11 Digital IO Control

The camera is equipped with a 6-pin GPIO connector on the back of the case. The connector is a Hirose HR10A-7R-6PB, the mating connector is a Hirose HR10A-7P-6S(73).

Diagram	Color	Pin	Line	Function	Description
	Green	1	3	Power / Input	+12 V DC Camera Power / Non-isolated input
	Black	2	0	Opto Input 1	Opto-isolated input
	Red	3	2	NC / +3.3 V / GPIO	+3.3 V output. Current 120 mA (nominal) Firmware enabled / Non-isolated I/O
	White	4	1	Opto Output 1	Opto-isolated output
	Blue	5	N/A	Opto GND	Ground for opto-isolated I/O, not connected to camera ground
	Brown	6	N/A	GND	DC camera power ground

This section describes how to configure the camera's general purpose digital input and outputs (sometimes referred to as GPIO).

Use LineSelector to choose which of the 4 lines to configure. All the features listed beneath it are controllable on a per line basis.

Use Line Mode to control the direction - either **Input** or **Output** - of the selected I/O line.

Use 3.3V Enable to supply external circuits with power. This is different than standard logic outputs in that it is comparatively slow to switch but can supply a more significant amount of power. This is only available on some pins.

Use LineInverter to control a logic inverter on the selected line.

LineStatus indicates the current status of the selected line. A checked status (enabled) indicates logic high. An unchecked status (disabled) indicates logic low. Since this node must be polled to get its status it should not be used as a real time control for reading internal signals.

LineStatusAll is a hexadecimal representation of all the line status bits (Line 0 status corresponds to bit 0, Line 1 status with bit 1, etc). This allows simultaneous reading of all line statuses at once.

Use the LineInputFilterSelector to choose a filter. Filters are unique per line. Use LineFilterWidth to set the width of the filter in microseconds. There are two choices of filter:

> **Deglitch** - designed to filter out any noise or other spurious signals on the line, it does not consider the state to have transitioned until after the Filter Width time has expired. This means that Deglitch introduces a delay in the signal.

Debounce - designed to filter out rapid connecting and disconnecting common in mechanical switches. This means that Debounce considers the first edge as valid and won't allow a subsequent change of state until after the debounce time has elapsed.

Note: The Deglitch filter is applied before Debounce filter.

Use LineSource to control what signal is output on the line when the Line Mode is set to output. The choices are:

Other Lines - creates a loop back

User Outputs - outputs user controllable internal signals

Counter Active - shows when a counter is in use

Logic Blocks - drives the lines

Exposure Active - indicates when the image sensor is exposing

Frame Trigger Wait - indicates when the camera is ready to accept a new Frame Start trigger

If a User Output is selected as a Line Source, use UserOutputSelector to select which bit to use as internal signals within the camera. Use UserOutputValue to set the selected user output to logic high (enabled) or logic low (disabled).

UserOutputValueAll is a hexadecimal representation of all the user output bits (User Output 0 corresponds to bit 0, User Output 1 with bit 1, etc). Reading or writing User Output Value All allows simultaneous setting or reading of all user outputs at once.

LineFormat is read only and indicates what type of circuit the selected line has. The options for Line Format are:

Tri State - indicates the line is not driven. This is typical for digital inputs.

Opto Coupled - indicates that an opto isolator is being used to isolated the external circuitry from the internal camera electronics.

Open Drain - indicates there is an internal MOSFET that will pull the pin low but requires an external pull up resistor to produce a logic level high signal. This is typical for digital outputs.

11.1 Summary Table

Name	Interface	Access	Visibility	Description
Line Selector	IEnumeration		Expert	Selects the physical line (or pin) of the external device connector to configure
Line Mode [Line Selector]	IEnumeration		Expert	Controls if the physical Line is used to Input or Output a signal.
3.3V Enable [Line Selector]	IBoolean	RW	Guru	Internally generated 3.3V rail. Enable to supply external circuits with power. This is different than standard logic outputs in that it is comparatively slow to switch but can supply a more significant amount of power. This is only available on some pins.
Line Inverter [Line Selector]	IBoolean	RW	Expert	Controls the inversion of the signal of the selected input or output line.

Name	Interface	Access	Visibility	Description
Line Status [Line Selector]	IBoolean	RO	Expert	Returns the current status of the selected input or output Line
Line Status All	IInteger	RO	Expert	Returns the current status of all the line status bits in a hexadecimal representation (Line 0 status corresponds to bit 0, Line 1 status with bit 1, etc). This allows simultaneous reading of all line statuses at once.
Input filter Selector [Line Selector]	IEnumeration		Expert	Selects the kind of input filter to configure: Deglitch or Debounce.
Line Filter Width [Input filter Selector]	IFloat		Expert	Filter width in microseconds for the selected line and filter combination
Line Source [Line Selector]	IEnumeration		Expert	Selects which internal acquisition or I/O source signal to output on the selected line. LineMode must be Output.
Line Format [Line Selector]	IEnumeration	RO	Expert	Displays the current electrical format of the selected physical input or output Line.
Exposure Active Mode	IEnumeration	RW	Expert	Control sensor active exposure mode.
User Output Selector	IEnumeration		Expert	Selects which bit of the User Output register is set by UserOutputValue.
User Output Value [User Output Selector]	IBoolean	RW	Expert	Value of the selected user output, either logic high (enabled) or logic low (disabled).
User Output Value All	IInteger		Expert	Returns the current status of all the user output status bits in a hexadecimal representation (UserOutput 0 status corresponds to bit 0, UserOutput 1 status with bit 1, etc). This allows simultaneous reading of all user output statuses at once.

11.2 Digital IO Control Features