Very Low Frequency Data Acquisition Software User Manual

Robert Moore
Edward Kim

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Introduction

VLF DAQ stands for Very Low Frequency Data Acquisition. It is a data acquisition software designed for capturing and processing broadband and narrowband VLF signals. It works in conjunction with a TrueTime GPS receiver, and 1 or more ADC cards in the PCI slot. Though many different hardware configurations are possible with the software, the most common setup is illustrated below.
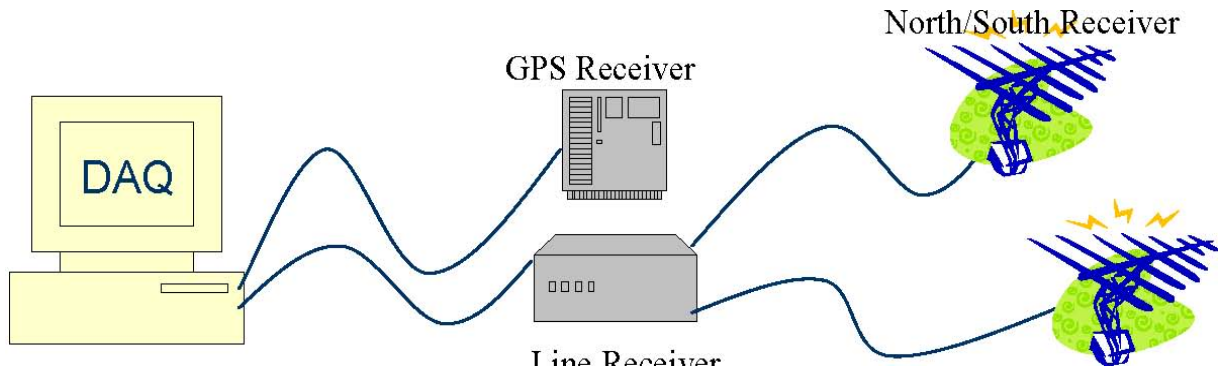
The line receiver gets VLF signals from 2 antennas. There is usually one antenna in the North/South orientation and another in the East/West orientation. These signals are sent to a 200kHz ADC card attached to the PCI slot of the computer. The ADC will capture data from each of the 2 antennas at 100kHz each. The signal from the GPS is fed into the ADC card.

The VLF DAQ software controls precisely when the system should acquire broadband and narrowband data. Upon data acquisition, various user-specified signal processing can be performed on the data. The data is then converted to MATLAB format and may be sent to another computer via FTP.

The VLF DAQ is designed to be robust even when multiple channels of synoptic broadband, continuous broadband, and narrowband are being run simultaneously.

Because different users may want to use the software for different applications, the software was built with scalability in mind. For example, user defined scripts can be run after acquisition of data.

DAQ

GPS Receiver

Line Receiver

North/South Receiver

East/West Receiver

Installing the Software

SYSTEM REQUIREMENTS:

   1) Intel Pentium 4 processor PC
   2) Microsoft Windows XP

3) 512 MB Ram
4) 10 GB Hard Drive for broadband acquisitions.

RECCOMENDATIONS:

The software is a very CPU intensive program during data acquisitions, so it is recommended that all other CPU heavy programs be turned off while data is being acquired.

REMOTE INSTALL PROCEEDURE (HAIL Software required)

The existing HAIL Software (Demodulator.exe) has the ability to send software updates through the internet via the Communicator program. We will use the existing Demodulator.exe software located in C:\HAILSoftware to remotely install the VLF DAQ software. Instead of updating HAILSoftware, we will use a custom made DownloadNewSoftwareNext.bat to install the new VLF_DAQ software. We will call the computer we would like the software installed on the "remote computer".. We will call the computer that we are installing from (usually located at Stanford) the "server computer". In general, "server computer" will be the hail.stanford.edu computer in 201

1) Make sure Spysweeper is disabled on the remote computer.
2) In "C:\HAILSoftware\hftp.cfg" of the remote computer, edit the variables in hftp.cfg file to the ftp settings on the server computer. In general, the variables should already be assigned correctly.
3) In "C:\HAILSoftware\Listener.ini" of the remote computer, edit the IP address and the port number to the IP address of the server computer and the port number that the Communicator.exe software is listening to. Again, this probably does not to be changed.
4) In the server computer, make sure that the computer contains the correct DownloadNewSoftwareNext.bat file. The correct batch file can be found in the software package under the "manuals_and_examples" directory. The remote computer must download this batch file when step 7 is executed. For the first install of this software, the remote computer will look somewhere in c:\HAILSoftware for the DownloadNewSoftwareNext.bat file. For example, if the remote computer is in Taylor, the Taylor computer will look in C:\HAILSoftwareDownloads\Taylor\HAILSoftware of the remote computer for the batch file. Thus, it is imperative that this batch file is placed in this directory.

We should make sure that DownloadNewSoftwareNext.bat contains the correct commands. The first line "mkdir c:\VLF_DAQ" creates the directory on the remote computer in which the software will be installed to. The next set of lines download the necessary files into the install directory. For example, "c:\HAILSoftware\hftp_get.exe c:\HAILSoftware\hftp_get.cfg

\DAQ_SoftwarePackage c:\VLF_DAQ\ dailyCleanup.bat" will copy e:\DAQ_SoftwarePackage\dailyCleanup.bat of the server computer into c:\dailyCleanup.bat of the remote computer.

 IMPORTANT NOTE: The drive letter that the remote computer FTPs into must be the same drive that contains \DAQ_SoftwarePackage. In hail.stanford.edu, all incoming FTPs are directed to the E:\. Thus, we must place the DAQ_SoftwarePackage directory in the E:\

After all the program files are copied, the batch file has the following line: "c:\HAILSoftware\hftp_get.exe c:\HAILSoftware\hftp_get.cfg \DAQ_SoftwarePackage c:\VLF_DAQ\ DownloadNewSoftware.bat"

This line should be included in the batch file only for the FIRST installation of the software package. Any subsequent updated of the software should not contain this line. This line will update the DownloadNewSoftware.bat file that is run on the remote computer anytime "update new software" is called from the Communicator. The new DownloadNewSoftware.bat file (found in \DAQ_SoftwarePackage directory), will instruct the remote computer to look for DownloadNewSoftwareNext.bat file in c:\VLF_DAQ from now on, instead of c:\HAILSoftare. Thus, in subsequent updates of the software, the remote computer will look in the VLF_DAQ directory for DownloadNewSoftwareNext.bat file instead of the HAILSoftware Directory.

The rest of the lines will download the filter files and create the necessary directories for the program to run correctly.

 5) Run Demodulator.exe on the remote computer.

 6) Run Communicator.exe on the server computer. A connection should be established between the 2 computers on the Communicator software.

 7) On the server computer, make sure the connected remote computer is checked and then select "Download New Software" from the pull down menu and then click "administrator send"

 8) The remote computer will download DownloadNewSoftwareNext.bat file from somewhere in the c:\HAILSoftware directory. After the file has been downloaded, DownloadNewSoftwareNext.bat file will be executed on the remote computer. The new software will then be installed on the remote computer under c:\VLF_DAQ.

LOCAL INSTALL PROCEEDURE (HAIL Software NOT required)

In the case that HAILSoftware is not installed on the remote computer, or the internet is not accessible in the remote computer, we must install the software locally using a CD

with the software on it.

1) Make sure Spysweeper is disabled on the remote computer.

2) Make a directory, preferably c:\VLF_DAQ, where the
software should be installed into. This directory should not
have any spaces.

3) Copy the entire contents of the CD into the install directory.

4) Run VLF_DAQ.exe. The startup folder will be updated the
first time the software is run.

Overview of the Software

MAIN GUI

The main GUI consists of various status indicator and buttons which open up sub-GUIS.
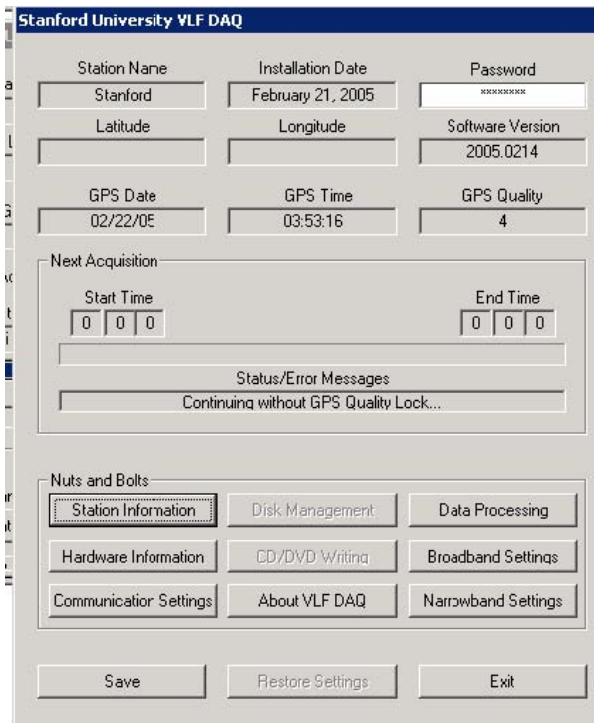
Station Name is the name of the station that the software is installed on. Installation Date
should be the date that the hardware was installed on the computer. Latitude, Longitude,

Software Version, GPS Date, GPS Time, GPS Quality will be filled in by the software. If a Motorola GPS system is hooked up, quality is simply the number of satellites the antenna sees. We require at least 3 satellites for a lock to be enabled in the Motorola system. In the truetime GPS is hooked up, quality says "LOCKED" when a GPS lock is acquired.

STATUS INDICATORS

Upon start, the software looks for GPS lock. During this time, no acquisitions may occur. If a GPS lock cannot be found within a certain time, the software will start its acquisition schedule without GPS lock. At the top of the GUI, there are several fields that display the status of the software. These include the station name, installation date, GPS latitude, GPS longitude, GPS date, GPS time, and GPS quality.
In the area entitled "Next Acquisition", the start and end time of the next acquisition is displayed. Below, there is a progress bar which fills up as the acquisition is completed. Below the progress bar, the general status of the software is displayed. Any errors are also displayed in this area as well.

PASSWORD

A password is required to enable any buttons on the DAQ software. This is to prevent unauthorized changes to the software settings.

SAVE

Any changes that are made to the software settings must be followed by a click on the save button in order for changes to take effect. Additionally, the software must be restarted for the saved changes to take effect.

RESTORE SETTINGS

This button restores the software settings to the last saved values.

EXIT

This button will close out any current data acquisitions and end the program.

STATION INFORMATION

This is where the user can specify the various characteristics of the station that the software is installed at. With the exception of StationID and Station name, the fields in this GUI do not directly affect the data acquisition. It should be used as reference when studying data acquired. Station name indicates the directory that the files will be FTPed to. For example, if "Stanford" is entered as Station Name, the files will be FTPed to the a directory called "Stanford". When narrowband data acquired, it will create matlab filename according to the new filename format:
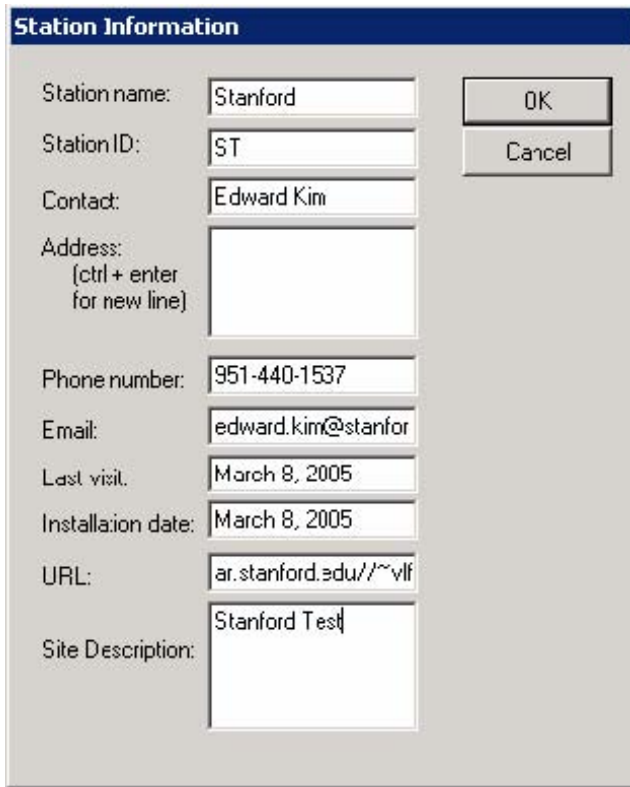
XXYYMMDDHHMMSSZZZ_ACCT.mat

XX – Station ID (from Station Information Dialogue Box YY –Year MM—Month DD—Day HH—Hour MM—Minute SS—Second ZZZ—Transmitter Callsign A—zero-based index of the ADC card that was used CC—zero-based index of the software channel number that was used. T—Amplitude/Phase or Lo/High Resolution. A corresponds to Lo resolution (1hz sampling rate) amplitude, B corresponds to Lo resolution (1hz sampling rate) phase, C corresponds to high resolution amplitude, D corresponds to high resolution phase.

Broadband files are named according to the following convention:

XXYYMMDDHHMMSS_ACC.mat

XX – Station ID (from Station Information Dialogue Box YY –Year MM—Month DD—Day HH—Hour MM—Minute SS—Second A—zero-based index of the ADC card that was used CC—zero-based index of the software channel number that was used.

Station Information

Station name:	Stanford
Station ID:	ST
Contact:	Edward Kim
Address: (ctrl + enter for new line)	
Phone number:	951-440-1537
Email:	edward.kim@stanfor
Last visit:	March 8, 2005
Installation date:	March 8, 2005
URL:	ar.stanford.edu//~vlf
Site Description:	Stanford Test

OK
Cancel

HARDWARE INFORMATION

This is where the user can enter the hardware setup of this station. Note that the user can enter multiple Preamp serial numbers by simply clicking on the "add" button and then using "next" and "prev" to navigate. ADC Card can simply be the model name of the ADC card. Again, the fields in this GUI do not directly affect the data acquisition. They are for informative purposes only. The only exception is the pull down menu in which the user may select the type of GPS sytem—Motorola or TrueTime—that the system is hooked upto.

ANTENNA SETTINGS

The user can enter various information about the antenna setup by clicking on the "Antenna Settings" button. The fields in this GUI do not directly affect the data acquisition. It should be used as reference when studying data acquired.
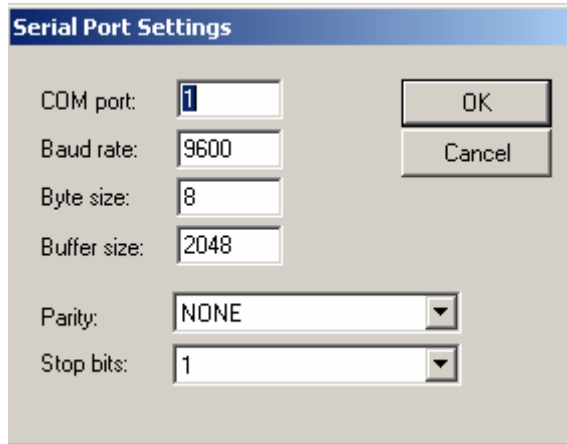
SERIAL SETTINGS

These are settings that the GPS system uses to communicate to the computer through the serial port.

Motorola GPS system should use the following settings:
Baud rate: 9600
Byte size: 8
Buffer size: 2048
Parity: None
Stop bits: 1

Truetime GPS system should use the following settings:
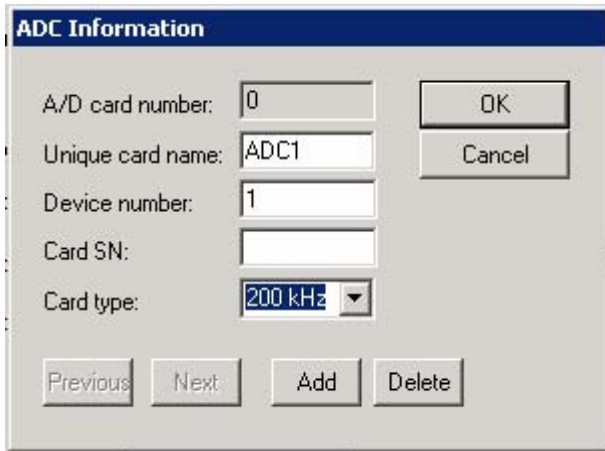Baud rate: 9600
Byte size: 7
Buffer size: 2048
Parity: even
Stop bits: 1

ADC SETTINGS

Most important in the hardware information GUI is the ADC sub-GUI. For each ADC card installed in the computer, the user should enter information of the card. The Device number assigned to the ADC card can be found on the NIDAQ configuration utility.

COMMUNICATIONS SETTINGS

The information in this GUI is important for any features in the software that make use of the Internet.

It is important that the "Have Internet Access" box is checked if internet is available and not checked if it is not available. If this box is not checked, any features requiring internet connectivity will be disabled.
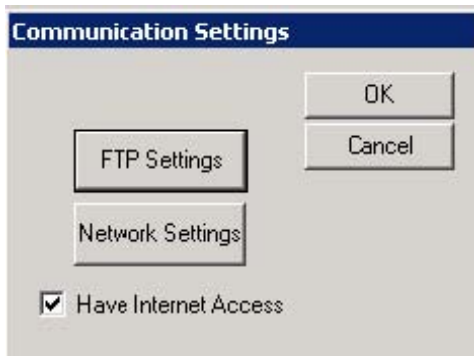
FTP SETTINGS

We would like to FTP data—particularly narrowband data--to a remote site after it is acquired and processed. To do this, the user must add a FTP setting in this GUI. We will call the computer that we would like to FTP data to the "FTP computer". For each FTP computer, the user must enter the FTP computer's IP address (i.e. vlf-europe.stanford.edu), port number, user name, password, FTP times, and directory you would like the data to be FTPed to. For each FTP setting, the user should give a name to this setting. The user must also enter the time of the day that they would like the FTP to begin and end. If all the files are FTPed before the end time, the FTP thread will simply close before the end time. If the files are not FTPed within the allotted time frame, the FTP will close and finish up the following day during the next FTP time. We currently

support only one FTP setting.

NETWORK SETTINGS

We can control the software over the internet without physical being at the actual
computer. We will call the computer we would like to control the "remote computer" and
the computer we would like the control the remote computer from the "server computer"
In order to have access to the remote computer, we must specify settings on the
controlling computer. In particular, we need the IP address and port number of the server
computer. The remote computer will then establish a connection with the server
computer. The server computer controls the remote computer via the Communicator
software. We can, for example, get the status of the remote computer, view and change
the settings of the remote computer, restart the remote computer, and command the
remote computer to FTP select data. We can also update the software of the remote
computer. When we want to view the software settings of the remote computer, the
remote computer sends the software settings to the server computer via FTP. For this
reason, a user name and password of the server's FTP is required. We may have multiple
server computers controlling remote computer. In this case, we simply click the "add"
button to add the information for more server computers.
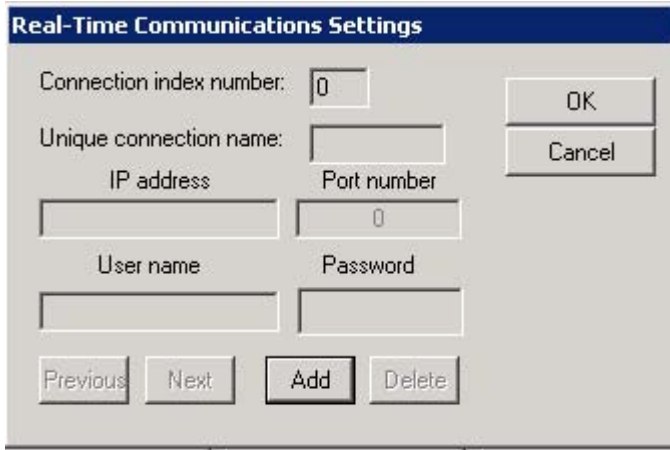
DATA PROCESSING

The data processing GUI contains sub-GUIs that are pertinent to the signal processing that is done on the raw data after it has been acquired.
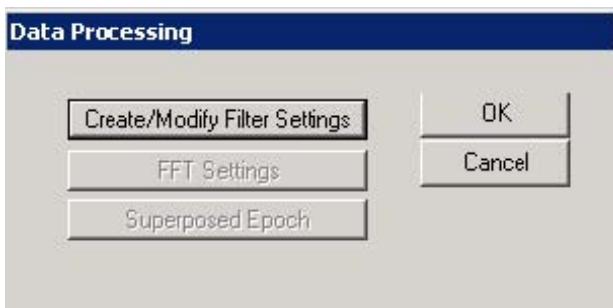
CREATE/MODIFY FILTER SETTINGS

After data is acquired, we would like it to be filtered. This is done through the filter GUI. To add a filter, simply click on the Add button, then click on the "Filter from File". A dialogue in which the user can select a filter file will be brought up. The filter file simply contains the filter coefficients of a filter—these filter files can be created through matlab. Sample filter files are included on the "filter" folder. For each filter setting, the user should specify a filter name.

Create/Modify Filter Settings

Filter number: 0

Unique filter name: 5000 Hz

Number of taps: 0

Cutoff frequency: 0 Hz

Sample frequency: 0 Hz

Decimate to: 0 Hz

OK

Cancel

Filter From File | | Remove
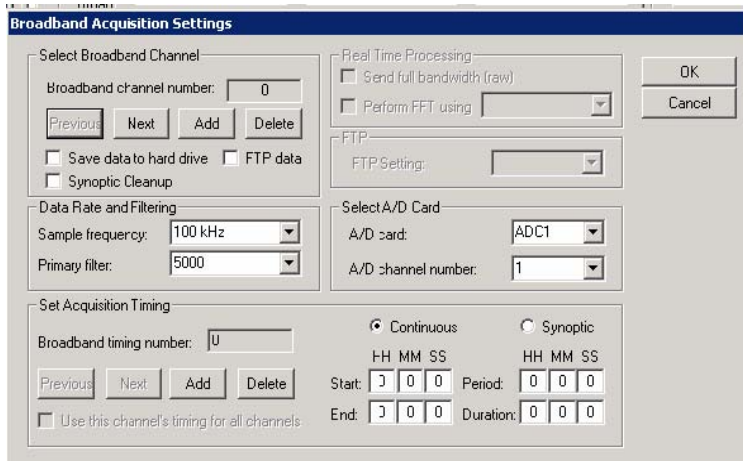
Previous Next Add Delete

BROADBAND

The software supports multiple channels of Broadband data acquisition. To add a channel, simply click on the add button in the Select Broadband Channel section. The save data to disk checkbox, if unchecked, will delete the data on the harddrive after it has been FTPed. The FTP data check box will FTP data using the specified FTP setting, which can be selected from the pull down menu. Note that FTPing of broadband data is not recommended because of the size of the files. The synoptic clean up checkbox, if checked, will run the synopticCleanup.bat file after every synoptic acquisition. The user may edit synopticCleanup.bat file to do anything. For each channel, the user must specify which ADC card to acquire data from. Also, the user must specify which of the 2 channels (usually north/south or east/west) on the ADC card to acquire from. For each channel, the user can specify the sample rate that data will be acquired at. The 100kHz data will be decimated down to this sample rate. For each channel, the user can specify a filter setting to be used from the filter settings created in the filter GUI.

For each channel, the user must specify the timing schedule for this channel. To add a timing schedule, simply click on "add" and enter the times:

Start time--The time that acquisition should start End time--The time that acquisition should end Period--For synoptic acquisitions, the period of acquisition. For continuous acquisitions, the length of data contained in each file. Duration--For synoptic acquisitions, the duration of each period. For continuous acquisitions, the length of data contained in each file.

Note: for continuous acquisitions, the period and duration should be the same.

For example, start time of 3:00, end time of 10:00, period of 1 hour, duration of 5 minutes will acquire data for the first 5 minutes of each hour from 3:00 to 10:00.

NARROWBAND

The software supports multiple channels of Narrowband data acquisition. To add a channel, simply click on the add button in the Select Narrowband Channel section. The save data to disk checkbox, if unchecked, will delete the data on the harddrive after it has been FTPed. The FTP data check box will FTP data using the specified FTP setting, which can be selected from the pull down menu. The synoptic clean up checkbox, if checked, will run the synopticCleanup.bat file after every synoptic acquisition. The Do Low-Res check box will create a matlab file containing 1 Hz data in addition to the regular settings of this channel. The spheric channel check box indicates if the channel is used for spheric detection. The MSK-modulated check box, if checked, will remove the phase modulation in the signal. For each channel, the user must specify which ADC card to acquire data from. Also, the user must specify which of the 2 channels (usually north/south or east/west) on the ADC card to acquire from. For each channel, the user can specify the Sample frequency that data will be acquired at. The 100kHz data will be decimated down to this frequency. For each channel, the user can specify a filter setting to be used from the filter settings created in the filter GUI.

For each channel, the user must specify the timing schedule for this channel. To add a timing schedule, simply click on "add" and enter the times.

Start time--The time that acquisition should start End time--The time that acquisition should end Period--For synoptic acquisitions, the period of acquisition. For continuous acquisitions, the length of data contained in each file. Duration--For synoptic acquisitions, the duration of each period. For continuous acquisitions, the length of data contained in each file.

For example, start time of 3:00, end time of 10:00, period of 1 hour, duration of 5 minutes will acquire data for the first 5 minutes of each hour from 3:00 to 10:00.

Note: The FTP pull down menu has been disabled since we do not allow multiple FTP settings un the current version.

Narrowband Acquisition Settings

Select Narrowband Channel

Narrowband Channel Number: 0

Previous | Next | Add | Delete

Channel Name (Call Sign): NLK
Center Frequency: 40000
Calibration Factor: 1

☐ Save Data to Disk   ☐ FTP Data
☐ Is MSK-Modulated   ☐ Do Low-Res
☐ Spheric Channel   ☐ Synoptic Cleanup

Real Time Processing

☐ Send Full Bandwidth (Raw)

FFT Setting Number | Superposed Epoch Setting Number

OK
Cancel

FTP

FTP Setting:

Data Rate and Filtering

Primary Filter Number:
Secondary Filter #:
Sample Frequency: NONE

Select A/D Card

A/D Card Number: NONE
A/D Channel Number: 1

Set Acquisition Timing

Narrowband Timing Number: 0

Previous | Next | Add | Delete

☐ Use this channel's timing for all channels

⦿ Continuous   ○ Synoptic

HH MM SS   HH MM SS
Start: 0 0 0   Period: 0 0 0
End: 0 0 0   Duration: 0 0 0

Sample Walk Through of a Simple Acquisition

This tutorial will walk through the steps necessary for the following:

BROADBAND

.   • Setup 2 continuous broadband channels acquiring from 3:30 to 3:00 (23.5 hours of the day).
.   • We want the continuous broadband files to be split into 30 minutes segments.
.   • The broadband data will be filtered with a cutoff of 12500Hz.
.   • The broadband data will be sampled at 100kHz

NARROWBAND

.   • Setup 2 synoptic narrowband channels acquiring data the first 5 minutes of each day starting at 0:00 and ending at 12:05.
.   • The narrowband data will be filtered with a cutoff of 200Hz.
.   • The narrowband data will be from the NLK transmitter, mixed down from 24800 Hz
.   • The narrowband will be sampled at 50Hz
.   • The narrowband data amplitude will be scaled by a calibration factor of 5.
.   • We will run the synoptic cleanup batch file for the narrowband data
.   • The narrowband data will be FTPed to vlf-europe.stanford.edu at 23:30.

1) Setup the necessary hardware

a) Install a 200kHz NIDAQ ADC card in the PCI slot of the computer.

b) Install the NIDAQ software, and properly assign the ADC card to be device number 1 using the NIDAQ software. Contact Eddie Kim for a copy of the NIDAQ software

c) Attach the line receiver to the ADC card.

d) Attach the GPS receiver to the ADC card. Contact Morris Cohen for instructions on how to do steps c and d.

2) On the computer, install the software package

3) Make sure SPYSWEEPER and NORTON ANTIVIRUS scheduled scans are disabled.

4) Run the VLF_DAQ_console_only.exe. This allows the user to change settings or the software without fear of data being acquired while settings are being changed.

5) Enter the password in the password box.

Stanford University VLF DAQ

Station Name	Installation Date	Password
Stanford	March 8, 2005	xxxxxxxx

Latitude	Longitude	Software Version
		2005.0214

GPS Date	GPS Time	GPS Quality

Next Acquisition

Start Time
| 0 | 0 | 0 |

End Time
| 0 | 0 | 0 |

Status/Error Messages
RUNNING CONSOLE ONLY...

Nuts and Bolts

Station Information	Disk Management	Data Processing
Hardware Information	CD/DVD Writing	Broadband Settings
Communication Settings	About VLF DAQ	Narrowband Settings

Save	Restore Settings	Exit

6) Click on "Station Information" and enter as much information as you can about the site. A copy of all this data is saved in the settings file, which is important to consult when studying your acquired data.

7) Click OK on the "Station Information" Dialogue Box

8) Click on "Hardware information" and enter as much information as you can about the hardware setup of the site.

a) Click on "ADC Settings"

b) Click "Add"

c) Type in "ADC1" for Unique Card Name

d) Type in "1" for Device Number

e) Under Card type select "200kHz"

f) Click OK

9) Click on Serial Settings.

Motorola GPS system should use the following settings:
Baud rate: 9600
Byte size: 8
Buffer size: 2048

Parity: None
Stop bits: 1

Click OK.

9) Click on "Antenna Settings" and enter as much information as you can about the
antenna setup. A copy of all this data is saved in the settings file, which is important
to consult when studying your acquired data.
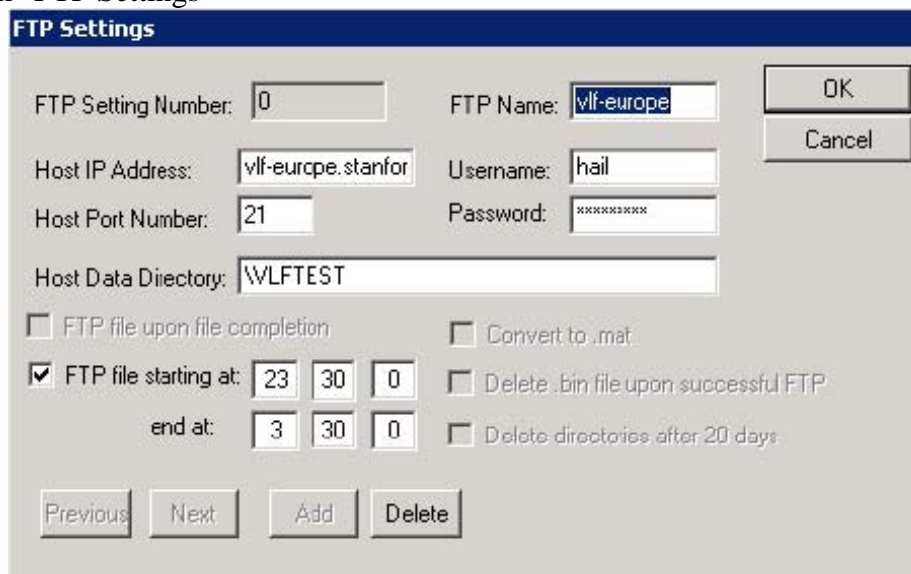

10) Click OK on the Antenna Settings Dialogue Box

11) Click OK on the "Hardware information" dialogue box

12) Click Communication Settings
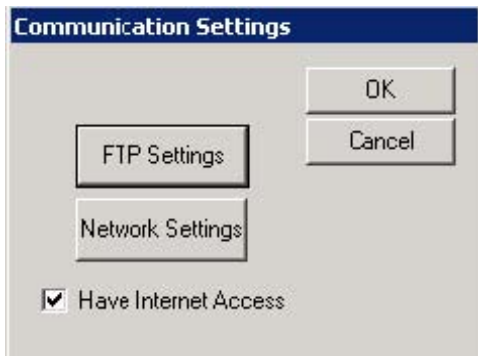
13) Check "Have Internet Access"

14) Click "FTP Settings"

a) Enter "vlf-europe.stanford.edu" under Host IP Address b) Enter 21 under Host

Port Number c) Enter the ftp username under username d) Enter the ftp password

under password e) Check "FTP file" f) Enter 23/30/00 under "FTP file starting at:"

g) Enter 3/30/00 under "end at:". This will give 4 hours to FTP the files.   h) Enter
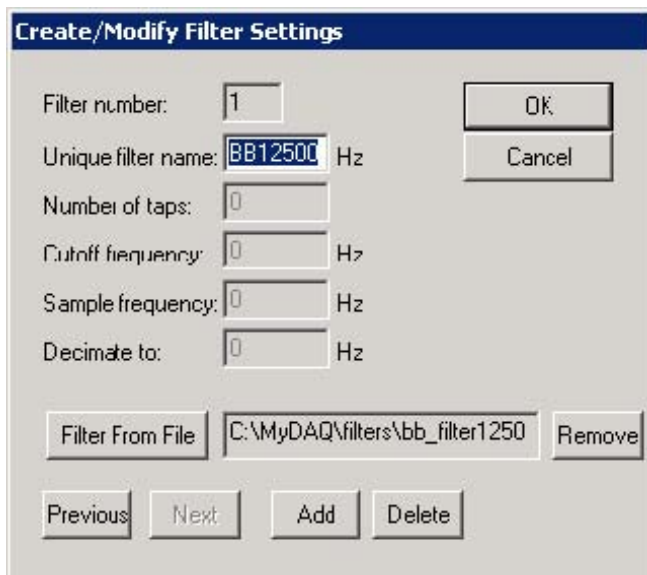
"vlf-europe" for FTP name i) Click OK

15) Click OK on the FTP Setting Dialogue

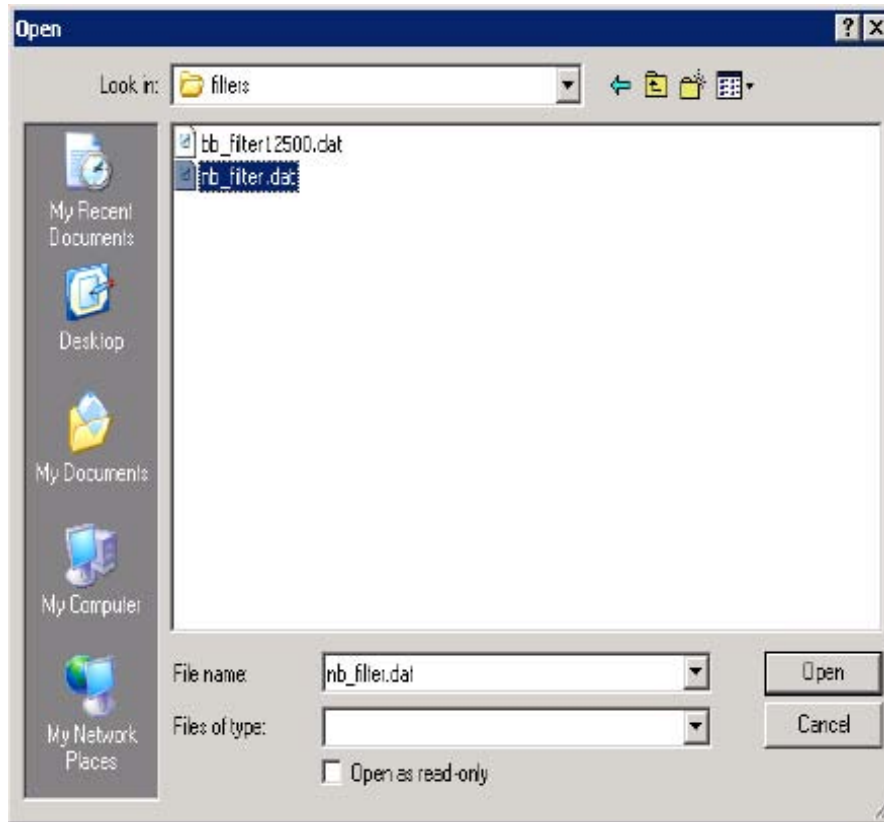16) Click OK on the Communications Settings dialogue box

17) Click on "Data Processing"
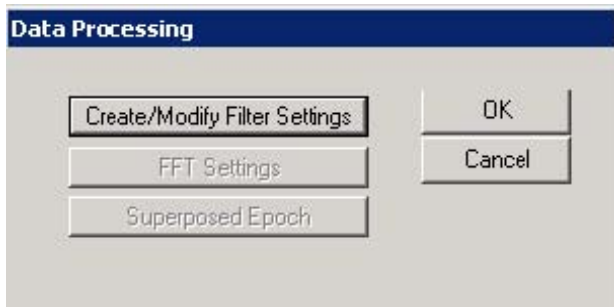
18) Click "Create/Modify Filter Settings"

a) Click "Add"

b) Enter "NB200" under Unique Filter Name

c) Click on "Filter from File"

d) Navigate to the Filter directory and select the file "nb_filter.dat"

e) Click OK to select the filter file

f) Click "Add"

g) Enter "BB12500" under Unique Filter Name

h) Click on "Filter from File"

i) Navigate to the Filter directory and select the file "bbfilter_1250.dat"

j) Click OK to select the filter file

k) Click OK on the "Create/Modify Filter Settings" GUI

19) Click OK on the Data Processing GUI

20) Click on the Broadband Settings button

a) Click on "Add" in the Select Broadband Channel section

b) Click "save data to hard drive"

c) Select 100kHz for sample frequency

d) Select BB12500 for primary filter

e) Select ADC1 for A/D card

f) Select 1 for A/D channel number

g) Click on "Add" in the "Set Acquisition Timing" section

h) Select Continuous radio button

i) Enter 03/30/00 for "Start"

j) Enter 03/00/00 for "End"

k) Enter 00/30/00 for "Period"

l) Enter 00/30/00 for "Duration"

m) Click on "Add" in the Select Broadband Channel section

n) Click "save data to hard drive"

o) Select 100kHz for sample frequency

p) Select BB12500 for primary filter

q) Select ADC1 for A/D card

r) Select 2 for A/D channel number

s) Click on "Add" in the "Set Acquisition Timing" section

t) Select Continuous radio button

u) Enter 03/30/00 for "Start"

v) Enter 03/00/00 for "End"

w) Enter 00/30/00 for "Period"

x) Enter 00/30/00 for "Duration"

y) Click OK

Broadband Acquisition Settings

Select Broadband Channel

Broadband channel number: 0

Previous | Next | Add | Delete

☑ Save data to hard drive   ☐ FTP data
☐ Synoptic Cleanup

Data Rate and Filtering

Sample frequency: 100 kHz
Primary filter: BE12500

Real Time Processing
☐ Send full bandwidth (raw)
☐ Perform FFT using

FTP
FTP Setting:

Select A/D Card
A/D card: ADC1
A/D channel number: 1

OK
Cancel

Set Acquisition Timing

Broadband timing number: 0

Previous | Next | Add | Delete

☐ Use this channel's timing for all channels

⦿ Continuous   ○ Synoptic

HH MM SS
Start: 3 30 0   Period: 0 30 0
End: 3 00 0   Duration: 0 30 0

21) Click OK for Broadband Settings GUI

22) Click on the Narrowband Settings button

a) Click on "Add" in the Select Narrowband Channel section

b) Click "save data to hard drive"

c) Click "FTP data"

d) Click "Is MSK-Modulated"

e) Click "Synoptic Cleanup"

f) Enter "NLK" under Channel Name

g) Enter 24800 for Center Frequency

h) Enter 5 for Calibration Factor

i) Select 50Hz for sample frequency

j) Select NB200 for primary filter

k) Select ADC1 for A/D card

l) Select 1 for A/D channel number

m) Click on "Add" in the "Set Acquisition Timing" section

n) Select Synoptic radio button

o) Enter 00/00/00 for "Start"

p) Enter 13/00/00 for "End"

q) Enter 00/05/00 for "Duration"

r) Enter 01/00/00 for "Period"

s) Click on "Add" in the Select Narrowband Channel section

t) Click "save data to hard drive"

u) Click "FTP data"

v) Click "Synoptic Cleanup"

w) Enter NLK under Channel Name

x) Enter 24800 for Center Frequency

y) Enter 5 for Calibration Factor

z) Select 50Hz for sample frequency

aa) Select NB200 for primary filter

bb) Select ADC1 for A/D card

cc) Select 2 for A/D channel number

dd) Click on "Add" in the "Set Acquisition Timing" section

ee) Select Synoptic radio button

ff) Enter 00/00/00 for "Start"

gg) Enter 13/00/00 for "End"

hh) Enter 00/05/00 for "Duration"

ii) Enter 01/00/00 for "Period"

jj) Click OK

23) Click OK for Narrowband Settings GUI

24) Click "Save" on the main dialogue.

25) Click "Exit" on the main dialogue.

26) Restart the computer. The software should startup automatically at the start of the

computer and the data acquisition will begin.