MicroSD Image Programming with Wind River Pulsar for Avnet Zynq Mini-ITX, MicroZed and PicoZed Kits

Beginning in January 2016 all MicroZed, PicoZed and Zynq Mini-ITX kits from Avnet will include a pre-programmed microSD card containing Wind River Pulsar Linux.   This document outlines the recommended procedure for programming the cards from either a Windows or Linux host.

The procedure can be used by customers who are already in possession of a supported Avnet SoM / motherboard in conjunction with images downloaded from the public repository:

Zynq Mini-ITX:

   https://distro.windriver.com/public_feeds/WindRiver-Pulsar-Linux-Avnet-Mini-ITX-image/

MicroZed:

   https://distro.windriver.com/public_feeds/WindRiver-Pulsar-Linux-Avnet-MicroZed-image/

Picozed:

   https://distro.windriver.com/public_feeds/WindRiver-Pulsar-Linux-Avnet-PicoZed-image/

This procedure can also be used to restore a microSD card to the factory default.

Requirements
- 8 GB class 10 UHS-1 microSD card (tested with Delkin, SanDisk, PNY, blackWeb, Lexar
- Win 32 Disk Imager software (Windows only)
    - Download from: http://sourceforge.net/projects/Win 32 Disk Imager/
- Certified Image for Avnet SoM/Motherboard

Images
There are 8 different images that correspond to a specific version of the supported boards:

- MicroZed 7010 and MicroZed 7020
- Zynq Mini-ITX 7045 and Zynq Mini-ITX 7100
- PicoZed 7010 , PicoZed 7015, PicoZed 7020 and PicoZed 7030, all paired with the Avnet FMC Carrier Card

Each image is clearly labelled according to the Xilinx device on the board, and there is an accompanying MD5 checksum that should also be downloaded and verified.

Programming Procedure from Windows

Note: Writing a disk image to a microSD card will destroy all data on the card. Ensure the target media has no valuable files before proceeding.

1. Insert a microSD card into your Windows host. The exact method is machine specific, but generally there will be slots available for different media formats, or you can use a USB card adapter to attach your target media. You may need an adapter card to use a full-size SD slot if a microSD slot is unavailable.

   If the microSD card has been used previously, you may see a dialog indicating potential issues with the media:
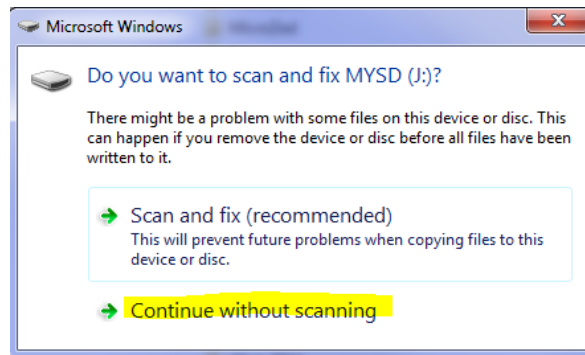
   Since the imaging procedure rewrites the microSD card sector by sector, you can ignore this warning and click **Continue without scanning**. The card will be assigned a drive letter visible in Windows Explorer (the driver letter may vary for each machine).
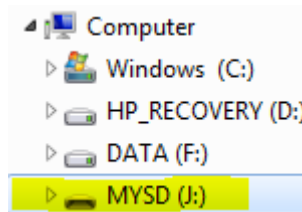

2. If necessary, download and install the Win 32 Disk Imager software to your Windows host machine from the URL provided in the **Requirements** section.

3. Launch Win 32 Disk Imager from the Start menu or the desktop icon.

4. If you see a dialog asking "*Do you want to allow the following program from an unknown publisher to make changes to this computer?*", click the **Yes** button.

5. Click the folder icon ![folder icon] to browse to the location of the master image file you wish to copy to the microSD card.
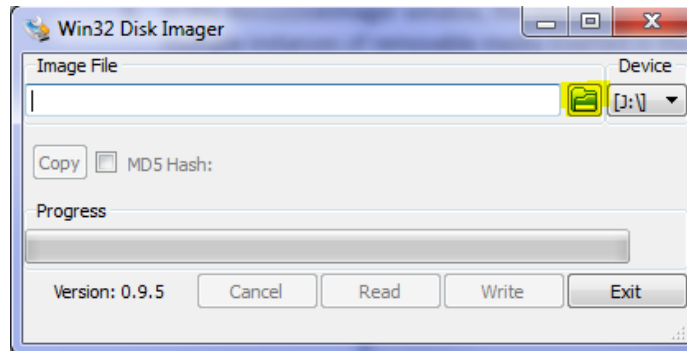

The actual name and location will be specific to your machine. For the purposes of this example, an image for a MicroZed 7010 is selected.
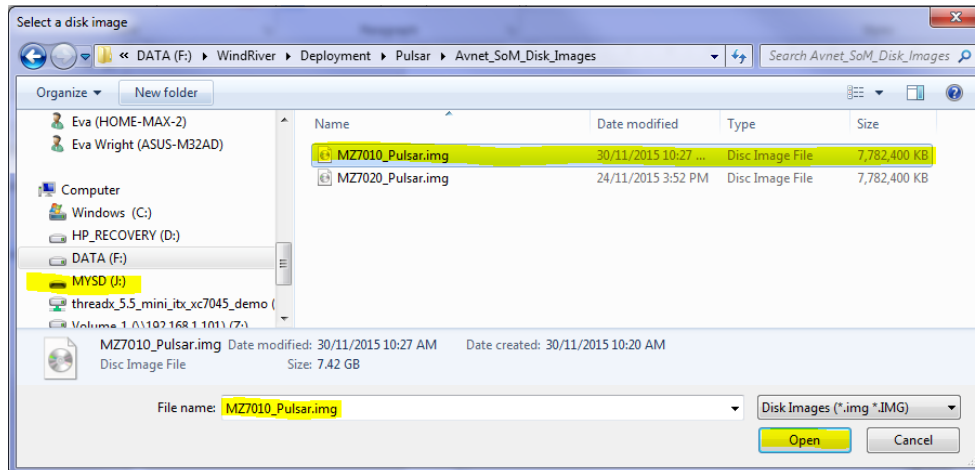

Click the **Open** button to select the file.

6. In the Win 32 Disk Imager window, the microSD should be automatically selected. If you have multiple instances of removable media inserted in the machines, make sure to use the dropdown to select the target microSD drive letter.
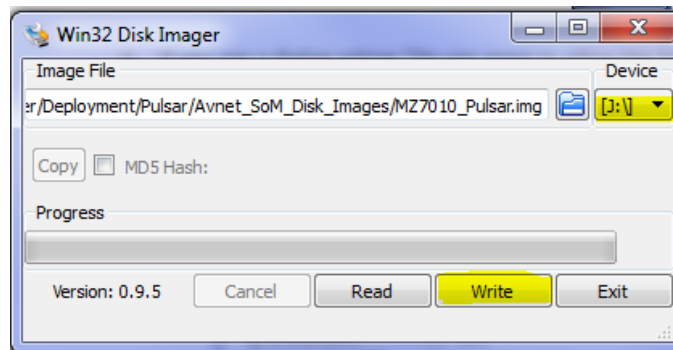
7. Click the **Write** button to initiate the disk copy. In the Confirm overwrite dialog, ensure the expected target is correct and click the **Yes** button.
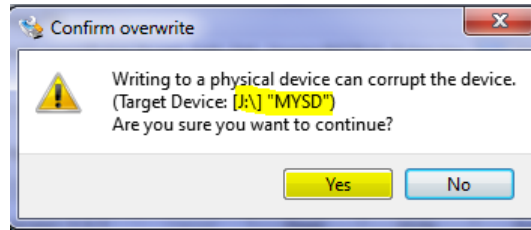
8. The image will be transferred to the microSD card in approximately 5-8 minutes, depending on the transfer rate available on your host system. A progress bar indicates the status of the write operation.
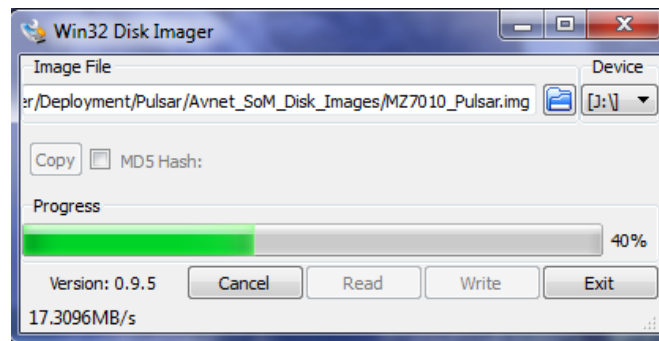
9. When the write is complete, click the **OK** button.
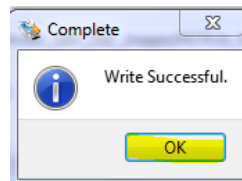
If you have no further microSD cards to program, you may click the Exit button in the *Win 32 Disk Imager* dialog to close the program.

10. Use Windows File Explorer to **Eject** the media from your system. The name on the media will be **OVERCBOOT**. Right-click on the **OVERCBOOT** entry and select **Eject** from the pop-up menu.
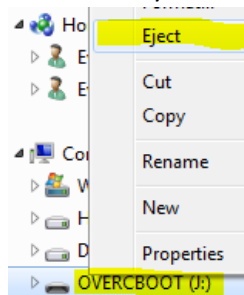
11. Physically remove the microSD card from the Windows host.

Programming Procedure from Linux

When using a Linux host, the simplest method for writing an image to a microSD card is to use the command line. The following instructions were performed on a Linux Ubuntu 14.04 LTS host, and assume a basic familiarity with the user interface in your selected Linux environment.

Your Linux host login requires root authority to write the image to the microSD card.

1. Open a Terminal Window on your Linux host.

2. Identify the device assigned to the microSD card. It will be something similar to **/dev/sdb** or **/dev/sdc** etc. Use the ls command before inserting the microSD for writing to view the current device assignments for disks.

   ```
   ron@HP-xw4600-WS:~/Pulsar/CertifedImages$ ls /dev/sd*
   /dev/sda   /dev/sda1   /dev/sda2   /dev/sda5
   ```

3. Insert a microSD card into your Linux host. The exact method is machine specific, but generally there will be slots available for different media formats, or you can use a USB card adapter to attach your target media. You may need an adapter card to use a full-size SD slot if a microSD slot is unavailable.

   Repeat the list command to determine the device assignment for the microSD. In this example, the microSD appears as **/dev/sdb**.

   ```
   ron@HP-xw4600-WS:~/Pulsar/CertifedImages$ ls /dev/sd*
   /dev/sda   /dev/sda1   /dev/sda2   /dev/sda5   /dev/sdb   /dev/sdb1
   ```

4. Locate the certified image on your Linux host, and change to that directory.

   ```
   ron@HP-xw4600-WS:~$ cd Pulsar/CertifedImages/
   ron@HP-xw4600-WS:~/Pulsar/CertifedImages$ ls
   MZ7010_Pulsar.img
   ```

5. Root authority is needed to copy the image to the microSD. In the Terminal window, enter:

   ```
   sudo dd if= <path>/<image>.img of=/dev/sdZ bs=1M
   ```

   In the example below, the command is preceded with time to have Linux calculate the duration required to complete the microSD write. On this host, the elapsed time was slightly more than 9.5 minutes.

   ```
   ron@HP-xw4600-WS:~/Pulsar/CertifedImages$ time sudo dd if=MZ7010_Pulsar.img of=/dev/sdb bs=1M
   [sudo] password for ron:
   7600+0 records in
   7600+0 records out
   7969177600 bytes (8.0 GB) copied, 566.82 s, 14.1 MB/s

   real    9m34.032s
   user    0m0.041s
   sys     0m11.571s
   ```

6. Once the write is complete, eject the drive and physically remove it from the Linux host.

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Using the Image

Connect the USB-UART, Ethernet and power as described in the Quick Start Card included with each kit.

1. Insert the microSD card into the card cage on the target SoM/motherboard or Carrier Card.

2. Connect a USB-serial cable to the device.

3. Power the board (MicroZed receives power from the USB-serial cable).

4. Open you favorite serial console on the host and connect to the active COM port.

5. The serial console should scroll rapidly as the Linux boot proceeds. The console may pause for 5-10 seconds at various points. Wait until the login prompt appears.

```
br0: port 3(vethIYBORJ) entered forwarding state

Pulsar Linux 7.0.0.10 cube-03-11-15-cube-server ttyPS0

cube-03-11-15-cube-server login: █
```

6. Log in with the UserID/Password: **root** / **incendia**.

7. To further explore the capabilities of this application-ready system, please visit:

    http://pulsar.windriver.com

    Scroll down to the bottom of the page and click the **Learn more** link in the ***Knowledge Library*** section.

    ## Knowledge Library

    Check out our knowledge library for developer and system admin guides and other helpful docs. Learn more -→

8. When you are done, it is always best if you shut down the system from the console rather than simply switching off power.

    a. **shutdown –h now**   or   **poweroff**

    ```
    Last login: Mon Nov 30 15:16:45 EST 2015 on ttyPS0
    root@cube-03-11-15-cube-server:~# shutdown -h now
    ```

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Revision History

Version	Date	Details
0.5	November 30, 2015	Original Draft– Pulsar 7
1.0	December 15, 2015	First Release