

# ***Supplemental File for “The Niwot Ridge Subalpine Forest US-NR1 AmeriFlux site – Part I: Data acquisition and site record-keeping” by S. P. Burns et al.***

## **README for: USNR1\_aster\_ndaq.zip**

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This is a README file for the zip archive of the ASTER software that ran on a Dell desktop (russter2) in the trailer at C-1 and the NDAQ software that ran on a Dell laptop (quacker) at the the US-NR1 AmeriFlux tower.

The files included are:

```
-rw-r--r-- sean 5427200 May 20 2007 aster_ndaq_code_070515.tar
-rw-r--r-- sean 29977 Sep 29 2008 info_about_aster_ndaq_install.txt
-rw-r--r-- sean 11025 Jan 19 2007 install_fedora_dell_latitude400.txt
-rw----- sean 5321 Feb 13 2007 install_ndaq_dell_c400.txt
-rw-r--r-- sean 34807 Aug 7 2008 install_ndaq_dell_inspiron7500.txt
```

where the into\*.txt and install\*.txt files are information about attempts to install/compile the ASTER and NDAQ code, and aster\_ndaq\_code\_070515.tar contains the software as two tar files,

```
tar -tvf aster_ndaq_code_070515.tar
```

```
-rw----- sean/sean 2423468 2007-05-15 22:57 aster.tar.gz
-rw----- sean/sean 3001072 2007-05-15 22:10 ndaq.tar.gz
```

The INSTALL file within the aster.tar archive has the following information about how to install the ASTER software:

Currently the aster base software builds and runs on these UNIX platforms:

The aster directory can be placed anywhere on the system.

The installed software resides entirely within the aster directory.

To Install:

0. Tools needed to build and install aster software:

```
gcc/g++      a recent version
bison        from GNU too
make,lex,rpcgen
              make sure these are in your path
```

1. Choose where to put the ASTER tree, for example /usr/local/isff:

```
cd /usr/local/isff
```

2a. Un-tar the distribution:

```
gunzip -c aster.tar.gz | tar xf -
or
```

2b. checkout the distribution

```
cd /usr/local/isff
mkdir aster
chmod g+ws aster
export CVS_RSH=ssh

cvs -d maclean@linus.atd.ucar.edu:/code/cvs co aster/Makefile.ini \
    aster/INSTALL aster/Imakefile aster/src aster/include aster/isff/src \
    aster/isff/Imakefile aster/config aster/imakeconfig aster/scripts
    aster/adm
```

2c. tklog

need tcl and tclx packages

```
cd /usr/local/isff/aster
mkdir util
cd util
cvs -d maclean@linus.atd.ucar.edu:/code/cvs co tklog

cd tklog
./tklog_install

cd /usr/local/isff/aster/scripts
ln -s ../util/tklog/tklog .
ln -s ../util/tklog/libtcl .
```

3. Set the ASTER environment variable to the location of the aster directory.  
For example, if the aster directory is on /usr/local/isff/aster:

```
setenv ASTER /usr/local/isff/aster
```

4. cd \$ASTER

5. make -f Makefile.ini Makefile

6.

CSH:

```
make World >& World.linux
make World >& World.sparc
or
make World |& tee World.linux
```

```
make World |& tee World.sparc
```

BASH

```
make World > World.linux 2>&1
make World > World.sparc 2>&1
or
make World 2>&1 | tee World.linux
make World 2>&1 | tee World.sparc
```

Look over log file

7. Install ingest and serial\_ingest as suid-to-root programs.

Become root, then

```
ASTER=/usr/local/isff/aster
export ASTER
PATH=$PATH:/usr/ccs/bin
export PATH
cd $ASTER/src/ingest
make rootinstall
```

8. To configure a user's account:

```
tcsh/csh
.login
setenv ASTER /usr/local/isff/aster
setenv PROJECT XXXXX
source $ASTER/scripts/aster.login
```

Add the following to their .cshrc:

```
setenv ASTER ...
source $ASTER/scripts/aster.cshrc
```

bash/sh

```
.profile or .bash_profile
#### aster stuff ####
export ASTER=/usr/local/isff/aster
export PROJECT=XXXX
. $ASTER/scripts/aster.profile
#### end of aster stuff ####
```

.bashrc

```
[ ! -z "$ASTER" -a -f $ASTER/scripts/aster.bashrc ] && source $ASTER/scripts/aster.bashrc
```

Have the user logout and login, then do "which prep" to see if things are setup properly.

9. As root, copy \$ASTER/adm/etc/init.d/aster to /etc/init.d. Change the userid if necessary. Then install it:

RedHat Linux:

```
chkconfig --add aster
chkconfig --list aster
```

Solaris:

```
ln -s /etc/init.d/aster S80aster
```

10. As root, edit /etc/syslog.conf, adding lines from \$ASTER/adm/etc/syslog.conf  
Create any necessary syslog files, as mentioned in \$ASTER/adm/etc/syslog.conf

Send a HUP to syslog: `kill -HUP `cat /etc/syslog.pid``

11. Create log directory:

`mkdir $ASTER/log`

Have fun...

Additional commands that are useful after the software has been installed:

### 1. Commands used for the quacker(NDAQ)/russter2(ASTER) System:

---

<u>quacker commands</u>	(run these as "root")
to stop data system (ndaq):	<b>ndaqstop quacker</b>
to start ndaq:	<b>/etc/init.d/ndaq start</b>

---

---

<u>russter2 commands</u>	
to stop aster:	<b>sudo /etc/rc.d/init.d/aster stop</b>
to start aster:	<b>sudo /etc/rc.d/init.d/aster start</b>

---

to re-start ndaq from russter2 : **ndaqrestart quacker** (for mods to prep.config, etc)

to stop ndaq from russter2 : **ndaqstop quacker**

note: if data system is completely down must run “**/etc/init.d/ndaq start**” from quacker to get ndaq re-started

### 2. Commands on russter2 that check data system:

“**ndaqstatus quacker**”. The output should look like:

```
*** System Status *****
Start time:  Mon May 21 11:14:56 2007
Restart time: Thu May 31 13:40:54 2007

      Socket  Socket  Max  Min
Time  Sample  Lost  Write  Temp Socket Socket Socket Buffered  Total Archive
Diff  Rate Samples Errors Unavail Write Write Rate  Samples Samples BadTTs
msec  #/s      #      #      #      bytes bytes byte/s  #      #      #
5587   35      0      0     32   7072   6588   1369    347    858     0
*****

*** A2D Status *****
A2D      Total  5min  Total  User
Sample  Missed Missed Intrpt
Rate Samples Samples Rate
#/s      #      #      #/s
0        0      0      0

A2D Sample
channel  Rate MinV MaxV  VRes
#      #/s  V    V    uV
*****

*** Serial Port Status *****
port      flow  Msg Sep Msg  read sampl  min  max readerrs writerrs overflow
name      chan  baud p/d/s cntl  Sep Loc Len  /sec  /sec read read 5min cum 5min cum 5min cum
/dev/ttyUSB0 200  9600 n/8/1 none \0xfc01 BOM 28  10  10  30  30  0  0  0  0  0  0
/dev/ttyUSB1 201  9600 n/8/1 none \0xfc01 BOM 40  10  10  42  42  0  0  0  0  0  0
/dev/ttyUSB2 202  9600 n/8/1 none \0x0a EOM  0  1  1  56  62  0  0  0  0  0  0
/dev/ttyUSB3 203  9600 n/8/1 none \0xfc01 BOM 24  1  1  26  26  0  0  0  0  0  0
```

```

/dev/ttyUSB4 204 9600 n/8/1 none \0xfc01 BOM 18 1 1 20 20 0 0 0 0 0 0 0
/dev/ttyUSB5 205 9600 n/8/1 none \0xfc01 BOM 22 1 1 24 24 0 0 0 0 0 0 0
/dev/ttyUSB6 206 9600 n/8/1 none \0x0a EOM 0 10 10 34 34 0 0 0 0 0 0 0
/dev/ttyUSB7 207 9600 n/8/1 none \0xfc01 BOM 26 1 1 28 28 0 0 0 0 0 0 0
*****

```

“check\_aster”. The output should look like:

```

check_aster
Thu Jun 14 08:28:53 MDT 2007

----- Environment -----
PROJECT = NIWOT, OPS=ops1

----- Server tasks -----
host      user      pid      start   exectime process
russter2  sburns    5303    May19 ? 00:00:00 adamserver
russter2  sburns    5305    May19 ? 00:00:23 nc_server

----- Ingest tasks -----
host      user      pid      start   exectime process
russter2  sburns    5307    May19 ? 00:00:05 ingest
russter2  sburns    14733   May31 ? 00:01:39 quacker

----- Archive tasks -----
host      user      pid      start   exectime process
russter2  root      14745   May31 ? 00:00:31 archive quacker .

----- Covar calcs -----
host      user      pid      start   exectime process
russter2  sburns    14749   May31 ? 00:05:20 covar -S -a quacker

----- X processes -----
host      user      pid      start   exectime process

----- Ingest Statistics -----
station   port      status   up since  sample/sec serialErrs
quacker   1041      open     May 31 13:40  34.94      0

----- Living adams -----
quacker

Filesystem      1K-blocks      Used Available Use% Mounted on
/dev/hda3        5162828      1171696   3728872   24% /usr/local
/dev/hda8        51088492     37824916  10668280   79% /data
Thu Jun 14 08:28:54 MDT 2007

```

### 3. Log Files to Check:

On russter2 do, “tail -100 /var/log/local/aster.log”. The output should look like:

```

Jun 13 12:20:56 russter2 ingest(quacker)[14733]: quacker DGRAM socket connected to russter2:33064, 3 active connections
Jun 13 16:42:48 russter2 ingest(quacker)[14733]: quacker russter2.33064 socket closed, 3 active connections
Jun 14 00:00:21 russter2 archive(quacker)[14745]: Opened: ./all/nwt070614.000000
Jun 14 00:00:21 russter2 covar[14749]: quacker@russter2: midnight rollover. Sample time: 2007 Jun 14 j165 00:00:00
Jun 14 00:10:26 russter2 nc_server[5305]: Created: /usr/local/aster/projects/NIWOT/results/covar/nwt.070614.nc
Jun 14 00:10:26 russter2 nc_server[5305]: Closing: /usr/local/aster/projects/NIWOT/results/covar/nwt.070612.nc
Jun 14 08:00:21 russter2 archive(quacker)[14745]: Opened: ./all/nwt070614.080000

```

On quacker do, “more /var/log/messages”. A system crash looks like:

```

May 21 10:42:12 quacker kernel: usb-uhci.c: interrupt, status 3, frame# 775
May 21 10:42:12 quacker kernel: usb.c: USB disconnect on device 00:07.2-1 address 2
May 21 10:42:12 quacker kernel: Unable to handle kernel paging request at virtual address 5a5a5a5a
May 21 10:42:12 quacker kernel: printing eip:
May 21 10:42:12 quacker kernel: c886b646
May 21 10:42:12 quacker kernel: *pde = 00000000
May 21 10:42:12 quacker kernel: Oops: 0000
May 21 10:42:12 quacker kernel: CPU: 0
May 21 10:42:12 quacker kernel: EIP: 0010:[c886b646] Not tainted
May 21 10:42:12 quacker kernel: EFLAGS: 00010206
May 21 10:42:12 quacker kernel: eax: ffffffff ebx: c7f94c94 ecx: c7a260e0 edx: 5a5a5a5a
May 21 10:42:12 quacker kernel: esi: c791d000 edi: c886b600 ebp: c7a260e0 esp: c7a19eb4
May 21 10:42:12 quacker kernel: ds: 0018 es: 0018 ss: 0018
May 21 10:42:12 quacker kernel: Process khubd (pid: 82, stackpage=c7a19000)
May 21 10:42:12 quacker kernel: Stack: 00000246 00000012 c7ad2744 00000286 c7f94c94 c118179c c7a260e0 c79b8000
May 21 10:42:12 quacker kernel: c7f94c94 c886b600 c7a260e0 c884eb45 c7f94c94 c7f94c0c c7f67344 c7f67000

```

```

May 21 10:42:12 quacker kernel: c7f67384 c79b7164 c7f94c94 c118179c c7bef400 c884ed28 c118179c c7f94c94
May 21 10:42:12 quacker kernel: Call Trace: [

```

When booting quacker with the edgeport `/var/log/messages` should show something like:

```

May 21 10:46:50 quacker kernel: usb.c: USB device 2 (vend/prod 0x1608/0xf) is not claimed by any active driver.
May 21 10:46:50 quacker kernel: usb.c: registered new driver serial
May 21 10:46:50 quacker kernel: usbserial.c: USB Serial Driver core v1.4
May 21 10:46:50 quacker kernel: usbserial.c: USB Serial support registered for Edgeport 1 port adapter
May 21 10:46:50 quacker kernel: usbserial.c: USB Serial support registered for Edgeport 2 port adapter
May 21 10:46:50 quacker kernel: usbserial.c: USB Serial support registered for Edgeport 4 port adapter
May 21 10:46:50 quacker kernel: usbserial.c: USB Serial support registered for Edgeport 8 port adapter
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter detected
May 21 10:46:50 quacker kernel: io_edgeport.c: Inside Out Network Edgeport/8 detected
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB0 (or usb/tts/0 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB1 (or usb/tts/1 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB2 (or usb/tts/2 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB3 (or usb/tts/3 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB4 (or usb/tts/4 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB5 (or usb/tts/5 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB6 (or usb/tts/6 for devfs)
May 21 10:46:50 quacker kernel: usbserial.c: Edgeport 8 port adapter converter now attached to ttyUSB7 (or usb/tts/7 for devfs)
May 21 10:46:50 quacker kernel: io_edgeport.c: Edgeport USB Serial Driver v2.3

```

Also on quacker when restarting ndaq, do “`more /var/log/local/cuff.log`” should see something like:

```

May 31 11:52:16 quacker logger: SensorPortHandler finished, closing remaining 8 serial ports
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB0
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB1
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB2
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB3
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB4
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB5
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB6
May 31 11:52:16 quacker logger: Closing: /dev/ttyUSB7
May 31 11:52:16 quacker logger: deleting sampler
May 31 11:52:16 quacker logger: deleting relayParsers
May 31 11:52:16 quacker logger: sleeping 20
May 31 11:52:36 quacker logger: Thread::run, name=RawSampleBuffer(id=4098), Non-RT, priority=0
May 31 11:52:36 quacker logger: Thread::run, name=SensorPortHandler(id=5123), Non-RT, priority=0
May 31 11:52:38 quacker logger: Opening: /dev/ttyUSB0
May 31 11:52:39 quacker logger: Opening: /dev/ttyUSB1
May 31 11:52:40 quacker logger: Opening: /dev/ttyUSB2
May 31 11:52:41 quacker logger: Opening: /dev/ttyUSB3
May 31 11:52:42 quacker logger: Opening: /dev/ttyUSB4
May 31 11:52:43 quacker logger: Opening: /dev/ttyUSB5
May 31 11:52:44 quacker logger: Opening: /dev/ttyUSB6
May 31 11:52:45 quacker logger: Opening: /dev/ttyUSB7
May 31 11:52:45 quacker logger: Thread::run, name=DaqMonitorRPC(id=6148), Non-RT, priority=0

```

#### 4. Tower Network Info:

```

port
----
8000 (ingest) 10.0.0.2 quacker
3000          10.0.0.3
              10.0.0.4
3001          10.0.0.5
              10.0.0.6
3002          10.0.0.7

              10.0.0.2 quacker
              10.0.0.3 tdl
              10.0.0.4 russter2-gw
              10.0.0.5 cr5000
              10.0.0.6 pfp
              10.0.0.7 cr5000-2

note, 10.0.0.1 (used to be russter)

```