TriggerPrimitive Data Size

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What is the data member sum?

Data Member	Bytes
`time_start`	8
`time_peak`	8
`time_over_threshold`	8
`adc_integral`	4
`algorithm`	4
`channel`	4
`type`	4
`adc_peak`	2
`detid`	2
`flag`	2
`version`	2
Total	48

What is the actual order and size?

Data Member	Bytes
`version`	2 + 6
`time_start`	8
`time_peak`	8
`time_over_threshold`	8
`channel`	4
`adc_integral`	4
`adc_peak`	2
`detid`	2
`type`	4
`algorithm`	4
`flag`	2 + 2
Subtotal	48
Padding	8
Total:	56

Removing The 8 B Padding

A simple reorder removes this.

- Breaks backwards compatibility.
  - Cannot read old data with new format.
- Padding data rate: (1 MHz TP rate)
  - 8 MB / s,
  - 480 MB / min,
  - 28.8 GB / hour.

Lightest protoDUNE TP

TPLite

Data Member	Bytes	Comments
`time_start`	8	
`time_peak`	2	Relative to `time_start`.
`time_over_threshold`	2	Not scaled by 32.
`adc_integral`	2	Limited by AVX2.
`adc_peak`	2	
`channel`	2	Less than 65,536 channels.
`flag`	2	Should it be less?
`algorithm`	1	Less than 255 algs.
`detid`	1	Less than 255 ids.
`type`	1	Less than 255 types.
`version`	1	Less than 255 versions.
Total	24	

Data Rate Comparison

At 1 MHz TP rate,

TPLite	Reordered TP	Original TP	
24.0	48.0	56.0	MBps
1.44	2.88	3.36	GB / min.
86.4	173	202	GB / hr.
2.07	4.15	4.84	TB / day
0.757	1.51	1.77	PB / yr.

Conclusions

- At least change from original to reordered TP.
- *TPLite* may be too extreme:
  - Can `flag` be reduced?
  - Does `channel` need to be increased?