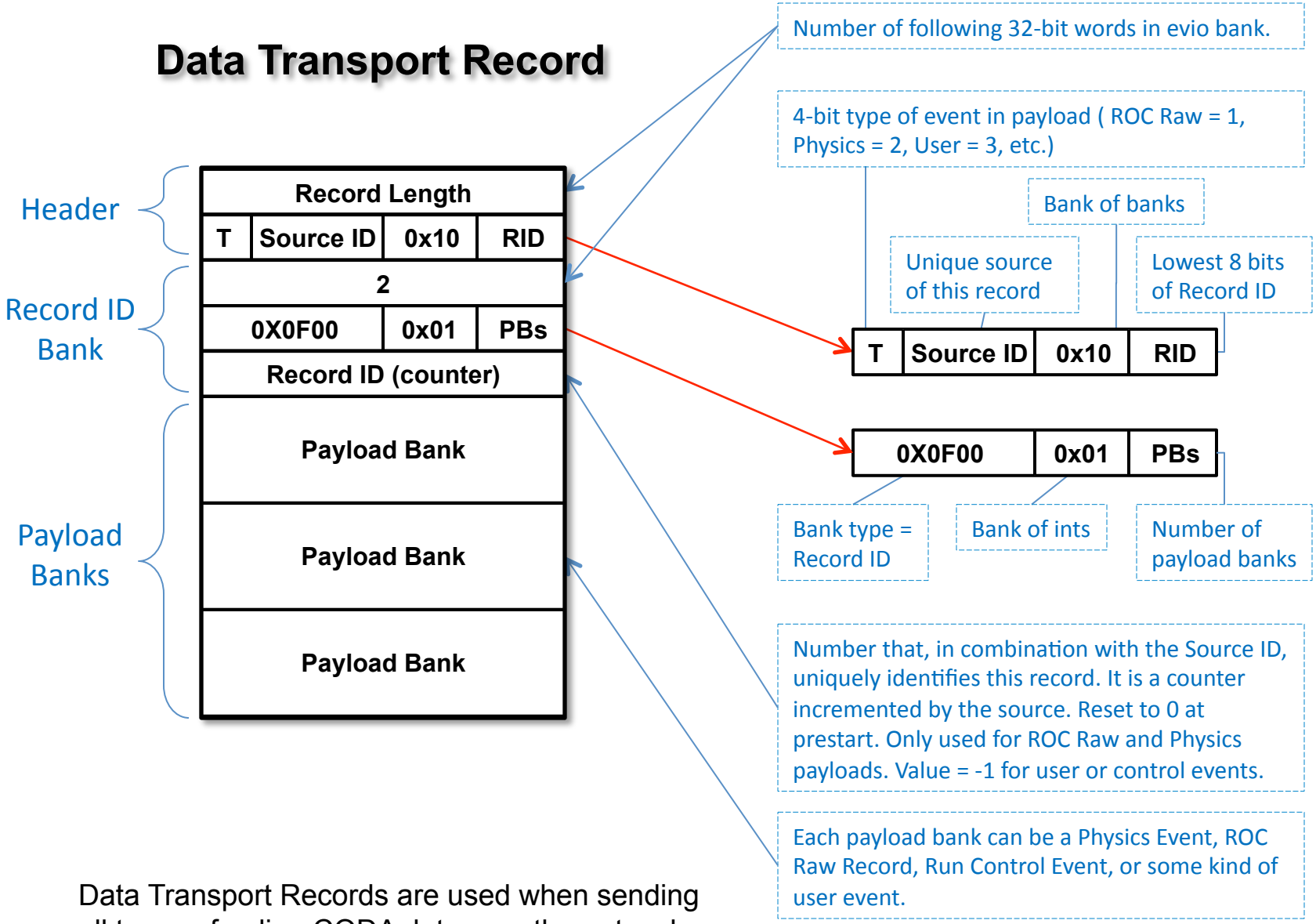
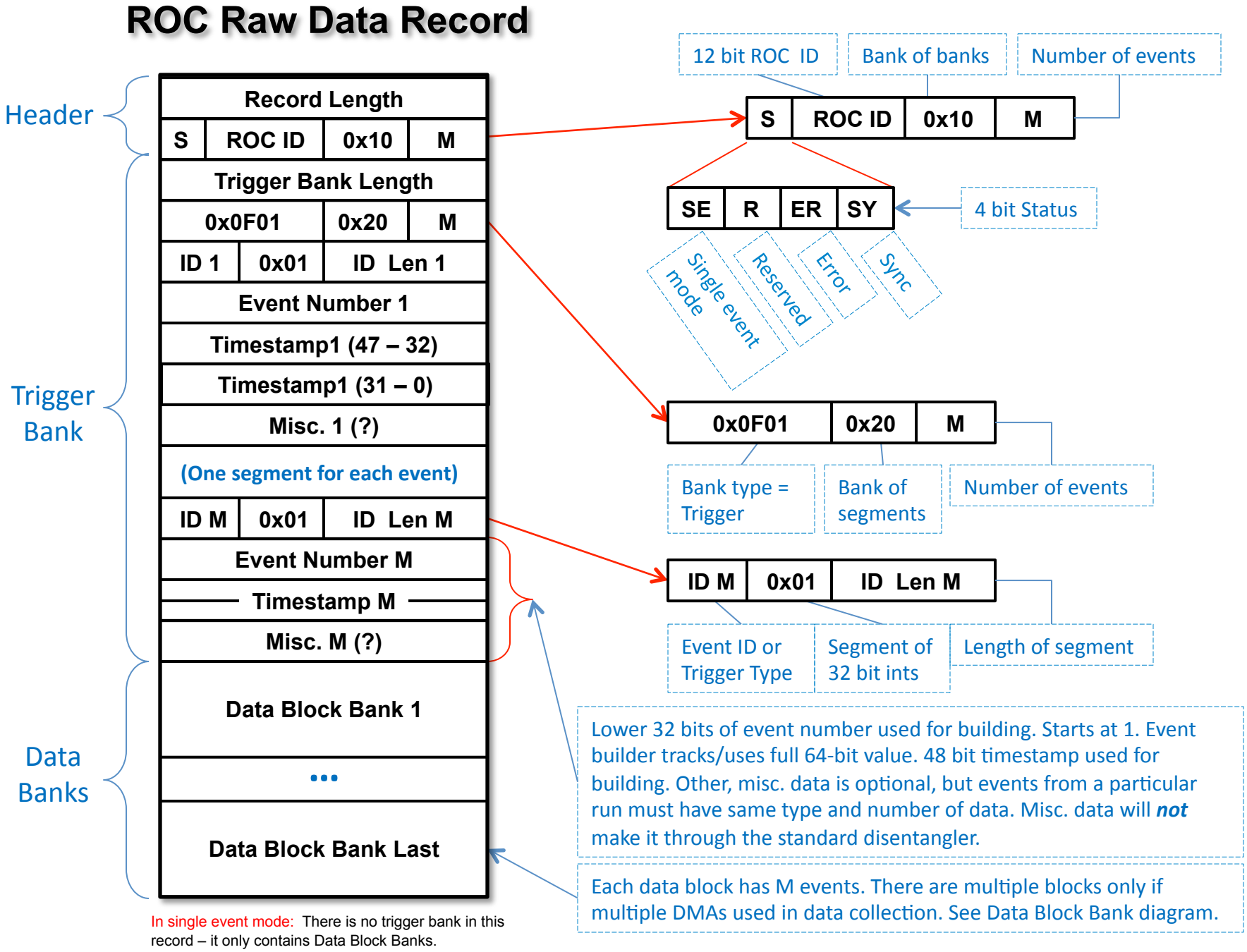
Event Building Evio Scheme

Data Transport Record

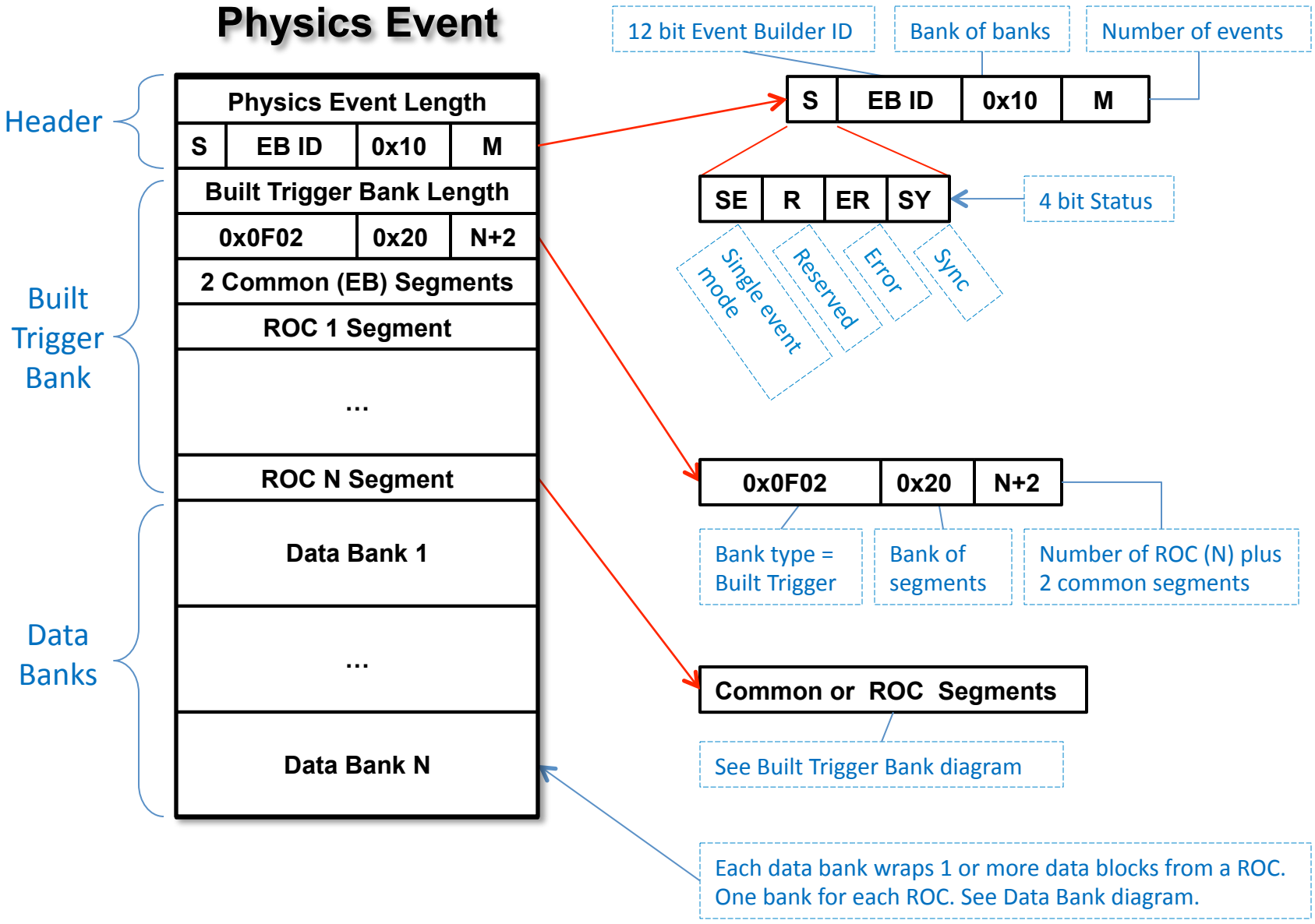


Data Transport Records are used when sending all types of online CODA data over the network.

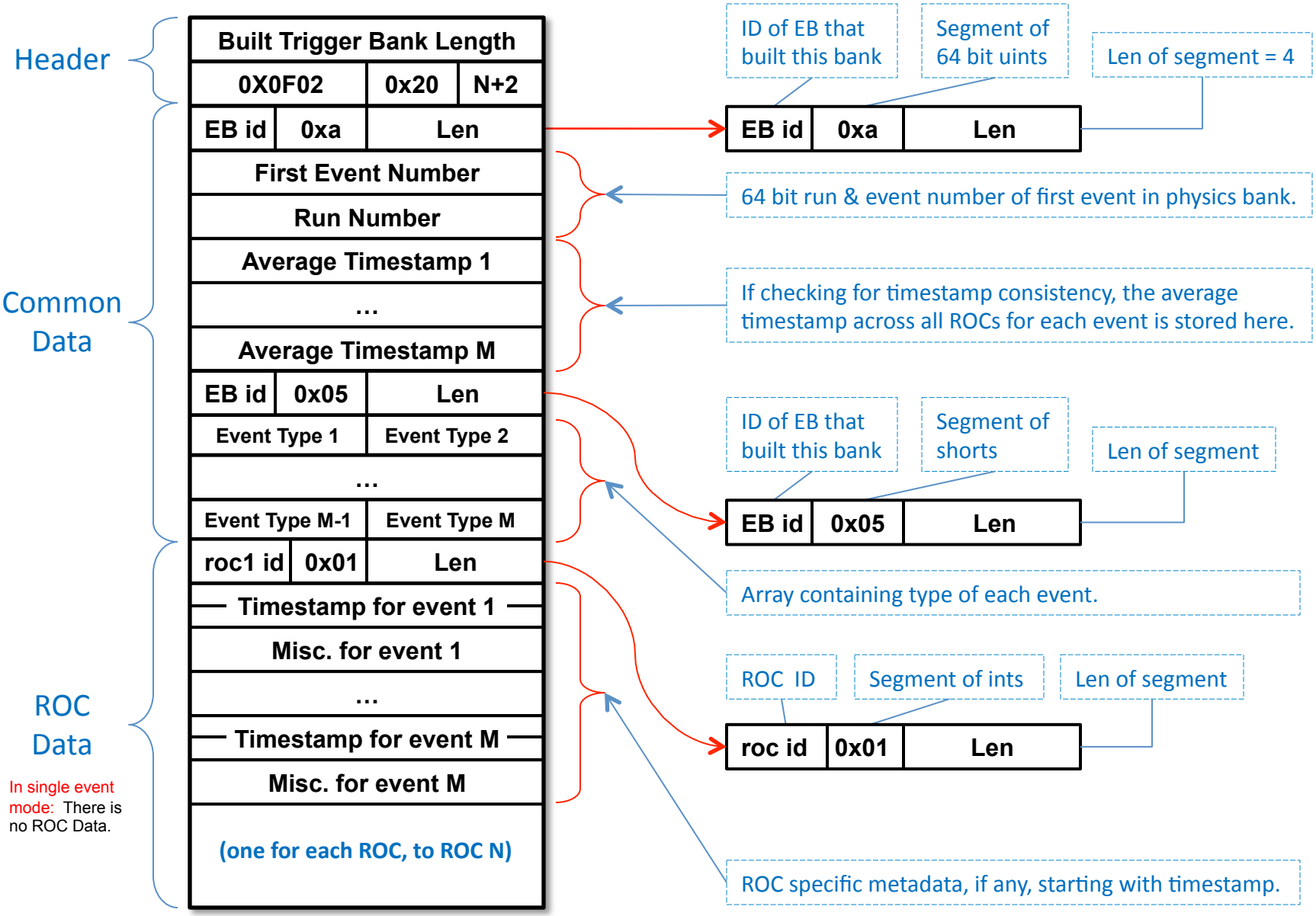
ROC Raw Data Record



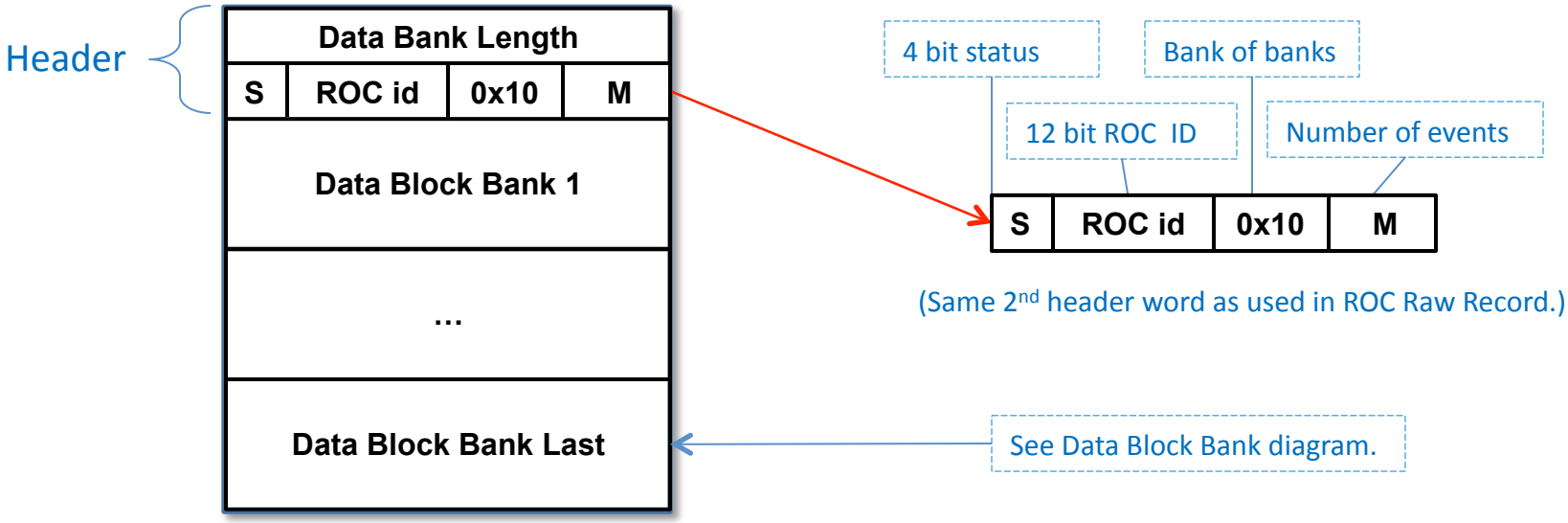
In single event mode: There is no trigger bank in this record – it only contains Data Block Banks.


Physics Event
Header
Built Trigger Bank
Data Banks
Physics Event Length
S
EB ID
0x10
M
Built Trigger Bank Length
0x0F02
0x20
N+2
2 Common (EB) Segments
ROC 1 Segment
...
ROC N Segment
Data Bank 1
...
Data Bank N
12 bit Event Builder ID
Bank of banks
Number of events
SE
R
ER
SY
4 bit Status
Single event mode
Reserved
Error
Sync
Bank type = Built Trigger
Bank of segments
Number of ROC (N) plus 2 common segments
Common or ROC Segments
See 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.

Physics Event's Built Trigger Bank

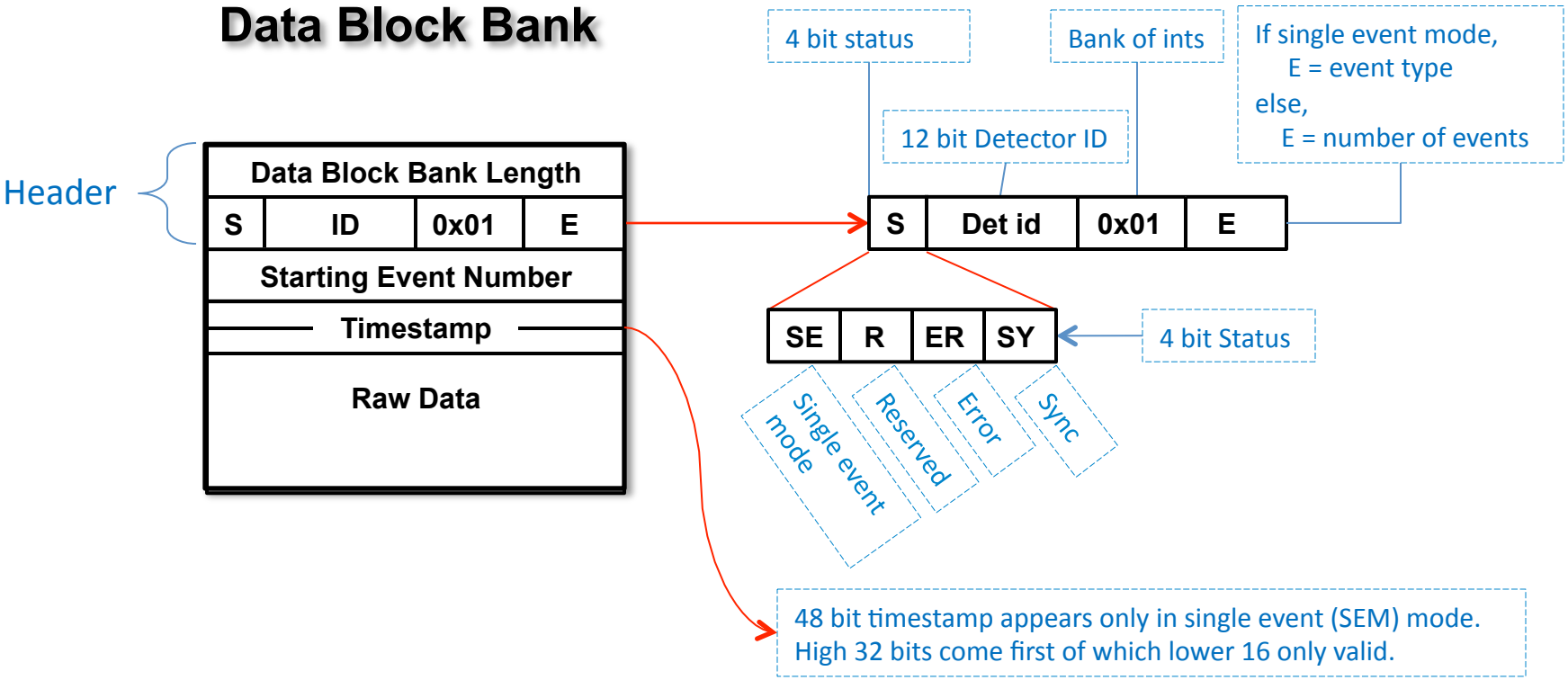


Physics Event's Data Bank



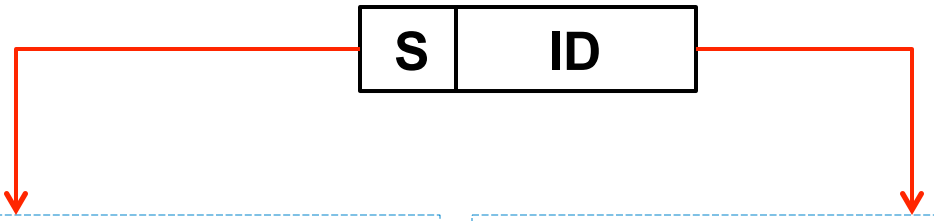
Data blocks from a single ROC are wrapped in this data bank. There should be at least one data block (only one in single event mode) and there may be more if more than one DMA is used in acquiring data for this ROC. If more than one block, each contains a fragment for every one of the M events and from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

Data Block Bank



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



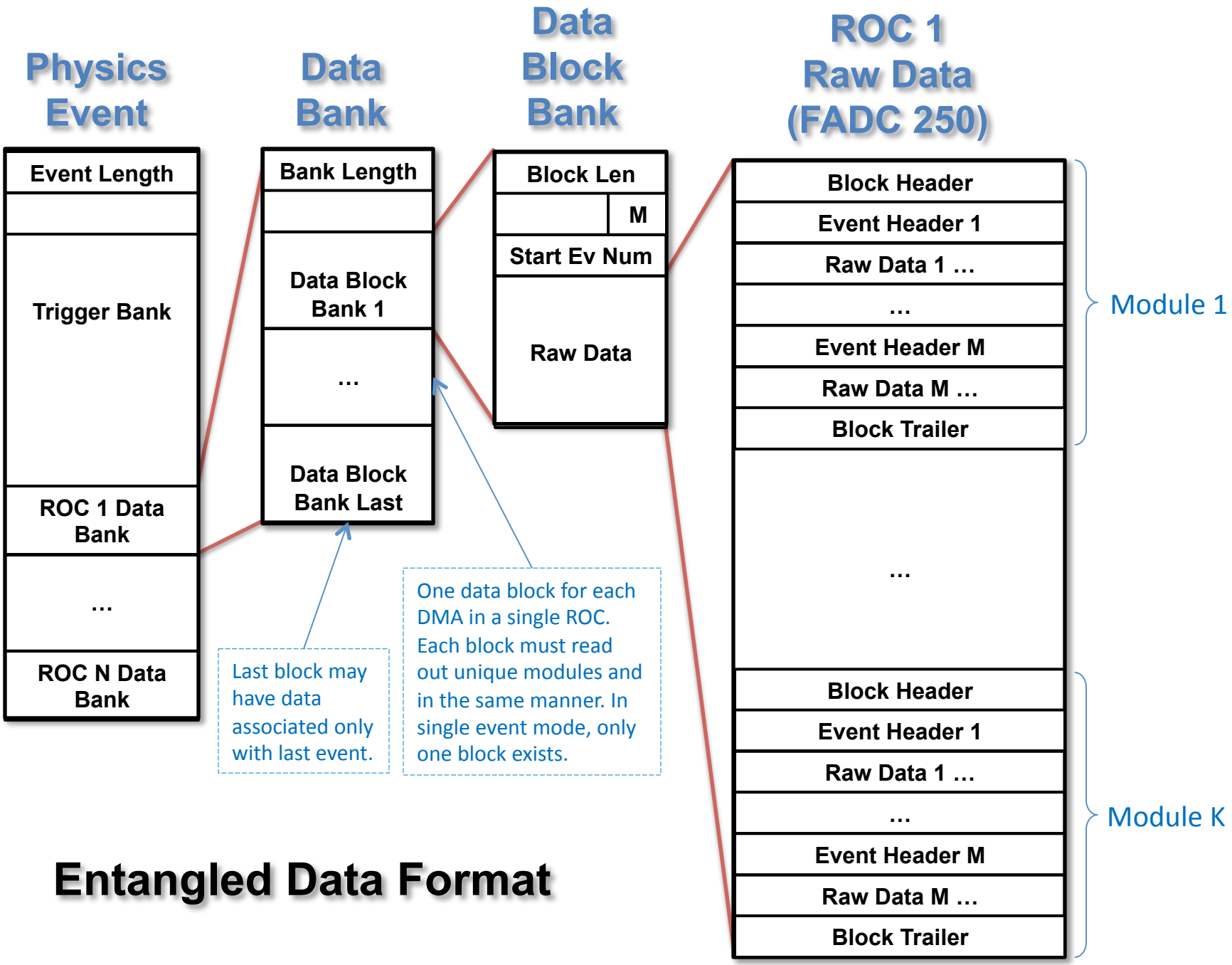
4 bits which can be:

1) = 0 when not used (Trigger & Record ID Banks)
2) Status bits for ROC Raw Records, Physics Events, and Data Banks:
   a) 4th (MSB) - Single event mode
   b) 3rd - Reserved
   c) 2nd - Error
   d) 1st (LSB) - Sync
3) the type of payload event contained in Data Transport Record:
   a) 1 = ROC Raw
   b) 2 = Physics
   c) 3 = User
   d) 4 = Disentangled Physics
   e) 5 = Prestart (run control)
   f) 6 = Go (run control)
   g) 7 = Pause (run control)
   h) 8 = End (run control)

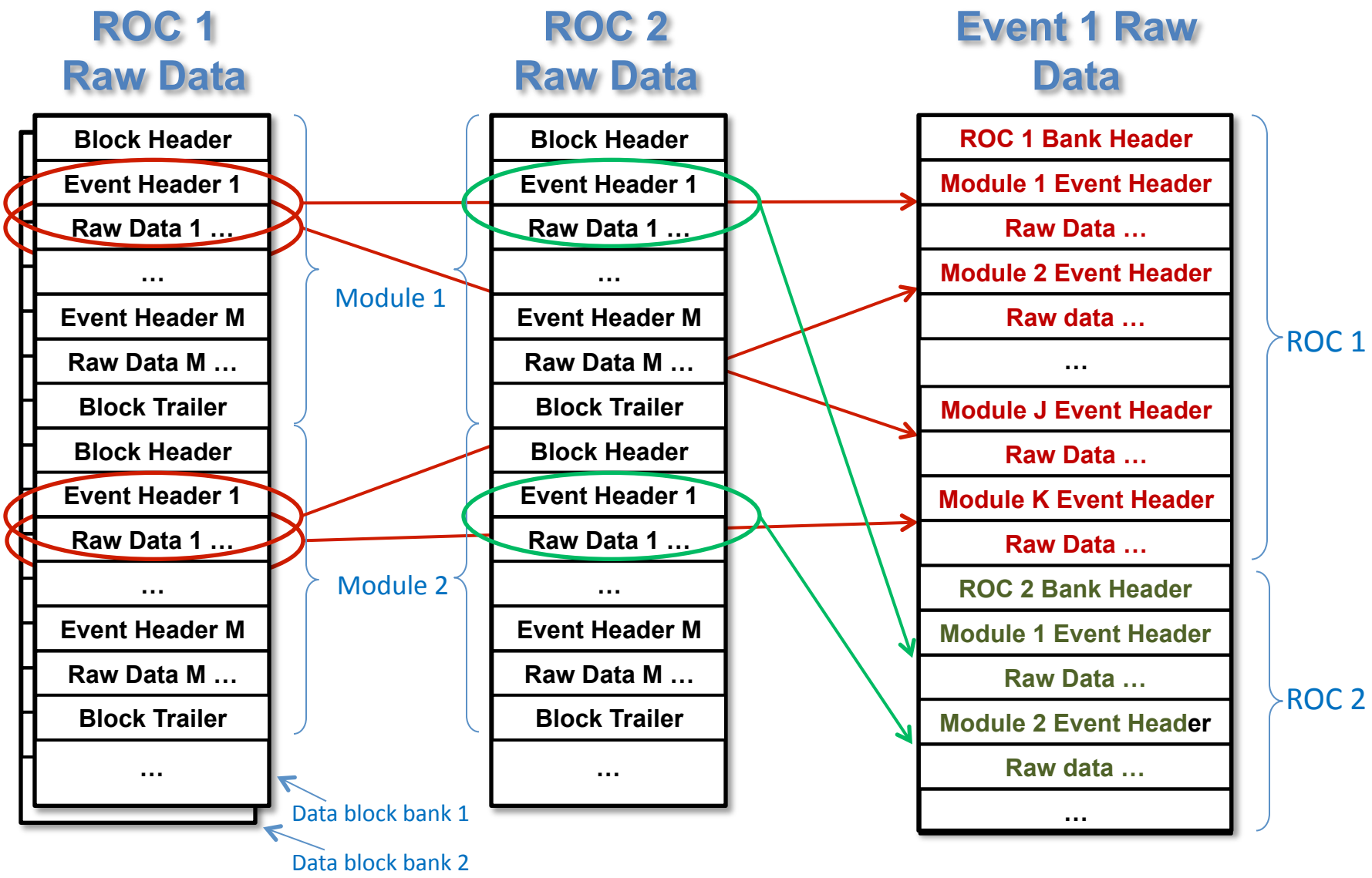
12 bits of identification which have:

1) ROC ID for Data Transport Records, ROC Raw Records, and Data Banks
2) EB ID for Data Transport Records and Physics Events
3) for Trigger and Record ID Banks:
   a) 0xF00 = Record ID Banks
   b) 0xF01 = Trigger Banks
   c) 0xF02 = Built Trigger Banks
   d) 0xF03 = Disentangled Event Data Bank

Disentangling Built Physics Event

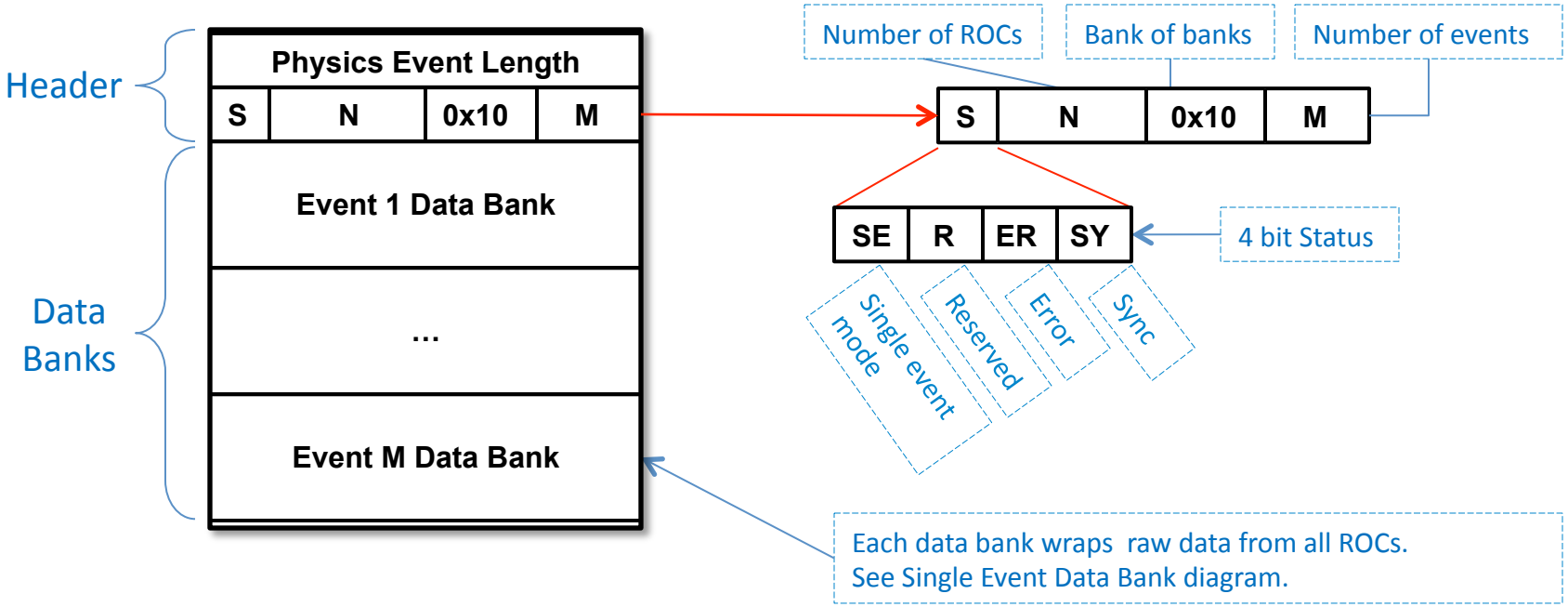


Entangled Data Format

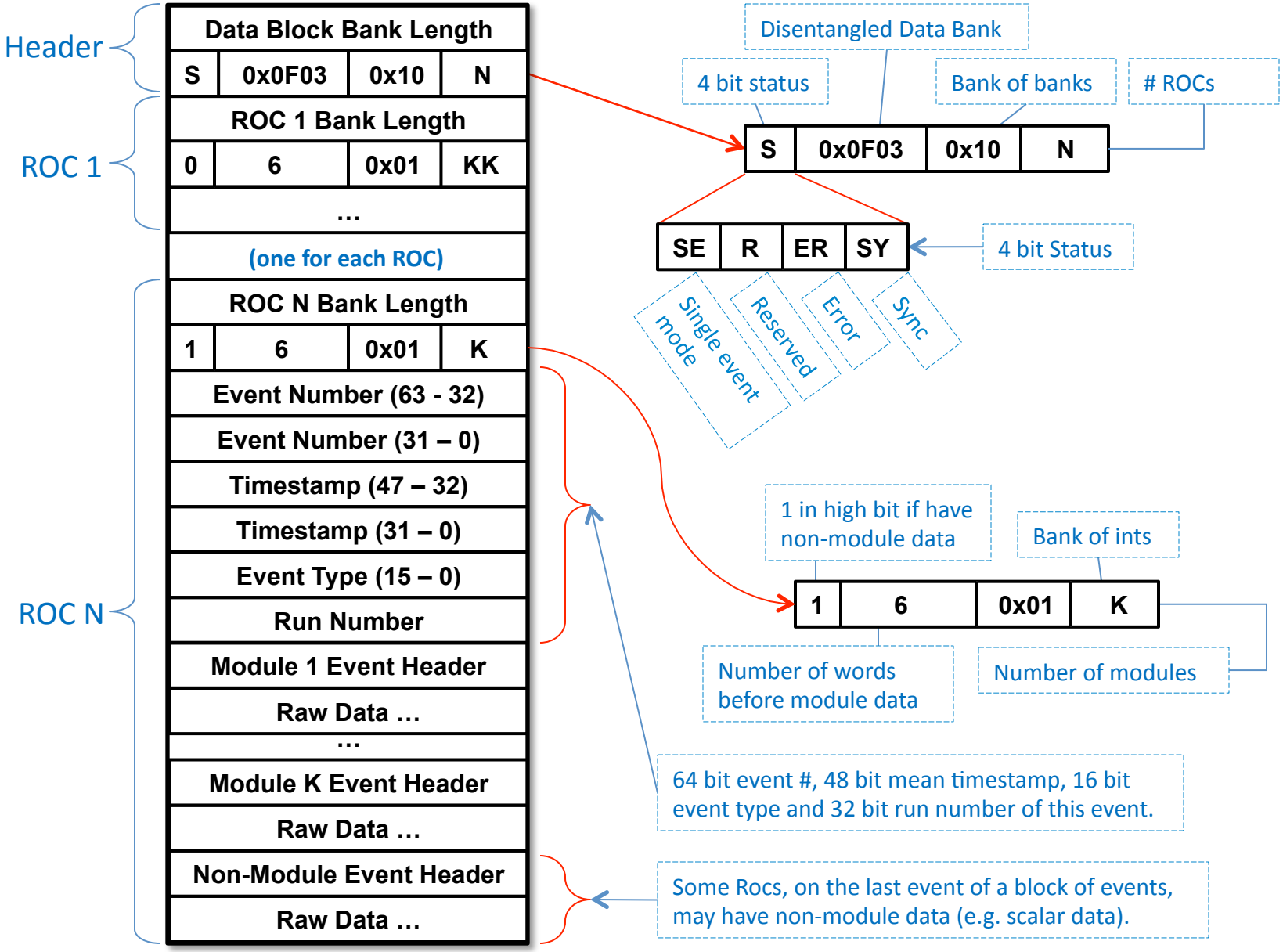


Entangled To Disentangled FADC 250 Raw Data

Disentangled Physics Event



Single Event (Disentangled) Data Bank



FADC 250

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