Smart cameras

Matrox **Iris P-Series**

Powerful programmable smart cameras.

Key features

- powerful embedded Intel® architecture processor
- runs Microsoft® Windows® CE .NET real-time operating system
- programmed using familiar Microsoft® development environment and Matrox Imaging Library (MIL)
- web-based configuration and monitoring
- high-fidelity monochrome or color CCD sensors
- externally triggered or internally controlled electronic shutter
- Ethernet network interface
- RS-232 serial communication
- auxiliary digital I/Os
- sturdy single or two-piece industrial design

Best of both worlds

Matrox Iris P-Series offers the best of both worlds by combining the integration of a conventional smart camera with the flexibility of a traditional PC-based machine vision system. Matrox Iris P-Series is a fully programmable device allowing extensive customization by OEMs and integrators for their individual vertical markets. It features an embedded Intel® architecture processor, which provides the computing power to handle typical machine vision applications. Matrox Iris P-Series uses a real-time operating system to deliver the performance and robustness necessary for mission-critical machine vision applications. Its familiar Windows® programming environment minimizes the learning curve and maximizes development flexibility while the Matrox Imaging Library (MIL) programming toolkit, with a solid 10-year track record, provides the image processing and analysis tools that allow OEMs and integrators to get the job done quickly and with confidence.

Single or two-piece design

Available in a uni-body or remote head plus processor unit design, the Matrox Iris P-Series is the right fit for typical machine vision applications. The two-piece design, by way of MDR26 connectors, makes use of the standard Camera Link® cabling to connect the remote head to the processor unit.

High-fidelity image sensors

Matrox Iris P-Series makes use of interline transfer progressive scan CCD image sensors with square pixels to produce fine, sharp and consistent details vital for accurate and precise image analysis. The family of available sensors include support for sub to megapixel resolutions, higher readout or frame rates, and monochrome or color (by way of a mosaic filter) imaging. The sensors provide an externally triggered electronic full-frame shutter, which enables the capture of rapidly moving objects in crisp images. An FPGA device is present to pre-process sensor data (e.g., color interpolation) releasing the camera's embedded microprocessor for more advanced image processing and analysis, communication, and control tasks.

MATROX
IMAGING

Matrox Iris P-Series

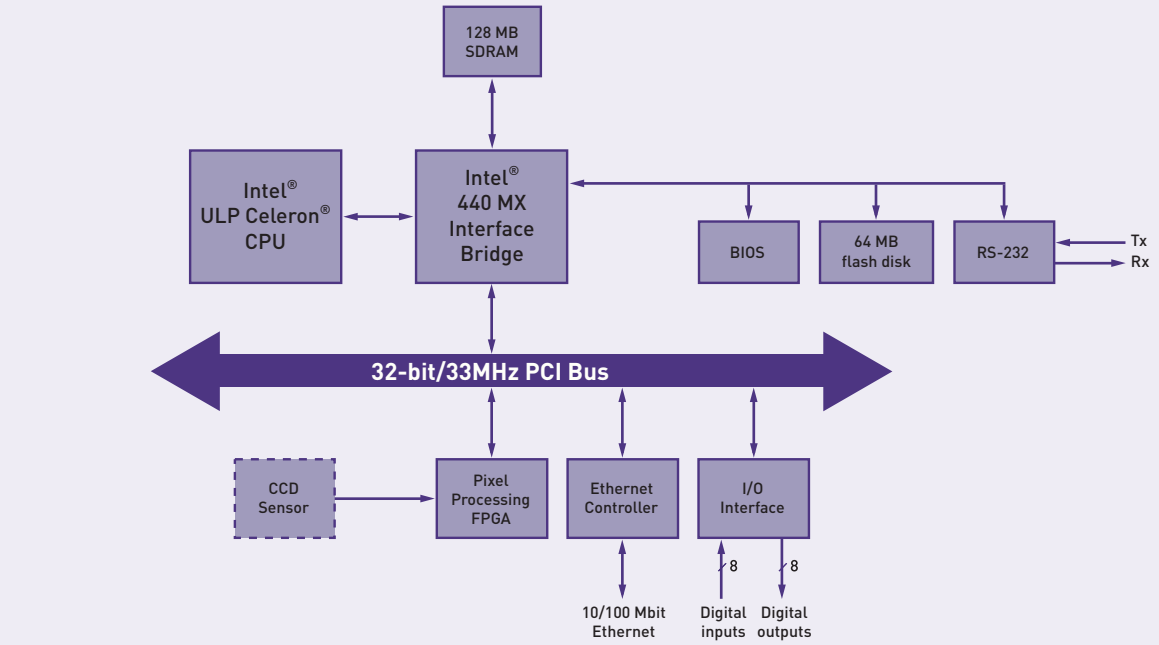

Figure 1

Cross-platform Development

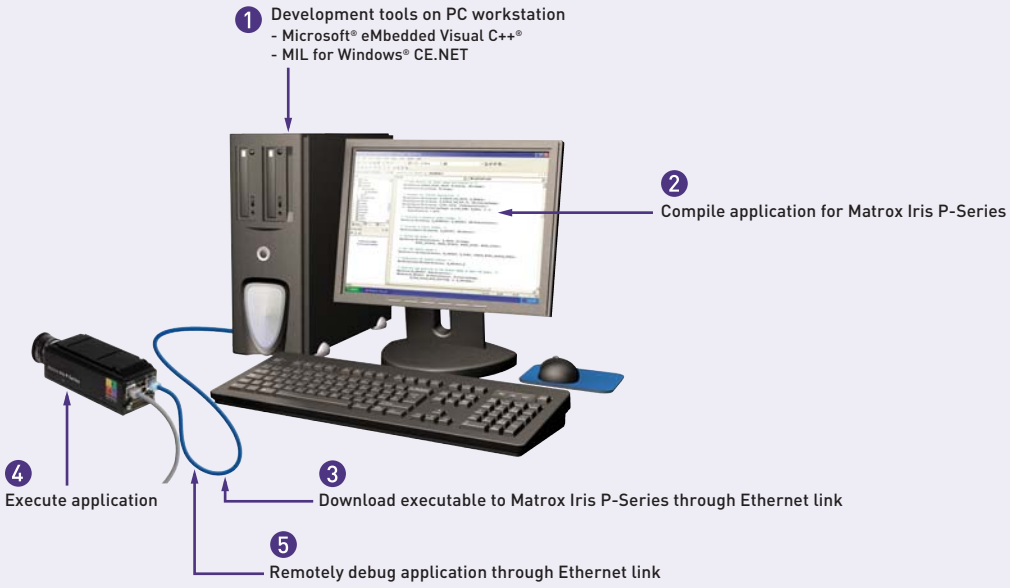

Figure 2

Embedded Intel® architecture processor

Advanced image processing and analysis, communication, and control operations are all performed on Matrox Iris P-Series by the industry proven Intel® Ultra Low Power (ULP) Celeron® processor with Intel® 440MX companion interface bridge. The flash disk and SDRAM memory located within Matrox Iris P-Series provides ample space to store and execute the operating system, MIL and a custom machine vision application.

Communication and I/O

Matrox Iris P-Series features a 10/100 Mbit Ethernet interface to provide the connectivity to the emerging factory floor networks. A RS-232 serial interface and 16 industrial digital I/Os (8 input and 8 output) enable the direct interaction with other factory automation devices.

Software Environment

Windows® CE .NET and eMbedded Visual C++

Matrox Iris P-Series comes pre-installed with Microsoft® Windows® CE .NET, a compact real-time operating system. Windows® CE .NET provides hard real-time capabilities (i.e., deterministic response to interrupts and task switches even when the CPU is heavily loaded), fast boot-up and immediate shut-down. Programming under Windows® CE .NET is done using a subset of the Win32® API and consists of a cross-platform environment (see Figure 2). The C/C++ application code is compiled using Microsoft® eMbedded Visual C++® running on a PC. The executable is downloaded to the camera through the Ethernet link, and the program can be debugged remotely from the PC running eMbedded Visual C++® over this same Ethernet link.

Matrox Imaging Library

Matrox Imaging Library (MIL) is a high-level programming library with an extensive set of optimized functions for image processing and analysis. Refer to the MIL brochure for more information.

Usage models

Matrox Iris P-Series can be configured to operate as a fully autonomous or network device. In either case, the application can be permanently resident or downloaded on power up. In the autonomous mode, the application executes without any remote interaction. In the network model, the application executes under the control of a supervisory application running on a remote PC, which communicates through the network link. Matrox Iris P-Series can even be configured to operate as a web server.

Configuration and monitoring

The configuration and monitoring of Matrox Iris P-Series is performed through resident web pages accessed remotely through Microsoft® Internet Explorer (see Figure 3). This web-based interface allows a user with the appropriate privileges to view status information (e.g., network interface, flash disk/memory usage, temperatures, event logs, etc.) and configure operational parameters (e.g., boot process, network interface, applications to run, firmware revisions, etc.). It also allows an operator to remotely view live video for camera alignment and focusing.

Remote Configuration

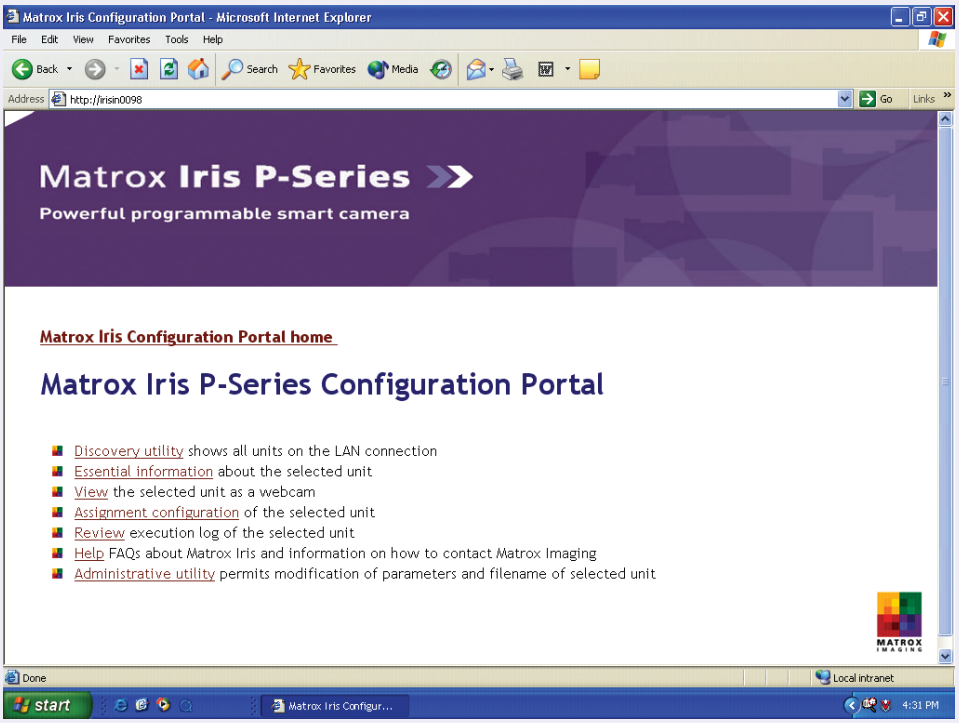

Figure 3

Dimensions - Uni-body

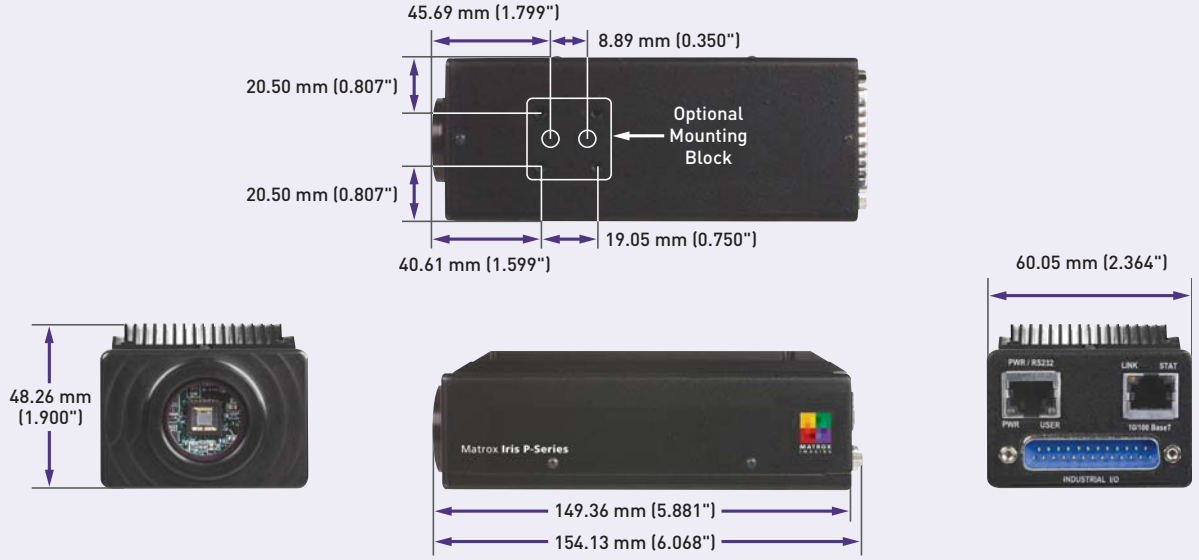

Figure 4

Dimensions - Remote Head and Processor Unit

Figure 5

Specifications

	Matrox Iris P300(R)	Matrox Iris P300C(R)	Matrox Iris P300H(R)	Matrox Iris P700(R)	Matrox Iris P1200(R)
Sensor board					
Sensor type	diagonal 4.5 mm (1/4"-type) interline transfer progressive scan monochrome CCD with square pixels (Sony ICX098BL)	diagonal 4.5 mm (1/4"-type) interline transfer progressive scan color CCD with square pixels (Sony ICX098BQ)	diagonal 6 mm (1/3"-type) interline transfer progressive scan monochrome CCD with square pixels (Kodak KAI-0340S)	diagonal 6 mm (1/3"-type) interline transfer progressive scan monochrome CCD with square pixels (Sony ICX204AL)	diagonal 8 mm (1/2"-type) interline transfer progressive scan monochrome CCD with square pixels (Sony ICX205AL)
Effective resolution	640 (H) x 480 (V)	640 (H) x 480 (V)	640 (H) x 480 (V)	1024 (H) x 768 (V))	1280 (H) x 1024 (V)
Frame rate	up to 30 fps	up to 30 fps	up to 100 fps	up to 20 fps	up to 7.5 fps
Pixel size	5.6 µm (H) x 5.6 µm (V)	5.6 µm (H) x 5.6 µm (V)	7.4 µm (H) x 7.4 µm (V)	4.65 µm (H) x 4.65 µm (V)	4.65 µm (H) x 4.65 µm (V)
Gain range	2 to 36 dB	2 to 36 dB	6 to 42 dB	2 to 36 dB	2 to 36 dB
Shutter speeds	100 µs to 0.5 s	100 µs to 0.5 s	45 µs to 83 ms	100 µs to 0.5 s	100 µs to 0.5 s
External trigger latency	85 µs	85 µs	22.8 µs	85 µs	155 µs
External trigger to output strobe delay	2µs (minimum)				
CPU board					
CPU	400MHz Intel® ULP Celeron®				
Volatile memory	128 MB SDRAM				
Non-volatile memory	64 MB flash disk				
I/O board					
Network interface	10/100 Mbit Ethernet				
Serial interface	RS-232				
Digital I/Os	8 inputs and 8 outputs				
Mechanical, electrical and environmental information					
Dimensions	refer to Figure 4 or Figure 5				
Lens type	CS mount[1]				
Connectors	RJ-45 for power and RS-232, RJ-45 for Ethernet and DB-25 for digital I/Os, and MDR26 for remote head to main body connection[2]				
Remote head distance	up to 5 meters (16.4 feet)				
Weight	435 g (15.3 oz.) for uni-body / 185 g (6.5 oz.) for remote head and 435 g (15.3 oz.) for main body				
Power consumption	375 mA @ 24 VDC or 9 W (typical)				
Digital I/O ratings	100 mA max. @ 5 to 24 VDC				
Operating temperature	0 °C to 45 °C (32 °F to 113 °F)				
Ventilation requirements	natural convection				
Operating humidity	up to 95% (non-condensing)				
Certifications	FCC class A and CE class A				
Software environment					
Operating system	Microsoft® Windows® CE .NET 4.2 (headless configuration with TCP/IP, telnet, http and ftp services)				
PC development tools	Microsoft® eMbedded Visual C++® 4.0 with Service Pack 4[3] and Matrox Imaging Library (MIL) for Windows® CE .NET				
PC requirements	Microsoft® Windows® XP Professional, 128 MB of memory, 450 MB hard disk space, Microsoft® Internet Explorer 6.0 and 100 Mbit Ethernet port				

Ordering Information

Hardware

Part number	Description
IP300	Matrox Iris P-Series smart camera with monochrome 640 x 480 30 fps CCD sensor, 400 MHz ULP Celeron, 128MB SDRAM and 64 MB flash disk.
IP300R	Same as above but with remote head and 2 m cable.
IP300C	Matrox Iris P-Series smart camera with color 640 x 480 30 fps CCD sensor, 400 MHz ULP Celeron, 128MB SDRAM and 64 MB flash disk.
IP300CR	Same as above but with remote head and 2 m cable.
IP300H	Matrox Iris P-Series smart camera with monochrome 640 x 480 100 fps CCD sensor, 400 MHz ULP Celeron, 128MB SDRAM and 64 MB flash disk.
IP300HR	Same as above but with remote head and 2 m cable.
IP700	Matrox Iris P-Series smart camera with monochrome 1024 x 768 20 fps format CCD sensor, 400 MHz ULP Celeron, 128MB SDRAM and 64 MB flash disk.
IP700R	Same as above but with remote head and 2 m cable.
IP1200	Matrox Iris P-Series smart camera with monochrome 1280 x 1024 7.5 fps format CCD sensor, 400 MHz ULP Celeron, 128MB SDRAM and 64 MB flash disk.
IP1200R	Same as above but with remote head and 2 m cable.
IRIS-SK/A, E *or* U	Matrox Iris P-Series (except for Iris P1200) starter kit accessories. Includes power supply with appropriate power cord (A for North America, E for Europe and U for UK), power supply/RS-232 cable, two CS-mount lenses and a DB-25 to open end cable for digital I/Os (requires customization).
IRIS-SK-P1200/A, E *or* U	Matrox Iris P1200 starter kit accessories. Includes power supply with appropriate power cord (A for North America, E for Europe and U for UK), power supply/RS-232 cable, one C-mount lens with 5 mm extension ring and a DB-25 to open end cable for digital I/Os (requires customization).

CS-mount lenses are also available from PENTAX Precision Co., Fujinon or other third parties.

Software

Part number	Description
MIL 8 DEV CE IRIS	Matrox Imaging Library (MIL) development package for Windows® CE .NET running on Matrox Iris P-Series (see MIL brochure for more details).

The MIL development package for Windows® CE .NET running on Matrox Iris P-Series requires a MIL run-time software license key.

Software Maintenance Program

Included in the original purchase price of MIL for Windows® CE .NET running on Matrox Iris P-Series development package, it entitles registered users to one year of technical support and free updates[4].

Part number	Description
MIL CE MAINT	One year program extension for MIL for Windows CE .NET development package.

Notes:

1. Can also accommodate a C mount lens when using a 5 mm extension tube.
2. Use standard Camera Link® cables.
3. Available for download from Microsoft®.
4. May require a new MIL run-time software license key.

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