Raspberry Pi and UPiS Communication

This document tries to clarify issues involving the serial communication between a Pi and the UPiS. The serial comm is used to configure the UPiS using @commands. The serial comm is also used for UPiS's firmware update from a Pi using the python script supplied in the Pi-modules forum.

The following procedures have been tested using a Pi Model B+ and an Advanced UPiS. Connection was facilitated with an flat cable with 40-pin and 26 pin connectors respectively. Stacking can be used with older models of the Pi.

How to serially connect to UPiS from Pi

Jumper settings on UPiS

- Set the jumpers as per figure 37 on page 57 of the manual (Version 1.10)
- Make sure pins 8 and 10 (TXD and RXD) are connected to the Pi (stacking or flat cable)

Steps to be taken on the Pi

- Open a terminal window on your Mac or Windows machine and log in to the Pi
- Use `sudo nano /etc/inittab` to edit the file
  Go to the end of the file. You will see a line similar to
  `T0:23:respawn:/sbin/getty -L ttyAMA0 115200 vt100`
  Disable this line by adding a # character to the beginning. Save the file.
- Install minicom on the Pi with
  `sudo apt-get install minicom`
- After proper installation run minicom on the Pi using this command
  `sudo minicom -b 38400 -o -D /dev/ttyAMA0`

Further info

Check this ressource with info on minicom. You may need to switch on „local echo" to see what you type in the minicom window.

http://www.tincantools.com/wiki/Minicom

Your done. Type one of the multitude of UPiS commands - start with @version.

UPiS Firmware Update from Pi

Make sure all of the above works and you can activate @commands on the UPiS. A functioning serial connection is necessary for a firmware update.

- Load the python firmware-update script from the forum website to your Mac or Windows machine.

  http://www.forum.pimodules.com/viewtopic.php?f=10&t=67
- Load the latest firmware from the forum website
- Open a terminal window on your Mac or Windows machine and login to the Pi
- Create a new folder and name it „firmware"
- Transfer the above two files from your Mac or Windows to that folder using ftp or any other means
- Shut down your Pi
- Disconnect power to Pi from the UPiS using the manual switch on the UPiS - put switch to the OFF position
- Keep Pi and UPiS stacked or connected with a flat cable - you will need the serial connection that runs over pins 8 and 10
- Put the UPiS into the bootloading state by following page 52 of the manual. It says:

  ...To invoke the bootloading procedure on the UPiS press and hold the RST button, while holding the RST button, press and hold the SDWN button. With both buttons being pressed simultaneously, release the RST button, then release the SDWN button.You will then see all of the Green LEDs light, afterwards the (STB) RED Light will illuminate. Your UPiS is now in the bootloading mode and waiting for the hex file. This procedure can be easy done with one finger due to close placement of these two buttons...
- Supply power to the Pi via the micro USB connector on the Pi (Note: during firmware update the Pi cannot be powered from the UPiS!)
- Login to the Pi in your terminal window
- Navigate to the firmware folder created earlier
- Run the firmware update script with this command

```
sudo python fwupdate_1_3.py  -f  UPiS_1.096_beta.hex
```

You will hopefully see this in your terminal

```
Validating firmware: OK

Checking communication with bootloader: OK

Uploading firmware: 0% ii|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|||!|
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Invoking factory reset of UPiS...

ALL Done :) Ready to go...

pi@raspberrypi ~
```

- This means the firmware has been successfully updated.
- Shutdown the Pi
- Disconnect the 5V power from the Pi and put the manual switch on the UPiS in the ON positions. Press SDWN button to restart Pi. Verify the new firmware with the command @ status in the minicom window.
- You are all set, congrats and happy computing

How to use the UPiS PICo Interface

From wikipedia:

...I²C (Inter-Integrated Circuit), pronounced I-squared-C, is a multi-master, multi-slave, single-ended, serial computer bus invented by Philips Semiconductor, known today as NXP Semiconductors, used for attaching low-speed peripherals to computer motherboards and embedded systems. Alternatively I²C is spelled I2C...

On the Pi I2C is facilitated through pins 3 and 5 (GPIO02 and GPIO03). To access the UPiS PICo interface from the Pi you need to set jumpers on the UPiS as per figure 22 in the manual.

Check out the following Adafruit tutorial to enable the I2C interface on the Pi:

https://learn.adafruit.com/adafruits-raspberry-pi-lesson-4-gpio-setup/configuring-i2c

Use this command on the Pi to show all devices connected to the Pi on the I2C bus:

```
sudo i2cdetect -y 1
```

Use commands like this to access/set the different registers on the UPiS

```
sudo i2cget -y 1 0x6a 1 w
```

Consult the UPiS forum for the available registers on the UPiS:

http://www.forum.pimodules.com/viewtopic.php?f=7&t=90

Prepared by Peter Boxler, October 2014.