RSI Technical Note 051

Rockland Data File Anatomy

v1.0

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1 Overview

The Rockland data files hold the unprocessed (raw) data observed by an instrument. These binary files are generated by the data acquisition software and are given the extension ".P".

Rockland offers different options to open and manipulate these data files such as functions within the ODAS Matlab Library and standalone software (Zissou Essentials). However, if you wish to write your own scripts to read and manipulate the raw data, the information provided below enables you to do so.

The file is structured as a series of records, the first of which includes a header and the configuration string. Subsequent records are data records constructed by prepending a header to a data block.

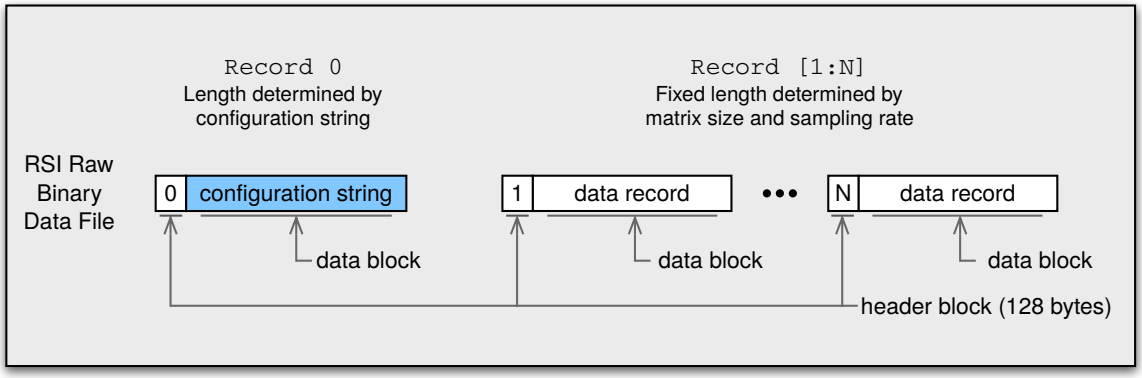

Figure 1: Visualization of the record composition of the Rockland data files.

1.1 Header

Both the configuration and data records start with a 128 byte header comprised of 64, 16-bit words. This header contains the information needed to correctly read the data file. Most entries in the header are self explanatory, see the table below, but some entries require the additional details described below.

Location	Description
1	File number - the four-digit number appended to the name of the data file.
2	Record number
3	Record number of the input on the RS-232 port, for real-time telemetering instruments (ODAS-RT only).
4	Year
5	Month
6	Day
7	Hour
8	Minute
9	Second
10	Millisecond
11	Header version (MSB: major version, LSB: minor version)
12	Configuration string size in bytes
13	Product ID (0=legacy 1=odas5ir, 2=odasrt, 3=odas4ir)
14	Build number (unique revision number from SVN)
15	Time zone as minutes from UTC
16	Buffer status (1 if special character check fails, 0 otherwise)
17	Restarted (1 if data acquisition was restarted due buffer status = 1. 0 otherwise)
18	Record header size in bytes (128)
20	Number of records written to the current file.
19	Data record size in bytes (header + data block)
21	Truncated frequency of the sampling clock (Hz)
22	Fractional part of the frequency of the sampling clock (to 0.001 Hz)
23-28	not used
29	Number of fast columns in the address `[matrix]`
30	Number of slow columns in the address `[matrix]`
31	Number of rows in the address `[matrix]`
32-62	not used
63	Profile (0=Vertical, 1=Horizontal). Not used.
64	Data type (0=unknown, 1=little endian, 2=big endian)

Table 1: Description of fields that constitute a record header.

- The date-time entries (items 4 – 10) are set to the time of the writing a record. Only the time of the first record should be used.
- Item 16 indicates a “Bad Buffer” which occurs when a channel does not issue a response in time. This means the value of this channel is set to -32,767 in the data record.
- Items 21 and 22 give the actual aggregate sampling rate. It may differ from the requested rate if it is not a whole-number divisor of the 38.4MHz reference clock. If so, the data acquisition software selects the nearest rate. The reference clock is accurate to 1.5 part per million. The sampling rate of fast channels is the aggregate sampling rate divided by the number of columns in the address `[matrix]`. The number of columns in the address matrix equals the sum of items 29 and 30.
- Items 29 to 31 are the dimensions of the address `[matrix]`. They are used to de-multiplex the data records into individual channels.
- The profile flag (item 63) indicates the direction an instrument travels. It is no longer used.
- The final item, 64, gives the endian format of the data file. Programs that read a data file directly should use this item to read the data correctly.

1.2 Configuration Record

The first record within a data file is the configuration record. The record consists of a header and a copy of the configuration file used for data acquisition. The copy is a single string of ASCII characters – the configuration string. The record number is always 0. The size of this record depends on the size of the configuration string.

To read the configuration record, open the data file and read the first 64 words (128 bytes). Use the last word, item 64, to determine the endian format of the data file. Close the file and reopen it with the correct endian, if necessary. Use items 18 and 12 to read the first header and the configuration string.

1.3 Data Record

Data records consist of a header and a data block. They follow the configuration record. The header is described in section 1.1 and the data block consists of unprocessed data from an instrument. Data words (samples of 2-byte numbers) are stored in the order provided by the address matrix. The number of words within a data block is a multiple of the size of the address matrix. The total size of a data record (header + data block) is stored in item 19 of the record header. All data records will be the same size.

To read the data records, start by reading the configuration record. The file pointer will be at the start of the first record. Use items 18 and 19 to read the header and data for the first data record. Continue reading data records until you reach the end-of-file.

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