ECE471: Embedded Systems – Homework 2 Part A Gumstix Board Setup

Due: Complete Part A as soon as possible, as it is a necessary pre-requisite for Part B

You should have received a box containing the Gumstix Overo board and its various companion parts in class on 1 October. If you missed class you will need to arrange a time to get the board.

More on the board can be found here: http://gumstix.org/getting-started.html

• Install Linux

- Find the 4GB mini-sd card.
- Put the card in your host computer so you can write the Linux image to it. Either put the SD card in an SD slot (using an adapter if too small) or else the provided USB/SD adapter.
- Download the image from my website and uncompress it. http://web.eece.maine. edu/~vweaver/classes/ece471_2013f/images/gumstix.img.zip Warning: the download is roughly 500MB and will take 4GB of disk space uncompressed. If you'd like to save time and bandwidth, stop by my office and we can write it direct.
- Unzip the image (unzip gumstix.img.zip on Linux). Write the image to the raw device. Under Linux this is simply a matter of (as root) issuing the command dd if=gumstix.img of=/dev/sdX where X is the letter corresponding to the disk name of your disk. You want to over-write the *whole* SD card, not just one of the partitions. The disk image contains 2 preformatted partitions because I'm trying to save you the trouble of partitioning and formatting. BE VERY CAREFUL HERE if you use the wrong drive value you can over-write your main hard-disk. One good way to find the value is by running dmesg after putting the SD card in your computer. This will take a while (flash is slow). Make sure it is done writing before removing.
- Similar instructions can work for OSX.
- There is a tool from SuSE called "Image Writer" that might make this easier via a gui interface, available for Windows too. I haven't personally tried it.

• Booting Linux

- Booting is simply a matter of inserting the SD card into the gumstix board, placing the gumstix onto the TOBI board, then plugging the power wall adapter into the jack labeled "POWER".
- You might want to hook up one of the log-in methods before doing this just so you can log in when it boots up.
- Be careful turning on/removing power to the board unexpectedly as it is unfortunately easy for the flash to get corrupted. Try to back up your code often just in case. If the flash gets corrupted you will have to re-image the card.

• Logging in

- The easiest way to log in is to use the USB/Serial connection. Plug the USB cable on one end to the jack marked CONSOLE and the other to your machine. Then use a terminal program to access things

On Linux you can use minicom. The device will likely be /dev/ttyUSB0. Settings 115200 baud, 8N1. If you see output but it won't take input then check the settings and set Hardware Flow Control to no and Software Flow Control to yes. You may also have to set your terminal emulation to VT102 so backspace and text interfaces might not work (export TERM=vt102) (i.e. you get \hat{H} instead of backspace).

On OSX there are probably terminal programs. I have not tried any. You can let me know if you find one that works well.

On Windows I recommend teraterm. Directions for using it can be found on the course website.

- Another way to connect is via the network. By default it comes up as 192.168.8.10. If you have a laptop with wired ethernet you can direct-connect with an ethernet cable, set your local IP to something like 192.168.8.1, and then ssh in to 192.168.8.10. You can also config it to get its own IP address via DHCP if you want it on your home network. You can also turn on wi-fi but that's more complicated (need to install firmware, plug in antenna, set up wifi password, etc).
- In theory if you have a USB keyboard and DVI monitor you can set things up with the HDMI-DVI adapter and USB hub. I have not gotten that working yet.

• Initial Setup

- Log in as user root password ChangeMe
- Change the root password with passwd
- You may want to add a user account. Something like adduser myname (replace myname with your desired account name). Answer the questions, then you should be able to log in as a regular user. That makes it harder to break things by accident.
- Installing software. This is a regular debian armhf "unstable" install. If you get your device on the internet you can install software with apt-get install. Otherwise you can get the .deb files and hand-install them with dpkg. Feel free to install things (text editor of choice, etc).
- Setting the time. Defaults to Jan 1 1970. Use date / date -s

• Shutting Down

You'll want to shutdown before removing the power. (No power button, have to yank cable). As root shutdown -h -t1 now will do it.

• Transferring Files

- If you have network going, scp or an scp/sftp client will work well.
- If you're using a terminal, look into using sz or rz. You can start sending a file using sz filename (starts zmodem transfer). You can receive a file with rz and telling your com program to send a file using zmodem.
- Worse case, you can just copy files off by shutting down the device and moving the SD card to another machine.