

Instructions for setting up to compile and run OSGPS code under Linux

A. The latest and greatest OSGPS software is available on SourceForge. If you are not already monitoring this, you need to be. To set up an account on Sourceforge at www.sourceforge.net , send an email to the osgps project administrator to be added as a developer.

B. Linux Operating System. The OSGPS group is using Fedora Core 5 Linux at the time of this printing. You can get this off the internet by going to the Redhat site. See: <http://www.redhat.com/fedora/>

OR: You can purchase a copy of the installation DVD at most popular book stores included in the publication: Red Hat Fedora™ 5 by Paul Hudson and Andrew Hudson, ISBN 0-672-32847-x

Follow the instructions to install Fedora 5.

For the instructions below, we are using the name “OSGPS” as the home directory. With the Fedora installation process, it is suggested that you call your computer OSGPS and use a password that has 6 or more characters.

Once you have Fedora installed on your system, go to the following steps:

- Download the most recent source code from SourceForge:

If you do not have access to the CVS archive on the Linux system you plan to use, use a PC with a network connection and download the latest release from sourceforge (i.e, the .tar file). For some reason, SourceForge may not have the makefile included in the archive. There is a copy of the “makefile” as appendix “A” to this document. More about this later.

Go to the SourceForge site: http://sourceforge.net/cvs/?group_id=91538
And select the “Download” button. See the picture below.

SF.net » Projects » OpenSourceGPS » CVS

OpenSourceGPS

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About CVS

CVS (Concurrent Versions System) is a tool used by many projects to manage changes within the code tree. CVS provides the means to store not only the code, but also a record of all changes (and who made those changes) that have occurred to that source code. Use of CVS is particularly common in projects with multiple developers, since CVS ensures changes made by one developer are not accidentally overwritten by another developer posts their changes to the source tree.

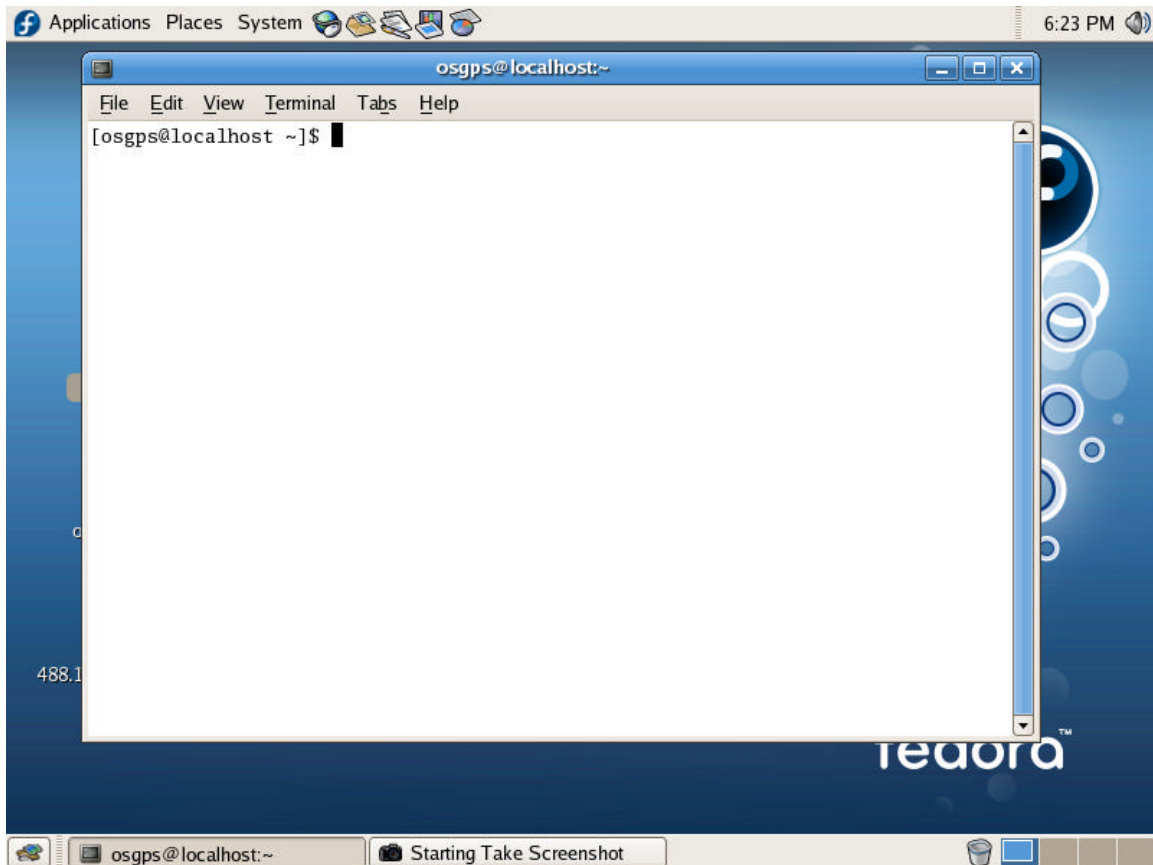
Information about accessing this CVS repository may be found in our document titled, "CVS (Version Control System) Commands"

- Next, copy the “osgps.tar” file from the list. It may be at the bottom of the list. Below is a picture of the expanded list. The “osgps.tar” file is the last line.

OSGPS114.zip		130845	336	1308	.zip
[-] osgps115					
Latest	[-] osgps115	(2004-06-23 10:37)			
OSGPS115.zip		203417	440	1308	.zip
[-] osgps116					
Latest	[-] osgps116	(2004-06-16 20:40)			
osgps116.zip		486125	421	1308	.zip
[-] osgps117					
Latest	[-] osgps117	(2005-02-20 10:00)			
osgps117.zip		674027	790	1308	.zip
[-] osgps118					
Latest	[-] osgps118	(2005-12-20 19:29)			
osgps118.zip		1465454	754	None	None
[-] osgps200					
Latest	[-] osgps210	(2006-11-22 18:47)			
osgps21.zip		399300	171	1308	Other Source File
[-] osgps200	(2006-07-16 21:00)				
Totals:	12	12	4052295	1621	

Next, you want to copy this archive on to the Linux computer you plan to use.

- Create a directory to work in called OSGPS. You can do this by using the graphical interface on Fedora by setting up a folder in the home directory.
- From this point forward, we will be using the terminal feature. Go to the “Applications” button and select “Accessories” and “Terminal”.



View of the “Terminal Window”

- The terminal window will be dimensioned 80X24. Change it to 80X25 by putting the mouse arrow on the bottom of the window and drag the window down one line. This should now show the dimensions as 80X25.
- Next, switch user by typing su and enter (lower case S, lower case U, return).
- The system will ask you to enter the password.
- After you enter the password, go to the OSGPS directory by typing: cd OSGPS
- Now copy the osgps.tar file into this directory. Unzip or expand the archive into this directory. You can check it by typing ls (lower case L, lower case S, return). You should see all the files. See picture below for what you should see. If the “Makefile” is not present, see appendix A. Be sure to call the file as Makefile (starts with uppercase M) and it has no extension.

```
osgps@localhost/home/osgps/osgps
File Edit View Terminal Tabs Help
[osgps@localhost ~]$ su
Password:
[root@localhost osgps]# cd osgps
[root@localhost osgps]# ls
80-osgps.rules  fwInter.o      gpcsr.o      linuxmod.o    PCI_08I
8CCD05.CFC     globals.h      gpcsr.c      linuxmod.c    revr_par.dat
changes.log     gp2021.c      gpcsr.h      linuxmod.o    reg_err.dat
CMatrix3.cpp   gp2021.h      GPSRCVR.DSM  log_err       regtest
CMatrix3.h     gp2021kn.ko   gpcsr.cvr.h  Makefile      regtest.c
consts.h       gp2021kn.mod.c GPSRCVR.IDE  nav_fix.c     regtest.cpp
curloc.dat     gp2021kn.mod.o GPSRCVR.MAK  nav_fix.o     regtest.DSM
curloc.dat~   gp2021kn.o    gpcsr.cvr.o  nsea.c        serport.c
current.alm    gp2021.o      interfac.c    nsea.h        serport.cpp
current.eph    gpsfunc.c     interfac.h    nsea.o        serport.h
CVS            gpsfunc.h     interfac.o    nseatest.out  structs.h
file.h         gpsfunc.o     ion_etc.dat  PCI.ASM       tbuild.bat
fwInter.c     gpcsr.c       irq.c        pciFind.c     types.h
fwInter.h     gpcsr.h       linuxmod.c   pci.h
```

This picture shows the files in the “terminal window” for the OSGPS directory.

- Do not compile the program as root as this is a bad practice. To compile, type:

```
# make
```
- Switch back to root and run “make install”:

```
# make install
```

NOTE: If you have errors with either “make” or “make install”, this may be due to the fact that your PC has never been set up for doing a “kernel-devel”. See **Appendix B** for more information on this procedure.

- Once you run “make install” you will find the driver in the folder. The driver is called “gp2021km.ko”. Do a listing (ls) to make sure it is there.
- Install the driver by typing the following commands:

```
# su -  
# insmod /home/osgps/osgps/gp2021km.ko
```

If there are no errors, you will get a prompt.

Next type:

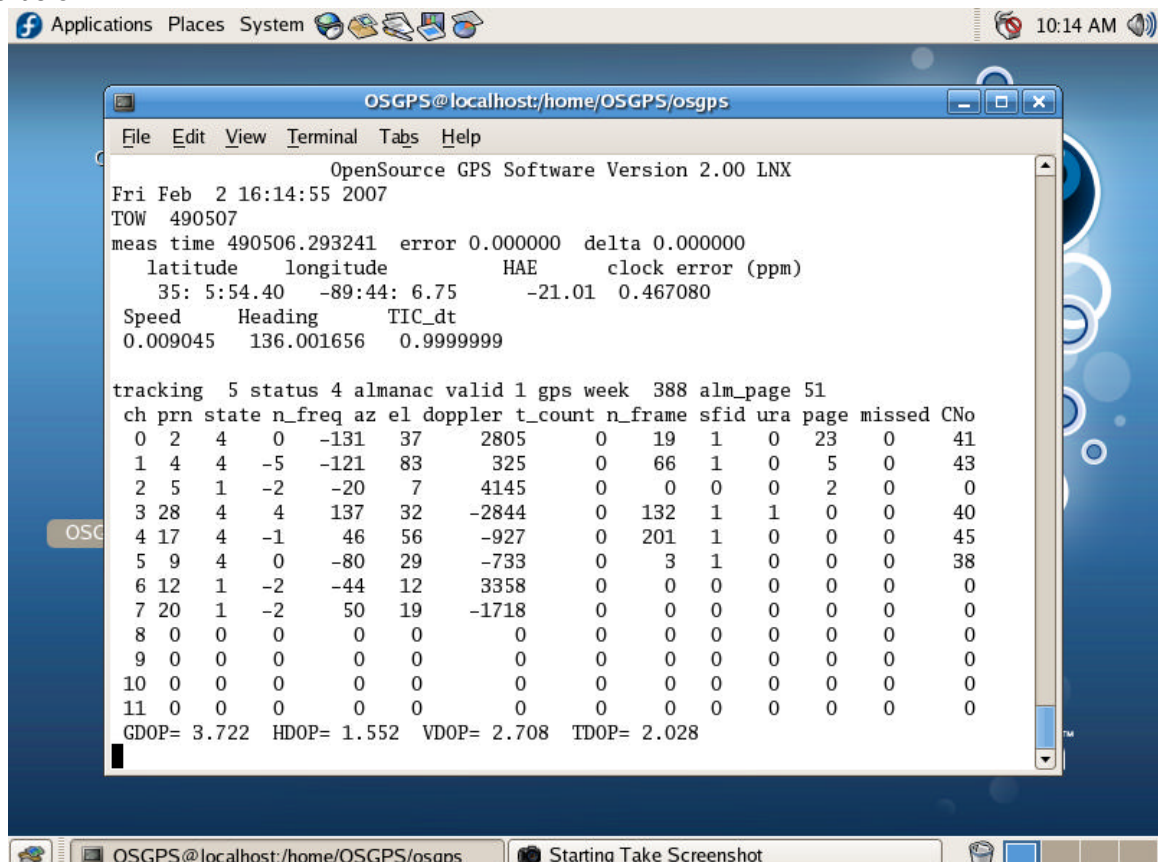
```
#exit
```

This will return the cursor to the top of the window. You can verify the driver is working by typing: “cat /proc/osgps”

- To start the userland program type:

```
# ./gpsrcvr
```

Congratulations, you are up and running with OSGPS! Your screen should look like the one below.



The screenshot shows a terminal window titled "OSGPS@localhost:/home/OSGPS/osgps". The terminal output displays the following information:

```
OSGPS@localhost:/home/OSGPS/osgps  
OpenSource GPS Software Version 2.00 LNX  
Fri Feb 2 16:14:55 2007  
TOW 490507  
meas time 490506.293241 error 0.000000 delta 0.000000  
latitude longitude HAE clock error (ppm)  
35: 5:54.40 -89:44: 6.75 -21.01 0.467080  
Speed Heading TIC_dt  
0.009045 136.001656 0.9999999  
  
tracking 5 status 4 almanac valid 1 gps week 388 alm_page 51  
ch prn state n_freq az el doppler t_count n_frame sfid ura page missed CNo  
0 2 4 0 -131 37 2805 0 19 1 0 23 0 41  
1 4 4 -5 -121 83 325 0 66 1 0 5 0 43  
2 5 1 -2 -20 7 4145 0 0 0 0 2 0 0  
3 28 4 4 137 32 -2844 0 132 1 1 0 0 40  
4 17 4 -1 46 56 -927 0 201 1 0 0 0 45  
5 9 4 0 -80 29 -733 0 3 1 0 0 0 38  
6 12 1 -2 -44 12 3358 0 0 0 0 0 0 0  
7 20 1 -2 50 19 -1718 0 0 0 0 0 0 0  
8 0 0 0 0 0 0 0 0 0 0 0 0 0  
9 0 0 0 0 0 0 0 0 0 0 0 0 0  
10 0 0 0 0 0 0 0 0 0 0 0 0 0  
11 0 0 0 0 0 0 0 0 0 0 0 0 0  
GDOP= 3.722 HDOP= 1.552 VDOP= 2.708 TDOP= 2.028
```

Appendix A:

This is the "Makefile". You can use a standard text editor to build this file. Be sure to call it Makefile with no extension and it begins with an upper case "M".

```
# To build modules outside of the kernel tree, we run "make"
# in the kernel source tree; the Makefile then includes this
# Makefile once again.
# This conditional selects whether we are being included from the
# kernel Makefile or not.
ifeq ($(PATCHLEVEL),)
```

```
    # Assume the source tree is where the running kernel was built
    # You should set KERNELDIR in the environment if it's elsewhere
    KERNELDIR ?= /lib/modules/$(shell uname -r)/build
    # The current directory is passed to sub-makes as argument
    PWD := $(shell pwd)
```

```
PROJ=gpsrcvr
SRC= gpsfuncs.c gpsrcvr.c nav_fix.c linuxusr.c nmea.c FwInter.c rinex.c
GUSRC=gpsfuncs.c gpsrcvr.c nav_fix.c interfac.c
# NMEA.c serport.c FwInter.c
```

```
CFLAGS=-g3 -O3 -Wall -W -pedantic -D_GNU_SOURCE -Werror
LDFLAGS=-lm
```

```
all: .depend gpsrcvr regtest modules 90-osgps.rules
```

```
modules:
```

```
    $(MAKE) -C $(KERNELDIR) M=$(PWD) modules
```

```
modules_install:
```

```
    $(MAKE) -C $(KERNELDIR) M=$(PWD) modules_install
```

```
gpsrcvr: $(SRC:.c=.o)
```

```
    $(CC) $(CFLAGS) $^ -o $@ $(LDFLAGS)
```

```
gpsuser: $(GUSRC:.c=.o)
```

```
    $(CC) $(CFLAGS) $^ -o $@ $(LDFLAGS)
```

```

90-osgps.rules:
    echo 'KERNEL=="gps.status", NAME="gps/status", MODE="0666" > $@
    echo 'KERNEL=="gps.measurement",NAME="gps/measurement",
MODE="0666" >> $@
    echo 'KERNEL=="gps.data", NAME="gps/data", MODE="0666" >> $@

install: modules_install
    cp 90-osgps.rules /etc/udev/rules.d/

clean:
    $(RM) -r *.o *~ core .depend *.cmd *.ko *.mod.c .tmp_versions
    $(RM) gpsrcvr regtest *.o *~
    $(RM) *.lib *.obj *.exe *.exe

.depend:
    $(RM) $@
    gcc -MM $(CFLAGS) $(SRC) > $@

.PHONY: modules modules_install clean depend

include .depend

else
    # called from kernel build system: just declare what our modules are
    gp2021km-objs := linuxmod.o gp2021.o gpsisr.o interfac.o
    obj-m := gp2021km.o
endif

```

Appendix B

Installing “kernel-devel” and “kernel-headers”

First check to see what is installed. At the command line and as root, type:

```
# rpm -qa | grep kernel
```

You may see that you only have something like: “kernel -2.6.15-1.2054_FC5”
If you do not see “kernel-devel”, you need to install it. If you are connected to the internet, then the easy way is to do:

```
# yum install kernel-devel kernel-headers
```

If you are not connected to the internet, use your Fedora installation CD or DVD and go to the Fedora folder and then to the RPM folder. Look for the file called:

```
kernel-devel-2.6.15-1.2054_FC5.i686
```

NOTE: the number 2.6.15-1.2054_FC5.i686 may be different for your version of Fedora. Consult the Fedora start-up page to get the correct information.

Double click on it to install “kernel-devel”

After it has completed the installation, go back to the terminal window and check again to confirm that the “kernel-devel” has been installed, type:

```
# rpm -qa | grep kernel
```

You should now see:

```
Kernel-2.6.15-1.2054_FC5  
Kernel-devel-2.6.15-1.2054_FC5.i686
```

This document was written by Doug Baker with the co-operation of Dr. Cliff Kelley and Rick Niles. Hopefully it will help you to install Fedora Linux and the OSGPS software to a successful conclusion! Please report mistakes or errors to: Email: dbaker@gpscreations.com