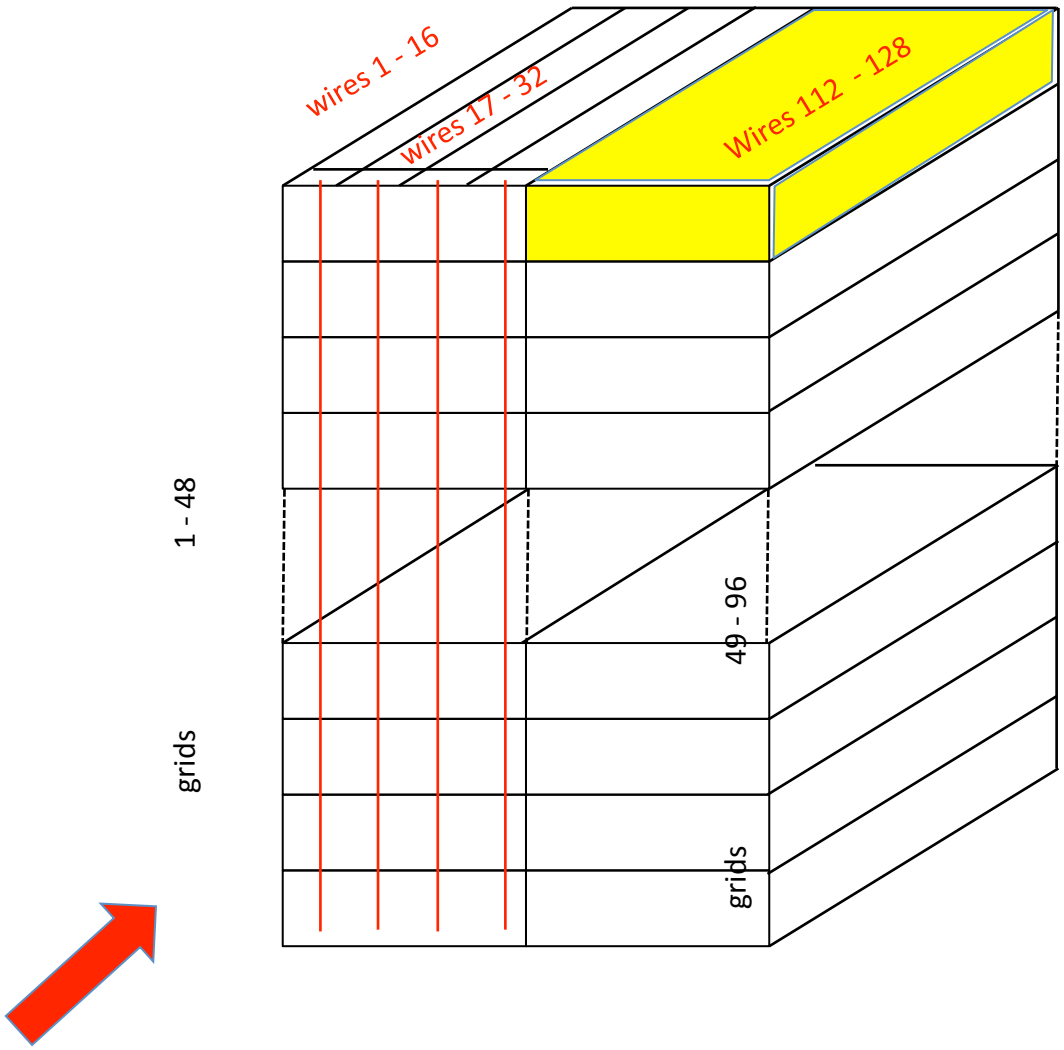
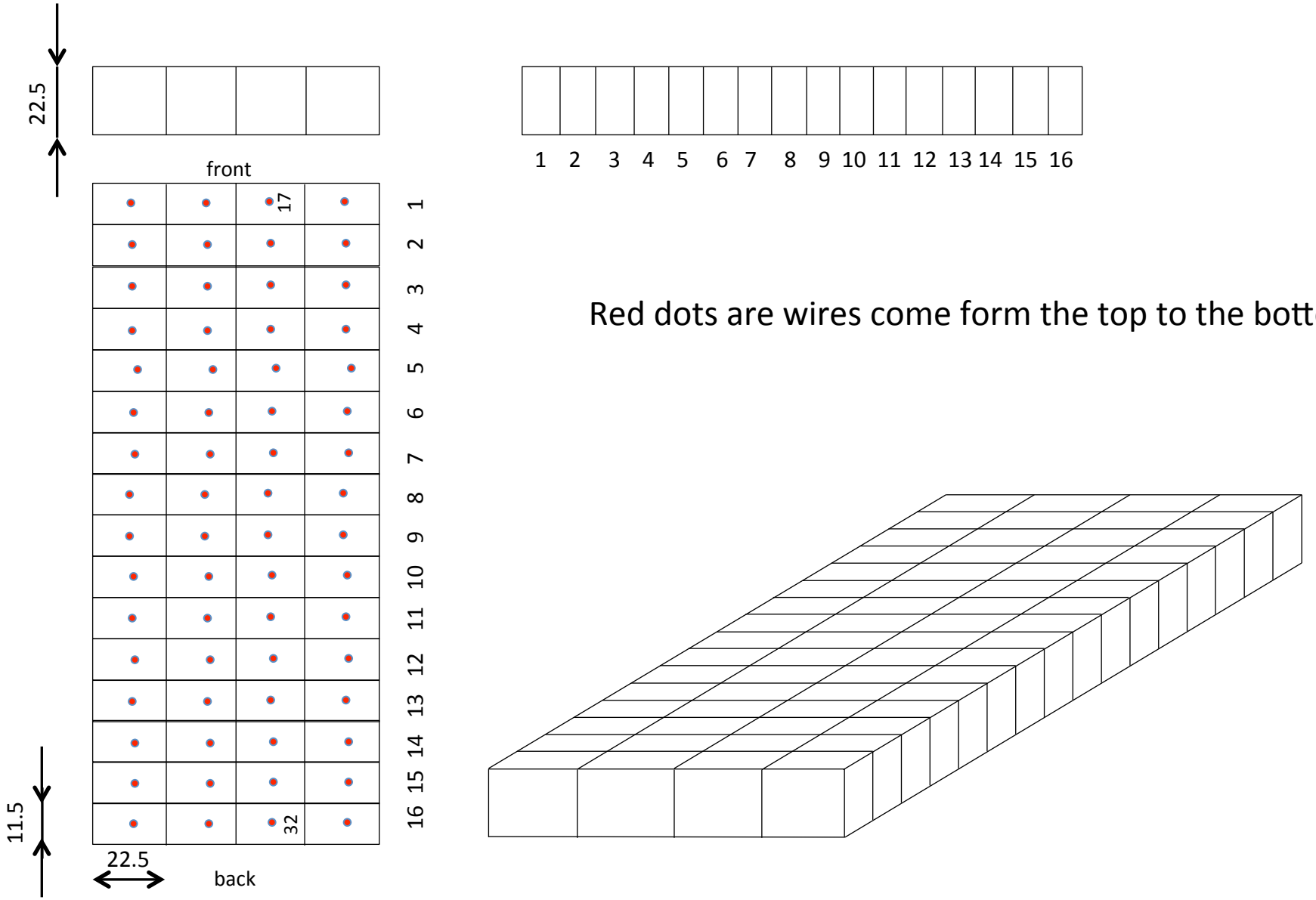


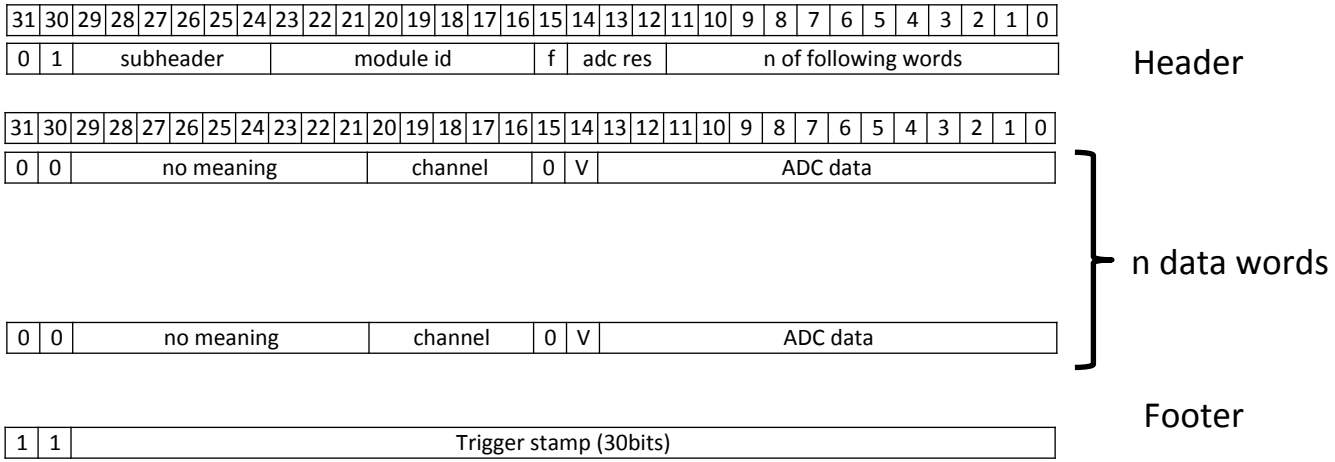
48 grids in one stack

Neutrons come from the front of the detector

The detector consists of 2 stacks with 48 grids on each.
The red lines show where wires are placed


22.5
front
17
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
32
11.5
22.5
back
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
Red dots are wires come form the top to the bottom

Data structure



v – if equal 1, means overflow

Keep in mind that we found a bug in the firmware, we reported it to the producer
they fixed if and now the new firmware is available. However, the data is collected with the old firmware.
Which means that sometimes this structure is broken, e.g. the number of data words do not match the number from the header, or the timestamp appears too early.
What you have to do is to skip this data and look for the next header in the data stream.

All the wires are connected to a muliplexing boxes.
The multiplexing boxes convert signals from each wires to two values, one which wire was fired, and the second what was the amplitude of the fired wire. There are 16x8 wires in the detector. And the multiplexing box produces two signals output from one stack and two from the second.
The wires are counted from the front to the back of the detector (1-16) for the first row, then second row (17-32) etc… till the last row. See the picture.

The grids from one stack are also connected to the multiplexing box, producing two signals, one denoting which grid and second the amplitude of this signal. Two stacks produce four signals output.
The grids are counted from 1 to 48 for the left stack and from 49 to 96 for the right stack.

Then we use a peak sensitive digitizer to get 8 channels in the data stream where:
Data1 – amplitude wire0
Data2 – amplitude wire1
Data3 – position wire0
Data4 – position wire1
Data5 – amplitude grid0
Data6 – amplitude grid1
Data7 – position grid0
Data8 – position grid1
If there is only one neutron there will be only data1, data3, data5, data6, data7, data8. If there are two neutrons at the same time then: data1, data2, data3, data4, data5, data6, data7, data8. If there are more than two neutrons at the same time we loose them.
Although the digitizer allows us to set threshold and suppress zeros, in our acquisition we set the threshold to 0, which means we have always 8 channels.