

TARGA® 1000 for Windows NT Online Reference Manual

Truevision, Inc.
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Santa Clara, CA 95051

Release 1.61, 10/2/96
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Part # 0700-0410
Release 1.61
10/2/96
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Official Notices and Warranties

Official Notices And Warranties

FCC Declaration of Conformity

TARGA 1000 Series

Note: This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. *Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate this equipment.*

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment 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. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

To minimize emissions from your system, use only shielded interface cables and certified Class B peripherals.



Carl Calabria, Senior Vice-President, Engineering
Truevision, Inc.
2500 Walsh Avenue
Santa Clara, CA 95051



DECLARATION OF CONFORMITY

Application Of Council Directive 89/336/EEC

Standards to which Conformity is Declared:
EN 55022 and EN 50082-1

Manufacturer's Name: Truevision Inc.
Manufacturer's Address: 2500 Walsh Avenue
Santa Clara, CA 95051
Type of Equipment: PCI Display Card
(PC Platform)
Model Name: TARGA 1000
Tested By: EMCE Engineering, Inc.
44370 S. Grimmer Blvd.
Fremont, CA 94538-6309 USA
Manufacturer's Test Engineer: Joe Cunningham

*I, the undersigned, hereby declare that the equipment specified above
conforms to the above Directive and Standard.*

Name (please print): Carl Calabria
Title: Senior VP of Engineering
Signature: *Carl Calabria*
Date: December 8, 1995

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What the Warranty Covers and How Long

If this product is defective in material or workmanship, return the TARGA 1000 board **within one year** of the original date of purchase and we will repair or replace it (with the same or an equivalent model), at our option, with no charge to you.

How to Exercise Your Warranty or Obtain Service

If you encounter problems with your TARGA 1000 board, contact your dealer or VAR first. They will provide you with assistance, or obtain an RMA Number from Truevision for your product. Then you may arrange for service or for warranty repair by shipping your TARGA 1000 to:

Truevision Inc.
2500 Walsh Avenue
Santa Clara, CA 95051

There will be no charge for warranty service except for your prepaid shipping cost to our site. We suggest that you retain the original packing material in case you need to ship your TARGA 1000 to us. When returning it to our site, please be sure to include:

Name
Address
Phone Number
Dated Proof of Purchase
RMA Number
Description of the Problem

We cannot assume responsibility for loss or damage during shipping. After we repair or replace (at our option) your TARGA 1000 board under warranty, it will be shipped back to you at no cost.

What This Warranty Does Not Cover:

This warranty does not cover damage resulting from accidents, alteration, failure to follow instructions, misuse, unauthorized service, fire, flood, acts of God, or other causes not arising out of defects in material or workmanship.

What We Will Not Do:

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Other Conditions:

If we repair your product, we may use reconditioned replacement parts or materials. If we choose to replace your product, we may replace it with a reconditioned one of the same or equivalent model. Parts used in repairing or replacing the product will be warranted for one year from the date that the product is returned. All replaced products become the property of Truevision, Inc.

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Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above exclusions or limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Official Notices And Warranties

Introduction

Introduction

Using the TARGA 1000 Online Reference Manual

This electronic document has been created in the Adobe™ Acrobat™ Portable Document Format (PDF). Truevision suggests that you print a hard copy of this manual for quick reference and note making. Hypertext links (the **highlighted** words) and a bookmarked index have been provided with this manual so you can quickly reference topics and locate information. The controls you use to navigate through this document are in the toolbar and status area of the Acrobat Viewer. They are defined as follows:



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Click this area at the lower left hand corner of the screen to go to any page in the manual. When clicked, a Enter Page dialog box appears asking which page you want to view.

Using This Manual

Chapter 1 contains basic concepts and information on digital movies. This should be read before making a movie with your TARGA 1000.

Chapter 2 shows how to set up your TARGA 1000 through its Control Panels.

Chapter 3 explains using Digital VCR to capture and playback movies.

Introduction

Chapter 4 covers the additional software applications that accompany your TARGA 1000.

Appendix A gives the technical specifications for the TARGA 1000.

Appendix B describes the cables that are used with the TARGA 1000.

Appendix C contains troubleshooting and contacting Truevision information.

Chapter 1 – Basic Concepts and Tips

Contents

This Chapter Contains:

- About Video Formats
- Video Sources
- Hardware Vs. Software Playback
- Transfer and Conversion of AVI Files
- Hardware Considerations When Using DVCR
- Data Rate Expectations

Chapter 1

Basic Concepts and Tips

Chapter 1

Basic Concepts And Tips

About Video Formats

Video is comprised of a series of still images called frames. When the frames are displayed in rapid succession, the eye interprets the changes between frames as motion. The NTSC video format displays 29.97 fps (often referred to as 30 fps). The PAL format displays at 25 fps.

Each video frame is made up of a series of horizontal lines, called scan lines. In the NTSC format, there are a total of 525 lines. Not all of these lines are part of the image. Some provide synchronization and other information. The TARGA 1000 digitizes up to 486 lines in NTSC and 576 lines in PAL.

The odd and even numbered scan lines (counting from the top) are separated into two groups, called fields. When the frame is displayed, the odd field is scanned first. Then the system goes back to the top of the screen and scans the even field. In this way, the two fields are alternately drawn. This is called interlaced display because the two fields interlace on the screen. While one field is fading, the other is drawn, so that the screen is constantly and uniformly refreshed.

The resolution or dimensions of the video frame is described as the number of pixels in each line by the number of lines. The video digitizer (i.e., TARGA 1000) samples each line at up to 648 pixels in NTSC and up to 768 pixels in PAL or SECAM. NTSC is 640 x 480, PAL and SECAM are 768 x 576. (The TARGA 1000 Pro upgrade and TARGA 1000 RTX offer CCIR 601 720 x 486 for NTSC and 720 x 576 for PAL.)

The sound track that accompanies most videos is a completely separate set of data. The only relationship the sound track has to the video is synchronization.

Video Sources

The best quality video source will yield the best recorded image. You will have to assess your intended audience and quality needs before deciding what device to record movies from. The TARGA 1000 accepts analog input in the form of S-Video (Y/C) and Composite Video. If you have the TARGA 1000 Pro, the analog inputs accepted by the card are Composite, S-Video (Y/C), RGB, and Component (Betacam, SMPTE/EBU) video. Most consumer cameras and VCRs output Composite video. Higher-end video products provide an S-Video signal. Professional level video products often provide RGB or Component.

RGB is preferred over Component; Component is preferred over S-Video; and S-Video is preferred over Composite. Cost increases as you move up the scale, but the benefits are better color saturation, sharper edges, better stability, and less noise.

Every transition between analog media lowers the signal quality, so recording directly from a video camera is ideal. Recording from tape involves a second step, which introduces signal loss. A second-generation tape (a copy of a tape) brings another degree of loss. A tape that has been used many times (i.e., worn tape) will also contribute to signal loss.

***Note:** Use only shielded video cable. Unshielded cable can pick up electronic noise from other hardware, like the computer and monitor, and degrade the signal. For composite video, be sure to use 75-Ohm video cable, not audio cable.*

Chapter 1

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Chapter 1

Basic Concepts And Tips

Hardware vs. Software Playback

When saving an AVI file in any Video For Windows aware application, you are generally asked to choose the type of compression/decompression (CODEC) method for saving the file. This allows AVI files to be exchanged between applications or between PCs.

There is a difference, however, between the various CODECs. Some of them are software methods of compression/decompression, and some are hardware methods. For instance, common VFW software CODECs are Cinepak, Microsoft Video 1, and Indeo. What makes them software compression/decompression schemes is that you do not need special hardware to playback a movie saved in these formats. Therefore, these movies can be played back on any PC and do not require a specific compression board.

On the other hand, the TARGA 1000 AVI video format is a hardware CODEC which requires a TARGA 1000 board and its associated drivers. Thus, when you save a movie in the “Truevision DVR AVI MJPG (LSI)” format, the PC that plays back this particular format must have a TARGA 2000 installed. If you need to play this file on a PC without a TARGA 2000, convert the movie’s video format to a software CODEC such as Cinepak, Microsoft Video 1, or Indeo.

Note: Any file created on a TARGA 2000 installed PC, but played on a PC which does not have a TARGA 1000, will retain its “full frame” capability, but will not retain the guaranteed “full motion” capability possible with a TARGA 1000.

Transfer and Conversion of AVI Files

Any VFW aware application (on a TARGA 1000 installed PC) will be able to import a TARGA 1000 AVI file without any special conversion.

Conversion of files is necessary, however, when you want the TARGA 1000 application Digital VCR to read an AVI file which is not in the TARGA 1000 video format. For instance, you have an AVI File that was saved as a Cinepak file. To convert the file, simply use an application such as AVIEdit (or any application capable of converting AVI files) to open the file and save it in the format: **Truevision DVR AVI MJPG (LSI)**

Note: The file must be 24-Bit. If the file is not 24-Bit, the Truevision compression option will not appear. Also, if the file is not 30 fps, it needs to be converted or playback will be compromised.

Hardware Considerations When Using Digital VCR

You should be aware that there are a number of hardware considerations that can influence your movie recording ability. Some involve the speed at which you can capture video frames while others affect image quality.

The primary criteria for evaluating digital components of your system is their ability to keep pace with the stream of data, both video and audio.

The NTSC full frame resolution is 640 x 480 pixels, for a total of 307,200 pixels. At 30 frames per second, that's 9,216,000 pixels per second. At 24 bits per pixel, that's 27.6MB per second. PAL is higher. No consumer-level CPU or hard disk available today can process that much data that quickly. Furthermore, adding sound can increase the data rate by up to 192K per second (stereo at 48 KHz, 16-Bit resolution).

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Basic Concepts And Tips

Compression and resolution reduction can bring the data rate within range, but for best quality movies, you'll want to work as high in the range as possible. Use a CPU and disk drive capable of high data rates. They are essential to keeping pace with a steady stream of movie data. (Consider a parallel disk array for fast-access mass storage.) In addition, it is imperative that you optimize and defragment your disk before video recording. This will create contiguous blocks of disk space that can be accessed more quickly. Disk fragmentation slows disk access, which can affect recording and playback. And as the disk nears capacity, this problem increases. Use a disk with a large amount of free space and use a disk utility program to defragment your hard disk.

Another hardware consideration is the quality of the video source. The best video quality will lead to the best recorded movie. You will have to assess your intended audience, quality needs, and budget when deciding what devices to use. Each device plays a role in achieving the final result because the final production will never rise above the limits imposed by any one device.

Data Rate Expectations

When you set up the scratch file for the Digital VCR Utility, a dialog box appears that tells you what your data rate will be given your current hardware and software configuration. At that point, you may be wondering why the Digital VCR Utility cannot capture at the disk's maximum transfer rate. Here are a few points that will help you recognize what to actually expect from your particular hard disk.

Why can't Digital VCR capture at the disk's maximum transfer rate?

Moving compressed data to disk from the DVR board with Direct Disk Access off in Windows NT is a two step process:

- 1) Move the data from DVR memory to system memory
- 2) Write the data to disk

During this waiting period, the application obviously cannot also be copying data from/to the board. Likewise, the time spent copying data from/to the board cannot also be used to read/write disk data. This means time is split between the two steps. Part of each second is spent copying, while another part is performing disk I/O. The drive may be able to do 5MB a second, but only if that's ALL the system is doing.

What exactly is the split between the two steps?

Digital VCR can process (conservatively) 7.5MB sec to/from the board under Windows NT with Direct Disk Access off. This yields the following formula for PCI platforms :

Capture or Play MB/sec = $(1 - (DS / (7.5 + DS))) * DS$

or $(DS * 7.5) / (DS + 7.5)$

Where DS is disk speed in MB/sec.

So, a disk capable of 5MB/sec would capture at:

$(1 - (5 / (7.5 + 5))) * 5 = 3\text{MB/sec}$

Maximum data rates are around 5MB a second. Individual system performance will vary.

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Basic Concepts And Tips

What will my disk's rate be?

The Digital VCR application actually does the read from DVR memory operation while writing the scratch file. So, the disk rate given following creation of a scratch file is an accurate but conservative indication of the possible capture rate WITHOUT audio. The chosen audio rate must be subtracted from the given maximum rate when setting the data rate slider for capture.

An additional variable is that the maximum movie rate is also dependent on the content of the clip being recorded. If portions of the clip compress extremely well (i.e. all black), then the rate can probably be set to a larger value since the system will 'catch up' during the low data rate sections.

Although it's not an exact science, the Digital VCR method gives some guidance and allows for maximum flexibility and power. Digital VCR gives you full access to the capability of the hardware, rather than trying to guess what would be acceptable to the majority of users.

What can I do to increase my data rates?

The most important factor in achieving desirable data rates is the disk drive. To maximize your data rates, use a fast-wide AV drive with a spindle speed of 5400 RPM or greater, or a fast-wide AV rated drive with a spindle speed of 7200 RPM or greater (AV rated drives contain a read/write memory caches that may need to be enabled). Either way the drive's seek time should be 9 milliseconds or less.

Also of importance is the controller card used to pass data to the drive. For best results, use a PCI bus-mastering controller card in a PCI slot configured for bus-mastering. This will enable you to use direct disk access, which will significantly increase your performance.

Chapter 2 – TARGA 1000 Control Panels

Contents

This Chapter contains:

- Overview of Control Panels
- Video Input Control Panel
- Video Output Control Panel
- Audio Control Panel
- Uninstalling TARGA 1000 Software

Chapter 2

TARGA 1000 Control Panels

Chapter 2

TARGA 1000 Control Panels

Overview of Control Panels

When using your TARGA 1000, you will be able to select various video formats, make adjustments to audio and video settings, and otherwise be able to control how the TARGA 1000 will function. All the above is accomplished through the TARGA 1000 Control Panels.

The Control Panels include the **Video Input Control Panel**, the **Video Output Control Panel**, and the **Audio Control Panel**. All of the hardware and software settings made in the control panels are saved in the DVR.INI file in the Windows NT directory, and remain as such until the settings are changed. The TARGA Control Panels are located in the TARGA 1000 Program Group (Figure 2-1).

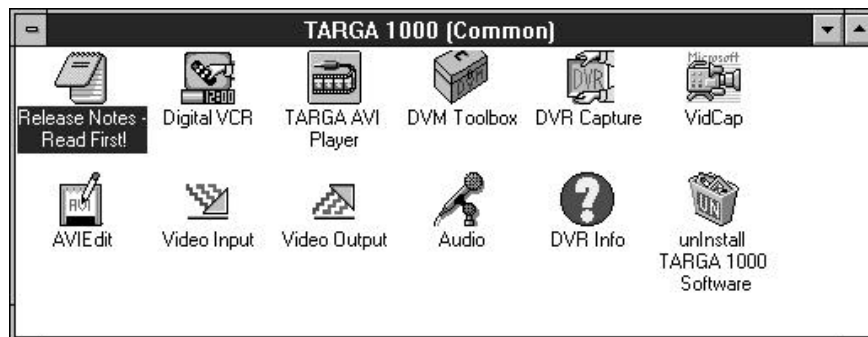


Figure 2-1 TARGA 1000 Program Group

You may also access the TARGA 1000 Control Panels by double clicking the Truevision DVR icon in the Windows NT Control Panels Program Group.



Figure 2-2 TARGA 1000 Control Panels

Video Input Control Panel

Before using any other TARGA 1000 software, you should select the type of video *input* format connected to the board. This is done through the Video Input Control Panel (Figure 2-3), accessed by double clicking its icon in the **TARGA 1000 Program Group**.

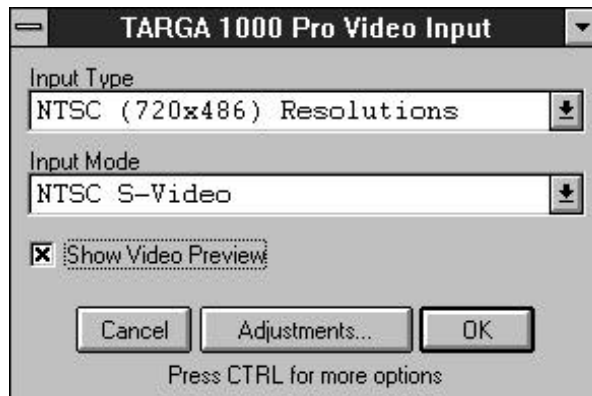


Figure 2-3 Video Input Control Panel

- Use your mouse or keyboard to select an appropriate **video input type**. The TARGA 1000 allows you to accept any of the following input types (available video formats can vary depending on your board type):

NTSC 640x480	PAL 720x576
NTSC 648x486	PAL 768x576
NTSC 720x486	
NTSC Japan 640x480	

- Next, select the appropriate **video input mode**. The TARGA 1000 allows you to accept any of the following input modes (available video formats can vary depending on your board type):

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NTSC Composite
NTSC S-Video
NTSC Betacam (Y, B-Y, R-Y)
NTSC RGB
NTSC SMPTE RGB
NTSC RGB (no setup)
NTSC RGB (with setup)

PAL Composite
PAL S-Video
PAL SMPTE/EBU
PAL SMPTE RGB

- Click on “Show Video Preview.” This verifies you have correctly set up your video inputs by passing through live video to your video display device. Your video input must be activated (i.e., tape playing, camera on) for this function to operate.

Note: The TARGA 1000 does not convert video signals from NTSC to PAL, or vice versa. If you have NTSC input, the output will automatically be set to NTSC. The same applies to PAL.

- Click Adjustments to open the Video Input Adjustments dialog box

Video Input Adjustments

Truevision supplies various filters and settings for your video input signal. Depending on your board, your input type, and your input mode, you could see a variety of options when you click on the Adjustments button. Following is a comprehensive list of what could appear in the Video Input Adjustments Window.

The **Vertical and Horizontal position sliders** allow you to adjust the position of your video on the output monitor.

Input Signal Type - Selecting Recorded Input (VCR) causes the decoder to respond more rapidly to variations in sync timing. Live Input (TV) may

sometimes be required to allow the system to lock onto certain video sources. However, the reliability of the field ordering may be degraded when the TV setting is used, so the VCR Input setting is recommended.

The **Hue slider** provides a means of changing the color of your incoming video. The slider is cyclical and will go through the color changes whether you proceed in a negative or positive direction. Hue control is not available in PAL modes.

Input Gamma - Allows you to make adjustments for color signal variations among different pieces of video equipment.

☛NOTE: We recommend 1.0 Linear Gamma for recording and playback of compressed video.

Advanced Video Input Adjustments

For even finer control over incoming video signals, the Advanced Video Input Adjustments are provided. All of these adjustments are very fine, and would normally be used only if a signal is below standard. To access the Advanced Video Input Adjustments window, click the Adjustments button in the Video Input Adjustments window while holding down the <CTRL> key. Depending on your board model, input type, and input mode you could see a variety of input adjustments. Following is a comprehensive list of all the Advanced Input Adjustments available.

Coring-- Provides processing control over the high frequency components of luminance. Used with higher aperture factors to reduce amplified noise, coring effectively throws away least significant bits of information.

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Color Control-- Enables/disables automatic color killing processing.

In **Automatic** mode, if color burst information meets or exceeds the color killer threshold, the decoder will attempt to extract color information.

Forced On mode forces color processing on signals that have input color information so weak that color processing could not compensate. If an input signal has no color information, and Color Control is forced on, erroneous color artifacting can occur.

Color Killer Threshold-- Defines the level at which the decoder will no longer attempt to extract color information from the input signal. If the decoder is forced to draw color information from a black and white source color banding can occur in the resulting images. The default setting is for quality video signals. If attempting to recover color information from weak signals, the setting should be increased to a larger negative value.

Chrominance Gain-- Provides additional amplification of chrominance information to compensate for weak input signals.

Chroma Gain CTRL Time Constant-- Used to control the speed of response of the chrominance gain circuit to variations in input color levels.

Aperture Bandpass Factor (Peaking)-- Used in conjunction with Aperture Bandpass Center Frequency to achieve desired processing of high frequency luminance components. The factor is a relative gain setting, therefore the higher the setting the higher the gain and amplified noise in the input signal.

Aperture Bandpass Center Frequency-- Provides peaking control of high frequency components of luminance. The characteristics of this filter can be modified by changing its center frequency and its gain factor.

Pre-Emphasis Filter-- Only used with composite video when the decoder chrominance trap is active. Enabling the filter adds gain to the luminance components above and below the chrominance trap frequency in an attempt to compensate for luminance losses that occur in this frequency range. Adding luminance does have the side effect of increasing ringing during sharp luminance transitions.

Luminance Delay Factor-- The separate processing paths for luminance and chrominance can cause variations in each signals time in the decoder. Luminance delay allows adjustment of the luminance signal to provide alignment with the chrominance at the output of the decoder.

Chroma Trap Disabled-- Improves the purity of the luminance (black and white) information by filtering out the 3.58 MHz (NTSC) subcarrier signal.

VIDEO OUTPUT CONTROL PANEL

Not only do you need to choose the type of video *input* format, but you should also choose the type of video *output* format connected to the TARGA 1000. To open the Video Output Control Panel (Figure 2-4), double-click its icon in the **TARGA 1000 Program Group** (or go to the Windows Control Panel for TARGA 1000 and click on the icon in that area).



Figure 2-4 Video Output Control Panel

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TARGA 1000 Control Panels

- Use your mouse or keyboard to select an appropriate **video output type**. The TARGA 1000 allows you to export any of the following output types (available video formats can vary depending on your board type):

NTSC 640x480	PAL 720x576
NTSC 648x486	PAL 768x576
NTSC 720x486	

- Next, select the appropriate **video output mode**. The TARGA 1000 allows you to accept any of the following output modes (available video formats can vary depending on your board type):

NTSC Composite	PAL Composite
NTSC S-Video	PAL S-Video
NTSC Betacam (Y, B-Y, R-Y)	PAL SMPTE/EBU
NTSC RGB	PAL SMPTE RGB
NTSC SMPTE RGB	
NTSC RGB (no setup)	
NTSC RGB (with setup)	

- Click on “Show Video Preview.” This verifies you have correctly set up your video outputs by passing through live video to your video display device. Your video input must be activated for this function to operate.

Note: The TARGA 1000 does not convert video signals from NTSC to PAL, or vice versa. If you have NTSC input, the output will automatically be set to NTSC. The same applies to PAL.

- Click Adjustments to open the Video Output Adjustments dialog box.

Video Output Adjustments

Truevision supplies various filters and settings for your video output signal. Depending on your board, your input type, and your input mode, you could see a variety of options when you click on the Adjustments button. Following is a comprehensive list of what could appear in the Video Output Adjustments Window.

Genlock Signal Source provides three options. None, Video Input 1, and Blackburst Genlock In. We suggest you select None if you do not need genlock. In Master Mode, you must select None.

If you are using a Composite Video source, you can choose Video Input 1 so that your input and output devices are in step with one another. If you have an S-Video source, you cannot use Video Source 1 as a genlock source because you get a timing lock but not a true genlock. To get around this problem, however, you can attach a Composite Signal Source (Composite Out on the device) to the yellow Composite cable lead on the CA-204 cable. (Video Source 1 requires Slave Mode.)

Blackburst Genlock In is intended for the studio environment in which there is a house sync. Connect the BLACK lead on your CA-204 cable to this sync. (Blackburst Genlock In requires Slave Mode.)

Output gamma is a means of adjusting color quality variations between video devices.

☞ Note: When doing compression and decompression, gamma should be left on Linear 1.0.

SMPTE 170M conforms output video to RS 170M analog signal timing standards. However, due to timing constraints in the digital to analog conversion, this will limit the number of pixels per line to 712 NTSC and 704 PAL.

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Full 720 Pixels if selected, the frame buffer will clock out 720 pixels by violating the color back porch timing and front porch timing of the analog signal.

Advanced Video Output Adjustments

For even finer control over outgoing video signals, the Advanced Video Output Adjustments are provided. All of these adjustments are very fine, and would normally be used only if a signal is below standard. To access the Advanced Video Output Adjustments window, click the Adjustments button in the Video Output Control Panel while holding down the <CTRL> key. Depending on your board model, input type, and input mode you could see a variety of output adjustments. Following is a comprehensive list of all the Advanced Output Adjustments available.

SCH (Sub Carrier to Horizontal) Phase (Degrees) is used to align color information in your video signals, and will require a vector scope. Color information is carried in the part of the signal called burst. The burst is composed of a carrier frequency of 3.58MHz for NTSC and 4.43MHz for PAL. For NTSC, the SCH phase refers to the phase relationship between the leading edge of horizontal sync at the 50% amplitude point, and the zero crossings of the color burst by extrapolating the color burst back to the leading edge of sync. This is expressed in degrees of subcarrier phase. The definition for PAL is slightly different, but similar.

Horizontal Phase is the timing relationship between the genlock signal and the output signal and requires the use of a scope. This is for studio users only. The human eye will not be able to discern differences through slider adjustments. This coarse adjustment allows us to shift the output signal in pixel clock increments of 81.5 nanoseconds relative to the genlock reference. In PAL mode, the increment is 67.8 nanoseconds.

The **Fine Horizontal Phase** adjustment further divides the pixel clock so that adjustments can be performed in 2.55 nanosecond steps, allowing for a very accurate sync of video signals. In PAL mode, this is a 2.12 nanosecond increment.

Audio Control Panel

The Audio Control Panel allows you to control the audio input and output signals of the audio devices attached to the TARGA 1000, and also sets up the defaults for the VFW (Video For Windows) driver.

To open the Audio Control Panel (Figure 2-5), click on the icon in the **TARGA 1000 Program Manager Group** (or go to the Windows Control Panel for TARGA 1000 and click on the Audio icon).



Figure 2-5 Audio Control Panel

Descriptions of the various Control Panel items follow. These menu items are: Record L R, Playback L R, Sample Rate, Audio Preview, Stereo, 16-Bit Sampling, and Mute.

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Note: Click on Audio Preview so that you can hear the audio when setting the Record and Playback levels.

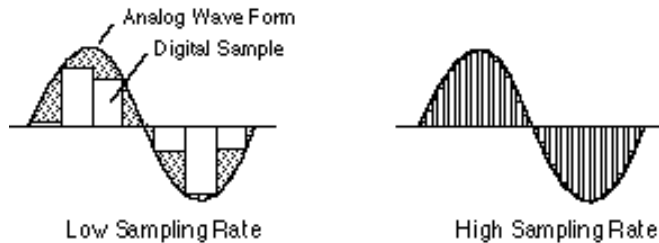
Record L R: The first set of slider bars are labeled “Record L R” and refer to the left and right channels of the audio input signal. Moving these sliders allows you to make adjustments to input gain.

Input gain is like a record level. For instance, the input level from a microphone jack output is tiny — 1 mV or 1 millivolt, while the record level from a cd player or tape deck is 700 mV or 700 millivolts. Here is a rule of thumb to follow regarding input gain: Set the hardware for the maximum input gain possible without causing distortion or dropouts. Then, adjust the second set of sliders labeled “Playback L R.”

Playback L R: Output gain (or output volume) is controlled by the second set of sliders labeled “Playback L R” and refers to the left and right channels of the audio output signal. Moving these sliders up or down allows you to adjust the audio output level.

Sample Rate: Determines the highest audio frequency that you can record. Sample Rate or sampling rate is the number of digital samples per second taken by the TARGA 1000 hardware. It is the number of times per second that the amplitude of the sound wave (analog signal) is tested and recorded. The more frequently the amplitude is sampled, the closer the sample values will follow the wave form.

In the figure on the next page, one wave form is shown with a low sampling rate and again with a higher rate. The shaded area beneath the wave form shows a discrepancy between the digital sample and the analog signal over time. The higher sampling rate, with less gray, indicates a higher fidelity. A reference point for sampling rate is that audio CD's are sampled at 44,100 samples per second or 44.1 KHz.



Note: The TARGA 1000 offers a dozen or so audio sampling rates, but many Video For Windows applications only deal with 11, 22, and 44.1 audio sampling rates. Keep this in mind when you are exporting files to these applications. These three rates are the “usual” Windows rates and are NOT a limitation of the TARGA 1000 drivers.

Miscellaneous: This area allows you to choose four different items: Audio Preview, Stereo, 16-Bit sampling, and Mute.

AUDIO PREVIEW -- When you click on this box, you simply allow sound to pass through so that you can hear it and make adjustments. Like Video Preview, it will turn off when you close the control panel.

STEREO -- When you click on this box, you are choosing to keep two separate audio channels. The trade-off is that this doubles the amount of data required to store the information.

16-BIT SAMPLING -- When you click on this box, you increase the amount of audio data saved for each sound sample. For example, the possible values available for a single sound sample when the data is saved at 8-Bits. is 256 possible values. At 16-Bit sampling, the number of possible values for a sound is increased to 65,536.

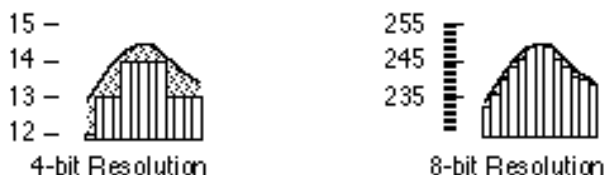
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The bit depth (8 or 16-Bit) is the number of binary digits (bits) used to specify the amplitude of each digital sample. With more bits used, the digital samples approach the true amplitude more closely. An 8-Bit resolution provides 256 levels (0-255), and a 16-Bit resolution provides more than 65 thousand levels. The figure below shows a portion of a wave form described at 4-Bit depth and 8-Bit depth. The shaded area beneath the wave form shows a discrepancy between the recorded amplitude of the digital sample and the true amplitude of the analog signal. The higher resolution, with less gray, indicates a higher fidelity.



MUTE -- When you click on this box, you are turning off the sound. When you select this option, you are muting, not disabling, Audio Preview.

Uninstall TARGA 1000 Software

In the event you need to remove the TARGA 1000 software and its associated files from your disk drive, a TARGA 1000 Uninstall Utility has been added. The TARGA 1000 Uninstall Utility removes shared program files, standard program files, the program folder and its contents, program directories, and program registry entries. Depending on your setup, the Uninstall Utility may not be able to completely remove all files. If this is the case, a dialog will appear after uninstall notifying you of unremovable files. Upon completion of uninstallation, reboot your computer.

Chapter 3 – Digital VCR Record/Playback

Contents

This Chapter Contains:

- Overview
- Optimizing DVCR
- Using UpdateMovie.exe
- Starting and Using DVCR

Chapter 3

Digital VCR Record/ Playback App

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Digital VCR Record/ Playback App

Overview

The TARGA 1000 Digital VCR is a Windows application that allows you to record and playback movie clips to and from your hard disk at full frame rates. This application has been optimized for speed and motion-smooth video while sustaining a synchronized soundtrack. Whether you need a consistent level of quality or a consistent size data stream, the Digital VCR software lets you control whichever aspect is more important to you and your video needs.

Digital VCR (DVCR) is a powerful application. In order to take full advantage of its capabilities, we strongly recommend you read this chapter entirely before using DVCR.

Optimizing The Digital VCR Utility

The following should be done to help obtain optimal results when using the Digital VCR record/playback utility:

- Defragment the hard disk where video will be stored
- Close any background applications
- Match audio sampling rate to editing application

Defragment — The hard disk where you are planning to store video should be defragmented. This will help to increase speed and picture quality when playing or storing video. We recommend you purchase a disk defragmenting application designed to work with drives set up for Windows NT.

Close Any Background Applications — Quit background applications to maximize computer processing capabilities.

Match Audio Sampling Rates — Match audio sampling rate to that of the editing application.

Note: The TARGA 1000 offers a dozen or so audio sampling rates, but many Video For Windows applications only deal with 11, 22, and 44.1 audio sampling rates. Keep this in mind when you are exporting files to these applications. These three rates are the "usual" Windows rates and are NOT a limitation of the TARGA 1000 drivers.

Using UpdateMovie.exe

If you are using AVI or DVM movie files created with TARGA 1000 software earlier than Version 1.4, you must run UpdateMovie.exe. UpdateMovie is loaded into the \TARGA1K\WIN32\APPS\UpdateMovie directory when you install the TARGA 1000 software.

UpdateMovie can be run from the Windows NT DOS prompt or from the Program Manager's File Menu "Run" item. The syntax for UpdateMovie is:

C:\TARGA1K\WIN32\APPS\UpdateMovie\UpdateMovie filename.DVM (or filename.AVI for AVI files)

UpdateMovie is a standalone application. Loading a DVM or AVI file into DVCR and then saving it will also update the movie.

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Starting the Digital VCR application

Digital VCR is loaded during software installation. To open DVCR, double clicks its icon in the TARGA 1000 Program Group. The Digital VCR application will appear (Figure 3-1).

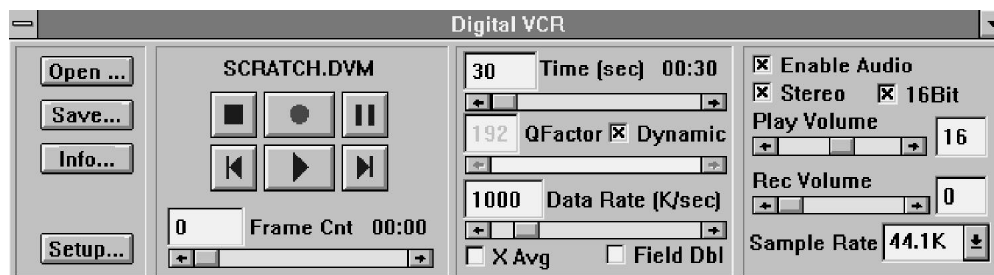


Figure 3-1 Digital VCR

DVCR is a complex tool designed to give the user maximum flexibility when recording movies. Changing settings in DVCR can result in major changes to your video quality, file size, and file compatibility to name a few. It is very important that you read the following explanations of DVCR options to get the most out of your Truevision product and achieve the highest possible quality results. Descriptions of DVCR controls and options began on the next page.



Title Bar: When the Digital VCR application is idle, the title bar will simply say Digital VCR. When the application is performing a function such as recording, playing, or saving, etc., the title bar lets you know this action is taking place by displaying the corresponding word. For instance, while recording video, the title bar reads RECORDING.

SCRATCH.DVM

Scratch.DVM: This area displays the file name of the current movie clip. The file name SCRATCH.DVM is a preallocated space for recording movies. When you are creating a movie clip or are working with a movie clip, you should always work with a scratch file. (More on scratch files later.)



Stop: Click on this button to stop the current action, such as Play or Record.



Record: Click this button to start recording.



Pause: Click on this button to temporarily stop the movie at the current display frame. Click on the Play button to resume.



Frame Backward: (This button is only functional while in pause.) Click on this button to reverse the movie to the previous frame.

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Play: Click on this button to play any clip that is loaded into DVCR



Frame Forward: (This button is only functional while in pause.) Click on this button to advance the movie to the next frame.



0

Frame Count Scroll Bar: The frame counter displays the number of the current frame and the total number of frames in the movie. Frame numbers, however, do not update during Play or Stop but will update during Pause. In other words, frame accuracy is valid only while in Pause.

You can type a specific frame number in the edit box and press <ENTER> to go directly to that frame. You will not be able to type in an incorrect or invalid number. For example, you cannot type in a frame number 555 if the maximum number of frames in the movie clip is 500.

Clicking and dragging on the scroll bar allows you to quickly move, or scrub, through the frames of your movie clip. Moving the bar to the left takes you toward the beginning of the movie clip. Moving the scroll bar to the right takes you toward the end of the movie clip.

A small rectangular button with a gray gradient and a black border, containing the text "Open ..." in a black sans-serif font.

Open: When you click on the Open button, you can load a DVM movie clip or Truevision formatted AVI clip into DVCR. The Digital VCR application cannot open non-Truevision type AVI movie clips. However, when used within a standard VFW application, the Truevision Video for Windows drivers allow you to convert between various types of AVI files. The Digital VCR application can then open the file.

You can also Open the “last” working scratch file. For instance, you create a movie in the scratch file and forget to save it. You then open a previously saved movie and realize the previous clip is not saved. At this point, you can still click on the Open button and load the scratch file. This will work as long as you haven't started to record a new movie into the scratch file.

A small rectangular button with a gray gradient and a black border, containing the text "Save..." in a black sans-serif font.

Save: Save is used to save the contents of the scratch file into a permanent file. When you click on the Save button, a dialog box appears that allows you to save the movie with either a DVM extension (TARGA 1000 compatible), or with an AVI extension (Video for Windows compatible).

When saving a movie from a scratch file, the size of the scratch file does not matter. The Save command saves the actual movie clip, not the entire scratch file. In other words, if you allocate 100MB to a scratch file and only use 10MB of this space for a movie, then the movie you save from this scratch file is 10MB.

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Info...

Setup...

Conversely, if your movie file is larger than the scratch file, say 115MB, your Saved file will also be 115MB. If your movie exceeds the scratch file dimensions, the scratch file will simply be lengthened to accommodate the data. A slight drop in performance may be experienced while writing to non allocated disk space.

Note: You must save AVI files with the .AVI extension in order to be read both by Digital VCR and any VFW aware application. DVM files, however, do not need the DVM extension to be recognized by Digital VCR.

Info: Clicking the Info button displays the current file name, the Average Q Factor for that file, and the average data rate for that file.

Setup: Clicking on the Setup button displays a dialog box (Figure 3-2) that allows you to configure DVCR scratch file and capture settings.



Figure 3-2 DVCR Setup

A rectangular button with a grey gradient and a thin black border, containing the text "New..." in a bold, sans-serif font.

New scratch file: Before you click on this button, you should set the size of the scratch file you want using the Scratch Size Edit Box & Scroll Bar. How large a scratch file to create is dependent upon several factors. In general, one second of video with 1 to 1 compression (no compression) creates about 30MB of data. A compression ratio of 15 to 1 creates approximately 2MB of data per second. A data rate of around 5MB/sec is possible under Windows NT, but only with a fast wide SCSI-II drive or drive array. Keep this in mind since any disk hardware with lesser capability will produce lesser data rates. In general, the scratch size should be equal to your largest expected movie multiplied by the expected data rate.

After setting the scratch file size, when you click on the New button, a dialog box appears with the question “Write a new scratch file with length *xx*?” (Where *xx* is the length you designated.)

If you select YES, a final dialog box appears. The program creates a scratch file and tells you the data rate that your drive supports. This number is based on the current video input, and is designed to be conservative. If you desire consistent scratch file rates, use the same input each time you Create New Scratch File.

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Save: Clicking on Save stores all the configuration parameters shown in the main Digital VCR window into the DVR.INI file, making it your default configuration. When making any important adjustments, save the new configuration. These settings will be the defaults the next time you start the application.

Done: Clicking the **Done** button closes the DVR Setup Dialog Box without saving changes to the DVR.INI file.

DVR Working Directory: This box specifies the drive and directory where you want the scratch file written, and subsequently where video will be captured to. Use this to designate a fast video drive, for example.

Audio Pass-through: Connects (passes through) sound information to your audio out device.

Loop play: When selected, the current clip will play continuously, looping to the start after finishing playing.

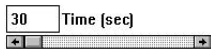
Show Realtime Counter: Displays a clock counter next to the Frame Count box in the DVCR window.

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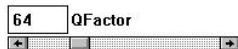
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Direct Disk Access: This option allows data to transfer from the TARGA 1000 directly to your bus mastering SCSI disk controller. This option requires that you have Windows NT US Service Pack #3 (or greater) installed. (See Chapters 2 & 3 for more details.)

No Video Out During Record: This turns off video output during recording to maximize TARGA 1000 processing capabilities.



Time Limit Scroll Bar: The Time Limit Scroll Bar and Edit Box lets you select how many seconds of video you want to capture in your movie. For instance, if you enter 5 seconds and click Record, Digital VCR will record for 5 seconds and then automatically shut off. (You can also click and drag the scroll bar to obtain the time limit.) The minimum time is 1 second and the maximum time is 3600 seconds or 1 hour. This is not a hardware limitation of the TARGA 1000, only of this particular mini-application. (View minutes above the right hand portion of the scroll bar.)



Q Factor Scroll Bar: Q Factor is a JPEG term for quantization factor. (You can think of it as a quality factor.) The Q Factory chops the amount of data to achieve a certain compression figure — the higher the number, the higher the quality, but the larger the file.

Note: JPEG is a standard of image compression that provides selectable compression ratios — the ratio of the size of the original data to the size of the compressed version. For example, if a 100KB file is compressed to 25KB, the compression ratio is 4:1.

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☒ **Dynamic**

You can also click and drag the scroll bar to adjust to a Q Factor. And again, as the quality increases the compression ratio decreases. The settings you choose depend upon how much you value image quality versus your limitations for data storage.

As an additional consideration, compression ratios will vary, depending on image content. Frames with broad areas of constant color compress better than frames with a high degree of variation. For example, a movie of a clear blue sky would compress well, whereas a movie of a waterfall would not due to the higher amount of motion.

Dynamic: This feature adjusts the compression quality for each video frame on-the-fly to maintain a constant data rate for your system.

When Dynamic is not selected or checked, the Data Rate option is grayed and only the specified Q Factor is taken into consideration when capturing video frames.

When you select or check DYNAMIC, it maximizes image quality throughout your movie while maintaining data rate. (DYNAMIC will not use a Q-factor lower than the one you specify.)

Because compression is in part dependent upon image content, the compression ratio will vary from frame to frame and therefore affect the data rate. For example, a series of frames will compress at a certain data rate, then frames with a high degree of variation may

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appear and the data rate will increase. This increase may raise the data rate beyond the capability of your system. With the DYNAMIC feature ON, compression for each frame is adjusted on-the-fly. (Frames with a great deal of variation will automatically record at a lower quality setting.) In this way, the data rate remains relatively constant.

The movie size may be smaller than the data rate you specify for several reasons. DYNAMIC data rates will stay 1-12% lower than the maximum to allow for variations in the content; portions of a clip will be of lower data rate while the software stabilizes at the optimal rate. Also, some frames – for instance those which are all one color – can compress to extremely small sizes lowering the overall size of the movie clip.

Note: High data rates might not be possible given certain limitations. DYNAMIC will attempt to maintain the specified rate, but may not be able to because of system limitations. An error message will appear alerting you to this problem. (You'll probably want to experiment with a few recordings to find what rate works best on your system.)



Data Rate Scroll Bar: Data rate is the amount of data that will write to the disk per second. If the Dynamic feature is On, the Q Factor will lower toward the specified minimum Q Factor when the data rate is raised — giving the best quality possible for the data rate that you specify.

When your system cannot keep up with the data rate that you select, you get the message “Could not

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maintain data rate.” This occurs either because the Q Factor is too high or the data rate is too high. Simply lower the data rate until you no longer get the “Could not maintain data rate” message.

A data rate of around 5MB/sec under Windows NT is possible on a fast wide SCSI-II drive. Any disk hardware with lesser capability will require lesser rates. You should experiment with data rates. (Do not rely on a disk manufacturer’s literature for accuracy regarding the data rate specification.) *To check the actual data rate capability, note the data rate returned when the scratch file is created.*

☐ X Average

X-Averaging is a method of reducing the amount of compressed data even further, so that it is possible to get a 2x increase in compression. When you select X-Averaging, the TARGA 1000 hardware takes incoming video and makes it 1/2 size by averaging the incoming pixels. Upon playback it duplicates these pixels back to full size.

Note: X-Averaged movies can be saved as AVI files, but appear as 1/2 horizontal size.

☐ Field Double

Field Double: Field double is another method of reducing the amount of data to compress. When you select this item, only one field is captured and then replicated during playback to create the entire frame. Since a frame of video normally consists of 2 fields, an odd field and an even field which are interlaced, using the Field Double feature effectively halves the data rate.

Note: Movies recorded with field doubling ON cannot be saved as AVI files.

☒ **Audio**

Enable Audio: When *playing* a movie clip, click on this button to turn the soundtrack On or Off. When *recording* a movie clip, having this item Off results in the audio *not* being saved in the file. The settings in the Audio section (Stereo, 16-Bit, and Sampling Rate) are parameters which are *recorded* when a movie is made. When a movie clip is *playing*, changing these settings has no impact. Please note that sampling rate and volume can be heard in audio pass through, but you will not hear a difference between stereo and 16-Bit because the TARGA 1000 is always using stereo and 16-Bit sampling during passthrough. The difference will be heard when playing back a clip recorded with Stereo or 16-Bit off.

☒ **Stereo**

Stereo: When you select this item, audio is saved as separate right and left channels. When this item is not selected, audio is saved as a single channel known as monaural, or mono. In the case of DVCR, the right audio channel would be saved.

It is recommended that the Stereo option is always selected because the hardware uses two channels anyway. In fact, efficiency is *decreased* by not selecting Stereo. However, Stereo can be turned off when trying to minimize the data rate to and from the disk.

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☒ 16Bit

16-Bit: When you select this item, digital sampling data is saved at 16-Bits. When this item is not selected, digital sampling data is saved at 8-Bits. As is the case with Stereo, it is recommended that 16-Bit always be selected since the hardware samples at this bit depth anyway. Efficiency is actually *decreased* by selecting 8-Bit sampling, but 16-Bit can be turned OFF when trying to maximize the data rate to and from disk.

The bit depth is the number of binary digits (bits) used to specify the amplitude of each digital sample. The more bits used, the more closely the digital sample will match the analog amplitude. An 8-Bit resolution provides 256 measurement levels (0-255) and a 16-Bit resolution provides more than 65 thousand measurement levels.

Figure 3-3 shows a portion of a wave form described at two different bit depths – 4-Bit and 8-Bit. The shaded area beneath the wave form shows a discrepancy between the recorded amplitude of the digital sample and the true amplitude of the analog signal. The higher resolution, with less gray, indicates a higher fidelity (i.e., it more closely resembles the original sound.)



Figure 3-3 Bit-depth Resolution



Volume Level Scroll Bar: These scroll bars allow you to alter audio output levels.

The Out scroll bar raises or lowers the audio output level. To use this parameter, click and drag the scroll bar to the proposed level or highlight the current number in the edit box and enter a new number. The level range is between 1 and 16, with the current level shown numerically in the edit box. To raise the audio output level, move the scroll bar toward the right. To reduce the sound level, move the scroll bar toward the left.

The In scroll bar adjusts input gain, much like a record level. For instance, the input level from a microphone jack output is tiny, about 1 millivolt, while the record level from a CD player or tape deck is 700 millivolts. As is a rule of thumb to determine input gain, set the hardware for the maximum input gain possible without distortion. Then, adjust the audio output level.



Audio Sampling Rate: This option menu allows you to choose the number of audio digital samples per second taken by the TARGA 1000 hardware. It is the number of times per second that the amplitude of the sound wave analog signal is tested and recorded. The more frequently the amplitude is sampled, the closer the sample values will follow the wave form. In the figure below, one wave form is shown with a low sampling rate and again with a higher rate. Notice that the higher sampling rate, with less gray, indicates a

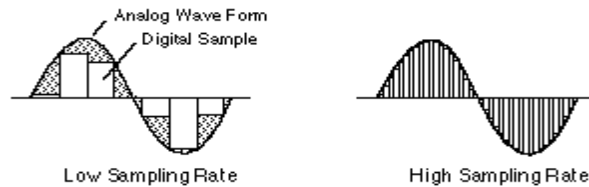
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higher fidelity. A reference point for sampling rate is that audio CD's are sampled at 44,100 samples per second, or 44.1 KHz.



To change the audio sampling rate, click on the box until a scroll-down menu appears. Select the sampling rate of your choice by clicking on the actual figure. Higher audio rates will require lower data rates or higher Q Factors to be chosen for the movie.

Note: Many Video For Windows applications only deal with 11KHz, 22KHz, and 44.1KHz audio sampling rates. These three rates are the "usual" Windows rates and are not a limitation of the TARGA 1000.

Chapter 4 – Video Utilities

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In this Chapter:

- Overview Of Applications
- DVR Capture
- DVM Toolbox
- TARGA AVI Player
- DVR Info

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Video Utilities

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Video Utilities

Overview of Applications

Included with your TARGA 1000 software are several utility applications that were loaded into your TARGA 1000 Program Group. These include DVR Capture, DVM Toolbox, TARGA AVI Player, and DVR Info.



DVR Capture is a frame capture application that enables you to grab single frames from live video into two separate frame buffers. It is also a convenient file format converter, and can generate color bars for testing your TARGA 1000.



DVM Toolbox is a utility for translating and combining DVM movie, TGA series, and FLC animation files. DVM Toolbox can extract a series of TGA images from a DVM movie, or, from a series of rendered TGA images, build an animated movie file in DVM format for output on your TARGA 1000 board.



The **TARGA AVI Player** is a quick, standalone way to access the TARGA 1000 video and audio playback capabilities for AVI files stored on your hard disk. The TARGA AVI Player can be used in several ways, such as a DVCR independent movie controller, a drag-and-drop AVI file player, or a Premiere export to video plug in.



DVR Info provides information on your TARGA 1000 hardware, software, and memory resources to be used in troubleshooting and compatibility testing.

DVR Capture

DVR Capture (Figure 4-1) is a frame capture utility that enables you to pass through live video and capture single frames into two separate buffers. DVR Capture also allows you to load/save images in several different file formats and is also a color bar generator which is useful for making sure your TARGA 1000 is working properly. DVR Capture is accessed by double clicking the DVR Capture icon in the **TARGA 1000 Program Group**.

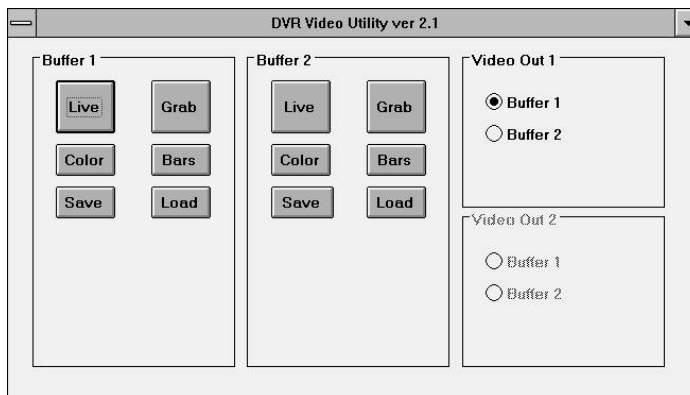


Figure 4-1 DVR Capture

You will see a dialog box showing Buffer 1 and Buffer 2 sections. A buffer is simply a holding area in memory for frame captures. When you first start DVR Capture, you should see a red screen on your video output device when Buffer 1 is active, and a cyan screen when Buffer 2 is active. If this is the case, your TARGA 1000 board is working properly.

Only one buffer can pass through live video at a time, but a Video Out port can display either buffer. On the right-hand portion of the menu is a Video Out 1 section and a Video Out 2 section. The TARGA 1000 has only one video output, so number two is grayed out. Use the Video Out 1 port to switch between buffers.

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Using DVR Capture

Basic control of DVR Capture is accomplished by selecting a buffer in the Video Out 1 window, and then telling that buffer what you want it to do in the Buffers window. For example:

- **To fill the output screen with a particular color** click on the “Color” button in the buffer menu of your choice. A Windows color menu appears from which you select a color, and press the OK button. Select the appropriate buffer, and the video output device screen will be filled with your selected color.
- **To fill the output screen with color bars** click on the “Bars” button in the buffer of your choice and select the appropriate buffer in the Video Out window. The video output device will display color bars.
- **To see live video on your output device** simply click on “Live” in either one of the buffers (while your video input is running). In the Video Out window, select the corresponding buffer. Video will appear on your output device.
- **To capture a frame of video** select Buffer 1 or 2 in the Video Out window, then click “Live” in the corresponding Buffer window to begin pass through (video input must be running). Click on “Grab” to capture a frame of video. The captured frame will be retained in the buffer. You can now switch to the other Buffer and do the same, and the images will be retained, allowing you to switch back and forth in the Video Out window.

— **To switch back and forth between live video and a captured image**

- Select the “Buffer 1” button in the Video Out 1 section.
- Go to the Buffer 1 section and select ‘Live.’ Live video will appear on your screen. (Video input must be running.)
- Click on the “Grab” button to capture a frame of video.
- Select “Buffer 2” in the Video Out window and click on the “Live” button to pass through live video.
- To switch back and forth between the live video and the captured frame, simply click either “Buffer 1” or “Buffer 2” in the Video Out window.

— **To save an image or captured frame**, click on the “Save” button in the buffer that holds the image. The Windows NT Save File dialog box appears. Refer to your Windows NT documentation for information on saving files in Windows NT.

— **To load an image** click on the “Load” button in the desired buffer. The Windows NT Load dialog box appears. Refer to your Windows NT documentation for information on loading files in Windows NT. Once loaded the image will be placed in the video buffer and will be displayed on the video output device.

— **To change an image format** load the file with the “Load” button. Next, click on the “Save” button and in the File Type: area select the new file format. Then select the location to which you wish to save the file. Click the OK button to finalize the change.

Chapter 4

Video Utilities

DVM Toolbox

DVM Toolbox (Figure 4-2) is a conversion utility for translating and combining DVM movie, TGA series, and FLC animation files. You can use DVM Toolbox to extract a series of TGA images from a DVM movie. In addition, from a series of rendered TGA images, you can build an animated movie file in DVM format for display and output on your TARGA 1000 board. Then, using DVCR, you could further convert the movie into an AVI file.

The DVM Toolbox files are automatically loaded to the TARGA1K\WIN32\APPS\DVMTBOX directory when you run the install program from your TARGA 1000 software diskettes. To launch DVM Toolbox, double click on its icon in the **TARGA 1000 Program Group**.

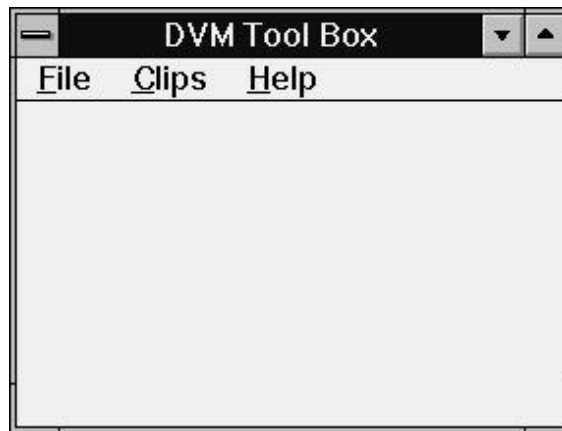


Figure 4-2 DVM Toolbox

DVM Toolbox Menu Items

File Menu

The File Menu contains the following items:

New: Creates a new clip list.

Open: Opens a previously saved clip list.

Save: Saves the contents of the current clip list.

Write Options: Allows you to select a rendering resolution. You also have the option of using the resolution of the first frame in the first file in the clip list. You must also specify NTSC or PAL video format. Maximum resolution is 640 x 480 NTSC, 768 x 576 PAL.

Write Sequence: Tells DVM Toolbox to begin rendering your clips. You must first specify the type of file you want your clip list to become, either DVM movie or TGA series, what drive and directory you want it to be written to, and what the new file name will be. The file name must contain less than eight characters and must include the file type (i.e., TGA, DVM).

***Note:** If you select TGA series as the file type, the file name must contain a frame digit after the filename and before the extension. For example, Pict1.TGA, where “Pict” is your filename and “1” represents the first frame digit. DVM Toolbox will not accept the name otherwise.*

Chapter 4

Video Utilities

Clip Menu

The Clip Menu contains the following items:

Add: To load a clip, select “Add...” From the Clips Menu. You are then presented with the File Select box. Select the drive, directory, and file you want and click OK. The file name cannot contain more than eight characters. Repeat this to add additional clips to the clip list. DVM Toolbox accepts DVM, TGA, and FLC files formats. However, you must observe the following before DVM Toolbox will load the clips.

- TGA files must be in a series, with a frame digit reference number. For example, File5.TGA would be the fifth frame in the File?.TGA series. When loading a TGA series, you need only select one file from the series, DVM Toolbox will automatically load the others.
- The file type selection menu has a selection for FLC animation files. If you have FLI files you want to use, you must first rename them as FLC files. Refer to your Windows NT documentation for information on changing file names.

After selecting a file, DVM Toolbox asks you to specify how many of the file frames you wish to use. You may either select “Use Entire File,” or you can tell it exactly which frames you want by deselecting (box is not checked) the “Use Entire File” option, and then entering the range of frame numbers you want to use.

Edit Clip List:

The Edit Clip List Menu contains the following Items:

Change Clip: Allows you to go back and reselect the frames in any file you wish to use. Select Change Clip, then the clip you wish to alter, then the new frames you want to use. Click OK and the new clip replaces the old one.

Delete Clip: Removes a clip from the clip list. Select Delete Clip, then the clip you wish to remove, then OK.

Move Clip: Allows you to change the order of the clips in the Clip List. DVM Toolbox renders frames in the order loaded. Select Move Clip from the Edit Clip List menu. When you Move Clip, you select one file and then the file you wish to move it *in front of*. For example, if your clip list contains the following files:

Clip1.TGA
Clip2.DVM
Clip3.DVM
Clip4.TGA

And you want the file CLIP4.TGA to come after CLIP1.TGA, you would select Move Clip, then click on CLIP4.TGA, then click on CLIP2.DVM. The new file structure would be:

Clip1.TGA
Clip4.TGA
Clip2.DVM
Clip3.DVM

Chapter 4

Video Utilities

Help Menu

The Help Menu contains the following items:

About DVM Toolbox: Displays the version number and copyright date of DVM Toolbox.

Creating a DVM Movie or TGA Series

To create a new clip from old ones, you must first tell DVM Toolbox what clips it will use and what parts of those clips to include. Then, all you need to do is tell DVM Toolbox what the output resolution and file type will be. Work through the following steps to load and write a new clip.

1) Select “Add” from the Clips Menu.

- Load the first clip into the Clip List.
- The Clip Info Window (Figure 4-3) appears. If you wish to use the entire file, select Include All Frames (Box is checked). If not, deselect Include All Frames (box is *not* checked), and in the From: and To: boxes, enter the starting and ending frame numbers you wish to use.

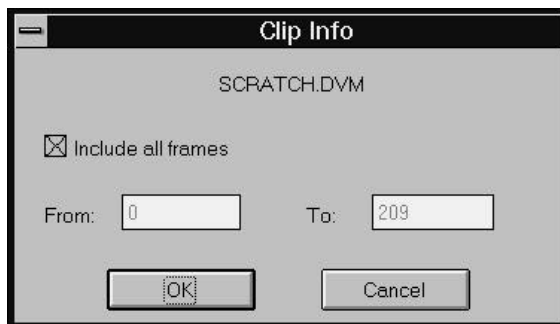


Figure 4-3 Clip Info Window

- Click OK

Repeat this process until all files you wish to use are in the Clip List. Remember, DVM Toolbox will combine files in the order entered into the Clip List. If you wish to change the sequence of clips, refer to page 6-8 for instructions on moving clips. You are now ready to create either a DVM movie file or a TGA series.

A .CLP file is not a rendered movie; it is strictly an organizational file containing information about the Clip List you created. At this point, you may wish to save the list you have built as a .CLP file. To do so, select “Save” from the File Menu and save the Clip List under any name you would like.

2) Select **“Write Options” from the File Menu.** The Write Sequence Configuration window appears (Figure 4-4).

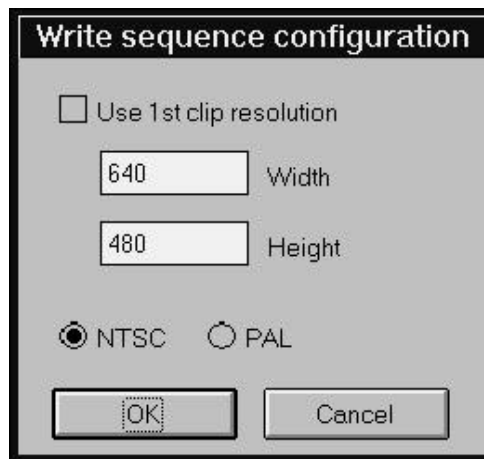


Figure 4-4 Write Sequence Configuration

- Select either “Use First Clip Resolution,” or deselect it (unchecked) and enter the output resolution you desire.

Chapter 4

Video Utilities

Note: You may select up to 640 x 480 NTSC or 768 x 576 PAL as maximum resolutions.

- Select the output format (NTSC or PAL) for your movie clip.
- Click OK.

3) Select “**Write Sequence**” from the File Menu.

- Select the drive, directory, name, and file type for the new movie.
A TGA file name must contain a number, and the file name cannot contain more than eight characters, including the file extension.
- Click OK.

After clicking OK, DVM Toolbox will begin rendering to the new format. You will be presented with an information box showing how far along the process has come and how much is left to go. When finished, you are returned to the DVM Toolbox window. You may now use the TARGA 1000 **Digital VCR** application to view/output the rendered movie.

TARGA AVI Player

The TARGA AVI Player application is a quick way to access the TARGA 1000 video and audio playback capabilities for AVI files stored on hard disk. It can also be used as a drag-and-drop AVI player when in the Windows NT File Manager, or as a export to video plug in for Premiere.

The TARGA AVI Player has several considerations you must take into account when making AVI files. These are listed below:

- The file must be an **AVI file**.
- The file must be compressed in Truevision AVI MJPEG format.
- The AVI movie dimensions must match the video output port settings. Subsequently, only full sized video can be used.
- TARGA AVI Player will NOT play AVI files that were captured with dropped frames.
- TARGA AVI Player will NOT play an AVI file made by Digital VCR *unless* converted by the **ConvertAVI.exe** tool.
- The AVI file will always be played at full speed regardless of its frame rate. However, the file's frame rate must specify either 29.97 or 30 fps (25fps for PAL).
- If the AVI movie's data rate causes frames to be dropped, the TARGA AVI Player will stop, report the dropped frames, then quit.

Chapter 4

Video Utilities

Open the TARGA AVI Player (Figure 4-5) by double clicking its icon in the **TARGA 1000 Program Group**.

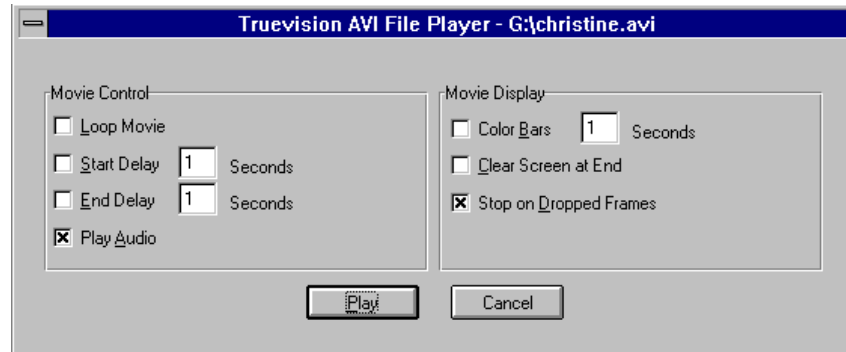


Figure 4-5 TARGA AVI Player

The TARGA AVI Player Control Panel has the following movie control options.

Loop Movie -- makes the movie play continuously when selected.

Start Delay -- this is the number of seconds to delay between the time the color bars go away and the time the movie starts. Type the number of seconds desired in its "Seconds" box.

End Delay -- this is the number of seconds between loops in the movie. Type the number of seconds desired in its "Seconds" box.

Play Audio -- plays audio through the video output device.

Color Bars -- displays color bars for a given number of seconds before the screen clears to begin playing the movie. Type the number of seconds desired in its "Seconds" box.

Clear Screen at End -- allows you to clear the screen at the end of the movie and then delay for the Stop Delay seconds.

Stop On Dropped Frames -- stops TARGA AVI Player if dropped frames are encountered.

Using ConvertAVI.exe

ConvertAVI.exe is a conversion application that allows DVCR-created AVI files created before the Version 1.5 software release to be played using the TARGA AVI Player. ConvertAVI.exe is loaded into the TARGA1K\WIN32\APPS\CONVERTAVI directory and can be used with the Program Manager's File Menu "Run" command or with the Windows NT DOS prompt. The syntax for running ConvertAVI is:

```
C:\TARGA1K\WIN32\APPS\CONVERTAVI convertavi source_filename.AVI destination_filename.AVI
```

ConvertAVI is a standalone application. Loading an AVI file into DVCR and then saving it will also convert the AVI file into a TARGA AVI Player compatible file. If you experience audio noise or popping while playing an AVI file in the TARGA AVI Player, running ConvertAVI on the file should correct it.

Using the TARGA AVI Player with Adobe Premiere 4.2

When making a movie in Premiere 4.2 to be used with the TARGA AVI Player, two items need to be set in the Make Menu's Compression dialog box. First, you must select CD-ROM padding (box is checked). Second, turn Optimize Stills off (box is unchecked). These points are for "Make Movie" items. TARGA AVI Player can export Vidcap and Premiere Capture Files immediately without these two adjustments, as long as the items on the previous pages are followed.

Chapter 4

Video Utilities

Note: If using Razor, which allows you to enter a value for padding, the value must be a multiple of 512 bytes.

With the plug in software you loaded during software installation, you can access the TARGA AVI Player through Premiere 4.2 with the File Menu's File/Export/Print to TARGA... option. This will play the AVI movie file on your output display and then terminate the TARGA AVI Player application. The TARGA AVI Player will not export previews from within Premiere's Construction window.

DVR Info

Clicking on DVR Info presents a window with options for Hardware, Software, and Resources. The information included in these windows covers topics such as board type, chip versions, compression and video modules, software versions, memory base addresses, and interrupt requests (IRQs). This information is intended to help **Truevision Technical Support** resolve any possible problems by giving information on your particular board.

Appendix A – Hardware Specifications

System Specifications*

General

Card Size	12.3" x 4.2"
Bus Interface	1 PCI slot (non-shared PCI interrupt)
Connector	26-pin high-density female (audio/video I/O)
Power Consumption	27 Watts
Regulatory Compliance	FCC Class B & CE
Warranty	1 year

Memory

Offscreen Memory	8 MB DRAM
------------------	-----------

Video Processor

Video Resizer	2D filter
Video Blender	256 levels
Video Ports	3 (Video In, Video Out, Compression)
Video Port Bandwidth	640 x 480 x 30 fps (37 MB/sec) 780 x 576 x 25 fps (44 MB/sec)
Hardware BLIT	100 MB/sec

On Board Digital Signal Processor

On-Board DSP	AT&T 3210 Floating Point DSP
Processor Clock Speed	50 MHz maximum
Local Processor Memory	128 KB SRAM
Memory Bandwidth	237 MB/sec

Video Input

Video Inputs	Composite or Y/C (S-video) Pro Model: Adds GBRS, G _s BR and Y, R-Y, B-Y (NTSC Betacam, PAL SMPTE/EBU)
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Appendix A Hardware Specifications

*All specifications subject to change without notice.

Appendix A
Hardware
Specifications

Video Standards	NTSC or PAL
Video Resolution	640 x 480, 648 x 486 (NTSC) - with Setup or without 768x576 (PAL) Pro Model: 720 x 486 (NTSC), 720 x 576 (PAL)
ADC Resolution	8 bits
Sampling Structure	4:4:4 subsampled to 4:2:2
Color Space Conversion	YUV to 24-bit RGB
Gamma Correction Tables	256 x 8 bits for each primary
Video Output	
Video Outputs	Composite and Y/C (S-video) Pro Model: Adds GBRS, G _s BR and Y, R-Y, B-Y (NTSC Betacam, PAL SMPTE/EBU) 1Volt p-p, 75 Ohm Y Signal: 1Volt p-p, 75 Ohm C Signal: +/- 350mv p-p, 75 Ohm
Composite (RCA)	Y Signal: 1V, p-p 75 Ohm
S-Video (4 Pin DIN)	R-Y Signal: 714mv p-p 75 Ohm B-Y Signal: 714mv p-p 75 Ohm
Component	Genlock to video input or via external genlock input (Black Burst or Composite)
Genlock Input	NTSC or PAL
Video Standards	640 x 480, 648 x 486 (NTSC) - with Setup or without 768 x 576 (PAL) Pro Model: 720 x 486 (NTSC), 720 x 576 (PAL)
Video Resolution	

Gamma Correction Tables	256 x 8 bits for each primary
Color Space Conversion	24-bit RGB to YUV
DAC Resolution	8 bits

Audio Input/Output

Audio Inputs (RCA)	Two unbalanced input channels configured as L&R stereo channels with 20 K Ohm input impedance, -10 dbu typical input level
Audio Outputs (RCA)	Two unbalanced output channels configured as L&R stereo channels capable of driving a 600 Ohm load to -10 dbu typical output level.
ADC/DAC Resolution	16 bits
Sampling Rate	Up to 48 kHz, 64X oversampling
Input Gain	0 to 20 in 1.5 dB steps
Output Attenuation	0 to -45 dB in 1.5 dB steps
Frequency Response	20Hz to 20kHz at a sample rate of 48kHz

Video Performance

Bandwidth	Greater than 6MHz @ -3dB with sinx/x compensation filter, greater than 7MHz @ -1db without filter.
Noise Floor	Greater than -65dB pk to rms captured single frame, greater than -55dB pk to rms through put.
Differential Gain	<2%
Differential Phase	<1.5 degrees
K-Factor	(2T pulse) <1%
Component Delay	< 20 nsec

Codec

Standard	Motion JPEG
Processor	LSI

Appendix A Hardware Specifications

**Appendix A
Hardware
Specifications**

Processor Clock Speed
Fields per Second
Pixel Data Rate

30 MHz
60 NTSC, 50 PAL
15 MPixel/sec

Accessories

Supplied

CA 204 Composite/S-video I/O cable
Pro & Pro Upgrade:
CA-207 Component Pro I/O cable (includes
two CA-203 adapter cables for S-video I/O)

Optional

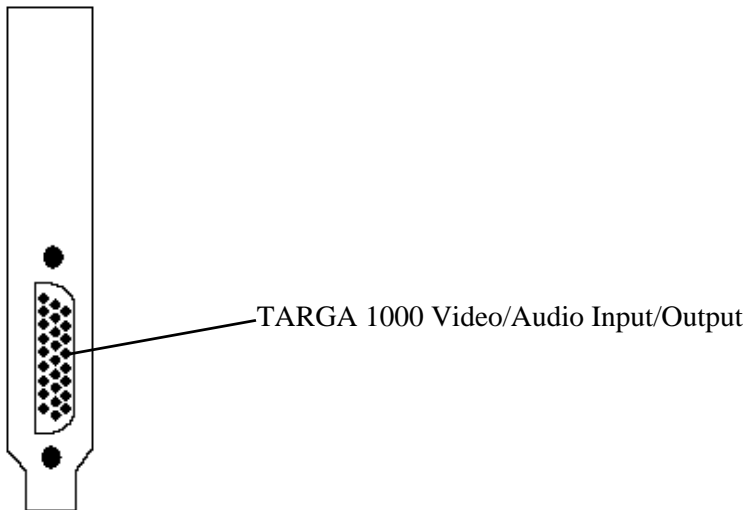
TARGA 1000 Pro Upgrade PCI converts
standard TARGA 1000 to Component Pro
model.

Appendix B – Cables and Connectors

Signal Termination

Unused video inputs/outputs should be terminated to minimize crosstalk between signals. We recommend a 75 Ohm BNC terminator with a .025% tolerance (such as the Tektronix 011-0102-01). For termination of S-Video signals, use the CA-203 cable S-Video splitter coupled with a BNC barrel connector, and then the 75 Ohm BNC terminator. Audio signals are internally terminated.

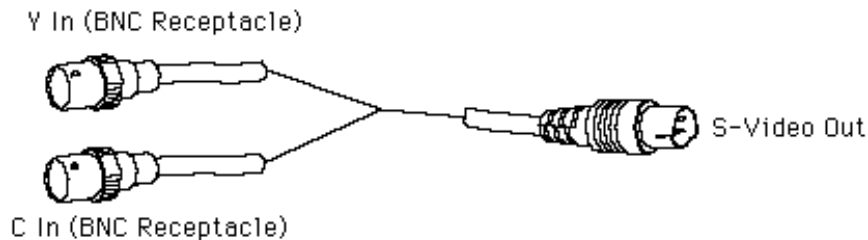
Appendix B Cables And Connectors



Appendix B Cables And Connectors

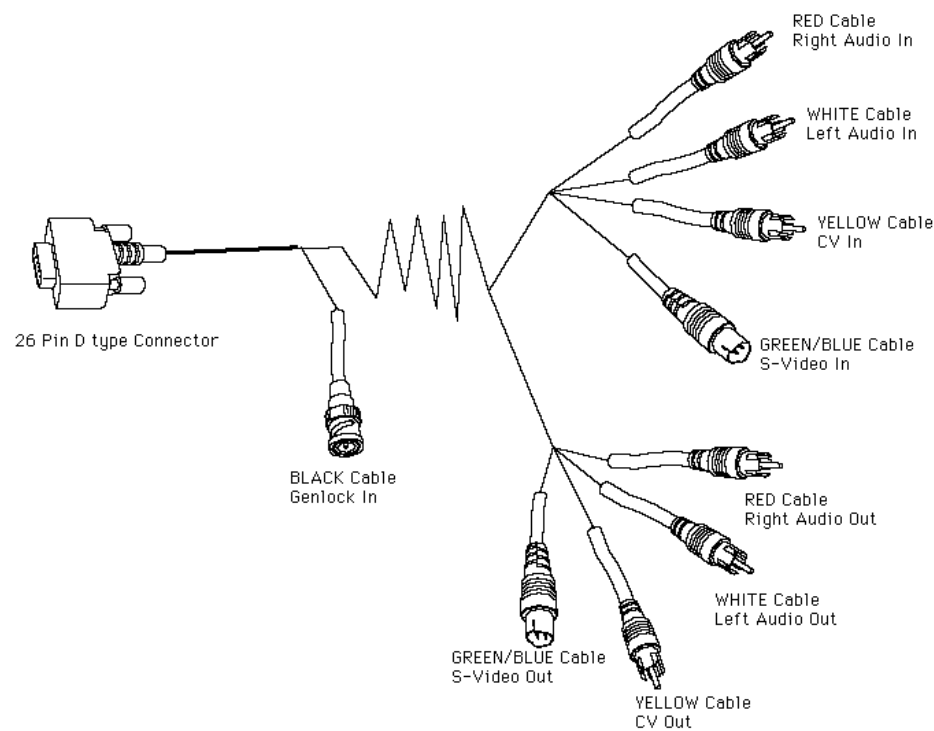
CA-203 CABLE DIAGRAM

The following is a diagram of the CA-203 cable. Two of these come with the TARGA 1000 Pro or Pro Upgrade. Attach the CA-207 BNC connector labeled “Y” (Luminance) to the CA-203 BNC receptacle labeled “Y,” and the CA-207 BNC connector labeled “C” (Chrominance) to the CA-203 BNC receptacle labeled “C.” The resulting output through the 4 Pin connector will be S-Video.



CA-204 CABLE DIAGRAM

The diagram below shows the connector descriptions for the CA-204 cable. The pin assignments for the 26 pin D type connector are displayed on the next page. One CA-204 cable is included with the TARGA 1000.

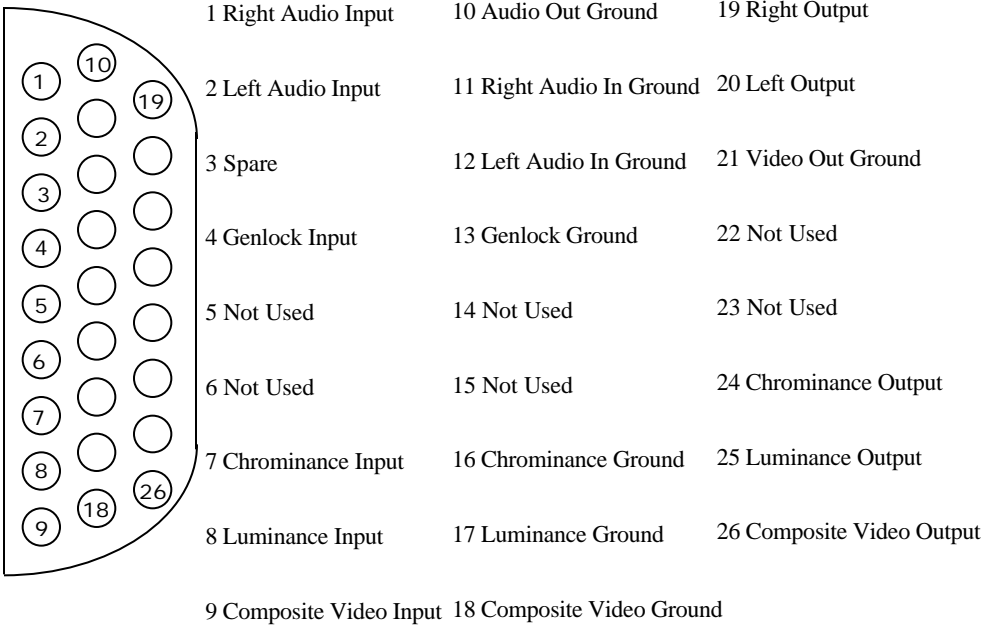


**Appendix B
Cables And
Connectors**

Appendix B
Cables And
Connectors

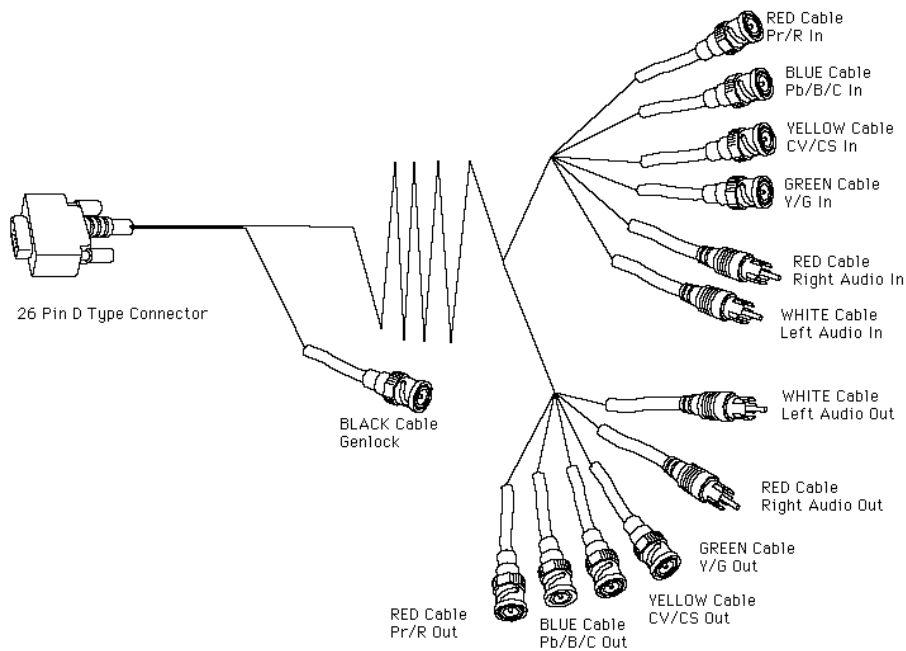
CA-204 CONNECTOR DIAGRAM

The diagram below shows the connector pin assignments for the 26 pin D type connector on the CA-204 cable (described on the previous page).



CA-207 CABLE DIAGRAM

The diagram below shows the connector descriptions for the CA-207 cable. This is the CA-204 equivalent for the TARGA 1000 Pro, allowing you to attach component video peripherals for higher quality results.

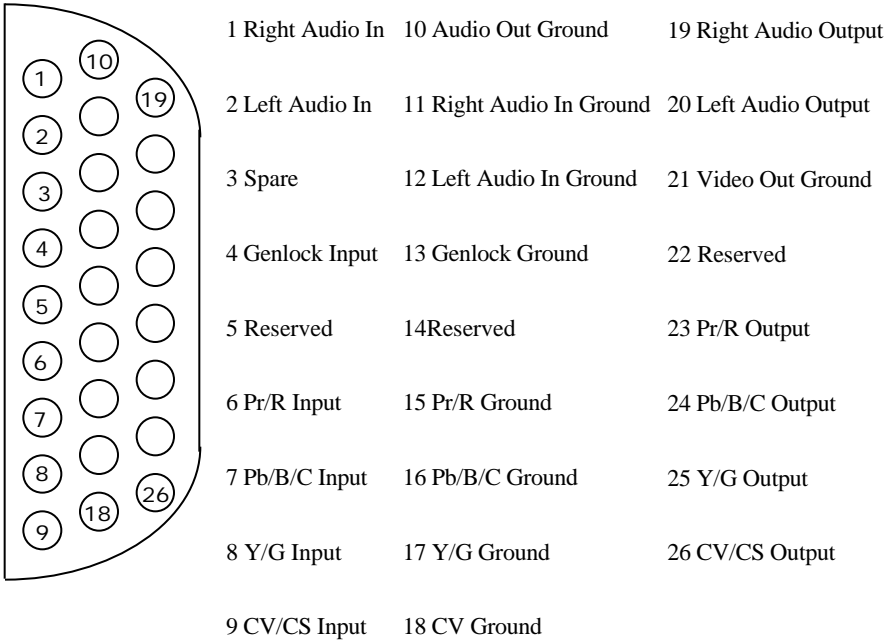


Appendix B Cables And Connectors

Appendix B
Cables And
Connectors

CA-207 CONNECTOR DIAGRAM

The diagram below shows the connector pin assignments for the 26-pin D-type connector on the CA-207 cable (described on the previous page).



Appendix C – Troubleshooting

OVERVIEW

Occasionally, you may have a problem while using your Truevision TARGA 1000 card. This Appendix covers potential situations and describes steps you can take to identify and correct them. It also contains information for contacting Truevision should you need additional help.

Important: Additional troubleshooting information discovered after this manual was printed can be found in the TARGA 1000 “Read Me” file within the TARGA 1000 Program Group.

Can’t Open TARGA Control Panels.

1. Verify that the board is correctly installed.
2. Make sure Control Panels aren’t open and backgrounded in Windows NT. If a panel is open and hidden, other Control Panels may not open.

Control Panels and screens appear but video either fails to appear or is not ‘clean.’

1. Verify that cables and connectors are appropriately connected and firmly seated.
2. You may not be set up for the correct video input/output format. Use the control panels for video input and output to select the appropriate format, recheck genlock parameters, and don’t forget to press the OK button when finished to save your changes.
3. Verify that your video equipment is set to the right video format, if applicable.

Appendix C

Trouble Shooting And Contacting Truevision

Appendix C

Trouble Shooting And Contacting Truevision

Screen Is Black on Boot Up

1. Check the card installation. Make sure it is firmly inserted into the PCI slot.
2. Check the cables. Make sure they are plugged into both the card and monitor.
3. Make sure your monitor runs at the specified resolution.
4. Make sure VGA Loop Through cabling is set up correctly.
5. Reinstall the TARGA software.
6. Call Tech Support

Live Video Does Not Work

1. Verify that you have all of the software components correctly installed.
2. Make sure the software is set to match your video format and source signal. (NTSC or PAL, RGB, S-Video, or Composite signal)
3. Check your video source. Some video cameras shut off automatically after a few minutes.
4. Check the cable from the video source to your multimedia card.

Appendix C

Trouble Shooting And Contacting Truevision

When you turn your computer OFF, a strong popping sound is heard.

When shutting down your system, it is a good idea to turn the speakers off before turning off the machine. If the speakers are ON when the system is turned OFF, then your computer may make a noise. This can occur even if the audio is not “running.” This phenomena is not unusual. Many multimedia machines make a similar noise and there is no cause for alarm.

You get the following error message: "cannot allocate DVR buffers."

In the rare instance where an application that uses the TARGA 1000 board unexpectedly quits, you may see this message. In order to recover, try restarting your machine and applications.

You get the following error message “cannot allocate enough DVR memory for compression buffers.”

This happens when you try to run more than one application that uses the TARGA 1000 board. Applications such as Digital VCR or Premiere may need to enlist all of the on-board memory available on the board and therefore cannot be open at the same time.

You record audio in mono, but when you play back there doesn't seem to be any audio.

Check the audio connections to make sure everything is cabled properly. Make sure Mute is off in the Audio Control Panel. Also check the Playback slider bars for adequate settings, and check the volume setting on any external controllers.

Appendix C

Trouble Shooting And Contacting Truevision

When using Digital VCR, an audio sampling rate was chosen, but it sounds terrible when played through another application.

The TARGA 1000 offers a dozen or so audio sampling rates, but many Video For Windows applications only deal with 11KHz, 22KHz, and 44.1KHz audio sampling rates. Keep this in mind when you export files to these applications. These three rates are the "usual" Windows rates and are NOT a limitation of the TARGA 1000 drivers.

Audio Output Crackles or Pops

1. Check your disk performance with DVCR's "Setup" feature and then limit the data rate to match your disk.
2. Make sure gain levels aren't set too high.

Sound too Low When Recording

1. Make sure gain is set correctly in DVCR and the Audio Control Panel.
2. Make sure volume is turned up adequately on your output and preview devices.

Screen Is Black on Boot Up

1. Check the card installation. Make sure it is firmly inserted into the PCI slot.

2. Check the cables. Make sure they are plugged into both the card and monitor.
3. Make sure your monitor runs at a supported resolution.
4. Make sure VGA Loop Through is set up correctly.
5. Reinstall the TARGA software.
6. Call Tech Support

I notice that the Windows NT Diagnostics tells me that another card is sharing an IRQ with my SCSI controller.

It is true that Windows NT can handle shared IRQs, but if the proceeding scenario is the case, expect your data rate to be halved. Remove any peripheral cards except for your VGA card, your SCSI controller card and your TARGA 1000. If this solves the speed issue then you can add back your other cards being careful to “manually” assign ISA IRQ’s to the appropriate cards, while leaving as many IRQ’s available to peripherals on the PCI bus.

I tried to provide my TARGAx000 and my SCSI controller a nonshared IRQ but it always ends up shared. My BIOS does not allow me to assign IRQ's.

Try reordering the cards in your PCI slots. Try to give the TARGA 1000 the first/primary PCI slot. This should ensure that the TARGA 1000 gets a clean non-shared IRQ. The next slot should be the SCSI controller followed by your VGA card. This will give you the ideal slot priority.

Appendix C

Trouble Shooting And Contacting Truevision

Appendix C

Trouble Shooting And Contacting Truevision

I have a SCSI boot drive (internal) and an A/V drive (external). My data rates are not great and I occasionally get system freezes and lockups.

Your problem is probably related to SCSI Termination. You should always use an active terminator on the end of your SCSI chain. Another problem in this scenario is that you may have placed your SCSI card in the middle of your SCSI chain. The best alternative will be to move your external A/V drive into the machine and add it to the end of the internal SCSI ribbon cable. This will keep all the data moving in one direction with the source on one end (i.e. SCSI controller) and with destinations (i.e., hard drives) on the other. Although the SCSI controller manufacturers show the original configuration as a viable one, sustained high data-throughput negates this option. Also use an active terminator. Most drives typically include only passive termination.

You are working with audio peripherals and monitoring devices that support balanced audio, but your TARGA 1000 or TARGA 1000 Pro support unbalanced audio input and output.

Use a good quality transformer with appropriate adapter connectors and wiring when converting from balanced to unbalanced audio. The better the transformer, the better the chance that it can sense the impedance level and compensate for the loads to match signal levels from input to output.

You get an error message on your screen that says there is a problem related to error number X, where X is one of the error message numbers below.

Find the error message number in the list, and note if there is a solution or action item provided. Those messages that do not show a specific action item simply require you to reboot your machine.

- Error 1 Could not locate a DVR board, PCI or EISA.
- Error 2 EISA Only. Board is in an illegal slot (slot < 0, or slot > 15).
- Error 3 PCI -- Bios mapped the board at a non 256MByte boundary or
PCI—Bios mapped the board at 0x50000000
EISA—Board address illegal. (address 0x70000000) Re-run EISA
config utility.
- Error 5 Could not map BIC address space.
- Error 6 Could not map SLIC address space.
- Error 7 Could not map BEC address space.
- Error 8 Could not map HUB address space.
- Error 10 Illegal VRAM size detected.
- Error 11 Illegal DRAM size detected.
- Error 12 Could not map DVR DRAM address space.
- Error 13 Could not map DVR DRAM address space.
- Error 14 Illegal interrupt number. Valid interrupts are 0 through 15.
PCI—BIOS assigned a bad interrupt number.
EISA—Re-run EISA Configuration utility.
- Error 15 Windows/NT or Windows/95—Could not create DVR interrupt
Windows 3.1—Could not hook hardware interrupt.
- Error 17 DVR.INI did not contain an IOModulePath statement.
- Error 18 The directory name pointed to by IOModuleSubdir was valid but no line with
IoModuleSubdir=filename was found.
- Error 19 A MOD file has an incorrect format or was not found.
- Error 20 Could not execute an otherwise correct MOD file.
- Error 21 Could not read the DSP software file indicated by the
LOADER=parameter in DVR.INI.
- Error 22 LOADER COFF file does not have the proper format.
- Error 24 A input MOD file has been used on an encoder, or an output
MOD file has been used on a decoder.
- Error 25 Could not allocate enough host RAM to load DSP software
LOADER.
- Error 26 Could not open the file specified by the LOADER=parameter in
DVR.INI.
- Error 31 Could not read the DSP software file indicated by the
KERNEL=parameter in DVR.INI.
- Error 33 KERNEL COFF file does not have the proper format.
- Error 35 Could not allocate enough host RAM to load DSP software
KERNEL.

Appendix C

Trouble Shooting And Contacting Truevision

Appendix C

Trouble Shooting And Contacting Truevision

Error 39 Could not open the file specified by the KERNEL=parameter in DVR.INI.

Error 40 Host timed out waiting, waiting for DSP to start.

Error 101 Windows NT only—Create Service on DVRNTSRV.SYS failed. Calling GetLastError may have more info.

Error 102 Windows NT only—Start Service on DVRNTSRV.SYS failed. Calling GetLastError may have more info.

Error 103 Windows NT or Windows 95—Kernel-mode driver open call failed. Calling GetLastError may have more info.

Truevision Customer Satisfaction Center

You can contact the Truevision Customer Satisfaction Center for additional help and technical support. Before contacting the Customer Satisfaction Center, please complete the Troubleshooting Questionnaire and have the answers ready when you contact us.

On-line services are available 24 hours per day. Customer Satisfaction Center personnel are available Monday through Friday 9:00 A.M. to 6:00 P.M. Eastern Standard Time.

Troubleshooting Questionnaire

Please have answers to the following questions before calling for additional help:

1. What are the serial numbers, model numbers, and software version numbers of the Truevision products that you have installed on your computer?
2. Which computer are you using with the product listed in item 1 of this questionnaire?
3. What operating systems and versions are you using?
4. How much memory (RAM) is installed on your computer?
5. What DOS/Windows Terminate and Stay Resident (TSR) programs do you have installed on your computer?
6. What other hardware is connected to your computer (multimedia cards, monitors, network cards, hard drives, etc.)? Please include all relevant model numbers, ROM version numbers, and software version numbers, where applicable.
7. What are the steps to duplicate the problem?

Appendix C

Trouble Shooting And Contacting Truevision

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Trouble Shooting And Contacting Truevision

On-Line Services

America On-line: Keyword: Truevision
 E-Mail: TRUEHELP

CompuServe: GO TRUEVISION

Internet: support@truevision.com

FTP Site: ftp.truevision.com

WWW Site: http://www.truevision.com/

DirectAccess BBS: (317) 577-8777
 Settings: 8 bits, no parity, 1 stop bit
 Up to 28,800 baud

Fax Inquires

U.S. and Canada: (317) 576-7770
Worldwide: (317) 594-2900

Telephone Contact

Sales Information, Technical Support, FaxBack System

U.S. and Canada: (800) 522-TRUE (522-8783)
Worldwide: (317) 577-8788

Note: The FaxBack System is an automated system that allows you to obtain immediate information on products, price lists, bulletins, and upgrades.

Mailing Address

Truevision Customer Satisfaction Center
7340 Shadeland Station
Indianapolis, IN 46256-3925

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