POWERED BY

matrox

Millennium G400 • Millennium G400 MAX

User Guide

Contents

Using this guide

This guide assumes you're familiar with basic functions like click, right-click and double-click, and that you're familiar with the basics of the operating system you're using. Also, we use the following conventions:

- **Bold** for text that appears on-screen, subheadings and labels.

- *Italics* for file names, paths, publication titles, and new terms.

- ***Bold Italics*** for emphasis.

- Keyboard keys in square brackets, with a plus sign separating keys that you press simultaneously. For example: press [Ctrl]+[Alt]+[Del] to restart your computer.

- Arrows ("→") to separate ordered directions. For example, "click **OK** → **Close** → **OK**" is the same as "click **OK**, then click **Close**, then click **OK**".

- When viewing online, green for cross-references and underlined green for links to Web pages. Click green text to jump to what is being referenced. (To jump to Web pages, your system first needs to have full Internet access.)

More information

We provide additional documentation in help files, *Readme* files, and Adobe Acrobat PDF (Portable Document Format) files. To view or print PDF files, use the **Acrobat Reader** program, which you can install from the Matrox installation CD-ROM. This guide is available on the CD-ROM as a PDF file (*Doc\English\Guide\Guide_en.pdf*). The online version of this guide has additional information, including the following sections: "Extra troubleshooting", "TV output", "Display information", "Hardware information", "Customer support", "Warranty" and "Software license agreement".

For context-sensitive help where available, click the " ? " icon in the title bar, then click the item you want help on. Right-click a help topic for a pop-up menu that lets you print or copy it.

Also, be sure to check for any last-minute release notes at the end of this manual and in the Matrox CD-ROM *Readme* file.

Hardware installation

> ⚠️ **WARNING:** Static electricity can severely damage electronic parts. Before touching any electronic parts, drain the static electricity from your body. You can do this by touching the metal frame of your computer. When handling a card, hold it by its edges, and avoid touching its circuitry.

1 Switch to the standard VGA display driver

**W9x** If you're running Windows 95/98 on your computer, this step isn't necessary.

If you're using another operating system (for example, Windows NT 4.0), see its documentation for how to switch to VGA mode.

2 Open your computer and remove your existing graphics card*

Turn off your computer and all peripherals such as your monitor or printer. Open the computer and remove your existing graphics card. (If you have a display adapter built into your computer's motherboard, it should automatically disable itself after your Matrox card is installed.)

3 Locate the AGP slot in your computer

Most computers have different types of expansion slots. Your Matrox graphics card is an AGP card. Locate the AGP slot in your computer. Your system manual should identify the location of each type of expansion slot in your computer.

(Back of computer)
AGP slot
PCI slot
ISA slot

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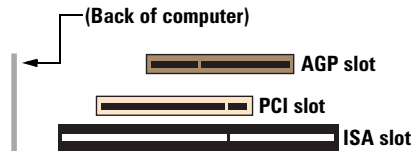
* With multi-display mode, you may be able to use your existing graphics card. For Windows 98, see Windows 98 online help under "Multiple Display Support". For Windows NT 4.0, only Matrox graphics card models supported by the Matrox display driver can be used.

⚠ **WARNING:** Inserting your Matrox card into the wrong type of slot could damage your card, your computer, or both.

Don't insert the plastic tab of your AGP card (see picture) into the slot.

**Plastic tab**

PCI card   **AGP card**
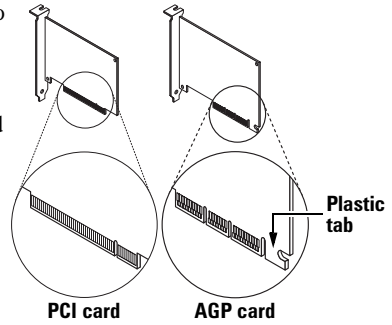
4 Insert your Matrox card

Remove the cover for the slot you intend to use. Save the screw for the mounting bracket. Position your Matrox card over the expansion slot you've chosen. Push the card in firmly and evenly until it's fully seated in the slot. Replace the screw to secure the bracket of your Matrox card to the computer frame.

Bracket screw   **Graphics card**

Motherboard
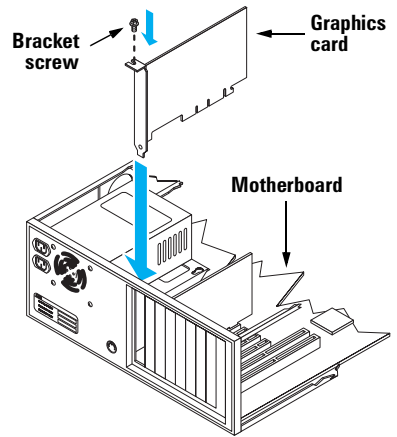
5 Connect the monitor

Simply plug your monitor cable into the monitor connector on your Matrox card (connector **1**, if you have a card with more than one connector). Make sure the other end of the monitor cable is properly connected to your monitor. See your monitor manual for more information.

Monitor cable
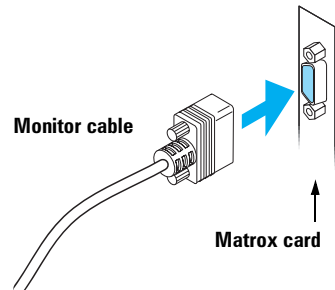
Matrox card

6 *If your Matrox card has a second monitor connector:*

Connect the second monitor

Simply plug your second monitor cable into monitor connector **2** on your Matrox card. Make sure the other end of the monitor cable is properly connected to your monitor. See your monitor manual for more information.

> **Note:** Instead of a computer monitor, you can connect a TV or VCR to the second monitor connector. You can do this using the special adapter included with your Matrox card. For more information, see "TV output" in the online version of this guide.

1

2
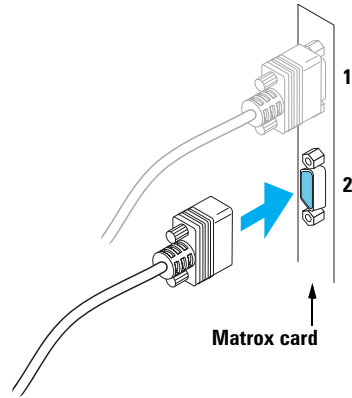
Matrox card

Your Matrox card is now installed. To get the most out of your Matrox card, install Matrox software:

- for Windows 95/98 and Windows NT 4.0, see "Software installation", page 7.

- for Windows 3.1, Windows NT 3.51, and OS/2 Warp 3.0/4.0, see the *Readme* file in the root folder of the Matrox installation CD-ROM.

Software installation

W^{9x}_{NT} This section describes how to install Matrox software for
Windows 95/98 or *Windows NT 4.0*.

(For other operating systems, see the *Readme* file in the root
folder of the Matrox installation CD-ROM.)
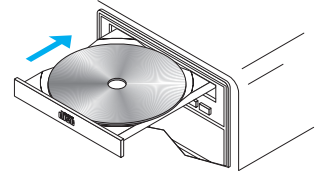
1 Restart your computer

W_{9x} **If you're using Windows 95/98**, it detects new hardware when you restart. If Matrox display
drivers haven't been previously installed, Windows reports finding a PCI adapter (even if you
have an AGP card). Windows prompts you to install a display driver. Follow the on-screen
instructions. (The Matrox Windows 95/98 display driver is in the *Win9x* folder of your
Matrox installation CD-ROM.)

2 Install required software

After your computer has restarted, insert (or reinsert) the Matrox installation CD-ROM in
your CD-ROM drive – the setup program automatically starts.[*] This setup program works
with Windows 95/98 and Windows NT 4.0, and detects which operating system you're
using. If the required display software isn't already installed, the setup program
automatically prompts you to install this software. Follow the on-screen instructions.

After the required display software is installed, you're prompted to restart your computer for
changes to take effect. Leave your Matrox CD-ROM in your CD-ROM drive.

3 Install optional software

After your computer restarts, the setup program shows you a list of additional items you can
install. For each item you want to install, select a list item, click **Install**, then follow the
on-screen instructions.

4 Set up your display software

See "Software setup", page 8.

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[*] If Windows doesn't automatically start the setup program, you can start it manually from the root folder of the CD-ROM.

Software setup

Matrox PowerDesk display drivers and utilities help you get the most out of your Matrox graphics card. This section has important information on how to configure your display settings using Matrox PowerDesk software.

Accessing PowerDesk property sheets

Many display controls are on Matrox PowerDesk property sheets. You can identify Matrox PowerDesk property sheets by the icon appearing on the tab. To access these property sheets:

W95 ■ **Windows 95 –** Right-click your Windows desktop background, then click **Properties**.

W98 ■ **Windows 98 –** Right-click your Windows desktop background, then click **Properties** → **Settings** → **Advanced**. If you're using a multi-display desktop, select a display before clicking **Advanced**.

WNT ■ **Windows NT 4.0 –** Click **Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties**.

Also, to access Matrox PowerDesk property sheets more quickly, you can double-click the QuickDesk icon ( ) on your Windows taskbar.

> ℹ **Note:** The Matrox display driver for Windows 95/98 supports multiple displays with Windows 98. For more information on multi-display mode, see Windows 98 online help under "Multiple Display support" and see "DualHead Multi-Display setup", page 10. (Windows 95 doesn't support multiple displays.)

Monitor setup

Before changing your display resolution, color palette, or other Matrox PowerDesk settings, make sure correct software monitor settings are selected. The following explains how to do this.

> ⚠ **WARNING:** If incorrect software monitor settings are applied, *some* monitors can be permanently damaged. For more information, see your monitor manual.

W9x **Windows 95/98 –** If you have a Plug-and-Play (DDC) monitor, Windows should automatically use the correct settings for your monitor. To make sure the correct monitor is selected in Windows:

1 Right-click your Windows desktop background, then click **Properties** → **Settings**.

2 Depending on what version of Windows you have, click **Change Display Type**, or **Advanced Properties** → **Monitor**, or **Advanced** → **Monitor**.

3 If the monitor name listed doesn't match your monitor, click the **Change** button to select a new monitor name. Follow the on-screen instructions.

For more information on Windows monitor settings, see Windows documentation.

If you want to customize your Windows monitor settings:

1 Access the PowerDesk **Monitor Settings** property sheet (see "Accessing PowerDesk property sheets", page 8).

2 Depending on what you want to do, click one of the buttons in the **Monitor settings selection method** box, then follow the on-screen instructions.
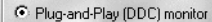
W_{NT} **Windows NT 4.0 –**

1 Click **Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Monitor**.
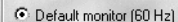
2 **If you have a Plug-and-Play monitor:**
Make sure the **Plug-and-Play (DDC) monitor** button is

⊙ Plug-and-Play (DDC) monitor

selected. If so, the Matrox display driver *automatically* uses the correct settings for your monitor. If not, click this button, then click **Apply**.

If you don't have a Plug-and-Play monitor:
See if the **Default monitor (60 Hz)** button is selected. If

⊙ Default monitor (60 Hz)

so, use the Matrox monitor selection method. For more information on Matrox monitor selection, see Matrox PowerDesk online documentation.

ℹ **Notes:**

- If you're using BNC connectors with a Plug-and-Play monitor, the Plug-and-Play feature of your monitor can't be used. To use the Plug-and-Play feature of your monitor, instead of the BNC connectors, use the 15-pin connector at the back of your monitor.

W_{9x} - In Windows 95/98, Matrox monitor settings are based on Windows monitor settings. If you change your Windows monitor settings, you may have to reselect or readjust your Matrox monitor settings.

W_{NT}⁹⁸ - In multi-display mode (see "DualHead Multi-Display setup"), each monitor has its own monitor settings (refresh rates).

DualHead Multi-Display setup

If your Matrox graphics card has a second monitor connector (see page 6), you can enable a second display (for example, a computer monitor or a TV) as part of your Windows desktop. This is the Matrox *DualHead Multi-Display* feature. To use this feature:

W98 **Windows 98 –**

1 Access the PowerDesk **DualHead** property sheet (see "Accessing PowerDesk property sheets", page 8).

2 Select the **DualHead Multi-Display** option button.

3 Click **OK** → **Yes** to restart your computer and for changes to take effect.

4 If multi-display mode isn't automatically enabled when you restart Windows:

a Right-click your Windows desktop background, then click **Properties** → **Settings**.

b Select the disabled display, enable the **Extend my Windows desktop onto this monitor** check box, then click **OK**.

WNT **Windows NT 4.0 –**

1 Click ⊞Start → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Performance**.

2 Select the **DualHead Multi-Display** option button.

3 Click **OK** → **Yes** to restart your computer and for changes to take effect.

4 Click ⊞Start → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Settings**.

5 Click **Multi-Display Desktop** ( ).

6 Move the **Desktop area** slider to adjust your multi-display desktop, then click **OK** to accept your changes.

ⓘ **Note:** In multi-display mode under Windows NT 4.0, the same display resolution and color palette is used for each display.

Other DualHead features

If your Matrox graphics card has a second monitor connector and you're using Windows 95/98, you can also use these features:

- **DualHead Clone** – View a copy of your main display on your secondary display. Each display can use different monitor settings (refresh rates).

- **DualHead DVDMax** – Play digital video in a window on your main display and, at the same time, view that video full-screen on a TV.

- **DualHead Zoom** – Use your secondary display to view a zoomed-in portion of your main display.

More PowerDesk information

For more information on Matrox PowerDesk:

W9x **Windows 95/98 –**

- Access the PowerDesk **Information** property sheet (see "Accessing PowerDesk property sheets", page 8), then click **Help** or **View Readme File**.

- Where available, see the PowerDesk context-sensitive help. (Some help topics are only available through context-sensitive help.)

WNT **Windows NT 4.0 –**

- Click **Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Information**.

- Click **Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox PowerDesk Guide**.

- Click **Start** → **Programs** → **Matrox PowerDesk NT** → **Readme**.

- Where available, see the PowerDesk context-sensitive help.

Troubleshooting

This section addresses possible problems that could prevent you from using your computer.

Note: More troubleshooting items are in the online version of this guide (see page 18). See also "More information", page 3, and "More PowerDesk information", page 11.

Problem   **Computer doesn't display information or boot after Matrox card is installed**

Cause   Your Matrox card may not be properly installed.

Solution   Make sure your Matrox card is properly installed. Specifically, make sure the card is firmly inserted in its expansion slot and that all connections to it are firmly in place. For more information, see "Hardware installation", page 4.

Cause   There may be an unsupported graphics adapter in your computer. (For Matrox *multi-display mode* in Windows NT, all graphics cards in your computer must be Matrox cards supported by the display driver.)

Solution   If another graphics card is plugged into an expansion slot, remove it.

Solution   If a graphics adapter is built-in to your computer motherboard, your system may not have automatically disabled it when you inserted your Matrox card. Check your system manual for instructions on how to disable your computer's built-in graphics adapter.

Cause   Your computer BIOS (Basic Input/Output System) may not be up to date. For more information on your computer BIOS, see your system manual.

Solution   Reinstall your previous graphics card and, if possible, update your computer BIOS. This can usually be done with software from the manufacturer of your computer. Contact your system vendor or manufacturer to get a BIOS update for your computer.

To get the correct BIOS update, you may need to know the serial number your computer displays when it restarts. (This number is usually in the lower-left corner of the display.)

Cause   The BIOS of your Matrox graphics card may need to be updated or restored.

Solution   **For advanced users** – If you have another VGA-compatible graphics card (ISA or PCI), you can try resetting the BIOS of your Matrox graphics card.

1   Turn off your computer and insert the other graphics card into an expansion slot. For more information on expansion slots, see "Locate the AGP slot in your computer", page 4.

2 Plug your monitor into the other graphics card and restart your computer.

ℹ **Note:** Make sure your computer uses the other graphics card to control your primary display. Your *primary display* is the one that first displays information when your computer restarts. For more information, see "Using multiple displays…", page 16, solutions 2 and 3.

3 Make sure **Matrox System Utilities** are installed on your computer. (These can be installed from your Matrox CD-ROM.)

4 Restart your computer in DOS mode, then type:

cd c:\matrox\util [Enter]
upbiosdos [Enter]

5 Turn off your computer, remove the other graphics card, then plug your monitor into your Matrox graphics card.

6 Restart your computer.

Problem **Wrong color balance, screen image off-center, or no picture at all**

Cause Your monitor video controls may be improperly set.

Solution Adjust your monitor controls (brightness, contrast and so on). For more information, see your monitor manual.

Cause Your monitor may not be properly connected.

Solution Make sure your monitor is connected to the correct connector on your Matrox graphics card (see "Connect the monitor", page 5).

Solution Make sure the monitor power cable is firmly in place.

Solution Make sure the 15-pin connector to your Matrox graphics card is firmly in place.
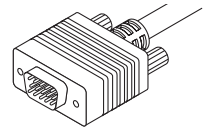
15-pin connector

Solution   Make sure the connection to the back of the monitor is firmly in place. This could be a 15-pin or BNC connection.

If your monitor uses BNC input, make sure the Red (**R**), Green (**G**), Blue (**B**), Horizontal Sync (**HSYNC** – white or gray wire), and Vertical Sync (**VSYNC** – black wire) connections are firmly in place and plugged into the correct input.

Bayonet Nut Connect (BNC)

Cause   If your monitor uses BNC input, one or more connection settings may be incorrect.

Solution   Set each of your monitor RGB input and sync switches (if available) to 75 ohms, with the sync set to "external". These controls are usually switches on the back of your monitor.

Cause   If display problems occur after the startup screen of your operating system, your software monitor settings may be incorrect.
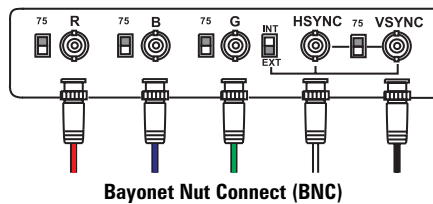
Solution   Make sure correct software monitor settings are selected.

W9xNT   If your display is still usable, see "Monitor setup", page 8. Otherwise, see the next troubleshooting item.

Problem   **After the startup screen, or after display settings are changed, the screen image is garbled or unusable**

(blank screen, rolling or overlapping screen images)

Cause   The Matrox display driver may be trying to use settings your monitor doesn't support. This can happen if a monitor was never selected in the software and the display resolution was changed to one your monitor doesn't support, or if the monitor connected to your computer was changed without changing it in the software.

⚠️   **WARNING:** If incorrect software monitor settings are applied, *some* monitors can be permanently damaged. For more information, see your monitor manual.

Solution   **Windows 95/98 –**

W9x

1   Press [Ctrl]+[Alt]+[Del] twice to restart your computer.

2   *Before* Windows starts, press [F8] for the Windows startup menu to appear. (With Windows 98, if [F8] doesn't work, instead try pressing and holding [Ctrl] before Windows starts.)

3   Select the number for "safe mode", then press [Enter].

4   Right-click the Windows desktop background, then click **Properties → Settings**.

5   Move the **Desktop area** (Windows 95) or **Screen area** (Windows 98) slider down to its lowest setting, then click **OK**.

6   Restart your computer normally.

7   Make sure the correct monitor is selected in Windows (see "Monitor setup", page 8).

8   Make sure you're not using inappropriate monitor setting customizations: Access the PowerDesk **Monitor Settings** property sheet (see "Accessing PowerDesk property sheets", page 8), then click **Delete all customizations**.

9   Restore your original display settings (see steps 4 and 5).

ℹ   **Note:** In multi-display mode (see "DualHead Multi-Display setup"), each monitor has its own monitor settings (refresh rates).

W_{NT}   **Windows NT 4.0 –**

1   Press [Ctrl]+[Alt]+[Del] → [Tab] → [Tab] → [Enter] → [↓] (down arrow) → [Enter] to restart your computer.

2   From the startup menu, choose Windows NT 4.0 "**VGA mode**".

3   Right-click the Windows desktop background, then click **Properties → Settings**.

Windows may prompt you that the display settings are incorrect for the current mode; click **OK** to continue.

4   Move the **Desktop area** slider down to its lowest setting, then click **OK**.

5   Restart your computer normally.

6   Select a monitor with the Matrox PowerDesk **Monitor** property sheet, then adjust your display settings. For more information, see the Matrox PowerDesk online documentation.

Cause   Files on your system may have been deleted or corrupted.

Solution   After you've made sure that your Matrox hardware is properly installed, try removing the current display drivers, then install Matrox display drivers.

W_{9x}   **Windows 95/98 –**

1   If your display is currently unusable, press [Ctrl]+[Alt]+[Del] twice to restart your computer. Otherwise, click [Start] → **Shut Down → Restart the computer**.

2   *Before* Windows starts, press [F8] to see a startup menu. (With Windows 98, if [F8] doesn't work, instead try pressing and holding [Ctrl].)

3 Select the number for "safe mode", then press [Enter].

4 If an old version (before version 5.*x*) of Matrox PowerDesk software is installed, remove it: click **⟦Start⟧** → **Settings** → **Control Panel** → **Add/Remove Programs** (double-click) → **Matrox PowerDesk** → **Add/Remove** → **Complete Uninstallation** → **OK**.

5 To switch to a standard (VGA) display driver, right-click your Windows desktop background, then click **Properties** → **Settings**, then:

- If you see the **Advanced Properties** button, click **Advanced Properties** → **Change** → **Show all devices** → **Standard display types** → **Standard Display Adapter (VGA)** → **OK** → **Close** → **Close** → **Yes**.

- If you see the **Change Display Type** button, click **Change Display Type** → **Change (Adapter)** → **Show all devices** → **Standard display types** → **Standard Display Adapter (VGA)** → **OK** → **Close** → **Close** → **Yes**.

- If you see the **Advanced** button, click **Advanced** → **Adapter** → **Change** → **Next** → **Display a list of all the drivers...** → **Next** → **Show all hardware** → **Standard display types** → **Standard Display Adapter (VGA)** → **Next** → **Yes** → **Next** → **Finish**.

6 Install the latest Matrox display drivers for your graphics card – run the setup program, then follow the on-screen instructions.

Problem
W98 NT

Using multiple displays under Windows 98 or NT 4.0, program (for example, a game) doesn't work with main graphics card

Cause Your main graphics card may not be controlling your primary display. Your *primary display* is the one that first displays information when your computer restarts. Programs that don't recognize multiple displays may not work with a graphics card unless it's controlling your primary display.

Your computer BIOS (Basic Input/Output System) and the slot type (ISA, PCI or AGP – see "Locate the AGP slot in your computer", page 4) of each graphics card help determine which graphics card controls your primary display.

Solution If you're having problems with a program that can be moved on your Windows desktop, run this program on your primary display. Make sure the program window doesn't overlap any other display. If the program doesn't work with the graphics card controlling your primary display, or you want your main graphics card to control your primary display, see the other solutions.

Solution Change the configuration of your computer BIOS so that the slot type of your main graphics card has priority for becoming the primary display. For information on how to change your computer BIOS settings, see your system manual.

If your computer BIOS doesn't let you select which slot type has priority for becoming the primary display, a BIOS update may be available to let you do this. (The BIOS of most computers can be updated with software.) For a possible BIOS update for your computer, contact your system vendor.

Solution If there's a graphics controller built into the motherboard of your computer, by changing your computer BIOS settings, you may be able to change which device controls your primary display. For more information, see your system manual.

Solution If you don't need to use the graphics card that's controlling your primary display, remove it from your computer. If your primary display is controlled by the motherboard of your computer, see your system manual for information on how to disable this graphics controller.

More troubleshooting

The online version of this guide () has extra troubleshooting items dealing with problems such as:

- Can't use Windows 95/98, Windows reports a configuration error, and/or can't install or uninstall Matrox display driver

- After game for Windows 95/98 starts, monitor doesn't display properly

- Matrox Diagnostic or setup program reports an IRQ problem

- Game for Windows 95/98 doesn't start or runs slower than normal

- After restarting computer, Windows 95/98 warns that the graphics card isn't configured correctly

- Screen image defects appear or program doesn't run properly

- Video file playback is jerky (skipping frames)

- DVD video playback is jerky (skipping frames)

- Can't play certain DVD videos

- TV image is garbled or unusable

- Computer text is hard to read with a TV

- Poor TV or video recorder image quality

- Can't record video with a video recorder

- Sound doesn't record, video files play back with no sound, or sound output is distorted or too loud

Extra troubleshooting

Graphics

The following troubleshooting items address problems related to graphics cards.

Problem **W9x** **Can't use Windows 95/98, Windows reports a configuration error, and/or can't install or uninstall Matrox display driver**

Cause Files on your system may have been deleted or corrupted.

Solution **For advanced users –** Manually remove any old or new display drivers, then reinstall the latest display driver for your Matrox graphics card:

1 Restart your computer, then *before* Windows starts, press [F8] to see a startup menu. (If [F8] doesn't work in Windows 98, instead try pressing and holding [Ctrl].)

2 Select the number for "safe mode", then press [Enter].

3 Right-click the **My Computer** icon on the Windows desktop background, then click **Properties → Device Manager**.

4 Click the plus sign next to **Other devices** (if it appears) and **Display adapters**. Delete all listed display adapters (click each, then click **Remove**), then click **OK**.

5 In the following folders, remove all files or folders related to "PowerDesk" (*pd*.**), "Matrox" or "MGA". (For more information on some files, right-click on them in Windows Explorer, then click **Properties → Version**. The following paths assume default installations and may be different on your computer.)

- *C:\Windows\Start Menu\Programs\StartUp*
- *C:\Windows\Startmenu\Programs*
- *C:\Windows\System*
- *C:\Program Files*

ⓘ **Note:** Recent versions of Matrox PowerDesk for Windows 95/98 (5.*x* and later) install files only to your Windows *System* folder.

6 Click **Start → Run**, type *regedit*, then click **OK**.

7 Under **HKEY_LOCAL_MACHINE → SOFTWARE**, remove all items starting with "Matrox" or "MGA".

Note: Recent versions of Matrox PowerDesk for Windows 95/98 (5.*x* and later) store registry settings under **HKEY_CURRENT_USER → SOFTWARE**. *Your* settings under **HKEY_CURRENT_USER** are only accessible if you're logged into Windows with your user name.

8 Restart your computer, then install the latest display drivers for your Matrox graphics card. You may also need to reinstall other Matrox software.

Problem W9x After game for Windows 95/98 starts, monitor doesn't display properly (blank screen, rolling or overlapping screen images)

Cause If your game uses a low-resolution (640 × 480 and below), full-screen display mode, your monitor may not support the refresh rate the Matrox driver is using.

Solution
1 If the game is still running in full-screen mode, press [Ctrl]+[Alt]+[Del] *once* for the **Close Program** dialog box, and then click the **End Task** button.

2 Access the Matrox PowerDesk **Monitor Settings** property sheet (see "Accessing PowerDesk property sheets", page 8).

3 Click **Select customizations from the Matrox list**.

4 From the Matrox monitor list, select the monitor model you're using. If your monitor model doesn't appear in the list, select a monitor that runs at 60 Hz at 640 × 480 (for example, **Standard monitor types → Vesa 1024X768 @60Hz → Next**). Follow the on-screen instructions to complete the selection.

Problem Matrox Diagnostic or setup program reports an IRQ problem (3D and video programs don't work)

Cause Your computer or program may not work well with bus mastering.

Solution Disable bus mastering:
(If you want to continue using bus mastering, see the other solutions.)

W9x Windows 95/98 –

1 Access the Matrox PowerDesk **Options** property sheet (see "Accessing PowerDesk property sheets", page 8).

2 Clear the **Use bus mastering** check box.

3 Click **OK → OK → Yes** to accept the changes and restart your computer.

W_{NT} **Windows NT 4.0 –**

1 Click [Start] → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Performance**.

2 Clear the **Use bus mastering** check box.

3 Click **OK** → **Yes** to accept the changes and restart your computer.

Cause Your computer may not have given an interrupt request (IRQ) to your Matrox graphics card or may have given one used by another device in your computer. This may be because your computer's "Plug-and-Play" feature is turned off.

W_{9x} **Windows 95/98 –** To check the display adapter's IRQ:

1 Right-click the **My Computer** icon on the Windows desktop background, then click **Properties** → **Device Manager**.

2 Click the plus sign to the left of the **Display adapters**. An "**X**" through an icon means the hardware has been disabled. A circled exclamation point through the icon means the hardware has a problem.

3 Double-click the name of your Matrox display adapter to open a properties dialog box. The type of problem is displayed in the **General** tab → **Device status** area. Check also the **Resources** tab → **Resource type** list for an **Interrupt Request**.

Resource type	Setting
Interrupt Request	11
Memory Range	FFBEC000 - FFBEFFFF
Memory Range	FF000000 - FF7FFFFF

Solution Change settings in your computer CMOS setup utility.

If your computer has the options of enabling Plug-and-Play detection, or assigning an IRQ to a VGA adapter, make sure they're enabled. If your computer doesn't have these options, you may be able to manually assign an IRQ to your graphics card using the CMOS setup utility.

For more information on your computer's CMOS setup utility, see your system manual or contact your system manufacturer.

Cause Your computer's other BIOS settings may be incorrect.

Solution Reset your computer BIOS settings to the factory defaults using your computer's built-in CMOS setup utility. The factory defaults are usually the "safest" settings. Check your system manual for more information.

Problem

W9x

Game for Windows 95/98 doesn't start or runs slower than normal (program uses Microsoft DirectX interface)

Cause An older version of DirectX may be installed. The Matrox CD-ROM setup program installs DirectX, but some programs install an older version of DirectX (overwriting your version). To see what version of DirectX is installed:

1 Access the Matrox PowerDesk **Information** property sheet (see "Accessing PowerDesk property sheets", page 8).

**2** Look at the **Microsoft DirectX** label.

Solution If DirectX 6.1 or later isn't installed, install it. Run the setup program from the *DirectX* folder of the Matrox installation CD-ROM.

Problem

W9x

After restarting computer, Windows 95/98 warns that the graphics card isn't configured correctly

Cause You may have a conflict because of previously installed display drivers.

Solution Delete all existing display drivers and reinstall Matrox display drivers.

1 If Windows 95/98 prompts you to start the **Add New Hardware Wizard**, click **Cancel**. (If you start the Wizard, it will *not* detect your graphics card.)

2 Right-click the **My Computer** icon on the Windows 95/98 desktop.

3 Click **Properties → Device Manager**.

4 Click the plus sign next to **Other devices** (if it appears) and **Display adapters**.

5 Delete *all* listed display adapters (click each, then click **Remove**), then click **OK**.

6 Restart your computer and reinstall the Matrox display drivers (see page 7).
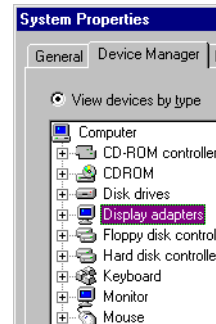
Problem <u>**Screen image defects appear or program doesn't run properly**</u>
<u>**(example: mouse pointer not drawn properly)**</u>

Cause Some programs may not work properly with some Matrox acceleration.

Solution Disable specific types of software acceleration:

W9x **Windows 95/98 –**

1 Access the Matrox PowerDesk **Options** property sheet (see "Accessing PowerDesk property sheets", page 8).

2 Clear one or more check boxes, starting with **Use device bitmaps caching**. For more information, see context-sensitive help.

3 Click **OK** → **Close** to accept the changes. (Depending on the feature you disabled, you may have to restart your computer for the changes to take effect.)

WNT **Windows NT 4.0 –**

1 Click ▓**Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Performance**.

2 Clear one or more check boxes. For more information, see context-sensitive help.

3 Click **OK** → **Yes** to accept the changes. (Depending on the feature you disabled, you may have to restart your computer for the changes to take effect.)

Solution If possible, update your Matrox display driver. Matrox makes new display drivers available on the Matrox Web site (*www.matrox.com/mga*) and BBS (see page 42).

Solution Disable Matrox hardware acceleration:

W9x **Windows 95/98 –**

1 Right-click the **My Computer** icon on the Windows desktop background.

2 Click **Properties** → **Performance** → **Graphics**.

3 Move the **Hardware acceleration** slider to **None**.

4 Click **OK** → **Close** → **Yes** to accept the changes and restart your computer.

Cause **Windows 95/98 –** There may be a conflict between resources in your system.

Solution **1** Right-click the **My Computer** icon on the Windows desktop background, then click
W9x **Properties** → **Device Manager**.

2 Click the plus sign next to **Other devices** (if it appears) and **Display adapters**.

3 Delete any display adapter *other than* the one for your Matrox graphics card.

4 Restart your computer.

ℹ **Note:** If you identify a program that doesn't work well with Matrox acceleration, please contact Matrox technical support (see page 43) and describe the problem. This information may help us come up with a fix or work-around in a future driver release.

Video

The following troubleshooting items address problems related to video files.

Problem **Video file playback is jerky (skipping frames)**

ℹ **Note:** Jerky video file playback may be the result of slow playback or recording. Slow recording causes frames to be dropped (frames aren't recorded). If jerky video is caused by frames that were dropped during recording, the problem can only be fixed by recapturing the video under better conditions.

Cause Your hard disk may be too slow.

Solution Try *defragmenting* your hard disk.

W9x **Windows 95/98 –** To defragment a hard disk, click 🏁**Start** → **Programs** → **Accessories** → **System Tools** → **Disk Defragmenter**.

Solution If possible, try using a faster disk.

ℹ **Tip:** If your computer has more than one hard disk, you may get better results if you play back video files from a disk *other than* the one where the Windows swap file is stored. The Windows swap file is usually stored on drive "*C:*".

Solution Make sure your hard disk is using DMA (if your hard disk supports DMA transfers). To use DMA:

ℹ **Note:** Not all hard disks support DMA well. For more information, see the documentation that came with your hard disk.

W9x **Windows 95/98 –**

1 Right-click the **My Computer** icon on your Windows desktop background, then click **Properties** → **Device Manager**.

2 Double-click the **Disk drives** list item to expand it, then double-click the name of the hard disk you're using.

3 Click **Settings**, then enable the **DMA** check box.

4 Click **OK → OK → Yes** to restart your computer and for changes to take effect.

W_{NT} **Windows NT 4.0 –** Install a DMA driver. For most computers, a DMA driver is available for Windows NT 4.0 (for example, the "PIIX Bus Master IDE" driver supports many computers). For more information on how to get this driver, contact your system vendor.

Cause Too many programs may be running (using up computer resources).

Solution Close other programs, including memory-resident programs like **System Agent**.

Cause Your display settings may be too high. As a result, video file playback may not be fully supported by Matrox hardware.

Solution Try lowering your display settings. We recommend a 1024 × 768 or lower display resolution with a 16-bit color palette.

W_{NT}^{9x} **Windows 95/98 or NT 4.0 –** To access display settings, .

Cause Your Matrox graphics card may be sharing an IRQ (interrupt request) with another PCI card in your computer (for example, a network card).

W_{9x} **Windows 95/98 –** To see if your graphics card is sharing an IRQ:

1 Right-click the **My Computer** icon on your Windows desktop background, then click **Properties → Device Manager → Properties**.

2 Look in the list box to see if your Matrox graphics card is assigned the same IRQ number as another PCI card in your computer.
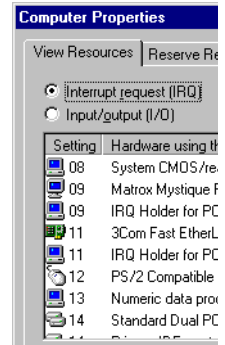
Solution Try moving the PCI card to another PCI slot in your computer. For more information, see the documentation for this card or see your system manual.

DVD

The following troubleshooting items address problems related to DVD. (For general video-related troubleshooting items, see "Video", page 24.)

Problem **DVD video playback is jerky (skipping frames)**

Cause Your DVD drive may be too slow.

Solution If your DVD drive supports DMA transfers, enable this feature.

> **Note:** Not all DVD drives support DMA well. For more information, see the documentation that came with your DVD drive.

W9x **Windows 95/98 –** To enable DMA for a DVD drive:

1 Right-click the **My Computer** icon on your Windows desktop background, then click **Properties → Device Manager**.

2 Double-click the **Disk drives** list item to expand it, then double-click the name of the DVD drive you're using.

3 Click **Settings**, then enable the **DMA** check box.

4 Click **OK → OK → Yes** to restart your computer and for changes to take effect.

WNT **Windows NT 4.0 –** Install a DMA driver. For more information on how to get this driver, contact your system vendor.

Problem **Can't play certain DVD videos**

Cause A DVD video may not play back because the region setting on your DVD player doesn't match the region code on the DVD-ROM disc. DVD players and videos use region codes to prevent the playback of video that was intended only for a certain region or market.

Solution To get a copy of a DVD video that's compatible with the region code of your DVD player, contact the vendor of that video.

TV output

If your Matrox graphics card has a second monitor connector, you can connect it to a TV or video recorder. This section describes how to use a TV or video recorder with your Matrox graphics card.

Connection setup

1 Turn off computer

W_{NT} **Windows NT 4.0 –** *Before turning off your computer,* make sure the *DualHead Multi-Display* mode is disabled (see "DualHead Multi-Display setup", page 10).

W^{9x}_{NT} **Windows 95/98 or NT 4.0 –** To shut down your computer, click **Start** → **Shut Down** → **Shut down** → **OK**, then turn off your computer.

⚠ **WARNING:** Don't change monitor connections while your computer is turned on. While your computer is turned on, it may be using monitor settings that are specific to the current monitor connections.

If a display device (monitor, TV or video recorder) is connected while your computer is using settings intended for another display device, the display of the new device may be garbled or unusable. *Some* devices may be permanently damaged if incorrect settings are used.

2 Attach TV adapter

Attach the TV adapter included with your Matrox graphics card to the second monitor connector (connector **2**) on your card.
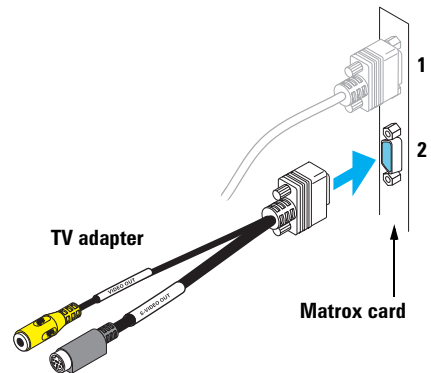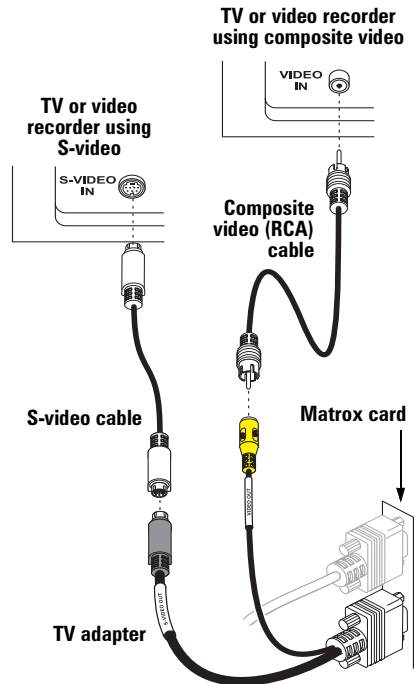
3 Connect video output

To connect to a TV or video recorder, you'll need the TV adapter included with your Matrox graphics card and you'll need a composite or S-video cable.

If your video device (TV or video recorder) didn't come with composite video (RCA) or S-video cables, this type of cable is available at most electronics stores. The type you use depends on what your video device (TV or video recorder) supports. Many video devices support composite video connections, and some higher-quality video devices support S-video connections.

a Attach one end of your composite video or S-video cable to the appropriate connector on your TV adapter.

b Attach the other end to the **VIDEO IN**[*] connector on your TV[†] or video recorder.

c Before viewing or recording video output directly from your computer, make sure your TV or video recorder is set up to use *line* input. For example, if your TV has a **TV/VIDEO** switch, set it to **VIDEO**; or if your video recorder has a **TUNER/LINE** switch, set it to **LINE**.

(Note: Using the Matrox composite video *and* S-video connectors at the same time is optional.)

Optionally, if you use the composite video *and* S-video connectors on your Matrox TV adapter, you can directly connect two different video devices at the same time.

To view *and* record output from the same Matrox video connector, you can connect it to a video recorder and connect the video recorder to a TV. For more information, see your video recorder and TV manuals.

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[*] The labels on your devices may not be consistent with what's in this guide. Different manufacturers sometimes use different labels for the same type of controls and connectors. For example, the **VIDEO IN** connector on your TV may be labeled **VIDEO 1** (or **VIDEO 2**). To match labels, see the documentation for your video devices.

[†] If your TV only has an antenna or cable TV connector, you can use an *RF modulator* to connect it to your Matrox card. RF modulators are available at most electronics stores.

4 Connect audio output

Typically, the sound output from a computer comes from speakers connected to your sound card. If you prefer, you can hear or record the sound output from your computer using the same TV or video recorder you connect to your graphics card. To do this, you need an audio cable with a stereo jack on one end and two RCA connectors on the other end. If you don't have this type of cable, you can buy one at most consumer electronics stores.
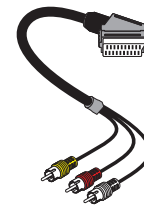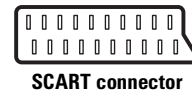
TV or video recorder

Sound card

a Plug the stereo-jack end of the audio cable into the **LINE OUT**[*] connector on your sound card.

b Plug the other end of the cable into the left (**L**) and right (**R**) **AUDIO IN** connectors of your video device. For more information, see your sound card manual.
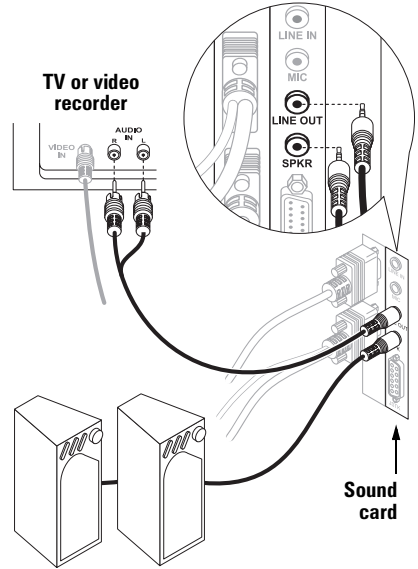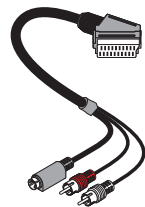
SCART adapter

Some video devices in Europe only have SCART connectors. This type of connector includes video *and* audio, whereas composite video or S-video connectors include only video.

SCART connector

If your TV or video recorder *only* uses a SCART connector, you need a SCART cable adapter to connect your computer to that TV or video recorder. If you don't already have a SCART adapter, you should be able to purchase one from your local electronics store. You need a SCART adapter with *3 connectors* – 2 audio and 1 video. There are different SCART adapters for composite video and S-video. If you're not sure which your TV or video recorder supports, see its manual.

Composite SCART adapter with 3 connectors

S-video SCART adapter with 3 connectors

To use a SCART adapter, connect the SCART end of the adapter to your TV or video recorder, then connect the other end to your Matrox TV adapter *and* sound card.

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[*] If your sound card has no **LINE OUT** connector, you can use its **SPKR** connector instead. In this case, all your computer's sound output goes to the video device you connected to.

Software setup *

If a TV or video recorder is connected to the second monitor connector on your Matrox graphics card, you can use TV output mode to view or record your display on your TV or video recorder. (To connect video devices to your computer, see page 27.)

While in TV output mode, your computer display may use TV settings. TV settings have lower resolutions and refresh rates than typical computer monitor settings. Lower refresh rates may result in more noticeable flicker.

⚠ **WARNING:** Because *some* computer monitors don't support TV settings, a computer monitor may become garbled or unusable if it uses TV settings. If this happens, you can simply turn off your computer monitor and use your TV to view your computer display.

Also, *some* computer monitors may be damaged if they use the 50 Hz vertical refresh rate used with European TV settings. For more information, see your monitor manual.

ⓘ **Note:** Two TV standards are supported for TV output. The NTSC standard is used in North America and Japan, among other places. The PAL standard is used in most of Western Europe and in China, among other places.

If an incorrect TV standard is selected in Matrox software, the output from your computer may not appear or record properly on your TV or your video recorder. To find out what standard your TV or video recorder supports, see its documentation.

W₉₈ **Windows 98** – To add a TV to your Windows desktop, see "DualHead Multi-Display setup", page 10.

W₉ₓ **Windows 95/98** – To use TV output, you can use the **DualHead Clone**, **DualHead Zoom**, or **DualHead DVDMax** features (see "Other DualHead features", page 11).

To adjust TV settings, access the Matrox PowerDesk **DualHead** property sheet (see "Accessing PowerDesk property sheets", page 8). To adjust advanced desktop TV settings, click **Desktop TV Settings**. To adjust advanced DVDMax TV settings, click **DVDMax TV Settings**.

ⓘ **Note:** With the **DualHead Clone** feature (Windows 95/98), you can avoid using TV settings with your computer monitor. You can do this by enabling the **Keep optimal refresh when possible** check box on the **DualHead Clone Options** dialog box.

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* To enable TV output support for DOS display modes, use **Matrox System Utilities**. You can install this software from your Matrox installation CD-ROM. For more information, see the *Readme* file included with this software.

W_{NT} **Windows NT 4.0** – To adjust TV settings, click **🏁Start** → **Programs** → **Matrox PowerDesk NT** → **Matrox Display Properties** → **Monitor**. To adjust advanced TV settings, click **Advanced TV Settings**.

For more information on how you can use your secondary display, see PowerDesk online help.

TV output troubleshooting

The following troubleshooting items are related to TV output support (see "TV output", page 27).

Problem **TV image is garbled or unusable**

(a blank screen, or rolling or overlapping screen images)

Cause Your TV or video recorder may not be properly connected.

Solution Make sure your TV or video recorder is properly connected. For more information, see "Connection setup", page 27.

Cause Your TV or video recorder may not be properly set up.

Solution If a TV is connected to your Matrox graphics card and the TV has a **TV/VIDEO** switch, set it to **VIDEO.** For more information, see your TV manual.

Solution If a video recorder is connected to your Matrox graphics card and the video recorder has a **TUNER/LINE** switch, set it to **LINE**. For more information, see your video recorder manual.

Cause Matrox software may not be set up for TV output. Particularly, the TV standard selected may not be correct.

Solution **Windows 95/98 or NT 4.0 –** See "Software setup", page 30.

Cause You may be using a DOS display mode *without* your Matrox graphics card being properly configured for DOS TV output. DOS display modes are used for:

- DOS programs that run full-screen

- a full-screen DOS prompt under Windows

- text displayed before Windows starts

Solution Make sure your Matrox graphics card is properly configured to support TV output for DOS display modes. To enable TV output support for DOS display modes, use **Matrox System Utilities**. You can install this software from your Matrox installation CD-ROM. For more information, see the *Readme* file included with this software.

Cause If you're using a program that runs full-screen, this program may be using a display mode that's not supported for TV output.

Solution If the program offers a choice of display modes, select a display mode supported for TV output. For a list of display modes supported for TV output, see "Supported TV output modes", page 39. For information on how to change display modes with the program you're using, see its documentation.

Solution View the program you're using with your computer monitor instead of your TV.

Problem **Computer text is hard to read with a TV**

Cause The resolution of a TV is lower than a typical computer display. As a result, some text may be harder to read with a TV than with a computer monitor.

Solution Lower your computer display resolution:

W9x **Windows 95/98 –**

   1 Right-click your Windows desktop background, then click **Properties → Settings**.

   2 Move the **Desktop area** (Windows 95) or **Screen area** (Windows 98) slider to a lower setting.

   3 Click **OK** to close the dialog box and apply changes.

WNT **Windows NT 4.0 –**

   1 Click ⊞Start → **Programs → Matrox PowerDesk NT → Matrox Display Properties → Settings**.

   2 Move the **Display area** slider to a lower setting.

   3 Click **OK** to close the dialog box and apply changes.

Solution If you're using a display area larger than 640×480, you can use larger system fonts to make some text more readable:

W95 **1** **Windows 95 –** Right-click your Windows desktop background, then click **Properties → Settings**.

W98 **Windows 98 –** Right-click your Windows desktop background, then click **Properties → Settings → Advanced → General.**

WNT **Windows NT 4.0 –** Click ⊞Start → **Programs → Matrox PowerDesk NT → Matrox Display Properties → Settings.**

   2 Under **Font size**, select **Large Fonts**.

   3 Click **OK** to close the dialog box and apply changes.

Problem **Poor TV or video recorder image quality**

Cause Your software TV settings may need adjusting.

Solution See "Software setup", page 30.

Cause There may be too many video devices between your video source and destination, or one or more of the video devices may be degrading the quality of the video signal. Demodulators, long cables, cable extensions and improper connections can all affect video signal quality.

Solution If your video equipment supports it, use S-video connections. For more information, see "Connection setup", page 27.

Solution Try changing one or more video devices.

Solution If possible, use fewer connections. For example, don't use cable extensions.

Cause The image settings on your TV may need adjusting.

Solution Some TVs have an aperture control sometimes called **PICTURE**. Lowering this setting may reduce this problem. Reducing your TV's brightness setting may also improve image quality. For more information, see your TV manual.

Problem **Can't record video with a video recorder**

Cause The video source may be copy protected. Your Matrox product may not let you make copies of copy-protected video. (Some video sources let you make a copy of a video, but you may not be able to make a copy of that copy.)

Solution To get copies of a copy-protected video, contact the vendor of the video.

Problem **Video appears stretched or squished on a TV**

Cause **W9x** **Windows 95/98 –** If you're using the *DualHead DVDMax* feature to view video full-screen on your TV, the aspect ratio of a video may not match the aspect ratio of your TV.

Solution Adjust software settings:

1 Access the Matrox PowerDesk **DualHead** property sheet (see "Accessing PowerDesk property sheets", page 8).

2 Click **DVDMax Options**.

3 Select **Preserve aspect ratio**.

4 Select the aspect ratio of your TV (4:3 or 16:9 – most TVs are 4:3).

5 Select **Detect based on video window size**.

6 Click **OK** or **Apply** for your changes to take effect.

For more information, see context-sensitive help.

Sound troubleshooting

The following troubleshooting items address problems related to sound cards.

Problem **Sound doesn't record, video files play back with no sound, or sound output is distorted or too loud**

Cause If the sound problem is with a particular device (for example, TV or speaker), the volume control on the device itself may need adjusting.

Solution Adjust the volume control on the device itself.

Cause Audio cables may be loose or incorrectly wired.

Solution Make sure your sound card cables are properly connected (see "Connect audio output", page 29).

Cause Your sound card's Windows software settings may be incorrect. Specifically, input or output may be disabled, or volume levels may be too low or too high.

Solution **Windows 95/98 or NT 4.0** – Make sure your sound card's Windows software settings are correct.

**1** Double-click the speaker icon ( ) on the Windows taskbar.

If you ***don't*** see the speaker icon:

a Click **Start** → **Settings** → **Control Panel**.

b Double-click the **Multimedia** icon.

c Enable the "**Show volume control on the taskbar**" check box.

d Click **OK**.

e Double-click the speaker icon on the taskbar.

2 Click **Options** → **Properties**.

3 Click the **Recording** button, enable all check boxes in the list box, then click **OK**.

4 For the **Line In** and/or **Microphone** controls, make sure the **Volume** slider levels are okay (if you're not sure, try half level), and the **Select** check boxes are enabled.

5 Click **Options → Properties**.

6 Click the **Playback** button, enable all check boxes in the list box, then click **OK**.

7 For the **Master**, **Line** and/or **Wave** controls, make sure the **Volume** sliders are at one-quarter to one-half levels (if you're not sure, try half level), and the **Mute** check boxes are cleared.

8 Close the dialog box.
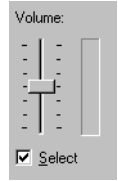
Cause The problem may be specific to the sound card you have.

Solution For more information, see your sound card manual.

Display information

- Matrox graphics cards that can support a secondary display have the Matrox *DualHead* feature. For information on which card models support this feature, see "Hardware information", page 40.

W9x

- **Windows 95/98 –** In *DualHead Multi-Display* mode (see page 10), the graphics memory is divided equally between the main and secondary display. For example, if you have a 16 MB graphics card, the main and secondary displays each have 8 MB available to them. As a result, maximum display capabilities may be affected.

- In *DualHead Multi-Display* mode (see page 10), the secondary display only supports a 16- or 32-bit color palette.

- 3D acceleration is only available with a 16- or 32-bit color palette.

- The display resolutions available depend on your Matrox graphics card, display driver and software monitor settings. Different software monitor settings have different resolutions available to them. With your software monitor settings, some of the resolutions listed in this section may not be available, *or* resolutions not listed in this section may be available. For more information on software monitor settings with Windows 95/98 or NT 4.0, see "Monitor setup", page 8.

- Many Plug-and-Play monitors don't automatically report if they're capable of 1152×864, or 1600×1200 and higher display resolutions. To use these resolutions, or higher refresh rates than those reported by the monitor, you can use the Matrox monitor selection method. To use Matrox monitor settings with Windows 95/98 or NT 4.0, see "Monitor setup", page 8.

- The maximum refresh rates listed in this section have been rounded and are based on a monitor with a maximum horizontal refresh rate of 130 kHz. Depending on your monitor, refresh rate capabilities may vary. For information on the capabilities of your monitor, see your monitor documentation.

Maximum display resolution

Aspect ratio	Main display	Secondary display
4:3/5:4 (standard)	2048 × 1536	1280 × 1024
16:9/16:10 (wide screen)	1920 × 1200	1280 × 720

Maximum vertical refresh rate (Hz)*

Aspect ratio	Display resolution	Main display		Secondary display (135 MHz RAMDAC)
		300 MHz RAMDAC	360 MHz RAMDAC	
4:3/5:4 (standard)	640 × 480	200	200	200
	800 × 600	200	200	180
	1024 × 768	160	160	115
	1152 × 864	140	140	95
	1280 × 1024	120	120	75
	1600 × 1200	100	100	—
	1800 × 1440	80	85	—
	1920 × 1440	75	85	—
	2048 × 1536	70	85	—
16:9/16:10 (wide screen)	856 × 480	200	200	200
	1280 × 720	160	160	100
	1600 × 1024	120	120	—
	1920 × 1080	100	110	—
	1920 × 1200	90	100	—

* Based on a monitor with a maximum horizontal refresh rate of 130 kHz

Maximum horizontal refresh rate (kHz) *

Aspect Ratio	Display resolution	Main display		Secondary display (135 MHz RAMDAC)
		300 MHz RAMDAC	360 MHz RAMDAC	
4:3/5:4 (standard)	640 × 480	130	130	130
	800 × 600	130	130	120
	1024 × 768	130	130	95
	1152 × 864	130	130	85
	1280 × 1024	130	130	80
	1600 × 1200	130	130	—
	1800 × 1440	120	130	—
	1920 × 1440	115	130	—
	2048 × 1536	110	130	—
16:9/16:10 (wide screen)	856 × 480	130	130	108
	1280 × 720	130	130	76
	1600 × 1024	130	130	—
	1920 × 1080	115	130	—
	1920 × 1200	115	130	—

* Based on a monitor with a maximum horizontal refresh rate of 130 kHz

Maximum 3D display resolutions (main display)

Graphics memory	Color palette*	Maximum display resolution		
		Double-buffering without Z-buffering	Double buffering with 16-bit Z-buffering	Double buffering with 32-bit Z-buffering
16 MB	64 K colors (16-bit)	2048 × 1536	1800 × 1440	1600 × 1200
	16 M colors (32-bit)	1600 × 1200	1280 × 1024	1280 × 1024
32 MB	64 K colors (16-bit)	2048 × 1536	2048 × 1536	2048 × 1536
	16 M colors (32-bit)	2048 × 1536	2048 × 1536	1800 × 1440

* 3D acceleration is only available with a 16- or 32-bit color palette.

Supported VESA modes

In the table below, VESA modes supported by your Matrox graphics card are indicated by a VESA mode number. Many Super VGA DOS programs use VESA modes.

Display resolution	16 colors	256 colors	32 K colors	64 K colors	16 M colors
640 × 400	—	100	—	—	—
640 × 480	(VGA)	101	110	111	112
800 × 600	102	103	113	114	115
1024 × 768*	—	105	116	117	118
1280 × 1024*	—	107	119	11A	11B
1600 × 1200*	—	11C	11D	11E	—

* To use this resolution, install **Matrox System Utilities** from your Matrox installation CD-ROM. For more information, see the *Readme* file included with this software.

Supported TV output modes*

- **Windows 95/98 or NT 4.0** (all color modes) – 640 × 400 (DirectX only), 640 × 480, 800 × 600, 1024 × 768

- **DOS**† – 720 × 400, text (02h, 03h); 320 × 200, 256 colors (13h); 640 × 480, 16 colors (12h); 640 × 400, 256 colors (100h); 640 × 480, 256 colors (101h); 640 × 480, 32 K colors (110h); 640 × 480, 64 K colors (111h); 640 × 480, 16 M colors (112h)

* Only for Matrox graphics cards with TV output support. For more information, .

† To enable TV output support for DOS display modes, use **Matrox System Utilities**. You can install this software from your Matrox installation CD-ROM. For more information, see the *Readme* file included with this software.

Hardware information

Features

	Millennium G400 (single-display)	Millennium G400 (DualHead)	Millennium G400 MAX (DualHead)
Graphics chip	Matrox G400 (256-bit DualBus)		
3D features	VCQ^2 (Vibrant Color Quality^2), environment-mapped bump mapping, stencil buffering, anisotropic filtering, bilinear filtering, trilinear filtering, alpha blending, anti-aliased vectors, vertex fogging, table fogging, specular highlighting, 16-bit Z-buffering, 32-bit Z-buffering, single buffering, double buffering, triple buffering, texture mapping, MIP mapping, Gouraud shading		
Main RAMDAC	300 MHz	300 MHz	360 MHz
Secondary RAMDAC	—	135 MHz	135 MHz
Memory	16 MB or 32 MB	16 MB or 32 MB	32 MB
Memory type	SGRAM or SDRAM	SGRAM	SGRAM
DualHead	—	✓	✓
TV output*	—	✓	✓
Card type	Compatible with AGP 2× and AGP 4× systems †		
AGP form factor	ATX		

* TV output: Composite video and S-video output (NTSC and PAL)

† These cards are compatible with AGP 2× and AGP 4× systems and can achieve a peak AGP transfer rate of 532 MB/sec.

Matrox hardware add-ons (sold separately)

	Millennium G400 (single-display)	Millennium G400 (DualHead)	Millennium G400 MAX (DualHead)
Rainbow Runner G-Series (video editing card)	—	✓	✓
DualHead + TV output * (for G400 cards)	✓ †	—	—
Digital flat panel (for G400 cards)	✓	✓	✓

* TV output: Composite video and S-video output (NTSC and PAL)

† Matrox DualHead/TV output and digital flat panel add-ons can't be used at the same time.

Video specifications

- Separate sync monitors only

- The video follows the PS/2 standard, with no sync on RGB, and no blanking pedestal. Black or blank – 0.0 V; White – 0.700 V.

- There are five connections to a monitor that uses BNC (Bayonet Nut Connect) connectors – R, G, B, HSYNC (white or gray wire), and VSYNC (black wire).

Environmental specifications

- Minimum/maximum ambient operating temperatures: 0 to 55º C

- Minimum/maximum storage temperature: -40 to 75º C

- Maximum altitude for operation: 3,000 meters

- Maximum altitude for transport: 12,000 meters

- Operating humidity: 20 to 80% relative humidity (non-condensing)

- Storage humidity: 5 to 95% relative humidity (non-condensing)

Customer support

Matrox Web and FTP sites

Matrox is on the Internet with a World Wide Web (WWW) and File Transfer Protocol (FTP) site. Our Web site has product literature, press releases, technical material, a sales office list, trade show information, and other relevant material. Our FTP site contains current drivers for Matrox products. You can download drivers using the Internet FTP site, in addition to our BBS. You can access our FTP server independently, or from the Matrox Web site.

Our address for Matrox Graphics Inc. is:

WWW;   *www.matrox.com/mga*

FTP;   *ftp.matrox.com/pub/mga/*

Send questions or comments regarding the site to:

e-mail;   *webmaster@matrox.com*

If you have a problem

If you have a problem, we recommend that you follow the procedure below for the quickest results.

1 **Contact your dealer –** This is usually the quickest and most effective method of technical assistance. Your dealer is local and may be familiar with your complete system. In the case of hardware warranty assistance, the product must be returned to the dealer, who will return it to Matrox.

2 If your Matrox product was provided by your computer manufacturer, contact this manufacturer. For contact information, see your computer documentation or contact the vendor.

3 **CompuServe –** If you have a modem and an account on CompuServe, you can get technical assistance and driver updates directly from Matrox by typing *GO MATROX* at the "!" prompt.

4 **Matrox BBS –** You can download driver updates (which may eliminate a particular bug), utilities, and other information from our 24-hour Bulletin Board Service (BBS). The phone number is **514-685-6008**. The communication parameters are 8 data bits, 1 stop bit, and no parity. You'll be prompted to enter your first and last name and a password. If you don't have an account, it's created when you enter your name for the first time. See also "Matrox Web and FTP sites".

5   MATFAX instant fax – Call our dial-up Matrox fax service at **514-685-0174**. Using a touch-tone phone, you can have faxes sent to you automatically 24 hours a day. Available documents include common installation problems, available drivers and updates, and product data sheets.

6   Direct Matrox Technical Assistance – If you still can't resolve a problem (and your Matrox product wasn't provided by your computer manufacturer), you can get direct technical assistance four ways:

- Call Technical Support (Canada) at **514-685-0270**. For residents of Quebec only, call **514-822-6330**.

- Send a FAX to **514-822-6363**, Attention: Graphics Technical Assistance.

- Send e-mail to *graphics.techsupport@matrox.com*.

- Write a letter to Graphics Customer Support at our Corporate Headquarters. The address is: **Matrox Graphics Inc., 1055 St. Regis Blvd., Dorval, QC, Canada, H9P 2T4**.

Information we need

Please give a complete description of the problem, and include:

- Matrox card serial number, model number, revision number, BIOS number, driver type and version, and memory address at which the Matrox card is installed.

- Computer brand name, system BIOS manufacturer and version number or date, bus type, model, processor speed, and amount of memory.

- Monitor brand and model name.

- Operating system and version – if you're using a memory manager, its brand and version. Also, list any memory-resident programs in use.

- If you're using a network card, its brand and version.

- Brand and model of any other cards and devices installed on your system.

Program specific problems

If a problem appears with a specific program, please give us the following information:

- Display settings (color palette, display resolution, and so on) applied when the problem occurs.

- Program name and version. Name any add-on packages you're using.

- If possible, take note of the file and segment address that caused the problem.

- Detailed steps known to cause the bug, so we can reproduce it.

ⓘ Where to get information

For display information:

W9x ■ **Windows 95/98** – access the **Information** property sheet (see "Accessing PowerDesk property sheets", page 8).

WNT ■ **Windows NT 4.0** – click [Start] → **Programs → Matrox PowerDesk NT → Matrox Display Properties → Information**.

For system information:

W9x ■ **Windows 95/98** – right-click the **My Computer** icon on your Windows desktop background, then click **Properties**.

W98 ■ **Windows 98** – click [Start] → **Programs → Accessories → System Tools → System Information**.

WNT ■ **Windows NT 4.0** – click [Start] → **Administrative Tools (Common) → Windows NT Diagnostics**.

Warranty

A. Limited Warranty Statement

1. Matrox Graphics Inc. ("Matrox") warrants to the end-user customer, who provides adequate proof of purchase that Matrox hardware products purchased from Matrox authorized dealers will be free from defects in materials and workmanship for a period of three (3) years from the date of purchase. This warranty applies only to the original end-user purchaser and is non-transferable. Conditions and limitations of Matrox's warranty are stated below.

2. Matrox's limited warranty covers only those defects which arise as a result of normal use of the hardware and does not apply to any:

   a. improper or inadequate maintenance;

   b. incompatibilities due to the user's hardware or software applications with or in which the Matrox product interfaces;

   c. product of a special or custom-made nature;

   d. unauthorized modification or misuse;

   e. improper installation, misapplication or negligence;

   f. operation outside the product's environmental specifications;

   g. improper site preparation or maintenance;

   h. software;

   i. other causes that do not relate to a product defect;

   j. defects or damage suffered as a result of force majeure (including theft);

   k. defects or damage suffered as a result of normal wear and tear; and/or

   l. stolen goods.

3. If Matrox receives, during the applicable warranty period, notice of a defect in a warranted hardware product and the defective Matrox product in question, Matrox shall at its sole option, either repair or replace the product, and shall return the repaired product or a replacement product within a reasonable delay. The replacement product may not be new, provided that it has functionality at least equal to that of the product being replaced.

4. This warranty is valid in any country where Matrox hardware products are distributed by Matrox or its authorized dealers.

5. This Limited Warranty Statement gives the customer specific legal rights. The customer may also have other rights which vary from state to state in the United States, from province to province in Canada, and from country to country elsewhere in the world.

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1. NEITHER MATROX NOR ANY OF ITS THIRD PARTY SUPPLIERS MAKES ANY OTHER WARRANTY OF ANY KIND, WHETHER EXPRESSED OR IMPLIED, WITH RESPECT TO MATROX PRODUCTS. MATROX SPECIFICALLY DISCLAIMS (and the customer, by accepting the Matrox product, specifically accepts such disclaimer and waives) ALL OTHER WARRANTIES, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR OR INTENDED PURPOSE OR USE AND THE WARRANTY AGAINST LATENT DEFECTS, WITH RESPECT TO THE HARDWARE AND/OR SOFTWARE.

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3. To the extent allowed by local law, the remedies provided in this Limited Warranty Statement are the customer's sole and exclusive remedies.

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1. EXCEPT FOR THE OBLIGATIONS SPECIFICALLY SET FORTH IN THE LIMITED WARRANTY STATEMENT, IN NO EVENT SHALL MATROX BE LIABLE FOR:

a. any direct, indirect, special, incidental, consequential, foreseeable or unforeseeable, or punitive damages, whether based on contract, tort, delict or any other legal theory and whether advised of the possibility of such damages; and/or

b. damages arising from the loss of use, data, production revenue and/or profit of in connection with the Matrox product or any business interruption.

2. Without prejudice to the foregoing, any liability of Matrox for any breach of warranty shall be limited to the amount paid by the customer for the defective hardware in question.

3. To the extent allowed by local law, Matrox's entire liability and the customer's exclusive remedy shall be the repair or replacement of any defective product during the warranty period. Matrox does not offer any other warranty with respect to Matrox hardware or software or any other hardware or software.

4. Customer shall be responsible for all applicable taxes, duties and customs fees on any replacement unit, as well as all transport, insurance, storage and other charges incurred on all returned products.

D. Obtaining Service

1. Verify that your Matrox product was installed and configured according to the information in its accompanying documentation.

2. Read the "Troubleshooting" information included with the Matrox product to see if you can solve the problem yourself.

3. If you are still experiencing difficulties, please contact your dealer where you purchased your Matrox product.

4. If you must return a Matrox product, leave the configuration as it was when you were using it, and leave all identification stickers on the product. Pack the product in its original box and return to your Matrox dealer where the product was purchased, together with your proof of purchase. Your Matrox dealer will return the product for you. Alternatively, if this first option is unavailable to you, you may contact the Matrox Technical Support group who will issue an Return Merchandise Authorization (RMA) number, upon receipt of adequate proof of purchase, and inform you of shipping instructions. DO NOT RETURN THE PRODUCT TO MATROX WITHOUT MATROX'S RMA NUMBER AND EXPRESS AUTHORIZATION.

E. General

This limited warranty shall be governed by the laws of the Province of Quebec, Canada and the federal laws of Canada applicable therein and the courts of the Province of Quebec shall have exclusive jurisdiction to hear and decide any dispute instituted by the customer in connection with this limited warranty; the customer waives, by accepting the product, its rights to institute proceedings in connection with this warranty against Matrox in any jurisdiction other than Quebec.

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3. The documentation is substantially complete and contains all the information Matrox deems necessary to use the software.

4. The Software functions substantially as described in the documentation.

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