WinFrog Device Group:	**Sounder**
Device Name/Model:	**Innerspace 412 (Digitizer)**
Device Manufacturer:	**Innerspace Technology Inc.** 36 Industrial Park Waldwick, NJ 07463 USA Tel: (201) 447-0398 Fax: (201) 447-1919 E-mail: info@innerspacetechnology.com
Device Data String(s) Output to WinFrog:	Depth (in 10^{ths} of feet). See Configuration Details below.
WinFrog Data String(s) Output to Device:	Nil
WinFrog .raw Data Record Type(s):	Depth: Type 411: depth, status & dtime are repeated 15 times

DEVICE DESCRIPTION:
The Innerspace 412 Digitizer is an external interface box that converts timing data from analogue echosounders (such as the Raytheon 719 series) to a standardized digital format.

The Innerspace 412 allows for the configuration of various operational parameters including:

- Speed of Sound
- Gate Width
- Draft
- Sensitivity
- Mode (Direct, Gated or Auto)
- Reply
- Alarm (on or off)

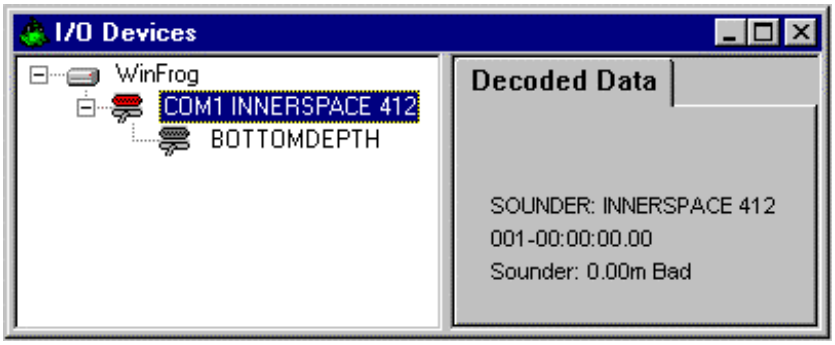
The Innerspace 412 applies these user-defined parameters to the raw timing signals received from the echosounder to calculate digital depth data. The Innerspace 412 is calibrated independently from the echosounder, as calibrating only the sounder has no affect on the digitizer. Due to the fact that various parameters (including the sound velocity) can be input in the Innerspace 412 and the sounder, it is advised that a bar check calibration should be undertaken to ensure the validity of the data being output by the Innerspace 412.

See Configuration Details below for information on the operation of the Innerspace 412.

DEVICE CONFIGURATION INSTRUCTIONS (Suggested for ASCII Converter):
Baud Rate: 9600
Data Bits: 8
Stop Bits: 1
Parity: None

The output from the Innerspace 412 is in BCD format. To be read by WinFrog this data must be converted to ASCII format. Black Box corporation manufactures a BCD – ASCII converter that will perform this operation.

WINFROG I/O DEVICES > CONFIG OPTIONS:
The Innerspace 412 is added to WinFrog from the SOUNDER device category. There is no configuration required or available at the "generic" I/O Device window level.



WINFROG VEHICLE - DEVICES > EDIT OPTIONS:
Adding the Innerspace 412 "sounder" to WinFrog creates a BOTTOMDEPTH data item that must be added to the appropriate vehicle's device list. Once the BOTTOMDEPTH data item has been added to a vehicle's device list, it must be edited to suit the application.

In the vehicle's device list, highlight the SOUNDER, INNERSPACE 412, BOTTOMDEPTH data item and click the Edit button. The standard **Configure Sounder** dialog box appears. Refer to documentation on the NMEA DEPTH device for information on configuring this dialog box.

CONFIGURATION DETAILS:
Prior to connecting the Innerspace 412 to the ASCII converter, the switches on the 412G Buffer Storage Card inside the unit must be configured. To insure interfacing compatibility switches 2 and 5 should be turned on, and the others should be turned off. For operation of the unit, the Test switch located on the 412J Test Board should be set to NORM (as opposed to TEST).

As mentioned above, an external BCD - ASCII converter must be incorporated to get an ASCII data string from the Innerspace 412. When connecting the interface converter to WinFrog, set the interface converter to CONTINUOUS TX mode.

The pin outs between the 25 pin female connector (BCD) on the Innerspace 412 and the 37 pin female connector on the Black Box Converter is as follows:

DB 25 pin male Innerspace 412	DB 37 pin male Black Box BCD-ASCII
1	2
2	3
3	4
4	5
5	6
6	7
7	8
8	9
9	35
10	34
11	33
12	32
13	31
14	30
15	29
16	28
17	-
18	-
19	1
20	-
21	-
22	-
23	-
24	20
25	-

Connections:

The following connectors are found on the rear of the Innerspace 412:

- J1-Power In: Connect to either 115Vac or 12VDc.
- J2-Start/Stop: Cable should be provided to connect the digitizer to the start and signal pulses in the sounder.
- J3-BCD Output: This port is used to connect the Innerspace 412 to the Black Box Binary to ASCII converter. See above cable pin outs.

Operating Procedure:

1. Start echosounder, perform draft adjustment, and adjust sensitivity until a bottom echo appears on the paper readout.
2. Turn the digitizer mode switch to the DIRECT position, the DRAFT switch to the DISPLAY position, the GATE WIDTH switch to the 4 x 1, and the SENSITIVITY and DISPLAY controls fully counter clockwise.
3. Turn the POWER on.
4. The draft setting is now displayed and output. The draft may now be adjusted to the proper setting by turning the DRAFT SET knob. Remember to turn the DRAFT switch to the + or – position to add or subtract the draft reading to the range.
5. Rotate the SENSITIVITY control until the water depth is observed and the readout. Compare the depth indicated on the chart paper with the readout. They should be nearly the same.
6. Perform a bar check with the recorder and adjust the speed of sound controls on the sounder, and on the digitizer to give the true depth.
7. Rotate the DISPLAY control until the desired digitizing rate is set. Note that full speed is fully counter clock wise, and this setting should be used while surveying.
8. The Innerspace 412 is now digitizing the range without the use of a range gate. To use the range gate, the MODE switch is put into the GATED or AUTO position and the gate will therefore automatically track the bottom.
9. The GATE WIDTH switch may now be rotated to select a gate width that will work satisfactorily with the bottom terrain.
10. If the Digitizer loses track while in the GATED position (indicated by the readout not changing), the MODE switch is merely put into the DIRECT position to reacquire the bottom. The switch can then be put back into the GATED position to automatically track the bottom again. If this situation occurs it is possible that the gate width setting is too narrow for the bottom conditions.
11. If the Digitizer starts to track the outgoing transmission from the recorder, i.e. it reads close to zero, it may be necessary to increase the blanking. This is performed by rotating the internal blanking potentiometer on the Timing Board D, clockwise, until the Digitizer starts to track normally. The blanking period should be slightly longer than the duration of the outgoing pulse as seen at the output of the receiver.