Investigating heartbeat puzzle

long and short times

Splitting heartbeats by (chip) ID

ID:LongTime/40E6 {Entry$<400}
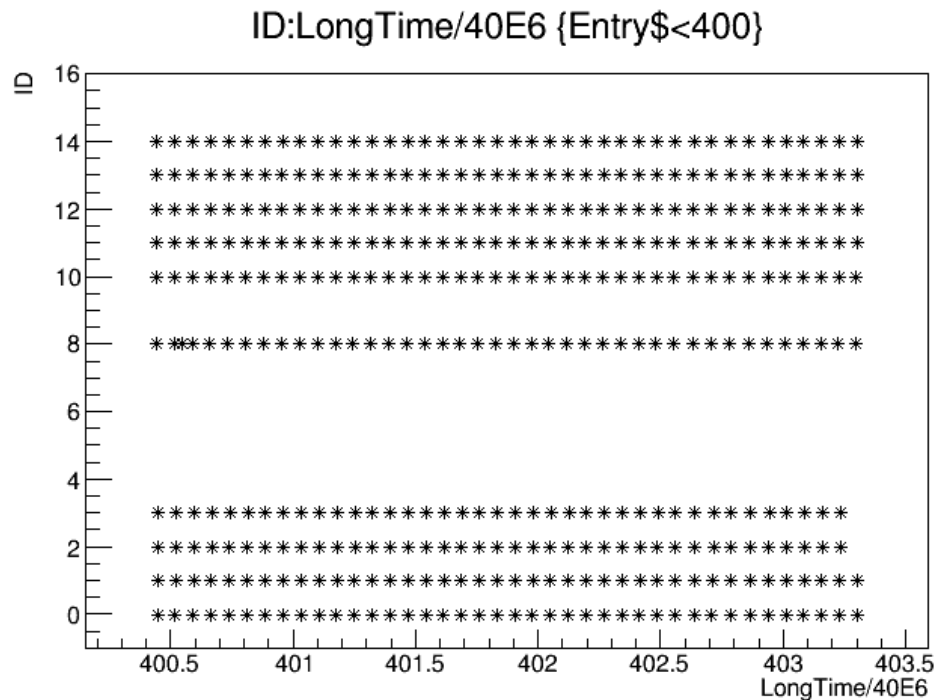
- Note: LongTime = heartbeat time
- LongTime unit in plots is seconds
- ID is the 3rd nibble (from LSB) in the 64-bit dataword

- Every chip sends a heartbeat !
- This is not needed, one per datafile (= per concentrator?) is enough

- Next slides: zoom in, and some irregularities

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Zoom in of time axis


ID:LongTime/40E6 {Entry$<400}
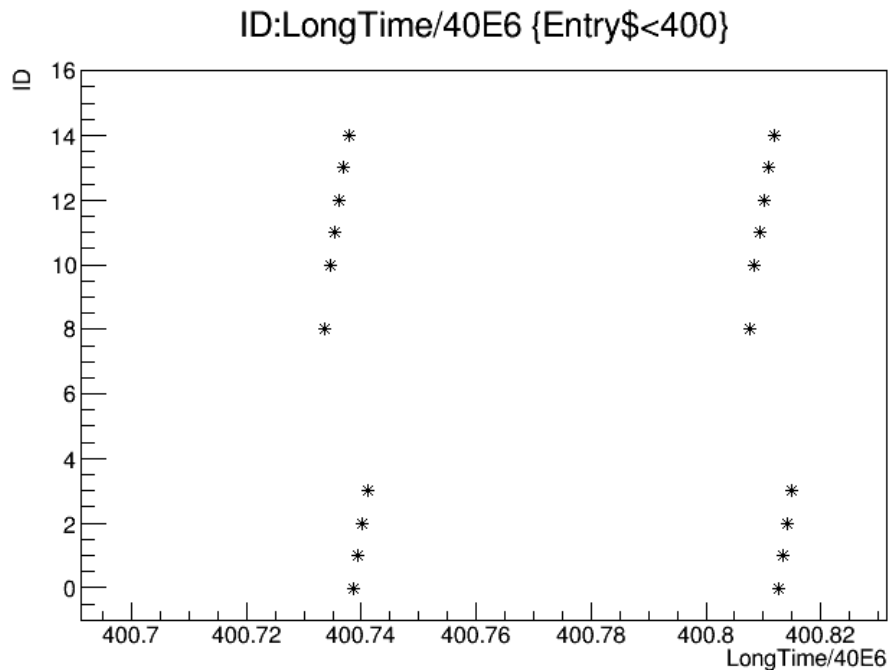
- Time between heartbeats of same chip is about 70 ms
  - Expected 50 ms, but 50 ms is sleep time in code, software loop is slow
- About 1 ms time difference in heartbeat of 'consecutive' chips
  - 1 ms delay probably due to time of ethernet packet send/receive and Leon CPU
  - -> use the heartbeat that the Leon CPU generates (has this been this tested?)
- This explains the two peaks in the heartbeat time difference distribution

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Number of heartbeat per chip
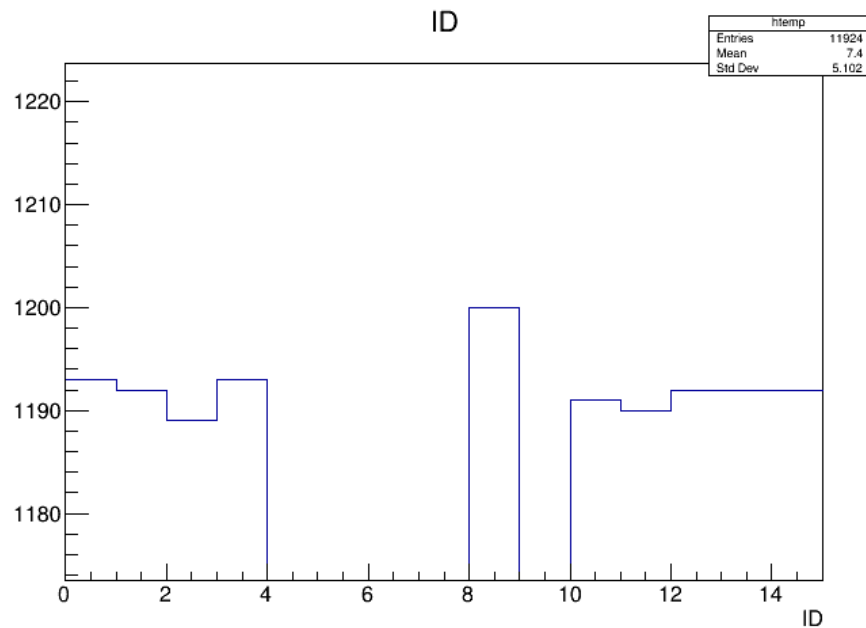
- Chips do not give equal number of heartbeats
  - A difference of one could maybe be explained by the start/stop of run, but not more than one

- Missing or extra heartbeats, or both
- Order 1%

Irregularities (I)
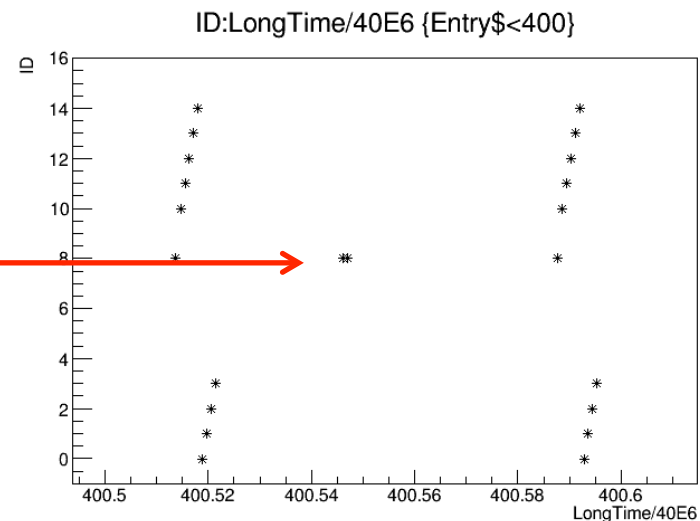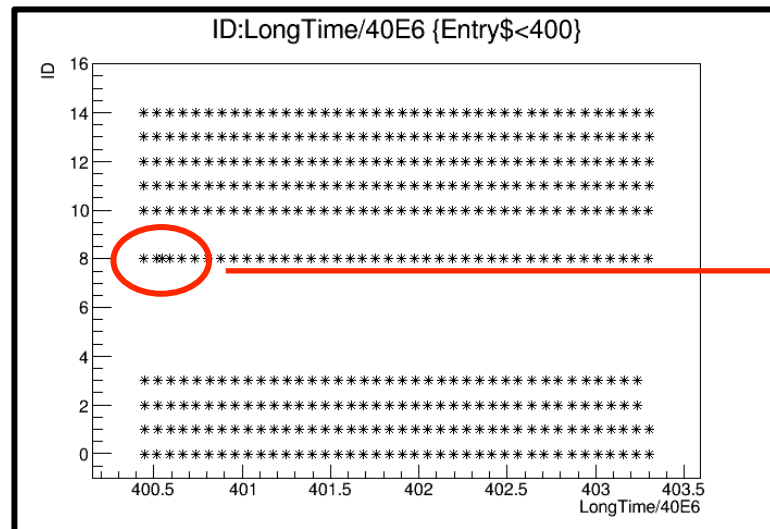
- Two <u>extra</u> heartbeats
- Midway between expected beats, hence in the middle of 50 ms sleep time
- Very odd!

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Irregularities (II)

ID:LongTime/40E6 {Entry$>5*400 && Entry$<6*400}
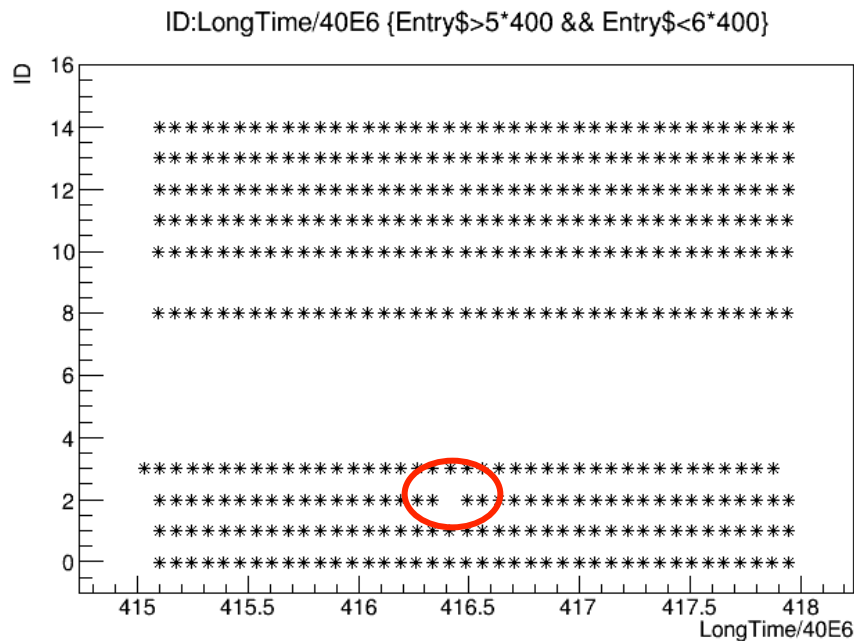
- Missing heartbeat, seen more than once
- To do: check if both packets of a heartbeat are missing
  - Timepix3 sends heartbeat in two packets (32 bit LSB, and 16 bit MSB)
  - If one packet is missing it most likely is a problem of the Timepix3
  - Otherwise maybe an ethernet/ SPIDR/Concentrator issue
- order 1% loss is a lot, should be fixed
  - or at least understood if only heartbeat is affected or also pixel hits