EUT: VGA CARD

FCC ID:I27MM-VF05A

Biostar Microtech int'l Corp

USER'S MANUAL

FEDERAL COMMUNICATIONS COMMISSION

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 interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

NOTE

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection. This equipment generates, uses and can radiated radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

EXHIBIT D

-Reorient o relocate the receiving antenna.
-Increase the separation between the equipment and receiver.
-Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-Consult the dealer or an experienced radio/TV technician for help.

Shielded interface cables must be used in order to comply with emission limits.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Chapter 1 Introduction

Voodoo Banshee AGP

Voodoo Banshee AGP

User's Manual

Chapter 1: Introduction

Voodoo Banshee is the first of 3Dfx's family of integrated 2D/3D accelerators to storm into the consumer PC arena to score a one-punch knockout, unlike the Voodoo Rush it doesn't require an additional 2D part. The Voodoo architecture, which has built a religious following among game developers, is now married with ultra-fast 2D, designed to accelerate graphic intensive Windows applications.3Dfx was putting a lot of effort into the 2D hardware, offering 'all Windows GDI functions in hardware', thus saving a software layer between the driver and the graphics hardware. This is supposed to make it the fastest 2D chip available. It offers an integrated 250 MHz RAMDAC, to enable good quality 2D. Banshee also comes with 'full DVD support', enabling 'hardware assist' for software DVD and a 'full' VMI interface for single slot hardware DVD.

The first 0.35 micron part will run with either SDRAM or SGRAM at 100 MHz memory bus, thus offering 100 MPixels 3D fill rate, the later 0.25 micron part will do 125 MHz, thus 125 MPixels fill rate.

The most important thing about Banshee is of course the 3D core. Banshee has an only slightly different 3D interface as Voodoo2 and can so not only run the Direct3D software, but also all the numerous Glide titles programmed for Voodoo and Voodoo2 as soon as Glide 3.0 is available with it.

Chapter 2 About Banshee

Chapter 2: About Banshee

Feature Summary

- Voodoo2 3D Core
  - Highest performance in single chip
  - Stunning visual quality
  - Advanced features at full performance
  - Largest game base
  - 3D in a window support
  - Glide support
  - Optimized Direct3D support
  - Renown compatibility
- 128-bit 2D engine
  - All Windows GDI in hardware
  - All 256 ROPS with tertiary functions

  - Hardware polygon generation
  - Near theoretical maximum performance in NT benchmarks
- 128-bit VGA core
  - World's first 128-bit VGA
  - DOS speed beyond belief
  - Fully IBM 8514 compliant
- 128-bit memory interface
  - 4 to 16MB SGRAM/SDRAM
  - 100/125MHz operation
  - Block write with SGRAM
  - Simultaneous tiled and linear memory support
- Optimized for Pentium II
  - Dual command buffers
  - Full support for write combine
  - Patent pending technology for command reordering

3D Feature Set

- Integrated Voodoo2 pixel unit and single texture unit
- 100/125 Mpixel/s fill rate
- 100/125 Mtexel/s fill rate
- HW triangle setup capable of 4M tri/s
- On-chip high speed texture cache unit
- High precision 16-bit floating point Z-buffer
- Tiled memory architecture
- Transparency and chroma-key with color mask
- Alpha blending on source and destination pixels
- Dynamic environment maps
- 24-bit color dithering to native 16-bit RGB

- 16-bit color "expansion" to display near 24-bit quality
- Per-pixel table based fog/ haze effects
- Per-pixel MIP mapping, tri-linear filtering
- Full scene, edge anti-aliasing
- Bump mapping
- Optimized for local memory texturing
- Sub-pixel and sub-texel correction
- Perspective corrected 3D texture mapping
- Palettized and compressed textures

Video Sub-system

- Double or triple buffering of incoming video
- Bob and Weave de-interlacing
- Packed or planar YUV 4:2:2
- Bilinear vertical and horizontal filtering
- Hardware color-space-conversion

2D Feature Set

- 100/125MHz 128-bit GUI accelerator
- Full featured 128-bit BitBlt engine
- Hardware Bresenham line drawing engine
- Hardware polygon generation and fill engine
- Source and destination chroma-keying
- Advanced single cycle block-write
- Full 256 Raster Operations in hardware

Other Features

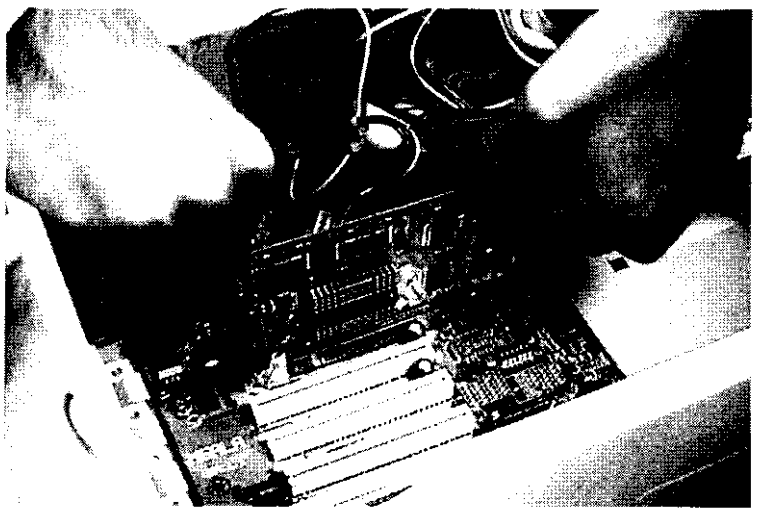
- PCI 66MHz and AGP with sideband signaling
- High speed memory with duplicate RAS support
- Dual command FIFO for CPU parallelism
- 256-bit internal buffering for maximum memory efficiency
- PC '97 and PC '98 compliant
- 250 MHz RAMDAC with three independent PLLs

Chapter3 Voodoo Banshee AGP Hardware Installation

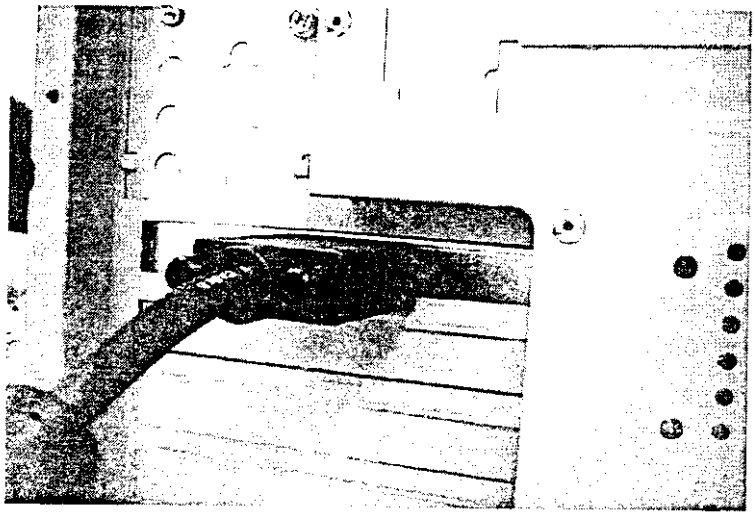
Chapter 3: Voodoo Banshee AGP Hardware Installation

1. **With the power off, remove your computer cover. Find the AGP slot and remove the bracket and screw.** (Remember which cables go to which connectors. You may want to label your computer's cables before disconnecting them!)

2. **Insert Voodoo Banshee Card firmly into the AGP slot. Care should be taken to press it evenly and snugly into its slot. Once you are certain Voodoo Banshee Card is installed properly in its slot, secure it with a screw.**



3.Connect the VGA port on Voodoo Banshee to your monitor with a standard monitor cable.
4.Secure your computer cover and attach any previously removed cables.



5.Use Voodoo Banshee to play the latest and greatest 3D games. Enjoy it!

Chapter 4 Voodoo Banshee AGP Software

Voodoo Banshee AGP

Chapter 4: Voodoo Banshee AGP Software

4-1 Software List

Windows 95/98 Display Drivers

1.GDI Driver
2.Glide 2x
3.Glide 3x
4.Direct3D
5.3Dfx OpenGL Miniport Driver (For Quake, Quake2 and Hexen2 game titles)

Windows NT Display DriversCategory Version

1.GDI Driver
2.Glide 2x
3.Glide 3x

4-2 Software Installation

You can use CD installation wizard, CD Installation Utility (START.EXE), located in the root of CD to install some usually used drivers conveniently.

You can simply put CD into CD-ROM drive and the Installation Utility will autorun or you can run the CD Installation Utility directly.

Then use mouse cursor to click the proper option on the page. Utility will invoke other applications to complete the rest of installation.

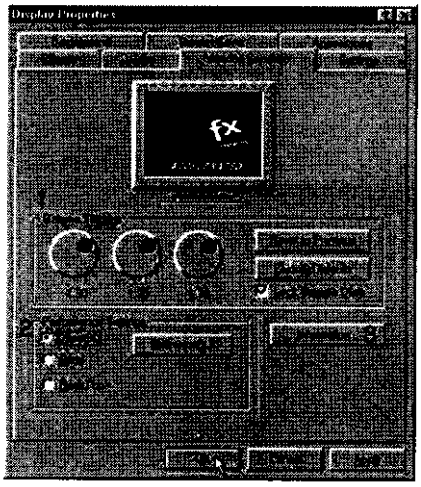
Important Note: Recommended installation orders under Windows 95(OSR2)/98:

1. Run USBSUPP.EXE (4.03.1212 or above) to upgrade system to Windows 95 OSR2.1. This file will patch Windows kernel to apply to the new AGP standard. (Only needed by Windows 95 OSR2)
2. Microsoft DirectX
3. If your mainboard, with AGP support, is not using Intel chipset and is one of following chip venders, You MUST install the AGP Driver provided by these thirty-party venders to enable the AGP feature.
   a. VIA
   b. ALI
   c. SIS
4. Voodoo Banshee AGP Windows 95/98 Drivers
5. Others (3D Games)

4-3 Using Software

Note: You can right-click mouse button on the background screen. Then select properties in the pop-up menu to invoke the Display Properties Control Panel.

Using 3Dfx Voodoo Banshee Extended Display Properties Control Panel

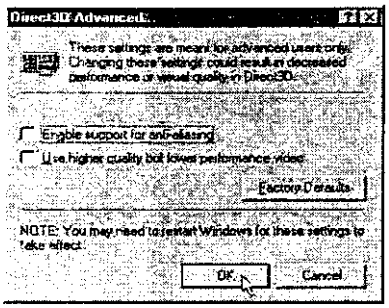


In this page, you can:

1. Use the controls to adjust the amount of Red, Green , and Blue Gamma for Direct3D, Glide, and Desk Top
2. Use the controls to select Desk Top or 3D standards you want to modify settings.

   Select the option and click Advanced button, then one of the following dialogs will pop up.

For Direct3D:



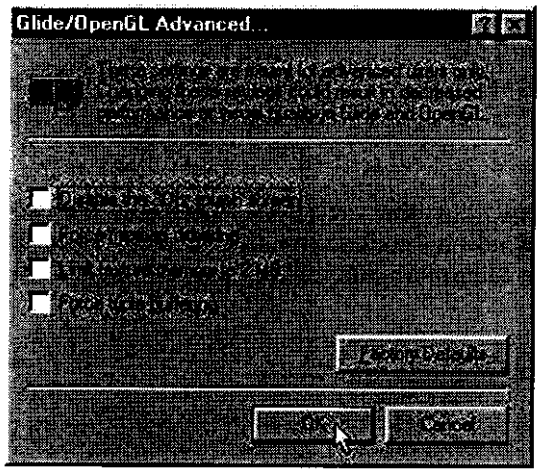
Enable support for anti-aliasing –

Enable the anti-aliasing function to enhance the 3D quality.

Use higher quality but lower performance video –

As it means.

For Glide / OpenGL



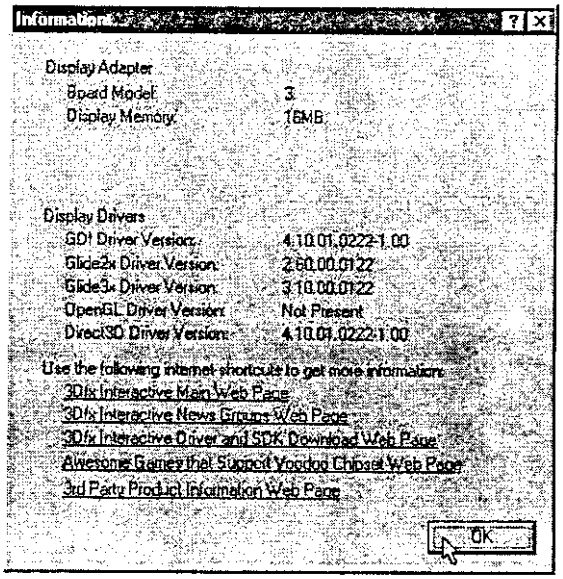
Disable the 3Dfx splash screen –
Disable the 3Dfx splash logo when the Glide applications and games initialize.

Force mipmap dithering –
When selected, Glide apps will enable texture mipmap dithering. Visual quality of the rendered scene may be improved when this option is selected, however a rendering performance decrease may occur.

Limit texture memory to 2 MB –
When selected, Glide apps will force 2 Mbytes of texture memory for each texture mapping unit. some Glide games may not work correctly if this option is not selected.

Force triple buffering –
When selected, Glide apps will enable triple color buffering if there is enough frame buffer memory to support it. Rendering performance may increase when this option is enabled, however not all apps are compatible with triple color buffering and may exhibit visual artifacts if enabled.

4. Click the Information Button to see the informations for Adater, Drivers, and some useful WWW links.



APPENDIX

APPENDIX B: 3D Dictionary

❖ **Alpha blending**

Combining two images with different transparency levels so that one image appears visible through the other. An object's transparency is defined as its Alpha value or Alpha level.

❖ **Anti-aliasing**

The removal of artifacts from an image.

❖ **Bi-linear sampling/filtering**

A combination of four colors in a single 3D image used to improve that image's resolution.

❖ **Clipping**

Removal of any image displayed outside of a predefined shape.

❖ **Compressed Textures Depth cueing**

Changing the color and brightness of a 3D image as it moves, relevant to the viewer. Color becomes less bright as the image moves away, brighter as it moves closer.

❖ **Dithering**

Substituting combinations of colors you do have for colors that you don't. For example, if your computer is only capable of displaying 256 colors and you load an image that use 65,000 colors, your computer will create substitutes for the colors you don't have by combining the colors that you do. The color quality of a dithered image is inferior to a non-dithered image

❖ **Double buffering**

A way for your computer to work on an image two different ways at once. Before displaying an image, your video card calculates what a finished image will look like and displays that image while it is calculating the next image in a video stream. Double-buffering affords smoother playback for video or any other multiple-frame file format.

❖ **Frames Per Second (FPS)**

A measurement of how often information in a video or animation file is updated on your screen or how many frames of motion you sees in a given second. Movies and television shows are shown at 24fps.

❖ **Photo mapping**

Overlaying a photo image on a 3D object, so that the photo takes the shape of that object.

❖ **Rasterization**

Transformation of a 2D object into a 3D object.

❖ **Ray tracing**

One way of rendering a picture. The computer computes the path of a light ray from the light source to the objects (from which the ray reflects), and further to the observer. It does this for every pixel on the monitor. This is a very intensive calculation, but the results are worth it.

❖ **Refraction**

Bending of light when it passes through another substance.

❖ **Rendering**

Converting a graphics image into an array of pixel colors for the display.

❖ **Shading (Gouraud/Phong)**

Both shading methods make the surface and color of an object appears smoother. Phong shading takes more CPU time but gives better results. Gouraud shading is faster.

❖ **Texture mapping**

Overlaying a graphics image on a 3D object, so that the photo takes the shape of that object.

❖ **Transparent/Translucent: An image that can partially be seen through.**

❖ **Tri-linear mip-mapping**

The texture map is stored at several levels of detail in a structure called mip-map. You compute the texture coordinates and the exact level of detail. This gives you the two closest levels of detail available in the mip-map. In each one you perform a bilinear interpolation, and then a linear interpolation between the two levels (that's why it's called tri-linear). High-end graphics workstation (like SGI Reality Engine) use tri-linear mip-mapping.

❖ **Tri-Strip processing Vertex**

A point, which marks the intersection of two or more edges of a polygon or other graphics, object.

❖ **Video mapping**

The same as texture mapping. In the case of video mapping, the texture is applied to animation or a video clip.

❖ **Z-buffer**

A two dimensional array made up of a grid of points on a sea-level plane, each containing the value of the depth (z) at that point. This way every pixel on the monitor has a "depth value" so that the program knows which polygons are in the foreground and which are in the background.

APPENDIX C: Banshee FAQ

1.What is Voodoo Banshee?

3Dfx's first integrated 2D/3D/video Windows accelerator chip. Voodoo Banshee combines a completely new 128-bit 2D core with a 3Dfx-designed 128-bit VGA, video pipeline and a 3D core from 3Dfx's flagship gaming product, Voodoo2. Voodoo Banshee is specifically designed for OEM applications and is targeted to provide the highest 2D and 3D performance in an integrated graphics processor. Key to the Voodoo Banshee, is the large library of compatible 3D game titles, expected to top 400 by Christmas 1998

2.How does this new chip relate to Voodoo Rush?

Voodoo Banshee is a completely different chip with 3D derived from Voodoo2 and a whole new 2D core that was developed completely by 3Dfx. Voodoo Rush was an all in one graphic card composed of a separate 2D accelerator from Alliance Semiconductor and the Voodoo Rush 3D accelerator derived from the original Voodoo Graphics. Voodoo Banshee, on the other hand, is a fully integrated device with VGA, 2D, 3D, video and integrated RAMDAC.

3.How does this new chip relate to Voodoo2?

with Voodoo Graphics, Voodoo Rush and Voodoo2 and provides very high game performance. Voodoo2 is higher in performance in many leading games because is contains 2 texture processors rather than the single texture processor in Voodoo Banshee. Two texture processors allow Voodoo2 to apply two textures in a single

Voodoo Banshee has a core derived from 3Dfx's Voodoo2. The core is compatible
cycle to create effects like those used in Quake or Quake 2. Voodoo Banshee also uses a different memory type than Voodoo2. Voodoo2 is similar is design to Voodoo Graphics which has separate frame buffer and texture memories and uses a memory type called EDO DRAM. Voodoo Banshee uses the next generation technologies of SGRAM or SDRAM and supports a unified memory architecture. Finally Voodoo2 needs a primary 2D board to run, while Voodoo Banshee will replace your existing 2D board. So Voodoo Banshee is a complete upgrade to your graphics subsystem.

4.Will Voodoo Banshee work in Scan Line Interleave mode?

No, Voodoo Banshee does not have this capability. Scan Line Interleave mode is a feature of Voodoo2 where two separate graphics boards can operate in parallel to double rendering performance. This is one of two advantages of Voodoo2.

5.So is Voodoo Banshee faster or is Voodoo2?

Voodoo Banshee runs with 128-bit interface to 100MHz SGRAM, Vooodoo2 runs with dedicated 64-bit buses to 90MHz EDO. Because of the faster memory, Voodoo Banshee will be able to sustain a higher fill rate when applying a single texture. What this means is Voodoo Banshee will be able to run single texturing applications at a slightly faster rate than Voodoo2, but any multi texturing games such as Quake2 will benefit greatly from Voodoo2's second texture processor.

6.Will Voodoo Banshee work with a Voodoo2?

Voodoo Banshee will work with a Voodoo2, but not in SLI mode. Voodoo Banshee will be the primary device

and Voodoo2 will be the secondary device for the serious 3D gaming experience. For the ultimate setup, a system can support a Voodoo Banshee as the primary graphic device and two Voodoo2 boards connected in SLI mode. This way the user will have the fastest 2D acceleration coupled with renown Voodoo2 3D capabilities.

7.What resolutions will Banshee support?

Voodoo Banshee will support up to 1900x1440 in 2D and 3D resolutions are just as flexible. Currently the 3D drivers are capable of rendering at resolutions as high as 1600x1200 for selected games. As the drivers mature, Voodoo Banshee will support many more titles at this ultra high resolution.

8.What memory configurations will Voodoo Banshee support?

Voodoo Banshee will operate with 4-16MB of SGRAM. Also Voodoo Banshee supports low cost SDRAM as well. With its 128-bit memory interface, only 16MB SDRAM configuration will be supported since SDRAM is available in only 1Mx16.

9.What bus will Voodoo Banshee support?

Both PCI and AGP will be supported. PCI 66MHz and AGP 1X with sideband support will be available for Voodoo Banshee. Voodoo Banshee is designed around the Voodoo2 core which is optimized for texturing from local memory. Voodoo Banshee's memory interface provides up to 1.6 Gigabytes/second of texture bandwidth versus a maximum of 500 Megabytes/second of bandwidth available through AGP texturing. With an efficient connection to the processor and an efficient memory interface, games will more likely be limited by CPU performance, not bus bandwidth.

10.Will there be any performance differences between PCI, AGP?

For Voodoo Banshee, there will be minimal performance differences between AGP and PCI. Because of the faster bus speed on AGP, there will be a slight improvement in performance when compared to a standard 33MHz PCI bus. Overall performance will not be affected by the bus since Voodoo Banshee is architected to texture out of local frame buffer memory. As always, local texturing will always be faster than texturing from host memory. For this reason Banshee will outperform most products that have AGP execute mode (texturing out of system, or host memory). Voodoo Banshee is designed around the Voodoo2 core which is optimized for texturing from local memory. Voodoo Banshee's memory interface provides up to 1.6 Gigabytes/second of texture bandwidth versus a maximum of 500 Megabytes/second of bandwidth available through AGP texturing. With an efficient connection to the processor and an efficient memory interface, games will more likely be limited by CPU performance, not bus bandwidth.

11.When will Voodoo Banshee products be available on the shelf?

Voodoo Banshee is expected to be available by the August/September time frame from various add-in-card manufacturers.

12.Will Voodoo Banshee have the same game support as the current Voodoo2?

Yes, all D3D, OGL, and Glide based games that are currently supported by Voodoo2 will be supported by Voodoo Banshee.

13.With competitive products supporting up to 2k x 2k textures, will Voo-doo Banshee be at a disadvantage by only supporting 256 x 256 tex-tures?

No, nearly all games were designed with 256 x 256 textures since most games were designed with the Voodoo architecture in mind. Therefore supporting larger textures during this time will be wasted.

14.Is there any disadvantage to supporting a 16-bit Z buffer when some competitors support 24 and 32-bit Z buffers?

No, most, if not all games, are designed with 16-bit Z buffers, or 64k Z accuracy. Games require real time frame rates, and increasing the Z-depth to 24 or 32-bits requires twice the memory bandwidth and twice the memory storage. All Voodoo generation products support both integer and floating-point Z values. With floating-point Z, the range of Z is increased to the equivalent of 22-bits while keeping the benefits of 16-bit memory bandwidth and memory size. While supporting a deeper Z value provides great marketing, it slows
game performance.

15.Why is Voodoo Banshee's 2D performance so much higher than tradi-tional accelerators?

3Dfx analyzed the shortcomings of current 2D accelerators and designed a totally new 2D core. This core is much better integrated with Windows and includes functions such as complete 256 ROPS support, hardware polygon generation and true SGRAM block write support. With increasing resolutions requiring the generation and movement of larger blocks of data, a faster 2D architecture will provide much better performance.

11/04/1998
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R.O.C