

Feature-extraction data format

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Belle II collaboration



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TOP software meeting

v1.8 (from TWiki)

1.8 Belle 2 TOP Data Format (Production Data)

Note that the data listed below does NOT include protocol headers; trigger type, ctime, utime, and trgtag are included in Belle.

		Bits																															
Word	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Hit
0	Type				Version					ASIC				Channel				SCROD_ID								N/A							
1	SD_type				Slow data								C_offset				T_fine				Window								1				
2	Samp_i												dSamp_peak				V_peak								1								
3	V_i								V_i+1																1								
4					dSamp_fall				dV_fall+1								Integral								1								
5	V_fall								V_fall+1																1								
																	...																
N*5+1	Footer flag?																Nhits								N								
Event size = (N*5+2) * 4 bytes		e.g., for an event with 20 hits --> 408 bytes at 30 kHz trigger rate, this gives 11.67 Mb/s																															

- ASIC, Channel → belong to hit data block (words 1 - 5)

v1.9b (ASIC & Channel to hit data, reorganized)

1,9b Belle 2 TOP Data Format (Production Data)		Bits																				Hit											
Word	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	
0	Type								Version								SCROD_ID								N/A								
1	ASIC				Channel				Samp_i								C_offset				T_fine				Window								1
2	dSamp_peak				dSamp_fall				dV_fall+1								V_peak								1								
3	V_i								V_i+1								1																
4	V_fall								V_fall+1								1																
5	SD_type				Slow data								Integral								1												
	...																																
N*5+1	Footer flag?																Nhits								N								
Event size = (N*5+2) * 4 bytes		e.g., for an event with 20 hits --> 408 bytes																															
		at 30 kHz trigger rate, this gives 11.67 Mb/s																															

- SD_type requires 8 bits → can be moved to footer
 - Footer flags: maybe 3 bits enough?

v1.9c (slow data moved to footer, T_fine & C_offset swapped)

1,9c Belle 2 TOP Data Format (Production Data)																																	
Bits																																	
Word	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Hit
0	Type								Version								SCROD_ID								N/A								
1	carrier	ASIC	Channel	Samp_i								T_fine	C_offs	Window								1											
2	dSamp_peak				dSamp_fall				dV_fall+1								V_peak								1								
3	V_i																V_i+1								1								
4	V_fall																V_fall+1								1								
5																	Integral								1								
...																																	
N*5+1	SD_type								Slow data								Nhits								N								
Event size = (N*5+2) * 4 bytes																e.g., for an event with 20 hits --> 408 bytes at 30 kHz trigger rate, this gives 11.67 Mb/s																	

consistency check: data size == Nhits * 5 + 2

v1.9d (additional footer word and spare bits set for sanitary checks)

1,9d Belle 2 TOP Data Format (Production Data)																																	
Bits																																	
Word	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00	Hit
0	Type								Version								SCROD_ID								N/A								
1	carrier	ASIC	Channel	Samp_i								T_fine	C_offs	Window								1											
2	dSamp_peak				dSamp_fall				dV_fall+1								V_peak								1								
3	V_i																V_i+1								1								
4	V_fall																V_fall+1								1								
5	SCROD_ID								Integral								1																
...																																	
N*5+1	SD_type								Slow data								Nhits								N								
N*5+2	magic word ("last" in ASCII)																																
Event size = (N*5+3) * 4 bytes e.g., for an event with 20 hits --> 412 bytes																																	