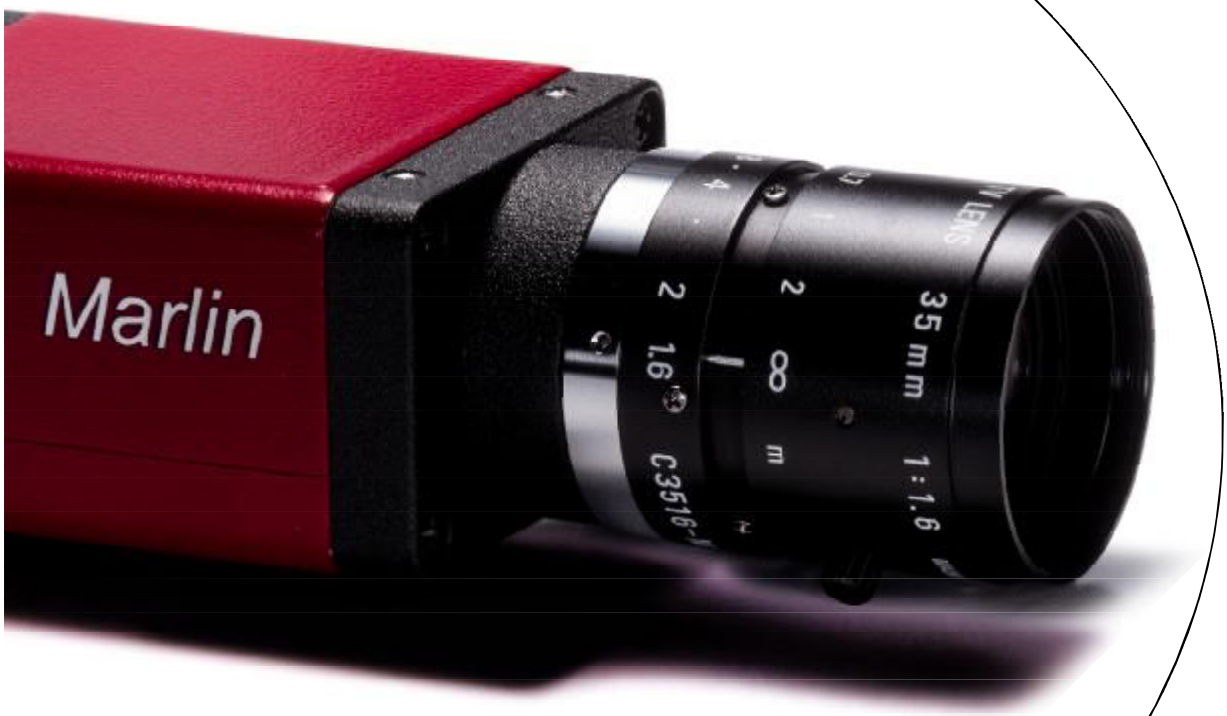
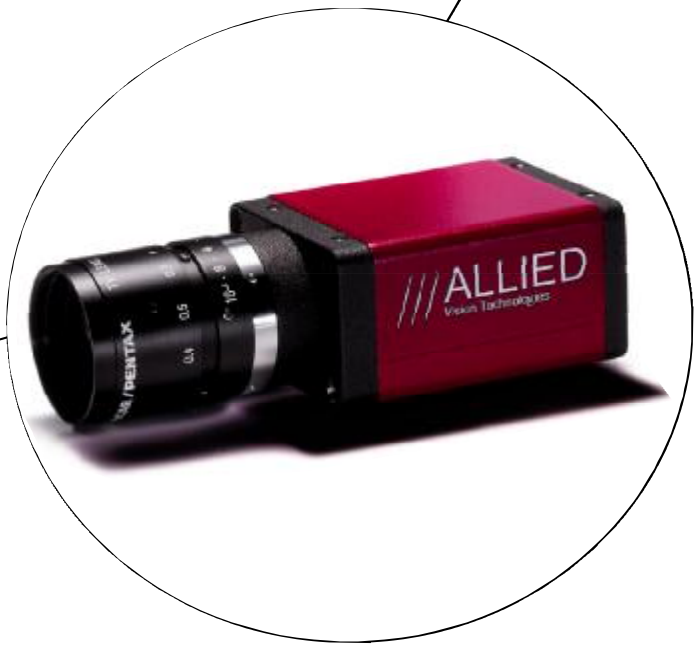
AVT Marlin IEEE 1394 Digital Camera





Go digital! It´s never been so easy to get into it.

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Vision Technologies

AVT Marlin

	MARLIN F-033B / C	MARLIN F-046B / C	MARLIN F-080B / C
Image device	Type 1/2 (diag. 8 mm), progressive scan SONY CCD	Type 1/2 (diag. 8 mm), progressive scan SONY CCD	Type 1/3 (diag. 6 mm), progressive scan SONY CCD
Effective picture elements	Raw8: 656(H) x 494(V); YUV: 656(H) x 492(V)	Raw8: 780(H) x 582(V); YUV: 780(H) x 580(V)	Raw8: 1032(H) x 778(V); YUV: 1032(H) x 776(V)
Picture size	656 x 494	780 x 582	1032 x 778
Cell size	9.9 µm x 9.9 µm	8.3 µm x 8.3 µm	4.65 µm x 4.65 µm
Resolution depth	8 bit / 10 bit (Marlin F-033B); 12 bit (ADC)	8 bit / 10 bit (Marlin F-046B), 12 bit (ADC)	8 bit / 10 bit (Marlin F-080B), 12 bit (ADC)
Lens mount	C-Mount	C-Mount	C-Mount
Color modes	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8
Digital interface	IEEE 1394 IIDC V1.3	IEEE 1394 IIDC V1.3	IEEE 1394 IIDC V1.3
Transfer rate	100 Mbit/s, 200 Mbit/s, 400 Mbit/s	100 Mbit/s, 200 Mbit/s, 400 Mbit/s	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Frame rates (mono)	Up to 74 Hz; (full frames)	Up to 53 Hz; (full frames)	Up to 20 Hz; (full frames)
Frame rates (color)- max.	74 fps (Raw 8 bit); 51 fps (YUV 4:2:2); 68 fps (YUV 4:1:1); 33 fps (RGB8)	53 fps (Raw 8 bit); 36 fps (YUV 4:2:2); 49 fps (YUV 4:1:1); 24 fps (RGB8)	20 fps (Raw 8 bit); 20 fps (YUV 4:2:2); 20 fps (YUV 4:1:1); 13 fps (RGB8); **optional 30 fps**
Image FIFO size	Up to 17 frames	Up to 13 frames	Up to 7 frames
Gain Control	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)
Shutter speed	20 µs...67.1 s, auto shutter	20 µs...67.1 s, auto shutter	20 µs...67.1 s, auto shutter
External trigger Shutter	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter
Advanced features	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)
Power requirements	DC 8 V – 36 V via IEEE 1394 cable	DC 8 V – 36 V via IEEE 1394 cable	DC 8 V – 36 V via IEEE 1394 cable
Power consumption	Less than 3 watt (@ 12 V DC)	Less than 3 watt (@ 12 V DC)	Less than 3 watt (@ 12 V DC)
Dimensions	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens
Mass	<120 g (without lens)	<120 g (without lens)	<120 g (without lens)
Operating temperature	+ 5... + 45 °Celsius	+ 5... + 45 °Celsius	+ 5... + 45 °Celsius
Storage temperature	- 10... + 60 °Celsius	- 10... + 60 °Celsius	- 10... + 60 °Celsius
Regulations	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation
Options	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux

The AVT Marlin family.

Go digital! It´s never been so easy to get into it.

Entry into the world of digital image processing has never been as simple and cost-effective before. With the new MARLIN, Allied Vision Technologies presents a whole series of attractive digital camera entry-level models of the FireWire™ category. Seven different cameras, available in monochrome and color, complete a program which contains a large selection of different resolutions and high-end specifications. In this price class, the Marlin is practically without an equal and offers sound arguments for anyone wishing to switch from analog to digital technology.

FireWire™ - the new standard in image processing.

The digital connective technology, introduced to the computer industry as early as 1994 by Apple, is now taking over the world of industrial image processing. The IEEE 1394 (FireWire™ or i.Link™) industry standard enables the simplest computer compatibility and bi-directional data transfer via Plug & Play. The savings potentials enabled by the technology, high data rates of 400 Mbit/s, the remarkable image quality and simple integration with existing applications result in FireWire cameras becoming more and more popular.

The MARLIN family at a glance.

The AVT Marlin family consists of 7 very compact IEEE 1394 C-mount cameras, which are equipped with highly sensitive high-quality sensors (CCD, CMOS). Each of these cameras is available in black/white as well as in color. The cameras, operating in 8-bit mode, impress in almost any situation by their ability to produce highly sophisticated images. The MARLIN is equipped with an asynchronous trigger shutter as well as true partial scan and integrates numerous useful and intelligent smart features for image processing. A large selection of different sensors (type 1/1.8, type 1/2, type 1/3, type 2/3) and resolutions (VGA, SVGA, XGA, SXGA, UXGA) leaves no wish unfulfilled and provides the right camera for all individual applications.

MARLIN F-131B / C	MARLIN F-145B2 /C2	MARLIN F-146B / C	MARLIN F-201B / C
Type 2/3 (diag. 11 mm), global shutter CMOS sensor	Type 1/2 (diag. 8 mm), progressive scan SONY CCD	Type 1/2 (diag. 8 mm), progressive scan SONY CCD	Type 1/1.8 (diag. 9 mm), progressive scan SONY CCD
1280 (H) x 1024 (V)	Raw8:1392(H) x 1040(V); YUV:1392(H) x 1038(V)	Raw8:1392(H) x 1040(V); YUV:1392(H) x 1036(V)	Raw8:1628(H) x 1236(V); YUV:1628(H) x 1234(V)
1280 x 1024	1392 x 1040	1392 x 1040	1628 x 1236
6.7 µm x 6.7 µm	4.65 µm x 4.65 µm	4.65 µm x 4.65 µm	4.4 µm x 4.4 µm
8 bit / 10 bit (ADC)	8 bit / 10 bit (Marlin F-145B), 12 bit (ADC)	8 bit /10 bit (Marlin F-146B), 12 bit (ADC)	8 it / 10 bit (Marlin F-201B), 12 bit (ADC)
C-Mount	C-Mount	C-Mount	C-Mount
Raw 8; YUV 4:2:2; YUV 4:1:1	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8	Raw 8; YUV 4:2:2; YUV 4:1:1, RGB8
IEEE 1394 IIDC V1.3	IEEE 1394 IIDC V1.3	IEEE 1394 IIDC V1.3	IEEE 1394 IIDC V1.3
100 Mbit/s, 200 Mbit/s, 400 Mbit/s	100 Mbit/s, 200 Mbit/s, 400 Mbit/s	100 Mbit/s, 200 Mbit/s, 400 Mbit/s	100 Mbit/s, 200 Mbit/s, 400 Mbit/s
Up to 25 Hz; (full frames)	Up to 10 Hz; (full frames)	Up to 17.4 Hz; (full frames)	Up to 12.5 Hz; (full frames)
25 fps (Raw 8 bit); 12 fps (YUV 4:2:2); 17 fps (YUV 4:1:1)	10 fps (Raw 8 bit); 10 fps (YUV 4:2:2); 10 fps (YUV 4:1:1); 7 fps (RGB8)	17.4 fps (Raw 8 bit); 11 fps (YUV 4:2:2); 15 fps (YUV 4:1:1); 7 fps (RGB8)	12.5 fps (Raw 8 bit); 8 fps (YUV 4:2:2); 11 fps (YUV 4:1:1); 5 fps (RGB8)
Up to 4 frames	Up to 3 frames	Up to 3 frames	Up to 2 frames
Manual: 0-16 dB (13 x 1.25 dB), auto gain	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)	Manual: 0-24 dB (0.035 dB/step), auto gain (select. AOI)
20 µs...67.1 s, auto shutter	20 µs...67.1 s, auto shutter	20 µs...67.1 s, auto shutter	20 µs...67.1 s, auto shutter
Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter	Trigger_Mode_0, Trigger_Mode_1, advanced feature: Trigger_Mode_15 (bulk); image transfer by command, trigger delay, trigger counter
DSNU correction, real time shading correction; built in FIFO memory up to 4 frames; one user progr. LUT; 2 conf. inputs/outputs; HDR mode, image mirror; sub-sampling, serial port (IIDV V1.3)	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)	Real time shading correction; image sequencing; one user progr. LUT; 2 conf. inputs/outputs; image mirror; binning, secure image signature; user profiles, serial port (IIDC V1.3)
DC 8 V – 36 V via IEEE 1394 cable	DC 8 V – 36 V via IEEE 1394 cable	DC 8 V – 36 V via IEEE 1394 cable	DC 8 V – 36 V via IEEE 1394 cable
Less than 3 watt (@ 12 V DC)	Less than 3 watt (@ 12 V DC)	Less than 3 watt (@ 12 V DC)	Less than 3 watt (@ 12 V DC)
72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens	72 mm x 44 mm x 29 mm (L x W x H); w/o tripod and lens
<120 g (without lens)	<120 g (without lens)	<120 g (without lens)	<120 g (without lens)
+ 5... + 45 °Celsius	+ 5... + 45 °Celsius	+ 5... + 45 °Celsius	+ 5 / + 45 °Celsius
- 10... + 60 °Celsius	- 10... + 60 °Celsius	- 10... + 60 °Celsius	- 10 / + 60 °Celsius
EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation	EN 55022, EN 61000, EN 55024, FCC Class B, DIN ISO 9022, ROHS in preparation
Host adapter card, locking IEEE 1394 cable, API (FirePackage), AVT FirePackage, Direct FirePackage, Fire4Linux	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux	Removable IR cut filter; host adapter card, locking IEEE 1394 cable, AVT FirePackage, Direct FirePackage, Fire4Linux

- **MARLIN F-033B/C**

  Type 1/2 Sony progressive scan CCD;
  (VGA) 656 (H) x 494 (V); up to 74 fps*.

- **MARLIN F-046B/C**

  Type 1/2 Sony progressive scan CCD; (SVGA) 780 (H) x 582 (V); up to 53 fps*.

- **MARLIN F-080B/C**

  Type 1/3 Sony progressive scan CCD;
  (XGA) 1032 (H) x 778 (V); up to 20 fps / 30fps*.

- **MARLIN F-131B/C**

  Type 2/3 global shutter CMOS;
  (SXGA) 1280 (H) x 1024 (V); up to 25 fps*.

- **MARLIN F-145B2/C2**

  Type 1/2 Sony progressive scan CCD;
  (SXGA) 1392 (H) x 1040 (V); up to 10 fps*.

* **at full resolution**

- **MARLIN F-146B/C**

  Type 1/2 Sony progressive scan CCD; (SXGA) 1392 (H) x 1040 (V); up to 17.4 fps*.

- **MARLIN F-201B/C**

  Type 1/1.8 Sony progressive scan CCD;
  (UXGA) 1392 (H) x 1040 (V); up to 12.5 fps*.

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AVT Marlin

The MARLIN architecture: a multitude of individual possibilities.

The MARLIN series offers the prerequisites for a camera on demand through its separation of the sensor and mainboard - " the design-in" and the adaptation to the required application therefore knows practically no limits. The ARM 7 microcontroller and the large FPGA (field programmable gate array) ensure the fast execution of all the camera's commands and thus results in the incredible performance of important functions - such as a perfect shading correction or a reliable white balance.
Color creation and correction takes place in the large-dimensioned FPGA, which also takes on the entire realtime control of the camera. Additionally, the MARLIN offers 64 Mbit/s onboard memory to successfully execute a variety of smart features such as image-FIFO, filters, color transformation, shading values and more.

The sensor.

The MARLIN camera series offers seven different sensors, which all distinguish themselves with a high level of image quality and resolutions. The highly-sensitive CCD and CMOS sensors significantly reduce unwanted effects such as smear or blooming and offer an image quality previously unseen in this price class of FireWire cameras.

Global shutter.

When ever applications require perfect images of fast-moving objects, the global shutter function of the MARLIN will prove its worth. The capture of all pixels at the exact same time ensures unchanging, high image quality.

Asynchronous external trigger.

The MARLIN is equipped with an asynchronous external trigger, which enables instantaneous capturing without any significant latency time.

Intelligent – by SmartFeatures.

The MARLIN's numerous built-in smart features enables a variety of useful image-processing tasks on the fly, which can free up a PC that buffers image processes.

Look UP Table.

The programmable Look Up Table (LUT) in the internal memory of the MARLIN can be switched into the signal routes as needed. The LUT can be created with a PC (for example with a program such as Excel™) and then be loaded effortlessly into the camera. The advantages of the MARLIN's integrated Look Up Table become especially apparent during complex image processing tasks, such as the creation of non-linear characteristic lines, to emphasize different image level areas (gamma LUT) or threshold operations.

Realtime shading correction.

A further smart feature of the MARLIN is realtime shading correction, which can bring any image point to a normal level via a corrective matrix, to compensate for local lighting or objective errors for example.

Intelligent color processing.

The color versions of the MARLIN series offer an extremely good and balanced color display, as a result of a well-thought-out color correction matrix. The MARLIN takes care of the Bayer demosaicing and the color conversion from RGB to YUV in the FPGA. The color display thus becomes more natural and individual color tones can be displayed or distinguished.

Image memory - FIFO.

A MARLIN camera can store up to 17 full-resolution images (F-080: 7 images, F-131: 4 images, F-145/F-146: 3 images; F201: 2 images) in its image FIFO at a maximum image rate and can thus relieve a PC's image capturing and the related waiting times to a large extent. This smart camera can also take pictures whilst the PC is still processing the previous images.

Sequencing.

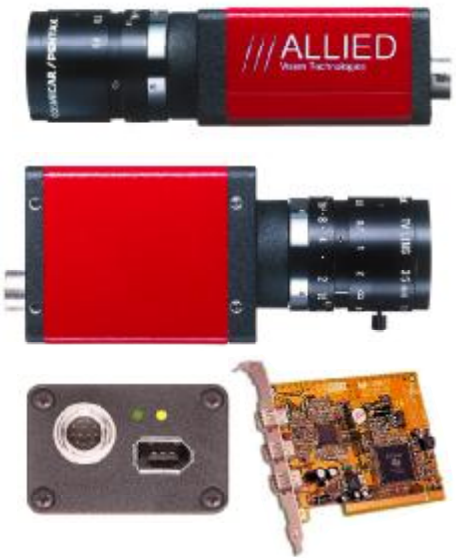
When capturing in sequencing mode (not MARLIN F-131), every image can have specific parameters applied to it – such as gain, offset, image cutout and LUT.
The parameters are thereby updated in the camera itself, from one image to the next.

Programmable I/O.

Apart from its simple operation, the MARLIN offers a series of well-thought-out trigger functions. For the hardware end of the connection to the process, two inputs and two outputs are available. Apart from the external trigger, image capturing via signal connection (e.g. Gate and trigger) is also possible.

Software.

Image processing with the MARLIN follows the Plug & Play principle: the Allied Vision Technologies software supports still image (WIA/TWAIN) and video stream (video capture and preview) as well as the integration of the camera over its own API. Digital cameras are as easy to use for image processing today as analog cameras and frame grabbers, but naturally offer better images and higher speed. The prerequisites for the simplest integration are established with AVT's software. The MARLIN family is compatible with all current image processing packages, such as National Instruments Labview, MVTec Halcon, MVTec Active Vision Tools, Stemmer Imaging Common Vision Blox and Matrox Inspector – all of which support the FireWire standard.



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