/MINIZED™

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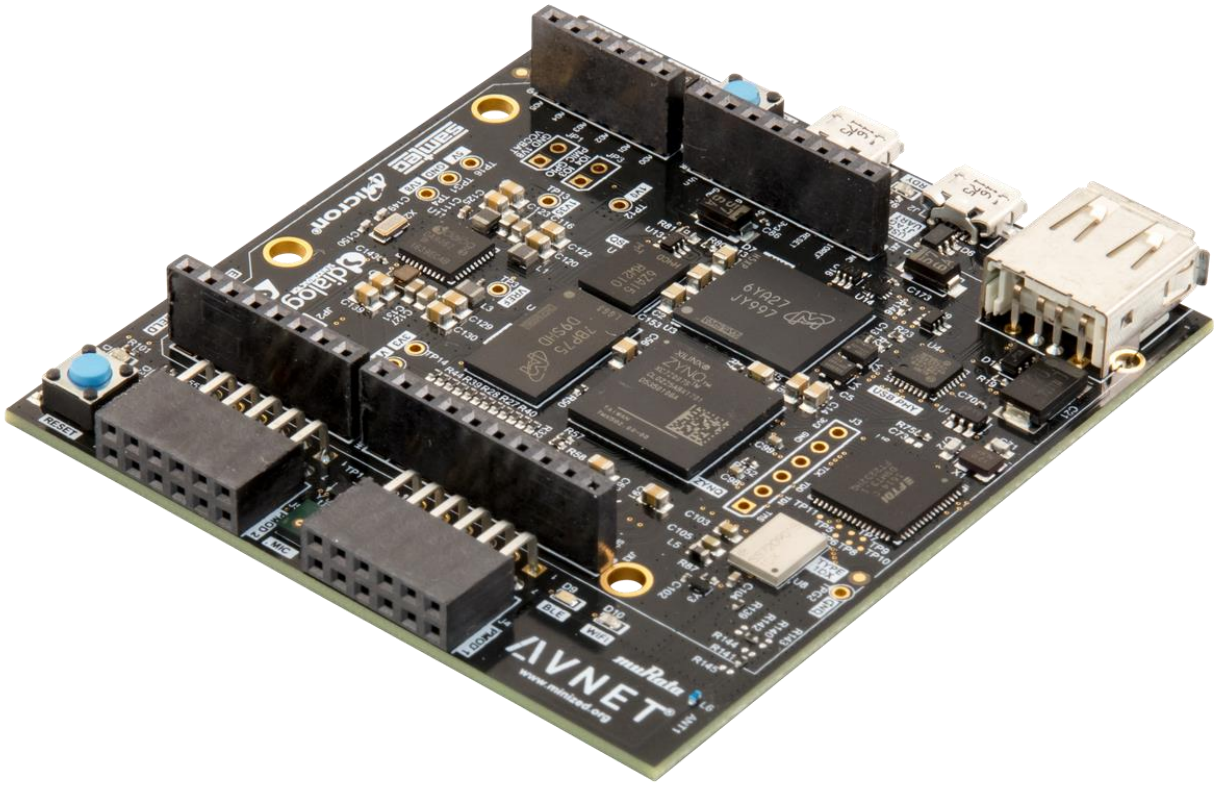


# MiniZed Getting Started Guide

**Version 1.2**





LIT# MiniZed-GSG-v1-1-V1

# Document Control

**Document Version:** 1.2

**Document Date:** 21 May 2018

## Prior Version History

| Version | Date | Comment |
|---|---|---|
| 1.0 | 12 Jun 2017 | Initial MiniZed Hardware User Guide |
| 1.1 | 22 Jun 2017 | Fixed a formatting problem with Appendix A |
| 1.2 | 21 May 2018 | Fixed an error about the USB stick on page 10 |

# Contents

# Figures

# 1 Getting Started with MiniZed

The Avnet MiniZed enables hardware and software developers to explore the capabilities of the Zynq™-7000 All Programmable SoC Single-Core. Designers can create or evaluate designs for both the Zynq Processor Subsystem (PS) and the Programmable Logic (PL) fabric.

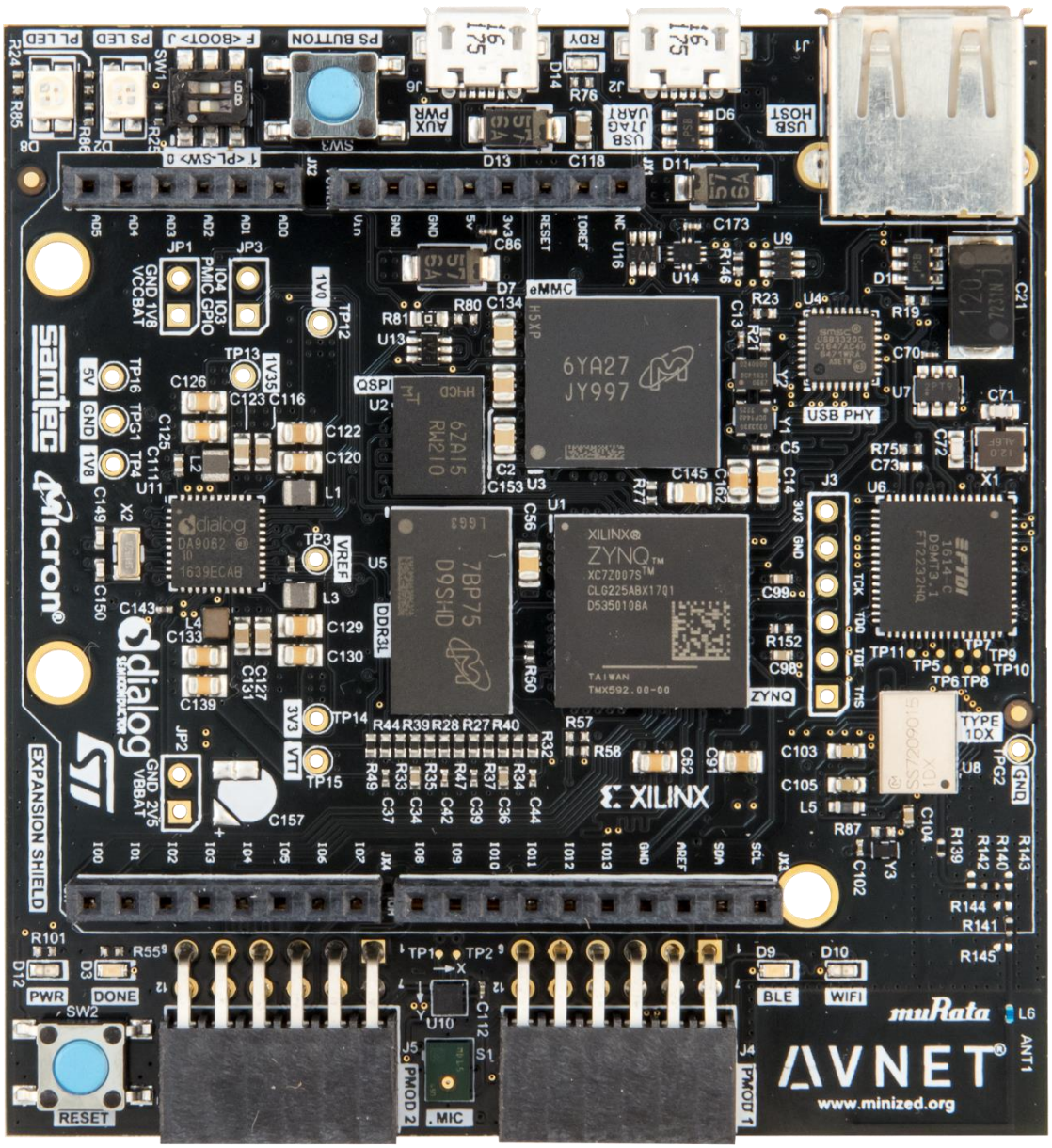



**Figure 1 – MiniZed**

This Getting Started Guide will outline the steps to setup the MiniZed hardware. It documents the procedure to run a PetaLinux design running on the ARM® Cortex™-A9 MPCore™ Processing System (PS).

# 2 What's Inside the Box?

- MiniZed development board
- Voucher for SDSoC license from Xilinx
- Micro USB cable
- Quick Start Instruction card
- Safety Instructions pamphlet

## 2.1 Optional add-on items:

- External 2A @ 5V power supply with micro USB cable (AES-ACC-MINIZ-PWR)
- Digilent SD Card Pmod with SD Card (410-123)
- ST Micro Motion MEMS and environmental sensor expansion board (X-NUCLEO-IKS01A1)

# 3 What's on the Web?

MiniZed is a community-oriented kit, with all materials being made available through the MiniZed.org community website.

## 3.1 Official Documentation:

- Getting started guide
- Hardware user guide
- Schematics
- Bill of materials
- Layout
- PCB net lengths
- Mechanical drawing
- 3D Model
- Board definition files for Vivado integration
- Programmable logic (PL) master user constraints

## 3.2 Tutorials and Reference Designs:

- Introduction to Zynq Design Tutorials
- PetaLinux BSP
- Booting MiniZed using QSPI and eMMC

## 3.3 Trainings and Videos:

- Introduction to MiniZed

## 3.4 Available through Avnet FAE:

- Altium source database for schematic and layout

# 4 MiniZed Key Features

- Xilinx Zynq XC7Z007S SoC
- Memory
  - Micron 512 MB DDR3L
  - Micron 128 MB QSPI flash
  - Micron 8GB eMMC mass storage
- Configuration and Debug
  - On-board USB to JTAG and debug UART circuit
- Communications
  - On-board USB to JTAG and debug UART circuit
  - Murata "Type 1DX" wireless module with 802.11b/g/n Wi-Fi and Bluetooth 4.1 plus EDR and BLE (Bluetooth Low Energy)
  - USB 2.0 host interface
- Power
  - Dialog Semiconductor DA9062 PMIC (Power Management IC)
- Expansion connectors
  - Arduino-compatible shield interface
  - 2 x Pmod-compatible interfaces
- Sensors
  - ST Micro LIS2DS12 Accelerometer and Temperature sensor
  - ST Micro MP34DT05 digital MEMS microphone
- General Purpose I/O
  - Reset button
  - User button
  - User switch
  - Two user bi-element LEDs

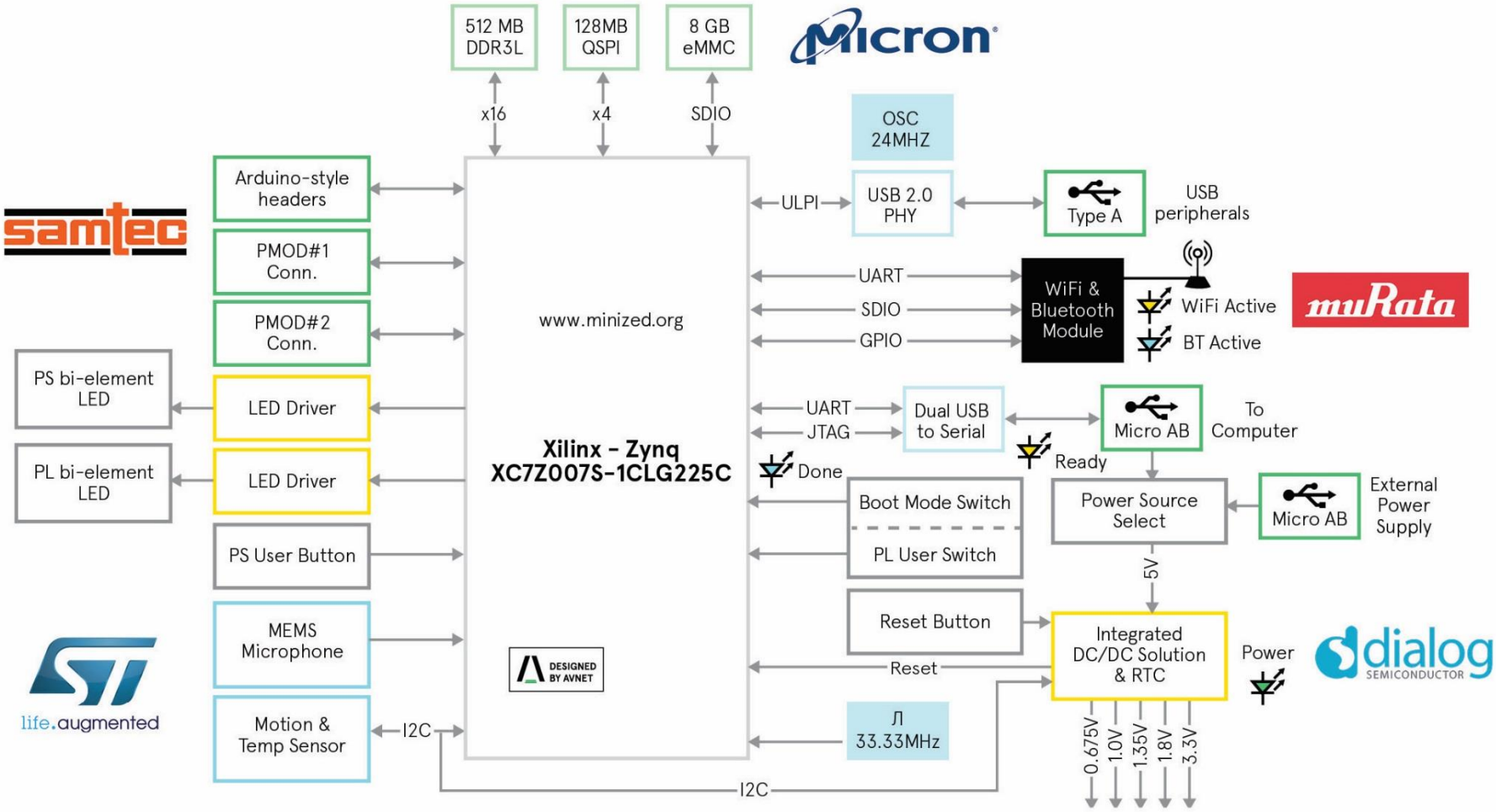



**Figure 2 – MiniZed Block Diagram**

# 5 MiniZed Basic Setup and Operation

The functionality of the MiniZed is determined by the application booted from the non-volatile memory – by default that is the QSPI and eMMC. This *Getting Started Guide* allows system developers to exercise and demonstrate multiple circuits through PetaLinux, including:

- USB 2.0
- eMMC
- Wi-Fi
- Bluetooth
- I2C Sensor
- Microphone

In addition to the items included in the kit, you will also need the following to complete the exercises in this tutorial.

- **Wi-Fi connection**
- **2nd micro-USB cable**
- **USB thumb drive formatted as FAT or FAT32**

A MiniZed image in its expected out-of-box configuration is shown below along with the locations of several key components.

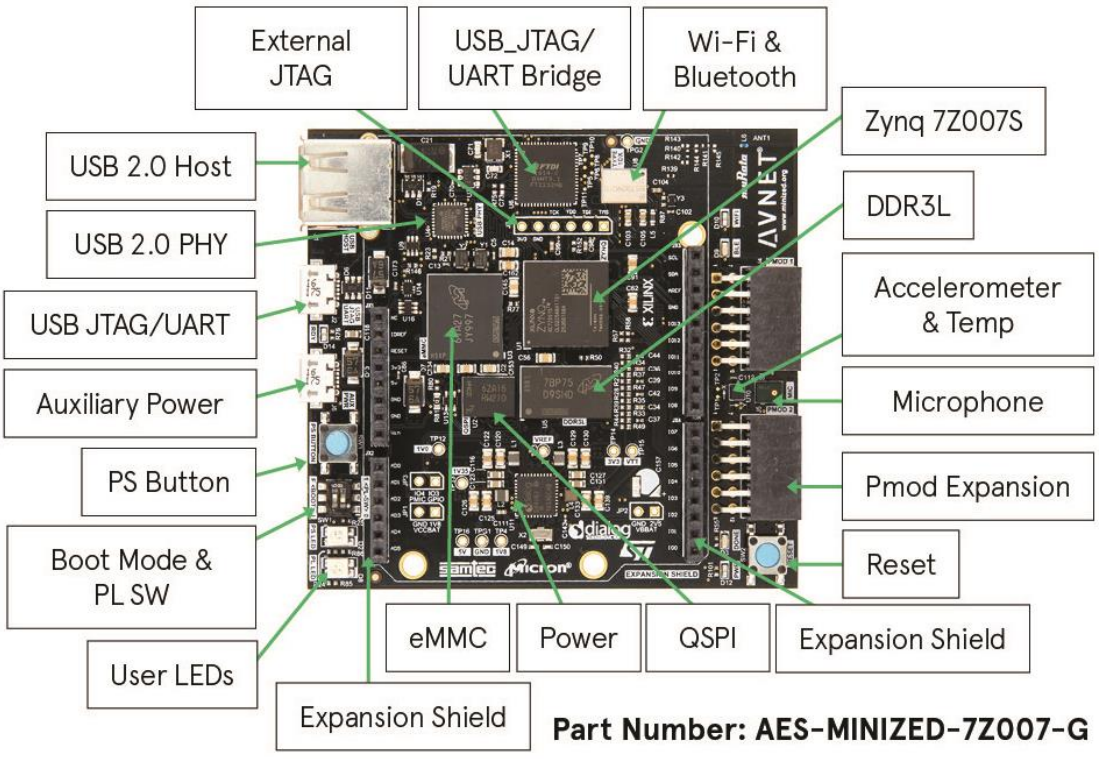



**Figure 3 – MiniZed Topology**

## 5.1 Example Design

The MiniZed ships with an example PetaLinux design stored in the QSPI and eMMC. If the QSPI has been erased or reprogrammed, than use the *Restore QSPI and eMMC Factory Images* tutorial available at www.MiniZed.org to restore both the QSPI and eMMC to the original factory images.

## 5.2 Hardware Setup

1. The USB thumb drive must be formatted as FAT32. If this has not been previously done, please do that now.

2. A terminal program is required. Tera Term was used in this example which can be downloaded from the Tera Term project on the SourceForge Japan page: ttssh2.sourceforge.jp Install Tera Term or another terminal program of your choice.

3. Connect the MiniZed USB-JTAG/UART port J2 to your Windows PC. It should automatically install the proper drivers, giving you a confirmation as shown below. If installed correctly, skip to Step 7.

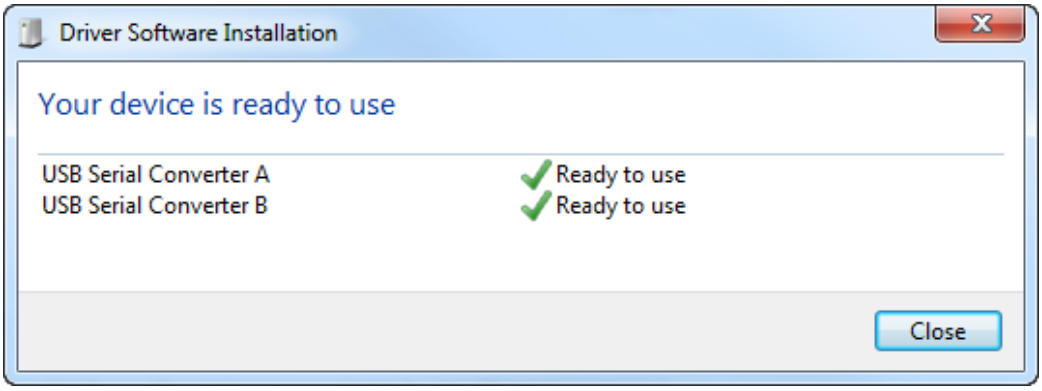



**Figure 4 – MiniZed USB-JTAG/UART Installed Correctly**

4. In the rare circumstance that the drivers are not auto-installed, then you must manually install the driver for the FTDI FT2232H device. Visit the FTDI website and download the appropriate driver for your operating system.

   http://www.ftdichip.com/Drivers/VCP.htm

5. Make sure the MiniZed is unplugged from the PC. Unzip and install the driver.

6. Reboot your PC then plug in the MiniZed.

7. Set the MiniZed boot mode switch SW1 to QSPI mode (‘F’ for Flash) as shown below.

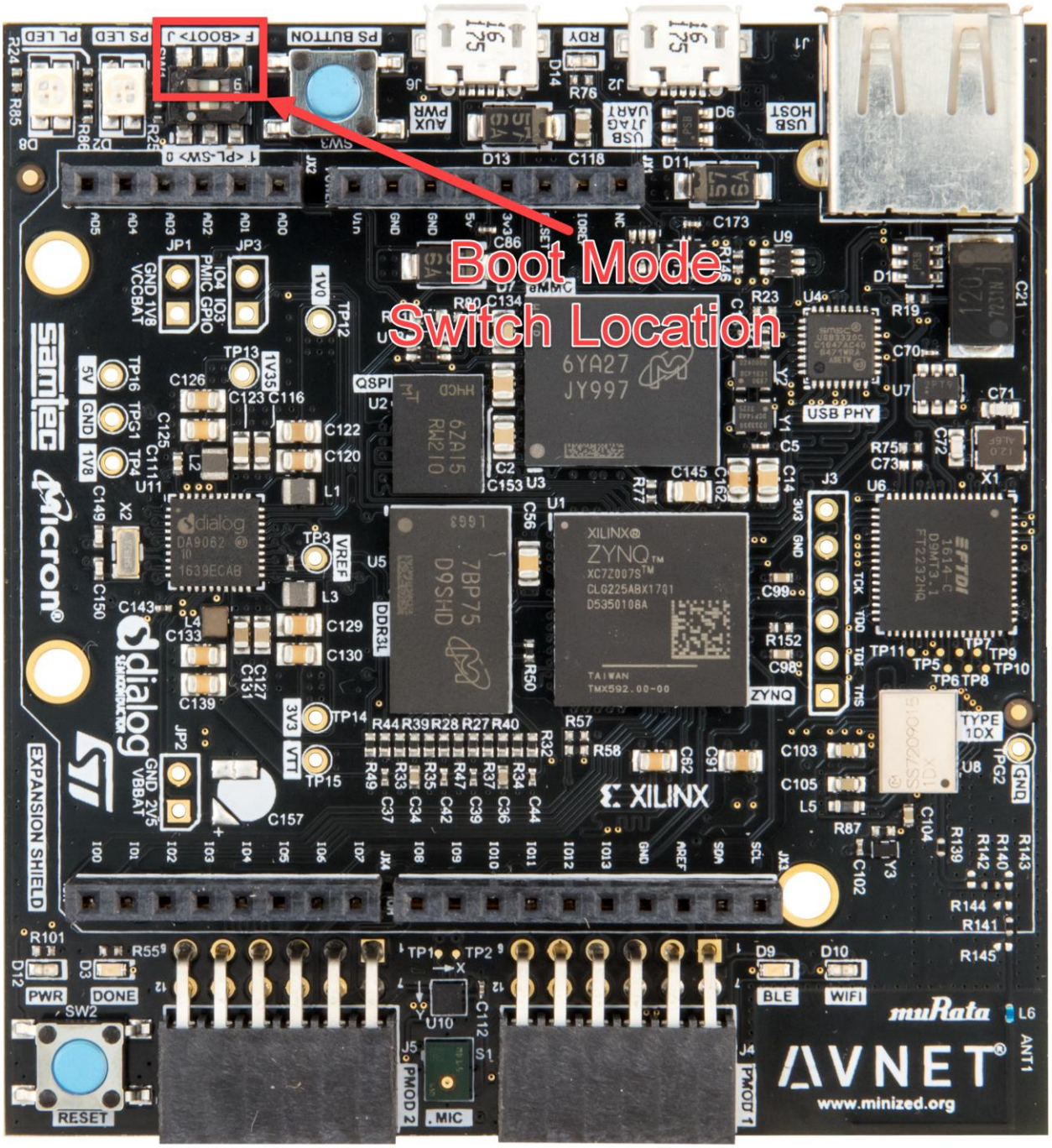



**Figure 5 – MiniZed Switch Location**

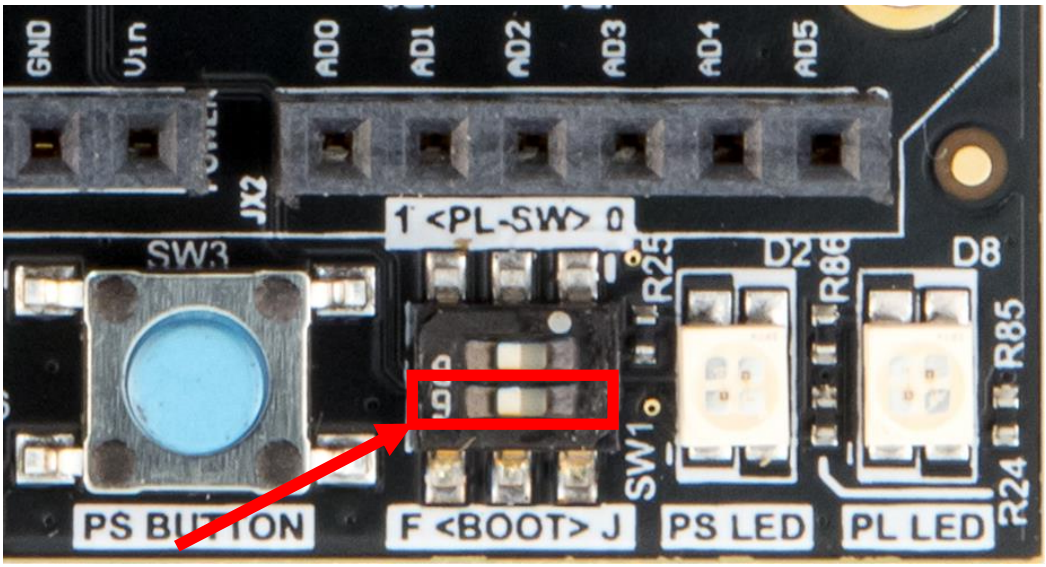



**Figure 6 – QSPI/Flash Boot Mode**

# 6 Boot Linux

8. If previously disconnected, plug in the micro-USB cable to the USB-JTAG/UART port.

9. Plug in the 2nd micro-USB cable to the auxiliary power port. This is necessary for the USB thumb drive to get power.

10. Launch and connect Tera Term using the settings shown below. Press the **RESET** button (SW2) to reset the board so you can see the boot sequence.

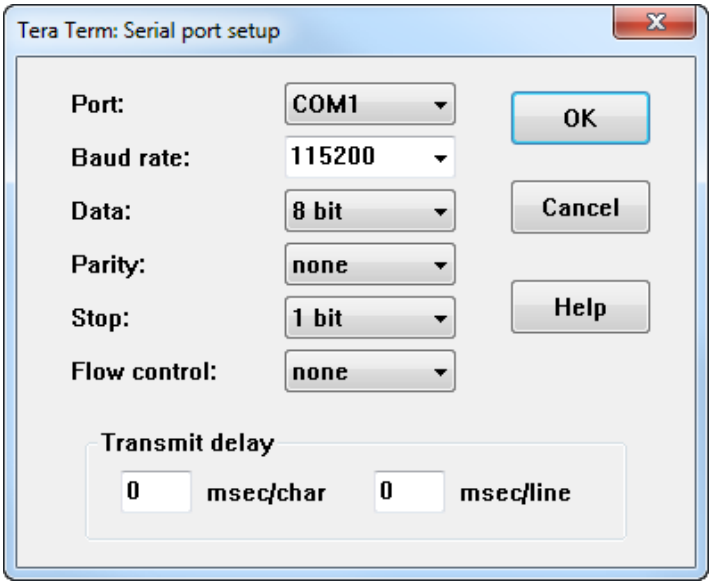



**Figure 7 – COM Port Settings for USB-UART Terminal**


**Figure 8 – PetaLinux Boot on MiniZed**

11. Login into the system with the following credentials (note that these credentials are set up under the PetaLinux build environment, and we purposely chose very simple username and password for this example).
    - Username: root
    - Password: root

This Linux image creates a “ramdisk” file system in the DDR3 on MiniZed. Basic Linux commands are available as you might expect on any Linux system.

# 7 Reading from USB

12. Plug the USB thumb drive into MiniZed. Linux should recognize the drive and report status to the terminal. Notice the USB device is labeled sda1.

```
root@plnx_arm:/bin# usb 1-1: new high-speed USB device number 2 using ci_hdrc
usb-storage 1-1:1.0: USB Mass Storage device detected
scsi host0: usb-storage 1-1:1.0
scsi 0:0:0:0: Direct-Access     SanDisk  Cruzer           1.20 PQ: 0 ANSI: 5
sd 0:0:0:0: Attached scsi generic sg0 type 0
sd 0:0:0:0: [sda] 62530624 512-byte logical blocks: (32.0 GB/29.8 GiB)
sd 0:0:0:0: [sda] Write Protect is off
sd 0:0:0:0: [sda] Write cache: disabled, read cache: enabled, doesn't support DPO or FUA
 sda: sda1
sd 0:0:0:0: [sda] Attached SCSI removable disk
random: nonblocking pool is initialized
```

**Figure 9 – USB Drive Recognized**

13. PetaLinux will also automatically mount the USB drive. Issue the 'df' command to see where the USB drive was mounted. Use 'ls' to see if you recognize the contents.

```
root@plnx_arm:~# df

root@plnx_arm:~# ls /run/media/sda1
```

```
root@plnx_arm:/bin# df
Filesystem           1K-blocks      Used Available Use% Mounted on
devtmpfs                    64         4        60   6% /dev
tmpfs                   254940        28    254912   0% /run
tmpfs                   254940        44    254896   0% /var/volatile
tmpfs                       64         4        60   6% /dev
/dev/mmcblk1p1          123089     16282    106807  13% /run/media/mmcblk1p1
/dev/sda1             31250016     18784  31231232   0% /run/media/sda1
root@plnx_arm:/bin# ls /run/media/sda1
boot_eMMC.bin        image.ub             wpa_supplicant.conf
root@plnx_arm:/bin#
```

**Figure 10 – USB Drive Mounted**

The eMMC was previously partitioned and formatted when your board was tested. In fact, you can see this in the 'df' command in Figure 10. The eMMC shows up as already mounted on `/run/media/mmcblk1p1`. In the interest of time, we will use this existing formatted partition as is. If you have time, you are welcome to learn about partitioning and formatting the eMMC in Appendix A – Partition and Format eMMC at the end of this document.

14. You may copy images from the USB stick to the eMMC.

```
root@plnx_arm:~# cd /run/media/sda1

root@plnx_arm:~# ls

root@plnx_arm:~# cp file1 ../mmcblk1p1

root@plnx_arm:~# cp file2 ../mmcblk1p1
```

# 8 Wi-Fi

15. Prior to testing the Wi-Fi, you must edit the configuration file to match your wireless settings. The config file is **wpa_supplicant.conf** and is located on the eMMC. You must edit this file so that SSID and passcode (psk) match your wireless connection. You can use the built-in editor vi to do this.

    For a list of vi commands, refer to http://www.linfo.org/vi/summary.html

    You may also copy **wpa_supplicant.conf** to the USB stick, then edit on your PC, then copy back to the eMMC.

```
root@plnx_arm:~# vi /run/media/mmcblk1p1/wpa_supplicant.conf
```

```
ctrl_interface=/var/run/wpa_supplicant
ctrl_interface_group=0
update_config=1

network={
        key_mgmt=WPA-PSK
        ssid="HotelStef"
        psk="74248483"
}
```

**Figure 11 – Edit these 2 fields in wpa_supplicant.conf**

16. To test your Wi-Fi connection, several setup steps are required. To ease the burden of typing, a script has been provided in the **/usr/local/bin** directory, which is in the default search path. To view the script, use the **cat** command. View the comments in the script to understand what the script is doing.

```
root@plnx_arm:~# cat /usr/local/bin/wifi.sh
```

17. Run the script to setup the Wi-Fi as shown below

```
root@plnx_arm:~# wifi.sh
```

When MiniZed connects with the network it will obtain an IP address and report it in the Tera Term window as below.

```
wl_bss_connect_done succeeded with 30:b5:c2:36:a7:0e
wl_bss_connect_done succeeded with 30:b5:c2:36:a7:0e
Sending discover...
Sending select for 192.168.0.104...
Lease of 192.168.0.104 obtained, lease time 7200
/etc/udhcpc.d/50default: Adding DNS 192.168.0.1
```

18. Now run iperf in Server mode on the MiniZed side:

```
root@plnx_arm:~# iperf -s
```

19. To complete the test, you must also run the iperf Client side on your PC, connecting to the displayed IP address. You can get iperf from the following site:

    https://iperf.fr/iperf-download.php

20. **First, make sure your PC is on the same Wi-Fi network as MiniZed**. Also, turn off any VPN or firewall that may prevent communication across the network. Open a CMD window. Change directory to the location where you copied iperf. Then enter command below, using the IP you discovered for MiniZed in the previous step.

    iperf -c <IP_of_MiniZed>

Results are then displayed in Tera Term as well as in the CMD window, as shown below.

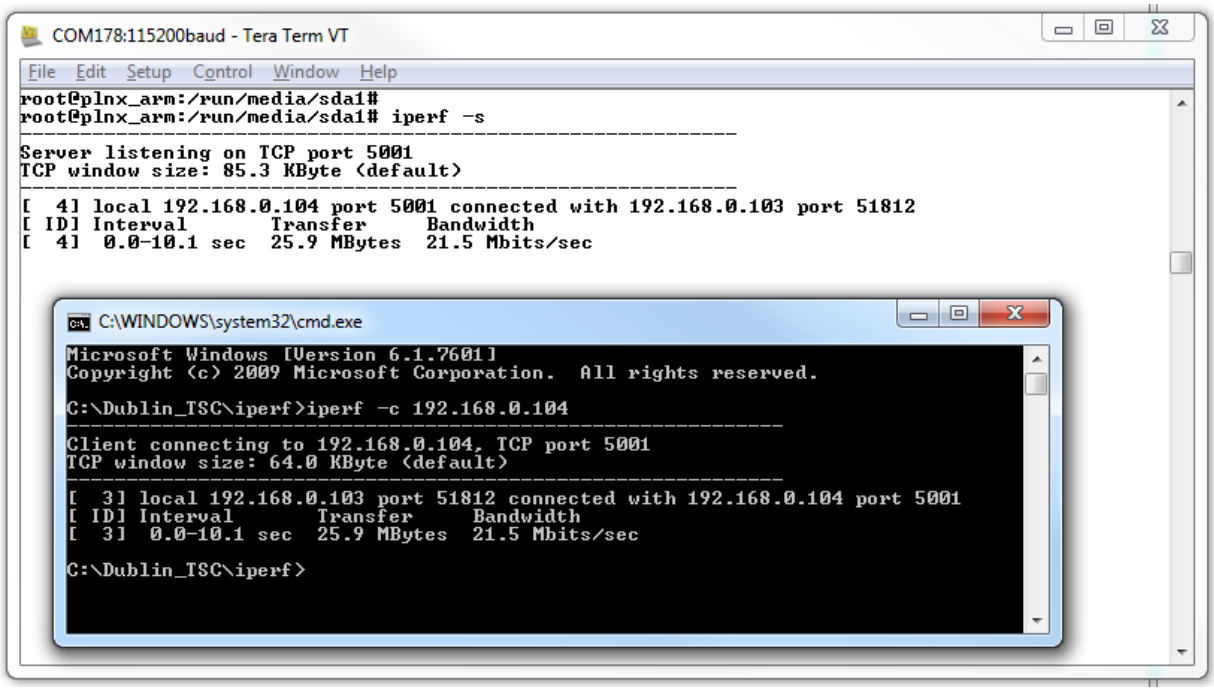



**Figure 12 – iperf results on MiniZed**

21. Use <Ctrl-C> to cancel iperf in Linux.

22. **Note that this step will only work if the Wi-Fi access point is connected to the internet.**

    Now try using ping to see if you can reach various internet sites using the DHCP server to resolve the IP addresses.

```
root@plnx_arm:~# ping -c 3 <URL>

 --- www.avnet.com

 --- www.xilinx.com

 --- www.google.com

 --- www.amazon.com, etc.
```


**Figure 13 – ping results**

23. **Note that this step will only work if the Wi-Fi access point is connected to the internet.**

    Get a file from a host website and display it.

```
root@plnx_arm:~# wget http://www.textfiles.com/food/brdpudd.des

root@plnx_arm:~# cat brdpudd.des
```

```
root@plnx_arm:~# wget http://www.textfiles.com/food/brdpudd.des
Connecting to www.textfiles.com (208.86.224.90:80)
brdpudd.des          100% |*******************************|   762   0:00:00 ETA
root@plnx_arm:~# cat brdpudd.des
Louisburg Cafe Bread Pudding
Taken form Taste Of Home  Magazine
Category: Desserts:  Cake, cookies, mousse, puddings, etc..
Posted by:     Pop
Quantity: 24 servings

Ingredients:
6 eggs, beaten                 6 cups milk
3/4 cup sugar                  1 cup raisins
10 to 12 cups broken bread
or rolls or doughnuts

Instructions:
Combine first four ingredients in a large bowl. Blend in
pieces of bread,  rolls or doughnuts. Pour mixture into a 13-
in X 9-in baking pan. Bake at 350  deg. for 45 minutes or
until set.

Comments:
Locals Agree that the Louisberg Cafe in Louisburg Minnesota
serves up  the best bread pudding there is! Taste of Home
editors convinced the  cafe's owner, Emily Hansen, to share
her recipe with our readers.
root@plnx_arm:~#
```

**Figure 14 – Download and View Text File**

24. Use ifconfig to get information about the connection.

```
root@plnx_arm:~# ifconfig
```

```
root@plnx_arm:/run/media/sda1# ifconfig
lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1%768144/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

wlan0     Link encap:Ethernet  HWaddr B0:72:BF:A6:50:A5
          inet addr:192.168.0.104  Bcast:192.168.0.255  Mask:255.255.255.0
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:41174 errors:0 dropped:0 overruns:0 frame:0
          TX packets:22448 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:58351505 (55.6 MiB)  TX bytes:1452643 (1.3 MiB)

root@plnx_arm:/run/media/sda1#
```

**Figure 15 -- ifconfig**

25. Open a Windows Command Prompt.

26. Connect an FTP session to the remote host with the command
    `ftp <MiniZed IP>`

27. Use the login **root**. You can use the ftp session to transfer files back and forth across the network to MiniZed. Commands such as '`cd`', '`ls`', '`pwd`', '`put`', and '`get`' are all useful commands.

28. Close the ftp session using the `quit` command.

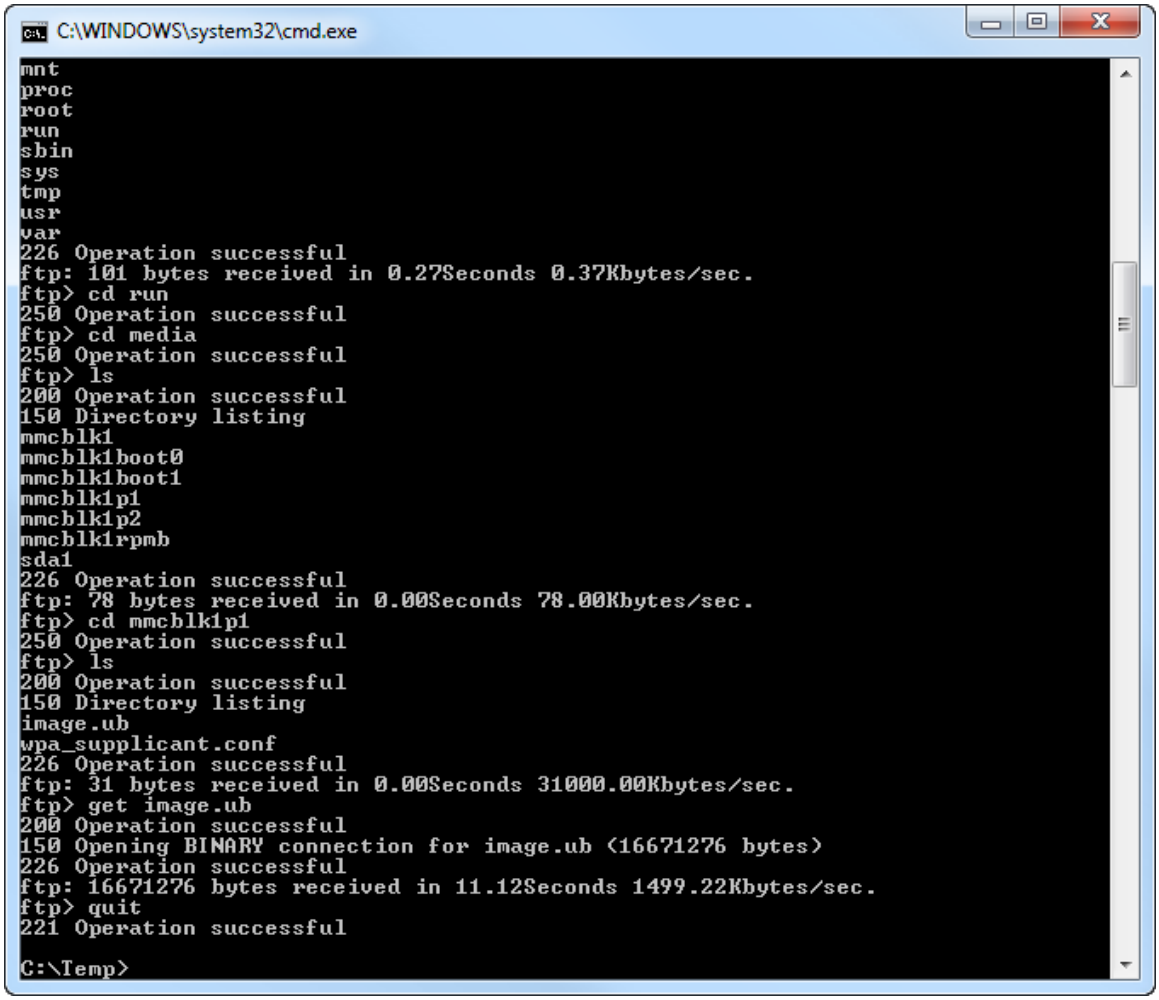



**Figure 16 – MiniZed FTP Session**

29. So far we have seen how files can be copied to and from MiniZed using a USB memory stick or over Wi-Fi via FTP. Lastly, we will look at a secure copy mechanism that can also be used with a graphical interface. WinSCP can be downloaded from http://winscp.net. It can be run command line under Windows or Linux.

    In Windows, browse to the **WinSCP** directory and double-click on WinSCP.exe.

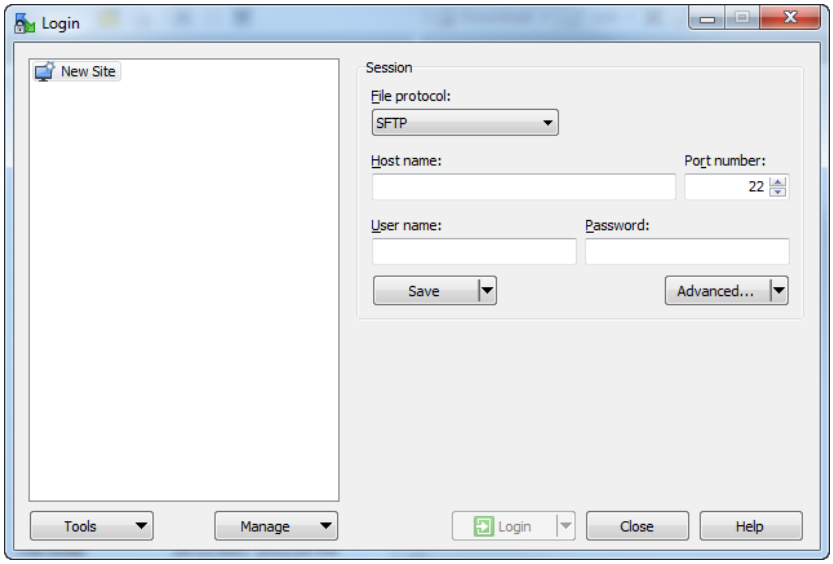



**Figure 17 – WinSCP Launched**

30. Change the *File protocol* to **SCP**. Edit the *Host name* to match the IP address of MiniZed. Use “root” for both the *User name* and *Password*.

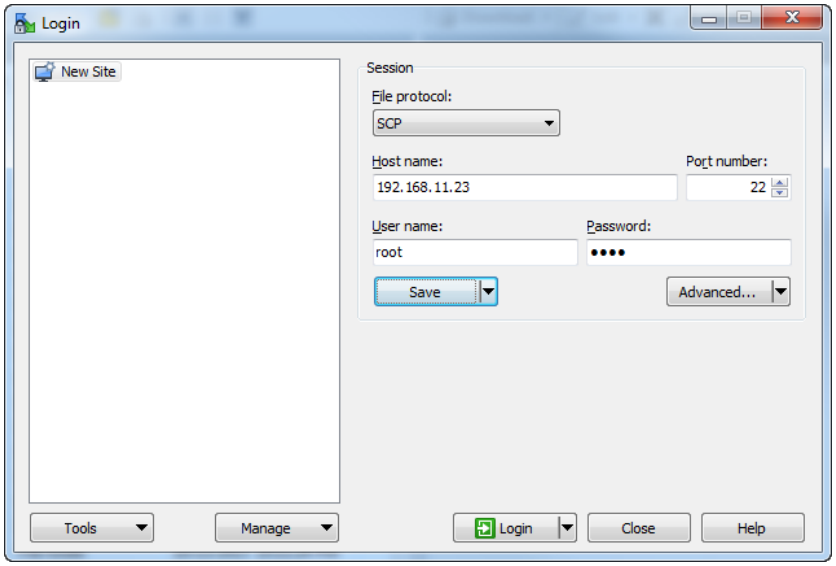



**Figure 18 – WinSCP Parameters Entered**

31. Click Save. You can set the *Site name* to “MiniZed” if you would like. You can also choose to *Save password*. Then click **OK**.

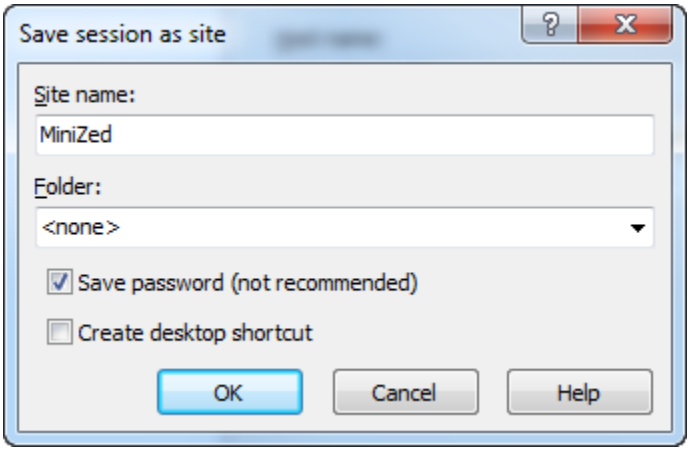
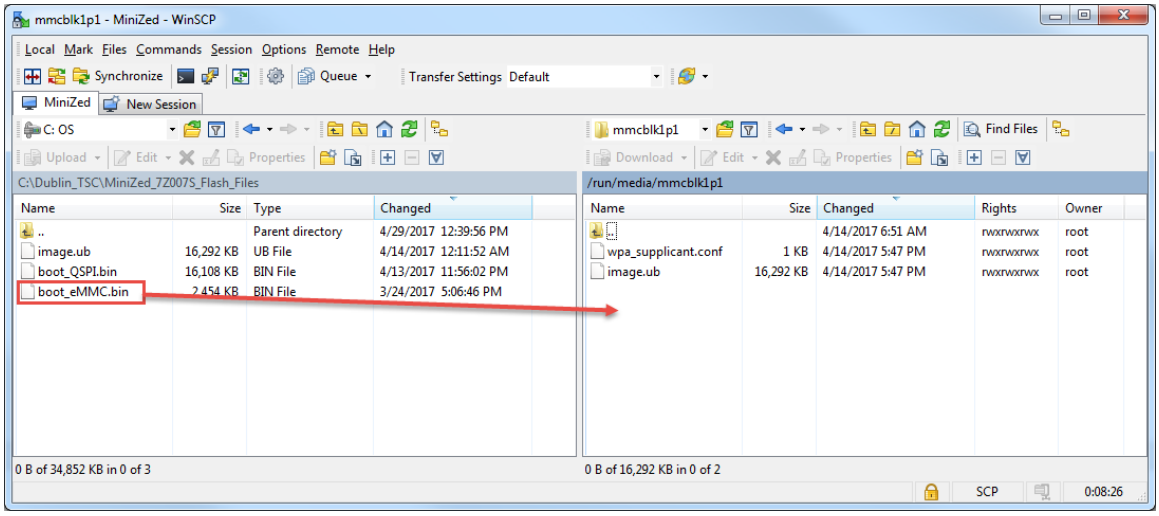



**Figure 19 – WinSCP Save Session**

32. Click Login. If you get a prompt about connecting to an unknown server, click Yes.




33. On the left side pane of the WinSCP, which is the host, browse a directory containing a file that you would like to transfer (for example, a new image.ub or .bin file for the QSPI). On the MiniZed side, browse to **/run/media/mmcblk1p1**, which is the eMMC. Drag the file to the eMMC side (or click F5) and click OK if prompted for permission.

# 9 Bluetooth

34. To test your bluetooth connection, several setup steps are required. To ease the burden of typing, a script has been provided in the **/usr/local/bin** directory. To view the script, use the **cat** command. View the comments in the script to understand what the script is doing.

```
root@plnx_arm:~# cat /usr/local/bin/bt.sh
```

35. Turn on your phone's Bluetooth and make it discoverable.

36. Enter the following to launch the Bluetooth setup script:

```
root@plnx_arm:~# bt.sh
```

```
root@plnx_arm:~# /custom/./bt.sh
#To turn on BT_REG_ON, which is on EMIO GPIO #0
echo 960 > /sys/class/gpio/export
echo out > /sys/class/gpio/gpio960/direction
echo 1 > /sys/class/gpio/gpio960/value
#Set uart0 = serial1 = ttyPS1 baudrate:
stty -F /dev/ttyPS1 115200
sleep 1s
#For the flow control.
#It seems you have to send a character before RTS from the 1DX modulke will be set in the correct state.
echo "W" > /dev/ttyPS1
sleep 1s
#Initialize the device:
hciattach /dev/ttyPS1 bcm43xx 921600 flow -t 10
bcm43xx_init
Set Controller UART speed to 921600 bit/s
Flash firmware /etc/firmware/BCM43430A1.1DX.hcd
Set Controller UART speed to 921600 bit/s
Device setup complete
sleep 2s
#Configure the right BT device:
hciconfig hci0 up
sleep 1s
#Scan for BT devices:
hcitool scan
Scanning ...
        D0:13:FD:72:6D:CC       V20
set +v
root@plnx_arm:~#
```

**Figure 20 – MiniZed Bluetooth Discovers V20 Android**

If you would like to scan again, do NOT rerun the script or it will hang your system.

37. To rescan the system, you can rerun the hcitool command:

```
root@plnx_arm:~# hcitool scan
```

or, for Bluetooth Low Energy only devices:

```
root@plnx_arm:~# hcitool lescan
```

Use <Ctrl-C> to cancel a low-energy scan.

# 10 I2C Sensor and GPIO

To ease testing of several peripheral devices on your board, a user application, **`i2csensor`**, has been built into image.ub.

38. To test the **LEDs, button, switch, and I2C sensor** on the board, enter

```
root@plnx_arm:~# i2csensor
```

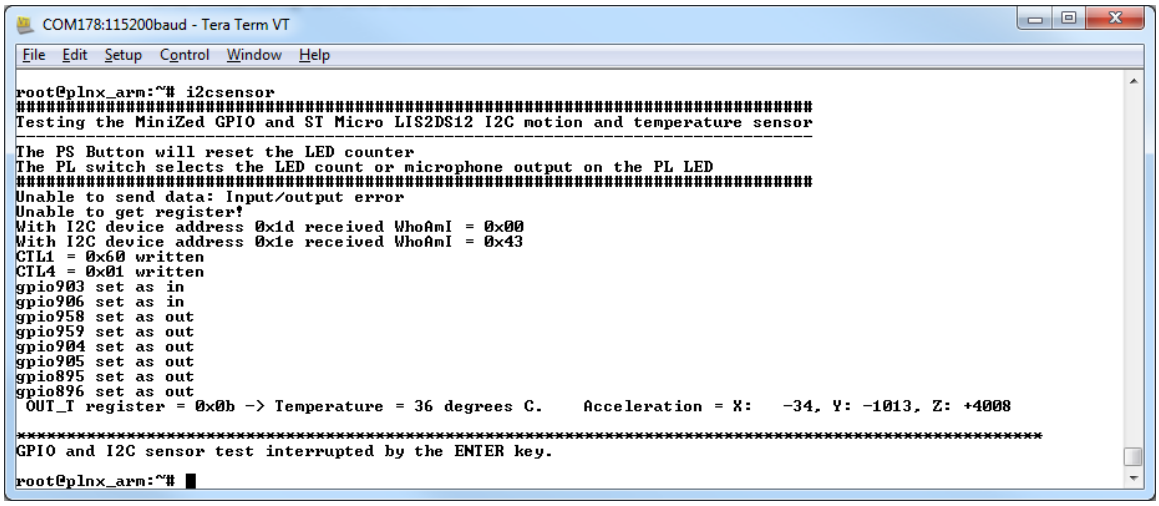



**Figure 21 – Testing LEDs, Button, Switch, and Sensor**

39. Set the 2nd dip switch nearest the Arduino connector towards the LED. This puts both LEDs into counting mode.

40. Press the PS push button (SW3) to blank the LEDs and restart the counter.

41. Set the 2nd dip switch towards the push button. This puts the outside LED into microphone mode. Speak near the microphone, and the LED brightness will reflect the intensity of the sound.

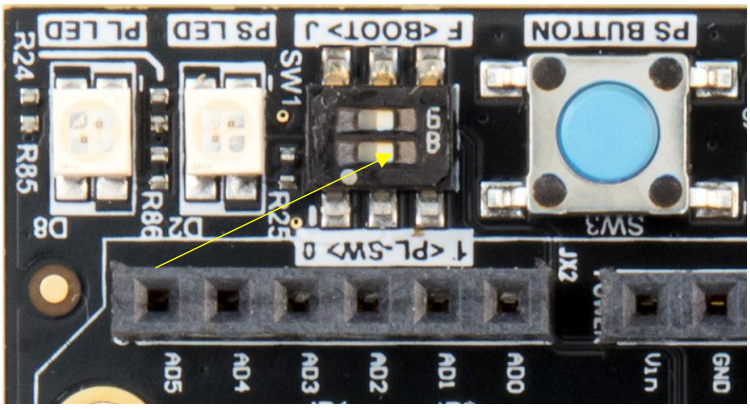



**Figure 22 – USER DIP set towards Push Button**

42. You may have to widen your Tera Term window to see the full output. Pick up and twist the MiniZed (preferably without giving it an ESD zap). See the changes in the XYZ measurements in the terminal.

43. The relative temperature is also reported. For this sensor the temperature delta is actually tracked, and the absolute displayed value is not necessarily accurate.

44. Press any key to exit the user test application.

# 11 Linux File System

45. CD into the /bin directory.

```
root@plnx_arm:~# cd /bin/
```

46. Check the current directory by typing the command below

```
root@plnx_arm:~# pwd
```

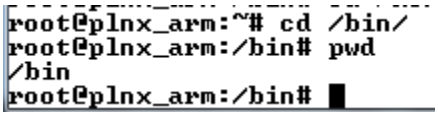



**Figure 23 – Print Working Directory**

47. List the contents of /bin by typing the command below

```
root@plnx_arm:~# ls
```

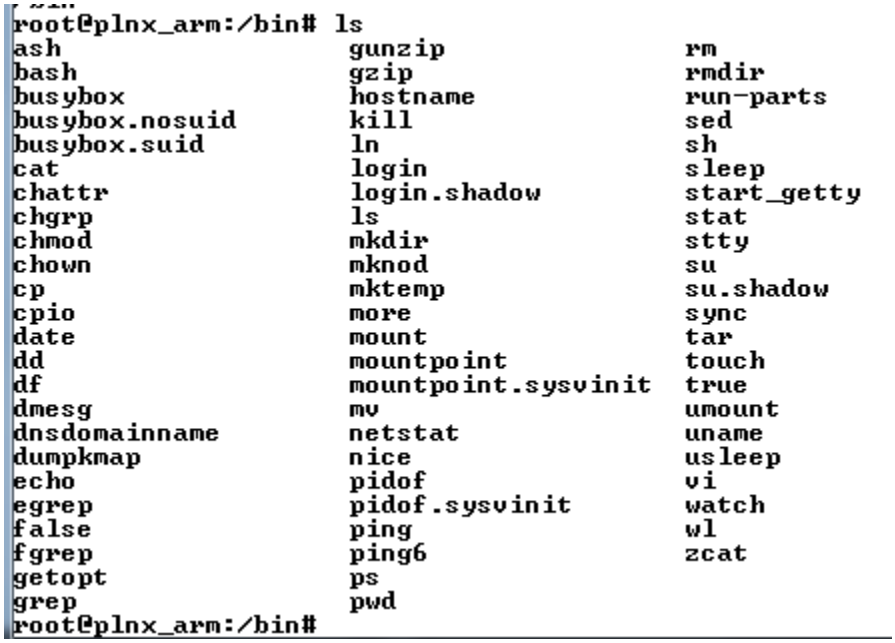



**Figure 24 – List Contents**

48. To see full details, use the command below

```
root@plnx_arm:~# ls -l
```

```
root@plnx_arm:/bin# ls -l
total 3336
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 ash -> /bin/busybox.nosuid
-rwxr-xr-x    1 root     root        822440 Dec  9 23:51 bash
lrwxrwxrwx    1 root     root            14 Mar  7 00:20 busybox -> busybox.nosuid
-rwxr-xr-x    1 root     root        627252 Feb 22 02:40 busybox.nosuid
-rwsr-xr-x    1 root     root         73208 Feb 22 02:40 busybox.suid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 cat -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 chattr -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 chgrp -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 chmod -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 chown -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 cp -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:20 cpio -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:20 date -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 dd -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 df -> /bin/busybox.nosuid
lrwxrwxrwx    1 root     root            19 Mar  7 00:21 dmesg -> /bin/busybox.nosuid
```

**Figure 25 – Detailed List Contents**

49. To see how much free disk space is available, use the command df. This will also show you what mass storage is already mounted. In our case, the eMMC (SDIO 1) partition #1 is /dev/mmcblk1p1 and is mounted at /run/media/mmcblk1p1.

```
root@plnx_arm:~# df
```

```
root@plnx_arm:/bin# df
Filesystem           1K-blocks      Used Available Use% Mounted on
devtmpfs                    64         4        60   6% /dev
tmpfs                   254940        28    254912   0% /run
tmpfs                   254940        40    254900   0% /var/volatile
tmpfs                       64         4        60   6% /dev
/dev/mmcblk1p1          123089     16282    106807  13% /run/media/mmcblk1p1
root@plnx_arm:/bin#
```

**Figure 26 – Disk Free**

50. To find a file in the file system, use the command ‘find’. The command below searches from the root directory looking for a file called “flaschcp”.

```
root@plnx_arm:~# find / -name "flashcp"
```

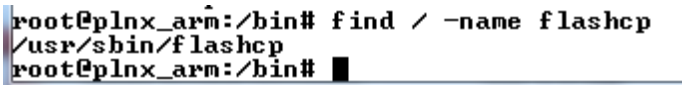



**Figure 27 – Find a File**

51. In the case with two executables with the same name, it might be useful to know which one is found without explicitly spelling out the path. Command ‘which’ will tell you the path of the executable to be run. For example, see how many copies of command ‘echo’ are on the system and then which one is executed.

```
root@plnx_arm:~# find / -name "echo"

root@plnx_arm:~# which echo
```

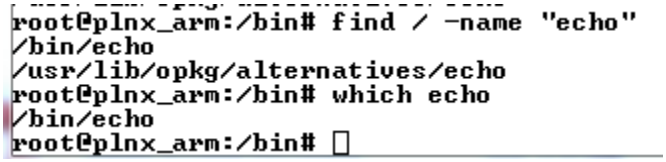



**Figure 28 – Which**

A short list of several more useful file- and directory-oriented commands are listed below. For an explanation of these commands, see:

https://en.wikibooks.org/wiki/Guide_to_Unix/Commands/File_System_Utilities.

- mkdir
- rmdir
- rm
- chmod
- cp
- mv
- less <file>

# 12 Poweroff

When you are finished experimenting with PetaLinux on MiniZed, you should shut PetaLinux down gracefully to prevent corruption of your eMMC.

52. Enter either of the following commands to shut down the MiniZed properly. Both accomplish the same thing.

```
root@plnx_arm:~# shutdown –h now
```

or

```
root@plnx_arm:~# poweroff
```

If you want to issue a restart to the system, use the following command:

```
root@plnx_arm:~# reboot
```

# 13 Getting Help and Support

## 13.1 Avnet Support

The MiniZed is a versatile development kit that allows evaluation of the Zynq SoC, which can help you adopt Zynq into your next design. All technical support is offered through www.minized.org website support forums. MiniZed users are encouraged to participate in the forums and offer help to others when possible.

http://minized.org/forums/

For questions regarding the MiniZed community website, please direct any questions to:

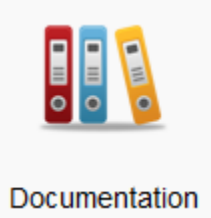
MiniZed.org Web Master – webmaster@MiniZed.org

To access the most current collateral for MiniZed please visit the community support page at:

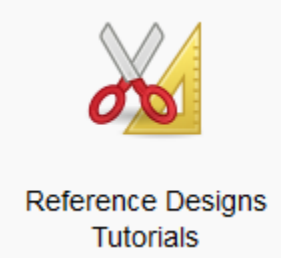
www.MiniZed.org/content/support

Once on the MiniZed.org support page:

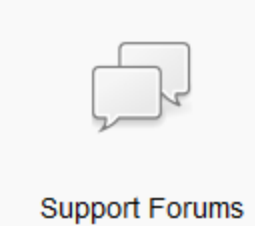
To access the latest MiniZed documentation, click on the Documentation link:



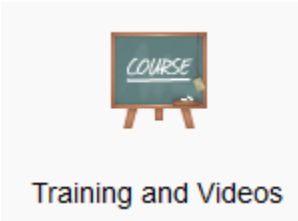

To access the latest reference designs for MiniZed, click on the following link:




To access the MiniZed technical forums, click on the following link:




To view online training and videos, click on the following link:




## 13.2 Xilinx Support

For questions regarding products within the Product Entitlement Account, send an e-mail message to the Customer Service Representative in your region:

Canada, USA and South America - isscs_cases@xilinx.com

Europe, Middle East, and Africa - eucases@xilinx.com

Asia Pacific including Japan - apaccase@xilinx.com

For technical support including the installation and use of the product license file, contact Xilinx Online Technical Support at www.xilinx.com/support. The following assistance resources are also available on the website:

- Software, IP and documentation updates
- Access to technical support web tools
- Searchable answer database with over 4,000 solutions
- User forums

# 14 Installing and Licensing Xilinx Software

## 14.1 Install Vivado Design Suite, WebPack Edition

The Zynq device on the MiniZed is supported in Vivado Design Suite, WebPack Edition. Version 2017.1 or later is required for the on-board USB-JTAG/UART circuit to work. See

www.xilinx.com/products/design-tools/vivado/vivado-webpack.html

This software can be downloaded online at:

www.xilinx.com/support/download/index.htm

Although free, WebPack still must be licensed. To obtain your free license, visit the following website and insert the voucher code from the certificate included in your kit:

http://www.xilinx.com/getlicense

If a full seat of Vivado System or Design Edition has already been installed, then no further software will be needed. Please check online for any updates at:

www.xilinx.com/support/download/index.htm

For detailed instructions on installing and licensing the Xilinx tools, please refer to the latest version of **Vivado Design Suite User Guide *Release Notes, Installation, and Licensing* (UG973)**. The 2017.1 version is available on the Xilinx website at:

https://www.xilinx.com/support/documentation/sw_manuals/xilinx2017_1/ug973-vivado-release-notes-install-license.pdf

# 15 Certification Disclaimer

Both CE and FCC certifications are necessary for system level products in those countries governed by these regulatory bodies.

Because Avnet boards are intended for evaluation kits only and destined for professionals (you) to be used solely at research and development facilities for such purposes, they are considered exempt from the EU product directives and normally are not tested for CE or FCC compliance.

If you choose to use your board to transmit using an antenna, it is your responsibility to make sure that you are in compliance with all laws for the country, frequency, and power levels in which the device is used. Additionally, some countries regulate reception in certain frequency bands. Again, it is the responsibility of the user to maintain compliance with all local laws and regulations.

# 16 Regulatory Compliance Information

**EU Compliance Statement:**

Hereby, Avnet declares that this device is in compliance with the essential requirements and other relevant provisions of the Radio Equipment Directive 2014/53/EU. A full copy of the Declaration of Conformity can be found at http://minized.org/policies.

**US Compliance Statement:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

**Canada Compliance Statement:**

**English**
This device complies with Industry Canada's licence-exempt RSSs. Operation is subject to the following two
conditions:
(1) This device may not cause interference; and
(2) This device must accept any interference, including interference that may cause undesired operation of the device.

**French**
Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence.
L'exploitation est autorisée aux deux conditions suivantes:
1) l'appareil ne doit pas produire de brouillage;
2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible
d'en compromettre le fonctionnement.

**WEEE statement:**

Correct Disposal of this product. This marking indicates that this product should not be disposed with other household wastes throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmental safe recycling.

# 17 Safety Warnings

This product shall only be connected to an external power supply rated at 5V DC that provides a minimum current of 500mA. Any external power supply used with MiniZed shall comply with relevant regulations and standards applicable in the country of intended use.

Only compatible plug-in modules shall be connected to MiniZed. The connection of incompatible devices may affect compliance or result in damage to the unit and void the warranty.

This product shall be operated in a well-ventilated environment. If a case is used, it shall have adequate ventilation.

# 18 RF Certification

The frequency range is 2.4 to 2.4835GHz.

The max power complies with 802.11b, which is 17dBm (typ).

# 19 Appendix A – Partition and Format eMMC

Although the eMMC was previously formatted and partitioned, you can repeat the steps to learn the process.

1. First, unmount the eMMC.

```
root@plnx_arm:~# umount /run/media/mmcblk1p1
```

2. The Linux fdisk utility is used to create a partition on the storage media for use with a file system. Enter the commands as shown below:
    a. Start the fdisk utility for the eMMC controller. ( fdisk <device name> )

```
root@plnx_arm:~# fdisk /dev/mmcblk1
```

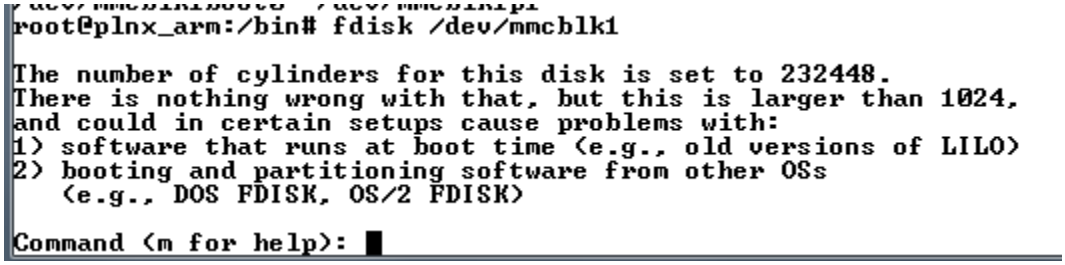



**Figure 29 – fdisk started**

    b. List the existing partition information by typing command ‘p’. If the storage media has never been used, there should be no partitions shown. In our case, there is one partition which is 3907 units large, 32768 bytes per unit, for a total of 128MB. The formatting is Linux.

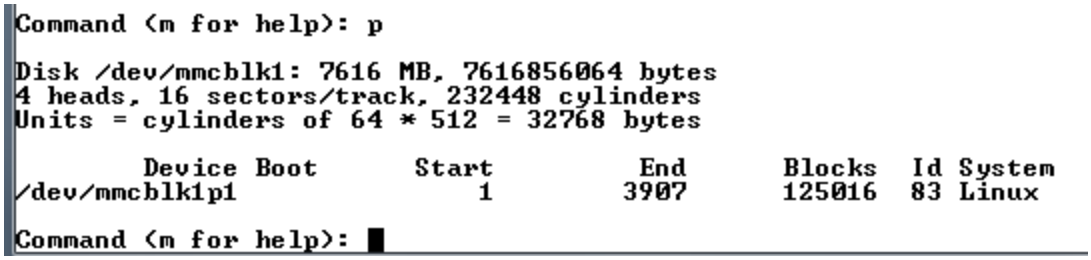



**Figure 30 – View Partitions**

c. Delete this partition with command ‘d’

```
Command (m for help): d
Selected partition 1
```

**Figure 31 – Partition 1 Deleted**

d. Create a new primary partition #1 starting at the first cylinder and extending for 128 MB using commands ‘n’, ‘p’, ‘1’, ‘1’, ‘+128M’

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 1
First cylinder (1-232448, default 1): 1
Last cylinder or +size or +sizeM or +sizeK (1-232448, default 232448): +128M

Command (m for help):
```

**Figure 32 – 128 MB Primary Partition Created**

e. Create another partition that spans the remainder of the eMMC, using commands ‘n’, ‘p’, ‘2’, ‘3908’, ‘232448’

```
Command (m for help): n
Command action
   e   extended
   p   primary partition (1-4)
p
Partition number (1-4): 2
First cylinder (3908-232448, default 3908): 3908
Last cylinder or +size or +sizeM or +sizeK (3908-232448, default 232448): 232448

Command (m for help):
```

**Figure 33 – Partition #2**

f. Type command ‘p’ to print the new partition table

```
Command (m for help): p

Disk /dev/mmcblk1: 7616 MB, 7616856064 bytes
4 heads, 16 sectors/track, 232448 cylinders
Units = cylinders of 64 * 512 = 32768 bytes

        Device Boot      Start         End      Blocks   Id System
/dev/mmcblk1p1               1        3907      125016   83 Linux
/dev/mmcblk1p2            3908      232448     7313312   83 Linux

Command (m for help):
```

**Figure 34 – New Partitions**

g. Change the Type for Partition 1 to be FAT32 using commands ‘t’, ‘1’, ‘L’, ‘b’ and then reprint the table with ‘p’

```
Command (m for help): t
Partition number (1-4): 1
Hex code (type L to list codes): L

 0 Empty                 1b Hidden Win95 FAT32     9f BSD/OS
 1 FAT12                 1c Hidden W95 FAT32 (LBA) a0 Thinkpad hibernation
 4 FAT16 <32M            1e Hidden W95 FAT16 (LBA) a5 FreeBSD
 5 Extended              3c Part.Magic recovery    a6 OpenBSD
 6 FAT16                 41 PPC PReP Boot          a8 Darwin UFS
 7 HPFS/NTFS             42 SFS                    a9 NetBSD
 a OS/2 Boot Manager     63 GNU HURD or SysV       ab Darwin boot
 b Win95 FAT32           80 Old Minix              b7 BSDI fs
 c Win95 FAT32 (LBA)     81 Minix / old Linux      b8 BSDI swap
 e Win95 FAT16 (LBA)     82 Linux swap             be Solaris boot
 f Win95 Ext'd (LBA)     83 Linux                  eb BeOS fs
11 Hidden FAT12          84 OS/2 hidden C: drive   ee EFI GPT
12 Compaq diagnostics    85 Linux extended         ef EFI (FAT-12/16/32)
14 Hidden FAT16 <32M     86 NTFS volume set        f0 Linux/PA-RISC boot
16 Hidden FAT16          87 NTFS volume set        f2 DOS secondary
17 Hidden HPFS/NTFS      8e Linux LVM              fd Linux raid autodetect
Hex code (type L to list codes): b
Changed system type of partition 1 to b (Win95 FAT32)

Command (m for help): p

Disk /dev/mmcblk1: 7616 MB, 7616856064 bytes
4 heads, 16 sectors/track, 232448 cylinders
Units = cylinders of 64 * 512 = 32768 bytes

        Device Boot      Start         End      Blocks   Id System
/dev/mmcblk1p1               1        3907      125016    b Win95 FAT32
/dev/mmcblk1p2            3908      232448     7313312   83 Linux
```

**Figure 35 – Partition Type Set to FAT32**

h. Write the partition table and exit fdisk using command ‘w’

```
Command (m for help): w
The partition table has been altered.
Calling ioctl() to re-read partition table
 mmcblk1: p1 p2
root@plnx_arm:/bin#
```

**Figure 36 – Partition Table Written**

3. Before the new partitions can be used, they must be formatted. Format the first one with a FAT32 file system. Use the Linux mkdosfs utility to perform this action. ( mkdosfs –F 32 <device name> )

```
root@plnx_arm:~# mkdosfs -F 32 /dev/mmcblk1p1
```

4. Format the 2nd partition using mkfs.vfat as follows:

```
root@plnx_arm:~# mkfs.vfat /dev/mmcblk1p2
```

5. The first partition will be automatically mounted. The second one must be mounted manually.

```
root@plnx_arm:~# mount /dev/mmcblk1p2 /run/media/mmcblk1p2
```

6. Use df to see what is available now.

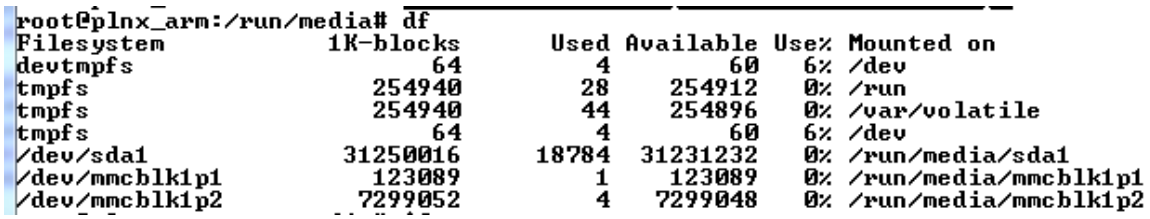



**Figure 37 – eMMC Partitions Mounted**