GPIO expansion bracket for the Komodo and Predator frame grabbers
Data book

August 2024
Rev 1.3

KAYA INSTRUMENTS

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1 Revision History

Version	Date	Notes
1.0	03/2016	Initial release
1.1	01/2017	Updated Predator (rev 3) frame grabber IO
1.2	09/2017	Change GPIO pin assignments Table 1 and Table 2
1.3	08/2024	Redesign and major revision

Table 1 – Revision History

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3 Introduction

3.1 Safety precautions

With your GPIO expansion (KY-GPIO) connector in hand, please take the time to read through the precautions listed below to avoid preventable and unnecessary injuries and damage to you, other personnel, or property. Read these safety instructions carefully before your first use of the product, as these precautions contain safety instructions that must be observed. Be sure to follow this manual to prevent misuse of the product.

⚠️	**Caution! Read carefully and do not disregard these instructions.**

In the event of a failure, disconnect the power supply Disconnect the power supply immediately and contact our sales personnel for repair. Continuing to use the product in this state may result in a fire or electric shock.
If an unpleasant smell or smoking occurs, disconnect the power supply. Disconnect the power supply immediately! Continuing to use the product in this state may result in a fire or electric shock. After verifying that no smoking is observed, contact our sales personnel for repair.
Do not disassemble, repair or modify the product. Such actions may result in a fire or electric shock due to a circuit shortage or heat generation. Contact our sales personnel before inspection, modification, or repair.
Do not place the product on unstable surfaces. Otherwise, it may drop or fall, resulting in injury to persons or the camera.
Do not use the product if dropped or damaged. Otherwise, a fire or electric shock may occur.
Do not touch the product with metallic objects. Otherwise, a fire or electric shock may occur.
Do not place the product in dusty or humid environments, nor where water may splash. Otherwise, a fire or electric shock may occur.
Do not wet the product or touch it with wet hands. Otherwise, the product may fail or cause a fire, smoking, or electric shock.
Do not touch the gold-plated sections of the connectors on the product. Otherwise, the surface of the connector may be contaminated by sweat or skin oil, resulting in contact failure of a connector, malfunction, fire, or electric shock due to static electricity discharge.
Do not use or place the product in the following locations.   ▪ Unventilated areas such as closets or bookshelves   ▪ Near oils, smoke, or steam   ▪ Next to heat sources   ▪ A car with closed doors where the temperature can become hot   ▪ Static electricity replete locations   ▪ Near water or chemicals   Otherwise, a fire, electric shock, accident, or deformation may occur due to a short circuit or heat generation.
Do not place heavy objects on the product. Otherwise, the product may be damaged.
Be sure to discharge static electricity from the body before touching any sensitive electronic components. The electronic circuits in your computer and the circuits on the cameras and the hardware boards are sensitive to static electricity and surges. Improper handling may seriously damage the circuits. In addition, do not let your clothing come in contact with the circuit boards or components. Otherwise, the product may be damaged.

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3.2 Disclaimer

This product should be used only with KAYA's frame grabbers, for digital input/output (GPIO) purposes. **KAYA Instruments** assumes no responsibility for any damage that may ensue by using this product for any purpose other than intended, as previously stated. Without detracting what was previously written, please be advised that the company takes no responsibility for any damages caused by:

- Earthquake, thunder strike, natural disasters, a fire caused by usage beyond our control, willful and/or accidental misuse and/or use under other abnormal and/or unreasonable conditions
- Secondary damages caused by the use of this product or its unusable state (business interruption or others)
- Use of this product in any manner that contradicts this manual or malfunctions due to connection to other devices.
- Damage to this product that is out of our control or failure due to modification.
- Accidents and/or third parties that may be involved.

Additionally, **KAYA Instruments** assumes no responsibility or liability for:

- Erasure or corruption of data caused by the use of this product.
- Any consequences or other abnormalities arising from use of this product, or damage of this product not due to our responsibility or failure due to modification.

Repair of this product is carried out by replacing it on a chargeable basis, not repairing the faulty devices. However, non-chargeable replacement is offered for initial failure if such notification is received within two weeks after delivery of the product.

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4   Overview

The KY-GPIO is used together with the Komodo and Predator frame grabbers to gain easy access to the GPIO connectors that are present on KAYA's frame grabbers. The KY-GPIO connected on one side to the GPIO connector of the frame grabber and on the other side it's connected to a DB25 connector that is mounted on a standard full height bracket.

4.1   Features

- Interfaces:
  - 2 deferential LVDS inputs
  - 2 deferential LVDS outputs
  - 12 LVTTL inputs / outputs
  - inputs (optionally opto-isolated)
  - 4 outputs (optionally opto-isolated)
  - 4 inputs / outputs
  - 4 TTL inputs / outputs
- 0 °C to 50 °C operating environment temperature

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5   System description

5.1   Komodo Frame Frabber general purpose I/O

The following table gives a brief functionality description of the various available GPIO signals on the Komodo frame grabber, for more details please go to the relevant documentation.

Board reference (J1)	Signal Name	I/O Standard	Description
1 2	din[0]	LVDS	Pin 1 of this header is the positive signal and pin 2 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
3 4	din[1]	LVDS	Pin 3 of this header is the positive signal and pin 4 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
5 6	rout[0]	LVDS	Pin 5 of this header is the positive signal and pin 6 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
7 8	rout[1]	LVDS	Pin 7 of this header is the positive signal and pin 8 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
9	io_out[0]	3.3-V LVTTL	Optically isolated outputs
10	io_out[1]	3.3-V LVTTL	Optically isolated outputs
11	io_out[2]	3.3-V LVTTL	Optically isolated outputs
12	io_out[3]	3.3-V LVTTL	Optically isolated outputs
13	io_in[0]	3.3-V LVTTL	Optically isolated inputs
14	io_in[1]	3.3-V LVTTL	Optically isolated inputs
15	io_in[2]	3.3-V LVTTL	Optically isolated inputs
16	io_in[3]	3.3-V LVTTL	Optically isolated inputs
17	OptoCoupled GND	-	Ground signal for opto-isolated signals on this connector
18	GND	-	Reference ground signal - Board GND
19	gpio_vt[0]	TTL	General Purpose IO
20	gpio_vt[1]	TTL	
21	gpio_vt[2]	TTL	
22	gpio_vt[3]	TTL	
23	gpio[0]	3.3-V LVTTL	
24	gpio[1]	3.3-V LVTTL	
25	gpio[2]	3.3-V LVTTL	
26	gpio[3]	3.3-V LVTTL	

Table 2 – GPIO pin assignments, signal name and functions for Komodo J1

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Board reference (J2)	Signal Name	I/O Standard	Description
1 2	din[0]	LVDS	Pin 1 of this header is the positive signal and pin 2 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
3 4	din[1]	LVDS	Pin 3 of this header is the positive signal and pin 4 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
5 6	rout[0]	LVDS	Pin 5 of this header is the positive signal and pin 6 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
7 8	rout[1]	LVDS	Pin 7 of this header is the positive signal and pin 8 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
9	io_out[4]	3.3-V LVTTL	Optically isolated outputs
10	io_out[5]	3.3-V LVTTL	Optically isolated outputs
11	io_out[6	3.3-V LVTTL	Optically isolated outputs
12	io_out[7]	3.3-V LVTTL	Optically isolated outputs
13	io_in[4]	3.3-V LVTTL	Optically isolated inputs
14	io_in[5]	3.3-V LVTTL	Optically isolated inputs
15	io_in[6]	3.3-V LVTTL	Optically isolated inputs
16	io_in[7]	3.3-V LVTTL	Optically isolated inputs
17	OptoCoupled GND	-	Ground signal for opto-isolated signals on this connector
18	GND	-	Reference ground signal - Board GND
19	gpio_vt[4]	TTL	General Purpose IO
20	gpio_vt[5]	TTL	
21	gpio_vt[6]	TTL	
22	gpio_vt[7]	TTL	
23	gpio[4]	3.3-V LVTTL	
24	gpio[5]	3.3-V LVTTL	
25	gpio[6]	3.3-V LVTTL	
26	gpio[7]	3.3-V LVTTL	

Table 3 – GPIO pin assignments, signal name and functions for Komodo J2

5.2 Predator frame grabber general purpose I/O (rev 3 and higher only)

The following table gives a brief functionality description of the various available GPIO signals on the Predator frame grabber, for more details please go to the relevant documentation.

Board reference (J18)	Signal Name	I/O Standard	Description
1 2	din[0]	LVDS	Pin 1 of this header is the positive signal and pin 2 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
3 4	din[1]	LVDS	Pin 3 of this header is the positive signal and pin 4 in the negative signal of this LVDS. The differential pair is converted to a single input on the FPGA
5 6	rout[0]	LVDS	Pin 5 of this header is the positive signal and pin 6 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
7 8	rout[1]	LVDS	Pin 7 of this header is the positive signal and pin 8 in the negative signal of this LVDS. The differential pair is converted to a single output on the FPGA
9	io_out[0]	3.3-V LVTTL	Optically isolated outputs
10	io_out[1]	3.3-V LVTTL	Optically isolated outputs
11	io_out[2]	3.3-V LVTTL	Optically isolated outputs
12	io_out[3]	3.3-V LVTTL	Optically isolated outputs
13	io_in[0]	3.3-V LVTTL	Optically isolated inputs
14	io_in[1]	3.3-V LVTTL	Optically isolated inputs
15	io_in[2]	3.3-V LVTTL	Optically isolated inputs
16	io_in[3]	3.3-V LVTTL	Optically isolated inputs
17	OptoCoupled GND	-	Ground signal for opto-isolated signals on this connector
18	GND	-	Reference ground signal - Board GND
19	gpio_vt[0]	TTL	General Purpose IO
20	gpio_vt[1]	TTL	
21	gpio_vt[2]	TTL	
22	gpio_vt[3]	TTL	
23	gpio[0]	3.3-V LVTTL	
24	gpio[1]	3.3-V LVTTL	
25	gpio[2]	3.3-V LVTTL	
26	gpio[3]	3.3-V LVTTL	

Table 4 – GPIO pin assignments, signal name and functions for Predator J18

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5.3 KY_GPIO connection
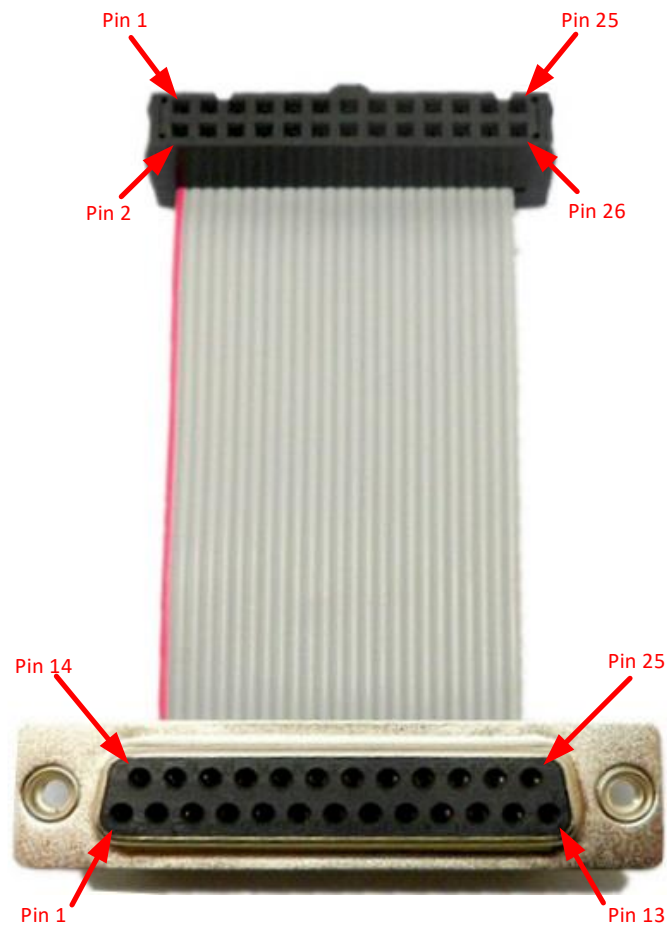
Figure 1 – KY_GPIO connection

FC26 connector	DB25 connector	FC26 connector	DB25 connector
1	1	14	20
2	14	15	8
3	2	16	21
4	15	17	9
5	3	18	22
6	16	19	10
7	4	20	23
8	17	21	11
9	5	22	24
10	18	23	12
11	6	24	25
12	19	25	13
13	7	26	-

Table 5 – KY_GPIO connection

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5.3.1   Installation instruction

1.   Before installing, turn of the power to the computer.
2.   Firmly press the FC-26P connector to the GPIO connector on the frame grabber board.
3.   Anchor the PCIe bracket to the computer chassis using M3 screw.
4.   Power up the computer.

REFERENCES

Supported vision standards:

CoaXPress **GEN<i>CAM**

Vision Point documentation:

Vision Point

TECHNICAL SUPPORT AND PROFESSIONAL SERVICE

If you searched the documents and could not find the answers you need, contact KAYA Instruments support service:

- ☐ Create a support request on the web: support.kayainstruments.com
- ☐ Our knowledge base is available on: support.kayainstruments.com/kb/

Visit us at kayainstruments.com for comprehensive information.

SUBMITTING A SUPPORT REQUEST

When opening a support request, please provide the following information when applicable:

For Frame Grabbers:	For Camera:	For Range Extender:
☐ Vision Point Diagnostic Info[*] ☐ Serial number of Frame Grabber ☐ Camera model ☐ SFP+ module model ☐ CoaXPress/Fiber cable model and length ☐ External power or PoCXP ☐ PC motherboard model [*]Use the "Collect diagnostic info" function in the Vision Point application, Info tab.	☐ Vision Point Diagnostic Info (or frame grabber being utilized) ☐ Serial Number of Camera ☐ XML dump and/or description of how the camera is being utilized ☐ Description of issue ☐ SFP+ module model ☐ CoaXPress/Fiber cable model and length ☐ External power or PoCXP	☐ Range Extender model ☐ Serial Number of Range Extender ☐ SFP+ module model ☐ CoaXPress/Fiber Cable model and length ☐ PC configuration ☐ Operating System ☐ Software revision ☐ Camera and Frame Grabber manufacturer and model