# 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

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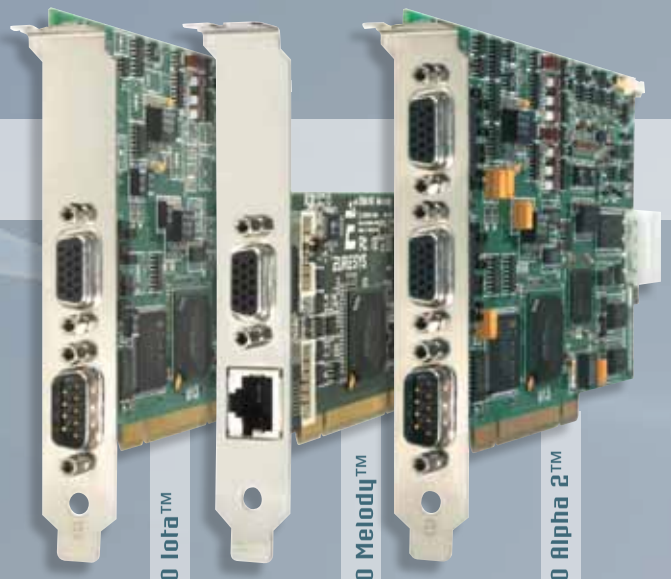
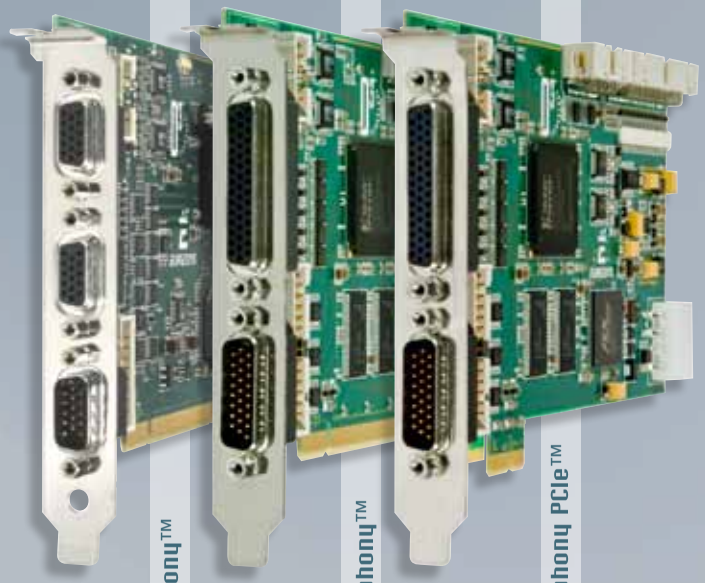
# The DOMINO™ series Comparison Chart




| | 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 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*

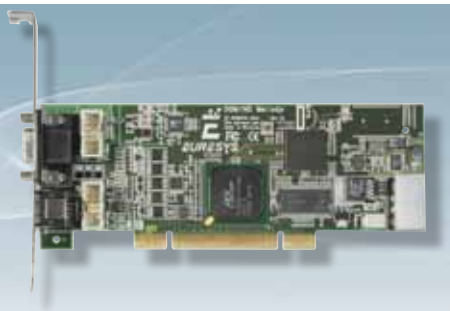
The Domino Melody, Harmony and Symphony support top-notch cameras such as dual, triple and quad-speed. As a unique feature, they have strictly no jumpers. Even the 75-ohm termination resistor is a software selectable feature.

## 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™

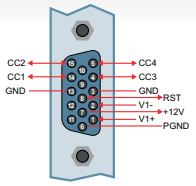
***One single-tap camera***
***One 10-bit 40 MHz A/D converter*** *One 8- or 10-bit LUT*
***16-Mbyte on-board memory***
***Form factor: Conventional PCI*** *32-bit, 33 MHz, 3V or 5V signaling*
*Standard and low profile*

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

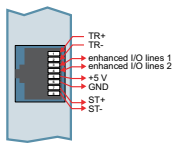


Camera connector
HD15

## 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™

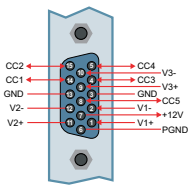
***One RGB or two monochrome cameras***
***10-bit 40 MHz A/D converters***
***32-Mbyte on-board memory***
***Two DMA channels***
***Form factor: Conventional PCI*** *64-bit, 66 MHz, 3V or 5V signaling*

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 -

**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

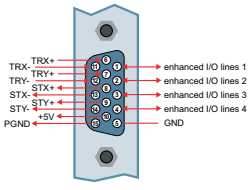


Camera connector
HD15F

## 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

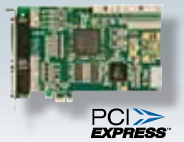
**System connectors:** - One **HD15 system connector on the bracket**
- One **internal 16-pin header system connector**



System connector
HD15M

# DOMINO Symphony™

***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*

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

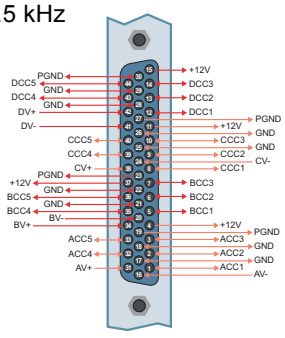
The Domino Symphony and Domino Symphony PCIe are high-speed analog frame grabbers. They provide affordable image acquisition for applications with multiple monochrome cameras.

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

# Software Support

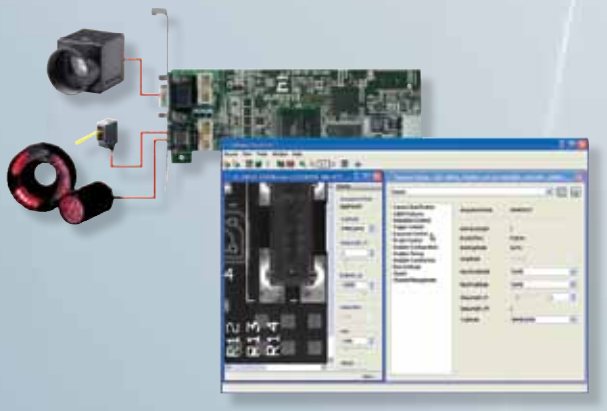
## MultiCam™ Drivers

***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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