EureCard DOMINO series

DOMINO Iota, DOMINO Alpha 2, DOMINO Gamma, DOMINO Delta

Manual

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This book is part of the documentation provided with MultiCam.

For more information, refer to the documentation provided in the latest MultiCam release.

EureCard Domino series Manual
Tome 1
December 2004

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with the use of the hardware or the software of EURESYS S.A.
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Thank you for buying a Euresys frame grabber.

All our boards come with the “Euresys Solutions CD” including free drivers and software libraries.

By following this manual, you will install properly the board and the driver.

Enjoy Euresys software and hardware industrial vision products !

Table of Contents

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Precautions of Use

Warning:
Electrostatic sensitive device

Domino boards may be damaged by electrostatic discharges. Follow the procedure hereby described and apply any general procedure aimed at reducing the risk associated to electrostatic discharge. Damage caused by improper handling is not covered by the manufacturer warranty.

Warning:
Electrostatic compatibility

Domino boards are compliant with electromagnetic compatibility regulatory requirements. To ensure this compliance, it is mandatory to secure the card bracket with the relevant screw according to the procedure hereby described.

Warning:
Risk of electrical shock

Do not operate the computer with any enclosure cover removed. During the hardware installation, ensure the AC power cord is unplugged before touching any internal part of the computer.

Warning:
Heating device

In operation, it is normal that a Domino board dissipates some heat. To ensure the adequate cooling effect of the fan equipping your computer, it is mandatory to correctly fit all enclosure covers, including blank brackets.

Warning:
Hot plugging forbidden

Uncontrolled plugging and unplugging of equipment may damage a Domino board. Always switch-off the computer, the cameras and any relevant system device when connecting or disconnecting a cable at the frame grabber or auxiliary board bracket.

Warning:
Poor grounding protection

The computer and the camera can be located in distant areas with distinct ground connections. Poor ground interconnection, ground loop or ground fault may induce unwanted voltage between equipments, causing excessive current in the interconnecting cables. This faulty situation can damage the frame grabber or the camera electrical interface.
The user must follow proper equipment grounding practices at all ends of the interconnecting cables. In addition, it is recommended to use cable assemblies with overall shield solidly connected to the conductive shell of all connectors. Besides the beneficial effect of cable shielding on electromagnetic compatibility, the shield connection can increase the protection level against grounding problems in temporarily absorbing unwanted fault current.

Standard Compliance

Following notices apply to:

- **DOMINO Iota**
- **DOMINO Alpha 2**
- **DOMINO Gamma**
- **DOMINO Delta**

Notice for USA

Compliance Information Statement (Declaration of Conformity Procedure) DoC FCC Part 15

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules.

These limits are designed to provide reasonable protection against harmful interference in a residential installation or when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Notice for Europe

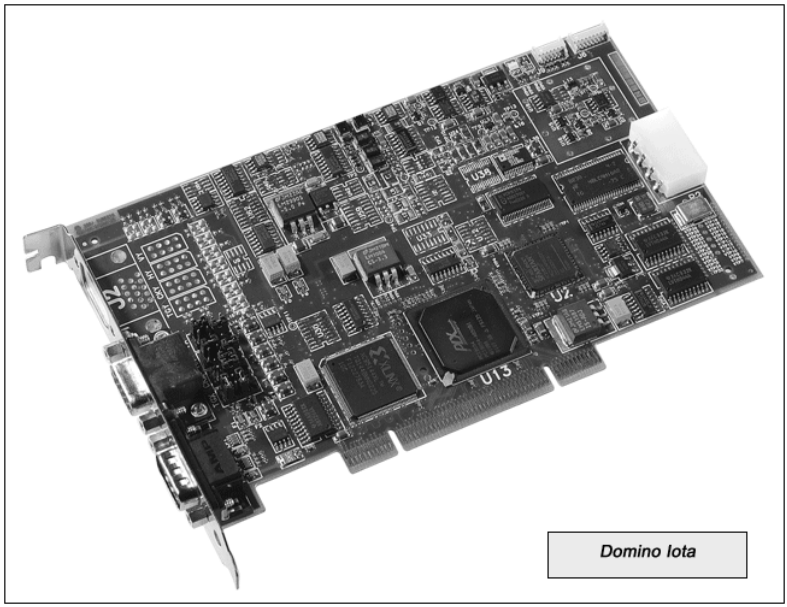
This product is in conformity with the Council Directive 89/336/EEC amended by 92/31/EEC and 93/68/EEC

This equipment has been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24. To meet EC requirements, shielded cables must be used to connect a peripheral to the card. This product has been tested in a typical class B compliant host system. It is assumed that this product will also achieve compliance in any class B compliant unit.

DOMINO Iota Description

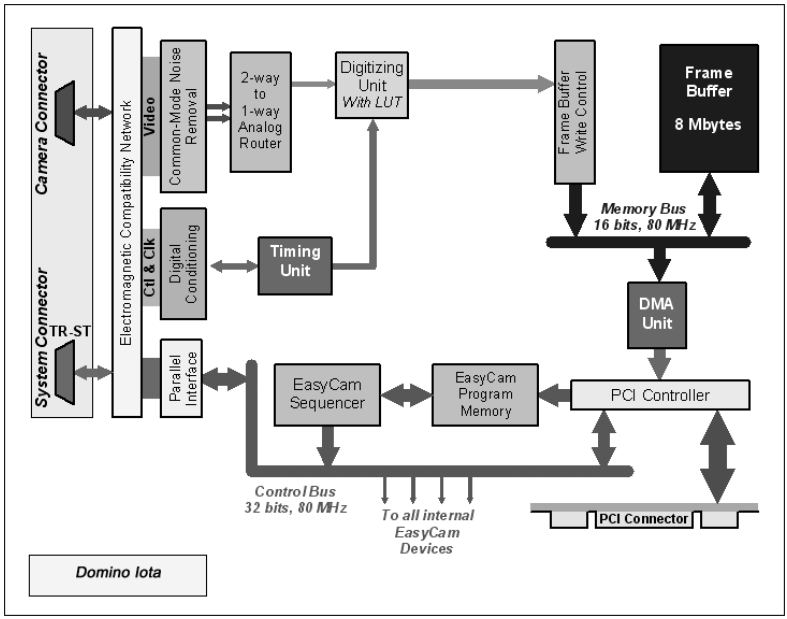
Product presentation

Domino Iota is a high-quality and cost-effective board for image acquisition from a monochrome analog camera. This mono-camera frame grabber is an ideal solution for cost-sensitive applications inspecting fast-moving objects.

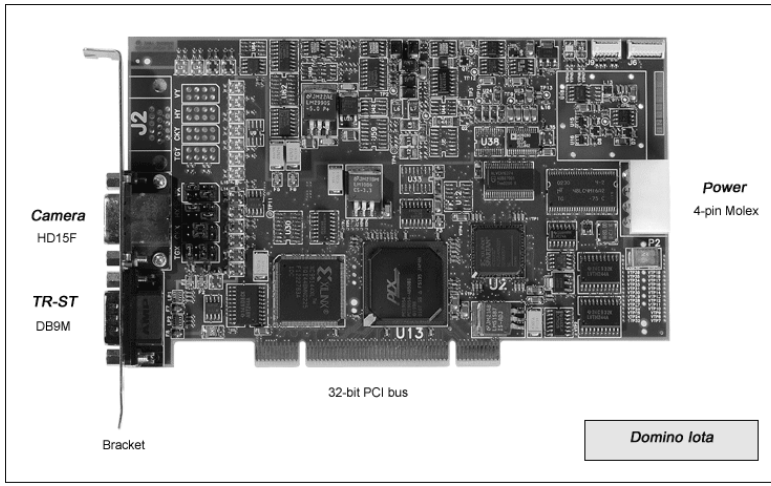


Domino Iota

Block diagram



Board layout



Bracket layout

The bracket attached to Domino Iota provides two connectors.

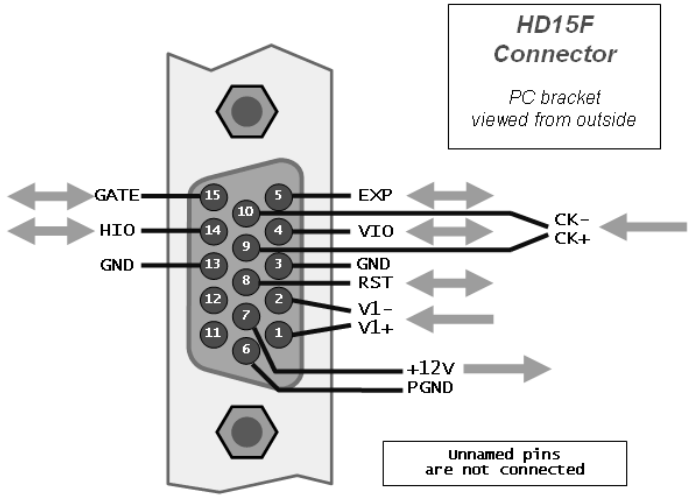
The upper connector is for camera connection. It is a sub-D high-density 15-pin female connector. It complies with the Euresys proprietary standard for analog camera connection, used on all Domino boards. This connector is called *Camera*.

The lower connector is for system connection, such as external trigger or illumination control. It is a sub-D 9-pin male connector. This connector is called *TR-ST*.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

Camera connector

Domino Iota offers an on-board high-density 15-pin female sub-D connector named *Camera* for camera connection.

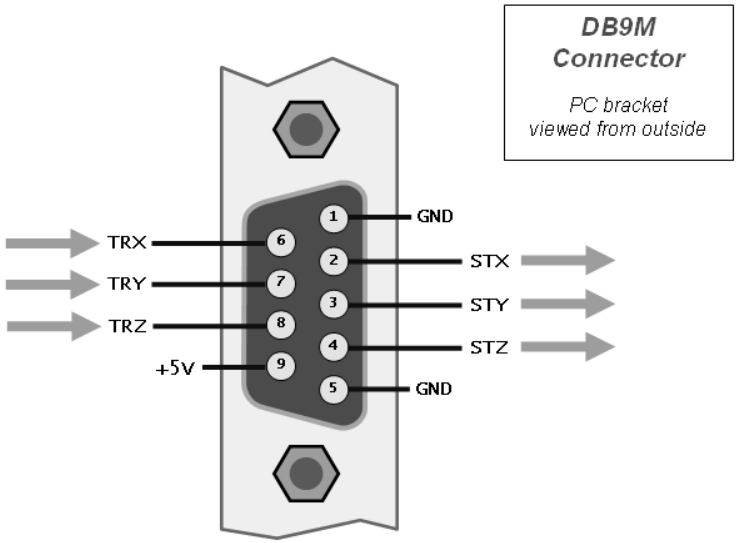


In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

System connector

Domino Iota provides an on-board 9-pin male sub-D connector named *TR-ST* for system connection, including trigger and strobe lines.

TR-ST means "Trigger-Strobe".
It includes three trigger inputs, three strobe outputs and a +5V power supply voltage. All inputs and outputs have a common ground and are TTL compliant.



Installing interconnection cables to this connector is highly system dependent.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

PCI requirements

PCI stands for "Peripheral Component Interconnect" and refers to standardized means to install an add-on board inside a computer.

Domino Iota is a short-size PCI card to be inserted in a standard PCI slot inside a PC. The PCI edge connector is compliant with the official PCI specification, revision 2.2. It is 32-bit wide, operates at 33 MHz maximum and supports both 3.3 V and 5 V signaling systems.

Domino Iota can be used in a 33 MHz or 66 MHz PCI slot like in a 66 MHz, 100 MHz or 133 MHz PCI-X slot. Installing the board on a 66 MHz or faster bus will restrict the bus to conventional PCI at 33 MHz for all agents installed on this bus.

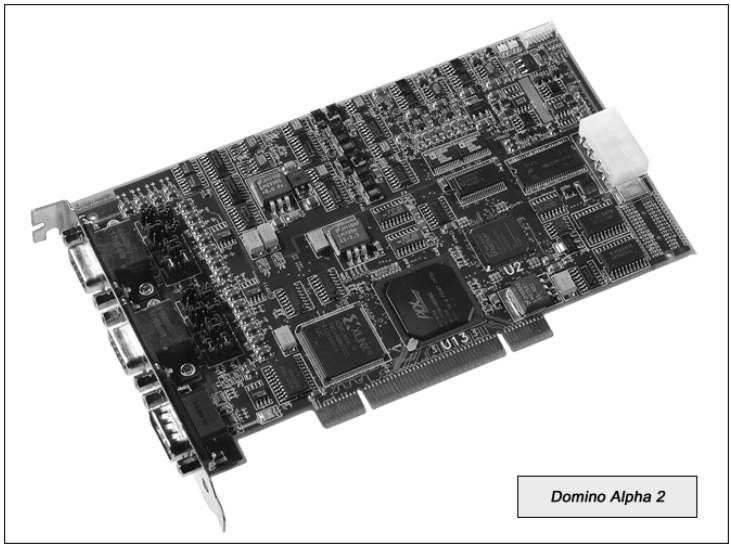
For more information about PCI and PCI-X, refer to the Euresys application note entitled "PCI Bus Variation".

Domino Iota uses the +5 V, +12 V and -12 V power supply rails provided by the PCI bus.

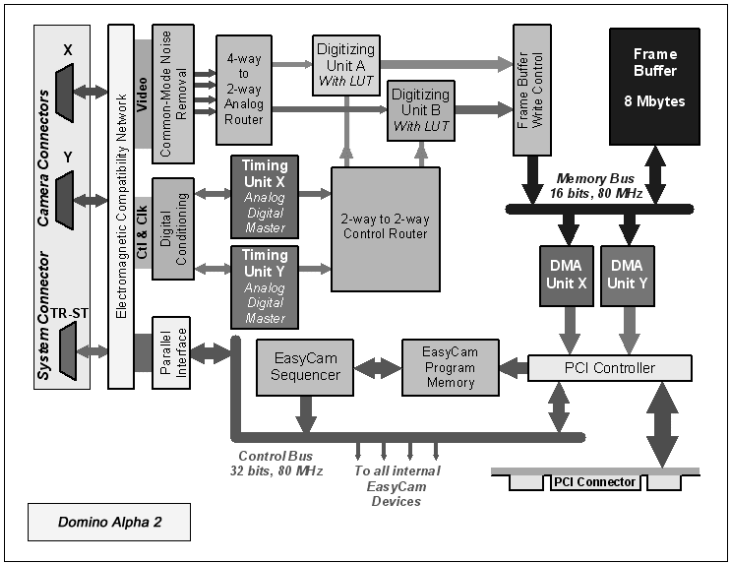
DOMINO Alpha 2 Description

Product presentation

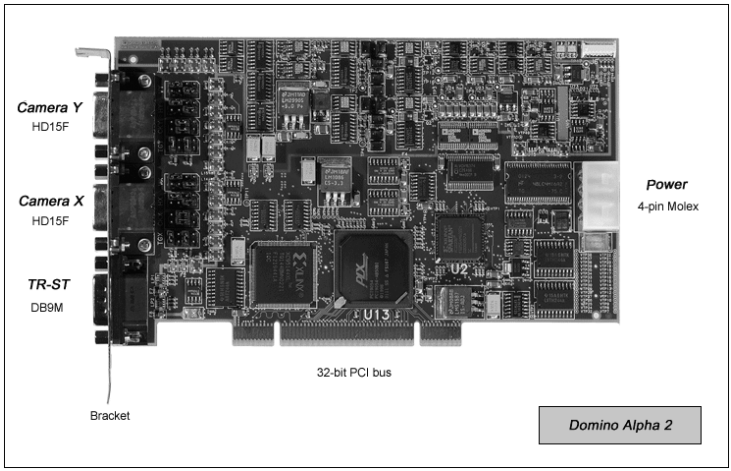
Domino Alpha 2 provides parallel acquisition and independent control from one dual-tap or two single-tap monochrome analog cameras. It is the frame grabber to acquire detailed images or to inspect objects on-the-fly.



Block diagram



Board layout



Bracket layout

The bracket attached to Domino Alpha 2 provides three connectors.

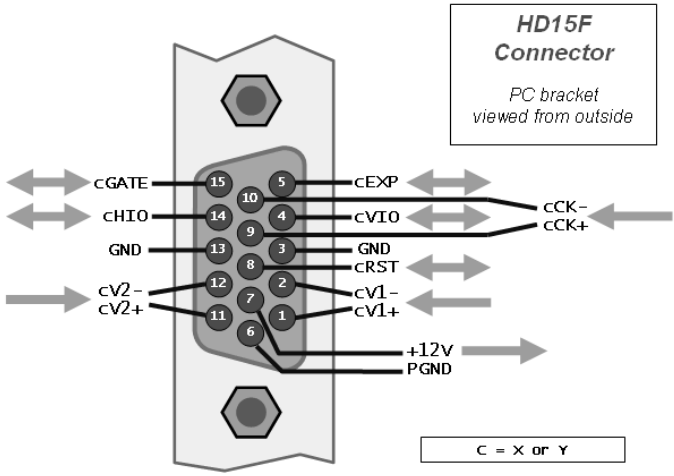
The two upper connectors are for camera connection. They are sub-D high-density 15-pin female connectors. They comply with the Euresys proprietary standard for analog camera connection, used on all Domino boards.
The top connector is called *Camera Y* while the center one is called *Camera X*.

The lower connector is for system connection, such as external trigger or illumination control. It is a sub-D 9-pin male connector.
This connector is called *TR-ST*.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

Camera connector

Domino Alpha 2 offers two on-board high-density 15-pin female sub-D connectors for camera connection. They are named *Camera X* and *Camera Y*.

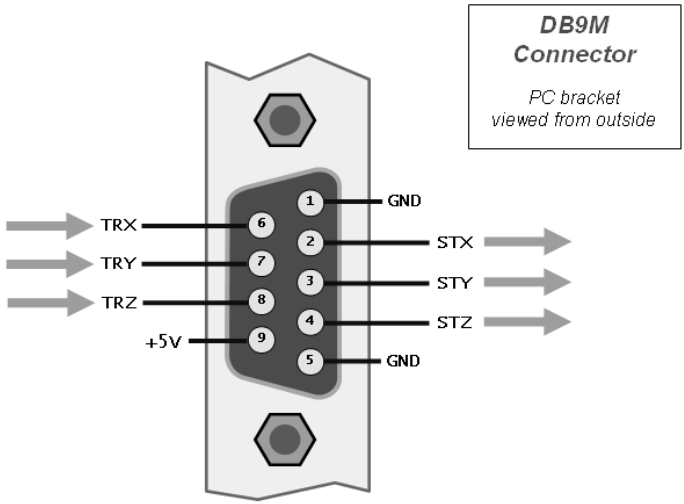


In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

System connector

Domino Alpha 2 provides an on-board 9-pin male sub-D connector named *TR-ST* for system connection, including trigger and strobe lines.

TR-ST means "Trigger-Strobe".
It includes three trigger inputs, three strobe outputs and a +5V power supply voltage. All inputs and outputs have a common ground and are TTL compliant.



Installing interconnection cables to this connector is highly system dependent.

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PCI requirements

PCI stands for "Peripheral Component Interconnect" and refers to standardized means to install an add-on board inside a computer.

Domino Alpha 2 is a short-size PCI card to be inserted in a standard PCI slot inside a PC. The PCI edge connector is compliant with the official PCI specification, revision 2.2. It is 32-bit wide, operates at 33 MHz maximum and supports both 3.3 V and 5 V signaling systems.

Domino Alpha 2 can be used in a 33 MHz or 66 MHz PCI slot like in a 66 MHz, 100 MHz or 133 MHz PCI-X slot. Installing the board on a 66 MHz or faster bus will restrict the bus to conventional PCI at 33 MHz for all agents installed on this bus.

For more information about PCI and PCI-X, refer to the Euresys application note entitled "PCI Bus Variation".

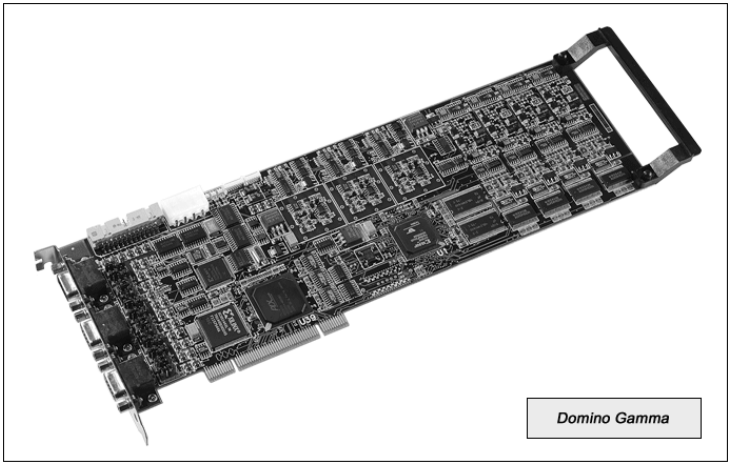
Domino Alpha 2 use the +5 V, +12 V and -12 V power supply rails provided by the PCI bus.

DOMINO Gamma Description

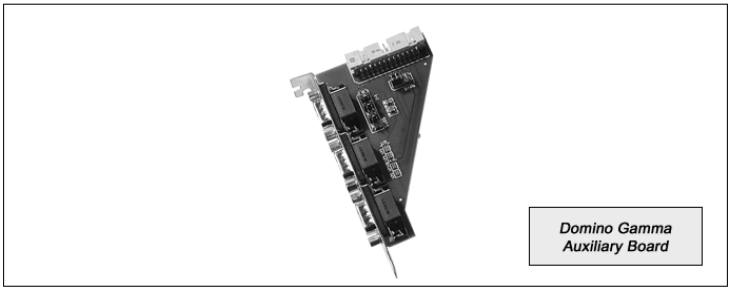
Product presentation

Domino Gamma is a frame grabber dedicated to high-end multiple-camera applications. It provides simultaneously acquisition and independent control from up to three analog cameras on a single PCI board. The three cameras may even have different speeds and resolutions. Domino Gamma acquires images from three single-tap, two dual-tap or one RGB and one single-tap cameras.

Domino Gamma comes with an auxiliary board offering additional interconnection means.

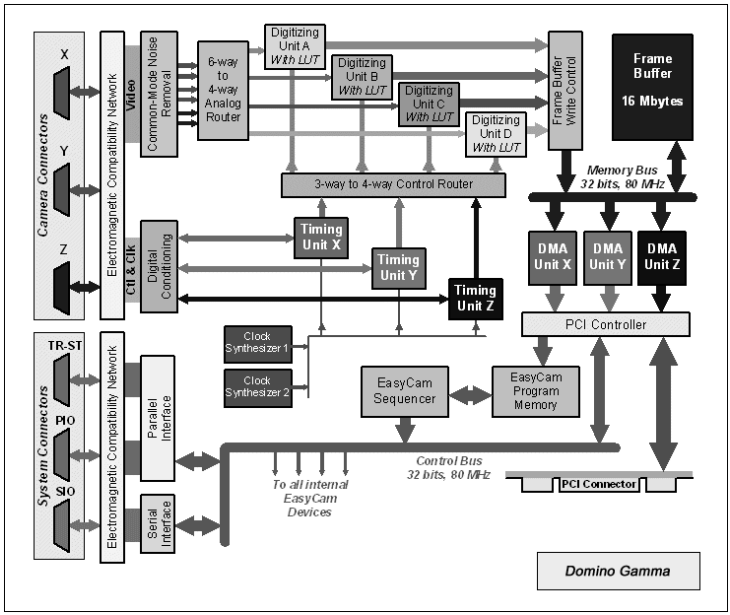


Domino Gamma

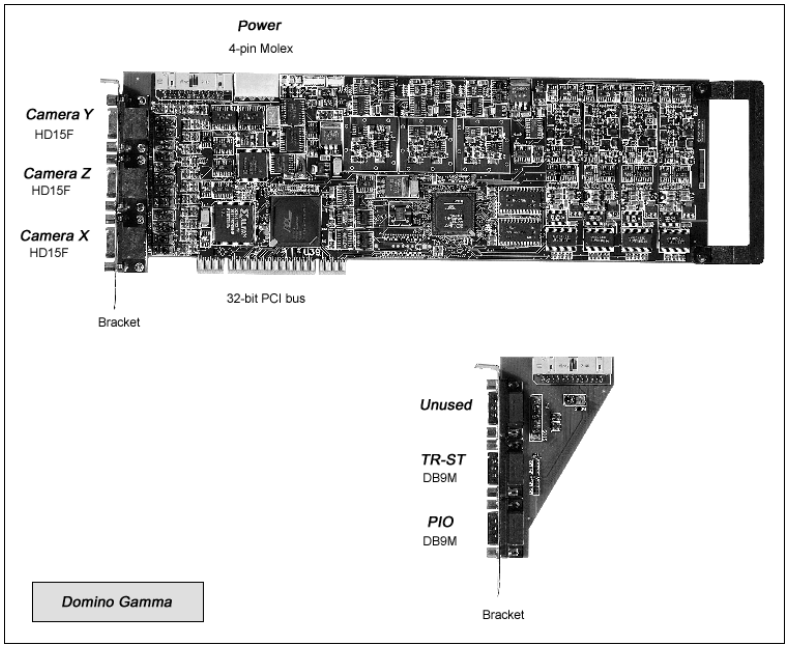


Domino Gamma Auxiliary Board

Block diagram



Board layout



Bracket layout

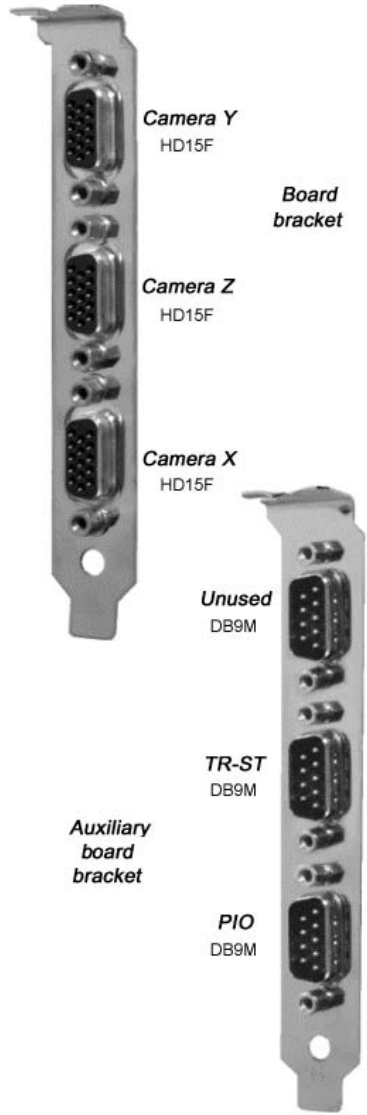
The interconnection structure of Domino Gamma uses two brackets.

The bracket attached to Domino Gamma provides three connectors.
They are all three for camera connection.
They are sub-D high-density 15-pin female connectors. They comply with the Euresys proprietary standard for analog camera connection, used on all Domino boards.
The top connector is called *Camera Y*, the center one is called *Camera Z*, while the lower one is called *Camera X*.

Additional interconnection means are provided on a separate card bracket.
It is attached to an auxiliary board linked to Domino Gamma.

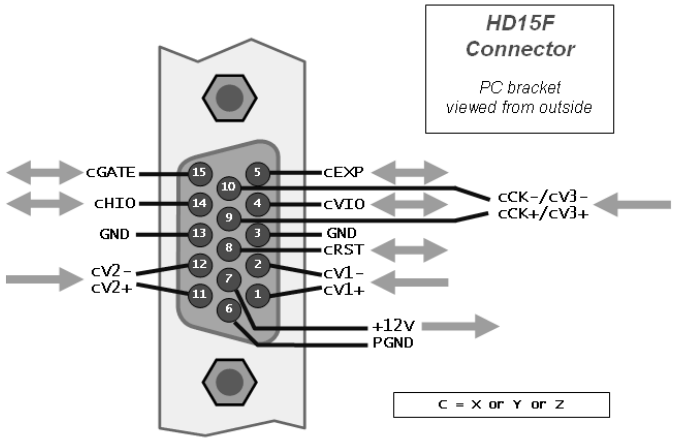
The auxiliary bracket provides three connectors.
The upper connector is unused.
The center connector is for system connection, such as external trigger or illumination control. It is a sub-D 9-pin male connector.
This connector is called *TR-ST*.
The lower connector is for general purpose I/O. It is a sub-D 9-pin male connector.
This connector is called *PIO*.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.



Camera connector

Domino Gamma offers three on-board high-density 15-pin female sub-D connectors for camera connection. They are named *Camera X*, *Camera Y* and *Camera Z*.



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System connectors

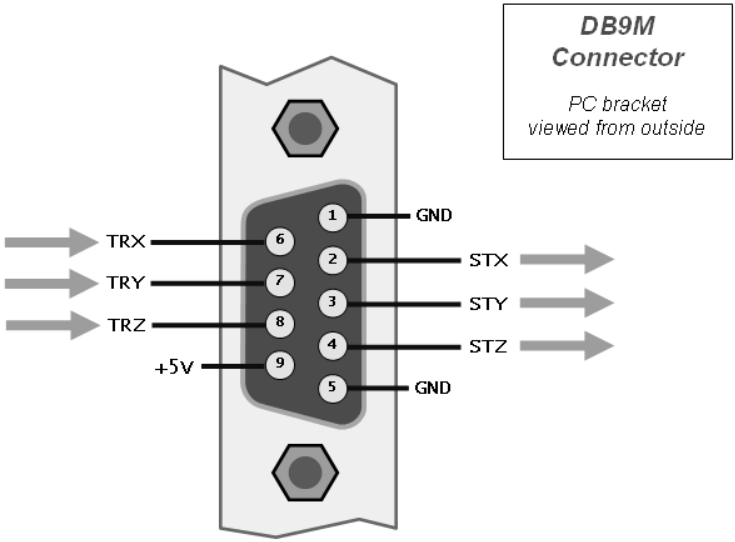
Domino Gamma provides three system connectors on a separate card bracket:

- A 9-pin male sub-D connector named *TR-ST* for system connection, including trigger and strobe lines.

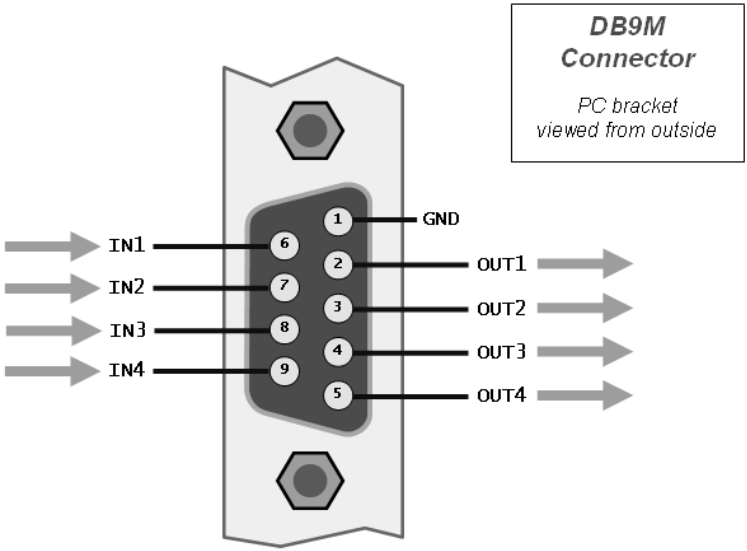
- A 9-pin male sub-D connector named *PIO* for general purpose inputs/outputs.

- An unused 9-pin male sub-D connector.

TR-ST means "Trigger-Strobe". It includes three trigger inputs, three strobe outputs and a +5V power supply voltage. All inputs and outputs have a common ground and are TTL compliant. This connector is found in the center position of the auxiliary bracket.



PIO means "Parallel Input Output". It includes four general purpose inputs and four general purpose outputs. All inputs and outputs have a common ground and are TTL compliant. This connector is found in the lower position of the auxiliary bracket.



Installing interconnection cables to these connectors is highly system dependent.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

PCI requirements

PCI stands for "Peripheral Component Interconnect" and refers to standardized means to install an add-on board inside a computer.

Domino Gamma is a long-size PCI card to be inserted in a standard PCI slot inside a PC. The PCI edge connector is compliant with the official PCI specification, revision 2.2. It is 32 bit wide, operates at 33 MHz maximum and supports both 3.3 V and 5 V signaling systems.

Domino Gamma can be used in a 33 MHz or 66 MHz PCI slot like in a 66 MHz, 100 MHz or 133 MHz PCI-X slot. Installing the board on a 66 MHz or faster bus will restrict the bus to conventional PCI at 33 MHz for all agents installed on this bus.

For more information about PCI and PCI-X, refer to the Euresys application note entitled "PCI Bus Variation".

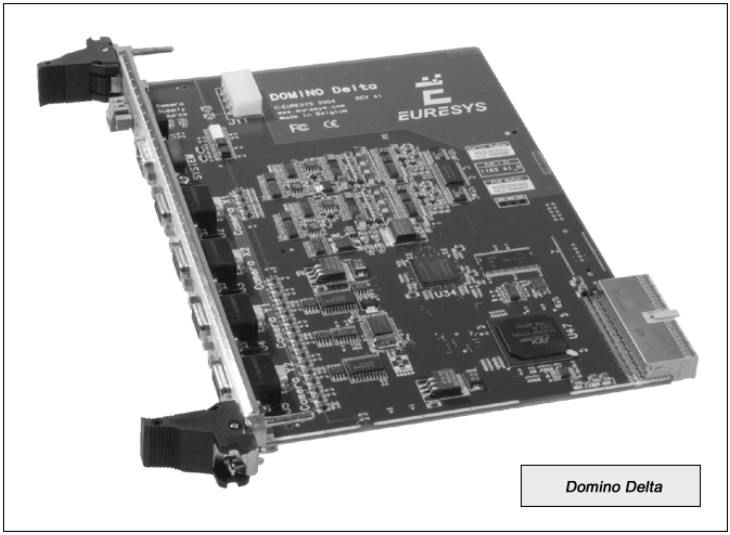
Domino Gamma uses the +5 V, +12 V and -12 V power supply rails provided by the PCI bus.

DOMINO Delta Description

Product presentation

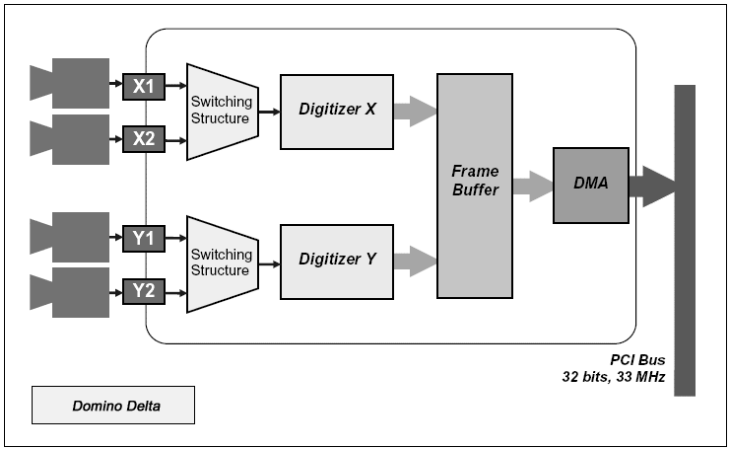
Domino Delta is a four-input frame grabber with two analog-to-digital converters. It exposes two sets of two connectors, able to connect up to four cameras. The two sets operate independently of each other, supporting the simultaneous operation of two cameras, one in each set.

Each input of Domino Delta supports a single-lane monochrome camera, including the double-speed grade. Domino Delta accurately acquires images from cameras with pixel rate up to 32 MHz.
Domino Delta can interface a large variety of single-tap area-scan analog cameras in master mode and efficiently makes use of features such as asynchronous reset, exposure control, external trigger and strobe control.
Domino Delta is equipped with two input and two output opto-isolated lines. These lines are available for easy integration in the user's application.

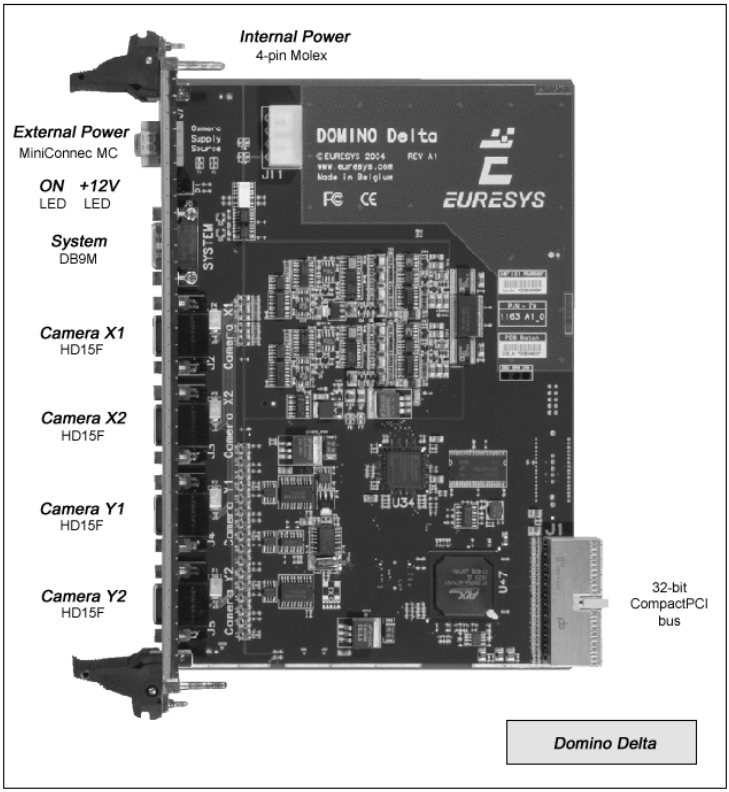


Domino Delta

Block diagram



Board layout



Bracket layout

The bracket attached to Domino Delta provides six connectors.

The upper connector is for camera powering. It is a MiniConnec MC connector.
This connector is called *External Power* (+12V*)*.

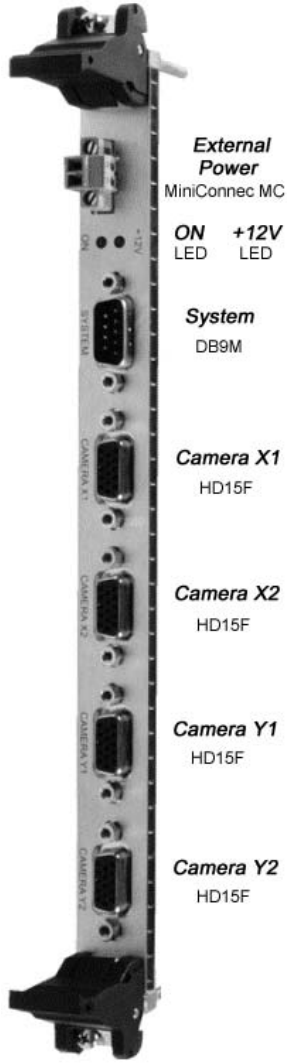
The green LED called *ON* indicates the presence (ON) or absence (OFF) of the board powering (+3.3V).

The green LED called *+12V* indicates the presence (ON) or absence (OFF) of the camera powering (+12V).

The second connector is for system connection, such as external trigger or illumination control. It is a sub-D 9-pin male connector.
This connector is called *System*.

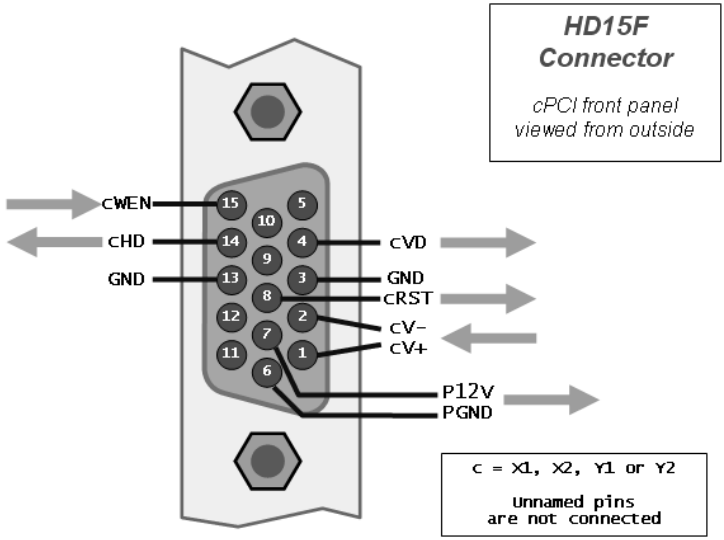
The four bottom connectors are for camera connection. They are sub-D high-density 15-pin female connectors. They comply with the Euresys proprietary standard for analog camera connection, used on all Domino boards.
These connectors are called, from top to bottom, *Camera X1*, *Camera X2*, *Camera Y1* and *Camera Y2*.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.



Camera connector

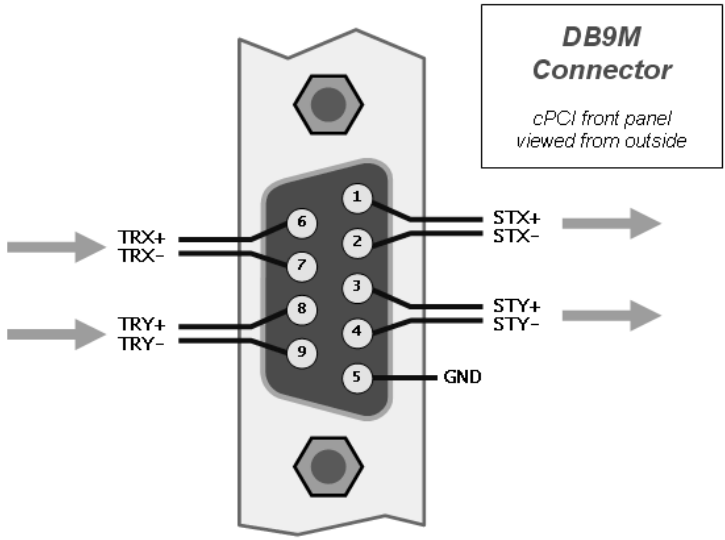
Domino Delta offers four on-board high-density 15-pin female sub-D connectors for camera connection. They are named *Camera X1*, *Camera X2*, *Camera Y1* and *Camera Y2*.



In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

System connector

Domino Delta provides an on-board 9-pin male sub-D connector named *System* for system connection, including trigger and strobe lines.



Installing interconnection cables to this connector is highly system dependent.

In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

PCI requirements

PCI stands for "Peripheral Component Interconnect" and refers to standardized means to install an add-on board inside a computer.

Domino Delta is a 6U, 4HP CompactPCI card to be inserted in a standard CompactPCI slot inside an industrial PC. The CompactPCI connector is compliant with the official CompactPCI specification PICMG 2.0 R3.0 dated October 1, 1999. It is 32-bit wide, operates at 33 MHz maximum, and supports 3.3 V or 5 V signaling system.

Domino Delta can be used in a 33 MHz or 66 MHz CompactPCI slot. Installing the board on a 66 MHz bus will restrict the speed to 33 MHz for all PCI agents installed on the CompactPCI bus.

For more information about PCI and PCI-X, refer to the Euresys application note entitled "PCI Bus Variation".

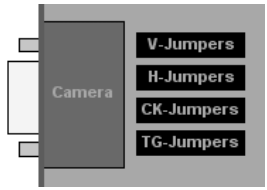
Domino Delta uses the +5 V, +12 V and -12 V power supply rails provided by the CompactPCI bus.

DOMINO series Installation Instructions

Hardware installation procedure for Domino Iota, Alpha 2 and Gamma

Jumper settings

Domino Iota, Alpha 2 and Gamma exhibit four jumper-blocks per camera connector. They are more conveniently configured before installation.



In depth information is available in the electronic documentation coming with Euresys products. Domino manuals are parts of Euresys MultiCam documentation.

Board installation

Domino Iota, Alpha 2 and Gamma are PCI add-on boards. Before operation, they must be physically inserted in an available PCI slot of your computer.
Multiple Euresys boards can be hosted in the same computer, as long as slots are available.

Recommended installation procedure:

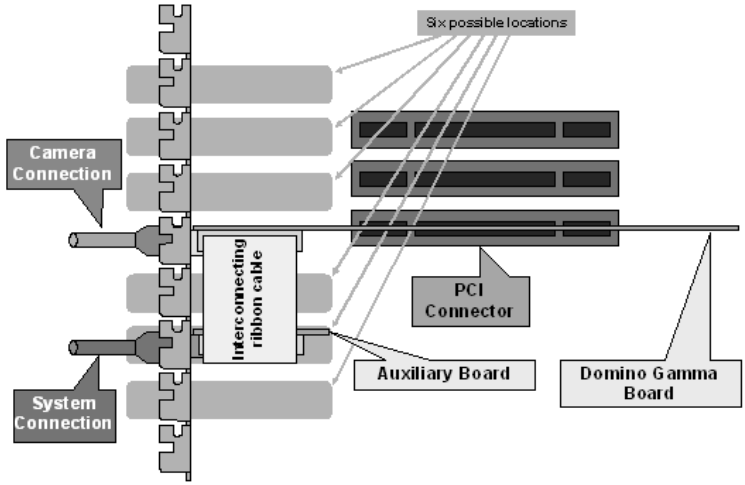
1. Switch-off the computer and all connected peripherals (monitor, printer...).
2. Discharge any static electricity that could be accumulated on your body. You can achieve this by touching an unpainted metal part of the enclosure of your computer with a bare hand. Make sure that the computer is linked to the AC power outlet with proper earth connection.
3. Disconnect all cables from your computer, including AC power.
4. Open the computer enclosure to gain access to the PCI slots according to the manufacturer instructions.
5. Locate an available PCI slot and remove the blank bracket associated with this location. To achieve this, remove the securing screw and keep it aside for later use in the procedure. Keep the blank bracket in a known place for possible re-use.
6. Unwrap the Domino packing, take the board and carefully hold it. Avoid any contact of the board with unnecessary items, including your clothes.
7. Gently insert the board in the targeted PCI slot, taking care to push it down fully into the slot. If you experience some resistance, remove the board and repeat the operation. You should attempt to make a perfect board-to-slot mechanical alignment for best results. Ensure that the lower part of the bracket is inserted into the corresponding enclosure fastening.
8. Secure the board with the saved screw.
9. For Domino Gamma, optionally install the auxiliary board (see following pages).
10. If needed, establish the camera power source connection (see following pages).
11. Close the computer enclosure according to the manufacturer instructions.
12. Establish the camera connection (see following pages).

Auxiliary board installation

Domino Gamma comes with an auxiliary board that includes an additional card bracket. It provides highly convenient means for system connection not directly related to camera. Installing this board is optional.

The two jumper-blocks of auxiliary board do not need any modification. Leave them as delivered from factory.

The auxiliary board must be installed in a free PC bracket location, as depicted in the drawing, taking into account the length of the provided interconnecting ribbon cable.



Note. Install the bracket after installing Domino Gamma, with the same precautions.

Auxiliary board recommended installation procedure:

1. Choose an available location and remove the associated blank bracket. To achieve this, remove the securing screw and keep it aside for later use in the procedure. Keep the blank bracket in a known place for possible re-use.
2. Place the auxiliary board in the targeted location. Ensure that the lower part of the bracket is inserting into the corresponding enclosure fastening.
3. Secure the auxiliary board with the saved screw.
4. Fasten the interconnecting ribbon cable on both sides. If necessary, bend this cable.

Hardware installation procedure for Domino Delta

Domino Delta is a CompactPCI add-on board. Before operation, it must be physically inserted in an available CompactPCI slot of the industrial PC.
Multiple Euresys boards can be hosted in the same industrial PC, as long as slots are available.

Domino Delta needs no hardware setup adjustment (switch or jumper).

Recommended installation procedure:

1. Switch-off the industrial PC and all connected peripherals (monitor, printer...).
2. Discharge any static electricity that could be accumulated on your body. You can achieve this by touching an unpainted metal part of the enclosure of your industrial PC with a bare hand. Make sure that the industrial PC is linked to the AC power outlet with proper earth connection.
3. Locate an available CompactPCI slot and remove the blank front plate associated with this location. Keep the blank front plate in a known place for possible re-use.
4. Unwrap the Domino packing, take the board and carefully hold it. Avoid any contact of the board with unnecessary items, including your clothes.
5. Prior to the installation of the board, disengage the insertion/extraction handles by first unlocking the handles and pressing them down.
6. Gently insert the board in the chosen CompactPCI slot and, using the insertion/extraction handles, ensure that it is properly seated in the backplane. The front panel should be flush with the rack front and the insertion/extraction handles should be locked.
7. Fasten the front panel retaining screws.
8. If needed, establish the power source connection.
9. Establish the camera connection.

Recommended removal procedure:

1. Disconnect all cables that are connected to the board.
2. Loosen both of the front panel retaining screws.
3. Unlock the insertion/extraction handles.
4. Gently disengage the board from the backplane by pressing down on the insertion/extraction handles and pull the board out of the CompactPCI slot ensuring that the board does not make any contact with adjacent boards. If the insertion/extraction handles do not move, it is that they are not unlock; unlock them and try again.

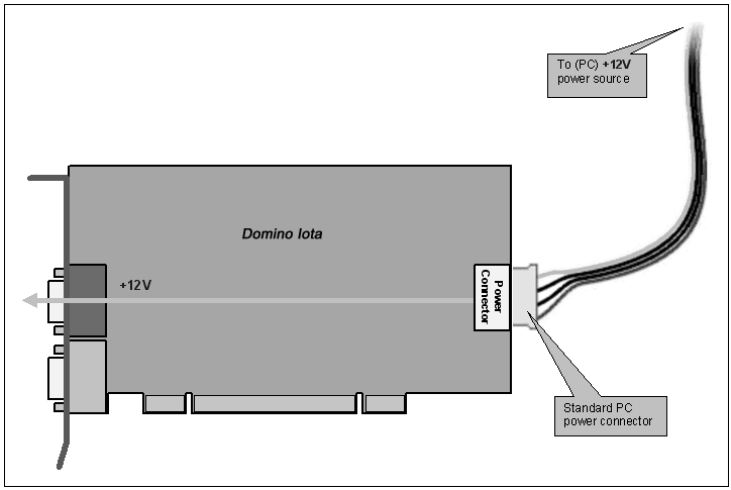
Camera power source connection

For analog cameras, it is usual to deliver the power voltage to the camera from the frame grabber through the interconnecting cable.

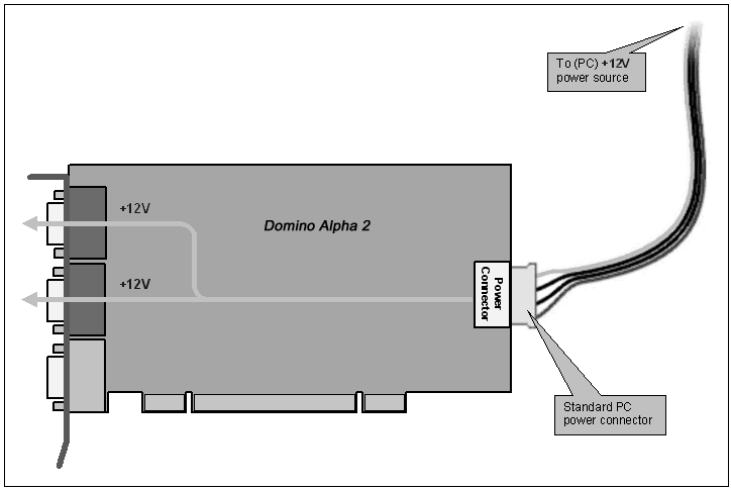
To avoid the camera supply current flowing through the sensitive PCI connector, it has been chosen to bring a 12-volt power supply to the Domino boards directly from the host PC power unit using a standard disk-drive connector.

If required, connect the camera power supply as shown in the drawings below.

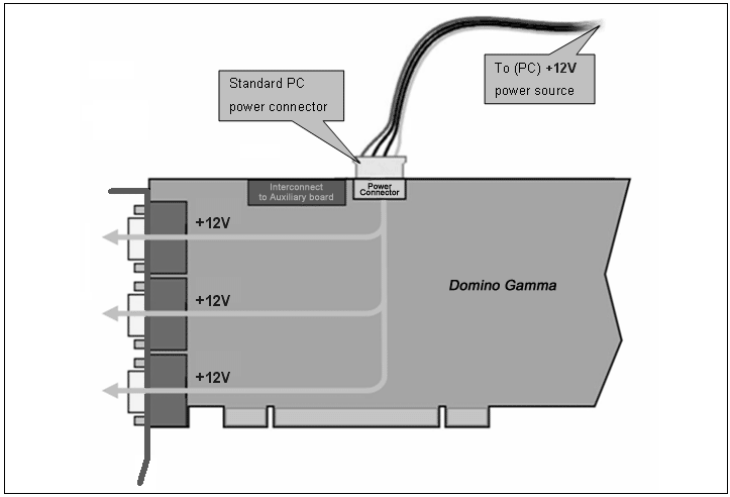
Domino Iota power connector location



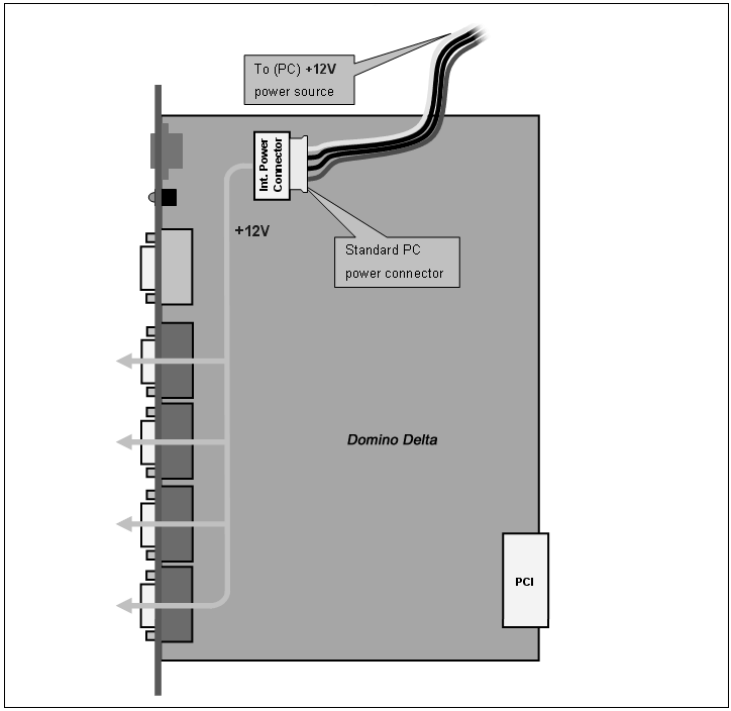
Domino Alpha 2 power connector location



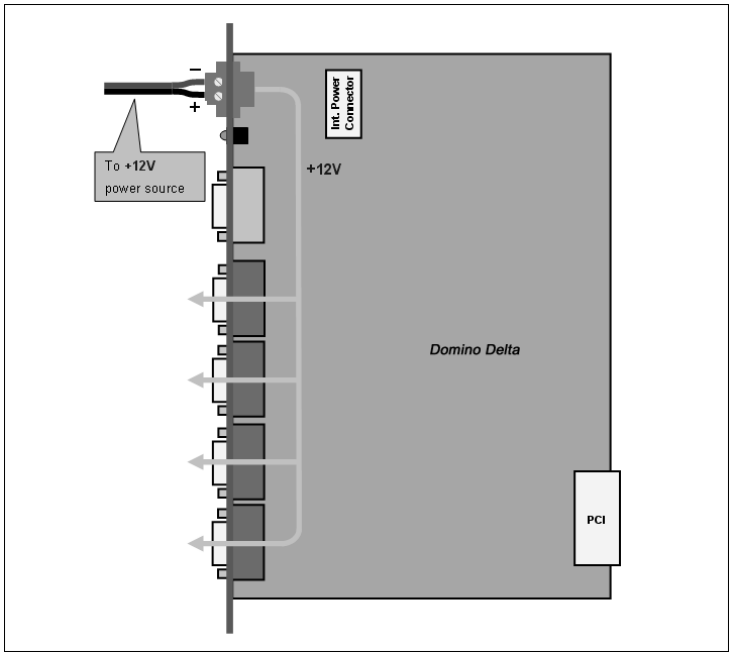
Domino Gamma power connector location



Domino Delta power connector location



In addition to the standard disk-drive connector for internal powering, Domino Delta is equipped with an external connector for connecting an external camera power supply.



Camera connection

Linking a camera to a Domino board requires a special interconnecting cable that depends on the camera involved.

In depth information is available in the electronic documentation coming with Euresys products.

Euresys has developed a part numbering system and naming conventions for the camera cables. Cable reference information is provided in the Euresys MultiCam documentation. It fully explains how the cable is built, as well as internal functional details.

The idea is to provide the user with enough information for having the cable manufactured by himself or by a third party.

Some cables can be purchased from Euresys. Check with Euresys for specific cable availability.

The part numbers for Domino family cables are prefixed with "A15", standing for "Analog 15-pin". The grabber-side connector is high-density 15-pin sub-D male connector.

MultiCam Installation Instructions

Hardware requirements

Following features are recommended to operate MultiCam:	
CPU	Pentium III Class or above
System memory	Minimum 128 MB
Hard disk drive	Minimum 150 MB free

Windows installation

Software requirements

MultiCam and Domino boards can be operated on the following Microsoft Windows operating systems.

OS version	Additional information
Windows Server 2003	-
Windows XP Embedded	-
Windows XP	-
Windows 2000	Service Pack 2 or later

The development tools are C, C++, ActiveX and .NET* based. Thus all popular development environments can be used to develop applications using Domino boards and MultiCam. Moreover, sample programs are provided for various development environments.

* Check the electronic documentation for details.

IDE version
In depth information about the supported development environment versions is available in the electronic documentation coming with Euresys products.

The electronic documentation coming with Euresys products is provided in Microsoft standard CHM format. Additional information can be provided as Adobe Acrobat PDF files.

Utilities	File format
Internet Explorer 4 or later *	For CHM files.
Adobe Acrobat Reader 4 or later *	For PDF files.

* For your convenience, a version is provided on most Euresys CD-ROM.

Installation instructions

1. Switch-on your computer and start Windows. Log in with administrative rights.
2. If a Domino board was newly added in the system, Windows "Hardware Installation Wizard" will detect the board and possibly prompt for user action. Don't care about this wizard.

3. Place Euresys CD-ROM in the drive. The setup application starts automatically. If this is not the case, run 'setup.exe' directly from the CD-ROM.
4. Select the option to install MultiCam.
5. Depending on the operating system, the installation procedure may differ. Follow carefully the setup program instructions.
6. Check for proper installation: connect a camera to the Domino board and run *eVision Evaluator*.

Linux installation

Run-time software requirements

MultiCam and Domino boards can be operated on the following Linux operating systems.

OS version	Additional information
RedHat 7.3	Kernel 2.4.18-3
RedHat 8.0	Kernel 2.4.18-14

The development tools are C or C++ based. Thus all popular development environments can be used to develop applications using Domino boards and MultiCam.
Moreover, sample programs are provided for various development environments.

IDE version
In depth information about the supported development environment versions is available in the electronic documentation coming with Euresys products.

The electronic documentation coming with Euresys products is provided in standard HTML format. Additional information can be provided as Adobe Acrobat PDF files.

Utilities	File format
Mozilla 0.9.9 or later	For HTML files.
xpdf or Adobe Acrobat Reader 4 (or later)	For PDF files.

Installation instructions

1. Switch-on your computer and start Linux.
2. Place Euresys CD-ROM in the drive and mount it.
3. Copy `multicam-x.y.tar.gz` on hard disk drive where `x.y` is the release version of MultiCam.
   Example: multicam-4.4.tar.gz
4. Extract the archive: `# tar -xzvf multicam-x.y.tar.gz`
5. Go into the MultiCam directory: `# cd multicam-x.y`
6. Log in as root.
7. Execute the installation script: `# ./install`
8. Check for proper installation: connect a camera to the Domino board and run *eVision Evaluator*.

Technical Specifications

Domino Iota technical specifications

Characteristics

Dimensions	176 mm x 107 mm
Power consumption	4.4 W
PCI capability	32-bit, 33 MHz, 3.3 V or 5 V signaling
Certification	FCC class B and CE
Video connection	1 single-tap camera

Operating conditions

Parameter		Symbol	Min	Typ	Max	Units
Power supply +5V		V_{+5V}	4.75	5.00	5.25	V
Power supply +12V		V_{+12V}	11	12	13	V
Power supply -12V		V_{-12V}	-11	-12	-13	V
Analog video input levels	Overall peak to peak amplitude	V_{in}	0.6	1.0	2.0	V
	Sync amplitude	V_{sync}	180	300	600	mV
	Rise/fall time of sync edges		50		300	ns
	Tolerated noise on sync				50	mV
Ambient operating temperature		T_A	0		50	°C

Power supply current requirements

Parameter	Symbol	Max	Units
Supply current for +5V	I_{+5V}	400	mA
Supply current for +12V	I_{+12V}	150	mA
Supply current for -12 V	I_{-12V}	50	mA

Domino Alpha 2 technical specifications

Characteristics

Dimensions	176 mm x 107 mm
Power consumption	8 W
PCI capability	32-bit, 33 MHz, 3.3 V or 5 V signaling
Certification	FCC class B and CE
Video connections	Up to 4 single-tap switched cameras or 2 dual-tap switched cameras and more

Operating conditions

Parameter		Symbol	Min	Typ	Max	Units
Power supply +5V		V_{+5V}	4.75	5.00	5.25	V
Power supply +12V		V_{+12V}	11	12	13	V
Power supply -12V		V_{-12V}	-11	-12	-13	V
Analog video input levels	Overall peak to peak amplitude	V_{in}	0.6	1.0	2.0	V
	Sync amplitude	V_{sync}	180	300	600	mV
	Rise/fall time of sync edges		50		300	ns
	Tolerated noise on sync				50	mV
Ambient operating temperature		T_A	0		50	°C

Power supply current requirements

Parameter	Symbol	Max	Units
Supply current for +5V	I_{+5V}	800	mA
Supply current for +12V	I_{+12V}	270	mA
Supply current for -12 V	I_{-12V}	70	mA

Domino Gamma technical specifications

Characteristics

Dimensions	314 mm x 107 mm
Power consumption	15 W
PCI capability	32-bit, 33 MHz, 3.3 V or 5 V signaling
Certification	FCC class B and CE
Video connections	Up to 6 single-tap switched cameras or 3 dual-tap switched cameras or 2 RGB switched cameras and more

Operating conditions

Parameter		Symbol	Min	Typ	Max	Units
Power supply +5V		V_{+5V}	4.75	5.00	5.25	V
Power supply +12V		V_{+12V}	11	12	13	V
Power supply -12V		V_{-12V}	-11	-12	-13	V
Analog video input levels	Overall peak to peak amplitude	V_{in}	0.6	1.0	2.0	V
	Sync amplitude	V_{sync}	180	300	600	mV
	Rise/fall time of sync edges		50		300	ns
	Tolerated noise on sync				50	mV
Ambient operating temperature		T_A	0		50	°C

Power supply current requirements

Parameter	Symbol	Max	Units
Supply current for +5V	I_{+5V}	1.1	A
Supply current for +12V	I_{+12V}	600	mA
Supply current for -12 V	I_{-12V}	200	mA

Domino Delta technical specifications

Characteristics

Dimensions	160 mm x 233.35 mm
Power consumption	7 W
PCI capability	cPCI 32-bit, 33 MHz, 3.3 V or 5 V signaling
Certification	FCC class B and CE
Video connections	4 single-tap cameras

Operating conditions

Parameter		Symbol	Min	Typ	Max	Units
Power supply +5V		V_{+5V}	4.75	5.00	5.25	V
Power supply +12V		V_{+12V}	11	12	13	V
Power supply -12V		V_{-12V}	-11	-12	-13	V
Analog video input levels	Overall peak to peak amplitude	V_{in}	0.6	1.0	2.0	V
	Sync amplitude	V_{sync}	180	300	600	mV
	Rise/fall time of sync edges		50		300	ns
	Tolerated noise on sync				50	mV
Ambient operating temperature		T_A	0		50	°C

Power supply current requirements

Parameter	Symbol	Max	Units
Supply current for +5V	I_{+5V}	750	mA
Supply current for +12V	I_{+12V}	210	mA
Supply current for -12 V	I_{-12V}	70	mA