WinFrog Device Group:	**Output**
Device Name/Model:	**Simrad SDP24**
Device Manufacturer:	**KONGSBERG SIMRAD AS** DYRMYRGATA 35, P.O. BOX 483 3601 KONGSBERG NORWAY Phone: 47 32 28 50 00; Fax: 47 32 73 59 87 E-mail: WebOffice@kongsberg.simrad.com http://www.kongsberg-simrad.com/ **KONGSBERG SIMRAD INC.** 7250 LANGTRY STREET HOUSTON TX 77040-6625, U.S.A. Phone: 1 713 934 8885; Fax: 1 713 934 8886
Device Data String(s) Output to WinFrog:	Tension (tons) from COUNT and PLOWDATA data items. (PLOWDATA converted to tons from kN). Raw data stored in originating device.
WinFrog Data String(s) Output to Device:	NMEA strings: $GPGGA, $GPVTG, $PRTNW, $PSWCH. See Configuration Details.
WinFrog .raw Data Record Type(s):	Type: 450

DEVICE DESCRIPTION:
Kongsberg Simrad Dynamic Positioning (SDP) control systems integrate control of the vessel's propulsion systems via inputs from positioning systems, gyrocompasses, wind speed and direction monitoring equipment, and any other sensors which can assist with the automatic positioning of the vessel.

Commands to the thrusters can be based on two main types of systems. The first version has conventional cabling of signals to and from thrusters; while the second version has dual net communication. These commands control the dynamic positioning system, thruster control, power management and other vessel control systems.

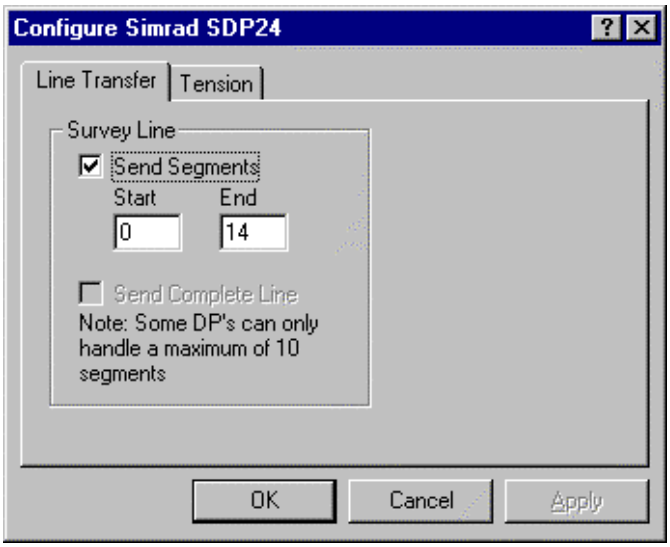
Many of Kongsberg's Dynamic Positioning (DP) systems are based on common hardware and software. Following is a list of current WinFrog drivers having outputs to Simrad DP systems:

- SIMRAD 301 DP
- SIMRAD 701 DP
- SIMRAD 702 WP
- SIMRAD SDP21 WP
- **SIMRAD SDP24**
- SIMRAD SDP600

The SDP24 system has two (2) consoles, with one (1) control unit for each of the thrusters. This driver outputs the vessel position and cable tension to the DP system.

DEVICE CONFIGURATION INSTRUCTIONS (WinFrog Suggested):
Baud Rate: 4800
Data Bits: 8
Stop Bits: 1
Parity: None

WINFROG I/O DEVICES > CONFIG OPTIONS:
The SIMRAD SDP24 device is added to WinFrog from the OUTPUT device types. The DP OUTPUT data item is added along with the SIMRAD SDP24 device. The following dialog box appears for configuring output data via the *Configure > I/O Devices > Configuration* command. This dialog box can also be accessed if you highlight the SIMRAD SDP24 device, right-click in the I/O Devices Window, and choose *Configure Device*.



The following items are configurable under the Line Transfer tab of the Configure Simrad SDP24 dialog box:

Survey Line:

Enter in the survey line segments, of the active survey line, in the Start and End boxes; then select the Send Segments checkbox. When the OK button is clicked to exit the dialog box, the survey line segments are sent to the DP system. The Simrad SDP24 will accept and store a maximum of 99 line nodes, therefore the *Send Complete Line* command is grayed out. Refer to Configuration Details for more information on the raw data logging and data output strings associated with the Simrad SDP24 driver. The device must be added to a vehicle before any data transfer occurs.

The above procedure must be repeated every time you wish to send Line Segments to the DP system. Note that $GPGGA and $GPVTG data strings are sent to the

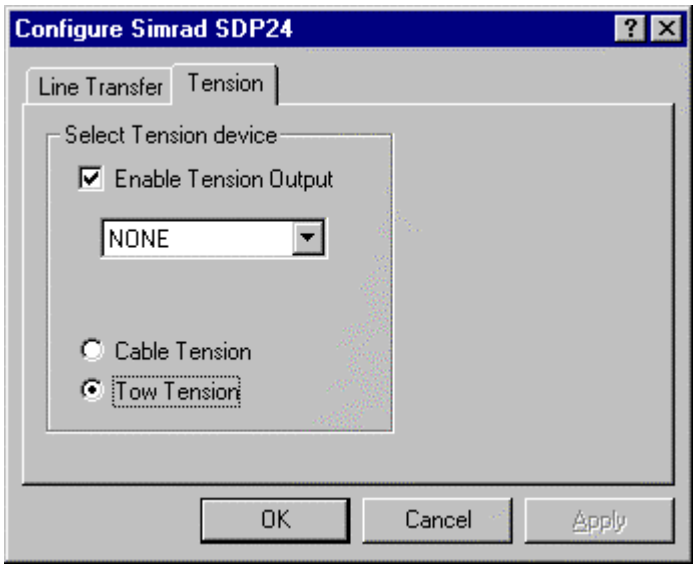
SDP24, at 1Hz, as soon as the device is added to the vehicle. Refer to the section on Configuration Details for a complete listing of the input/outputs.

Data Checks:
Prior to attempting to send the specified line nodes, several checks are performed, including the validity of the segments selected. The tests are as follows:

- Is there a valid line selected for the respective vehicle?
- Is the start segment >= 0, the first node in any line?
- Is the end segment > the start segment?
- Is the start segment > the last line node?
- Is the end segment > the last line node?
- Is the span of the segments selected greater than the maximum allowed (by the software) of 10. Note that presently this driver works with 11 line segments or 12 line segment waypoints or nodes.

If the answer to any of the above is negative, the waypoint download is aborted.

The second item that is configurable at the device level is the Tension. The dialog box below shows the Configure Simrad SDP24 when the Tension tab is clicked.

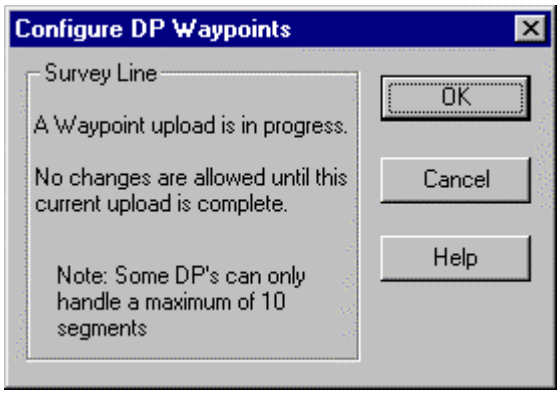


Select Tension device:

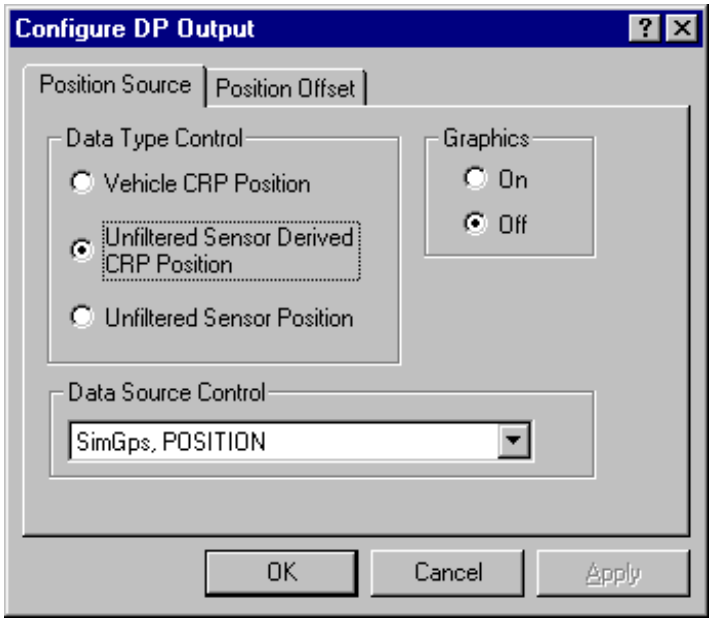
To facilitate Tension, select the *Enable Tension Output* checkbox, choose the Counter device where the tension is originating, and select either Cable Tension or Tow Tension (depending on the tension device). The tension devices available show up in the dropdown list. Note that if this box is not checked, then the $PSWCH data string will not show up under the Decoded Data tab in the I/O Devices Window; and, the data string will not be output.

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

The SIMRAD SDP24, DP OUTPUT is added to the vehicle with the DP system in use. This vehicle must also be tracking the Survey Line for which you intend to send the relevant line data, to the DP system. If a Survey Line is not enabled, or the device is not added to the vehicle, no line segment data will be transferred. The dialog box below will appear when you attempt to configure the device, and send data to the vehicle. This will not change until a tracking line is enabled and the device is added to the vehicle.



When the SIMRAD SDP24, DP OUTPUT item is edited from the Configure Vehicle Devices dialog box, the Configure DP Output dialog box appears. The *Position Source* and the *Position Offset* tabs must be configured. These items configure the vehicle position output as described in the type 450 record under Configuration Details.



Position Source:

Three items need to be configured on this tab: Data Type Control, Graphics, and Data Source Control.

Data Type Control:
In Data Type Control, there are three options to choose from: *Vehicle CRP Position*, *Unfiltered Sensor Derived CRP Position*, and *Unfiltered Sensor Position*.

Choose the *Vehicle CRP Position* for filtered position updates referenced to the vehicles' Central Reference Point (CRP). The offset input under the Position Offset tab is added to the CRP position.

The *Unfiltered Sensor Derived CRP Position* is the same as the above only unfiltered data is output. With this option, filtering can be performed within the DP unit.

The *Unfiltered Sensor Position* outputs unfiltered positions from the positioning sensors' location. The offset input under the Position Offset tab is added to the sensors raw position.

Data Source Control:
The data source depends on the Data Type Control that was selected. If the *Vehicle CRP Position* is chosen, the Data Source Control will automatically be set to VEHICLE, CRP POSITION, and the primary positioning sensor data will be used. If either the *Unfiltered Sensor Derived CRP Position* or the *Unfiltered Sensor Position* is chosen in the Data Type Control, then the positioning sensor can be chosen from the dropdown list under Data Source Control. Here a secondary positioning sensor can be chosen. It is important to note that the *Unfiltered Sensor Derived CRP Position* is based on the chosen sensor, however the data is related to the CRP. Note that the SimGps, POSITION is used in this dialog as an example only.

Graphics:
Turning on the Graphics will display the device name and a square at the location of the Simrad SDP24 position output. This position (grid) can be found in the type 450 record in the fields shown under the Configuration Details section of this document.

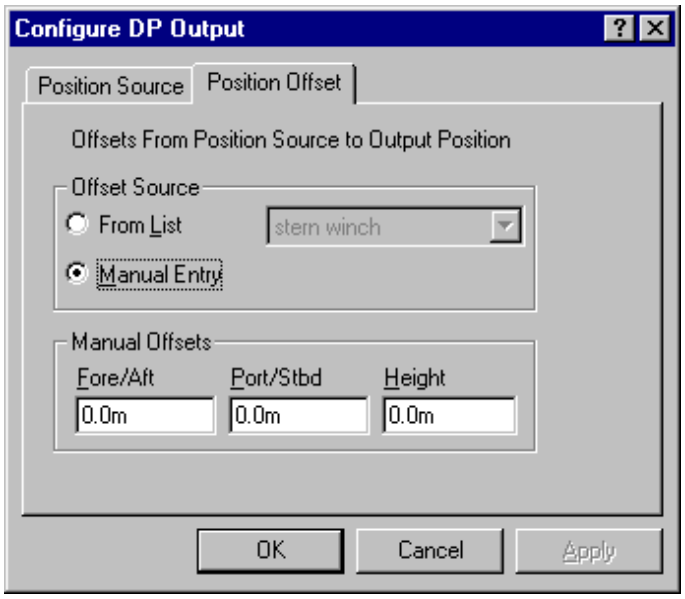
It is advisable to have this option turned on so the position output location can be visually referenced from the Graphics Window.

Position Offset:

The ‘Offsets From Position Source to Output Position’ can be configured on the Position Offset tab. This means that any offset input here will be applied to the position output from the Position Source tab options listed above.

Offset Source:
The Offset Source can be chosen from the list of offsets for the vehicle, or the Manual Entry can be used.

Manual Offsets:
If Manual Entry is chosen under the Offset Source, the offsets must be input here. Offsets are input similar to all offsets in WinFrog.

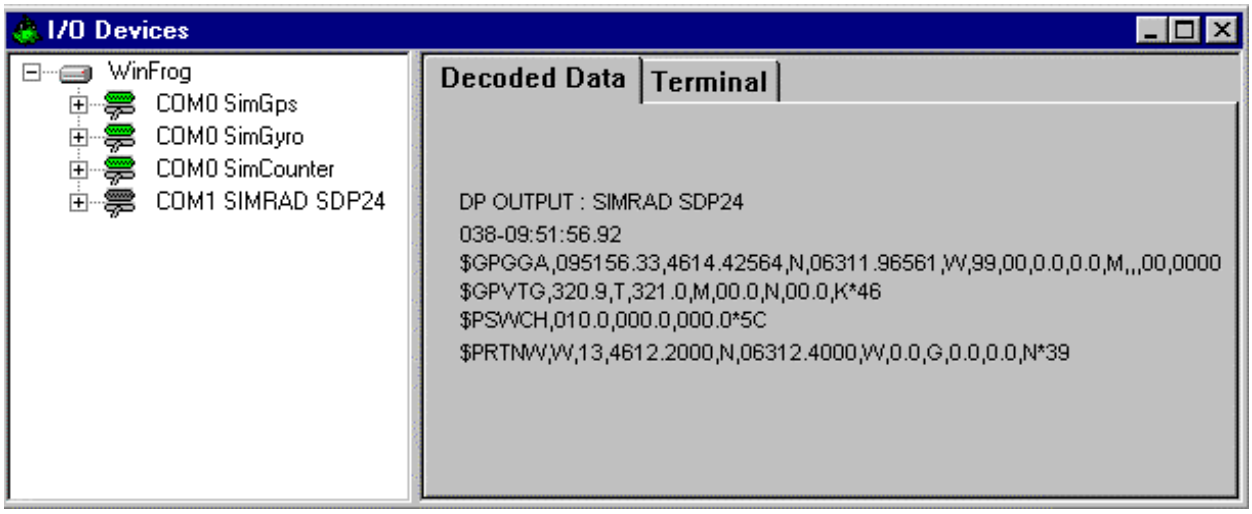


CONFIGURATION DETAILS:
Interfacing to the DP system should only be performed under the supervision of the vessels' electrician or other qualified person as designated by the Captain. After interfacing, all systems should be thoroughly checked prior to operation. First check that the correct data is being output from WinFrog, and then check for the input at the DP system.

Raw Data Logging and Data Output Strings:

The I/O Device Window below displays the output data strings, which are:

- $GPGGA – Global Positioning System Fix Data,
- $GPVTG – Course Over Ground (COG) and Ground Speed,
- $PSWCH – Winch Tension Data,
- $PRTNW – Route Data,



The above Window shows the following:

1. Global Positioning System Fix Data (Simulated),
2. COG and Ground Speed from Simulated GPS and Gyro,
3. Winch Tension Data from a Simulated Counter,
4. Route Data being sent (line node 12 in the WinFrog Survey Line File and Waypoint 13 in the DP System).

Data Output Strings:

GGA - Global Positioning System Fix Data:

$--GGA,hhmmss.ss,llll.ll,a,yyyyy.yy,a,x,xx,x.x,x.x,M,x.x,Mx.x,xxxx*hh<CR><LF>

$--GGA,123519,4807.038,N,01131.324,E,1,08,0.9,545.4,M,46.9,M, , *42

Where:

123519	Fix taken at 12:35:19 UTC	
4807.038,N	Latitude 48Deg. 07.038 min N	
01131.324,E	Longitude 11Deg 31.324 min E	
1	Fix quality: 0 = invalid	3=GPS PPS Mode,fix valid
	1 = GPS fix	99= Simulator Mode
	2 = DGPS fix	10= Simulator Mode Edit
08	Number of satellites being tracked	
0.9	Horizontal dilution of position	
545.4,M	Altitude, Metres, above mean sea level	
46.9,M	Height of geoid (mean sea level) above WGS84 ellipsoid	
(Empty field)	time in seconds since last DGPS update	
(Empty field)	DGPS station ID number	

VTG - Track made good and ground speed

VTG,054.7,T,034.4,M,005.5,N,010.2,K

Where:

054.7,T	True track made good
034.4,M	Magnetic track made good
005.5,N	Ground speed, knots
010.2,K	Ground speed, Kilometers per hour

$PSWCH – Winch Tension Data

$PSWCH,010.0,000.0,000.0*5C

Where:

010.0	Cable Tension in Tons (first)
000.0	Cable Tension in Tons (second)
000.0	Cable Tension in Tons (third)

$PRTNW - Route Data

First String: $PRTNW,H,Hello,5,01,02,03,04,05*71

Where:

H	identifies that this is the First String,
Hello	Line Name (in WinFrog),
5	Segments in line,
01,..,05	Waypoint ID’s for DP System,

Other Strings: $PRTNW,W,3,4615.0000,N,6312.0000,W,0.0,G,0.0,0.0,N*09

Where:

W	identifies that this is a not the First String,
3	Waypoint ID (for DP system) which the data refers,
4615.0000	Geographic Latitude,
N	North,
6312.0000	Geographic Longitude,
W	West,

All other information contained in this data string is not relevant.

Raw Data (Type 450 record):
When the survey line waypoint (node) data is sent from WinFrog to the Simrad SDP24 system, the position of the vessel, as described in the Position Source section of this document, is recorded in the type 450 raw record. This record is described in the WinFrog User's Guide (Appendix B) and is as follows:

In WinFrog:

```
sprintf(rawStr, "450,%s,%.2f,%.8f,%.8f,%.8f,%.8f,%.3f,%.3f,%.3f,%.8f,%.8f\n",name,
                fixTime,centreLat,centreLon,
                waypointX,waypointY,desiredBrg,desiredSpeed,desiredRange,
                currentX,currentY);
```

Raw 450 Record:

```
450,SIMRAD 24,980437502.29,46.22148557,-63.19405810,
484583.43330372,5121844.24644184,0.000,0.000,0.000,0.00000000,0.00000000
```

Where:

`980437502.29,` is the time of the last position,
`46.22148557,-63.19405810,` is the latitude and longitude of the vessel position,
`484583.43330372,5121844.24644184,` is the position (Grid) of the line segment waypoints,

and,

no other data fields are recorded for the Simrad SDP24 WP device.

It is important to note that one (1) line segment waypoint position is sent to the raw file every second. Therefore if the Raw data is being recorded 'AT EVENTS', then the eventing must be set at one second to record all the line nodes. A better option is to record raw data 'WITH EVENTS'. By recording in this manner, all of the line segment waypoint positions will be recorded in the raw file.