

Planar Silicon Detector Data Format

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This document describes the data format and classes used to store data for a planer silicon strip detector.

I. INTRODUCTION

Digitized data from the planer silicon strip detector is stored in bit packed format. The detector geometry of the silicon sensors is defined in [1].

II. DATA FORMAT

Data is stored in individual bytes or pairs of bytes for information that does not fit in one byte. The data structure is as follows.

- 1 byte: event number, max 256
- - 1 byte: layer number, max 5 (repeated number of events times)
- - 1 byte: number of strips, max 256 (repeated 5 times)
- — 2 bytes: strip number, 11 bytes max 2048, 5 bytes, max 32 (repeated number of strips times)

Note event numbers and layer numbers are not necessary to the structure but included to facilitate synchronization with reading of other event information and with layer ordering.

III. DATA INPUT AND OUTPUT

Data input and output is controlled via standard C++ library binary input and output functions. `std::ofstream`, `ifstream`. Byte writing is performed write and read function as:

```
stripdata.write(reinterpret_cast<const char*>(&myInt), 1);  
stripdata.read(myCharByte, 1);
```

A planned upgrade is to hide the read and write implementations to allow the underlying method to be optimized to improve performance for all software using the byte input output format.

IV. STRIPSET CLASS

Strip data can be stored in the `stripSet` class implemented in the `stripSet.cc` and `stripSet.hh` files. Class variables:

- `typedef map layer_map: int key int value` map of strip and adc data, with
- `vector layer_map_vector: vector of number of sensor layers layer_maps`

Class functions:

- `void clear(void)` to clear the `layer_map_vector`

[1] detectorGeometry note, M. Herndon (2014)