



**HYPACK**  
a xylem brand

## Side Scan Drivers

### Interfacing Notes

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# Sidescan Survey Interfacing Notes

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## Revision History:

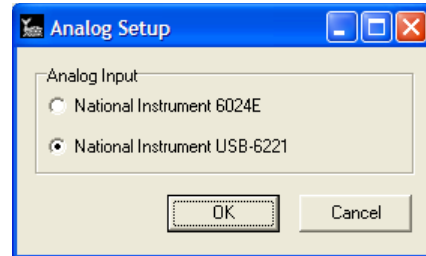
- ▲ 6/29/2016 Added Kongsberg PulSAR
- ▲ 9/17/2015 Added SonarTech SonarBeam S-150 and Marine Sonic Sea Scan Arc Explorer
- ▲ 3/13/2014 Review and update. (Many post-09 updates were not listed here)
- ▲ 3/13/2009 Internal trigger option for USB analog sidescan.
- ▲ 10/9/2008 USB Analog sidescan interface.
- ▲ 7/02/2008 Added GeoAcoustics DSSS and Benthos 1624/1625 sections.
- ▲ 3/21/2008 Updated Klein section, added 3900 notes.
- ▲ 5/02/2005 Add Edgetech 272-T/TD notes.
- ▲ 3/15/2005 Add Edgetech 4100 notes.
- ▲ 8/31/2004 Add CMAX CM-2 Notes.

## Analog Sidescan

Driver providing 2-channel sidescan information from analog input. A separate program (AscanUSB.exe) is run automatically to sample the ping trigger and digitize the analog inputs. The digitized data are passed to Sidescan Survey through shared memory.

### Setup Form:

The setup form allows you to select the analog input device. The NI 6024E is a PCMCIA device which works fine in Windows XP and earlier but is not supported by National Instruments in Vista, and therefore can not be used in HYPACK® under Vista. The NI USB-6221 is a USB device which should work in all Windows versions supported by HYPACK®.



### Additional Setup:

Clicking “Analog Sidescan Monitor” (on the taskbar) during Sidescan Survey will show the following form for sidescan configuration on the fly.

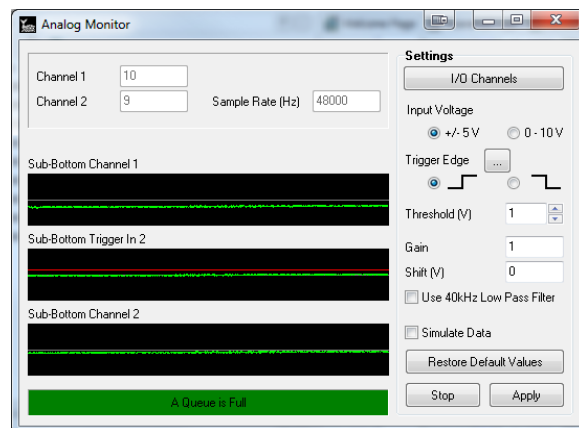
**Input:** Select one of the voltage range options.

**Trigger:** Ping is on low to high or high to low transition of the trigger signal.

**Gain:** Gain constant (voltage multiplier).

**Threshold:** This is the A/D count level at which triggering occurs.

**Test:** Simulate data provides a dummy amplitude time series for each channel.



### Connection:

Connected via a National Instruments multifunction I/O device – PCI board, PCMCIA card or USB. The device is plug and play – no configuration required in Sidescan Hardware.

### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### Notes:

See Appendix A: Analog Sidescan Interfacing.

## Benthos 1624/1625

Driver for 1624/1625 sidescans with control.

### Setup Form:

None.

### Connection:

Uses a TCP network connection. According to Benthos documentation, the IP address of the system should always be 192.168.0.17. It uses port 5009 for ping data and 5010 for telemetry. The driver is hardcoded to these ports so the port field in setup is ignored.

### Sonar Head Offsets:

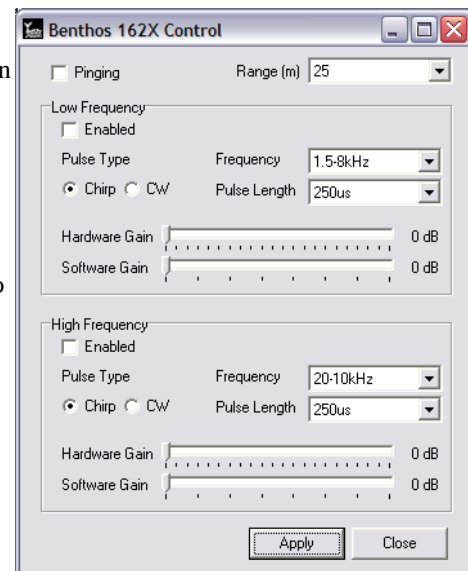
For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey. All Other Offsets: Enter 0.

### Online Sonar Control:

The control functions are available under Tools Menu, Sidescan Device Control. The pulse type, length, and frequency can be changed as well as hardware and software gain (on the Benthos side).

### Notes:

The telemetry data stream may include pressure. This is displayed in the towfish sensor window, but is also converted to depth.



## C-MAX CM-2

Sidescan Sonar driver using COM port for control and analog interface for input.

### Connection:

There are two connections. Sidescan signal and trigger use the analog interface (See Analog Sidescan above). Other information exchange (control / status ) is through a COM port - 4800 baud, 8 data bits, 1 stop bit, no parity.

COM offset is configurable within the CM-2. Hypack expects the following message:  
*S,RangeFreqCode,Alt0.1m<CR>*

Refer to the CM-2 manual for further details.

### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

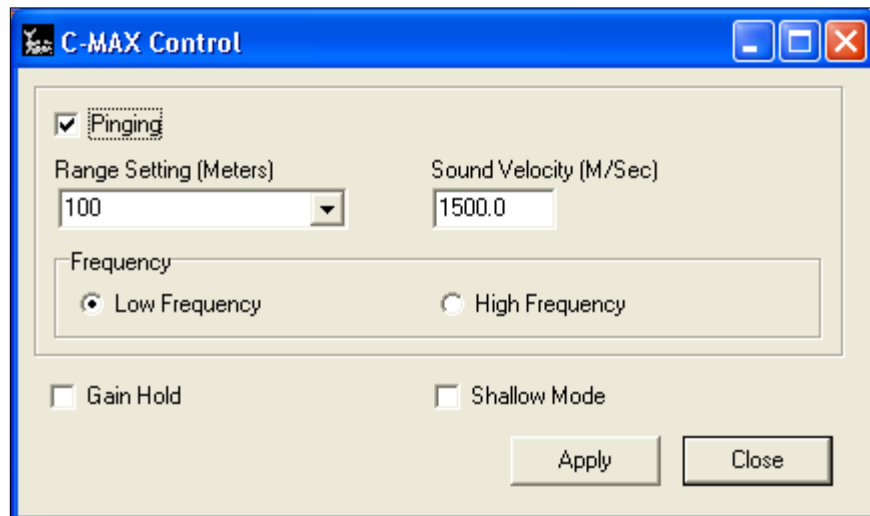
All Other Offsets: Enter 0.

### Online Sonar Control:

The standard control functions (ping on/off, range, SV and frequency selection) are available under Tools Menu, Sidescan Device Control. In addition:

Gain Hold: When selected, holds the current towfish gain settings. When deselected, reverts to auto-gain.

Shallow Mode: Allows towfish operation in 1.5m water or less.



## C-MAX CM-2 (USB)

Sidescan Sonar driver using USB interface for control and data.

### Connection:

No configuration is needed for the USB interface.

### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

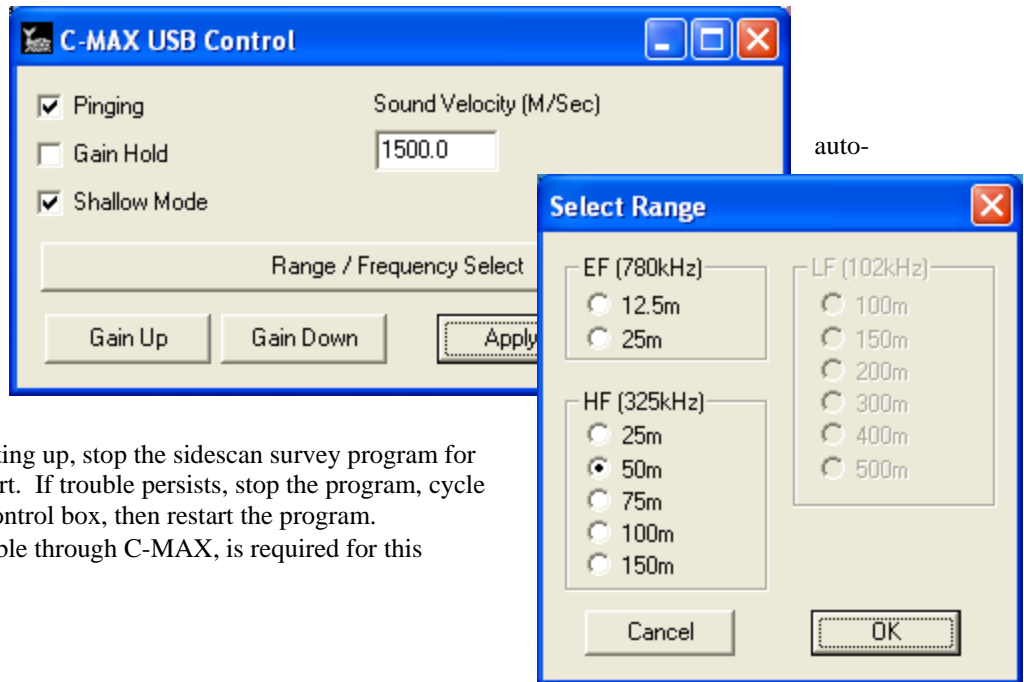
All Other Offsets: Enter 0.

### Online Sonar Control:

The standard control functions (ping on/off, range, SV and frequency selection) are available under Tools Menu, Sidescan Device Control. In addition:

Gain Hold: When selected, holds the current towfish gain settings. When deselected, reverts to auto-gain.

Shallow Mode: Allows towfish operation in 1.5m water or less.



### Notes:

- If having trouble starting up, stop the sidescan survey program for one minute then restart. If trouble persists, stop the program, cycle power at the CM-2 control box, then restart the program.
- A USB driver, available through C-MAX, is required for this interface.



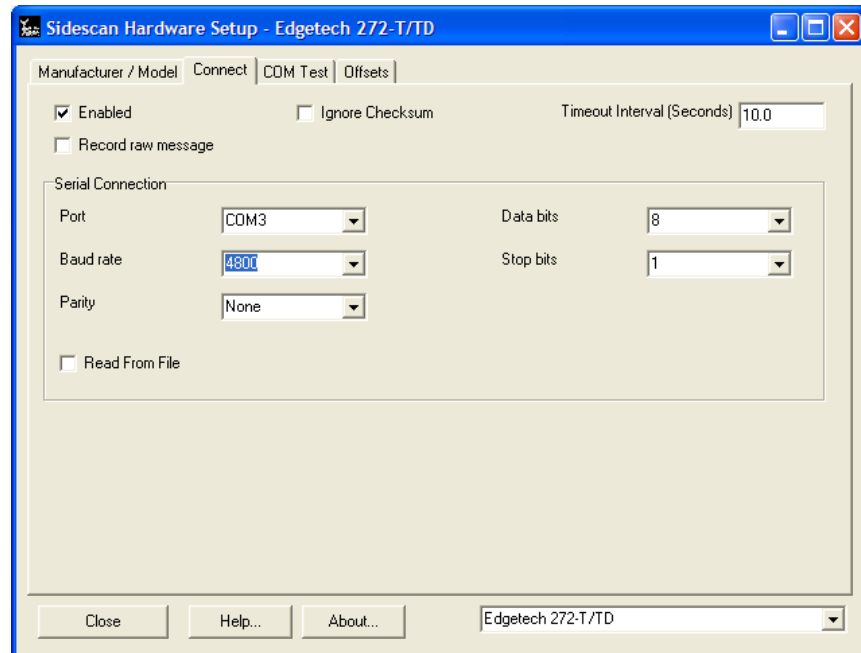
## Edgetech 272-T/TD

Driver for Edgetech 272 sidescan. Interface is via the ACI (Analog Control Interface). Sidescan input is via A/D card (see analog sidescan above). Control is via RS232 COM port.

### Connection:

Select COM port through which the control messages are output.

Analog inputs are configured in the ASCAN.EXE program (Analog Sidescan Monitor) which runs minimized when this driver is used.



### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### Online Sonar Control:

Identical to Edgetech 4100 driver.

### Notes:

See "Analog Sidescan" driver and Appendix A to configure analog inputs.

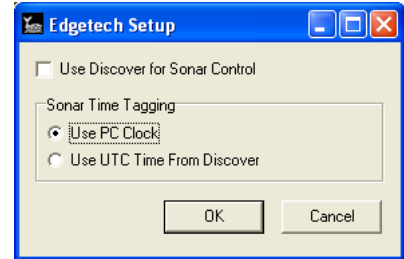
# Edgetech 4100

Replaces Edgetech 4100 topside program. The 4100 system consists of the 272 towfish and the 560 control PC, running Edgetech "Discover" software. The Hypack driver replaces Discover for display, data logging and real-time controls.

## Setup Form:

### Use Discover for Sonar Control:

By default, Hypack issues 4100 control commands. Users who want advanced sonar control (trigger divisors for example) should check this and allow Discover to control the sonar. Hypack will still display and log sidescan.



### Use PC Clock:

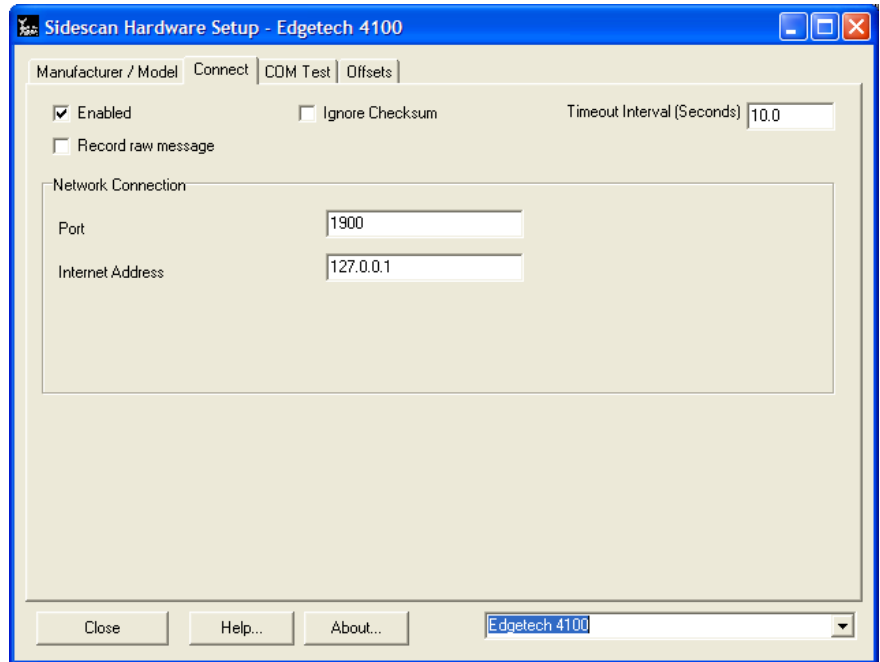
Less accurate time tagging but does not require time synchronization. Good enough unless you have very accurate timing requirements.

### Use UTC Time From Discover:

More accurate but requires synchronization of Hypack and Discover to UTC time.

## Connection:

The Hypack driver connects to the Edgetech program running on the same PC. Network setting are given in the screen shot.



## Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

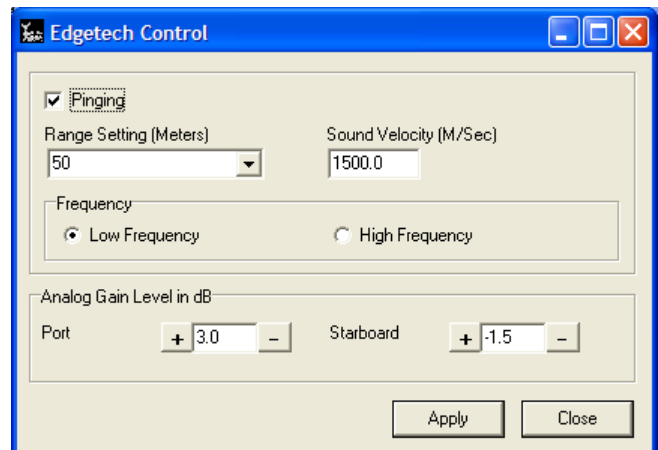
All Other Offsets: Enter 0.

## Online Sonar Control:

The standard control functions (ping on/off, range, SV and frequency selection) are available under Tools Menu, Sidescan Device Control. In addition:

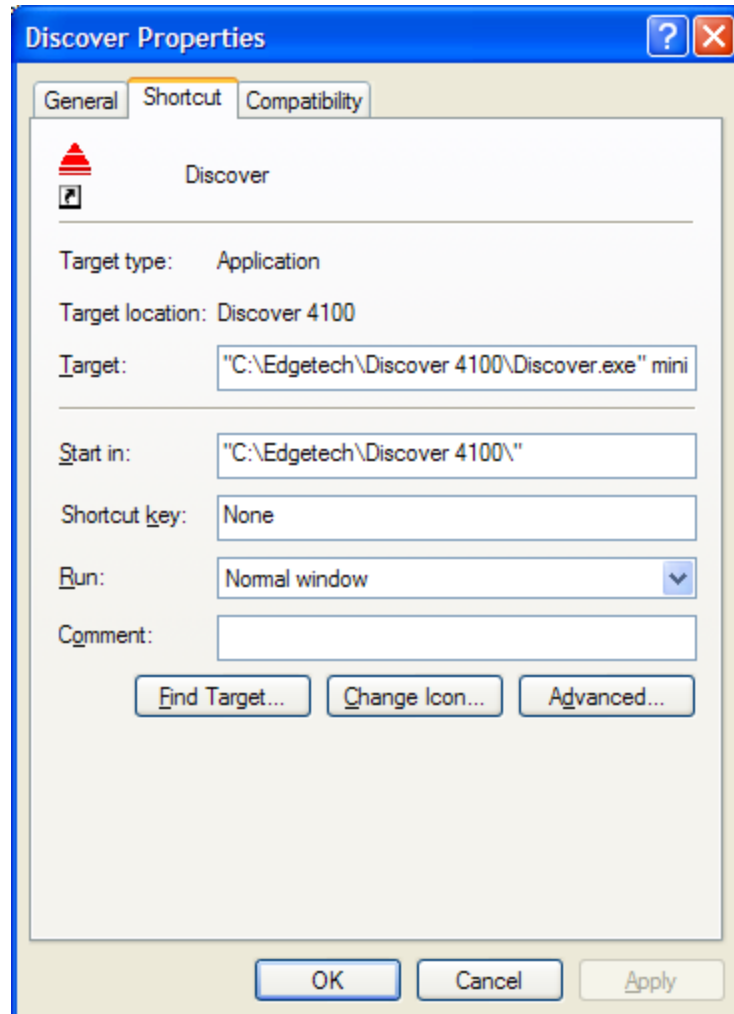
### Analog Gain Levels:

Adjust analog gains from minus 12 to plus 12 dB.



Notes:

- To have Hypack Max start the Discover program automatically, you must create a shortcut in the Hypack folder. Shortcut name must be Discover.lnk. Example shortcut:



## Edgetech 4125/4200/4300

Driver for EdgeTech 4200 system. May work with other systems (4150 for example). EdgeTech's Discover program runs in combination with Hypack (see 4100 description above).

### Setup Form:

#### Use Discover for Sonar Control:

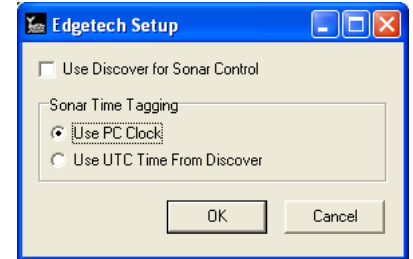
By default, Hypack issues 42100 control commands. Users who want advanced sonar control (trigger divisors for example) should check this and allow Discover to control the sonar. Hypack will still display and log sidescan.

#### Use PC Clock:

Less accurate time tagging but does not require time synchronization. Good enough unless you have very accurate timing requirements.

#### Use UTC Time From Discover:

More accurate but requires synchronization of Hypack and Discover to UTC time.

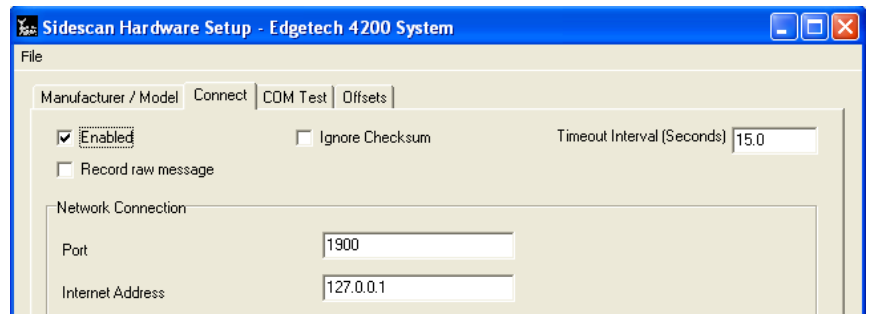


### Connection:

Network setting when running Hypack and Discover on the same computer are given in the screen shot at right.

### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.



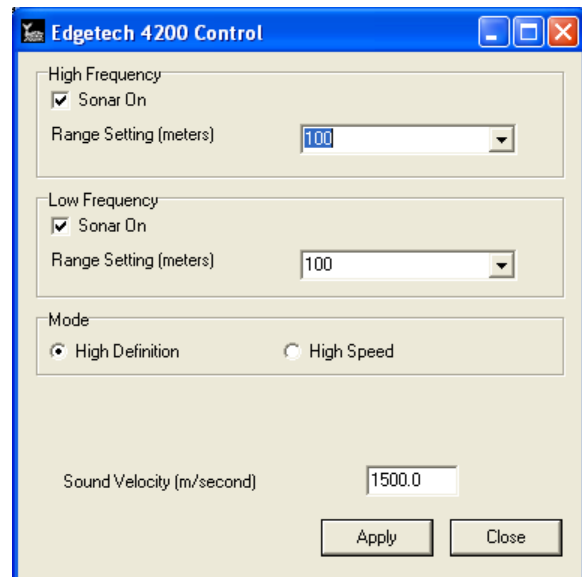
All Other Offsets: Enter 0.

### Online Sonar Control:

Sonar controls are available under Tools Menu, Sidescan Device Control. The 4200 driver is capable of display and logging of both frequencies simultaneously.

### Notes:

Discover is typically run on the same computer as Hypack, although it's not required. The fish I.P. Address in Discover (Configuration menu, Network) is 192.9.0.101, Port 1700 in at least one installation.



## GeoAcoustics Digital Side Scan

Driver for GeoAcoustics Digital Side Scan system. GeoAcoustics' GeoUTS program runs in combination with Hypack. GeoUTS should have its 'Processing Unit' setting set to "NEW-usesthis". Expect the name of this setting to change. (Other software interfaces with this system differently so there are several options here...)

### Setup Form:

None.

### Connection:

Uses a TCP network connection. IP should be set to the IP address of the system using port 502.

### Sonar Head Offsets:

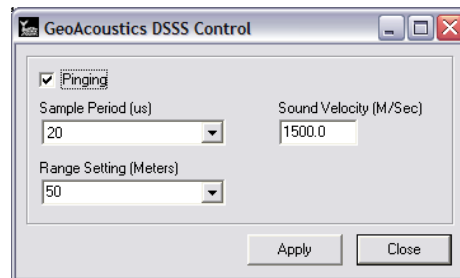
Forward / Starboard: Enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### Online Sonar Control:

Sonar controls are available under Tools Menu, Sidescan Device Control. The range and sample period can be adjusted.

### Notes:



## Hypack Mobile

Provides information from the first Hypack Survey mobile - typically the sidescan towfish.

- Towfish position and position time.
- Towfish heading – actually, course over ground.
- 

### **Connection:**

None required because data is exchanged through shared memory.

### **Offsets – Antenna:**

- Starboard, forward, vertical: Enter 0.
- Yaw, Pitch, Roll: Enter 0.
- Latency: Primary GPS latency (positive).

### **Offsets – Gyro:**

- All zero.

### **Notes:**

- The Hypack Mobile driver is only required when the sidescan is installed on a towfish. See Appendix C for the Hypack Survey setup.

## Hypack Navigation

Provides information from Hypack Survey primary navigation device – typically GPS.

- Grid position and position time.
- GPS heading and speed.

### Connection:

None required because data is exchanged through shared memory.

### Offsets – Antenna:

- Starboard: Antenna position starboard of **boat reference**. When the sidescan sonar is mounted directly to the boat, the **boat reference** point is the mounting location. When the sonar is towfish mounted, the **boat reference** point is the attachment point of the towfish cable.
- Forward: Antenna position forward of **boat reference**.
- Vertical: Antenna height relative to the waterline. This is a negative number when the antenna is above water.
- Yaw, Pitch, Roll: Enter 0.
- Latency: GPS latency (positive).

### Offsets – Gyro:

- All zero.

### Notes:

- If sidescan is installed on a towfish, the present driver (Hypack Navigation) is used for display only. If sidescan is installed on the main vessel, the present driver is used for sidescan positioning. See Appendices B and C.

# Imagenex Yellowfin

Driver for the Imagenex Yellowfin sidescan sonar.

## Connection:

Network interface. Yellowfin control box has fixed IP Address 192.168.0.2 and uses port 4040. The Hypack PC must use a compatible IP address; 192.168.0.3 for example.

*Note: The Yellowfin control box does not respond to ping commands.*

## Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

## Online Sonar Control:

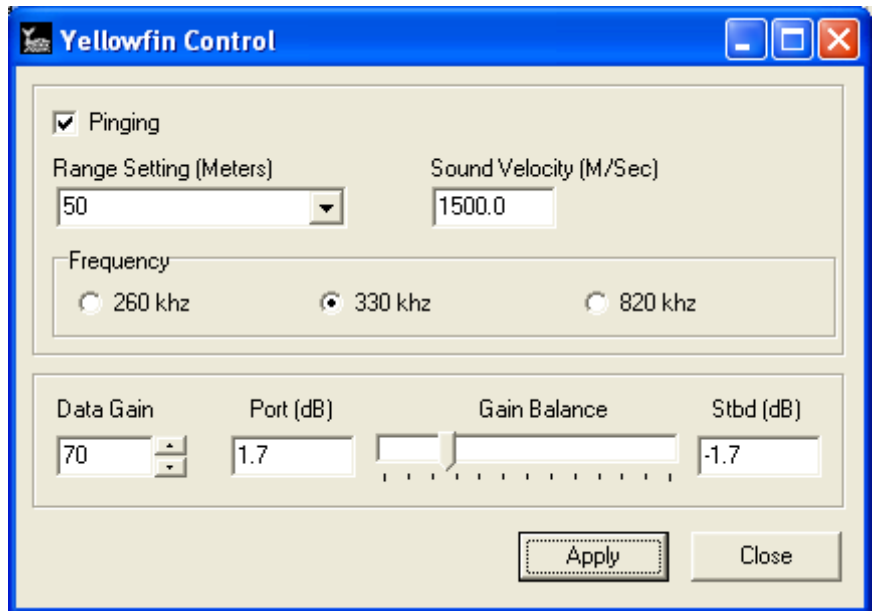
The standard control functions (run/standby, range, SV and frequency selection) are available under Sidescan Controls, Survey tab.

In addition:

Data Gain: Compensation for cable length.

Gain Balance: Use to bias brightness to port or starboard side in 0.1 dB steps.

## Notes:





# Imagenex Sportscan

Driver for the ImaGenex Sportscan sidescan sonar.

## Connection:

COM Interface. The Sportscan may be connected to any COM port, but COM parameters are fixed at 115200,n,8,1. Because polling is required, Sportscan data will not show up in the COM test even when the interface is working properly.

The Hypack connection will normally replace the connection to the ImaGenex program. Input to both programs is possible with a split cable.

## Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

## Online Sonar Control:

The standard control functions (run/standby, range, SV and frequency selection) are available under Sidescan Controls, Survey tab.

In addition:

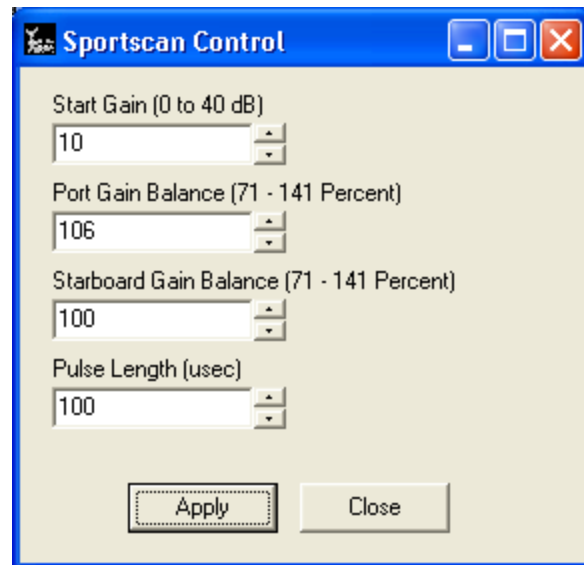
Start Gain: Main gain control.

Port Gain Balance: To brighten / darken the port side scan.

Starboard Gain Balance: To brighten/darken the starboard side scan.

Pulse Length: Select the transmitter pulse length.

## Notes:



## **Innomar SES**

Driver for the Innomar SES with the side scan option.

### **Connection:**

Network Interface. Set the IP address and port number (4001 during testing) of the SES in SS HARDWARE. This is a passive driver; we do not send control commands to the sonar so you must use the Innomar-provided computer for changing range and other system settings.

### **Sonar Head Offsets:**

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### **Notes:**

## Klein 3000 / 3900 / 5000

Driver for Klein 3000, 3900, and 5000 sidescan sonars.

### Connection:

Network interface. Enter the IP Address of the Tranceiver Processing Unit (TPU) – 192.168.0.81 in one installation. The port number does not matter. Of course the Hypack PC IP Address must be set in the range that can communicate with the TPU, i.e., 192.168.0.xxx.

### Sonar Head Offsets:

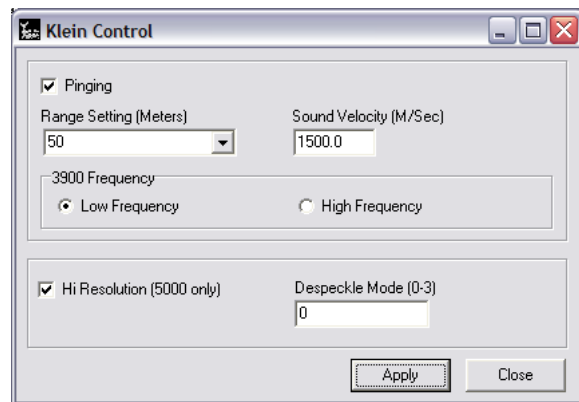
Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### Online Sonar Control:

The standard control functions (run/standby, range, SV and frequency selection) are available when Hypack is the master connection to the TPU. Frequency selection is used only for the 3900, which can only operate on one frequency at a time. The control functions are not available when Klein Sonar Pro is the master and Hypack is the slave connection. Typically the master is the first connected to the TPU.

For the system 3000, the despeckle mode is selectable.



### Notes:

# Kongsberg PulSAR

Driver for Kongsberg PulSAR sidescan sonar.

## **Connection:**

Network interface. Connection and control of the PulSAR device is handled by the PulSAR software. Connect the device to the computer. Launch the PulSAR software (included with every device). In Hardware, set the IP address to 127.0.0.1 and port to 5000. Start pinging in the PulSAR software and launch Sidescan Survey.

## **Sonar Head Offsets:**

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.  
All Other Offsets: Enter 0.

## **Online Sonar Control:**

The option to Connect and Disconnect are presented to the user in Sidescan Survey. All other control is done through the PulSAR software.

## **Notes:**

# Marine Sonic Sea Scan

Driver for Marine Sonic sidescan sonars that use their Sea Scan software for communication.

### Connection:

Network interface for data, serial connection for control. Sea Scan uses UDP for communication. In Sea Scan, choose External->Real Time->Settings... from the menu. Set the IP Address to the address of the HYPACK computer and choose a port (the default of 6500 is fine). Set the Interface option to 'Sonar Data Stream'. In SS Hardware, leave IP address as is (unused for UDP connections) and set the port to the same as in Sea Scan.

For remote control, choose External->Host-Remote->Settings... from the menu. Select 'Allow Remote Control' and configure the serial port settings.

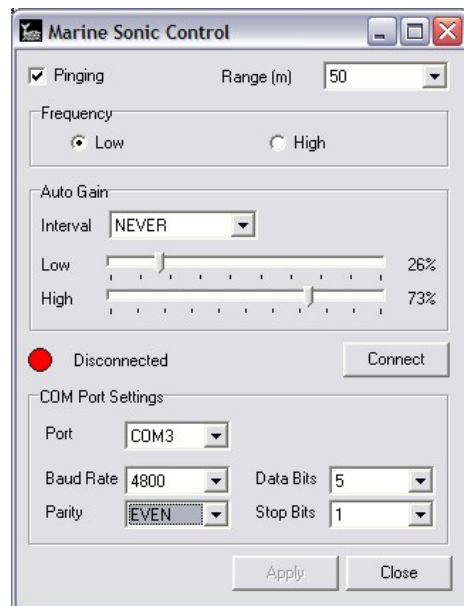
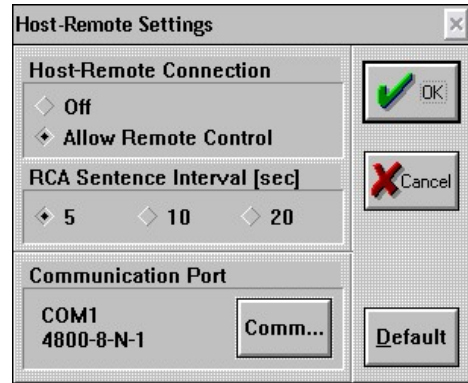
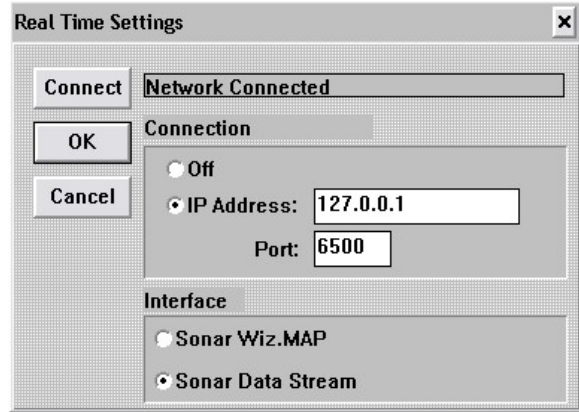
### Sonar Head Offsets:

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey. All Other Offsets: Enter 0.

### Online Sonar Control:

Standard control functions are available if you also connect to Sea Scan with a serial cable. Configure the serial port settings on the control form and press 'Connect'.

### Notes:



## Marine Sonic Sea Scan ARC Explorer

Driver for Marine Sonic Sea Scan ARC Explorer sidescan sonar.  
Driver written by Daniel Tobin in 2015.

### Connection:

The S-150 uses a network connection for communication. Connection and communication is done through the Marine Sonic DLLs, so there shouldn't be any setup required to run this device.

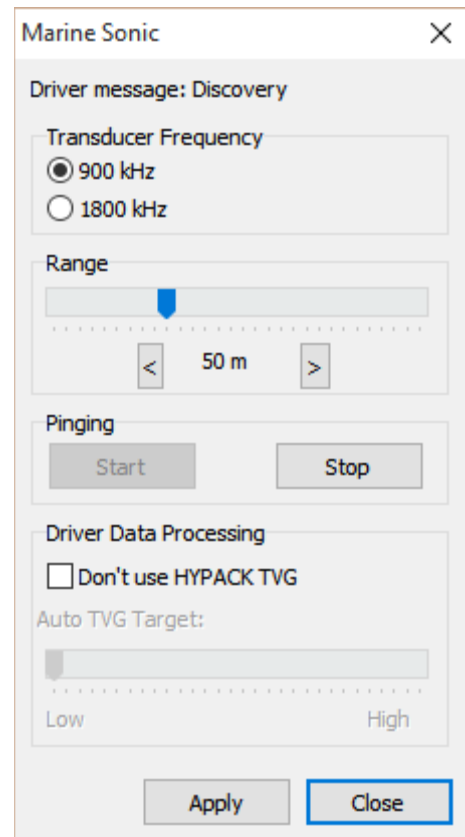
### Sonar Head Offsets:

Forward / Starboard: For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.  
All Other Offsets: Enter 0.

### Online Sonar Control:

Transducer frequency, range, and an option to start and stop pinging are in the settings. The ARC Explorer offers an option to use TVG provided by the official Marine Sonic DLL with a slider to adjust the TVG target. Enabling Marine Sonic TVG disables HYPACK TVG.

### Notes:



## **Marine Sonic Sea Scan HDS**

Driver for Marine Sonic HDS. Plug and play USB, nothing special to configure.

### **Connection:**

USB.

### **Sonar Head Offsets:**

Forward / Starboard: For hull mount, enter offsets relative to boat origin. For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### **Notes:**

## SonarTech SonarBeam S-150

Driver for SonarTech SonarBeam S-150 sidescan sonar.  
Driver written by Daniel Tobin in 2015.

### Connection:

The S-150 uses a comport for communication. Set the port number to the port the device is connected to and all other settings should be left at their default setting.

### Sonar Head Offsets:

Forward / Starboard: For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

All Other Offsets: Enter 0.

### Online Sonar Control:

Controls for setting many different options are available.

SonarTech Setup

Transmit Frequency

100kHz

400kHz

900kHz

1250kHz

Range: 100m

Gain

Port High Gain

Starboard High Gain

Sensor Type

100m

200m

500m

1000m

Transmit Frequency

-10dB

0dB

+10dB

Safety Water Depth

0

0.5

1

2

3

Sampling Frequency

10kHz

25kHz

50kHz

100kHz

Apply Close



## TriTech StarFish 450/990

Driver for TriTech StarFish sidescan sonar.

### Connection:

The StarFish uses USB for communication. Make sure you have the software drivers for the StarFish installed. These are required for HYPACK to find the sidescan device.

### Sonar Head Offsets:

Forward / Starboard: For towfish, enter 0, 0 as offsets are applied to the tow cable driver (TOWCABLE.DLL) in Hypack survey.

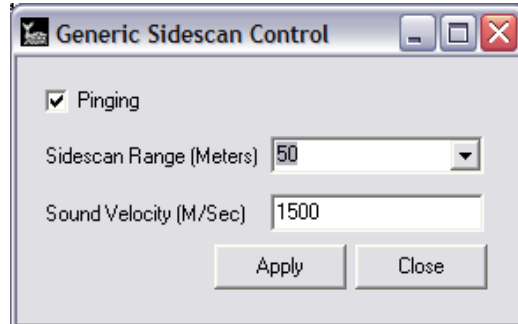
All Other Offsets: Enter 0.

### Online Sonar Control:

A basic control is available to toggle pinging as well as changing range and sound velocity.

### Notes:

We have had reports of the Starfish interface box conflicting with Serial-to-USB converters as well as overheating. One customer wraps the box in ice packs before starting the survey day.



Regarding 2011 and earlier: Note that SIDESCAN SURVEY will resend initialization commands to the fish if SURVEY is restarted which may cause the fish to stop sending data for a minute while it reinitializes. We recommend that the timeout setting in SIDESCAN HARDWARE is set to a minute or more to avoid a timeout message in this case.

2012 and on: When support for the 990 was added, the Trittech StarFish drivers use the newer DLL interface from Trittech. Make sure that you have installed the relevant software from Trittech to make sure that you have the latest DLLs on your system.

## Appendix A: Analog Sidescan Interfacing

Requires a multifunction I/O device for port and starboard transducer signals + trigger, a cable and a connector block. All are available from National Instruments, along with a CD containing driver software.

National Instruments  
11500 North Mopac Expressway,  
Austin, TX 78795-3504

TEL: (512) 794-0100  
FAX: (512) 683-9300  
[www.ni.com](http://www.ni.com)

### I/O Board

For Desktop Computers: NI PCI-6023E – PCI Board.  
For Notebook Computers: NI DAQ Card-6024E – PCMCIA Card  
USB: NI USB-6221 BNC – USB interface.



### Cable

For the Desktop PCI Board: SH68-68-EP  
For the Notebook PCMCIA Card: SHC-68-68-EP  
USB: Included.

### Connector Block

For PCI and PCMCIA: SCB-68.  
USB: Included.

### Connections (PCI and PCMCIA)

To connect the three inputs – (1) port signal, (2) starboard signal, (3) trigger.

| <u>Input</u> | <u>Connector Block</u> |
|--------------|------------------------|
| 1 Signal     | 68 (ACH0)              |
| 1 Ground     | 67 (AIGND)             |
| 2 Signal     | 33 (ACH1)              |
| 2 Ground     | 32 (AIGND)             |
| 3 Trigger    | 65 (ACH2)              |
| 3 Ground     | 64 (AIGND)             |

Note: The trigger wiring below is obsolete as of Hypack version 2.12A.

3 Signal                    10 (PFI1/TRIG2)  
3 Ground                    9 (DGND)

11 (PFI0/TRIG1) connected to  
47 (DIO3) for internal trigger test mode.

### **Connections (USB)**

Connect coax cables: AI0 = Port signal, AI1 = Starboard signal, AI2 = Trigger Input, AO0 = Trigger Output.

### **Hardware / Software Installation (PCI)**

- Before installing the NI-DAQ software, install the PCI-6023E board in a spare PCI slot.
- Start the computer and cancel the New Hardware Wizard.
- Install the NI-DAQ software from CD then restart the computer.
- Upon restart, the PCI-6023E is automatically recognized and configured.

### **Hardware / Software Installation (USB)**

No special instruction; Just install the National Instruments drivers and hardware per their recommendation.

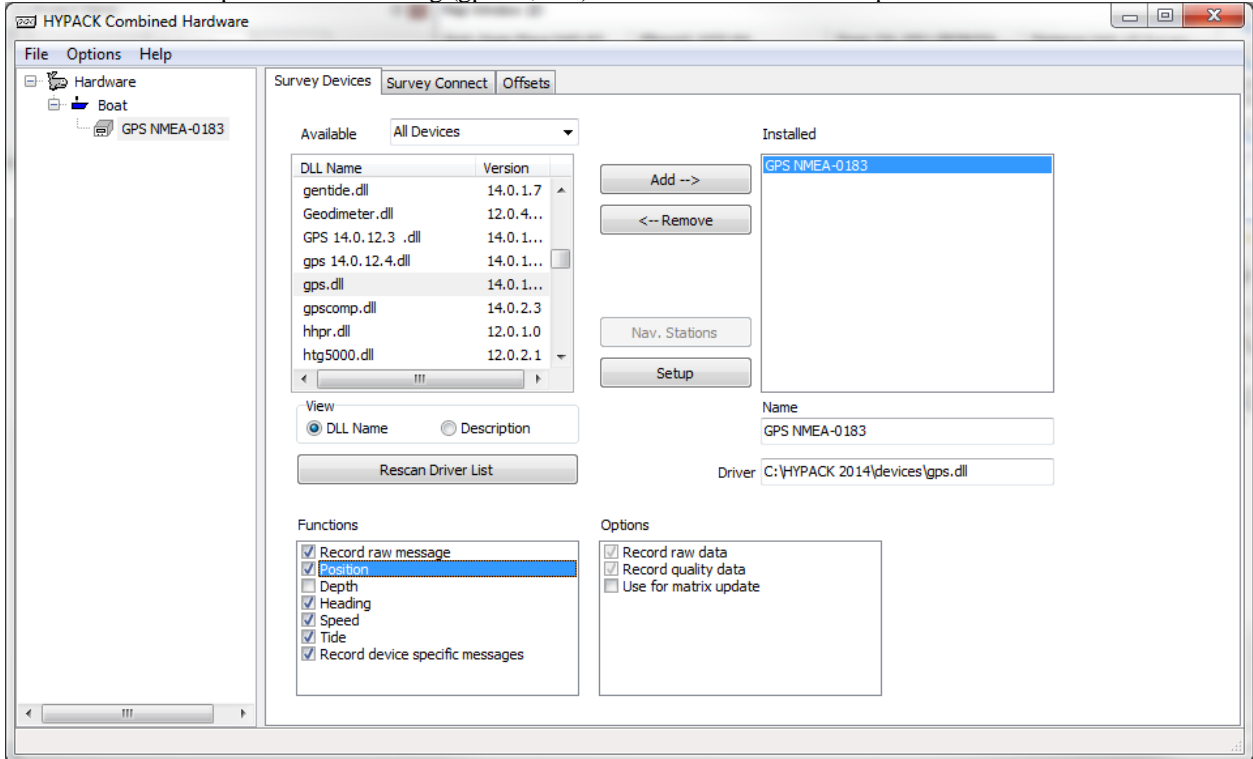
### **Trigger Options**

External Trigger: The sonar generates the trigger which is wired into AI2.

Internal Trigger: HYPACK generates the trigger. It is wired to the sonar and also to AI2.

## Appendix B: Hypack Hardware Setup – Boat Mounted Sonar

When sidescan sonar is mounted directly on the boat, Hypack Survey requires only a position driver. The driver takes in GPS position and heading (gps.dll, etc.) and calculates sonar head position.



The best way to deal with offsets is to define the sonar location as the boat origin and enter the offsets **from** the sonar **to** the GPS antenna.

If more accurate heading is available (e.g., gyro), add the appropriate driver in Hypack Hardware. Nmea.dll reads the \$HDT message sent by most gyros.

With boat mounted sonar, the Sidescan Survey program gets sonar position from the “Hypack Navigation” driver – see above.

## Appendix C: Hypack Hardware Setup – Towfish Mounted Sonar

When sidescan sonar is mounted on a towfish, Hypack Survey requires two position drivers – (1) the position of the Primary Survey Vessel comes from GPS and (2) the position of the first Hypack Mobile (Towfish) is calculated from boat position and towfish cable out.

We select the boat origin as the point where the towfish cable is attached to the boat.

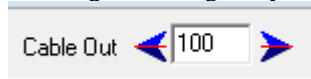
### Primary Survey Vessel:

Takes in GPS position and heading (gps.dll). Enter offsets **from** the cable attachment point **to** the GPS antenna.

### Hypack Mobile (Towfish):

Calculates towfish / sonar position. The recommended driver is towfish.dll, which you will install on the first Hypack mobile. Offsets are zero. The setup dialog for towfish.dll is shown to the right. Unless you have good reasons otherwise, setup the driver as shown.

During survey, the amount of cable out can be adjusted resulting in a changed layback.



With towfish mounted sonar, the Sidescan Survey program gets sonar position from the “Hypack Mobile” driver – see above.

