

WinFrog Device Group:	Output
Device Name/Model:	Simrad 701 DP
Device Manufacturer:	<p>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/</p> <p>KONGSBERG SIMRAD INC. 7250 LANGTRY STREET HOUSTON TX 77040-6625, U.S.A. Phone: 1 713 934 8885; Fax: 1 713 934 8886</p>
Device Data String(s) Output to WinFrog:	N/A
WinFrog Data String(s) Output to Device:	Binary (Hex to BCD conversion)
WinFrog .raw Data Record Type(s):	Type: 450

DEVICE DESCRIPTION:

Kongsberg Simrad Dynamic Positioning (SDP) control systems integrate control of the vessels propulsion systems via inputs from positioning systems, gyrocompasses, wind speed and direction monitoring equipment, and any other sensors that 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 Simrad 701 system is configured (for inputs and outputs) by Simrad. These systems can accept completely differing input/output data strings. Prior to interfacing to

these devices, the WinFrog operator should verify the system configuration of the Simrad 701 DP system installed on the vessel.

DEVICE CONFIGURATION INSTRUCTIONS (WinFrog Suggested):

Baud Rate: 9600

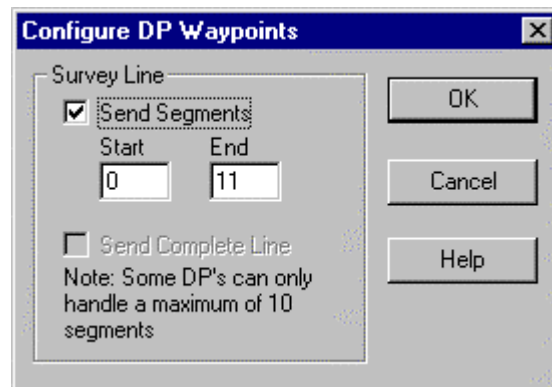
Data Bits: 8

Stop Bits: 1

Parity: None

WINFROG I/O DEVICES > CONFIG OPTIONS:

The SIMRAD701 DP device is added to WinFrog from the OUTPUT device types. The DP OUTPUT data type is added along with the SIMRAD701 DP device. The following dialog box appears for configuring output data via the Configure > I/O Devices > Configuration command. This dialog box will also appear if you highlight the SIMRAD701 DP device in the I/O Devices Window, then right-click and choose Configure Device.



The following items are configurable within this Window:

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 device must be added to a vehicle before any data transfer occurs.

The data being sent is binary (BCD) and is shown in the Configuration Details section of this document. As the data is binary, the only way to check how many line segments (or nodes) are being sent to the DP is by checking incoming data at the DP system. From tests without using the DP system, WinFrog may send only line nodes >0 (not equal to zero) to the DP system. The maximum accepted by the Simrad 701 is not know and therefore a maximum of 10 segments should be sent. Refer to Configuration Details for more information on the raw data logging and data output strings associated with the SIMRAD701 DP driver.

The above procedure must be repeated every time the operator wishes to send Line Segments to the DP system. The vessel position is sent continuously to the DP system, at 1Hz.

Data Checks:

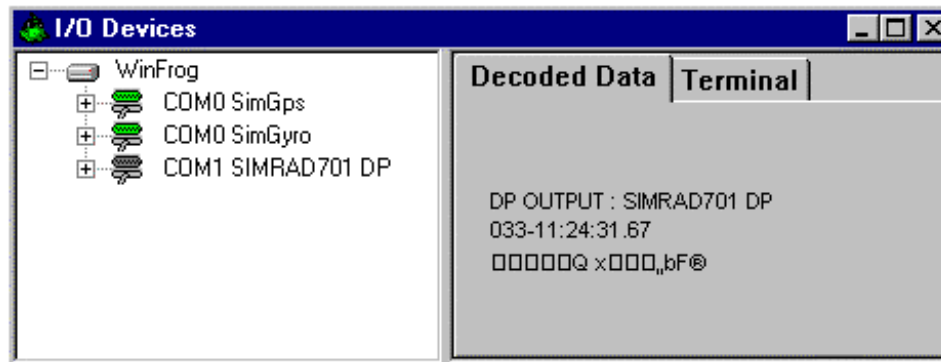
Prior to attempting to send the specified line nodes, several checks are performed, including the validity of the segments selected. The tests are as follows:

- Is there a valid line selected for the respective vehicle?
- Is the start segment ≥ 0 , the first node in any line? This should be checked with the Simrad 701 as in-house tests show that the start segment must be ≥ 1 .
- 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.

Download Status:

No status is displayed in the I/O Devices Window during the transfer of data from WinFrog to the Simrad 701. What is shown is the binary data being output, as displayed below.

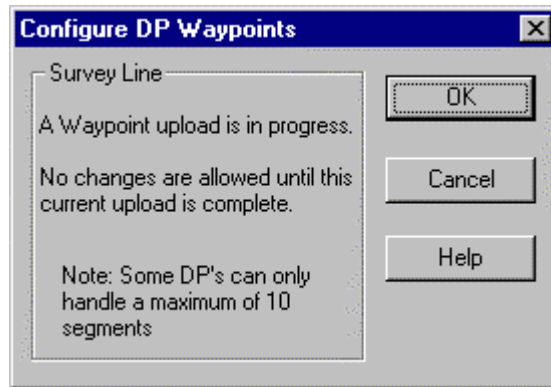


Note that the SimGps and SimGyro devices are added to show the output of data.

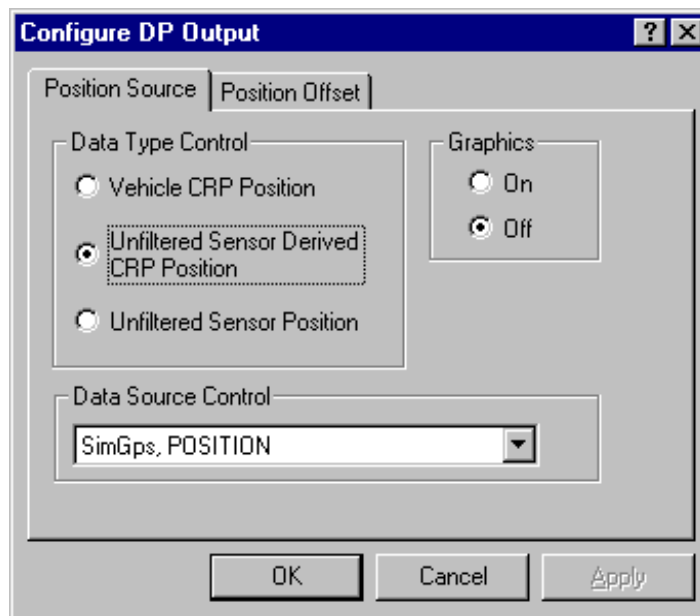
WINFROG VEHICLE - DEVICES > EDIT OPTIONS:

The SIMRAD701 DP, DP OUTPUT is added to the vehicle with the DP system in use. This vehicle should also be tracking the Survey Line for which the operator intends 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 the operator attempts 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 SIMRAD701 DP, DP OUTPUT item is edited from the Configure Vehicle Calculations dialog box, the Configure DP Output Window appears. The **Position Source** and the **Position Offset** tabs must be configured from here. 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: 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 Folder is added to the CRP position.

The **Unfiltered Sensor Derived CRP Position** is the same as the above only unfiltered (or raw) 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 Folder 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 box 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 window as an example only.

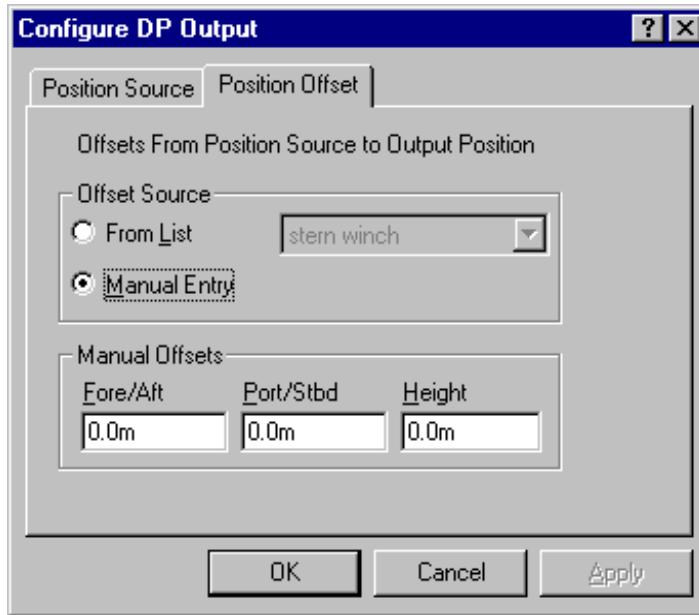
Graphics:

Turning on the Graphics will display the device name and a square at the location of the SIMRAD701 DP 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:

As shown below, the Offsets From Position Source to Output Position can be configured on this 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.

Data Output:

The output to the Simrad 701 is binary (BCD), and therefore looks like the following string when output to a Terminal Program.

```

t' L' Q yq- „r0 t' L' Q yt- „r0 t' L' Q ys- „r( t' L' Q yp- „r0» t' L' Q yt- „r1¼ t' L' Q yt- „
r0 t' L' Q yx- „r(« t' L' Q yq- „r0 t' L' Q yt- „r($ t' L' Q yt- „r0 t' L' Q yq- „r1» t' L' Q
yu- „r0¾ t' L' Q yv- „r1¼ t' L' Q yq- „r2, t' L' Q yu- „r0¾ t' L' Q yr- „r0 t' L' Q yt- „r) t'
L' Q yt- „r) t' L' Q yp- „r1°

```

After ensuring that there is something exiting from WinFrog, the data should be checked at the DP system.

Raw Data Logging (type 450 record):

In WinFrog:

The output from WinFrog (in the program) is as follows:

```
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:

The raw record that is sent out is as follows:

```
450,SIMRAD701 DP,981049207.16,46.24042762,-63.19942990,
484606.33122696,5120733.25075906,0.000,0.000,0.000,4846244.23073136,512
07802.12423819
```

Where:

981049207.16, is the time of the last position.
46.24042762,-63.19942990, is the latitude and longitude of the vessel position (as described in the Config DP Output Window).
484606.33122696,5120733.25075906, are UTM grid coordinates for the Waypoint being tracked under Setup Waypoint Tracking in the Configure Vehicles Window. This is not to be confused with Line Tracking. I.e. This driver tracks Waypoints, not Line Nodes.
4846244.23073136,51207802.12423819, is the Vessel Position (Grid) (as described in the Config DP Output Window). This value is described to the decimeter, not to the metre.

and,

no other data fields are relevant for the Simrad 701 WP device.

Note that Survey Line nodes will not show up in the type 450 raw data file, instead the Waypoint being tracked (under Setup Waypoint Tracking) will be output to the raw file.