Garmin Gadget

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1 Introduction

Here we introduce how to use Garmin Forerunner in Linux system.

2 Linux Setup

You may type the command line:

```
udevadm monitor
```

You may type the command line, if you get:

```
monitor will print the received events for:
UDEV - the event which udev sends out after rule processing
KERNEL - the kernel uevent

KERNEL[10617.492679] add      /devices/pci0000:00/0000:00:1a
    .0/usb1/1-1/1-1.2 (usb)
KERNEL[10617.493716] add      /devices/pci0000:00/0000:00:1a
    .0/usb1/1-1/1-1.2/1-1.2:1.0 (usb)
UDEV  [10617.523787] add      /devices/pci0000:00/0000:00:1a
    .0/usb1/1-1/1-1.2 (usb)
UDEV  [10617.533120] add      /devices/pci0000:00/0000:00:1a
    .0/usb1/1-1/1-1.2/1-1.2:1.0 (usb)
```

it means it was not recognized correctly.

You may also type following command to get the USB information after inserting you ANT+ key:

```
$ lsusb | grep Dynastream
Bus 001 Device 004: ID 0fcf:1008 Dynastream Innovations, Inc.
```

*(v1.1)

2.1 udev Rule

If usbserial is a seperated module, you may add a udev rule to the config file /etc/udev/rules.d/80-garmin-ant2.rules

```
sudo su -
#not work: echo 'BUS=="usb", SYSFS{idVendor}=="0fcf", SYSFS{idProduct}=="1008", RUN+="/sbin/modprobe usbserial vendor=0x0fcf product=0x1008"' > /etc/udev/rules.d/80-garmin-ant2.rules
#echo 'SUBSYSTEM=="usb", ATTRS{idVendor}=="0fcf", ATTRS{idProduct}=="1008", RUN+="/sbin/modprobe usbserial vendor=0x0fcf product=0x1008"' > /etc/udev/rules.d/80-garmin-ant2.rules
echo 'SUBSYSTEM=="usb", ATTR{idVendor}=="0fcf", ATTR{idProduct}=="1008", MODE="0666", SYMLINK+="ttyANT", ACTION=="add", RUN+="/sbin/modprobe usbserial vendor=0x0fcf product=0x1008"' > /etc/udev/rules.d/80-garmin-ant2.rules
```

Or you have to type command line at each time you insert your ANT+ key:

```
sudo /sbin/modprobe usbserial vendor=0x0fcf product=0x1008
```

And the linux should show the messages after you insert your ANT+ key again:

```
KERNEL[3801.729434] add      /module/usbserial (module)
UDEV  [3801.729922] add      /module/usbserial (module)
KERNEL[3801.730226] add      /bus/usb-serial (bus)
UDEV  [3801.730511] add      /bus/usb-serial (bus)
KERNEL[3801.730744] add      /bus/usb/drivers/usbserial (drivers)
KERNEL[3801.730777] add      /bus/usb/drivers/usbserial_generic (drivers)
KERNEL[3801.730803] add      /bus/usb-serial/drivers/generic (drivers)
KERNEL[3801.730913] add      /devices/pci0000:00/0000:00:1a.0/usb1/1-1/1-1.2/1-1.2:1.0/ttyUSB0 (usb-serial)
UDEV  [3801.731572] add      /bus/usb/drivers/usbserial_generic (drivers)
KERNEL[3801.731620] add      /devices/pci0000:00/0000:00:1a.0/usb1/1-1/1-1.2/1-1.2:1.0/ttyUSB0/tty/ttyUSB0 (tty)
UDEV  [3801.732094] add      /bus/usb/drivers/usbserial (drivers)
UDEV  [3801.732279] add      /bus/usb-serial/drivers/generic (drivers)
```

```
13 UDEV  [3801.733116] add      /devices/pci0000:00/0000:00:1a
     .0/usb1/1-1/1-1.2/1-1.2:1.0/ttyUSB0 (usb-serial)
14 UDEV  [3801.744466] add      /devices/pci0000:00/0000:00:1a
     .0/usb1/1-1/1-1.2/1-1.2:1.0/ttyUSB0/tty/ttyUSB0 (tty)
```

You may check your device files:

```
1 $ ls -l /dev/ttyUSB0
2 crw-rw---- 1 root dialout 188, 0 May  3 14:02 /dev/ttyUSB0
```

2.2 grub2

If `usbserial` was compiled in the kernel, as `Fedora 15` did, then you need to setup `grub2`[1].

```
1 # add following line to the GRUB_CMDLINE_LINUX in file /etc/
    default/grub
2 # usbserial.vendor=0x0fcf usbserial.product=0x1008
3 sudo sed -i.bak "s/GRUB_CMDLINE_LINUX_DEFAULT[^ \t]*=[^ \t]*\
    "/GRUB_CMDLINE_LINUX_DEFAULT=\"usbserial.vendor=0x0fcf
    usbserial.product=0x1008 /g" /etc/default/grub
4
5 # Update the grub config by issuing
6 grub2-mkconfig > /boot/grub2/grub.cfg
7
8 # reboot
9 shutdown -r now
```

3 Transfer Files from Garmin Watch

You may use Gant[2] or `python-ant-downloader`[3] to transfer the files from the watch to your computer. If the watch is 610, 310, FR60, 910XT etc, you would like to try `Garmin-Forerunner-610-Extractor`[4].

NOTE: I use 405, so Garmin-Forerunner-610-Extractor would not work, and python-ant-downloader failed getting files from the watch. The only work gant verion is yhfudev's.

3.1 Gant

If you want to compile and run from source code, you may want to use yhfudev's gant version[2].

Download and compile gant

```
mkdir -p ~/Development/Native/
cd ~/Development/Native/
git clone https://github.com/yhfudev/gant.git gant-git
cd gant-git/
mkdir -p build
cd build
../configure && make
```

Run

1. Insert the ANT+ key to the computer's USB slot;
2. Put Forerunner into pairing mode

```
Menu > Settings > ANT+ > Computer > Pairing > On
```

3. make sure that communication is enabled:

```
Menu > Settings > ANT+ > Computer > Enabled > Yes
```

4. You may need to also set "Force Send". This seems to send all data on the device, whether or not the data's been downloaded from the device before.

```
Menu > Settings > ANT+ > Computer > Force Send > Yes
```

5. authorizated by watch

```
# Use garmin-ant-downloader in debian
# gant -f nameofyourwatchid -a nameofauthentificationfile
#sudo ./gant -f Forerunner-405 -a auth405
sudo ./gant -f yhfu -a auth405
```

6. transfer .tcx files from your watch

```
sudo ./gant -nza auth405 > output
```

Alternatively you can move the authorization file to your home directory; Gant looks for it there automatically:

```
cp ./auth405 ~/.gant
sudo ./gant -nz > output
```

7. Upload all of these `.tcx` to Garmin Connect, or open these files by pytrainer.

3.2 python-ant-downloader

```
git clone https://github.com/braiden/python-ant-downloader
sudo apt-get install python-pip python-usb libusb-1.0-0
sudo apt-get install python-lxml
sudo apt-get install python python-lxml python-pkg-resources
   python-poster python-serial

# replace python-usb 0.4 by 1.0
sudo apt-get install python-pip &&
    pyusbdir="$(mktemp -d)" &&
    pushd "$pyusbdir" &&
    git clone https://github.com/walac/pyusb &&
    cd ./pyusb/; git checkout 1.0.0a3 && cd .. &&
    sudo pip install ./pyusb/ &&
    popd &&
    rm "$pyusbdir" -rfv &&
    unset pyusbdir

./ant-downloader.py --help
```

Setup the watch as we described above, then run

```
sudo ./ant-downloader.py
```

3.3 Garmin-Forerunner-610-Extractor

Supported devices by Garmin-Forerunner-610-Extractor[4]:

1. Garmin Forerunner 60
2. Garmin Forerunner 405CX
3. Garmin Forerunner 310XT
4. Garmin Forerunner 610
5. Garmin Forerunner 910XT
6. Garmin FR70
7. Garmin Swim

Download and run the application:

```
git clone https://github.com/Tigge/Garmin-Forerunner-610-Extractor
cd Garmin-Forerunner-610-Extractor
sudo cp resources/ant-usbstick2.rules /etc/udev/rules.d/80-garmin-ant2.rules
echo 'SUBSYSTEM=="usb", ATTR{idVendor}=="0fcf", ATTR{idProduct}=="1008", MODE="0666", SYMLINK+="ttyANT", ACTION=="add", RUN+="/sbin/modprobe usbserial vendor=0x0fcf product=0x1008"' > /etc/udev/rules.d/80-garmin-ant2.rules

sudo ./garmin.py
```

4 Applications

4.1 pytrainer

Pytrainer[5] is a desktop tool for logging and graphing sporting excursions, the file formats include: GPX, TCX, FIT .

Install in Ubuntu Linux:

```
sudo apt-get install pytrainer
```

Or installed from source code:

```
git clone https://github.com/pytrainer/pytrainer.git
cd pytrainer
sudo python setup.py install
pytrainer -i
```

4.2 Garmin Connect

5 Related Work

There's two versions of the gant, The DanAnker's [1] seems contains the latest version of the origin author, because of the latest commits are in this repo, while the Debin's [2] has not. Another jamesarbrown's [3] was from one early version of wbell in a web forum.

Unfortunally, the three versions above were not able to get files from the watch Only yhfudev's version can work correctly.

[1] DanAnker's gant https://github.com/DanAnkers/garmin-ant-downloader.git

[2] Debian's gant git://git.debian.org/git/pkg-running/garmin-ant-downloader.git

[3] jamesarbrown's gant https://github.com/jamesarbrown/Gant.git

James A R Brown[1] described how to transfer files from Garmin watch, and import the files to pytrainer.

braiden[6] introduced how to use Garmintools[7] to communicate with Garmin Forerunner 305[8] in Linux, and he also give an enhanced Python tool[3]; Another work[9] introduced the protocol between host and Garmin Forerunner 405[10]CX[11], and it also introduced the Python source code[3].

Garmin-Forerunner-610-Extractor[4] support a newer devices, such as 610.

Linux Garmin Communicator Plugin[12] support uploading files to Gamin's website by using Firefox. [4]

Bibliography

[1] J. A. R. Brown, "Garmin Forerunner 405 (ANT USB2) in Linux." http://www.jamesarbrown.com/?p=5, May 2011. 3, 7

[2] yhfudev, "Gant's clone." https://github.com/yhfudev/gant.git, Mar. 2013. 3

[3] braiden, "python-ant-downloader." https://github.com/braiden/python-ant-downloader.git, Mar. 2012. 3, 7

[4] "Garmin Forerunner 610 Extractor." https://github.com/Tigge/Garmin-Forerunner-610-Extractor.git, May 2013. 3, 5, 7

[5] D. Granda, "pytrainer – a desktop application for logging and graphing sporting excursions." http://sourceforge.net/projects/pytrainer/, Aug. 2012. 6

[6] braiden, "Garmin Connect & Linux." http://braiden.org/?p=62, Mar. 2010. 7

[7] dbaile@gmail.com, "GarminTools." http://code.google.com/p/garmintools/, Mar. 2009. 7

[8] Garmin, "Garmin Forerunner 305." http://support.garmin.com/support/sw/supportPage/display?locale=en_US&topicIDs={6d19e750-030b-11dc-e9ab-000000000000}&topicIDs=Running&topicIDs={64bfd220-03bc-11dc-786a-000000000000}&topicIDs={c4231240-03bc-11dc-786a-000000000000}. 7

[9] braiden, "Implementing Linux Support for Garmin 405CX." http://braiden.org/?p=293, Mar. 2012. 7

[4]The Plugin's GitHub source code https://github.com/adiesner/GarminPlugin.git, to compile it, it needs xulrunner-dev, Tinyxml, garmintools, libusb etc.

[10] Garmin, "Garmin Forerunner 405." http://support.garmin.com/support/sw/supportPage/display?locale=en_US&topicIDs={6d19e750-030b-11dc-e9ab-000000000000}&topicIDs=Running&topicIDs={64bfd220-03bc-11dc-786a-000000000000}&topicIDs={cbabf930-e572-11dc-d6fc-000000000000}. 7

[11] Garmin, "Garmin Forerunner 405CX." http://support.garmin.com/support/sw/supportPage/display?locale=en_US&topicIDs={6d19e750-030b-11dc-e9ab-000000000000}&topicIDs=Running&topicIDs={64bfd220-03bc-11dc-786a-000000000000}&topicIDs={ea3a4f30-1f9d-11de-76c5-000000000000}. 7

[12] A. Diesner, "Linux Garmin Communicator Plugin." http://www.andreas-diesner.de/garminplugin/, Mar. 2013. 7