

Mango DAQ update

Twin Cameras

Vito Monno 03/07/2025

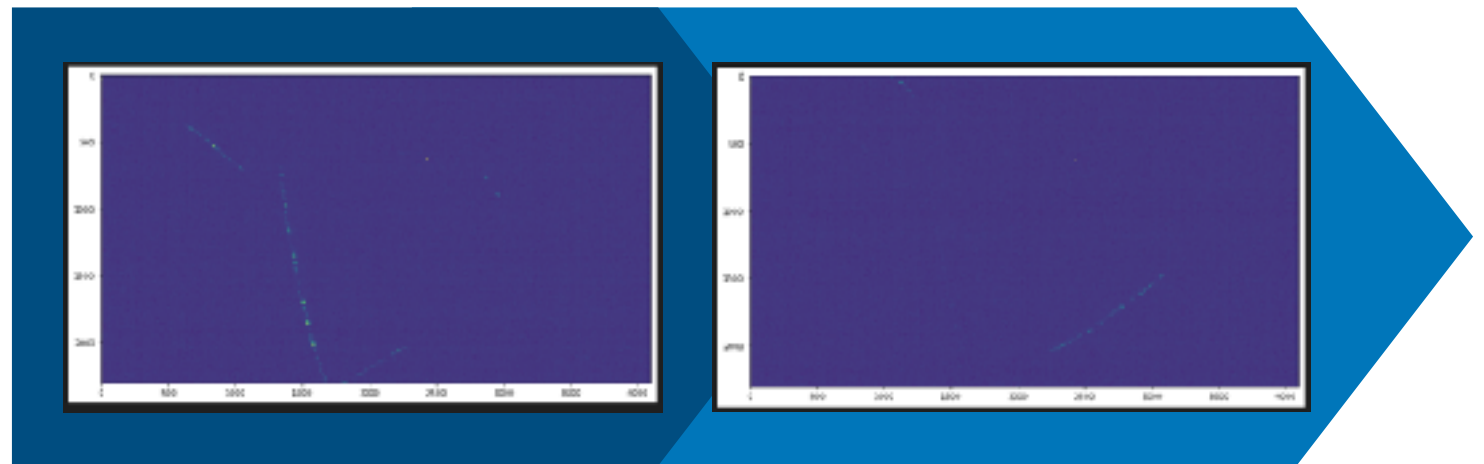
Previously on Mango :



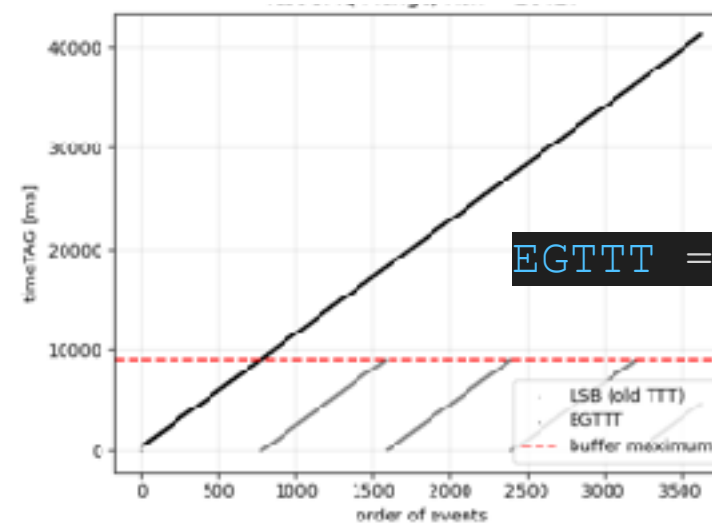
Set up continuous imaging CMOS mode



Cut Tracks seen



Trigger Time Tag extended to 60 bit



$$\text{EGTTT} = ((\text{timeTAG1} \ll 30) \mid \text{timeTAG})$$



Proposed update to CygnoLib to support it
All backward compatible

More Cameras: software adjustment

New Macro for max number of cameras

```
#ifdef HAVE_CAMERA  
#define NCAM_MAX 6  
#endif
```

```
#ifdef HAVE_CAMERA  
int nCamera = 1;  
vector<HDCAM> gCam(NCAM_MAX, 0);  
vector<HDCAMWAIT> hwait(NCAM_MAX, 0);  
vector<bool> CamMask(NCAM_MAX, false);  
//HDCAMWAIT hwait = 0;  
#endif
```

vectorisation of camera handles



Updated frontend functions to **loop over** camera index **icam**

easy cam management in ODB:

Online Database Browser

Equipment / Trigger / Settings

Key Value

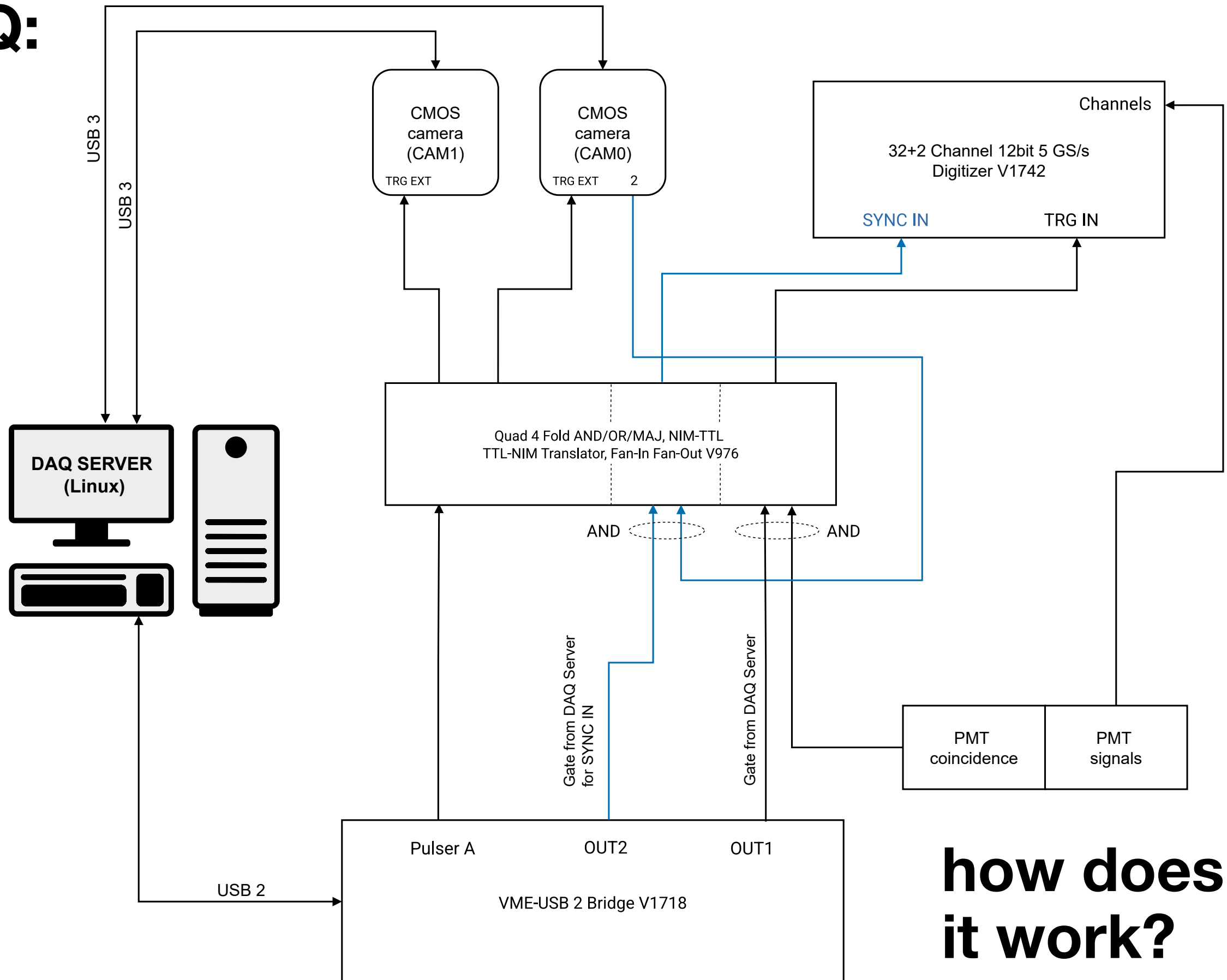
nCamera	1 (0x1)
CameraSN	*
	[0] 00141
	[1] 00225
	[2] 00220
	[3] 00112
	[4] 00219
	[5] 00113
CameraMask	*
	Yes
	No
	No
	No
	No
	No

Number of cams to use
(= \leq NCAM_MAX)

Camera Serial
Numbers

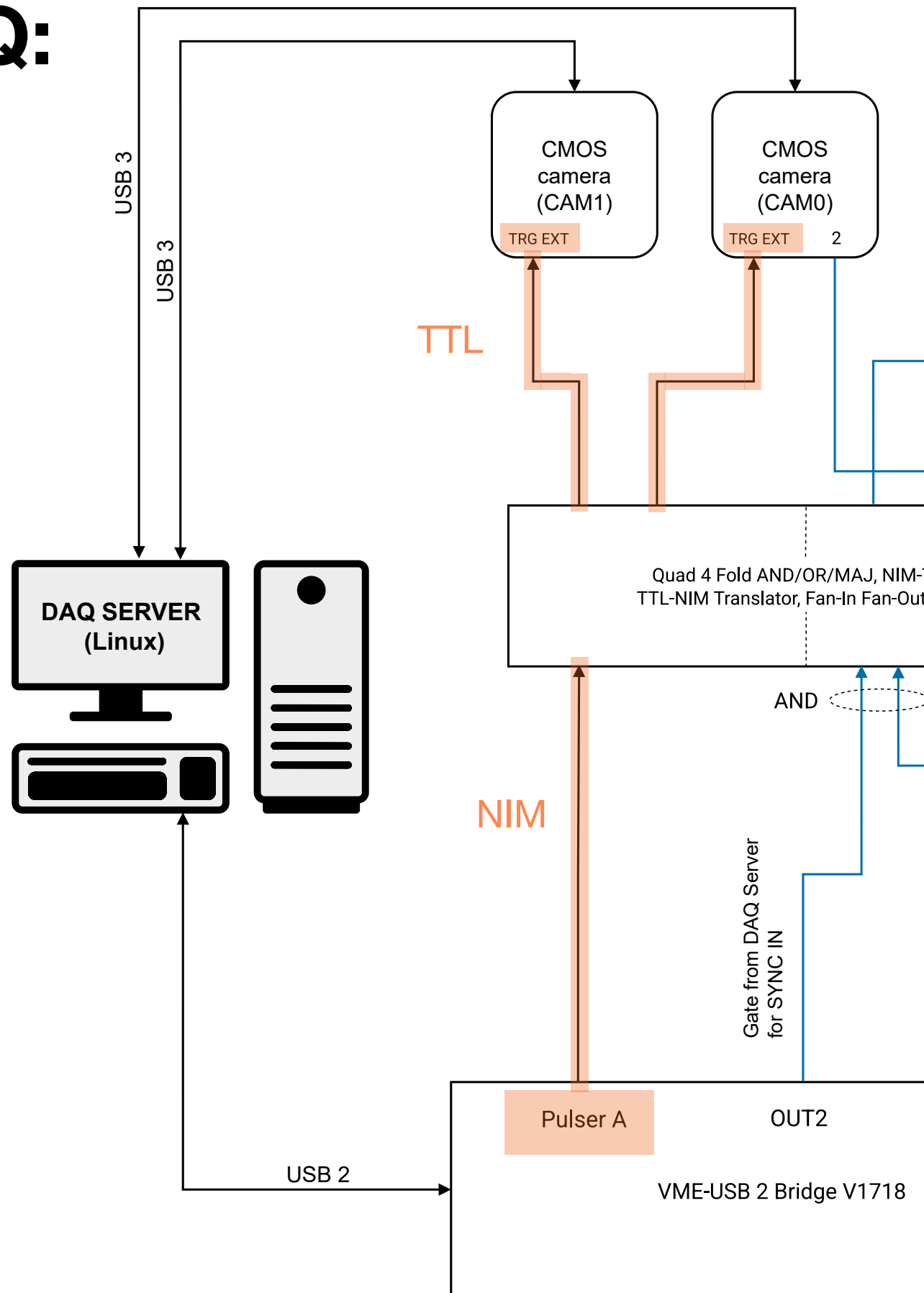
Boolean Mask for fast
selection

DAQ:

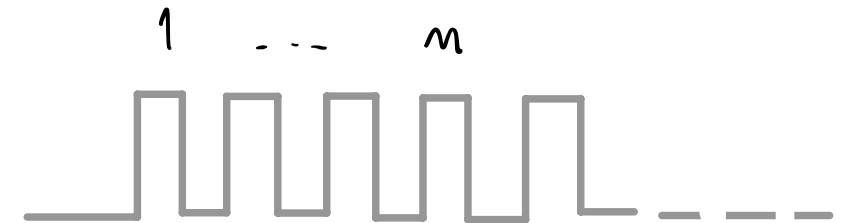


how does it work?

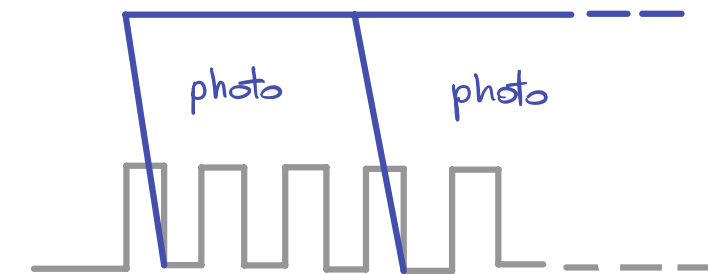
DAQ:



Pulser A from Bridge send a trigger to CAMs:



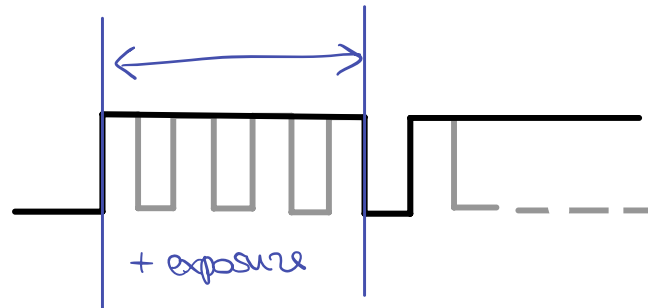
CAMs count received triggers



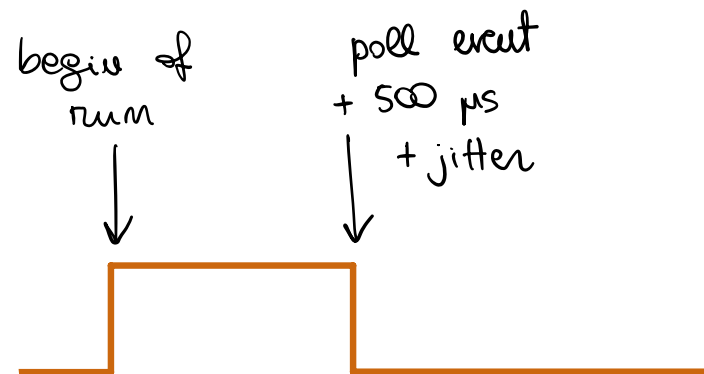
Then at N-triggers (based on wanted exposure) write data & start a new photo

DAQ:

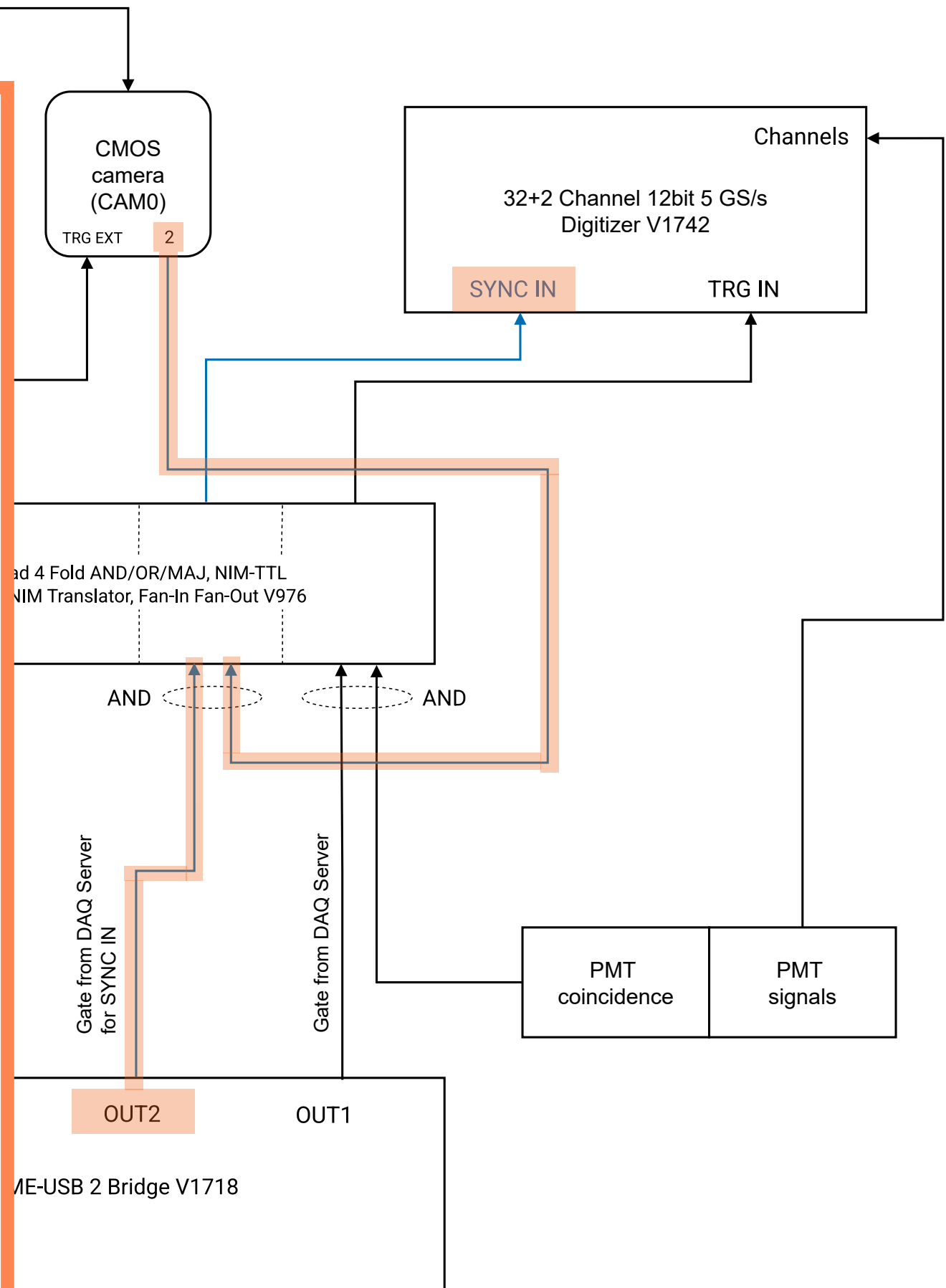
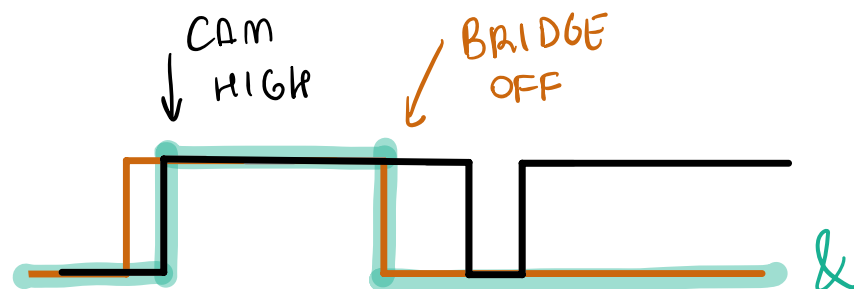
One of the cams (any of them, all are equivalent) sends a modified version of received trigger:



While the Bridge on OUT2:



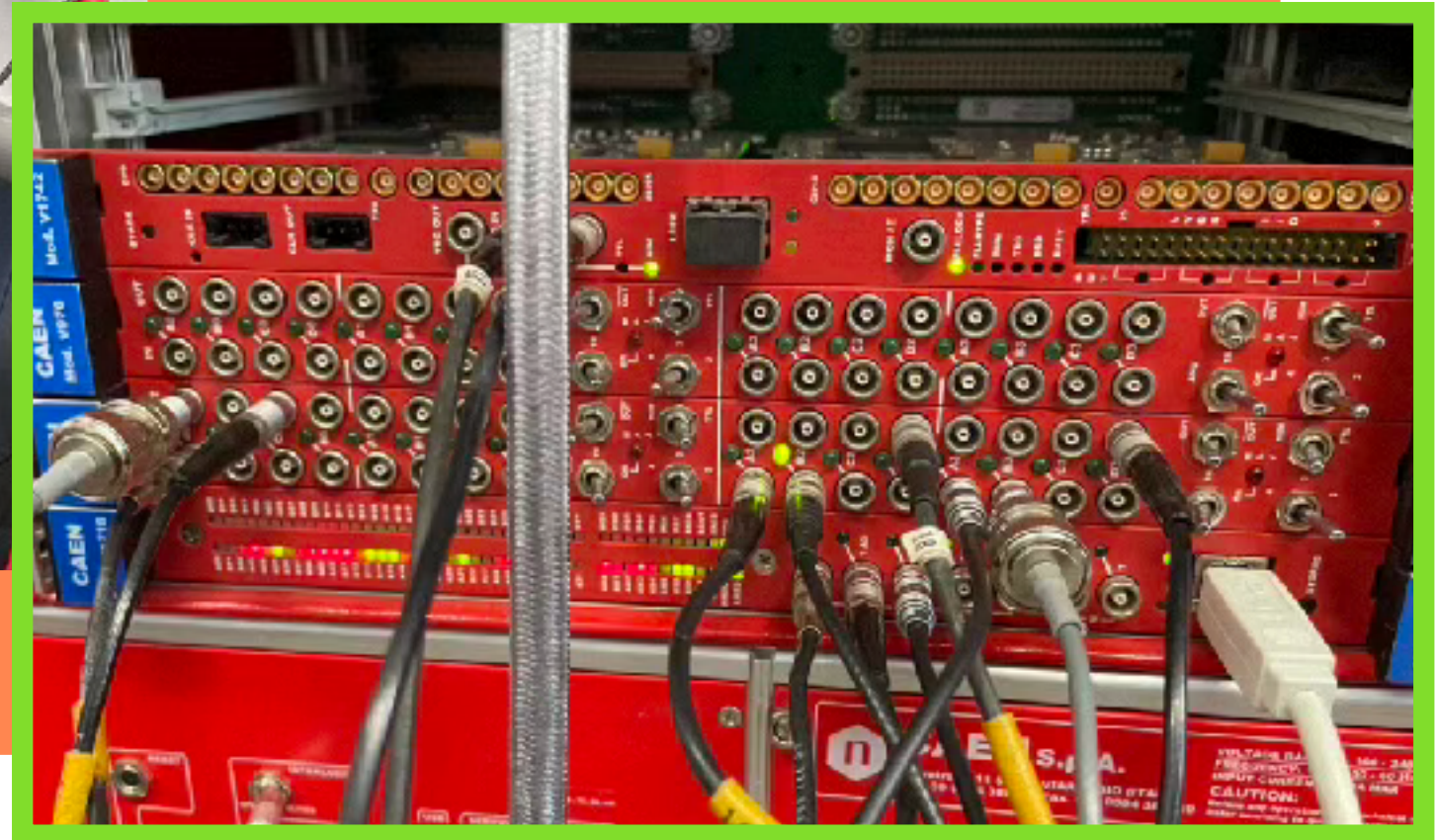
the AND-LOGIC guarantees the SYNC IN of the digitizer



The 'Gate from DAQ Server' Logic AND with 'PMT coincidence' deliver the trigger in signal for the dgtz acquisition

```
graph LR; A[GATE FROM DAQ SERVER] --- AND((&)); B[PMT COINCIDENCE] --- AND; AND --- C[DGTZ TRG-IN]
```

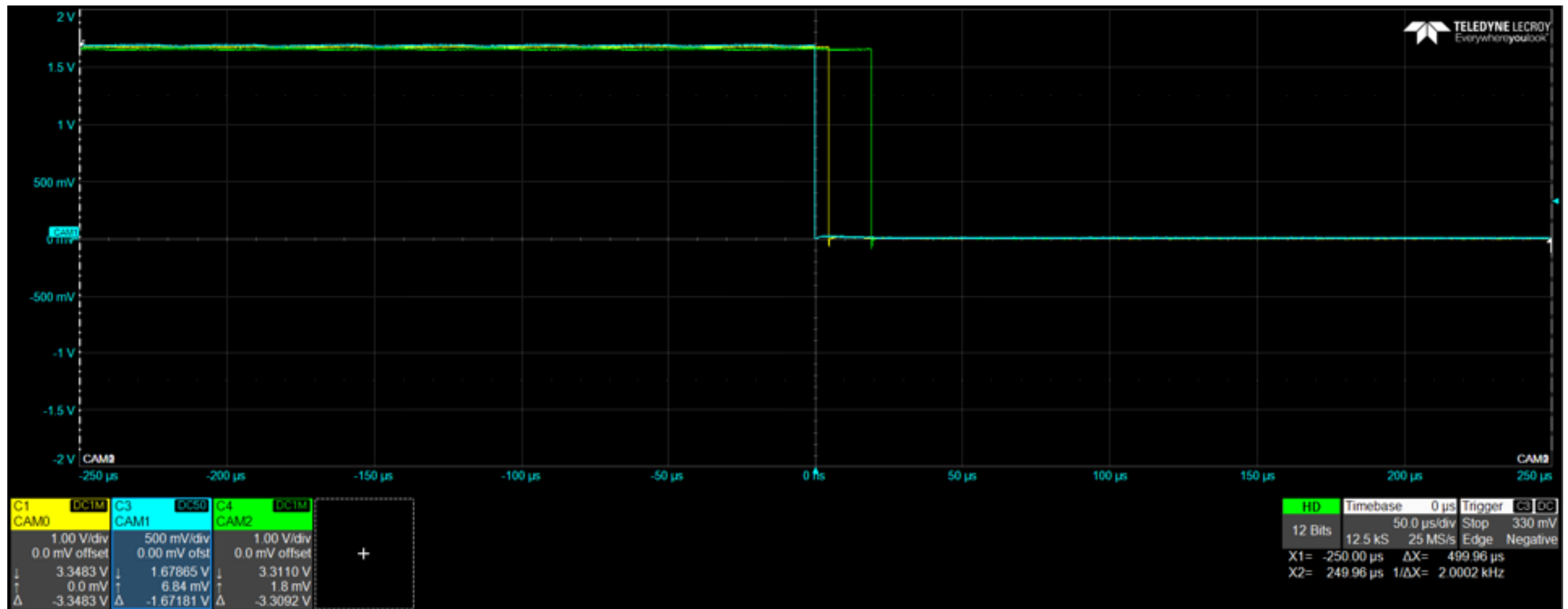

Some photos



Even three cameras

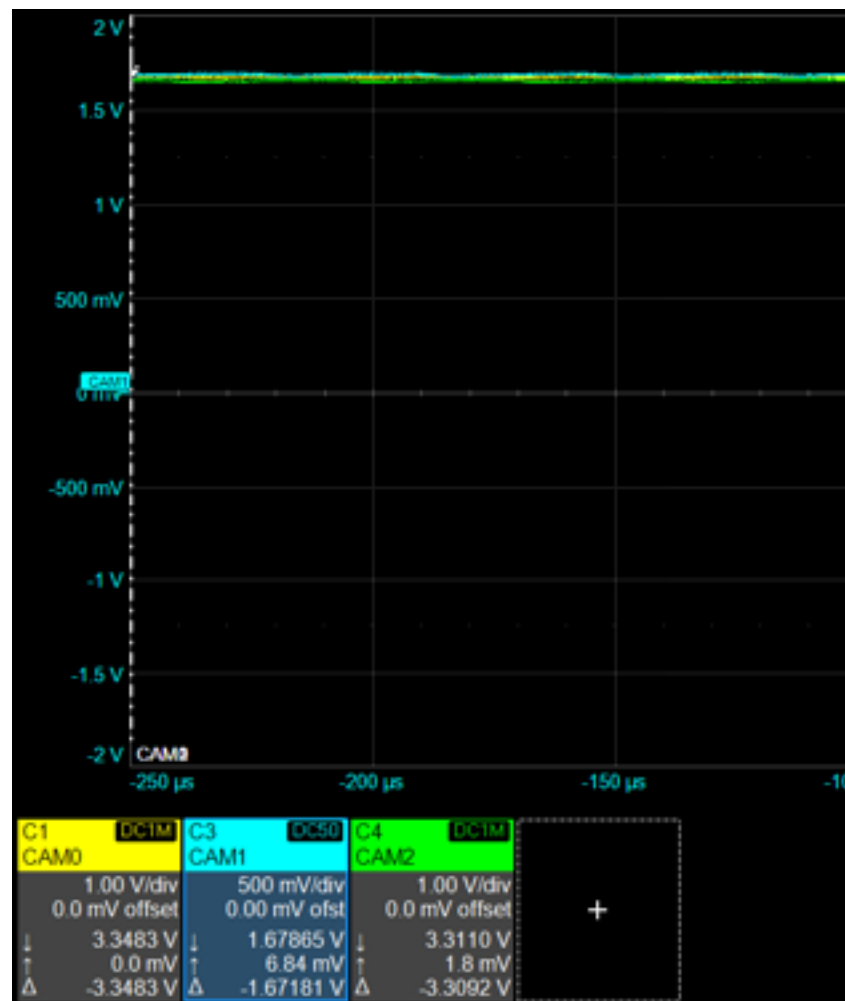


Jitter evidence



Order of ~10us

Jitter evidence



Order of ~10us

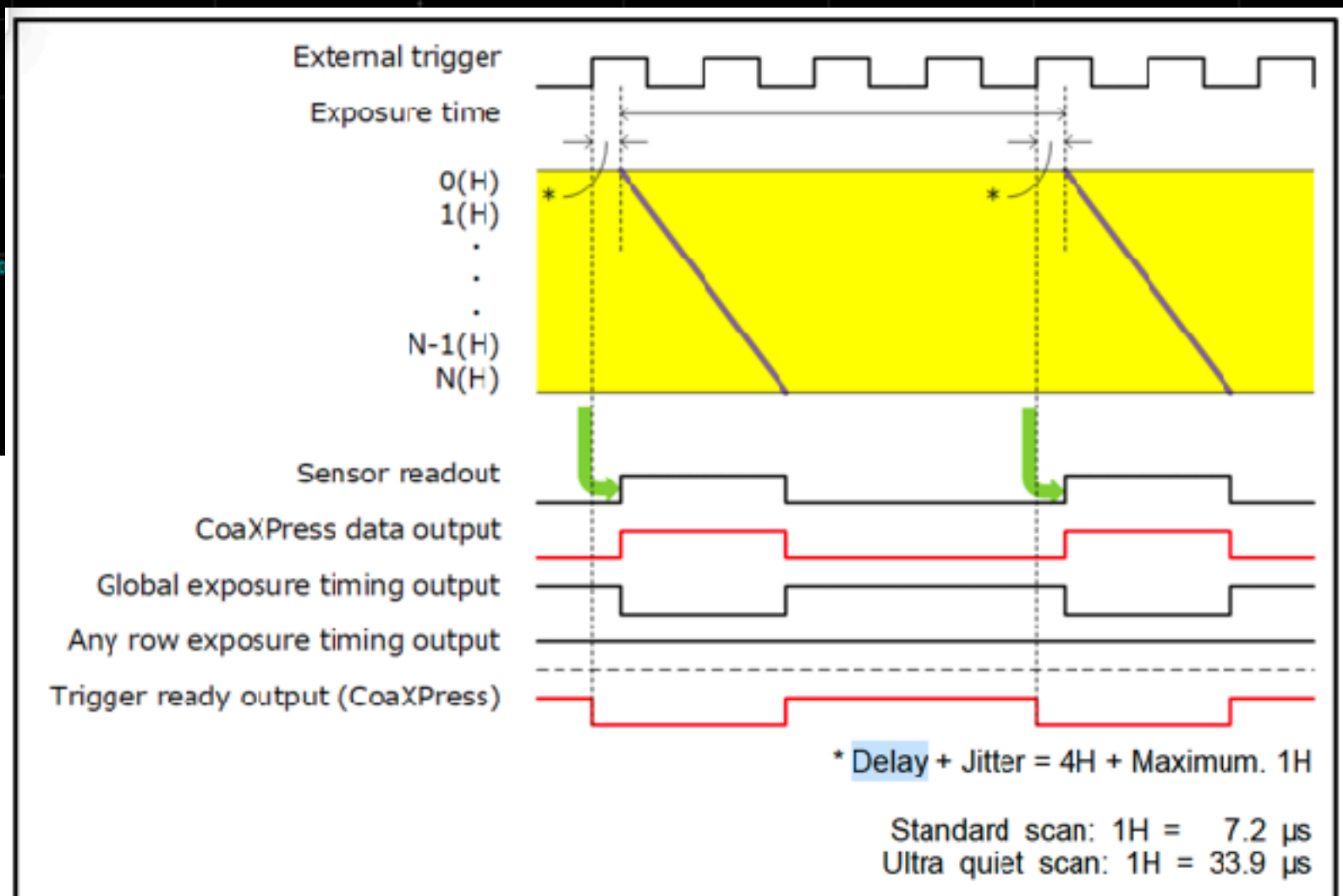
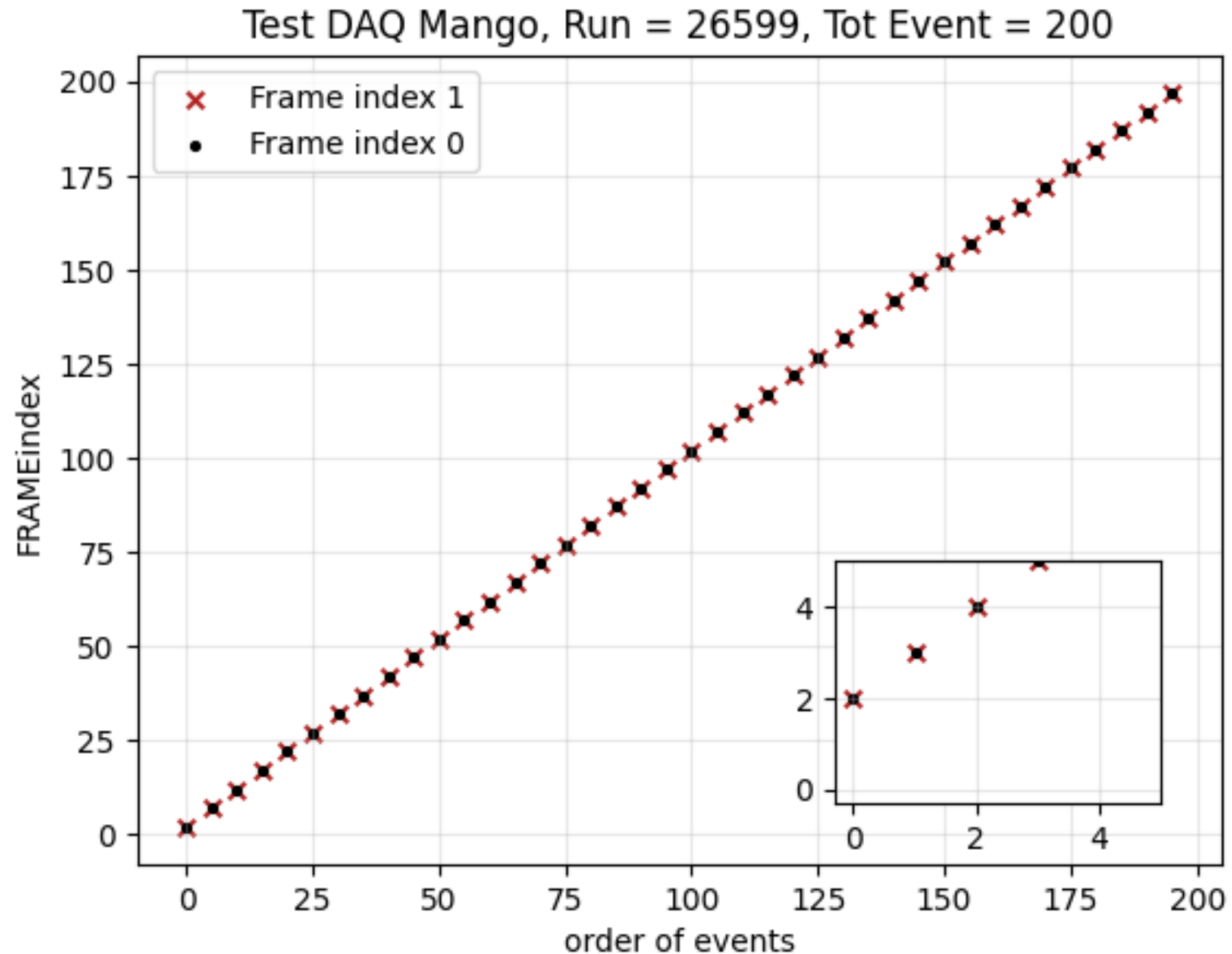


Figure 11-11 (Trigger Times)

Frame index: OK

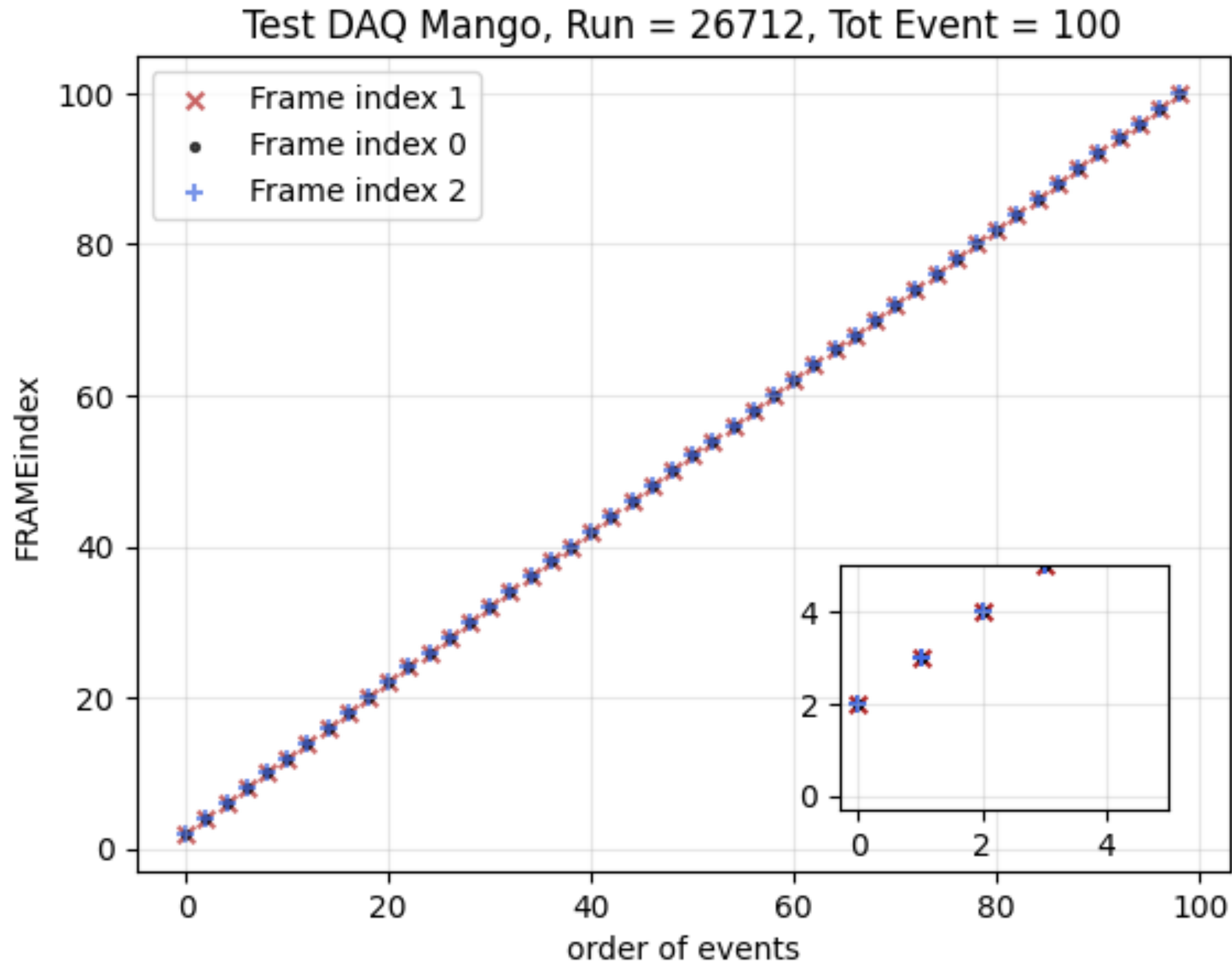
Same frame index

—> no frame skipped during readout

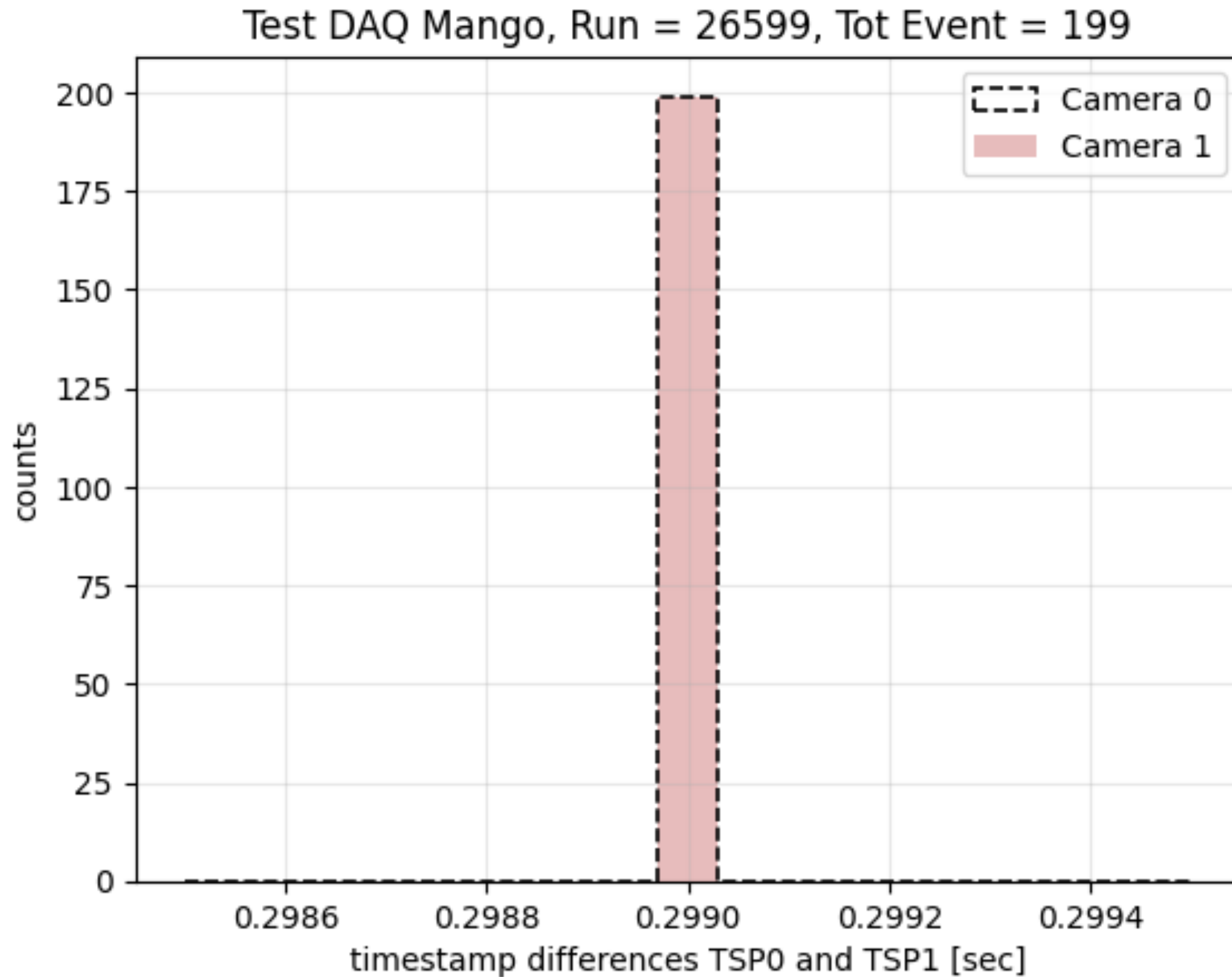


Frame index: OK

Even three cameras



Exposure still consistent





Thanks for your attention