DOMINO™ series

Analog Image Acquisition Boards with Perfect Digital Quality

D3™ TECHNOLOGY

PCI EXPRESS™

DOMINO Melody™
Standard and Low Profile

DOMINO Harmony™

DOMINO Symphony™
PCI and PCIe

DOMINO™ series
DOMINO Iota™ – DOMINO Melody™ – DOMINO Alpha 2™
DOMINO Harmony™ – DOMINO Symphony™ – DOMINO Symphony PCIe™

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Excellence in vision

The DOMINO™ series Comparison Chart

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		DOMINO Iota	DOMINO Melody	DOMINO Alpha 2	DOMINO Harmony	DOMINO Symphony	DOMINO Symphony PCIe
Form factor		32-bit, 33 MHz PCI	32-bit, 33 MHz PCI Low Profile compatible	32-bit, 33 MHz PCI	64-bit, 66 MHz PCI	64-bit, 66 MHz PCI	x1 PCI Express Full height, half length
Analog cameras	Single-tap	1	1	Up to 4	2*	4	4
	Dual-tap	-	-	Up to 2	-	-	-
	RGB	-	-	-	1*	-	-
Video connector	On the bracket	1 x HD15	1 x HD15	2x HD15	2 x HD15	1 x HD44	1 x HD44
	Internally	-	1 x 10-pin header	-	1 x 10-pin header	1 x 10-pin header	1 x 10-pin header
Sampling resolution / Max. frequency *Max. line rate operation a*		8 bits @ 32 MHz	10 bits @ 40 MHz	8 bits @ 32 MHz	10 bits @ 40 MHz	10 bits @ 65 MHz	10 bits @ 65 MHz
Max. line rate	Synchronous mode	31.5 kHz	42 kHz	31.5 kHz	42 kHz	52.5 kHz	52.5 kHz
	Asynchronous mode	31.5 kHz	31.5 kHz	31.5 kHz	31.5 kHz	52.5 kHz (digital vertical synch.)	52.5 kHz (digital vertical synch.)
Delivery bandwidth		90 MB/s	90 MB/s	90 MB/s	Up to 240 MB/s	Up to 240 MB/s	Up to 180 MB/s
On-board memory		8-MB	16-MB	8-MB	32-MB	64-MB	64-MB
D³ Technology™		-	✓	-	✓	✓	✓
Pre-processing		1 x 8-bit LUT	1 x 8- or 10-bit LUT	2 x 8-bit LUT	-	4 x 8- or 10-bit LUT	4 x 8- or 10-bit LUT
Input Output Lines							
- System IO connector -							
Connector type	On the bracket	DB-9M	RJ-45	DB-9M	HD-15M	HD-26M	HD-26M
	Internal header	-	10-pin	-	10-pin	26-pin	26-pin
Input lines		3 TTL	1 LVDS	3 TTL	2 LVDS	4 LVDS	4 LVDS
Output lines		3 TTL	1 opto-isolated	3 TTL	2 opto-isolated	4 opto-isolated	4 opto-isolated
TTL bidirectional I/O lines		-	2 TTL	-	4 TTL	4 TTL	4 TTL
5V Power supply		✓	✓	✓	✓	✓	✓
- Factory IO connector -							
Connector type	Internal header	-	-	-	-	34-pin	34-pin
Differential lines		-	-	-	-	4 Input / 12 Output	4 Input / 12 Output
- Camera Com connector -							
Connector type	Internal header	-	-	-	-	16-pin	16-pin
Serial RS-232 lines		-	-	-	-	4	4
- 12V camera power connector -							
Connector type	Internal header	1 Molex 4-pin	1 Molex 4-pin	1 Molex 4-pin	1 Molex 4-pin	1 Molex 4-pin	1 Molex 4-pin

* Exclusive

DOMINO Alpha 2™

DOMINO Melody™

DOMINO Iota™

DOMINO Symphony PCIe™

DOMINO Symphony™
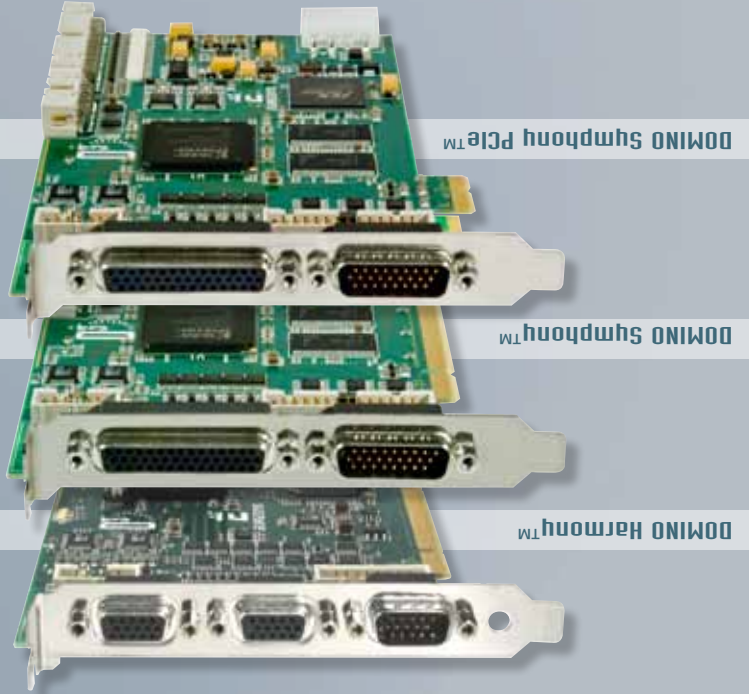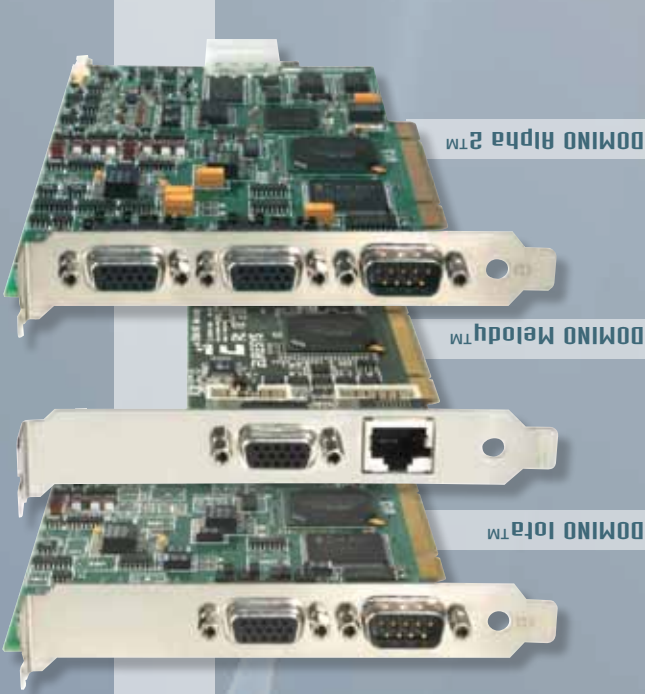
DOMINO Harmony™

DOMINO Melody™, Harmony™ & Symphony™ Common Features

- **Support of analog cameras**
  - Progressive or interlaced scanning
  - Synchronous timing or asynchronous reset and shutter control
  - Monochrome single-tap or RGB
  - High-resolution, support for mega-pixel cameras

- **High-accuracy 10-bit 40/60 MHz A/D converters**
  - 8- or 10-bit input look-up-table and programmable input filter
  - Programmable gain and offset control

- **On-board memory**

- **Trigger, strobe, enhanced I/O lines**

- **Internal connectors: video, system and power**

- **D³ Technology™*** - *Melody, Harmony, Symphony* -
  - Fully digital signal processing chain
    - Black level restoration
    - Sampling clock generation
    - Gain, offset control
    - Color sub-carrier removal
    - Control over horizontal and vertical pixel counts
    - Synchronization recovery: vertical and horizontal
    - Low-pass filtering
  - Extremely low synchronization jitter
  - Absolute digital stability and consequently no need of pixel clock
  - Absolute parametric stability
  - Various camera synchronization mode supported
  - Excellent performance reproducibility

- **MultiCam drivers for Microsoft Windows® and Linux**

The Domino series is a range of high-end **PCI** and **PCI Express** frame grabbers for **analog** cameras. The Domino series support any system function associated to industrial acquisition, such as camera asynchronous reset, exposure and strobe control. The latest Domino boards - Melody, Harmony and Symphony - are based on an innovative proprietary technology called **D³ Technology™***. It provides a **perfect digital image** with the benefits of a proven analog environment: low-cost, reliable cabling and connections, smallest cameras, low power, … The D³ Technology* offers unequalled signal stability and image quality to the analog acquisition. These boards are further enhanced by extensive on-board I/O capabilities.

Bus Mastering

All Euresys frame grabbers are **PCI bus mastering** agents that directly store the acquired images into the PC physical memory without CPU involvement. As a **unique feature**, a Euresys board automatically recovers the **scatter-gather** virtual memory mapping to present the data as a regular bitmap image in a user allocated memory buffer.

Interfaced Cameras

The Domino series and the MultiCam drivers interface an impressive choice of different analog cameras. ➤ *An up-to-date list is available on the web site www.euresys.com*

The Domino Melody, Harmony and Symphony support top-notch cameras such as dual, triple and quad-speed. As a unique feature, they have strictly no jumpers. Even the 75-ohm termination resistor is a software selectable feature.

Trigger, Strobe, Enhanced I/O Lines

In order to facilitate the integration of the board into the application system, the new Domino boards offer digital I/O lines configurable for trigger input, strobe output or general purpose control.

*Patent pending

DOMINO Melody™

One single-tap camera
One 10-bit 40 MHz A/D converter *One 8- or 10-bit LUT*
16-Mbyte on-board memory
Form factor: Conventional PCI *32-bit, 33 MHz, 3V or 5V signaling*
*Standard and low profile*

The Domino Melody is an ideal solution for single-camera applications inspecting fast moving objects.

Camera Support

- One single-tap analog camera

- Maximum line rate:
  - ✔ 42 kHz - synchronous mode -
  - ✔ 31.5 kHz - asynchronous mode -

Video and power connectors:

- One HD15 video connector on the bracket

- One internal 10-pin header video connector

- One Molex 4-pin connector for camera power supply
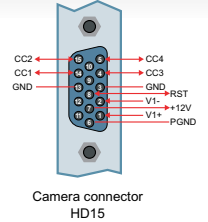
Camera connector
HD15

Trigger, Strobe, Enhanced I/O Lines

- One **opto-isolated output line** for safe control of external strobe light equipment

- One **differential LVDS input line** for high-speed, robust and flexible control from external equipment

- Two **digital TTL I/O lines** for general purpose control

System connectors: - One **RJ45 system connector on the bracket**

  - One **internal 10-pin header**
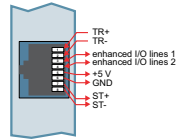
System connector
RJ45

Form Factors

The Domino Melody has a small PCB size corresponding to the Low Profile form factor. It is delivered with two brackets, allowing to install the board in either a low profile small standard PC or in a conventional larger PC. The Low Profile computers are smaller than standard PCs saving space which is so important for industrial applications.

DOMINO Harmony™

One RGB or two monochrome cameras
10-bit 40 MHz A/D converters
32-Mbyte on-board memory
Two DMA channels
*Form factor: Conventional PCI* *64-bit, 66 MHz, 3V or 5V signaling*

The Domino Harmony is an analog frame grabber for on-the-fly acquisition with two industrial monochromes and one RGB analog camera.

Camera Support

- One or two single-tap analog cameras
- One RGB analog camera
- Maximum line rate: ✔ 42 kHz - synchronous mode -
  ✔ 31.5 kHz - asynchronous mode -

Camera connector
HD15F

Video and power connectors: - Two HD15 video connectors on the bracket
  - One internal 10-pin header video connector
 - One Molex 4-pin connector for camera power supply
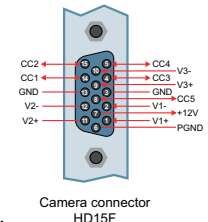
Trigger, Strobe, Enhanced I/O Lines

- Two **opto-isolated output lines** for safe control of external strobe light equipment
- Two **differential LVDS input lines** for high-speed, robust and flexible control from external equipment
- Four **digital TTL I/O lines** for general purpose control

System connectors: - One **HD15 system connector on the bracket**
  - One **internal 16-pin header system connector**
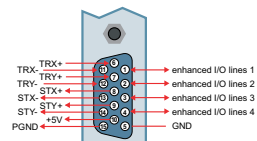
System connector
HD15M

DOMINO Symphony™

D3™

Four single-tap cameras
10-bit 65 MHz A/D converters   *Four 8- or 10-bit LUTs*
64-Mbyte on-board memory
Four DMA channels
Form factor: **Conventional PCI**   *64-bit, 66 MHz, 3V or 5V signaling*

DOMINO Symphony PCIe™

PCI Express *Full-height, half-length, x1*

PCI EXPRESS™

1-lane PCI Express: up to 176 MB/s delivery bandwidth

The Domino Symphony and Domino Symphony PCIe are high-speed analog frame grabbers. They provide affordable image acquisition for applications with multiple monochrome cameras.

Camera Support

- Four single-tap analog cameras

- Maximum line rate in synchronous and asynchronous (digital vertical synchronization) modes: 52.5 kHz

- Including top-notch cameras with high performances such as:
  - ✔ 30 fps, 1.2 Megapixels
  - ✔ 90 fps VGA

Video and power connectors:

- One HD44F video connectors on the bracket. For evaluations, a spider cable is available on request. This adapter enables 4 cameras connections on independent connectors compatible with the other Domino boards camera connectors -HD15-.

- One internal 10-pin header video connector

- One Molex 4-pin connector for camera power supply

Camera connector
HD44
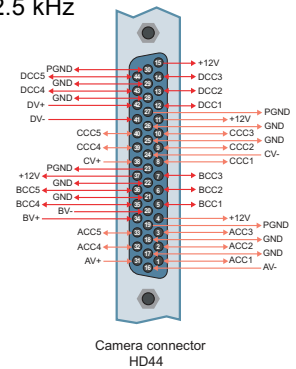
Rich Set of I/O Lines

| Connector name	Type of connector	I/O lines
System IO connectors	*On the bracket:* One HD26 system connector	- 4 opto-isolated output lines for safe control of external equipment
	Internally: One 26-pin header	- 4 differential LVDS input lines for high-speed, robust and flexible control from external equipment - 4 digital TTL I/O lines for general purpose control
Factory IO connector	*Internally:* One 34-pin header	- 4 contact-closure inputs - 12 solid-state outputs
Camera COM connector *Exposed to the OS as standard COM ports*	*Internally:* One 16-pin header	- 4 RS232 asynchronous serial communication lines to control the cameras

Software Support

MultiCam™ Drivers

Different types of MultiCam drivers are available:

- **MultiCam for Windows 32-bit** *(Windows XP®, Server 2003® and Vista®)*
- **MultiCam for Linux 32-bit** and **MultiCam for Linux 64-bit**
  *These two MultiCam products are designed to be distribution-independent with the **kernels 2.6.18 and 2.6.24, x86 platforms**. Red Hat Enterprise Linux 5.2 is the only distribution validated and for which support is provided.*

C, C++, .NET classes and ActiveX controls
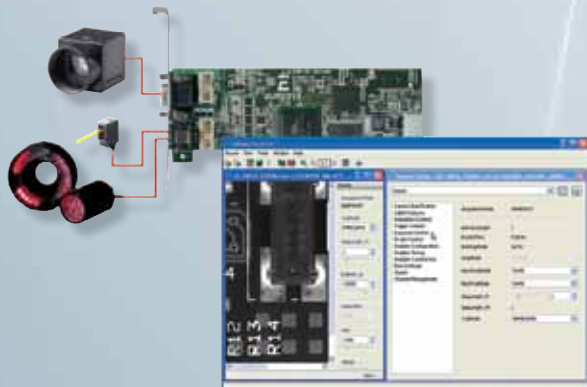
The **MultiCam driver** enables the consistent control of several Euresys frame grabbers, using an arbitrary number of cameras, from **one or several software applications**. MultiCam allows defining **channels** linking cameras to buffers in the PC memory.

The MultiCam channel **identifies all parameters** ruling the acquisition process from a camera. Every camera feature, such as its type, resolution or image format, is described and controlled through **simple parameters**, considerably easing the camera control task. For each channel-controlled camera, a set of dedicated parameters is created from a CAM file. Euresys delivers pre-defined files for many popular cameras; still the user can customize his **CAM files**.

➤ *An up-to-date list is available on the Interfacing Cameras page of the Euresys web site.*

MultiCam IDEs

Using ...	OS	Environment
MultiCam with C and C++	Windows® 32-bit	Microsoft Visual C++ 2005
		Microsoft Visual C++ .NET 2003
		Microsoft Visual C++ 6.0
		Borland C++ Builder 2006
		Borland C++ Builder 6.0
	Linux 32-bit / 64-bit	gcc 4.1.0-28.4
MultiCam with .NET	Windows®	Microsoft Visual C# 2005
		Microsoft Visual C# .NET 2003
MultiCam with ActiveX	Windows®	Microsoft Visual Basic 6.0
		Borland Delphi 2006
		Borland Delphi 6.0

Euresys Dedicated DirectShow Filters

Ordering Information

ORDER CODE	DESIGNATION	ORDER CODE	DESIGNATION
1162	DOMINO Iota	1168	DOMINO Harmony
1167	DOMINO Melody	1169	DOMINO Symphony
1161	DOMINO Alpha 2	1601	DOMINO Symphony PCIe

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