

VIDEO CRUNCH IT 2000

User Guide



Rel. 0197
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FCC Compliance

This board 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 against harmful interference in residential installation. This device generates, uses and can radiate 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.

Important Note

You must **imperatively** read the README file on the DIAMOND Diskettes and all the documentation supplied with your graphics board before installing it! If you fail to do so DIAMOND cannot accept any responsibility for claims that may result as a consequence.

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General Information

Overview of this manual

What do the single chapters contain?

Introduction

Tells you everything about what the VIDEO CRUNCH IT 2000 is, what you can do with the board, its features and the package contents

Hardware Installation

Describes all important steps for a successful installation of the board, including the internal and external connections, the different installation possibilities and combinations with other boards and equipment.

Software Installation

Describes the installation of the driver software and explains the meanings of the driver dialog boxes.

Technical Details

Describes in detail the technical specifications, pinouts of the internal connections, and the external connection possibilities

Troubleshooting

In case you have problems with the installation or with your video-editing software, you may find useful tips in this section.

Background Information

Are you pretty new to the subject of Creating a Digital Video File or are you interested in the basic theory of video editing, video overlay, M-JPEG a.s.o.? Then this chapter is for you.

Glossary

Definition of multimedia terms

Symbols and Conventions

The following symbols and syntax conventions are used in this manual:

Warning! This section contains a warning or important information.

Note: This section contains useful hints.

DOS commands are written in capital letters, example:

A:
INSTALL

If not defined in another way, all DOS commands must be confirmed with the ENTER or RETURN key.

Example: Examples are indicated by this format.

Screen messages are shown in *Courier*.

References to **other parts of the manual** are shown in *italic*.

Directory names mentioned in this manual are examples and are written in capital letters.

The DIAMOND software is delivered on 3.5" disks. Therefore, the documentation refers to disk drive A:. Please enter B: if your 3.5" disk drive is addressed with B:.

Checklist of Package Contents

Your DIAMOND package should contain the following items:

- 1 VIDEO CRUNCH IT 2000 board
- 1 SPEA Movie Bus connection cable
- 1 S3 Scenic Highway (LPB) Bus Connection cable
- Installation Software
- Video Editing Software + manual
- this manual

External TV Tuner Box

An external TV Tuner Box is optionally available for the VIDEO CRUNCH IT 2000. For PAL and SECAM, this tuner contains a teletext converter.

To purchase this external tuner box, please contact your local dealer.

Last-Minute Changes - README file

Our software is constantly being improved and updated. The latest information is contained in a file named README. It appears on the screen automatically at the end of the software installation.

Warranty

You have a 5-year warranty for your DIAMOND video card. To ensure your warranty, it is necessary that you keep the invoice of the video card. If your video card is damaged, contact your local retailer first.

Your board is a complex electronic device and can only be repaired by authorized technical personnel with the required equipment. Do **not** attempt to change or repair any parts of this product. Doing so will render your warranty invalid.

Support

The following support services are offered by Diamond Multimedia:

- technical support
- online information and software updates via modem (Mailbox, Internet, CompuServe)
- software updates on CD (SuperCD).

Further information concerning these support services can be found in the 'DIAMOND Support Team' section on the last pages of this manual.

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Introduction

What is the VIDEO CRUNCH IT 2000 and what is it used for?

With the Video Crunch It 2000, DIAMOND offers a unique new product for the consumer video market. It gives the customer for the first time the chance to achieve high - Professional S-VHS like - video-quality for non-linear video-editing with a board for the PC at a very affordable consumer price.

Video Crunch It 2000 is also suitable for any PC professional who needs to capture video clips for use on the PC.

And finally, Video Crunch It 2000 is also great for professionals who want to output digitally produced video clips and 3D animations to video tape or a video screen.

The VIDEO CRUNCH IT 2000 is not suitable to output a VGA signal to Video.

What does the Video Crunch It 2000 do?

The Video Crunch it 2000 is a PCI-based board with video inputs and video output. It uses a highly specialized processor to compress and decompress the captured or played-back video in real time with special Motion JPEG (also named as M-JPEG or MJPG) technology.

Why video input and output ?

Having video inputs and outputs allows you to record video material from any (standard) video source - such as a VCR or Camcorder - onto the hard disk of the PC and, after it has been edited or manipulated with a video-editing or special-effects software, it can be recorded back onto the video tape.

Non-linear video editing on the PC requires an „interface“ that allows video data to be imported into the PC and exported back out.

Why compression? Why Motion JPEG?

It is impossible to store uncompressed video on (today's) hard disks. The amount of data that is required is almost 22 MBytes per second for PAL / SECAM and almost 18 MByte for NTSC. Even if today's hard disks were fast enough to handle such amounts, a standard 1-GByte hard disk would be filled up in 49 seconds with PAL video and in 58 seconds with NTSC video.

Compression with specialized algorithms - Motion-JPEG is one - reduces the amount of data to what today's PC's can handle.

Why PCI ?

PCI is a modern high-performance bus system not only for PCs. PCI eliminates several problems that the old ISA and VESA Local (VL) bus have:

Plug 'n' Play: Plug and Play eliminates all of the classical configuration problems like setting jumpers and dip switches. This makes the installation very easy - especially if the operating system also supports PnP - like Windows 95.

Performance: The ISA bus is a real bottleneck for anything that has to be transported through it. Its performance is too poor to get high-quality video - even when it is compressed - through it.

Interference: With different boards trying to transport data over the ISA bus, the overall performance of a board can drop dramatically. A sound board can reduce the bandwidth that is available to a video-editing board by more than 50%. A PCI bus master board - the Video Crunch It 2000 is one - cannot be interrupted by - for example - a soundboard.

Features: A special feature is available in combination with certain PCI graphics boards (see details in the attached README file). The Video Crunch It 2000 can write (bus

master) the video signal directly into the memory of the graphics board. This allows video overlay on the Windows screen without special cabling and complex configurations.

Using PCI bus master technology, the Video Crunch It 2000 is designed

- to be quickly and easily installed and ready to go,
- to achieve full performance in a fast Pentium-based PC without hours of fine-tuning,
- to be fully compatible with Windows 95 and any application that operates Video for Windows 95,
- to be compatible with previously installed hardware,
- to achieve true S-Video quality,

Features of the VIDEO CRUNCH IT 2000

- Real-time Video Digitizer with TrueColor S-VHS / Hi-8 Quality
- Full NTSC or PAL / SECAM Resolutions (640 x 480 / 768 x 576)
- Real-time M-JPEG Compression
- Standard YUV 4:2:2 Format
- Y/C (S-Video) and Composite Video Inputs and Outputs
- High performance PCI design for true S-Video quality
- ZORAN ZR 36050 / 36055 Motion JPEG video processor
- Video encoder & decoder (video editing)
- High performance 32-bit PCI 2.1 design using Philips SAA7145
- Full NTSC / PAL / SECAM (640 x 480 / 768 x 576 pixels) resolution at full frame- / field-rate (30 / 25 frames or 60 / 50 fields), true color
- Video overlay using S3 Scenic Highway (LPB)
- Software-controlled video filters for better quality at high compression ratios
- Bit-rate control for a constant data stream without JPEG peaks
- TV Tuner (NTSC, SECAM or PAL) upgradable. PAL or SECAM versions include Teletext decoder.
- Variable compression ratios from 1:4 (1:8) to 1:100
- Video inputs:
 - 1 composite video (CVBS) - Cinch connector
 - 1 Y/C (S-VHS, Hi-8) - Mini-DIN 4 Pin connector
- Video outputs:
 - 1 composite Video (CVBS) - Cinch connector
 - 1 Y/C (S-VHS, Hi-8) - Mini-DIN 4 Pin connector
- S3 Scenic Highway (LPB) connector for Diamond graphics-boards with LPB connector
- SPEA Movie Bus (YUV bus) for video-data transmission to graphics-boards with SPEA Movie Bus
- Adjustable Brightness, Contrast, Color and Hue; the last item is applicable for NTSC video only

Check the glossary in this manual for a brief description of the abbreviations and terms used here.

Software for your Board

The standard software delivered with the VIDEO CRUNCH IT 2000 contains the following programs:

- Driver for Windows® 95 and Windows® 3.1x
- Professional video-editing software for capturing still images and live video, titling, editing, audio. Available in English, French, German (incl. manual)

Compatible to all software that can make use of Microsoft Video for Windows MCI commands.

Hardware Installation

Installation of the board

General Procedure: The installation of the VIDEO CRUNCH IT 2000 consists of three basic steps:

Step 1: Installing the VIDEO CRUNCH IT 2000

Step 2: Combining the VIDEO CRUNCH IT 2000 with the graphics board

(four alternative variations, depending on the sort of graphics board)

Step 3: Connecting external equipment to the board

Warning!

Please take the time to follow the instructions below and keep it simple to begin with; don't try to do everything at once - One step at a time!

System Requirements and Considerations

IBM compatible **computer** Pentium 75 class PC with a free PCI 2.1 bus expansion slot

Operating system Windows® 95 or Windows® 3.1x

16 MB **RAM**

Hard disk capacity

- 16 MB of free hard drive space for applications
- (Recommended) an extra (fast) hard-drive for recording and playback of video sequences

Graphics Board and Monitor (see Readme file for details)

- A PCI 2.1x graphics board with Direct Draw drivers
or
SPEA/Diamond graphics board with S3 SCENIC HIGHWAY (LPB) connector
or
SPEA/Diamond graphics board with SPEA Movie Bus
or
any other graphics board (without achieving an Overlay)
- Color depth
256 colors
(recommended: High- or TrueColour)
- Resolution:
640 x 480 pixels
(recommended: 1024 x 768 pixels)

Video In

Video source such as a video recorder, video camera a.s.o.

Video Out

Output device, e.g. video monitor or video recorder + video monitor

Audio

Windows® compatible soundboard, if sound is to be edited.

Typical System Configuration

A typical configuration environment for your board is described as follows:

- Pentium 133 MHz, PCI bus, 16 - 32 MB of memory
- 21" monitor
- Video source: video recorder or video camera
- Video output: video monitor or video recorder
- Windows® compatible sound board - for sound recording and editing
- Quad speed CD ROM drive

Warning!

Prevent damage by static electricity. Static electricity can cause severe damage to microcircuits, but here are some easy ways to avoid it.

1. Hold the DIAMOND card on its edges only. Don't touch edge connectors or exposed circuitry.
2. Leave the DIAMOND card in the anti-static protective bag until ready to install it in your computer.
3. If possible, ground yourself when handling the DIAMOND card. The metal power supply housing is generally considered the best place to ground yourself.
4. Do not place the DIAMOND card on a metal surface.
5. Make the least possible movement to avoid building up static electricity from your clothing, carpets and furniture.

Preparing the Installation

Warning!

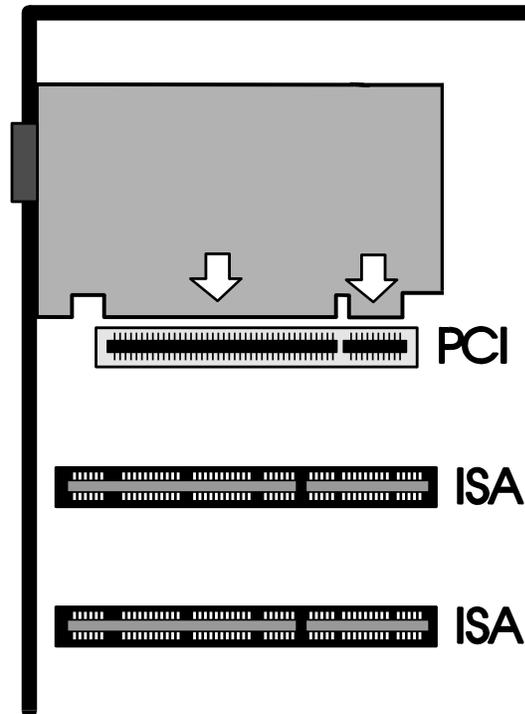
Please note that, before you install the VIDEO CRUNCH IT 2000, a VGA board or multimedia board has to be installed and configured in your system. Start the installation of the VIDEO CRUNCH IT 2000 after you have installed the VGA or multimedia board. Additional information can be found in the manual of the corresponding board.

1. Switch off your computer and all external devices (printer, display and others) and unplug all power cords from the electrical source.
2. Remove the cover mounting screws and save them for later.
3. Remove the cover of the computer.

Step 1: Installing the DIAMOND Card

The DIAMOND card is installed in a free PCI bus expansion slot.

1. Select a free expansion slot and remove its metal slot cover. Save the screw to secure the graphics card later.
2. Hold the card by the edges and press it firmly into the expansion slot.



Installing the Card in a PCI Slot

Warning! The following step is very important in order to ground your DIAMOND card properly.

3. Align the slot in the mounting bracket of the DIAMOND card with the screw hole in the rear panel of the computer case. Use the screw you removed from the expansion slot cover or the previously installed video adapter to secure the DIAMOND card in place.
4. Install the multimedia board.

Now continue with Step 2 and there choose the alternative that corresponds to the kind of graphics board you have installed in your PC.

Step 2: Combining the graphics board with the VIDEO CRUNCH IT 2000 via the Internal Connectors

Note: Internal connectors on your board are all connectors on-board which need to be attached before you reassemble your PC, because they will be inside the PC. For VIDEO CRUNCH IT 2000 this means that the SPEA Movie Bus or the LPB Feature Connector have to be connected first.

Depending on the physical configuration of your graphics board, there are three alternatives to combine the VIDEO CRUNCH IT 2000 and your graphics board. Select the alternative that suits your board and then continue with the external connection described in the next chapter.

Alternative 1: Connection via a S3 scenic Highway (LPB) Feature Connector

There are four ways to combine the VIDEO CRUNCH IT 2000 with a graphics board. The following shows a connection with a graphics board via an S3 Scenic Highway (LPB) feature connector (e.g. a Diamond / SPEA graphics board with this connector).

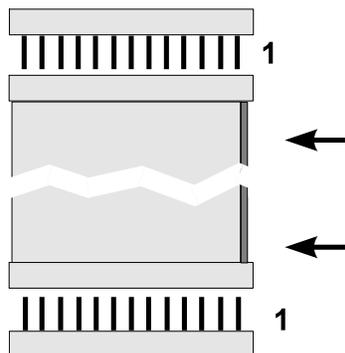
Note: Boards from other Manufacturers than SPEA or Diamond with an S3 Scenic Highway (LPB) Connector may work fine - at least with certain resolutions. But we cannot guarantee this. Please contact your graphics board manufacturer for the latest drivers.

Note: If you do not know where to find the LPB Connector on your board, please consult your graphics board manual.

After both boards (VGA and VIDEO CRUNCH IT 2000) are installed in your system, connect the S3 Scenic Highway (LPB) feature connector via the supplied 34-pin flat ribbon cable.

Warning! Do not confuse the 40-pin cable for the SPEA Movie Bus with the 34-pin cable for the LPB Connector.

Warning! The ribbon cable has a colored line on one side. Take care that the colored line is at the end where you connect the cable to Pin#1, which is marked on the board!



Connecting the ribbon cable with the colored line at the side of Pin #1

Connect the peripheral equipment as follows:

1. Connect the PC monitor cable to the VGA output of the VGA board.
2. Connect your video source to one of the video input connections of the VIDEO CRUNCH IT 2000.

- Optional (not necessary for video editing): Connect your video output device to one of the video output connections (video recorder and monitor) - either separately or with the video monitor and the video recorder coupled together

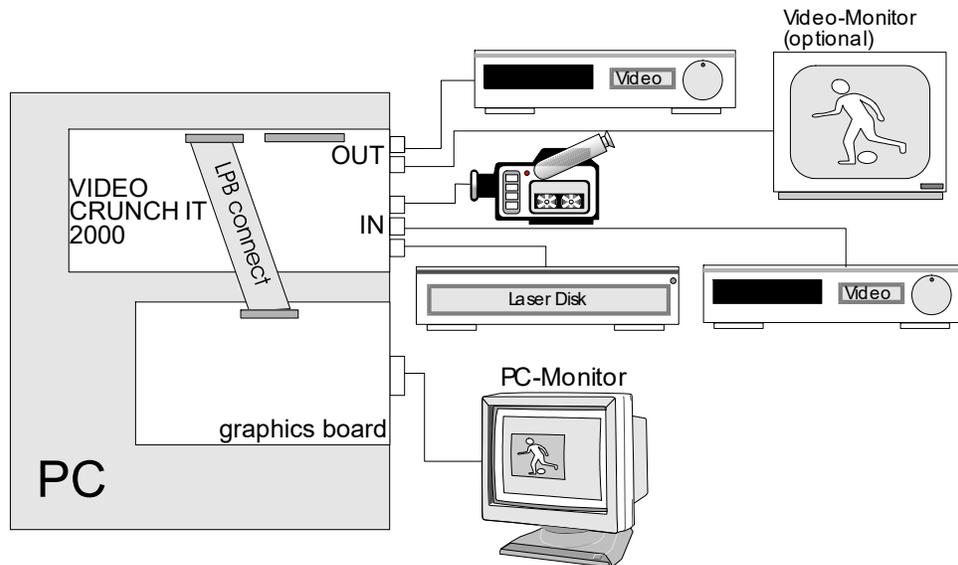
Note: Always combine two similar connections, Y/C (S-VHS or Hi-8) with Y/C and Composite with Composite!

Warning! Be sure to connect any peripheral devices to the computer and switch them on BEFORE switching on your computer. This avoids a damaging power surge, and the possibility of electrical discharge damage when live connections meet.

Note: It is necessary to install a Windows compatible soundboard if you also want to edit the sound of your video.

Note for the Software Installation:

Install the software for the graphics board **FIRST**, then the software for the VIDEO CRUNCH IT 2000!



Configuration example VIDEO CRUNCH IT 2000 with graphics board via an S3 Scenic Highway (LPB) Feature Connector

Alternative 2: Connection via the SPEA Movie Bus

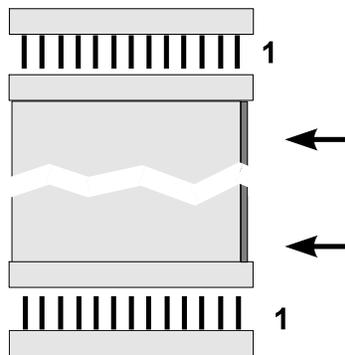
There are four ways to combine the VIDEO CRUNCH IT 2000 with a graphics board. The following shows a connection with a graphics board via a SPEA Movie Bus (e.g. a SPEA graphics board with this connector).

Note: If you do not know where to find the SPEA Movie Bus on your board please consult your graphics board manual.

After both boards (VGA and VIDEO CRUNCH IT 2000) are installed in your system, connect the SPEA Movie Bus via the supplied 40-pin flat ribbon cable.

Warning! Do not confuse the 40-pin cable for the SPEA Movie Bus with the 34-pin cable for the LPB Connector.

Warning! The ribbon cable has a colored line on one side. Take care that the colored line is at the end where you connect the cable to Pin#1, which is marked on the board!



Connecting the ribbon cable with the colored line at the side of Pin #1

Connect the peripheral equipment as follows:

1. Connect the PC monitor cable to the VGA output of the VGA board.
2. Connect your video source to one of the video input connections of the VIDEO CRUNCH IT 2000.
3. Optional (not necessary for video editing): Connect your video output device to one of the video output connections (video recorder and monitor) - either separately or with the video monitor and the video recorder coupled together

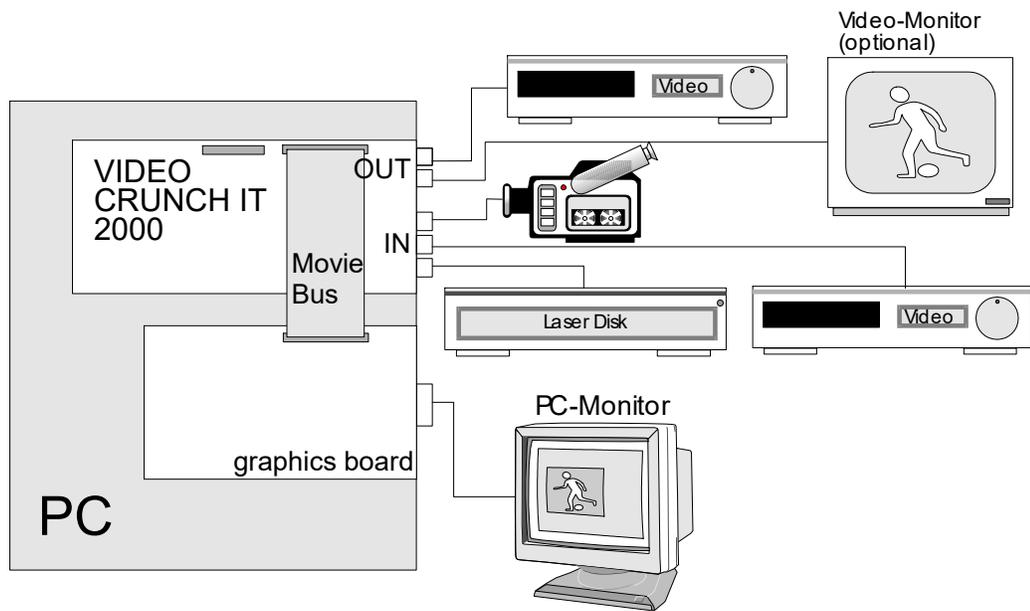
Note: Always combine two similar connections, Y/C (S-VHS or Hi-8) with Y/C and Composite with Composite!

Warning! Be sure to connect any peripheral devices to the computer and switch them on BEFORE switching on your computer. This avoids a damaging power surge, and the possibility of electrical discharge damage when live connections meet.

Note: It is necessary to install a Windows compatible soundboard if you also want to edit the sound of your video.

Note for the Software Installation:

Install the software for the graphics board **FIRST**, then the software for the VIDEO CRUNCH IT 2000!



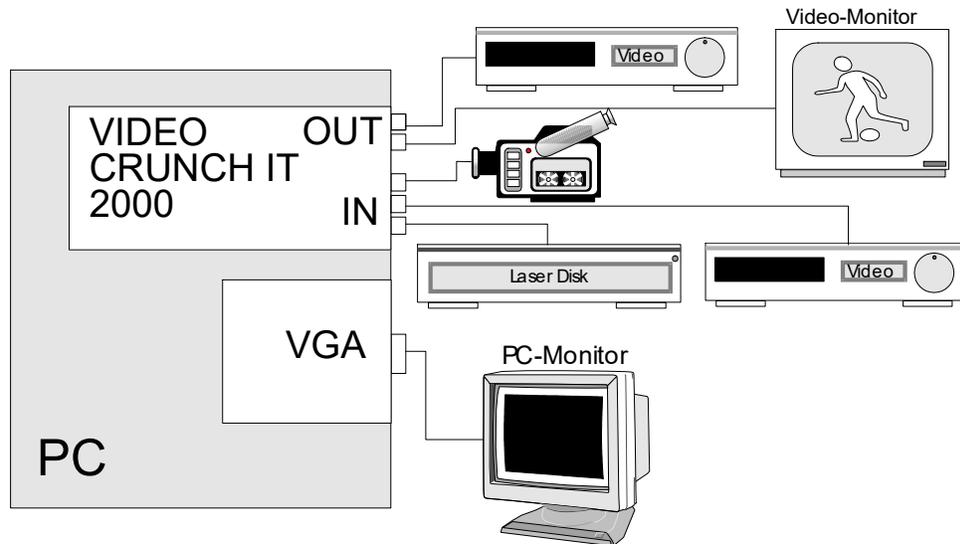
Configuration Example VIDEO CRUNCH IT 2000 with a graphics board via a SPEA Movie Bus

Alternative 3: Combine with any other VGA board

After you have installed both cards (graphics and video) in your system, connect the PC monitor cable to the VGA output of the VGA board.
Connect a Video Monitor to the Video Output of the VIDEO CRUNCH IT 2000 .

Note: A Video Monitor is required, because Video Overlay to the PC Monitor is impossible

Note: As no Video Overlay is available, a black box will be displayed on the screen by Video for Windows. This is not a malfunction. The Video Signal can be seen on the external Video Monitor.



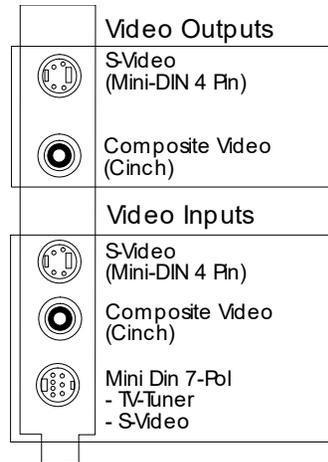
Configuration example VIDEO CRUNCH IT 2000 VGA graphics board without Video Overlay

Step 3: Connecting External Equipment to the inputs and outputs

The connectors on the board are standardized, with the exception of the SPEA Movie Bus / S3 Scenic Highway (LPB) Connector (see Section, Technical Details). For this reason, you only need to take note of a few points when making connections to external equipment.

Warning!

Be sure to connect any peripheral devices to the computer and switch them on BEFORE switching on your computer. This avoids a damaging power surge, and the possibility of electrical discharge damage when live connections meet.



Inputs and Outputs of the VIDEO CRUNCH IT 2000

Video Outputs

- Y/C (S-VHS, Hi-8) Video output (Mini-DIN 4 Pin cable):
For connecting a S-VHS or Hi-8 video recorder.
- Composite Video output (Cinch cable):
for connecting a video monitor or a video recorder

Video Inputs

- Y/C Video In for S-VHS or Hi-8 (Mini-DIN 4 Pin cable):
This input is connected with a Video recorder or Camcorder output. **Please note that the antenna signal from the wall socket is not suitable!**
- Composite Video In (Cinch cable):
This input is connected with a Video recorder or Camcorder output. **Please note that the antenna signal from the wall socket is not suitable!**
- Input Mini DIN 7-Pin cable:

Warning!

If you use the Mini DIN 7 Pin cable as S-Video Input or with the TV-Tuner Box, NO Video Source can be connected to the Cinch Video Input. If you do so, two Video In sources will be active and overlaid each other. This may cause an interference on the resulting display

Connect **external TV-Tuner** (see paragraph below) from / to Diamond TV-Tuner Box
OR
connect **S-Video** cable to Video In source
OR
connect a **desktop camera** using a 7 Pin Mini DIN Connector (Video Data and Power Supply) according to the Philips specifications.

External TV Tuner Box

An external TV tuner box is available as an option for the VIDEO CRUNCH IT 2000. For SECAM and PAL, this tuner includes a teletext converter.
To purchase this external tuner box, please contact your local dealer.

Note:

It is necessary to install a Windows compatible soundboard if you also want to edit the sound of your video.

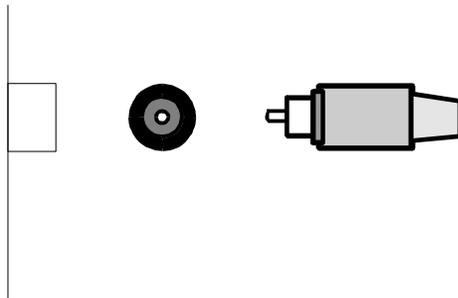
Diamond VIDEO CRUNCH IT 2000 Connection Possibilities

There are several ways to connect different video equipment to the DIAMOND VIDEO CRUNCH IT 2000. The large number of possibilities and different connections available, e.g. on videorecorders, make it difficult to obtain a clear picture of what is possible and/or necessary.

Two different signal types are used:

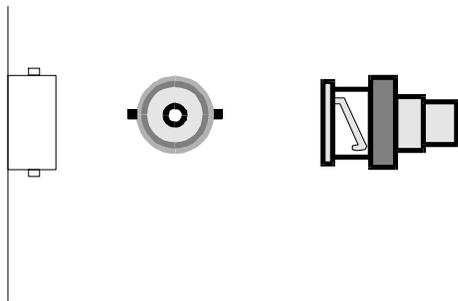
- **Composite (also called: FBAS, CVBS)**
Used for: VHS, Beta, Video8
Connector: cinch, BNC, SCART/Euro-AV
The composite signal contains the entire image information.
- **Y/C (also called: S-Video)**
Used for: S-VHS, Betamax, Hi-8
Connector: Mini-DIN 4 Pin or SCART/Euro-AV
The Y/C signal contains the luminescence and color information of an image in two separate signals ('Y' and 'C' respectively).

The different video connections that can be available on videorecorders (VCR's), camcorders, laserdisk and CDi devices are described in the following sections.



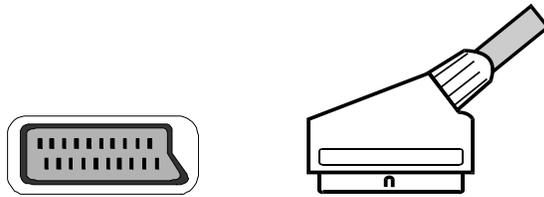
Cinch Connectors (female/male)

Cinch connections (sometimes also referred to as 'RCA connectors') are normally used for composite CVBS signals (DIAMOND VIDEO CRUNCH IT 2000: Composite Input, Composite Video Input # and Composite Video Output).



BNC Connectors (female/male)

BNC connectors are normally used in high-quality video equipment. They are used for composite signals.



SCART (Euro-AV) Connectors (female/male)

A SCART or Euro-AV ('European Audio-Video') connector usually transports a composite signal. It is an input and an output connector on VCRs. This connector also contains input and output lines for stereo audio signals (line) and S-Video devices carry a Y/C signal (switchable input or output). Some televisions require a switch voltage via the SCART/Euro-AV connector in order to switch between TV signals and SCART/Euro-AV. **If the DIAMOND CRUNCH IT is connected to such a television, the adapter cable must provide the switching voltage!**



Y/C (S-Video) Mini DIN 4-Pin Connectors (female/male)

The Y/C connector is used to transport the luminescence and color information of an image in two separate signal lines. Connecting a Y/C signal and a composite signal is only possible with the use of a special interface device (Y/C-Composite transformer).

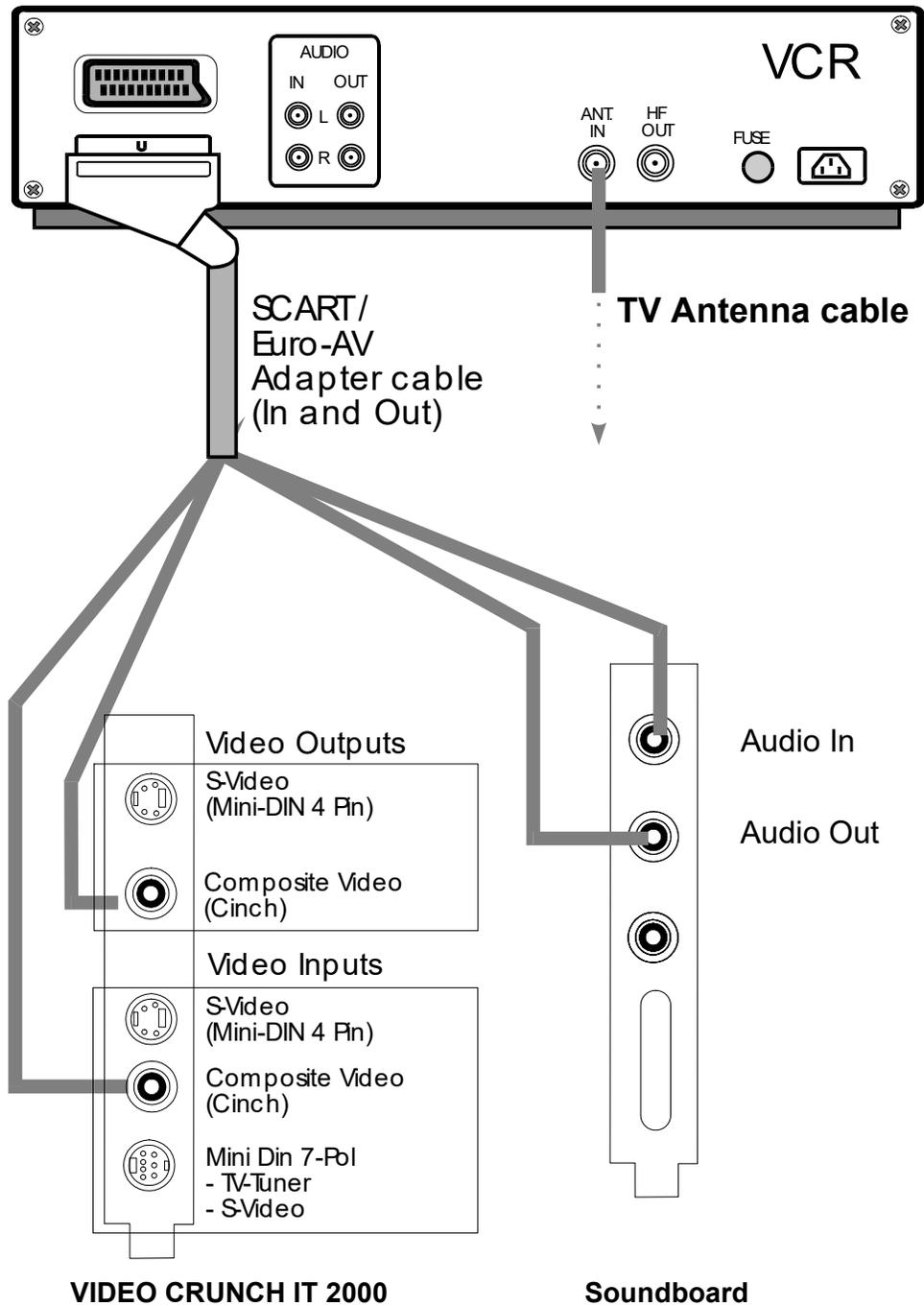
A wide variety of possibilities exist to connect one or two VCRs or additional playback devices such as laserdiscs, VideoCD and CDi players, video camcorders and TV tuners. Some devices have one or two SCART/Euro-AV connectors with additional cinch or BNC sockets as well as Y/C (S-Video) sockets. For this reason it is not possible to cover all the connections that can be made, however, the following three examples should help you to grasp typical variations.

Warning!

An output signal (OUT) may only be connected with an input connector (IN)!

Attention! Adaption Cables that name the output as input and vice versa have been seen! If you think you have done everything correct, but you get no video running, give it a try and connect the input adapter to 'input' and the output adapter to 'output'. This should not cause any harm to the VIDEO CRUNCH IT 2000 or your other video equipment.

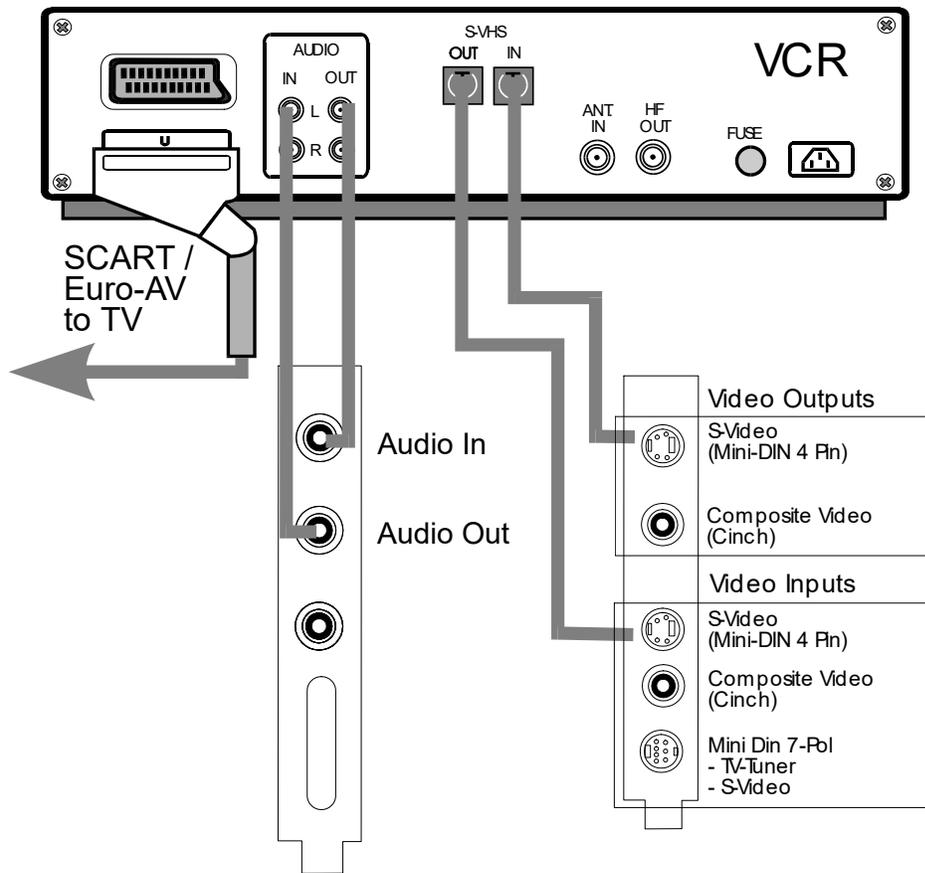
Example 1: A video recorder (SCART/Euro-AV)



Warning!

Configurations such as these can easily create feedback. Feedback, in turn, can damage your loudspeakers (or the loudspeaker of your TV). Before you switch your DIAMOND VIDEO CRUNCH IT 2000 or videorecorder from record mode to playback mode, turn the volume level on the mixer of your soundboard or VCR down as far as possible.

Example 2: S-VHS (etc.) VCR



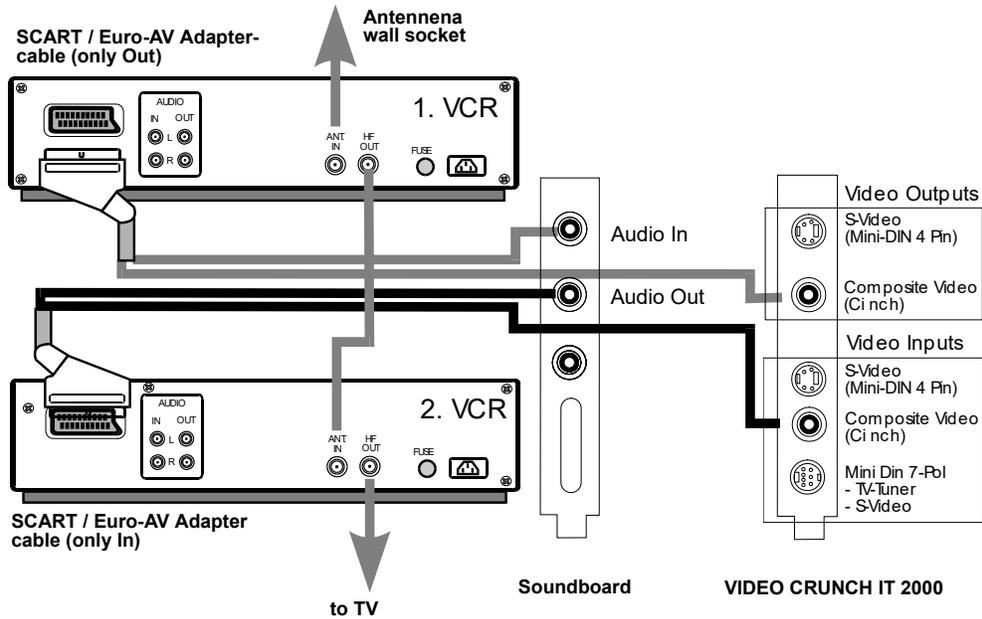
Soundboard

VIDEO CRUNCH IT 2000

Warning!

Configurations such as these can easily create feedback. Feedback in turn, can damage your loudspeakers (or the loudspeaker of your TV). Before you switch your DIAMOND VIDEO CRUNCH IT 2000 or videorecorder from record mode to playback mode, turn the volume level on the mixer of your soundboard or VCR down as far as possible.

Example 3: Two VCR's



Note:

Audio inputs and outputs on video devices and SCART/Euro-AV cables are normally available as cinch male or female connectors (in the case of SCART/Euro-AV cables these lines are separate connectors at the opposite end of the SCART/Euro-AV cable). PC sound boards however, normally use small jack plugs as inputs and outputs for space reasons. The right kinds of cable (SCART/Euro-AV and cinch-to-jackplug adapters) are available in most shops specializing in audio or video equipment.

After Installing the VIDEO CRUNCH IT 2000

If you have correctly installed the DIAMOND board, Windows® 95 should start correctly and automatically detect the new board in the PC.

If your system does NOT boot as it should, check again to see that the installation instructions were properly followed, or refer to the section *Troubleshooting* in this manual.

Software Installation

Software Driver Installation of the VIDEO CRUNCH IT 2000 - under Windows® 95

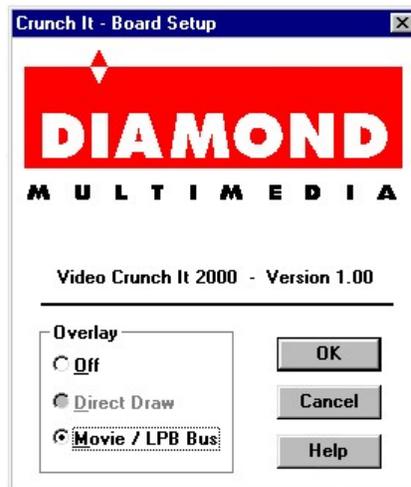
Now that you have installed and connected all cables and external equipment to the VIDEO CRUNCH IT 2000, continue as follows:

1. Switch on the PC.
2. Start Windows® 95.
3. As the VIDEO CRUNCH IT 2000 is a Plug & Play board, Windows® 95 will automatically detect the new hardware immediately after its installation.
4. After you have started Windows® 95 a dialog box will open which says: 'Windows ® 95 has found a new hardware component' and 'Windows is now installing the software for the identified component'.
5. A dialog box appears which says 'Choose the new hardware driver'.
6. As the VIDEO CRUNCH IT 2000 driver software is not included in your Windows® 95 package, Windows® 95 has to copy these files from the floppy disk onto your system.
7. Choose the second option 'Driver on manufacturer's installation disk' and click OK.
8. A dialog box with the message 'Install from disk' appears.
9. Insert the driver disk supplied with the VIDEO CRUNCH IT 2000 into the appropriate drive in your PC and click OK to continue.
10. The files are copied into the appropriate directories and the VIDEO CRUNCH IT 2000 is registered in the Windows® 95 registry.

The VIDEO CRUNCH IT 2000 driver dialogs

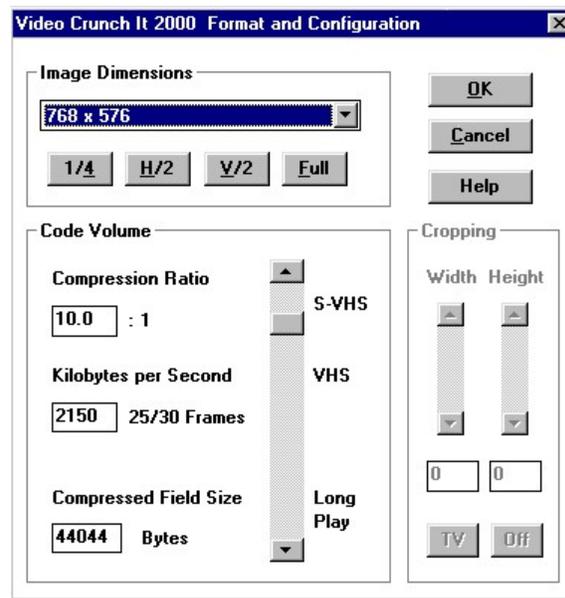
Where to find the driver dialogs

You will have access to the following dialog boxes after you have installed and configured these drivers and when you use them with video-editing software such as Ulead MediaStudio or any other video-editing software.



Therefore it is necessary that you have installed the software completely. The driver dialogs appear when you have selected the corresponding configuration option from within the software package.

Video Format and Code Volume Setup



- **Image Dimensions**

Defines the resolution which you want to use for digitizing. Depending on the chosen video standard, you will have the following resolutions:

1/4 PAL: 384 x 288 pixels
NTSC: 320 x 240 pixels

These resolutions are also called SIF (Source Image Format).

With this setting, the digitized frame will be scaled by half on the x - axis. Only every second field will be processed; that means:

for PAL/SECAM: 25 Frames = Fields per Second
and

for NTSC: 30 Frames = Fields per Second

H/2 PAL: 384 x 576 pixels,
NTSC: 320 x 480 pixels; in comparison to the 1/4 mode, both fields are processed, that means: PAL: 50 fps, NTSC 60 fps

V/2 PAL: 768 x 288 pixels, NTSC 640 x 240 pixels, only each second frame is processed in full horizontal resolution

Full PAL: 768 x 576 pixels, NTSC: 640 x 480 pixels; here the full video frame is used. Both fields are processed in full resolution.

- **Cropping**

Cropping is a method of reducing the amount of data by cropping unimportant, invisible areas from the sides of the picture (horizontally and vertically). Thus, you have the same image quality, but less data (KB/s).

Width / Height by moving the slider, pixels will be reduced in width (horizontally) and / or Height (vertically) 16 or 32 pixel per step.

TV The cropping settings will jump to a setting that corresponds with the TV mode you have setup on your system.

OFF The Cropping values are set back to '0'.

- **Code Volume Setup**

Defines the compression rate:

Note:

Only one setting at once is active. All options have an influence on the compression rate. We recommend to use the slider.

Compression Ratio

Compression rate in the following ratio:

Data volume compressed frame / original data

Example:

Frame resolution x 2 x (1/Ratio) =
Size of the compressed frame

$384 \times 288 \times 2 \times (1/24) = 9216 = 9 \text{ kB}$

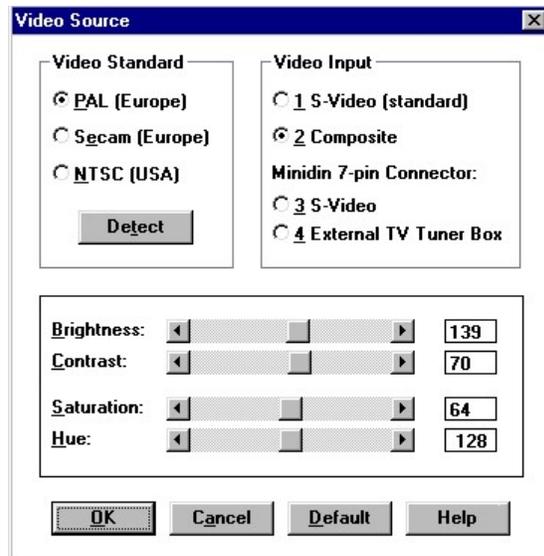
KB per second

Shows the resulting amount of data in KB/s. The setting assumes 25 (PAL) or 30 (NTSC) fps (frames per second). If you record using different settings for the Frame rate, this value will not show the true data rate produced by the VIDEO CRUNCH IT 2000.

Compressed Field Size

Shows the size of a compressed single frame in Bytes.

Video Source



- Video Standard
 - **PAL** (Europe) {50 Hz}
 - **SECAM** (Europe) {50 Hz., e.g. France}
 - **NTSC** (USA) {60 Hz}
 - Detect discovers which of the three standard video signals is sent to the selected video input.

Note: Detection of PAL / SECAM is difficult and may not work under all conditions. This means that VIDEO CRUNCH IT 2000 could detect PAL with a SECAM signal attached and vice versa.

- Video Input
 - Selects one of the video inputs
 - **S-Video** (Y/C Input)
 - **Composite** (Video Input)
 - **Minidin 7-Pin Connector for:**
 - S-Video (power supply)
 - External TV Tuner Box active
- Video Control
 - The following settings correct the individual parameters during the digitizing process:
 - Brightness: controls the light content
 - Contrast: controls the contrast
 - Saturation: controls the color saturation
 - Hue: controls the colors (applicable only for NTSC Video Signals only)

Default setting: Video Input: 1 Video Standard: PAL Brightness, Contrast a.s.o.: the average value for each
--

Video Display

This dialog sets the parameter required for the video output (with video encoder).



- [X] Sync to Video Input

With this setting, the video output can be run synchronized to the selected video input. Thus you can mix the signal generated by the VIDEO CRUNCH IT 2000 afterwards with a video mixer. This is only possible with special video equipment and therefore for a simple video output with monitor or recorder this option should be set to '[]' (deactivated).

Note:

If this option is switched to 'ON' and no video signal is provided to the activated video input, the output of the VIDEO CRUNCH IT 2000 may be black & white only. In this case switch the option 'Sync to Video Input' to 'OFF'.

Now you are ready to start working with your video software - enjoy it !

Software Driver Installation and Configuration under Windows 3.1x

Software Driver Installation

Note for the Software Installation:

- Install the software drivers for your graphics board BEFORE you install the software for the VIDEO CRUNCH IT 2000!
- You must already have installed Windows 3.1x on your system.
- Before installing the supplied software, make a backup of the Diamond installations disks. Use the backup copy for your installation and store the originals in a safe place.

1. Start Windows and insert the VIDEO CRUNCH IT 2000 Installation disks in drive A:.
2. In the Program Manager select 'File' 'Run' and enter the following command in the dialog box:
A:
SETUP
3. Follow the instructions on the screen. The necessary drivers for the VIDEO CRUNCH IT 2000 will be installed onto your system.
4. Next, restart your system so that the changes take effect.

Note:

If you have problems with the installation in your PCI system, you can find more information in the Troubleshooting section in this manual or in the Readme file on the installation disk.

Before you start to edit video captures on your PC you have to configure the VIDEO CRUNCH IT 2000 under Windows as described:

Software Configuration of the VIDEO CRUNCH IT 2000

Warning!

During the driver configuration, or when you start the video editing software system, software crashes may occur if there is no video signal present at the video input of the VIDEO CRUNCH IT 2000.

In this case terminate Windows, activate a video signal and then restart Windows

In the program Manager's Main Group open the Icon 'Control Panel'.
Select the option 'Driver'.

In the dialogue box doubleclick on either of the following drivers:

'Video Crunch It 2000 - Motion JPEG Capture Driver'

'Video Crunch It 2000 - Motion JPEG CoDEC Driver'

VIDEO CRUNCH IT 2000 Driver Dialogues

The VIDEO CRUNCH IT 2000 driver dialogues are the same as they are described under Windows® 95. Please read the corresponding section under Windows® 95.

Technical Details

Technical Data

- High performance PCI design for true S-Video quality
- Chipset: ZORAN ZR 36050 / 36055 Motion JPEG video processor
- Colors: YUV 4:2:2, True Color
- Compression: Still images:
 - recording of one field 1:4
 - recording of one frame 1:8Motion Video:
 - recording of one field: 1:4 to 1:100
 - recording of one frame 1:8 to 1:100
- Video encoder & decoder (video-editing)
- High performance 32-bit PCI 2.1 design using Philips SAA7145
- Full NTSC / PAL / SECAM (640 x 480 / 768 x 576 pixels) resolution at full frame- / field-rate (30 / 25 frames or 60 / 50 fields), true-color (24 Bit)
- Video overlay using S3 Scenic Highway (LPB)
- Software-controlled video filters for better quality at high compression ratios
- Bit-rate control for a constant data stream without JPEG peaks
- TV Tuner (NTSC, SECAM or PAL) upgradable. The PAL and SECAM version includes Teletext decoder.
- Variable compression ratios from 1:8 (1:4) to 1:100
- Video inputs (supported video standards: PAL, SECAM, NTSC):
 - 1 composite video (CVBS) - Cinch connector
 - 1 Y/C (S-VHS, Hi-8) - Mini-DIN 4 Pin connector
 - DIAMOND TV Tuner (external)
- Video outputs (supported video standards: PAL, NTSC):
 - 1 composite Video (CVBS) - Cinch connector
 - 1 Y/C (S-VHS, Hi-8) - Mini-DIN 4 Pin connector
- S3 Scenic Highway (LPB) connector for S3 graphics boards with LPB connector
- Adjustable brightness, contrast, color and hue; the last item is only applicable to NTSC Video signals.

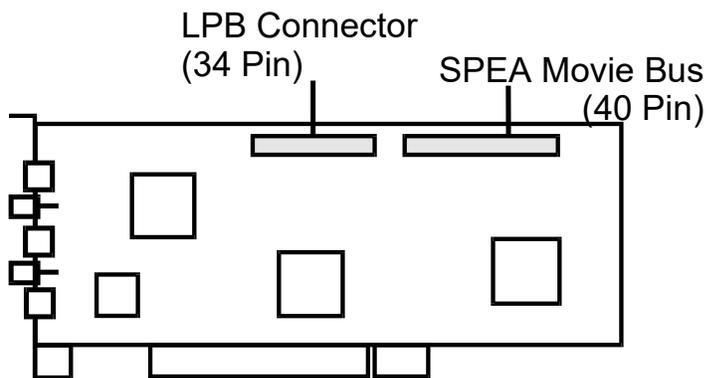
The internal Connection Possibilities of the VIDEO CRUNCH IT 2000

Note: If your graphics board is supplied with an S3 Scenic Highway (LPB) feature connector or a SPEA Movie Bus, these internal connections have to be made BEFORE you reassemble your PC. Consult the layout diagram of the VIDEO CRUNCH IT 2000 in the next section to see where the appropriate connecting pins are.

VESA-Compatible S3 Scenic Highway (LPB) Feature Connector

Pin	Function	Pin	Function
1	SCL (bi)	2	GND
3	SDA (bi)	4	ODD (bi)
5	FEIN (in)	6	FEOUT
7	HREF (bi)	8	GND
9	HS (bi)	10	VS (bi)
11	LLC2 (bi)	12	GND
13	CREF (bi)	14	GND
15	LLC (bi)	16	GND
17	UV0 (bi)	18	UV1 (bi)
19	GND	20	UV2 (bi)
21	UV3 (bi)	22	GND
23	UV4 (bi)	24	UV5
25	GND	26	UV6 (bi)
27	UV7 (bi)	28	GND
29	Y0 (bi)	30	Y1 (bi)
31	GND	32	Y2 (bi)
33	Y3 (bi)	34	GND
35	Y4 (bi)	36	Y5 (bi)
37	GND	38	Y6 (bi)
39	Y7 (bi)	40	GND

Who is who? Layout of the VIDEO CRUNCH IT 2000



Layout of the VIDEO CRUNCH IT 2000

The external Connections of the VIDEO CRUNCH IT 2000

The board has 3 inputs and 2 outputs as seen from the side of the board.

Video Outputs - Technical Data

- 1 x Y/C (S-VHS, Hi-8) Video output (Mini-DIN 4 Pin cable):
For connecting a S-VHS or Hi-8 video recorder.
- 1 x Composite Video output (Cinch cable):
for connecting a video monitor or a video recorder

Color resolution: 24-bit True Color (16.7 Million colors)
Supported Signal standards: PAL, NTSC
Resolution: 768 x 576 pixels for 2 fields (PAL)
640 x 480 pixels for 2 fields (NTSC)
square pixels
Digital / Analog Conversion: 1/50 seconds per field in PAL
1/60 seconds per field in NTSC

Video Inputs(PAL, SECAM, NTSC)

- 1 x Y/C Video In for S-VHS or Hi-8 (Mini-DIN 4 Pin cable):
This input is connected with a Video recorder or Camcorder output. **Please note, that the antenna signal from the wall socket is not suitable!**
- 1 x Composite Video In (Cinch cable):
These input is connected with a Video recorder or Camcorder output. **Please note, that the antenna signal from the wall socket is not suitable!**
- 1 x Input Mini DIN 7-Pin cable:

Warning!

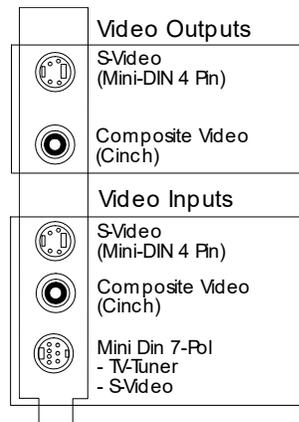
If you use the Mini DIN 7 Pin cable as S-Video Input or with the TV-Tuner Box, NO Video Source can be connected to the Cinch Video Input. If you do so, two Video In sources will be active and overlaid each other. This may cause an interference on the resulting display

Connect **external TV-Tuner** (see paragraph below) from / to Diamond TV Tuner Box
OR
connect **S-Video** cable to Video In source

Color resolution: 24-bit True Color (16.7 Million colors)
Supported Signal standards: PAL, NTSC, SECAM
Video scan rate: PAL/SECAM: 14.75 MHz
NTSC: 12.27 MHz
Resolution: 768 x 576 pixels for 2 fields (PAL)
640 x 480 pixels for 2 fields (NTSC)
square pixels
Digital / Analog Conversion: 1/50 seconds per field in PAL
1/60 seconds per field in NTSC real time

External TV Tuner Box

An external TV tuner box is optionally available for the VIDEO CRUNCH IT 2000. For SECAM and PAL this tuner contains a teletext converter.
To purchase this external tuner box, please contact your local dealer.



Video inputs and outputs of the VIDEO CRUNCH IT 2000

Troubleshooting

General Considerations

Make sure the DIAMOND board is firmly seated in its 32 Bit PCI expansion slot, and that it is not touching other boards in your system.

Be sure your monitor cable is properly connected to the graphics board and that your monitor power switch is on.

Defragment your Hard Disk

You can speed up your work if you defragment your hard disk (using Windows® 95 or DOS DEFRAG command) before you begin.

Zone Bit Recording (ZBR)

Modern hard disks record less sectors on the inner tracks (=Zone Bit Recording) than on the outside tracks. Because a disk is filled from the outside to the inside, it will get slower the more it is filled.

Deactivate the Cache Function

If the 'Write Caching' function is activated, the continuous dataflow to the hard disk can be interrupted.

Deactivate the 'Write Caching' or switch it off completely. Windows works slower with a deactivated cache. It is advisable to reorganize your hard disk into two partitions and to deactivate the cache function for the partition which will contain the stored video sequences.

In some cases (not always) it makes sense to deactivate the read cache for the drive which is used for storing the video sequences. This depends on your individual system configuration. A generalization is not possible.

See your DOS/Windows or Windows® 95 documentation for details.

What you should consider if you buy a new Hard Disk

Check that the hard disk has a **fast access time** and (much more important) that the data transmission rate is as high as possible. If you look for the **data transmission rate**, be sure not to confuse the data for the interface speed (E-IDE 16 MB/s or SCSI 10 MB/s), with the actual transmission rate of the hard disk. A new hard disk should have a **data rate** of 2,0 - 3,0 MB/s or more. SCSI hard disks normally are faster than IDE hard disks - especially if connected to a Busmastering PCI to SCSI Host adapter as they actively support the system in transferring the data.

It is very important that a **32 bit driver** (.386) for Windows 3.1x is available for the hard disk (E-IDE) or the SCSI host adapter and used; otherwise Windows will not be capable of using the high speed of the hard disk.

It is advisable to use a **special Audio / Video (AV) hard disk**. These hard disks guarantee a high data rate without interruptions.

Keep it simple to begin with

Although it may be tempting when installing the VIDEO CRUNCH IT 2000 to connect your sound board, video source a.s.o., it is wise not to try to do everything at once. Make sure your VGA board or multimedia board is installed correctly and works properly. The same applies to your sound board - if one is installed in your PC.

Make the connections properly

If just one cable is not connected correctly, the flow of data will be broken and one or more parts of your multimedia system will not work properly. As many of the standard cables are very similar, it is possible to make a mistake.

VHS versus S-VHS

VHS video tapes can be played back with an S-VHS recorder, but it is usually impossible to play an S-VHS video tape with a VHS recorder.
S-VHS delivers significantly better quality.

Problems with Playback and Editing of Video Sequences

Q: When recording a video sequence, the capture software always reports, that xx frames have been dropped during the recording.

A: **Settings in the Video Software:**

You have chosen the settings for the video data stream (video format, compression, frames per second and sound quality) in a way, that the system was unable to handle it. Reduce the data quantity so that the system can handle it.

A / V hard disks:

Hard disks with a special Audio / Video Firmware provide a constant data flow and avoid this problem.

Zone Bit Recording:

Modern hard disks record less sectors on the inner tracks (=Zone Bit Recording) than on the outside tracks. Because it is filled from the outside to the inside, it will get slower the more it is filled.

Defragment your hard disk:

Defragment the hard disk you save the video data on. MS-DOS provides the utility DEFrag for this purpose.

Deactivate the Cache function:

Switch off the 'write caching' option for the drive on which you store the video data.

Q: It seems that the video playback is not smooth.

A: Please consider all notes for the question above. Besides that:

Changing the settings:

If the video data stream contains dropped frames, the video is not played back smoothly. Please take note of the steps described above. If the data flow defined is very close to the maximum data rate, it may occur that Video for Windows doesn't receive the necessary data in time.

Reduce the data flow as far as possible until the effect disappears.

Read Cache:

It can also help to add a read cache for the drive with the video sequences.

Data Rate:

A Data Rate was used for capturing that is too high to be played back by your system.

Virtual Memory:

If you are running Windows® 95 and it happens that you receive dropped frames, turn off the virtual memory settings of Windows® 95. This can be found under 'Start' | 'Settings' | 'Control Panel' | 'System' | 'Performance' | 'Virtual Memory'

Background Information

How to create a Digital Video file - The General Steps

You are pretty new to creating a Digital Video file?

If so, this short section will show you the general steps for creating a digital video file.

1. Capture or create the video sequences you want to edit
2. Import the media and put it onto the time line of your editing program
3. Add or edit transitions
4. Apply filters and other special effects.
5. Create titles.
6. Modify video and sound settings.
7. Choose compression settings.
8. Build the final video file (using the VIDEO CRUNCH IT 2000 Codec to output this to Video again or to convert it to MPEG format. To keep the video on the PC, choose an appropriate codec for this (like Indeo).

Please read the Video Editing Software Manual for further information (e.g. MediaStudio 2).

Digital Video

Two ways of video editing are known: Linear video editing - which is also known as online or analog video editing - and non-linear video editing - which is also known as off-line or digital video editing.

Linear Video Editing (Analog Video Editing)

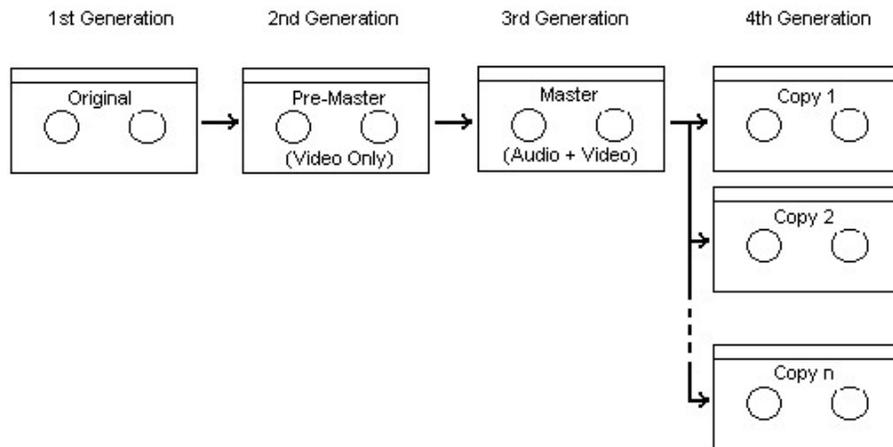
Linear or analog video editing - in its simplest way - means connecting two video decks to each other with playing video material from one of the decks and recording the desired scenes with the second deck. Of course this means just hard cuts, no titles, and no special effects.

By investing more and more money more source video decks, special effects generators, titlers, and video mixers can be added. Such a system can very easily become expensive, very complex to install and operate, and - usually - seems to attract malfunctions and user-mistakes.

Depending on the video standard used audio-dubbing becomes difficult or - if HiFi quality is required - impossible.

The biggest disadvantage of analog video tapes is that with each copy generation you will dramatically lose quality. With analog video editing you will easily come to the 3rd or 4th generation before you are finished and then will have a bad quality.

Not to forget one thing: With playing and recording videos back and forth, pausing, rewinding and so on, you will decrease the lifetime of your video deck or camcorder significantly.



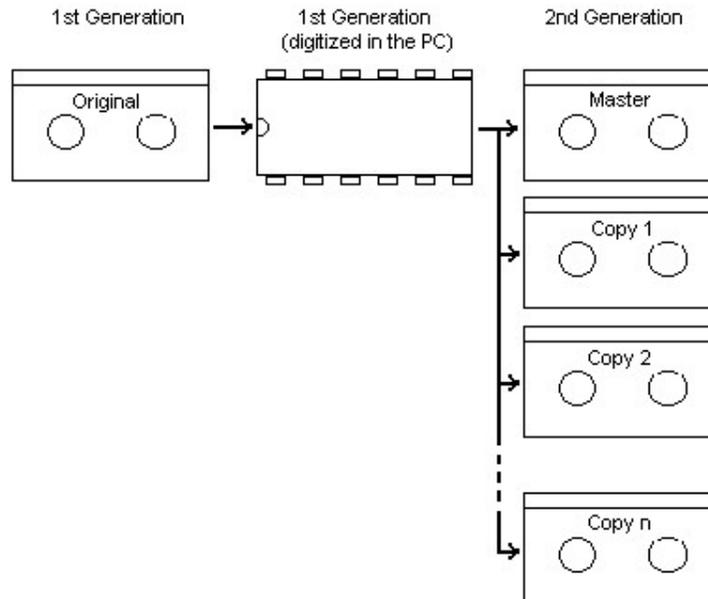
Non-linear Video Editing (Digital Video Editing)

Non-linear or digital video editing means to digitize and compress analog video and sound onto a computer's hard disk. When all sequences are in the PC you start editing the video and the sound on the time line of the video editing software. You get virtually any function - and much more - that is available with analog special effects and video mixing devices which costs a lot of money. In addition to that you get easy handling and can always get a quick preview without a big problem. User-errors can easily be reworked. If wanted, still images, drawings, morphings, single picture manipulations, and so on, can easily be incorporated into the video.

A high quality digitalization and compression / decompression assumed - the Video Crunch It 2000 does both - the final result of the editing will have a high quality which usually can be compared to a 2nd generation analog video copy.

Besides the PC with the digital video board, a sound board and lots of free hard disk space just one video deck or camcorder is required. No other special video equipment.

With all these advantages, must there be a disadvantage? Yes, there is one: Digital video editing takes its time. With including special effects, wipes, and so on into the video all these effects have to be calculated! Rendering a whole sequence can easily take half an hour or longer - even on a fast PC.



Why compression ? What means 'data-rates', 'compression ratio' and so on ?

A digitized video is an awful amount of data. Video in PAL or SECAM standard is about 22 Megabytes (MB) per Second, NTSC Video is a little less (see details on this under 'Compression and Hard Disk Memory') !

Even today's high capacity and high speed hard disks would be full up in a few seconds with this enormous amount of data and - what the bigger problem is - they are usually not fast enough to store 22 MB per second. Because of this the data have to be compressed. Ordinary compression algorithms that are used to store files - like ZIP or LZH - are not very suitable for storing video data, since they usually achieve compression ratios of 2:1, which means that the original data is twice as big as the compressed data.

To compress video to a level today's PCs can handle, special compression algorithms have been developed. These compression techniques' main difference from an ordinary algorithm like ZIP or LZH is that these are so called 'lossy compressions'. This means not all the data is stored. Just the important information is stored. This usually works fine with compression ratios of 4:1 to 15:1. The stronger the compression gets (like 25:1) the worse the quality becomes. With a compression of 100:1 you would hardly be able to recognize anything on the video.

To help to identify a suitable compression ratio for the Motion JPEG (M-JPEG, MJPG) algorithm - this is the one that is used by VideoCrunch It 2000 - the following definitions have been made by the video industry:

Compression Ratio Motion-JPEG	Comparable Video Quality level
3:1 to 5:1	Broadcast (BetaCAM SP, D1, etc.)
8:1 to 12:1	S-Video (S-VHS, Hi-8)
15:1 to 22:1	VHS, Video-8
25:1 and higher	none Applies to Video for Windows AVIs.

Understanding PCI Bus Technology

The Advantages of the PCI Bus for Digital Video

With the great progress that has been made in the past few years in the development of hard disks, controllers, and video cards, the most limiting factor of the PC has become the ISA bus architecture. It especially restricts the power and performance of PC-based digital video editing. Only professional systems with hard disk controllers of their own were able to come around the bus architecture to achieve professional image quality and performance at low compression rates.

The now established PCI bus architecture gives users many new opportunities. It supports bandwidths of up to 132 MB/s which allows to run compressed video data over the bus without problems. Even the enormous amounts of data generated by digitized video can be transferred over the PCI bus. With the PCI technology hard disk controllers on video cards are no longer required and this makes it easier to integrate the board into the total system.

PCI Bus Mastering

Why PCI bus mastering? What makes the difference? DIAMOND is one of the first producers of video cards worldwide who implements a new generation of PCI chips that are capable of bus mastering. The generation of motherboards hosting PCI slots supports this technology that optimally utilizes the PCI bus.

PCI 'slave' cards

Most of the PCI-based multimedia and video cards that have become available in the past used to be so-called PCI "slave" cards. In contrast to master cards, the system's CPU has to do all the work of transferring data from the system to the board and vice versa. A slave card places demands on the CPU. At a data rate of 2.5 MB/s - which would correspond to a compression ratio of 8:1 - for example, the CPU is already loaded to 60% (average) or more. The result is that the bandwidth of the PCI bus cannot be used because the CPU acts as a bottleneck, since it has to do a couple of other things, too. Because of this a PCI slave is forced to wait until the bus is released by the CPU. Only then data can be transferred via the bus. Slave cards are extremely dependent on the actual available performance of the system's CPU and the card's interaction with other system components.

PCI bus master card

The Video Crunch It 2000 is designed as a bus master. PCI busmaster cards reduce the number of tasks allocated to the CPU, freeing it for other tasks. They considerably increase the overall performance of the system, support high data transfer rates and allow efficient, professional operation.

By comparing digital video cards for the PCI bus that are either PCI busmaster devices (like the DIAMOND Video Crunch It 2000) - or just PCI slave devices - the differences become visible very dramatically.

Running tests on the same Pentium 100 MHz PC equipped with an Intel motherboard showed the following results (We expect the today's standard midrange PC to be a 100 MHz Pentium):

- With recording and playing back just video the Video Crunch It 2000 achieves approximately 20% higher data rate than a PCI slave board before dropping frames during record or playback.
- When recording and playing back not only video but also sound at CD quality level - video usually comes with sound - you can see a dramatic advantage of the PCI busmaster technology: Video Crunch It 2000 easily achieved approximately 50% higher data rates than a PCI slave board.

Running this test not with a SCSI hard disk controlled by a PCI busmaster SCSI host adapter - but with an IDE hard disk that is controlled by a PCI slave controller the differences between Video Crunch It 2000 and a PCI slave board are as big as 40% without sound and 100% with sound.

Using a slower system increases the advantage of the PCI busmaster controlled Video Crunch It 2000. With using a faster system, the distance between master and slave becomes slightly smaller but with a Pentium 166 the Video Crunch It 2000 will still be able to do 25% higher data rates when recording with sound.

Additionally the Video Crunch It 2000 comes with a feature that is unique to PCI busmaster devices. If combined with an appropriate PCI graphics board Video Crunch It 2000 can drive a video overlay right into the memory of the graphics boards. This allows to have a video overlay without complex and difficult installation loop-through or feature-connector cables.

What is Video Overlay

A video overlay is not only a nice feature to have but also can help to save space and money which a separate video monitor would require.

But what is video overlay?

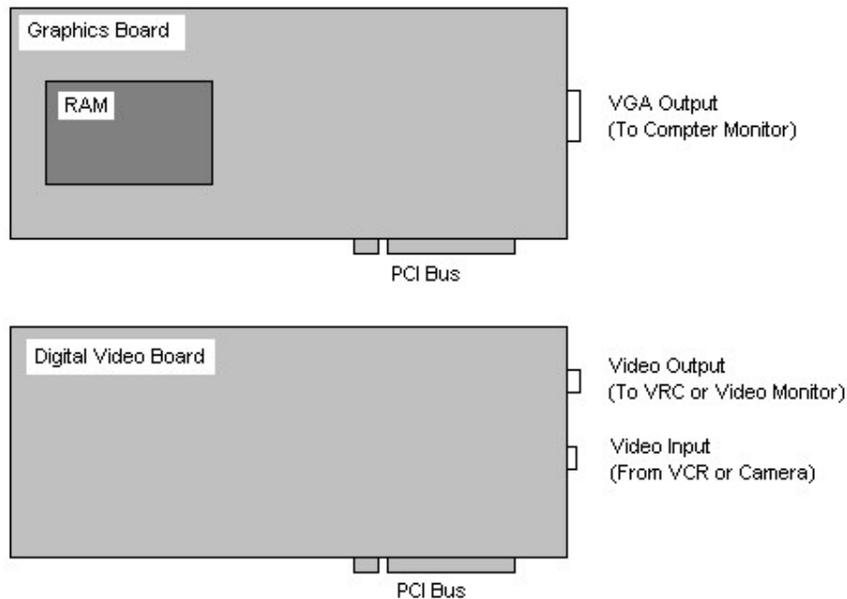
Video overlay means that your computer monitor does not only show you the Windows or Windows95 desktop but also a window with the live video signal that is currently sent to the video outputs of the digital video board.

Without this feature you would need to connect a video monitor or TV with video input to one of the video outputs of the digital video board to see the video signal you are currently recording, to see the quality of the video output, and so on. Such a video monitor or TV with video input would take up extra space on your desk and - if you do not yet own one - costs extra money.

Video editing boards of the present and the past usually have one of the following options / technologies to get a video overlay:

Video editing with No Video Overlay

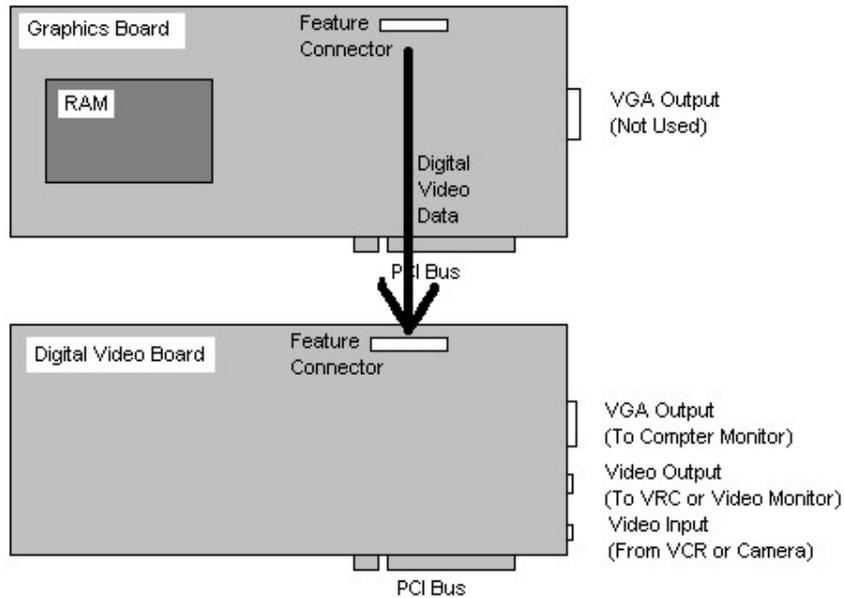
No video overlay can be displayed. All you would get is a window that shows snapshots of the video. They are updated approximately once or twice a second and slow down the whole system.



Video Overlay via a VGA Feature Connector connection

A flat ribbon cable connects the graphics board to the digital video board. Almost any graphics board has a VGA feature connector - so this seems to be the perfect way to achieve a video overlay. Unfortunately the VGA feature connector was designed back in 1980-something just for use with VGA resolutions. With most graphics boards the feature connector is disabled with higher resolutions and color depths. This means that this solution is not applicable for modern graphics boards.

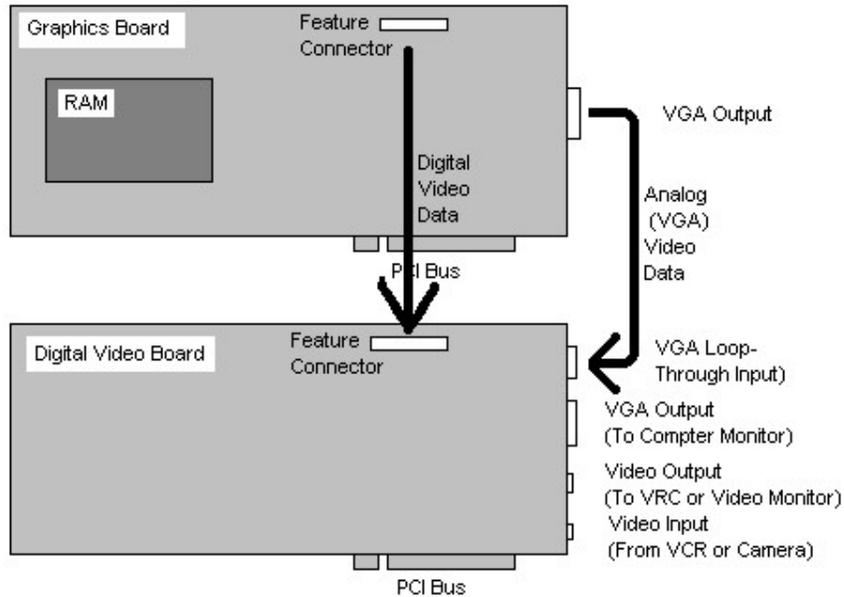
Working with different modes - e.g. high resolution for word processing and VGA resolution for video editing is almost impossible since the computer monitor has to be hooked up to the digital video board for overlay and has to be reconnected to the graphics board for high resolution operations. (see scheme)



Video Overlay via a VGA Feature Connector plus VGA loop-through cable connection

This technology has pretty the same limitations as the plain VGA feature connector connection. With many DRAM based graphics boards resolutions of 800 times 600 pixels with low refresh rates can be successfully be achieved.

An advantage is that the computer monitor can be left connected to the digital video board even with running higher resolutions. But running the analog video signal from the graphics board through the VGA loop-through cable, through the digital video board to the computer monitor can reduce display quality - especially at high resolutions. (see scheme)

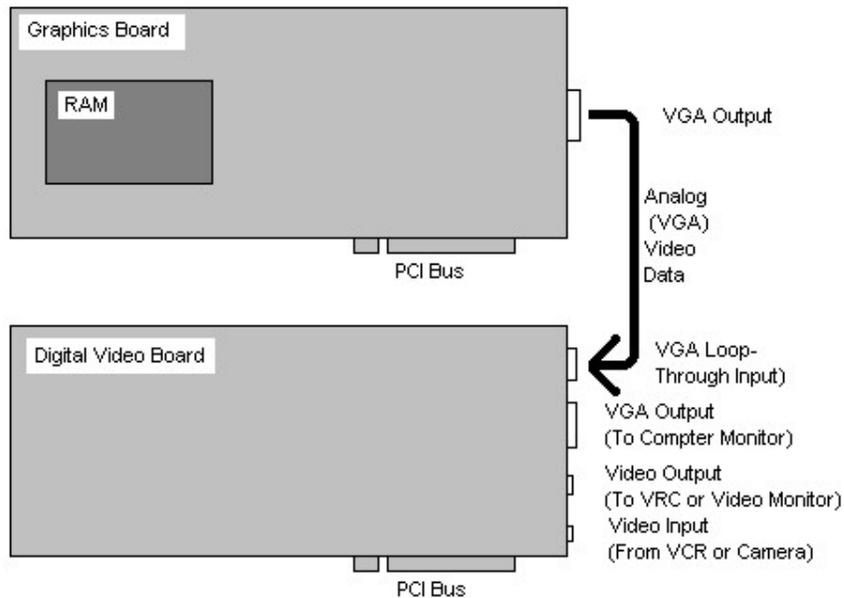


Video Overlay via VGA Loop-Through cable connection

By just connecting the digital video board in-between the graphics board and the computer monitor without using the feature connector a video overlay solution is achieved that is independent of the graphics board.

With this system usually 1024 times 768 pixels with standard refresh rates can be achieved without problems. Higher resolutions usually not !

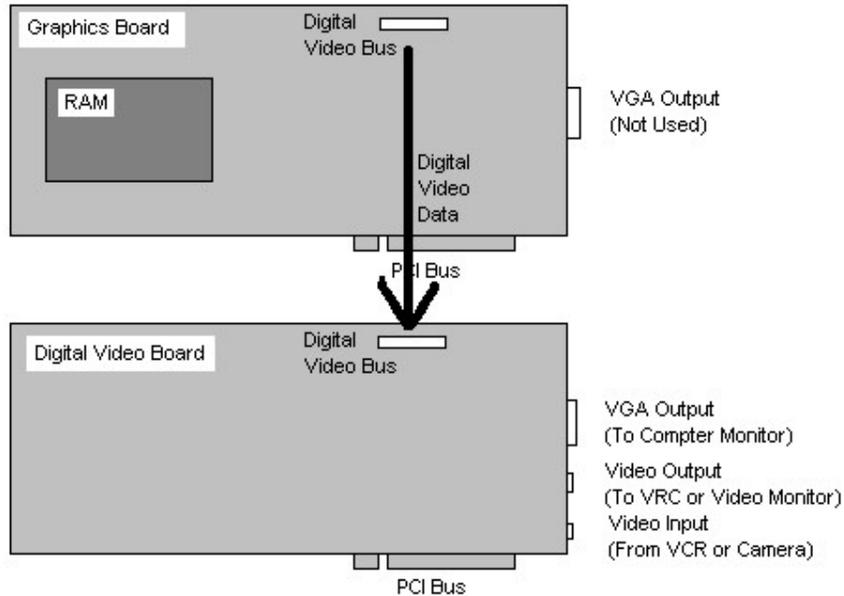
Even this technology has its disadvantages: The display quality can be reduced by the loop-through technology; at high resolutions or refresh rates it can be very difficult to adjust the overlay size and position; the installation of the VGA loop-through cable is not so easy to every one; and this technology increases the price of the product remarkably.



Video Overlay via a Proprietary or industry standard digital video bus

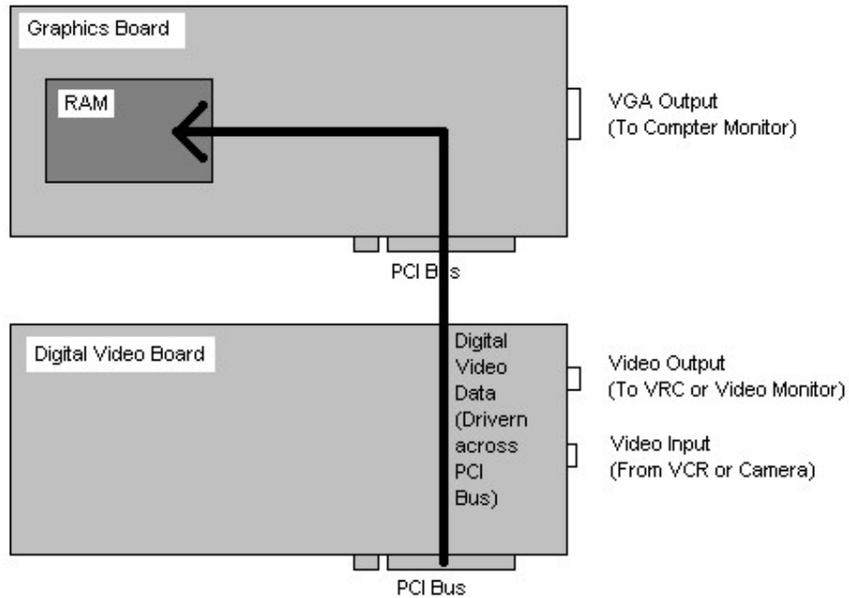
This is a simple and cheap technology to achieve highest quality video overlays but it also has a big limitation:

If it is a proprietary or if it is an industry standard architecture - like the SPEA MovieBus (proprietary) or the S3 Local Peripheral Bus / LPB (industry standard) - you always have to have a graphics board that is equipped with this bus.



Video Overlay via the PCI Bus Master technology

With this technology a PCI busmaster device writes the video data over the PCI bus right into the graphics memory of the graphics card. This requires to have a PCI graphics board with a DCI (Windows 3.1x) or DirectDraw (Windows 95, Windows NT 4.0) installed. Unfortunately many graphics boards that could be capable of being used for this kind of overlay don't have DCI / DirectDraw implemented into their drivers or have severe bugs in the required routines. This situation should become better in the near future.



Glossary

8-bit video

A Video file that uses up to 256 colors to display the colors in each frame.

Analog Display

A monitor that uses variable color control voltages to display a very large number of colors but requires very few inputs.

ANSI

American National Standards Institute.

ASCII

American Standards Committee on Information Interchange. A standard used by IBM and compatible computers to represent numbers and characters in binary form.

Authoring Systems

Authoring systems are used to create multimedia applications. They combine existing presentation information (texts, images and sound) and control the flow of these during the multimedia show. The dialogue with the user is controlled with this software. The individual information must have already been created and saved with special programs.

AUTOEXEC.BAT

A batch file that directs the activities performed by the computer during system startup.

AV Hard disks

Hard disks with a special audio / video firmware which ensures a constant data flow. Recalibrations that could interrupt the data flow are suppressed and an internal recording format is used on the hard disk.

AVI

Audio Video Interleaved. AVI files are the standard format for digital video films on PCs.

Bandwidth

The required capacity for the data volume and transmission rate.

BIOS

Stands for Basic Input-Output System. Code in your computer's ROM (Read Only Memory) that provides the power-on self test and other operating functions.

BMP (Windows Bitmap)

This format enables Microsoft Windows to display images on devices with similar capabilities in a consistent way. Save pictures in this format if you wish to continue to process them later under Windows.

Booting/Booting Up

Starting the computer. There are two types. Warm booting is accomplished by simultaneously pressing the CTRL/ALT/DEL keys and can occur only when the computer is running. A cold boot requires activation of the ON/OFF switch.

Brightness

The brightness of an image is determined by the amount of light emitted by it. No light (black) therefore means 'no brightness', whereas pure white light means 'maximum brightness'.

Capture

The process of converting a video or audio signal from a television, VCR, tape deck, or other source into a digital file that you can manipulate on a computer.

CD-I

Compact Disc Interactive. A technique developed by Philips in order to playback games, films and music videos on a CDI player.

CD-ROM

High-density medium to store digital data. CD-ROMs have read-only status. There are different CD-ROM formats:

YellowBook: conventional CD-ROM format

GreenBook: used for linear video, this is typical for CD-I's (see below)

WhiteBook: used for Digital Video VideoCDs.

CGA

The IBM Color Graphics Adapter.

Cinepak

Software-Codec. Makes fast decoding possible. Good image quality possible as long as the image dimensions are not increased. The video encoding process is time-consuming.

CODEC

Compressor / Decompressor, responsible for the compression and decompression of image data.

Color Display

A type of monitor capable of displaying information in color. It is often called an RGB (red, green, blue) monitor, referring to the signals needed to drive it.

Color Palette Conversion

Conversion of video data from the YUV color model into the RGB color model, or v.v.

Composite Video

Coding of all video information in one single signal.

Compression

The process of removing redundant data from video, sound and graphic files to reduce file size and enhance playback.

CONFIG.SYS

An ASCII file that is created to provide the computer with special information about applications and hardware.

Contrast

The contrast of an image is the difference between light and dark. A contrast-intensive image is one in which contains strong transitions from light to dark. A contrast-weak image contains transitions that are hardly noticeable.

Data Transfer Rate

The data transfer rate describes the amount of data transferred to or from the storage medium (e.g. hard disk) per second. Each data storage medium has a specific data transfer rate which it can handle. Typical values are:

- old hard disks 300 KB/s
- new hard disks 600 KB/s
- standard CD-ROM drives 150 KB/s
- DoubleSpeed CD-ROM drives 300 KB/s

DCI

Display Control Interface. An interface defined by the Intel and Microsoft corporations, which enables enhanced graphics performance due to direct access to the video memory.

Decompression

The process of a computer reading a compressed file so that the information in it can be displayed or played back.

Default Mode

The capabilities, resolutions and display mode the system operates with when you start your computer.

Defragment

To reorganize noncontiguous clusters of information on your hard disk into contiguous files to improve performance.

Digital Display

Also called TTL. A type of monitor that switches signals ON or OFF to determine display color. Types of digital displays include the IBM Enhanced Color Display or Monochrome Display.

Digital Video

Digital videos contain optical information bitwise in a file.

DIP Switch

Dual Inline Package switch; a series of tiny, two position switches which allow users to select and change options on computer boards, printers, and other peripherals.

Driver

Part of a software program that interacts with a particular piece of equipment in your computer system (i.e. video boards, printers, and keyboards). Drivers are often loaded by your config.sys at system boot.

Dropped Frames

The images of a video which are not displayed or recorded when replaying (resp. recording).

EEPROM

Electrically erasable programmable read only memory; used to replace DIP switches and jumpers on new graphics boards like yours.

EGA

The IBM Enhanced Graphics Adapter.

EMS

Enhanced Memory Specification. Originally developed to break the DOS 640K limit, it is now used as a general term for types of add-in memory.

Enhanced Color Display (ECD)

The IBM Enhanced Color Display capable of 640 x 350 resolution.

EPS (Encapsulated PostScript)

EPS is a device-independent file format, which contains all the information required to reproduce an image directly on a PostScript printer or to use it in suitable applications. A small header section contains the data of the image as a TIFF-format file so that applications that can not display PostScript data directly can still obtain an impression of the file contents.

Expansion Board

A device used to expand a computer's capability.

Expansion Slot

An electrical connection within the computer used for the addition of Expansion Boards.

Fill-in Images

When video data is being saved onto a CD-ROM (during manufacturing) the images are normally 'polstered' with fill-in images so that each video file completely uses the assigned 2KB area. This ensures a constant data rate and a smoother playback appearance. The file size is not changed by doing this.

Filter

A special effect applied to a video clip or image to alter its appearance. Filters can also correct problems involving color balance or brightness and contrast.

Fixed Frequency Monitor

An analog monitor which can only sync to a very narrow range of scan frequencies.

fps

frames per second. Measurement unit for the frame rate.

Frame

Single video image.

Frame Rate

Number of images shown per time unit. Software videos have a fixed frame rate. When playing back the actual frame rate achieved can differ to the rate defined in the video considerably.

Framegrabber

If an overlay board (see below) also contains a realtime video digitizer (= frame grabber), then the user can capture a random frame from the video sequence being replayed and can save this onto his hard disk.

Frame size

The width and height of a frame expressed in pixels.

Frequency

The number of samples per second in a sound or video file. The higher the frequency, the better the quality of the sound or video.

General MIDI

The MIDI Association's MIDI Song File standard has established itself as the General MIDI standard for the exchange of MIDI music data between different PC systems.

GIF (Graphics Interchange Format)

A graphics file format developed by CompuServe to enable the device-independent exchange of images between systems. GIF-format files can be up to 64MB in size with color information up to 256 colors (8 bits). GIF files do not contain information about the image resolution.

Greyscales

A greyscale image consists of different shades of grey (like a black-and-white photograph). This normally means that 254 different greyscales plus black and white (= 256) are used.

Hardware Cursor

The cursor's movements and display are controlled by the accelerator chip. This means that the CPU only has to pass the mouse co-ordinates to the graphics board, reducing the CPU's workload.

Hercules Graphics Card (HGC)

A video adapter that provides bit mapped single color graphics.

Hexadecimal Notation

A base-16 numbering system that uses numbers and letters. The hexadecimal sequence begins: 1 2 3 4 5 6 7 8 9 A B C D E F, then 10, 11 etc.

Horizontal Frequency

The rate at which a monitor displays each scan line. Usually measured in kilohertz (kHz).

I/O Port

Input/Output port. An address used to access a hardware device.

Image Compression

Technique used to reduce the volume of data in digital image and video files.

INDEO

Intel Video. Compression technique developed by Intel. Gives good quality but requires a high level of processing work to decompress.

Indexed 16 and 256 Color Images

Indexed color images contain a color table in the file. This table lists all the colors that could be used in the file. An indexed 16-colour image contains a table with 16 colour entries (4 bits) whereas an indexed 256 colour image 256 colours are listed (8 bits). Other colors can be simulated in a way similar to using greyscales in a black-and-white image, by simply positioning the pixels in varying densities. The eye then sees color mixtures that are not actually in the color table.

You can transform images into indexed color images in order to load them into programs such as Windows Paintbrush, or just to see them on monitors that can only display 256 or 16 colors.

Interlaced Display

A monitor that refreshes every other scan line every other pass of the screen. A non-interlaced monitor refreshes the entire screen (every scan line) every pass of the screen.

Interleave

A technique used to organize audio and video data so that every audio data segment is followed by video data, e.g. AVAVAV.....

Interrupt Request (IRQ)

Signal used by a device, such as a mouse, to inform the CPU that it is present and functioning.

JPEG

A new compressed file format industry standard developed by the Joint Photographic Experts Group. It enables compression ratios up to 100:1 (original file size to compressed file size). A new feature of this standard is that it is device-independent. These files can be replayed using any application that supports this format. JPEG differs from the LZW compression method in that it works with quality loss. This means that some of the original data is lost during the compression phase. In order to surpass this visual effect JPEG compression attempts to 'lose' information which is less important to the human eye. Use this format if you don't have much memory space available or if you are processing very large image files.

Jumper

A small plastic plug that fits over a pair of pins. When the plug straddles two pins it makes an electrical connection. The computer makes decisions based on whether the connection is made or not. A group of jumper pins is called a jumper block.

Keyframe

Technique used to compress video data whereby certain frames are defined as 'keyframes' and are fully saved during compression. The video data of the frames

between two keyframes are only partially stored. During decompression the 'partial frames' use the information stored in the keyframes.

Line Drawing

This is a hardware function of the graphics processor chip. Only the starting and ending co-ordinates of a line are supplied by the CPU. The rest of the work drawing the line is then done by the graphics processor.

Lossless

Describes a compression method that preserves all the data in the video or image being compressed. Lossless compression routines, such as MicroSoft RLE, maintain image quality but do not reduce file size as much as lossy routines.

Lossy

Described a compression method that eliminates data from the video or image being compressed. Lossy compression routines, such as Cinepak and Intel Indeo, significantly reduce file size but may also affect image quality. However, the result may be imperceptible to your audience.

MCI (Media Control Interface)

A Windows standard interface that enables software to control external media devices such as video decks.

M-JPEG

Motion JPEG. A codec (see above), which is especially suited to video processing. Hardware decompression is strongly recommendable for this.

MDA

The IBM Monochrome Display Adapter.

MIDI

Musical Instrument Digital Interface. A serial interface used to link computers, synthesizers and other electronic sound generating devices.

Monochrome Display

Monitor that displays information in one color only; sometimes called a black & white display.

MPC

Multimedia PC. This trademark is intended to help consumers when purchasing hardware and software (similar to the VHS symbol used in the video product market).

MPEG

Motion Picture Expert Group. The compression method known as MPEG 1 is suited to digital video playback. A hardware decompressor is necessary.

MPEG

MPEG stands for Motion Pictures Experts Group, a group of the ISO committee for standards. With the MPEG format an international standard for the display of 25 images per second and a transmission rate of between 150 and 300 KByte per second is defined. Through a highly sophisticated compression method MPEG is a way to display full screen and full motion video with CD sound quality using little memory. This way, MPEG files can be played back as well as Video CDs, interactive programs and presentations.

MT-32

The MIDI module MT-32 created by Roland.

Multi-frequency Monitor

A type of monitor that supports a wide range of horizontal scanning frequencies and

vertical refresh frequencies. This type of monitor accepts inputs from many different video display adapters.

NTSC

National Television Standards Committee. The committee responsible for the definition of the north american television standard (with the same name). NTSC creates 30 images per second.

Overlay Boards

Overlay boards are able to digitize video images being input in realtime, to synchronize the data with the random segment of the screen and to show both images (incoming video signal and background screen image) simultaneously on the PC's monitor. The result is a window showing a video film which is placed over a background (e.g. a Windows application).

PAL

Phase Alternation Line. PAL is the television standard used in Germany and Great Britain. The video signals are transformed into 25 images per second.

Palette

A selection of colors from which to choose. Your board provides as many as 16.7 million simultaneous colors from a palette of 16.7 million. This capability is sometimes referred to as TrueColor. It is believed that the human eye can discern no more than 16.7 million colors.

PCX (PC Paintbrush)

This file format was developed by Zsoft Corporation for PC Paintbrush, one of the first computer drawing programs. It is the standard format for many scanners and drawing programs. Some versions of the PCX format don't contain any information about the resolution of the image.

Peripheral Equipment

Auxiliary equipment connected to a computer (e.g. monitor, printer, keyboard, etc.).

Pixel

Short for picture element; the smallest field displayed on the monitor; could be compared to the dots which form images in photos printed in newspapers. Also called pel.

Polygon Fill

A special hardware (chip) routine used to fill polygons with pixel information.

Primary Display

The monitor that is active when you power on your system.

PS/2 Display Adapter

The IBM VGA board for Industry Standard Architecture (AT bus) computers.

RAM

Random Access Memory; memory that can be read from and written to.

Resolution

The number of pixels (from picture cells) in both horizontal and vertical directions.

Resolution

Number of pixels displayed on the monitor. The higher the resolution, the crisper and sharper the images appear.

RGB 8Color

RGB8 color file types are 3 bit types in which each pixel can have one of 8 colors. The RGB8 color images are automatically transformed into indexed 16 color images whereby

the 8 colors are retained but space for further 8 colors is created. It is not possible to transform an existing file into an RGB8 color file type.

RGB Color Model

Monitors use additive mixing of the three basic colors red, green and blue to create images on the screen with an infinite number of colors. Image data is therefore processed via data for RGB color combinations. The combinations of the three basic colors create a color model whose origin is the colour black and the opposite value is the color white.

RGB True Color

RGB stands for red - green - blue. All the colors that are used in this file are created additively mixing parts of the three basic colors. The parts of the three basic colors can be varied in 256 steps. If you mix all these colors together a total of 16.7 million possible color combinations is attainable ($3 \times 8 \text{ bits} = 24 \text{ bits}$, $2 \text{ to the power of } 24 = 16.7 \text{ million}$). As the human eye can not tell the differences between color hues from about this level, such an image is termed 'True Color', i.e. 'as in real life'.

ROM

Read Only Memory; memory space in your computer for storing permanent operating instructions.

Saturation

The saturation refers to the purity of a color. A color with a high saturation value is optically very intensive. A color with a low saturation value appears weak (i.e. with less color content).

Scaling

Transformation of image data to different sizes.

SECAM

Acronym for Sequentielle Couleur Avec Mémoire. A video standard used in France, Eastern Europe, Russia and parts of Africa. The SECAM standard has a vertical resolution of 625 lines and a frame rate of 25 frames per second.

Sound Files

The most common file type for sound files under Windows are WAV files.

Storyboard

A frame-by-frame sketch that maps the key objects and actions in an animation or video. Used in planning the animation or video project.

Sync

The stable condition that exists when two repetitive events maintain a constant time relationship; your monitor is in sync with the signals from your board when the display is correct and stable.

Terminate and Stay Resident (TSR)

Programs that are run once then remain in memory in order to be activated by a sequence of key strokes or a 'hotkey.' It is possible that a TSR may take up too much memory and cause conflicts with other programs.

TGA (Targa)

Developed by the company True Vision especially for its true color video boards (especially the Targa board), this is a format preferred by many specialists.

TIFF (Tagged Image File Format)

This format was developed by Aldus and Microsoft in order to promote the use of desktop scanners and DTP systems. Uncompressed TIFF files are hardware and software-dependant, however there are different incompatible compression methods. Select this

format for the maximum compatibility with other applications and to improve the compression level.

Time code

A time value that identifies the position of a clip in a video sequence with respect to a starting point, usually the beginning of the video project (in a digital format) or source tape (in an analog format). Its standard form is Hours:Minutes:Seconds:Frames

TrueColor

The ability to display 16.7 million simultaneous colors. It is believed that the human eye can discern no more than 16.7 million colors. See 'palette'.

Variable Frequency Display (VFD)

A monitor that is capable of displaying a wide range of resolutions through its ability to sync to a wide range of horizontal and vertical scan frequencies.

Vertical Frequency

The rate at which the monitor screen is refreshed. Usually measured in hertz (Hz).

VGA

The IBM Video Graphics Adapter.

Video CD

The VideoCD specification was published in 1993 by JVC, Matsushita, Sony and Philips as the so-called 'Whitebook' standard. Using this up to 74 minutes of digital video compressed with the MPEG 1 technique can be stored on a CD. The image resolution is 352 x 240 pixels and 30 frames per second for the NTSC standard and 532 x 288 pixels at 25 fps for PAL.

Video Connector

The standard 15-pin monitor output connector located on the board.

Video Electronics Standards Association (VESA)

industry-wide consortium organized to standardize graphic modes. Your board supports the VESA standards.

Video Keying

This term refers to the process of mixing two video and computer graphics signals.

YUV Color Palette

The image information of individual frames is comprised of a brightness part and 2 color parts. The color part is calculated by evaluating the difference to the brightness value. This method was first utilized in television technology.

YUV Signal

A video signal that is comprised of a brightness part (luminescence Y) and two color parts (chrominance U and V). Due to the characteristics of the human eye, it is enough to transfer the color parts with a lower resolution. This mixture is technically achieved by only evaluating 2 chrominance signals U and V compared with the 4 values calculated for the luminescence. This results in statements in the format 4:2:2. Other constellations are possible.

Zone Bit Recording (ZBR)

Recording procedure where the default amount of bytes per sector is identical, but the amount of sectors varies, depending on the circumference of the hard disk. The bigger the circumference, the more sectors can be found. By this way there are different zones with a different number of sectors on the hard disk (inner track with less sectors, outside track with more sectors). Thus, the capacity of the hard disk is used in the most profitable manner. The result is a higher data rate on the outer tracks than on the inner tracks. In general, the more the hard disk is filled, the slower it becomes.

Zooming

Increased display of an image section.

If You Need Help

Your documentation and the README files provide tips and suggestions to help you, should you encounter problems or have questions regarding the use of your Diamond product.

Additional technical support is available from the extensive information and support services offered by the *Diamond Technical Support Team Europe*. Further information is available from our company headquarters in the USA. Below is a brief description of our European support services and how you can take advantage of them. We also provide an overview of our worldwide information services.

In order for us to service your inquiries to the best of our ability, please be prepared to provide the following information when you contact Diamond for technical support:

- The exact designation of your Diamond Multimedia product
- The operating system you are using, as well as information about the computing environment in which you use your product
- For graphics and video cards, the card's BIOS version
- For modem products, result codes from the **I3** command (if possible)
- Names and version numbers of the Diamond drivers and applications you are using
- Name and version number of the application with which you have encountered problems
- A detailed description of the problem. Please reproduce the problem several times and provide a detailed description of the necessary steps.

Diamond's Online Services: BBS, CompuServe, Internet

Among other things, you can find the following kinds of information in the **Diamond BBS** as well as in Diamond's **CompuServe** forums and **Internet** services:

- the most current releases of Diamond drivers and software updates;
- optional drivers and programs that aren't standard components of our products;
- tips, hints and technical information prepared and constantly updated by Diamond's support staff--you'll find these under the heading *Tips & FAQ's for our Products*;
- and a variety of other information.

The online services are available **24 hours every day** and provide (technical) information about all aspects of our products. Please consult these sources before calling our hotline. It's quite possible that the answer to your question is already documented in our online services.

Here's where you can reach the online services of Diamond's Technical Support Team Europe:

Diamond BBS

Diamond Germany	+49 - 81 51 - 266 333 +49 - 81 51 - 266 334	Modem, up to 28.8 kBaud ISDN
Diamond U.K.	+44 - 11 89 - 44 44 15	Modem, up to 28.8 kBaud
Diamond France	+44 - 11 89 - 44 44 15 +49 - 81 51 - 266 333 +49 - 81 51 - 266 334	Modem, up to 28.8 kBaud Modem, up to 28.8 kBaud ISDN

Diamond's

GO SPEA

European forum (German

CompuServe Forums

GO DIAMOND
GO SUPRA

language)
US forum (English)
US forum (English), for modem
products

Diamond im Internet World Wide Web

<http://www.spea.com>

European WWW server
(multilingual)

<http://www.diamondm.com>

US WWW server (English)

<http://www.supra.com>

US WWW server (English), for
modem products

FTP

[ftp.diamondm.com](ftp://diamondm.com)
[ftp.supra.com](ftp://supra.com)

US FTP server (English)
US FTP server (English), for
modem products

Diamond's Fax-back System

You also have access to a variety of information through our fax-back system. All you need is a touch-tone phone to select documents such as:

- technical tips, tricks and suggestions, compiled by our support staff;
- answers to frequently asked questions;
- and much more information about Diamond and its products.

The fax-back system is available **24 hours daily** at the following numbers:

Diamond Fax Info Service

Diamond Germany

+49 - 81 51 - 26 63 32

Most information is available in
German and English.

Diamond U.K.
Diamond France

in preparation
in preparation

Diamond ExpertLine: Technical Support Hotline

We also offer a telephone support hotline to which you can direct questions for which you can't find answers in the documentation and README files or in the online information services. In order for us to service your inquiries to the best of our ability, please be prepared to provide the following information when you contact Diamond for technical support:

- The exact designation of your Diamond Multimedia product
- The operating system you are using, as well as information about the computing environment in which you use your product
- For graphics and video cards, the card's BIOS version
- For modem products, result codes from the **I3** command (if possible)
- Names and version numbers of the Diamond drivers and applications you are using
- Name and version number of the application with which you have encountered problems
- A detailed description of the problem. Please reproduce the problem several times and provide a detailed description of the necessary steps.

You can also request information outside of our regular business hours by simply calling our support hotline's regular number from a touch-tone phone. You can access information about how to get software updates, availability of drivers and so on, or you can request that such information be faxed to you via our fax-back system.

Here are the telephone numbers for the support hotline:

Diamond ExpertLine - Technical Support Hotline

Telephone:

Diamond Germany	+49 - 81 51 - 26 63 30	German support Monday - Friday Monday - Thursday	9:00 - 12:00 13:00 - 16:00
Diamond U.K.	+44 - 11 89 - 44 44 44	English support Monday - Friday	8:30 - 17:30
	+44 - 11 89 - 44 44 33	French support Monday - Friday	8:30 - 17:30

E-mail:

Diamond Germany	via GO SPEA in CompuServe
Diamond U.K.	100632.1252@compuserve .com

Diamond SuperCD: Driver and Software Updates on CD

Most drivers and software updates are available on the Diamond SuperCD as well as from our online services. This CD is updated at irregular intervals and can be obtained directly from Diamond. Please fax orders to the number below. Delivery follows on advance payment (COD and delivery outside of Germany only by Eurocheque plus DM 15.00 shipping and handling charge).

Diamond SuperCD - Mailorder

Diamond Germany **+49 - 81 51 - 2 12 58** Fax number for CD orders
Price per CD : DM 22.50 as of June
1996

Diamond WorldWide: Support Services in the USA

In addition to the European services described above, a number of information services are available from the support staff at Diamond in the USA. These include:

Diamond Multimedia Inc., USA

BBS	+1 - 408 - 325 - 7080	up to 2400 Baud
	+1 - 408 - 325 - 7175	up to 14400 Baud
CompuServe	GO DIAMOND	
America Online	DIAMOND	
Internet	http://www.diamondm.com	World Wide Web
	ftp.diamondmm.com	FTP
Support hotline	+1 - 408 - 325 - 7100	
Tech support fax	+1 - 408 - 325 - 7171	

Diamond Communications Division USA

BBS	+1 - 541 - 967 - 2444	
CompuServe	GO SUPRA	
America Online	SupraCorp2	e-mail
FidoNet	SupraCorp	Echo-Mail
GEnie	SupraTech	e-mail
Internet	supratech@supra.com	General support
	intltech@supra.com	International support
	http://www.supra.com	World Wide Web
	ftp.supra.com	FTP
Fax-Abrufsystem	+1 - 541 - 967 - 0072	
Support hotline	+1 - 541 - 967 - 2490	PC
	+1 - 541 - 967 - 2491	Windows
	+1 - 541 - 967 - 2492	Macintosh
Fax	+1 - 541 - 967 - 2401	