MGA
Matrox Graphics Architecture

MGA Millennium
Windows 3.1 PowerDesk Guide

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Contents

Introduction

The MGA Windows 3.1 PowerDesk group window provides you with access to the following five 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 a monitor file with timing parameters that match the capability of your monitor, and view a test screen of each display mode.

- ◆ MGA Millennium Control Panel: A program that gives you control over all aspects of your MGA Windows display. If you click your right mouse 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 Millennium Control Panel. It can be set to always appear on top, and within the visible area of your Windows display.

- ◆ MGA Uninstall program: A utlity to disable or uninstall the Millennium Windows drivers and DynaView software.

√ Double-click on the Notepad icon to see the *readme.win* file, which contains any last minute information. Please read this file.
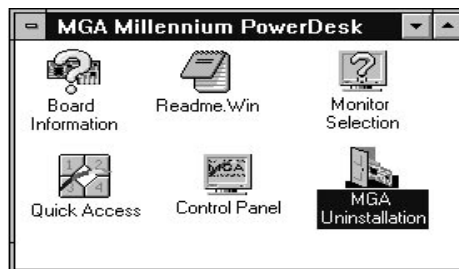
Note that the **MGA Millennium Control Panel** icon is displayed at the bottom of the screen to indicate your current **Display** mode, **Desktop** size, and **Zoom** factor. In this example the current mode is 1024×768, 8 bit color, with a **Desktop** of 1280×1024 with no zoom in effect. The icon can be used to launch **MGA Millennium Control Panel**.

An MGA Screen Saver and DCI driver are also part of the PowerDesk. They are installed in your *\windows* directory. The screen saver is accessible through the Windows **Control Panel**. See the *MGA Screen Saver for Windows* section later in this manual. The DCI driver will increase AVI and MPEG software playback of video files. See the *MGA DCI Driver* section later in this manual.

MGA Board Information

*D*ouble-click on the MGA Board Information icon for information on your MGA board type, amount of WRAM, 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 allows you to test the display. Double-click on the **MGA Monitor Selection** icon in the **MGA Millennium PowerDesk** group Window to start the program. Click on the **Monitor Selection** button, then select a 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.) Note that virtually all monitors will function correctly at 60Hz., and that most monitors support the VESA (Video Electronics Standards Association) standard timings.
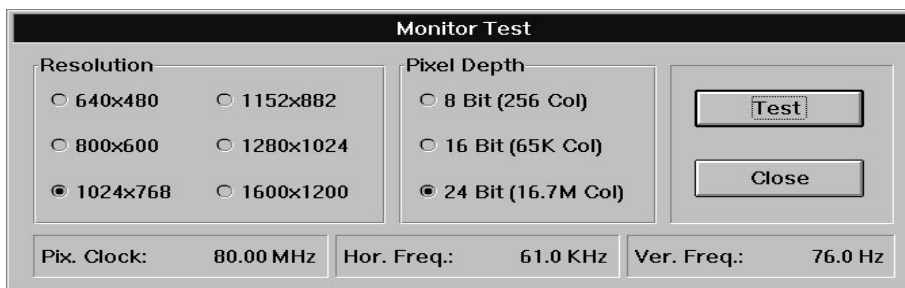
DDC-compliant monitors

DDC (Direct Data Channel) is a VESA standard which allows graphics drivers like the MGA Millennium Windows driver to automatically obtain a monitor's timings from the monitor itself. Note that many new monitors are now DDC-compliant.

If a DDC monitor is detected, your MGA board will automatically use the monitor's timing information, and the Monitor Selection program will be disabled. To over-ride the DDC timings, a monitor file must be created from the DOS MGA *setup* program, which is located on the MGA CAD Driver disk.

√ Note that many DDC monitors do not return timings for the 1152×882 resolution. If you wish to use this resolution, you will have to create an MGA monitor file, as outlined above.

Testing your monitor

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

Monitor Test				
Resolution		**Pixel Depth**		
○ 640×480	○ 1152×882	○ 8 Bit (256 Col)		[Test]
○ 800×600	○ 1280×1024	○ 16 Bit (65K Col)		
● 1024×768	○ 1600×1200	● 24 Bit (16.7M Col)		Close
Pix. Clock:	80.00 MHz	Hor. Freq.:	61.0 KHz	Ver. Freq.: 76.0 Hz

Using the **Resolution** and **Pixel Depth** panels, select the mode that you wish to test. A status bar shows the horizontal and vertical refresh rates and the pixel clock for that specific mode. When you click on **Test**, a test screen consisting of a grid and color bars will appear.

· If your monitor displays properly, use the test pattern to fine tune your monitor in terms of screen size, position, and aspect ratio. Most monitors on the market today will automatically save your adjustments for future use. Duplicate this monitor test procedure for each display mode that you plan to use.

· If your monitor does not sync (display) properly within a few seconds, press Esc to return to the main dialog box and make a different monitor selection.

Saving and Exiting

Once you've made a satisfactory monitor selection, use the **Save and Exit** button to confirm your choice. The Monitor Selection utility will suggest that you restart Windows in order to make this change now.

MGA Millennium Control Panel

Running MGA Millennium Control Panel

The MGA Millennium Control Panel provides you with easy access to the many features of your MGA Windows 3.1 driver. To run MGA Millennium Control Panel, double-click on its icon in the **MGA Millennium 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 Millennium Control Panel dialog box

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

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

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

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

- Change the cursor color

- Enable the desktop features (CenterPOPUP, MaxVIEW) and set Hotkeys

- Configure on-board RAM memory usage (**Setup/Display Option**)

Selecting Modes

The MGA Control Panel keeps track of four modes, a *mode* being the combination of display resolution, virtual desktop, pixel depth, font size, and memory usage 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 ModeSWITCH 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 immediately.

Configuring modes

To configure any of the four modes, click on the appropriate **Setup** button. You will be presented with the **Mode Setup** dialog box:
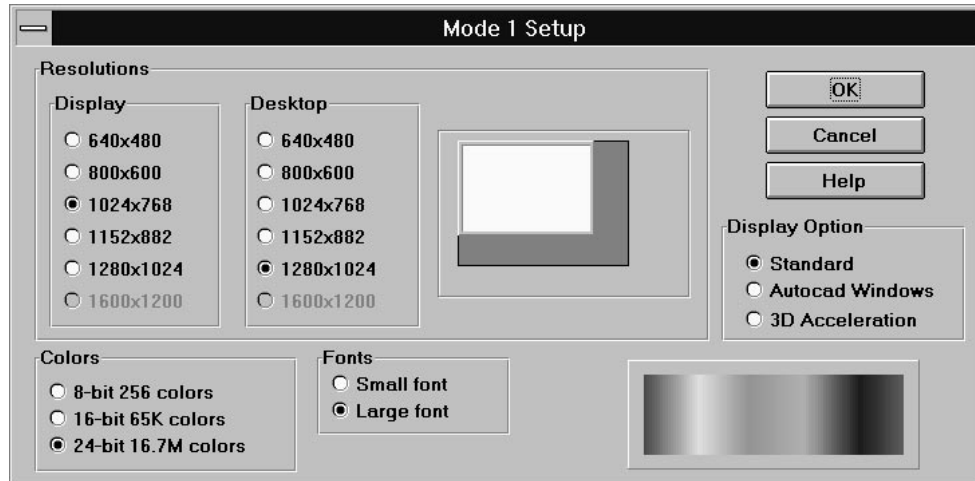
The settings of this dialog box are inter-dependent; that is, the display and desktop resolutions available depend on the available on-board RAM, the desired number of colors, and also on the **Display Option** setting. The list of available resolutions also depends on the monitor you have selected. Refer to the *MGA Millennium Installation Guide* for the list of the modes available for your particular MGA board.

Fonts

Fonts controls the size of the characters used by the system menus and dialog boxes. The setting will also affect the size of other system resources such as buttons and window size. Windows must be restarted when you change the font size.

The **Small** font is the default font for the 640×480 resolution. **Large** font is automatically selected for 800×600 and higher resolutions.

Colors

Select one of three color settings in this panel. The list contains all of the color possibilities supported by the MGA Millennium Control Panel, even though they may not all be available at your current resolution or on your particular board. If this is the case, MGA Millennium Control Panel will automatically select the highest resolution

that supports your color choice. The color preview panel to the right shows an approximate spectrum display of the available colors for the selected color depth.

Tables of the available color depths for each MGA board type are presented near the beginning of your installation guide. When you change the color depth, Windows must be restarted unless you are running ModeSWITCH.

QCDP: Special 8-bit and 15-bit QCDP (Quality Color Dithering Process) modes are used instead of the usual 8- and 16-bit modes when you enable **ModeSWITCH**. These modes feature a hardware dithering process which emulates true color (24-bit pixel depth) using only 8 or 15 bits of color. This allows greater selection of resolutions than the normal 24-bit, 16.7 million colors mode. The drawback lies in speed of operation, which will be slower than the standard 256 color driver, but about the same as with the 24-bit driver.

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 'PixelTOUCH' in 'Using the Desktop features'). 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.

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.

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 alternately 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 alternately 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.

Display Option

The **Display Option** settings configure how the RAM on your board is to be used by the MGA Millennium software.You must select one of the following three settings:

Standard: Enable this for standard Windows operation.

Autocad Windows: Enable this if you are using AutoCAD for Windows with our DynaView 2D driver. This selection enables smooth animation for the Spy Glass command.

3D Acceleration: Enable this if you are using the MGA 3D Viewer, or any other application that supports MGA 3D hardware acceleration in Windows.

Help

The **Help** button runs the on-line Help file for the MGA Millennium Control Panel.

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' (without restarting Windows).

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 this one time, 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, or if you change font size*. Note that Windows will always start up with the last mode you were using.

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

Reconfigure 'on the fly'

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, use QCDP. 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 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 additional features which can be described as 'Desktop features'. These include:

- PixelTOUCH
- MaxVIEW
- PanLOCK
- CenterWINDOW
- CenterPOPUP

These features are discussed in the following sections.

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 pseudo 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 Millennium Control Panel dialog box, or in **Quick Access**.
- 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 × 4 zoom is not available at resolutions of 800 × 600 and lower.

- At zoom factors of × 1, × 2, and × 4, the display pans 32, 64, and 128 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

This feature will cause any pop-up error message or warning dialog boxes to be centered in the visible display. This ensures that you are properly informed of any application or system problems. It becomes very useful when you are using a virtual **Desktop** or when you are zoomed. You can enable this feature by clicking on the **CenterPOPUP** checkbox.

This feature works only with pop-up windows; this means that other types of windows (such as application windows, floating toolbars, etc.) will not be affected. CenterPOPUP differs from CenterWINDOW in one essential way: CenterPOPUP moves the pop-up window into the visible display area, whereas CenterWINDOW relocates the visible display area to the active application window.

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 Millennium Control Panel** main dialog box

- Using the **MaxVIEW** hotkey

- Using the **Quick Access** panel

If you want to use the hotkey for MaxView, it must be enabled through the
Hotkeys... dialog box. The hotkey acts as a toggle, so to disable MaxVIEW, simply
press the hotkey again. Some programs, such as Word for Windows, may extend
vertically beyond the visible window, even when MaxVIEW is on.

CenterWINDOW

This feature works when your display is zoomed into an area, or when you have a
virtual **Desktop**. The CenterWINDOW feature will center your display on the cur-
rently active window. Suppose you have four applications opened on your **Desktop**,
and they're not all visible at once. When you want to center your display around one
of them, use Task Manager (Ctrl+Esc) to switch to that application, then use the Cen-
terWINDOW hotkey combination to move the visible area of your Desktop to the
active application. The mouse pointer is positioned in the center of the window.

You must enable this feature through the **Hotkey selection** dialog box. When you
want to center your display around the active application, use the hotkey combina-
tion to call the command. CenterWINDOW works even when your display is
zoomed in on another area, and is only available through a hotkey.

Advanced driver switches
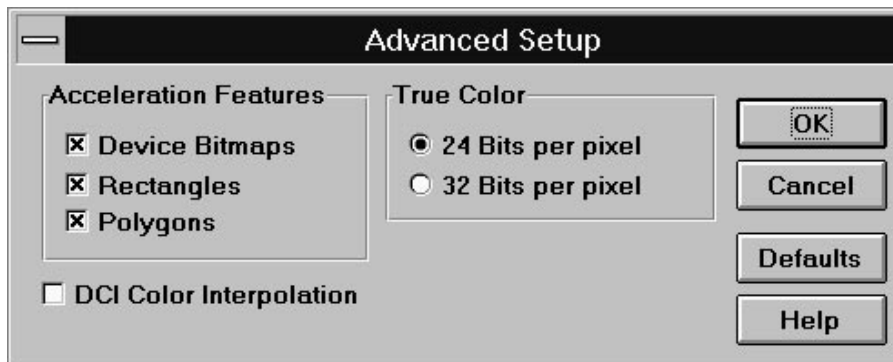
If you click on the **Advanced** button in **MGA Millennium Control Panel**, a dialog
box allows you to configure certain acceleration features of the MGA
Millenniumboard. All of the features are enabled by default, and your board will
work fastest when they are all enabled. The dialog box has check boxes for:

· **Device Bitmaps**: When this check box is enabled, bitmaps will be stored in
  video memory (off-screen) instead of in the RAM on your PC. Keep this
  enabled unless you see your display being redrawn incorrectly within a
  particular application. Then you should disable Device Bitmaps (at least while
  using that application).

- **Rectangles**: When this check box is enabled, bordered rectangles can be drawn in one pass, rather than two passes. Some applications may freeze your system when this is enabled. If one of your applications freezes up, try de-selecting this check box and restarting the application.

- **Polygons:** When this check box is enabled, hardware acceleration is used for drawing complex polygon objects. If complex polygon objects are not drawn properly within a particular application, de-select this check box.

In addition, there is a check box for the DCI driver:

- **DCI Color Interpolation:** DCI Color Interpolation may be used when you stretch a video window to two or more times its original size. It works only with IF09 (Indeo) and YUY2 video color formats, and these formats are only supported in our 16- and 32-bit color modes. See the section on the DCI driver for more details.

There are also buttons to configure the **True Color** mode:

- **24 Bits per pixel**: When this option button is selected, you will have true color with 24 bits per pixel, in a 'packed pixel' mode. This option is slightly faster, and offers you a higher maximum resolution choice than 32 bits per pixel.

  24 bits per pixel mode provides limited DCI video support; we recommend that you use the 32 bits per pixel mode for 'true color' DCI playback.

- **32 Bits per pixel:** Use this option if you require full DCI support. Full support for DCI includes hardware accelerated window stretching, and support for primary and off-screen surfaces.

  When you select this option, **32 Bits per pixel** will replace **24 Bits per pixel** in the Colors panel of the Setup dialog box.

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 in the **Cursor color selection** dialog box.

Other Control Panel buttons

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

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

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

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

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

The default settings for MGA Millennium Control Panel are:

- Current display mode is Mode 1
- Zoom is ×1
- ModeSWITCH is disabled
- **Features** checkboxes are not enabled

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

MGA Quick Access

Changing Display modes

Running the MGA Quick Access program gives you a faster way to access the **Desktop** features of MGA Millennium 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.

Feature 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 the 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.

MGA 3D Screen Saver for Windows

*T*he MGA 3D Screen Saver allows you to have AutoCAD 3D drawings presented as a screen saver display. It also supports DPMS, for EnergyStar monitors. We provide some sample drawings. If you have AutoCAD 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 following diagram.

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.
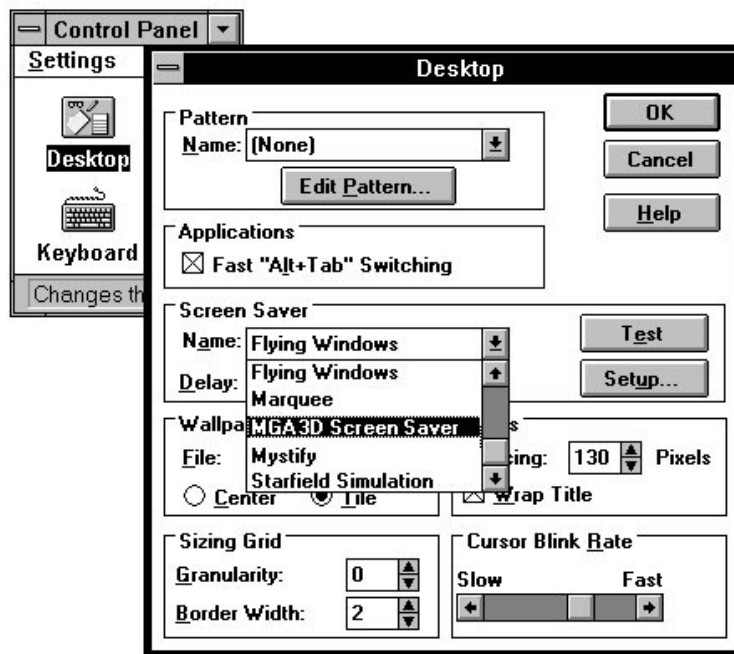
To configure the screen saver click on the **Setup** button. The **MGA 3D Screen Saver Setup** dialog box (shown following) allows you to select the object you want to display and the appearance of this object. Your choice of appearance may be limited by the amount of on-board memory. It is not necessary to have enabled **3D acceleration** in the MGA Control Panel to use the 3D Screen Saver.
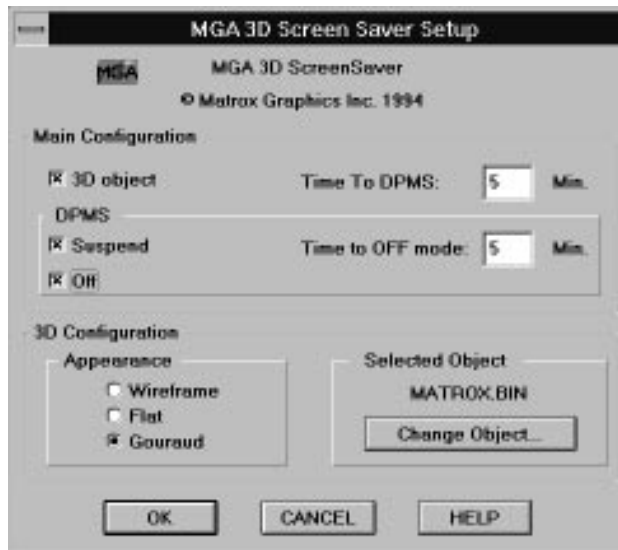
Main configuration panel

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. If you select the wrong type of file you will get a floating MGA icon in place of your selection.

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 for Windows, you can create your own objects. For more information on this, view the on-line Help file or read the section entitled 'Creating a *.bin* file' in the '3D Viewer' chapter of the *MGA Millennium CAD Drivers Guide*.

DPMS for your monitor

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 or EnergyStar monitor*.

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

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, the MGA Millennium BIOS will support it.

MGA DCI Driver

The MGA DCI (Display Control Interface) driver is a Microsoft / Intel compliant driver which accelerates the playback of *Video for Windows* Release 1.1 (*.avi*) and MPEG (*.mpg*) files. You must be using 'DCI-aware' codecs (encoding/decoding software) in order to have video window acceleration.

The DCI driver is always installed by the installation program, but it is enabled at your request only. This can be done when you are installing the driver files. If you wish to enable or disable the DCI driver at later time, you can do this through the MGA *uninstall* program. For more details on this, see the next section.

DCI driver support

The Millennium DCI driver is a full implementation of the DCI specification, which means it supports both the 'Primary Surface' and the 'Offscreen Surface'.

Primary Surface is the minimum implementation. It allows a video codec to download images directly to the Millennium frame buffer, bypassing the Windows GDI and giving you better playback performance. However, if the video window is stretched or the clip is not in the same color format as the driver (i.e. the clip is in a particular YUV format, or in an RGB pixel depth different than the current driver's pixel depth), there is still a significant amount of software overhead that the codec must process.

The **Offscreen Surface** is an optional DCI mechanism by which the codec can off-load the color conversion and/or image stretching to the DCI driver and graphic board hardware. This helps playback performance more than basic Primary Surface support.

The Millennium DCI driver and 2064-W hardware support varies depending on which pixel depth the Windows driver is in:

	Pixel Depth				
	8-bit (LUT)	**16-bit**	**24-bit**	**32-bit**	**ModeSWITCH**
Primary Surface	Yes	Yes	Yes	Yes	No
Off-Screen Surface	RGB8	RGB16 IF09 YUY2	None	RGB32 IF09 YUY2	None

- As shown above, DCI is not available when ModeSWITCH is on, meaning that the playback will rely on the Windows GDI and the display driver. As well, only Primary Surface is supported in 24-bit mode, meaning inferior performance compared to 32-bit mode, particularly if the clip is stretched or is in a particular YUV format. To select 32-bit mode, run **MGA Millennium Control Panel**, click

on the **Advanced** button, and select **32 Bits per pixel**.

- The IF09 surface type is for the Indeo YUV-9 format. The YUY2 surface type is used by most MPEG Software players. In 16- and 32-bit modes, the hardware of the 2064-W is used to perform color conversion, providing a significant increase in performance over a non-DCI configuration.

When a DCI Offscreen surface is used by a codec, the DCI driver is also responsible for the stretching of the image. With the IF09, YUY2, and RGB32, stretching is hardware assisted, avoiding unacceptable playback speed reduction when the image is stretched.

The hardware of the 2064-W can also perform some color interpolation when stretching the video. This feature can be controlled through a switch in the **Advanced** dialog of the **Millennium Control Panel** (enable **DCI Color Interpolation**). In RGB8 (palettized) and RGB16, the stretching is performed by a well-optimized hardware/software algorithm which partially compensates for the additional pixels to output.

The decision to make use of the DCI driver is up to the various codecs (Microsoft's *Video1*, Intel's *Indeo*, *Cinepak*, etc.). Microsoft has put together upgrade packages called 1.1d and 1.1e, which include DCI-aware codecs. These upgrades **must** be installed on your system to get any kind of DCI acceleration. Other codecs not included in this package may not be DCI-compliant.

Even DCI-compliant codecs do not always utilize DCI to the same level. Some, like the Microsoft *MSVIDEO* codec, never use DCI off-screen surfaces, and don't always use the Primary surface mechanism. *Indeo* and *Cinepak* do, however, use the off-screen surfaces.

Generally speaking, for small clips (for instance 160×120 pixels) of low frame rates (for instance 15 fps) DCI is not needed, particularly in 8-bit at low zoom factors. There is no way to detect if the DCI driver is called, and which type of surface is used.

If the performance is not acceptable, you should try to locate the bottleneck:

1. It could be the CD-ROM speed, which can't accomodate the data rate of the clip. If you play your clip from a hard disk, it could be the hard disk access time. In these cases, copying the clip to a 'RAM drive' would eliminate the input drive bottleneck.

2. If the performance is still low, you should check whether DCI was called in the first place. To do this, disable the Millennium DCI driver (just the DCI driver, not the Millennium Windows driver) through the Millennium *uninstall* utility, and

replay the clip. If the performance is about the same, it probably means that DCI was not utilized by the program. In this case, check your clip type, codec type and version.

To get data about a clip:

3. Go to the **Device** menu of your Media Player; it will tell you which MCI device has been loaded to handle your clip (usually *Video for Windows* or some MPEG driver).

4. Click on **Configure** to get more information about the MCI device and (in the case of *Video for Windows*) the actual clip. This will tell you the type of clip it is, its resolution, color format, frames per second, and required data rate. This could help you understand why some of your clips play great and others don't.

To find out the exact frame rate of playback:

5. Configure Media Player for **NO** AutoRewind and **NO** AutoRepeat (**Edit/Option** menu).

6. Configure the *Video for Windows* device to **skip frames if behind** (**Device/Configure** menu).

7. Take note of the total number of frames in the clip. Play the clip. At the end, type Ctrl-F5, to get the **MCI String Command** menu.

8. Type *status frames skipped* in the **Command** box; you will get the number of frames that were skipped.

9. From that number, and the total number of frames, you can get a fairly accurate measure of the real frames per second that the DCI driver can achieve with that clip.

   √ Note that the Ctrl-F5 key to get the **MCI String Command** may interfere with the PowerDesk **PixelTOUCH** key. You may have to disable the **PixelTOUCH** key through the **Millennium Control Panel**.

MGA Uninstall program

*T*he *uninstall* program allows you to disable or remove all or parts of the MGA Millennium Windows and DynaView software. You can start the program from the icon in the **MGA PowerDesk** group. The main dialog box is shown below:

- In the **Windows Driver** panel, you can disable the MGA Millennium driver and switch to the Windows VGA driver at the click of a button. You can still run this program in Windows VGA mode and switch back to the Millennium driver.

- In the **DCI Driver** panel, you can enable or disable the DCI driver.

- The **Uninstall** panel allows you to remove all or parts of the MGA Millennium software. At first, you can only select one or both of the top two options. After you click on **OK**, a dialog box informs you of your choices, and the last checkbox is enabled. If you want to keep the DOS version of MGA *setup* and the *mga.inf* file (so you can use our DOS AutoCAD driver), click on the last checkbox to disable it. When you click on **OK** to proceed, all the selected files will be **deleted** from your hard disk, and all entries for MGA Millennium will be removed from your Windows *.ini* files.

Changing Windows drivers

If you wish to run Windows with a non-VGA driver from another manufacturer without uninstalling the MGA driver, run the Windows *setup* program.

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 Millennium 16-bit 65K Colors*
> *Matrox MGA Millennium 24-bit 16.7M Colors*
> *Matrox MGA Millennium 8-bit 256 Colors*
> *Matrox MGA Millennium 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 Millennium Control Panel program.

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