Appendix H
RDI DVS Sensor

Profiler firmware release versions 4.11 and above support the Teledyne RDI Doppler Velocity Sensor (DVS), an optional sensor that measures current velocity. DVS data is recorded in the ACM file (one \texttt{ANNNNNNN.DAT} file for each profile). This appendix provides assembly information and firmware settings for using the DVS with the Ice Tethered Profiler (ITP). The 4.11 Release Notes also contain information about ITP and DVS integration.

The DVS sensor is installed on the ITP in a housing and end cap at the bottom of the profiler. The ITP is shipped with the DVS installed. The battery must be installed and connected, which requires removing the DVS and bottom end cap.

\begin{figure}[h]
\centering
\includegraphics[width=0.5\textwidth]{figure_h_1.png}
\caption{ITP with DVS Sensor}
\end{figure}
Removing the DVS Sensor

To remove the DVS sensor and bottom end cap, complete the following steps:

1. Lay the ITP on a stable surface.
2. Disconnect the COM/UIM cable (Figure H-2).
3. Using a Hex driver (included in the toolkit), remove the 10-32 SS screws from the DVS sensor head (Figure H-3).

4. Using the plastic wedge (included in the toolkit), separate the DVS head from the DVS housing (Figure H-4).
5. Remove the DVS head to expose the DVS electronics and disconnect the sensor (Figure H-5).

Figure H-2: Disconnecting the COM/UIM Cable
Figure H-3: Removing Screws

Figure H-4: Removing the DVS Head
Figure H-5: Disconnecting the DVS Sensor
6. Using a T-handle hex driver (included in the toolkit), unscrew and remove the DVS housing connection plate (Figures H-6, H-7 and H8).

![Figure H-6: Removing DVS Connection Plate](image1)  ![Figure H-7: DVS Connection Plate](image2)

When the connection plate is removed, pull off the DVS housing. The battery holder bottom plate, secured with retaining ring will be exposed (Figure H-9).

7. Disconnect the COM/UIM connector from the battery holder bottom plate (Figure H-9).

![Figure H-8: Removing Connection Plate](image3)  ![Figure H-9: Battery Holder Bottom Plate](image4)

8. Follow the steps in Chapter 2 of the ITP User Manual to remove the CTD and top end cap. Once the CTD electronics are disconnected, steps in Chapter 2 illustrate how to remove the battery plate, install and connect the battery.
Connecting and Reinstalling the DVS

To reconnect and reinstall the DVS, complete the following steps:

1. Follow the steps in Chapter 2 of the ITP User Manual to secure the retaining ring on the battery holder bottom plate (Figure H-10).
2. Connect the COM/UIM connector (Figure H-11).
3. Feed the DVS connector through the DVS housing (Figure H-12). Before sliding the housing back onto the battery holder bottom plate, inspect the o-ring for cracks or foreign material that could affect the seal. The o-ring must be exceptionally clean to prevent leaks.
4. Insert the DVS housing connection plate.
5. Using a T-handle hex driver (included in the toolkit), tighten the DVS housing connection plate. Reconnect the DVS Sensor and slide back into the DVS housing (Figures H-13 and H-14).

![Image of tightening connection plate](image1.png)  ![Image of reconnecting DVS sensor](image2.png)

*Figure H-13: Tightening Connection Plate  Figure H-14: Reconnecting DVS Sensor*

6. Reattach the DVS sensor head and tighten the 10-32 SS screws to complete the DVS installation (Figure H-15).

7. Reconnect the COM/UIM cable (Figure H-16).

![Image of reattaching DVS sensor head](image3.png)  ![Image of reconnecting COM/UIM](image4.png)

*Figure H-15: Reattaching DVS Sensor Head  Figure H-16: Reconnecting COM/UIM*
Configuring the Firmware to Use the DVS Sensor

The System Configuration menu specifies which sensors are enabled. When the DVS is installed, this option is enabled in the Configuration Menu. To enable a DVS sensor, complete the following steps:

1. From the Main Menu type ‘c’ and enter the password ‘configure’.

2. Select <R> Teledyne RDI DVS and then select ‘Y’ to enable the sensor.

3. Select [X] to exit and save the entry.
Communicating with the DVS

Use the Bench Tests menu in the firmware to communicate with the DVS sensor. To display and verify settings, complete the following steps:

1. From the Bench Tests menu, select <5> ‘ACM Communication’.

![Figure H-18: Bench Tests Menu](image)

The RDI/DVS Bench Test Menu displays as shown in Figure H-19.

![Figure H-19: RDI/DVS Bench Test Menu](image)
Selecting <1> from the RDI/DVS Bench Test Menu connects directly with the DVS sensor as shown in Figure H-20.

```plaintext
Selection ? 1
Press ^C to terminate session
RDI/DVS communication channels opened..
RDI/DVS powered ON.

DVS
Teledyne RD Instruments (c) 2008
All rights reserved.
Firmware Version: 41.16
>cb ?
CB 411 ------------------ Serial Port Control {baud;parity;stop}
> [^C]
RDI/DVS powered OFF.
RDI/DVS power-down delay ....................
RDI/DVS communication channels closed..
```

**Figure H-20: Direct Communications with DVS**

Option <2> and Option <3> from the RDI/DVS Bench Test menu provide a way to restore the McLane or Teledyne RDI factory settings on the DVS.

Figure H-21 shows an example of resetting the McLane-defined parameters. Using option <2> requires typing the password ‘McLane’.

**IMPORTANT**

The profiler firmware requires the DVS parameters configured by McLane. Changing these settings, including resetting to the factory settings will prevent the DVS from working correctly with the profiler.
Restoring McLane parameters provides a way to configure a new DVS to work with the profiler firmware.

Selection ? 2  Password: mclane

RDI/DVS communication channels opened.
RDI/DVS powered ON.
RDI/DVS waiting for sign-on message . ... .......
RDI/DVS sending [CR1] command . .... .
RDI/DVS sending [CA 0] command ..
RDI/DVS sending [CF 11100] command ..
RDI/DVS sending [CT 0] command ..
RDI/DVS sending [EA 00000] command ..
RDI/DVS sending [EB 00000] command ..
RDI/DVS sending [EC 1500] command ..
RDI/DVS sending [ED 00100] command ..
RDI/DVS sending [ES 35] command ..
RDI/DVS sending [EX 01111] command ..
RDI/DVS sending [EZ 1022201] command ..
RDI/DVS sending [TE 00:00:04.00] command ......
RDI/DVS sending [TP 00:00:00] command ..
RDI/DVS sending [WF 030] command ..
RDI/DVS sending [WN 4] command ..
RDI/DVS sending [WP 001] command ..
RDI/DVS sending [WS 050] command ..
RDI/DVS sending [CK] command ......
RDI/DVS was able to restore McLane parameters.

RDI/DVS powered OFF.
RDI/DVS power-down delay .................
RDI/DVS communication channels closed..

Figure H-21: Option <2> Restore McLane Parameters

Option <3> (not shown) restores the factory configuration parameters delivered with the DVS. Option <3> requires using the password ‘factory’.
Appendix H-10

Option <4> displays the current DVS parameter settings as shown in Figure H-22.

<table>
<thead>
<tr>
<th>Selection  ? 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>RDI/DVS communication channels opened..</td>
</tr>
<tr>
<td>RDI/DVS powered ON.</td>
</tr>
<tr>
<td>RDI/DVS waiting for sign-on message ... ........</td>
</tr>
<tr>
<td>RDI/DVS current parameter settings.</td>
</tr>
<tr>
<td>CA 0 ----------- Communication Timeout (0=Off, 10-65536 sec)</td>
</tr>
<tr>
<td>CF 11100 --------------- Set Ctrl Flags {e;p;b;s;*}</td>
</tr>
<tr>
<td>CT 0 ------------------ Turnkey (0 = OFF, 1 = ON)</td>
</tr>
<tr>
<td>EA +00000 --------------- Heading Alignment (0.01 deg)</td>
</tr>
<tr>
<td>EB +00000 --------------- Heading Bias (0.01 deg)</td>
</tr>
<tr>
<td>EC 1500 ---------------- Speed Of Sound (m/s)</td>
</tr>
<tr>
<td>ED 00100 --------------- Xdcr Depth (decimeters)</td>
</tr>
<tr>
<td>ES 35 ----------------- Salinity (ppt)</td>
</tr>
<tr>
<td>EX 01111 --------------- Coordinate Transformations (cct3m)</td>
</tr>
<tr>
<td>EZ 102201 --------------- Sensor Source {c;d;h;p;r;s;t}</td>
</tr>
<tr>
<td>TE 00:00:04.00 --------- Time Between Ensembles</td>
</tr>
<tr>
<td>TP 00:00.00 ------------- Time Between Samples</td>
</tr>
<tr>
<td>WF 0030 ----------------- Blanking Distance (cm)</td>
</tr>
<tr>
<td>WN 004 ------------------ Number of Bins [1-5]</td>
</tr>
<tr>
<td>WP 001 ------------------ Number of Samples [1-999]</td>
</tr>
<tr>
<td>WS 0050 ----------------- Bin Size (cm)</td>
</tr>
<tr>
<td>RDI/DVS powered OFF.</td>
</tr>
<tr>
<td>RDI/DVS power-down delay .......................</td>
</tr>
<tr>
<td>RDI/DVS communication channels closed..</td>
</tr>
</tbody>
</table>

*Figure H-22: Option <4> Report Parameter Settings*

Option <5> performs a profile test loop. This test simulates an automated sensor verification and a 5 minute profile, as shown in Figure H-23.

The predefined 5 minute test time allows 2 minutes for sensor warm up, 1 minute for simulated profiling and 2 minutes for sensor warm down.
Selection  ?  5
Press ^C to exit the loop

RDI/DVS  communication channels opened..
RDI/DVS  powered ON.
RDI/DVS  waiting for sign-on message . . .
RDI/DVS  powered OFF.
RDI/DVS  power-down delay .................
RDI/DVS  communication channels closed..

RDI/DVS  communication channels opened..
RDI/DVS  powered ON.
RDI/DVS  waiting for sign-on message . . .
RDI/DVS  sending [CR0] command . . .
RDI/DVS  sending [CS] command .
RDI/DVS  successfully started logging.
RDI/DVS  communication channels closed..

RDI/DVS  Sleeping/Pinging for 1 minute.

RDI/DVS  communication channels opened..
RDI/DVS  sending [CStop] command .
RDI/DVS  successfully stopped logging.
RDI/DVS  communication channels closed..

RDI/DVS  communication channels opened..
RDI/DVS  sending [MM] command .
RDI/DVS  opening file A0000000.DAT for profile 0
RDI/DVS  writing 4 byte header for profile 0.
RDI/DVS  sending [CA 0] command .
RDI/DVS  sending [CT 0] command .
RDI/DVS  sending [MY] command .
RDI/DVS  offloading 12800 bytes.
RDI/DVS  Ymodem received header block for profile 0
RDI/DVS  Ymodem received block #1. 1024 bytes for profile 0
RDI/DVS  Ymodem received block #2. 2048 bytes for profile 0
RDI/DVS  Ymodem received block #3. 3072 bytes for profile 0
RDI/DVS  Ymodem received block #4. 4096 bytes for profile 0
 . . .
RDI/DVS  Ymodem received block #16. 12800 bytes for profile 0
RDI/DVS  Ymodem end of receive. 12800 bytes for profile 0
RDI/DVS  offloaded 12800 of 12800 bytes in 21 seconds (~609 CPS). . .
RDI/DVS  writing 8 byte trailer for profile 0.
RDI/DVS  closing file A0000000.DAT for profile 0
RDI/DVS  sending [ME ErAsE] command . . . ~2 minute delay . . .

RDI/DVS  powered OFF.
RDI/DVS  power-down delay .................
RDI/DVS  communication channels closed..

RDI/DVS  test profile succeeded
Press ^C to exit the loop

Figure H-23: Option <5> Perform a profile test loop
Notes