

**MGA Millennium
Installation Guide**

MGA
Matrox Graphics Architecture

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Installation Guide

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American user's information - 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.

Remark for MGA-MIL/2 series (FCC ID: ID7057600) and MGA-MIL/4 series (FCC ID: ID7059000), at video resolutions up to 1600 × 1200 with 72 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 expressly approved by the party responsible for compliance would void the compliance to FCC regulations and therefore, the user's authority to operate the equipment.

Remark for other devices listed in this manual

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to

correct the interference at his or her own expense.



European user's information- Declaration of Conformity

Remark for MGA-MIL/2 series at a video resolutions up to 1600 × 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. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures. The use of shielded cables for connection of the monitor to the card is required to meet EC requirements.

Canadian user's information - Industry Canada Compliance Statement

Remark for MGA-MIL/2 series and MGA-MIL/4 series, at video resolutions up to 1600 × 1200 with 72 Hz refresh:

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

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

Remark for other devices listed in this manual

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

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

Japanese user's information - VCCI Compliance Statement

Remark for MGA-MIL/2 series (FCC ID: ID7057600) at video resolutions up to 1600 × 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 residential areas.

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

Read the instructions for correct handling.

Contents

FCC, CE, and VCCI Statements

<i>Overview</i>	1
<hr/>	
Display information	1
<i>Hardware Installation</i>	3
<hr/>	
<i>Software Installation</i>	6
<hr/>	
The PowerDesk and DynaView for Windows disks	6
The MGA CAD drivers disk	9
Driver installation for WIN NT 3.5	10
Driver installation for OS/2 PM MGA	12
<i>Troubleshooting</i>	14
<hr/>	
<i>Technical Information</i>	15
<hr/>	
<i>Index</i>	
<hr/>	

Contents: 2

Overview

Features

Thank you for purchasing an MGA Millennium board. This board takes advantage of our 64-bit graphics engine technology, which provides you with very fast graphics and video acceleration. All MGA boards remain 100% VGA compatible, VESA compatible (SVGA, DPMS, DDC) and provide many additional features including a high speed, high-resolution, flicker-free display.

This manual describes the installation of MGA Millennium boards for PCI bus computer systems. For more information on a particular Windows program click on the Help button in the program screen.

Drivers and utilities we provide:

- PowerDrivers and PowerDesk for Windows 3.1 and Windows for Workgroups
- DynaView for AutoCAD (DOS) and AutoCAD for Windows
- Additional drivers for MicroStation, Windows NT 3.5, and OS/2 PM 2.1 and 'Warp'.

Display information

The following tables provide information on supported resolutions, pixel depths (colors), maximum virtual Desktop, 3D, and refresh rates for the board and memory upgrades.

Maximum Windows Desktop and 3D Capabilities				
Memory	Bits Per Pixel	Max. Desktop	Max. Real-time 3D	3D Capabilities
2 MB	8	1600 × 1200	640 × 480	800 × 600
	16	1152 × 882	640 × 480	800 × 600
	24	800 × 600	N/A	640 × 480
4 MB*	8	1600 × 1200	1152 × 882	1280 × 1024
	16	1600 × 1200	800 × 600	1152 × 882
	24	1280 × 1024	640 × 480	800 × 600
8 MB*	8	1600 × 1200	1600 × 1200	1600 × 1200
	16	1600 × 1200	1280 × 1024	1600 × 1200
	24	1600 × 1200	1024 × 768	1280 × 1024

* Refer to page 15 for a list of the available memory upgrade configurations

Resolution, Pixel Depth, and Maximum Refresh Rates				
Resolution	Bits / Pixel (2 MB)	Bits / Pixel (4 MB)	Bits / Pixel (8 MB)	Maximum Refresh (175 MHz board)
640 × 480	8, 16, 24	8, 16, 24	8, 16, 24	120 Hz
800 × 600	8, 16, 24	8, 16, 24	8, 16, 24	120 Hz
1024 × 768	8, 16	8, 16, 24	8, 16, 24	120 Hz
1152 × 882	8, 16	8, 16, 24	8, 16, 24	110 Hz
1280 × 1024	8	8, 16, 24	8, 16, 24	100 Hz
1600 × 1200	8	8, 16	8, 16, 24	72 Hz

Contents of the distribution disks

- MGA Millennium PowerDesk and DynaView for Windows Drivers: Windows Drivers, Control Panel, Board Information and Monitor Selection programs, DCI driver, 3D Screen Saver with DPMS functions, AutoCAD for Windows, and DynaView 3D for Windows.
- MGA Millennium CAD (DOS) Drivers: DynaView drivers for AutoCAD for DOS and MicroStation 5.0, DOS *setup* program (monitor selection).
- MGA Millennium Windows NT and OS/2 drivers: Windows NT and OS/2 drivers.

Before you begin

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 PCI computer.
- 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, and a flat-head or Philips screwdriver may be necessary.
- MS-DOS 5 or later, or equivalent.

Hardware Installation

Warning! – Static

△ *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:*

- Turn off the power to all equipment. Touch the metal chassis of your computer (it has to be plugged in) to drain the static electricity from your body **before** you touch the MGA board. Don't let your clothes touch any of the components while you work.

Configuring your PCI board

When you add a piece of hardware to a PCI system, the system BIOS will automatically map it to an available memory space for you. This is known as 'Plug and Play' which means you should not have to set switches or change jumpers on your board. However, we have provided two DIP switches, which may be required in special circumstances. Take a moment to become familiar with your new MGA Millennium board. The diagram on the next page shows you where some of the major components are located. To change a DIP switch setting, use a small screwdriver or a ball-point pen. Avoid using a pencil tip, which can leave an electrically-conductive graphite residue.

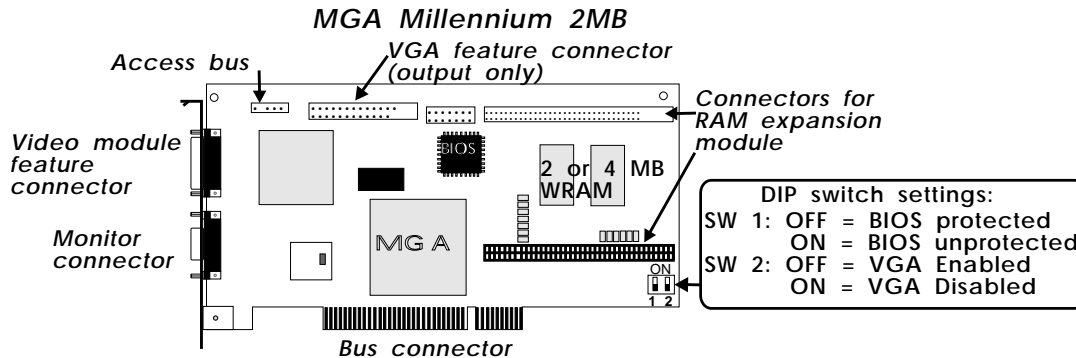
Switch 1: Flash EPROM Switch for VGA BIOS

If you need to upgrade your VGA BIOS in the future, this can be done by reprogramming the Flash EPROM. This safe and simple operation is accomplished with a software utility and a BIOS upgrade file. Set Switch 1 to ON to allow re-programming of the Flash EPROM. You must not leave this switch ON during normal usage, as the Flash EPROM in this state is susceptible to being erased without warning.

Switch 2: VGA Enable / Disable switch

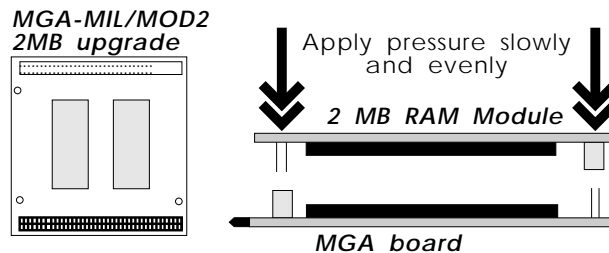
By default the VGA of the MGA board is enabled (Switch 2=OFF) for single-screen operation, which means that you must remove or disable your existing VGA, if you have one. If the VGA is on the mother board of your PCI system, it should be disabled automatically.

This switch should be set to ON if you want to work in a dual-screen configuration. In this case you will also be using either a VGA in another slot or on your system's mother board, or another MGA board for output to the second monitor.



Installing the MGA video RAM upgrade

The following diagram illustrates the optional add-on 2 MB RAM module (4 and 6 MB also available), and how to install it. The MGA software will automatically recognize the new memory upgrade.



- △ *Make sure the module is properly aligned before pressing it onto the board, and that no pins extend beyond the sockets. Otherwise you could severely damage the memory upgrade module.*

Steps to take

1. Open your computer

Now you're ready to open up your computer and install your Matrox MGA Millennium board as explained below:

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

- If you intend to use the MGA for both VGA and high resolution display, you must remove or disable any other VGA in your system (see your system manual).

2. Choose a slot

Most PCI bus computers contain a combination of PCI slots and, for example, ISA slots. Usually the PCI slots are made with plastic of a contrasting color. PCI slots are shorter than any other slots you would find in your system, and when a PCI board is placed in its slot, the components on the board are facing the opposite direction, compared to the other (non-PCI) boards in your system. If you're not sure which slot to use, consult the owner's manual for your system. Plugging the board into a non-PCI slot could damage the board, your computer, or both.

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. As well, 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 near the start of this manual. Just plug your monitor cable into the 15-pin (Dsub) video output connector on your MGA board. 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). Consult your monitor manual for proper connection of the cable to your monitor. You should also take note of the maximum vertical and horizontal frequencies supported by your monitor, and see if there are preset frequencies.

Software Installation

Steps to take

Now you're ready to install the Matrox-supplied software. This software allows your existing programs to take full advantage of the power of your MGA Millennium 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. If you plan to use a particular driver, the corresponding program must already be installed on your system.

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 and additional notes that did not make it into the manual.

The PowerDesk and DynaView for Windows disks

These disks contain Windows 3.1 drivers, PowerDesk utilities, a monitor file, a Screen Saver, a DCI driver, as well as DynaView 2D and 3D for Windows. To install, start Windows, put Disk #1 in drive A, and follow the steps below:

1. You should be running Windows in VGA resolution. Select **File/Run** in Program Manager. Type *a:\setup* in the **Command Line** box.
2. You will be prompted for the products to install: Windows Drivers and PowerDesk (including Screen Saver and DCI), DynaView for Windows, or both.
 - ❖ Do not select DynaView for Windows if you don't have AutoCAD for Windows installed.

If you select DynaView for Windows, you will be prompted for the specific products to install: DynaView 2D for Rel 12, DynaView 3D for Rel 13 and / or DynaView 3D (see the 'Notes' section following).

3. Once you have selected what you want to install, the installation program will prompt you for the various paths in which to install each product. Next, the MGA software installation program will run (bar graphs indicate the progress of the installation). A new Windows group called **MGA Millennium PowerDesk** will be created.

Select a monitor

4. If this is a first time installation the Monitor Selection program will be started 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 explained in its help file (click on the **Help** button).

- ❖ 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.

Select a start-up mode

5. The next step is to select a start-up display mode for Windows. The range of resolutions and colors available to you is limited by the amount of RAM on your board. 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 kind of selections using the **MGA Control Panel** program.

Rebooting

6. 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.

Notes:

DynaView 2D

The default path for AutoCAD for Windows is *C:\acadwin* for Rel 12 and *C:\acadr13\win* for Rel 13. Make sure you indicate the path where your AutoCAD software is actually installed, otherwise the MGA driver will not be found by AutoCAD .

Read the *readme.mga* file in your destination path for information on configuring the MGA driver. The DynaView 2D driver comes with a Bird's Eye utility. To call it, type *dsvviewer* from within AutoCAD. On-line Help is available for DynaView 2D; just press the **Help** button.

DynaView 3D

This product comes in two parts: the 3D Viewer program and the ADS program. The installation adds an icon for the 3D Viewer (and its associated *readme* file) in the PowerDesk group. For the 3D Viewer to display Gouraud shading, the MGA Millennium Windows driver must be '3D-enabled'. To do this, start MGA Control Panel and select a display mode that will allow you to enable the **3D** checkbox. Note that with 3D enabled, the available range of resolutions and pixel depths is reduced. On-line Help is available for DynaView 3D; just press the **Help** button.

3D Screen Saver

The MGA Screen Saver displays 3D images created with the DynaView 3D software. A few 3D images are included on the distribution disks. The Screen Saver also supports DPMS, for EnergyStar-compatible monitors.

You must select *MGA Screen Saver* from the list shown in the Windows **Control Panel / Desktop** applet. On-line help is provided; just press the **Help** button.

DCI Video for Windows accelerator

The MGA DCI (Display Control Interface) driver is a Microsoft / Intel compliant driver which accelerates MPEG software players, as well as playback of Video for Windows 1.1 (only the 1.1 upgrade supports DCI). The DCI driver and some upgrade files for Video for Windows will be installed in your `\windows\system` directory. You must be using 'DCI-aware' codecs in order to have video window acceleration. See the *readme.win* file for a list of known DCI-aware applications.

The DCI driver is always installed by the installation program, but is enabled at your request only. It can later be disabled through the *uninstall* utility.

Uninstall

This program allows removal or disabling (and later re-enabling) of all or parts of the MGA Millennium Windows and DynaView software. It is accessible from the **MGA Millennium PowerDesk** group.

The MGA CAD drivers disk

Place a copy of the *MGA CAD drivers* disk in a floppy drive. Type *a:\install* at the DOS prompt. First you are presented with a *readme* file for the installation. Then a menu appears, listing your installation choices. Use the keyboard arrow keys to select an item.

When you select a program or driver, *install* will decompress it from the diskette, place it (usually) under the *mga* directory, then return to the main menu so you can install another.

Installing the Utilities and Setup program

This selection installs utilities such as the Flash EPROM programming utility and the DOS *setup* program. If you have already installed the Windows drivers and selected a monitor with the Monitor Selection program, you don't need to install the *setup* program.

When you select this option, you are prompted for the following information:

1. The install path for *setup* (the default path is *c:\mga\setup*).
2. Your boot drive (the default is 'c:').
3. See the *readme.set* file for more details on the software, and on the BIOS DPMS, DDC, and VESA support.

Installing the AutoCAD DynaView driver for DOS

This selection installs the AutoCAD for DOS driver, with its DynaView 2D and 3D features. Install this if you have AutoCAD 11, 12, or 13 for DOS. This driver also supports 3D Studio and AutoShade.

When you select this option, you're prompted for:

1. The installation path (*c:\mga\acadrv* is the default).
2. The AutoCAD product you want to run (AutoCAD 11, 12, or 13 for DOS). Use AutoCAD 11 for 3D Studio and AutoShade.
3. You will be asked if you wish to run *acadrv.bat* from your *autoexec.bat* file. If you do not place this call in your *autoexec.bat* file, you will have to remember to run *acadrv.bat* before starting AutoCAD, as it sets certain environment variables necessary for the driver and AutoCAD.
4. See the *MGA Millennium CAD Drivers Guide* (available in electronic form) for details on how to configure AutoCAD to use our driver and how to use the DynaView for DOS features.

Refer to the Matrox *readme.aca* file installed in *\mga\acadrv* for instructions on configuring the driver for AutoShade and 3D Studio.

Installing the MicroStation PC driver

The MicroStation PC driver supports MicroStation 5.0 only.

1. The default installation path for the files is *c:\ustation*. Change the path if you installed MicroStation in another directory. Press Enter to continue, and the driver files will be copied to the *\drivers* subdirectory.
2. See the *MGA Millennium CAD Drivers Guide* for instructions on selecting and configuring the MicroStation driver. See also the *readme.mga* file in your *\ustation\driver* subdirectory for more information on the driver.

Driver installation for WIN NT 3.5

The MGA Windows NT 3.5 Display Driver supports 8-bit (256 colors), 16-bit (64K colors), and 24-bit (true color) display modes under Windows NT, in resolutions ranging from 640 × 480 to 1600 × 1200. This driver also supports dual-MGA Millennium configurations. The general procedure for changing a display driver is:

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 the 'Overview' section at the front of this manual to determine the supported resolution and pixel depth combinations.
7. Answer **Yes** in the **Installing the Driver** dialog box.
8. If the MGA Millennium 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 driver supports multiple MGA Millennium 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.

Monitor Configuration for WIN NT

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 60 Hz.

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.

More Information

For more information about this driver, refer to *readme.nt* on the distribution diskette.

Driver installation for OS/2 PM MGA

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 also includes a Seamless Windows driver. Note that the MGA PowerDesk program and features are not supported under Seamless Windows.

To install the software, follow the procedure below:

1. If you are installing this driver for the first time, have the MGA Millennium board installed and boot OS/2. Select VGA as the display driver.
2. Using the **Command Prompts** folder of OS/2, open an OS/2 Window or Full Screen session.
3. Insert the driver disk in a floppy drive, make that drive active and type `<srcpath>\install`, where `<srcpath>`: is the path which contains the MGA PM drivers. Example:
`a:\os2\install` (for the diskette with OS/2 and Windows NT)
4. You will see a dialog box in which you can select the **Primary Display**. Choose *Matrox MGA Millennium*. You may have to change the source drive if you are not installing from drive A.
5. The installation program will then proceed. 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, OS/2 will restart in the default MGA resolution (640 × 480 × 256 colors). 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.

Changing resolutions

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 Configuration for OS/2

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 60 Hz, 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.

More Information

For more information about this driver (including uninstalling), refer to the *readme.os2* file on the distribution diskette.

Troubleshooting

This section contains a list of some possible problems that you may encounter with your MGA Millennium graphics adapter.

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

- 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.

3. Problems with the MGA Windows installation

- Check the *readme.win* file for the list of changes normally made to *system.ini*, *win.ini*, and *progman.ini*.

4. Problems with the AutoCAD DOS driver

- 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 in Windows, AutoCAD, or another Millennium driver

- 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'.
- Try adjusting the brightness, sharpness, and contrast controls of your monitor.
- Try adjusting the centering and positioning controls of your monitor to position the picture on the screen.
- Contact your vendor for a special BIOS for Nanao 780iW or EIZO 780iW monitors.
- Your monitor file might be inappropriate. Delete the `\mga\setup\mga.inf` file. Restart Windows and the 60Hz driver will be used by default. If this works, start the Monitor Selection utility and try to find the best match (start selecting higher timing speeds and / or higher resolutions). Always *test* a selection before saving.

Technical Information

Global information

- Products:
 - MGA-MIL/2: (North America) 175 MHz RAMDAC, with 2 MB memory, upgradeable
 - MGA-MIL/4: (North America) 175 MHz RAMDAC, with 4 MB memory, upgradeable
 - MGA-MIL/MOD2: 2 MB Memory upgrade - for 2 MB boards only (4 MB total)
 - MGA-MIL/MOD4: 4 MB Memory upgrade - for 4 MB boards only (8 MB total)
 - MGA-MIL/MOD6: 6 MB Memory upgrade - for 2 MB boards only (8 MB total)
- System requirements
 - Computers with a 486 or better CPU, and a PCI bus architecture.
 - Minimum system RAM required: 4 MB
- Operating systems: DOS version 5 and later, OS/2 PM Version 2.1(and Warp), Windows NT 3.5, and Windows 3.1.
- Technical features:
 - 64-bit VGA-compatible drawing engine
 - TVP 3026-175 64-bit RAMDAC
 - Separate sync monitors only

Default settings

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

Electrical Specifications

- Operating voltage and current:
 - 0.6 A typical with no module
 - 0.8 A with 2MB Module
 - 1.0 A with with 6MB Module

Video Specifications

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.

Mechanical Specifications

- Technology:
 - Hybrid of through-hole and surface mounting on a glass/epoxy board.
- Board physical dimensions (excluding brackets):
 - 16.5 cm × 9.5 cm × 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)

Index

O - 9

3D capabilities 1-1

A

autoexec.bat additions 1-7

B

boot mode 1-15

C

Changing resolutions in OS/2 1-12

Changing resolutions in WIN NT 3.5 1-11

contents of distribution disks 1-2

D

DCI video driver 1-8

DIP switches diagram 1-3

Display information 1-1

E

environment variable 1-7

F

features 1-15

Flash EPROM DIP switch 1-3

H

hard disk space required 1-2

I

Installing AutoCAD DynaView for DOS 1-9

Installing DCI (Display Control Interface) . 1-8

Installing DynaView /2D 1-7

Installing DynaView /3D 1-8

Installing from the CAD drivers disk 1-9

Installing PowerDesk and DynaView for

Windows 1-6

Installing the driver for OS/2 and Warp 1-12

Installing the MicroStation PC driver 1-10

Installing the Screen Saver 1-8

Installing the Utilities and Setup program... 1-9

Installing the WIN NT 3.5 driver 1-10

M

Maximum refresh rates 1-2

Maximum Windows Desktop 1-1

MGA environment variable 1-7

mode, boot 1-15

Monitor connections 1-5

Monitor customization for OS/2 1-13

Monitor customization for WIN NT 3.5 1-11

P

product specifications 1-15

program

 setup.exe 1-9

R

RAM upgrade

 diagram 1-4

 module 1-4

S

setup program.....	1-9
specifications	
product.....	1-15
static electricity.....	1-3
system requirements	1-2

T

Technical information	1-15
-----------------------------	------

U

Uninstalling the MGA software	1-8
-------------------------------------	-----

V

VGA enable / disable switch	1-3
-----------------------------------	-----