VFU-M034

**Camera Model**
VFU-M034

**Sensor Specifications**
- Image sensor: Aptina MT9M034
- Sensor type: CMOS
- Optical size: 1/3"
- Chromatics: Mono / Color
- Active pixels: 1280(H) x 960(V)
- Pixel size: 3.75µm x 3.75µm
- Shutter type: Rolling shutter

**Camera Specifications**
- Partial scan: Yes
- Binning: Yes
- Sub-sampling: Yes
- Integration time (min / max): 40µs – 6000ms
- Supported bit depth: 8 / 10 Bit
- Full resolution framerate (freerun): 25
- Full resolution framerate (triggered): 25
- Dynamic range: >65dB (110dB HDR)
- Interface: USB 2.0
- On-board image buffer: No
- Power supply: 5V DC via USB
- Power consumption: <120mA

**Mechanical**
- Packaging: Housed / Board-level
- Available lens mount options: C / CS / M12
- Dimensions (housed): 40mm x 40mm x 29mm
- Dimensions (board-level M12): 34mm x 34mm x 16mm
- Weight (housed): 75g
- Weight (board-level): 11g

**Environmental**
- Storage temperature: -25°C to 85°C
- Ambient operating temperature: -20°C to 85°C
- Ambient humidity: 20% - 95%, non condensing

**System Requirements**
- Hardware
  - CPU / RAM: 1.8GHz / 1GB
  - GPU: Supporting PixelShader v2
  - Camera interface: USB2.0 High-Speed Host
- Software
  - .Net Framework 3.5 SP1
- Supported operating systems
  - (32 / 64 Bit): Windows 2000 (SP3), Windows XP (SP3), Windows Vista, Windows 7
- Supported API languages
  - .Net / C++-interface

**Synchronization**
- Inputs
  - Count / Internal circuit: 2 / Opto-coupled
  - High level / Maximum: 1.8V / 24V
- Outputs
  - Count / Internal circuit: 2 / Opto-coupled
  - Maximum voltage: 24V
## Mechanical Dimensions

### Housed

<table>
<thead>
<tr>
<th>Front View</th>
<th>C-/CS-Mount</th>
<th>M12-Mount</th>
<th>Rear View (all Mounts)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><img src="image" alt="C-/CS-Mount Diagram" /></td>
<td><img src="image" alt="M12-Mount Diagram" /></td>
<td><img src="image" alt="Rear View Diagram" /></td>
</tr>
</tbody>
</table>

### Side View

<table>
<thead>
<tr>
<th>Side View</th>
<th>C-/M12-Mount</th>
<th>CS-Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Side View Diagram" /></td>
<td><img src="image" alt="C-/M12-Mount Diagram" /></td>
<td><img src="image" alt="CS-Mount Diagram" /></td>
</tr>
</tbody>
</table>

### Board-Level B

<table>
<thead>
<tr>
<th>Front View</th>
<th>Side View</th>
<th>Rear View (all Mounts)</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="C-/CS-Mount Diagram" /></td>
<td><img src="image" alt="Side View Diagram" /></td>
<td><img src="image" alt="Rear View (all Mounts) Diagram" /></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>M12-Mount</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="M12-Mount Diagram" /></td>
</tr>
</tbody>
</table>
VFU-M034

Mechanical Dimensions

Front View  Side View  Rear View (all Mounts)

M12a-Mount

C-Mount  (Square)

Connectivity

<table>
<thead>
<tr>
<th>Pin</th>
<th>Board-Level B</th>
<th>Board-Level S</th>
<th>Pin</th>
<th>Housed</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trigger IN</td>
<td>IN2</td>
<td>1</td>
<td>GND Trigger / Flashlight</td>
</tr>
<tr>
<td>2</td>
<td>IN1</td>
<td>IN1</td>
<td>2</td>
<td>Trigger IN</td>
</tr>
<tr>
<td>3</td>
<td>IN2</td>
<td>Trigger IN</td>
<td>3</td>
<td>IN2</td>
</tr>
<tr>
<td>4</td>
<td>OUT1</td>
<td>GND for Trigger / Flashlight</td>
<td>4</td>
<td>OUT1</td>
</tr>
<tr>
<td>5</td>
<td>GND INx / OUTx / Trigger IN</td>
<td>Flashlight OUT</td>
<td>5</td>
<td>OUT2</td>
</tr>
<tr>
<td>6</td>
<td>OUT2</td>
<td>GND for Flashlight</td>
<td>6</td>
<td>Flashlight OUT</td>
</tr>
<tr>
<td>7</td>
<td>Flashlight OUT</td>
<td>GND for INx / OUTx</td>
<td>7</td>
<td>GND INx / OUTx</td>
</tr>
<tr>
<td>8</td>
<td>GND for Flashlight</td>
<td>OUT1</td>
<td>8</td>
<td>OUT2</td>
</tr>
</tbody>
</table>

USB-Connector

Molex Picoblade 51021-0800

<table>
<thead>
<tr>
<th>Pin</th>
<th>Standard</th>
<th>Pin</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>SYS-/USB-GND</td>
<td>1</td>
<td>SYS-/USB-GND</td>
</tr>
<tr>
<td>2</td>
<td>D-</td>
<td>2</td>
<td>D-</td>
</tr>
<tr>
<td>3</td>
<td>D+</td>
<td>3</td>
<td>D+</td>
</tr>
<tr>
<td>4</td>
<td>USB Vcc</td>
<td>4</td>
<td>USB Vcc</td>
</tr>
<tr>
<td>5</td>
<td>SYS-/USB-GND</td>
<td>5</td>
<td>Cable Shielding</td>
</tr>
<tr>
<td>6</td>
<td>Cable Shielding</td>
<td>6</td>
<td>USB Vcc</td>
</tr>
</tbody>
</table>

LED-Connector

Molex Picoblade 51021-0500

<table>
<thead>
<tr>
<th>Pin</th>
<th>Standard</th>
<th>Pin</th>
<th>Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>VCC LED (5V)</td>
<td>1</td>
<td>GND Trigger / Flashlight</td>
</tr>
<tr>
<td>2</td>
<td>LED_EXT OUT4</td>
<td>2</td>
<td>Trigger IN</td>
</tr>
<tr>
<td>3</td>
<td>LED_EXT OUT3</td>
<td>3</td>
<td>IN1</td>
</tr>
<tr>
<td>4</td>
<td>LED_EXT OUT2</td>
<td>4</td>
<td>IN2</td>
</tr>
<tr>
<td>5</td>
<td>LED_EXT OUT1</td>
<td>5</td>
<td>OUT1</td>
</tr>
</tbody>
</table>

I/O-Connector

Molex Picoblade 51021-0600

<table>
<thead>
<tr>
<th>Pin</th>
<th>Board-Level S</th>
<th>Pin</th>
<th>Board-Level S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Trigger IN</td>
<td>IN2</td>
<td>Board-Level S</td>
</tr>
<tr>
<td>2</td>
<td>IN1</td>
<td>IN1</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>IN2</td>
<td>Trigger IN</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GND for Trigger / Flashlight</td>
<td>OUT1</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Flashlight OUT</td>
<td>GND for INx / OUTx</td>
<td>OUT2</td>
</tr>
<tr>
<td>6</td>
<td>Flashlight OUT</td>
<td>GND for INx / OUTx</td>
<td>OUT2</td>
</tr>
</tbody>
</table>

Binder 09 0481 65 08

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Ordering Information for Visionsens VF Camera Platform

### VFU - M034 - MH - C - IRC - LED470

**Interface**
- U: USB2.0
- U3: USB3.0

**Sensor**
- V024
- M034
- P031
- J003
- X445
- CMV2000

**Chromatics**
- M: mono
- C: color

**Packaging**
- H: housing
- S: board level with standard interface
- B: board level with Molex jacks

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### Ordering Information

**Order code**
- V024
- M034
- P031
- J003
- X445
- CMV2000

**Sensor**
- V024: Aptina, MT9V024, CMOS, Global Shutter
- M034: Aptina, MT9M034, CMOS, Rolling Shutter
- P031: Aptina, MT9P031, CMOS, Rolling Shutter
- J003: Aptina, MT9J003, CMOS, Rolling Shutter
- X445*: Sony, ICX445, CCD
- CMV2000*: CMOSIS, CMV2000

**Technology**
- CMOS, Global Shutter
- CMOS, Rolling Shutter
- CMOS

**Resolution**
- 752x480: 0.4 MP
- 1280x960: 1.2 MP
- 2592x1944: 5.0 MP
- 3664x2748: 10.1 MP
- 1280x960: 1.2 MP
- 2048x1088: 2.2 MP

**Frame rate [fps]**
- 60
- 25
- 4
- 3.5
- 22
- -

**Sensor size**
- 1/3"
- 1/3"
- 1/2.5" (To come)
- 1/2.3" (To come)
- 1/3" (To come)

**Pixel size**
- 6 µm
- 3.75 µm
- 2.2 µm
- 1.67 µm
- 3.75 µm
- 5.5 µm

**Exposure time**
- 60 µs – 500 ms
- 40 µs – 6000 ms
- 10 µs – 3500 ms
- 60 µs – 14000 ms
- To come
- To come

**ADC depth**
- 8 / 10 Bit
- 8 / 10 Bit
- 8 / 10 Bit
- 8 / 10 Bit
- 8 / 10 Bit
- 8 / 10 Bit

**LED wavelength (nm)**
- Blank: none
- LED470, LED525, LED590, LED630, LED670, LED850, LEDww (warm white)

**Filter**
- Blank, in case of packaging S, B without mount: none
- Blank, in case of chromatics M: clear glass window
- Blank, in case of chromatics C: IR cut filter
- IRC: IR cut
- IRP: IR long pass
- CLG: clear glass window

**Mount**
- Blank: without mount
- C: C-mount for housing, round C-mount for packaging B
- Cp: square C-mount (plastic) for packaging S
- Ca: square C-mount (aluminum) for packaging S
- M12: M12-mount for housing, round M12-mount for packaging B
- M12p: square M12-mount (plastic) for packaging S
- M12a: square M12-mount (aluminum) for packaging S

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* Available 2013
### Option Mount

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Dependencies with other options</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>C-mount, round, plastic</td>
<td>not available with LED Ring, for packaging B only</td>
</tr>
<tr>
<td>Ca</td>
<td>C-mount, square (board size), aluminum</td>
<td>not available with LED Ring, for packaging S only</td>
</tr>
<tr>
<td>Cp</td>
<td>C-mount, square (board size), plastic</td>
<td>not available with LED Ring, for packaging S only</td>
</tr>
<tr>
<td>CS</td>
<td>CS-mount, round, plastic</td>
<td>not available with LED Ring, for packaging B only</td>
</tr>
<tr>
<td>Csa</td>
<td>C-mount, square (board size), aluminum</td>
<td>not available with LED Ring, for packaging S only</td>
</tr>
<tr>
<td>CSp</td>
<td>C-mount, square (board size), plastic</td>
<td>not available with LED Ring, for packaging S only</td>
</tr>
<tr>
<td>M12</td>
<td>S-mount with M12x0.5 thread, round, plastic</td>
<td>no filter option available, limited screw in depth, for packaging B only</td>
</tr>
<tr>
<td>M12a</td>
<td>S-mount with M12x0.5 thread, square (board size), aluminum</td>
<td>no filter option available, for packaging S only</td>
</tr>
<tr>
<td>M12p</td>
<td>S-mount with M12x0.5 thread, square (board size), plastic</td>
<td>no filter option available, for packaging S only</td>
</tr>
</tbody>
</table>

### Option Filter

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Dependencies with other options</th>
</tr>
</thead>
<tbody>
<tr>
<td>blank</td>
<td>for monochrome cameras: clear glass window</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for color cameras: IR cut filter (see option IRC)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>for mount M12: no filter, no clear glass</td>
<td></td>
</tr>
<tr>
<td>IRC</td>
<td>IR-cut filter, cuts IR radiation at wavelengths below 670nm</td>
<td>not available for Mount Option M12</td>
</tr>
<tr>
<td>IRP</td>
<td>IR-pass filter, lets IR radiation pass at a wavelength above 680nm</td>
<td>not available for Mount Option M12</td>
</tr>
<tr>
<td>CLG</td>
<td>clear glass window</td>
<td>not available for Mount Option M12</td>
</tr>
</tbody>
</table>

### Option LED-Ring

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
<th>Dependencies with other options</th>
</tr>
</thead>
<tbody>
<tr>
<td>LED470, LED525, LED590, LED630, LED670, LED850</td>
<td>LED Ring with 8 LEDs at corresponding wavelength, LED ring is either embedded in the housing or mounted on the board level camera</td>
<td>requires Mount Option M12</td>
</tr>
<tr>
<td>LEDww</td>
<td>LED Ring with 8 LEDs of warm white, LED ring is either embedded in the housing or mounted on the board level camera</td>
<td>requires Mount Option M12</td>
</tr>
</tbody>
</table>