WinFrog Device Group:	**LBL ACOUSTIC**
Device Name/Model:	**DS-7000**
Device Manufacturer:	Benthos, Inc. 49 Edgerton Drive North Falmouth, Massachusetts 02556 U.S.A. Telephone: 1-508-563-1000/1-800-446-1222 Fax: 1-508-563-6444 www.benthos.com
Device Data String(s) Output to WinFrog:	DS7000 command responses See manual M-500-004 Rev. H
WinFrog Data String(s) Output to Device:	DS7000 commands See manual M-500-004 Rev. H
WinFrog .raw Data Record Type(s):	Transceiver (LBL TRANCEIVER): Type 420 Transponder (XPONDER); Type 421

DEVICE DESCRIPTION:
Long base line acoustic equipment. Used to position underwater vehicles or structures and surface vehicles. Uses fixed transponders placed upon the bottom and other transponders placed on vehicles; relay or responder only. See also the following chapters: “WORKING TRANSPONDERS (.XPT) FILE”, “LBL ACOUSTICS” and “ACOUSTIC CALIBRATIONS” in the WinFrog User’s Guide.

There are two data types: LBL TRANCEIVER and XPONDER.

DEVICE CONFIGURATION INSTRUCTIONS:
Baud Rate: 9600
Stop Bits: 1
Parity: None
Bits per character: 8
DUPLEX: Half
Character Delay: 01FFh

The baud rate may be set on the front panel of the DS7000. The stop bits, bits per character and parity are fixed to these values. From the front panel set the duplex to half; this is not the default. Use the default character delay unless a slow computer is employed, in which case you should see the DS7000 manual for details on changing this value.

DS7000 CONFIGURATION DETAILS:
Prior to using this device the DS7000 must be setup and running in REMOTE mode. See section 6.3.2 of the DS7000 manual. It does not matter which channel is displayed when the DS7000 is switched to REMOTE mode.

The main setup requirement in the DS7000 is the channel assignment. Other setups are for the communication parameters. Set up a channel for each transponder according to the DS7000 manual. See section 5.3 of the DS7000 manual. If a relay or responder is to be used then a channel must be assigned to each of these as well. Even though the DS7000 does not use a TX FREQ to interrogate a responder, a unique TX FREQ must be assigned which matches the Receive code/frequency of the responder as it appears in the Transponder file.

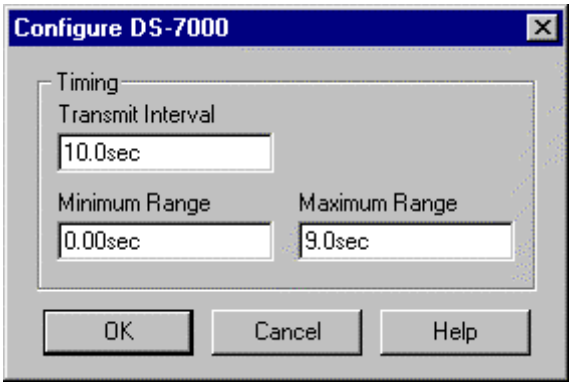
In this example of a DS7000 channel assignment to a responder below, the 09.00 must appear in the **Receive** channel for this responder as it appears in WinFrog's transponder file.

RANGING	RX FREQ	TX FREQ	GAIN	RANGE
CH # 4	11.50	09.00	05	xxxxx.x

When the DS-7000 device is started WinFrog sends the FRE command (enable first reply) until it gets the expected response, then the SS command is sent. The SS command reads the channel assignments in the DS7000 that are required for operations. Do not change the channel setup in the DS7000 once the device has been started in WinFrog, as WinFrog only reads the channel assignments once. If a mistake has been made in the channel assignments, the DS7000 device must be deleted from WinFrog then reselected after the channel assignments have been corrected and the DS7000 has been switched to REMOTE mode.

Note: When entering frequencies into WinFrog the frequencies must be entered to two decimal places even if the least significant digit is zero (i.e. use 9.00 not 9).

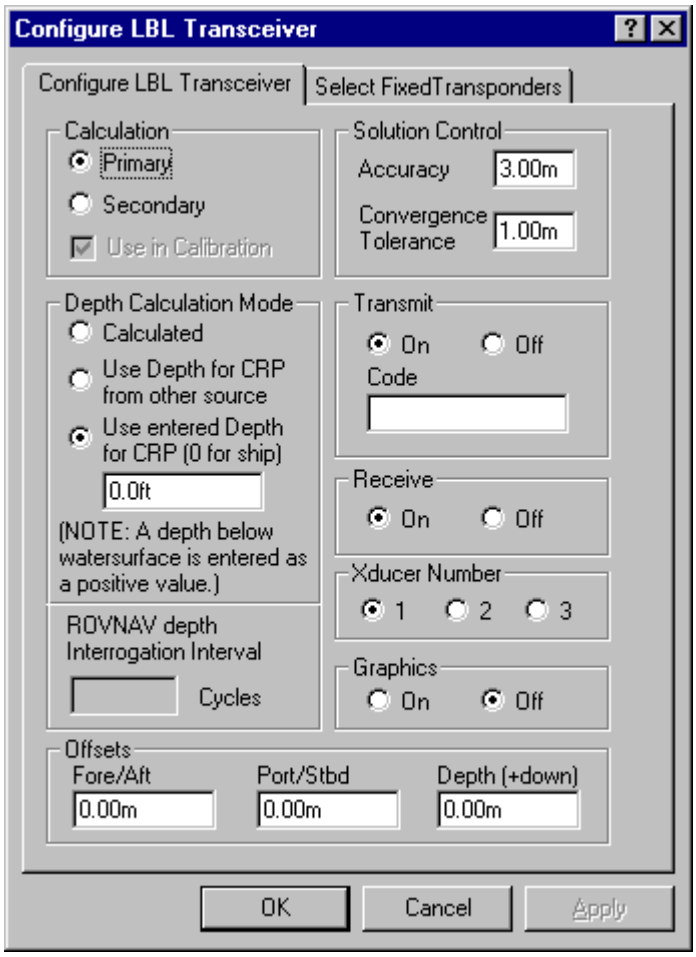
WINFROG I/O DEVICES > CONFIG OPTIONS:
This provides access to the following dialog:



The first value "Transmit Interval" is the minimum time between interrogations. The observed range must lie between the "Minimum Range" and "Maximum Range" for it to be accepted. Note: the units of these values are seconds.

WINFROG VEHICLE TEXT WINDOW > CONFIGURE VEHICLE DEVICES > DEVICE > EDIT OPTIONS:

Data item: LBL, DS-7000,LBL TRANCEIVER

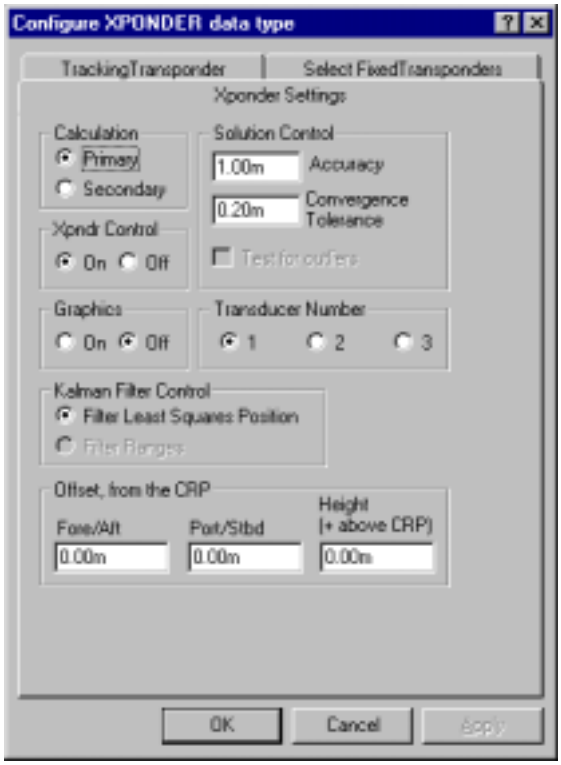


See the LBL ACOUSTICS chapter of the WinFrog User's Guide for details on setting these parameters. They are the same across all LBL TRANCEIVERS except for the **Transmit Code**. The "transmit code" to enter for a DS7000 is the Receive frequency of the fixed transponders.

The accuracy described in the LBL ACOUSTICS chapter usually depends upon frequency. However the DS7000 manual only lists a single value of 0.1 millisecond for high signal to noise ratios. This value will have to be converted to meters 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.

It is required to attach the transceiver to the vehicle and enter a frequency for collection of surface ranges for calibration or relay operations.

Data item: LBL,DS-7000,XPONDER



See the LBL ACOUSTICS chapter for details on setting these parameters. They are the same across all transponders (XPONDERS).

Relay Transponder

Currently WinFrog uses an observed range from the transceiver to a fixed transponder to reduce the observed relay transponder's range (which includes the ranges: vessel to relay, relay to fixed transponder and transponder to transceiver, sometimes called sing-around range). Consequently the LBL TRANCEIVER must be setup to interrogate, i.e. a frequency must be entered. For details on the settings see the LBL ACOUSTICS chapter.

The accuracy described in the LBL ACOUSTICS chapter usually depends upon frequency. However the DS7000 manual only lists a single value of 0.1 millisecond for high signal to noise ratios. This value will have to be converted to meters 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.

Responder Transponder

Setup for the responder is essentially the same as the relay except that one selects the appropriate transponder. The hardware must be setup differently as a responder will be triggered by an electrical impulse transmitted via a wire that must be connected to the DS-7000. See the DS-7000 manual for the correct wiring.