# Declaration of Conformity

We, Manufacturer/Importer

(full address)

**G.B.T. Technology Träding GMbH**

**Ausschlager Weg 41,1F, 20537 Hamburg, Germany**

declare that the product

( description of the apparatus, system, installation to which it refers)

**VGA Card**

GV-R9000

is in conformity with

(reference to the specification under which conformity is declared)

in accordance with 89/336 EEC-EMC Directive

| | | | | |
|---|---|---|---|---|
| ☐ EN 55011 | Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM high frequency equipment | ☐ EN 61000-3-2*<br>☒ EN 60555-2 | | Disturbances in supply systems cause by household appliances and similar electrical equipment "Harmonics" |
| ☐ EN 55013 | Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment | ☐ EN 61000-3-3*<br>☒ EN 60555-3 | | Disturbances in supply systems cause by household appliances and similar electrical equipment "Voltage fluctuations" |
| ☐ EN 55014 | Limits and methods of measurement of radio disturbance characteristics of household electrical appliances, portable tools and similar electrical apparatus | ☒ EN 50081-1 | | Generic emission standard Part 1: Residual commercial and light industry |
| | | ☒ EN 50082-1 | | Generic immunity standard Part 1: Residual commercial and light industry |
| ☐ EN 55015 | Limits and methods of measurement of radio disturbance characteristics of fluorescent lamps and luminaries | ☐ EN 55081-2 | | Generic emission standard Part 2: Industrial environment |
| ☐ EN 55020 | Immunity from radio interference of broadcast receivers and associated equipment | ☐ EN 55082-2 | | Generic emission standard Part 2: Industrial environment |
| ☒ EN 55022 | Limits and methods of measurement of radio disturbance characteristics of information technology equipment | ☐ ENV 55104 | | Immunity requirements for household appliances tools and similar apparatus |
| ☐ DIN VDE 0855<br>☐ part 10<br>☐ part 12 | Cabled distribution systems; Equipment for receiving and/or distribution from sound and television signals | ☐ EN50091-2 | | EMC requirements for uninterruptible power systems (UPS) |
| ☒ CE marking | | | | (EC conformity marking) |

CE

**The manufacturer also declares the conformity of above mentioned product**
**with the actual required safety standards in accordance with LVD 73/23 EEC**

| | | | |
|---|---|---|---|
| ☐ EN 60065 | Safety requirements for mains operated electronic and related apparatus for household and similar general use | ☐ EN 60950 | Safety for information technology equipment including electrical bussiness equipment |
| ☐ EN 60335 | Safety of household and similar electrical appliances | ☐ EN 50091-1 | General and Safety requirements for uninterruptible power systems (UPS) |

<u>Manufacturer/Importer</u>

(Stamp)

Date: Aug. 21, 2002

Signature: *Timmy Huang*

Name: Timmy Huang

# DECLARATION OF CONFORMITY

Per FCC Part 2 Section 2.1077(a)

**Responsible Party Name: G.B.T. INC. (U.S.A.)**

**Address: 17358 Railroad Street**

**City of Industry, CA 91748**

**Phone/Fax No: (818) 854-9338/(818) 854-9339**

hereby declares that the product

**Product Name: VGA Card**

**Model Number: GV-R9000**

Conforms to the following specifications:

FCC Part 15, Subpart B, Section 15.107(a) and Section 15.109 (a),Class B Digital Device

**Supplementary Information:**

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful and (2)this device must accept any inference received, including that may cause undesired operation.

Representative Person's Name: ERIC LU

Signature: *Eric Lu*

Date: Aug. 21, 2002

# GV-R9000

## Radeon 9000 Graphics Accelerator

# USER'S MANUAL

# *Chapter 1 User's Manual*

## Copyright

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## Notice

Due to rapid change in technology, some of the specifications might be out of date before publication of this booklet.

The author assumes no responsibility for any errors or omissions which may appear in this document nor does it make a commitment to update the information contained herein. Please do not remove any labels on VGA card , this may void the warranty of this VGA card.

Sep. 17, 2002 Taipei, Taiwan

# Table of Contents

# 1. INTRODUCTION

## 1.1. PREFACE

GV-R9000 provides high-end performance to the mainstream graphics market at a competitive price point. GV-R9000 features four parallel, highly optimized rendering pipelines usually available only for the high-end gaming cards that significantly enhance performance and game-play responsiveness by doubling the pixel fill rate compared to the standard 2-pipeline architectures found in most mid-range products.

## 1.2. KEY FEATURES

- Powered by ATi Radeon 9000 GPU with 64MB DDR SDRAM
- 250MHz engine and 200MHz memory clock speeds
- SMARTSHADER™ technology fully supports DirectX® 8.1
- Sharper-looking 3D graphics with ATI SMOOTHVISION™ technology
- Dual display support with HYDRAVISION™
- Featuring ATI CATLYST™ - Industry-leading software suite
- TV-Out supported

# 2. HARDWARE INSTALLATION

## 2.1. UNPACKING

The GV-R9000 package contains the following:

● The GV-R9000 Graphics Accelerator
● This USER'S MANUAL
● The GV-R9000 Driver CD x 1
● Power DVD XP CDx1
● Game CD x 2
● One cable support S-video and AV-Output

---

## ⚠ WARNING!

Expansion cards contain very delicate Integrated Circuit (IC) chips. To protect them against damage from static electricity, you should follow some precautions whenever you work on your computer.

1. Turn off your computer and unplug power supply.
2. Use a grounded wrist strap before handling computer components. If you do not have one, touch both of your hands to a safely grounded object or to a metal object, such as the power supply case.
3. Place components on a grounded antistatic pad or on the bag that came with the components whenever the components are separated from the system.

The card contains sensitive electric components, which can be easily damaged by static electricity, so the card should be left in its original packing until it is installed.

Unpacking and installation should be done on a grounded anti-static mat. The operator should be wearing an anti-static wristband, grounded at the same point as the anti-static mat.

Inspect the card carton for obvious damage. Shipping and handling may cause damage to your card. Be sure there are no shipping and handling damages on the card before proceeding.

💣 **DO NOT APPLY POWER TO YOUR SYSTEM IF IT HAS BEEN DAMAGED ON THE CARD.**

💣 **In order to ensure your graphics card working correctly, please use official Gigabyte BIOS only. Use none official gigabyte BIOS might cause problem on the graphics card.**

---

**English** (left margin)

## 2.2. BOARD LAYOUT

GV-R9000 (64MB DDR)



TV-Out

VGA Monitor
Connector
(15pin)



AV Output

NTSC / PAL TV

S-VideoOutput

Projector

TV-out

VGA Monitor
Connector
(15pin)

OR     VGA Output

Analog LCD Monitor     Analog Monitor
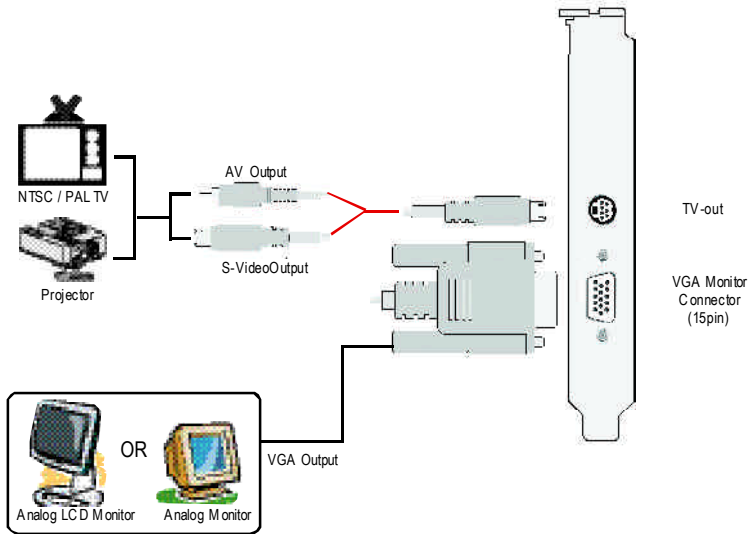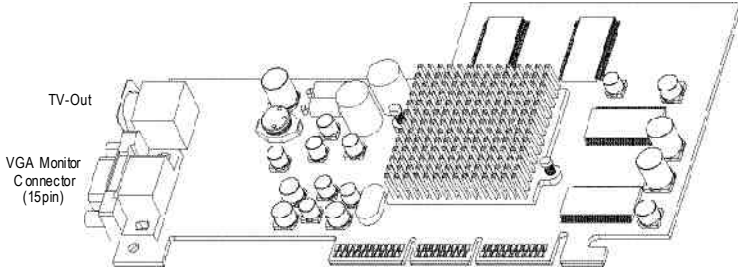
## 2.3. HARDWARE INSTALLATION

Installing Your Graphics card.

Now that you have prepared your computer, you are ready to install your graphics accelerator card.

**To install your graphics accelerator card:**

1. Power off the computer and monitor, then disconnect the display cable from the back of your computer.

2. Remove the computer cover. If necessary, consult your computer's manual for help in removing the cover.
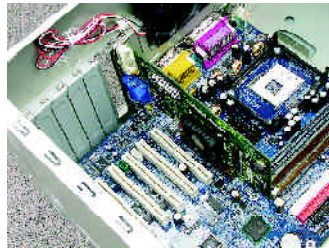
3. Remove any existing graphics card from your computer.

   Or, if your computer has any on-board graphics capability, you may need to disable it on the motherboard. For more information, see you computer documentation.

4. Locate the AGP slot. If necessary, remove the metal cover from this slot; then align your Graphics card with the AGP slot, and press it in firmly until the card is fully eated.
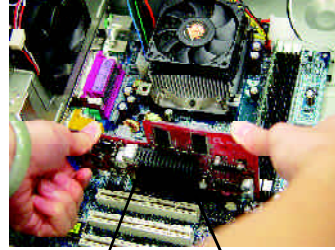
GV-R9000 Graphics card      AGP Slot

5. Replace the screw to fasten the card in place, and replace the computer cover.

6. Plug the display cable into your card; then turn on the computer and monitor.

To TV or VCR

To VGA MONITOR

You are now ready to proceed with the installation of the Graphics card driver. For detailed instructions, select your operating system from the list below.

# 3. SOFTWARE INSTALLATION

**In this manual, we assume that your CD-ROM Drive letter to be Drive D:**

## 3.1. WINDOWS® 98 /98SE / WINDOWS® ME / WINDOWS® XP DRIVER AND UTILITIES INSTALLATION

The installation of Win® 98/98SE / Win® ME / Win® XP drivers is very simple. When you insert the driver CD into your CD-ROM drive, you can see the AUTORUN window (if it does not show up, run "D:\setup.exe"). Then you can follow guides to setup your GV-R9000 driver (Please follow the subsection 3.1.3 "Step By Step Installation" to install the driver for your GV-R9000 graphics accelerator.

### 3.1.1. OPERATING SYSTEM REQUIREMENT

● If your OS is Microsoft Windows, when loading the GV-R9000 drivers for the system, please make sure your system (Windows 98/98SE, Windows2000 or Windows ME) has installed DirectX8.1 or later.

● If you install the GV-R9000 drivers for the motherboard, which consist of SIS, ALI or VIA chipsets, please install the appropriate Driver program for that motherboard. Or please contact your motherboard nearest dealer for M/B Driver.

### 3.1.2. DIRECTX INSTALLATION

Install Microsoft DirectX 8.1 to enable 3D hardware acceleration support for Windows®
98/98SE/ Windows® 2000 / or Windows® ME to achieve better 3D performence.

◆ Note: For software MPEG support in Windows® 98/ 98SE/ Windows® 2000 or
Windows® ME, you must install DirectX8.1(or later) first. (If your OS is Windows® XP,
please skip this section.)
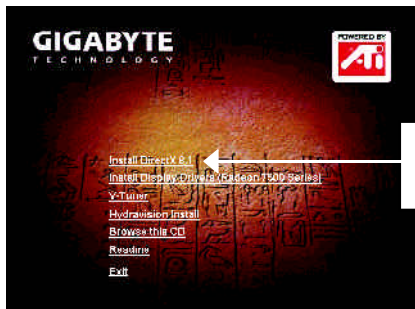


1. Install DirectX Driver:
   Click "Install DirectX 8.1" Item.



2.Click "Yes" icon.



3.Click "Yes" icon.

4.Click "OK" item.
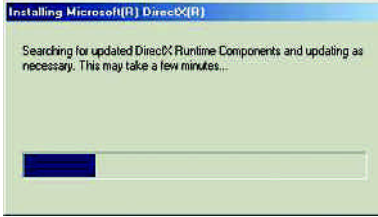
Then the DirectX 8.1 installation is completed.
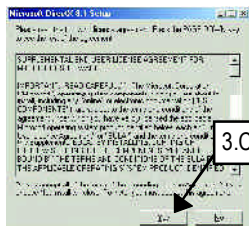
### 3.1.3. DRIVER INSTALLATION

The following is the step-by-step installation guide.

**Step 1: New Hardware Found**

After GV-R9000 is inserted into your computer at the first time, the windows will automatically detect a new hardware in the system and pop out a "New Hardware Found" message. Please select "Do not install a driver" and press OK.

**Step 2: Update Device Driver Wizard: Standard PCI Graphics Adapter(VGA)**



1.Click "Next" icon.

🔥 **Don't click "Cancel", because the system will hang if you press it.**
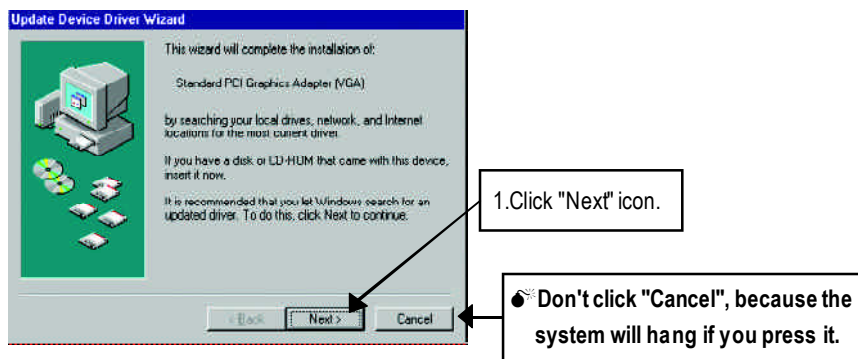
**Step 3: Update Device Driver Wizard: Finish**

At this time, system will ask for your Windows CD in order to complete the VGA driver installation.

If you don't have the CD, you can press C:\Windows\System directory.

**Step 4: System Setting Change**



2.Click "Finish" icon.

**System Settings Change**

To finish setting up your new hardware, you must restart your computer.

Do you want to restart your computer now?

Yes     No

3..Click "No" icon.

After the system has finished loading, insert the GV-R9000 driver CD disk into your CD-ROM, and then you can see the AUTORUN window. If it does not show up, please run "D:\setup.exe".

**Step 5: Driver Setup**
**(Pictures below are shown in Windows XP)**

GIGABYTE
TECHNOLOGY

POWERED BY ATi

Windows XP Drivers (Radeon 9000 Series)
ATI WDM Driver (MVOF
V-Tuner
Hydravision Install
Browse this CD
Readme
Exit
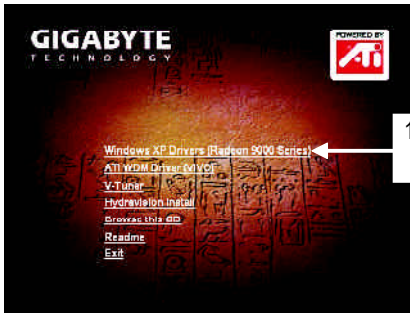
1. Click "Windows XP Drivers (Radeon 9000 Series)" item.

**InstallShield Wizard**

ATI Software Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.

Cancel

**ATI Software**

Welcome to the InstallShield Wizard for ATI Software.

The InstallShield Wizard will install ATI Software on your computer. To continue, click Next.

2.Click "Next".

3.Click "Yes".

4. Click "Express" or "Custom" icon.

5. Click "Finish" to restart computer.

After installation of the display drivers, you will find an ATI icon ATI on the taskbar's status area. Clicking this icon open the ATi control panel.

**HYDRAVISION™**

HYDRAVISION™ and the Desktop Manager are activated whenever Windows® starts. Installing HYDRAVISION™ adds menu options to the ATI Icon.

Click on the ATI icon to access the application's features and help, or to unload the HYDRAVISION™ Desktop Manager.



1.Using Single Display



2.Hydravision

HYDRAVISION™ is primarily software designed for multiple monitor settings. RADEON 9000 graphic cards that have more than one display output can benefit fully from this software. A RADEON 9000 with only one display output can still take advantage of the many features of HYDRAVISION™.

HYDRAVISION™ installation enables the Desktop Manager and creates a Windows® program group for HYDRAVISION™ display management software.

### 3.1.4. DISPLAY PROPERTIES PAGES

The screen shows the information of display adapter, color, the range of display area and the refresh rate.

<u>Settings (Resolutions and Color depth for windows)</u>

The Setting properties page allows you to adjust the Direct 3D settings.



You can move the slider to the change resolution.

You can click the item to change the color depth.

Click "Advanced" icon for adapter and setting.
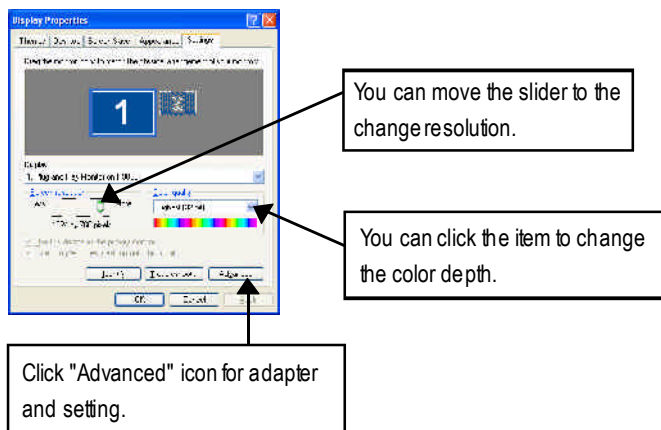
Click "Advanced", into details settings:

<u>Options Properties</u>
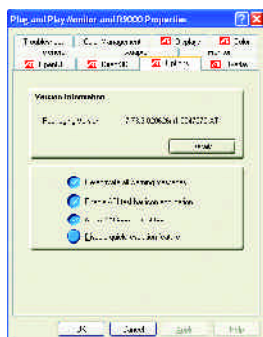


- **Version Information** provides the Catalyst version number, 2D version number and the driver build information.
- **Details button** access to the Details tab which lists the card's hardware details and driver information.
- **Re-activate all warning messages** allows you to reactivate any disabled graphics warning messages.
- **Enable ATI taskbar icon application** enables or disables the ATI taskbar icon. However, this feature must be enabled for ATI hotkey support.

- **Show ATI icon on taskbar** adds or removes the ATI icon from the taskbar.
- **Disable quick resolution feature** is accessible by left-clicking the ATI icon in the taskbar.

<u>**OpenGL Properties:**</u>

The OpenGL properties page gives you complete control of the OpenGL settings.
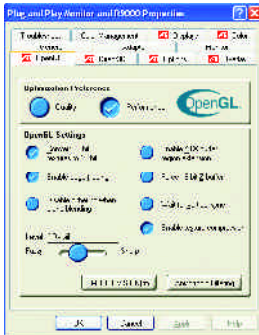


- ■ **Optimization Preference**
  - ● **Quality** allows you to optimize your OpenGL settings for quality.
  - ● **Performance** allows you to optimize your OpenGL settings for performance.
- ■ **OpenGL Settings**
  - ● **Convert 32 bit textures to 16 bit** allows you to increase video performance for games that make heavy use of textures. However this could also reduce image quality.
- ● **Enable KTX buffer region extension** enables rapid updates of those portions of your screen that have been moved.
- ● **Enable page flipping** allows you to enable hardware acceleration of page flipping to swap full screen buffers.
- ● **Force 16-bit Z-buffering** allows you to disable all other formats of Z-buffer and utilizes 16-bit Z-buffering.
- ● **Disable dithering when alpha blending** may remove artifacts left on the screen when both dithering and alpha blending are enabled.
- ● **Wait for vertical sync** lowers the frames per second rate in full screen games However this can reduce the image tearing that can occur with higher frame rates.
- ● **Enable texture compression** enables and disables texture compression.
- ■ **Level of Detail** allows you to set the level of mipmapped detail.
  The **Sharp** setting is recommended for larger, more detailed, mipmapping scenes.
  The **Fuzzy** setting is recommended for smaller, less detailed, mipmapping scenes.
- ■ **SMOOTHVISION(tm) button** SmoothVision (Anti-Aliasing) improves image quality by removing jagged edges from 3D images, resulting in smoother, more natural-looking objects. Selecting **Application Preference** will result in high quality images, with a negligible reduction in the application's performance.
- ■ **Anisotropic filtering button** allows you to set a level of anisotropic texture filtering. This will result in much higher quality textures with a negligible reduction in performance.

## Direct 3D Display Properties

The Direct 3D properties page allows you to adjust the Direct 3D settings.
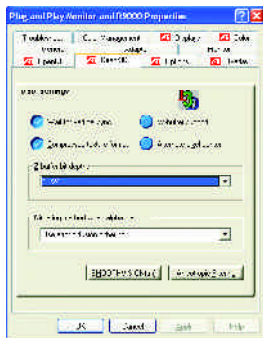


■ **D3D Settings**

● **Wait for vertical sync** allows you to lower the frame rate of full screen games. This will reduce image tearing that can occur with higher frame rates.

● **W-buffer support** allows you to enable or disable W-buffer support. It is recommend that W-buffer support should be disabled for games that do not support this feature.

● **Compressed texture format** allows you to enable support for DirectX compressed texture formats. Some applications cannot handle too many texture formats. Disabling compressed texture format the video driver ceases to support this feature.

● **Alternate pixel center** may eliminate problems with some 3D games that displays vertical and horizontal lines around textures or text that appears incorrect. However, this setting should only be used if you are experiencing these symptoms, as it may cause problems with other games.

■ **Z-buffer bit depths** allows you to set the Z-buffer bit rate. By default 16:24 (16 and 24) selected to achieve optimum performance.

8-bit stencil allows you to add 32-bit Z-buffer with 8 bits for stencil and 24 bits for the Z-buffer.

■ **Dithering method when alpha blending** will remove certain onscreen artifacts that are sometimes produced when both dithering and alpha blending are enabled.

## Color Properties

**The Color Properties** is used to adjust the color settings. It also allows gamma control for video playing of the Video Overlay. The color settings affect all display devices mapped to the view. You can change red, green, and blue display colors. Set Desktop and Video Overlay brightness (gamma) levels can also be changed.
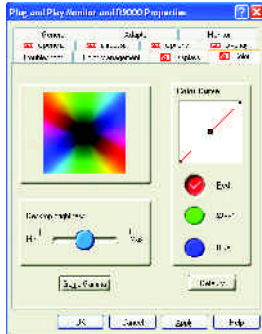


■ **Desktop brightness** increases or decreases the color brightness of your desktop. The higher the gamma value, the higher the brightness and contrast of your display.

■ **Color Curve** adjusts the selected color (red, green or blue) by moving the color curve with your mouse.

■ **Game Gamma button** accesses Game Gamma properties.

■ **Default** resets the desktop brightness and color settings to the default values.
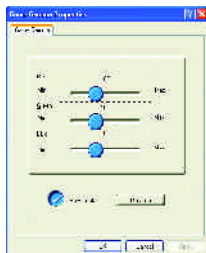


■ **Red / Green / Blue sliders** These controls allow you to increase or decrease the color brightness of Direct 3D and OpenGL games played in fullscreen mode.
(NOTE: Game Gamma is NOT supported in Windows NT4.0)

■ **RGB Lock** adjust the RGB sliders individually or adjust all three sliders at the same time.

■ **Default** resets the Game Gamma settings to the default values.

**Display Properties:**

If your VGA card is equipped with a S-Video connector, you can use a second output device (e.q. a TV or a computer monitor) as part of your operating desktop extending your desktop to second device or copying your desktop on the second device.
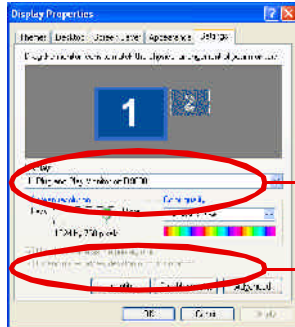


Select Display Type

Enable / Disable "Extend my windows desktop onto this monitor"
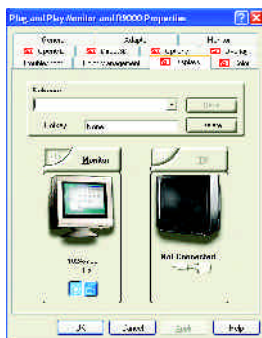


The Display tab provides the multi monitor features. Here you can enable/disable display devices and swap the assignment of **Primary** and **Secondary** displays.

**Connecting your graphics card to a TV or VCR**

Turn off your computer and your television (or VCR).

Ensure your graphics card is installed correctly.

For information about placing the card in your computer and installing the enhanced graphics driver, see the user's manual.

Determine if your television (or VCR) has an S-Video or Composite video connection.

Looking at the back of your computer, locate your graphics card. Using an S-Video cable or the supplied adapter cable, attach one end of the cable to your graphics card and the other to your television (or VCR). See "Connecting your graphics card to a TV (or VCR)" on the following page.

### Overlay Properties

**The Overlay Properties** is used to adjust the Brightness / Contrast / Saturation / Hue / Gamma settings.



■ **Overlay Adjustments**
- **Brightness** allows you to adjust the brightness of the video image.
- **Contrast** allows you to adjust the contrast in the video image.
- **Saturation** allows you to adjust the vividness of the color. Sliding it all the way to the left removes all color and produces a black and white picture.
- **Hue** allows you to adjust the pureness or tint of the red, green and blue components of the color.
- **Gamma** allows you to adjust the overall intensity of the video image.

■ **Difaults button** allows you to reset the Overlay settings to default values.

## 3.2. WINDOWS 2000 DRIVER INSTALLATION

Please make sure the Windows® 2000 have installed Windows® 2000 Service Pack version 2 (or later) before installing the graphics accelerator driver.

With Windows® 2000 running on your computer, you need to install the GV-R9000 driver to take advantage of the higher performance, resolutions, and special graphic features of the Graphics card. To ensure you install the latest driver, use the Installation CD that shipped with your GV-R9000 graphics card.

To install the GV-R9000 driver for Windows® 2000

1. Insert the INSTALLATION CD into your CD-ROM drive. If Windows® runs the CD automatically.
2. Click Start.
3. Select Run.
4. Type the following:
   D:\SETUP
   (If D is not your CD-ROM drive, substitute D with the correct drive letter.)
5. Click "OK".
6. Click on "Install Display Drivers(Radeon 9000 Series)" to begin the Installation Wizard.
7. Click "Next".
8. Click "Yes" to the license agreement.
9. Follow the Wizard's on-screen instructions to complete the installation.

## 3.3. BIOS FLASH UTILITY

**GV-R9000** BIOS update procedure:
  ☀Note: Please download the newest BIOS from our website (www.gigabyte.com.tw) or contact your local dealer for the file.
  ☀If you want to realize the BIOS flash information, please refer to detail on P.24.

---

# 4. Troubleshooting Tips

The following troubleshooting tips may help if you experience problems. Contact your dealer or GBT for more advanced troubleshooting information.

■ Check that the card is seated properly in the AGP slot.

■ Ensure that the display cable is securely fastened to the card's display connector.

■ Make sure that the monitor and computer are plugged in and receiving power.

■ If necessary, disable any built-in graphics capabilities on your motherboard. For more information, consult your computer's manual or manufacturer.

(NOTE: Some manufacturers do not allow the built-in graphics to be disabled or to become the secondary display.)

■ Make sure you selected the appropriate display device and graphics card when you installed the graphics driver.

■ If you have problems during bootup, start your computer in Safe Mode. In Windows® 98 SE and Windows® Me, press and hold the CTRL key until the Microsoft® Windows® Startup Menu appears on the screen. Then select the number for Safe Mode, and press Enter. (You can also use F8 to bring up the Microsoft Windows® Startup Menu.) In Safe Mode, bring up the Device Manager and check for duplicate display adapter and monitor entries if you are only using one graphics card.

■ For more assistance, use the Troubleshooting Guide located in the Windows® Help or contact your computer manufacturer.

⚠ If necessary, adjust your monitor's setting by monitor's adjust panel to make the screen looks focused, crisp, and sharp. (Please refer to the monitor's manual.)

# 5. Appendix

## 5.1. How to reflash the BIOS

How to reflash the BIOS for your graphics card?

1. Extract the Zip file to the drive C: or A:





2. Restart your PC in MS-DOS mode

   (This function only for Windows® 95 or Windows® 98 AIf your OS is Windows 2000 /
   Windows Me / Windows XP. Aplease use the bootable disk to MS-DOS mode)

3. Change the command path to the file location C:\> or A:\>
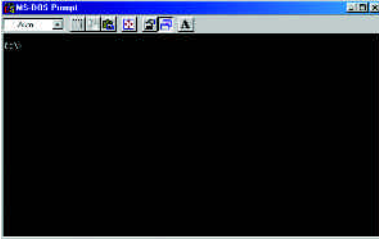


4. Reflash BIOS command as below : C:\> atiflash -p 0 <filename>
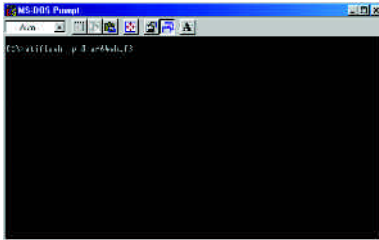


5. Reboot your PC when it's done.

## 5.2. Resolutions and Color Depth Table (In Windows XP)

### Radeon 9000 2D Single Display Modes

| Display Screen Resolution | Refresh Rate (Hz) | Color Depth (bpp) | | |
|---|---|---|---|---|
| | | 8bpp(256 color) Standard mode | 16bpp(65K color) High mode | 32bpp(16.7M) True mode |
| **640 x 480** | 60 | ✓ | ✓ | ✓ |
| | 72 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| | 120 | ✓ | ✓ | ✓ |
| | 160 | ✓ | ✓ | ✓ |
| | 200 | ✓ | ✓ | ✓ |
| **800 x 600** | 47 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 56 | ✓ | ✓ | ✓ |
| | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 72 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| | 120 | ✓ | ✓ | ✓ |
| | 160 | ✓ | ✓ | ✓ |
| | 200 | ✓ | ✓ | ✓ |
| **1024 x 768** | 43 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 72 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| | 120 | ✓ | ✓ | ✓ |
| | 150 | ✓ | ✓ | ✓ |
| | 160 | ✓ | ✓ | ✓ |
| | 200 | ✓ | ✓ | ✓ |

To be continued...

| Display Screen Resolution | Refresh Rate (Hz) | Color Depth (bpp) 8bpp(256 color) Standard mode | 16bpp(65K color) High mode | 32bpp(16.7M) True mode |
|---|---|---|---|---|
| **1152 x 864** | 43 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 47 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| **1280 x 768** | 56 | ✓ | ✓ | ✓ |
| | 60 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| **1280 x 1024** | 43 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 47 | ✓ (interlaced) | ✓ (interlaced) | ✓ (interlaced) |
| | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| | 120 | ✓ | ✓ | ✓ |
| | 160 | ✓ | ✓ | ✓ |
| **1600 x 1200** | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| | 120 | ✓ | ✓ | ✓ |
| **1792 x 1344** | 60 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| **1800 x 1440** | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |
| **1856 x 1392** | 60 | ✓ | ✓ | ✓ |
| | 72 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 90 | ✓ | ✓ | ✓ |

To be continued..

| Display Screen Resolution | Refresh Rate (Hz) | Color Depth (bpp) | | |
|---|---|---|---|---|
| | | 8bpp(256 color) Standard mode | 16bpp(65K color) High mode | 32bpp(16.7M) True mode |
| **1920 x 1080** | 60 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| **1920 x 1200** | 60 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| | 100 | ✓ | ✓ | ✓ |
| **1920 x 1440** | 60 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |
| **2048 x 1536** | 60 | ✓ | ✓ | ✓ |
| | 70 | ✓ | ✓ | ✓ |
| | 75 | ✓ | ✓ | ✓ |
| | 85 | ✓ | ✓ | ✓ |

**\*** Lower maximum refresh rates at some resolutions when using lower bandwidth memory configuration.