Miramar Camera GenICam Interface

# Revision History

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| --- | --- | --- | --- |
| **Date** | **Rev No.** | **Description** | **By** |
| Sep 2023 | 1 | Initial draft | Jeremy Hong |
| 6/10/2024 | 2 | Add register definitions | Bing Wen |
| 6/12/2024 | 2.01 | Add more register definitions | Bing Wen |
| 6/14/2024 | 2.02 | Add user data flash address | Bing Wen |
| 7/16/2024 | 3.0 | Modified Register definitions for firmware 3.0 | Bing Wen |
| 8/23/2024 | 3.1 | Register value change for firmware >3.1, FPGA >=1.6.7 | Bing Wen |
| 9/30/2024 | 3.1.1 | Remove invalid registers | Bing Wen |

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# Introduction

Miramar cameras use Genicam protocol. This document will discuss implementation of writing and reading registers from the camera, and registers that control the camera behavior.

# GenICam Protocol

For details on how to format writes and reads for GenICam protocol, please refer to the GenICam document “GenICam GenCP Gnereic Control Protocol Version 1.3”.

# Hardware implementation

Miramar Cameras with USB\_C connector implemented the GenICam interface on serial ports using USB. The USB port has VID=0x1FC9 and PID=00A3. If the correct serial port is chosen, reading 64 bytes from address 0x08 will return “OBSIDIAN SENSORS INC.”.

Future Cameras with MIPI/GMSL connector will implement GenICam protocol through I2C bus.

The existing communication buffer size is **4096** bytes. Do not send or request more than 4096 bytes data in each transaction

# Register definitions

|  |  |  |  |
| --- | --- | --- | --- |
| Adress | Length (bytes) | Read/Write | functions |
| 0x020C | 64 | R | Firmware Version String (ASCII) |
| 0x1000 | 1 | R | Camera board temperature, in Centigrade |
| 0x100E | 1 | R | shutter temperature = (value[0x100E]+256\*value[0x100F])/100, in Centigrade |
| 0x100F | 1 | R |
| 0x1010 | 1 | R | FPGA Major version |
| 0x1011 | 1 | R | FPGA Minor version |
| 0x1012 | 1 | R | FPGA Sub Minor version |
| 0x2001 | 1 | R/W | 0/1: Video stream disable/enable |
| 0x24000008 | 4 | R/W | Bit 4:0: number of frames to collect during background accumulation |
| 0x2005 | 1 | R/W | 0: shutter disabled  1: shutter enabled, odd polarity  2: shutter enabled, even polarity |
| 0x2008 | 1 | R/W | AGC 0: disable 1: linear 2: Histogram Equilibration |
| 0x2009 | 1 | R/W | Bit 0: 0/1 colormap off/on |
| 0x200A | 1 | R/W | Colormap index |
| 0x200D | 1 | W | Write 1 to save current MCU settings as default setting, which is loaded after every reboot |
| 0x2030 | 1 | W | Write 1 to save current FPGA settings as default setting, which is loaded after every reboot |
| 0x200F | 1 | R/W | Automatic shutter calibration 0: disable 1:enable |
| 0x2010 | 1 | W | X10 = Maximal number of seconds between shutter calibration |
| 0x2011 | 1 | R/W | Delay between shutter movement and background accumulation, in number of frames |
| 0x2035 | 1 | W | Write 1 to reboot immediately |
| 0x2036 | 1 | W | Perform background accumulation |
| 0x27000008 | 2 | R/W | Global gain and offset, output = (input – offset) X gain/64 |
| 0x609D3000 | 2,650,111 | R/W | 0x609D3000 - 0x60c59FFF stores user defined data in flash. Users can use these registers to store data that needs to be preserved after power cycles.   * Data is stored in sectors. Each sector is 4096 bytes in size. * The starting address must be dividable by 4096. The address should have format 0Xxxxx x000.   User data should be saved when video stream is turned off |

# Example tasks

## NUC using external shutter

Disable shutter, write 0 to 0x2005

Put blackbody in front of the lens, then write 1 to 0x2036

## Output raw data

Disable AGC, write 0 to 0x2008

Set offset=0 gain=1, write 0x00004000 to 0x27000008

Disable colormap, write 0 to 0x2009

## Output YUYV data for operating system camera apps

Enable colormap, write 1 to 0x2009

Enable AGC, write 1 or 2 to 0x2008

## Save Data to flash

Disable video stream, write 0 to 0x2001

Write data to address between 0x609D3000 and 0x60c59FFF in unit of sectors.

## Save current settings as default

write 1 to 0x200D

write 1 to 0x2030