**Pixirad-1 and Pixirad-2 changes:**

| Parameter | Pixirad-1 | | Pixirad-2 | | Pixirad-8 | |
|---|---|---|---|---|---|---|
| | **PIXIEII** | **PIXIEIII** | **PIXIEII** | **PIXIEIII** | **PIXIEII** | **PIXIEIII** |
| Sensor Rows | 476 | 402 | 476 | 402 | 476 | 402 |
| Sensor Columns | 512 | 512 | 1024 | 1024 | 4096 | 4096 |
| UDP data packets/frame | 360 | 270 | 720 | 540 | 2539 | TBD |
| UDP data port | 2223 | 2223 | 9999 | 9999 | 9999 | 9999 |
| Counters depth (bit) | 15 | 15 | 15 | 15 | 15 | 15 |
| UDP Autocal packets/frame | 135 | 180 | 270 | 360 | 1080 | TBD |
| | | | | | | |
| | | | | | | |

**Environmental conditions Monitor and Alarm manager**
An on-detector environmental monitor has been added so the detector itself can apply changes to the status to prevent from damages.
Threshold levels for the detector RH, Tcold, Thot can be changed with a "SYS:! SET_ALARMS" command.
Optionally Alarm status ("on", "off", "disabled") can be recovered from an UDP packet stream on the port 2225.
Once a Threshold is reached, if the corresponding alarm is enabled, the alarm status is set to "on" and the related action is taken. Even when the regular operating conditions are set back, the alarm status remains "on". Alarms status can be cleared with the "SYS:! CLEAR_ALARMS" command

NB: additional higher level (EPICS driver) environmental monitoring is always recommended when possible.

Related commands:

"**SYS:! SET_ALARMS** ***rh_al_th tcold_al_th thot_al_th rh al_en tcold_al_en thot_al_en al_status_msg_en\n***"

Description:
Sets Monitors status, values for Alarm threshold and Alarm message transmission status.

Number of parameters: 7

Parameters:

| | |
|---|---|
| *rh_al_th* | *: float RH Alarm Threshold* |
| *tcold_al_th* | *: float Tcold Alarm Threshold* |
| *thot_al_th* | *: float Thot Alarm Threshold* |
| *rh al_en* | *: int (0 or 1) RH Monitor Status* |
| *tcold_al_en* | *: int (0 or 1) Tcold Monitor Status* |
| *thot_al_en* | *: int (0 or 1) Thot Monitor Status* |
| *al_status_msg_en* | *: int (0 or 1) UDP packet transmission status* |

Notes:
When Thot or RH alarm thresholds are reached, Peltier Cooler is switched off (if on).
When Tcold alarm thresholds is reached the Sensor is switched off.

*"**SYS:! CLEAR_ALARMS\n**"*

Description:
Clears the Alarm Status.

Number of parameters: 0

Notes:
recovering from a Tcold alarm takes some seconds and anyway a power cycle is recommended.

**PIXIE-III related commands (Pixirad-1, Pixirad-2):**

"**DAQ:! SET_SENSOR_OPERATINGS *E4_dac E3_dac E2_dac E1_dac ro_mode cnt_mode vbgmcal_dac*\n**"

Description:
Set Energy threshold dacs, readout mode, counting mode.

Number of parameters: 8

Parameters:

| | |
|---|---|
| *E4_dac* | *:int (0- 4095)* |
| *E3_dac* | *:int (0- 4095)* |
| *E2_dac* | *:int (0- 4095)* |
| *E1_dac* | *:int (0- 4095)* |
| *ro_mode* | *:string ("DTF" or whatever) selects the DTF mode or the regular one when "whatever"* |
| *cnt_mode* | *:string ("NPI", "NPISUM" or whatever) selects the counter mode Neighbor Pixel Inhibit, Neighbor Pixel Inhibit with SUM, or regular when "whatever"* |
| *vbgmcal_dac* | *:int (0- 4095)* |

Notes:
The translation between Energyes in keV and dac is given by:

```
#define P0 494.70
#define P1 19.36


dac = (int) (EnergykeV * P1 + P0);
```

Vbgmcal_dac is a detector based constant.

Autocalibration Must be performed every time at least one of *ro_mode, cnt_mode, vbgmcal_dac* changes.

*"**DAQ:! SET_PIII_CONF *ofs0 fs0 ofs2 fs1 fs2 Ibias***\n*"*

Descritption:
Sets the PIII Autocalibration Parameters. Optimal Configuration changes detector by detector.

Number of Parameters: 7
Parameters:

| | |
|---|---|
| *ofs0* | *: int (0-7)* |
| *fs0* | *: int (0-7)* |
| *ofs2* | *: int (0-7)* |
| *fs1* | *: int (0-7)* |
| *fs2* | *: int (0-7)* |
| *Ibias* | *: int (0-15)* |