

# **Video-67P / Video-67TV**

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Multimedia Accelerator

(8267c)

**User's Manual**  
version 1.2

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Aug 1997, Rev C

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## 1. Introduce

Thank you for purchasing Jaton Video-67P / Video-67TV Graphical accelerator adapter. The Video-67P / Video-67TV is a highly integrated DRAM-base graphic/video accelerator and CRT controller. It provides a flexible, low cost; high performance solution for a diverse rang of color depths, CRT solutions, and display memory configurations with a PCI 2.1 compliant bus interface. Advanced feature on Video-67P / Video-67TV such as color space conversion, True Video<sup>®</sup> scaling, dual video windows, Video Module Interface (VMI), Vertical Blanking Interleave (VBI), Display Power Management Signaling (DPMS), a 24bit true color DAC and dual clock synthesizer allow operation at peak performance levels. The Video-67P / Video-67TV embedded with The Trident 9685 graphic chipset, which design with enhanced feature set and flexible system configuration can be tailored for a wide range of applications. The accelerated functions are providing outstanding performance greater than super VGA for PC's running Microsoft Windows 3.1x, Windows 95 operating system.

- ☑ 64-bit GUI and Video Acceleration
- ☑ True Color DAC and Clock Synthesizer
- ☑ VESA SuperVGA BIOS Extension in ROM
- ☑ PCI Local Bus Plug and Play Support
- ☑ PCI Bus Mastering and Burst Mode Support
- ☑ Windows 95 DirectDraw/DirectVideo/Direct3D Acceleration
- ☑ Full-screen Full-motion True Video<sup>®</sup> Playback
- ☑ CD with Drivers, Utilities and Video CD Player
- ☑ Optional Daughter Cards (Video-67TV)

### 1.1 Compatibility

- ☑ 486 PCI and Pentium PCI systems
- ☑ 100% IBM VGA compatible on BIOS, register, and hardware levels
- ☑ Non-interlaced and interlaced monitor support
- ☑ Compatible with Multi-Scanning and PS/2<sup>™</sup> monitors
- ☑ Supports VESA Display Power Management Signaling (DPMS) which decreases energy consumption when used with a compatible monitor

- ☑ Supports the standard IBM Feature Connector (FC) for sending graphics data to an add-on video controller
- ☑ Can auto-configure by communicating with VESA DDC2B monitors
- ☑ Contains drivers for the most popular operating systems and software available today

## **1.2 Resolution and Color Selection**

- ☑ Supports 640x480 in 16, 256, 32K, 64K and 16M colors non-interlaced
- ☑ Supports 800x600 in 16, 256, 32K, 64K and 16M colors non-interlaced
- ☑ Supports 1024x768 in 16, 256, 32K, 64K and 16M colors non-interlaced
- ☑ Supports 1280x1024 in 16, 256, 32K and 64K colors non-interlaced
- ☑ Supports 1600x1200 in 16 and 256 colors non-interlaced

## **1.3 Extended Text Display**

- ☑ 80 column text modes in 30, 43 and 60 rows
- ☑ 132 column text modes in 25, 30, 43 and 60 rows

## **1.4 GUI Accelerator**

Accelerates the most frequently used functions in today's graphics-intensive environments:

- ☑ BitBLT
- ☑ Image and Text Transfer
- ☑ Area Fill
- ☑ Line Draw
- ☑ Short Stroke Vector Draw
- ☑ Hardware Cursor

## **1.5 Video Accelerator**

An essential part of the Trident9685 is its hardware acceleration of video functions, the most important of which are: video overlay, color space conversion, and scaling. By implementing these features in

hardware, the Trident9685 allows smooth, full-color, mixed mode playback of video with less usage of the CPU than by other methods. Normally to display video in a window the video information must go through the CPU for decompression, then the CPU must scale the image, do the necessary color conversions, and manage putting the information onto the screen by sending the video overlay information to the graphics display. On-screen information, i.e. areas covered by the video overlay, must be stored in a separate memory area either in off-screen video memory or in main system memory, which causes delays when restoring the original image to the screen. The illustration below graphically depicts the amount of work that must be done by the CPU.

CPU Tasks					Trident 9685
Video Data Transfer	Decompression	Scaling	Color Space Conversion	Overlay	Graphics Display

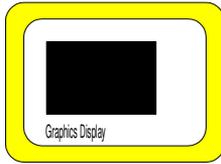
In contrast, the Trident9685 video overlay functions, when called by the proper driver such as Trident's DCI driver in Windows 3.1, allow the video image to be mixed with onscreen graphics data without trading the graphics data out of its original area in display memory. These functions also perform color conversion and scaling without the intervention of the CPU, as depicted below.

CPU Tasks		Trident9685			
Video Data Transfer	Decompression	Scaling	Color Space Conversion	Overlay	Graphics Display

This results in smoother video playback and it frees the CPU for other tasks.

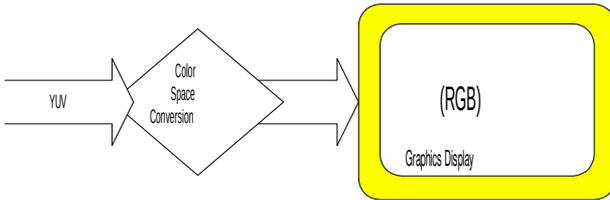
## Video Overlay

The Trident9685 overlay function allows a video image to be placed on screen simultaneously with graphics data without removing the graphics data from memory. This results in seamless transitions from graphics to video so that when the video functions obscure graphics data, the graphics data remains in its original location and restoring the graphics data becomes instantaneous.



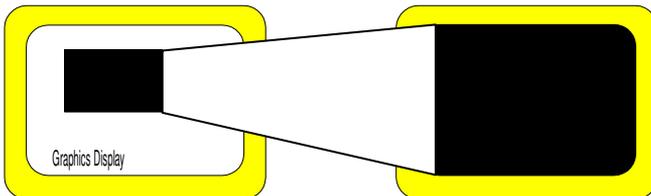
### 1.5.1 COLOR SPACE CONVERSION

Color Space Conversion that means the YUV input to the Trident9685, which is automatically converted to true color, and display in the video window without the intervention of the CPU.



### 1.5.2 VERTICAL AND HORIZONTAL SCALING

Scaling is essentially the process of taking video data and fitting it to the desired on-screen area. This allows relatively compact data, which is easily transported and stored to be displayed full-screen. Horizontal and vertical interpolation with Trident's proprietary edge-recovery technique provides a high picture quality. By doing scaling independently of the CPU, the larger picture comes free of any penalties on applications performance. The Trident9685 offers any size of vertical and horizontal scaling from miniature live display icons to full-screen display. The Trident9685 scaling algorithm minimizes the loss of image quality in full-screen zoom out.



## 1.6 Display Driver Supported

- |   |  |
|---|--|
| <input checked="" type="checkbox"/> AutoCAD®,<br>R12, R13 | <input checked="" type="checkbox"/> Autosshade™  |
| <input checked="" type="checkbox"/> Lotus 1-2-3™          | <input checked="" type="checkbox"/> GEM™ Desktop   |
| <input checked="" type="checkbox"/> Microsoft Word®       | <input checked="" type="checkbox"/> Microsoft Windows 3.1x,<br><input checked="" type="checkbox"/> Microsoft NT 4.0,<br><input checked="" type="checkbox"/> Microsoft Windows 95,<br><input checked="" type="checkbox"/> |

## 1.7 Check List

In addition to this manual, you should have the following:

- GUI Accelerator Adapter Card
- Windows 3.1x, Windows NT, Windows 95, and DOS applications driver's CD
- Software User's Guide*

If any of these items are missing or damaged, contact your dealer. Take this time to record the following information:

Dealer: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Invoice Number: \_\_\_\_\_

Dealer's Phone: \_\_\_\_\_

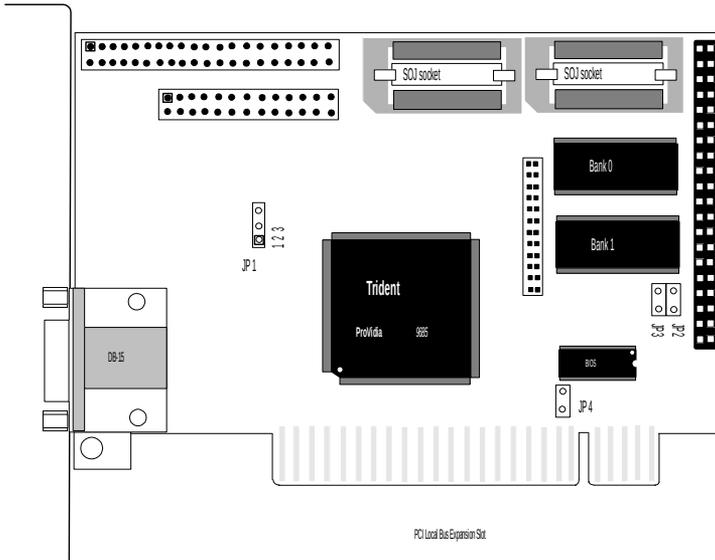
**Important:** Keep all packaging materials that accompany your adapter in the event you need to return the product.

## 1.8 Technical Support

In the event you have a technical problem, please reference Section 3, "Hardware Troubleshooting" of this manual. If you are still unable to resolve the problem, please contact your dealer for support.

# 2. Hardware Installation

## 2.1 Adapter Configuration



Jumper Setting



- Video-67P jumper setting should not changes with the default.
- Video-67TV jumper can be set with the following table as below, and that provides more functions with upgrade optional kit - 88021, 88022 & 88023.

Functions	JP 1	JP 2	JP 3	JP 4
VGA out		Open		
TV out		Closed		
NTSC TV	2 - 3		Closed	
PAL TV	1 - 2		Open	
w/TV out				Open
w/o TV out				Closed

## 2.2 Installation Procedures

To install the adapter into your system, follow these steps:

- 1? Turn OFF all power to your system, including any peripherals (printer, external drives, modem, etc.).

- 2? Disconnect the power cord and the monitor cable from the back of the computer.
- 3? Unfasten the cover mounting screws on your system and remove the system cover. Refer to your system user manual for instructions and to determine the location of the mounting screws.
- 4? Remove any graphics adapter that already exists on your motherboard. Start by removing the screw that holds the adapter retaining bracket in place (keep this screw, you will need it later). Then, gently pull straight up on the adapter card itself, and remove it from the motherboard.
- 5? If appropriate, you can use the expansion slot left vacant by the existing graphics adapter you just removed. Otherwise, select an appropriate unused PCI bus expansion slot for the new adapter. Refer to your computer system manual for the location of the PCI bus expansion slots. Remove the retaining screw that holds the slot cover in place. Slide the slot cover out and put the screw aside (you will need it to secure the adapter).
- 6? If you just removed an existing graphics adapter and are not going to use that expansion slot, you can install the slot cover you just removed from the unused expansion slot to cover the open hole.
- 7? Install the adapter. To install the adapter in the selected expansion slot, carefully line up the gold-fingered edge connector on the adapter directly above the expansion slot connector on the motherboard. Then press the adapter into place, completely, using only as much pressure as is safely necessary. DO NOT USE excessive force. Use the (remaining) screw you removed to secure the adapter-retaining bracket in place.
- 8? Replace the computer cover. Secure the cover with the mounting screws you removed in Step 3.

You have now completed the installation of your new graphics adapter on your system. Before you use the system, however, please refer to the following sections, “Connecting the Display”.

### **3. Software Installation**

#### **3.1 Microsoft Windows 95**

##### **3.1.1 WELCOME SCREEN FROM VIDEO-67P / VIDEO-67TV CD**

9? ENSURE that MS Windows 95 is up and running properly using the Trident SVGA driver that it has detected.

10? Insert the Video-67P / Video-67TV driver CD into your CD-ROM drive.

11? SELECT your CD-ROM drive or TYPE in X:\SETUP95 (X is the letter of your CD-ROM drive) for the Video-67P / Video-67TV Display Driver CD welcome screen menu.

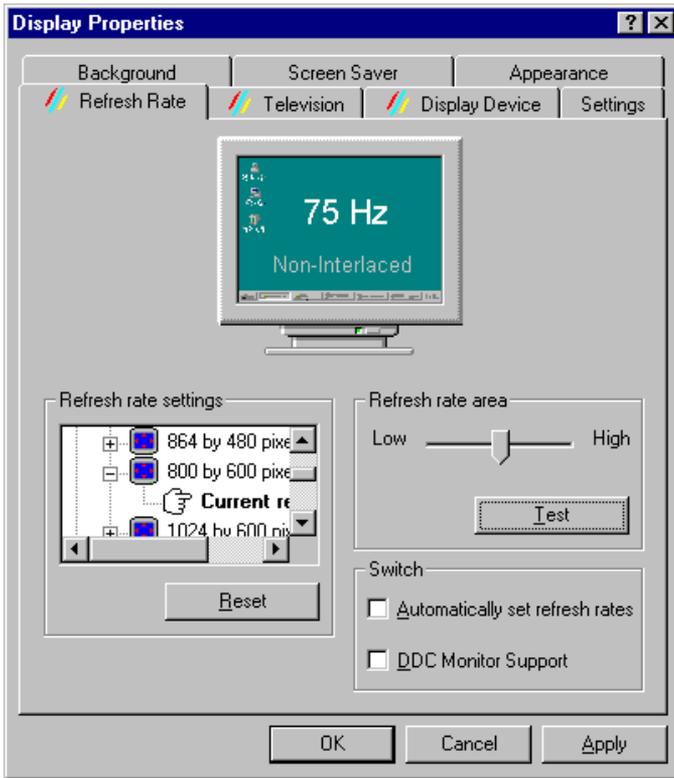
12? SELECT the "Display Driver" selection bar to install Windows 95 Display Driver.

13? Follow the on-screen instructions to finish Video-67P / Video-67TV display driver installation.

14? Restart Windows 95 to complete installation.

##### **3.1.2 DISPLAY PROPERTY CONFIGURATION:**

SELECT the "OK" button to close the "Select Device" window and to select the "Color palette", "Desktop Area", and "Refresh Rate" of your choice under the Video-67P / Video-67TV accelerated driver.



- ☑ Once the desired color palette (the number of colors), desktop area (resolution) and refresh rate have been chosen, the Windows 95 system will be re-started using the Trident accelerated driver.

## 3.2 Microsoft Windows NT 4.0 Driver Installation

- 15? SELECT the “Display” icon in control panel and then SELECT the “Settings” page.
- 16? SELECT “Display Type...” button in the “Settings” page.
- 17? SELECT “Change...” button from the Adapter type section.
- 18? SELECT “Have Disk...” button from the Change Display page.
- 19? Microsoft Windows NT 4.0 will prompt you for the correct path where the video drivers are located. ENTER the path “X:\NT40” where X: is the CD ROM drive where the Video-67P / Video-67TV Drivers & Utilities CD has been inserted.
- 20? If the driver “**Trident Video Accelerator**” is listed under the Display list, SELECT the “OK” button to continue.
- 21? Once the driver files are copied, RESTART Microsoft Windows NT 4.0 for the changes to take effect.
- 22? SELECT the desired color palette (the number of colors), desktop area (resolution), and refresh frequency in the settings page of Display Properties and then SELECT the “Test” button in the same page to determine whether your selection works properly. SELECT “Apply” to active the selected mode.

### 3.3 Microsoft Windows 3.1x Driver Installation

The graphic installation program (TINSTALL) supports a simple six-step installation procedure for the display driver setup program, the power management program and the UNinstall program.

To use TINSTALL, follow the 6 steps below:

- ☑ 1. ENSURE that MS Windows 3.1x is up and running properly, using the standard VGA driver.
- ☑ 2. SELECT the MAIN group in Program Manager.
- ☑ 3. CLICK on FILE or press ALT + F



- ☑ 4. CLICK on RUN or PRESS R to select command line.
- ☑ 5. TYPE in "X:\WIN\_31\TINSTALL" ("X" is the letter of your CD-ROM drive, typically D: or E:) and then PRESS ENTER.
- ☑ 6. A menu will appear, presenting a choice of Express or Custom Installation.

*Express* installation is quick and decision free. Display drivers will be copied into the JATON.SGI directory and Utility files will be copied into the JATON.UTL directory. Once all files are copied, a program group called DISPLAY DRIVER AND UTILITIES will be created.

*Custom* installation allows control over file storage and in what program group the icons are placed. The first dialog box that appears shows the default directory to which the display drivers will be

copied. To change the directory name select the default name, delete it and then enter the desired directory name. Once the desired directory name is selected, continue the installation procedure by selecting CONTINUE, or by pressing ENTER. The next dialog box displays a summary of where files are stored. Select CONTINUE to copy the drivers and utilities files. When all files are copied, the program will present a choice of program groups where the icons will be created. Create a new group to place the utility icons or select from pre-existing groups (e.g. main, applications, accessories etc.).

When all necessary files are copied and a group name is selected, the TINSTALL program will create three icons:

- a. Screen Control (Used to configure display drivers).
- b. DPMS (Used for power management configurations).
- c. UNinstall (Used to delete the installed TRIDENT drivers).

**NOTE:** Different “display driver set” versions cannot be installed to the same directory name.

## ***SCREEN CONTROL***

The Screen Control panel contains controls for setting screen resolution, color depth, font size, refresh rates. Not all combinations of screen resolution, color depth, font size and refresh rate are attainable.

Color depths of 16, 256, 64K, or 16.7M colors can be selected by clicking next to the desired option. Color depth determines the number of colors that may be simultaneously displayed on the screen.

The selected color depth determines the possible resolutions.

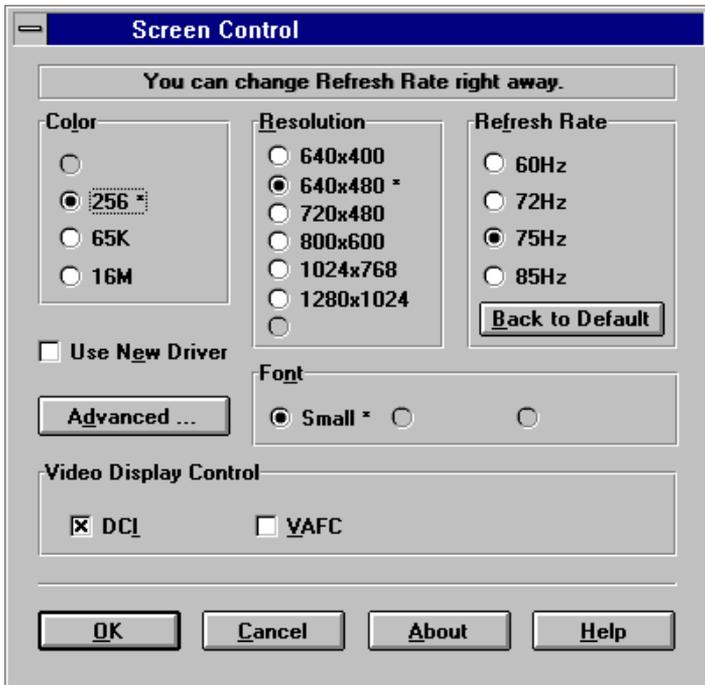
Screen resolutions of 640x480, 800x600, 1024x768, 1280x1024 or 1600x1200 can be selected by clicking next to the available options.

The virtual screen size is automatically adjusted to be at least as large as the selected screen resolution.

Available refresh rates are dependent on the selected color depth and resolution. The “Back to Default” option is used to reset the refresh rate to the factory default value in case your monitor does not support a high refresh rate.

### 3.3.1 CONFIGURING THE DISPLAY DRIVER

- Select the color depth first.
- Select the resolution.
- Select the font size (if available as an option).
- Select the refresh rate.
- Click on OK. If the current driver does not support the selected configuration, Windows will have to be restarted.



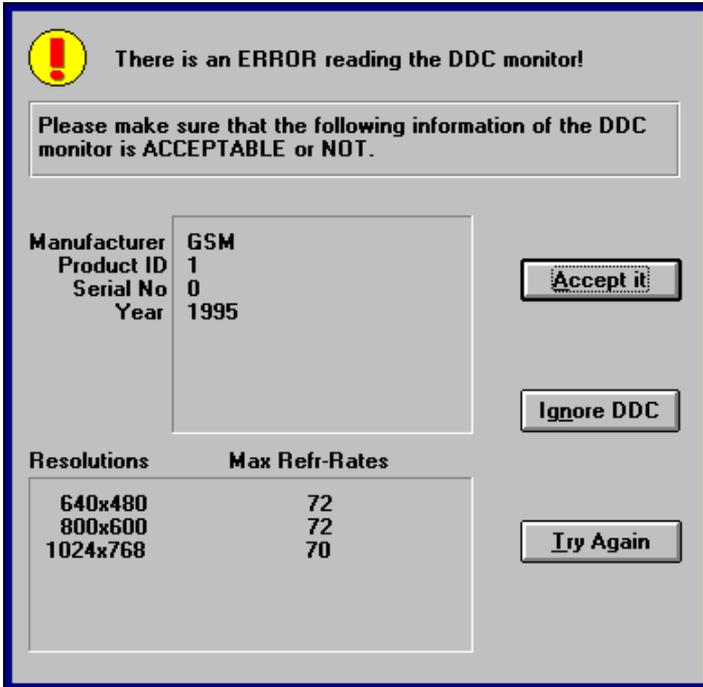
### DDC Monitor Auto Detection

If your monitor is a “PLUG & PLAY” monitor and is in compliance with VESA DDC2 Standard, the display driver will automatically detect the information provided by the DDC2 compliant monitor. If the display driver is not able to correctly detect the information provided by the monitor, a message will be displayed that allows you to:

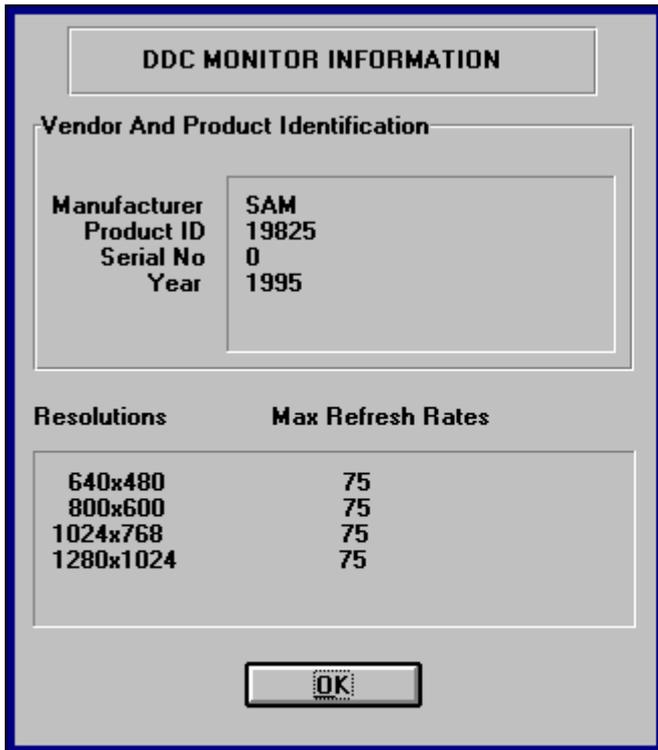
Accept it: The display driver will save the information from the DDC2 monitor that it was able to detect.

Ignore DDC: The display driver will not save the information from the DDC2 monitor and this monitor will not be treated as an DDC2 complaint monitor.

Try Again: The display driver will attempt again to detect the information provided by the DDC2 monitor.



If the display driver is able to detect the monitor successfully, the correct information will be shown once the button “DDC Monitor” in the Advanced page of the Screen Control panel is selected.



#### 4. The add-on Options

- **TV Out card (88021) for Video-67P**
- **TV Out & Capture card (88022) for Video-67P**
- **TV Out, TV Tuner & Capture card (88023) for Video-67P**
- **EDO RAM memory upgrade (8808)**

Those options will expand your PC to another dimension. All functions allow you to output image, capture live Video from various video source through RCA Video Cable or S\_Video(S-VHS) cable and input TV channel into your CRT. You can use it for Video Conferencing (network or modem connection required), or simply send the video clip through e\_mail. The TV Tuner (NTSC or PAL)

brings TV programs directly from antenna or cable TV wire to your PC monitor.

Video images and Audio ( a Sound Card is required) can be captured and saved in digital format (AVI) using the PCTV programs. You can playback the Video files using Media Player with superior display quality. Use more professional Video editing software for further processing. Add the daughter card to your Video-67TV is a snap, but retain your manual for future reference.

#### **4.0.1 FEATURES WITH ADD-ON CARDS**

- ◆ Direct Interfaces to MPEG and Video Decoder
- ◆ Built-in video capture port and hardware interface logic to directly connect to many MPEG and video decoders such as the Philips.( 88022 & 88023 only)
- ◆ Input data format can be YUV 4:1:1, YUV 4:2:2, etc.,
- ◆ Windows 95 DirectDraw Accelerator is enable world class games on a Windows 95 with class PC.
- ◆ Windows 95 DirectVideo acceleration is achieved by using the on-chip color space converter, True Video scaler and overlay control.
- ◆ Dual Video Windows for Videoconferencing.
- ◆ Either NTSC or PAL support
- ◆ Anti-tear support
- ◆ Interpolated scaling and overlay control for 30 fps software MPEG/video CODEC
- ◆ Overscan /underscan to TV display
- ◆ TV Out with 3 line flicker removal filter for output to interlaced monitors (88021, 88022 & 88023 optional kits)

## 4.0.2 SYSTEM REQUIREMENT

- ◆ Video-67P / Video-67TV Video Card
- ◆ Sound Card for Audio Recording and Playback
- ◆ Open slot for 88021, 88022 or 88023 cards
- ◆ Windows 3.1x, Windows 95 Operation System

## 4.0.3 OPTIONAL TV OUT

In Windows 95, use 'Television' control page and 'Display Device' control page to select television only features in display properties once the display driver for Windows 95 has been installed. The 'Television' control page allows the user to select 'Underscan' or 'Overscan', to select 'Interlaced' or 'Non-interlaced', to adjust the 'Screen Shift' of the television display horizontally and to select the degree of flicker reduction under Advance control button. The 'Display Device' control page allows the user to switch from color monitor to TV as the default display device and vice versa.

In Windows 3.1x, use the Display Control program in Display Driver and Utility Program Group to access TV display features and to switch from color monitor to TV as the default display device and vice versa. The Display Control program allows the user to select Underscan or Overscan, to select interlaced or non-interlaced, to select degree of flicker reduction and to adjust screen shift both horizontally and vertically.

In DOS, a TSR program "TVDISP" is available in the directory of "C:\TVGAUTIL\UTILITY" (where C is the letter of your hard disk drive). This program allows the user to select 'Underscan' or 'Overscan', to select 'Interlaced' or 'Non-interlaced', to switch from color monitor to TV as the default display device and vice versa, to adjust the 'Screen Shift' of the television display both horizontally and vertically, and to contract or expand the size of screen both horizontally and vertically. More information about the TVDISP program is available in the REAME.TXT file of this directory.

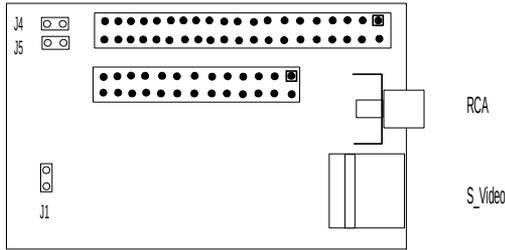
Conventional broadcast TV or VCR content provides an "Overscanned" viewing area in order to ensure that the entire visible screen is used. The result is that portions of the image along the border are beyond the physical screen. The actual visual area lost is dependent on the individual TV model. On the other hand, a PC system display content should be within the boundaries of the physically viewable screen. This is called underscan. When the TV is used as the display device in a PC, display hardware needs to control the image generation circuitry to drive the underscan timing to the TV.

Besides generating interlaced timing, hardware may have the option to drive non-interlaced timing to the TV. A non-interlaced display will remove much of the flicker effect but reduce the detail of the image.

The interlaced timing of a TV causes a flickering effect on the screen. Depending on the TV standard and tube phosphor material, the severity of flicker differs from one brand and model of TV to another. Since TV content is almost always full-motion video or animation, flicker is not as noticeable as it is when the screen content is stationary. Flickers are caused by TV low frame rate as well as the interlacing of adjacent scans. This flicker is most obvious when a particular scan contrasts highly with the scans directly above and below, such as a black horizontal line on a white background. This type of flicker can be greatly reduced by Trident9685 built-in flicker reduction filter.

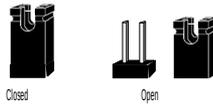
#### **4.1 TV OUT, TV TUNER & CAPTURE CARDS (ADD-ON) (88021)**

The TV Out (88021) board can be attached to the Video-67P video card as the diagram shown below .



88021  
TV OUT

Jumper Setting:



For optional TV connection, please check the back of your TV or VCR for the presence of a S-Video connector. If such a connector is present, you will need a S-Video cable to connect S-Video TV-Out on the adapter to S-Video In on the TV or VCR. If such a connector is not available, a RCA video cable is needed to connect Composite TV-Out on the adapter to Composite Video In on the TV or VCR. S-Video connection is recommended since it provides a higher quality display.

The TV Out (88021) is a Video output device that supports either TV display NTSC (USA) or PAL (Most Europe except France).

The Video-67TV is capable of displaying all standard and some extended VGA video modes on an NTSC or PAL TV. Resolutions up to 720x480 can be displayed on NTSC TV's; resolutions up to 800x600 can be displayed on PAL TV's. Extra features are built-in to reduce line flickering and to vertically scale the image for TV display. The image can be displayed on a TV in either overscan mode, as in normal TV where the image fills the entire screen, or in underscan mode as is done in normal VGA monitors where the image edges are visible with a dark space between them and the monitor's edges.

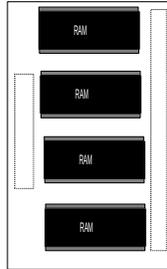
**Note:** 1. In overscan mode some of the information is lost off the screen, while in underscan mode all information is preserved.

Functions vs.	J 1	J4	J5
VGA out		Open	

NTSC TV	Open		
PAL TV			Open

**4.1.2 MEMORY MODULE UPGRADE BOARD (ADD-ON)  
(8808)**

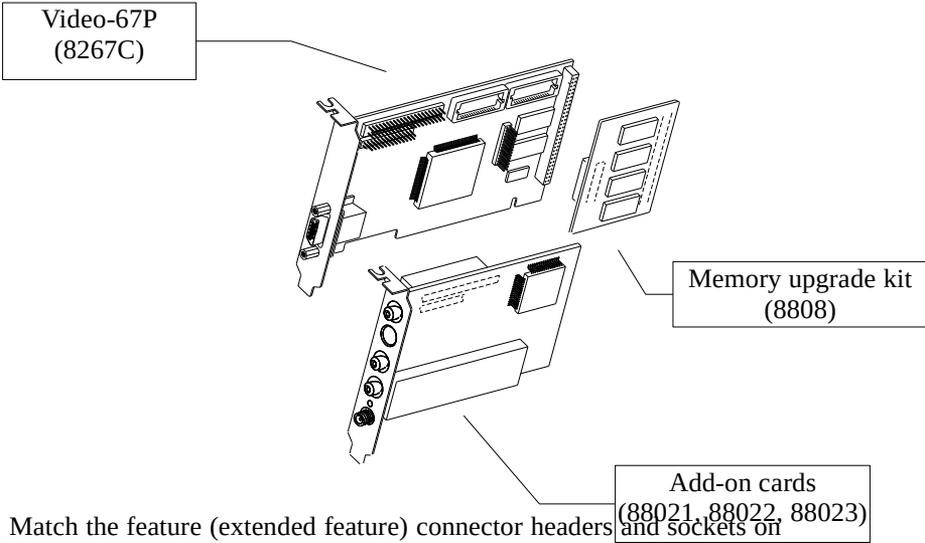
The memory module upgrade from 2MB to 4MB with added the 8808 board to Video-67TV. Read memory upgrade guide for more details.



8808  
Add-on memory module 2MB

**4.1.3 BOARDS ATTACHMENT:**

The manufacturer assumes no liability for any damage, caused directly or indirectly, by improper installation of any components by unauthorized service personnel. If you do not feel comfortable performing the installation, consult with a qualified computer technician.



Match the feature (extended feature) connector headers and sockets on each board and push two boards together. Install the connected boards

into two open slots with the mother video card inserted to the PCI socket. Fasten the mounting screws.

**C a u t i o n :**

Discharge static electricity by touching the **GROUND** such as metal part of your computer chassis/case connected with good power ground before you handle the electronic circuit boards.

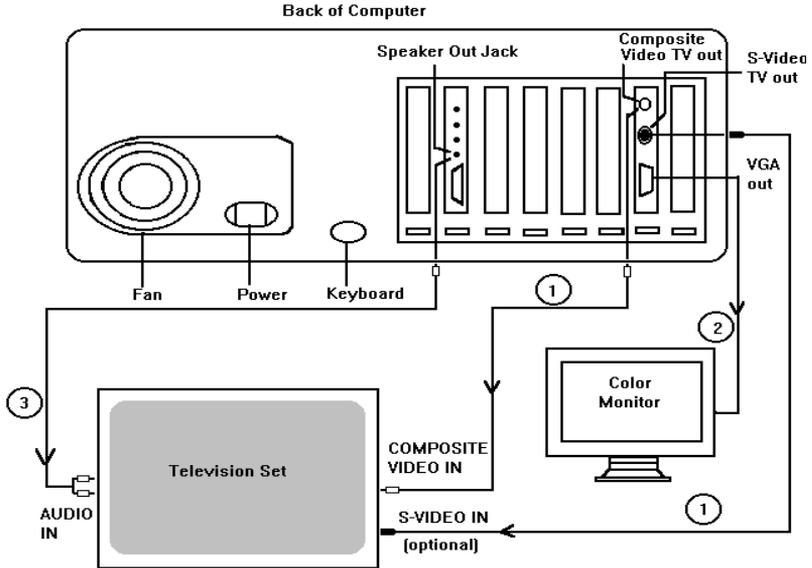
## **4.2 Making Connections with TV Tuner/Capture**

Video and TV capturing, viewing, editing and on-screen control software is provided for your Video Capturing and TV Tuner card. It performs all basic Video and TV capturing, viewing, editing functions under Windows.

The source deck is the Camcorder or VCR you use to record and play the video clips that you want to input. You need to make audio and video connections between your source deck to capture deck - your computer with Video-67TV, TV Out, TV Tuner/Video Capture board, and a sound card for audio.

You may connect any Video Source such as Camcorder, VCR, TV set to the Video Capture Board Video IN or S-Video IN connector via standard (RCA) Video cable or S-Video cable.

For TV Tuner, you may simply connect the antenna (VHF/UHF) or Cable TV wire to the TV Tuner /Capture Board via RG59/U coaxial cable (not provided).



**Note:** If you are using any other hardware (i.e. overlay card, sound card, etc.) please contact their support for more information or setup instructions. If you do not feel comfortable performing the connection, consult with a qualified computer technician.

1. Please check the back of your TV or VCR for the presence of a S-Video connector. If such a connector is present, you will need a S-Video cable to connect S-Video TV-Out on the adapter to S-Video In on the TV or VCR. If such a connector is not available, a RCA video cable is needed to connect Composite TV-Out on the adapter to Composite Video In on the TV or VCR. S-Video connection is recommended since it provides a higher quality display.
2. The adapter offers a standard VGA 15-pin analog connector. When you connect your monitor to the adapter, be sure you have the right cable and cable connector. Fixed-frequency analog monitors come equipped with a 15-pin connector. Variable frequency analog or analog/digital monitors may require a 9-to-15 pin cable connector.
3. If your system is equipped with a sound board, you can also connect a Y-cable for speaker (single male mini stereo phono jack to double male RCA jack) from the Speaker-Out jack of the sound board to the Audio-In jack on your television set.

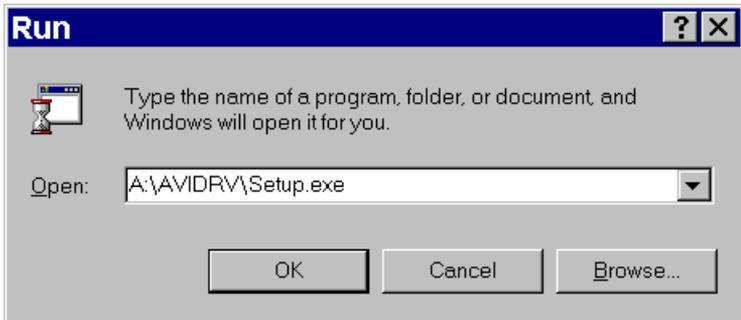
## BEFORE YOU START

Video-67TV display driver with DirectX API must be installed in your Windows 95 operating system. Refer to your Video-67TV Quick Start Guide for installing the proper display driver.

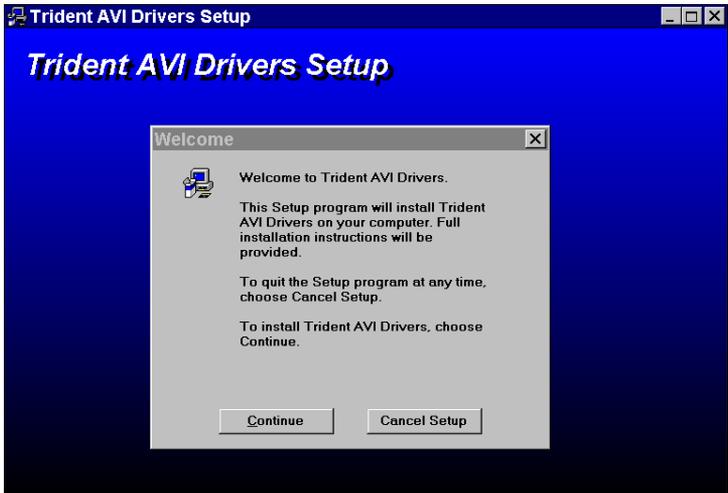
Additionally, any existing AVI drivers must be removed before you install any new AVI drivers. The AVI Driver must be installed before you install the PCTV program, even though your software installation program may be simplified, please read the README file for up-to-date information.

### 4.3 AVI Driver Installation

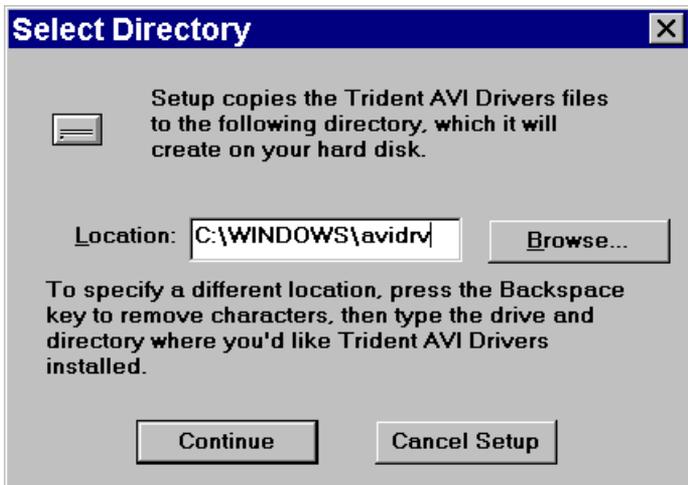
1. Click on “My Computer”, “ Control Panel”, “Add/Remove programs”.
2. Insert the software diskette into the floppy drive (A:), and enter “A:\AVIDRV\SETUP”, then click on “OK” to continue.



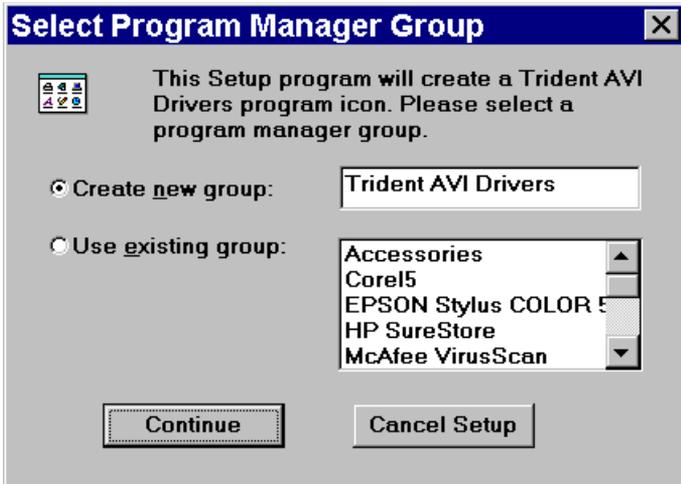
3. When “Trident AVI Driver Setup” started up, click on “Continue”.



4. Use the default directory for Trident AVI Driver or create a directory yourself.



5. Click on “Continue”.
6. Select “Create a new program group” or “Use an existing group” such as Accessories. An **AVI Driver Uninstallation** program icon will be created in the group.



7. Click on “Continue” or “Cancel Setup”.
8. Files will be copied to the directory you specified and a program icon will be created in the program group you created or designated.

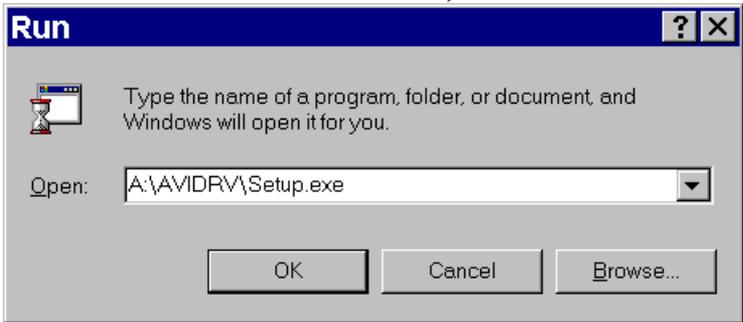


9. Click on “OK” to finish the Trident AVI drivers setup..

### 4.3.3 True TV Installation

1. Click on “My Computer”, “ Control Panel”, “Add/Remove programs”.

2. Insert the True TV diskette into the floppy drive (A:), and enter “A:\PCTV\SETUP”,

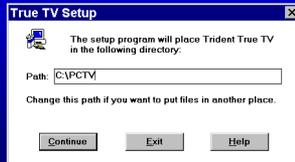


3. then click on “OK”, to continue.
4. The setup screen will prompt you to confirm the directory the Windows 95 have been installed to.

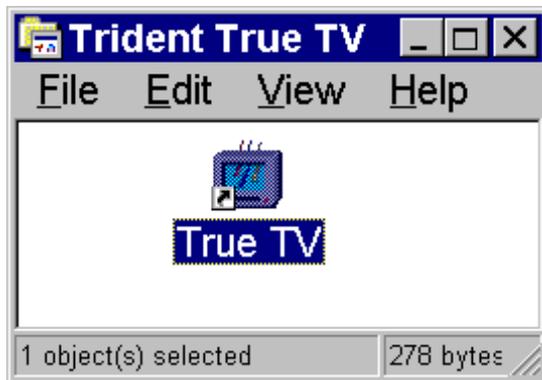


5. Use the default directory for the True TV program or enter a new one then click on “Continue”.

## Trident True TV Setup



6. After all files are copied to your hard drive, a TRUE TV icon will be created.



7. Click on "OK" to finish the True TV installation.

### 4.3.4 Using TRUE TV and Remote Control

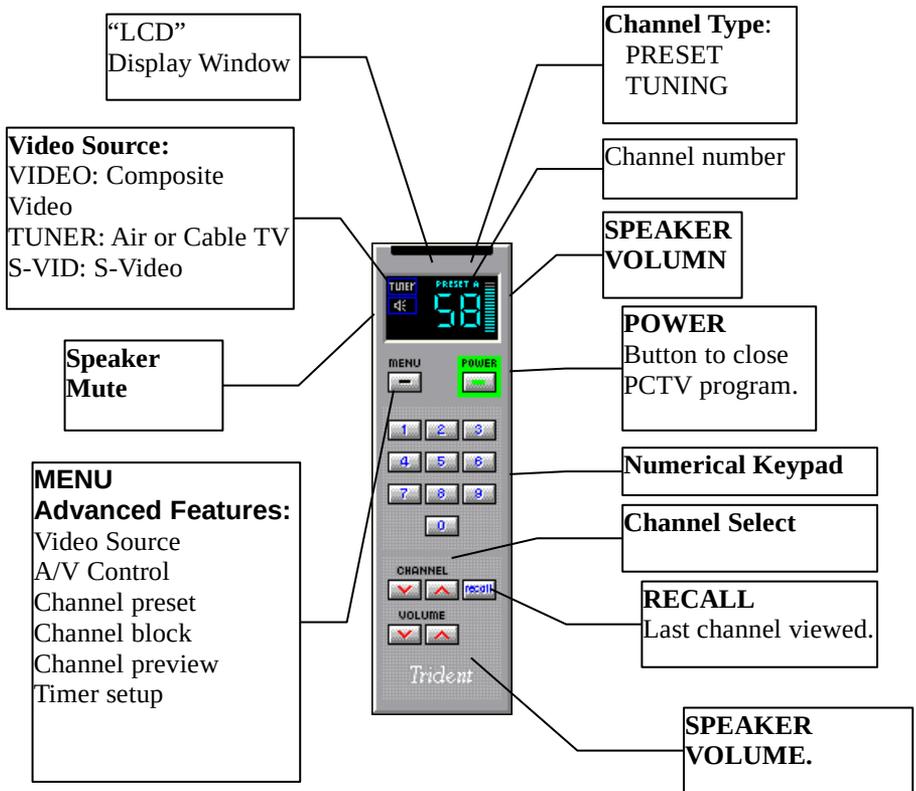
Click on “Start”, “Program”, “Trident True TV” on your Windows 95 to start.

A PCTV window and a Remote Control window will displayed on your screen.

Press “F1” key to display on-line help information.

The virtual remote control device on your screen functions just like your conventional TV Remote Control.





#### 4.3.5 REMOTE CONTROL "LCD" DISPLAY

In this LCD like window, you will see a **Channel Number** and **Status (PRESET or TUNING)**, **Volume Bar**, **Video Mode Box** (presented by "VIDEO", "TUNER", and "S-VID"), **Speaker Mute Box**.

When "TUNER" selected, you may receive TV program using Antenna or Cable TV connection. To select Cable TV, you need to click on the "MENU" button on the remote control.

#### 4.3.6 REMOTE CONTROL BUTTONS

- POWER** Click on this button to close PCTV program.
- MENU** Click this button for advanced Video Source and A/V control.
- 0 to 9** When TUNER is selected, you may select Channel using this numeric key pad.
- CHANNEL** When TUNER is selected, click UP or Down arrow to circle through preset channels.
- RECALL** When TUNER is selected, recall last channel viewed.
- VOLUME** Click UP or Down arrow to increase or decrease speaker volume.

#### ADVANCED MENU SELECTION:

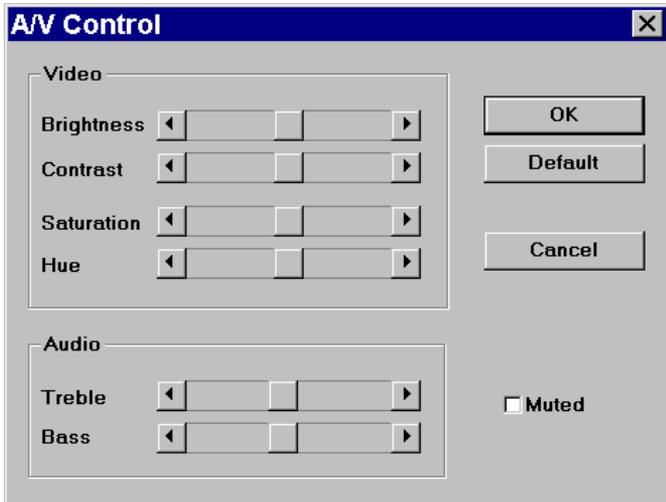
Some advanced features are contained in the menu list. They are "Video Source", "A/V Control", "Channel preset", "Channel block", "Channel preview", and "Timer setup".

#### 4.4 VIDEO SOURCE:

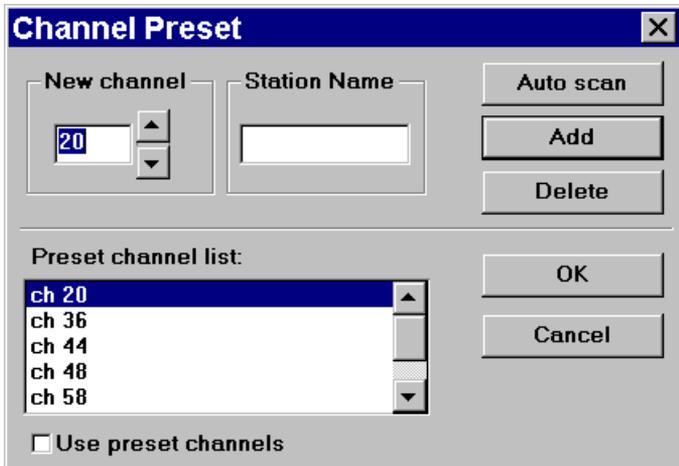


Only is TV Band selection available when TUNER is selected.

## 4.5 A/V CONTROL



## 4.6 CHANNEL PRESET



- ◆ You can set up to 20 channels as your favorite channels by using channel preset. Click "Auto scan" button to detect the broadcasting channels and set them to the preset list the first time. This

button works only when the video source is set to Tuner and the True TV program is running.

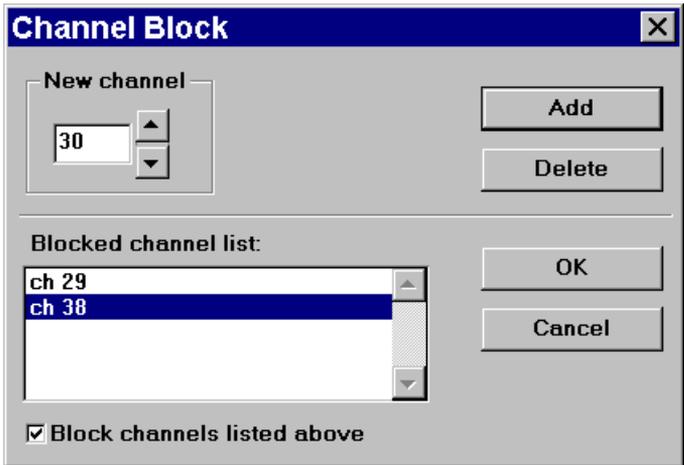
- ◆ You may add or delete channels. When you add channel, you may also want to add the description in the channel station editing box.
- ◆ Channel preset takes effect only when you check mark "Use Preset Channels". The status in the remote control LCD window will change from "Tuning" to "Preset".

#### 4.7 CHANNEL BLOCK

The image shows a dialog box titled "Input Password". It has a blue title bar with a close button (X) in the top right corner. The main area is light gray and contains the following elements:

- A label "Input password:" followed by a white text input field.
- A button labeled "OK" to the right of the input field.
- A section titled "Change Password" enclosed in a rounded rectangle, containing:
  - A label "Enter new password:" followed by a white text input field.
  - A label "Confirm password:" followed by a white text input field.
- A button labeled "Cancel" to the right of the "Change Password" section.
- A button labeled "Change" at the bottom right of the dialog.

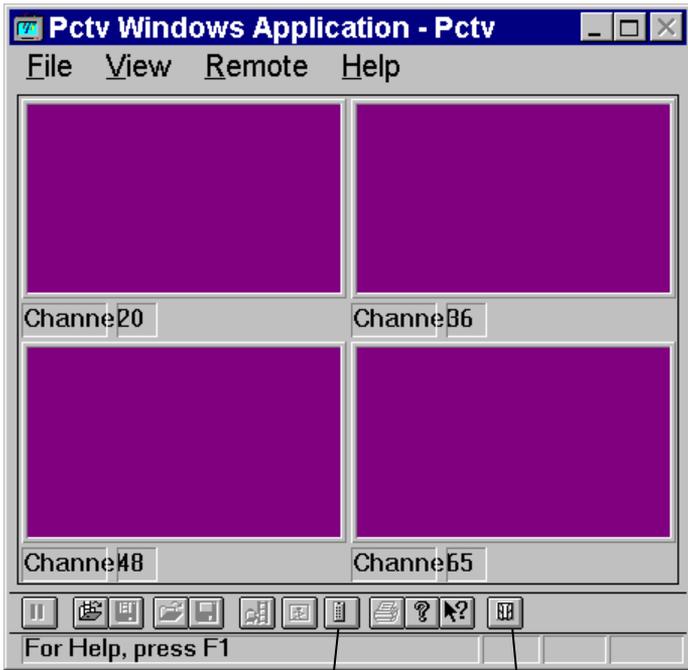
- ◆ You can block up to 20 channels with a password.
- ◆ You may add/delete the channels to be blocked in channel block dialog box. The blocked channels will not show up with channel select unless it is unblocked.



- ◆ Channel block takes effect only when you check the check mark "Block channels listed above".

#### 4.8 CHANNEL PREVIEW

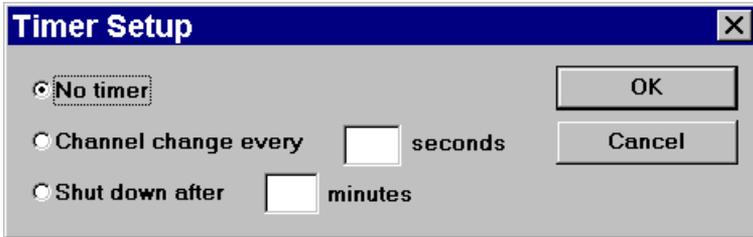
You may preview from 4 to 12 channels in some small video windows. The channels to be previewed are selected from the preset channels (when not blocked). Double click on a channel on the preset channels list will add that channel to the preview channels list. Double click a channel on the preview list will remove that channel from the list. Click on "Preview" button will present all the channels on the preview list.



Click this remote control button to change preview channels. Return to normal remote control, click this button after quick the preview.

Click this button to return to normal PCTV display.

## 4.9 TIMER SETUP



You can set timer to do one of the following things:

- ◆ Switching channel continuously every (1-99) seconds.
- ◆ Shut down the application and this remote control program after (1-99) minutes.

There will be a small clock shown on the LCD display window of the remote control.

To turn off the timer service, check mark "No timer".

## 4.10 TV CHANNEL SELECTION

You can change channel by clicking on the number buttons just as if you do with real remote control.

You may also click on channel up and down buttons, the TV channel will be switched to the previous /next channel. The new channel can be the nearest channel "Tuning" or the nearest preset channel "Preset".

Note:

Description of Channel preset & channel blocks do not apply to other type/model tuners.

## 5. Connecting the Display

### 5.1 MONITOR SUPPORT FOR ENHANCED VGA MODES

Your monitor must be capable of displaying the mode you choose. The tables list all available VGA display modes for the adapter, the monitors that support them.

Note that the color palette, i.e. the total number of possible colors to choose from, is 16,777,216 in all modes except for monochrome modes (designated by the letter 'M') where the color palette is 2: black and the monitor phosphor color. For example, in mode 62 (1024x768-256 colors), the total colors available for display on the monitor at one time is 256 different colors from a palette of 16,777,216. In mode 6C (640x480-16M colors), the total colors available for display on the monitor at one time is 16,777,216; i.e. 24 bit true color.

**TABLE : STANDARD VGA MODE SUPPORT**

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type
0h,1h	360x400-16	31.4	70	512K	40x25	Text
2h,3h	720x400-16	31.4	70	512K	80x25	Text
4h,5h	320x200-4	31.4	70	512K	40x25	Graph
6h	640x200-2	31.4	70	512K	80x25	Graph
7h	720x400-Mono	31.5	70	512K	80x25	Text
Dh	320x200-16	31.4	70	512K	40x25	Graph
Eh	640x200-16	31.4	70	512K	80x25	Graph
Fh	640x350-Mono	31.4	70	512K	80x25	Graph
10h	640x350-16	31.4	70	512K	80x25	Graph
11h	640x480-2	31.4	60	512K	80x30	Graph
12h	640x480-16	31.4	60	512K	80x30	Graph
13h	320x200-256	31.4	70	512K	40x25	Graph

**TABLE: EXTENDED VGA MODE SUPPORT**

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type
50h	640x480-16	31.5	60	512K	80x30	Text
51h	640x473-16	31.5	60	512K	80x43	Text
52h	640x480-16	31.5	60	512K	80x60	Text
53h	1056x350-16	31.3	70	512K	132x25	Text
54h	1056x480-16	31.3	60	512K	132x30	Text
55h	1056x473-16	31.3	60	512K	132x43	Text
56h	1056x480-16	31.3	60	512K	132x60	Text
57h	1188x350-16	31.3	70	512K	132x25	Text
58h	1188x480-16	31.3	60	512K	132x30	Text
59h	1188x473-16	31.3	60	512K	132x43	Text
5Ah	1188x480-16	31.3	60	512K	132x60	Text
5Bh_3	800x600-16	53.7	85	512K	100x75	Graph
5Bh_2	800x600-16	46.8	75	512K	100x75	Graph
5Bh_1	800x600-16	37.8	60	512K	100x75	Graph
5Ch	640x400-256	31.6	70	512K	80x25	Graph
5Dh_4	640x480-256	43.2	85	512K	80x30	Graph
5Dh_3	640x480-256	37.5	75	512K	80x30	Graph
5Dh_2	640x480-256	37.8	72	512K	80x30	Graph
5Dh_1	640x480-256	31.4	60	512K	80x30	Graph
5Eh_3	800x600-256	53.7	85	512K	100x37	Graph
5Eh_2	800x600-256	46.8	75	512K	100x37	Graph
5Eh_1	800x600-256	37.8	60	512K	100x37	Graph
5Fh_5	1024x768-16	68.7	85	512K	128x48	Graph
5Fh_4	1024x768-16	60.4	75	512K	128x48	Graph
5Fh_3	1024x768-16	56.4	70	512K	128x48	Graph
5Fh_2	1024x768-16	48.5	60	512K	128x48	Graph
5Fh_1	1024x768-16	35.5	87i	512K	128x48	Graph
60h	720x480-256	31.4	60	512K	90x30	Graph
61h	720x480-16M	31.4	60	1M	90x30	Graph
62h_5	1024x768-256	68.7	85	1M	128x48	Graph
62h_4	1024x768-256	60.0	75	1M	128x48	Graph
62h_3	1024x768-256	56.4	70	1M	128x48	Graph
62h_2	1024x768-256	48.3	60	1M	128x48	Graph
62h_1	1024x768-256	35.5	87i	1M	128x48	Graph
63h_3	1280x1024-16	80.0	75	1M	160x64	Graph
63h_2	1280x1024-16	63.9	60	1M	160x64	Graph
63h_1	1280x1024-16	46.4	87i	1M	160x64	Graph
64h_3	1280x1024-256	80.0	75	2M	160x64	Graph
64h_2	1280x1024-256	63.9	60	2M	160x64	Graph
64h_1	1280x1024-256	46.4	87i	2M	160x64	Graph
65h_2	1600x1200-16	75	60	1M	200x75	Graph
65h_1	1600x1200-16	62.5	96i	1M	200x75	Graph
66h_2	1600x1200-256	75	60	2M	200x75	Graph

Mode #	Resolution -Colors	Horz KHz	Vert Hz	Mem Req	Text Res	Mode Type
66h_1	1600x1200-256	62.5	96i	2M	200x75	Graph
6Ah_1 <sup>1</sup>	800x600-16	37.8	60	512K	100x75	Graph
6Bh	640x400-16M	31.6	70	1M	80x25	Graph
6Ch_4	640x480-16M	43.2	85	1M	160x60	Graph
6Ch_3	640x480-16M	37.5	75	1M	160x60	Graph
6Ch_2	640x480-16M	37.8	72	1M	160x60	Graph
6Ch_0	640x480-16M	31.4	60	1M	160x60	Graph
6Dh_3	800x600-16M	53.7	85	2M	200x74	Graph
6Dh_2	800x600-16M	46.8	75	2M	200x74	Graph
6Dh_1	800x600-16M	37.8	60	2M	200x74	Graph
6Eh_4	1024x768-16M	60.0	75	4M	128x48	Graph
6Eh_3	1024x768-16M	56.4	70	4M	128x48	Graph
6Eh_2	1024x768-16M	48.3	60	4M	128x48	Graph
6Eh_1	1024x768-16M	35.5	87i	4M	128x48	Graph
70/1h	720x480-32K/64K	31.4	60	1M	90x30	Graph
72/3h	640x400-32K/64K	31.6	70	1M	80x25	Graph
74/5h_4	640x480-32K/64K	43.2	85	1M	160x30	Graph
74/5h_3	640x480-32K/64K	37.5	75	1M	160x30	Graph
74/5h_2	640x480-32K/64K	37.8	72	1M	160x30	Graph
74/5h_1	640x480-32K/64K	31.4	60	1M	160x30	Graph
76/7h_4	800x600-32K/64K	53.7	85	1M	200x37	Graph
76/7h_3	800x600-32K/64K	46.8	75	1M	200x37	Graph
76/7h_2	800x600-32K/64K	37.8	60	1M	200x37	Graph
78/9h_5	1024x768-32K/64K	68.7	85	2M	128x96	Graph
78/9h_4	1024x768-32K/64K	60.0	75	2M	128x96	Graph
78/9h_3	1024x768-32K/64K	56.4	70	2M	128x96	Graph
78/9h_2	1024x768-32K/64K	48.3	60	2M	128x96	Graph
78/9h_1	1024x768-32K/64K	35.5	87i	2M	128x96	Graph
7A/Bh_3	1280x1024-32K/64K	80	75	4M	160x128	Graph
7A/Bh_2	1280x1024-32K/64K	63.9	60	4M	160x128	Graph
7A/Bh_1	1280x1024-32K/64K	46.4	87i	4M	160x128	Graph

**NOTES:**

VESA mode. Same as 5Bh\_1.

The "i" in the vertical frequency column denotes "interlaced".

## 5.2 Advanced Topics

The adapter supports a variety of video modes (standard VGA and higher resolutions) which are accessible through a video BIOS call from assembly language or a higher level programming language. When you start up in DOS, the screen display defaults to the standard 80-column text (alphanumeric) mode. This is mode 03H on a color system, or mode 07H on a monochrome VGA system.

## 6. Commonly Asked Questions

### □ MONITORS

**Q. Why does the display shift or change sizes when I switch modes?**

A. Some monitors lack auto-sizing features or just do not synchronize properly to the video board output. In some cases, horizontal and vertical display adjustments may be necessary. Use the TMONITOR program provided on your Driver/Utility disk to adjust the video board output. Reference the Software User's Guide for more information on the TMONITOR program.

**Q. What kind of monitor do I need to display 800x600 or 1024x768 resolution?**

A. To display 800x600 resolution at 56Hz refresh, your monitor must be capable of a 35.2KHz horizontal scan rate (e.g., NEC 2A, 3D). At 72Hz refresh, your monitor must be capable of a 48.0KHz scan rate (e.g., Sony HG 1304, NEC 4D, 5D, Seiko 1450).

To display 1024x768 interlaced, your monitor must be capable of a 35.5 KHz horizontal scan rate (e.g., NEC 3D, Seiko 1430 or 1440). To display 1024x768 non-interlaced (60Hz), your monitor must be capable of a 48.7KHz scan rate (e.g., SonyHG 1304, NEC4D, 5D, Seiko 1450). To display 1024x768 non-interlaced (70Hz), your monitor must be capable of a 56.4KHz scan rate (e.g. NEC 4FG).

**Q. What kind of monitor do I need to display 1280x1024 resolution?**

A. 19-inch or larger sizes monitor is recommended to display 1280x1024 (e.g. NEC 4FG). The monitor must also be capable of a 47.5 KHz scan rate.

### □ SYSTEMS

**Q. Can I have two graphics boards in my system at the same time?**

A. A monochrome card may co-reside with the VGA adapter. You cannot have an EGA, CGA, or another VGA card co-resident.

**Q. I see "mouse droppings" on the screen when I move my mouse around. Is this a problem with my mouse?**

A. It could be that the version of your mouse driver might not support VGA. Another possibility is that the DRAM on your card is not seated correctly or is not the right speed.

## □ SOFTWARE APPLICATIONS

***Q. My display is not correct when I run VPIC or RIX. What's wrong?***

A. The first thing to check is the software version. VPIC should be version 4.6 or later. RIX must be version 1.38 or later. If you are using an earlier version of VPIC, please contact your software vendors for upgrade information.

***Q. My display is not correct when I run the Print Preview function for WordPerfect 5.1, File Import/Export function of Applause 1.5, or IBM 3270 Emulation version 2. What's wrong?***

A. Try using the utility program called TPATCH. TPATCH provides several patch files to correct screen display problems. You can use TPATCH to correct the display problems in WordPerfect 5.1, Applause 1.5, IBM 3270 Emulation, and others. Please refer to the Software Owner's Manual for details.

## 7. Troubleshooting

This section provides troubleshooting tips for users having problems installing or using the high resolution drivers provided for Windows 3.1. Be sure you have installed the TMONITOR and SVM utilities on your hard drive before you continue with the troubleshooting procedures.

**NOTE:** "Delete driver files" means to delete all previous drivers prior to installing the new ones; i.e., "VDDTVGA.386", "OEM\*.INF" files, all the "MT\*.DRV", "T\*.DRV" and "W\*.DRV" files in the C:\WINDOWS\ and C:\WINDOWS\SYSTEM directories. Please refer to the README.TXT file in the WIN directory for a complete list of these file names.

***Problem:*** ***Windows screen won't come up. It kicks back to the DOS prompt.***

**Solution A:** Ensure the driver version is the correct one for the Trident chipset on your card. Ensure the resolution chosen is a match for the

amount of memory on-board. Refer to (open) the README.TXT file in the WIN subdirectory of your Driver/Utility Disk for details on memory requirements.

**Solution B:** Try adding the statement "EMMEXCLUDE=A000-C7FF" to the [386 enhanced] section of the Windows SYSTEM.INI file. The SYSTEM.INI file is located in the WINDOWS\SYSTEM directory.

**Solution C:** If using QEMM, try adding the following QEMM exclude statement "DEVICE=QEMM386.SYS X=A000-C7FF" to your CONFIG.SYS file.

**Solution D:** Check the CONFIG.SYS and AUTOEXEC.BAT files and minimize TSRs (Terminate and Stay Resident Programs) and Device Drivers such as the following:

DEVICE=TVGABIO.SYS in  
CONFIG.SYS, or PCSHELL.EXE in  
AUTOEXEC.BAT.

**Solution E:** Delete and reinstall the driver(s). See NOTE above.

***Problem:*** ***Windows hangs up during or after installing a driver.***

**Solution A:** Reread installation procedures to be sure you have installed the drivers correctly.

**Solution B:** Did Windows display an error message before hang-up?

*If no:* Check CONFIG.SYS and AUTOEXEC.BAT files and minimize TSRs (Terminate and Stay Resident Programs) and Device Drivers such as the following:

DEVICE=MOUSE.SYS in  
CONFIG.SYS, or PCTOOLS.EXE in  
AUTOEXEC.BAT.

If the SYSTEM.INI located in the WINDOWS\SYSTEM directory has been edited, try replacing it with a clean version from the original Windows diskettes.

**Note:** If this is done, any other changes you may have made to SYSTEM.INI file will be lost.

Delete and reinstall the driver(s).  
See **NOTE** on previous page.

*If yes:* If Windows reports "... file corrupted", be sure you have used the Windows® or Trident Setup program to install the drivers. Copying the drivers to your Windows directory without using the Windows or Trident setup program will result in a file corruption error (the files must be expanded as well as copied). If you use the correct setup program and still have problems, delete the Trident driver files from your Windows directory and use a new set of drivers.

If installing on a network via "SETUP/N", you will need to use the "EXPAND" utility (located on original Windows diskettes) to expand the display drivers.

***Problem:*** ***Garbage on the screen or double images.***

Solution A: Use View Option (FS) in the SVM program to verify the problem. See the Software User's Guide for more information on the SVM program.

Solution B: If the problem persists, the board may be defective. Contact your dealer for further support.

***Problem:*** ***Windows color palette does not look right or colors changing.***

Solution: Most likely a defective RAMDAC, memory chip, clock chip, or crystal. Contact your dealer to have the problem repaired.

***Problem:*** ***Can't display certain modes.***

Solution A: Run the SVM program (See the Software User's Guide for more information on the SVM program). If the SVM program fails, go to Solutions B, C, and D.

Solution B: Check to see that there is enough memory on the GUI accelerator to run this mode. For example, to run display mode 79H (1024x768-64K colors, refer to the tables in Section 2), 2 MB of display memory is required.

Solution C: Run the TMONITOR program to adjust video parameters (See the Software User's Guide for more information on the TMONITOR program).

Solution D: If Solutions A, B, or C do not resolve this problem, it may be hardware related. Check the specifications of the monitor.

**Problem:** *Windows screen size is too tall or too narrow.*

Solution A: Run SVM to verify the problem.

Solution B: Use TMONITOR to adjust screen size.

Solution C: Some monitors have limited bandwidth and the Windows screen size problem may not be corrected completely.

**Problem:** *Icons and characters are too small in 1024x768 and 1280x1024 modes.*

Solution: It is normal for icons and characters to become smaller in higher resolutions. A 19-inch or larger monitor is recommended for these higher modes.

**Problem:** *Mouse doesn't function properly.*

Solution A: Check the mouse connection and then re-boot the system.

Solution B: Contact the mouse vendor for the latest version of the mouse driver.

**Problem:** *When changing resolutions by running SETUP, the SETUP menu displays more than one selection for the same resolution mode.*

Solution: When upgrading to a new set of Windows drivers, you need to delete the old OEM?.INF (e.g. OEMO.INF) file in the WINDOWS\SYSTEM subdirectory. The SETUP menu will then display only one selection for each resolution mode.

**Problem:** *When installing a high resolution Trident display driver for foreign language Windows 3.1 (i.e., the German or French versions of Windows 3.1), the SETUP program prompts*

***you to insert an incorrect Microsoft Windows 3.1 diskette.***

Solution: Since Microsoft uses a different diskette arrangement for their foreign language Windows 3.1 fonts, the OEMSETUP.INF in the Driver/Utility Disk will prompt for a diskette number that is not correct for the foreign language Windows 3.1. In order to remedy this problem, a Universal Windows 3.1 driver that includes all the Windows 3.1 fonts has been created. This Universal Windows 3.1 driver does not require any fonts from the Windows 3.1 program diskettes. Contact your dealer to obtain a Trident Universal Windows 3.1 display driver diskette.

## **7.1 Troubleshooting (more)**

The following are some common problems and solution that you may encounter using **Capture** with Video-67TV. Please refer to this guide before calling Technical Support.

***My Capture deck is not responding to source signals.***

Try the following methods to relieve this problem:

- ◆ Make sure the all connections are corrected and established.
- ◆ Re-install the Capture application software to your system by overridden.
- ◆ Make sure the proper remote control type is selected.
- ◆ Check the cable with Electrometer.

***My mouse pointer is jumpy.***

Make sure no other capture applications are running, including "Terminate and Stay Resident" (TSR) programs.

## 8. Appendix A: Pinout and Sync Frequencies

The adapter offers a standard VGA 15-pin analog connector. When you connect your monitor to the video adapter, make be sure you have the right cable and cable connector. Fixed-frequency analog monitors come equipped with a 15-pin connector. Variable frequency analog or analog/digital monitors may require a 9-to-15 pin cable connector.

### 8.1 Analog Color Display Pinouts

Table 6-1 lists the GUI accelerator analog color display pinouts.

**TABLE . ANALOG COLOR DISPLAY PINOUTS**

PIN	FUNCTION
1	Red Video <sup>1</sup>
2	Green Video <sup>1</sup>
3	Blue Video <sup>1</sup>
4	Not Used
5	Ground
6	Red Return (ground)
7	Green Return (ground)
8	Blue Return (ground)
9	Key (no pin)
10	Sync Return (ground)
11	Monitor ID (not used)
12	SDA (DDC support)
13	Horizontal Sync
14	Vertical Sync
15	SCL (DDC support)

**Note 1:** Analog monochrome type monitors use green video for all video input and ignore red and blue video.

### 8.2 Conversion Table: Pin Adapters

If you will be using a 9-to-15 pin adapter cable to link your 9 pin monitor connector to the 15 pin accelerator card connector, check Table 6-2 carefully before you install the cable. The 9-to-15 pin

adapter cables are available from a variety of sources, but they need to match the specifications in Table to work properly with your new card.

The adapter cable requires a D-shaped 9 pin female connector and a D-shaped 15 pin male connector.

**9-TO-15 PIN CONVERSION TABLE**

9 PIN SIGNALS	PIN NO.	15 PIN SIGNALS	PIN NO.
Red	1	Red	1
Green	2	Green	2
Blue	3	Blue	3
Horz Sync	4	Horz Sync	13
Vert Sync	5	Vert Sync	14
Red Ground	6	Return Red	6
Green Ground	7	Return Green	7
Blue Ground	8	Return Blue	8
Sync Ground	9	Digital Ground	10
		Ground	5

### 8.3 Analog Video Signals

Black Level = 0 V

Full Intensity (White) Level = +0.7 V

## 9. Appendix B: FCC Compliance Statement

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 undesirable operation. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of 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 properly, in strict accordance with the manufacturer's 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 and correct the interference by one of 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 an experienced radio/TV technician for help and additional suggestions.

The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to Identify and Resolve Radio-TV Interference Problems." It is available from the U.S. Government Printing Office, Washington, D.C. 20402, and Stock No. 004-000-00345-4.

## **9.1 FCC Warning**

The user is cautioned that changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

**NOTE:** In order for an installation of this product to maintain compliance with the limits for a class B device, shielded cables and power cord must be used.