ATI mach64-GX (ISA) Graphics Option

Owner's Guide

Order Number: EK-ATIMC-OG. A01

This guide describes the installation of the ATI mach64-GX (ISA) Graphics Option on your Digital AlphaServer product.

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Contents

Preface

Purpose of This Guide

This guide describes how to install the ATI mach64-GX (ISA) Graphics Option in your computer system and how to configure the system console and the operating system to recognize the option.

Who Should Use This Guide

This guide is intended for anyone who has purchased the ATI mach64-GX (ISA) Graphics Option, either already installed or as an add-on.

Structure of This Guide

This guide is organized as follows:

- **Chapter 1, Overview**—Provides an overview of the ATI mach64-GX (ISA) Graphics Option.

- **Chapter 2, Digital UNIX and OpenVMS Alpha Installation**—Describes how to install the ATI mach64-GX (ISA) Graphics Option in your Digital AlphaServer running Digital UNIX or OpenVMS Alpha.

- **Chapter 3, Windows NT Installation**—Describes how to install the ATI mach64-GX (ISA) graphics Option in your Digital AlphaServer running Windows NT.

Conventions Used in This Guide

In this guide, every use of Digital UNIX means the Digital UNIX operating system, every use of OpenVMS Alpha means the OpenVMS Alpha operating system, and every use of Windows NT means the Windows NT operating system.

This guide also uses the following conventions:

Convention	Meaning
Note	A Note calls the reader's attention to any item of information that may be of special importance.
Caution	A Caution contains information essential to avoid damage to the equipment.
italic type	*Italic type* indicates complete titles of manuals.
bold type	**Bold type** indicates text that is highlighted for emphasis.

Reader's Comments

Digital welcomes your comments on this or any other manual. You can send your comments to Digital in the following ways:

- Internet electronic mail to : readers_comment@zk3.dec.com

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Overview

This chapter provides a brief overview and the specifications for the ATI mach64-GX (ISA) Graphics Option.

1.1 Module Description

The ATI mach64-GX (ISA) Graphics Option accelerator module is a single expansion-slot 16-bit ISA bus graphics option for use in Digital's AlphaServer 2000/2100 and 400/1000 systems. The option includes 2 Mbytes of DRAM video memory and supports up to 16.7 million colors, refresh rates up to 75 Hz, and display resolutions up to 1280 x 1024.

1.2 Specifications

The specifications for the ATI mach64-GX (ISA) Graphics Option are as follows:

System requirements:	Any Digital AlphaServer in the 2100/2000 and 400/1000 families.
Video port addresses:	102, 1CE, 1CF, 2E8, 2EC, 2ED, 2EE, 2EF, 3D4, 3D5, 3D8, 3D9, 3DA, 3DB, 3C0,3C1, 3C2, 3C3, 3C4, 3C5, 3C6, 3C7, 3C8, 3C9, 3CA,3CC, 3CE, 3CF, 3CD, and all aliases; 46E8.
Video output connector:	15-pin D shell (female)
VGA feature connector:	26-pin header, VGA output only, VESA standard
Sync signals:	Separate horizontal and vertical sync at TTL levels
Video BIOS address:	C000–C7FF
Power:	+5 V +/- 5% at 1.3 A typical
Ambient temperature:	50 to 122° F (10 to 50° C) in operation 32 to 162° F (0 to 70° C) in storage
Relative humidity:	5% to 90% noncondensing in operation 0% to 95% in storage
MTBF:	120,000 hours

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Digital UNIX and OpenVMS Alpha Installation

2.1 Introduction

This chapter describes the installation of the ATI mach64-GX (ISA) Graphics Option in your Digital AlphaServer system. Topics included in this chapter are:

- Unpacking
- Hardware installation
- Firmware configuration
- Operating system driver installation and configuration

2.2 Unpacking

The graphics option hardware and software are packaged in a single carton that contains a circuit card, a Windows NT driver update kit flexible diskette, an OpenVMS Alpha driver update kit flexible diskette, and an owner's guide.

2.3 Hardware Installation

The following section describes how to install the ATI mach64-GX (ISA) Graphics Option circuit card. To install the card, perform the following steps:

_____ **Note** _____

Before installing the circuit card, check your monitor specifications for signal compatibility and supported features with the graphics module.

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_____ **Caution** _____

Static electricity can damage sensitive electronic components. When
handling your graphics circuit card, use an antistatic wriststrap that is
connected to a grounded surface on your computer system.

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1. Remove power from your computer system and disconnect the monitor
   cable.

2. Remove the cover from your computer; refer to your system documentation.

3. If your computer has an existing graphics module, remove the hardware
   that secures it and remove the module.

4. If your system had a previously installed graphics option, you can use
   that slot if it is an EISA/ISA bus, or you can select any empty EISA/ISA
   expansion slot. Remove the slot cover if you are using a new slot.

   Note the slot number for later use.

5. Grasp the top edge of the circuit card and carefully insert it into the slot,
   then firmly seat it.

6. Secure the module retaining bracket.

7. Replace the computer cover.

8. Ensure that the monitor cable is connected to the video output connector
   located on the back of the graphics option card.

2.4 Firmware Configuration

The mach64-GX option is an ISA circuit card that can be installed in either an
ISA bus or an EISA bus. The following sections describe how to configure the
system firmware to recognize the mach64-GX option.

2.4.1 ISA Bus Systems

To configure the firmware in an ISA bus system to recognize the mach64-GX
option, perform the following steps from the SRM console prompt (>>>):

1. Run the ISA Configuration Utility:

   >>> **iconfig**

2. In the table displayed, add **ISA**- -**VGA** in the Name column, tab over to the
   Enabled column and type **Y**, and press **ENTER** twice.

3. Reinitialize the console and implement the changes:

   >>> **init**

4. Optionally, you can verify that the line has been entered:

   >>> **sh conf**

5. Proceed to Section 2.5.

2.4.2 EISA Bus Systems

_____ **Note** _____

The minimum firmware requirements are as follows:

- EISA Configuration Utility—V1.8
- System Consoles
  - AlphaServer 2100/2000—SRM V4.0
  - AlphaServer 1000—SRM V3.0-15
  - AlphaServer 400—SRM BL18

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To install the EISA configuration file in an EISA bus system, perform the
following steps from the SRM console prompt (>>>):

1. Insert the flexible diskette containing the ECU system setup software into
   the drive unit.

2. Run ECU:

   >>> **ECU**

3. Select **Step 2: Add or remove boards**.

4. Select the slot containing the mach64-GX option card.

5. Select OK-Enter to read V1.8 ECU configuration files (.CFG).

6. From the displayed list of configuration files, select **Standard VGA
   Controller (PHI8041.CFG)**.

7. Select the slot containing the mach64-GX option card.

8. Press **F10** to return to the main menu.

9. Select **Step 5: Save and exit** to save the configuration and exit ECU to
   the ARC console (NT).

10. Remove the ECU diskette.

11. Reinitialize your system by soft restart or power cycle to return to the SRM console prompt (>>>).

12. Proceed to Section 2.5.

2.5 Operating System Driver Installation and Configuration

The following sections describe how to configure the operating system for Digital UNIX and OpenVMS Alpha systems.

2.5.1 Digital UNIX Installation

Digital UNIX V3.2c (minimum version) already includes the display driver software required by the mach64-GX option.

If you have purchased a Digital AlphaServer that already has the mach64-GX option installed and you choose to use the factory-installed software, you do not need to take further action.

If you have purchased the mach64-GX option as an add-on or you have chosen not to use the factory-installed software and you choose to do a new Digital UNIX V3.2c installation, you need to install Digital UNIX V3.2c as described in Section 2.5.1.1.

If you have purchased the mach64-GX option as an add-on and your system is currently running Digital UNIX V3.2c, which was upgraded to that version while a graphics option other than the mach64-GX was installed, you need to install the mach64-GX driver software from the Digital UNIX V3.2c installation CD-ROM as described in Section 2.5.1.2.

Optionally, you can change the resolution of the graphics option as described in Section 2.5.1.3.

_____ **Note** _____

When the Digital UNIX system is powered on, the mach64-GX option runs in VGA text mode as a terminal device. If a graphics option other than the mach64-GX was previously running in the system, X/Motif cannot be started until the operating system kernel has been reconfigured.

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2.5.1.1 New Digital UNIX V3.2c Installation

With the mach64-GX option card installed, perform the following steps:

1. Shut down your Digital UNIX system to the SRM console prompt (>>>).

2. Insert the Digital UNIX V3.2c CD-ROM into the system CD-ROM drive unit.

3. Boot the CD-ROM that contains Digital UNIX V3.2c.

4. Refer to your Digital UNIX installation guide and complete the V3.2c installation.

2.5.1.2 Digital UNIX Upgraded to V3.2c with Another Graphics Card Installed

With the mach64-GX option installed, perform the following steps:

1. Install the Digital UNIX V3.2c or greater CD-ROM in the system CD-ROM drive unit.

2. Boot the system disk file **genvmunix** to single-user mode:

   >>> **set boot_osflags " "**
   >>> **boot** -**file genvmunix dka0**

3. Mount the Digital UNIX installation CD-ROM, install the driver software, and rebuild the kernel:

   # **/sbin/bcheckrc**
   # **mount -r /dev/rz6c /mnt**
   # **setld -l /mnt/ALPHA/BASE OSFSERPCI350**
   # **doconfig -c**
   # **cp /sys/hostname/vmunix /vmunix**
   # **halt**

4. Reset the SRM console target boot device to multiuser mode and boot:

   >>> **set boot_osflags A**
   >>> **boot dka0**

5. Upon rebooting, the operating system automatically detects the presence of the mach64-GX option and defaults to the 1024 x 768 display resolution mode.

Installation

2.5.1.3 Changing Digital UNIX Display Characteristics

The resolutions supported by Digital UNIX are as follows:

Resolution	Frequency	Pixel Frequency (MHz)
640 x 480	72	31.5
800 x 600	72	50
1024 x 768	72	75
1280 x 1024	72	119

To change to any one of the other supported resolution and refresh modes, perform the following steps:

1. Change directory to **/var/X11/xdm**:

   # cd /var/X11/xdm

2. Change the mode of **Xservers**:

   # chmod +w Xservers

3. Edit the file **Xservers**:

   # vi Xservers

4. At the end of the line that reads **:0 local /usr/bin/X11/X -nice ...**, append one of the following declarations:

   -screen0 640
   -screen0 800
   -screen0 1024 (default)
   -screen0 1280

   For example, **:0 local /usr/bin/X11/X -nice -2 -screen0 1280**

5. When the editing is complete, save the file and perform a shutdown with automatic reboot to affect the changes:

   # shutdown -r now

2.5.2 OpenVMS Alpha Installation

OpenVMS Alpha Version 6.2 (minimum version) does not include the driver software required by the mach64-GX option. However, this driver software is provided in a graphics update kit supplied on a 3 1/2-inch flexible diskette (kit number QA4X4AA-HC, diskette number AK-QRWHA-CA).

Note

For future releases of OpenVMS Alpha that include the mach64-GX driver on the operating system distribution media, follow the OpenVMS Alpha documentation for installation instructions.

If you have purchased a Digital AlphaServer that already has the ATI mach64-GX option installed and you choose to use the factory-installed software, you do not need to take further action.

If you have purchased the mach64-GX option as an add-on or you have chosen not to use the factory-installed software, you need to set up the operating system and the console software to make the presence of the mach64-GX option known. Optionally, you can change the resolution of the graphics option as described in Section 2.5.2.1.

Note

When OpenVMS Alpha is powered on, the mach64-GX option runs in VGA text mode as a terminal device. X/Motif cannot be started until this installation procedure has been completed.

With the mach64-GX option installed, set up the OpenVMS Alpha operating system by performing the following steps:

1. Log in to the system account from the graphics head or a serial terminal.

2. Mount the OpenVMS Alpha graphics flexible diskette that contains the update kit (kit number QA-4X4AA-HC, diskette number AK-QRWHA-CA):

   $ MOUNT DVA0: /OVER=ID

3. Invoke the VMSINSTAL program:

   $ @SYS$UPDATE:VMSINSTAL AXPGUP01_062.A DVA0:

4. Follow the instructions displayed. When completed, the program forces a shutdown and a reboot.

5. During reboot, the operating system detects the presence of the mach64-GX option and defaults to the 1024 x 768 display resolution mode.

Note

During reboot, the system display may momentarily appear distorted. This condition corrects itself when the DECwindows server comes up. If you have a multisync monitor, you can adjust it to remove the distortion.

2.5.2.1 Changing OpenVMS Alpha Display Characteristics

The resolutions supported by OpenVMS Alpha are as follows:

Resolution	Frequency	Pixel Frequency (MHz)
640 x 480	72	31.5
800 x 600	72	50
1024 x 768	72	75
1280 x 1024	72	119

Note

Although the 640 x 480 and 800 x 600 resolutions are available, Digital does not recommend their use because many X11/Motif applications make assumptions about minimum screen size.

To change to any of the other supported resolution and refresh modes, perform the following steps:

1. Copy the DECwindows server setup template to a command file:

    $ COPY SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.TEMPLATE SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM

2. Edit the file **SYS$MANAGER:DECW$PRIVATE_SERVER_SETUP.COM** to add the following lines in the **Cluster Common or Standalone Workstation Setup** area of the file along with the other setup options:
    DECW$XSIZE_IN_PIXELS = = 1280
    DECW$YSIZE_IN_PIXELS = = 1024
    DEFINE/SYSTEM DECW$SERVER_FIFO_LOW_WATER_MARK 8

If you use the 1024 x 768 resolution, you can enhance performance by defining the following logical in the private server setup file:

$ DEFINE/SYSTEM DECW$SERVER_FIFO_LOW_WATER_MARK 4

If random line flashing occurs, increase the value and restart the server. The default value of 8 is required for the 1280 x 1024 resolution.

_____ **Note** _____

Refer to the mach64-GX OpenVMS Alpha release notes for **LOW_WATER_MARK** settings for other supported resolutions.

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3. Invoke the shutdown and reboot process:

   $ @SYS$SYSTEM:SHUTDOWN

4. Continue to use the defaults until prompted to reboot and then press **Y** to reboot.

5. During reboot of OpenVMS Alpha, the new characteristics are loaded and the mach64-GX option comes up in the selected display mode.

_____ **Note** _____

During reboot, the system display may dim momentarily. This condition corrects itself when the DECwindows server comes up.

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Windows NT Installation

3.1 Introduction

This chapter describes the installation of the ATI mach64-GX (ISA) Graphics
Option in your Digital AlphaServer system. Topics included in this chapter
are:

- Unpacking
- Windows NT installation procedure
- Hardware installation

3.2 Unpacking

The graphics option hardware and software are packaged in a single carton
that contains a circuit card, a Windows NT driver update kit flexible diskette,
an OpenVMS Alpha driver update kit flexible diskette, and an owner's guide.

3.3 Windows NT Installation

Windows NT Version 3.51 (minimum version) does not include the graphics
driver required by the mach64-GX option. However, this driver software is
provided in a graphics update kit supplied on a 3 1/2-inch flexible diskette (kit
number QA-4X3AA-HC, diskette number AK-QRWJA-CA).

_____ **Note** _____

For future releases of Windows NT that include the mach64-GX option
driver on the operating system distribution media, follow the Windows
NT documentation for installation instructions.

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Windows NT Installation

> **Note** _____
>
> The minimum firmware requirements are as follows:
>
> • EISA Configuration Utility—V1.8
>
> • System Consoles
>
>   – AlphaServer 2100/2000—SRM V4.0
>
>   – AlphaServer 1000—SRM V3.0-15
>
>   – AlphaServer 400—SRM BL18

If you have purchased a Digital AlphaServer that already has the mach64-GX option installed, the graphics update kit has already been installed and you do not need to take further action.

> **Note** _____
>
> If a graphics option other than the mach64-GX option was previously operating in the system, keep that option installed while changing over to the mach64-GX option driver. If the previously installed graphics option is not available or it is not operational, reinstall Windows NT using the procedure described in Section 3.3.2.

If you have purchased the mach64-GX option as an add-on or you have chosen not to use the factory-installed software, install the Windows NT graphics update kit by performing the following steps:

1. From the Main menu, choose the **Control Panel** option.

2. In Control Panel, choose on the **Display** option.

3. In the Display Settings dialog box, click on the **Change Display Type** button. The Display Type dialog box lists information about the current driver.

4. In the Adapter Type dialog box, click on the **Change** button. The Select Device dialog box shows a list of current devices.

5. Insert the flexible diskette containing the Windows NT graphics update kit (kit number QA-4X3AA-HC, diskette number AK-QRWJA-CA) into the drive unit.

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

7. In the Install From Disk dialog box, enter the location of the diskette (the default is A:\) and click on the **OK** button.

8. From the list of software contained on the diskette, select the **ATI Graphics Accelerators**.

9. In the Select Device dialog box, click on the **Install** button.

10. In the Installing Driver dialog box, click on the **Yes** button.

11. Click on the **Restart now** button to start the system shutdown and reboot process.

12. When the display goes to the ARC Multiboot blue screen, you can remove power from your computer system and install the mach64-GX option circuit card as described in Section 3.4.

13. When the system reboots, the graphics driver is loaded and the mach64-GX option comes up in the 640 x 480 default mode.

14. Proceed to Section 3.4.

3.3.1 Changing Windows NT Display Characteristics

The resolutions supported by Windows NT are as follows:

Resolution	Colors	Pixel Frequency (MHz)
640 x 480	16, 256, 65536, 167772	60, 72
800 x 600	16, 256, 65536, 167772	60, 72
1024 x 768	16, 256, 65536, 167772	60, 70, 72
1280 x 1024	16, 256, 65536, 167772	60, 70

To change display resolution and refresh from the Windows NT Control Panel, perform the following steps:

1. Double click on the Display icon in the Control Panel dialog box and go through the following process:

   List modes
   Select a mode
   TEST

   The testing operation confirms that the monitor properly synchronizes in the selected mode. If the monitor synchronizes but the display appears geometrically distorted, you must adjust the monitor geometry controls after rebooting.

2. If the test bitmap was properly displayed, continue to respond affirmatively to the dialog boxes and when prompted, select **Restart now** to reboot.

3. When rebooted, the new display characteristics are loaded and the mach64-GX option comes up in the new display mode.

3.3.2 Custom Windows NT Installation

If the previously installed graphics option was not available, you must reinstall Windows NT.

With the mach64-GX option installed in your computer system, perform the following steps:

1. From the ARC Multiboot blue screen menu, select **Supplementary Menu**.

2. Select **Install Windows NT from CD-ROM**.

3. Within the Windows NT Workstation Setup process, the system queries for either **Express Setup** or **Custom Setup** installation. Select **C** for custom installation. If you encounter difficulty, refer to the Windows NT installation guide for guidance.

4. Early in the Custom Setup process, the program queries for either a **New Version** or an **Upgrade**. Select **N** for new version.

5. A list of hardware and software components is displayed. Use the up or down arrow key in the **Display** field to select the desired display and press Return.

6. Install the Windows NT driver diskette in the drive unit.

7. Scroll down to the **Other** option and follow the instructions displayed.

8. When queried, select the **ATI Graphics Accelerators** option and press Return.

9. Press Return again to continue and follow the Windows NT installation process instructions.

Note

Near the end of the first half of the Windows NT Setup process, an automatic reboot is invoked. Setup then continues in graphical mode. If you experience any difficulty, refer to the Windows NT installation guide for guidance.

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10. Near the end of the last half of the Windows NT Setup process (after the point where the system clock is set), a dialog box appears, acknowledging the presence of the mach64-GX option. Click on the **OK** button to proceed and select the **List all modes ...** option.

11. Set up a new default display mode as instructed in Section 3.3.1.

12. When Windows NT reboots, the new display characteristics are loaded and the mach64-GX option comes up in the selected display mode.

_____ **Note** _____

When updating from an older to a newer version of the driver software, you may have to perform a cold reboot to load the **ATI.DLL** file.

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13. Proceed to Section 3.4.

3.4 Hardware Installation

This section describes how to install the mach64-GX option circuit card. To install the card, performs the following steps:

_____ **Note** _____

Before installing the circuit card, check your monitor specifications for signal compatibility and supported features with the graphics module.

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_____ **Caution** _____

Static electricity can damage sensitive electronic components. When handling your graphics circuit card, use an antistatic wriststrap that is connected to a grounded surface on your computer system.

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1. Remove power from your computer system and disconnect the monitor cable.

2. Remove the cover from your computer; refer to your system documentation.

3. If your computer has an existing graphics module, remove the hardware that secures it and remove the module.

Windows NT Installation

4. If your system had a graphics option installed, you can use that slot if it is an EISA/ISA bus or you can select any empty EISA/ISA expansion slot. Remove the slot cover if you are using a new slot.

   Note the slot number for later use.

5. Grasp the top edge of the circuit card and carefully insert it into the slot, then firmly seat it.

6. Secure the module retaining bracket.

7. Replace the computer cover.

8. Ensure that the monitor cable is connected to the video output connector located on the back of the graphics option card.