Bonus
EV3 Programming Lessons

Introduction to ev3dev: Setup

Objectives

■ Learn how to install ev3dev on an EV3

■ Learn to setup networking on ev3dev and connect to the ev3 using ssh

■ **Prerequisites: none**

Materials

- EV3 brick

- USB WIFI (Optional)

- Micro SD card (2gb+ but smaller than 32gb)

What is ev3dev?

- ev3dev is a [Debian Linux](#)-based operating system that runs on the LEGO® MINDSTORMS EV3

- ev3dev allows you to program in different languages (eg. Python, c++)

- ev3dev supports many USB and Bluetooth devices, like Wi-Fi dongles, keyboards, keypads, joysticks and cameras work too.

Step 1: Download ev3dev

- Download the latest version of EV3dev for EV3 [here](https://github.com/ev3dev/ev3dev/releases) (https://github.com/ev3dev/ev3dev/releases)

- Unzip the file

– Remember where you put the .img file

Step 2: Write Image (Windows)

■ Download win32diskimager

■ Insert the Micro SD card into the computer

■ Browse for the .img file you downloaded in win32diskimager

■ Write to the drive letter of your SD card (in device dropdown)

■ Accept all warnings
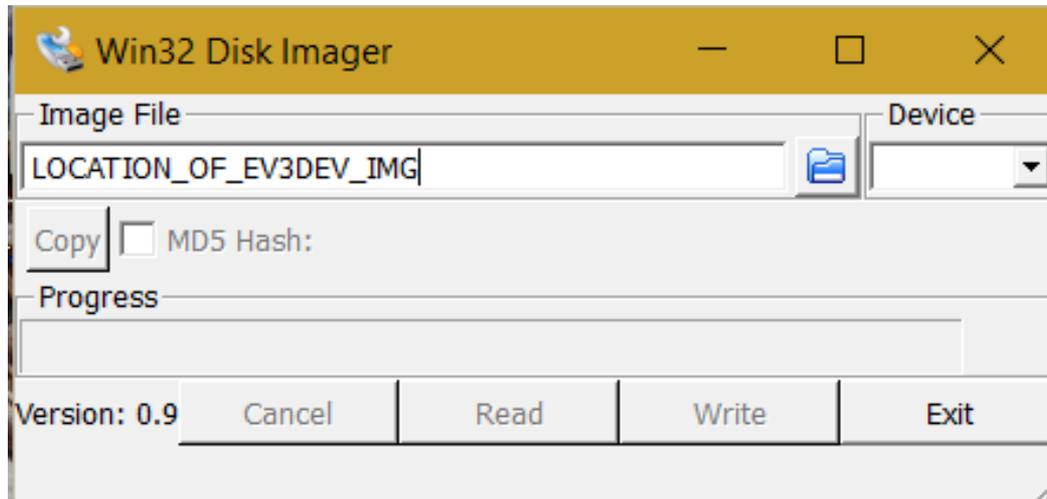
Step 2: Write Image (Mac OS X)

- Open terminal from Application → Utilities

- Run `diskutil list`

- Now insert you SD card and run `diskutil list` again. The new entry (/`dev/ID_OF_CARD`) is your SD card. Remember the `ID_OF_CARD`

- Run `diskutil unmountDisk /dev/ID_OF_CARDs1`

- Unmount your SD card. If it has more than one partition, you will need to do this for each partition.　(Listed as identifier when running diskutil list)

- This is the dangerous part. If you pick the wrong device, you could wipe out your hard drive, so BE CAREFUL!.

- *Run* `sudo dd if=Location_OF_EV3DEV_IMG of=/dev/rID_OF_CARD bs=4m`

- REPLACE EVERY `ID_OF_CARD` WITH THE ACTUAL DISK ENTRY FOUND IN `DISKUTIL LIST` (EG. DISK1)

Step 2: Write Image (Linux)

- **Run** `df -h`

- Now insert you SD card and run `df -h` again.

- See the a new entry eg.(`/dev/sdb1`)? That is your SD card. sdb is the actual device name and 1 is the partition number. Your actual device may be named something different.

- **Run** `sudo umount /dev/sdb1`

- You may have to run this more than once with a different number at the end if you have more than one partition

- *IMPORTANT: Note `sdb` is just an example id. Your actual device may be named something different.*

- **Run** `sudo dd if=Location_OF_EV3DEV_IMG  bs=4M of=/dev/sdb`

Step 2: Write Image (Ubuntu Linux)

■ Download the ev3dev image file ending with .xz instead of .zip (do not extract)
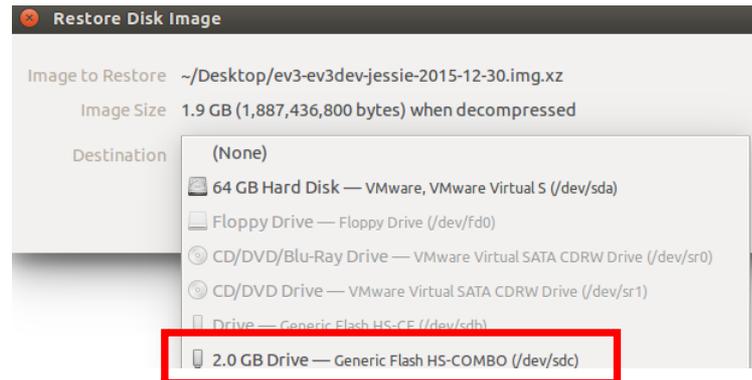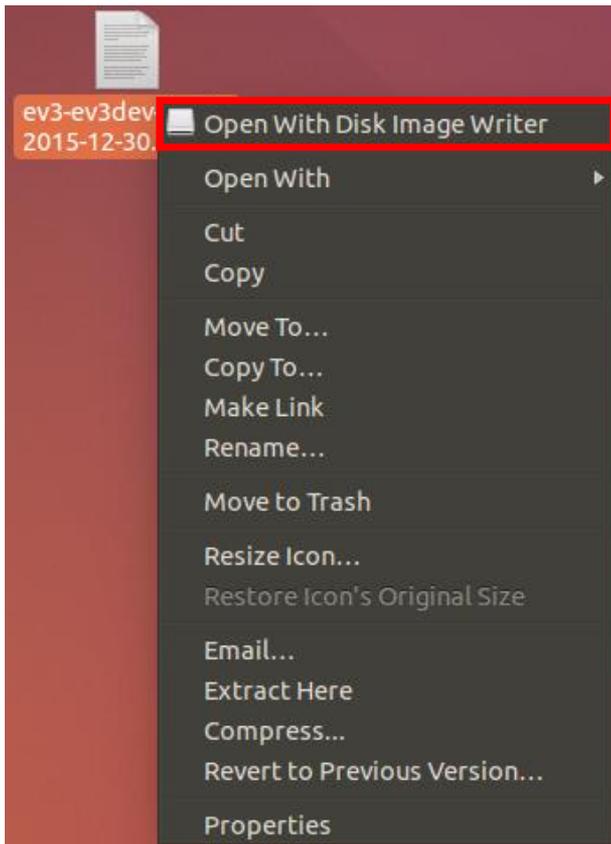
This is our micro SD card. (Yours will probably be different)
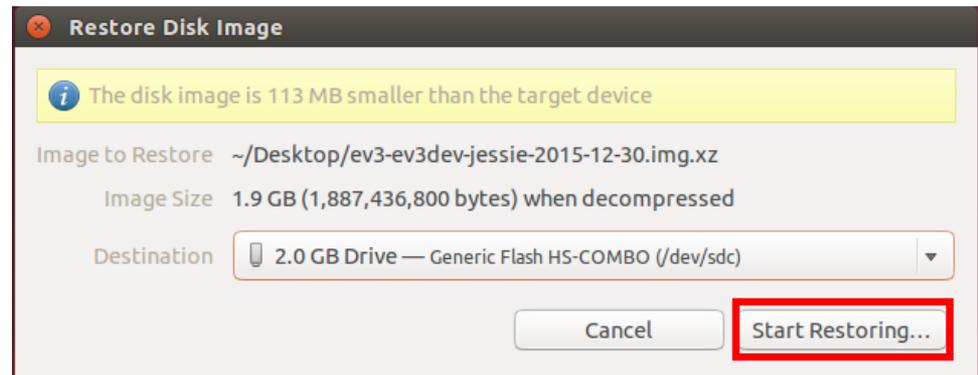
Step 3: Boot ev3dev

- Put the SD Card in your EV3 and power it on.

- At first, you will see the MINDSTORMS boot splash and the red LEDs will be on. This is immediately followed by the ev3dev boot splash and the LEDs changing to orange.

- The button lights on the EV3 brick (LEDs) indicate SD card activity.

Step 4: Connect to the Internet

- Insert the USB Wi-Fi dongle
  - *Note that more than the standard LEGO specified Wi-Fi dongles should work*

- Navigate to Wireless and Networks using arrow keys on robot
  - *Find Wi-Fi*

- Select Powered

- Press Start Scan

- Select a network that you recognize
  - *Press connect*
  - *When you are prompted with a dialogue press the middle button*

- Type in the passcode
  - *Select Accept then Accept on the other remaining dialogue*

- To connect to the Internet in another way (USB or Bluetooth) visit here

Step 5: SSH on Linux/Mac OS X

■ Launch terminal

■ Find the IP Address of your EV3 (On the top left of the EV3 screen)

■ In Terminal type `ssh IP_Address_EV3 -l root`

– *Replace* `IP_Address_EV3` *with the value you found in step 2*

– *The password is* `r00tme`

– `root` *is the username*

■ To change the password run `sudo passwd`

■ To make a new user run `useradd NAME_OF_USER`

– *Replace* `NAME_OF_USER` *with the username you want*

Step 5: SSH on Windows

- ■ Install Putty

- ■ Find the IP Address of your EV3 (On the top left of the EV3 screen)

- ■ Connect to the EV3:
- – *Press open*
- – `root` *is the username*
- – *The password is* `r00tme`
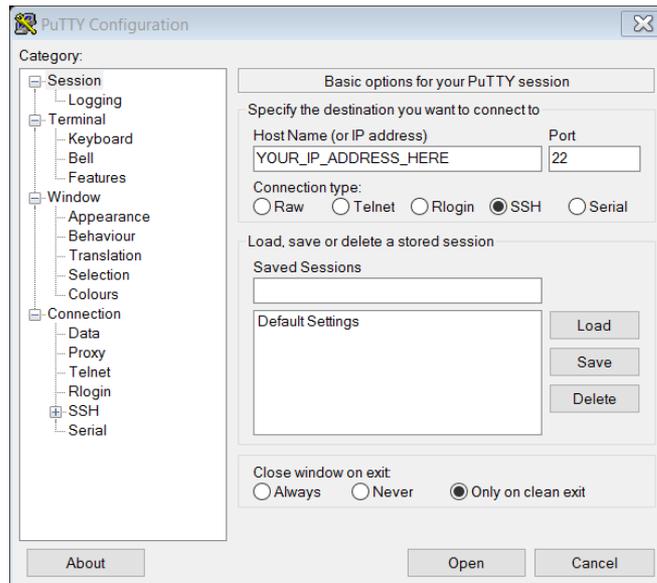
- ■ To change the password run `sudo passwd`

- ■ To make a new user run `useradd NAME_OF_USER`

- – *Replace* `NAME_OF_USER` *with the username you want*

CREDITS

- This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.

- More lessons are available at www.ev3lessons.com

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- Credits: ev3dev.org