WinFrog Device Group:	LBL ACOUSTIC
Device Name/Model:	ARTS
Device Manufacturer:	Naval Surface Warfare Center Carderock Division Southeast Alaska Acoustic Measurement Facility 1 Back Island Road Ketchikan, AK 99901-5637
Device Data String(s) Output to WinFrog:	Three Binary Messages 1)Range Message 2) Hydrophone message 3)Tide message See Messages below for description
WinFrog Data String(s) Output to Device:	None
Data items	XPONDER TIDE XPONDER COORDINATES
WinFrog .raw Data Record Type(s):	Hydrophone Coordinates (XPONDER COORDINATES): 425 Transponder (XPONDER): 421 TIDE: 380

DEVICE DESCRIPTION:
This is a driver for long base line (LBL) acoustic positioning equipment used to position underwater vehicles. Uses fixed transponders placed upon the bottom and synchronized pinger placed on vehicles. See also the following chapters in the WinFrog User's Guide: chapter 5 – Working Transponders (.XPT) File and chapter 17 – LBL Acoustics.

THIS EQUIPMANT CANNOT BE USED FOR A CALIBRATION. THE FIXED TRANSPONDER (hydrophone) COORDINATES MUST BE KNOWN.

SETUP
Hydrophones
The fixed hydrophones fall under the general category of transponders and need to be entered into the transponder file. See chapter 5 of the WinFrog User's Guide for more details on the setup and configuration of Transponder files (*.XPT) coordinates. Even though the coordinates can be received from the ARTS, a file with initial coordinates must be set up. The names are user-selectable, the model must be SEAFAC, they must be fixed and the Transmit name must be 1 through 24 corresponding to the number in the range message. Leave the Receive and address fields blank. Enter a time offset if desired.

Pingers
These must also be set up in the same file as the hydrophones. These also fall under the general category of transponders. Again the model is SEAFAC and the name is user-selectable. Set them as Synchronized Pinger, enter a Transmit code of 0 to 3 and Receive code of V0 to V3 corresponding to the value in the range message.

DEVICE CONFIGURATION INSTRUCTIONS

**WINFROG I/O DEVICES > EDIT I/O**
When the driver is first selected or if Edit I/O is selected, the following dialog will appear.
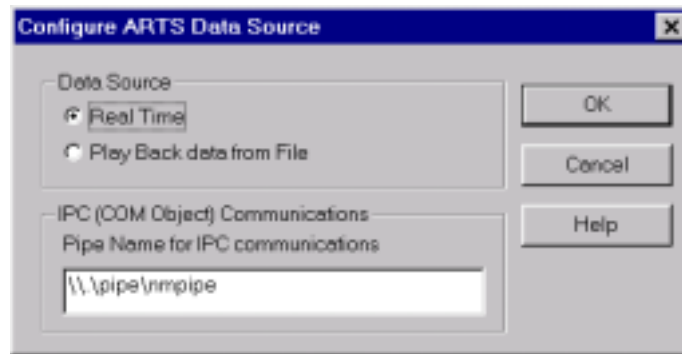
Select the source, either "Real Time" or "Play Back From a File". If real time is selected enter the pipe name for software communications from the ARTS program. This program (ARTS) needs to be running on the same computer WinFrog is running. The data is transferred through software using the pipe. The pipe name must be the same for both WinFrog and ARTS.

WINFROG I/O DEVICES > CONFIGURE DEVICE:
This provides access to the following dialog:
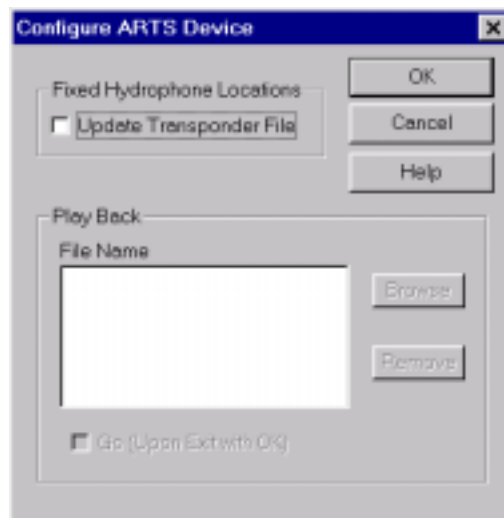
If "Real Time" is selected in the Edit I/O > Configure ARTS Data Source dialog, then the only option here is to select "Update Transponder File" or not. If this is selected and a coordinate record is received from the ARTS then the transponder file will be updated with these new coordinates. These new coordinates will also be used for future fixes. If this checkbox is not selected, then the new coordinates will not be used.

If "Play Back…" is selected in the Configure ARTS Data Source dialog, then the above also applies, however, you must also select the files (*.RAW – see the users guide) you wish to play back. Use the browse button to select the files. Select the Go checkbox if you are ready to start reading files upon exit. If not ready at this time, leave it unchecked but return to this menu to initiate the play back. All other files need to be setup prior to playback.

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:
Adding the ARTS device creates three data items: XPONDER, TIDE and XPONDER COORDINATES. At a minimum the XPONDER data item must be added to each and every vehicle to be positioned. The TIDE must be added if tide is to be applied to the pinger depth and XPONDER COORDINATES must be added if these are to be recorded in the *.RAW file.

Data item: LBL,ARTS,XPONDER

See chapter 17 of the WinFrog User's Guide for details on setting the parameters for LBL ACOUSTICS. They are the same across all transponders (XPONDERS).

Synchronized Pinger
Select the desired pinger from the dropdown list described in chapter 17, LBL ACOUSTICS. Note the pinger's receive code as entered into the transponder file needs to prefixed with a V.

The accuracy described in the LBL ACOUSTICS chapter usually depends upon frequency. This value will have to be converted to yards using a nominal speed of sound. This value should be considered a nominal value as it does not take into account sound velocity errors and ray path bending.

Data item: LBL,ARTS,TIDE

There is no edit for this data item. This data item needs to be added to the vehicle and the appropriate checkbox selected in the XPONDER edit dialog before the tide value will be applied to the observed depth.

Data item: LBL,ARTS,XPONDER CORDINATES

There is no edit dialog for this data item. This data item must be added to the vehicle for the coordinates to be stored in the raw data file. When a new set of coordinates is received and the working file is updated, you must then save it to the hard drive manually by opening the file and clicking OK. If WinFrog is shut down before this is done you will be asked to save the changed file or not.

Messages:

Range message

Description	Size	Value
Synchronization word	2 bytes	0x8e4c
Message length	2 bytes	Integer all inclusive
Message Id	2 bytes	0x70
Vehicle id	2 bytes	0 to 3
Date	Char[8]	ddmmyy
Time	double	Time in seconds from midnight
Range 1	double	Milliseconds one way travel time
Range 2	double	Milliseconds one way travel time
.	.	.
.	.	.
.	.	.
Range 24	double	Milliseconds one way travel time

Tide message

Description	Size	Value
Synchronization word	2 bytes	0x8e4c
Message length	2 bytes	Integer all inclusive
Message Id	2 bytes	0x72
Pad	2 bytes	Required to align with some compilers
Tide	double	Feet (+ above datum)

Hydrophone coordinates

Description	Size	Value
Synchronization word	2 bytes	0x8e4c
Message length	2 bytes	Integer all exclusive
Message Id	2 bytes	0x71
Range name	Char[32]	Name of range
Pad	2 bytes	Required to align with some compilers
Coordinates for hydrophone 1	3 doubles	See below
Coordinates for hydrophone 2	3 doubles	See below
.	.	.
.	.	.
.	.	.
Coordinates for hydrophone 24	3 doubles	See below

Coordinate triplet

Down range	double	Yards
Across Range	double	Yards
Elevation	double	Feet (+ above datum)