Allied Vision

GigE Firmware Release Notes

# Prosilica GB, GC, GE, GS, GT, GX cameras

**2026-Nov-09**
**FW-Loader 40111**

### Firmware for Mako, Manta, and selected Prosilica GT cameras

For technical reasons, firmware files and release notes have been separated **for all Mako and Manta** models, and **for selected Prosilica GT** models.
You can find the corresponding firmware loaders and release notes at www.alliedvision.com/en/support/firmware-downloads.

### PvAPI

**PvAPI**: Given only where naming varies in **PvAPI SampleViewer** versus **Vimba Viewer** and third-party software.

### User sets

If new firmware contains a new feature or control, saved camera `UserSets` [**PvAPI**: `ConfigFiles`] are invalidated and erased. Before loading new firmware, backup any used camera `UserSets` [**PvAPI**: see disk icon in SampleViewer to export current settings to file].

### Firmware update instructions

For more information on updating the firmware on your GigE camera, see your camera's user guide or the GigE Firmware Update application note at www.alliedvision.com/en/support/technical-papers-knowledge-base

### Camera feature reference

A complete listing of camera features including definitions can be found online.

- **Vimba** and third-party software users: GigE Features Reference
- **PvAPI** users: GigE Camera and Driver Attributes document

www.alliedvision.com/en/support/technical-documentation

### Supported models

Listed camera models include monochrome, color, NIR, and version variants (including hardware revisions). See the firmware loader executable for full list of variants.

### Prosilica GS

Prosilica GS models use Prosilica GB firmware. See Table 3: Firmware releases at a glance (firmware loader 01.42.05) on page 54 for the latest Prosilica GB firmware.

# Firmware releases in firmware loader 40111

**Firmware for Mako, Manta, and selected Prosilica GT cameras**

For technical reasons, firmware files and release notes have been separated for all Mako and Manta models, as well as for selected Prosilica GT models (**only GT1930, GT2000, GT2000NIR, GT2050, GT2050NIR, GT2460**).

You can find firmware files and release notes at www.alliedvision.com/en/support/firmware-downloads.

This document contains Mako, Manta, and Prosilica GT firmware release notes until 2nd of November, 2022.

Prosilica families are shortened in the table column headlines. For example, **GC** represents **Prosilica GC**.

| Camera family | | | | | Models | Firmware version | Doc release |
|---|---|---|---|---|---|---|---|
| Mako | Manta | GC | GT | GX | | | |
| ✓ | | | | | G-032, G-040, G-125, G-131, G-158, G-192, G-234, G-319, G-503, G-507, G-508 | FW 01.54.40105 | 2022-Nov-02 |
| | ✓ | | | | G-223, G-419, G-419B NIR | FW 01.54.39357 | 2022-May-04 |
| | ✓ | | | | G-040, G-158, G-235, G-319, G-507, G-895, G-1236, G-1620, G-2040, G-2460 | FW 01.54.38408 | 2022-Mar-25 |
| ✓ | | | | | G-511, G-811, G-1242 | FW 01.54.36475 | 2021-Nov-10 |
| | | | ✓ | | GT4400, GT5400, GT6400 | FW 01.54.33597 | 2021-Mar-22 |
| | ✓ | | | | G-1620, G-2040, G-2460 | FW 01.54.32153 | 2021-Jan-14 |
| | ✓ | | | | G-031, G-033, G-046, G-145, G-145-30fps, G-146, G-201, G-504 | FW 01.44.31238 | 2020-Nov-12 |
| | | | ✓ | | GT4400, GT5400, GT6400 | FW 01.54.29197 | 2020-Mar-31 |
| | ✓ | | | | G-125 | FW 01.44.28514 | 2020-Mar-31 |
| ✓ | | | | | G-030, G-223, G-419 | FW 01.54.26005 | 2019-Aug-25 |
| ✓ | | | | | G-508B POL | FW 01.54.21000 | 2019-Mar-11 |
| | ✓ | | | | G-040, G-158, G-235, G-319, G-507, G-895, G-1236 | FW 01.54.20343 | 2019-Mar-11 |
| ✓ | | | | | G-040, G-158, G-234, G-319, G-507 | FW 01.54.21000 | 2019-Jan-31 |
| ✓ | | | | | G-131, G-192, G-503 | FW 01.54.20700 | 2019-Jan-31 |
| | | | ✓ | | GT4090, GT4096, GT5120 | FW 01.54.20443 | 2019-Jan-31 |
| | | | ✓ | | GT1930, GT1930L, GT2460 | FW 01.54.20343 | 2019-Jan-31 |
| | | ✓ | | | GC2450 | FW 01.54.19678 | 2017-Dec-15 |
| | | ✓ | | | GC660, GC1290, GC1380H, GC1600H | FW 01.54.19654 | 2017-Dec-15 |
| | ✓ | | | | G-223, G-419 | FW 01.54.18163 | 2017-Jan-27 |
| | | | ✓ | | GT2000, GT2050 | FW 01.54.18163 | 2017-Jan-27 |
| ✓ | | | | | G-032, G-125 | FW 01.54.17933 | 2016-Oct-23 |
| | ✓ | | | | G-282, G-283, G-505, G-917 | FW 01.54.17624 | 2016-Aug-12 |
| | | | ✓ | | GT1290, GT1380, GT1600, GT1660, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300, GT3400, GT4905, GT4907, GT6600 | FW 01.54.17562 | 2016-Aug-12 |

*Table 1: Firmware releases at a glance (current firmware loader) (Sheet 1 of 2)*

| Camera family | | | | | Models | Firmware version | Doc release |
|---|---|---|---|---|---|---|---|
| Mako | Manta | GC | GT | GX | | | |
| ✓ | | | | | G-050, G-095 | FW 01.54.11233 | 2014-Oct-06 |
| | | ✓ | | | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | FW 01.50.01 | 2013-Jan-04 |
| | ✓ | | | | G-032, G-201-30fps | FW 01.44.18241 | 2016-Dec-16 |
| | ✓ | | | | G-046, G-146 | FW 01.44.18241 | 2016-Dec-02 |
| | ✓ | | | | G-095 | FW 01.44.7913 | 2013-Jul-22 |
| | | | | ✓ | GX1050, GX1660, GX1910, GX1920, GX2300, GX2750, GX3300 | FW 01.42.05 | 2011-Dec-12 |

*Table 1: Firmware releases at a glance (current firmware loader) (Sheet 2 of 2)*

# FW 01.54.40105

Document release date: 2022-Nov-02

**No firmware downgrade for cameras manufactured with new firmware**

Cameras with serial numbers >=537026137 are delivered with FW version 01.54.40105 or higher. To avoid damage, the firmware for these cameras cannot be reverted below 01.54.40105.
Cameras with serial numbers <537026137 can be updated to any FW version.

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-032, G-040, G-125, G-131, G-158, G-192, G-234, G-319, G-503, G-507, G-508 | 01.54.40105 |

## Adjustments for new hardware

Adjustment to support the new FPGA variant

## New features and enhancements

- Mako G-040, G-158, G-234, G-319, G-507, G-508
  Range for `ExposureTime` values was uniformly extended to: 16 µs to 85.89 s, with 1 µs increments
  Mako G-032, G-125, G-131, G-192, G-503
  Values from previous firmware maintained.
- Value range for `BalanceRatioAbs` was extended to 0.01 to 3.99.
  **Note** that the range of 0.8 to 3.00 is maintained for other Mako models.

# FW 01.54.39357

Document release date: 2022-May-04



**No firmware downgrade for cameras manufactured with new firmware**

Cameras with serial numbers >=503518717 are delivered with FW version 01.54.39357 or higher. To avoid damage, the firmware for these cameras cannot be reverted below 01.54.39357.
Cameras with serial numbers <503518717 can be updated to any FW version.

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-223, G-419, G-419B NIR | 01.54.39357 |

## Adjustments for new hardware

Adjustment to support the new FPGA variant

## Enhancements

Value range for `BalanceRatioAbs` was extended to 0.01 to 3.99.

# FW 01.54.38408

Document release date: 2022-Mar-25



**No firmware downgrade for cameras manufactured with new firmware**

Cameras with serial numbers >=503515581 are delivered with FW version 01.54.38408 or higher. To avoid damage, the firmware for these cameras cannot be reverted below 01.54.38408.
Cameras with serial numbers <503518717 can be updated to any FW version.

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-040, G-158, G-235, G-319, G-507, G-895, G-1236, G-1620, G-2040, G-2460 | 01.54.38408 |

## Adjustments for new hardware

Adjustment to support the new FPGA variant

## New features and enhancements

- Manta G-040, G-158, G-235, G-319, G-507, G-895, G-1236
  Range for `ExposureTime` values was uniformly extended to: 16 µs to 85.89 s, with 1 µs increments
  Manta G-1620, G-2040, G-2460
  Values from FW 01.54.32153 were maintained: 4 us to 171.8 s in increments of 1 us
- Value range for `BalanceRatioAbs` was extended to 0.01 to 3.99.
  **Note** that the range of 0.8 to 3.00 is maintained for other Manta G models.
- Added support for Pixel Defect Masking

# FW 01.54.36475

Document release date: 2021-Nov-10

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-511, G-811, G-1242 | 01.54.36475 |

## New models

Initial commercial release of Mako G-511B, G-511C, G-811B, G-811C, and G-1242B, and G-1242C models.

# FW 01.54.33597

Document release date: 2021-Mar-11

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica | GT4400, GT5400, GT6400 | 01.54.33597 |

## New features and enhancements

Extended EF-Mount lens control from Canon lenses only to additional support for:
Laowa 100 mm F2.8 CA-Dreamer, Sigma 20 mm F1.4 DG, and Sigma 50mm F1.4 DG.

# FW 01.54.32153

Document release date: 2021-Jan-14

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-1620, G-2040, G-2460 | 01.54.32153 |

## New models

Initial commercial release of Manta G-1620B, G-1620C, G-2040B, G-2040C, G-2460B, and G-2460C models.

# FW 01.44.31238

Document release date: 2020-Nov-12

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-033, G-046, G-145, G-145-30fps, G-146, G-201, G-504 | 01.44.31238 |

## Resolved issue

Fixed a bug that caused the top of the image to be darker on the first image captured after power-up.

# FW 01.54.29197

Document release date: 2020-Mar-31

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT4400, GT5400, GT6400 | 01.54.29197 |

## New features and enhancements

Exposure time control range and increments have changed since the last firmware release:

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.26872 | Exposure range and increment Firmware version 01.54.29197 |
|---|---|---|---|
| Prosilica GT4400 | 8-bit, 12-bit | 61 µs to 171.8 s;<br>31.68 µs increments | 31 µs to 171.8 s;<br>1 µs increments |
| | 16-bit | 72 µs to 171.8 s;<br>42.24 µs increments | |
| | 24-bit | 93 µs to 171.8 s;<br>63.36 µs increments | |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.26872 | Exposure range and increment Firmware version 01.54.29197 |
|---|---|---|---|
| Prosilica GT5400 | 8-bit, 12-bit | 68 µs to 171.8 s;<br>38.72 µs increments | 31 µs to 171.8 s;<br>1 µs increments |
| | 16-bit | 81 µs to 171.8 s;<br>51.52 µs increments | |
| | 24-bit | 107 µs to 171.8 s;<br>77.44 µs increments | |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.26872 | Exposure range and increment Firmware version 01.54.29197 |
|---|---|---|---|
| Prosilica GT6400 | 8-bit, 12-bit | 75 µs to 171.8 s;<br>45.44 µs increments | 31 µs to 171.8 s;<br>1 µs increments |
| | 16-bit | 90 µs to 171.8 s;<br>60.48 µs increments | |
| | 24-bit | 120 µs to 171.8 s;<br>90.88 µs increments | |

# FW 01.44.28514

Document release date: 2020-Mar-30

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-125 | 01.44.28514 |

## Resolved issue

Fixed a bug that caused the top of the image to be darker on the first image captured after power-up.

# FW 01.54.26782

Document release date: 2019-Nov-14

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT4400, GT5400, GT6400 | 01.54.26872 |

## New models

Initial commercial release of Prosilica GT4400, GT4400C, GT5400, GT5400C, GT6400, and GT6400C models.

# FW 01.54.26005

Document release date: 2019-Aug-25

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-030, G-223, G-419 | 01.54.26005 |

## New features and enhancements

- Added IEEE 1588-2008 Precision Time Protocol
- Added Trigger over Ethernet Action Commands

## Resolved issues

- Auto-exposure does not work when gain is not zero
- Gain will stay within `GainAutoMin` and `GainAutoMax` in auto modes

## Known issues

`Gain` feature should be set to zero when using `ExposureAuto` and `GainAuto` features together. Otherwise exposure value could remain constant.

# FW 01.54.21000

Document release date: 2019-Mar-11

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-508B POL | 01.54.21000 |

## New model

Initial commercial release of the Mako G-508B POL polarized sensor model.

# FW 01.54.20343

Document release date: 2019-Mar-11

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-040, G-158, G-235, G-319, G-507, G-895, G-1236 | 01.54.20343 |

## New features and enhancements

- Improved FPGA timing for improved camera reliability

- Increased frame rates:

| Models | Frame rate at full resolution Firmware version 01.54.19767 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-040 | 286.0 fps<br>295.7 fps (burst mode) | 286.3 fps<br>313.1 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.19767 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-158 | 75.3 fps<br>83.09 fps (burst mode) | 75.2 fps<br>89.1 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.17562 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-235 | 50.7 fps<br>57.5 fps (burst mode) | 50.8 fps<br>59.2 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.17562 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-319 | 37.6 fps<br>43.3 fps (burst mode) | 37.6 fps (no change)<br>45.0 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.17562 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-507 | 23.7 fps<br>27.6 fps (burst mode) | 23.7 fps (no change)<br>28.7 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.18110 | Frame rate at full resolution Firmware version 01.54.20343 |
|---|---|---|
| Manta G-895 | 13.4 fps<br>15.69 fps (burst mode) | 13.4 fps (no change)<br>16.2 fps (burst mode) |

- Exposure minimum values and increments have changed since the last firmware release.

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.19767 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-040 | 8-bit, 12-bit | 25 µs to 85.9 s;<br>5.76 µs increments | 19 µs to 85.9 s;<br>5.44 µs increments |
| | 16-bit | 29 µs to 85.9 s;<br>7.68 µs increments | 21 µs to 85.9 s;<br>7.28 µs increments |
| | 24-bit | 36 µs to 85.9 s;<br>11.52 µs increments | 24 µs to 85.9 s;<br>10.88 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.19767 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-158 | 8-bit, 12-bit | 35 µs to 85.9 s;<br>10.64 µs increments | 23 µs to 85.9 s;<br>9.92 µs increments |
| | 16-bit | 42 µs to 85.9 s;<br>14.16 µs increments | 26 µs to 85.9 s;<br>13.2 µs increments |
| | 24-bit | 56 µs to 85.9 s;<br>21.28 µs increments | 33 µs to 85.9 s;<br>19.84 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.17562 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-235 | 8-bit, 12-bit | 41 µs to 86 s;<br>14 µs increments | 27 µs to 85.9 s;<br>13.44 µs increments |
| | 16-bit | 50 µs to 86 s;<br>18 µs increments | 31 µs to 85.9 s;<br>17.92 µs increments |
| | 24-bit | 69 µs to 86 s;<br>28 µs increments | 40 µs to 85.9 s;<br>26.88 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.17562 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-319 | 8-bit, 12-bit | 43 µs to 79.4 s;<br>14.6 µs increments | 27 µs to 85.89 s;<br>14.08 µs increments |
| | 16-bit | 52 µs to 79.4 s;<br>19.5 µs increments | 32 µs to 85.89 s;<br>18.72 µs increments |
| | 24-bit | 72 µs to 79.4 s;<br>29.3 µs increments | 41 µs to 85.89 s;<br>28.16 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.17562 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-507 | 8-bit, 12-bit | 48 µs to 85.9 s;<br>17.4 µs increments | 30 µs to 85.9 s;<br>16.64 µs increments |
| | 16-bit | 59 µs to 85.9 s;<br>23.1 µs increments | 35 µs to 85.9 s;<br>22.16 µs increments |
| | 24-bit | 83 µs to 85.9 s;<br>34.7 µs increments | 47 µs to 85.9 s;<br>33.28 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.18110 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-895 | 8-bit, 12-bit | 71 µs to 85.9 s;<br>28.8 µs increments | 42 µs to 85.89 s;<br>27.84 µs increments |
| | 16-bit | 90 µs to 85.9 s;<br>38.3 µs increments | 51 µs to 85.89 s;<br>37.04 µs increments |
| | 24-bit | 129 µs to 85.9 s;<br>57.6 µs increments | 69 µs to 85.89 s;<br>55.68 µs increments |

- Trigger latency values have changed since the last firmware release:

| Models | Pixel formats | Trigger latency Firmware version 01.54.19767 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-040 | 8-bit, 12-bit | 17.28 µs | 16.32 µs |
| | 16-bit | 23.04 µs | 21.84 µs |
| | 24-bit | 34.56 µs | 32.64 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.19767 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-158 | 8-bit, 12-bit | 31.92 µs | 29.76 µs |
| | 16-bit | 42.48 µs | 39.6 µs |
| | 24-bit | 63.84 µs | 59.52 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.17562 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-235 | 8-bit, 12-bit | 42 µs | 40.32 µs |
| | 16-bit | 55.14 µs | 53.76 µs |
| | 24-bit | 84 µs | 80.64 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.17562 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-319 | 8-bit, 12-bit | 44.21 µs | 42.24 µs |
| | 16-bit | 58.65 µs | 56.16 µs |
| | 24-bit | 88.06 µs | 84.48 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.17562 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-507 | 8-bit, 12-bit | 52.3 µs | 49.92 µs |
| | 16-bit | 69.6 µs | 66.48 µs |
| | 24-bit | 104.6 µs | 99.84 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.18110 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-895 | 8-bit, 12-bit | 86.34 µs | 83.52 µs |
| | 16-bit | 114.96 µs | 111.12 µs |
| | 24-bit | 172.68 µs | 167.04 µs |

- Trigger jitter values have changed since the last firmware release.

| Models | Pixel formats | Trigger jitter Firmware version 01.54.19767 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-040 | 8-bit, 12-bit | ±2.88 µs | ±2.72 µs |
| | 16-bit | ±3.84 µs | ±3.64 µs |
| | 24-bit | ±5.76 µs | ±5.44 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.19767 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-158 | 8-bit, 12-bit | ±5.32 µs | ±4.96 µs |
| | 16-bit | ±7.08 µs | ±6.6 µs |
| | 24-bit | ±10.64 µs | ±9.92 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.17562 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-235 | 8-bit, 12-bit | ±7 µs | ±6.72 µs |
| | 16-bit | ±9.2 µs | ± 8.96 µs |
| | 24-bit | ±14 µs | ±13.44 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.17562 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-319 | 8-bit, 12-bit | ±7.3 µs | ±7.04 µs |
| | 16-bit | ±9.75 µs | ±9.36 µs |
| | 24-bit | ±14.65 µs | ±14.08 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.17562 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-507 | 8-bit, 12-bit | ±8.7 µs | ±8.32 µs |
| | 16-bit | ±11.55 µs | ±11.08 µs |
| | 24-bit | ±17.35 µs | ±16.64 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.18110 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-895 | 8-bit, 12-bit | ±14.4 µs | ±13.92 µs |
| | 16-bit | ±19.16 µs | ±18.52 µs |
| | 24-bit | ±28.8 µs | ±27.84 µs |

- Changes to ROI frame rates:

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.19767 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-040 | 728 × 544 (full res.) | 286.0 fps | 286.3 fps |
| | 728 × 480 | 331.9 fps | 328.3 fps |
| | 728 × 360 | 430.7 fps | 420.6 fps |
| | 728 × 180 | 778.5 fps | 792.3 fps |
| | 728 × 120 | 1065.0 fps | 1120.8 fps |
| | 728 × 80 | 1411.4 fps | 1494.3 fps |
| | 728 × 60 | 1684.4 fps | 1784.4 fps |
| | 728 × 40 | 2091.6 fps | 2214.3 fps |
| | 728 × 20 | 2744.5 fps | 2918.0 fps |
| | 728 × 12 | 3156.5 fps | 3342.2 fps |
| | 728 × 4 | 3692.7 fps | 3910.8 fps |

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.19767 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-158 | 1456 × 1088 (full res.) | 75.3 fps | 75.2 fps |
| | 1456 × 1080 | 75.7 fps | 75.6 fps |
| | 1456 × 1024 | 79.8 fps | 79.6 fps |
| | 1456 × 960 | 84.9 fps | 85.2 fps |
| | 1456 × 768 | 105.8 fps | 106.0 fps |
| | 1456 × 600 | 135.2 fps | 134.6 fps |
| | 1456 × 480 | 167.8 fps | 168.3 fps |
| | 1456 × 360 | 221.1 fps | 220.6 fps |
| | 1456 × 180 | 421.4 fps | 420.0 fps |
| | 1456 × 120 | 576.4 fps | 610.9 fps |
| | 1456 × 60 | 912.4 fps | 978.7 fps |
| | 1456 × 20 | 1491.6 fps | 1600.0 fps |
| | 1456 × 4 | 1999.6 fps | 2144.5 fps |

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.17562 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-235 | 1936 × 1216 (full res.) | 50.7 fps | 50.8 fps |
| | 1936 × 1080 | 57.1 fps | 57.0 fps |
| | 1936 × 1024 | 60.1 fps | 60.1 fps (no change) |
| | 1936 × 960 | 64.1 fps | 64.2 fps |
| | 1936 × 768 | 80.2 fps | 79.8 fps |
| | 1936 × 600 | 101.9 fps | 102.0 fps |
| | 1936 × 480 | 127.2 fps | 126.5 fps |
| | 1936 × 360 | 168.4 fps | 166.4 fps |
| | 1936 × 180 | 328.4 fps | 320.7 fps |
| | 1936 × 120 | 454.4 fps | 467.9 fps |
| | 1936 × 60 | 729.9 fps | 751.5 fps |
| | 1936 × 20 | 1224.6 fps | 1261.0 fps |
| | 1936 × 12 | - | 1458.8 fps |
| | 1936 × 4 | - | 1730.1 fps |
| | 1936 × 2 | 1762.1 fps | 1814.5 fps |

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.17562 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-319 | 2064 × 1544 (full res.) | 37.6 fps | 37.6 fps (no change) |
| | 2064 × 1324 | 43.9 fps | 43.8 fps |
| | 2064 × 1280 | 45.3 fps | 45.3 fps (no change) |
| | 2064 × 1024 | 56.6 fps | 56.6 fps (no change) |
| | 2064 × 960 | 60.1 fps | 60.0 fps |
| | 2064 × 768 | 75.2 fps | 75.1 fps |
| | 2064 × 600 | 95.5 fps | 95.4 fps |
| | 2064 × 480 | 119.2 fps | 118.9 fps |
| | 2064 × 360 | 158.5 fps | 158.1 fps |
| | 2064 × 240 | 232.3 fps | 232.1 fps |
| | 2064 × 160 | 346.7 fps | 344.7 fps |
| | 2064 × 80 | 604.5 fps | 628.4 fps |
| | 2064 × 36 | 990.0 fps | 1029.3 fps |
| | 2064 × 12 | 1517 fps | 1578.2 fps |
| | 2064 × 4 | 1517 fps | 1919.3 fps |

| Models | ROI (H × V) | ROI frame rate<br>Firmware version 01.54.17562 | ROI frame rate<br>Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-507 | 2464 × 2056 (full res.) | 23.7 fps | 23.7 fps (no change) |
| | 2464 × 1544 | 31.5 fps | 31.5 fps (no change) |
| | 2464 × 1324 | 36.8 fps | 36.7 fps |
| | 2464 × 1280 | 38.0 fps | 37.9 fps |
| | 2464 × 1024 | 47.4 fps | 47.3 fps |
| | 2464 × 960 | 50.6 fps | 50.4 fps |
| | 2464 × 768 | 62.9 fps | 63.0 fps |
| | 2464 × 600 | 80.7 fps | 80.3 fps |
| | 2464 × 480 | 100.5 fps | 99.8 fps |
| | 2464 × 360 | 133.3 fps | 132.9 fps |
| | 2464 × 240 | 197.9 fps | 196.4 fps |
| | 2464 × 180 | 259.5 fps | 257.9 fps |
| | 2464 × 80 | 509.8 fps | 531.8 fps |
| | 2464 × 40 | 789.1 fps | 823.2 fps |
| | 2464 × 20 | 1280.1 fps | 1133.8 fps |
| | 2464 × 4 | - | 1624.2 fps |
| | 2464 × 2 | 1280.1 fps | - |

| Models | ROI (H × V) | ROI frame rate<br>Firmware version 01.54.18110 | ROI frame rate<br>Firmware version 01.54.20343 |
|---|---|---|---|
| Manta G-895 | 4112 × 2176 (full res.) | 13.4 fps | 13.4 fps (no change) |
| | 4112 × 2048 | 14.3 fps | 14.3 fps (no change) |
| | 4112 × 2000 | 14.6 fps | 14.6 fps (no change) |
| | 4112 × 1600 | 18.3 fps | 18.3 fps (no change) |
| | 4112 × 1280 | 22.8 fps | 22.8 fps (no change) |
| | 4112 × 1200 | 24.4 fps | 24.4 fps (no change) |
| | 4112 × 1024 | 28.5 fps | 28.5 fps (no change) |
| | 4112 × 960 | 30.4 fps | 30.4 fps (no change) |
| | 4112 × 800 | 36.4 fps | 36.4 fps (no change) |
| | 4112 × 768 | 37.9 fps | 37.9 fps (no change) |
| | 4112 × 640 | 45.5 fps | 45.5 fps (no change) |
| | 4112 × 600 | 48.4 fps | 48.4 fps (no change) |
| | 4112 × 480 | 60.4 fps | 60.4 fps (no change) |
| | 4112 × 400 | 72.3 fps | 72.3 fps (no change) |
| | 4112 × 320 | 90.2 fps | 90.3 fps |
| | 4112 × 300 | 96.2 fps | 96.0 fps |
| | 4112 × 240 | 119.7 fps | 119.0 fps |
| | 4112 × 120 | 224.0 fps | 231.7 fps |
| | 4112 × 60 | 365.5 fps | 378.1 fps |
| | 4112 × 32 | 518.2 fps | 536.1 fps |
| | 4112 × 23 | 738.8 fps | 764.2 fps |
| | 4112 × 4 | 890.3 fps | 921.0 fps |

## Resolved issues

- Auto-exposure does not work when gain is not zero
- Gain will stay within `GainAutoMin` and `GainAutoMax` in auto modes

### Known issues

`Gain` feature should be set to zero when using `ExposureAuto` and `GainAuto` features together. Otherwise exposure value could remain constant.

## FW 01.54.21000

Document release date: 2019-Jan-31

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-040, G-158, G-234, G-319, G-507 | 01.54.21000 |

### New features and enhancements

- Added IEEE 1588-2008 Precision Time Protocol
- Added Trigger over Ethernet Action Commands
- Improved FPGA timing for improved camera reliability
- Increased frame rates:

| Models | Frame rate at full resolution Firmware version 01.54.18318 | | Frame rate at full resolution Firmware version 01.54.21000 | |
|---|---|---|---|---|
| | 12-bit readout | 10-bit readout | 12-bit readout | 10-bit readout |
| Mako G-234 | 31.8 fps | 41.2 fps | 32.3 fps | 41.5 fps |

| Models | Frame rate at full resolution Firmware version 01.54.18914 | Frame rate at full resolution Firmware version 01.54.21000 |
|---|---|---|
| Mako G-319 | 37.5 fps<br>- | 37.6 fps<br>39.5 fps (burst mode) |

| Models | Frame rate at full resolution Firmware version 01.54.18914 | Frame rate at full resolution Firmware version 01.54.21000 |
|---|---|---|
| Mako G-507 | 23.7 fps<br>- | 23.7 fps (no change)<br>25.3 fps (burst mode) |

- Exposure minimum values and increments have changed since the last firmware release:

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.18318 | | Exposure range and increment Firmware version 01.54.21000 | |
|---|---|---|---|---|---|
| | | 12-bit readout | 10-bit readout | 12-bit readout | 10-bit readout |
| Mako G-234 | 8-bit, 12-bit, 16-bit | 63 µs to 71 s; 25 µs increments | 52 µs to 71 s; 19.3 µs increments | 38 µs to 85.9 s; 24.64 µs increments | 32 µs to 71.6 s; 19.2 µs increments |
| | 24-bit | 113 µs to 71 s; 50 µs increments | 91 µs to 71 s; 38.6 µs increments | 63 µs to 85.9 s; 49.28 µs increments | 52 µs to 71.6 s; 38.4 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.18914 | Exposure range and increment Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-319 | 8-bit, 12-bit | 46 µs to 85.9 s;<br>16.5 µs increments | 29 µs to 85.9 s;<br>16 µs increments |
| | 16-bit | 57 µs to 85.9 s;<br>21.9 µs increments | 35 µs to 85.9 s;<br>21.28 µs increments |
| | 24-bit | 79 µs to 85.9 s;<br>32.9 µs increments | 45 µs to 85.9 s;<br>32 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.18914 | Exposure range and increment Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-507 | 8-bit, 12-bit | 52 µs to 85.9 s;<br>19.5 µs increments | 32 µs to 85.9 s;<br>18.88 µs increments |
| | 16-bit | 65 µs to 85.9 s;<br>26 µs increments | 38 µs to 85.9 s;<br>25.12 µs increments |
| | 24-bit | 91 µs to 85.9 s;<br>39.0 µs increments | 51 µs to 85.9 s;<br>37.76 µs increments |

- Trigger latency values have changed since the last firmware release:

| Models | Pixel formats | Trigger latency Firmware version 01.54.18318 | | Trigger latency Firmware version 01.54.21000 | |
|---|---|---|---|---|---|
| | | 12-bit readout | 10-bit readout | 12-bit readout | 10-bit readout |
| Mako G-234 | 8-bit, 12-bit, 16-bit | 75.6 µs | 58.2 µs | 73.92 µs | 57.6 µs |
| | 24-bit | 151.2 µs | 116.4 µs | 147.84 µs | 115.2 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.18914 | Trigger latency Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-319 | 8-bit, 12-bit | 49.4 µs | 48 µs |
| | 16-bit | 65.8 µs | 63.84 µs |
| | 24-bit | 98.9 µs | 96 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.18914 | Trigger latency Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-507 | 8-bit, 12-bit | 58.6 µs | 56.64 µs |
| | 16-bit | 78 µs | 75.36 µs |
| | 24-bit | 117.1 µs | 113.28 µs |

- Trigger jitter values have changed since the last firmware release:

| Models | Pixel formats | Trigger jitter Firmware version 01.54.18318 | | Trigger jitter Firmware version 01.54.21000 | |
|---|---|---|---|---|---|
| | | 12-bit readout | 10-bit readout | 12-bit readout | 10-bit readout |
| Mako G-234 | 8-bit, 12-bit, 16-bit | ±12.5 µs | ±9.6 µs | ±12.32 µs | ±9.6 µs |
| | 24-bit | ±25.0 µs | ±19.3 µs | ±24.64 µs | ±19.2 µs |

| Models | Pixel formats | Trigger jitter<br>Firmware version 01.54.18914 | Trigger jitter<br>Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-319 | 8-bit, 12-bit | ±8.1 µs | ±8 µs |
| | 16-bit | ±10.9 µs | ±10.64 µs |
| | 24-bit | ±16.5 µs | ±16 µs |

| Models | Pixel formats | Trigger jitter<br>Firmware version 01.54.18914 | Trigger jitter<br>Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-507 | 8-bit, 12-bit | ±9.8 µs | ±9.44 µs |
| | 16-bit | ±13 µs | ±12.56 µs |
| | 24-bit | ±19.5 µs | ±18.88 µs |

- Changes to ROI frame rates:.

| Models | ROI (H × V) | ROI frame rate<br>Firmware version 01.54.18318 | | ROI frame rate<br>Firmware version 01.54.21000 | |
|---|---|---|---|---|---|
| | | 12-bit readout | 10-bit readout | 12-bit readout | 10-bit readout |
| Mako G-234 | 1936 × 1216 (full res.) | 31.8 fps | 41.2 fps | 32.3 fps | 41.5 fps |
| | 1936 × 1080 | 35.7 fps | 46.2 fps | 36.3 fps | 46.5 fps |
| | 1936 × 1024 | 37.6 fps | 48.6 fps | 38.2 fps | 49.0 fps |
| | 1936 × 960 | 40.0 fps | 51.7 fps | 40.6 fps | 52.1 fps |
| | 1936 × 768 | 49.5 fps | 64.0 fps | 50.3 fps | 64.5 fps |
| | 1936 × 600 | 62.5 fps | 80.9 fps | 63.5 fps | 81.5 fps |
| | 1936 × 480 | 77.0 fps | 99.6 fps | 78.2 fps | 100.3 fps |
| | 1936 × 200 | 167.3 fps | 216.4 fps | 169.8 fps | 217.9 fps |
| | 1936 × 100 | 287.7 fps | 372.1 fps | 292.0 fps | 374.7 fps |
| | 1936 × 50 | 449.4 fps | 581.1 fps | 456.0 fps | 585.2 fps |
| | 1936 × 20 | 677.9 fps | 876.6 fps | 687.8 fps | 882.8 fps |
| | 1936 × 12 | - | - | 795.7 fps | 1021.2 fps |
| | 1936 × 10 | 813.3 fps | 1055.6 fps | - | - |
| | 1936 × 4 | - | - | 943.7 fps | 1211.2 fps |
| | 1936 × 2 | - | - | 989.8 fps | 1270.3 fps |

| Models | ROI (H × V) | ROI frame rate<br>Firmware version 01.54.18914 | ROI frame rate<br>Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-319 | 2064 × 1544 (full res.) | 37.5 fps | 37.6 fps |
| | 2064 × 1280 | 45.3 fps | 45.2 fps |
| | 2064 × 1024 | 56.5 fps | 56.5 fps (no change) |
| | 2064 × 800 | 71.9 fps | 71.9 fps (no change) |
| | 2064 × 600 | 95.4 fps | 95.4 fps (no change) |
| | 2064 × 400 | 140.1 fps | 141.4 fps |
| | 2064 × 300 | 182.2 fps | 187.7 fps |
| | 2064 × 120 | 396.5 fps | 408.5 fps |
| | 2064 × 60 | 652.4 fps | 672.0 fps |
| | 2064 × 20 | 1144.8 fps | 1179.2 fps |
| | 2064 × 12 | - | 1388.9 fps |
| | 2064 × 10 | 1348.4 fps | - |
| | 2064 × 4 | - | 1889.2 fps |

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.18914 | ROI frame rate Firmware version 01.54.21000 |
|---|---|---|---|
| Mako G-507 | 2464 × 2056 (full res.) | 23.7 fps | 23.7 fps (no change) |
| | 2464 × 1544 | 31.5 fps | 31.5 fps (no change) |
| | 2464 × 1324 | 36.8 fps | 36.8 fps (no change) |
| | 2464 × 1280 | 38.0 fps | 38.0 fps (no change) |
| | 2464 × 1024 | 47.4 fps | 47.4 fps (no change) |
| | 2464 × 960 | 50.6 fps | 50.6 fps (no change) |
| | 2464 × 768 | 62.9 fps | 62.9 fps (no change) |
| | 2464 × 600 | 80.5 fps | 80.6 fps |
| | 2464 × 480 | 99.9 fps | 100.3 fps |
| | 2464 × 360 | 130.4 fps | 133.0 fps |
| | 2464 × 240 | 187.7 fps | 194.0 fps |
| | 2464 × 180 | 240.5 fps | 248.7 fps |
| | 2464 × 80 | 453.4 fps | 468.7 fps |
| | 2464 × 40 | 701.8 fps | 725.5 fps |
| | 2464 × 20 | 996.6 fps | 999.3 fps |
| | 2464 × 4 | 1384.5 fps | 1431.4 fps |

### Resolved issues

- Mako restrain Heartbeat Acknowledge
- Auto-exposure does not work when gain is not zero
- Gain will stay within `GainAutoMin` and `GainAutoMax` in auto modes

## FW 01.54.20700

Document release date: 2019-Jan-31

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-131, G-192, G-503 | 01.54.20700 |

### Resolved issues

Host/camera connection timeout issue

# FW 01.54.20443

Document release date: 2019-Jan-31

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT4090, GT4096, GT5120 | 01.54.20443 |

## New features and enhancements

Improved exposure time control:

| | Exposure range and increment<br>Firmware version 01.54.19199 | Exposure range and increment<br>Firmware version 01.54.20443 |
|---|---|---|
| Exposure Time Control | 100 µs to 1 s; 1 µs increments | 1 µs to 1 s; 1 µs increments |

# FW 01.54.20343

Document release date: 2019-Jan-31

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1930, GT1930L, GT2460 | 01.54.20343 |

## New features and enhancements

- Improved FPGA timing for improved camera reliability
- Increased frame rates:

| Models | Frame rate at full resolution<br>Firmware version 01.54.17562 | Frame rate at full resolution<br>Firmware version 01.54.20343 |
|---|---|---|
| Prosilica GT1930, GT1930L | 50.7 fps<br>55.8 fps (burst mode) | 50.8 fps<br>59.2 fps (burst mode) |

| Models | Frame rate at full resolution<br>Firmware version 01.54.17562 | Frame rate at full resolution<br>Firmware version 01.54.20343 |
|---|---|---|
| Prosilica GT2460 | 23.7 fps<br>27.4 fps (burst mode) | 23.7 fps (no change)<br>28.7 fps (burst mode) |

- Exposure minimum values and increments have changed since the last firmware release:

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.17562 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT1930, GT1930L | 8-bit, 12-bit | 42 µs to 88 s | 27 µs to 85.9 s;<br>13.44 µs increments |
| | 16-bit | 28 µs to 88 s;<br>14 µs increments | 31 µs to 85.9 s;<br>17.92 µs increments |
| | 24-bit | 56 µs to 88 s;<br>28 µs increments | 40 µs to 85.9 s;<br>26.88 µs increments |

| Models | Pixel formats | Exposure range and increment Firmware version 01.54.19214 | Exposure range and increment Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT2460 | 8-bit, 12-bit | 48 µs to 85.9 s;<br>17.44 µs increments | 30 µs to 85.9 s;<br>16.64 µs increments |
| | 16-bit | 60 µs to 85.9 s;<br>23.2 µs increments | 35 µs to 85.9 s;<br>22.16 µs increments |
| | 24-bit | 83 µs to 85.9 s;<br>34.88 µs increments | 47 µs to 85.9 s;<br>33.28 µs increments |

- Trigger latency values have changed since the last firmware release:

| Models | Pixel formats | Trigger latency Firmware version 01.54.17562 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT1930, GT1930L | 8-bit, 12-bit | 50.1 µs | 40.32 µs |
| | 16-bit | - | 53.76 µs |
| | 24-bit | - | 80.64 µs |

| Models | Pixel formats | Trigger latency Firmware version 01.54.19214 | Trigger latency Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT2460 | 8-bit, 12-bit | 52.3 µs | 49.92 µs |
| | 16-bit | 69.6 µs | 66.48 µs |
| | 24-bit | 104.6 µs | 99.84 µs |

- Trigger jitter values have changed since the last firmware release:

| Models | Pixel formats | Trigger jitter Firmware version 01.54.17562 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT1930, GT1930L | 8-bit, 12-bit | ±7.2 µs | ±6.72 µs |
| | 16-bit | - | ±8.96 µs |
| | 24-bit | - | ±13.44 µs |

| Models | Pixel formats | Trigger jitter Firmware version 01.54.19214 | Trigger jitter Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT2460 | 8-bit, 12-bit | ±8.72 µs | ±8.32 µs |
| | 16-bit | ±11.6 µs | ±11.08 µs |
| | 24-bit | ±17.44 µs | ±16.64 µs |

- Changes to ROI frame rates:

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.17562 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT1930, GT1930L | 1936 × 1216 (full res.) | 50.7 fps | 50.8 fps |
| | 1936 × 1200 | 51.4 fps | - |
| | 1936 × 1080 | 57.0 fps | 57.0 fps (no change) |
| | 1936 × 1024 | 60.0 fps | 60.1 fps |
| | 1936 × 960 | 64.0 fps | 64.2 fps |
| | 1936 × 768 | 80.1 fps | 79.8 fps |
| | 1936 × 600 | 102.0 fps | 102.0 fps (no change) |
| | 1936 × 480 | 126.9 fps | 126.5 fps |
| | 1936 × 360 | - | 166.4 fps |
| | 1936 × 180 | - | 320.7 fps |
| | 1936 × 120 | - | 467.9 fps |
| | 1936 × 100 | 503.6 fps | - |
| | 1936 × 60 | - | 751.5 fps |
| | 1936 × 50 | 787.0 fps | - |
| | 1936 × 20 | 1187.2 fps | 1261.0 fps |
| | 1936 × 12 | - | 1458.8 fps |
| | 1936 × 10 | 1429.4 fps | - |
| | 1936 × 4 | - | 1730.1 fps |
| | 1936 × 2 | - | 1814.5 fps |

| Models | ROI (H × V) | ROI frame rate Firmware version 01.54.19214 | ROI frame rate Firmware version 01.54.20343 |
|---|---|---|---|
| Prosilica GT2460 | 2464 × 2056 (full res.) | 23.7 fps | 23.7 fps (no change) |
| | 2464 × 1544 | 31.5 fps | 31.5 fps (no change) |
| | 2464 × 1324 | 36.7 fps | 36.7 fps (no change) |
| | 2464 × 1280 | 37.9 fps | 37.9 fps (no change) |
| | 2464 × 1024 | 47.4 fps | 47.3 fps |
| | 2464 × 960 | 50.5 fps | 50.4 fps |
| | 2464 × 768 | 63.0 fps | 63.0 fps (no change) |
| | 2464 × 600 | 80.3 fps | 80.3 fps (no change) |
| | 2464 × 480 | 99.7 fps | 99.8 fps |
| | 2464 × 360 | 133.3 fps | 132.9 fps |
| | 2464 × 240 | 196.3 fps | 196.4 fps |
| | 2464 × 180 | 258.3 fps | 257.9 fps |
| | 2464 × 80 | 507.4 fps | 531.8 fps |
| | 2464 × 40 | 785.4 fps | 823.2 fps |
| | 2464 × 20 | 1081.9 fps | 1133.8 fps |
| | 2464 × 4 | 1549.7 fps | 1624.2 fps |

# FW 01.54.20339

Document release date: 2018-Jul-11

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-040, G-158 | 01.54.20339 |

## New models

Initial commercial release of Mako G-040B, G-040C,G-158B, and G-158C models

# FW 01.54.19214

Document release date: 2018-May-01

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT2460 | 01.54.19214 |

## New models

Initial commercial release of Prosilica GT2460, GT2460C (order code 02-xxxx and 06-xxxx)

# FW 01.54.20072

Document release date: 2018-Mar-07

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-1236 | 01.54.20072 |

## New features and enhancements

- Improved FPGA timing for improved camera reliability
- Improved burst mode frame rate:

| | Burst mode frame rate<br>Firmware version 01.54.18183 | Burst mode frame rate<br>Firmware version 01.54.20072 |
|---|---|---|
| Burst mode frame rate | 11.4 fps | 11.8 fps |

- Exposure minimum values and increments have changed since the last firmware release:.

| Pixel formats | Exposure range and increment<br>Firmware version 01.54.18183 | Exposure range and increment<br>Firmware version 01.54.20072 |
|---|---|---|
| 8-bit and 12-bit formats | 71 µs to 85.89 s; 28.8 µs increments | 42 µs to 85.89 s;<br>27.84 µs increments |
| 16-bit formats | 90 µs to 85.89 s; 38.32 µs increments | 51 µs to 85.89 s; 3<br>7.04 µs increments |
| 24-bit formats | 129 µs to 85.89 s; 57.6 µs increments | 69 µs to 85.89 s;<br>55.68 µs increments |

- Trigger latency values have changed since the last firmware release:.

| Pixel formats | Trigger latency<br>Firmware version 01.54.18183 | Trigger latency<br>Firmware version 01.54.20072 |
|---|---|---|
| 8-bit and 12-bit formats | 86.4 µs | 83.52 µs |
| 16-bit formats | 114.95 µs | 111.12 µs |
| 24-bit formats | 172.8 µs | 167.04 µs |

- Trigger jitter values have changed since the last firmware release:.

| Pixel formats | Trigger jitter<br>Firmware version 01.54.18183 | Trigger jitter<br>Firmware version 01.54.20072 |
|---|---|---|
| 8-bit and 12-bit formats | ±14.4 µs | ±13.92 µs |
| 16-bit formats | ±19.16 µs | ±18.52 µs |
| 24-bit formats | ±28.8 µs | ±27.84 µs |

- Changes to ROI frame rates:.

| ROI (H × V) | ROI frame rate<br>Firmware version 01.54.18183 | ROI frame rate<br>Firmware version 01.54.20072 |
|---|---|---|
| 4112 × 3008 | 9.73 fps | 9.73 fps (no change) |
| 4112 × 3000 | 9.76 fps | 9.76 fps (no change) |
| 4112 × 2800 | 10.46 fps | 10.46 fps (no change) |
| 4112 × 2560 | 11.43 fps | 11.43 fps (no change) |
| 4112 × 2400 | 12.2 fps | 12.2 fps (no change) |
| 4112 × 2048 | 14.3 fps | 14.3 fps (no change) |
| 4112 × 2000 | 14.6 fps | 14.6 fps (no change) |
| 4112 × 1600 | 18.3 fps | 18.3 fps (no change) |
| 4112 × 1280 | 22.8 fps | 22.8 fps (no change) |
| 4112 × 1200 | 24.4 fps | 24.3 |
| 4112 × 1024 | 28.5 fps | 28.5 fps (no change) |
| 4112 × 960 | 30.4 fps | 30.4 fps (no change) |
| 4112 × 800 | 36.4 fps | 36.4 fps (no change) |
| 4112 × 768 | 37.9 fps | 37.9 fps (no change) |
| 4112 × 640 | 45.5 fps | 45.5 fps (no change) |
| 4112 × 600 | 48.4 fps | 48.4 fps (no change) |
| 4112 × 480 | 60.4 fps | 60.4 fps (no change) |
| 4112 × 400 | 72.3 fps | 72.3 fps (no change) |
| 4112 × 320 | 90.2 fps | 90.2 fps (no change) |
| 4112 × 300 | 96.2 fps | 96.0 |
| 4112 × 240 | 119.7 fps | 118.9 |
| 4112 × 120 | 224.0 fps | 231.7 |
| 4112 × 60 | 365.5 fps | 378.1 |
| 4112 × 32 | 518.2 fps | 536.1 |
| 4112 × 12 | 738.8 fps | 764.2 |
| 4112 × 4 | 890.3 fps | 921.0 |

### Known issues

`Gain` feature should be set to zero when using `ExposureAuto` and `GainAuto` features together. Otherwise exposure value could remain constant.

## FW 01.54.19767

Document release date: 2018-Jan-31

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-040, G-158 | 01.54.19767 |

### New models

Initial commercial release of Manta G-040B, G-040C, G-158B, G-158C (order code E00xxxx and E06xxxx)

# FW 01.54.19654

Document release date: 2017-Dec-15

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC660, GC1290, GC1380H, GC1600H | 01.54.19654 |

## New models

Initial commercial release of Prosilica GC660, GC660C, GC1290, GC1290C, GC1380H, GC1380CH, GC1600H, GC1600CH (order code 06-xxxx)

## New features and enhancements

Improved FPGA timing for improved camera reliability (order code 02-xxxx only)

## Changes

- Exposure minimum and exposure maximum values have changed since the last firmware release (order code 02-xxxx only):.

| Models | Exposure range and increment Firmware version 01.54.16528 | Exposure range and increment Firmware version 01.54.19654 |
|---|---|---|
| GC660 | 10 µs to 72.4 s; 1 µs increments | 10 µs to 72.9 s; 1 µs increments |
| GC1290 | 12 µs to 72.9 s; 1 µs increments | 12 µs to 72.4 s; 1 µs increments |
| GC1380H | 10 µs to 72.4 s; 1 µs increments | 10 µs to 72.9 s; 1 µs increments |

- Gain maximum values have changed since the last firmware release (order code 02-xxxx only):.

| Models | Gain range and increments Firmware version 01.54.16528 | Gain range and increments Firmware version 01.54.19654 |
|---|---|---|
| GC1600H | 0 to 32 dB; 1 dB increments | 10 to 30 dB; 1 dB increments |

# FW 01.54.19678

Document release date: 2017-Dec-15

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC2450 | 01.54.19678 |

## New models

Initial commercial release of Prosilica GC2450 and GC2450C (order code 06-xxxx)

## New features and enhancements

Improved FPGA timing for improved camera reliability (order code 02-xxxx only)

### Changes

- Exposure minimum and exposure maximum values have changed since the last firmware release (order code 02-xxxx only):.

| Models | Exposure range and increment Firmware version 01.54.16528 | Exposure range and increment Firmware version 01.54.19678 |
|---|---|---|
| GC2450 | 49 µs to 38.0 s; 1 µs increments | 10 µs to 48.0 s; 1 µs increments |

- Gain maximum values have changed since the last firmware release (order code 02-xxxx only):.

| Models | Gain range and increment Firmware version 01.54.16528 | Gain range and increment Firmware version 01.54.19678 |
|---|---|---|
| GC2450 | 0 to 32 dB; 1 dB increments | 10 to 24 dB; 1 dB increments |

## FW 01.54.18914

Document release date: 2017-Aug-18

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-319, G-507 | 01.54.18914 |

### New features and enhancements

Improved FPGA timing for improved camera reliability

## FW 01.54.19199

Document release date: 2017-Aug-04

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT4090, GT4096, GT5120 | 01.54.19199 |

### New models

Initial commercial release of Prosilica GT4090, GT4090NIR, GT4096, GT4096NIR, GT5120, GT5120NIR (order code 02-xxxx and 06-xxxx)

### New features and enhancements

- Fixed Pattern Noise Correction (FPNC)
- Enhanced Defect Pixel Correction (DPC) feature with a new **Defective Pixel List Management** tool

# FW 01.54.18836

Document release date: 2017-May-02

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-131, G-192 | 01.54.18836 |

## Resolved issues

Mako G-131B, G-131C, G-192B, G-192C loses connection after setting the `TriggerSource` to *`Line1`* and then stopping acquisition.

# FW 01.54.18318

Document release date: 2017-May-02

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-234 | 01.54.18318 |

## New features and enhancements

Improved FPGA timing for improved camera reliability.

# FW 01.54.18391

Document release date: 2017-Mar-13

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-030, G-223, G-419 | 01.54.18391 |

## New models

Initial commercial release of Mako G-030B, G-030C, G-223B, G-223B NIR, G-223C (order code E06xxxxx)

## New features and enhancements

- Improved registry
- `DeviceUserID` is now accessible via the **Vimba** user interface
- Piecewise Linear (HDR) mode

## Resolved issues

- GVCP command drop (no Ack)
- Camera no longer ignores ARP message responses sent to IP Address 0.0.0.0 if that is the camera's current IP address (which it is on power-up)

# FW 01.54.18110

Document release date: 2017-Feb-10

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-131, G-192, G-503 | 01.54.18110 |

## New features and enhancements

- Improved registry
- `DeviceUserID` is now accessible via the **Vimba** user interface

## Resolved issues

- GVCP command drop (no Ack)
- Camera no longer ignores ARP message responses sent to IP Address 0.0.0.0 if that is the camera's current IP address (which it is on power-up)
- Black stripe on top of the image in Mako G-503B

## Limitations

- Mako G-503B, G-503C catches two frames with one software trigger
- Mako G-131B, G-131C, G-192B, G-192C loses connection after setting the `TriggerSource` to *`Line1`* and then stopping acquisition

# FW 01.54.18163

Document release date: 2017-Jan-27

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-223, G-419 | 01.54.18163 |
| Prosilica GT | GT2000, GT2050 | 01.54.18163 |

## New features and enhancements

- ToE Action Commands feature
- Piecewise Linear (HDR) mode
- Improved registry
- `DecimationHorizontal` and `DecimationVertical`
- `ReverseX` and `ReverseY`
- `DeviceUserID` is now accessible via the **Vimba** user interface
- IEEE 1588-2008 Precision Time Protocol enhancements
  - `PtpStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Initializing(0)`*, *`Faulty(1)`*, *`Disabled(2)`*, *`Listening(3)`*, *`PreMaster(4)`*, *`Master(5)`*, *`Passive(6)`*, *`Uncalibrated(7)`*, *`Slave(8)`*

- `GevTimestampValue` is no longer reset by turning off PTP
- Acquisition is no longer stopped when changing `PtpMode`
- `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`Off`*
- `EventPtpSyncLost` now sent when `PtpMode` changed
- `PtpMode` is no longer set to *`Off`* when PTP synchronization is lost
- `PtpMode Auto` now correctly finds best master clock
- PTP synchronization drift lessened

- New event added: `ExposureStart` (ID 40019)

# FW 01.54.18184

Document release date: 2016-Dec-16

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-1236 | 01.54.18184 |

## New models

Initial commercial release of Manta G-1236B, G-1236C (order code E00xxxx and E06xxxxx)

# FW 01.44.18241

Document release date: 2016-Dec-16

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-125, G-145, G-145-30fps, G-146, G-201, G-201-30fps, G-504 | 01.44.18241 |

## New models

Initial commercial release of Manta G-031B, G-031C, G-032B, G-032C, G-033B, G-033C, G-125B, G-125C, G-145B, G-145B-30fps, G-145B NIR, G-145C, G-145C-30fps, G-201B, G-201B-30fps, G-201C, G-201C-30fps, G-504B, G-504C (order code E06xxxxx only)

## New features and enhancements

Added `ReverseX` to monochrome models (Manta G-031B, G-033B, G-046, G-125B, G-146B, G-201B, G-201B-30fps, G-504B). Previously only Manta G-145B, G-145B-30fps, and G-145B NIR had this feature.

## Resolved issues

- BayerGR12Packed pixel format changed to BayerRG12Packed
- Chunk data displayed is from the previous frame.
- `AutoExposureOnce` does not work if `ExposureTimeAbs` is set to a value less than 100 µs before imaging.

- When `BinningVertical` > *8* using a packed pixel format, the camera stops responding and requires a power cycle to continue streaming (Manta G-504C).

### Limitations

- Manta G-032B: `ReverseX` is not supported
- Manta G-145: Enabling `Binning` with `OffsetY` > 0 stops camera streaming
- Manta G-201-30fps: When selecting an Region of Interest, only even `OffsetX` or `OffsetY` numbers are supported.

## FW 01.44.18241

Document release date: 2016-Dec-02

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-046, G-146 | 01.44.18241 |

### New models

Initial commercial release of Manta G-046B, G-046C, G-146B, G-146C (order code E06xxxxx only)

## FW 01.44.18182, 01.52.18193, 01.54.18110

Document release date: 2016-Nov-25

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-895 | 01.54.18110 |
| Manta | G-223, G-419 | 01.52.18193 |
| Prosilica GT | GT2000, GT2050 | 01.52.18193 |
| Manta | G-031, G-033, G-145 | 01.44.18182 |

### New models

- Initial commercial release of Manta G-895B, G-895C (order code E00xxxx and E06xxxxx)
- Initial commercial release of Manta G-223B, G-223B NIR, G-223C, G-419B, G-419B NIR, G-419C (order code E06xxxxx only)
- Initial commercial release of Prosilica GT2000, GT2000NIR, GT2000C, GT2050, GT2050NIR, GT2050C (order code 06-xxxx only)
- Initial commercial release of Manta G-031B, G-031C, G-033B, G-033C, G-145B, G-145C (order code E06xxxxx only)

# FW 01.44.18182

Document release date: 2016-Nov-17

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-032, G-125, G-201, G-504 | 01.44.18182 |

## New models

Initial commercial release of Manta G-032B, G-032C, G-201B, G-201C, G-125B, G-125C, G-504B, G-504C (order code E06xxxxx only)

# FW 01.54.18110

Document release date: 2016-Nov-02

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-319 | 01.54.18110 |

## New models

Initial commercial release of Mako G-319B, G-319C (order code xxxx and xxxx-06)

## Limitations

The Mako G-319C does not support `BinningY`

# FW 01.54.17933

Document release date: 2016-Oct-21

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-032, G-125 | 01.54.17933 |

## New models

Initial commercial release of Mako G-032B, G-032C, G-125B, G-125C (order code xxxx-06 only)

## New features and enhancements

Improved registry

# FW 01.54.18032

Document release date: 2016-Oct-07

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-234, G-507 | 01.54.18032 |

## New models

- Initial commercial release of Mako G-507B, G-507C (order code xxxx and xxxx-06)
- Initial commercial release of Mako G-234B, G-234C (order code xxxx-06 only)

## New features and enhancements

- Improved registry
- `DeviceUserID` is now accessible via the **Vimba** user interface
- Exposure related enhancements
  - When `ExposureMode` = ***`Timed`***: Improved accuracy in exposure calculation with deviation < 1 µs, exposure calculation takes into account exposure time error (`tOFFSET`)
  - Partial Fix: When `ExposureMode` = ***`TriggerWidth`***, you will see improved accuracy in exposure calculation with deviation ≤ one `ExposureTimeIncrement`, For a given trigger pulse width, effective exposure duration will be trigger pulse width plus exposure time error (`tOFFSET`)



Exposure time error (`tOFFSET`) = 13.73 µs from Sony IMX249, IMX264, and IMX265 data sheets.

- Added support for sensor readout mode in Mako G-234B and G-234C models
  - This allows you to choose between 10-bit and 12-bit (default) sensor readout. 10-bit sensor readout can achieve relatively higher frame rates, especially 8-bit pixel formats and also in a small Region of Interest.

## Changes

- Frame rates, exposure minimum, exposure maximum values, `ExposureTimeIncrement`, trigger jitter and trigger latency values are updated for Mako G-234B and G-234C:

| Specification | Firmware version 01.54.15954 | Firmware version 01.54.18032 |
|---|---|---|
| Maximum frame rate | 40 fps | 41.2 fps |
| Exposure control | 53 µs to 73 s;<br>19.86 µs increments | 52 µs to 71 s;<br>19.3 µs increments |
| Trigger latency | 69.6 µs | 58.2 µs |
| Trigger Jitter | ±9.8 µs | ±9.6 µs |
| Values in this table reflect 8-bit pixel formats (Mono8 and BayerRG8) and 10-bit sensor readout mode at full resolution. | | |

*Table 2: Timing values for Mako G-234B and 234C*

### Resolved issues

- GVCP command drop (no Ack)
- In auto gain and auto exposure, current value will stay within the range in accordance to minimum and maximum value changes
- Camera no longer ignores ARP message responses sent to IP Address 0.0.0.0 if that is the camera's current IP address (which it is on power-up).
- White flicker at minimum exposure and maximum gain no longer occurs.
- When `ReverseX` is enabled, changing the pixel format to YUV format will keep `Width` less than `WidthMax`.

### Limitations

- Pixel format, binning, and decimation are changeable only when the camera is not streaming.
- The Mako G-507C does not support `BinningY`

## FW 01.52.17702

Document release date: 2016-Aug-12

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-419 | 01.52.17702 |

### New models

Initial commercial release of Mako G-419B, G-419B NIR, G-419C (order code xxxx-06 only)

## FW 01.54.17624

Document release date: 2016-Aug-12

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-282, G-283, G-505, G-917 | 01.54.17624 |

### New models

Initial commercial release of Manta G-282B, G-282C, G-283B, G-283C, G-505B, G-505C, G-917B, G-917C standard and board level models (order code E06xxxxx only)

### New features and enhancements

- Consolidated firmware update for Manta dual-tap cameras
- Improved registry
- `DeviceUserID` is now accessible via the **Vimba** user interface
- Selectable mode of sensor digitization taps (one-tap or two-tap mode), except Manta G-505B, G505C
- ToE Action Commands feature

- Binning
  - Changed the maximum **BinningX** and **BinningY** value to **4** for Manta G-505B, G-505C
- Added **ReverseX** to all color models
- Temperature readout for sensor board (see Limitations)
- IEEE 1588-2008 Precision Time Protocol enhancements
  - **PtpStatus** enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *Initializing(0)*, *Faulty(1)*, *Disabled(2)*, *Listening(3)*, *PreMaster(4)*, *Master(5)*, *Passive(6)*, *Uncalibrated(7)*, *Slave(8)*
  - **GevTimestampValue** is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing **PtpMode**
  - **PtpAcquisitionGateTime** now reset to zero when **PtpMode** is set to *Off*
  - **EventPtpSyncLost** now sent when **PtpMode** changed
  - **PtpMode** is no longer set to *Off* when PTP synchronization is lost
  - **PtpMode Auto** now correctly finds best master clock
  - PTP synchronization drift lessened
- New event added: **ExposureStart** (ID 40019)

## Resolved issues

- GVCP command drop (no Ack)
- In auto gain and auto exposure, current value will stay within the range in accordance to minimum and maximum value changes
- When **ReverseX** is enabled, changing the pixel format to YUV format will keep **Width** less than **WidthMax**.

## Limitations

- Pixel format, binning, and decimation are changeable only when the camera is not streaming
- IEEE 1588-2008 Precision Time Protocol related limitations
  - PTP in this firmware version has many improvements, some of which cause PTP incompatibility issues with cameras running older firmware versions.
  - When using PTP in a network with cameras running a mix of older and newer PTP firmware, **PtpMode** = *Auto* can not be used, and the master camera (camera with **PtpMode** = *Master*) must be a camera running the newer firmware version.
  - To take full advantage of the latest PTP resolved issues and improvements, it is recommended to upgrade the firmware of the listed supported models.
- The temperature readout for the sensor board does not work as expected. When selected, the temperature is the main board temperature.

# FW 01.54.17562

Document release date: 2016-Aug-12

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1290, GT1380, GT1600, GT1660, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300,GT3400, GT4905, GT4907, GT6600 | 01.54.17562 |

## New models

Initial commercial release of Prosilica GT1290, GT1290C, GT1380, GT1380C, GT1600, GT1600C, GT1660, GT1660C, GT1910, GT1910C, GT1920, GT1920C, GT2300, GT2300C, GT2450, GT2450C, GT2750, GT2750C, GT3300, GT3300C, GT3400, GT3400C, GT4905, GT4905C, GT4907, GT4907C, GT6600, GT6600C (order code 06-xxxxx only)

## New features and enhancements

- Trigger over Ethernet (ToE) Action Commands feature
- Prosilica GT2450 and GT2450C
  - Aligned features with FW 01.54.16845

## Limitations

- Black level control is not available for all Prosilica GT CCD cameras
- The following features are not implemented in Prosilica GT quad-tap CCD cameras in single-tap mode:
  - `DecimationHorizontal`
  - `DecimationVertical`
  - `ReverseX`
  - `ReverseY`
- Look-up Tables may have different behaviors for different cameras
- No iris, exposure, gain selectable auto priority
- Dual-tap and single-tap cameras do not support column defect masking
- Tap mode switchability is not supported for Prosilica GT2450, GT2450C
- The following feature is not implemented in dual-tap CCD cameras due to sensor limitations:
  - `ReverseY` (Prosilica GT2450, GT2450C)
- The following features are not implemented in single-tap CCD cameras due to sensor limitations:
  - `ReverseX`, `ReverseY` (Prosilica GT1290, GT1290C, GT1380, GT1380C, GT1600, GT1600C)

# FW 01.54.17562

Document release date: 2016-Jul-06

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1930, GT1930L | 01.54.17562 |
| Manta | G-235, G-319, G-507 | 01.54.17562 |

## New models

- Initial commercial release of Prosilica GT1930, GT1930C, GT1930L, GT1930LC (order code 06-xxxxx only)
- Initial commercial release of Manta G-319B, G-319C, G-507B, and G-507C standard and board level models (order code E00xxxxx and E06xxxxx)

## New features and enhancements

- Improved registry
- `DeviceUserID` is now accessible via the **Vimba** user interface
- Update for Manta G-235B and G-235C standard and board level models
- BayerRG12Packed pixel format is supported for color cameras (Manta G-235C)
- ToE Action Commands feature
- IEEE 1588-2008 Precision Time Protocol enhancements
  - `PtpStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Initializing(0)`*, *`Faulty(1)`*, *`Disabled(2)`*, *`Listening(3)`*, *`PreMaster(4)`*, *`Master(5)`*, *`Passive(6)`*, *`Uncalibrated(7)`*, *`Slave(8)`*
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`Off`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - `PtpMode` is no longer set to *`Off`* when PTP synchronization is lost
  - `PtpMode` 'Auto' now correctly finds best master clock
  - PTP synchronization drift lessened
- Exposure related enhancements
  - When `ExposureMode` = *`Timed`*: Improved accuracy in exposure calculation with deviation < 1 µs, exposure calculation takes into account exposure time error (`tOFFSET`)
  - Partial fix: When `ExposureMode` = *`TriggerWidth`*: Improved accuracy in exposure calculation with deviation ≤ one `ExposureTimeIncrement`. For a given trigger pulse width, effective exposure duration will be trigger pulse width plus exposure time error (`tOFFSET`).
  - `ExposureTimeIncrement` value now shows decimal values
  - Exposure minimum, exposure maximum values, `ExposureTimeIncrement`, trigger jitter, and trigger latencies are updated



Exposure time error (`tOFFSET`) = 13.73 µs from Sony IMX174, IMX264, and IMX265 data sheets.

### Resolved issues

- GVCP command drop (no Ack)
- In auto gain and auto exposure, the current value will stay within the range in accordance to minimum and maximum value changes
- Camera no longer ignores ARP message responses sent to IP Address 0.0.0.0 if that is the camera's current IP address (which it is on power-up).
- Manta G-235 board level model with 200 mm flex cable is now stable
- `ReverseX`, `ReverseY` will first flip the image and then applies the Region of Interest
- White flicker at minimum exposure and maximum gain no longer occurs.
- When `ReverseX` is enabled, changing the pixel format to YUV format will keep `Width` less than `WidthMax`.

### Limitations

- Pixel format, binning, and decimation are changeable only when the camera is not streaming
- IEEE 1588-2008 Precision Time Protocol related limitations
  - PTP in this firmware version has many improvements, some of which cause PTP incompatibility issues with cameras running older firmware versions.
  - When using PTP in a network with cameras running a mix of older and newer PTP firmware, `PtpMode` = ***`Auto`*** can not be used, and the master camera (camera with `PtpMode` = ***`Master`***) must be a camera running the newer firmware version.
  - To take full advantage of the latest PTP resolved issues and improvements, it is recommended to upgrade the firmware of the listed supported models.

## FW 01.54.17455

Document release date: 2016-Jul-07

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-131, G-192, G-503 | 01.54.17455 |

### New models

Initial commercial release of Mako G-131B, G-131C, G-192B, G-192C, G-503B, G-503C models (order code E06xxxx only)

# FW 01.54.16845

Document release date: 2016-May-12

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1290, GT1380, GT1600, GT1660, GT1910, GT1920, GT2300, GT2750, GT3300, GT3400, GT4905, GT4907, GT6600 | 01.54.16845 |

## New features and enhancements

- Consolidated firmware update for Prosilica GT CCD single-tap and quad-tap cameras
- `DeviceUserID` is now accessible via the **Vimba** user interface
- Selectable mode of sensor digitization taps (one-tap or four-tap mode)
- Added `ReverseX` and `ReverseY` to all multi-tap CCD models
- Added Look-up Tables and binning to all models
- Added `DecimationHorizontal`, `DecimationVertical` for single-tap and quad-tap models
- Temperature readout for sensor board
- Added column defect masking support for all Prosilica GT quad-tap models running in single-tap mode
- IEEE 1588-2008 Precision Time Protocol enhancements
  - `PtpStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Initializing(0)`*, *`Faulty(1)`*, *`Disabled(2)`*, *`Listening(3)`*, *`PreMaster(4)`*, *`Master(5)`*, *`Passive(6)`*, *`Uncalibrated(7)`*, *`Slave(8)`*
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`Off`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - `PtpMode` is no longer set to *`Off`* when PTP synchronization is lost
  - `PtpMode` = *`Auto`* now correctly finds best master clock
  - PTP synchronization drift lessened

## Features removed

- Cleaned up lens controls
  - Removed P-Iris and DC-Iris controls from Prosilica GT large format models
  - Removed EF controls from Prosilica GT standard format models

## Resolved issues

- GVCP command drop (no Ack)
- Issue where changing the auto gain or auto exposure maximum or minimum value when the current value is within the target range does not change the current value.
- When `ReverseX` is enabled, changing the pixel format to YUV format will keep `Width` less than `WidthMax`.

### Limitations

- IEEE 1588-2008 Precision Time Protocol related limitations
  - PTP in this firmware version has many improvements, some of which cause PTP incompatibility issues with models running older firmware versions.
  - When using PTP in a network with models running a mix of older and newer PTP firmware, `PtpMode` = *`Auto`* can not be used, and the master camera (`PtpMode` = *`Master`*) must be a camera running the newer firmware version.
  - To take full advantage of the latest PTP resolved issues and improvements, it is recommended to upgrade the firmware of the listed supported models.

## FW 01.54.16528

Document release date: 2016-June-30

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC660, GC1290, GC1380H, GC1600H, GC2450 | 01.54.16528 |



This firmware is not backwards compatible with Prosilica GC hardware revision A models.

### New models

Initial commercial release of Prosilica GC hardware revision D models.

### New features and enhancements

- Gamma correction
- Look-up Tables
- Hue, saturation, color transformation control (color models only)
- Device temperature readout (sensor is located on mainboard)
- New event added: `ExposureStart` (ID 40019)
- IEEE 1588-2008 Precision Time Protocol enhancements
  - `PtpStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Initializing(0)`*, *`Faulty(1)`*, *`Disabled(2)`*, *`Listening(3)`*, *`PreMaster(4)`*, *`Master(5)`*, *`Passive(6)`*, *`Uncalibrated(7)`*, *`Slave(8)`*
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`Off`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - `PtpMode` is no longer set to *`Off`* when PTP synchronization is lost
  - `PtpMode` = *`Auto`* now correctly finds best master clock
  - PTP synchronization drift lessened

## Features removed

- Black level control
- Non-functional events
- The Prosilica GC has only two inputs. Therefore the following events have been removed in the new Prosilica GC hardware revision D models:
  - `EventLine3FallingEdgeFrameID`
  - `EventLine3FallingEdgeTimestamp`
  - `EventLine3RisingEdgeFrameID`
  - `EventLine3RisingEdgeTimestamp`
  - `EventLine4FallingEdgeFrameID`
  - `EventLine4FallingEdgeTimestamp`
  - `EventLine4RisingEdgeFrameID`
  - `EventLine4RisingEdgeTimestamp`
- The corresponding events in the `EventSelector` were also removed: `Line3RisingEdge`, `Line3FallingEdge`, `Line4RisingEdge`, and `Line4FallingEdge`

## Changes

- Differences in frame rates: Some of the new Prosilica GC hardware revision D models require to use different imager frequencies. Therefore it is difficult to apply the same frame rates as Prosilica GC hardware revision A models. As a side effect higher frame rates can be achieved:

| Models | Frame rate for Prosilica GC hardware revision A models | Frame rate for Prosilica GC hardware revision D models |
|---|---|---|
| Prosilica GC660 | 119.30 fps | 121.20 fps |
| Prosilica GC1290 | 32.79 fps | 33.31 fps |
| Prosilica GC1380H | 30.01 fps | 30.49 fps |



All other Prosilica GC hardware revision D models support the same frame rates as the previous Prosilica GC models.

- Features renamed: On Prosilica GC hardware revision A models, `Gain` is called `GainRaw`; on the new Prosilica GC hardware revision D models it is referred to as `Gain`. This is just a name change to be GenICam SFNC compliant; the functionality remains the same. `GainRaw` is still available, but now it is an invisible attribute that can still be applied by programmers (**PvAPI** users for example).
- Due to the increased memory the new models have an extended `StreamHoldCapacity`. The changes are as follows:

| Models | StreamHoldCapacity for Prosilica GC hardware revision A models | StreamHoldCapacity for Prosilica GC hardware revision D models |
|---|---|---|
| Prosilica GC660 | 46 frames | 194 frames |
| Prosilica GC1290 | 12 frames | 52 frames |
| Prosilica GC1380H | 11 frames | 46 frames |
| Prosilica GC1600H | 7 frames | 33 frames |
| Prosilica GC2450 | 3 frames | 12 frames |

- Prosilica GC hardware revision A models support five user sets, the new Prosilica GC hardware revision D models support three user sets.

### Limitations

- IEEE 1588-2008 Precision Time Protocol related limitations
  - PTP in this firmware version has many improvements, some of which cause PTP incompatibility issues with cameras running older firmware versions.
  - When using PTP in a network with cameras running a mix of older and newer PTP firmware, `PtpMode` = ***`Auto`*** can not be used, and the master camera (`PtpMode` = ***`Master`***) must be a camera running the newer firmware version.
  - To take full advantage of the latest PTP resolved issues and improvements, it is recommended to upgrade the firmware of the listed supported models.

## FW 01.54.16414

Document release date: 2016-Mar-07

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1930, GT1930L | 01.54.16414 |

### New models

Initial commercial release of Prosilica GT1930 and GT1930C models

### New features and enhancements

- Prosilica GT1930L and GT1930LC only
  - Added editing capability to `DeviceUserID` (users can now edit `DeviceUserID`)
  - All EF-Lens features are now disabled if no EF-Lens is attached to camera
  - Increased minimum exposure from 28 to 42

### Other

- Prosilica GT1930L and GT1930LC only
  - Removed P-Iris and DC-Iris controls
  - Removed Event Control ID for `SyncIn3` and `SyncIn4`

### Resolved issues

- Prosilica GT1930L and GT1930LC only
  - `ExposureTimeIncrement` value now shows decimal values

# FW 01.54.15954

Document release date: 2015-Nov-20

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-234 | 01.54.15954 |

## New models

Initial commercial release of Mako G-234B and G-234C models

## New features and enhancements

- 10-bit, 12-bit switchability based on pixel format
- `ExposureValue` now rounds up or down to the nearest valid exposure value instead of always rounding down.

# FW 01.54.14865

Document release date: 2015-Oct-22

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-282, G-283, G-505, G-609, G-917 | 01.54.14865 |

## New features and enhancements

- IEEE 1588-2008 Precision Time Protocol enhancements
  - `PtpStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Initializing(0)`*, *`Faulty(1)`*, *`Disabled(2)`*, *`Listening(3)`*, *`PreMaster(4)`*, *`Master(5)`*, *`Passive(6)`*, *`Uncalibrated(7)`*, *`Slave(8)`*
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`Off`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - `PtpMode` is no longer set to *`Off`* when PTP synchronization is lost
  - `PtpMode` = *`Auto`* now correctly finds best master clock
  - PTP synchronization drift lessened

## Changes

- Adjusted the following parameter(s):
  - `/Controls/Exposure; ExposureAuto; RW;  Off(1) Once(3) Continuous(2)`
  - `/Controls/Exposure; ExposureMode; RW;  Timed(0) TriggerWidth(1)`

### Limitations

- IEEE 1588-2008 Precision Time Protocol related limitations
  - PTP in this firmware version has many improvements, some of which cause PTP incompatibility issues with models running older firmware versions.
  - When using PTP in a network with cameras running a mix of older and newer PTP firmware, `PtpMode` = ***`Auto`*** can not be used, and the master camera (`PtpMode` = ***`Master`***) must be a camera running the newer firmware version.
  - To take full advantage of the latest PTP resolved issues and improvements, it is recommended to upgrade the firmware of the listed supported models.

## FW 01.54.12720

Document release date: 2014-Feb-20

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-503 | 01.54.12720 |

### New models

Initial commercial release of Mako G-503B and G-503C models

### New features and enhancements

`DefectMaskEnable`
Up to 200 pixel defects may be masked

### Limitations

`DefectMaskEnable` is not possible if binning or decimation is enabled.

## FW 01.54.12239

Document release date: 2014-Dec-19

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1930L | 01.54.12239 |

### New models

Initial commercial release of Prosilica GT1930L and GT1930LC models

### New features and enhancements

Canon EF iris and focus lens control

### Resolved issues

- As gain is reported in 1/10 dB steps and gain in chunk data is an integer, gain value is reported as ten times the actual value (gain of 23.7 is reported as 237 for example).
- Mirroring applied before the Region of Interest for `ReverseY`

## FW 01.54.11712

Document release date: 2014-Dec-19

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-131, G-192 | 01.54.11712 |

### New models

Initial commercial release of Mako G-131B, G-131C, G-192B, and G-192C models

### New features and enhancements

`DefectMaskEnable`
Up to 200 pixel defects may be masked

### Limitations

Mako G-192B and G-192C: With exposure auto and gain auto both active, the priority mechanism does not work as expected.

## FW 01.54.11488

Document release date: 2014-Dec-16

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-030 | 01.54.11488 |

### New models

Initial commercial release of Mako G-030B and G-030C models

### New features and enhancements

- `DefectMaskEnable`
  Up to 200 pixel defects may be masked
- Piecewise Linear (HDR) mode

# FW 01.54.11233

Document release date: 2014-Oct-06

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-050, G-095 | 01.54.11233 |

## New models

Initial commercial release of Mako G-050B, G-050C, G-095B, and G-095C models

## New features and enhancements

`DefectMaskEnable`
Up to 200 pixel defects may be masked

# FW 01.54.11232

Document release date: 2014-Oct-06

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-505 | 01.54.11232 |

## New models

Initial commercial release of Manta G-505B and G-505C models

## New features and enhancements

- IEEE 1588-2008 Precision Time Protocol enhancements:
  - `PTPStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Disabled`*, *`Initializing`*, *`Listening`*, *`Master`*, *`Passive`*, *`Uncalibrated`*, *`Slave`*.
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`OFF`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - PTP synchronization drift lessened

# FW 01.54.11026

Document release date: 2014-Sep-24

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-235 | 01.54.11026 |

## New models

Initial commercial release of Manta G-235B and G-235C models

## New features and enhancements

- `ReverseX` and `ReverseY`
- `ExposureTimeIncrement`: read only, constant. Granularity of `ExposureTimeAbs`
  [**PvAPI**: `ExposureValue`]
- `ExposureTimeAbs` [**PvAPI**: `ExposureValue`]: Values written to control are rounded to nearest multiple of `ExposureIncrement`. Reading this control returns the used, rounded value.
- `Gain` [**PvAPI**: `GainValue`]: increment is 0.1, units are dB.
  [**PvAPI**: `GainValue` increment is 1, units are 0.1 dB]
- `GainAuto` [**PvAPI**: `GainMode`]: auto algorithm adjusts using 1 dB gain increments. `GainAutoMin` and `GainAutoMax` may be set to using 0.1 dB increments.
- IEEE 1588-2008 Precision Time Protocol enhancements:
  - `PTPStatus` enumerations updated to IEEE 1588-2008 Precision Time Protocol standard: *`Disabled`*, *`Initializing`*, *`Listening`*, *`Master`*, *`Passive`*, *`Uncalibrated`*, *`Slave`*
  - `GevTimestampValue` is no longer reset by turning off PTP
  - Acquisition is no longer stopped when changing `PtpMode`
  - `PtpAcquisitionGateTime` now reset to zero when `PtpMode` is set to *`OFF`*
  - `EventPtpSyncLost` now sent when `PtpMode` changed
  - PTP synchronization drift lessened

## Limitations

`ReverseY` applies any Region of Interest first, then flips image. This not the correct order. Image flip should be applied first, then the Region of Interest.

# FW 01.52.11715

Document release date: 2014-Dec-04

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Mako | G-032, G-125 | 01.52.11715 |

## Resolved issues

Removed a possible issue that prevents saving a permanent IP address in some cases.

# FW 01.52.7068

Document release date: 2013-Sep-20

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1290, GT1380 | 01.52.7068 |

## New features and enhancements

Added Look-up Tables to Prosilica GT1290, GT1290C, GT1380, and GT1380C

# FW 01.44.8549

Document release date: 2013-Sep-20

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-145, G-145B-NIR, G-145B-30fps | 01.44.8549 |

## New features and enhancements

Added X-Mirror feature to Manta G-145B, G-145B-30fps, and G-145B-NIR

## Resolved issues

- Reduced blooming effect (Manta G-145B and G-145C including 30 fps variants)
- Minimum exposure time increased from 38 µs to 43 µs (Manta G-145B and G-145C)
- Minimum exposure time increased from 37 µs to 38 µs (Manta G-145B and G-145C-30fps variants only)
- Sensor Y-size changed from 1390 to 1388 (Manta G-145B and G-145C including 30 fps variants)
- BayerGR12Packed pixel format changed to BayerRG12Packed (Manta G-145C and G-145C-30fps)

# FW 01.52.8151

Document release date: 2013-Aug-23

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT2000, GT2050 | 01.52.8151 |
| Manta | G-223, G-419 | 01.52.8151 |
| Mako | G-032, G-125, G-223, G-419 | 01.52.8151 |

### New models

- Initial commercial release Mako G-032B, G-032C, G-125B, G-125C, G-223B, G-223C, G-419B, G-419B-NIR, and G-419C models
- Initial commercial release for Manta G-419B, G-419B NIR, and G-419C models

### New features and enhancements

- Enhanced factory sensor calibration of the Prosilica GT2000, GT2050, and Manta G-223
- New maximum gain of 26 dB for Prosilica GT2000, GT2050, and Manta G-223

### Limitations

Camera firmware shows the minimum exposure values without frame overhead time for Prosilica GT2000 and GT2050 series models, that is, 1 µs. See sensor data sheet for details on frame overhead time.

## FW 01.52.7114

Document release date: 2013-May-23

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-917 | 01.52.7114 |

### Resolved issues

Optimized tap balance

## FW 01.52.7068

Document release date: 2013-May-21

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT2000, GT2050, GT3400, GT4905, GT4907, GT6600 | 01.52.7068 |

### New models

Initial commercial release for supported models

### New features and enhancements

Added three Look-up Tables

# FW 01.52.00

Document release date: 2013-Mar-27

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-223, G-282, G-283, G-609, G-917 | 01.52.00 |

## New models

Initial commercial release for supported models

## New Manta platform

- New hardware to support larger multi-tap sensors. Differences from previously released Manta models:
  - Larger 128 MB image buffer
  - Different LED behavior. See the Manta Technical Manual: www.alliedvision.com/en/support/technical-documentation/manta-documentation.html
  - IEEE 1588-2008 Precision Time Protocol
  - `DeviceTemperatureSelector` = *`Sensor`*
  - Gamma correction enhanced to support values [0.25 to 4]
  - Reduced the number of `UserSets` to 3

## Limitations

- Look-up Tables on Manta G-223B and G-223C are currently limited to 10-bit. Future maintenance release will bring this to 12-bit.
- `EdgeFilter` is not currently supported
- Manta G-223B and G-223C do not support binning (this is not a sensor feature).

# FW 01.50.02

Document release date: 2013-Jan-28

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1660, GT1910, GT2300, GT3300 | 01.50.02 |

## Resolved issues

Prosilica GT cameras with ON Semiconductor CCD sensors dropping packets on multiple camera systems.

# FW 01.50.01

Document release date: 2013-Jan-04

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.50.01 |
| Prosilica GT | GT1290, GT1380, GT1600, GT1660, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300 | 01.50.01 |

## New features and enhancements

- `FrameTriggerReady` event
- `DeviceTemperatureSelector` = *Sensor* [**PvAPI**: `DeviceTemperatureSensor`] added for Prosilica GT series, except Prosilica GT2450 and GT2450C.

## Resolved issues

- Camera maximum `ExposureTimeAbs` [**PvAPI**: `ExposureValue`] are now accurate. Previously, all cameras were listed as 60 seconds, but all cameras did not achieve this. See the camera Technical Manual for new maximum values.
- `FrameTrigger` signal removed from `SyncOutSource` [**PvAPI**: `SyncOutMode`]. Signal was too short to be seen on camera outputs
- `DSPSubregionBottom`, `DSPSubregionTop` upper limit changed from 4294967295 to sensor maximum height
- `DSPSubregionLeft`, `DSPSubregionRight` upper limit changed from 4294967295 to sensor maximum width
- Gamma correction is now properly saved or loaded in `SavedUserSets` [**PvAPI**: `ConfigFile`]

## Limitations

- `EdgeFilter` does not work, feature removed
- RGB48 `PixelFormat` does not work, feature removed

# FW 01.50.00

Document release date: 2012-Jun-01

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.50.00 |
| Prosilica GT | GT1290, GT1380, GT1600, GT1660, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300 | 01.50.00 |

### New models
Initial commercial release of Prosilica GT1660 and GT1660C models

### New features and enhancements
IEEE 1588-2008 Precision Time Protocol synchronization added to Prosilica GC models

## FW 01.48.02
Document release date: 2012-Apr-04

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1290, GT1380, GT1600, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300 | 01.48.02 |

### Resolved issues
`LensDCIris` was not driving some DC-lenses properly

## FW 01.48.01
Document release date: 2012-Feb-20

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GT | GT1290, GT1380, GT1600, GT1910, GT1920, GT2300, GT2450, GT2750, GT3300 | 01.48.01 |

### New models
Initial commercial release of Prosilica GT series

### New features and enhancements
- IEEE 1588-2008 Precision Time Protocol synchronization
- `LensDCIris` control
- `LensPIris` control
- `DeviceTemperature` [**PvAPI**: `DeviceTemperatureMainboard`] monitoring

# FW 01.44.7913

Document release date: 2013-Jul-22

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-095 | 01.44.7913 |

## Resolved issues

Imaging artifact on Manta G-095B and G-095C observed at-20 °Celsius to +5 °Celsius ambient.

## Firmware end of life

This is the last official firmware release for the Manta G-095B and G-095C models.

# FW 01.44.09

Document release date: 2013-Jan-18

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-095, G-125, G-145, G-145-30fps, G-146, G-201, G-201-30fps, G-504 | 01.44.09 |

## Resolved issues

- `StreamBytesPerSecond` calculation issues for all Manta models
- `LUTControl` parameters (`LUTEnable`, `LUTMode` for example) are not saved in `ConfigFile` for all Manta models
- `Gain` or `Offset` affecting maximum gray level on Manta G-032B and G-032C

# FW 01.44.08

Document release date: 2012-Oct-26

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-032, G-095 | 01.44.08 |

## Resolved issues

Improved production yield for Manta G-032B, G-032C, and G-095C

# FW 01.44.04

Document release date: 2012-Feb-13

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-095, G-125, G-145, G-145-30fps, G-146, G-201, G-201-30fps, G-504 | 01.44.04 |

## Resolved issues

- `TimestampValue` between first and second frame was not correct
- Delay between first and second image in external triggered acquisition
- Influence of `ExposureValue` in `ExposureMode` = *`External`*

## Other

- Feature renamed: `BlackLevelValue` to `BlackLevel` according to GenICam SFNC version 1.5
- Feature renamed: `GainRaw` to `Gain` according to GenICam SFNC version 1.5

# FW 01.44.00

Document release date: 2011-Jul-11

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-095, G-125, G-145, G-145-30fps, G-146, G-201, G-201-30fps, G-504 | 01.44.00 |

## New models

Initial commercial release of Manta G-145B, G-145C, G-201B, and G-201C (including 30 fps variants)

## New features and enhancements

- Added three 12-bit Look-up Tables
- Gamma correction default values: 0.45, 0.5, and 0.7
- `DecimationHorizontal` and `DecimationVertical` (sub-sampling) excluding Manta G-032B and G-032C
- Mono12Packed and Bayer12Packed
- `ChunkData`
- Event channel
- `SyncInGlitchFilter`
- Auto Iris (Video Type) support

## Resolved issues

- Baud rate of serial port now configurable
- Manta G-032B, G-032C, G-125B, and G-125C first image defective

- Manta G-201B and G-201C picture optimization
- Manta G-032B and G-032C trigger error in external level trigger mode
- Varying image brightness in level and edge mode
- Exposure signal jitter in external trigger mode
- Manta G-145B and G-145C stop grabbing in free-run at exposure time 320 µs

# Firmware releases in firmware loader 01.42.05

| Camera family | Models | Firmware version | Doc release |
|---|---|---|---|
| Prosilica GX | GX1920, GX2750 | FW 01.42.05 | 2011-Dec-12 |
| Prosilica GB | GB650, GB660, GB1380, GB2450 | FW 01.42.04 | 2011-Jun-01 |
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1350H, GC1380, GC1380H, GC1600, GC1600H, GC2450 | FW 01.42.04 | 2011-Jun-01 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | FW 01.42.04 | 2011-Jun-01 |
| Prosilica GX | GX1050, GX1660, GX1910, GX2300, GX3300 | FW 01.42.02 | 2011-Jan-17 |
| Prosilica GC | GC640, GC1280 | FW 01.36.00 | 2009-Mar-13 |
| Prosilica GE | GE640 | FW 01.36.00 | 2009-Mar-13 |
| Prosilica GC | GC750 | FW 01.30.00 | 2007-Dec-17 |
| Note: Prosilica GS models use the Prosilica GB firmware version | | | |

*Table 3: Firmware releases at a glance (firmware loader 01.42.05)*

# FW 01.42.05

Document release date: 2011-Dec-12

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GX | GX1920, GX2750 | 01.42.05 |

## New models

Initial commercial release of Prosilica GX2750 models.

## Resolved issues

Prosilica GX1920 connection issue with National Instruments LabView

# FW 01.42.04

Document release date: 2011-Jun-01

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.42.04 |
| Prosilica GC | GC650, GC655,GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.42.04 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.42.04 |

# FW 01.42.03

Document release date: 2011-Apr-19

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.42.03 |
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.42.03 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.42.03 |
| Prosilica GX | GX1050, GX1660, GX1910, GX1920, GX2300, GX3300 | 01.42.03 |

## New models

Initial commercial release of Prosilica GX1920 models.

# FW 01.42.02

Document release date: 2011-Jan-17

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.42.02 |
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.42.02 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.42.02 |
| Prosilica GX | GX1050, GX1660, GX1910, GX1920, GX2300, GX3300 | 01.42.02 |

### Resolved issues

- `ChunkModeActive` added to Prosilica GB models
- Issue where firmware update from version 01.36 to 01.42.00 or 01.42.01 corrupts `SavedUserSets` if `UserSetDefaultSelector` = *`Default`* [**PvAPI**: `ConfigFilePowerUp` = *`Factory`*].
- `SyncIn1GlitchFilter` now defaults to 2000 on startup

## FW 01.42.01

Document release date: 2011-Jan-06

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.42.01 |

### Resolved issues

Issue on Prosilica GE models where `BinningVertical` [**PvAPI**: `BinningY`] > 1 caused tap imbalance.

## FW 01.42.00

Document release date: 2010-Nov-10

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-095, G-125, G-145, G-146, G-201, G-504 | 01.42.00 |

### Resolved issues

- Intermittent gaps within histogram
- Corrected minimum `ExposureValues`
- `SyncOut1` delay issue at short exposure times. Applicable to Manta G-032B and G-032C only

# FW 01.42.00

Document release date: 2010-Nov-02

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.42.00 |
| Prosilica GC | GC650, GC655, GC660, GC780, GC1020, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.42.00 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.42.00 |
| Prosilica GX | GX1050, GX1660, GX1910, GX2300, GX3300 | 01.42.00 |

## New features and enhancements

- `ChunkModeActive` added to Prosilica GC and GE models
- `EventControls` added to all camera models
- `StreamFrameRateConstrain`
- `TriggerOverlap`
  [**PvAPI**: `FrameStartTriggerOverlap`]
- `SyncInGlitchFilter`
- If using `ExposureMode` = ***`Auto`***, and `GainMode` = ***`Auto`*** simultaneously, priority is given to changes in exposure until `ExposureAutoMax` is reached, at which point priority is given to changes in gain.
- RGB and YUV color modes added to Prosilica GC2450C, GB2450C, and GC1600CH

# FW 01.40.00

Document release date: 2010-Jun-15

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Manta | G-031, G-032, G-033, G-046, G-095, G-125, G-145, G-146, G-201, G-504 | 01.40.00 |

## Change log

Update of pre-series models from firmware version 01.38 to version 01.40

# FW 01.40.00

Document release date: 2010-Feb-23

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GX | GX1050, GX1660, GX1910, GX2300, GX3300 | 01.40.00 |

## New features and enhancements

- `LensDrive` controls for 1, 2, 3 axis (iris, focus, zoom) lenses
- `DefectMaskColumnEnable`
- `ChunkModeActive`

# FW 01.38.00

Document release date: 2010-Feb-10

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GX | GX1050, GX1660, GX1910, GX2300, GX3300 | 01.38.00 |

## New models

Initial commercial release of Prosilica GX series

## New features and enhancements

`EventControls`

# FW 01.36.00

Document release date: 2009-Mar-13

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.36.00 |
| Prosilica GC | GC640, GC650, GC655, GC660, GC780, GC1020, GC1280, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.36.00 |
| Prosilica GE | GE640, GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.36.00 |

## New models

Initial commercial release of Prosilica GC780 models.

### Resolved issues

- XML register `RegMemoryFileCmdExecute` changed from Read Only to Read/Write for Cognex compatibility.
- Issue where Prosilica GC1290 first exposure after `AcquisitionStart` was slightly darker than rest.

### Firmware end of life

This is the last official firmware release for the Prosilica GC640, GC1280, and GE640 models.

## FW 01.34.00

Document release date: 2009-Jan-12

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GB | GB650, GB660, GB1380, GB2450 | 01.34.00 |
| Prosilica GC | GC640, GC650, GC655, GC660, GC1020, GC1280, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.34.00 |
| Prosilica GE | GE650, GE655, GE680, GE1050, GE1350, GE1380, GE1600, GE1650, GE1660, GE1900, GE1910, GE2040, GE4000, GE4900 | 01.34.00 |

### New models

- Initial commercial release of Prosilica GB series
- Initial commercial release of Prosilica GE1660 and GE1910 models

### Resolved issues

- DHCP now works when multiple DHCP servers are active
- `AcquisitonStart` now allowed while `AcquisitionStop` is in progress
- RGBA32 and BGRA32 work on all cameras

## FW 01.32.00

Document release date: 2008-Mar-28

### Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE680, GE1650, GE1900, GE2040 | 01.32.00 |

### Resolved issues

Mono16 and Bayer16 image pixel format issue

# FW 01.30.00

Document release date: 2007-Dec-17

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC640, GC650, GC655, GC660, GC750, GC1020, GC1280, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.30.00 |
| Prosilica GE | GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040, GE4000, GE4900 | 01.30.00 |

## Resolved issues

Firmware version 01.28.00 flash erase issue

## Firmware end of life

This is the last official firmware release for the Prosilica GC750 models.

# FW 01.28.00

Document release date: 2007-Dec-04

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC640, GC650, GC655, GC660, GC750, GC1020, GC1280, GC1290, GC1350, GC1380, GC1380H, GC1600, GC1600H, GC2450 | 01.28.00 |
| Prosilica GE | GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040, GE4000, GE4900 | 01.28.00 |

## New models

Initial commercial release of Prosilica GC660, GC1290, GC1600H, GC2450, and GC1280 models.

## New features and enhancements

- `SavedUserSets`
  [**PvAPI**: `ConfigFiles`]
- User Read/Write non-volatile `CameraName` (**PvAPI** only)

## Resolved issues

- `StreamBytesPerSecond` now works at very low values
- `StreamHoldCapacity` correctly calculated

# FW 01.26.00

Document release date: 2007-May-30

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC640, GC650, GC655, GC750, GC1020, GC1350, GC1380, GC1380H, GC1600 | 01.26.00 |
| Prosilica GE | GE640, GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040, GE4000, GE4900 | 01.26.00 |

## New models

Initial commercial release of Prosilica GC750, GC1380H, GE4000, and GE4900 models.

## New features and enhancements

- Prosilica GC Iris controls added (auto iris for video-type iris lenses)
- `AcquisitionMode` = *`SingleFrame`*, *`Multiframe`*, *`Recorder`*
- `StreamBytesPerSecond` `BandwidthCtrlMode` added. Allows limiting camera bandwidth
- `StreamHoldCapacity`

## Firmware end of life

This is the last official firmware release for the Prosilica GE640 models.

# FW 01.24.00

Document release date: 2006-Nov-30

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC640, GC650, GC655, GC1020, GC1350, GC1380, GC1600 | 01.24.00 |
| Prosilica GE | GE640, GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040 | 01.24.00 |

## New models

Initial commercial release of Prosilica GC655, GC1020, and GE655 models.

# FW 01.22.00

Document release date: 2006-Sep-08

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GC | GC640, GC650, GC655, GC1020, GC1350, GC1380, GC1600 | 01.22.00 |
| Prosilica GE | GE640, GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040 | 01.22.00 |

## New models

Initial commercial release of Prosilica GC series.

## New features and enhancements

- `StreamHold`
- `SyncOutSource` = *GPO* with `SyncOutLevels`
  [**PvAPI**: `SyncOutGPOLevels`]

# FW 01.20.00

Boot code update only

# FW 01.18.00

Document release date: 2006-Aug-02

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE640, GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040 | 01.18.00 |

## New features and enhancements

- `DHCP`, `Auto-IP`, `Persistent-IP` addressing modes
- `PixelFormat` = *YUV411Packed*, *YUV422Packed*, *YUV444Packed*
  [**PvAPI**: *YUV411*, *YUV422*, *YUV444*]

# FW 01.16.00

Document release date: 2006-Jun-28

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE640, GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040 | 01.16.00 |

## New models

Initial commercial release of Prosilica GE640 models.

# FW 01.14.00

Document release date: 2006-Apr-12

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE655, GE680, GE1350, GE1380, GE1600, GE1650, GE1900, GE2040 | 01.14.00 |

## New models

Initial commercial release of Prosilica GE655, GE680, GE1650, GE1900, and GE2040 models.

## New features and enhancements

- `ExposureAuto` = *`Once`*, *`Continuous`*
  [**PvAPI**: `ExposureMode` = *`Auto`*, *`AutoOnce`*]
- `BalanceWhiteAuto` = *`Once`*, *`Continuous`*
  [**PvAPI**: `WhitebalMode` = *`Auto`*, *`AutoOnce`*]

# FW 01.08.00 to 01.12.00

Boot code update only

# FW 01.06.00

Document release date: 2006-Mar-08

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE1350, GE1380, GE1600 | 01.06.00 |

## New models

Initial commercial release of Prosilica GE650C, GE1350C, GE1380C, and GE1600C color models.

## New features and enhancements

`PixelFormat` = *`BayerRG8`*, *`BayerRG12`*, *`RGB8Packed`*, *`BGR8Packed`*
[**PvAPI**: *`Bayer8`*, *`Bayer16`*, *`RGB24`*, *`BGR24`*]

# FW 01.04.00

Document release date: 2006-Feb-24

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE1350, GE1380, GE1600 | 01.04.00 |

## New models

Initial commercial release of Prosilica GE1350 and GE1600 monochrome models.

# FW 01.02.00

Document release date: 2006-Feb-13

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE1380 | 01.02.00 |

## New features and enhancements

Serial RS232 communication

# FW 01.00.00

Document release date: 2006-Feb-03

## Supported models

| Camera family | Models | Firmware version |
|---|---|---|
| Prosilica GE | GE650, GE1380 | 01.00.00 |

## New models

Initial commercial release of Prosilica GE650 and GE1380 monochrome models.

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## Headquarter

Allied Vision Technologies GmbH
Taschenweg 2a
07646 Stadtroda, Germany
T// +49 36428 677-0 (Reception)
T// +49 36428 677-230 (Sales)
F// +49 36428 677-28

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