Camera Parameter IDs and Definitions

NOTE: Not all parameters and/or values for parameters are valid for all cameras. Check with the camera supplier for the capabilities of the specific camera.

<u>Camera specific Ids</u>

0   **Min Blocks** – Amount to group on the shift register before throwing away. This is only available on Princeton Instruments cameras and Acton cameras.

1   **Number of Min Blocks** – Number of min blocks to use before going to a geometric grouping on shift register. This is only available on Princeton Instruments cameras (note that this is not available on Acton InSpectrum camera).

2   **Number of Strips Per Clear** – Number of strips to group on the shift register when performing a clear operation. For example, clear operations occur when doing continuous clears/cleans. This parameter is only available on Princeton Instruments cameras.

3   **Anti-Blooming Flag** – Enables (1) and Disables (0) anti-blooming. This is only available on PI Thompson ST133/MicroMax 5Mhz cameras.

4   **Logic Output** – Sets the value of the Logic Out connector.
       1 = NOT_SCAN
       2 = SHUTTER
       3 = NOT_RDY
       4 = LOGIC0
       5 = CLEARING
       6 = NOT_FT_IMAGE_SHIFT
       7 = RESERVED
       8 = LOGIC1
       9 = EXPOS_PROG
       10 = EXPOS
       11 = IMAGE_SHIFT
       12 = READOUT
       13 = ACQUIRING
       14 = WAIT_FOR_TRIG

5   **Edge Trigger** - Edge Trigger defines whether the external sync trigger is positive or negitive edge active.
       1 = POSITIVE
       2 = NEGATIVE

6   **Intensifier Gain** - Intensifier gain. See camera manual for valid values.

7   **Shutter-Gate Mode** - Shutter, Gate, or Safe mode, for the PI-Max.
       1 = SAFE
       2 = GATING
       3 = SHUTTER

8   **ADC Offset** - ADC offset setting

9   **Chip Name** - Camera chip name.
10   **Cooling Mode** (1 = Enable, 0 = Disable)
11   **Preamp Delay**
12   **Pre-Flash**
13   **Color Mode** – Camera is a color camera or not (1=Yes, 0 = No)
14   **MPP Capable Flag** - Camera can do MPP or not (1 = Yes, 0 = No)
15   **Preamp Off Control**
16   **Camera Serial Number**
17   **Pre-Mask** – Y Pre-Mask (pre-strip) pixels
18   **Pre-Scan** – X Pre-Scan (pre-line) pixels
19   **Post-Mask** – Y Post-Mast (post-strip) pixels
20   **Post-Scan** – X Post-Mask (post-line) pixels
21   **Pixel Y Distance -** Distance between pixels in the Y dimension (microns)
22   **Pixel Size -** Size of pixel in the Y dimension (microns)
23   **Pixel X Distance -** Distance between pixels in the X dimension
24   **Pixel X Size -** Size of pixel in the X dimension
25   **Summing Well**
26   **F Well Cpacity**
27   **Detector Y Size -** Number of pixels in Y dimension of active area of detector
28   **Detector X Size -** Number of pixels in X dimension of active area of detector
29   **Controller Active Flag -** Is the controller on and running?
30   **Readout Time -** Readout time of current ROI, in ms
31   **Clear Cycles** – Number of Clear Cycles to perform
32   **Clear Mode**
33   **Frame Capable**
34   **Readout Mode** (P Mode)
            1 = Normal readout
            2 = Frame Transfer readout
            3 = MPP readout
            4 = Frame Transfer MPP
            5 = Alternate Timing for Normal readout
            6 = Alternate Timing for Frame Transfer
            7 = Alternate Timing for MPP
            8 = Alternate Timing for Frame Transfer MP
            9 = Interline
35   **CCS Status**
36   **Continuous Clears Flag**
37   **Temperature -** This is the actual temperature (°C) of the detector (Get Only)
38   **Temperature Set Point -** This is the desired temperature (°C) to set.
39   **Firmware Version**
40   **Camera Head Serial Number Alpha**
41   **PCI Firmware Version**
42   **Exposure Mode**
            1 = Internal Trigger (free run)
            2 = External trigger activates all data collection
            3 = Each exposure requires a trigger (external sync)

        4 = External trigger controls both the beginning and end of each exposure (Bulb mode)

        5 = External triggers may occur at uneven intervals (Variable mode)

        6 = External trigger activates all data collection (Flash mode). In addition, if the camera is fitted with a flash port, the signal is brought out to these pins.

        7 = Internal trigger. For use when triggering is controlled by a pulse timing generator such as the Princeton Instruments PTG. Note that this mode does not work with older PTG systems.

       13 = Shift per Trigger

       14 = Max Exposure Mode

    1792 = Internal Trigger (CMOS)

   2048 = Trigger First (CMOS)

   2304 = Edge Trigger (CMOS)

43   **Bit Depth** – Bits per data point for the current ADC

44   **Gain Index** – Index for Gain of the current ADC

45   **Speed Table Index** – Index into the speed look-up table of the current ADC

46   **Readout Port -** Define which port (amplifier on shift register) to use

47   **Pixel Time** - Pixel time for current ADC. 1/pixel time = Mhz.

48   **Shutter Close Delay Time** – Time allowed for shutter to close (ms)

49   **Shutter Open Delay Time** – Time allowed for shutter to open (ms)

50   **Shutter Open Mode**

        1 = Always Closed

        2 = Open Shutter Before Each Exposure

        3 = Open Shutter Before Each Sequence of Exposures

        4 = Open Shutter While Waiting for External Trigger

        5 = No Change

51   **Shutter Status**

57   **Exposure Time**

58   **Exposure Res**

59   **Exposure Minimum Time** – Minimum allowed exposure time

60   **Exposure Res Index**

61   **Begin Of Frame (BOF)/ End Of Frame (EOF) Enable**

62   **BOF/EOF Count**

63   **BOF/EOF Clear**

64   **Circular Buffer -** Test to see if hardware/software can perform circular buffer

65   **Current Camera Buffer Exists**

66   **Current Camera Buffer Size** (in bytes)

67   **Reserved**

68   **Driver Buffer Exists**

69   **Driver Buffer Size** (in bytes)

70   **Device Driver Version**

71   **Gain Factor** – This is a non-linear setting.

72   **Enable Cascade Gain**

73   **RS170 Enable** – Enables RS170 output

74	**RS170 Bit Shift**
75	**RS170 Offset**
76	**RS170 Lut Type**
77	**RS170 Video Modes**
78	**Reserved**
79	**Reserved**
80	**Reserved**
81	**Reserved**
82	**Reserved**
83	**Reserved**
84	**Reserved**
85	**Reserved**
86	**Reserved**
87	**Reserved**
88	**Return Number of Bytes Transferred** (from camera)
89	**Return Number of Buffers Transferred** (from camera)
90	**Fast Frame Available Flag**
91	**Fast Frame Accumulation Number**
92	**Fast Frame Paired Mode** - (1 = On, 0 = Off)
93	**Fast Frame Accumulation Mode** - (1 = On, 0 = Off)
94	**Fast Frame Version Number**
95	**Abort Condition** - Abort end condition (used by some cameras for ccs and shutter)
96	**Data Type of Raw Data From Camera**
97	**Enable Auto Exposure –** Usually only for low cost cameras
98	**Enable Auto Gain -** Usually only for low cost cameras
99	**Exposure (in seconds)** - Usually only for low cost cameras
100	**Standard Gain -** monochrome camera.
101	**Green Gain 1** - Usually only for low cost cameras
102	**Green Gain 2** - Usually only for low cost cameras
103	**Red Gain** - Usually only for low cost cameras
104	**Blue Gain** - Usually only for low cost cameras
105	**Camera Is Color** - Returns 1 if color camera, otherwise 0
106	**Clock Frequency**
107	**Camera Model Number**
108	**Column Skip** - Some low cost cameras allow columns to be skipped
109	**Row Skip** - Some low cost cameras allow rows to be skipped
110	**External Trigger Mode**

                    1 = No external trigger used
                    2 = External trigger activates all data collection
                    3 = Each exposure requires a trigger
                    4 = Bulb mode (Photometrics cameras only)
                    5 = Variable mode (Photometrics cameras only)
                    6 = Flash mode (Photometrics cameras only)

111	**Reserved**
112	**Reserved**

113   **Reserved**
114   **Reserved**
115   **Reserved**
116   **Enable Fast Pulse** - Enable fast pulse (PI-Max cameras without PTG)
117   **Vertical Clock –** Only active for kinetics mode
118   **Enable Custom Chip -** Custom chip, for pre-post and chip size
119   **Enable Custom Timing** - Custom timing enable for vertical and horizontal shift
120   **Kinetics Window Size**
121   **Parallel Shift Time Override** - Ns parallel shift time override
122   **Serial Shift Time Override** - Ns serial shift time override
123   **Shutter Polarity** - positive or negative (value depends on camera)
124   **Shutter Type** –
         0 = None or None with signal low
         1 = Internal
         2 = External
         3 – None with signal high
125   **Reserved**
126   **Reserved**
127   **Enable Hardware Accumulation** – 1 = Enable, 0 = Disable
128   **Hardware Accumulation Count** - Number of accumulations to do in hardware
129   **Hardware Cosmic Ray Removal** – 0 = None, 1 = Z, 2 = Spatial
130   **Hardware Cosmic Ray Threshold** - For Z this is frames, for Spatial this is threshold
131   **Hardware Horizontal Flip -** 1 = Enable, 0 = Disable
132   **Hardware Vertical Flip** - 1 = Enable, 0 = Disable
133   **Hardware Background Correction** – 0 = None, 1= Offset, 2 = Offset & Gain
134   **ADC Speed** - ADC enumerated type
135   **Hardware Bad Pixel Correction** - 1 = Enable, 0 = Disable
136   **Total ROIs Set** - Total number of ROIs set in camera
137   **ROIs Available** – 0 = No, 1 = Yes
138   **Digital Binning Available** - 0 = No, 1 = Yes
139   **Camera Reset**
140   **Enable HV or Intensifier Gain** – 0 = Disable, 1 = Enable
141   **Demo Data** - Turn on demo pattern in some cameras
142   **Hardware Cosmic Ray Frames** - Frames for cosmic ray
143   **TTL Output**
144   **TTL Input**
145   **Set Readout Mode** – Set readout mode (for some cameras)
146   **Skip Register Cleans** - Special for some cameras
147   **Chip Y Dimension** - Active area of chip
148   **Chip X Dimension** - Active area of chip
149   **Enable Cosmic Ray Temporal** – 1 = Enable, 0 =Disable
150   **Enable Cosmic Ray Spatial** – 1 = Enable, 0 =Disable

151 **Enable DIFF (Paired Mode)** - 1 = Enable, 0 =Disable (DIFF cameras only)
152 **Co-Initialize -** call co-initialize
153 **Data Acquisition Mode**
    1 = Continuous Acquire, pull latest frame always
    2 = Continuous Acquire, pull frames in order
    3 = One Shot, One Shot, One Shot, etc...
    4 = Stream a sequence
    5 = For ST138 only, to do only start
    6 = Moves spectrometer and collects data
154 **Acquire Modes** - gives all the modes for acquire available for camera
155 **Focus Modes -** gives all the modes for focus available for the camera
156 **Output Address**
157 **Output Event -** Same as logic output for some cameras
158 **Output Signal Type**
159 **All ROIs 1 Strip Flag -** Some cameras need this set if all ROIs are 1 strip
160 **Reference Gain**
161 **Normalize Flag -** 1 = Normalize, 0 = Do Not Normalize
162 **Enable Fan** – 1 = Enable, 0 = Disable
163 **Enable Cooling -** 1 = Enable, 0 = Disable
164 **Device Type -** Front Illumination, Deep Depletion, and Back Illumination
165 **FPGA Version**
166 **Invert Logic Output Flag**
167 **Exposure Display Precision**
168 **Apply Zero Mean Flag -** applies zero mean to data
169 **Temperature Lock Flux -** Amount from set point temperature can drift and still be considered locked
170 **Vender Name**
171 **Substrate Bias**
172 **Target Counts**
173 **Clears Minimum Block -** min block value for clears
174 **Red Exposure in Seconds**
175 **Blue Exposure in Seconds**
176 **Normalized Gain in DB -** micro units

177	**Over Sample Flag**
178	**High Sensitivity Mode**
179	**Blackout Mode**
180	**EM Mode**
181	**EM Locked Gain Mode**
182	**EM Gain Value 10**
183	**EM Gain Value 20**
184	**EM Gain Value 40**
185	**Temperature Locked**
186	**Hardware Version**
187	**Stream Version**
188	**Step and Glue Sleep Time –** Time in ms to wait between spectrometer move and data collection restart
189	**Camera Name**
190	**ADC Speed in KHz**
191	**Regulated Cooling**
192	**Trigger Line** - Trigger line for external trigger
193	**Color Wheel**
194	**Binning**
195	**Horizontal Binning**
196	**Vertical Binning**
197	**Trigger Type**
198	**SYNC-b**
199	**Trigger Delay**
200	**Camera Mode**
201	**Over Sample**
202	**Reserved**
203	**Reserved**
204	**Normal Intensity Gain DB**
205	**Do Post Processing**
206	**Do Post Processing Red**
207	**Do Post Processing Green**
208	**Do Post Processing Blue**
209	**Do Post Processing Bayer**
210	**Post Processing Image Format**
211	**Pre-Flight**
212	**White Balance**
213	**Unique ID**
214	**Image Data Size**
215	**Type B**
216	**Intensifier Model**
217	**Exposure Res**
218	**Trigger Res**
219	**Stream Version**
220	**Normal Gain Sig Figs**
221	**Normal Gain DB Res**

222	**Normal IT Gain Sig Figs**
223	**Normal IT Gain DB Res**
224	**Post Processing Image Size**
225	**Asymmetrical Binning**
226	**EM Gain Available**
227	**EM Mode Supported**
228	**Locked Gain Supported**
229	**Image Interval**
230	**Shutter Delay Resolution**
231	**Phosphor Decay Delay (64 Bit)**
232	**Phosphor Decay Delay (32 Bit)**
233	**Intensifier Diameter**
234	**Photocathode Sensitivity**
235	**Phosphor Type**
236	**Intensifier Status**
237	**Readout Port Count**
238	**Readout Orientation**
239	**Correct Pixel Bias**
240	**Temperature Status**
241	**Camera Handle**
242	**Intensifier Options**
243	**Exact Readout Count Max**
244	**DIF Starting Gate**
245	**DIF Ending Gate**
250	**External Shutter Flag**
251	**Frames per Readout**
252	**Camera Frame Rate Calc**
253	**Max Buffers**
254	**Min Buffers**
255	**Expose Out Mode**
256	**Start Time (for special data collection)**
257	**End Time (for special data collection)**