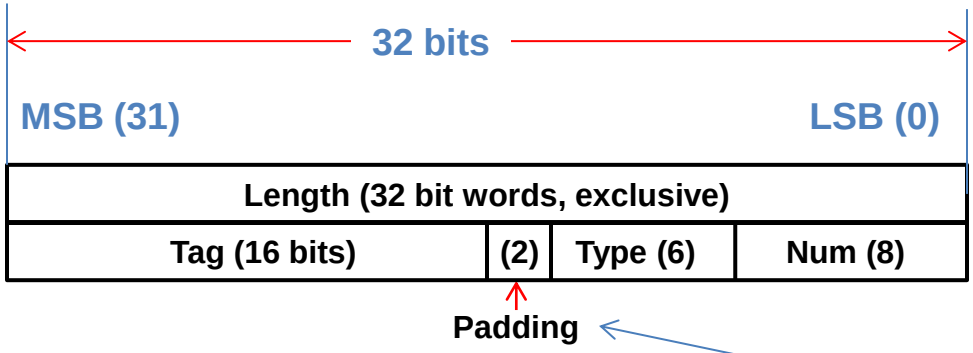
CODA Online Data Formats

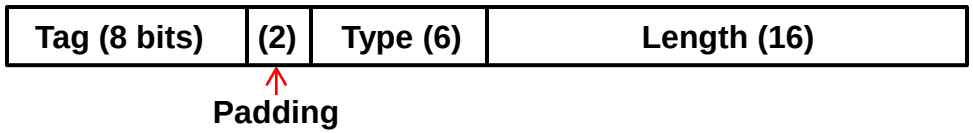
Evio Header Formats

Bank :

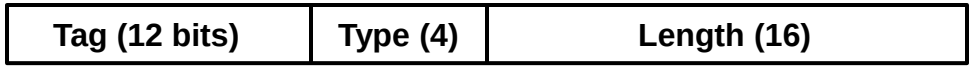


Number of unused bytes at end of following data if not a multiple of 32 bits.
For shorts, it is 0 or 2.
For chars (not strings), it is 0, 1, 2, or 3

Segment :



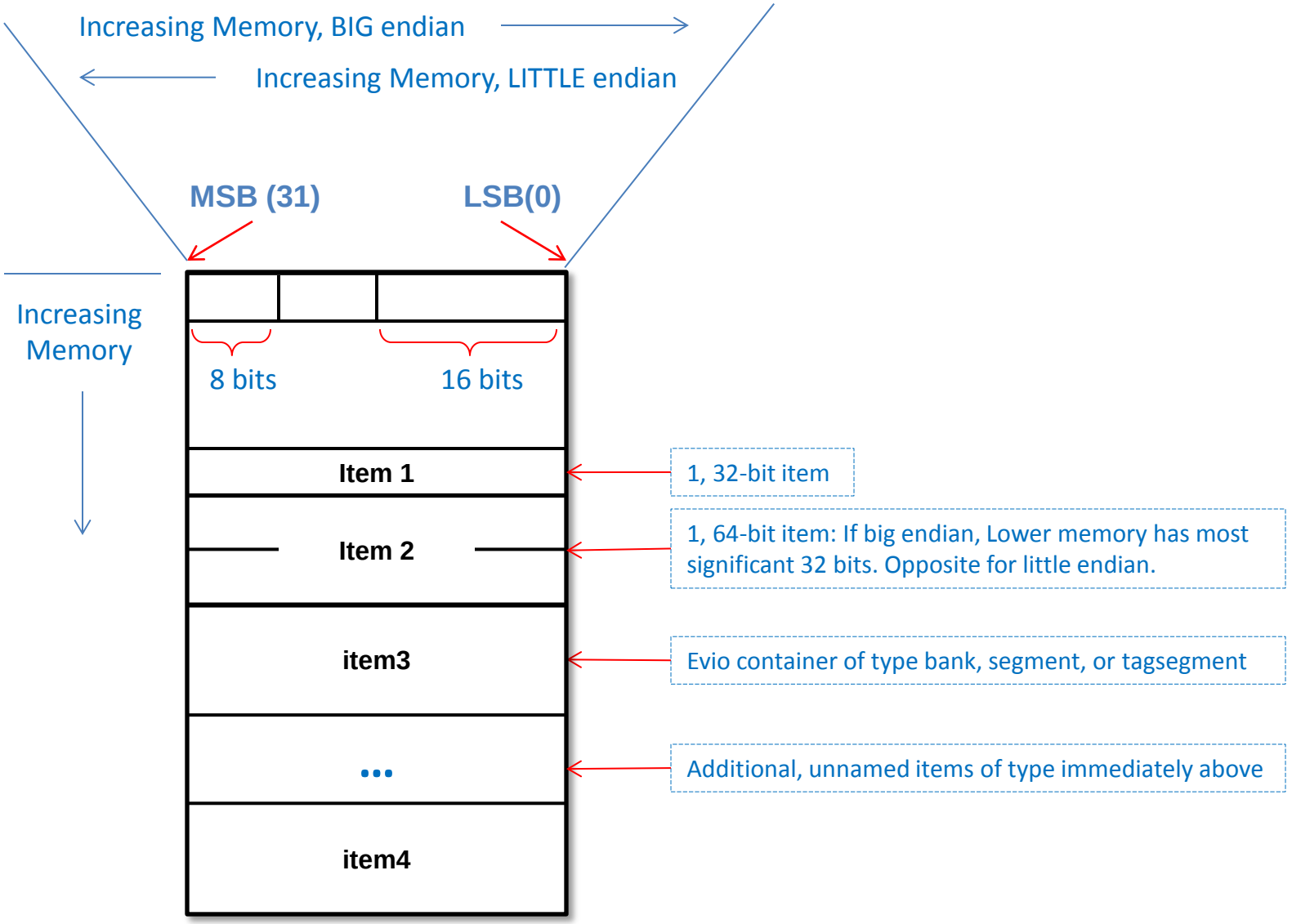
Tag Segment :



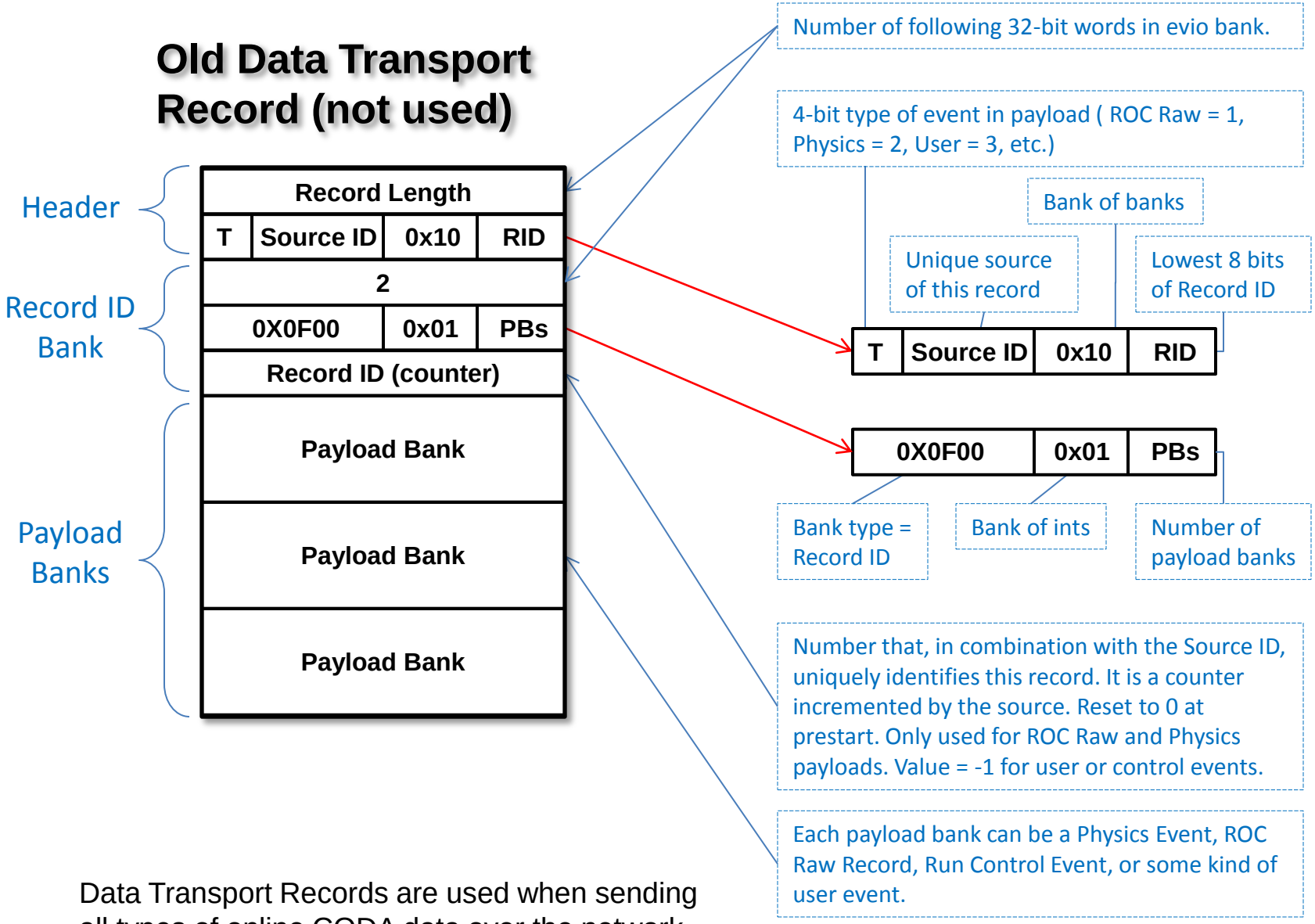
Evio Content Type Codes

Content Type	Primitive Data Type
0x0	32 bit unknown (not swapped)
0x1	32 bit unsigned int
0x2	32 bit float
0x3	8 bit char* (string)
0x4	16 bit signed int
0x5	16 bit unsigned int
0x6	8 bit signed int
0x7	8 bit unsigned int
0x8	64 bit double
0x9	64 bit signed int
0xa	64 bit unsigned int
0xb	32 bit signed int
0xc	Tag Segment
0xd	Segment
0xe	Bank
0xf	Composite
0x10	Bank
0x20	Segment
0x21	Hollerit (only used internally for Composite data)
0x22	N value (only used internally for Composite data)

Key to Reading Data Layouts

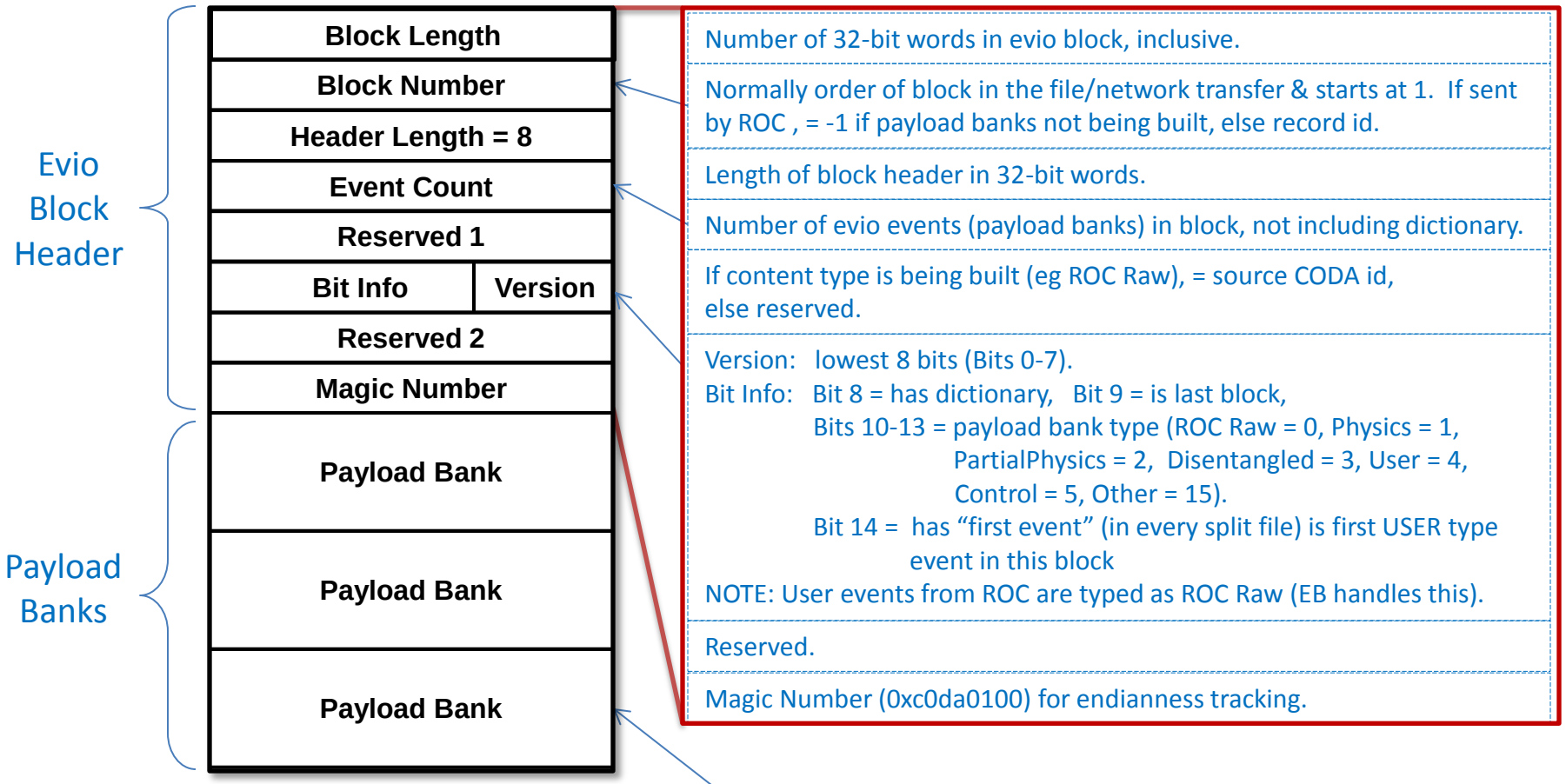


Old Data Transport Record (not used)



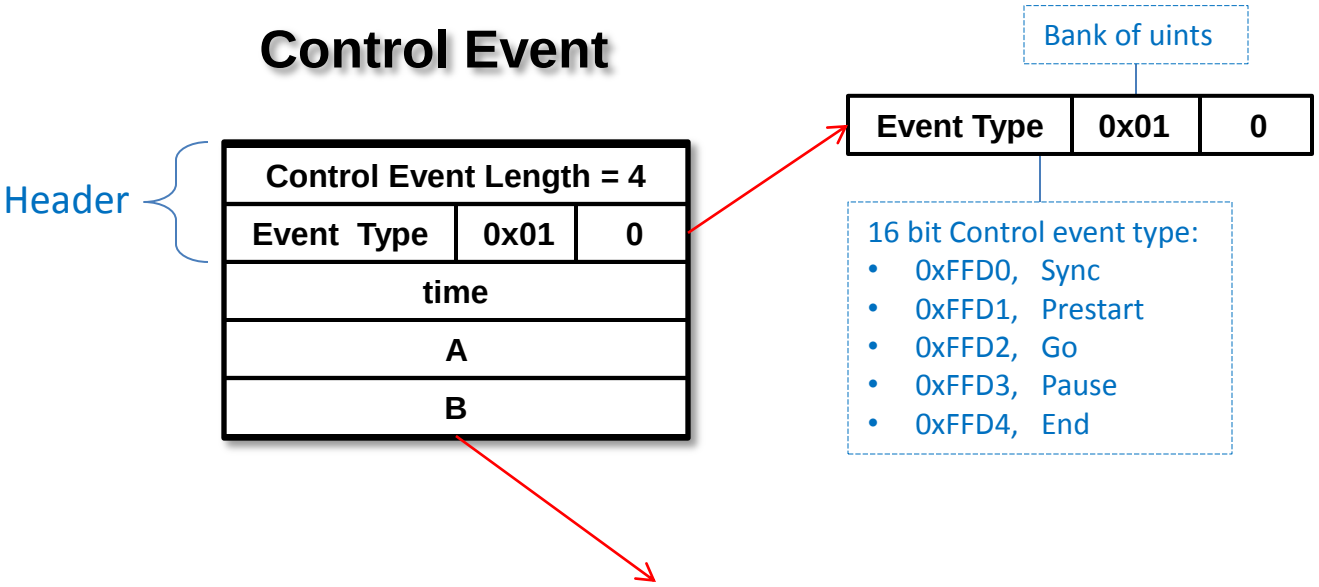
Data Transport Records are used when sending all types of online CODA data over the network.

Network Transfer (Evio Output) Format



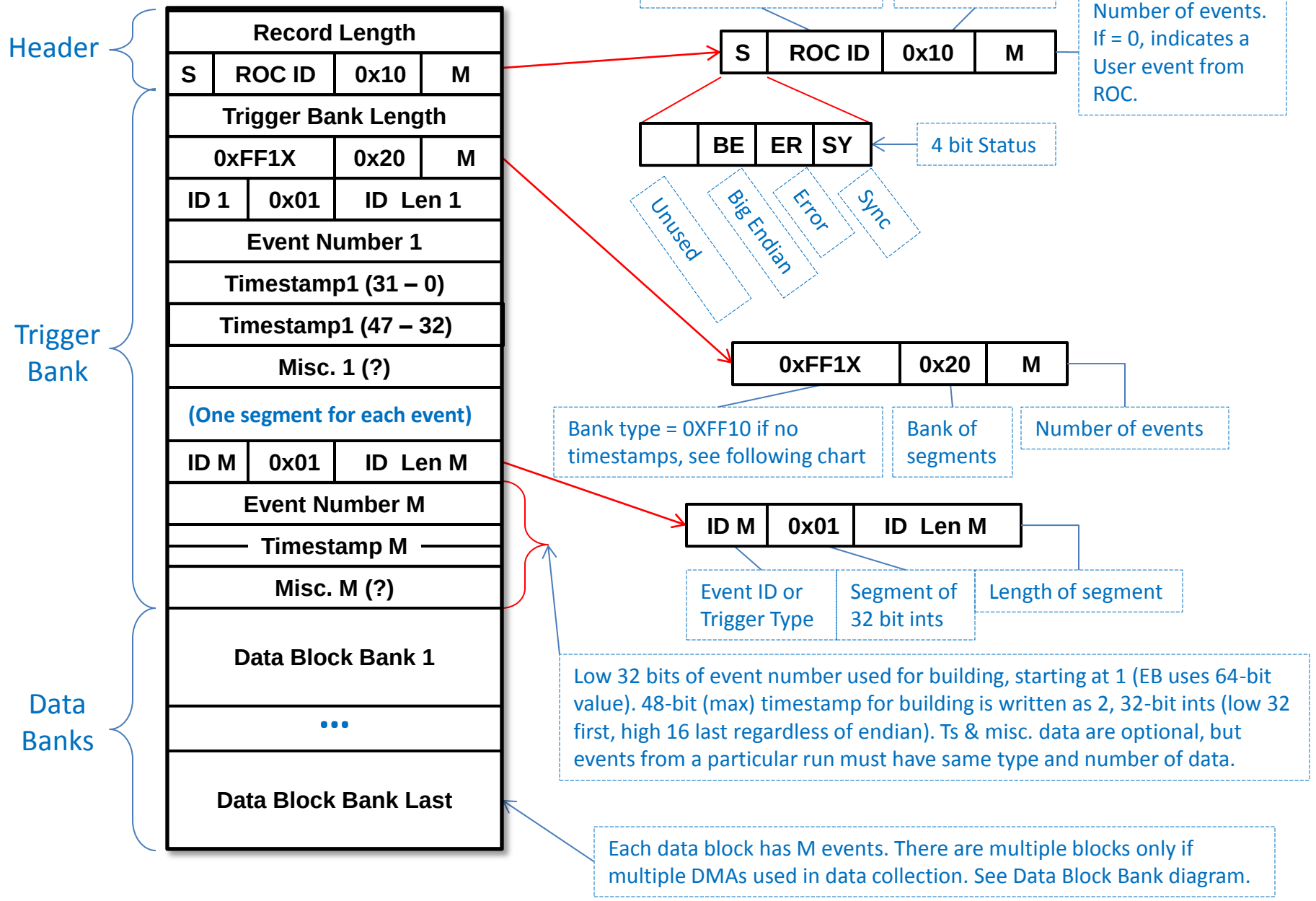
Format used when sending all types of online CODA data over the network. They are in standard evio buffer/file output format with block headers.

Control Event



Event Type	A	B
Sync	# events since last sync	# events in run
Prestart	run number	run type
Go	(reserved)	# events in run so far
Pause	(reserved)	# events in run so far
End	(reserved)	# events in run so far

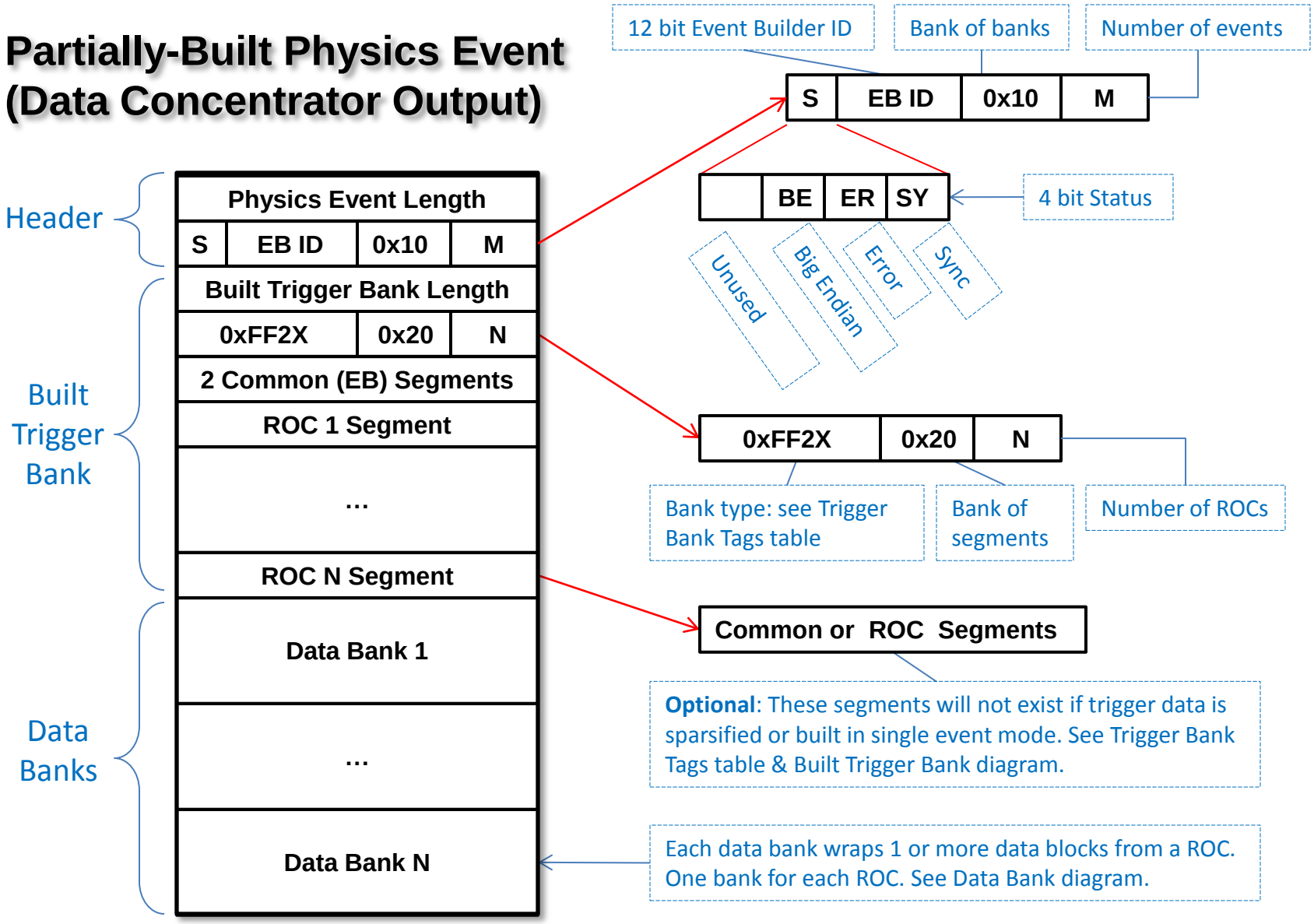
ROC Raw Data Record



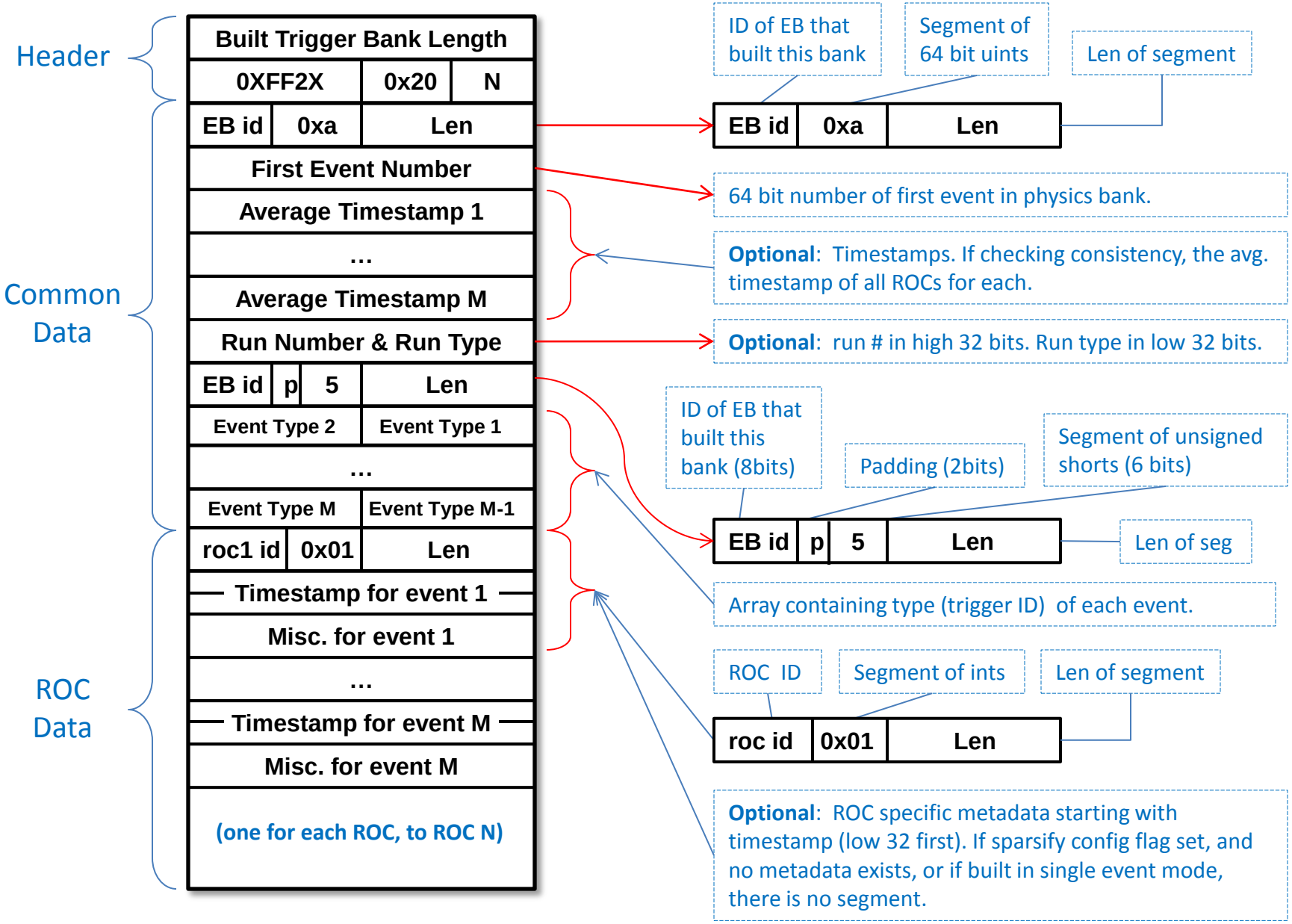
TRIGGER BANK TAGS

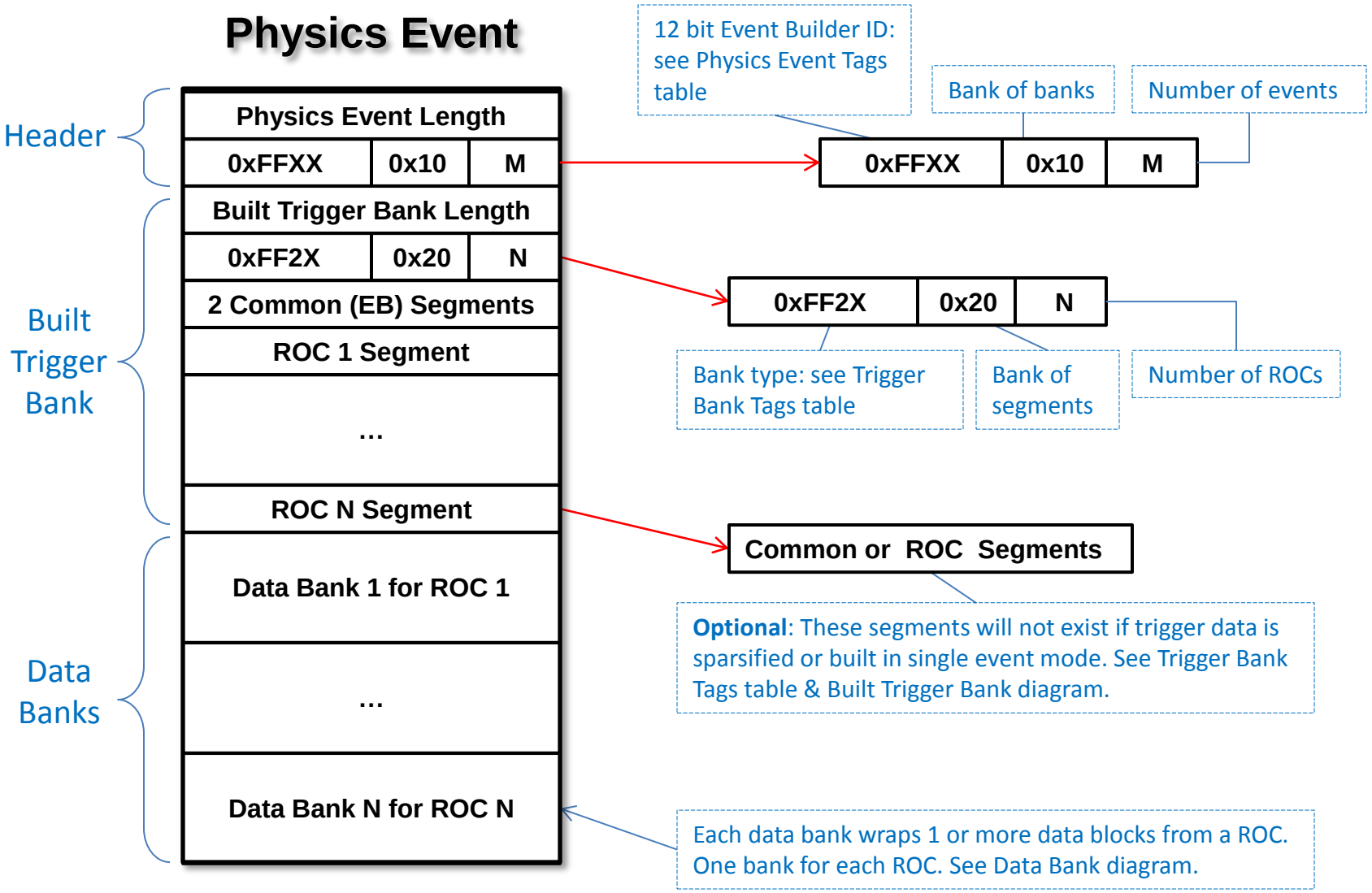
Tag Value	Purpose
0xFF10	Raw trigger, no timestamps
0xFF11	Raw trigger, w/ timestamps
0xFF20	Built trigger, **no** timestamps, **no** run # & run type, includes run specific data
0xFF21	Built trigger, w/ timestamps, but **no** run # & run type, includes run specific data
0xFF22	Built trigger w/ run # & run type, but **no** timestamps, includes run specific data
0xFF23	Built trigger with timestamps and run # & run type, includes run specific data
0xFF24	Built trigger, **no** timestamps, **no** run # & run type, **no** run specific data
0xFF25	Built trigger, w/ timestamps, but **no** run # & run type, **no** run specific data
0xFF26	Built trigger w/ run # & run type, but **no** timestamps, **no** run specific data
0xFF27	Built trigger with timestamps and run # & run type, **no** run specific data

Partially-Built Physics Event (Data Concentrator Output)



Physics Event's Built Trigger Bank




Physics Event
Header
Built Trigger Bank
Data Banks
Physics Event Length
0xFFXX
0x10
M
Built Trigger Bank Length
0xFF2X
0x20
N
2 Common (EB) Segments
ROC 1 Segment
...
ROC N Segment
Data Bank 1 for ROC 1
...
Data Bank N for ROC N
12 bit Event Builder ID: see Physics Event Tags table
Bank of banks
Number of events
0xFFXX
0x10
M
0xFF2X
0x20
N
Bank type: see Trigger Bank Tags table
Bank of segments
Number of ROCs
Common or ROC Segments
Optional: These segments will not exist if trigger data is sparsified or built in single event mode. See Trigger Bank Tags table & Built Trigger Bank diagram.
Each data bank wraps 1 or more data blocks from a ROC. One bank for each ROC. See Data Bank diagram.

CODA RESERVED BANK TAGS

Tag Value Range	Purpose
0xFF00 - 0xFFFF	Complete range of reserved values
0xFFE0 - 0xFFFF	Undetermined
0xFFD0 - 0xFFDF	Control events
0xFF90 - 0xFFCF	Undetermined
0xFF50 - 0xFF8F	Physics events
0xFF10 - 0xFF4F	Trigger banks
0xFF00 - 0xFF0F	Undetermined

CONTROL EVENT TAGS

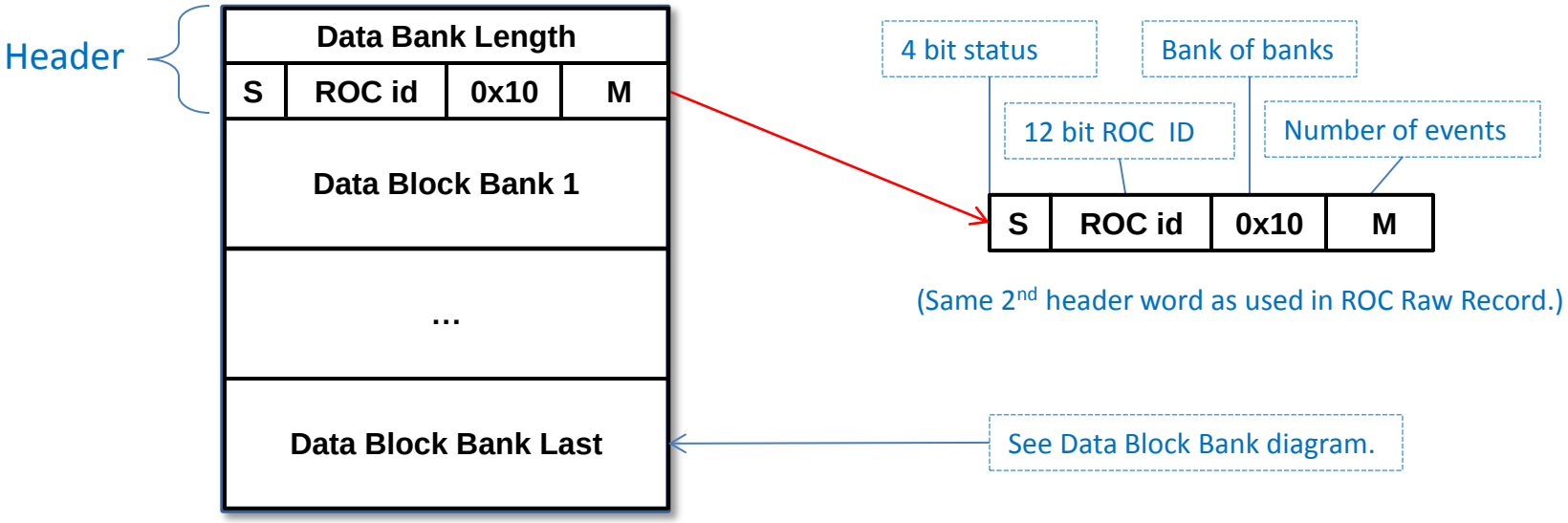
Tag Value	Control Event
0xFFD0	Sync
0xFFD1	Prestart
0xFFD2	Go
0xFFD3	Pause
0xFFD4	End

PHYSICS EVENT TAGS

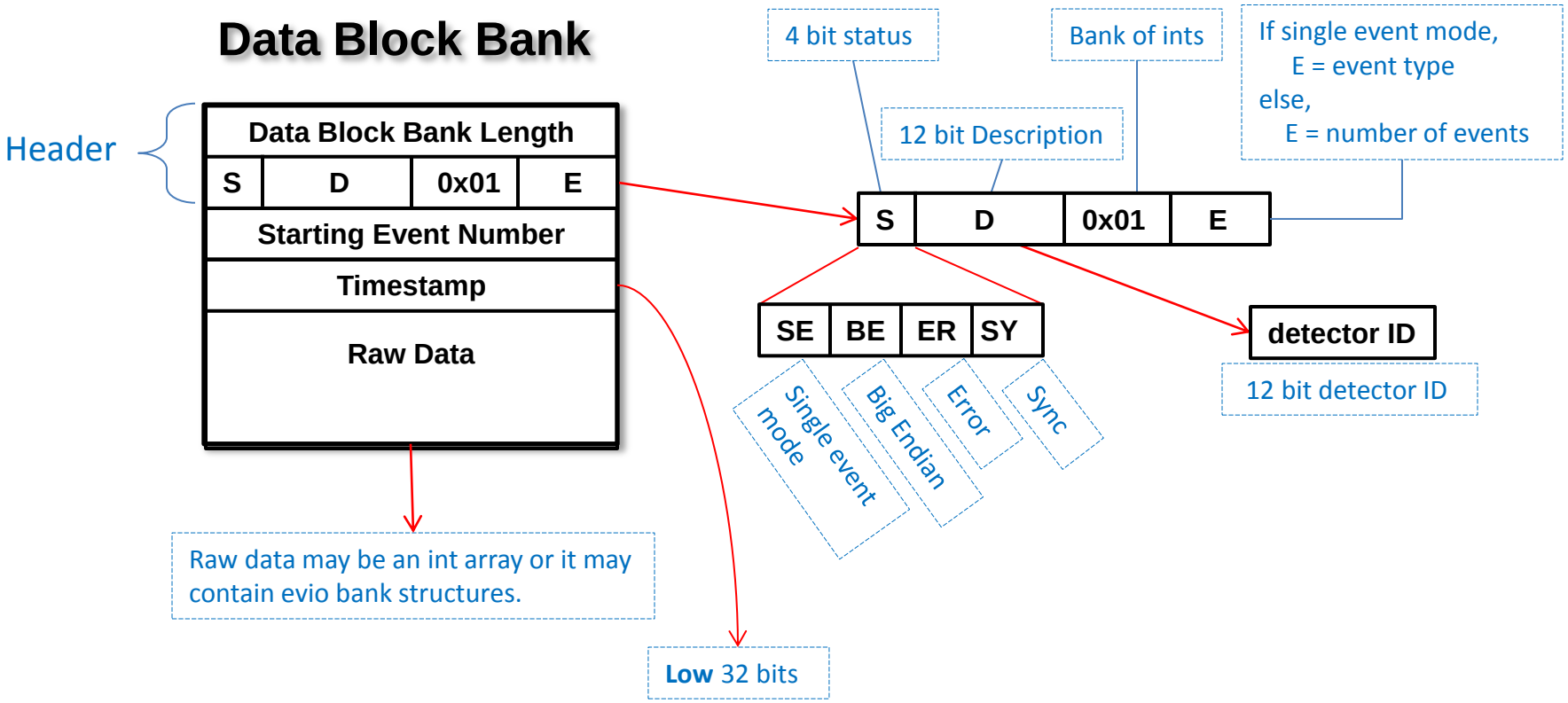
Tag Value	Event Made by
0xFF50	PEB
0xFF58	PEB with sync set
0xFF70	SEB
0xFF78	SEB with sync set

4th bit set indicates that the last event in the entangled block is a sync event

Physics Event's Data Bank

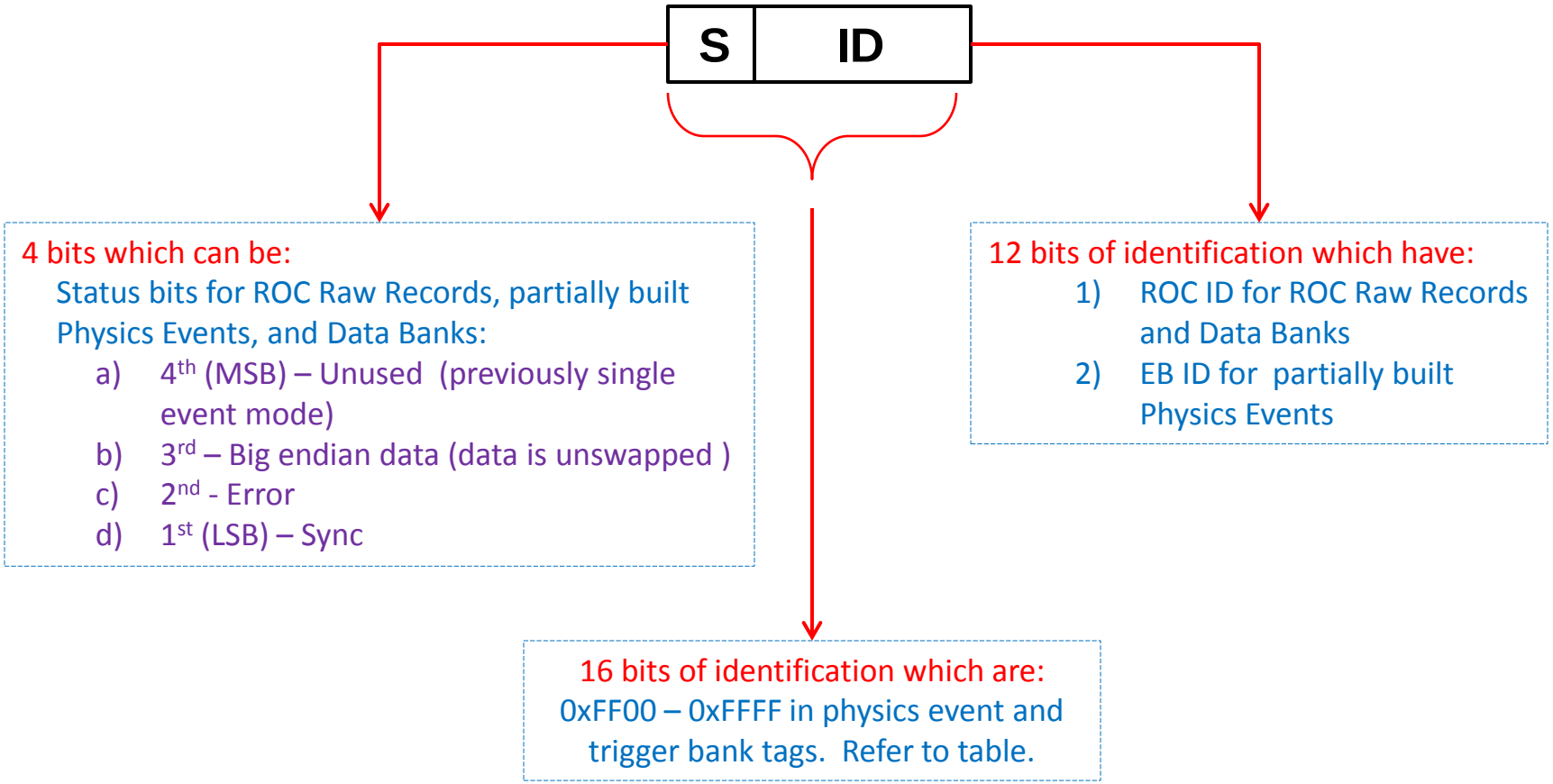


Data blocks from a single ROC are wrapped in this data bank. There should be at least one data block and there may be more if more than one DMA is used in acquiring data for this ROC. If more than one block, each contains a fragment for every one of the M events and from unique modules. In addition, the last block may have data associated only with the last event (such as scalar data).

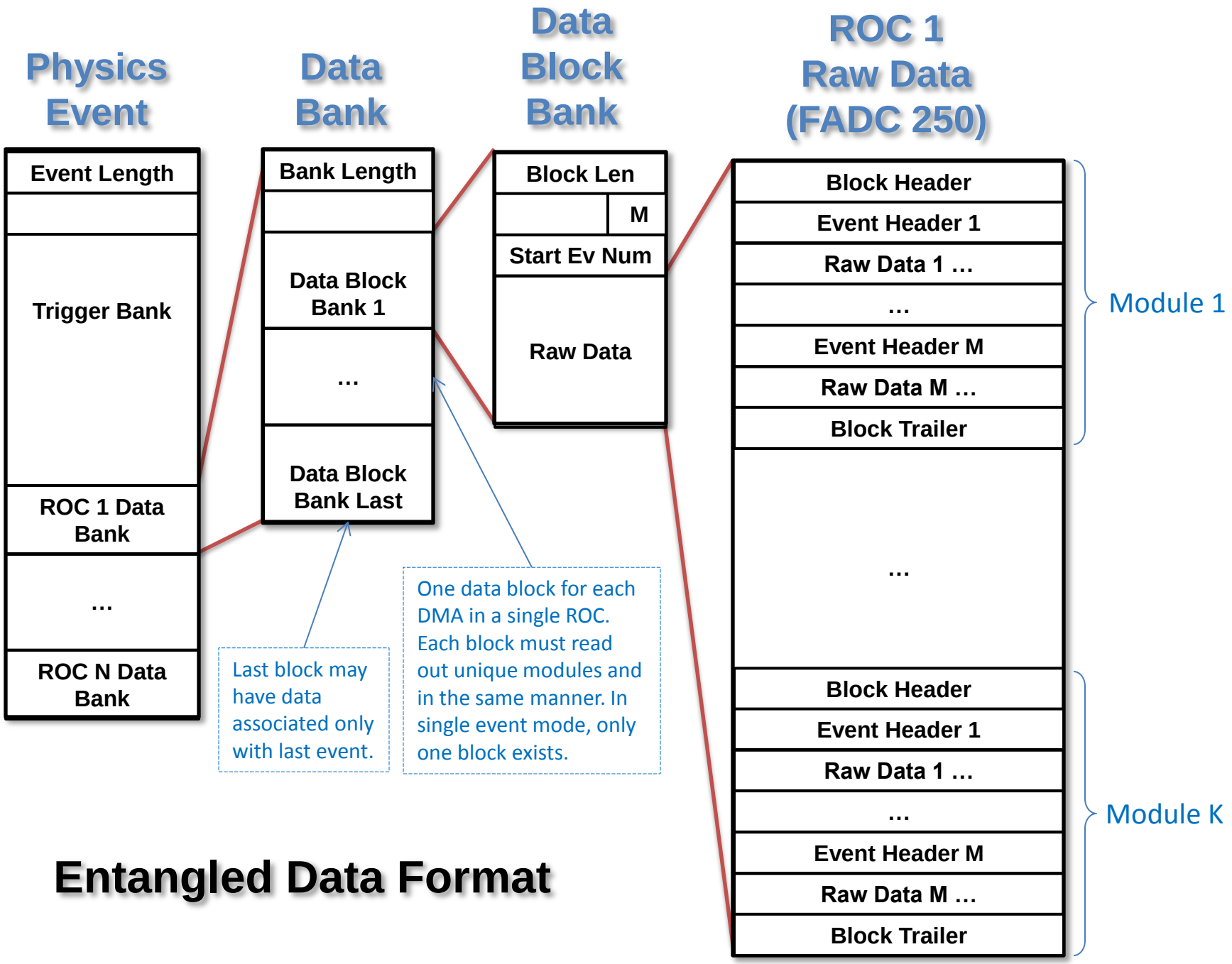


Contains raw data from a single ROC containing one or more events. If this block is the last in a data bank, and there are multiple events, and E = 1, then this data is associated only with the last event (e.g. scalar readout).

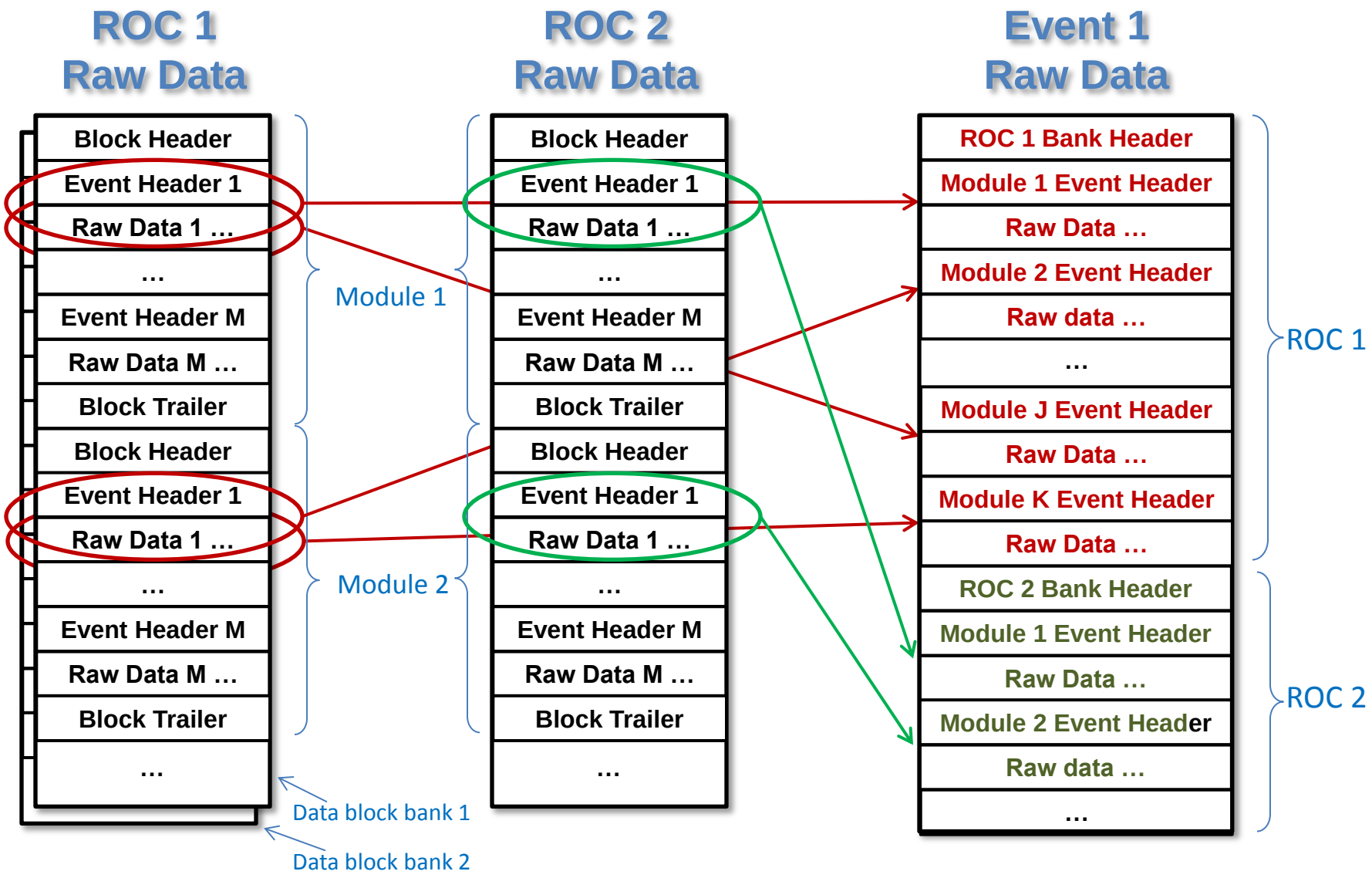
16-bit EVIO CODA-Format Tag



Disentangling Built Physics Event

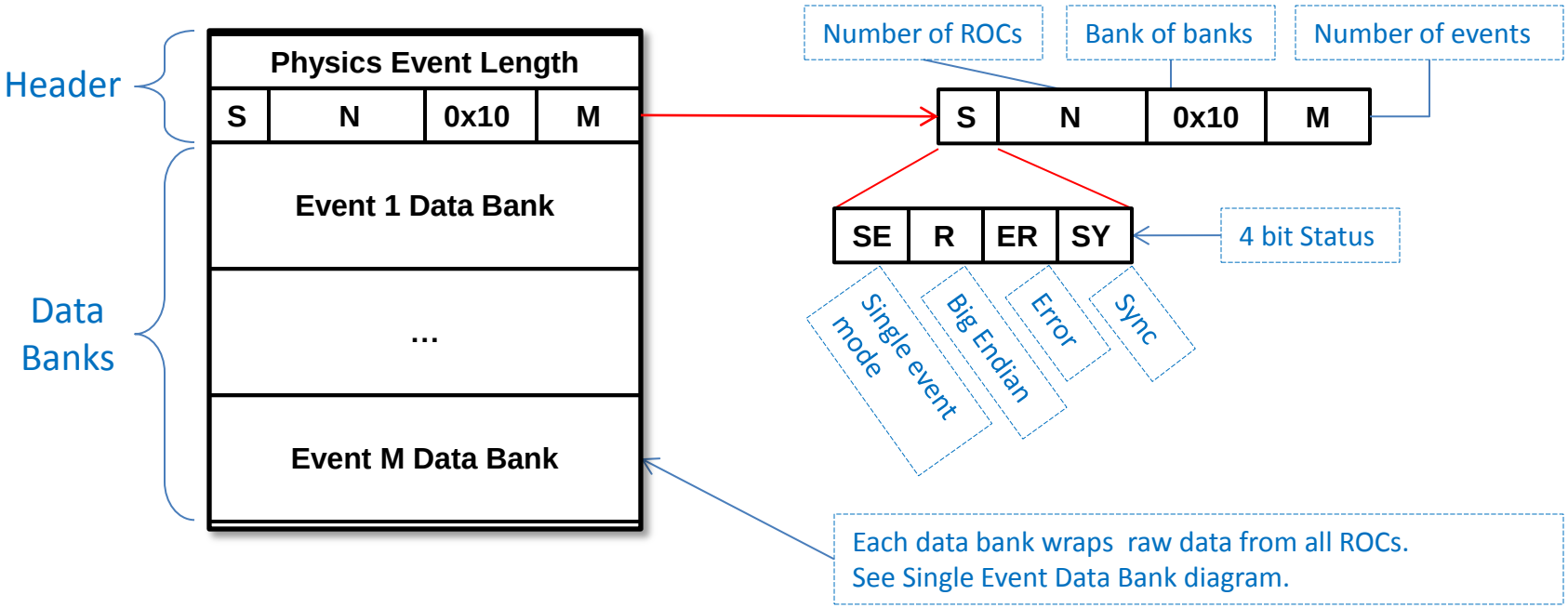


Entangled Data Format

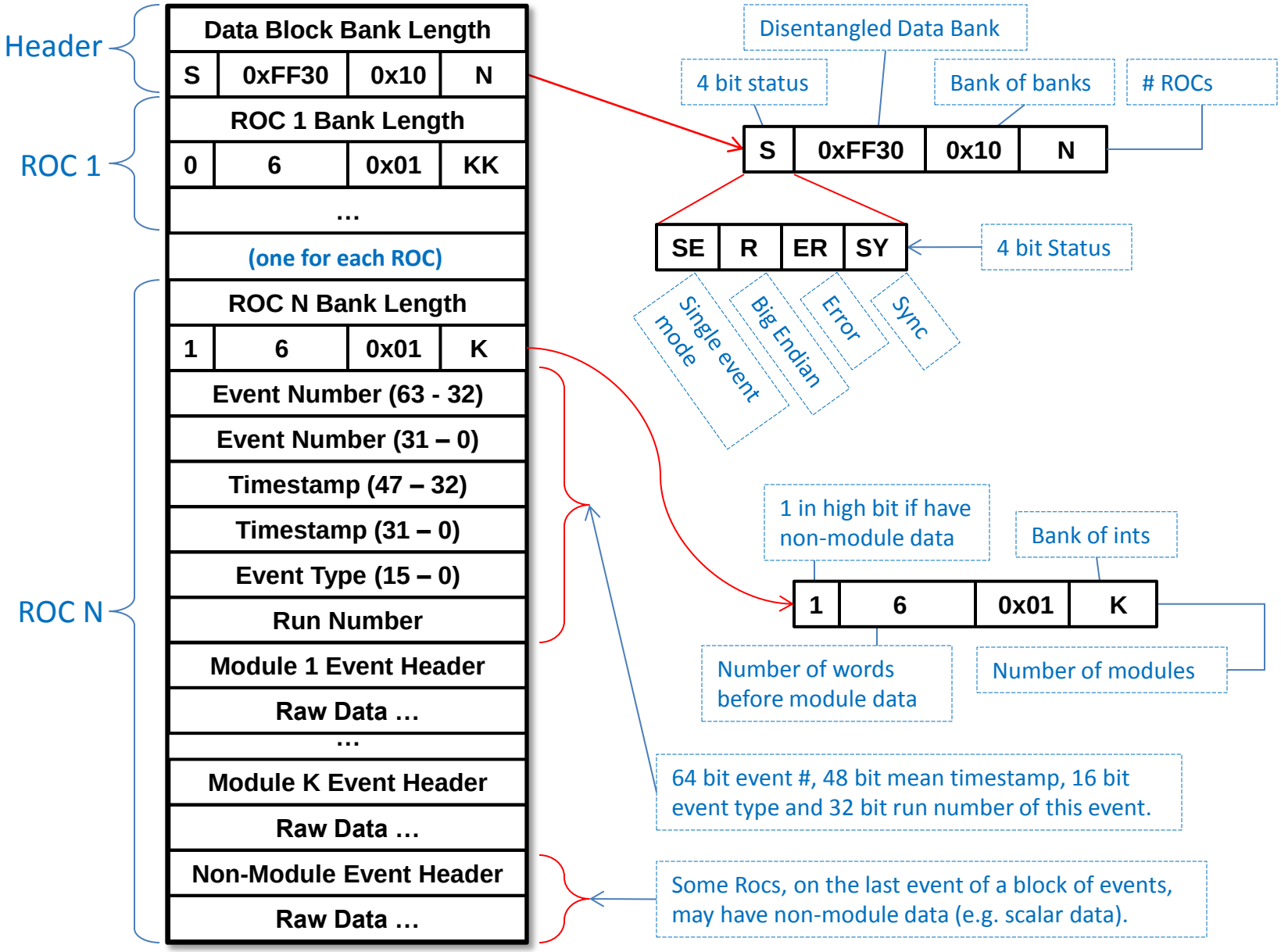


Entangled To Disentangled FADC 250 Raw Data

Disentangled Physics Event



Single Event (Disentangled) Data Bank



FADC 250

Data Type Values	
0 – block header	7 – pulse integral
1 – block trailer	8 – pulse time
2 – event header	9 – streaming raw data
3 – trigger time	10 – 12 user defined
4 – window raw data	13 – event trailer (debug only)
5 – window sum	14 – data not valid (empty module)
6 – pulse raw data	15 – filler (non-data) word

Block Header Word Format

Bits	Value	Comment
31	1	This is a type defining word
30 – 27	0	Data type = block header
26 – 22	Slot ID	Set by VME64 backplane
21 – 14	Event #	Number of events in block
13 – 12	Module Type	0=FADC250, etc.
11 – 0	Event block #	Used to align block when building events

General Data Word Format

31st bit	Bits	Usage
1	30 - 27	4-bit data type (see chart)
1	26 - 0	Data type dependent data payload
0	3 0 - 0	Data payload using last defined data type

Block Trailer Word Format

Bits	Value	Comment
31	1	This is a type defining word
30 – 27	1	Data type = block trailer
26 – 22	Slot ID	Set by VME64 backplane
21 – 0	Total # of words in block of events	Number of 32 bit words in block

Event Header Word Format

Bits	Value	Comment
31	1	This is a type defining word
30 – 27	2	Data type = event header
26 – 22	Slot ID	Set by VME64 backplane
21 – 20	Module type	0=FADC250, etc.
19 – 0	Trigger number	ADC processing chip #