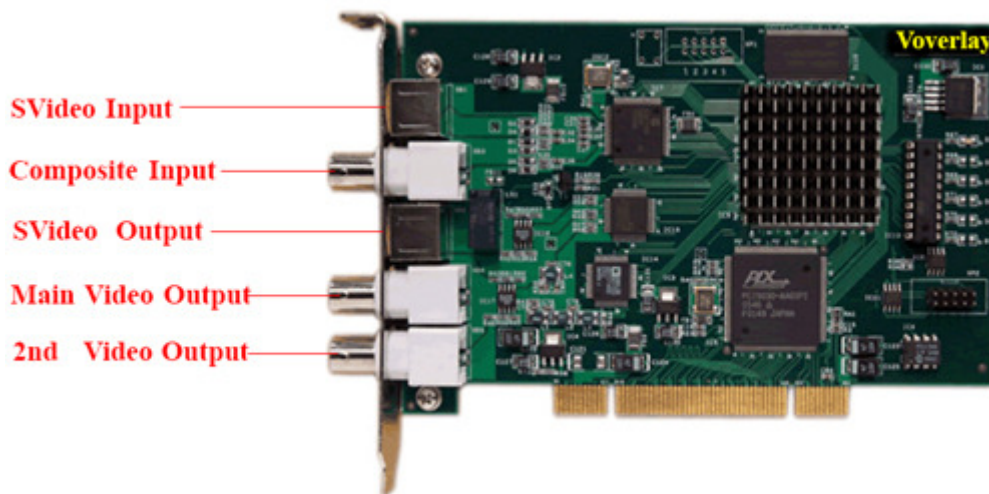# VOVERLAY
PCI Card for Realtime Text and Graphics Overlay on Video
User Manual
Version 1.2.1.0
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Table of Contents

1. Main Features & Functions:

VOVERLAY is a **Realtime Text & Graphics on Video Overlay Card** with many features & functions:

- **Realtime overlay superior-quality PC-generated text, graphics and video on incoming video signal**
- **Full-Alpha blending control on all colour pixels mixed with incoming video at full 720X576(480) resolution**
- **Instant on-board overlay memory read and write without any delay on outputting video signal**
- **Un-limited PC-generated text, graphics and video can be overlaid simultaneously on incoming video**
- **Use full Windows GDI power to generate un-limited vector & bitmap graphics overlaid on incoming video**
- **Output video with overlaid graphics data is forever synchronized with input video**
- **Multiple cards up to 32 can be run on the same PC controllable by the same software**
- **Full software control at application and SDK level on video brightness, contrast, hue and saturation**
- **PAL and NTSC video format are supported and software selectable**
- **SVideo and Composite Video Input and Output, software selectable**
- **SVideo output, main and secondary Composite video output ports**
- **Secondary video output port can be separately configured independent of the main video output**
- **Output ports can be software configured to display video only, video plus overlay, overlay only**
- **Built-in TBC function always provides clear video output even from old tapes and noisy incoming signal**
- **Automatic Video Pass through on Power-Off**
- **Overlay Text String support for different font colour, font name, font size**
- **Overlay Graphics Files support for BMP, JPEG, GIF, PND, TIFF and Targa format**
- **Apply single or a range of "Transparency Colours" on Graphics Files to realize "Blue-Screen" effect**
- **Overlay Timer support for time, date, mille-second, frame number**
- **Overlay Card Operation support for instant screen clear, area alpha change, port I/O selection, etc.**
- **Overlay Windows support for constantly displaying any window's content to external TV & VCR**
- **Constant Alpha Channel Value Change under software control for timing and increment**
- **Horizontal and Vertical Moving Text & Graphics Overlay with software configurable steps and times**
- **Instant Overlay Display to external TV from any combination of overlay items constructed & loaded**
- **Save and Open Overlay Item List Files for repeated use of complicated overlay schemes and patterns**
- **Full SDK for Software Development inc. full C++ & VB source codes of fully functioning application software**

2. Package Contents:

VOVERLAY PCI Card version b (to be used with this version application software, SDK and driver)
One Installation CD
One User Manual
One SDK Manual

3. Minimum System Requirement

Hardware: Pentium4 CPU based PC, one empty PCI slot.

Software: Microsoft Windows XP, Windows Vista or Windows 7, DirectX 9 and above. Please note although running the main **Voverlay.exe** application does not require it, running the sample **VoverlayVB.exe** application will need the Microsoft .Net Framework 3.5 and above to be installed.

4. Hardware Installation

Un-plug the PC's power cable, open PC case, locate a free PCI slot, plug in the **VOVERLAY** card and screw it firmly to the back-panel.

Plug in video cables between the external video input/output devices and **VOVERLAY**. To view the incoming video mixed with overlaid text/graphics, eternal TV monitors need to be connected to the output sockets of the **VOVERLAY** card. Alternatively, video capture cards like **Inventa MPEGIO/USBOSDM2** etc. can be used to accept video output signals from **VOVERLAY** to view the video with overlaid text/graphics.

5. Software Installation

Software installation has two steps: device driver software installation and application software installation.

5.1 After hardware installation, the MS Windows will inform that new hardware is found:
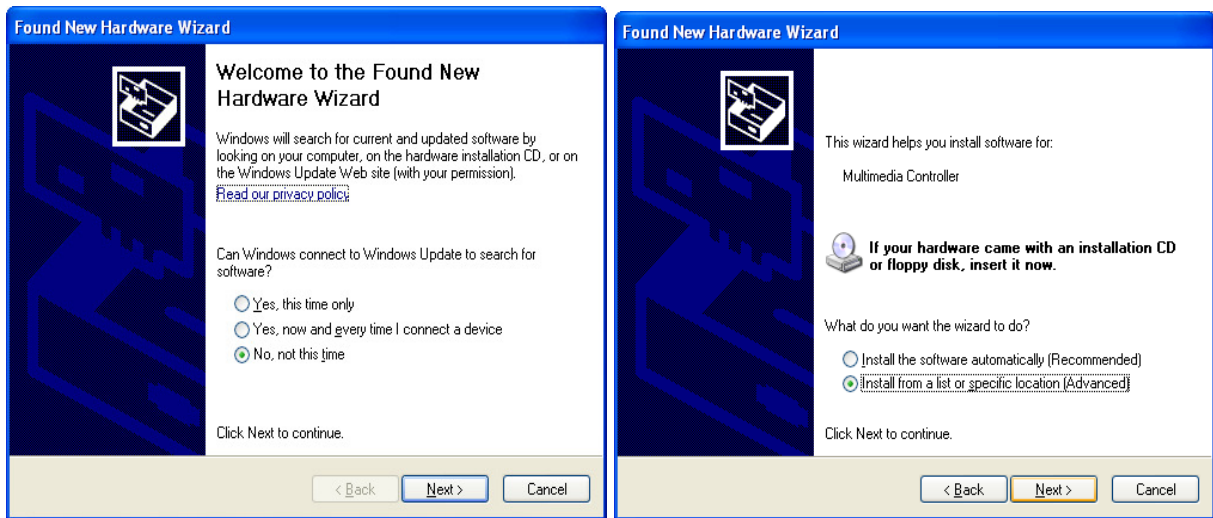

5.2 Put the **Voverlay** installation CD into PC's CD/DVD drive, click "Next" button, let Windows search for device driver specifically from the "**driver**" folder on the installation CD Disk. During the driver installation, ignore those warnings claiming the device driver "has not passed Windows Logo testing…" etc, press "Continue Anyway" to keep going, until the driver is installed, then check the Windows' "ControlPanel" to make sure the
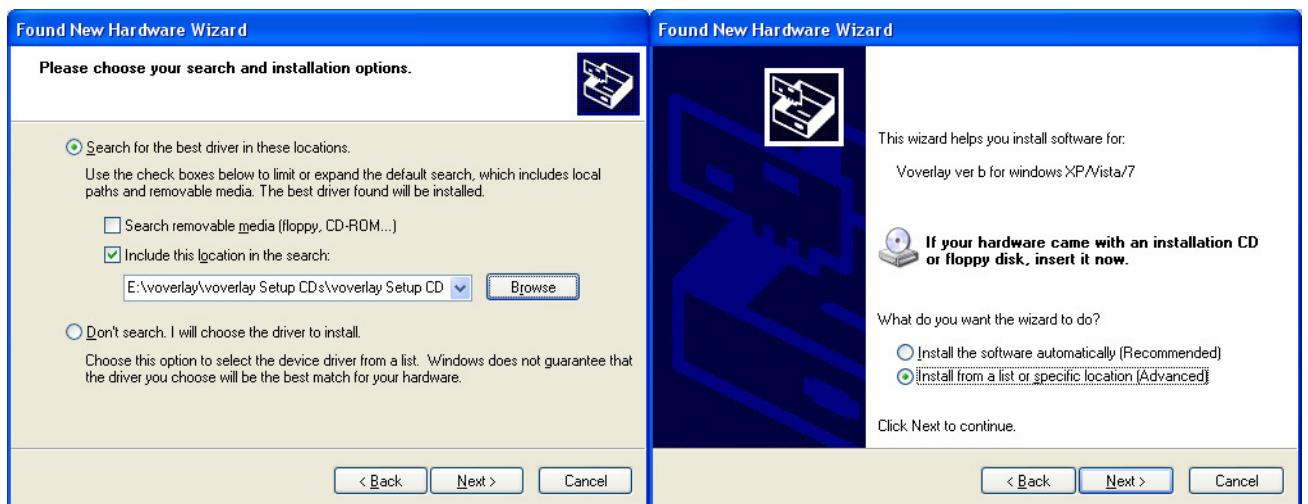
 "System->Hardware->DeviceManager ->Sound, video and game controllers" category has a device driver line "**Voverlay ver b for windows XP/Vista/7**" listed for every **Voverlay** card there without question mark or exclamation mark:
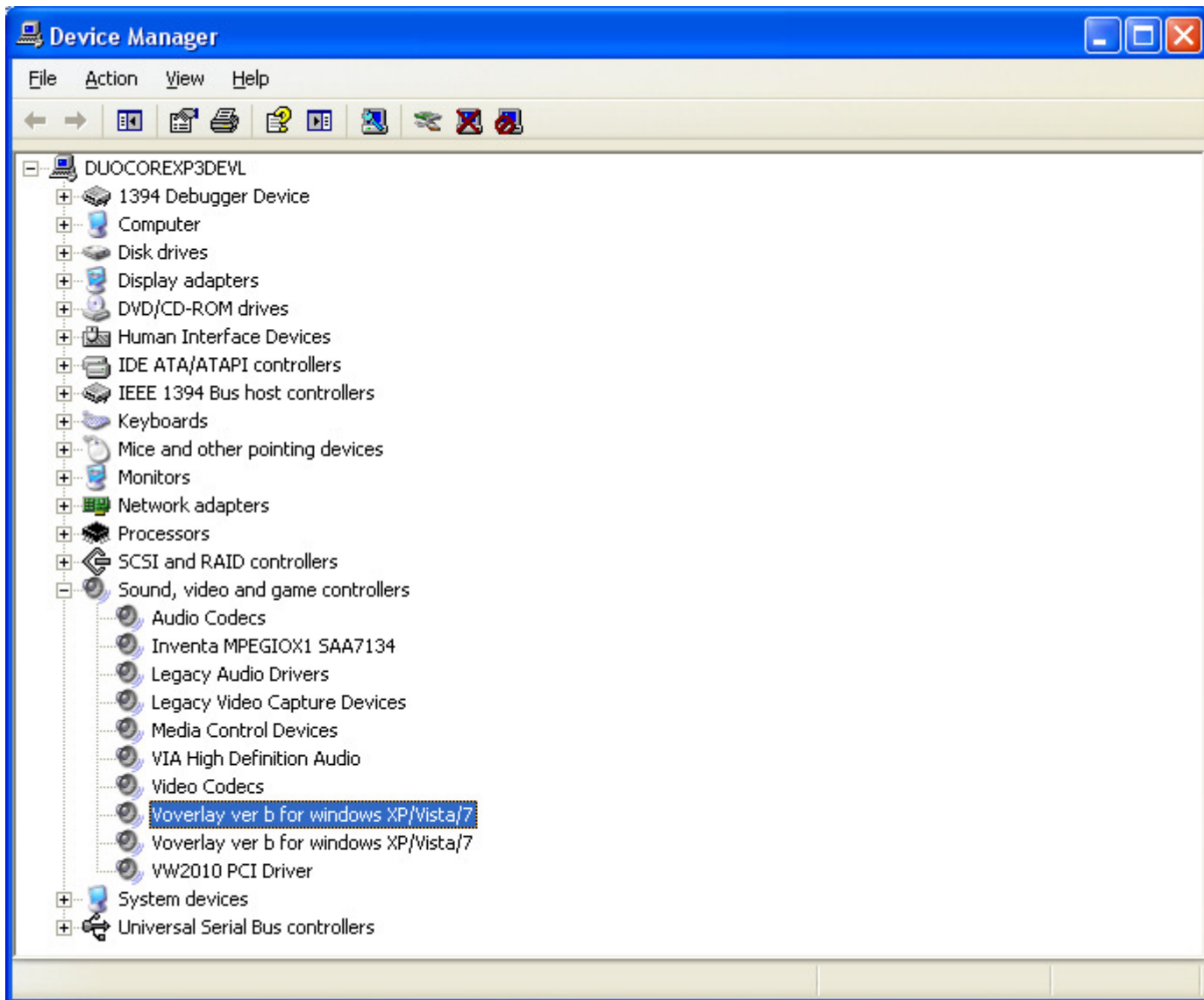
When device driver has been installed properly, Windows will have a pop-up message box at the
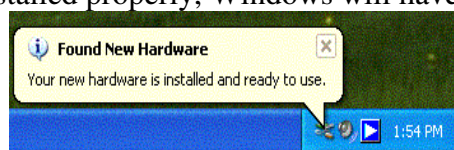

lower right corner of the screen:

Please note: after re-installing MS Windows on a PC with VOVERLAY card remaining seated in PCI slot, one "Multimedia Controller/PCI Device" or similar line will appear in the Windows' ControlPannel->System->Hardware->DeviceManager window, preceded by a yellow question mark or exclamation mark, since Windows will not(cannot) install the device driver software. This item will need "update driver" operation(right-mouse click then select "Update driver…") to install the proper driver software from the "driver" folder on the Setup CD, before the VOVERLAY card and application software can be used properly. Alternatively, you can delete this question-mark/exclamation-mark preceded item(right-mouse click them then select "Uninstall"), highlight the PC's name in the DeviceManager window then select "Scan for Hardware Changes":
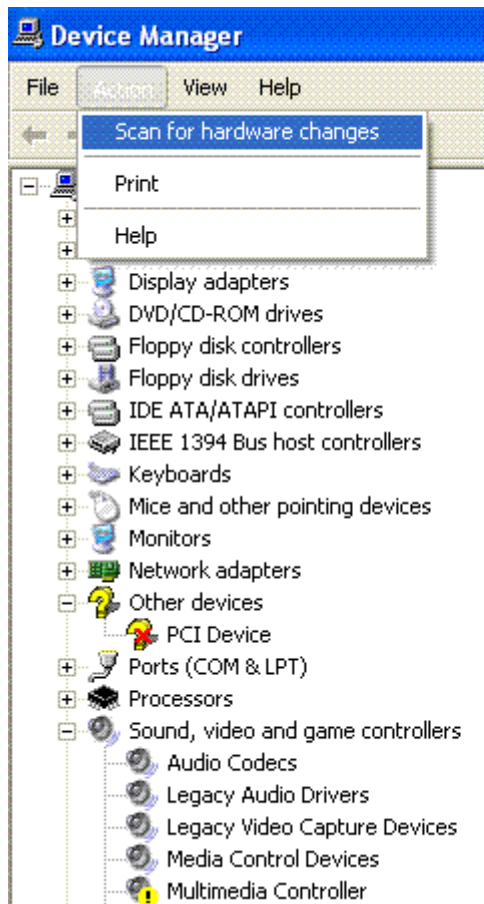
then follow the same steps as at the start of this section to install the device driver.

5.3 To install the application software, click "**Next"** on the "VOVERLAY Setup Wizard" window ---
which normally starts up automatically after inserting the set-up CD, or will appear after double-
clicking the "**Setup.exe**" software on the set-up CD:

,
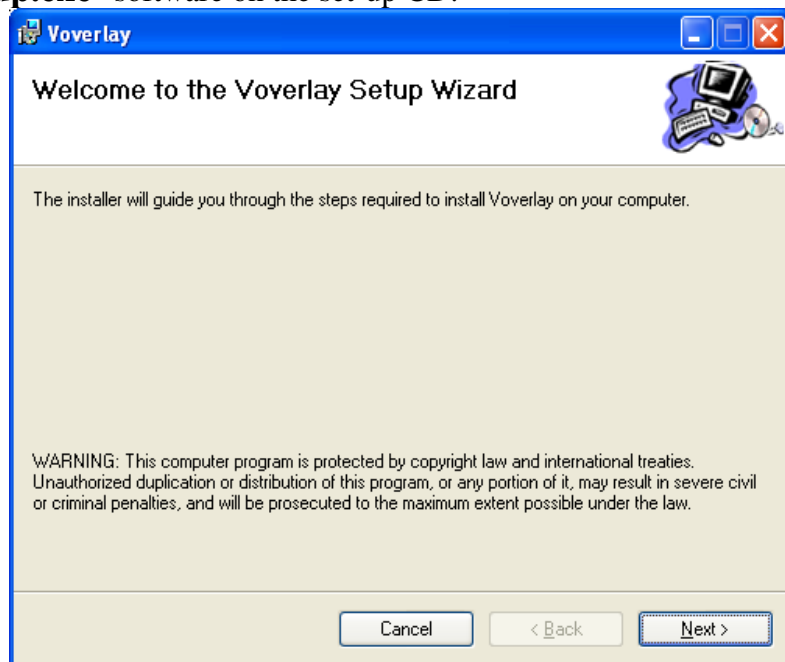
then follow the on-screen instructions to install the application software.

5.4 To remove the installed software, run "VoverlayUninstall.exe" from the **Voverlay** program group.

6. Starting the Software

After a successful application software installation, a "**VOVERLAY.EXE**" shortcut icon will appear on the Windows' desktop. Mouse double-clicking this icon will start the software. The software can also be started from Window's "Start->Program Files->Inventa->Voverlay" group.
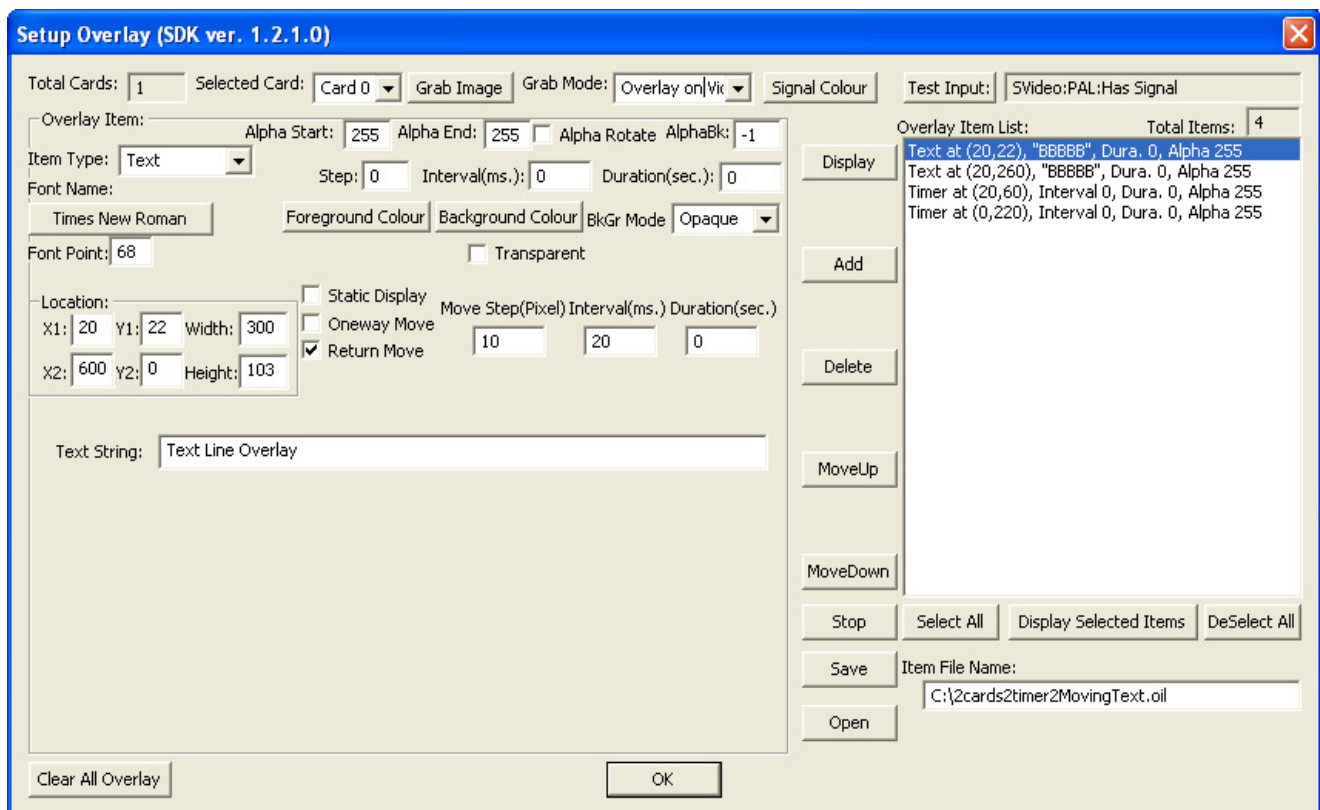
7. Operate Voverlay Card
Once started, **VOVELAY** will display its main window:
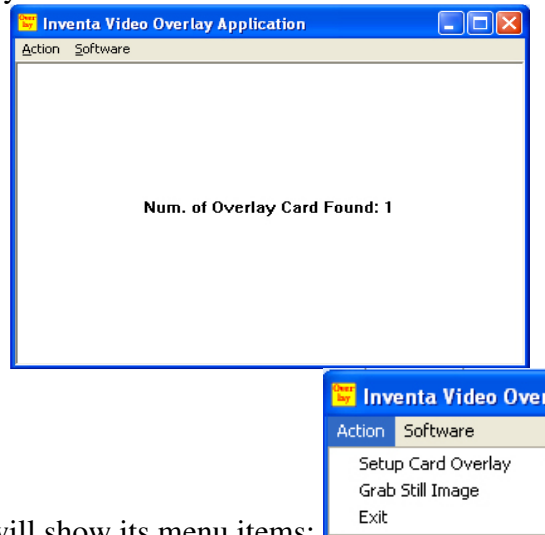
Mouse-clicking the "**Action**" menu will show its menu items:

Selecting the "**Setup Card Overlay**" item will start the "Setup Overlay" window, where all the major operations for **VOVERLAY** card can be accomplished:

The Setup Window arranges its functions in several main areas: on the top line is the **Generic Operation** area, below it on the left is the **Overlay Items** area, on the right is the **Overlay Item List Box**, and in between the **Item** and **Item List Box** areas there are **Operation Buttons** that can be used for **Overlay Items** and **Item List**, such as **Display** Current Item, **Add** Item to Item List, **Save** and **Open** Item List File, etc.

7.1 Generic Operations

The top line of the Setup Overlay Window lists several generic operations, inc. overlay card selection(when there are multiple cards installed), still image grabbing which will display the grabbed video and/or overlay image in the application's main window, colour selection, and input signal testing operation.
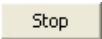
7.2. Overlay Items

Below the Generic Operation area, on the left is the Overlay Item selection area. Overlay Items have **Item Types** such as Text, Timer, Graphics File, Card Operation, and Window --- theses are used to differentiate the functions and features each type of item can operate. Overlay Item Types are selected through the "**Item**
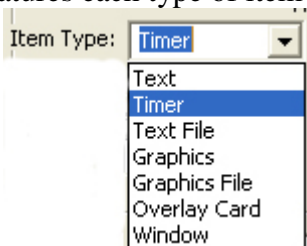

Type" Combo box: .... Each time a different Item Type is selected, specific buttons and combox etc controls relevant to that Item Type will be displayed.

Pressing the "**Display**" button [Display] between the "**Overlay Item**" and "**Overlay Item List**" areas will display the currently selected Overlay Item's contents onto the video output ports immediately: e.g., when "**Clear All**" Card Operation Item [Card Operation: Clear All] is selected, pressing "**Display**" button will clear all overlay contents on all the video output ports.

Pressing the "**Stop**" button [Stop] will stop the displaying.

Clicking the "**Clear All Overlay**" button [Clear All Overlay] will erase all the displayed overlays on the current **Voverlay** card**.**

7.2.1 Text Overlay Item
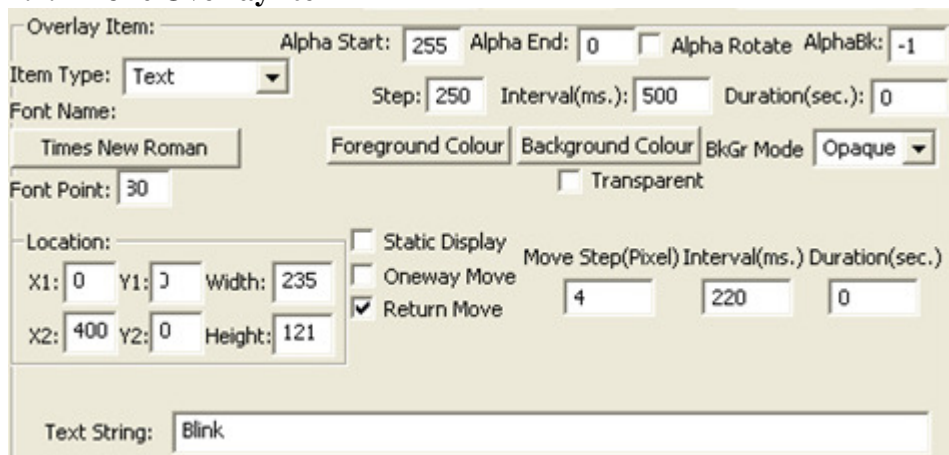
Text Overlay Items allow static or moving text to be displayed over incoming video. Many parameters, inc. alpha blending, colour, font, transparency, location, duration, etc can be selected and changed. Appropriately combining these parameters, text with numerous different displaying-features can be output on external TV

overlaid over the incoming video, or by themselves without incoming video. For example, the settings in the previous screenshot will create a blinking text "Blink" blinking every half a second, while slowly moving

across the top of the video screen: . The following settings (note "**AlphaBk**" is set to 126)

will create a word "Blink" with half-transparent background colour:

As shown in the screenshot, the **Text Overlay Item** has two time-changing parameter sets:

(1) **Alpha Start & Alpha End Change:** Setting a these parameters to different values and giving some values to the Alpha **Step**, **Interval** parameters will cause the displayed text to have a changing visibility every "**Interval**" time in "**Step**" increment/decrement, such as gradually fading in or fading out. The "**Alpha Rotate**" controls when the changing "**Alpha Start**" value reaches the "**Alpha End**", if it will gradually change back from the "**Alpha End**" back to "**Alpha Start**" in "**Step**" increment/decrement, or it will abruptly jump back to the original "**Alpha Start**" value. The Alpha "**Duration**" (below **AlphaBk** field) controls how long this **Alpha Start<->Alpha End** visibility change will last: a zero duration means the changes will last forever until being cancelled specifically.

(2) **X/Y Location Change:** Setting the **(X1, Y1)** and **(X2, Y2)** values different will cause the text to move horizontally or vertically, in the increment of "**Move Step**" value, every "**Interval**" time, for "**Duration**" period (zero **Duration** means moving forever until being manually stopped):

The "**Oneway Move**" and "**Return Move**" check boxes control if the movement will repeat when reaching the (X2, Y2) position.

As shown in the previous example, the "**AlphaBk**" value controls the visibility of the text's surrounding background colour when the "**BkMode**" is **Opaque** and the **Transparent** CheckBox is cleared:

, .

The text **Font Name, Font Point, Foreground Colour, Background Colour, Background Mode, Transparency** can all be changed by using the corresponding buttons.

Note to create those Transparent Background text as shown above, the **"Background Colour"** must be set to **Black** (RGB = 0,0,0), the **BkGr Mode** must be "**Opaque**", and the "**Transparent**" checkbox must be cleared. If the **Background Colour** is non-black then the resulting text will have a background of

Background Colour such as this (**Background Colour** is green)**:**

7.2.2 **Timer** Overlay Item

Timer overlay item has similar parameters as **Text** overlay items, except the displayed text is always the current time (and date if "**Display Date**" checkbox is checked). The setting in the screen shot below displays a one-second interval timer at (20, 0) position with transparent background(Background Colour must be Black) that will run forever until being stopped manually (since "**Duration**" is zero):

.
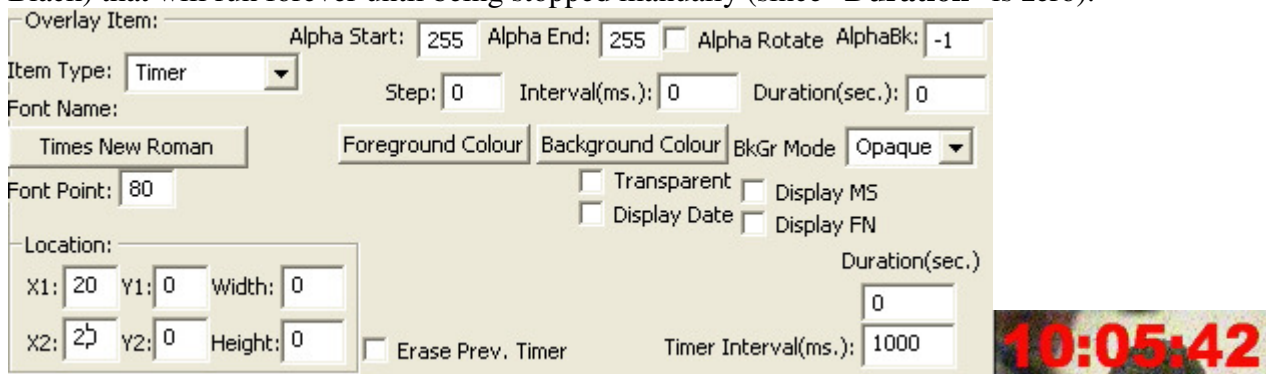
The "**Erase Prev. Timer**" checkbox controls if to clear the previously displayed timer (if any) when the current timer item is displayed. Note when a new **Timer** is defined and the "**Display**" button is clicked, any previously defined **Timer** will be automatically stopped since one **Voverlay** card can only display one **Timer** at any time.

Similar as the "**Display Date**" checkbox, the **"Display MS"** controls if the **Mille-Second** will be displayed, while the "**Display FN**" controls if the incoming video's **Frame Number** will be displayed.

The **Font** and **Alpha** parameters have the same effects for the **Timer Items** as for the **Text Item,** but the **Timer Item** will not move its X/Y location as the **Text Item**.

7.2.3 Graphics File Overlay Item
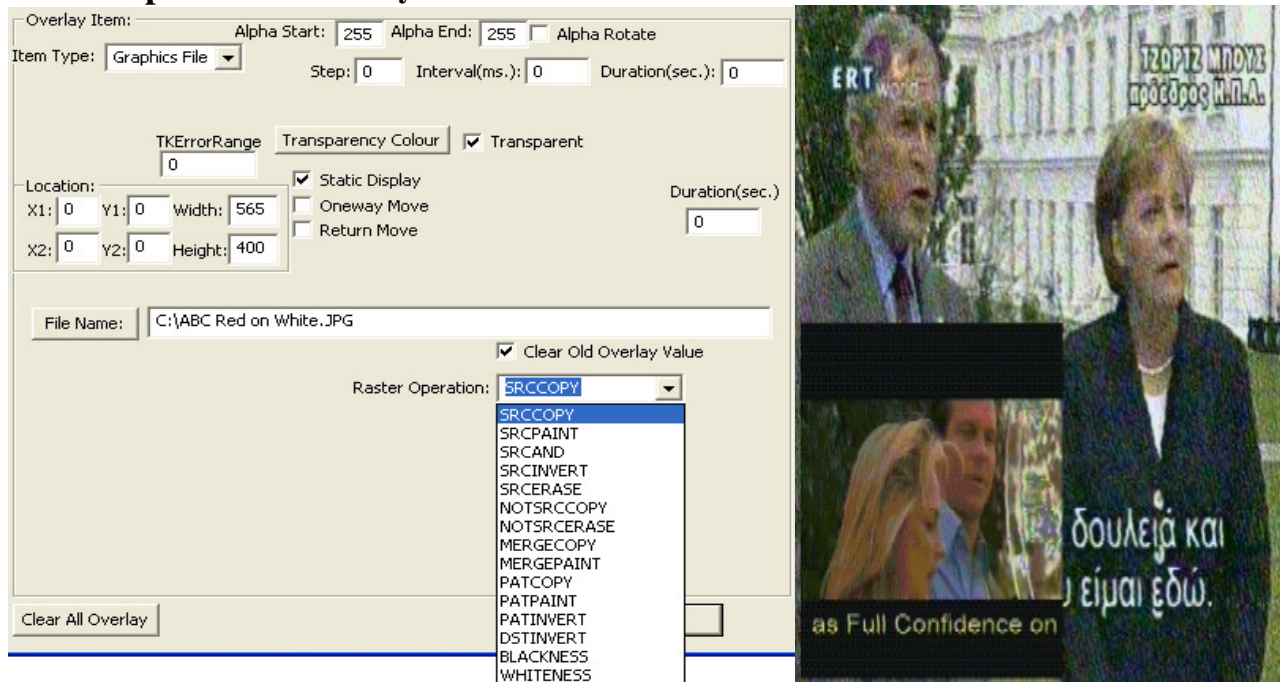
Graphics File Items allow graphics files to be displayed over incoming video or by themselves at the output video ports. Supported graphics file types are .BMP, .JPG, .GIF, .PNG, .TIF, and .TGA.

Apart from the file name selection, this item has several new parameters:

(1) **Transparency Colour**

When "**Transparent**" checkbox is ticked, the overlay process will not display the pixels from the graphics file whose colour RGB values and the "**Transparency Colour**" value have minimum difference, that is:

$$abs(Rp - Rt) + abs(Gp - Gt) + abs(Bp - Bt) \ <= \ \textbf{TKErrorRange};$$
where abs(X) is the absolute value of X,
Rp/Gp/Bp is the RGB value of the pixel on the graphics file,
Rt/Gt/Bt is the RGB value of the **TransparencyKey** Colour,
TKErrorRange is a value >= zero as supplied on the screen.

For example, when "**Transparent**" checkbox is ticked and the "**Transparency Colour**" set to "blue"
 (RGB= (0,0,255)), a graphics file with people in front of a blue background will be displayed only with the people over the incoming video, the blue background becomes invisible, achieving in a "blue-screen" effect.

(2) **TKErrorRange**

This value makes pixels on the graphics file whose colour values and the "**Transparency Colour**" value have minimum difference as indicated above to be invisible(exposing the underneath video content). Setting this value to be larger than zero will be useful when the area to be made invisible contains non-uniform colour, e.g., a white background contains pixels with colours close to but not exactly the pure white, as illustrated in the following example where the same overlay graphics file is applied on the same video but on the left **Voverlay** card with TKErrorRange =0, while on the right **Voverlay** card with TKErrorRange =220:

(3)**Clear Old Overlay Value**

This box is only meaningful when box "**Transparent**" is also ticked:

If **Clear Old Overlay Value** is ticked, then those pixels in the graphics file whose colour values and the "**Transparency Colour**" have the minimum difference (as described in the "**Transparency Colour**" above) will become totally transparent, i.e., the video underneath them will be exposed.

If this box is cleared, then those pixels in the graphics file whose colour values and the "**Transparency Colour**" have minimum difference as described in the "**Transparency Colour**" above will combine (logical or) their old alpha value with the new alpha value on screen, so that if the resulting alpha is nonzero then some degree of overlay will appear on top of the video – this is useful for example to display an half-transparent background exposing some of the video underneath. The following are examples using the same graphics file with red text **ABCD** in front of a white background, and **Transparency Colour** is white, **Alpha Start / Alpha End** are 128:

(1)**Transparent** and **Clear Old Overlay Value** Ticked   (2) **Transparent** Ticked, **Clear Old Overlay Value** Cleared

(4) **Raster Operation**

This controls how the pixels of the graphics file will be combined with the overlay pixels already being displayed on the same position by previous Overlay operations(if there is any): SRCCOPY means the new pixels completely replace the original pixel, SRCAND means the new pixels do logical AND with the original pixels, the BLACKNESS means display black at the positions, etc.

Alpha change, **X/Y** change, duration, etc parameters have the same meaning as in **Text** and **Timer** items.

Graphics File Item has no "**AlphaBk**" parameter since it has not background colour.

Each time a non-targa(not .tga) graphics file is loaded, its width and height are automatically loaded into the

"Width" and "Height" fields: . When displaying a graphics file item, using these width and height, or making these two fields all zeroes, will put the graphics exactly as their original width and height (in pixels) onto the external TV. If supplying a width or height different from the graphics file's original width and height, the displayed graphics will be shrunk or expanded accordingly. Note the current shrunk mechanism does

not guarantee a perfect shrunk image with proper colour, so when displaying graphics files with dimension larger than the maximum screen resolution (720 X 576-Pixel for PAL, 720 X 480-Pixel for NTSC), using an external graphics software such as MS Paint or Adobe PhotoShop to shrink them first is recommended.

Targa graphics files (.tga) will not have their width and height automatically calculated and they can not be shrunk or expanded.

7.2.4 **Card Operation** Overlay Item
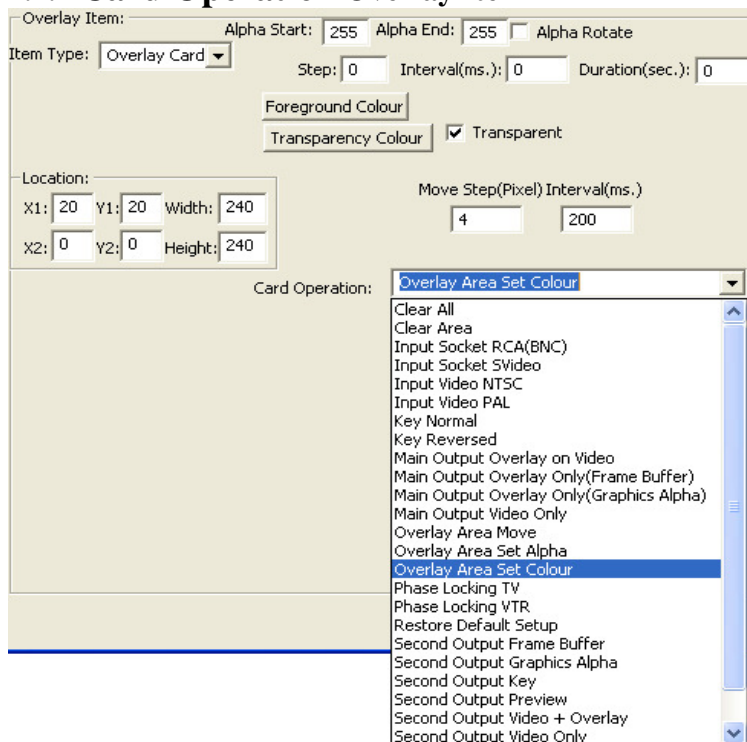
Card Operation Overlay Item operates the **Voverlay** card directly, normally without involving any PC-generated graphics data, except in the **"Overlay Area Set Colour"** operation: if the "**Transparent**" checkbox is not ticked, the **Foreground Colour** will be used to fill the area's pixels, while if the **Transparent** checkbox is ticked, then the **Foreground Colour** will be used to fill the area's pixels where the current colours are different from the **Transparency Colour**. Also in this "**Overlay Area Set Colour** " card operation, if the **Transparent** is ticked, and the **Move Step** and **Interval** fields have values, the area's alpha and colour value setting will take place gradually: if the **MoveStep** has a positive value, the gradual alpha and colour change will happen from left to right within the specified area (X1, Y1) (X1+Width, Y1+Height), in "**MoveStep**" pixels every "**Interval**" mille-second, while if the **MoveStep** has a negative value, the gradual alpha and colour change will take place from top towards the bottom within the specified area(X1, Y1) (X1+Width, Y1+Height)), in "**MoveStep**" pixels every "**Interval**" mille-second.

7.2.5 Window Overlay Item

Window Overlay Item allows any window on the desktop top to be displayed at video output ports, in front of the incoming video or by itself. This is useful to create a "Video in Video" result on TV, or display a live animation to external TV, etc.

The window selection is through a window's handle, or its class name, title, or its root window's class name and title. Pressing the "**Get A Window Handle**" button [Get A Window Handle] once, then move the mouse cursor(now changed to I-Beam shape) to any window and single click that window, that clicked window's handle, class name, title and root window's class name, title values will be copied into the corresponding fields on the **Setup Overlay**

Window: .

Clicking the "**Client Area O**nly" checkbox means only displaying the selected window client area's contents. Clicking the "**Erase on Exit**" checkbox means the window's display will be cleared when the display duration expires or the display is manually stopped.

The "**Pause Time**" means how long the executing thread will pause in between displaying consecutive frames of the selected window. For a live video/animation displaying window, set this time to 40~80 mille-seconds will give good smooth moving result on the output video ports.

Click the "**Window Content Static**" if the content of the window is not changing constantly.

Click the "**Transparent**" check box and select a colour from the "**Transparency Colour**" button initiated colour dialog, if you wish to make some portion of the window transparent (invisible), e.g. making the blue background to disappear on the live video.

Click the "**Clear Old Overlay Value**" to make the "**Transparency**" effect clean without shivering pixels flying around. This box has the same significance as explained in the "**Graphics File Overlay Item**" section, and it is only meaningful when the "**Transparent**" box is ticked.

7.3 Overlay Item List

The "**Overlay Item List**" is for holding multiple **Overlay Items**, so that they can be displayed simultaneously on external TV, or they can be saved as files for later repeated use. Pressing the "**Add**", or "**Delete**" button in the middle of the screen will add or delete items into or from the **Overlay Item List** box, while with one item selected in the list box, pressing "**MoveUp**" or "**MoveDown**" button will change the selected item's position in the list.

When some items have been selected in the Item List box, pressing the "**Display Selected Items**" button will display these items' contents on the video output ports, in the order of their positions in the list box:
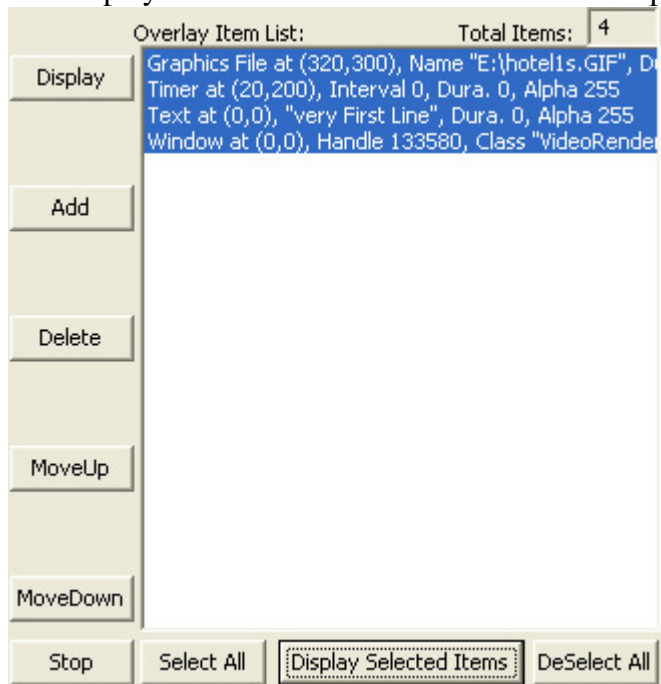
Pressing the "**Stop**" button will stop the displaying.

The "**Save**" and "**Open**" buttons are used to save the items inside the item list box (if any) to files, and to load a file's contents back into the **Item List Box** (when loading from an item list file, items already in the list box will be cleared).

7.4 Using Multiple Voverlay Cards

To operate multiple (2~32) **Voverlay** cards on the same PC, select each card's number from the **"Selected Card:"** Combo box (first card is number 0), then apply any operation on this card.

When using timer-based overlay items such as **Timer** or moving text, manual start of an item will automatically stop other timer-based items previously defined even on another **Voverlay** card. For example, whenever a "**Timer**" Overlay Item is started on the currently selected card, the previously applied **Timer** item on another **Voverlay** card will be automatically stopped. To make multiple cards all displaying their own **Timer** Overlay Items simultaneously, the **Overlay Item List** needs to be used: define a **Timer** for each individual **Voverlay** card then click the "**Add**" button to add this **Timer** into the **Overlay Item List** ---- when all timers for all cards are added to the **Overlay Item List,** click the "**Select All**" button below the Overlay Item List ListBox, then click "**Display Selected Items**" button next to it, all **Voverlay** cards with **Timer** defined will start displaying overlaid timer simultaneously.

8. Support
Technical support is at support@inventa.com.au.

9. Source Code
The **Voverlay.exe** software is supplied with full C++ source code together with the **Voverlay** card's SDK. An sample VisualBasic application **VoverlayVB.exe** is also supplied with full source code: both applications with source codes and their Microsoft VisualStudio project files are under the "**src**" folder on the Setup CD. Please note Microsoft .Net Framework 3.5 and above is required to run the VoverlayVB.exe.