Matrox Meteor-II

Installation and Hardware Reference

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Contents

Chapter 1: Introduction

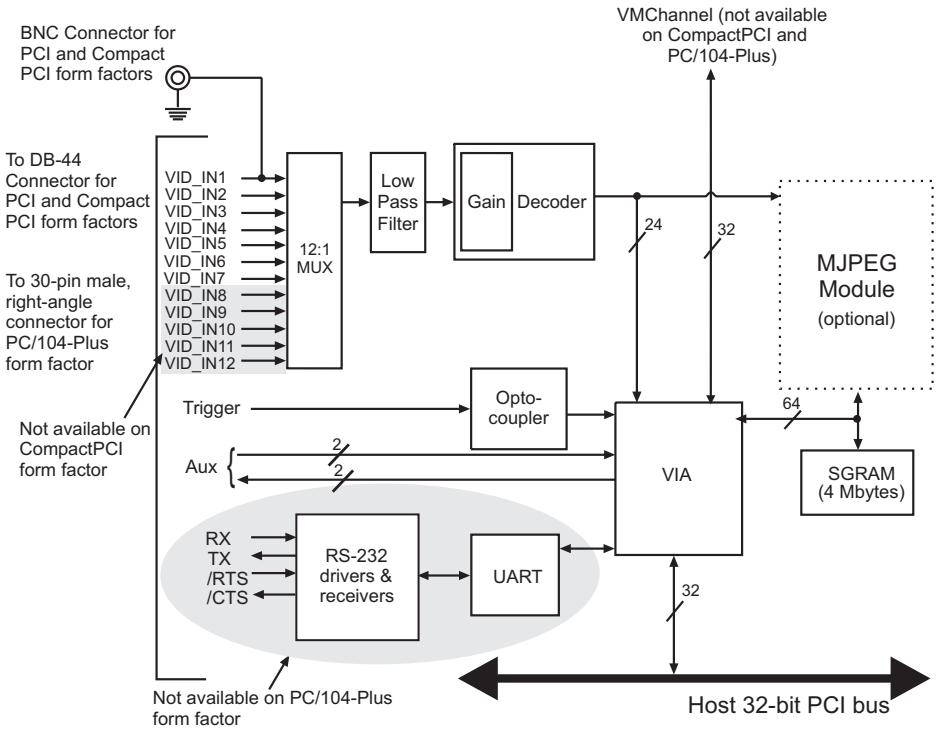
This chapter outlines the key features of Matrox Meteor-II boards.

Matrox Meteor-II boards

Matrox Meteor-II comes in four versions: Matrox Meteor-II /Standard, Matrox Meteor-II /Multi-Channel, Matrox Meteor-II /Digital, and Matrox Meteor-II /1394. Some of these boards are available in different form factors, namely PCI, CompactPCI, and PC/104-*Plus*. All boards and form factors support real time image transfer to Host memory, and can be programmed with the Matrox Imaging Library (MIL) or any of its derivatives.

Matrox Meteor-II /Standard

Matrox Meteor-II /Standard is a standard monochrome and color analog frame grabber. This board is available in a PCI, PC/104-*Plus*, or CompactPCI (3U) form factor, all of which can use a Matrox Meteor-II MJPEG module for compression and decompression of monochrome and color images.



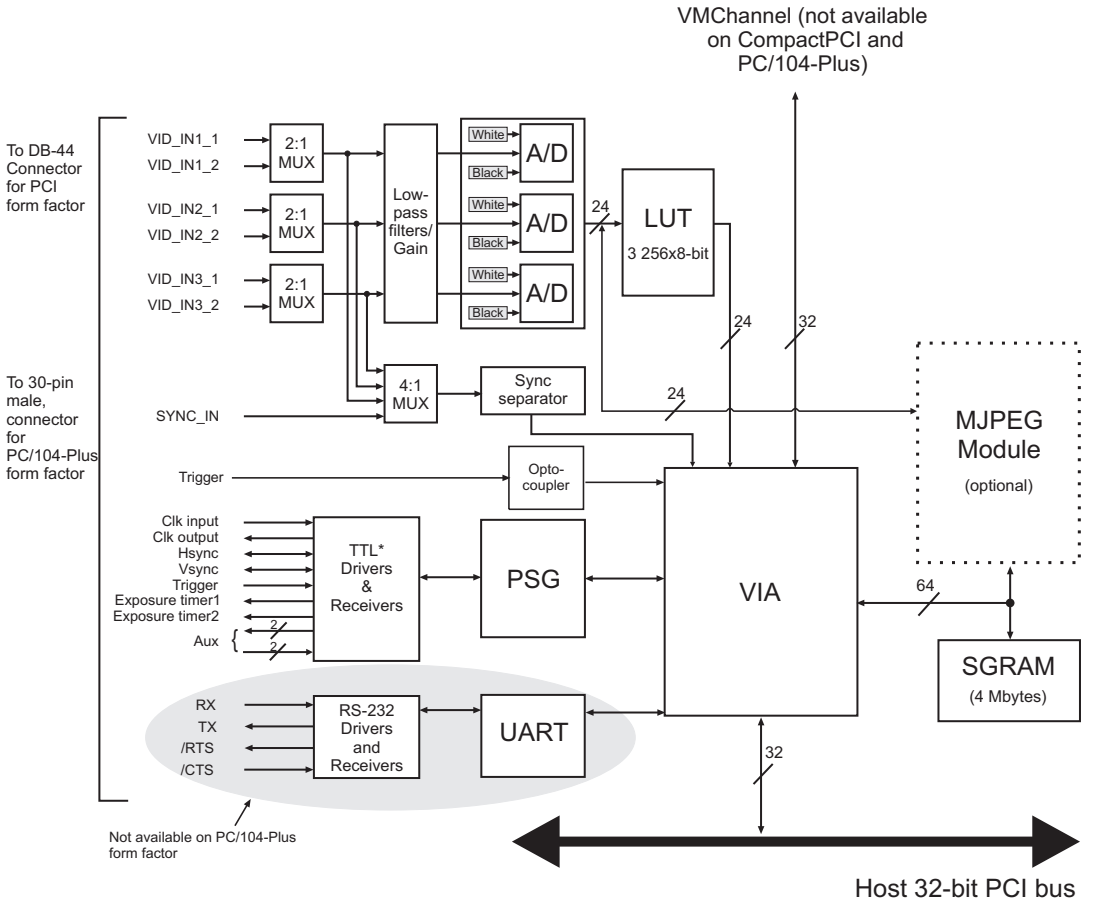
Acquisition features

Matrox Meteor-II /Standard can acquire different types of standard video formats using its video decoder. The video decoder can accept composite (CVBS) and component (Y/C) video in NTSC/PAL formats, and convert it to RGB 8:8:8, YUV 4:2:2 (stored in YUYV format) or YUV 4:1:1, with either square pixels or CCIR-601 resolutions. It can also convert composite RS-170/CCIR video formats with square pixels or CCIR-601 resolutions. The PCI and PC/104-*Plus* form factors feature twelve software-selectable input channels to switch between six Y/C or twelve composite video sources. The CompactPCI form factor features seven inputs to switch between three Y/C or seven composite video sources.

Matrox Meteor-II /Standard accepts an external trigger input, and can operate in next valid frame/field mode. The PCI form factor also includes an auxiliary power supply input, which can be used to draw auxiliary power from your computer to provide power to your camera.

Matrox Meteor-II /Multi-Channel

Matrox Meteor-II /Multi-Channel is a monochrome and component RGB analog frame grabber for standard and non-standard video acquisition. Matrox Meteor-II /Multi-Channel is available in a PCI or PC/104-*Plus* form factor, both of which can use a Matrox Meteor-II MJPEG module for compression and decompression of monochrome and color images.



* RS-422 version of these signals are available on the optional RS-422 connector.
This connector is only available on Matrox Meteor-II /Multi-Channel in a PCI form factor.

Acquisition features

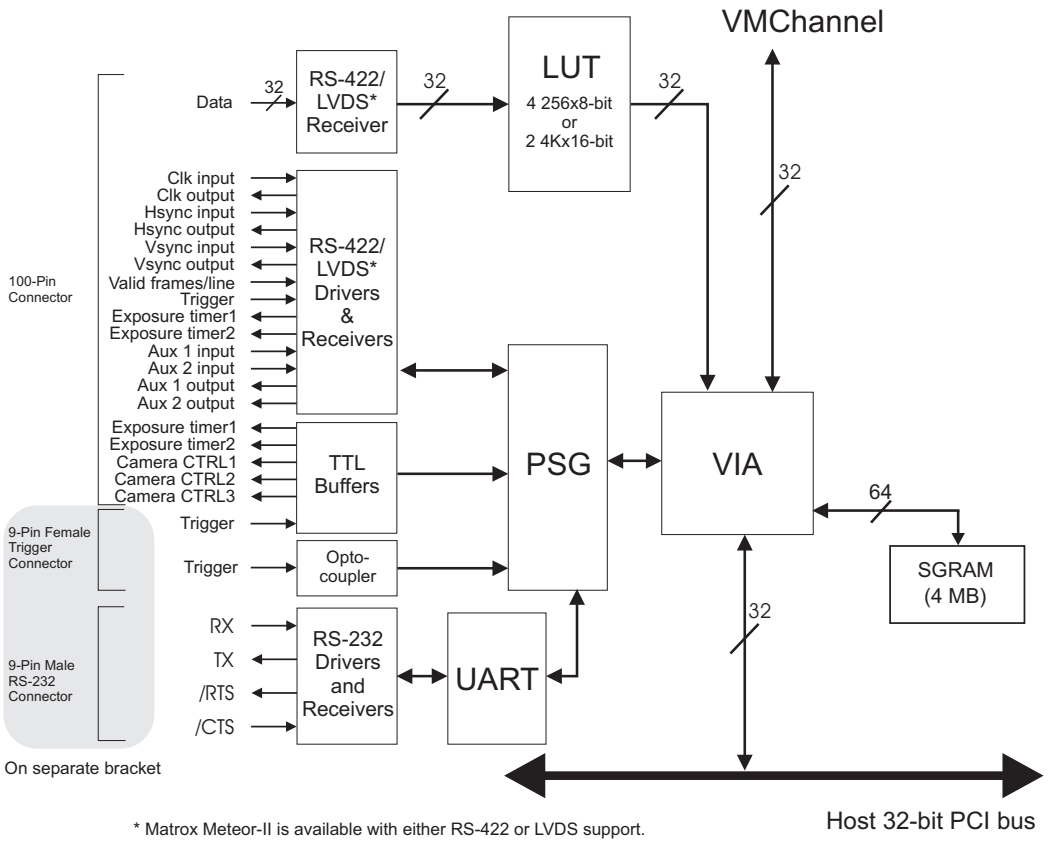
Matrox Meteor-II /Multi-Channel can acquire different types of standard and non-standard monochrome and component RGB video. The board features six software-selectable input channels on which two component RGB or six monochrome cameras can be attached. Matrox Meteor-II /Multi-Channel supports acquisition from one camera at a time or simultaneous acquisition from up to three gen-locked RS-170/CCIR cameras. Matrox Meteor-II /Multi-Channel supports both single and

dual-tap configurations. It also accepts an external trigger, and can operate in either asynchronous reset mode or next valid frame/field mode.

The PCI form factor also includes an auxiliary power supply input, which can be used to draw auxiliary power from your computer to provide power to your camera.

Matrox Meteor-II /Digital

Matrox Meteor-II /Digital is a digital frame grabber for standard and non-standard video acquisition. This board is only available in a PCI form factor.



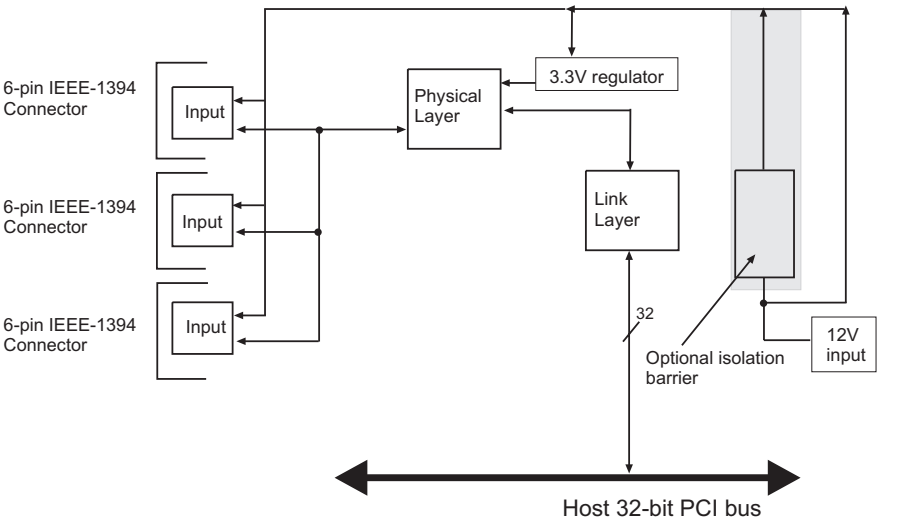
* Matrox Meteor-II is available with either RS-422 or LVDS support.

Acquisition features

Matrox Meteor-II /Digital can acquire digital video from standard and non-standard 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 or component RGB images. The board also supports multi-tap grabs (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.

Matrox Meteor-II /1394

Matrox Meteor-II /1394 is an IEEE 1394-to-PCI adapter board that permits simplified, high-performance digital video capture using a computer. This board is only available in a PCI form factor.



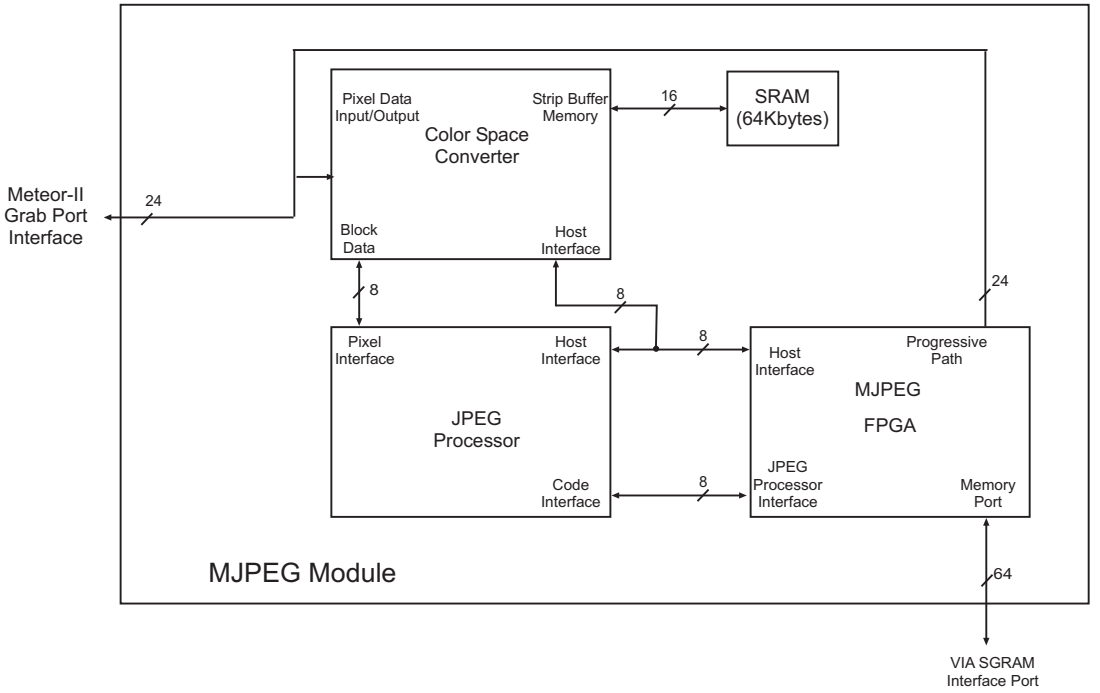
Acquisition features

Matrox Meteor-II /1394 supports the transfer of monochrome or color digital video from cameras which are compliant with the IEEE 1394 Digital Camera Specification (DCS). Note, Matrox Meteor-II /1394 has three input ports which can be used for image acquisition.

The Meteor-II /1394 can also supply power from your computer through the IEEE 1394 interface.

Matrox Meteor-II MJPEG module

Matrox Meteor-II MJPEG module is an optional board which module supports lossy and lossless MJPEG (interlaced and non-interlaced) compression and decompression of color and monochrome video. There are two versions of the Matrox Meteor-II MJPEG module: one is for use with the PCI and CompactPCI form factors, and the other is for use with the PC/104-*Plus* form factor. The Matrox Meteor-II MJPEG module is not supported by Matrox Meteor-II /Digital and /1394.



Data transfer

All versions of the Matrox Meteor-II board allow 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, the Matrox Meteor-II boards (except Meteor-II /1394) feature 4 Mbytes of SGRAM for temporary frame storage. All boards except Matrox Meteor-II /1394 are also equipped with the Matrox Video Interface ASIC (VIA).

All PCI form factor boards (except the Meteor-II /1394) also have 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 Corona, Matrox Genesis main board, or Matrox Genesis processor board)[1].

Software

You can purchase one or more Matrox Imaging software products that support the Matrox Meteor-II board. These are the Matrox Imaging Library (MIL) and its derivatives (MIL-Lite, ActiveMIL-Lite, and Matrox Inspector). All Matrox software is supported under Windows; consult your software manual for supported Windows environments.

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.

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, in order for VMChannel transfers to operate correctly.

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.)

Inspector

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

MIL 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.

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[1] (DCF) files, which MIL and its derivatives use to interface to specific non-standard video sources. Intellicam is included with both MIL and MIL-Lite.

1. Matrox Meteor-II /Standard and /1394 only support pre-defined DCF files.

What you need to get started

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

- computer with a PCI bus and a Pentium processor or better.
- Windows: See your software package for supported environments and RAM requirements.

Other useful considerations

- A computer with a relatively up-to-date PCI chipset, such as the Intel 430HX, 430VX, 430TX, 440FX, 440LX, or 440BX for full Matrox Meteor-II functionality. These chipsets are recommended because they offer the required sustained-throughput to Host memory.
- 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.

Inspecting the Matrox Meteor-II package

Standard package

When you unpack your Matrox Meteor-II 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.

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

- The Matrox Meteor-II /Standard, Matrox Meteor-II /Multi-Channel, Matrox Meteor-II /Digital, or Matrox Meteor-II /1394 board.
- The *Matrox Meteor-II Installation and Hardware Reference* manual (this document).
- A 4-pin power cable, included with Matrox Meteor-II /Standard and /Multi-Channel (PCI form factor), and with Matrox Meteor-II /1394.
- A bracket with flat cables that attach to the trigger and RS-232 input connectors, included with Matrox Meteor-II /Digital.
- A 30-pin connector to interface with the video input connector, included with Matrox Meteor-II /Standard and /Multi-Channel for PC/104-*Plus* (stand-alone version).

Optional items

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

- MIL-32/CD, which includes ActiveMIL; MIL-LITE/32 CD, which includes ActiveMIL-Lite; or Matrox INSPECTOR-32/CD. MIL and MIL-Lite CDs include Intellicam.
- Matrox Meteor-II MJPEG module.

- DBHD44-TO-13BNC input cable with a high density 44-pin connector and thirteen BNC connectors for the Matrox Meteor-II /Standard (PCI and CompactPCI form factors). Six BNC-TO-SVHS (Y/C) adapter cables are shipped with the DBHD44-TO-13BNC cable.
- DH44-TO-13BNC/O input cable with a high density 44-pin connector, available for the Matrox Meteor-II /Standard. This cable is required if you want to connect to special input and output signals, such as synchronization signals, control signals, and DC power output.
- DBHD44-TO-8BNC input cable with a high density 44-pin connector and eight BNC connectors for Meteor-II /Multi-Channel (PCI form factor). Three BNC-TO-SVHS (Y/C) adapter cables are shipped with the DBHD44-TO-8BNC cable.
- DH44-TO-8BNC/O input cable with a high density 44-pin connector, available for the Matrox Meteor-II /Multi-Channel. This cable is required if you want to connect to special input and output signals, such as synchronization signals, control signals, and DC power output.
- DBHD100-TO-OPEN cable for the 100-pin digital input connector on the Matrox Meteor-II /Digital board.

❖ Cables for Matrox Meteor-II /1394 are typically supplied with the camera.

Handling components

The electronic circuits in your computer and the circuits on Matrox Meteor-II 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, including specifications and connector descriptions, and pinouts, see Appendix B for Matrox Meteor-II /Standard, Appendix C for Matrox Meteor-II /Multi-Channel, Appendix D for Matrox Meteor-II /Digital, and Appendix E for Matrox Meteor-II /1394.

A history of the development of Matrox Meteor-II is available in Appendix F.

Conventions

When the term *Matrox Meteor-II boards* is used, it refers to all versions of the board.

When the term *Meteor-II for PC/104-Plus* is used, it refers to the stand-alone version (MET2+/4 or MET2-MC+/4). Another version of Matrox Meteor-II is available pre-installed with Matrox 4Sight, and technical information for this board is available in the *Matrox 4Sight User Guide*.

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]

1. Most items can be accomplished with Matrox Inspector.

Need help?

Appendix A offers solutions to potential problems. If your Matrox Meteor-II 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.

Chapter 2: Hardware installation

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

Installing Matrox Meteor-II

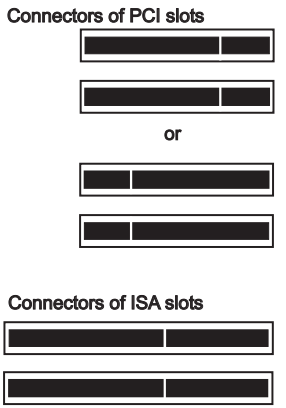
Before you install your board, some precautionary measures must be taken. Turn off power to the computer and its peripherals, and drain static electricity from your body (by touching a metal part of the computer chassis). Next, follow the steps to install your board according to its form factor: PCI,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

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

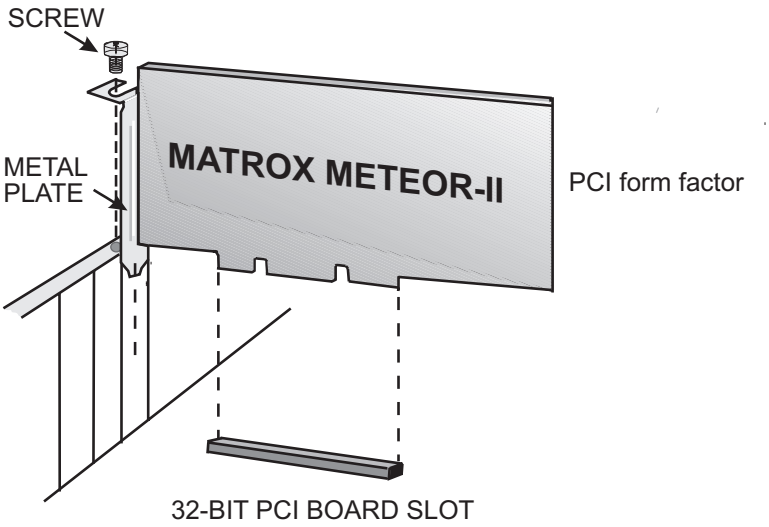
1. Remove the cover from your computer using the instructions from your computer manual.
2. Check that you have an empty PCI (32-bit) slot that can accommodate the board. If you do not have an empty slot, remove a PCI board from your computer to make room for your Matrox Meteor-II board and take note of the slot number you choose.



▲ ***Caution***

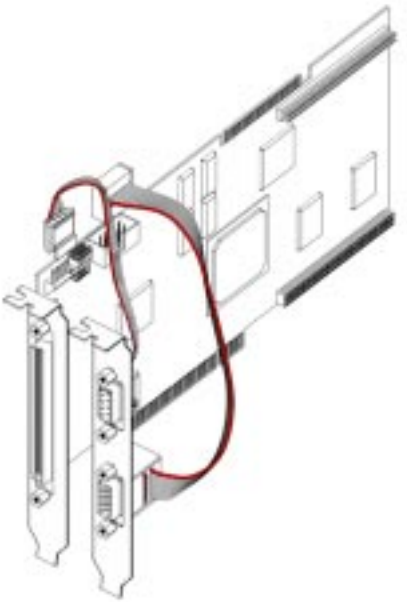
Some computers have a large, black-ridged heat sink that prevents boards from using most PCI board slots. Your Matrox Meteor-II **must not** touch this heat sink. Therefore, choose a slot where the board completely avoids it.

3. Connect the Matrox Meteor-II MJPEG module to the board if required. See the section, *Installing the Matrox Meteor-II MJPEG module*.
4. 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.
5. 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.



6. Once perfectly aligned with an empty slot, press the board firmly but carefully into the connector.
7. Anchor the board by replacing the screw that you removed.
8. If you are installing the Matrox Meteor-II /Standard, /Multi-Channel, or Meteor-II /1394, proceed to Step 9. If you are installing the Matrox Meteor-II /Digital board, continue with the following steps:

- 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.
- Install the bracket with the trigger and RS-232 input connectors and fasten it with the screw you just removed.
- 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).



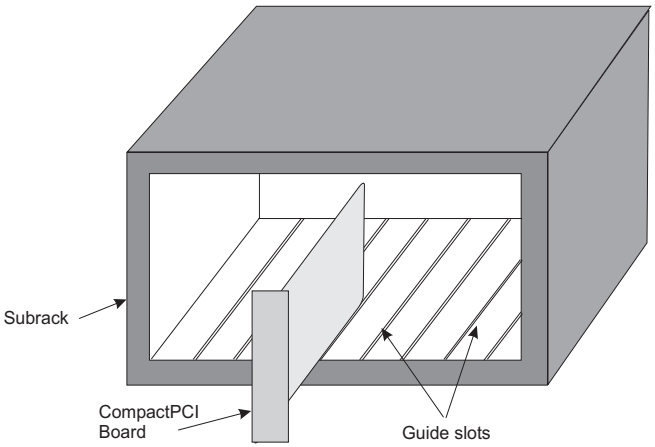
9. Replace the cover of your computer.
10. Connect your video sources. For details, see the *Connecting external devices* section.
11. Turn on your computer.

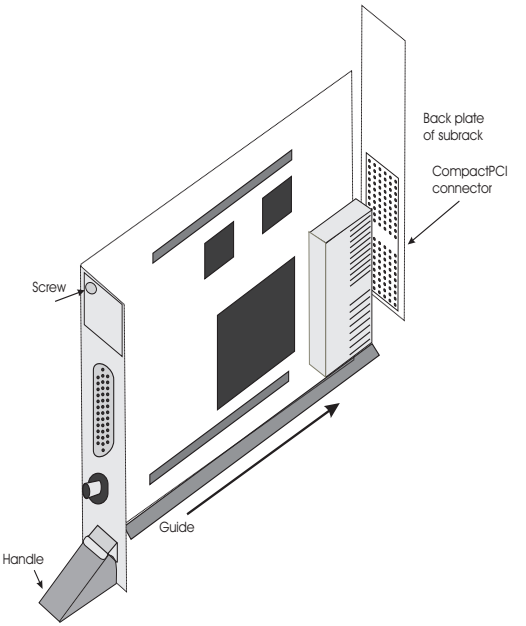
    Under Windows 98, when you boot your computer, Windows' Plug-and-Play system will detect a new PCI card and you will be asked to assign a driver to it. At this point, you should click on **Cancel** because the driver will be installed during the installation of MIL or one of its derivatives.

Installing Matrox Meteor-II for CompactPCI

Use the following steps to install your Matrox Meteor-II board for CompactPCI (3U). Note that a 6U replacement bracket is available.

1. Remove a plate on the subrack, exposing an empty slot.
2. Connect the Matrox Meteor-II MJPEG module to the board if required. See the section, *Installing the Matrox Meteor-II MJPEG module*.
3. Carefully position Matrox Meteor-II along one of the guide rails and slide the board towards the connector at the back.





4. Press the board firmly but carefully into the connector.
5. When the board is in place, the handle opens automatically, exposing a screw. Tighten both this screw, and the one at the top of the bracket.
6. Connect your video sources. For details, see the *Connecting external devices* section.
7. Turn on your computer.

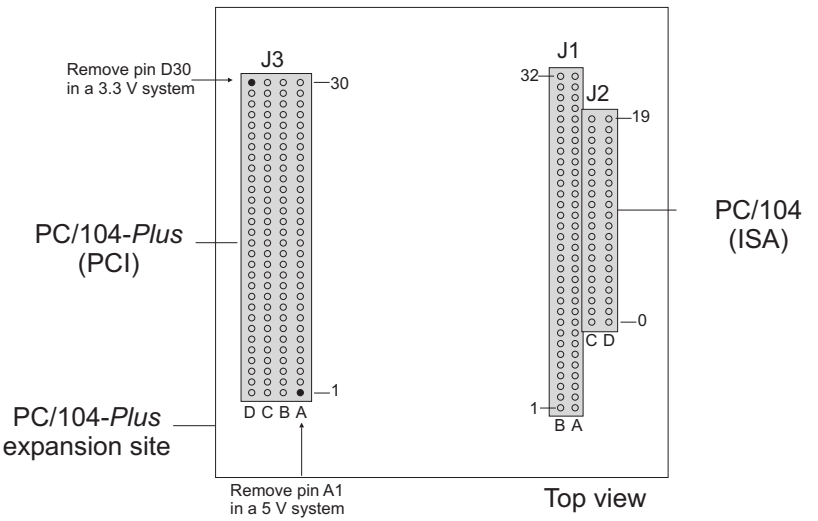
   Under Windows 98, when you boot your computer, Windows' Plug-and-Play system will detect a new PCI card and you will be asked to assign a driver to it. At this point, you should click on **Cancel** because the driver will be installed during the installation of MIL or one of its derivatives.

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

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

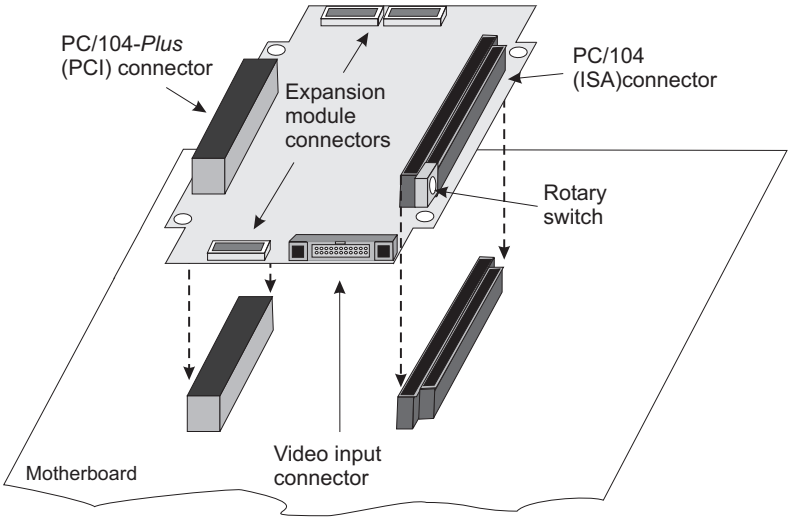
1. Matrox Meteor-II for PC/104-*Plus* can operate in either a 5V or 3.3V system. In some cases, a hole in the PC/104-*Plus* (PCI) connector is filled, which prevents another PC/104-*Plus* module from being stacked on top. To install Matrox Meteor-II for PC/104-*Plus* in a specific signalling environment, 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



2. Connect the Matrox Meteor-II MJPEG module to the board if required. See the section, *Installing the Matrox Meteor-II MJPEG module.*

3. Check that you have an available PC/104-*Plus* connector on the motherboard, or verify that your existing stack can support another 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. Remove the anchoring screws from the stack; do not discard them since you will need them to fasten the Matrox Meteor-II board.
6. Carefully position Matrox Meteor-II over the connectors and press the board firmly into place.
7. Replace the anchoring screws.
8. Set the rotary switch (next to the PC/104 (ISA) connector) to 0 if installing the first stackable module, or another appropriate setting if not the first. See the section, *Multiple board installation*, in Chapter 4.



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

10. Turn on your computer.

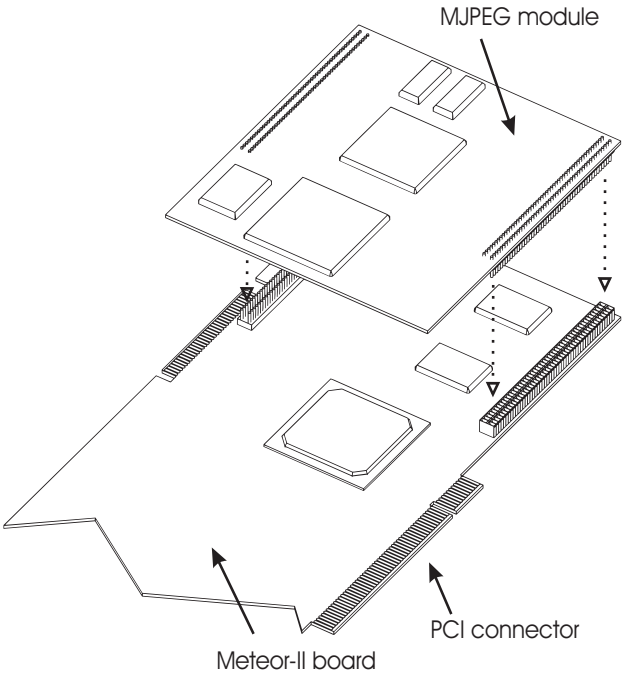
    Under Windows 98, when you boot your computer, Windows' Plug-and-Play system will detect a new PCI card and you will be asked to assign a driver to it. At this point, you should click on **Cancel** because the driver will be installed during the installation of MIL or one of its derivatives.

Installing the Matrox Meteor-II MJPEG module

Matrox Meteor-II MJPEG module is available in two form factors: one for use with PCI and CompactPCI form factors, and one for use with the PC/104-*Plus* form factor. The module is supported on Matrox Meteor-II /Standard and /Multi-Channel.

PCI and CompactPCI form factors

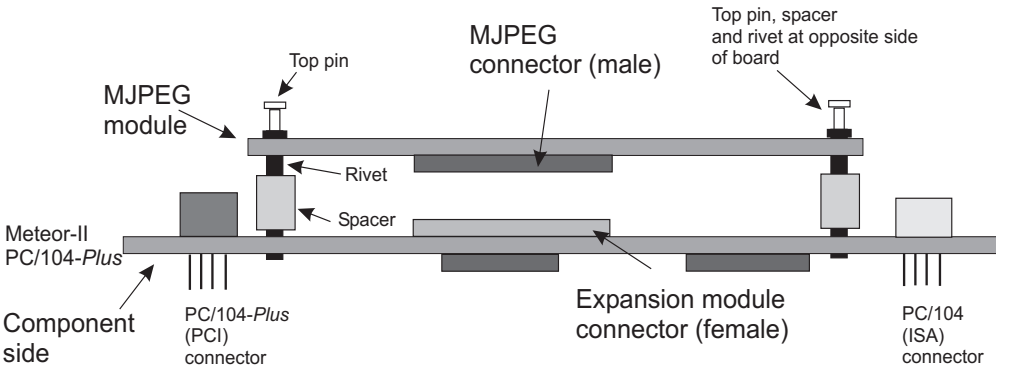
1. Position the boards such that the male connector on the module is aligned with the female connector on the base board and the female connector on the module is aligned with the male connector of the base board.



2. Once the boards are perfectly aligned, press the module firmly but carefully into the connectors.

PC/104-Plus form factor

On the PC/104-*Plus* form factor, the expansion connectors are located on the soldered side of the board. Follow the steps below to connect the Matrox Meteor-II MJPEG module to Matrox Meteor-II for PC/104-*Plus*[1]:



1. Align the connectors of the Matrox Meteor-II MJPEG module with the expansion module connectors on the Matrox Meteor-II board.
2. Position the spacer between the boards over each small hole, next to the MJPEG connectors.
3. Insert the rivet into each hole from the soldered side of the Matrox Meteor-II MJPEG module, ensuring that it goes through the spacer.
4. Press the boards together, so the connectors are snapped in place.
5. Insert the top pin through the hole from the soldered side of the Matrox Meteor-II MJPEG module to hold the rivet, spacer, and boards in place.

1. The Matrox Meteor-II MJPEG module 896-00 rev. A has two connectors and two pins. 896-01 rev. A has three connectors and five pins.

Connecting external devices

All boards and form factors have their own particularities regarding connectors and input devices. In this section, the boards will be discussed in the following order:

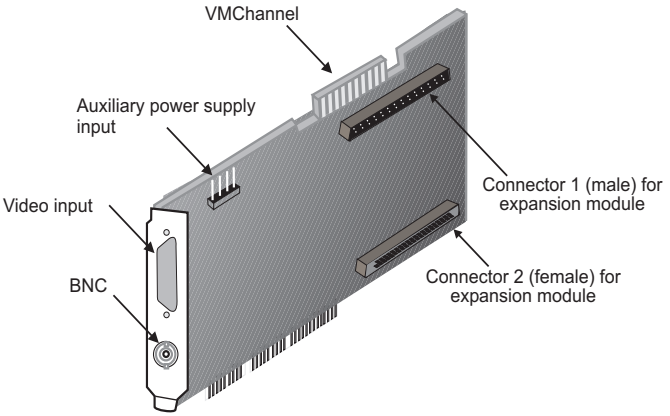
- Matrox Meteor-II /Standard for PCI.
- Matrox Meteor-II /Standard for CompactPCI.
- Matrox Meteor-II /Multi-Channel for PCI.
- Matrox Meteor-II /Standard and /Multi-Channel for PC/104-*Plus*.
- Matrox Meteor-II /Digital.
- Matrox Meteor-II /1394.

Matrox Meteor-II /Standard for PCI

Matrox Meteor-II /Standard has six connectors, which are indicated in the diagram below. Two of these connectors are located on its bracket.The first four connectors listed are discussed in detail in Appendix B.

- **Video input connector.** Used to receive analog video, as well as send and receive synchronization signals and power.
- **BNC connector.** Used to receive composite analog video.
- **Auxiliary power supply input.** Used to route power from your computer through the Matrox Meteor-II board to your camera.
- **VMChannel connector.** Used to send data to another Matrox board.
- **Expansion module interface**[1]. Used to connect to the optional Matrox Meteor-II MJPEG module (for image compression and decompression).

1. Matrox Meteor-II /Standard boards 750-00 rev. A and 750-01 rev. A do not support the Matrox Meteor-II MJPEG module and therefore do not have these connectors.



Connecting a video input to Meteor-II /Standard for PCI or CompactPCI

You can connect video sources to Matrox Meteor-II /Standard's video input connector, using the optional DBHD44-TO-13BNC cable. This cable has thirteen BNC connectors and a 44-pin high-density D-Subminiature plug. The wires of the cable are color-coded as follows. Connect your cameras accordingly.

Wires	Signals	Expected Input	Form factor
RED (1)	VID_IN1	Analog Video Input1 or Y1	PCI, CompactPCI
GREEN (2)	VID_IN2	Analog Video Input2 or C1	PCI, CompactPCI
BLUE (3)	VID_IN3	Analog Video Input3 or Y2	PCI, CompactPCI
BLACK (4)	VID_IN4	Analog Video Input4 or C2	PCI, CompactPCI
WHITE (5)	VID_IN5	Analog Video Input5 or C4	PCI, CompactPCI
YELLOW (6)	VID_IN6	Analog Video Input6 or Y3	PCI, CompactPCI
PURPLE (7)	VID_IN7	Analog Video Input7 or C3	PCI, CompactPCI

Wires	Signals	Expected Input	Form factor
BROWN (8)	VID_IN8	Analog Video Input8 or Y4	PCI
LIGHT BLUE (9)	VID_IN9	Analog Video Input9 or Y5	PCI
ORANGE (10)	VID_IN10	Analog Video Input10 or C5	PCI
PINK (11)	VID_IN11	Analog Video Input11or Y6	PCI
LIGHT GREEN (12)	VID_IN12	Analog Video Input12 or C6	PCI
GRAY (13)	OPTOTRIG	External trigger input*	PCI, CompactPCI

*OPTOTRIG- is usually connected to the ground of the trigger source.

Connect the supplied BNC-TO SVHS adaptor cables to the DBHD44-TO-13BNC cable for Y/C input. The PCI form factor supports up to six Y/C sources, and the CompactPCI form factor supports up to three. The cable is color coded as follows:

Wires on BNC-TO-SVHS	Wires on DBHD44-TO-13BNC						Description
BLUE (Y)	Red (1)	Blue (3)	Yellow (6)	Brown (8)	Light Blue (9)	Pink (11)	Luminance
GREEN (C)	Green (2)	Black (4)	Purple (7)	White (5)	Orange (10)	Light Green (12)	Chrominance

Connecting Matrox Meteor-II /Standard to other boards

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

Connecting Matrox Meteor-II /Standard to the auxiliary power supply input

To use Matrox Meteor-II /Standard to power your camera:

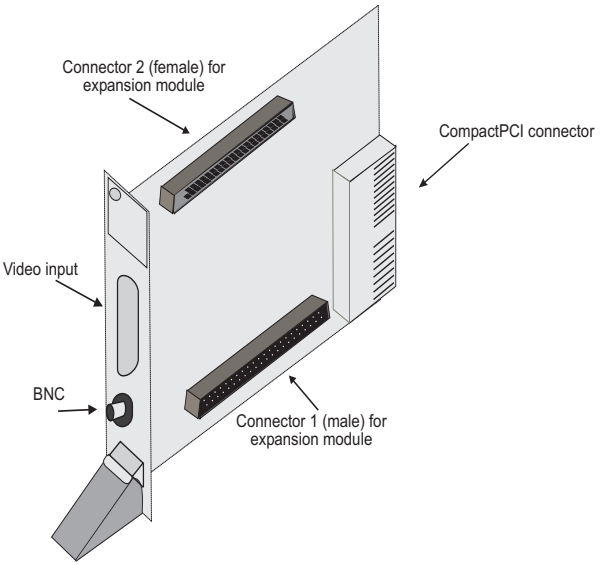
1. Use the 4-pin power cable to connect the auxiliary power supply connector to the power supply in the computer.
2. Ensure that the jumper is across the appropriate Matrox Meteor-II auxiliary power supply selection pins, for the required voltage (5 V or 12 V). See Appendix B for a diagram.
3. Use the DBHD44-TO-13BNC/O cable to connect your camera's video output and power supply input to the video input connector. Note that the total current drawn by all the cameras is limited to 1.5 A, and the circuit uses an auto-resettable fuse.

Matrox Meteor-II /Standard for CompactPCI

Matrox Meteor-II for CompactPCI has five connectors, which are indicated in the diagram below. Two of these connectors are located on its bracket, and are discussed in detail in Appendix B.

- **Video input connector.** Used to receive analog video, as well as send and receive synchronization signals and power.
- **BNC connector.** Used to receive composite analog video.
- **CompactPCI connector.** Used to connect your board to the PCI bus.

- **Expansion module interface**. Used to connect to the optional Matrox Meteor-II MJPEG module (for image compression and decompression).



Connecting a video input (CompactPCI)

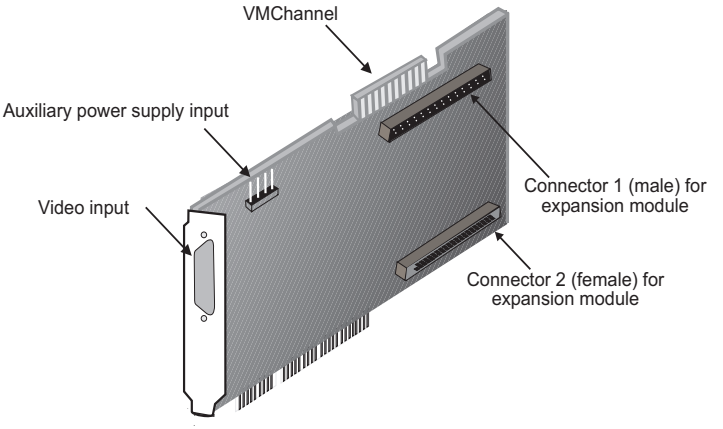
You can connect video sources to Matrox Meteor-II /Standard's video input connector CompactPCI form factor, using the optional DBHD44-TO-13BNC cable. See the section, *Connecting a video input to Meteor-II /Standard for PCI or CompactPCI*.

Matrox Meteor-II /Multi-Channel for PCI

Matrox Meteor-II /Multi-Channel has six connectors, which are indicated in the diagram below. One of these connectors is located on its bracket. The first four connectors listed are discussed in detail in Appendix C.

- **Video input connector.** Used to receive analog video, as well as send and receive synchronization signals and power.
- **VMChannel connector.** Used to send data to another Matrox board.

- **Auxiliary power supply input.** Used to route power from your computer through the Matrox Meteor-II board to your camera.
- **Expansion module interface.** Used to connect the optional Matrox Meteor-II MJPEG module (for image compression and decompression).



Connecting a video input to Meteor-II /Multi-Channel

Connect video sources to Matrox Meteor-II /Multi-Channel's video input connector, using the optional DBHD44-TO-8BNC cable. This cable has eight BNC connectors and a 44-pin high-density D-Subminiature plug. The wires of the cable are color-coded as follows:

Wires	Signals	Description
RED (1)	VID1_IN1	Analog Video Input1, R
GREEN (2)	VID1_IN2	Analog Video Input2, G
BLUE (3)	VID1_IN3	Analog Video Input3, B
BLACK (4)	SYNC_IN	SYNC input
GREY (5)	OPTOTRIG*	External trigger input
WHITE (6)	VID2_IN1	Analog Video Input4, R
YELLOW (7)	VID2_IN2	Analog Video Input5, G
PURPLE (8)	VID2_IN3	Analog Video input6, B

*OPTOTRIG- is usually connected to the ground of the trigger source.

Connecting Matrox Meteor-II /Multi-Channel to other boards

The VMChannel interface allows the transfer of data to other Matrox boards. Insert a VMChannel backplane (available with interconnect kits) 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 is not bus-controller capable.

Connecting Matrox Meteor-II /Multi-Channel to the auxiliary power supply input

To use Matrox Meteor-II /Multi-Channel to power your camera:

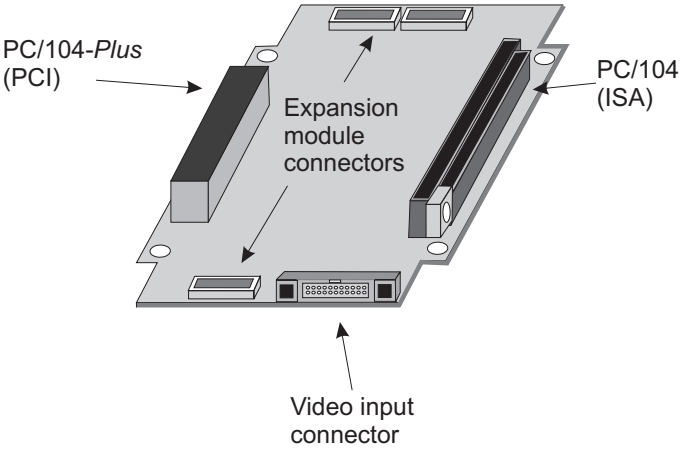
1. Use the 4-pin power cable to connect the auxiliary power supply connector to the power supply in the computer.
2. Ensure that the jumper is across the appropriate Matrox Meteor-II auxiliary power supply selection pins, for the required voltage (5 V or 12 V). See Appendix B for a diagram.
3. Use the DBHD44-TO-8BNC/O cable to connect your camera's video output and power supply input to the video input connector. Note that the total current drawn by all the cameras is limited to 1.5 A, and the circuit uses an auto-resettable fuse.

Matrox Meteor-II /Standard and /Multi-Channel for PC/104-*Plus*

Matrox Meteor-II /Standard and /Multi-Channel PC/104-*Plus* form factor have seven connectors, which are indicated in the diagram below.

- **Video input connector.** A connector used to receive analog 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.
- **Expansion module interface.** Three connectors used to attach to the optional Matrox Meteor-II MJPEG module (for image compression and decompression); located on the soldered side of the board.



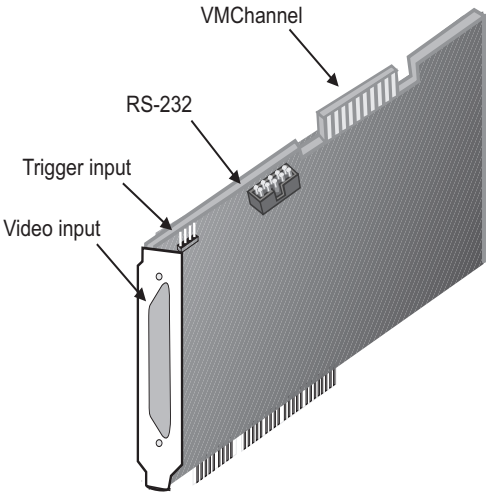
Connecting a video input to Matrox Meteor-II for PC/104-*Plus*

Connect video sources to Matrox Meteor-II /Standard or /Multi-Channel through their video input connector, a 30-pin right-angle male connector. A standard cable for PC/104-*Plus* form factor boards is not available from Matrox. You can use the included mating connector, crimp the ribbon cable to it and attach your required connector to the other end of the ribbon cable. Then, connect this custom cable to the video input connector. See Appendices B and C for the pinouts, signals, and ribbon cable information for the /Standard and /Multi-Channel, respectively.

Matrox Meteor-II /Digital

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

- **Digital Video input.** Used to receive digital video, as well as send and receive synchronization signals.
- **Trigger input.** 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.



Connecting a video input to Meteor-II /Digital

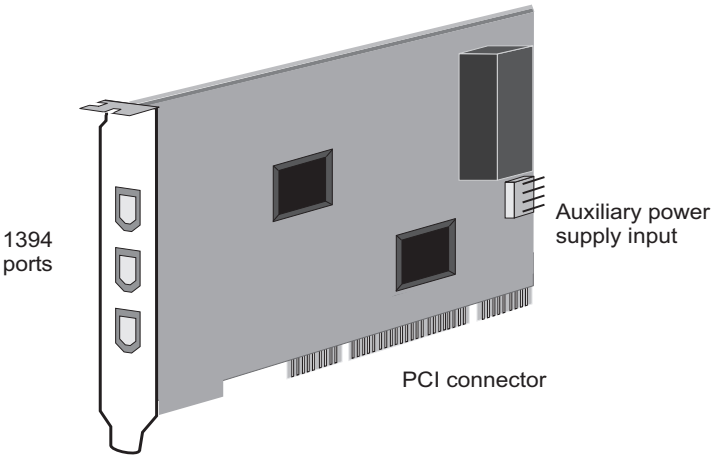
Connect video sources to Matrox Meteor-II /Digital's video input connector, using the optional DBHD100-TO-OPEN. This cable can be customized to fit with the connector on your video source. See Appendix D for the pinouts, signals, and mating connector supplier.

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 interconnect kits) 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 is not bus-controller capable.

Matrox Meteor-II /1394

Matrox Meteor-II /1394 has four connectors, which are indicated in the diagram below. Three of these connectors are located on its bracket, and are discussed in detail in Appendix E.



- **1394 ports.** Used to provide bi-directional serial communication and power. Each I/O port features a standard 6 pin connector. See Appendix E for pinouts.
- **Auxiliary power supply input**. Used to route power from your computer through the Matrox Meteor-II /1394 board to your camera.

Connecting a device to Meteor-II /1394

Connect devices to Matrox Meteor-II /1394's ports, using the 6-pin connectors. The cable for the Meteor-II /1394 is not available from Matrox, but 1394 devices, such as cameras, typically include a cable. See Appendix E for the pinouts, signals, and mating connector supplier.

Connecting Matrox Meteor-II /1394 to the auxiliary power supply input

To use Matrox Meteor-II /1394 to power your device:

1. Use the 4-pin power cable to connect the auxiliary power supply connector to the power supply in the computer.
2. Connect your camera's 1394 cable to one of the board's ports. Note that the total current drawn by all the cameras is limited to 1.5 A.

Chapter 3: Installing software

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

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 board, check the MGA control panel to ensure that you have the latest display driver installed. If you do not have the latest, 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. Note that Matrox Meteor-II /Standard and /1394 only accept standard input formats; therefore, you can only use the predefined DCFs.

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

Chapter 4: Using multiple Matrox Meteor-II boards

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

Using multiple Matrox Meteor-II boards

This section describes how to use multiple Matrox Meteor-II boards. When a grab buffer is selected for display, grabbed images are displayed on the VGA, live or pseudo-live, depending on the operating computer and the position of the windows. Note that the PCI bandwidth is limited, and heavy usage can affect the data transfer in computers using multiple boards.

Multiple board installation

Installing multiple PCI and CompactPCI cards

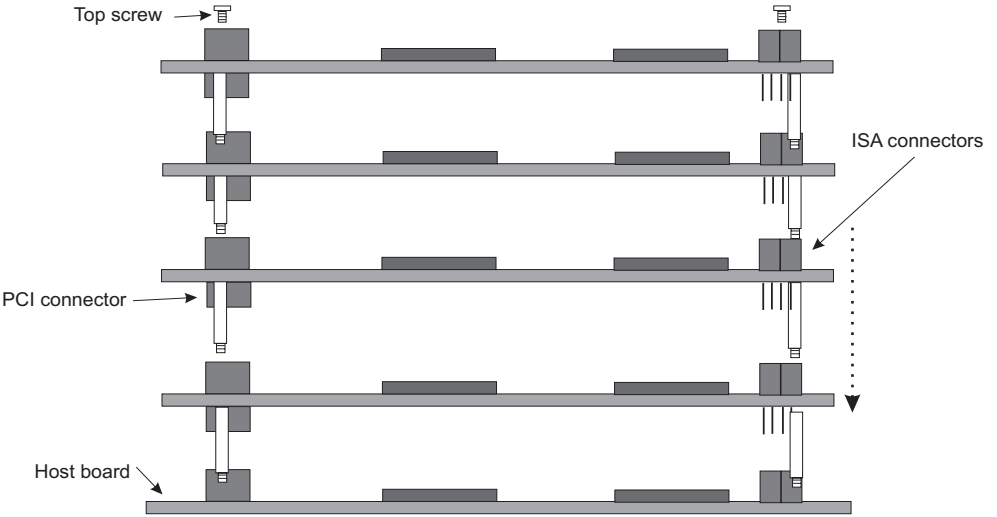
Install each additional Matrox Meteor-II board, PCI and CompactPCI form factors, as you installed the first board (refer to Chapter 2). In other words, place each additional board in an empty slot. For the PCI form factor, ensure that the installed boards avoid the CPU heat sink.

Theoretically, you can have as many as 16 Matrox Meteor-II PCI/CompactPCI 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 modules

You can stack a maximum of four PC/104-*Plus* modules, shown in the diagram below. Note that if you have PC/104 modules in your computer, they must be placed at the top of the stack.



In addition, you must set the rotary switch of each PC/104-*Plus* module to a unique setting in the stack. Setting the rotary switch dedicates a group of PCI signals to the module in the stack: clock, request grant, ID select, and interrupt signals. It is recommended that the first module installed (the module 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 module, as well as the dedicated signals.

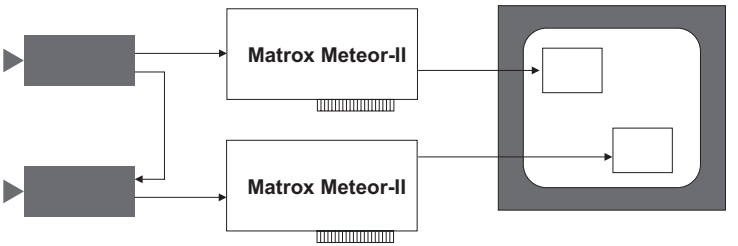
Switch position	Module position	Interrupt	Request grant	ID select
0 or 4	1	Interrupt A	0	0
1 or 5	2	Interrupt B	1	1
2 or 6	3	Interrupt C	2	2
3 or 7	4	Interrupt D	2	3

If you are installing an additional Matrox Meteor-II board on Matrox 4Sight, the module already installed has the setting fixed at 0; therefore, the setting of the additional module 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) and their corresponding digitizer configuration formats must be the same. Note that this restriction does not apply to Matrox Meteor-II /1394

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



Grabbing from two genlocked cameras

PCI bandwidth requirements

Matrox Meteor-II /Standard, /Multi-Channel, and /Digital have a low susceptibility to PCI bus latency due to 4 Mbytes of SGRAM. In addition, sustained PCI-transfers to memory require the use of a high performance PCI core-logic chipset, such as the Intel 440LX or 440BX. If a high performance chipset is used with a Matrox Meteor-II /Standard or /Multi-Channel board, you should not have any PCI bandwidth problems when grabbing up to two full-sized color images simultaneously (using two boards). However, grabbing more than two images simultaneously might result in PCI bandwidth problems.

As a reference point, grabbing one full-sized NTSC or PAL image in real time will require a PCI bandwidth of 35 Mbytes/sec or 42 Mbytes/sec, respectively, when transferring in RGBX (32-bit) mode.

With the Matrox Meteor-II /Digital board, you can experience PCI bandwidth problems 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.

Matrox Meteor-II /1394

Although Matrox Meteor-II /1394 supports simultaneous input from multiple cameras, there are issues with respect to both the PCI bus and the IEEE 1394 bus that restricts the actual number. With respect to the PCI bus, the available sustained bandwidth is a factor, like other Matrox Meteor-II boards. However, Matrox Meteor-II /1394 has a much smaller FIFO, and is therefore more susceptible to long PCI bus latencies. With respect to the IEEE 1394 bus, Matrox Meteor-II /1394 OHCI-Lynx PCI-to-1394 Host controller is compatible with serial IEEE 1394 bus data rates of 100, 200, or 400 Mbits per second, and these rates are shared across the three input ports. Once a time slice is allocated, the device is guaranteed to have that time slice, and therefore transfer data; however, the time slices available will pose a limitation. In smaller systems, for example with two or three cameras, there should be enough time slices to handle the load.

Chapter 5: Matrox Meteor-II hardware reference

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

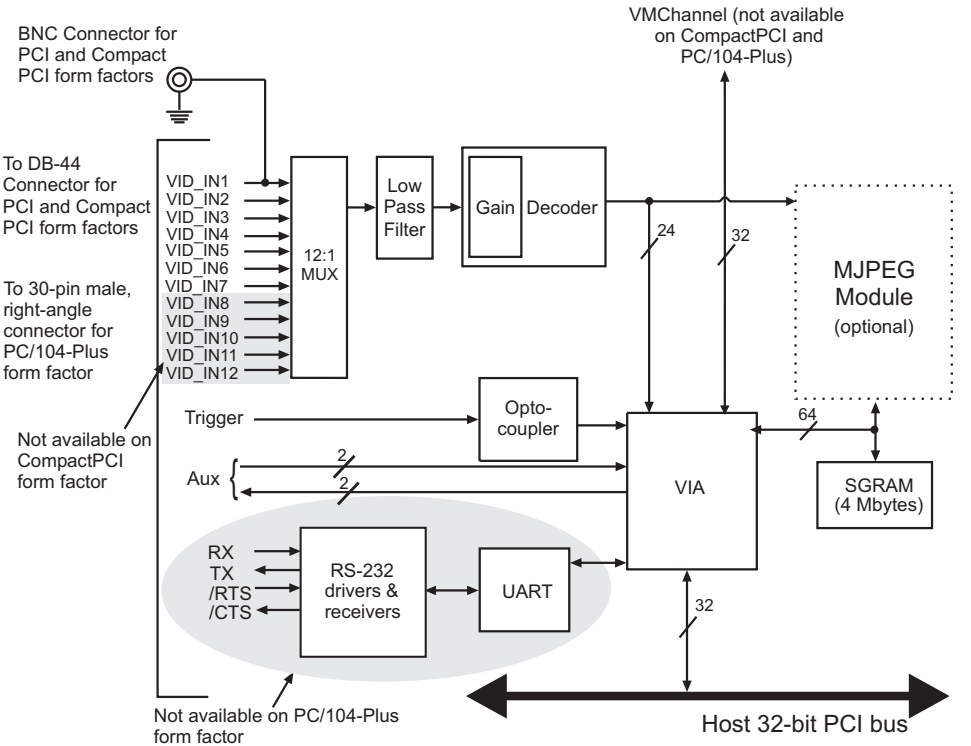
Matrox Meteor-II hardware reference

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

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

Matrox Meteor-II /Standard grab section

The grab section of the Matrox Meteor-II /Standard board uses a video decoder to capture composite RS-170, CCIR, NTSC, and PAL, and component (Y/C) NTSC and PAL.



Performance

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

	CCIR 601 sampling rates		**Square pixel sampling rates**	
	NTSC	**PAL**	**NTSC**	**PAL**
Field rate (Hz)	60	50	60	50
Pixel/line (Pixels)	858	864	780	944
Active pixel/line (Pixels)	720	720	640	768
Active lines/frame (Lines)	480	580	480	580
Pixel rate (MHz)	13.5	13.5	12.27	14.75
ADC sampling rate (MHz)	27	27	24.54	29.50
Line rate (KHz)	15.750	15.625	15.750	15.625

Input channels

Matrox Meteor-II /Standard for PCI and PC/104-*Plus* can switch between up to twelve independent composite or six Y/C video sources. Matrox Meteor-II /Standard for CompactPCI can switch between seven independent composite sources, or up to three Y/C video sources.

You can only acquire data from one channel at a time. Channels can be selected with the MIL-Lite command, *MdigChannel()*.

Low-pass filter

The input low-pass filtering stage is used to limit high frequency noise and aliasing effects at the input of the decoder. The filter used on Matrox Meteor-II /Standard for PCI and CompactPCI is a 4th order Butterworth filter with a cutoff frequency of 8 MHZ. The filter used on Matrox Meteor-II /Standard for PC/104-*Plus* is a single-order filter with a cutoff frequency of 6 MHz.

Video decoder

A multi-standard video decoder is used to convert NTSC and PAL analog video signals that are in composite (CVBS), or (Y/C) formats to digitized component video. The decoder supports

RGB 8:8:8 (24-bit), RGB 5:6:5, YUV 4:2:2, and YUV 4:1:1 output pixel formats. Note that YUV 4:2:2 output pixel formats are grabbed as YUYV.

The video decoder on all form factors also features automatic gain control (AGC). However, you can disable this feature (MIL-Lite *MdigControl()* with M_GRAB_AUTOMATIC_INPUT_GAIN set to M_DISABLE) and adjust the gain manually (*MdigControl()* with M_GRAB_INPUT_GAIN).

UART

Matrox Meteor-II /Standard for PCI and CompactPCI feature 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 remotely communicate with a program logic controller (PLC). The UART is programmed using the MIL-Lite command *MdigControl()* with the M_UART... control types.

Trigger

Matrox Meteor-II /Standard accepts an external trigger input which allows image acquisition to be synchronized to external events. The trigger is synchronous to the incoming video stream and it is received through an opto-coupler that helps isolate the rest of the circuitry from surges. Matrox Meteor-II /Standard operates 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*.

* The polarity of the active and inactive levels of the trigger signal are software programmable.

Trigger signals connected to the OPTOTRIG- and OPTOTRIG+ input pins, pass through an opto-coupler, a device that protects the board from outside surges; OPTOTRIG- is usually connected to the ground of the trigger source. The voltage difference across OPTOTRIG+ and OPTOTRIG- must be between 4.05 V and 9.16 V for logic high, and between -5.0 V and 0.8 V for logic low. Refer to Appendix B for the pinouts of these signals on your respective form factor.

User bits

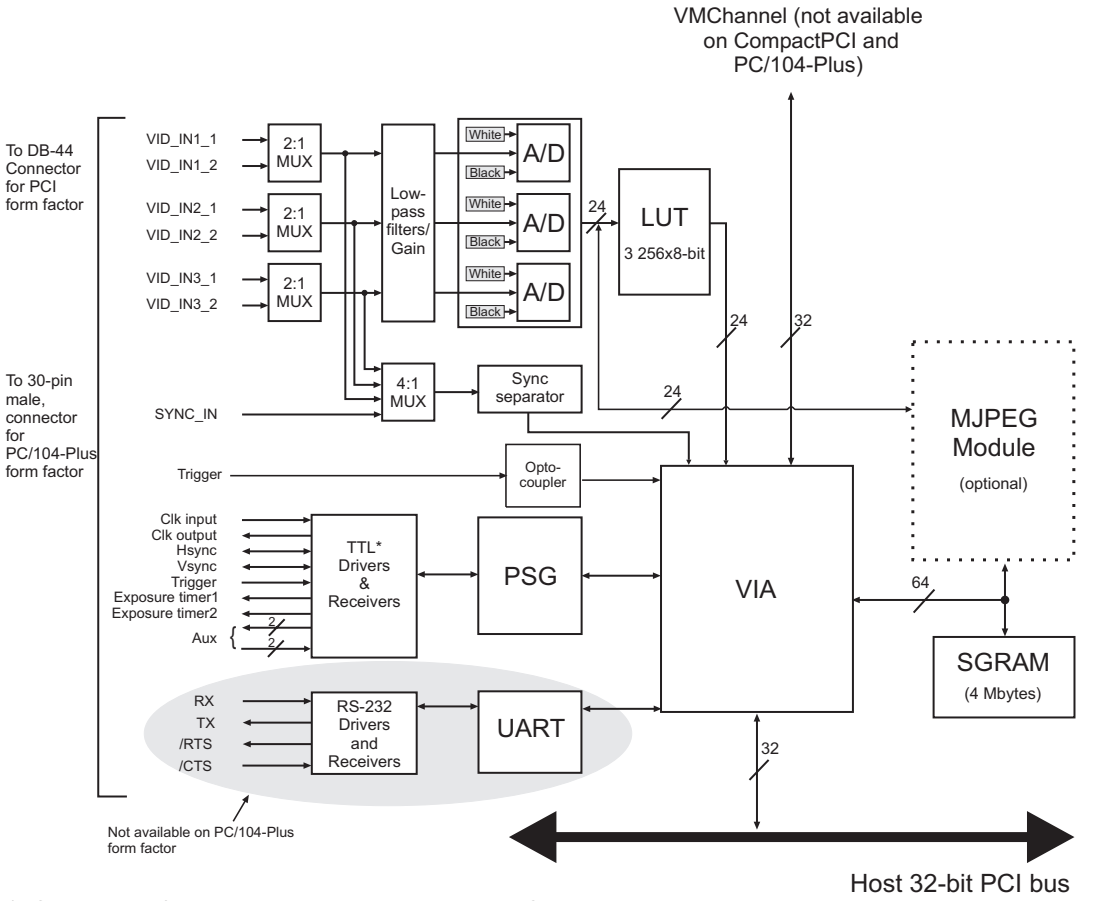
Matrox Meteor-II /Standard supports four auxiliary user bits through the video input connector: two input and two output. These are available for controlling external events such as a strobe light. User bits are programmed using the MIL-Lite command *MdigControl()*.

Using the auxiliary power supply

Matrox Meteor-II /Standard can supply power to your camera. Use the 4-pin power cable provided with your board to connect to the power supply of your computer. The operating voltage can be set to either 5 V or 12 V, but the current drawn by all cameras is limited to 1.5 A. The circuit uses an auto-resettable fuse. For further information on connecting to the auxiliary power supply connector, see the section, *Connecting Matrox Meteor-II / Standard to the auxiliary power supply input* in Chapter 2, and Appendix B. Note that this input is not available on the CompactPCI and PC/104-*Plus* form factors.

Matrox Meteor-II /Multi-Channel grab section

The grab section of the Matrox Meteor-II /Multi-Channel board captures monochrome or component-RGB video signals from standard and non-standard cameras. Six monochrome or two RGB cameras can be attached.



* RS-422 version of these signals are available on the optional RS-422 connector.
This connector is only available on Matrox Meteor-II /Multi-Channel in a PCI form factor.

Performance

The video timing parameters (including those for progressive scan) supported by the Matrox Meteor-II /Multi-Channel board are as follows:

	Max
Number of pixels / line (including sync and blanking)	4096*
Number of lines / frame (including sync and blanking)	4096*
Sampling rate (with external clock input, or in line-locking mode)	30 MSPS

Note that the maximum number of pixels per line that MIL supports is:

$$\frac{\text{Pixels}}{\text{Line}} \times \text{Number of Lines} \leq 4 \text{ Mbytes}$$

Input channels

The Matrox Meteor-II /Multi-Channel has six independent analog channels. These channels can support input from two RGB or six monochrome cameras where the channels can be selected with the MIL-Lite *MdigChannel()* command.

Low-pass filter

The input low-pass filtering stage is used to limit high frequency noise and aliasing effects at the input of the triple A/D converter. The filter used on Matrox Meteor-II /Multi-Channel is a 4th order Butterworth filter with a cutoff frequency of 10 MHz.

Gain

Matrox Meteor-II /Multi-Channel has adjustable gains. This allows you to optimize the video input signal range.

You can change the gain value using the MIL-Lite *MdigControl()* command. The supported gain factors are as follows:

Input video signal amplitude (excluding sync)	Total input video signal amplitude (including sync)	Required gain setting	MIL
0.0 V up to 0.5 V	0.0 - 0.7 Vpp	4	M_GAIN3
0.5 V up to 0.7 V	0.7 - 1.0 Vpp	2.8 (default)	M_GAIN2
0.7 V up to 1.0 V	1.0 - 1.4 Vpp	2	M_GAIN1
1.0 V up to 1.5 V	1.4 - 2.1 Vpp	1.3	M_GAIN0
1.5 V up to 2.0 V	2.1 - 2.9 Vpp	1	M_GAIN4

Triple A/D converter

A triple A/D converter with external reference generation and sync slicing is used for component RGB digitization. The converter can be operated at up to 30 MSPS.

In addition, the converter's black and white reference levels can be adjusted individually. The black and white reference levels can be adjusted between 0.6 V to 1.6 V and 1.6 V to 2.6 V respectively, in increments of 10.23 mV (98 distinct adjustments).

Use the MIL-Lite *MdigReference()* command to set the black and white reference levels.

PSG

The Programmable Synchronization Generator (PSG) is responsible for managing all timing and synchronization signals.

Phase-locked loop

The high-performance, low-jitter phase-locked loop (PLL) uses frequency synthesis techniques to generate the clock signal, when necessary.

The PLL can use the following sources as a reference:

- The on-board crystal oscillator.
- The horizontal video synchronization signal supplied by the video source (line-locked mode).

  When in line-locked mode and accepting a composite video signal, the PLL can synchronize to either serrated or block vertical synchronization signals.
- The clock signal supplied by the video source (to generate a different clock).

When the input source supplies a sampling clock that does not require adjustment, the PLL is bypassed to avoid adding jitter to the supplied clock.

General synchronization

Matrox Meteor-II /Multi-Channel can operate in either **slave** or **master** mode.

Slave mode

- In **slave** mode, the video source provides the synchronization information to Matrox Meteor-II /Multi-Channel. It can accept one of the following synchronization schemes:
  - The video source encodes the synchronization signals on the analog video signal provided to the board.
  - The video source supplies the horizontal and/or vertical synchronization signals separately in TTL format.
  - The video source provides a composite synchronization signal in TTL format, separate from the analog video.
- Synchronization information can be sent either with the video data, or on a separate analog synchronization channel.

Master mode

- In **master** mode, Matrox Meteor-II /Multi-Channel generates (using the PSG) the horizontal and/or vertical (TTL) synchronization signals and supplies them to the video source. This allows the video source to synchronize to the board.

Trigger

Matrox Meteor-II /Multi-Channel accepts an external trigger input which allows image acquisition to be synchronized to external events. The board can operate in one of two modes, and the selected mode is specified by the DCF.

Matrox Meteor-II /Multi-Channel 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*.

* The polarity of the active and inactive levels of the trigger signal are software programmable.

Matrox Meteor-II /Multi-Channel 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.

Direct TTL trigger

Trigger signals can be received in TTL format directly through the video-input connector on the PCI form factor. The TTL level signal must have a maximum amplitude of 5 V. A signal over 2 V is considered high while anything less than 0.8 V is considered low. The transition of 0.8 V to 2 V is considered to be the rising edge.

The trigger signal's pulse width must be greater than one pixel. You can determine the pulse width by taking the inverse of the *pixel frequency*. For example, if the pixel frequency is 12.27 MHz, the minimum pulse width is 1/12.27 MHz ≈ 82 nanoseconds.

Note the PC/104-*Plus* form factor does not support a TTL trigger.

opto-isolated trigger

Trigger signals connected to the OPTOTRIG- and OPTOTRIG+ input pins, pass through an opto-coupler, a device that protects the board from outside surges; OPTOTRIG- is usually connected to the ground of the trigger source. The voltage difference across OPTOTRIG+ and OPTOTRIG- must be between 4.05 V and 9.16 V for logic high, and between -5.0 V and 0.8 V for logic low. Refer to Appendix C for the pinouts of these signals on your board.

UART

Matrox Meteor-II /Multi-Channel 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 remotely communicate with a program logic controller (PLC). The UART is programmed using the MIL-Lite command *MdigControl()* with the M_UART... control types.

Note that the UART is not present on the Meteor-II /Multi-Channel for PC/104-*Plus*.

Lookup table (LUT)

Matrox Meteor-II /Multi-Channel has three 256x8-bit input lookup tables (LUTs), allowing independent re-mapping of three 8-bit input streams.

The LUTs on the Matrox Meteor-II /Multi-Channel for PCI support RGB 8:8:8 (24-bit) output pixel formats. The LUTs on the PC/104-*Plus* form factor support RGB 8:8:8, RGB 5:6:5, and RGB 5:5:5 output pixel formats. LUTs are programmed using the MIL-Lite command, *MdigLut()*.

User bits

Meteor-II /Multi-Channel supports four auxiliary TTL user bits through the video input connector: two input and two output. These are available for controlling external events such as a strobe light or PLC. User bits are programmed using the MIL-Lite command *MdigControl()*.

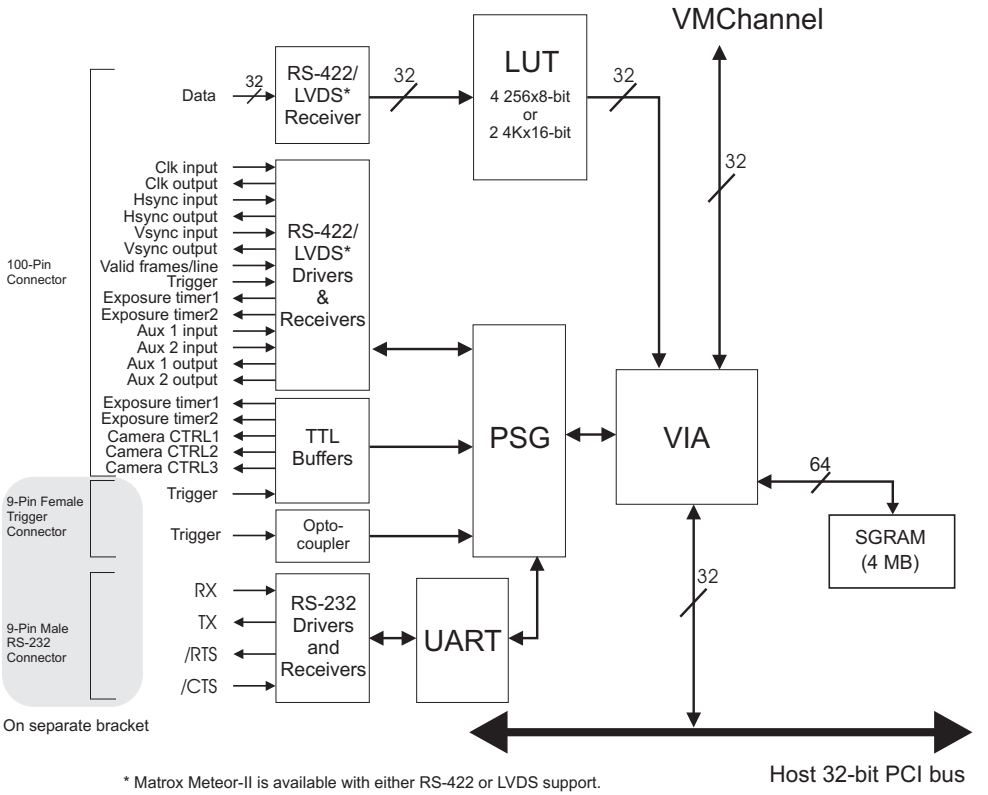
Using the auxiliary power supply

Matrox Meteor-II /Multi-Channel can supply power to your camera. Use the 4-pin power cable provided with your board to connect to the power supply of your computer. The operating voltage can be set to either 5 V or 12 V, but the current drawn by all cameras is limited to 1.5 A. The circuit uses an auto-resettable fuse. For further information on connecting to the auxiliary power supply connector, see the section, *Connecting Matrox Meteor-II /Multi-Channel to the auxiliary power supply input* in Chapter 2, and Appendix B. Note that this input is not available on the CompactPCI and PC/104-*Plus* form factors.

Matrox Meteor-II /Digital grab section

The grab section of the Matrox Meteor-II /Digital board captures video from standard and non-standard 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.

The board is available in two versions to support either the RS-422 or the LVDS interface, but is available for the PCI form factor only.



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

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, or LVDS with external clock input)	40 Mhz
Sampling rate (RS-422 or RS-422 with external clock input)	25 Mhz

UART

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

Lookup table (LUT)

The Matrox Meteor-II /Digital board has four 256x8-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

The Programmable Synchronization Generator (PSG) 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 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.

Clock

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

Auxiliary

Seven general purpose auxiliary signals are supported: four RS-422 or LVDS user signals (two input, two output), and three 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. There 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 and RS-422/LVDS trigger input. In addition, a trigger signal 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. This external trigger input allows 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*.

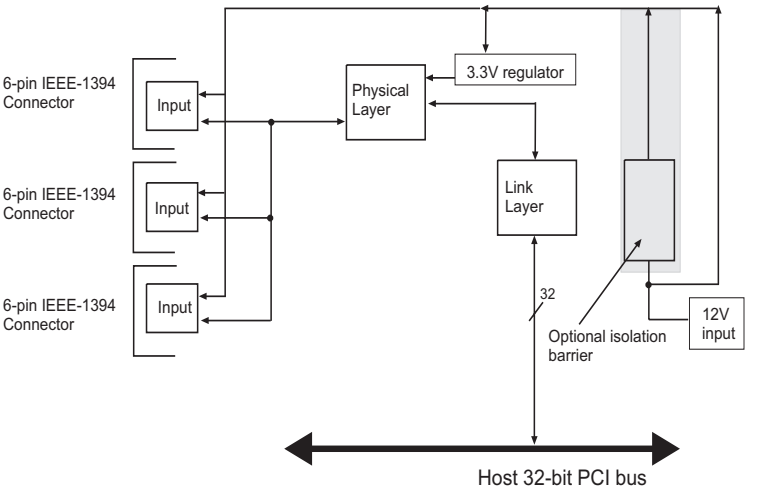
* The polarity of the active and inactive levels of the trigger signal are software programmable.

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.

Matrox Meteor-II /1394

Matrox Meteor-II /1394 is capable of acting as bus manager (cycle master), isochronous resource manager, and node controller ("root"). The cycle master triggers the data signal at 125-microsecond intervals. The isochronous resource manager is responsible for reserving, distributing, and managing the two modes of data streams (isochronous and asynchronous) along the available bandwidth. The root controller can control all peripheral devices connected (up to a maximum of 62).

The 1394 bus transfers real-time (isochronous) data streams through a four-layered architecture, two of which are implemented in hardware: the Physical Layer and the Link Layer.



Inputs

Matrox Meteor-II /1394 has three IEEE 1394 input ports to which 1394 devices can be attached, as long as the configuration of devices complies with the IEEE 1394 tree topology. Serial data bus rates of 100, 200, or 400 Mbits per second are shared across the three ports. MIL-Lite can be used to grab from monochrome or color digital cameras that are compliant with the IEEE 1394 Digital Camera Specification (DCS). Note that YUV 4:2:2 data is grabbed in UYVY format.

Physical Layer

The physical layer (PHY) is part of a bi-directional interface between the link layer (Link) and the actual IEEE 1394 serial bus. The physical layer acts as a converter, reformatting the commands and digital data it receives, so that the data can be transmitted over the serial bus. The PHY monitors the line conditions to determining connection status, for initialization and arbitration, and for packet reception and transmission. The physical layer supports data transmission rates of up to 400 Mbits per second.

Link Layer

The link layer (Link) is the second component in the bi-directional interface between the physical layer (PHY) and PCI bus. The Link is a PCI-to-1394 Host controller and is compliant with both PCI and 1394 OHCI specifications. The link layer supports both asynchronous and isochronous data transfer between nodes. When transmitting packets, the Link must send a request to the PHY, which controls the direction of transmission between the two layers. The link layer also controls the transfer speed between itself and the PHY, and supports data transfers of 100, 200, or 400 Mbits per second. In addition, the Link is capable of transferring a cacheline of data at 132 MBytes per second over the PCI bus after connecting to the memory controller on the Host. In order to overcome high or long PCI latency, the link layer also provides deep FIFOs.

Galvanic isolation barrier (optional)

The optional galvanic isolation barrier isolates the Matrox Meteor-II /1394's ground from that of the 1394 network. For example, 1394 network could consist of several PCs, or other devices such as a digital television or digital VCR. If each device in the network has a different ground, a potential difference is created across them; this situation is called a ground loop, and can eventually lead to loss of data, or even damage to system components. If a power surge occurs, the circuit tries to ground excess power, but the Matrox Meteor-II /1394 would be protected because its ground is isolated from the rest of the network.

Data interfaces

Video Interface ASIC

With the exception of Meteor-II/1394, all Meteor-II boards have a VIA, which acts mainly as a bridge to the PCI bus. The VIA is capable of high-speed image transfers to Host memory or other PCI devices across the PCI bus. It uses 4 Mbytes of SGRAM (on-board memory) to store data until the PCI bus becomes available. 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 SGRAM, and concurrently transfer data over the VMChannel or PCI buses.

General features

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

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 support 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.

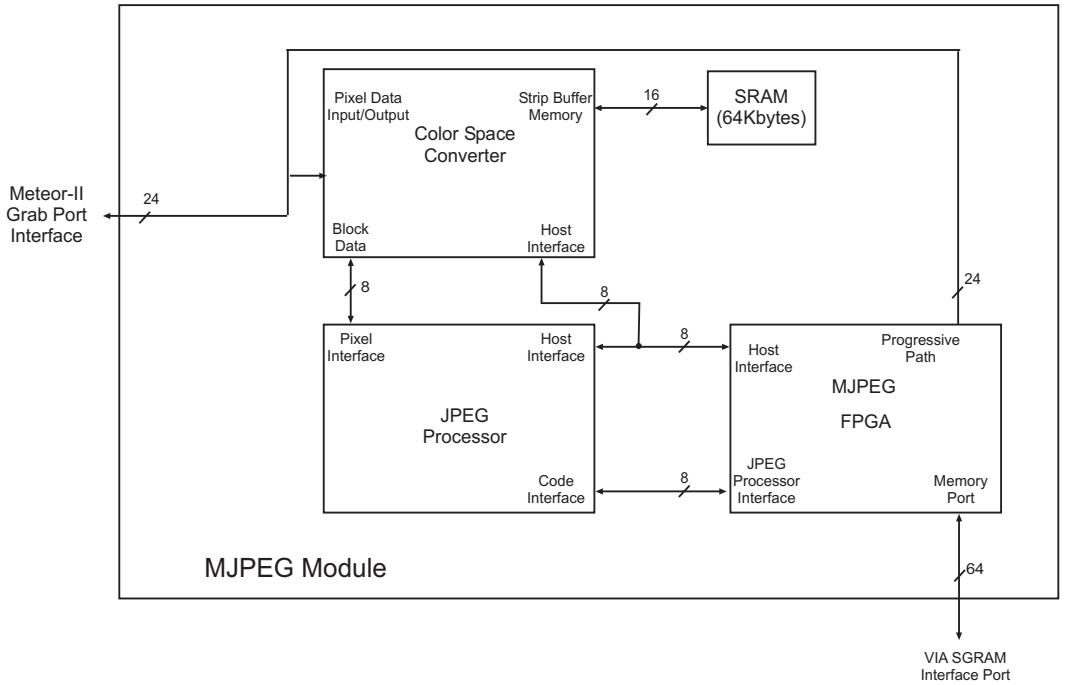
VMChannel

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 68-wire ribbon cable system, the VMChannel runs at 25 MHz for 100 Mbytes/sec peak transfer rates. 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/Standard, /Multi-Channel, and /Digital.

Matrox Meteor-II MJPEG Module

The optional Matrox Meteor-II MJPEG module performs real-time lossy and lossless MJPEG (interlaced and non-interlaced) compression and decompression of color and monochrome video. There are two versions of the Matrox Meteor-II MJPEG module available: PCI and PC/104-*Plus*. Matrox Meteor-II for CompactPCI boards can use the PCI version of the Matrox Meteor-II MJPEG module. The Matrox Meteor-II MJPEG module is not supported by Matrox Meteor-II /Digital and Matrox Meteor-II /1394.



The Matrox Meteor-II MJPEG module supports lossy compression of RGB 8:8:8 and YUV 4:2:2 standard video, in continuous mode. The module also supports lossy and lossless compression of 8-bit monochrome images.

❖ 10- and 12-bit lossless compression is supported on the PCI/CompactPCI version only.

Color Space Converter

The Color Space Converter has two functions. During compression, it converts the incoming data for the JPEG processor; the data is reformatted from raster format into 8 x 8 pixel blocks and then passed back to the JPEG processor. The Color Space Converter's second function is to convert RGB data into YUV format in order to reduce the processing time and the amount of data for compression.

During decompression, the 8 x 8 pixel blocks are reformatted into raster format, and in the case of RGB data, the Color Space Converter reconverts the compressed YUV data into RGB data.

JPEG Processor

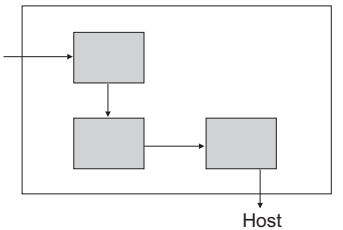
During compression, the JPEG Processor receives the 8 x 8 pixel blocks and compresses them according the JPEG standard. Both lossy and lossless formats are supported. During decompression, the JPEG Processor decompresses the data, and transfers the 8 x 8 pixel blocks to the Color Space Converter.

MJPEG FPGA

The MJPEG FPGA controls the direction of compressed and decompressed data and generates control signals on the module. It implements a bus handshake with the VIA on the baseboard to access the SGRAM. The SGRAM on the baseboard is used to store the compressed data.

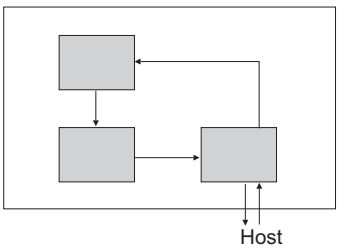
Encoding MJPEG

During MJPEG (interlaced) compression, the baseboard grabs a field of data. This data enters the module through the Meteor-II grab port, and passes through the Color Space Converter, the JPEG Processor, and finally exits the module to the Host through the memory port on the MJPEG FPGA chip.



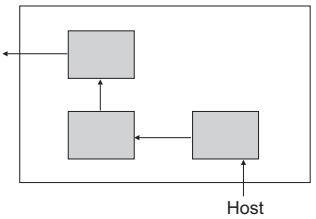
Encoding JPEG

During JPEG (non-interlaced) compression, the baseboard grabs an entire frame of data. This data enters the module through the memory port on the MJPEG FPGA chip and passes through the Color Space Converter. From there, JPEG compression follows the same path as MJPEG compression. Compressing an archived video stream is supported under JPEG compression.



Decoding

During decompression, the data enters through the memory port on the MJPEG FPGA chip, and passes through the JPEG processor, the Color Space Converter, and finally exits through the Matrox Meteor-II grab port.



❖ Due to a hardware limitation, the MJPEG module on the Matrox Meteor-II /Standard cannot decompress JPEG (non-interlaced) compressed data; decompression of JPEG data will be performed by the Host.

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.

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 module cannot be stacked**

- If you cannot stack your PC/104-*Plus* module, check the connectors of the board in the stack and determine if any of the 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 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* modules. 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.

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 98, the driver is probably not installed. Check for a Meteor-II device in the Windows **Device Manager** property sheet. This sheet can be accessed using the **System** utility in the **Control Panel**. If you do not see a Meteor-II device under **Matrox Imaging Adapters**, you will have to reinstall the driver.
- 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. Select **Computer** in the Computer Management dialog box. Select the **View Hidden Devices** command. Select **Device Manager** in the left pane. Select **Non-Plug and Play Drivers** in the right pane. Double-click on the name of your Matrox driver. Select the **Driver** tab in the presented dialog box. Click the **Start** button. If you do not see a 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 the problem of DMA memory, uninstall and reinstall MIL, and specify the correct DMA setting.

- 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, upgrade 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 **Windows NT Diagnostics** property sheet (found under **Start Programs Administrative Tools (Common)**. Under the Resources tab, check for devices that are sharing an IRQ with your Matrox frame grabber.
- Under Windows 98, right-click on **My Computer**, and select **Computer** from the presented menu. Go to **View Resources**, selecting the Interrupt request (IRQ) checkbox. 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. Select **Computer** in the Computer Management dialog box. Select System Information \ Hardware Resources \ IRQ. Check for devices that are sharing an IRQ with your Matrox frame grabber.

☛ **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 increasing the amount of DMA memory on your computer. Uninstall and reinstall MIL and specify the appropriate amount of DMA memory. Alternatively, re-allocate DMA memory using the included *milconfig.exe* utility.

Grabbing Problems

☛ **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; for example, complex PCI devices, or bus master devices should not share an IRQ. The types of difficulties that you might run into are 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, if possible (accessible on bootup).

- IRQ conflict under Windows 98

  To resolve this problem with the PCI and CompactPCI form factors, either re-assign a different IRQ line to the PCI slot in which the Matrox Meteor-II board is installed or change the resource settings in the Windows' **Device Manager** property page. This page can be accessed using the **System** utility in the **Control Panel.**

  To resolve this problem with the PC/104-*Plus* form factor, change the rotary switch settings.

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

Other possible solutions to the above problems:

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

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 sheet (found under **Start Programs Administrative Tools (Common)**. Under the Resources tab, check for devices that are sharing an IRQ with your Matrox frame grabber.
- Under Windows 98, right-click on My Computer, and select Computer from the presented menu. Go to View Resources, selecting the Interrupt request (IRQ) checkbox. 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. Select **Computer** in the Computer Management dialog box. Select System Information\ Hardware Resources\ IRQ. 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.

Appendix B: Technical information Matrox Meteor-II /Standard

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

Technical information

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

General information

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

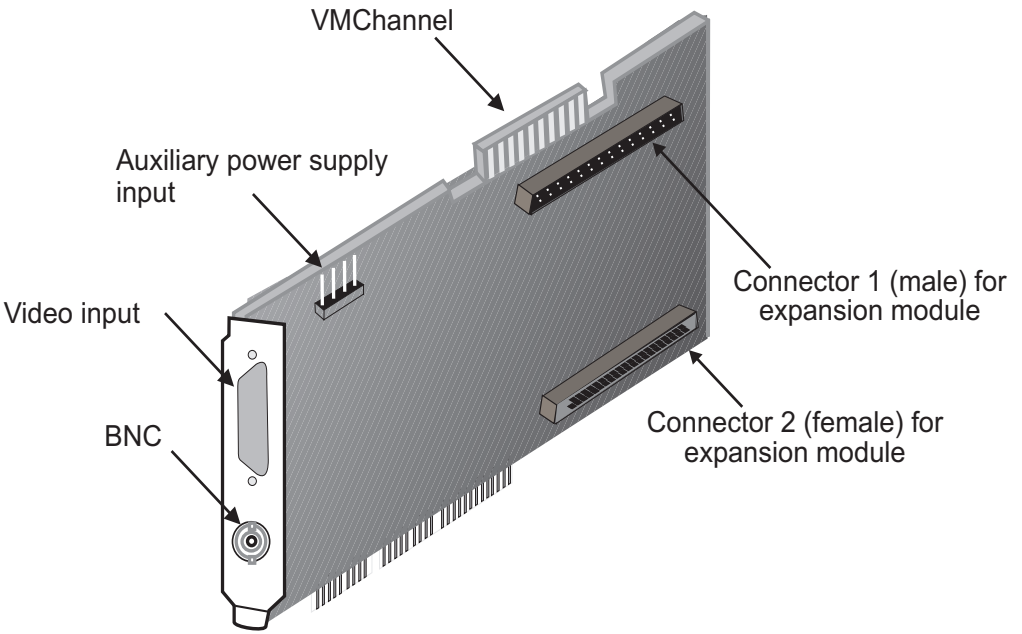
  Some older systems use a core logic chipset (interfaces PCI with Host memory) that has limited throughput capabilities. Matrox Meteor-II /Standard might not be able to attain full functionality on such systems. We recommend systems with newer PCI chipsets, such as the Intel 430HX, 430VX, 430TX, 440FX, 440LX, or 440BX. If you need more specific information regarding potential problems, refer to Appendix A - *Troubleshooting*.
- Technical features:
  - PCI and PC/104-*Plus* form factors feature twelve software selectable channels, which support up to twelve inputs in either monochrome RS-170/CCIR or composite NTSC/PAL formats, or up to six Y/C video inputs in NTSC/PAL formats.
  - CompactPCI form factor features seven software selectable channels, which support up to seven inputs in either monochrome RS-170/CCIR or composite NTSC/PAL formats, or up to three Y/C video inputs NTSC/PAL formats.
  - Accepts an external trigger input, which can operate in next valid frame/field mode.
  - Features programmable or automatic gain control.
  - Features 4 MBytes of SGRAM.
  - Features Strap-selectable 5 or 12 V DC output (PCI form factor only).

- Features an RS-232 port.
- Features 32-bit bus-controller VMChannel interface.

Board input and output connectors

PCI form factor

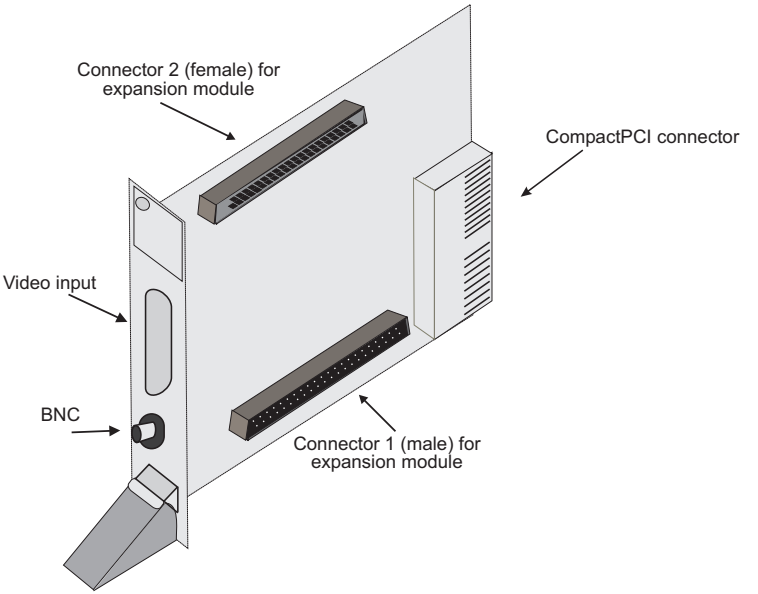
Matrox Meteor-II /Standard PCI form factor has six interface connectors: a VMChannel, an auxiliary power supply input, a video input, two connectors[1] for an expansion module, and a BNC connector.



1. Revisions 0 and 1 of the Matrox Meteor-II /Standard board do not have an expansion site and therefore do not have these connectors.

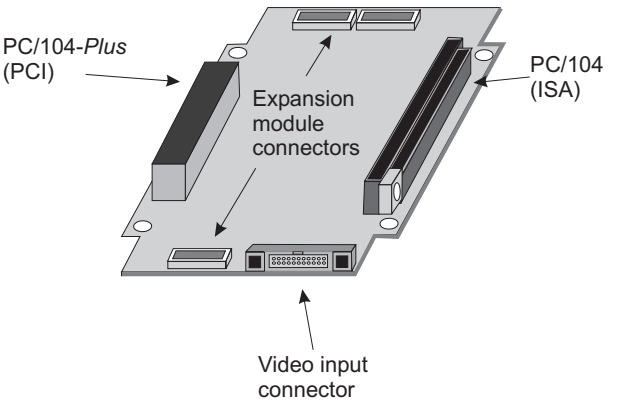
CompactPCI form factor

Matrox Meteor-II /Standard CompactPCI form factor has five interface connectors: a video input, a BNC, two connectors for an expansion module, and a CompactPCI connector.

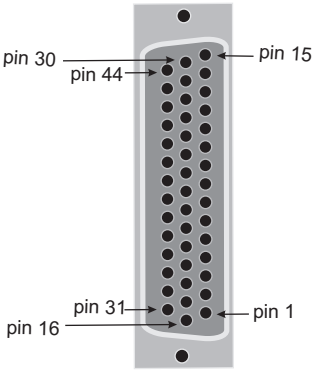


PC/104-Plus form factor

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



Video input connector on Matrox Meteor-II for PCI and CompactPCI



The video input connector is a high density DB-44 female connector on the PCI and CompactPCI form factors. Its pinout is shown below. Note the Form Factor column specifies the board which supports that particular pinout.

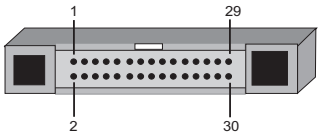
Pin	Signal	I/O	Description	Form Factor
1	DC_OUT	O	+12 V/ +5 V Power Supply.	PCI
2	VID_IN12	I	Analog Video Input #12 or C6	PCI
3-5	GND	-	Ground.	PCI, CompactPCI
6	CTS	I	Clear To Send (RS-232).	PCI, CompactPCI
8	USER(2)_OUT	O	Auxiliary User Output #2	PCI, CompactPCI
9	USER(2)_IN	I	Auxiliary User Input #2	PCI, CompactPCI
11	VID_IN5	I	Analog Video Input #5 or C4	PCI, CompactPCI
13	VID_IN3	I	Analog Video Input #3 or Y2	PCI, CompactPCI
14	GND	-	Ground.	PCI, CompactPCI
15	VID_IN1	I	Analog Video Input #1 or Y1	PCI, CompactPCI
16	DC_OUT	O	+12 V/ +5 V Power Supply.	PCI
17-18	GND	-	Ground.	PCI, CompactPCI
19	VID_IN10	I	Analog Video Input #10 or C5	PCI

Pin	Signal	I/O	Description	Form Factor
20	VID_IN9	I	Analog Video Input #9 or Y5	PCI
21	RTS	O	Request To Send (RS-232).	PCI, CompactPCI
22	RX	I	Receive (RS-232).	PCI, CompactPCI
23	VID_IN8	I	Analog Video Input #8 or Y4	PCI
24	USER(1)_OUT	O	Auxiliary User Output #1	PCI, CompactPCI
25-31	GND	-	Ground.	PCI, CompactPCI
33	VID_IN11	I	Analog Video Input #11 or Y6	PCI
34	OPTOTRIG-	I	Opto-Isolated trigger negative input.	PCI, CompactPCI
35	OPTOTRIG+	I	Opto-Isolated trigger positive input.	PCI, CompactPCI
36	TX	O	Transmit (RS-232).	PCI, CompactPCI
39	USER(1)_IN	I	Auxiliary User Input #1	PCI, CompactPCI
40	VID_IN7	I	Analog Video Input #7 or C3	PCI, CompactPCI
41	VID_IN6	I	Analog Video Input #6 or Y3	PCI, CompactPCI
42	GND	-	Ground.	PCI, CompactPCI
43	VID_IN4	I	Analog Video Input #4 or C2	PCI, CompactPCI
44	VID_IN2	I	Analog Video Input #2 or C1	PCI, CompactPCI
7, 10, 12, 32, 37, 38	Not used			PCI, CompactPCI

Use Matrox cable DBHD44-TO-13BNC to interface with this connector. The cable has thirteen BNC connectors, and a high-density 44-pin D-Subminiature male connector. This cable allows you to attach up to twelve analog video sources, and a trigger input.

An open-ended version of this cable, the DH44-TO-13BNC/O, is also available that can be used to access signals in addition to those described above. Parts for cables can be purchased from:

- Manufacturer: NorComp Interconnect Devices
- Connector & shell: HDT44P



Video input connector on Matrox Meteor-II /Standard for PC/104-Plus

The video input connector on the Meteor-II /Standard for PC/104-*Plus* is located on the top side of the board. Its pinout is as follows:

Pin	Signal	I/O	Description
2	VID_IN1	I	Analog Video Input #1 or Y1
4	VID_IN2	I	Analog Video Input #2 or C1
6	VID_IN3	I	Analog Video Input #3 or Y2
8	VID_IN4	I	Analog Video Input #4 or C2
10	VID_IN5	I	Analog Video Input#5 or C4
12	VID_IN6	I	Analog Video Input #6 or Y3
14	VID_IN7	I	Analog Video Input #7 or C3
15	USER(2)_IN	I	Auxiliary User Input #2
16	USER(1)_IN	I	Auxiliary User Input #1
17	USER(2)_OUT	O	Auxiliary User Output #2
18	USER(1)_OUT	O	Auxiliary User Output #1
20	VID_IN8	I	Analog Video Input #8 or Y4
22	VID_IN9	I	Analog Video Input #9 or Y5
23	OPTOTRIG-	I	Opto-Isolated trigger negative input
24	OPTOTRIG+	I	Opto-Isolated trigger positive input
26	VID_IN10	I	Analog Video Input #10 or C5
28	VID_IN11	I	Analog Video Input #11 or Y6
30	VID_IN12	I	Analog Video Input #12 or C6
1, 3, 5, 7, 9, 11, 13, 19, 21, 25, 27, 29	GND		Ground

The mating connector included with the board is a 30-pin male, 0.050 pitch right angle connector. Parts for cables can be purchased from:

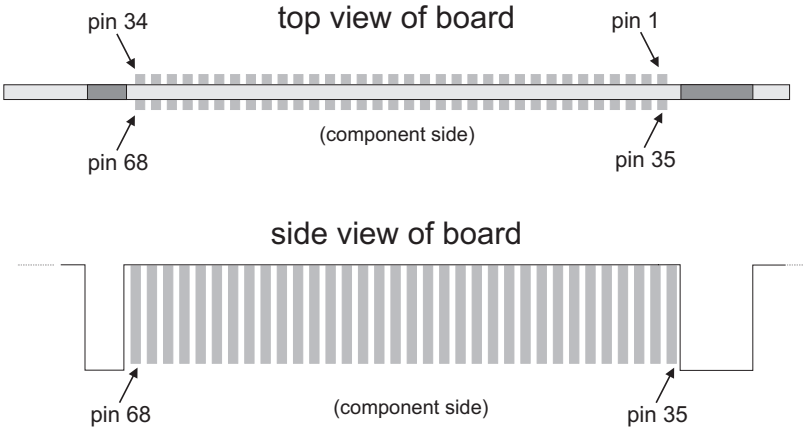
- Manufacturer: Fujitsu
- Connector FCN-217J030-G/O

This connector interfaces with a ribbon cable, 0.025 inch pitch (0.635 mm), AWG #30 (solid wire).

VMChannel interface connector

The VMChannel interface allows Matrox Meteor-II /Standard 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 CompactPCI and PC/104-*Plus* form factors.



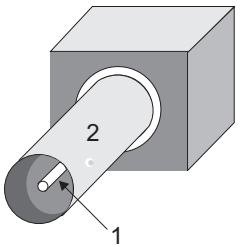
The following table provides the pinout of the VMChannel interface:

Pin	Signal	Pin	Signal
1	SAN	35	N/C*

Pin	Signal	Pin	Signal
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
24	DATA[18]	58	DATA[19]
25	DGND	59	DATA[20]
26	DATA[21]	60	DGND

Pin	Signal	Pin	Signal
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 might be defined as part of the VMChannel interface standard but it is not used on the Matrox Meteor-II /Standard board.

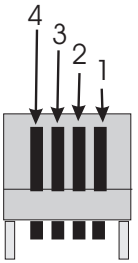


BNC connector

The BNC connector provides a single composite input to the Matrox Meteor-II /Standard board. Its pin assignments are as follows:

- 1: composite 1 or VID_IN1.
- 2 (SHELL): ground.

You can use a standard video cable (available from your local electronic store) to interface with this connector.



Auxiliary power supply input

The auxiliary power supply input connector is a standard 4-pin male connector that routes power from the computer to a camera (via the DB-44). Use the 4-pin power cable provided with your board to connect to the power supply of your computer. The operating current is 1.5 A with an auto-resettable fuse. Note that this input is not available on the CompactPCI and PC/104-*Plus* form factors.

The pinout of the auxiliary power supply input connector is as follows:

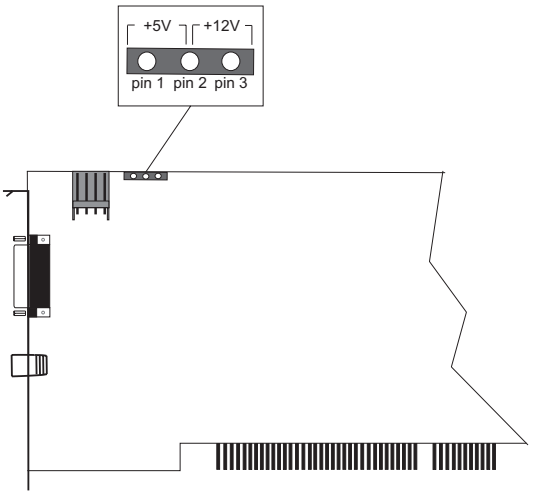
Pin	Description
1	+12 V
2	Ground
3	Ground
4	+5 V

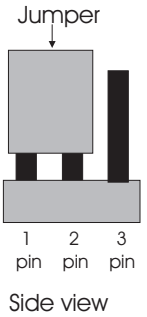
For customers building their own cable, the part number of the camera supply connector is as follows:

- Manufacturer: VEN
- Connector: 2490-04PRT

Auxiliary power supply selection

The following diagram shows the location of the auxiliary power supply selection and their corresponding pin numbers:





As shown in the table below, place the jumper across pins 1 and 2 for a +5 V supply output and across pins 2 and 3 for a +12 V supply output.

Pin	Description
1-2	+5 V (default)
2-3	+12 V

By default, auxiliary power supply is strapped for +5 V (pins 1-2).

Specifications

Electrical

Form Factor	Operating Voltage and current					Power Consumption[a]
	5 V ±5%	-5 V ±5%	3.3 V ±5%	12 V ±10%	-12 V ±10%	
PCI and CompactPCI	1.25 A	n/a	n/a	250 mA	50 mA	9.85 W
PC/104-*Plus*	100 mA	25 mA	1.1 A	150 mA	n/a	6.06 W

a. This number represents the total power consumption of the Matrox Meteor-II board only. It does not include the power consumption of a Matrox Meteor-II MJPEG module, or of a camera which draws current through the auxiliary power supply input.

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).

Appendix C: Technical information Matrox Meteor-II /Multi-Channel

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

Technical information

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

Global information

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

  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 430HX, 430VX, 430TX, 440FX, 440LX, or 440BX. If you need more specific information regarding potential problems, refer to Appendix A - *Troubleshooting*.

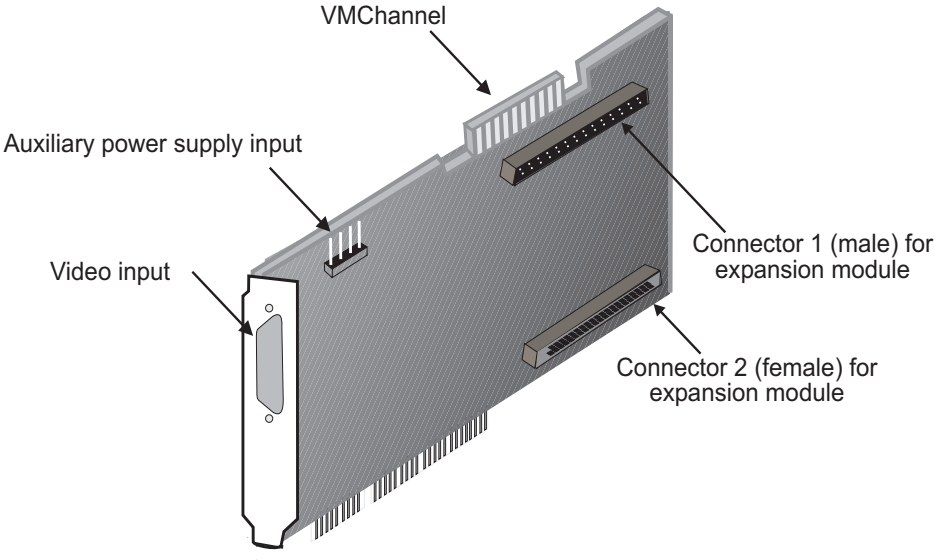
Technical features:

- Features six software selectable channels, which support six monochrome or two component RGB video inputs. Any of these channels can serve as the sync channel; however, there is also a separate sync channel.
- Supports both single and dual-tap (channel) monochrome cameras.
- Accepts an external trigger input and can operate in next valid frame/field mode or asynchronous reset mode.
- Features three 256 8-bit input lookup tables that can output RGB 8:8:8, YUV 5:5:5, or YUV 5:6:5.
- Features four Mbytes of SGRAM.
- Features programmable reference levels.
- Features various input gain settings.
- Features an RS-232 port.

- Features strap-selectable 5 or 12 V DC output (PCI form factor only).
- Features 32-bit bus-controller VM Channel interface.

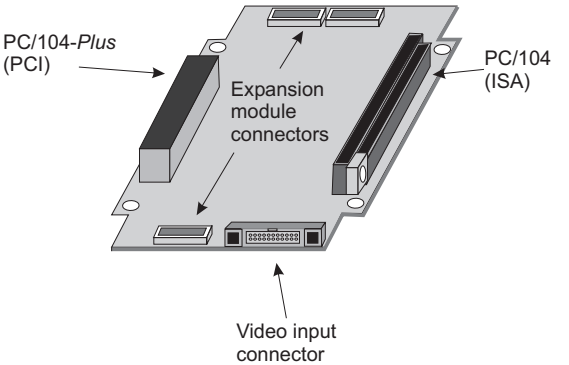
Board input and output connectors

The Matrox Meteor-II /Multi-Channel PCI form factor has six interface connectors: a VMChannel, an auxiliary power supply input, a video input, two connectors for an expansion module.



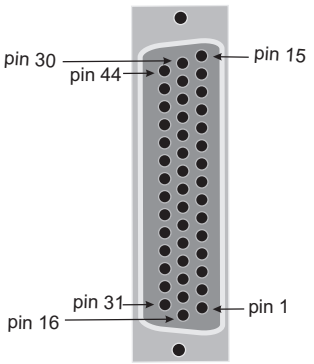
PC/104-Plus form factor

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



Video input connector on the PCI form factor

The video input connector is a high density DB-44 female connector on the PCI form factor. Its pinout is as follows:



Pin	Signal	Description
15	VID1_IN1	RED Analog Video Input (Channel 1).
44	VID1_IN2	GREEN Analog Video Input (Channel 1).
13	VID1_IN3	BLUE Analog Video Input (Channel 1).
43	SYNC_IN	Analog Video Input (SYNC).
11	VID2_IN1	RED Analog Video Input (Channel 2).
41	VID2_IN2	GREEN Analog Video Input (Channel 2).
40	VID2_IN3	BLUE Analog Video Input (Channel 2).
35	OPTOTRIG+	Opto-Isolated trigger positive input.
34	OPTOTRIG-	Opto-Isolated trigger negative input.
20	TRIGGER	Non-Protected TTL trigger input.
19	CLK_IN_TTL	Clock input (TTL).
33	CLK_OUT_TTL	Clock output (TTL).
32	VSYNC_TTL	Vsync input or output (TTL).

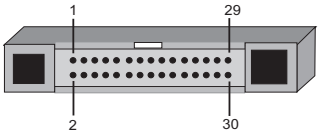
Pin	Signal	Description
2	HSYNC_TTL	Hsync input or output (TTL).
38	EXP(1)	Exposure #1 output (TTL).
23	EXP(2)	Exposure #2 output (TTL).
36	TX	Transmit (RS-232).
22	RX	Receive (RS-232).
6	CTS	CTS (RS-232).
21	RTS	RTS (RS-232).
39	USER1IN+	Auxiliary User Input #1 (positive).
12	USER1IN-	Auxiliary User Input #1 (negative).
9	USER2IN+	Auxiliary User Input #2 (positive).
10	USER2IN-	Auxiliary User Input #2 (negative).
24	USER1OUT	Auxiliary User Output #1 (TTL).
8	USER2OUT	Auxiliary User Output #2 (TTL).
1, 16	DC POWER	+12 V OR +5 V Power Supply.
7, 37	NC	Not connected on METEOR-II/Multi-Channel.
3-5, 14, 17-18, 25-31,42	GND	Ground.

Use Matrox cable DBHD44-TO-8BNC to interface with this connector. It has eight BNC connectors and a high-density 44-pin D-Subminiature male connector. This cable allows you to attach up to six video sources, an analog sync, and a trigger input.

An open-ended version of this cable, the DH44-TO-8BNC/O, is also available and can be customized to access signals in addition to those described above. For customers planning to build their own cable, parts can be purchased from:

- Manufacturer: NorComp Interconnect Devices
- Connector: HDT44P

Video input connector on the Meteor-II /Multi-Channel for PC/104-*Plus*



The video input connector on the Meteor-II /Multi-Channel for PC/104-*Plus* is located on the top side of the board. Its pinout is as follows:

Pin	Signal	I/O	Description
2	VID1_IN1	I	RED Analog Video Input (Channel 1).
4	VID1_IN2	I	GREEN Analog Video Input (Channel 1).
6	VID1_IN3	I	BLUE Analog Video Input (Channel 1).
8	SYNC_IN	I	Analog Video Input (SYNC).
10	VID2_IN1	I	RED Analog Video Input (Channel 2).
12	VID2_IN2	I	GREEN Analog Video Input (Channel 2).
14	VID2_IN3	I	BLUE Analog Video Input (Channel 2).
15	USER(2)_IN	I	Auxiliary User Input #2.
16	USER(1)_IN	I	Auxiliary User Input #1.
17	USER(1)_OUT	O	Auxiliary User Output #1.
18	USER(2)_OUT	O	Auxiliary User Output #2.
19	EXP(1)	I	Exposure #1 (TTL).
20	EXP(2)	I	Exposure #2 (TTL).
22	TRIG	I	Trigger (TTL).
23	OPTOTRIG-	I	Opto-isolated trigger negative input.
24	OPTOTRIG+	I	Opto-isolated trigger positive input.
26	CLK_IN	I	Clock input (TTL).
28	CLK_OUT	O	Clock output (TTL).
29	VSYNC	I/O	Vsync input or output (TTL).
30	HSYNC	I/O	Hsync input or output (TTL).

Pin	Signal	I/O	Description
1, 3, 5, 7, 9, 11, 13, 21, 25, 27	GND		Ground.

The connector used is a 30-pin male, 0.050 pitch right angle connector. For customers planning to build their own cables, parts can be purchased from:

- Manufacturer: Fujitsu
- Connector FCN-217J030-G/O

This connector interfaces with a ribbon cable, 0.025 inch pitch (0.635 mm), AWG #30 (solid wire).

VMChannel interface connector

The VMChannel interface allows Matrox Meteor-II /Multi-Channel 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. For pinout information, see *VMChannel interface connector* in Appendix B.

Auxiliary power supply input

For pinout information, see *Auxiliary power supply input* in Appendix B.

Auxiliary power supply selection

For information, see *Auxiliary power supply selection* in Appendix B.

Specifications

Electrical

Form Factor	Operating Voltage and current					Power Consumption[a]
	5 V ±5%	-5 V ±5%	3.3 V ±5%	12 V ±10%	-12 V ±10%	
PCI	1.0 A	n/a	n/a	150 mA	75 mA	7.7 W
PC/104-*Plus*	140 mA	60 mA	1.03 A	15 mA	n/a	5.08 W

a. This number represents the total power consumption of the Matrox Meteor-II board only. It does not include the power consumption of an Matrox Meteor-II MJPEG module, or of a camera which draws current through the auxiliary power supply input.

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)

Appendix D: Technical information Matrox Meteor-II /Digital

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

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 Windows[1].
- System requirements: A computer with a PCI bus and a Pentium processor or equivalent.

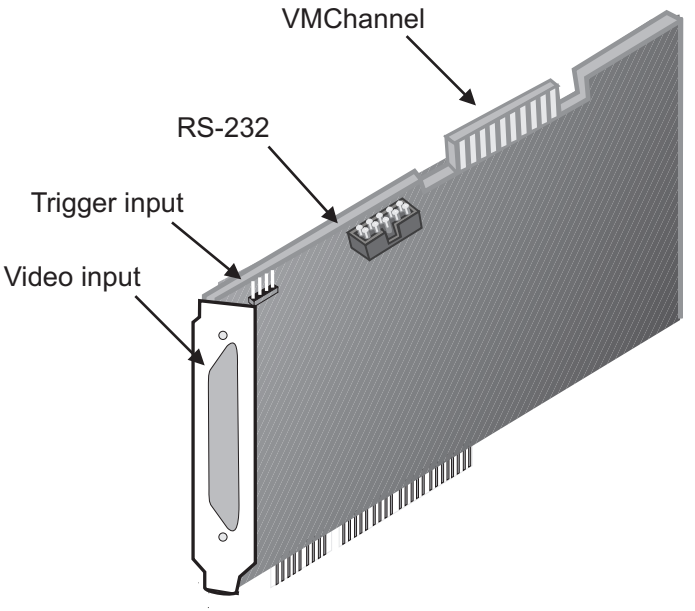
  Some older systems use a core logic chipset (interfaces PCI with Host memory) that has limited throughput capabilities. Matrox Meteor-II might not be able to attain full functionality on such systems. We recommend systems with newer PCI chipsets, such as the Intel 430HX, 430VX, 430TX, 440FX, 440LX, or 440BX. If you need more specific information regarding potential problems, refer to Appendix A - *Troubleshooting*.
- Technical features:
  - Captures monochrome or component RGB frame scan and line scan sources.
  - Available with a RS-422 or LVDS interface.
  - Supports multi-tap acquisition: up to four 8-bit inputs, or two 16-bit inputs.
  - Accepts an external trigger input and can operate in next valid frame/field mode or asynchronous reset mode.
  - Features four 256 8-bit lookup tables that include three different configurations:
    - Four 8-bit LUTs.
    - Two 10-bit LUTs.
    - Two 12-bit LUTs.

1. Matrox Meteor-II /Digital is not supported under Windows 98.

- Features 4 Mbytes of SGRAM.
- Features 32-bit bus-controller VM Channel interface.

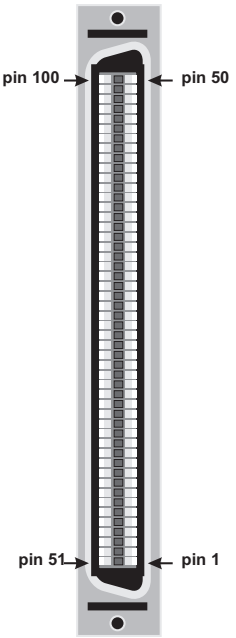
Board input and output connectors

Matrox Meteor-II digital has four user connectors: a VMChannel, a trigger input, a RS-232 input, and a digital interface.



Digital interface connector

The digital interface connector has 100 pins. The pinouts are 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-

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 can be purchased from:

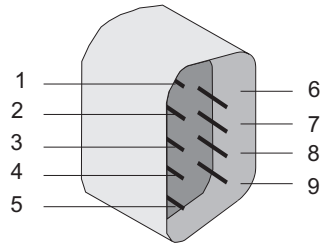
- Manufacturer: ACON Advanced-Connectek Inc.
- Connector and shell: HPBP-5100-10S-N-KN6

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

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).

The pinouts of the 9-pin DB9 male connector are as follows:

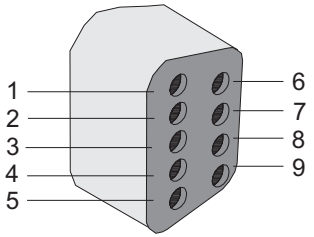


Pin	Signal	Description
1	N/C	Not connected.
2	RX	Receive.
3	TX	Transmit.
4	N/C	Not connected.
5	GND	Ground.
6	N/C	Not connected.
7	RTS	Request To Send.
8	CTS	Clear To Send.
9	N/C	Not connected.

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.

The pinouts of the 9-pin DB9 female connector are 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.

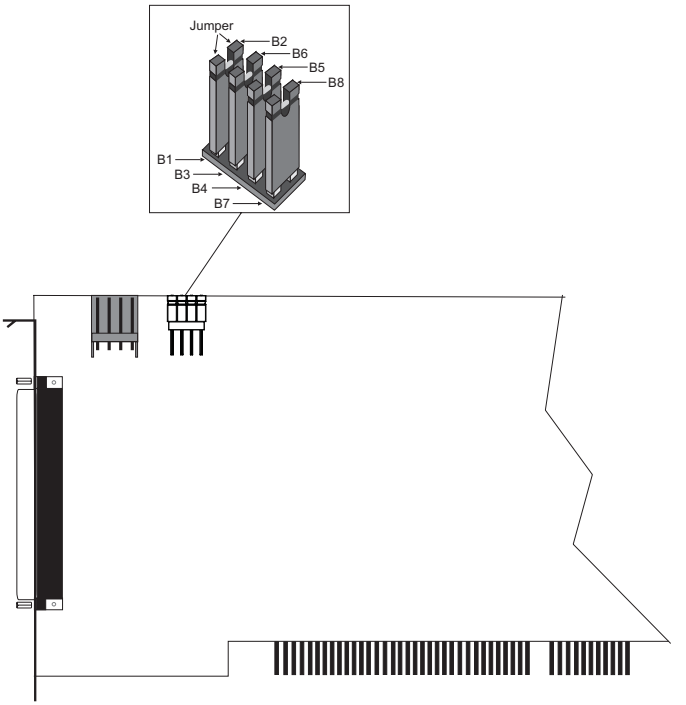
VMChannel interface connector

The VMChannel interface allows Matrox Meteor-II 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. For pinout information, see *VMChannel interface connector* in Appendix B.

Jumpers

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.

Specifications

Electrical

Operating voltage and current:

- 5 V ±5%, 1.4 A
- 12 V ±10%, 30 mA

Power consumption:

- 7.36 watts

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)

Appendix E: Technical information Matrox Meteor-II /1394

This appendix contains information that might be useful when installing your Matrox Meteor-II /1394 board.

Technical information

This appendix contains information that might be useful when installing your Matrox Meteor-II /1394.

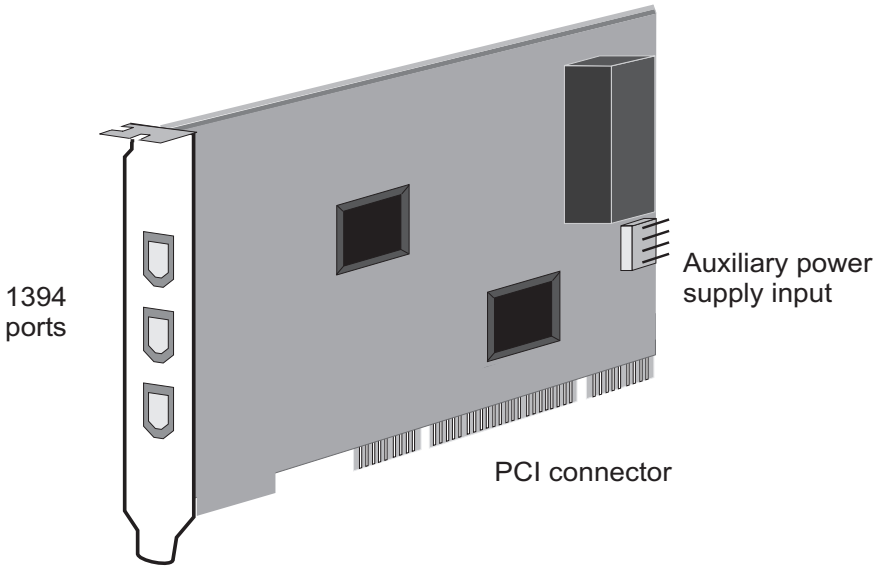
Global information

- Operating systems: See your software manual for supported versions of Windows.
- System requirements: A computer with a PCI bus and a Pentium processor or equivalent.

  Some older systems use a core logic chipset (interfaces PCI with Host memory) that has limited throughput capabilities. Matrox Meteor-II /1394 might not be able to attain full functionality on such systems. We recommend systems with newer PCI chipsets, such as the Intel 430HX, 430VX, 430TX, 440FX, 440LX, or 440BX. If you need more specific information regarding potential problems, refer to Appendix A - *Troubleshooting*.
- Technical features:
  - Supports up to 62 peripheral devices in a serial bus network.
  - Compliant with IEEE and OHCI specifications.
  - Supports data transfer rates of up to 400 Mbits per second.
  - Optional galvanic isolation barrier to prevent data loss and protect electronic equipment.

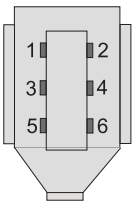
Board input and output connectors

Matrox Meteor-II /1394 has four interface connectors: three 1394 ports and an auxiliary power supply input:



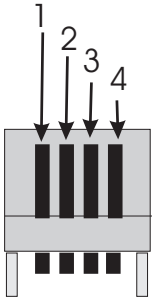
IEEE 1394 ports

Each IEEE 1394 port is a 6-pin connector. Its pinout is as follows:



Pin	Signal
1	+12 V, 1.25A (max)
2	GND
3	/TPB
4	TPB
5	/TPA
6	TPA

Auxiliary power supply input



The auxiliary power supply input is a standard 4-pin male connector. Use the cable provided with your board to connect to the power supply of your computer.

The pinout of the auxiliary power supply input is as follows:

Pin	Description
1	+12 V
2	Ground
3	Ground
4	(not used)

The part number of the camera supply connector is as follows:

- Manufacturer: VEN
- Connector: 2490-04PRT

References

For further reading, consult:

Anderson, Don. FireWire System Architecture. Reading, Massachusetts: Mindshare Inc., 1998.

Henehan, Burke. "1394 Firewire Hardware Design Considerations." Multimedia Systems Design Mar. 1998.

(Or see http://www.msdmag.com)

Specifications

Electrical

Operating voltage and current:

- 5 V ±5%, 250 mA
- 12 V ±10%, 50 mA

Power consumption:

- 7.36 watts[1]

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)

1. This number represents the total power consumption of the Matrox Meteor-II /1394 board only. It does not include the power consumption of a device attached to the 1394 network.

Appendix F: Listing of Matrox Meteor-II Boards

This appendix lists specific versions and revisions of Matrox Meteor-II boards, including the MJPEG module.

Matrox Meteor-II boards

Board	Version	Description
PCI form factor		
Matrox Meteor-II /Standard PCI	750-00 rev. A	Original version.
	750-01 rev. A	No functional change.
	750-02 rev. A	Added expansion connectors, moved up from 4 to 7 inputs.
	750-02 rev. B	No functional change.
	750-0201 rev. A	Support for KS0127 rev. B video decoder, and moved up from 7 to 12 inputs.
Matrox Meteor-II /Standard CompactPCI	807-00 rev. A	Original version.
	807-00 rev. B	No functional changes.
	807-0001 rev. A	Support for KS0127 rev. B video decoder.
Matrox Meteor-II /Multi-Channel PCI	751-00 rev. A	Original version.
	751-01 rev. A	No functional change.
Matrox Meteor-II /Digital PCI	752-00 rev. A	Original version.
	752-01 rev. A	No functional change.
	752-02 rev. A	No functional change.
PC/104-*Plus* form factor		
Matrox Meteor-II /Standard PC/104-*Plus*	885-00 rev. A	Original version.
	885-00 rev. B	No functional change.
	885-00 rev. C	No functional change.
	885-0001 rev. A	Support for KS0127 rev. B video decoder.
	885-01 rev. A	Replaced expansion connectors (for 896-01).

Board	Version	Description
Matrox Meteor-II /Multi-Channel PC/104-*Plus*	886-00 rev. A	Original version.
	886-00 rev. B	No functional change.
	886-01 rev. A	Replaced expansion connectors (for 896-01).
Matrox Meteor-II MJPEG Module		
PCI and CompactPCI	774-00 rev. A	Original version. Interlaced compression only.
	774-01 rev. A	No functional change.
	774-01 rev. B	No functional change.
	913-00 rev. A	Supports interlaced and non-interlaced compression. Removed on-board memory (use backboard memory instead).
	913-00 rev. B	No functional change.
PC/104-*Plus*	896-00 rev. A	Similar to 913-00.*
	896-01 rev. A	Replaced interface connectors.**

*This revision is supported on Matrox Meteor-II /Standard revisions 885-00 rev. A to 885-0001 rev. A.
This revision is supported on Matrox Meteor-II /Multi-Channel for revisions 886-00 rev. A and 886-00 rev. B.

**This revision is supported on Matrox Meteor-II /Standard for revisions 885-01 rev. A and higher.
This revision is supported on Matrox Meteor-II /Multi-Channel for revisions 886-01 rev. A and higher.

Appendix G: Glossary

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

- **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 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.

- **Color space**

  A color space is a way of representing and describing the complete range of perceived colors. A number of color spaces have been developed. Common color spaces are RGB and HSL. Both describe the same range of perceivable colors.

- **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.*

  A software program that tells an operating system how to use a hardware device.

- **Ethernet cable**

  A wire similar to a telephone cable that carries the signals between Ethernet devices.

- **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.

- **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.

- **MSPS**

  Mega Samples per second.

- **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*.

- **RAMDAC**

  Random access memory digital-to-analog converter. A digital to analog converter that includes static RAM for use as a look-up table.

- **Real-time processing**

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

  Also known as *live processing*.

- **Reference levels**

  The zero and full-scale levels of an analog-to-digital converter. Voltages below a *black reference level* are converted to a zero pixel value; voltages above a *white reference level* are converted to the maximum pixel value. Together with the analog gain factor, the reference levels affect the brightness and contrast of the resulting image.

- **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*.

- **Trigger**

  A signal that allows image acquisition to be synchronized to external events. If supported, a digitizer can operate in one of two modes upon receiving a trigger:

  - *Asynchronous reset mode*: If your digitizer supports and uses this mode, the camera is reset to begin a new frame when the trigger signal is received.
  - *Next valid frame/field mode*: If your digitizer supports and uses this mode, the digitizer will grab the next valid frame or field.

- **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*.

- **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, it is used primarily to share data with other Matrox imaging boards.

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Customer support

Note: The most up-to-date telephone numbers are available from the Matrox internet web site.

If you have a question that is not answered in your manual, in the release notes, or in the *readme* files on the software CDs, contact your local representative, your regional Matrox office (if applicable), or Matrox Canada (corporate headquarters).

To ensure that Customer Support can answer your questions quickly, fill out and fax the "Product Assistance Request" form before calling.

	Telephone	Fax	E-mail
Matrox Canada (corporate headquarters)	country code: 1 514- 822-6061	(514) 822-6273	imaging.techsupport@matrox.com
Matrox France SARL (France only)	country code: 33 (0) 1 45 60 62 03	(0) 1 45 60 62 05	Tech.Support.Imaging@matrox.fr
Matrox Electronic Systems GmbH (Germany or Austria only)	country code: 49 (0) 89 614 47 40	(0) 89 614 97 43	Imaging.Germany@matrox.com
Matrox (UK) Ltd. (UK or Benelux only)	country code: 44 (0) 1753 665500	(0) 1753 665599	Image.Tech.uk@matrox.com

You will find up-to-the-minute release information on our web site.

Internet Web site: **http://www.matrox.com/imaging**
ftp site: **ftp.matrox.com/pub/imaging**

Warranty

This product is warranted against defects in materials and workmanship for a period of ***one year*** *from date of delivery. We will repair or replace products that prove to be defective during the warranty period provided they are returned, at the user's expense, to Matrox Electronic Systems Limited. No other warranty is expressed or implied. Matrox is not liable for consequential damages.*

If you wish to return your board, contact the Matrox authorized dealer where you purchased the board for service. **Do not return a product to Matrox without authorization.**

If for some reason you must return the board directly to Matrox, follow these steps:

1. Contact Customer Support (see above for phone numbers).

   Customer Support will ask you to describe the problem and will issue a Return Merchandise Authorization (RMA) number, if necessary.

2. Leave the configuration as it was when you were using the board.

3. Pack the board in its original box and return it with a completed "Product Assistance Request" form (see the following page).

Return address

U.S. customers must return their products to our U.S. address:

- Matrox International Corp.
  Trimex Building
  Mooers, N.Y.
  12958

Canadian and other international customers can return their products directly to our Canadian facility:

- Matrox Electronic Systems Ltd.
  1055 St. Regis Blvd.
  Dorval, Quebec
  H9P 2T4

Product Assistance Request Form

Name:	
Company:	
Address:	
Phone:	Fax:
E-mail:	
Hardware Specific Information	
Computer:	CPU:
System memory:	PCI Chipset:
System BIOS rev:	
Video card used:	Resolution:
Network Card:	Network Software:
Other cards in system:	
Software Specific Information	
Operating system:	Rev:
Matrox SW used:	Rev:
Compiler:	Rev:
Fill out only if you are returning a board	
RMA #:	
Who were you talking to in customer support?	
Date board was received:	Date of failure:
MOD #:	These numbers are on the label at the back of the board.
SER #:	
REV #:	
PMB #:	
PNS #:	
Can you reproduce the problem? Yes ❒ No ❒	
Is an error code displayed? Yes ❒ No ❒	If so, what code?
	... Continued on reverse

Describe the problem:

Regulatory Compliance

FCC Compliance Statement

Warning

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

Note

This device complies with Part 15 of FCC Rules. Operation is subject to the following two conditions:

1. this device may not cause harmful interference, and

2. this device 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 a Class A digital device, 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 this device 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. The user is advised that any equipment changes or modifications not expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

Industry Canada Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emission from digital apparatus set out in the Radio Interference Regulations of Industry Canada.

Le présent appareil numérique n'émet 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.

EC Declaration of Conformity

WARNING: This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures

AVERTISSEMENT: Cet appareil est de la classe A. Lorsque cet appareil est utilisé dans un environnment résidentiel, il peut entraîner des interférences radioélectriques. Dans ce cas, l'usager peut être prié de prendre des mesures correctives appropriées.

This device complies with EC Directive 89/336/EEC for a Class A digital device. It has been tested and found to comply with EN55022/CISPR22 and EN55024/CISPR24.

Le présent appareil numérique répond aux exigences stipulées dans la directive européenne 89/336/EEC prescrite pour les appareils numériques de classe A. Ce produit a été testé conformément aux procédures EN55022/CISPR22 et EN55024/CISPR24.