

SYSTEM REQUIREMENTS VGSTUDIO / VGSTUDIO MAX 2.1

SYSTEM REQUIREMENTS FOR VISUALIZATION AND ANALYSIS OF VOXEL DATA

Graphics board

- Minimum:
 - Support for OpenGL 2.x and at least 256 MB graphics memory
 - All separate NVIDIA or ATI boards should work.

Onboard graphics are generally not recommended and should be thoroughly evaluated if no dedicated graphics board is available.

- Recommended:
 - NVIDIA GeForce GTS 250 or later with at least 512 MB of graphics memory
 - NVIDIA Quadro FX 1700 or higher
 - ATI Radeon HD 4650 or higher
 - ATI FirePro V8700 or higher
- Drivers tested by Volume Graphics:
 - NVIDIA GeForce: driver version 185.85 (for Windows XP and Windows Vista)
 - NVIDIA GeForce 480 GTX: driver version 197.75 (for Windows 7)
 - ATI Radeon: driver version 9.12 (for Windows XP)
 - ATI FirePro V8700: driver version 8.702 (for Windows XP)

Display

VGStudio/VGStudio MAX 2.1 is not operable with a resolution below 1024 x 768.

- Minimum recommended: A resolution of 1280 x 1024

Processor

- Minimum:
 - Intel Core 2 Duo with 2.0 GHz, AMD Athlon x2 with 2.2 GHz
- Recommended:
 - Latest Intel or AMD Quad core processors e.g. Quad Core Intel Core i5 processor with 3.2 GHz or higher

RAM

- Minimum:
 - Main memory should be twice the size of the largest data set you want to visualize. If you want to analyze the data set (segmentation, porosity/inclusion detection, wall thickness analysis etc.), please look at the recommended requirements below.
- Recommended:
 - Main memory should be clearly more than twice the size of the largest data set you want to work with. Each analysis requires extra memory, especially if the analysis will be run on the complete object. Additional memory is also required for advanced surface determination and segmentation.
 - Please make use of our evaluation version of the software to test with your typical data sets and analyses. Contact our support team during that evaluation phase in case questions arise.



- Recommended system for professional use:
 - Data set with 1024 slice images. Slice image with 1024 x 1024 pixels.
 $1024^3 = 2 \text{ GB}$ of data => Visualization only: minimum 4 GB memory
 => Professional data analysis: 8 – 16 GB memory
 - Data set with 2048 slice images. Slice image with 2048 x 2048 pixels.
 $2048^3 = 16 \text{ GB}$ of data => Visualization only: minimum 32 GB memory
 => Professional data analysis: 64 – 96 GB memory

Operating systems tested and supported by Volume Graphics

- Minimum:
 - Windows XP Professional 32 bit,
 - Windows Vista Home Premium 32 bit,
 - Windows 7 Professional 32 bit,
 - SuSE Linux Enterprise Desktop 10.0 (SLED 10) 32 bit,
 - Mac OS X 10.4 (aka 'Tiger'),
 - Mac OS X 10.5 (aka 'Leopard') and higher for Intel processors. Mac OS X IS NOT SUPPORTED on PowerPC architecture!

Please note: Depending on the size of your data set, a 32 bit operating system will NOT be sufficient. Cross-check with the minimum requirements for RAM.

- Recommended:
 - Windows XP Professional 64 bit,
 - Windows Vista Business or higher with 64 bit,
 - Windows 7 Professional 64 bit,
 - SuSE Linux Enterprise Desktop 10.0 (SLED 10) 64 bit.

Optimum for industrial usage is a PC with 2 Intel Xeon 5400 processors running at 3.2 GHz, 16 GB RAM or more and Windows XP Professional 64 bit. Please note that upgrading your existing system to Windows 7 might result in incompatibilities with drivers of existing hardware, especially the graphics board, which in turn might cause problems with *VGStudio/VGStudio MAX* applications.

- Basically Volume Graphics recommends a 64 bit system for the professional use consisting of:
 - 64 bit hardware,
 - 64 bit operating system, and
 - 64 bit version of *VGStudio/VGStudio MAX*

Even though 32 bit versions of our software are generally operable on 64 bit systems, 32 bit applications cannot use more than 4 GB main memory.

- Virtual machines are NOT SUPPORTED. *VGStudio/VGStudio MAX* should be executed on your local machine. For floating licenses, this also applies to the license server.



SYSTEM REQUIREMENTS FOR CT RECONSTRUCTION

The optional CT Reconstruction module has some specific requirements for graphics board and RAM. For other system hardware, please refer to the general system requirements listed above. Please make sure to turn off the Aero theme when performing a CT Reconstruction under Windows 7 to achieve an optimal system performance.

Graphics board

- Minimum:
 - NVIDIA GeForce 8 series or higher
 - NVIDIA Quadro FX 3700 or higher, NVIDIA Quadro FX 4600 or higher
 - ATI FirePro V8700 or higher
- Recommended:
 - NVIDIA GeForce GTX 285 1 GB or NVIDIA Quadro FX 4800 or higher
- Drivers tested by Volume Graphics:
 - NVIDIA GeForce: driver version 185.85 (for Windows XP and Windows Vista)
 - ATI FirePro V8700: driver version 8.702 (for Windows XP)

RAM

Calculate the optimal size of memory based on the size of the volume ($x * y * z$), the size of one projection ($x * y$) and the number of projections:

size of memory = (volume size * 4) + (projection size * number of projections * 4)

The result is the optimal size of memory in bytes. To convert to MB, divide by 1,000,000.

■ Example:

volume: $1024 * 1024 * 1024$

size of one projection: $1024 * 1024$

number of projections: 720

size of memory = $(1024 * 1024 * 1024 * 4) + (1024 * 1024 * 720 * 4) = 7,314,866,176$

This equates to 7,315 MB or 7.315 GB



TIPS, TRICKS AND WARNINGS

General

VGStudio MAX and *VGStudio* are software applications with high requirements on the computer system. This is why both applications will run a number of checks when the program is started.

System resources such as main memory, number of processors and GDI objects are checked since these may be insufficient, especially if several applications are run at the same time. If your system resources are not sufficient, a warning message will be displayed. Under certain conditions, starting of the application may be prevented.

These system resource checks may be partly disabled by starting the application with the parameter `--no_instance_check`. For *VGStudio MAX 2.1*, you would have to enter `vgstudiomax21.exe --no_instance_check`.

- Since a number of problems may arise, running the application without having the system resources checked is neither recommended nor supported.

Typical effects are, for example, problems with the user interface such as incomplete or misplaced interface elements or errors in the display of images. User settings like presets or workspace layout may inadvertently be overwritten. Processor capacity and main memory will be shared between instances of the application and may prove insufficient. This may result in a dramatically low system performance or even application crashes, especially if parts of the information need to be swapped to disk due to high memory consumption.

- Using a language different from the system language may cause compatibility problems. English is the default language and is fully supported on all systems. To avoid the risk of compatibility problems, please use ASCII characters only, and stay within the first 128 characters of the system character map when naming files, folders, and objects (i. e. avoid umlauts and special characters). This also applies to projects transferred to a computer with another system language.

Graphics board

- Make sure to have the recommended driver for your graphics board installed.
- Graphics board drivers for laptops available from the laptop manufacturer may be out of date. Please check the graphics board manufacturer's website for the latest graphics board drivers.
- Onboard graphics chips are not recommended.

RAM

- Please note that for the calculation of the required RAM, only the size of the data set when loaded into the RAM is relevant. If the data is saved in compressed files, e. g. in the JPEG 2000 format (.jp2), the size of the data set on the hard disk may be significantly smaller than the size of the data set when loaded into the RAM.
- Do not deactivate the swap space. If more RAM is needed than available and there is no swap space, this may cause the system to crash.

Remote access

Remote access to our software is not supported, i.e. you should run the software locally on your own computer. If you use remote access to run *VGStudio MAX 2.1* or *VGStudio 2.1*, you may encounter a number of problems, e. g.:

- corrupted display of the user interface
- low performance
- application crashes



GRAPHICS BOARDS

Please refer to the following table for suitable combinations of graphics board, graphics board driver and operating system.
Please note: This table is not complete. It is compiled according to our current knowledge and will be updated as necessary.

| PRODUCER | GRAPHICS BOARD | DRIVER | OPERATING SYSTEM | COMMENTS |
|----------|-----------------------|-------------------------|------------------------------------|---|
| NVIDIA | Geforce GTX 580 | 262.99 | Windows 7 64 bit | No known problems |
| NVIDIA | Geforce GTX 480 | 257.21 | Windows 7 64 bit | Good performance when using Windows 7 basic theme |
| NVIDIA | GeForce GTX 285 | 185.85 | Windows XP 64 bit | No known problems, recommended for CT reconstruction |
| NVIDIA | GeForce GTX 285 | 196.21 | Windows XP 64 bit | No known problems |
| NVIDIA | GeForce GTX 285 | 196.21 | Windows 7 | Problems with graphics display, not recommended |
| NVIDIA | GeForce GTX 280 | 182.50 | Windows Vista 64 bit SP2 | No known problems |
| NVIDIA | GeForce GT 120 | 179.36 | Vista Business 64 bit SP1 | Slow performance with dual screens, low performance for CT reconstruction, recommended with limitations |
| NVIDIA | GeForce 9800 GT | 185.85 | Windows XP 64 bit | No known problems, recommended for CT reconstruction |
| NVIDIA | GeForce 9800 GT | 196.21 | Windows XP 64 bit | No known problems |
| NVIDIA | Quadro FX 3700M | 190.62 | Vista Business 64 bit SP1 | No known problems |
| NVIDIA | Quadro FX 3700M | 179.76 | Windows Vista 64 bit | No known problems |
| NVIDIA | Quadro FX 3700 | 190.38 | Windows 7 Ultimate 64 bit | No known problems |
| NVIDIA | Quadro FX 3500 | 169.96 | Windows XP 64 bit | Problems with graphics display, not recommended |
| NVIDIA | Quadro FX 3400 | 182.65 | Windows XP 64 bit SP2 | No known problems |
| NVIDIA | Quadro FX 1600M | 197.16 | Windows Vista 64 bit | Application crashes, not recommended |
| NVIDIA | Quadro FX 1600M | 186.81 | Windows Vista 64 bit | No known problems |
| NVIDIA | Quadro FX 3800M | 188.43 | Windows 7 64 bit | Problems with Porosity/Inclusion Analysis Module, application crashes, not recommended |
| NVIDIA | Quadro FX 4600 | 162.62 | Windows XP, Windows Vista | Problems with graphics display, not recommended |
| NVIDIA | Quadro 4000 | 265.70 259.81 | Windows 7, Windows Vista 64 bit | Problems with graphics display, not recommended |
| NVIDIA | Quadro 4000 | 275.65 | Windows 7 | Application crashes due to recurrent driver crashes, not recommended |
| NVIDIA | Quadro 6000 | 275.65 | Windows 7 | No known problems Other drivers may cause problems |
| ATI | FirePro V8700 | 8.603 8.563 8.702 | Windows XP 64 bit | No known problems |
| ATI | FirePro V7750 | 8.633 | Windows XP 64 bit SP2 | Problems with graphics display, not recommended |
| ATI | FireGL V7700 | 8.634 8.633 | Windows Vista 64 bit SP2 | Problems with graphics display, not recommended |
| ATI | Radeon HD 4870 | 9.5 | Windows XP 64 bit | Problems with CT reconstruction, recommended with limitations |
| ATI | Radeon HD 5870 (1 GB) | 9.12 | Windows XP 64 bit | No known problems, very good performance for CT reconstruction and hardware renderer |
| INTEL | Intel HD Graphics | 15.21.5.2266 | Windows 7 Ultimate 32 bit | No known problems |



VOLUME
GRAPHICS
SOLUTIONS ABOUT VOXELS

TROUBLESHOOTING FOR VG PRODUCTS*

Some common problems and their solutions are listed in the table below.

| PROBLEM | POSSIBLE CAUSE | POSSIBLE SOLUTIONS |
|---|--|---|
| Rendering problems occur, e.g. 3D window not (correctly) displayed, saved images are faulty. | An out-of-date graphics board driver is installed. | Download and install the current graphics board driver for your graphics board. |
| | An onboard graphics board is installed. | Onboard graphics board might be insufficient to run your VG product. Please refer to Graphics board on page 1. |
| | The installed graphics board is not recognized correctly. | In Edit > Preferences > General > General, go to the <i>Hardware renderer</i> , activate the option <i>Memory override</i> and manually set the correct memory of your graphics board. |
| On Windows 7: Only part of the 3D window is updated when moving an object. | No Aero theme is selected in Windows. | In the <i>Personalization</i> window of the Windows control panel, switch to an Aero theme. |
| The performance is low. | There's not enough RAM available due to other applications running at the same time. | Close all other applications when running your VG product. |
| The performance is extremely low with large data sets (64 bit system). | The size of the data sets exceeds the installed RAM, data will be swapped on harddisk. | <ul style="list-style-type: none"> - Install more RAM (if possible). - Reduce the size of the data set, e.g. using suitable Import settings. |
| The performance is extremely low with large data sets (32 bit system) and/or the application crashes. | The size of the data sets exceeds the installed RAM, data will be swapped on harddisk. | <ul style="list-style-type: none"> - Install more RAM (if possible). - Switch to a 64 bit system. (upgrade required) - Reduce the size of the data set, e.g. using suitable Import settings. |
| The application crashes when working with large data sets (64 bit systems). | The size of the data sets exceeds the installed RAM, the swap space is not activated or too small. | <ul style="list-style-type: none"> - Activate the swap space. - Enlarge the size of the swap space to about the order of magnitude of the RAM - Install more RAM. - Reduce the size of the data set, e.g. using suitable Import settings. |
| The application crashes when saving large image stacks (NVIDIA graphics board). | There's an incorrect implementation of OpenGL in the graphics board driver. | <ul style="list-style-type: none"> - In Edit > Preferences > General > General, go to the <i>Off-screen rendering settings</i> and deactivate the option <i>Use framebufferobject</i> extension. - Download and install a more current graphics card driver for your graphics board. |

*This includes *VGStudio MAX 2.2*, *VGStudio 2.2* and *myVGL 2.2*. Please note that some entries might be applicable only for selected products and/or configurations (e.g. license for add-on modules).



| PROBLEM | POSSIBLE CAUSE | POSSIBLE SOLUTIONS |
|--|--|---|
| An installed codec is not visible in the codec selection when saving an .avi file (64 or 32 bit system). | The codec is not compatible with the selected settings of the avi. | <ul style="list-style-type: none"> - Change the settings for the .avi file, e.g. frame size, frame rate (fps). In many codecs the width and height of the image must be a multiple of 2. - Select another codec. |
| An installed codec is not visible in the codec selection when saving an .avi file (64 bit system). | A 32 bit version instead of a 64 bit version of the codec is installed. | <ul style="list-style-type: none"> - Install the 64 bit version of this codec. - Select another codec. |
| The GUI is corrupted, windows are not displayed correctly. | Two or more instances of your VG product are running, or other graphics intensive software is running at the same time, therefore exceeding the GDI/Userobjects limit. | <ul style="list-style-type: none"> - Close all other applications when running your VG product. - Only run one instance of your VG product at the same time. |
| On Windows 7: performance during reconstruction is slow | An Aero theme is selected in Windows. | In the <i>Personalization</i> window of the Windows control panel, switch to a basic theme. |
| The application crashes when trying to save an animation to an .avi file using the MPEG-4 encoding of ffdshow (K-Lite codec pack). | There are bugs in the MPEG-4 encoding of ffdshow. | <ul style="list-style-type: none"> - Select another codec of this codec package to save the animation to an .avi file. - Use another codec package. - Render the animation as an uncompressed .avi file or an image stack and convert it to a compressed .avi file using a third-party software (e.g. VirtualDub). |
| On Mac OS X: The application crashes during start. | No printer driver is installed (installing printer drivers is optional for newer versions of Mac OS X). | Install at least one printer driver. |

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