
H2RG readout for efficient coadds of bright images

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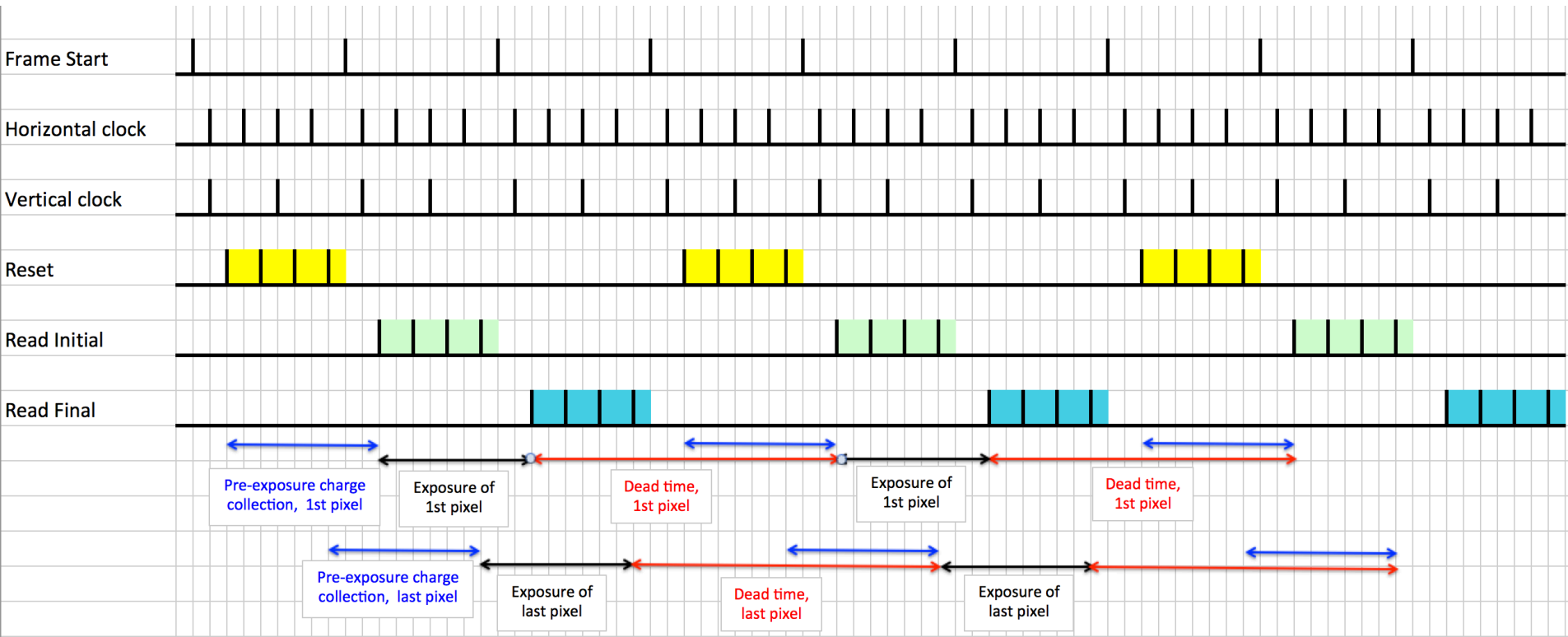
Caltech

2014 March

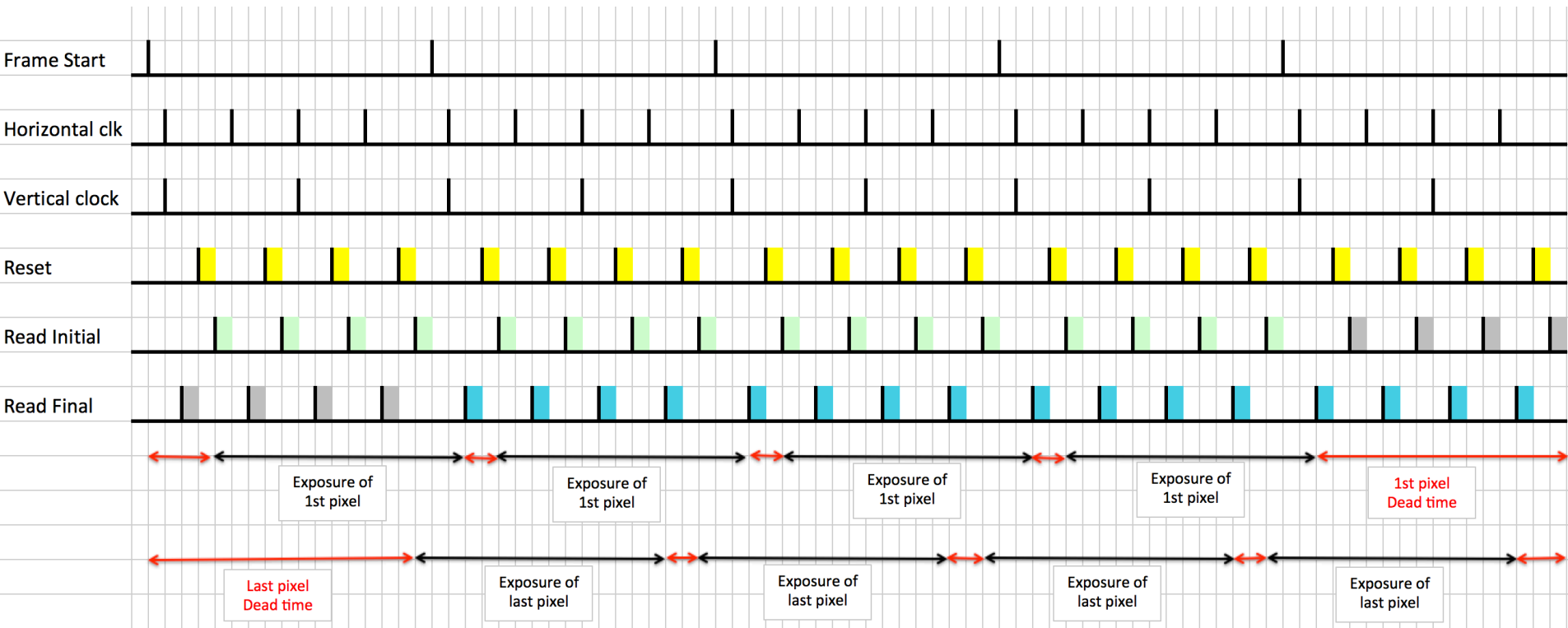
Problems with present read mode

- For minimum length exposures, needed for observing bright sources (eg for exoplanet observations) the standard readout mode for JWST is not optimal. At short exposure times, the frame (or region of interest) must be scanned three times
 1. reset frame
 2. read frame (initial value)
 3. read frame (final value)
- $\text{Signal} = \text{final read} - \text{initial read}$. Minimum exposure (no delay between frames) is one frame time, so duty cycle drops to 33%.
- As much signal accumulates prior to the first read as during the exposure time so bright limit is halved.
- As much again accumulates after the final read. This results in more charge trapping and thus more image persistence.

Reset Read Read frames



Per pixel Read Reset Read



Per pixel Read Reset Read

Address a pixel, read final value, reset that pixel then read initial value for next exposure *before moving to next pixel*:

- Pixel time is doubled
- Dead time ~ 1 pixel time per frame, *plus one frame time per N coadds.*
- **Flux limit is same** as standard Read-Reset Read but charge collected per exposure is doubled.
- Duty cycle at max frame rate is tripled (for long coadd sequences)
- Charge does not stay on pixel past final read so persistence will be lower.