1 Overview

Congratulation on the purchase of this VGA board! You are now the owner of a state-of -the-art video adapter that offers features and functionality equal to, and beyond any other in the VGA class.

System Requirements
The minimum system requirements for installing the graphics card are as follows:
➢ a personal computer with a Pentium, Pentium II or compatible microprocessor and at least 8MB of memory
➢ a VGA analog monitor supporting a minimum 60Hz vertical refresh rate
➢ a free AGP bus slot
➢ a CD-ROM drive

Features
➢ nVIDIA RIVA TNT/RIVA TNT2/VANTA TwiN-Texel 32-bit Graphics Engine.
  - 2 Texture-mapped, Lit Pixels per Clock
   - Single Pass Multi-texture Rendering
➢ 24-bit or 16-bit Z-buffer, 8-bit Stencil Buffer.
➢ High Performance 128-bit 2D/GUI/DirectDraw Acceleration.
➢ TextureBlend supports Multi-texturing, Bump-mapping, Texture-modulation, Light Maps, Reflection Maps, Detail Textures, Environmental Maps, Procedural Textures.
   - 32-bit ARGB Rendering with Destination Alpha
   - Point Sampled, Bilinear, Trilinear and 8-tap Anisotropic Filtering
➢ Per Pixel Perspective Correct Texture Mapping -Fog, Light, and Mip Mapping.
➢ Multiple Video Windows with Hardware Color Space Conversion and Filtering.
➢ DVD Sub-Picture Alpha-Blended Compositing.
➢ Video Acceleration for DirectShow MPEG-1, MPEG-2 and Indeo.
➢ Optimized Direct Frame Buffer (DFB) Access with Write-combining.
➢ Palette-DAC Pipeline Accelerates Full-Motion Video Playback, Sustaining Fast Frame Rates with High Quality Color Resolution.
➢ True Bilinear Filtering for Scaled Video, and Compensation for Filtering Losses with Edge Enhancement Algorithms.
➢ Back-end Hardware Video Scaling for Video Conferencing and Playback.

LCD Features (Option)
➢ Support PanelLink digital interface for LCD monitor.
➢ LCD support VGA,SVGA,XGA,SXGA 18/24 TFT color monitors.
➢ LCD resolution ups to 1280x1024 and color depths up to 16 million.
➢ VESA EDID support for LCD type auto-detect.

1 Overview

RIVA TNT
- ➢ 128-bit Wide Frame Buffer Interface Supports up to 16MB SGRAM/SDRAM
- ➢ 250 MHz Palette-DAC Supports up to 1920x1200 @ 75Hz.
- ➢ Variable Length Burst DMA Bus Mastering for Data transfers over 450 MB/s Throughput.
- ➢ 66 MHz AGP clock rate and AGP 2X mode.
- ➢ 100% Hardware Triangle Setup Engine.

RIVA TNT2/ TNT2 Ultra
- ➢ 128-bit Wide Frame Buffer Interface Supports up to 32MB SDRAM
- ➢ 300 MHz Palette-DAC Supports up to 2048x1536 @ 60Hz.
- ➢ Variable Length Burst DMA Bus Mastering for Data transfers over 900 MB/s Throughput.
- ➢ 66 MHz AGP clock rate and AGP 4X/2X mode.
- ➢ 128-bit Graphics with over 2.4GB/s Throughput.
- ➢ RIVA TNT2 150MHz MCLK, Ultra 183MHz MCLK

RIVA TNT2 M64
- ➢ 64-bit Wide Frame Buffer Interface Supports up to 32 MB SDRAM
- ➢ 300 MHz Palette-DAC Supports up to 1600x1200 @ 85Hz
- ➢ Variable Length Burst DMA Bus Mastering for Data transfers over 900 MB/s Throughput
- ➢ 66 MHz AGP clock rate and AGP 4X/2X mode
- ➢ 64-bit Graphics with over 1GB/s Throughput.

Vanta
- ➢ 64-bit Wide Frame Buffer Interface Supports up to 16MB SDRAM.
- ➢ 250 MHz Palette-DAC Supports up to 1920x1200 @ 75Hz.
- ➢ Variable Length Burst DMA Bus Mastering for Data transfers over 900 MB/s Throughput.
- ➢ 66 MHz AGP clock rate and AGP 4X/2X mode.
- ➢ 64-bit Graphics with over 1GB/s Throughput.

Software Support
- ➢ Microsoft Windows 95/98
- ➢ Microsoft Windows NT4.0
- ➢ Microsoft Windows 2000 (Option)
- ➢ DirectX
- ➢ OpenGL ICD

2 Hardware Installation

CAUTION !

Static electricity can severely damage electronic parts. Take these precautions:

➢ Before touching any electronic parts, drain the static electricity from your body. You can do this by touching the internal metal frame of your computer while it's unplugged.

➢ Don't remove a card from the anti-static container it shipped in until you're ready to install it. When you remove a card from your computer, place it back in its container.

➢ Don't let your clothes touch any electronic parts.

➢ When handling a card, hold it by its edges, and avoid touching its circuitry.

Before You Begin

Before you process further, make sure your computer system meets the peripheral requirements and switch to the standard VGA display driver.

Prepare Your Computer for Installation

Prior to working on your computer, make sure the power of the computer and any related equipment is turned off.

Select a Vacant Expansion PCI (AGP) Slot

Most AGP (PCI) bus computers have a combination of AGP (PCI) and ISA expansion slots. AGP (PCI) are usually made with plastic of a contrasting brown color (beige color), and are shorter than other slots in your computer. Your system manual should identify the AGP (PCI) slots. Plugging your Graphic card into a non-AGP (PCI) slot could damage the card, your computer, or both.


AGP vs. PCI vs. ISA expansion slots
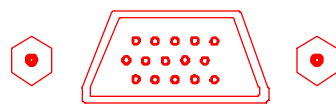
2 Hardware Installation

Insert your Graphic Card

Remove the cover for the slot you intend to use and save the screw for the mounting bracket. Then, pick up the Graphic card and position it over the expansion slot you've chosen. Push the card with firmly and evenly until it's fully seated in the slot. Replace the screw to secure the bracket of the Graphic card to the computer chassis.

Bracket screw

AGP expansion slot

Graphics card

PCI expansion slot

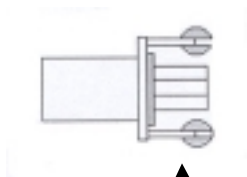Motherboard
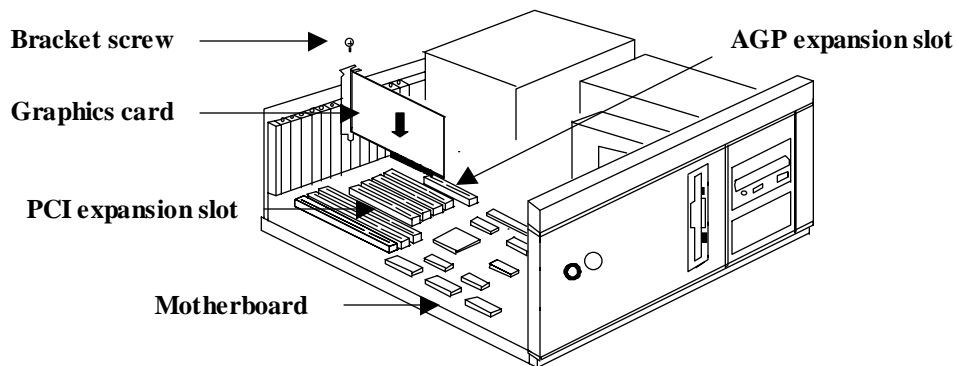
Connect the monitor/LCD/TV

Plug your monitor/LCD/TV cable into the monitor/LCD/TV connector on your Graphic card. Make sure the other end of the monitor/LCD/TV cable is properly connected to your monitor/LCD/TV.

Monitor connector (blue)

DFP Host Receptacle Connector

TV-Out Composite

3 Software Installation

☞ *Before installing the Display driver, make sure your Windows 95/98/NT is installed in VGA mode and work fine.*

☞ *For Windows 95 system, please install the DirectX before you want to play the MPEG Movie Player.*

☞ *To use an AGP graphics card with NT4.0, you may need to pre-install NT with Service Pack 3 (SP3) or latter version before installing the AGP card.*

☞ *If you are running Windows NT4.0, please note that some drivers are not compatible with earlier releases of Windows NT. Consult your dealer or local support to ensure you have the most recent releases for Windows NT and the drivers.*

Before You Begin

If your system is running Windows 95/98/NT, the **New Hardware Found** dialog box will appear after restart. Select **Driver from disk provided by hardware manufacturer**, click **OK**, then follow all on-screen instructions. If the **New Hardware Found** dialog box does not appear, follow the instructions below.

Setup VGA Mode

Click the right mouse button anywhere on the Windows 95/98/NT desktop and select **Properties** from the pop-up menu that appears on screen. Select **Settings | Change Display Type** (For OSR2 users, please select **Settings Advanced Properties.** For Windows 98 users, please select **Settings Advanced.** For Windows NT users, please select **Setting Display Type**) and then click the **[Change]** button for Adapter Type. When the Select Device dialog box appears on the screen, please select **[Standard display types]** from the manufactures and select **Standard Display Adapter (VGA)** from the Models then click **OK** button.

Install Software Driver

1. Turn on your computer and start Windows 95/98/NT.
2. Insert the **Driver CD** into your CD-ROM driver.
3. Click the **Start** button on the task bar and then select **Run** button.
4. Type D:**Cdsetup.exe** [**Enter**] in the Run dialog box (where **D:** is the location of your CD-ROM drive).
5. The **Expertool VGA Installation** dialog box will appear on the screen, please click **"Continue"** button and follow the instruction on screen to complete installation.
6. Final, restart your computer for the changes to take effect.

Windows 95/98/NT Display Properties

Windows 95/98/NT allows you to select resolution, color depth, refresh frequency and font size using the standard Windows 95/98/NT Display Properties sheet, which can be accessed by right clicking anywhere on the Windows 95/98/NT desktop, and then selecting Properties from the pop-up menu that appears on screen.

Display Properties for Windows

4

☞ *The pictures in this chapter are only for RIVA TNT under Win98 reference.*
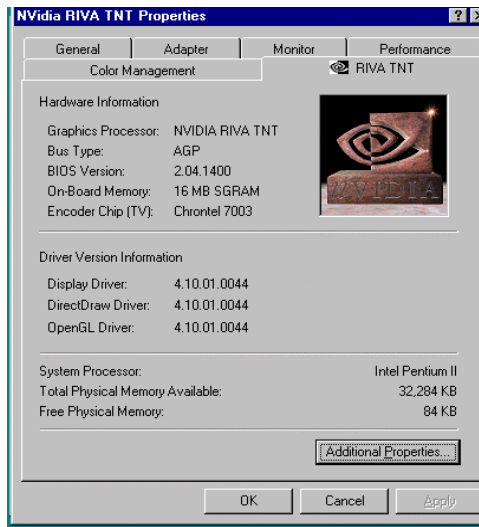☞ *If the Color correction doesn't appear, please adjust the color palette to high color or true color.*
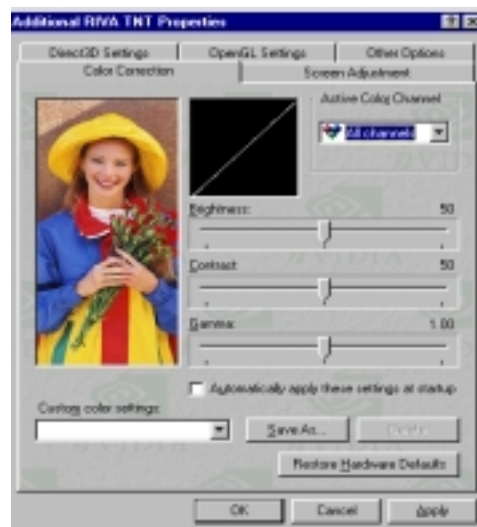

Figure 4-1

Figure 4-2

Click the right mouse button anywhere on the Windows desktop and select **Properties** from the pop-up menu that appears on screen. For Win95, please select **RIVA TNT (or VANTA or TNT2 series)** item. For Win98, please select **Settings Advanced** button then choose **RIVA TNT (or VANTA or TNT2 series)** item as Figure 4-1. In **nVIDIA RIVA TNT (or VANTA or TNT2 series) Properties** dialog box, select **Additional Properties** button, the **Additional RIVA TNT (or VANTA or TNT2 series) Properties** dialog box will appear. In the **Additional RIVA TNT (or VANTA or TNT2 series) Properties** dialog box, select **Color Correction** item as Figure 4-2.

The slider controls allow you to adjust the gamma values for each channel.

Active Color Channel: Allows you to select the color channel controlled by the sliders. You can adjust the red, green or blue channels individually or all three channels at once.
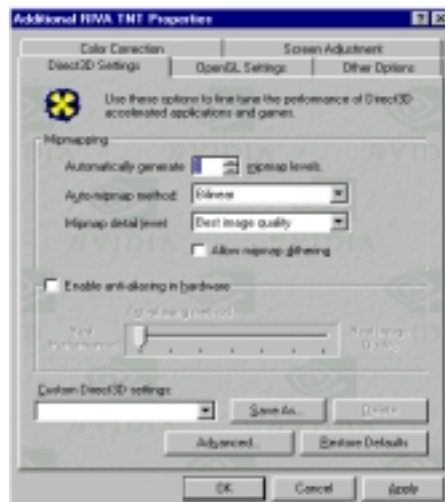
Display Properties for Windows
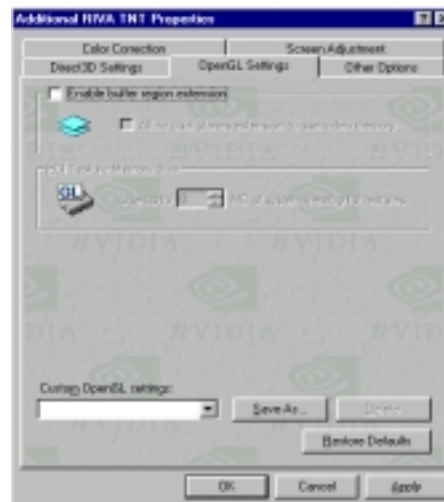
4

Figure 4-3   Figure 4-4

(As Figure 4-3)

Automatically generate mipmap levels: The RIVA TNT (or VANTA or TNT2 series) can automatically generate mipmaps to increase the efficiency of texture transfers across the bus and provide higher application performance.

Auto-mipmap method: Allows you to select the auto-mipmapping method used by the RIVA TNT (or VANTA or TNT2 series).

Mipmap detail level: Allows you to adjust the LOD (Level of Detail) bias for mipmaps. A lower bias will provide better image quality, while a higher bias will increase application performance.

Allow mipmap dithering check box: This option allows for dithering of trilinear mipmaps.

Enable anti-aliasing in hardware: This option allows you to control the anti-aliasing features of the drivers.

Anti-aliasing method: Allows you to select the anti-aliasing sampling method.

Custom Direct3D settings: A list of the custom settings (or "tweaks") you have saved. Selecting an item from the list will activate the setting. To apply the setting, choose the "OK" or "Apply" button.

(As Figure 4-4)

Enable buffer region extension check box: Allows the drivers to use the OpenGL extension GL_KTX_buffer_region. This can increase application performance in 3D modeling applications that support this extension.

PCI Texture Memory Size: Allows you to specify the maximum size of the PCI texture heap. Increasing this value on PCI systems with sufficient memory may significantly improve the performance of some OpenGL applications. This option is not available on display adapters that use the AGP bus.
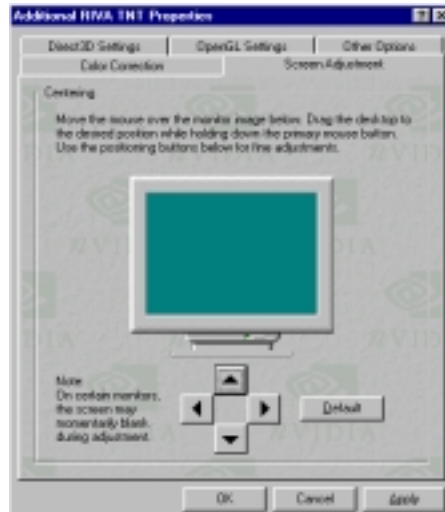
4 Display Properties for Windows
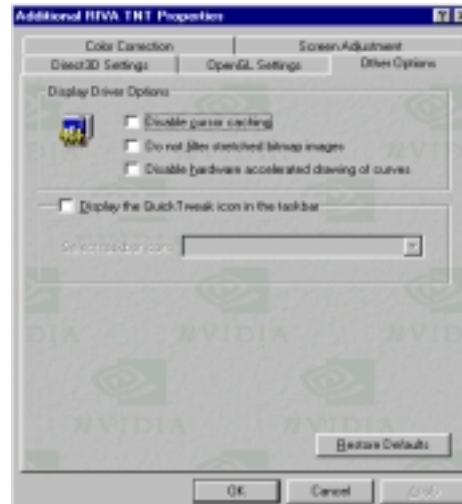

Figure 4-5   **Figure 4-6**

(As Figure 4-5)
Use the arrow buttons to adjust the position of the desktop on your monitor.
(As Figure 4-6)
Disable cursor caching check box: Select this option to disable the caching of cursors by the drivers.
Do not filter stretched bitmap image check box: This option prevents pixel interpolation of stretched bitmap image.
Disable hardware accelerated drawing of curves check box: This turns off GDI hardware acceleration for curve drawing.
Display the Quick Tweak icon the taskbar check box: Adds the NVidia Quick Tweak icon to the Windows taskbar.

5 TV Output for Windows (Option)

Figure 5-1

(As Figure 5-1)

Output Device: These options allow you to select the output display device (monitor or TV). If TV is selected, you can also specify the output format of TV signal (either NTSC or PAL).

TV resolution and color depth: Selects the screen resolution and color depth for output to the TV.

Brightness or Saturation slider controls: Use these controls to adjust the brightness and saturation of the TV image.

Flicker Filter: Use this controls to adjust the amount of flicker filter you want applied to the TV signal.

Expertool for Windows

6

☞ *For maximum compatibility and flexibility, the Expertool can be loaded and unloaded dynamically, but note that many of the features it provides are only available while the Expertool is running.*

☞ *The pictures in this chapter are only for RIVA TNT under Win98 reference.*

The Expertool is a display control and desktop enhancement utility for Windows 95/98/NT, specially designed and optimized for use with your graphics accelerator. You should think of the Expertool as a kind of supplementary **"device driver"** which works in conjunction with your accelerator's display driver.

Installation

The Expertool is automatically installed when you use the Setup program under windows 95/98/NT (refer to Chapter 3). Then click **Programs Expertool Expertool** (Figure 6-1) or click on the "**Expertool**" (Figure 6-3) icon in the System tray to show the Expertool Properties on your screen. (Figure 6-2)

Uninstall

1. Click **Close** button to close the Expertool. (Figure 6-2)
2. Then click **Start** button on the task bar and select **Settings Control Panel add/Remove Programs**.
3. Choice **Expertool** item for Install/Uninstall and click **add/Remove** button.
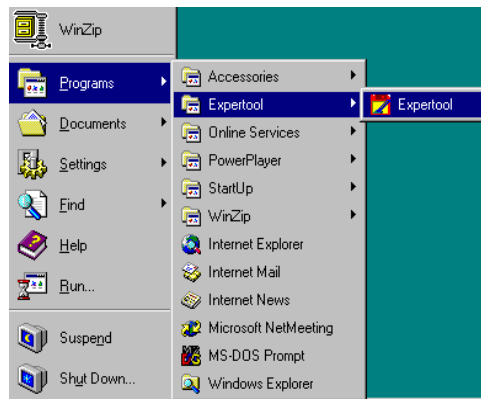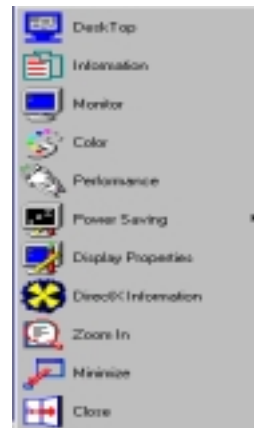4. Click **OK** to uninstall the Expertool.
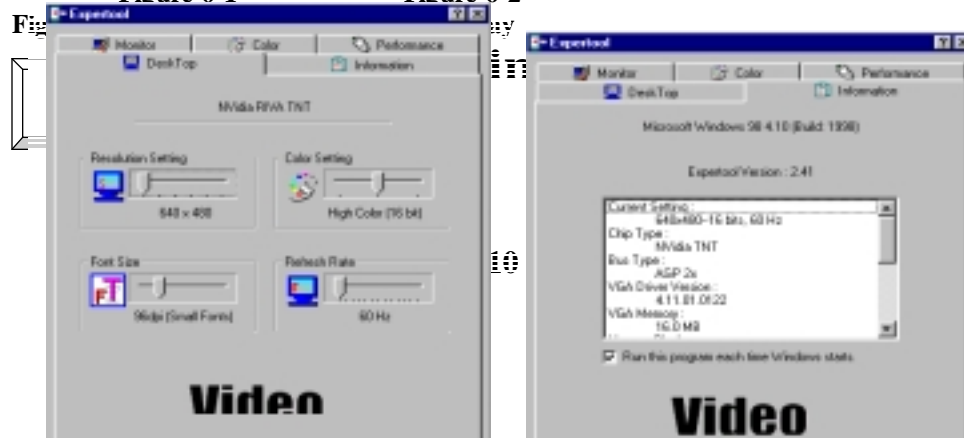
Figure 6-1   **Figure 6-2**

Figure

Figure 6-4   **Figure 6-5**

(As Figure 6-4)

Desk Top: Displays the current Resolution Setting, Color Setting, Font Size and Refresh Rate for the monitor whose video adapter in Desk Top. Drag the slider to specify the each one you want and click **OK** button to take effect.

(As Figure 6-5)

Information: Appears the current settings and information of your computer.

Run this program each time Windows starts check box: Select this option to run the Expertool immediately each time when Windows starts.
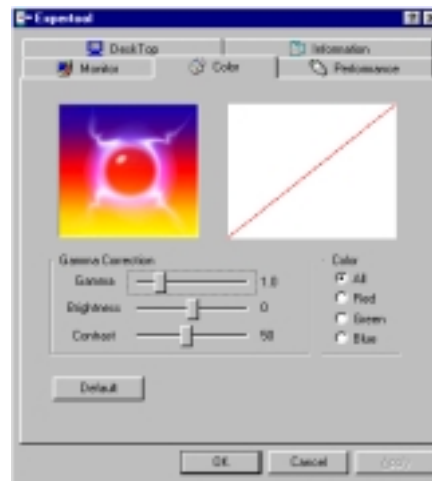
Figure 6-6   **Figure 6-7**

6   Expertool for Windows

(As Figure 6-6)

Screen Adjustment: Select **Adjust** button to adjust the screen position with the keyboard. If you want resort the settings you have made, please select **Default** button.

Monitor Information: Show you the information of your monitor.

Power Saving: Allows you to adjust the Power Saving for Standby, Suspend or Shut-off mode.

Standby check box: This option instantly places your monitor in standby mode, which delivers minimal power savings but provides the fastest recovery time.

Suspend check box: This option instantly places your monitor in Suspend mode, which delivers maximum savings but requires a somewhat longer recovery time than Standby mode.

Shut-off check box: This option effectively turns your monitor off, and recovery time is practically equivalent to turning the monitor on using the monitor's power switch.

(As Figure 6-7)

Color: Move the slider to adjust the gamma value. The farther you slide this to the right, the higher the gamma value, and the brighter will be. The more you slide this to the left, the lower the gamma value, and the dimmer will be.
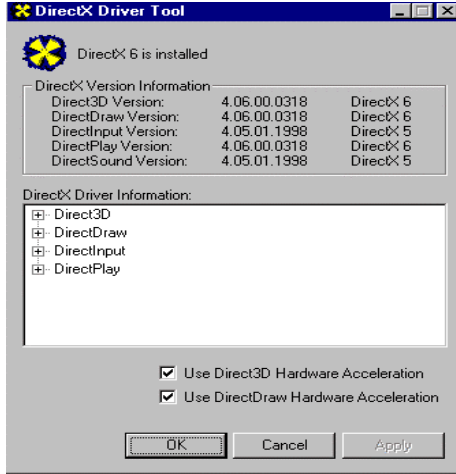

| Figure 6-8 | Figure 6-9 |

(As Figure 6-8)

Memory Clock Setting Slider Control: Allows you to adjust your video memory clock for peek performance and maximum stability. The higher memory clock setting you select the higher performance shows. But change the value will affect the stability of VGA card. It's better for you to use the original setting value.

(As Figure 6-9)

DirectX: DirectX properties vary depending on the version of windows you are running, the version of DirectX installed, and the type of DirectX-enabled drivers installed. In this dialog box will also show you the system's DirectX capabilities, and relative information.

7 Technical Information

Display Memory Configuration
Memory-Resolution/Color

This table is only for RIVA TNT reference.

	16MB		
	256 color	**64K color**	**16.7M color**
640x480	240Hz	240Hz	240Hz
800x600	240Hz	240Hz	240Hz
1024x768	170Hz	170Hz	170Hz
1280x1024	120Hz	120Hz	100Hz
1600x1200	85Hz	85Hz	75Hz

This table is only for RIVA TNT2 reference.

	16/32MB		
	256 color	**64K color**	**16.7M color**
640x480	240Hz	240Hz	240Hz
800x600	240Hz	240Hz	240Hz
1024x768	200Hz	200Hz	200Hz
1280x1024	150Hz	150Hz	120Hz
1600x900	120Hz	120Hz	100Hz
1600x1200	100Hz	100Hz	85Hz

This table is only for VANTA / TNT2 M64 reference.

	8/16MB			
	256 color	**64K color**	**16.7M color**	
640x480	240Hz	240Hz	240Hz	240Hz
800x600	240Hz	240Hz	240Hz	240Hz
1024x768	200Hz	200Hz	200Hz	200Hz
1280x1024	120Hz	120Hz	120Hz	120Hz
1600x1200	85Hz	85Hz	85Hz	85Hz

7 Technical Information

Monitor Connector Pin Assignments

Pin no.	Function	Pin no.	Function
1	Red Video	9	+5V
2	Green Video	10	Sync Return (ground)
3	Blue Video	11	NC
4	NC	12	DDC DATA
5	Ground	13	Horizontal Sync
6	Red Return (ground)	14	Vertical Sync
7	Green Return (ground)	15	DDC CLOCK
8	Blue Return (ground)		

DFP Connector Pin Assignments and Description

Pin no.	Signal Name	Description
1	TX1+	TMDS positive differential output, channel 1
2	TX1-	TMDS negative differential output, channel 1
3	SHLD1	Shield for TMDS channel 1
4	SHLDC	Shield for TMDS clock
5	TXC+	TMDS positive differential output, reference clock
6	TXC-	TMDS negative differential output, reference clock
7	GND	Logic Ground
8	+5V	Logic +5V Supply
9	Reserved 9	Reserved do not connect
10	Reserved 10	Reserved do not connect
11	TX2+	TMDS positive differential output, channel 2
12	TX2-	TMDS negative differential output, channel 2
13	SHLD2	Shield for TMDS channel 2
14	SHLD0	Shield for TMDS channel 0
15	TX0+	TMDS positive differential output, channel 0
16	TX0-	TMDS negative differential output, channel 0
17	Reserved 17	Reserved do not connect
18	Reserved 18	Reserved do not connect
19	DDC_DAT	DDC2B Data
20	DDC_CLK	DDC2B Clock

VIP Interface

The VIP interface is compliant with the Video Interface Port VIP Specification, Version 1.1. Only a single slave device can be active at one time (no concurrency). VIP provides a glueless interface to VIP-complaint devices for example glueless interface to industry standard video digitizers and MPEG decorers.

Fan Connector (Option)

Trouble Shooting

8
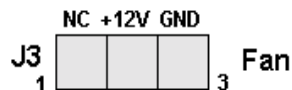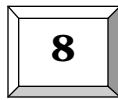
Problem: After installation and restarting, Windows 95 informs me that display
setting is still incorrect. What can I do?
There may be conflict between previous and current display drivers.
This is caused by not complete removal of previous display driver. Try
the following steps to remove it:

Solution:
 (1) Use right button of mouse to click on "My Computer" icon on desktop.
 (2) Select "Properties" and "System Properties" box appears
 (3) Click on "Device Manager" tab
 (4) You will see a list of devices on your computer.
 (5) Open "Display adapters" in the list (double click it).
 (6) You will find two (or more) conflicted adapters listed here.
 (7) Remove all previous adapters by selecting them and press "Remove"
 (8) Close Device Manager and restart Windows 95.
 (9) Now display driver will work correctly.

Problem: After installing the driver, Windows 95 doesn't prompt me for restarting
and the driver still doesn't work after I reboot it by myself.
You may have installed similar drivers before. Try the following steps to
install:

Solution:
 (1) Use right button of mouse to click on "My Computer" icon on desktop.
 (2) Select "Properties" and "System Properties" box appears
 (3) Click on "Device Manager" tab
 (4) You will see a list of devices on your computer.
 (5) If "Display adapters" appears in the list, click it.
   If "Display adapters" doesn't appear, jump to step 9 and continue.
 (6) The name of your card will be listed in the box. Double click it.
 (7) The properties box of your card appears. Select "Driver" tab.
 (8) Click "Change Driver.." and follow the installation steps.
 (9) Click "Other devices" you will see your card is listed.
 (10) Click on the name of card, the properties box appears.
    Select "Driver" tab.
 (11) Click "Change Driver.." and follow the installation steps.

Problem: When the system is starting up, there is a series of prolonged beeps.
Solution:
The VGA card may not be firmly inserted into the expansion slot. Ensure that the gold-
striped bus connector of the graphics card is properly inserted into the expansion slot.
Ensure this by pressing the card gently and evenly into the slot. Alternatively, remove the
card and re-insert it.

Trouble Shooting

8
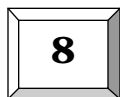
Problem: Monitor display flickers after Windows 95 or Windows 98 starts.
Solution:
Your monitor may not support the resolution or refresh rate that you have set. Use display settings supported by the monitor. To change the display settings:
(1) Restart your system in Windows 95/Windows 98 Safe mode. To do so:
   a. Restart your system and when the message "Starting Windows 95/98…" appears, press F8. A list of options such as Safe Mode and Command Prompt Only Mode appears.
   b. Select Safe Mode and press ENTER.
(2) Lower your monitor's resolution.
   For the resolutions supported by you monitor, refer to its manual.

Problem: Why can't I run the Additional Properties item in the Display Properties RIVA TNT (or VANTA or TNT2 series) dialog box under Win95?
Solution:
The Additional Properties could be selected and run after you download the IE4.0 or latter version.
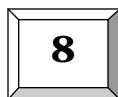
8 Trouble Shooting

When you need advanced technique service, please Complete this form and FAX to your dealer.

Your name: **Phone :**

Product S/N: **PCB NO.:**

HARDWARE CONFIGURATION	
Mainboard Chipset:	**CPU Speed:** **MHz**
Mainboard CPU:	**VGA Memory Type:**
Mainboard Memory: **MB**	**VGA Memory** **MB**
Mainboard Brand:	**VGA Memory Brand:**
Cache Memory: **KB**	**FDD/HDC Card:**
Monitor Type:	**Horizontal Freq. :** **KHz** **to** **KHZ** **Vertical Freq. :** **HZ** **to** **HZ**

Operating System or Test Programs:

Application Software:

Other Cards installed in system:

Problem Description:

Printed in Taiwan