, use the **/MZ7020\_FMCCC/BOOT.bin** file instead) Plug the microSD card into the microSD card slot (J6) on MicroZed.
3. Ensure the following MicroZed jumper settings are set for microSD booting.

JP1	JP2	JP3
1-2	2-3	2-3

4. Attach the MicroZed to the FMC Carrier Card.
5. Set the FMC Carrier Card VADJ select jumper (J6) to 1-2 position to select the 3.3V setting.
6. Attach the Zed LCD Interface into JA and JB on the FMC Carrier Card.
7. Attach the DisplayPort cable from the Zed LCD Interface to the ALI3 Sharp7 Adapter on the back of the LCD assembly.
8. Make sure the FMC Carrier Card power switch (SW3) is off. Connect the **12V** power supply to the FMC Carrier Card.
9. Connect **12V** power supply to the ALI3 Sharp7 Adapter (CON4) on the back of the LCD assembly.
10. Verify cable connections and jumper positions.



11. Turn FMC Carrier Card power switch (SW3) ON. The green Power Good LED (D5) on MicroZed and the green Power Good LED (LED6) should illuminate.

12. After about 2 seconds, the blue Done LED (D2) on MicroZed and the blue Done LED (LED5) on the FMC Carrier Card should illuminate and the “Configuring System Please Wait” screen should appear.



13. Wait approximately 10 seconds for the system configuration to complete and for the touch screen to calibrate its internal DAC.
14. When booting for the first time, you will be asked to calibrate the touch panel on the LCD Assembly. Calibration is performed by pressing on the sequence of three target images (shown below). The calibration data will be saved to the MicroZed’s QSPI flash.



15. After calibration, the LCD Assembly should display this image.



16. You will be able to draw black dots on the panel by pressing the LCD Assembly with your finger



## 2.6 Running the Display Kit Demo on MicroZed with FMC Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the FMC Carrier Card. More information on the FMC Carrier Card can be found at <http://www.microzed.org>.*

1. If not previously done, use the instructions available on <http://www.microzed.org> to download and install the Silicon Labs CP2104 USB-to-UART driver.
2. Connect the UART port of MicroZed (J2) to a PC using the MicroUSB cable.
3. Use Device Manager to determine the COM Port. Open a Terminal Program and configure to 115200/8/n/1/n.
4. Reset the Zynq SoC on MicroZed by pressing and releasing the RST button (SW2) on the MicroZed SOM.
5. In the Terminal Window, a simple standalone image (shown below) should boot with functionality that demonstrates the basic capabilities of the 7-inch Zed Touch Display Kit attached to MicroZed (with FMC Carrier Card).

```
COM14:115200baud - Tera Term VT
File Edit Setup Control Window Help
-----
                Zed Display Kit
                ALI3 Controller Demonstration
                Standalone Application
                -----

Video DMA <Output Side> Initialization ...
FlashID=0x1 0x20 0x18
I2C Touch Controller Initialization ...
Clicktouch slave device discovered at address 0x1F

-----
                ;2HBA3i;                ;r:
                rHE02;::;r5h93XsR, G000s
                .9002::;S3hH000000000000#i r000r
                30#: .r2AH#000000000000H#0000#r X00h
                ;00; s#r i00##B&&&&H#00000000 r00X
                .90X #0; s#BM0X. .A0M s00r
                A0i ;000s SG. r05 009
                A02 i0MAB0#: i0000000#r r00 A0M:
                r; r#0AAB00000000M;r#r r0000 &0#;
                00A0M05 .#00 .2h&AAAHAM00M#h #00.
                .00AH3 .#000000000000#A0M. 00i
                .00#i .B0000000##000Xs20002 .H00.
                00##2 .S000ii. .02 B00s
                r0r ;0000r i0HG25; .22 i003
                h00 r0000000000000000i rH
                :000 .00000000##00000000 #0
                ;000; .H0000000##00000000; 900s
                .0000; ;2A####AXr. ;#0000000;
                i0000H: ;2A####AXr. ;h#MS.
                ;&000000##HAA00000000s
                .:rs2hAHBBH&35s;:;

                ;0B.                ;000000.                ;00h.
                ;i;                ;SS; .ir. ;s. sSir                ;r#r                ;r#5;                ;r;:0A.
                :00X .002:0H .B0#000r .0000009B00M000r #0r M00sM00. A000003.
                .00000000;0G 30: .r. .00S: ;0& s00 200. :00Hix00Sic: 0H:
                .0# 00A 0s 0A s05 .0G .0& :00i 00M;00i A05.A0r .SX s02 :0M:
                .#2 02.0# A00000i .00 H000#. #0000000i h0000h #000002:

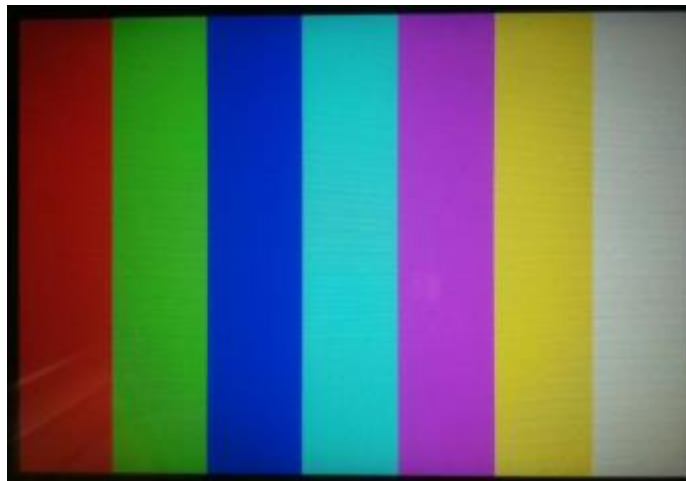
-----
                Zed Display Kit Demonstration
                -----

AUNET>
```

6. Type "help" to see the command options available. You should see this:

```
AUNET>help
-----
                        Text-based Console for
                        Zed Display Kit Demonstration
-----
General Commands:
colorbars  Display colorbars pattern to display
control    Display control panel
calibrate  Calibrate touch
delay      Wait for specified delay
help       Print the Top-Level menu Help Screen
iic        IIC accesses on Zed Display Kit
udma       Display UDMA status
logo       Display logo to display
men        Memory accesses
pcap       Display status of last PCAP touch event
quit       Exit console <if applicable>
verbose    Toggle verbosity on/off
-----
AUNET>
```

7. Type the "colorbars" command. You should see this on the LCD Assembly.



8. Type the "logo" command. You should see the original image shown at startup





9. Type the “control start” command. The image shown below allows the user to control the status of LED1-LED4 while monitoring the status of BTN1-BTN2 on the FMC Carrier Card.



10. Users can switch between the “control” and “colorbars” by pressing SW1 button on MicroZed SOM.
11. When you are done, run the command “quit” and then disconnect the USB cable from MicroZed. Turn power off.

### **Congratulations!**

You have now run the 7-inch Zed Touch Display Kit reference design through MicroZed (with FMC Carrier Card) to exercise the LCD Assembly’s capabilities. Using this fully functional standalone reference design, you can leverage the underlying low level design to accelerate your own Zynq application development.

## 2.7 Booting the 7-inch Zed Touch Display Kit with MicroZed with EMBV Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the Embedded Vision (EMBV) Carrier Card. More information on the EMBV Carrier Card can be found at <http://www.microzed.org>.*

1. Download the Quick Start Demo SD Image from the website <http://www.microzed.org>.
2. Un-zip, copy and paste the **/MZ7010\_EMBV/BOOT.bin** file onto your microSD card. (If you are using the MicroZed 7020 SOM rather than the 7010 version, use the **/MZ7020\_EMBV/BOOT.bin** file instead) Plug the microSD card into the microSD card slot (J6) on MicroZed.
3. Ensure the following MicroZed jumper settings are set for microSD booting.

JP1	JP2	JP3
1-2	2-3	2-3

4. Attach the MicroZed to the EMBV Carrier Card.
5. Attach the Zed LCD Interface into JD and JC on the EMBV Carrier Card.
6. Attach the DisplayPort cable from the Zed LCD Interface to the ALI3 Sharp7 Adapter on the back of the LCD assembly.
7. Make sure the EMBV Carrier Card power switch (SW2) is off. Connect the **5V** power supply or POE power to the EMBV Carrier Card.
8. Connect **12V** power supply to the ALI3 Sharp7 Adapter (CON4) on the back of the LCD assembly.
9. Verify cable connections and jumper positions.



10. Turn FMC Carrier Card power switch (SW2) ON. The green Power Good LED (D5) and the green Power Good LED (LED6) should illuminate.

11. After about 2 seconds, the blue Done LED (D2) on MicroZed and the blue Done LED (LED2) on the EMBV Carrier Card should illuminate and the “Configuring System Please Wait” screen should appear.



12. Wait approximately 10 seconds for the system configuration to complete and for the touch screen to calibrate its internal DAC.
13. When booting for the first time, you will be asked to calibrate the touch panel on the LCD Assembly. Calibration is performed by pressing on the sequence of three target images (shown below). The calibration data will be saved to the MicroZed’s QSPI flash.



14. After calibration, the LCD Assembly should display this image.



15. You will be able to draw black dots on the panel by pressing the LCD Assembly with your finger.



## 2.8 Running the Display Kit Demo on MicroZed with EMBV Carrier

*NOTE: Running the following demonstration requires attaching MicroZed to the Embedded Vision (EMBV) Carrier Card. More information on the EMBV Carrier Card can be found at <http://www.microzed.org>.*

1. If not previously done, use the instructions available on <http://www.microzed.org> to download and install the Silicon Labs CP2104 USB-to-UART driver.
2. Connect the UART port of MicroZed (J2) to a PC using the MicroUSB cable.
3. Use Device Manager to determine the COM Port. Open a Terminal Program and configure to 115200/8/n/1/n.
4. Reset the Zynq SoC on MicroZed by pressing and releasing the RST button (SW2) on the MicroZed SOM.
5. In the Terminal Window, a simple standalone image (shown below) should boot with functionality that demonstrates the basic capabilities of the 7-inch Zed Touch Display Kit attached to MicroZed (with EMBV Carrier Card).

```
COM14:115200baud - Tera Term VT
File Edit Setup Control Window Help
-----
                Zed Display Kit
                ALI3 Controller Demonstration
                Standalone Application
-----

Video DMA <Output Side> Initialization ...
FlashID=0x1 0x20 0x18
I2C Touch Controller Initialization ...
Clicktouch slave device discovered at address 0x1F

-----
                ;2HBA3i;                ;r:
                rH002;::;r5h93XSr, G000S
                9002::;S3hH000000000000i r000r
                30#: r2AH#0000000000000000#r X00h
                ;00; sHr i00##B&&&&H#000000& r00X
                .90X #0; s#BM0X. .ACM s00r
                AEi ;000s SG. r05 009
                AE2 iEMAB0#: .i00000000#r r00 A0M:
                r; r#00AB00000000M;r r0000 &0#;
                00A005 .#00 2h&AAAHAM00M#h #00
                .00AH3 . #00000000000#A0M, 00i
                .00#i .BG000000#000Xs20002 .H00
                00##2 ..S000ii, .02 B00s
                r0r ;00000, i0HG25; 22 i003
                h00 r000000000000000000i rH
                :000 .0000000000000000 #0
                ;000; .H0000000000000000; 900s
                .0000: ;2A####AXr. ;#0000000;
                i00000: ;: .h#MS.
                ;&000000#HAAB000000s
                .:rs2hAHBBH&35s;:.

                ;0B,                ;:
                ;: i; ;SS; .ir .s, ,sSir r#r ;ri5; .r;:0A
                :00X .002:0H .B0#000r,0000009B00M000r .#0r M00sM00. A000003
                .00000000;0G 30: .r. .00S: ;0& s00 200. :00Hix00Si0: 0H:
                ,0# 00A 0s 0A s05 .0G ,0& :00i 00M;00i A05 .A0r .SX s02 :0M:
                ,#2 02.0# A000000i ,00 H000#. #00000000i h0000h #000002:

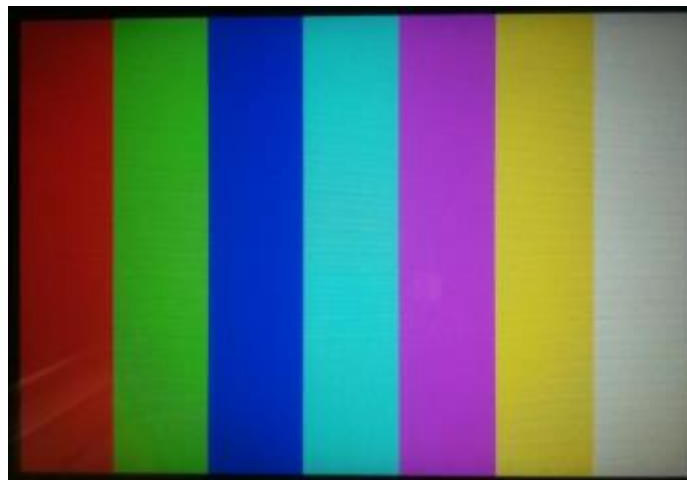
-----
                Zed Display Kit Demonstration
-----

AUNET>
```

6. Type "help" to see the command options available. You should see this:

```
AUNET>help
-----
                        Text-based Console for
                        Zed Display Kit Demonstration
-----
General Commands:
colorbars  Display colorbars pattern to display
control    Display control panel
calibrate  Calibrate touch
delay      Wait for specified delay
help       Print the Top-Level menu Help Screen
iic        IIC accesses on Zed Display Kit
vdma       Display UDMA status
logo       Display logo to display
men        Memory accesses
pcap       Display status of last PCAP touch event
quit       Exit console <if applicable>
verbose    Toggle verbosity on/off
-----
AUNET>
```

7. Type the "colorbars" command. You should see this on the LCD Assembly.



8. Type the "logo" command. You should see the original image shown at startup



9. Type the “control start” command. The image shown below allows the user to control the status of LED0-LED1 while monitoring the status of BTN0-BTN1 on the FMC Carrier Card.



10. Users can switch between the “control” and “colorbars” by pressing SW1 button on MicroZed SOM.
11. When you are done, run the command “quit” and then disconnect the USB cable from MicroZed. Turn power off.

### **Congratulations!**

You have now run the 7-inch Zed Touch Display Kit reference design through MicroZed (with EMBV Carrier Card) to exercise the LCD Assembly’s capabilities. Using this fully functional standalone reference design, you can leverage the underlying low level design to accelerate your own Zynq application development.

## 2.9 Booting the 7-inch Zed Touch Display Kit with Zynq Mini-ITX

1. Download the Quick Start Demo SD Image from the website <http://www.microzed.org>.
2. Un-zip, copy and paste the **/MITXZ7045/BOOT.bin** file onto your microSD card. (If you are using the Zynq Mini- ITX 7Z100 rather than the 7Z045 version, use the **/MITXZ7100/BOOT.bin** file instead) Plug the microSD card into the microSD card slot (J6) on Zynq Mini-ITX.
3. Ensure the following Mini-ITX jumper settings are set for microSD booting.

SW7_1	SW7_2	SW7_3	SW7_4	SW7_5
OFF	OFF	ON	ON	OFF

4. Set I2C mode select jumper (JP12) to 1-2 position which selects Programmable Logic I2C master mode.
5. Set the VADJ select jumper (JP7) to 3-4 position to select the 2.5V setting.
6. Attach the DisplayPort cable to the ALI3 display connector (P3) connector on Zynq Mini-ITX.
7. Attach the other end of the DisplayPort cable to the ALI3 Sharp7 Adapter on the back of the LCD assembly.
8. Make sure the Zynq Mini-ITX power switch (SW12) is off. Connect the ITX power supply to the Zynq Mini-ITX platform.
9. Connect 12V power supply to the ALI3 Sharp7 Adapter (CON4) on the back of the LCD assembly.
10. Turn the Zynq Mini-ITX power switch (SW12) ON. The green power rail LEDs (D18-D25) should illuminate.
11. After about 2 seconds, the blue Done LED (D3) on Zynq Mini-ITX should illuminate and the “Configuring System Please Wait” screen should appear.



12. Wait approximately 10 seconds for the system configuration to complete and for the touch screen to calibrate its internal DAC.
13. When booting for the first time, you will be asked to calibrate the touch panel on the LCD Assembly. Calibration is performed by pressing on the sequence of three target images (shown below). The calibration data will be saved to the Zynq Mini-ITX QSPI flash.





14. After calibration, the LCD Assembly should display this image.



15. You will be able to draw black dots on the panel by pressing the LCD Assembly with your finger.



## 2.10 Running the Display Kit Demo on Mini-ITX

1. If not previously done, use the instructions available on <http://www.microzed.org> to download and install the Silicon Labs CP2104 USB-to-UART driver.
2. Connect the UART port of Zynq Mini-ITX (J7) to a PC using the MicroUSB cable.
3. Use Device Manager to determine the COM Port. Open a Terminal Program and configure to 115200/8/n/1/n.
4. Reset the Zynq SoC on Mini-ITX by pressing and releasing the PS\_POR# button (SW8).
5. In the Terminal Window, a simple standalone application (shown below) should boot with functionality that demonstrates the basic capabilities of the 7-inch Zed Touch Display Kit attached to Zynq Mini-ITX.

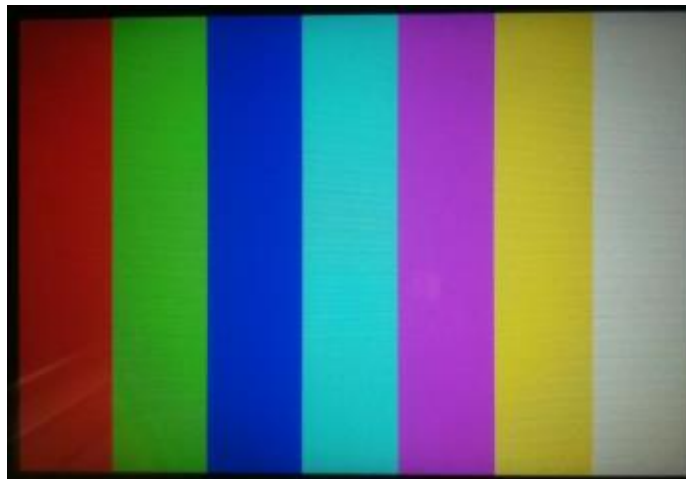


```
COM5:115200baud - Tera Term VT
File Edit Setup Control Window Help
-----
Zynq Mini-ITX Display Kit
ALI3 Controller Demonstration
Standalone Application
-----
Video DMA <Output Side> Initialization ...
FlashID=0x1 0x20 0x18
I2C Touch Controller Initialization ...
Clicktouch slave device discovered at address 0x1F
Unknown slave device discovered at address 0x70
-----
      e      e      eeeeeeee  eeeeeeee  eee  eee
     ee  ee  eeeeeeee  eeeeeeee  eee  eee
    e e e e e      e      e      e      e      e
   e e e e e      e      e      e      e      e
  e e e e e      e      e      e      e      e
 e e e e e      e      e      e      e      e
e e e e e      e      e      e      e      e
-----
Zynq Mini-ITX Display Kit Demonstration
-----
AUNET>
```

6. Type "help" to see the command options available. You should see this:

```
AUNET>help
-----
                        Text-based Console for
                        Zynq Mini-ITX Display Kit Demonstration
-----
General Commands:
colorbars  Display colorbars pattern to display
control    Display control panel
calibrate  Calibrate touch
delay      Wait for specified delay
help       Print the Top-Level menu Help Screen
iic        IIC accesses on Zynq Mini-ITX Display Kit
udma       Display UDMA status
logo       Display logo to display
mem        Memory accesses
pcap       Display status of last PCAP touch event
quit       Exit console <if applicable>
verbose    Toggle verbosity on/off
-----
AUNET>
```

7. Type the "colorbars" command. You should see this on the LCD Assembly.



8. Type the "logo" command. You should see the original image shown at startup



9. Type the “control start” command. The image shown below allows the user to control the user LEDs D4- D11 while monitoring the status of SW3-SW6 buttons and SW2 switch on the Zynq Mini-ITX.



10. When you are done, run the command “quit” and then disconnect the USB cable from Zynq Mini-ITX. Turn power off.

### **Congratulations!**

You have now run the 7-inch Zed Touch Display Kit reference design using the Zynq Mini-ITX platform to exercise the LCD Assembly’s capabilities. Using this fully functional standalone reference design, you can leverage the underlying low level design to accelerate your own Zynq application development.

### 3 GETTING HELP AND SUPPORT

Contact Avnet Support for any questions regarding the 7-inch Zed Touch Display Kit reference design or kit hardware at <http://www.microzed.org>.

The latest source files for the Quick Start Demo SD Image targeting the Xilinx Vivado Design Suite are available on the Avnet Github repository. For instructions on how to obtain the source code for a particular Reference Design/Tutorial, please see the PDF documentation included with the Reference Design/Tutorial archive downloaded from [the http://www.microzed.org](http://www.microzed.org) Reference Design/Tutorial page.