

Second Pass on WIB Metadata

K/D	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Data Source
0001	0x00				0x00				0x00				SOF (K28.1)												WIB								
0000	14-bit WIB Code														Data Frame Version#		FEMB Valid	F#	WIB Slot#		WIEC Crate#						WIB						
0000	32-bit WIB/COLDATA Code																																WIB
0000	Timestamp [31:0]																																WIB
0000	Timestamp [63:32]																																WIB
0000	U(2) ADC[3:0]				U(1) ADC[13:0]								U(0) ADC[13:0]																FEMB0				
0000	U(4) ADC[7:0]								U(3) ADC[13:0]								U(2) ADC[13:4]								FEMB0								

0000	X(45) ADC[9:0]				X(44) ADC[13:0]																X(43) ADC[13:6]						FEMB1						
0000	X(47) ADC[13:0]														X(46) ADC[13:0]						X(45) ADC[13:10]						FEMB1						
0000	12-bit flex word														CRC-20																		WIB
0001	24-bit flex word																		EOF (K28.6)						WIB								
0001	0x00				0x00								0x00								IDLE (K28.5)						IDLE/WIB						

14-bit WIB Code

32-bit WIB/COLDATA Code

12-bit flex word

24-bit flex word

(We are going to completely ignore slow controls and DDSS information, which do not (obviously) go into the frame header or trailer).

+One bit of the COLDATA v2 already dedicated to pulser

Configurations and Conditions

One way to divide up the cases:

Configurations=the way we want it to be set up

Conditions=how it may have changed

This gets murky when we imagine *dynamic re-configurations*:

- WIB will run calibrations locally, re-configuring DAC settings, etc.
- WIB will have ability to remove and FEMB from data stream (e.g., mask)
- WIB will run its own resynchronizations if necessary

For our purposes, this doesn't matter too much unless we want to go through the pain of first alerting CCM there is a problem and having it re-configure things---
We have to be able to flag dynamic changes to config information

Use Case: Physics Running

We want (at least):

- Data Frame version number
 - WIB slot number
 - WIEC crate number
 - CRC-20
- } Already in frame definition
- FEMB “enables” --- 2-bit mask that tells us which FEMBs are currently providing valid data
 - Configuration ID --- how many bits?
 - Configuration ongoing (transition bit?) 1 bit
 - FEMB Rx Link “enables” –16 bits/WIB
 - ADC Calibration bit (0 for normal data) --- data doesn’t go to FELIX so not needed
 - Pulser calibration bit (0 for normal data)
 - Stream this data (1 bit per FEMB?) and ignore for hit-finding
 - WIB Synchronization OK --- 1 for OK, comes from PLL, could get this from Endpoint
 - FEMB synchronization OK --- 2 bits, 1 for OK
 - Need to figure out how to determine this
 - Will we be able to do this while powered? Just need to test.

Use Case: Pulser Calibrations

Flex bits (contextualized by pulser calibration bit):

- Current DAC setting --- ~16 bits
- ~~Current gain setting — 2 bits — Move this to new run, keep in config database — has to come from Run Control~~
- ~~Current shaper setting — 2 bits? Move this to new run, keep in config database — has to come from Run Control~~
- Pulser offset? --- need to define — need to think about real bit width necessary
- Pulse count? --- need to define. Can't set number of pulses, but could count the
- Frame includes pulse?

Do we need to double number of bits to deal with 2 FEMBs?