MGA
Matrox Graphics Architecture

MGA Impression Plus / Lite
Owner's Manual

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FCC Compliance Statement

Warning

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

The use of shielded cables for connection of the monitor to the card is required to meet FCC requirements.

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.

Remarks for:

MGA-IMP+/P series (FCC ID: ID7054202), MGA-IMP+/A series (FCC ID: ID7055501), and MGA-IMP+/P/220 (FCC ID: ID7054202) at video resolutions up to 1600×1200 with 66 Hz refresh;

MGA-IMP+/P4 series (FCC ID: ID7055301), at video resolutions up to 1600×1200 with 72 Hz refresh;

MGA-IMP/LTE/V series (FCC ID: ID7050301) at video resolutions up to 1280×1024 with 76 Hz refresh;

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

The user is advised that any equipment changes or modifications not expressedly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

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CE Compliance Statement

Remark for: MGA-IMP+/P4 series at a video resolution up to 1600 x 1200 with 72 Hz refresh;

This device complies with EC Directive 89/336/EEC for a Class B digital device. It has been tested and found to comply with EN50081-1 (EN55022/CISPR22), EN50082-1 (IEC801-2:1991, IEC801-3:1984, IEC801-4:1994) and EN60950. The use of shielded cables for connection of the monitor to the card is required to meet EC requirements.

DOC Compliance Statement

Remark for;

MGA-IMP+/P series and MGA-IMP+/P/220 at video resolutions up to 1600 × 1200 with 66Hz refresh;
MGA-IMP+/P4 series (FCC ID: ID7055301) at a video resolution up to 1600 x 1200 with 72 Hz refresh;
MGA-IMP+/A series (FCC ID: ID7055501) at a video resolution up to 1600 x 1200 with 66 Hz refresh;
MGA-IMP/LTE/V series (FCC ID: ID7050301) at video resolution up to 1280 x 1024 with 76 Hz refresh

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian

Department of Communications.

Le présent appareil numérique n'émet pas de bruit radioélectriques dépassant les limites applicables aux appareils numériques de Classe B prescrites dans le Réglement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

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This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruit radioélectriques dépassant les limites applicables aux appareils numériques de Classe A prescrites dans le Réglement sur le brouillage radioélectrique édicté par le Ministère des Communications du Canada.

VCCI Compliance Statement

Remark for: MGA-IMP+/P4 series at a video resolution up to 1600 x 1200 with 72 Hz refresh;

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取扱説明書に従って正しい取り扱いをして下さい。

This equipment is in the 2nd Class category (information equipment to be used in a residential area or an adjacent area thereto) and conforms to the standards set by the Voluntary Control Council For Interference by Information Technology Equipment aimed at preventing radio interference in such residential area.

When used near a radio or TV receiver, it may become the cause of radio interference.

Read the instructions for correct handling.

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Chapter 1: Introduction

What MGA is All About

Features

You made a wise investment when you purchased your MGA (Matrox Graphics Architecture) board. This board takes advantage of our new MGA 64-bit graphics engine technology, which provides you with the fastest graphics and video acceleration. All MGA boards are 100% VGA-compatible while providing many additional features and a high speed, high-resolution, flicker-free display.

Bus architecture
This MGA Impression Plus board is designed for any computer that utilizes the PCI bus architecture and can provide a 32-bit bus connector for the board. This includes many 486 and Pentium systems.

There are three MGA Impression PCI models:

■ Impression Lite (MGA-IMP /LTE): 2MB, not upgradeable to 4 MB, up to 1280×1024 resolution, limited 3D capabilities.

■ Impression Plus (MGA - IMP+/P): 2 MB upgradable to 4 MB, up to 1600×1200 resolution.

■ Impression Plus /220MHz (MGA - IMP+/P/220): 2MB, upgradable to 4 MB, with 85 Hz refresh rate at 1600×1200.

Drivers and utilities
We provide PowerDrivers for Windows 3.1 and Windows for Workgroups, AutoCAD (DOS) Releases 11 and 12, AutoCAD 12 for Windows, and MicroStation.

Drivers for Windows NT and OS/2 PM are also available, either on a separate diskette or on the SuperPack CD-ROM, depending on what version of the CD-ROM you receive.

SuperPack
A CD-ROM disk is included containing 3D games for the MGA and an on-line manual that can be loaded on to your hard disk (requires about 7 megabytes (MB) of disk space) and run from there.

We also provide utilities to enhance the power of your MGA. The available features are listed below:

- **High resolution:** Display resolutions from 640×480 to 1600×1200 are available.

- **Color depth:** Choose 8-bits per pixel (256 colors), 16-bits per pixel (65,536 colors), or photo-realistic 24-bits per pixel (16.7 million colors) at resolutions up to 1280×1024 (Packed Pixel mode).

- **3D hardware acceleration:** The Impression Plus provides hardware accelerated real-time 3D rendering in AutoCAD and MicroStation PC, with Gouraud shading at resolutions up to 1152×882.

- **Display memory:** MGA Impression Plus is available with 2 or 4 MB of VRAM.

- **VESA compatibility:** By loading our *mgavesa.com* TSR program, you can run many programs and games that utilize VESA standard (version 1.2) Super VGA display modes.

- **MGA Control Panel:** This Windows 3.1x application was designed to provide you with easy access to the PowerDesk features of your MGA Windows display driver.

- **Instant ModeSWITCH:** Now you can change your Windows display resolution and color depth 'on the fly'.

- **PowerDesk:** Includes the powerful features of your MGA Windows display drivers including virtual Desktop, PixelTOUCH, CenterPOPUP, CenterWINDOW, MaxVIEW, PanLOCK, and Cursor Color.

- **Quick Access menu:** This repositionable iconic menu gives you instant access to MGA's hotkey features.

- **QCDP:** MGA's Quality Color Dithering Process true-color emulation can be used to achieve near true-color image quality in 8 and 15-bit modes (in ModeSWITCH), at resolutions up to 1600×1200.

- **3D Screen Savers:** A screen saver that utilizes the 3D hardware acceleration of MGA, also includes Display Power Management Signaling (DPMS), which utilizes a hardware mechanism for controlling the power consumption of any VESA DPMS compliant monitor.

- **Monitor selection program:** Using this program, you can maximize the performance of your monitor and MGA board through interactive testing of color depths, resolutions, and refresh rates from within Windows.

- **DynaView for AutoCAD under DOS:** This custom driver for AutoCAD Release 11 and 12 runs in Protected Mode and is fully compatible with ADI 4.2. DynaView offers high resolution, display list operation with dynamic Bird's Eye and Spy Glass views, customizable menus, pop-up windows, and real-time 3D. This driver can be used as a display driver for and 3D Studio version 2.0 and 3.0.

- **AutoCAD for Windows driver:** This custom driver for AutoCAD for Windows offers direct board access, bypassing Windows GDI, and giving you even faster redraws and zooms. This driver includes the Matrox Viewer, which provides access to a full set of extra commands including real-time Spy Glass and Matrox Zoom Dynamic.

Display information

The first set of tables on the following pages show the maximum vertical refresh rates supported by each of the available MGA resolutions. The subsequent tables show, for each MGA board, the available display resolutions, color depths, and maximum Windows Desktop resolutions.

A blank space indicates an unavailable combination. Not all possible frequencies are supported by the MGA monitor file. Additional frequencies are being added regularly. See the *mga.mon* file for a complete listing of all frequencies. The tables starting on page 1-5 indicate which resolutions and colors are available with 2MB and with 4MB of memory.

Maximum vertical refresh rates

The MGA - IMP +/P, MGA-IMP+/P4, and MGA-IMP+/P/LTE			
Resolution	**8-bit color**	**16-bit color**	**24-bit color**
640 × 480	120 Hz	120 Hz	120 Hz
800 × 600	120 Hz	120 Hz	120 Hz
1024 × 768	120 Hz	120 Hz	76 Hz[1]
1152 × 882	100 Hz	100 Hz	76 Hz[1]
1280 × 1024	90 Hz	90 Hz[1]	76 Hz[1]
1600 × 1200 [2]	72 Hz	72 Hz[1]	

[1] Requires 4MB memory

[2] Not available on Impression Lite (MGA-IMP+/P/LTE).

The MGA - IMP + /A and MGA-IMP+/V			
Resolution	**8-bit color**	**16-bit color**	**24-bit color**
640 × 480	120 Hz	120 Hz	120 Hz
800 × 600	120 Hz	120 Hz	120 Hz
1024 × 768	120 Hz	120 Hz	76 Hz[1]
1152 × 882	100 Hz	100 Hz	76 Hz[1]
1280 × 1024	90 Hz	90 Hz[1]	76 Hz[1]
1600 × 1200	66 Hz	66 Hz[1]	

The MGA - IMP /LTE/V			
Resolution	**8-bit color**	**16-bit color**	**24-bit color**
640 × 480	120 Hz	120 Hz	100 Hz
800 × 600	120 Hz	120 Hz	72 Hz
1024 × 768	120 Hz	90 Hz	
1152 × 882	90 Hz	70 Hz	
1280 × 1024	76 Hz		

The MGA - IMP+/P/220, MGA-IMP+/V/220, and MGA-IMP+/A/220			
Resolution	**8-bit color**	**16-bit color**	**24-bit color**
640 × 480	120 Hz	120 Hz	120 Hz
800 × 600	120 Hz	120 Hz	120 Hz
1024 × 768	120 Hz	120 Hz	90 Hz
1152 × 882	120 Hz	120 Hz	76 Hz
1280 × 1024	110 Hz	100 Hz[1]	76 Hz(1)
1600 × 1200	85 Hz	76 Hz[1]	

❖ Note: The MGA IMP+ /220 board is equipped with a DIP switch to control the VGA frequency (31.5 KHz or 46 KHz). See Chapter 2 for more details.

(1) Requires 4MB of RAM

Resolutions and colors

MGA Impression Lite			MGA Impression Plus		
Resolution	**bits/ pixel**	**Max Windows virtual Desktop**	**Resolution**	**bits/ pixel**	**Max Windows virtual Desktop**
640×480	8	1600×1200	640×480	8	1600×1200
	16	1152×882		16	1152×882
	24	800×600		24	800×600
800×600	8	1600×1200	800×600	8	1600×1200
	16	1152×882		16	1152×882
	24	800 × 600		24	800 × 600
1024×768	8	1600×1200	1024×768	8	1600×1200
	16	1152×882		16	1152×882
1152×882	8	1600×1200	1152×882	8	1600×1200
	16	1152×882		16	1152×882
1280×1024	8	1600×1200	1280×1024	8	1600×1200
			1600×1200	8	1600×1200

MGA Impression Plus with 4 MB					
Resolution	**bits/ pixel**	**Max Windows virtual Desktop**	**Resolution**	**bits/ pixel**	**Max Windows virtual Desktop**
640×480	8	1600×1200	1152×882	8	1600×1200
	16	1600×1200		16	1600×1200
	24	1152×882		24	1152×882
800×600	8	1600×1200	1280×1024	8	1600×1200
	16	1600×1200		16	1600×1200
	24	1152×882		24	1280×1024
1024×768	8	1600×1200	1600×1200	8	1600×1200
	16	1600×1200		16	1600×1200
	24	1152×882		—	—

3D capabilities

This table lists the 3D capabilities under AutoCAD for Windows and under AutoCAD for DOS for the two memory configurations.

	AutoCAD/DOS	**AutoCAD/Windows**
2 Mb	$640 \times 480 \times 8$ bpp, 16 bpp	$640 \times 480 \times 8$ bpp
	$800 \times 600 \times 8$ bpp, 16 bpp	$800 \times 600 \times 8$ bpp
4 Mb	$640 \times 480 \times 8$ bpp, 16 bpp, 24 bpp	$640 \times 480 \times 8$ bpp, 16 bpp
	$800 \times 600 \times 8$ bpp, 16 bpp, 24 bpp	$800 \times 600 \times 8$ bpp, 16 bpp
	$1024 \times 768 \times 8$ bpp, 16 bpp	$1024 \times 768 \times 8$ bpp
	$1152 \times 882 \times 8$ bpp, 16 bpp	$1152 \times 882 \times 8$ bpp

On the Impression Lite, Gouraud-shaded 3D is not available under Windows. It is available with the AutoCAD for DOS driver, but not for animation commands.

The 3D games included in the SuperPack are fully supported on the Impression Lite.

- File names, manual titles, diskette labels, environment variables, program names, screen prompts, and text you must enter on your keyboard are presented in *italics*. For example: Enter *a:\install*.

- Dialog box options, buttons, title bars and menu options are formatted in a **bold sans serif** font. For example: Select **Edit/Cut**.

- Throughout the manual, ***bold italics*** are used for emphasis.

- When you must press and hold down a key then press another key, this is expressed as (for example) Press Ctrl+C.

- When discussing the AutoCAD driver features, the pick button is the left mouse button.

- In this manual we assume the floppy drive you'll be using is drive A. If you're using another drive, just substitute that drive letter whenever you see 'a:'. This also applies to any references to your CD ROM drive.

- We also assume your hard disk is drive C, so if this isn't the case for you, substitute the letter for your drive whenever you see 'c:'.

- The manual hierarchy is indicated by the style of topic headings, as illustrated following:

SECTION title

Subsection title

Sub-subsection title

Heading title

The **Section**, **Subsection**, and **Sub-subsection** titles are listed in the Contents at the start of the manual.

- *MGA PowerDesk Windows Drivers*: Windows Drivers, Control Panel, Board Information and Monitor Selection programs, MGA DCI driver, *mgavesa, rambios, mga.mon*

- *MGA Windows Supplemental disk*: 3D Screen Saver and sample files with DPMS functions, AutoCAD for Windows, DynaView /3D for Windows, MGA DCI driver.

- *MGA CAD (DOS) Drivers*: DynaView drivers for AutoCAD for DOS and MicroStation 4.0 and 5.0, DOS *setup* program (monitor selection), VGA utilities (*mgavesa, rambios*), *mga.mon*.

- *MGA Windows NT and OS/2 drivers*: (not included if you have the SuperPack CD-ROM version 2 or higher.) MGA Windows NT and OS/2 drivers.
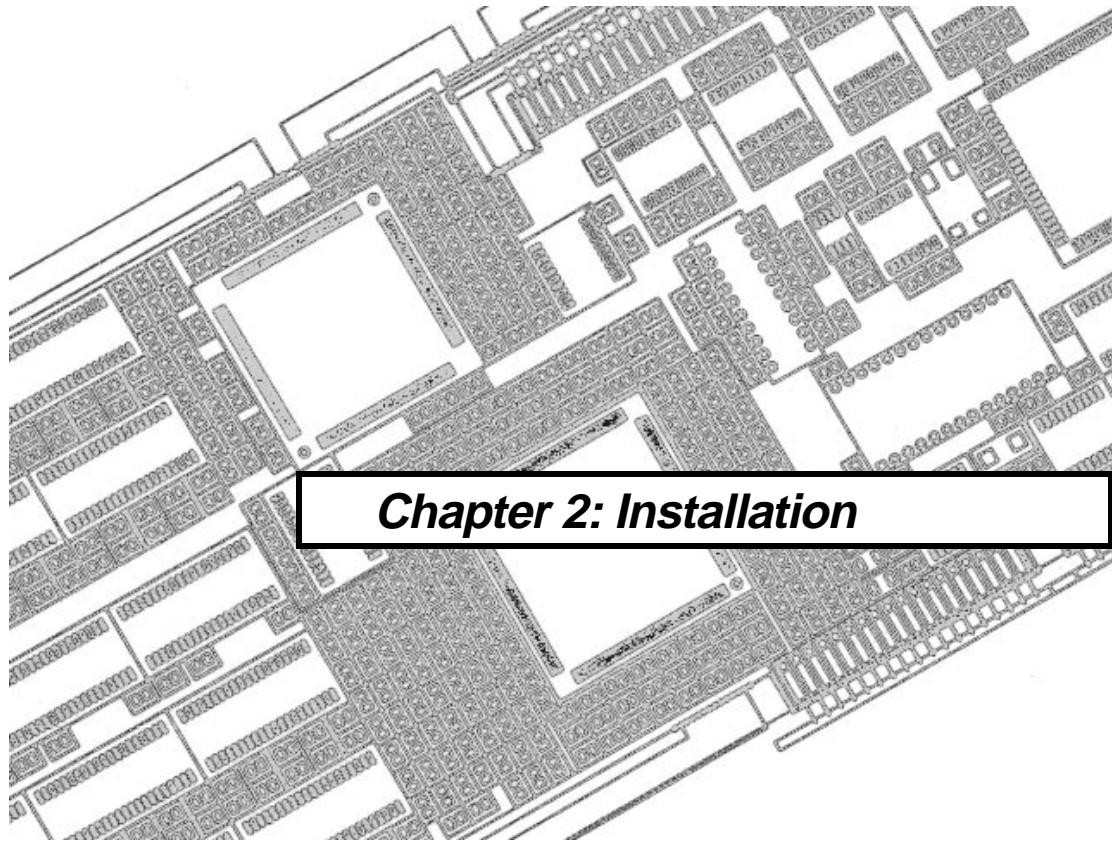
Chapter 2: Installation

Preparations

*B*efore you begin installing your new MGA board, please make backup copies of the distribution diskettes using the DOS *diskcopy* command, and use the backup diskettes during the installation. There are a few things you must have:

- A 486 or Pentium computer that uses a PCI bus architecture.

- 5.5 MBytes of free space on your hard disk for a complete installation.

- A high-resolution analog RGB monitor (multi-sync recommended).

- All the necessary connector cables.

- A flat-head or Philips screwdriver may be necessary.

- MS-DOS 5 or later, or equivalent.

- We've provided drivers for several software programs. If you plan to use any of these drivers, the corresponding programs must already be installed on your system.

Installation overview

- Open your computer, remove your VGA card (if there is one) or disable it.

- Install your MGA board in a free bus slot and close your computer.

- Reboot your system, and load the MGA software.

- Read the rest of the manual, and explore the MGA software.

These topics are discussed in the remainder of this chapter.

Warning! – Static

Δ *Static electricity can severely damage electronic components. To be safe, take the following precautions before you touch your MGA board or the inside of your computer:*

- Avoid wearing wool or polyester, and work in an area that has a relative humidity of at least 50%. Don't let your clothes touch any of the components while you work.

- Turn off the power to all equipment.

- Touch the chassis of your computer (it has to be plugged in) to drain the static electricity from your body before you touch the MGA, or wear a grounding wrist strap, available at many electronics stores.

MGA's on-board VGA

Single screen   When you have an MGA board, you don't need a separate VGA card. If your system has a VGA board, and you intend to use the MGA for both VGA and high resolution display you will have to remove your VGA board. If your system has the VGA built on to the mother board, it will be automatically disabled when the MGA's VGA is enabled. When you install your MGA board for the first time, the board is set for single screen operation. No further adjustments are required.

In a dual-screen configuration, you use another board (and another monitor) for the VGA display, and the MGA board for the output to your high resolution display. A PCI system should automatically disable the VGA on your MGA. The IMP/P/220 and all Rev. 3 PCI boards have a DIP switch to disable the VGA, in case your system does not do it. If you have two MGAs in your computer, the PCI system should automatically disable the VGA one of them.

PCI Automatic Configuration

When you add a piece of hardware to a PCI system, the system BI0S will automatically map it to an available memory space for you. You don't need to configure DIP switches to set the memory map for the board. This is one of the major advantages of a PCI system. If you have an Impression Plus /220 board and a Nanao F780iW or EIZO 780iW monitor, you will have to change one DIP switch to set the DOS refresh rate to 45KHz. This is discussed later.

Take a moment to become familiar with your new MGA board. The following illustration shows you where some of the major components are located on an MGA Impression Plus, /P/220 (the only Rev. 2 board with DIP switches), and Lite boards. Note that on the Impression Lite board, the connectors for the 2MB upgrade module are absent.

PCI bus Revision 2 board

PCI bus Revision 3 board
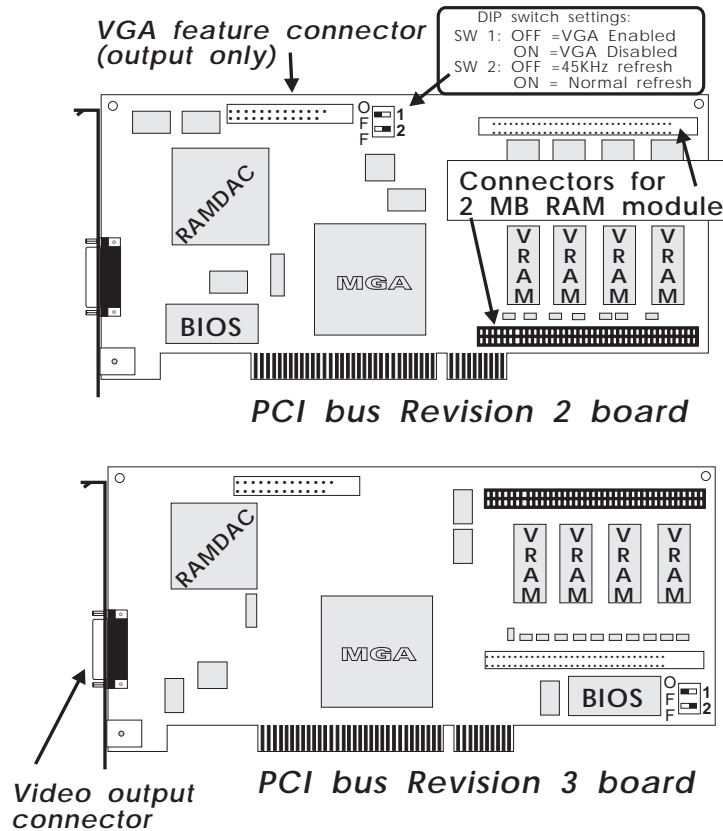
Installing the MGA video RAM upgrade

The diagram following illustrates the optional add-on 2MB RAM module and how to install it. The MGA software will automatically recognize the new memory upgrade.

MGA-MOD /2MB/1   MGA-MOD /2MB   Apply pressure slowly
                                              and evenly

                                         2 MB RAM Module

   RAM Module   RAM Module   MGA Impression Plus
    for Rev 2   for Rev 3
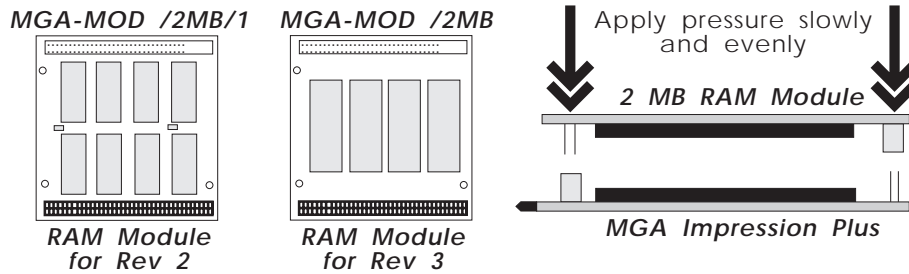
DIP switches on PCI bus boards

The Impression Plus /220 and Impression Lite boards for PCI bus systems have DIP (Dual In-line Package) switches added to:

- Enable /disable the on board VGA (for dual screen)

- Set the VGA boot-up frequency

Switch 1 should not be changed, as the VGA is normally automatically disabled by your system in dual screen configuration.

Switch 2 is intended for monitors such as the Nanao 780iW or EIZO 780iW. These monitors do not support the standard VGA frequency.

On the Rev 2 board (IMP/P/220), these DIP switches are located near the VGA feature connector. On Rev 3 boards, they are located at the lower corner.

Hardware Installation

1. Open your computer

*N*ow you're ready to open up your computer and install your Matrox MGA board as explained below:

- Make sure you've turned off your computer and all peripherals such as the monitor or printer.

- If your system has a VGA board, and you intend to use the MGA for both VGA and high resolution display, this would be a good time to remove your VGA board.

2. Choose a slot

Most PCI bus computers contain a combination of PCI and ISA slots. Usually the PCI slots are made with plastic of a contrasting color, and they are shorter. When a PCI board is placed in its slot, the components on the board are facing the in the opposite direction, compared to the other (non PCI) boards in your system.

3. Plug the MGA board in

Remove the expansion slot cover that lines up with the slot that you intend to use. Save the screw to fasten the MGA mounting bracket to the chassis after it's been installed. Making sure you're grounded, pick up the MGA board and orient it with the expansion slot. Push the board in firmly and evenly until you make contact with the computer's bus connector. Verify that the board is aligned correctly, then continue pushing until the board is fully seated in the slot. The screw slot on the MGA's bracket should line up with the screw hole on the back chassis of your system. Replace the screw that secures the MGA's bracket to the computer chassis.

4. Monitor connections

Your MGA works with a variety of VGA and high-resolution monitors. To take full advantage of your MGA board, you need an analog multisync RGB monitor that supports separate vertical and horizontal sync. The MGA board can display all VGA and better resolutions ranging from 640×480 up to 1600×1200, at vertical frequencies ranging from 60 Hz up to 120 Hz. Tables of monitor frequencies necessary for each supported video mode are provided in Chapter 1.

If your monitor has its own built-in video cable (8514-type monitors, for example), simply plug this cable into the 15-pin video output

**Monitor cable
built-in**   connector on your MGA board. Some monitors may have an
'Analog/TTL' switch. For MGA, select 'Analog'. You must also select
'External' sync and '75 ohms' if these options are available.

**Monitor cable
not built-in**   If your monitor has no built-in cable, you'll need a cable that has a
15-pin (Dsub) video connector at one end for the MGA, and the
appropriate connectors for your monitor at the other end. These are often
BNC (Bayonet Nut Connect) or Dsub connectors; refer to your monitor's
instruction manual for more information about your particular monitor.

**Separate
sync**   Our boards require monitors that have separate signal lines for the
horizontal and vertical sync. There are five connections to a monitor that
uses BNC connectors (R, G, B, HSYNC, and VSYNC). The monitor
cable can be purchased from most computer distributors. Some monitors
have an 'Analog/TTL' switch. For MGA, select 'Analog'. You must also
select 'External' sync and '75 ohms', if possible. The diagram below
illustrates these settings.
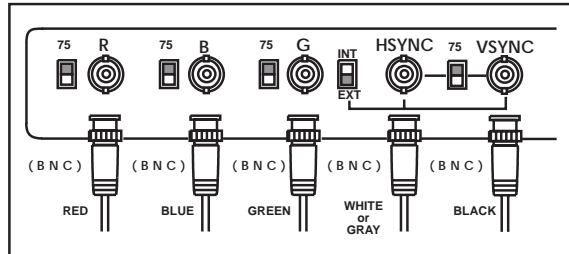
Software Installation

Now you're ready to install the Matrox-supplied software. The supplied software allows your existing programs to take full advantage of the power of your MGA board. Certain default paths are assumed, so if your installation is not standard, just substitute your directory names where appropriate.

Your MGA diskettes contain software utilities, PowerDrivers and applications for Windows 3.1, AutoCAD, MicroStation and more. See the end of Chapter 1 for a complete list of the contents of the disks.

Most of the files are installed under the *MGA* directory; each program in its own subdirectory. You should read any *readme* files that are copied to these subdirectories by the installation programs. The *readme* files may contain last minute information that did not make it into the manual.

Installing Windows 3.1 drivers and MGA PowerDesk tools

The MGA display drivers allow Windows to take full advantage of the MGA board's capabilities. They are easy to install. Start Windows in VGA mode, put the *MGA Windows Drivers and PowerDesk* disk in drive A and follow the steps below:

1. Select **File/Run** from the Program Manager menu and enter *a:\setup* in the **Command Line** box.

2. You will be prompted for the path where Windows is installed, and the path where you would like the MGA PowerDesk software and utilities to be installed. All of the dialog boxes that are presented resemble the following one:

3. Next, the MGA software installation program will run. Bar graphs indicate the progress of the installation throughout. A new Windows group called **MGA PowerDesk** is created.

4. If this is a first time installation the Monitor Selection program will be automatically invoked to let you select an appropriate monitor. Please select one at this point, otherwise the driver may start up in a resolution not supported by your monitor. The Monitor Selection program is covered in detail in Chapter 3.

5. If you are updating one of our older drivers, then the monitor program will not be invoked, but the installation program will ask you if you wish to keep your present *mga.mon* file, in case you have customized the file for a particular monitor. If you have not customized this file, click on **YES** to overwrite it with the new version.

6. The next step is to select a startup display mode for Windows. The dialog box below appears. Choose a combination of one of the available resolutions and pixel depths. You are indicating to the MGA software how it should present Windows the first time you run it. Later, you'll be able to make the same sorts of selections using the MGA Control Panel program.

   ▪ *If you have a fixed sync monitor*, you must be sure to select only the resolution that is supported by your monitor.
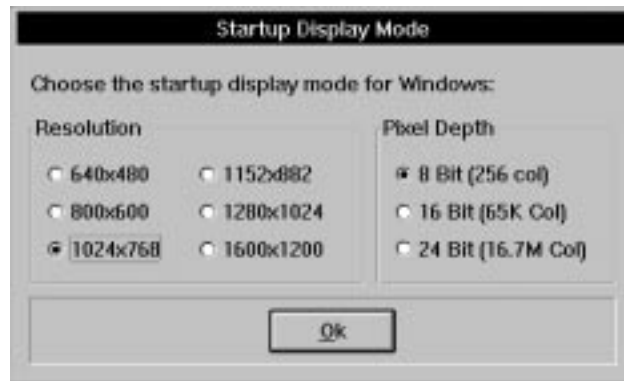
7. After you click on the **OK** button in the **Startup Display Mode** dialog box, the installation program will either reboot your system (in the case of a first-time installation) or reboot Windows (in the case of an

upgrade). Rebooting the system on a first-time installation is essential to set the MGA environmental variable (see below).

An *MGA environment variable* is automatically added to your *autoexec.bat* file by the installation program. Make sure you don't delete the *set mga=c:\mga\setup* line from your *autoexec.bat* file. If you delete this variable setting, your MGA board will lose track of any customized configuration done by the monitor selection program.

MGA PowerDesk group

The **MGA PowerDesk** group window provides you with access to all the Matrox Windows utilities: Board Information, Monitor Selection, MGA Control Panel, and Quick Access. You will also see an icon for the *readme.win file*, which contains any last minute information. You should read this file now. You can resize and position the **MGA PowerDesk** window to your preference. For a complete explanation of each of the PowerDesk programs, refer to Chapter 3.

Installing the MGA DCI driver

The MGA DCI (Display Control Interface) driver is a Microsoft / Intel compliant driver which accelerates new Win G-based games, as well as playback of Video for Windows 1.1. This driver is found on the MGA *Windows Supplementary* disk. Just type *setup* to start the installation program and select *DCI Driver*.

The MGA DCI driver and some upgrade files for *Video for Windows* will be installed in your *\windows\system* directory. You must be using 'DCI-aware' applications in order to have video acceleration. See the *readme.win* file for a list of known DCI-aware applications.

Installing the AutoCAD for Windows driver

The AutoCAD for Windows driver accelerates AutoCAD 12 for Windows significantly. Before installing the driver files you should have our Windows 3.1 drivers and AutoCAD for Windows installed and running. This driver is found on the MGA *Windows Supplementary* disk.

Just type *setup* to start the installation program.

1. You will be prompted for the installation path. The default path is *c:\acadwin*.

2. You will be prompted for the path to Windows 3.1 on your system. The default path is *c:\windows*.

3. After a few moments, you will see a message stating that the installation is completed. See the *MGA CAD Drivers Guide* for information on configuring AutoCAD to use the MGA driver.

Installing MGA DynaView / 3D for Windows

This selection installs an AutoCAD 12 for Windows ADS application to render 3D models, and a 3D Viewer to manipulate your models in real-time. This driver is found on the MGA *Windows Supplementary* disk. Just type *setup* to start the installation program. Before installing this program you should have our Windows 3.1 drivers installed and running.

1. You will be prompted for the installation path. The default path is *c:\mga\dyna3dw*.

2. You will be prompted for the path to Windows 3.1 on your system. The default path is *c:\windows*.

3. After a few moments, a message will state that the installation is completed. The installation adds an icon for the 3D Viewer and the DynaView/3D for Windows *readme* file in the MGA PowerDesk group.

4. Start the **MGA Control Panel** program, *you must use the ModeSWITCH driver* (the **use ModeSWITCH** checkbox), and enable 3D for the display mode you want to use. (You may have to restart Windows.)

5. See the *MGA CAD Drivers Guide* for details on using the DynaView / 3D Viewer program and the DynaView / 3D ADS program.

MGA 3D Screen Saver for Windows

The MGA 3D Screen Saver allows you to have AutoCAD 3D drawings presented as a screen saver display. This program is found on the MGA *Windows Supplementary* disk. Just type *setup* to start the installation program. We provide some sample drawings. If you have AutoCAD 12 for Windows, you can also use your own drawings with the screen saver.

Enabling and configuring the screen saver

To activate the screen saver you must run Windows Control Panel and select *MGA 3D Screen Saver* from the list of available screen savers. This is shown in the diagram below.

Set the idle waiting time in the **Delay** box of the Windows Desktop **Screen Saver** panel. You can click on the box and enter the number (of minutes) or use the up and down arrows to adjust the value.
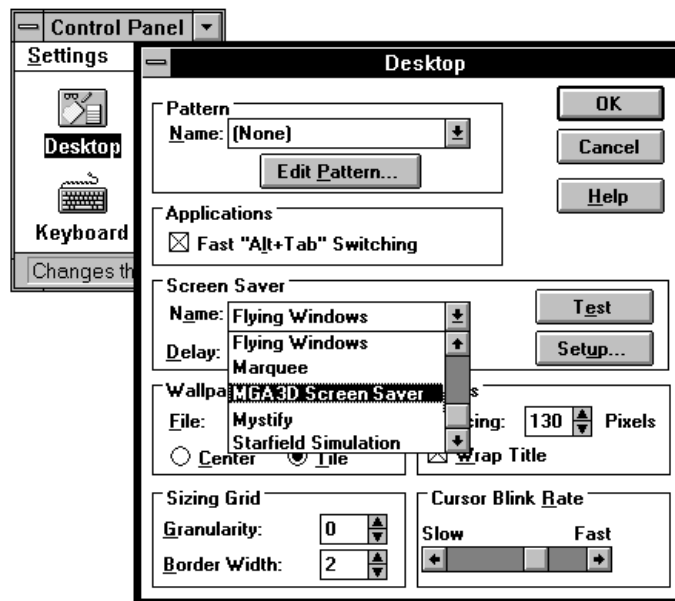
To configure the screen saver click on the **Setup** button. The **MGA 3D Screen Saver Setup** dialog box (shown below) allows you to select the object you want to display and the appearance of this object. Your choice of appearance may be limited by the model of board you have.
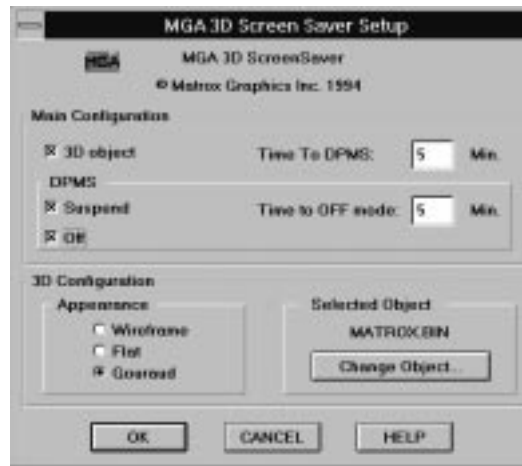
Main configuration panel

In the **Main Configuration** panel you can select to display a 3D object and enable the DPMS power saving feature.

The **Time To DPMS** is the time interval that the 3D object will be displayed before a DPMS-compliant monitor will shut down to save electricity. You must enable a DPMS option, (**Suspend** or **OFF**) before you can enter a value in this box.

The **Time To OFF mode** is the time that will be spent in **Suspend** mode before your monitor goes into **OFF** mode.

If you don't select any options, the screen saver will default to a floating MGA bitmap on the screen. The floating bitmap screen saver will also appear if you selected a 3D object which is not supported or if you are not running an MGA driver.

For more information on setting the DPMS options, see 'DPMS for your monitor' later on in this chapter.

3D configuration panel

The **3D Configuration** panel lets you select the **Object** you want to see animated as well as its **Appearance** (shading).

Selected Object

When you select the **3D object** checkbox, the **3D Configuration** panel is enabled as well. Click on the **Change Object...** button to select a new 3D object.

Appearance

There are three types of shading available — **Wireframe**, **Flat**, and **Gouraud**:

Wireframe: The object is shown with lines only. No light is applied. The AutoCAD color is used for the object's color. Even very large objects are fast to redraw.

Flat: The object is shown with flat faces (a sphere will appear blocky). It takes a bit longer (than Wireframe) to redraw a flat shaded object.

Gouraud: The object is shown with Gouraud shading, (a sphere will have a smooth rounded look). This method has the slowest redraw time.

To select another object, click on **Change Object** and select a file with the extension *.bin*, then click on **Open** and **OK**. You can click on the **Test** button in the **Desktop** dialog box to preview your selection. We provide some sample files. If you select the wrong type of file you will get a floating MGA icon in place of your selection.

All Impression Plus boards support 3D hardware acceleration. On a 2 MB board, the screen saver will operate in 800×600. On a 4 MB board, it can go up to 1152×882, if your monitor supports this resolution. On the Impression Lite board only Wireframe appearance is supported. With the Windows VGA driver, you will see a 2D floating MGA icon instead.

Creating objects for the screen saver

The 3D Screen Saver displays objects that have been saved as *.bin* files using the DynaView/3D for Windows software. If you have AutoCAD 12 for Windows, you can create your own objects. See the

section entitled 'Creating a *.bin* file' in the DynaView 3D for Windows chapter of the *MGA CAD Drivers Guide*.

DPMS for your monitor

Introduction   DPMS (Display Power Management Signaling) is a VESA-standard program which utilizes a hardware mechanism for controlling the power consumption of *any VESA DPMS compliant monitor*. The DPMS software is incorporated into the MGA 3D Screen Saver.

When the system detects that your monitor has not been accessed by your graphics adapter after a certain interval of time, it shuts down your monitor (to a specified level) until you press a key or move the mouse. In this way you can reduce the amount of power consumed by a system while it is idle, and prevent screen burn-in on your monitor. (Screen burn-in is caused when the same image is displayed on your monitor for an extended period of time.)

Δ   *Important: This program is for use only with VESA DPMS compliant monitors. Do not attempt to use it for any other type of monitors. You could damage a monitor that is not VESA DPMS compliant.*

DPMS under Windows

As stated earlier, the DPMS software is automatically installed on your system as part of the MGA Screen Saver package. DPMS under Windows is handled through the MGA VDD (Virtual Display Driver).

Supported DPMS levels

MGA DPMS allows you to choose among varying levels of shutdown for your monitor:

- DPMS **Suspend** mode: This mode achieves substantial power savings and takes the shortest time to recover. The monitor enters Suspend mode after the time interval set in the **Time to DPMS** box.

- DPMS **OFF** mode: This mode achieves maximum power savings, but may require the longest recovery time, depending on the type of monitor used. Recovery from this state may require you to manually turn on the monitor. See your monitor documentation for

more details. The monitor enters **Off** mode after the time interval set in the **Time to DPMS** box or after the interval set in the **Time to OFF mode** box (see below).

- **Combining modes**: You can set the screen saver to (a) wait a few minutes, display the 3D object for a set interval, then (b) go into **DPMS Suspend** mode for a set interval, then (c) go into **DPMS OFF** mode. This is done by enabling **3D Object** and *both* DPMS modes.

  When you enable both DPMS modes, the monitor will first go into **Suspend** mode after the interval specified in the **Time To DPMS** box and then go into **OFF** mode after the interval specified in the **Time to OFF mode**.

DPMS under DOS

If your computer offers DPMS in its configuration, or you have a DOS program for DPMS control, our ROM BIOS will support it.

Windows NT and OS2 Drivers

Installing the Windows NT MGA display driver

The MGA Windows NT 3.5 Display Driver supports 8-bit (256 colors), 16-bit (64K colors), and 24-bit (16M colors) display modes under Windows NT, in resolutions ranging from 640×480 to 1600×1200. This driver supports all MGA Ultima, Impression and Impression Lite models. It also supports dual-MGA configurations.

We recommend that no board be mapped at 0xAC000 in a multi-board setup. The general procedure for changing a display driver as follows:

1. Open the **Control Panel/Display** applet.

2. Click on the **Change Display Type...** button.

3. In the **Display Type** dialog box, click on the **Change...** button.

4. In the **Select Device** dialog box, click on the **Other...** button.

5. In the **Install From Disk** dialog box, type the location of the Matrox MGA installation files (for example: *a:\winnt*).

6. From the displayed list, select a resolution and pixel depth that are supported by your board and monitor, then select **Install**. Refer to your *MGA Owner's Manual* to determine the supported resolution and pixel depth combinations.

7. Answer **Yes** in the **Installing the Driver** dialog box.

8. If the MGA drivers are already installed on your system, you will be prompted to choose between the currently-installed drivers or new ones. If you select **New**, you will be prompted for the path to the new driver files. By default, this is the path that was entered in the **Install From Disk** dialog box.

9. In the **Display Settings Change** dialog box, you should select **Restart Now** in order for the new settings to take effect.

If your system does not re-boot at the expected resolution, it is probable that your board does not support the selected resolution and /or pixel depth combination. Open the **Control Panel/Display** applet again and click on the **List All Modes...** button to obtain a list of all the modes that are available for your particular board. You can also experiment with the **Color Palette** and **Desktop Area** controls to select a new mode. Use the **Test** button to ensure that the new mode is supported by your monitor.

Changing Resolutions

Whenever you want to change the display resolution, run the **Control Panel/ Display** applet. The available modes can be displayed via the **List All Modes...** button.

The current version of the drivers supports multiple MGA boards, enabling use of a single large desktop which spans multiple monitors. The multi-board modes that are supported by your hardware configuration can be selected and tested (as with any regular mode) using the **Display** applet. We recommend that none of the boards be mapped at AC000 in a multi-board setup.

Monitor Customization

By default, the display driver assumes that you have a 60 Hz monitor. If your monitor is capable of higher refresh rates, you should run the **Control Panel/MGA Monitor** applet and select a different monitor. The **MGA Monitor** applet should have been copied by the Windows NT setup program into your *SystemRoot\SYSTEM32* subdirectory when the MGA drivers were installed. To customize your monitor:

1. Open the **Control Panel/MGA Monitor** applet.

2. From the list of monitors, select the appropriate monitor, or one whose maximum refresh rate matches the one you are using. An *mga.inf* file will be created in the *SystemRoot\SYSTEM32* subdirectory.

3. To ensure that the newly-created *mga.inf* file is correct for your monitor:

   ❑ From **Control Panel**, start the **Display** applet.

   ❑ Select the resolution and pixel depth that you wish to test.

   ❑ Click on the **Test** button. The test will use the video parameters that are appropriate for the monitor selected in **MGA Monitor**.

   ❑ If your monitor does not display a stable test screen, then the parameters set by *mga.inf* are not suitable for your monitor. Click on the **Cancel** button to close the **Display** applet, run **MGA Monitor** again to select another monitor from the list, and repeat the **Display** test.

4. When the monitor timings are satisfactory, restart Windows NT in order for the new *mga.inf* settings to take effect.

No resolution higher than the set limit will appear in the **Display** applet mode list. Deleting *mga.inf* will remove all monitor limits to the resolution, although the refresh rate will default to 60Hz.

In a multi-board configuration, the *mga.inf* settings will affect all monitors. We recommend that the monitor you select in **MGA Monitor** be compatible with the least-capable monitor in your system. For more information about this driver, refer to the *readme.nt* file on the distribution diskette.

This MGA OS/2 PM driver supports 8-bit (256 colors), 16-bit (64K colors), and 24-bit (16M colors) display modes under OS/2 2.1 up to 'Warp', in resolutions ranging from 640×480 to 1600×1200. The driver works on all MGA Ultima and Impression models. It also includes a Seamless Windows driver.

To install the software, follow the procedure below:

1. If you are installing this driver for the first time, have the MGA board installed and boot OS/2. Select VGA as the display driver.

2. If you downloaded the driver from the Matrox BBS, use the DOS *label* command to label your floppy as OS/2.

3. Using the **Command Prompts** folder of OS/2, open an OS/2 Window or Full Screen session.

4. Insert the driver disk in a floppy drive (if you are installing from the floppy disk) or insert the CD-ROM in its drive bay.

5. Make the CD-ROM or floppy disk the active drive and type *<srcpath>\install*,

   where *<srcpath>*: is the path which contains the MGA PM drivers.
   Examples: *a:\install* (diskette with OS/2 only)
                        a:\os2\install (diskette with OS/2 and Windows NT)
                        d:\os2\install (CD-ROM)

6. You will see a dialog box in which you can select the **Primary Display**. Choose *Matrox MGA Series*. You may have to change the source drive if you are not installing from drive A.

7. The installation program will then proceed with the installation. When it is complete, you will have to shut down your system in order for the MGA driver to take effect.

If you are installing this driver for the first time, or over a version older than 2.00, OS/2 will restart in the default MGA resolution (640 x 480 x 256). It is therefore advisable to select the desired resolution immediately before rebooting, by means of the **OS/2 System Setup**

folder, as explained in the next section.

Driver Configuration

To change the driver mode (resolution or pixel depth), use the following procedure:

1. Click the right button on the PM desktop background.

2. Select **System Setup** to open the system setup folder.

3. Double-click on the **System** icon.

4. Select the **Screen** tab and choose the resolution/pixel depth.

You will need to reboot the system to see the change take effect.

Monitor Customization

By default, the driver assumes that you have a monitor which supports all resolutions available to your board at a 60Hz refresh rate (non-interlaced). If you have a monitor that is capable of refresh rates higher than 60Hz, you can perform monitor file customization with the help of the *mgamon* program. This program creates a file called *mga.inf*, which contains the appropriate video parameters for your monitor. The *mga.inf* file is read by the MGA display driver when OS/2 boots.

The *mgamon* program is located in the *\mga\os2* directory. It is a DOS program, so it must be run in a DOS session (either windowed or full screen).

To run *mgamon*, open a DOS session:

1. Enter: *cd\mga\os2*
                 mgamon

2. Select a monitor and exit the program.

You must shut down OS/2 and reboot your computer for the changes to take effect. For more information about this driver, refer to the *readme.os2* file on the distribution diskette. Topics covered include uninstalling the driver, dual-boot limitations, and BIOS-related issues for older MGA graphics accelerators.

VESA compatibility

Standard VGA modes and VESA modes

Supported VGA modes

Through the years, various video standards have been defined for PCs. Each new graphics adapter brought improved BIOS functions and video output (better resolution, more colors). In 1987, the VGA (Video Graphics Array) was developed offering many modes, the 'best' of which was 640×480, with 16 colors. MGA supports all the standard VGA modes, which are shown below. You do not need to run *mgavesa* to access these modes in DOS.

Standard VGA Modes

Mode #	Resolution	Colors	Mode Type
0,1	360 × 400	16 colors	Text
2,3	720 × 400	16 colors	Text
7	720 × 400	Monochrome	Text
4,5	320 × 200	4 of 262, 144	Graphics
6	640 × 200	2 colors	Graphics
13	320 × 200	16 colors	Graphics
14	640 × 200	16 colors	Graphics
15	640 × 350	Monochrome	Graphics
16	640 × 350	16 colors	Graphics
17	640 × 480	2 colors	Graphics
18	640 × 480	16 colors	Graphics
19	320 × 200	256 colors	Graphics

In 1989, the VESA (Video Electronics Standards Association) standard was developed. VESA modes are an extension of the VGA modes. The goal of the VESA standard was to provide a common software interface to the *enhanced modes* that individual hardware manufacturers were adding to their VGA cards. The existence of a common software interface allows program developers to write their software for that standard interface, without worrying how individual hardware manufacturers implement these enhanced modes.

Many DOS games and graphics programs on the market use these 'Super VGA' enhanced modes to obtain higher resolution and more colors. Some of these programs are custom designed to work only on specific graphics cards. Most 'Super VGA' programs are written to comply with the established VESA standard. They will work with any graphics board as long as the appropriate VESA device driver is loaded. This is why we provide *mgavesa.com*. If your game or word processor runs in a Super VGA mode, and **adheres to the VESA standard**, just run *mgavesa.com* before you start that program. This program can only be loaded into memory if VGA is enabled on the MGA board.

MGAVESA supported modes

If you installed the Windows drivers or if you installed 'Utilities and Setup Program' from the AutoCAD disk, the *mgavesa.com* program was copied to *c:\mga\setup*.
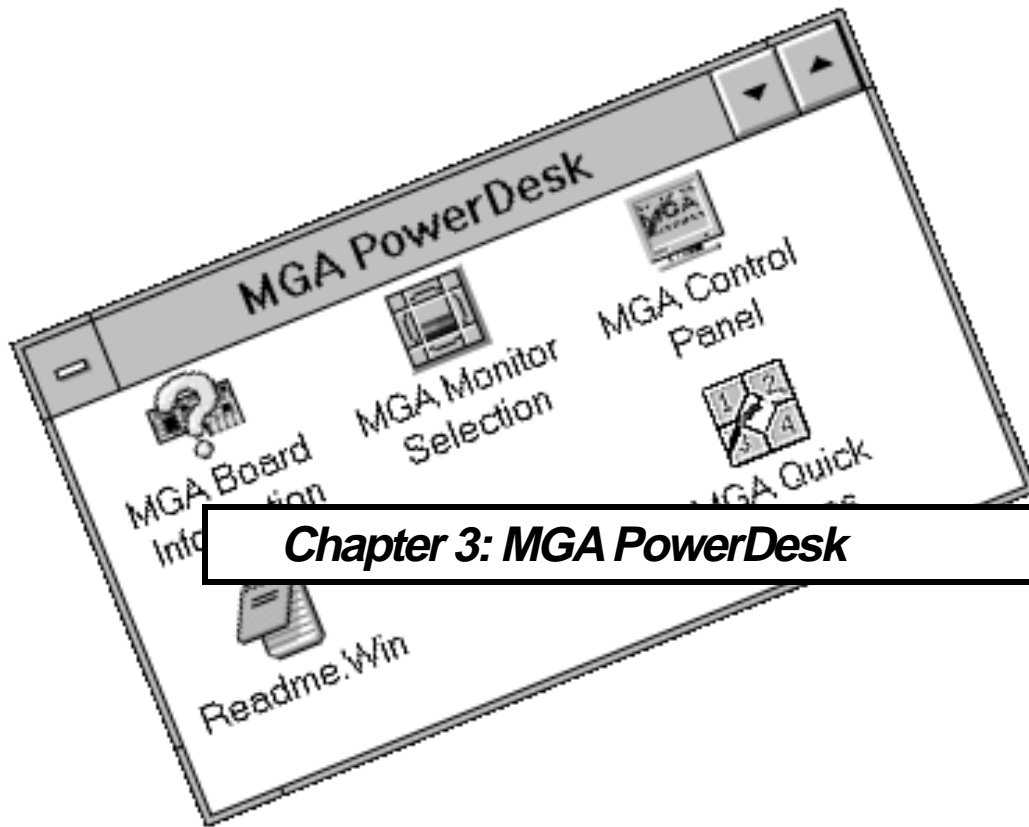
This is a TSR (Terminate and Stay Resident) program that remains active in the background. It enables VESA compatibility (according to Standards version 1.2) for six Super VGA display modes. If you regularly use VESA-compatible programs, you should add the following line to your *autoexec.bat* file:

c:\mga\setup\mgavesa

The supported VESA modes are listed on the following page.

VESA Standard Modes

Mode #	Resolution	Colors	Mode Type
100 h	640×400	256	Graphics
101 h	640×480	256	Graphics
102 h	800×600	16	Graphics
103 h	800×600	256	Graphics
104 h	1024×768	16	Graphics
105 h	1024×768	256	Graphics

MGA PowerDesk

MGA Control
Panel

MGA Monitor
Selection

MGA Board
Information

MGA Quick

Chapter 3: MGA PowerDesk

Readme.Win

Introduction

The MGA PowerDesk group window provides you with access to the following four programs:

❏ MGA Board Information: A pop-up screen that displays information about your MGA board and software configuration.

❏ MGA Monitor Selection: A program that permits you to select timing parameters that match the capability of your monitor and view a test screen of each display mode.

❏ MGA Control Panel: The program that gives you control over all aspects of your MGA's Windows display. If you click your mouse right button on or near a control, you will see a short explanation of that control.

❏ MGA Quick Access: A small dialog box that lets you quickly access some of the major features of the MGA Control Panel. It can be set to always appear on top of your Windows display.
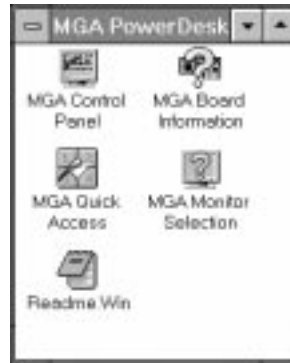
❖ Double-click on the Notepad icon to see the *readme.win* file, which contains any last minute information. Please read this file.

Note that the MGA Control Panel icon is displayed at the bottom of the screen to indicate your current display mode, Desktop size, and zoom factor. In this example the current mode is (1024×768, 8 bit color), as well as the size of the Desktop (1280×1024) and your current zoom setting (z1 means $\times 1$ zoom). The icon can be used to launch MGA Control Panel.

MGA Board Information

*D*ouble-click on the MGA Board Information icon for information on your MGA Board type, amount of VRAM, 3D capabilities, memory mapping, and the name of the monitor file your driver is using. You should run this program to obtain information before calling our Customer Support group.

MGA Monitor Selection program

Selecting a monitor

*T*he MGA Monitor Selection utility identifies your monitor to the MGA hardware, and tests the display. Double-click on the **MGA Monitor Selection** icon in the **MGA PowerDesk** group Window to start the program. Click on the **Monitor Selection** button, then highlight your monitor from the list. If your particular monitor is not listed by name, highlight the generic category that it falls into. Click on **OK**. (You can also delete monitors from the list with the Del key.)

Testing your monitor

Click on the **Test** button. The **Monitor Test** dialog box appears:

In the **Resolution** and **Pixel Depth** panels, select the mode that you wish to test. When you click on **Test**, a test screen consisting of a grid and color bars will appear. Press the Esc key to return to the dialog box.

MGA Control Panel

The MGA Control Panel provides you with easy access to the many features of your MGA Windows 3.1 drivers.
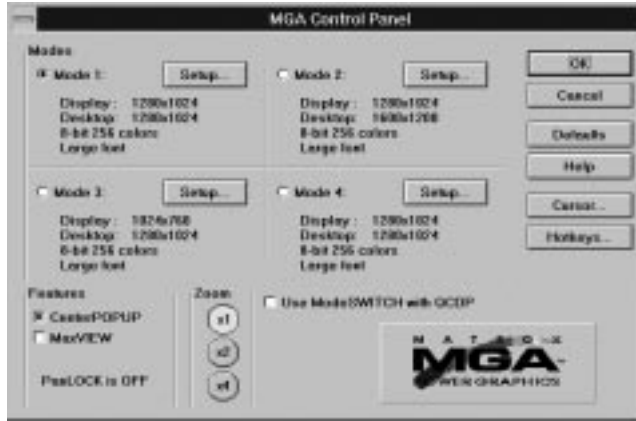
Running MGA Control Panel

To run MGA Control Panel just double-click on its icon in the **MGA PowerDesk** group window or hold down the Alt key and press and release the Tab key until you see the MGA icon, then release the Alt key. After you have made the changes you want, click on the **OK** button to confirm, and the Control Panel program will close. Click on the **Cancel** button to exit without saving any changes.

MGA Control Panel dialog box

The MGA Control Panel dialog box contains panels and buttons to:

- Control your display Modes (you can set up four different modes for instant access). Adjustments include screen resolution, number of colors, font size, desktop area (which can be larger than the screen area.)

- Enable/disable ModeSwitch (changes the screen resolution 'on the fly' without exiting Windows.)

- ■ Select zoom factors of ×1, ×2, and ×4.

- ■ Change the cursor color

- ■ Enable certain display features (CenterPOPUP, MaxVIEW)

- ■ Configure Hotkeys for PanLOCK, CenterPOPUP, MaxVIEW, etc.

Selecting Modes

The Control Panel keeps track of four modes, a mode being the combination of display resolution, virtual desktop, pixel depth, font size, and 3D settings. To select a pre-set mode, click on the appropriate **Mode** option button and then click on **OK**. If you are not using the Mode SWITCH driver, the program will inform you that Windows must be restarted.

At this point you may select **Continue** to restart Windows manually at a later time or **Restart Windows** to restart Windows automatically and immediately.

<u>*Configuring modes*</u>

To configure any of the four modes, click on the appropriate **Setup** button. You will be presented with the **Mode Setup** dialog box:
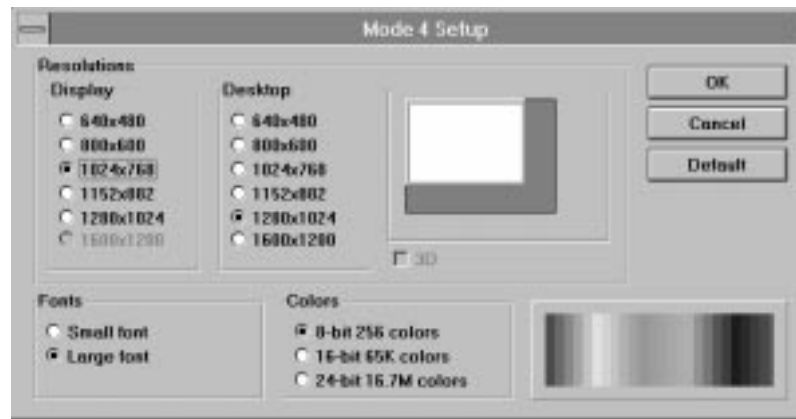
The different settings of this dialog box are inter-dependent; that is, the display and desktop resolutions available depend on the desired number of colors. The list of available resolutions also depends on the

monitor you have selected. Refer to Chapter 1 for the list of the modes available for your particular MGA board.

Fonts

The small font is the default font for the lower resolutions (640×480 and 800×600). Large font is recommended for higher resolutions.

Desktop

The **Desktop** is an additional feature of the PowerDesk which allows you to set up a virtual Desktop area that's larger than the actual screen display. For example, this feature lets you set up a Windows **Desktop** environment that occupies an area of up to 1600×1200 pixels, but view it at a Display size of 1024×768. When you want to see a part of the screen that's hidden from view (but still active in the **Desktop** area), just touch one of the screen edges with the mouse cursor to pan there (see 'Using the Desktop features').

The **Desktop** allows you to, for example:

- View a two-page side-by-side document

- Open a large, fully maximized spreadsheet and view smaller blocks of cells while avoiding long redraw delays.

The available **Desktop** sizes consist of all the resolutions greater than the display resolution, up to the maximum resolution available for the current pixel depth.

The **Mode Setup** dialog box contains a 'preview window' which shows you what portion of the **Desktop** will be available as the on-screen Display. You can select your *display size* in the preview window by clicking on the *left mouse button* and dragging the white screen to the desired size. You can select your *desktop size* in the preview window by clicking on the *right mouse button* and dragging the dark grey area (if there is one) around the white screen to the desired size.

3D check box

The **3D** check box will enable Gouraud shading for Windows applications that make use of the 3D hardware capabilities of your MGA. (For example, the DynaView /3D Viewer application.) Note that the

Matrox 3D Screen saver automatically switches to the optimal 3D mode, so you do not need to enable 3D here just to use the screen saver.

3D is selectable only when using the ModeSWITCH feature of the MGA Windows drivers. Note that since a portion of the VRAM is used for the 'Z-buffer' and 'double-buffering', the number of resolutions and pixel depths available is reduced while 3D is enabled.

Defaults

The **Defaults** button returns the current mode to the default settings. See page 3-12 for the table of default settings.

Using ModeSWITCH

ModeSWITCH introduces an alternate method of controlling the display. The ModeSWITCH feature uses a special Windows driver that lets you toggle between various resolutions and pixel depths 'on-the fly'.

ModeSWITCH can save you a great deal of time when you switch between, for example, a high-resolution 8-bit color display and a medium resolution 24-bit color mode. Other advantages are the fact that display switching is immediate, and that all your applications can remain open, because Windows isn't actually restarted.

After clicking on the **Use ModeSWITCH** check box and restarting Windows, you can switch between the four modes without restarting Windows each time. ***You will have to restart Windows only when you enable or disable ModeSWITCH***. Note that Windows will always start up with the last mode you were using.

Reconfigure on the fly   You can also change the configuration of a mode while you're running ModeSWITCH, and use it immediately.

You can switch between display modes by:

- Clicking on the option button for a mode

- Using the Hotkey for that mode

- Using the Quick Access panel to select a mode

All the modes in ModeSWITCH, except for 24-bit color, will use the

Colors

QCDP feature. This feature uses a hardware dithering process which emulates true color (24-bit, 16.7 million colors) using only 8 or 15 bits of color. This allows greater selection of resolutions than the normal 24-bit display driver. The drawback lies in speed of operation, which will be slower than the standard 8-bit driver, but about the same as with the 24-bit driver.

Fonts

The ModeSWITCH driver can use the **Small** or **Large** font, but the same font will be used for all resolutions. The **Small** font will be selected for all modes if one of your ModeSWITCH resolutions uses it. Using the **Large** font in 640×480 resolution is not recommended.

ModeSWITCH Hotkeys

There are default hotkeys for the four modes (they are not enabled by default), but you can click on the **Hotkeys...** button to choose different hotkeys to access the four available modes. Your Windows display will instantly switch to the predefined display settings for a mode when you press the hotkeys for that mode. Note that the hotkeys for ModeSWITCH do not work while you are using a DOS window or full-screen DOS.

Using the Desktop features

MGA PowerDesk includes a collection of features which can be described as 'Desktop features'. These include:

- Desktop
- PixelTOUCH
- PanLOCK
- CenterPOPUP
- MaxVIEW
- CenterWINDOW

Virtual Desktop

The **Desktop** feature is accessible through the **Mode Setup** dialog box, and requires Windows to be restarted after a change, unless ModeSWITCH is being used.

PixelTOUCH zoom

The PixelTOUCH feature uses the MGA hardware to instantly zoom your screen by a factor of 2 or 4 times. Once zoomed in, you are working with a 'de facto' virtual desktop, and by moving the cursor to the edges of the screen, your display will pan to new portions of the Windows desktop.

You can change the zoom factor by:

- Using the **Zoom** buttons in the MGA Control Panel main dialog box.

- Using the **Quick Access** panel.

- Using the PixelTOUCH hotkey.

The hotkey (Ctrl+F5 by default) must be enabled through the **Hotkey selection** dialog box, if you plan to use this method to zoom. The hotkey toggles in a circular order through the three zoom factors ($\times 1, \times 2, \times 4, \times 1, ...$).

❖ Notes:

- The $\times 4$ zoom is not available at resolutions of 800×600 and lower.

- At zoom factors of $\times 1, \times 2,$ and $\times 4$, the display pans 16, 32, and 64 pixels at a time, respectively.

- The PixelTOUCH hotkeys do not work while a DOS window is active.

PanLOCK   The PanLOCK feature 'locks' your view to the current area by temporarily disabling edge panning. PanLOCK can be used if you have a virtual Desktop or you are currently zoomed in.

PanLOCK can be requested by pressing the PanLOCK hotkeys or using the **Quick Access** panel. Before you can use the PanLOCK hotkey for the first time, it must be enabled in the **Hotkey selection** dialog box. The PanLOCK hotkey is a toggle, so to unlock your display, simply press the hotkey again.

CenterPOPUP   The CenterPOPUP feature will cause any pop-up dialog boxes to be centered in your current display area. This feature is very pratical if you are using a **Desktop** that is significantly larger than your display resolution, because in some cases, pop-up boxes could be completely off-screen! CenterPOPUP can be activated by clicking on the **CenterPOPUP** check box of the **MGA Control Panel** main dialog box or by using the **Quick Access** panel.

MaxVIEW   The MaxVIEW feature limits the size of the window so that it does not extend outside your immediate working on-screen area (you can still scroll to any off-screen areas on your desktop). When enabled, MaxVIEW will apply to any Windows application that you will later maximize.

MaxVIEW can be activated by:

- Clicking on the **MaxVIEW** check box of the **MGA Control Panel** main dialog box.

- Using the **MaxVIEW** hotkey

- Using the **Quick Access** panel.

If you elect to use the hotkey, it must be enabled through the **Hotkeys...** dialog box. The hotkey acts as a toggle, so to disable MaxVIEW, simply press the hotkey again.

CenterWINDOW   The CenterWINDOW feature will center your display area on the currently active window. You can enable this feature through the **Hotkey selection** dialog box. When you want to center your display around the active application, use the hotkey combination to call the command. CenterWINDOW works even when you're display is zoomed in on another area, and is only available through a hotkey.

Cursor...

Using the Cursor color feature

When you click on the **Cursor** button, the **Cursor color selection** dialog box opens. This dialog box lets you interactively set the colors of your mouse cursor. The **Cursors Preview** panel displays three frequently used cursors to show you how your colors will look. For more details on changing your cursor color click on the **Help** button for on-line help about MGA Control Panel.

Other Control Panel buttons

OK

The **OK** button accepts the changes you've made and closes the MGA Control Panel program. As mentioned earlier, if you changed modes and are not using ModeSWITCH, you will be prompted to restart Windows.

When the Control Panel is closed you can still access many of the PowerDesk features through the various hotkeys and the **Quick Access** panel.

Cancel

Help

The **Cancel** button cancels all changes to **Mode** and **Features** made since the **MGA Control Panel** dialog box was opened.

Click on the **Help** button for on-line help about MGA Control Panel.

Hotkeys...

When you click on the **Hotkeys...** button, a dialog box opens to let you configure hotkey settings for:

- The four display modes
- CenterWINDOW
- PixelTOUCH
- PanLOCK
- MaxVIEW

Hotkey changes are saved when you click on **OK**.

By default, hotkey combinations are selected, but none of them are enabled. The default Hotkey settings are:

Mode 1: Shift+F6	**PixelTOUCH:** Ctrl+F5
Mode 2: Shift+F7	**MaxVIEW:** Ctrl+F12
Mode 3: Shift+F8	**CenterWINDOW:** Ctrl+F11
Mode 4: Shift+F9	**PanLOCK:** Ctrl+F3

Defaults

The **Defaults** button can be used to reset all options in the main dialog box to their default settings.

The default settings for MGA Control Panel are:

- Current display mode is Mode 1

- Zoom is ×1

- ModeSWITCH is disabled

- **Features** checkboxes are not enabled

To reset each display mode to its default, click on the **Setup** button for that mode, then click on the **Default** button in that dialog box, then click on **OK**.

The default settings for the **Display** modes are:

	Default **Mode 1** settings:	Default **Mode 2** settings:
Display:	1024×768	1024×768
Desktop:	1024×768	1600×1200
Color:	8-bit, 256 colors	8-bit, 256 colors
Font:	Large font	Large font
	Default **Mode 3** settings:	Default **Mode 4** settings:
Display:	1024×768	800×600
Desktop:	1024×768	800×600
Color:	16-bit, 65K colors	24-bit, 16.7 M colors
Font:	Large font	Large font

MGA Quick Access

Changing Display modes

*R*unning the MGA Quick Access program gives you a faster way to access the **Desktop** features of MGA Control Panel. It is useful if you regularly use the **ModeSWITCH**, **Desktop**, or **Zoom** features. Double click on the icon to launch MGA Quick Access. The dialog box opens immediately. It is divided into three areas. From top to bottom, these areas control the active Display mode, Features, and Zoom factor. As well, there are **System Menu** configuration options.

You can change your current display mode just by clicking on the button for another mode. (By clicking on a mode button with the right mouse button, you can view the settings for that button.) You can enable or disable ModeSWITCH by clicking on the button with the two monitors and arrows on it. (you will have to restart Windows). The button stays depressed to indicate that ModeSWITCH is running. While ModeSWITCH is running, you can change modes just by clicking on one of the four mode buttons.

PanLOCK: By clicking on this button, you enable PanLOCK, to temporarily lock the view when using a virtual Desktop or the Zoom feature. The **PanLOCK** button is a toggle, so just click again on the button to enable panning.

CenterPOPUP: By clicking on this button, you enable the CenterPOPUP feature, which causes any pop-up dialog boxes to be centered in your current display area.

MaxVIEW: By clicking on this button, you enable the MaxVIEW feature, which will constrain maximized applications to the display area rather than the whole **Desktop** area.

Zoom: By clicking on the '+' or '-' button, you can zoom into or out from your present view.

System menu options

By clicking in the system menu area of Quick Access, or pressing Alt+spacebar while the program is active, you can configure display options for Quick Access. These options include:

No Title: When this is checked, the title bar and system menu area disappears. You can also enable and disable this option by double clicking on any area in Quick Access where there is no button.

Show Vertical/ Horizontal: This will toggle between a vertical or horizontal layout for the **Quick Access** window.

Follow Display: When this is enabled, (usually in combination with the next option) the **Quick Access** window will follow when you scroll your display to another area of your desktop.

Always on Top: When this is enabled, the **Quick Access** window will always be on top of any applications you are running. If this is combined with the **Follow Display** option, you will always have Quick Access within your viewing area.

Changing Windows drivers

*I*f you wish to run Windows with a different driver from another manufacturer, just run the Windows *setup* program.

To do this, from DOS, enter these lines:

> *c:*
> *cd \windows*
> *setup*

Highlight the **Display** option, press Enter, and select the new driver you wish to use (either from the list presented or by selecting Other and responding to the prompts). To return to the MGA Windows driver, run Windows *setup* as just explained, and select any one of the following options:

> *Matrox MGA 16-bit 65K Colors*
> *Matrox MGA 24-bit 16.7M Colors*
> *Matrox MGA 24-bit Packed Pixel*
> *Matrox MGA 8-bit 256 Colors*
> *Matrox MGA ModeSWITCH*

Windows will start next time with the selected driver, at the 640×480 resolution. You'll be able to select a new resolution (and other features of your display) by running the MGA Control Panel program.

Appendix A: Technical Information
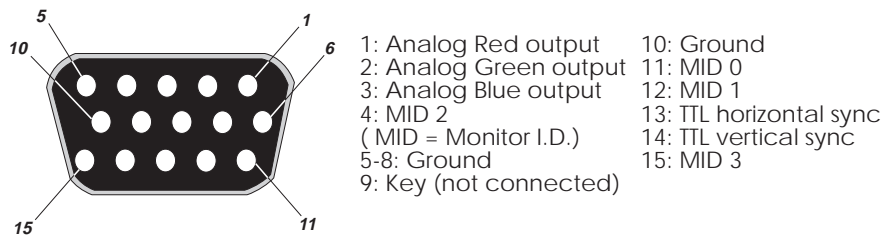
Global information

- Products:
  - MGA-IMP /LTE/(Por V): 2 MB RAM, not upgradeable to 4 MB
  - MGA-IMP+ /(Por A or V): 2 MB RAM, upgradeable to 4MB
  - MGA-IMP+ /(Por A or V)/220: 2 MB RAM, 1600 × 1200 resolution at 220MHz
  - MGA-MOD/2MB/1: 2MB upgrade for the MGA-IMP+ /P
- System requirements
  - Computers with a 386 or better CPU, and a PCI, ISA, or VL bus architecture.
  - Minimum system RAM required: 4 MB
- Operating systems: DOS version 5 and later. With the Supplementary package, OS/2 PM Version 2.1 and Windows NT.
- Technical features:
  - 64-bit VGA-compatible drawing engine
  - TVP 3026-175 64-bit RAMDAC for the MGA-IMP+ and /LTE
  - TVP 3026-220 64-bit RAMDAC for the MGA-IMP+ /220
  - Separate sync monitors only

Default settings

- Boot video mode/resolution: VGA Mode 3 (80 characters, 25 lines)
- Memory map: System-determined

Video Connector

The video is connected at a 15-pin female connector, located on the MGA's mounting bracket:

1: Analog Red output   10: Ground
2: Analog Green output   11: MID 0
3: Analog Blue output   12: MID 1
4: MID 2   13: TTL horizontal sync
(MID = Monitor I.D.)   14: TTL vertical sync
5-8: Ground   15: MID 3
9: Key (not connected)

VGA feature connector pin signal outputs

```
24 23 22 21 20 19 18 17 16 15 14 13
 12 11 10 9  8  7  6  5  4  3  2  1  0
```
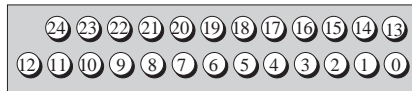
0-7: Pixel data	16: External pixel data enable *
8: Pixel clock	17: External sync enable *
9: Blanking	18: External pixel clock enable *
10: Horizontal sync	19: Unused (Reserved)
11: Vertical sync	20-23: Ground
12-15: Ground	24: Unused (Reserved)

 * When enabled, these signals are active low.

Electrical Specifications

- Operating voltage and current:

5 V $\pm$ 5%, at 1.2 Amps for the /P model
            at 1.6 Amps with memory module

12V $\pm$ 5% at .04 Amps

Video Specifications

The video follows the RS-343 standard, with no sync on RGB, and no blanking pedestal. Black or blank: 0.0 V; White: 0.660 V

Mechanical Specifications

- Technology:
  - Hybrid of through-hole and surface mounting on a glass/epoxy board.
- Board physical dimensions (excluding brackets):
  - IMP+ /P: 17.5cm $\times$ 10.7 cm $\times$ 1.2 cm
  - MGA-IMP+ /P/220:17.5 cm $\times$ 10.7 cm $\times$ 1.2 cm

Environmental Specifications

- Minimum/maximum ambient operating temperatures: 0° C - 55° C
- Minimum/maximum storage temperature: -40° C - 75° C
- Maximum altitude for operation: 3,000 meters
- Maximum altitude for transport: 12,000 meters
- Operating humidity: 20 - 80% relative humidity (non-condensing)
- Storage humidity: 5 - 95% relative humidity (non-condensing)
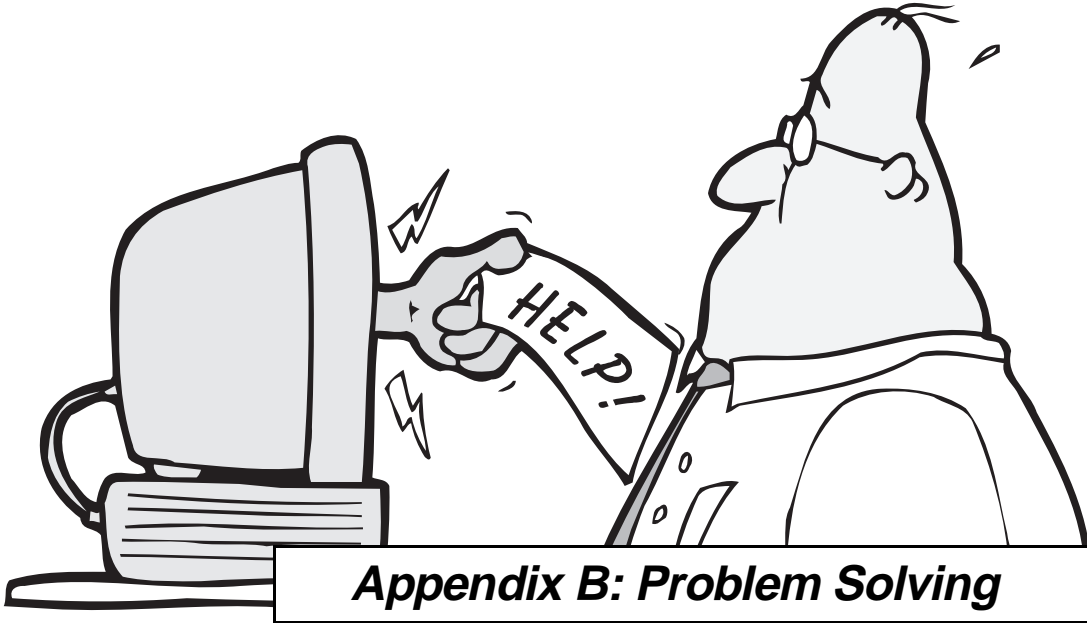
Appendix B: Problem Solving

Troubleshooting

Problem Solving for the Matrox MGA

*P*roblems with your Matrox MGA graphics adapter can often be resolved by simply updating the software that is supplied with your board. Please see the Appendix C for additional information on obtaining driver updates. If you have already attempted this and it still does not resolve your problem, then you should read through the following section for solutions to common problems.

General Problem Solving Tips

To resolve any problem, it is necessary to isolate the problem to a specific set of circumstances. It may be helpful to categorize the problem as one of the following:

1. The system won't boot with the MGA installed
2. Problems with DOS/Super VGA (VESA) programs
3. Problems with the MGA installation and setup programs
4. Problems with Windows, NT, OS/2, AutoCAD, or MicroStation
5. Video problems

Once the problem has been categorized, refer to the corresponding sections below:

1. The system won't boot with the MGA installed

This is extremely unusual with PCI systems since the PCI standard has very clear specifications for the hardware interface. Check for the following:

■ If there is another VGA card in your system remove it. If the VGA is on the mother board, it should have been disabled, but you should check your system's owner's manual, to see if this has to be done manually.

2. Problems with DOS/Super VGA (VESA) programs

The MGA's on-board VGA is completely compatible with programs that use standard VGA and VESA modes, as explained in Chapter Two of this manual. If you experience problems running DOS programs in Super VGA modes, check the following:

- Make sure the program is compliant with version 1.2 of the VESA Super VGA standard. Some programs that are written to run in Super VGA modes are not VESA compliant and depend on the specific chip used for VGA. They are probably not compatible with our VGA's extended modes.

3. Problems with the MGA Windows installation

If you have problems with the Windows driver installation, check the *readme.win* file for the list of changes normally made to *system.ini*, *win.ini*, and *progman.ini*.

4. Problems with Windows NT, OS/2, AutoCAD, MicroStation

Each of these programs uses a driver developed by Matrox for the MGA products. There are no special problems associated with these programs running on PCI systems. Each driver is supplied with a *readme* file that should be consulted for problems that are specific to the driver.

If any problems that are not listed in the *readme* file are encountered with these drivers, you should consult either the Matrox BBS or the CompuServe forum for updates.

- One problem of special note that can occur with any installation concerns AutoCAD 12 for DOS. To ensure that our drivers work correctly with this program, it is essential that AutoCAD's environment variables be set correctly. In particular, verify the following variables: *acad* and *acaddrv*.

5. Video problems

Problems which are specific to the video output are usually related to mismatches between the monitor and the timing of the video signal provided by the MGA. The MGA is supplied with a file for several generic monitor settings. Check for the following:

☞ **There is no picture on the video display; the screen is blank.**

Some of the possibilities are that there are no cables connected, there is an incorrect or poor cable connection, the power is not turned on, the power cord for the computer or monitor isn't connected, or that the monitor does not accept MGA's video parameters.

- Recheck your connections to the video cables.
- Set the monitor's RGB inputs (and sync switches, if this option is available) to 75 ohms, with the sync set to 'external'.
- Use the monitor selection program to select another monitor file.
- If you're using a Nanao 780iW or EIZO 780iW, set the DIP switch for DOS 45KHz refresh (see Chapter 2).

☞ **The picture quality is poor, with a dim picture, poor contrast, and poor sharpness.**

The monitor may not be properly adjusted.

- Correctly adjust the brightness, sharpness, and contrast controls of your monitor.
- Ensure that the video cable is correctly and completely inserted at both ends.
- Make sure that the input switches are set for 75 ohms.

☞ **The picture is not centered (shifted vertically).**

The monitor may be improperly adjusted.

- Adjust the centering control of your monitor to position the picture on the screen. Run the Monitor Selection program to adjust it.

☞ **The picture is broken up, with bad horizontal sync; that is, it rolls, jitters, or blinks.**

The monitor connections may be incomplete, the monitor may be misadjusted, or it may not accept MGA's video parameters.

- Ensure that the sync line(s) are properly connected. If this doesn't solve the problem, your monitor may need adjustment, or it may be defective. Refer to your monitor's instruction manual.
- If you are using a fixed-sync monitor, make sure that it accepts a vertical sweep rate of 60 Hz and the horizontal sweep rate of the resolution you're using. See the first problem in this chapter for more details on customizing for fixed-sync monitors.

☞ **The colors are wrong.**

Incorrect colors indicate that either the cabling or monitor impedance is incorrect.

- Are the R G B lines connected to the right R G B monitor inputs.
- Make sure your monitor's RGB inputs are set to 75 ohms.
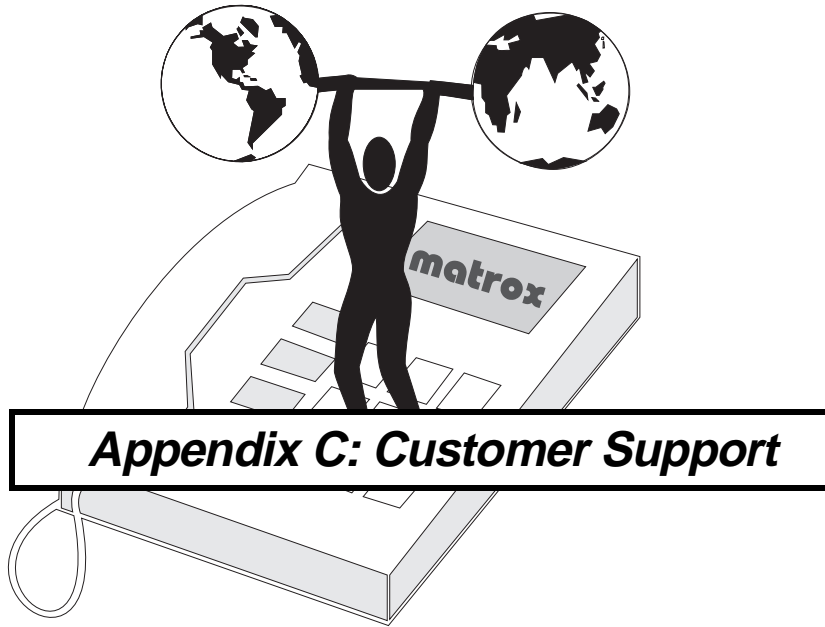
Appendix C: Customer Support

Customer Support group

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 since your dealer is local and may be familiar with your complete system. In the case of a hardware warranty assistance, the product must be returned to the dealer, who will return it to Matrox. See the following page for a list of information that your dealer will need to diagnose your problem.

2. **CompuServe**® - If you have a modem and an account on CompuServe, you may obtain technical assistance and driver updates directly from Matrox by typing 'GO MATROX' at the '!' prompt. See the 'Free CompuServe Introductory Membership Offer' section later on in this appendix.

3. **Matrox BBS** - Driver updates (which may eliminate a particular bug), utilities, and other information about our products can be downloaded from our 24 hour Bulletin Board Service. See the 'BBS' section in this appendix for more details.

4. **MATFAX Instant FAX** - Call our dial-up 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.

5. **Direct Matrox Technical Assistance** - If you still can't resolve a problem, you can get direct technical assistance three ways:

   a. Call Technical Support at **514-685-0270**. If you can't reach technical assistance immediately, please leave a message. We will respond within 24 hours.

   b. Send a FAX to **514-685-2853**, Att: Graphics Technical Assistance.

   c. Send E-mail to **graph_ts@matrox.com**. Sending us a FAX or E-mail is useful if you want to report a bug, or feel it may be difficult for us to call you back.

Information we need

Please give a complete description of the problem including the details specified below:

- Board serial number, model number, revision number, BIOS number, and memory address at which the MGA board is installed. To obtain most of this information, run the **MGA Board Information** program from Windows.
- Computer brand name, bus type, model, processor speed, and amount of memory. If the computer is not a well known brand, we will need to know the model of the mother board, chipset, and system BIOS. **MicroSoft Diagnostic** will give you detailed information about your computer type, and all of its peripherals. (_MSD_ is located in your Windows directory and in your DOS (6.0 and later) directory.
- Brand and model of monitor if the problem is video-related.
- Operating system (DOS, OS/2, or Windows NT) type and version.
- Brand and version of memory manager.
- Brand and version of network system if applicable.
- A list of the other boards and peripherals installed in the system.
- If the problem appears to be of a complex nature, we may need to know the contents of your _autoexec.bat_ and _config.sys_ files. For Windows users, we'll need the contents of your _win.ini_ and _system.ini_ files as well.
- A list of any memory resident programs (TSRs) in use.

If a problem appears while you are in a particular application, please include the following information:

- Please specify which driver is used. Mention if it's the 8-bit, 16-bit, 24-bit or ModeSWITCH driver which causes the problem. State the resolution and virtual desktop, if applicable.
- State the application name and version number (for example: Lotus 1-2-3 v4.01 for Windows). Name any add-on packages that are being used.
- If the problem is a General Protection Fault (GPF) in Windows, please include a Dr. Watson log. (Run _drwatson.exe_, which is located in the _\windows_ directory.)
- Give detailed steps that are known to cause the bug, so we can reproduce it.

BBS

24-hour computerized Bulletin Board Service

*H*ere you'll find up-to-date information on software changes, supported monitors, and new releases. Please have your graphics board model and serial number on hand when you call for the first time.

Logging on

To log on to the Matrox BBS, please take note of the following items:

- The phone number is **514-685-6008**.
- The **communication parameters** are 14,400, 9600, 2400, or 1200 baud, with 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'll be created for you as you enter your name.

Downloading files

All files on our BBS are archived using *pkzip.exe*. To unzip a file, you will need the *pkunzip.exe* program. This program, along with *pkzip.exe* and *pkzipfix.exe*, is found unzipped in the GENERAL DOWNLOADS area of the BBS. Files for the MGA are found in the MGA product area of the BBS.

In most cases, our drivers are distributed with an *install* program for installing them on your hard disk. We recommend that after you download any material to your hard disk, you use *pkunzip* to expand the programs to a floppy disk, and then run *install* from the floppy.

The following sample command line expands a zipped file from the current directory to floppy drive A. The *-d* parameter recreates the original subdirectories on the floppy disk.

pkunzip -d mgastuff.zip a:

Free CompuServe Introductory Membership Offer !

As a Matrox customer, you are entitled to a free Introductory Membership to CompuServe including:

- Free access to CompuServe's Basic Services for one month
- $15 introductory usage credit to explore the Matrox section on the Graphics B Vendor Forum and CompuServe's other Extended and

Premium service offerings
- A personal User ID Number and Password
- A complimentary subscription to CompuServe's monthly magazine, *CompuServe Magazine*.

To receive your free CompuServe Introductory Membership:

- Call toll-free 1-800-524-3388 and ask for **Representative 229**.
In the United Kingdom, call 0800 289 378;
In Germany, call 0130 37 32;
In the rest of Europe, call 44 272 760 681;
Outside of the U.S., Canada, and Europe call 614-529-1349

Contact Matrox on CompuServe to receive answers to questions you may have about our Graphics Accelerators and Video products. You can receive:
- Assistance on technical questions
- Information on the latest products and upgrades
- Tips on using Matrox products

Through CompuServe, you can directly contact Matrox technical representatives or other Matrox users. You can also take advantage of the many services CompuServe offers.

Warranty

Procedure to follow

$\mathcal{M}$atrox MGA products are warranted against defects in materials and workmanship for a period of *two years* from the date of delivery. We will repair or replace products which prove to be defective during the warranty period provided they are returned, through your dealer, to Matrox Electronic Systems Limited. No other warranty is expressed or implied. Matrox is not liable for consequential damages.

Contact your dealer

If you experience difficulties with your Matrox product, please contact the dealer where you purchased the product for service. Do not return any product to Matrox without authorization.

Please follow these steps:

1. Verify that your MGA board was installed and configured according to the information in Chapter 2.
2. Read Appendix B to see if you can solve the problem yourself. This is the quickest and easiest solution to attempt.
3. Contact the dealer where you purchased the board for additional help. If for some reason you can't reach a Matrox dealer, contact the our Customer Support group at *514-685-0270*. They will ask you to describe the malfunction, and may issue a Tracking Number.

   If you must return the board, follow the instructions below.

Returning a board

If you must return a board, leave the configuration as it was when you were using the board. Pack the product in its original box and bring it in to your dealer who will return the board to Matrox for you.

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