

SNANA Installation Guide

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1 Overview

The installation of SNANA involves two tarballs available from the “SNANA Download” button. First is the SNANA software that includes all of the source code and a Makefile. The second tarball, called “\$SNANA_DIR/\$SNANA_ROOT,” contains data (§5), a simulation-output directory, and many files needed to run the SNANA programs including K-correction tables, model parameters, filter responses, primary spectra (Vega, BD17), etc. Environment variables \$SNANA_DIR and \$SNANA_ROOT must be defined to point to these areas, and it is convenient to define these in a login script. You will also need to add \$SNANA_DIR/bin and \$SNANA_DIR/util to your path. It is recommended that \$SNANA_DIR be write-protected, while \$SNANA_ROOT has write-access for all users. Once you have installed SNANA, see the snana_manual for instructions on running the programs.

To make the SNANA binary executables,

```
cd $SNANA_DIR/src
make
```

The SNANA software is updated rather often, so it is recommended to create an automated script to ‘wget’ the current SNANA code and run the make command. The largest program size is under 400 Mb, but this does not include dynamic memory allocations.

2 Linux

To use the SNANA package you must install the 32-bit or 64-bit versions of CFITSIO, GSL and libncurses. It is also recommended to install CERNLIB and/or ROOT to make light curve plots and to access the full table of analysis variables; however, neither of these packages is required starting with v10_34b. Finally, python 2.7 or higher is required.

In the following, \$SOFTDIR refers to the top-directory of your software packages, and \$SCRATCHDIR refers to your working area or scratch disk. After installing the required packages and assuming you are using the tcsh shell, add the following in your login or SNANA-setup script,

```
> setenv CERN_DIR      $SOFTDIR/cern      ! optional (see below)
> setenv ROOT_DIR     $SOFTDIR/root      ! optional (see below)
> setenv CFITSIO_DIR  $SOFTDIR/cfitsio
> setenv GSL_DIR      $SOFTDIR/gsl
> setenv PATH         $CERN_DIR/bin:$PATH
> setenv LD_LIBRARY_PATH $CERN_DIR/lib:$LD_LIBRARY_PATH
> setenv SNANA_DIR    $SOFTDIR/SNANA/snana_v10_42i
> setenv PATH $SNANA_DIR/bin:$SNANA_DIR/util:$PATH
> python --version    (must be 2.7 or higher)
```

and for bash make the appropriate 'export' substitutions.

Download the most recent SNANA tarball to \$SOFTDIR/SNANA and do

```
> cd $SOFTDIR/SNANA
> tar xzf snana_v10_42i.tar.gz
> cd snana_v10_42i/src

> make
    (hold your breath ... )
```

See §4 on how to enable or disable compilation with HBOOK and ROOT. Once you have the SNANA software installed, download the most recent SNDATA_ROOT tarball to \$SCRATCHDIR/SNDATA_ROOT, and do

```
> setenv SNDATA_ROOT $SCRATCHDIR/SNDATA_ROOT
```

Based on the selection of HBOOK or ROOT, the output file is selected in the namelist file with

```
&SNLCINP
  HFILE_OUT      = 'anything.his'      ! HBOOK option
  ROOTFILE_OUT   = 'anything.root'     ! ROOT  option
```

2.1 Troubleshooting

1. If you get errors similar to

```
$SOFTDIR/cern/2004/lib/libpacklib.a(cfclos.o)(.text+0xa):  
In function 'cfclos_': : undefined reference to 'rfio_close'  
%$
```

then, in `$SNANA_DIR/src/Makefile`, replace “`-lkernlib -lpacklib`” with “`-lkernlib_noshift -lpacklib_noshift`” if you have the latter with your CERNLIB distribution. If not, then try installing the appropriate version from the CERNLIB page.

2. If you have a 64-bit machine of type other than `x86_64`, then modify the BITNESS logical test in the `Makefile` so that the `-m32` flag is used.

3 Mac OS with Intel Processor

2014.05.27 Tested on Mac OSX v10.9 by S.Rodney.

1. Make sure you have a working gfortran.

Here are three possible sources:

- (a) RECOMMENDED: <http://gcc.gnu.org/wiki/GFortranBinaries> :
.dmg installer puts gfortran in /usr/local/gfortran/bin
add that to your \$PATH or make sure links in /usr/local/bin exist.
- (b) <http://hpc.sourceforge.net>:
unpack a tar ball, putting binaries into /usr/local/bin
- (c) <http://r.research.att.com/tools/> :
.dmg installer puts binaries in /usr/local/bin
they say "most other binaries are either incomplete or broken (do not use compilers from HPC, they won't work correctly!)."
but that may be outdated.

2. Install SNANA dependencies : CFITSIO, GSL, and optionally ROOT or CERNLIB.

There are two required dependencies for SNANA. I recommend using a package installer, such as homebrew (<http://brew.sh>). Then you simply need to be sure that the homebrew install location is on your PATH (it defaults to /usr/local, which should be fine).

```
# update homebrew itself, including recipes
brew update
```

```
# upgrade the libraries
brew install gsl
brew install cfitsio
```

Before upgrading SNANA in the future you can first upgrade these libraries using:

```
brew update
brew upgrade gsl
brew upgrade cfitsio
```

3. OPTIONAL : install ROOT

Go to <http://root.cern.ch/> or pre-compiled libraries at
<https://root.cern.ch/content/release-53434>

4. Be sure you have set the environment variables ROOT_DIR, CFITSIO_DIR, and GSL_DIR, following the instructions above.
5. Build SNANA following the linux instructions above.

4 Optional Compilation with HBOOK and ROOT

SNANA supports three output table formats: TEXT, HBOOK, ROOT. TEXT format requires no special libraries and is thus always available. The SNANA codes will compile with HBOOK if environment (ENV) variable `$CERN_DIR` is defined. SNANA codes will compile with ROOT if ENV `$ROOT_DIR` is defined. To compile without HBOOK or ROOT, make sure that the associated ENV is not defined. Do not modify any files to adjust compilation with HBOOK or ROOT.

5 Data Samples in Download

The downloads include SN data versions in `$SNDATA_ROOT/lcmerge`.¹ Each SN data version corresponds to a published data set that has been converted into the format needed for the SNANA light curve fitter. To see a summary of the available data samples,

```
> cd $SNDATA_ROOT/lcmerge/  
> ls */*.README
```

and then “more” any README file for details.

¹“lcmerge” refers to the merging of data and meta-data such as PSF, skynoise, moon, etc ...