



**HYPACK**  
a xylem brand

## HYPACK® SUB-BOTTOM User Manual

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## WELCOME TO HYPACK® SUB-BOTTOM!

Sub-bottom profilers are used extensively in offshore, coastal and port engineering and geotechnical site surveys, renewable energy surveys, dredging studies, mineral exploration and habitat mapping projects. The interpreted data from these systems includes the thickness and qualitative sediment characteristics of the different sediment layers that comprise the sub-bottom strata.

HYPACK® SUB-BOTTOM is a specialized software package for sub-bottom profiling surveys. It provides all of the tools needed to design the survey, and collect and process sub-bottom profiler data.

The SUB-BOTTOM PROCESSOR displays SEG-Y sub-bottom data and provides tools with which you mark targets, and digitize your layers. The SUB-BOTTOM PROCESSOR displays the sub-bottom profiles and converts the digitized points to the HYPACK® SUB-BOTTOM All format or XYZ format, which may then be displayed with the targets in the HYPACK® SUB-BOTTOM screen, plotted from HYPLOT or converted to other formats in EXPORT.

### More Information

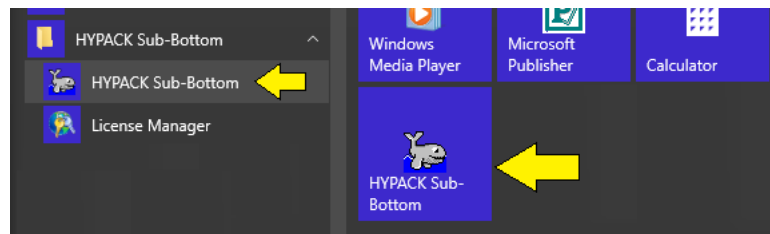
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## OPENING THE PROGRAM

When you install the software on your computer, it creates a HYPACK® SUB-BOTTOM desktop icon and a Windows® Start menu item. **To launch the software**, click on either one.

*FIGURE 1. Launching HYPACK® SUB-BOTTOM —Windows® Start Menu (left), Desktop Icon (right)*



**The first time you start the package**, it loads a default project; otherwise, it returns to the project where you worked most recently.

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## HYPACK® SUB-BOTTOM INTERFACE

The unified HYPACK® SUB-BOTTOM user interface displays the data and project files included in your project.

FIGURE 2. HYPACK® SUB-BOTTOM User Interface (Main Program)

Title Bar

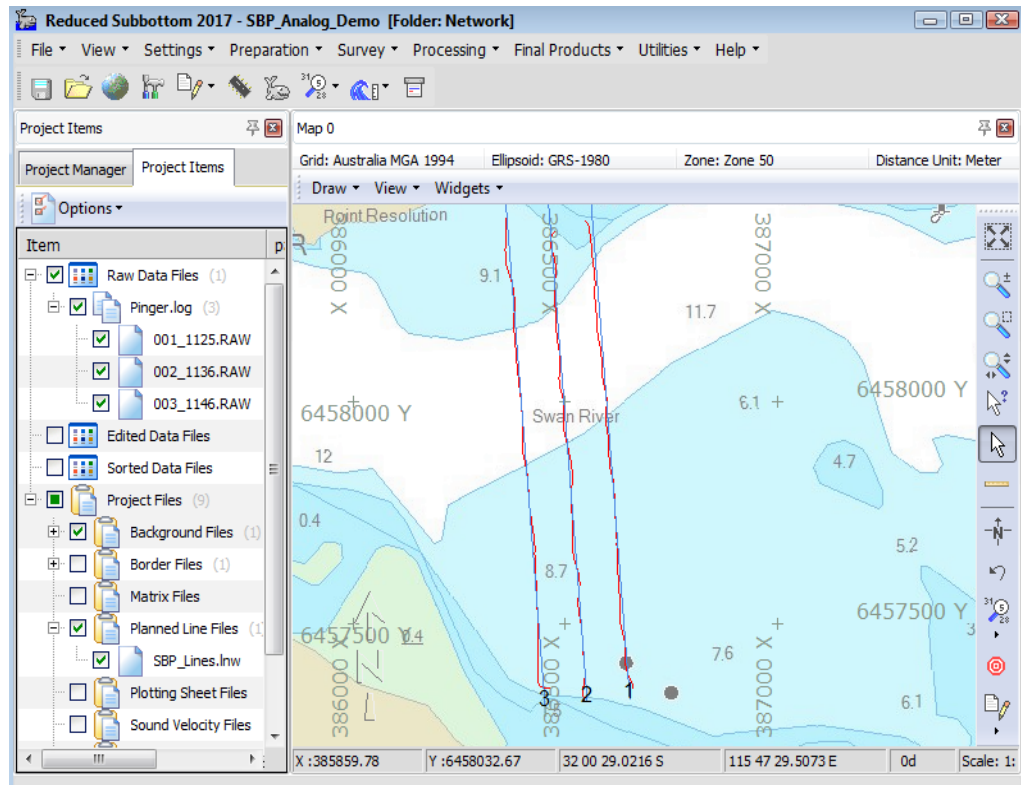
Menu Bar

Toolbar

Panels:

- Project Manager
- Project Items List
- Web Maps

Status Bar



Area Map

Map View Tools

All of the HYPACK® SUB-BOTTOM programs can be accessed from the interface. Start programs from either the toolbar or from the menu bar. The icons and menu selections are enabled according to your type of license (dongle).

## HYPACK® SUB-BOTTOM PROJECT ITEMS LIST

The HYPACK® SUB-BOTTOM user interface includes a tree view listing of the files associated with the current project, and each file location, called the Project Items list.

**To display the Project Items list**, select VIEW-PROJECT ITEMS or click the Project Items tab.

In the Project Items list, you can do any of the following:

- **Control which files are loaded to your project** and displayed in the area maps.



- **Checkbox checked:** File is enabled in your project (drawn to the screen).
- **Checkbox clear:** File is disabled.  
*Tip:* Use the Options menu to quickly disable the data files, the project files, or all files in the Project Items list.
- **Red X:** File is not available at the designated location.

---

**NOTE:** The red X is visible only when OPTIONS-FOLDER ICONS is selected. Otherwise, the file appears in the Project Items list without a checkbox.

---

**To remove these files** from your project list, select OPTIONS-REMOVE MISSING FILES from the Project Items menu.

- **Remove files:** Select one or more files or folders in the File Items list then right-click and select REMOVE FILE or REMOVE FOLDER FILES respectively. The process unloads them from your project, but does not remove them from your hard drive.
- **Delete files:** Select one or more files in the File Items list then right-click and select DELETE FILE. The unloads them from your project and moves them to the Windows® Recycle Bin.
- **Rename files** via a right-click menu. HYPACK® SUB-BOTTOM does not allow you to rename S57, S63, ARCS or VPF charts.
- **Collapse/expand the tree view** based on your needs by clicking the plus and minus signs on the left side.
- **Customize the folders displayed** using the Options menu selections:
  - **Folder Visibility:** Select the project file folders to include in the File List. With these options you can omit folders that are not applicable to your project.
  - **Hide Empty Folders:** Choose to show all folders selected under Folder Visibility, or only those that currently contain project files.
  - **Folder Icons:** Choose traditional Windows® folder and file icons or just checkboxes.
- **Sort the display order of files in each folder.** Right-click on the folder and select Sort by and your choice of sort method: By name, date or file type.

---

**NOTE:** These sort settings remain only until you leave the project or close HYPACK® SUB-BOTTOM.

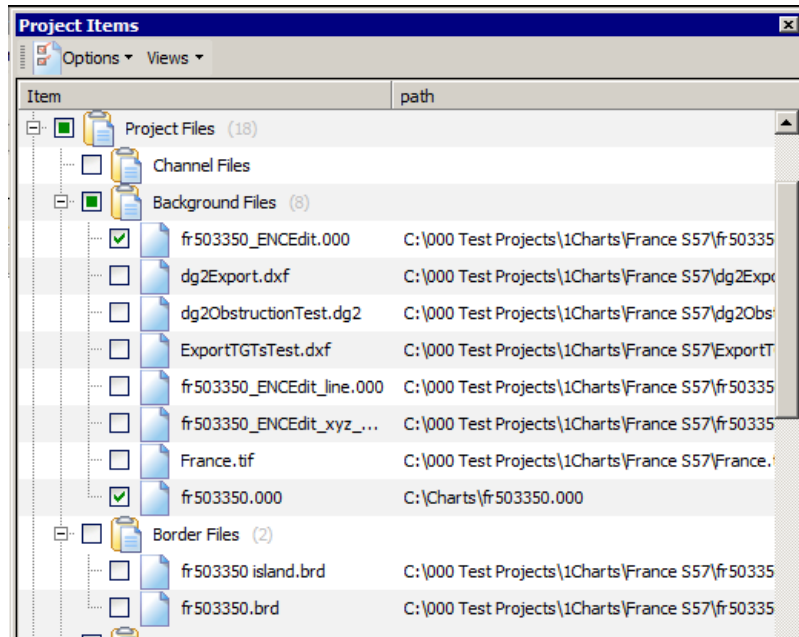
---



- **Open any ASCII file in NotePad:** Right-click and select 'Open in Notepad'.
- **Open Windows® Explorer to the folder in which any file in your project is stored:** Right-click and select 'Open in Explorer'. Alternatively, open the project folder by selecting FILE-WINDOWS EXPLORER.

To widen the display area drag the right border horizontally across the screen.

FIGURE 3. Project Items



## HYPACK® SUB-BOTTOM TOOLBARS

The menu and toolbars in the HYPACK® SUB-BOTTOM shell access the program modules and display controls. You can toggle the toolbars on and off through a right-click menu or drag the toolbars to whatever position you prefer—even outside of the HYPACK® SUB-BOTTOM window.

The screen controls in each Area Map window remain docked in the window, but you can dock it to any side.

### Menu Bar

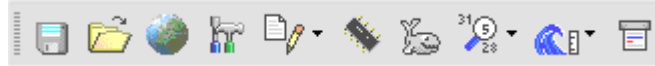
The HYPACK® SUB-BOTTOM menu bar selections group all of the component programs into basic functional areas.

In addition, the File, View and Settings menu items provide tools with which you will manage your project and its display settings.

*Toolbar*

The **toolbar** quickly launches a program with a click on its icon. As with all toolbars in HYPACK® SUB-BOTTOM, if you hover the cursor over an icon, a tool tip appears which describes the function of the icon.

**FIGURE 4.** HYPACK® SUB-BOTTOM Toolbar



**To turn the toolbar display on/off**, right-click in the toolbar area and select/deselect 'HYPACK® SUB-BOTTOM toolbar'.








*Map View Tools*

The map view tools enable you to quickly adjust the HYPACK® SUB-BOTTOM screen display. Many of its functions are also found in the Draw and View menus for each Map window.

**To turn the Map View Tool display on/off**, right-click in the toolbar area and select/deselect Map View Tools.

**TABLE 1.** Map View Tools

Icon	Function
	<b>Zoom Extents:</b> Draws the display at a zoom scale that displays all enabled data. <b>To zoom to the extents of an enabled file</b> , right-click on it in the Project Items list and select Zoom Extents.
	<b>Zoom In/Out:</b> When this option is selected, a left-click decreases the scale (zoom in) and a right-click increases the scale (zoom out).
	<b>Zoom Window:</b> Select this option and drag a rectangle in the window to define the extent of your desired view. The program will redraw the screen to display the defined area optimally.
	<b>Pan:</b> Select this option, then click in the window and drag the cursor to the position where it should be displayed. As you drag, the program displays the distance and azimuth of the cursor motion. When you release the mouse button the display updates accordingly.
	The <b>Query Tool</b> displays attribute information about objects in S57 and SHP charts, as well as about several types of HYPACK® SUB-BOTTOM files. When you click the Query Tool icon, the cursor changes to an Interrogate tool. When you click or drag an area in the area map, it displays the attribute information for any object within 2mm of the defined location. All supported objects within range of your query are listed in the top of the Query Results window. Select the object on the top and its attribute information appears below.

Icon	Function
	<p><b>Default Cursor</b> changes the cursor back to the default arrow used for most general HYPACK® SUB-BOTTOM operations. The cursor position is displayed in the status bar.</p> <hr/> <p><b>NOTE:</b> The Lat-Long grid is displayed in the Lat-Long of the local datum.</p>
	<p>The <b>Measuring Tool</b> measures the distance and azimuth between points in the HYPACK® SUB-BOTTOM area map.</p>
	<p><b>Rotate to North Up</b> sets the map to position north at the top of your screen.</p>
	<p><b>Undo</b> reverses the last Zoom operation.</p>
	<p>The <b>Sounding Display</b> icon provides quick and easy access to the sounding style and color options from the Control Panel.</p>
	<p><b>Add Target</b> toggles Target Editor mode, to mark targets with the cursor in the Map window. For each click, HYPACK® marks a target in the map and saves it in the Shell target group in the Project Items list.</p>
	<p><b>Editor Mode:</b> Some of the modules used to create and edit HYPACK® SUB-BOTTOM 'support files' (ex. border, matrix, target and plotting sheet editors) allow you to record data in the editor by clicking positions or manipulating file borders in the area map. During these processes, you may need to temporarily interrupt this type of work to adjust the map view which would require a different cursor tool. To resume recording information to the editor, you must select your editor from the drop-down associated with this icon.</p>

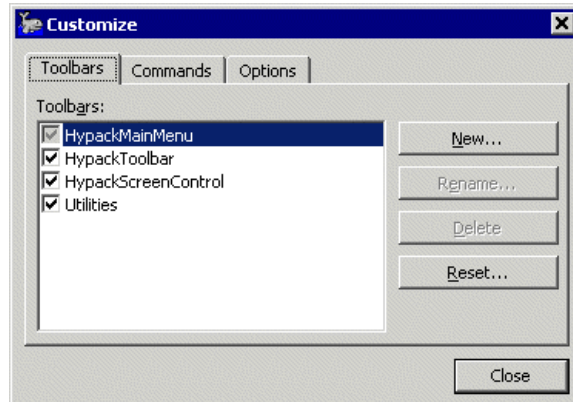
## CONFIGURING THE HYPACK® SUB-BOTTOM TOOLBARS AND MENU BAR

The HYPACK® SUB-BOTTOM menu and toolbars are installed with a default set of items and icons. However, you can configure them with any number of programs and commands available according to your license (dongle) type.

1. **Right-click on any toolbar and select 'Customize'.** A tabbed dialog will appear.

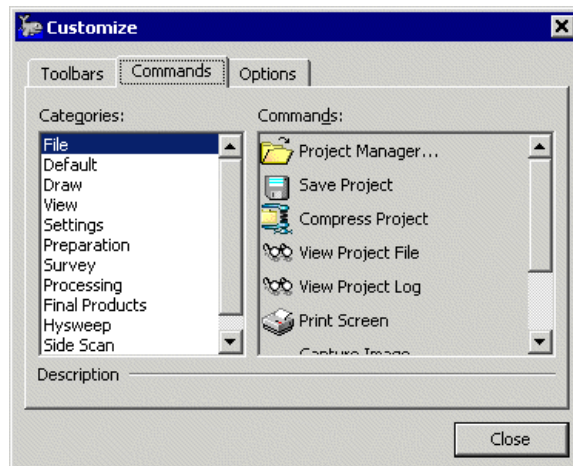
2. In the **Toolbars** tab, select which toolbars to display, generate new ones, rename existing bars or delete custom toolbars you no longer need.

FIGURE 5. Toolbars Tab



- To select which toolbars display, check the corresponding checkbox in the toolbars list.
  - To generate a new toolbar, click [New] and name your toolbar in the dialog provided then use the Command tab to add the items you need.
  - To rename a toolbar, select the toolbar in the list and click [Rename]. Enter the new name in the dialog provided and click [OK].
  - To delete a toolbar, select the toolbar in the list and click [Delete]. You cannot delete the default toolbars.
3. In the **Commands** tab, configure your menus and icons. Each menu heading is listed on the left and the commands applicable to the selected heading are listed on the right.

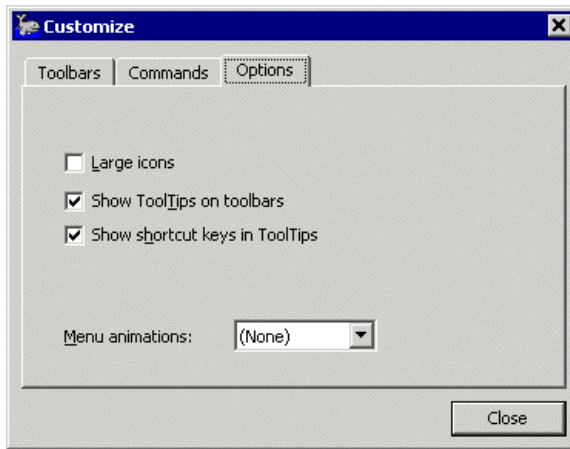
FIGURE 6. Commands Tab



- To add icons or commands.

- i. Select the menu where the required command is listed by default.
    - ii. Drag the command from the list on the right to the desired menu bar or toolbar location.
  - **To remove icons or commands** from the toolbars drag from the toolbar to the dialog.
4. In the Options tab, **set options for how your menus and toolbars display.**

*FIGURE 7. Options Tab*



5. **Return to the HYPACK® SUB-BOTTOM screen** by clicking [Close].

## USING THE MEASURING TOOL

You can use the measuring tool to measure the distance and azimuth between points in the HYPACK® SUB-BOTTOM area map.

*FIGURE 8. Distance and Azimuth Toolbar*



*Measuring the Distance and Azimuth Between Two Points:*

**To measure the distance and azimuth between two points:**

1. **Click the measuring tool icon in the Map View Tools.**
2. **Use the drop-down list to set the units in which you want to measure:** U.S. feet, meters, kilometers or nautical miles.
3. **Click and drag between the two points on the map.** The measurements will appear in the measuring tool.



*Measuring the Distance Along A Multi-segmented Line:*

**To measure the distance along a multi-segmented line:**

1. **Select [Path].**
2. **Click along the line you want to measure at the beginning, at each point where the line changes direction and at the end.** At each click, the toolbar displays the total distance along line and the azimuth of the most recent segment.

**NOTE:** The Line to Cursor icon, used together with the Path, displays the path between the previous point and your current cursor position.



*Beginning a New Path:*

**To begin a new path,** click the Clear icon. The Path button will remain depressed so you can begin another set of measurements.



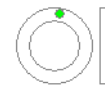
## HYPACK® SUB-BOTTOM AREA MAP

The area map displays your project items. It enables you to preview your map display as you prepare to begin a project, and to view the results of many of the files generated in post-processing.

The Map window may optionally include one or more widgets:

- The **color bar** reflects the project colors set in the Color Editor panel.
- The **status bar** below the map displays the current cursor position in X,Y and Lat./Lon. (Local Grid) coordinates, and indicates the rotation and scale of the area map display.
- The **geodesy bar** above the map displays the project geodesy according to current options in the GEODETIC PARAMETERS program.

- The **pan/zoom/rotate control** to adjust your map display with your mouse.



- A **north arrow**



You can display your project data, enabling and disabling files and with all of the HYPACK® SUB-BOTTOM view options without owning a HYPACK® SUB-BOTTOM license (Viewer Mode).

However, a dongle with current license information is required to access the supporting program modules and do any work.

HYPACK® SUB-BOTTOM provides numerous tools and settings that enable you to optimize the display of enabled project files. These settings are configured in one or more locations in the HYPACK® SUB-BOTTOM interface.

- In the menu and Map View tools for each Map window
- In the Control Panel
- In the Project Items List
- In the COLOR EDITOR

## SETTING CHART TRANSPARENCY

Background charts and matrix files are often solid areas of color. Even if they are not solid, they can obstruct your view of another file drawn beneath it.

Sometimes you can modify the draw order to place the 'solid' file below the file it is obstructing. However, if you have two solid files, changing the draw order will not help. In this case, you can set the transparency of the top file so you can see through it to the file below. Transparency only applies to charts and matrix files.

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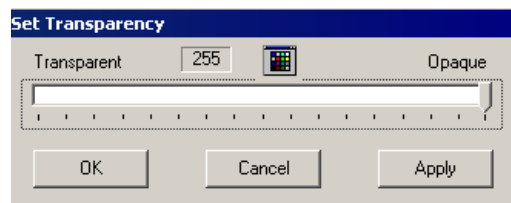
**NOTE:** The Transparency option is not available for ARCS, C-Map, S64, SHP or VPF charts.

---

### To set file transparency:

1. **Select one or more files, in the Project Items list, for which you want to adjust the transparency to the same level.**
2. **Right-click on the selection and select 'Transparency'.** The transparency dialog will appear.

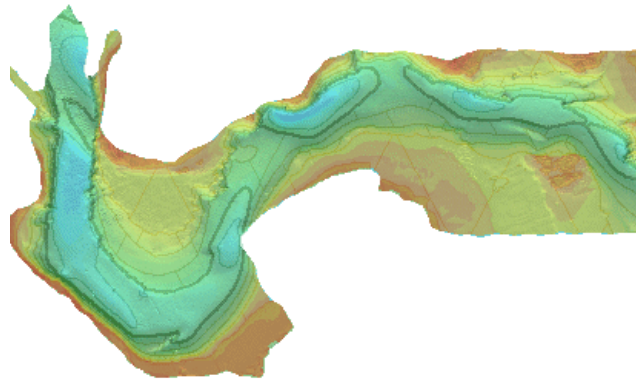
**FIGURE 9.** *Transparency Dialog*



3. **Adjust the level of transparency with the slider.**
4. **Preview the effect.** (Optional) Click [Apply].
5. **When your setting is satisfactory, click [OK].**

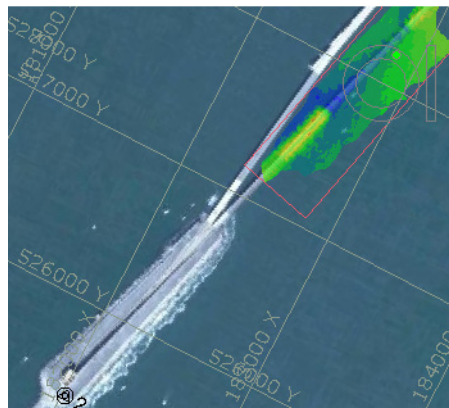
**FIGURE 10.** TIF Overlaid on an S57 with 60% Opacity

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**FIGURE 11.** File Transparency - The transparent matrix allows you to see the TIF chart beneath

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You can also set a specified chart color to be transparent. It would be useful to set, for example, the background color of a DXF chart to be transparent. Then you could see the data beneath the DXF, but retain the display of its features.

**NOTE:** This only works if the color specified is an *exact match* to the one in your chart.

---

**To set a transparent chart color:**

1. **Open the transparency dialog** for your chart.
2. **Click the Colors Icon** and a Color Select dialog will appear.
3. **Select the color you want to become transparent and click [OK].**



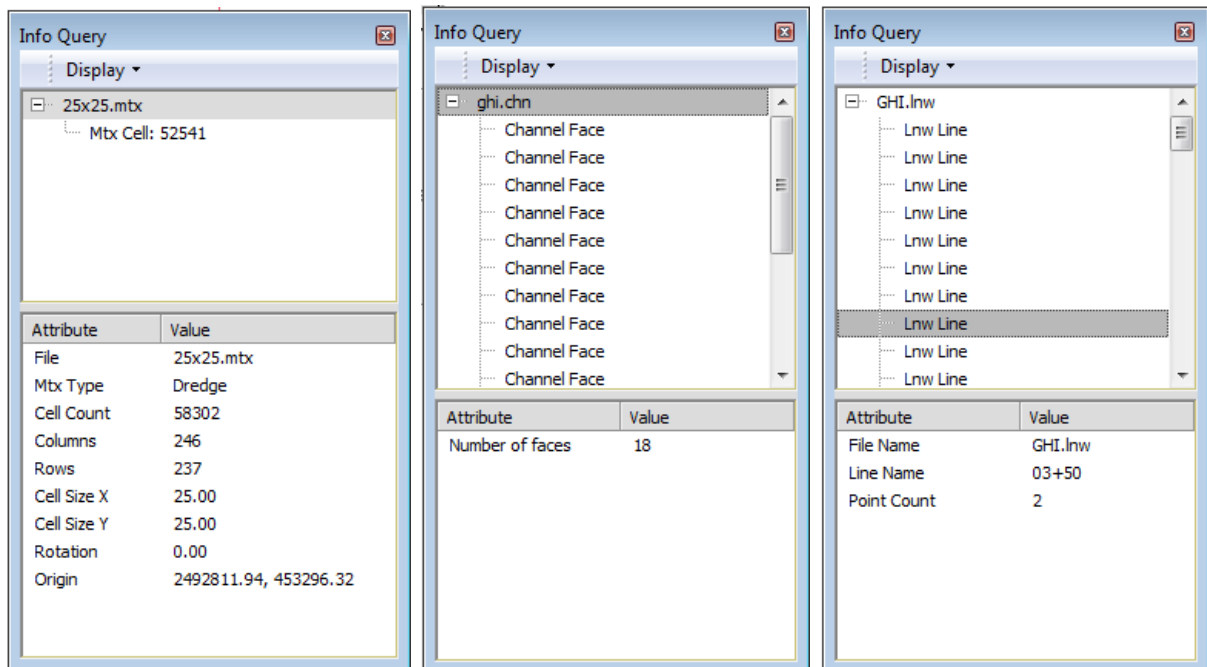


## QUERYING AREA MAP FEATURES

The **Query Tool** displays attribute information about objects in S57 and SHP charts, as well as about several types of HYPACK® SUB-BOTTOM files. When you click the Query Tool icon, the cursor changes to an Interrogate tool. When you click or drag an area in the area map, it displays the attribute information for any object within 2mm of the defined location. All supported objects within range of your query are listed in the top of the Query Results window. Select the object on the top and its attribute information appears below.



**FIGURE 12.** Sample Query Results—Matrix File (left), Planned Line (right), Channel (center)



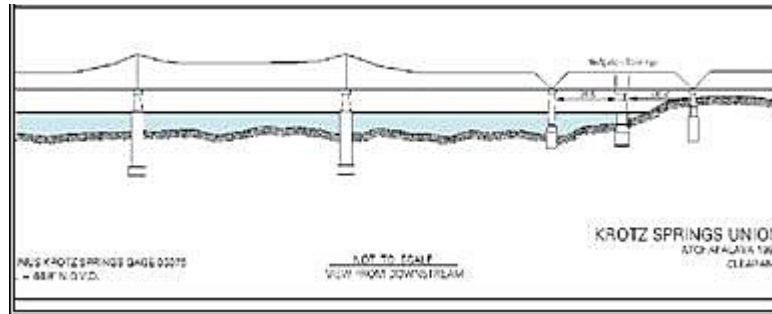
### S57 and SHP Charts

Click on any feature in your S57 or SHP chart, and the query window presents information about the chart itself, as well as the features at your click location. Some charts have purple information tags. Use the query tool to access the chart information embedded in the chart.

S57 information will be in either text, \*.JPG or \*.TIF files, which must be in the same folder as the chart file.

SHP charts require the corresponding DBF files (with the same root name) which provide the object attribute information.

**FIGURE 13.** Sample S57 Information in TIF Format Shows a Profile View of the Bridge Queried in the Chart.



**HYPACK® SUB-BOTTOM All Format Data Files**

Click on a line of All Format data and the Query Results window presents information about the survey and the individual sounding:

To see survey information, and geodesy and hardware settings, select the line name in the Query Results window.

Select a sounding to see statistics about that sounding such as the raw and corrected values, all corrections and quality information.

**FIGURE 14.** Results of All Format Query—Line Query (left), Sounding Query (right)

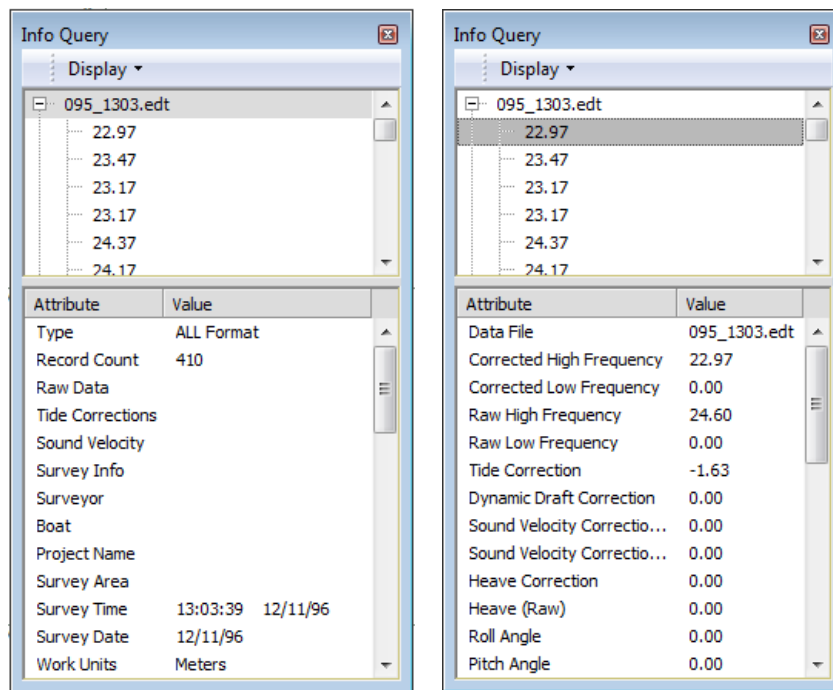
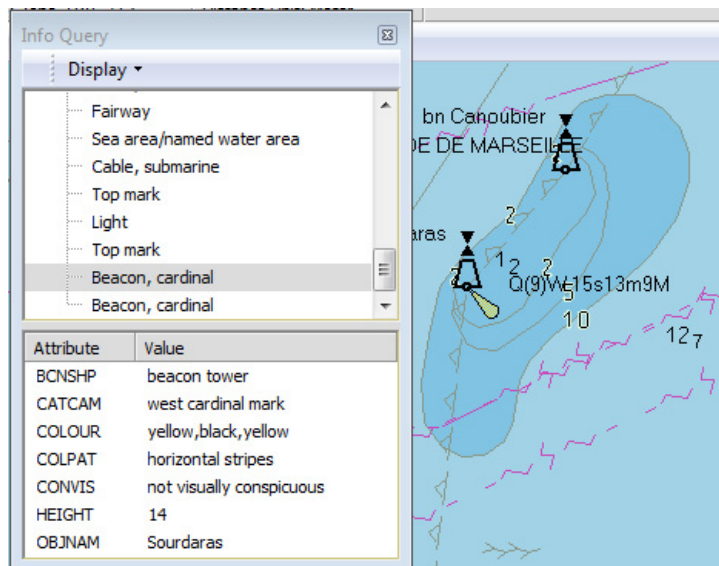


FIGURE 15. S57 Feature Information

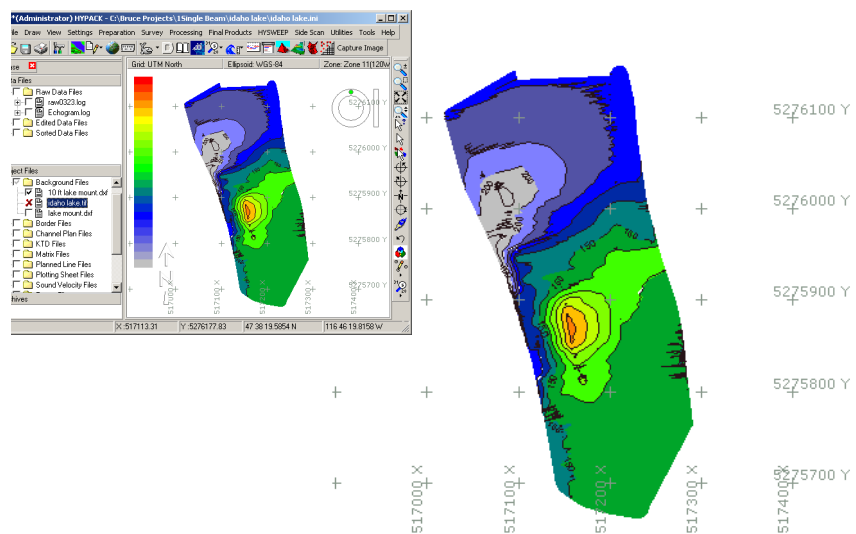


### SAVING SCREEN CAPTURES OF THE AREA MAP

HYPACK® SUB-BOTTOM includes a simple tool with which you can export a bitmap (\*.BMP) image of your current Area Map display (excluding the north arrow, color bar and screen controls).

1. **Select FILE-CAPTURE IMAGE.** A File Save dialog will appear.
2. **Navigate to the location where you want to save your image.**
3. **Name your file and click [Save].**

FIGURE 16. Original HYPACK® SUB-BOTTOM Screen (left) with the Captured Image (right)



## DISPLAY SETTINGS IN THE HYPACK® SUB-BOTTOM CONTROL PANEL

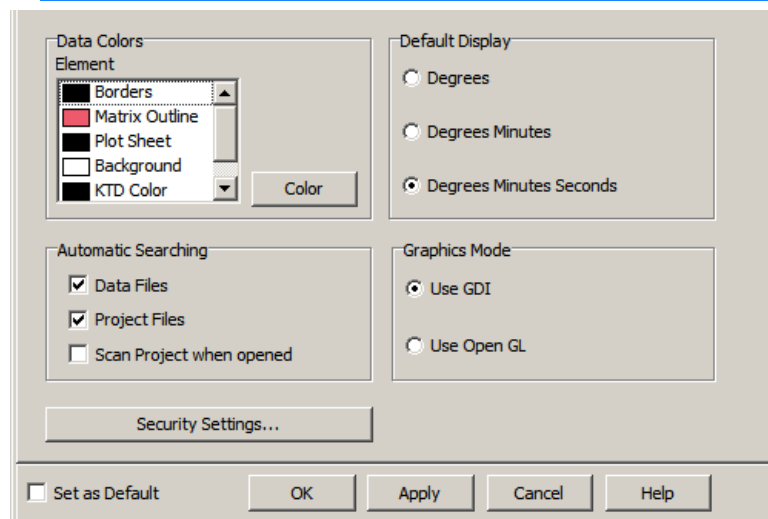
Select SETTINGS-SETTINGS (F9) to control the presentation in the area map.

**[Apply]** enables you to preview your settings before exiting the Control Panel.

**Set as Default** saves the current settings and uses them any time you create a new project.

### GENERAL DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM

FIGURE 17. Control Panel—General Tab



The **General Tab** sets the display colors of several features.

**Data Color Control** enables you to select various file types and click [Color] to specify the color used on the screen.

**Default Display** determines the Lat/Lon format for data input and in the HYPACK® SUB-BOTTOM status bar.

**Automatic Searching** options are used when you return to the main HYPACK® SUB-BOTTOM screen from one of the program modules.

- **Search Data Files** loads all Raw, Edited and Sorted data files in the project that are not currently loaded to the HYPACK® SUB-BOTTOM display.

**NOTE:** To save time, it loads but does not enable HS2 or HSX files.

- **Search Project Files** tells HYPACK® SUB-BOTTOM load all project files in the project to the HYPACK® SUB-BOTTOM display.
- If you also check the **Scan Project When Opened** option, HYPACK® SUB-BOTTOM reloads the files indicated by the first two options when you enter the project.

These options are selected by default, however, if you have an excessive number of files in your project, you may want to manage the files loaded to your display manually. To do this, deselect one or both of the search options and the Scan Project option, then manually draw or remove them in the display as needed using the Load and Remove options in the right-click menu for each file type of the Project Items list.

## GRID DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM

FIGURE 18. Grid Tab

The image shows two side-by-side panels for grid settings. The left panel is titled 'X,Y Grid' and has a 'Plot' checkbox (unchecked). Below it are radio buttons for 'Automatic Spacing' (selected) and 'Fixed Spacing' (with a text box containing '1000' and 'm or ft'). A 'Style' section has radio buttons for 'Lines' (selected) and 'Tics'. A 'Label Projection' section has four checked checkboxes: 'Left', 'Right', 'Top', and 'Bottom'. At the bottom are 'Font...' and 'Color...' buttons, with a text box showing '123.45'. The right panel is titled 'Lat/Lon Grid' and has a 'Plot' checkbox (unchecked). Below it are radio buttons for 'Automatic Spacing' (selected) and 'Fixed Spacing' (with a text box containing '60' and a degree symbol). A 'Style' section has radio buttons for 'Lines' (selected) and 'Tics'. A 'Label Projection' section has four checked checkboxes: 'Left', 'Right', 'Top', and 'Bottom'. A 'Format' section has three radio buttons: 'ddd.ddddddd', 'ddd mm.mmmmm', and 'ddd mm ss.sss' (selected). At the bottom are 'Font...' and 'Color' buttons, with a text box showing '83 24 16'.

The Grid Tabs enable you to specify how HYPACK® SUB-BOTTOM displays projection grids and latitude-longitude (lat./lon.) grids. HYPACK® SUB-BOTTOM displays the lat./lon. of the local datum.

**Plot** toggles the grid display on and off.

**Automatic Spacing** is the default setting to determine the spacing between projection grid lines. HYPACK® SUB-BOTTOM automatically changes the spacing as you zoom in/out.

**Fixed Spacing** specifies the meters (or feet) between projection grid lines and seconds of arc between lat/lon grid lines. This will be kept constant while you zoom in/out.

**Style** enables you to draw your projection grid using either lines or tics.

**Label Projection** enables you to assign which sides of the HYPACK® SUB-BOTTOM screen you wish to have the projection labels placed.

**Font** enables you to assign the font of the projection grid labels. Standard Windows® Color Selection and Font Selection dialogs are presented for your choices.

---

**NOTE:** Select only true type fonts to achieve the correct rotation.

---

**Color** sets the color for your projection grid lines and labels.

The Latitude-Longitude Grid has an additional setting to those found under Projection Grid. **Format** enables you to specify how the lat./lon. labels are written in the grid and in the HYPACK® SUB-BOTTOM status bar.

## ***SOUNDINGS DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM***

The Soundings Tab enables you to set how the soundings are presented and plotted.

To toggle the display of the soundings, right-click the data file folder and select 'Enable Soundings'.

FIGURE 19. Soundings Tab

**Orientation** draws XYZ data at a user-specified angle relative to the first LNW file listed in the project files list. Elect to plot soundings:

- **Perpendicular** to the planned line,
- **Parallel** to the planned line
- **At a user-defined Fixed Angle**. This is the angle the text appears relative to the map window. (It is unrelated to the map orientation.) Any angle from -360 to +360 is permissible

**Style:** Choose the format with which to write your sounding.

- **Decimal Point on the Mark** (USACE) option places the decimal point at the location of the sounding and writes a normal size fraction.
- **Cartographic** (IHO) centers the integer portion of the sounding at the sounding location and then writes a smaller, lower fraction.
- **Spanish Navy** (IHM) places the decimal point at the location of the sounding and then writes a smaller, lower fraction.
- **Pixel:** represent the location of each sounding with a color-coded Pixel (dot) of a user-defined size.

- **Russian:** The sounding location is marked with a dot with the sounding value from the TIN MODEL Input file to its right. If you have a second TIN model, the depth from the Additional file appears left of the sounding position.

**Color:** Defines predefined sounding color settings (Black or ECDIS) or the value HYPACK® SUB-BOTTOM is color-coded according to a user-defined palette.

When you select the Color by Depth option, click **[Color Table]** to assign and configure the color palette in the COLOR EDITOR from within the Control Panel. This also affects the palette displayed in the Color Bar.

- **Black:** HYPACK® SUB-BOTTOM ignores the project colors and draws all soundings in black.
- **Color By File** enables you to set specific colors for each catalog or individual file through the right-click menus in the Project Items list. Files loaded as part of a catalog all inherit the color of the catalog. When you assign a color to a file, the file name appears in the same color in the Project Items list.

---

**NOTE: To color individual files,** you must first load them to the project separately.

---

- **ECDIS Colors:** HYPACK® SUB-BOTTOM ignores the project colors and draws all soundings according to ECDIS convention.
- **Color by Depth** colors your data based on the Z-values. Configure your palette according to your expected Z range.

**Resolution** enables you to specify soundings to either one 1 Decimal (Tenths) resolution or 2 Decimal (Hundredths) resolution.

**Rounding** enables you to determine how the soundings are presented.

- **None** displays the soundings decimal places according to the resolution setting.
- **Truncate to Tenth** just leaves off the hundredth digit. For example, 6.97 is written as 6.9.
- **HYPACK:**
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.05 rounding point (e.g 12.46 -> 12.5)
  - **Depth below Nearest Half value:** Round using 3 rounding points:
    - <x.3 =x.0 (e.g 42.28 -> 42.0)
    - <=x.8 = x.5 (e.g. 42.6 -> 42.5)
    - > x.8 = (x + 1).0 (e.g. 42.83 -> 43.0)



- **Depth above Nearest Half value:** Round to a whole number using x.8 rounding point (e.g. 123.7 -> 123.0, but 123.8 -> 124.0).
- **ROK Rules (Republic of Korea):**
  - **Depth < the specified Nearest Tenth** threshold, it is displayed at the specified decimal resolution.
  - **Depth >= 31**, it is truncated to a whole value, otherwise it is truncated to the first decimal.

---

**NOTE:** The rule stated 31 meters as the whole value threshold but, *if you are using depths in feet, the threshold will be interpreted as 31 feet by the sounding engine.*

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- **UKHO Rules (United Kingdom Hydrographic Office):**
  - **Depth < 0:** Drying Heights are rounded nearest tenth using a x.03 threshold.
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.08 threshold.
  - **Depth below Nearest Half value:** Output x.0 or x.5 using a x.5 threshold.
  - **Depth above Nearest Half value:** Round to a whole number using a x.75 threshold.
- **NOAA (National Oceanographic and Atmospheric Administration):**
  - **Depth < 0:** Drying Heights are rounded to nearest whole number using a x.5 threshold.
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.075 threshold.
  - **Above Nearest Tenth** (Nearest Half not used) Round to a whole number using a x.75 threshold.
- **AHOI (Australian Hydrographic Office):**
  - **Depth < 31:** (designed for meters) Display in Tenths, round at a x.065 threshold.
  - **Depth >= 31:** Display as a whole number, round at a x.65 threshold.

**[Test Rounding]** provides a quick test platform to aid in understanding how your current settings affect your sounding display, and to ensure that the rounding rules have been implemented correctly. Just enter any sounding value in the dialog provided and see the display value based on the current option set.

The **Options** settings contain the following items:

- **Negative Soundings get "+"** does just that. If you have processed your sounding data in elevation mode (z values are

negative), this setting will display them on the screen in depth mode (z values are positive).

- **Hide Soundings Above** a user-defined level plots only soundings deeper than the specified depth.
- **Hide Soundings Below** a user-defined level plots only soundings shoaler than he specified depth.
- **Depth 1 Text** and **Depth 2 Text** (HYPACK® SUB-BOTTOM Control Panel only) are the terms by which you, personally, call the depths in a dual frequency data string. If you prefer a term other than 'Depth 1' and 'Depth 2', enter them in the fields provided. Your terms will then replace 'Depth 1' and 'Depth 2' in this and other HYPACK® SUB-BOTTOM dialogs.

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**NOTE:** These labels have not been fully implemented . They occur initially in the HYPACK® SUB-BOTTOM and HYPLOT Control Panels, and in the SB SELECTION program.

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**Draw Mode:** Select a method and set the corresponding parameters.

**Fonts:** [Font] displays the Windows® Font dialog where you can set font, and font size. (Ignore the remaining options; HYPACK® SUB-BOTTOM does.)

**Vector options:** Set the Vector Scale at which you expect to plot your survey, then enter a Vector Size that appears as you wish.

#### More Information

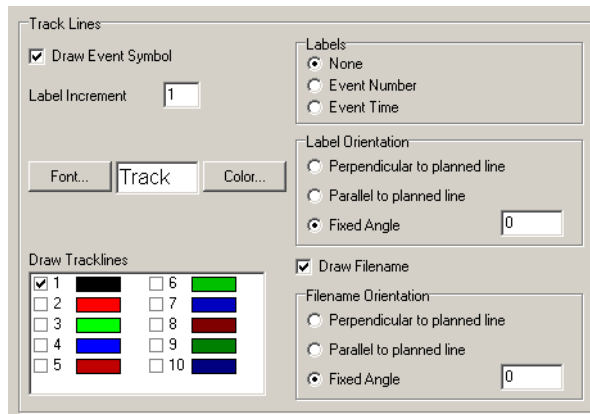
- [“Project Colors in HYPACK® SUB-BOTTOM”](#) on page 1-32

## ***TRACK LINE DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM***

The Track Lines Tab affects the drawing and labeling of events and track lines.

**To toggle the display of track lines** to the screen, right-click the data file folder in the Project Items list and selecting *Enable Track Lines*.

FIGURE 20. The Track Lines Tab



*Event Display Options:*

**Draw Event Symbol** instructs the program to draw the event symbol at points where the SURVEY program generated event marks.

**Label Increment** defines how often the event marks will be labeled. An increment of 1 means every event mark is labeled. An increment of 5 means every 5th event mark is labeled.

**Labels** tells the program whether to label Events with Event Number or Event Time.

**Label Orientation** sets the angle at which event labels will be drawn. Elect to label events Perpendicular or Parallel to the planned line, or define another angle. Fixed Angle is the angle the text is drawn relative to the map window. (It is unrelated to the map and sounding orientations.)

**[Font]** is used to determine the font of the event labels.

**[Color]** is used to set the color of the event labels.

*Track Line Display Options:*

**Draw File Name** enables you to label the track lines with its file name.

**File Name Orientation** affects track line labels in the same manner as the Label Orientation affects the event labels.

**Additional Track lines** enables drawing the track lines of up to 7 vessels (positioning systems) to the screen. We all know that towfish don't follow the same track of the vessel towing it. Now you can see both track lines accurately displayed. Track line 1 will always belong to the vessel designated as the main vessel in SURVEY.

## PLANNED LINE DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM

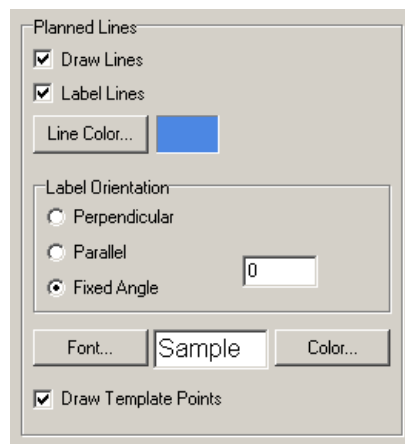
The Planned Lines tab includes checkboxes where you can choose whether to display the lines and the labels.

Click **[Line Color]** to access a color dialog where you can choose the color that the planned lines will display.

The **Label Orientation** and **[Font]** options are the same as track line options.

**Draw Template Points:** If you have a planned line with template information, HYPACK® SUB-BOTTOM draws small circles at each template inflection point in the area map display.

FIGURE 21. The Planned Lines Tab



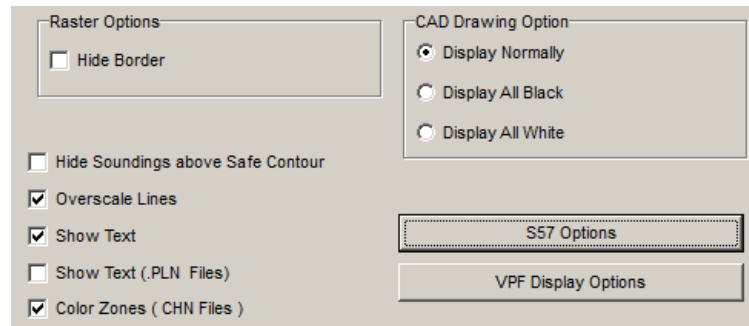
### More Information

- [“Planned Survey Lines”](#) on page 2-45

## CHART DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM

The Charts Tab provides display options for background charts.

FIGURE 22. The Charts Tab

**Raster Options:**

**Hide Border** displays only the map part of the chart file, omitting the text, scales and other 'extraneous' information around the outside.

**CAD Drawing Option:**

**Display Normally** (default) draws your chart using the colors specified in the file.

**Display All Black** and **Display All White** override the chart colors in the HYPACK® SUB-BOTTOM display.

**Hide Soundings above Safe Contour** displays soundings, other than those in the Project Items list, greater than the Safety Contour value in the S57 Options.

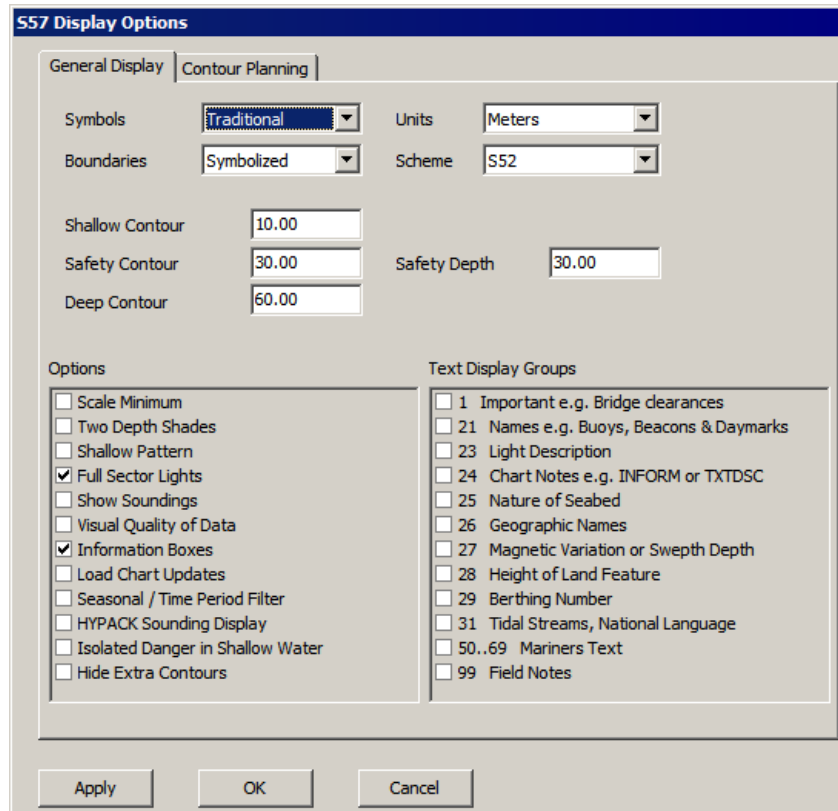
**Over scale Lines** tell you that you are viewing the chart at a smaller scale than that in which it was created. An over scale chart will appear with diagonal, white-dotted lines. These appear on ARCS chart displays.

**Show Text** includes item labels in the display. If you have several labeled items in a small area or if you are viewing a large area at a small zoom scale, the labels may become confusing. If this is the case, clear this option to display only the symbols.

**S57 Options:**

**[S57 Options]** in the displays the ECDIS Display Options dialog.

FIGURE 23. S57 Options Dialog



**Symbols:** Choose between Traditional and Simplified.

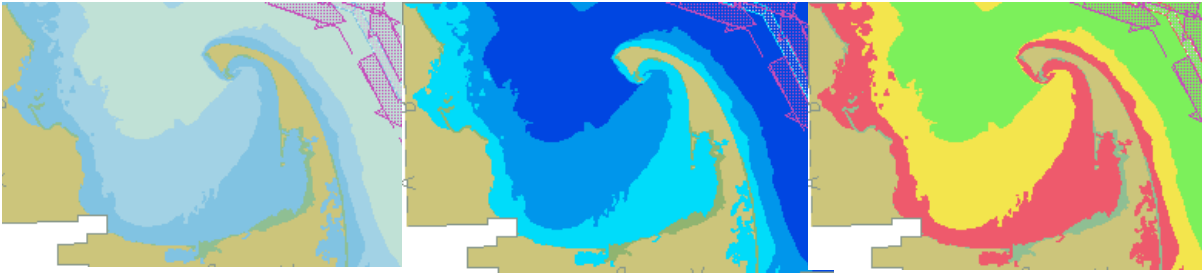
**Boundaries:** Choose to have them marked with symbols (Symbolized) or as plain lines (Plain).

**Units:** Displays depths in your choice of U.S. feet or meters.

**Scheme:**

- **S52:** The industry standard where the colors progress from darkest to lighter shades of blue as depths increase.
- **Bathy Blue:** The reverse of S52 where the deepest water is the darkest color.
- **Red Yellow Green:** Displays three categories of depth areas:
  - unsafe (red),
  - safe with caution (yellow)
  - safe (green)

**FIGURE 24.** S57 Color Schemes: S52 (left), Bathy Blue (center), Red Yellow Green (right)



**Safety Depth** displays depth labels in different colors above and below this depth.

**Safety Contour, Shallow Contour** and **Deep Contour** define different depth ranges which will be displayed with backgrounds of different shades of blue.

---

**NOTE:** This option is overridden by the Two Depth Shades option.

---

**Scale Minimum** displays different map features and symbols at varying zoom scales according to S57 standards. This option prevents your Map window from becoming overly cluttered. If this option is clear, everything will be displayed regardless of the zoom scale.

**Two Depth Shades** uses only two shades to display depths greater than and less than the Safety Contour.

**Shallow Pattern** draws a pattern in the areas of the map where the depth is shoaler than the safety contour.

**Full Sector Lights** includes data regarding direction and color of lights. If this is off, you will see only the position of the light source.

**Show Soundings** toggles the display of chart soundings.

**Visual Quality of Data:** S57 charts include markings that indicate whether the chart has been tested for accuracy and, if so, how accurate it is. Check this option to clear this 'clutter' from your display.

**Draw Information Boxes:** Draws S57 markers at all points of interest. Clearing this option will provide a less cluttered display.

**Load Chart Updates:** When you load a base chart (typically \*.000) and there are update charts (typically \*.001, \*.002...) in the same folder, checking this option loads all related chart information to provide the most updated display.

**Seasonal/Time Period Filter:** Object attributes may specify time ranges when they would be most applicable to display. Check this

option to display only objects whose attributes match the current time.

**HYPACK® SUB-BOTTOM Soundings Display:** When 'Show Soundings' is checked, this option toggles between ECDIS display and HYPACK® SUB-BOTTOM display options.

**Isolated Danger in Shallow Water** assures that those features coded as isolated dangers are always displayed.

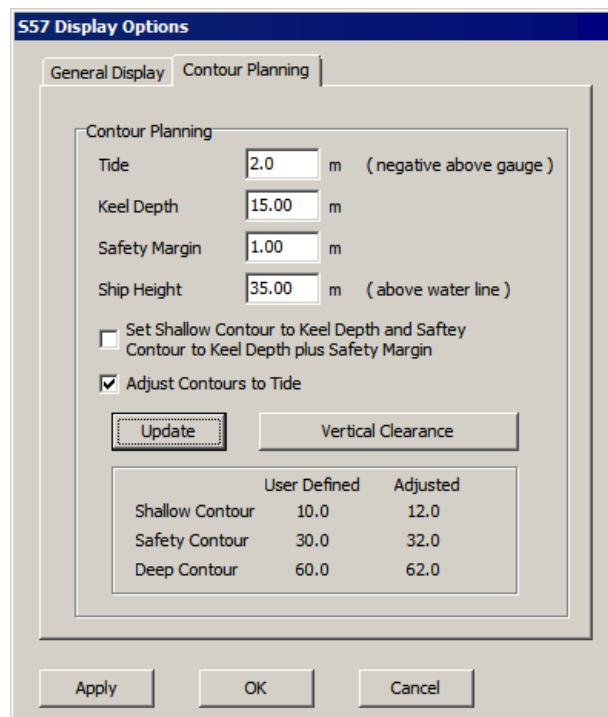
**Hide Extra Contours:** Omits any contour that is above the deep contour or below the shallow contour. They are valid contours, but do not contribute to the safe navigation of your vessel.

**Text Display Groups:** Charts can get cluttered with excessive text. Select only those text features you want to see in your chart display.

*Contour Tab:*

The Contour Planning tab provides options that adjust the display by additional user-defined variables related to your vessel and tide conditions. It also enables you to search for features, such as bridges, that may be too low for your vessel to safely pass under.

*FIGURE 25. Contour Planning View Options*



**Tide:** Tide level expected when you will be on the water.

**Keel Depth:** Distance from the water surface to the tip of the keel.

**Safety Margin:** Enables you to adjust the contours to allow for this amount of clearance beneath the keel.



**Ship Height:** Distance from the water level to the highest point on your vessel.

**Set Shallow Contour to Keel Depth and Safety Contour to Keel Depth + Safety Margin** calculates the adjusted contours based on your Keel Depth and Safety Margin variables.

**Adjust Contours to Tide:** Depth areas, contours and spot soundings are displayed accounting for changing tide levels to provide more accurate, real-time depth information for the helmsman.

*Calculating the Adjusted Contours*

**To calculate the adjusted contour levels without affecting the chart display**, enter your variables and click [Update]. The lower part of the dialog compares your contour depths as defined in the General Display tab and their adjusted values based on your contour planning options.

*Checking Vertical Clearance*

**To verify safe vertical clearance**, click [Vertical Clearance]. The program lists chart features that include the Vertical Clearance attribute, and use the user-defined Keel Depth, Vessel Height and (optionally) tide to calculate locations where your vessel has inadequate clearance.

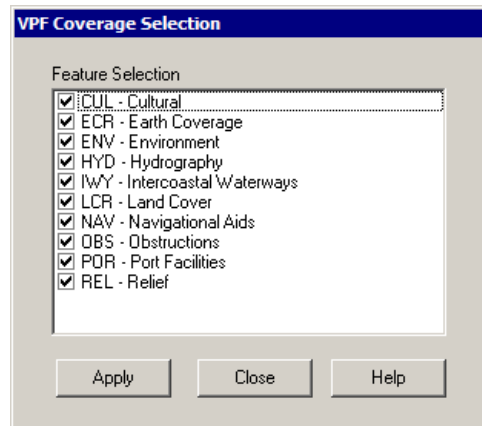
**FIGURE 26.** Vertical Clearance Report

Feature	Name	Vertical Cleara...	Vertical Clearance Adjusted	Vessel Height	Difference
Bridge	Peary Street Bridge	2.1	2.6	10.0	-7.4
Bridge	<missing>	3.3	3.8	10.0	-6.2
Bridge	Coasters Harbor Islan...	0.9	1.4	10.0	-8.6
Bridge	Coasters Harbor Islan...	0.9	1.4	10.0	-8.6
Bridge	<missing>	4.2	4.7	10.0	-5.3

*VPF Display Options:*

Check the features listed in the Feature Selection you wish to have drawn and click [Apply] and [Close].

FIGURE 27. VPF Display Options



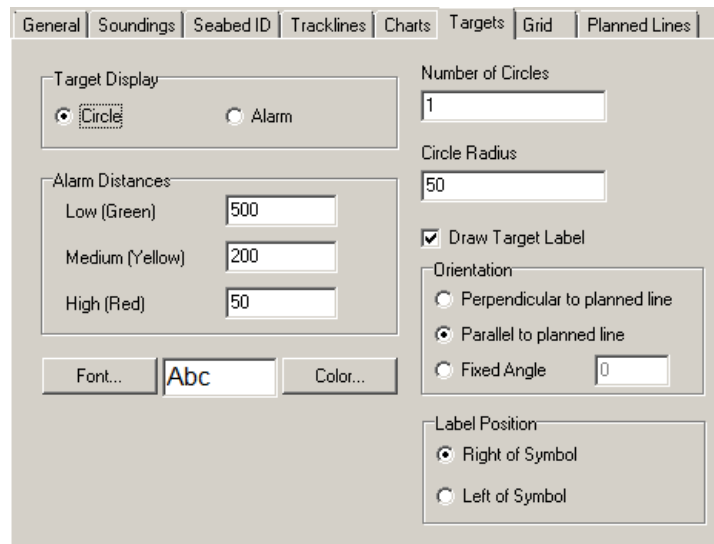
**Raster Options: Hide Border** allows you to draw ARCS and BSB charts without the border visible.

### More Information

- [“Background Charts”](#) on page 2-3

## TARGET DISPLAY SETTINGS IN HYPACK® SUB-BOTTOM

FIGURE 28. Target Display Settings



The Targets tab of the Control Panel sets the target display in the HYPACK® SUB-BOTTOM main window. The SURVEY display settings are set independently.

### Target Display Options:

- **Circle** displays a plain target. Additional display options apply:
  - **Number of Circles:** Circles drawn around each plain target to make them more visible on your map displays.
  - **Circle Radius:** Distance, in survey units, between the target and target circles around each target.
  - **Draw Target Label** toggles the display of the target name when you are drawing circle targets. Too many target labels may clutter your display.
  - **Orientation** sets the angle at which target labels will be drawn when the circle target display is selected. Elect to label targets **Perpendicular** or **Parallel** to the planned line, or define another angle. **Fixed Angle** is the angle the text is drawn relative to the map window. (It is unrelated to the map orientation.)
- **Alarm** includes a flag with the target name. Its background changes color according to the Alarm Distances settings. In SURVEY, alarm flags also display distance and bearing from the tracking point to the target.
  - **Alarm Distances:** If you display the alarm flags, you can set them to change color according the distance between the targets and the boat origin. In the previous figure, the alarm flag will turn green when the vessel comes within 500 survey units of the target, yellow when it is within 200 units and red when it reaches 50 units from the target. These are the default colors and may be changed using the program.
  - Set the **orientation** of the alarm flag in SURVEY through the Target Properties dialog or by entering the number of degrees rotated from north under 'Angle' in the TARGET EDITOR.
- **S57 Symbols** can also be displayed at target locations. The symbols are set in the TARGET EDITOR.

*FIGURE 29. Sample S57 Symbols at Target Locations*



**Target Label Color** and **Font** can be set through a Windows® Font dialog. Just click [...] and make your changes. The alarm flag will automatically resize to fit the label information. (If your labels are too large, try a smaller font.)

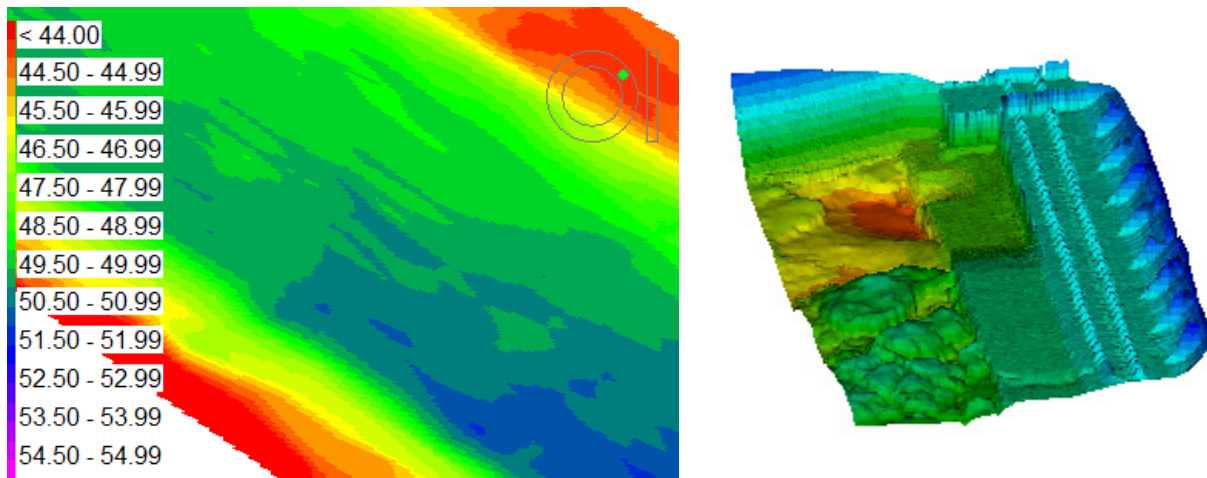
**More Information**

- [“Targets in HYPACK® SUB-BOTTOM”](#) on page 2-111
- [“TARGET EDITOR”](#) on page 2-113
- [“Target Display Options”](#) on page 2-112
- [“Targets in SURVEY”](#) on page 3-42

## PROJECT COLORS IN HYPACK® SUB-BOTTOM

Palette 1 defines the default project colors that color-code your sounding and matrix files, or select calculated values in your HYPACK® SUB-BOTTOM displays. You can override the palette colors with some of the Color options in the Soundings tab of the HYPACK® SUB-BOTTOM Control Panel: Black, ECDIS Colors, and Color by File.

*FIGURE 30. Color-coded Sounding Data*



Alternatively, you can assign a palette to a particular XYZ or matrix file through its right-click menu in the Project Items list.

Use the COLOR EDITOR to create color palettes for the value ranges that are represented in your data. Each palette option in the Colors menu has a default HYPACK® SUB-BOTTOM Color File (\*.HCF) that stores the latest settings:

*TABLE 2. Default Files*

Colors Menu Selection	Default HCF File Name
<b>Palette 1</b>	color.HCF
<b>Palette 2</b>	clr01.HCF
<b>Palette 3</b>	clr02.HCF

Colors Menu Selection	Default HCF File Name
Palette 4	clr03.HCF
Palette 5	clr04.HCF

HYPACK® SUB-BOTTOM overwrites the HCF file for your current palette each time you apply the colors to your project .

The COLOR EDITOR panel is used *only to configure the 5 palettes*. The project colors are always Palette 1. Assign any of the additional palettes to a select XYZ or MTX file through its right-click menu in the Project Items list (SET PALETTE).



**Tip:** You can create additional HCF (HYPACK® SUB-BOTTOM Color File) files using different file names. Doing so enables you to quickly restore the same colors by loading the desired HCF file into the selected color palette. Your selections of color style, zone colors and band settings define your palette colors. Once you select your color style, you can further customize the colors and the values they represent by editing the color range, zones and bands.

The **Color Zones** set the color sequence used by your color style. The COLOR EDITOR evenly distributes the zone colors over the user-defined color range, then smooths (interpolates) the colors for the bands (value increments) between each zone color. Some color styles have fixed zones, however, most allow you to change one or more colors in the sequence. If the zone colors are editable, the Color Zones display appears below the menu in the COLOR EDITOR.

**Bands** are the value increments in your color palette. Typically, each band has a unique color so you can distinguish data values in your graphical displays.

## ABOUT COLOR STYLES

The **Color Style** initiates a predefined sequence of colors (zones) that is used to color-code your data in your area map. Select your style from the Style menu in the COLOR EDITOR.

- **RGB Color** uses a rainbow spectrum, automatically distributing the colors over the specified depth range. The color zones, and bands are editable. RGB Color is the only style in which the colors can be smoothed (interpolated).
- **DXF Color** works in similar manner to RGB Color. However, color selection is limited by the AutoCAD Color dialog and only individual color bands can be edited.

- **Light, Medium and Dark Spectra** automatically calculates a preset range of colors over the depth range. The individual color bands cannot be edited, but the sequence of colors that create the spectrum (zones) can be customized.
- **Relief** and **Chart** automatically calculate a preset palette of colors over the depth range. You cannot edit zones or bands.
- **DXF Spectrum** distributes a DXF compliant rainbow spectrum over 20 bands. When you select DXF Spectrum, HYPACK® SUB-BOTTOM automatically adjusts the current increment to evenly distribute the specified range over the 20 bands. You cannot edit zones or bands.
- **Contrast** uses a series of highly contrasting colors to provide distinct transitions between band ranges. You cannot edit zones or bands.
- **Side Scan Options:** There are several 'Sidescan X' options in the Color Style list are specifically designed to display side scan data. They automatically change the number of bands to range from 0 to 63 and apply color combinations that mimic the colors from the Colors tab in the Side Scan Controls dialog. You cannot edit individual bands.

Different color styles support different sets of editing capabilities:

*TABLE 3. Color Style Editing Capabilities*

Color Style	Color Zones	Band Color	Color Smoothing
<b>RGB</b>	Yes	Yes	Yes
<b>DXF</b>	No	Yes	No
<b>Light, Medium and Dark Spectrum</b>	Yes	No	No
<b>DXF Spectrum</b>	No	No	No
<b>Relief, Chart, Gray Scale and Contrast</b>	No	No	No
<b>Side Scan Options</b>	Yes	No	No

All styles allow you to invert your colors across the color range.

### **MODIFYING COLOR ZONES IN THE COLOR EDITOR**

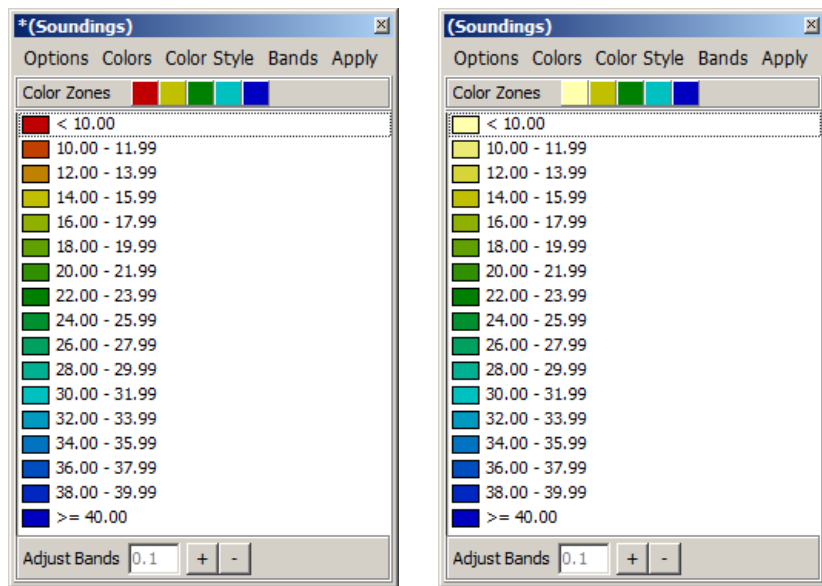
The **Color Zones** set the color sequence used by your color style. The COLOR EDITOR evenly distributes the zone colors over the user-defined color range, then smooths (interpolates) the colors for

the bands (value increments) between each zone color. Some color styles have fixed zones, however, most allow you to change one or more colors in the sequence. If the zone colors are editable, the Color Zones display appears below the menu in the COLOR EDITOR.

To change a zone color, do the following:

1. **Click on the zone.** A color dialog appears.
2. **Choose a color and click [OK].** Your color is inserted in the selected zone and smoothed into the neighboring colors.
3. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

*FIGURE 31. Original Medium Spectrum (left), First Color Zone Changed to Yellow (right)*



### GENERATING THE COLOR BANDS FOR A PALETTE IN THE COLOR EDITOR

When you have selected your palette, and color style, you are ready to define the value range for the palette and generate the color bands that compose the palette.

**Bands** are the value increments in your color palette. Typically, each band has a unique color so you can distinguish data values in your graphical displays.

When you define the initial color palette in your project, you set the **minimum** and **maximum** values that your colors represent. Data

values less than the defined minimum use the color of the first band in the palette, while values greater than the maximum use the color of last band.

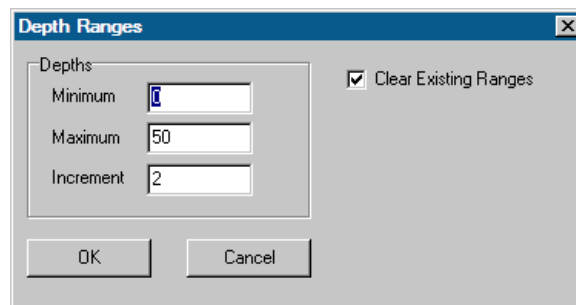
The **Increment** option determines the number of color bands:

$$\text{Number of Bands} = (\text{Maximum} - \text{Minimum}) / \text{Increment} \quad (\text{EQ 1})$$

There are two exceptions to this rule:

- The **DXF Spectrum** color style defaults to 20 bands and adjusts the increment accordingly.
  - The **Side Scan styles** set the minimum to zero, the maximum to 63 and the increment to 1, then apply the colors across the bands.
1. **Select BANDS-SET BANDS.** The Depth Ranges dialog appears.

**FIGURE 32.** Depth Ranges Dialog



2. **In the Depth Ranges dialog, do the following:**
  - a. **Check the Clear Existing Ranges option.** This tells the editor to generate a color palette based only on the currently selected style and the information in this dialog.
  - b. **Enter the minimum and maximum values.**
  - c. **Enter the increment.** The units depend on what the colors represent. (For example, survey units for sounding depths or gamma for magnetometer data.)
  - d. **Use the Adjust Bands feature, to fine tune the range.** (Optional) Enter the increment then click the [+] and [-] to shift the range up and down. (The number and size of the bands remain constant.)
  - e. **Click [OK]** to generate your color palette.
3. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.



**Tip:** If you have an XYZ file representative of your data set, you can quickly set the color palette to fit your depth range:



1. **Right-click on the XYZ file in the Project Items list, select SET PALETTE and choose the palette with which you will color the file Z-values.**
2. **Right-click on the XYZ file in the Project Items list and select SET PALETTE RANGE FOR ASSOCIATED PALETTE.**

### ***MODIFYING COLOR BANDS IN THE COLOR EDITOR***

**Bands** are the value increments in your color palette. Typically, each band has a unique color so you can distinguish data values in your graphical displays.

You can modify the bands in your project colors in several ways:

- Change the color of 1 or more zones
- Change the range of values your project colors represent.
- Change the color of one or more bands
- Add bands
- Remove bands

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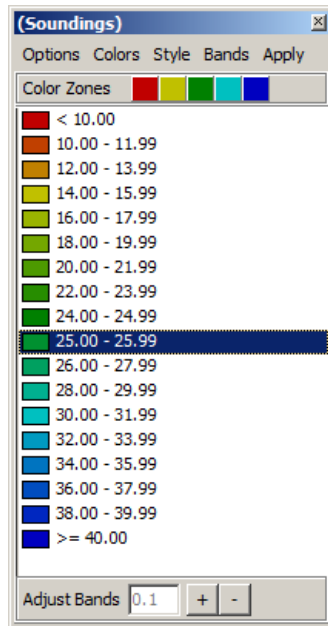
#### **CHANGING INDIVIDUAL BAND COLORS**

---

When you have chosen the color style and defined the initial color palette, the COLOR EDITOR displays a preview of the defined project colors. There may be times when you want to change the color of one or more bands, perhaps to highlight them in your map display.

1. **Select the band from the color display** in the COLOR EDITOR.
2. **Select BANDS-EDIT SELECTED BAND.** A color dialog appears. (If this option is disabled, your color style does not support this feature.)
3. **Select the desired color and click [OK].**

**FIGURE 33.** Individual Bands Highlighted by Contrasting Color



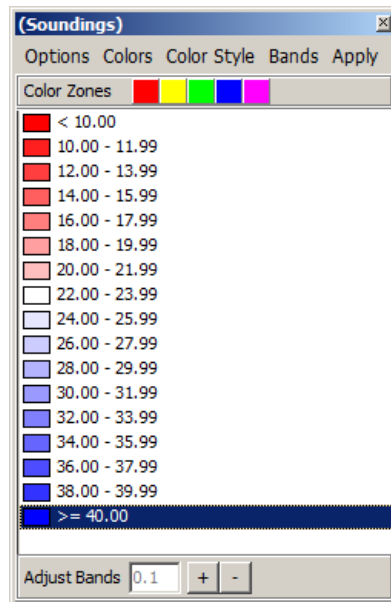
4. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

## SMOOTHING BAND COLORS

The RGB color style supports manual smoothing which interpolates the colors over several selected bands. You can interpolate colors across the full range of the color bar or only a selected portion.

1. **Set the colors for the first and last band in the range where you want to interpolate** the colors.
2. **Hold the Shift key and click the first and last band in the range to interpolate.** They are highlighted by a dark background.
3. **Select BANDS-SMOOTH SELECTED BANDS.**

**FIGURE 34.** Band Colors Smoothed Twice—Above and Below Grade Level



4. Click **[Apply]**. This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

## ADDING COLOR BANDS

When you have chosen the color style and defined the color range, the COLOR EDITOR displays a preview of the defined project colors. There may be times when you want to add one or more bands at specified values in addition to those generated at the original intervals. You can add bands one at a time or at even intervals across a specified range.

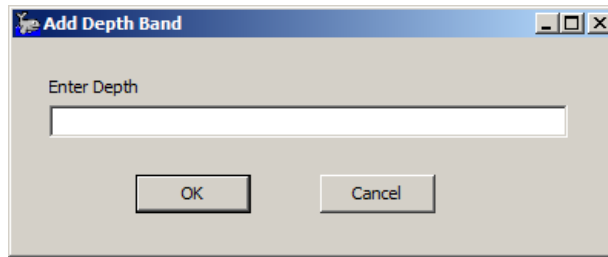
**NOTE:** The COLOR EDITOR *does not remove existing bands*. It calculates the levels defined by the dialog and adds bands at those levels where none currently exist.

When you add bands to most existing color sets, the program assigns the color interpolated from the band colors on either side. When you add a band to RGB Spectrum and DXF Spectrum style color sets, the added band defaults to black, but you can edit the color of the band to be anything you want.

### Adding One Band

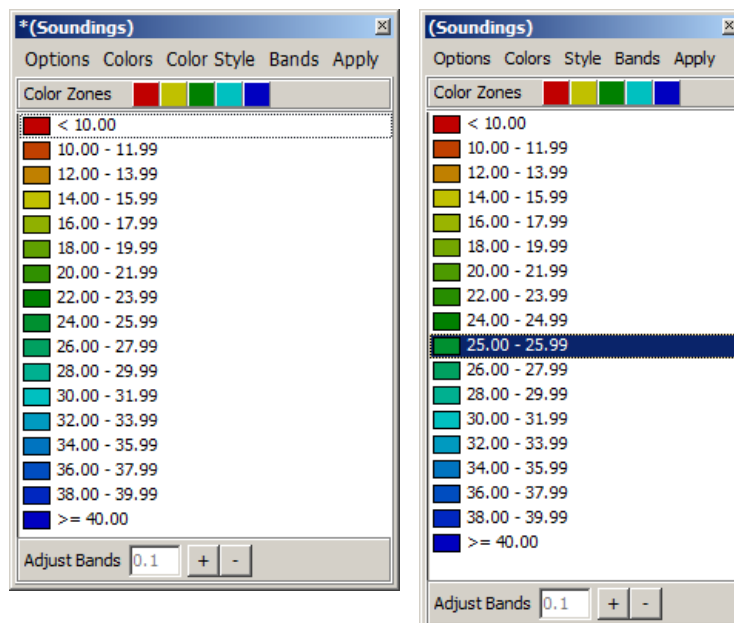
1. Select **BANDS-ADD SINGLE BAND**. The Add Depth Band dialog appears.

FIGURE 35. Add Depth Band Dialog



2. **Enter the depth for your new band and click [OK].** A new band is added to your project colors at the specified value.

FIGURE 36. Added Band at 27.5—Before (left) and After (right)

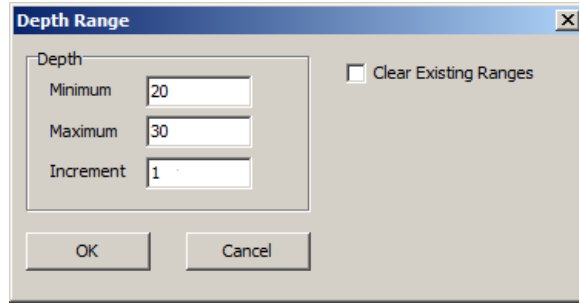


3. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

### Adding Multiple Bands

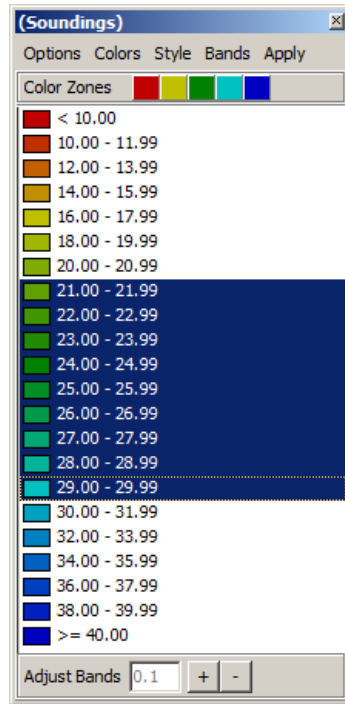
1. **Select BANDS-SET BANDS.** The Depth Ranges dialog appears.

FIGURE 37. Depth Ranges Dialog



2. **Deselect the Clear Existing Ranges option.** This tells the COLOR EDITOR to modify the existing project colors *rather than creating a new color palette*.
3. **Enter the Minimum and Maximum of the range in which you want to increase the number of bands.**
4. **Enter the increment you want between the added bands and click [OK].**

FIGURE 38. Adding Multiple Bands



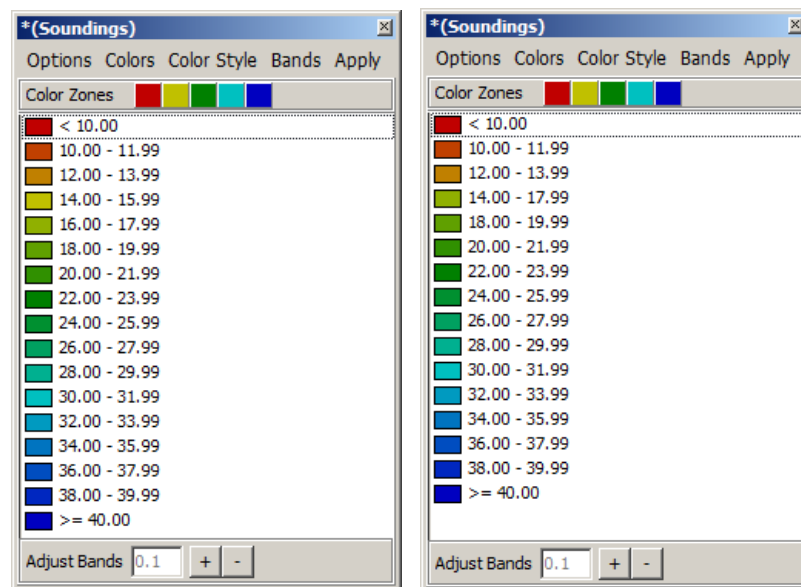
5. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

## REMOVING COLOR BANDS

As you customize your color palette, you may want to remove one or more color bands. When you delete a color band, the COLOR EDITOR merges the values from the deleted band with the next higher band.

1. **Use your cursor to select one or more bands.**
  - To select one band, click on the band in the display.
  - To select multiple individual bands, hold the Ctrl key while you click.
  - To select several contiguous bands, hold the Shift key and click the first and last band.
2. **Select BANDS-DELETE SELECTED BANDS.**

*FIGURE 39. Deleting a Band (14.00-15.99)—Before (left) and After (right)*



3. **Click [Apply].** This updates your displays with the new color palette and stores your current palette in the corresponding HCF file.

## LOADING A HYPACK® SUB-BOTTOM COLOR FILE TO A PALETTE

To reload a HYPACK® SUB-BOTTOM Colors File (\*.HCF) in the COLOR EDITOR, do the following:

1. **In the Colors menu, select the color palette** you want to configure with your HCF file settings.
2. **Select OPTIONS-OPEN COLOR FILE.**
3. **Select your HCF file and click [Open].**

4. **Click [Apply].** This updates your selected palette and the corresponding HCF file with the color settings in the selected HCF file.

## LANGUAGE SELECTION

HYPACK® SUB-BOTTOM is available in multiple languages. If you want to use HYPACK® SUB-BOTTOM using a language other than English, you must load the languages during installation. HYPACK® SUB-BOTTOM will then default to the language set in Windows® if it is available. If the Windows® language is not available, HYPACK® SUB-BOTTOM will default to English.

You may change the language designation by selecting your preference from the SETTINGS-LANGUAGE menu. To set your choice as the default, you must then exit and re-launch HYPACK® SUB-BOTTOM.

The language of each program module will default to the HYPACK® SUB-BOTTOM language if it is available. Otherwise, it will be displayed in English. You may change the language of any module individually through the language menu. That change will remain effective until you exit the module.

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## PROJECTS IN HYPACK® SUB-BOTTOM

Every time you begin a new survey in HYPACK® SUB-BOTTOM, you create a new “project”. A **project** is a folder, with a user-defined project name, and all of the information about your survey it contains. Under the project folder, HYPACK® SUB-BOTTOM creates a series of subfolders:

- **Raw, Edit, Sort** data files will be saved, by default, to the subfolder appropriate to their type.
- **Satellite:** Georeferenced PNG files, generated from satellite images available on Web servers. HYPACK® SUB-BOTTOM shows them in the Web Maps folder of the Project Items list.

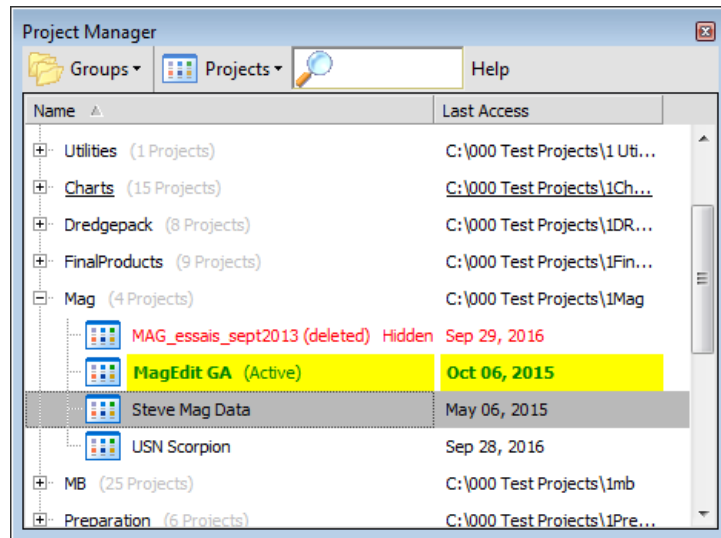
The **project file group** is a folder that stores one or more HYPACK® SUB-BOTTOM projects. HYPACK® SUB-BOTTOM stores projects, by default, to the \HYPACK Sub-bottom\Projects folder. Projects stored there are known as **local projects**.

As part of the HYPACK® SUB-BOTTOM network capabilities, you may also store projects in project file group folders in alternate locations on your computer or network. Projects that reside outside

the \HYPACK Sub-bottom\Projects folder are known as **network projects**.

**To verify the project path**, check the path of the project group folder in the Project Manager.

*FIGURE 40. Project Manager*



**Tip:** To access the current project folder, select the FILE-WINDOWS EXPLORER menu option or right-click on a file in the Project Items list and select 'Open in Explorer'.

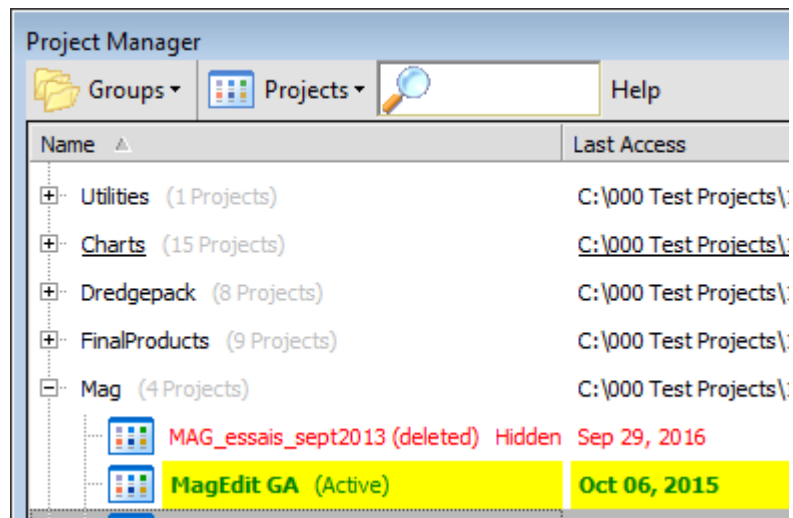
## THE PROJECT MANAGER

The Project Manager lists available projects and project group folders, and highlights the current project. Each project listing includes the date it was last modified. Each project group folder includes the hard drive location.

**To view the Project Manager**, select VIEW-PROJECT MANAGER.



FIGURE 41. Project Manager



Use the Project Manager to manage your individual projects and to customize the project and project group folder lists.

## MANAGING PROJECT GROUP FOLDERS

The Project Manager displays project group folders and the projects they contain. It also controls the display of the folders in the Project Manager.

---

**NOTE:** Changes made to *project group folders* through the Project Manager do not affect the folders on your hard drive. *These options are for display purposes only.*

---

HYPACK® SUB-BOTTOM begins with two group folders:

- The Local \HYPACK **Sub-bottomProjects** group includes the projects from the \HYPACK Sub-bottom\Projects folder.
- The **Network** group also points, initially, to the \HYPACK Sub-bottom\Projects folder.

The \HYPACK Sub-bottomProjects and Network groups can neither be renamed nor deleted, but they can be assigned to an alternate location.

When you have additional project locations, you can add, remove and rename additional project group folders in the Project Manager. In addition, you can select a project group folder to display in the Project Manager, or display all project group folders.

## ASSIGNING THE GROUP LOCATION

You can make a project group display the contents of a different folder in your system. This can be useful if you move projects on your system, then need to tell HYPACK® SUB-BOTTOM where to find them.

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Right-click on the project group that you want to move and select Set Group Location.** A File Select dialog appears.
3. **Direct HYPACK® SUB-BOTTOM to the folder to which you want the project group assigned.**



**Tip:** If the folder doesn't yet exist, navigate to the folder in which it should reside and use [Make New Folder] to create the new project group destination folder.

4. **Click [OK].** The Project Group path updates in the Project Manager.

## ADDING AND REMOVING PROJECT GROUP FOLDERS

Initially, the Project Manager displays only the \HYPACK Sub-bottomProjects and Network project folders. However, you may add alternate project group folders and display them in addition to the initial project folders.

### Adding a Project Group Folder

1. **Select GROUPS-ADD GROUP.** A browse dialog appears.
2. **Select the alternate folder and click [OK].** The Modify Display Name dialog appears.
3. **Enter a display new display name.** (Optional) This option is useful if you have more than one project group folder with the same name on your system memory.
4. **Click [OK].** The Project Manager displays the new project group folder and any projects that may be stored there.

The name of each added project group folder appears in the Projects menu where you may select it for display.

### Removing a Project Group Folder

**To remove a project group folder from the Project Manager display,** right-click on the project group file that you want to remove and select the Remove Folder option.

---

**NOTE:** This option is not available for the \HYPACK Sub-bottomProjects or Network project groups.

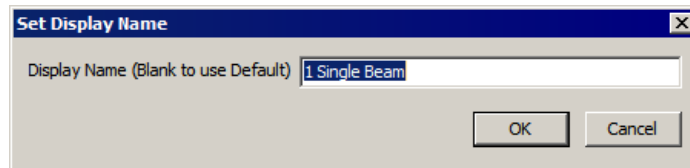
---

## RENAMING PROJECT GROUP FOLDERS

The Project Manager enables you to rename your project group folders *in the Project Manager display*. This option is useful if you have more than one project group folder with the same name on your system memory. You cannot rename the \HYPACK Sub-bottomProjects or Network project group.

1. **Right-click on the project group folder and select Rename Group.** A Set Display Name dialog appears with the current folder name.

**FIGURE 42.** Set Display Name Dialog



2. **Name your folder.**
  - **To customize the name**, enter your new name in the field provided.
  - **To display the same name as Windows® Explorer**, clear the field.
3. **Click [OK].**

## NAVIGATING PROJECT GROUPS

When you store projects in multiple locations, you can display one or all of the defined project group folders in the Project Manager using the Projects menu options.

**To display one project group folder**, select the desired folder from the Projects menu.

**To display all project group folders**, select PROJECTS-SHOW ALL.

**To display the projects in a project group folder**, click the [+] that precedes the project group folder name in the Project Manager.



**Tip:** If a project group list appears to be unsynchronized with the projects you see in Windows® Explorer, try the following:

- **Rescan the group folder.** Right-click on the project group and select Rescan Folder. HYPACK® SUB-BOTTOM rechecks the projects at the selected location and regenerates the project group list.
- **Select OPTIONS-SHOW HIDDEN PROJECTS** to see if it is hidden.

When HYPACK® SUB-BOTTOM starts for the very first time, it automatically opens the sample Halifax project that you can use as a test project, or you can create a new project of your own. HYPACK® SUB-BOTTOM automatically opens subsequent sessions in the last project of the previous session.

HYPACK® SUB-BOTTOM includes multiple methods for creating projects. Choose the method that best serves your needs.

- New Project:** The first time that you work at a particular site, you create a new project. Each time you create a new project, HYPACK® SUB-BOTTOM creates a folder using the project name in the user-defined project group folder location. The new project defaults to the geodesy, hardware and SURVEY settings of the current project, but *you must modify them for your current project location, sensors and requirements, if necessary.*
- Copy Project:** If you are going to work in an area you have worked before (for example, running a postdredge survey where you have already performed the predredge), you should create a new project by copying the existing project. The program generates a new project folder with a user-defined name and project group folder location.

All files in the selected project folder except project data, data from the project \automatrix folder, and tide and sound velocity correction files are copied to the new project maintaining their enabled or disabled state. Files referenced in the project that are *outside* of the project folder *are not copied*.

- Transfer Project:** This gives you the same result as using Windows® Explorer to copy the project folder to another folder location. The result is two identical, but *independently functioning* projects, with the same name but different locations.

FIGURE 43. Comparison of Project Creation Techniques

	New Project	Copy Project	Transfer Project
<b>Geodesy</b>	Copied from current project <sup>a</sup>	Copied from original project	Copied from original project
<b>Boat Hardware</b>	Copied from current project <sup>a</sup>	Copied from original project	Copied from original project
<b>Survey Settings</b> (window layout, navigation parameters, alarm settings, etc.)	Copied from current project <sup>a</sup>	Copied from original project	Copied from original project

	New Project	Copy Project	Transfer Project
<b>Planned Lines</b>	None	Copied from original project	Copied from original project
<b>Background Files</b>	None	Copied from original project	Copied from original project
<b>Data Files</b>	None	None	Copied from original project
<b>Other Files</b> (targets, plotting sheets, matrix files, etc.)	None	Copied from original project <i>except tide correction files</i>	Copied from original project
<b>Display Settings</b>	Uses default display settings set in the Control Panel	Copied from original project	Copied from original project

- a. If this is your very first project, you must set your Geodesy, Hardware and Survey settings as well. HYPACK® SUB-BOTTOM includes a sample project with the installation and will default to those settings if no other projects have been created.

Over time, as you survey different areas at different times, you will create and work on several projects, and change from one project to another according to the set of data on which you are working.

Of course, over time, if you kept every project you ever recorded, the long project lists would become unnecessarily awkward, so you can hide them in the project list or delete them from your hard drive.

All of these tasks are done through the Project Manager.

## OPENING AN EXISTING PROJECT

HYPACK® SUB-BOTTOM automatically opens to the last project of the previous session. If you want to work in another project, the Project Manager provides multiple methods with which you can open an existing project:

- Recent Projects
- Filter Your Projects
- Manually Navigate through the Project Manager

HYPACK® SUB-BOTTOM restores the screen, geodesy, colors and other settings as when you last saved the selected project.

As long as you comply with the network system requirements, files can be read and written across the network. Anyone (with proper network permission) can access projects simultaneously across the network. This means that one user can be creating reports from data one day while another can be editing data from the next. It

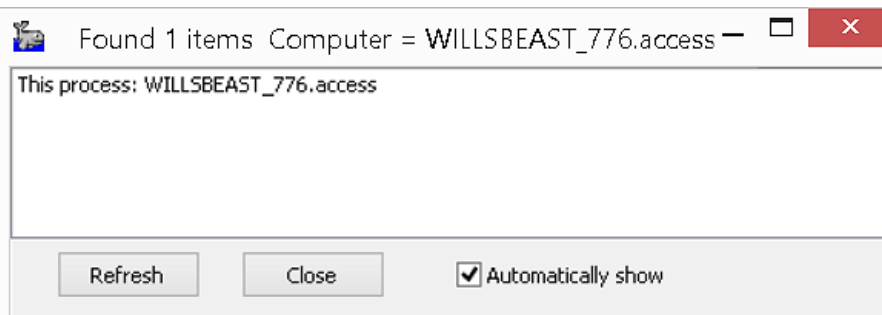
*Beware!*

also means that there is potential for the two users to compromise each other's work.

**BEWARE!** Take care that files within a project that are likely to be changed are accessed by only one user at a time. There is potential for one user over-writing the other's work. ("He who saves last wins!")

HYPACK® SUB-BOTTOM monitors projects for multiple, simultaneous users and, by default, warns you that there are other users working in the project and who they are in the Project Usage dialog:

FIGURE 44. Project Usage Dialog

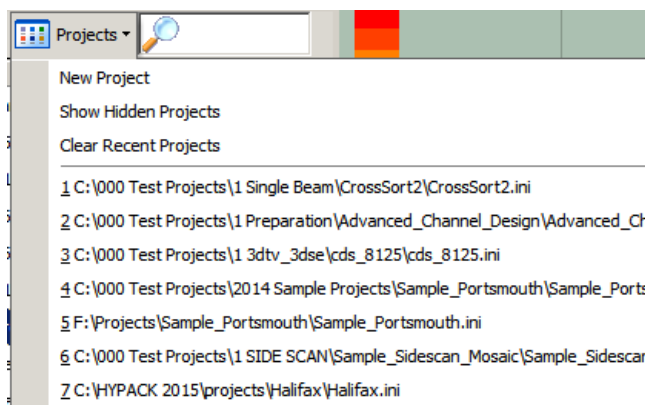


The **Automatically Show** option provides the automated warning. **To view the same dialog manually**, select FILE-PROJECT USAGE. The dialog displays the users working in the project at that time. Use [Refresh] to update the display after a time.

### OPENING RECENT PROJECTS

The **Projects** menu lists the last ten projects where you have worked. Quickly return to any of those projects by selecting it in the menu.

FIGURE 45. Selecting a Recent Project





**Tip:** To remove all of the projects from the Recent menu, select PROJECTS-CLEAR RECENT PROJECTS. The menu begins to rebuild itself from that point forward.

## **FILTERING YOUR PROJECTS**

If you know the name of the desired project or if you have tagged your projects with key words, use the project filter to quickly find it.

The **project filter** updates the projects listed in the Project Manager to include only those projects with names or tags fulfilling the filter criteria.

**To fulfill the filter criteria**, any part of the project name contains the filter sequence, or one of the project tags exactly matches a the filter sequence.

For example, the CD from the HYPACK® SUB-BOTTOM training conference has about 40 projects with sample data of all types. If you are interested in only side scan projects, enter 'side scan' and the filter will show only those projects with side scan in their name.

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.

2. **Display the correct project group folder.**

**Tip:** If you are unsure of the project group in which your project resides, display all project group folders. The filter shows any project in any group folder that meets the filter criteria.

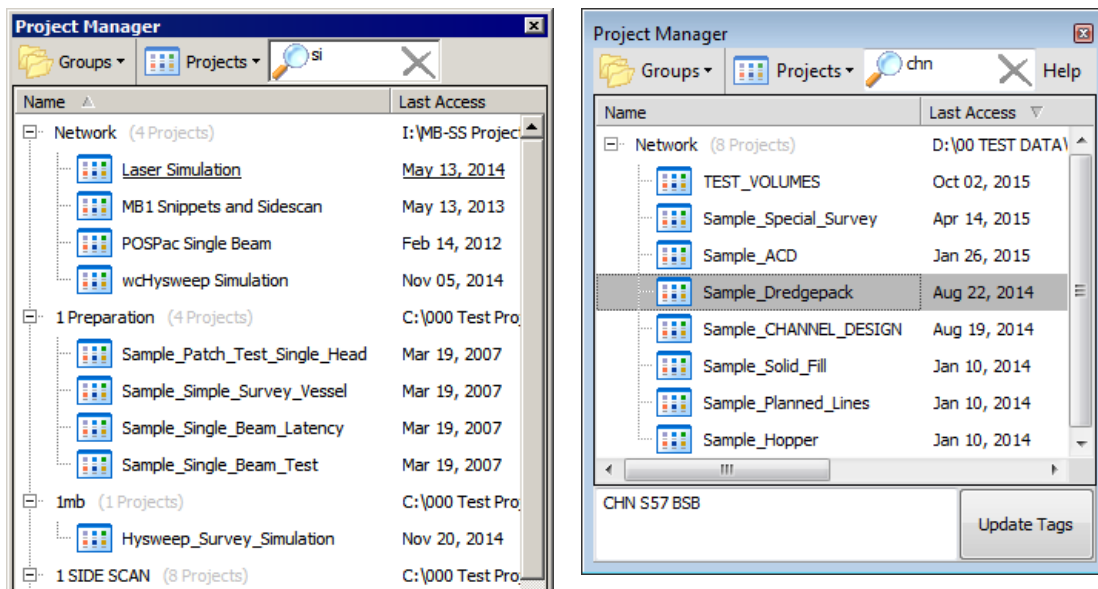
3. **Begin typing the project name in the Project Filter area.**

The Project Manager updates to include only those projects with names containing the filter sequence.

**Tip:** To clear the Project Filter, click the 'X' in the Project Filter field.



**FIGURE 46.** *Filtering your Projects—Display All Projects With Filter Criteria of “si” (left), Display Network Group with Filter Criteria of CHN (right).*

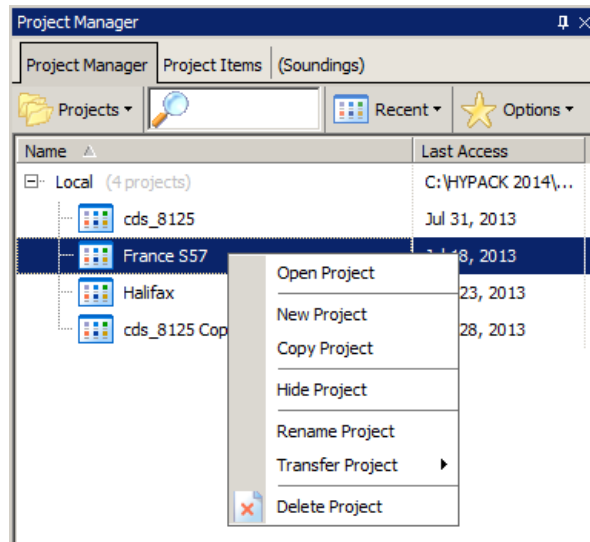


### **MANUALLY NAVIGATING THROUGH THE PROJECT MANAGER DISPLAY**

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Display the correct project group folder in the Project Manager** and expand it to show its projects.
3. **Double-click on the desired project** or right-click on the project and select Open Project.



**FIGURE 47.** Opening the Project Through the Right-click Menu

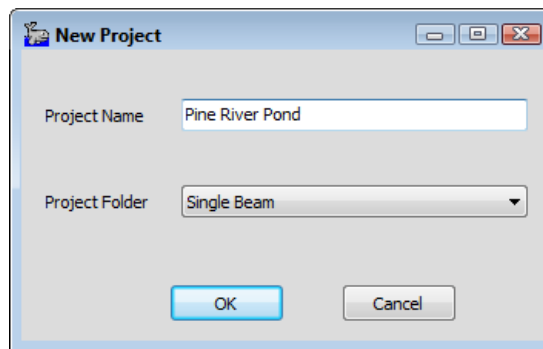


## CREATING A NEW PROJECT

Each time you begin a new survey, you should create a new project. HYPACK® SUB-BOTTOM enables you to name your project and then stores all of the information about that survey in the project folder.

1. **Select FILE-NEW PROJECT** and the New Project dialog appears.

**FIGURE 48.** Setting the New Project Name and Location



2. **Name the project and select a folder where the project will be stored.**
  - **Project Name:** Enter a name that will remind you of the location and the date of the survey. Project names may not contain periods, back or forward slashes, question marks, less than or greater than signs, or bars.

**TABLE 4.** *Invalid Characters*

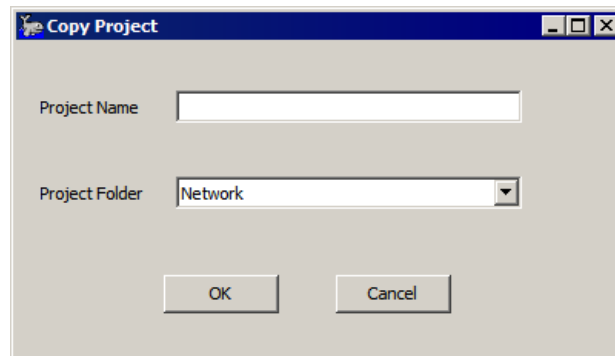
.	/	\	?	<	>	
---	---	---	---	---	---	--

- **Project Folder:** Enter the project group folder where your project should reside. We recommend you use the default project folder (\HYPACK Sub-bottomProjects).  
The software creates a folder in the specified location using the project name.
3. **Click [OK].**

## COPYING AN EXISTING PROJECT

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Direct HYPACK® SUB-BOTTOM to the correct group folder,** if necessary.
3. **Right-click on the project and select Copy Project.** The Copy Project dialog appears.

**FIGURE 49.** *Copy Project Dialog*



4. **Name your new project, choose a project group folder and click [OK].**

## TRANSFERRING PROJECTS BETWEEN PROJECT GROUP FOLDERS

To create a duplicate copy of a project in another project group folder, transfer the project. The result is two identical, but *independently functioning* projects, with the same name but different locations.

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Add the destination folder as a project group folder,** if necessary.
3. **Direct HYPACK® SUB-BOTTOM to the project group folder where your project currently resides,** if necessary.
4. **Right-click on the project and select Transfer Project then the project group folder to which you want the project copied.** The Project Manager copies the project, using the same project name, to the destination folder and asks if you want to open the copied project. To stay in the current project, click [No].

*Beware!*

**BEWARE!** *Be careful how you use this feature!* The potential for overwriting work is real. We recommend designating one location for project storage, then working on projects over the network, if possible.

## TAGGING YOUR PROJECTS

**Project tags** are one or more user-defined key words (tags) that provide added project filtering capability.

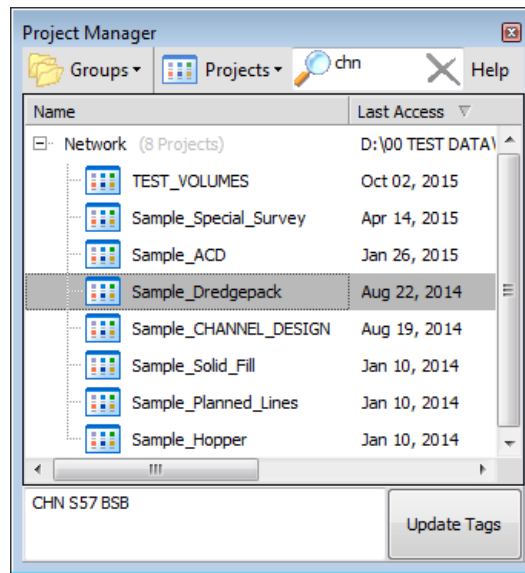
The **project filter** updates the projects listed in the Project Manager to include only those projects with names or tags fulfilling the filter criteria.

**To fulfill the filter criteria,** any part of the project name contains the filter sequence, or one of the project tags exactly matches a the filter sequence.

**To apply project tags,** do the following:

1. **In the Project Manager, select PROJECTS-TAG EDITOR.** A tagging area appears below the projects list.
2. **Select the project you want to tag.**
3. **Enter one or more tags in the tagging area and click [Update Tags].** Enter tags in a space-delimited list. They are not case-sensitive.

FIGURE 50. Filtering Tagged Projects



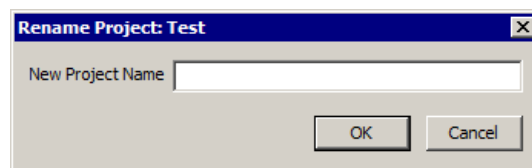
## RENAMING YOUR PROJECT

From the Project Manager, you can rename any project other than the one that is currently open. When you rename a project, the Windows® folder and the *ProjectName.ini* file are renamed at their current location and the name in the Project Manager list is updated accordingly.

### To rename a project:

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Navigate to the project group folder where the project to be renamed is stored.**
3. **Right-click on the project to be renamed and select Rename Project.** The Rename Project dialog appears with the name of the selected project in the title bar.

FIGURE 51. Rename Project Dialog



4. **Enter the new project name and click [OK].**

## HIDING AND RESTORING YOUR PROJECT

If you kept every project you ever recorded, the long project lists would become unnecessarily awkward. You can temporarily manage the project list by hiding and restoring projects.

**NOTE:** You can not hide your the currently active project.

### Hiding Projects

Hiding a project appends "(deleted)" to the file name and removes the project from the list in the Project Manager. *It does not delete the project or any files within the project from the hard drive.*

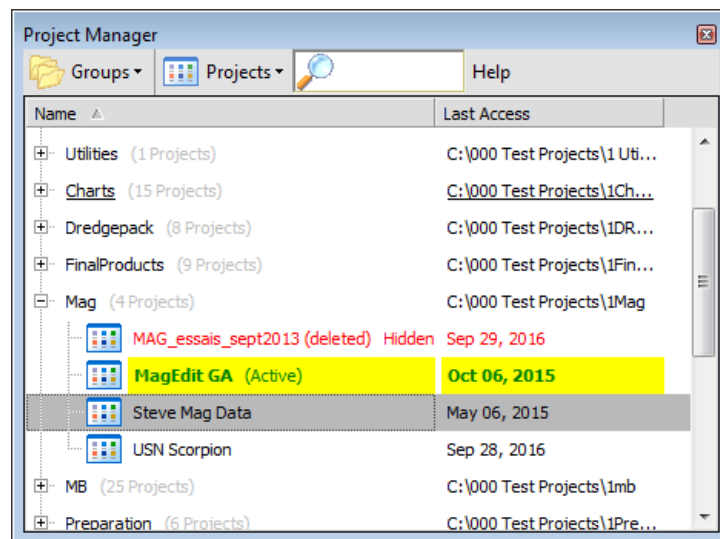
1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Select the location (Project Group Folder) where your new project resides.**
3. **Right-click on the project** and select HIDE PROJECT and click [Yes] to confirm the operation.

### Restoring Hidden Projects to the Project Manager List

When you restore a project, the program returns the project name to its original name and the project, again, appears in the Project Manager list.

1. **View a complete project list.** Select PROJECTS-SHOW HIDDEN PROJECTS. The Project Manager lists hidden projects in red while the unhidden projects remain in black.

**FIGURE 52.** Showing Hidden Projects



2. **Right-click on the project to be restored and select SHOW PROJECT.** The project, again, displays in black and remains in the list.

3. **Rehide hidden projects.** Select PROJECTS and deselect SHOW HIDDEN PROJECTS.

## DELETING YOUR PROJECT

If you are very sure you are finished with a project, you can send the project folder and all of its contents to the Windows® Recycle Bin.

You can not delete the current project.

---

**IMPORTANT!** To avoid data loss, store a copy of your project in an alternate location.

---

1. **Open the Project Manager.** Click the Project Manager tab or select VIEW-PROJECT MANAGER.
2. **Select the location (Project Group Folder) where your new project resides.**
3. **Right-click on the project you want to delete in the project list and select DELETE PROJECT.** The program will confirm with you that you want to delete the project.
4. **Click [OK]** to complete the process. The project folder moves from the project group folder to the recycle bin.

---

## HYPACK® SUB-BOTTOM PROJECT FILES

Project Files are the support files (not data files) used in the project.

**Background charts** provide context and navigational reference for your work. HYPACK® SUB-BOTTOM displays several types of electronic charts in the area map and in the data collection and editing programs.

---

**NOTE:** Charts drawn in XY (DGN, DXF, DIG, TIF and SHP) *must be in the same geodesy as your project* to be positioned correctly. Charts drawn in WGS-84 (S57, VPF), the SURVEY program will transform the data files to the local datum, using the datum transformation parameters in the GEODETIC PARAMETERS program, before converting them to your projection. This allows you to use these file formats on any projection.

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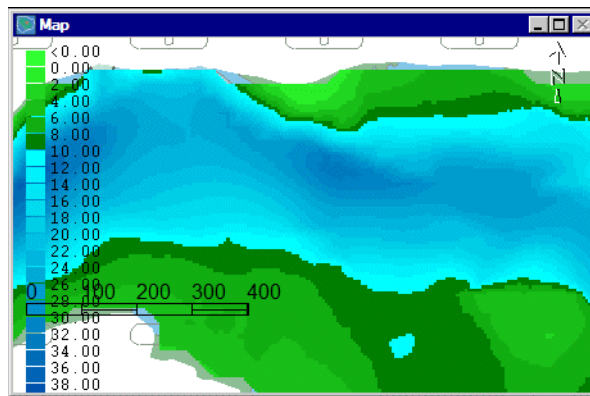
**Border Files (\*.BRD):** A user-defined listing of XY positions that defines an area in your project area. Typically, Border files are created in the BORDER EDITOR and stored in your project folder. They have several uses, most often to clip data or limit program calculations to a user-defined area.

Use a border file to trim data and limit the extents of your display in the SUB-BOTTOM PROCESSOR.

**Matrix files (\*.MTX)** are gridded rectangular areas. You can fill the cells with depth information from your sub-bottom profiler in real time during data collection, or in post-processing.

Empty matrix files are typically created in the MATRIX EDITOR and saved to the project folder.

*FIGURE 53. Matrix File in the SURVEY Programs*



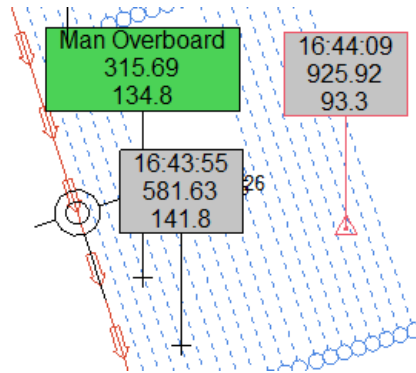
**Planned survey lines (\*.LNW)** define where you want your vessel to go. The line file contains the grid coordinates and names for each planned line in your project area and can also contain cross section template information. Line files are typically created in the LINE EDITOR program.

**Plotting Sheet files (\*.PLT)** contain origin coordinates, scale, rotation, and sheet dimensions for plotting on smooth sheets. These files are typically created in the PLOTTING SHEET EDITOR and saved with the PLT extension to your project file. They are primarily used by HYPLOT to define the plot area.

**Targets** mark points of interest in your project area. To that end, each target must at least include a name and the XY position, but it can also include a lot of other metadata according to the project and the technology used and the program in which you mark your target. Targets marked in the SUB-BOTTOM PROCESSOR includes depth and depth of burial.

You can create targets in the HYPACK® SUB-BOTTOM interface or in the TARGET EDITOR then display them in the SURVEY program. This enables you to navigate *to* predetermined locations or *away* from areas dangerous for navigation. You can also mark targets at points of interest in SURVEY and in post-processing and save them to the project target list. The TARGET EDITOR displays all information about each target in one window and enables you to modify target properties and attributes where appropriate.

**FIGURE 54.** *Targets in SURVEY.*



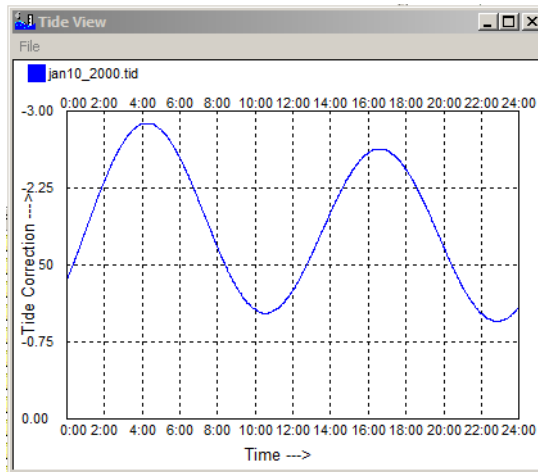
Each project maintains a **target database** (targets.db) in the project folder. The HYPACK® SUB-BOTTOM shell, SURVEY and SUB-BOTTOM PROCESSOR all read and write target information to this database. The database model currently supports a lengthy list of target properties and attributes. Each program reads and writes only the properties and attributes they need.

**Tide Correction Files (\*.TID)** are created in the HARMONIC TIDES and MANUAL TIDES programs. They contain corresponding tide levels (in survey units) and time information that can be used in post-processing programs to apply water level corrections to your sounding data. For each day included in the file, there is one correction value for every minute in the 24 hr. period for a total of 1,440 records per day. A multiday file marks the beginning of each day with its date.

You can display a graph of any TID file in your project by right-clicking on the file in the Project Items list and selecting 'Graph'. The Tide View window appears with the graph of the selected tide file.



FIGURE 55. Tide View Window



While in the Tide View window, you can do the following:

- **View a different tide corrections file** by selecting FILE-OPEN.
- **Save an image of the graph to a BMP file** by selecting FILE-SAVE AS and naming your file.
- **Print the graph** by selecting FILE-PRINT SCREEN.

## MANAGING FILES IN YOUR PROJECT

Several types of files may comprise your project data. These files are listed in the Project Items lists. HYPACK® SUB-BOTTOM provides a number of tools with which you control the files used in your project at any one time.

**Loading:** You must load files that you want to use in your project, but do not yet appear in your project items. The process tells HYPACK® SUB-BOTTOM the name of the file and where it is stored on your system.

**Enabling and Disabling:** Generally, enabled files are drawn to your map window. By enabling and disabling select files, you control the combination of files displayed in the map window at any one time.

**Renaming files** in the Project Items list and on your hard drive simultaneously from the HYPACK® SUB-BOTTOM interface.

**Removing files** unloads them from your project, but *does not* remove them from your hard drive. If you change your mind, you can reload them to you project.

**Deleting files** unloads them from your project and moves them to the Windows® Recycle Bin.

#### More Information

- [“HYPACK® SUB-BOTTOM Project Items List”](#) on page 1-3

## LOADING FILES TO YOUR PROJECT

Files that you create while working in a project are saved, by default, to the project folder, enabled (drawn) on the screen, and added to the Project Items list. HYPACK® SUB-BOTTOM attempts to draw your data in an order which will optimize the display of all enabled files. Occasionally, modifications to the draw order or transparency are required.

Most files are loaded to the project through either of two simple methods: Using one of the Add File options from the right-click menu or the Windows® drag and drop method.

---

**NOTE:** Certain chart types require special procedures before you can load them.

---

### *Add File Options*

1. **Right-click the folder in the Project Items list that corresponds to the file type you want to load** in the Project Items list.
2. **Select Add File or Add File & Copy and choose the file.** The loaded program becomes enabled in the Project Items list.
  - **Add File** reads the file from its current location but *does not copy it to the project folder*. This can be useful if you are using very large files (eg. charts) that take excessive space on your hard drive in multiple projects.
  - **Add File & Copy** allows you to select a file from outside the project folder. It then imports the file from its current location to the project folder and enables it in the project.

This manual assumes that you store all project files in the project folder.

### *Drag and Drop*

The drag and drop method adds and enables the selected files to your project. They are *not copied to the project folder* on your hard drive.

1. **Use Windows® Explorer to find and select your files.**
2. **Drag the selected files to the HYPACK® SUB-BOTTOM Map window.**

*Beware!*

**BEWARE!** Saving the project file does not save a file that has not been copied into the project file. When you only add a file to the project, it must remain where it is on your system so HYPACK® SUB-BOTTOM can find it when you open the project.

## ENABLING AND DISABLING FILES

Your Project Items list shows all files associated with your current project.

**Enabled files** have checks in their corresponding check box and appear in the area map.

---

**NOTE:** HYPACK® SUB-BOTTOM can not display binary files. In multibeam and side scan projects, HYPACK® SUB-BOTTOM shows the data from the corresponding RAW files which contain the positioning information. Multibeam projects display the track lines and the nadir depth for each position record, while side scan projects can display only track lines.

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- **To enable all files of one type** check the check box for the file type in the Project Items list.
- **To enable an individual file**, check its check box in the Project Items list.

**Disabled files** remain in your Project Items list, but HYPACK® SUB-BOTTOM omits it from the area map.

- **To disable all except the sounding files in the current project select FOLDERS-DISABLE PROJECT FILES.** This includes all of your planned lines, background files, etc.
- **To disable only the data files in the current project, select FOLDERS-DISABLE DATA FILES.**
- **To disable one type of Project Item** (ex. sorted data files, matrix files, targets, etc), clear the check box associated with the file type folder in the Project Items list.
- **To disable an individual file**, clear its check box in the Project Items list.

## RENAMING PROJECT FILES

From the HYPACK® SUB-BOTTOM interface, you can rename almost any file in the Project Items list *and on your hard drive*

simultaneously. HYPACK® SUB-BOTTOM does not allow you to rename S57, S63, ARCS or VPF charts.

1. **In the Project Items list, right-click on the file you want to rename and select the Rename option.** A Rename File dialog appears.
2. **Enter the new file name and click [Save].** The file name changes in both locations.
  - **If you rename a data file,** HYPACK® SUB-BOTTOM also updates catalog files in which the file resides.
  - **If you rename georeferenced images** (TIF, JPG, PNG or SHP), HYPACK® SUB-BOTTOM also renames the associated files.

## UNLOADING FILES FROM YOUR PROJECT

To unload files from your project, you can either remove them from your Project Items list, while they remain in place on your hard drive, or remove them from your Project Items list and move them to the Windows® Recycle Bin.

### Removing Files

- **To remove individual files,** do the following:
  - a. **Select one or more files** in the Project Items list.
    - **To select several individual files,** hold the Ctrl key while you use your mouse to choose your lines.
    - **To select a range of files,** hold the Shift key and select the first and last file of a range.
  - b. **Right-click on a selected file and select REMOVE FILE.**
- **To remove all of one file type,** right-click on the file type folder and select REMOVE FOLDER FILES.

---

**NOTE:** Neither disabling nor removing will delete the file from your hard drive. You can re-enable your file or reload the file to your project.

---

### Deleting Files

**To delete any file,** right-click on the file in the Project Items list and select DELETE FILE. You are asked to confirm your deletion.

---

**NOTE:** When you delete a \*.LOG file, the member files remain in the same folder in the project while the LOG file itself goes to the recycle bin. When you delete a \*.MLOG file, the member matrix files go with the MLOG file to the Recycle Bin.

---

---

## HYPACK® SUB-BOTTOM DATA FILES

The Project Items list begins with the data files: Raw, Edited and Sorted. When non-binary data files are enabled in a project, you can choose to display them in the area map:

- Draw the soundings
- Draw the track lines
- Draw both soundings and track lines

To make your choice, right-click on the data folder and select ENABLE SOUNDINGS, ENABLE TRACK LINES or both.

---

**NOTE:** Track lines can not be displayed for XYZ files as there is no track line information available in this format.

---

Other display settings are made in the Control Panel, the COLOR EDITOR.

## RAW DATA FILES

**Raw files** are the data files that result from the SURVEY or DREDGEPACK® program. Every time you log data, a new “Raw” data file is created. They are ASCII format files that contain the header information and time-series information for each survey device.

By default, they have the RAW extension and, in a standard HYPACK® SUB-BOTTOM project, are stored in the \HYPACK Sub-bottom\Projects\*ProjectName*\Raw folder.

A list of individual data files is provided in a catalog (\*.LOG) file. You can quickly draw or process a group of files by specifying the \*.LOG name, instead of entering the name of each data file.

IRAW sub-bottom data is logged to a separate SEG-Y file. In the SUB-BOTTOM PROCESSOR, you can then define the bottom track and sub-bottom layers and export them to HYPACK All Format or XYZ data files.

## EDITED DATA FILES

In the SUB-BOTTOM PROCESSOR, when you have defined the bottom track and digitized the sub-bottom layers, you save the

result to the project Edit folder. You can store them in HYPACK All format or the XYZ format—both ASCII text files.

## SORTED DATA FILES

After running the edited data files through the SORT program, you save the resulting data files to a sorted XYZ data file in the Sort folder of the current project.

## CATALOG FILES (\*.LOG)

A **Catalog File** is an ASCII document that lists a series of other files. You can quickly draw or process a group of files by specifying the \*.LOG name, instead of entering the name of each data file. The LOG file is written to the same folder where your data files are stored. (All data files must be in the same folder.)

HYPACK® SURVEY does not generate LOG files for Sub-bottom SEG files. You can create one in the HYPACK® SUB-BOTTOM interface, if you wish, but it is not required.

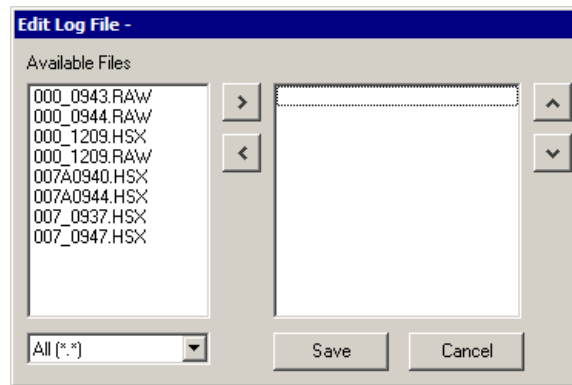
When you process the raw data in the SUB-BOTTOM PROCESSOR, the program stores the resulting All format files in the Edit folder, and generates a new catalog file for the bottom track and each reflector layer.

### *CREATING A NEW CATALOG FILE*

On occasion, you may want to create a catalog file that is different from one automatically created by HYPACK® SUB-BOTTOM. The procedure is simple.

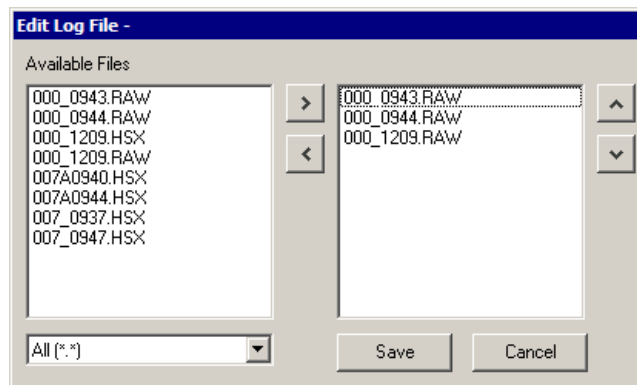
1. **Right-click on the project data folder in the Project Items list and select CREATE NEW LOG FILE from the menu.** A dialog appears with a listing of all data files in the data folder.

**FIGURE 56.** *Creating a New Catalog File (Before)*



2. **If there are multiple file extensions represented in the folder, choose to list only files with the extension of your choice.** (Optional) Select the desired extension in the drop-down list at the bottom left.
3. **Select the file names you wish to include and click [Add].**

**FIGURE 57.** *Creating a New Catalog File (After)*



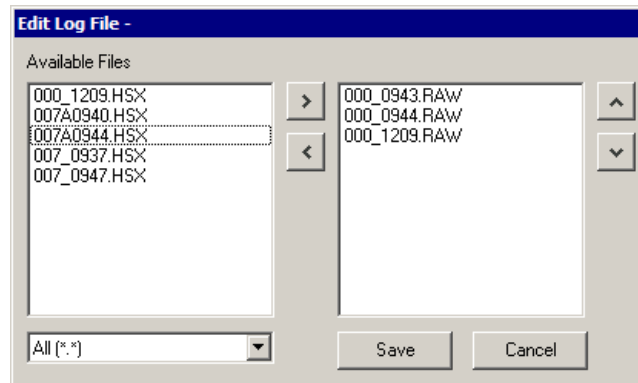
4. **Save your catalog file.** Click [Save] and name your file. HYPACK® SUB-BOTTOM saves your file with the LOG extension in the same folder (Raw, Edit or Sort) that you originally chose.

## **EDITING CATALOG FILES**

You can also edit existing catalog files.

1. **Right-click on a LOG File in the Project Items list and select EDIT LOG FILE from the drop-down menu.** A dialog will appear listing the files in the catalog and other files available in the project.

FIGURE 58. Edit Log File Dialog



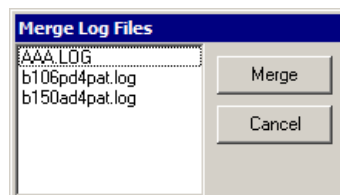
2. **Modify the files included in the catalog:**
  - **To delete line files from the catalog**, select them on the right, then click the left arrow button.
  - **To add available line files**, select them on the left, then click the right arrow button.
  - **To reorder the lines in the catalog**, select a line then use the up and down arrow buttons to reposition it in the list.
3. **Save your changes.**
  - a. **Click [Save]**. A File Save dialog appears.
  - b. **Name your LOG file and click [Save]**. You can use the same file name and overwrite the existing catalog or use a different file name and create a new catalog.

## MERGING CATALOG FILES

You can also merge the files contained in multiple catalog files together.

1. **Right-click on the a LOG file in the Project Items list and select MERGE LOG FILES from the drop-down menu.** A dialog appears with a listing of all catalog files in the same data folder.

FIGURE 59. Merging Catalog Files



2. **Select the file names you wish to include** by holding the control key while making your selections.



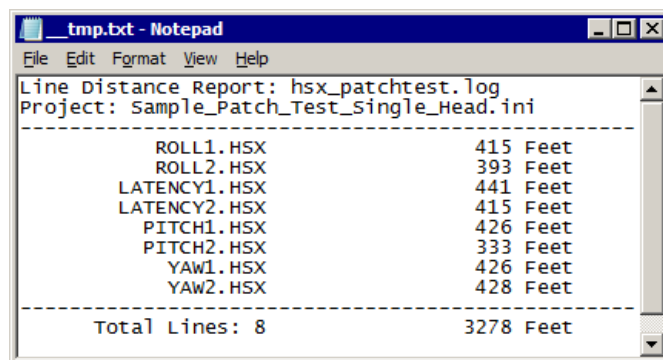
3. Click **[Merge]** and name your new catalog. HYPACK® SUB-BOTTOM saves your file with the LOG extension in the same folder (Raw, Edit or Sort) as the file you right-clicked originally.

### SHOW LINES REPORT FOR CATALOG FILES

A Lines Report, is an ASCII text file listing each of the lines in the catalog (or the selected line) and distance traveled while logging—the distance surveyed.

Right-click on a catalog file (or on an individual survey data file) and select SHOW LINES REPORT.

*FIGURE 60. Sample Show Lines Report*



```
tmp.txt - Notepad
File Edit Format View Help
Line Distance Report: hsx_patchtest.log
Project: Sample_Patch_Test_Single_Head.ini
-----
ROLL1.HSX                415 Feet
ROLL2.HSX                393 Feet
LATENCY1.HSX            441 Feet
LATENCY2.HSX            415 Feet
PITCH1.HSX              426 Feet
PITCH2.HSX              333 Feet
YAW1.HSX                426 Feet
YAW2.HSX                428 Feet
-----
Total Lines: 8           3278 Feet
```



---

Typically, you want to be as ready to collect data as possible, *before you head out to your project area*. The following sections discuss creating your HYPACK® SUB-BOTTOM project, settings to configure and project files you are likely to need ready.

Before you begin your work in your project area, there are several tasks to consider:

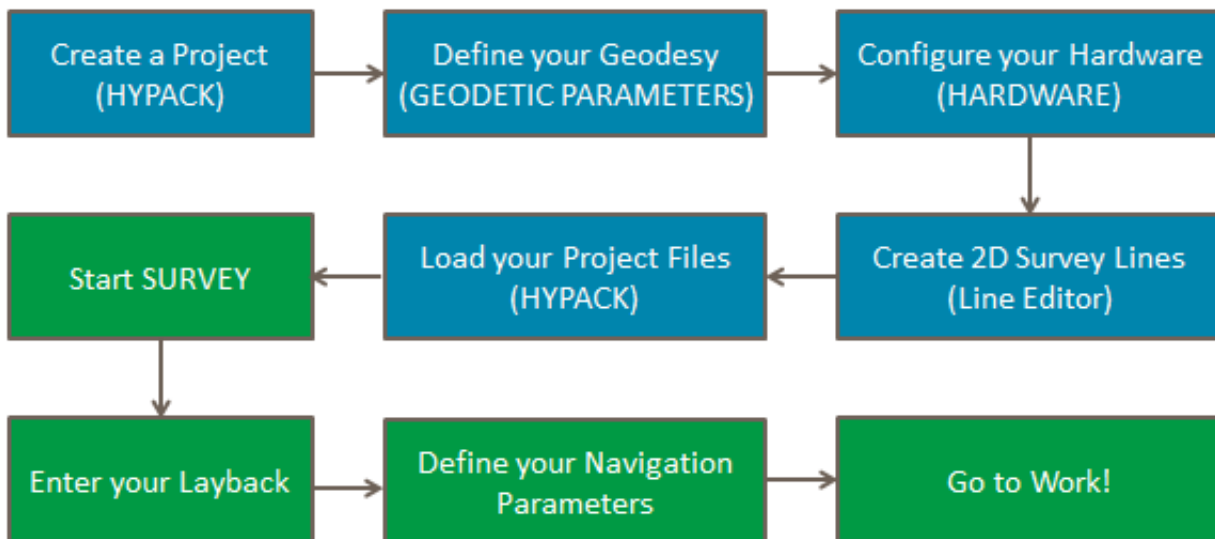
1. **Create a new project.** You can create a new project and all of the files in it by using the FILE-NEW command or copy an existing project using the FILE-COPY menu command.
  - **When you create a new project**, it inherits the last settings for geodesy and hardware.
  - **When you copy a project**, it copies everything from the previous project, with the exception of the data files.
2. **Check your Geodesy.** If you have not previously specified your geodesy, enter the GEODETIC PARAMETERS program and configure your geodesy.
3. **Configure and calibrate your hardware.** If you have not previously specified your sensors, configure your equipment in the HARDWARE program.
4. **Create your planned survey lines.** (Optional)  
**If you are working on a new survey project**, you typically create planned survey lines to assure even coverage. Create planned lines in the LINE EDITOR.
5. **Prepare and load other support files as needed.** These may include:
  - Background charts
  - Matrix files
  - Corrections files
  - Targets
  - Vessel shapes
6. **Launch SURVEY and configure your survey settings.**

- **Configure the size, position and features of the display windows.**
- **Load and configure planned survey lines.** (Optional) )
- **Set your Layback.**
- **Set the Navigation Parameters.**
- **Input the Project Information.** (Optional)
- **Configure your Boat Features.**
- **Load and configure any Targets.** (Optional)
- **Load and configure any Matrix Files.** (Optional. )

The following figure illustrates a typical sequence of steps. The blue blocks represent tasks done from the HYPACK® SUB-BOTTOM shell, while the green blocks are done in SURVEY.

For more information, click any program block and jump to the corresponding segment of this manual.

*FIGURE 1. Sub-bottom SURVEY Work Flow*



### More Information

- [“Creating a New Project”](#) on page 1-53
- [“Entering your Geodetic Parameters”](#) on page 2-38
- [“Configuring Sub-bottom Profiling Systems in HARDWARE”](#) on page 2-79
- [“Creating Planned Lines in the Line Editor”](#) on page 2-48
- [“Loading Background Charts to the Project”](#) on page 2-4
- [“Loading Files to your Project”](#) on page 1-62
- [“HYPACK® SURVEY”](#) on page 3-1
- [“Layback for Towed Sub-Bottom Systems”](#) on page 3-42
- [“Navigating Planned Lines in SURVEY”](#) on page 3-63
- [“Logging Data in SURVEY”](#) on page 3-67

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## BACKGROUND CHARTS

**Background charts** provide context and navigational reference for your work. HYPACK® SUB-BOTTOM displays several types of electronic charts in the area map and in the data collection and editing programs.

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**NOTE:** Charts drawn in XY (DGN, DXF, DIG, TIF and SHP) *must be in the same geodesy as your project* to be positioned correctly. Charts drawn in WGS-84 (S57, VPF), the SURVEY program will transform the data files to the local datum, using the datum transformation parameters in the GEODETIC PARAMETERS program, before converting them to your projection. This allows you to use these file formats on any projection.

---

Most background files will be imported from external sources. HYPACK® SUB-BOTTOM supports the following electronic chart formats:

- ARCS
- BSB ver. 3
- C-Map Ed. 2
- DIG
- DG2
- DGN<sup>a</sup>
- DGW<sup>b</sup>
- DWG<sup>b</sup>
- DXF
- ECW
- GML
- JPEG2000
- MIF
- MrSid
- PDF (Georeferenced)
- PNG (Georeferenced)
- S57
- S63
- SHP
- TIF
- VPF

a. DGN: v7 and v8. Version 8 for display only.

b. DXF and DWG: Versions 13-15, 18, 2004, 2007, 2010 and 2013. Used as chart display in any chart-supporting module, and as source or destination file in EXPORT TO CAD.

You may create background files in select HYPACK® SUB-BOTTOM programs and save them to the project.

Module	Chart Type	Project Items Listing
<b>HYPACK® SUB-BOTTOM</b>	Georeferenced TIF	Background Charts
<b>EXPORT</b>	DXF DGN DWG	Background Charts
<b>HYPLOT</b>	Georeferenced PDF Georeferenced TIF DGN DWG DXF	Background Charts

If you have Internet access, you can download georeferenced PNG files from Web servers through the Web Maps tab in the HYPACK® SUB-BOTTOM interface. HYPACK® SUB-BOTTOM stores these charts in the project \Satellites folder.

## LOADING BACKGROUND CHARTS TO THE PROJECT

Most charts are loaded to the project in the same manner:

1. **Right-click Background Files** in the Project Files list.
2. **Select Add File & Copy**, and the chart file type from the list displayed. A File Open dialog appears.
  - **Add File** enables the project to read a chart that is not stored in your project folder. This can be useful if you are using very large chart files in more than one project.
  - **Add File & Copy** copies the chart to your project folder and enables it in your project.
3. **Choose the file and click [OK]**. The file will be drawn to the screen and enabled in the Background files list.

ARCS and S63 charts have special procedures that must be followed before you can add them to your project.

HYPACK® SUB-BOTTOM attempts to draw your data in an order which will optimize the display of all enabled files. Occasionally, modifications to the draw order are required and may be made by creating a custom draw order.

### **LOADING ARCS CHARTS TO HYPACK® SUB-BOTTOM**

British Admiralty ARCS charts are electronic raster charts. World-wide coverage is provided by these charts and updates are available throughout the year according to your permit agreement. Arcs charts and their permits can be purchased from an authorized distributor or reseller.

#### **To display ARCS charts in HYPACK® SUB-BOTTOM:**

1. **Acquire the ARCS Charts for your survey area.** If you have multiple HYPACK® SUB-BOTTOM licenses (dongles) and you want more than one to have ARCS capability, you will need to purchase multiple ARCS permits.
2. **Load your charts to your hard drive.**
3. **Load the charts to HYPACK® SUB-BOTTOM.** You may only need a portion of the charts that you have purchased in a project. Load only those charts that correspond to your project area.

*Beware!*

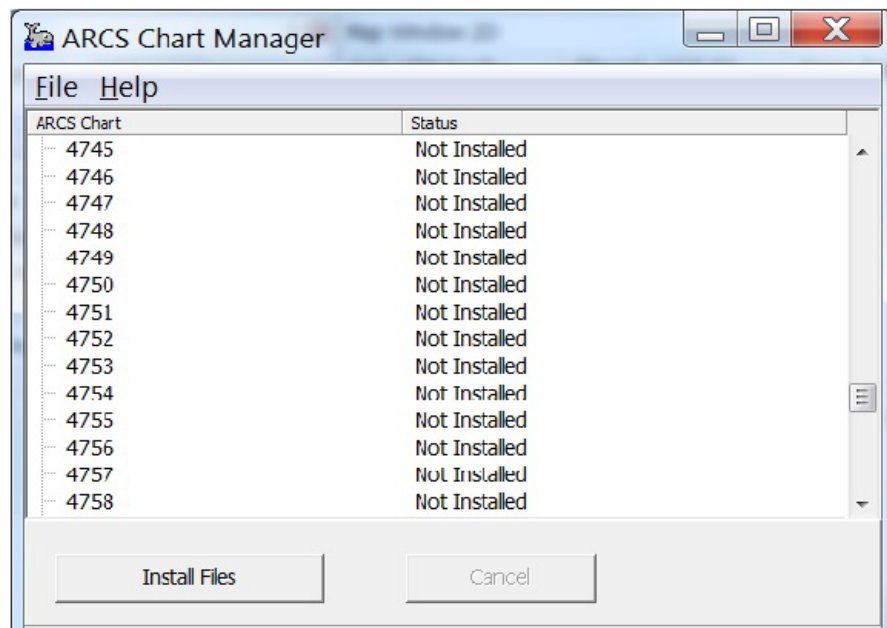
**BEWARE!** Any time that you load ARCS charts to your HYPACK® SUB-BOTTOM project, you must use the same dongle that was used to load the chart permits to that computer. You must load your chart permits through the ARCS Manager each time you change dongles.

**INSTALLING  
ARCS LICENSE  
AND CHART  
PERMITS**

1. In HYPACK, select **PREPARATION – ARCS CHART MANAGER**. The ARCS Chart Manager appears.
2. **Install the license.**
  - a. **Select FILE - INSTALL LICENSE.**
  - b. **Navigate to the location of the license files** provided to you.
  - c. **Select the \*.lcn file and click [Open].**
3. **Load your permits.**
  - a. **Select FILE – ADD PERMITS.**
  - b. **Select the \*.NCP file** provided to you.
  - c. **Click [Open].**

The ARCS Chart Manager displays a list of charts for which you are licensed.

*FIGURE 2. Charts for Which You are Licensed*

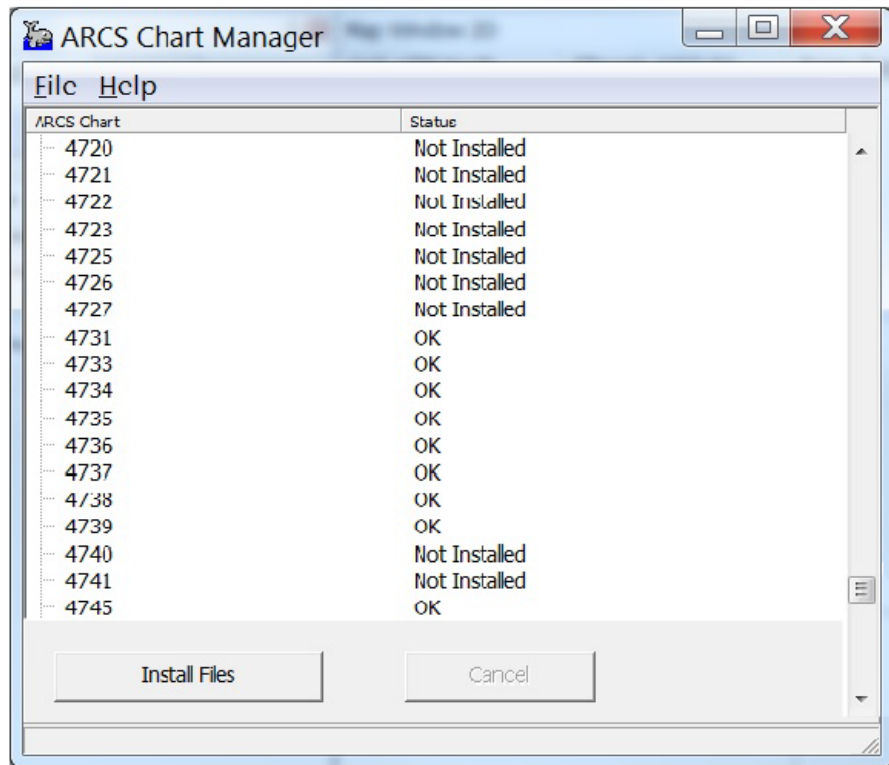


**INSTALLING  
ARCS CHARTS  
ON YOUR  
COMPUTER**

- When you have installed your ARCS license and permits, and downloaded your ARCS chart files, you are ready to install the charts you have purchased:
1. **Click [INSTALL FILES].**
  2. **Navigate to the location of your charts.**
  3. **Click [OK].** All permitted charts that are loaded have an “OK” status in the ARCS CHART MANAGER.



**FIGURE 3.** The ARCS Chart Manager Displays the Status of Each Chart

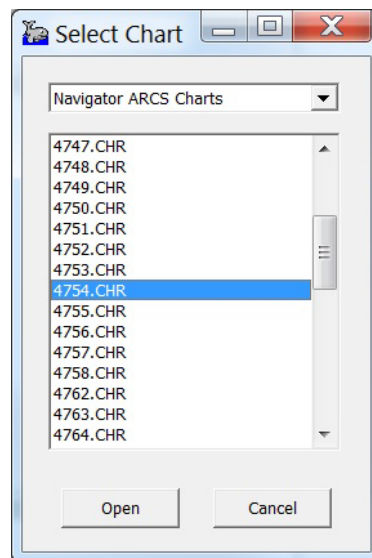


4. **Select FILE-CLOSE.**

**LOADING ARCS  
CHARTS TO YOUR  
PROJECT**

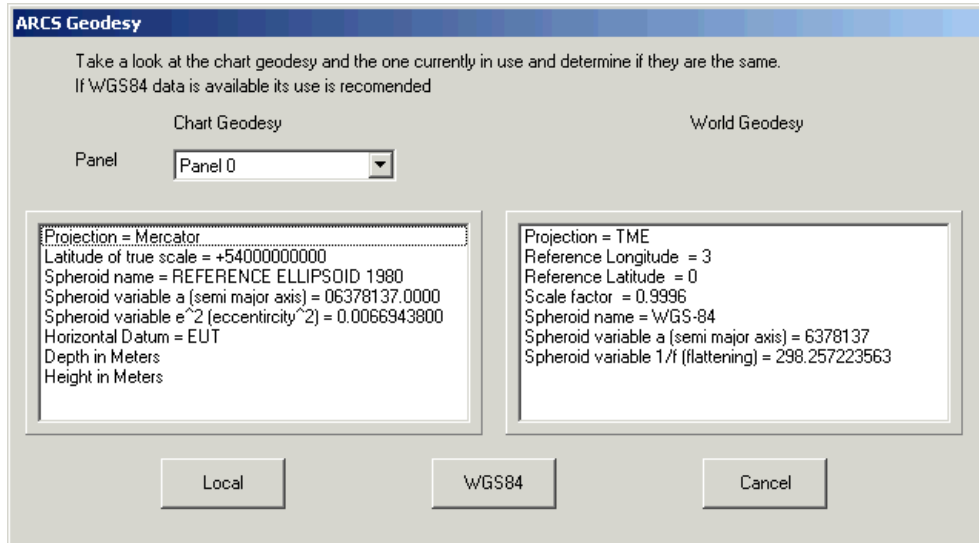
1. **Right-click Background Files** in the Project Files list and select ARCS. A Select Chart dialog appears.

**FIGURE 4.** Opening your Charts



2. **Select one or more charts and click [Open].** The ARCS Geodesy dialog appears next.

FIGURE 5. Choosing the Background Chart Panel



3. **Select the panel you will use.** Some charts include multiple panels. If this is the case, they are listed in the Panel drop-down box.



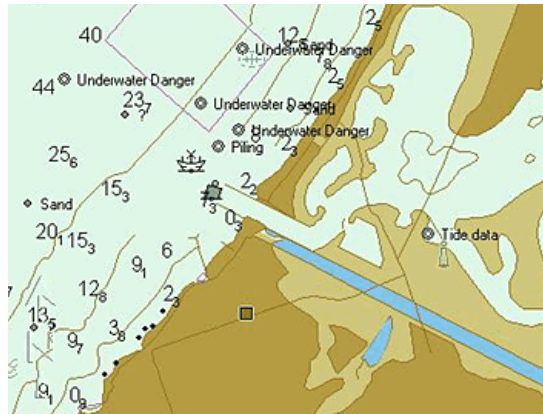
**Tip:** “Panel 0” is typically the main map. You can change panels through the ARCS Geodesy dialog accessed from the Project Items List: right-click on the chart name and select Change Active Panel.

4. **Compare your Chart and World geodesy settings.** The Chart geodesy is part of the chart file. Most charts come with geodesy information relative to the geodesy the chart is drawn in (chart geodesy) and WGS-84. (If there is no WGS-84 information for your selected chart, [WGS84] is disabled.) Your goal is to get your chart geodesy coordinated with your project geodesy.
5. **Choose your geodesy conversion method** and the program returns you to the HYPACK® SUB-BOTTOM screen.
  - **If your chart has WGS84 information** ([WGS84] is enabled), we recommend that you use this option.
  - **If the Chart and World Geodesy settings are different**, you must use the WGS-84 selection to achieve proper overlay of your chart with your other project data.
  - **If the Chart Geodesy (left) matches the World Geodesy (right**, read from your geodetic parameters) you can choose either option.
  - **If the Chart and World Geodesy settings are different AND your chart has only Chart geodesy settings**, the chart will not work in this HYPACK® SUB-BOTTOM project.

## LOADING VPF CHARTS TO THE PROJECT

Vector Product Format (VPF) is an electronic chart format from the U.S. National Imagery and Mapping Agency (NIMA, formerly DMA).

**FIGURE 6.** Sample VPF Chart in HYPACK® SUB-BOTTOM



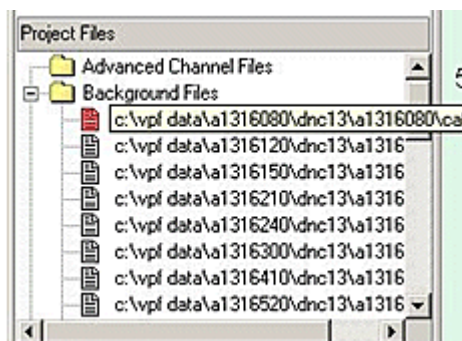
VPF files are loaded in similar manner to other charts, but they have a little quirk that might be confusing.

### Method 1:

1. **Right-click Background Charts in the Project Items list and select ADD FILE-VPF.** A File Open dialog appears.
2. **Scan the VPF database for the CAT file** (no extension) for the chart you want to load.

**NOTE:** It is helpful to have the 'Full Paths in Tree' option checked in HYPACK® SUB-BOTTOM to see which VPF files are loaded. Otherwise you will only see a list of files all named CAT.

**FIGURE 7.** Loading VPF Charts

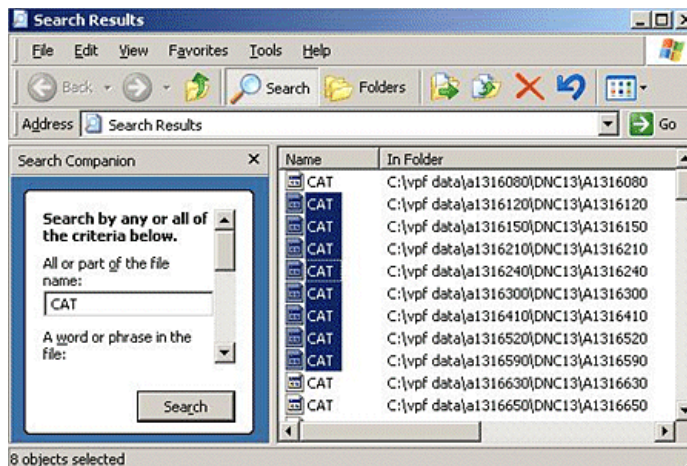


### Method2:

Adding several VPF files using the Add File option can be cumbersome, as you will likely have to browse through several levels to the CAT file each time. Windows® Explorer provides an easy alternative.

1. **Open a search window in Explorer and search for ‘CAT’.**

*FIGURE 8. Results of a Search on ‘CAT’*



2. **Select the VPF files you want then drag and drop them onto the HYPACK® SUB-BOTTOM map window.**

### LOADING S63 CHARTS TO THE PROJECT

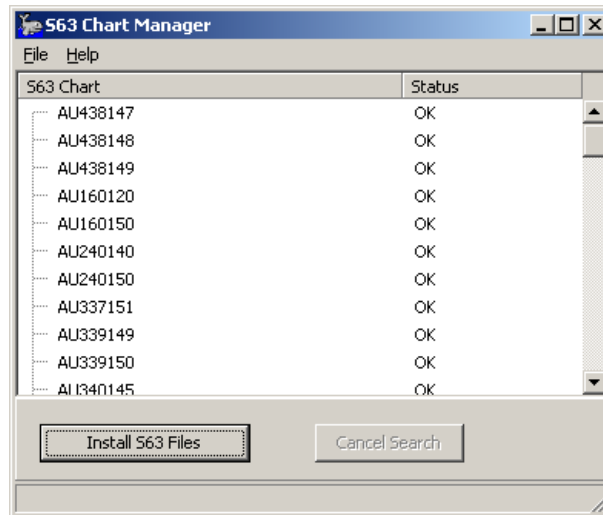
**S63 Charts** are encrypted S57 charts. They are encrypted using the IHO Data Protection Scheme. In HYPACK® SUB-BOTTOM, this requires the following:

- License data on your key
- IHO certificate file
- Permit file
- Encrypted charts

Use the S63 Manager to load the certificate, permits, and charts or chart updates:

1. **Launch the S63 Manager.** Select PREPARATION – S63 MANAGER.
2. **Load the permits.** Select FILE-ADD PERMITS and navigate to the permit listing file from your vendor. The charts for which you have permits are listed with a **Not Installed** status.
3. **Load your Charts.** Click [Install S63 Charts] and navigate to the root directory of the data files from your vendor. The manager searches this directory and its sub-directories for files matching your permits. These charts are installed, with any associated TIF and text files, in the HYPACK® S63 folder and the status for each chart changes to **OK**.

**FIGURE 9.** S63 Chart Manager



**NOTE:** A **Permit Error** status most likely indicates you are either using the S63 MANAGER without your dongle or your dongle is not valid for your vendor-supplied charts.

4. **Exit from the S63 MANAGER and load your charts** as usual.

**To remove S63 chart data**, select one or more permit files in the S63 MANAGER then select FILE-REMOVE SELECTIONS. This removes both the installed files from your S63 directory and the permit.

## NOAA AND ACOE ELECTRONIC CHARTS

NOAA (National Oceanic and Atmospheric Administration) and the US ACOE (Army Corps of Engineers) provide their latest S57 charts, free of charge, for download.

You can manually download the relevant chart files and load them to your project one at a time; however, the HYPACK® SUB-BOTTOM interface includes an easy, process that automatically downloads and displays the latest NOAA and ACOE charts in the area currently shown in the Map window.

HYPACK® SUB-BOTTOM stores these charts in the \HYPACK Sub-bottom\Background\NOAA and \HYPACK Sub-bottom\Background\ACOE folders.

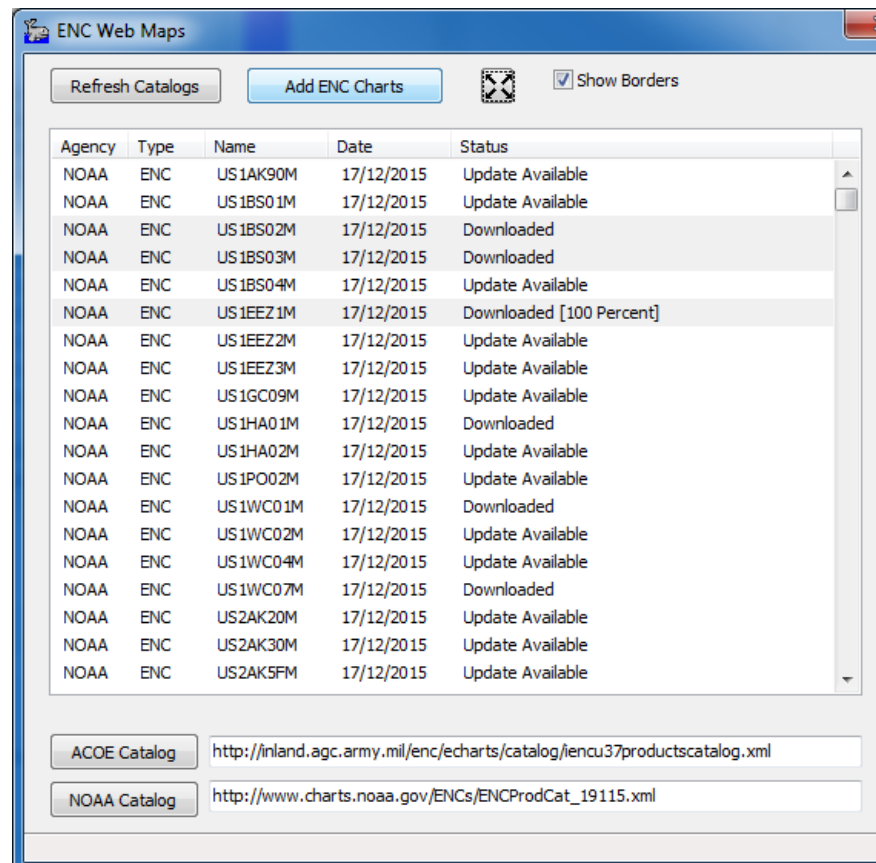
**NOTE:** In addition to these S57 charts, you can also add the NOAA Web Map Server in the Web Maps Panel to access geo-referenced PNG charts.

## CHECKING FOR UPDATED CHART

NOAA and the US Army Corps update their site frequently so, before you head out onto the water, it's a good idea to confirm that you have the latest charts. The Web ENC dialog shows a complete list of charts in the catalogs with each chart name, originating agency, chart type, last modified date (dd/mm/yyyy) and the status relative to your project:

- **Downloaded:** You have the most recent version of this chart.
  - **Update Available:** The most recent version of this chart has not been downloaded.
1. **Click ADVANCED in the ENC Web Maps toolbar.** The Web ENC window appears.

**FIGURE 10.** Web ENC Window



2. **Refresh your catalogs.** Click [Refresh Catalogs] to get the most current information about available charts.

3. **Check the list for charts in your project for which updates are available.** (The status is Available or Updates Available.)

**Tips:**

- **Show Chart Borders** displays an outline for each chart in the catalog. NOAA charts are outlined in green, while the ACOA charts are multicolored.
  - **To see the area covered by selected charts**, select one or more charts in the dialog, then zoom extents.
    - **To select several individual files**, hold the Ctrl key while you use your mouse to choose your files.
    - **To select a range of files**, hold the Shift key and select the first and last file of a range.
4. **Select any charts you want to update and click [Add ENC Charts].** HYPACK® SUB-BOTTOM downloads the latest versions of the selected files, loads them in your project, and updates the catalog listing to “Downloaded”.

---

**LOADING NOAA  
AND ACOE S57  
CHARTS**

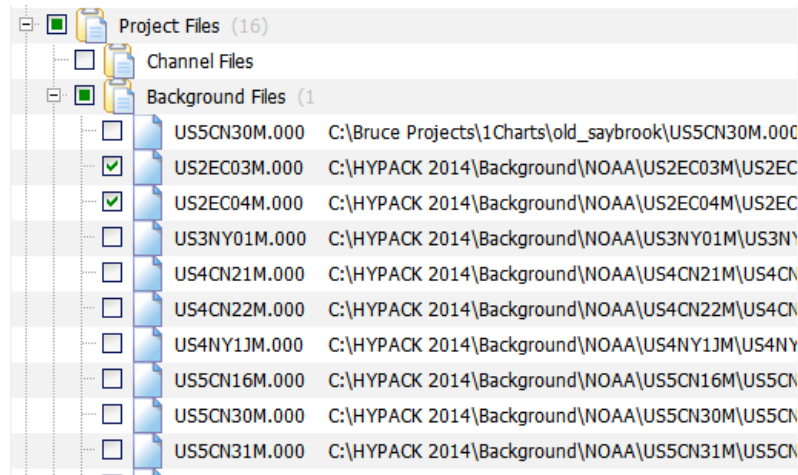
---



1. **If the ENC Web Maps toolbar is not visible, select VIEW-ENC WEB MAPS.**
2. **Update the Chart catalogs, if necessary.** Click UPDATE ENC CATALOGS in the ENC Web Maps toolbar. The status bar shows the updating progress.

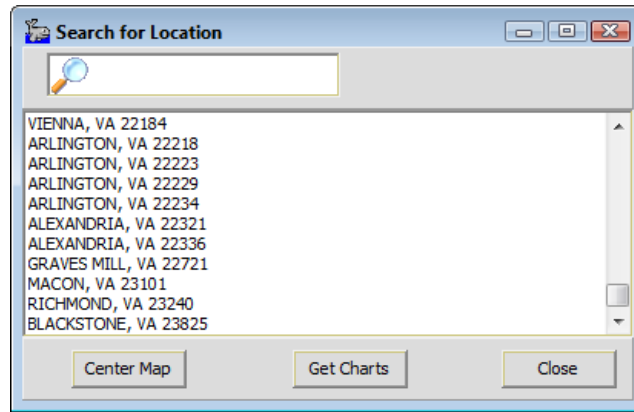
**Tip:** Hold your cursor over [Update ENC Catalogs]. HYPACK® SUB-BOTTOM displays the date of the last update.
3. **Set your Map display to show the area for which you need charts.**
4. **Click ADD ENC CHARTS in the ENC Web Maps toolbar.** HYPACK® SUB-BOTTOM searches the catalogs for any charts that fall in your Map area, and installs them in your project, automatically displaying them with the most detailed charts on top.

FIGURE 11. NOAA Charts Installed in the Project



**Tip:** For projects in the United States, select PREPARATION-SEARCH FOR LOCATION and enter the name or zip code of your project area. **[Center Map]** centers the HYPACK® SUB-BOTTOM Map display on that location at a zoom scale of 1000 fpi (foot grid) or 1:10000 (metric grid). **[Get Maps]** downloads any NOAA or ACOE chart that intersects that map area.

FIGURE 12. Search for Location Dialog



### GEO-REFERENCED PNG CHARTS FROM THE INTERNET

If you have an Internet connection, HYPACK® SUB-BOTTOM can generate georeferenced PNG files from satellite images available on Web servers. HYPACK® SUB-BOTTOM stores the files to the project \Satellite folder. In addition, Web maps appear in the Web Maps folder of the Project Items list.

These georeferenced PNG charts may be used as any other chart file in all HYPACK® SUB-BOTTOM modules.



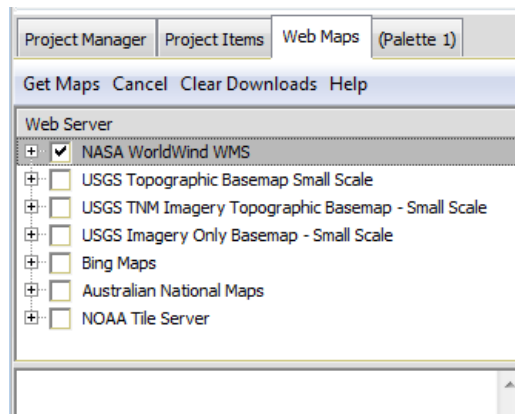
**FIGURE 13. Georeferenced PNG**



**ADDING A WEB  
SERVER TO THE  
WEB MAPS  
PANEL**

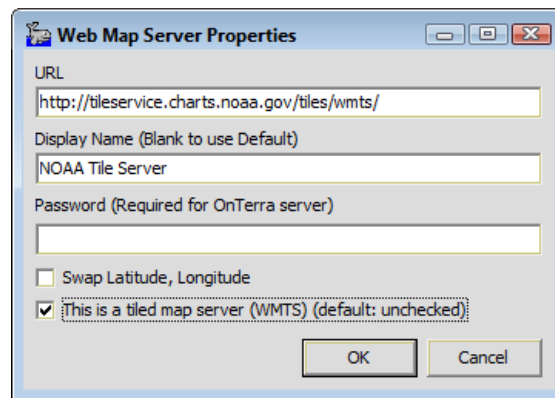
1. **Open the Web Maps panel.** Select VIEW-WMS WEB MAPS.

**FIGURE 14. Web Maps Panel**



2. **Right-click in the Web Server area and select Add Server.** The Web Map Server Properties dialog appears.

FIGURE 15. Web Map Server Properties Dialog



3. **Enter the Server properties:**
  - **URL:** The server Internet address.
  - **Display Name:** What appears in the Web Maps panel.
  - **Password** if you are using the OnTerra server or add another server that requires a password.
  - **Swap Latitude, Longitude:** Check this option if the chart positioning information is reversed.
  - **This is a Tiled Map Server:** Indicates the server is a Web Map Tile Server (WMTS) rather than a Web Map Server (WMS).
4. **Click [OK].**



**Tips:** If you survey in the United States where NOAA has charts available, the previous figure shows the settings to add the NOAA Tile Server. When the server is loaded, enable only layer 50000\_1.

**To eliminate unnecessary layers from a server list,** select them in the server list then right-click on your selection and select HIDE SELECTED LAYERS.

**To restore hidden layers to the display,** right-click on a displayed layer and select UNHIDE SERVER'S LAYERS.

### REMOVING A WEB SERVER FROM THE WEB MAPS PANEL

If there are Web servers in your list that you do not need, you can remove them from the list:

1. **Open the Web Maps panel.** Select VIEW-WMS WEB MAPS.
2. **In the Web Server list, right-click on the server you want to remove and select Remove Server.**

### GENERATING GEO-REFERENCED PNG CHARTS FROM INTERNET IMAGES

1. **Open the Web Maps panel** (VIEW-WMS WEB MAPS).
2. **Select one or more Web servers** that are applicable to your needs and survey area. HYPACK® SUB-BOTTOM includes several Web servers by default.

---

**NOTE:** You may add and remove servers or modify server properties using a right-click menu in the server list.

---

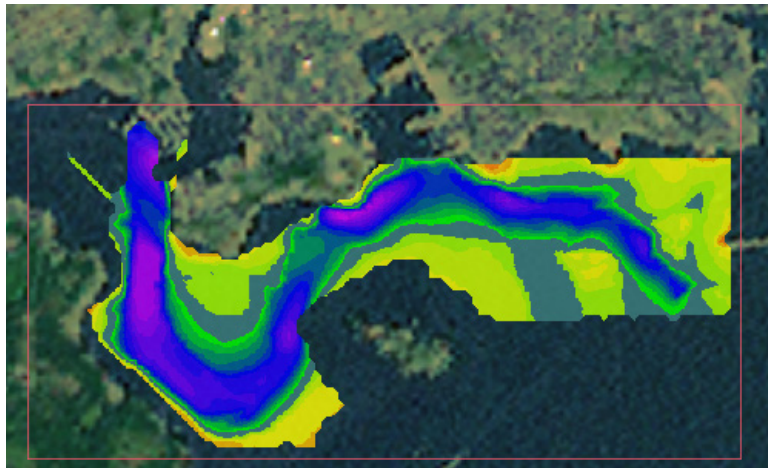
3. **For each Web server, select a layer.** Different servers and layers offer different types of imagery of varying quality.
4. **Set your project area.** Set your area map to show the largest area you expect to view in this project.
5. **Click [Get Maps].** The program searches the selected servers for images to best match the defined extents and generates the following:
  - **PNG image** that displays in your area map.
  - **PGW file** that contains coordinates that describe the location, scale and rotation of the PNG image.
  - **TXT file** that lists the coordinates of the lower left and upper right corners of your defined area, and one or more satellite image sources for the generated images.

The **Status** field updates as each step is completed and as each image file downloads. In addition, the overall progress appears in the HYPACK® SUB-BOTTOM status bar.

**If a problem occurs during the download,** “Download Error” appears in the Layer column of the Web Maps panel. Hover your cursor over the message for a more complete description. **[Cancel]** aborts the download process.

**FIGURE 16.** Filled Matrix Overlaid on the Georeferenced PNG

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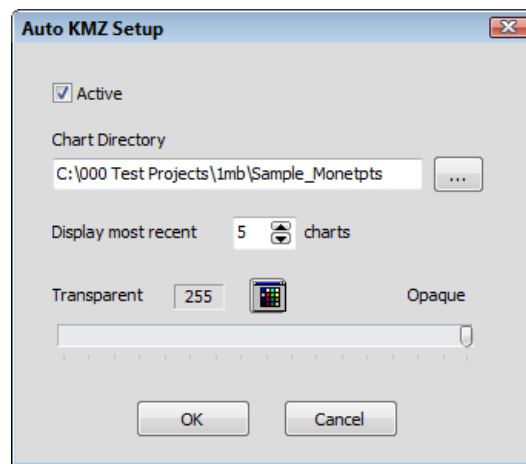
**Tip:** If you decide, for some reason, you want a fresh start with your project Web maps, **[Clear Downloads]** deletes the Web Charts from the project.

## AUTOKMZ

The AutoKMZ feature enables HYPACK® SUB-BOTTOM to update the KMZ charts drawn in the project as they are added to or removed from a user-defined location.

1. **Activate AutoKMZ in your project.** Right-click on the Background Files folder and select the Add Auto KMZ to Project option. A KMZ\_Auto item appears in the Background Files list.
2. **Open the Auto KMZ configuration dialog.** Right-click on the KMZ\_Auto item and select Auto KMZ Properties.

**FIGURE 17.** Auto KMZ Configuration Dialog



3. **Configure the AutoKMZ options:**
  - **Active** enables Automatic KMZ updates. When disabled, chart change activity is ignored.
  - **Chart Directory** specifies where AutoKMZ watches for changing KMZ files.
  - **Display most recent charts** limits the number of KMZ charts displayed.
  - **Transparency** settings apply to all managed charts in the Chart Directory. Adjust the level of transparency with the slider.

You can also choose one color in your chart to become transparent in the display which allows other items drawn below it to show through while the remaining areas of the chart are fully opaque.

### To set a transparent chart color:

- i. **Open the transparency dialog** for your chart.
- ii. **Click the Colors Icon** and a Color Select dialog will appear. ColorsIcon2.png



- iii. **Select the color you want to become transparent and click [OK].**

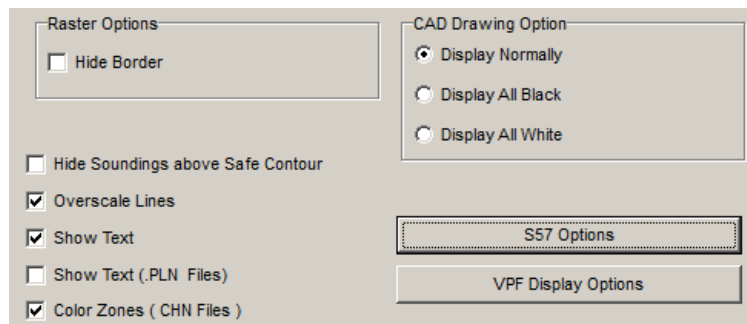
## CHART DISPLAY OPTIONS

Some chart types have display options unique to their file type. Some of these display options are set in the Charts tab of the Control Panel. Other options are accessed by right-clicking on the chart name in the Project Files list.

### DISPLAYING CAD CHARTS

You can draw any CAD file "as is", or in black or white regardless of whether the original chart is in color. Select your choice in the Charts tab of the Control Panel.

**FIGURE 18.** *HYPACK® SUB-BOTTOM Control Panel—Charts Tab*



**To override the setting in the Control Panel**, right-click on the file name in the Project Files list, and select DISPLAY OVERRIDE and your desired setting.

**To return to the setting in the Control Panel** by selecting DISPLAY OVERRIDE-PROJECT SETTING in the right-click menu.

### DISPLAYING CHART LAYERS

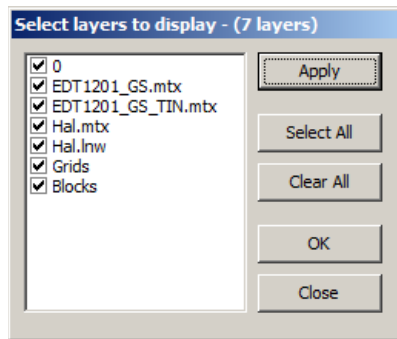
When you enable a PDF or CAD chart, if it has layers, a plus sign appears left of the file name in the Project Items list indicating that it can expand to show the layers.

To select the layers of the chart to display, just enable and disable them in the Project Items list.

Alternatively, you can use the Layers dialog:

1. **Right-click on the enabled chart in the Project Files list and select the Layers option.** A dialog will appear with the chart layers listed.

*FIGURE 19. Selecting Chart Layers*



2. **Check the layers you want to display.**
3. **Preview your results** by clicking [Apply].
4. **When your display is satisfactory, click [OK].**

## **DISPLAYING S57 CHARTS**

S57 chart settings are accessed from the Charts tab of the HYPACK® SUB-BOTTOM control panel.

*S57 Options:*

**[S57 Options]** in the displays the S57 Display Options dialog.

FIGURE 20. S57 Options Dialog

**Symbols:** Choose between Traditional and Simplified.

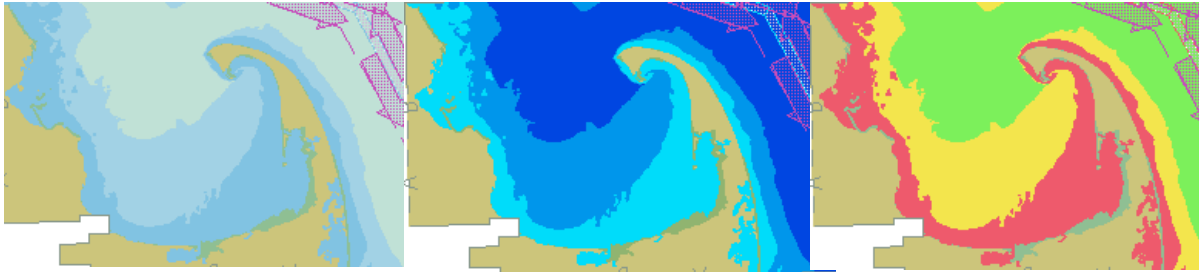
**Boundaries:** Choose to have them marked with symbols (Symbolized) or as plain lines (Plain).

**Units:** Displays depths in your choice of U.S. feet or meters.

**Scheme:**

- **S52:** The industry standard where the colors progress from darkest to lighter shades of blue as depths increase.
- **Bathy Blue:** The reverse of S52 where the deepest water is the darkest color.
- **Red Yellow Green:** Displays three categories of depth areas:
  - unsafe (red),
  - safe with caution (yellow)
  - safe (green)

**FIGURE 21.** S57 Color Schemes: S52 (left), Bathy Blue (center), Red Yellow Green (right)



**Safety Depth** displays depth labels in different colors above and below this depth.

**Safety Contour, Shallow Contour** and **Deep Contour** define different depth ranges which will be displayed with backgrounds of different shades of blue.

---

**NOTE:** This option is overridden by the Two Depth Shades option.

---

**Scale Minimum** displays different map features and symbols at varying zoom scales according to S57 standards. This option prevents your Map window from becoming overly cluttered. If this option is clear, everything will be displayed regardless of the zoom scale.

**Two Depth Shades** uses only two shades to display depths greater than and less than the Safety Contour.

**Shallow Pattern** draws a pattern in the areas of the map where the depth is shoaler than the safety contour.

**Full Sector Lights** includes data regarding direction and color of lights. If this is off, you will see only the position of the light source.

**Show Soundings** toggles the display of chart soundings.

**Visual Quality of Data:** S57 charts include markings that indicate whether the chart has been tested for accuracy and, if so, how accurate it is. Check this option to clear this 'clutter' from your display.

**Draw Information Boxes:** Draws S57 markers at all points of interest. Clearing this option will provide a less cluttered display.

**Load Chart Updates:** When you load a base chart (typically \*.000) and there are update charts (typically \*.001, \*.002...) in the same folder, checking this option loads all related chart information to provide the most updated display.

**Seasonal/Time Period Filter:** Object attributes may specify time ranges when they would be most applicable to display. Check this



option to display only objects whose attributes match the current time.

**HYPACK® SUB-BOTTOM Soundings Display:** When 'Show Soundings' is checked, this option toggles between ECDIS display and HYPACK® SUB-BOTTOM display options.

**Isolated Danger in Shallow Water** assures that those features coded as isolated dangers are always displayed.

**Hide Extra Contours:** Omits any contour that is above the deep contour or below the shallow contour. They are valid contours, but do not contribute to the safe navigation of your vessel.

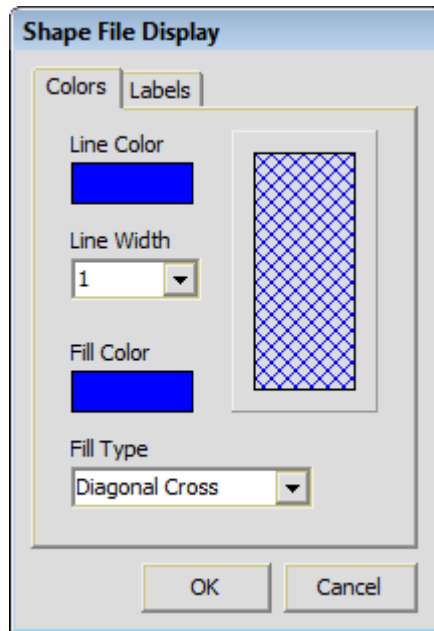
**Text Display Groups:** Charts can get cluttered with excessive text. Select only those text features you want to see in your chart display.

## **DISPLAYING SHP CHARTS**

These line and polyline shape files (\*.SHP) available from ArcView and ArcInfo. HYPACK® SUB-BOTTOM currently only supports drawing the main chart file, which defines points, lines and areas. (There are no attributes drawn.) In HYPACK® SUB-BOTTOM, you can enhance the chart display by assigning colors and textures and line weights.

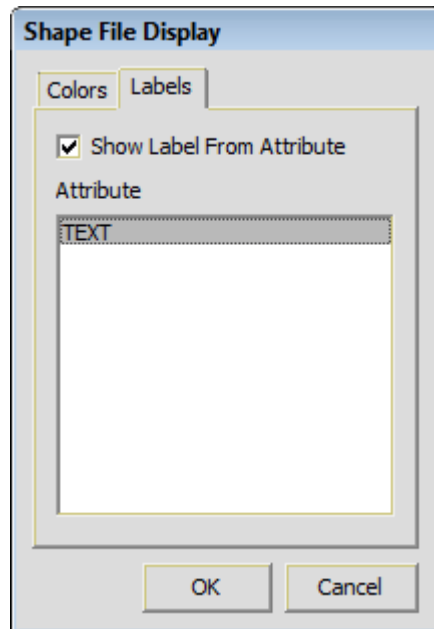
1. **Load the chart to your project** as you would most background files.
2. **Right-click the file name in the Project Files list** and select "Edit Colors". The Shape File Display dialog appears.
3. **Configure your display options and click [OK].**  
The **Line Color** and **Line Width** affect point objects and the lines that define line and area objects in the chart.  
**Fill Color** and **Fill Type** affect the interior of area objects.

FIGURE 22. Shape File Editor—Colors Tab



To modify colors, click the current color block and select a color from the selection dialog that appears.

FIGURE 23. Shape File Editor—Labels Tab



To label the SHP object, check the Show Label option and select the attribute value that will serve as the label.

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**NOTE:** This only works if the corresponding \*.DBF file is present in the folder with the \*SHP file. Otherwise, there will be no attribute list.

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4. Click [OK].

#### More Information

- [“Querying Area Map Features”](#) on page 1-13

## CREATING GEOREFERENCED TIF CHARTS IN HYPACK® SUB-BOTTOM

HYPACK® SUB-BOTTOM includes utilities that enable you to generate georeferenced TIF images that you can then load to your project as background charts.

**Generate TIF charts from your current HYPACK® SUB-BOTTOM map** display using the TIF CAPTURE tool. You can use the resulting chart in HYPACK® SUB-BOTTOM or export it to display in other software packages.

**Generate TIF charts from any TIF, BMP or JPG image** using the IMAGE GEOREFERENCE routine. This option enables you to georeference images, such as satellite images or snapshots taken from a plane, and display it as a chart in your project.

### ***EXPORTING GEOREFERENCED TIF CHARTS OF YOUR HYPACK® SUB-BOTTOM DISPLAY***

HYPACK® SUB-BOTTOM enables you to create a geo-referenced TIF file from your HYPACK® SUB-BOTTOM display or a portion of it. It will include everything that appears within user-defined boundaries, ready to display as a background chart in your project.

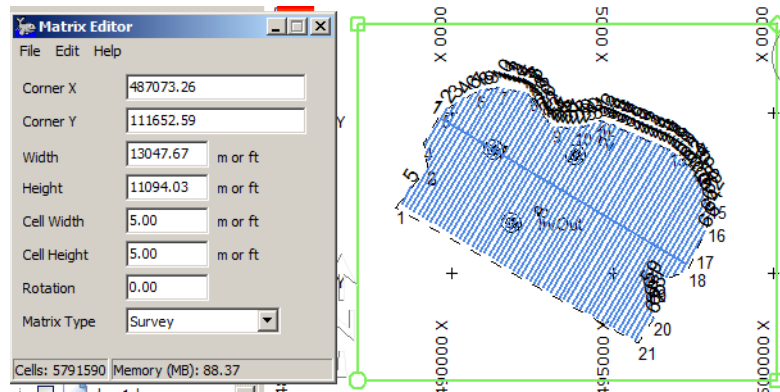
We define the boundaries of the area to be captured by entering the coordinates of the bottom-left corner and the dimensions of the area in survey units. You can do this with any of the following methods:

- Manually enter the information to the TIF Output dialog.
- Use the cursor to define the capture area.
- Load a matrix file that borders the capture area.

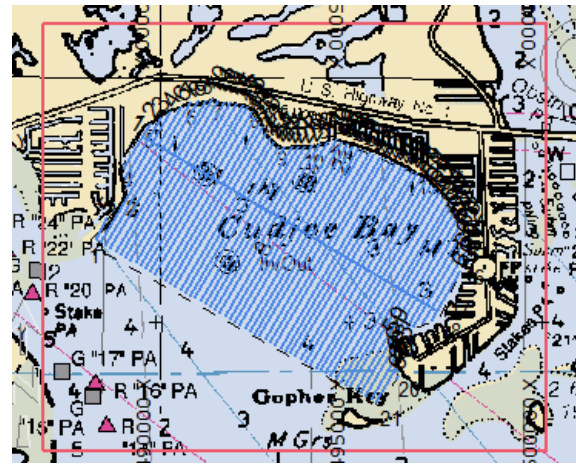


1. **Enable all HYPACK® SUB-BOTTOM features to be included in your TIF.**  
*Tip:* Consider disabling the grid display while you capture your image to avoid cluttering your chart with information that will be provided when you display the chart in HYPACK® SUB-BOTTOM.
2. **If you are using a matrix to position and size the TIF, create it in the MATRIX EDITOR.** To assure that your data will be fully included in the TIF:
  - Size and position the matrix over your data and
  - Set the rotation to zero.

**FIGURE 24.** *Creating the Matrix (Background File disabled to display the matrix more clearly.)*

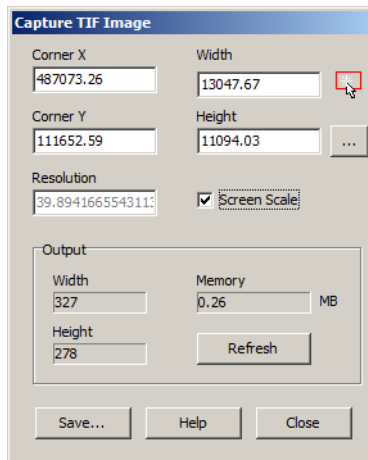


**FIGURE 25.** *Add the BSB Chart Behind the HYPACK® SUB-BOTTOM Features.*



3. **Select FILE-CAPTURE TIF IMAGE.**

FIGURE 26. TIF Output Dialog



4. **Define the capture area.**

- **Manually enter the information:** Enter the coordinates for the southwest corner of the matrix, and the matrix height and width (survey units).
- **Use the cursor:** Click the Select Area icon and drag the cursor between diagonally opposite corners of the capture area in the area map. The TIF Output dialog updates with the size and location of your defined area.
- **Load a matrix file:** Click [...] and select a matrix file that defines your capture area. The CornerX, CornerY, View Height and Width will update according to the matrix properties.



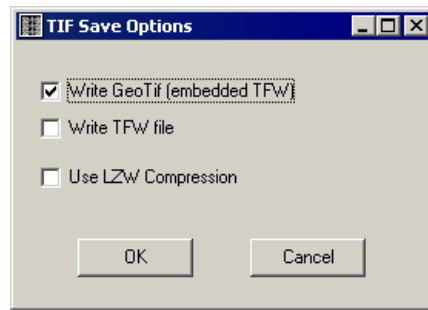
5. **Define the resolution.** The default value is 5. The **Screen Scale** option sets a resolution to match your current screen resolution. The program calculates the output TIF size and displays it at the bottom of the dialog. Smaller resolutions result in larger output size. It is up to you to decide what resolution best balances file size and resolution to suit your needs. Adjust the resolution and click [Refresh] to determine the image size until you are satisfied.



**Tip:** Start with the **Screen Scale**. Check the Screen Scale option and note the resolution. You can then deselect the Screen Scale option and manually adjust the resolution if you choose.

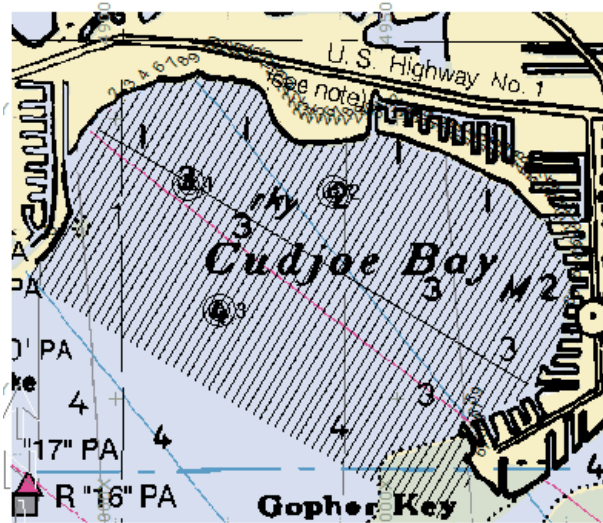
6. **Save the results as a georeferenced TIF image.**
- a. **Click [Save...].** The TIF Save Options dialog appears.

FIGURE 27. TIF Save Options



- b. **Select your options and click [OK].**
    - **Write GeoTif** (embedded TFW).
    - **Write TFW** file enables you to generate a separate file that contains coordinates that describe the location, scale, and rotation of the TIF. It is used by geographic information systems (GIS) software for locating areas in raster map images.
    - **Use LZW Compression:** This is a lossless compression algorithm that significantly reduces the resulting file size without losing resolution of the image.
  - c. **Name your file and click [Save].** The TIF and TFW files will be created and saved, by default to the project directory. The program will notify you when the TIF is complete.
  - d. **Click [OK]** to close the message.
7. **Click [Close]** to return to the HYPACK® SUB-BOTTOM screen.
  8. **Load the TIF to your project** as you would most other background charts.

**FIGURE 28.** *The Resulting TIF*



## CONVERTING IMAGE FILES TO GEOREFERENCED TIFs

The IMAGE GEOREFERENCE routine is used to convert image files to georeferenced TIF images that can be used as background charts in HYPACK® SUB-BOTTOM and SURVEY. You can also load them to the ENC EDITOR to be used as a guide for building an S57 chart of your project area.

### You will need the following:

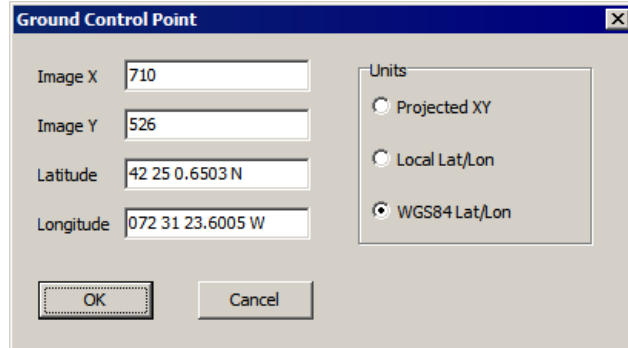
- **The image files** can be from anywhere: screen captures of other chart types, satellite photos or aerial fly-over shots. The tool accepts TIF, BMP or JPG. (If your image is of a different file type, it can easily be converted in most graphic programs.)
- **The positions of two distinct features in your image.** These positions, called 'ground control points', are used to calculate the correct position, rotation and scale of your image file. A third (optional) ground control point *may* increase your chart accuracy.

When you have your image and ground control points, you are ready to georeference your image.

1. **Select PREPARATION-EDITORS-IMAGE GEOREFERENCE.**
2. **Load your image file.**
  - a. **Select IMAGE-LOAD.**
  - b. **Set the file type to match your image file type.**
  - c. **Select your image file and click [Open].**  
The image draws to the IMAGE GEOREFERENCE window.  
Tip: To shift the image in the display, click and drag
3. **Adjust the image display** as necessary.

- **To zoom in and out**, use the zoom tools or mouse wheel.
  - **To pan**, click and drag the image.
4. **Define your ground control points (GCP)**. The program requires at least two (optionally more) ground control points.
- a. **With the default cursor, right-click on the image at the first known position and select ADD GCP**. A red symbol appears on the image and a dialog appears.

FIGURE 29. Defining Ground Control Points



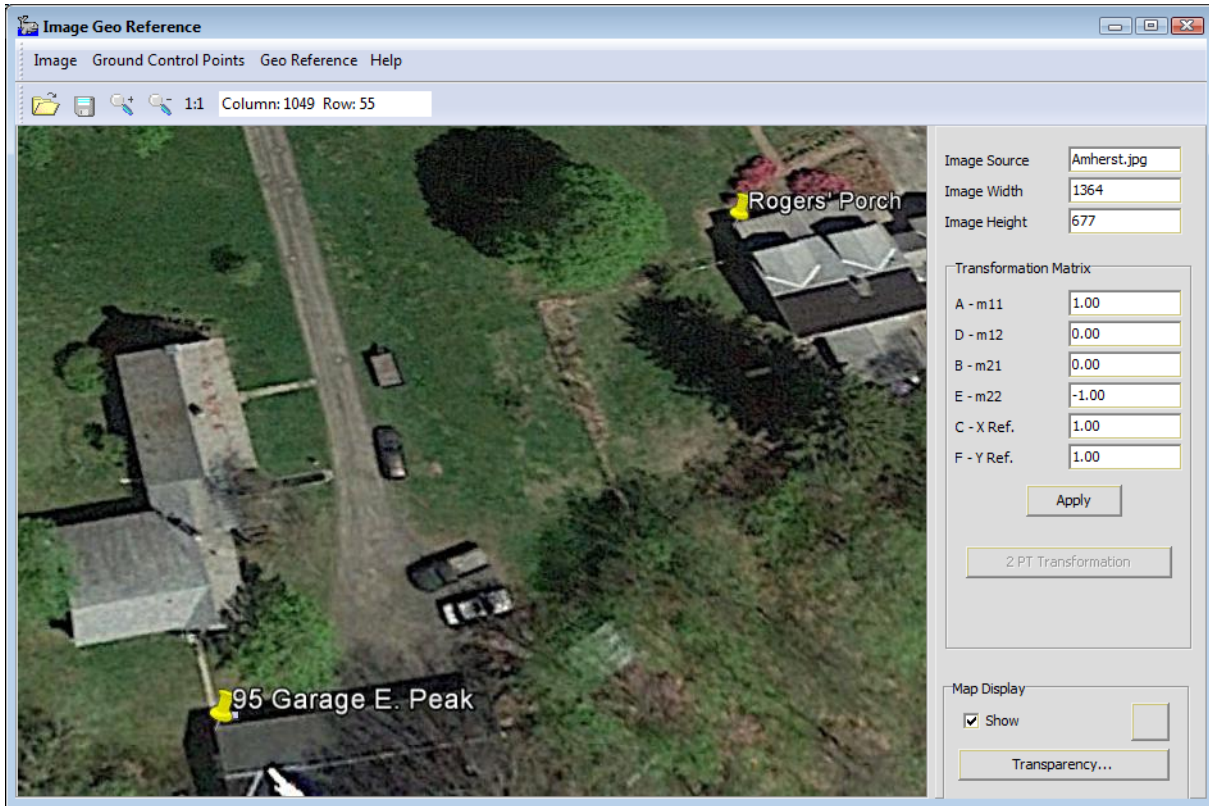
- b. **Select the format in which you want to enter your GCP positions.**
- c. **Enter the position information under 'World X' and 'World Y' and click [OK].**
- d. **Repeat for your second and third reference points.**



**Tip:** To adjust the reference point position, click and drag the red marker in the image window or right-click on it and select Edit GCP to reopen the Ground Control Point dialog.  
**To delete a ground control point**, right-click on it and select Delete.

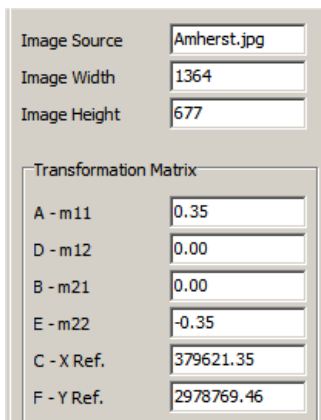


**FIGURE 30.** Image with Ground Control Points



5. Calculate the rotation and scale of your image to fit the world coordinates of your ground control points.
  - With two ground control points, click [2PT Transformation].
  - With three or more ground control points, select GEOREFERENCE-3+ PT TRANSFORMATION.

**FIGURE 31.** Image Information Shows the Calculated Scale and Position Values..





6. **Apply the calculated scale and rotation to the image.** Click [Apply].

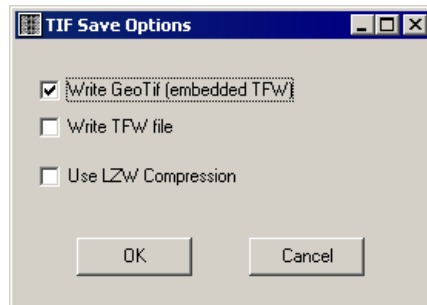
**Tip:** Check the Map Display option and click the Zoom Extents icon to preview the georeferenced image in the HYPACK® SUB-BOTTOM map display. Red markers show the positions of the control points so you can verify their accuracy.

7. **If there are features behind the TIF, you can adjust the transparency of the image preview.** (Optional)
- a. **Click [Transparency]** to access the Transparency dialog.
  - b. **Choose the level of transparency** using the slider.
  - c. **If you have checked the Map Display option, click [Apply]** to see the results in the HYPACK® SUB-BOTTOM map.

**NOTE:** *This is for preview purposes only.* The TIF will be saved with 100% opacity. You can set its transparency in your HYPACK® SUB-BOTTOM display through the Transparency option when you right-click on the chart name in the Project Files list.

- d. **Click [OK]** to return to the Image Georeference dialog.
8. **Save the results** as a georeferenced TIF image.
- a. **Select IMAGE-SAVE.** The TIF Save Options dialog will appear.

**FIGURE 32.** TIF Save Options



b. **Select your options and click [OK].**

9. **Load the new chart to HYPACK® SUB-BOTTOM.**

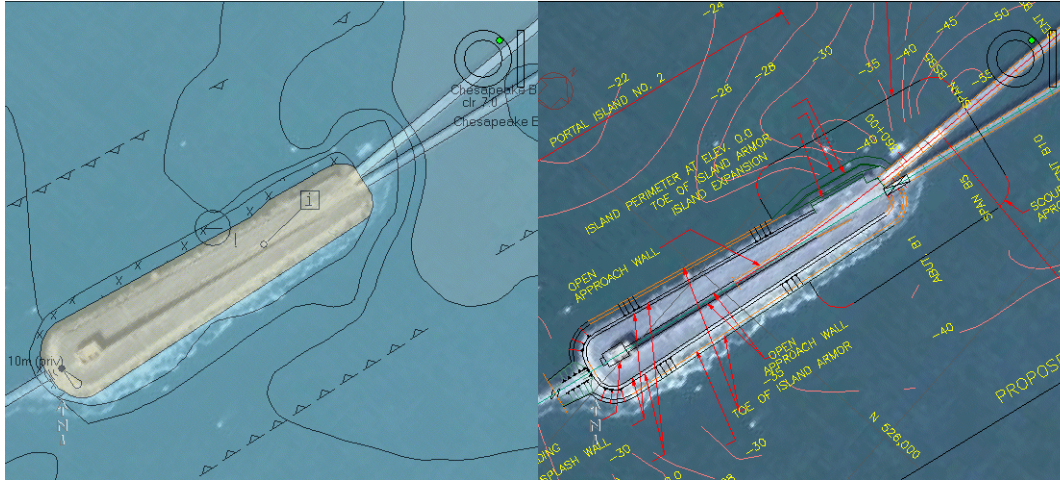


**Tip:** You can verify the accuracy of the chart positioning by checking the 'Draw Image' option in the Image Geo-referencing Tool. This displays the calibration points in the HYPACK® SUB-BOTTOM Map window where you can compare their position on your grid.

10. **Modify the transparencies, if necessary,** to optimize the view of all objects in your map window.

The following figure shows a georeferenced satellite photograph of a segment of the Chesapeake Bay Bridge-Tunnel displayed with S57 and DWG files.

**FIGURE 33.** Sample TIF Displays in HYPACK® SUB-BOTTOM



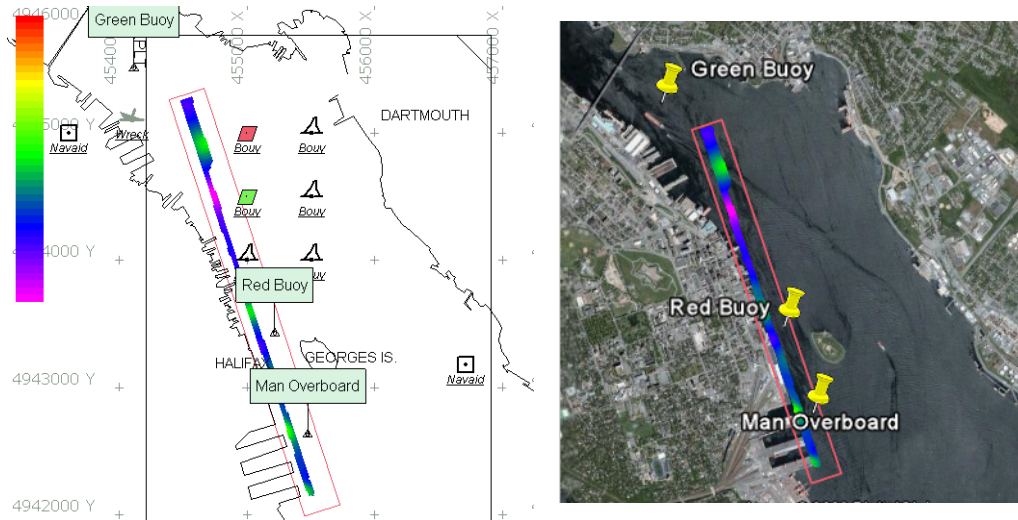
## EXPORTING MAP FEATURES TO GOOGLE EARTH

You can export select HYPACK® SUB-BOTTOM file types to a Google Earth KMZ file, which you can then open in the Google Earth program and view them overlaid in the display.

The following file types are supported by this feature:

- XYZ
- track lines
- targets
- DXF contours and hatch
- matrix
- planned lines

**FIGURE 34.** Filled Matrix and Targets from HYPACK® SUB-BOTTOM to Google Earth HYPACK® SUB-BOTTOM input (left) and Google Earth Output (right)



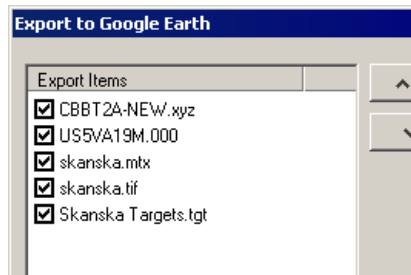
KMZ files can be generated from the HYPACK® SUB-BOTTOM Files list or from the EXPORT program.

*Exporting KMZ from HYPACK® SUB-BOTTOM*

**To export a KMZ file from HYPACK® SUB-BOTTOM:**

1. **Right-click in the Project Files or Data Files area and select 'Export Google Earth'.** A dialog will appear listing all project files that are available for export
2. **Select the files to export to Google Earth and click [Export].** The Export to Google Earth dialog will appear listing all enabled files in their current draw order.

**FIGURE 35.** Export to Google Earth Dialog



3. **Omit any of the listed files, if necessary,** by clearing their check boxes.
4. **Reorder the draw order, if necessary.** Select a file in the list and move it up to draw sooner or down to draw later (on top) using the corresponding buttons.
5. **Click [Export] and name your file** in the File Save dialog. It will be saved, by default, to the project directory with the KMZ extension.

### Exporting KMZ from EXPORT



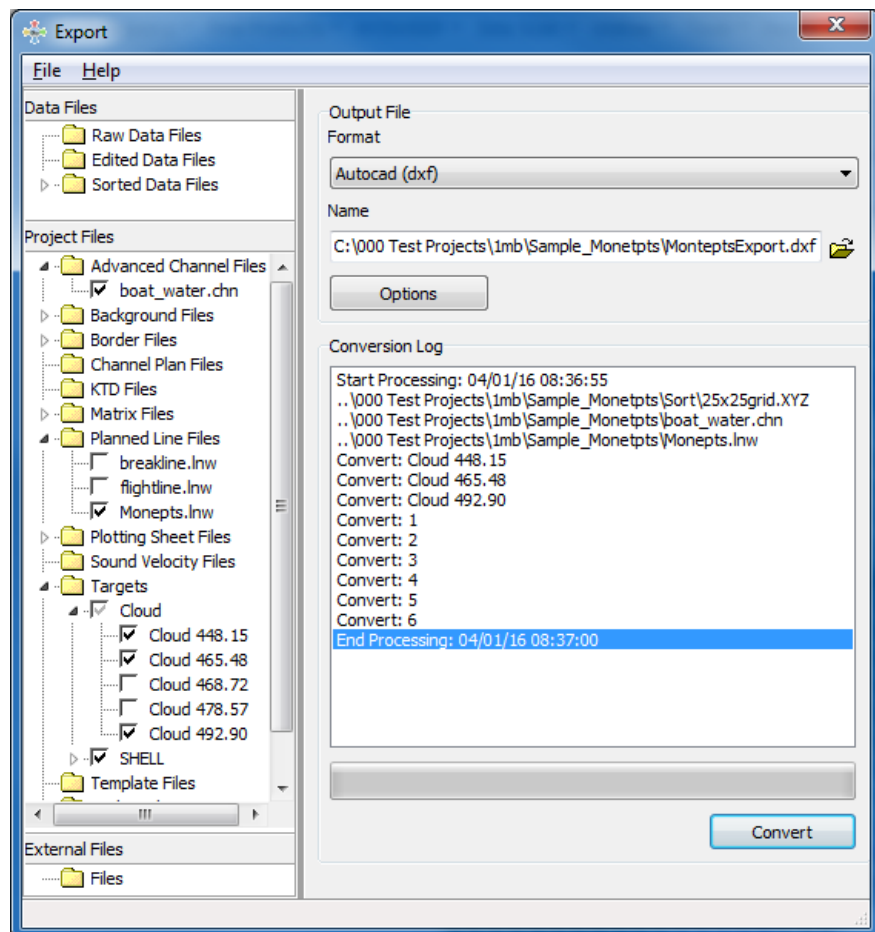
6. When you are finished exporting, return to the HYPACK® SUB-BOTTOM window, click [Close].

EXPORT includes the KMZ Output File Format. No output options are required.

1. Start the EXPORT program by selecting FINAL PRODUCTS-EXPORT. All files associated with the project are loaded in their current enabled or disabled state to the EXPORT interface.

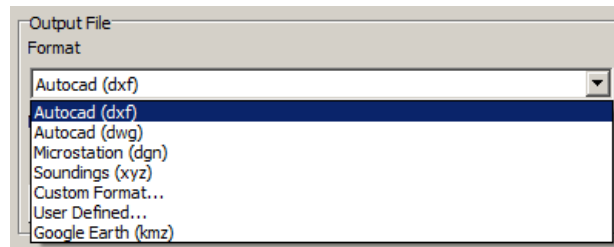
**Tip:** To quickly enable or disable all files, the File menu includes Check All and Uncheck All options.

FIGURE 36. The Main Window of the EXPORT Program



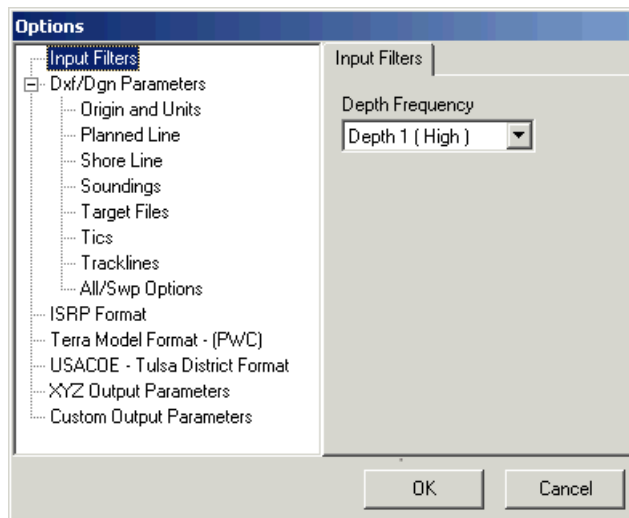
2. Select the Output file type to which you want to export from the Output File Format drop-down menu.

FIGURE 37. Selecting the Target Format



3. **Click the File Open icon and name your output file.** The path will default, in most cases, to your project directory. XYZ output formats default to the Sort directory.
4. **Select the file or files you want to convert** by enabling and disabling them in the file tree on the left side of the window as you would in the main HYPACK® SUB-BOTTOM screen. Files of types that can not be converted to the designated output format are marked with X's.
5. **Add External files (optional).** These are files that were not part of your project when you started EXPORT TO CAD, but you want to add them to your exported project data. Select FILES-ADD FILES or right click on the Files folder in the External Files list and select "Add File(s)". A File Selection Dialog will appear for you to browse for additional files.
6. **Set your Input and Output Options.**

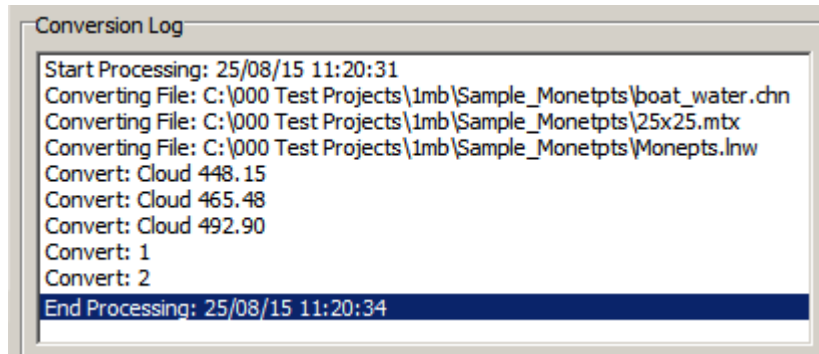
FIGURE 38. Export Options Dialog



- a. **Click [Options]** or F9 to access the Options dialog.
- b. **For each option applicable to your output file type on the left, select the option and set the related options displayed on the right.**
- c. **Click [OK].**

7. **When your list is complete and all parameters have been set, click on [Convert]** (or select FILE-CONVERT). The conversion will be made and you can see its progress in the conversion log which is displayed on the screen.

*FIGURE 39. Conversion Log*



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**NOTE:** This shows which files have been successfully converted and if, for some reason, any have not.

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## PROJECT GEODESY

**Geodesy** is the science of positioning objects on the earth's surface. Even though you don't need to be a master of geodesy to run HYPACK® SUB-BOTTOM, some basic geodetic knowledge can make the difference between obtaining a correct position and having your boat plot downtown.

Most GPS equipment outputs your position in WGS-84.

$$\Phi\Lambda H_{\text{WGS-84}} \rightarrow \Phi\Lambda H_{\text{Local Datum}} \rightarrow XY_{\text{Projection}}$$

In other words, HYPACK® SUB-BOTTOM receives the Latitude, Longitude and Height information based on the WGS-84 ellipsoid, and transforms it into a Latitude, Longitude and Height on the Local Datum. It then performs a grid conversion to calculate an X (Easting) and Y (Northing) on the specified projection.

## ENTERING YOUR GEODETIC PARAMETERS

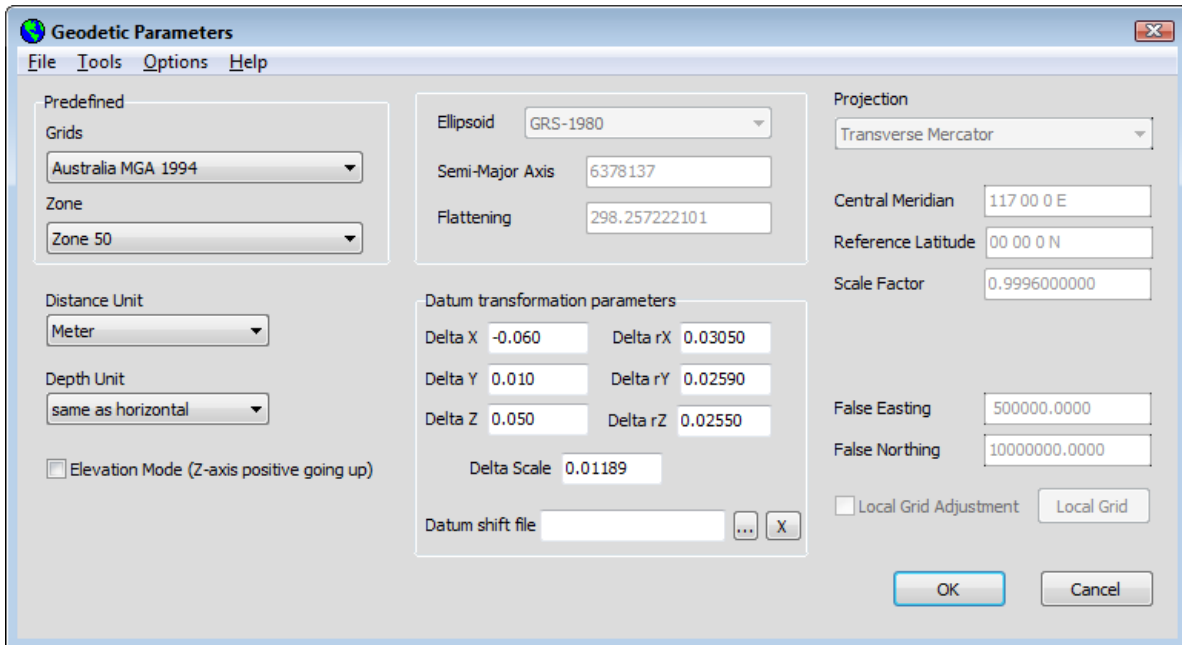
The **GEODETIC PARAMETERS** define your local grid. This enables HYPACK® SUB-BOTTOM to correctly calculate your XY position on your local grid from your GPS data (typically WGS84). You must define the following geodetic parameters for your local grid.

- The reference ellipsoid.
- Any necessary datum transformation parameters: If your local grid is not based on the WGS-84 ellipsoid, datum transform parameters are required.
- The projection parameters: Automatic when you choose one of the pre-defined grids.

The grid, zone, ellipsoid and survey units are displayed in the HYPACK® SUB-BOTTOM status bar above the area map.

1. **Start the GEODETIC PARAMETERS program** by selecting PREPARATION-GEODETIC PARAMETERS.

**FIGURE 40.** *Geodetic Parameters Dialog*



2. **Select your Ellipsoids and Projection Parameters.** Many grids have been built into HYPACK® SUB-BOTTOM. Just select the correct grid and zone, and your projection parameters are automatically loaded.



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**NOTE:** If your ellipsoid is other than WGS-84, you must also enter datum transformation parameters. Consult your project specifications.

---

3. **Select your Distance Units.** Notice that you can set your vertical and horizontal distances to be measured in different units if you wish.
4. **Set your Datum Transformation values.**
5. **Choose your degrees format.** Select OPTIONS-DEGREES FORMAT and the format you want to use.
6. **If you are working in Elevation mode, do the following:**
  - **Select the Elevation Mode option.**
  - **Enter a user-defined Chart Datum Level above Geoid.**
7. **Click [OK].** Your geodesy settings will automatically be saved to your project.

## SELECTING ELLIPSOIDS AND PROJECTION PARAMETERS

The lat/long/height that describes your position depends upon your mathematical model of the earth (your "Ellipsoid" ).

Many grids have been built into HYPACK® SUB-BOTTOM. Just select the correct grid and zone, and your projection parameters are automatically loaded.

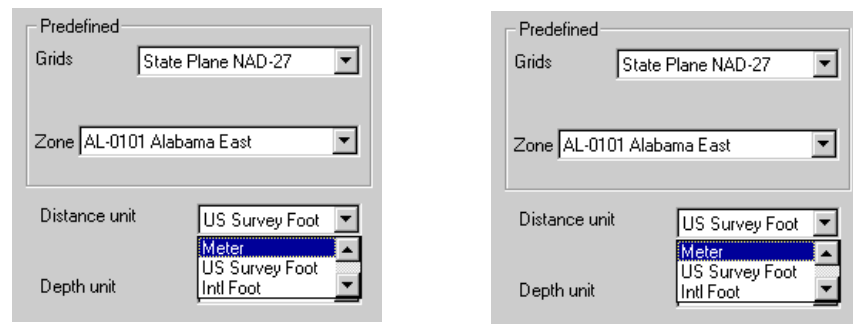
### *USING PREDEFINED GRIDS*

Whether you're surveying in UTM, State Plane or some other grid, the procedure is the same.

**To select a grid:**

1. **Select your Grid from the Grids drop-down list.** The Zone choices will now relate to your grid choice.
2. **Select your survey zone.** The geodetic information for each zone is "hard-wired" in the code and will appear down the right-hand side.
3. **Select your survey distance unit** HYPACK® SUB-BOTTOM provides a choice several measurement methods.

**FIGURE 41.** State Plane Metric Survey (left), US Survey Foot Survey (right)



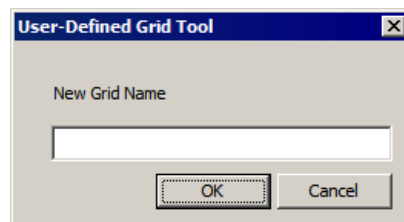
## MANUAL GRID SELECTION

If your survey requires a grid other than those in our predefined grids list, you can enter your own projection parameters.

Tip: If you anticipate needing these same grid settings again, save them for easy recall from the Grids list.

1. **Set the Grid List to User-defined.** This provides access to all of the other features on the GEODETIC PARAMETERS window.
2. **Select your Ellipsoid from the choices in the ellipsoid drop-down box.** As soon as you make your selection, the Semi-Major Axis ( $a$ ) and Flattening ( $1/f$ ) values will change. If your ellipsoid is not in the list, click on the Other ellipsoid choice and manually enter the ( $a$ ) and ( $1/f$ ) values.
3. **Select your projection from the Projections list.** Different projections require different types of information. The labels and number of box entries down the right-hand side change according to the selected projection type.
4. **Select your survey distance units.**
5. **Save your settings.** (Optional)
  - a. **Select TOOLS-SAVE CUSTOM GRID.** A dialog appears.

**FIGURE 42.** User-Defined Grid Tool Dialog



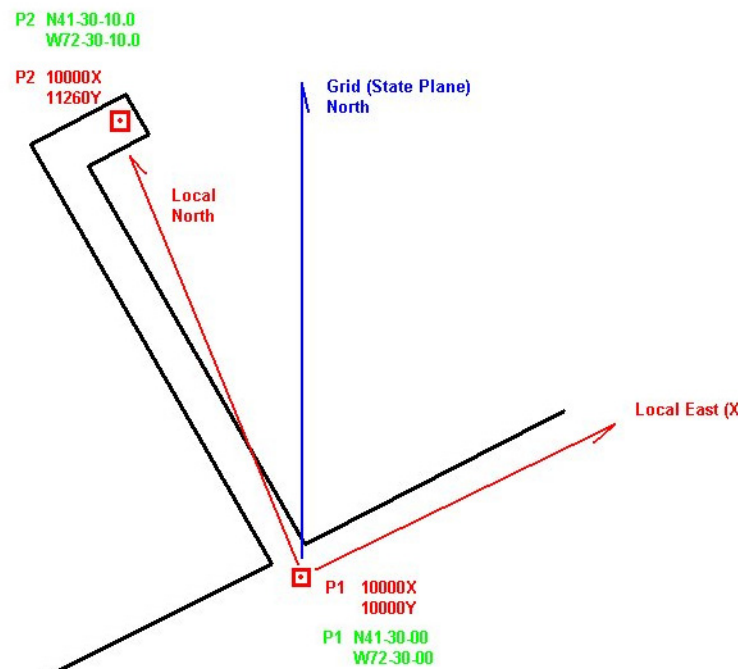
- b. **Enter a name for your grid and click [OK].**
6. **Click [OK].**

The Semi-Major Axis and Flattening, Scale Factor and other geodetic information pertinent to your chosen projection should now be set.

## LOCAL GRIDS

The “Local Grid” option in the GEODETIC PARAMETERS program enables you to position yourself on a local construction grid using your GPS equipment. To accomplish this, HYPACK® SUB-BOTTOM first takes the latitude/longitude from the GPS and converts it to an XY on one of the existing projections (e.g. State Plane 1983 or UTM). It then translates the projection coordinate to a local coordinate, using the information you supply in the “Local Grid” option box of the GEODETIC PARAMETERS program.

**FIGURE 43.** Example of Local Grid Calculations



An example would probably best illustrate how to go about this.

In this figure, you have two points P1 and P2. The coordinates on the local grid are as follows:

P1:	X = 10000.0	P2:	X = 10000.0
	Y = 10000.0		Y = 11260.0

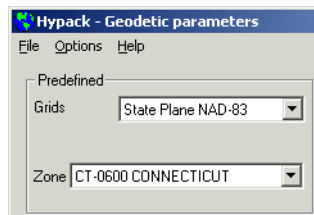
We have also performed a GPS survey on these points and found their WGS-84 (world) positions to be:

P1:	N41 – 30 – 00.0000	P2:	N41 – 30 – 10.0000
	W72 – 30 – 00.0000		W72 – 30 – 10.0000

Since we are in the State of Connecticut, we have decided to use the NAD-1983 CT State Plane Zone as our projection.

1. **Calculate State Plane coordinates for our P1 and P2**, using the WGS-84 Latitude and Longitude Information.
2. **Start the GEODETIC PARAMETERS program and set it for NAD-83 CT State Plane Zone.**

*FIGURE 44. Setting the Geodetic Parameters for your Local Grid*



3. **Convert both the P1 and P2 values to State Plane coordinates** in the GRID CONVERSION utility program. The resulting conversions provide us with the following information:

P1:	X = 1068483.01	P2:	X = 1067719.20
	Y = 743007.91		Y = 744017.87

**FIGURE 45.** Converting the P1 and P2 values to State Plane Coordinates

**Grid Conversion - Sample\_MTXReporter**

Geographic to XY     Datum Transformation     XY to Geographic

Latitude: 41d30'10.0000"N    Latitude:    Easting(X): 1067719.199 ftUS  
Longitude: 072d30'10.0000"W    Longitude:    Northing(Y): 744017.869 ftUS  
Ellipsoid: WGS-84    Ellipsoid: WGS-84    Scale Factor: 0.999983

Lat/Lon Options:  Deg Min Sec     Deg Min     Decimal Degrees

Height Conversion:  Ellipsoidal     Orthometric     Chart Datum

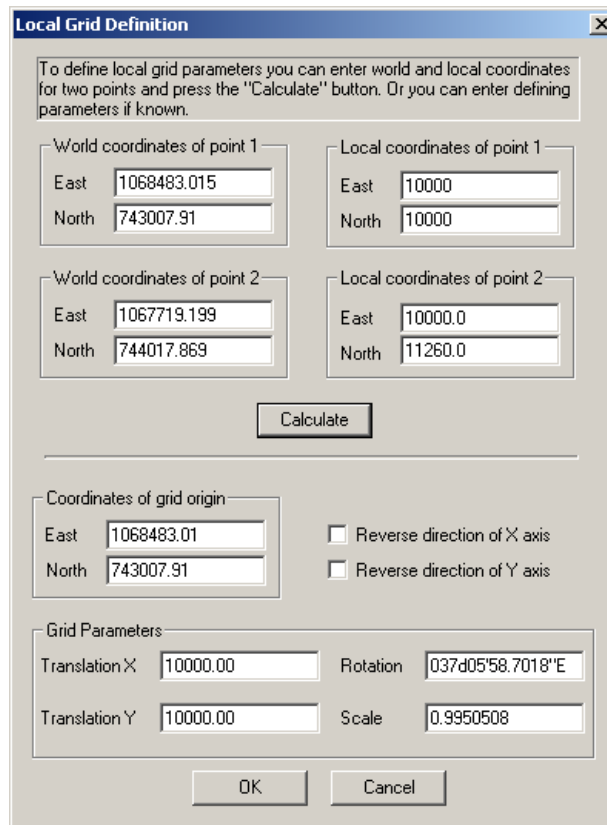
Point Name: P2       

Name	Latitude	Longitude	Easting	Northing
P2	41d30'10.0000"N	072d30'10.0000"W	1067719.199	744017.869
P1	41d30'00.0000"N	072d30'00.0000"W	1068483.015	743007.910

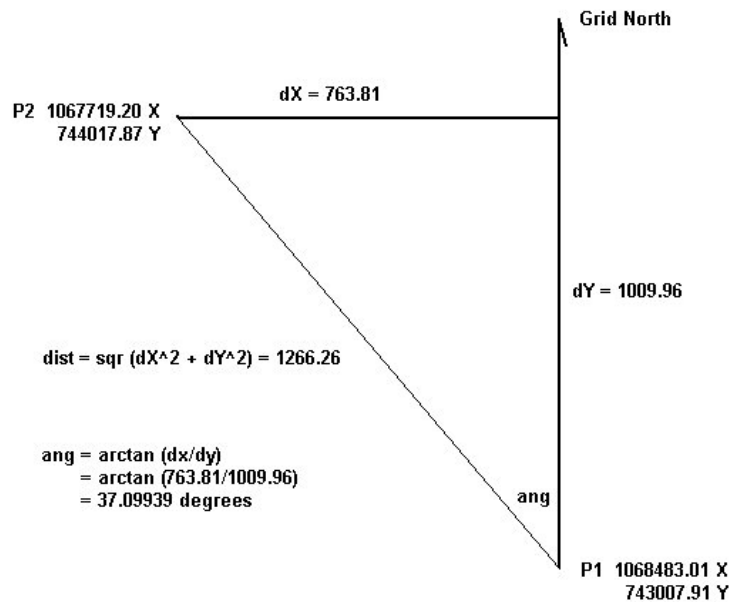
4. **Translate the projection coordinate to a local coordinate.**
  - a. **Go back to the GEODETIC PARAMETERS program.** It is still set up for NAD-1983 CT.
  - b. **Change the “Grids” frame from “State Plane NAD-83” to “None”.**
  - c. **Check the Local Grid Adjustment check box.**
  - d. **Click [Local Grid].** The Local Grid Definition window will appear.

FIGURE 46. Calculating the X and Y values



- e. Enter the world and local coordinates of each point and click [Calculate]. The program automatically calculates the local grid parameters and displays them in the dialog.

FIGURE 47. Calculating the Distances and Angles in the Local Grid



- f. **Click [OK]** again to save your parameters and exit the GEODETIC PARAMETERS program. The local grid parameters are now applied in your project as long as the Local Grid option is checked.
5. **Test your results.**
  - a. **Enter the HARDWARE program.** Place your GPS over P1 and run the Test function. The resulting X-Y coordinate should be 10000X and 10000Y.
  - b. Now the true test. **Place your GPS antenna over P2 and run the same test.** If you did your math correctly, you should be able to get X=10000, Y=12260.

---

## PLANNED SURVEY LINES

**Planned survey lines (\*.LNW)** define where you want your vessel to go. The line file contains the grid coordinates and names for each planned line in your project area and can also contain cross section template information. Line files are typically created in the LINE EDITOR program.

Planned lines are saved with an LNW extension and are saved in the project folder. You should give each set of planned lines a unique name which will allow you to determine for what area the survey lines were created.

Although it is possible to collect survey data without planned lines, it will make the editing process more logical and assure your required coverage if you have referenced some kind of survey lines in your area.

## OFFSET PATTERNS FOR PLANNED LINES

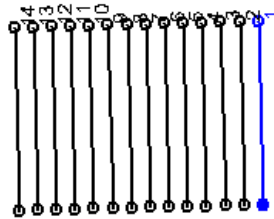
Planned lines can be created in any one of several patterns using the Offsets function. All of the following patterns are available when you generate lines in the LINE EDITOR.

In sub-bottom surveys, line spacing requirements depend on the purpose of your survey. For general surveys, you can use wider 150-300 foot (50-100 meter) spacing. For high resolution surveys, use 5-10 foot (2-3 meter) spacing. In addition, it is good practice to run a few cross check lines to check for good alignment of the layers in post-processing.

TABLE 1. Planned Survey Line Offset Patterns

**Parallel Offsets**

Parallel lines on either side of the initial line.



Select Offset Method - Meter

Center Line | Parallel | Radial | Search Pattern | Stair Step | Extend Lines

Lines left of center: 5

Lines right of center: 8

Distance between lines: 25 e.g. 100, 50, 30 etc to create pattern

GeoNav Naming

Append offsets to single line

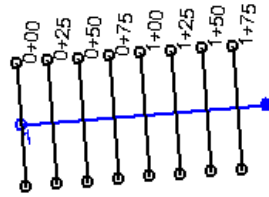
Automatically calculate curve radius for segments

Allow Line Renaming

OK Cancel

**Center Line Offsets**

Perpendicular lines at user-defined spacing along the initial line.



Select Offset Method

Center Line | Parallel | Radial | Search Pattern | Stair Step | Extend Lines

Starting Chainage: 0.0 Naming Scheme: ######

Distance Port: 100 Angle: 90

Distance Starboard: 100  Smart Corners

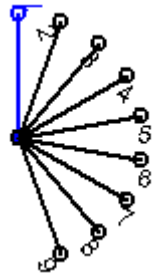
Line Spacing: 50

Allow Line Renaming

OK Cancel

**Radial Offsets**

Pivot your planned line about the first point entered.



Select Offset Method

Center Line | Parallel | Radial | Search Pattern | Stair Step | Extend Lines

Angle Increment: 20

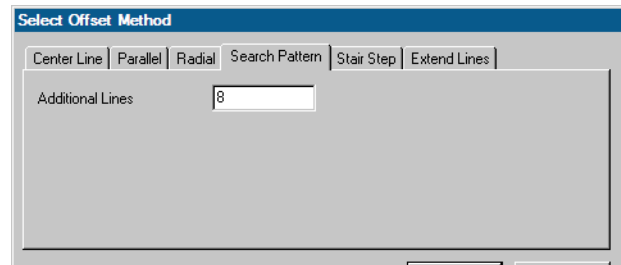
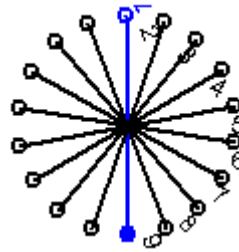
Additional Lines: 8

OK Cancel



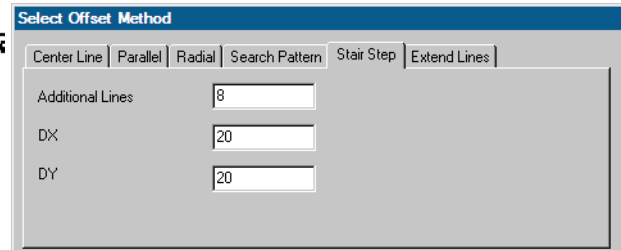
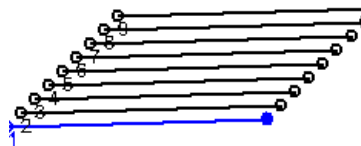
**Search Offsets**

Pivot your planned line about the midpoint of the first segment.



**Stair Step Offsets**

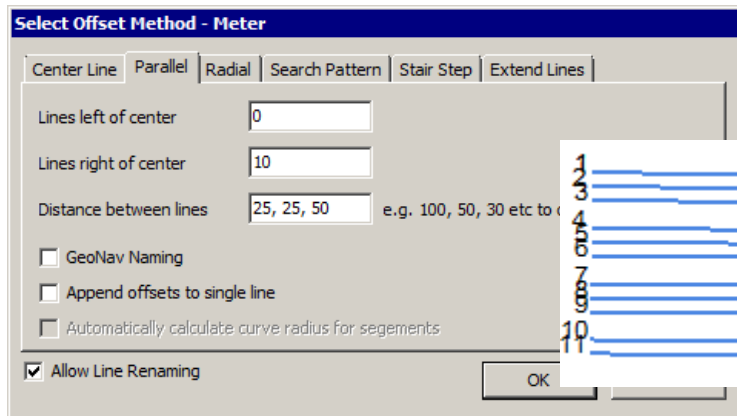
Add user-entered X, Y values to each waypoint creating a stair step effect.



*Parallel Line Options*

- **Line Spacing:** The parallel line pattern can space all of the lines uniformly, when only one distance is entered, or space them in a patterned sequence set by entering a comma delimited list of distances.

*FIGURE 48. Entering a Pattern of Distances (left), and the Results (right)*



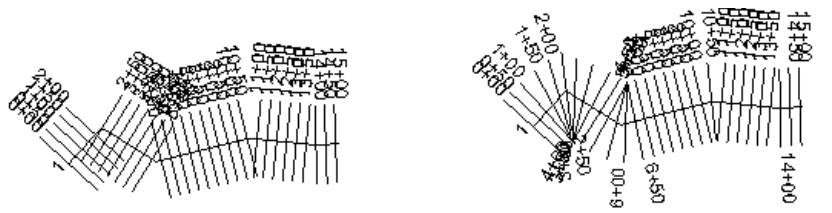
- As an alternative to simple, sequential line numbers, **GeoNav Naming** names your original line '1', and each offset line according to the distance and direction it is offset from the original—lines starboard of line 1 have positive line numbers, lines port have negative line numbers.

*Center Line Options*

The **center line pattern** includes the **Smart Corners** option which rotates lines about the intersection of the planned line and the channel center line so that the line does not intersect with any other planned line.

**Naming Scheme:** Cross line names in the center line pattern default to ###.##, but you may choose ##.###

**FIGURE 49.** Center Line Pattern - No Smart Corners (left), Smart Corners (right)



The Offsets dialog also includes an **Extend Lines** tab where you can adjust the length of existing survey lines. This enables you to expand your survey area and maintain the ability to do accurate historical comparisons with previous surveys.

## CREATING PLANNED LINES IN THE LINE EDITOR

**LINE EDITOR** creates planned line files. Create each line individually, or create one line then additional lines offset in a choice of patterns. There is no limit to the number of waypoints per line or lines per file.

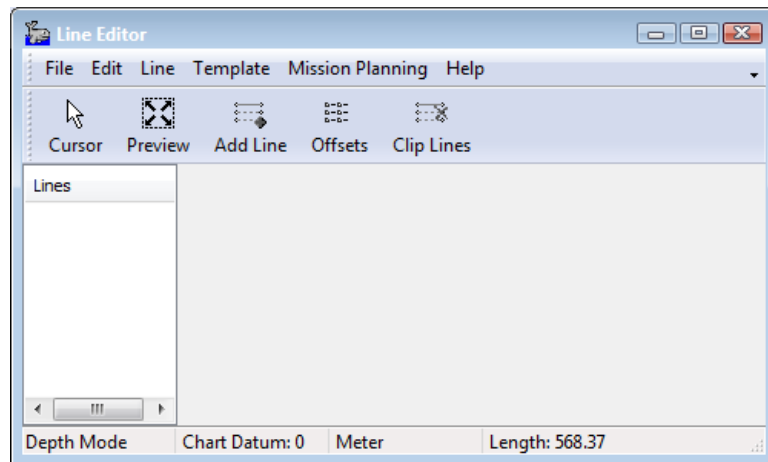
Additionally, planned lines may be exported to a selection of third-party plan files.

Alternatively, the LINE EDITOR Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the LINE EDITOR to generate single-segmented planned lines.

**To create planned lines in the LINE EDITOR:**

1. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR.

FIGURE 50. Line Editor Dialog



2. **Choose to enter your position information in XY or Lat/Lon format.** Select EDIT-INPUT MODE and your choice. Lat./Lon. coordinates from the local datum will be entered according to the default format specified in the HYPACK® SUB-BOTTOM Control Panel.
3. **Set your line naming options.** (Optional)
4. **Define your planned lines** by entering the waypoints that describe each line. Each page on the spreadsheet represents a separate planned survey line and may be viewed by selecting the line name in the left-hand pane.
5. **Save your planned lines.** HYPACK® SUB-BOTTOM planned lines: select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project folder and enabled in the project files listing.

### More Information

- [“Loading Background Charts to the Project”](#) on page 2-4
- [“Offset Patterns for Planned Lines”](#) on page 2-45
- [“Editing your Planned Line File in the Line Editor”](#) on page 2-59
- [“Creating 2-Dimensional Planned Lines - Spreadsheet Method”](#) on page 2-50

## LINE NAMING OPTIONS

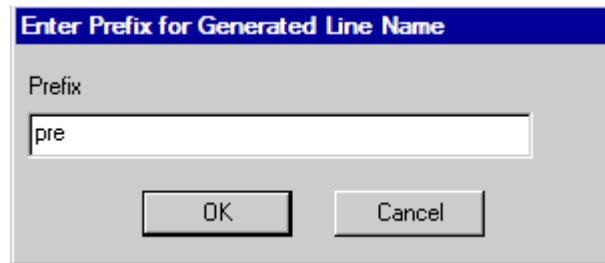
If you prefer something more than a simple line number to identify each planned line in the file, you can pre-define a text string that will be appended to the line number as specified. This feature is optional and must be set each time you enter the LINE EDITOR.

**NOTE:** This option is not available for lines created using center line offsets.

### Defining a Prefix or Suffix

1. Select **LINE-LINE NAME PREFIX** or **LINE-LINE NAME SUFFIX**. A dialog will appear.

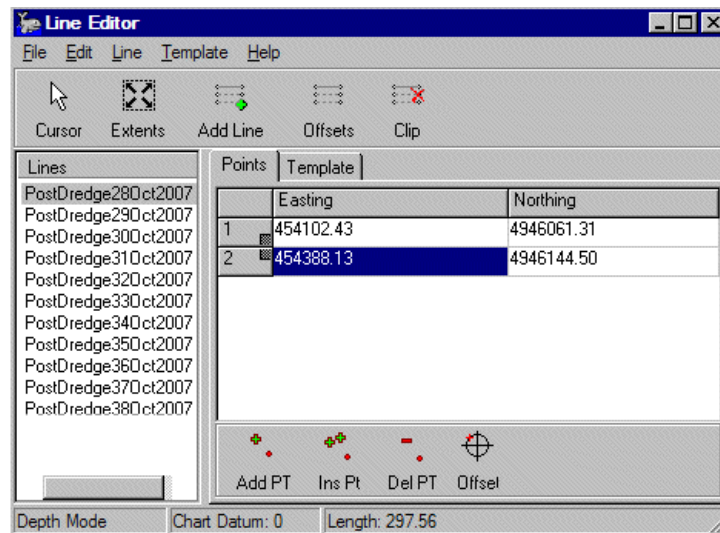
**FIGURE 51.** Line Name Prefix and Postfix Dialog



2. Enter the required text string and click OK.

Once a string has been entered, it will appear next to the menu selection and will be appended to all lines created after that until you change the string definition or close the LINE EDITOR.

**FIGURE 52.** Line Names with Prefix and Postfix



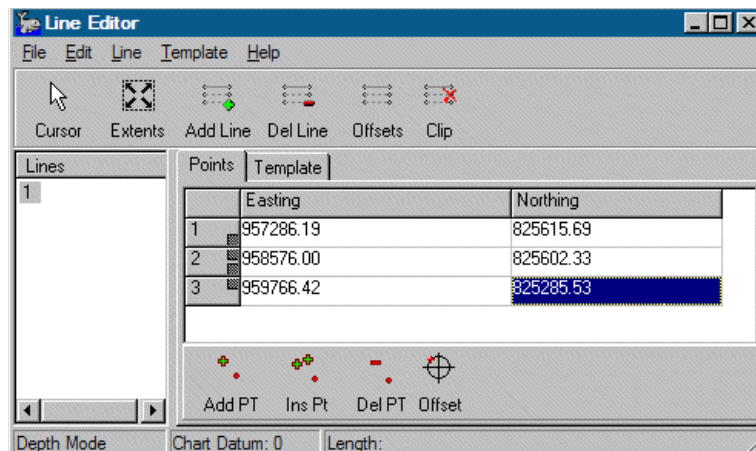
## CREATING 2-DIMENSIONAL PLANNED LINES - SPREADSHEET METHOD

1. Open the **LINE EDITOR**. Select **PREPARATION-EDITORS-LINE EDITOR**.

2. **Create the spreadsheet** by clicking the Add Point icon once for each waypoint you wish to enter in the initial survey line. Each point will be automatically filled with the coordinates of the upper left corner of the area map.
3. **Enter the coordinates with the waypoint position information for the first line** into the spreadsheet.



FIGURE 53. Entering the Initial Line in Line Editor



4. **Create your offsets.**
  - a. **Click on the Offsets icon.** The offsets dialog will appear.
  - b. **Select the pattern of lines** you wish to use by selecting the corresponding tab.
  - c. **Enter the parameters for line construction—typically, the number of offsets to be created as well as the distance or angle between them,** but the parallel and centerline patterns include additional options:
    - **To determine which way is left or right** (port or starboard) for parallel and center line offsets, imagine you are standing at the start of the initial line looking toward the end.
    - Line Naming: Parallel lines default to sequential numbers, but you may choose GeoNav naming. Cross line names in the center line pattern default to ###.##, but you may choose ##.###.
    - The center line pattern also requires a **chainage** on which the line numbering will be based and the **angle** at which the offsets will be generated relative to the center line.
  - d. **If you are generating parallel offsets, choose whether to allow line renumbering.**  
When the LINE EDITOR generates your offset lines, usually, it creates (and numbers) the offsets, in sequence,

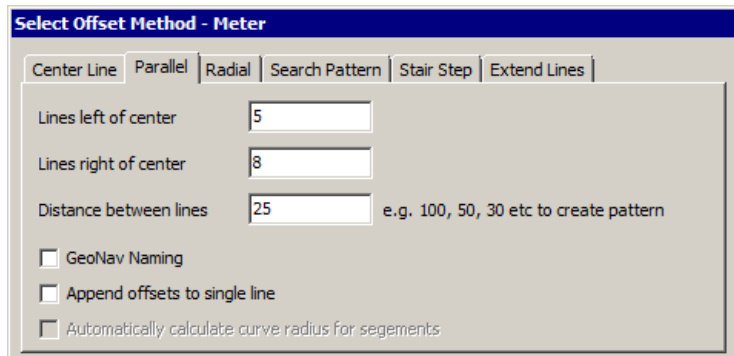


after the initial line (eg. 1,2,3,4,5). However, since you can generate parallel offsets on either side of the initial line (line '1'), they would be out of sequence (eg. 2,3,1,4,5).

**To generate lines sequentially numbered**, we have to renumber (rename) the lines by checking **Allow Line Renumbering**.

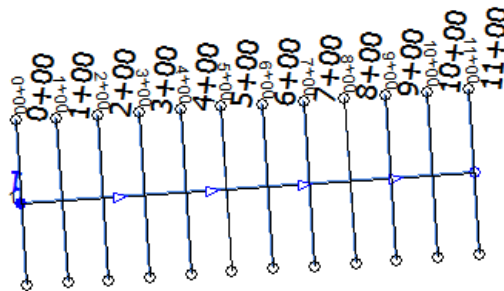
**Tip:** There are times, such as when you have generated offsets more than once, when this method of renumbering will not yield a sequential line set. If this is the case, select LINE-RENUMBER. The LINE EDITOR will renumber all of the lines in the file.

FIGURE 54. Offsets—Parallel Tab



- e. **Click [OK].** HYPACK® SUB-BOTTOM will display your filled spreadsheet and the lines will be drawn to the screen. Alternatively, you can manually enter all of the waypoint data into the spreadsheet. (If you have a file with a lot of waypoints, you'll need a lot of time and patience for this option.)
- 5. **Preview your lines** by clicking the Extents icon. The LINE EDITOR spreadsheet will minimize and the area map will zoom in to the line file. Arrows show the direction of the line currently selected in the editor.

FIGURE 55. Previewing Your Lines



- 6. **Return to the LINE EDITOR** by clicking [Line Editor] at the lower left.
- 7. **Name individual lines** (optional):

- Select LINE-LINE NAME and provide the name in the dialog that appears.

OR

- Right-click on the current line name, select 'Rename' and enter the new line name.
8. **You may edit your lines, in the spreadsheet or with the cursor**, if you wish. Continue to preview and edit until your lines are satisfactory.
  9. **Save your file.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

---

**NOTE:** You may start again by selecting FILE-CLOSE. Confirm that you do not wish to save the file and the LINE EDITOR will return to the point when you first launched it.

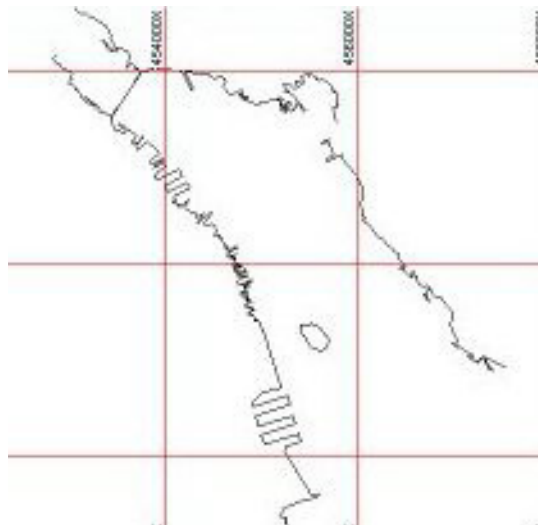
---

### **CREATING 2-DIMENSIONAL PLANNED LINES USING THE CURSOR AND OFFSETS METHOD**

You can interactively create planned survey lines in the LINE EDITOR:

1. **Open a Background File** of your survey area.

*FIGURE 56. Sample Background File*

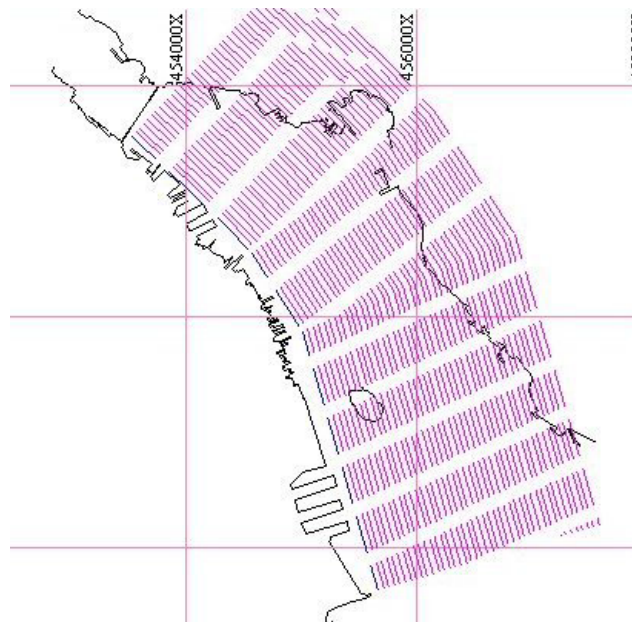


2. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR

3. **Create your initial planned line.** Click the Cursor icon and the LINE EDITOR will minimize.
4. **Click in the area map to mark each waypoint in the initial line.**
5. **Restore the LINE EDITOR** by clicking [Line Editor] at the bottom left. You can review the points of your first line, and then continue.
6. **Create your Offset Lines.**
7. **Preview your lines** by clicking the Extents icon. The LINE EDITOR spreadsheet will minimize and the area map will zoom in to the line file.



**FIGURE 57.** *Planned Lines Preview on HAL.DIG*



8. **Return to the LINE EDITOR** by clicking [Line Editor] at the lower left.
9. **Save your Line File.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

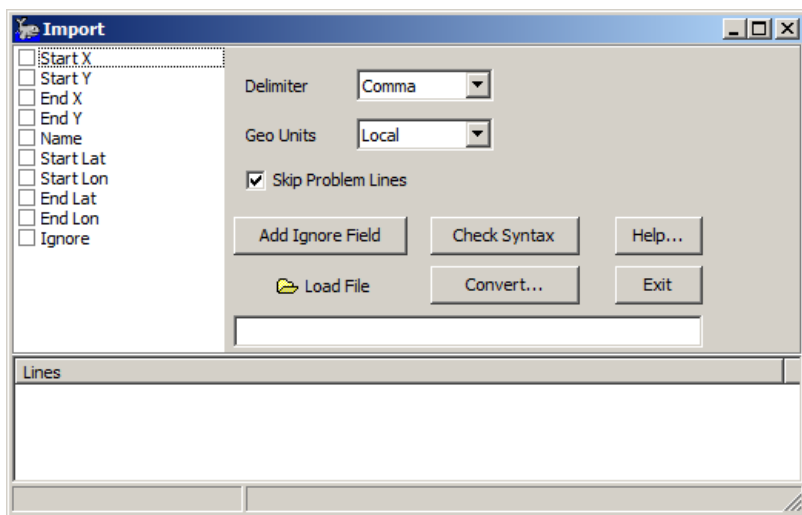
### **IMPORTING WAYPOINTS FROM A TEXT FILE TO THE LINE EDITOR**

The LINE EDITOR Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the LINE EDITOR to generate single-segmented planned lines.



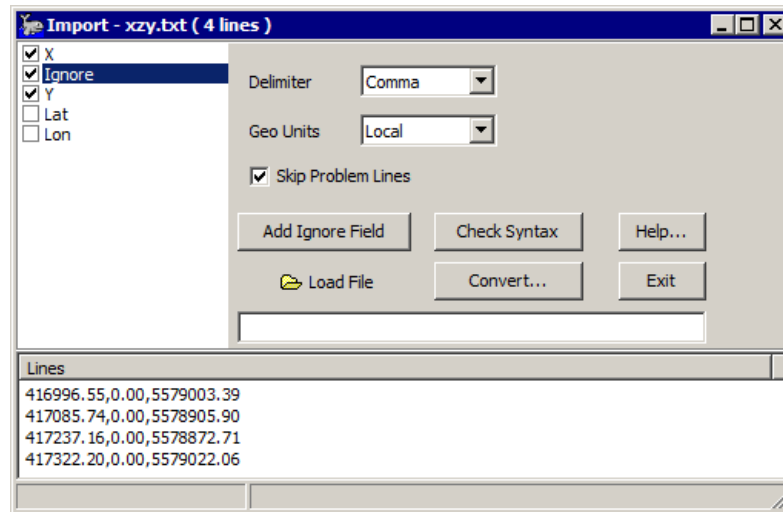
- Each line (or record) in the text file must contain the data for one line in the planned line file and present the data in the same order.
  - Each line must, at least, contain the coordinates for the start and end points of the line. If no name is imported, the LINE EDITOR automatically numbers your lines when you import the data.
1. **Open the LINE EDITOR.** Select PREPARATION-EDITORS-LINE EDITOR.
  2. **Select FILE-IMPORT.** This will give you the dialog box which you will use to set up your import of the text document.

*FIGURE 58. Line Import Dialog—Importing the Second Through Fifth Fields of Each Record: The Waypoint Positions*



3. **Select and order the fields used to create your new line file.**
  - **Place a check in the box for each field in your text file** you want to use to populate the Line file
  - **Use the cursor to drag the fields** into the order that they appear in your file.
  - **To skip a field in the string**, check 'Ignore' and drag it to the position of the field to be skipped in the list. If you need more than one Ignore field, click [Add Ignore Field] to generate as many as you need.

**FIGURE 59.** Ignoring Fields in the Import String—Ignoring the Second Field in an XY Import



4. **Choose the correct delimited format.** The program supports comma, tab and space delimiters.
5. **Load the text file.** Click [Load File], select your file and click [Open]. In the Lines area, you will see your waypoints as they appear in your file and you can see the syntax of the records.
6. **Check the syntax of your file against the field list.** (Optional) This process verifies that your configuration settings are compatible with the text file you have loaded.
  - a. **Select a line** from the Lines area.
  - b. **Click [Check Syntax].** A message window will appear to tell you how many records of the total number can be converted using your current settings.
7. **Click [Convert]** A message window will appear to tell you how many records have been converted.
8. **Click [Exit].** The Import dialog will close and the LINE EDITOR will be populated with the data from the text file.
9. **Save your line file.** Select FILE-SAVE or FILE-SAVE AS and name your file. Your data will be saved, by default, with an LNW extension to your project folder.

## CREATING PLANNED LINES TO FIT YOUR SURVEY AREA

You can create a border file in the BORDER EDITOR, which defines the boundary areas of your survey area. Use it to guide HYPACK® SUB-BOTTOM in creating or "clipping" the survey lines to exactly fit within a coastline or unorthometric survey area.

Create one or more border files to describe your survey area. You will need one border to define the perimeter of your survey area. Additional border files may be required if there are obstructions, such as islands, in your survey area that will disrupt your line pattern.

**NOTE:** The last point of the border describing the perimeter should always be *inside* the border area. The last point of borders describing unsurveyable areas, such as islands, within the survey area should be outside the border area.

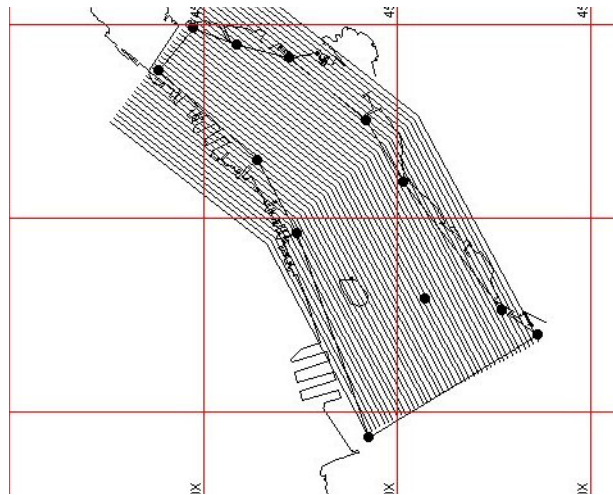
Once you have defined your survey area with border files, you can clip existing line files or generate a new line set within the border defining the perimeter.

### CLIPPING PLANNED LINES TO THE SURVEY AREA

If you have a planned line file whose lines extend outside the survey area, you can use a Border file to clip the lines to fit your area.

1. **Create a border file** (or border files) defining the boundaries of your survey area.
2. **Open your planned line file** by opening the LINE EDITOR and clicking FILE-OPEN then selecting the correct line file.

**FIGURE 60.** Planned Line File with Border File overlaid

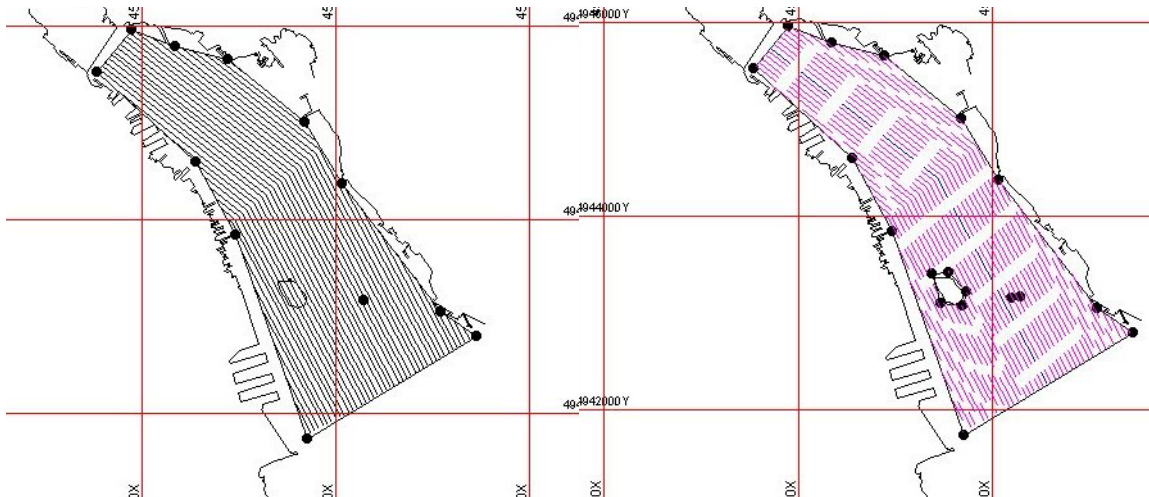


3. **Click [Clip Lines].**
4. **Select the border file that you want to clip with and click [OK].** HYPACK® SUB-BOTTOM does the rest. If the border is concave and lines are broken, the segments toward the end of the line will be renamed with an “\_Number” appended. For example, line 2 would become “2” and “2\_1”.



**NOTE:** You may need to repeat this process multiple times if you have more than one border file.

**FIGURE 61.** *Clipped Planned Lines --After First Clip (left) and Second Clip (right)*



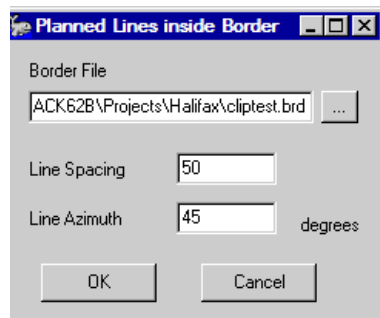
5. **Save your file.** Use FILE-SAVE if you want to overwrite your original line file. Use FILE-SAVE AS to preserve your original line file and save the clipped lines to a different name. Your data will be saved, by default, with an LNW extension to your project folder and enabled in the project files listing.

**CREATING  
PLANNED LINES  
INSIDE A BORDER  
FILE**

If you are creating a new line file the LINE EDITOR can create a set of survey lines with user-defined spacing and azimuth to fit within the border file.

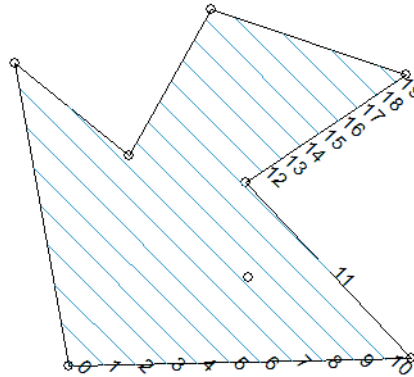
1. **Create the border file** to describe the perimeter of your area. Take care to place the last point inside the area defined.
2. **Open the LINE EDITOR.**
3. **Select LINE-GENERATE LINES IN BORDER.** A dialog will appear.

**FIGURE 62.** *Entering the parameters to create lines inside a border file.*



4. **Enter border file, line spacing and line azimuth for your file and click [OK].** The lines will be generated and drawn to the design window for preview.
5. **Save your line file.** Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

**FIGURE 63.** Sample Line File within a border



#### More Information


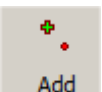



- [“Border Files”](#) on page 2-68

### **EDITING YOUR PLANNED LINE FILE IN THE LINE EDITOR**

You may edit a planned line file that has been created in the LINE EDITOR, at any time, by opening the LINE EDITOR and selecting FILE-OPEN and selecting the LNW from the file selection dialog. The saved data will appear in the spreadsheet where you can make your changes.

Many changes can be made either in the spreadsheet or by using the cursor in the area map. The following describes the editing operations available and instructions to do them in each mode.

TABLE 2. Editing Tools and Methods in the LINE EDITOR

Task	Spreadsheet Method	Cursor Method
<b>Add Line</b> 	Click the Add Line icon then the Add point icon. Enter the waypoint position data. 	Add Line icon then the Cursor icon. Click on the map at waypoint positions. 
<b>Delete Line</b>	Right-click on the line name of the line to be removed and select 'Delete'.	
<b>Insert a Waypoint</b> 	Select waypoint below where the new point should be inserted and click the Insert Point icon. Enter the appropriate coordinates.	Select waypoint immediately before it on the line. (The circle will fill.) Hold the Shift key and click with the cursor at the new waypoint location.
<b>Delete Waypoint</b> 	Select the waypoint in the spreadsheet and click Delete Point icon.	Select the waypoint in the area map (it becomes solid filled) and push the delete key on keyboard.
<b>Reposition a Waypoint</b>	Type new coordinates for the point you want to move.	Select the waypoint in the area map then drag it with the cursor to the new location.
<b>Reverse the Order of Waypoints</b>	Right-click on the current line name and select 'Reverse Order'.	
<b>Clip lines to survey area</b>	(See "Clipping Planned Lines to the Survey Area". )	
<b>Rename lines</b>	Right-click on the current line name, select 'Rename' and enter the new line name.	

## UNDO OFFSETS

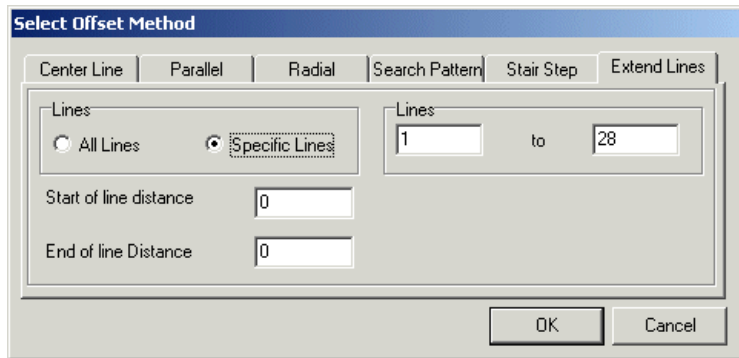
If you have just used the automatic Offsets feature and are unsatisfied, and you have not yet closed the file, select LINE-UNDO OFFSETS and try again. Continue to preview and edit until your lines are satisfactory.

## EXTENDING OR SHORTENING LINES

Modifying the length of the planned line (at either or both ends) enables you to expand your survey area and maintain the ability to do accurate historical comparisons with previous surveys.

1. **Open the line file** where you want to extend lines.
2. **Click the Offsets icon and select the Extend Lines tab.**

FIGURE 64. Offsets – Extend Lines Tab



3. **Select whether you want to extend All Lines or Specific Lines.**
4. **If you choose “Specific Lines”, specify a range of lines** (by line number) to be affected. (The dialog default includes all of the lines in your file.)

**NOTE:** These numbers usually correspond to the line numbers. However, if the line naming scheme is other than sequential numbering beginning at one, you should count the lines in the Lines list to determine how to describe the range of lines. For example, if you are extending the offsets in a center line pattern, the center line is "1", then the section lines begin, by default, at "0+00". If you specify a range of 5-15, the lines named "3+00" to "13+00" will be extended.

5. **Enter the distance that you want to extend the lines** at the start or end (or both) of the specified lines. (If you want to shorten your line, enter a negative distance.)
6. **Click [OK]** and the LINE EDITOR will move the start line point by the specified distance.

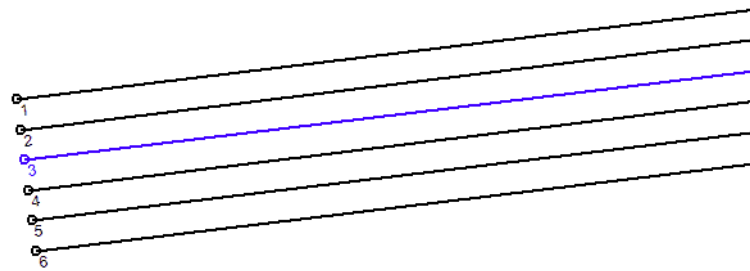
### INSERTING EQUIDISTANT LINES WITHIN A LINE FILE

You can insert a user-defined number of survey lines between two adjacent lines in an existing planned line file. The Line Editor will calculate the required waypoint coordinates to distribute them evenly between the two existing lines using the same offset pattern. Line Editor generates unique numeric line names for the inserted lines.

**To insert additional lines into an existing planned line file:**

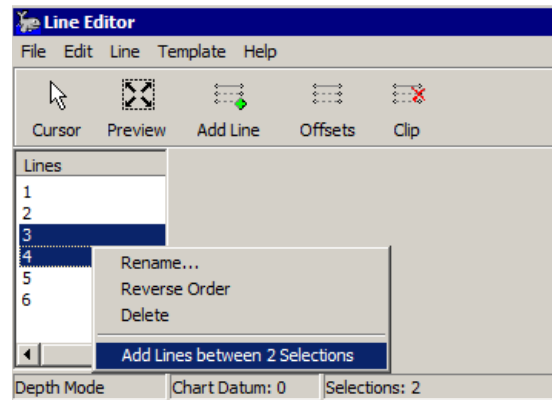
1. **Open the existing planned line file in the LINE EDITOR.**

**FIGURE 65.** *The Original Planned Line File*

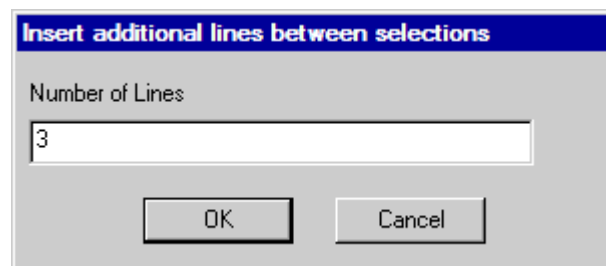


2. **Hold the Ctrl key and use your cursor to select the two adjacent lines** between which you want to insert the additional lines.
3. **Right-click in the shaded space created by the selection and select “Add lines between 2 selections”**. A dialog will appear.

**FIGURE 66.** *Inserting lines in the LINE EDITOR*



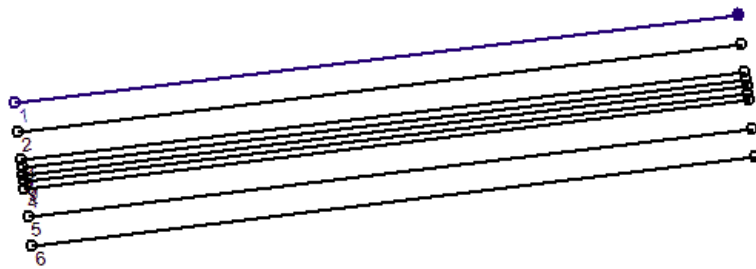
**FIGURE 67.** *Specifying the number of lines to be inserted*



4. **Enter the number of lines you want to insert and click [OK]**. The lines will be inserted into the file. In this example, we began with six lines named by number. The inserted lines are named 7, 8 and 9. You may rename them manually, if you wish.



**FIGURE 68.** Three Lines Inserted to a Line File with Parallel Offsets



5. **Save your modified file.** Select FILE-SAVE to overwrite the original line file. Select FILE-SAVE AS to write the results to a new line file. Your data will be saved, by default, with an LNW extension to your project Folder and enabled in the project files listing.

### APPENDING LINE FILES

You can append one existing Line File to another in the LINE EDITOR.

1. **Open or create a line file** in the LINE EDITOR.
2. **Select FILE-APPEND** and a file selection dialog will appear.
3. **Choose the second line file and click [OK].** The second file will be appended to the end of the first. When the Line Editor combines the two files, it checks for duplicate line names. If there are duplicate line names in the appended file, the LINE EDITOR appends an “\_1” to the name. If that name already exists, the LINE EDITOR appends an “\_2”. LINE EDITOR will continue incrementing the number after the underscore until it creates a line name that is unique to the file.
4. **Preview the results** by clicking the Extents icon.
5. **Save your file.** FILE-SAVE will overwrite the original line file. FILE-SAVE AS will enable you to assign a new name to the combined file.

### CREATING WAYPOINTS USING DISTANCE AND BEARING

You can extend the end of a survey line by adding a waypoint based on distance and bearing information instead of waypoint coordinates.

1. **Define the coordinates of at least one waypoint in a survey line.** You can enter it manually or use the cursor method.

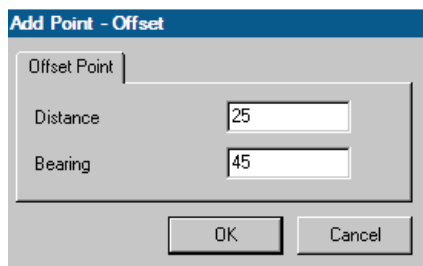
FIGURE 69. Initial Survey Line



2. **Click the Offset Icon** from the lower toolbar. A dialog will appear.



FIGURE 70. Offset Point Dialog



3. **Enter the distance and bearing from the last waypoint in the line to the end point of your extension and click [OK].** The LINE EDITOR will calculate the position and automatically append the coordinates as the last waypoint in the line.

FIGURE 71. Survey Line Extended 45 Survey Units at a Bearing of 45 Degrees

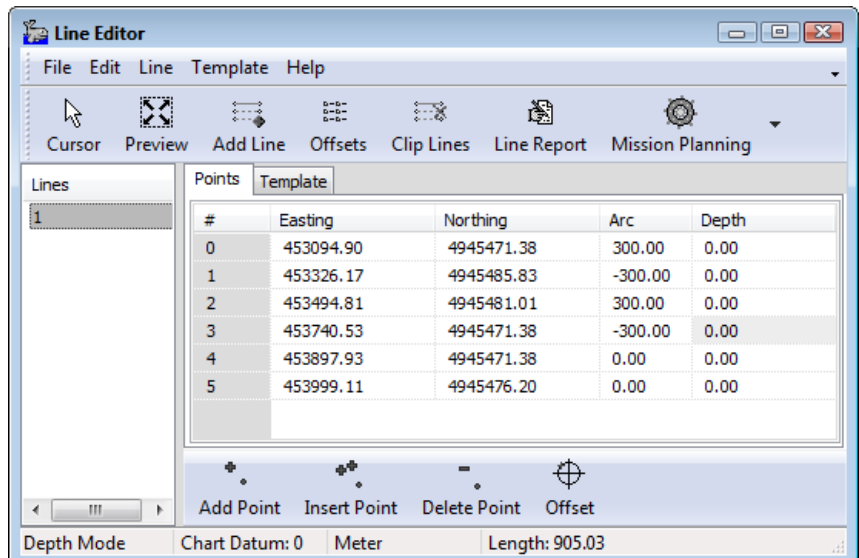


### CREATING CURVED LINES WITH THE LINE EDITOR

Curved survey lines will be defined in HYPACK® SUB-BOTTOM as any survey line containing one or more arched segments connecting their defining points.

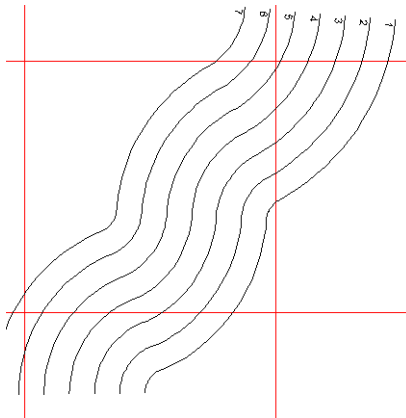
1. **Create your initial line** as you would with straight lines. Typically, you define the initial line by entering a few points, using either the cursor or spreadsheet method. These points will automatically be connected by straight segments.
2. **Add curvature to any segment of the line as needed.** Enter your radius in the Arc column for the waypoint preceding the segment you want to curve. In this example, we alternated 300 and -300.

**FIGURE 72.** Specifying the Radius of your Arc



- Enter any radius that is, by absolute value, greater than the half-length of the segment. Otherwise, the arc can not be created.
  - A positive or negative radius determines that the center point of the arc will be right or left of the segment respectively.
3. **Create your offsets as normal.** All offset patterns can be used with curved lines (some with more useful result than others).

**FIGURE 73.** Curved Parallel Lines—Four Consecutive Curved Segments



**NOTE:** The Clip Lines option does not support curved lines. It will clip curved segments, as if they were straight.

## LINE REPORTS

HYPACK® SUB-BOTTOM generates line reports from a right-click menu in the HYPACK® SUB-BOTTOM Project Items list and from the LINE EDITOR. Both list the distance along line for each line in the planned line (\*.LNW) file. The report generated in the LINE EDITOR also attempts to estimate the time to survey the line set based on your estimates of your average speed and time to change lines.

### SHOW LINES REPORT

Once you have a line file loaded to HYPACK®, you can generate a listing of the distances along each survey line and their total by right-clicking on the Line File name in the Project File list and selecting *Show Lines Report*.

**FIGURE 74.** *Show Lines Report*

---

Line Distance Report: C:\HYPACK 2017\projects\B1b\black.lnw  
Project: B1b.ini

---

50	326 Meters
51	326 Meters
52	326 Meters
53	326 Meters
54	326 Meters
55	326 Meters
56	326 Meters
57	326 Meters
58	326 Meters
59	326 Meters
60	326 Meters

---

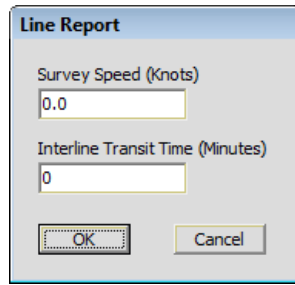
Total Lines: 11                      3585 Meters

### ESTIMATING SURVEY TIME AND DISTANCE

A lines report is a listing of the distances along each survey line, and the calculated the total line distance and the approximate travel time based on user-defined travel speed and line change time. You can generate lines reports from enabled planned line files (\*.LNW), or raw data files (\*.RAW, \*.HSX).

1. **Load the planned line file into the LINE EDITOR.**
2. **Click the Line Report icon.**The Line Report dialog appears.

FIGURE 75. Line Report Dialog



3. **Enter your report calculation variables and click [OK].** The generated report appears in Windows® Notepad.
  - **Survey Speed:** Estimated average travel speed (knots).
  - **Interline Transit Time:** Estimated time between an end line and the next start line.

FIGURE 76. A Sample Line Report

```

Line Distance Report: C:\000 Test Projects\1mb\7101 Philadelphia\raw
\HSX_0617.LOG
Project: 7101 Philadelphia.ini
-----
      ROLL.HSX                564 Feet          00:01:07
      ROLLA.HSX               513 Feet          00:01:01
      002_1437.HSX            349 Feet          00:00:41
      002_1439.HSX            309 Feet          00:00:37
      003_1442.HSX            334 Feet          00:00:40
      003_1444.HSX            308 Feet          00:00:37
      004_1446.HSX            310 Feet          00:00:37
      004_1449.HSX            289 Feet          00:00:34
      001_1454.HSX            327 Feet          00:00:39
      004_1456.HSX            332 Feet          00:00:39
      002_1458.HSX            351 Feet          00:00:42
      005_1500.HSX            280 Feet          00:00:33
      003_1503.HSX            335 Feet          00:00:40
      010_1505.HSX            285 Feet          00:00:34
      007_1507.HSX            303 Feet          00:00:36
      006_1510.HSX            332 Feet          00:00:39
      008_1512.HSX            311 Feet          00:00:37
      009_1515.HSX            306 Feet          00:00:36
-----
      Total Lines: 18                6138 Feet          00:12:07
                                     Total transit time: 02:50:00
                                     Total time:         03:02:07
    
```

4. **Save your report.** (Optional) In Notepad, select FILE-SAVE AS, set the location and name for your report and click [Save].

**NOTE:** FILE-SAVE defaults to the \HYPACK Sub-bottom\Temp folder.

---

## BORDER FILES

**Border Files (\*.BRD):** A user-defined listing of XY positions that defines an area in your project area. Typically, Border files are created in the BORDER EDITOR and stored in your project folder. They have several uses, most often to clip data or limit program calculations to a user-defined area.

Use a border file to trim data and limit the extents of your display in the SUB-BOTTOM PROCESSOR.

## CREATING A BORDER FILE WITH THE CURSOR METHOD

In the BORDER EDITOR, the cursor method is a quick and easy way to define your borders if you have a background file of your survey area available to you.

Use your cursor to define the perimeter of your area. These locations appear as open circles at the map location. The BORDER EDITOR also, automatically generates small, black “virtual waypoints” between each pair of defined waypoints. At any time, you can click and drag a waypoint or virtual waypoint to a new position. If you reposition a virtual waypoint, it becomes a waypoint and two additional virtual points appear on either side of it.

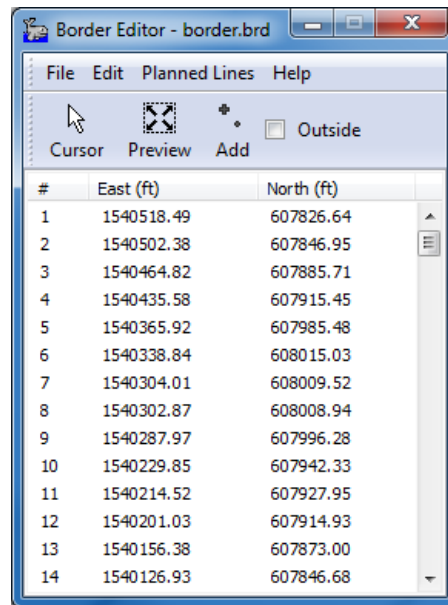
---

**NOTE:** You may need to repeat this process multiple times if more than one area must be defined.

---

1. **Open the background file** in your project.
2. **Open the BORDER EDITOR** by selecting PREPARATION-EDITORS-LINE EDITOR.
3. **Specify that you are creating a new file** by selecting FILE-NEW.
4. **Click [Cursor].** The BORDER EDITOR will minimize and a BORDER EDITOR button will appear at the lower left, leaving the map visible again.
5. **Click on the map at enough locations around the perimeter of your survey area to define its shape.**
6. **Restore the BORDER EDITOR** to the screen by clicking [Border Editor]. It will display a spreadsheet of all points you have selected.

FIGURE 77. BORDER EDITOR



#	East (ft)	North (ft)
1	1540518.49	607826.64
2	1540502.38	607846.95
3	1540464.82	607885.71
4	1540435.58	607915.45
5	1540365.92	607985.48
6	1540338.84	608015.03
7	1540304.01	608009.52
8	1540302.87	608008.94
9	1540287.97	607996.28
10	1540229.85	607942.33
11	1540214.52	607927.95
12	1540201.03	607914.93
13	1540156.38	607873.00
14	1540126.93	607846.68

7. **Check or clear the Outside option** to indicate the area in which you want to keep your data.
8. **Edit your points** at this time if necessary using the Add icon and right-click menu.

Once a border is defined, you can select any point in the border, which will turn it red, and modify the file as follows:

- **Overtyp**e any coordinates you want to change.
- **[Add]**: Inserts a waypoint at the end of the spreadsheet mid-way between the first and last points.
- **Insert**: Adds a point mid-way between the selected point and the point *before* it.

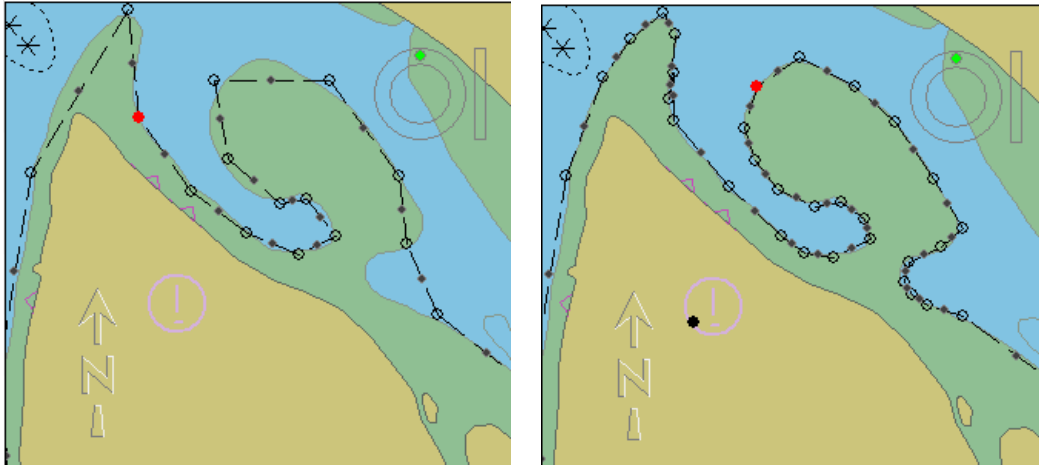
**Tip:** Alternatively, HYPACK® SUB-BOTTOM automatically generates a **virtual point** in the area map at the midpoint between each point defined in the BORDER EDITOR.

Virtual points only become part of the border file if you click on it. At this time, two new virtual points appear before and after the new border point.

- **Delete**: Removes the selected point.
  - **Delete All**: Removes all waypoints in the current file.
  - **Copy**: Copies the selected coordinate pair to the Windows® clipboard.
  - **Paste**: Overwrites the selected coordinate pair with the copied coordinate pair on the clipboard.
9. **Preview your entries** by clicking [Preview]. The BORDER EDITOR will minimize and the area map will zoom in on your points.



**FIGURE 78. BORDER EDITOR Preview—Preliminary Border (left), Detailed Border (right)**



10. **Save the file.** When you are satisfied, click FILE–SAVE AS. You will be asked to name the border file which will be saved, by default, with a BRD extension to the project directory and enabled (drawn to the screen) in your project.

**NOTE:** The BRD file stores the waypoints in XY coordinates. Alternatively, you can save the same file with WGS-84 coordinates (\*.B84) for use outside of HYPACK®.

## CREATING A BORDER FILE WITH THE SPREADSHEET METHOD

In this method, it is useful if you know the coordinates of your shoreline, islands and any other areas you want to exclude from your survey area that is currently covered by your planned lines.

**NOTE:** You may need to repeat this process multiple times if more than one area must be defined.

1. **Open the BORDER EDITOR** by selecting PREPARATION-EDITORS-BORDER EDITOR. The BORDER EDITOR will appear.
2. **Click on FILE-NEW** to clear the spreadsheet.
3. **Set the format in which you want to enter your target positions.** You can enter position data in either X,Y or Lat./Lon. format. Toggle between these options using the EDIT-

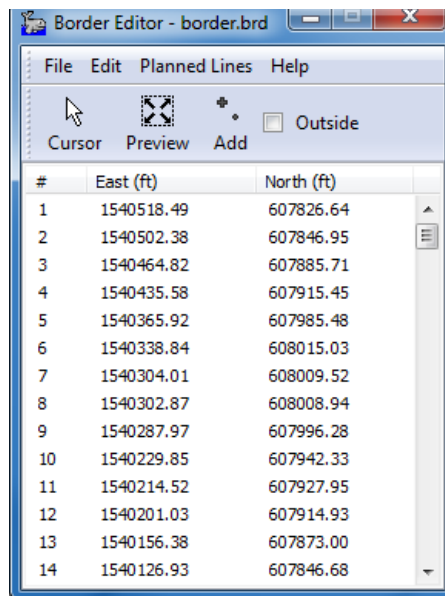


UNITS menu selection. Lat./Lon. displays follow the default setting found in the General Tab of the HYPACK® SUB-BOTTOM Control Panel.

4. **Enter the coordinates for your boundary.** To enter your waypoints manually:
  - a. **Click the Add Point icon for each point needed** to define the area perimeter. Each point will be automatically filled with the coordinates of the upper left corner of the area map.
  - b. **Edit the coordinates with the waypoint position information for your border file..** Remember that the points must form one continuous line.
5. **Check or clear the Outside option** to indicate the area in which you want to keep your data.



**FIGURE 79.** The BORDER EDITOR Window



6. **Preview your entries** by clicking [Preview]. The BORDER EDITOR will minimize and the area map will zoom in on your points.
7. **You may edit your points as necessary** by reopening the BORDER EDITOR and making any changes using the right-click menu.

Once a border is defined, you can select any point in the border, which will turn it red, and modify the file as follows:

- **Overtyping any coordinates** you want to change.
  - **[Add]:** Inserts a waypoint at the end of the spreadsheet mid-way between the first and last points.

**Tip:** Alternatively, HYPACK® SUB-BOTTOM automatically generates a **virtual point** in the area map at the midpoint



between each point defined in the BORDER EDITOR. Virtual points only become part of the border file if you click on it. At this time, two new virtual points appear before and after the new border point.

A right-click on the selected point accesses the following menu:

- **Insert:** Adds a point mid-way between the selected point and the point *before* it.
  - **Delete:** Removes the selected point.
  - **Delete All:** Removes all waypoints in the current file.
  - **Copy:** Copies the selected coordinate pair to the Windows® clipboard.
  - **Paste:** Overwrites the selected coordinate pair with the copied coordinate pair on the clipboard.
8. **Save your file** by clicking on FILE-SAVE, giving it a name and saving your file to your project. Your Border File will be saved with the BRD extension in your project directory and enabled (drawn to the screen) in your project.

---

**NOTE:** The BRD file stores the waypoints in XY coordinates. Alternatively, you can save the same file with WGS-84 coordinates (\*.B84) for use outside of HYPACK®.

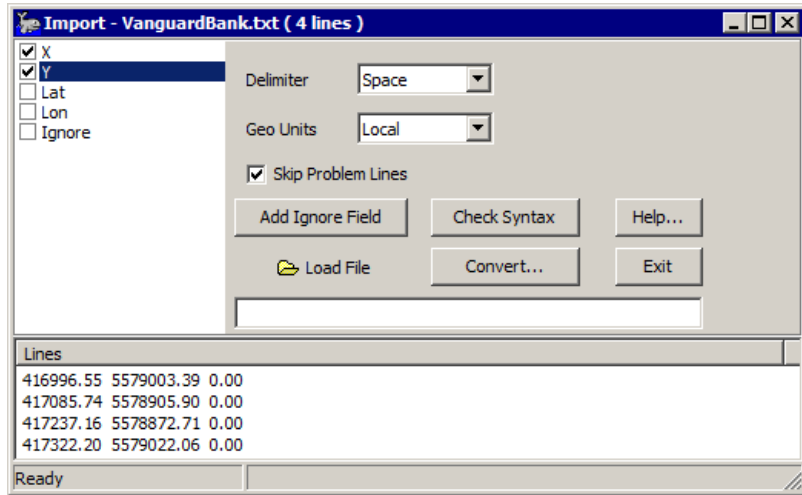
---

## IMPORTING BORDER POINTS TO THE BORDER EDITOR

The Border Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the BORDER EDITOR. Each line (or record) in the text file must contain the data for one point in the border and present the data in the same order.

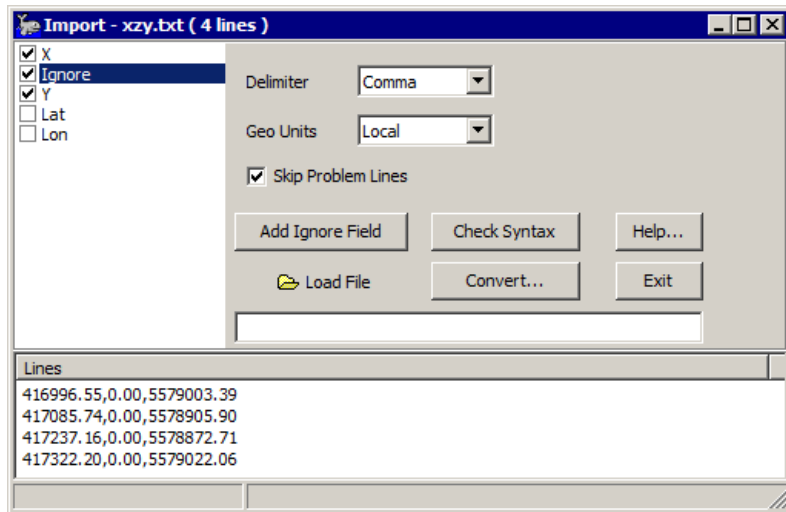
1. **Open the BORDER EDITOR** from the Editors menu in the HYPACK® SUB-BOTTOM shell.
2. **Select FILE-IMPORT.** This will give you the dialog box which you will use to set up your import of the text document.

**FIGURE 80.** Border Import Dialog--importing the first two fields of each record: the XY positions



3. **Select and order the fields used to create your new border file.**
  - a. **Place a check in the box for each field** in your text file you want to use to populate the border file
  - b. **Use the cursor to drag the fields** into the order that they appear in your file.
    - **To skip a field in the string**, check 'Ignore' and drag it to the position of the field to be skipped in the list. If you need more than one Ignore field, click [Add Ignore Field] to generate as many as you need.

**FIGURE 81.** Ignoring Fields in the Import String--Ignoring the Second Field in an XY Import



4. **Choose the correct delimited format.** The program supports comma, tab and space delimiters.
5. **Load the text file.** Click [Load File], select your file and click [Open]. In the Lines area, you will see your border points as they appear in your file and you can see the syntax of the records.
6. **Check the syntax of your file against the field list.** (Optional) This process verifies that your configuration settings are compatible with the text file you have loaded.
  - a. **Select a line** from the Lines area.
  - b. **Click [Check Syntax].** A message window will appear to tell you how many records of the total number can be converted using your current settings.
7. **Click [Convert]** A message window will appear to tell you how many records have been converted.
8. **Click [Exit].** The Import dialog will close and the BORDER EDITOR will be populated with the data from the text file.
9. **Save your border file** by selecting FILE-SAVE and naming your file. Your file will be saved, by default, to your project folder.

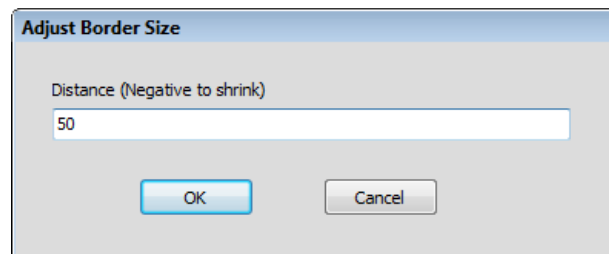
## ADJUSTING BORDER SIZE

If you find an existing border file is incorrectly sized, you can quickly expand or contract the border by a user-defined amount.

**If the value is mathematically impossible to implement** based on the original border measurements, the editor displays a message and aborts the adjustment.

1. **Open the BORDER EDITOR** from the Editors menu in the HYPACK® SUB-BOTTOM shell.
2. **Open the border file you want to resize.** Select FILE-OPEN, select your file, and click [Open].
3. **Select EDIT-OFFSET BORDER.** The Adjust Border Size dialog appears.

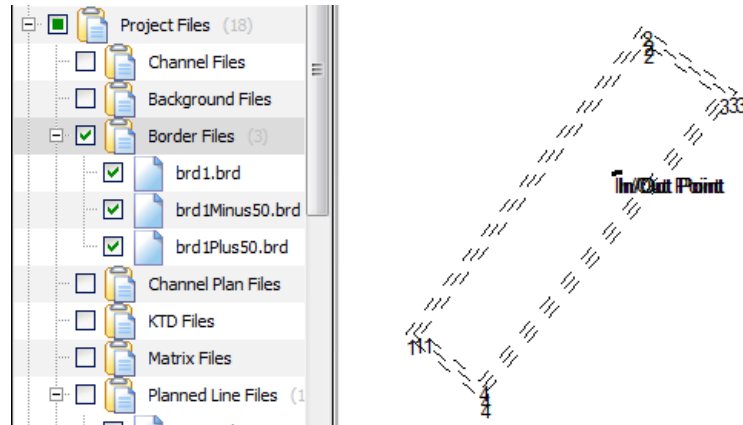
**FIGURE 82.** *Border File Adjust Dialog*



4. **Enter the distance, in survey units, by which you want to shift the border waypoints and click [OK].** A positive value expands the border area, and a negative value decreases the border area.

The adjusted waypoints replace the original waypoints in the BORDER EDITOR spreadsheet, and a preview of the adjusted border appears in the HYPACK® SUB-BOTTOM Map display.

**FIGURE 83.** *Three Border Files—The Original BRD, a BRD Increased by 50 and a BRD Decreased by 50*



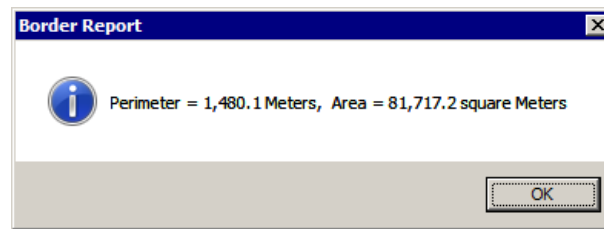
5. **Save your border file.**
  - **To overwrite the original border file,** select FILE-SAVE.
  - **To generate a new border file,** select FILE-SAVE AS and name your file. Your file will be saved, by default, to your project folder.

## BORDER REPORTS

A border report displays the perimeter distance and area of a border file.

### To display a border report:

1. **In the Project Files list, right-click on the border file** for which you would like to generate the statistics.
2. **Select 'Border Report'.**

**FIGURE 84.** *Sample Border Report*

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## CONFIGURING YOUR HARDWARE

In general, sub-bottom profiling (SBP) systems are single-channel systems used for shallow reflection seismic profiling. These sub-bottom profilers operate at different transmit frequencies and this has an effect on the depth of acoustic penetration into the seabed and the resultant resolution. Lower frequency sound sources produce more acoustic penetration into the seabed, but at a lower resolution; and conversely, higher frequency systems attain less penetration but produce higher resolution data. Signal penetration is further limited in coarse sediment or highly compacted sands, due to scattering. Most sub-bottom profiling systems can be considered as “uncalibrated systems” which makes statistical sediment classification and other quantitative measurements difficult to calculate. There are however certain SBP systems, making use of Chirp Technology, which can be considered “calibrated systems” and these could be used for quantitative seabed assessments.

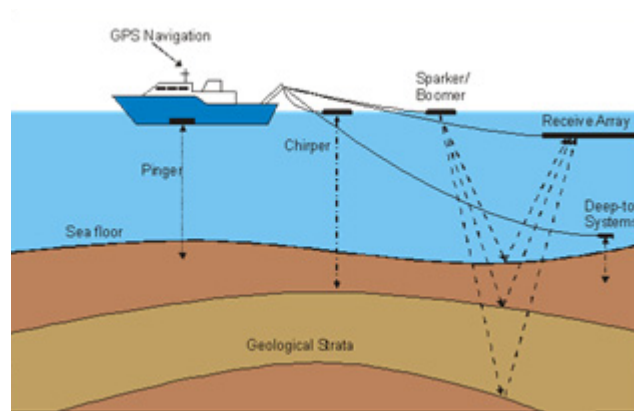
Sub-bottom profilers are used extensively in offshore, coastal and port engineering and geotechnical site surveys, renewable energy surveys, dredging studies, mineral exploration and habitat mapping projects. The interpreted data from these systems includes the thickness and qualitative sediment characteristics of the different sediment layers that comprise the sub-bottom strata.

## PRINCIPLES OF SUB-BOTTOM PROFILING

Depending on the type of sub-bottom profiling system, the energy source and the receiver can be combined, as in a transducer, or separated, as a sound source (i.e. boomer plate) and a receiver (hydrophone array) – see Figure 85. It is important that the number of hydrophone elements and the spacing between the elements is matched to the acoustic characteristics of the sound source.

Sub-bottom profilers work by transmitting sound energy in the form of a short pulse towards the seabed. This sound energy is reflected from the seabed and the sub-surface sediment layers. The reflected energy intensity depends on the different densities of the sediments, the denser (harder) the sediments, the stronger the reflected signal. The reflected signal then travels back through the water to the receiver (either a towed hydrophone or transducer). The received signals are then amplified, processed and displayed in the acquisition system.

**FIGURE 85.** Deployment of Various Shallow-Water Sub-bottom Profiling Systems. After Stoker et al. (1997).



## TYPES OF SUB-BOTTOM PROFILING SYSTEMS

Typically sub-bottom profiling surveys are undertaken using a variety of systems: Chirp, Pinger, Parametric, Bubble Pulser, Boomer, Sparker or mini-Airgun systems. In the following table, these systems are listed according to their increasing typical depth of acoustic penetration into the seabed/lake/river substrate. Generally, sub-bottom profilers transmit acoustic energy around a central frequency, but the band width varies from system to system. The exceptions to this are Chirp and Parametric sub-bottom profilers. Chirp sub-bottom profiling systems operate around a central frequency that is swept electronically across a range of frequencies between 2 kHz to 16 kHz, which can improve resolution in shallow seabed sediments. Parametric sub-bottom profilers are non-linear systems that transmit two different higher frequencies that interact during sound propagation to generate a resultant lower frequency (i.e. 4 kHz). This lower frequency can penetrate the seabed more effectively.

**TABLE 3.** Acoustic characteristics of commonly used sub-bottom profiling systems. The depth of penetration is related to the frequency, source energy & nature of the seabed geology..

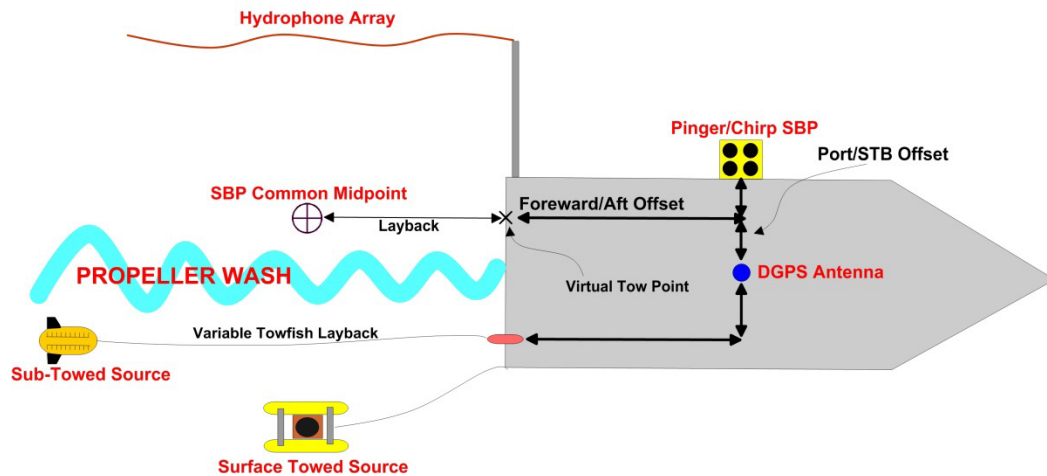
System	Operating Frequency	Source & Receive Array	Typical Resolution	Typical Depth of Penetration	Mount Configuration
Chirp	2 - 16 kHz	Swept frequency transducer	0.05 – 0.1 m	5 – 50 m	Vessel mounted or sub-towed
Parametric SBP	2 - 22 kHz	Parametric transducer	0.05 – 0.1 m	5 – 30 m	Vessel mounted or sub-towed
Pinger	2 - 12 kHz	Combined piezo-transducer/ transceiver	0.2 m	10 – 50 m	Vessel mounted or sub-towed
Bubble Pulser	0.4 kHz	Plate & towed array	0.3 - .05 m	20 – 100 m	Surface catamaran
Boomer	0.3 - 6 kHz	Plate & towed array	0.2 - 0.5 m	20 – 150 m	Surface catamaran
Sparker	0.2 – 3 kHz	Spark electrodes & towed array	0.3 – 1 m	30 – 750 m	Surface catamaran or sub-towed
Mini-Airgun	0.1 – 3 kHz	Airgun & towed array	0.5 – 1 m	30 – 200 m	Towed

## INSTALLATION & TOWING CONFIGURATION RECOMMENDATIONS

Mounting a sub-bottom profiler on a vessel and towing the source/ hydrophone array correctly are critical to acquiring a noise-free dataset. In vessel hull mounted or over-the-side systems, it is important that the transducers are mounted away from areas of potential noise or turbulence, which can have a considerable effect on the quality of the data acquired. With a surface towed source and receive array configuration, it is a good idea to have the source and the receive array separated by the aerated propeller wash as this significantly reduces the amplitude of the direct/first arrival signal. It is, however, important that the source and receive array do not get towed into the aerated propeller wash as this causes acoustic blanking and poor data quality. The data position origin when using a surface towed source and separated receive array is mid-point between the source and receive array and this is termed the SBP Common Midpoint.



**FIGURE 86.** Various towed and vessel mounted sub-bottom profiling system installations.



## CONFIGURING SUB-BOTTOM PROFILING SYSTEMS IN HARDWARE

'Hardware' is the term we use for the sensor devices from which HYPACK® SUB-BOTTOM receives data. In order for HYPACK® SUB-BOTTOM to work properly, we need to know what kind of instruments you have, how they are connected, how often you want to read them, how often you want to record them, etc.

All devices are configured from a common HARDWARE interface; however, HARDWARE includes three separate sets of configuration tabs according to the type of project and device—HYPACK, HYSWEEP® and SIDE SCAN HARDWARE.

A sub-bottom survey requires only HYPACK devices. They can be hull-mounted or towed systems with GPS or inertial positioning.

**If your equipment does not change**, and you are satisfied with the communication between your equipment and the survey programs, you don't have to run HARDWARE again.

**If you change survey equipment**, you will have to reconfigure your hardware.

1. **Select PREPARATION-HARDWARE SETUP** or click on the Hardware icon. The HARDWARE window will appear with any configured devices listed on the left. When there are no devices configured, it lists a "boat" with no devices.
2. **Select FILE-NEW.** The configuration begins with a single vessel and no devices. The program asks whether to save the

current configuration. If you want to save it, click [Yes] and save your configuration file before proceeding with this step. If you don't need it or have already saved the current configuration, click [No] and build a new hardware configuration from the beginning.

3. **Create a mobile for each device position you will track.** For example, the vessel and the towfish.
4. **Set your mobile settings.** Your hardware configuration includes a mobile for each device position you will track. A sub-bottom configuration depends on the type of transducer: a hull-mounted pinger needs only the initial boat mobile with the tracking point at the transducer, while towed systems requires a second mobile with the tracking point at the sub-bottom profiler common midpoint. Each vessel (mobile) in your configuration has an associated Mobile dialog which appears when you select the vessel name in your device list. This is where you can rename the mobile and set the tracking point.
5. **Configure each device in your system.** This includes selecting a device driver for each device and configuring the driver setup options, connection information and the position of the device relative to a fixed reference point on the mobile (measured offsets).
6. **Test the communication** between the devices and your survey computer.
7. **Save your configuration.** When you select FILE-SAVE, your current hardware configuration is stored in the \HYPACK Sub-bottom\Projects\*ProjectName*\survey32.ini.

## **MOBILES AND MOBILE SETTINGS**

A **Vessel** (also called a **mobile**) in HYPACK® SUB-BOTTOM is any independently mobile object. 'Vessel' most commonly means some sort of boat, but in HYPACK® SUB-BOTTOM, it may be a lot of other things—a towfish, an ROV, a digging tool on a dredge, one HYPACK® computer monitoring signals broadcast over wireless connection from multiple vessels, etc. If HYPACK® SUB-BOTTOM needs to have a position for it, it's a vessel. For each mobile, SURVEY displays a symbol or boat shape at its current position.

HARDWARE always has at least one mobile. Each mobile has an origin (reference point) and a tracking point. You may also assign a boat shape which can be used in place of the simple symbol options to more closely represent your vessel in SURVEY.

The **vessel origin** is the reference by which you position your devices and tracking point on your vessel. The tracking point and

each sensor is referenced to the origin based on the distance in survey units it is starboard (X-direction), forward (Y-direction) and vertically (Z-direction). Vertical offsets are measured from the static water line, and are always *positive downward*.

A **tracking point** is the position used by SURVEY to position the mobile in the world. It is used to provide left/right guidance, make automatic “start line” and “end line” decisions, and calculate horizontal distances between the vessel and features in your survey area. It is also the location at which Quickmark targets are marked.

SURVEY must know the position of each mobile and, in order to properly position your other data, which devices are on each mobile. To do this our hardware configuration defines the devices, the mobiles, which devices are on each mobile and each device position relative to the origin of its mobile.

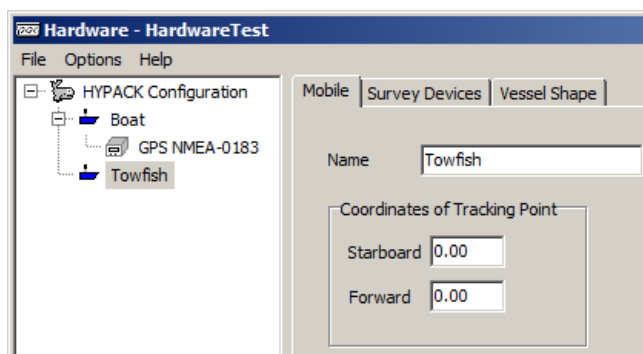
## ADDING A MOBILE

A new HARDWARE configuration begins with a ‘boat’ mobile. Your configuration must include a mobile for each independent position SURVEY will track.

For configurations requiring multiple mobiles, you must insert additional mobiles.

1. **Right-click on HYPACK Configuration and select ‘Add Mobile’.** An additional boat mobile appears.
2. **Select the boat in the configuration tree** to display the Mobile, Survey Devices and Vessel Shape tabs for the selected mobile.
3. **Name your mobile.** Each mobile should have a unique name.
4. **Set your Mobile properties:** the tracking point and vessel shape.

**FIGURE 87.** *Setting your Mobile Properties*



## MOBILE OFFSETS

### *Beware!*

If a mobile has no positioning device, HYPACK® SURVEY can calculate its position based on a set of user-defined measurements and the position of another mobile.

**BEWARE!** When the position of a mobile is calculated *relative to another mobile, the horizontal offset signs are reversed from the normal convention* (i.e. distances port and forward of the origin are negative and distances starboard and aft of the origin are positive). To avoid confusion, enter the offsets, *using the normal convention, in the driver setup dialog* instead of in the usual Offsets fields when possible. The driver then assigns the correct offset signs.

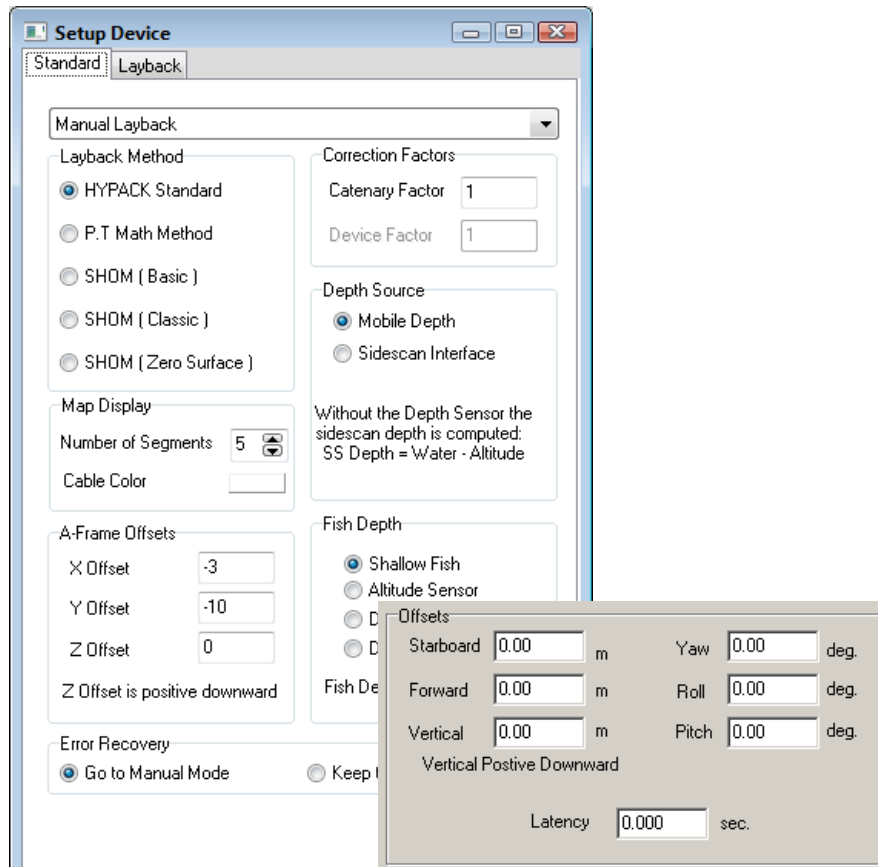
**To accommodate this idiosyncrasy, specify offsets in the driver setup dialog where available.** Some drivers, such as the towfish driver, include offsets in the driver setup dialog (accessed when you select the driver and click [Setup] in HARDWARE). There, you can enter the offsets using the normal sign convention and leave the forward, starboard and height offsets in the Offsets tab of HARDWARE set to zero.

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**NOTE:** The height offset can be entered using the normal sign convention either in the driver setup or in the Offsets tab, but *not both!*

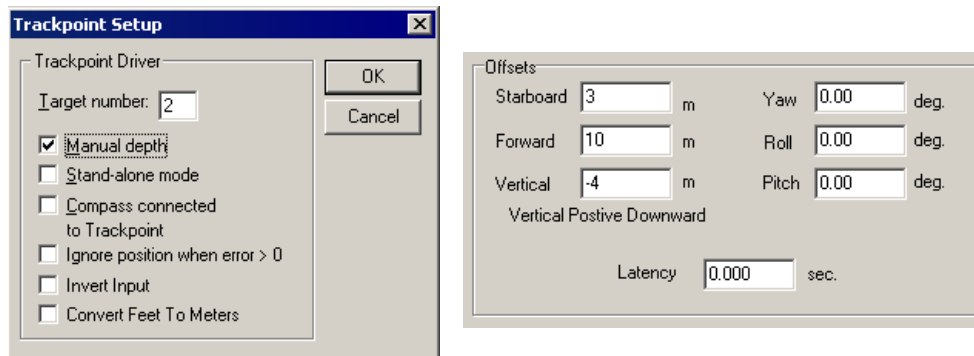
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**FIGURE 88.** *Towfish Driver Setup—Offsets in the Device Setup are All Zero*



- **Reverse the signs for the X, and Y offsets.** Drivers without offsets in the driver setup dialog require that you reverse the signs of the forward, starboard offsets in the offsets on the Offsets tab.

**FIGURE 89.** *Trackpoint Driver Setup (left), Offsets 10m port and 3m aft (right)*



## ASSIGNING THE TRACKING POINT

In addition to the sensors, each mobile must include a tracking point.

A **tracking point** is the position used by SURVEY to position the mobile in the world. It is used to provide left/right guidance, make automatic “start line” and “end line” decisions, and calculate horizontal distances between the vessel and features in your survey area. It is also the location at which Quickmark targets are marked.

**To define the tracking point position**, enter its offset distances from the vessel origin in the Mobile tab.

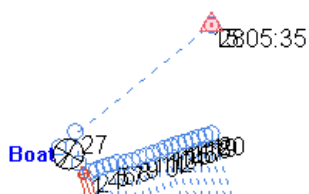
On a sub-bottom survey, it depends on the type of system. For hull-mounted pingers, you typically place the tracking point over the transducer because all of the tracking point functions should be relative to the transducer. For towed systems, you typically place the tracking point at the towfish attachment point (0,0).

**ASSIGNING A BOAT SHAPE TO EACH MOBILE**

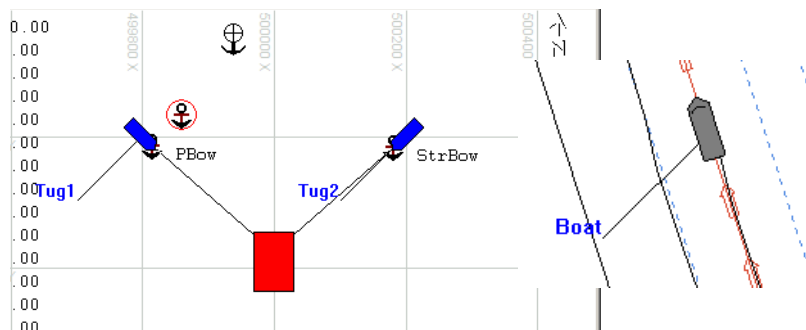
In the Vessel Shape tab, you may select a boat shape file (\*.SHP) and view an overhead display of the shape and a rear view of a vessel, overlaid with the device positions. The devices in your configuration are listed in the order they are entered in the configuration and their device numbers are positioned in the boat shape according to their offset settings.

When you assign a boat shape to a mobile in HARDWARE, you can display a shape that more closely represents your vessel in SURVEY.

*FIGURE 90. Boat Symbol*



*FIGURE 91. Boat Shape in SURVEY*



**To assign a boat shape to a mobile** do the following:

1. **Use the BOAT SHAPE EDITOR** to create a boat shape file (\*.SHP) that represents each mobile.

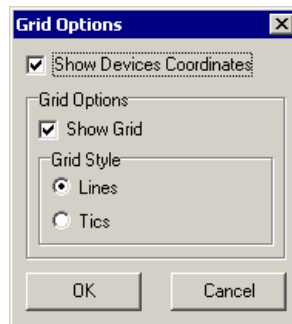
2. In **HARDWARE**, select the **mobile** in the tree view.
3. In the **Vessel Shape** tab, click the [...] and browse for the boat shape file that represents the selected mobile and click **[Open]**. The boat shape is then displayed, in top and rear views, with the origin and tracking points.

The Vessel Shape Tab includes a toolbar with some basic tools with which you can adjust the display.

- **Basic zoom tools** adjust the scale of the vessel display.
- **Grid Options** affect the display other than the boat shape and devices. Access the dialog with the Control Panel icon.



**FIGURE 92.** Control Panel



- **Show Device Coordinates** displays the offsets for each device.
- **Show Grid** draws grid lines or tics, according to the **Grid Style** selection, in the display to provide information about the scale of the vessel.
- **Show HYPACK® SUB-BOTTOM Devices** and **Show HYSWEEP® Devices**: Choose whether to display of the devices configured in **HARDWARE** or **HYSWEEP® HARDWARE** respectively.
- **X, Y and Z displays** of the current cursor position relative to the vessel origin in the displays.

## CONFIGURING YOUR DEVICES

For each device in your configuration, you must provide HYPACK® SUB-BOTTOM with the information it needs to read, interpret and record the device output.

1. **Select the device driver** (\*.DLL) for one of your devices.
2. **Set the type of data** to be obtained from the device.
3. **Set the offset and connection information.**
4. **Click [Setup] (or double-click the driver in the Installed list) and specify any setup information** specific to that device driver. Each setup is different according to the needs of the

device driver. Some devices do not require any special configuration, and [Setup] is disabled or just returns information about that device. Other device drivers require detailed information that can only be entered through the Driver Setup dialog.

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## SPECIFYING DEVICES IN HARDWARE

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When you have created a mobile for each position you want to track in SURVEY, you are ready to begin configuring your devices.

A sub-bottom configuration includes a positioning driver for each mobile and the sub-bot.dll for each sub-bottom profiler.

1. **Open the HARDWARE program.** Select PREPARATION-HARDWARE SETUP.
2. **Add a mobile for each vessel.**
3. **For each device:**
  - a. **Select the correct mobile in the tree view for your device type.**
  - b. **Select the Survey Devices tab.**
  - c. **Move the devices in your configuration to the Installed list.**
    - Select the device in the Available list on the left and click [Add->] or
    - Double-click the device in the available list.
  - d. **Name your device.** The name (under the Installed list) defaults to the driver description, but you can change it to something simpler or to distinguish between two devices using the same device driver.
  - e. **Configure the Connection, Offsets and Driver Setup options.**
4. **Save your configuration (FILE-SAVE).**

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## HYPACK® SUB- BOTTOM DEVICE FUNCTIONS AND OPTIONS

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When you are configuring HYPACK® SUB-BOTTOM devices (not multibeam or side scan), the Functions list in the Survey Devices tab shows types of data the selected driver can collect. Select the driver in the tree view and check the data types that you want to record with the selected driver. For example, a GPS unit, may be used to get the position, calculate speed and heading. With RTK capability, the GPS driver can also calculate tide information.

- **Position** tells the driver to accept the designated position messages and convert them to X-Y coordinates, using the datum transformation and projection parameters as given in the GEODETIC PARAMETERS program.  
SURVEY tags position records with POS in the raw files.
- **Heading** tells the SURVEY program to store heading data.



**Beware!**

SURVEY tags heading records with GYR in the raw files.

**BEWARE!** If you have a gyro, the SURVEY program will use that as the primary orientation information. In this case, *you should not also select for GPS heading* as this would cause SURVEY to switch between gyro and GPS orientation as each device updates, and your vessel will ‘twitch’ on screen.

- **Speed** tells the SURVEY program to use the speed information from the VTG message for the vessel speed. The GPS speed is much smoother and more accurate than the speed the SURVEY program will calculate.

SURVEY tags speed records with SPD in the raw files.

**Tip:** We recommend that you use the speed from your GPS antenna.

- **Tide** is available for tide gauge drivers. If you check this box, the program will store water level corrections from a tide gauge. HYPACK® SUB-BOTTOM does not support real-time RTK tides.
- **Heave** records motion data. Drivers with this function may record heave only, pitch and roll, or heave, pitch and roll data. SURVEY tags these records with HCP in the raw files.
- **Record Raw Messages** enables you to record the data string, as it is read from the device, into your raw files.  
SURVEY tags raw messages records with MSG (single beam), RMB (multibeam) or RSS (side scan) in the raw files.
- **Record Device Specific Messages** records data strings as described in the driver. It allows us to customize output strings for our users where necessary.  
SURVEY tags these records in the raw files using unique tags determined in the device driver.
- **Generate Output Messages:** The driver constructs and sends messages out the designated port.**Paper Annotation:** Annotates each event on the sounder’s paper roll or digital echogram. SURVEY tags these records in the raw files using FIX tags.

The **Options** settings allow you to optionally record or annotate (or both) the Raw and Quality measurements from certain types of survey equipment. HYPACK® SUB-BOTTOM records all of the final information for all sensors. It always records the calculated position for GPS updates, the raw depth information received from echosounders, the gyro heading from gyros, etc.

- **Use for Matrix Update** is only available for echosounders and magnetometers. If this option is checked, data from this device is used to fill the matrix file in HYPACK® SURVEY. If you have more than one depth device in your setup, check this box for only one of them.

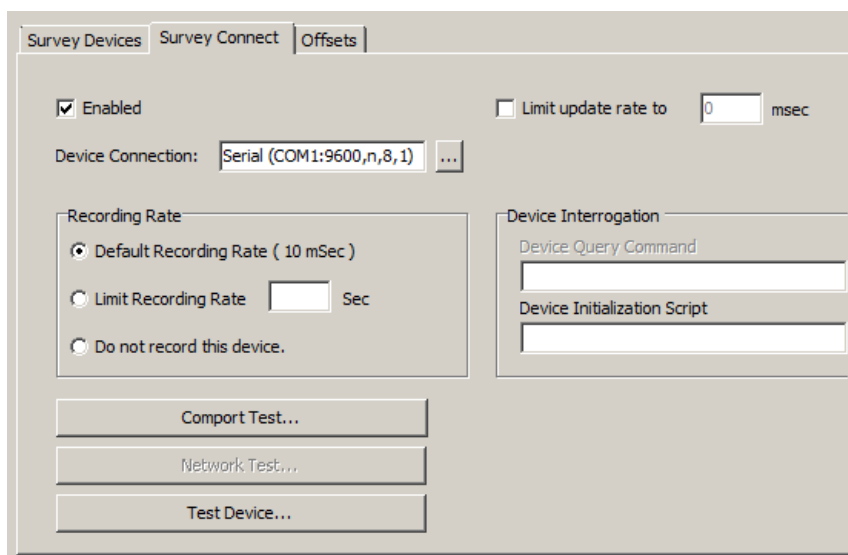
**CONFIGURING CONNECTIONS FOR HYPACK® SUB-BOTTOM DEVICES**

- The **Paper Annotation** selection is only applicable to echosounders with annotation capability. Checking this will enable echosounders with this capability to mark significant events during the survey.
- **Record Raw Data:** When this box is checked for a GPS device, the program will also record the WGS-84 latitude/longitude/ellipsoid height along with the position record. This enables you to recalculate positions or RTK tides in post-processing should you collect data with erroneous settings.
- **Record Quality Data** allows you to record quality information obtained from different devices.

The Connect information tells the SURVEY program the device location and communication parameters.

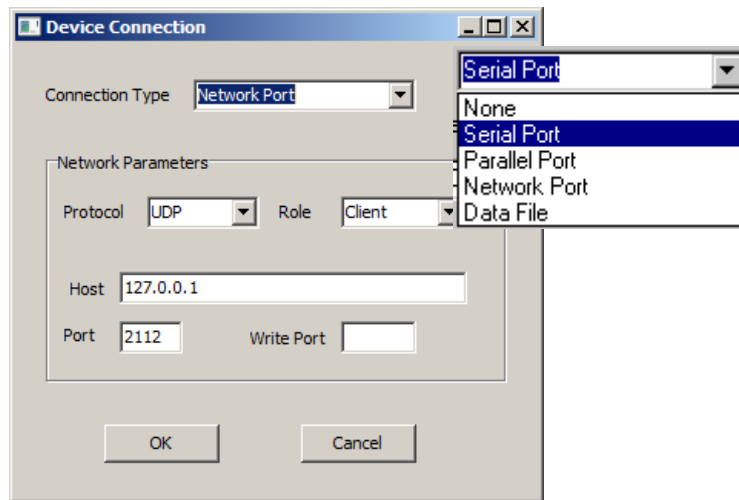
1. **Select the device in the tree view and open the Survey Connect tab.**

*FIGURE 93. Survey Connect Tab*



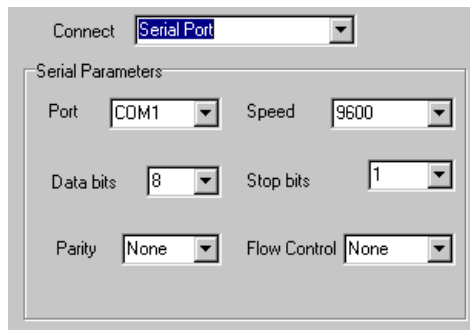
2. **Check the Enabled option.**
3. **Specify the device connection type for this device.**
  - a. **Click [...].** The Device Connection dialog appears.

FIGURE 94. Device Connection Dialog



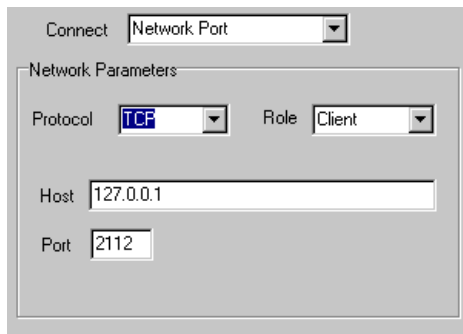
- b. **Select the connection type.** The default settings corresponding to the selected type are displayed below the selection.
- c. **Enter the port settings or data file you are simulating.** If the default settings are not accurate, they may be edited. HYPACK® SUB-BOTTOM uses the same serial (COM1: through COM50:) and parallel (LPT1: through LPT4:) drivers utilized by the Windows® operating systems.
  - The **Serial connections** (Parity, Flow Control, Baud, Data Bits, Stop Bits and Flow Control) must be set to match your equipment or SURVEY will not read the device data.

FIGURE 95. Serial Connect Options



- **Network Connections:** Network devices are becoming more common. Echosounders with network connections are advantageous in that full scan information can be recorded instead of only the depths.

FIGURE 96. Network Connect Options



**Protocol:** Choose between TCPIP, which passes data between two specific computers or UDP, which broadcasts to all computers on the local network

**Role:** Only valid for TCPIP protocol, it depends the configuration in the echosounder. You can check your sounder’s user manual for that information but, the majority of the time, the sounder will be the Server so you should configure HYPACK® SUB-BOTTOM to be the Client.

**Host:** This is the IP address of your sounder. Your sounder should be set to read the IP address of your survey computer.

**Port:** The port number is set for each device. It is the port from which HYPACK® SUB-BOTTOM is to read data. (Odom devices use 1601. Reson devices use 1998.)

**Write Port** is only required for the UDP protocol. It is the port at which HYPACK® SUB-BOTTOM should respond to this device.

- **Parallel Connections:** The port number is the only setting required for parallel connections.
- **No Connection (None):** Analog devices are frequently found on dredges to measure rotation. They interface with your survey computer through an Analog to Digital (A/D) card specific for the kind of input: 4-20mA, 0-5VDC, 0-10VDC, or -5 to +5VDC

d. Click [OK].

4. **Set any of the remaining options where they are applicable:**

- The **Limit Update Rate To** option is the time interval (in milliseconds) that the SURVEY program requests information from the device. The default value is 10, but you can modify the amount of information passed between the device driver to the SURVEY program through this setting.



A millisecond is 1/1000th of a second. If your echosounder is updating 20 times per second and you specify an update frequency of 100 milliseconds, the device driver will only pass the last depth received to the SURVEY program 10 times per second, based on the update frequency setting.

**Tip:** Drivers that have “Generate Output Messages” capability default to 100 msec.. A limit of 500 msec. will be appropriate for the purposes served by most of these drivers.

All devices in HYPACK® SUB-BOTTOM operate on a “Last Only” basis. This means if a new piece of information arrives at the device driver before it has delivered the last update, it deletes the earlier information and holds only the last measurements. If you want to get every bit of information received from a particular device, make sure the update frequency is quicker than the update rate of the equipment.

- **Recording Rate** is the rate (in seconds) at which records values for the device when logging. The default rate is 10 msec.
- **Device Initialization Script** sends user-supplied configuration information to certain echosounders. The information is sent at the start of HYPACK® SURVEY to restore the device to exact settings.

### TESTING SERIAL COMMUNICATION WITH WCOM32

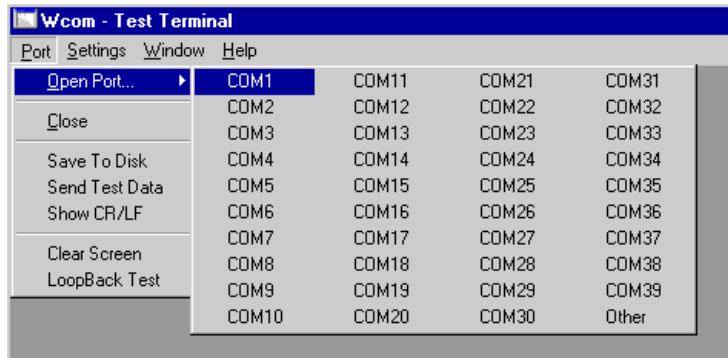
1. **Make sure the equipment is turned on** and actually sending information. This can be confirmed by attaching a serial LED line tester to the end of your cable. The Receive Data light should be flashing (changing state from red to green) at each measurement transmission. If there are no lights flashing, your equipment is not transmitting or your cable is grossly wrong. A serial LED line tester is a great piece of equipment that can be picked up inexpensively at an electronics store.
2. If you have verified the equipment is transmitting, **try to display or record the data in the WCOM32 program.** HYPACK has included a shareware program (courtesy of Control Corp., the manufacturer of Rocketport serial cards) in your HYPACK® SUB-BOTTOM install to make this recording process really easy. Here's how it works.
  - a. **Launch the Wcom32 program** by selecting OPTIONS-WCOM32 in the HARDWARE window. The WCom32 dialog will appear.

FIGURE 97. Connect-Data Window



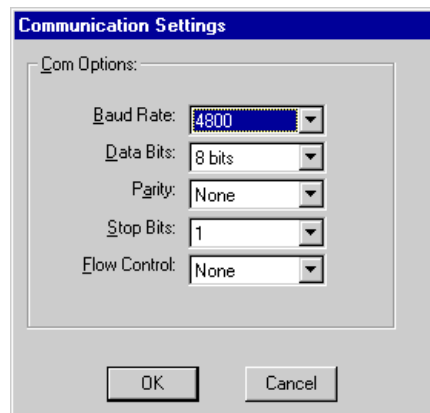
- b. **Select PORT-OPEN PORT** and select the port from which you want to capture data.

FIGURE 98. Selecting the Port



- c. **Select SETTINGS-PORT SETTINGS** and select settings that match those of your device.

FIGURE 99. Port Settings



- d. **Repeat the steps 3 and 4 for each device** from which you would like to record data.

- e. **Select PORT-SAVE TO DISK** and wait about a minute. The data is now recording to files on your hard drive.
- f. **Select PORT-SAVE TO DISK** again (deselecting this option) to end the recording process.
- g. **Rename your saved data files by device name.** Use Windows® Explorer to go to the \HYPACK Sub-bottom\Support\Com directory. The files that you have just recorded are named KOMx.txt where x is the port number from which the data was recorded. You can see that a data file named for the port rather than the device would soon be mixed up with all of the others that are named in the same way. This will avoid that problem.

---

**NOTE** This is also the procedure to use if you have questions or problems regarding your data and or Technical Support asks you to send us some sample data.

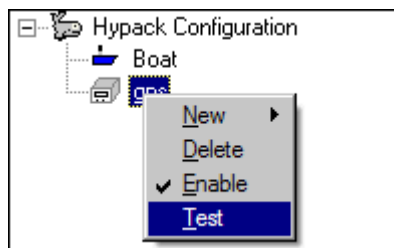
---

3. If you are successful in reading the messages in the WCOM32 program, **test each device in the HARDWARE program.** This checks that you are using the correct device driver and whether the communication settings have been properly set.
  - a. **Start the HARDWARE program.**
  - b. **Test your first device by right-clicking on the device in the configuration list and selecting “Test”,** The HARDWARE program will launch the TEST program with a sample device window for that device.
 

**To suspend the display updates** to allow you to view it more easily, select TEST-PAUSE ALL. Repeat the same selection to resume scrolling.

**To terminate the test** select TEST-STOP ALL.. If you are unsuccessful at this point, you probably have the wrong device driver specified in the library entry. Contact HYPACK, and ask for Technical Support.

**FIGURE 100.** *Launching the Interface Test for all equipment from the HARDWARE Program*



- c. **Repeat the test process for each device.** When all test correctly individually, go on to the next step.

**NOTE:** Once the Test program is open, you can test remaining devices from within the Test program by selecting TEST- *DeviceName*.

- d. **Test all of the survey devices at once.** This determines if there are hardware conflicts between serial ports. In the TEST program, select TEST-TEST ALL. A device window will appear for each device.

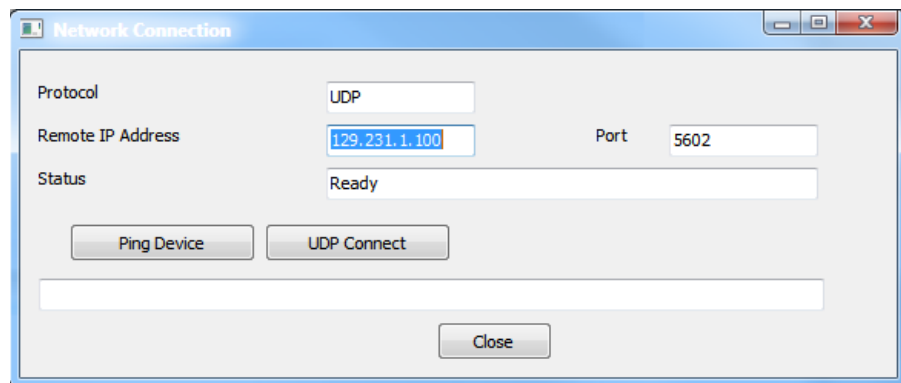
If every device is being properly interfaced, you are ready to enter the HYPACK® SURVEY program.

If all of your devices work when testing them individually, but *do not* work when testing them together, you have a problem with your serial communication hardware. Contact Technical Support at HYPACK, Inc. for assistance.

**TESTING  
NETWORK  
COMMUNICATION  
FOR ALL  
NETWORK  
DEVICES**

If you are using a network connection, you can test your settings to which you are connecting:

**FIGURE 101.** Network Test Dialog




- **For TCP/IP connections,** click **[Ping Device]**. If the designated address is found, the status reads 'Ping OK'. If not, it says 'Time out waiting for a reply'.

**NOTE:** If you leave the address at the default 127.0.0.1, you ping your own computer and the status message tells you it is not a remote address.

- **For UDP connections,** click **[UDP Connect]** to attempt to read incoming data from the UDP port. If the connection is successful, the status field continuously updates the number of messages and their size. Each message display in the field at the bottom, though it will not be text you can read.

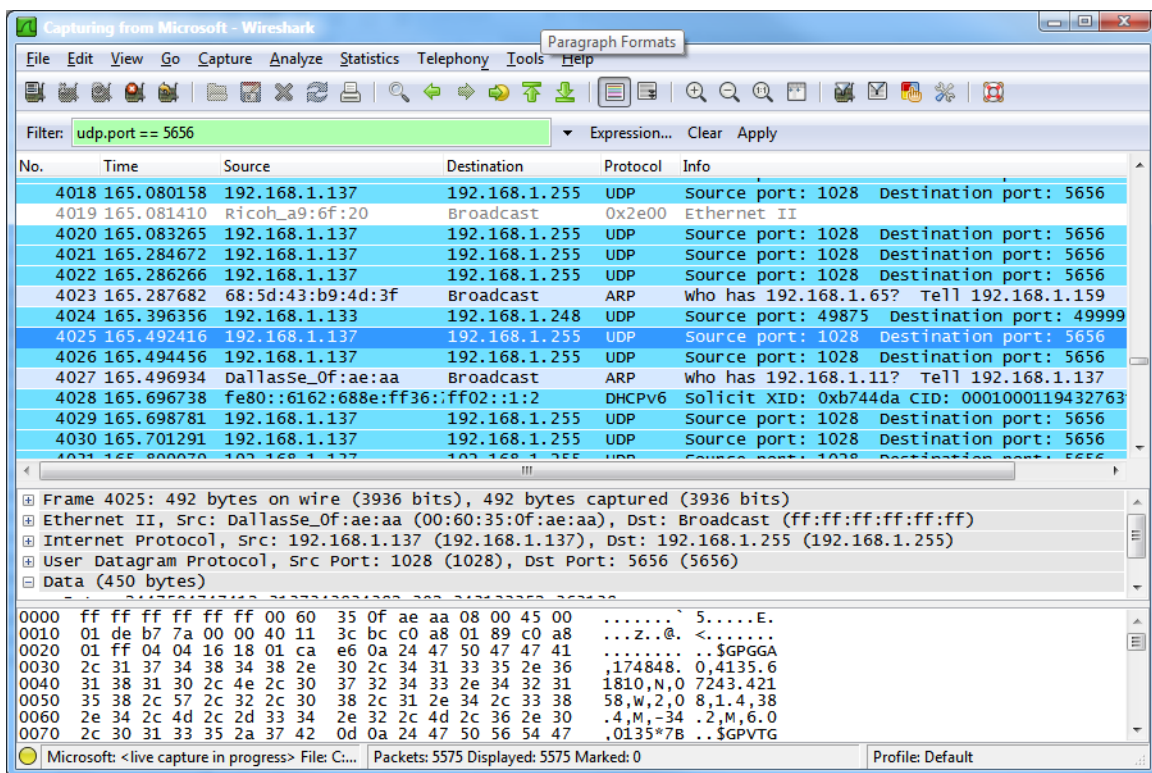


**TESTING  
NETWORK DEVICE  
CONNECTIONS  
USING  
WIRESHARK**

1. **Install the Wireshark Program.** The 32-bit and 64-bit installer packages for the Wireshark program can be found in your \HYPACK 2014\Support\Utilities\Wireshark folder.
2. **Open Wireshark to find the home page.**
3. **List the available network connections from which to capture data.** Click the List Available Interfaces icon. 
4. **Choose the network connection from which you would like to view network packets and click [Start].**
5. **Enter the port setting in the Filter field using the following format:**  
Udp.port == *PortNumber*. (For example, Udp.port == 5656” displays the device attached to port number 5656.) The field turns green to indicate a valid input string.
6. **Click [Apply].** The data from that port scrolls through the Wireshark display.

**NOTE:** You must see packets displayed for HYPACK® SUB-BOTTOM to receive data.

*FIGURE 102. Wireshark with Streaming Data*



To view the contents of any packet, select it in the list then check the display at the bottom of the dialog.

## OFFSETS AND LATENCY IN HARDWARE

The **vessel origin** is the reference by which you position your devices and tracking point on your vessel. The tracking point and each sensor is referenced to the origin based on the distance in survey units it is starboard (X-direction), forward (Y-direction) and vertically (Z-direction). Vertical offsets are measured from the static water line, and are always *positive downward*.

The offsets for a device on the towfish is measured from the cable anchoring point on the towfish.

**Hull-mounted SBP systems:** Enter the horizontal offsets for the SBP relative to the GPS, and the vertical offset relative to the static waterline.

**Surface-towed SBP systems** get calculated positioning from the Towfish device driver (Towfish.dll). Enter the **offsets** from the GPS to the A-frame attachment point as the A-Frame Offsets in the Towfish device driver setup, and set the **Catenary Factor** to 1 for surface towed SBP systems. The **Cable Out** value, from the A-frame attachment point to the SBP Common Midpoint, is input in the Towfish Device Window in SURVEY.

---

### MEASURING HARDWARE OFFSETS

---

#### *Location Measurements:*

The position of everything on a mobile is determined by applying their offsets to the mobile heading and origin position. For the most accurate data collection, it is important to measure as accurately as possible.

**Position** measurements are the distances, measured in survey units, starboard, forward and vertically from your boat origin to your device.

- The **Starboard** and **Forward** offsets: Use positive numbers for positions forward and starboard of the origin and negative numbers for devices aft and port of the origin.

---

**IMPORTANT!** *Mobiles that are positioned relative to another mobile (eg. towfish and dredge hopper arms) are exceptions to this rule. Reverse the signs for offsets entered in the Offsets tab; do not reverse the signs for offsets entered in the Driver Setup. Enter offsets in either location, not both.*

---



- The **Vertical** offset is the distance below the static waterline of the vessel. Enter the antenna height above the water line as a *negative* value. The distance from the waterline to the transducer head will be positive.

**Tip:** To view an overhead display of the boat shape and a rear view of a generic vessel, overlaid with the device positions, select the mobile in the tree view and open the Vessel Shape tab. The devices in your configuration are listed in the order they are entered in the configuration and their device numbers are positioned in the boat shape according to their offset settings.

---

### SPECIFYING OFFSETS IN HARDWARE

---

When you have carefully measured your position offsets, enter your measurements for each in the Offsets tab of HARDWARE.

1. **Open HARDWARE.**
2. **For each device, do the following:**
  - a. **Add the device to the appropriate mobile in your configuration.**
  - b. **Select the device in the tree view.**
  - c. **Click the Offsets tab.**
  - d. **Enter your position offsets and close HARDWARE.**

---

#### NOTES:

Take care that the offsets are correct. There is no way to correct them for the SEG-Y data in the SUB-BOTTOM PROCESSOR.

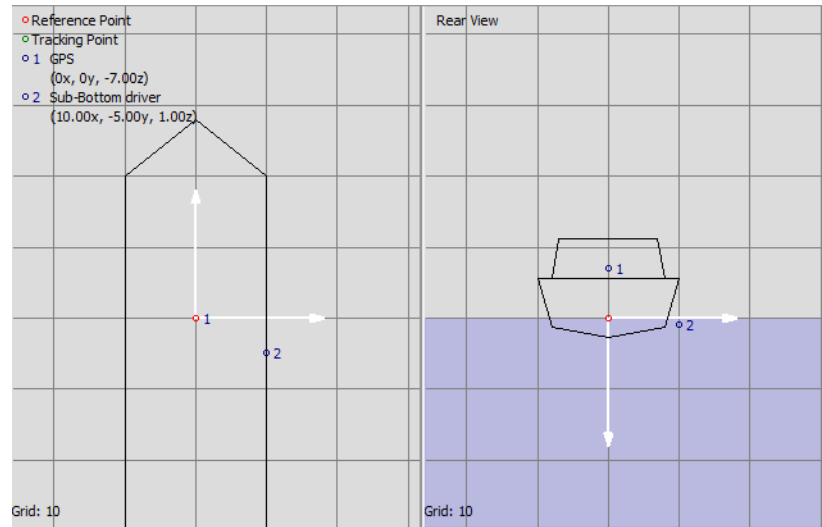
*Do not apply latency during acquisition;* it may negatively effect your SEG-Y data. Latency is applied during post-processing in the SUB-BOTTOM PROCESSOR.

---

3. **Save your configuration (FILE-SAVE).**

The following example shows a simple sub-bottom configuration:

**FIGURE 103.** Sample Sub-Bottom Configuration



- The boat **origin** has been positioned directly below the GPS at the level of the static water line.
- The **tracking point**, used by HYPACK® SURVEY to position your vessel in the world, is positioned over the sub-bottom profiler. This assists the helmsman in keeping the profiler over the survey line and bases all logging calculations such as start and end line, alarms, etc on the profiler position.

**FIGURE 104.** Tracking Point Coordinates in the Mobile Tab

Name

Tracking Point

Starboard

Forward

- The **GPS antenna** is directly above the boat origin so the port and forward offsets are zero. The vertical offset is the distance above the waterline. This value is negative because, in HYPACK® SUB-BOTTOM, the Z axis is positive downward from the waterline.

FIGURE 105. Sample GPS Offsets

Survey Devices | Survey Connect | Offsets

GPS NMEA-0183

**Position**  
Enter Device Offset From Boat Reference Point (Center of Mass).  
The Vertical Offset is Positive Downward and Measured From Waterline.

Starboard   
Forward   
Vertical

**Rotation**  
Enter Device Rotation from Forward (Yaw) and Vertical (Roll and Pitch)  
Yaw rotation follows azimuth (clockwise rotation is positive). Bow up is positive pitch, port side up is positive roll.

Yaw   
Pitch   
Roll

**Device Latency**  
Enter the Latency Time (Positive) in Seconds

- The **profiler** is starboard and aft of the origin so the starboard offset is positive and the forward offset is negative.

## SYSTEM SETTINGS IN HARDWARE

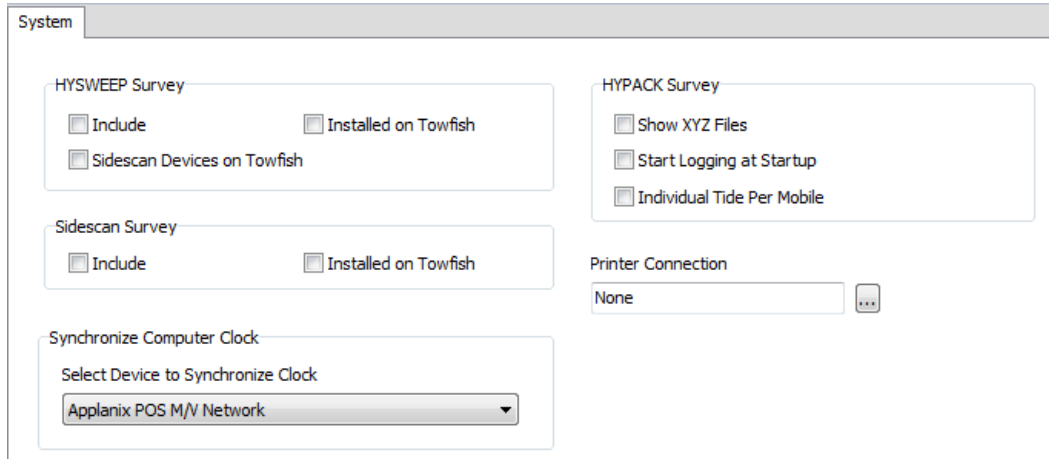
To access the **System settings** select “Hardware” in the tree view. In Sub-bottom surveys, the only setting you may need is the **Synchronize the Computer Clock** option.

*All devices must use the same time basis*—the computer Veritime or UTC time. If any device sends UTC time-stamped data, you must synchronize your computer clock with UTC time using the 1PPS box or the NMEA ZDA message.

If you synchronize the clock, HYPACK® SUB-BOTTOM adjusts the Veritime clock speed to match the UTC time based on the time in the ZDA message from the GPS.

For example, if you are using inertial positioning that outputs time-stamped data, you must synchronize the HYPACK® SUB-BOTTOM Veritime clock to the UTC time from the inertial system by selecting the inertial system name in the Synchronize Computer Clock area.

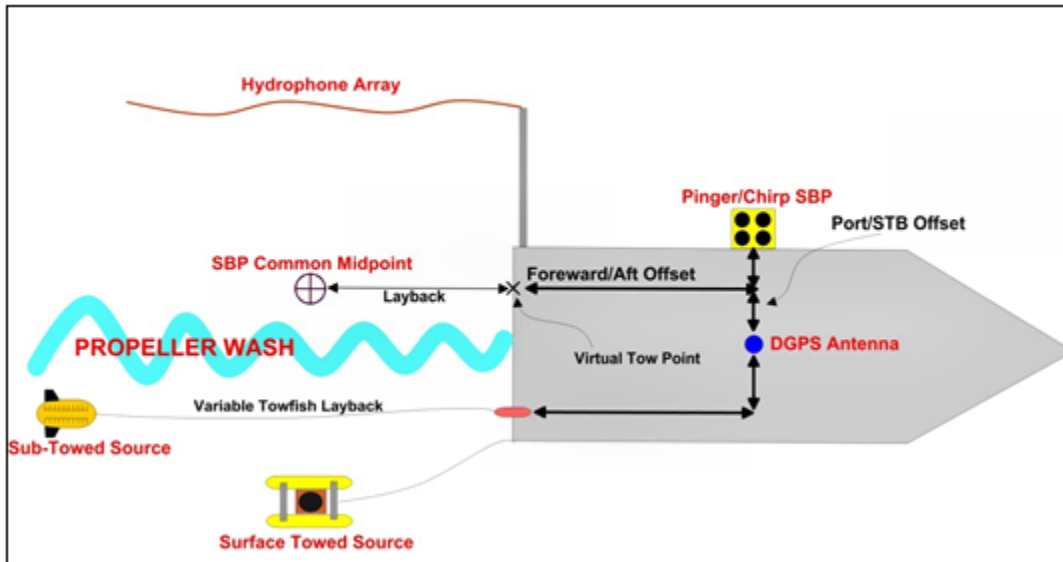
FIGURE 106. Hardware System Settings



## SAMPLE SUB-BOTTOM HARDWARE CONFIGURATION

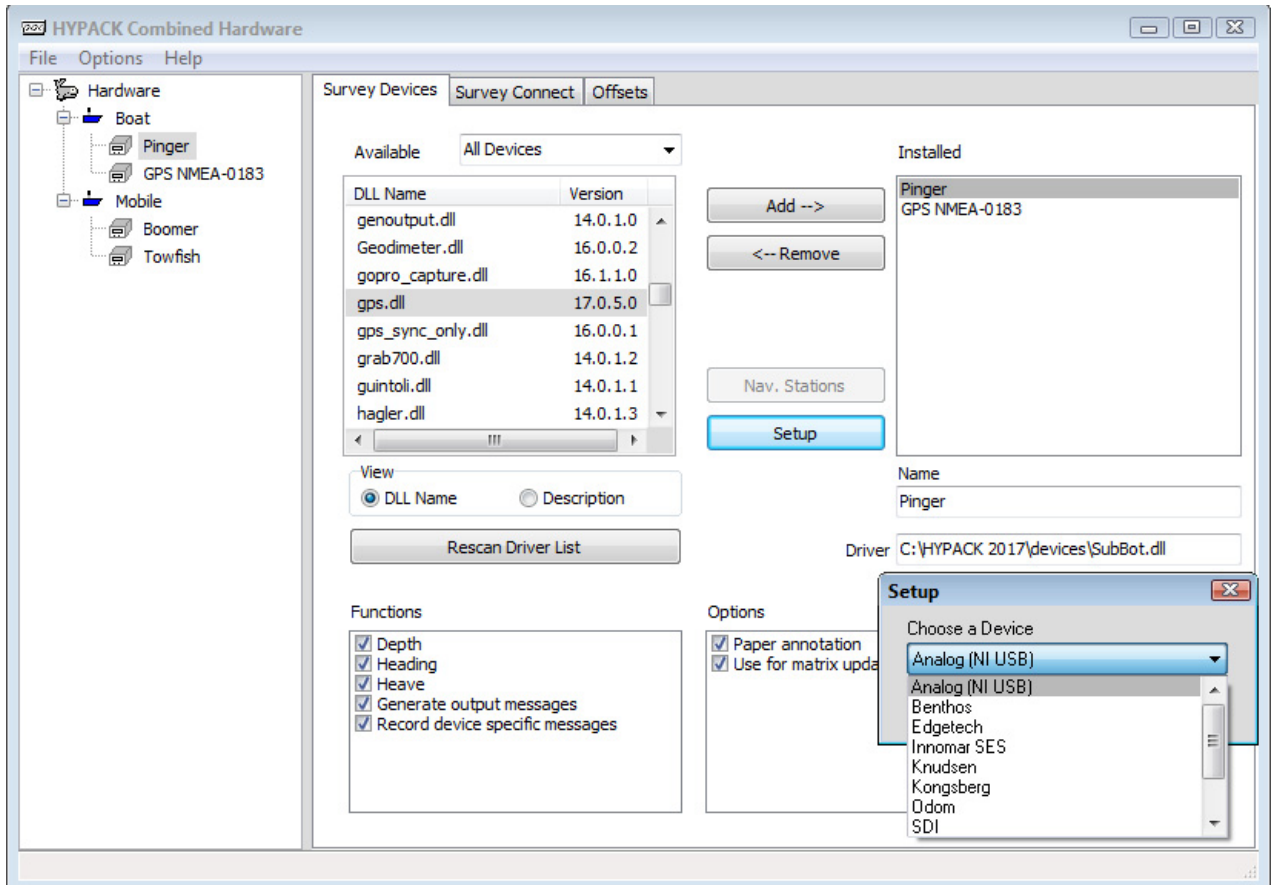
The following example shows a dual sub-bottom configuration:

FIGURE 107. HARDWARE Configuration with Hull-mounted and Towed Sub-bottom Profilers



In this example, one sub-bottom profiling system is installed on the boat mobile and a second sub-bottom profiling system is surface towed on the second mobile. Both systems are configured with the subbot device driver, and you just select the model of your sub-bottom profiler (SBP) in the driver Setup dialog.

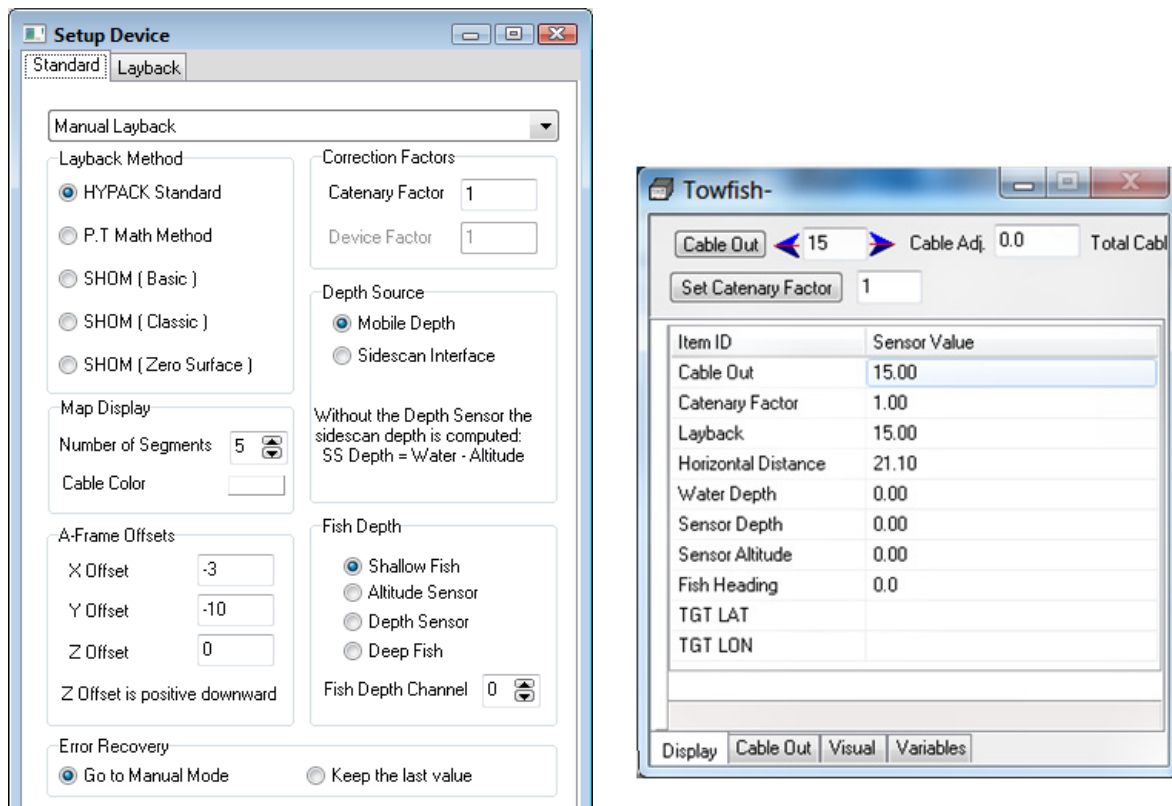
**FIGURE 108.** Hardware Configuration—Choose the SBP Model in the Subbot Driver Setup Dialog



**Hull-mounted SBP systems** use a GPS for positioning. Enter the horizontal offsets for the SBP relative to the GPS, and the vertical offset relative to the static waterline.

**Surface-towed SBP systems** get positioning calculated using the Towfish device driver (Towfish.dll). Enter the offsets from the GPS to the A-frame attachment point as the A-Frame Offsets in the Towfish device driver setup, and set the Catenary Factor to 1 for surface towed SBP systems. The cable out value, from the A-frame attachment point to the SBP Common Midpoint, is input in the Towfish Device Window in SURVEY.

**FIGURE 109.** *Towfish Driver Setup—HARDWARE (left) and SURVEY (right)*



## CONFIGURING ANALOG DEVICES

*For analog systems,* connect a National Instruments NI USB-6221 A/D box to the survey computer to acquire the data. HYPACK® SUB-BOTTOM has a single program, the Analog Monitor, which talks directly to the NI USB device and acts as an intermediary between it and the HYPACK® SURVEY drivers. Digital systems do not use this program.

**NOTE:** HYPACK® SUB-BOTTOM supports other National Instrument A/D cards with analog output for internal triggering. For dual channel profilers, an output FIFO size of greater than 8000 samples/channel is required. Single channel systems require 4000 samples/channel. Other Analog A/D cards with external triggering require analog output.

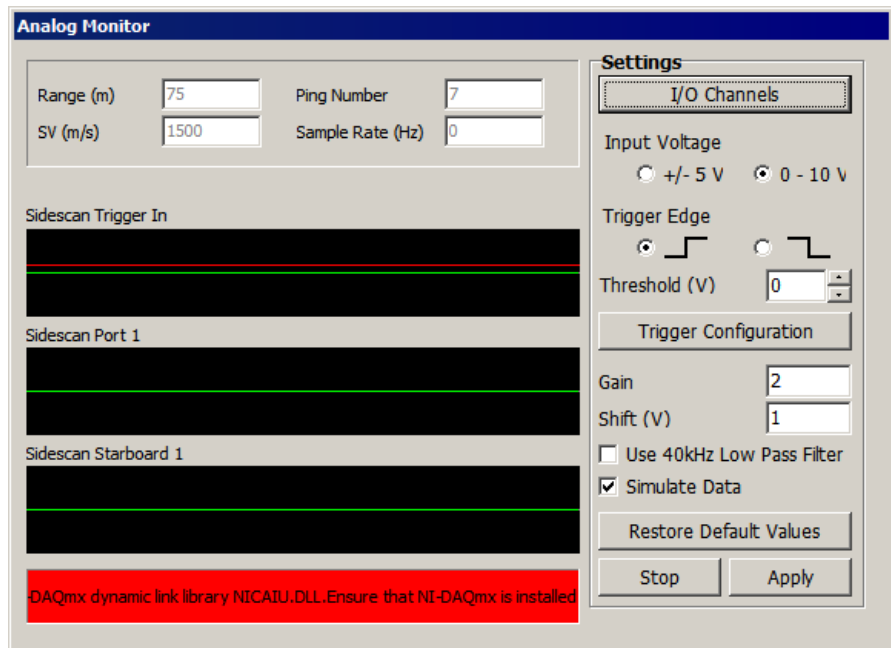
The NI USB device (I/O ports, voltage levels, etc.) configuration occurs in the Analog Monitor; therefore, the HYPACK® SUB-BOTTOM drivers need very minimal setup themselves. By default,



the first analog SBP device is allocated to Channel 1. For the second SBP, select the “Use Channel 2” option under its Subbot driver setup dialog.

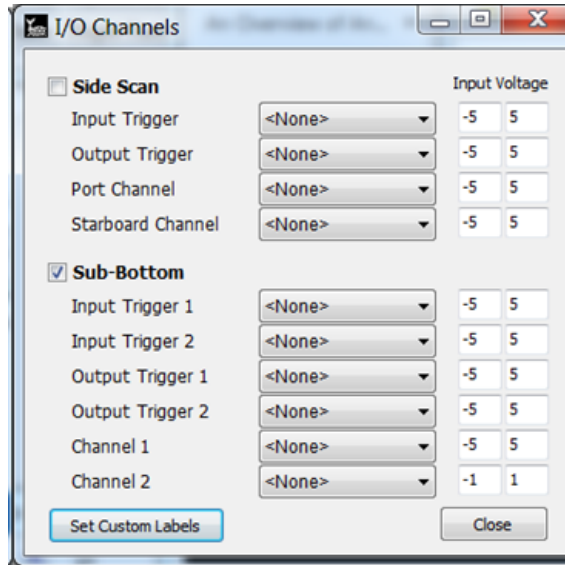
When SURVEY starts, the drivers automatically start the Analog Monitor. From there, you can access the dialogs to configure the input/output channels and triggers.

**FIGURE 110.** *Input/Output Configuration in the Analog Monitor—The Analog Monitor (left) and I/O Configuration (right)*



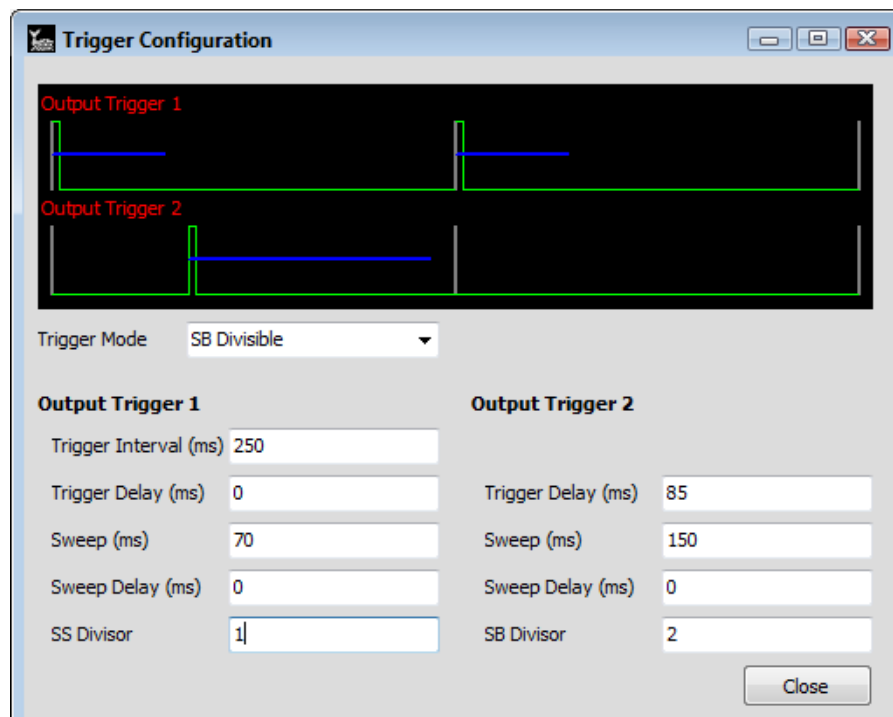
1. **Configure the Input/Output.** Click [I/O Channels] on the Analog Monitor to access the dialog. For each field, configure the channel on the NI USB device to which the signal is wired. Each of the Channels can be assigned a custom label or name applicable to the SBP system in use (i.e., “Sparker Signal”).

**FIGURE 111.** Input/Output Configuration in the Analog Monitor—The Analog Monitor (left) and I/O Configuration (right)



2. **Configure the triggers.** Click [Trigger Configuration] on the Analog Monitor to access the dialog which provides advanced options on setting the SBP triggering configurations.

**FIGURE 112.** Trigger Configuration



Any configuration problems will be reported as a bright red message at the bottom of the Analog Monitor. Signal traces are displayed for diagnostic purposes and to insure that the trigger

signal is being received. (Click the labels to cycle through the channels.)

At this point, if the wiring and Analog Monitor configuration is correct, you should be able to start SURVEY, see data coming in on the correct signal traces, and view the Ping Number field on the Analog Monitor steadily increasing. The scrolling data window in SURVEY will also display the sub-bottom profiling data.

### ANALOG INPUT/OUTPUT CONFIGURATION

1. **In the Analog Monitor window, click [I/O Channels].**
2. **Check the Sub-bottom option** to pass the data to the subbot driver.
3. **For each field, configure the channel on the NI USB device to which the signal is wired.**
  - **Custom Labels:** (Optional) Assign a name applicable to the SBP system in use (i.e., “Sparker Signal”).
  - **Trigger voltage** generally use the default levels of -5V/+5V.

TABLE 4. Recommended Signal Voltage Levels

System Type	Recommendation
Pinger/Chirp	In the -5V/+5V and -2V/+5V range depending on the age of the system
Hydrophone Arrays for Boomers/Sparkers/etc.	In the -1V/+1V to -5V/+5V volt range depending on the sensitivity of array, the gain on the hydrophone preamp and the reflectivity of the seabed.

- **Channel 1 and/or 2 voltage levels** can be considered as a “base gain” for the channel. It is important not to clip the incoming signals as these clipped data cannot be recovered.



**Tip:** Rule of Thumb: Set the voltage range about one third higher than the actual input signal voltage.

### ANALOG TRIGGER CONFIGURATION

The trigger threshold should be set just above the base voltage; it is displayed as a red line in the Analog Monitor. Each time the trigger signal crosses this line, a ping is logged.

- **Trigger Mode:** Various Trigger Mode options are available to suit most applications and four options are provided.
  - **External:** Triggers originate from outside HYPACK® SUB-BOTTOM and the Analog Monitor only listens for signals.

- **Internal** creates only one sub-bottom trigger from the NI USB box.
- **SS Divisible:** Side-scan is the primary trigger, sub-bottom Channel 1 is the divisible.
- **SB Divisible:** Two channels of sub-bottom, sub-bottom Channel 2 is the divisible.
- **Trigger Interval:** The rate (in milliseconds) that the sub-bottom will fire if it is the primary system.
- **Trigger Delay:** The time delay (in milliseconds) to wait before firing the sub-bottom system.
- **Sweep:** The length of time (in milliseconds) that the sub-bottom receiver listens for the return acoustic signal.
- **Sweep Delay:** The length of time (in milliseconds) to wait after the sub-bottom system has fired before starting to listen for the return acoustic signal. This feature can be used in deeper water to reduce the length of the water column in the data.
- **SS Divisor:** How to divide the side-scan trigger if sub-bottom channel 1 is the secondary system.
- **SB Divisor:** How to divide the primary trigger if sub-bottom channel 2 is the secondary system. If the primary trigger interval is set to 250 ms and the SB Divisor set to 2, the resultant Channel 2 trigger interval will be 500 ms.

As an example, the general rules of thumb for configuring the triggers and sweep length for various sub-bottom profilers, in a maximum water depth of 30 meters, appear in the following table.

**NOTE:** To convert from meters to milliseconds, divide by 0.75.

*TABLE 5. General rules for setting the sweep length based for different expected acoustic penetration for a selection of sub-bottom profilers.*

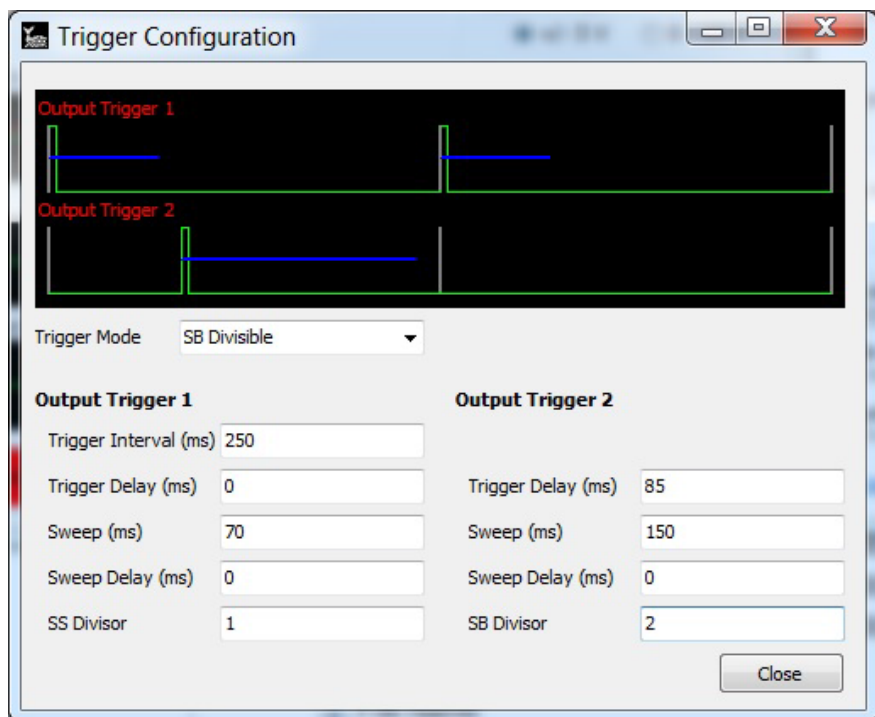
System	Trigger Interval	Max. Water Depth Plus Expected Penetration	Sweep Calculation	Sweep Setting
<b>Pinger/Chirp</b>	250 ms	30 m depth plus 15 m penetration	40 ms + 20 ms	60 ms
<b>Boomer</b>	500 ms	30 m depth plus 30 m penetration	40 ms + 40 ms	80 ms
<b>Sparker</b>	500 ms to 1 s	30 m depth plus 40 m penetration	40 ms + 53 ms	93 ms
<b>Mini-Airgun</b>	1 s to 2 s	30 m depth plus 50 m penetration	40 ms + 67 ms	107 ms

**NOTE:** It is a good idea to set the sweep value to a bit more than is calculated to allow a safety margin for unknown seabed conditions.

These advanced trigger configuration features enable you to acquire two different sub-bottom profiling (SBP) systems simultaneously with no acoustic interference between the systems. You can tell if there will be any acoustic interference between the systems, if the blue sweep lines overlap vertically, in the graphic at the top of the dialog. When there is no overlap, the result will be two interference-free datasets.

In the following figure, the SBP System 1 is triggered every 250 ms with sweep length of 70 ms ( $\pm 53$  m). The SBP System 1 trigger divided by 2 gives a SBP System a trigger interval of 500 ms with a 85 ms trigger delay and a 150 ms sweep length.

**FIGURE 113.** Sample Trigger Configuration for Dual Channel Sub-bottom Profiling Acquisition.



## MATRIX FILES (\*.MTX) IN HYPACK® SUB-BOTTOM

**Matrix files (\*.MTX)** are gridded rectangular areas. You can fill the cells with depth information from your sub-bottom profiler in real time during data collection, or in post-processing.

Empty matrix files are typically created in the MATRIX EDITOR and saved to the project folder.

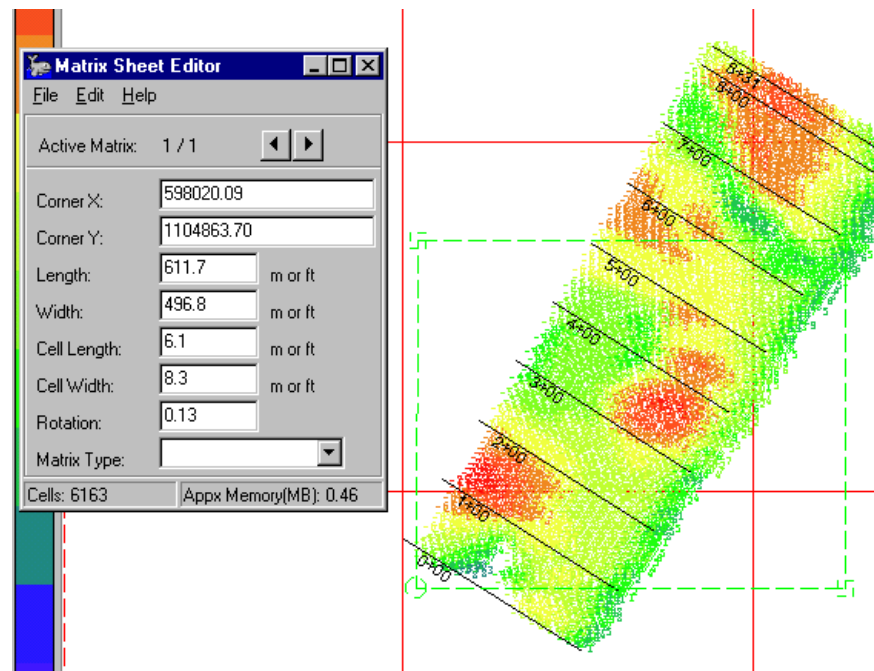
### More Information

- [“Matrix Files in SURVEY”](#) on page 3-51

## CREATING A MATRIX FILE WITH THE MATRIX EDITOR

1. **Load the files that define your survey area** (ex. background files or planned line files). Right-click on background files or planned line files at the lower left and select Add File and follow the prompts to select your file. You may choose to zoom-in or – out to adjust the size of the area to fit your screen.
2. **Open the Matrix Editor** by selecting PREPARATION-EDITORS-MATRIX. A default Matrix will be drawn to the screen and defined in the Matrix Editor dialog.

**FIGURE 114.** The Matrix Editor



3. **Position and size the Matrix File** to cover your survey area.
  - **With the cursor, drag the corners** in the HYPACK® SUB-BOTTOM map window.
    - **To move the matrix file**, click and drag the circled corner.
    - **To rotate the matrix file**, click and drag the square corner opposite the circled corner.
    - **To change the length of your matrix area**, click and drag the first square corner counter-clockwise from the circled corner.
    - **To change the width of your matrix area**, click and drag the first square corner clockwise from the circled corner.
  - **In the MATRIX EDITOR**, edit the length, width and rotation information displayed.

The X-Y coordinates represent the position of the circled corner of the matrix file. All other information is relative to that point.

As you enter each change in the MATRIX EDITOR, the drawing in the Area Map updates accordingly.
4. **Define the cell length and width** to set the size of the individual cells inside the matrix. The number of cells and approximate memory required for this matrix is displayed in the status bar.

**Tip:** To see the specified cell size relative to your other chart files, select EDIT-DRAW CELL OUTLINES. The matrix grid draws in the matrix preview in the HYPACK® SURVEY Map.
5. **Choose the Type of matrix.**

For sub-bottom surveys, choose the Hypack type.
6. **Save your matrix file** by selecting FILE-SAVE. You will be asked to name your file. It will be saved to your project directory with the MTX extension and will be enabled in your project. You now have an empty (unfilled) matrix!



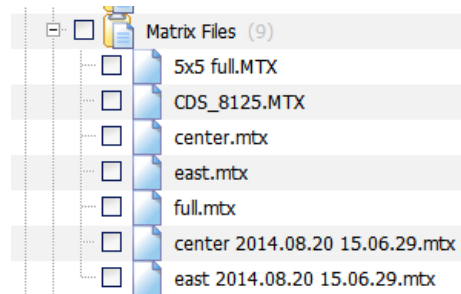
## MATRIX FILE BACKUPS IN HYPACK® SUB-BOTTOM

You can quickly and easily make a backup copy of your filled matrix file and include it in your Project Items list. HYPACK® SUB-BOTTOM automatically names the backup copy by appending the date and time to the original matrix file name: *FileName yyyy.mm.dd hh.mm.ss.mtx*.

This enables you to maintain a series of backup matrix files over time. You can compare files to see changes from one time to another.

1. **Select one or more matrix files** in the Project Items list.
2. **Right-click on the selection and select Backup MTX Files** from the menu.

**FIGURE 115.** Two Matrix Files Backed up at 3:06 on August 20, 2014



## EDITING AN EXISTING MATRIX FILE

You can make changes to an existing Matrix file in the MATRIX EDITOR. The changes can be saved to the original file name (overwriting it), or saved to a new file name.

1. **Load the Matrix file to the MATRIX EDITOR.** You can do this by:
  - Double-clicking on the file name in the Project Files List.
  - Selecting FILE-OPEN from the MATRIX EDITOR menu and selecting the file you want to change.
2. **Edit the matrix file.** you can click and drag the corners to move, rotate or resize the matrix. You can also go to the MATRIX EDITOR and change cell dimensions as well as the positioning of the matrix area. The changes are reflected in the area map as they are entered.

**BEWARE!** If you edit a “filled” matrix file, it will lose its depth content.

*Beware!*

3. **When you are satisfied, save your file.**
  - **To overwrite the original matrix information with a new, empty matrix,** select FILE-SAVE.
  - **To create a new, empty matrix,** select FILE-SAVE AS and name your file.

The HYPACK® SUB-BOTTOM screen display will reflect your work.

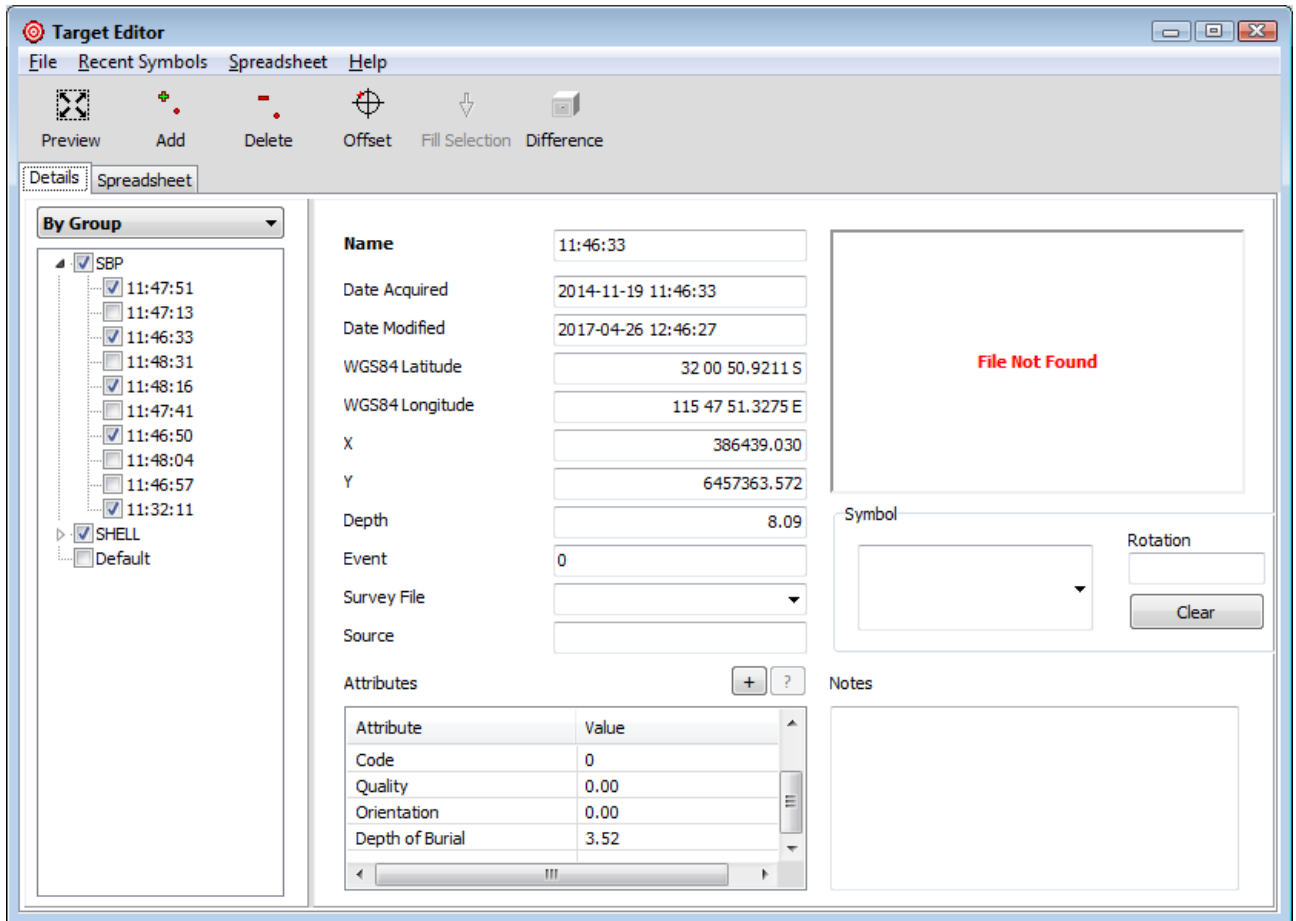


## TARGETS IN HYPACK® SUB-BOTTOM

**Targets** mark points of interest in your project area. To that end, each target must at least include a name and the XY position, but it can also include a lot of other metadata according to the project and the technology used and the program in which you mark your target. Targets marked in the SUB-BOTTOM PROCESSOR includes depth and depth of burial.

You can create targets in the HYPACK® SUB-BOTTOM interface or in the TARGET EDITOR then display them in the SURVEY program. This enables you to navigate *to* predetermined locations or *away* from areas dangerous for navigation. You can also mark targets at points of interest in SURVEY and in post-processing and save them to the project target list. The TARGET EDITOR displays all information about each target in one window and enables you to modify target properties and attributes where appropriate.

FIGURE 116. Sample TARGET EDITOR Display



A target group is a list of individual targets, which allows you to enable and disable all targets in the group in one operation (in much the same way catalogs facilitate data files).

HYPACK® SUB-BOTTOM automatically creates several default groups in the Project Items list named according to the program in which the member targets were created. You can also create target groups to suit your needs. Targets can be members of more than one group.

Each project maintains a **target database** (targets.db) in the project folder. The HYPACK® SUB-BOTTOM shell, SURVEY and SUB-BOTTOM PROCESSOR all read and write target information to this database. The database model currently supports a lengthy list of target properties and attributes. Each program reads and writes only the properties and attributes they need.

#### More Information

- [“Targets in SURVEY”](#) on page 3-42
- [“Targets in the SUB-BOTTOM PROCESSOR”](#) on page 4-44

## MARKING TARGETS WITH YOUR CURSOR IN HYPACK® SUB-BOTTOM

You can use the cursor, in Target Editor mode, to mark targets in the Map window. For each click, HYPACK® SUB-BOTTOM marks a target in the map and saves it in the Shell target group in the Project Items list. HYPACK® SUB-BOTTOM automatically names targets using consecutive numbers, but you can rename them in the TARGET EDITOR.

1. **If you have files that define your survey area (ex. background files or planned line files), load them.**
2. **In the Map View tools, click the Add Target icon.**  
The cursor changes to a triangle beside crosshairs.
3. **Click in the Map window (with the cross hairs part of the cursor) at each target location.** For each click, HYPACK® SUB-BOTTOM marks a target in the map and saves it to the Shell group.



## TARGET DISPLAY OPTIONS

The Targets tab in the HYPACK® SUB-BOTTOM Control Panel affects the display in the HYPACK® SUB-BOTTOM area map. The

Target Parameters in SURVEY provide the default target display options in SURVEY. These settings are applied universally to all targets enabled in your map windows.

For options that affect only select targets, use the right-click menu or TARGET EDITOR to modify the target properties.

## ZOOM EXTENTS ON TARGETS IN HYPACK® SUB-BOTTOM

You can use the right-click menu to zoom in on an individual target, on the enabled targets in a select group or on all of the project targets:

1. **In the Project Items list, right-click on the target item on which you want to zoom.**

Targets to Zoom	Right-click Location
Individual target	Target
Target group	Target group
All project targets	Target folder

2. **Select Zoom Extents.**

## TARGET EDITOR

The TARGET EDITOR is the interface where you can create, view and edit your target information.

**To open the TARGET EDITOR,** use any of the following methods:

- Select PREPARATION-EDITORS-TARGET EDITOR.
- Right-click on the Targets folder in the Project Items list and select Open Target Editor.
- Right-click on a target in the Project Items list and select Edit Target.
- Double-click on a target in the Project Items list.

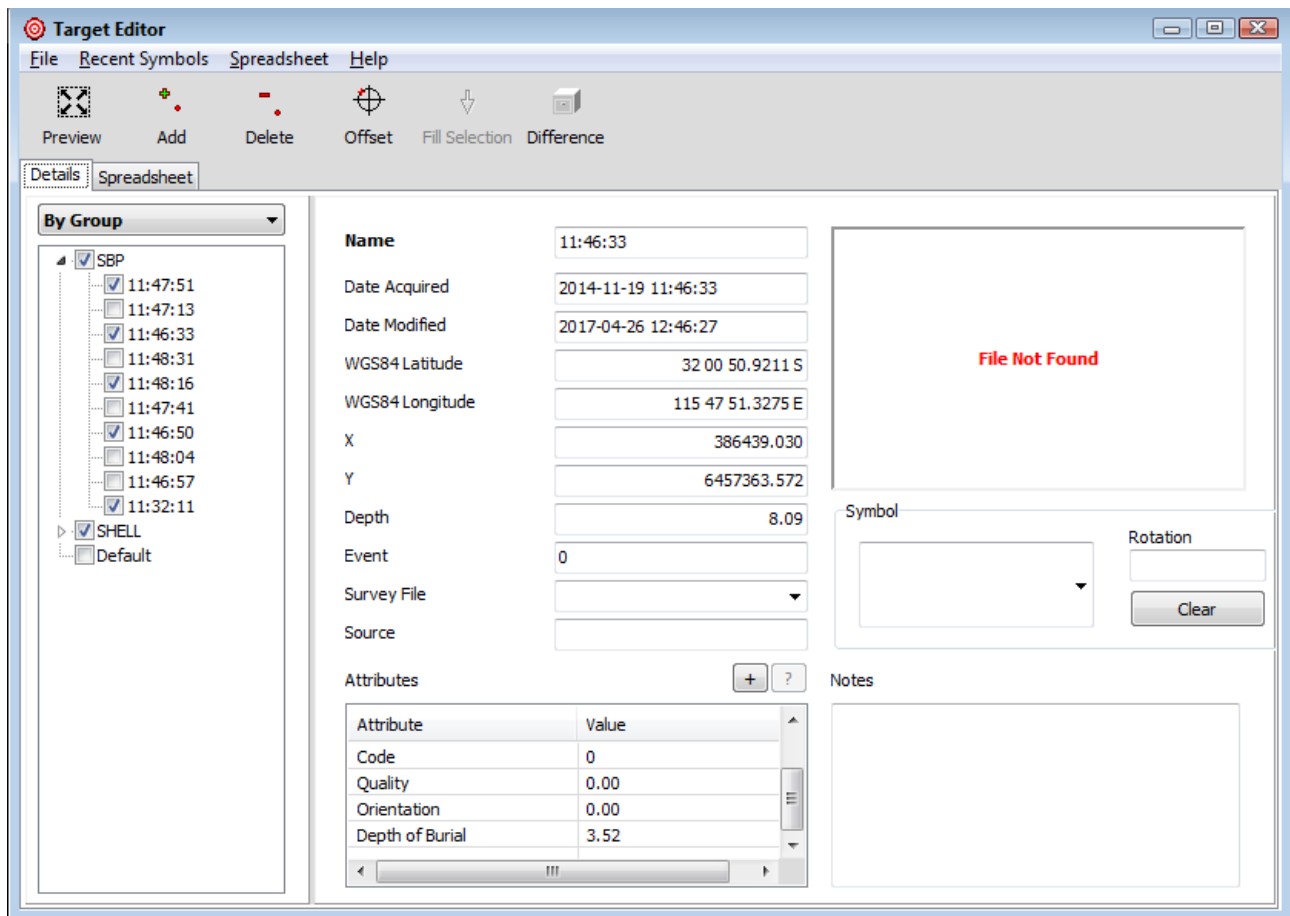
It presents your target properties and attributes in two tabs: Details and Spreadsheet.

## DETAILS TAB

The **Details** tab lists all of the targets in your project. Most viewing and editing can be done in this tab.

- **Choose a sort method:** date, survey line, name or group. Click on the link above the tree listing until you reach your preferred sort option.
- **Enable and disable targets or target groups** using the check boxes. You may also use these selections to display only selected targets from the spreadsheet menu. The Export Checked options in the File menu limit target reports and target exports.
- **View and edit target properties.** When you select a target in the tree, its properties appear in the tab. Only select fields can be modified in Edit Target Mode.

FIGURE 117. Sample Details Tab



## SPREADSHEET TAB

The **Spreadsheet** tab enables you to see each of your targets and their properties in one row of a table. In this view, you can see the properties of multiple targets at once.

You can configure the TARGET EDITOR Spreadsheet using common Windows® spreadsheet operations:

- **Sort the spreadsheet** based on any attribute in ascending or descending order by clicking on the column heading.
- **Resize the columns.** Click and drag the right-hand edge of each column heading.
- **Reorder the columns.** Click and drag the column heading.
- **Enable and disable targets.** Click the target number.
- **Display only enabled targets** (SPREADSHEET-SHOW CHECKED) or all project targets (SPREADSHEET-SHOW ALL).
- **Choose the displayed properties** by selecting and deselecting them in the Columns menu. A Select dialog enables you to more easily configure multiple columns: Items available are listed on the left, while items selected are listed to the right. Select items in either column then use the [Add=>] and [<=Remove] to include or omit them from your spreadsheet display.

---

**NOTE:** The list of items available is maintained in alphabetical order. The list of items selected shows the order that the columns will be displayed in the spreadsheet. Normally, they will be listed in the order that they are selected. **To reorder the selected items**, use the cursor to drag and drop items in the list.

---



**Tip:** Use the Default button for your project type to automatically configure the spreadsheet to display the target name, position and the attributes specific to the project type.

FIGURE 118. Select Dialog—Classic Defaults

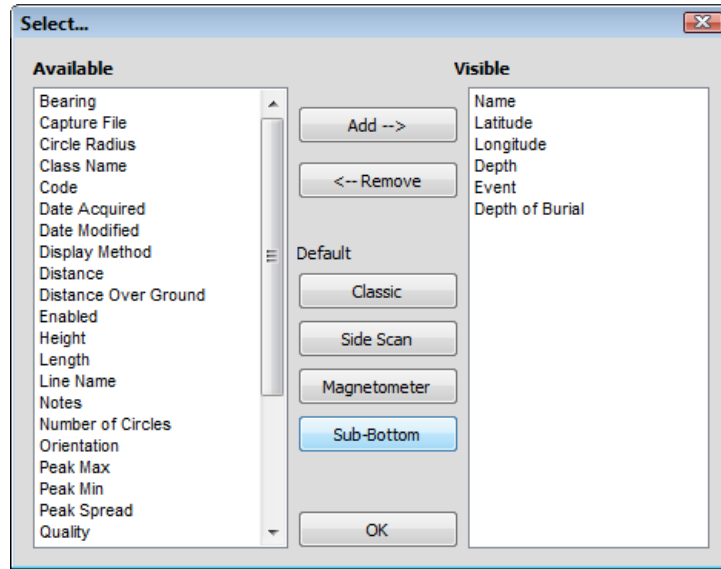


FIGURE 119. Select Dialog Defaults—Sub-Bottom

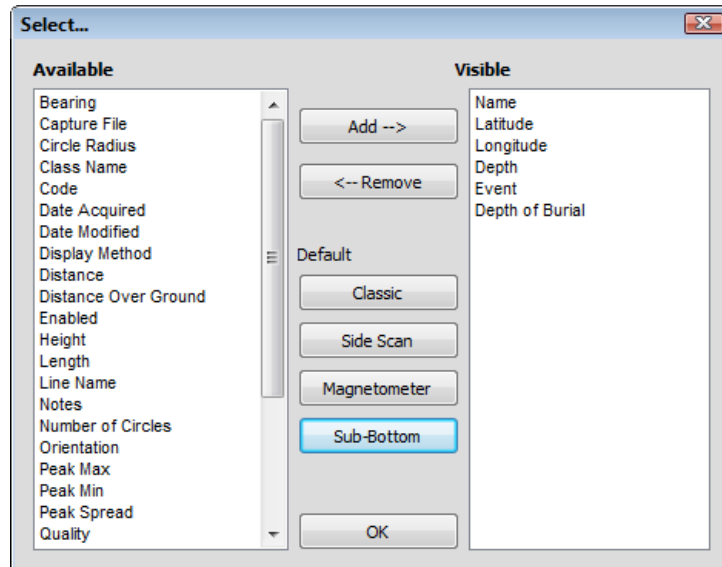


FIGURE 120. Sample Spreadsheet View

	Name	Latitude	Longitude	- Height	Length	Width	Range	Tow Fish Alt	Tow Fish He	Capt
1	✓ 12:39:15	49 23.358811 N	000 53.54764 W	4.90	59.20	19.10	61.30	15.80	93.40	12-35
2	✓ 12:39:14	49 23.358406 N	000 53.549146 W	3.50	0.00	0.00	61.30	15.70	93.30	12-35
3	09:21:51	49 23.711837 N	000 53.795578 W							
4	09:22:04	49 23.700079 N	000 53.793665 W							
5	09:22:09	49 23.69473 N	000 53.792802 W							
6	✓ 12:54:49	49 23.384654 N	000 53.786998 W				51.94	5.00	130.08	12-54
7	✓ 12:55:05	49 23.38094 N	000 53.73124 W				29.21	5.00	103.97	12-55

### CREATING TARGETS IN THE TARGET EDITOR

When you know the coordinates of your target positions, you can create targets by entering target names and positions in the TARGET EDITOR:

1. **Open the TARGET EDITOR.** Select PREPARATION-EDITORS-TARGET EDITOR.
2. **Select FILE-ADD TARGET** (or click the Add icon). The Add Target dialog appears.



FIGURE 121. Add Target Dialog

**Add Target**

Name:

X:  000000.00

Y:  000000.00

Position Units:

Lat/Lon Options:

3. **Select your preferred units with which to enter the position:** X/Y, Local Latitude/Longitude, or WGS-84 Latitude/Longitude.
4. **If you have chosen one of the Latitude/Longitude options, set your preferred input format.**

5. **Enter your target name and position coordinates.**
6. **Click [Add].** The TARGET EDITOR saves the target to the Default group.

## TARGET PROPERTIES

### Properties

Target Properties can apply to all targets, regardless of where or how you generate them.

TABLE 6. Target Properties

Property	Definition	Editable?
<b>Name</b>	Target Name	Yes
<b>Date Acquired</b>	Date and time the target was originally generated.	No
<b>Date Modified</b>	Date and time the target was last edited.	No
<b>WGS-84 Latitude and Longitude</b>	Current target position. Automatically updates if you change X,Y.	Yes
<b>X, Y</b>	Current target position. Automatically updates if you change Lat/Lon.	Yes
<b>Depth</b>	Water depth at target location.	Yes
<b>Event</b>	If the target is marked during SURVEY, this is the latest event number. Otherwise, this value will be 0.	Yes
<b>Survey File/Line Name</b>	Survey line file on which the target is marked during SURVEY.	Yes
<b>Source</b>	Program in which you mark the target or "imported".	No
<b>Notes</b>	User-defined memo regarding target position. User notes entered in the Target Properties dialog in SURVEY, in TARGETING AND MOSAICKING during targeting, or in TARGET VIEWER.	Yes
<b>Symbol</b>	S57 chart display symbol that can be displayed at target locations. The symbols are set in the TARGET EDITOR or through the right-click menu from the Project Items list. Overridden by Display Method = 1 (Alarm)	Yes
<b>Rotation</b>	Clockwise symbol rotation.	Yes

### Attributes

Target attributes are generally only pertinent to the source program. For example, circles, alarm, transparency is only supported in HYPACK® SURVEY, but not in main HYPACK® SUB-BOTTOM Map window.



TABLE 7. Target Attributes

Attribute	Definition	Editable?
<b>Distance</b>	Distance from the current target position. SURVEY displays the target at the position calculated using Distance and Bearing properties, with a dotted line back to the original location. You can relocate all targets based on these attributes in the TARGET EDITOR.	Yes
<b>Bearing</b>	Direction the target is offset by the Distance property value.	Yes.
<b>Code</b>		In development
<b>Quality</b>	Confidence Code for Target Classification. Otherwise, value is always '0'.	Yes
<b>Orientation</b>	The angle of the alarm flag from the target when displaying it in SURVEY. Applicable only when Display Method = 1 (Alarm)	Yes
<b>Circle Radius</b>	Radius of the first circle around the target (and distance from there to any subsequent circles) when you select the Circle Target Display option in the HYPACK® SUB-BOTTOM Control Panel. Applicable only when Display Method = 0 (Circle)	Yes
<b>Number of Circles</b>	Number of concentric circles around the target when you select the Circle Target Display Method in the HYPACK® SUB-BOTTOM Control Panel. Applicable only when Display Method = 0 (Circle)	Yes
<b>Towfish Heading</b>	Towfish Heading when the target was marked.	Yes
<b>Display Method</b>	In the HYPACK® SURVEY Map window. 0 = Circle or 1 = Alarm.	Yes
<b>Depth of Burial</b>	Isopach depth. Generated in the SUB-BOTTOM PROCESSOR.	Yes
<b>Transparency</b>	Percent opaqueness. (0 = transparent, 100 fully opaque)	Yes

### EDITING TARGET PROPERTIES

In the TARGET EDITOR, *when you are in Edit Mode*, you can edit or add target properties and attributes in either the Tree or Spreadsheet tab. The program automatically saves your changes when you close the dialog.

**Set Edit Mode** in the Spreadsheet menu. The Edit Mode item toggles the mode on and off.

Target attributes are generally only pertinent to the source program. For example, circles, alarm, transparency is only supported in HYPACK® SURVEY, but not in the main HYPACK® SUB-BOTTOM Map window.



**Tip:** The **Recent Symbols** menu provides the ten most recently used S57 symbols. Those you commonly use are more readily available than in the full list of the Display tab and are also accessible from the Spreadsheet.

A right-click menu from the Project Items list also accesses a routine specifically for assigning S57 symbols to a select target.

### EDITING TARGET PROPERTIES IN THE DETAILS TAB

1. **Right-click on a target in the Project Items list and select Edit Target.** The TARGET EDITOR appears with the target information displayed.
2. **Select SPREADSHEET and be sure the Edit Mode is checked.**
3. **Return to the Details tab.**
4. **Select (highlight) the target you want to edit.** The properties for the selected target are displayed on the right side of the TARGET EDITOR.
5. **Modify the target properties as needed.**
6. **Add any other applicable attributes as needed:**
  - a. **Click [+]** and select the required attribute. The selected attribute appears in the Other Attributes list.
  - b. **Enter the attribute value.**
7. **Close the dialog.**

### EDITING TARGET PROPERTIES IN THE SPREADSHEET TAB

In the Spreadsheet tab, you can edit properties for individual targets, as you can in the Details tab. (Just find the row for the target and change the property value in the appropriate column.) You can also apply the same property to multiple targets at once:

1. **Open the Target Editor.** Select EDITORS-TARGET EDITOR.
2. **Select SPREADSHEET and be sure the Edit Mode is checked.**
3. **Limit your Spreadsheet display to the targets you want to modify:**
  - a. **In the Details tab, check all targets to which you want to enter the same property.**
  - b. **In the Spreadsheet tab, select SPREADSHEET-SHOW CHECKED.**
4. **Enter the new property at the top of the column (eg. the target symbol).**

5. **Multiselect the column and click the Fill Selection icon.** The property value of the first selected cell gets copied to the remaining selected cells. *It is not applied to targets that are not displayed.*
6. **Close the dialog.**

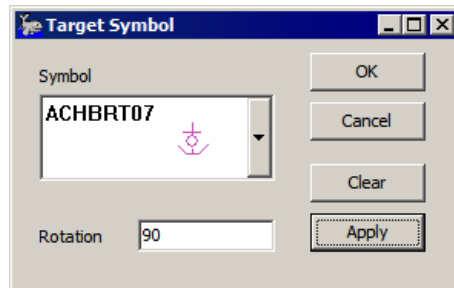


**ASSIGNING S57  
DISPLAY  
SYMBOLS FROM  
THE PROJECT  
ITEMS LIST**

You can assign an S57 display symbol to any target in HYPACK® SUB-BOTTOM, in the TARGET EDITOR or from Project Items list. The symbol appears at the target location together with the circles or alarm flags designated in the Control Panel settings.

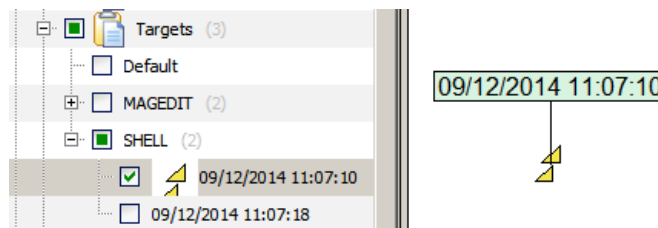
1. **Access the Target Symbol dialog.**
  - **In the Project Items list**, right-click on the target to which you want to assign the symbol and select Assign Display Symbol.
  - **In the Spreadsheet tab of the TARGET EDITOR**, right-click on the target name in the spreadsheet and select Edit Symbol.

FIGURE 122. Target Symbol Dialog



2. **Use the Symbol drop-down to select your S57 symbol.**
3. **Enter the rotation.** (Optional) The number of degrees to rotate the symbol clock-wise.
4. **Preview the results,** (Optional) Click [Apply].

FIGURE 123. Sample S57 Target Symbols



5. **Click [OK].**

To remove the S57 Symbol, do the following:

1. **Right-click in the Project Items list on the target to which you want to assign the symbol and select Assign Display Symbol.** The Target Symbol dialog appears.
2. **Click [Clear].** The symbol disappears in the dialog.
3. **Preview the results.** (Optional) Click [Apply].
4. **Click [OK].** The HYPACK® SUB-BOTTOM displays remove the symbol and the map window restores the default target symbol.

### OFFSETTING TARGETS IN THE TARGET EDITOR

In the TARGET EDITOR, you can create additional targets at user-defined positions *relative to existing targets*.

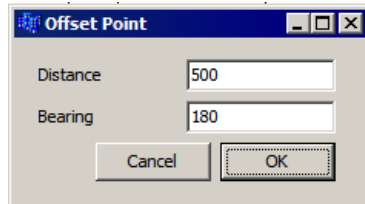


1. **In the TARGET EDITOR, select one or more targets in the tree view.**

**Tip:** To multiselect files, hold the Ctrl key and select multiple individual records or hold the Shift key and click on the first and last records in a range of consecutive records.

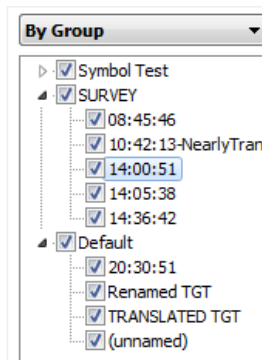
2. **Right-click and select Offset Selected Targets.** The Offset Point Dialog appears.

FIGURE 124. Offsets Point Dialog



3. **Enter the distance and bearing, at which you want the new targets generated relative to the selected targets and click [OK].**

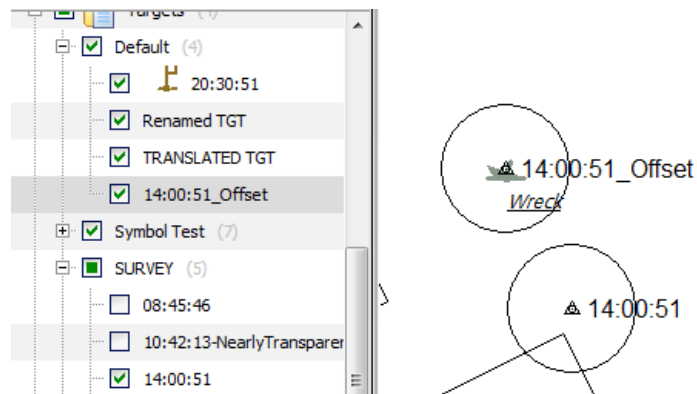
FIGURE 125. The Resulting Targets in the TARGET EDITOR



4. **Name your new targets.** Enter a Name attribute in the TARGET EDITOR.

HYPACK® SUB-BOTTOM assigns the new targets to the Default target group

**FIGURE 126.** Resulting Targets in HYPACK® SUB-BOTTOM



## DELETING TARGETS IN THE TARGET EDITOR

**IMPORTANT!** There is a critical difference between *removing* and *deleting* targets:

**Removing a target** omits it from the current group listing, but the target remains in the project. If it has no assigned group, HYPACK® SUB-BOTTOM automatically assigns it to the Default group.

**Deleting a target** removes it from your project and from your hard drive. *It no longer exists.*

- **From the HYPACK® SUB-BOTTOM Interface**, right-click in the Project Items list on the target you want to delete and select Delete Target.
- **From the TARGET EDITOR**, select the target you want to delete in the Details tab and click the Delete icon.



## IMPORTING AND EXPORTING TARGET DATA TO THE TARGET EDITOR

When you open a project with legacy TGT format target files from earlier HYPACK® SUB-BOTTOM versions, HYPACK® SUB-BOTTOM automatically converts each TGT file to a target group.

In addition, you can import or export target information in the Project Items list using either a simple text (\*.TXT) file or the HYPACK® SUB-BOTTOM target file (\*.TGT) format, respectively.

**NOTE:** This procedure was designed to import HYPACK® SUB-BOTTOM TGT files from earlier projects. For this reason, it only supports select target properties (not target attributes).

**More Information**

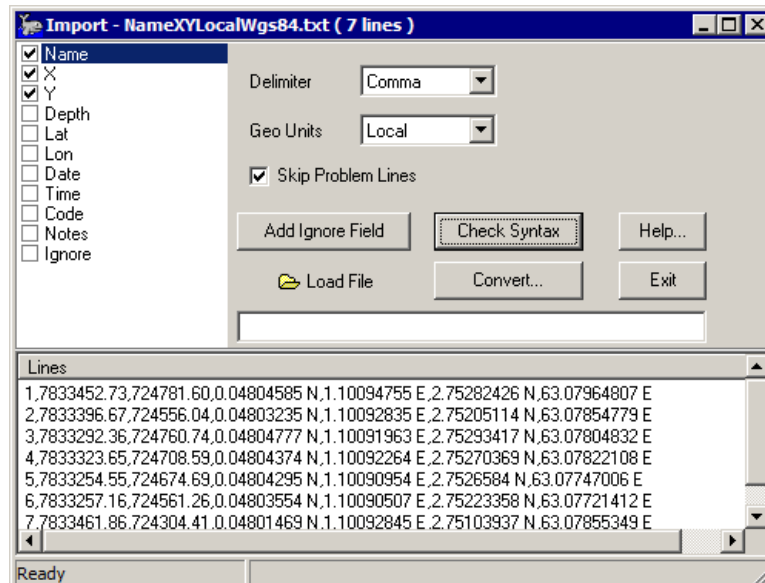
- [“Target Properties”](#) on page 2-118
- [“Target Reports”](#) on page 2-128

**IMPORTING TEXT FILES TO THE TARGET EDITOR**

The Target Import dialog enables you to extract data from ASCII text files and use it to populate the fields of the TARGET EDITOR. Each line (or record) in the text file must contain the data for one target and present the data in the same order.

1. **In the HYPACK® SUB-BOTTOM File List, right-click on the target group to which you want to import the targets and select Import Targets: \*.TXT FILE.** The Target Import dialog appears where you configure the import.

*FIGURE 127. Target Import Dialog*



2. **Select and order the fields used to create your new target file.**

- a. **Place a check in the box for each field in your text file** you want to use to populate the line file
- b. **Use the cursor to drag the fields** into the order that they appear in your file.
  - **To skip a field in the string**, check 'Ignore' and drag it to the position of the field to be skipped in the list. If you need more than one Ignore field, click [Add Ignore Field] to generate as many as you need.
3. **Choose the correct delimited format.** The program supports comma, tab and space delimiters.
4. **Load the text file.** Click [Load File], select your file and click [Open]. In the Lines area, you will see your targets as they appear in your file and you can see the syntax of the records.
5. **Check the syntax of your file against the field list.**  
(Optional) This process verifies that your configuration settings are compatible with the text file you have loaded.
  - a. **Select a line** from the Lines area. (Optional) The default is the first line in your input file.
  - b. **Click [Check Syntax].** A message window will appear to tell you how many records of the total number can be converted using your current settings. If you don't get the expected results, adjust your configuration and check the syntax again.

---

**NOTE:** Alternatively, you may need to adjust the structure of your text file and restart the entire process.

---

6. **Click [Convert]** A message window appears to tell you how many records have been converted.
7. **Click [Exit].** The Import dialog closes and the target group is populated with the data from the text file.

## ***EXPORTING TEXT FILES FROM THE TARGET EDITOR***

You can generate a user-configured text file which may then be imported to a text editor or spreadsheet programs. You can export all targets in the project or only selected targets. The output file is stored, by default to the project folder.

1. **Configure your Spreadsheet tab with the data** you want to export.
  - a. **Select the data** using the Columns menu or dialog.
  - b. **Order the columns.** Drag the spreadsheet headings.
  - c. **Select the targets you want to export:**
    - i. **Select SPREADSHEET-SHOW ALL.**

- ii. **Click the target number to select or deselect targets until only the targets for export are checked.**
  - iii. **Select SPREADSHEET-SHOW CHECKED.**
2. **Select FILE-SPREADSHEET EXPORT.** A File Save dialog appears.
  3. **Choose a location, name your file and click [Save].** The exported file is saved, by default, to the project folder with a CSV extension.

**FIGURE 128.** *Sample Output File:*

```
455473.70,4942631.39,0.00,"Man Overboard"
455216.00,4943428.67,0.00,"Red Buoy"
454113.00,4945510.67,0.00,"Green Buoy"
```

### TARGET DATABASE COMPARISONS

The Difference routine compares the target database (targets.db) from the current project with a second target database. For example, you can compare targets in your project between your survey and office computers, or historical and current target data.

The routine compares the targets by name, position or both.

Each target (row) is color-coded based on how it compares to those in the project targets:

**TABLE 8.** *Target Comparison Color-coding*

Color	Comparison Results
Red	Missing (No match in the project targets.)
Green	Match
Yellow	Partial match: When comparing both name and position, only one of the two criteria matches.




**FIGURE 129.** Initial Comparison—Project Targets.db (left) and Second Targets.db in the Difference Dialog

	Name	Date Acquir	Latitude	Longitude	Source	Depth	Notes	Symbol
1	Dive Location	2000-06-15 1	44 38 8.3754	063 33 41.03	IMPORTED	0.00		
2	Red Buoy	2000-06-15 1	44 38 34.155	063 33 52.98	IMPORTED	0.00		
3	Green Buoy	2016-01-14 1	44 39 41.376	063 34 43.72	IMPORTED	0.00		
4	19:09:29	2016-10-12 1	44 39 17.256	063 34 19.90	SURVEY	54.90		
5	19:13:52	2016-10-12 1	44 38 18.238	063 33 50 W	SURVEY	54.90		
6	Man Overboa	2016-10-12 1	44 38 34.261	063 33 57.83	SURVEY	57.40		
7	19:22:43	2016-10-12 1	44 39 9.7269	063 34 16.32	SURVEY	78.70		
8	19:53:56	2016-10-12 1	44 39 36.099	063 34 30.20	SURVEY	60.00		
9	Renamed TGT	2016-10-12 1	44 39 36.831	063 34 30.41	SURVEY	0.00		
10	20:30:51	2016-10-12 2	44 39 41.906	063 34 45.77	SURVEY	56.70	SURVEY	
11	Red Buoy	2016-10-26 1	44 38 53.052	063 34 2.859	SHELL	0.00		
12	Green Buoy	2016-10-26 1	44 38 53.018	063 33 40.08	SHELL	0.00		

You can then, optionally, import targets from the second file based on how they compare to the first. The imported targets are copied to the Default target group.

**NOTE:** The second target database remains unchanged.

1. **Configure the columns in the Spreadsheet tab.** The same columns appear in the comparison results.
2. **Click the Difference icon.** The Import Target File dialog appears. 
3. **Select the second target database and click [Open].** The Difference window appears listing the targets in the second database.
4. **Set your comparison criteria:**
  - **Compare:** Positions, Name or both.
  - **Tolerance:** When comparing positions, if targets are within the specified distance (survey units), it is considered a match.

The color-coding updates accordingly.
5. **Import select targets to the project targets database.** (Optional)
  - a. **Set the import criteria:**

- **Accept Misses Only** imports only the red rows. (Red rows update to green and yellow rows remain yellow.)
- **Accept Partial Matches** imports the red and yellow rows. (All rows become green.)
- **Accept All** imports all targets from the second database regardless of comparison results. Green rows create targets in the Default target group that duplicate targets already in another target group. (All rows become green.)

b. **Click the Import icon.** The Default target group receives the imported targets and the color-codes in the Difference display update.



**FIGURE 130.** *The Project Targets.db—Before Importing the Missing Targets (left) and After (center and right)*

The screenshot shows the software interface with a 'By Group' tree on the left and a 'Difference' window on the right. The 'By Group' tree shows a hierarchy with 'Halw' as the parent, containing 'Man Overboard', 'Red Buoy', and 'Green Buoy'. Below it is the 'Default' group, which contains a list of targets with their respective acquisition times and names. The 'Difference' window displays a table with columns: Name, Date Acquir, Latitude, Longitude, Source, Depth, and Notes. The table lists 15 targets, with some rows highlighted in green. The 'Import Criteria' dropdown is set to 'Accept Partial Hits' and the 'Compare' dropdown is set to 'By Name & Position'.

	Name	Date Acquir	Latitude	Longitude	Source	Depth	Notes
1	Dive Location	2000-06-15 1	44 38 8.3754	063 33 41.03	IMPORTED	0.00	
2	Red Buoy	2000-06-15 1	44 38 34.155	063 33 52.98	IMPORTED	0.00	
3	Green Buoy	2016-01-14 1	44 39 41.376	063 34 43.72	IMPORTED	0.00	
4	19:09:29	2016-10-12 1	44 39 17.256	063 34 19.90	SURVEY	54.90	
5	19:13:52	2016-10-12 1	44 38 18.238	063 33 50 W	SURVEY	54.90	
6	Man Overboa	2016-10-12 1	44 38 34.261	063 33 57.83	SURVEY	57.40	
7	19:22:43	2016-10-12 1	44 39 9.7269	063 34 16.32	SURVEY	78.70	
8	19:53:56	2016-10-12 1	44 39 36.099	063 34 30.20	SURVEY	60.00	
9	Renamed TGT	2016-10-12 1	44 39 36.831	063 34 30.41	SURVEY	0.00	
10	20:30:51	2016-10-12 2	44 39 41.906	063 34 45.77	SURVEY	56.70	SURVEY
11	Red Buoy	2016-10-26 1	44 38 53.052	063 34 2.859	SHELL	0.00	
12	Green Buoy	2016-10-26 1	44 38 53.018	063 33 40.08	SHELL	0.00	
13	19:11:59	2016-10-26 1	44 38 9.5261	063 33 48.50	SBMAX64	0.00	
14	19:14:24	2016-10-26 1	44 38 31.449	063 33 56.40	SBMAX64	0.00	
15	TRANSLATED	2016-10-26 1	44 39 37.470	063 34 32.91	SURVEY	58.60	

6. **Close the Difference window** to return to the TARGET EDITOR.

## TARGET REPORTS


The TARGET EDITOR generates a report in rich text format (\*.RTF) that presents the data about each target in an easy-to-read form, one page per target. The output file is stored, by default to the project folder.

The TARGET EDITOR and TARGETING AND MOSAICKING generate a report in rich text format (\*.RTF) that presents the data

about each target in an easy-to-read form, one page per target. The output file is stored, by default to the project folder.

1. **Choose your targets to export:**
  - **To export select targets**, check the targets or groups you want to export and select FILE-EXPORT CHECKED TO RTF.
  - **To export all targets**, select FILE-EXPORT ALL TO RTF.
2. **Name your file and click [Save].** The report is saved, by default, to your project folder.

*FIGURE 131. Sample Target Report*

Name	Date	11/08/2004
09:06:51	Time	09:06:51
Survey File	Event	2388
001_0904.HSX	X	2381019.4
Capture File	Y	320845.5
09-06-51.JPG	WGS84 Latitude	32.70885673 N
	WGS84 Longitude	79.76123512 W
	Heading	166
	Fish Altitude	98.6
	Range to Target	98.6
	Height Above Bottom	0
	Length	0
	Width	0
Notes	Height: 0.0	
		

## MANAGING TARGETS AND TARGET GROUPS

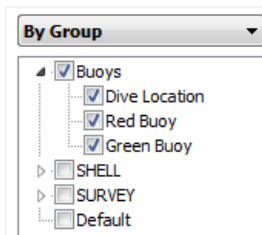
A target group is a list of individual targets, which allows you to enable and disable all targets in the group in one operation (in much the same way catalogs facilitate data files).

HYPACK® SUB-BOTTOM automatically creates several default groups in the Project Items list named according to the program in

which the member targets were created. You can also create target groups to suit your needs. Targets can be members of more than one group.

**NOTE:** The Project Items list displays empty groups, but the TARGET EDITOR displays only populated groups.

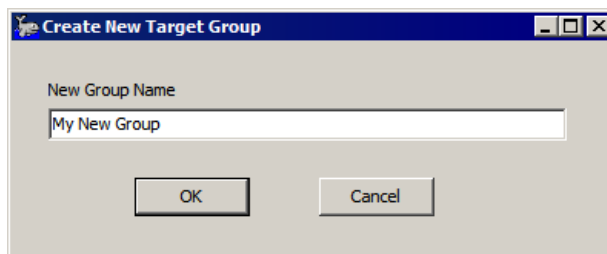
FIGURE 132. Sample Target Groups



### ADDING TARGET GROUPS

1. **Open the Create New Target Group dialog.**
  - From the HYPACK® SUB-BOTTOM Interface, right-click on Targets in the Project Items list and select Add Group.
  - From the Target Editor, select FILE-ADD GROUP.

FIGURE 133. Create New Target Group



2. **Enter the name for your new group and click [OK].** Your new target group appears under Targets in the Project Items list when you close the TARGET EDITOR. It appears in the Details tab of the TARGET EDITOR only when you add a target to the group.

### ADDING TARGETS TO TARGET GROUPS

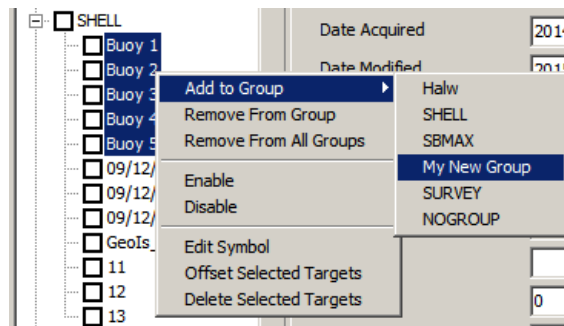
When you first mark a target, HYPACK® SUB-BOTTOM stores it in the default group according to the program in which you marked it. However, targets can be members of multiple groups, if you wish.

You can copy one or more targets from their current group to another as follows:



1. **Select one or more targets in the Details tab.**  
**Tip:** To multiselect files, hold the Ctrl key and select multiple individual records or hold the Shift key and click on the first and last records in a range of consecutive records.
2. **Right-click on the selection and select Add to Group then the name of the group to which you want to copy the selected targets.**

**FIGURE 134.** Adding Selected Targets to a Target Group



### REMOVING TARGET GROUPS

When you remove a target group, the targets in the selected group remain and become part of the Default target group.

- **From the HYPACK® SUB-BOTTOM Interface**, right-click in the Project Items list on the target group you want to remove and select Remove Target Group.
- **From the TARGET EDITOR**, select one or more groups to remove in the Details tab and select FILE-REMOVE GROUP.



**Tip:** To multiselect files, hold the Ctrl key and select multiple individual groups or hold the Shift key and click on the first and last group in a range of consecutive groups.

### REMOVING TARGETS FROM TARGET GROUPS

In the TARGET EDITOR, you can remove select targets from one or more groups:

**IMPORTANT!** There is a critical difference between *removing* and *deleting* targets:  
**Removing a target** omits it from the current group listing, but the target remains in the project. If it has no assigned

group, HYPACK® SUB-BOTTOM automatically assigns it to the Default group.

**Deleting a target** removes it from your project and from your hard drive. *It no longer exists.*

---

1. **Select one or more targets in the Details tab.**
2. **Right-click on your selection and select the appropriate Remove option:**
  - **Remove from Group** omits the selected target from the group in which you have selected it. If it resides in another group, it remains there.
  - **Remove from All Groups** omits the selected target from all groups and moves it to the Default group.

### RENAMING TARGET GROUPS

1. **From the TARGET EDITOR**, select the group you want to remove in the Details tab.
2. **Select FILE-RENAME GROUP.** A dialog appears with the current group name.
3. **Enter the new name and click [OK].**

---

## PLOTTING SHEETS (\*.PLT)

**Plotting Sheet files (\*.PLT)** contain origin coordinates, scale, rotation, and sheet dimensions for plotting on smooth sheets. These files are typically created in the PLOTTING SHEET EDITOR and saved with the PLT extension to your project file. They are primarily used by HYPLOT to define the plot area.

#### More Information

- [“HYPLOT”](#) on page 5-1

## CREATING PLOTTING SHEETS IN THE PLOTTING SHEET EDITOR

1. **Load the files that define your survey area** (ex. background files or Planned Line Files). Right-click on background files or Planned Line Files at the lower left and select Add File and

follow the prompts to select your file. You may choose to zoom-in or –out to adjust the size of the area to fit your screen.

2. **Open the PLOTTING SHEET EDITOR** by selecting PREPARATION-EDITORS-PLOTTING SHEET EDITOR.
3. **Open a new Plotting File** by selecting FILE-NEW. The PLOTTING SHEET EDITOR is open and displays, behind it, a Plotting file on a blank grid or with your background file if you have opened one. The Plotting file is defined by pink lines to indicate it is only in memory. When the file has been saved, the lines will change color according to the settings in the HYPACK® SUB-BOTTOM Control Panel.
4. **Set your input units.** You can enter either X,Y or Lat./Lon.. Select EDIT-UNITS to toggle from one unit to the other.
5. **If you want to position the file with your cursor, set the sizing method.** In the Edit menu, the sizing option can be toggled between Scale or Length/Width.
  - **Scale** (ft/in on foot grids or m/m on metric grids) maintains the scale ratio between the length and width of the plotting sheet.
  - **Length/Width** (inches on foot grids and cm on metric grids) enables you to resize the length and width of the plotting sheet independently of each other.
6. **Position and size the Plotting File.** You may position the Plotting file and resize it to cover your survey area.
  - **With the cursor:**
    - Click and drag the circled corner to move the plotting file.
    - Click and drag the square corner opposite the circled corner to rotate the plotting file.
    - Click and drag corners adjacent to the circled corner to change the length and width of your plotting area.

---

**NOTE:** If you selected the 'Scale' sizing method, the border will maintain the specified length:width ratio. Otherwise, you can scale length and width independently.

---

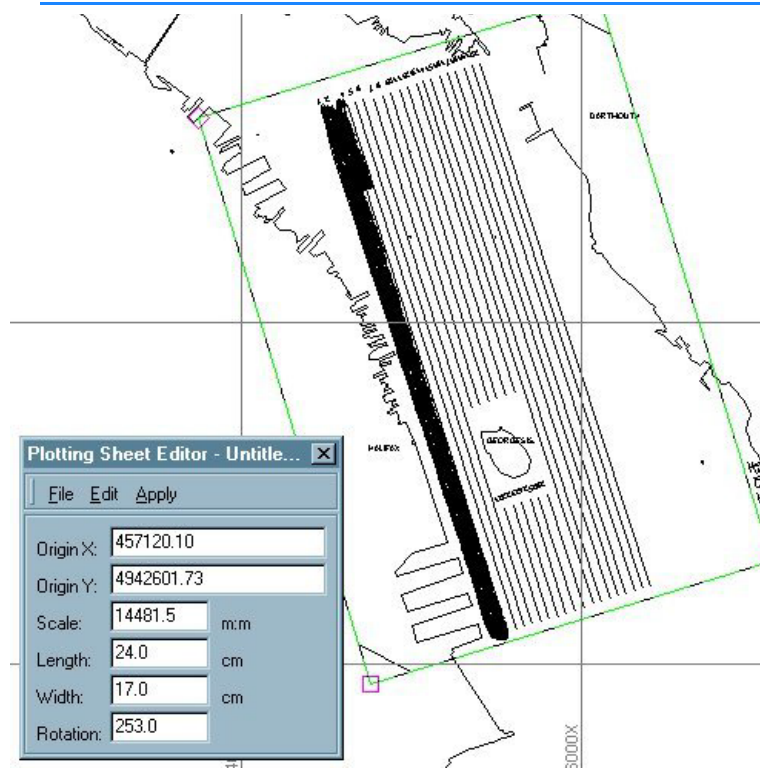
- **Edit the information in the PLOTTING SHEET EDITOR.**
  - The X-Y or Lat./Long. coordinates represent the position of the circled corner of the plotting file.
  - All other information is relative to that point.

Any changes you have made will be reflected in the screen when you click [Enter].

**NOTE:** Most standard MS Windows® printers will not print to the very edge of a piece of paper. You probably need to account for this margin. The size of the margin is printer-dependent. Check the printer's manual. Also, you must leave space for any border you plan to add in HYPLOT.

7. **Save your Plotting Sheet file** by selecting FILE-SAVE and naming your file. It will be saved with the extension .PLT to your project directory and displayed in the HYPACK® SUB-BOTTOM Area Map .

**FIGURE 135.** The PLOTTING SHEET EDITOR



## EDITING AN EXISTING PLOTTING SHEET FILE IN THE PLOTTING SHEET EDITOR

You can make changes to an existing Plotting file in the PLOTTING SHEET EDITOR. The changes can be saved to the original file name (overwriting it), or saved to a new file name. The procedure is very simple.



1. **Load the plotting sheet file to the PLOTTING SHEET EDITOR.** You can do this by:
  - Double-clicking on the file name in the Project Files list.
  - Selecting FILE-OPEN from the PLOTTING SHEET EDITOR menu and selecting the file you want to change.
2. **Edit the plotting sheet file**, you can click and drag the corners to move, rotate or resize the plotting area. You can also use the PLOTTING SHEET EDITOR to change the Scale, Sheet Dimensions and the positioning of the plotting area. Convert your coordinates from XY to Lat Long (or vice versa) by selecting EDIT-UNITS. You will automatically see your results displayed on the screen.

---

**NOTE:** If you are editing a PLT file that has had additional display settings saved to it in HYPLOT, the display settings will remain. However, if you are making the sheet smaller, be mindful of the placement of your non-data items (for example, the north arrow, ruler, color bar...). Objects near the top or left edge of a larger plot may disappear out of range of the smaller plotting sheet size. You will have to retrieve them by repositioning them in the HYPLOT Control Panel.

---

3. **When you are satisfied, save your file.** Click on either FILE-SAVE or FILE-SAVE AS. If you select SAVE, it will overwrite the original size, scale and rotation information. If you use SAVE AS, it will ask you for a new file name and create a new plotting file using that name.

The plotting sheet display in the HYPACK® SUB-BOTTOM window will show only the plotting sheet border.

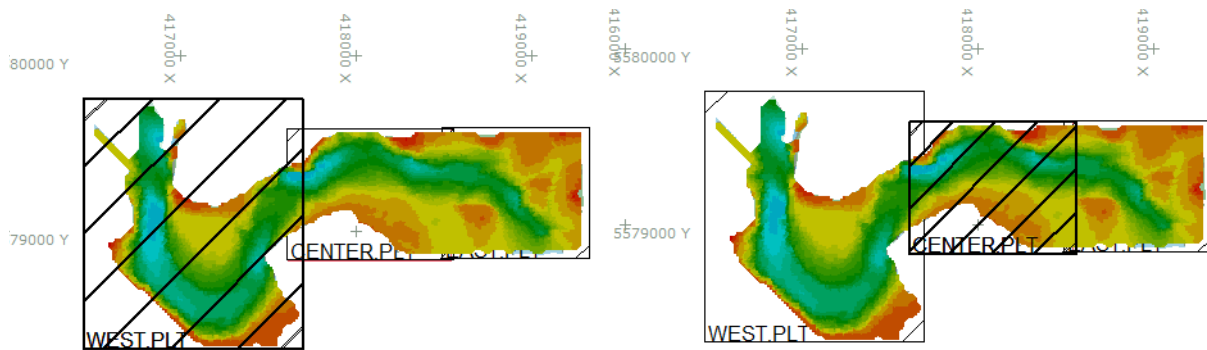
In HYPLOT, the non-data items remain positioned relative to the lower left corner of the PLT.

## GENERATING PLOTTING SHEET LAYOUT GRAPHICS

When you plot your data, it is often helpful to know where your plotting sheet fits in the context of the surrounding area. This may be particularly helpful if you are plotting a small portion of a large project area.

A plotting sheet layout graphic is a bitmap screen capture of the HYPACK® SUB-BOTTOM area map that highlights the selected, active plotting sheet file.

FIGURE 136. Sample Plotting Sheet Layout Bitmaps



### To generate a Plotting Sheet Layout graphic:

1. **Setup your HYPACK® SUB-BOTTOM Map display as you want it to appear in the graphic.**
  - Enable one or more PLT files.
  - Enable other project and data files you want to include.
  - Set other view options in the control panel, by selecting a scheme or both.
2. **In the Project Files list, right-click on the enabled PLT file that should be highlighted in the resulting graphic and select 'Sheet Layout Block'.** The graphic is automatically named *FileName\_SheetLayout.bmp* and saved to the project folder.

## BOAT SHAPE EDITOR

The BOAT SHAPE EDITOR is used to create a custom, true-to-scale boat shape that matches your survey or dredge vessel. Boat shapes include at least a polygon defining the perimeter of your vessel. It may include structural features and anchor attachment points.

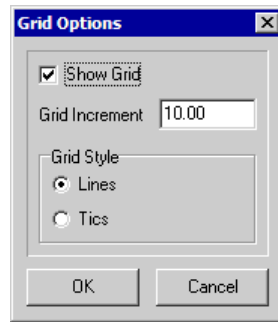
Boat shape files (\*.SHP) are saved, by default, to the \HYPACK Sub-bottom\Boat Shapes folder. You may then load a boat shape to represent each mobile displayed in the Map windows of SURVEY, HYSWEEP® SURVEY or DREDGEPACK® to show real time boat position, and use the Anchor Manager to display your anchor positions when you drop, raise and transport them.

## CREATING A BOAT SHAPE

In the BOAT SHAPE EDITOR, you draw your boat shape in the design area. You describe the boat shape using XY coordinates, in survey units, relative to the boat origin. This is the same origin from which you offset your devices in the HARDWARE program. A solid circle represents the origin in the design area.

- In **Manual Mode**, type the offset coordinates in the spreadsheets provided: Boat Points, Anchor Points and Drawing Objects.
  - In **Mouse Mode**, use the drawing tools and click in the design area to define the boat shape perimeter and features.  
The **Snap to Grid** feature shifts each point to the nearest grid intersection.
1. **Establish an origin point on your vessel.**
  2. **Open the BOAT SHAPE EDITOR** by clicking PREPARATION-EDITORS-BOAT SHAPE EDITOR.
  3. **Click on FILE-NEW SHAPE** to indicate that you are creating a new boat shape (or FILE-OPEN SHAPE to load a boat shape that you want to modify).
  4. **Set your display options.**
    - **Check which items you want to see drawn** in the BOAT SHAPE EDITOR.
      - **Show Devices** shows a list of hardware devices in the upper left corner of the drawing area.
      - **Show Offsets** draws devices and tracking point in position on the boat shape according to the listing in the Survey32.ini.
      - **Show Anchor Points** draws an "X" at each anchor point.
      - **Show Drawing Objects** draws the lines described in the Drawing Objects spreadsheet.
    - **Set your grid options. (Optional)** Using a grid is not required, but it is much easier to create a vessel with the correct dimensions.

FIGURE 137. BOAT SHAPE EDITOR Grid Options



- **Show Grid** implements the grid display in the design window. If you check 'Snap to Grid' in the editor toolbar, all points that you define with your cursor while drawing your boat shape will automatically shift to the nearest grid line.
  - **Grid Increment** sets the distance represented by each grid line.
  - **Grid Style** determines whether the grid is drawn with lines or only marks where line intersections would occur.
5. **Describe your boat shape.**
- **In Manual Mode:** In the Boat Shape spreadsheet, enter the coordinates defining the perimeter of the boat shape relative to the boat origin.
  - **In Mouse Mode:** Click the boat tool and, using the origin and the grid to guide you, click around the outline of your vessel. The horizontal offset coordinates of those points (in survey units) relative to the origin appear in the Boat Points list on the left. The program will automatically close your boat shape back to the first point in the list.

FIGURE 138. Drawing Tools—(left to right) Boat, Anchor, Drawing and Box Tools



6. **Enter your anchor points.** (Optional)
- **In Manual Mode:** In the Anchor Points spreadsheet, enter the coordinates defining the offsets relative to the boat origin for each anchor attachment point.
  - **In Mouse Mode:** Click the anchor tool then click on the boat shape at the anchor locations. The horizontal offset coordinates of those points, relative to your vessel origin, appear in the Anchor Points list on the left.

You can enter up to nine anchor locations for your boat.

7. **Describe any drawing objects.** (Optional) Drawing objects describe objects inside the perimeter of the vessel *for visual effect only*. The programs do not take them into account for any calculations. Each drawing object is comprised of the start and end points, and the radius. The start and end points are expressed as offsets relative to your vessel origin. Radius measurements create arcs between the points. Radius values can be positive or negative to arc right or left respectively, but the absolute value should be greater than half the distance between the end points.

**Tip:** Use the Box tool to draw the four segments of a user-defined rectangle in one operation.

- **In Manual Mode:** In the Drawing Object spreadsheet, enter the coordinates defining the end points and arc of each line segment in your object.
  - **In Mouse Mode:** Use the drawing object tool to click and drag each line segment in your object then enter the radius in the spreadsheet in the Mouse Mode tab.
8. When you are finished, **save your file**. You may do either of the following to save your file, by default, to the boat shapes directory:
- **To save a HYPACK® SUB-BOTTOM boat shape file,** click on FILE-SAVE SHAPE and name your file. It is saved with an SHP extension.
  - **To save your shape in a format that may also be opened in CAD,** select FILE-EXPORT TO DXF.

## MODIFYING AN EXISTING BOAT SHAPE

It's simple to modify your boat shape in the BOAT SHAPE EDITOR. At any time, you can do any of the following:

- Edit any of the coordinates that describe the vessel outline, anchors or drawing objects.
- Change the location of the vessel origin.
- Rescale the vessel to a different size.

### MODIFYING OBJECT COORDINATES IN YOUR BOAT SHAPE

You may need to change one or more coordinate pairs in your boat shape for any of the following reasons:

- To change the vessel outline
- To relocate an anchor

- To change the size, shape or location of a drawing object

There are two methods to relocate select coordinates that describe your vessel.

#### *Relocating Coordinates Using your Cursor*

1. **Click the tool appropriate for the object you want to change.**
2. **In the design area, drag the object to a its new location.** The coordinates will update accordingly.
3. **Save your boat shape file.** Select FILE-SAVE SHAPE and name your shape in the dialog provided.

#### *Relocating Coordinates in the Spreadsheet*

1. **Select the coordinates in the object list.**
2. **Edit them in the spreadsheet at the lower left.** The drawing in the design area will update accordingly.
3. **Save your boat shape file.** Select FILE-SAVE SHAPE and name your shape in the dialog provided.

#### *Adding a Point in your Boat Shape Outline*

1. **Select the boat tool.**
2. **Right-click on the coordinate pair preceding where you need the new point and select 'Insert Point'.** A point is added mid-way between the selected point and the next existing coordinate pair.

**Tip:** The selected point is displayed in blue in the design area. You can determine which side of a selected point the new one will be drawn by clicking two consecutive points and observing where they are located relative to each other.

3. **Edit the coordinates to position the new point** as required for your boat shape.
4. **Save your boat shape file.** Select FILE-SAVE SHAPE and name your shape in the dialog provided.

#### *Deleting Points in the Boat Shape*

You can delete any point in your boat shape—in boat points, in drawing objects or anchor points—through the right-click menu in the Mouse Mode tab:

1. **Open the Mouse Mode tab.**
2. **Expand the area of the tree where you want to delete points.**
3. **Right-click on the point you want to delete and select the Delete Point option.** The drawing in the design area updates accordingly.

## **RELOCATING THE VESSEL ORIGIN IN YOUR BOAT SHAPE**

If you have an existing boat shape file, but the origin on which it is based, is not the origin of your hardware configuration, you could draw a new boat shape file, but there's an easier solution. You can

redefine the position of the origin in your shape file and the BOAT SHAPE EDITOR updates all the offset coordinates accordingly.

---

**NOTE** This *does not* affect your hardware configuration.

---

1. **Select OPTIONS-SET ORIGIN POINT.** The cursor, held over the drawing area, appears as two concentric circles.
2. **In the drawing area, click at the new origin position.** The origin marker will move to the click position and all coordinates listed on the left will update accordingly.
3. **Save your boat shape file.** Select FILE-SAVE SHAPE and name your shape in the dialog provided.

### **SCALING YOUR BOAT SHAPE IN THE BOAT SHAPE EDITOR**

You can uniformly increase or decrease the size of your boat shape by multiplying all offsets and radii by the same number. You could do this by manually editing each set of coordinates and radii individually, but there's a much easier way.

1. **Select OPTIONS-SCALE BOAT SHAPE.**
2. **Enter a value by which the coordinates should be multiplied.** For example, to double the size of the boat shape, enter 2.
3. **Click [OK].** The coordinates and radii will be multiplied and the drawing in the design area will update accordingly.
4. **Save your boat shape file.** Select FILE-SAVE SHAPE and name your shape in the dialog provided.

---

## PLOTTING SHEETS (\*.PLT)

**Plotting Sheet files (\*.PLT)** contain origin coordinates, scale, rotation, and sheet dimensions for plotting on smooth sheets. These files are typically created in the PLOTTING SHEET EDITOR and saved with the PLT extension to your project file. They are primarily used by HYPLOT to define the plot area.

### More Information

- [“HYPLOT”](#) on page 2-1

## CREATING PLOTTING SHEETS IN THE PLOTTING SHEET EDITOR

1. **Load the files that define your survey area** (ex. background files or Planned Line Files). Right-click on background files or Planned Line Files at the lower left and select Add File and follow the prompts to select your file. You may choose to zoom-in or –out to adjust the size of the area to fit your screen.
2. **Open the PLOTTING SHEET EDITOR** by selecting PREPARATION-EDITORS-PLOTTING SHEET EDITOR.
3. **Open a new Plotting File** by selecting FILE-NEW. The PLOTTING SHEET EDITOR is open and displays, behind it, a Plotting file on a blank grid or with your background file if you have opened one. The Plotting file is defined by pink lines to indicate it is only in memory. When the file has been saved, the lines will change color according to the settings in the HYPACK® SUB-BOTTOM Control Panel.
4. **Set your input units.** You can enter either X,Y or Lat./Lon.. Select EDIT-UNITS to toggle from one unit to the other.
5. **If you want to position the file with your cursor, set the sizing method.** In the Edit menu, the sizing option can be toggled between Scale or Length/Width.
  - **Scale** (ft/in on foot grids or m/m on metric grids) maintains the scale ratio between the length and width of the plotting sheet.
  - **Length/Width** (inches on foot grids and cm on metric grids) enables you to resize the length and width of the plotting sheet independently of each other.
6. **Position and size the Plotting File.** You may position the Plotting file and resize it to cover your survey area.



- **With the cursor:**
  - Click and drag the circled corner to move the plotting file.
  - Click and drag the square corner opposite the circled corner to rotate the plotting file.
  - Click and drag corners adjacent to the circled corner to change the length and width of your plotting area.

---

**NOTE:** If you selected the 'Scale' sizing method, the border will maintain the specified length:width ratio. Otherwise, you can scale length and width independently.

---

- **Edit the information in the PLOTTING SHEET EDITOR.**
  - The X-Y or Lat./Long. coordinates represent the position of the circled corner of the plotting file.
  - All other information is relative to that point.

Any changes you have made will be reflected in the screen when you click [Enter].

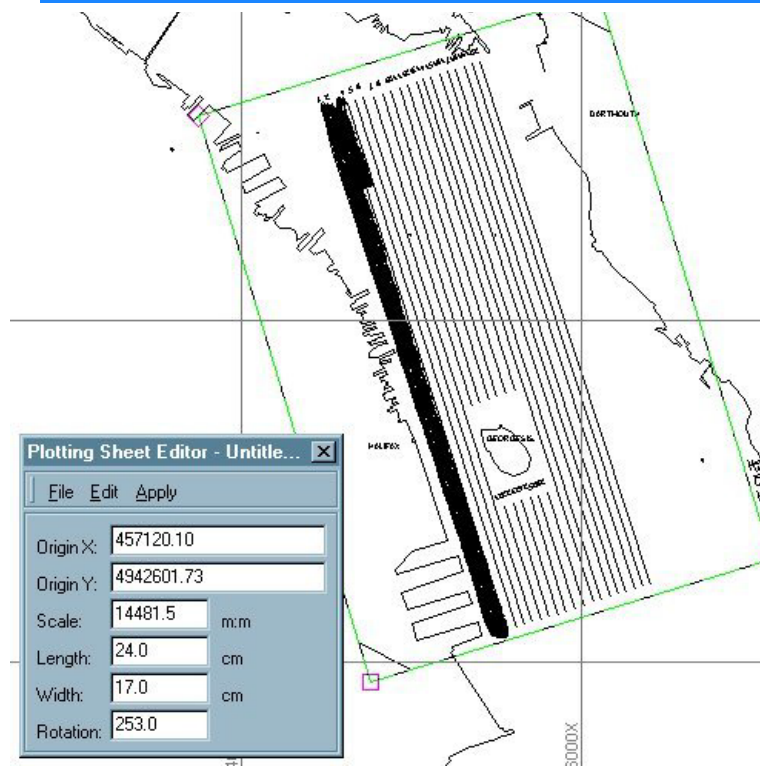
---

**NOTE:** Most standard MS Windows® printers will not print to the very edge of a piece of paper. You probably need to account for this margin. The size of the margin is printer-dependent. Check the printer's manual. Also, you must leave space for any border you plan to add in HYPLOT.

---

7. **Save your Plotting Sheet file** by selecting FILE-SAVE and naming your file. It will be saved with the extension .PLT to your project directory and displayed in the HYPACK® SUB-BOTTOM Area Map .

FIGURE 1. The PLOTTING SHEET EDITOR



## EDITING AN EXISTING PLOTTING SHEET FILE IN THE PLOTTING SHEET EDITOR

You can make changes to an existing Plotting file in the PLOTTING SHEET EDITOR. The changes can be saved to the original file name (overwriting it), or saved to a new file name. The procedure is very simple.

1. **Load the plotting sheet file to the PLOTTING SHEET EDITOR.** You can do this by:
  - Double-clicking on the file name in the Project Files list.
  - Selecting FILE-OPEN from the PLOTTING SHEET EDITOR menu and selecting the file you want to change.
2. **Edit the plotting sheet file,** you can click and drag the corners to move, rotate or resize the plotting area. You can also use the PLOTTING SHEET EDITOR to change the Scale, Sheet Dimensions and the positioning of the plotting area. Convert your coordinates from XY to Lat Long (or vice versa) by selecting EDIT-UNITS. You will automatically see your results displayed on the screen.

**NOTE:** If you are editing a PLT file that has had additional display settings saved to it in HYPLOT, the display settings will remain. However, if you are making the sheet smaller, be mindful of the placement of your non-data items (for example, the north arrow, ruler, color bar...). Objects near the top or left edge of a larger plot may disappear out of range of the smaller plotting sheet size. You will have to retrieve them by repositioning them in the HYPLOT Control Panel.

3. **When you are satisfied, save your file.** Click on either FILE-SAVE or FILE-SAVE AS. If you select SAVE, it will overwrite the original size, scale and rotation information. If you use SAVE AS, it will ask you for a new file name and create a new plotting file using that name.

The plotting sheet display in the HYPACK® SUB-BOTTOM window will show only the plotting sheet border.

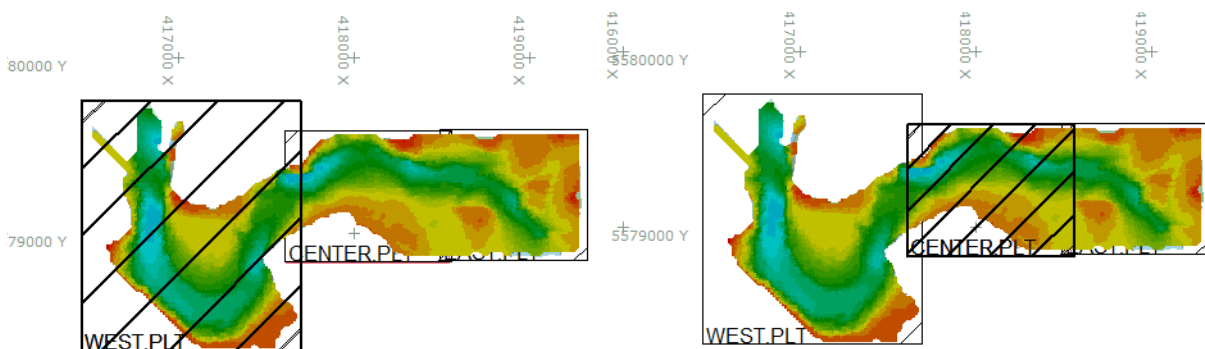
In HYPLOT, the non-data items remain positioned relative to the lower left corner of the PLT.

## GENERATING PLOTTING SHEET LAYOUT GRAPHICS

When you plot your data, it is often helpful to know where your plotting sheet fits in the context of the surrounding area. This may be particularly helpful if you are plotting a small portion of a large project area.

A plotting sheet layout graphic is a bitmap screen capture of the HYPACK® SUB-BOTTOM area map that highlights the selected, active plotting sheet file.

*FIGURE 2. Sample Plotting Sheet Layout Bitmaps*



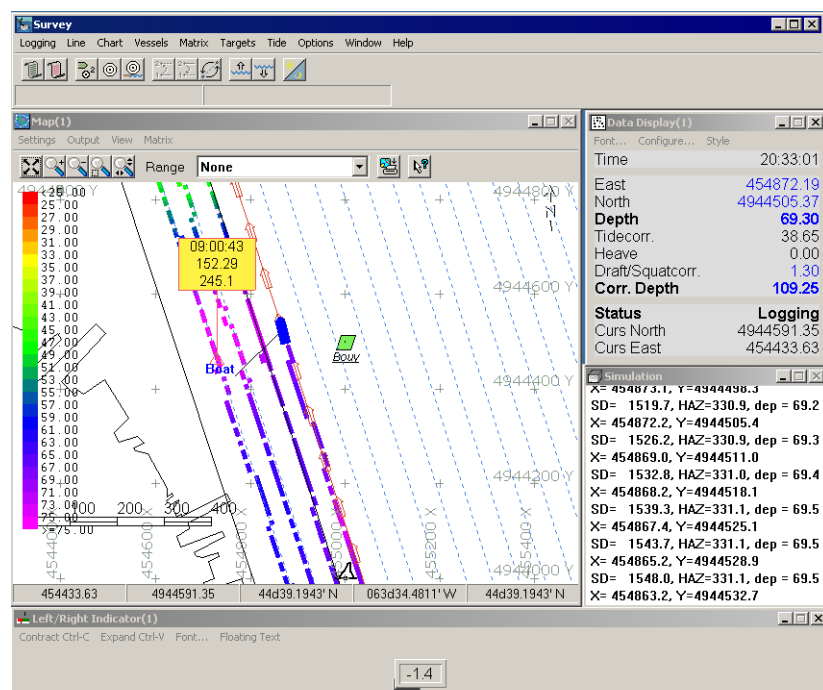
**To generate a Plotting Sheet Layout graphic:**

1. **Setup your HYPACK® SUB-BOTTOM Map display as you want it to appear in the graphic.**
  - Enable one or more PLT files.
  - Enable other project and data files you want to include.
  - Set other view options in the control panel, by selecting a scheme or both.
2. **In the Project Files list, right-click on the enabled PLT file that should be highlighted in the resulting graphic and select 'Sheet Layout Block'.** The graphic is automatically named *FileName\_SheetLayout.bmp* and saved to the project folder.

The Survey section primarily describes configuring and logging data with the SURVEY program. Additionally, it provides information about the optional SURVEY DATA TRANSFER and SURVEY LOG programs that may be run simultaneously with SURVEY.

## HYPACK® SURVEY

FIGURE 1. Program Interface



To launch HYPACK® SURVEY, select SURVEY-HYPACK® SURVEY or click the icon.



**Tip: Smart Launch Survey icon** in the HYPACK® SUB-BOTTOM toolbar launches one or more survey programs according to your current hardware configuration:

- **Single beam, sub-bottom or magnetometer** configurations launch only HYPACK® SURVEY.
- **Multibeam** configurations, *including those with side scan sonar*, launch HYPACK® SURVEY and HYSWEEP® SURVEY.
- **Side scan** configurations launch HYPACK® SURVEY and SIDE SCAN SURVEY.

The HYPACK® SURVEY program loads the information from the current project. The program reads geodetic information and hardware information from the project initialization files. It loads the most recently used planned survey line file (\*.LNW) from the current project, as well as any background files and matrix files that are currently 'Enabled'.

HYPACK® SURVEY functions can be executed through the menus in the shell, the (optional) toolbar, or through keyboard shortcuts.

**FIGURE 2.** HYPACK® SURVEY Toolbar



The toolbar is a row of icons that duplicate the function of several of the menu selections. To determine each icon's function, hold the cursor over the icon and a tool tip will appear.

## WINDOWS IN SURVEY

The SURVEY display is comprised of the 'shell', with a menu bar and toolbars, as well as your choice of several independently-displayed and configured windows:

- **Area Map:** This is a plan view of your project area. It displays any enabled project files along with the position of the vessels and their track lines.
- **Left-Right Indicator:** Shows the position of the boat relative to the current planned line segment.
- **Data Display:** Shows real-time, textual information regarding your survey.
- **Device Windows:** Each device driver has an independent window that displays information relative to that device.
- **GPS Graphs:** Graphical displays of various GPS-related data.
- The **Comment window** stores your input to the project log.

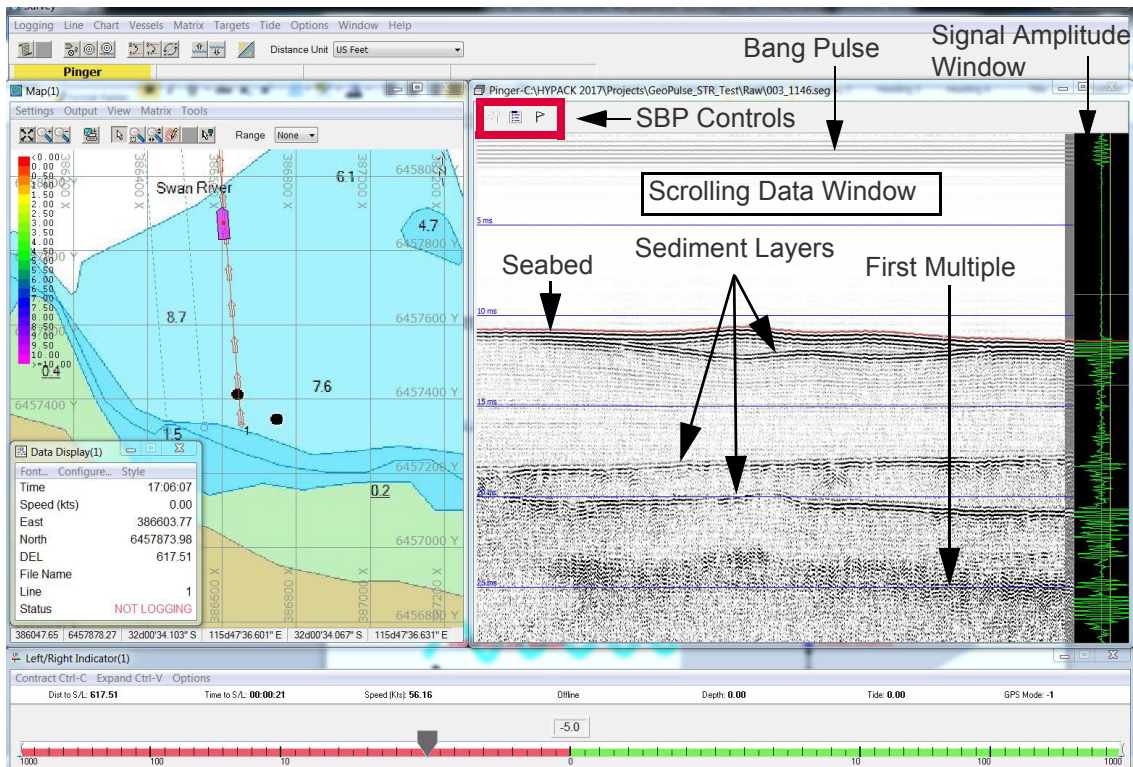
To generate additional window displays, select WINDOW-NEW and select the type of window you want.

SURVEY can display multiple windows of each type, each independently configurable through its menus. Multiple windows of the same type are distinguished by numbers, both on their title bars and in the Window Manager.

You may reposition and size all windows, in one or more monitors, using the Window Manager or using the cursor to drag the title bars and window edges. You can lock them in place by selecting WINDOW-FREEZE WINDOWS. WINDOW-THAW WINDOWS allows you to again size and position all windows.

Once you have configured, sized and placed the windows on the screen, the SURVEY program remembers and restores them to the same status and location each time you start the SURVEY program.

**FIGURE 3.** The SURVEY Program Showing the Map, Scrolling Data & Left/Right Indicator windows

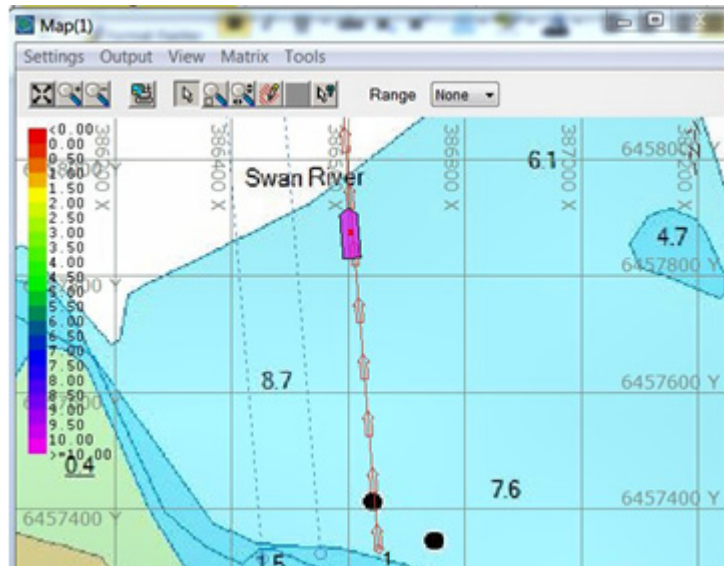


### AREA MAP IN SURVEY

The Area Map window contains a plan view of your survey area that includes all files active in HYPACK® SUB-BOTTOM when you

start SURVEY and a symbol representing each mobile in your hardware configuration.

**FIGURE 4.** A Sample Area Map



Sounding colors are determined by the project's color settings. The position of the survey boat is updated on the Area Map at an interval defined by the GPS Update Frequency in the HARDWARE program.

Each area map includes the standard zoom and pan controls:

**NOTES:** The Range setting in the Area Map toolbar enables you to set the zoom at any of a series of preset zoom scales.

A tracking setting other than "No Tracking" overrides the effect of the pan tool.

When you exit the SURVEY program, it records the status of the items in the Area Map and restores the same configuration when you re-start the program.

### **LEFT-RIGHT INDICATOR**

The Left-Right Indicator window only appears when you have planned lines loaded into the SURVEY program. It shows the position of the main vessel relative to the planned survey line, as well as certain information of particular interest to the helmsman:



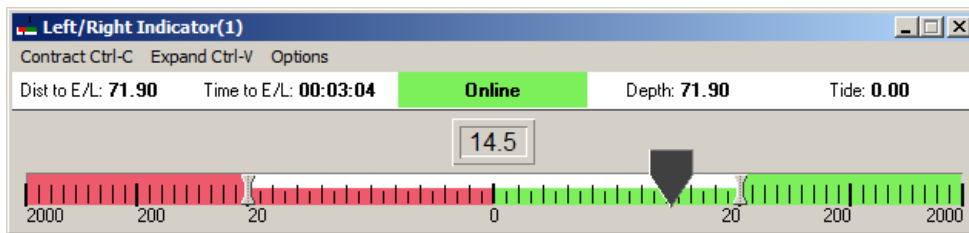
**TABLE 1.** *Left-Right Indicator Statistics*

Logging Status	Display
Logging	Distance and Time <sup>a</sup> to the end of the current survey line.
Not Logging	Distance and Time* to the start of the next survey line.
Always	Logging status, uncorrected depth and tide

a. Times are calculated based on distance and current speed.

Additional, displays can be loaded by selecting WINDOW-NEW-LR INDICATOR.

**FIGURE 5.** *The Left-Right Indicator*



*Configuring the Scale*

You can display the cross track error using either of two scales, and expand and contract the either scale to suit your purposes.

**To choose the type of scale,** select or deselect the Logarithmic Scale option in the Options menu.

**To contract the scale:**

- Click 'Contract' on the menu bar.
- Use Ctrl-C (Contract) from the keyboard.

**To expand the scale:**

- Click 'Expand' on the menu bar.
- Use Ctrl-V (Expand) from the keyboard.

**NOTE** These keyboard commands only work with the focus on the Left-Right Indicator window.

*Configuring the XTE Label*

The cross track error label is a real-time display of the distance off line. The font and float properties can be configured to meet the needs of different operators.

**To modify the font,** select OPTIONS-FONT in the indicator menu. The Windows® Font Dialog appears for you to make your

adjustments. *Only the font, style and size apply.* These settings override the current scheme until you exit SURVEY.

The label can float above the pointer in the indicator or remain centered over the graphical display.

**To toggle the float setting**, select and deselect the OPTIONS-FLOATING TEXT menu option.

### *Setting the XTE Alarm Distance*

SURVEY alerts you that your vessel is too far off the currently selected survey line. You can decide the distance at which you will be alerted.

**To set a “Cross Track Error Alarm” distance:**

- **Drag the tab indexes in the left–right indicator window.** The tab indexes are small gray bars, equidistant from center on the indicator scale.
- **Set the XTE limit in the Navigation Parameters dialog** (in the Options menu).

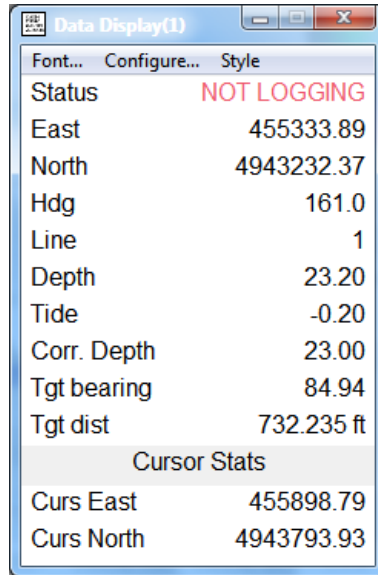
When this setting is changed, all other Cross Track Error displays update accordingly.

When the boat travels outside this range, the frame around the cross track label turns either red (planned line is to starboard) or green (planned line is to port), and the ‘XTE’ alarm appears in the shell. *This has no effect on the data logging;* it is only a visual alarm to the helm to steer toward the survey line.

## **DATA DISPLAY WINDOW IN SURVEY**

The Data Display window shows textual information about the survey.

**FIGURE 6.** *The Data Display Window*



When you first start the SURVEY program, the display does not contain any items. Use the menu in the Data Display window to configure the Data Display. You can select the items to display, the font of the displayed items, or change the style of the display.

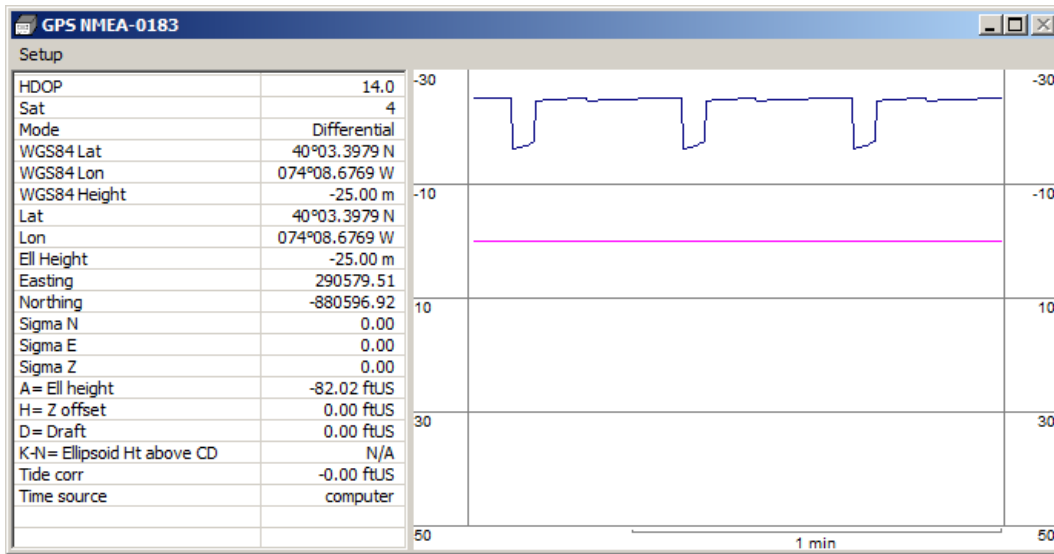
Once the Data Display has been configured, the SURVEY program will restore the items and font in the same way, when the program is re-started.

STYLE-STAY ON TOP assures the Data Display window remains visible even when it overlaps with another window.

### **DEVICE WINDOWS IN SURVEY**

Each device you have selected in the HARDWARE program will generate it's own window. The device driver, not the SURVEY program, controls the content of each window. This means that the information for different devices will vary according to the device type and model.

FIGURE 7. GPS.dll Device Window



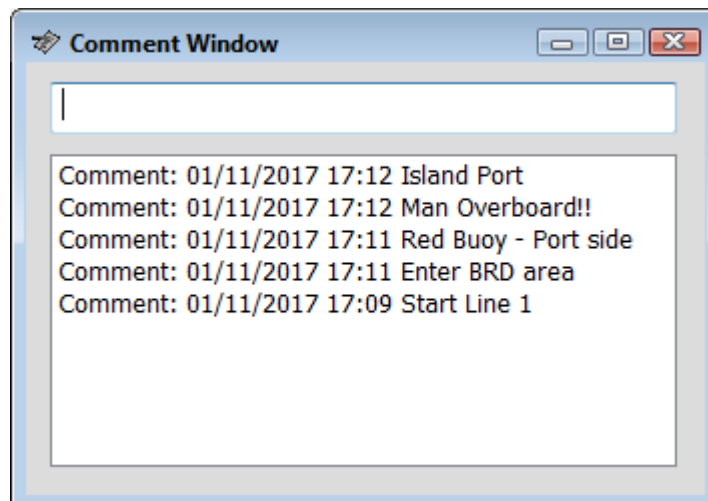
You can also adjust the scale of the display by resizing the window itself and often by using the mouse wheel to zoom in and out.

**Apply Offsets** is available only for the HPR and Depth Device Windows. Check this option to correct the graphed values using no real-time lever-arm calculations.

### COMMENTS IN SURVEY

The **Comment window** stores your input to the project log.

FIGURE 8. Sample Comments Window



Enter your notes in the field at the top. Each time you press your Enter key, your comment drops down to the display in the lower part of the window and a copy is stored to the project log. In the single beam and HYSWEEP® editors, you can refer to these comments during the editing process.

### ALARMS IN SURVEY

Alarm windows are located along the bottom of the SURVEY screen. They are used to denote error conditions to the operator. When the criteria are met, the alarm window turns red and the Windows® exclamation alarm sounds. You can turn off the audio alarm by pressing the Escape key. This will also change the alarm boxes to yellow until the reason for the alarm has been corrected.

The SURVEY program can generate the following alarms:

TABLE 2. Survey Alarm

Alarm	Text Displayed	Reason	Documented
Track Error	XTE	Generated when the tracking point is outside the limit set in the Navigation Parameters dialog or the Left-Right Indicator	Trace File <sup>a</sup>
Time Out	Time Out	Generated when a device has not reported an update within the last 5 seconds.	Survey Log
Minimum Depth	Min Depth	Generated when the measured depth drops below the value defined in the Navigation Parameters dialog	Survey Log
Maximum Depth	Max Depth	Generated when the measured depth is greater than the value defined in the Navigation Parameters dialog	Survey Log
Heave Drift	Drift = Current Drift Value	If the heave value differs from the average of the last 100 heave readings by more than the “Alarm Threshold” set in the Vessel Setup.	Survey Log

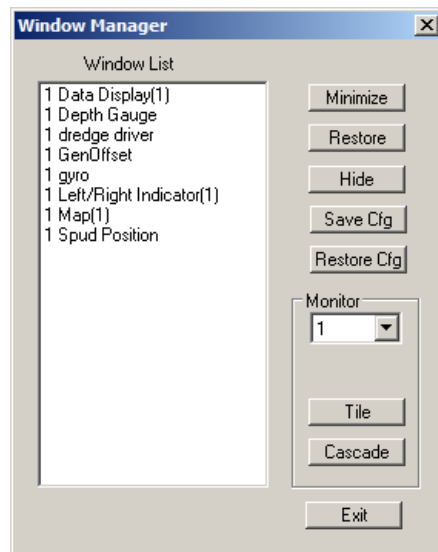
a. The **Trace file** is named RAW date.txt (eg RAW0927.txt) and saved in your project folder. It contains basic information about which files you are using as you survey, as well as data about events, targets, logging, etc. You can read it with any text editor.

## CONFIGURING YOUR WINDOW DISPLAY WITH THE WINDOW MANAGER

The Window Manager may be used to arrange your survey windows in one or more monitors.

1. **Access the Window Manager** by selecting WINDOW-WINDOW MANAGER in the SURVEY shell. The Window Manager will appear with a list of your current Survey windows. Multiple windows of the same type are distinguished by numbers, both on their title bars and in the Window Manager.

**FIGURE 9.** *Window Manager*



2. **Choose the windows to view.**
  - a. **Select one or more windows in the list.**
  - b. **Click [Minimize], [Hide] or [Restore].**
    - [Minimize] closes the selected window and positions a restore button at the bottom of the screen.
    - [Hide] closes the selected window. It can only be restored through the Window Manager.
    - [Restore] reopens the selected window in your display.
3. **If you have multiple monitors, assign windows to each monitor.** (Optional) The monitor numbers designated in the Windows® display settings populate the Monitor drop-down list.
  - a. **Select the monitor window to configure.**
  - b. **Select the windows for the selected monitor.**
4. **Position the windows in the monitor.**
  - a. **Select the windows for the selected monitor.**
  - b. **Click [Tile] or [Cascade].**

- [Tile]: SURVEY attempts to arrange the selected windows optimally on the screen.
  - [Cascade] arranges all of the windows, diagonally offset from each other, in the upper-left corner of your screen.
5. **Save your configuration.** (Optional) Click [Save Cfg] and name your window configuration. At any time, you can return to this layout by clicking [Restore Cfg] and selecting the file. This is handy to quickly switch between multiple configurations or to return to a “user-defined default” after you have rearranged the windows.
  6. **Click [Exit]** and manually make any final adjustments to window size and positioning.

## SHARED MEMORY PROGRAMS

The Shared Memory programs enable you to display and export information from the SURVEY program. These programs were developed to enable you to write powerful interface drivers for application programs without interfering with the SURVEY program. These programs can be launched from the OPTIONS–SHARED MEMORY menu item of SURVEY.

### *MEMORY VIEWER*

This program is used to monitor items from the SURVEY program. It also provides for scrolling DOP and # of Satellites graphs which can be useful while surveying.

Start the program by selecting OPTIONS–SHARED MEMORY–MEMORY VIEWER. The program will automatically seek and display the information to the screen.

If this program is open when you close SURVEY, it will store the options in the *ProjectName.ini* file and use the same settings the next time you launch SURVEY.

FIGURE 10. Vessel Information Window from Memory Viewer

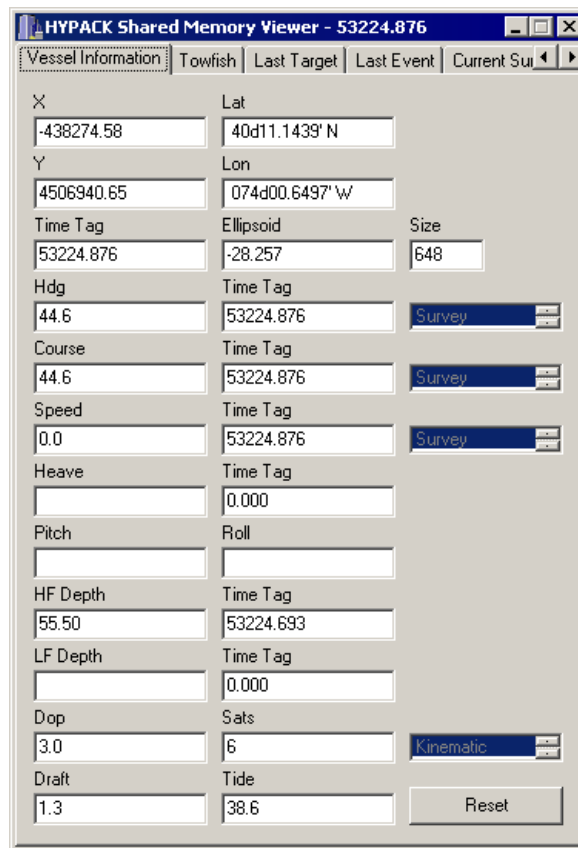
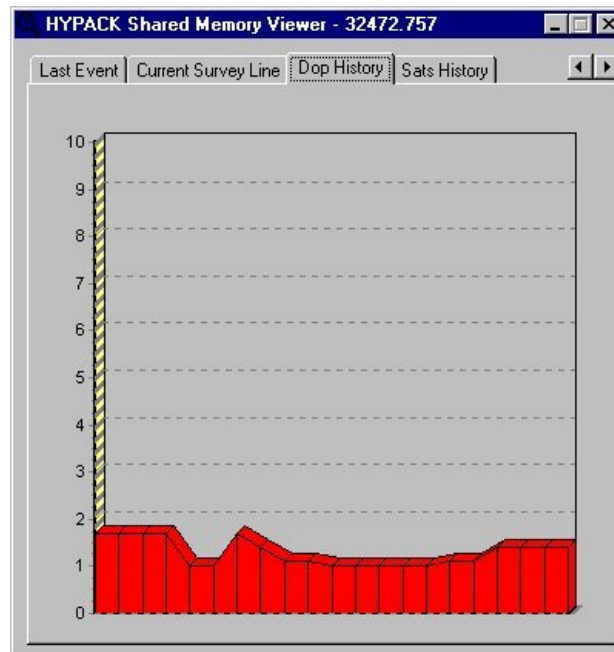
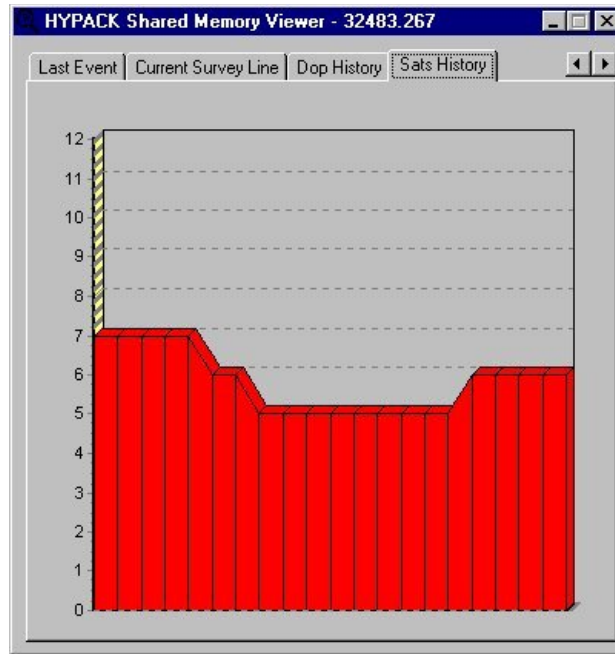


FIGURE 11. DOP History Window from the Memory Viewer Program





**FIGURE 12.** Number of Satellites Window from the Memory Viewer Program



### SHARED MEMORY OUTPUT PROGRAM

The Shared Memory Output program is used by those who need to save specific data from the HYPACK® SURVEY program out the serial, network or parallel ports or to a file. You can select which items to export from a set-up window and format the chosen items according to your needs.

If this program is open when you close SURVEY, it will store the options in the \HYPACK Sub-bottomProjects\smo.ini file and use the same settings the next time you launch SURVEY.

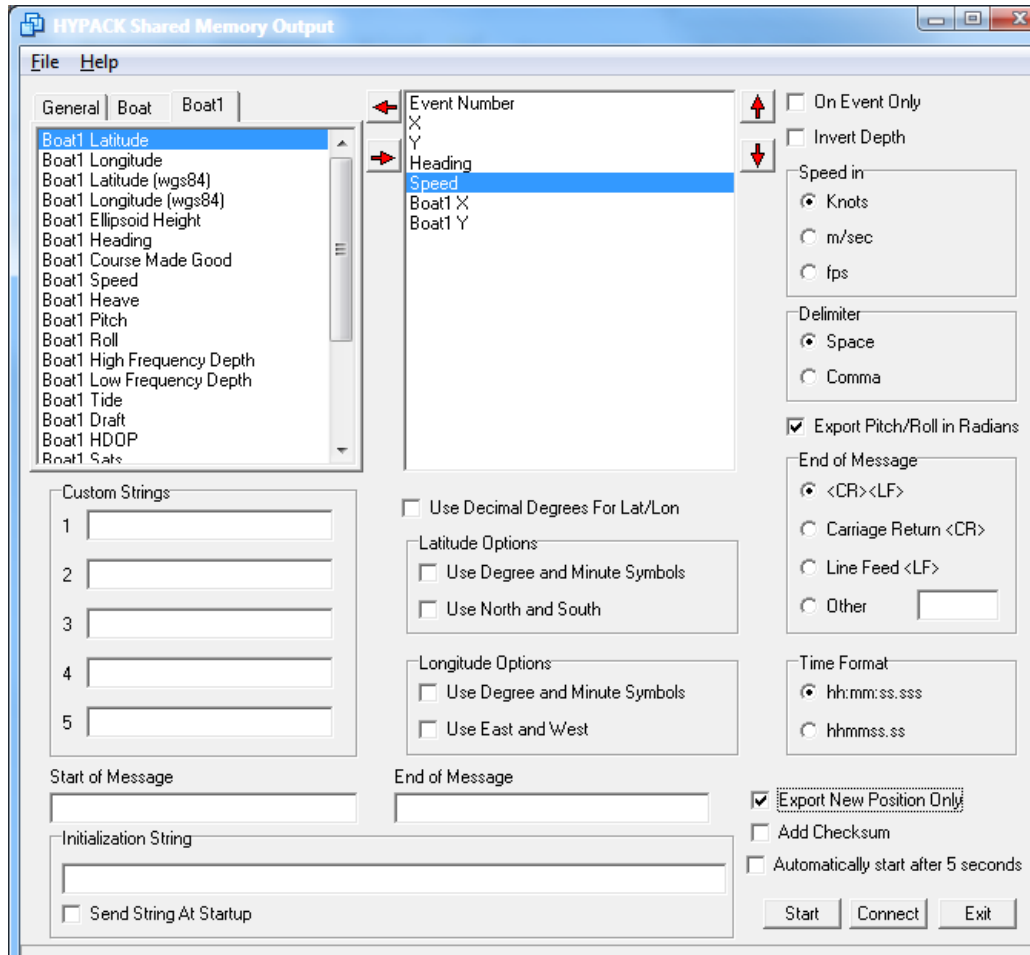
---

**NOTE:** If you want to output multiple sets of data, you can launch more than one incident of this module with different connection settings for each.

---

1. **Start the program by selecting OPTIONS-SHARED MEMORY-OUTPUT.** The Shared Memory Output window will appear.

FIGURE 13. Shared Memory Output



2. **Select and order your output data.**
3. **Set your output format and connection options.**
4. **Start the data output** by clicking [Start]. You can preview the data strings on the status bar at the bottom of the window.

## SETTING YOUR MEMORY OUTPUT DATA

The SHARED MEMORY OUTPUT interface includes one tab for survey data that is not vessel-specific (the General tab) and one tab for each active mobile in the hardware configuration.

1. **Select each item you wish in your export string.**
  - a. Select the correct tab.
  - b. Select the item and click the right arrow button to move it to the list on the right.

**NOTE:** You can also enter up to five custom strings which may then be selected when configuring your Shared Memory Output.

2. **Arrange the items on the right in the order that they should appear in the exported data string.** You can reposition an item relative to another by:
  - Selecting the item and using the up or down arrows.
  - Selecting an item and dragging it in the list.

## SETTING YOUR MEMORY OUTPUT OPTIONS

All data available from SURVEY is listed in the left-hand side of the Shared Memory Output window.

The whole idea of Shared Memory Output is that you can create a custom output string. There are several output options to consider beyond the data you want to include in your output string:

- **The exported data string format** according to the needs of the receiving computer.
  - **Use Decimal Degrees:** If unselected, lat./lon. is output in dddmm.mmmm format with or without a degree and minute symbol.
  - **Invert depth:** If you are exporting depths and you want to invert them, check the box.
  - **Add Checksum:** If your device expects a checksum, check the box.
  - **Lat./Lon. Options** enable you to choose the format of the position information regarding degree signs and the use of N/S and E/W. At this time the only configuration is dd mm.mmm.
  - **Speed units:** Choose knots, meters/second, or feet/second.
  - **Delimiter:** Items in your output string can be separated by commas or spaces.
  - Enter the characters expected by your receiving device for the **start and end of the message**. The End of Message string from the second column will appear immediately before the End of Message selection in the third column.
  - Indicate what message should appear at the end of the string. You have a choice of Carriage Return, Line Feed or both. If none of these suits your need, create one that does under Other.
- **Towfish Source Mobile:** If you have more than one towfish mobile, select the mobile from which the output data should be read.
- **Automatically Start after 5 Seconds:** All options are disabled and the Shared Memory Output begins to send output five seconds after you open the program.
- **Initialization String** options enable you to configure and send an initialization string if you are outputting data to a recording device that first needs to be prepared in this manner.

- a. **Enter the initialization string** required by your device.
- b. **Check the Send String At Startup option.** This automatically sends the initialization string when you start the Shared Memory Output.
- **The Send Frequency:** You can send your string at any of the following times:
  - At each reading of any kind.
  - At each record with a new position. (**Export New Position Only**)
  - Only when an event is marked. (**On Event Only**)

---

**NOTE:** Selecting both check boxes will result in no output.

---

- **Tell the program where to send the message.** Click [Connect] to access the standard connect parameters as in the HARDWARE program.

*FIGURE 14. Serial and Parallel Connection Settings*

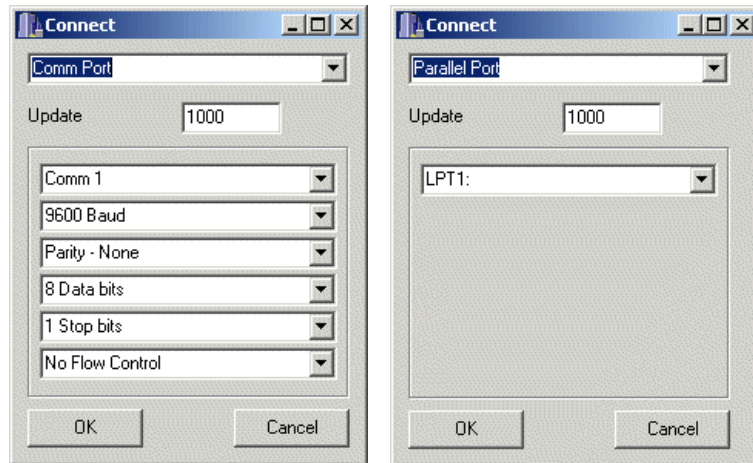
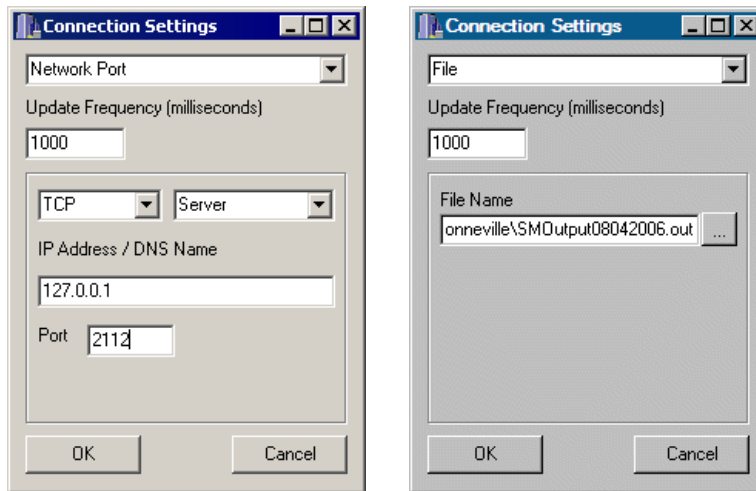


FIGURE 15. Network and File Connection Settings



- a. **Select the output destination.** The data can be exported through either a parallel or serial port, to a file or over a network.  
If you connect to a file, the program will output to a write-only text file with the \*.OUT extension (SMOutput.out, by default) to the project folder. The program continues to append data to that file until you change this setting.
- b. **Provide the output information pertinent to the destination.**
- c. **Specify the Update Frequency (msec).**
- d. **Click [OK]** to return to the Shared Memory Output dialog.

## BROADCASTING SURVEY DATA OVER THE NETWORK

If you save your Shared Memory Output settings to an INI file and export your Shared Memory Output to the network, any network computer, including your own, can use the Shared Memory Input device driver (SMInput.dll) to read the data strings.

This requires that both computers have licensed versions of HYPACK® SUB-BOTTOM that can run SURVEY and the dongle that goes with it.

In this way you can run another incident of SURVEY, but read the data from Shared Memory instead of the devices themselves.

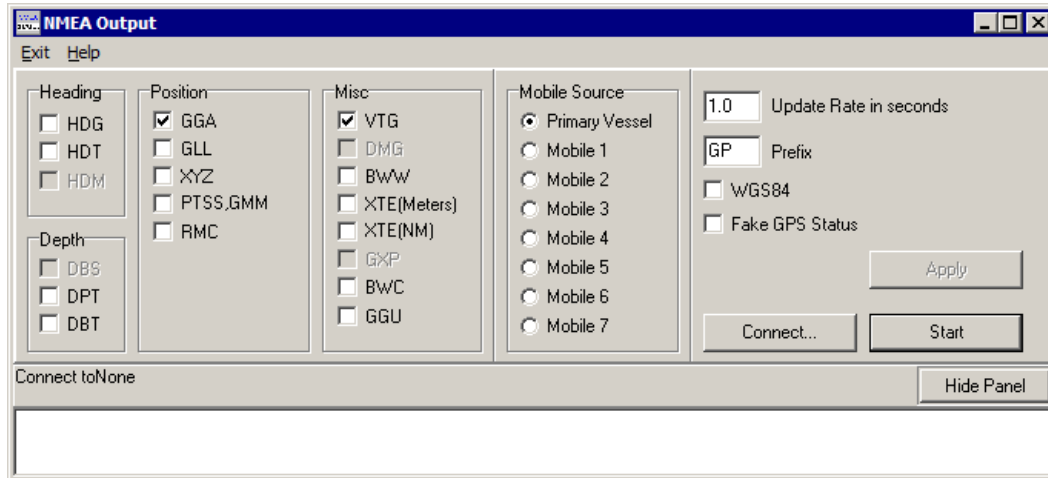
## NMEA OUTPUT

NMEA Output enables you to export user-defined NMEA strings from the SURVEY program. It can be used together with the NetNMEA.dll to broadcast the output strings over the network. If you want to output multiple sets of data, you can launch more than one incident of this module with different connection settings for each. If this program is open when you close SURVEY, it will

resume using the same settings the next time you launch SURVEY.

1. **Select OPTIONS-SHARED MEMORY-NMEA OUTPUT.**

*FIGURE 16. NMEA Output Display*



2. **Select which NMEA strings to export.** Checking the WGS84 option tells it to output WGS84 rather than local coordinates.
3. **Define the Update Rate** (the frequency to send messages).
4. **Define the Prefix.** This is typically GP, but it can be anything.
5. **Choose to output your position data in WGS84** (check WGS84) or local grid coordinates.
6. **If your output must include a GPS status code, check 'Fake GPS Status'.** This option outputs hard-coded GPS status values and ellipsoid height.
  - Mode = 2
  - Number of Satellites = 7
  - HDOP = 0
  - Ellipsoid Height = 0
 When unselected, the output uses the incoming GPS data.
7. **Set the connection information** by clicking [Connect] and filling in the dialog (as in HARDWARE).
8. **Click [Start].** You can preview the output in the bottom of the screen or click on [Hide Screen] to remove this display.

**NOTE:** The [Start] key changes to [Pause] when the program is exporting data. You can toggle the export of data on and off with this button.

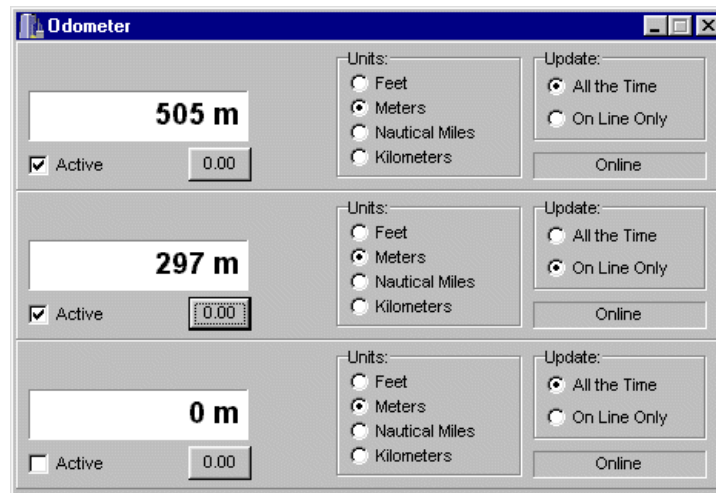
## ODOMETER

The Odometer program enables you to monitor the distance traveled. This is only for on-screen viewing; there is no data output. The program allows you to view up to 3 different configurations.

If this program is open when you close SURVEY, it will store the options in the *ProjectName.ini* file and use the same settings the next time you launch SURVEY

1. **Launch the ODOMETER program** by selecting OPTIONS-SHARED MEMORY-ODOMETER.

**FIGURE 17.** Odometer Display



2. **Select the distance units.**
3. **Specify distance to measure**, all travel or only the distance traveled while surveying.
4. **Check the Active check box and view the distances in the windows on the left.** Toggle this measurement on and off manually by checking and clearing the box.

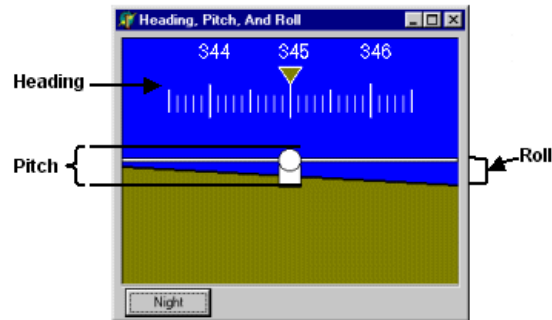
**To prevent the Odometer from being hidden behind other windows** (optional), right-click on the window and select **Always On Top**.

**To display zeros up to the 1 million place** (Optional), right-click and select **Show Leading Zeros**.

## GRAPHICAL MOTION REFERENCE UNIT

The Graphical MRU program shows Heading, Pitch and Roll in a real time, visual display.

**FIGURE 18.** Graphical MRU Display



The scale at the top of the window represents the heading.

The vessel is represented by the square in the center. When the vessel:

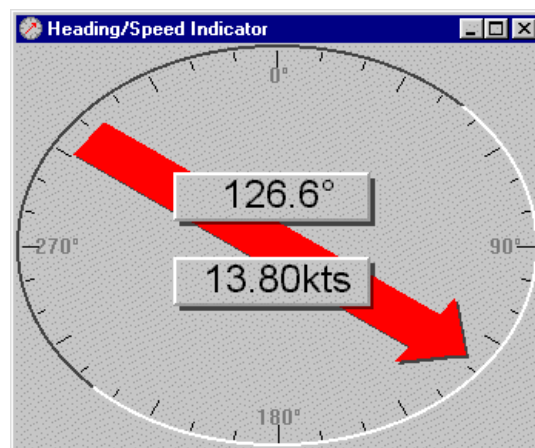
- **Is stationary**, the lines extending out on either side lie at the change from green to blue.
- **Rolls**, the diagram green/blue border rotates out of line with the horizon line by the amount of the roll.
- **Pitches**, the square moves vertically out of line with the circle by the amount of the pitch.

The **Day/Night** label enables you to toggle between dark and light displays according to your survey environment.

## HEADING AND SPEED INDICATOR

The heading and speed indicator is a graphical display of your vessel's heading and speed.

**FIGURE 19.** Heading and Speed Indicator





## CONFIGURING YOUR AREA MAP DISPLAY IN SURVEY

The SURVEY program loads the information from the current project. It gets geodetic information and hardware information by reading the project's initialization files. It will load the most recently used planned survey line file (\*.LNW) from the current project, as well as any background files and matrix files that are currently 'Enabled'.

The HYPACK® SURVEY interface also enables you to load additional files and set other display options. If you have more than one area map display, you can configure each display independently.

### LOADING FILES TO YOUR AREA MAP DISPLAY IN SURVEY

In addition to the files loaded based on the HYPACK® SUB-BOTTOM display, you can load files through the SURVEY menus.

- **Background Files** may be loaded using the CHART menu in the SURVEY shell. In addition to background chart files, you can also load several other HYPACK® SUB-BOTTOM file types (eg. BRD, CHN, MTX, LNW, PLN, TGT...) *for display purposes only*.
- **Planned Lines:** A planned line file may be loaded by selecting LINE-SELECT FILE and choosing your file. Since you may only have one line file loaded at a time, SURVEY will unload any active Line File and load the selected file. This will be the one on which the Cross Track Error, Distance from Beginning of Line and other such measurements are based. You may display other planned line files as charts by loading them through the Charts menu.
- **Targets:** Select targets for display the Targets menu. SURVEY append new targets to the SURVEY target group.
- **Active Matrix files:** Load matrix files through the Matrix menu. You may use multiple matrix files loaded at a time to cover large project areas. You may also load matrix files *for display purposes only* through the Charts menu.

**Corrected or Raw Soundings and/or Events** at each event mark. These items are stored in the current Project directory. Each day, separate Sounding and Event files are created. The SURVEY program automatically re-loads each file to provide you with a history of the day's survey.

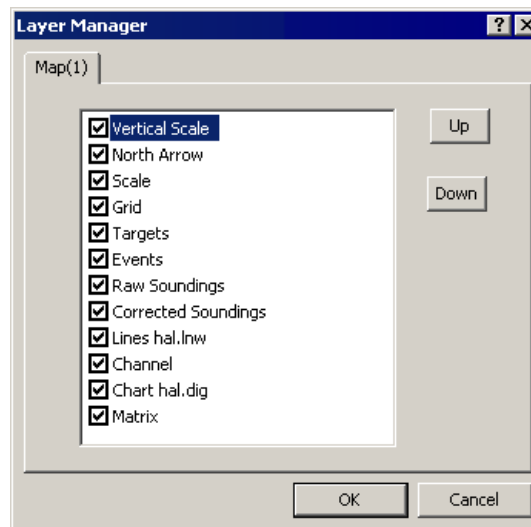
## AREA MAP LAYER MANAGER

In addition to your project files, you may also include chart features, such as a legend, scale, north arrow, and projection and lat./lon. grids, in your area map display.

**To set the files displayed and their draw order:**

1. **Access the Layer Manger** by selecting SETTINGS-LAYER MANAGER.
2. **Check the files and features you want to display.**
3. **Set the draw order.** You can click and drag the files in the list or select one and reposition it with the Up and Down buttons. Items at the end of the list are drawn first and will be overlaid by any in the list above them that are selected.
4. **Click [OK].**

*FIGURE 20. A Sample Area Map*



## AREA MAP MENU OPTIONS

**Print Output Menu:**

- **Save Bitmap** saves a bitmap record of the current Area Map window to the project directory.
- **Print Map** sends a copy of the Area Map to the default Windows® printer.

**View Menu:**

**Zoom In/Out:** When this option is selected, a left-click decreases the scale (zoom in) and a right-click increases the scale (zoom out).

**Zoom Window:** Select this option and drag a rectangle in the window to define the extent of your desired view. The program redraws the screen to display the defined area optimally.

**Zoom Extents:** Draws the display at a zoom scale that displays all enabled data.

**Pan:** Select this option, then click in the window and drag the cursor to the position where that point should be displayed. As you drag, the program displays the distance and azimuth of the cursor motion. When you release the mouse button the display updates accordingly.

**Move options** (or the arrow keys) can be used to pan the screen.

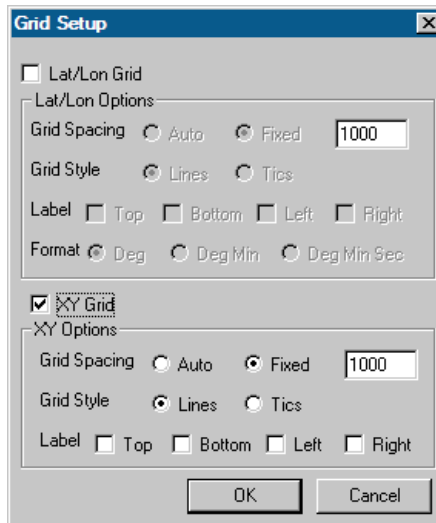
**Rotate options** turn the area map display.

### AREA MAP GRID PROPERTIES

**Grid Properties** set how the projection and lat/long grids are presented. Select SETTING-GRID PROPERTIES to access the Grid Setup dialog. As in the HYPACK® SUB-BOTTOM Control Panel, you can choose automatic or fixed spacing and the style of the labels. Labeling is available on all four sides of the map.

**NOTE** The Lat/Lon grid is displayed in Lat/Lon of the local datum.

*FIGURE 21. Grid Setup Dialog*

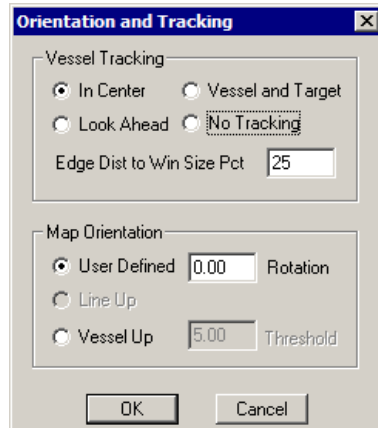


## AREA MAP TRACKING AND ORIENTATION OPTIONS

**Tracking and Orientation** options automatically re-adjust the screen when the boat leaves the display area and to rotate your map to your preferred orientation.

Vessel track points are limited to one per second.

**FIGURE 22.** *Tracking and Orientation Dialog*



Select SETTINGS-TRACKING/ORIENTATION from the menu and the Orientation and Tracking dialog appears.

### *Vessel Tracking:*

- **In Center** returns the boat to the center of the screen as it nears the edge. The **Edge Dist to Win Size Pct** option determines when the centering will occur based on the distance between the vessel and the edge of the area map (expressed in percentage of the Area Map window size with an allowable range of 5-25%).

**NOTE:** If you enter a value outside the 5-25 range, the program will reset the value to 5, if you have entered a value less than 5, or 25 if you have entered a value greater than 25.

- **Look Ahead** moves the boat further back from the center to maximize the amount of space displayed ahead of the vessel.
- **Vessel and Target** keeps the boat and the current active target in view. The map automatically zooms to fit as you approach.
- **No Tracking** allows you to move the screen anywhere you want without having it zoom back to keep the boat in view. (Press the Home key to center the vessel on your screen.)

If you set your preferred method of tracking, you can quickly toggle between this setting and “No Tracking” by selecting SETTINGS-TOGGLE TRACKING (Ctrl+T).

### *Map Orientation:*

- **Vessel Up** aligns the Area Map with the current vessel heading. Define a threshold (in degrees) to determine how

much the vessel heading must change to cause the map orientation to adjust. This prevents constant (annoying) updates of the map orientation with only small changes in vessel heading.

- **Line Up** draws the screen so the current line segment is directly “up” the screen. If you are in the “Line Up” orientation, the boat should be progressing up the screen. If your boat is going “down” the screen, you need to “whip” the line ends (change the start-line and end-line points) by using the Ctrl-W key command or the LINE–SWAP menu item.
- **User-Defined Rotation** draws the Area Map according to the specified degrees. Zero degrees will orient the map with North up.

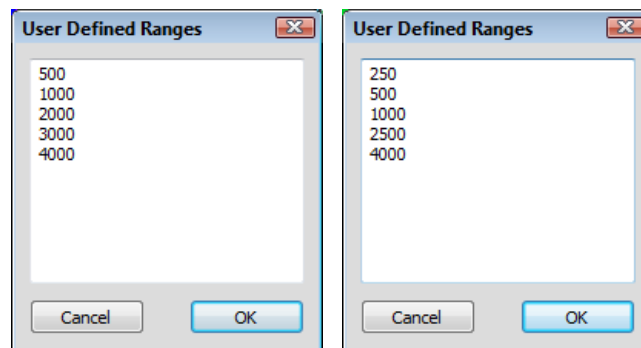
### AREA MAP RANGE OPTIONS

**Range options** on the Area Map toolbar allow you to quickly scale the map display. Just select a range in the SURVEY toolbar. SURVEY automatically scales the selected Map window so the length of shortest side displays the selected real-world distance. Each subsequent window resize adjusts the scale accordingly, but any zoom action will cause the range to revert back to "None".

The default values are 500, 1000, 2000, 3000 and 5000 survey units, but you can customize this list for your needs in each project:

1. **Select the Edit option from the Range drop-down list.** A dialog appears with a list of the current zoom ranges.
2. **Modify the list as needed and click [OK].**

**FIGURE 23.** Map Zoom Ranges—Default (left), Edited (right)

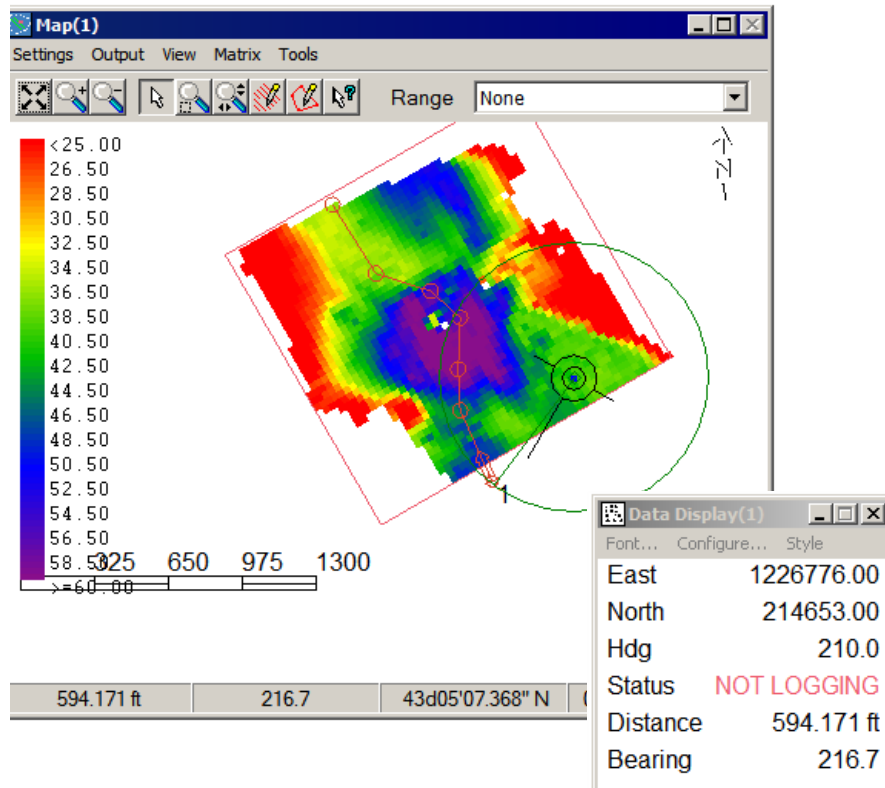


## MEASURING DISTANCE AND BEARING IN THE AREA MAP

You can measure the distance and azimuth between points in the SURVEYarea map.

1. Use the drop-down list in the toolbar to set the units in which you want to measure: U.S. feet, meters, kilometers or nautical miles.
2. Click and drag between the two points on the map. The measurements appear in the status bar.

FIGURE 24. Measuring in SURVEY

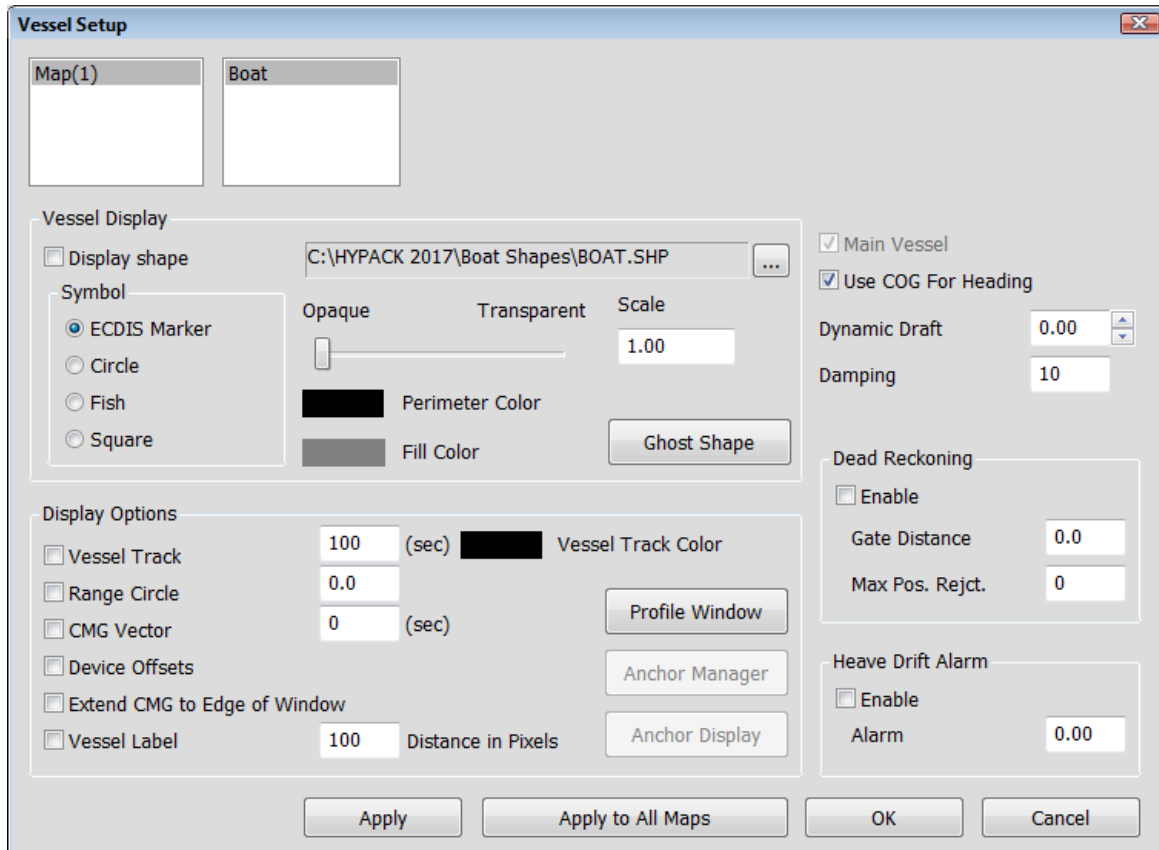


**Tip:** If you configure your Data Display to show Cursor North and Cursor East (current cursor coordinates), when you do a measurement these values change to display the distance and bearing.

## BOAT FEATURES IN HYPACK® SURVEY

You can configure the display options and draft correction for each vessel through a Vessel Setup dialog. In addition, each Map window can display the same vessels identically or differently, each according to its own vessel setup.

FIGURE 25. Vessel Setup Dialog



1. **Open the Vessels Setup dialog** by clicking VESSELS on the menu bar.
2. **Select the vessel whose features you want to modify and the Map window for which these settings apply** at the upper left.
3. **Choose your vessel settings and click [Apply].** The Apply button allows you to preview your display before exiting the dialog. If it doesn't suit you, make some adjustments and apply again.
4. When you are satisfied, **click [OK].**

The configuration for each vessel is saved when you exit the SURVEY program and are restored when you re-start the program.

### **SPECIFYING THE MAIN VESSEL IN SURVEY**

For applications with multiple vessels or a vessel and towfish, one vessel must be set as the “Main Vessel”. The main vessel is used for calculating Cross Track Error and Distance To Go information. It is also used for the automatic Start Line and End Line decisions.

**To set your selected vessel as the Main Vessel:**

1. **Open the Vessels Setup dialog** by clicking VESSELS on the menu bar.
2. **Select the vessel whose features you want to modify** at the upper left.
3. **Check the ‘Main Vessel’ option.** Checking this box will automatically clear this option for any other vessel.



**Tip:** If you are tracking an ROV or using a towfish, you probably want to make the ROV or towfish the main vessel.

### Assigning a Boat Shape

## BOAT SHAPES AND SYMBOLS IN SURVEY

When the SURVEY program first loads a new vessel, it will default to a circle symbol.

You can assign a custom Boat Shape, created in the BOAT SHAPE EDITOR (\*.SHP) to a vessel through the vessel setup dialog.

1. **Access the Vessel Setup dialog**, select VESSELS in the menu.
2. **Select the vessel whose features you want to modify and the Map window for which these settings apply** at the upper left.
3. **Check the ‘Display Shape File’ option and click the [...] for the Shape field.** It will bring up a listing of the available shapes, defaulting to the \HYPACK Sub-bottom\Shapes folder.
4. **Select the vessel shape file** that represents your vessel and click [Open]. Multiple file types are supported:
  - SHP files: The default file type is created in the BOAT SHAPE EDITOR
  - DXF files, typically drawn in a CAD program, with the 0,0 point at the boat origin.
  - BMP files

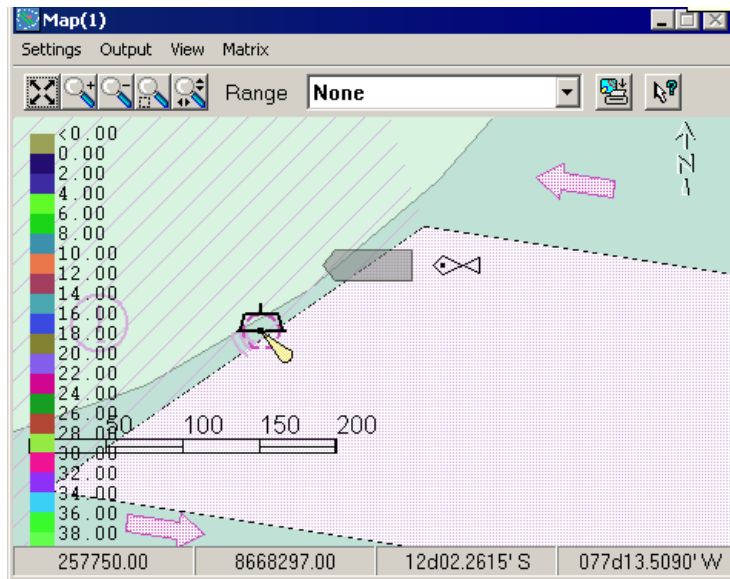
**To display the boat symbol instead of the shape**, clear the ‘Display Shape’ check box.

By default, SURVEY draws each vessel shape using the ECDIS boat symbol. You can select an alternate symbol (circle, fish or square) from the Symbol list or a boat shape for each vessel.

In the following figure, we selected the BOAT.SHP (custom shape found in the \HYPACK Sub-bottom\Support\Boat Shapes folder) for our main vessel. For the ROV, we have selected a Fish shape from the SHAPE options.



**FIGURE 26.** Main Vessel and Towfish Shapes and Symbols in SURVEY



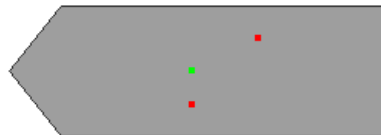
You may distinguish between different vessels by assigning different symbols, shapes or fill colors, or by displaying vessel labels.

*Displaying Origin, Tracking Point and Device Locations*

When you display a boat shape, check **Display Offsets** in the Vessels dialog to display colored pixels at the locations of the vessel origin (green), the tracking point (blue) and the location of each device (red).

**NOTE:** If a device is located at the origin or tracking point, the red pixel representing the device will hide the green and blue pixels for the origin and tracking point.

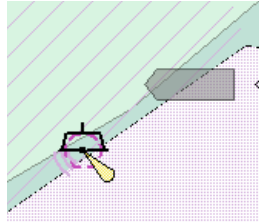
**FIGURE 27.** Viewing the Origin and Device Locations on the Vessel Shape in SURVEY.— In this example, the tracking point is at the echosounder location so it is not visible.



*Vessel Shape Transparency*

A transparent shape allows you to view other map display items (chart information, soundings, planned lines, etc.) that may otherwise be obscured from view by the boat shape. Transparency affects only the fill color; the perimeter remains opaque.

FIGURE 28. Sample Transparent Vessel Shape



To change the level of transparency, use the transparency slider.

Vessel Shape Scale

**Scale** affects the size of the vessel shape displayed. Enter a scale multiplier in the Vessels Setup dialog to adjust the size of your vessel in the Map window.



Vessel Perimeter Colors

**Tip:** If you use real measurements in the BOAT SHAPE EDITOR when you generate your boat shape, a scale of 1 should display your vessel at a proper scale in SURVEY.

The **Vessel Perimeter Color** defines the color of the vessel symbol, the outline of the boat shape that may be assigned to this vessel, as well as the color used to display text information about the boat in the Data Display.

**NOTES:** If you have multiple vessels, you can keep track of different ones by assigning different perimeter colors for each vessel.

The **Vessel Fill Color** is the color used to fill a boat shape. Note the fill color is independent of the symbol color.

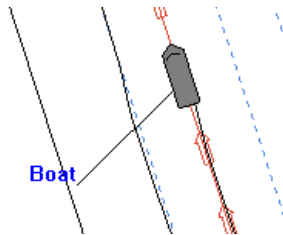
To assign either the perimeter or fill color, click in its color square and select a new color from the color selection dialog.

Labeling your Vessels

It may be useful, when tracking multiple vessels, to place a short label on the vessel.

To label your vessels, check the 'Display Vessel Label' option.

FIGURE 29. Labeling the Boat



**NOTE:** Vessel names (determined in HARDWARE) should be kept short, as the SURVEY program needs to capture the entire area surrounding the boat and label. If boats and labels overlap, the display can get confused as it captures pieces

of other labels. This can be re-set by zooming the screen in/out one time.

## BOAT TRACK PARAMETERS IN SURVEY

The track parameters are the settings that affect the calculation and display of the boat track line in SURVEY.

The **track line** shows the path that the vessel has traveled. It updates once per second.

*To Display the Track Line:*

- Check **Display Visible Track** and set the **track length** in seconds. A longer time results in a longer displayed track line.
- Set the **track color** by clicking in the **Vessel Track Color** square and selecting your color from the Colors dialog.

## VESSEL HEADING IN SURVEY

Typically, HYPACK® SURVEY orients your boat shape according to heading data received from your sensor (GPS or compass) configured in HARDWARE with the heading function. If no driver is configured to read heading, HYPACK® SURVEY calculates the heading based on course over ground (COG).

The **Use COG for Heading** option in the Vessel Setup dialog (VESSELS menu) enables you to ignore heading sensor data and use COG *until* you close HYPACK® SURVEY or deselect this option in the Vessel Setup dialog.

---

**IMPORTANT:** Each time you open HYPACK® SURVEY, the program automatically resets this option *according to your HARDWARE configuration*.

---

**To permanently use course over ground and ignore your heading data,** close your SURVEY programs, return to HARDWARE and deselect the Heading function.



**Tip:** If HYPACK® SURVEY always draws the vessel facing north, you have a driver configured to read heading, but HYPACK® SURVEY is not receiving heading data. Check that your heading device is outputting the heading or deselect the Heading function in HARDWARE and use COG.

## POSITION FILTERS IN SURVEY

GPS devices can occasionally generate an inaccurate reading. Position spikes such as this may cause a problem for users who are using automated features such as switching planned line segments, cross-track error, and Start and End Line Gates to control data logging in SURVEY. The position filters in the Vessel Setup dialog provide criteria for SURVEY to recognize a bad position and ignore it *for these purposes*.

1. **Open the Vessels Setup dialog** by clicking VESSELS on the menu bar.
2. **Select the vessel whose features you want to modify and the Map window for which these settings apply** at the upper left.

The **Dead Reckoning** option tells SURVEY to calculate a position based on current heading, speed and elapsed time since the last position, and use it in place of a rejected position.

**Gate Distance** is the maximum distance allowed between two consecutive positions when the vessel is stationary. Each time SURVEY receives a position, it calculates the distance it should be from the last recorded position based on the vessel speed and elapsed time since the last position. It compares that calculated distance against the actual distance. If the actual distance exceeds the calculated distance by more than the gate distance, SURVEY records the position to the data file, but ignores it for the purpose of the automated features in SURVEY.



**Tip:** Use a value slightly larger than your expected GPS error.

**Maximum Consecutive Positions Rejected** limits the number of points that can be rejected without accepting one. If SURVEY has rejected this number of consecutive position readings, it will accept the next position regardless of where it is.



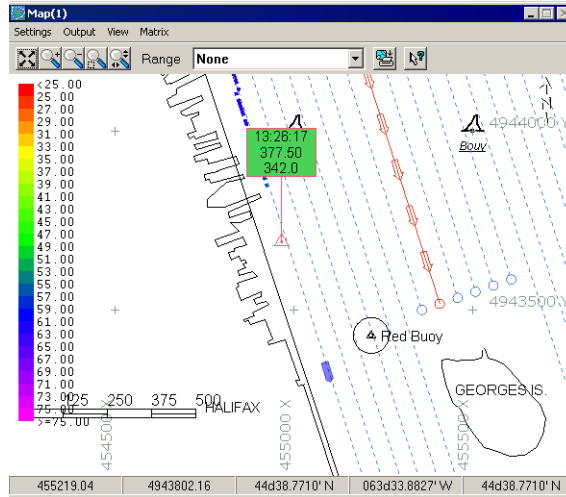
**Tip:** Calculate the number of positions you would normally log over the distance where you lose signal and use a value slightly greater.

## CHART (BACKGROUND) FILES IN SURVEY

The SURVEY program loads the information from the current project. It gets geodetic information and hardware information by reading the project's initialization files. It will load the most recently used planned survey line file (\*.LNW) from the current project, as well as any background files and matrix files that are currently "Enabled".

In addition to background chart files, you can also load several other HYPACK® SUB-BOTTOM file types in SURVEY (eg. BRD, CHN, MTX, LNW, PLN, TGT...) *for display purposes only.*

**FIGURE 30.** SURVEY with a DIG Chart, Target File (\*.TGT) as Background File (Red Buoy) and an Active Target File (13:26:17).



### LOADING CHARTS DURING SURVEY

1. **Select CHART-LOAD.** A file selection window will appear.
2. **Select the desired file type and the name of the data file you wish to add to the SURVEY Area Map.**

**NOTE:** Vector Product Format charts may also be loaded from SURVEY through the Chart menu. The process is the same as loading them to HYPACK® SUB-BOTTOM.

#### Chart Geodesy:

For Chart data to be correctly drawn, the geodetic parameters of HYPACK® SUB-BOTTOM must match the geodetic parameters of the background file (BSB, DIG, DGN, DGW, DXF, TIF, ARCS). For data stored in WGS-84 (C-Map, S57, VPF), the SURVEY program will transform the data files to the local datum, using the datum transformation parameters in the GEODETIC PARAMETERS program before converting them to your projection. This allows you to use these file formats on any projection.

#### Draw Order:

Charts inside the SURVEY program will draw in the order they have been loaded. If you have a Chart which has a solid background (e.g. BSB, S57, TIF, VPF), these will obliterate other types of background charts. To view both charts together, you must do either of the following:

- **Specify the correct draw order.**

- **Set the transparency setting** of the file drawn on top to allow you to see through to the files below.

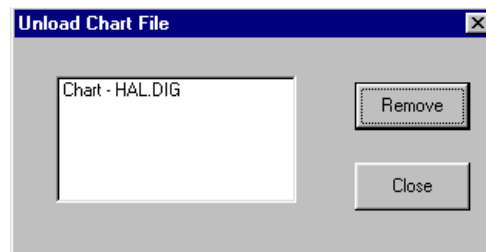
### More Information

- [“Setting Chart Transparency”](#) on page 1-11

## UNLOADING CHARTS DURING SURVEY

1. **Select CHART–UNLOAD.** The window shown in the following figure will appear.

**FIGURE 31.** *Unload Chart File Window*



2. **Click on the file you wish to “Unload” and click [Remove].** The screen will now redraw without the file you have unloaded.

## DISPLAYING HAZARD CONTOURS IN SURVEY

A **Hazard Contour** (also known as a safety contour) is a user-defined contour level that warns of depths unsafe for navigation.

When you display contours exported from the TIN MODEL program, the hazard contour can be set to draw in red in the SURVEY Map window. More than one DXF file can be affected by the Track Hazard Contour setting.

During SURVEY, the program monitors changes in your real-time tide and draft corrections, and shifts the red contour up or down accordingly.

---

**NOTE:** The Hazard Contour setting affects *only* DXF contours constructed in the TIN MODEL program.

---

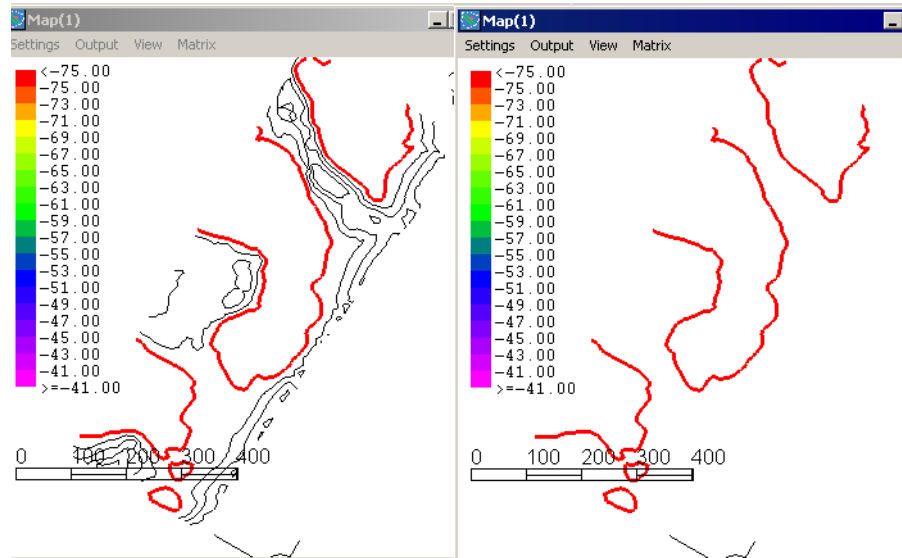
1. **Load one or more DXF files to SURVEY.**
2. **Select TIDE-CONTOUR.** The Track Hazard Contour dialog appears.

FIGURE 32. Track Hazard Contour Dialog



3. **Enter the hazard contour level** when the tide is at zero for your project area.
4. **Choose which contours you want to display.**
  - **Hazard** contour shows in red
  - **Shallow** displays the hazard contour in red and all shoaler contours in gray.
  - **All**: Shows all contours from your files with the hazard contour in red.
  - **None**: Shows all contours from your files, but the hazard contour is not drawn in red.
5. **Preview your results** (Optional) by clicking [Apply].

FIGURE 33. Hazard Contour - Shallow (left), Hazard (right)



6. **When you are satisfied with the results, click [OK]** to return to SURVEY.

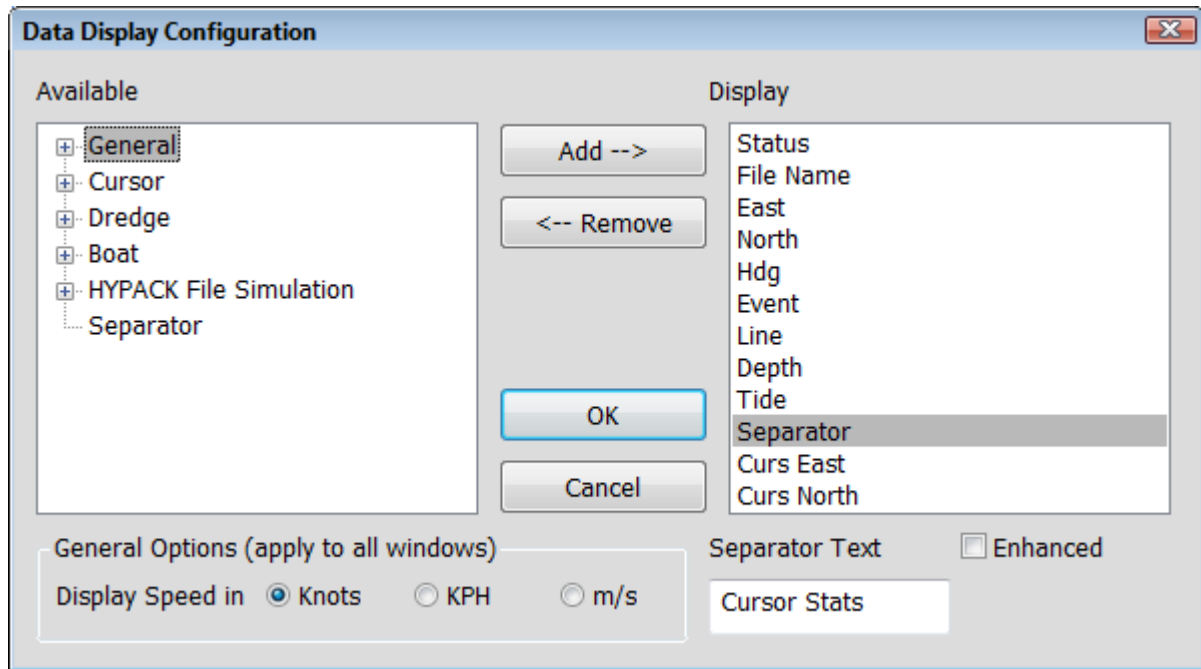
## CONFIGURING THE DATA DISPLAY WINDOW

### Selecting the Data Display Items

You can select the items displayed and the order in which they are displayed using the Data Display Configuration dialog.

1. **Select CONFIGURE on the menu bar** and the Data Display Configuration window appears.

FIGURE 34. Configuring the Display



2. **Select the items to be displayed.**

There are two lists: 'Available' and 'Display'. The items in the 'Display' list appear in the Data Display.

**To move any item from one list to the other**, do either of the following:

- Double-click on the item
- Select the item in the list, then click [Add=>] or [=<Remove].

Items appear in the Data Display in the order they have been added to the Display list. To re-configure the entire order, just drag the items up or down the Display list.

If your configuration includes multiple vessels, each vessel has a list of items which is preceded by the vessel name in your Data Display window. For example, if you have main vessel and a towfish named "ROV", you will find items named "ROV-East", "ROV-North", etc.

The Data Display uses black for all items that are not associated with a specific vessel. It uses the outline color designated for each



vessel to display vessel-specific information. This is an easy way to distinguish between the different vessels in the Data Display.

**NOTE** If you are surveying with only a multibeam system, the depth reading in the Data Display is the nadir depth. (The hysweep.dll must be installed to report this data.)



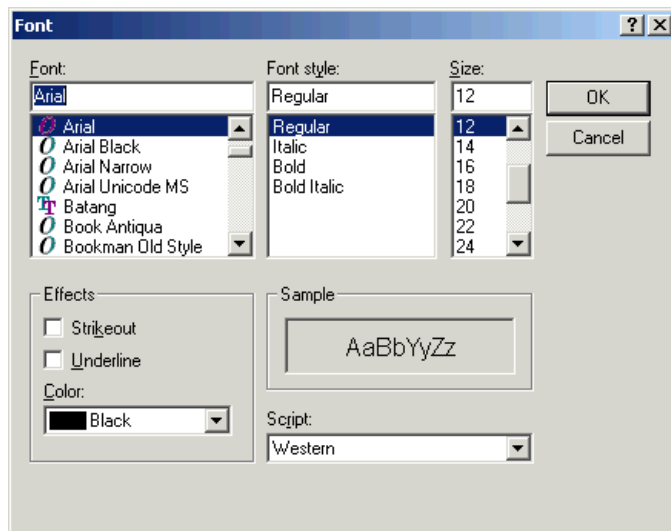
*View Options:*

**Tip:** If you load Cursor East and Cursor North, you can drag your cursor between two points to temporarily display the corresponding distance and bearing measurements in your Data Display Window. Set the distance units for these measurements in the toolbar.

- **Display Speed:** Choose to display your speed in knots, kilometers/hour. or meters/second.
- **Font:** The Font in the Data Display can be temporarily changed to meet the needs of different operators through the menu. These settings override the current scheme until you exit SURVEY.

**To Set the Font,** select DISPLAY-FONT and set your font in the Windows® Font dialog. *Only the font, style and size apply.*

**FIGURE 35.** *Selecting the font for the Data Display*



- **Enhanced Display:** Select items in the Data Display can be enhanced (written in a bolder font) to make them stand out among the other items.

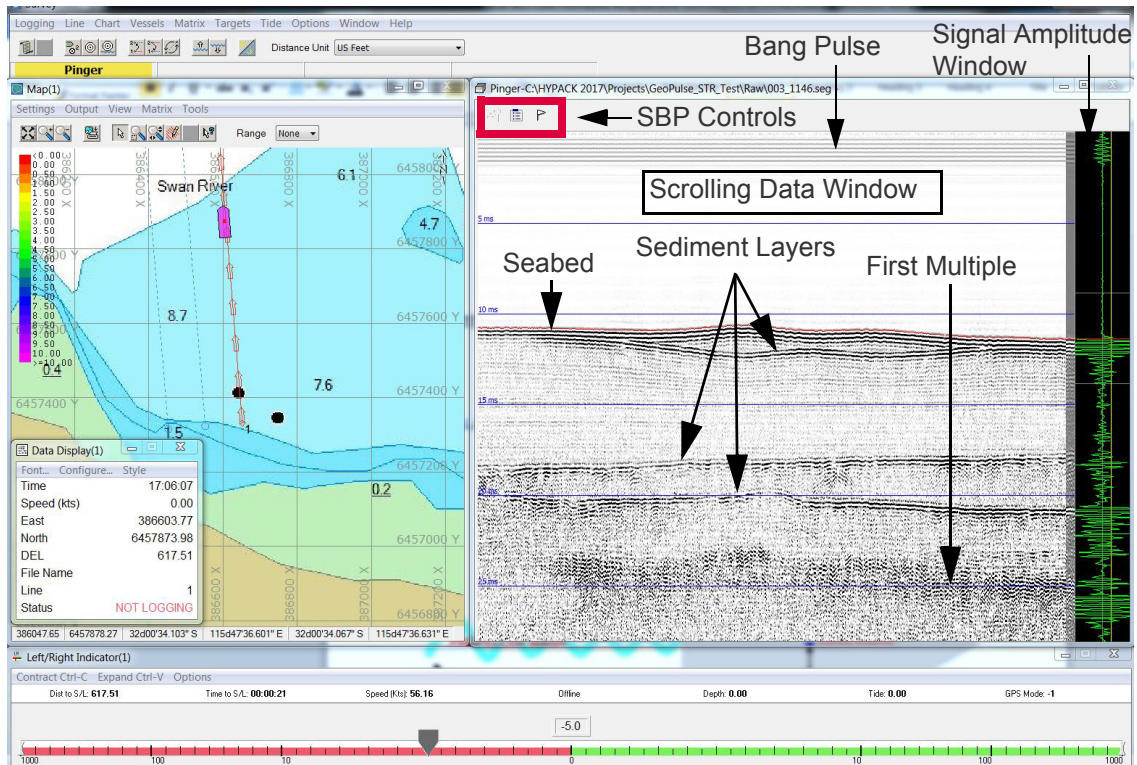
**To “Enhance” an item,** click on the item in the ‘Display’ list you want to enhance and then check the ‘Enhanced’ box.

**NOTE** The “Enhance” feature will work best, if you are using a standard font. If you have selected a “Bold” type font, it will be less effective.

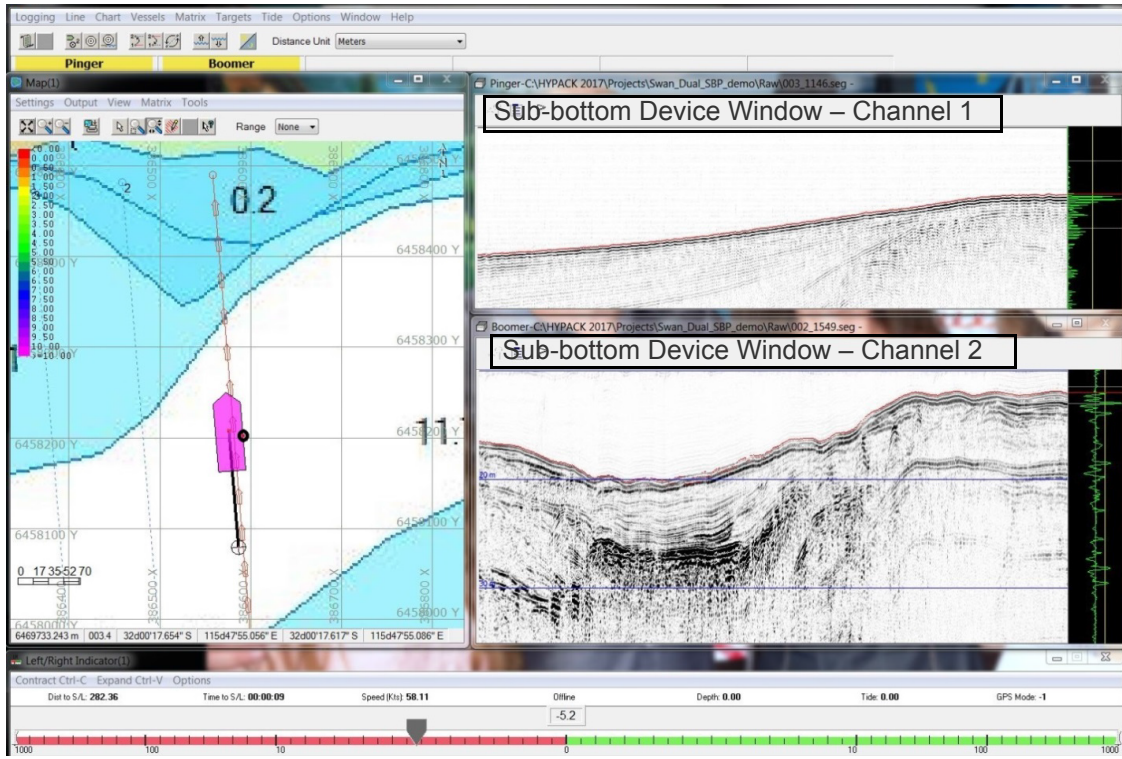
## SUB-BOTTOM PROFILERS IN SURVEY

In SURVEY the sub-bottom profiling data is viewed in the Scrolling Data Window. If you simultaneously acquire two channels of sub-bottom data, there will be two instances of the Scrolling Data window—one for each channel.

**FIGURE 36.** The SURVEY Program Showing the Map, Scrolling Data & Left/Right Indicator windows



**FIGURE 37.** The SURVEY program Showing Dual Sub-bottom Systems Displayed on Two Instances of the Scrolling Data Window.



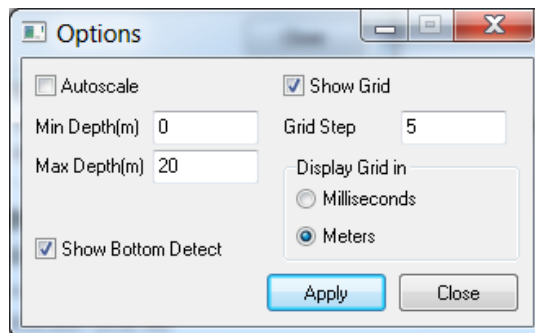
### CONFIGURING THE SUB-BOTTOM DEVICE WINDOW

There are two Sub-Bottom Controls accessed – through icons at the top of the Scrolling Data window:

- **View Options** control the window display other than the data itself.
- **Sub-bottom Corrections** affect how the data is drawn in the window.

### SUB-BOTTOM VIEW OPTIONS

**FIGURE 38.** Scrolling Data Window Display Options.



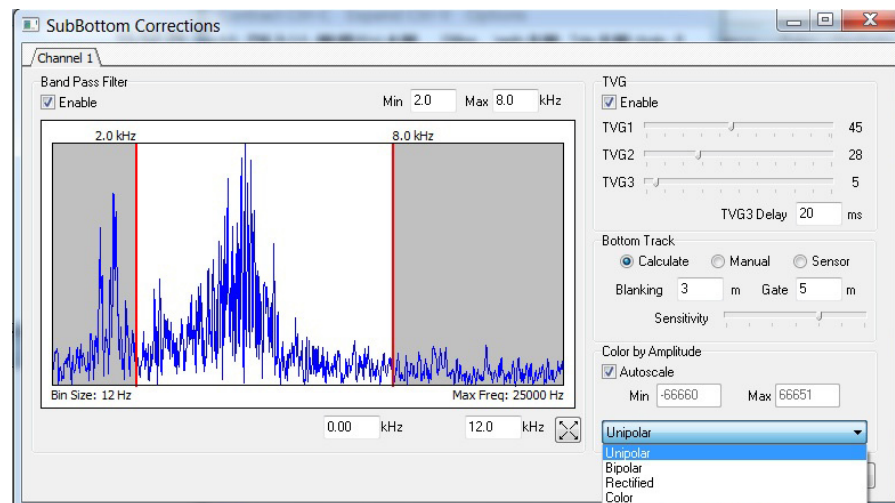
**SUB-BOTTOM  
CORRECTIONS**

- **Scale:** Configure the vertical scale using Autoscale or Manual values.
- **Grid:** If you choose to display a grid on the sub-bottom data imagery, you may also choose the units: milliseconds or meters.
- **Show Bottom Detect:** Draws a red line in both the signal amplitude display and the scrolling data window.

The options in the Sub-bottom Corrections window control the data Band Pass Filtering, TVG, Bottom Tracking and Signal Display Modes.

**NOTE:** These *corrections are not applied to the SEG-Y data files as HYPACK® SUB-BOTTOM always records the raw data to the SEG-Y file.*

*FIGURE 39. Sub-bottom Correction Window used to Adjust the Data Visualization Parameters.*



- **Band Pass Filtering** reduces extraneous noise recorded by the sub-bottom receiver during acquisition. This can take the form of vessel, electrical or ambient ocean noise. The recommended starting point for filtering sub-bottom data is a low pass start frequency of half of the sub-bottom transmit frequency and a high pass end frequency of double the sub-bottom transmit frequency. For example, if you are using a sub-bottom profiler transmitting at 4 kHz, use band pass filtering of between 2 kHz and 8 kHz as a starting point then adjust accordingly to achieve good quality data.

**NOTE:** Generally, additional band pass filtering should not be applied to Chirp data due to the match filtering and

correlation that is applied to the signal arrivals by the sub-bottom profiler manufacturer.

---

- **TVG** (Time Varied Gain) has three levels (TVG1, TVG2 & TVG3) that can be applied to enhance the real-time data display. TVG1 rate applies through the water column, TVG2 rate applies from the seabed bottom tracking through the seabed strata and TVG3 rate applies during the final part of the sweep period.

Set TVG3 to a lower rate than TVG2 to prevent the saturation that might otherwise occur if the gain continues to increase during long sweep periods.

Set a delay period for when you require the TVG3 rate to apply. The TVG3 delay begins at the seabed bottom tracking (start of the TVG2 ramp).

---

**NOTE:** If you set a TVG3 delay period of zero, the TVG2 rate will apply from the seabed tracking to the end of the sweep. For shallow penetration sub-bottom profiling systems only TVG1 & TVG2 are generally used. The optimal combination varies, depending on the sub-bottom system and the depth of penetration.

---

- **Bottom tracking** can be determined by one of three methods:
  - **Calculate:** Calculation based on the signal amplitude levels using the user-defined blanking, gate size and sensitivity values.
  - **Manual:** Manually setting the depth for the bottom tracking.
  - **Sensor:** Reading the bottom tracking from the sub-bottom system.

**To set the bottom tracking location,** click where the red horizontal bottom track line should appear in the Signal Amplitude window in the Scrolling Data window.
- **Signal Display Modes** (Color by Amplitude) are available to adjust how the data is visualized. The display scale can be set to Autoscale or manually adjusted:
  - **Unipolar:** Gray scale image in which the negative signal amplitude is zeroed. This works well with Pinger and Chirp data.
  - **Bipolar:** Gray scale image in which both positive and negative signals are displayed with the zero signal level colored 50% gray. This works well for Boomer/Sparker data.
  - **Rectified:** Gray scale image displayed as the absolute signal amplitude value where negative signals are

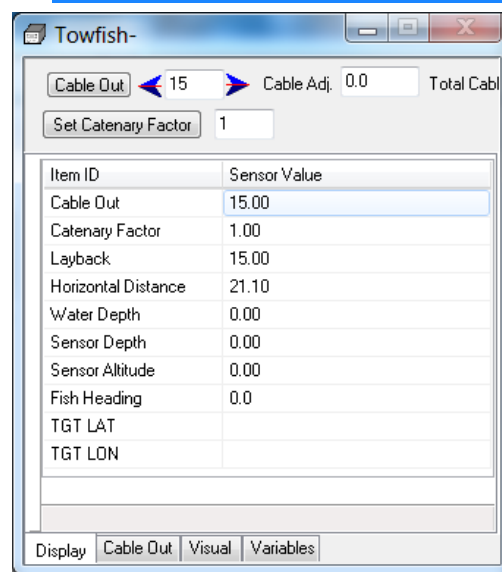
converted to positive values. This works well for Boomer/Sparker data.

- **Color:** Color version of the Bipolar display.

### LAYBACK FOR TOWED SUB-BOTTOM SYSTEMS

You can set the layback value of the common midpoint behind the attachment point in SURVEY. In the Towfish device window, enter this value in the Cable Out field. For surface towed sub-bottom systems the Catenary Factor should be set to 1, but for sub-towed systems a value of 0.8 is more appropriate.

**FIGURE 40.** *Input the Layback Value of the Sub-bottom System in the Towfish Window in SURVEY.*



You can also position a sub-tow sub-bottom system using a USBL/LBL positioning system, which can be set up in the HARDWARE program.

#### More Information

- [“Configuring the Sub-bottom Device Window”](#) on page 3-39
- [“Corrections in the SUB-BOTTOM PROCESSOR”](#) on page 4-34

## TARGETS IN SURVEY

**Targets** mark points of interest in your project area. To that end, each target must at least include a name and the XY position, but it can also include a lot of other metadata according to the project

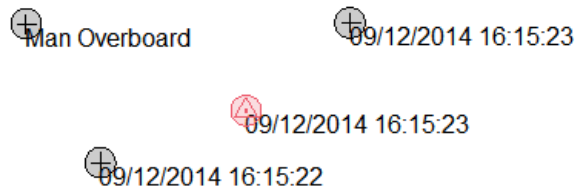
and the technology used and the program in which you mark your target. Targets marked in the SUB-BOTTOM PROCESSOR includes depth and depth of burial.

You can create targets in the HYPACK® SUB-BOTTOM interface or in the TARGET EDITOR then display them in the SURVEY program. This enables you to navigate *to* predetermined locations or *away* from areas dangerous for navigation. You can also mark targets at points of interest in SURVEY and in post-processing and save them to the project target list. The TARGET EDITOR displays all information about each target in one window and enables you to modify target properties and attributes where appropriate.

In SURVEY , targets can be used to mark items such as navigation aids (buoys, beacons, etc.), locations where you take water quality or bottom samples, or the “Waters Edge” location when surveying on rivers.

When you mark a target, SURVEY draws it to the area map and stores it to the SURVEY target group.

**FIGURE 41.** *Targets in an Area Map*



#### More Information

- [“Targets in HYPACK® SUB-BOTTOM”](#) on page 2-111
- [“Targets in the SUB-BOTTOM PROCESSOR”](#) on page 4-44

## MARKING TARGETS IN SURVEY

When you mark a target in SURVEY the name defaults to the computer clock time at which a target was marked, except when you create it through the Target Select dialog.

**You can use any of the following methods:**

- **Select TARGETS–QUICK MARK (or F5 key)**, marks a target at the current tracking point position.
- **If you have multiple mobiles:**
  - **Alt + F5** marks a target at the tracking point of the second mobile.
  - **Shift+F5** marks a target at the tracking point of the third mobile.

- **Double-click in the Area Map window**, a target is set at that position.
- **Select TARGET-SELECT and click [New]** in the dialog. The Target Properties dialog appears for you to enter the necessary data.

Each time you create a target in SURVEY, it is saved to the Survey target group.

### ***EDITING TARGET PROPERTIES IN HYPACK® SURVEY***

You may edit the target properties just by typing in the new information in the Target Properties dialog.

1. **Access the Target Properties dialog.**
  - Right-click on a target and select Properties.
  - Select TARGET-PROPERTIES from the menu.
  - Select a target and press F6.
  - Through the Select Target dialog:
    - i. **Select TARGETS-SELECT.** The Select Target dialog displays a list of project targets.
    - ii. **Click on the target you want to delete.** (It is highlighted.)
    - iii. **Click [Modify].**
2. **Enter your new target properties and click [OK].**



## TARGET PROPERTIES IN SURVEY

FIGURE 42. The Target Properties Dialog

The **Name of a Target** defaults to the computer clock time a target was marked.

Display the **Boat Position** and **Target Position** in either X-Y or Lat-Lon. in the format specified in the HYPACK® SUB-BOTTOM Control Panel. The **Target Position** is the actual location of the target, offsetting it by the Distance and Bearing entered from the tracking point. This is changed with the **Display Position in Lat/Lon** check box.

The **Boat Position** is the location of the tracking point when the target is marked using the Quickmark function. If the target was created with the Targets cursor in the HYPACK® SUB-BOTTOM Screen Controls, it will be the same as the Target Position.

**Distance and Bearing** settings enable you to display a target offset from the marked location. Enter the Distance and Bearing then click [Recalc]. SURVEY *displays* the target in the new position with a line connecting it to the original position to show the offset.

---

**NOTE:** The Distance and Bearing affect only the display in SURVEY. They appear at their original location in the HYPACK® SUB-BOTTOM Map window. You can permanently translate the targets according to their Distance and Bearing properties in the TARGET EDITOR.

---

The **Depth** represents the corrected depth at the time the target was marked.

The **Code** and **Notes** fields are available to you for whatever purpose you desire.

**Orientation** (Angle) The angle of the alarm flag from the target when displaying it in SURVEY .

**Alarm:** Display method in SURVEY To display the alarm flag, enter 1. For circle display enter 0.

**Display Options:**

- **Number of Circles:** Circles drawn around each plain target to make them more visible on your map displays.
- **Radius Increment:** Distance, in survey units, between the target and target circles around each target.
- **Transparency:** Adjusts the circle display to be opaque or allow viewing charts and data drawn beneath.

**Time, Date, Event, and QUA** data are saved for each target as it is created.

In the following figure, Buoy 23 Red is the current selected target, noted by the triangle in the center. Buoy 20 Green has been offset 100' at a bearing of 045 degrees. A vector is drawn from the boat origin to the Target Position and the Target Circles are centered about the Target Position.

*FIGURE 43. Displaying an Offset Target (Buoy 20 Green)*



**DELETING TARGETS IN SURVEY**

Deleting targets permanently removes them from your project.

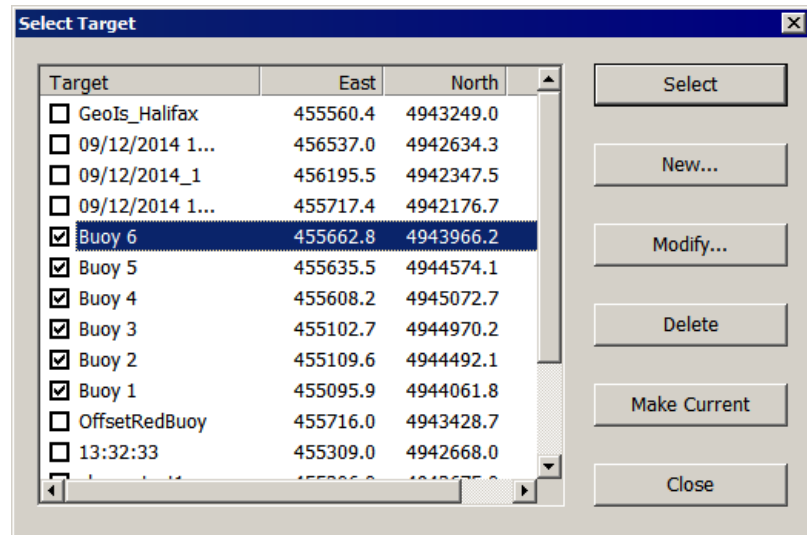
1. **Select TARGETS-SELECT.** The Select Target dialog displays a list of project targets.
2. **Click on the target you want to delete.** (It is highlighted.)
3. **Click [Delete] and confirm the deletion.**

## CHOOSING TARGETS TO DISPLAY IN SURVEY

SURVEY automatically displays the targets that were enabled in HYPACK® SUB-BOTTOM when you launch the program. You can modify the target display through the Target Select dialog:

1. **Select TARGETS-SELECT.** The Select Target dialog displays a list of project targets.

**FIGURE 44.** Select Target Dialog



2. **Check the checkbox for each target you want to have displayed in the Area Map.**
  - Check the checkbox for each target.
  - Select one or more targets in the list and click [Select].

**NOTE:** [Select] *toggles the check status* of each selected target.



**Tip:** To multiselect targets, hold the Ctrl key and select multiple individual targets or hold the Shift key and click on the first and last target in a range of consecutive targets.

3. **Click [Close]** to close the dialog and draw the checked targets in the Area Map window.

## REMOVING TARGETS FROM THE DISPLAY IN SURVEY

You can configure which targets display in the Area Map by selecting them in the Select Target dialog. Additionally, you can remove one or all targets from the Area Map. When you remove targets from the display, the targets remain in the target list, but

they become deselected and can be restored to the display in the Select Target dialog.

- **To remove any target from the Area Map display**, right-click on the target and select Erase.
- **To remove the currently active target** (denoted by a red triangle), select TARGETS-ERASE CURRENT.
- **To remove all of the targets from the Area Map display**, select TARGETS-ERASE ALL.

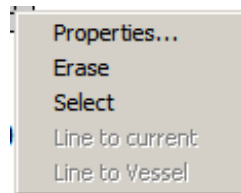
## SETTING THE ACTIVE TARGET IN SURVEY

The currently active target is drawn with a triangle at its center while other targets are drawn with a “plus” sign at their center. SURVEY can calculate and display several statistics about the active target relative to the main vessel in the Data Display window.

**To set the active target, use either of the following methods:**

- **Use the right-click menu:** Right-click on the desired target and select the Select option.

*FIGURE 45. Right-clicking on a Target Displays the Target Selection Menu.*



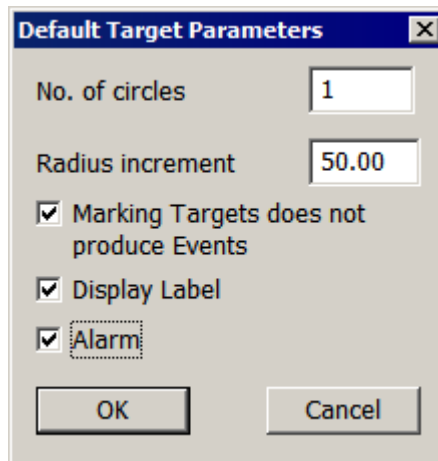
- **Use the Select Target dialog:**
  - a. **Select TARGETS-SELECT.** The Select Target dialog displays a list of project targets.
  - b. **Select the desired target in the list and click [Make Current] then [Close].**

## TARGET DISPLAY DEFAULTS IN SURVEY

**To set the Target Display defaults:**

1. **Select TARGETS-TARGET PARAMETERS.** The Default Target Parameters dialog appears.
2. **Set your options and click [OK].**

FIGURE 46. Default Target Parameters



**Number of Circles** When the Alarm option is unselected, this option draws concentric circles around the target.

**Radius Increment:** Distance, in survey units, between the target and target circles around each target.

**Making Targets does not produce Events** prevents events at target locations. Clear this option to produce events when targets are created.

**Display Label** toggles the display of the target name when you are drawing circle targets. Too many target labels may clutter your display.

**Alarm** includes a flag with the target name. Its background changes color according to the Alarm Distances settings. In SURVEY, alarm flags also display distance and bearing from the tracking point to the target. The text box changes color, according to the alarm distances set in the Target tab of the HYPACK® SUB-BOTTOM Control Panel. The default colors are green (low), yellow (medium caution) and red (danger), but you can set your own colors using the SCHEME BUILDER program.

**NOTE:** This Alarm setting overrides the setting in the Control Panel, Targets tab.



**Tip:** If alarm flags overlap or if they are obstructing your view of other critical features in your area map, you can modify the positioning of the flag through the Target Properties. (Right-click the target whose alarm flag you want to modify, select Properties and change the Orientation setting.)

## CONNECTING TARGETS WITH SURVEY LINES IN SURVEY

You can create a single-segmented survey line wherever you need one--right in HYPACK® SURVEY.

1. **Create two targets, one at each end of the line** you need.
2. **Select the Target to which you want to draw the line.**
3. **Right click on the Target that you want to draw the line from and select "Line to Current".** A survey line will be drawn between the indicated Targets and added to the currently selected Planned Line File.

**FIGURE 47.** Drawing a Survey Line Between Two Targets

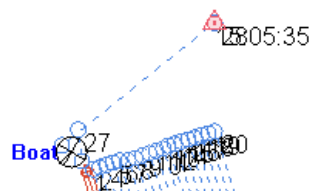


## CONNECTING TARGETS TO THE BOAT POSITION IN SURVEY

If you have a planned line file enabled, you can create a survey line from your tracking point position to a target. Just right-click on the target and select 'Line to Vessel'. A survey line will be drawn between the indicated target and your vessel, and added to the currently selected planned line file.

**NOTE:** This option is disabled if there is no planned line file enabled.

**FIGURE 48.** Drawing a Survey Line Between a Target and the Boat Position

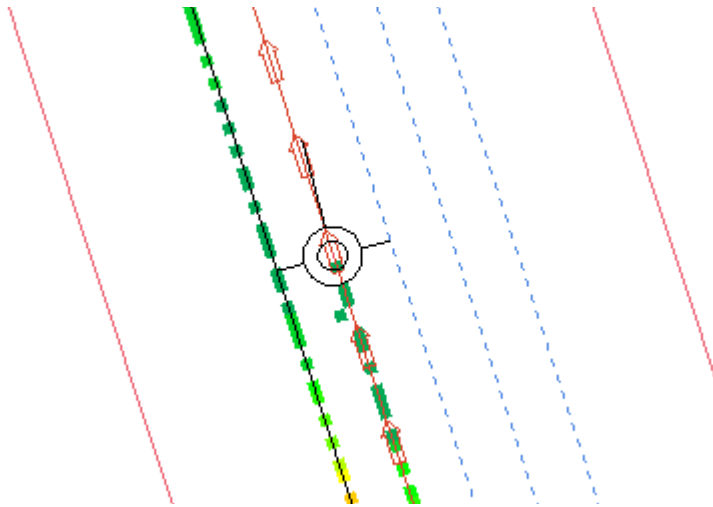


## MATRIX FILES IN SURVEY

**Matrix files (\*.MTX)** are gridded rectangular areas. You can fill the cells with depth information from your sub-bottom profiler in real time during data collection, or in post-processing.

Empty matrix files are typically created in the MATRIX EDITOR and saved to the project folder.

**FIGURE 49.** Matrix File in SURVEY



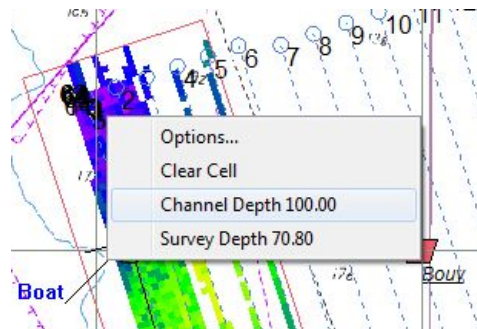
Matrices can be filled in the survey programs to provide a coverage diagram. This is particularly useful for multibeam and multiple transducer surveys.

**NOTE:** Be aware that there are limits to the maximum size of a matrix that can be successfully used in SURVEY. The maximum size depends on the amount of RAM, free hard drive space and processing power on your computer. Users with very large project areas should consider creating multiple matrices.

You can save matrix files at even time intervals by setting a Matrix Backup Time in the navigation parameters. The **Matrix Backup** file is a binary record of the matrix of the same root name, minus the last letter, appended with the time of backup (hh\_mm). It is stored in the project Archive folder.

The color bar in the map window gives you a general idea of the depths displayed in your matrix, but you can also view the exact depth in any matrix cell in the right-click display.

**FIGURE 50.** Right-click Display from a Matrix



### More Information

- [“Creating a Matrix File with the Matrix Editor”](#) on page 2-108

## LOADING AND UNLOADING MATRIX FILES IN SURVEY

If matrix files (\*.MTX) have been enabled in the HYPACK® SUB-BOTTOM project screen, they are automatically loaded into the SURVEY program. You can also “Load” and “Unload” matrix files in real time.

**NOTE:** You should be aware that there are limits as to the maximum size of a matrix that can be used successfully. The maximum size depends on the amount of RAM, free hard drive space and processing power on your computer. If you are working in a very large project area, consider creating multiple matrices.

### Loading a Matrix File

Select MATRIX-LOAD and select the Matrix File from the project selection dialog.

If you have loaded a “filled” matrix and wish to remove the sounding data, select MATRIX-CLEAR CURRENT DATA. You can choose to save the data to a backup matrix file in the project’s backup directory or just discard it.

**NOTE:** If you clear the data, you can not later use the MATRIX-SHOW ORIGINAL DATA option to compare previous data from the survey area with current ones.

### Unloading a Matrix File

Select MATRIX-UNLOAD.



## ***MULTIPLE MATRIX FILES***

In certain projects, it may be advantageous to have a series of smaller matrix files, rather than one huge matrix file. It is more efficient for the program to concentrate on one, small matrix file at a time and automatically change from one to the other according to the vessel position rather than to manage and re-draw one matrix that is hundreds of megabytes in size.

The SURVEY program loads multiple matrix files. It displays and updates any matrix while the main vessel falls within its boundary. As the vessel moves through the project area, the program continues to load and unload the individual matrix files, depending on its location.

Note that only one matrix can display data at a time while you are logging data. All matrices may be displayed simultaneously (complete with sounding data) only when you are not logging data by selecting MATRIX-DISPLAY ALL MATRICES.

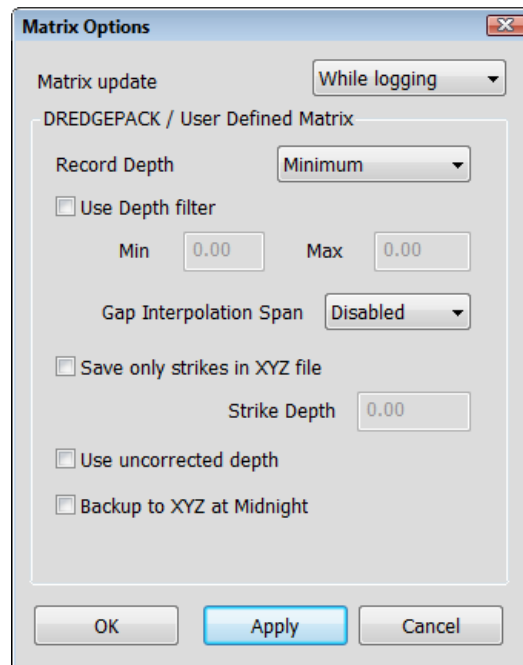
## ***SAVING SOUNDINGS TO A USER-DEFINED MATRIX IN SURVEY***

As you log data to a user-defined matrix during SURVEY, you can 'paint' either an empty matrix with only the current survey data or a matrix filled with data from a previous survey.

If you begin with a filled matrix, the new sounding data will overwrite what was previously entered.

The soundings you record to the matrix will be saved according to the criteria set in the matrix options. Select MATRIX-OPTIONS and the Matrix Options dialog will appear.

FIGURE 51. Matrix Options Dialog



**Record Depth** determines the depth reading to be stored to each Matrix Cell. Note how they are affected by Elevation or Depth Mode that you have set in the Matrix Menu.

**Minimum** will record the smallest depth value received in that cell.

- **In Depth Mode**, the smallest value is at the shoalest point.
- **In Elevation Mode**, the smallest value is at the deepest point.

**Maximum** will record the largest depth value received in that cell.

- **In Depth Mode**, the largest depth is deepest, while the smallest depth is shoalest.
- **In Elevation Mode**, the largest depth is shoalest, while the smallest depth is deepest.

**Last** will record the last sounding received.

**Use Depth Filter** option can be used to eliminate depths outside a user-defined range (Min Depth to Max Depth) from being saved to the matrix. This function can be used in either Depth or Elevation Mode. Since soundings are output as positive values, the Min. and Max values are always positive and the depths saved will fall in that range.

**Save only strikes in XYZ file:** When you select MATRIX-SAVE TO XYZ, it saves the difference between the sounding value and the user-defined Strike Depth. This is useful to see how much must be dredged to level the area to the strike depth.

*Beware!*

- **If selected in depth mode**, it only saves sounding if the Z-value of the As Dredged Depth is less than the Strike Depth. In this case, it saves the difference of the Strike Depth minus the Z-value of the As Dredged Depth
- **If selected in elevation mode**, it only saves sounding if the Z-value of the As Dredged Depth is greater than the Strike Depth. In this case, it saves the difference of the As Dredged Depth minus the Z-value of the Strike Depth
- **If unselected**, this option saves all depths.

**BEWARE!** This function is influenced by the Elevation Mode setting. If you are in Elevation Mode, this will record depths deeper than the strike mode. Probably not a very useful set of data!

#### Matrix Update Basis:

- **Always** updates your Matrix continuously. This option enables you to follow your dredging in the Matrix while not recording the Raw data if you don't need it.
- **While Logging** updates your Matrix only when you are logging Raw data.
- **Never** causes the program not to update the matrix with dredge depths.

**Use Uncorrected Depths:** The Matrix is updated, by default, with corrected depth information. If your device outputs corrected data, check 'Use Uncorrected Depths' to avoid double corrections in the matrix.

**Gap Interpolation Span** fills empty cells between filled cells in SURVEY. The interpolated data is not saved in the matrix, but you may export it with the all of the other cell depths to an XYZ file from SURVEY.

**Backup to XYZ at Midnight:** At midnight, the program saves the value of each cell to an XYZ file at the position of the cell center.

**Dredge Data in Empty Cells:** This option, available only in DREDGEPACK®, enables you to paint matrix cells in DREDGEPACK® even if they contain no survey data. Use this option to paint an empty matrix or when you are working beyond the filled area of the matrix.

#### INTERPOLATING MATRIX DEPTHS WHILE LOGGING

1. **In SURVEY, select MATRIX-OPTIONS** to open the Matrix Options dialog.
2. **Select the appropriate Interpolation Span** to limit the interpolation distance.
3. **Start logging.** The program will interpolate the data to fill unpopulated cells with no additional intervention.

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**INTERPOLATING  
MATRIX DEPTHS  
WHEN NOT  
LOGGING**

---



1. In SURVEY, **open the Matrix Options dialog**. Select MATRIX-OPTIONS.
2. **Disable the Gap Interpolation Span and click [OK]**.
3. **Log your data**.
4. **When you stop logging, return to the Matrix Options dialog and select the desirable Gap Interpolation Span**.
5. **Select MATRIX-FILL GAPS**.

**Tip:** If the results are unsatisfactory, remove the interpolated data (MATRIX-CLEAR GAPS) and try again.

You can experiment with different Gap Interpolation Span values until you get a satisfactory result.

### **EDITING MATRIX DEPTHS IN SURVEY**

The Matrix menu in the Map window in SURVEY has a group of selections that, together, enable you to use a border file to modify the matrix soundings inside or outside its boundaries.

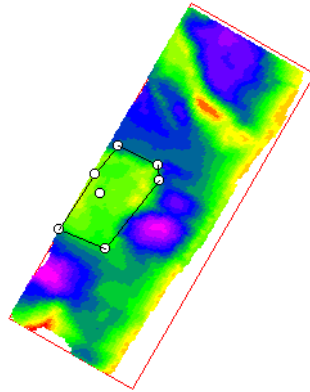
---

**NOTE:** The options and their effects on the data are a little different according to the module in which you perform them.

---

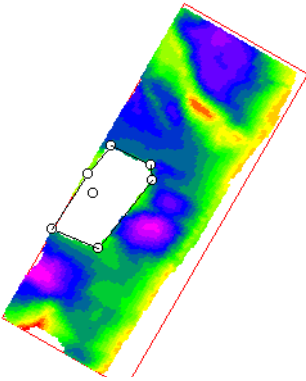
1. **Create a Border File** describing the area you wish to edit. You can:
  - **Create it in the BORDER EDITOR and load it into SURVEY** by selecting MATRIX-LOAD BORDER.
  - **Create it in SURVEY**.
    - i. **Select MATRIX-CREATE BORDER**.
    - ii. **Click as many points as you need** to outline your area.
    - iii. **Right-click either inside or outside of the border** you have created according to which portion of your data you want to modify. The polygon will automatically connect the first and last left-clicked points.

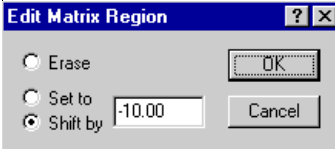
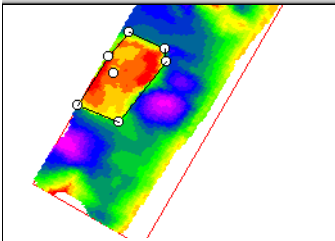
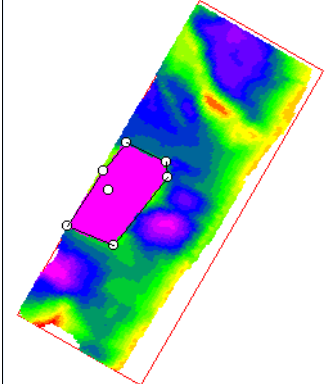
FIGURE 52. Border File Superimposed on Matrix File



- iv. **Save your border file** by selecting MATRIX-SAVE BORDER and providing a name. The file will be saved to your project directory with the \*.BRD extension.
- 2. **Modify your data.** Select MATRIX-EDIT BORDER and the Edit Matrix Region dialog will appear. For all soundings inside or outside the border (depending on where you right-clicked when you created the border) you can do the following:

TABLE 3. Editing your Matrix—Options and Actions

Dialog Option	Action in SURVEY	Action in DREDGEPACK®
<b>Erase</b> 	Deletes the survey data.	Deletes <i>both</i> the survey and dredge data.
<b>Reset Dredge Depth</b>	(Not Available)	Copies the survey depth to the dredge depth.

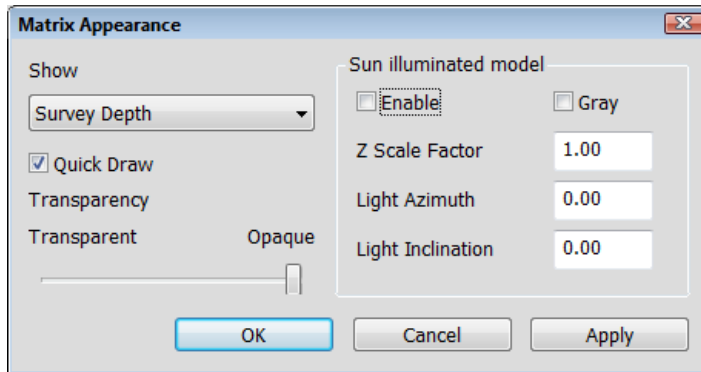
Dialog Option	Action in SURVEY	Action in DREDGEPACK®
<p><b>Shift by</b> and enter a positive or negative amount</p>  	<p>Increases or decreases the <i>survey</i> depth by the user-defined amount.</p>	<p>Increases or decreases the <i>dredge</i> depth by the user-defined amount.</p>
<p><b>Set to</b> and enter a depth</p> 	<p>Sets the <i>survey</i> depth to the user-defined depth.</p>	<p>Sets the <i>dredge</i> depth to the user-defined depth.</p>

3. **Click [OK].** The dialog disappears and the matrix display updates to reflect the modification.
4. **Remove the border file from your display.** (Optional) Select MATRIX-REMOVE BORDER.

### **MATRIX DISPLAY OPTIONS IN SURVEY**

The matrix file display can be independently configured *in each area map* using the Matrix Appearance dialog (In the Map window, select MATRIX-DISPLAY OPTIONS.)

**FIGURE 53. Set Matrix Appearance Dialog**



Matrix files have two depth fields. This allows you to choose for the matrix to be color-coded according to any of the following values:

**Show** : In Sub-bottom surveys, only the Survey option is applicable.

**NOTE** These settings *do not affect the values that are stored in the matrix*. They are for display purposes only. You can change them at any time.

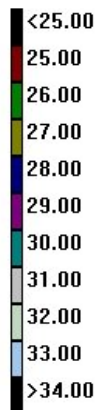
The other options in this dialog are not particularly useful for sub-bottom data.

### MATRIX COLOR SETTINGS IN SURVEY

The matrix file colors default to the project colors set in HYPACK® SUB-BOTTOM Sounding Colors.

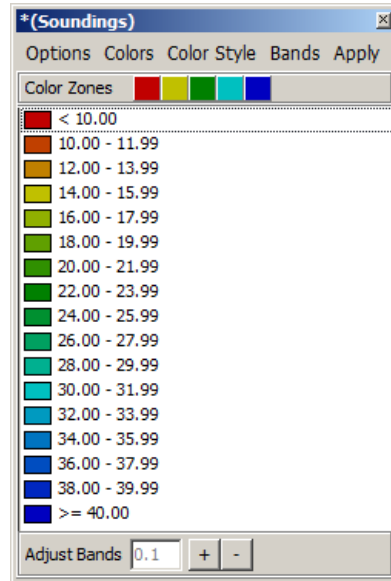
If a matrix is loaded in your area map, the matrix file legend appears along the left-hand side of the Area Map. This displays the current color zones used to display the matrix depths.

**FIGURE 54. Sample Matrix Legend**



To modify the colors, right-click on the legend and select *Settings*. The COLOR EDITOR appears for you to make any changes.

FIGURE 55. Color Editor



## SAVING MATRIX FILES IN SURVEY

You can manually or automatically save your matrix data at any time as you work in your project.

### Manual Saves

At any time, you can manually save your MTX or extract the data to an XYZ file based on the settings in your Matrix Options dialog.

- **To save your MTX** to its current file location and in its current state, select MATRIX-SAVE MATRIX.
- **To save the MTX data in XYZ format**, select MATRIX-SAVE TO XYZ to the current data in XYZ format. In this case, the data will be saved according to the choices in the Matrix Options dialog.

### Automatic Saves.

At user-defined time intervals, the filled matrix is saved to a binary record in the project Archives folder. SURVEY names each binary backup using the original matrix file name appended with the time and an MXB extension (*FileName\_HH\_MM.MXB*). This provides you with a series of MXB files generated over the course of a day. The binary files are quite small; the improved security against data loss is well worth the storage space.



---

**NOTE:** The time for the first MXB is rounded to a time at or previous to the backup time and divisible by the time interval. For example, an MXB record generated at 10:23 will be named *FileName\_10\_20.MXB*. After that, the time extension will match the file generation time.

---

You can use any of these MXB files to restore your project MTX to its state at the time the file was generated. This provides an easy recovery from power failure.

**To automatically generate binary backups of your matrix:**

1. **Select OPTIONS–NAVIGATION PARAMETERS** and the Navigation Parameters dialog will appear.
2. **Enter a number, in minutes, in MTX Backup Time.** This is the frequency that the program automatically saves the MTX file. (A value of '0' disables this option.)

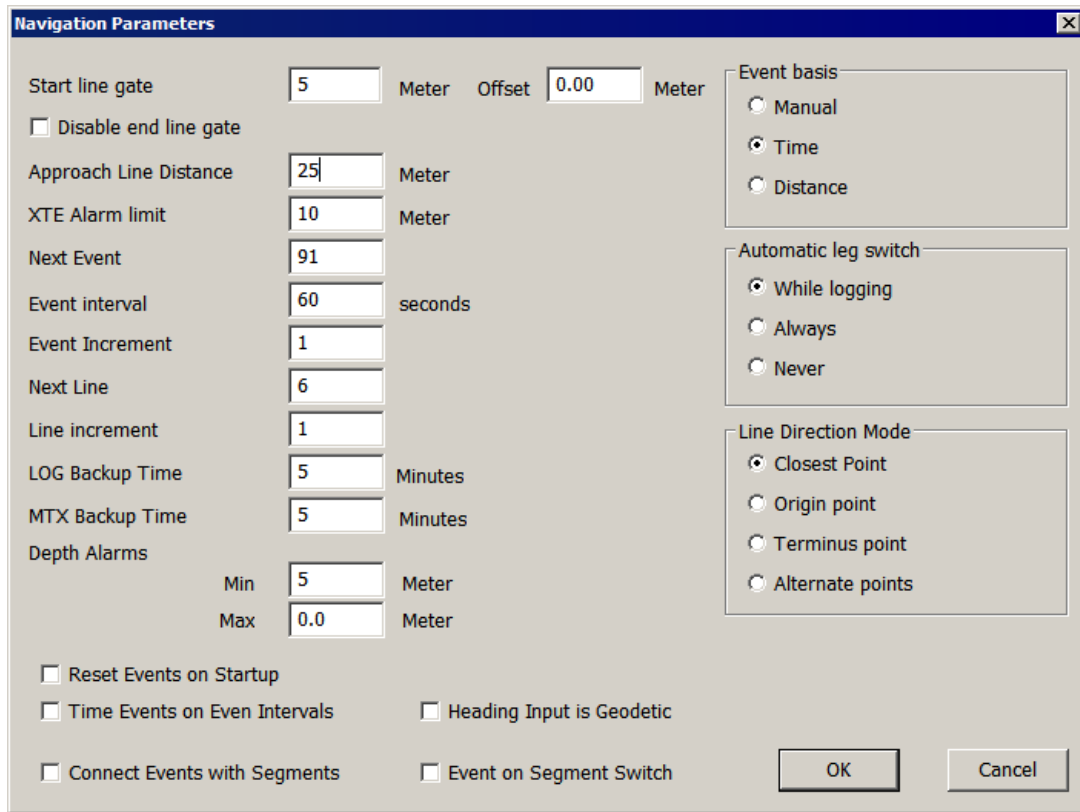


**Tip:** A value of 10 to 15 is recommended.

**To restore your MTX from an MXB file:**

1. In the HYPACK® SUB-BOTTOM screen, **right-click on the Matrix Files folder in the Project File list and select 'Convert Mxb->Mtx'**. A File Select dialog will appear.
2. **Select the MXB file you want to restore to MTX and click [Open].** A File Save dialog will open.
3. **Name your restored matrix (MTX) and click [Save].** The name defaults to the root name of the selected MXB file.

FIGURE 56. Navigation Parameters Window



## CORRECTIONS IN SURVEY

**Draft:** Dynamic draft corrections are not required in Sub-bottom surveys. For hull-mounted SBP systems, configure the static draft as a vertical offset relative to the waterline.

**IMPORTANT!** Take care with your positional offsets in HARDWARE. There is no way to correct them after acquisition in HYPACK® SUB-BOTTOM.

**Tide and Sound Velocity Corrections:** SURVEY records tide corrections to the RAW data files, but the SEG-Y files are unaffected. You apply tide and sound velocity corrections to sub-bottom data in post-processing. You can then export corrected All format (\*.EDT) and XYZ data from the SUB-BOTTOM PROCESSOR.

**Layback:** You can enter the layback value of the common midpoint behind the attachment point in SURVEY. In the Towfish device window, enter this value in the Cable Out field.

**More Information**

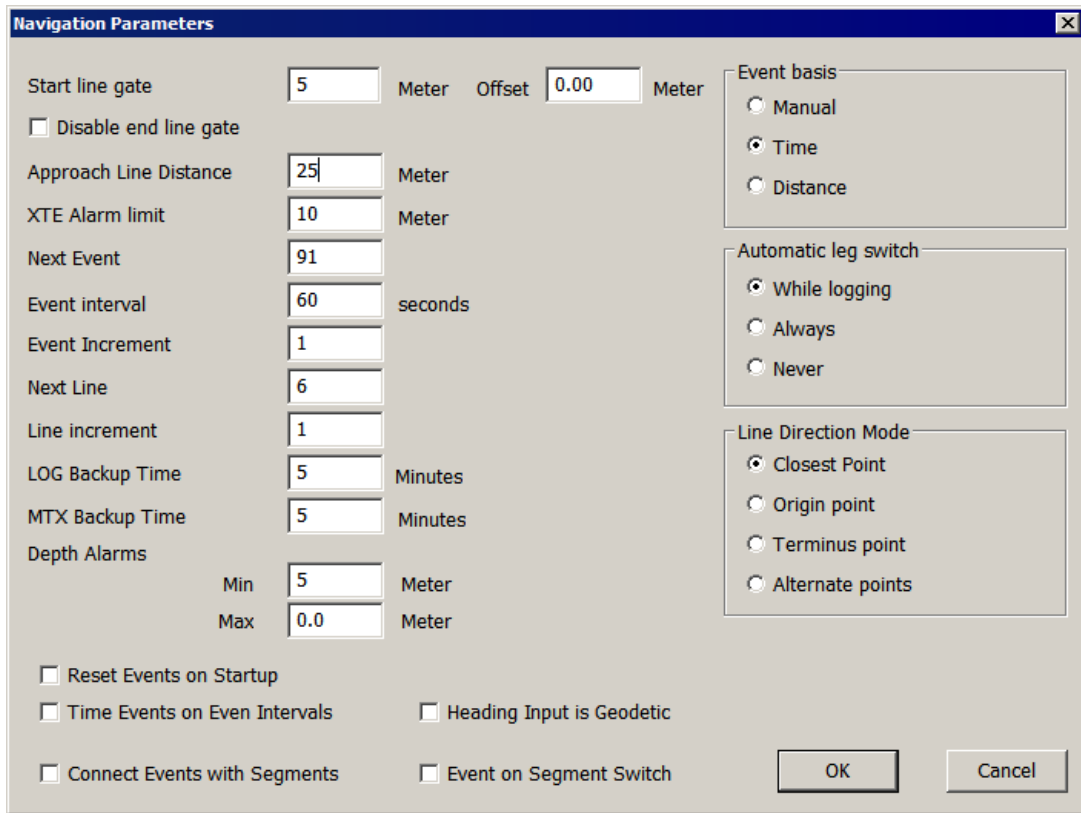
- [“Harmonic Tidal Predictions”](#) on page 4-4
- [“Manual Tides Program”](#) on page 4-6
- [“Corrections in the SUB-BOTTOM PROCESSOR”](#) on page 4-34
- [“Layback for Towed Sub-Bottom Systems”](#) on page 3-42

## NAVIGATING PLANNED LINES IN SURVEY

The Navigation Parameters dialog in SURVEY provides options to help automate the planned line navigation and data logging. This allows the helmsman to focus on driving while SURVEY handles the survey data.

To access the Navigation Parameters, select OPTIONS-NAVIGATION PARAMETERS.

*FIGURE 57. Navigation Parameters Dialog*



## SELECTING SURVEY LINES IN SURVEY

The active planned line file in your project will be loaded to the SURVEY program. You can load a different line file by selecting LINE-SELECT FILE and choosing the new line file from the file selection dialog. SURVEY will unload any active line file and load the selected file. Only one planned line file may be enabled at a time. (You can unload any active line file and work with no lines loaded by selecting LINE-UNLOAD.)

When you first enter the SURVEY program, it will select the first line in the queue as the current active line. When you exit the SURVEY program, it writes the current active line to a default file. When you re-start the SURVEY program, it reads this default file and re-establishes the last active line as the current active line.

**To select the line you wish to survey**, use one of the following methods:

- **Right-click on a line handle and then click the “Select” item.** The “handles” are located at each line origin (the first point entered when creating the line) and are drawn as little boxes at the origin of a planned line.

**FIGURE 58.** *Selecting a Line Using “Handles”*



- **Use the LINE-INCREMENT LINE menu item** or Ctrl-I to move ahead by the number of lines defined under Line Increment in the Navigation Parameters.
- **Use the LINE-DECREMENT LINE menu item** or Ctrl-D to move back by the number of lines defined under Line Increment in the Navigation Parameters.
- **Enter the desired line number under Next Line in the Navigation Parameters.** You may enter either the number or name (“34+00”) associated with a line.

## CHANGING SURVEY DIRECTION

When you select a new planned line or when the SURVEY program selects a new planned line, it sets the “Start Line” end according to the Line Direction Mode in Navigation Parameters, and assumes you will be running the line from that end to the far end. It draws a red circle about the “Start Line” end (when off-line)

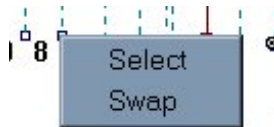
to show you which end it has selected as the “Start Line” end. It also superimposes a series of arrows along the line to indicate the expected direction of travel.

- **Line Direction Mode** tells SURVEY the pattern the survey vessel will normally follow when a new planned line is selected.
  - **Closest** looks for the end of the line closest to the vessel and assumes you want to run the line starting from that end.
  - **Line Origin** starts the line at the first set of coordinates for the line in the Planned Line File. This is useful for surveyors who want to run all of their lines in the same direction.
  - **Line Terminus** starts the line at the last set of coordinates for the line in the Planned Line File. This is useful for surveyors who want to run all of their lines in the same direction.
  - **Alternate Direction** starts the next line in the opposite direction from the direction of current one based on the coordinates entered in the Planned Line File. (Alternates Origin-to-Terminus, then Terminus to Origin.)

To change the selection of the “Start Line” end:

- **Select LINE-SWAP.**
- **Right-click on the line handle and clicking “Swap”.**

*FIGURE 59. Swapping line direction using the ‘handles’.*



- **Select the line and press Ctrl + W.**

## **SELECTING SEGMENTS ON MULTIPLE SEGMENT LINES IN SURVEY**

This is used by SURVEY to determine how to step through multiple segment planned lines.

Select OPTIONS–NAVIGATION PARAMETERS. The available choices are:

- **While Logging:** Using this method, the current segment is fixed until the program goes “On Line”. It then automatically switches to the closest segment, based on the off-line distance of each segment.

- **Always:** This method constantly updates to the most appropriate segment, whether the program is “On Line” or “Off Line”.
- **Never:** This will not change the current segment. You may manually change segments using the Ctrl+F (Forward Segment) or Ctrl+B (Backward Segment) key commands.

## ADDING NEW LINES IN SURVEY

Surveyors can create a new planned line in SURVEY using any of the following methods:

- Create a parallel offset from an existing planned line.
- Use the cursor to digitize a new planned line in the Map window.
- Connect targets with a planned line.
- Connect the vessel tracking point to the current target.

### ***DIGITIZING PLANNED LINES IN SURVEY***

At any time that you are off line while in SURVEY, you can use the cursor to define path of one or more additional planned lines. Each new line will be defined by two or more waypoints that describe its path.

When you are not logging, the first of two icons in the toolbar of Map window becomes enabled for you to begin this process.

1. **Click on the red icon.**
2. **Use your cursor to click at the location of each waypoint in the new planned line.** Each waypoint will be marked with red and connected with black line segments. As soon as you have defined at least two waypoints, the second (blue) icon is enabled.
3. **When you have finished digitizing the line, click the blue icon.** The new planned line becomes the active planned line.



If you have a planned line loaded in SURVEY, the new line will be appended to the active planned line file. Otherwise, a line file containing the new planned line file, manual\_entry.LNW, will be created.

Each digitized line will be automatically named using the time at which it was created. For example, a line created at 9:05:25 will be named 09\_08\_25.

### More Information

- [“Creating Parallel Line Offsets in SURVEY”](#) on page 3-67
- [“Connecting Targets with Survey Lines in SURVEY”](#) on page 3-50
- [“Connecting Targets to the Boat Position in SURVEY”](#) on page 3-50

## CREATING PARALLEL LINE OFFSETS IN SURVEY

To create a new planned line a parallel offset from an existing planned line.

Select LINE-ADD and the Add New Line dialog will appear. This example, tells SURVEY to create a new line named “33”. This line will be created 15’ (or meters, according to the current grid units) from line number “1”. Positive offset values create lines to the right of the “Base Line” when you stand at point 1 of the base line and look at point 2. The new line created is saved to the LNW file and becomes a permanent line in the planned line file.

**FIGURE 60.** Add New Line Window

Field	Value
Base line	1
Line name	33
Offset	15
From waypoint	1
To waypoint	3 (0 for last waypoint)

## LOGGING DATA IN SURVEY

Typically, when you set up a survey project, you create a set of planned survey lines to guide your navigation as you collect data. They help insure that you achieve the proper coverage of your survey area. Most surveyors begin on the first line of the line file and navigate up one line and down the next, logging data for each line, until they reach the end.

When you begin logging data at the beginning of each planned line (start line), the SURVEY program opens a data file and begins to record data. The status in the Data Display window will change to ‘Logging’. This is your indication that you have started line and the SURVEY program is logging data.

*To Start Logging:*

You can start line manually or automatically.

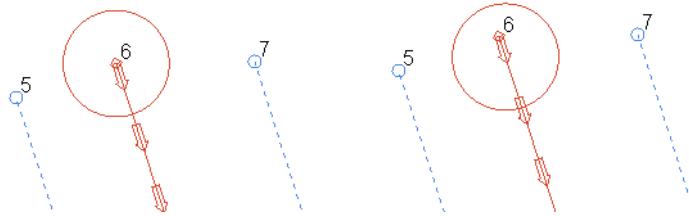
- **Manually** by selecting LOGGING-START LOGGING (Ctrl+S)
- **Automatically** using the automatic Start Line Gate feature.

The automated Start Line Gate feature begins logging automatically if the vessel tracking point passes within the specified distance of the start line point.

The **Start Line Gate** is specified in the Navigation Parameters window. Select OPTIONS–NAVIGATION PARAMETERS.

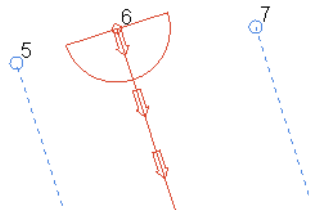
- **Start Line Gate = “0.0”**, the feature is disabled and the SURVEY program only starts and ends logging if you manually intervene.
- **If the Start Line Gate > 0**, the program starts logging automatically when the distance from the tracking point to the starting point of the planned line is less than the absolute value of the Start Line Gate. This "trigger area" is shown as a circle at the beginning of the planned line. A positive **Offset** shifts the circle down line by the specified amount, while a negative offset shifts it backward along the line.

**FIGURE 61.** Start Line Gate = 25 (left), with Offset=10 (right)



- **Start Line Gate < 0**, the SURVEY program only starts logging when the tracking point breaks the perpendicular projection of the start line point and the distance from the tracking point to the starting point of the planned line is less than the absolute value of the Start Line Gate.

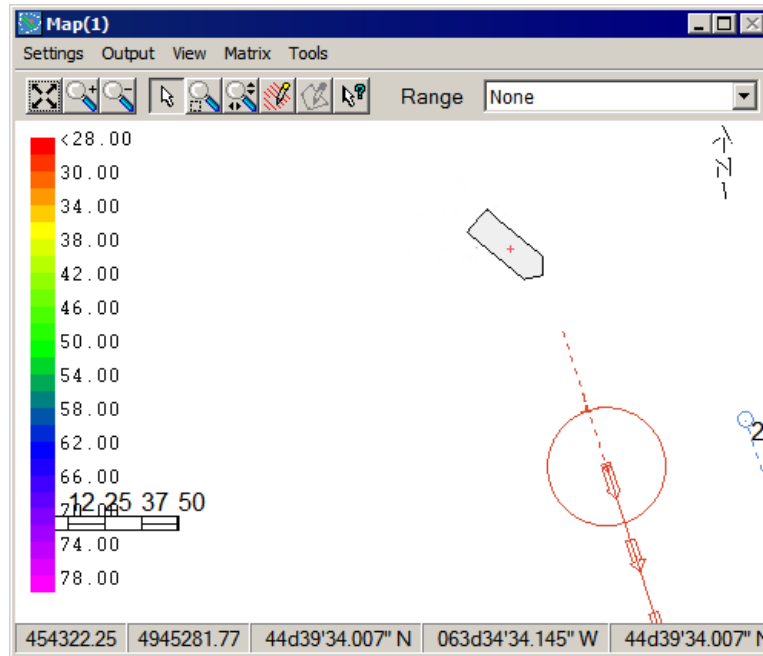
**FIGURE 62.** Negative Start Line Gate



**Tip:** The **Approach Line Distance** option in the Navigation Parameters draws a dotted extension from the planned line for a user-defined distance. The approach line is a visual guide for your helmsman align your vessel with the line before you reach the start line.



**FIGURE 63.** Approach Line Extends 50 Meters from the Start Line



**To Suspend Logging:**

At any time while logging, select LOGGING-SUSPEND LOGGING (Ctrl+U). The status in the Data Display window will display the word "Suspended". A target with the name "Paused" will be placed on the screen at the tracking point position. You will still receive screen updates and position information, but the program will not write information to disk. This is useful if the survey boat needs to pause for traffic.

**To Resume Logging:**

Select LOGGING-RESUME LOGGING (Ctrl+R).

**To Abort Logging:**

At any time while "On-Line", select LOGGING-ABORT LOGGING (Ctrl+A). SURVEY stops logging data and saves the data logged to that point with an \*.XXA extension. (If this would cause a duplicate file name, the extension becomes \*.XXB, \*.XXC...). The aborted file is *not included in the current catalog file*.

**To End Logging:**

Once logging has been started, it can be ended (end line) as follows:

- **Manually** by selecting the LOGGING-END LOGGING (Ctrl+E).
- **Automatically** if you are using the Start Line Gate. The line will be ended automatically when the tracking point breaks the a line projected perpendicular from the end segment point of the planned line.

**To disable the automatic end line**, select the Disable End Line Gate option in the Navigation Parameters dialog. In this

case, you must stop logging manually, though a start line gate automatically starts logging.

When the SURVEY program executes an “End Line” event, it closes and saves the data file and then selects the next line in the line queue. It determines the start line point based on the Line Mode in the Navigation Parameters dialog. A small red circle is drawn about the start line point and arrows indicate the direction of travel.

***Beware!***

***BEWARE!*** Logging data to a network location has not been done successfully. All data should be logged on the survey computer.

#### More Information

- [“Raw Data File Naming Convention”](#).

### ***PROJECT INFORMATION IN SURVEY***

The project header data, which is written to the header of the raw data files, is defined in the project information. The header data is optional, (for display purposes only) but a year from now you may be thankful that somebody took the time to fill out the available fields.

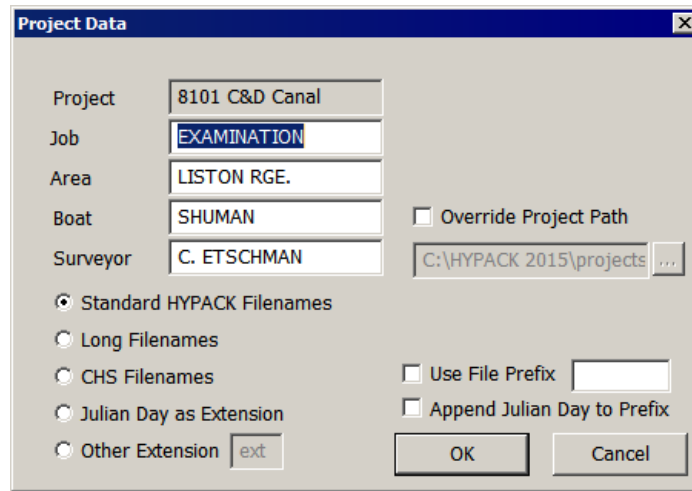
#### **To enter your project information:**

1. **Access the project information dialog** by selecting OPTIONS–PROJECT INFORMATION.
2. **Describe your project and click [OK].**
  - The **Project, Job, Area, Boat** and **Surveyor** fields are self-explanatory.
  - **Choose your file-naming convention.**
  - **‘Override Project Path’:** Define alternate location to store your raw survey data. The default location is the *ProjectName*\Raw folder.

***Beware!***

***BEWARE!*** Logging data to a network computer is unreliable. All data should be logged on the survey computer.

FIGURE 64. Project Information Window



### RAW DATA FILE OPTIONS IN SURVEY

**Raw files** are the data files that result from the SURVEY or DREDGEPACK® program. Every time you log data, a new “Raw” data file is created. They are ASCII format files that contain the header information and time-series information for each survey device.

By default, they have the RAW extension and, in a standard HYPACK® SUB-BOTTOM project, are stored in the \HYPACK Sub-bottom\Projects\ProjectName\Raw folder.

A list of individual data files is provided in a catalog (\*.LOG) file. You can quickly draw or process a group of files by specifying the \*.LOG name, instead of entering the name of each data file.

#### RAW DATA FILE NAMING CONVENTION

Each time goes “on-line”, it creates a new data file with a unique name.

**To set your file naming format**, select OPTION-PROJECT INFORMATION and choose from the following options:

Naming Format	Description	Example
<b>Standard HYPACK® SUB-BOTTOM</b>	(See details below.)	
Named Lines	LineName.RAW	34P00.RAW
Unnamed Lines	LineNumber_start line time.RAW	014A1325.RAW

Naming Format	Description	Example
<b>Long Filenames</b>	YR+ 1ST 2 char. of boat + Julian day + time(HHMM)_Line Number	00BO0911325_014.RAW
<b>CHS Filenames</b>	YR + 1ST 2 char. of boat + Julian day + time(HHMM)	00BO0911325.RAW
<b>Julian Day as Extension</b>	HYPACK® SUB-BOTTOM name with Day Number as the extension	014A1325.091
<b>Other Extension</b>	You define the extension in the adjoining box.	014A1325.NEW
<b>Use File Prefix</b>	You define the prefix in the adjoining box.	JJB_014A1325.RAW
<b>Append Julian Day to Prefix</b>	Julian day is applied as a prefix.	153_014A1324.RAW

**Standard HYPACK® SUB-BOTTOM Details:**

- If your lines have names**, your data file will be the name of the planned line, plus the extension. For example, if you are logging data on a line named “34+00”, the resulting data file will be named “34P00.RAW”. If you log on the same line again, it creates a data file named “34P00A.RAW”. If you log on the same line once again, it creates a data file named “34P00B.RAW”, etc.

Line names of three or less numeric characters are an exception; they are named as if the lines do not have names.
- If your lines do not have names**, your data file will be named using a combination of the start line time from the computer clock and the number associated with the line. For example, if you begin line #14 at 13:25, the survey information will be stored in a data file named “014\_1325.RAW”. If you start the same line again during the same minute, a data file named “014A1325.RAW” will be created.
- If you are not using survey lines**, the line names will begin with “000” in place of the line number.

You may also choose to append a prefix to any of these file name formats. Use the Julian Day, define your own prefix or use both options together.

It is impossible to duplicate or overwrite existing files in the program.

---

## DATA DIRECTORIES FOR RAW DATA FILES

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When you create a new project, HYPACK® SUB-BOTTOM creates a sub-directory under the \HYPACK Sub-bottom\Project directory with the name of your project. It then creates a sub-directory named 'Raw'. For example, if your new project was named "Richmond 1998", your raw data files from the program would be stored in the "\HYPACK Sub-bottom\Projects\Richmond 1998\Raw" directory.

The program stores your survey data, by default, in the HYPACK® SUB-BOTTOM "Raw" format in the \RAW directory under the current project.

**To specify another directory path**, select OPTIONS-PROJECT INFORMATION from the menu and set a path under 'Override Project Path'.

---

## CLOSING DATA FILES BASED ON TIME

---

If you anticipate being 'on line' for extended periods of time, you can instruct the program to automatically close the current data file and open a new data file without changing the current survey line.

### **To set an automatic Log Backup Time:**

Select OPTIONS-NAVIGATION PARAMETERS and enter a non-zero value in the "Log Backup Time". The value entered represents the number of minutes elapsed before closing the current data file and opening a new file. New files that are opened using this feature are named using the conventional naming scheme for data files which eliminates duplicate file names.

## **LOGGING EVENTS IN SURVEY**

Event marks are also called "Fix Marks". They are used to mark recorders to allow you to correlate digital (HYPACK® SUB-BOTTOM) and analog records. Include the beep.dll in your hardware setup to sound a user-defined tone each time an event mark is created. Configure the basis on which events are generated in the Navigation Parameters dialog (OPTIONS-NAVIGATION PARAMETERS).

### *Automatic events*

**Next Event** sets the number of the next event mark.

**Reset Events on Startup** causes your event numbers to begin at one, each time you launch SURVEY. If you deselect this option, SURVEY remembers the last event number when it is shut down and, when restarted, will begin numbering event marks accordingly.

Event Marks are always generated when you pass a waypoint (switch legs) in your survey line.

Event Marks can also be automatically generated based on time or distance along line. Choose the **Event Basis**.

- **If you select "Time"**, the **Event Increment** is expressed in seconds.
- **If you select "Distance"**, the **Event Increment** is the distance in survey grid units (feet or meters) between events.

**NOTE** HYPACK® SUB-BOTTOM does not predict when your survey vessel passes over precise fix locations. It simply generates a fix mark at the first position update which is equal to or farther down-line from the pre-defined event location

*Marking Events on Even Intervals*

Check **Events on Even Intervals**.

- **If your event basis is time**, automatic, mid-line events are generated at even second intervals. For example, if your event interval is 5 sec. and your start line event is at xxx12.072 sec., the next event will be at xxx15.000 (plus or minus .001 sec).
- **If your event basis is distance**, SURVEY attempts to place the events at even distance intervals based on DBL as you progress down the line.

*Generating a Manual Event Mark*

At any time, select LOGGING-MANUAL EVENT (Ctrl+N).

**SURVEY KEYBOARD SHORTCUTS**

TABLE 4. SURVEY Keyboard Commands

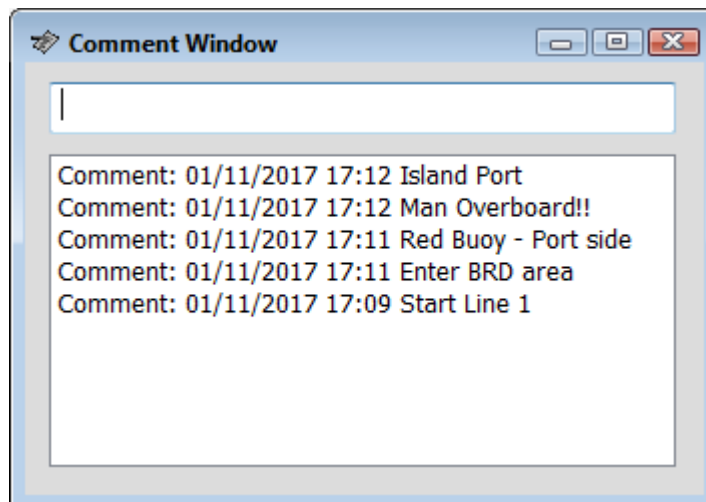
	Functions	Commands
<b>Line Functions</b>	Decrement line by 1 (Works only when not logging.)	Ctrl+D
	Increment line by 1 (Works only when not logging.)	Ctrl+I
	Swap planned start end	Ctrl+W
	Decrement line segment by 1	Ctrl+B
	Increment line segment by 1	Ctrl+F
<b>Logging Functions</b>	Start Logging	Ctrl+S
	Pause Logging	Ctrl + U
	Resume Logging	Ctrl + R
	Manual Event Mark	Ctrl+N
	Abort Logging	Ctrl + A
	End Logging	Ctrl+E
<b>Target Commands</b>	Mark target at tracking point	F5

	Functions	Commands
	Target Properties dialog	F6
	Marks a Waters Edge Target	F7
<b>Tide Corrections</b>	Increment by current increment	Alt+Y
	Decrement by current increment	Alt+Z
<b>Map Zoom Commands</b>	Zoom In	+
	Zoom Out	-
	Move left, right, up and down	Arrow Keys
	Rotate Starboard	Ctrl++
	Rotate Port	Ctrl + -
	Center Map	Home
	North Up	Ctrl+Home
<b>L/R Indicator Commands</b>	Contract scale	Ctrl+C
	Expand scale	Ctrl+V
<b>Profile Window Commands</b>	Contract horizontal scale	Ctrl+C
	Expand horizontal scale	Ctrl+V
	Decrease Vertical scale	Alt+C
	Increase vertical scale	Alt+V

## RECORDING COMMENTS IN SURVEY

The **Comment window** stores your input to the project log.

*FIGURE 65. Sample Comments Window*



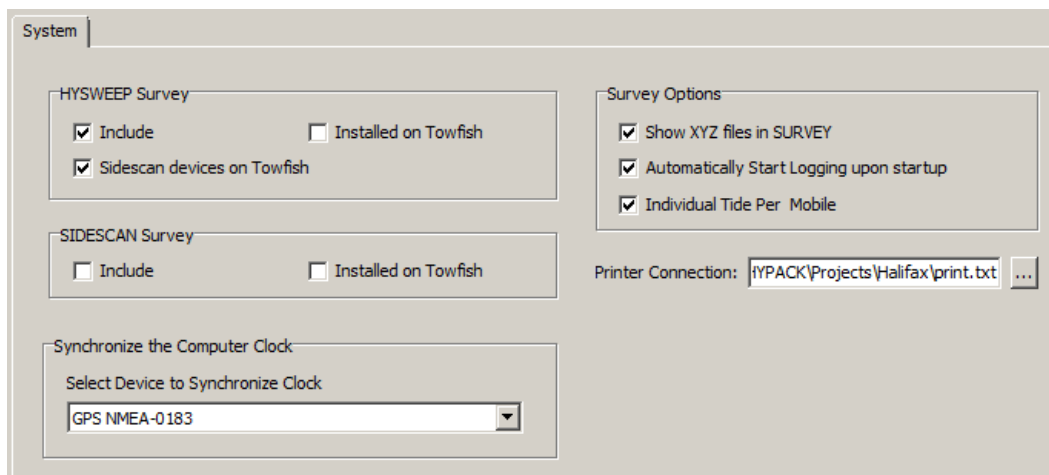
Enter your notes in the field at the top. Each time you press your Enter key, your comment drops down to the display in the lower part of the window and a copy is stored to the project log. In the single beam and HYSWEEP® editors, you can refer to these comments during the editing process.

## PRINTING SURVEY DATA

You can print survey data to any printer while logging. The location of the printer is specified under the Device menu of the HARDWARE program. The message to be printed is defined in the SURVEY program.

1. **Configure HARDWARE to perform this function.**
  - a. **Click on PREPARATION -HYPACK HARDWARE.**
  - b. **Select 'Hypack Configuration' and the System tab to the right.**

*FIGURE 66. HYPACK® SUB-BOTTOM System Tab*



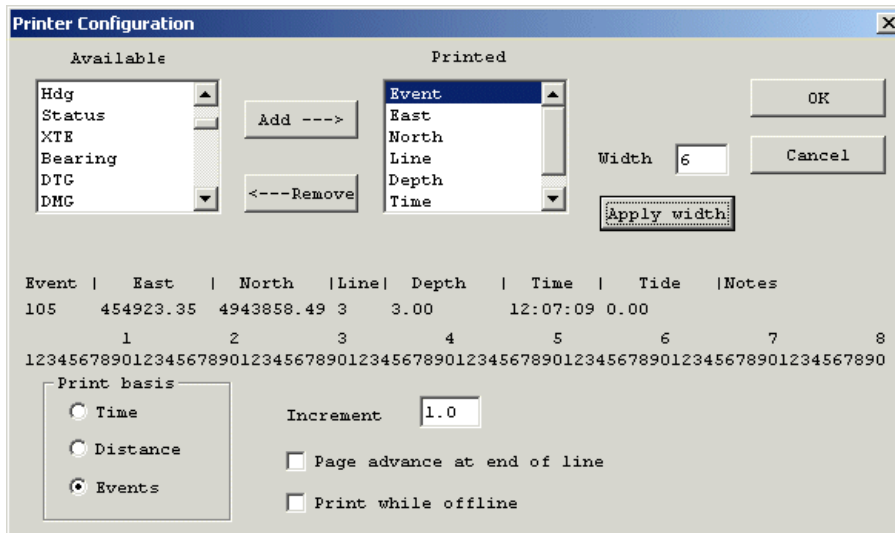
- c. **Set your Printer Connection to Data File.** This will send the information you want to a text file. The Data file configuration options will appear.
  - d. **Click [Browse], navigate to where you want to save the file, enter a name.**
2. **Configure your output to the file.** SURVEY is where we configure exactly what we want to output to the file and at what frequency: Time, Distance, or Event.
  - a. **Launch SURVEY.** Click the whale icon on the Icon Bar or select SURVEY-SURVEY from the menu.



- b. **Select LOGGING-PRINT-CONFIGURE** to open the Printer Configuration window. The Printer Configuration window, first appears with the “Printed” list blank.
- c. **Configure each item you want sent to your data file.**
  - i. **Move items you want to have printed from the Available list to the Printed list in the order you want them printed.** You can move an item by clicking on an item in the Available list and then clicking [Add->] or by double-clicking on the item in the Available list.
  - ii. **Enter the number of characters you want to reserve for each item in the Printed list.** Click on the item, then enter a value in the Width box. Click [Apply Width]. You can see the actual message constructed beneath the list windows.

**NOTE:** Take care that your printer message does not exceed 80 characters.

**FIGURE 67.** Printer Configuration in SURVEY



3. **Set other output options.**
  - **Print Basis** is the frequency, in seconds, at which the data is sent to the data file.
  - **Print While Off-line:** Check this option to print regardless of your logging status. Clear this option to print only while logging.
  - **Page Advance at End of Line:** This option begins a new page at the start of each new planned line.
4. **Test your report generation in SURVEY.**

- **If the 'Print while offline' option is selected**, SURVEY will automatically begin sending data to the text file as long as you are in SURVEY.
- **If the 'Print while offline' option is not selected**, you must manually start the print function when you first open SURVEY. (Select LOGGING- PRINT- START.) After that, the printing will turn on and off with your logging status.
- **Print Basis:** You can elect to have your message printed based on distance, time or events. In most operations, you should select "Events" with an increment of "1". This prints the requested data at each event mark.

**To begin printing**, select LOGGING–PRINT–START.

**To shut down printing**, select LOGGING–PRINT–STOP.

**To print the header**, at any time, select LOGGING–PRINT–HEADER.

---

**NOTE** You may elect to print the information to a text file instead of sending the text to the printer. This can be done by specifying a "Data File" under the Connect information for the Printer in the HARDWARE program and then providing a name for the text file.

---

**To print a full page-sized screen capture of your Area Map window**, click the Print Screen icon in the toolbar.



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## SURVEY DATA TRANSFER

SURVEY DATA TRANSFER sends a *copy* of your data files out via a LAN or an Internet connection. It is a separate program that you run simultaneously with HYPACK® SURVEY.

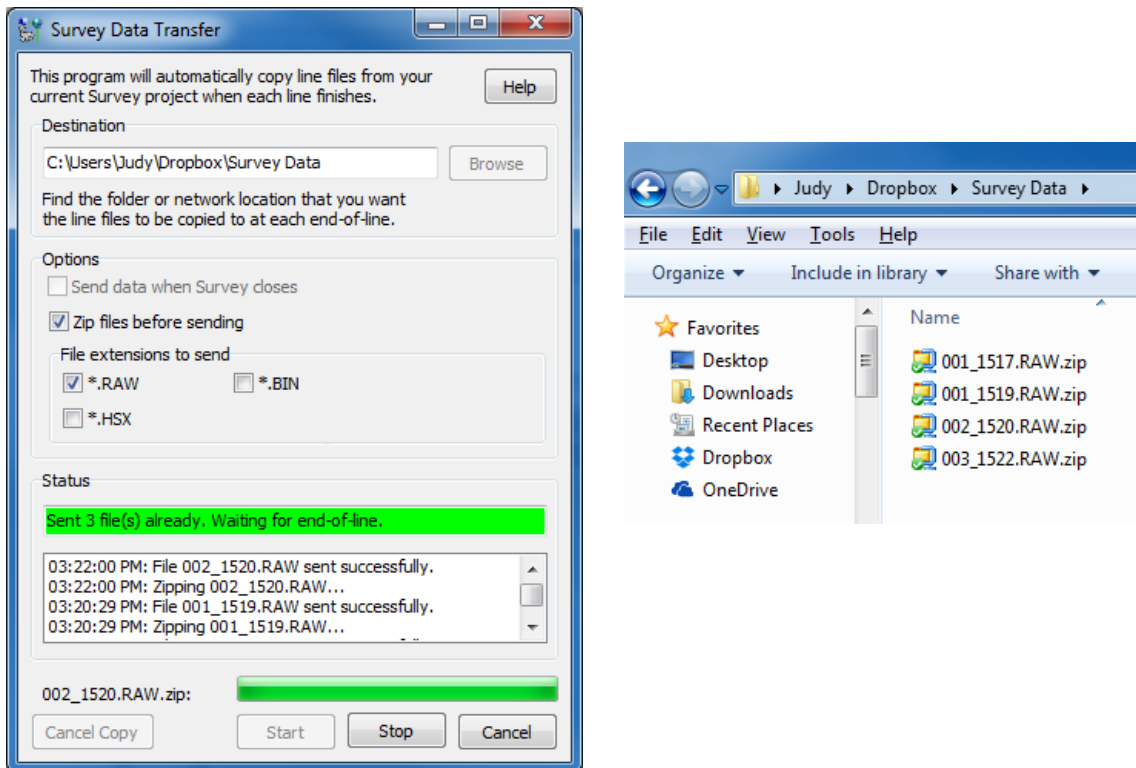
Each time you end logging, SURVEY tells SURVEY DATA TRANSFER that there's data available. SURVEY DATA TRANSFER sends the data to user-defined destination. In a very short time after the end of line, the data can be in post-processing elsewhere on the boat (via your LAN), at the office on shore, or half-way around the world.

Alternatively, you can instruct the program to send the files only when you close HYPACK® SURVEY.

**To transfer data over the Internet**, both the survey computer and the receiving computer must have access to a Dropbox account. The file transfer occurs through the Dropbox folder.

In the Options area of the program, you can configure the program to transfer the raw data types according to your project type: RAW, BIN (echogram data), and HSX files. The program must compress HSX files in a ZIP or EXE file before the transfer, but if you send only RAW files, the program can transfer them directly when you end logging.

**FIGURE 68.** Running the SURVEY DATA TRANSFER to Dropbox



1. **Open SURVEY DATA TRANSFER.** In the HYPACK® SUB-BOTTOM menu, select SURVEY-SURVEY DATA TRANSFER.
2. **Configure your output destination.**
  - Browse for your LAN destination or Dropbox folder.
  - **Send Data When Survey Closes:** SURVEY sends no data until you close the program. To send data at the end of each line, clear this option.
  - **Zip Files Before Sending** enables you to compress your data before the transfer. When you select this option, also select your preferred extension (ZIP or EXE). To send uncompressed data, clear this option.
3. **Click [Start].** SURVEY DATA TRANSFER waits for an end line message from SURVEY.
4. **Run SURVEY as usual.** Each time you stop logging, the SURVEY DATA TRANSFER copies the data to your destination

folder, adds a message in the dialog that the transfer was successful, and updates the Status field.

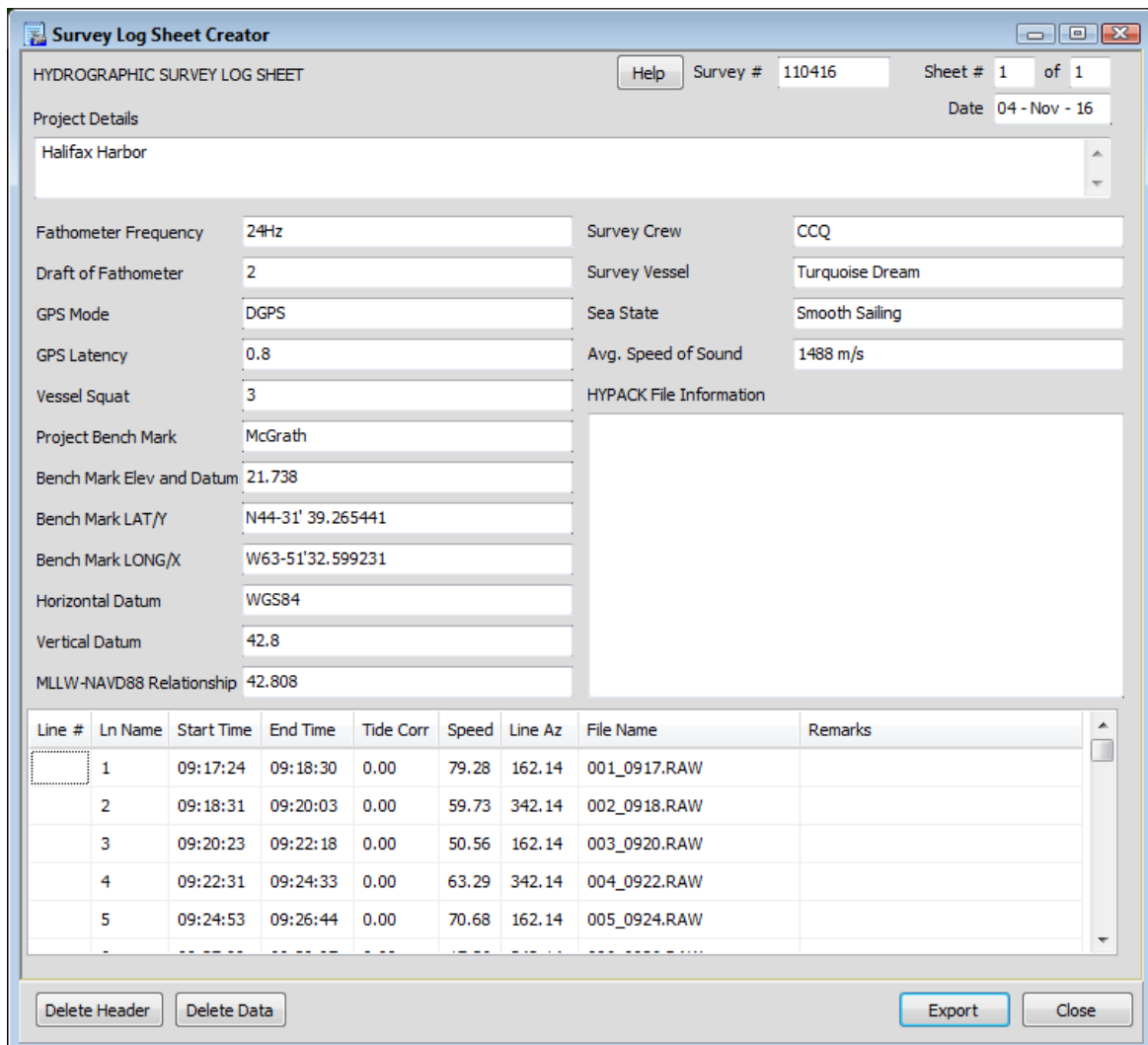
5. **When your survey session is finished, or you no longer want to transfer data, click [Stop] and close the program.**

## SURVEY LOG

The SURVEY LOG program runs simultaneously with HYPACK® SURVEY and generates a log sheet for your survey session based on the main vessel.

1. **Open the SURVEY LOG.** Select SURVEY-SURVEY LOG from the HYPACK® SUB-BOTTOM shell menu.

FIGURE 69. SURVEY LOG Interface



2. **Enter the project information** in the top section of the dialog.
3. **Configure your spreadsheet.**
  - **Select columns.** Right-click on the spreadsheet header and select them.
  - **Adjust column widths.** Drag the dividers.
4. **Run HYPACK® SURVEY.** You can enter any remarks as you run the line then, at the end of each line, the program automatically completes the record with the survey line statistics and adds a new blank record for the next survey line.
5. **At the end of each survey session. output the log information output the log to a PDF document or Excel spreadsheet (\*.xls).** Click [Export]. In the File Save dialog, select the output file type and name your report.

When you close SURVEY LOG, the program stores the header data and restores it when you next open the program.

At any time, you can clear the project information or the survey line statistics using the **[Delete Header]** or **[Delete Data]** button, respectively.

**FIGURE 70.** Sample Survey Log

HYDROGRAPHIC SURVEY LOG SHEET				Survey #: 110416		Sheet # 1 of 1		Date: 04 - Nov - 16	
Project Details: Halifax Harbor									
Fathometer Frequency		24Hz		Survey Crew		CCQ			
Draft of Fathometer		2		Survey Vessel		Turquoise Dream			
GPS Mode		DGPS		Sea State		Smooth Sailing			
GPS Latency		0.8		Avg. Speed of Sound		1488 m/s			
Vessel Squat		3		HYPACK File Information					
Project Bench Mark		McGrath							
Bench Mark LAT/Y		N44-31' 39.265441							
Bench Mark LONG/X		W63-51'32.599231							
Horizontal Datum		WGS84							
Vertical Datum		42.8							
MLLW-NAVD88 Relationship		42.808							
Line #	Ln Name	Start Time	End Time	Tide Corr	Speed	Line Az	File Name	Remarks	
1		09:17:24	09:18:30	0.00	79.28	162.14	001_0917.RAW		
2		09:18:31	09:20:03	0.00	59.73	342.14	002_0918.RAW		
3		09:20:23	09:22:18	0.00	50.56	162.14	003_0920.RAW		
4		09:22:31	09:24:33	0.00	63.29	342.14	004_0922.RAW		
5		09:24:53	09:26:44	0.00	70.68	162.14	005_0924.RAW		
6		09:27:00	09:29:07	0.00	17.36	342.14	006_0926.RAW		
7		09:29:18	09:30:36	0.00	78.91	162.42	007_0929.RAW		

FIGURE 71. Sample Survey Log in Excel

HYDROGRAPHIC SURVEY LOG SHEET								
Survey #: 110416	Sheet # 1 of 1	Date: 04 - Nov - 16	Project Details: Halifax Harbor					
Fathometer Frequency	24Hz	Vertical Datum	42.8					
Draft of Fathometer	2	Survey Crew	CCQ					
GPS Mode	DGPS	Survey Vessel	Turquoise Dream					
GPS Latency	0.8	Sea State	Smooth Sailing					
Vessel Squat	3	Avg. Speed of Sound	1488 m/s					
Project Bench Mark	McGrath	HYPACK File Information						
Bench Mark LAT/Y	N44-31' 39.265441							
Bench Mark LONG/X	W63-51'32.599231							
Horizontal Datum	WGS84							
Vertical Datum	42.8							
MLLW-NAVD88 Relationship	42.808							
Line #	Ln Name	Start Time	End Time	Tide Corr	Speed	Line Az	File Name	Remarks
	1	15:53:17	15:54:39	0.00	76.61	162.14	001_1553.RAW	
	2	15:54:40	15:56:12	0.00	59.82	342.14	002_1554.RAW	
	3	15:56:32	15:58:25	0.00	48.83	162.14	003_1556.RAW	

# *Sub-bottom Post-processing*

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Post-processing is the work done with the data after acquisition and before you generate your final products. It describes two typical processing work flows, as well as the steps required for each one.

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## ***SUB-BOTTOM PROCESSING WORK FLOWS***

The first step in processing sub-bottom data is always digitizing the seabed and sub-bottom layers in the SUB-BOTTOM PROCESSOR.

The SUB-BOTTOM PROCESSOR displays SEG-Y sub-bottom data and provides tools with which you mark targets, and digitize your layers. The SUB-BOTTOM PROCESSOR displays the sub-bottom profiles and converts the digitized points to the HYPACK® SUB-BOTTOM All format or XYZ format, which may then be displayed with the targets in the HYPACK® SUB-BOTTOM screen, plotted from HYPLOT or converted to other formats in EXPORT.

When you create and load tide and sound velocity correction files to the SUB-BOTTOM PROCESSOR, the output soundings will include those corrections.

Depending on the density of your data, and the intended output, you may use the SORT program to thin your data.

HYPACK® SUB-BOTTOM includes two final product programs: HYPLOT and EXPORT.

- HYPLOT defines the features to be plotted and sends the information to the plotter.
- EXPORT converts HYPACK® SUB-BOTTOM data files to other formats, primarily digitized chart files.

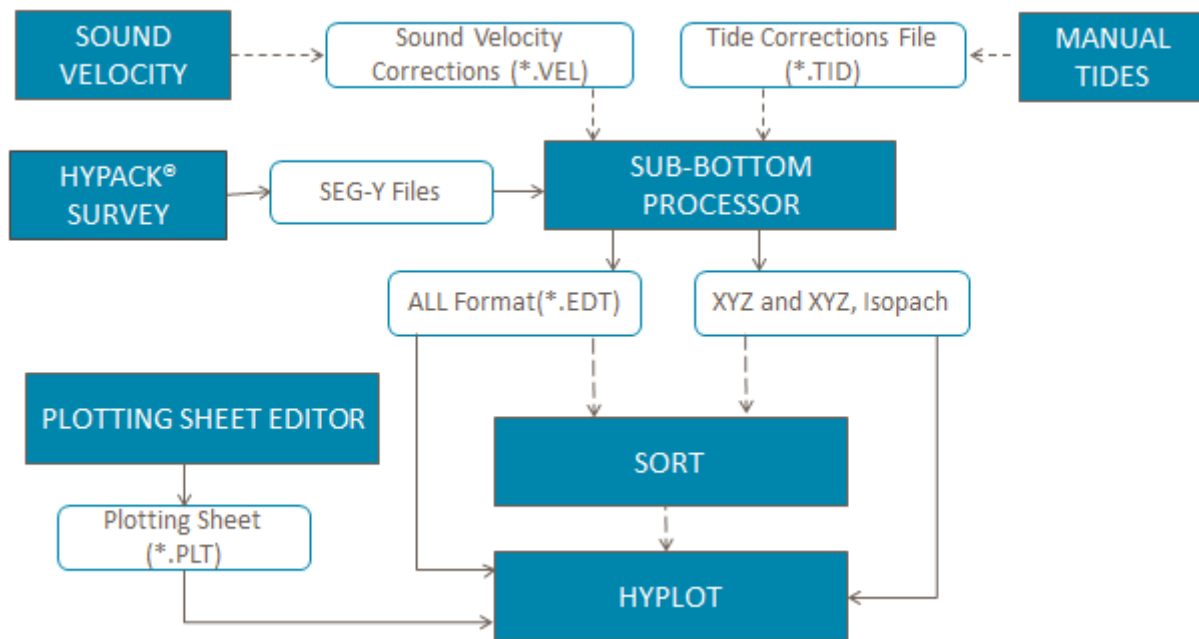
The Flowcharts in this section provide *overview* work flows for processing sub-bottom data.

For more information, click any program block and jump to the corresponding manual section.

## PLOTTING SUB-BOTTOM DATA

HYPLOT defines the features to be plotted and sends the information to the plotter. It requires a plotting sheet file (\*.PLT) that you can create for your project in the PLOTTING SHEET EDITOR.

**FIGURE 1.** *Plotting Sub-bottom Data*



### More Information

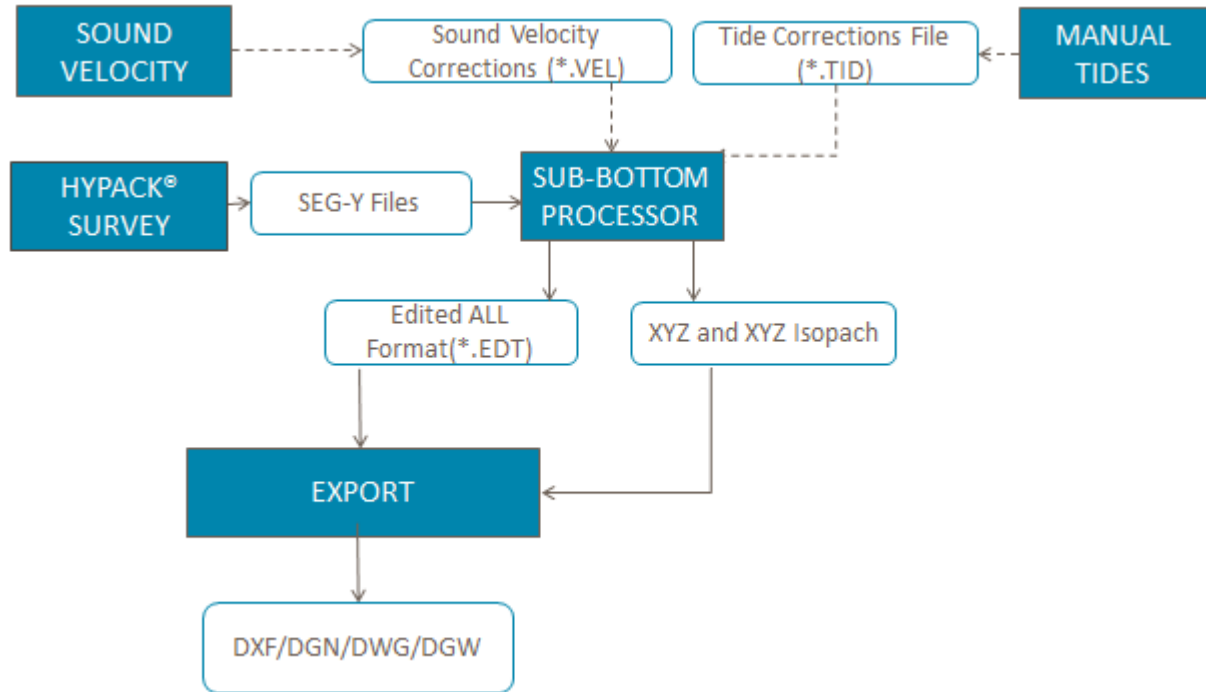
- [“Creating a Sound Velocity File in the SOUND VELOCITY Program”](#) on page 4-16
- [“Tide \(Water Level\) Corrections in HYPACK® SUB-BOTTOM”](#) on page 4-4
- [“HYPACK® SURVEY”](#) on page 3-1
- [“Sub-bottom Processing”](#) on page 4-22
- [“SORT Program”](#) on page 4-53
- [“HYPLOT”](#) on page 5-1



## GENERATING CAD CHART FILES FROM SUB-BOTTOM DATA

EXPORT converts HYPACK® SUB-BOTTOM data files to other formats, primarily digitized chart files.

**FIGURE 2.** Exporting Sub-bottom Data to CAD Charts



### More Information

- [“Creating a Sound Velocity File in the SOUND VELOCITY Program”](#) on page 4-16
- [“Tide \(Water Level\) Corrections in HYPACK® SUB-BOTTOM”](#) on page 4-4
- [“HYPACK® SURVEY”](#) on page 3-1
- [“Sub-bottom Processing”](#) on page 4-22
- [“EXPORT”](#) on page 5-44

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## TIDE (WATER LEVEL) CORRECTIONS IN HYPACK® SUB-BOTTOM

You can use any of the tide drivers provided to record tide corrections to the RAW data file during acquisition; however this data is not recorded or applied to the SEG-Y files.

In HYPACK® SUB-BOTTOM, you must apply tide corrections to sub-bottom data in post-processing. You can then export corrected All format (\*.EDT) and XYZ data from the SUB-BOTTOM PROCESSOR.

1. **Create a Tide Correction file.**
  - **Harmonic predictions** in the HARMONIC PREDICTION program.
  - **Predicted high-low water times** in the MANUAL TIDES program.
  - **Actual tide levels and times** in the MANUAL TIDES program.
2. **Load it to the SUB-BOTTOM PROCESSOR** in the Tide tab of the Settings dialog.

The important thing to remember in all of these methods is that the *tide correction is added to the raw sounding*. Tide corrections relate raw soundings to the chart (low water) datum. Since you normally want to remove the water column above the sounding datum, *the overwhelming majority of the time your tide corrections will be negative numbers!* The HARMONIC PREDICTION program takes care of this automatically. You have to make some mental adjustments when entering tidal heights in the MANUAL TIDES program.

- When creating a tide file for **depth mode**, enter tide values as *negative numbers*.
- When creating a tide file for **elevation mode**, enter tide values as *positive numbers*.

Tide corrections are measured in survey units.

Any sounding with a timetag before the first time of your \*.TID file will get the value of that first time. Any sounding with a timetag after the last time of your \*.TID file will get the value of that last time.

## HARMONIC TIDAL PREDICTIONS

We don't intend to teach you about Harmonic Tidal Predictions and harmonic constituents. All we want to do is show you how to create

a Tide Correction file (\*.TID) using the HARMONIC PREDICTION program.

The routines in this program are taken from the British Admiralty publication N.R.203. It uses combined constituent data for M2, S2, O1, and K1. This means that the minor constituents of them are combined into these four values. The harmonic constituents published by the French hydrographic authorities take a slightly different approach, so they won't give the correct answer if you plug them into these formulae.

In order to compute a harmonic tidal prediction, you need the following information:

- The harmonic constituents for the desired port
- The day factors (0000H) for the day in question
- The day factors (0000H) for the next day

It needs the day factors for both days in order to perform an interpolation throughout the day. All of these constituents and factors are published in the British Admiralty publication N.R.203. It comes out every year and is divided into three volumes. One is for the Atlantic Ocean, Caribbean, and Mediterranean. The second is for the Pacific Ocean. The third is for the Indian Ocean ports. You can buy these from your Admiralty chart agent.

1. **Start the program** from the tides icon or by clicking PROCESSING-TIDES-HARMONIC TIDES. The Harmonic Tides dialog will appear.
2. **Enter the necessary information.**
  - The Date for Prediction, Site for Prediction, Mean Level and Seasonal Correction come from the Port Factor page.
  - Enter the Harmonic Constituents for the port.
  - Enter the day factors (0000H) for the day of the prediction
  - Enter the day factors (0000H) for the day after the prediction
3. **Save the input data** by clicking [Save Tide Ref].
4. **Click on [Compute And Graph].** A graph of your tide corrections over a 24 hour period will appear. You can return to the spreadsheet to recheck your data by clicking [Exit] or continue on.
5. **Save your corrections** by clicking on [Save To \*.TID]. You will be asked for a name for the Tide Correction file. Give it a name you can remember, one that reminds you both of the area and the day for which the corrections are made.

**In the input dialog:**

- **[Get Last Reference]** reloads the last saved data.
- **[New Prediction]** presents an empty dialog.

In the graph dialog:

- **[Print Graph]** sends the graph display to the Windows® default printer.
- **[Print Corrections]** sends a copy of your entries in the spreadsheet and a listing of time ranges and their predicted tide corrections over the specified time range.

## MANUAL TIDES PROGRAM

In the MANUAL TIDES program, you will enter a series of dates, times and tide correction values spanning the time of your data collection. The program creates two files:

- A **\*.TDX file** contains the date, time, correction information. It is used to repopulate the spreadsheet if you want to reload it in MANUAL TIDES.
- A **\*.TID file** contains the tide correction value for every minute of each day. It is used in the editing programs to correct your Raw data for changing water levels.

Your tide corrections will almost always be negative numbers because HYPACK® SUB-BOTTOM *adds* your tide correction to the raw sounding, but you are *removing* the water column from your sounding value.

### **TIDE CORRECTIONS FROM HIGH-LOW WATER TIMES AND HEIGHTS**

1. **Open the MANUAL TIDES program** by selecting PROCESSING-TIDES - MANUAL TIDES. The Manual tides dialog will appear.
2. **Enter your tide data.** The program requires date (mm/dd/yyyy), time (hh:mm) and water level (survey units) data for the period of your survey. It can read up to 14400 records.
3. **Select Min-Max.** This tells the program to use the high water-low water prediction algorithm developed by NOAA. The program calculates a tide height for every minute of each day. The results are graphed on the right. You can use the left and right arrows to view the graph for each day.
4. **Save the tide data.** Select FILE-SAVE and enter the file name. The program saves the table data to the *FileName*.TDX file and the tide corrections to the *FileName*.TID file.

**NOTE:** If you are using the NOAA tide book and you are working in depth mode, place a minus sign in front of all of your height entries. For example, if the NOAA book shows a high tide that is 5.6' above gauge, you need to remove 5.6' from the water column. You, therefore, must enter -5.6' in HYPACK® SUB-BOTTOM.

The following is an example of using MANUAL TIDES with High-Low Water Times and Heights.

**Example:** Creating Tide Files using MANUAL TIDES

Create a Tide Correction (\*.TID) file using the following information from the NOAA book.

**Solution:**

Day	Time	Height
<b>February 13</b>	05:05	-0.20
	10:59	-3.70
	13:55	-2.30
	16:48	-0.50
	18:00	-2.40
	22:35	-3.20
<b>February 14</b>	5:10	-0.20
	11:02	-3.60
	13:37	-2.30
	16:45	-0.6
	18:05	-2.50
	22:30	-3.10

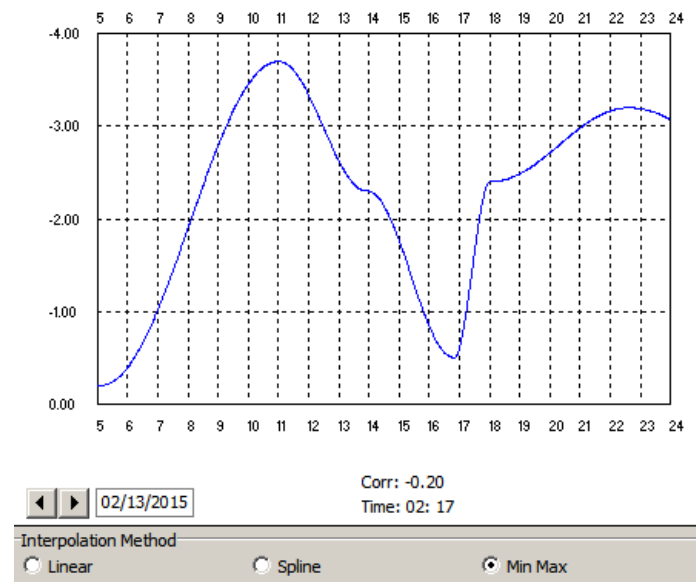
1. **Open the MANUAL TIDES program and enter the data** so it looks like the figure below. All of the NOAA heights have a minus sign placed in front of them because we want to remove the water from the sounding.

**FIGURE 1. Entering Data for High-Low Waters**

	Date	Time	Corr
1	02/13/2015	05:05	-0.20
2	02/13/2015	10:59	-3.70
3	02/13/2015	13:55	-2.30
4	02/13/2015	16:48	-0.50
5	02/13/2015	18:00	-2.40
6	02/13/2015	22:35	-3.20
7	02/14/2015	05:10	-2.00
8	02/14/2015	11:02	-3.60
9	02/14/2015	13:37	-2.30
10	02/14/2015	16:45	-0.60
11	02/14/2015	18:05	-2.50
12	02/14/2015	22:30	-3.10

2. **Click on Min-Max.** Your graph will be drawn as shown on the right side of the dialog.

**FIGURE 2. Tide Graph**



3. **Save the tide data.** Select FILE-SAVE and enter the BOS\_1125 file name.

## TIDE CORRECTIONS WITH MANUAL OBSERVATIONS

1. **Open the MANUAL TIDES program** by clicking PROCESSING-TIDES-MANUAL TIDE or from the TIDES icon.
2. **Enter the time and tide correction pairs in the grid.** A handy feature with the MANUAL TIDES program is the AutoTime

feature. Enter a Starting Time and Ending Time, along with a time increment, click [OK] and the program will automatically fill the time column with the requested times.



**Tip:** It works best to include a tide reading from before you start your survey and one after you finish so the program can finish the tides for the period of survey.

**FIGURE 3.** Auto-time Dialog

	hh:mm	Date	mm/dd/yyyy
Starting Time	22:00	Date	02/11/2006
Ending Time	02:00	Date	02/12/2006
Time increment	15	Minutes	

3. **Select either the Linear or the Spline method.** The Spline method fits the curve through your data points.

**NOTE:** You need at least five points to run the spline algorithm.

4. **Save your tide corrections.** The MANUAL TIDES program saves your table of data to a \*.TDX file and your tide corrections to a \*.TID file. The TDX file allows you to later retrieve the tide table should there be any questions about what values were used. The TID file is used in post-processing to correct your soundings.
5. **Save the tide data.** Select FILE-SAVE and enter the file name. The program saves the table data to the *FileName*.TDX file and the tide corrections to the *FileName*.TID file.

The following is an example of using Manual tides with observed high low water values.

**Example: Manual Tides**

During the day, our crackerjack tide staff reader made the following readings of times and gauge heights.

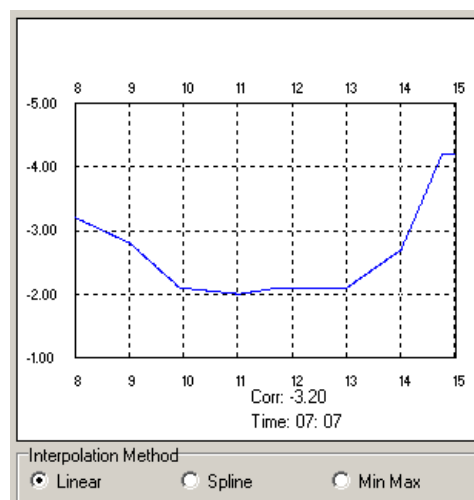
Time	Gauge Height
08:00	-3.20
09:00	-2.80
09:55	-2.10
11:00	-2.00
11:45	-2.10
13:00	-2.30
14:00	-2.70
14:45	-4.20

Your mission is to make a \*.TID file named "TideData.TID", using a straight-line interpolation between the points. Once you're done, click on [Spline] to see what it looks like.

**Solution:**

1. **Open the MANUAL TIDES program** by clicking PROCESSING-TIDES-MANUAL TIDE or from the TIDES icon.
2. **Enter the values as given above.** Since we are given the height of the water above the gauge zeros, we have to enter the correction values as negative numbers.
3. **Click [Linear]** and the points will be connected with a straight line.

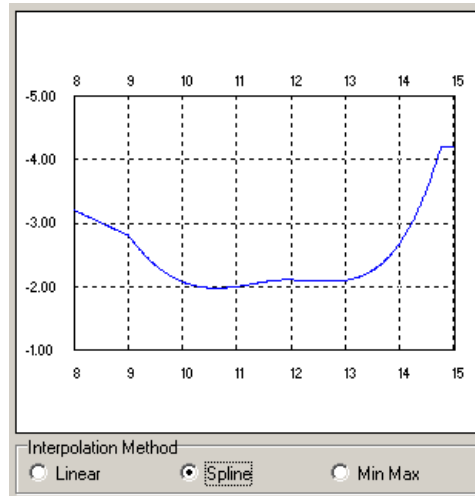
**FIGURE 4.** Tide Data with Linear Interpolation





4. **Save the tide data.** Select FILE-SAVE and enter the file name. The program saves the table data to the *FileName.TDX* file and the tide corrections to the *FileName.TID* file.
5. **Click [Spline].** Your graph should now look like the following figure.

**FIGURE 5.** Tide Data with Spline Interpolation



## IMPORTING TIDE DATA TO THE MANUAL TIDES PROGRAM

While you can manually type tide corrections data into the spreadsheet, it is a time-consuming process. The MANUAL TIDES program has routines that efficiently import tide data to the spreadsheet.

### IMPORTING TIDE DATA FROM A TEXT FILE



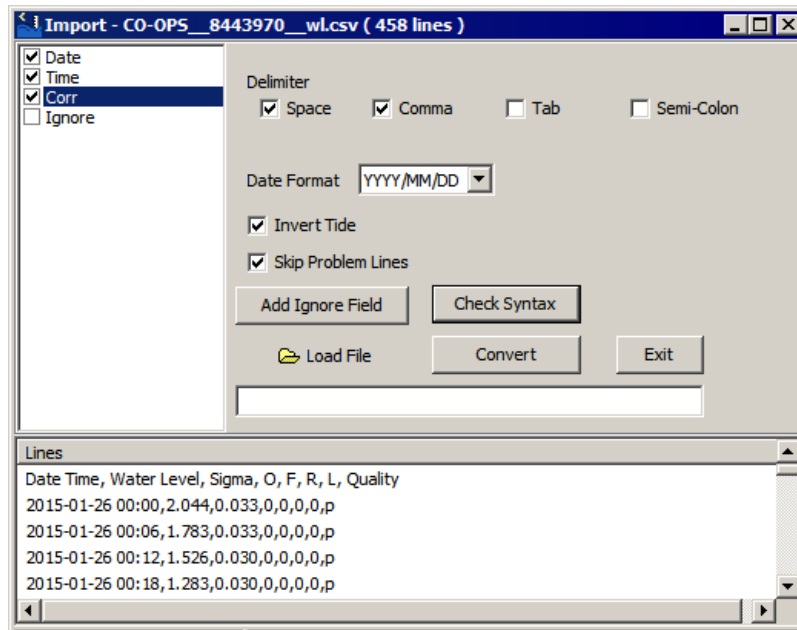
The Import feature enables you to load your tide data from a text file in one simple operation.

Each line of the text file is one tide record and must all be structured in the same pattern which you will describe in the Import dialog.

**Tip:** You can download NOAA tide data as a CSV (comma separated value) text file which you can then import to MANUAL TIDES. The program can import text files in other formats as well.

1. **Access the Import dialog** by clicking [Import File].

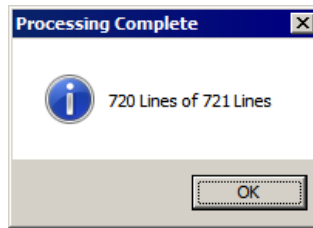
FIGURE 6. Import Dialog



2. **Load your text file.**
  - a. **Click [Load File].** The File Open dialog will appear.
  - b. **Select the text file and click [Open].**
3. **Define the structure of each tide record.**
  - a. **Check the data elements included in your text file and arrange them in the proper order.**
    - **Use the 'Ignore' field to indicate data the editor should omit.** If there is more than one item in each line, use **[Add Ignore Field]** to create more.
    - **Arrange the order of the fields** by dragging them to their proper positions in the list with your cursor.
  - b. **Define the delimiter** between the items in each record. The program supports spaces, commas or tabs. You can select one or more delimiters as required by your text file. (The NOAA CSV format requires both space and comma delimiters.)
  - c. **Define the format in which the date appears** in your text file.
  - d. **If the tide correction value in your text file is positive, check the 'Invert Tide' option.**
  - e. **If there are any lines that don't conform** to the same structure, you can omit them by checking **'Skip Problem Lines'**.
4. **Confirm the record structure you have described matches the text you have loaded** by clicking **[Check Syntax]**.

If your defined structure is incorrect, adjust your settings and try again.

**FIGURE 7.** Correct Syntax Configuration Parses All But 1 Line



5. Click **[Convert]** to import the data from the text file to the Manual Tides spreadsheet.
6. **Save the tide data.** Select FILE-SAVE and enter the file name. The program saves the table data to the *FileName.TDX* file and the tide corrections to the *FileName.TID* file.

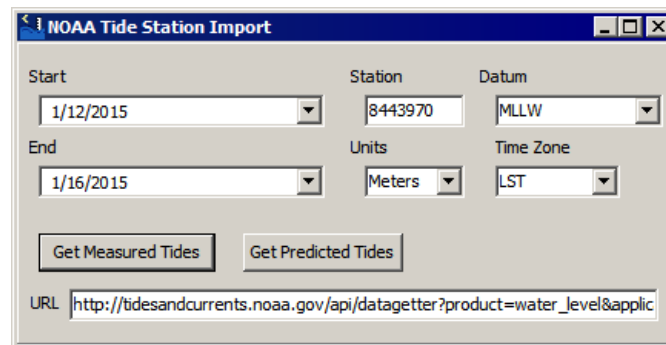
## IMPORTING NOAA TIDE DATA



Historical water level data can be obtained from the NOAA website and imported into the MANUAL TIDES program.

1. Select **FILE-NOAA TIDE STATION IMPORT**.
2. Select the **tide station** nearest you.  
*Tip:* You can get the tide station identification number from the NOAA site (<http://tidesandcurrents.noaa.gov/>).
3. **Enter the dates** for which you want data from that tide station along with the correct datum, distance units and time zone.

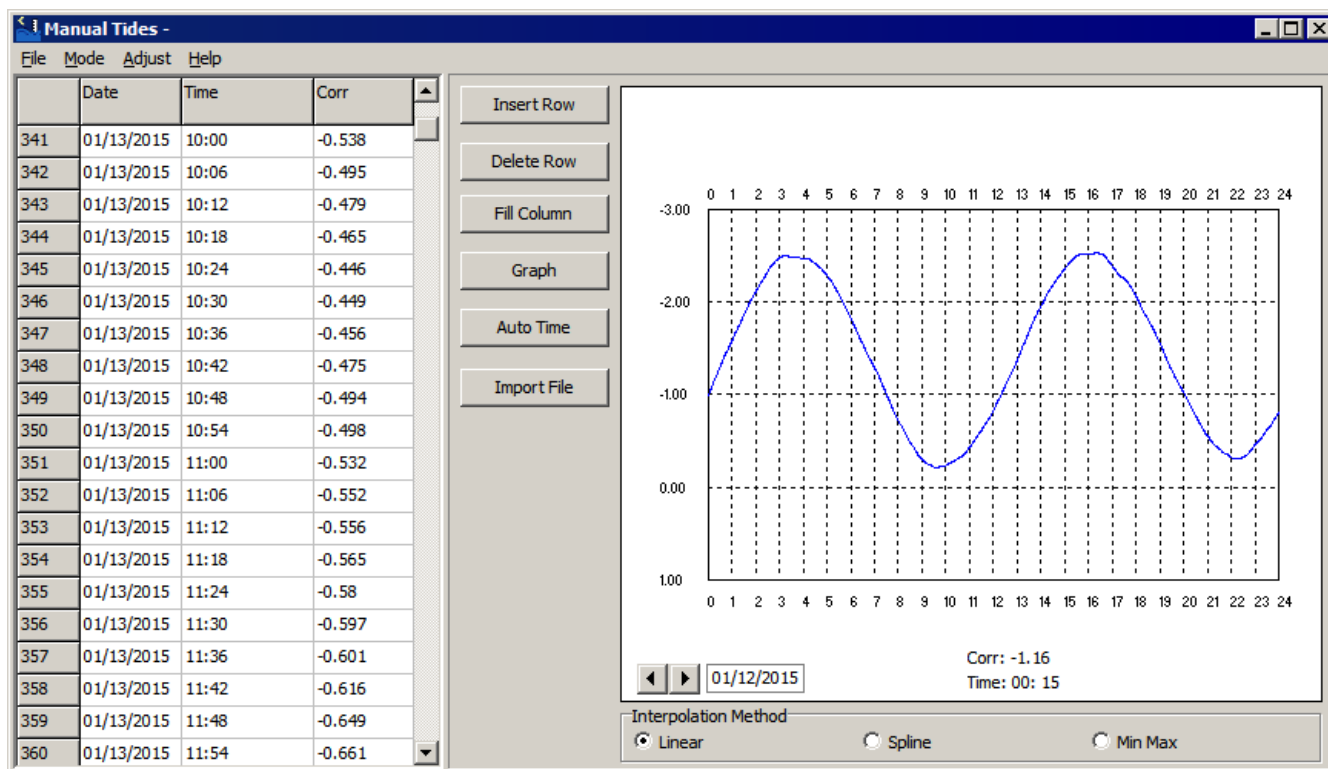
**FIGURE 8.** NOAA Tide Station Import Dialog



4. Click the button corresponding to the type of tide data you want to load:
  - Get Measured Tides
  - Get Predicted Tides
 MANUAL TIDES automatically downloads the requested data and displays it in the interface.

5. **Close the NOAA Tide Station Import dialog.**

**FIGURE 9. NOAA Data in MANUAL TIDES**



6. **Save the tide data.** Select FILE-SAVE and enter the file name. The program saves the table data to the *FileName.TDX* file and the tide corrections to the *FileName.TID* file.

### EDITING TIDE FILES IN THE MANUAL TIDES PROGRAM

Tide Files (\*.TID) that have been created in the MANUAL TIDES program may also be edited in MANUAL TIDES.

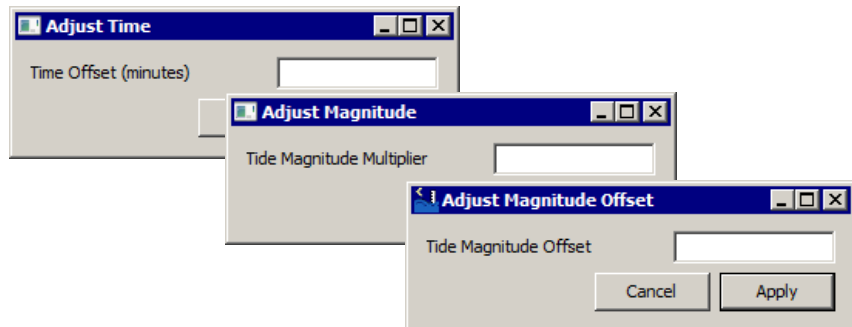
1. **Open the MANUAL TIDES program** by selecting PROCESSING-TIDES-MANUAL TIDES.
2. **Select the file to edit** by selecting FILE-OPEN and choose the \*.TDX file of the same name from the file manager

**NOTE:** If you open a TDX file that was generated in single-day mode of earlier versions of MANUAL TIDES, the program asks for the date, which it then uses to autofill the new Date column.

3. **Make any changes:**

- **[Insert Row]** creates a blank row above the current cursor position.
- **[Delete Row]** removes the current row from the spreadsheet.
- **[Fill Column]** copies the entry from the current cell to the last filled cell in the column.
- **ADJUST-ADJUST TIME:** Add a user-defined constant to each time.
- **ADJUST-ADJUST MAGNITUDE:** Multiply the correction by a user-defined multiplier.
- **ADJUST-MAGNITUDE OFFSET:** Add a user-defined constant to each correction.

*FIGURE 10. Adjust Dialogs—Adjust Time (left), Adjust Magnitude (center), Magnitude Offset (right)*



- **ADJUST-INVERT TIDES:** Multiply all tide values by -1.
4. **Save your file.** Changes will be saved, both to the \*.TID File and the \*.TDX File.

## SOUND VELOCITY CORRECTIONS

**Sound Velocity Corrections** files are generated in the SOUND VELOCITY program and contain depth vs sound velocity data. They are used to correct soundings for variations of sound in the water column. Typically, you will perform one or more sound velocity casts in your project area. You can import the data to the SOUND VELOCITY program which generates the sound velocity corrections (\*.VEL) file for post-processing.

In HYPACK® SUB-BOTTOM, sound velocity corrections are applied in the SUB-BOTTOM PROCESSOR during post-processing based on the data collected from a sound velocity probe. The program assigns a sound velocity correction to each exported sounding record based on the depth value and the depth ranges and correction values specified in your sound velocity file.

In the SUB-BOTTOM PROCESSOR, enter the \*VEL file, or a constant correction value to correct for sound velocity in the water column. In the same tab, enter a separate correction constant for the sediment appropriate to your bottom type.

## CREATING A SOUND VELOCITY FILE IN THE SOUND VELOCITY PROGRAM

Enter the depth and sound velocity values (in survey units & survey units/sec) into the spreadsheet in increasing depth order. Manually type the data or import the file generated by your sound velocity profiler. You can use [Graph] to check for errors when you're done.

The profiler data can be either space- or comma-delimited with each record on a different line. It is easiest if depth and sound velocity values are in the same position in each line.

You can enter as many depth-sound velocity pairs you choose, however when more than 512 layers are found, down sampling occurs, merging the layers with the most similar gradients.

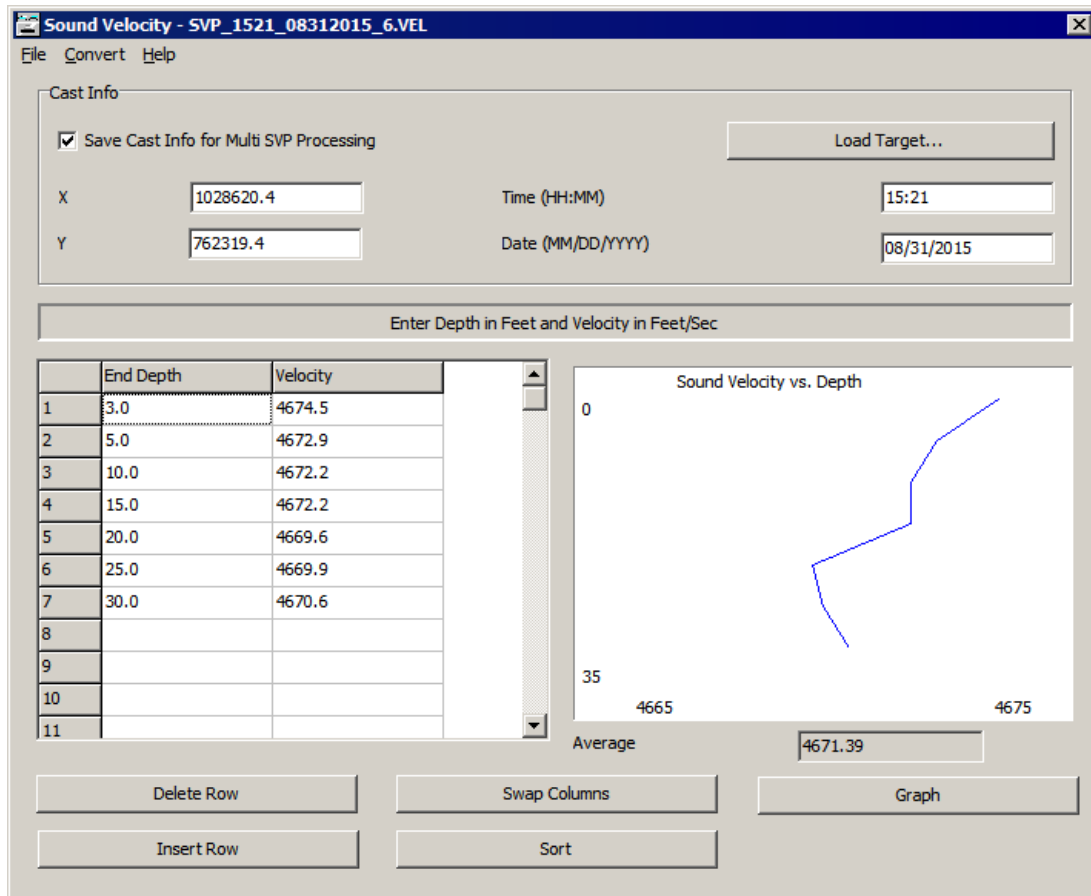
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**NOTE:** If the units of your sound velocity cast differ from your survey units, use the Convert menu options to automatically convert the values in one or both columns.

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1. **Start the SOUND VELOCITY program** by selecting PROCESSING-SOUND VELOCITY. The Sound Velocity spreadsheet will appear.

FIGURE 11. Sound Velocity Spreadsheet



2. **Enter your cast data.**
3. **Click [Graph]** (Optional) to display a graph the data on the right side of the window.
4. **Save your spreadsheet data.** Select FILE-SAVE and name your file. The spreadsheet data will be saved to a sound velocity corrections file (\*.VEL) in your project directory. You may re-open the spreadsheet for editing purposes at a later time by selecting FILE-OPEN and selecting the file.

## IMPORTING SOUND VELOCITY DATA FROM A TEXT FILE

Many of you save the data from your sound velocity casts in a text document (or format that can be easily converted to a text document). You can quickly and easily import a text file to the SOUND VELOCITY program.

The file can be either space- or comma-delimited with each record on a different line. It is easiest if depth and sound velocity values are in the same position in each line.

The SOUND VELOCITY program limits the profile to 512 depth/sound velocity pairs.

**NOTE:** You may load more than 512 SV layers from text files or VEL files; however, when more than 512 layers are found, downsampling occurs, merging the layers with the most similar gradients.

**FIGURE 12.** Sample Import File for the Sound Velocity Program

Depth	Sound Velocity	Correction	Other
1.205	4789.52	0.0454	0.000e+00
1.554	4789.53	0.0454	0.000e+00
2.515	4789.53	0.0462	0.000e+00
3.476	4789.50	0.0454	0.000e+00
4.699	4788.61	0.0454	0.000e+00
6.010	4787.42	0.0455	0.000e+00
7.233	4786.07	0.0456	0.000e+00
8.369	4785.24	0.0456	0.000e+00
9.505	4784.84	0.0457	0.000e+00
10.728	4784.48	0.0457	0.000e+00

1. **Select FILE-IMPORT** and a File Selection dialog will appear for you to select your text file. The Import dialog will appear with a display of the values from the first line in your text file.
  - a. **If the values in your profiler data are separated by commas, check Comma Separated Data.**
  - b. **If your profiler data is an XBT file, check XBT.**
  - c. **If the first record does not contain correction values, click [Skip Record] to advance the program one line in your imported file. Continue to skip records until you find a depth/correction pair.**



FIGURE 13. Sample Import Dialog

Field	Accept
1.205	<input checked="" type="checkbox"/>
4789.53	<input checked="" type="checkbox"/>
0.0454	<input type="checkbox"/>
0.00	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>
	<input type="checkbox"/>

Comma Separated Fields  
 XBT  
 Salinity (PPT)

- d. **Check the Accept box next to the two fields that represent the depth and sound velocity correction values.** This tells the program which two values to read from the displayed record.
  - e. **Accept the data for your Sound Velocity Corrections file.**
    - **If your depth and correction values are always in the same position, as suggested, click [Accept All]** and the program will extract the selected fields from each line in the file.
    - **If the value position varies or if each line is not a record, click [Accept Record].** The program will copy only the displayed values to your Sound Velocity Corrections file, then display the values from the next line of the text file. This allows you to step through your text file, one line at a time, changing the position designations (select new checkboxes) before accepting each record or skipping lines all together ([Skip Record]). Continue through your file until you have all of the values in your corrections file that you need.
  - f. **Click [OK]** to return to the SOUND VELOCITY spreadsheet. The selected data are listed in the spreadsheet and graphed in the SOUND VELOCITY dialog.
2. **If the depths and correction values have been reversed in the spreadsheet, correct them by clicking [Swap Columns].**

3. **If your depths are not in chronological order, Sort your depths** by clicking [Sort].

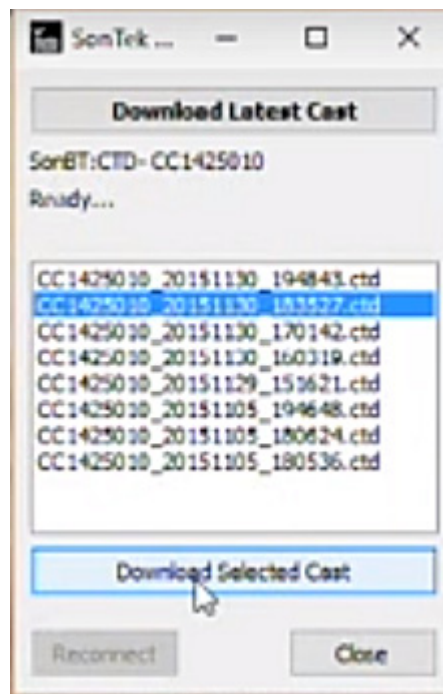
## IMPORTING SOUND VELOCITY DATA FROM A SONTEK CASTAWAY

Once you have recorded a cast on your CastAway, the SOUND VELOCITY programs provide a tools with which you can quickly and easily import data from the CastAway into your HYPACK® SUB-BOTTOM project.

Both programs convert the CastAway data to HYPACK® SUB-BOTTOM sound velocity corrections files (\*.VEL), stored in the project folder.

1. **Open the SOUND VELOCITY program.** Select PROCESSING-SOUND VELOCITY-SOUND VELOCITY.
2. **Select FILE-IMPORT-CASTAWAY.** A dialog appears with a listing of all casts currently recorded on the device.

FIGURE 14. SonTek CastAway



3. **Download the cast information:**
  - **To download the most recent cast information,** click [Download Latest Cast].

- **To download data from a selected cast**, select the cast from the list in the dialog and click [Download Selected Cast].

The program creates a VEL for the selected CTD file and stores it in the project folder.

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## CALCULATING SUB-BOTTOM LATENCY

We calculate latency by comparing data from pairs of reciprocal lines perpendicular to an object with a well-defined edge (e.g. a pipeline).

**For the best results** keep the following in mind:

- **Follow the planned line** as exactly as possible.
- **Keep consistent boat speed.** Keep record of your boat speed for the latency calculation.
- If you are positioning with the gps.dll, **monitor the number of satellites** read by your GPS. You can set your system to log data based on the HDOP or number of satellites in the Alarm tab of the driver setup dialog for the GPS.dll.
- **Run the test three times**, each with separate pairs of lines and average the calculated latency time.

The goal is to find the correction value that will result in the best alignment when the profiles are overlaid.

1. **Collect your data.** Run a line in each direction over a well-defined object and at constant boat speed.
2. **Keep a record of your boat speed.**
3. **Open your data in the SUB-BOTTOM PROCESSOR.**
4. **In each line, mark a target at the same location** on the object.
5. **Close the SUB-BOTTOM PROCESSOR.**
6. **In the HYPACK® SUB-BOTTOM Map window, display the targets.**
7. **Use the measuring tool to find the horizontal position difference.**
8. **Calculate the latency:**

*(Distance between Targets/2) / boat speed*

**(EQ 1)**

Sub-bottom systems typically have a latency of 0.8 - 1 second.

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## SUB-BOTTOM PROCESSING

The SUB-BOTTOM PROCESSOR displays SEG-Y sub-bottom data and provides tools with which you mark targets, and digitize your layers. The SUB-BOTTOM PROCESSOR displays the sub-bottom profiles and converts the digitized points to the HYPACK® SUB-BOTTOM All format or XYZ format, which may then be displayed with the targets in the HYPACK® SUB-BOTTOM screen, plotted from HYPLOT or converted to other formats in EXPORT.

HYPACK® SUB-BOTTOM includes two versions of the SUB-BOTTOM PROCESSOR: 32-bit and 64-bit. Select PROCESSING - SUB-BOTTOM PROCESSING. HYPACK® SUB-BOTTOM automatically runs the version matching your Windows® operating system.

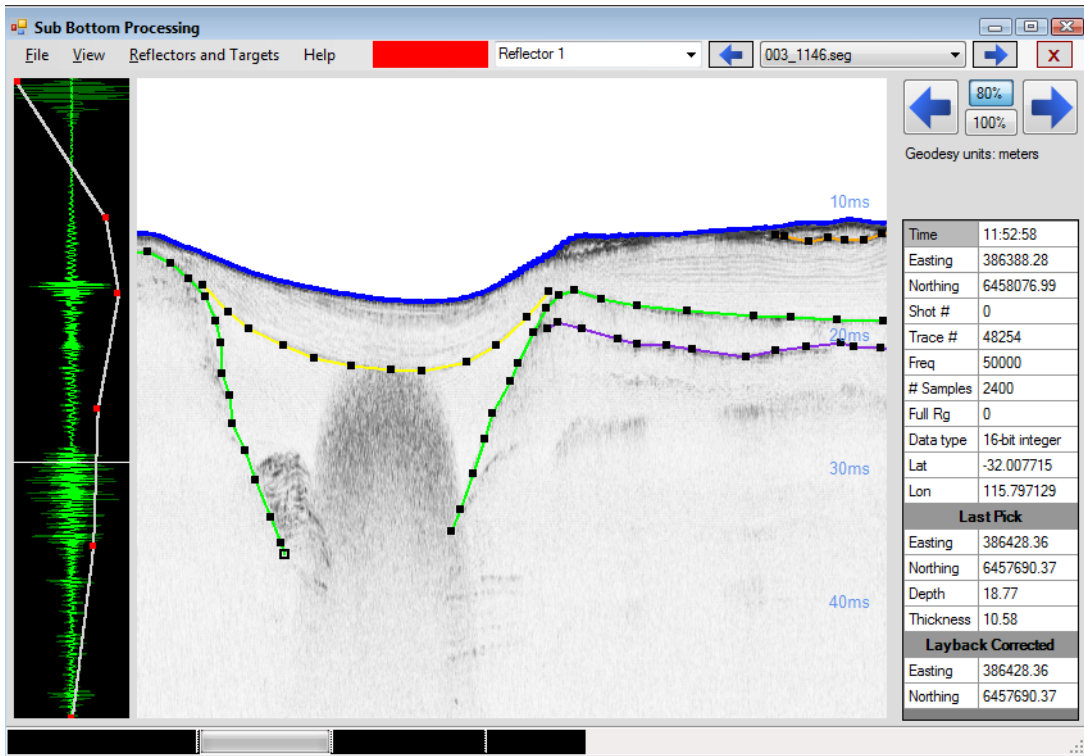
## WINDOWS IN THE SUB-BOTTOM PROCESSOR

The SUB-BOTTOM PROCESSOR is comprised of three window displays and a multi-tabbed dialog with all of the options with which you can configure your displays.

### *Processing Window*

The **Processing** window is the primary window. Its menu system controls the data input to the display and output based on your work in its rendering of the SEG-Y profile.

FIGURE 1. Sample Processing Window



### View Tracks Window

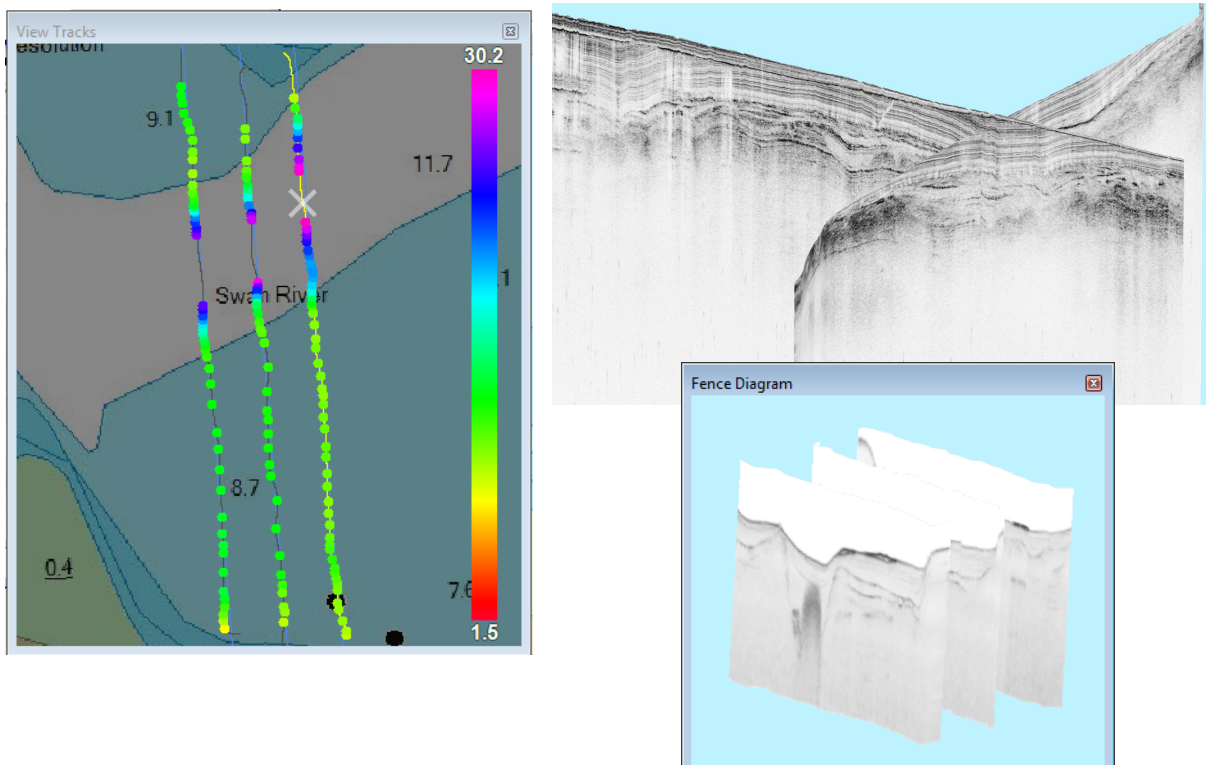
The **View Tracks** window automatically displays a map view of project files that are enabled when you open the SUB-BOTTOM PROCESSOR. In the View Tracks tab of the Settings dialog, you can configure it to show your digitized layers and targets as well.

As you move your cursor over the profile in the Processing window, the position of an 'X' updates in the View Tracks window to show your current position on the track line.

### Fence Diagram

The sub-bottom **fence diagram** shows one or more profiles together in a 3-dimensional, interactive display. The options in the Settings dialog enable you to customize your display.

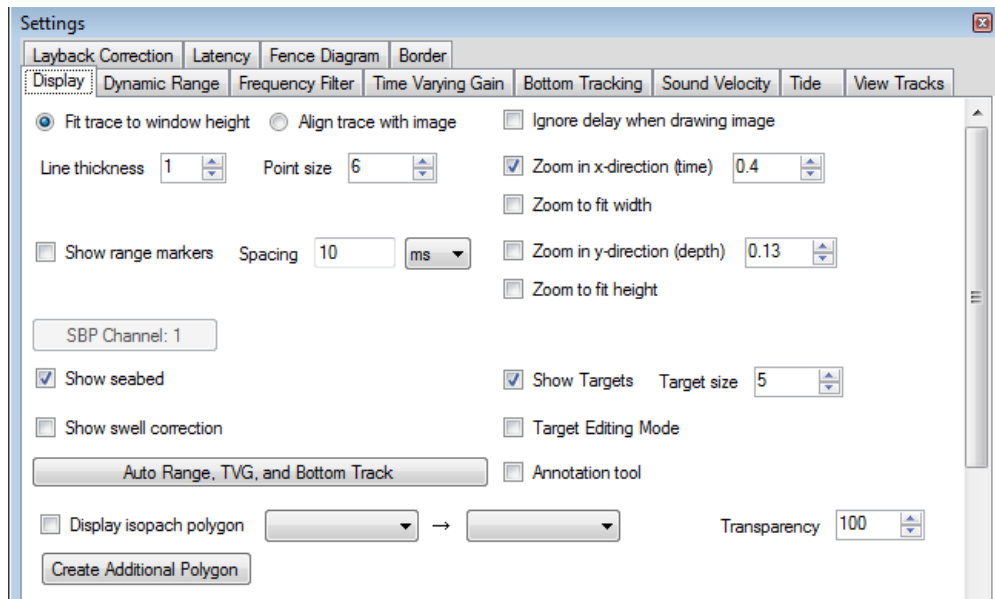
FIGURE 2. Sample View Tracks (left), Fence Diagrams (right) and View Tracks (right)



*Settings Dialog*

The **Settings** dialog is a multi-tabbed dialog where you make the SUB-BOTTOM PROCESSOR work for you. It provides settings with which you can control the display of your SEG-Y data, as well as the other project files that provide context in your processing; options that control the cursor mode (digitizing, targeting or annotation); and the opportunity to apply corrections to your exported seabed and reflector points. You can apply all features to the full extent of your SEG-Y data, or use a border file (\*.BRD) to focus your work within a user-defined area.

FIGURE 3. Settings Dialog



## RUNNING THE SUB-BOTTOM PROCESSOR

1. **In the HYPACK® SUB-BOTTOM shell**, enable the files you want to display in the View Tracks display of the SUB-BOTTOM PROCESSOR.
2. **Open the SUB-BOTTOM PROCESSOR.** Select PROCESSING-SUB-BOTTOM PROCESSING.
3. **Open a sub-bottom session.**
  - **For a new data set**, select FILE-NEW SESSION (Ctrl+N). This option provides a dialog where you will select your raw data. The program can read SEG-Y and JSF format files. You can multiselect individual files or create a catalog (\*.LOG) file to load them at once.
  - **For an existing project**, select FILE-OPEN SESSION (Ctrl+O) and choose the SBP.xml from the desired project. The program loads the data with the associated bottom track and digitized layers as they were when you last saved them.
4. **Modify your data set you will digitize, if necessary.** You can add or remove files from the current list.
5. **Optimize the display of the acoustic profile** using the options in the first four Options tabs.
  - **The first time you work in the SUB-BOTTOM PROCESSOR with data of this sub-bottom type**, work from left to right, find the optimal settings in each tab before moving to the next.



**Tip:** Save your settings (FILE-SAVE CONFIGURATION) to a configuration file (\*.config) which can be used to quickly load the same settings for similar data in other projects.

- **If you have worked in the SUB-BOTTOM PROCESSOR with this type of data**, load the settings from that project by loading the configuration file (FILE-LOAD CONFIGURATION).
6. **Set your sound velocity corrections.** The program defaults to 1500 meters/second in water and 1600 meters/second in sediment.
  7. **Find a clearly defined, continuous bottom track** for each line.
  8. **Set your view options for the View Tracks window.**
  9. **Digitize your layers and mark any targets.**
  10. **Save your project.**

## MODIFYING YOUR DATA SET IN SUB-BOTTOM PROCESSOR

The SUB-BOTTOM PROCESSOR enables you to add or remove SEG-Y files from the current session at any time.

HYPACK® SURVEY does not generate catalog (\*.LOG) files for Sub-bottom SEG-Y files. You can multiselect SEG-Y files in both the loading and unloading processes.



**Tip:** To multiselect files, hold the Ctrl key and select multiple individual records or hold the Shift key and click on the first and last records in a range of consecutive records.

- **For a new session**, load the SEG-Y files you want to process. You can select multiple SEG-Y files or a catalog of files from the project Raw folder. The SUB-BOTTOM PROCESSOR recognizes an SEG-Y, SEG-Y or SGY extension.
- **For an existing session**, you can add or remove files from the current processing session. *This does not remove the files from the project or your hard drive.*

### Loading SEG-Y Files to the Session

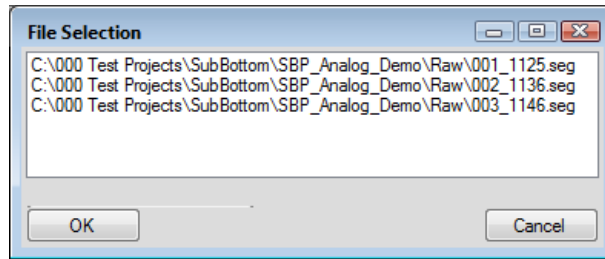
1. **Select FILE-ADD FILES TO SESSION.** A File Select dialog appears.
2. **Select one or more files from the Raw folder and click [OK].**

### Removing SEG-Y Files from the Session

1. **Select FILE-REMOVE SEG-Y FROM SESSION.** The File Selection dialog appears listing the current project files.



**FIGURE 4.** File Selection Dialog



2. **Select one or more files from the list.**
3. **Click [OK].** The selected files are removed from the SEG-Y Files list.

## DISPLAY OPTIONS IN THE SUB-BOTTOM PROCESSOR

The SUB-BOTTOM PROCESSOR View Options are included with the other tools and settings in the Settings dialog. Once you have loaded your data, use the first four tabs, working from left to right, to configure your acoustic profiles for optimal viewing.

Additional tabs enable you to configure the display of other project files that provide context in your processing; options that control the cursor mode (digitizing, targeting or annotation); the opportunity to apply corrections to your exported seabed and reflector points. You can apply all features to the full extent of your SEG-Y data, or use a border file (\*.BRD) to focus your work within a user-defined area.

### **DISPLAY TAB IN THE SUB-BOTTOM PROCESSOR**

Use the options in the Display tab to fit the data in the displays and choose what additional information and guides appear.

FIGURE 5. View Options—Display Tab

**Fit Trace to Window Height** distributes the full range of the single acoustic return display evenly down the display.

**Align Trace With Image** (recommended) shows only the portion of the single acoustic return display that corresponds to the vertical range of the acoustic profile.

**Line Thickness:** Width of the line defining the bottom track and each isopach layer. A setting of one or two pixels is recommended.

**Point Size** adjusts the size (pixels) of the reflectors marking the isopach layers.

**Show Range Markers** (optional) draws horizontal lines at intervals defined under **Spacing**.

**[SBP Channel]:** Dual channel systems load separate SEG-Y files—one for each channel, and you process them separately. This button displays the channel currently in process.

**Show Seabed** (recommended) displays the thick, blue line that shows where the program has detected the bottom.

**Show Swell Correction:** If the Swell Correct option is selected on the Bottom Tracking tab, this option displays the result as a thick, green line in the acoustic profile.

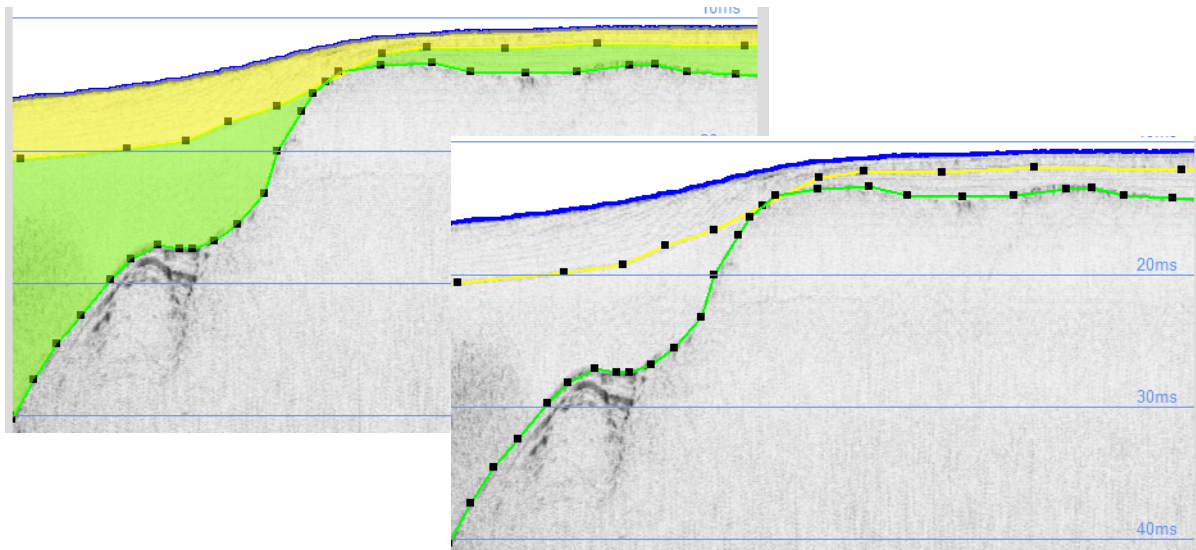
**[Auto Range, TVG and Bottom Track]** attempts to automatically set the best values based on your data set. This option does not work well on noisy data.

**Display Isopach Polygon:** When you have digitized one or more isopach layers, you can color fill between user-defined layers to

highlight those areas in the profile as well as in the fence display. The Settings dialog initially shows options for only one polygon, but you can use **[Create Additional Polygon]** and **[Delete Polygon]** to create and remove additional areas. For each polygon, you can define the layers between which the color appears and a level of transparency (0 to 100%). A high transparency allows you to see the sub-bottom data through the coloration.

**NOTE:** Layers that define one or more polygons must be complete to draw correctly. If you want to digitize more point in such a layer, just deselect the Display Isopach Polygon option while you do so.

**FIGURE 6.** Polygons (left), No Polygons (right)

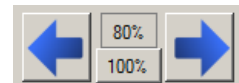


**Ignore delay when drawing image:** For systems that intentionally ignore the upper segment—a specified time delay—of the water column in deep water areas. If your project includes both deep and shallow water, your layers may not align at the transition area. Clear this option when this misalignment occurs; otherwise, check this option to optimize your display.

**Zoom in X Direction** and **Zoom in Y Direction** adjust the horizontal and vertical scale respectively.



**Tip:** Select Zoom in Y-Direction (depth) and use the mouse wheel to reduce data display until it fits inside display window. Once you find the desired Y range, clear the Zoom in Y Direction option and continue to zoom only in the X direction until you can see the data clearly. You can then scroll through the line using the scroll arrows in the processing window. [80%] and



[100%] sets the amount of the acoustic profile scrolled for each click.

**Zoom to Fit Width** automatically sets the scale in the X direction to exactly fit the display window. It overrides the Zoom in X direction option.

**Show Targets** includes targets in the acoustic profile.

**Target Size** adjusts the size of the target location.

**Target Editing Mode:** Determines whether a click in the data generates a reflector or a target.

**Annotation Tool** enables annotation mode where the interface displays the depth and the distance between each isopach layer at the cursor location. To display the annotations at multiple locations, click at each location.

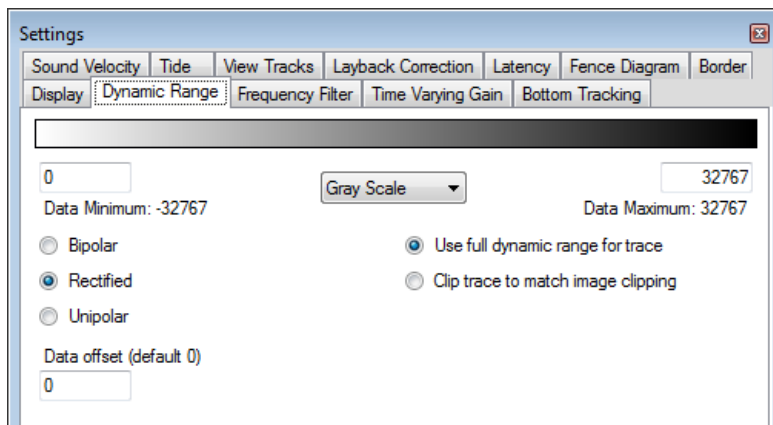
**More Information**

- [“Marking Targets in the SUB-BOTTOM PROCESSOR”](#) on page 4-45

## DYNAMIC RANGE TAB IN THE SUB-BOTTOM PROCESSOR

The Dynamic Range options configure the acoustic profile.

FIGURE 7. View Options—Dynamic Range Tab



**Data Minimum** and **Data Maximum** display the range of the signal.

**Color Options:** You may choose from a selection of pre-defined color options based on personal preference.

**Bipolar** both positive and negative signals are displayed with the zero signal level colored 50% gray. This works well for Boomer/ Sparker data.

**Rectified** shifts the negative side of the single acoustic return display to the positive. This works well for Boomer/Sparker data.

**Unipolar** omits the negative side of the single acoustic return display. This works well for Pinger/Chirp data.

**Data Offset** (default 0) shifts the data value by a user-defined constant. This option is only used to improve drawing of data outside the typical range.

**Use Full Dynamic Range for Trace** always shows full range of the single acoustic return display.

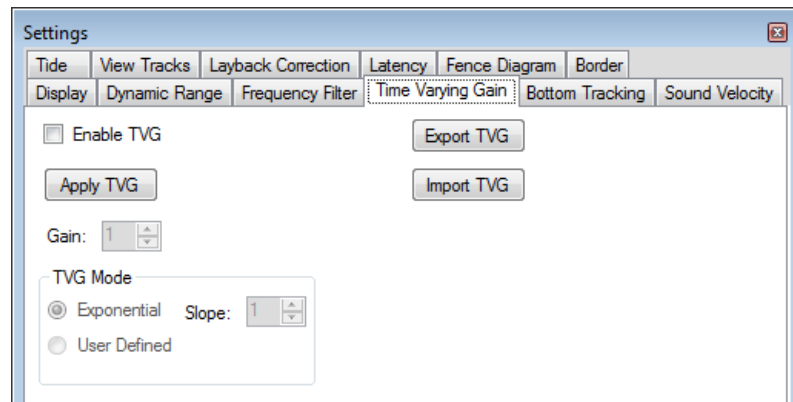
**Clip Trace to Match Image Clipping:** If you have selected the Rectified or Unipolar option, the single acoustic return display shows only the positive side.

## TIME VARYING GAIN CONTROLS IN THE SUB-BOTTOM PROCESSOR

Time Varying Gain (TVG) controls enable you to adjust the TVG levels over the range of the data to optimize your acoustic profile.

With the Enable TVG option checked, you can experiment with different settings—alternately changing the settings then applying them—until you are satisfied.

**FIGURE 8.** View Options—TVG Tab



**Enable TVG** allows the settings in this tab to affect the acoustic profile.

**Gain** multiplies the strength of the data rendering. As gain increases, the single acoustic return widens and the acoustic profile gets darker.

**TVG Mode:** Choose the mode with which TVG is adjusted. The white line in the single acoustic return display shows the adjustment across the display in either mode.

- **Exponential**, for pinger or CHIRP data, mathematically calculates a regular adjustment based on the user-defined slope. The higher the slope, the more delay before it applies any TVG, but when it does, it increases the strength of the TVG over a shorter time.
- **User-Defined**, for boomer, sparker or airgun data, enables you to manually set the adjustment over the full length of the single acoustic return. Click and drag any point on the adjustment indicator left or right to customize the adjustment over the length of your return.

When the TVG curve is set correctly it should fill most of the oscilloscope window (left) with the highest peaks clipped at the edge of the display.

**[Export TVG]** saves your manual TVG settings so you can reproduce them later. They are stored, by default, to *CurrentLineName.TVG* in your project folder.

Use **[Import TVG]** to reload your saved TVG settings.

**FIGURE 9.** TVG Settings—Exponential

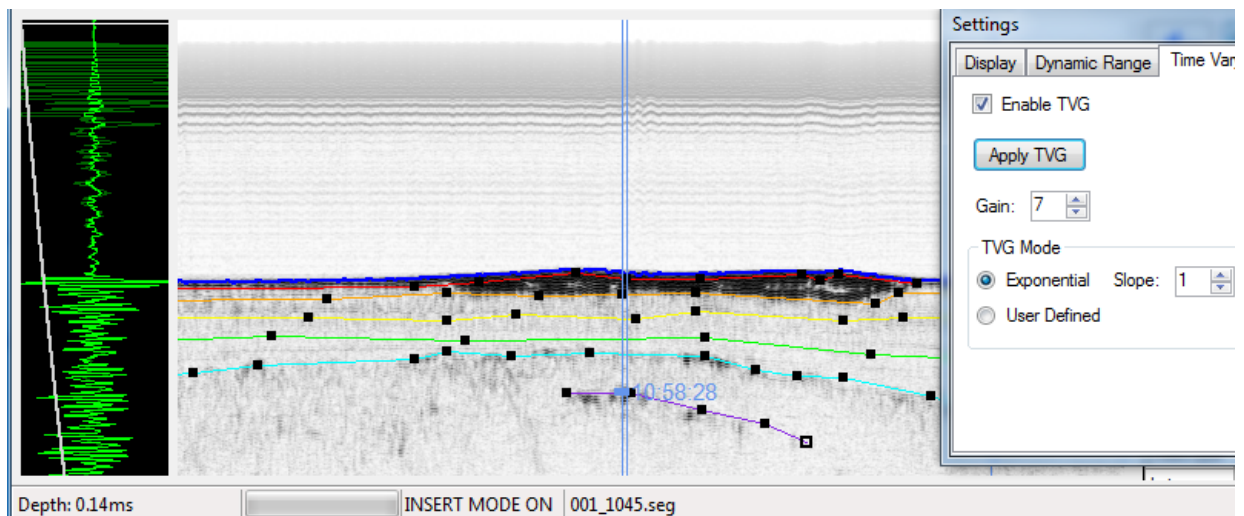
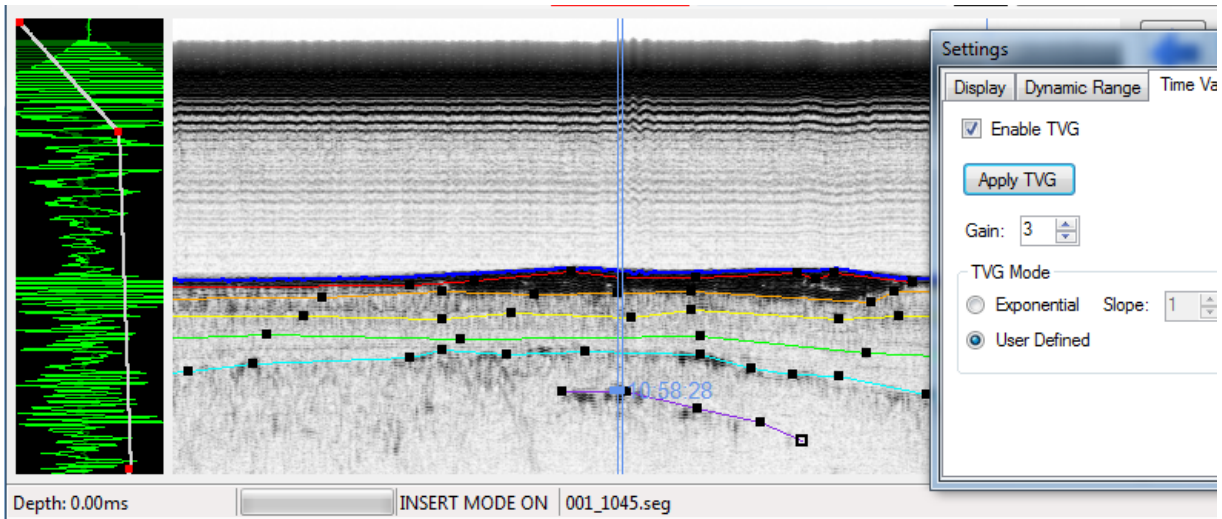


FIGURE 10. TVG Settings—User-Defined



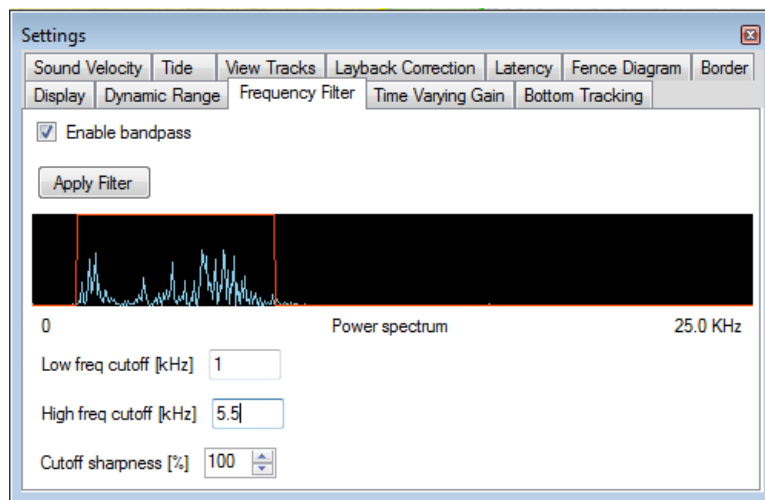
## FREQUENCY FILTER IN THE SUB-BOTTOM PROCESSOR

The frequency filter removes all data outside of the user-defined range. These are the same filters as were used to improve the display in the sub-bottom device window during acquisition.



**Tip:** To see where the data range is, move the cursor over the profile display.

FIGURE 11. View Options—Frequency Filter



**Enable Bandpass** allows the filter settings on this tab to affect the acoustic profile.

- **Low Frequency Cutoff** and **High Frequency Cutoff** define the range of power to display. The recommended starting point

for filtering sub-bottom data is a low pass start frequency of half of the sub-bottom transmit frequency and a high pass end frequency of double the sub-bottom transmit frequency.

---

**NOTE:** Generally, additional band pass filtering should not be applied to Chirp data due to the match filtering and correlation that is applied to the signal arrivals by the sub-bottom profiler manufacturer.

---

**Cutoff Sharpness** rounds the curve for the cutoff range. The Power Spectrum display shows the defined cutoff range (orange) overlaid on a sample return.

**[Apply Filter]** updates your displays according to the current settings.

## CORRECTIONS IN THE SUB-BOTTOM PROCESSOR

The SUB-BOTTOM PROCESSOR can apply one or more of the following corrections to the exported data.

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**IMPORTANT:** Corrections can affect the drawing in the scrolling data window, so it is important to apply them before you begin to digitize your layers.

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- **Sound Velocity** and **Tide** corrections are applied to the digitized depths. When you include these corrections, the SUB-BOTTOM PROCESSOR exports corrected data.
- **Latency** is included in the SEG-Y data; however, you can correct any latency errors by entering the correct information in the latency tab.
- **Layback:** *Use these options only when your data is not corrected for layback.* Data logged in HYPACK® SUB-BOTTOM includes layback correction from the towfish driver.

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### SOUND VELOCITY CORRECTIONS

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Sound velocity corrections are used when the SUB-BOTTOM PROCESSOR exports your digitized data. The conversion of the depth measured in milliseconds to depth in survey units for your exported data files requires accurate sound velocity information.

The SUB-BOTTOM PROCESSOR enters default sound velocity corrections for both water (1500 meters/second) and sediment (1600 meters/second), but you can manually enter new values.

Alternatively, for the water column only, you can enter a Sound Velocity Correction file (\*.VEL) based on a sound velocity cast and created in the SOUND VELOCITY program.



## TIDE CORRECTIONS

You can use any of the tide drivers provided to record tide corrections to the RAW data file during acquisition; however this data is not recorded or applied to the SEG-Y files.

In HYPACK® SUB-BOTTOM, you must apply tide corrections to sub-bottom data in post-processing. You can then export corrected All format (\*.EDT) and XYZ data from the SUB-BOTTOM PROCESSOR.

1. **Create a Tide Correction file.**
  - **Harmonic predictions** in the HARMONIC PREDICTION program.
  - **Predicted high-low water times** in the MANUAL TIDES program.
  - **Actual tide levels and times** in the MANUAL TIDES program.
2. **Load it to the SUB-BOTTOM PROCESSOR** in the Tide tab of the Settings dialog.

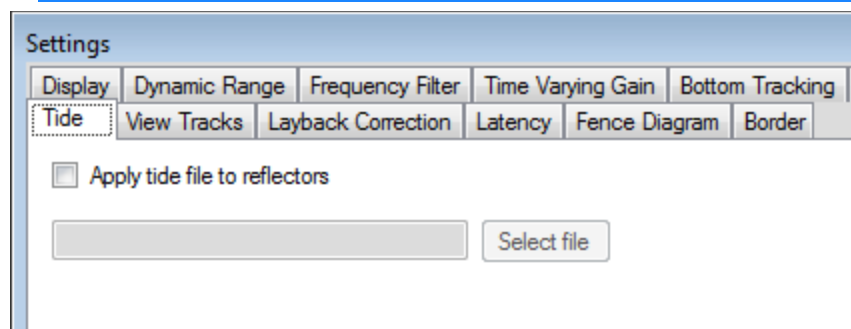
The important thing to remember in all of these methods is that the *tide correction is added to the raw sounding*. Tide corrections relate raw soundings to the chart (low water) datum. Since you normally want to remove the water column above the sounding datum, *the overwhelming majority of the time your tide corrections will be negative numbers!* The HARMONIC PREDICTION program takes care of this automatically. You have to make some mental adjustments when entering tidal heights in the MANUAL TIDES program.

- When creating a tide file for **depth mode**, enter tide values as *negative numbers*.
- When creating a tide file for **elevation mode**, enter tide values as *positive numbers*.

Tide corrections are measured in survey units.

Any sounding with a timetag before the first time of your \*.TID file will get the value of that first time. Any sounding with a timetag after the last time of your \*.TID file will get the value of that last time.

**FIGURE 12.** View Options—Tide Tab

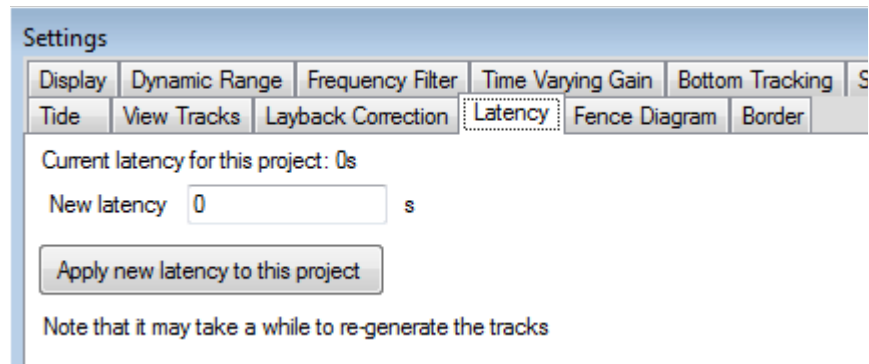


1. **Select the Apply Tide File to Reflectors option.**
2. **Load your tide corrections file.** Click [Select File] and choose the TID file from the file selection dialog.

**LATENCY CORRECTIONS**

The Latency tab displays the current latency value and enables you to apply a different latency to your edited data. Just enter the **New Latency** value and click [Apply].

FIGURE 13. Latency Options

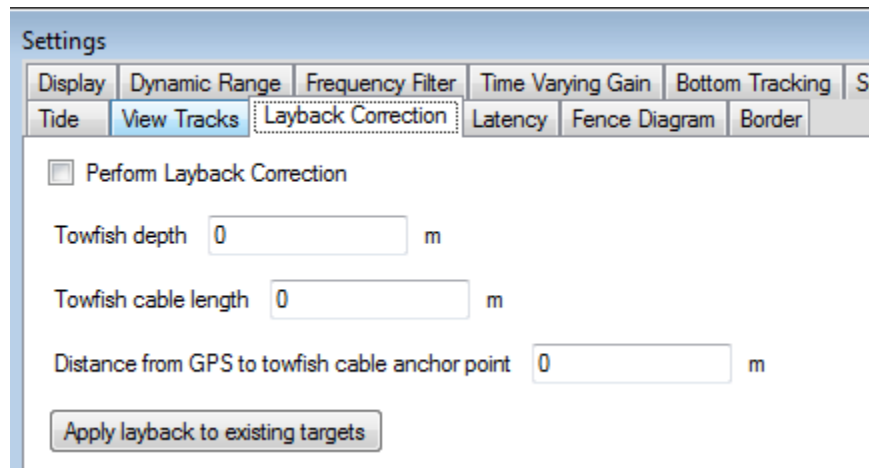


**LAYBACK CORRECTIONS**

HYPACK® SUB-BOTTOM uses the Towfish Depth, Distance from the GPS to Towfish Cable Anchor Point (A-frame connection point) and corrected Cable Length to calculate the horizontal distance from the A-frame connection point to the towfish. That distance is added to the Y-offset to calculate the layback.

**IMPORTANT:** Use these options only when your data is not corrected for layback. Data logged in HYPACK® SUB-BOTTOM includes layback correction from the towfish driver.

FIGURE 14. Layback Correction Options



**Perform Layback Correction** instructs the program to calculate and apply a layback correction based on the information entered in the Layback Correction tab.

**Towfish Depth** and **Towfish Cable Length** are user-defined constants in survey units.

**Distance from GPS to Towfish Cable Anchor Point:** The Y-offset between the GPS and cable anchor point.

**[Apply Layback to Existing Targets]** calculates and applies layback based on the current settings.

### More Information

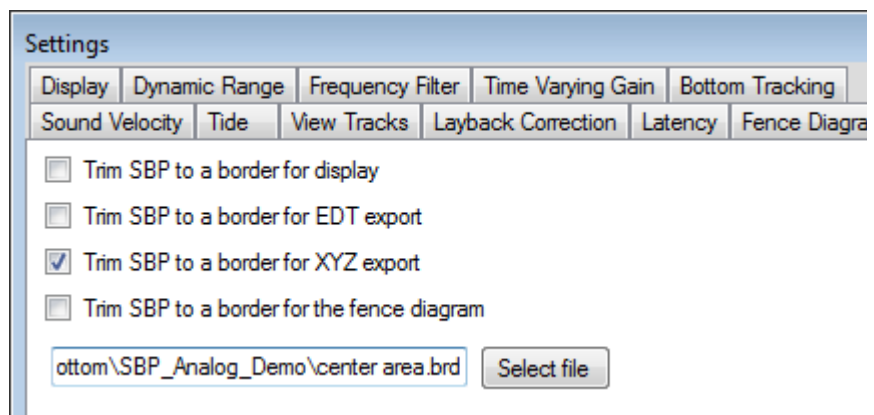
- [“Calculating Sub-bottom Latency”](#) on page 4-21
- [“Harmonic Tidal Predictions”](#) on page 4-4
- [“Manual Tides Program”](#) on page 4-6

## LIMITING DATA WITH A BORDER FILE

In addition to your initial data selection, you can further limit the data in your displays and in your export operations using a border file. Use this option to focus on a defined area of a larger survey or to limit the extent of exported data files.

These options are in the Border tab of the Settings dialog.

*FIGURE 15. Settings Dialog—Border Tab*



1. In the HYPACK® SUB-BOTTOM BORDER EDITOR, create a border file around your area of interest.
2. In the SUB-BOTTOM PROCESSOR,
3. Click [Select File] and choose the border file with which to trim your data. The checkboxes then become enabled.
4. Choose the operations where trimming should occur.

- Trim SBP to a border for display
- Trim SBP to a border for EDT export
- Trim SBP to a border for XYZ export
- Trim SBP to a border for the fence diagram

#### More Information

- [“Border Files”](#) on page 2-68

## VIEW TRACKS VIEW OPTIONS IN THE SUB-BOTTOM PROCESSOR

The View Tracks window automatically displays project files that are enabled when you open the SUB-BOTTOM PROCESSOR.

The View Tracks options configure the track line data display in the View Tracks window.

*FIGURE 16. View Tracks Window*

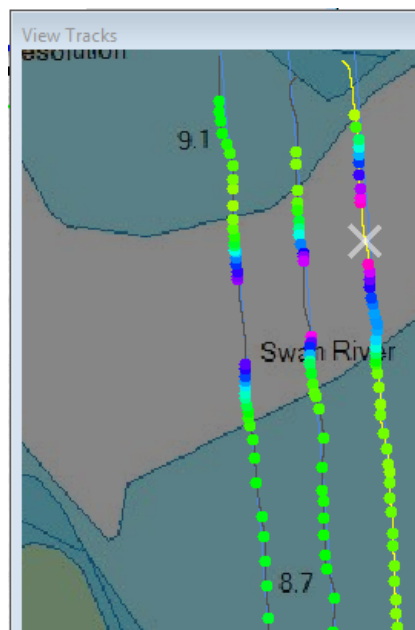
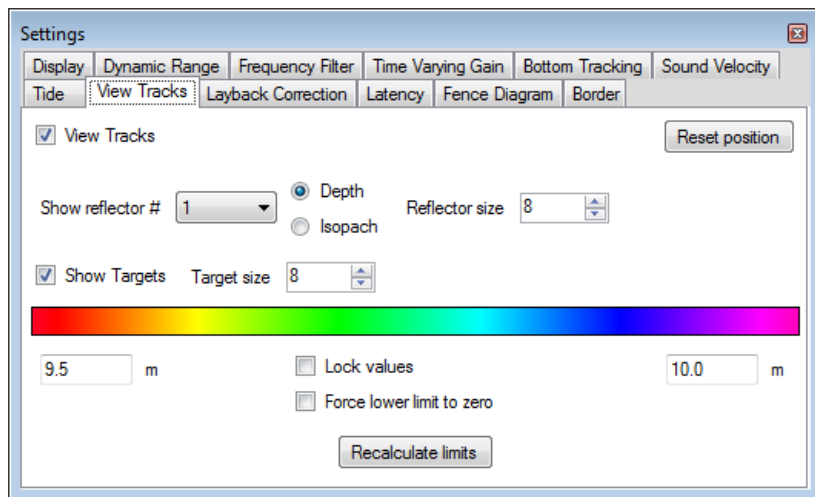


FIGURE 17. View Tracks Tab



**View Tracks** displays the View Tracks window.

**Show Reflector #:** The View Tracks display shows only one layer at a time. Choose to display the seabed or one of the digitized sub-bottom layers. The color-coding depends on your selection of the Depth or Isopach option:

- **Depth** color-codes using absolute depth.
- **Isopach** color-codes using depth below the bottom track.

**NOTE:** To show the seabed, you must have a valid bottom track. To show a reflector layer, you must have digitized the selected isopach layer in your profile.

**Reflector Size** adjusts the size of the digitized points in the display.

**Show Targets** overlays your targets on the track line.

**Target Size** adjusts the size of the font and target symbols.

**Color Range:** The reflectors in the View Tracks window are color-coded based on this depth range. The range is defined by the values at each end of the spectrum.

**Lock Values** maintain the current color range for all levels.

**Force Lower Limit to Zero** sets the lower end of the color spectrum to zero.

**[Reset Position]** scales the display to fit the window.

**[Zoom Extents]** scales the display to the extent of the sub-bottom data.

**Blank Water Column** omits noise in the water column.

**[Recalculate Limits]** distributes the color spectrum evenly across the range of the data set.

**More Information**

- [“Windows in the SUB-BOTTOM PROCESSOR”](#) on page 4-22

## BOTTOM TRACKING IN THE SUB-BOTTOM PROCESSOR

The bottom track is our best estimate of the seabed surface. It is essential to have a clearly-defined bottom track before you progress to digitizing your layers, as it is used to measure the isopach and depth of burial (distance from the seabed) when you mark targets.

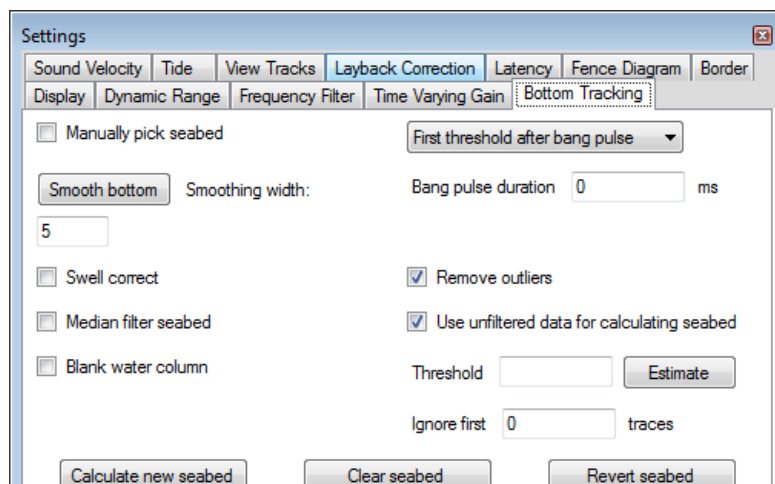
**IMPORTANT:** A good bottom track is essential to obtaining accurate isopach measurements.

### CALCULATING THE BOTTOM TRACK IN THE SUB-BOTTOM PROCESSOR

Use the following process to define the bottom track for each line *before* you begin digitizing sub-bottom layers.

1. **In the Display tab, check the Show Seabed option.**
2. **Open the Bottom Tracking tab.**

*FIGURE 18. Bottom Tracking Tab*



3. **Choose the basis on which you think the program will best find the seabed.**

4. **Enter the Bang Pulse Duration.** Typically, the bang pulse is 0-4 ms. In this case, 5ms should work well.
5. **Enter the Threshold.** Click [Estimate] to let the program calculate the Threshold. This is a good starting point, but you can experiment with other values if you choose.
6. **Apply Swell Correct. (Optional)** Swell Correct removes the effects of heave, flattening the upper surface of the seismic data; the underlying data is adjusted accordingly. This generally enhances the seismic reflectors, so it is recommended before picking the seismic reflectors.
7. **Click [Calculate New Seabed].** Blue pixels overlay the acoustic profile where the program has found the bottom.
  - **[Clear Seabed]** removes the current seabed definition.
  - **[Revert Seabed]** applies the previous seabed definition.
8. **Experiment with different settings**—alternating between changing settings and calculating a new seabed—until you have the best results possible.
9. **Smooth the bottom track.**
10. **Manually digitize areas where the bottom is still unclear.** (Optional)



**Tip:** For best results, zoom in on your data to work with a detailed rendering of your data.

For each segment do the following:

- a. **Check the Manually Pick Seabed option.**
- b. **Use your cursor to click two or more points on the acoustic profile where the bottom track should be defined.** At the end of the re-digitized line segment, make the final pick as accurately as possible on the “good” line segment.

---

**NOTE:** Your digitized points replace the calculated bottom tracking, so make the new picks in sufficient detail.

---

- c. **Clear the Manually Pick Seabed option** to accept your work.

---

**NOTE:** If the results are unsatisfactory, just manually digitize the same segment again. The program will update to the newest point set.

---

## ***BOTTOM TRACK TOOLS AND OPTIONS IN THE SUB-BOTTOM PROCESSOR***

To automatically find the seabed, the SUB-BOTTOM PROCESSOR analyzes the full length of the first acoustic return and draws the bottom track in blue based on the options in the Bottom Tracking tab. Experiment with different settings to find the combination that generates the best presentation in the acoustic profile.

---

**IMPORTANT:** Display the entire SEG-Y file in the profile window to see if there are any areas that require correcting. (In the Display tab, check **Zoom To Fit Width** to view entire line.)

---

**Manually Pick Seabed** enables you to use the cursor to digitize the seabed bottom or segments of it. (Seabed Picking Mode replaces the reflectors in the toolbar.) Typically, you would use this tool to fill small gaps in the bottom defined using the automated settings.

**[Smooth Bottom]** rounds jagged contours based on the adjacent bottom track points. The **smoothing width** sets the number of points considered on each side of each point.

---

**NOTE:** Smoothing removes manually digitized points.

---

**Swell Correct** removes the effects of heave, flattening the upper surface of the seismic data; the underlying data is adjusted accordingly. This generally enhances the seismic reflectors, so it is recommended before picking the seismic reflectors.

If the **Show Swell Correction** option is selected on the Display tab, this option displays the result as a thick, green line in the acoustic profile.

**Median Filter Seabed** calculates the median of the points it initially defines.

**Basis for Determining the Seabed:** The program ignores any data in the Bang Pulse Duration and looks for the next prominent feature:

- **Find First Peak:** The first prominent increase in return strength.
- **First Threshold after Bang:** (recommended) The first time at which it reaches the user-defined **Threshold** strength after the Bang Pulse duration.
- **Horizontal Gradient:** The most sudden change of strength.



**Bang Pulse Duration:** Time (msec) from the trigger until the sound source stops ringing.

**Remove Outliers** (recommended) ignores scattered data in the water column.

**Use Unfiltered Data for Calculating Seabed** (recommended) calculates the seabed without excluding the data from the frequency filters.

**Threshold:** The strength of return required by the First Threshold after Bang option. Click **[Estimate]** to get an initial value.

**Ignore First Traces** skips a user-defined number of acoustic returns at the start of each line before it analyzes one to find the seabed. Use this to eliminate noisy data caused by logging before the system has stabilized on the new line.

**[Calculate New Seabed]:** Click to apply current bottom tracking settings.

**[Clear Seabed]:** Removes the current seabed calculation.

**[Revert Seabed]:** Restores settings and data to its original form on loading.

## DIGITIZING LAYERS IN THE SUB-BOTTOM PROCESSOR

Once you have a clear bottom track defined, you are ready to digitize your sub-bottom layers.

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**NOTE:** The start of line is on the right.

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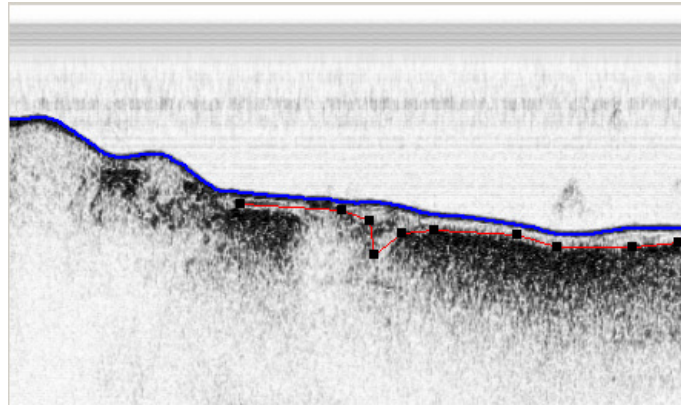
**For each layer do the following:**

1. **In the toolbar, select the layer number you want to digitize** from the reflector drop-down list.
2. **Clear the Target Editing Mode option** in the Display tab, if necessary.
3. **Use your cursor to click a series of points that define the selected layer.**
  - **To indicate a break in the layer**, define an End Node on the left side of the break: right-click the node and select Toggle End Node. (End Nodes have transparent centers.) The program then maintains a break between the End Node and the next node to its right.
  - **To insert a reflector in any defined segment**, just click at the required position. The program will automatically update the segment according to its horizontal position.

- **To delete a reflector**, hold the Shift key and click the reflector.

**FIGURE 19.** *Portion of Digitized Sub-bottom Layer 1*

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## TARGETS IN THE SUB-BOTTOM PROCESSOR

As you view your data in the SUB-BOTTOM PROCESSOR, you can mark targets at points of interest. These targets are annotated in the SUB-BOTTOM PROCESSOR and may be displayed in other HYPACK® SUB-BOTTOM modules that support targets.

Targets marked in the SUB-BOTTOM PROCESSOR are depth of burial targets, which record the isopach depth. When you close the SUB-BOTTOM PROCESSOR, each target is named with its timestamp and stored in an SBP target group in the project. Each target record automatically includes the X, Y and Z coordinates at the target position, the Depth of Burial, and the time and date of the data collection at that point (Date Acquired) as well as the time and date you marked the target (Date Modified).

### **DISPLAYING TARGETS IN THE SUB-BOTTOM PROCESSOR**

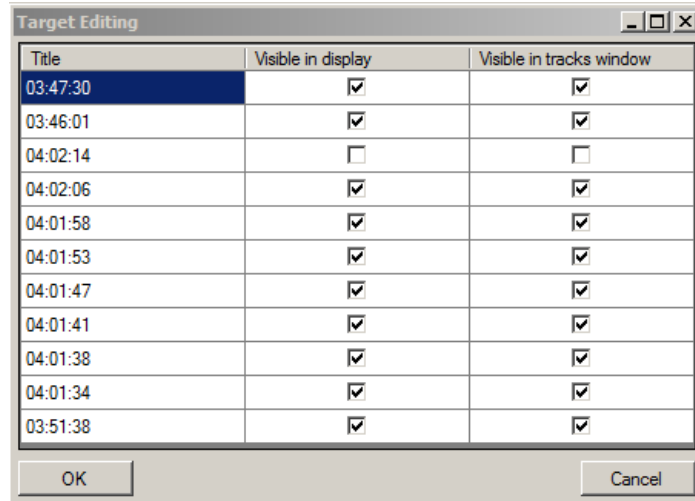
The Target Visibility dialog controls which targets from the SBP target group appear in the sub-bottom profile display and, configured separately, in the View Tracks window.

In addition, the **Show Targets** option in View Tracks tab of the Settings dialog toggles the display of all targets in the group on and off. When you use this option, the column for the tracks window updates accordingly.

These settings do *not* affect the targets displayed in the HYPACK® SUB-BOTTOM area map.

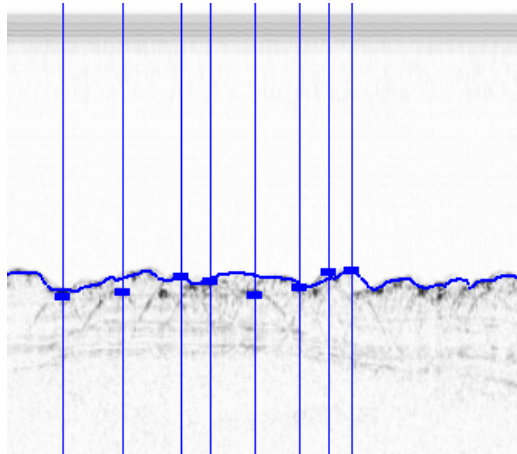
1. **Select REFLECTORS AND TARGETS-TARGET VISIBILITY.**  
A dialog will appear with each target listed and two columns of checkboxes: one for each window.

*FIGURE 20. Target Visibility Dialog*



2. In each column, check the boxes for the targets you want to display in the corresponding window.
3. Click [OK].

*FIGURE 21. Sample Targets in the SUB-BOTTOM PROCESSOR*



## **MARKING TARGETS IN THE SUB-BOTTOM PROCESSOR**

1. In the Display tab, check the Target Editing Mode option. "Target Editing Mode" replaces the reflector options in the toolbar.

2. **Use your cursor in the acoustic profile to mark targets** at points of interest on any isopach. There are two methods:
  - **To mark multiple targets**, select Target Editing Mode in the Display tab of the Settings dialog, then click at each target location in the data profile. When you have finished, deselect the Target Editing Mode option.
  - **To mark a single target**, right-click at the location and select Add Target.
3. **When you are finished marking targets, clear the Target Editing Mode option.**



**Tip:** Alternatively, in digitizing mode, right-click at the location on the isopach you want to mark and select Add Target.

## REMOVING TARGETS IN THE SUB-BOTTOM PROCESSOR

The SUB-BOTTOM PROCESSOR provides options to remove one or more targets. Alternatively, you can use the tools in the TARGET EDITOR.

- **To delete a single target:**
  - a. **Check the Target Editing Mode** option in the Display tab.
  - b. **Hold the Shift key and click on the target.**
- **To delete all of the targets on the current line** select REFLECTORS AND TARGETS-DELETE ALL TARGETS-FOR THIS SEG-Y FILE.
- **To delete all of the targets in the project**, select REFLECTORS AND TARGETS-DELETE ALL TARGETS-FOR ALL SEG-Y FILES IN THE PROJECT.

### More Information

- [“Deleting Targets in the TARGET EDITOR”](#) on page 2-123
- [“Targets in HYPACK® SUB-BOTTOM”](#) on page 2-111
- [“Targets in SURVEY”](#) on page 3-42

## EXPORTING YOUR DIGITIZED DEPTHS

The ultimate goal of the SUB-BOTTOM PROCESSOR is to generate sounding data files representing the sub-bottom data. Once you have defined the bottom track and digitized your reflector layers, you are ready to generate the sounding files. This is actually a two-step process:

1. **Enter corrections information.** The SUB-BOTTOM PROCESSOR only draws data in the SEG-Y file. Even though

you may have recorded tide, sound velocity to the RAW data files during acquisition, the SUB-BOTTOM PROCESSOR does not read those files. In addition, you can correct any layback and latency errors.

---

**IMPORTANT:** To output corrected sounding data from your bottom track and reflectors, you must enter the correction information in the SUB-BOTTOM PROCESSOR before you export sounding files.

---

2. **Export your sounding data.** SUB-BOTTOM PROCESSOR provides several options in various combinations: All (\*.EDT) or XYZ format; current line or all lines; and seabed, reflectors or both.

*Beware!*

**BEWARE!** Once you have exported a particular line/layer/format combination, *subsequent export operations will overwrite the existing files of the same combination.*

- **EXPORT EDT** options convert your digitized layers to All format files, one for each layer, and stores them in the project Edit folder. Each file is named with the format *LineName.LayerName.edt* (e.g. 003\_1146.seabed.edt or 003\_1146.reflector4.edt).  
Additionally, it generates catalog files for each exported layer. Each LOG file is named with the layer it represents (e.g. seabed.log, or reflector4.log).
- **EXPORT XYZ** options stores the digitized points to XYZ format files, one for each layer, in the project Sort folder. You can choose to export depth, isopach or both as the Z-value. Each file is named with the format *LineName.reflectorR.xyz* where *R* indicates the layer number. For XYZ output, you may output X, Y, Depth; X, Y, Isopach; or X, Y, Depth, Isopach.

---

**NOTE:** Though you can choose one or more values to be stored as the Z value, the output file names for each option are the same. This means if you want to generate separate sets of files (for example, a set of X, Y, Depth files, and a set of X, Y, isopach files), you must generate the first set then save them somewhere other than the project Sort folder before you generate the second set.

---

With each XYZ output file, the program also generates a REF file with the same root name (e.g.

001\_1125.reflector1.xyzref). This text file provides information about the soundings in the file:

**TABLE 1.** *Sample REF File*

```
Sound speed in water: 1500  
Sound speed in sediment: 1600  
Output values: Depth and Isopach  
UTM Zone: Zone 50  
No layback correction  
No tide data applied
```

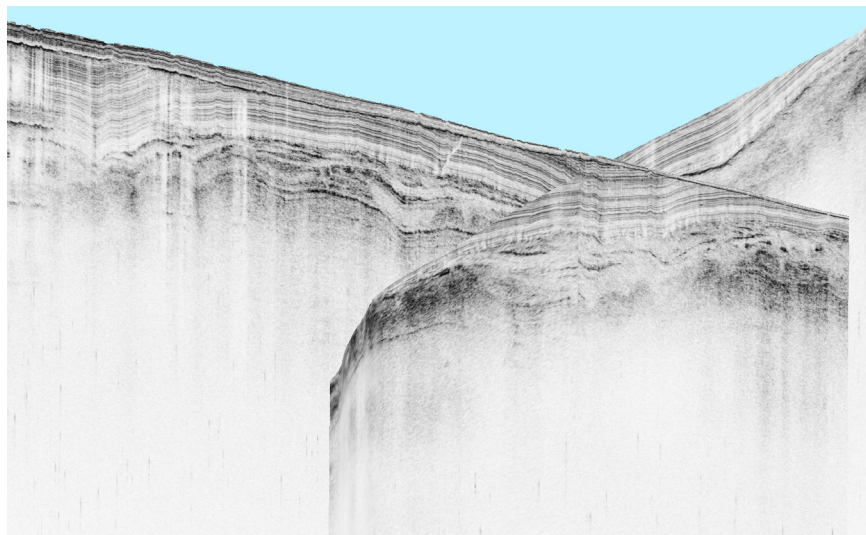
## FENCE DIAGRAMS

The sub-bottom fence diagram shows one or more profiles together in a 3-dimensional, interactive display. The options in the Settings dialog enable you to customize your display.

### **GENERATING THE FENCE DIAGRAM**

1. **Select FILE-EXPORT FENCE and choose the current line or all lines.**
2. **In the Fence tab, check Show Fence Diagram.**

**FIGURE 22.** *Sample Fence Display—Layers Match on Intersecting Lines*

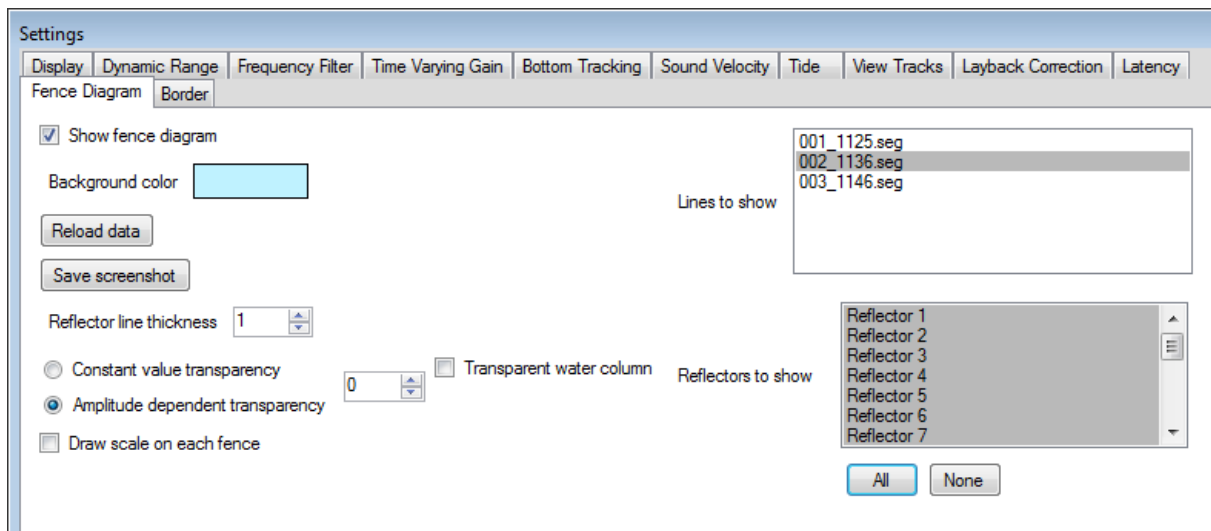


### **FENCE DISPLAY OPTIONS IN THE SUB-BOTTOM PROCESSOR**

Many of the SUB-BOTTOM PROCESSOR options are common to both the sub-bottom profile and the fence diagram.

The options in the Fences Diagram tab of the Settings affect only the Fence Diagram:

**FIGURE 23.** Settings Dialog—Fences Diagram Tab



- **Show Fence diagram** displays the Fence Diagram window. It draws the diagrams for all lines currently loaded in the SUB-BOTTOM PROCESSOR and any other lines in the project for which you have already drawn fence diagrams.
- **Lines to Show** and **Reflectors to Show**: Select the lines and reflectors to include in your Fences Diagram window.
 

**Tip: To multiselect files**, hold the Ctrl key and select multiple individual records or hold the Shift key and click on the first and last records in a range of consecutive records.
- **Background Color**: The colored square shows the current background color in the Fences Diagram window. To assign an alternate color, click in the color square and select a new color from the color selection dialog.
- **Reflector Line Thickness** Enter a value 1-10 to control the line weight for the reflectors.
- **Constant Value Transparency**
- **Amplitude Dependent Transparency**
- **Draw Scale on Each Fence** provides vertical and horizontal reference in survey units.
- **[Reload Data]** updates the display for changed options.
- **[Save Screenshot]** generates an image file of the window display in your project folder. A File Save dialog appears with the default image name capturing the date and time—"Fence Diagram Screenshot yyyyymmdd hhmms.png"— but you may provide an alternate name if you wish, then click [Save].



When you export a screenshot, the program also stores a text file with the same root name that includes line coordinates that describe the extent of the image, and the sweep length.

FIGURE 24. Sample Screenshot Information File

```
Start: 386660.540, 6457348.810  
End: 386546.710, 6458406.190  
Sweep length: 38.300 meters
```

Hold the shift key and use your cursor in the display to pan and rotate the display.

## STORING SCREEN SHOTS FROM THE SUB-BOTTOM PROCESSOR

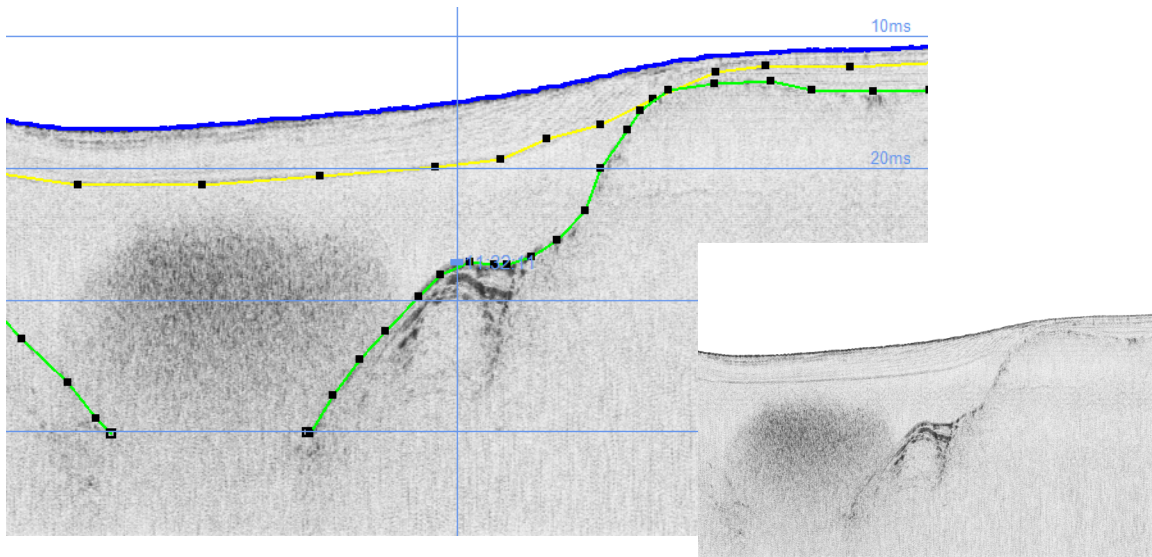
### Acoustic Profile Images

The View menu provides multiple options to quickly and easily store an image of the current acoustic profile or Fence Diagram.

In each case, select the menu item, name your file and click [Save]. You can save the image in PNG, JPG or BMP format.

- **SAVE SCREENSHOT** captures the current display including the seabed, any isopach layers, annotations and targets.
- **SAVE SCREENSHOT (NO INTERPRETATION)** captures the current display but omits the seabed, any isopach layers, annotations and targets.

FIGURE 25. Annotated Screenshot (left), No Interpretation (right)





*Fence Diagram  
Images*

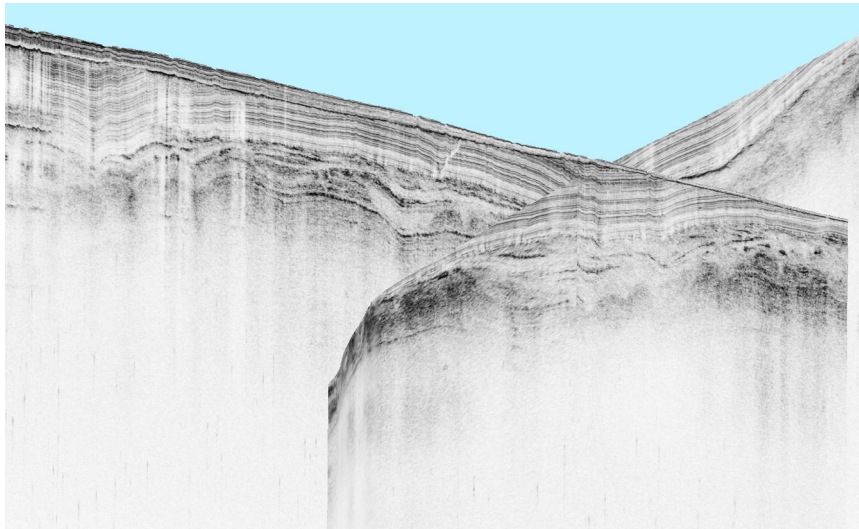
- **FULL LINE SCREENSHOT** captures the complete length of the profile including the seabed, any isopach layers, annotations and targets.
- **FULL LINE SCREENSHOT (NO INTERPRETATION)** captures the complete length of the profile, but omits the seabed, any isopach layers, annotations and targets.

In the Fences Diagram tab of the Settings dialog, **[Save Screenshot]** generates an image file of the window display in your project folder. A File Save dialog appears with the default image name capturing the date and time—"Fence Diagram Screenshot yyyyymmdd hhmmss.png"—but you may provide an alternate name if you wish, then click [Save].

*FIGURE 26. Sample Screenshot Information File*

```
Start: 386660.540, 6457348.810
End: 386546.710, 6458406.190
Sweep length: 38.300 meters
```

*FIGURE 27. Fence Screenshot of Intersecting Lines*



## SAVING PROJECT CONFIGURATIONS IN THE SUB-BOTTOM PROCESSOR

A configuration file in the SUB-BOTTOM PROCESSOR records all of the information necessary to restore your current settings and stores them, by default to the SBP.config file in your project folder.



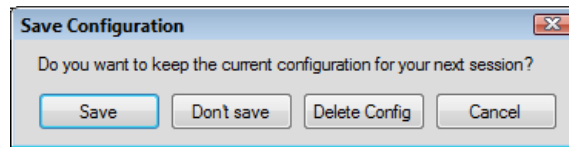
**Tip:** If you use more than one type of equipment (eg a boomer and a pinger), you can store a configuration file for each type. This

enables you to quickly and easily load the settings in the control panel for whichever type of data you are processing.

**To save the configuration at any time**, select FILE-SAVE CONFIGURATION and name your file.

**When you exit the SUB-BOTTOM PROCESSOR**, it asks if you want to save the configuration file.

*FIGURE 28. Saving the Configuration File on Exit*



- **[Save]** automatically saves the settings to the default SBP.config file in your project folder.
- **[Don't Save]** retains all configuration files as they were when you entered the program.
- **[Delete Config]** deletes the current configuration file. When you return to the SUB-BOTTOM PROCESSOR, the Settings dialog begins with all default settings.
- **[Cancel]** returns you to the SUB-BOTTOM PROCESSOR.

---

## **SORT PROGRAM**

In HYPACK® SUB-BOTTOM, the SORT program reads individual or catalogs of All format files, or XYZ format files, and saves the final results to an ASCII XYZ file. You may sort based only on horizontal positioning (2D sort) for cartographic selection, or based on both horizontal and vertical (3D sort) for 3-dimensional data displays.

HYPACK® SUB-BOTTOM includes two versions of SORT: 32-bit and 64-bit. Select PROCESSING-SOUNDING SELECTION-SORT. HYPACK® SUB-BOTTOM automatically runs the version according to your Windows® operating system.

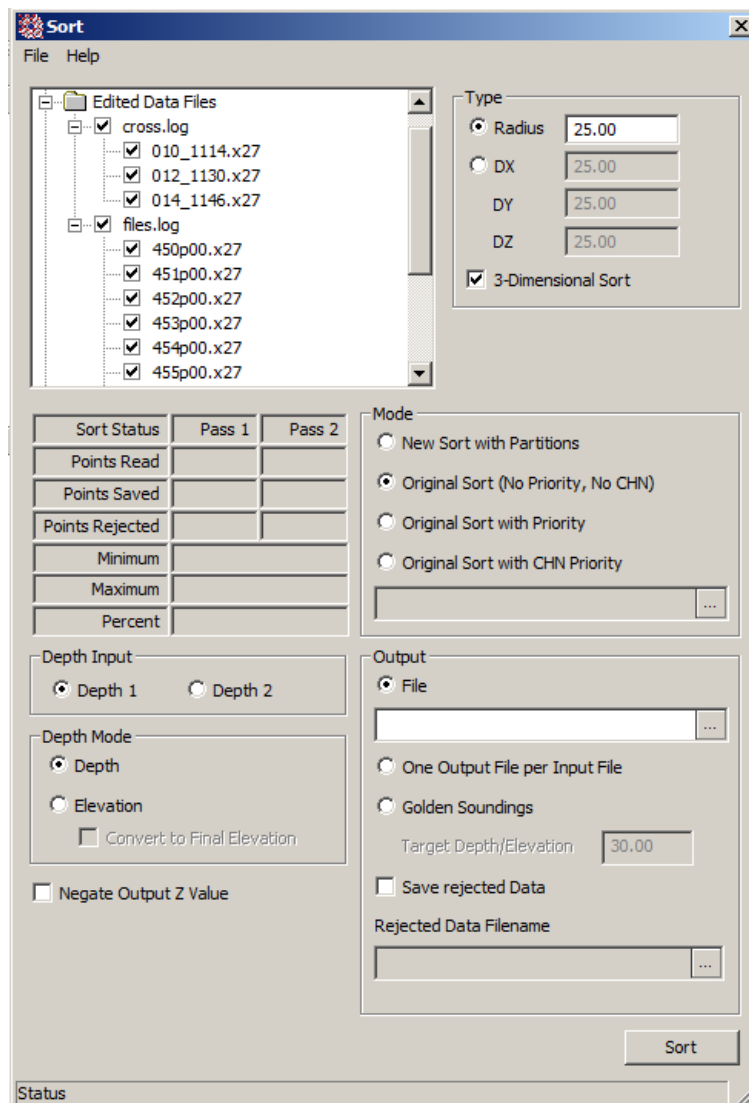
*TABLE 1. Advantages and Disadvantages of Sort*

<b>Advantages to SORT</b>	<ul style="list-style-type: none"><li>• It guarantees the minimum soundings will be placed on the smooth sheet at their proper locations.</li></ul>
<b>Disadvantages to SORT</b>	<ul style="list-style-type: none"><li>• It does not place soundings as an eye-pleasing constant interval.</li></ul>

## **RUNNING THE SORT PROGRAM**

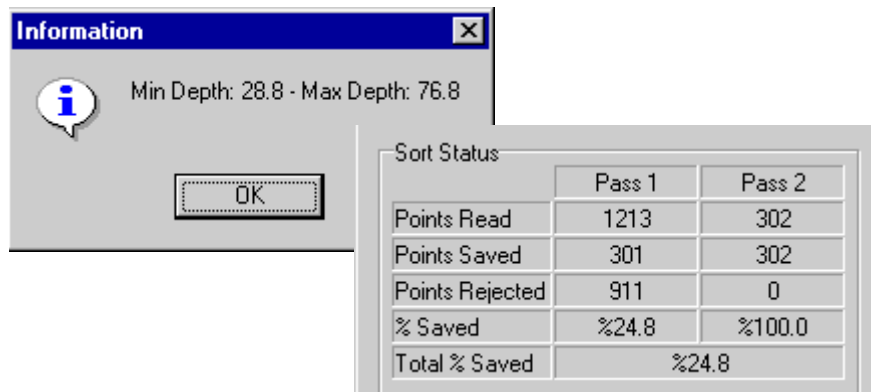
1. **Start the SORT program** by selecting PROCESSING-SOUNDING SELECTION-SORT from the menu bar.

FIGURE 1. The Main Window of SORT

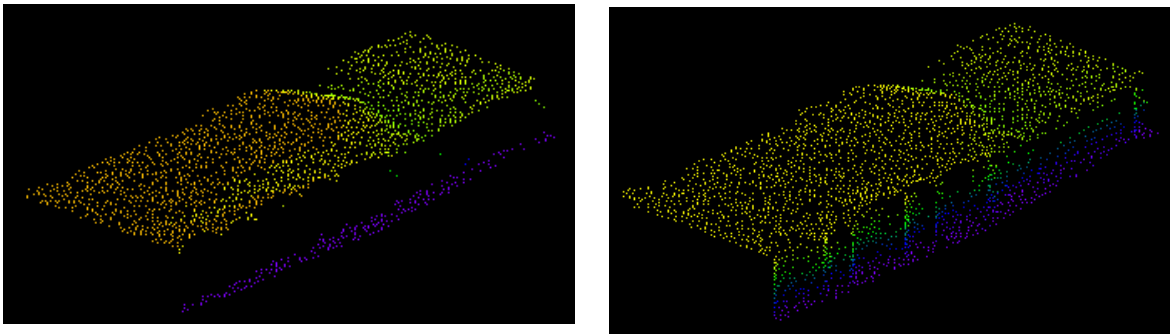


2. **Enter specifications for the sort process.**
3. **Begin the sort process** by clicking [Sort]. Upon completion, it shows the Minimum and Maximum Depths encountered during the sorting process and statistics about the sorting of your data.

**FIGURE 2. Statistics of the Sort**



**FIGURE 3. Results of a 2D Sort (left) vs 3D Sort (right)**



## SORT OPTIONS

- **Input File:** SORT supports any of the following file types:
  - **All format:** You can load one or more All format individual data files, or a Catalog File (\*.LOG) of All format data.
  - **XYZ**

All data files are listed in the Data Files display. Those that are enabled in the list will be included in the sort.

**To toggle the enable status for each file**, right-click on it then select or deselect the enable option.
- **Choose to sort in two or three dimensions.** Select the **3-Dimensional Sort** option to sort in three dimensions. Clear the same checkbox for a 2-dimensional sort.
- **Sort Mode:**
  - **New Sort with Partitions** divides the data set and sorts each portion individually. In each partition, it looks for the minimum sounding in two or three dimensions according to the options you set in the dialog. It saves this sounding to a temporary file and eliminates any data point that is within a user-specified distance. It then repeats the process until all

points in the file have been saved to the temporary file or eliminated. When all data is sorted, the program merges the results

**Advantage:** Fewer points are loaded into memory at once so it's better for large data sets and for sharing resources with other processes running on the computer.

**Disadvantage:** It has to parse the input data for each partition.

- **Original Sort (No Priority, No CHN)** sorts the data by input file then sorts the results again to get the overlapping data.

**Disadvantage:** If the input data file is very big, the program becomes increasingly slower as it uses more system resources and has more data to process.

- **Original Sort with Priority** allows you to give selected files priority over others in the context of the Original SORT routine. The files that have priority are sorted first. Then, when compared to other non-priority data, priority data is kept regardless of the comparison result.

**To mark data files with priority** right-click on them and select Priority from the right-click menu. Priority files will be red in the Data Files list.

- **Original SORT with CHN Priority** assigns priority to the soundings that fall within the boundaries of any flat surfaces in a specified Advanced Channel file (\*.CHN).

**To enter the CHN file** for comparison, click the corresponding [...] and browse for the correct channel file.

**Tip:** If you need priority, for larger files and data sets, use partitions. For smaller data sets, the original SORT algorithm will probably be a little better.

- **Radius or X,Y distances** are the basis for the SORT program to eliminate conflicting data points. Select the sort type and specify the Protection Values.

- In a **Radius** type sort, the program eliminates any other data record that is within the radial distance in any direction, of the accepted point. This 3-dimensional sort method is particularly useful where your data set has steep slopes.

- In the **XY** type sort, it eliminates any point that is closer in Easting than the DX distance or closer in Northing than the DY distance. This 2-dimensional sort method will eliminate more soundings on steep slopes, which may cause you to lose some definition in your terrain.

**Tip:** Normally, Radius is preferred. DX-DY is preferable if you have long numbers, such as magnetometer data where you want to protect a larger direction in one axis than the other.



- The **Depth Input** can either be Hi Frequency (Depth 1) or Low Frequency (Depth 2).
- **Depth Mode:** Enter whether you are in depth or elevation mode. This assures that Sort will always output the minimum depths. In elevation mode, Convert to Final Elevation may be selected to record the Chart Datum Level minus Final Depth
- **Sorted File Name:** Click the [...] and enter a name for the output file. The SORT program will write an ASCII XYZ output file to the Sort folder.
- **One Output File per Input File:** SORT generates one XYZ output file for each input named *InputFileName\_Mode\_TypeSize*. *Mode* reflects the selected sort mode: New, Old, Priority, or CHN. *TypeSize* represents the integer value of the radius or the DX value.
- **Golden Soundings:** SORT generates golden soundings for all soundings shoaler than the user-defined **Target Depth/Elevation**.
- **Rejected Data File:** In addition to the sorted file, you can also save the “rejected” soundings to a second “\*.XYZ” file. This is useful where you want to have the final sorted soundings in one CAD layer and the surrounding soundings (rejected data) on a second layer.





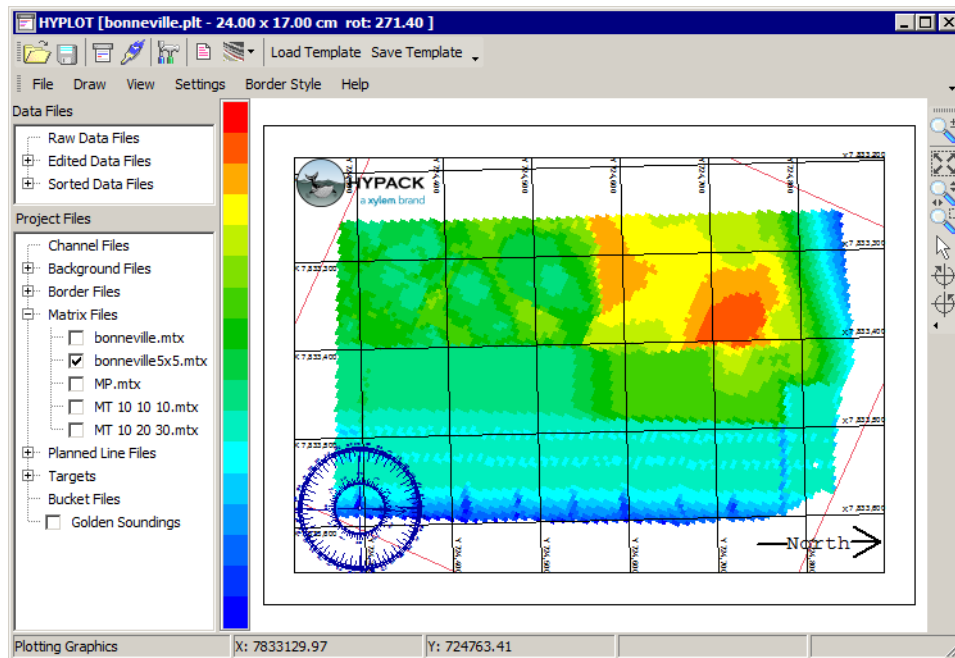
HYPACK® SUB-BOTTOM includes two final product programs: HYPLOT and EXPORT.

- HYPLOT defines the features to be plotted and sends the information to the plotter.
- EXPORT converts HYPACK® SUB-BOTTOM data files to other formats, primarily digitized chart files.

## HYPLOT

HYPLOT defines the features to be plotted and sends the information to the plotter.

FIGURE 1. HYPLOT Interface



The HYPLOT interface is much like the HYPACK® SUB-BOTTOM window. HYPLOT automatically loads all of the files that are loaded to the project and draws all that are enabled in the HYPACK® SUB-BOTTOM area map and are located within the area defined by your plotting sheet file. From there, you can draw and erase them from the screen, and define display settings in much the same manner as you do in HYPACK® SUB-BOTTOM.

Items that may be included in your plotting sheet, but have no fixed position, such as the North Arrow, imported text and graphics, are initially positioned in your plotting sheet using the appropriate settings dialog. You can easily relocate them by dragging them with your cursor in the HYPLOT display (or by entering coordinates in the control panel). The status bar displays the current cursor position with the current zoom scale relative to the plotting sheet size.

The finished results can be plotted on any Windows® driven plotter or printer.

#### More Information

- [“Creating Plotting Sheets in the Plotting Sheet Editor”](#) on page 4-67

## RUNNING HYPLOT

The procedure is very simple:

1. **Verify that you have created an appropriate plotting sheet file (\*.PLT) for your desired output.** These files are created in the PLOTTING SHEET EDITOR and define the area to be plotted, the size of your Plotting Sheet and the scale and rotation of your sheet.
2. **Start the HYPLOT program** by selecting FINAL PRODUCTS-HYPLOT.
3. **Load the Plotting Sheet File.**
  - **If you have no PLT file in your project,** HYPLOT will ask you to create one and close.
  - **If you have only one in your project,** it will be automatically loaded.
  - **If you have more than one PLT,** the program will ask which you want to use.

The HYPLOT screen will appear displaying all of the enabled files in your project.



**Tip:** Use alternative drag-and-drop loading: drag a plotting sheet file (\*.PLT) from the Project Files list to the HYPLOT icon on the tool bar.

4. **Draw all the files you want to plot in the Plot Design window.**

- **Enable the files you want to plot** by right-clicking on the file name in the lists at the left and selecting Enable.

When **single beam raw** or **All format files** are enabled in a project, you can choose to draw the soundings, track lines or both.

For **binary data** files (HSX, HS2, HS2X), you can draw only track lines.

**To make your choice**, right-click on the data folder and select 'Enable Soundings' or 'Enable Track lines' (or both).

---

**NOTE:** Track lines can not be displayed for XYZ files as there is no track line information available in this format.

---

- **Remove any files you do not wish to plot** by right-clicking on the file name in the lists at the left and clearing the Enable option.



**Tip:** To disable all project or data files of a selected type, select the folder in the Files list then select DRAW-DISABLE FILES from the menu.

5. **Define your display settings.** Each type of file has a corresponding tab in the Control Panel where you can choose how they will be displayed.
6. **Save your settings.** (Optional) Click [Save Template] and name your file. All of the settings are saved, by default to a\*.HYT file in the \\HYPACK Sub-bottom\Templates folder and can be reloaded at a later time by clicking [Load Template] and selecting the HYT file.
7. **Choose your plotting method.** Select FILE-PRINT and select to plot a composite of raster and vector drawings or plot pure vector data directly. When you click [OK], the Windows® Page Setup dialog automatically appears.
8. **Enter your Page Setup information.** (This can also be accessed by selecting FILE-PAGE SETUP. )
9. **Export your plot.** Typically, you send it to the printer or plotter by selecting FILE-PLOT and selecting your printer or plotter settings and clicking [OK]. You may also generate DXF charts or georeferenced PDF and TIF files.

## SETTING DISPLAY OPTIONS IN HYPLOT

### Menus and Toolbars

The **Draw and View menus**, as well as the **Icon Bar** (top) and **Screen Control Bar** (right) of HYPLOT provide many of the standard display controls:

- Designate the display of certain features in the plot itself
- Adjust the HYPLOT screen view
- Save and print your plotting sheet

### Control Panel

The **Control Panel** (F9) defines your plotting settings for each type of file. Select a feature from the tree view of categories on the left and the related display options will be available for viewing and modification on the right. At any time, you can set the current settings, for all feature types, as your default by clicking **[Save as Default]**. If you then make changes and want to reload the default settings, you can easily return to those settings by clicking **[Restore Default]**.

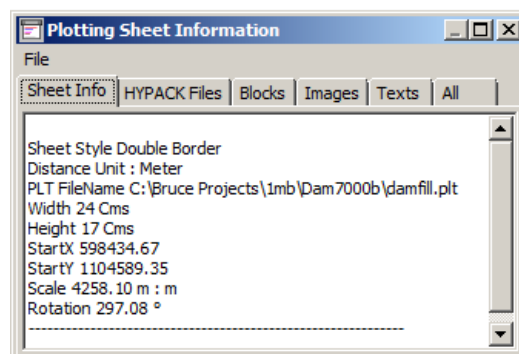


**TIP:** Don't be too worried about exactly positioning features such as added text, title blocks, the north arrow, etc. You can use the cursor to drag them to the exact position with your cursor in the HYPLOT display.

The **Plotting Sheet Information** icon accesses a tabbed report form which displays the Control Panel settings in textual form. Each tab displays information on a particular type of input to your plotting sheet. You can print the content of each tab on your default printer or save it to a text file.

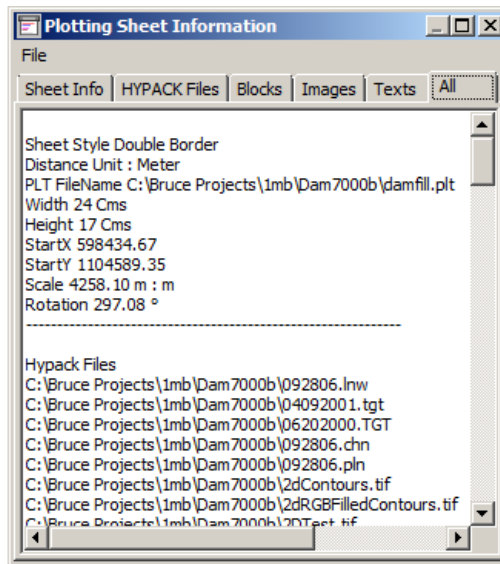


**FIGURE 2.** Plotting Sheet Information—Sheet Info Tab



The **All Tab** combines all the data from the other tabs into one, thus you can focus on only 1 feature or the entire sheet.

**FIGURE 3.** *Plotting Sheet Information—All Tab*



*Border Style  
Menu*

The **Border Style** drop-down menu enables easy border selection for your plot.

*Sounding Colors*

**Define Sounding Colors** by selecting SETTINGS-SOUNDING COLORS and using the standard Colors dialog.

*Screen Control  
Bar*

Adjust your screen display using the tool in the Screen Control bar:

- **Zoom In/Out:** When this option is selected, a left-click decreases the scale (zoom in) and a right-click increases the scale (zoom out).
- **Zoom Window:** Select this option and drag a rectangle in the window to define the extent of your desired view. The program redraws the screen to display the defined area optimally.
- **Zoom Extents:** Draws the display at a zoom scale that displays all enabled data.
- **Pan:** Select this option, then click in the window and drag the cursor to the position where that point should be displayed. As you drag, the program displays the distance and azimuth of the cursor motion. When you release the mouse button the display updates accordingly.
- **Default Cursor** changes the cursor back to the default arrow used for most general HYPACK® SUB-BOTTOM operations. The cursor position is displayed in the status bar.

**NOTE:** The Lat-Long grid is displayed in the Lat-Long of the local datum.

*Chart Display  
Order Dialog:*

- **Rotate Counter Clockwise** and **Rotate Clockwise** rotate the chart 5 degrees.

**Tip:** The HYPLOT interface supports both the Windows® Graphic Design Interface (DRAW-GDI) and the Open Graphics Library (DRAW-OpenGL). The default setting is OpenGL, which works very well with most graphic cards. In the rare case that your graphics card may render the image better using GDI, you can easily change the drawing method through the Draw menu.

#### More Information

- [“Project Colors in HYPACK® SUB-BOTTOM”](#) on page 1-32

### ***BORDER OPTIONS IN HYPLOT***

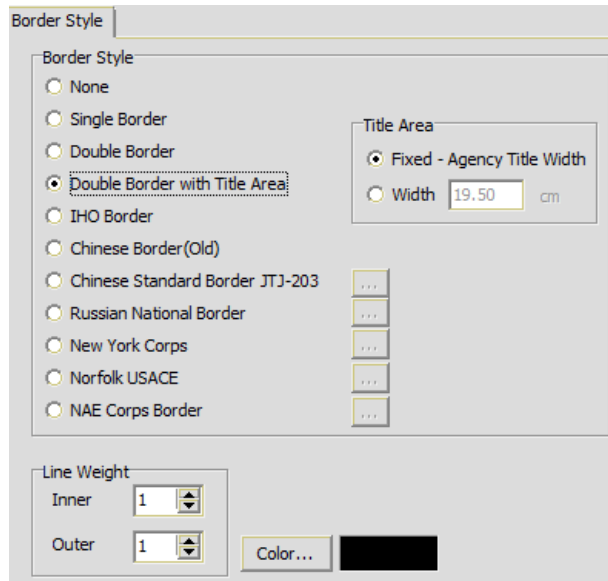
The Borders Tab in the Control Panel describes the border of your plot. Select the **Border Style** from the list. The **Line Weight** can be set for the generic styles by typing the number of pixels in the Inner and Outer fields. Set the color by clicking **[Color]** and selecting the one you want from the colors dialog.

If you select the "Double Line with Title Area" option, the Title Area options are enabled.

- **Fixed** sets the width of the title area to fit the Agency Title Block.
- **Width** creates a title area with user-defined width.

These options are not available for the IHO border style. The IHO border also requires the rotation of your plotting sheet to be 0 or divisible by 90 degrees.

**FIGURE 4.** Border Display Settings in HYPLOT



The custom border styles have additional display options which are accessed by clicking the corresponding button ( [...] ).

Both the Russian, Chinese and New York standard options define several labels that appear at pre-determined places outside the border.

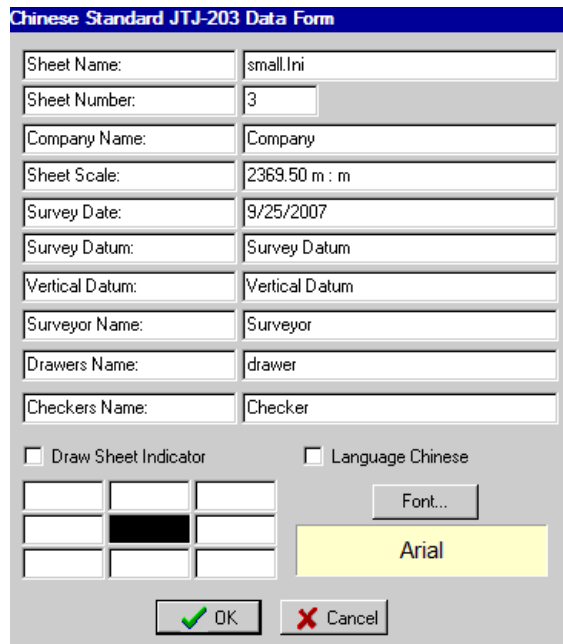
**CHINESE  
STANDARD  
BORDER OPTIONS**

The **Chinese Standard** includes a Sheet Indicator--a diagram where your current plot is in the center. The additional fields surrounding it represent additional plots of adjacent areas. This diagram can be included on your current plotting sheet to indicate the adjoining sheets.

**To plot the Sheet Indicator:**

1. **Click the [...] corresponding to the Chinese Standard border.**
2. **Check the Draw Sheet Indicator option.** The Chinese Standard Data Form will appear.

FIGURE 5. Chinese Standard Border Options

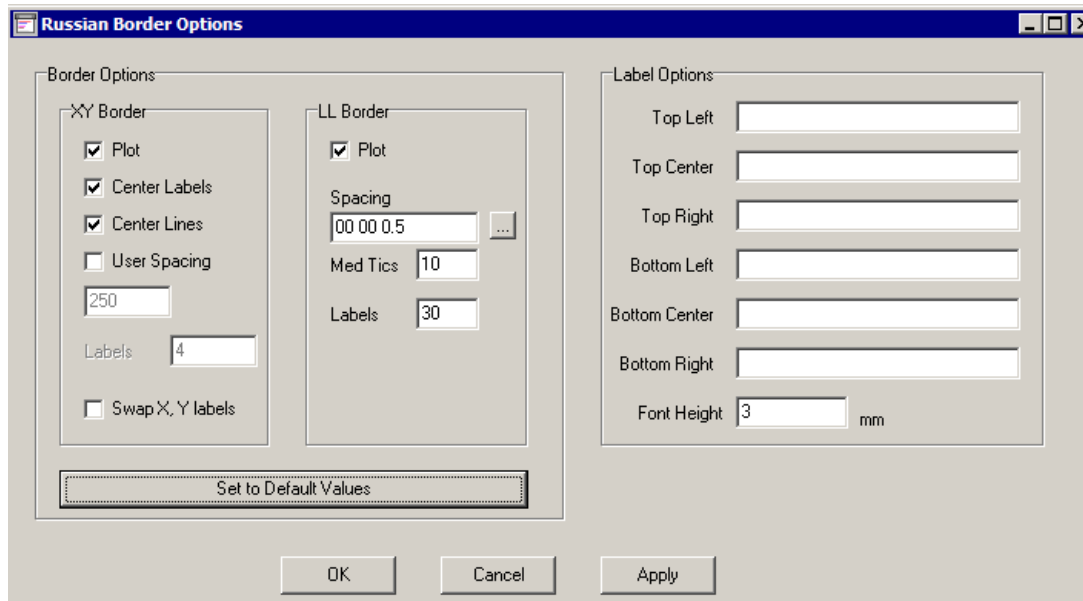


3. Enter the names of the adjoining charts in the fields surrounding the solid square and click [OK].

**RUSSIAN  
STANDARD  
BORDER OPTIONS**

The Russian border options provide some alternative grid labeling choices:

FIGURE 6. Russian Border Options



**XY Border**

- **Center Labels:** The center of each side is marked and labeled.



- **Center Lines:** Draws a line, perpendicular to the border, at each center label location.
- **User Spacing:** Intervals, in survey units, marked outside the inner border.
- **Swap X, Y Labels:** Sets X as the vertical axis and Y as the horizontal axis.
- **Labels:** Tic intervals where labels appear. For example, enter a 10 and every 10th tic will be larger and labeled.

**Lat/Lon. Border Options:**

- **Spacing:** Distance in degrees, of the ticks marking the outside of the border.
- **Medium Tics:** Intervals of these ticks can be marked with medium-sized marks for easy reading. For example, enter a 5 and every 5th tic will be larger.

**Labels:** Tic intervals where labels appear on large tics. For example, enter a 10 and every 10th tic will be larger and labeled.

**Label Options:** Define additional labels to be drawn just outside the border at 1 or more of the listed locations and at the user-defined font height.

**NEW YORK AND NORFOLK STANDARD BORDER OPTIONS**

The **New York, New England** and **Norfolk** USACE standards include a series of custom title blocks that fit side-by-side along the right side of your plot.

*FIGURE 7. New York and NAE Standard Border Options*

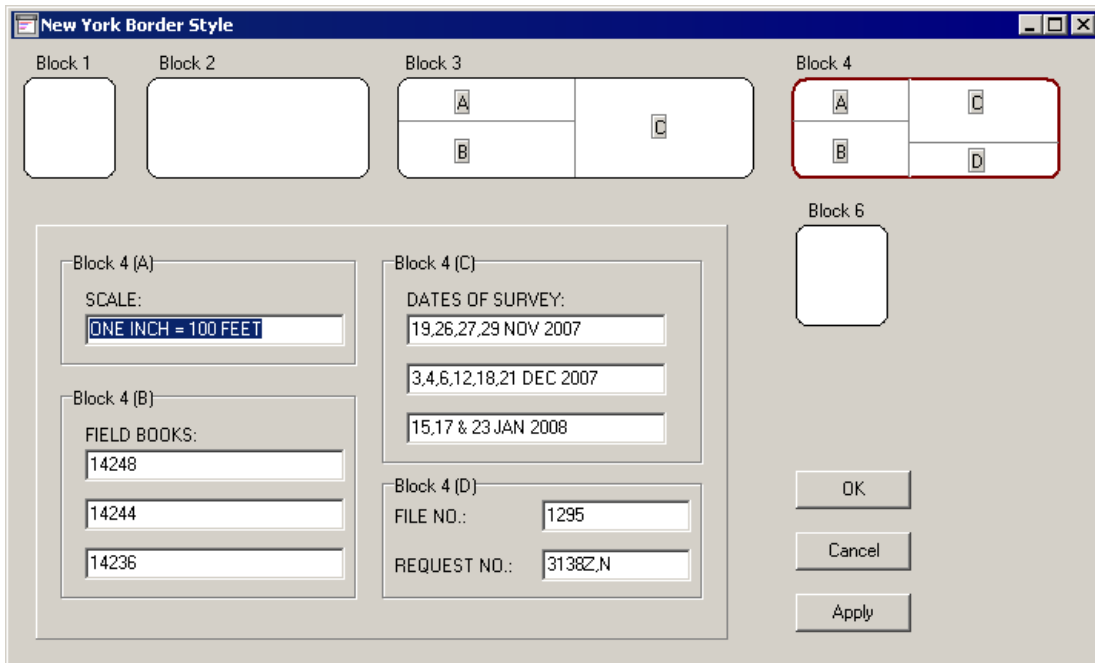
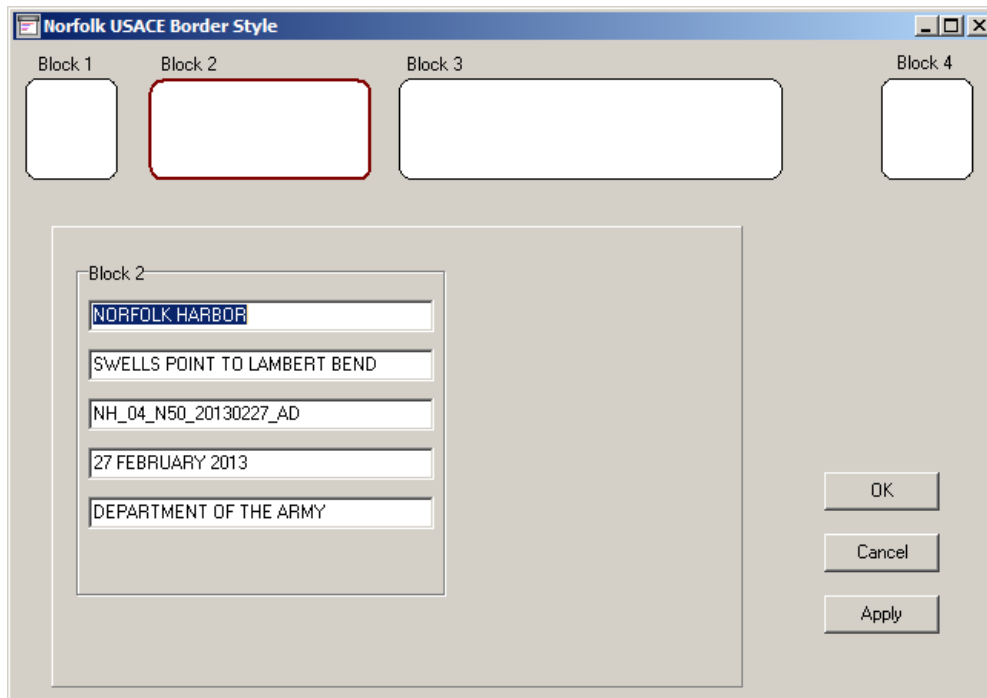


FIGURE 8. Norfolk Standard Border Options



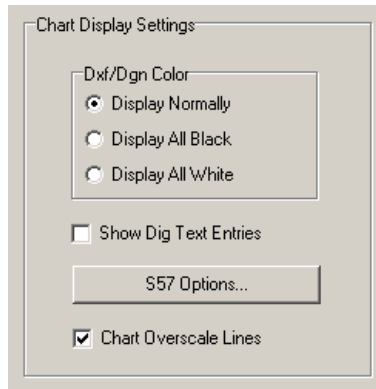
Each block is represented by a diagram in the dialog.

**To enter your content:**

1. **For each block, do the following:**
  - a. **Click the diagram of the block.** Its border will be highlighted and the data entry fields for the selected block will appear.
  - b. **Enter your project information** in the fields provided.
2. **When you have defined each block, click [OK].**

### **CHART OPTIONS IN HYPLOT**

The Charts Tab offers display options that pertain to DXF, DGN and DIG charts.

**FIGURE 9.** Chart Display Settings in HYPLOT

**DXF/DGN Color** options allow you to optimize its display against other background files.

- **Display Normal** draws the file using whatever colors are stored in the file. (It can't draw color contours unless it was created with color!)
- **Display All Black** and **Display All White** enable you to draw them in whichever color is best in your circumstance. If you have a dark TIF file, a white overlay would display best. If you have an S57 chart, a black DXF might be more appropriate.

**Show Dig Text Entries:** If you are plotting a DIG file, you can choose to include or exclude the object labels.

**Chart Overscale Lines:** Over scale Lines tell you that you are viewing the chart at a smaller scale than that in which it was created. An over scale chart will appear with diagonal, white-dotted lines.

**[S57 Options]** in the displays the ECDIS Display Options dialog.

FIGURE 10. S57 Options Dialog

**S57 Display Options**

General Display | Contour Planning

Symbols: Traditional Units: Meters

Boundaries: Symbolized Scheme: S52

Shallow Contour: 10.00

Safety Contour: 30.00 Safety Depth: 30.00

Deep Contour: 60.00

Options

- Scale Minimum
- Two Depth Shades
- Shallow Pattern
- Full Sector Lights
- Show Soundings
- Visual Quality of Data
- Information Boxes
- Load Chart Updates
- Seasonal / Time Period Filter
- HYPACK Sounding Display
- Isolated Danger in Shallow Water
- Hide Extra Contours

Text Display Groups

- 1 Important e.g. Bridge clearances
- 21 Names e.g. Buoys, Beacons & Daymarks
- 23 Light Description
- 24 Chart Notes e.g. INFORM or TXTDSC
- 25 Nature of Seabed
- 26 Geographic Names
- 27 Magnetic Variation or Swept Depth
- 28 Height of Land Feature
- 29 Berthing Number
- 31 Tidal Streams, National Language
- 50..69 Mariners Text
- 99 Field Notes

Apply OK Cancel

**Symbols:** Choose between Traditional and Simplified.

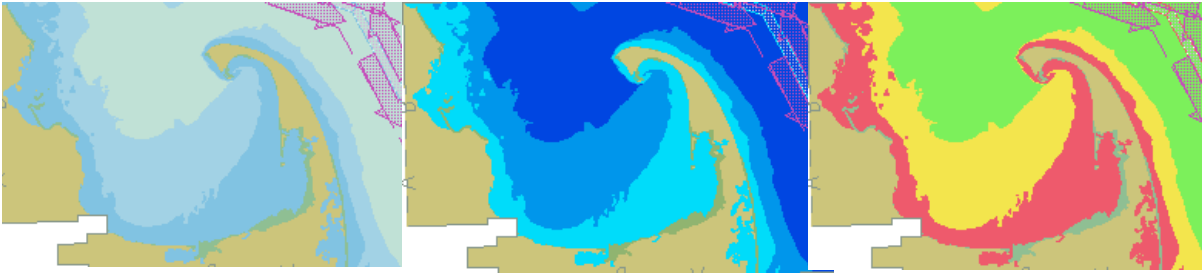
**Boundaries:** Choose to have them marked with symbols (Symbolized) or as plain lines (Plain).

**Units:** Displays depths in your choice of U.S. feet or meters.

**Scheme:**

- **S52:** The industry standard where the colors progress from darkest to lighter shades of blue as depths increase.
- **Bathy Blue:** The reverse of S52 where the deepest water is the darkest color.
- **Red Yellow Green:** Displays three categories of depth areas:
  - unsafe (red),
  - safe with caution (yellow)
  - safe (green)

**FIGURE 11.** S57 Color Schemes: S52 (left), Bathy Blue (center), Red Yellow Green (right)



**Safety Depth** displays depth labels in different colors above and below this depth.

**Safety Contour, Shallow Contour** and **Deep Contour** define different depth ranges which will be displayed with backgrounds of different shades of blue.

---

**NOTE:** This option is overridden by the Two Depth Shades option.

---

**Scale Minimum** displays different map features and symbols at varying zoom scales according to S57 standards. This option prevents your Map window from becoming overly cluttered. If this option is clear, everything will be displayed regardless of the zoom scale.

**Two Depth Shades** uses only two shades to display depths greater than and less than the Safety Contour.

**Shallow Pattern** draws a pattern in the areas of the map where the depth is shoaler than the safety contour.

**Full Sector Lights** includes data regarding direction and color of lights. If this is off, you will see only the position of the light source.

**Show Soundings** toggles the display of chart soundings.

**Visual Quality of Data:** S57 charts include markings that indicate whether the chart has been tested for accuracy and, if so, how accurate it is. Check this option to clear this 'clutter' from your display.

**Draw Information Boxes:** Draws S57 markers at all points of interest. Clearing this option will provide a less cluttered display.

**Load Chart Updates:** When you load a base chart (typically \*.000) and there are update charts (typically \*.001, \*.002...) in the same folder, checking this option loads all related chart information to provide the most updated display.

**Seasonal/Time Period Filter:** Object attributes may specify time ranges when they would be most applicable to display. Check this

option to display only objects whose attributes match the current time.

**HYPACK® SUB-BOTTOM Soundings Display:** When 'Show Soundings' is checked, this option toggles between ECDIS display and HYPACK® SUB-BOTTOM display options.

**Isolated Danger in Shallow Water** assures that those features coded as isolated dangers are always displayed.

**Hide Extra Contours:** Omits any contour that is above the deep contour or below the shallow contour. They are valid contours, but do not contribute to the safe navigation of your vessel.

**Text Display Groups:** Charts can get cluttered with excessive text. Select only those text features you want to see in your chart display.

## GRID OPTIONS IN HYPLOT

The Grid Tabs define the format for labeling both the lines and tics. You can choose to plot the projection grid or Lat/Long (or both) and set different display settings for each.

### PROJECTION GRIDS

**FIGURE 12.** Grid Display Settings in HYPLOT

**Plot** determines whether you want to plot the XY grid.

Given that, the rest of the settings describe how it will appear.

**Inside:** Grid labels plot inside the border parallel to the grid lines. Otherwise, they plot perpendicular to the grid lines outside the border.

**Style** is a choice of drawing the lines or tics at the user-specified spacing. If you plot tics, **Tic Length** determines their size.

**Projection Spacing** determines the distance between grid lines or tics.

- **Automatic Spacing** adjusts according to the zoom factor to provide a useful display.
- **Fixed Spacing** keeps the grid markings at the constant distance defined in the corresponding field.

**Label Projection** selects which sides of the plotting sheet will display grid labels.

*Tip:* We find that Left and Bottom works well.

**Auto Font Size** automatically sizes the labels to fit the number of grid lines specified. The labels will be as large as possible and still fit side by side on your plotting sheet.

**Labels** can display as **X,Y** or **E, N**.

**Line Weight** sets the thickness of the lines or tics.

**[Font]** displays the standard Windows® Font dialog for you to adjust the appearance of the grids and grid labels. Sample results of each change can be viewed in the area below each set of buttons.

## LAT./LON. GRIDS

HYPLOT enables you to display WGS-84 or Local Lat./Lon.. Their setup tabs are identical.

**FIGURE 13.** Grid Display Settings in HYPLOT

Lat/Lon Grid

Plot

Inside

Style:  Lines  Tics

Tic Length: 3 mm

Projection Spacing:  Automatic Recommended Spacing: 1  Fixed 60 Seconds

Label Projection:  Left  Top  Right  Bottom  Auto Font Size

Line Weight: 1 Font... Tahoma [14]

Format:  Use ° , ' , "labeling style  ddd.dddddddd  ddd mm.mmmmm  ddd mm ss.ssss

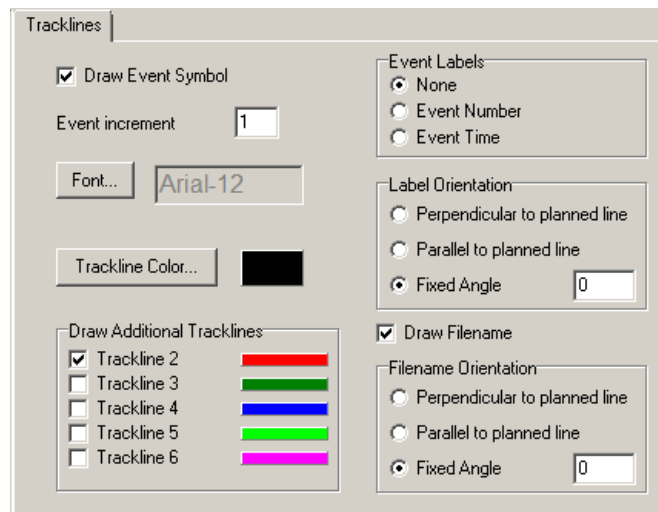
**Lat/Lon. Grid** settings are the same as Projection Grid settings, but the Format options replace the Labels option.

**Format** defines how the Lat./Lon. positions are expressed and whether to use the common symbols for degrees, minutes and seconds. If you choose not to use symbols, HYPLOT inserts a dash to separate the values.

## TRACK LINE OPTIONS IN HYPLOT

The Track Lines Tab affects the drawing and labeling of events and track lines. You can toggle the display of track lines to the screen by right-clicking the data file folder in the list at the upper left and selecting Enable Track Lines.

**FIGURE 14.** Track Line Options in HYPLOT



**Draw Event Symbol** draws a circle at each event location with the user-defined label. You can choose to label your track lines with the Event Numbers or the Time of the soundings. You may label every event (Label Increment=1) or at even intervals by entering an integer greater than one.

**Event Increment** defines how often the event marks will be labeled. An increment of 1 means every event mark is labeled. An increment of 5 means every 5th event mark is labeled.

**Event Labels** tells the program whether to label with Event Number or Event Time.

**Label Orientation** sets the angle at which event labels will be drawn. Elect to label events Perpendicular or Parallel to the planned line, or define another angle. **Fixed Angle** is the angle the text is drawn relative to the map window. (It is unrelated to the map orientation.)

**[Font]** is used to determine the color and font of the event labels.



**Draw File Name** enables you to label the track lines with its file name.

File Name Orientation affects track line labels in the same manner as the Label Orientation affects the event labels.

**Draw Additional Track Lines** enables drawing the track lines of up to 6 vessels (positioning systems) to the screen. We all know that towfish don't follow the same track of the vessel towing it. Now you can see both track lines accurately displayed. Track line 1 will always belong to the vessel designated as the main vessel in Survey.

### More Information

- [“Specifying the Main Vessel in SURVEY”](#) on page 3-27

## SOUNDINGS IN HYPLOT

The Soundings Tab enables you to set how the soundings are presented and plotted.

To toggle the display of the soundings, right-click the data file folder and select 'Enable Soundings'.

**To enable and disable the golden sounding display**, right-click Golden Soundings in the HYPLOT Project Files list and select or deselect the Enable Golden Soundings option.

**FIGURE 15.** *The Soundings Tab*

The screenshot displays the 'Soundings Tab' settings in HYPLOT. The interface is organized into several sections:

- Orientation:** Set to 'Perpendicular to planned line' (dropdown), with an 'Angle' of 0 (input field).
- Sounding Style:** Set to 'Decimal Point on mark (USACE)' (dropdown), with a 'Size' of 1 (input field).
- Color:** Set to 'All Soundings in Black' (dropdown), with a 'Color Table' button.
- Resolution:** Set to '1 Decimal' (dropdown).
- Truncation:** Set to 'Truncate to Tenth' (dropdown), with 'Nearest Tenth <' set to 0 (input field) and 'Nearest Half <' set to 0 (input field).
- Plot:** Set to 'Depth 2' (dropdown).
- Options:**
  - Negative Soundings get +
  - Hide Soundings over 0.00 (input field)
  - Hide above CHN Design Depth plus this value 0.00 (input field)
- Sounding Style:**
  - Font: Set to 'Arial-12' (dropdown), with a 'Font...' button.
  - Vector: Set to 2 mm (input field).

**Orientation** draws XYZ data at a user-specified angle relative to the first LNW file listed in the project files list. Elect to plot soundings:

- **Perpendicular** to the planned line,
- **Parallel** to the planned line
- **At a user-defined Fixed Angle**. This is the angle the text appears relative to the map window. (It is unrelated to the map orientation.) Any angle from -360 to +360 is permissible

**Style:** Choose the format with which to write your sounding.

- **Decimal Point on the Mark** (USACE) option places the decimal point at the location of the sounding and writes a normal size fraction.
- **Cartographic** (IHO) centers the integer portion of the sounding at the sounding location and then writes a smaller, lower fraction.
- **Spanish Navy** (IHM) places the decimal point at the location of the sounding and then writes a smaller, lower fraction.
- **Pixel:** represent the location of each sounding with a color-coded Pixel (dot) of a user-defined size.
- **Russian:** The sounding location is marked with a dot with the sounding value from the TIN MODEL Input file to its right. If you have a second TIN model, the depth from the Additional file appears left of the sounding position.

**Color:** Defines predefined sounding color settings (Black or ECDIS) or the value HYPACK® SUB-BOTTOM is color-coded according to a user-defined palette.

When you select the Color by Depth option, click [**Color Table**] to assign and configure the color palette in the COLOR EDITOR from within the Control Panel. This also affects the palette displayed in the Color Bar.

- **Black:** HYPACK® SUB-BOTTOM ignores the project colors and draws all soundings in black.
- **Color By File** enables you to set specific colors for each catalog or individual file through the right-click menus in the Project Items list. Files loaded as part of a catalog all inherit the color of the catalog. When you assign a color to a file, the file name appears in the same color in the Project Items list.

---

**NOTE: To color individual files**, you must first load them to the project separately.

---

- **ECDIS Colors:** HYPACK® SUB-BOTTOM ignores the project colors and draws all soundings according to ECDIS convention.
- **Color by Depth** colors your data based on the Z-values. Configure your palette according to your expected Z range.

These changes only affect this session of HYPLOT.

**Resolution** enables you to specify soundings to either one 1 Decimal (Tenths) resolution or 2 Decimal (Hundredths) resolution.

**Rounding** enables you to determine how the soundings are presented.

- **None** displays the soundings decimal places according to the resolution setting.
- **Truncate to Tenth** just leaves off the hundredth digit. For example, 6.97 is written as 6.9.
- **HYPACK:**
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.05 rounding point (e.g. 12.46 -> 12.5)
  - **Depth below Nearest Half value:** Round using 3 rounding points:  
<x.3 = x.0 (e.g. 42.28 -> 42.0)  
<=x.8 = x.5 (e.g. 42.6 -> 42.5)  
> x.8 = (x + 1).0 (e.g. 42.83 -> 43.0)
  - **Depth above Nearest Half value:** Round to a whole number using x.8 rounding point (e.g. 123.7 -> 123.0, but 123.8 -> 124.0).
- **ROK Rules (Republic of Korea):**
  - **Depth < the specified Nearest Tenth** threshold, it is displayed at the specified decimal resolution.
  - **Depth >= 31**, it is truncated to a whole value, otherwise it is truncated to the first decimal.

---

**NOTE:** The rule stated 31 meters as the whole value threshold but, *if you are using depths in feet, the threshold will be interpreted as 31 feet by the sounding engine.*

---

- **UKHO Rules (United Kingdom Hydrographic Office):**
  - **Depth < 0:** Drying Heights are rounded nearest tenth using a x.03 threshold.
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.08 threshold.
  - **Depth below Nearest Half value:** Output x.0 or x.5 using a x.5 threshold.

- **Depth above Nearest Half value:** Round to a whole number using a x.75 threshold.
- **NOAA (National Oceanographic and Atmospheric Administration):**
  - **Depth < 0:** Drying Heights are rounded to nearest whole number using a x.5 threshold.
  - **Depth below Nearest Tenth value:** Round to nearest tenth using a x.075 threshold.
  - **Above Nearest Tenth (Nearest Half not used)** Round to a whole number using a x.75 threshold.
- **AHOI (Australian Hydrographic Office):**
  - **Depth < 31:** (designed for meters) Display in Tenths, round at a x.065 threshold.
  - **Depth >= 31:** Display as a whole number, round at a x.65 threshold.

**[Test Rounding]** provides a quick test platform to aid in understanding how your current settings affect your sounding display, and to ensure that the rounding rules have been implemented correctly. Just enter any sounding value in the dialog provided and see the display value based on the current option set.

The **Options** settings contain the following items:

- **Negative Soundings get "+"** does just that. If you have processed your sounding data in elevation mode (z values are negative), this setting will display them on the screen in depth mode (z values are positive).
- **Hide Soundings Above** a user-defined level plots only soundings deeper than the specified depth.
- **Hide Soundings Below** a user-defined level plots only soundings shoaler than he specified depth.
- **Depth 1 Text** and **Depth 2 Text** (HYPACK® SUB-BOTTOM Control Panel only) are the terms by which you, personally, call the depths in a dual frequency data string. If you prefer a term other than 'Depth 1' and 'Depth 2', enter them in the fields provided. Your terms will then replace 'Depth 1' and 'Depth 2' in this and other HYPACK® SUB-BOTTOM dialogs.

---

**NOTE:** These labels have not been fully implemented . They occur initially in the HYPACK® SUB-BOTTOM and HYPLOT Control Panels, and in the SB SELECTION program.

---

The **Plot Depth** options are used to tell the plotting program which depth to present.

- **Plot High Frequency** plots depth 1.
- **Plot Low Frequency** plots depth 2.
- **Plot Difference** plots Depth 2-Depth 1. This may provide a general idea of the thickness of bottom material.

**Draw Mode:** Select a method and set the corresponding parameters.

- **Fonts: [Font]** displays the Windows® Font dialog where you can set font, and font size for bit-map style text. (Ignore the remaining options; HYPACK® SUB-BOTTOM does.)
- For **Vector** text, select the **Vector** option and enter a **Vector Size** that appears as you wish.

### **MATRIX OPTIONS IN HYPLOT**

The Matrix Tab enables you to choose to plot your matrix border, the depths (if it is a filled matrix) or both.

**Paint Matrix Depths** toggles the matrix depth data on and off.

The **[Matrix Border Color]** displays a color selection dialog to customize the color of the matrix border.

**Matrix Display:** Matrix files contain two depths for each matrix cell: the predredge Survey Depth and the Dredge Depth. The matrix display options enable you to plot either depth value or the difference between them (Dredge Depth – Survey Depth or Survey Depth - Dredge Depth).

---

**NOTE:** If you have a HYPACK® SUB-BOTTOM matrix file, select Survey Depth. The Dredge Depth and Difference options will display an empty matrix.

---

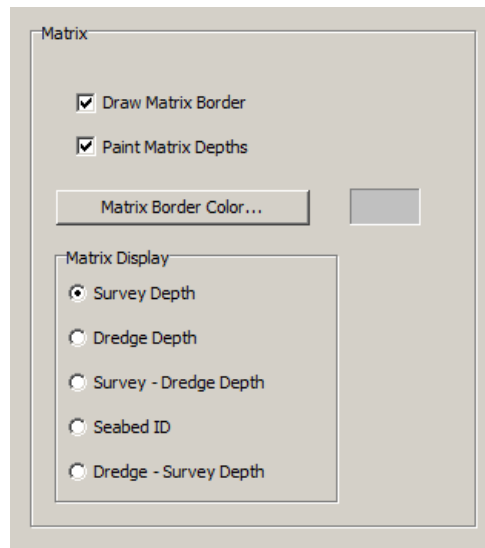
If you have a Seabed ID matrix from SEABED MAPPER, select Seabed ID to color the matrix based on your seabed colors.

---

**NOTE:** With SEABED MAPPER, you can also store your seabed colors to a HYPACK® SUB-BOTTOM color file (\*.HCF). **To display seabed ID colors**, you must load this color file as your project colors.

---

**FIGURE 16. Matrix Options in HYPLOT**



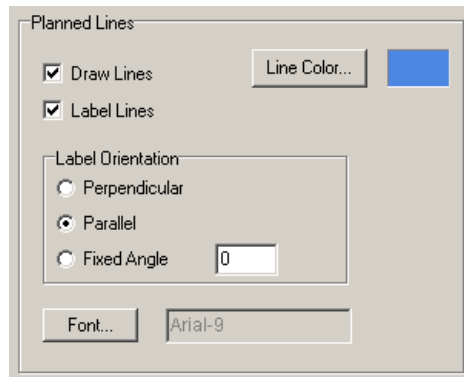
**More Information**

- [“Matrix Files \(\\*.MTX\) in HYPACK® SUB-BOTTOM”](#) on page 2-108
- [“Matrix Files in SURVEY”](#) on page 3-51

**PLANNED LINE OPTIONS IN HYPLOT**

The Planned Lines tab contains display settings for any survey lines that you plot.

**FIGURE 17. Planned Line Settings in HYPLOT**



**Draw Lines** includes your Planned Line file in the plotting sheet. **Label Lines** places the line name at the start of each line in the plotting sheet.

**Label Orientation** rotates the label relative to the planned line. It can be **Perpendicular**, **Parallel** or set at a user-defined **Fixed Angle**.

**[Font]** displays the Windows® font dialog to designate the size and color of the line labels. HYPLOT supports only true type fonts.

**[Line Color]:** Click the button to select a new color from a colors dialog. The current color is displayed in the color box.

**To modify the line color**, click [Line Color] and select the color from the color selection dialog.

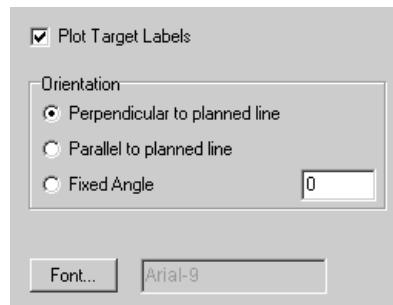
### More Information

- [“Planned Survey Lines”](#) on page 2-45
- [“Navigating Planned Lines in SURVEY”](#) on page 3-63

## TARGET OPTIONS IN HYPLOT

The Targets dialog in the Control Panel provides choices about plotting target labels.

**FIGURE 18.** Target Options in HYPLOT



If you choose to plot them, set the color and font using the [Font] button. The targets themselves are black.

**Orientation** sets the angle at which target labels will be drawn when the circle target display is selected. Elect to label targets **Perpendicular** or **Parallel** to the planned line, or to define another angle. **Fixed Angle** is the angle the text is drawn relative to the map window. (It is unrelated to the map orientation.)

## TITLE BLOCKS IN HYPLOT

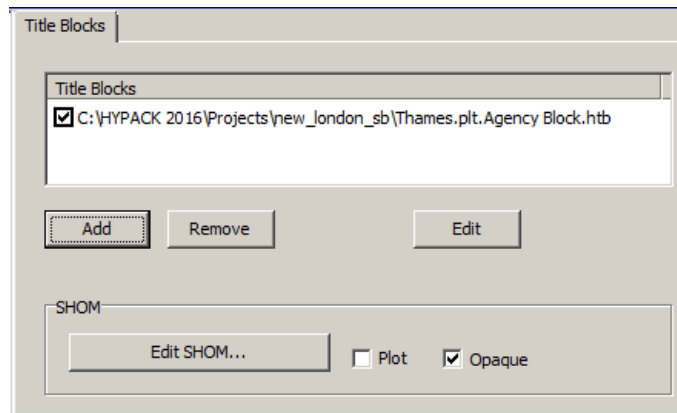
The Title Block Tab enables you to select one or more Title Blocks to plot. You can plot without a Title Block or you can plot with one or more blocks. Several Title Block templates are included in the \HYPACK Sub-bottom\Templates\Hypplot Title Blocks folder.

**To add a title block to your plotting sheet, you can:**

- Load an existing title block and modify it for your current plotting sheet if necessary.
- Build a custom title block.

*Loading a Title Block Template***To load a title block to your plot:**

1. **Open the HYPLOT Control Panel.**
2. **Select the ‘Title Blocks’ item in the list on the left.** The Title Blocks options will appear on the right.

**FIGURE 19.** *Title Block Options in HYPLOT*

3. **Click [Add].**
4. **Select the title block you want and click [Open].** You can select a template from the \HYPACK Sub-bottom\Templates\Hypplot Title Blocks folder, or another existing title block. If you choose a title block outside of the project, HYPLOT will make a local copy of the selected title block, renaming it by appending the project name to the beginning of the title block file name. The new file will then appear in the list in the Title Blocks dialog.
5. **Plot one or more title blocks listed** by checking only the boxes for the blocks you want to print.
6. **Click [OK]** to return to the HYPLOT screen.

*Loading the SHOM Title Block:*

The SHOM title block has more complex set of requirements. Therefore, it has its own routine for loading and editing it for your plotting sheet.

---

**NOTE:** To display the SHOM title block, you must also select the ‘Double Border with Title Area’ border option.

---

**To include a SHOM title block in your plotting sheet:**

1. **Check the ‘Plot’ checkbox.**
2. **Click [Edit SHOM...]** and the SHOM template appears.



FIGURE 20. SHOM Title Block Editor

3. Check the checkboxes to select each section you want to write in your title box.
4. Modify the text in all selected fields to make them correct for your current plotting sheet.
5. Choose whether the selected fields draw at the top or bottom of the title area.
6. Load the correct logo by clicking the [...] and browsing for the correct image file.
7. Set the Paper Size to A0 or A3.
8. When you are satisfied, click [OK] to return to the Control Panel.

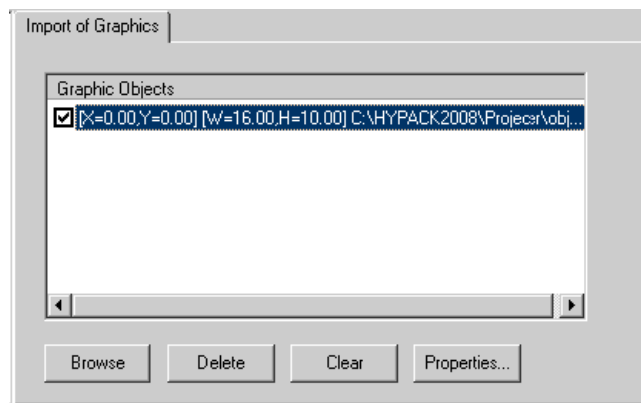
### More Information

- [“Creating a Custom Title Block Title Block Editor”](#) on page 5-33
- [“Border Options in HYPLOT”](#) on page 5-6

## IMPORT OF GRAPHICS IN HYPLOT

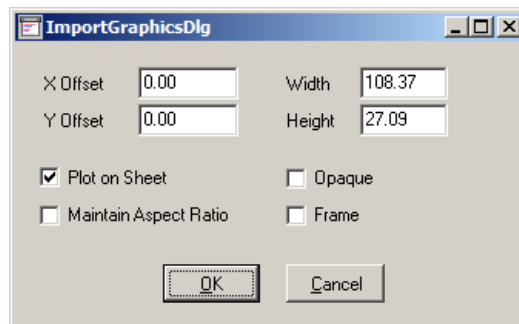
The Import of Graphics tab enables you to import image files to your plots. This enables you to include your company logo, a plotting sheet layout graphic or any other graphic in your plot.

**FIGURE 21.** Importing a Graphic File to HYPLOT



1. **Load one or more graphic files.** For each image, click [Browse] and choose your graphic using the file selection dialog.
2. **Set your graphic properties.** There are two methods.
  - **To set graphic properties through a dialog,** highlight the graphic you want to modify and click [Properties]. The Import Graphics dialog will appear.

**FIGURE 22.** Import Graphics Dialog



- **X and Y Offsets** set its position relative to the lower left corner of the plot.

- **Plot on Sheet** is an additional place where you can tell HYPLOT to include this image. It stays synchronized with the checkboxes in the Import of Graphics dialog.
- **Maintain Aspect Ratio** forces the image to retain its vertical to horizontal proportions when you change either the **Height** or **Width**. Otherwise, you can change **Height** and **Width** independently of each other and the image will stretch to fit.
- If you check the '**Opaque**' box, the image will cover any data it overlays. Otherwise, it will be transparent and you can see data that may be plotted behind it.
- Check **Frame** to draw a narrow black outline around the image.
- **To set graphic properties with your mouse:**
  - **Position the graphic** by clicking anywhere inside the graphic display in your plotting sheet and drag it to its new position.
  - **Resize the graphic** by selecting the graphic then clicking and dragging the handles any of its sides.
  - **Set the graphic to plot** by checking its checkbox in the Import Graphics tab.

To delete an entry, select the File Name and clicking [Delete].

To delete all of your entries, click [Clear].

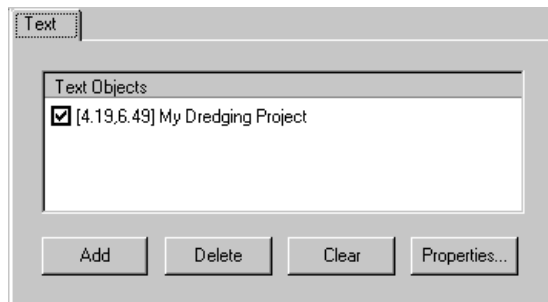
### More Information

- [“Generating Plotting Sheet Layout Graphics”](#) on page 4-70

## TEXT OPTIONS IN HYPLOT

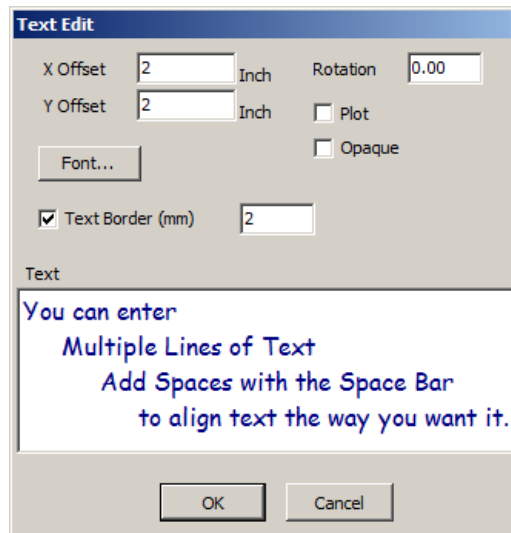
You can insert text other than the labels to your plot. Do this through the text settings in the Control Panel.

FIGURE 23. Text Tab



1. **Click in the Text column and then on [Add].** The Insert Text dialog will appear.

FIGURE 24. Text Insert Dialog



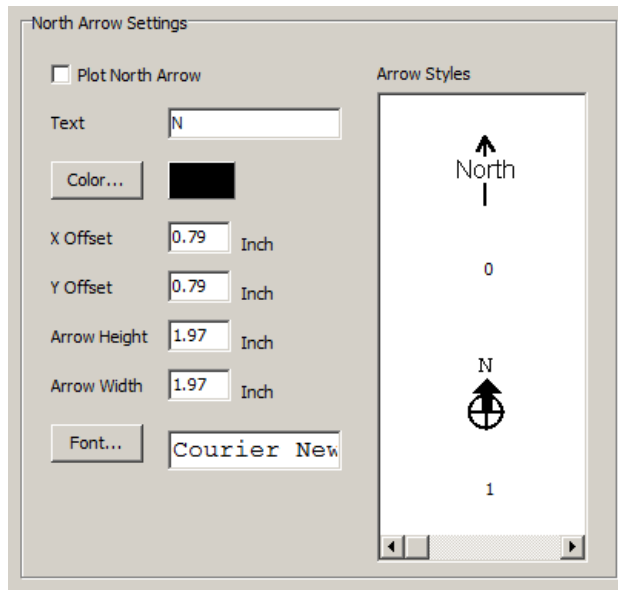
2. **Enter the X and Y offsets** (cm) from the bottom left corner of the plotting sheet to the point where the text will begin.
3. **Set the font** using [Font] and the standard Windows® font dialog.
4. **If you want to enclose your text in a box, check Text Border** and enter the line width (mm).
5. **If you want the text to appear at any angle other than what you see in the text box, enter a rotation angle.** The text rotates counterclockwise around the bottom, left corner of a text border (whether you draw the border or not).
6. **Enter the text you want to appear** under Text.
7. **Click [OK].**

**NOTE:** You can later edit your text by selecting it in the Text Tab and clicking [Properties]. The Text Edit dialog will appear with the data corresponding to the selected text loaded. Make your changes and click [OK].

## NORTH ARROW OPTIONS IN HYPLOT

To plot a North Arrow select DRAW-NORTH ARROW in the HYPLOT menu or check **Plot North Arrow** in the North Arrow Tab. Display settings for the North Arrow symbol include:

**FIGURE 25.** North Arrow Tab



**Arrow Styles** provides a selection of North Arrow styles. Scroll through the options and click on your choice.

**Text** labels the arrow. If you choose the first arrow style, you can edit the text that bisects the arrow. If no text is entered, a solid arrow will be drawn.

**Color** affects the color of the arrow symbol.

**Offset X** and **Offset Y** positions the arrow on your plotting sheet where settings of zero indicate the lower left corner.

**Arrow Height** and **Arrow Width** are the vertical and horizontal measurements of the arrow.

**[Font...]** affects only the text in the North Arrow display.

### **COLOR BAR OPTIONS IN HYPLOT**

To plot a legend of the colors and corresponding depths:

- **Select DRAW-COLOR BAR** from the HYPLOT menu or
- **Check Plot Color Bar** in the Color Bar Tab and define the settings for its position and size.

FIGURE 26. The Color Bar Tab

**X Offset** and **Y Offset** designate the position for the lower left corner of the color bar.

**Font Size** enables you to adjust the size of the labels.



**Tip:** If your labels are overlapping or crowded too closely together, select the **Prevent Label Overwrite** option.

**Bar Width** and **Bar Height** defines the size of the color bar. There are two methods:

- **Bar Height \* Color Entries:** Select this option to apply the Bar Height to each color range in your project colors. In this case, the Bar Height value should be quite small so the whole color bar fits in the plotting sheet.
- **Set Height to Bar Height:** Select this option to apply the Bar Height to the full height of the color bar. The color ranges will be evenly distributed across the set distance in the color bar. In this case, set a size no more than the size of your plotting sheet.

**Plot Color Bar** toggles the Color Bar display on and off.

**Labels in Black** prints the color bar ranges in black. If this is cleared, they will be printed in colors matching the color of the range they describe.

**Label first value of range** prints only the upper depth of each color range.

**Black Outline** borders the color bar and each color range in black.

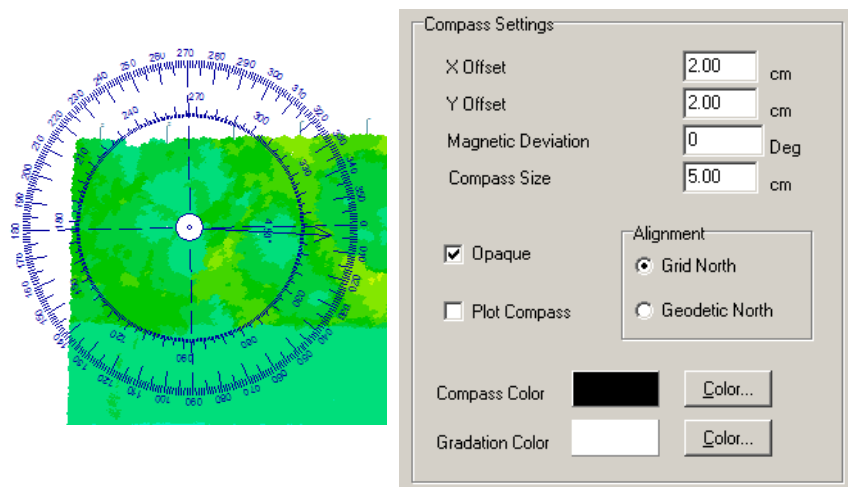
**Mode:** By HYPACK® SUB-BOTTOM convention, positive depths are downward in depth mode and upward in elevation mode. In HYPLOT all depth values are positive. Selecting Elevation Mode places the larger value at the top of the color bar display. (Greater

value indicates greater height.) Depth Mode places the larger value at the bottom.

## COMPASS OPTIONS IN HYPLOT

You can include a compass on your plot using the settings in the Compass Tab.

**FIGURE 27.** Transparent Compass (left), Compass Tab (right)



**Center X Offset** and **Center Y Offset** determines the position of the compass center on the plot.

**Magnetic Deviation** enables you rotate the compass by a user-defined amount to show the difference between the direction to Geodetic North and Magnetic North.

**Compass Size** sets the diameter of the plotted compass.

Check **Opaque** to draw a solid white background behind the compass. If this is not selected, other plotted objects will be visible through the compass.

**Plot Compass** instructs HYPLOT to draw the compass according to these settings. If you prefer to omit this feature from your plot, deselect this option.

**Alignment** determines whether the compass will be pointing to Grid North or Geodetic (True) North.

**Compass Color** is the background color when the compass is opaque.

**Gradation Color** is the color of the markings and numbers on the compass.

You can set each color by using the coordinating [Color] and selecting your color from the dialog.

## RULER OPTIONS IN HYPLOT

You can plot a ruler to show the scale of your drawing.

FIGURE 28. A Sample Scale Ruler

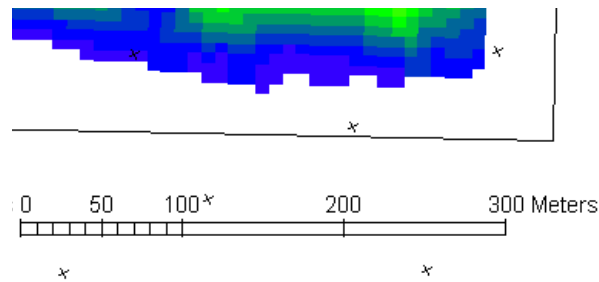
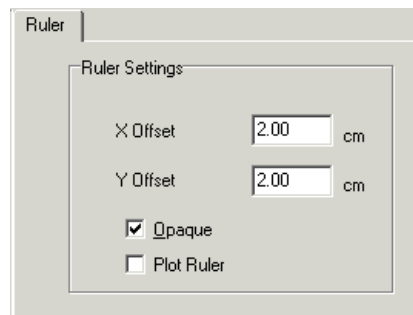


FIGURE 29. The Ruler Tab



**X Offset** and **Y Offset** position the left end of the scale.

**Opaque** draws it with a white background.

**Plot Ruler** tells whether the ruler will be drawn.

## PLOTTING SHEET INFORMATION IN HYPLOT

The **Date**, **Time** and **Plotting Sheet Number** can be included in your plot.

**Date Time Format** provides a selection of formats for the presentation of the date and time that the sheet is plotted.

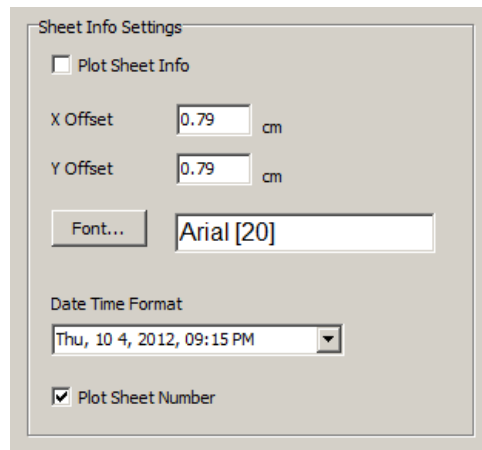
**X and Y Offsets** can be used to position the text on your plotting sheet where settings of 0,0 begins the line in the lower left corner.

**[Font]** displays the Windows® Font dialog to set the type.

**Plot Sheet Number** begins at "1" when you initially open a PLT file and it is automatically increased each time you print it. Check this option to append the plotting sheet number to the end of the Date Time string.

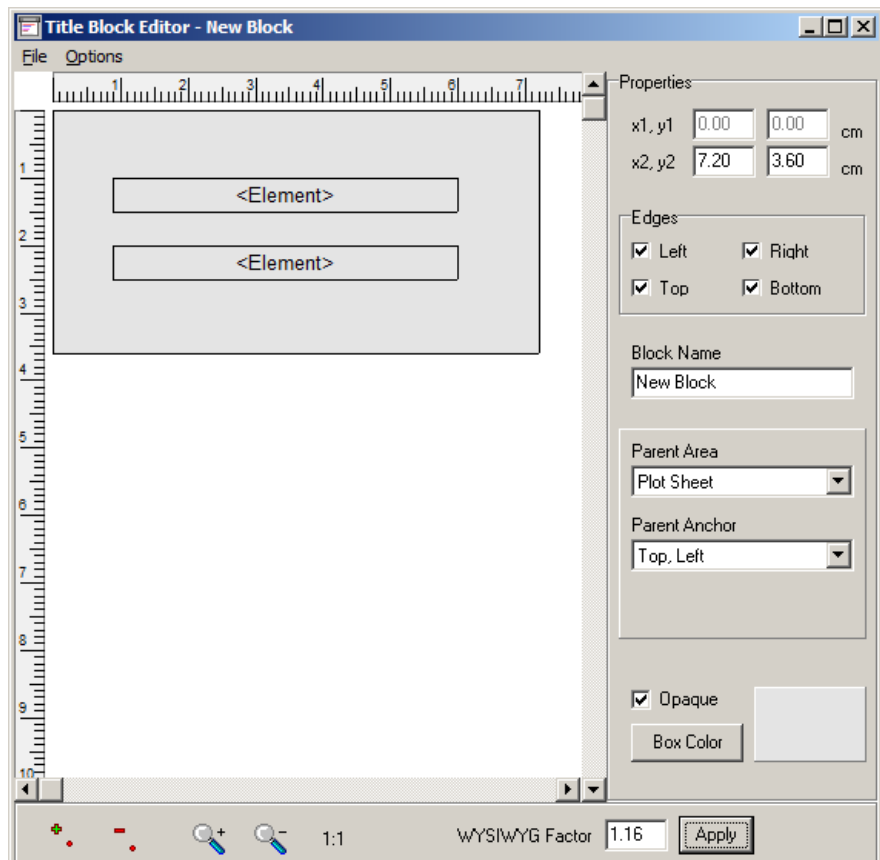
The **Plot Sheet Info** option toggles the display on and off.



**FIGURE 30.** *The Sheet Information Tab*

## CREATING A CUSTOM TITLE BLOCK TITLE BLOCK EDITOR

Whether you modify an existing title block or create a custom one of your own, you work in the Title Block Editor.

**FIGURE 31.** *Sample Title Block in the Title Block Editor*

**To create a new title block:**

1. **Open the Title Block Editor** by selecting SETTINGS-TITLE BLOCK EDITOR. The program will display an empty title block.
2. In the Title Block Editor, **select FILE-NEW**. The Title Block Editor will appear with only a 'container' rectangle defined.
3. **Set the Title Block properties**.
4. **Add the required elements to your Title Block**, setting the properties and entering the content for each one.
5. When you are finished, **save the title block** by selecting FILE-SAVE and naming your Title Block. The new title block will be saved, by default, to the \HYPACK Sub-bottom\Templates\Hypplot Title Blocks folder where it can be reused in future plots.

## ***EDITING A TITLE BLOCK***

If you have loaded a title block template, or another existing title block, you may need to customize the title block for the current plotting sheet.

**To edit an existing block:**

1. **Select the title block to be modified** in the Title Blocks dialog.
2. **Click [Edit]**. The selected title block will appear in the Title Block Editor. By default, the title block properties are displayed on the right.
3. **Modify the title block as necessary**.
  - **Set the title block properties**
  - **Work with the elements. You can change any number of the following:**
    - number
    - properties
    - layout
    - content
4. **When you are satisfied, click [OK]** to return to HYPLOT.

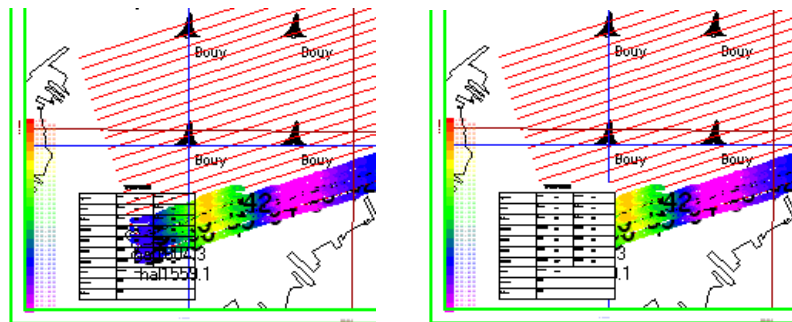
## ***SETTING TITLE BLOCK PROPERTIES***

Title Block Properties apply only to the 'container' rectangle of the title block.

1. **Select the title block by clicking outside the title block in the design area.**
2. **Modify the title block properties (right)**.
  - **X1, Y1:** Fixed at 0,0.
  - **X2, Y2:** Defines the size of the title block.

- **Edges:** Check those edges that should be visible.
  - **Block Name:** Name your title block, preferably something that will indicate the content so you'll know if it will be useful in future plotting sheets.
  - **Parent Area** determines whether the title block will appear in the plotting sheet area or in the title block area.
  - **Parent Anchor** is the position in the Parent Area where the title block will reside. If you want the title block in some position other than one of the corners, select 'Bottom Left' and set **X and Y Offsets** to shift the block up and right respectively.
- Tip:** Alternatively, you can quickly position the title block anywhere in the plot by selecting the 'Bottom Left' option, then using the cursor in the plot display to drag the title block into position.
- **Opaque:** If you check the 'Opaque' box, the title block will plot with a solid background covering any data it overlays. Otherwise, it will have a clear background; you can see data that may be plotted behind it.

**FIGURE 32.** Title Block - Non-Opaque (left) and Opaque (right)



- **Box Color:** Click [Box Color] and select the background color to be used for opaque title blocks.

## WORKING WITH TITLE BLOCK ELEMENTS

Think of a title block as a rectangular container with one or more rectangular elements within. The title block and each of its elements is drawn according to the properties which you will set in the area on the right-hand side of the editor. You can change the content; the number, arrangement and appearance of the elements and the display of the 'container' block.

### Adding an Element

Click the Add Element Icon. A 'generic element' will appear in your title block for which you must now position and set properties.



### Deleting an Element

Select the element you want to remove from the title block and click the 'Delete Element' Icon.



### Setting Element Properties



1. **Select the element.** Its current properties appear at the right.
2. **Set the properties as desired for the selected element.**
  - **X1, Y1:** Position coordinates for the upper left-hand corner of the element relative to the upper left-hand corner of the block
  - **X2, Y2:** Position coordinates for the lower right-hand corner of the element relative to the upper left-hand corner of the block.

**Tip:** You can also use your cursor to reposition and resize elements within the title block.

**Position the element** by clicking anywhere inside the element display in your plotting sheet and drag it to its new position.

**Resize the element** by selecting the element then clicking and dragging the handles any of its sides.

- **Edges:** Check those edges that should be visible.
  - **Text:** If you want text in the selected element, type the text you require in the field below 'Text'.
  - **Picture:** If you want to display an image file, check the box then click [...] to browse for the required image location. The Title Block Editor supports JPG and BMP images.
  - **Text Alignment:** Horizontal and Vertical positioning of your text within the selected element.
  - **[Font]** accesses a font selection dialog.
  - **Opaque:** If you check the 'Opaque' box, the element will plot with a solid background covering any data it overlays. Otherwise, it will have a clear background and you can see data that may be plotted behind it.
  - **Box Color:** Click [Box Color] and select the background color to be used for opaque elements.
3. **Save the changes by selecting FILE-SAVE.** The Title Block Editor will automatically return you to the Control Panel.

## TITLE BLOCK EDITOR DISPLAY OPTIONS

The program provides several display options that enable you to optimize your view while you work. These affect *only* the display within the Title Block Editor.

- In the Options menu:
  - **Units:** Choose to work in inches, centimeters or millimeters.
  - **Ruler:** Toggles the vertical and horizontal rulers on and off.

- **Snap to Grid:** Automatically aligns each side of your element to the nearest 0.625 inch [one sixteenth] or millimeter.
- **Zoom In/Out icons** adjust the scale by 25%.
- **[1:1]:** Sets the zoom scale to real world dimensions.
- **WYSIWYG Factor** adjusts the scale of the drawing in the Title Block Editor. It does not affect the size of the title block itself.

## PLOTTING SHEET TEMPLATES

One of the great things about HYPLOT is the extensive selection of display options that enable you to plot exactly what you want. If you had to configure the numerous options each time you want to plot data, it would be a time-consuming task. However, most of you use a standard set of options to plot your project data because you use the same plotter and require specific chart items at certain plot locations. If this is the case, plotting sheet templates will save you a lot of time.

Plotting sheet templates store all of the plotting options set in HYPLOT at the time you save it. You can then quickly restore all of those settings, applying them to the same or to a different plotting sheet file (PLT) at a later time, by loading the plotting sheet template file.

---

**NOTE:** The template plots items based on the offset measurements specified when the template was saved. If you load the template to a smaller plotting sheet, it is possible to "lose" chart features off the top or right edges of your new chart.

---

### *Saving the Plotting Sheet Template*

When you have configured your plotting sheet with the options in the HYPLOT Control Panel, click **[Save Template]** and name your file. HYPLOT saves your settings, by default, to a \*.HYT (HYPLOT Template) file in the \HYPACK Sub-bottom\Templates folder.

### *Loading a Plotting Sheet Template*

Once you have configured a plotting sheet template, you can apply it to any plotting sheet (\*.PLT) in any project; it can be the same project area or a new location.

1. **Open HYPLOT using a plotting sheet appropriate for your project area.**
2. **Click [Load Template] and select the \*.HYT file containing the Control Panel settings you require.** The display options from the template will be applied to the plotting sheet (\*.PLT) and data of your current project.
3. **Make any plot-specific modifications.** (For example: do you have to change date and location in your title block?)
4. **Plot your sheet.**

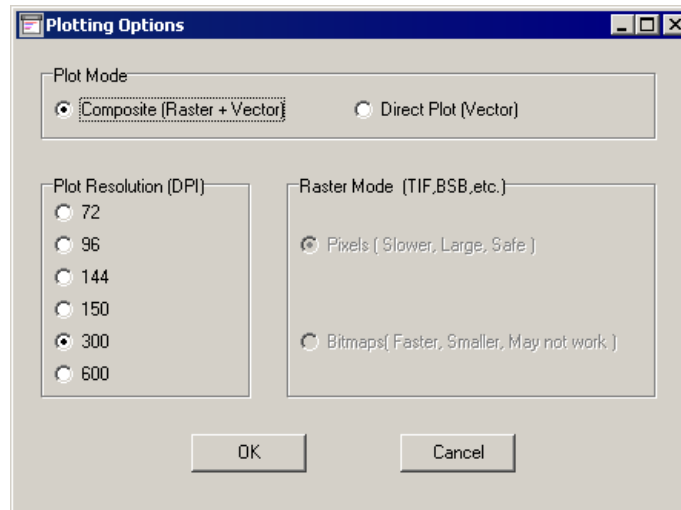
## PLOTTING METHODS IN HYPLOT

When you have all of your data chosen and your display options configured, you're ready to send it to the plotter. With the exception of bitmap-based (raster) files, such as ARCS, BSB or TIF charts, HYPLOT can easily plot almost anything you can display on your computer screen.

### To send your plot to the plotter:

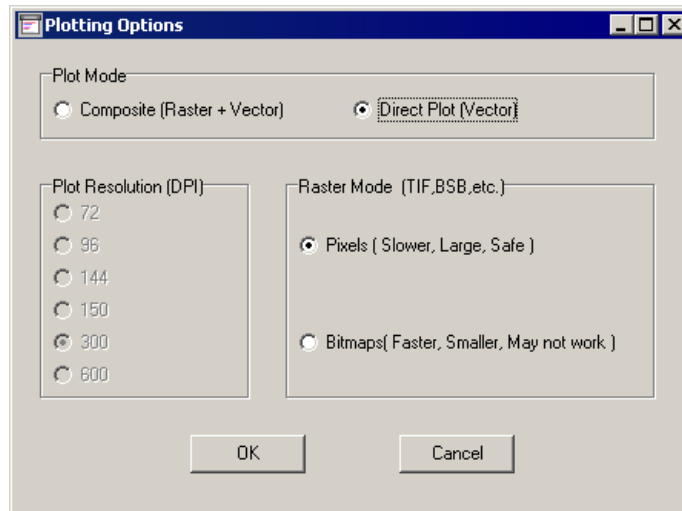
1. **Select FILE-PRINT** and the Plotting Options dialog will appear with the recommended settings based on the files included in your plot.
2. **Verify your plotting settings.** HYPLOT offers 2 plotting method choices:
  - **Composite:** This option is more reliable if your plot includes raster data. It uses a process in memory that reproduces the more complex features found in raster charts.  
If HYPLOT detects raster data in the plot, the dialog defaults to this method with a resolution of 300 DPI. Remember that resolution directly affects the size of the output file. If your system doesn't have enough memory, or if it's just taking too long to print, choose a lower resolution.

*FIGURE 33. Composite Plotting Options*



- **Direct Plotting** is faster and uses less memory, but it is only reliable for vector objects. It sends the data directly to the printer.  
If you have raster data, you can choose to override the Composite default. If this is your choice, you must also choose how HYPLOT will handle the complex colors of the raster data.

**FIGURE 34.** Direct Plotting Options



- **Pixels** converts the bitmap into a very large number of pixel color cells. So many that the normal speed of direct plotting might be completely negated.
  - **Bitmaps** option doesn't add too much overhead, but it is likely to generate an incorrect or unacceptable plot, because the program can't perform the coloration processes required for the more complex chart displays.
3. **Click [OK]** and wait for the plotter to finish!

## EXPORTING YOUR PLOTS TO CHART FILES IN HYPLOT

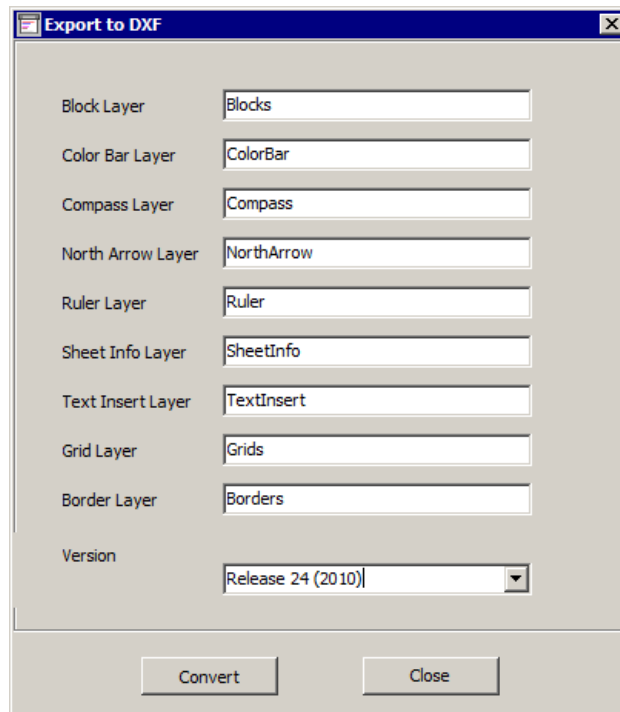
In addition to printing or plotting your data from HYPLOT, you can output the data in your plotting sheet to CAD DXF or DWG formats, or to georeferenced PDF and TIF charts.

### EXPORTING YOUR PLOTTING SHEET TO CAD FORMATS

HYPLOT can export your entire plotting sheet to DXF and DWG formats for our CAD users. The exported file includes borders, labels, scale bar, compass rose and most of the other display features offered in HYPLOT. We are not yet able to handle complex background files, such as Ortho-TIF, BSB and ARCS charts.

1. **Click the Export icon** on the toolbar and select your output. The corresponding Export dialog will appear. Whether you export to DXF or DWG, all of the CAD export dialogs are the same except DWG does not include the Version option.



**FIGURE 35.** HYPLOT Export to CAD Options

2. **For each item listed, enter a layer name** to which that item will be drawn.
3. **Select your output version** of your choice.
4. **Click [Convert]**, enter a name for your output chart and click [OK].

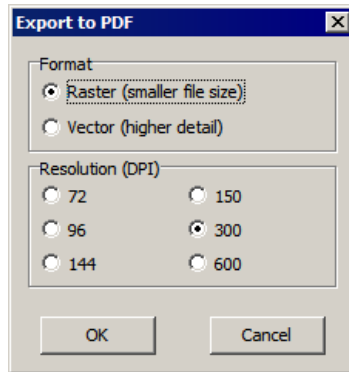
### **SAVING YOUR PLOT TO PDF FORMAT**

HYPLOT prints your plot directly to PDF format with no need for a third-party printer driver. It georeferences the PDF according to the Open Geospatial Consortium best practices, which means you can open the PDF in a variety of programs, including HYPACK® SUB-BOTTOM, and they will be able to recognize the geospatial coordinates of areas on the plot.

1. **Select FILE-EXPORT TO PDF.** The Export to PDF dialog appears.

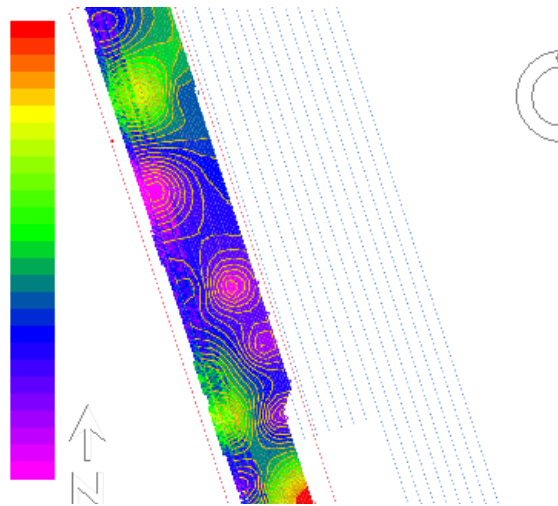


**FIGURE 36.** *Export to PDF Dialog*



2. **Enter your export instructions and click [OK].**
  - **Format:** Select Raster or Vector output.
  - **Resolution** in dots per inch. This is enabled only for Raster output. Remember that resolution directly affects the size of the output file. If your system doesn't have enough memory, or if it's just taking too long to print, choose a lower resolution.
3. **Name your chart and click [Save].** The file is saved, by default, to the current project folder.

**FIGURE 37.** *Sample Georeferenced PDF in HYPACK® SUB-BOTTOM*



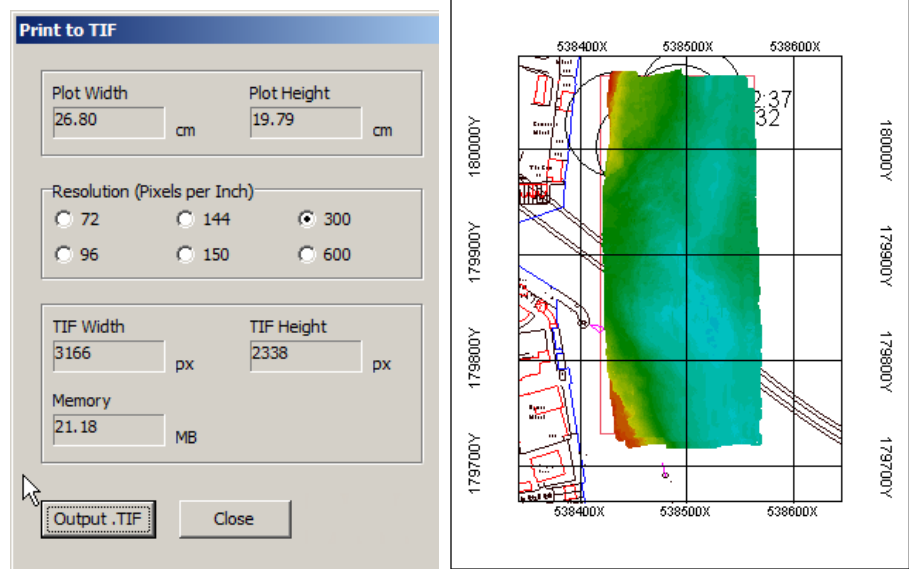
### **SAVING YOUR PLOT TO A GEOREFERENCED TIF GRAPHIC**

You can save a georeferenced TIF image of your plot at your choice of six resolutions. When you choose your resolution, HYPLOT calculates and displays the dimensions and size of your potential image file. If the file size does not suit you, choose a different resolution before generating the file.

1. Click the **Export to CAD icon** on the toolbar and select 'To TIF'. The HYPLOT TIF Output dialog will appear.



FIGURE 38. HYPLOT TIF Output



2. Choose the resolution of the image and check the calculated size of the proposed TIF.
3. Click **[Output TIF]**. The TIF Save Options dialog will appear.
4. Set your TIF Save options and click **[OK]**. The Save As dialog will appear.
  - **Write GeoTif** (embedded TFW).
  - **Write TFW** file enables you to generate a separate file that contains coordinates that describe the location, scale, and rotation of the TIF. It is used by geographic information systems (GIS) software for locating areas in raster map images.
  - **Use LZW Compression**: This is a lossless compression algorithm that significantly reduces the resulting file size without losing resolution of the image.
5. Name your file and click **[Save]**. The TIF file will be saved, by default to your project folder. HYPLOT displays the generation progress in the status bar and a pop-up message at its completion.

**NOTE:** Plotting large, high resolution plots may require more memory than is available in your system. In this case, HYPLOT tells you that you are out of memory. You should reduce the resolution and try again.



## EXPORT

EXPORT converts HYPACK® SUB-BOTTOM data files to other formats. The primary formats supported are DXF, DWG, DGN and XYZ.

- **HYPACK® SUB-BOTTOM File to CAD:** You can convert most HYPACK® SUB-BOTTOM files to DXF, DWG or DGN format. This can be very useful if you integrate HYPACK® SUB-BOTTOM data with work in CAD systems or if you want to display them as chart data in HYPACK® SUB-BOTTOM.
- **CAD to XYZ:** You can also convert point and text objects from DXF, DWG or DGN files (as well as a few HYPACK® SUB-BOTTOM files) to XYZ format.

This two-way file conversion capability gives you several options:

- **Export the sounding data from the charts (point features) to XYZ format,** which can then be displayed in HYPACK® SUB-BOTTOM or loaded to several of the other program modules.
- **Append XYZ sounding data to your chart file** and display all of the data as a background file in HYPACK® SUB-BOTTOM or your favorite CAD program.
- **All Format and XYZ to Custom Formats** All Format sounding files can be exported to a choice of several custom formats.

The following table summarizes the types of conversions possible through the EXPORT program:

*TABLE 1. EXPORT Conversion Summary.*

Output Formats	Input Formats		
DXF	ALL	DWG	Tics
DWG	BRD	Edited ALL	Targets
DGN	DIG	LNW	XYZ
		PLT	
XYZ (and variations)	ALL	DGN	
	BRD	DXF	
Custom Formats	ALL		

### More Information

- [“Running the Export Program”](#) on page 5-45
- [“Export Options in Export”](#) on page 5-47
- [“Exporting Map Features to Google Earth”](#) on page 2-197

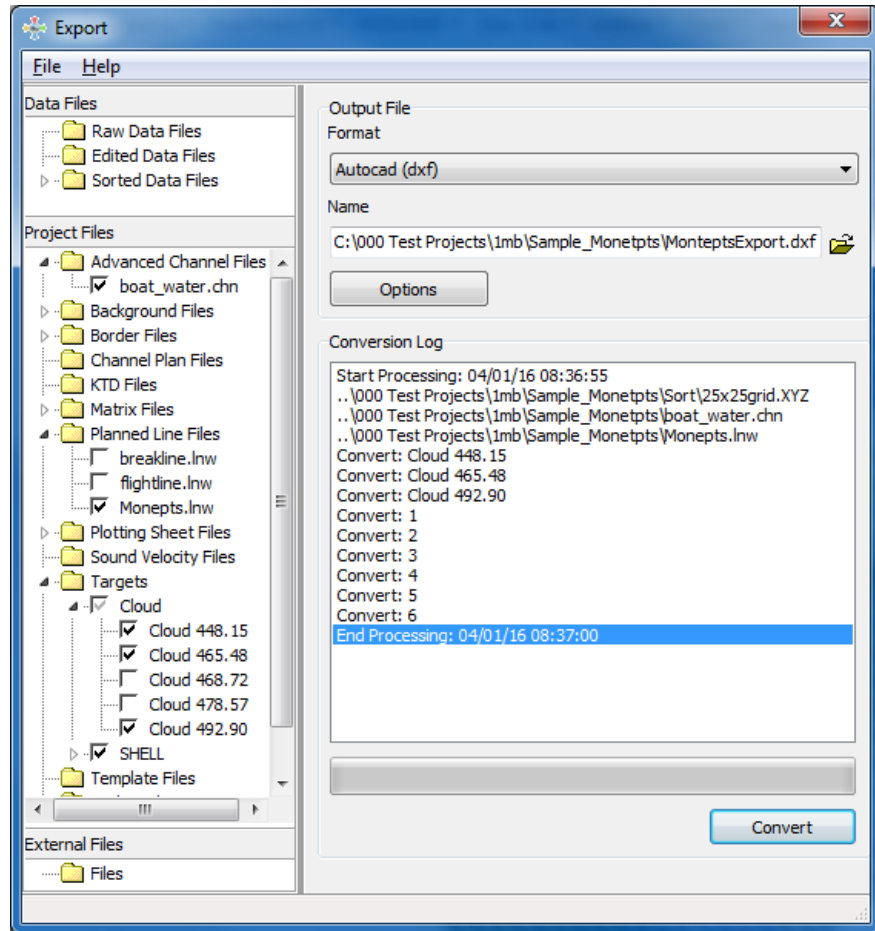
## RUNNING THE EXPORT PROGRAM

1. **Start the EXPORT program** by selecting FINAL PRODUCTS-EXPORT. All files associated with the project are loaded in their current enabled or disabled state to the EXPORT interface.

**Tip:** To quickly enable or disable all files, the File menu includes Check All and Uncheck All options.

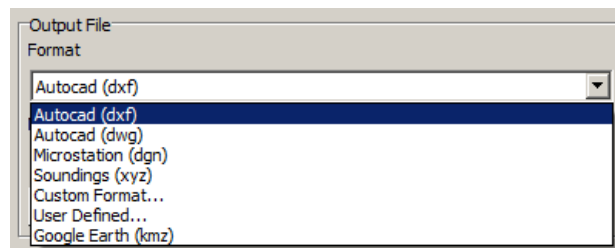


FIGURE 1. The Main Window of the EXPORT Program



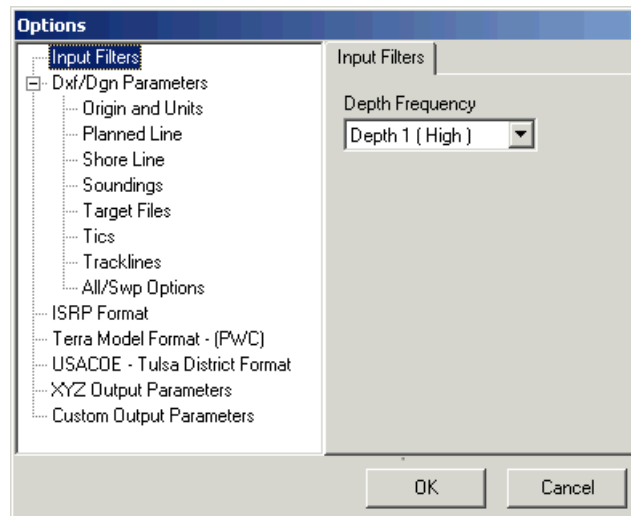
2. **Select the Output file type** to which you want to export from the Output File Format drop-down menu.

FIGURE 2. Selecting the Target Format



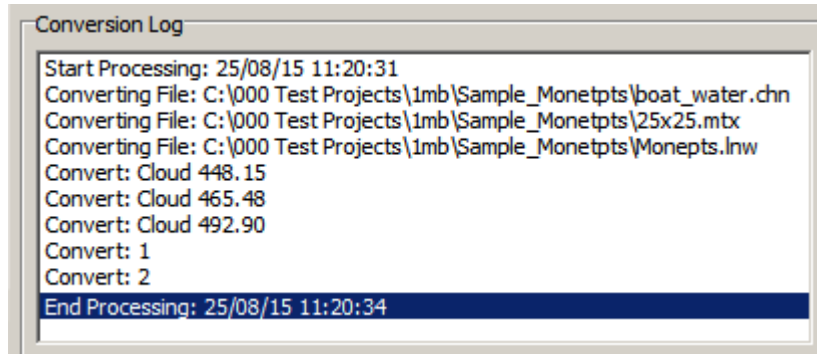
3. **Click the File Open icon and name your output file.** The path will default, in most cases, to your project directory. XYZ output formats default to the Sort directory.
4. **Select the file or files you want to convert** by enabling and disabling them in the file tree on the left side of the window as you would in the main HYPACK® SUB-BOTTOM screen. Files of types that can not be converted to the designated output format are marked with X's.
5. **Add External files (optional).** These are files that were not part of your project when you started EXPORT TO CAD, but you want to add them to your exported project data. Select FILES-ADD FILES or right click on the Files folder in the External Files list and select "Add File(s)". A File Selection Dialog will appear for you to browse for additional files.
6. **Set your Input and Output Options.**

**FIGURE 3.** *Export Options Dialog*



- a. **Click [Options]** or F9 to access the Options dialog.
- b. **For each option applicable to your output file type on the left, select the option and set the related options displayed on the right.**
- c. **Click [OK].**
7. **When your list is complete and all parameters have been set, click on [Convert]** (or select FILE-CONVERT). The conversion will be made and you can see its progress in the conversion log which is displayed on the screen.

FIGURE 4. Conversion Log

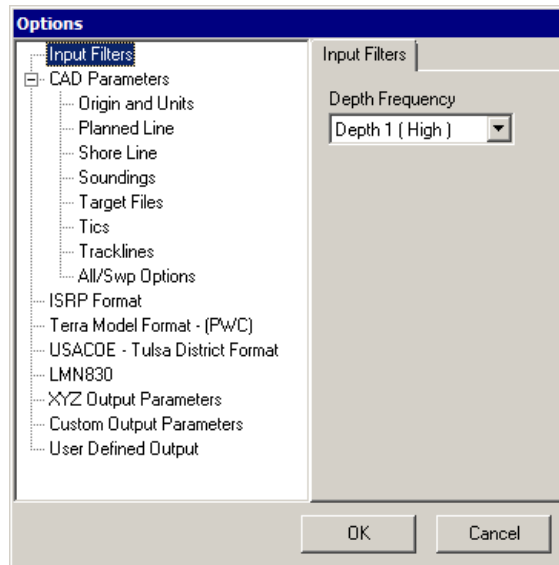


**NOTE:** This shows which files have been successfully converted and if, for some reason, any have not.

## EXPORT OPTIONS IN EXPORT

**[Options]** opens the Export Options dialog where you can control how your data is output. It is a multi-tabbed dialog. Access each tab through the navigation bar.

FIGURE 5. Export Options Dialog

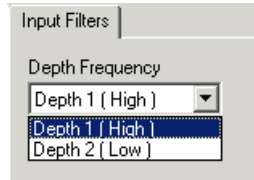


Enter your settings on each tab applicable to your chosen output format.

## INPUT OPTIONS IN EXPORT

For dual frequency data, use this dialog to elect to convert either Depth 1 or Depth 2 to your exported files.

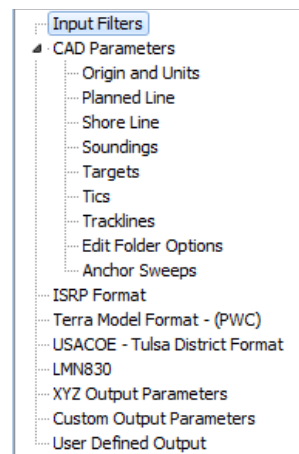
FIGURE 6. Input Filters



## CAD OUTPUT SETTINGS IN EXPORT

Define the output settings pertinent to creating DXF, DGN or DWG Files and the Source File types you are exporting to them. The Origin and Units information must only be provided if you are converting to DGN format.

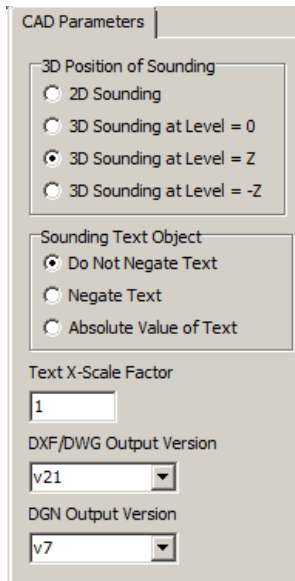
FIGURE 7. CAD Parameters Menu



### CAD PARAMETERS

The CAD settings are for creating the chart regardless of which features are included.



**FIGURE 8.** CAD Parameters Dialog

**3D Position of Sounding:** When any object (point, text, or line object) is stored in a CAD file, it has a physical X, Y, and Z position in the model. A sounding at a depth of 25.0 has a default Z value of 25.0. This option lets you manipulate that physical position in the model as follows:

- **2D Sounding:** For older CAD formats, there is no Z value associated with the object. This is essentially the same as the **3D Sound at Level = 0** option.
- **3D Sounding at Level = 0:** Stores the object at  $Z = 0$ .
- **3D Sounding at Level = Z (Default):** The object's Z value is the actual depth/elevation of the sounding.
- **3D Sounding at Level = -Z:** Stores the object at the inverse of the actual depth/elevation of the sounding.

**Sounding Text Object** specifies how the object is displayed. A sounding will be represented either by a text object or by a polyline object (vector soundings). With this option, you can manipulate that. The options are:

- **Do Not Negate Text (Default)** leaves the text as it is. If the sounding is 25.0, you see the text '25.0'.
- **Negate Text** inverts value of the sounding. If the sounding is 25.0, you see '-25.0'. If it's -25.0, you see '25.0'.
- **Absolute Value of Text** displays the absolute value of the sounding (both 25.0 and -25.0 are displayed as '25.0').

**NOTE:** The 3D Position of Soundings and Sounding Text Object act separately. Each will consider the *source* depth/elevation and make their adjustments accordingly.

**FIGURE 9.** 3D Position of Sounding and Sounding Text Object with Positive Soundings

Sounding: 25.0	Do Not Negate Text	Negate Text	Absolute Value of Text
<b>2D Sounding</b>	Object: 0.0 – n/a Text: “25.0”	Object: 0.0 – n/a Text: “-25.0”	Object: 0.0 – n/a Text: “25.0”
<b>3D Sounding at Level = 0</b>	Object: 0.0 Text: “25.0”	Object: 0.0 Text: “-25.0”	Object: 0.0 Text: “25.0”
<b>3D Sounding at Level = Z</b>	Object: 25.0 Text: “25.0”	Object: 25.0 Text: “-25.0”	Object: 25.0 Text: “25.0”
<b>3D Sounding at Level = -Z</b>	Object: -25.0 Text: “25.0”	Object: -25.0 Text: “-25.0”	Object: -25.0 Text: “25.0”

**FIGURE 10.** 3D Position of Sounding and Sounding Text Object with Negative Soundings

Sounding: -25.0	Do Not Negate Text	Negate Text	Absolute Value of Text
<b>2D Sounding</b>	Object: 0.0 – n/a Text: “-25.0”	Object: 0.0 – n/a Text: “25.0”	Object: 0.0 – n/a Text: “25.0”
<b>3D Sounding at Level = 0</b>	Object: 0.0 Text: “-25.0”	Object: 0.0 Text: “25.0”	Object: 0.0 Text: “25.0”
<b>3D Sounding at Level = Z</b>	Object: -25.0 Text: “-25.0”	Object: -25.0 Text: “25.0”	Object: -25.0 Text: “25.0”
<b>3D Sounding at Level = -Z</b>	Object: 25.0 Text: “-25.0”	Object: 25.0 Text: “25.0”	Object: 25.0 Text: “25.0”

**Text X-Scale Factor:** Scales the text width to the user-specified text height.

**DXF/DWG Output Version and DGN Output Version:** Select the output version number for in the field appropriate to your chosen output format.

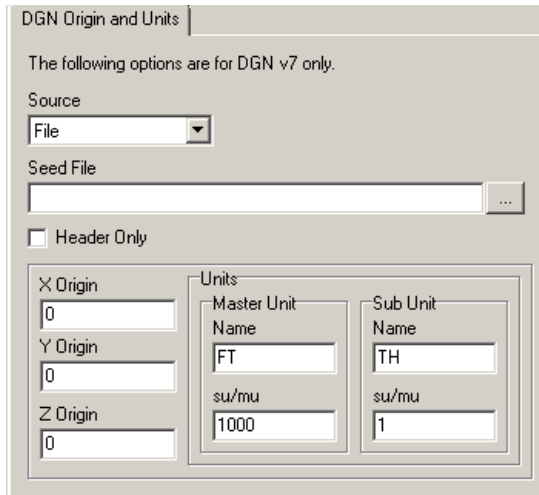
**DGN ORIGIN AND UNITS**

The DGN Origin and Units are used for two purposes:

- To combine project data with previously created DGN data (the seed file)

- To specify the origin, Master Unit and Sub Unit for a new DGN file.

**FIGURE 11.** DGN Parameters Window



**Source** enables you to select a DGN file from which you will read all data or only the header information. Reading the data will combine all data together in your exported DGN file.

**Header Only** reads the header from a previously created DGN file—the **Seed File**—to the header of the one you are creating, thus assuring the two files will overlay accurately.

Export File	Source	Header Only	XYZ, mu +su
<b>New DGN</b>	Custom	No	Yes
<b>New DGN to overlay Existing DGN</b>	File + Seed File	Yes	No
<b>New DGN combining Existing DGN with new data</b>	File + Seed File	No	No

**CAD PLANNED  
LINE  
PARAMETERS**

The Planned Line Parameters set what layer (DXF or DWG) or Level (DGN) in the output file the survey lines will be and provides labeling directions.

FIGURE 12. Planned Lines Parameters Window

CAD Planned Line Parameters

Layer Name / Level No  
Plan

Text Height  
10

Label Planned Lines  
No

Text Angle Style  
Perpendicular to Line 0

Export Template Where Available

**Layer Name / Level Number** is the layer or level your data will be written on in AutoCAD.

**To label the survey lines**, set Label Planned Lines to True and enter the Text Height and Angle Style.

**Text Height** is based upon “drawing units”, which will usually be feet or meters.

**Text Angle Style** can either be written perpendicular to the planned line, or at a user-defined, fixed angle.

**Export Template Where Available** extracts any line template information from a planned line file to include in the exported DWG, DXF, or DGN file.

## CAD SHORELINE PARAMETERS

The Shoreline Parameters set the location and label size of exported shoreline files.

FIGURE 13. Shoreline Parameters Window

CAD Shoreline Parameters

Layer Name / Level No  
Shore

Text Height  
10

**Layer Name / Level Number** is the layer or level your data will be written on in AutoCAD.

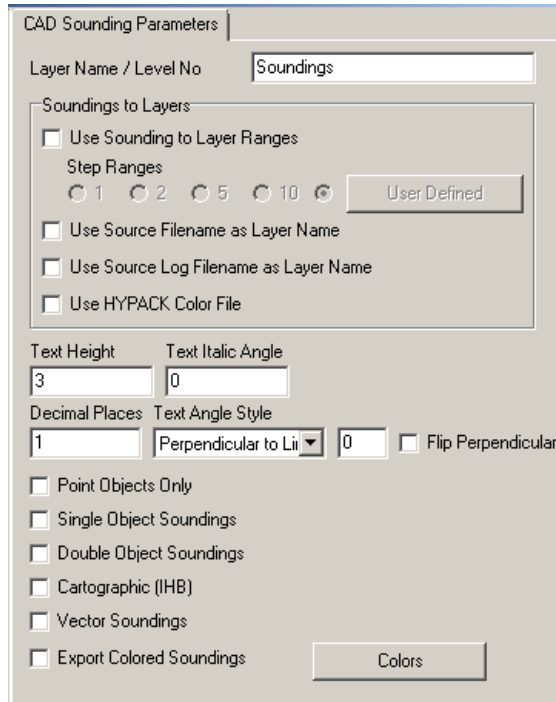
**Text Height** is based upon “drawing units”, which will usually be feet or meters.

## CAD SOUNDING PARAMETERS

The Sounding Parameters dialog defines how soundings will be output to the CAD output file. The input sounding file may be All, HS2, HS2X or XYZ format, or golden sounding point features. EXPORT honors the project rounding rules *for CAD output formats only*.

**NOTE:** Be sure to check the 3D CAD Dimension in the CAD Parameters. 2D DXFs contain no Z values, which defeats the purpose when you are exporting soundings.

**FIGURE 14.** Sounding Parameters Window

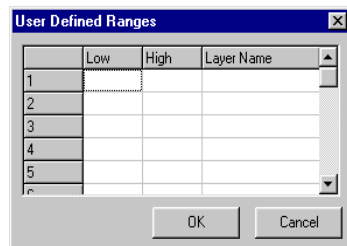


**Layer Name/Level Number** displays the default layer/level name of “Soundings”.

Soundings saved to CAD format can be saved to more than one layer according to depth ranges or source file names.

**To create layers based on depth ranges**, check Use Sounding to Layer Ranges. You can elect to create a different layer for every 1, 2, 5 or 10 survey units of depth, or you can define your own depth increments. Just click [User-Defined] and enter your depth ranges and layer names to the User-defined Range dialog.

**FIGURE 15.** User-Defined Depth Ranges for Each Exported Layer



**To create layers by source file name**, you must first choose whether to name your layers according to each individual data file

name or use the catalog file name. The following table compares each choice where the input data is the Hal0405.log which contains Hal0405.1, Hal0405.2 and Hal0405.3.

Option	Resultant Layer Name(s)
Use Source File Name as Layer Name	Hal0405_1, Hal0405_2 and Hal0405_3
Use Log File Name as Layer Name	Hal0405

**Use HYPACK Color File** sets layers and colors objects based on the selected HYPACK® SUB-BOTTOM color file (project colors).

**Text Height**, and **Text Angle Style** are the same as for Planned Lines.

**Text Italic Angle** affects the amount of slant in italicized text. The results are not visible in HYPACK® SUB-BOTTOM; they are only visible in the CAD program.

**Decimal Places** tells the program how many decimal places to export. Truncation and Rounding Rules are taken from the HYPACK® SUB-BOTTOM Control Panel.

**Flip Perpendicular:** Available only for All format files when the soundings are written perpendicular to line, this option rotates the text 180 degrees.

**Point Objects Only** places a dot at the sounding position. In a DXF file, it will appear as a dot. In a DGN file, it will appear as a small ellipse.

**Single Object Soundings and Double Object Soundings:**

- The **Single Object Soundings** option exports soundings, each as a complete object on the chart layer/level with the decimal point *approximately* on the sounding.
- The **Double Object Soundings** option places the decimal point separately and *more accurately* at the sounding position.

---

**NOTE:** The Single and Double Object Sounding options are unavailable for DGN v7 output.

---

**Cartographic Soundings** centers the integer portion of the sounding at the sounding location and then writes a smaller, lower fraction. If this is not selected, the decimal point will be centered on the sounding location. If the sounding is a negative value, the integer is underlined.

**Tip:** To more accurately position Cartographic soundings in your display, you should also select the Vector Soundings option.

## CAD TARGET PARAMETERS

**Vector Soundings** draws the soundings as a polyline instead of text. This option improves the precision of positioning the soundings in your display because it can better adjust for different fonts and export styles. This option can be used together with the Cartographic Soundings option. Otherwise, it places the decimal at the sounding location.

**Export Colored Soundings** color-codes the exported soundings according to the current project color settings. You can modify the colors through the standard Color Settings dialog. Click [Colors] to customize your sounding colors.

EXPORT only displays the target groups (not individual targets). However, when you select a target group in EXPORT, the exported file includes *only the targets that are enabled in the HYPACK® SUB-BOTTOM window*.

**NOTE:** When you open a project with legacy TGT format target files from earlier HYPACK® SUB-BOTTOM versions, HYPACK® SUB-BOTTOM automatically converts each TGT file to a target group.

The Target Parameter dialog sets the layer/level number and labeling information. It also enables you to input the Target Circle Radius and the Number of Circles that are drawn around each Target.

**FIGURE 16.** Target Parameters Window

## CAD PLOT/TIC PARAMETERS

This routine is used to include a Plotting Sheet File (\*.PLT) marked with projection tic marks and labels into a CAD drawing. (You probably want only one PLT file enabled at a time.)

In the Plot/Tic Parameters dialog, you can specify whether to draw the plotting sheet border (Plot Border) and grid tics (Plot Tics). You can also enter the Distance Between Tics and Tic Size (measured in "drawing units"—typically feet or meters), and choose on what

sides of the plotting sheet area you wish to label the tic marks. The grid labels will be formatted according to the HYPACK® SUB-BOTTOM display settings set in the control panel.

**FIGURE 17.** Tic Parameters Window

## CAD TRACK LINE EXPORT PARAMETERS

The Track Line Parameters sets labeling information for the event marks on the Track Lines layer.

**Select to label Events** by selecting either **Events** (Event Number) or **Time** in the Label Events field. Set the **Text Height** and **Text Angle Style** as you did for Planned Lines. A **Circle Radius** greater than 0 draws a circle at that distance around each event.

**Use Line Name as Layer Name** exports the track line for each survey line to a separate DXF layer and names the layers according to the survey line name. If this is not selected, all track lines will be stored on 1 layer.

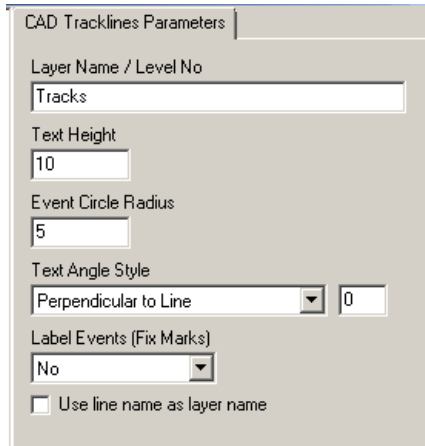
---

**NOTE:** This option is unavailable for DGN v7 output.

---



FIGURE 18. Track Line Parameters Window

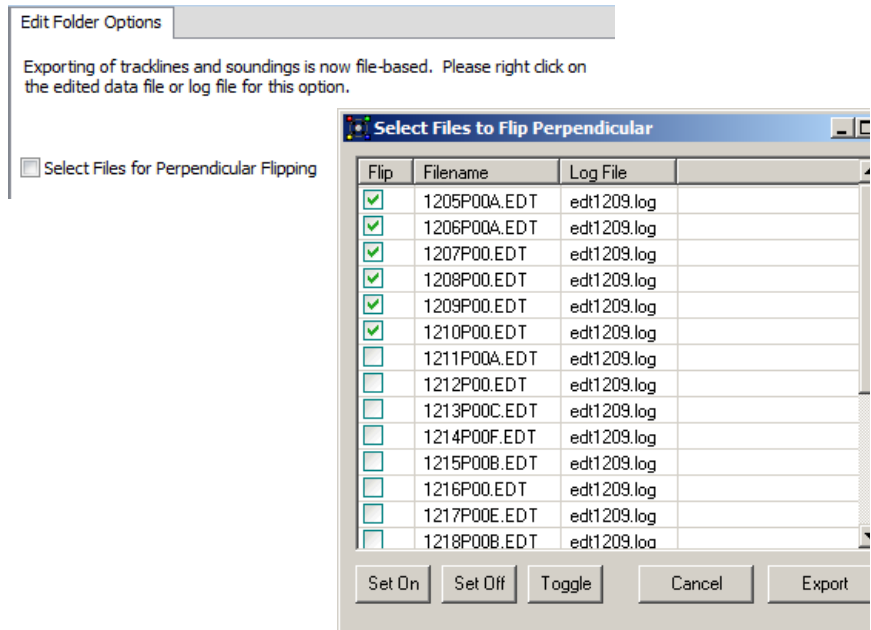


**EDIT FOLDER  
PARAMETERS**

**Track lines and Soundings:** Right-click on each catalog or edited ALL2 format file and choose to export the track lines, the soundings or both.

**Select Files for Perpendicular Flipping:** Available only for All format files whose soundings are drawn perpendicular to the line. Check this option and, when you click [Convert], a dialog will appear where you choose the lines on which the soundings will be rotated 180 degrees.

FIGURE 19. All Output Options



To select the each line individually, check its associated 'flip' box.

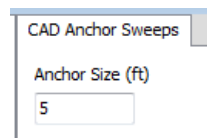
**To work with multiple lines:**

1. **Select multiple lines by clicking the Filenames.** (The files highlight.) Use the Shift key to select contiguous files or the Ctrl key to select multiple noncontiguous files.
2. **Use the buttons at the bottom to manage the checkbox status** of the selected files.
  - **[Set On]** checks all selected files.
  - **[Set Off]** clears the checkboxes for all selected files.
  - **[Toggle]** reverses the check status of all selected files.
3. **Click [Export]** to continue the conversion process.

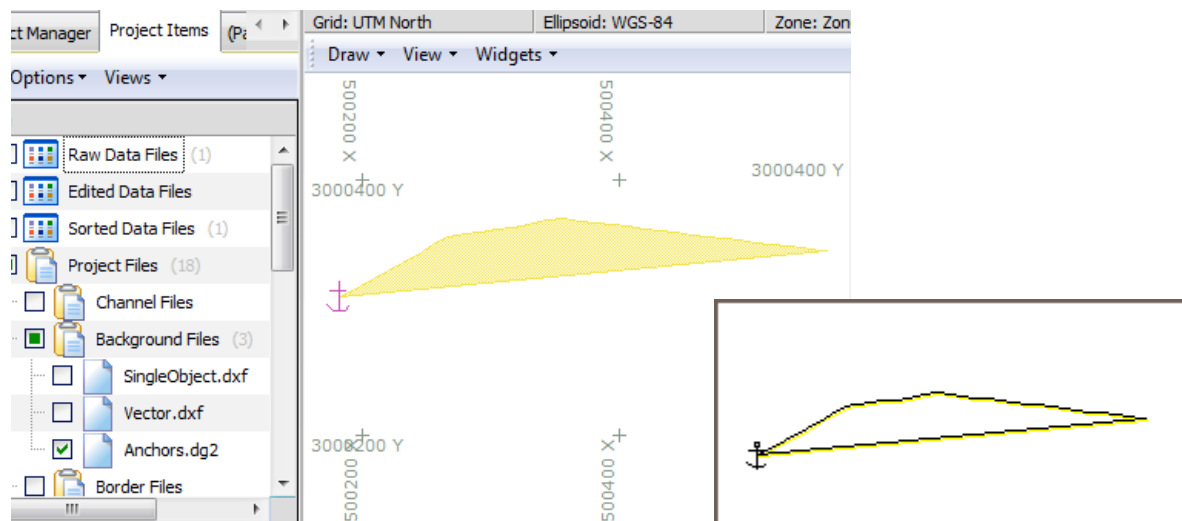
## ANCHOR SWEEP PARAMETERS

Anchors.DG2 represents the project anchor sweeps. When exported to CAD formats, an anchor symbol of user-defined size (survey units) appears at the anchor drop position.

*FIGURE 20. Anchor Sweep Options*



*FIGURE 21. Anchors.DG2 (left) and Anchors.DXF (right)*



## XYZ PARAMETERS IN EXPORT

If you prefer to export your data to XYZ format, use the XYZ Parameters to specify how the data will be output. You can use this method to convert a DXF file to a TIN Model. Just export the soundings and polylines from the DXF file to an XYZ file that can then be used in the TIN MODEL program. You could also export

soundings from a DGN or DXF chart by selecting the sounding level/layer and export the soundings to XYZ format which can be displayed in HYPACK® SUB-BOTTOM.

**Output Format** provides a choice of data combinations and orders.

The **Decimals options** set the number of decimal places to be exported with the data. The X and Y values will have the same number of places. You may choose a different number for the Z value.

---

**NOTE:** Reducing the number of decimal places reduces the accuracy and affects volumes calculations.

---

**Z-Offset** adds the offset value to the Z value in your data set before it is exported to your file. If you have selected *Invert Z Value*, that operation occurs first. This combination comes in handy for those surveying at elevations but prefer to keep everything in depth mode until the end. In this case, if you have a depth of 20 and Z Offset of 1000, the exported Z value will be 980 (-20 + 1000).

**Comma Delimited** set to True will insert commas between each field in the output; otherwise there will be a space.

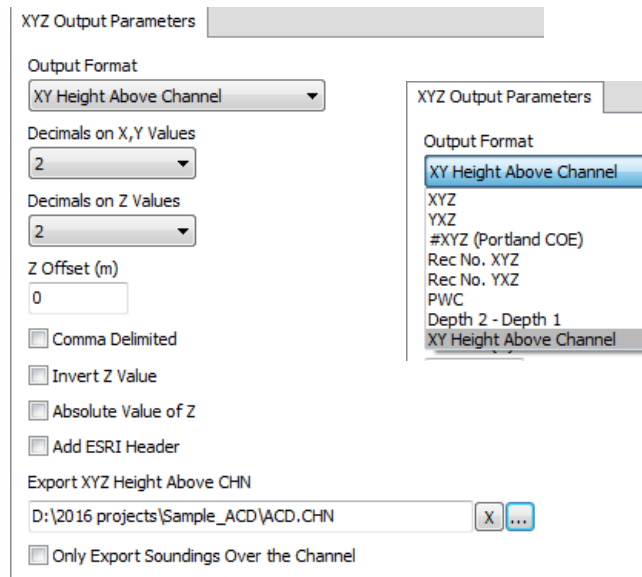
**Invert Z Value** negates the current depth value in the export file unless you are also exporting XYZ soundings. In this case, the sign designated for soundings in the XYZ Parameters dialog may override this option.

**Absolute Value of Z** outputs the current depth value as a positive number.

**Export XYZ Height above CHN** works with the XY Height above Channel output option to export the height difference between a user-specified channel file (\*.CHN) and the soundings. (Negative values indicate the sounding is below the channel level.) It exports nothing where the soundings fall horizontally outside the channel.

- **To select the channel** against which you want to compare your soundings, click [...] and select the CHN file.
- **To include *only* soundings above the channel**, check the Omit Points Below Channel option.

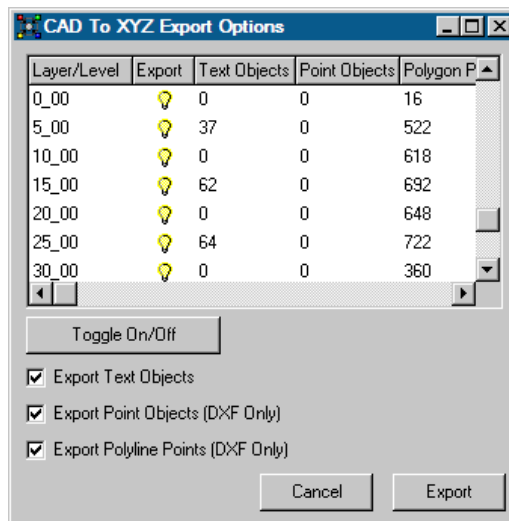
**FIGURE 22.** XYZ Parameters Window with Output Format Options



If you are exporting CAD Formats to XYZ, EXPORT analyzes the DXF or DGN file and displays a listing of the layers/levels in the file and the number of convertible (point, polyline and text) objects on each. By default, all of the layers/levels are selected (the light bulb icon is yellow).

1. **Select which layers you want to include** in the exported file by double clicking the corresponding icon in the Export column (or by selecting the icon and clicking [Toggle On/Off]). A gray light bulb is not selected.

**FIGURE 23.** Exporting CAD to XYZ

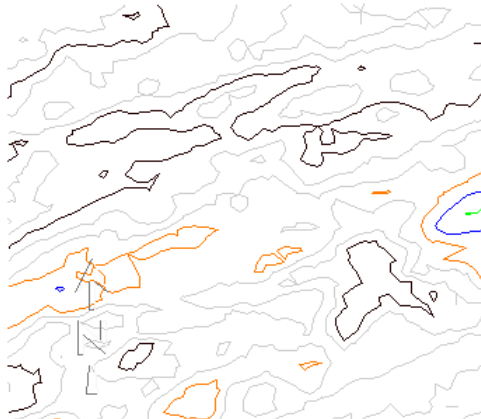


2. **Choose whether to export text, point, polygon objects or any combination** by checking the corresponding checkboxes.
3. **Click [Export]** to continue the conversion.

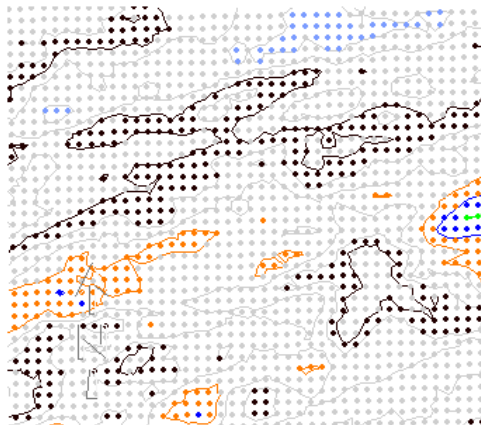
EXPORT converts object type a bit differently as follows:

- **Point objects:** The X,Y,Z values are written to the text file.
- **Text objects:** Writes the X and Y values of the objects, but uses numeric values of the text as the Z value.
- **Polyline Points:** Writes X and Y values of each vertex, but uses 0 as the Z value.

*FIGURE 24. Original DXF Chart*



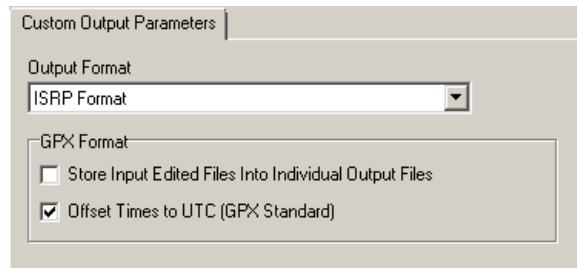
*FIGURE 25. Exported XYZ Overlaid on the Original DXF*



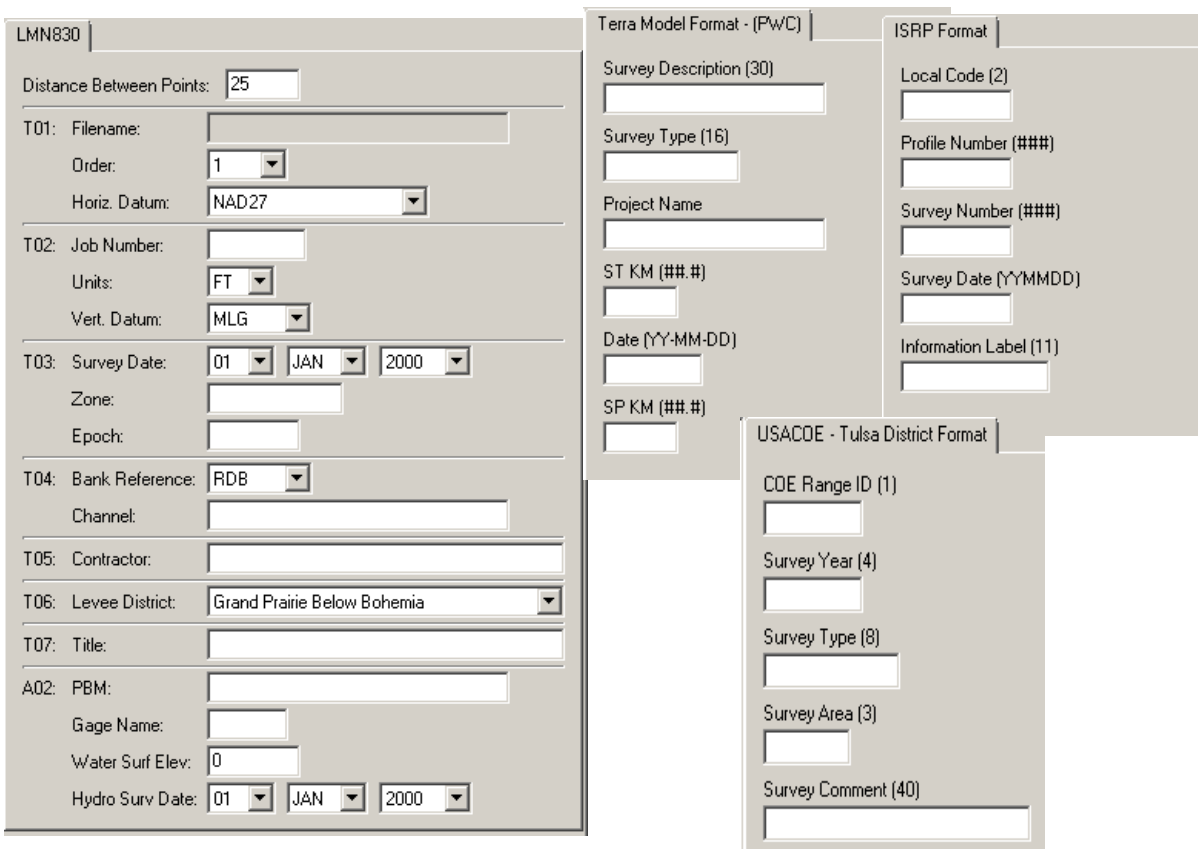
## **CUSTOM OUTPUT FORMATS IN EXPORT**

There are several pre-defined custom formats that can be selected in the Custom Formats dialog. The ISRP, Terra Model and Tulsa COE formats require additional information in their corresponding dialog. GPX format has additional options below the output selection.

**FIGURE 26. Selecting Custom Output Formats**



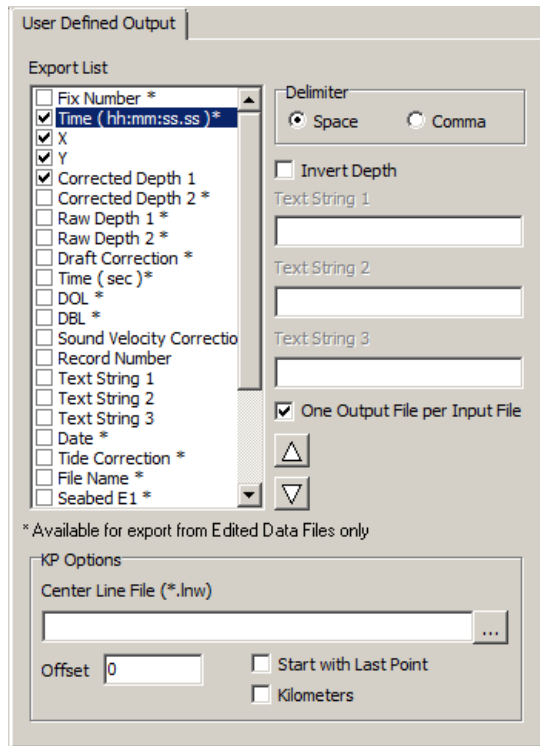
**FIGURE 27. Custom Output Parameters Vary with the Selected Output**



## USER-DEFINED OUTPUT FROM EXPORT

The user-defined output options enable you to extract data from edited ALL Format files and custom format your output strings. Just select the User-Defined option and define your ASCII output sequence.

**FIGURE 28.** User-defined Output Dialog

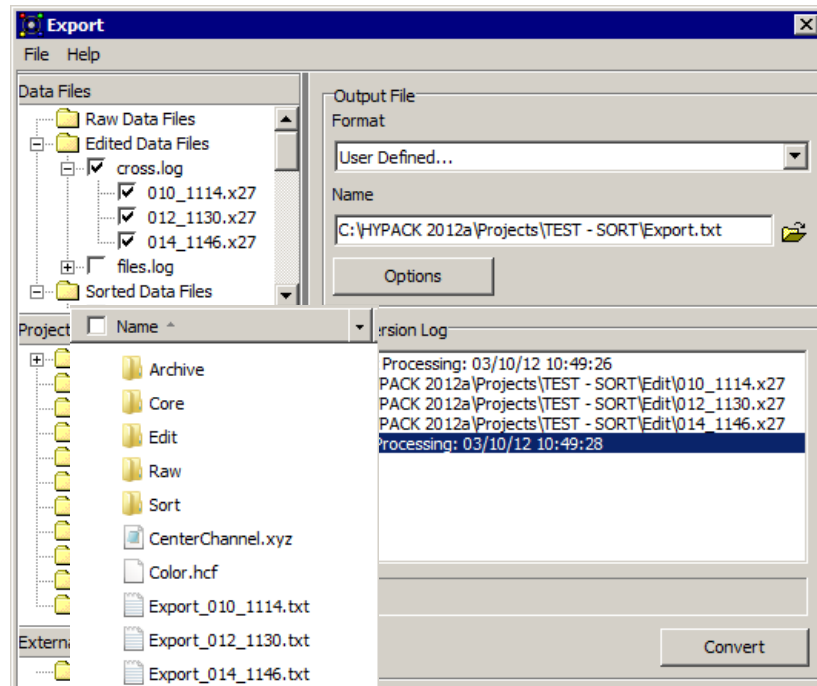


1. **Select each item to include** by checking the corresponding checkbox in the list.
2. If you need to **add a constant string that is not listed**, select one of the “Text String” options and type the string in the corresponding field.
3. **Arrange the order of the items** in the string by selecting an item and moving it up or down in the list using the arrow buttons.
4. **Choose the Space or Comma delimiter.**
5. **If you want to invert your depths**, check the “Invert Depth” box.
6. **Choose whether to generate separate files for each input file.**
7. **Set your [KP options](#)** (Optional).
8. **Click [OK]** to return to the EXPORT interface.

*One Output File  
per Input File*

EXPORT generates one text file for each input named *OutputFileName\_InputFileName.txt*. In the following figure, the Output File Name is ‘Export’ so, when we convert 010-1114.x27, the resulting output file is *Export\_010-1114.txt*.

FIGURE 29. Exporting One File per Input File



### KP Options

Select the 'KP' export item, you must enter the information in the KP Options section. For each sounding in an XYZ or All format file, the KP item exports the distance from the beginning or end of a user-defined center line.

- **Center Line File:** The line file (\*.LNW) defining the center line. It should contain only the center line.
- **Offset:** The distance either side of the defined center line where EXPORT should include.
- **Start with Last Point:** Select this option to export distance from the *end* of the center line.
- **Kilometers:** The default unit of measure is meters. Check this option to output kilometers instead.

The program will take the selected information from each record in the Input file and send it to the specified Output file. Lat/Lon formatting is determined by your settings in the HYPACK® SUB-BOTTOM Control Panel.



---

The following sections include information and tasks for the system administrator to reference after the initial installation to the HYPACK® SUB-BOTTOM computer and typically before building HYPACK® SUB-BOTTOM projects.

- **Install your software.**
- **Configure your system settings.**
- **Importing Global Settings** simplifies the process of upgrading HYPACK® SUB-BOTTOM by copying a lot of HYPACK® SUB-BOTTOM configuration settings that are not specific to a particular project.
- **User Permissions** can be configured to limit which modules are available to each person or group of people who use HYPACK®.

---

## **HYPACK® SUB-BOTTOM MINIMUM SYSTEM REQUIREMENTS**

The following are the *minimum* requirements to run these programs. Particularly if you are working with multibeam or side scan data, a good gaming computer (large RAM, multiple CPU cores and fast graphics) will be much more efficient.

---

**NOTE:** To run the 64-bit modules, you must install HYPACK® SUB-BOTTOM on a computer with 64-bit capability.

---

TABLE 1. Minimum System Requirements

		HYPACK® SUB-BOTTOM	HYSWEEP®
<b>Operating System</b>		Windows® 7, Windows® 8, Windows® 10	
<b>Processor</b>	Windows® 7,8 or 10	1 GHz or faster	
<b>RAM<sup>a</sup></b>	Windows® 7, 8 or 10	4 Gb	
<b>Hard Drive</b>		20 Gb	120 Gb with backup <sup>b</sup>
<b>Monitor</b>	Resolution	1024x768	
	Colors	32-bit	
<b>Dongles</b>		Dongles are USB devices required by HYPACK® SUB-BOTTOM to activate the program modules associated with the license purchased.	

- a. Increased RAM will speed the performance of many programs significantly. In this case more is better.
- b. Multibeam and side scan data files are very large. Depending on your project, you may need a larger hard drive.

## INSTALLING YOUR SOFTWARE

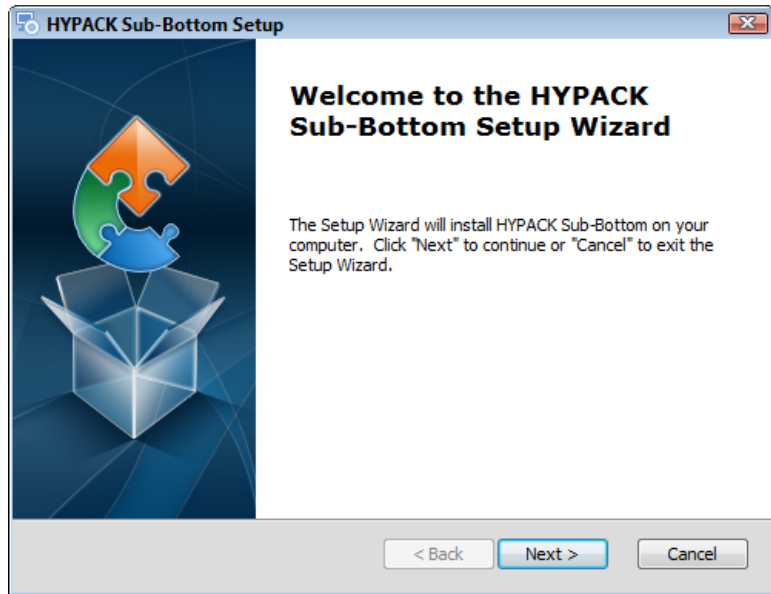
The HYPACK® Sub-Bottom program can be installed from a CD or by downloading the HYPACK\_SubBottom\_Setup.exe file from the HYPACK website ([www.hypack.com](http://www.hypack.com)).

1. **Start the installation program.** The following screen appears.

**FIGURE 1.** First Installation Screen

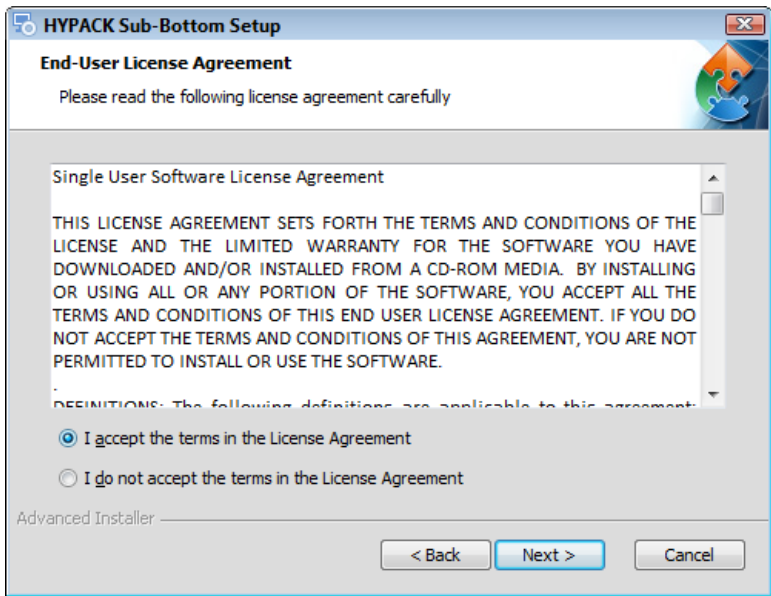
2. **Click on the “Install HYPACK® Sub-Bottom” menu item.** The program checks your available memory on your hard drive. If there is enough space to install the package, the Welcome page appears.

FIGURE 2. The Welcome Page



3. Click [Next] button to continue the installation.
4. Review the HYPACK® SUB-BOTTOM End-User License Agreement. Read it carefully.

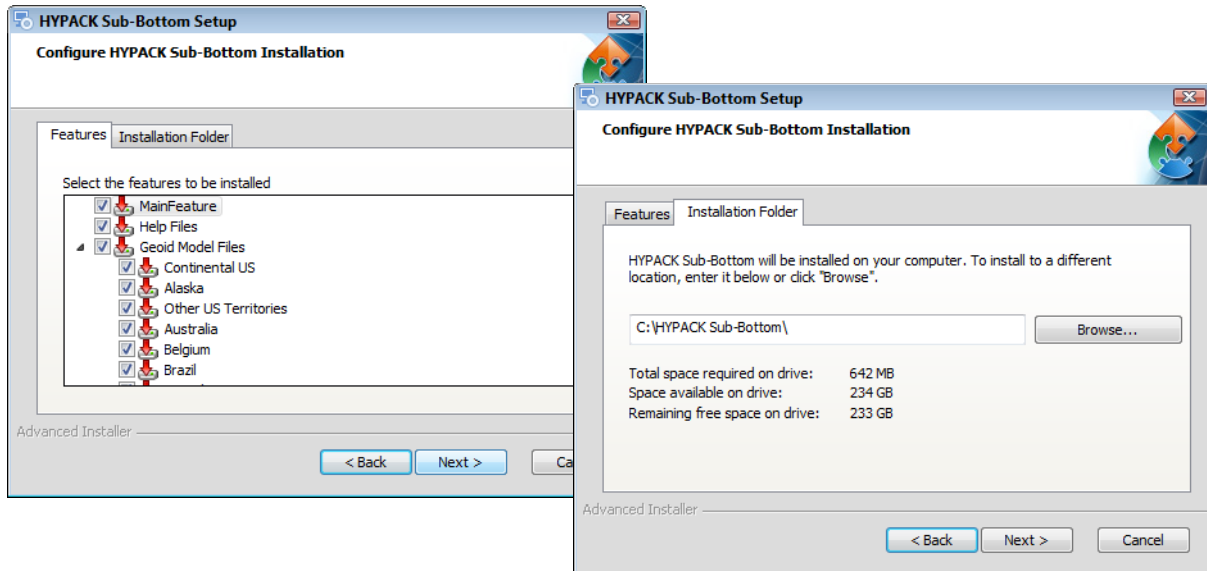
FIGURE 3. HYPACK® Sub-Bottom End User License Agreement



5. If you agree to the terms, check the "I accept the terms in the License Agreement" checkbox and click [Next]. The Custom Setup dialog appears next.  
If you don't agree to the terms, contact HYPACK Sales and arrange to return the software.

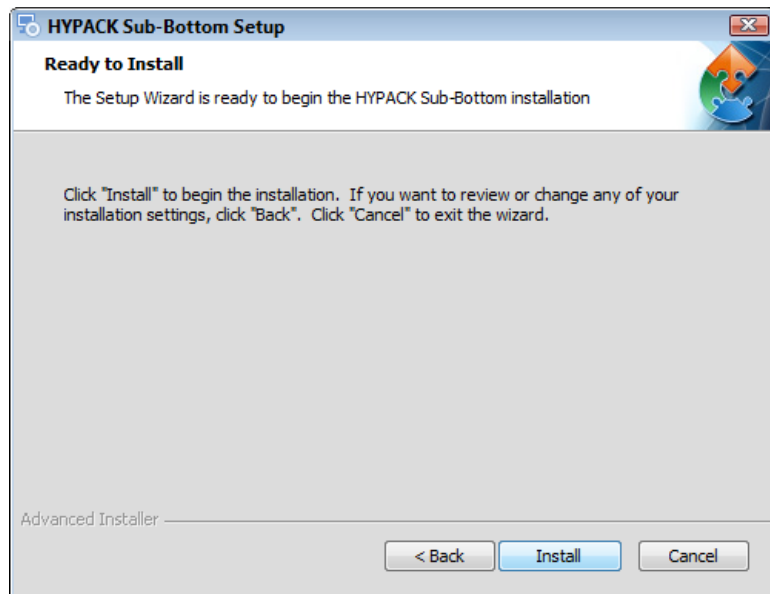
- In the Custom Setup dialog, **select the folder where the software will be installed and click [Next]**. It defaults to the C:\HYPACK Sub-bottom SubBottom folder. We recommend you use this folder.

**FIGURE 4.** HYPACK® Sub-Bottom Custom Setup Dialog



**IMPORTANT!** If you have other HYPACK® SUB-BOTTOM software installed on the computer, *do not install the HYPACK® Sub-Bottom package to those folders* (HYPACK 20xx).

- In the Install window, **click [Install]** and the software will be copied onto your hard drive. This might take a couple of minutes. The HYPACK® Sub-Bottom dialog shows the install progress.

**FIGURE 5.** *Installing HYPACK® Sub-Bottom*

8. **When the installation has finished copying the files, click [Finish] and the Install window reappears.**
9. **Close the Installation program.** Click the “Exit” menu item.

#### More Information

- [“Windows® System Settings”](#) on page 6-5
- [“Network System Requirements”](#) on page 6-8
- [“HYPACK® SUB-BOTTOM Licensing”](#) on page 6-9

## WINDOWS® SYSTEM SETTINGS

There are a few system settings that affect the proper function of HYPACK® SUB-BOTTOM. For best results, check the following options before you begin.

- Windows® User Account Controls
- Windows® Regional Options
- Windows® 7 Data Execution Prevention setting
- Firewall
- Windows® updates: HYPACK® SUB-BOTTOM, like any software that runs on Windows® machines, uses the most up-to-date Windows® drivers and runtime libraries. So should you.

## USER ACCOUNT CONTROLS IN WINDOWS®

User account controls (UAC) have been responsible for various erratic HYPACK® SUB-BOTTOM issues. Some of these occur during installation. The UAC also interferes with time synchronization capabilities. For this reason, we recommend that you turn the user account control off.

### To turn off the User Account Control:

1. **In the Windows® Control Panel, go into 'User Accounts and Family Control'.**
2. **Select 'User Accounts'.**
3. **Click on the option to 'Turn User Account Control on or off'. A new dialog will appear.**
4. **Clear the 'Use UAC to help protect your computer' checkbox.**
5. **Restart the computer to put your change into effect.**

## WINDOWS® REGIONAL OPTIONS

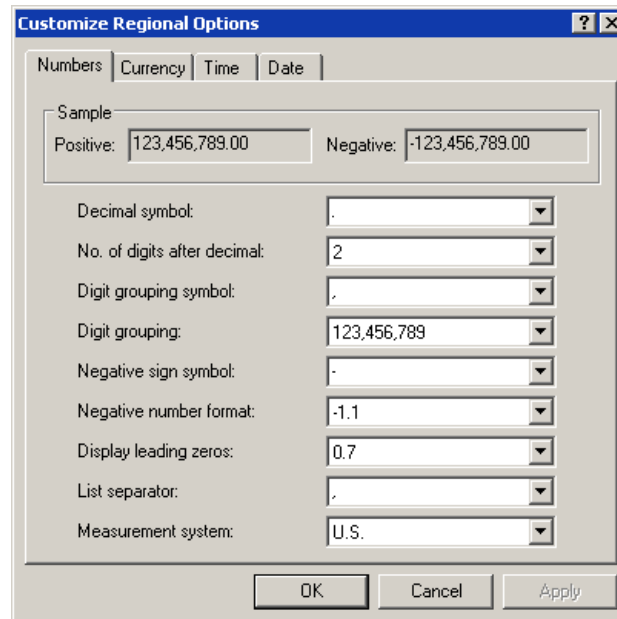
There are varying conventions for numerical notation throughout the world. In the United States, we use a comma for digit grouping (ex. 12,345) while some of our users abroad use a period. Similarly, where in the States we use a period as the decimal symbol (56.13), some of our users use a comma.

HYPACK® SUB-BOTTOM uses the American convention using a period for the decimal symbol and a comma for digit grouping. Problems arise if your Windows® settings for these options are not set to use the same convention.

When you install HYPACK® SUB-BOTTOM, you may see a small warning that your settings are not compatible.

### To change your conventions for numeric notation:

1. **Click the Windows® Start button-SETTINGS-CONTROL PANEL.**
2. **Select REGIONAL AND LANGUAGE OPTIONS.**
3. **In the General tab, click [Customize].** The Customize Regional Options dialog appears.

**FIGURE 6.** Customizing your Numeric Notation Conventions

4. In the Numeric tab, set the Decimal Symbol to '.' and your Digital Grouping symbol to ','.
5. Click [OK].

## WINDOWS® 7 DATA EXECUTION PREVENTION SETTINGS

Some of our users on Windows® 7 machines have had periodic exception errors when they tried to launch certain HYPACK® SUB-BOTTOM modules (GEODETIC PARAMETERS and SURVEY). The problem originated with the Windows® Data Execution Prevention (DEP) function. The solution: limit this function to Windows® programs and services.

### To modify your DEP setting:

1. In the Windows® Control Panel, open 'System and Security' and click the System link.
2. Click on the Advanced system settings link in the navigation bar. The System Properties dialog will appear.
3. In the Advanced tab, click [Settings]. The Performance Options dialog will appear.
4. In the Data Execution Prevention tab, select 'Turn n DEP for essential Windows® programs and services only' and click [OK].
5. Restart your computer for these changes to take effect.

## FIREWALLS

Your firewall settings can affect HYPACK® SUB-BOTTOM performance when you are working with network connections. As technology advances, HYPACK® SUB-BOTTOM uses network connections increasingly more often. These applications include such uses as:

- Network dongles
- Network connections in the hardware configuration
- Using the OPC server in dredge configurations

Any time you have network connections, the firewall can interfere with required HYPACK® SUB-BOTTOM function of these connections.

**The solution:** Take your computer off the Internet and turn off your firewall.

---

## NETWORK SYSTEM REQUIREMENTS

Users can share project data across a network. You can elect to share projects on your computer with other users on your network or you can use a designated computer as a central storage facility and all users can access projects from that location.

Unless you specify otherwise, HYPACK® SUB-BOTTOM still defaults to the directories in your \HYPACK Sub-bottom\Projects\*ProjectName* folder so, if you prefer, you can use HYPACK® SUB-BOTTOM without the network capability.

---

**NOTE:** If you decide to have a computer act as your storage location, that computer does not need a HYPACK® SUB-BOTTOM dongle. Only computers that actually run HYPACK® SUB-BOTTOM require a dongle.

---

The network capability was originally developed to access and share your projects in the office. During SURVEY, it is possible to load a network project and log the data directly back to the network computer *only if you have totally reliable Ethernet (not WiFi) connections. If your hardware configuration includes serial devices, we recommend that you only log data to the same computer that is running the SURVEY program.*



**Tip:** Alternatively, you can use the SURVEY DATA TRANSFER program, which runs simultaneously with HYPACK® SURVEY, to send a *copy* of your data files to a user-defined location via a LAN



or Internet connection. You can instruct the program to send the data at the end of each line or when you close HYPACK® SURVEY.

There are some system rules that must be followed for networked projects to work completely. All further references in this manual to working with projects over the network will assume that these conditions have been met.

- **All computers to which the project refers must stay on the network.** If your project refers to a computer that has been disconnected from the network, those files will be listed in the Project Items list, but they will be marked with a red 'X' to indicate that they are unavailable. Of course, if the computer with the project file is off of the network, no one can open the project at all!
- **All computers with files included in the project must share those directories with both read and write capabilities** through the Windows® operating system. An unshared folder is as unavailable as if the computer was turned off. A read-only file can not interact with the other files in the project in order to do the work that you are trying to accomplish.
- **All files included in the project must remain in the same location.** If you move files, you must reload them to your project. Otherwise, the file will be marked with a red X indicating that it is unavailable.

#### More Information

- [“SURVEY DATA TRANSFER”](#) on page 3-78

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## HYPACK® SUB-BOTTOM LICENSING

Anyone, whether they own a HYPACK® SUB-BOTTOM license or not, can use the HYPACK® SUB-BOTTOM shell to view project data. You can change display options, and enable and disable files to view your data as you choose.

A dongle is required by HYPACK® SUB-BOTTOM to activate the program modules associated with the license purchased. The dongle is also encoded with permit numbers required to display S63 or ARCS electronic charts.

The **License Manager** runs the dongle test. The program reads your license information and displays your dongle status and permit numbers.

HYPACK® SUB-BOTTOM dongles have the following features:

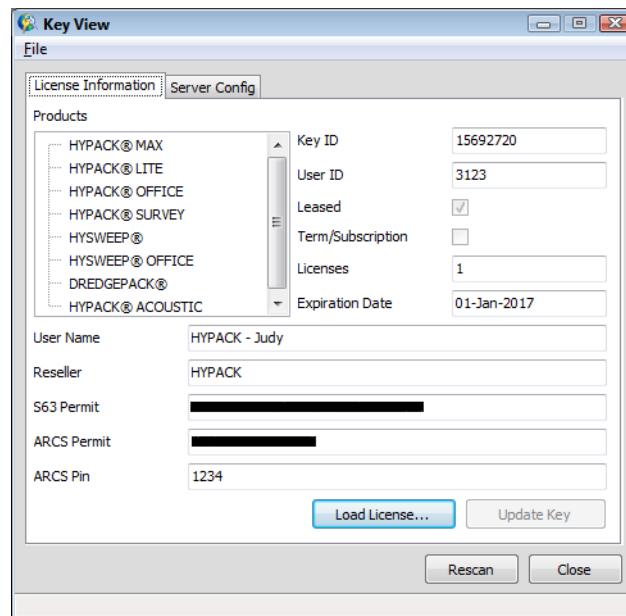
- **Programmable expiration date:** The keys will be burned with the your maintenance plan expiration date. After this date, the dongle will not allow you to run further program upgrades until your license is renewed. (Leased dongles will not allow you to run HYPACK® SUB-BOTTOM after the lease expiration.)
- **Allows renewal over the Internet:** When your license is renewed, HYPACK will email you a license file which is used to update your dongle information.
- **Allows multiple users to use one dongle on a local network.** One dongle on a specified computer in your office can be used for 'n' users (5, 10, 12, 25, etc.). The dongle automatically limits the number of users at any one time to the number of license purchased for this key.

All of these functions will be managed through the License Manager.

## LICENSE MANAGER

The LICENSE MANAGER reads your HYPACK® SUB-BOTTOM license information from your dongle and displays your dongle status.

**FIGURE 7.** LICENSE MANAGER



- **All dongle types detected** will be listed under Modules. If it detects no key, it displays a dialog with direction to either attach

your key and try again or define a new network location where your network key is found.

- **MP (Maintenance Plan) Ending:** HYPACK® SUB-BOTTOM continues to function, but *any program updates after this date* will not run. You can arrange with our Accounting department (MP@hypack.com) to renew your Maintenance Plan over the Internet.
- **Leased:** If this option is checked, the dongle will not be recognized and *HYPACK® SUB-BOTTOM will not run on leased keys after the expiration date.*

**[Rescan]** repeats the test.

## UPDATING YOUR LICENSE

When your maintenance plan or lease nears expiration, you must contact HYPACK to arrange for renewal if you want to continue to receive program updates and new releases past your expiration date. When the proper arrangements have been made with our accounting department, we will email you a license file. (You may receive these burned to CD by special request.)

1. **Copy the license file to your hard drive.** The location on the hard drive is unimportant. (If you copy it from a CD, be sure the file on your hard drive is not read only.)
2. **Select SETTINGS-CHECK HARDLOCK** to access the License Manager.
3. **Click [Load License File].** A File Select dialog will appear
4. **Select your license file and click [Open].** The new license information will display in the License Manager.
5. **Verify the new information is correct.** The MP Ending date should match your new Maintenance Plan Expiration date.

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**IMPORTANT!** If, by chance, an error is made in generating your license file, you may not be able to run the modules for which you have purchased licenses.

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6. **Click [Update Key].** This checks that the key number matches the license information, then updates the key to run HYPACK® SUB-BOTTOM according to your license.

