# Setting up the Raspberry Pi

The Raspberry Pi4 Compute Module on the Saturn board is a full performance Raspberry Pi computer. It needs a configured Micro SD card to boot and operate. We recommend a 32GByte SD Card; it needs to be reasonably fast & mine is a Sandisk Ultra.

# Pre-Boot operations

1. Download and install Raspberry PI Imager (https://www.raspberrypi.com/software/) onto your PC.
2. If you want the 64 bit operating system, you will need to download it first from here: https://forums.raspberrypi.com/viewtopic.php?t=275370
3. Run the Raspberry Pi imager
4. Choose either Raspberry Pi OS Full (32 bit) or “Use custom” to select a downloaded image (eg 64 bit)
5. Insert your SD card, select it and click “write”
6. Make coffee at this point…
7. When it has finished, eject the re-insert your SD card. Take care not to let windows format part of it!
8. You will need to enable the USB interface. Edit file config.txt in the top directory on your SD card. Add two lines as follows:

#enable USB

dtoverlay=dwc2,dr\_mode=host

1. We have found the default settings do not work well with cordless keyboards & mice. To improve, edit file cmdline.txt in the top directory on your SD card and add to the end:

usbhid.mousepoll=0

(if you need to edit this one the pi is running, use **sudo nano /boot/cmdline.txt**)

1. Insert the SD card into your Raspberry pi, and power it on
2. The filesystem resizes to fill the SD card, and eventually a screen “welcome to raspberry pi” will be displayed. Enter your location details, new password, wifi password. Tell it to update software. Finally tell it to restart.

# After Initial Boot

1. Open a terminal window
2. Check your keyboard layout. Getting a UK layout right often needs manual intervention

Visit application menu > preferences >keyboard preferences

1. You will need to download the linux kernel header files:

**sudo apt install raspberrypi-kernel-headers**

1. Install Visual Studio Code.

**sudo apt install code**

1. Install some other libraries:

**sudo apt install libgtk-3-dev**

1. Download a GUI git client:

**sudo apt-get install git-cola**

1. You will need to get the Saturn repository: type these commands:

**mkdir github**

**cd github**

**git clone** [**https://github.com/laurencebarker/Saturn**](https://github.com/laurencebarker/Saturn)

(you could also use gitcola for this!)

1. Build the xdma driver:

**cd Saturn/linuxdriver/xdma**

**sudo make install**

**sudo cp ../etc/udev/rules.d/\* /etc/udev/rules.d/**

**sudo modprobe xdma**

1. Do not do this now: but if there is ever a need to remove the device driver, eg to rebuild it you would use:

**sudo rmmod -s xdma**

1. Build the Xilinx debug/support tools:

**cd ../tools**

**make**

1. you can run the Xilinx test scripts at this point Litefury only REMOVE FOR SATURN!:

**cd ../tests**

**sudo chmod 755 \*.sh**

**./run\_test.sh**

(it should report that it has found 2 H2C and 2 C2H channels, and that it has a memory mapped PCI express interface)

1. Build the Saturn utilities:

**cd ~/github/Saturn/sw\_tools**

**cd axi\_rw**

**make**

**cd ../dmatest**

**make**

**cd ../flashwriter**

**make**

1. Copy some desktop shortcuts:

**cd ~/github/Saturn/desktop**

**cp \* ~/Desktop**

1. Install some vs code extensions:

**Run vscode**

**Select the “extensions” icon on the left**

**Find & install “C/C++”**

**Find & install “GitLens”**

1. Build the P2 app:

**Select the explorer icon on the left**

**Click “open folder”**

**Navigate to ~/pi/github/Saturn/sw\_projects/P2\_app**

**Click “OK” at bottom right**

**(the C files are shown on the left; you can click a file and edit it)**

**On the menu: select Terminal > Run Build Task…**

**(the make file is executed and the code builds)**