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Matrox Meteor-II /Digital

Installation and Hardware Reference

Manual no. Y10762-101-0103

January 9, 2013

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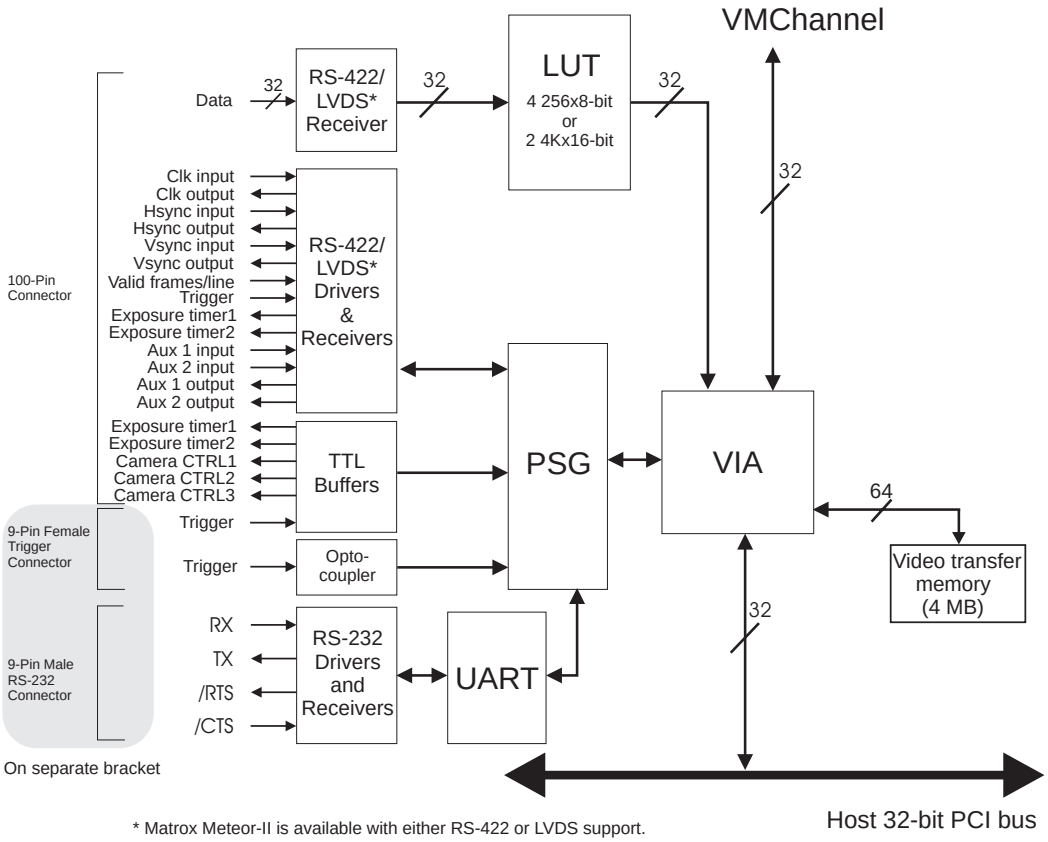
Chapter 1: Introduction

This chapter outlines the key features of the Matrox Meteor-II /Digital board.

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Matrox Meteor-II /Digital

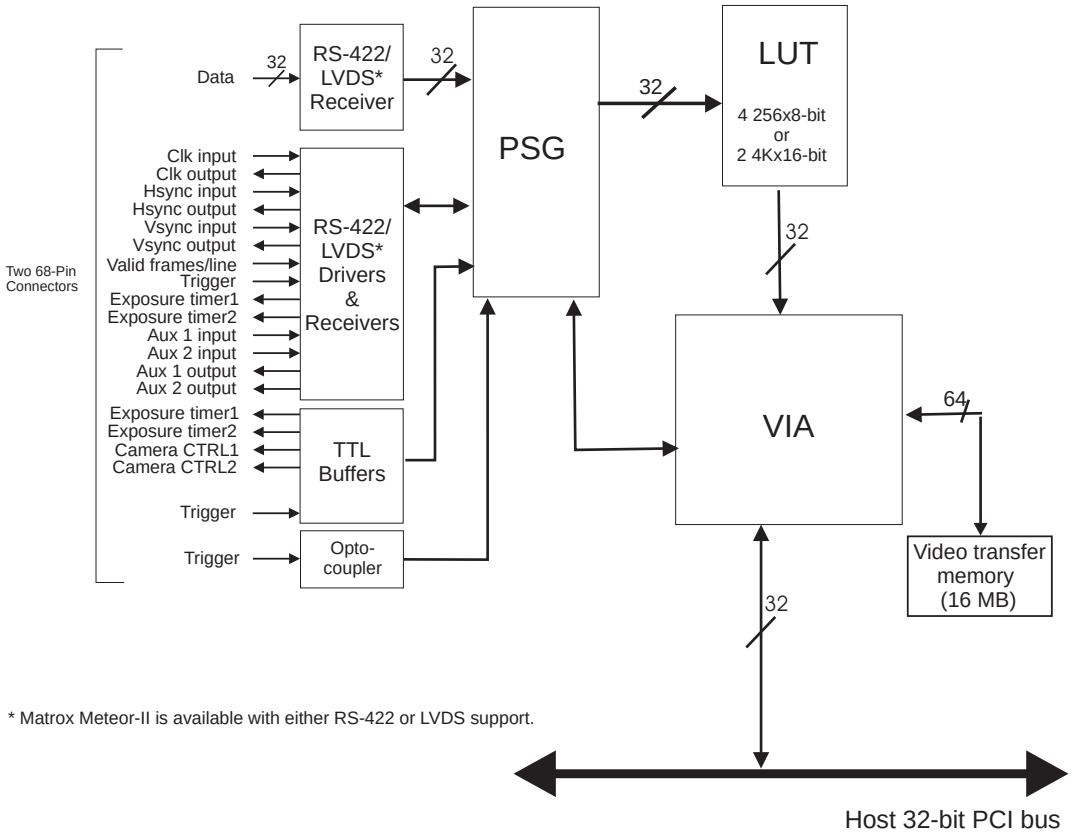
Matrox Meteor-II /Digital is a frame grabber used for digital video acquisition. This board is available in a PCI or a PC/104-*Plus* form factor. The diagram for Matrox Meteor-II /Digital for PCI is shown below.



* Matrox Meteor-II is available with either RS-422 or LVDS support.

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The diagram for Matrox Meteor-II /Digital for PC/104-*Plus* is the following.



* Matrox Meteor-II is available with either RS-422 or LVDS support.

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Acquisition features

Matrox Meteor-II /Digital can acquire digital video from cameras using the RS-422 or LVDS differential signed format. It supports image acquisition from genlocked cameras in 4 x 8-bit, 2 x 16-bit, or 1 x 32-bit configurations; therefore, up to four cameras can be attached to acquire four 8-bit images or one component RGB image. The board also supports multi-tap configurations (up to four taps). In addition, Matrox Meteor-II /Digital accepts an external trigger, and can operate in either asynchronous reset mode or next valid frame/field mode.

Data transfer

The Matrox Meteor-II /Digital board allows the transfer of live video to Host memory or off-board display memory. To prevent loss of data during long bus-access latencies found in heavily loaded computer systems, Matrox Meteor-II /Digital for PCI form factor features 4 Mbytes of video transfer memory for temporary frame storage, whereas Matrox Meteor-II /Digital for PC/104-*Plus* includes 16 Mbytes of video transfer memory. The board is also equipped with the Matrox Video Interface ASIC (VIA), which acts as a video-to-PCI bridge.

The Matrox Meteor-II /Digital for PCI also has a VMChannel interface (non-bus controller), which is used to send data to other VM devices found on other Matrox Imaging boards (for example, Matrox Genesis main board or Matrox Genesis processor board)[1].

1. Since the Matrox Meteor-II boards cannot perform the function of bus controller, they must be connected with at least one board which is bus controller capable; otherwise, VMChannel transfers will not work.

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Software

To operate Matrox Meteor-II /Digital, you can purchase one or more Matrox Imaging software products that support the Matrox Meteor-II /Digital board. These are the Matrox Imaging Library (MIL) and its derivatives (MIL-Lite, ActiveMIL, ActiveMIL-Lite, and Matrox Inspector). Consult your software manual for supported Windows environments.

❖ Note that, although other software products might be available to operate Matrox Meteor-II /Digital, the discussion throughout this manual is based in terms of Matrox Imaging software products.

MIL

MIL is a development library which provides an extensive list of commands used to capture, process, analyze, transfer, display, and archive images. Processing and analysis operations include: spatial filtering operations, morphological operations, measurements, blob analysis, optical character recognition (OCR), pattern matching, matrix/bar code reading, and calibration.

MIL-Lite

MIL-Lite is a subset of MIL. It includes all the MIL commands for image acquisition, transfer, display control, and archiving.

ActiveMIL

ActiveMIL is a set of ActiveX controls that are based on MIL. ActiveMIL was designed for rapid application development (RAD) tools, such as Microsoft's Visual Basic. ActiveMIL is included with MIL (ActiveMIL-Lite is included with MIL-Lite).

Matrox Inspector

Matrox Inspector is an interactive Windows application for image capture, processing, analysis, and archiving.

MIL application developers can use Matrox Inspector as a prototyping tool to quickly build proof-of-concept demonstrations for their machine vision, image analysis, and medical imaging system. End users can use Matrox Inspector to perform and automate image enhancement and measurement tasks.

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Matrox Intellicam

Matrox Intellicam is an interactive Windows program that allows fast camera interfacing and provides interactive access to all the acquisition features of your Matrox board. For boards that accept non-standard video sources, Matrox Intellicam also has the ability to create custom digitizer configuration format (DCF) files, which MIL and its derivatives use to interface to specific non-standard video sources. Matrox Intellicam is included with MIL /ActiveMIL and MIL-Lite /ActiveMIL-Lite.

What you need to get started

To begin using Matrox Meteor-II /Digital, you need the following:

- A computer with a PCI bus and an Intel Pentium processor (or equivalent) or better.
- Microsoft Windows if using Matrox Imaging software (consult the Matrox Imaging software package for specific supported environments and computer memory/storage requirements).

Other useful considerations

- A computer with a relatively up-to-date PCI chipset, such as the Intel 440BX, 810, 815E, 820, 840, or 850 for full Matrox Meteor-II functionality. These chipsets are recommended because they generally offer better performance in terms of data transfer rates.
- A computer with an empty full-length 32-bit PCI expansion slot (bus-master capable).
- A CD drive, and a hard disk or network drive on which to install the Matrox Meteor-II software.

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Inspecting the Matrox Meteor-II /Digital package

When you unpack your Matrox Meteor-II /Digital package, you should check its contents. Note that optional parts might or might not be included, depending on what you ordered. If something is missing or damaged, contact your Matrox representative.

Standard package

If you ordered Matrox Meteor-II /Digital, you should receive the following items:

- The Matrox Meteor-II /Digital board.
- The *Matrox Meteor-II /Digital Installation and Hardware Reference* manual (this document).
- A bracket with flat cables that attach to the trigger and RS-232 input connectors, included with Matrox Meteor-II /Digital for PCI.
- Two video input mating connectors (low profile IDC connectors) for the Matrox Meteor-II /Digital for PC/104-*Plus*.

Optional items

You might have also ordered one or more of the following:

- DBHD100-TO-OPEN cable for the 100-pin digital interface connector on the Matrox Meteor-II /Digital board for PCI.
- The VMChannel interconnect kit (GEN-BUS/#) for Matrox Meteor-II /Digital for PCI.
- MIL-32/CD, which includes ActiveMIL; MIL-LITE/CD, which includes ActiveMIL-Lite; or Matrox INSPECTOR-32/CD. Both MIL and MIL-Lite CDs include Matrox Intellicam.

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Handling components

The electronic circuits in your computer and the circuits on Matrox Meteor-II /Digital are sensitive to static electricity and surges. Improper handling can seriously damage the circuits. Be sure to follow these precautions:

- Drain static electricity from your body by touching a metal fixture (or ground) before you touch any electronic component.
- Avoid letting your clothing come in contact with the circuit boards or components.

▲ *Caution*

Before you add or remove devices from your computer, always **turn off** the power to your computer and all peripherals.

Installation overview

The installation procedure consists of the following steps:

1. Complete the hardware installation as described in Chapter 2. If you have any problems, refer to Appendix A.
2. Complete the software installation as described in Chapter 3.

More information

For information on using multiple Matrox Meteor-II boards, refer to Chapter 4, and for in-depth hardware information, refer to Chapter 5.

If you want technical information about Matrox Meteor-II /Digital, including specifications and connector descriptions, and pinouts, refer to Appendix B.

A history of the development of Matrox Meteor-II /Digital is available in Appendix C.

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Conventions

When the term *Host* is used in this manual, it refers to your computer.

This manual occasionally makes reference to a MIL-Lite command. However, anything that can be accomplished with MIL-Lite can also be accomplished with MIL, ActiveMIL, ActiveMIL-Lite, or Matrox Inspector.[1]

Need help?

Appendix A offers solutions to potential problems. If your Matrox Meteor-II /Digital installation questions are not answered in this manual, contact your local Matrox representative, Matrox Sales Office, or Matrox Imaging Customer Support Group (see the *Customer Support* section at the back of this manual for telephone numbers).

In the unlikely event of a failure, the warranty and *Product Assistance Request Form* at the back of this manual outlines return conditions and procedures.

1. Most items can be accomplished with Matrox Inspector.

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Chapter 2: Hardware installation

This chapter explains how to install the Matrox Meteor-II /Digital hardware.

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Installing Matrox Meteor-II /Digital

Before you install your board, some precautionary measures must be taken. Turn off the power to the computer and its peripherals, and drain static electricity from your body (by touching a metal part of the computer chassis). Next, follow the steps to install your board according to its form factor: PCI or PC/104-*Plus*.

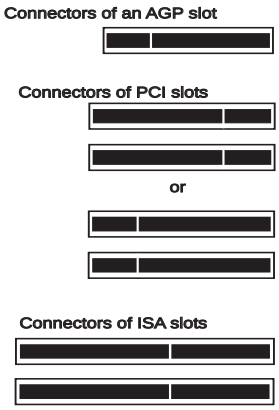
❖ If you are not using Windows NT as your operating system, your board must be installed before you install the software (either MIL or one of its derivatives). If you are adding another Matrox Meteor-II to your computer, you will have to re-install your software after installing your board.

Installing Matrox Meteor-II /Digital for PCI

Use the following steps to install your Matrox Meteor-II board for PCI:

1. Remove the cover from your computer using the instructions from your computer manual.
2. If you plan to use the RS-232 input connector or the trigger connector, check that you have two adjacent empty PCI slots to accommodate the board and the adapter bracket (one slot is enough if you do not need to use the adapter bracket). If you do not have empty slots, remove a PCI board(s) from your computer to make room for your Matrox Meteor-II board, and take note of the slot number(s) you choose.

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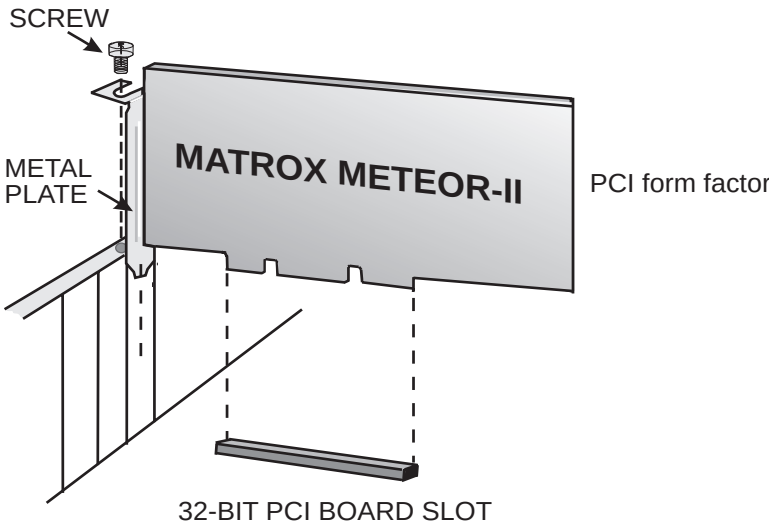


▲ *Caution*

Some computers have a large, black-ridged heat sink that prevents boards from using most PCI board slots. Your Matrox Meteor-II **must not** touch this heat sink. Therefore, choose a slot where the board completely avoids it.

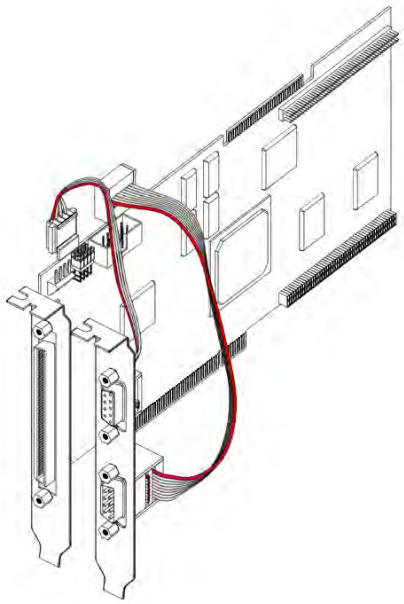
3. If present, remove the blank metal plate located at the back of the selected slot. Keep the removed screw; you will need it to fasten the Matrox Meteor-II board.

4. Carefully position Matrox Meteor-II in the selected PCI slot as illustrated below. If you are using a tower computer, orient the board to suit the board slots in your computer.



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5. Once perfectly aligned with an empty slot, press the board firmly but carefully into the connector.
6. Anchor the board by replacing the screw that you removed.
7. Follow the steps below to install the adapter bracket:
   a. If present, remove the blank metal plate located at the back of a slot next to the Matrox Meteor-II /Digital board; do not discard this screw.
   b. Install the bracket with the trigger and RS-232 input connectors and fasten it with the screw you just removed.
   c. Connect the cables to the 4-pin trigger connector and the 10-pin RS-232 connector on the Matrox Meteor-II /Digital board (see figure below).



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d. Replace the cover of your computer.

e. Connect your video sources. For details, see the *Connecting external devices* section.

f. Turn on your computer.

In some cases, when you boot your computer, Windows' Plug-and-Play system will detect a new PCI card and you will be asked to assign a driver to it. At this point, you should click on **Cancel** because the driver will be installed during the installation of MIL or one of its derivatives.

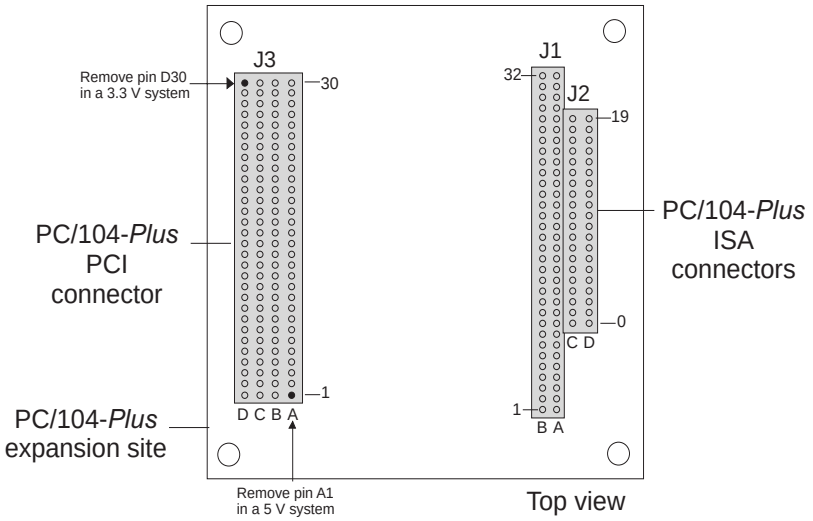
Installing Matrox Meteor-II /Digital for PC/104-*Plus*

Use the following steps to install your Matrox Meteor-II board for PC/104-*Plus*:

1. Matrox Meteor-II for PC/104-*Plus* can operate in either a 5V or 3.3V system. In some cases, a hole in the PC/104-*Plus* (PCI) connector is filled, which prevents another PC/104-*Plus* board from being stacked on top. To install Matrox Meteor-II for PC/104-*Plus* in a system with a specific signalling environment, a pin must be removed. The table and diagram below indicate which pins to cut, and their locations on the connector.

Signalling environment	**Pin to remove on J3 connector**
5V	A1
3.3V	D30

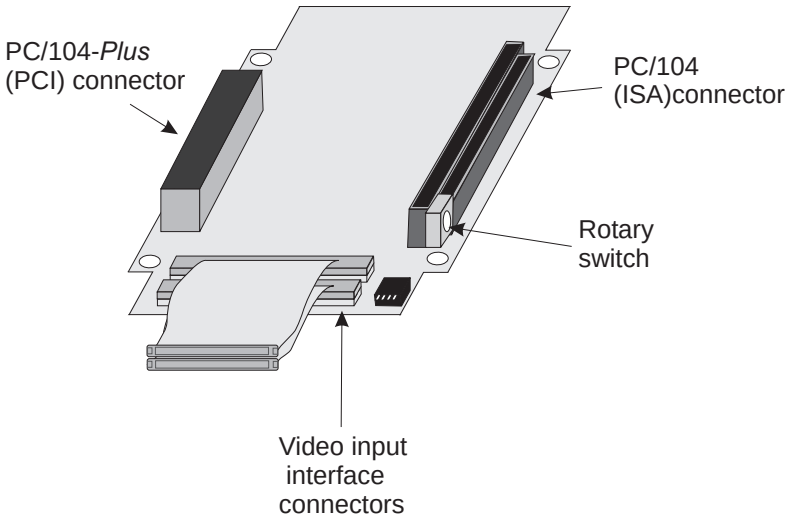
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2. Check that you have an available PC/104-*Plus* connector on the motherboard, or verify that your existing stack can support another board.
3. Remove the anchoring screws from the stack; do not discard them since you will need them to fasten the Matrox Meteor-II board.
4. If you have existing PC/104 boards in your computer, remove them and stack them on the PC/104-*Plus* board. PC/104 boards must be stacked last.
5. Carefully position Matrox Meteor-II over the connectors and press the board firmly into place.
6. Replace the anchoring screws.
7. Assemble a cable using two ribbon cables of the appropriate length, the two included video input low profile IDC connectors, and two connectors capable of interfacing with the connectors of your camera's cable. See Appendix B for the pinouts, signals, and ribbon cable information. A standard cable for PC/104-Plus form factor boards is not available from Matrox.
8. Attach the newly assembled cable to the video input interface connectors.

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9. Set the rotary switch (next to the PC/104 (ISA) connector) to 0 if installing the first stackable board, or another appropriate setting if not the first. See the section, *Multiple board installation* in Chapter 4.



10. Connect your video sources. For details, see the section *Connecting a video input to Matrox Meteor-II /Digital for PC/104-Plus*.

11. Turn on your computer.

    In some cases, when you boot your computer, Windows' Plug-and-Play system will detect a new PCI card and you will be asked to assign a driver to it. At this point, you should click on **Cancel** because the driver will be installed during the installation of MIL or one of its derivatives.

❖ Matrox Meteor-II /Digital for PC/104-*Plus* can be used with Matrox 4Sight-II. When ordered as part of the Matrox 4Sight-II unit, Matrox Meteor-II for PC/104-*Plus* comes pre-installed. See the *Matrox 4Sight-II installation and hardware reference* manual for more information.

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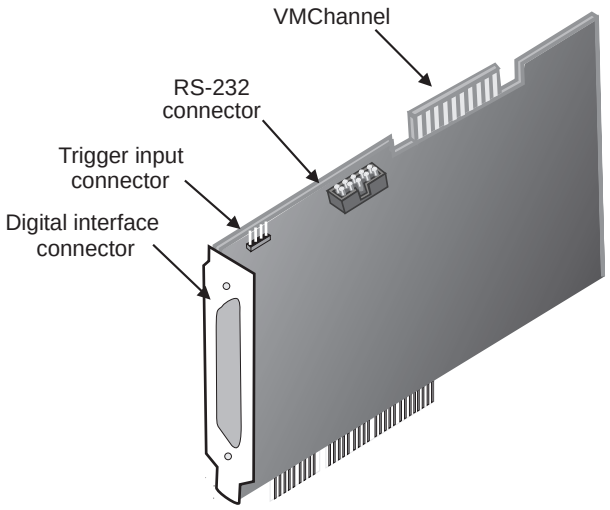
Connecting external devices

This section will discuss the connectors of the two form factors (PCI and PC/104-*Plus*) of the Matrox Meteor-II /Digital board.

Matrox Meteor-II /Digital for PCI

Matrox Meteor-II /Digital for PCI has four connectors, which are indicated in the diagram that follows. Only one of these connectors is located on its bracket. All these connectors listed below are discussed in detail in Appendix B.

- **Digital interface connector.** Used to receive digital video, as well as send and receive synchronization signals.
- **Trigger input connector.** A connector for direct trigger input in TTL or opto-isolated format.
- **RS-232 input connector.** Used as a standard RS-232 serial port interface.
- **VMChannel.** Used to send data to another Matrox board.



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Connecting a video input to Matrox Meteor-II /Digital for PCI

Connect video sources to the digital interface connector on Matrox Meteor-II /Digital for PCI, using the optional DBHD100-TO-OPEN cable. This cable must be customized to fit with the connector on your video source. See Appendix B for the pinouts, signals, and mating connector supplier.

Connecting Matrox Meteor-II /Digital to other boards

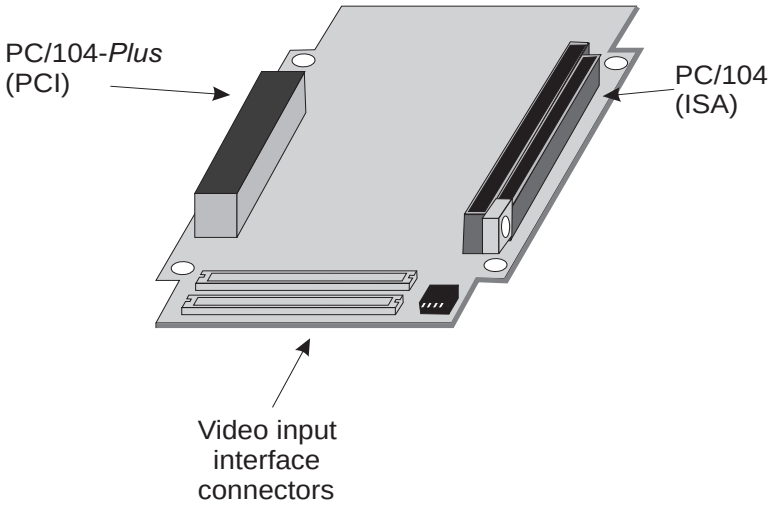
The VMChannel interface allows the transfer of data to other Matrox boards. Insert a VMChannel backplane (available with the interconnect kit) across the VMChannel interface to connect the boards. Note that when connecting multiple Matrox boards, at least one of the boards you are connecting must be bus-controller capable. Matrox Meteor-II /Digital is not bus-controller capable.

❖ The VMChannel is not supported on the PC/104-*Plus* form factor.

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Matrox Meteor-II /Digital for PC/104-*Plus*

Matrox Meteor-II /Digital for PC/104-*Plus* form factor has four connectors, which are indicated in the diagram below.



- **Two video input interface connectors.** Used to receive digital video, as well as send and receive synchronization signals and power.
- **PC/104-*Plus* (PCI) connector.** An interface connector to send data across the PCI bus.
- **PC/104 (ISA) connectors.** Two interface connectors to send data across the ISA bus.

Connecting a video input to Matrox Meteor-II /Digital for PC/104-*Plus*

Connect your video source's cable to the custom cable that you attached to the video input interface connectors on Matrox Meteor-II /Digital for PC/104-*Plus* (see the section *Installing Matrox Meteor-II /Digital for PC/104-Plus).*

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Chapter 3: Installing software

This chapter explains how to install the Matrox Meteor-II software.

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Installing the software

To install any Matrox Imaging software, place its CD in the appropriate drive; the *setup.exe* file will run automatically.

While installing the software, you will be asked to provide the following information:

- The drive and directory in which to install the software.
- The target operating system and compiler.
- The type of Matrox hardware that is installed in your computer.

❖ If you have an MGA graphics board, you should install the display driver that is on the CD.

After installation, read the *readme* file(s) recommended by the installation program.

Note about Matrox Intellicam

MIL-Lite uses digitizer configuration formats (DCFs) to configure the camera interface on Matrox digitizers. The DCF defines, among other things, the video timing signals and the video data format. Matrox Intellicam can be used to create or customize a DCF file, if the supplied files do not include one that matches your video source.

For more information about Matrox Intellicam, refer to the *Matrox Intellicam User Guide*.

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Chapter 4: Using multiple Matrox Meteor-II boards

This chapter explains how to use multiple Matrox Meteor-II boards.

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Multiple board installation

This section describes how to use multiple Matrox Meteor-II boards.

Installing multiple PCI boards

Install each additional Matrox Meteor-II board for PCI as you installed the first board (refer to Chapter 2). In other words, place each additional board in an empty slot. For the PCI form factor, ensure that the installed boards avoid the CPU heat sink.

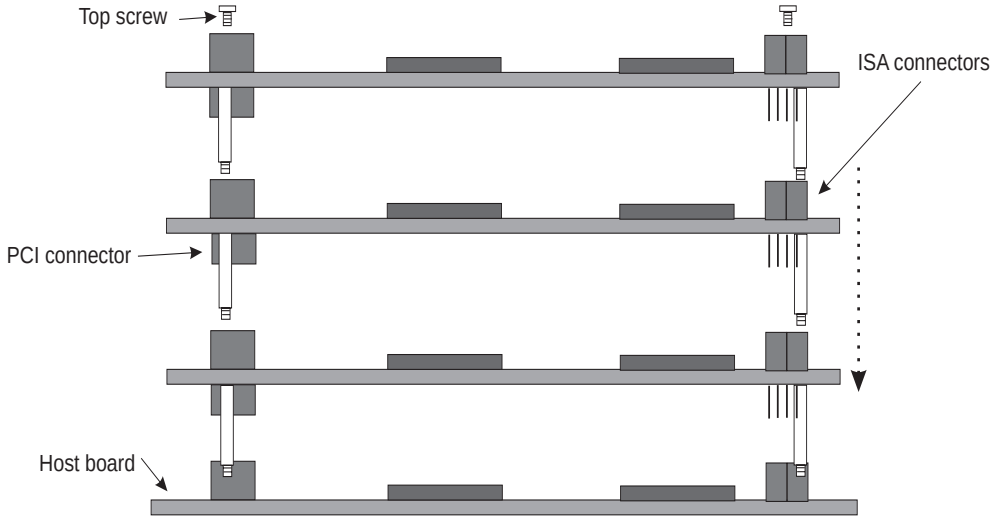
Theoretically, you can have as many as 16 Matrox Meteor-II PCI boards installed in your computer at one time; this number is, however, limited by the number of empty slots in your computer and, for simultaneous grabs, by the available bandwidth of your computer (discussed later in this chapter).

Using MIL-Lite, you have to allocate a MIL system for each board and allocate the resources of each MIL system.

Installing multiple PC/104-Plus boards

The number of PC/104-*Plus* baords that you can stack depends on the computer you are using. If using Matrox 4Sight or Matrox 4Sight-II integrated units, you can stack a maximum of three PC/104-*Plus* boards, as shown in the diagram below. Note that if you have PC/104 boards in your computer, they must be placed at the top of the stack.

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In addition, you must set the rotary switch of each PC/104-*Plus* board to a unique setting in the stack. Setting the rotary switch dedicates a group of PCI signals to the board in the stack: clock, request grant, ID select, and interrupt signals. It is recommended that the first board installed (the board closest to the Host CPU board) be configured to 0, the second 1, and so on. The table below shows the recommended switch setting for each board, as well as the corresponding setting for the dedicated signals.

Switch position	board position	Interrupt	Request grant	ID select
0 or 4	1	Interrupt A	0	0
1 or 5	2	Interrupt B	1	1
2 or 6	3	Interrupt C	2	2
3 or 7	4	Interrupt D	2	3

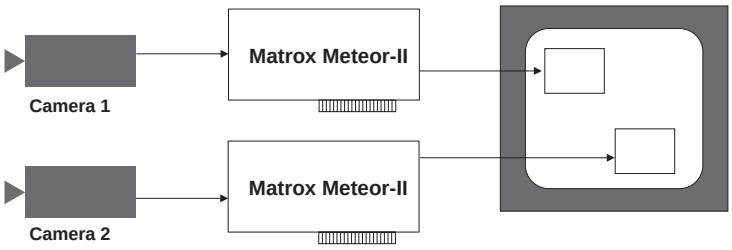
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If you are installing an additional Matrox Meteor-II board on Matrox 4Sight or Matrox 4Sight-II, the board already installed has the setting fixed at 0; therefore, the setting of the additional board must be at a setting other than 0 or 4.

Grabbing simultaneously from different boards

You can simultaneously grab images from cameras attached to different Matrox Meteor-II boards. To grab at exactly the same time, the cameras must be genlocked (synchronized).

The number of cameras from which you can simultaneously grab is determined by the PCI bandwidth available in your computer.



Grabbing from two Matrox Meteor-II boards

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PCI bandwidth requirements

Matrox Meteor-II /Digital has a low susceptibility to PCI bus latency due to 4 or 16 Mbytes of video transfer memory, depending on the form factor. In addition, sustained PCI-transfers to memory require the use of a high performance PCI core-logic chipset, such as the Intel 820, 840 or 850.

As a reference point, grabbing one 640 x 480 color image in real time will require a PCI bandwidth of 35 Mbytes/sec when transferring in RGBX (32-bit) mode.

Note, however, that you can sometimes experience PCI bandwidth problems with Matrox Meteor-II /Digital when grabbing from multiple cameras that require a high bandwidth.

When grabbing from three or more Matrox Meteor-II boards simultaneously, you will have to reduce the image size to avoid reaching the upper limits of the overall available bandwidth.

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Chapter 5: Hardware reference

This chapter explains the architecture of the Matrox Meteor-II /Digital hardware, as well as the available features and modes.

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Matrox Meteor-II hardware reference

This chapter provides information on the architecture, operating modes, and supported features of the Matrox Meteor-II /Digital board.

For a summary of the information given in this chapter and detailed specifications of connectors and pinouts, refer to Appendix B of this manual.

Matrox Meteor-II /Digital grab section

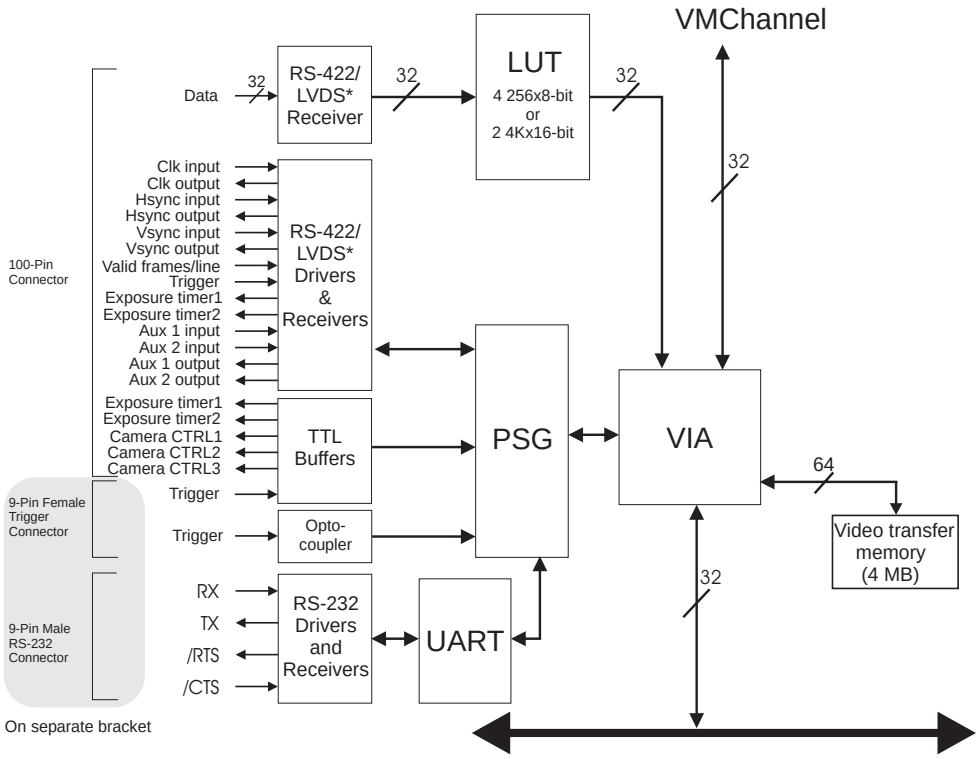
The grab section of the Matrox Meteor-II /Digital board captures video from digital cameras. It supports component RGB, as well as monochrome acquisition, in single or multi-tap configurations. Up to four genlocked cameras can be attached to acquire four 8-bit or two 16-bit inputs.

Matrox Meteor-II /Digital supports either the RS-422 or the LVDS interface.

Note that the board does not support the Matrox Meteor-II MJPEG module.

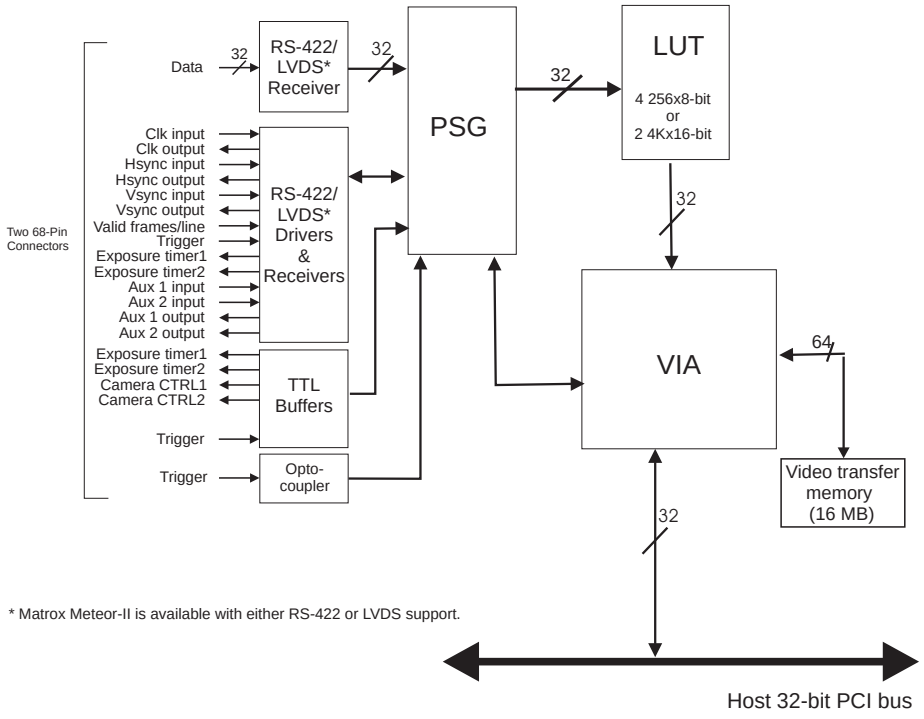
The following diagrams represent Matrox Meteor-II /Digital for PCI and for PC/104-*Plus*, respectively.

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* Matrox Meteor-II is available with either RS-422 or LVDS support.

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Performance

The video timing parameters supported by the Matrox Meteor-II /Digital board are as follows:

	Max
Number of pixels / line (including sync and blanking)	65536
Number of lines / frame (including sync and blanking)	65536
Sampling rate (LVDS)	40 MHz
Sampling rate (RS-422)	25 MHz

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UART and RS-232 serial port

Matrox Meteor-II /Digital for PCI features a Universal Asynchronous Receiver/Transmitter (UART) that provides an RS-232 serial interface. For example, this allows you to remotely control a camera or a motion control unit, or to communicate with a program logic controller (PLC). The UART is programmed using the MIL-Lite function, *MdigControl()* with the M_UART... control types.

❖ The UART is not supported on the PC/104-*Plus* form factor.

Lookup tables

The Matrox Meteor-II /Digital board has four 256 x 8-bit programmable lookup tables. The LUTs on Matrox Meteor-II /Digital can be operated as four 8-bit lookup tables, two 10-bit lookup tables, or two 12-bit lookup tables.

PSG

Matrox Meteor-II /Digital contains a Programmable Synchronization Generator (PSG), which is responsible for managing all timing and synchronization signals.

Control signals

The following is a short description of the control signals on the Matrox Meteor-II /Digital interface. Note that depending on the version of your board, the signals will be in RS-422 or LVDS format. It is indicated when other signals such as TTL signals are also supported.

Synchronization

The interface can receive and/or supply the HSYNC and VSYNC signals. The VIA receives the synchronization signals from the PSG or from an external source.

Valid

The VIA also receives a VALID signal that can either be generated by the PSG or an external source. When received by the PSG, it can indicate valid pixels on a line by line basis. When received from an external source, it can indicate valid pixels on a pixel by pixel basis.

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Clock

The interface of the Matrox Meteor-II /Digital board can receive and supply a clock, simultaneously.

Auxiliary I/Os

Seven general purpose auxiliary signals are supported on the PCI form factor: four RS-422 or LVDS user signals (two input, two output), and three TTL output signals. The PC/104-*Plus* form factor supports six auxilliary signals: four RS-422 or LVDS user signals (two input, two output), and two TTL output signals. These are available for controlling external devices, such as a strobe light. User signals are programmed using the MIL-Lite command *MdigControl()*.

Exposure

Two timers in the PSG can generate two exposure signals simultaneously. These are available in TTL or RS-422/LVDS formats. Exposures are programmed using the MIL-Lite function, *MdigControl()*.

Trigger

Three trigger inputs are routed directly to the PSG; the interface supports TTL , RS-422/LVDS, and opto-isolated trigger inputs. The latter, connected to the OPTOTRIG- and OPTOTRIG+ input pins, passes through an opto-coupler, a device that protects the board from outside surges; OPTOTRIG- is usually connected to the ground of the trigger source. External trigger inputs allow image acquisition to be synchronized with external events. The board can operate in one of two modes, and the selected mode is specified by the DCF.

Matrox Meteor-II /Digital can operate in next valid frame/field mode. When in this mode, the digitizer waits for the next valid frame or field (as specified by the DCF file) before commencing the grab. This trigger mode functions in one of three ways:

- **Edge-triggered monoshot acquisition:** The VIA (Video Interface Asic) waits for the rising/falling edge to capture a single frame.
- **Edge-triggered continuous acquisition:** The VIA waits for the rising/falling edge to start a continous grab.
- **Level-sensitive "continuous" acquisition:** The VIA grabs continuously while the level of the trigger is high/low.

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❖ The polarity of the active and inactive levels of the trigger signal is software programmable.

Matrox Meteor-II /Digital can also operate in asynchronous reset mode. In this mode, the digitizer resets the camera to begin a new frame when the trigger signal is received.

Data interfaces

Video Interface ASIC

The Matrox Meteor-II /Digital board has a VIA, which acts mainly as a video-to-PCI bridge. The VIA is capable of high-speed image transfers to Host memory or other PCI devices across the PCI bus. The VIA uses video transfer memory to store data until the PCI bus becomes available. There is 4 Mbytes (SGRAM) and 16 Mbytes (SDRAM) of video transfer memory on Matrox Meteor-II /Digital for PCI and PC/104-Plus, respectively. On the PCI form factor, the VIA also supports image transfers across the VMChannel to one or more Matrox Imaging boards for accelerated image processing or display.

Simultaneous data streams

Matrox VIA can manage up to two simultaneous data streams. For example, it can grab into video transfer memory, and concurrently transfer data over the VMChannel or PCI buses.

General features

The VIA is capable of separating image data into two, three, or four 8-bit or two 16-bit components (for example, RGB packed to RGB planar). This mechanism is also used to merge line segments of monochrome multi-tap cameras.

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PCI interface

Matrox Meteor-II has a 32-bit PCI bus interface, capable of a peak transfer rate of 132 Mbytes/sec.

The VIA's PCI interface

The VIA's PCI interface is 32 bits wide and operates at 33 MHz. It allows all VIA resources to be accessed through a 128-Mbyte memory region, mappable anywhere in the 4-Gbyte PCI address space.

In addition, the PCI interface supports various plane and pixel transfer modes by using some of the VMChannel logic. Consequently, VMChannel and PCI transfers cannot be performed simultaneously.

Read pre-fetch and write posting buffers are integrated to optimize Host access.

VMChannel

Matrox Meteor-II provides a 32-bit non-bus controller VMChannel interface for a secondary or additional high-speed connection between on-board and external devices. On a backplane system, it runs at 33 MHz for 132 Mbytes/sec peak transfer rates.

The VMChannel is only available on the PCI form factor of Matrox Meteor-II /Digital board.

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Appendix A: Troubleshooting

This appendix gives suggestions to help you resolve potential problems. If your problem is not addressed here, contact your local Matrox representative, Matrox Sales Office, or the Matrox Imaging Customer Support Group.

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Troubleshooting

If you have problems using your Matrox Meteor-II board, please try the following:

- Check for disconnected power cords.
- Read the *Common problems and solutions* section in this chapter.

If your problem is not addressed in this chapter or if the solutions suggested don't work for you, contact your local Matrox representative, Matrox Sales Office, or the Matrox Imaging Customer Support Group.

Common problems and solutions

Installation Problems

☛ **PC/104-*Plus* board cannot be stacked**

- If you cannot stack your PC/104-*Plus* board, check the connectors of the last board in the stack and determine if any of its PCI connector's holes are filled. If this is the case, cut the corresponding pins on your board. See the section, *Installing Matrox Meteor-II /Digital for PC/104-Plus* in Chapter 2.
- If your computer has PC/104 modules, you must re-stack them so the PC/104 modules are on top of PC/104-*Plus* boards. Be sure to reset the rotary switches for your new stack configuration.

☛ **Board service fails to start**

This could happen due to the following two reasons:

- The MIL Matrox Meteor-II drivers are not installed correctly.
  - When the board fails to start under Windows NT, your computer will prompt you to go to the Event Viewer utility to identify the device that was unable to start. Click the **Devices** icon in the **Control Panel**. In the **Devices** dialog box, find your Matrox frame grabber in the presented list.

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If the **Startup** column reads **Automatic**, and the **Status** column is blank, the driver can be started by clicking the **Start** button.

- When the board fails to start under Windows 2000, the driver might not have started. Right-click on **My Computer**, and select **Manage** from the presented menu. From the **Computer Management** explorer window, display the **System Tools** and then the **Device Manager**. If you do not see a Matrox Meteor-II device under **Matrox Imaging Adapters**, you will have to reinstall the driver.

If the above solution for your operating system does not work, try the following.

- The driver also might not start due to too much or insufficient allocation of DMA memory. To address this problem, re-allocate DMA memory using the included *milconfig.exe* utility.
- There is a conflict in the BIOS Setup program. This problem generally occurs when there is a PCI memory mapping error or when there is a PCI-IRQ routing error. To resolve this problem with the PCI form factor, first try to swap boards from one PCI slot to another; for the PC/104-*Plus*, change the rotary switch settings. If the problem still persists, try upgrading your BIOS.

If the above solution does not work, try the following to determine if there is an IRQ conflict.

- Under Windows NT, go to the **Windows NT Diagnostics** property page (found under **Start Programs Administrative Tools (Common)**). Under the Resources page, check for devices that are sharing an IRQ with your Matrox frame grabber.
- Under Windows 2000, right-click on **My Computer**, and select **Manage** from the presented menu. From the **Computer Management** explorer window, display the System Tools\ System Information\ Hardware Resources\ IRQs folder. Check for devices that are sharing an IRQ with your Matrox frame grabber.

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☛ **Not enough memory to allocate buffer under Windows NT 4.0**

This is the message that you will receive if you try to allocate a grab buffer that is greater than the amount of DMA memory specified during software installation. This problem can be addressed by changing the amount of DMA memory on your computer. Re-allocate DMA memory using the included *milconfig.exe* utility. Alternatively, uninstall and reinstall MIL and specify the appropriate amount of DMA memory.

Grabbing Problems

☛ **The trigger pulse is not being sent**

This happens when the opto-isolated trigger pulse is not connected. When using the opto-isolated trigger, both OPTOTRIG- and OPTOTRIG+ signals must be connected. OPTOTRIG- is usually connected to the ground of the trigger source.

☛ **IRQ conflicts**

In general, PCI devices can share an interrupt line (IRQ). However, sometimes this might not be possible. One type of difficulty that you might run into is as follows:

- IRQ conflict under Windows NT 4.0

  In the event that your Matrox Imaging board(s) cannot share an IRQ line with other devices, allocate a different IRQ to each device in the IRQ Configuration Setup section of the BIOS Setup Program (accessible on bootup), if possible.

- IRQ conflict under Windows 2000

  To resolve this problem, re-assign a different IRQ line to the PCI slot in which the Matrox Meteor-II board is installed.

❖ Note that PCI devices cannot share interrupt lines with EISA or ISA devices.

Other possible solutions to the above problem:

- Move the Matrox Meteor-II board to another (free) PCI slot.
- Swap Matrox Meteor-II with another board, by switching PCI slots.

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Problems during application development

☛ **Computer `hangs' or produces unwanted results while an application is running**

Sometimes, an EISA or ISA device might attempt to use the same interrupt, registers, or memory space as PCI boards, and this causes a conflict. Check for an interrupt, memory, or register conflict:

- Under Windows NT, go to **Windows NT Diagnostics** property page (found under **Start Programs Administrative Tools (Common)**. Under the Resources page, check for devices that are sharing an IRQ with your Matrox frame grabber.
- Under Windows 2000, right-click on **My Computer**, and select **Manage** from the presented menu. From the **Computer Management** explorer window, display the System Tools\ System Information\ Hardware Resources\ IRQs folder. Check for devices that are sharing an IRQ with your Matrox frame grabber.

Contacting Matrox

Before contacting your local Matrox representative, Matrox Sales Office, or the Matrox Imaging Customer Support Group, you will need the following information:

- A description of what happened.
- Computer (motherboard) make and model number, environment, and peripherals (especially boards sharing the computer with your Matrox Meteor-II).
- Your board's serial number (printed on the bar code label), and revision number.

Use the *Product Assistance Request Form* at the back of this manual to record the necessary information.

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Appendix B: Technical information

This appendix contains information that might be useful when installing your Matrox Meteor-II /Digital board.

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Technical information

This appendix contains information that might be useful when installing your Matrox Meteor-II /Digital board.

Global information

- Operating system: See your software manual for supported versions of Microsoft Windows.
- System requirements: A computer with a PCI bus and an Intel Pentium processor (or equivalent) or better.

  Some older systems use a core logic chipset (interfaces PCI with Host memory) that has limited throughput capabilities. Matrox Meteor-II might not be able to attain full functionality on such systems. We recommend systems with newer PCI chipsets, such as the Intel 440BX, 810, 815E, 820, 840, or 850. If you need more specific information regarding potential problems, refer to Appendix A - *Troubleshooting*.
- Technical features:
  - Monochrome or component RGB frame scan and line scan sources.
  - Available with a RS-422 or LVDS interface.
  - Support for multi-tap acquisition: up to four 8-bit inputs, or two 16-bit inputs.
  - Support for an external trigger input in either next valid frame/field mode or asynchronous reset mode.
  - RS-232 port (UART).
  - Four 256 8-bit lookup tables that include three different configurations:
    - Four 8-bit LUTs.
    - Two 10-bit LUTs.
    - Two 12-bit LUTs.

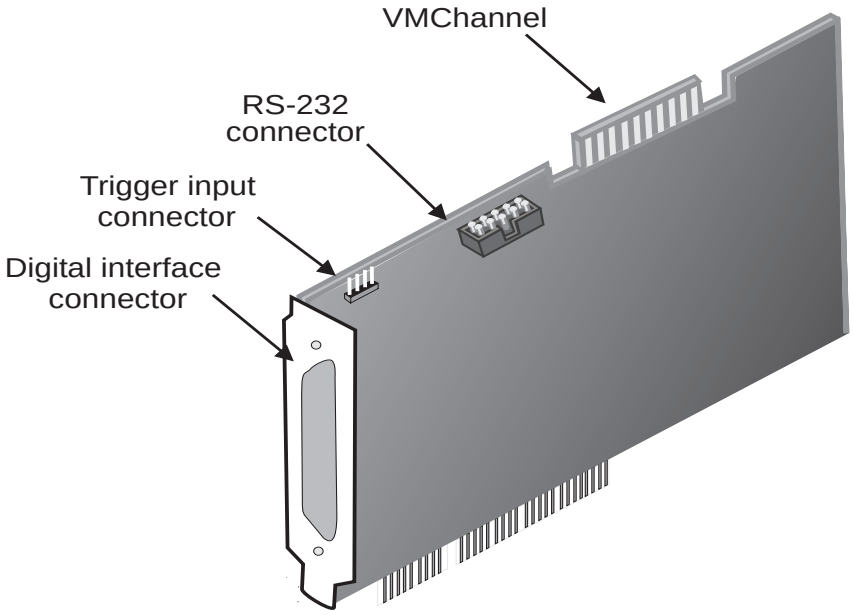
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- 4 Mbytes, and 16 Mbytes, of video transfer memory for Matrox Meteor-II /Digital for PCI, and Matrox Meteor-II /Digital for PC/104-*Plus*, respectively.
- 32-bit non bus-controller VM Channel interface (not available for Matrox Meteor-II /Digital for PC/104-*Plus*).

Board input and output connectors

PCI form factor

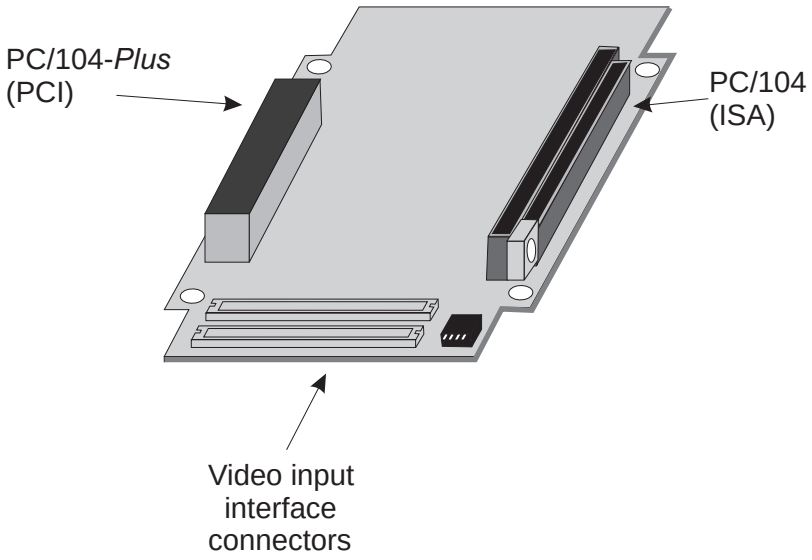
Matrox Meteor-II /Digital for PCI form factor has four interface connectors: a VMChannel, a trigger input, a RS-232 input, and a digital interface.



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PC/104-Plus form factor

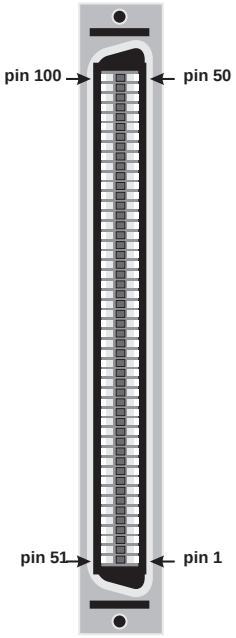
Matrox Meteor-II for the PC/104-*Plus* form factor has four interface connectors: two video input interface connectors, a PC/104-*Plus* (PCI) connector, and a PC/104 (ISA) connector.



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Digital interface connector for the PCI form factor

The digital interface connector has 100 pins. The pinout is as follows:



PIN	SIGNAL	PIN	SIGNAL
1	DATA, INPUT, 0+	51	DATA, INPUT, 16+
2	DATA, INPUT, 0-	52	DATA, INPUT, 16-
3	DATA, INPUT, 1+	53	DATA, INPUT, 17+
4	DATA, INPUT, 1-	54	DATA, INPUT, 17-
5	DATA, INPUT, 2+	55	DATA, INPUT, 18+
6	DATA, INPUT, 2-	56	DATA, INPUT, 18-
7	DATA, INPUT, 3+	57	DATA, INPUT, 19+
8	DATA, INPUT, 3-	58	DATA, INPUT, 19-
9	DATA, INPUT, 4+	59	DATA, INPUT, 20+
10	DATA, INPUT, 4-	60	DATA, INPUT, 20-
11	DATA, INPUT, 5+	61	DATA, INPUT, 21+
12	DATA, INPUT, 5-	62	DATA, INPUT, 21-
13	DATA, INPUT, 6+	63	DATA, INPUT, 22+
14	DATA, INPUT, 6-	64	DATA, INPUT, 22-
15	DATA, INPUT, 7+	65	DATA, INPUT, 23+
16	DATA, INPUT, 7-	66	DATA, INPUT, 23-
17	DATA, INPUT, 8+	67	DATA, INPUT, 24+
18	DATA, INPUT, 8-	68	DATA, INPUT, 24-
19	DATA, INPUT, 9+	69	DATA, INPUT, 25+
20	DATA, INPUT, 9-	70	DATA, INPUT, 25-
21	DATA, INPUT, 10+	71	DATA, INPUT, 26+
22	DATA, INPUT, 10-	72	DATA, INPUT, 26-
23	DATA, INPUT, 11+	73	DATA, INPUT, 27+
24	DATA, INPUT, 11-	74	DATA, INPUT, 27-
25	DATA, INPUT, 12+	75	DATA, INPUT, 28+
26	DATA, INPUT, 12-	76	DATA, INPUT, 28-
27	DATA, INPUT, 13+	77	DATA, INPUT, 29+
28	DATA, INPUT, 13-	78	DATA, INPUT, 29-

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PIN	SIGNAL	PIN	SIGNAL
29	DATA, INPUT, 14+	79	DATA, INPUT, 30+
30	DATA, INPUT, 14-	80	DATA, INPUT, 30-
31	DATA, INPUT, 15+	81	DATA, INPUT, 31+
32	DATA, INPUT, 15-	82	DATA, INPUT, 31-
33	HSYNC, INPUT, +	83	HSYNC, OUTPUT, +
34	HSYNC, INPUT, -	84	HSYNC, OUTPUT, -
35	VSYNC, INPUT, +	85	VSYNC, OUTPUT, +
36	VSYNC, INPUT, -	86	VSYNC, OUTPUT, -
37	GROUND	87	EXPOSURE1, OUTPUT, TTL
38	GROUND	88	EXPOSURE2, OUTPUT, TTL
39	CLOCK, INPUT, +	89	CLOCK, OUTPUT, +
40	CLOCK, INPUT, -	90	CLOCK, OUTPUT, -
41	USER, INPUT, 0+	91	USER, OUTPUT, 0+
42	USER, INPUT, 0-	92	USER, OUTPUT, 0-
43	USER, INPUT, 1+	93	USER, OUTPUT, 1+
44	USER, INPUT, 1-	94	USER, OUTPUT, 1-
45	VALID, INPUT, +	95	EXPOSURE1, OUTPUT, +
46	VALID, INPUT, -	96	EXPOSURE1, OUTPUT, -
47	TRIGGER, INPUT, +	97	EXPOSURE2, OUTPUT, +
48	TRIGGER, INPUT, -	98	EXPOSURE2, OUTPUT, -
49	CAMERA CTRL BIT0, OUTPUT, TTL	99	CAMERA CTRL BIT1, OUTPUT, TTL
50	GROUND	100	CAMERA CTRL BIT2, OUTPUT, TTL

Customize the open-ended Matrox DBHD100-TO-OPEN input cable to interface with the connector on your video source. For customers planning to build their own cable, parts for the mating connector can be purchased from:

- Manufacturer: ACON Advanced-Connectek Inc.
- Connector and shell: HBP50-1AK3202

If you are building your own cable, ensure that it is a twisted-pair type cable which is twisted along signal pairs.

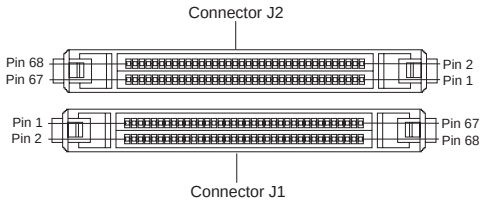
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▲ ***Caution***

The length of the DBHD100-TO-OPEN should not be extended since its construction does not guarantee reliable transmission at longer lengths. The EIA/TIA 568 specification document should be consulted in order to build custom cables of greater length.

Video input interface connectors for the PC/104-*Plus* form factor

Matrox Meteor-II /digital for PC/104-Plus has two low profile IDC video input interface connectors, J1 and J2; each has 68 pins.



The pinout for connector J1 is as follows:

PIN	SIGNAL	PIN	SIGNAL
1	DATA, INPUT, 16+	35	USER, OUTPUT, 1+
2	DATA, INPUT, 16-	36	USER, OUTPUT, 1-
3	DATA, INPUT, 17+	37	VALID, INPUT, +
4	DATA, INPUT, 17-	38	VALID, INPUT, -
5	DATA, INPUT, 18+	39	TRIGGER, INPUT, +
6	DATA, INPUT, 18-	40	TRIGGER, INPUT, -
7	DATA, INPUT, 19+	41	EXPOSURE1, OUTPUT, +
8	DATA, INPUT, 19-	42	EXPOSURE1, OUTPUT, -
9	DATA, INPUT, 20+	43	EXPOSURE2, OUTPUT, +
10	DATA, INPUT, 20-	44	EXPOSURE2, OUTPUT, -
11	DATA, INPUT, 21+	45	EXPOSURE1, OUTPUT, TTL
12	DATA, INPUT, 21-	46	EXPOSURE2, OUTPUT, TTL
13	DATA, INPUT, 22+	47	OPTOTRIGGER, INPUT
14	DATA, INPUT, 22-	48	CAMERA CTRL BIT0, OUTPUT, TTL

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PIN	SIGNAL	PIN	SIGNAL
15	DATA, INPUT, 23+	49	OPTOTRIG COM (GROUND)
16	DATA, INPUT, 23-	50	CAMERA CTRL BIT1, OUTPUT, TTL
17	HSYNC, INPUT, +	51	TRIGGER, INPUT, TTL
18	HSYNC, INPUT, -	52	GROUND
19	HSYNC, OUTPUT, +	53	DATA, INPUT, 24+
20	HSYNC, OUTPUT, -	54	DATA, INPUT, 24-
21	VSYNC, INPUT, +	55	DATA, INPUT, 25+
22	VSYNC, INPUT, -	56	DATA, INPUT, 25-
23	VSYNC, OUTPUT, +	57	DATA, INPUT, 26+
24	VSYNC, OUTPUT, -	58	DATA, INPUT, 26-
25	CLOCK, INPUT, +	59	DATA, INPUT, 27+
26	CLOCK, INPUT, -	60	DATA, INPUT, 27-
27	CLOCK, OUTPUT, +	61	DATA, INPUT, 28+
28	CLOCK, OUTPUT, -	62	DATA, INPUT, 28-
29	USER, INPUT, 0+	63	DATA, INPUT, 29+
30	USER, INPUT, 0-	64	DATA, INPUT, 29-
31	USER, INPUT, 1+	65	DATA, INPUT, 30+
32	USER, INPUT, 1-	66	DATA, INPUT, 30-
33	USER, OUTPUT, 0+	67	DATA, INPUT, 31+
34	USER, OUTPUT, 0-	68	DATA, INPUT, 31-

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The pinout for connector J2 is the following:

PIN	SIGNAL	PIN	SIGNAL
1	DATA, INPUT, 0+	35	USER, OUTPUT, 1+
2	DATA, INPUT, 0-	36	USER, OUTPUT, 1-
3	DATA, INPUT, 1+	37	VALID, INPUT, +
4	DATA, INPUT, 1-	38	VALID, INPUT, -
5	DATA, INPUT, 2+	39	TRIGGER, INPUT, +
6	DATA, INPUT, 2-	40	TRIGGER, INPUT, -
7	DATA, INPUT, 3+	41	EXPOSURE1, OUTPUT, +
8	DATA, INPUT, 3-	42	EXPOSURE1, OUTPUT, -
9	DATA, INPUT,4+-	43	EXPOSURE2, OUTPUT, +
10	DATA, INPUT, 4-	44	EXPOSURE2, OUTPUT, -
11	DATA, INPUT, 5+	45	EXPOSURE1, OUTPUT, TTL
12	DATA, INPUT, 5-	46	EXPOSURE2, OUTPUT, TTL
13	DATA, INPUT, 6+	47	OPTOTRIGGER, INPUT
14	DATA, INPUT, 6-	48	CAMERA CTRL BIT0, OUTPUT, TTL
15	DATA, INPUT, 7+	49	OPTOTRIG COM (GROUND)
16	DATA, INPUT, 7-	50	CAMERA CTRL BIT1, OUTPUT, TTL
17	HSYNC, INPUT, +	51	TRIGGER, INPUT, TTL
18	HSYNC, INPUT, -	52	GROUND
19	HSYNC, OUTPUT, +	53	DATA, INPUT, 8+
20	HSYNC, OUTPUT, -	54	DATA, INPUT, 8-
21	VSYNC, INPUT, +	55	DATA, INPUT, 9+
22	VSYNC, INPUT, -	56	DATA, INPUT, 9-
23	VSYNC, OUTPUT, +	57	DATA, INPUT, 10+
24	VSYNC, OUTPUT, -	58	DATA, INPUT, 10-
25	CLOCK, INPUT, +	59	DATA, INPUT, 11+
26	CLOCK, INPUT, -	60	DATA, INPUT, 11-
27	CLOCK, OUTPUT, +	61	DATA, INPUT, 12+
28	CLOCK, OUTPUT, -	62	DATA, INPUT, 12-

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PIN	SIGNAL	PIN	SIGNAL
29	USER, INPUT, 0+	63	DATA, INPUT, 13+
30	USER, INPUT, 0-	64	DATA, INPUT, 13-
31	USER, INPUT, 1+	65	DATA, INPUT, 14+
32	USER, INPUT, 1-	66	DATA, INPUT, 14-
33	USER, OUTPUT, 0+	67	DATA, INPUT, 15+
34	USER, OUTPUT, 0-	68	DATA, INPUT, 15-

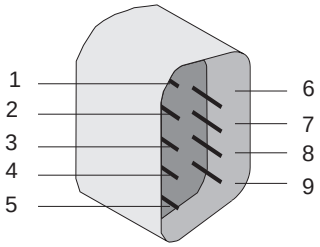
You can build a custom ribbon cable using the included low profile IDC mating connectors, which are supplied by:

Manufacturer: Robinson-Nugent
Connector: P25LE-68S-TGF

RS-232 input connector

The RS-232 signals are routed through a 9-pin male connector on the second mounting bracket, to a 10-pin RS-232 connector on the board (see the installation diagram in Chapter 2). Note that this connector is not available on the PC/104-*Plus* form factor.

The pinout of the 9-pin DB9 male connector is as follows:



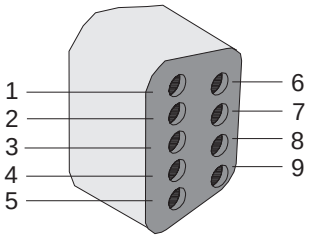
Pin	Signal	Description
1	N/C	Not connected.
2	RX	Receive.
3	TX	Transmit.
4	N/C	Not connected.
5	GND	Ground.
6	N/C	Not connected.
7	RTS	Request To Send.
8	CTS	Clear To Send.
9	N/C	Not connected.

Trigger input connector

The trigger input connector is routed through the 9-pin female connector on the second mounting bracket to a 4-pin connector on the board. Note that this connector is not available on the PC/104-*Plus* form factor.

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The pinout of the 9-pin DB9 female connector is as follows:

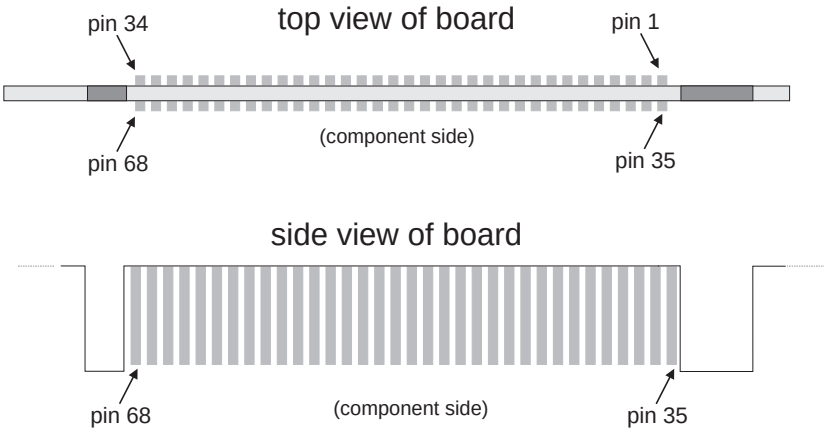


Pin	Signal	Description
1	TTL TRIG	TTL trigger.
2	OPTO TRIG-	Opto-isolated trigger (negative input).
3	N/C	Not connected.
4	N/C	Not connected.
5	N/C	Not connected.
6	GND	Ground.
7	OPTO TRIG+	Opto-isolated trigger (positive input).
8	N/C	Not connected.
9	N/C	Not connected.

VMChannel interface connector

The VMChannel interface allows Matrox Meteor-II /Digital to share data with any Matrox imaging board that has a VMChannel interface capable of performing the bus controller function. A VMChannel backplane (available with the GEN-BUS/... interconnect kits) must be inserted across the VMChannel interfaces of the boards.

Note the VMChannel is not supported on the PC/104-*Plus* form factor.



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The following table provides the pinout of the VMChannel interface:

Pin	Signal	Pin	Signal
1	SAN	35	N/C*
2	N/C*	36	DGND
3	BSN[0]	37	BSN[1]
4	DGND	38	SNRDYN
5	CONTROL	39	DGND
6	N/C	40	DGND
7	CLK	41	DGND
8	VMSENSE	42	DGND
9	MASK0	43	MASK1
10	DGND	44	DATA[0]
11	DATA[1]	45	DGND
12	DATA[2]	46	DATA[3]
13	DGND	47	DATA[4]
14	DATA[5]	48	DGND
15	DATA[6]	49	DATA[7]
16	DGND	50	DATA[8]
17	DATA[9]	51	DGND
18	DATA[10]	52	DATA[11]
19	DGND	53	DATA[12]
20	DATA[13]	54	DGND
21	DATA[14]	55	DATA[15]
22	DGND	56	DATA[16]
23	DATA[17]	57	DGND

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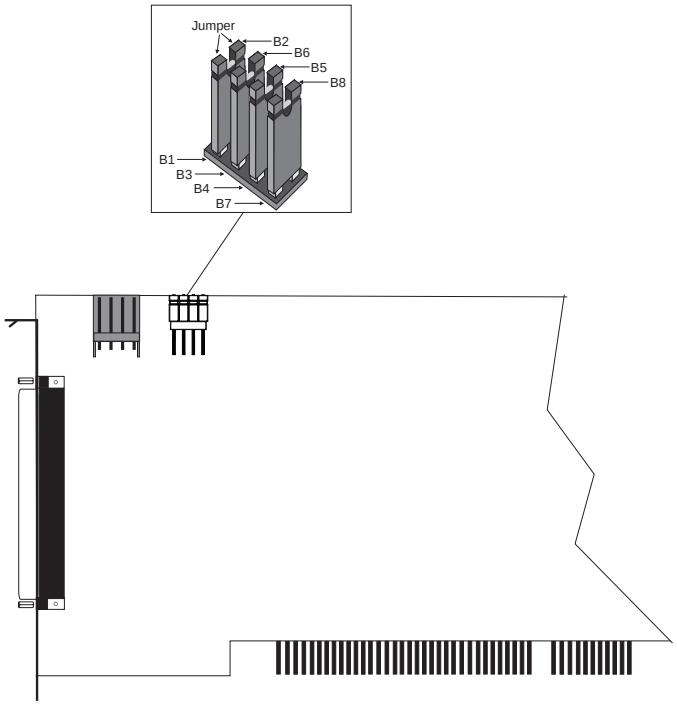
Pin	Signal	Pin	Signal
24	DATA[18]	58	DATA[19]
25	DGND	59	DATA[20]
26	DATA[21]	60	DGND
27	DATA[22]	61	DATA[23]
28	DGND	62	DATA[24]
29	DATA[25]	63	DGND
30	DATA[26]	64	DATA[27]
31	DGND	65	DATA[28]
32	DATA[29]	66	DGND
33	DATA[30]	67	DATA[31]
34	DGND	68	SBN

* N/C = Not connected. This means that the pin is defined as part of the VMChannel interface standard but it is not used on the Matrox Meteor-II /Digital board.

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Jumpers

Jumpers are only available for the PCI form factor. They are replaced by DIP switches on the PC/104-*Plus* form factor (see the following section).



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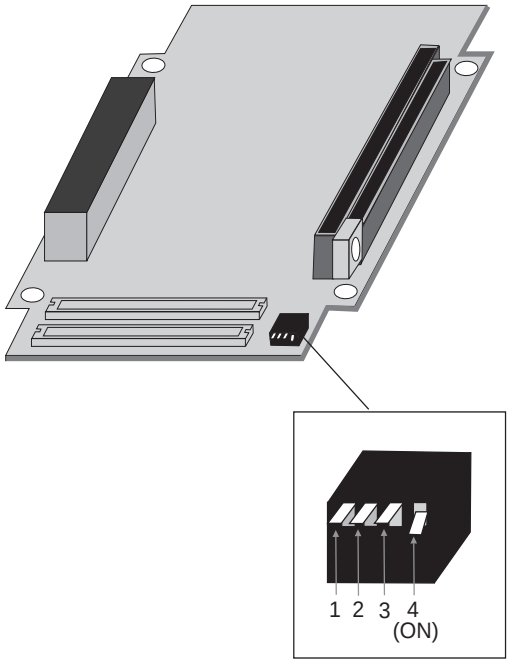
Each jumper connects a 100Ω termination resistor between the two polarities of the following signals:

Jumper B1 - B2: TRIG+, TRIG-
Jumper B3 - B6: VSYNC+, VSYNC-
Jumper B4 - B5: HSYNC+, HSYNC-
Jumper B7 - B8: CLKIN+, CLKIN-

By default, all jumpers are in place. If more than one load (for example, two line-locked cameras) are to be connected to the TRIG, VSYNC, HSYNC, or CLKIN, the corresponding jumpers should be removed.

DIP switches

DIP switches are only available for the PC/104-*Plus* form factor. They are replaced by jumpers on the PCI form factor (see the previous section).



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Each DIP switch, when set to ON, connects a 100Ω termination resistor between the two polarities of the following signals:

	ON
Switch 1:	CLKIN+, CLKIN-
Switch 2:	HSYNC+, HSYNC-
Switch 3:	VSYNC+, VSYNC-
Switch 4:	TRIG+, TRIG-

Specifications

Electrical

Operating voltage and current:

- 3.3 V, 2.75 A, power consumption: 9 watts
- 5 V, 0.5 A, power consumption: 2.5 watts

I/O specifications

- Input signals in LVDS format:
  - Termination: 100 Ω differential.
  - Input current:
    - Min: -20 μA.
    - Max: 20 μA.
  - Input voltage:
    - Differential high threshold:

      Typ*: 20 mV.

      Max: 100 mV.
    - Differential low threshold:

      Min: -100 mV.

      Typ*: -20 mV.

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- Output signals in LVDS format:
  - No termination.
  - Output current:
    - Min: 2.5 mA.
    - Max: 4.5 mA.
  - Output voltage:
    - Differential high threshold:

      Typ*: 1.38 V.

      Max: 1.6 V.
    - Differential low threshold:

      Min: -0.9 V.

      Typ*: 1.03 V.
- Input signals in TTL format:
  - No termination.
  - Input current: Max of ±1µA.
  - Input voltage:
    - Min of low: 0 V
    - Max of low: 0.8 V.
    - Min of high: 2 V.
    - Max of high: 5 V.
- Output signals in TTL format:
  - No termination.
  - Output current:
    - Max of low: 64 mA.
    - Max of high: -32 mA.

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- Output voltage:
  - Min of low: 0 V.
  - Max of low: 0.55 V.
  - Min of high: 2 V.
  - Max of high: 5 V.

- Trigger input signal (opto-isolated):
  - Termination: 511 ohms series.
  - Input current:
    - Min of low: 0 µA.
    - Max of low: 250 µA.
    - Min of high: 5 mA[1].
    - Max of high: 20 mA[2].
  - Input voltage:
    - Min of low: 0 V.
    - Max of low: 0.8 V.
    - Min of high: 2 V.
    - Max of high: 5 V.

*Abbreviation for Typical value.

1. A Min of 6.3 mA recommended.
2. A Max of 10 mA recommended.

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Environmental

- Min./max. ambient operating temperature: 0°C - 55° C.
- Min./max. storage temperature: -40° C - 75° C.
- Max. altitude for operation: 3000 meters.
- Max. altitude for transport: 12000 meters.
- Operating humidity: 20 - 80% relative humidity (non-condensing).

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Appendix C: Listing of Matrox Meteor-II /Digital Boards

This appendix lists specific versions and revisions of the Matrox Meteor-II /Digital board.

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Revisions of Matrox Meteor-II /Digital

Board	Version	Description
Matrox Meteor-II /Digital for PCI	752-00 rev. A	Original version.
	752-01 rev. A	No functional change.
	752-02 rev. A	No functional change.
Matrox Meteor-II /Digital for PC/104-*Plus*	7035-01 rev. A	Original version

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Appendix D: Glossary

This appendix defines some of the specialized terms used in this Matrox Meteor-II document.

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- **ASIC**

  Application-specific integrated circuit. An integrated circuit custom-made to meet the requirements of a specific application. It integrates several digital and/or analog functions into a single die. This results in a reduction in cost, board area, and power consumption, while improving performance when compared to an equivalent implementation using off-the-shelf components.

- **Backplane**

  A circuit board that acts as a pathway between multiple boards. For example, if a backplane is inserted between the VMChannels of two Matrox Meteor-II boards, the boards can share data through their VMChannel.

- **Band**

  One of the surfaces of a buffer. A grayscale image requires just one band. A color image requires three bands, one for each color component.

- **Bandwidth**

  A term describing the capacity to transfer data. Greater bandwidth is needed to sustain a higher transfer rate. Greater bandwidth can be achieved, for example, by using a wider bus.

- **Bit**

  A digit of a binary number. Images are described as 1-bit, 8-bit, 16-bit, etc. The numbers indicate the bits available to store the value of each pixel in the image.

- **Bus**

  A pathway along which signals are sent, generally in two directions, for communication of data.

- **Color component**

  One of the components that make up a color space. Typically, each component of a color image is stored in a separate band of a multi-band buffer.

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- **Composite sync**

  A synchronization signal made up of two components: one horizontal and one vertical.

- **Contiguous memory**

  A block of memory occupying a single, consecutive series of locations.

- **DCF**

  Digitizer Configuration Format. A DCF defines the input data format and among other things, how to accept or generate video timing signals such as horizontal sync, vertical sync, and pixel clock.

- **Display memory**

  See *frame buffer.*

- **Exposure time**

  Refers to the period during which the image sensor of a camera is exposed to light. As the length of this period increases, so does the image brightness.

- **Field**

  One of the two halves that make up an image. One half consists of the image's odd lines (known as the *odd field*); the other half consists of the image's even lines (known as the *even field*).

- **Frame**

  A single image grabbed from a video camera.

- **Frame buffer**

  A frame buffer is a dedicated storage area often used for data transfers between devices of differing speeds. For example, since a computer sends out data faster than a screen can display it, the data is temporarily stored in the frame buffer. The buffer is generally thought of as a two-dimensional surface with a certain pixel depth.

- **Grab**

  To acquire an image from a camera.

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- **Horizontal sync**

  The part of a video signal that indicates the end of a line and the start of a new one.

  See also *vertical sync*.

- **HSL**

  A color space that represents color using components of hue, saturation, and luminance. The hue component describes the actual color of a pixel. The saturation component describes the concentration of that color. The luminance component describes the combined brightness of the primary colors.

- **Host**

  In general, Host refers to the principal CPU in one's computer.

- **Interlaced scanning**

  Describes a transfer of data in which the odd-numbered lines of the source are written to the destination buffer first and then the even-numbered lines (or vice-versa).

  See also *progressive scanning*.

- **Latency**

  The time from when an operation is started to when the final result is produced.

- **Live processing**

  See *real-time processing*.

- **LUT mapping**

  Look-up table mapping. A point-to-point operation that uses a table to define a replacement value for each possible pixel value in an image.

- **LVDS**

  Low-Voltage Differential Signaling. It is a way to communicate data using a very low voltage swing (about 350mV) over two differential printed circuit board (PCB) traces or a balanced cable.

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- **PCI**

  Peripheral Component Interconnect. An expansion bus standard for the ’90s.

- **PCI Primary/Secondary Bus**

  A high-performance bus that provides a processor-independent data path between the CPU and high-speed peripherals.

- **PLC**

  Programmable Logic Controller. A device used to automate monitoring and control of industrial plants. It can be used as a stand-alone device or in conjunction with data acquisition.

- **Progressive scanning**

  Describes a transfer of data in which the lines of the source input device are written sequentially into the destination buffer.

  Also known as *non-interlaced.* See also *interlaced scanning*.

- **Real-time processing**

  The processing of an image as quickly as the next image is grabbed.

  Also known as *live processing*.

- **RGB**

  A color space that represents color using the primary colors (red, green and blue) as components.

- **Synchronous function**

  A function that does not return control to the caller until it has finished executing.

  See also *asynchronous function*.

- **Vertical sync**

  The part of a video signal that indicates the end of a frame and the start of a new one.

  See also *horizontal sync*.

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- **VIA**

  Video Interface ASIC. A custom ASIC that connects all the data buses on the board (the grab, VMChannel, and PCI bus) to one another, and directs and monitors data flow "traffic". It is a video interface that provides various ways of inputting and outputting data.

- **VMChannel**

  Vesa Media Channel. An industry standard 32-bit bus designed for carrying video data. On Matrox Meteor-II boards, it is used primarily to share data with other Matrox imaging boards.

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Regulatory Compliance

FCC Compliance Statement

Warning

Changes or modifications to these units not expressly approved by the party responsible for the compliance could void the user's authority to operate this equipment.

The use of shielded cables for connections of these devices to other peripherals is required to meet the regulatory requirements.

Note

These devices comply with Part 15 of FCC Rules. Operation is subject to the following two conditions:

1. These devices may not cause harmful interference, and
2. These devices must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for Class A digital devices, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference 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 instruction manual, may cause harmful interference to radio communications. Operation of these devices in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Industry Canada Compliance Statement

These digital apparatuses do not exceed the Class A limits for radio noise emission from digital apparatuses set out in the Radio Interference Regulations of Industry Canada.

Ces appareils numériques n'émettent pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le Règlement sur le brouillage radioélectrique édicté par Industrie Canada.

EU Notice (European Union)

WARNING: These are class A products. In a domestic environment these products may cause radio interference in which case the user may be required to take adequate measures.

AVERTISSEMENT: Ces appareils sont des produits informatiques de Classe A. Lorsque ces appareils sont utilisent dans un environnement résidentiel, ces produits peuvent entraîner des interférences radioélectriques. Dans ce cas, l'usager peut être prié de prendre des mesures correctives appropriées.

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This device complies with EC Directive 89/336/EEC for Class A digital devices. They have been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24 when installed in a typical class A compliant host system. It is assumed that these devices will also achieve compliance in any Class A compliant system.

Ces unités sont conformes à la Directive communautaire 89/336/EEC pour les unités numériques de Classe A. Les tests effectués one prouvé qu'elles sont conformes aux normes EN55022/CISPR22 et EN55024/CISPR24 lorsqu'elles sont installées dans un système hôte typique de la Classe A. On suppose qu'ils présenteront la même compatibilité dans tout système compatible de la Classe A.

Directive on Waste Electrical and Electronic Equipment (WEEE)

Europe



(English) European user's information – Directive on Waste Electrical and Electronic Equipment (WEEE)

Please refer to the Matrox Web site (**www.matrox.com/environment/weee**) for recycling information.

(Français) Informations aux utilisateurs Européens – Règlementation des déchets d'équipements électriques et électroniques (DEEE)

Se référer au site Web de Matrox (**www.matrox.com/environment/weee**) pour l'information concernant le recyclage.

(Deutsch) Information für europäische Anwender – Europäische Regelungen zu Elektro- und Elektronikaltgeräten (WEEE)

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(Italiano) Informazioni per gli utenti europei – Direttiva sui rifiuti di apparecchiature elettriche ed elettroniche (RAEE)

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