



**AzfpLink**

Version 1.0.16 Users Guide

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# 1 Introduction

This software manual is for the AzfpLink PC software Version 1.0.10 or higher and Acoustic Zoo-plankton and Fish Profiler sonar units running Firmware version 3.02 and later.

The AZFP implements a Large Dynamic Range Detector which provides instantaneous dynamic range in the receiver of between 80 and 90 dB, and does not require time-varying gain.

The following is a summary of the functions performed by the software:

- The software provides a graphical user interface to operate your AZFP using a Windows PC.
- The software communicates with the AZFP via RS232 communications protocol.
- The program can retrieve the units parameters and display status and available data storage capacity.
- If the unit is programmed to transmit data over the RS232 the program the software can act as a data logger saving the data on a drive connected to the PC. The program has the ability to display the real time data in both text and graphical form as it is transmitted by the AZFP unit to the PC.
- The program can retrieve data that is stored on the AZFP's Compact FLASH (CF) memory over the RS232 port. Note that this is not a recommended method of data retrieval except for relatively small amounts of data as this can take several of hours if there are large volumes of data. The CF has a PC compatible file system which allows retrieval of the data using a standard compact FLASH card reader.
- The program can set the AZFP unit's internal date and time clock.
- The program can plot data files that have been retrieved from the units CF or the real time data files that were created by AzfpLink while monitoring in real time mode. Both individual pings and series of pings plotted as an echogram are available. For data retrieved from a calibrated instrument the program can display or export Sv and/or Ts quantities.
- The program can decode and export the pings to formats compatible with other analysis and display programs such as Echoview.
- If the AZFP is connected to the ASL Data Logger the unit can be operated over an internet/intranet connection including acquisition of real time data as it is being transmitted by the unit. The data files acquired by the ASL Data Logger can be viewed and retrieved as well.

## 2 Minimum System Requirements

The following list describes the minimum system requirements recommended for hardware and software you need to run AzfpLink software. The program may run on machines with less resources.

- 1 GHz Pentium or higher processor, with at least 512 MB of RAM and at least 5 MB of free disk space for the software.
- 1024x768 SVGA
- Windows XP/VISTA/7
- Sufficient free disk space is required to up load the data from a unit's compact FLASH disk and/or real time data.
- 1 RS232 port
- A USB-RS232 is provided with your unit for computers that do not have a RS232 port.

This software requires firmware Version 3.00 or higher.

### 3 Installation

Installation of this software requires that the users account have administrative privileges.

#### 3.1 Program Installation

The software is provided in a self extracting and executing WinZIP file named as follows:

AzfpLink\_A\_B\_CC\_YYYYMMDD.exe

Where:

A - is the software's Major version number

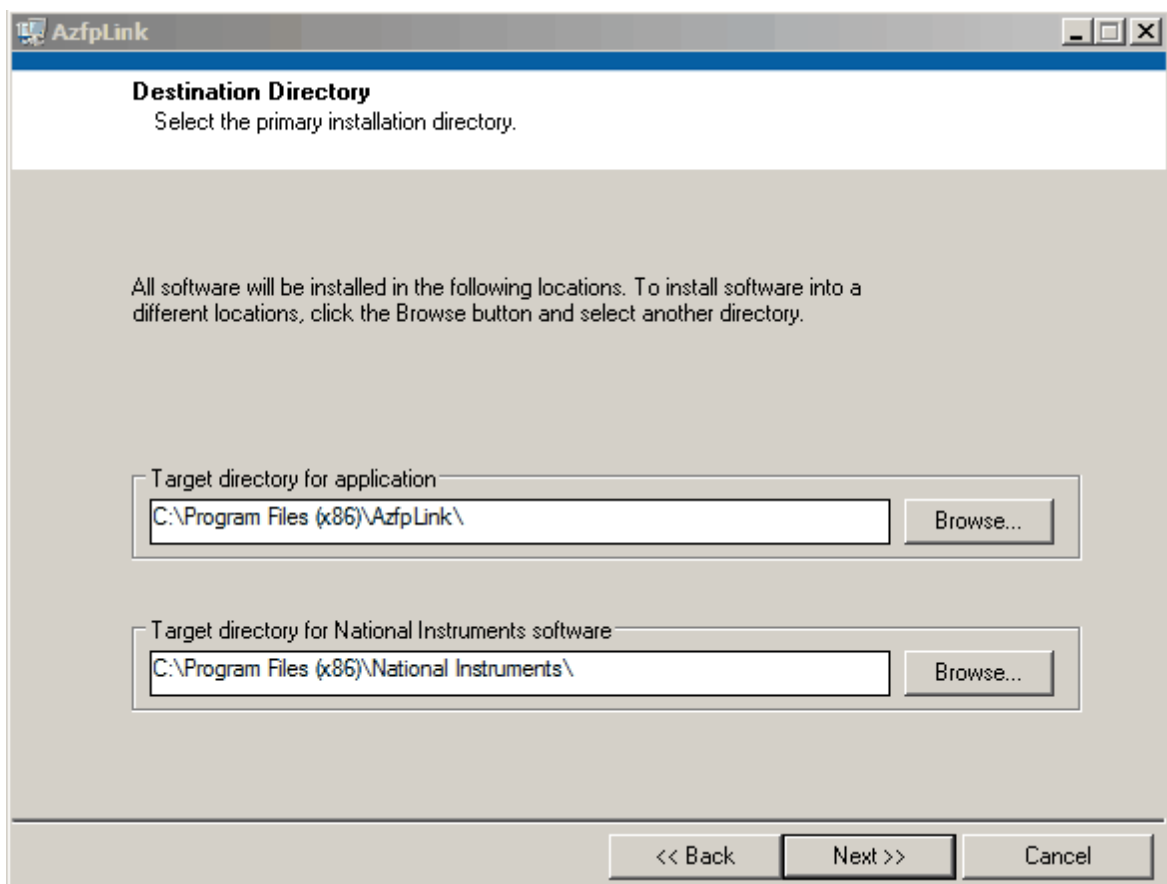
B - is the software's Minor version number

CC - is the software's Sub Minor version number

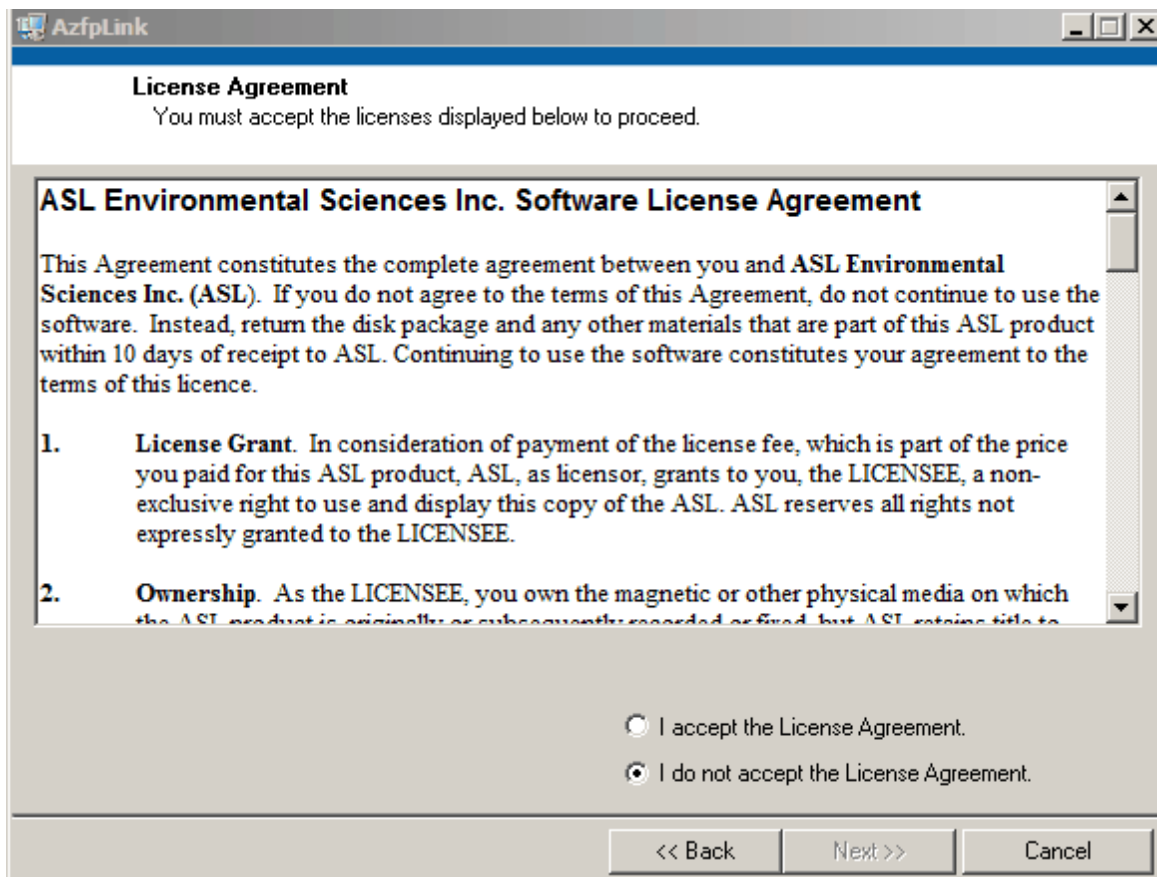
YYYYMMDD is the software build date.

This file can be found on the CD-ROM provided with your instrument or via Internet download.

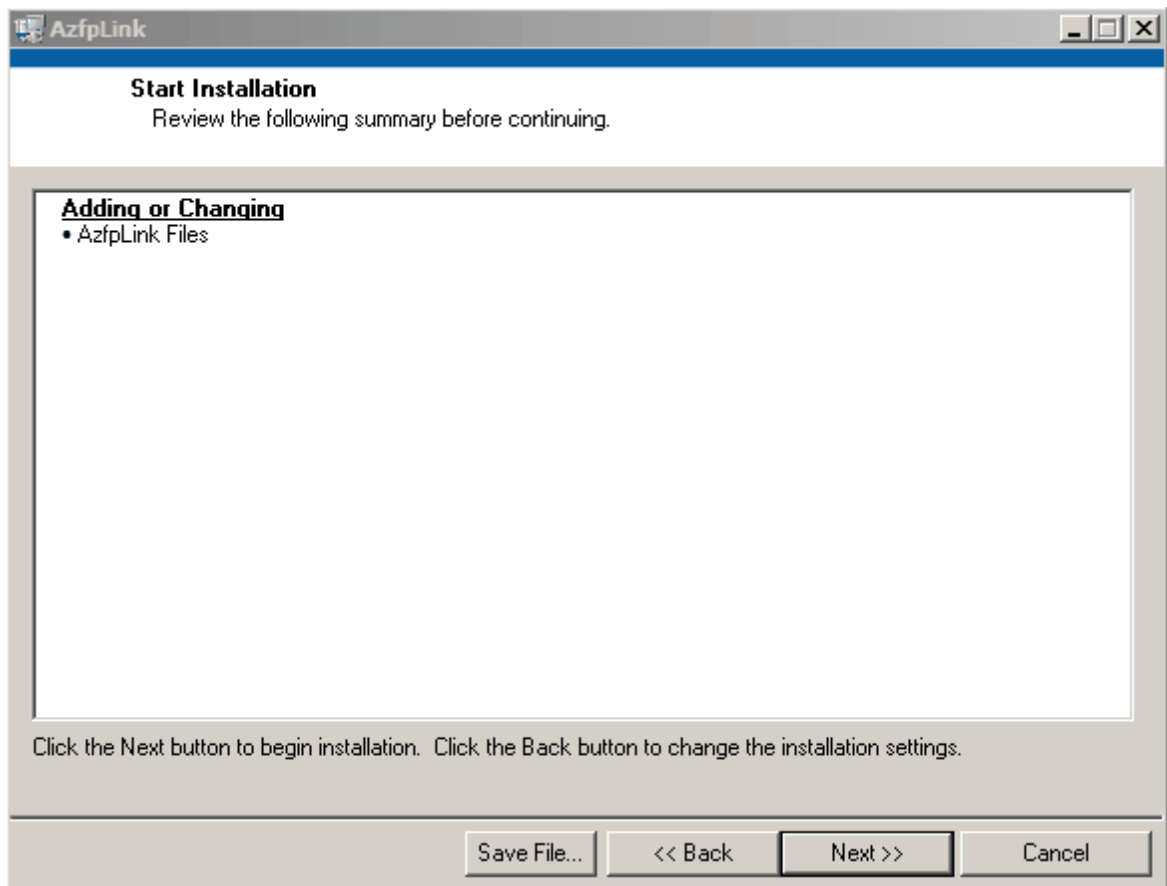
Click on the AzfpLink\_A\_B\_CC\_YYYYMMDD.exe to begin the installation.



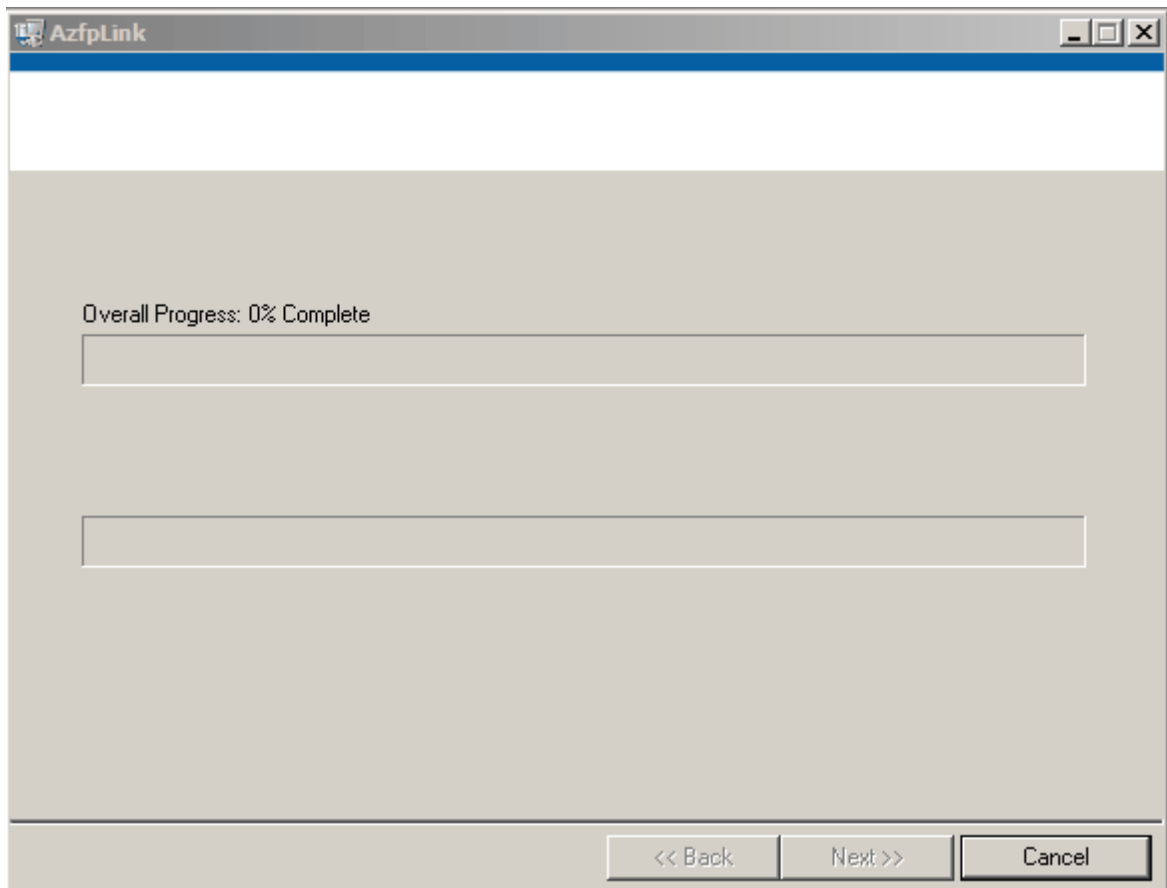
Click Next.

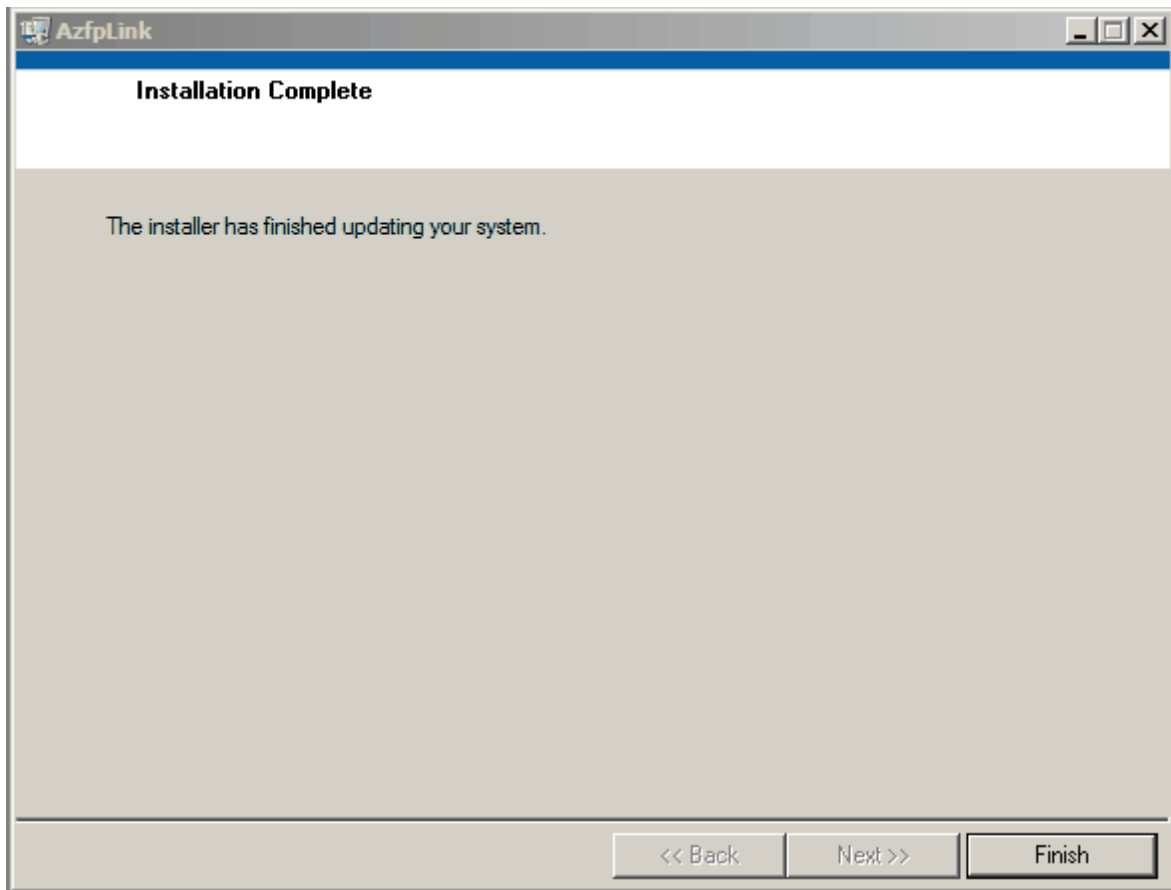


Click I accept and then the Next button.



Click Next.





Click Finish to complete the installation.

Start the program by selecting it on the Start->All Programs->AzfpLink->AzfpLink menu.

The first function when running the program is to set the correct COM port in the [Preferences tab](#).

### 3.2 Setting Up AzfpLink Communications

After installation connect your AZFP to the PC's serial port.

Start AzfpLink.

Go to the preferences panel and select the COM port the instrument is connected to.

| Deploy  | Operating Schedule | Unit [51102] Coef | Real Time | File | Logger/TCP | Display | Echogram | Export | Preferences | Firmware      | About   |
|---|--------------------|-------------------|-----------|------|------------|---------|----------|--------|-------------|---------------|---------|
| Deployment File Directory   |                    |                   |           |      |            |         |          |        |             | Change        | Explore |
| Real Time Data Storage  |                    |                   |           |      |            |         |          |        |             | Change        | Explore |
| Instrument Status Log Files   |                    |                   |           |      |            |         |          |        |             | Change        | Explore |
| Real Time Storage File Prefix   |                    |                   |           |      |            |         |          |        |             | Change Prefix |         |
| <input type="checkbox"/> Check Battery Consumption on Deployment<br>Tx Battery Pack Amp Hours: 10<br>Main Battery Pack Amp Hours: 120<br>COM3 <b>Communications Port</b> <a href="#">Search COM Ports for Instrument</a><br><input type="checkbox"/> 9600 BAUD Operation (AZFP must be manually set to operate at 9600 BAUD see manual)<br><input checked="" type="checkbox"/> Warn user on startup if AzfpLink is set to 9600 BAUD operation<br><input checked="" type="checkbox"/> Save Real Time Data on Bootup<br><input type="checkbox"/> Plot Real Time Data on Bootup<br><input checked="" type="checkbox"/> Check Firmware Version<br><input type="checkbox"/> Warn if deploying with RS232 output ON<br><input type="checkbox"/> Warn if deploying with deactivated channels<br><input type="checkbox"/> Ask if purge plug is installed when deploying the instrument<br><input type="checkbox"/> Ask if the Compact FLASH is formatted when deploying the instrument<br><br><input type="checkbox"/> Allow Any Absorption Values<br><input type="checkbox"/> Show Send Go command & Sleep mode buttons<br><input checked="" type="checkbox"/> Show Message Panel on Startup<br><br>Maximum Sensor Samples to load (more samples requires more memory usage on the PC)<br>Max Sensors: 1000000 |                    |                   |           |      |            |         |          |        |             |               |         |

Check your connection by going to the AZFP tab and click on the **End Deployment - Get Status** command button. This will end AZFP deployment if it is deployed and return status information.

| Instrument Status |                     |
|-------------------|---------------------|
| Last Update       | 2012/02/09 12:13:00 |
| Firmware          | 3.01 (20120209)     |
| UNIT S/N          | 55034               |
| CPU S/N           | 9172                |
| Mode              | STANDBY             |
| Param. Status     | VALID               |
| Param. Saved      | YES                 |
| Free (Mb)         | 6600.26             |
| Used (Mb)         | 1397.82             |
| Total (Mb)        | 7998.08             |

### 3.3 Setting Up Terminal Emulation Communications

A terminal emulator called Motocross is included with this software package. The purpose of the emulator is to gain direct RS232 communications to the unit. This can be useful for trouble shooting communications problems.

Follow the instruction found in the [Terminal Emulator Command Button](#) section for setting up the Motocross Terminal Emulator communications settings.

The terminal emulator can be used to for trouble shooting functions.

## 4 Theory of Operation

The AZFP software system consists of two software packages, the AZFP Firmware that controls and operates the unit and the AzfpLink PC based software used to program the AZFP and monitor the unit during real time data acquisition. The two software packages communicate with each other over a RS232 serial interface.

A third software package called Motocross is included in the installation. This is a terminal emulator program that allows the users to communicate with the AZFP with the keyboard for special operations or just to check communications. More information on the Terminal Emulator can be found in section [Terminal Emulator](#)

The AZFP transmits a pulse of sound, digitizes the returning signals and stores the data to solid state memory (Compact FLASH), transmits the data to a PC over RS232 or both. The AZFP has the capability of averaging the returns both spatially and in time. It has the capability of digitizing the returns at 64000, 40000 or 20000 samples per second.

The AZFP has the capability of acquiring data from 1 to 4 different transducers depending on the unit's configuration. The number of frequencies is configured at the factory based on the clients purchasing decision.

Data is stored on Compact FLASH (CF) ranging in size from 16 MB to 16 GB and/or transmitted to a PC in real-time via RS232.

The AZFP stores operating parameters, configuration and auxiliary sensor coefficient parameters in internal non-volatile memory that remains intact after power off/on cycles. Configuration and coefficient information is typically set by the manufacturer and remains the same for any type of deployment. Operating parameters are set by the end-user and are programmed to the instrument when it is deployed.

The AZFP unit is capable of running a number of different operating parameters over selected periods of time. These periods of time are called phases. Each phase is defined by a start time and duration. When the duration of one phase is complete the instrument switches to the next phase. If a unit is on the last phase it continues to collect data using the operating parameters of this phase until either the unit runs out of battery power or the CF is full.

Phases and their parameters are described in more detail in a section below.



When the unit is equipped with more than one frequency the data is collected sequentially and then stored to CF and/or transmitted over the RS232 link.

When more than one frequency is available the instrument transmits and collects data on each channel with the highest frequency collected first followed by the next highest and to the lowest frequency. This is done regardless of the physical board layout of the frequencies in the instrument.

## 4.1 Phases

The AZFP has the capability of acquiring data with specific data acquisition parameters for specific intervals of time: these intervals of time are called "Phases". The AZFP has the capability of being programmed up to 12 Phases. When a Phase is complete the unit moves on to the next Phase and collects data with the parameters for that Phase. When the final Phase is complete the unit continues collecting data with the final phase parameters until the Compact FLASH is filled or the battery is exhausted.

The AZFP has three different types of Phases: Normal, Sleep and Repeat. A Normal Phase is a Phase with normal parameters. A Sleep Phase is a Phase in which no data collection is performed, this can be useful to save energy for period where no data is required. A Sleep phase can not be programmed as final phase. A Repeat Phase is a special phase that causes the unit to reset the start date of the first phase to the current date and time, thus repeating the sequence of phases. Only the final phase can be a Repeat phase.

The start date and time of the first phase is determined by the acquisition start date which is set by the end user. The end date of the first phase is its start date/time plus its "Duration Time". The "Start Date" for the next phase is the start date of the previous phase plus the duration of the previous phase.

For example:

Phase 1 start date: 2008/01/01 12:00:00  
Duration: 2 days

Phase 2 start date: 2008/01/03 12:00:00

## 4.2 Time Intervals and Data Acquisition

The AZFP is driven by a one second clock chip that wakes the units CPU from a low power sleep mode. This clock guarantees that data is acquired on even time intervals and conserve battery power by putting the CPU and electronics into a low power sleep mode. On each second interval the CPU wakes up, determines if its time for a phase change and/or determines if it is time to acquire data. When finished it goes back to sleep and is then reawakened on the next second to repeat the sequence.

When the unit is in a data acquisition phase (see definition of phases), it keeps a number of software counters to determine when it is time to acquire Bursts of pings. A Burst is a number of averaged or individual pings. The pings can be averaged in time (series of pings) and/or spatially averaged in range. A Ping is the transmission of an acoustic pulse and the digitization of the return for each frequency channel; the channels are sampled sequentially; once digitization for one channel is completed, the



Continuous storage of pings with no averaging is available but will consume the CF storage relatively quickly depending on the number of samples required for each ping, the size of the CF and the length of the deployment.

### 4.3 Internal Data Storage

The AZFP unit stores data on Compact FLASH (CF). The units are capable of accepting CF up to 32 Gigabyte; larger units are yet to be approved. Certain standards of CF are required for proper operation. Larger CF's may become available in the future.

The AZFP unit on power up creates a data directory called DATA. As data is stored to the CF the unit creates sub-directories using the current year and month. The names of these subdirectories are YYYYMM where YYYY is the year and MM is the month. Any data file created for that year and that month will reside in this subdirectory.

There are 4 types of files created in the directories; XML, LOG, DPL and data files for which the file type is set to the phase number. For example, type .01A is data created from phase 1, .02A from phase 2 through .12A for phase 12. The 3rd character of the type is A unless the instrument has been stopped and restarted within the same hour. If this is the case the instrument detects that the A file exists and the next character 'B' is used.

The XML files are created when the unit is deployed. All parameters including operating mode and instrument coefficients are stored in a XML format in these files. These files are suitable for future processing programs to read. An example file name is "07011212.XML".

The DPL files are created when the unit is deployed. These files contain deployment parameters in a more user readable format for reference. An example file name is "07011212.DPL".

The LOG files are created when a unit writes a to indicate a boot up, phase change or error. These message are in a ASCII readable form for user reference. An example file name is "20070112.LOG". Note only one log file is created per day.

### 4.4 Terminal Emulator

A terminal emulator called Motocross is included with this software package. The purpose of the emulator is to allow direct RS232 communications to the unit. This can be useful for trouble shooting communications problems.

The Terminal Emulator and AzfpLink cannot run at the same time. When the Terminal Emulator is run from the AzfpLink software, the AzfpLink is suspended and the emulator software starts up and takes over the serial port.

**When the Terminal Emulator is first invoked it must be programmed with the correct RS232 COM port in its preferences menu. This is described section [Terminal Emulator Command Button](#).**

### 4.5 ASL Data Logger Connection

Version 1.0.00 of the AzfpLink software contains a panel called "Logger" that provides the functionality to have the software connect to the ASL Data Logger and any AZFP link unit that is connected to the logger over the TCP/IP. This connection can be a local area network or the internet.

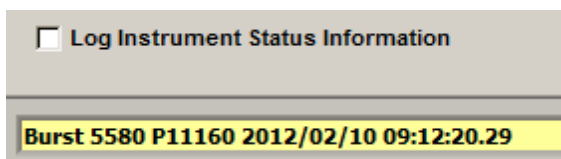
This connection allows AzfpLink to program the units, retrieve data files on either the ASL Data Logger or the connected units. It also allows the retrieval of real time data being transmitted by a AZFP.

## 4.6 Status Information After a Deployment

After a deployment the instrument sends out status information over the RS232 for 24 hrs before turning of this feature.

The 24 hour count restarts after any deployment.

This information is shown in the status line at the bottom of the main panel.



Log Instrument Status Information

To enable the logging of the information to log files enable the check box. The log files are stored with the log directory specified in the [Preference](#) tab.

The purpose of this status information is to verify that the instrument is deployed.

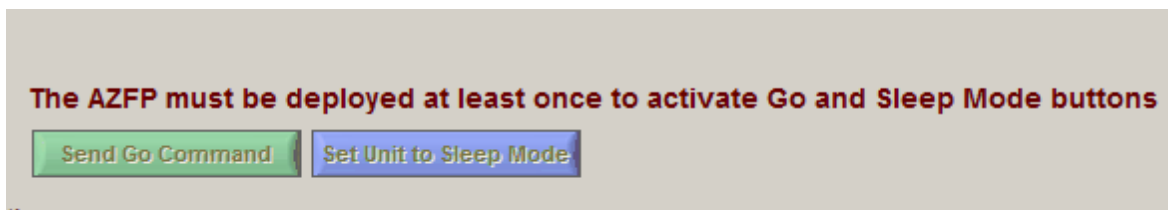
## 4.7 Go and Sleep Mode

For some applications where the AZFP is connected to AzfpLink and battery life is to be conserved and/or it is advantageous to break up the acquisition files for specific periods the Go and Sleep mode of operation can be used.

The Go and Sleep command buttons can be activated from the preference panel using the following option;

Show Send Go command & Sleep mode buttons

The button will show up on the deployment panel.



Once the instrument is deployed the buttons become active.



To restart an acquisition (create a new file) click on the **Send Go Command** button.

To stop an acquisition (close the file) and put the AZFP in a low power sleep mode click on the **Set Unit to Sleep Mode** button.

To leave sleep mode and start a new acquisition click on the **Send Go Command** button.

## 5 AzfpLink

This section describes the operation of the AzfpLink software.

### 5.1 Overview

The AzfpLink software consists of a number of tabs as shown below.

The screenshot displays the AzfpLink software interface with the following components:

- Navigation Tabs:** Deploy, Operating Schedule, Unit [51000] Coef, Real Time, File, Display, Echogram, Export, Preferences, Firmware, About.
- Buttons:** End Deployment - Get Status, Load Deployment File, Show Units Date/Time, Manually Set Units Date/Time, Set Unit to PC's Date/Time, Deploy Instrument, Terminal Emulator, Retrieve Parameters from Unit, Log Instrument Status Information (checkbox).
- Instrument Status:**
  - Last Update: 2013/12/12 10:45:08
  - Firmware: 3.04 (201311126)
  - UNIT S/N: 51000
  - CPU S/N: 11958
  - Mode: STANDBY
  - Param. Status: VALID
  - Param. Saved: YES
  - Free (Mb): 11389.70
  - Used (Mb): 4997.45
  - Total (Mb): 16387.15
- Deployment Summary:**
  - Deployment File: Parameters from last program invocation
  - Storage is to 'FLASH and RS232' [ 462.59 Mb ], Power Main [0.9 Ah] Tx [0.0 Ah]
- Phase Table:**

| Phase # | Type   | Start Date            | Duration   | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
|---------|--------|-----------------------|------------|----------------|------------|-------------|---------|----------|---------|
| 1       | Normal | Dec 10, 2013 11:32:28 | Continuous | 6 sec          | 1 sec      | 1           | no      | 462.6 Mb | 0.86    |
- Command Status:**
  - Wake Unit: The unit is in STANDBY mode
  - Config change: The configuration values have been changed to match that of the instrument.
- Message Panel:** Received configuration parameters. Includes buttons for Show Message Panel, Clear, and a checkbox for Disable Message Auto Popup. Also includes Help, COM, and Cursor Help checkboxes.

The tab labeled ['Deploy'](#) contains a number of command buttons and sub tabs used to program the unit.

The tab labeled ['Operating Schedule'](#) is used to set up the data acquisition parameters for a deployment.

The tab labeled "Unit [55034] Coef" displays the coefficients retrieved from the unit or loaded from a file. The '55034' will change to the units serial number that is either connected or whose coefficients have been loaded into the program.

The tab labeled 'Real Time' displays real time data sent over the RS232 port to the PC if the unit has been programmed to send the data over the RS232.

The tab labeled 'File' is used to retrieve data stored on the unit's CF, remove files from the CF and to format the CF.

The tab labeled 'Display' is used to display data obtained from AZFP instruments.

The tab labeled 'Echogram' is used to display data files retrieved from the unit's CF or files created by 'AzfpLink' when data is sent to it in real-time by the unit.


The tab labeled 'Export' is used to export data files retrieved from the unit either from the units Compact FLASH or files created by 'AzfpLink' when data is sent to it in real-time by the unit.

The tab labeled 'Preferences' is used to set some program parameters for AzfpLink.

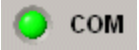

The tab labeled 'Firmware' is used to upgrade the units firmware if required.

The tab labeled 'About' shows program and contact information.

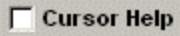
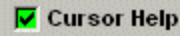
### 5.1.1 Help


At the bottom of the main tab is the  command button. Click on the button to get the program help.

### 5.1.2 Communications Indicator

At the bottom of the main panel is an indicator that is GREEN if the PC's communications port was successfully opened . If the communications port is not present or used by another program it is RED . If the indicator is RED then you must terminate any program that is using the port or change the port setting in the [Preferences Panel](#).

### 5.1.3 Cursor Help

The  check box is used to enable or disable Cursor Help. If enabled  the program provides some information on the controls and indicators that the cursor is focused on.

 **Cursor Help**

In the example above the cursor is focused on the Ping Processing Time. Note that the cursor must be focused on the panel and controls that it hovers above.

## 5.2 PC Files and Directories

When AzfpLink starts it creates the following directories if they do not already exist. The location of these directories can be changed by the user if desired. The 'account' is the login account of the user.

```
c:\Documents and Settings\account\My Documents\AZFP\Deployments  
c:\Documents and Settings\account\My Documents\AZFP\Realtime  
c:\Documents and Settings\account\My Documents\AZFP\DownLoad  
c:\Documents and Settings\account\My Documents\AZFP\Parameters  
c:\Documents and Settings\account\My Documents\AZFP\Log
```

Whenever the AzfpLink deploys an instrument a deployment file is written to c:\Documents and Settings\account\My Documents\AZFP\Deployments. These files contain information about the deployment.

If the real time data is being transmitted to the PC from the AZFP, it is stored in the c:\Documents and Settings\account\My Documents\AZFP\Realtime directory.

## 5.3 Deploy Tab

The Deploy tab is used program the control and program the unit. The tab contains a number command buttons for deploying the instrument, terminating the deployment, setting the units date, entering the terminal emulator, displaying the status of a deployment and other functions.

**Deploy** | Operating Schedule | Unit [51000] Coef | Real Time | File | Display | Echogram | Export | Preferences | Firmware | About

**End Deployment - Get Status**

**Instrument Status**

Last Update: 2013/12/12 10:45:08

Firmware: 3.04 (20131126)

UNIT S/N: 51000

CPU S/N: 11958

Mode: **STANDBY**

Param. Status: VALID

Param. Saved: YES

Free (Mb): 11389.70

Used (Mb): 4997.45

Total (Mb): 16387.15

**Deployment Summary**

Deployment File: **Parameters from last program invocation**

**Storage is to 'FLASH and RS232' [ 462.59 Mb ], Power Main [0.9 Ah] Tx [0.0 Ah]**

| Phase # | Type   | Start Date            | Duration   | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
|---------|--------|-----------------------|------------|----------------|------------|-------------|---------|----------|---------|
| 1       | Normal | Dec 10, 2013 11:32:28 | Continuous | 6 sec          | 1 sec      | 1           | no      | 462.6 Mb | 0.86    |

**Command Status**

**Wake Unit** The unit is in STANDBY mode

**Config change** The configuration values have been changed to match that of the instrument.

Unit:

PC:

**Manually Set Units Date/Time**

**Set Unit to PC's Date/Time**

**Deploy Instrument**

**Terminal Emulator**

**Retrieve Parameters from Unit**

Log Instrument Status Information

Received configuration parameters | **Show Message Panel** | **Clear** |  Disable Message Auto Popup | **Help** | COM |  Cursor Help

### 5.3.1 Instrument Status Indicators

The Deploy tab contains a number of instrument status indicators. These show status information sent up by the unit when it is either deployed or a deployment is terminated. Below is an example of the status indicators after a deployment is terminated and or it was already terminated and the

**End Deployment - Get Status**

command button is clicked.



| Instrument Status |                     |
|-------------------|---------------------|
| Last Update       | 2012/02/09 12:13:00 |
| Firmware          | 3.01 (20120209)     |
| UNIT S/N          | 55034               |
| CPU S/N           | 9172                |
| Mode              | STANDBY             |
| Param. Status     | VALID               |
| Param. Saved      | YES                 |
| Free (Mb)         | 6600.26             |
| Used (Mb)         | 1397.82             |
| Total (Mb)        | 7998.08             |

- The Last Update indicator shows the date/time of the status information.
- The Version is the AZFP units firmware version.
- The UNIT S/N is the serial number assigned to the unit by the manufacturer.
- The CPU S/N is the serial number of the AZFP's CPU.
- The Mode indicator will either indicate "STANDBY" or "DEPLOYED".
- The Param. Status indicator shows the status of the configuration parameters as checked by the firmware.
- The Param. Saved indicator shows whether or not the configuration parameters are saved to the internal non-volatile memory contained within the CPU (note this is not the CF memory).
- The Free (Mb) is the amount of free space left on the CF.
- The Used (Mb) is the amount of used space on the CF.
- The Total (Mb) is the total space available on the CF.

### 5.3.2 Command Status

The command status appears when deploying the unit or terminating the deployment.

In the example below the user has click on the **End Deployment - Get Status** command button. The unit was deployed so it needs to be told to end the deployment.

| Command Status |   |
|----------------|---|
| Info           | The unit either not connected or it is deployed                         |
| Info           | Waking the unit may take a few minutes if it is in a 'Sleep' Phase      |
| Wake Unit      | Click 'Continue' to end the deployment and set the unit to standby mode |
|                | <b>Continue</b> <b>Cancel</b>   |

The user at this point can click 'Continue' to end the deployment or 'Cancel' the command.

After clicking on the **Deploy Instrument** the user is asked questions about the deployment as shown below.

**Command Status**

|                 |  |            |           |
|-----------------|--|------------|-----------|
| <b>Question</b> | Has the FLASH been formatted (cleared of files and tested) ? | <b>Yes</b> | <b>No</b> |
|-----------------|--|------------|-----------|

Clicking 'no'.

**Command Status**

|                     |  |                 |               |
|---------------------|--|-----------------|---------------|
| <b>Format FLASH</b> | It is advisable to format the FLASH before a deployment.                           |                 |               |
| <b>Question</b>     | The FLASH has not been formatted, would you like to continue with the deployment ? | <b>Continue</b> | <b>Cancel</b> |

Below is an example of the full deployment after clicking 'Continue'.

**Command Status**

|                       |  |  |  |
|-----------------------|--|--|--|
| <b>Format FLASH</b>   | It is advisable to format the FLASH before a deployment.                 |  |  |
| <b>Format FLASH</b>   | Deployment continued. The user has indicated formatting is not required. |  |  |
| <b>Plug Installed</b> | The purge plug is installed. The deployment will continue.               |  |  |
| <b>Wake Unit</b>      | Unit ready to receive parameters   |  |  |
| <b>Configuration</b>  | Received configuration parameters  |  |  |
| <b>Deployed</b>       | Unit deployed  |  |  |

### 5.3.3 Deployment Summary

The 'Deployment Summary' is a set of controls that gives the user a quick indication of the operating schedule being used to deploy the instrument.

**Deployment Summary**

Deployment File **Parameters from last program invocation**

**Storage is to 'FLASH' [ 1.93 Gb ], Power Main [22.8 Ah] Tx [1.5 Ah]**

| Phase # | Type   | Start Date            | Duration   | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
|---------|--------|-----------------------|------------|----------------|------------|-------------|---------|----------|---------|
| 1       | Normal | Feb 09, 2012 09:12:57 | 60 sec     | 5 sec          | 1 sec      | 3           | yes     | 1.3 Mb   | 0.00    |
| 2       | Normal | Feb 09, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 3       | Normal | Feb 16, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 4       | Normal | Feb 23, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 5       | Normal | Mar 01, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 6       | Normal | Mar 08, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 7       | Normal | Mar 15, 2012 09:13:57 | Continuous | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |

The 'Deployment File' indicator shows the last deployment file loaded or saved by the user. If the user has entered some new values then it indicates the operating schedule contains manually edited values as shown above.

The operating mode is shown.

The type of data storage is shown.

A Phase summary table is shown. This table show the Phase number, the Phase type, the Phase start date, the Phase duration and other values .

The user can quickly move the the Phase editing tab for any of the displayed Phases by clicking on the specific 'Phase #'.

### 5.3.4 Deployment Summary with a Repeat Phase

Below is an example of the Deployment Summary if the last phase is a repeat phase.

The program estimates the number of repeats and the number of days the deployment will last with the the specified Amp Hrs for the main battery. This value is set in the [Preferences tab](#).

| Repeat - Battery capacity=120 Ahr, will last 33.9 repeats or 237.1 days, and storage=16.3 Gb |        |                       |          |                |            |             |         |          |         |
|--|--------|-----------------------|----------|----------------|------------|-------------|---------|----------|---------|
| Phase #  | Type   | Start Date            | Duration | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
| 1  | Normal | Feb 09, 2012 13:38:59 | 1.0 days | 45 sec         | 1 sec      | 3           | yes     | 206.9 Mb | 0.29    |
| 2  | Normal | Feb 10, 2012 13:39:59 | 6.0 days | 60 sec         | 1 sec      | 15          | no      | 275.3 Mb | 3.26    |
| 3  | Repeat | Feb 16, 2012 13:39:59 |          |                |            |             |         |          |         |

### 5.3.5 Deploy Instrument Command Button

**Deploy Instrument**

The **Deploy Instrument** command button causes AzfpLink to deploy the instrument with the operation parameters. After a successful deployment the status information will look like the figure shown below.

The screenshot displays the AzfpLink software interface. The top menu bar includes: Deploy, Operating Schedule, Unit [55034] Coef, Real Time, File, Display, Echogram, Export, Preferences, Firmware, and About. The main window is titled "Deployment Summary" and shows the "Parameters from last program invocation" deployment file. A yellow banner indicates: "Storage is to 'FLASH' [ 1.93 Gb ], Power Main [22.8 Ah] Tx [1.5 Ah]". Below this is a table of phases:

| Phase # | Type   | Start Date            | Duration   | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
|---------|--------|-----------------------|------------|----------------|------------|-------------|---------|----------|---------|
| 1       | Normal | Feb 09, 2012 13:38:59 | 60 sec     | 5 sec          | 1 sec      | 3           | yes     | 1.3 Mb   | 0.00    |
| 2       | Normal | Feb 09, 2012 13:39:59 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 3       | Normal | Feb 16, 2012 13:39:59 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 4       | Normal | Feb 23, 2012 13:39:59 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 5       | Normal | Mar 01, 2012 13:39:59 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 6       | Normal | Mar 08, 2012 13:39:59 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 7       | Normal | Mar 15, 2012 13:39:59 | Continuous | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |

Below the phase table is the "Command Status" section, which lists the following actions and their results:

- Format FLASH**: Deployment continued. The user has indicated formatting is not required.
- Plug Installed**: The purge plug is installed. The deployment will continue.
- Wake Unit**: The unit is awake and ready for deployment.
- Rx Config**: Received configuration parameters.
- Programming**: Unit programmed.
- Deploy**: Unit deployed.

On the left side of the interface, there is an "Instrument Status" panel with the following information:

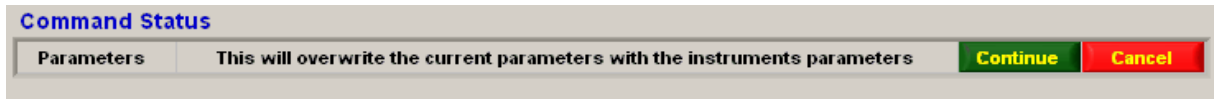
- Last Update: 2012/02/09 13:39:20
- Firmware: 3.01 (20120209)
- UNIT S/N: 55034
- CPU S/N: 9172
- Mode: DEPLOYED
- Param. Status: VALID
- Param. Saved: YES
- Free (Mb): 6589.28
- Used (Mb): 1408.79
- Total (Mb): 7998.08

At the bottom left, there are buttons for "Load Deployment File", "Show Units Date/Time", "Unit", "PC", and "Manually Set Units Date/Time".

### 5.3.6 Retrieve Parameters from Unit Command Button

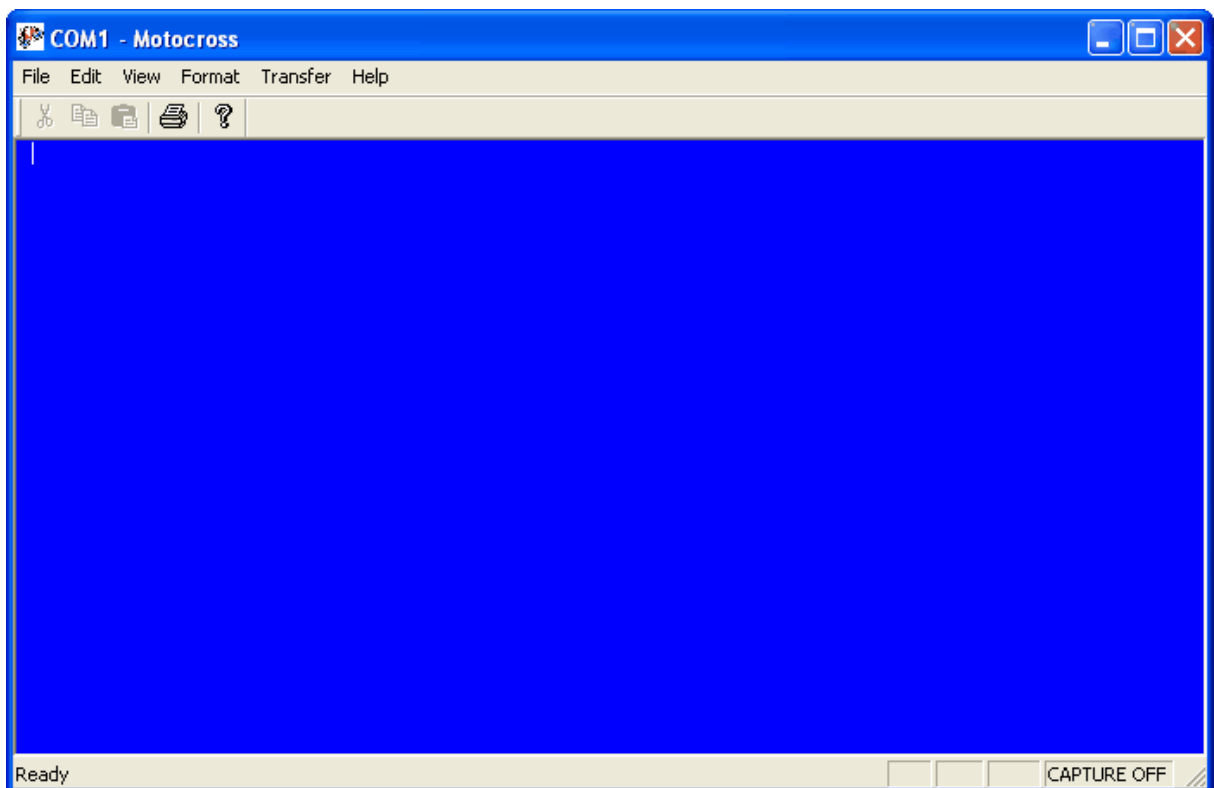
The **Retrieve Parameters from Unit** command button causes the AzfpLink to retrieve both Operational Parameter and Configuration Parameters from the unit and replace those currently displayed.

A warning is issued first.

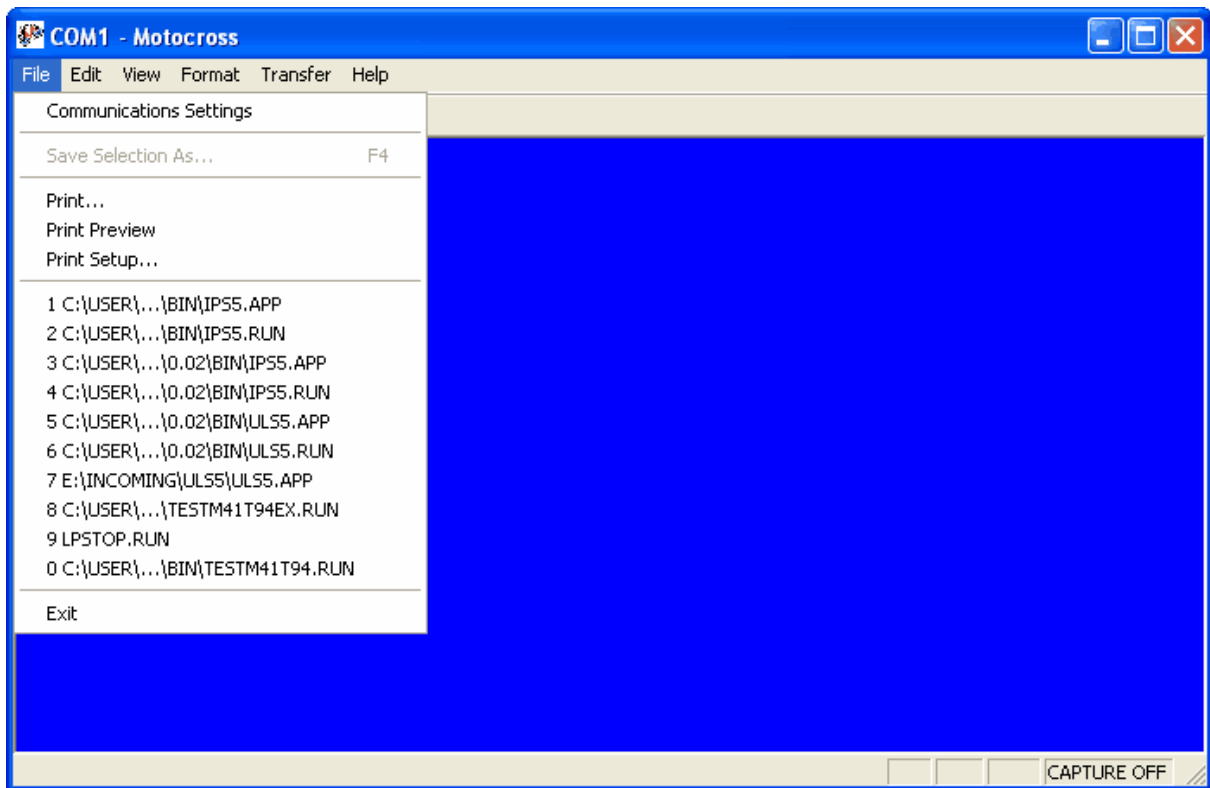


### 5.3.7 Terminal Emulator Command Button

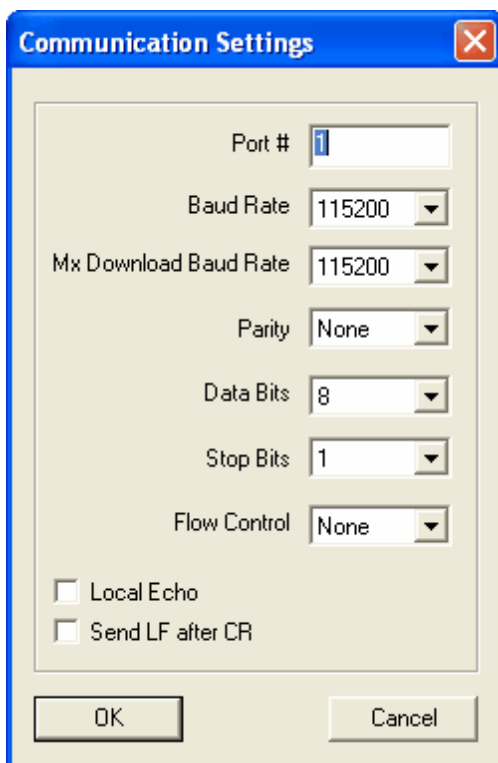
The **Terminal Emulator** command button causes AzfpLink to launch the Motocross terminal emulator program that is installed with AzfpLink. AzfpLink closes its connection to the RS232 port before it launches Motocross because only one program can access a serial port at one time. The AzfpLink interface disappears and the Motocross interface appears as shown below.



Note in the top left hand corner of the window "COM1 - Motocross" this indicates that the Motocross program is linked to RS232 communications port 1. If this is not the correct port and/or this is the first time Motocross has been launched then the COM port must be set up in the preferences menu. To do so click on the File pull down menu.

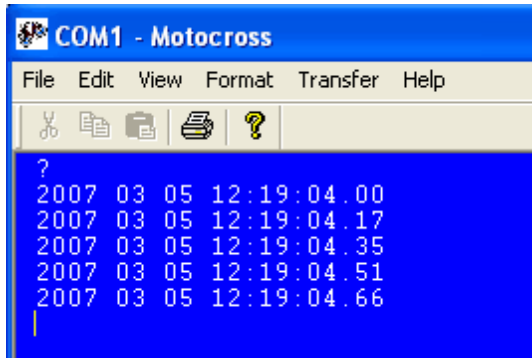


Select "Communications Settings".




Enter the correct port number. The rest of the settings must be set as shown above.

If the unit is not deployed then the pressing the "Enter" key on the keyboard will cause the Firmware to display the date and time.




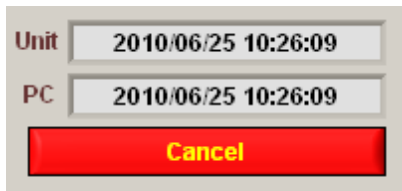
If the unit is deployed you can end the deployment manually by continually pressing the 's' key.

Functions that can be performed in the Motocross Terminal Emulator are described in later sections.

To exit the program and return to "AzfpLink" click on the  button in the top right hand corner.


### 5.3.8 Show Units Date and Time

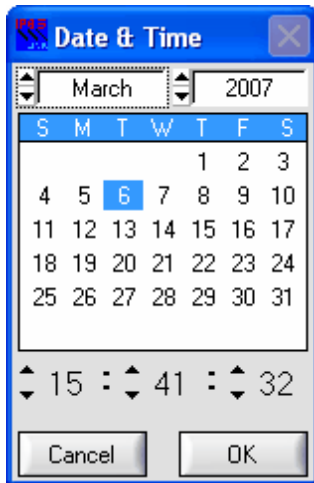
The  command button is to display the units date and time as well as the PC date and time. Note the unit must be in STANDBY mode for this command to work.



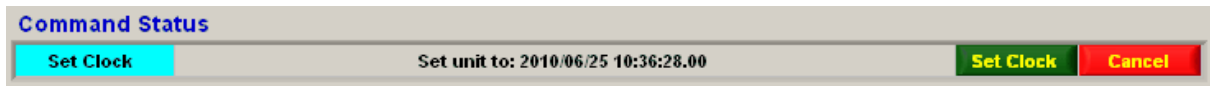
Click on the 'Cancel' command button to terminate the displaying of the date and time.

### 5.3.9 Set Units Date

Use the  command button to set the units date and time manually from another clock.

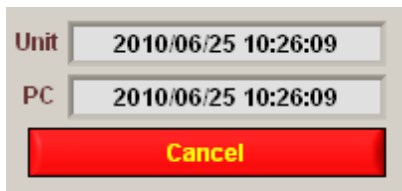


Set the date and time to a desired value and then click ok



The unit is ready to be programmed with the selected date and time. Click the 'Set Clock' button on the Command Status bar to program the unit with the new date and time.

After programming the unit the program starts showing the units and PC time.



Click on the 'Cancel' to terminate the displaying of the data and time.

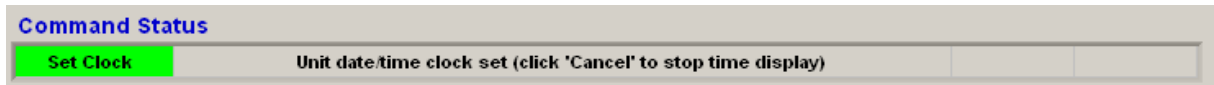
Click yes to program the unit.

### 5.3.10 Set Unit to PC Date

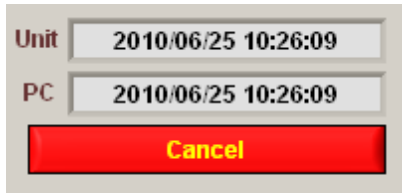
The **Set Unitsto PC's Date/Time** command button causes Ips5LinkE to set the units date and time to the PC's date and time.

The unit is programmed with the PC's data and time.

After the programming you should see the date and time that was programmed on the command status bar.



After programming the unit the program starts showing the units and PC time.

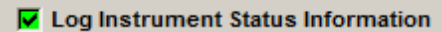
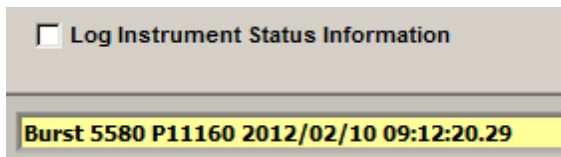


Click on the 'Cancel' button to terminate the displaying of the data and time.

### 5.3.11 Log Status Information

After a deployment the instrument sends out status information over the RS232 for 24 hrs before turning of this feature.

This information is shown in the status line at the bottom of the main panel.

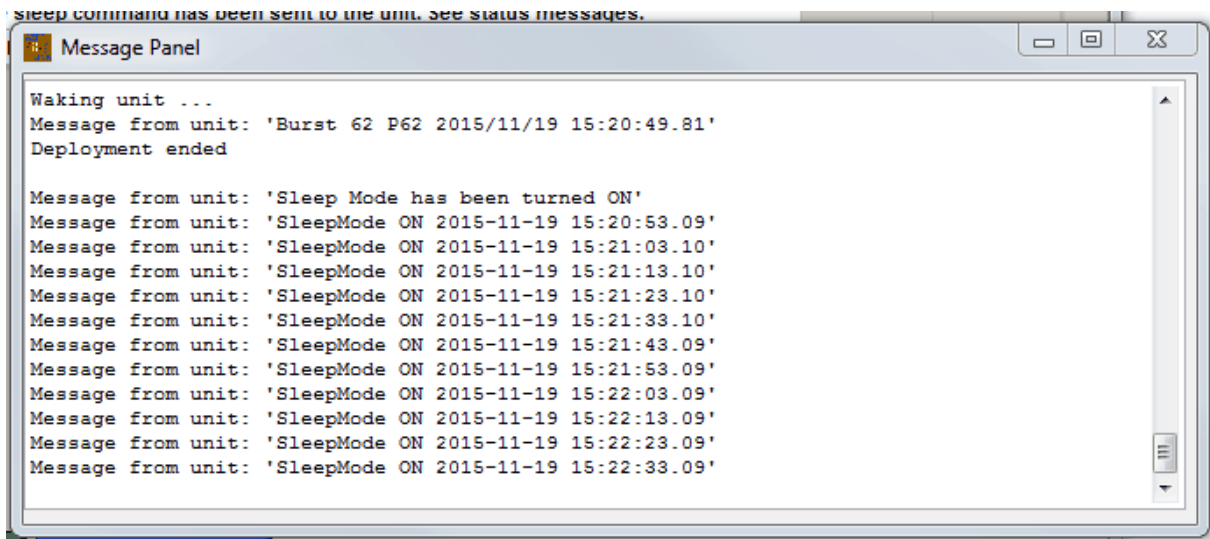


To enable the logging of the information to log files enable the check box. The log files are stored with the log directory specified in the [Preference](#) tab.

### 5.3.12 Message Panel

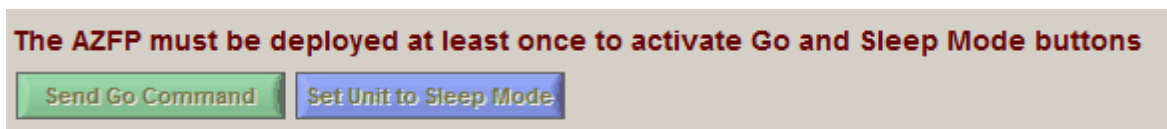
The message panel provides information sent by the AZFP in a text format.



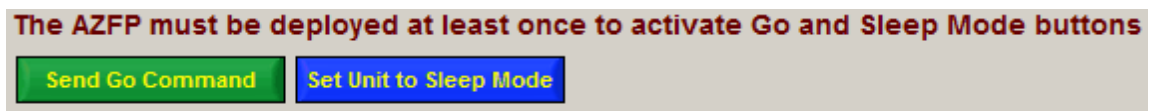


### 5.3.13 Send Go command or Sleep command

For Go and Sleep operations the following buttons are displayed in the deployment panel.



To activate the button the AZFP must be deployed at least once to program in the desired parameters.



Once the buttons are active either can be selected.

If the AZFP is acquiring data clicking on the **Send Go Command** is clicked it will cause the unit to stop the data acquisition and then restart the acquisition. This will cause the AZFP to create a new file.

If the AZFP is acquiring data and the is **Set Unit to Sleep Mode** clicked the AZFP will terminate the acquisition and go into a low power sleep more.

```

1 sec | 9 | yes | 641 Kb | 0.00
Message Panel
Message from unit: 'Burst 59 P59 2015/11/19 15:20:34.81'
Sending request for system status.
Message from unit: 'Burst 60 P60 2015/11/19 15:20:39.81'
Sending request for system status..
Ending Deployment ...
Sending request for system status.
Sending request for system status..
Message from unit: 'Burst 61 P61 2015/11/19 15:20:44.81'
Waking unit ...
Message from unit: 'Burst 62 P62 2015/11/19 15:20:49.81'
Deployment ended
Message from unit: 'Sleep Mode has been turned ON'
Message from unit: 'SleepMode ON 2015-11-19 15:20:53.09'
    
```

## 5.4 Operating Schedule Tab

The Operating Schedule on the AZFP tab is used to set the operational parameters for the deployment of the AZFP unit. This tab contains a number of controls, indicators and sub tabs.

**Battery Requirements**

Total Tx Pack: 1.50 Ah  
 Total Main Pack: 22.79 Ah  
 Delayed Start: 0.00 Ah *If deployed now*

**Resource Requirements Computed for: Feb 09, 2012 13:38:59 - Mar 22, 2012 13:39:58**

| Summary          | P1                    | P2                    | P3                    | P4                    | P5                    | P6                    | P7 |
|------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|----|
|                  | Phase 1               | Phase 2               | Phase 3               | Phase 4               | Phase 5               | Phase 6               |    |
| Start Date       | Feb 09, 2012 13:38:59 | Feb 09, 2012 13:39:59 | Feb 16, 2012 13:39:59 | Feb 23, 2012 13:39:59 | Mar 01, 2012 13:39:59 | Mar 08, 2012 13:39:59 |    |
| Duration         | 1.00 minutes          | 7.0000 days           | 7.0000 days           | 7.0000 days           | 7.0000 days           | 7.0000 days           |    |
| Phase type       | Normal                | Normal                | Normal                | Normal                | Normal                | Normal                |    |
| Freq (kHz)       | 125,200,400,740       | 125,200,400,740       | 125,200,400,740       | 125,200,400,740       | 125,200,400,740       | 125,200,400,740       |    |
| Acquire Freq     | Y,Y,Y,Y               | Y,Y,Y,Y               | Y,Y,Y,Y               | Y,Y,Y,Y               | Y,Y,Y,Y               | Y,Y,Y,Y               |    |
| PulseLen (us)    | 300,300,150,150       | 300,300,300,300       | 300,300,300,300       | 300,300,300,300       | 300,300,300,300       | 300,300,300,300       |    |
| DigRate (kHz)    | 40,40,40,40           | 40,40,40,40           | 40,40,40,40           | 40,40,40,40           | 40,40,40,40           | 40,40,40,40           |    |
| Burst Interval   | 5 sec                 | 1.00 minutes          | 1.00 minutes          | 1.00 minutes          | 1.00 minutes          | 1.00 minutes          |    |
| Base Ping Period | 1 sec                 | 1 sec                 | 1 sec                 | 1 sec                 | 1 sec                 | 1 sec                 |    |
| Pings/Burst      | 3 pings               | 15 pings              | 15 pings              | 15 pings              | 15 pings              | 15 pings              |    |
| Range (m)        | 90.7,99.7,99.7,99.7   | 99.7,99.7,99.7,99.7   | 99.7,99.7,99.7,99.7   | 99.7,99.7,99.7,99.7   | 99.7,99.7,99.7,99.7   | 99.7,99.7,99.7,99.7   |    |
| RangeAvg (m)     | 0.02,0.02,0.02,0.02   | 1.00,1.00,1.00,1.00   | 1.00,1.00,1.00,1.00   | 1.00,1.00,1.00,1.00   | 1.00,1.00,1.00,1.00   | 1.00,1.00,1.00,1.00   |    |
| LockOut (m)      | 0.00,0.00,0.00,0.00   | 0.00,0.00,0.00,0.00   | 0.00,0.00,0.00,0.00   | 0.00,0.00,0.00,0.00   | 0.00,0.00,0.00,0.00   | 0.00,0.00,0.00,0.00   |    |
| Avg. Burst Pings | Yes                   | No                    | No                    | No                    | No                    | No                    |    |
| Mega Bytes       | 1.3 Mb                | 321.1 Mb              | 321.1 Mb              | 321.1 Mb              | 321.1 Mb              | 321.1 Mb              |    |
| Main Battery     | 0.00 AH               | 3.80 AH               | 3.80 AH               | 3.80 AH               | 3.80 AH               | 3.80 AH               |    |
| Tx Battery       | 0.00 AH               | 0.25 AH               | 0.25 AH               | 0.25 AH               | 0.25 AH               | 0.25 AH               |    |

## 5.4.1 Number of Phases

The **Number of Phases** numeric control determines the number of phases to program. The example below shows the Operations tab with 1 phase.

**Operating Schedule** Unit [51102] Coef Real Time File Display Echogram Export Preferences Firmware About

Number of Phases: 1 Number of Frequencies: 4

Data Output: FLASH

Sound Speed (m/sec): 1475.0

Storage Requirements: 223.55 Gb

**Battery Requirements**

Total Tx Pack: 19.47 Ah

Total Main Pack: 165.17 Ah

Delayed Start: 0.00 Ah If deployed now

Buttons: Save Deployment to File, Load Deployment from File, Load Instrument XML File, Check Parameters

Deployment File: Parameters from last program invocation

**Resource Requirements Computed for: Jul 21, 2014 14:48:36 - Jan 17, 2015 14:48:35**

Summary P1

Set Start Date Phase Start: Jul 21, 2014 14:48:36 End Date: Jan 17, 2015 14:48:35 Copy Phase: 1

Set Date to Now

Phase Length: 180.0000 Days

Phase Type: Normal

Burst Interval: 3 Seconds

Ping Period: 2 Seconds

Pings per Burst: 1 Pings

Average Burst Pings: No

Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

Main Amp Hours: 165.166

Tx Amp Hours: 19.466

Num Burst: 5184000

Total Pings: 5184000

Sensor Reads/Burst: 1

Bins/Ping: 21500

Bytes/Ping: 43124

Bytes/Phase: 223.55 Gb

Processing Time

End of Burst [sec]: 1.010

Copy First Frequency Parameters to all Frequencies Show Range Units as: Samples

| Acquire                                     | Pulse Length | Digitization | Max. Range | Bin Averaging | Lockout | Storage Type |
|---|--------------|--------------|------------|---------------|---------|--------------|
| 125 kHz <input checked="" type="checkbox"/> | 500 [us]     | 40 kS/s      | 5000 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 200 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 455 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 769 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |

Show Message Panel Clear  Disable Message Auto Popup Help COM  Cursor Help

The example below shows the Operation tab with 12 phases. Note the tabs P1, P2 .. P12. These tabs contain the settings for the individual phases. These are described in a later section.

The screenshot displays the 'Operating Schedule' configuration window. At the top, there are tabs for 'Deploy', 'Operating Schedule', 'Unit [55034]', 'Coef', 'Real Time', 'File', 'Display', 'Echogram', 'Export', 'Preferences', 'Firmware', and 'About'. The 'Operating Schedule' tab is selected, showing a 'Number of Phases' set to 12 and 'Number of Frequencies' set to 4. The 'Data Output' is set to 'FLASH' and 'Sound Speed (m/sec)' is 1450.5. 'Battery Requirements' are shown as Total Tx Pack: 2.75 Ah, Total Main Pack: 41.78 Ah, and Delayed Start: 0.00 Ah. 'Storage Requirements' are 3.53 Gb. A 'Deployment File' field contains 'Parameters from last program invocation'. Below this, a red banner indicates 'Resource Requirements Computed for: Feb 09, 2012 13:38:59 - Apr 26, 2012 13:39:58'. A row of tabs for phases P1 through P12 is visible. The 'P1' tab is active, showing 'Phase Start' as 'Feb 09, 2012 13:38:59' and 'End Date' as 'Feb 09, 2012 13:39:58'. Other settings for P1 include 'Phase Length' of 1.00 Minutes, 'Phase Type' of Normal, 'Burst Interval' of 5 Seconds, 'Ping Period' of 1 Seconds, 'Pings per Burst' of 3 Pings, and 'Average Burst Pings' set to Yes. A 'Processing Time [sec]' of 1.730 is displayed in a green box. A table at the bottom lists acquisition parameters for four frequencies: 125 kHz, 200 kHz, 400 kHz, and 740 kHz. Each row includes 'Pulse Length', 'Dig Rate', 'Max. Range', 'Bin Averaging', 'Lockout', and 'Storage Type'.

## 5.4.2 Data Output

The Data Output selection control allows Three different selections.



\*\*\* Unless there is a PC connected to the unit for real time applications do not set the parameter for one of the RS232 output options as this consumes more battery power.

### 5.4.2.1 Data Output FLASH

The Data Output FLASH selection causes the unit to store data only to the CF memory.

### 5.4.2.2 Data Output FLASH & RS232

The Data Output FLASH & RS232 selection causes the unit to store data to Compact FLASH and send it over the RS232 serial port.

### 5.4.2.3 Data Output RS232


The Data Output RS232 selection causes the unit send it over the RS232 serial port and not to store it to Compact FLASH.

A warning is given about this setting because data is not stored to CF in this setting. The control is set to YELLOW as a warning.



Typically this setting is used for real time applications where it is not required that the data be written to the internal CF.

### 5.4.3 Sound Speed

The  numeric control is the sound speed used to compute values such as the number of samples to collect for a particular Range setting and the number of samples to ignore for the Lock Out etc.


Make sure the sound speed that is selected is valid for the area where the instrument will be deployed. Users should use a nominal value to make sure the unit will sample enough of the water column regardless of water temperature.

If the sound speed is set to a value less than 1400 m/s or greater than 1650 m/s the value is shown in RED to warn the user that the sound speed being used may be invalid.



Invalid sound speeds might be used when doing tests in air.

### 5.4.4 Storage Requirements

The storage requirements numeric indicator  shows the number of MB required for the storage of data for all the specified phases. Note that this value should be less than or equal to the size of the installed Compact FLASH (listed in the status panel).

### 5.4.5 Battery Requirements

There are three controls that show the battery requirements for the current parameters.

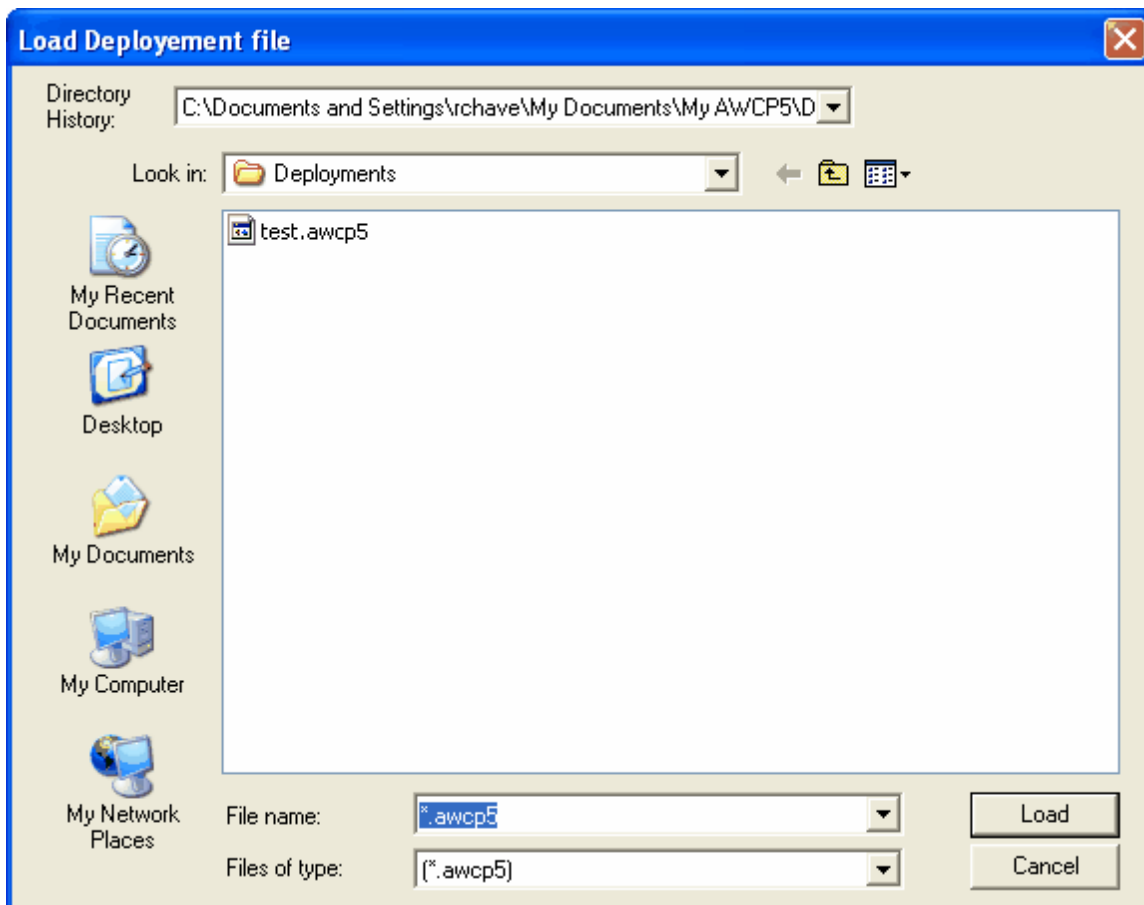
| Battery Requirements |  |
|----------------------|--|
| Total Tx Pack        | 2.75 Ah  |
| Total Main Pack      | 41.78 Ah   |
| Delayed Start        | 0.00 Ah <span style="color: green;">If deployed now</span> |

The values are the total aggregate power requirements for all the phases up to the end of the last phase.

If there is a delayed start the 'Delayed Start' shows the amount of power required while the instrument is waiting to start the first phase as there is a base level of power required even when the instrument is not collecting data.

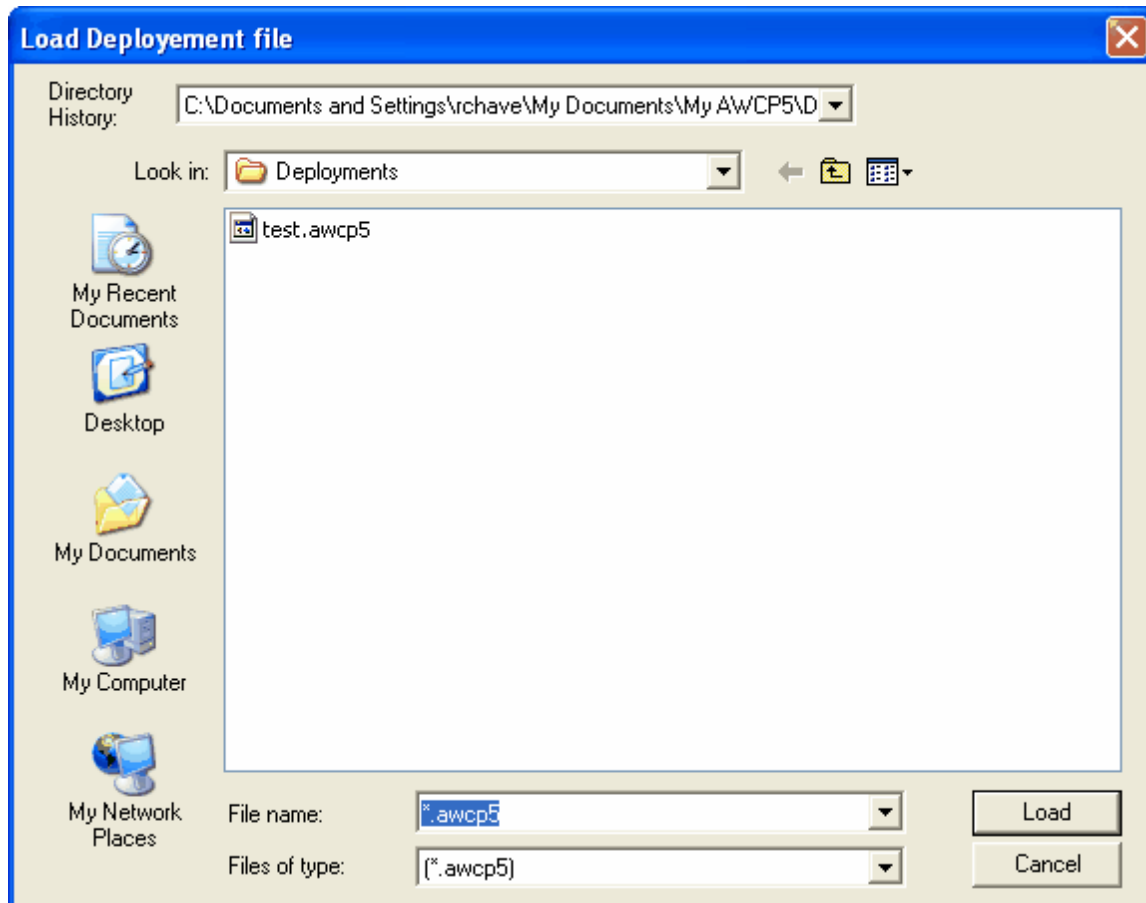
### 5.4.6 Save Deployment to File

The **Save Deployment to File** command button is used to save the deployment parameters to a file on the PC. A file select popup panel is shown for the user to select a storage directory and set a file name.



### 5.4.7 Load Deployment from File

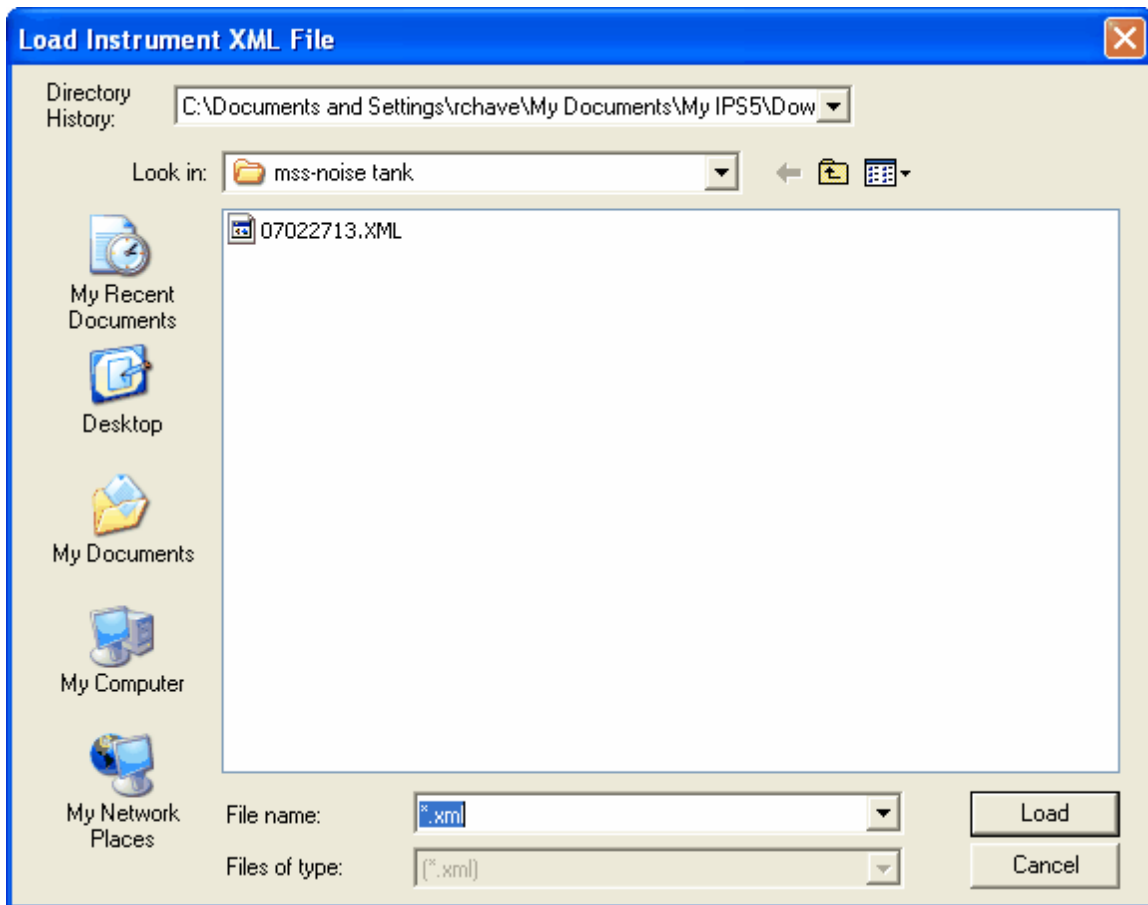
The **Load Deployment from File** command button is used to load a deployment from a file on the PC. A file select popup panel is shown for the user to select a storage directory and file.



### 5.4.8 Load Instrument XML File

The **Load Instrument XML File** command button is used to load an instrument's deployment XML file created by an AZFP unit. These files are created by the instruments when they are deployed and contain the operational parameters as well as the instrument configuration parameters. Using this command button will cause the operational parameters and configuration parameters to be replaced by the contents of the file that is loaded.

When the button is clicked a file select popup appears as shown below.



### 5.4.9 Check Parameters

The **Check Parameters** button is used to check the parameters. This check is done automatically before the instrument is deployed when the **Deploy Instrument** button is pressed.

### 5.4.10 Deployment File

The Deployment file indicator shows the last file that was loaded or saved.

The example below shows that no file has been loaded and the parameters that were loaded in the last invocation of the program are being used.

Deployment File **Parameters from last program invocation**

### 5.4.11 Summary Tab

The sub-tab called 'Summary' consists of a table with all the phase values displayed. Up to 6 phases can be viewed at one time with a scroll slide at the bottom; slide to left or right to view other phases. The example below shows the Summary Tab for a deployment with three phases.



| Summary          | P1                    | P2 | P3                    | P4 | P5                    | P6 | P7                    | P8 | P9                    | P10 | P11                   | P12 |
|------------------|-----------------------|----|-----------------------|----|-----------------------|----|-----------------------|----|-----------------------|-----|-----------------------|-----|
|                  | Phase 1               |    | Phase 2               |    | Phase 3               |    | Phase 4               |    | Phase 5               |     | Phase 6               |     |
| Start Date       | Feb 09, 2012 13:38:59 |    | Feb 09, 2012 13:39:59 |    | Feb 16, 2012 13:39:59 |    | Feb 23, 2012 13:39:59 |    | Mar 01, 2012 13:39:59 |     | Mar 08, 2012 13:39:59 |     |
| Duration         | 1.00 minutes          |    | 7.0000 days           |    | 7.0000 days           |    | 7.0000 days           |    | 7.0000 days           |     | 7.0000 days           |     |
| Phase type       | Normal                |    | Normal                |    | Normal                |    | Normal                |    | Normal                |     | Normal                |     |
| Freq (kHz)       | 125,200,400,740       |    | 125,200,400,740       |    | 125,200,400,740       |    | 125,200,400,740       |    | 125,200,400,740       |     | 125,200,400,740       |     |
| Acquire Freq     | Y,Y,Y,Y               |    | Y,Y,Y,Y               |    | Y,Y,Y,Y               |    | Y,Y,Y,Y               |    | Y,Y,Y,Y               |     | Y,Y,Y,Y               |     |
| PulseLen (us)    | 300,300,150,150       |    | 300,300,300,300       |    | 300,300,300,300       |    | 300,300,300,300       |    | 300,300,300,300       |     | 300,300,300,300       |     |
| DigRate (kHz)    | 40,40,40,40           |    | 40,40,40,40           |    | 40,40,40,40           |    | 40,40,40,40           |    | 40,40,40,40           |     | 40,40,40,40           |     |
| Burst Interval   | 5 sec                 |    | 1.00 minutes          |    | 1.00 minutes          |    | 1.00 minutes          |    | 1.00 minutes          |     | 1.00 minutes          |     |
| Base Ping Period | 1 sec                 |    | 1 sec                 |    | 1 sec                 |    | 1 sec                 |    | 1 sec                 |     | 1 sec                 |     |
| Pings/Burst      | 3 pings               |    | 15 pings              |    | 15 pings              |    | 15 pings              |    | 15 pings              |     | 15 pings              |     |
| Range (m)        | 90.7,99.7,99.7,99.7   |    | 99.7,99.7,99.7,99.7   |    | 99.7,99.7,99.7,99.7   |    | 99.7,99.7,99.7,99.7   |    | 99.7,99.7,99.7,99.7   |     | 99.7,99.7,99.7,99.7   |     |
| RangeAvg (m)     | 0.02,0.02,0.02,0.02   |    | 1.00,1.00,1.00,1.00   |    | 1.00,1.00,1.00,1.00   |    | 1.00,1.00,1.00,1.00   |    | 1.00,1.00,1.00,1.00   |     | 1.00,1.00,1.00,1.00   |     |
| LockOut (m)      | 0.00,0.00,0.00,0.00   |    | 0.00,0.00,0.00,0.00   |    | 0.00,0.00,0.00,0.00   |    | 0.00,0.00,0.00,0.00   |    | 0.00,0.00,0.00,0.00   |     | 0.00,0.00,0.00,0.00   |     |
| Avg. Burst Pings | Yes                   |    | No                    |    | No                    |    | No                    |    | No                    |     | No                    |     |
| Mega Bytes       | 1.3 Mb                |    | 321.1 Mb              |    | 321.1 Mb              |    | 321.1 Mb              |    | 321.1 Mb              |     | 321.1 Mb              |     |
| Main Battery     | 0.00 AH               |    | 3.80 AH               |    | 3.80 AH               |    | 3.80 AH               |    | 3.80 AH               |     | 3.80 AH               |     |
| Tx Battery       | 0.00 AH               |    | 0.25 AH               |    | 0.25 AH               |    | 0.25 AH               |    | 0.25 AH               |     | 0.25 AH               |     |

The values in these tables can not be changed on this table. To get to the tab value parameter you want to change select the item by right clicking on it. For example the Pulse Len on Phase 1.

|                  |                       |
|------------------|-----------------------|
| <b>Pulse Len</b> | 300 ,300 ,300 ,300 us |
|------------------|-----------------------|

Now right click on the item. This will bring up a menu "Go To Item".

|                    |                        |        |
|--------------------|------------------------|--------|
| <b>Frequencies</b> | 120 ,100 ,150 ,800 KHZ | 120 ,1 |
| <b>Pulse Len</b>   | 300 ,300 ,300 ,300 us  | 300 ,1 |
| <b>Gain</b>        | 1 ,1 ,1 ,1             | 1 ,1   |

Select the "Go to item" and the program will switch to the Phase and the item you wish to change.

|     |                   |
|-----|-------------------|
| 300 | [us] pulse length |
|-----|-------------------|

## 5.4.12 Phase Tabs

In this section we describe the Phase Tabs and their parameters. A Phase Tab is a tab corresponding to a tab containing the parameters for one phase. A phase is a period of time to acquire data using a particular set of parameters. The AZFP has the capability operating up to 12 phases.

There are 3 types of phases.

Normal phases are used to collect targets for the detection of Ice flows. Below is an example.

Summary P1

Set Start Date Phase Start Jul 21, 2014 14:48:36 End Date Jul 22, 2014 14:49:35 Copy Phase 1

Set Date to Now

Phase Length 1441.00 Minutes

Phase Type Normal

Burst Interval 6 Seconds

Ping Period 2 Seconds

Pings per Burst 3 Pings

Average Burst Pings Yes

Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

Main Amp Hours 1.435

Tx Amp Hours 0.159

Num Burst 14410

Total Pings 43230

Sensor Reads/Burst 1

Bins/Ping 21500

Bytes/Ping 107624

Bytes/Phase 1.55 Gb

Processing Time

End of Burst [sec] 1.850

Inter Ping Period [sec] 1.330

Copy First Frequency Parameters to all Frequencies Show Range Units as Samples

| Acquire                                     | Pulse Length | Digitization | Max. Range | Bin Averaging | Lockout | Storage Type |
|---|--------------|--------------|------------|---------------|---------|--------------|
| 125 kHz <input checked="" type="checkbox"/> | 500 [us]     | 40 kS/s      | 5000 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 200 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 455 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 769 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |

Sleep phases cause the program to end data acquisition and restart it at a later time. The first or last phase cannot be a sleep phase.

Summary P1 P2 P3

Set Start Date Phase Start Jul 22, 2014 14:49:36 End Date Jul 29, 2014 14:49:35 Copy Phase 1

Phase Length 7.0000 Days

Phase Type Sleep

Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

Main Amp Hours 0.842

Tx Amp Hours 0.000

Only the last phase can be a repeat phase. A repeat phase is a phase which switches back to the first phase. Below is an example of a repeat phase.

Summary P1 P2 P3

Set Start Date Phase Start Jul 29, 2014 14:49:36 Copy Phase 1

Phase Type Repeat

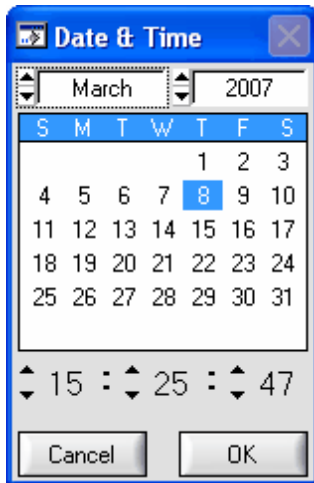
Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

#### 5.4.12.1 Set Start Date

The Phase start date and time can be set using the **Set Start Date** command button.

A date selection pop-up appears.



Use this date panel to set the desired Start Date. Simply use the up or down arrows to set Month, Year, Hour, Minute and Second and click on the date. Double clicking on a day exits the panel with the new date or you can click on the OK button.

The Phase start dates and times are summarized on the Deploy tab.

**Deployment Summary**

Deployment File **Parameters from last program invocation**

**Storage is to 'FLASH' [ 1.93 Gb ], Power Main [22.8 Ah] Tx [1.5 Ah]**

| Phase # | Type   | Start Date            | Duration   | Burst Interval | PingPeriod | Pings/Burst | Average | Bytes    | Main Ah |
|---------|--------|-----------------------|------------|----------------|------------|-------------|---------|----------|---------|
| 1       | Normal | Feb 09, 2012 09:12:57 | 60 sec     | 5 sec          | 1 sec      | 3           | yes     | 1.3 Mb   | 0.00    |
| 2       | Normal | Feb 09, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 3       | Normal | Feb 16, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 4       | Normal | Feb 23, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 5       | Normal | Mar 01, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 6       | Normal | Mar 08, 2012 09:13:57 | 7.0 days   | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |
| 7       | Normal | Mar 15, 2012 09:13:57 | Continuous | 60 sec         | 1 sec      | 15          | no      | 321.1 Mb | 3.80    |

Note that if the selected date is greater than the following Phase the following Phase start date and time is shifted.

Selecting a date and time that is before the next Phase's start date and time will cause the current Phase and the previous Phase durations to change.

Examples 1:

Phase 2 is shifted to two days later.

Before shift.

Phase 1 is 2010 5 10 00:00:00 duration 10 days

Phase 2 is 2010 5 20 00:00:00 duration 10 days

Phase 3 is 2010 5 30 00:00:00 duration 10 days

After Phase 2 is shift by two days later.

Phase 1 is 2010 5 10 00:00:00 duration 12 days  
Phase 2 is 2010 5 22 00:00:00 duration 8 days  
Phase 3 is 2010 5 30 00:00:00 duration 10 days

Examples 2:

Phase 2 is shifted to two days earlier.

Before shift.

Phase 1 is 2010 6 10 00:00:00 duration 10 days  
Phase 2 is 2010 6 20 00:00:00 duration 10 days  
Phase 3 is 2010 6 30 00:00:00 duration 10 days

After Phase 2 is shift by two days earlier.

Phase 1 is 2010 6 10 00:00:00 duration 8 days  
Phase 2 is 2010 6 18 00:00:00 duration 12 days  
Phase 3 is 2010 6 30 00:00:00 duration 10 days

Examples 3:

Phase 1 is shifted 11 days later.

Before shift.

Phase 1 is 2010 6 10 00:00:00 duration 10 days  
Phase 2 is 2010 6 20 00:00:00 duration 10 days  
Phase 3 is 2010 6 30 00:00:00 duration 10 days

After Phase 1 is shifted 11 days later.

Phase 1 is 2010 6 21 00:00:00 duration 8 days  
Phase 2 is 2010 7 01 00:00:00 duration 12 days  
Phase 3 is 2010 7 11 00:00:00 duration 10 days

Examples 4:

Phase 1 is shifted 20 days earlier.

Before shift.

Phase 1 is 2010 6 10 00:00:00 duration 10 days  
Phase 2 is 2010 6 20 00:00:00 duration 10 days  
Phase 3 is 2010 6 30 00:00:00 duration 10 days

After Phase 2 is shift by two days earlier.

Phase 1 is 2010 5 21 00:00:00 duration 30 days  
Phase 2 is 2010 7 01 00:00:00 duration 10 days

Phase 3 is 2010 7 11 00:00:00 duration 10 days

#### 5.4.12.2 Set Start Date Now

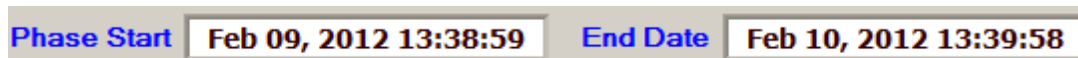
The **Set Date to Now** command button is only available in the first Phase. The command sets the Phase 1 start date and time to the PC's date and time when the command button is pressed.

If the PC's start date and time is greater then the current start date of the second phase a warning is given that following Phases will have their start date and time pushed forward.

If the Phase 1 start date and time is greater than the PC's date and time, the Phase 1 duration will change.

#### 5.4.12.3 Phase Period

At the top of each phase type is the duration of the phase.

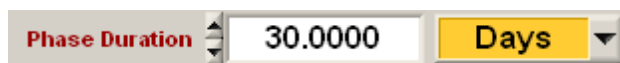


This shows the start and stop date time of the phase.

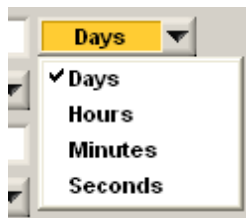
#### 5.4.12.4 Duration

The Duration of the Phase specifies how long the Phase is from the start date.

The user can enter the number of day, hours, minutes or seconds specified by the two controls shown below.



The type of time being entered is selected by the control to the right.



**\*\*\* This method of setting the duration of the Phase will reset the start date and time of all the following Phases.**

#### 5.4.12.5 Phase Type

The **Phase Type** **Normal** sets the type of phase. There are three phase types of phases, Normal, Sleep and Repeat.

## 5.4.12.5.1 Normal Phase

A 'Normal' phase is a phase with parameters that are used for the data acquisition during a specified period of time.

Deploy Operating Schedule Unit [51102] Coef Real Time File Display Echogram Export Preferences Firmware About

Number of Phases: 1 Number of Frequencies: 4

Data Output: FLASH

Sound Speed (m/sec): 1475.0

Storage Requirements: 223.55 Gb

Battery Requirements

Total Tx Pack: 19.47 Ah

Total Main Pack: 165.17 Ah

Delayed Start: 0.00 Ah If deployed now

Save Deployment to File

Load Deployment from File

Load Instrument XML File

Check Parameters

Deployment File: Parameters from last program invocation

Resource Requirements Computed for: Jul 21, 2014 14:48:36 - Jan 17, 2015 14:48:35

Summary P1

Set Start Date Phase Start: Jul 21, 2014 14:48:36 End Date: Jan 17, 2015 14:48:35 Copy Phase: 1

Set Date to Now

Phase Length: 180.0000 Days

Phase Type: Normal

Burst Interval: 3 Seconds

Ping Period: 2 Seconds

Pings per Burst: 1 Pings

Average Burst Pings: No

Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

Main Amp Hours: 165.166

Tx Amp Hours: 19.466

Num Burst: 5184000

Total Pings: 5184000

Sensor Reads/Burst: 1

Bins/Ping: 21500

Bytes/Ping: 43124

Bytes/Phase: 223.55 Gb

Processing Time

End of Burst [sec]: 1.010

Copy First Frequency Parameters to all Frequencies Show Range Units as: Samples

| Acquire                                     | Pulse Length | Digitization | Max. Range | Bin Averaging | Lockout | Storage Type |
|---|--------------|--------------|------------|---------------|---------|--------------|
| 125 kHz <input checked="" type="checkbox"/> | 500 [us]     | 40 kS/s      | 5000 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 200 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 455 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |
| 769 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kS/s      | 5500 [N]   | 1 [N]         | 0 [N]   | 2 bytes/bin  |

Show Message Panel Clear  Disable Message Auto PopUp Help COM  Cursor Help

## 5.4.12.5.2 Sleep Phase

A sleep phase is a phase where the instrument will not collect any data for the period of the phase. Below is an example of a sleep phase.

Summary P1 P2 P3

Set Start Date Phase Start: Jul 22, 2014 14:49:36 End Date: Jul 29, 2014 14:49:35 Copy Phase: 1

Phase Length: 7.0000 Days

Phase Type: Sleep

Changing a Phase's start date/time will modify the Phase duration of the Phase that precedes it.

Changing the duration of a Phase will modify the start date and times of the Phases that follow.

Main Amp Hours: 0.842

Tx Amp Hours: 0.000

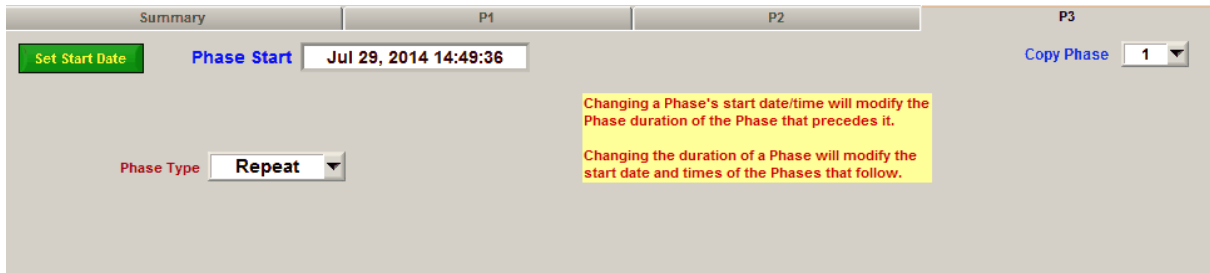
Processing Time

End of Burst [sec]: 1.010

A sleep phase can not be the final phase. AzfpLink will not allow programming of the unit if it is.

#### 5.4.12.5.3 Repeat Phase

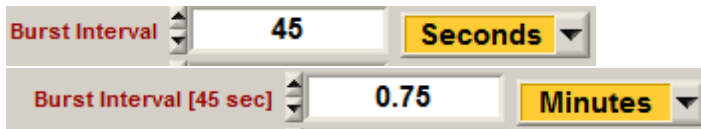
A repeat phase is a phase which switches back to the first phase. Below is an example of a repeat phase.



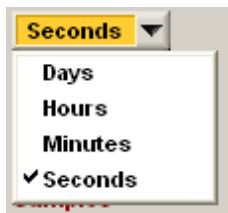
This is accomplished by resetting the Acquisition Start Date to the start date of the repeat phase and then resetting all the start dates of the other phases.

#### 5.4.12.6 Burst Interval

The Burst Interval is the length of time between the collection of one or more pings. Two controls are used to set the Burst Interval as shown below.



The interval can be entered in several different time types.



Below is an example of the 45 seconds shown in Minutes.



#### 5.4.12.7 Ping Period

The Ping Period is the number of seconds between pings.



#### 5.4.12.8 Pings per Burst

The Pings per Burst is the number of pings to acquire at the start of each Burst at the specified Ping Period. These ping may or may not be averaged depending on the [Average Burst Pings](#) setting.

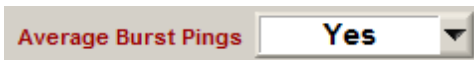


The label to the left of the control shows the same value in seconds.

Note that increasing the Pings per Burst to a period longer than the current [Burst Interval](#) causes the [Burst Interval](#) to be increased.

#### 5.4.12.9 Average Burst Pings

This controls is set to 'Yes' or 'No' to determine if the pings in a burst will be averaged.



If the pings are averaged then the program stores one averaged ping after the completion of a burst.

If the pings are not averaged then all the pings in the burst are stored.

Pings that are not averaged can still have spacial averaging in the water column.

#### 5.4.12.10 Channel Parameters

The bottom portion of the Phase tab contains a number of controls to set the following parameters for each channel.

Acquire - acquire a channel.

Pulse Length - The transmit pulse length in microseconds.

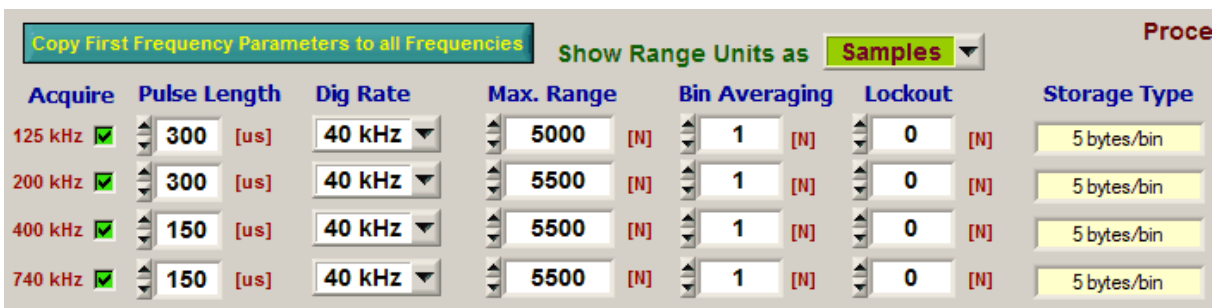
Dig Rate - The digitization rate for the channel.

Max Range - The maximum range to digitize and store.

Bin Averaging - The bin averaging for the channel.

Lockout - To reduce data the lockout is the number of samples or meters to discard from the beginning of the ping.

Storage Type - This shows the number of bytes per bin the channel will require to store per ping.



The **Copy First Frequency Parameters to all Frequencies** command button causes the settings of the first channel to be copied to the rest of the channels.

There is a units command button that allows the user to change the view from samples to meters or meters to samples. **Samples**



Copy First Frequency Parameters to all Frequencies Show Range Units as **Meters** Process

| Acquire                                     | Pulse Length | Dig Rate | Max. Range | Bin Averaging | Lockout   | Storage Type |
|---|--------------|----------|------------|---------------|-----------|--------------|
| 125 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kHz   | 90.656 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 200 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 400 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 740 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |

The computation to Meters uses the user selected [Sound Speed](#) at the top of the [Operating Schedule](#) tab.

#### 5.4.12.10.1 Acquire Channel

Check or uncheck the checkbox's to enable or disable the acquisition of the specific frequencies.

Acquire all channels.

Copy First Frequency Parameters to all Frequencies Show Range Units as **Samples** Process

| Acquire                                     | Pulse Length | Dig Rate | Max. Range | Bin Averaging | Lockout | Storage Type |
|---|--------------|----------|------------|---------------|---------|--------------|
| 125 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kHz   | 5000 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 200 kHz <input checked="" type="checkbox"/> | 300 [us]     | 40 kHz   | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 400 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kHz   | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |
| 740 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kHz   | 5500 [N]   | 1 [N]         | 0 [N]   | 5 bytes/bin  |

Acquire only the 4 th channel.

Copy First Frequency Parameters to all Frequencies Show Range Units as **Meters** Process

| Acquire                                     | Pulse Length | Dig Rate | Max. Range | Bin Averaging | Lockout   | Storage Type |
|---|--------------|----------|------------|---------------|-----------|--------------|
| 125 kHz <input type="checkbox"/>            | 300 [us]     | 40 kHz   | 90.656 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 200 kHz <input type="checkbox"/>            | 300 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 400 kHz <input type="checkbox"/>            | 150 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |
| 740 kHz <input checked="" type="checkbox"/> | 150 [us]     | 40 kHz   | 99.722 [m] | 0.019 [m]     | 0.000 [m] | 5 bytes/bin  |

#### 5.4.12.10.2 Pulse Length

Each frequency can have its own specific pulse length.

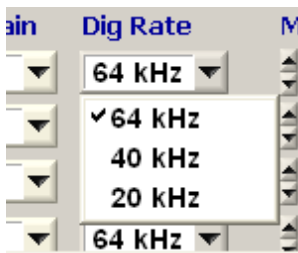
Units for pulse length is in microseconds.

Enter the pulse length in the numeric control for each channel.



#### 5.4.12.10.3 Digitization Rate

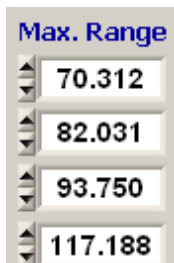
The Digitization Rate is the rate at which the received signal is digitized. Three rates are available: 64 kHz, 40kHz and 20 KHz.



#### 5.4.12.10.4 Max Range

The Maximum Range sets the maximum range from which samples are digitized.

Set the value using the numerical controls for Maximum Range for each channel.



The controls are shown in sample or meters depending on the units control



When the units are set to Meters, the distance that is being sampled is calculated using the Sound Speed and Digitization Rate.

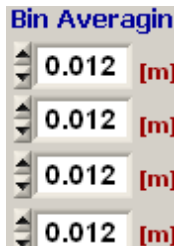
R = Distance in Meters  
 D = Digitization Rate  
 S = Sound Speed  
 N = Number of Samples

$$R = N/D * (S/2);$$

## 5.4.12.10.5 Bin Averaging

Bin Averaging is the spatial averaging of echoes over Range. For example, if the Maximum Range is 100 meters the echoes could be averaged into 100 one meter bins.

Set the value using the numerical controls for Bin Averaging for each channel.



The controls are shown in sample or meters depending on the units control

Samples ▼

When the units are set to Meters, the distance that is being averaged is calculated using the Sound Speed and Digitization Rate.

For:

- R = Averaging Distance
- D = Digitization Rate
- S = Sound Speed
- N = Number of Samples

$$R = N/D * (S/2);$$

## 5.4.12.10.6 Range Lockout

The Range Lockout sets the lockout time from the start of the transmission during which the digitized data is not stored or transmitted to the PC.

Set the value using the numerical controls for Range Lockout for each channel.



The controls are shown in sample or meters depending on the units control

Samples ▼

When the units are set to Meters, the distance that is being is calculated using the Sound Speed and Digitization Rate.

For:

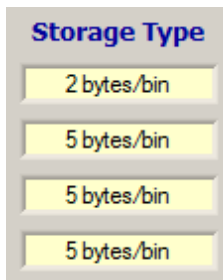
- R = Range Lockout Distance in Meters

D = Digitization Rate  
 S = Sound Speed  
 N = Number of Samples

$$R = N/D * (S/2);$$

#### 5.4.12.10.7 Storage Type

This shows the number of bytes per bin the channel will require to store per ping.  
 Note that non averaged data in either space or time (burst ping averaging) takes two bytes per bins and averaged data 5 bytes per bin.



#### 5.4.12.11 Copy Phase

The **Copy Phase**  pull down allows the user to copy the parameters in other phases. If you have a number of similar phases this speeds up the setup time.

Below is an example of the pull down when 5 phases are available.



#### 5.4.12.12 Tx Amp Hours

The **Tx Amp Hours**  indicator shows the number of amp hours required to execute the phase.

#### 5.4.12.13 Main Amp Hours

The **Main Amp Hours**  indicator shows the number of Amp Hours required for acquiring, processing and storing the pings for the current phase.

#### 5.4.12.14 Phase Statistics

A number of indicators showing some statistics for the phase.

|                    |           |
|--------------------|-----------|
| Num Burst          | 1922      |
| Total Pings        | 5766      |
| Sensor Reads/Burst | 1         |
| Bins/Ping          | 13247     |
| Bytes/Ping         | 51368     |
| Bytes/Phase        | 296.19 Mb |

Number of Burst - The total number of bursts for the phase.

Total Pings - The total number of pings for the phase.

Sensor Readings Per Burst - The number of auxiliary sensor readings (temperature, tilt etc.) within each Burst for the phase.

Bins/Ping - The number of bins for each ping.

Bytes/Ping - Bytes required for the storage of one ping..

Bytes/Phase - The number of bytes required to store all the pings that will be acquired by the phase.

#### 5.4.12.15 Profile Processing Time

The **Processing Time [sec]** **1.261** is the estimated amount of time required to process the last ping in a Burst, where processing means data acquisition, storage to Compact FLASH and/or transmission over RS232.

When the control is GREEN it is estimated that there should be time available to process the ping with no over runs. An over run means that there is insufficient time to process the final ping before the next Burst is due to be acquired.

If the control is YELLOW then some ping overruns may occur especially during a change in data storage files. A new file is created every hour on the unit.

If the control is RED then it is very likely that some data overruns will occur.

Overruns cause the start of the following ping to shift in time and cause loss of data.

## 5.5 Coefficients Tab

The Coefficient tab shows the units configuration in terms of the sensors it contains as well as the coefficients required to convert the sensor data into engineering units. This information can be retrieved from the instrument when it is connected to the PC, saved to a file, loaded from a file or if required stored to the instrument. Do not store a configuration to the instrument unless advised to do so by ASL as the values are typically set at the factory .

Unlike previous versions of the AzfpLink software and firmware the AzfpLink Coefficients tab now includes acoustic coefficients for a calibrated instrument. The coefficients are used to convert the digitized returns to volume backscatter (Sv) and/or target strength (Ts) in dB.

Below is an example of the panel for an instrument with four acoustic channels and an analog pressure sensor.

An instrument's configuration should not be changed unless authorized by ASL Environmental Sciences. The coefficients are set in manufacturing

Serial Number: 51102      Sensors: Tilt - Thermistor - Analog Pressure

Instrument Type: AZFP      EClock (sec): 2.499982344000E-7

Analog Sensors: RT Clock

| TiltX Coefficients |                    | Temperature Coefficients |                   |
|--------------------|--------------------|--------------------------|-------------------|
| X_a                | -5.191099067000E+1 | ka                       | 5.197538960000E+2 |
| X_b                | 2.373921000000E-3  | kb                       | 3.000000000000E+3 |
| X_c                | 0.000000000000E+0  | kc                       | 1.874752511000E+0 |
| X_d                | 0.000000000000E+0  | A                        | 1.466000000000E-3 |
|                    |                    | B                        | 2.388090000000E-4 |
|                    |                    | C                        | 1.003350000000E-7 |

| TiltY Coefficients |                    | Pressure Coefficients |                    |
|--------------------|--------------------|-----------------------|--------------------|
| Y_a                | -5.035908534000E+1 | a0                    | -1.723690000000E+1 |
| Y_b                | 2.362169000000E-3  | a1                    | 4.309220000000E+1  |
| Y_c                | 0.000000000000E+0  | a2                    | 0.000000000000E+0  |
| Y_d                | 0.000000000000E+0  | a3                    | 0.000000000000E+0  |

Channels: 4

125 kHz    200 kHz    400 kHz    740 kHz

Receiver Coefficients

kHz: 125

TVR: 173.1      Min Pulse Length: 300

VTX: 72.5

BP: 0.037345

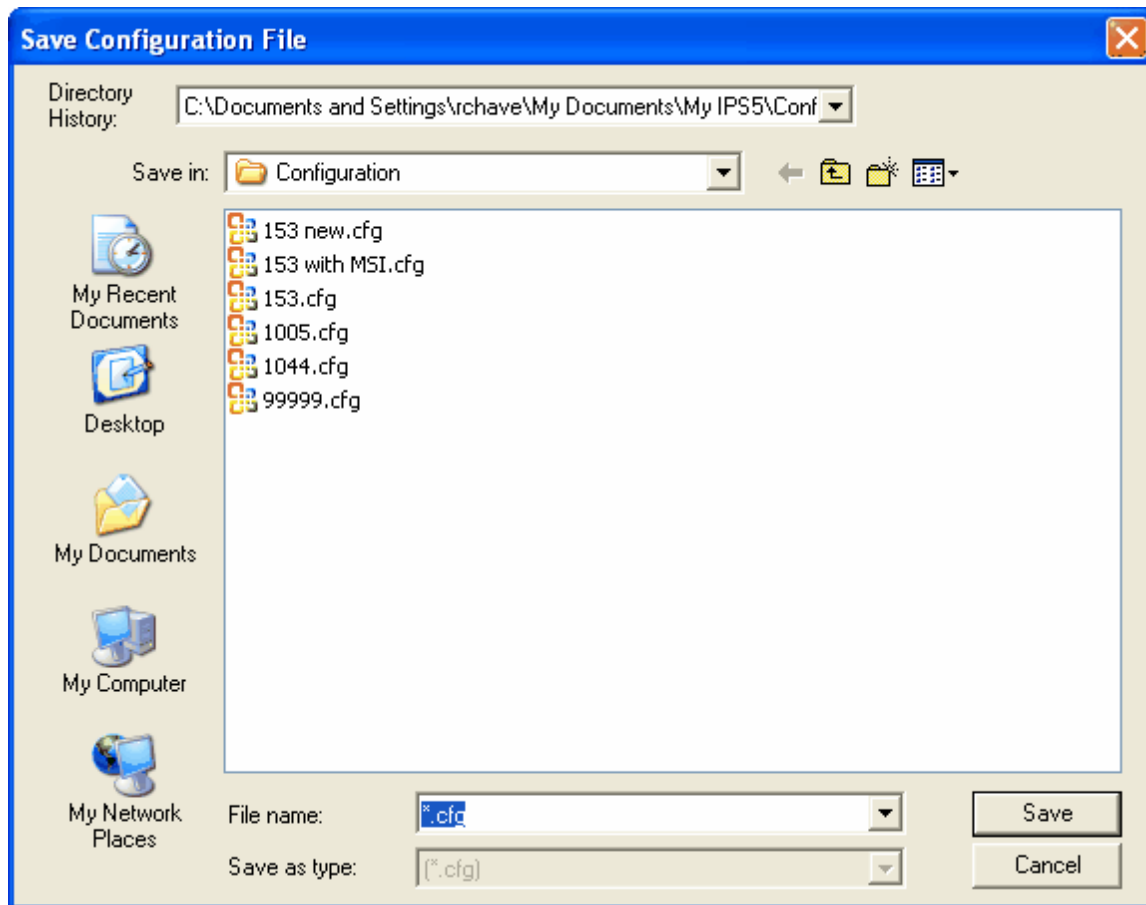
Echo Level: 150.0

Detector Slope: 0.021000

Buttons: Enable Modifications, Save Configuration Coefficients to File, Load Configuration from File, Retrieve Configuration from Unit, Store Configuration to Unit

### 5.5.1 Save Configuration to File

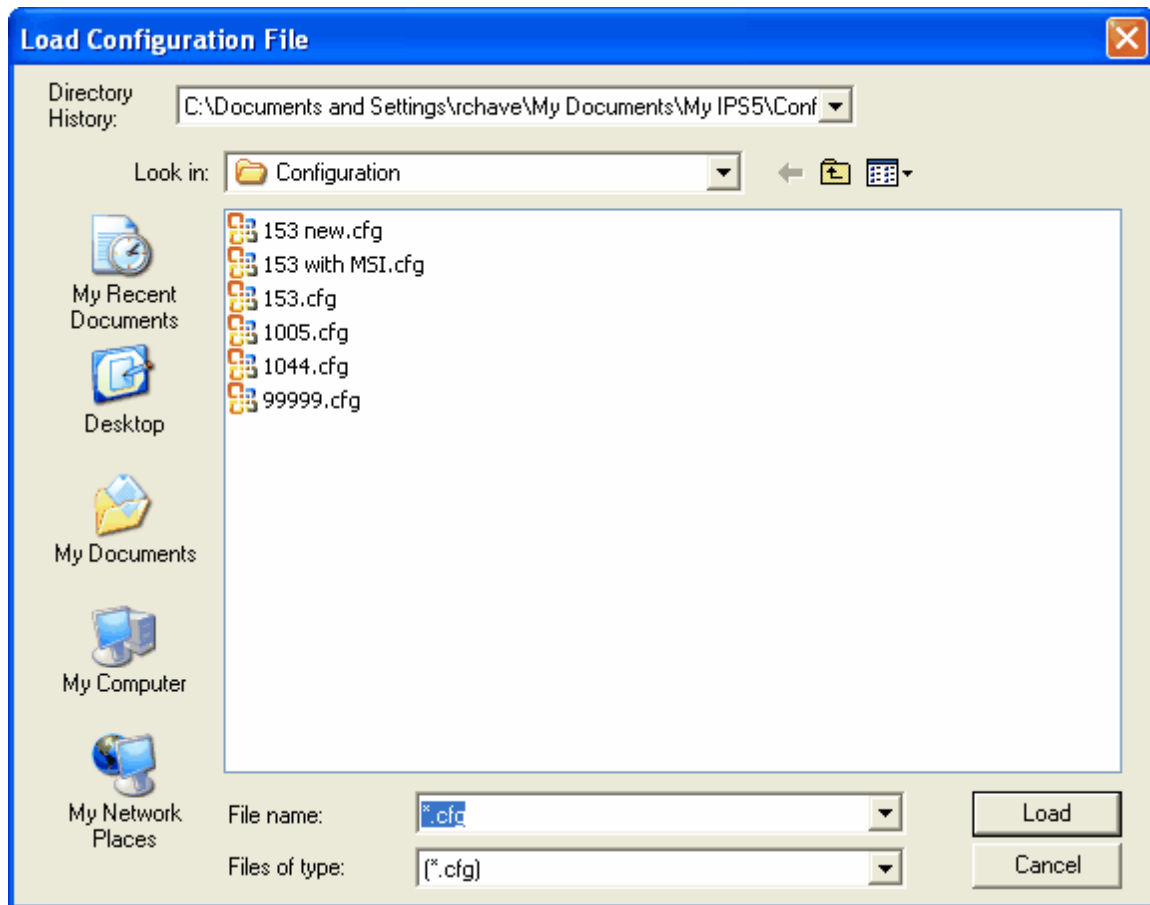
The  command button is used to save configuration information to a file. When clicked, a file selection popup appears.



Enter a file name and then click on the Save button.

## 5.5.2 Load Configuration from File

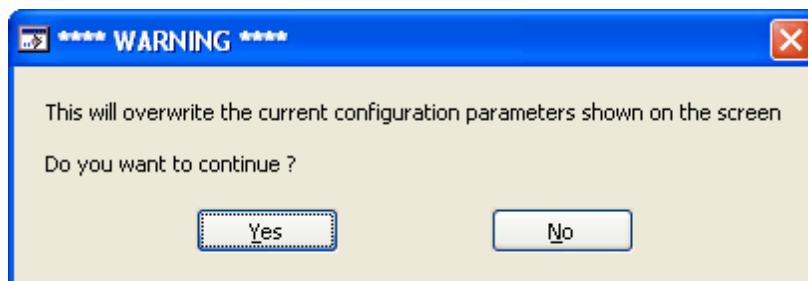
The **Load Configuration from File** command button is used to load a configuration from a configuration file. A file select popup appears.



The configuration is loaded and displayed on the Configuration tab.

### 5.5.3 Retrieve Configuration from Unit

The **Retrieve Configuration from Unit** command button is used to retrieve configuration parameters from a unit. The unit must be in STANDBY mode for this function to work. Click on the button to start the process and a warning message appears.



Click Yes to continue.

### 5.5.4 Store Configuration to Unit

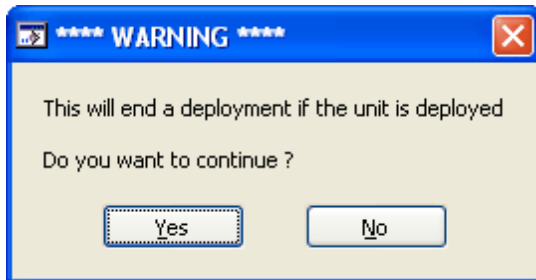
The **Store Configuration to Unit** command button is used to program the configuration information



to the unit.

\*\*\* Great care should be taken when making these changes as wrong configuration parameters will cause problems in future data processing.

When the button is clicked a warning message appears.



Click yes to continue.

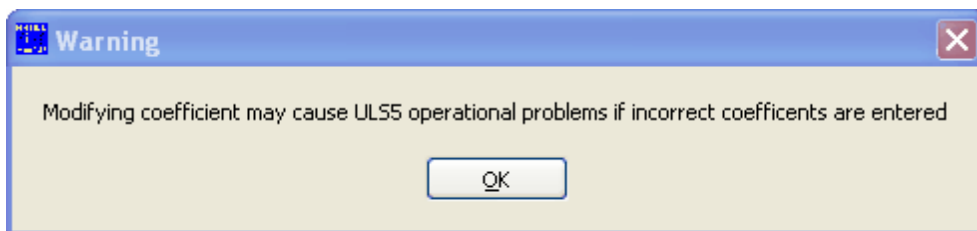
If the programming is successful a message in the yellow status bar at the bottom of the main panel will appear as follows:



### 5.5.5 Enable Modifications

The **Enable Modifications** command button is used to enable the modification of all parameters found on the Configuration tab.

A message will appear.



Note the addition of decrement and increment arrows on the numeric controls.

The screenshot shows the configuration interface for the AzfpLink device. At the top, there are tabs for "Analog Sensors" and "RT Clock", and a red "Disable Modifications" button. The interface is divided into three sections: TiltX Coefficients, TiltY Coefficients, and Temperature Coefficients. Each section contains four input fields with numerical values in scientific notation.

| Section                  | Parameter         | Value              |
|--------------------------|-------------------|--------------------|
| TiltX Coefficients       | X_a               | -4.534636432000E+1 |
|                          | X_b               | 1.284906000000E-3  |
|                          | X_c               | 0.000000000000E+0  |
|                          | X_d               | 0.000000000000E+0  |
| TiltY Coefficients       | Y_a               | -4.282403680000E+1 |
|                          | Y_b               | 1.234508000000E-3  |
|                          | Y_c               | 0.000000000000E+0  |
|                          | Y_d               | 0.000000000000E+0  |
| Temperature Coefficients | ka                | 5.105984829000E+2  |
|                          | kb                | 3.000000000000E+3  |
|                          | kc                | 1.877804316000E+0  |
|                          | A                 | 1.466000000000E-3  |
| B                        | 2.388090000000E-4 |                    |
| C                        | 1.003350000000E-7 |                    |

The command button changes to "Disable Modifications" to disable modifications.

\*\*\* DO NOT CHANGE PARAMETERS UNLESS INSTRUCTED TO BY THE MANUFACTURER \*\*\*

### 5.5.6 Instrument Type

The instrument type validates that the coefficients for the correct type of instrument are installed.

The screenshot shows the "Instrument Type" dropdown menu with "AZFP" selected.

### 5.5.7 Serial Number

The Serial Number is the AZFP the serial number for which the configuration parameters are designed for. Attempting to program these configuration parameters to another unit will not work.

The screenshot shows the "Serial Number" input field with the value "153" entered.

### 5.5.8 Sensors

The Sensors pull down control shows the sensors that are installed in the unit.

The screenshot shows the "Sensors" dropdown menu with "Tilt - Thermistor" selected.

The example below shows an analog pressure sensor is installed.

The screenshot shows the "Sensors" dropdown menu with "Tilt - Thermistor - Analog Pressure" selected.

### 5.5.9 E-Clock

The clock that runs the CPU is used for driving counters and timers for the measurement of some sensor parameters. The clock is divided down by 4 and that period is used in the measurements. The nominal value for the E-Clock should be 1/4000000 or 0.00000025. The value input to this control is the actual measured period.

**EClock (sec)**

### 5.5.10 Analog Sensors Tab

The Analog Sensor tab is a tab that contains the coefficients for the analog sensors installed on the instrument. The coefficients are used to convert sensor raw counts to engineering units. These values are provided by the manufacturer and should not be changed unless instructed to do so.

| Analog Sensors            |   | RT Clock                        |  |
|---------------------------|---|---------------------------------|--|
| <b>TiltX Coefficients</b> |   | <b>Temperature Coefficients</b> |  |
| X_a                       | <input type="text" value="-4.534636432000E+1"/> | ka                              | <input type="text" value="5.105984829000E+2"/> |
| X_b                       | <input type="text" value="1.284906000000E-3"/>  | kb                              | <input type="text" value="3.000000000000E+3"/> |
| X_c                       | <input type="text" value="0.000000000000E+0"/>  | kc                              | <input type="text" value="1.877804316000E+0"/> |
| X_d                       | <input type="text" value="0.000000000000E+0"/>  | A                               | <input type="text" value="1.466000000000E-3"/> |
| <b>TiltY Coefficients</b> |   | B                               | <input type="text" value="2.388090000000E-4"/> |
| Y_a                       | <input type="text" value="-4.282403680000E+1"/> | C                               | <input type="text" value="1.003350000000E-7"/> |
| Y_b                       | <input type="text" value="1.234508000000E-3"/>  |                                 |  |
| Y_c                       | <input type="text" value="0.000000000000E+0"/>  |                                 |  |
| Y_d                       | <input type="text" value="0.000000000000E+0"/>  |                                 |  |

### 5.5.11 RT Clock Tab

The RT Clock tab contains a calibration parameter for the units Real Time Clock. These values are provided by the manufacturer and should not be changed unless instructed to by the manufacturer.

| Analog Sensors         |  | RT Clock                                       |  |
|------------------------|--|--|--|
| <b>RTC Calibration</b> | <input type="text" value="1.953115800000e-03 [Error 4.71 ppm] Correction -2"/> | <input type="text" value="1.953115800000E-3"/> |  |
|                        | <b>Frequency Hz</b>  | <input type="text" value="512.0000000"/>       |  |

### 5.5.12 Acoustic Coefficients

The indicators and controls shown below provide information for the acoustic channels including frequencies and calibration coefficients. These values are provided by the manufacturer and should not be changed unless instructed to by the manufacturer.

Channels **4**

125 kHz | 200 kHz | 400 kHz | 740 kHz

**Receiver Coefficients**

kHz **125**

TVR **173.1**      Min Pulse Length **300**

VTX **72.5**

BP **0.037345**

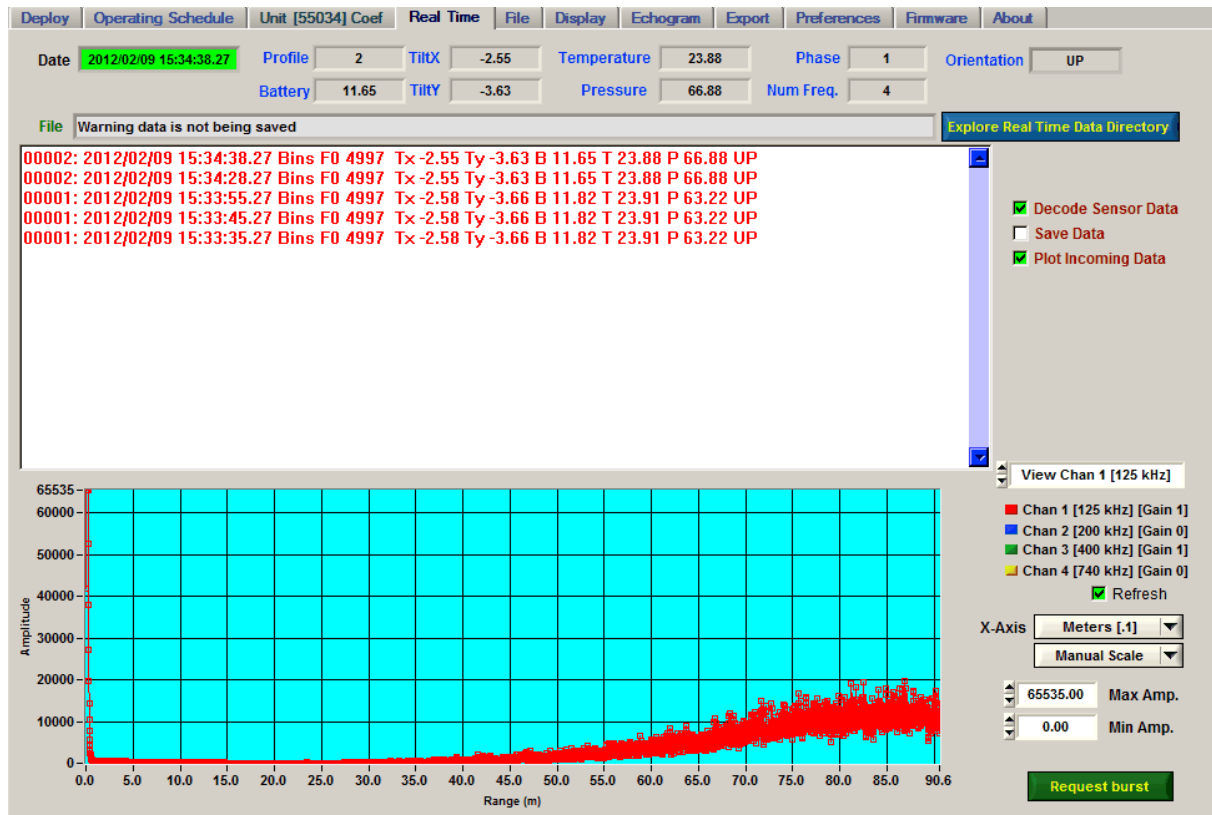
Echo Level **150.0**

Detector Slope **0.021000**

The channels indicator shows the number of acoustic channels installed. There is a corresponding tab for each channel showing the frequency and the calibration coefficients for the channel.

## 5.6 Real Time Tab

If the AZFP unit is programmed to upload target and ping data over the RS232 port, the Real Time tab displays and plots the data as it is received.



The panel above shows the headers as the data is acquired and plots it if the  **Plot Incoming Data** checkbox is enabled.

The  **Decode Sensor Data** checkbox enables or disables the decoding of sensor data for display as the data comes in.

Below is an example of the headers with raw sensor data.

```
File c:\Documents and Settings\rchave\My Documents\MFAWCP\RealTime\MFAWCP_2008120912.001
00128: 2008/12/09 12:13:48.76 Bins 2118 Tx 34648, Ty 34395 B 47795 T 21377 DOWN
00127: 2008/12/09 12:13:47.76 Bins 2118 Tx 34649, Ty 34396 B 47797 T 21375 DOWN
00126: 2008/12/09 12:13:46.76 Bins 2118 Tx 34654, Ty 34395 B 47796 T 21376 DOWN
00125: 2008/12/09 12:13:45.77 Bins 2118 Tx 34657, Ty 34392 B 47796 T 21375 DOWN
00124: 2008/12/09 12:13:44.76 Bins 2118 Tx 34658, Ty 34387 B 47794 T 21375 DOWN
00123: 2008/12/09 12:13:43.76 Bins 2118 Tx 34652, Ty 34389 B 47794 T 21375 DOWN
00122: 2008/12/09 12:13:42.76 Bins 2118 Tx 34640, Ty 34403 B 47796 T 21376 DOWN
```

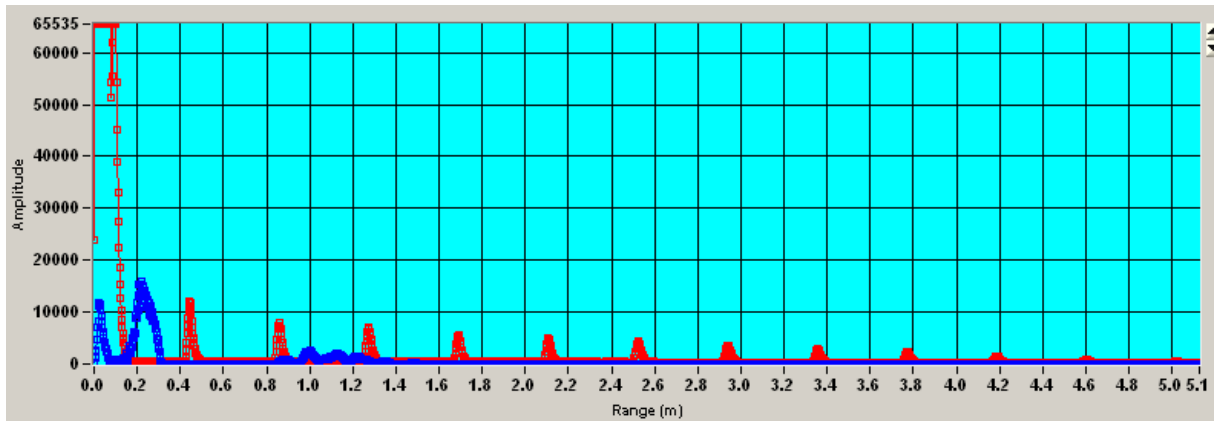
The  **Save Data** checkbox enables or disables the saving of the ping data as it comes in.

If data is not saved the header information is shown in RED.

```
00376: 2008/05/16 10:41:32.64 Bins 2624 Tx 2.04 Ty 0.40 B 11.84 T 21.76 DOWN
00375: 2008/05/16 10:41:31.64 Bins 2624 Tx 2.04 Ty 0.40 B 11.84 T 21.76 DOWN
00374: 2008/05/16 10:41:30.64 Bins 2624 Tx 2.04 Ty 0.40 B 11.84 T 21.76 DOWN
00373: 2008/05/16 10:41:29.64 Bins 2624 Tx 2.04 Ty 0.40 B 11.84 T 21.76 DOWN
00372: 2008/05/16 10:41:28.64 Bins 2624 Tx 2.03 Ty 0.40 B 11.84 T 21.76 DOWN
00371: 2008/05/16 10:41:27.64 Bins 2624 Tx 2.04 Ty 0.40 B 11.84 T 21.75 DOWN
```



The  **View All Channels** control allows the user to select which frequencies to display for each ping. All frequencies can be shown at once.



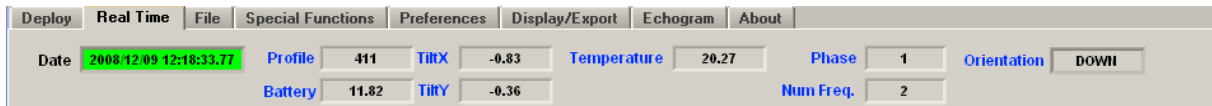
The  Refresh checkbox enables or disables the refresh of the graph for every new ping that comes in.

The X-Axis Meters pull down is used to set the x-axis to meters or (bins). X-Axis Samples pull down is used to set the x-axis to samples.

The Auto Scale Manual Scale pull down selector allows the user to auto-scale or manually scale the y-axis.

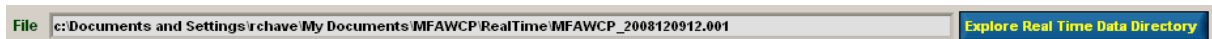
If manual scale is chosen the numeric controls are used to select the axis range.

Note that the header information for each ping is shown as the ping are received.



Note the Battery control shows the battery voltage. The Orientation indicates if the unit is pointed up (shown as "UP") or is upside down or on its side (shown as "DOWN").

The file being written is shown and a command button allows you to explore the data directory.

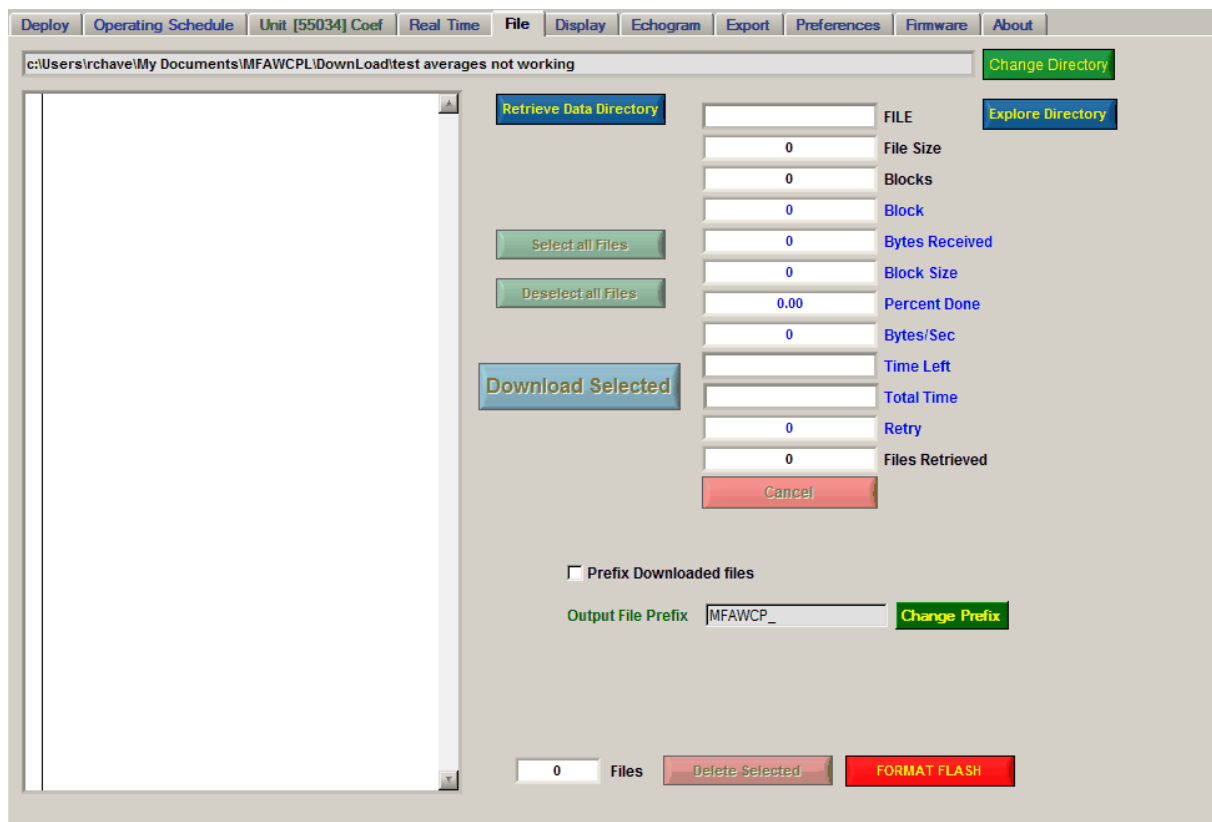


## 5.6.1 Request Burst Command

The **Request burst** command button sends the #PG command to the unit requesting a burst of data. The unit must not be deployed for this command to work.

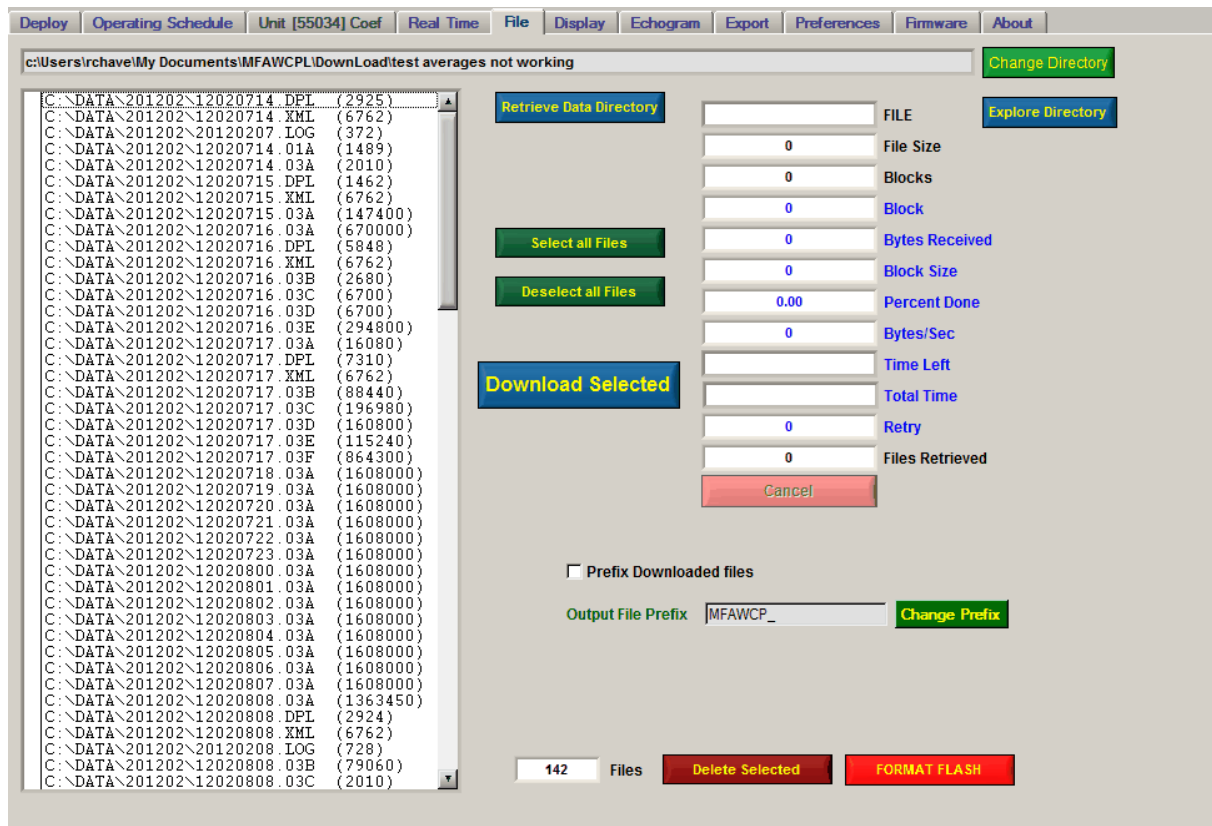
## 5.7 File Tab

The File tab is used to retrieve data from the units memory (Compact FLASH (CF)) , delete specific files from the CF and to format the CF.



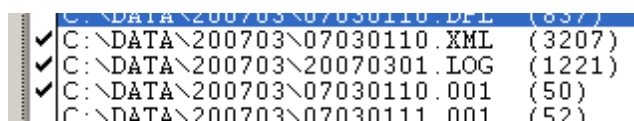
### 5.7.1 Retrieve Data Directory

The **Retrieve Data Directory** command button is used to retrieve the directory of files in the AZFP unit. The unit must be in STANDBY mode for this operation to work.



## 5.7.2 Selecting Files to Download or Delete

Files must be selected for download or delete. They are selected by clicking on the column to the left of the file name which produces a check mark to the left of the file name.



All files can be selected by clicking on the **Select all Files** command button or deselected by clicking on the **Deselect all Files** command button.

## 5.7.3 Download Directory

The download directory is the location that files will be stored as they are retrieved from the unit. Note that the directory structure in the unit is not maintained.

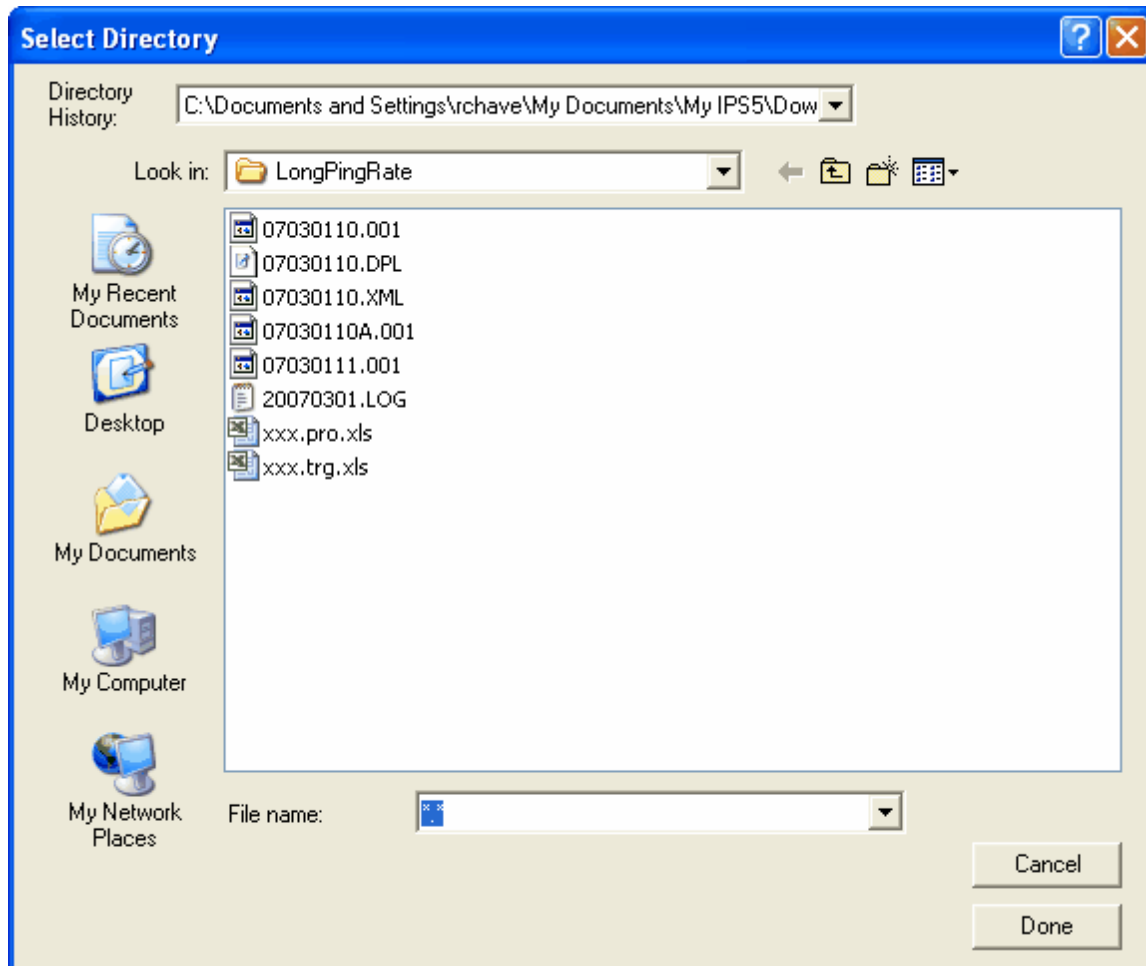




## 5.7.4 Changing the Download Directory

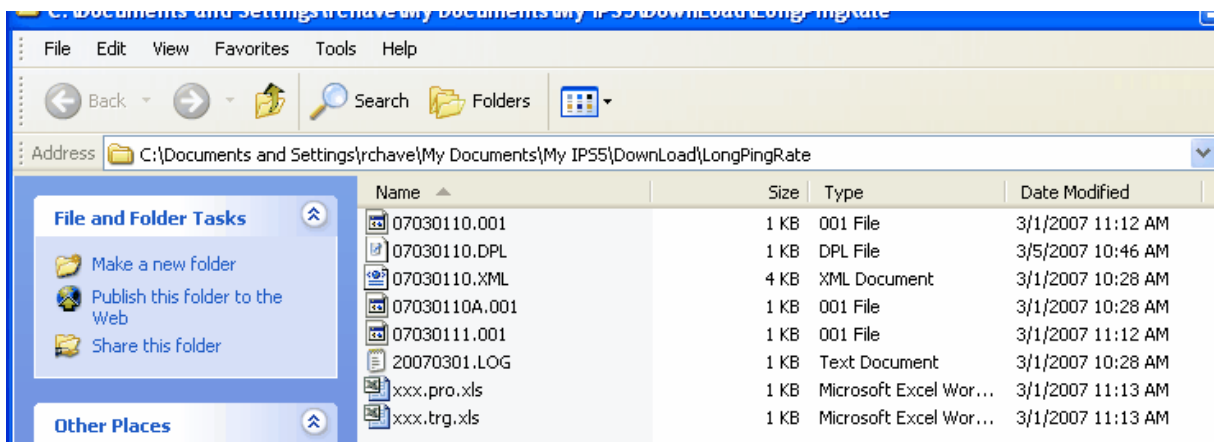
To Change the Download Directory click on the **Change Directory** command button.

A directory selection/creation popup appears.



## 5.7.5 Explore Download Directory

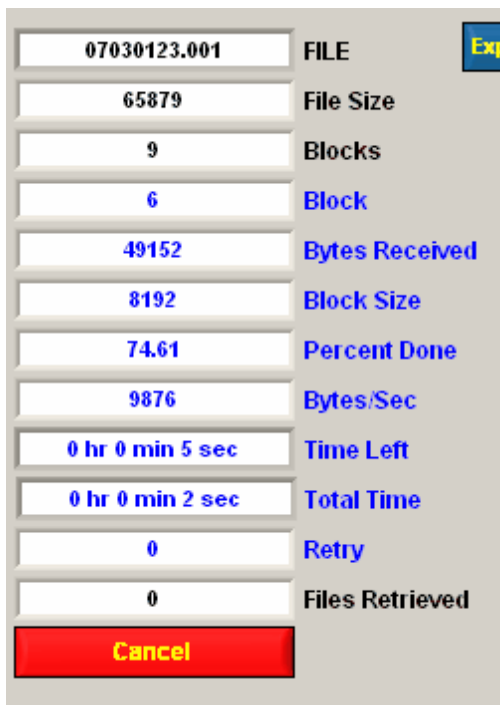
The **Explore Directory** command button causes the program to launch Windows Explorer with the contents of the Download Directory.



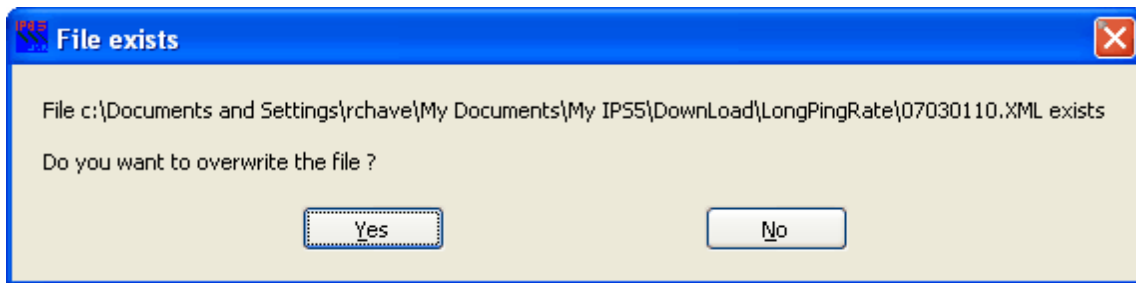
### 5.7.6 Downloading Files

To download the selected files, click on the **Download Selected** command button.

Information on the download indicators shows the progress of the download. A Cancel button is provided to cancel the download.



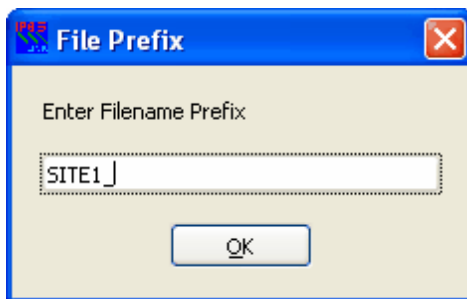
If a file already exists on the PC with the same name then the program displays a warning popup.



### 5.7.7 Prefix Download Files

Files on the unit are of the form YYMMDDHH.PPP where YY is the year, MM is the month, DD is the day, HH is the hour and PPP is the phase the data was collected with. There is an option to prefix the name of these files with a user selected prefix. For example, you may wish to prefix all the file names with SITE1\_. To do this enable the prefix by clicking on the  **Prefix Downloaded files** to enable it  **Prefix Downloaded files**.

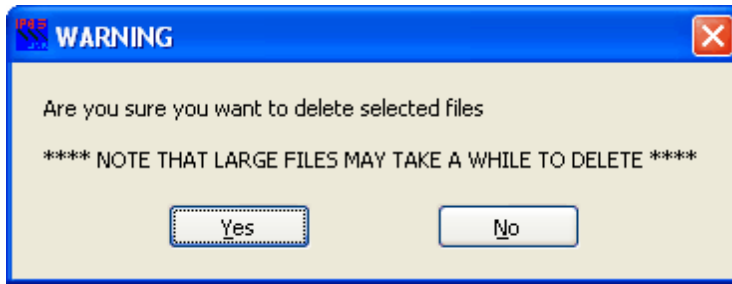
Change the prefix to your selection by clicking on the **Change Prefix** command button.



Download files will now have the SITE1\_ prefix added to the file names.

### 5.7.8 Deleting Selected Files

To delete selected files click on the **Delete Selected** command button. A popup warning comes up.



The files are deleted. These are shown in some of the indicators.

|              |           |
|--------------|-----------|
| 07030113.DPL | FILE      |
| 837          | File Size |
| 9            | Blocks    |
| 0            | Block     |

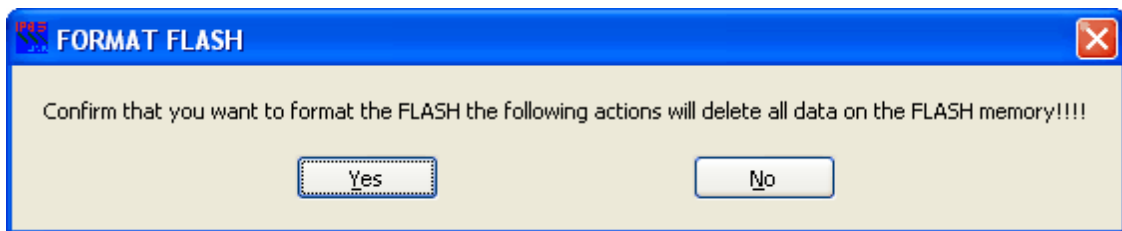
\*\*\* Formatting the CF is preferable to deleting files and quicker.

### 5.7.9 Formatting the CF

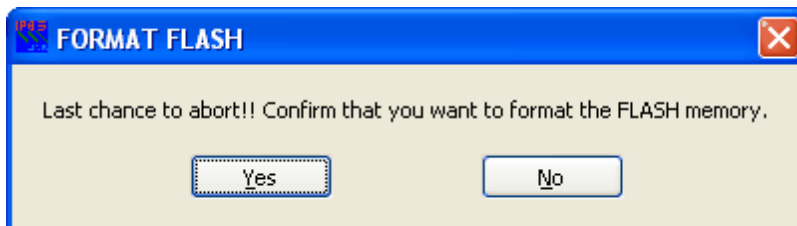
The best way to delete all the data on the CF is to format it. This starts the CF fresh in case any type of file corruption has occurred. As well, the file delete function does not delete sub directories so it is possible to have a number of sub directories with no files remaining after the files within them have been deleted.

Click on the **FORMAT FLASH** command button.

A warning message comes up.

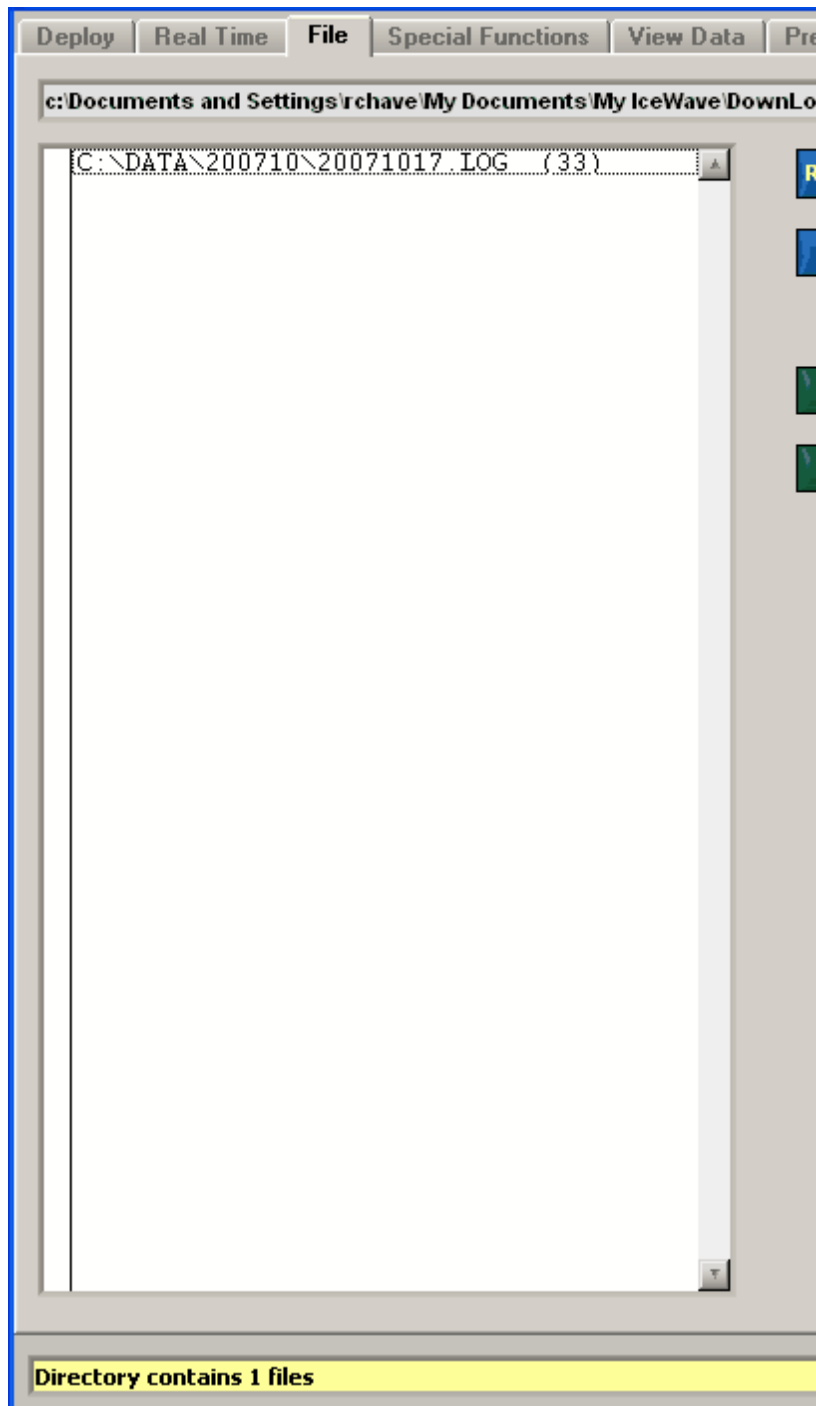


The formatting of the CF is a critical function. It is performed by placing the CPU in the unit under a DOS like O/S called PicoDOS and then executing a format c: command. When the c:> prompt is detected a second warning is provided to allow the user to abort the formatting.



Click Yes to start the format processing which can take several seconds depending on the size of the CF.

As a test the unit will write a log file to the CF.



\*\*\* Warning \*\*\*

If this command fails it is possible that the unit has remained in its native PICO DOS operating system. If this is the case you must enter the terminal emulator and enter "Reset". Alternatively you can power the instrument off and then on.

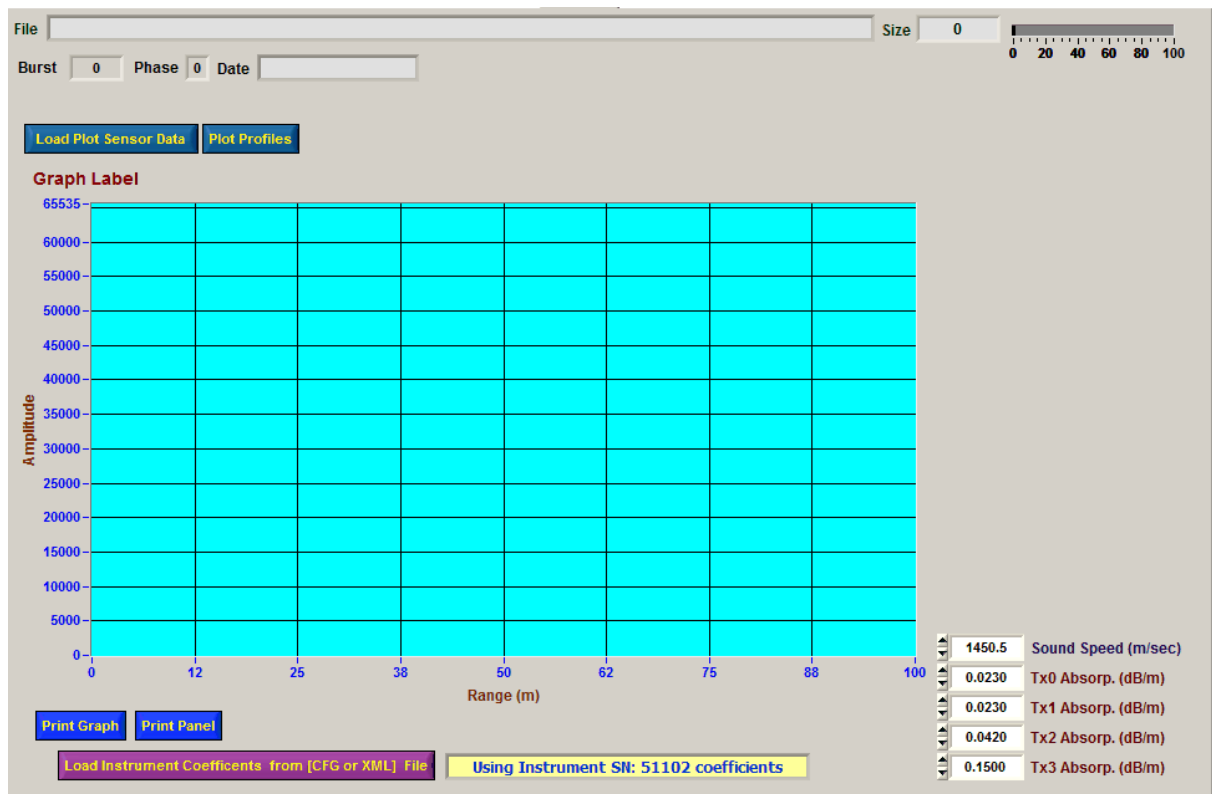
### 5.7.10 Compact FLASH Formated by Other Devices

Do not use compact FLASH that has been formatted by other devices such as Cameras. Using these compact FLASH will cause the unit to fail.

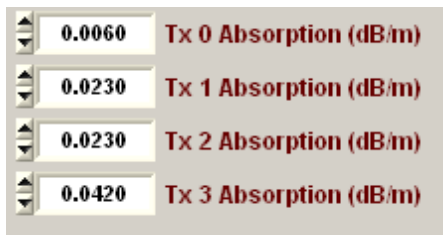
## 5.8 Display Tab

The Display tab is used to display the data from files retrieved from the unit and/or stored by AzfpLink when it stores real time data. The tab can display sensor or ping data. The ping data can be viewed as acoustic volume backscatter (Sv) or target strength (Ts).

The Computation of range in meters scales is based on the Sound Speed which is entered on the tab.




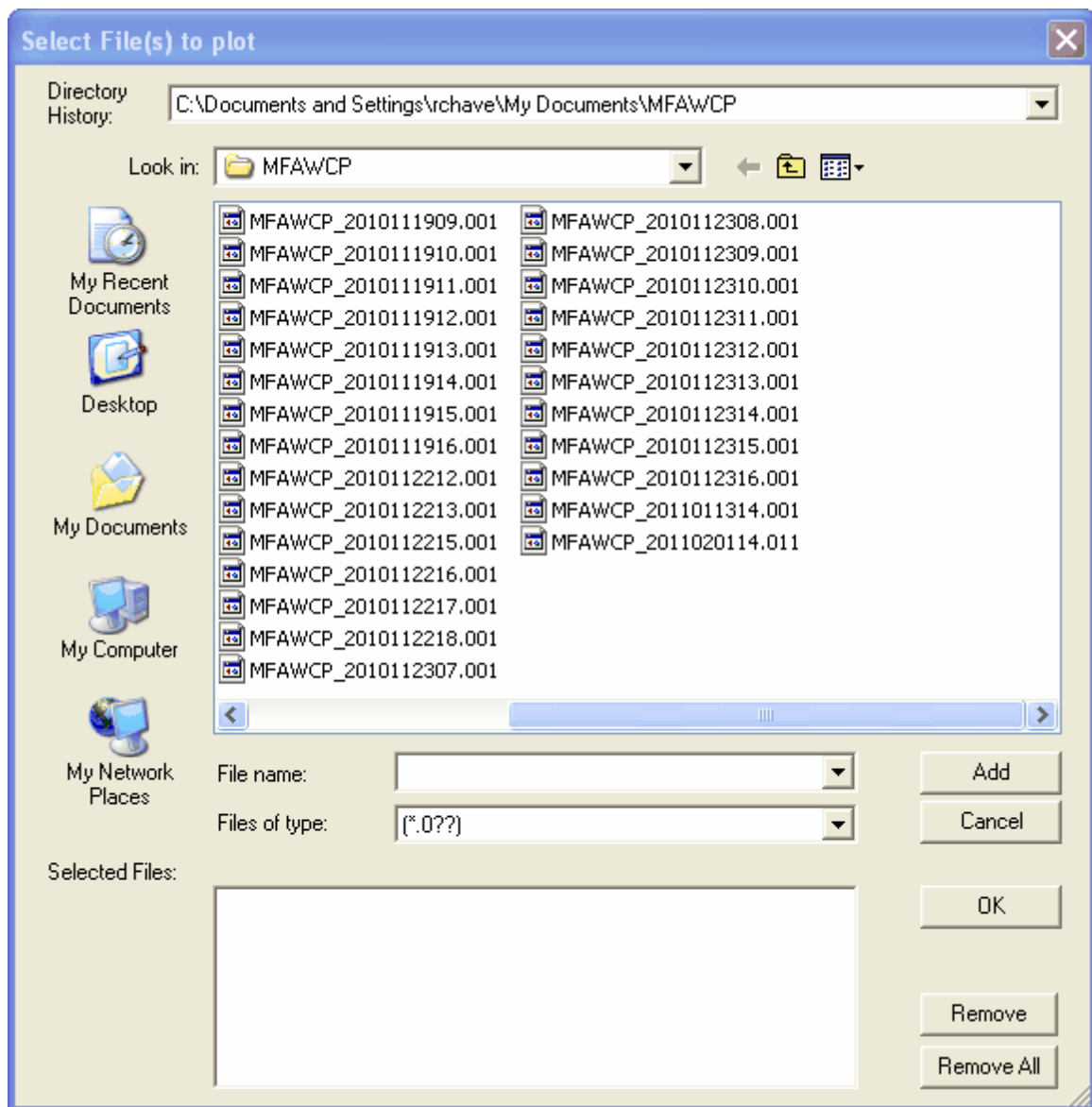
If the unit has calibration coefficients the user should set the absorption values for each channel.



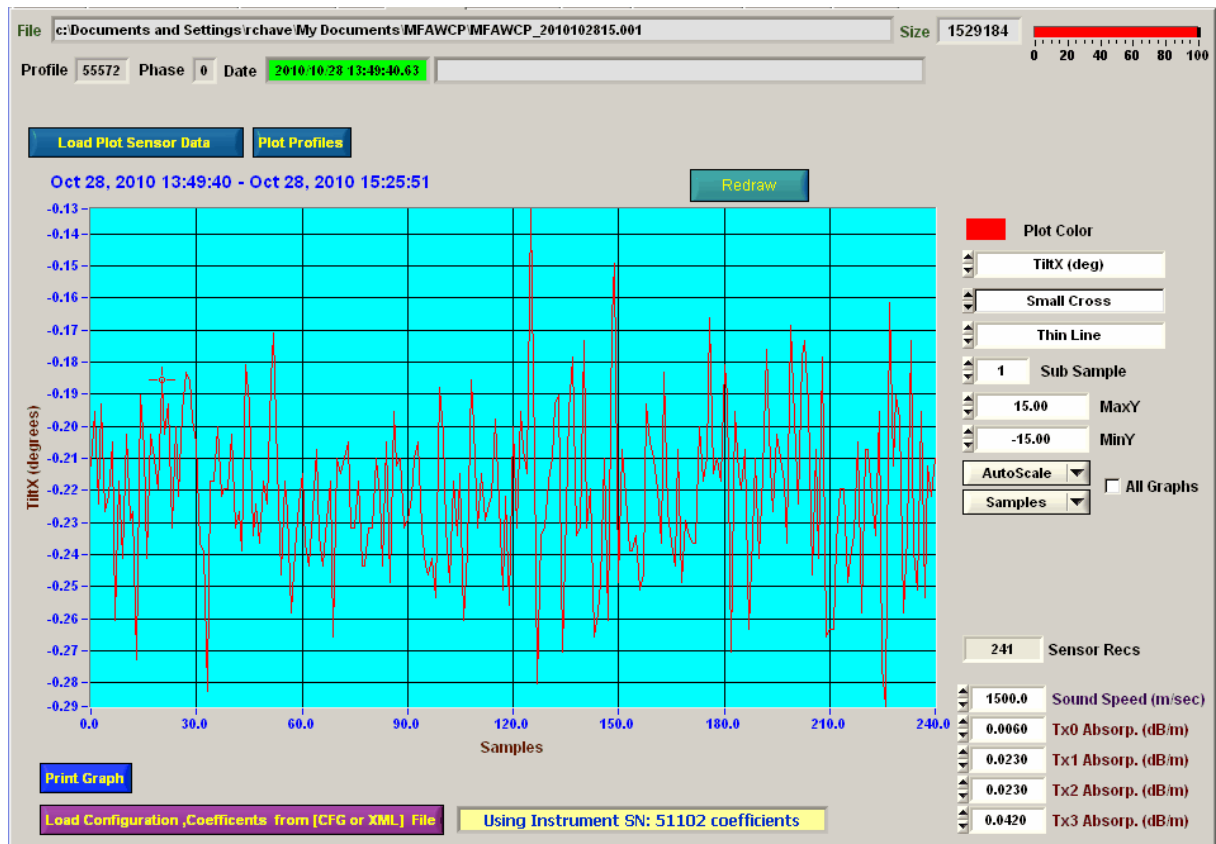
|        |                        |
|--------|------------------------|
| 0.0060 | Tx 0 Absorption (dB/m) |
| 0.0230 | Tx 1 Absorption (dB/m) |
| 0.0230 | Tx 2 Absorption (dB/m) |
| 0.0420 | Tx 3 Absorption (dB/m) |

### 5.8.1 Load Plot Sensor Data

The  command button is used to load data into memory for display on the graph. The maximum amount of data that can be loaded is set in the [Preferences](#) tab. A popup "file select" control appears, select the files then click on the Ok button.

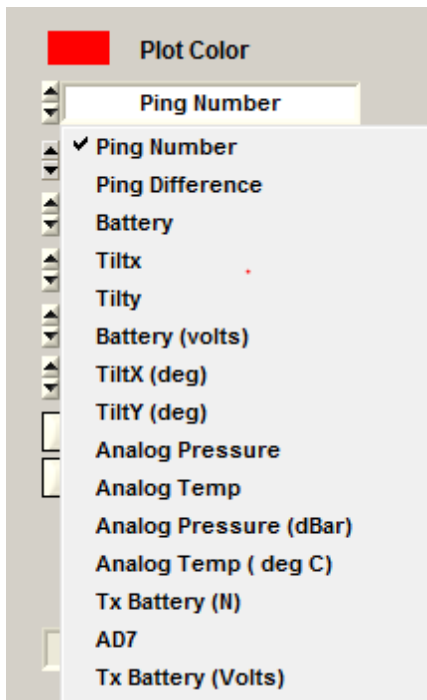






### 5.8.1.1 Selecting Data to Plot

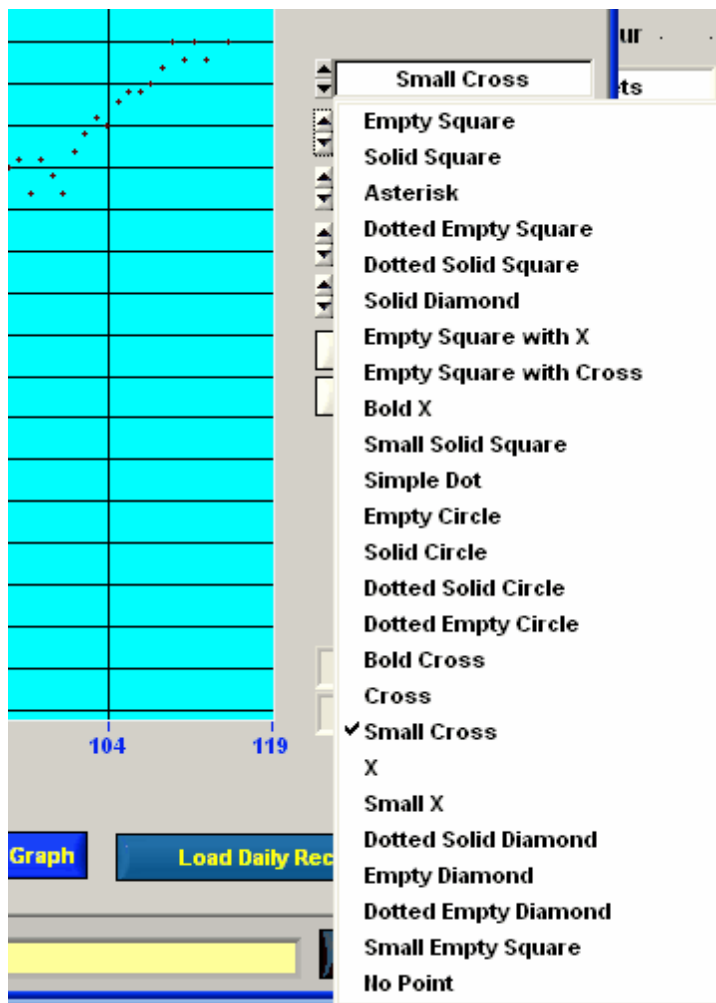
The user can select the data to plot using the data selection pull down menu command button.




|                        |  |
|------------------------|--|
| Ping Number            | Plot the ping number. This is the ping counter tagged to all data  |
| Ping Difference        | This is the successive difference between pings. Used to check for missing pings.  |
| Battery                | Plot the battery in A/D counts.  |
| Tiltx                  | Plot the Tilt X in A/D counts  |
| Tilty                  | Plot the Tilt Y in A/D counts  |
| Battery (volts)        | Plot the battery converted to volts  |
| TiltX (deg)            | Plot the Tilt X converted to engineering units (*)   |
| TiltY (deg)            | Plot the Tilt Y converted to engineering units (*)   |
| Analog Pressure        | Plot the Analog Pressure in A/D counts.  |
| Analog Temp            | Plot the Analog Temperature in A/D counts  |
| Analog Pressure (dBar) | Plot the Analog Pressure converted to engineering units (*)  |
| Analog Temp (deg C)    | Plot the Analog Temperature converted to engineering units (*)   |
| Tx Battery (N)         | Plot the Transmit battery value A/D count  |
| AD2                    | Plot spare A/D sensor A/D count.   |
| Tx Battery (Volts)     | Plot the Transmit battery value converted to engineering units (*)   |
| (*)                    | Using calibration parameter found in the <a href="#">Configuration Tab</a> (NOTE UNIT MUST CONTAIN THE SPECIFIC HARDWARE FOR VALID VALUES) |

### 5.8.1.2 Symbol Type

The user can select the symbol type to use in the plots. These are used if the [plot\\_type](#) is either a scatter plot or connected point plot.

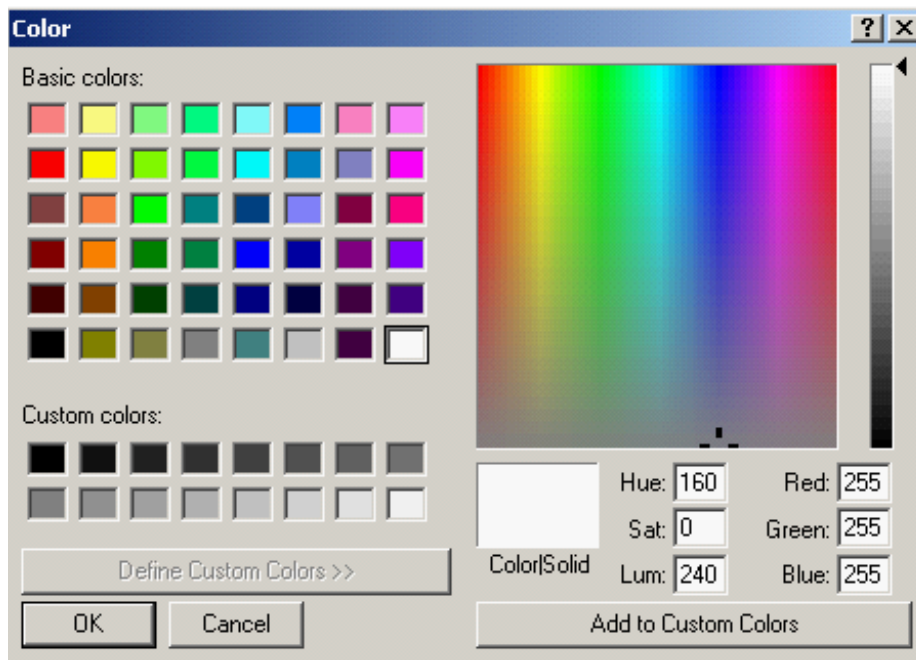


### 5.8.1.3 Plot Color

The  **Plot Color** color control allows the operator to set the line color. Click on the control to set the color.



Clicking the  button in the color popup allows the operator to select a wider range of colors.



#### 5.8.1.4 Plot Type

Select the plot type using the pull down selector below the symbol type pull down.

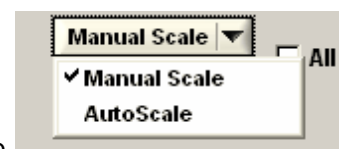


#### 5.8.1.5 Y Axis Scaling

Scaling of the Y Axis is done using the following controls.



If AutoScale is used then MaxY and MinY is ignored and the graph is auto scaled.



To use the MaxY and MinY scales set the scale pull down button to

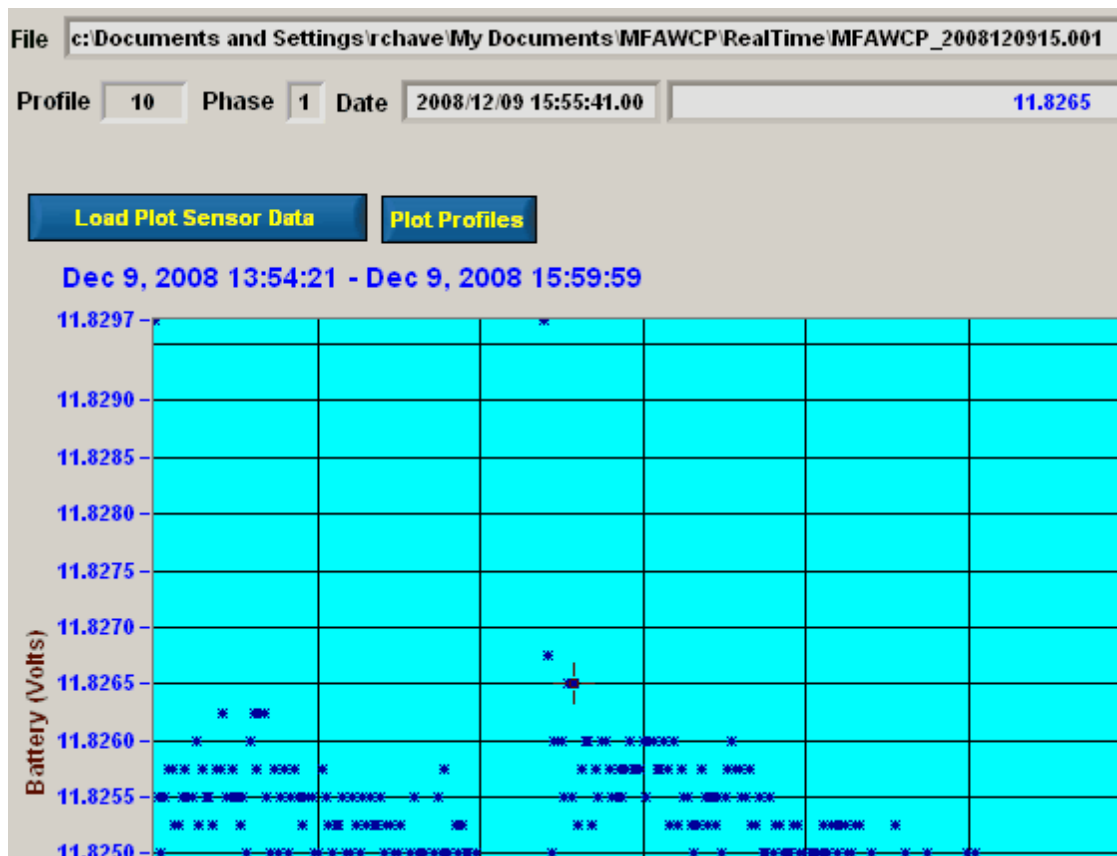
### 5.8.1.6 X Axis Scaling

The X Axis can be set to display date/time and or sample numbers using the X Scale pull down control.



### 5.8.1.7 Displaying Data Point Values

A left click of the mouse with the cursor near a data point causes it to snap to that point and displays its date/time, ping number and data value.

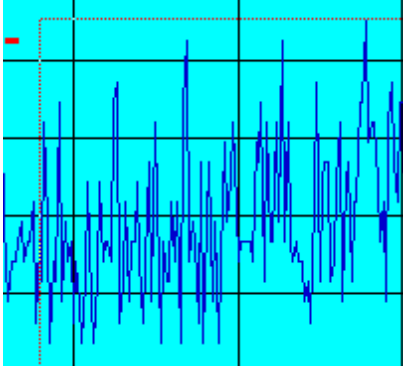


The example above shows the cursor snapped to profile 10 battery voltage data at a value of 11.8265.


### 5.8.1.8 Zoom

To zoom on a section of the graph, press the keyboard Ctrl key and left mouse button down at the same time.


A box will appear in the graph as you move the mouse to select an area to zoom in on.

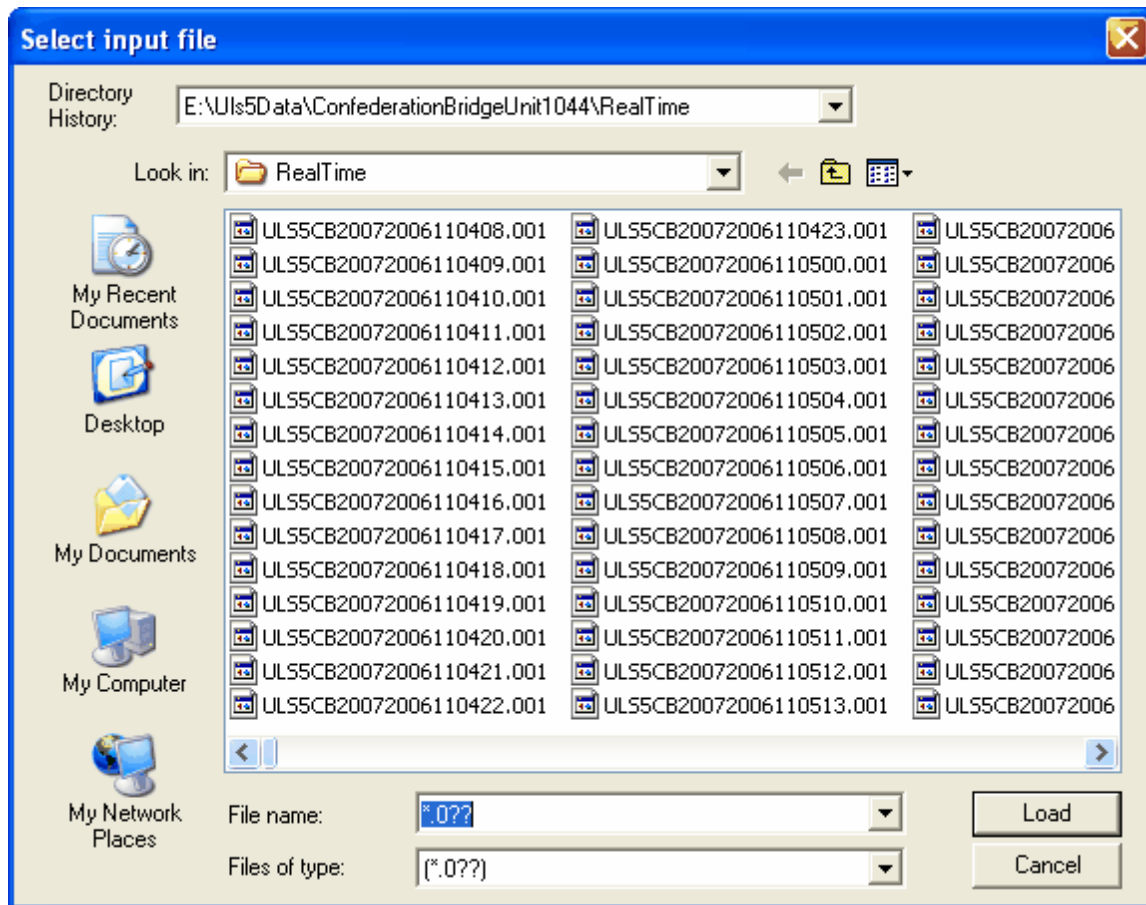


### 5.8.1.9 Sub Sample

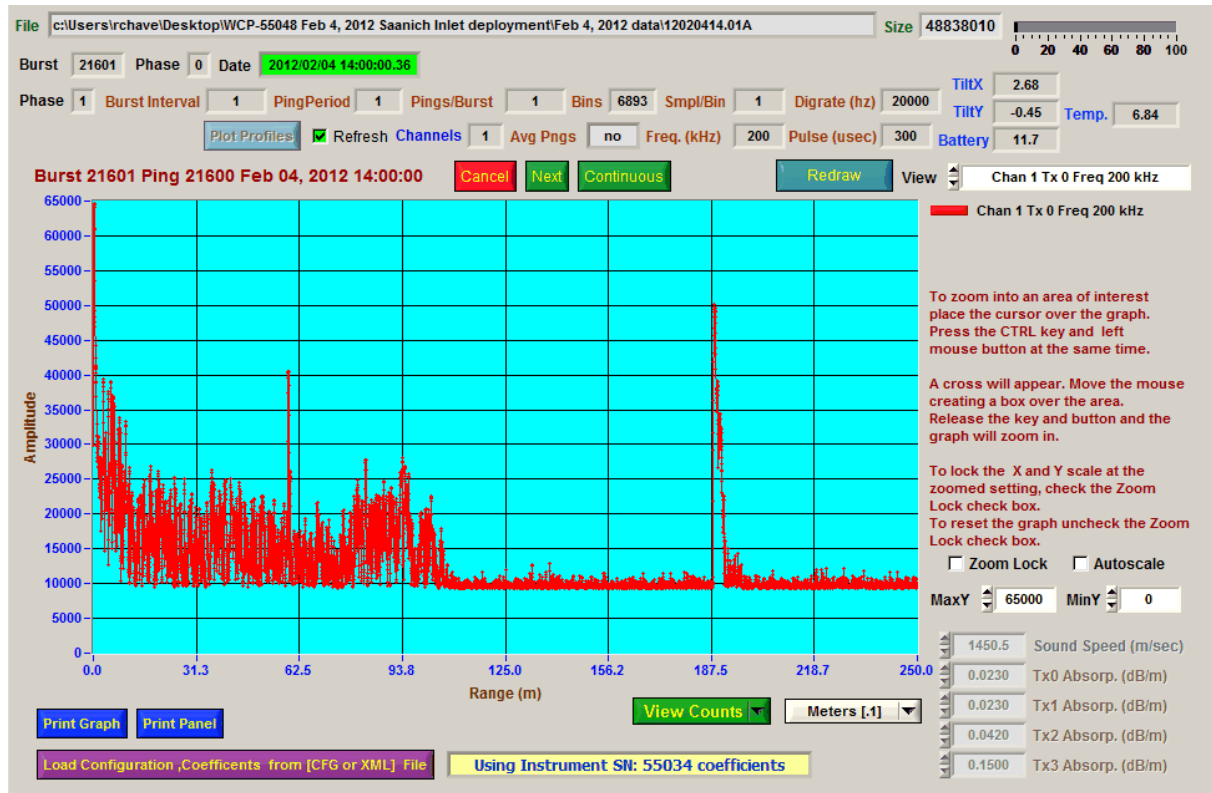
The  is used to reduce the amount of data that is displayed if multi day amounts of data have been loaded.

## 5.8.2 Plot Profiles

The  command button is used to plot the profiles in a data file. A file select popup appears. Select the data file to plot.

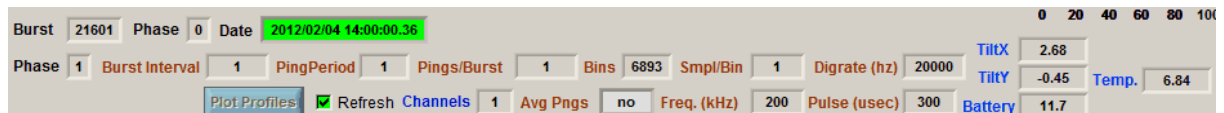


The first profile is plotted.



To plot the next profile in the data file click on the **Next** command button. To move quickly through the profiles click on the **Continuous** command button. A **Pause** command button appears that will stop the program from the continuous reading and display of the profiles.

Profile information including sensor data that is contained in the profile is displayed.

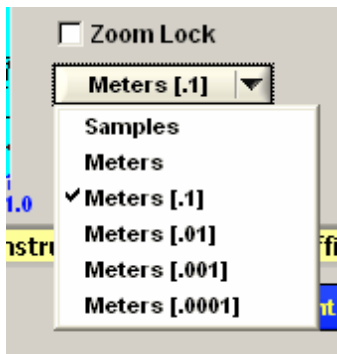



Note that if the Date is shaded green the Sensor data is from the current profile being displayed.


The x-axis scale can be set to **Meters** or **Samples**.

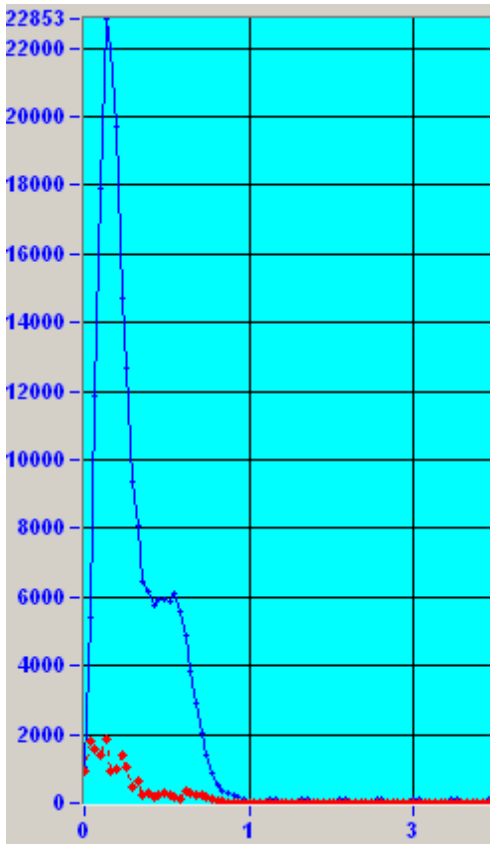
This control has additional settings to view the X-Axis with the meter values shown to specific decimal places.



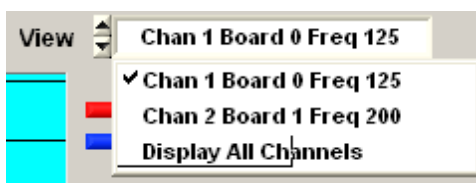


When the  button is clicked the program closes the file.

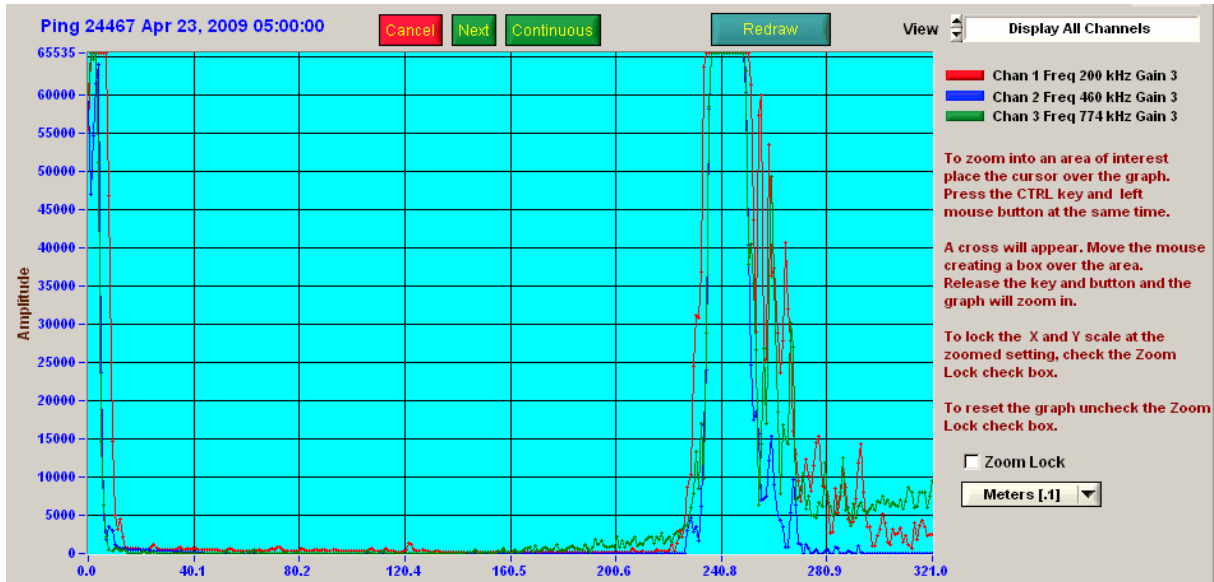
If the Standard Deviation has been stored with the data then it will be plotted in RED if the  STD check box is on.



You can select which frequency to view with the frequency select pull down.

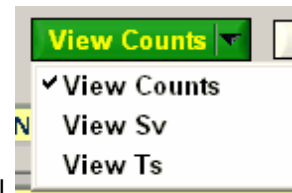


Below is an example that shows the data for all channels.



### 5.8.2.1 Plott Sv or Ts

If the instrument has been calibrated then the profile data can be viewed as acoustic volume backscatter (Sv) or target strength (Ts).



To view these quantities select them using the pull down control

If the calibration coefficients are not available a message will appear to indicate this and the Sv or Ts quantities will not be plotted.

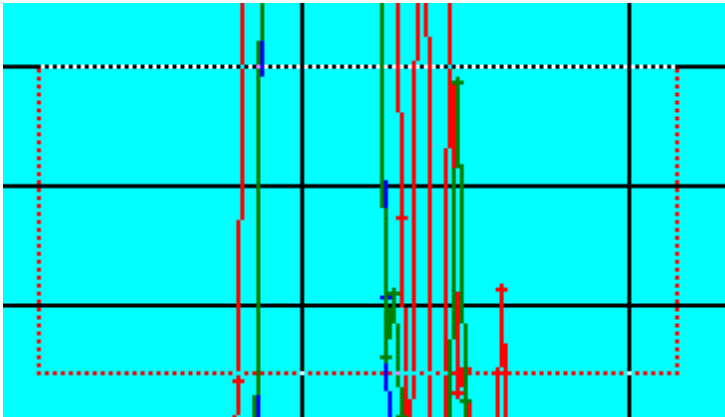
**No acoustic calibration coefficients loaded to display Sv or Ts**

### 5.8.2.2 Zooming in on an Area of Interest

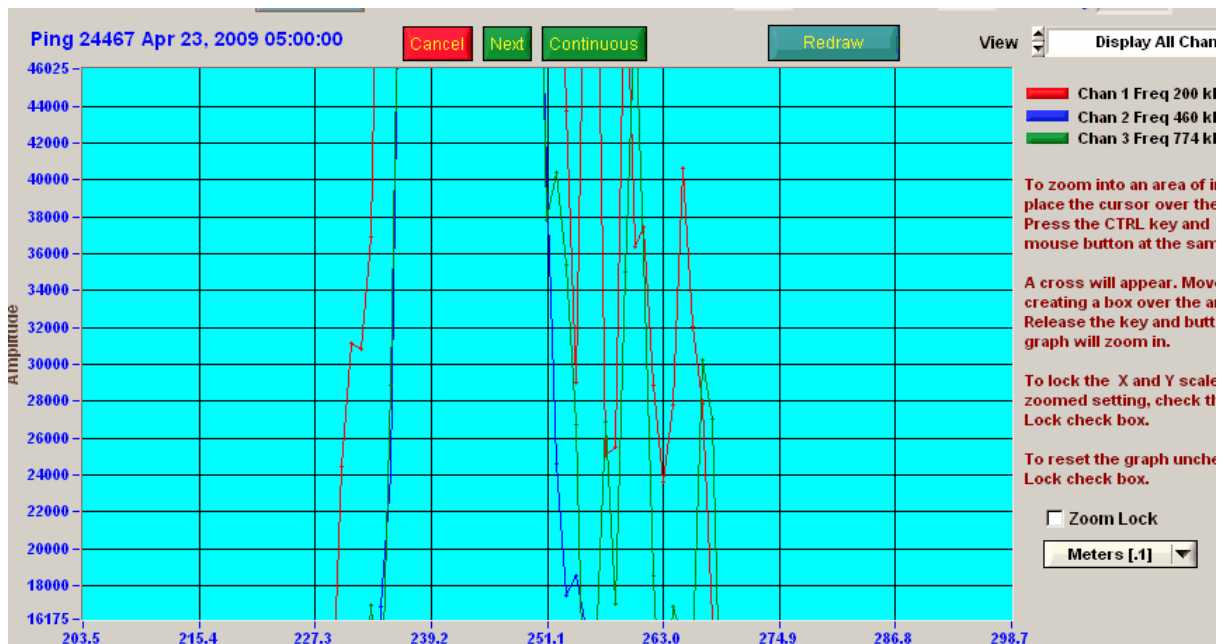
This section explains how to zoom in on an area of interest on the graph.

With the mouse hovering over the graph, hold down the keyboard CTRL key and the left mouse button at the same time.

The mouse cursor will turn into a cross. Drag the mouse while holding down the keys to form a square that defines the zoom area.



Let go of the mouse button to zoom the graph.



To keep the graph zoomed on subsequent profiles check the  **Zoom Lock**.

To reset the graph to a full display uncheck the box.

### 5.8.3 Adjusting the y axis scale


The y axis is auto scaled if the  **Autoscale** control is checked.

If it isn't then numerical controls are available to set the y axis.



The Zoom Lock control allows the user to lock the zoom so subsequent profiles are zoomed in at the same zoom settings.


#### 5.8.4 Print Graph

The graph can be printed to a local printer using the  command button.

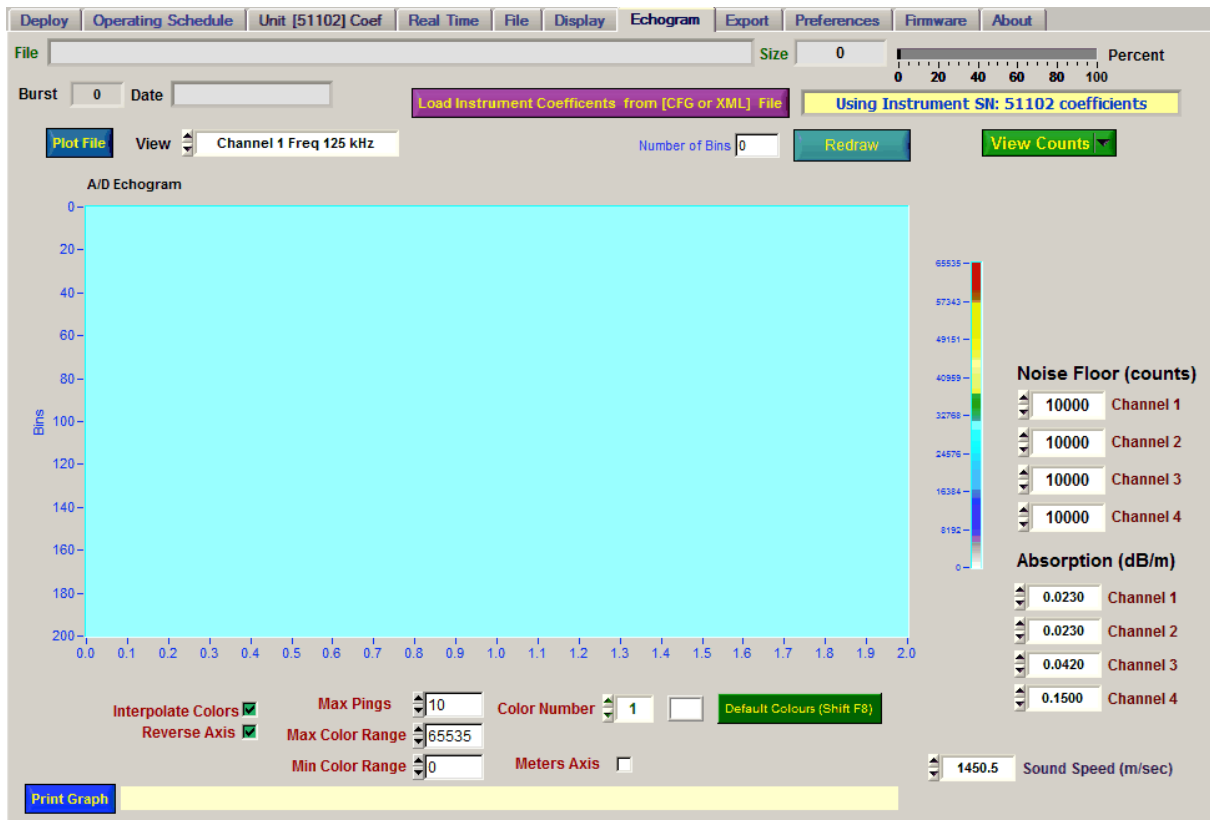
### 5.9 Echogram

If the instrument has been calibrated the panel can be used to display computed volume backscatter Sv and Target strength Ts.

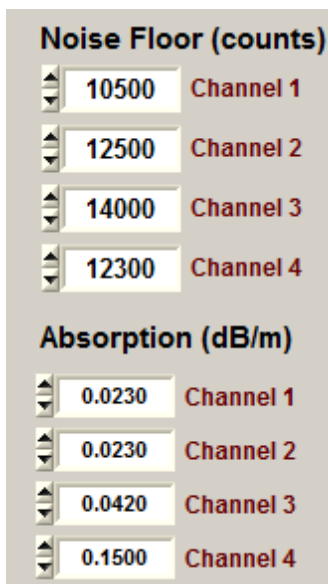


The type of data that is plotted is selected with the  control.


Note that this function is only meant to allow the user a quick look at the data retrieved from an instrument and is not sufficient for detailed analysis of the data.




Note that the Absorption and Noise Floor values need to be set for each channel.

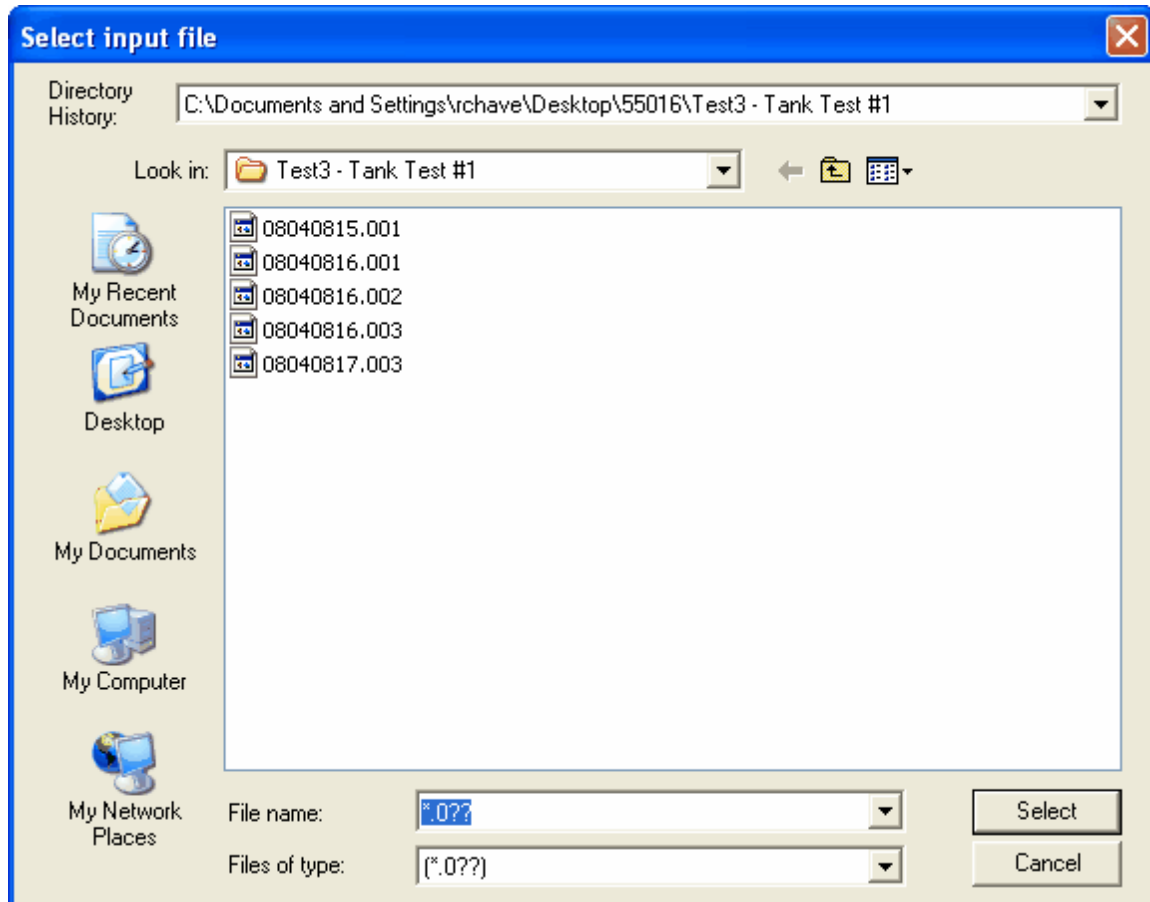


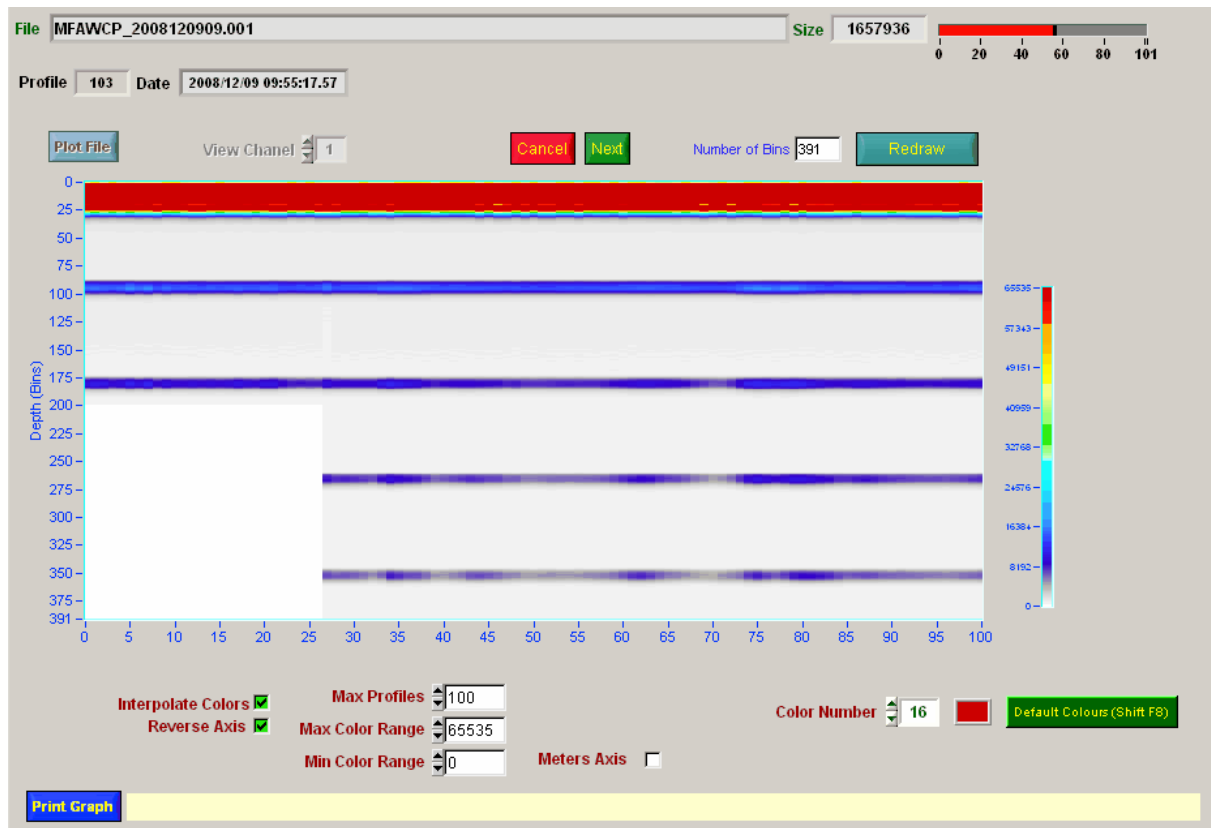
### 5.9.1 Plot File

Before clicking on the  command button select the channel (frequency) you wish to view using



Clicking on the  command button causes the file select popup to appear. Select the file to plot.





## 5.9.2 Interpolate Colors

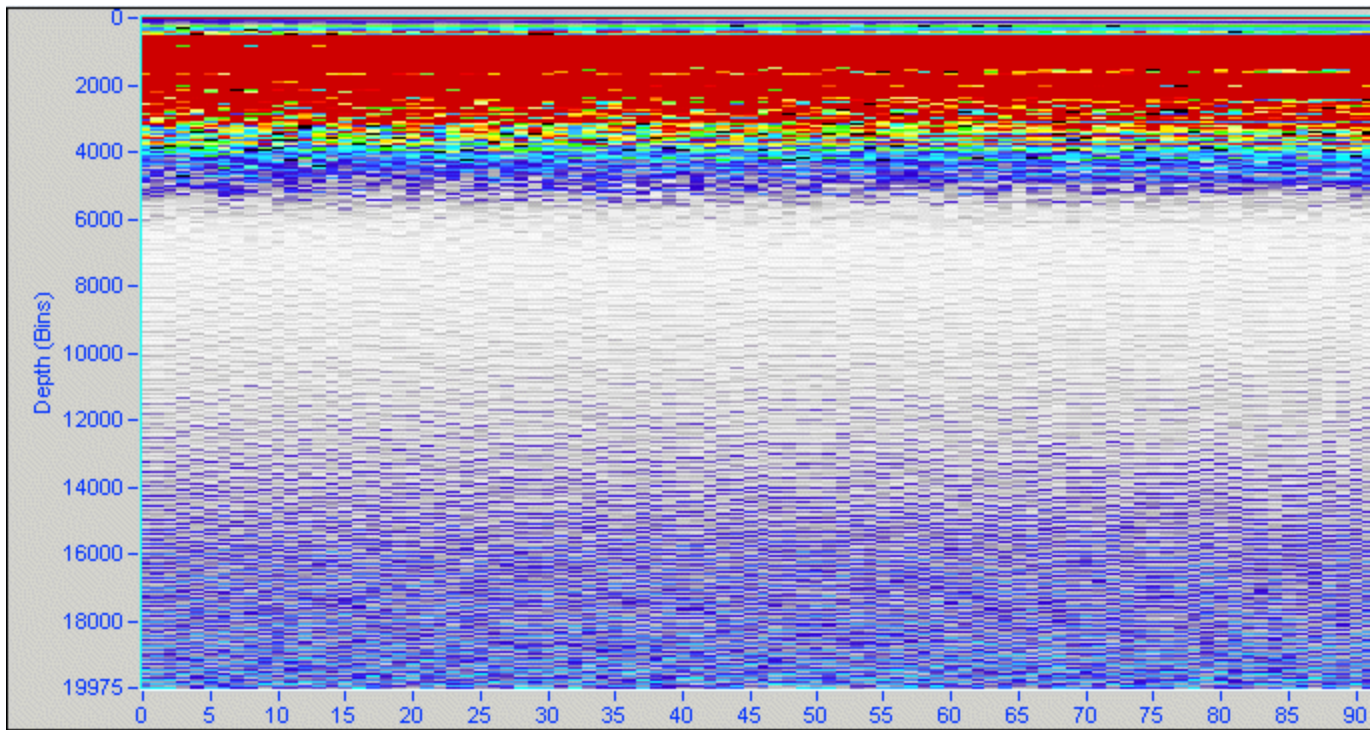
The **Interpolate Colors**  checkbox allows the user to turn on or off the interpolation of color values.

When Interpolate Colors is off, then the data value is assigned the color associated with the next higher Color Map data value.

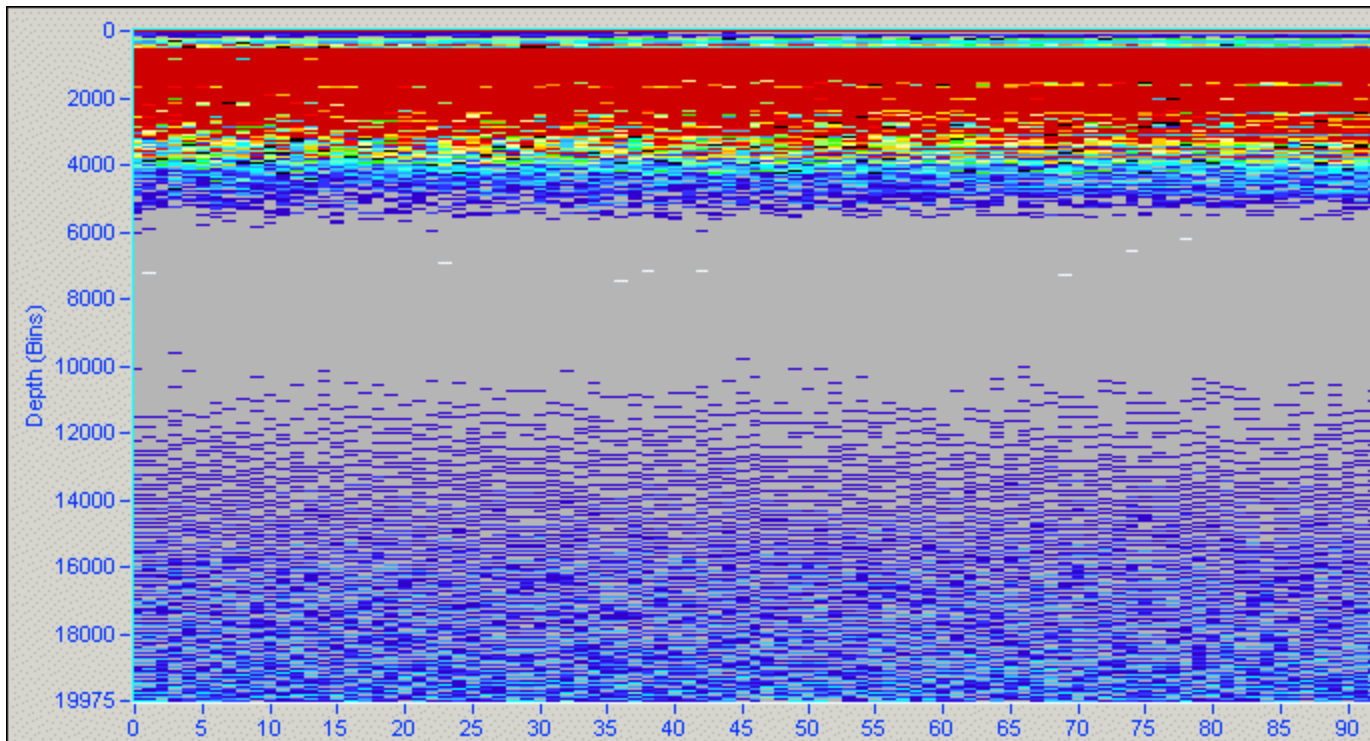
When Interpolate Colors is on, then the data value is assigned a color computed using a weighted mean of the colors associated with the Color Map data values above and below the Z Array data value.

Regardless of the value of Interpolate Colors

- data values below the lowest Color Map data value are assigned the color of the lowest Color Map data value.
- data values above the highest Color Map data value are assigned the value passed in the Hi Color parameter.



Below is the same graph with color interpolation off.





### 5.9.3 Reverse Axis

This toggle reverses the Y axis of the graph.

### 5.9.4 Max. Profiles

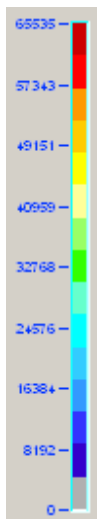
The **Max Profiles** numeric control sets the maximum number of profiles that are loaded per plot. If the file contains more profiles than Max Profiles then the programs **Cancel** **Next** buttons are enabled so the user can load a new set of profiles by clicking Next or cancelling the plots by clicking Cancel. This value has a minimum of 50 and a maximum of 10000.

### 5.9.5 Color Range

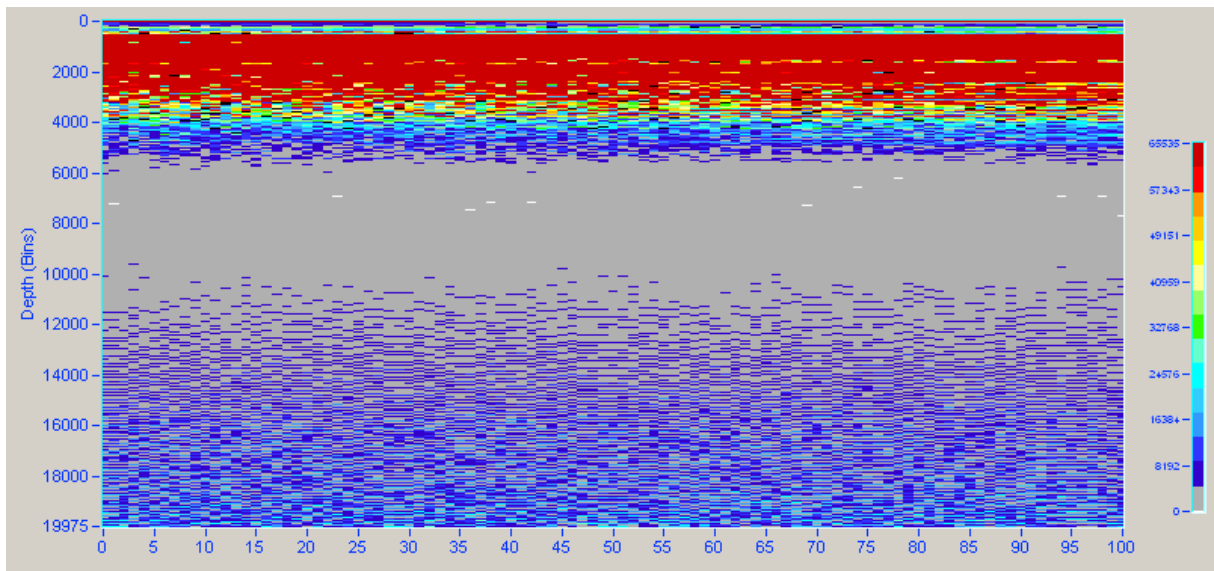
Use the numeric controls shown below to set the min and max color ranges.

|                        |                                    |
|------------------------|------------------------------------|
| <b>Max Color Range</b> | <input type="text" value="65535"/> |
| <b>Min Color Range</b> | <input type="text" value="0"/>     |

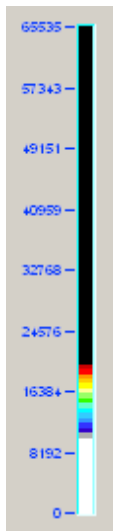
The Min Color Range and the Max Color Range are used to narrow the numerical range of the colors. For example the normal rainbow colors between 0 and 65535 is shown below:



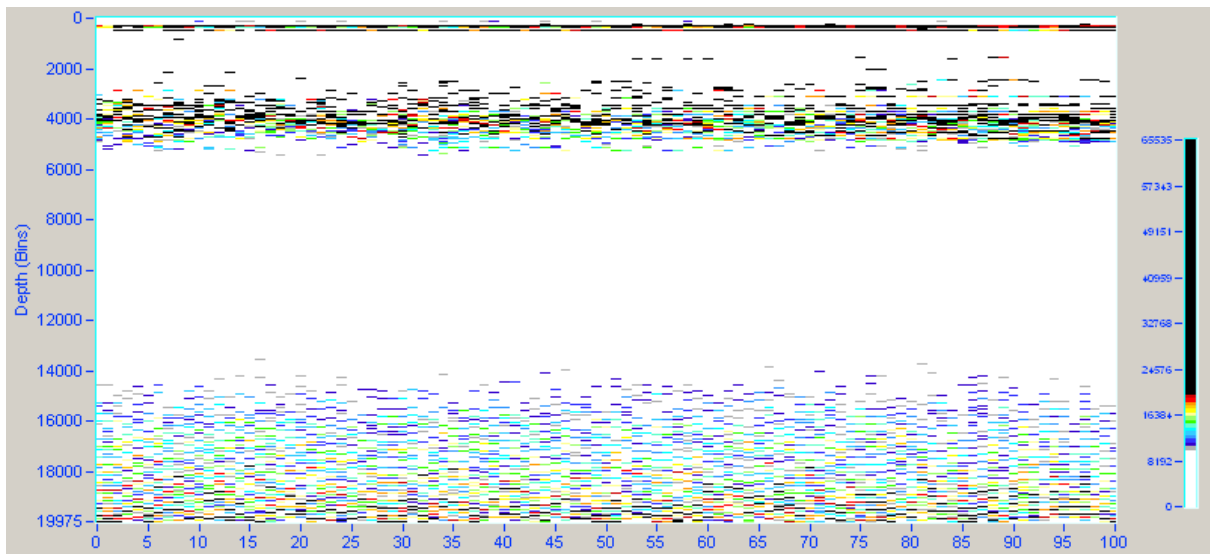
The graph plotted with this range is shown below.



If the minimum and maximum color ranges are set to 10000 and 20000 respectively then the color map appears as shown below.



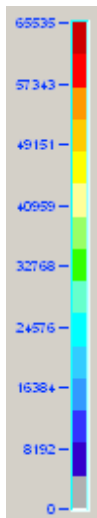
The same data plotted with this range is shown below:



### 5.9.6 Default colors

Default Colours (Shift F8)

The **Default Colours (Shift F8)** command button resets the colors to the program default.

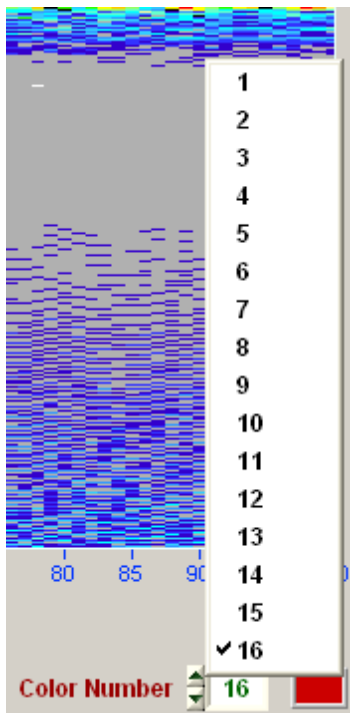


### 5.9.7 Setting Colors

The numerical values for the 16 colors that make up the color range can be set by the user.

Select the color you wish to change by selecting the color number pull down control.





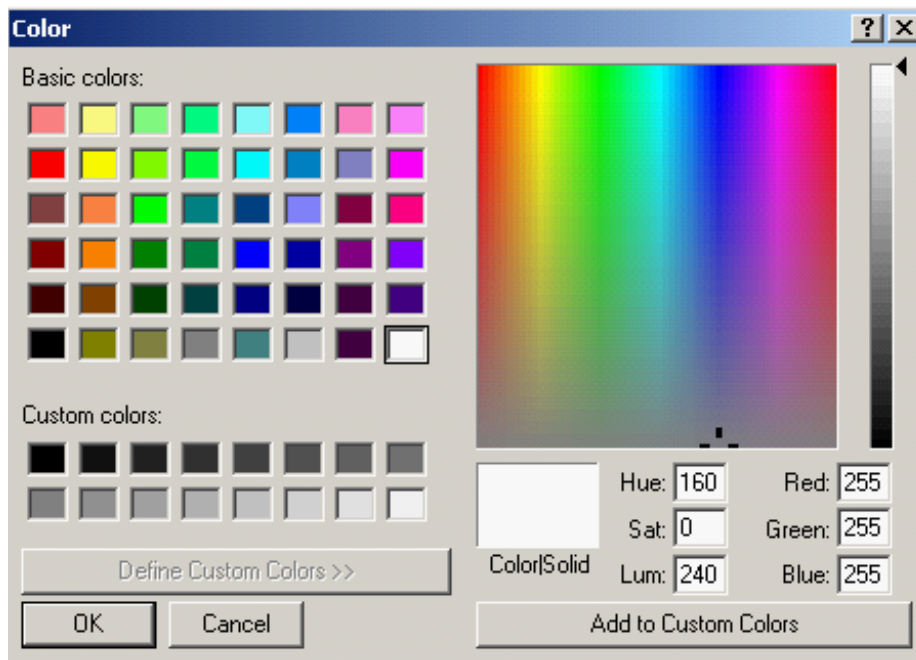
Select any of the 16 colors. The colors are numbered from 1 to 16.



To change the color click on the color control and select a color.



Clicking the  button in the color popup allows the operator to select a wider range of colors.



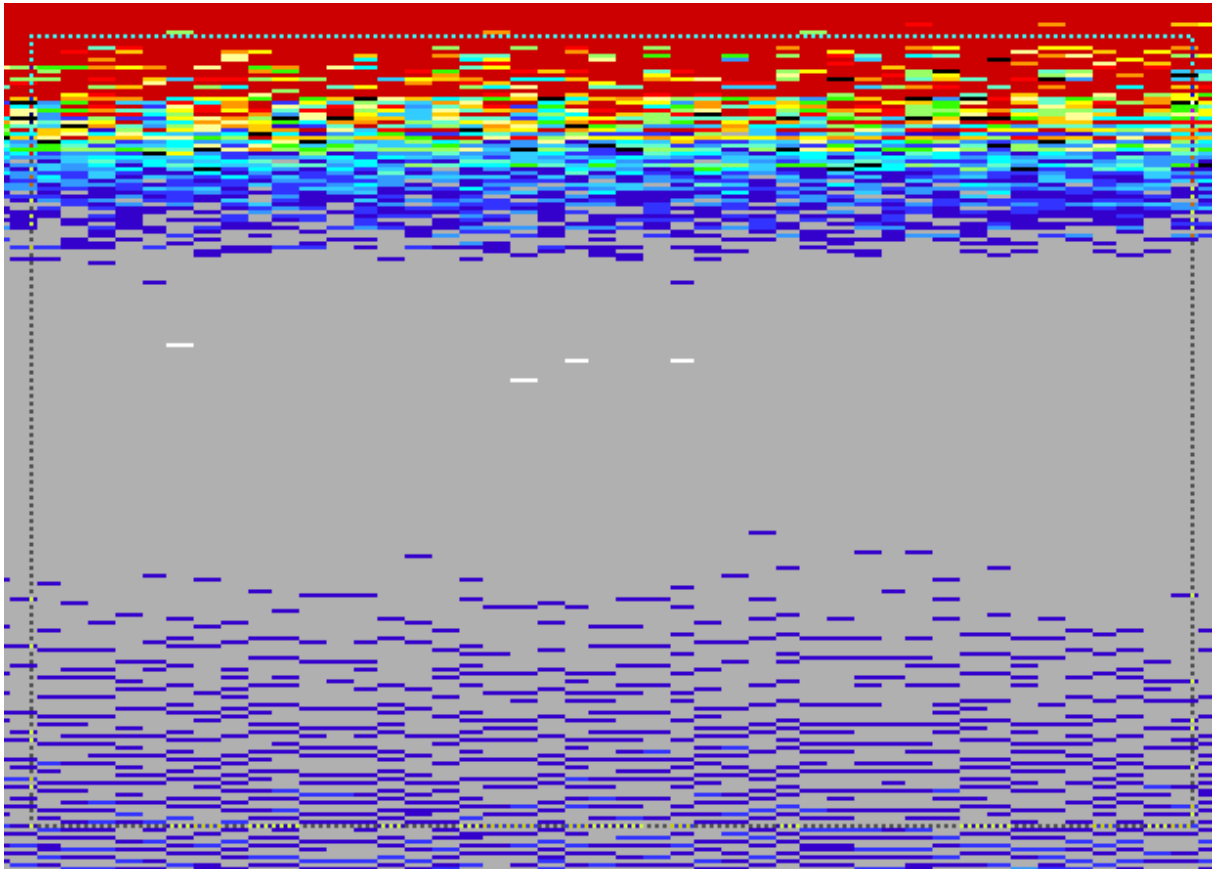
### 5.9.8 Meter Axis


The **Meters Axis**  checkbox is used to change the y axis graph from bins to meters. The meters range is set using the user specified sound speed found in the deployment panel.

### 5.9.9 Zoom

The user may zoom in on sections of the echo gram by pressing the keyboard ctrl key and the mouse left button at the same time.


A zoom rectangle is formed by dragging the mouse. When the user lets go of the left mouse button the graph zooms in on the rectangle.




To reset the graph to its original scale click on the  command button.

### 5.9.10 View Type

The default is to view digital data.

If the unit is calibrated the  control allows the viewing of Sv and Ts values computed using the coefficients that have been retrieved from the unit or from a file.




Click on the control to view the selection .

Note that the absorption values need to be set for each channel.

|    |        |                        |
|----|--------|------------------------|
| ▲▼ | 0.0060 | Tx 0 Absorption (dB/m) |
| ▲▼ | 0.0230 | Tx 1 Absorption (dB/m) |
| ▲▼ | 0.0230 | Tx 2 Absorption (dB/m) |
| ▲▼ | 0.0420 | Tx 3 Absorption (dB/m) |

### 5.9.11 Print Graph

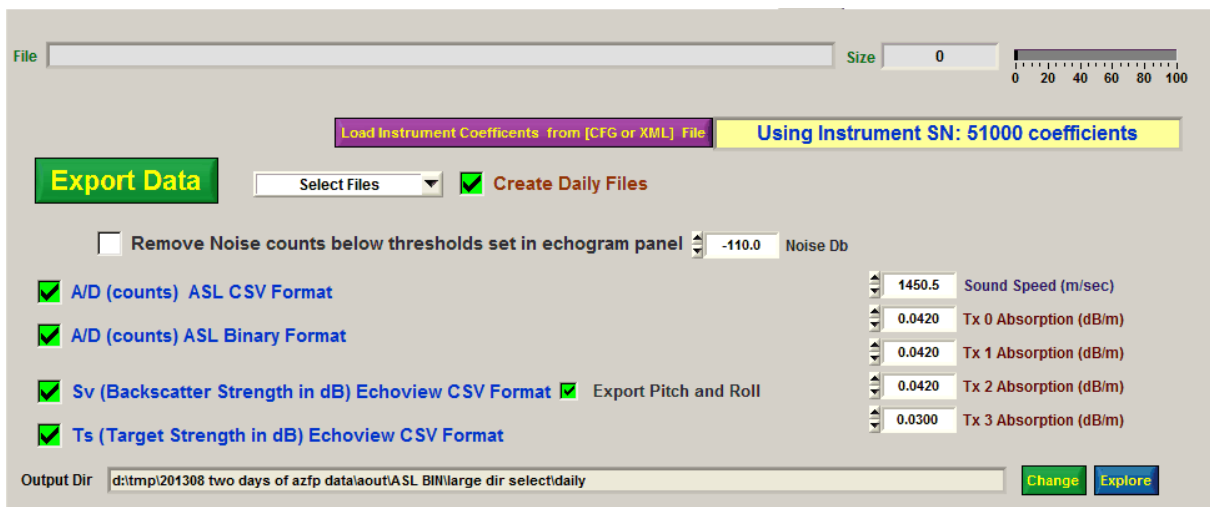
Click on the  command button to print the graph.


### 5.9.12 Noise Floor


The Noise Floor values allows the user to remove the baseline noise from the echogram. Typically this value is around 10000 but may vary from frequency to frequency.

## 5.10 Export Tab

The Export tab is used to export profile data for import into 3rd party software such as Echoview™.

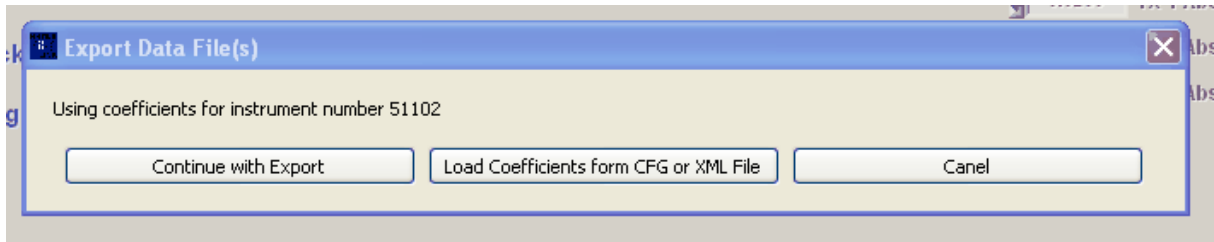



Use the  to choose how files are selected for export. Select Directory to export all the file in a directory or Files to select specific files.

The  indicator shows the serial number of the instrument who's coefficients are being used. Even if this incorrect the user is given an option to load a different set of coefficients before the export takes place.

## Export Data

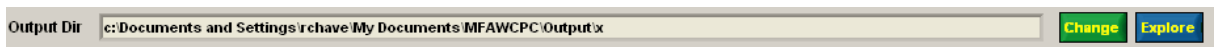
To export files click on the **Export Data** button.



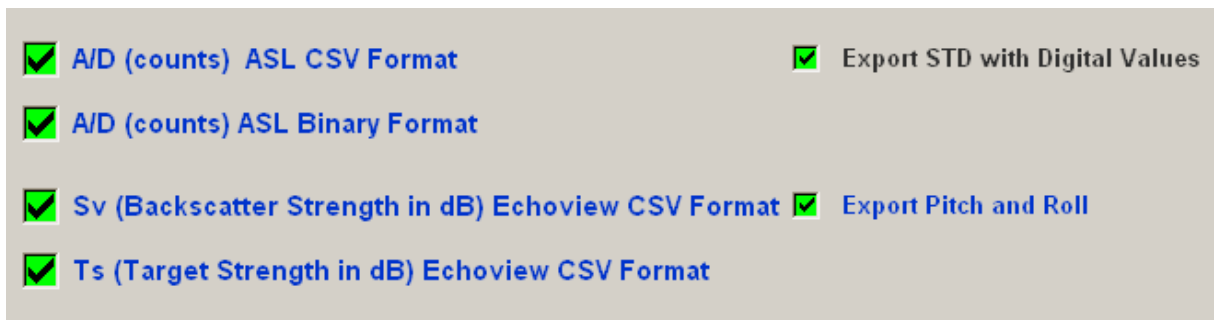
If the user chooses **Load Coefficients form CFG or XML File** they are asked to load an XML file (created by the instrument during acquisition) or CFG (configuration file) provided by the manufacturer.

The program will export all the data files in the selected directory unless specific files have been selected.

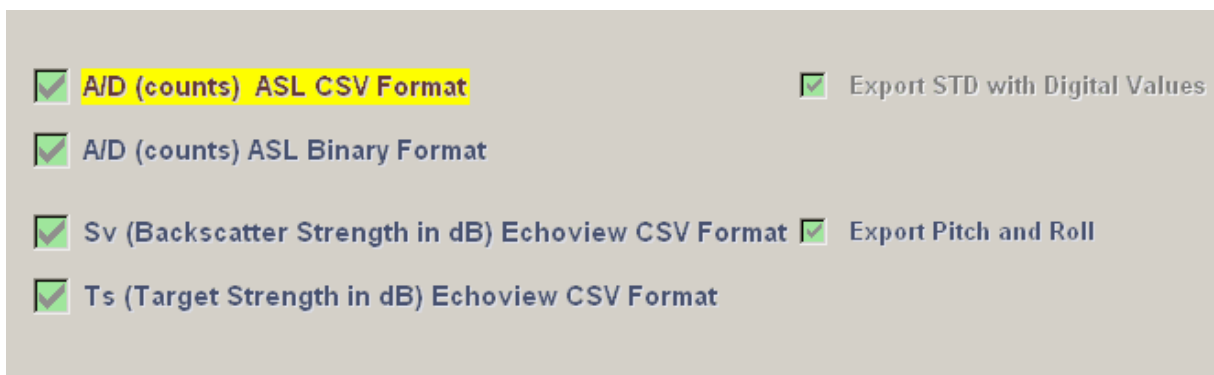
The exported files are exported to the Output Directory. This needs to be selected before the export.



All export types can be exported in one selection. The export functions are done one at a time.



As the export functions are being performed they are set to a yellow background.





Exports can be cancelled at any time by clicking on the

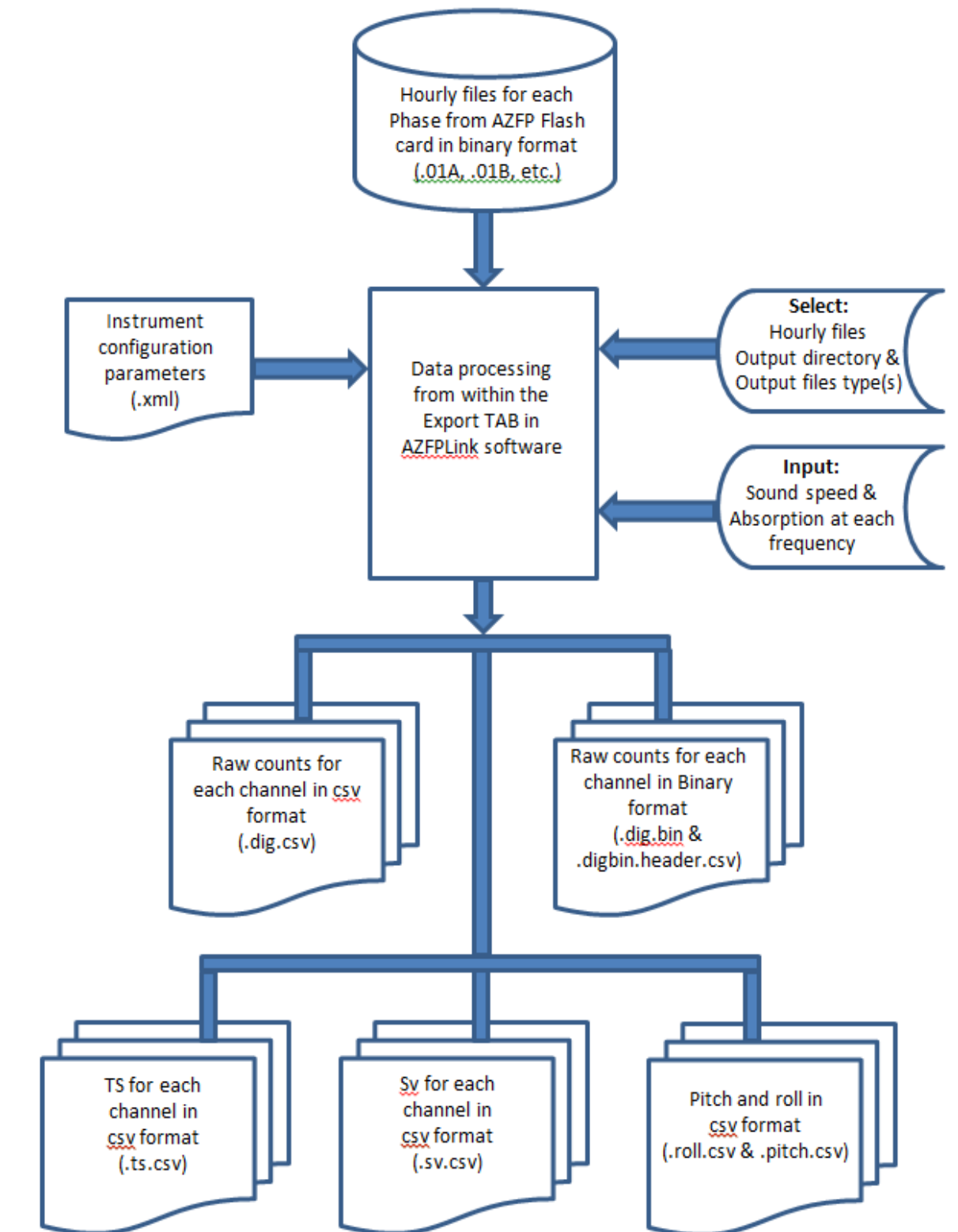


button that appears when export is started.

### 5.10.1 Export Process Summary

Below is a flowchart showing the export process.

## AZFP Data Export Process Summary



## 5.10.2 Export ASL CSV Format

To export data in the ASL CSV format.

A/D (counts) ASL CSV Format

CSV format causes the program to export the data in Comma Delimited format (CSV) shown below is an example when read into Microsoft EXCEL.

| Start | Ping | Date       | Time    | Num_Chan | BurstInterval | PingPeriod | PingsPerBurst | AveragePings | OutPut_Chan | OutPut_Board | OutPut_Frequency | StartIndex | Num_bins | Samples_Bin | Pulse_len | Digitrate | SoundSpeed | Range_start_m | Range_stop_m | Range_resolution_m | TiltX | TiltY | Bat   | Temp | Pressure | AD6   | AD7   |
|-------|------|------------|---------|----------|---------------|------------|---------------|--------------|-------------|--------------|------------------|------------|----------|-------------|-----------|-----------|------------|---------------|--------------|--------------------|-------|-------|-------|------|----------|-------|-------|
| 1     | 0    | 02/09/2012 | 4:00:00 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 1    | 02/09/2012 | 4:00:02 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 2    | 02/09/2012 | 4:00:03 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 3    | 02/09/2012 | 4:00:04 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 4    | 02/09/2012 | 4:00:05 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 5    | 02/09/2012 | 4:00:06 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 6    | 02/09/2012 | 4:00:07 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |
| 1     | 7    | 02/09/2012 | 4:00:08 | 1        | 60            | 1          | 30            | 0            | 1           | 0            | 200              | 0          | 6844     | 1           | 300       | 20000     | 1450.5     | 0             | 248.181      | 0.036              | 1.42  | -1.59 | 12.17 | 6.07 | -99      | 54079 | 32195 |

The CSV columns have the following labels.

|                    |  |
|--------------------|--|
| Burst              | Burst number                                   |
| Ping               |  |
| Burst/Ping Date    | Date of the profile                            |
| Burst/Ping Time    | Time of the profile                            |
| Num_Chan           | Number of channels (boards or frequencies)     |
| Burst Interval     | The burst interval                             |
| Ping Period        | The Ping Period                                |
| PingsPerBurst      | The Pings acquired per burst                   |
| Average Pings      | 1 = this is an averaged ping, 0 = non averaged |
| OutPut_Chan        | Number of the channel 1,2,3,4                  |
| OutPut_Board       | Number of the board 0,1,2,3                    |
| OutPut_Frequency   | Frequency of the transducer                    |
| StartIndex         | Start of the range in sample number            |
| Num_bins           | Number of bins                                 |
| Samples_Bin        | Samples per bin                                |
| Pulse_len          | Pulse Length in microseconds                   |
| Digitrate          | Digitization Rate in samples/second            |
| SoundSpeed         | Speed of sound as entered in AzfpLink in m/s   |
| Range_start_m      | Start of the Range in meters                   |
| Range_stop_m       | End of the Range in meters                     |
| Range_resolution_m | Range resolution in meters                     |
| TiltX              | Tilt in X direction                            |
| TiltY              | Tilt in Y direction                            |
| Bat                | Voltage of the main battery pack               |
| Gain               | Receiver gain setting: 0, 1, 2 or 3            |
| Temp               | Temperature                                    |
| Pressure           | Pressure                                       |
| AD6                | Analog channel Tx Battery N                    |
| AD7                | Analog channel 7 (unused)                      |

The rest of the columns contain the digital values of the bins.

Exported file names are created by the program based on the instrument number channel and frequency. Below is an example of the names of the files created.

ASL CSV file names

```
5112_C1_038KHZ.dig.csv
5112_C2_038KHZ.dig.csv
5112_C3_038KHZ.dig.csv
5112_C4_038KHZ.dig.csv
```

### 5.10.3 Export ASL BINARY Format

To export data in the ASL Binary format select.

A/D (counts) ASL Binary Format

The BINARY format produces two files for each channel. One is a .BIN file with the bins written out in consecutive 16 bit binary values. The header information is written to a .CSV file with the header information in the same format as in the ASL CSV output format but doesn't include the bin data. The header file is created with the same name but with .header.csv appended.

Exported file names are created by the program based on the instrument number channel and frequency. Below is an example of the names of the files created.

Example:

```
5112_C1_038KHZ.dig.bin
5112_C1_038KHZ.dig.bin.header.csv
5112_C2_038KHZ.dig.bin
5112_C2_038KHZ.dig.bin.header.csv
5112_C3_038KHZ.dig.bin
5112_C3_038KHZ.dig.bin.header.csv
5112_C4_038KHZ.dig.bin
5112_C4_038KHZ.dig.bin.header.csv
```

### 5.10.4 Export Echoview Format

To export Echoview format files the instrument must have been calibrated.

Select Sv or Ts or both to export and optionally export Pitch and Roll data which corresponds to the TiltY and TiltX of the instrument tilt sensor.

- Sv (Backscatter Strength in dB) Echoview CSV Format  Export Pitch and Roll
- Ts (Target Strength in dB) Echoview CSV Format

The user should set the absorption values for each channel.

|        |                        |
|--------|------------------------|
| 0.0060 | Tx 0 Absorption (dB/m) |
| 0.0230 | Tx 1 Absorption (dB/m) |
| 0.0230 | Tx 2 Absorption (dB/m) |
| 0.0420 | Tx 3 Absorption (dB/m) |

Below is an example of the output file names.

5112\_C1\_038KHZ.sv.csv  
 5112\_C2\_038KHZ.sv.csv  
 5112\_C3\_038KHZ.sv.csv  
 5112\_C4\_038KHZ.sv.csv

5112\_C1\_038KHZ.ts.csv  
 5112\_C2\_038KHZ.ts.csv  
 5112\_C3\_038KHZ.ts.csv  
 5112\_C4\_038KHZ.Ts.csv

5112\_X.roll.csv  
 5112\_Y.pitch.csv

The following documentation is from the Echoview site

## Data values from single beam

### File format

The first line of the \*.csv file lists the names of the variables that appear in subsequent lines (these will be used as column headings if the file is loaded into a spreadsheet program). No column heading is provided for the list of data values. Each subsequent line contains the value for each variable for a single ping and the data value for each sample in the ping.

The following columns are expected.

| Variable  | Description |
|-----------|-------------|
| Ping_date | yyyy-mm-dd  |
| Ping_time | hh:mm:ss    |

|                     |                                       |
|---------------------|---------------------------------------|
| Ping_milliseconds   | ms (optional column, may be left out) |
| Range_start         | m                                     |
| Range_stop          | m                                     |
| Sample_count        | Number of samples to follow           |
| List of data values | Sample values (separated by commas)   |

Notes:

- If there is not the correct number of samples specified by Sample\_count then the ping is considered invalid and all data for that ping are ignored (it will appear as a no data gap in an echogram).
- The start and stop range and the number of samples may change for every line of data (ping).
- In the resulting echogram, each datapoint (sample) is assigned a range so that the data is evenly spaced based over the ping, using the Sample\_count, Range\_start and Range\_stop.

That is, the range of each datapoint (measured at the center of that datapoint) is,

$$\text{Range} = \text{Range\_start} + (n + 0.5) * (\text{Range\_stop} - \text{Range\_start}) / \text{Sample\_count}$$

Where  $n = 0, 1, 2, 3, 4 \dots \text{Sample\_count}-1$

- The data values must be in units appropriate to the data type identified in the name of the data file (eg. Sv must be dB re 1m-1 and TS dB re 1m2).

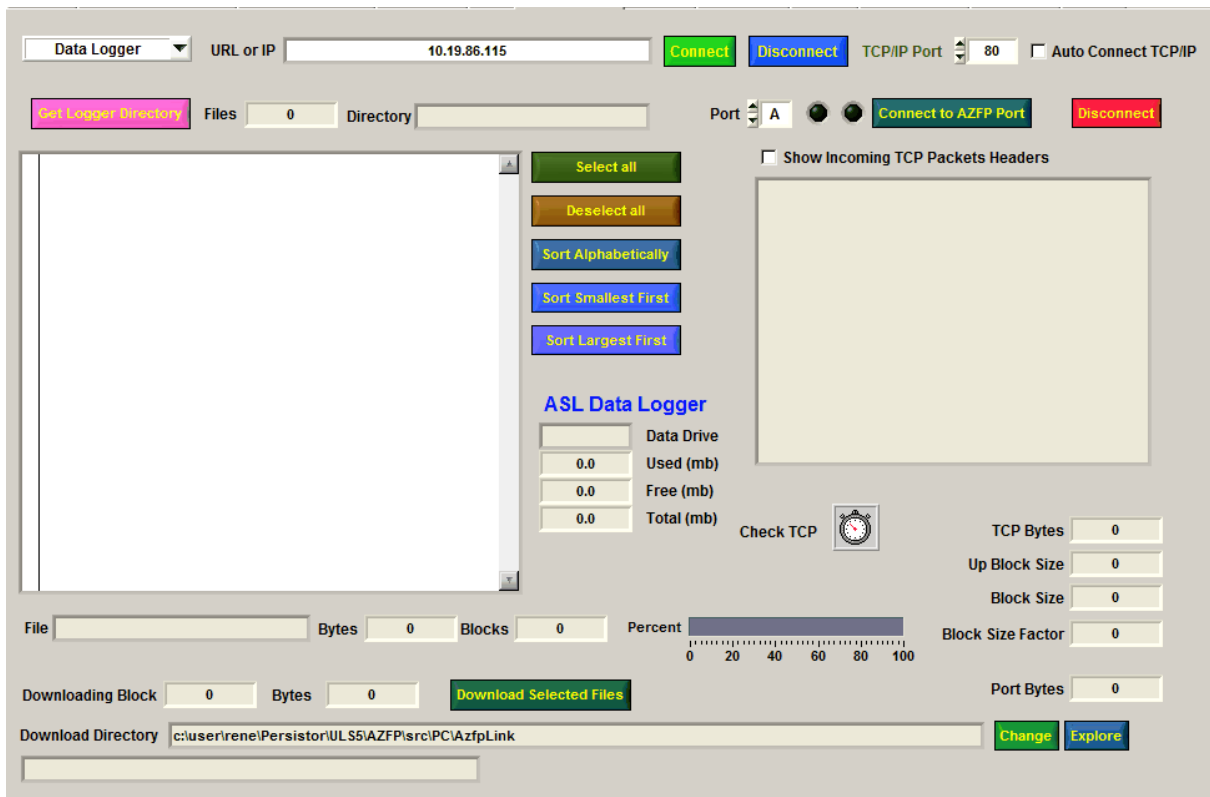
## 5.11 Logger/TCP Tab

The Logger/TCP tab is used to connect to instruments that are connected to the an ASL Data Logger that is either on the internet or local area network.


The software supports the ASL Data Logger and the connection of the unit to a serial RS232 to Ethernet converter.

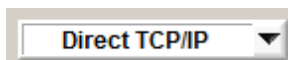
The ASL Data Logger is a device that records RS232 data from any instrument that provides data over RS232. In addition if one of the instruments is a AZFP the logger allows a pass through connection to the instrument so that AzfpLink can program the instrument, retrieve data files directly from the internal FLASH (see File tab) and/or acquire real time data being transmitted over the RS232 port.

In addition the Data Logger tab provides the means to get a directory listing of the data acquired by the logger and to retrieve specific files. Note that the files acquired by the ASL Data Logger require some additional processing to create compatible data files for viewing by AzfpLink and ProfileView.




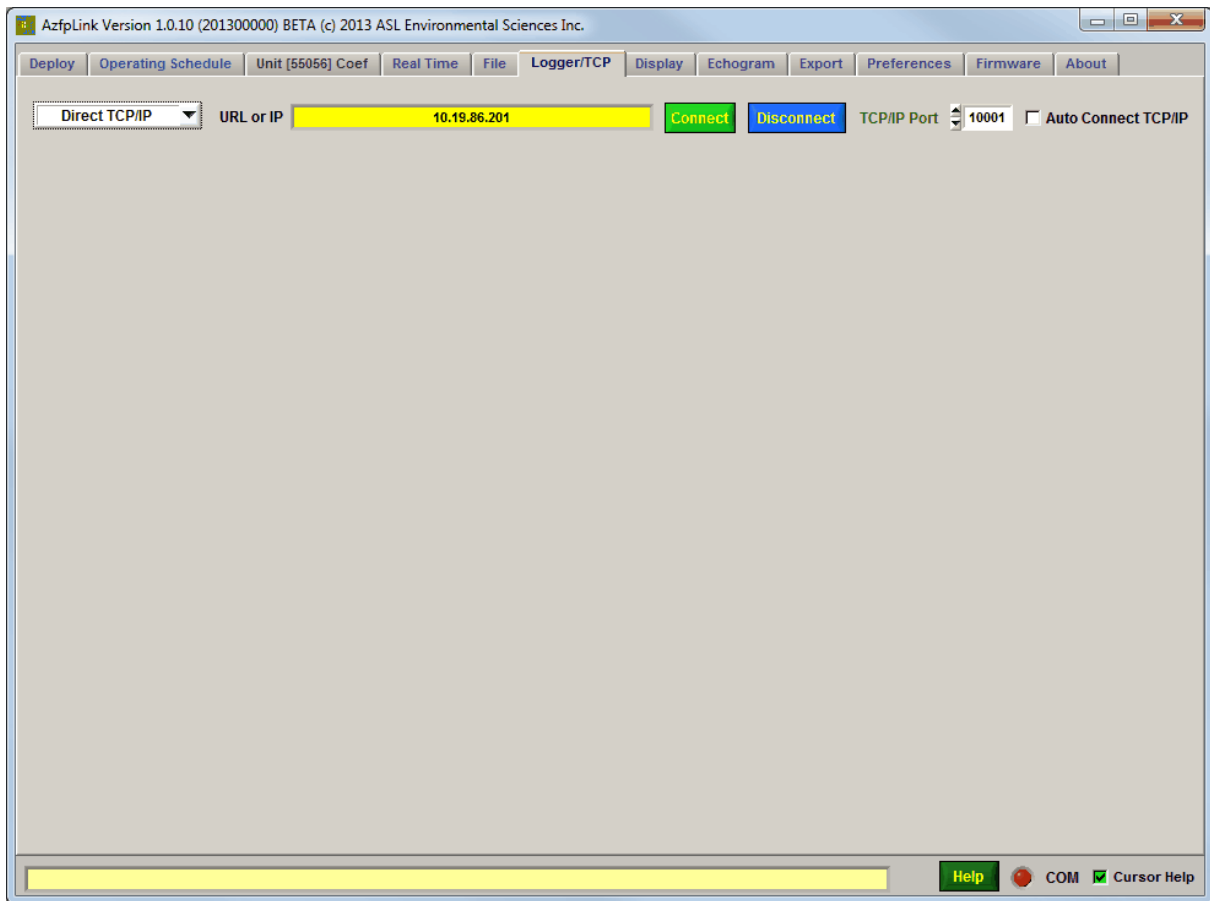
### 5.11.1 Connection Type Selection

The  pull down is used to select either a connection to an ASL data logger or a connection to a serial to Ethernet converter that is configured for TCP/IP connection on the selected port.

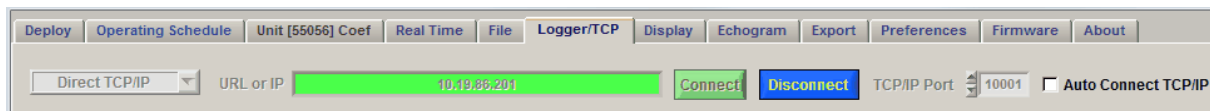


### 5.11.2 Connection to Serial to Ethernet Converter

When the connection type selector is set to  the software is configured to directly talk to the AZFP instrument via TCP/IP. The tab appears as follows:



Select the IP address and port number and click connect to connect directly to the AZFP.



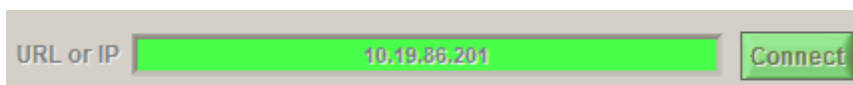
You can now run most commands as if the unit is directly connected via RS232.

### 5.11.3 URL or IP

The **URL or IP**  control displays the URL or IP address of the ASL Data Logger or to the serial to Ethernet converter. To change this value select the control and enter a new value.


Check the connection by clicking on the **Connect** command button.

When the TCP/IP connection is successful the Logger Url or IP display turns green and the value in it can not be changed until it is disconnected..






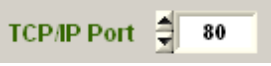
#### 5.11.4 Connect

The  command button causes the program to connect to the specified URL or IP address with the specified TCP/IP Port.


#### 5.11.5 Disconnect

The  command button causes the program to disconnect from the data logger if it is connected.

#### 5.11.6 TCP/IP Port


The  is the port that the ASL Data Logger will respond to when a connection is attempted. This port value is setup when the ASL Data Logger is installed and configured.

#### 5.11.7 Auto Connect TCP/IP

The   checkbox selects the auto connection when the program starts up.

Note that if this box is checked on startup the program automatically connects to the ASL Data Logger. It requests a direct connection to the AZFP port if the TCP/IP connection is successful.

#### 5.11.8 Get Logger Directory

The  command button causes the program to request the ASL Data Logger file directory from the storage device. If successful the files are displayed in the list box. As well the number of files and the name of the data directory is displayed in the two controls above the list.

The control will connect the TCP/IP connection if it is not already connected.

A successful retrieval of the data file listing on the ASL Data Logger storage device is shown below.

The screenshot shows the AzfpLink software interface. At the top, there is a pink button labeled "Get Logger Directory". To its right, the "Files" count is 323 and the "Directory" is D:\ASLDATALOGGER\. Below this is a list of files with their sizes in bytes, sorted in descending order of size. The files are SWIPA\_201010191105\_1.bin (157090 bytes) down to SWIPA\_201010200900\_1.bin (4047192 bytes). To the right of the file list are five buttons: "Select all" (green), "Deselect all" (orange), "Sort Alphabetically" (yellow), "Sort Smallest First" (blue), and "Sort Largest First" (blue). Below these buttons is a section titled "ASL Data Logger" which displays system statistics for the Data Drive (D): 5311.8 mb Used, 59662.2 mb Free, and 64974.0 mb Total.

| File Name                | Size (bytes) |
|--------------------------|--------------|
| SWIPA_201010191105_1.bin | [157090]     |
| SWIPA_201010191201_1.bin | [8]          |
| SWIPA_201010191202_1.bin | [8753085]    |
| SWIPA_201010191246_1.bin | [8]          |
| SWIPA_201010191306_1.bin | [81654]      |
| SWIPA_201010191445_1.bin | [20005880]   |
| SWIPA_201010191724_1.bin | [20008225]   |
| SWIPA_201010191855_1.bin | [20009881]   |
| SWIPA_201010192026_1.bin | [20006873]   |
| SWIPA_201010192157_1.bin | [20003287]   |
| SWIPA_201010192328_1.bin | [6873748]    |
| SWIPA_201010200000_1.bin | [20009542]   |
| 20101020.log             | [6858]       |
| SWIPA_201010200131_1.bin | [20003567]   |
| SWIPA_201010200302_1.bin | [20002047]   |
| SWIPA_201010200432_1.bin | [20007657]   |
| SWIPA_201010200603_1.bin | [20002215]   |
| SWIPA_201010200734_1.bin | [13879296]   |
| SWIPA_201010200839_1.bin | [774383]     |
| SWIPA_201010200843_1.bin | [334703]     |
| SWIPA_201010200845_1.bin | [706328]     |
| SWIPA_201010200848_1.bin | [403046]     |
| SWIPA_201010200850_1.bin | [285798]     |
| SWIPA_201010200852_1.bin | [454340]     |
| SWIPA_201010200854_1.bin | [1124831]    |
| SWIPA_201010200859_1.bin | [8]          |
| SWIPA_201010200900_1.bin | [4047192]    |

**ASL Data Logger**

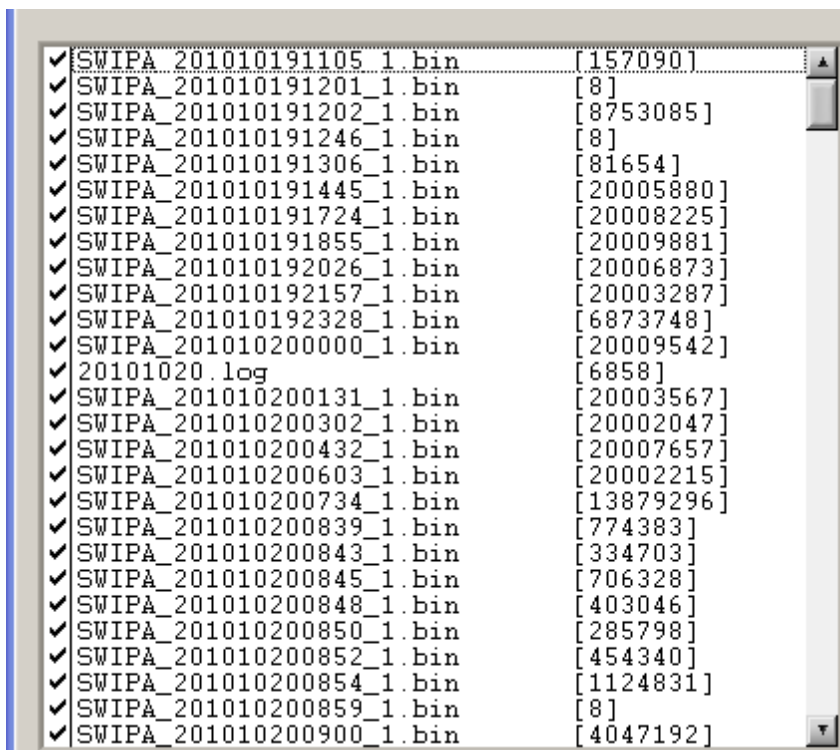
| D       | Data Drive |
|---------|------------|
| 5311.8  | Used (mb)  |
| 59662.2 | Free (mb)  |
| 64974.0 | Total (mb) |

Note that ASL Data Logger Data Drive, Used, Free and Total MB are returned.

There are 5 command buttons that allow you to manipulate the file list.



The "Select all" button causes all the files to be selected.



This places a check mark to the left of the file name. Note that this can be manually done by clicking on a file name or passing over the left area with the left mouse button clicked down continually.

The "Deselect all" command button de-selects all the files in the list.

The other three command buttons allow you to sort by file size or alphabetically.

### 5.11.9 Connecting to the AZFP

The AzfpLink software can be connected directly to any AZFP that is connected to one of the ASL Data Logger RS232 ports. The ports are associated with a letter such as 'A', 'B' etc. The letter designation is setup on the data logger when the system is installed.

The following controls are associated with connecting to the AZFP.



Use the Port control to select the port number. Click on the  to connect to the AZFP on the selected port.

If the connection is successful the LED to the left of the command button will turn green.

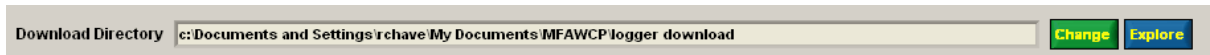
At this point you can not change the port until you disconnect.

When AzfpLink is connected like this you can use the normal command on the other panels as if the AZFP unit was connected to an RS232 port.

The only functions not available are the FLASH formatting and Firmware Upgrade functions.

### 5.11.10 Downloading Logger Data Files

Before downloading the data files make sure the download directory is where you want the downloaded files to be placed.



Use the "Change" command button to change the location.

To download logger data files shown in the list you need to first get the list and then select the files you want to download.

|   |                          |            |
|---|--------------------------|------------|
|   | SWIPA_201010200432_1.bin | [20007657] |
|   | SWIPA_201010200603_1.bin | [20002215] |
| ✓ | SWIPA_201010200734_1.bin | [13879296] |
| ✓ | SWIPA_201010200839_1.bin | [774383]   |
| ✓ | SWIPA_201010200843_1.bin | [334703]   |
| ✓ | SWIPA_201010200845_1.bin | [706328]   |
|   | SWIPA_201010200848_1.bin | [403046]   |
|   | SWIPA_201010200850_1.bin | [285798]   |

**Download Selected Files**

Click the **Download Selected Files** to start the download.

The files will be downloaded.



The download can be canceled by clicking on the "Cancel" command button.

If there is an interruption in the download process the file download can be restarted without redoing the full file.

### 5.11.11 ASL Data Logger RS232 Files

The files retrieved from the ASL Data Logger storage device are not compatible with the AzfpLink program for viewing. These files contain raw RS232 data packets that the logger received and stored in these data files. For this reason further pre-processing are required to get these files into a format compatible with AzfpLink or ProfileView.

## 5.12 Preferences Tab

The preferences tab is used to set up some parameters specific to the AzfpLink program. These values are remembered between invocations of the program.

### 5.12.1 Deployment File Directory

These indicators display and set the location of deployment files. Deployment files are files written by AzfpLink when an instrument is deployed.

The current deployment file directory is shown in a text box.

To change the location click on the **Change** command button to the right of the text box.

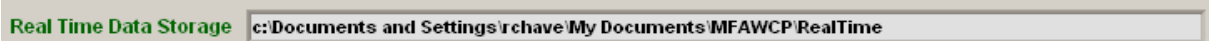
A directory select pop-up appears to select the directory.

The  opens Windows Explorer to the selected directory.

### 5.12.2 Real Time Data Storage Directory

These indicators display and set the location of real time data files as they are created by AzfpLink from the data received from the unit.

The name of the directory is shown in a text box.



To change the location click on the  command button to the right of the text box.

A directory select pop-up appears to select the directory.

The  opens Windows Explorer to the selected directory.

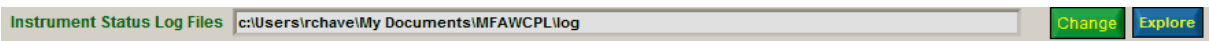
### 5.12.3 Log File Directory

These indicators display and set the location of log files where status information from the unit is stored.

After a deployment the instrument sends out status information over the RS232 for 24 hrs before turning of this feature.

This allows the user to confirm the operation of the instrument. If the user has turned on the logging of the status records they are stored in files in the specified directory.

The name of the directory is shown in a text box.



To change the location click on the  command button to the right of the text box.

A directory select pop-up appears to select the directory.

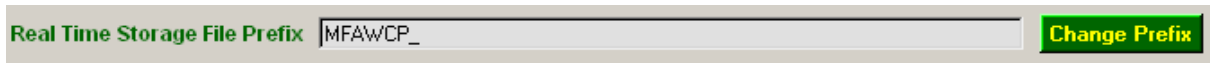
The  opens Windows Explorer to the selected directory.

The log files are stored as ASCII text with the file names using the year, month, and day in the name with a .log extension.

20120209.log  
20120210.log  
20120211.log

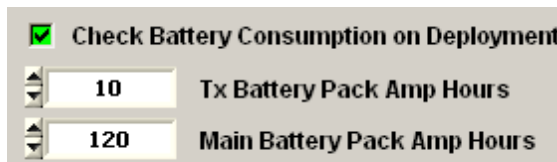
### 5.12.4 Real Time Storage File Prefix

As files are stored to the Real Time Data Directory there names are prefixed by a user selectable prefix.



To change the prefix click on the **Change Prefix** command button.

### 5.12.5 Check Battery Consumption on Deployment



The controls are used to set battery capacities and a flag to check the estimated battery consumption based on the selected phase parameters.

### 5.12.6 COM Port

The RS232 communications port for communicating with the AZFP is set here.



Up to 16 different ports can be selected. Once a port is selected the program tries to open the port. If an error occurs a pop-up message is displayed.

If the unit is connected to an ASL Data Logger the program can be connected to the unit using TCP/IP. To enable this functionality the Com Port must be set to TCP/IP.



The **Search COM Ports for Instrument** button causes the program to search for an instruments on all available RS232 COM ports on the computer. This function may take several minutes if the computer contains many COM ports.

### 5.12.7 9600 Baud Operation

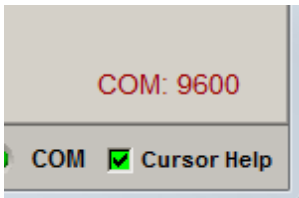
Enable this check box have AzfpLink operate the RS232 port at 9600 baud.

**The AZFP unit must set to operate at 9600 BAUD or AzfpLink can not communicate with it. See [Setting the Instrument to 9600 baud.](#)**

**9600 BAUD Operation (AZFP must be manually set to operate at 9600 BAUD see the AzfpLink manual)**

\*\*\* FIRMWARE UPGRADES can not be performed at this rate. Both the instrument and AzfpLink must be returned to the default baud rate of 115200 baud.

Not that the operating baud rate is shown in the deployment panel in the bottom right hand corner.



### 5.12.8 Save Real Time On Boot Up

**Save Real Time Data on Bootup**

Enable this check box if you want AzfpLink to automatically save real time data when it boots up.

### 5.12.9 Plot Real Time On Boot Up

**Plot Real Time Data on Bootup**

Enable this check box to have AzfpLink to plot real time data automatically when it boots up.

Normally data plotting is disabled when the software is started.

### 5.12.10 Check Firmware Version

The  **Check Firmware Version** control enables or disables the checking of the firmware version when deploying an instrument for firmware upgrades.

### 5.12.11 Warn if deploying with RS232 output ON

If the AZFP is deployed with RS232 real time output set to on, AzfpLink will give the user a warning. Data acquisition with real time output on will use more power and can take a long time between pings to output the data so that the desired ping rates cannot be achieved.

**Warn if deploying with RS232 output ON**

### 5.12.12 Warn if deploying with deactivated channels

If the AZFP is deployed with deactivated channels, AzfpLink will give the user a warning.

**Warn if deploying with deactivated channels**



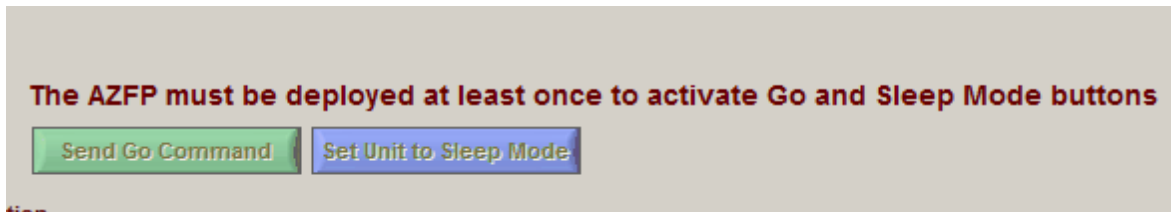
### 5.12.13 Allow Any Absorption Value

Allow Any Absorption Values

To allow the entry of any absorption value for calculating SV or TS set this check box on.

### 5.12.14 Show Send Go command & Sleep mode buttons

Enable  Show Send Go command & Sleep mode buttons to have the Send Go & Sleep mode buttons available in the deployment panel.



### 5.12.15 Show Message Panel on Startup

Enable this option to show the Message panel on the start up of the AzfpLink.

Show Message Panel on Startup

Deployment File Parameters from last program invocation

Storage is to 'FLASH' [ 9.07 Mb ], Power Main [0.0 Ah] Tx [0.0 Ah]

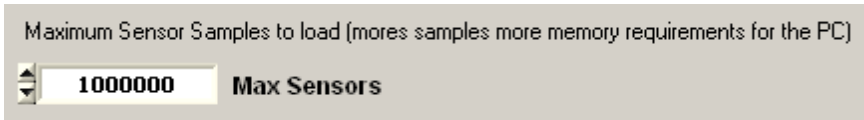
| Phase # | Type   | Start Date            | Duration   | Burst Interval | Ping Period | Pings/Burst | Average | Bytes  | Main Ah |
|---------|--------|-----------------------|------------|----------------|-------------|-------------|---------|--------|---------|
| 1       | Normal | Oct 06, 2015 11:43:43 | 10.0 min   | 5 sec          | 5 sec       | 1           | no      | 890 Kb | 0.01    |
| 2       | Normal | Oct 06, 2015 11:53:43 | 5.0 min    | 1 sec          | 1 sec       | 1           | no      | 6.7 Mb | 0.01    |
| 3       | Normal | Oct 06, 2015 11:58:43 | 10.0 min   | 10 sec         | 1 sec       | 9           | yes     | 641 Kb | 0.00    |
| 4       | Normal | Oct 06, 2015 12:08:43 | Continuous | 5 sec          | 5 sec       | 1           | no      | 890 Kb | 0.01    |

The AZFP must be

Send Go Command Set Unit to Sleep Mode

Message Panel

### 5.12.16 Maximum Sensor Samples to load



Max Sensors limits the number of samples and sensors that are loaded into memory when loading files in the Display tab. If the limit is reached the program stops loading data and displays it. Since there is no limit on the number of files to load, these controls limit the amount of memory that is used in the plotting to avoid lockup due to too much memory being used.

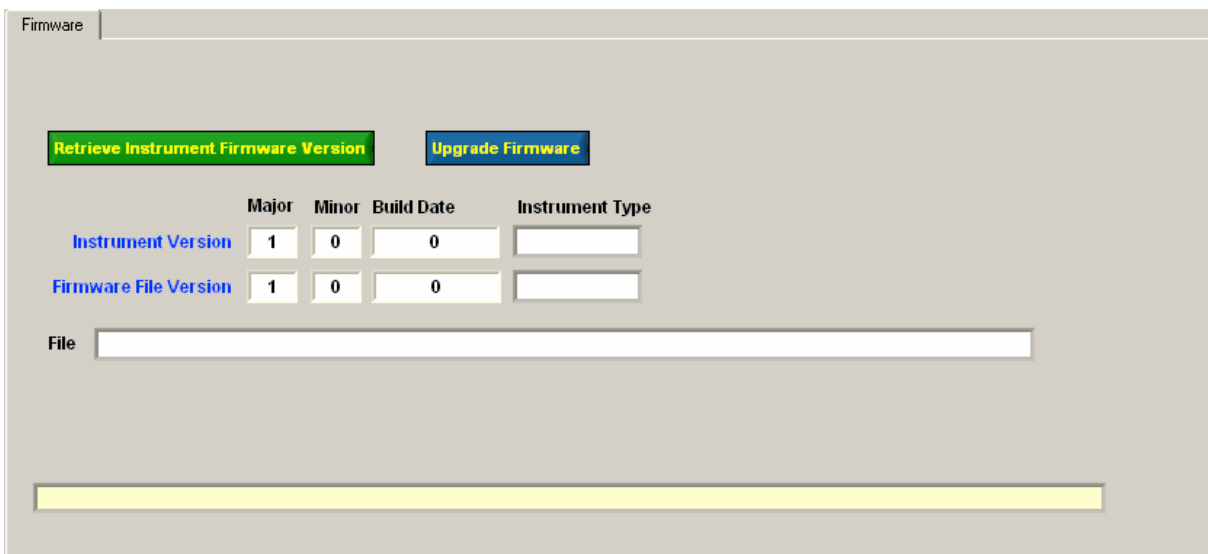
### 5.12.17 Show Logger Tab

The  **Show Data Logger Tab** check box causes the program to show the Logger tab.



## 6 Firmware Tab

The Firmware tab is used to perform firmware upgrades. Instructions for using this panel are in the [Firmware Upgrades](#) section.



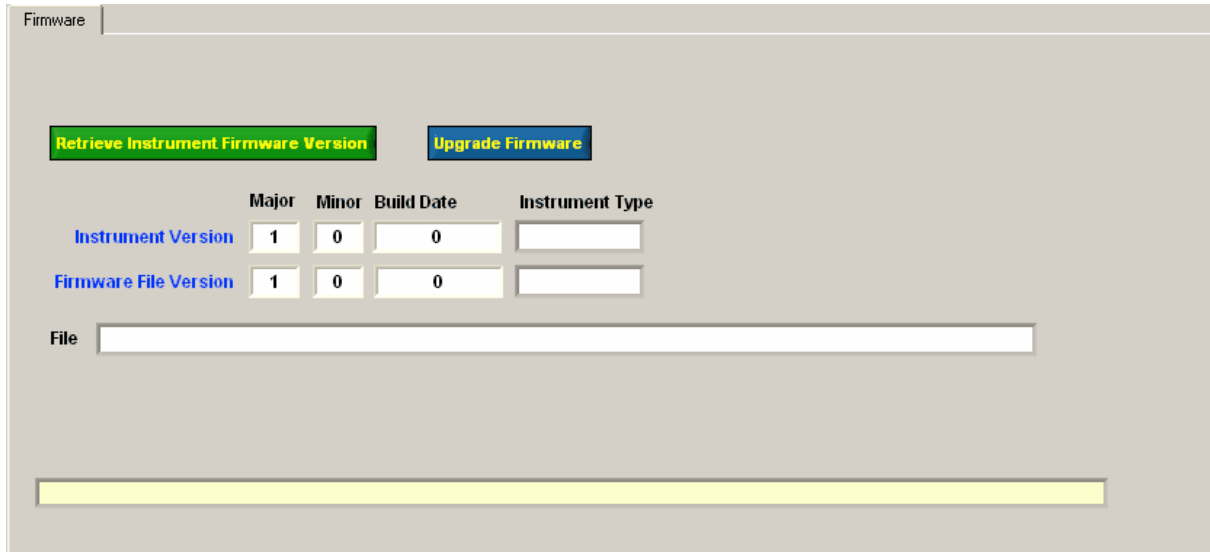
## 7 Upgrading the Units Firmware

**Before upgrading your firmware the following step is recommended to make sure the unit or the computer will not be interrupted by the loss of power during the upgrade procedure.**

Make sure that the PC to unit communications is good by performing file transfers and programming with the PC you are going to do the upgrade with. Do not run other software on your PC when performing an upgrade. Performance issues have been found with some USB-RS232 adapters which make them unsuitable for upgrading units.

## 7.1 Firmware Tab

The Firmware tab is used to perform firmware upgrades.



The screenshot shows the Firmware tab interface. At the top left, there is a tab labeled 'Firmware'. Below it, there are two buttons: 'Retrieve Instrument Firmware Version' (highlighted in green) and 'Upgrade Firmware' (highlighted in blue). Below these buttons is a table with the following structure:

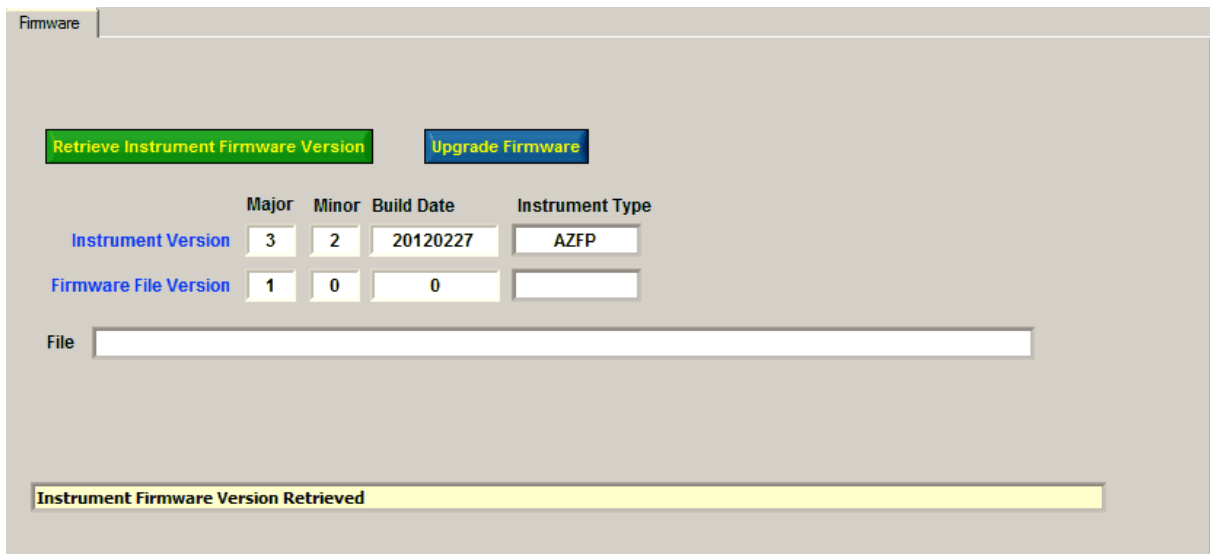
|                       | Major | Minor | Build Date | Instrument Type |
|-----------------------|-------|-------|------------|-----------------|
| Instrument Version    | 1     | 0     | 0          |                 |
| Firmware File Version | 1     | 0     | 0          |                 |

Below the table is a 'File' label followed by a text input field. At the bottom of the interface, there is a yellow progress bar.

### 7.1.1 Retrieve Instrument Firmware Version

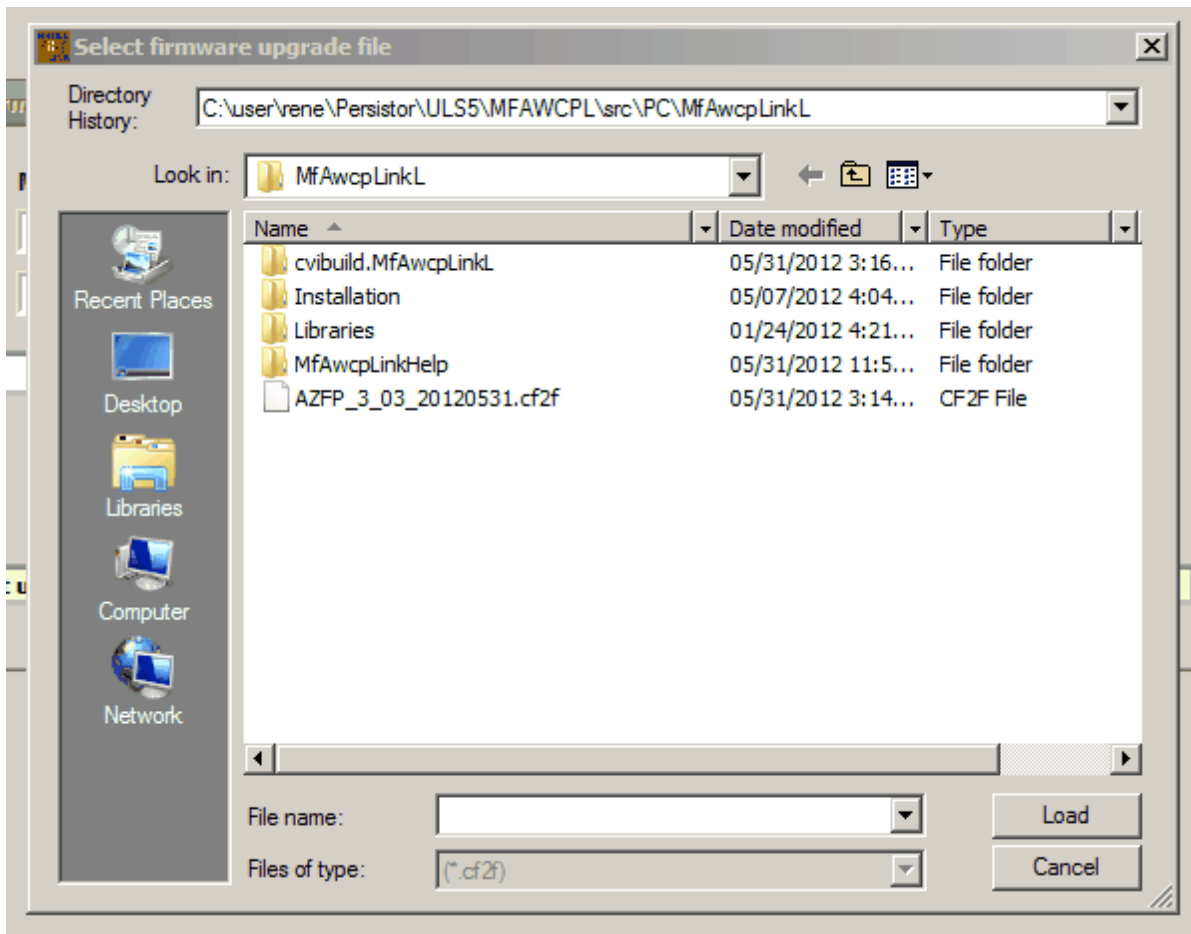
Make sure your unit is not deployed by clicking on the **End Deployment - Get Status** located in the Deploy tab.

Clicking on **Retrieve Instrument Firmware Version** command button cause the program to send a request to the instrument for its current firmware version.



### 7.1.2 Upgrade the AZFP Firmware

Clicking on the **Upgrade Firmware** command button opens a file selection box for the user to select a (\*.cf2f) firmware file.



Select a .cf2f file to upgrade the unit with.

Files are always named IPS5\_x\_zz\_yyyymmdd.cf2f where:

x - Firmware's major version number  
zz - Firmware's minor version number  
yyyy - Firmware's year  
mm - Firmware's month  
dd - Firmware's day

|                       | Major | Minor | Build Date | Instrument Type |
|-----------------------|-------|-------|------------|-----------------|
| Instrument Version    | 3     | 2     | 20120227   | AZFP            |
| Firmware File Version | 3     | 3     | 20120531   | AZFP            |

File: c:\user\rene\Persistor\ULS5\IMFAWCPL\src\PC\ImfAwcpLink\LAZFP\_3\_03\_20120531.cf2f

**Proceed with the Upgrade** **Cancel the Upgrade**

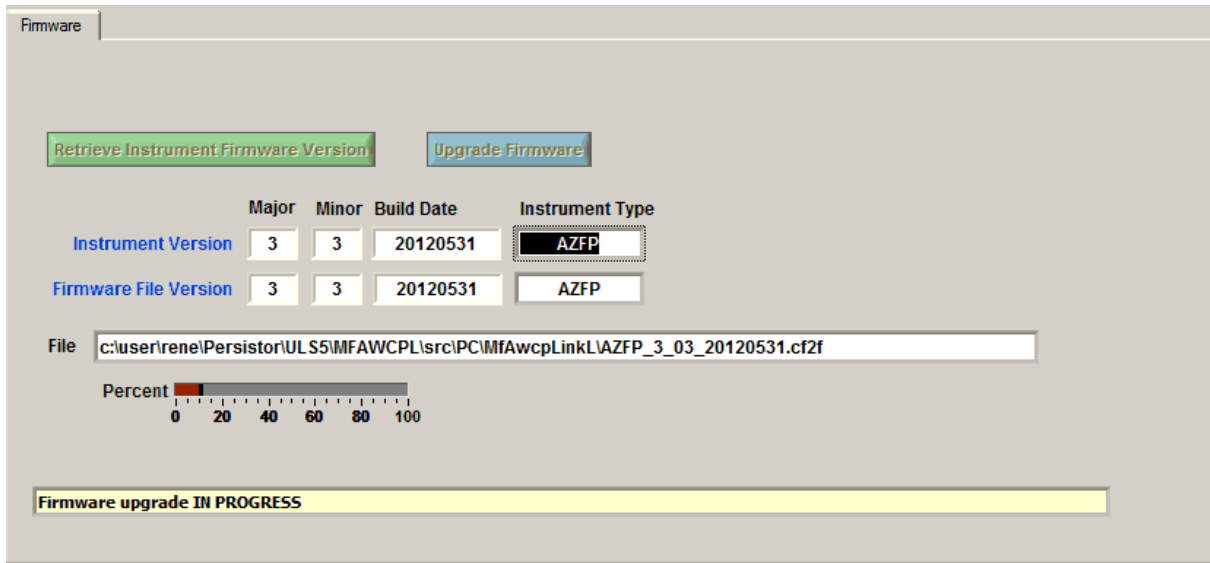
Click on Upgrade or Cancel

Note the firmware version of the file is now listed and there is the addition of

**Proceed with the Upgrade** and **Cancel the Upgrade** command buttons.

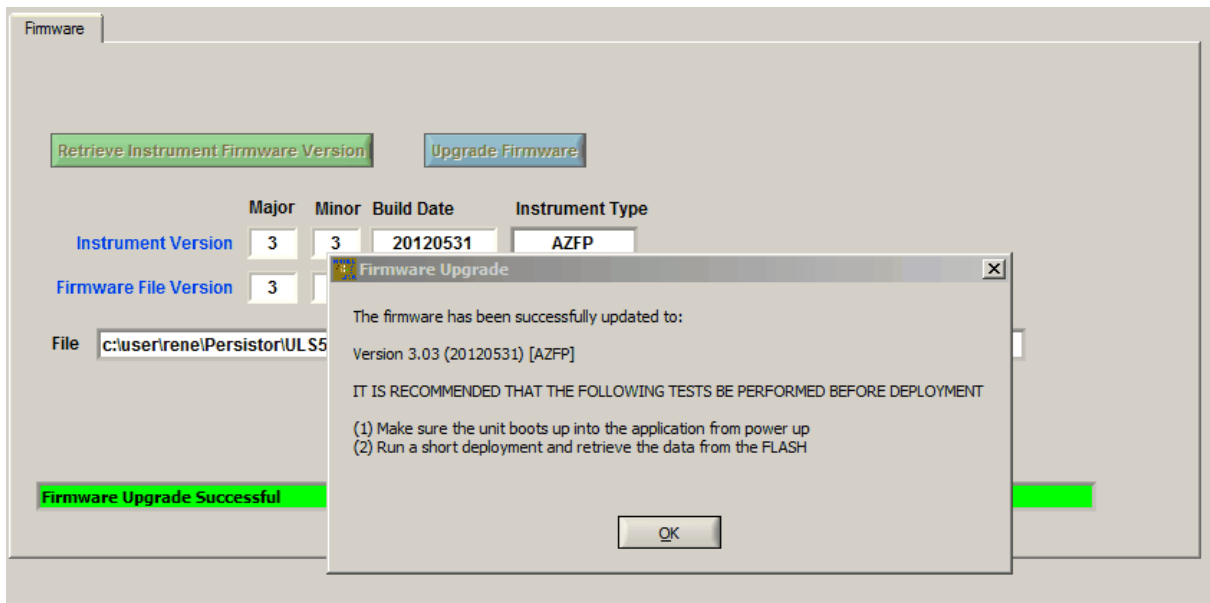
To cancel the upgrade click on the **Cancel the Upgrade** command buttons.

To continue click on the **Proceed with the Upgrade** command button.



A percentage done bar is displayed as the firmware is downloaded to the unit.

Below is an example of a successful upgrade.

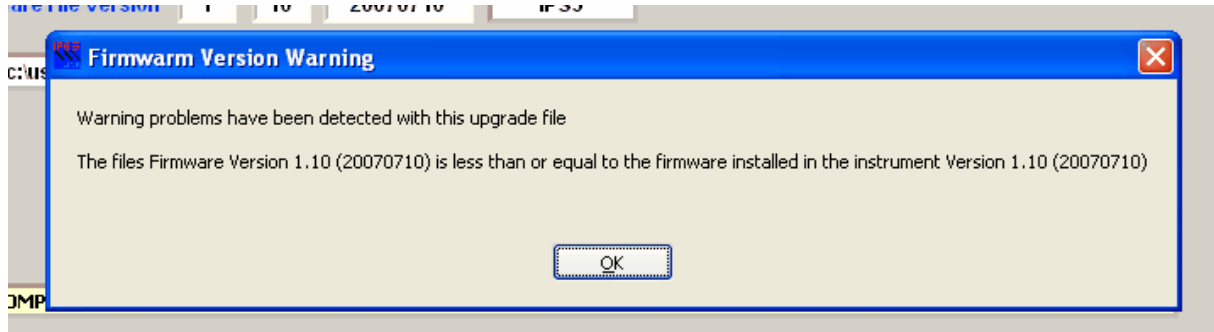


### 7.1.3 Firmware Upgrade Trouble Shooting

This section is used to trouble shoot potential problems that can occur.

### 7.1.3.1 Firmware Version Warning

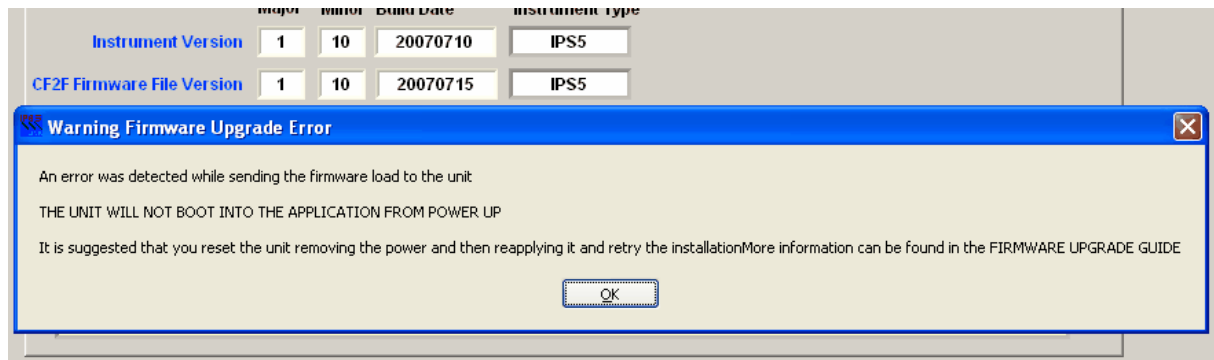
A firmware version warning is caused by trying to upgrade a unit with an older version of the firmware. This is only a warning and the software will let you do so.



### 7.1.3.2 Firmware Upgrade Warning Aborted Upgrade

The following message will be caused if there is a communication error or the unit is rebooted during the download of the unit.

In this case the unit will not boot into the firmware as it is left in a state that boots it into its native Operating System PicoDOS.

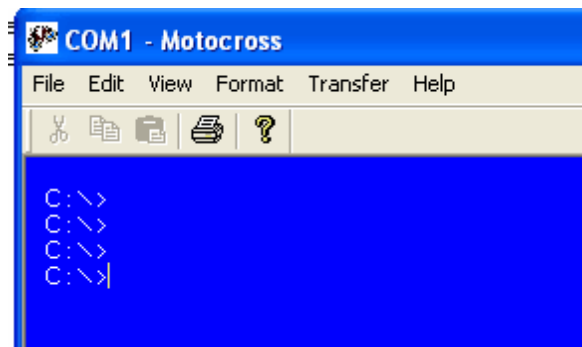


Click on the OK button. Enter the terminal mode from the main tab by clicking on the

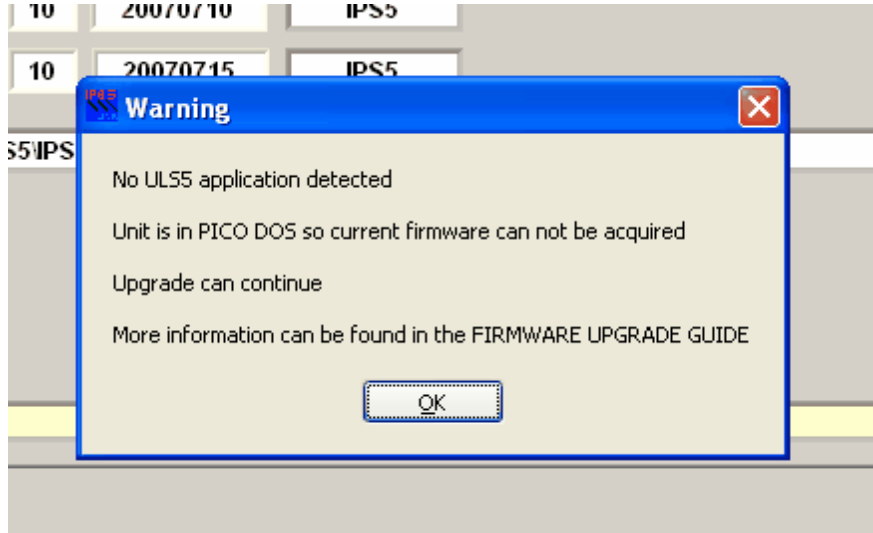


command button.

Press the return key to confirm that you get a C:\> prompt. If it doesn't appear then reset the unit by removing and then re-applying power to the unit.



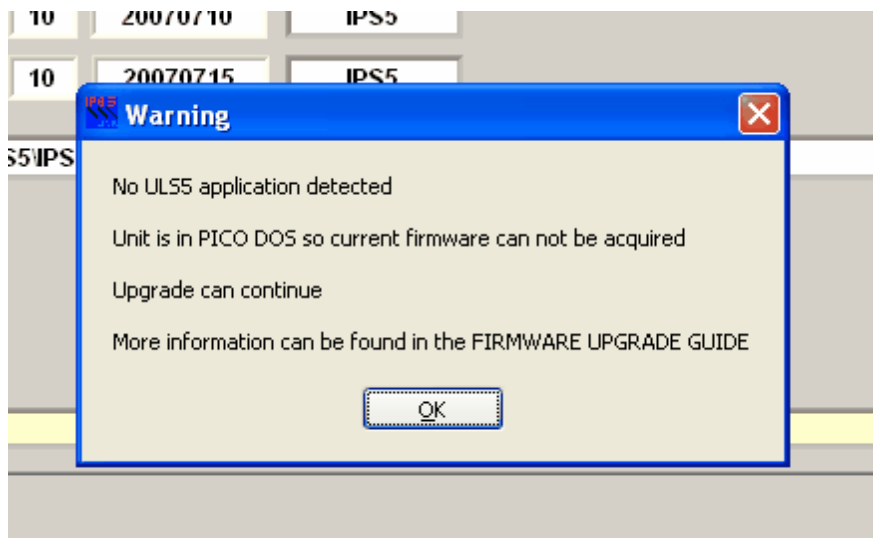
At this stage you can return to the Firmware Tab and retry the upgrade. NOTE: When you start the upgrade while the unit is in PicoDOS you will get a message that the upgrade procedure cannot confirm the units current firmware version.



### 7.1.3.3 Firmware Upgrade Warning Unit In PicoDOS

This warning appears if the unit was not running in the application. Instead the unit is running in the PICO DOS operating environment which is the native OS for the control CPU if it is not running an application. This could happen if a previous firmware upgrade was attempted and failed.

When you start the upgrade while the unit is in PicoDOS you will get a message that the upgrade procedure cannot confirm the units current firmware version.



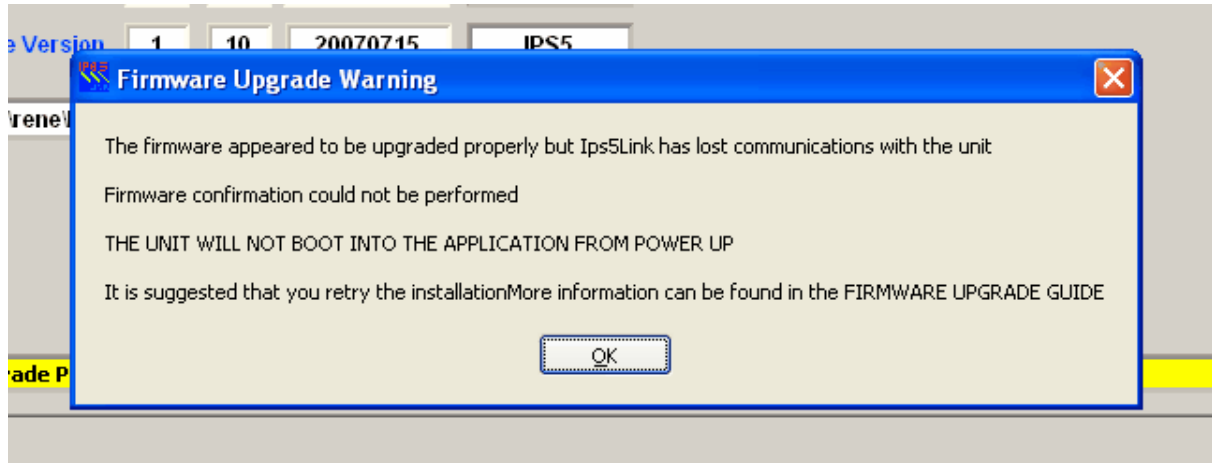
Click on the Ok button to continue and the file select option for the firmware file will appear and you can continue with the firmware upgrade.



#### 7.1.3.4 Firmware Upgrade Warning Lost Communications

If the warning shown below shows up then the upgrade procedure lost communications with the unit after it was booted into the application or the upgrade procedure could not detect the return to PicoDOS to set the unit to boot into the application from power up.

In either case it is possible the firmware was downloaded correctly but since the version could not be confirmed the unit will boot into PicoDOS on power up which is not desirable for any deployment.



Please contact the manufacturer if this problem occurs.

## 8 Deployment Steps

### 8.1 Clear the FLASH Memory

Clear the CF if the space will be required for the deployment and/or the data has been recovered. The best way to clear all data is found in the [Formatting the CF](#) section.

### 8.2 Confirm Date/Time Clock

Confirm that the units date and time is correct.

### 8.3 Confirm your parameters

Make sure you have the correct deployment parameters.

### 8.4 Inserting a New Compact FLASH card

If you are inserting a new CF card it is recommended that it be FORMATTED using AzfpLink.

Power down the unit.

Remove the old CF.

Insert the CF making sure it is properly seated.

Power the unit up.

End the deployment as the unit usually start up in DEPLOYED mode.

Format the CF using the instruction found in the [Formatting the CF](#) section.

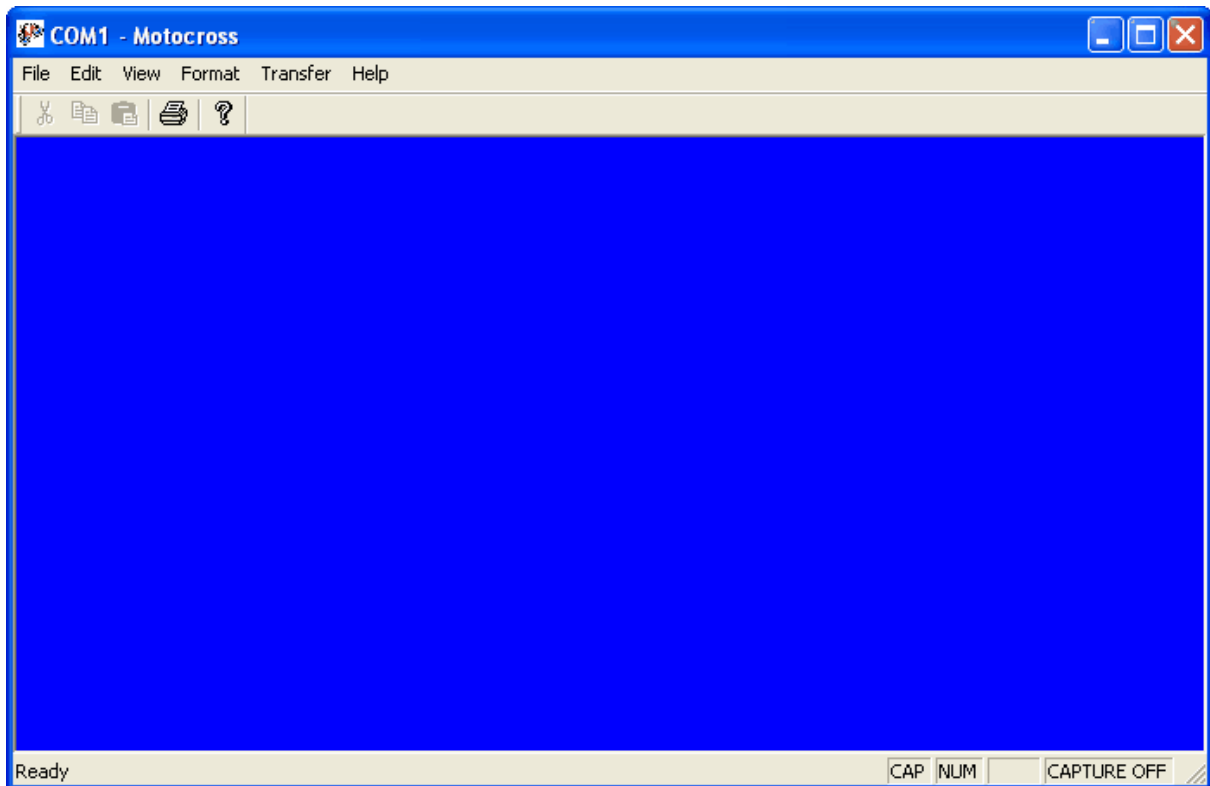
It is recommended that you start a deployment and then stop it to make sure the unit wrote to the CF with no problem. Then either format the CF or delete the files.

## 8.5 Confirming that a unit is running

### 8.5.1 Units connected to a cable without RS232 output

For units that are connected to a shore cable and not set to send RS232 data to the surface. A quick test can be performed to confirm operation after the deployment.

Enter terminal mode by clicking on the  button to go into terminal mode.



Press the 'v' key (lower case v) continuously until you see the message "Verbose set to ON"

```
PP01 1 N 1410 2007/07/09 15:26:43.26 TX 31427 TY 31025 BA 47325 AT [12658] AP [45154]
Verbose set to ON
Profile update 6 2007/07/09 15:26:53.26
Profile update 7 2007/07/09 15:26:54.26
Profile update 8 2007/07/09 15:26:55.26
Profile update 9 2007/07/09 15:26:56.26
Profile update 10 2007/07/09 15:26:57.26
PP01 2 N 1410 2007/07/09 15:26:53.26 TX 31432 TY 31040 BA 47331 AT [12693] AP [45159]
Profile update 11 2007/07/09 15:27:03.26
Profile update 12 2007/07/09 15:27:04.26
Profile update 13 2007/07/09 15:27:05.27
Profile update 14 2007/07/09 15:27:06.27
Profile update 15 2007/07/09 15:27:07.27
PP01 3 N 1410 2007/07/09 15:27:03.26 TX 31436 TY 31024 BA 47323 AT [12691] AP [45153]
Profile update 16 2007/07/09 15:27:13.26
Profile update 17 2007/07/09 15:27:14.26
Profile update 18 2007/07/09 15:27:15.27
Profile update 19 2007/07/09 15:27:16.27
Profile update 20 2007/07/09 15:27:17.27
PP01 4 N 1410 2007/07/09 15:27:13.26 TX 31439 TY 31018 BA 47323 AT [12691] AP [45116]
```

Note that lines that appear. PP01 means the profile is for Phase 1 followed by the ping number etc.

\*\* Do not leave the unit in this mode as it uses more battery power.

Press the 'V' key (upper case V) continuously until you see "Verbose set to OFF".

```
Profile update 47 2
Profile update 48 2
Profile update 49 2
Profile update 50 2
PP01 10 N 1410 2
Profile update 51 2
Verbose set to OFF
```

## 9 Data Retrieval

If you have filled a CF card with data it is not recommended to retrieve the data using the RS232 serial port connection as this will take many hours depending on the volume of data. The best option is to remove the CF and retrieve the data using a generally available CF reader. These readers are generally sold with the option to read many types of CF cards.

\*\* Be sure to end the deployment and then power the unit down before removing the CF

The data retrieval using the serial port is documented in the [File Tab](#) section. This option is useful if there is just a small amount of data or the user just wants to retrieve a small subset of data.

## 10 Data Formats

The section describes output formats.

## 10.1 Real Time Profile Output Format

### 10.1.1 Packet Types

The Profile Data sent in real time over the RS232 has two possible two packet formats. These packets are a byte stream as described in the following two sections.

There are Packet Type 2, Packet Type 3.

The binary data in the payloads are in "Big-Endian" (Motorola) format byte order and needs to be converted to Intel PC's which are little-Endian (Intel).

The packets are basically identical except that Packet Type 3 as a byte counter for the payload data that allows more than 65535 bytes to be sent out in one packet transmission. Packet Type 3 used for profiles that have a large bin counts and have the Sum of Squares data for averaged range and ping bins. The packet headers are in ASCII so there is no Endian conversion required (see below) for the packet information.

Packet Type 5 packets are STATUS packets.

#### 10.1.1.1 Packet Format Type 2

| Field | Length | Type   | Value | Value                 | Format       | Comment   |
|-------|--------|--------|-------|-----------------------|--------------|---|
| 1     | 1      | ASCII  | \n    | ASCII line feed       | char         | ASCII value 13  |
| 2     | 1      | ASCII  | \$    | ASCII '\$'            | char         | Packet header   |
| 3     | 1      | ASCII  | 2     | ASCII '2'             | char         | Packet header   |
| 4     | 4      | ASCII  | XXXX  | packet counter        | HEX 4 bytes  | Unique packet counter in hex format   |
| 5     | 4      | ASCII  | XXXX  | data type             | HEX 4 bytes  | The type of data in the payload   |
| 6     | 4      | ASCII  | XXXX  | num bytes (N)         | HEX 4 bytes  | The number of bytes in the payload (N)  |
| 7     | 5      | ASCII  | BHEAD | ASCII "BHEAD"         | 5 characters | The character string "BHEAD"  |
| 8     | 1      | ASCII  | \r    | ASCII carriage return | char         | ASCII Value 25  |
| 9     | N      | binary |       | packet payload        | char         | Character buffer containing data structures   |
| 10    | 1      | ASCII  | \$    | ASCII '\$'            | char         | Packet tail   |
| 11    | 1      | ASCII  | 8     | ASCII '8'             | char         | Packet tail   |
| 12    | 4      | ASCII  | XXXX  | packet counter        | HEX 4 bytes  | Unique packet counter in hex format should be same as field 3                                   |
| 13    | 4      | ASCII  | XXXX  | checksum              | HEX 4 bytes  | checksum of payload where checksum is the sum of the payload characters into unsigned short int |
| 14    | 5      | ASCII  | BTAIL | ASCII "BTAIL"         | 5 characters | The character string "BTAIL"  |
| 15    | 1      | ASCII  | \n    | ASCII line feed       | char         | ASCII value 13  |

#### 10.1.1.2 Packet Format Type 3

| Field | Length | Type | Value | Value | Format | Comment |
|-------|--------|------|-------|-------|--------|---------|
|-------|--------|------|-------|-------|--------|---------|

|    |   |        |              |                       |              |   |
|----|---|--------|--------------|-----------------------|--------------|---|
| 1  | 1 | ASCII  | \n           | ASCII line feed       | char         | ASCII value 13  |
| 2  | 1 | ASCII  | \$           | Character '\$'        | char         | Packet header   |
| 3  | 1 | ASCII  | 3            | character '3'         | char         | Packet header   |
| 4  | 4 | ASCII  | XXXX         | packet counter        | HEX 4 bytes  | Unique packet counter in hex format   |
| 5  | 4 | ASCII  | XXXX         | data type             | HEX 4 bytes  | The type of data in the payload   |
| 6  | 8 | ASCII  | XXXX<br>XXXX | num bytes (N)         | HEX 8 bytes  | The number of bytes in the payload (N)  |
| 7  | 5 | ASCII  | BHEAD<br>D   | ASCII "BHEAD"         | 5 characters | The character string "BHEAD"  |
| 8  | 1 | ASCII  | \r           | ASCII carriage return | char         | ASCII Value 25  |
| 9  | N | binary |              | packet payload        | char         | Character buffer containing data structures   |
| 10 | 1 | ASCII  | \$           | ASCII '\$'            | char         | Packet tail   |
| 11 | 1 | ASCII  | 8            | ASCII '8'             | char         | Packet tail   |
| 12 | 4 | ASCII  | XXXX         | packet counter        | HEX 4 bytes  | Unique packet counter in hex format should be same as field 3                                   |
| 13 | 4 | ASCII  | XXXX         | checksum              | HEX 4 bytes  | checksum of payload where checksum is the sum of the payload characters into unsigned short int |
| 14 | 5 | ASCII  | BTAIL        | ASCII "BTAIL"         | 5 characters | The character string "BTAIL"  |
| 15 | 1 | ASCII  | \n           | ASCII line feed       | char         | ASCII value 13  |

### 10.1.1.3 Packet Format Type 5

Packet type 5 is status information sent out by the instrument up to 24 hours after deployment.

| Field | Length | Type  | Value  | Value                                      | Format      | Comment  |
|-------|--------|-------|--------|--|-------------|--|
| 1     | 1      | ASCII | \n     | ASCII line feed                            | char        | ASCII value 13   |
| 2     | 1      | ASCII | \$     | Character '\$'                             | char        | Packet header  |
| 3     | 1      | ASCII | 5      | character '5'                              | char        | Packet header  |
| 4     | 4      | ASCII | XXXX   | Type                                       | HEX 4 bytes | Status message type  |
| 5     | 4      | ASCII | XXXX   | Value 1                                    | HEX 4 bytes | Status message value 1   |
| 6     | 8      | ASCII | XXXX   | Value 2                                    | HEX 4 bytes | Status message value 2   |
| 7     | 5      | ASCII | XXXX   | N  | HEX 4 bytes | The number of characters in the message not including the "STAT-" characters |
| 8     | 1      | ASCII | string | "STAT-" followed by a string of characters | char        | string of characters   |

|       |   |       |      |           |             |   |
|-------|---|-------|------|-----------|-------------|---|
| 8+N   | N | #     | \#'  | ASCII '#' | char        | character after string of characters  |
| 8+N+1 | 4 | ASCII | XXXX | checksum  | HEX 4 bytes | checksum of payload where checksum is the sum of the payload characters into unsigned short int |

Example: \$5e020000100010021STAT-Burst 1 P1 2016/02/26 15:18:38.10#0770

## 10.1.2 Data Type

Below is a table showing the data types.

| Data Type Number | Description       |
|------------------|-------------------|
| 0xBBAA           | Profile Data      |
| 0xADDE           | Message Packet    |
| 0xAAAA           | System Parameters |

### 10.1.2.1 Profile Data

The profile byte stream is described below.

| All data is in binary Big-Endian format |       |                                |             |   |
|---|-------|--------------------------------|-------------|---|
| Field                                   | Bytes | Name                           | Units       | Comment   |
| 1                                       | 2     | Burst Number                   | n           | Profile number  |
| 2                                       | 2     | Instrument Serial Number       |             | The instrument serial number  |
| 3                                       | 2     | Ping Status                    | n           | status  |
| 4                                       | 4     | Burst Interval                 | n           | seconds   |
| 5                                       | 2     | Year                           | 20YY        | year  |
| 6                                       | 2     | Month                          | 1-12        | month   |
| 7                                       | 2     | Day                            | 1-31        | day   |
| 8                                       | 2     | Hour                           | 0-23        | hour  |
| 9                                       | 2     | Minute                         | 0-59        | minute  |
| 10                                      | 2     | Second                         | 0-59        | seconds   |
| 11                                      | 2     | Hundreds                       | 0-99        | hundreds of seconds   |
| 12                                      | 8     | Digitization Rate chan 1,2,3,4 | samples/sec | 64000, 40000 or 20000 for each channel                                  |
| 13                                      | 8     | Lockout Index chan 1,2,3,4     | N           | The sample number samples skipped at the start of the ping (4 channels) |
| 14                                      | 8     | Bins 1,2,3,4                   | N           | number of bins (4 channels)   |
| 15                                      | 8     | Range Samples per Bin          | N           | range samples per bin (4 channels)                                      |
| 16                                      | 2     | Ping Per Profile               | N           | number of pings per profile   |
| 17                                      | 2     | Averaged pings                 |             | Flag to indicate if pings are averaged in time                          |
| 18                                      | 2     | Num Acquired Pings             | N           | Pings that have been acquired in this burst                             |
| 19                                      | 2     | Ping Period                    | Seconds     | Ping Period in seconds  |

|    |      |                           |        |  |
|----|------|---------------------------|--------|--|
| 20 | 2    | First Ping                |        | number of the first averaged ping or the ping number if not averaged       |
| 21 | 2    | Last Ping                 |        | number of the last averaged ping or same as First ping if not averaged     |
| 22 | 4    | Data Type of each channel |        | 1 = Averaged Data (5 bytes) , 0 = not averaged data (2 bytes)              |
| 23 | 2    | Data Error                |        | Error number if an error occurred  |
| 24 | 1    | Phase                     |        | Phase used to acquire this profile   |
| 25 | 1    | Over run                  |        | 1 if an over run occurred  |
| 26 | 1    | Number of channels        |        | 1,2,3 or 4   |
| 27 | 1    | Gain chan 1               |        | gain 0, 1, 2, 3 (Obsolete)   |
| 28 | 1    | Gain chan 2               |        | gain 0, 1, 2, 3 (Obsolete)   |
| 29 | 1    | Gain chan 3               |        | gain 0, 1, 2, 3 (Obsolete)   |
| 20 | 1    | Gain chan 4               |        | gain 0, 1, 2, 3 (Obsolete)   |
| 31 | 1    | Spare                     |        | spare  |
| 32 | 2    | Pulse Length chan 1       | uS     | The pulse length for chan 1  |
| 33 | 2    | Pulse Length chan 2       | uS     | The pulse length for chan 2  |
| 34 | 2    | Pulse Length chan 3       | uS     | The pulse length for chan 3  |
| 35 | 2    | Pulse Length chan 4       | uS     | The pulse length for chan 4  |
| 36 | 2    | Board number for chan 1   |        | The board the data came from for channel 1                                 |
| 37 | 2    | Board number for chan 2   |        | The board the data came from for channel 2                                 |
| 38 | 2    | Board number for chan 3   |        | The board the data came from for channel 3                                 |
| 39 | 2    | Board number for chan 4   |        | The board the data came from for channel 4                                 |
| 40 | 2    | Board Frequency chan 1    | Hz     | The frequency for the channel 1  |
| 41 | 2    | Board Frequency chan 2    | Hz     | The frequency for the channel 2  |
| 42 | 2    | Board Frequency chan 3    | Hz     | The frequency for the channel 3  |
| 43 | 2    | Board Frequency chan 4    | Hz     | The frequency for the channel 4  |
| 44 | 2    | Sensor Flag               |        | Sensor Flag to indicate if pressure sensor or temperature sensor available |
| 45 | 2    | Tilt x                    | Counts | counts   |
| 46 | 2    | Tilt y                    | Counts | counts   |
| 47 | 2    | Battery                   | Counts | counts   |
| 48 | 2    | Pressure                  | Counts | counts   |
| 49 | 2    | Temperature               | Counts | counts   |
| 50 | 2    | AD channel 6              | Counts | AD channel 6   |
| 51 | 2    | AD channel 7              | Counts | AD channel 7   |
| 52 | Bins | Data chan 1               |        | See documentation below  |

|    |  |                        |  |  |
|----|--|------------------------|--|--|
| 53 |  | Data chan 2 (if avail) |  |  |
| 54 |  | Data chan 3 (if avail) |  |  |
| 55 |  | Data chan 4 (if avail) |  |  |

### Channel Storage

Data that is stored as 16 bit digitized data is stored as consecutive 16 bit values. The number is defined by the number of bins or NumBins.

Averaged data is summed up linear scale data that is stored in NumBins \* 32 bit unsigned integer sums, this is followed by NumBins \* 8 bit Overflow counts.

The averaged data is calculated by Overflow \* 0xFFFF + the sum. This gives linear scale from the detector which is a log detector.

Contact ASL Environmental Sciences support for more details on how to convert this data to Sv or Ts and how to convert sensor counts to Engineering units.

### 10.1.2.2 Message Data

This section describes the message format from the unit.

| Field | Bytes | Format                | Name    | Comment        |
|-------|-------|-----------------------|---------|----------------|
| 1     | 2     | binary                | Number  | Message Number |
| 2     | 2     | binary                | value   | Message Value  |
| 3     | 100   | ASCII Null Terminated | message | Message text   |

### 10.1.2.3 System Information

A system data packet contains information about the system. The data consists of the following 'C' data structures.

The data is stored in "Big-Endian" (Motorola) format byte order.

This packet of information is sent by the instrument when it enters data (DEPLOYED) or goes into STANDBY mode.

```
typedef struct {
    unsigned short VersionMajor;    // Major version number
    unsigned short VersionMinor;    // Minor version number
    unsigned long  VersionDate;     // Version date
    unsigned short File;            // File Version number
    unsigned short ParameterVersion; // Parameter version
    unsigned long  CPU;             // CPU number
    unsigned short SerialNumber;    // Serial number
    unsigned short SizeofSystemParameters; // size of this structure
    unsigned short InstrumentType;  // instrument type
}
```



```

    unsigned short ConfigurationVersion;    // configuration version number
    unsigned short BoardVersion;           // digital board version
    unsigned short Reserved[1];            // reserved
} version_t;

typedef struct {

    version_t      Version;                 // Contains version information
    unsigned long  FreeSectors;             // Total free sectors on the FLASH
    unsigned long  TotalSectors;           // Total sectors on the FLASH
    unsigned long  BytesPerSector;         // Bytes per sector on the FLASH
    unsigned short Mode;                   // Mode instrument is in Usually STANDBY
    unsigned short FullDuplex;             // Usually should be HALF DUPLEX
    unsigned short ValidConfiguration;     // FLAG for the current parameters
    unsigned short ParametersSaved;        // flag that the parameters is saved to VEEPROM
    unsigned short ConfigSaved;           // flag that the configuration is saved to VEEPROM
    unsigned short Watchdog;               // Indicator as to weather the unit was woken from
WATCHDOG timer
    unsigned short Reserved[4];
} system_t;

```

| All data is in binary Big-Endian format |       |  |   |
|---|-------|--|---|
| Field                                   | Bytes | Name                                   | Comment   |
| 1                                       | 2     | Version Major                          | The major version number of the firmware                                      |
| 2                                       | 2     | Version Minor                          | The minor version number of the firmware                                      |
| 3                                       | 4     | Version date                           | The date of the version as a numerical such as 20161201 (dec 1, 2016)         |
| 4                                       | 4     | File version                           | The file version number (1)   |
| 5                                       | 2     | Parameter version                      | The parameter version number (2)  |
| 6                                       | 4     | CPU                                    | CPU serial number   |
| 7                                       | 2     | Size of the system parameter structure | size of the system_parameters_t structure                                     |
| 8                                       | 2     | Instrument type                        | always 5 for AZFP   |
| 9                                       | 2     | Configuration Version                  | Configuration Version (2)   |
| 10                                      | 2     | Board Version                          | Board version * 100 (example 210 = 2.10)                                      |
| 11                                      | 2     | Reserved                               | reserved  |
| 12                                      | 4     | Free Sectors                           | Total free sectors on the FLASH   |
| 13                                      | 4     | Total Sectors                          | Total sectors on the FLASH  |
| 14                                      | 4     | Bytes per Sector                       | Bytes per sector on the FLASH   |
| 15                                      | 2     | Mode                                   | Mode STANDBY = 0xabcd, 1 = MODE_DEPLOYED                                      |
| 16                                      | 2     | FullDuplex                             | RS232 Duplex 0=false (default and normal operation), 1 = true                 |
| 17                                      | 2     | ValidConfiguration                     | 1 = true valid configuration has been received by the instrument, 0 = false   |
| 18                                      | 2     | ConfigSaved                            | 1 = configuration has been saved to VEEPROM, 0 = false no configuration saved |
| 19                                      | 8     | Reserved                               | reserved  |

### 10.1.3 Big Endian and Little Endian Formats

Binary data that is retrieved from the units are in Big Endian or Motorola format.

Below is a 'C' routine that is use for converting the binary data.

```
#ifndef _SWAPENDIAN_H
#define _SWAPENDIAN_H

// Macs and SGIs are Big-Endian; PCs are little endian
// returns TRUE if current machine is little endian
extern int IsLittleEndian(void);

/*****
  FUNCTION: SwapEndian
  PURPOSE: Swap the byte order of a structure
  EXAMPLE: float F=123.456;; SWAP_FLOAT(F);
  *****/

#define SWAP_SHORT(Var)  Var = *(short*)          SwapEndian((void*)&Var,
sizeof(short))
#define SWAP_USHORT(Var) Var = *(unsigned short*) SwapEndian((void*)&Var,
sizeof(short))
#define SWAP_LONG(Var)   Var = *(long*)          SwapEndian((void*)&Var, sizeof(long))
#define SWAP_ULONG(Var)  Var = *(unsigned long*) SwapEndian((void*)&Var, sizeof(long))
#define SWAP_RGB(Var)    Var = *(int*)          SwapEndian((void*)&Var, 3)
#define SWAP_FLOAT(Var)  Var = *(float*)        SwapEndian((void*)&Var,
sizeof(float))
#define SWAP_DOUBLE(Var) Var = *(double*)       SwapEndian((void*)&Var,
sizeof(double))

extern void *SwapEndian(void* Addr, const int Nb);

#endif

static long _TestEndian=1;

int IsLittleEndian(void) {
    return *(char*)&_TestEndian;
}

/*****
  FUNCTION: SwapEndian
  PURPOSE: Swap the byte order of a structure
  EXAMPLE: float F=123.456;; SWAP_FLOAT(F);
  *****/

void *SwapEndian(void* Addr, const int Nb) {
    static char Swapped[16];
    switch (Nb) {
        case 2:
            Swapped[0]=*((char*)Addr+1);
            Swapped[1]=*((char*)Addr );
            break;
        case 3:
            // As far as I know, 3 is used only with RGB images
            Swapped[0]=*((char*)Addr+2);
            Swapped[1]=*((char*)Addr+1);
    }
}
```

```
        Swapped[2]=*((char*)Addr );
        break;
    case 4:
        Swapped[0]=*((char*)Addr+3);
        Swapped[1]=*((char*)Addr+2);
        Swapped[2]=*((char*)Addr+1);
        Swapped[3]=*((char*)Addr );
        break;
    case 8:
        Swapped[0]=*((char*)Addr+7);
        Swapped[1]=*((char*)Addr+6);
        Swapped[2]=*((char*)Addr+5);
        Swapped[3]=*((char*)Addr+4);
        Swapped[4]=*((char*)Addr+3);
        Swapped[5]=*((char*)Addr+2);
        Swapped[6]=*((char*)Addr+1);
        Swapped[7]=*((char*)Addr );
        break;
    case 16:Swapped[0]=*((char*)Addr+15);
        Swapped[1]=*((char*)Addr+14);
        Swapped[2]=*((char*)Addr+13);
        Swapped[3]=*((char*)Addr+12);
        Swapped[4]=*((char*)Addr+11);
        Swapped[5]=*((char*)Addr+10);
        Swapped[6]=*((char*)Addr+9);
        Swapped[7]=*((char*)Addr+8);
        Swapped[8]=*((char*)Addr+7);
        Swapped[9]=*((char*)Addr+6);
        Swapped[10]=*((char*)Addr+5);
        Swapped[11]=*((char*)Addr+4);
        Swapped[12]=*((char*)Addr+3);
        Swapped[13]=*((char*)Addr+2);
        Swapped[14]=*((char*)Addr+1);
        Swapped[15]=*((char*)Addr );
        break;
    }
    return (void*)Swapped;
}
```

## 10.2 Exported Data File

The format of the exported files is described in section [Export Profiles](#).

## 10.3 FLASH Data Format

Data on the CF is stored in binary “Big-Endian” (Motorola) format.

The data files consists of a profile flag followed by the profile.

Note that the FLAG is also in “Big-Endian” (Motorola) format.

|                    |
|--------------------|
| FLAG binary 0xFD02 |
| Profile            |
| FLAG binary 0xFD02 |
| Profile            |
| ... etc.           |

The profiles are in the same format as described in section [Profile Data](#).

## 10.4 Real Time Data Files

This section describes the format of the profiles as they are stored by AzfpLink when they are received.

The data is stored in "little-Endian" (Intel) binary format.

The data files consists of a profile flag followed by the profile.

|                    |
|--------------------|
| FLAG binary 0xFC02 |
| Profile            |
| FLAG binary 0xFC02 |
| Profile            |
| ... etc.           |

The profiles are in the same format as described in section [Profile Data](#) but are stored in the Intel Format.

## 11 Command Line Commands

The AZFP firmware contains some commands to enable third party programming of the unit for real time applications. Only one phase is allowed for this type of operation.

Command line commands can be entered via the terminal emulator that comes with the AzfpLink or any other terminal emulator.

Entering a '?' (question mark without the quotes) gets the following listing of the commands.

-----

Commands are composed of one or more characters followed by one or more parameters on one line. Commands and parameters are separated by blanks. Command or parameter letters enclosed with braces {} are optional. Parameters enclosed with square braces [] are mandatory. All addresses and values are expressed in base 16, Counts are in base 10.

| COMMAND | PARAMETER(S) | DESCRIPTION                |
|---------|--------------|----------------------------|
| &G      |              | Deploy unit. then send ACK |
| &F      |              | Full duplex                |

```

&H                Half duplex
&Pico             Jump to PICO DOS
&Reset           BIOS Reset
&V              Show firmware version
&Wreset         Reset using watchdog
dn              Dump system variables and parameters
ds              Dump system variables only
dp              Dump parameters only
di              Display directory on FLASH
dc              Display condense parameters
ee      [parameter]  Erase VEE parameter from VEEPROM memory          (CAUTION !!!)
es              Show all VEE parameters                               )
er              Read system parameters from VEEPROM and show         )
ed      [ERASE]     Erase all parameters in the VEEPROM except SYS. (CAUTION !!!)
ea      [NOAUTO, AUTO]  Enable or disable no auto deploy
eb      [ON, OFF]    Enable or disable backscatter pings
eo      [ERASE]     Erase old configuration data
ex      [ERASE]     List and ask to erase entries (CAUTION !!!!)
ec              Clean up and compact VEEPROM
en      [SERIAL serial]  View or set serial number of the instrument
ev      [BV version]   View or set board version of the instrument
#P1             Show phase 1
#P1C [y m d hr min sec]  Set the real time clock date and time
#P1Dy           Set phase 1 digrate all channels where y=0,1,2 0=64000 1=40000 2=20000
#P1Ky           Set phase 1 average pings in the burst y=1=true y=0=false
#P1FxEy         Set phase 1 Acquire frequency x=freq(1,2,3,or 4) y=1=true y=0=false
#P1FxDy         Set phase 1 digrate where x=freq(1,2,3,or 4) y=0,1,2 0=64000 1=40000
#P1FxP {pulse_len}  Set phase 1 pulse length, x=freq(1,2,3,or 4)
#P1FxRA {range_averaging}  Set phase 1 range averaging x=freq(1,2,3,or 4)
#P1FxRL {range_lockout}    Set phase 1 range lockout x=freq(1,2,3,or 4)
#P1FxRS {range_samples}    Set phase 1 range samples x=freq(1,2,3,or 4)
#P1RA {range_averaging}    Set phase 1 range averaging all channels
#P1RL {range_lockout}      Set phase 1 range lockout all channels
#P1RS {range_samples}      Set phase 1 range samples all channels
#P1Ox           Set phase 1 x=R (RS232 only) x=F (FLASH & RS232) x=O (FLASH only)
#P1PP {ping_period}        Set phase 1 ping period
#P1PI {profile_interval}   Set phase 1 profile interval
#P1PN {ping_per_profile}   Set phase 1 pings per profile
#P1S           Set the AZFP to one phase, start date now, RS232 output, long duration
#P1TT [minutes]           Set the start date to the top of the next hour + optional minutes
#P1TD [y m d hr min sec]  Set the start date to optional date entered, set to now if no date is
#P1U [ASL]               Save phase parameters to VEEPROM 'ASL' command line parameter requires
#PI                   Initialize phase parameters (resets clock 1 second timer)
#PG                   Acquire one or more and transmit one profile
#PS                   Set the sound speed
#CE                   Condense Pings Enable
#CD                   Condense Pings Disable
#COB                  RS232 output format BINARY - standard binary packet format
#COA                  RS232 output format ASCII - ASCII output
#COS                  RS232 output format BINARY SHORT - short binary format
#CSR                  Storage to RS232
#CSF                  Storage to FLASH
#CSB                  Storage to FLASH & RS232
#CMA                  Condense all profiles
#CMO [N]              Enable modulus mode and condense every N profile
#CB [C1] [C2] [C3] [C4]  Set bin averaging for each channel, min 1 max 1000
#CW                   Write condense parameters to VEEPROM
#CR                   Load condense parameters from VEEPROM and display them
#CZD                  Disable Sea-Bird modem operation
#CZE                  Enable Sea-Bird modem operation (condensed data output only)
#DIx                  Digital IO Mode x=1 ON, x=0 OFF, x=? report

```

#STx

Enable/Disable first 24 status information x=1 ON, x=0 OFF, x=? report

## 11.1 Limitation of Command Line Operation

The command line operations only allows the programming of a single phase configuration. These commands are intended for third party software for programming the unit for real time data acquisition.

Note that changed parameters using the # commands are not permanent until the #P1U command is used to store the parameters to the units non volatile memory (VEEPROM).

The main commands to use for operating the unit are:

&G and the #P1 commands.

## 11.2 Terminating a Data Acquisition

Once a data acquisition is started the unit goes into a low power mode. It is woken up on the second by a real time clock trigger. When it wakes it either acquires data or goes right back to sleep. Before going to sleep the unit checks to see if it should end data acquisition by looking for the character 's' on the RS232 port.

In the low power state and during data acquisition the serial port is shut down. This offers a very small window for the unit to see any 's' characters transmitted by the PC software so many 's' characters in sequence must be transmitted to accomplish the wake up.

To terminate a deployment and set the unit to standby mode enter a consecutive set of 's' characters.

Example:

```
sssssss  
Standby Mode
```

```
$20000aaaa003cBHEAD
```

```
CEv$80000077aBTAIL
```

NOTE: The unit will deploy automatically after one hour unless the NO AUTO DEPLOY (EA command) has been enabled.

## 11.3 Deploy (&G)

Deploy the unit using the current parameters and then send an acknowledge message packet.

## 11.4 Full Duplex (&F)

Set unit to full duplex so characters entered are echoed by the unit.

Note the unit must be run in Half Duplex unless being controlled manually using the command line commands.

## 11.5 Half Duplex (&H)

Set unit to half duplex so characters entered are not echoed by the unit. In this mode the terminal program should be set to echo characters if this is desired.

Note the unit must be run in Half Duplex unless being manually controlled.

## 11.6 Enter PICO DOS (&pico)

Exit the application and enter the underlying Operation System PICO DOS.

Use with caution. Used for maintenance such as reformatting the FLASH.

To return to the applications type in 'APP'.

## 11.7 RESET UNIT (&reset)

Reset the unit.

The unit resets and boots into the application.

## 11.8 Print Version Information (&V)

Send the firmware Version.

Example:

&V

```
AZFP Version 3.03 (20120531)
Persistor CF2 SN:6503 BIOS:4.2 PicoDOS:4.2
```

## 11.9 Dump System and Parameter Variables (dn)

Dump all system variables and parameters including phases and coefficient values.

Example:

```
DN
Parameters - 2011 08 31 14:30:15.99
Number of boards... 4
```

Board 0 BoardFreq. 38  
Board 1 BoardFreq. 125  
Board 2 BoardFreq. 200  
Board 3 BoardFreq. 460  
SoundSpeed ..... 1500.00  
Output ..... FLASH  
ACQ Start Date .... 2011 8 26 15 31 42  
NumPhases ..... 1  
P01 Start Date .... 2011 8 26 15 31 42  
P01 Duration(days). 2.6863  
P01 Phase Type..... Normal  
P01 PingPeriod ..... 1  
P01 ProfileInterval. 1  
P01 PingsPerProfile. 1  
P01 F1 BoardFrequency.. 38  
P01 F1 acquire..... 1  
P01 F1 Gain..... 1  
P01 F1 PulseLen ..... 150  
P01 F1 DigRate (hz)... 64000  
P01 F1 RangeSamples.... 6500  
P01 F1 LockOutIndex.... 0  
P01 F1 RangeAvgSamples. 1  
P01 F1 StoreSTD..... 0  
P01 F2 BoardFrequency.. 125  
P01 F2 acquire..... 1  
P01 F2 Gain..... 1  
P01 F2 PulseLen ..... 150  
P01 F2 DigRate (hz)... 64000  
P01 F2 RangeSamples.... 6500  
P01 F2 LockOutIndex.... 0  
P01 F2 RangeAvgSamples. 1  
P01 F2 StoreSTD..... 0  
P01 F3 BoardFrequency.. 200  
P01 F3 acquire..... 1  
P01 F3 Gain..... 1  
P01 F3 PulseLen ..... 150  
P01 F3 DigRate (hz)... 64000  
P01 F3 RangeSamples.... 6500  
P01 F3 LockOutIndex.... 0  
P01 F3 RangeAvgSamples. 1  
P01 F3 StoreSTD..... 0  
P01 F4 BoardFrequency.. 460  
P01 F4 acquire..... 1  
P01 F4 Gain..... 1  
P01 F4 PulseLen ..... 150  
P01 F4 DigRate (hz)... 64000  
P01 F4 RangeSamples.... 6500  
P01 F4 LockOutIndex.... 0  
P01 F4 RangeAvgSamples. 1  
P01 F4 StoreSTD..... 0  
Coef Serial Number. 51102  
Eclock (sec)..... 2.5000488e-07  
Paros Installed ... NO



Gain Installed .... YES  
Eclock Freq (hz) .. 3999922.00  
RTC Period (sec)... 1.9531158e-03  
RTC Frequency (hz). 512.002412  
RTC PpmOffset (hz). 4.71  
RTC Calibration.... -2  
AG X\_a ..... -5.2934010e+01  
AG X\_b ..... 2.4242110e-03  
AG X\_c ..... 0.0000000e+00  
AG X\_d ..... 0.0000000e+00  
AG Y\_a ..... -5.3141287e+01  
AG Y\_b ..... 2.4751040e-03  
AG Y\_c ..... 0.0000000e+00  
AG Y\_d ..... 0.0000000e+00  
ANALOG Press a0.... -1.2505000e+01  
ANALOG Press a1.... 3.1270000e+01  
ANALOG Press a2.... 0.0000000e+00  
ANALOG Press a3.... 0.0000000e+00  
ANALOG Temp ka .... 2.9257143e+02  
ANALOG Temp kb .... 3.0000000e+03  
ANALOG Temp kc .... 1.9504800e+00  
ANALOG Temp A ..... 1.4660000e-03  
ANALOG Temp B ..... 2.3880900e-04  
ANALOG Temp C ..... 1.0033500e-07  
CurPhase ..... 1  
CurPingModulus .... 1  
Freq 0 CurFiringOrder .... 3  
Freq 0 CurBoard ..... 0  
Freq 0 CurFreq ..... 38  
Freq 0 CurPulseLen ..... 150  
Freq 0 CurGain... ..... 1  
Freq 0 CurDigRate ..... 64000  
Freq 0 CurSamplesPerPing . 6500  
Freq 0 CurBins ..... 6500  
Freq 0 CurRngSmplPerBin .. 1  
Freq 0 CurPhaLockOutIndex. 0  
Freq 0 CurPhaseStoreSTD... 0  
Freq 1 CurFiringOrder .... 2  
Freq 1 CurBoard ..... 1  
Freq 1 CurFreq ..... 125  
Freq 1 CurPulseLen ..... 150  
Freq 1 CurGain... ..... 1  
Freq 1 CurDigRate ..... 64000  
Freq 1 CurSamplesPerPing . 6500  
Freq 1 CurBins ..... 6500  
Freq 1 CurRngSmplPerBin .. 1  
Freq 1 CurPhaLockOutIndex. 0  
Freq 1 CurPhaseStoreSTD... 0  
Freq 2 CurFiringOrder .... 1  
Freq 2 CurBoard ..... 2  
Freq 2 CurFreq ..... 200  
Freq 2 CurPulseLen ..... 150  
Freq 2 CurGain... ..... 1

```

Freq 2 CurDigRate ..... 64000
Freq 2 CurSamplesPerPing . 6500
Freq 2 CurBins ..... 6500
Freq 2 CurRngSmplPerBin .. 1
Freq 2 CurPhaLockOutIndex. 0
Freq 2 CurPhaseStoreSTD... 0
Freq 3 CurFiringOrder .... 0
Freq 3 CurBoard ..... 3
Freq 3 CurFreq ..... 460
Freq 3 CurPulseLen ..... 150
Freq 3 CurGain... ..... 1
Freq 3 CurDigRate ..... 64000
Freq 3 CurSamplesPerPing . 6500
Freq 3 CurBins ..... 6500
Freq 3 CurRngSmplPerBin .. 1
Freq 3 CurPhaLockOutIndex. 0
Freq 3 CurPhaseStoreSTD... 0

```

## 11.10 Display Stored File Names (di)

This command displays the files stored on the FLASH disk under the root directory \DATA.

```

Dir c:\DATA
C:\DATA\200901 <DIR>                2009/01/07 08:29 AM
c:\DATA\200901\20090107.LOG          4048 2009/01/07 05:35 PM
c:\DATA\200901\09010708.001         419832 2009/01/07 08:30 AM
c:\DATA\200901\09010708.DPL          2114 2009/01/07 08:30 AM
c:\DATA\200901\09010708.XML          6122 2009/01/07 08:30 AM
c:\DATA\200901\09010716.DPL          5289 2009/01/07 04:59 PM
c:\DATA\200901\09010716.XML          6123 2009/01/07 04:59 PM
c:\DATA\200901\09010716.001         1620864 2009/01/07 04:59 PM
c:\DATA\200901\09010717.001         46234672 2009/01/07 06:00 PM
c:\DATA\200901\09010717.DPL          8513 2009/01/07 05:26 PM
c:\DATA\200901\09010717.XML          6123 2009/01/07 05:26 PM
c:\DATA\200901\09010718.001         72172800 2009/01/07 07:00 PM
c:\DATA\200901\09010719.001         72172800 2009/01/07 08:00 PM
c:\DATA\200901\09010720.001         72172800 2009/01/07 09:00 PM
c:\DATA\200901\09010721.001         72172800 2009/01/07 10:00 PM
c:\DATA\200901\09010722.001         72172800 2009/01/07 11:00 PM
c:\DATA\200901\09010723.001         72172800 2009/01/08 00:00 AM
c:\DATA\200901\09010800.001         72172800 2009/01/08 01:00 AM
c:\DATA\200901\09010801.001         72172800 2009/01/08 02:00 AM
c:\DATA\200901\09010802.001         72172800 2009/01/08 03:00 AM
c:\DATA\200901\09010803.001         72172800 2009/01/08 04:00 AM
c:\DATA\200901\09010804.001         72172800 2009/01/08 05:00 AM
c:\DATA\200901\09010805.001         72172800 2009/01/08 06:00 AM
c:\DATA\200901\09010806.001         72172800 2009/01/08 07:00 AM
c:\DATA\200901\09010807.001         30914016 2009/01/08 07:25 AM
c:\DATA\200901\20090108.LOG          1282 2009/01/08 11:59 AM
c:\DATA\200901\20090109.LOG          4592 2009/01/09 01:12 PM
c:\DATA\200901\09010907.DPL          1055 2009/01/09 07:41 AM
c:\DATA\200901\09010907.XML          6120 2009/01/09 07:41 AM
c:\DATA\200901\09010907.001          296 2009/01/09 07:41 AM
c:\DATA\200901\09010910.001          2872 2009/01/09 10:52 AM
c:\DATA\200901\09010911.001          3376 2009/01/09 11:28 AM
c:\DATA\200901\09010912.001          10128 2009/01/09 00:53 PM
c:\DATA\200901\09010913.001          2676 2009/01/09 01:07 PM

```

```

1 Directories 33 Files 993658 KB
Used 997120 KB Free 3015680 KB Total 4012800 KB

```

## 11.11 Dump System Variables (ds)

Dump system variables.

```

Parameters - 2009 01 09 13:13:10.08
*Serial Number..... 55027
*CPU ..... 6503
*Parameter Version..... 1
*Configuration Version. 1
*Parameters Saved ..... YES
*Configuration Saved .. YES
*Duplex..... HALF
*Mode ..... STANDBY
*Valid Config..... YES
*CPU Speed ..... 14720

```

## 11.12 Dump System Parameters (dp)

Dump system parameters.

```

Number of boards... 2
Board 0 BoardFreq. 125
Board 1 BoardFreq. 200
SoundSpeed .... 1420.00
Output ..... RS232
ACQ Start Date .... 2009 1 9 13 17 21
NumPhases ..... 1
P01 Start Date .... 2008 12 9 10 46 18
P01 Duration(days). 41.6250
P01 Phase Type..... Normal
P01 PingPeriod ..... 1
P01 DigRate (hz).... 20000
P01 ProfileInterval. 9
P01 PingsPerProfile. 1
P01 RangeSamples.... 1991
P01 LockOutIndex.... 1
P01 RangeAvgSamples. 5
P01 StoreSTD..... 0
P01 F1 BoardFrequency.. 125
P01 F1 acquire..... 0
P01 F1 Gain..... 1
P01 F1 PulseLen ..... 150
P01 F2 BoardFrequency.. 200
P01 F2 acquire..... 1
P01 F2 Gain..... 1
P01 F2 PulseLen ..... 150
Coef Serial Number. 55027
Eclock (sec)..... 2.5000516e-07
Paros Installed ... NO
Gain Installed .... YES
Eclock Freq (hz) .. 3999917.51
RTC Period (sec)... 1.9531070e-03

```

```

RTC Frequency (hz). 512.004720
RTC PpmOffset (hz). 9.22
RTC Calibration.... -5
AG X_a ..... -4.5346364e+01
AG X_b ..... 1.2849060e-03
AG X_c ..... 0.0000000e+00
AG X_d ..... 0.0000000e+00
AG Y_a ..... -4.2824037e+01
AG Y_b ..... 1.2345080e-03
AG Y_c ..... 0.0000000e+00
AG Y_d ..... 0.0000000e+00
ANALOG Press m .... 4.3092200e+01
ANALOG Press b .... -1.7236900e+01
ANALOG Temp ka .... 5.1059848e+02
ANALOG Temp kb .... 3.0000000e+03
ANALOG Temp kc .... 1.8778043e+00
ANALOG Temp A ..... 1.4660000e-03
ANALOG Temp B ..... 2.3880900e-04
ANALOG Temp C ..... 1.0033500e-07
CurPhase ..... 0
CurPingModulus .... 0
CurPulseLen ..... 1
CurDigRate ..... 0
CurSamplesPerPing . 0
CurBins ..... 0
CurRngSmplPerBin .. 0
CurPhaLockOutIndex. 0

```

### 11.13 Erase VEEPROM Variables (ee)

ee [parameter]

Erase VEEPROM values

(DO NOT USE WITHOUT FACTORY AUTHORIZATION)

### 11.14 Display VEEPROM Variables (es)

Display the variables stored in the non volatile memory.

```

VEE has 904 bytes left
SYS.BAUD      = 115200
SYS.CLOCK     = 14720
PARAM_COEF    = (binary) 212 bytes
CONFIGVERSION = (binary) 2 bytes
SERIALNUMBER  = (binary) 6 bytes
PARAM_CONFIG  = (binary) 272 bytes
PARAMVERSION  = (binary) 2 bytes
ASLHARDWARE   = (binary) 256 bytes
PARAM_PHASE   = (binary) 624 bytes
PARAM_HEAD    = (binary) 26 bytes
--
VEE has 904 bytes left

```

## 11.15 Enable or disable auto deployment (ea)

WARNING!

Do not enable NO AUTO DEPLOY unless your instrument is to be used for real time deployments where it is controlled by a PC or other computer system. This feature is useful for real time systems so the unit will only acquire data when requested to by the controlling system.

Units default to auto deployment on boot up or after one hour of inactivity on the communications port. This is to avoid no data being recorded if the user has forgotten to deploy the instrument.

The EA command allows the units auto deployment feature to be disabled. By default NO AUTO DEPLOY is disabled in the units.

ea [NOAUTO, AUTO]

display, enable or disable auto deployment.

\*\* the unit NO AUTO DEPLOY should only be enabled for realtime operation with access to the units communications.

Examples no parameters:

EA

NO AUTO DEPLOY IS DISABLED

-----

Example to enable NO AUTO DEPLOY

EA NOAUTO

NO AUTO DEPLOY IS ENABLED

-----

Example to disable NO AUTO DEPLOY

EA AUTO

NO AUTO DEPLOY IS DISABLED

## 11.16 Read system variables form VEEPROM and display them (er)

Read the system variables from the non volatile memory and display them.

ES

Parameters - 2009 01 09 14:08:14.78  
\*Serial Number..... 55027  
\*CPU ..... 6503  
\*Parameter Version..... 1  
\*Configuration Version. 1  
\*Parameters Saved ..... YES  
\*Configuration Saved .. YES  
\*Duplex..... HALF  
\*Mode ..... STANDBY  
\*Valid Config..... YES  
\*CPU Speed ..... 14720  
Number of boards... 2  
Board 0 BoardFreq. 125  
Board 1 BoardFreq. 200  
SoundSpeed .... 1420.00  
Output ..... RS232  
ACQ Start Date .... 2009 1 9 13 17 21  
NumPhases ..... 1  
P01 Start Date .... 2008 12 9 10 46 18  
P01 Duration(days). 41.6250  
P01 Phase Type..... Normal  
P01 PingPeriod ..... 1  
P01 DigRate (hz).... 20000  
P01 ProfileInterval. 9  
P01 PingsPerProfile. 1  
P01 RangeSamples.... 1991  
P01 LockOutIndex.... 1  
P01 RangeAvgSamples. 5  
P01 StoreSTD..... 0  
P01 F1 BoardFrequency.. 125  
P01 F1 acquire..... 0  
P01 F1 Gain..... 1  
P01 F1 PulseLen ..... 150  
P01 F2 BoardFrequency.. 200  
P01 F2 acquire..... 1  
P01 F2 Gain..... 1  
P01 F2 PulseLen ..... 150  
Coef Serial Number. 55027  
Eclock (sec)..... 2.5000516e-07  
Paros Installed ... NO  
Gain Installed .... YES  
Eclock Freq (hz) .. 3999917.51  
RTC Period (sec)... 1.9531070e-03  
RTC Frequency (hz). 512.004720  
RTC PpmOffset (hz). 9.22  
RTC Calibration.... -5  
AG X\_a ..... -4.5346364e+01  
AG X\_b ..... 1.2849060e-03  
AG X\_c ..... 0.0000000e+00  
AG X\_d ..... 0.0000000e+00

```
AG Y_a ..... -4.2824037e+01
AG Y_b ..... 1.2345080e-03
AG Y_c ..... 0.0000000e+00
AG Y_d ..... 0.0000000e+00
ANALOG Press m .... 4.3092200e+01
ANALOG Press b .... -1.7236900e+01
ANALOG Temp ka .... 5.1059848e+02
ANALOG Temp kb .... 3.0000000e+03
ANALOG Temp kc .... 1.8778043e+00
ANALOG Temp A ..... 1.4660000e-03
ANALOG Temp B ..... 2.3880900e-04
ANALOG Temp C ..... 1.0033500e-07
CurPhase ..... 0
CurPingModulus .... 0
CurPulseLen ..... 1
CurDigRate ..... 0
CurSamplesPerPing . 0
CurBins ..... 0
CurRngSmplPerBin .. 0
CurPhaLockOutIndex. 0
```

## 11.17 Erase VEEPROM (ed)

ed [ERASE]

This command deletes non volatile memory except for some key values.

(DO NOT USE WITHOUT FACTORY AUTHORIZATION)

## 11.18 Erase Old Parameters (eo)

eo [ERASE]

This command deletes parameters from previous firmware installation that are no longer used such as the HS string from non volatile memory

(DO NOT USE WITHOUT FACTORY AUTHORIZATION)

## 11.19 #P Commands

These commands are used to program one phase for real time operation.

Using any of these commands causes the firmware to set the number of phases to 1 phase only.

Commands are not case sensitive.

Some parameters are case sensitive.

Note that the description of some of these parameters that are modified with these command can be read in the user interface portion of this manual in the section that describes [phase parameters](#).

### 11.19.1 Display Phase 1 (#p1)

Display the phase 1 parameters.

Example:

#p1

response:

```

^P1 -----
^P1 startdate 2015  3 26 13  0  0
^P1 NumPhases 1
^P1 NumFrequencies  4
^P1 Phase Type      normal phase
^P1 Output      FLASH only
^P1 Duration              86400
^P1 PingPeriod           3
^P1 BurstInterval       20
^P1 PingsPerBurst       3
^P1 AverageBurstPings   0
^P1 freq 1 frequency    125
^P1 freq 1 acquire      1
^P1 freq 1 pulselen     1000
^P1 freq 1 DigRate      64000
^P1 freq 1 RangeSamples 12640
^P1 freq 1 LockOutIndex  0
^P1 freq 1 RangeAvgSamples 10
^P1 freq 1 StorageFormat linear
^P1 freq 2 frequency    200
^P1 freq 2 acquire      1
^P1 freq 2 pulselen     1000
^P1 freq 2 DigRate      64000
^P1 freq 2 RangeSamples 12640
^P1 freq 2 LockOutIndex  0
^P1 freq 2 RangeAvgSamples 10
^P1 freq 2 StorageFormat linear
^P1 freq 3 frequency    455
^P1 freq 3 acquire      1
^P1 freq 3 pulselen     1000
^P1 freq 3 DigRate      64000
^P1 freq 3 RangeSamples 12640
^P1 freq 3 LockOutIndex  0
^P1 freq 3 RangeAvgSamples 10
^P1 freq 3 StorageFormat linear
^P1 freq 4 frequency    769

```



```
^P1 freq 4 acquire          1
^P1 freq 4 pulselen        1000
^P1 freq 4 DigRate         64000
^P1 freq 4 RangeSamples    12640
^P1 freq 4 LockOutIndex    0
^P1 freq 4 RangeAvgSamples 10
^P1 freq 4 StorageFormat   linear
```

### 11.19.2 Set Date/Time (#P1C y m d hr min sec)

Set the units real time clock.

#P1C y m d hr min sec

where:

y = year  
m = month  
d = day  
hr = hour (24 hour)  
min = minute  
sec = second

Example:

```
#p1c 2009 1 1 12 45 0
```

Response:

```
^P1 clock set 2009 1 1 12 45 0
```

### 11.19.3 Set Digitization Rate (#p1Dy)

Set the digitization rate for all channels

#P1Dy

where:

y = 0 64000 hz  
y = 1 40000 hz  
y = 2 20000 hz

Example:

```
#P1D1
^P1 DigRate          20000
```

#### 11.19.4 Enable or disable the averaging of pings in a burst. (#P1Ky)

Enable or disable the averaging of pings in a burst.

#P1Ky

where:

y = 0    disable

y = 1    enable

Example:

#P1K1

Response:

```
^P1 AverageBurstPings      1
^P1 StorageFormat freq 1   linear
^P1 StorageFormat freq 2   linear
^P1 StorageFormat freq 3   linear
^P1 StorageFormat freq 4   linear
```

#### 11.19.5 Set Enable or Disable Acquisition of channel (p1fxEy)

Enable or disable the acquisition for channel x.

#P1FxEy

x = 1,2,3 or 4;

y = 0 disable or 1 enable

Example:

#P1F2E0 Disable channel 2

Response:

```
^P1 freq 2 acquire      0
```

NOTE: if all frequencies are disabled, frequency 1 is enabled.

#### 11.19.6 Set channel digitization rate (#P1FxDy)

Set the digitization rate for channel x.

#P1FxDy

x = 1,2,3 or 4

y = 0    64000 hz

y = 1    40000 hz

y = 2    20000 hz

Example:

#P1F2D2 Set channel 2 to digitization rate 20000

Response:

^P1 freq 2 DigRate 20000

### 11.19.7 Set Channel Pulse Length (#P1FxP)

Set the pulse length for channel x.

#P1FxO [pulse length]

x = 1,2,3 or 4;

[pulse length] in micro seconds

Example:

#P1F1P 150 Set the pulse length for frequency 1 to 150 cycles.

Response:

^P1 freq 1 pulselen 150

Minimum pulse length is 0 maximum pulse length is 1000

If no value for pulse length is entered then the current value is displayed.

### 11.19.8 Set Channel Range Averaging (#P1FxRA)

Set the range averaging for channel x.

#P1FxRA [range\_averaging]

x = 1,2,3 or 4;

[range\_averaging] in samples

Example:

#P1F1RA 7 Set channel 1 to 7 sample range averaging

Response:

^P1 freq 1 pulselen 150

^P1 Warning 'Some range parameters modified'

^P1 freq 1 RangeSamples 6496

^P1 freq 1 LockOutIndex 0

^P1 freq 1 RangeAvgSamples 7

Range Samples and Range lockout may be recalculated so the range is a multiple of the averaging

### 11.19.9 Set Channel Range Lockout (#P1FxRL)

Set the range lockout for channel x.

#P1FxRA [range\_lockout]

x = 1,2,3 or 4; channel number

[range\_lockout] in samples

Example:

#P1F1RL 20                    Set channel 1 range lockout to 20 samples

Response:

```
^P1 freq 1 RangeSamples 6495
^P1 freq 1 LockOutIndex 20
^P1 freq 1 RangeAvgSamples 7
^P1 freq 1 LockOutIndex 20
^P1 StoreSTD 1
^P1 StoreSTD 0
^P1 StoreSTD 0
^P1 StoreSTD 0
```

Range Samples and Range lockout may be recalculated so the range is a multiple of the averaging

### 11.19.10 Set Channel Range samples (#P1FxRS)

Set the range samples for channel x.

#P1FxRA [range\_samples]

x = 1,2,3 or 4; channel number

[range\_samples] in samples

Example:

#P1F1RS 2000                Set channel 1 range samples to 2000 samples

Response:

```
^P1 freq 1 Warning 'Some range parameters modified'
^P1 freq 1 RangeSamples 1994
^P1 freq 1 LockOutIndex 20
^P1 freq 1 RangeAvgSamples 7
^P1 RangeSamples freq 1 RangeSamples 1994
^P1 StoreSTD 1
^P1 StoreSTD 0
^P1 StoreSTD 0
^P1 StoreSTD 0
```

### 11.19.11 Set Range Averaging (#P1RA)

Set the Range Averaging (samples) for all channels

```
#P1RA [range_averaging]
```

Example:

```
#P1RA 2  
^P1 RangeAvgSamples 2
```

Note that some parameters may be changed to accommodate other range settings.

```
^P1 Warning 'Some range parameters modified'  
^P1 RangeSamples 1990  
^P1 LockOutIndex 1  
^P1 RangeAvgSamples 3
```

### 11.19.12 Set Range lockout (#P1RL)

Set the Range Lockout (samples) for all channels

```
#P1RA [range_lockout]
```

Example:

```
#P1RL 100  
^P1 LockOutIndex 100
```

Note that some parameters may be changed to accommodate other range settings.

```
^P1 Warning 'Some range parameters modified'  
^P1 RangeSamples 1990  
^P1 LockOutIndex 1  
^P1 RangeAvgSamples 3
```

### 11.19.13 Set Range Samples (#P1RS)

Set the Range Averaging (samples) for all channels

```
#P1RA [range_samples]
```

Example:

```
#P1RA 2000  
^P1 RangeSamples 2000
```

Note that some parameters may be changed to accommodate other range settings.

```
^P1 Warning 'Some range parameters modified'
```

```
^P1 RangeSamples 1990
^P1 LockOutIndex 1
^P1 RangeAvgSamples 3
```

#### 11.19.14 Set Output Option (P1Ox)

Set the output option to RS232 or RS232 and FLASH.

```
#P1Ox
```

Where x =R or F.

R = RS232 only.

F = RS232 and FLASH.

Example:

```
#P1OR
```

```
^P1 Output RS232 Only
```

#### 11.19.15 Set Ping Period (#P1PP)

Set the Ping Period (seconds)

```
#P1PP [ping_period]
```

Example:

```
#P1PP 5
```

```
^P1 PingPeriod 5
```

The ping period can not be greater than the Burst Interval.

If no value is entered the current value is displayed.

#### 11.19.16 Set Profile Interval (#P1PI)

Set the Burst Interval (seconds)

```
#P1PP [ping_period]
```

Example:

```
#P1PI 10
```

```
^P1 ProfileInterval 10
```

Changing this value may cause other values such as Ping Period. For example if the current Ping Period is 40 then entering a Burst Interval of 20 will change the Ping Period to a valid value of 20.

```
^P1 Warning 'ping period reset to Burst Interval'
^P1 PingPeriod 10
```

If no value is entered the current value is displayed.

### 11.19.17 Set Ping Per Profile (#P1PN)

Set the Pings per Profile (pings)

```
#P1PN [pings_per_profile]
```

Example:

```
#P1PN 2
^P1 PingPerProfile 2
```

If no value is entered the current value is displayed.

### 11.19.18 Set Unit to 1 Phase and Display it (#P1S)

Set the unit to 1 phase, RS232 only and the start time to now.

```
#P1S
```

```
^P1 -----
^P1 startdate 2015 3 26 13 0 0
^P1 NumPhases 1
^P1 NumFrequencies 4
^P1 Phase Type normal phase
^P1 Output FLASH only
^P1 Duration 86400
^P1 PingPeriod 3
^P1 BurstInterval 20
^P1 PingsPerBurst 3
^P1 AverageBurstPings 0
^P1 freq 1 frequency 125
^P1 freq 1 acquire 1
^P1 freq 1 pulselen 1000
^P1 freq 1 DigRate 64000
^P1 freq 1 RangeSamples 12640
^P1 freq 1 LockOutIndex 0
^P1 freq 1 RangeAvgSamples 10
^P1 freq 1 StorageFormat linear
^P1 freq 2 frequency 200
^P1 freq 2 acquire 1
^P1 freq 2 pulselen 1000
^P1 freq 2 DigRate 64000
^P1 freq 2 RangeSamples 12640
^P1 freq 2 LockOutIndex 0
^P1 freq 2 RangeAvgSamples 10
```

```

^P1 freq 2 StorageFormat    linear
^P1 freq 3 frequency       455
^P1 freq 3 acquire         1
^P1 freq 3 pulsesen       1000
^P1 freq 3 DigRate        64000
^P1 freq 3 RangeSamples    12640
^P1 freq 3 LockOutIndex    0
^P1 freq 3 RangeAvgSamples  10
^P1 freq 3 StorageFormat   linear
^P1 freq 4 frequency       769
^P1 freq 4 acquire         1
^P1 freq 4 pulsesen       1000
^P1 freq 4 DigRate        64000
^P1 freq 4 RangeSamples    12640
^P1 freq 4 LockOutIndex    0
^P1 freq 4 RangeAvgSamples  10
^P1 freq 4 StorageFormat   linear

```

### 11.19.19 Set the phase Start Date to the top of the next hour (#p1TT)

Set the phase Start Date to the top of the next hour + optional minutes

It may be desirable to have the AZFP start at the top of the hour plus some offset.

If the optional minutes is left out it is assumed to be zero minutes.

Minutes can be negative to start the phase earlier than the top of the next hour.

For example if the time is 10:15:00 setting the minutes to -30 will set the start phase to 10:30:00 .

#P1TT [minutes]

Example 1:

#P1TT

Response:

```
^P1 startdate 2015 3 26 14 0 0
```

Example 2:

#P1TT 15

Response:

```
^P1 startdate 2015 3 26 14 15 0
```

### 11.19.20 Set the phase Start Date to the a user specified value (#p1TD)

Set the phase Start Date to a specific date and time

#P1TD [year month day hour minute second]



If the optional date and time is not entered the AZFP sets the phase start date to the current date and time off the internal clock.

If an INVALID date and time is entered the AZFP sends an error message and ignores the command.

Example:

```
#P1TD 2015 4 1 12 0 0
```

Response:

```
^P1 startdate 2015 4 1 12 0 0
```

### 11.19.21 Save Parameters to VEEPROM (#P1U)

Save the current settings to the units VEEPROM (non volatile memory).

This save the parameters so that they are retained between power on/off cycles.

```
#P1U ASL
```

```
^P1 VEEPROMSAVE SUCCESSFULL
```

### 11.19.22 Initialize Phase Parameters for #PG command (#PI)

The #PI command initializes the data acquisition parameters for the use of the #PG command. When any new parameters have been programmed the command is called automatically on the first use of #PG. Besides programming the units parameters using the phase 1 parameters this command causes the real-time clock 1 second interval to be reprogrammed.

```
#PI
```

Example;

```
#PI
```

response:

```
P1 Initialized
```

### 11.19.23 Acquire a profile of data and transmit it over com port (#PG)

The command #PG is used to start the collection of one profile of data based on the Phase 1 programming.

The acquisition is started on the next real time clock one second trigger.

If any new parameters have been programmed the #PI command is executed before the profile is acquired.

Example:

#PG

asdf^%\$^-asdassfasd asTAIL

NOTE: This command only sends data to serial port. Data is not stored to FLASH regardless of the [Data Output](#) setting.

### 11.19.24 Set Sound Speed (#PS)

Set the sound speed

#PS [SPEED]

Example;

#p1c 1450

response:

^PS soundspeed 1450.00

Note that sound speed is not used by the unit but the command is included in the command line set because the sound speed used by lps5Link is programmed to the unit under normal operation. The sound speed is stored in XML and DPL files produced by the unit for information purposes.

## 11.20 #STx Enable or Disable the 24 hour status output

This command replaces the #SE and #SD command that was available in previous version although they are still functional for system that used them.

When the AZFP starts it sends status information for the first 24 hours. After 24 hours it no longer send the status information.

This setting is persistent between power reboots of the AZFP.

The #STx command is used to either enable (the default) or disable this option.

#STx

x = 0 disable or 1 enable

if x is not present the command returns the current state of the setting.

Example:

#ST1

Response:

^ST Send status is ON

or

#ST0

Response:

^ST Send status is OFF

Obsolete but still active commands that do the same thing are:

#SE same as #ST1

#SD same as #ST0

## 11.21 #Dlx Enable or Disable Digital IO Mode of operation

A new feature has been added to allow the AZFP to acquire data based on the digital level of PIN 42 of the digital IO line. This line would be controlled by an external system.

When this feature is enabled during a deployment the AZFP ignores the start date and time and goes into its sleep mode where it wakes up once second and monitors the data line.

If it detects the line as being high or '1' it begins to acquire data. After each acquisition it monitors the line and when the level is set back to low it stops acquiring data and returns to the sleep mode waking up every second to monitor the line.

This setting is persistent between power reboots of the AZFP.

The #Dlx command is used to either enable or disable (the default) this option.

#Dlx

x = 0 disable or 1 enable

if x is not present the command returns the current state of the setting.

Example:

#DI1

Response:

^DI ON

#COM

or

```
#DIO  
Response:  
^DI OFF  
#COM
```

## 12 Condensed Profiles Operation

This is a description of the Profile Condensing Feature which has been added to the operation of the instrument.

### 12.1 Overview

Due to a customer requirement to periodically send AZFP profiles over a slow and/or limited bandwidth device such as an inductive modem we have implemented an option in the AZFP to provide this function. The solution to provide this functionality was to implement a Profile Condensing Feature (PCF) that reprocesses standard profiles as they are acquired and to condense them down to a manageable size for output over the limited bandwidth communications link. The PCF averages bins within the profiles to further reduce them. Condensing of profiles is not a reversible process (this is not compression), therefore the original profiles should be stored to FLASH as the original data cannot be recovered from a condensed profile.

Standard profiles with bins that are averaged in either space (vertical averages) or time (consecutive pings) store the averaged bins in 5 bytes. When doing the bin averaging, the low power AZFP processor converts the log data to a linear form summing the data in a 4 byte unsigned integer and tracking any overflow in an other byte. The 4-byte sum and overflow byte are stored instead of converting back to log form to save power. The low-power processor has limited conversion capabilities. The PCF process further averages the bins and reverts the bins back to an approximation of the log form by using the inverse log table lookup.

The AZFP firmware with the PCF implementation provides all previous functions as before. However, the newly implemented features that are now included for operating an instrument with the PCF could interfere with normal operation of the AZFP if the PCF is not required. For example, if PCF is on and saving data to the FLASH in addition to the normal saving of profile data, the PCF does take a small amount of additional power to perform. At this point in time, the additional power requirements and additional processing times have not been determined.

It should be clear to the users that programming of the AZFP with PCF functionality can only be done while the instrument is in STANDBY mode.

### 12.2 PCF Theory of Operation

The PCF options are programmed from the Motocross Terminal Emulator in AzfpLink. Once the new condensing parameters have been set, save them on the VEEPROM (see commands below) and close the emulator to return to AzfpLink to deploy the unit. As the standard profiles are processed (stored to FLASH, sent to RS232 or both), the firmware checks to see if PCF has been enabled. If PCF is enabled, the firmware checks to see which mode of operation is enabled:

1. Condense every N<sup>th</sup> profile.
2. Condense every profile.

There is also an option to command the instrument to process the next profile with PCF while the instrument is operating by sending a special character to the instrument (see section below).

Note that regardless of the mode, only profiles with a new burst number are processed by the PCF. If the bursts are made up of several pings and each ping is stored instead of averaging in time then only the first ping in the burst will be processed with PCF.

When PCF is enabled, the AZFP processes data in its standard way regardless of the mode of operation of the PCF. For example, if the AZFP has been programmed to transmit profiles over RS232, it will send the profile and then process it with PCF. Therefore it is possible to have both the standard profile and the condensed to be sent over RS232 and/or both to be stored to FLASH. Generally it is expected that the standard profiles will be stored to FLASH and the condensed version will be sent over RS232. Note that saving both to FLASH will result in a file intermixed with both the full profile and the condensed profile. The storage of condensed profiles to FLASH is for testing purposes only and normally would not be used for operations.

There are three forms of output over RS232 for the condensed profiles, BINARY, ASCII and BINARY SHORT.

The BINARY version consists of the same format as standard profiles sent over RS232 and recognized by AzfpLink if AzfpLink is being used to accept data from the RS233 line. This format has the full header information and data. This version is sent up in the packet format described in the AzfpLink manual.

The ASCII version is comma delimited data which includes some of the header information followed by the data. The data is slightly reduced by subtracting each bin by the lowest value in the profile. That value is stored in the header and needs to be added back before processing. Note that AzfpLink does not recognize the ASCII format. If the output of the PCF is requested in ASCII format, other software needs to be used.

The BINARY SHORT version is shortened binary form that includes some of the header information followed by the data. Note that AzfpLink does not recognize the ASCII format. If the output of the PCF is requested in BINARY SHORT format, other software needs to be used to view or decode the data.

The BINARY SHORT format is recommended as it provides the smallest possible output.

## 12.3 Limitations

The internal memory buffers for PCF are 50 times smaller than the standard profile buffer so the maximum number of bins for the condensed profile is 14000/50 or 280 bins. If a channel is collecting 14000 samples and the user specifies a condensation factor of less than 50 then the resulting

condensed profile will not contain the last portion of a profile. There is no warning and it is up to the user to determine the correct values to use for the averaging so that the no data is missed. The number of samples recorded is displayed in the Operating Schedule tab of AzfpLink (Max. Range, Show Range Units as Samples).

## 12.4 Power Consumption

The amount of power consumed by the condensing functions has yet to be determined.

## 12.5 Placing the AZFP in STANDBY mode

To program the PCF using the #C commands the unit needs to be placed in STANDBY mode (not collecting data).

The instrument can be put in STANDBY mode either from AzfpLink or from the emulator. To place the instrument into STANDBY mode (wake the instrument up) requires the transmission of the character “s” over the RS232 from the controlling PC. When the AZFP detects an ‘s’, it stays awake a few milliseconds longer to look for another two ‘s’ before it goes into STANDBY mode. When the AZFP is in low power mode, the RS232 port is off so there is no guarantee that one series of ‘s’ will place it into STANDBY mode.

Sending a string of “s” characters about 6 milliseconds apart and spanning one second will normally wake it up. Further information is available in the AZFP software manual

## 12.6 9600 Baud Operation

The typical use of this operation is to send a limited amount of data over a lower bandwidth connection.

Although it is not required if not needed, the AZFP instrument and AzfpLink can be set to operate the RS232 at 9600 BAUD.

See section [9600 Baud Operation](#)

## 12.7 Setting the Instrument to 9600 baud

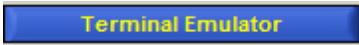
This section describes how to set the baud rate of the instrument to 9600 or back to the standard 115200 BAUD. The instructions below are the same for setting both baud rates.

Note that it is important to follow the instructions to the letter.

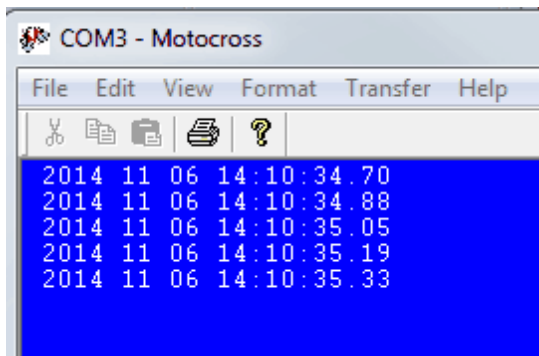
End the deployment



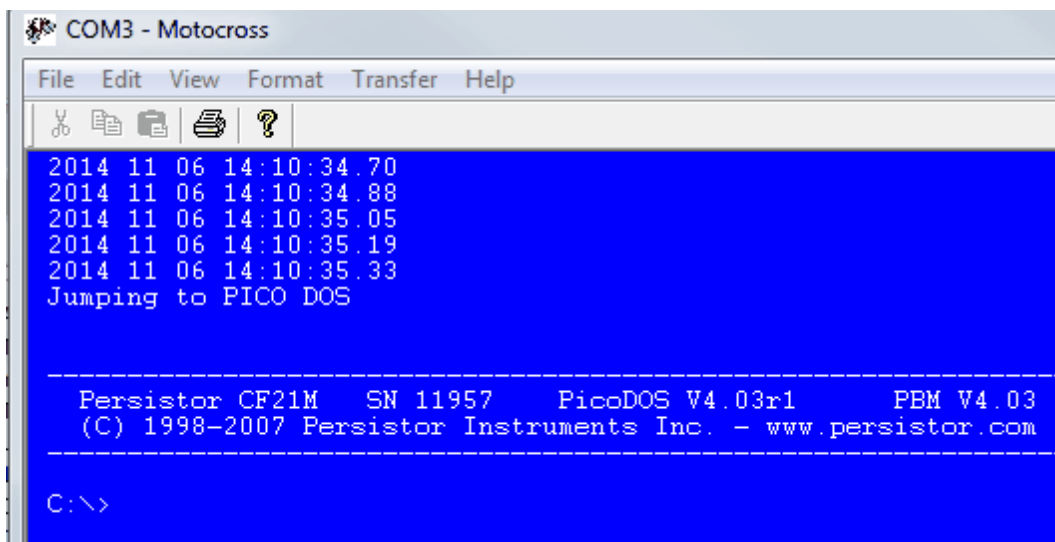
Start the Terminal Emulator



The instrument should respond with the date and time when the return key is pressed.



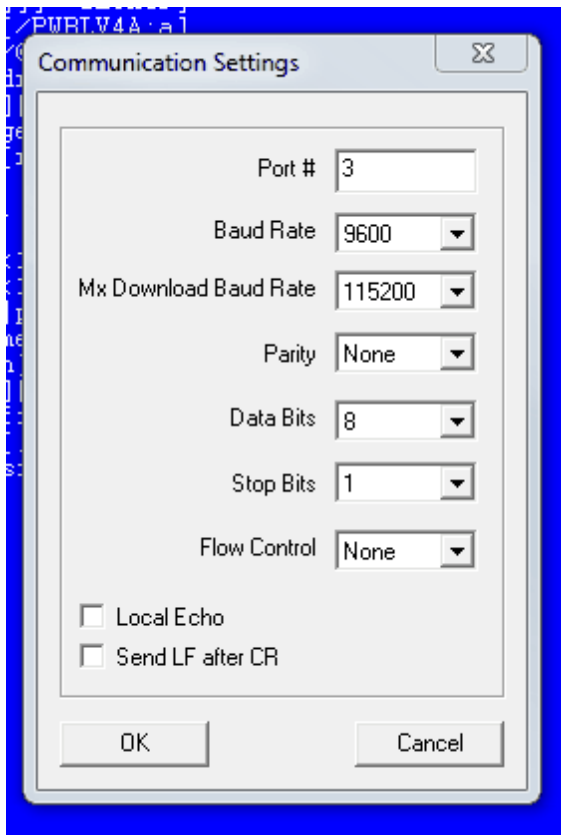
Enter '&pico' (without quotes) to place the instrument into the PICO DOS operation.



To set the baud rate enter 'baud 9600 /p'

```
C:\>baud 9600 /P
Requesting 9600 BAUD,N (actual 9615, 0.1% error) with 16000kHz clock
Change terminal baud rate now --- hit <Enter> when ready ...
... also change SYS.CLOCK to make this permanent [Y] ?
```

Under the "File" menu select "Communications Settings"



Set the baud rate to 9600 baud as shown above.

Hit the enter key.

The unit should now respond with "**... also change SYS.CLOCK to make this permanent [Y] ?**" when you press the enter key.

```
C:\>baud 115200 /P
Requesting 115200 BAUD,N (actual 115000, 0.1% error) with 1
Change terminal baud rate now --- hit <Enter> when ready ...
... also change SYS.CLOCK to make this permanent [Y] ? y
BAUD = 115000,N
C:\>
```

Enter Y.

Now return to the AZFP application by entering 'APP N' (APP space N). The N starts the unit without deploying.

```
C:\>
C:\>APP NPersistor CF2 SN
Program: MfAwcpMain.c: Nov 6 2014 11:37:54
Persistor CF2 SN:11957 BIOS:4.3 PicoDOS:4.3
$5e00000000000003eSTAT-Boot AZFP Ver. 3.05 (20141100) SN: 51102 CPU: 11957 BRD: 00132#0e05
```



Exit the Terminal Emulator and set AzfpLink by checking the 9600 baud box in the preference panel or un-checking it if the baud rate has been set to 115200 BAUD.

**9600 BAUD Operation (AZFP must be manually set to operate at 9600 BAUD see the AzfpLink manual)**

To return the instrument to 115200 perform the same operations stated above but use 115200 instead of 9600.

## 12.8 Seabird Modem

The unit can be set to transmit samples to an attached Seabird modem for retrieval at a later time by an external system attached to a companion modem.

When condensed mode is enabled and a modem is attached the unit attempts to attach to the modem and transmit the data.

The modem should be set up so it does not echo characters sent to it by the AZFP.

The modem should also be setup so that the number of allowed samples times the maximum size of each sample should be less than the 16K. This allows the modem to add records and remove the oldest so it can insert the newest.

For example, if samples are expected to be about 1 kb then allow a maximum of 15 samples although it might be best to have more of a buffer for example 12 samples.

The operation works as follows when a condensed profile is ready for transmission :

1. The unit sends '\r' (carriage return to the modem) to wake it up.
2. It looks for the 'IMM>' prompt from the modem. If it doesn't get one within 3 seconds it tries again up to 3 times.
3. If it gets the prompt it sends the "SampleAdd" command and looks for the '<Executing/>' response from the modem.
4. If it gets the '<Executing/>' response from the modem it transmits a timestamp (current date/time) and the condensed profile in the format specified by the user (ASCII or BINARY SHORT).
5. After the transmission of the profile it waits for 3 seconds for the '<Executed/>' command and then send the 'PwrOff' command to power down the modem. It sends the 'PwrOff' command whether or not it finds the '<Executed/>' command.

The following is an example sequence of commands (entered commands in red) to retrieve data from external modem talking to a modem attached to the AZFP. The AZFP is sending condensed profiles in ASCII format to its attached modem.

The external modem first captures the line. It then requests the last sample.

```
IMM>captureline <Executing/> <Executed/>  
IMM>!01samplegetlast
```

```

<RemoteReply><Executing/> <SampleData ID='0x00000024' Len='2502'
CRC='0x2DF1A060'>@D20141125155600I@P1,4,4,137,137,137,137,10280,9888,13400,17344,14112515
555579,-0.9,-
1.2,15.2,21.5,99.0,48104,27064,1688,256,136,48,256,104,72,88,168,32,72,264,288,56,56,360,40,24,104
,0,176,10152,944,104,56,584,88,72,1016,88,32,104,56,72,1392,4448,96,40,304,48,48,344,640,32,240,13
6,24,72,328,96,24,408,88,120,240,248,40,64,592,256,344,496,704,48,88,264,32,1208,2112,136,64,648,1
60,64,120,8512,24,32,288,56,64,104,216,112,5808,8200,192,112,136,56,56,168,192,24,368,120,48,64,1
76,0,72,920,176,32,24,112,40,728,168,320,88,176,136,48,5832,2376,40,1480,1112,8,88,112,128,24,16,3
352,24,24,128,24,72,96,56,56,304,48952,26360,2984,528,112,400,1416,80,456,912,40,272,3976,1720,1
12,1400,1248,112,328,1768,48,264,656,2272,192,2384,3272,16,320,2728,144,808,2272,2664,96,336,22
24,16,480,3640,160,640,1144,464,96,1824,1720,80,328,1600,40,424,1248,672,104,456,712,32,352,1416
,40,232,2528,584,104,800,2032,64,272,1288,128,336,632,400,72,464,2936,0,640,936,80,168,440,504,48
,464,1216,72,808,1240,136,248,1352,552,96,616,3512,72,360,672,48,184,1296,1568,112,992,1576,96,2
88,2192,184,1224,1384,1064,104,456,720,32,264,1064,72,296,1872,848,128,528,4736,96,224,648,16,64
8,1552,1080,56,384,1400,43464,11688,3584,1624,5520,4200,1176,5496,8784,1256,4072,8896,5312,204
8,6008,6616,1552,3008,6568,1024,5616,6968,2104,3248,4712,8240,1640,6536,10984,1208,4408,6888,3
888,3096,5096,8080,1040,3152,9032,552,6040,7736,4616,2496,4776,4752,1608,7240,8328,1256,4168,7
368,3272,2584,7232,4632,664,3000,6576,104,4080,9768,3768,1112,6120,8200,744,5824,5696,232,4488,
5504,5576,3272,6128,6744,1512,5416,6384,1296,5648,7880,2024,2664,4632,6568,1392,4632,10504,0,2
832,6544,2864,3256,5704,4080,680,3208,7464,2392,3568,9640,3784,1864,4792,4416,952,5168,7680,18
56,3464,8944,5888,2416,6872,5400,1192,2736,5912,1128,6080,7368,5064,1808,4824,8304,880,6064,88
40,832,3400,5384,3920,3544,5800,8168,936,37112,752,2096,2568,2176,984,2400,1960,256,3168,2512,1
024,1960,2184,2200,864,2800,2448,552,2536,2352,880,2256,2656,2336,936,2088,2208,264,2992,2576,1
264,1616,2240,1552,992,3072,2440,496,2648,2384,904,2288,2224,2032,848,2344,2672,0,2888,2592,920
,1760,2000,1928,1128,3120,2728,664,2320,2352,992,2112,2560,1984,800,2408,2480,240,2848,2704,896
,1792,2048,1400,1264,3120,2568,504,2352,2328,1088,2224,2840,1728,816,2736,2384,736,3032,2656,96
8,1864,2432,2152,384,2864,2528,216,2344,2456,856,2160,2440,2080,1088,2432,2624,168,2768,2720,14
08,1920,2152,2048,904,2832,2496,680,2376,2408,912,2152,2648,1952,576,2504,2240,752,3088,2704,14
16,1848,2160,1624,752,3152! </SampleData> <Executed/></RemoteReply> <Executed/> IMM>

```

A listing of samples available can be gotten using the “samplegetlist” command.

```

<Executed/>
IMM>captureline
<Executing/>
<Executing/>
<Executed/>
IMM>!01samplegetlist
<RemoteReply><Executing/>
<SampleList>
<Sample ID='0x00000521' Len='2150' CRC='0x37DCF2C3'/>
<Sample ID='0x00000520' Len='2140' CRC='0x27EA7F0B'/>
<Sample ID='0x0000051F' Len='2147' CRC='0xF2AA603F'/>
<Sample ID='0x0000051E' Len='2169' CRC='0xF223CF6C'/>
<Sample ID='0x0000051D' Len='2165' CRC='0x703819E2'/>
</SampleList>
<Executed/></RemoteReply>
<Executed/>
IMM>

```

### 12.8.1 Modem Setup

Local echo must be disabled.

Use the **setenableecho=0** command.

The modem must be setup such that the maximum number of records times the maximum size of any record is less than 16 K.

Use the **setmaxnumsamples=x**

## 12.9 #C Condense Commands

A set of commands to have the AZFP further condense profiles for output to slower devices over RS232 have been implemented as of firmware version 3.04. These commands are in beta development and testing.

A number of # commands have been implemented to control the condensing of profile. These commands are only available when the instrument is in STANDBY mode (not collecting data). It is possible to have the unit condense the next profile while operating by sending the character “c” to the instrument. This is described in a later section.

NOTE: Commands are not echoed back by the instrument.

\*\*\* Parameters do not become permanent until the #CW command is issued.

| Command | Parameters |   |
|---------|------------|---|
| #CE     |            | Enable PCF  |
| #CD     |            | Disable PCF   |
| #COB    |            | Set the PCF profiles RS232 output to standard real-time profile output.   |
| #COA    |            | Set the PCF profiles RS232 output to ASCII output.  |
| #COS    |            | Set the PCF profiles RS232 output to BINARY SHORT output.   |
| #CSR    |            | Send PCF profiles to RS232  |
| #CSF    |            | Store PCF profiles to FLASH (not recommended as it will intermix with standard profiles, used for testing only)         |
| #CSB    |            | Store PCF profiles to FLASH & RS232 (not recommended as it will intermix with standard profiles, used for testing only) |

| Command | Parameters             |  |
|---------|------------------------|--|
| #CMO    | [N]                    | Condense every N <sup>th</sup> profile where N=X is the condense modulus |
| #CMA    |                        | Condense all profiles  |
| #CB     | [C1] [C2] [C3]<br>[C4] | Set bin averaging for each channel, min 1 max 1000                       |
| #CW     |                        | Write condense parameters to VEEPROM. This make the settings permanent.  |
| #CR     |                        | Load condense parameters from VEEPROM and display them                   |
| #CZE    |                        | Enable Sea-Bird acoustic modem output.                                   |
| #CZD    |                        | Disable Sea-Bird acoustic modem output                                   |
| #SE     |                        | Enable first 24 hours of status information                              |
| #SD     |                        | Disable first 24 hours of status information                             |

### 12.9.1 #CE Condense Pings Enable

Enable PCF. If PCF is disabled then only the on demand PCF is available.

Enter:

#CE

Results:

^CE Condense parameters enabled

### 12.9.2 #CD Condense Pings Disable

Disable PCF. If PCF is disabled then only the 'on demand' PCF is available.

Enter:

#CD

Results:

^CE Condense parameters disabled

### 12.9.3 #COB RS232 output format BINARY - standard ping\_t format

Set the compressed ping RS232 format to BINARY. This is the standard format that standard profiles are sent over the RS232 and is described in another section of the manual.

Note that this format has full header information and packet header and trailer that add many bytes to the output. It is recommended to use the BINARY SHORT format

Enter:

#COB

Result:

^COB Condense output standard BINARY packet

### 12.9.4 #COA RS232 output format ASCII - ASCII modem output

Set the RS232 format to ASCII. This format is described in a section below.

Enter:

#COA

Result:

^COA Condense output ASCII

### 12.9.5 #COS Compressed RS232 output format BINARY SHORT

Set the compressed ping RS232 format to BINARY SHORT. This is basically the same format as the ASCII output except it is in binary and there is no subtraction of the minimum values for each channel value.

This format provides the least amount of data to transmit over a low bandwidth system.

Enter:

#COS

Result:

^COS Condense output BINARY SHORT form

### 12.9.6 #CSR Storage to RS232

Send condensed profiles to RS232.

Enter:

#CSR

Result:

^CSR Store to RS232

### 12.9.7 #CSF Storage to FLASH

Store condensed profiles to FLASH.

*This setting is available for testing purposes and is not recommended for operation as it will inter mingle standard and condensed data in the same file. Files with intermingled condensed profiles with standard profiles files are readable by the AzfpLink software but would require additional processing to separate the data.*

Enter:

# CSB

Result:

^CSR Store to FLASH

### 12.9.8 #CSB Storage to FLASH & RS232

Send condensed profiles to RS232 and store to FLASH

*This setting is available for testing purposes and is not recommended for operation as it will inter mingle standard and condensed data in the same file. Files with intermingled condensed profiles with standard profiles files are still be readable by the AzfpLink software but would require additional processing to separate the data.*

Enter:

# CSB

Result:

^CSR Store to FLASH and RS232

### 12.9.9 #CMA Condense all profiles

Set the mode to condense every profile

Enter:

#CMA

Results:

^CMA Mode condense all profiles

### 12.9.10 #CMO [N] Enable modulus mode and condense every Nth profile

Enable modulus mode and set the modulus of the condensing of profiles.

Enter:

#CMO 6

Result:

^CMO Condense modulus of profile pings 6.

### 12.9.11 #CB [C1] [C2] [C3] [C4] Set bin averaging for each channel

Set the bin averaging for each channel (minimum is 1 maximum is 1000).

\*\* If the full profiles are averaged then these number indicate further averaging of the bins. For example if the full profiles consist of .25 meter bins and you wish to condense to 3 meters then the condense averaging should be 3/.25 or 12.

Enter:

```
#CB 12 12 12 12
```

Result:

```
^CB 12 12 12 12
```

### 12.9.12 #CW Write condense parameters to VEEPROM

Write the current values of the condense parameters to VEEPROM for permanent storage. The values are retained between CPU reboots.

Enter:

```
#CW
```

Result:

```
^CS Condense parameters saved
```

### 12.9.13 #CR Load condense parameter's from VEEPROM

Read condense parameters from the VEEPROM and display them.

Enter:

```
#CR
```

Result:

```
Condense_enable..... YES
Condense_mode..... all profiles
Condense_modulus..... 6
Condense_storage ..... FLASH and RS232
Condense_RS232_format ... ASCII
Condense_bin_avg_C1 ..... 41
Condense_bin_avg_C2 ..... 42
Condense_bin_avg_C3 ..... 43
Condense_bin_avg_C4 ..... 44 .
```

### 12.9.14 #CZE Enable Sea-Bird modem operation

This command enables Sea-Bird operation whereby the AZFP attempts to communicate with an attached Sea-Bird modem before transmitting condensed pings.

If communications with the modem is not established the profile is not sent out.

Enter: #CZE

Result:

^CZ Modem status is ON

### **12.9.15 #CZE Disable Sea-Bird modem operation**

This command disables Sea-Bird operation whereby the AZFP attempts to communicate with an attached Sea-Bird modem before transmitting condensed pings.

Condensed pings are sent over the RS232 with no attempted communications with a modem.

Enter: #CZD

Result:

^CZ Modem status is OFF

### **12.9.16 #SE Enable first 24 hours of status information**

This setting enables the output of status information for each ping. Normal operation has the instrument send this information for the first 24 hours for deployments.

### **12.9.17 #SD Disable first 24 hours of status information**

This setting disables the output of status information for each ping. Normal operation has the instrument send this information for the first 24 hours for deployments.

## **12.10 Condensed Profile Output Format**

This section describes the format of the condensed profile as they are output over the RS232. Both the ASCII and BINARY SHORT formats have a timestamp (transmission) date and time preceding the profile data.

### **12.10.1 Transmission Time Stamp**

Time stamps that precede the ASCII and BINARY SHORT formats have the following format.

@Dyyyymmddhhmmss!

Where: yyyy is the year, mm is the month, dd is the day, hh is the hour, mm is the minute and ss is the second.

The time stamp included in the indicate the date and time the data was transmitted by unit.

### **12.10.2 Binary**

The binary format over RS232 is identical to the standard real time format of profile data as described in an earlier section.



### 12.10.3 ASCII

The ASCII output consists of a string delimited by a starting '@' character followed by comma delimited, header information, data and then terminated with an '!' character and carriage return.

| Field     | Type   | Description                                      |
|-----------|--------|--|
| 1         | char   | Starting character always '@P'                   |
| 2         | uint   | Instrument Serial Number                         |
| 3         | Int    | Phase  |
| 4         | int    | Burst number (1 – 65535)                         |
| 5         | int    | Number of stored frequencies 1 – 4               |
| 6         | int    | N1 = Number of bins for frequency 1              |
| 7 (1)     | int    | N2 -=Number of bins for frequency 2              |
| 8(1)      | int    | N3 = Number of bins for frequency 3              |
| 9 (1)     | int    | N4 = Number of bins for frequency 4              |
| 10        | uint   | Minimum value in the data subtracted out         |
| 11 (1)    | uint   | Minimum value in the data subtracted out         |
| 12 (1)    | uint   | Minimum value in the data subtracted out         |
| 13 (1)    | uint   | Minimum value in the data subtracted out         |
| 14        | string | Date of burstYYMMDDHHMMSSHH                      |
| 15        | double | Tilt X   |
| 16        | double | Tilt Y   |
| 17        | double | Battery voltage                                  |
| 18        | double | Temperature                                      |
| 19        | double | Pressure (valid value if sensor is available)    |
| 20        | Uchar  | Channel 1 board number always 0                  |
| 21        | Uint   | Channel 1 frequency                              |
| N1 values | uint   | channel 1 values minus minimum value             |
| N1+1      | Uchar  | Channel 2 board number always 1                  |
| N1+2      | uint   | Channel 2 frequency                              |
| N2 values | uint   | channel 2 values minus minimum value (available) |
| N2+1      | Uchar  | Channel 3 board number always 2                  |
| N2+2      | uint   | Channel 3 frequency                              |

|           |       |  |
|-----------|-------|--|
| N3 values | uint  | channel 3 values minus minimum value (available) |
| N3+1      | Uchar | Channel 4 board number always 3                  |
| N3+2      | uint  | Channel 4 frequency                              |
| N4 values | uint  | channel 4 values minus minimum value (available) |
| Last      | char  | !\n  |

(1) If not, present the frequency is not available.

Example:

@P1,23066,1,280,12440,14072808052343,0.3,2.2,11.2,24.0,99.0,3752,360,1456,400,2280,760,792,304,440,1208,1144,1344,368,1872,424,1144,920,1048,920,2384,896,904,304,904,1424,1240,192,616,192,1600,1688,784,616,2040,896,360,616,1240,272,768,1392,808,496,1416,1288,872,1008,256,984,1648,600,1624,1160,1688,520,1384,1144,1272,536,168,1024,1616,1136,120,1328,1144,400,768,1264,1616,592,712,592,792,496,1416,1472,416,1168,896,1360,2216,168,1064,384,592,192,1144,1344,528,880,1456,592,912,384,568,536,176,88,760,472,544,656,432,104,64,920,560,448,488,992,1080,632,1736,1456,384,240,1976,624,600,552,624,640,432,1040,1064,1560,536,336,2216,528,184,2192,2040,768,1664,1368,688,1800,1592,488,704,536,320,488,1864,1320,0,144,792,360,1512,368,944,96,192,904,1272,1200,368,1408,552,680,560,3912,1560,408,216,536,720,2920,2392,464,408,232,552,504,1304,488,360,696,448,408,1064,392,728,600,88,488,2304,1688,560,1120,272,336,1432,1480,528,544,176,152,368,1480,200,808,1368,1064,688,1136,1304,136,720,1176,936,1128,1832,760,880,880,1008,760,1960,1216,744,968,1040,360,1560,1752,16,424,384,2312,1024,1032,736,624,600,424,592,328,448,1008,576,960,656,616,2688,456,576,504,1264,1216,2328,1360,720,472,520,712,1320,1112,240,816,624,600,752,1136,1624,1080,624,744,344,560,1328,296,472,640,720,440,632!

#### 12.10.4 Binary Short

A date stamp is output before the profile.

The BINARY SHORT format is effectively the same format as the ASCII but presented in Big-Endian binary format. This provides for a reduction in the number of byte transmitted for each profile.

The data is delimited by a starting '@' character by header information, data and then terminated with an '!' character.

| Field | Type   | Size | Description                            |
|-------|--------|------|--|
| 1     | char   | 1    | Starting character always '@'          |
| 2     | char   | 1    | Always 'B'                             |
| 3     | ushort | 2    | Total bytes in packet including header |
| 4     | ushort | 2    | Instrument Serial Number               |

|                          |        |      |   |
|--------------------------|--------|------|---|
| 5                        | ushort | 1    | Phase   |
| 6                        | ushort | 2    | Burst number (1 – 65535)                      |
| 7                        | char   | 1    | Number of stored frequencies 1 – 4            |
| 8                        | ushort | 2    | N1 = Number of bins for frequency 1           |
| 9 <sup>(1)</sup>         | ushort | 2    | N2 = Number of bins for frequency 2           |
| 10 <sup>(1)</sup>        | ushort | 2    | N3 = Number of bins for frequency 3           |
| 11 <sup>(1)</sup>        | ushort | 2    | N4 = Number of bins for frequency 4           |
| 12                       | ushort | 2    | Date year                                     |
| 13                       | ushort | 1    | Date month                                    |
| 14                       | ushort | 1    | Date day                                      |
| 15                       | ushort | 1    | Date hour                                     |
| 16                       | ushort | 1    | Date minute                                   |
| 17                       | ushort | 1    | Date second                                   |
| 18                       | ushort | 1    | Date hundreds                                 |
| 19                       | float  | 4    | Tilt X  |
| 20                       | float  | 4    | Tilt Y  |
| 21                       | float  | 4    | Battery voltage                               |
| 22                       | float  | 4    | Temperature                                   |
| 23                       | float  | 4    | Pressure (valid value if sensor is available) |
| 24                       | char   | 1    | Channel 1 board number                        |
| 25                       | ushort | 2    | Channel 1 frequency                           |
| N1 Values                | ushort | N1*2 | channel 1 data values                         |
| N1 + 1                   | char   | 1    | Channel 1 board number always 0               |
| N1 + 2                   | ushort | 2    | Channel 1 frequency                           |
| N2 values <sup>(1)</sup> | ushort | N2*2 | Channel 2 data values                         |
| N2 + 1 <sup>(1)</sup>    | char   | 1    | Channel 1 board number always 1               |
| N2 + 2 <sup>(1)</sup>    | ushort | 2    | Channel 1 frequency                           |
| N3 values <sup>(1)</sup> | ushort | N4*2 | channel 3 data values                         |
| N3 + 1 <sup>(1)</sup>    | char   | 1    | Channel 1 board number always 2               |

|                           |        |          |                               |
|---------------------------|--------|----------|-------------------------------|
| $N3 + 2^{(1)}$            | ushort | 2        | Channel 1 frequency           |
| $N4 \text{ values}^{(1)}$ | ushort | $N5 * 2$ | Channel4 data values always 3 |
| $N4 + 1$                  | char   | 1        | !                             |

The binary data is stored as Big-Endian format.

(1) Not present if frequency not acquired.

## 12.11 Request the Next Profile be Condensed and Transmitted

When not collecting data, the instrument goes into a low-power mode to conserve battery life. It wakes up once a second to determine if it is time to collect data. If it is time to collect data, it does the collection and then goes back to the low-power mode. Before the AZFP goes back to the low-power mode, it always checks the RS232 port for special characters to tell it to stop data acquisition mode and to go into STANDBY mode. In STANDBY mode, the AZFP is able to accept commands. NOTE: In STANDBY mode the AZFP's CPU is always on and consumes more power than when in data acquisition mode.

### 12.11.1 Requesting a Condensed Profile

It is possible to request the instrument to condense the next profile regardless of the modulus of the profile count. Before going to low power mode, as well as checking for the "s" character for a request to go into STANDBY mode, the instrument checks to see if the character "c" has been sent by the controlling PC. Sending a string of "c" characters about 6 milliseconds apart and spanning one second will normally cause the "c" to be detected. If a "c" is detected, the instrument responds with:

```
^CONR
```

Then the AZFP goes into low power mode. When the next profile is acquired, the AZFP will condense and transmit it according to the programmed parameters specified for storage (RS232, FLASH or BOTH) and condensing parameters.

This option is available regardless of whether or not PCF mode is enabled.

## 12.12 Examples of set of Commands for the three different Condensing Functions

Enter topic text here.

### 12.12.1 Examples of set of Commands for the three different Condensing Functions

The following set of commands can be used to condense and transmit every 8<sup>th</sup> profile:

```
Put the instrument in STANDBY mode with "s"es
#CE To enable Condense Pings
```

|                 |  |
|-----------------|--|
| #CSR            | To set storage to RS232                            |
| #COA            | To set output format to ASCII                      |
| #CMO 9          | To condense every 9th profile                      |
| #CB 10 15 20 25 | To set bin averaging for a 4-channel instrument    |
| #CW             | To write condense parameters to instrument VEEPROM |
| #SD             | To disable first 24 hours of status information    |

### 12.12.2 Example of Condense every profile

The following set of commands can be used to condense and transmit every profile:

Put the instrument in STANDBY mode with “s”es

|                 |  |
|-----------------|--|
| #CE             | To enable Condense Pings                           |
| #CSR            | To set storage to RS232                            |
| #COA            | To set output format to ASCII                      |
| #CMA            | To condense all profiles                           |
| #CB 10 15 20 25 | To set bin averaging for a 4-channel instrument    |
| #CW             | To write condense parameters to instrument VEEPROM |
| #SD             | To disable first 24 hours of status information    |

### 12.12.3 Example of Condense “On-Demand” with PCF Turned Off:

The following set of commands can be used to condense and transmit an occasional profile “on-demand”:

Put the instrument in STANDBY mode with “s”es

|                 |  |
|-----------------|--|
| #CD             | Disable standard PCF mode.                         |
| #CSR            | To set storage to RS232                            |
| #COA            | To set output format to ASCII                      |
| #CB 10 15 20 25 | To set bin averaging for a 4-channel instrument    |
| #CW             | To write condense parameters to instrument VEEPROM |
| #SD             | To disable first 24 hours of status information    |

Request a condensed profile periodically by sending “c”

### 12.12.4 Operation of PCF Function

Typically the settings should be confirmed in a lab setting.

The parameters should be set and then writing to the non-volatile memory of the AZFP using the #CW command.

## 13 Trouble Shooting

### 13.1 AzfpLink won't communicate with the unit

Check the COM port setting in the [Preferences Tab](#) section. Note that some USB to SERIAL products may not work with the unit. We recommend the MOXA UPort 1110 V1.4 USB to Serial (RS-232) that

is shipped with each instrument.

## 13.2 The Terminal Emulator won't talk to the unit

Check that the communications parameters for the terminal emulator are correct see [Setting Up Terminal Emulation Communications](#) section.

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