WinFrog Device Group:	**USBL**
Device Name/Model:	**MDL FANBEAM**
Device Manufacturer:	**Measurement Devices Ltd. (MDL)** Silverburn Crescent, Bridge of Don Industrial Estate, Aberdeen AB23 8EW, Scotland, UK Tel:+44 (0)1224 246700 Fax:+44 (0)1224 824987 sales@mdl.co.uk
Device Data String(s) Output to WinFrog:	**ASCII MDL Format, Single Target** Target ID, Range(m), Bearing(deg) E.g. DD RRRR.RR BBB.BB, xxx, xxx, Xxx<CR> <LF> Where: DD Target number RRRR.RR Range metres BBB.BB Bearing degrees Xxx Undecoded **ASCII MDL Format Multi-Target** Window (tgt), Range*10(m), Bearing*100(deg), Time,Validity Flag, Repeat above 5 fields up to 9 times,* E.g. WW,RRRRR,BBBBB,TIME,FLAG* Where: WW Window (Target number) RRRRR Range*10 metres BBBBB Bearing*100 degrees **BCD Simrad Format Single target** Binary coded data. BBBRRR00{255} Where: BBB Bytes 1-3 Bearing*1000 RRR Bytes 4-6 Range*10 00 Bytes 7-8 two zeros {255} Byte 9 terminator hex FF
WinFrog Data String(s) Output to Device:	Nil
WinFrog Data Item(s) and their RAW record:	HYDROPHONE 312 BEACON 309

DEVICE DESCRIPTION:

The MDL Fanbeam is a laser radar system used primarily for repetitive, positioning and tracking of marine vessels, seismic gun arrays, and structures. The system consists of a laser-scanning unit with a Universal Control Unit (USU). The Manufacturer insists that the system is: easy to set up, operates very well for distances under 1500 metres, provides consistent accuracy, utilizes safe targets, and requires little maintenance.

DEVICE CONFIGURATION INSTRUCTIONS

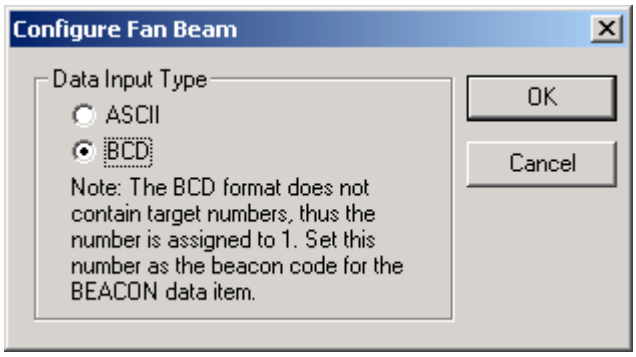
WINFROG I/O DEVICES > EDIT I/O:

Baud Rate: 9600
Data Bits: 8
Stop Bits: 1
Parity: N

RS-232C data communication

WINFROG I/O DEVICES > CONFIGURE DEVICE:

Once the MDL FANBEAM device has been added to the vehicle's device list, it must be configured to suit the application. In the vehicle's device list, highlight the MDL FANBEAM device and click Configure Device. The Configure Fan Beam dialog box appears as seen below.



Select the type of data the instrument is outputting, either ASCII or BCD. These formats are described above. WinFrog can differentiate between the two ASCII formats.

WINFROG VEHICLE > CONFIGURE VEHICLE DEVICES > DEVICE DATA ITEM > EDIT:

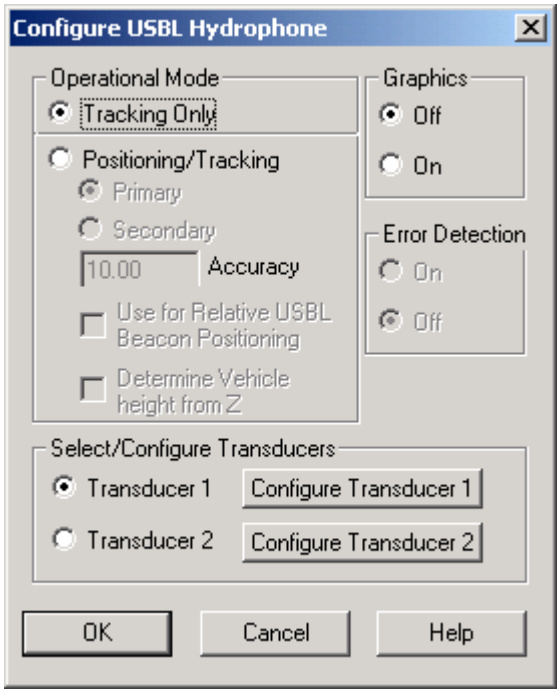
Adding the MDL FANBEAM device to WinFrog creates two data items: the USBL, MDL FANBEAM, USBL HYDROPHONE and the USBL, MDL FANBEAM, BEACON.

For remote vehicle tracking, the Hydrophone data item must be added to the device list of the vehicle to which the hydrophone has been physically attached (i.e. the main ship). The Beacon data item must be added to the vehicle to which the beacon has been physically attached (i.e. the ROV or towed vehicle).

USBL systems can also be used for positioning of the main vessel. In this type of operation the USBL Beacon must be physically attached to some fixed point on the seabed or subsurface structure. The Hydrophone position (i.e. vehicle position) is derived from measurements made to the fixed beacon. For this type of positioning, you must define a working Xponder File (*.XPT) in WinFrog, and enter the fixed position of the Beacon into that file. The Hydrophone must be added to the ship's device list and configured for positioning as opposed to tracking mode. See chapter 5 of the WinFrog User's Guide for more information on setting up *.XPT files.

Data item: USBL, MDL FANBEAM, USBL HYDROPHONE

Once the MDL FANBEAM Hydrophone has been added to the appropriate vehicle's device list it must be edited to suit the application. In the vehicle's devices list, highlight the USBL, MDL FANBEAM, USBL HYDROPHONE then click the Edit button. The Configure USBL Hydrophone dialog box appears as seen below.



Operational Mode:
As mentioned above, USBL systems can be used for tracking of remote vehicles or for positioning of the main vehicle to which the hydrophone is attached. Select **Tracking Only** if relative tracking of a structure/vessel is desired.

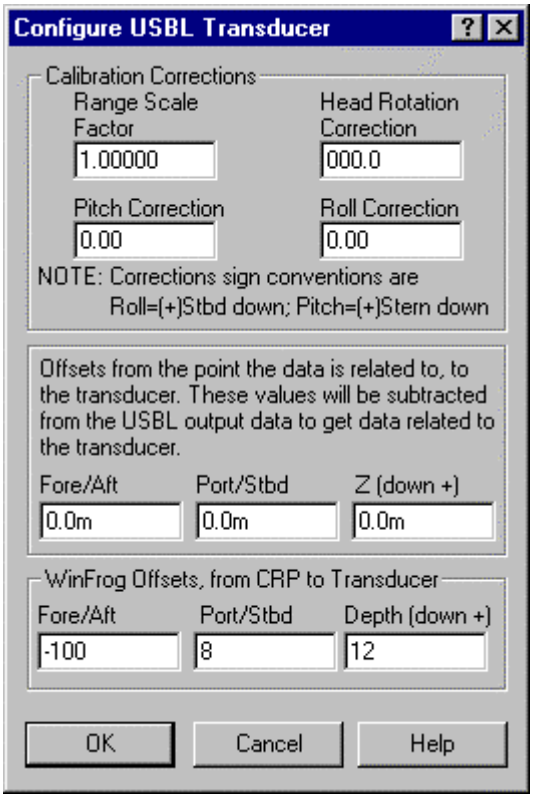
Select **Positioning/Tracking** and **Primary** if you want to position the Master Vessel relative to a stationary (fixed) beacon. The beacon must be located on the stationary (fixed) object, as defined in a working XPONDER (.XPT) file. See chapter 5 of the WinFrog User's Guide for more information on setting up .XPT files.

Note: the default value for the Positioning Accuracy is 10m. It is not recommended to set this value below 7m. In Tracking Mode, the accuracy setting is in the Beacon configuration dialog.

Graphics:
Selecting the On radio button will display the device name and a square at the location of the total station, within the Graphics and Bird's Eye windows.

Error Detection:
By enabling this option, error detection codes are included in the Raw Files. This option is mainly for post project QC analysis and future development.

Select/Configure Transducers:
Two unit locations can be configured for use. Click Configure Transducer 1 or Configure Transducer 2 as required. The Configure USBL Transducer dialog box appears as seen below.

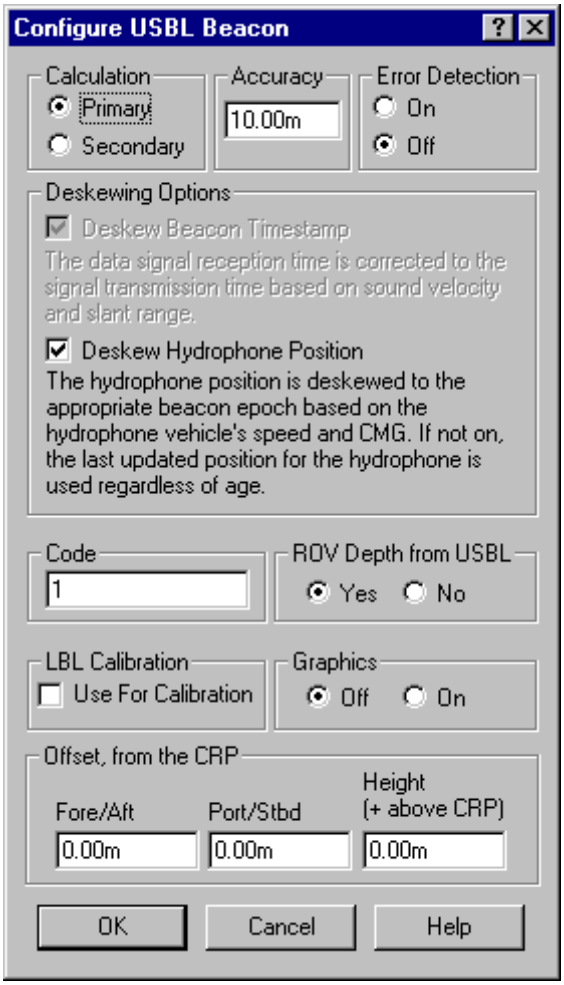


Calibration Corrections:
These values do not apply for MDL FANBEAM operation. Set values as displayed above.

Offsets:
In the top section, the offsets from the point the data is related to, to the transducer, are set to zero for MDL operation as offsets either cannot be configured into the unit, or are not required. The WinFrog Offsets, from CRP to Transducer are set to similar values as would be applied to any device offset in WinFrog. In the example above, the instrument is located 100 (m) aft, 8 (m) starboard and 12 (m) below the CRP.

Data item: USBL, MDL FANBEAM, BEACON

As mentioned above, for subsurface vehicle positioning, the USBL beacon must be added to the appropriate vehicle's device list. Once added to the device list, it must be edited to suit the application. Editing the USBL, MDL FANBEAM, BEACON device brings up the Configure USBL Beacon dialog box, as seen below.



Calculation
Set Calculation to **Primary** if the beacon is to be used for positioning the vehicle to which it is attached. Multiple beacons can be added to the same vehicle's device list, each configured as Primary. WinFrog will calculate a weighted mean position using the Accuracy value entered.

Accuracy
This value is used by WinFrog to weight the use of different positioning devices in solving a single vehicle's position. The lower the accuracy value entered, the more accurate it is deemed to be, and hence the more weight that will be applied to it in comparison to the other devices.

Error Detection:
Setting Error Detection to 'On' instructs WinFrog to identify error codes received in the data string and disable the use of bad data. Only the MDL Multi-target ASCII format contains a validity code. WinFrog accepts all validity code except 2 as valid data. If error detection is on then data with a validity code of 2 will be rejected.

Code:
Set code to the desired target number or window for this vehicle (beacon). If using the BCD data format, the code must be 1 as there is no target number in this telegram.

ROV Depth from USBL:
Since none of the telegrams contain the elevation, nor a vertical angle, the elevation of the target cannot be determined by this device. Setting this to yes will cause the elevation to be set to zero, overwriting another device that is assigning elevation to this vehicle.

LBL Calibration:
No calibration within WinFrog is required for operation of the MDL FANBEAM.

Graphics:
By setting the Graphics to On, a square and label will be displayed for the target location.

Offsets:
The Offsets are applied from CRP (of the structure/vessel) to the target Location. These values are set similar to values that would be applied to any device offset within WinFrog.

CONFIGURATION DETAILS:

A MDL FANBEAM Laser Unit was not available for this documentation.

The MDL FANBEAM is set up with clear line of sight to the target(s). The system is good for construction applications where GPS blockage exists.