

Tuning of the linear RD53A with YARR

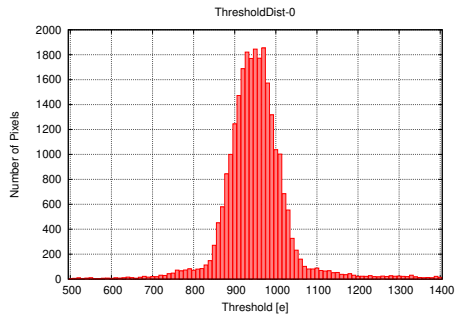
- YARR version from git branch `devel_rogue_v0p2`
- Hardware controller ZCU102
- Used the tuning routine and values suggested by YARR Docs, only tuned the linear part

- `lin_tune_globalthreshold.json` (good starting threshold target is 2000e, resets prev. TDACs)
- `lin_tune_pixelthreshold.json` (2000e again)
- `lin_retune_globalthreshold.json` (now retuning from 2000e to 1000e target)
- `lin_retune_pixelthreshold.json` (1000e again)
- `lin_tune_globalpreamp.json` (use mid of the range ToT values, e.g. 10000e at 8ToT)
- `lin_retune_pixelthreshold.json` (1000e again)
- `lin_tune_finepixelthreshold.json` (1000e again)

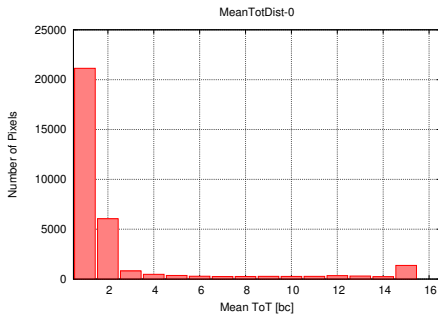
<https://yarr.readthedocs.io/en/latest/rd53a/>

Results of the Tuning

All implemented Threshold tunings overwrite ToT tuning results



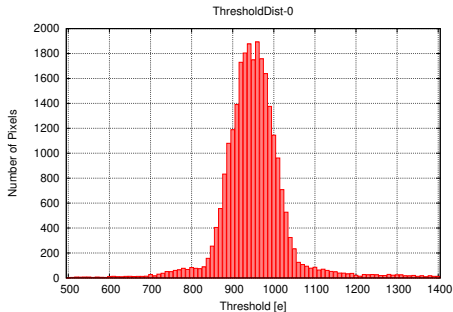
Target Threshold: $1000e^-$



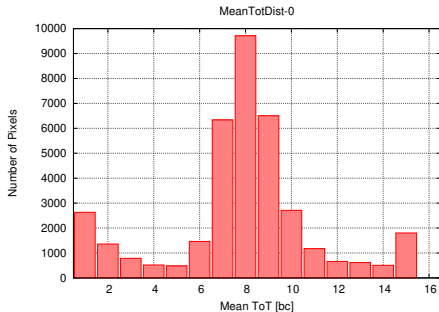
Target ToT: 8

Results of the Tuning

Results after one additional `lin_tune_globalpreamp` tuning



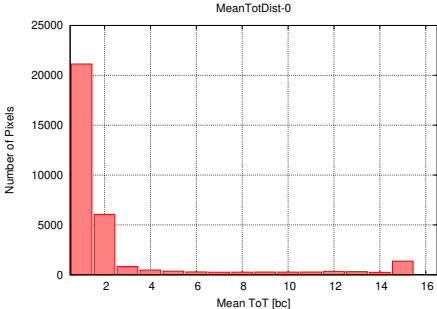
Target Threshold: $1000e^-$



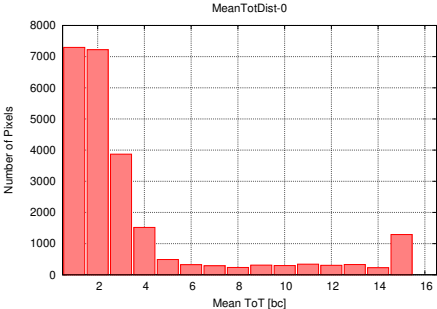
Target ToT: 8

Remark on Threshold Tunings

lin_tune_globalthreshold affects ToT differently than pixelthreshold tunings



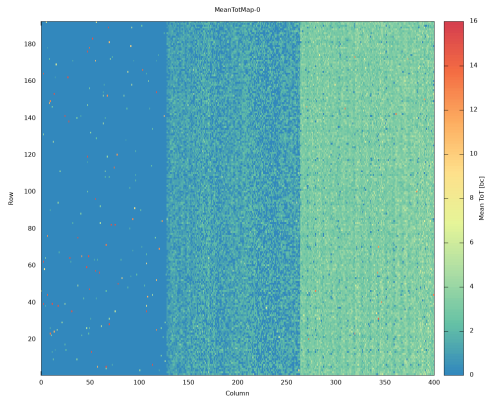
ToT after
lin_tune_finepixelthreshold



ToT after
lin_tune_globalthreshold

Remark on differential FE Tuning

- Threshold tunings of the differential FE also overwrite ToT tuning results
- Threshold tunings of the linear FE also affect the ToT of the differential FE and vice versa



ToT Map of previously tuned chip
after additional
lin_tune_globalthreshold

Other Findings

- Globalpreamp tunings and ToT scans occasionally fail due to “Time Out for Header-Trigger check” (expected header count is 1600, received only 14xx-15xx). Starting the respective scan again fixes the problem (sometimes three tries are needed)
- Threshold scans occasionally take some minutes or get stuck while plotting