

Seabird MicroCAT CTD Interface

1 Introduction

The RD Instruments WorkHorse ADCP can be interfaced with a SEABIRD 37-SM RS485 MicroCAT CTD. There are two options for the interface.

Interface Option 1 – The MicroCAT is attached to the WorkHorse via an adapter cable (see “Interface Cables,” page 8) that connects the WorkHorse RS-485 communications to the RS-485 communications of the MicroCAT. The WorkHorse interrogates the MicroCAT and stores the MicroCAT data in the WorkHorse.

Important Points.

- To enable the MicroCAT interface you must add the CC000000001 command to the command file.
- Data is stored in the WorkHorse, not the MicroCAT.
- The WorkHorse is awake for an extra 0.4sec per ensemble (2.2W power consumption). This must be considered in the battery consumption of the WorkHorse.

Interface Option 2 – The MicroCAT is attached to the WorkHorse via an adapter cable (see “Interface Cables,” page 8) that connects the WorkHorse RS-485 communications to the RS-485 communications of the MicroCAT. The WorkHorse is set up to generate a “Sync Pulse” each ensemble that triggers the MicroCAT to take a sample.

Important Points.

- To enable the “Sync Pulse”, you must add the SM1 and SA010 commands to the command file.
- The data from the MicroCAT is not output to the WorkHorse, but stored in the MicroCAT.
- There is no significant change in the battery requirements for either instrument.

1.1 Using Interface Option 1

The WorkHorse is set up using the CC command.

The MicroCAT is set to “polled” mode.

Data from the MicroCAT is stored in the WorkHorse.

1.1.1 WorkHorse Setup Cecklist

- a. The CC command is used to enable the MicroCAT interface. The command CC000000001 must be added to the command file.
- b. Connect the MicroCAT to the WorkHorse using the adapter cable.



NOTE. The WorkHorse must be in RS232 protocol (default). The interface cannot be used with RS422 protocol enabled.

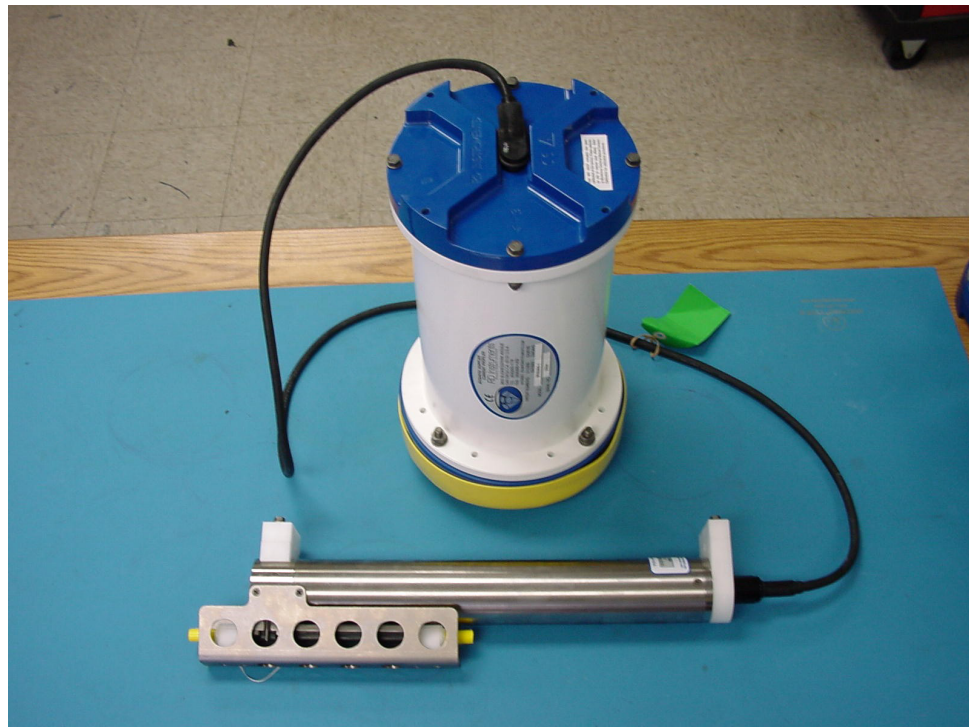
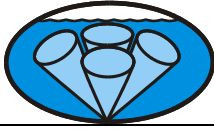


Figure 1. MicroCAT Connected to the WorkHorse (Self-Contained Configuration Shown)



1.1.2 SeaBird MicroCAT Setup Checklist



NOTE. Refer to the SeaBird MicroCAT Manual for more details.

- a. If you have not already installed the program *SeaTerm* (provided by MicroCAT), then do so now.
- b. Start *SeaTerm*.
- c. Ensure the MicroCAT ID = 01 (Default) by sending the ID? command. For example, you should see id = 01.
- d. Send @@#01DS to ensure that the required parameters are being output.
- e. Ensure the Date and Time are synchronized between the WorkHorse, MicroCAT, and the PC by doing the following.
 1. Set Day #01MMDDYY = xxxxxx (Example: 051602)
 2. Set Time #01HHMMSS = xxxxxx (Example: 071500)

1.1.3 Option 1 Timing Description

For Time between ensembles (TE) greater than 30secs.

- a. The MicroCAT is interrogated using the “polled” mode.
- b. The WorkHorse “wakes up” 10 seconds before the start of an ensemble and sends a command to the MicroCAT to wake up the MicroCAT.
- c. A command to collect data (@@GDATA) is sent to the MicroCAT 5 seconds before the start of the ensemble.
- d. At the start of the ensemble the WorkHorse sends the retrieve data command (@@DATA01) and reads the response from the MicroCAT. The data is stored in a field in the ensemble data and the MicroCAT is powered down (@@PWROFF).
- e. The MicroCAT data is time-stamped 5 seconds before the start of the ensemble.



NOTE. When calculating Time between Pings (TP) you must allow 10 seconds prior to the start of the ensemble for the MicroCAT interrogation.

$TP(WP+BP) + 10 \text{ seconds}$ should be less than TE.

Where

TP = Time between pings, WP = Number of Water Pings, BP = Number of Bottom Pings

For Time between ensembles (TE) less than 30secs.

Due to sampling and timing issues that directly affect battery life for both instruments slightly different commands are used for ensembles of short duration (TE is less than 30 seconds).

- a. The MicroCAT is interrogated using the “polled” mode.
- b. At the start of the ensemble the WorkHorse sends the retrieve data command (@@DATA01) and reads the response from the MicroCAT. The data is stored in a field in the ensemble data.
- c. Immediately after the data has been received a command to collect data (@@GDATA) is sent to the MicroCAT.
- d. The result is that the MicroCAT data is collected and time-stamped for the previous ensemble.
- e. The WorkHorse will not attempt to interrogate the MicroCAT if less than 5 seconds has elapsed since the last MicroCAT data but uses the last good sample.

1.1.4 Data Recovery

The MicroCAT data is part of the WorkHorse raw data. The MicroCAT data can be exported from the WorkHorse data using the **Export** menu in *WinADCP*.

- a. Start *WinADCP* and load your data file.
- b. Click **Export**. The Export Options control box will display.
- c. Click on the **Series/Ancillary** tab.
- d. Select the File Type **TXT** button.
- e. Select what bins, ensembles, and data types to export.
- f. Check the **MicroCAT** box (see [Figure 2, page 5](#)).
- g. Click **OK**.

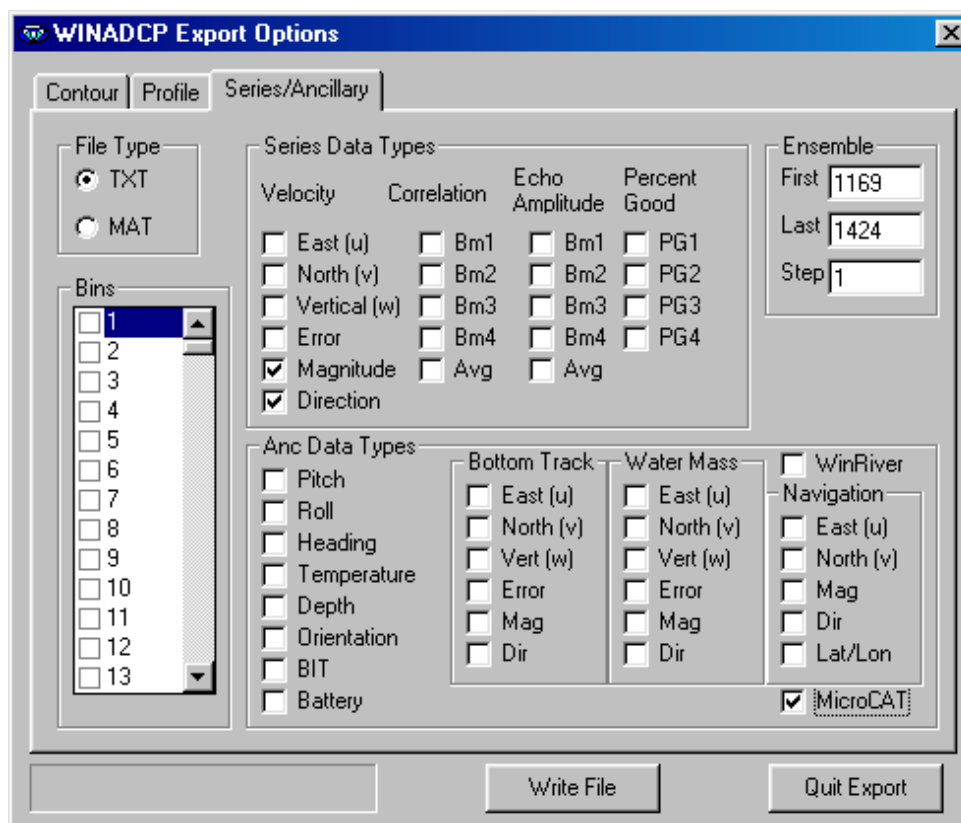


Figure 2. WinADCP Export Options



NOTE. You must use WinADCP version 1.11 to export MicroCAT data.

1.2 Using Interface Option 2

The WorkHorse is set up to generate a “Sync Pulse” before each ensemble.

The MicroCAT is set to “Serial Line Sync” mode.

When a sample is required the WorkHorse places a sync pulse on the 485 lines that trigger the MicroCAT to take a sample.

1.2.1 WorkHorse Setup Checklist

- a. Connect the MicroCAT to the WorkHorse using the adapter cable (see [Figure 1, page 2](#)).
- b. The WorkHorse uses the Ping Synchronization commands to determine the frequency of the sync pulse.



NOTE. Please refer to the WorkHorse Commands and Output Data Format Guide, Ping Synchronization Commands for more details.

Typical commands would be:

- SM1 – Sets WorkHorse as Master for generating Sync Pulse
- SA01X – Sends a sync pulse before each ensemble (where X = 0, 1, or 2)



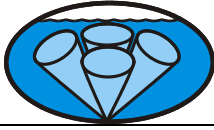
NOTE. The WorkHorse must be in RS232 protocol (default). The interface cannot be used with RS422 protocol enabled.

1.2.2 SeaBird MicroCAT Setup Checklist



NOTE. Refer to the SeaBird MicroCAT Manual for more details.

- a. If you have not already installed the program *SeaTerm* (provided by MicroCAT), then do so now.
- b. Start *SeaTerm*. On the **Config** menu, locate your MicroCAT device and ensure the communication settings are set to RS-485 (Half Duplex).
- c. On the **Communication** menu, select **Connect**.
- d. Ensure the MicroCAT ID = 01 (Default) by sending the ID? command. For example, you should see id = 01.
- e. Send @@#01DS to ensure that the required parameters are being output.
- f. Ensure the Date and Time are synchronized between the WorkHorse, MicroCAT, and the PC by doing the following.
 1. Set Day #01MMDDYY = xxxxxx (Example: 051602)



2. Set Time #01HHMMSS = xxxxxx (Example: 071500)
- g. Set the sample number by sending @@#01SAMPLENUM = 0 (0 = the sample number for the first sample when logging begins).
- h. Set the interval setting to 5 seconds by sending @@#01INTERVAL = 5 (x = seconds between samples (5 to 32767))
- i. Enable the Serial Line Sync by sending @@!01SYNCMODE = Y.
- j. Enable power save function @@PWROFF.



NOTE. When the ADCP begins to ping the MicroCAT will record samples based on your interval setting.

The MicroCAT will ONLY update data at a minimum of 5 seconds (see interval timing above).

1.2.3 Data Recovery

Data is recovered from the individual instruments using the respective vendor software.

Do the following to recover the MicroCAT data.

- a. Start *SeaTerm*.
- b. On the **Communications** menu, select **Send 5 second break**.
- c. Click the **Connect** icon.
- d. Click the **Capture** icon.
- e. Enter the desired filename.
- f. Click **Open**.
- g. Click **Connect**.
- h. Send @@#01ds to show the total samples collected (samplenum = x).
- i. Send #01DDb,e where b= beginning sample and e= ending sample.
- j. Click **Capture**.

2 Deployment Sequence

Self-Contained Deployments

- Connect the ADCP to the computer using the standard WorkHorse I/O cable as shown in the ADCP User's Guide.
- Setup the ADCP for either interface option 1 or 2 as explained in [“Using Interface Option 1,” page 2](#) and [“Using Interface Option 2,” page 6](#).
- Setup the MicroCAT.
- Disconnect the standard WorkHorse I/O cable and connect the ADCP and the MicroCAT together using the cable shown in [Figure 3](#).
- Deploy the ADCP and MicroCAT.

Real-Time Deployments

- Connect the ADCP to the computer using the MicroCAT Real-Time interface cable (see [Figure 4, page 9](#) or [Figure 5, page 9](#)).
- Setup the ADCP for either interface option 1 or 2 as explained in [“Using Interface Option 1,” page 2](#) and [“Using Interface Option 2,” page 6](#).
- Setup the MicroCAT.
- Connect the MicroCAT to the MicroCAT Real-Time Interface cable (see [Figure 4, page 9](#) or [Figure 5, page 9](#)).
- Deploy the ADCP and MicroCAT.

3 Interface Cables

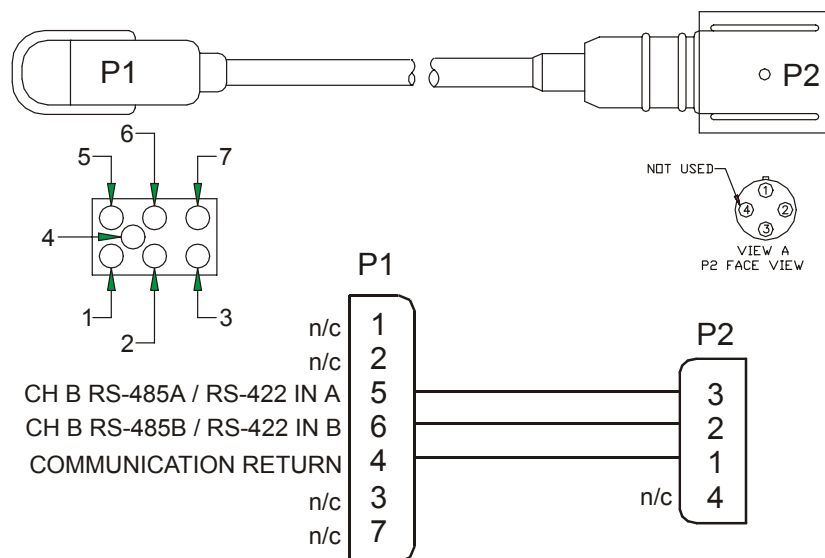


Figure 3. MicroCAT Self-Contained Interface Cable Wiring

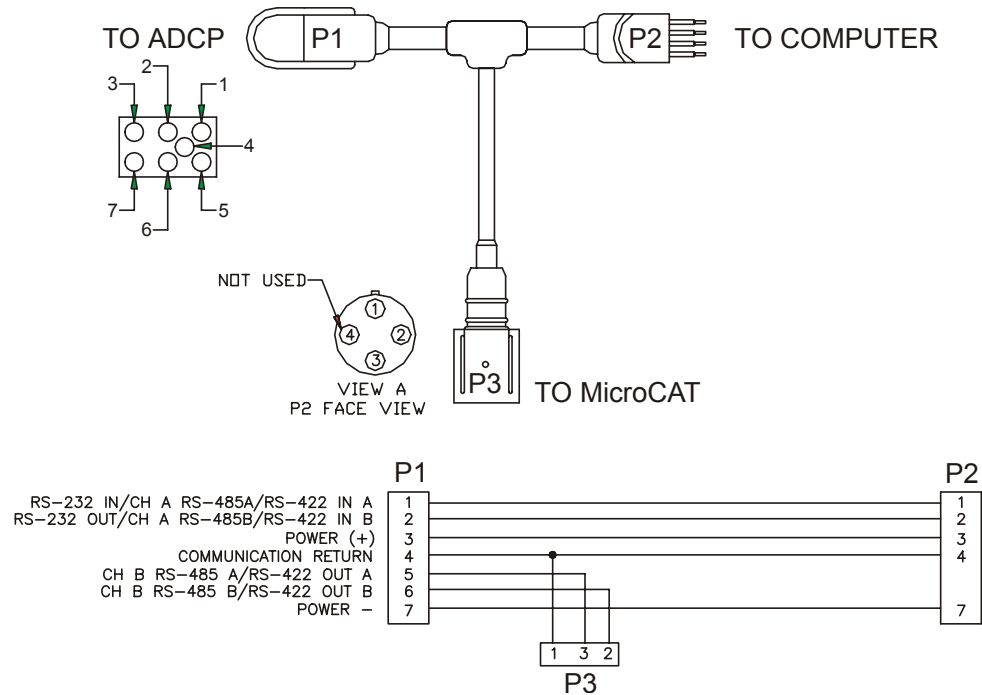


Figure 4. MicroCAT Real-Time Interface Cable Wiring for WorkHorse Monitor/Sentinel/Navigator/Long Ranger

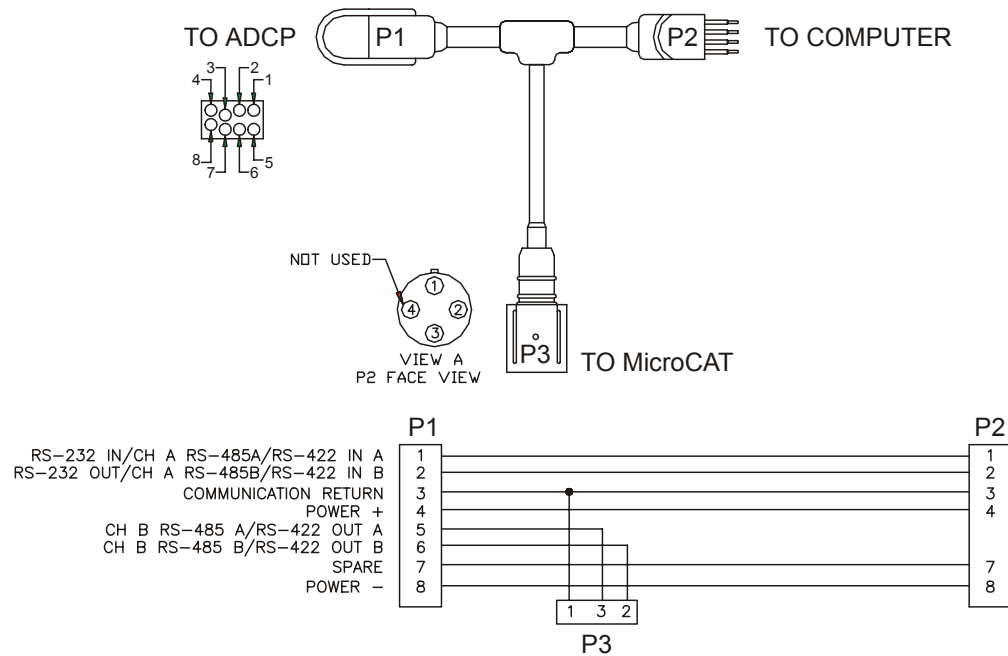


Figure 5. MicroCAT Real-Time Interface Cable Wiring for WorkHorse Rio Grande

NOTES