Ventana System

Rebuild/Reinstall Guide

Subject: *The purpose of this document is to explain the process of rebuilding/reinstalling a Greensea topside computer, Balefire Workspace, and related touch screens.*

Revision History

Revision 010

Revision	*Initials*	*Date*	*Comments*
001	Ljd, Sno	05/27/15	Initial.
002	Meb	06/15/15	Added content, edited.
003	Mbg	06/15/15	Edited.
004	Clr, Sno	06/09/15	Edited.
005	Meb	06/15/15	Proofread, edited.
006	Sno	06/15/15	Corrected commands.
007	Sno	06/17/15	Moved moxa and nvidia content to after kernel reinstall.
008	Gdg	06/18/15	Included updated shell scripts in Appendix.
009	Ljd, Meb	06/24/15	Removed repository sections and moved kernel build up in steps, edited.
010	Clr	06/09/15	Edited 8.1.1

Table 1: Revision history.

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1 Introduction

Installing a new Greensea Topside and Balefire Workspace is a multi-step process. The key components of this process are outlined in the following document. The sections will briefly outline the steps, tools, and further documentation required to set up the system, as well as provide a detailed overview of the documentation and configurations required to install and run a new system installation. This guide assumes the user is planning to install on a Debian platform.

2 Linux Installation Overview

We will use a set of tools that are described throughout this document, including scripts, software libraries, and device drivers.

- Balefire Workspace software Greensea scripts
- Greensea Dependency folder
- Online links for graphics drivers
- Configuration tools for touch screens

The convention used to describe an action on the command line is a '$' to precede commands typed as sudo user or non-root, and a '#' to precede a root command.

3 The Debian Base System

To start from a bare system, you should have hard drive capacity of at least 200 GB. A 250 to 500GB hard drive is ideal. This will give the /home and swap areas plenty of space, and allow for plenty of storage.

The topside installation document will take you through the entire Debian installation process. The ideal working setup we have configured runs with a 32-bit Debian Wheezy installation installed by a Debian Wheezy install disk an a network cable.

Once the base system is installed, follow the steps to set up directories and install packages to configure the system for Greensea's software to run correctly on.

- install_gss_packages.sh
- install_3rd_party_packages.sh
- gss_topside_install.sh
- 3rd_party_dependencies folder
- gss_dependencies folder

Follow the instructions to install each of these components with the topside installation. Linux configurations, monitor set up, and graphics card specifics are all explained in the Topside Installation section.

4 Topside Installation

4.1 Pre-Installation Check

If this is a new build or a rebuild, follow the steps in this section to ensure the computer is assembled properly. If this is a software installation on an existing system, skip to Debian Installation in section 5.

4.2 Hardware check

___ All the screws mounting the motherboard are secured tightly with mid-grade Loctite.

___ All screws holding optical drive and power supply are secured tightly using mid-grade Loctite.

Note: The hard drive assembly frame should be secured, but not with Loctite until software installation is complete and the packing check is done.

5 Debian Installation

Verify that the topside boots up to the motherboard screen. Reboot the topside with the Debian 32-bit Wheezy install disk inserted. Follow the steps in the following section carefully. Most but not all of the options are pre-selected by default. If instructions are not specified for a particular option, just press **Enter** or Next to accept the default options and continue through the installation wizard.

Note: Before beginning, be sure the topside is connected to a monitor, with a keyboard, mouse, and connection to the Internet.

Ethernet connection is required for many configurations.

5.1 Debian Installation Wizard Options

Initial as completed.

____ Select : Advanced Options.

____ Select: Alternate Desktop Environment → KDE.

____ Select: Advanced Options.

____ Select: Graphical Expert Installations.

The graphical install wizard will take you through a list of steps. For most steps it is OK to accept the default selection. There are a couple of selections that need to be changed from the default — be sure to verify with the guide before clicking through. The following section in this document will go through each of these steps.

5.2 Debian Installer Main Menu

Each of the menu steps is configured in order. Though these are very basic steps, they are all included to keep the process transparent.

5.2.1 Choose a Language

____ Select English and click Continue.

____ Select United States and click Continue.

____ Select en_US.UTF-8, this will be the default based on the previous selection; click Continue.

____ Do not select additional locales, just click Continue. (If you press **Enter** the first box will be selected; you have to click Continue for this step.)

5.2.2 Speech Synthesizer

____ Click Continue.

5.2.3 Configure Keyboard

____ Click Continue.

____ Select American English and click Continue.

5.2.4 Detect and Mount CD-ROM

____ Click Continue for any kernel modules that are detected.

____ Click Continue (it will return a success message).

5.2.5 Load Installer Components From CD

____ Click Continue.

____ When the installer menu comes up, do not select any; click Continue. (All components will be installed automatically.)

5.2.6 Detect Network Hardware

____ Click Continue.

5.2.7 Configure the Network

Depending on your network configuration, this order may vary. The wait time prompt may be displayed multiple times if multiple network interfaces are detected.

____ Leave max wait time for network detection at three seconds (default) and click Continue.

____ If prompted, select Ethernet Connection and click Continue.

____ Select Yes to automatically configure network; click Continue.

____ Enter a host name for the system (computer name) and click Continue.

____ Enter domain name as gss.com; click Continue.

5.2.8 Set Up Passwords

____ Click Continue.

____ Click Continue to accept the default settings for shadow passwords and root login.

____ Enter the root password. This is the super user password with high level admin privileges — do not lose it.

____ Enter a username for the account; it can be the same as the machine name.

____ Enter the password for this user. When the computer is rebooted, this is the prompted username and password combination.

5.2.9 Configure the Clock

____ Click Continue.

____ Set the clock using NPT? Default is Yes; click Continue.

____ Use the default NTP server; click Continue.

____ Select a time zone; click Continue.

5.2.10 Detect Disks

____ Click Continue.

5.2.11 Partition Disks

____ Select Guided — use entire disk.

____ Select the hard disk to install Debian on. Click Continue.

____ Select separate /home partition.

____ Look at the table; the partition sizes will vary depending on the HD capacity. It should provide roughly 16G swap (a ratio of 2* RAM for the SWAP value), and at least 80 G /root with the rest (at least 150G) /home. The standard setup for a 500 GB HD is shown below. If the table is not acceptable, follow the next steps.

____ Double-click the hard drive.

____ Select YES to create a new partition table.

____ Select MSDOS for HD under 2 TB.

____ All the partitions are primary.

____ The partition table will be set up something like this: 16GB swap, 120GB B ext4 / (root), 364GB ext4 /home (the remaining space).

____ The B shows the boot flag has been set on.

____ Click Finish and Write to Disk.

Note: Be sure to save changes and write to disk. You must change this to YES or the table will not save.

____ Partition any other disks as needed, using one whole partition formatted to ext4.

5.2.12 Install the Base System

____ Click Continue. (This takes a few minutes.)

____ For kernel, select linux-image-xxx (the latest image); click Continue.

____ Drivers to include? Select generic: include all available drivers; click Continue.

5.2.13 Configure the Package Manager

____ Click Continue.

____ Include a network mirror is defaulted to Yes, click Continue.

____ Protocol for file downloads should be http; click Continue.

____ Debian archive mirror country defaults to United States; click Continue.

____ Debian archive mirror defaults to ftp.us.debian.org; click Continue.

____ Leave the http proxy question blank and click Continue.

____ Use non-free software. **Note:** Default is No; change this to Yes and click Continue.

____ Security and release updates: leave as default and click Continue.

5.2.14 Select and Install Software

____ Click Continue. (This section may take a few minutes.)

____ Participate in package usage survey? Select No and click Continue.

____ Install man and mandb with 'setuid man'–? Select No; click Continue.

____ Software to install? Select Debian Desktop Environment, Print Server, SSH Server, Standard System Utilities.

5.2.15 Install GRUB Boot Loader on a Hard Disk

____ Click Continue.

____ Install the GRUB boot loader to the master boot record? Yes is the default, click Continue.

5.2.16 Finish the Installation

____ Click Continue.

____ Is the clock set to UTC? Yes is default; click Continue.

5.2.17 Installation Complete

____ Remove CD and click Continue.

6 Greensea Configuration

Before installing Greensea-specific software and libraries, the system is configured with Greensea preferences.

6.1 Sudoers

Adding your user to the list of sudoers will make many install steps easier, so do this step before moving on to other software installs.

____ `$su <type root password when prompted>`

____ `$adduser <username> sudo`

____ `$exit`

____ `$logout` (Being added to the sudo group does not take effect until the user logs back in again.)

6.2 Additional Repositories

Add additional repositories to allow non-Debian software to be downloaded. The list of repositories used is found in /etc/apt/sources.list.

`1.`

____ `$sudo nano /etc/apt/sources.list`

____ Add the following lines as necessary, then save and quit nano.

`2.` To install Firefox and Thunderbird:

```
deb http://downloads.sourceforge.net/project/ubuntuzilla/mozilla/apt all main
```

`3.` To install Chrome:

```
deb http://dl.google.com/linux/chrome/deb/ stable main
```

6.3 Add Missing Keys

Now update the repository to find out what other keys you require.

____ `$sudo apt-get update`

It should display errors that begin with W: GPG error: and end with a NO_PUBKEY and a hexadecimal number. To obtain the keys, type the following for each missing key:

____ `$sudo apt-key adv --recv-keys --keyserver keys.gnupg.net <last eight characters of missing key>`

____ `$sudo apt-get install debian-keyring debian-archive-keyring`

Once all of the keys have been obtained, update the repository again.

____ `$sudo apt-get update`

7 Install the New Kernel

Be prepared for kernel installation to take between 30 minutes to two hours to complete.

___ Change directories to the /usr/src and list it; it should be empty.

```
$cd /usr/local/src

$ls
```

____ Get the new kernel using apt get.

```
$sudo apt-get source linux
```

Delete everything but the source directory.

```
____ $sudo rm -rf <file to delete>

____ $sudo ln -s ./linux-xxxx ./linux

____ $cd ./linux
```

Copy current config over from boot.

```
____ $sudo cp /boot/config<version> ./

____ $sudo cp ./configxxx ./.config

____ $sudo make menuconfig
```

This will bring up a GUI screen. Choose:

____ → Load an alternate Configuration File.

Configure to use more serial ports.

____ → Device Drivers → Character Devices → Serial Drivers → Change number of ports to register at runtime to 24

Exit to Main Menu, exit again, and save.

```
____ $sudo make-kpkg clean

____ $sudo time fakeroot make-kpkg --initrd --append-to-version=default001
kernel_image kernel_headers
```

(This process takes a long time, sometimes hours.)

```
____ $cd ..

____ $sudo dpkg -i *.deb
```

8 Install Dependencies for Greensea Applications

The necessary Greensea libraries are downloaded and installed from the Greensea Dependencies source folder.

8.1 Install Third-Party Libraries

The 'install_3rd_party_packages.sh' script will install the libraries and utilities that are available from the official Wheezy repository. It will also download, build, and install Debian packages from source for libraries that are not available from the official repositories.

```
____ $ cp -r 3rd_party_dependencies gss_dependencies \

install_3rd_party_packages.sh ~/
```

____ `$ cd ~`

____ `$sudo chmod +x ./install_3rd_party_packages.sh`

____ `$sudo chmod +x ./3rd_party_dependencies/build_*.sh`

____ `$sudo ./install_3rd_party_packages.sh`

8.1.1 Install Greensea CMake Files

The 'gss_dependencies' directory contains scripts and files needed to build Greensea applications. To install navigate into the directory and install gss-cmake_1.16-1_all.deb.

____ $ cd gss_dependencies

____ $ sudo dpkg -i *.deb

This will install common CMake build instructions used to build the device applications. The files are installed in /usr/local/share/cmake/gss_camke and if needed can simply be copied from one machine to another.

8.2 Install the Greensea Applications for Your Topside

Once all of the external dependencies have been installed, the Greensea applications for your system may be installed by executing the self-extracting .run archive containing the most recent software.

9 Install Third-Party Hardware Drivers

9.1 Graphics Driver for NVIDIA Cards

Download and install Nvidia driver for video card. Go to http://www.nvidia.com and find the version for 32-bit Linux.

____ `$lspci`

Seach the results for VGA NVIDIA card information.

____ `$mv <nvidia_version.run> /usr/local/share`

____ `Press cntrl+alt+f1 to exit the graphics screen`

____ Log in as root. (You cannot use su here, you have to type root and then you will be prompted to enter your root password.)

____ `#telinit 1`

____ `#cd /home/user/usr/local/share`

____ `#chmod +x <nvidia_version.run>`

____ `#./<nvidia_version.run>`

A GUI screen will come up. Accept the terms and OK through the steps.

____ `#exit`

____ `$reboot`

A newer card may require a backport of the current NVIDIA driver from Debian Jessie. This has been successfully applied without trouble. Instructions can be found at: https://wiki.debian.org/NvidiaGraphicsDrivers under section 3. It is advised that you remove the reference to the backports repository after this process is completed to avoid other accidental backports.

9.2 Installing Moxa Drivers

Moxa build utilities are found in the tar file npreal2_1.18.33_Build_14060316.

Install the Moxa npreal driver. The driver is located in the 3rd_party_dependencies folder.

____ `$sudo ln -s /lib/modules/3.2.68default001/build \`

`/lib/modules/3.2.0-4-686- pae/build`

____ `$tar -xzvf npreal2_1.18.33_Build_14060316`

____ `$cd ./tmp/moxa`

____ `$sudo ./mxinst`

____ Press **N** and hit **Enter** when asked whether or not to install the SSL function.

____ `$cd /user/lib/npreal2/driver`

____ `$sudo ./mxaddsvr <IP#><#ports>`

____ Add this line to rc.local before the call to 'exit 0': /etc/init.d/npreals.

9.3 Office Software (Optional)

Remove Iceweasel prior to installing Firefox (if you plan to install Firefox).

____ `$sudo apt-get remove iceweasel`

Remove icedove prior to installing Thunderbird (if you plan to install Thunderbird).

____ `$sudo apt-get remove icedove`

Install your browser of choice, Chrome and/or Firefox.

____ `$sudo apt-get install google-chrome-stable`

____ `$sudo apt-get install firefox-mozilla-build`

Install email client if required.

____ `$sudo apt-get install thunderbird-mozilla-build`

In a browser, go to www.libreoffice.org, click on “DOWNLOAD NOW”. Under “Main Installer”, click on “change?” and select “Linux x86 (deb)”. Now click on “Download Version X.X.X”. Once that file has been downloaded, unzip it (right-click on the file in Dolphin and select Extract → Extract Archive Here, Autodetect Subfolder), navigate to the DEBS folder and execute the command.

____ `$sudo dpkg -i *.deb`

9.4 Desktop Configurations

____ Right-click on Start Menu and switch to classic menu style.

____ Go to Start → Settings → System Settings →Power Management→ Energy Saving Settings and uncheck "Dim Display", "Screen Energy Saving", and "Suspend Session" to prevent the monitor from dimming or turning off.

10 Configuration

This section covers special configurations not discussed in previous sections.

10.1 Monitors

Check the monitor settings and verify dual monitor use is configured.

____ Connect a second monitor.

____ Go to Settings → System Settings → Display and Monitors.

____ In the "Size and Orientation" menu, set the position of the second monitor to Right Of. Click Apply and Save as Default.

10.2 ELO Touch Screen Configuration

To re-install the ELO touch screen drivers:

____ Navigate to http://www.elotouch.com/Support/Downloads/Driver/DriverDownload/Default.aspx.

____ In the "Operating System" drop-down menu select "Linux (2.4/2.6/3.0 Kernel)(Serial)".

____ Click the "Linux 32 bit Serial Driver (Intel i686)(.tgz, 194k)" link and follow ELO's instructions to download the drivers.

____ Follow the installation instructions at: http://www.elotouch.com/files/install/Elo-Linux-Serial-Driver-v3.4.0_Installation-Instructions.txt.

10.3 The Configuration Folder

The gss_configs folder contains configurations specific to the *Ventana* package. This folder contains directories for each application that is customizable via a configuration file.

The following applications require YAML files contained in the config files directory.

- balefire_workspace
- gss_csv_to_pcomms
- gss_signal_mapper
- gss_wago
- openins
- gss_alarm_manager
- gss_fo_micro

- gss_ventana_pan_tilt
- opencmd
- openmngr

The *Ventana* thruster config and the process server config are also included in this directory.

- python_files

The python files directory contains the pcomms transmit python scripts to listen for transmitted LCM.

11 Troubleshooting

This section covers some of the errors common during the initial boot up with a new Wheezy Debian installation. Occasionally, a compatibility issue or outdated driver software causes the screen to stop during boot. We'll list some noted errors and the paths to fix them.

11.1 ACPI GRUB Parameters

On boot, the boot hangs and a cursor blinks at a line that says something like: sys_enter_do_call+0x1/0x28.

This is an Advanced Configuration and Power Interface (ACPI) power management issue. ACPI is a newer standard for managing power that may not be supported. To boot into the system, reboot and wait for the Debian Menu screen to come up. Instead of selecting Regular or Recovery Mode, press **E** to open the grub boot parameters. Scroll down to the line for starting Linux and append the ro quiet with one of the following:

ro quiet splash pci=noacpi (this one usually works)

ro quiet acpi=off,noapic,nolapic

APIC (Advanced Programmable Interrupt Controller). This is a newer feature set up to handle interrupts. LAPIC is the local version.

Note: You may need to try one and if it does not work, try another.

Once booted into Linux, the GRUB menu can be edited to always do this on boot up.

____ Log in as root.

____ `# cd /etc/default`

____ `# nano grub`

Scroll down to the Linux start line and in the quotes that read "`quiet`" change to "`quiet splash pci=noacpi`"

control + **X** to exit. Be sure to press **Y** to save changes. Now you will need to update the GRUB config file.

____ `# update-grub` (This is important!)

Once the config file is updated, reboot. The GRUB menu will now boot with ACPI off.

Become root and type reboot to test.

11.2 Graphics Card

The common error for the graphics card causes the boot loader to hang. The system will try to boot and then hang in a location that references the NVIDIA drivers.

Reboot and press e for edit when the Debian Menu comes up. This will give the GRUB boot parameters. To boot into Linux:

____ Scroll down to the linux line with ro quiet and replace "`quiet`" with "`nomodeset`".

Type **control** + **x** to boot with these parameters. This will only work for that boot session, you will need to open a terminal window and download the correct drivers for the graphics card.

11.3 Workspace Not Building

For some installations, ld needs to be pointed to the correct location of the qserialport libraries. To fix this, edit the /etc/ld.so.conf file.

____ `$ sudo echo /usr/local/qserialport/lib >> /etc/ld.so.conf`

____ `$ sudo ldconfig`

12 Autostart

The gss-process-server and gss_process_client applications hand starting all of the necessary Greensea applications. After installing a new .run, scripts for starting the process server and the different process clients will be placed in the /usr/local/bin directory. These scripts should be run at startup by calling them from /etc/rc.local. The process server should be run on one machine, and each machine should run whichever configuration of process client is appropriate for it.

13 Software Update Process

Software and configuration updates will be distributed as a self-extracting executable file that completely replaces installed Greensea software and default configuration on a given computer. Typically, Greensea will provide MBARI a link in a release announcement email to download the update.

After downloading the file, MBARI effects the update by copying the file to each host ('20150401_mbari_software_r01.run' in the example) and performing the following steps in turn:

____`$ cd /home/ventana`

____`$ ls 20150401_mbari_software_r01.run`

____`$ chmod +x 20150401_mbari_software_r01.run`

____`$ cp -a gss_configs gss_configs_r00`

____`$ sudo ./20150401_mbari_software_r01.run`

Note: Special care should be taken to backup the folder /home/ventana/gss_configs on each machine before installing ANY update. This folder contains all of the active and saved configurations files. In the example above this was accomplished with 'cp -a gss_configs gss_configs_r00'.

You should see a bunch of text stream by, ending with "Install Completed Successfully!" Please contact Greensea if you see anything else.

14 Appendix: Scripts

install_3rd_party_packages.sh:

```
#!/bin/bash
# This script installs 3rd party applications that are useful for building and running
# GreenSea software
set -e
echo "updating and installing required packages (this will take a little while ...)"
apt-get update

# utilities and basic applications
apt-get -y install \
htop \
keychain \
subversion \
ntpdate \
minicom \
cutecom \
debian-keyring \
debian-archive-keyring \
nmap \
meld

# office type applications
apt-get -y install \
dia
# could add firefox, thunderbird, chrome here if appropriate repositories are added
# would need to remove iceweasel first
# need to install libreoffice from .deb to get the most recent version

# Third party libraries
apt-get -y install \
fakeroot \
build-essential \
checkinstall \
cmake \
libgdal-dev \
libqwt-dev \
libyaml-cpp-dev \
openjdk-6-jdk \
libglib2.0-dev \
subversion-tools \
git \
doxygen \
doxygen-gui \
graphviz \
eclipse \
qt-sdk \
ipython \
python-dev \
python-gtk2 \
python-gtk2-dev \
libgtk2.0-dev \
mesa-common-dev \
libgl1-mesa-dev \
libglu1-mesa-dev \
freeglut3-dev \
libjpeg-dev \
autoconf \
automake \
autopoint \
libtool \
libbz2-dev \
libopencv-dev \
```

```
gdal-bin \
libyaml-cpp0.3 \
ncurses-dev \
kernel-package \
makeself

#3rd party libraries that aren't available from the official repo:
#It would be nice to use the official debian repository versions of these
#but unfortunately Wheezy doesn't have the necessary versions. Jessie does though...
#python-geographiclib \
#libboost-all-dev \
#libgeographiclib9 \
#geographiclib-tools \
#libgeographiclib-dev \

#attempt to install from gss repository
set +e
echo "Attempting to update/install third party libraries from gss-local repository"
apt-get -y install \
qserialport \
lcm \
libbot \
gssboost \
libgeographiclib \
geographiclib-magnetic-files
set -e

#If the apt-get install wasn't succesfull..
if [ $? -ne 0 ]; then
  #we'll install them from source
  echo "Could not install from gss-local repository."
  echo "Downloading and building from source"
  cd 3rd_party_dependencies
  chmod +x *.sh
  ./build_geographiclib.sh
  ./build_lcm.sh
  ./build.libbot.sh
  ./build_qserialport.sh
  ./build_boost_1_55_0.sh
  dpkg -i *.deb
fi
```

install_gss_packages.sh:

```
#!/bin/bash
# This script installs GreenSea libraries that are necessary for building and running GreenSea
applications
# run this script after adding the gss repository (192.168.1.99) to your sources.list file and
obtaining the server key
echo "Updating and installing GSS libraries"
apt-get -y install \
libopensea \
libgss-types \
libgss-types-dev \
libgss-filters \
gss-cmake \
gss-deploy
```

gss_topside_install.sh:

```
#!/bin/bash
#install 3rd party packages
./install_3rd_party_packages.sh

#Install packages from the greensea aptly repo
#todo: check if we have access to gss repo
./install_gss_packages.sh
```

build_boost_1_55_0.sh:

```
#!/bin/bash
#Download
dir=$(pwd)
wget -O boost_1_55_0.tar.bz2
http://sourceforge.net/projects/boost/files/boost/1.55.0/boost_1_55_0.tar.bz2/download
tar xvf boost_1_55_0.tar.bz2
cd boost_1_55_0
./bootstrap.sh --help
./bootstrap.sh
#Untar and build package
checkinstall --nodoc \
--pkgname=gssboost \
--pkggroup=GSS \
--pkgversion=1.55.0 \
--provides=gssboost \
--backup=no \
-y \
--install=no \
./b2 install
```

build_geographiclib.sh:

```
#!/bin/bash
#Download Geographic lib
dir=$(pwd)
wget -O GeographicLib-1.37.tar.gz
http://sourceforge.net/projects/geographiclib/files/distrib/archive/GeographicLib-1.37.tar.gz/download

#Untar and build package
tar xvf GeographicLib-1.37.tar.gz
cd GeographicLib-1.37
mkdir build
cd build
cmake ..
make -j5
make test
checkinstall --nodoc \
--pkgname=libgeographiclib \
--pkggroup=GSS \
--pkgversion=1.37 \
--provides=libgeographiclib \
--backup=no \
-y \
--install=no \
make install

#Download magnetic files
wget -O igfr12.tar.bz2 http://sourceforge.net/projects/geographiclib/files/magnetic-
distrib/igrf12.tar.bz2/download
wget -O wmm2015.tar.bz2 http://sourceforge.net/projects/geographiclib/files/magnetic-
distrib/wmm2015.tar.bz2/download
tar xvf igfr12.tar.bz2
tar xvf wmm2015.tar.bz2
mkdir GeographicLib
mv magnetic GeographicLib
checkinstall --nodoc \
--pkgname=geographiclib-magnetic-files \
--pkggroup=GSS \
--pkgversion=1.37 \
--provides=geographiclib-magnetic-files \
--backup=no \
-y \
--install=no \
cp -r GeographicLib /usr/local/share
```

```
mv *.deb $dir
```

build_lcm.sh:

```
#!/bin/bash
dir=$(pwd)
wget -O lcm-1.2.1.tar.gz https://github.com/lcm-proj/lcm/archive/v1.2.1.tar.gz
tar xvf lcm-1.2.1.tar.gz
cd lcm-1.2.1
./bootstrap.sh
./configure
make -j4
checkinstall --nodoc \
--pkgname=lcm \
--pkggroup=GSS \
--pkgversion=1.2.1 \
--provides=lcm \
--backup=no \
-y \
--install=no \
make install
```

build_qserialport.sh:

```
#!/bin/bash
# git clone git://code.qt.io/qt/qtserialport.git
# cd qtserialport
# git checkout qt4-dev
# mkdir build
# cd build
# qmake ../qtserialport.pro
# make -j5
dir=$(pwd)
ln -s /usr/share/qt4/ /usr/lib/qt
tar xvf qserialport.tar.gz
cd qserialport
chmod +x ./configure
./configure
make -j4
checkinstall --nodoc \
--fstrans=no \
--pkgname=qserialport \
--pkggroup=GSS \
--pkgversion=1.0.0 \
--provides=qserialport \
--backup=no \
-y \
--install=no \
bash -c "make install && echo /usr/local/qserialport/lib/ >> /etc/ld.so.conf && ldconfig"
```

build_libbot.sh:

```
#!/bin/bash
dir=$(pwd)
svn checkout http://libbot.googlecode.com/svn/ libbot-read-only
cd libbot-read-only/trunk
checkinstall --nodoc \
--pkgname=libbot \
--pkggroup=GSS \
--pkgversion=0.1 \
--provides=libbot \
--backup=no \
-y \
--install=no \
make BUILD_PREFIX=/usr/local
```

End Page