

## MegaHertz “The Protector”

Video Inserter with Integral Combiner

### Operation Manual

Change 02, 27 Apr 02

Due to possible design modifications, the descriptions and technical data in this manual are subject to change without prior notice. For technical assistance or service, contact Keywest Technology at:

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## INTRODUCTION

The Protector is designed specifically for maintaining a background image while displaying a compressed foreground image. The need for the Protector stemmed from CNBC's broadcasts of a real-time stock ticker. When local cable affiliates insert local advertisements without the use of the Protector or its predecessors, the CNBC's ticker would be covered for a period of time. With the boom of day-trading, it became a nuisance to have your ticker covered when the local ad was playing. Your customer would then have to wait until your stock listing made the rounds again, because as the "law" goes, the local ad would come on exactly at the wrong time, covering the one stock they've been waiting to see...to buy.... to sell!

The Protector incorporates a state-of-the-art digital video-processing device that is actually a full frame sync/time base corrector, with video scaling capability. The Protector also features a built-in video combiner for "picture-in-picture" effects (such as revealing a portion of a background video source). In addition, the Protector serves the purpose of many other devices in former installations—it replaces a separate timer device with its own graphical user interface (GUI) event controller—it replaces a separate distribution amplifier with its own included distribution system—it replaces a separate Vertical Blanking Interval (VBI) extractor/insertor with its own VBI electronics (broadcast quality closed-captioning passes transparently through the device). The Protector also provides the additional features of direct LAN interface, optional dial-up control, and consolidated 2 rack-unit high chassis.

The Protector is well suited for the "ticker" job, and combined with its DVE features, it is a versatile and proven device that will serve you well in any video combining installation you may encounter.

Manual use note: For a full color version of this manual, visit <http://www.keywesttechnology.com/support/downloads> or request CD

### CAUTION

The Protector is configured to auto-start as soon as power is applied and the master power switch on the rear of the unit is switched on. This is to ensure the unit will automatically re-start should you experience power fluctuations or loss. It is therefore critical that you connect all setup equipment prior to initial power up. The operating system may not recognize keyboards or mice if not connected prior to boot. Equipment damage could result from failure to follow this caution.

**DO NOT CONNECT PERIPHERALS WITH POWER APPLIED TO THE PROTECTOR**

## INSTALLATION

Mount the Protector in a 19" Rack.

### CAUTION

Ensure the unit is mounted securely by all four rack-ear bolts to provide sufficient support for the chassis. When the unit is rack-mounted, do not put additional weight on top without adding additional support below. The Protector should be operated in a relatively dust-free environment. Rear air intake and front air expulsion vents must not be obstructed.

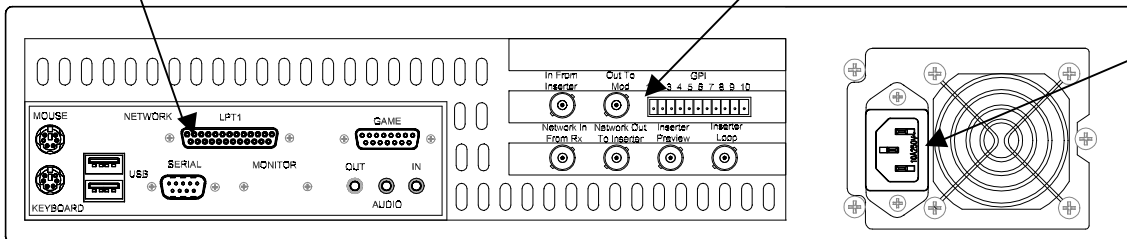
Make the necessary cable connections.

Provide 115 VAC main power to the unit via the provided, ground-isolation power cord.

Computer Connections  
See Figure 3

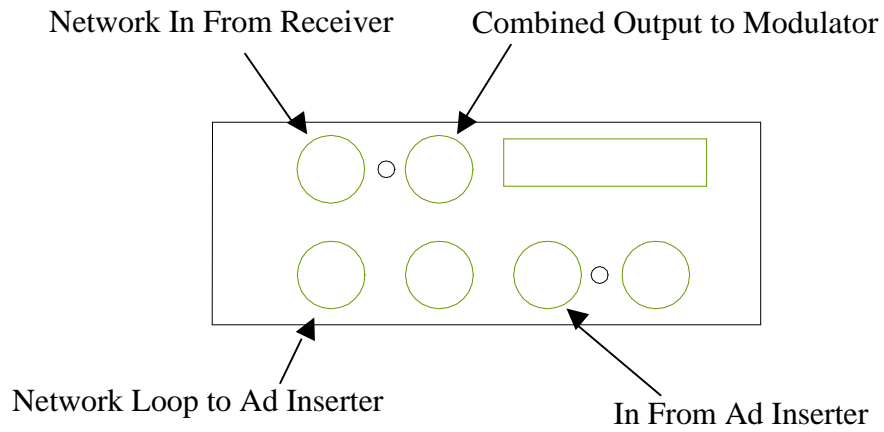
Video Connections

115 VAC  
Main Input

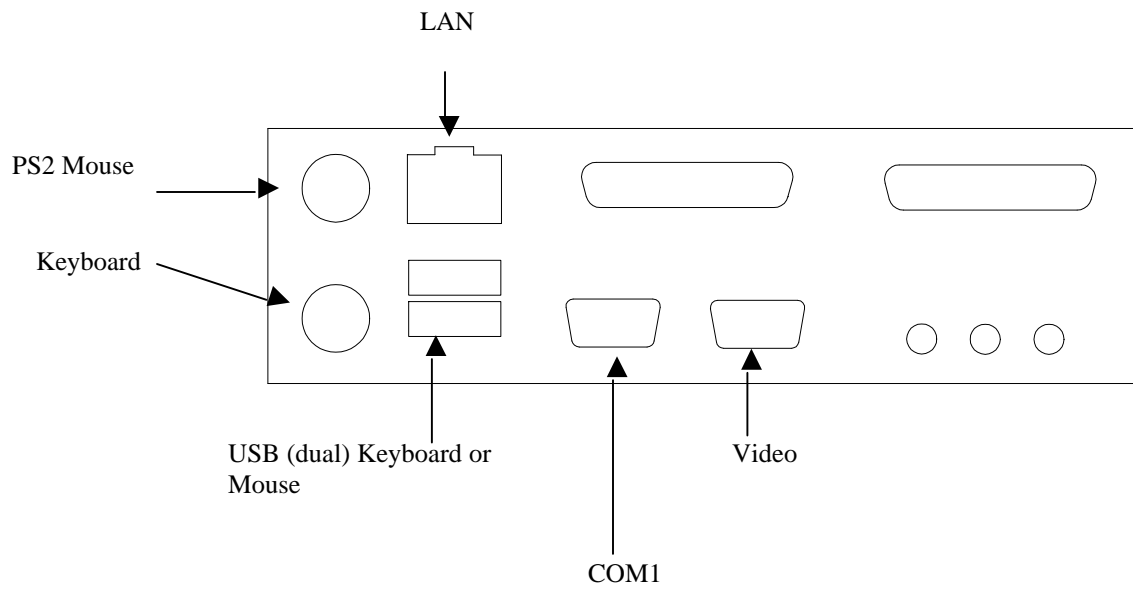


Protector Rear Panel View  
(see following pages for Video and PC connections)

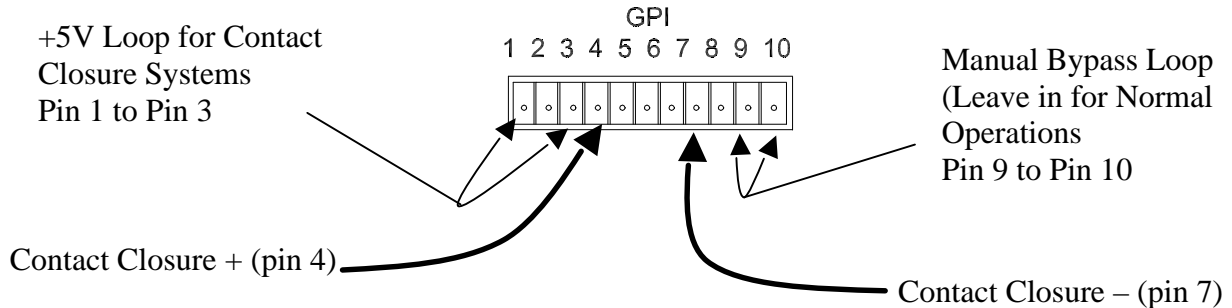
## Typical Video Connections



## Typical PC Setup Connections



## Typical GPI Connections



Typical GPI connections for the ticker job require only one set of wires. Ad insertion equipment should have some sort of contact closure, GPI output, or relay that will make a low (0V) or simple ground. The Protector reacts to the GPI based on how you program it in the Event Controller covered later in this manual.

This version of the Protector has an added feature. Pin 9 and Pin 10 are looped together on the GPI plug—removal of this loop, or the GPI plug itself will force the Protector into bypass mode. This is useful for quick bypass--simply remove the Green GPI plug.

Most contact closure outputs from the ad inserters will be labeled + and -; in reality, the Protector won't care, but following these symbols will ensure proper connection.

Use the removable 10-pin plug (green Phoenix type). Strip your GPI contacts from the ad inserter; insert stripped end into plug; tighten locking screws; plug 10-pin plug back into bottom row of the GPI plug (labeled GPI).

## INITIAL SETUP

Out of the box, the Protector is programmed to run video compression sequences triggered by GPI pulses. You can make the video connections and the GPI connections, and have response from the Protector, but it's much more than that. The Protector software contains an Event Controller that will allow you to set functions based on dates and times. Your Protector can then "squeeze" video when you need it, and maintain full screen video when you don't.

For initial installation, you will need to connect an SVGA (800 x 600 progressive scan) monitor, a mouse (PS2 or USB) and a keyboard. Also, to utilize the full function of the unit, you should take the time to connect it to your Local Area Network (LAN). With the Ethernet or LAN connection, you have the capability to control the unit from any internet connected PC worldwide (so, while you're off at NAB, and the ticker is running overtime, you can log on and change the Protector's settings to keep your viewers tuned in to your revenue generating ads).

Make your video connections per Figure 2. Composite network feed should be input to "NET IN FROM RX". Composite ad inserter video should be input to "IN FROM INSERTER". Output to the modulator or other downstream equipment should be taken from "NET OUT TO MOD".

Once initial setup is complete, you can remove the monitor, mouse, and keyboard...but leave the LAN connected.

After you have connected the computer peripherals, power up the Protector as described in the following paragraphs.

## OPERATION

The Protector is a microprocessor-based system. The current operating system is running on a 733 MHz or greater CPU. The operating system is Windows 2000 Professional? .

The main software engine of the Protector is the Graphical User Interface (GUI). The GUI is a custom application that gives you full control over all features of the video scaling board and the combining board. The combiner handles all of the general-purpose interrupt (GPI) function as well as the mixing of foreground and background video. With the built in flexibility of the system and its GUI, the system can serve many purposes, however, this manual will cover the most important facets of the "stock ticker" application. So, let's get started!

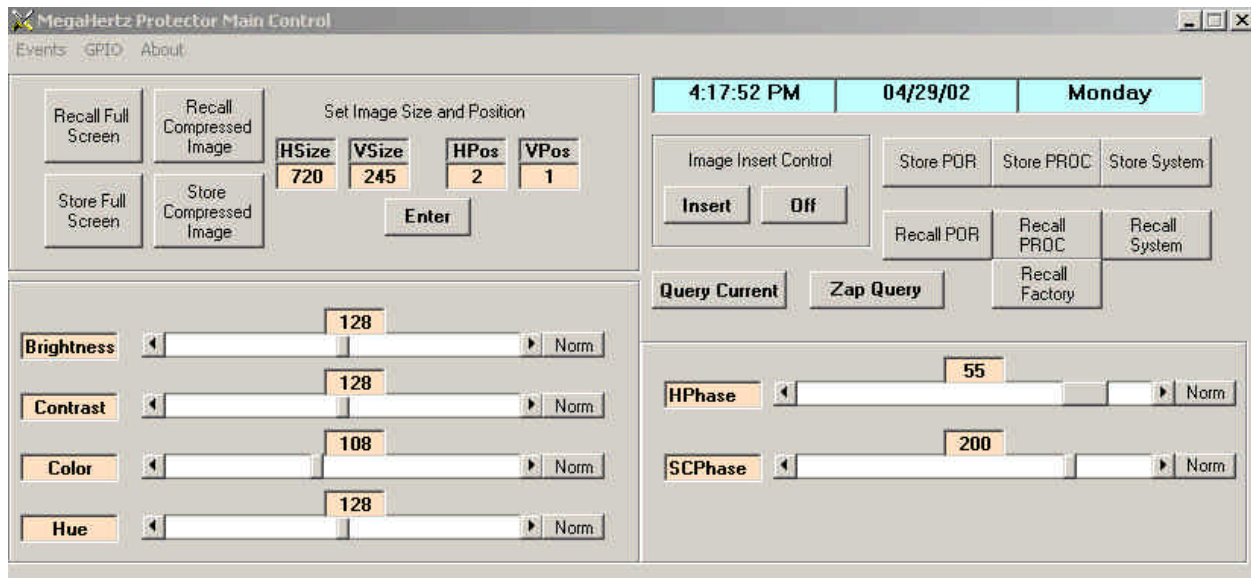
## GETTING STARTED

Once you have every thing connected for initial setup we can configure the Protector for operation.

Set the MAIN POWER SWITCH (fig. 1) to the ON position (this is a momentary switch located at the front of the unit).

The unit is configured to auto-start, and auto-logon. You should see normal boot sequence, with the GUI starting and becoming visible on your PC screen. It's setup to auto-logon and auto-start so that any power glitches will not affect operation. If you change to manual log-on, and the system suffers a power loss, you will have to physically go to the unit and press the "ON" button.

The first thing you should see on your setup monitor after the operating system completely boots up, is the GUI Main Control Page (If you own Protectors of earlier vintage (prior to version 2.10) you will notice that we've greatly simplified the operation of the unit—this manual is only useful for version 2.10 and above):



The Protector is calibrated for video levels and timings at the factory, but you may wish to tweak these values to perfectly match your system. Simply utilize the Brightness, Contrast, Color, Hue, Horizontal Phase and Sub-Carrier Phase sliders as required. Be sure to click on STORE PROC to save these values as default.



If needed, re-set your levels according to the main form figure above, to return to factory defaults.

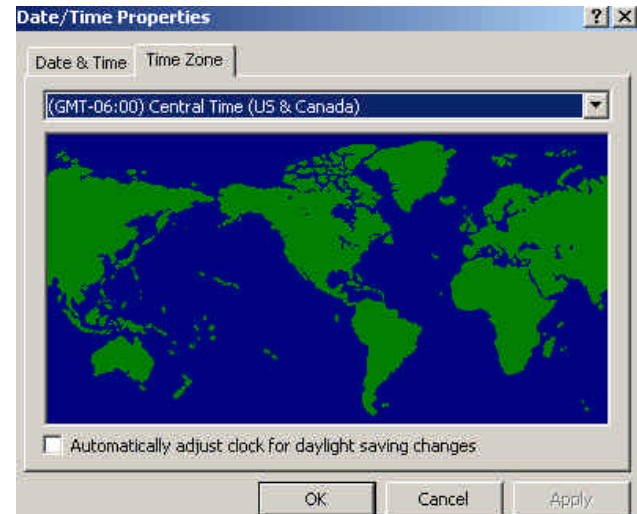
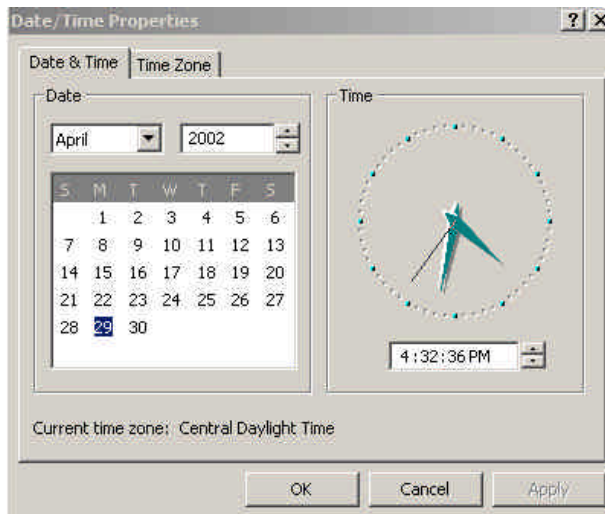
## INITIAL OPERATION SETUP

### System Clock

The Protector is shipped set to the Central time zone. The unit does automatically compensate for daylight savings time. Regardless of what time zone you are in, you should double-click on the system clock in the lower right corner of the desktop.

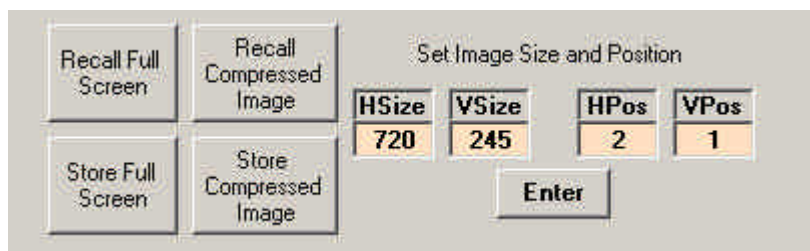


This will bring up the Windows™ Date/Time Properties application—verify that your date, time (including AM & PM), and time zone are properly set for your region. If necessary, make changes and APPLY.



## Video Size and Position Settings

The Protector utilizes two size and position settings—referred to as FULL SCREEN and COMPRESSED IMAGE. Full Screen is just that...a Full Screen image. This is the setting that is used when the stock ticker is not being displayed by CNBC® and you want your ads to show full screen. Compressed Image is the setting that “squeezes” the local ad down a few lines, to reveal the national video feed stock ticker. This is the normal mode of operation during the business week, while CNBC® is displaying live stock tickers at the bottom of their feed.



The Protector comes from the factory defaulting to FULL SCREEN mode, which means if you install the Protector during the business day, you’ll need to click RECALL COMPRESSED IMAGE to operate properly the first day. After that, the Protector will automatically select the proper mode based upon the EVENT SCHEDULER, which we’ll cover shortly.

Notice the Image Size and Position boxes on the GUI (shown above)—FULL SCREEN mode presents Horizontal Size of 720 and a Vertical Size of (242), the Horizontal Position defaults to pixel 2 and the Vertical Position defaults to line 1. In the COMPRESSED IMAGE mode, the only value that changes is Vertical Size, which will now read 198. You can manually adjust these sizes and positions as necessary by clicking in the appropriate box, entering through the keyboard the new data, and clicking either STORE FULL SCREEN or STORE COMPRESSED IMAGE, whichever you desired to modify. This is useful for some systems where external equipment may be offsetting either local or national video, and you need your compressed image to be a line or two bigger or smaller.

## Image Insert Control

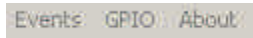
This control allows you to manually insert the local advertisement video as a troubleshooting method. By clicking on INSERT you will force the ad inserter’s video to overlay on national background feed. So, if you click INSERT when an ad is not playing, typically, you’ll see a “double ticker” on your CATV output (which in this case, will be two copies of both CNBC® tickers). This can be used to verify proper cabling.



The Image Insert Control typically shouldn't be adjusted for any other reason. The Protector will manage this feature automatically via the EVENT CONTROLLER. The default mode for this control is OFF. When a GPI is received by the Protector, it will switch to INSERT mode.

## GPIO

Next, find the GPI control screen. This can be located by clicking on GPI on the MAIN screen menu bar.



This screen allows for manual setting of the GPI functions. GPI is defined as General Purpose Interrupt, and sometimes as Ground Pulse Interrupt—it is merely a signal that creates a ground or zero volt contact to another device, in this case, The Protector.

The Protector has two GPI contacts, and two modes of operation for both—GPI OFF and AD INSERT. You can select the GPI mode by clicking on the drop-down box for either GPI and selecting the mode you need



Typically the GPI is set via the EVENT CONTROLLER. No user changes should be necessary, but just in case, a basic understanding is useful.

GPI OFF setting forces the Protector to ignore any GPI inputs, while AD INSERT forces the Protector to display the Ad Inserter video upon receipt of a GPI. AD INSERT is the mode for most all normal operations.

As shown in figure **XXX**, the GPI consists of a two-wire contact closure link from the ad inserter.

With this basic knowledge, we're ready to examine the most important part of the GUI for the stock ticker job—the EVENT CONTROLLER.

## EVENT CONTROLLER

To access the EVENT CONTROLLER, click on EVENTS on a main screen.



Events GPIO About

The blue background EVENT CONTROLLER screen will now be visible and usable.



The event controller is capable of an infinite number of programmings, but for the ticker job, the 20 that initially appear on the screen are more than enough. In fact, only two are absolutely necessary.

To program an event, you must first know exactly what you want the unit to do. For the stock ticker job, you more than likely want the local ads to be compressed during times that the ticker is present on the national feed, and you want the local ads full screen when no national ticker is present.

This makes programming very simple. You will program EVENT #1 to send the Protector GPI #1 into COMPRESSED INSERT mode during ticker times. You will then program EVENT #2 to send the Protector GPI 1 to AD INSERT mode during ticker times (this is a safety event, that is used to ensure the GPI is in the proper mode—as long as no one has made any adjustments to the GPI, the Protector would work fine without this event). Finally, you'll program EVENT #3 to return to FULL SCREEN mode during non-ticker display times. These three events are shown in the above figure.

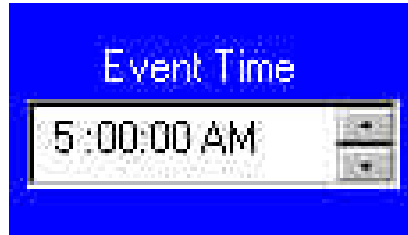
So, let's take a look at what you have to do to make this happen!  
Across the top of the Event Controller form, you will see five white text boxes.



The first box is for selecting a specific date. You may want to select a specific date to program a certain day differently than most days, such as a holiday. For our purposes though, you will want to make a couple of events that run the same every weekday, so DESELECT EVENT DATE box by clicking on the checkmark, and ensuring the checkmark disappears.



Move to the next white box, the EVENT TIME box. Since you are setting the on event first, you'll want to select the time in this box at which you want the Protector to begin compressing the local ad (this should be the time when the national ticker begins in your area). We'll use 5:00 AM for this example, but you can set it to any desired time for your locale. Change the time in this EVENT TIME box by placing the cursor over the hours, minutes, seconds, or AM/PM consecutively. Use the up and down arrows that are part of this box to change the event time to your desired time. Ensure your AM/PM is set correctly!



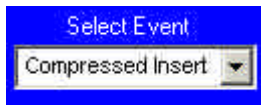
Once you have the proper “on” time set, move to the EVENT MONTH box. For normal ticker operations, you’ll want to set this at EVERY MONTH by pressing the down arrow on this box, and clicking on EVERY MONTH. You want this setting of course, because the ticker happens every month.



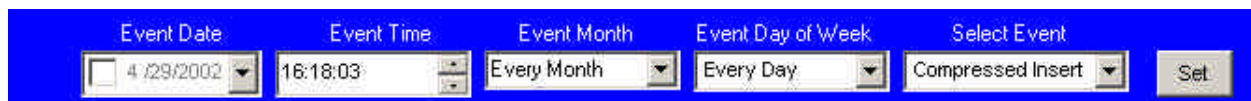
Next, move to the EVENT DAY OF THE WEEK box. Here, you’ll want to use the down arrow, and select WEEKDAYS ONLY. This selection is made because in the vast majority of instances, you will only want the local ads compressed during normal business days, and full screen on the weekends.



Now, move to the SELECT EVENT box. Since we are setting up the “on” condition, you will want to select Compressed Insert.



Review the white boxes at the top of the Event Controller--you have preset the Protector for the on conditions—from left to right, you should see that the EVENT DATE box is de-selected (no checkmark); the EVENT TIME box should contain the time at which you want local ad compression to begin; the EVENT MONTH box should read EVERY MONTH; the EVENT DAY OF THE WEEK box should display WEEKDAYS ONLY; and the SELECT EVENT box should read COMPRESSED INSERT.



If that is all correct, click on the SET button, just to the right of the white boxes we just set up.

You will now see a small form that asks you which event to set this information as. Select EVENT 1, and then click ENTER on this form.





The information you entered in the white boxes should now be transposed to the EVENT CONTROLLER EVENT 1 line. The numbered box to the left of EVENT 1 line should now be green (this indicates that the event is active, that you intend for the protector to run this command at the set time and day).

The light yellow boxes in EVENT 1 line should remain yellow with the exception of the DATE box, which should now be gray, and will read *Figure 18* not selected—indicating that we are not programming a specific date event, but an everyday event.



If all of this is correct, then you are ready to move on to programming the “safety” event.

Most of the data in the white boxes at the top of the screen will be useful for the off event, so, you’ll only have to adjust a couple of them.

EVENT DATE should still be de-selected—if not, de-select it (remove the checkmark).



EVENT TIME will have to change. Using the same method you used to set the “on” time, now set the “safety” time for 5 seconds after the first event (in our example, we use 5:00:05 AM).



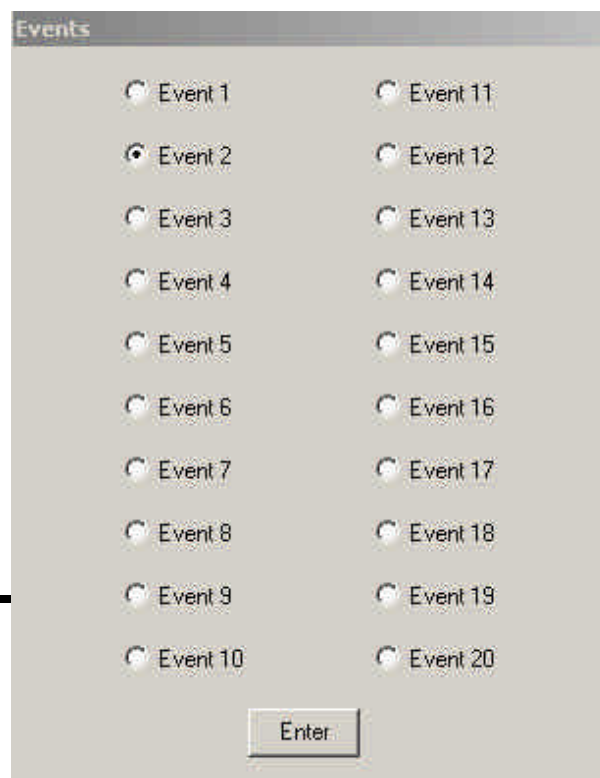
EVENT MONTH and EVENT DAY OF WEEK should remain the same as the “on” settings (EVERY MONTH and WEEKDAYS ONLY).



SELECTED EVENT needs to be changed. Select GPI 1 AD INSERT for this box.



Click the SET button, to access the event enter screen. This time, select the event to enter as EVENT 2, and then click ENTER on this form.



Now, you should see two programmed lines on your EVENT CONTROLLER.

1	Not Used	5:00:00 AM	Every Month	Weekdays Only	Compressed Insert	
2	Not Used	5:00:05 AM	Every Month	Weekdays Only	GPI 1 Ad Insert	

If all of this is correct, then you are ready to move on to programming the “off-hours” event.

Most of the data in the white boxes at the top of the screen will be useful for the off-hours event, so, you’ll only have to adjust a couple of them.

EVENT DATE should still be de-selected—if not, de-select it (remove the checkmark).



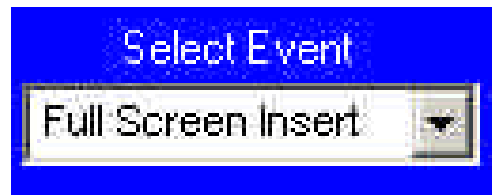
EVENT TIME will have to change. Using the same method you used to set the “on” time, now set the “off” time (in our example, we use 7:00 PM—note, the Protector can display in standard time or 24-hour time, depending upon the settings of your system).



EVENT MONTH and EVENT DAY OF WEEK should remain the same as the “on” settings (EVERY MONTH and WEEKDAYS ONLY).



SELECTED EVENT needs to be changed. Select FULL SCREEN INSERT for this box.



Click the SET button, to access the event enter screen. This time, select the event to enter as EVENT 3, and then click ENTER on this form.

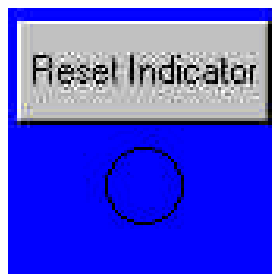


Now, you should see three programmed lines on your EVENT CONTROLLER.

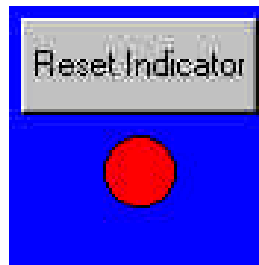
1	Not Used	5:00:00 AM	Every Month	Weekdays Only	Compressed Insert
2	Not Used	5:00:05 AM	Every Month	Weekdays Only	GPI 1 Ad Insert
3	Not Used	7:00:00 PM	Every Month	Weekdays Only	Full Screen Insert

Is this all correct? If so, let's move on to see it work...if not, backtrack through the above steps and make the necessary corrections.

In the lower right corner of the EVENT CONTROLLER you'll see a small circle, and above it is a button labeled RESET INDICATOR (fig. 26).



This little circle is an aid for you to verify that the Protector can tell accurate time, and can communicate with the VP boards. Whenever an event occurs (the time and days you programmed) this circle will turn red. If the circle does not turn red, then we need to revisit our settings (days of week, months, AM/PM, etc...).



You can reset this circle to “unfilled” and use it to verify that the Protector has effectively triggered.

At the right edge of the Event Controller, you will see 20 gray rectangles, that are labeled as a column “LAST TRIGGERED”. These boxes will display a text indication of the last time the related event was triggered by the Event Controller.



The “real-world” check can be done by shorting the contact closure connection manually (simulating the contact closure out of the inserter device)...if the Protector is programmed in AD INSERT mode for the time and day you’re running the test, you should see a foreground video compress revealing a background video bottom 1/3 (a ticker).

Final note on the Event Controller...this form is the heart and soul of the timed operation of the Protector. The EVENT CONTROLLER CAN BE MINIMIZED, but not exited without exiting the entire program. IF YOU EXIT THE GUI, the PROTECTOR will continue to operate, but will not be able to change modes. Leave the software running!

Once you have everything set, and it are ready to move on, you can remove your setup monitor, your setup keyboard, and your setup mouse, and leave the Protector to do its job.

## SPECIFICATIONS

<b>PHYSICAL</b>	
Dimensions	
Weight	
<b>POWER</b>	
Input	110 – 220 VAC Manual Switch Internal
<b>VIDEO PROCESSOR</b>	
Frequency Response	4.5MHz Luma, 5.5MHz Chroma minimum
Filtering	Notch, Comb
Raster Size (per Field)	720 pixels by 242 lines
Input Formats	Composite, Y/C
Output Formats	Composite, Y/C
GPI	2 GPI
<b>Microcomputer</b>	
CPU	Greater than 500 MHz
Buss	Greater than 66 MHz
RAM	Equal to or Greater than 64 Mb
Hard Drive	Greater than 10 Gb
PSU	250W

## NOTES