Paroscientific, Inc.
Digiquartz®
Instrumentation

Serial DataLogger
User Manual

Doc. Number 8822-001 Rev A

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Reference

Refer to Paroscientific Intelligent Instruments Manuals, document numbers 8821-001 (M7 processor), 8820-001 (M3 processor), and 8819-001 (4130-based devices) for further information.

Introduction

The serial DataLogger is based on a serial logger board from SLERJ. It can be powered either directly using 3.3 – 3.8 VDC from a Lithium battery, or at 4 – 15 VDC from a power supply. If using a 3.6 VDC battery, ensure that the 3.3 VDC setting is selected on the box.

An appropriate microSDXC card that meets the operating temperature and storage space requirement should be used with the DataLogger. Note that microSDUC cards are currently not supported for use in this device.

CAUTION: *If 3.3 VDC is selected, do not supply more than 3.8 VDC or permanent damage to the logger may occur.*

General Setup

The general logging hardware setup is shown in Figure 1.

- The raw frequency outputs (square wave) from the sensor are connected via a terminal block to the intelligent module. If desired, the leads can be shortened to save space.
- The sensor is powered using the screw terminal block on the power adapter as shown.
- The logger is powered via its own screw terminal block.

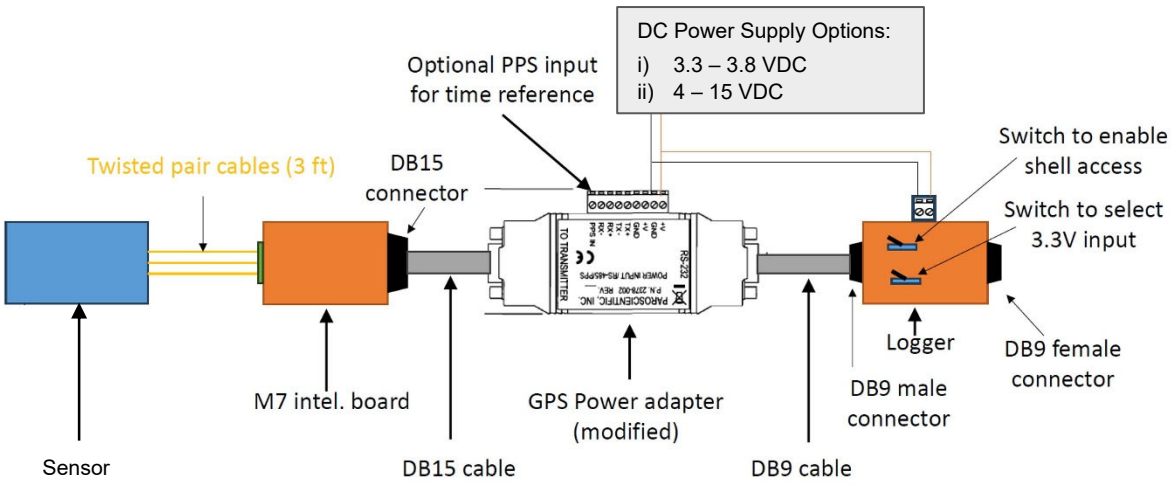

Figure 1: DataLogger Hardware Setup

Configuring the DataLogger

To configure the DataLogger, use the following setup instructions. Depending on your device, refer to Intelligent Board Manuals 8821-001, 8820-001 or 8819-001 for additional information. A description of terms used during the setup can be found in the glossary at the end of this manual.

DataLogger Module

1. Enable Shell access

   Toggle the DataLogger switch labeled *'Shell Mode'* to the ON position. This will enable shell access.

2. Run the utility *'DataLoggerConfig'*

   Please select the appropriate settings, particularly the board version, sampling rate, cutoff frequency, file size (1 GB default) and file prefix desired. Refer to Figure 2 and the glossary for details. The files will be named as *'FilePrefixXXXX.txt'* where XXXX is the 4-digit file number.

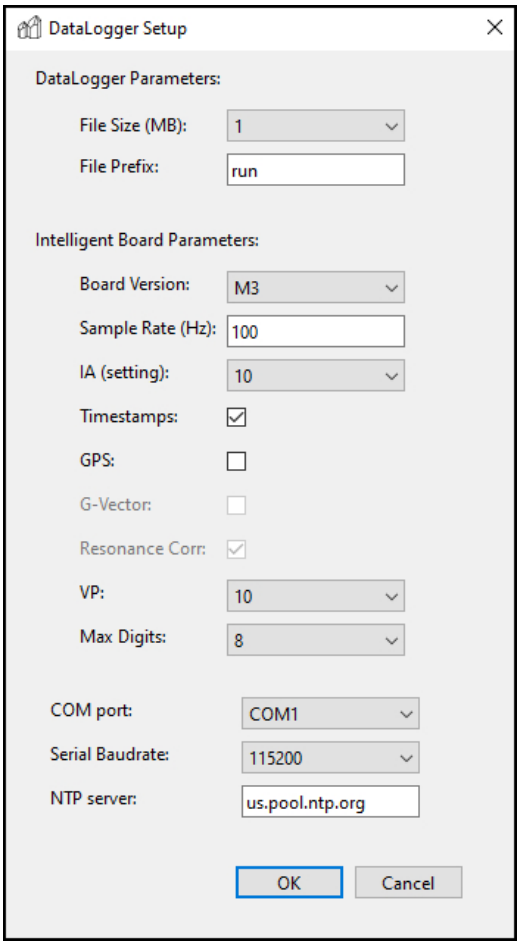

Figure 2: DataLogger Config Utility Settings

NOTE: As recommended in the intelligent board manual, the cutoff frequency should be set well below the sampling rate.

3. Set the COM port

   This is the COM port your computer will use to communicate with the DataLogger. To access this, open Windows Device Manager and expand the *'Ports'* section to see the configured COM ports. To access COM port properties, right-click on the specific COM port you want to manage and select *'Properties'* from the menu.

4. Connect the Serial Port

   Connect one end of the Serial Port to the computer, and the other end to the DataLogger.

5. Confirm Setup

   Press OK and you will be asked in the Command Prompt to check if the setup is correct. Enter *'YES'* and the chosen settings will be saved to the device.

Intelligent Board Module

1. Connect the Intelligent Board

   The program will then prompt the user to connect to the intelligent board. Toggle the DataLogger switch labeled *'Shell Mode'* to the OFF position. Verify that the computer's serial port is connected to the DataLogger. Select *'Y'* to continue.

2. Intelligent Board Clock

   The program will set the intelligent board clock and load the chosen settings to the intelligent board. The clock is set with a user specified NTP (Network Timing Protocol) server and a serial command. For best results the user's PC should have reliable network connectivity, preferably ethernet.

3. USB Serial Adapter

   The USB/serial adapter must be configured for low latency (check Window's Device Manager/advanced settings and set latency to 1 msec). The timing is also dependent on the NTP server in use. Public servers like pool.ntp.org are acceptable, but may introduce systematic offsets of 10-20 msec.

Data Conversion Utility

To convert the logged files to miniSeed format, use the Data Conversion Utility and follow the instructions below. The user will need to select record-length, station, channel names, and so forth. Refer to Figure 3 and the DataLogger Convert Glossary for additional information.

1. Remove microSD card: When data logging is complete, remove the microSD card from the DataLogger and insert it into a card reader connected to the computer. The DataLogger can only log data, it cannot be used to transfer data back to the computer for processing.
2. Navigate to the microSD File Path using the Browse button.
3. Specify the Output Path where the converter will output the miniSEED formatted files.
4. Specify the File Prefix to use for the converted file.
5. Adjust the Output and miniSEED Parameters as required. Refer to the DataLogger Convert Glossary for more information.
6. Once you are satisfied with the settings, press OK to begin the conversion process. The conversion process can take a long time depending on the size of the data.

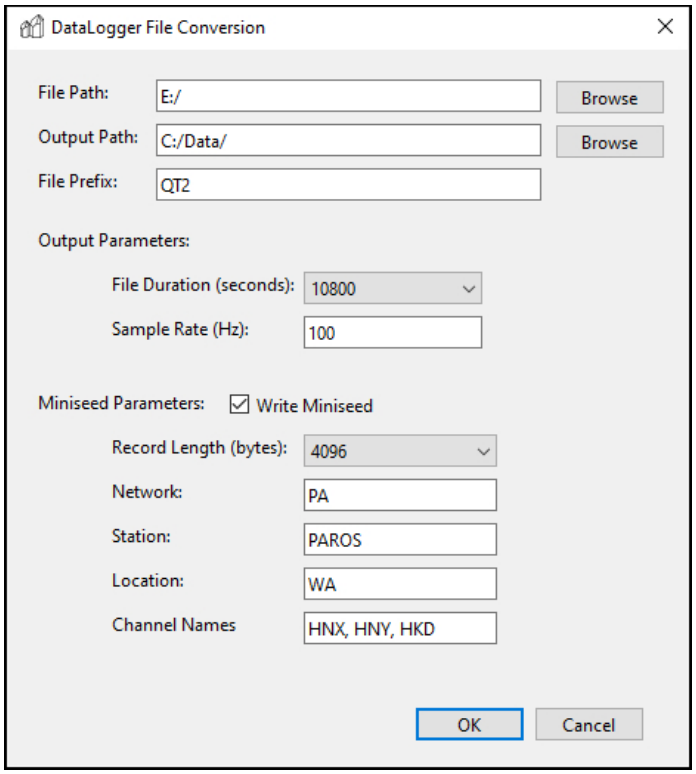

Figure 3: DataLogger Conversion Utility Settings

DataLogger Setup Glossary

File Size: The data logger saves files that are numbered from 0-9999 of a specified size, so a 1 MB file size will at maximum write 10000 MB. File sizes of up to 1 GB are supported.

File Prefix: The files generated by the data logger are text files with names *prefixXXXX.txt*, where prefix can be anything and XXXX are numbers 0000 for the 1st file, 0001 for the 2nd, etc.

Board Version: This is where the intelligent board version is selected. If unsure send a **9900vr* to the board and it will return a firmware version that start with a letter and ends with a number. The letter determines the board: R for the 4130, Q for an M3, and K for an M7. The number is irrelevant except for the 4130 where a version less than 5.1 is unsupported.

Sample Rate (Hz): The rate at which data will be recorded.

Cutoff (Hz)/IA (setting): For the M7 boards, cutoff frequency for the butterworth filter can be directly specified in Hz, whereas if an M3 or a 4130 board is being used, the IA setting needs to be specified. The higher the IA setting, the lower in frequency the IIR cutoff is. Refer to the manual for your board for more information.

Timestamps: Select whether you want the data to be timestamped. Leaving this out saves space.

GPS: Select whether the intelligent board is connected to a GPS.

G-Vector: For the Triaxial accelerometers, the M7 or M3 board can add the G-vector to the end of the output of the e4 command. G-vector is the magnitude of the acceleration vector being experienced by the accelerometer.

Resonance Corr: This setting controls the optional resonance correction feature for the QA15 accelerometers and QT2 tiltmeters on M7 boards.

VP: An advanced setting that controls power versus performance of the intelligent boards. Higher VP improves the performance of the board at the cost of increased power draw. Not all VP settings are supported for all transducer modes. Refer to the 8821 manual for more information.

Max Digits: Forces fixed number of digits for outputs. Lower numbers save space and allow for higher sample rates for a given baud rate.

COM port: This lists the available serial ports on your PC, select the one the intelligent board is connected to.

Serial Baudrate: Higher baudrates allow for faster data acquisition.

NTP server: The configuration software queries an NTP (Network Time Protocol) server or your PC system time to set the intelligent board internal time for more accurate time stamps. To ensure precise time a GPS is necessary.

DataLogger Convert Glossary

File Path: Input file path will usually be to the Micro SD card of the DataLogger connected to your PC with a Micro SD to USB adapter or Micro SD to SD adapter.

Output Path: Where output files will be stored on your computer.

Prefix: Default is the same as the DataLogger Setup prefix parameter. The files on the SD card will have the form *prefixXXXX.txt* but can be renamed by the user.

File Duration (seconds): Each file generated will have a fixed duration of up to 1 day, 86400 seconds.

Write Miniseed: If not selected the files will be CSV files. If selected, it will output Miniseed that requires the following parameters.

Record Length: The number of bytes in a miniseed record.

Network: The seismic network the data will be a part of, 2 characters.

Station: The station name, 5 characters.

Location: Where the station is, 2 characters.

Channel Names: Each name is 3 characters, see documentation of the miniseed format to determine the meaning of each. Separate miniseed files are generated for each channel.