Virtual Set 2000

Environment Builder
for Virtual Studio Sets Control

HotActions User's Guide

Revision 1.07

Darim Vision Co., Ltd.

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1 Introduction

Thank you for purchasing our product!

Virtual Set 2000 (*VS2000*) is a real-time, 3D computer graphics system especially developed for low budget studio productions. The *VS2000* is a unique tool for creating *Virtual Sets* and overlaying 3D computer graphics and live video. It is a combination of hardware and software dedicated to specialized TV production graphics for use with live video.

The hardware is a rack mountable box running under Windows with specialized boards for rendering the 3D graphics. There is also a rack mountable switching box for connecting the system to its various components as well as external devices.

HotActions software comes pre-installed with *VS2000*. This is the environment for creation of 3D scenery/sets and their interaction with the live video (operation).

There are four manuals which accompany *VS2000*. They are:

- **HotActions User's Guide** – Overview and Tutorial.
- **Video and Sound Settings Guide** – Detailed technical information on setting up system.
- **3D Scene Creation Guide** – Detailed information for creating rendered scenery and sets.
- **Script Commands Guide** – Detailed information for creating scripts for unattended use along with a command glossary and script examples.

Your system comes completely configured and ready for use. No installation procedures are required other than connecting the components via their appropriate cables. This document explains the use and functions of this unique set of tools for television production.

Version (1.07) of this document corresponds to version 1.35 of *HotActions* software for *VS2000*.

Television production with *VS2000* can be divided into two basic processes: preliminary work and actually camera shootings during ***LiveAction Mode***. Typical tasks involved with television show production using *VS2000* include:

- Preparation of scenario and selection of necessary videos and audio materials, decorations and etc.
- Creation and export of a 3d-scene, or a set of scenes (including geometry, animation of objects and virtual cameras and etc) with the help of the *3D Studio Max* program. Familiarity with contents of all manuals especially for 3d-scenes creation is recommended.
- Creation of the project in *HotActions*, using ready 3d-scenes. The focus of this document is devoted to the description of *HotActions*.
- Creation of the interface elements for control of studio in ***LiveAction Mode*** of *HotActions*. For example, animation of objects or the virtual cameras, executed by pressing assigned buttons or hot-keys. For this purpose special *HotActions* scripts are used. *HotActions* itself is an environmental builder and interactive control set which allows flexible configuration. Sections following 3.1 are devoted to the description of flexible configuration.
- Tuning of parameters of input and output video and a sound using *HotActions* (as described in separate document). Parameters of output video, such as the television standard (PAL or NTSC) and type of an output signal should be correctly adjusted by each user. Input parameters should be adusted to the operating conditions of studio. As a rule, parameters of output video are not required to be changed. Adjustment of parameters of input video is usually required after any change of a configuration of the external equipment. And parameters of chroma keying (rear-projection) may need adjustments, for example, if illumination in studio has changed.
- Once ready projects of input and output video are adjusted it is possible to begin execution of the planned scenario. Shootings are made in the ***LiveAction Mode*** of *HotActions*. Any necessary adjustments to actions can be done directly during shooting either as a change of parameters carried out automatically (as a script sequence), or interactively under the control of the operator in ***LiveAction Mode.***

Chapter 2 briefly describes a typical working interaction with the system along with the data necessary for starting the system and creation of first results with the system. The configuration of studio *VS2000* with analog video is also described.

Special features and corresponding adjustments of a configuration are described to assist users with special circumstances.

The subsequent chapters contain information on all program components of the system, giving full description of interfaces and functionality of the current version of software.

Some typical problems and their solutions are examined in chapter 6 «Troubleshooting». We also recommend regularly visiting our WEB and FTP-sites where the latest versions of the software and the documentation, new information, user questions and responses are made available for your use.

2 Check Points for Start Up of Studio

This chapter describes setting up your *VS2000* and, in particular, acquaints you with the basics for working with *HotActions*. The subsequent chapters go into a greater detail description of this program. Separate documents are devoted to the description of adjustments to video and audio as well as 3D-scene generation and how to use the script language.

2.1 Connection of Studio Components and External Equipment

Before starting all of the components of studio should be properly connected. Detailed instructions are included with your *VS2000*. Section 7.1 of this document presents a simple configuration.

In particular make sure, that

- Output DVI connector of the graphic accelerator is connected with input DVI-connector of the *DVM* board, and
- *FD300* board (or boards) is/are connected by special cable to the switching panel (***Breakout Box***).

The passive switching panel is described in section 8. The signal from the switching panel connected to output *FD300* board usually goes to TV-monitor. Depending on configuration of studio and adjustments of output video this signal may be component (**YUV** or **RGB**), **S-Video**, or **Composite**. Sources of input video such as video cameras, video recorders also are connected to the panel.

The computer monitor, the keyboard and the mouse are connected as usual.

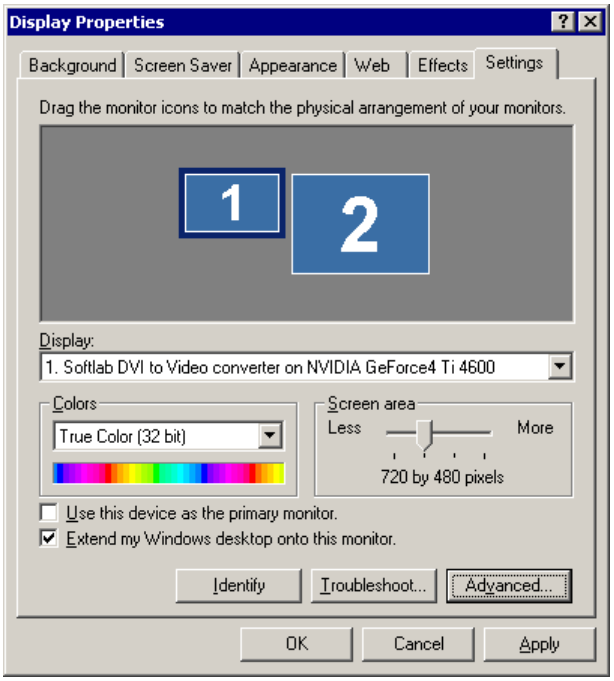
After checking correctness of connections turn on the system.

2.2 Check Windows Settings and start *HotActions*

If you are working with a one-monitor configuration please carefully read section 6.4.1.

In a configuration with two video adapters the video adapter with DVI output (***GeForce*** from ***NVIDIA***) must be connected and correctly adjusted for work with *VS2000*.

For this purpose it is necessary to start **Display Properties** dialog (figure on the right), using **Start->Settings->Control Panel-> Display Properties** or by clicking with right button on your desktop and choosing **Properties** from pop-up menu.



On **Settings** tab of this dialog tab, if you are using multiple monitors, click the monitor icon that represents the ***NVIDIA GeForce***. When working with two monitors, the check box next to **Extend my Windows desktop onto this monitor** needs to be checked.

True Color (32bit) should be selected in **Colors** list.

Under **Screen Area** the resolution should be set to **720 by 576 pixels** for the studio working in **PAL** or **720 by 480** for **NTSC**.

Check that **Digital Display** is chosen as the output device. For ***NVIDIA*** drivers of version 44.03 this can be done by the following steps:

1. Open **Display Properties** dialog. On the **Settings** tab, click **Advanced**.
2. Choose the tab with logo and name of the video adapter (**GeForce Ti 4600** at Figure 1). Then at the left menu choose **nView Display Mode** (Figure 1).
3. Click **Device Settings>>**, choose **Select Output Device** in pop-up menu and check up that **Digital Display** is set (Figure 1).

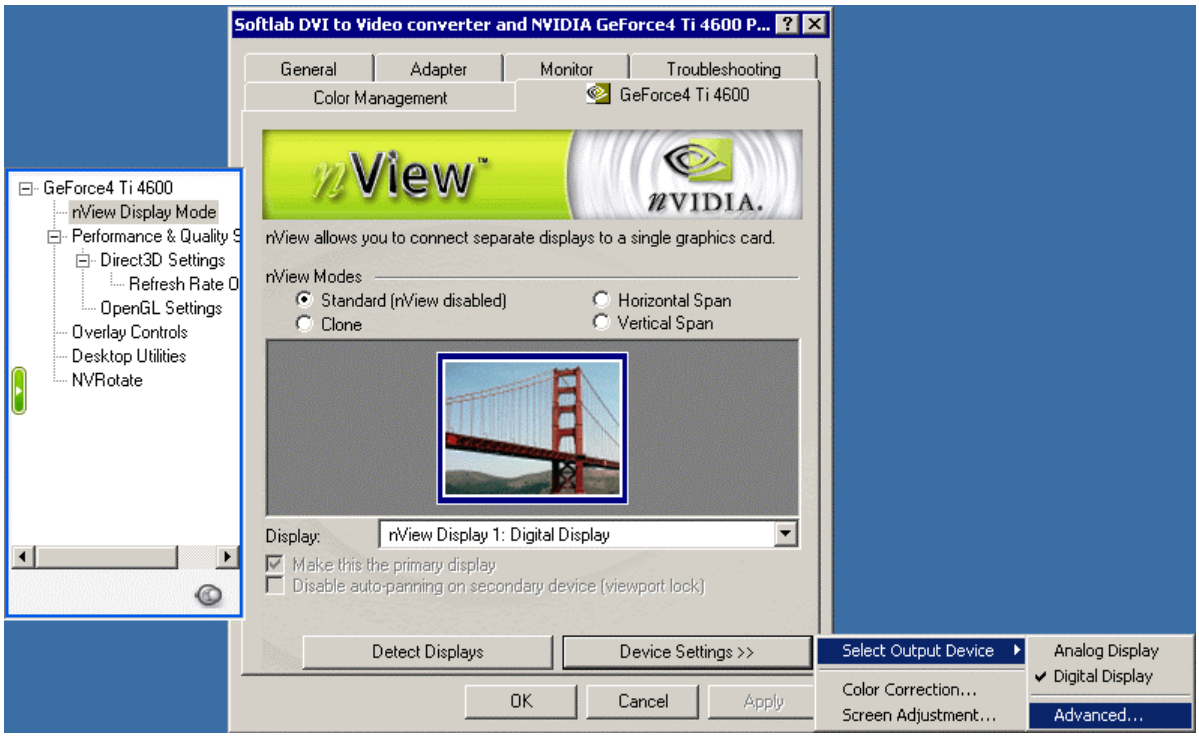


Figure 1. *nView Display Mode* dialog and its *Device Selection* pop-up menu

Before exiting the *Display Mode* dialog and its Device Selection pop-up menu on the left side of Figure 1, select the **Performance & Quality Settings** item. This will open up the dialog for shown in Figure 2 below.

The recommend settings are:

- ***Performance*** be set to **Aggressive.**
- ***Antialiasing*** should be set to either **4xS (Direct 3D Only) or Quincunx™**. There are five different levels of Antialiasing for the GeForce4 Ti4XXX series graphic accelerator cards.
- ***Anisotropic*** filtering is typically set at **4x** but 8x will work as well.
- ***Texture Sharpening*** should be **checked**.

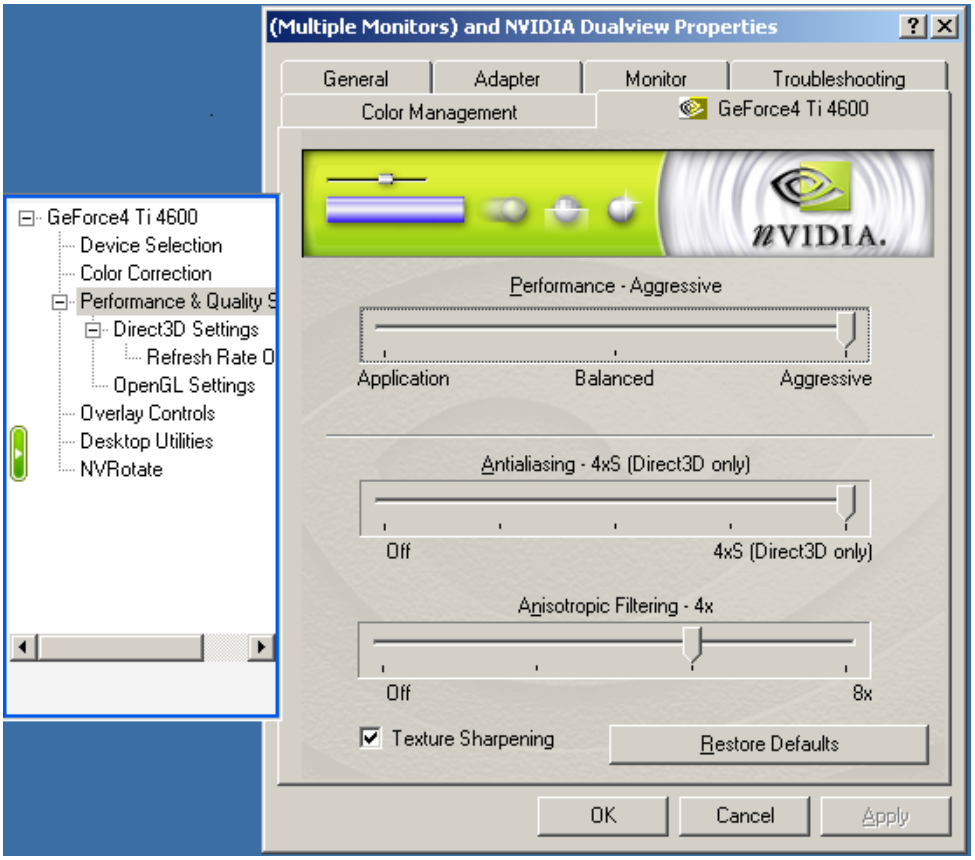


Figure 2. Performance & Quality Settings Dialog

To control *VS2000* you to must open *HotActions*. It can be opened from **Start** menu or by clicking on the *HotActions* icon on your *Windows* desktop (Figure 3).

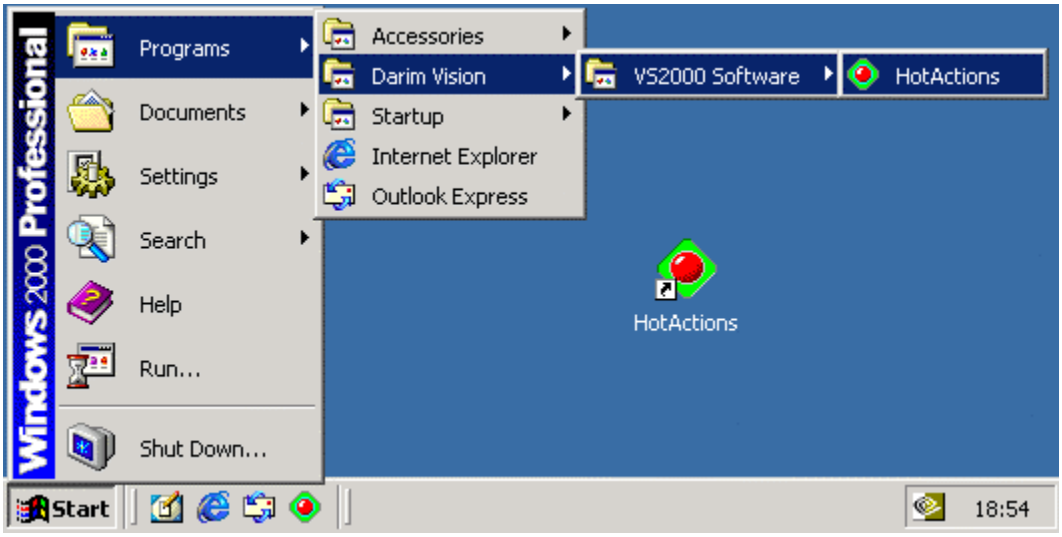


Figure 3. Start of *HotActions*

HotActions is the main window for management of *VS2000* and contains a window captioned *Render Output* for display of rendered video. After necessary adjustments to the output video, the *Render Output* should appear on the adjusted monitor. If window *Render Output* is not displayed on the desktop choose **Center Render Window** from menu **Window** of *HotActions*'s main window to display it in the center of the *HotActions*.

2.3 Video settings

To adjust video settings, open dialog *Options* by clicking the right-most button  on the toolbar of the *HotActions* main window (Figure 4) or by choosing **Options** from menu **Tools**. In *Options* dialog choose **Live Video** panel (Figure 5).

Figure 4. Toolbar of the *HotActions*'s main window.

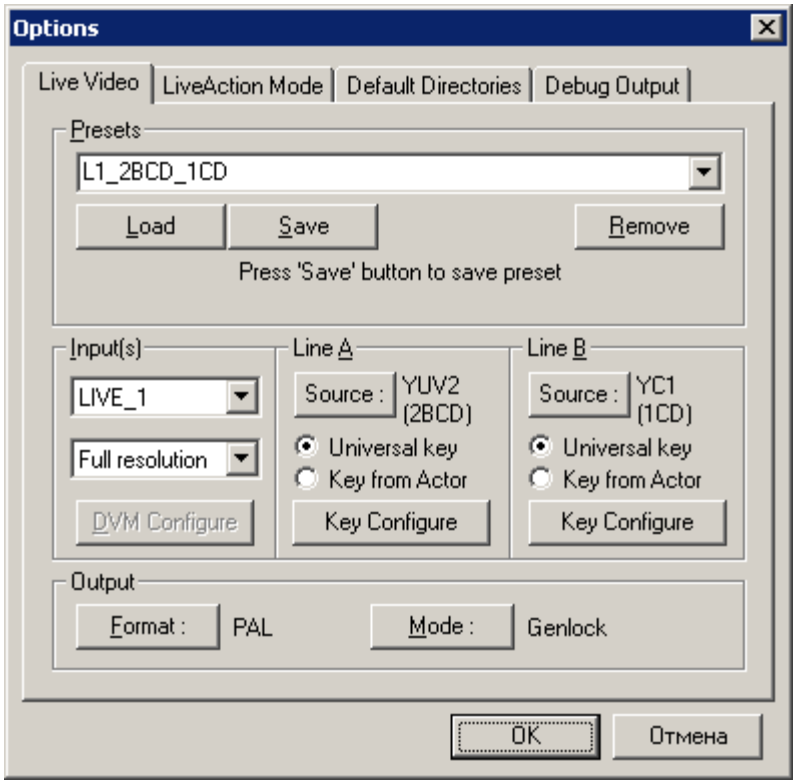


Figure 5. *Live Video* panel of *Options* dialog

Before starting a project it is necessary to adjust output video. The correct TV-format (Figure 5) should be specified on the panel **Live Video** near the button **Format** (**Output** controls group). If a different video **Format** is required, click on the **Format** button to access the *Format* dialog.

The **Mode** button opens *Output Mode Configure* dialog (Figure 6).

In controls group **Analog Video Output** of this dialog the type output signal (componential, S-Video or composite) is selected. By default in this list parameter **ColorBar YUV+CVBS** is selected for outputting test color bars.

From drop-down **Mode** list (Figure 6), please select the required mode. Select **Genlock** if your configuration provides **Genlock**-signal. In the minimal configuration mode **No Genlock** will be selected.

In case of **Genlock** system set type of synchronization in **Genlock Internal Video** list by choosing **Line A** for synchronization with video signal of the board's first channel.

*It strongly recommended to choose synchronization to the first (**Line A**) or to the second (**Line B**) of the used video sources.*

For the first start of the system we recommend to leave other adjustments at their default settings.

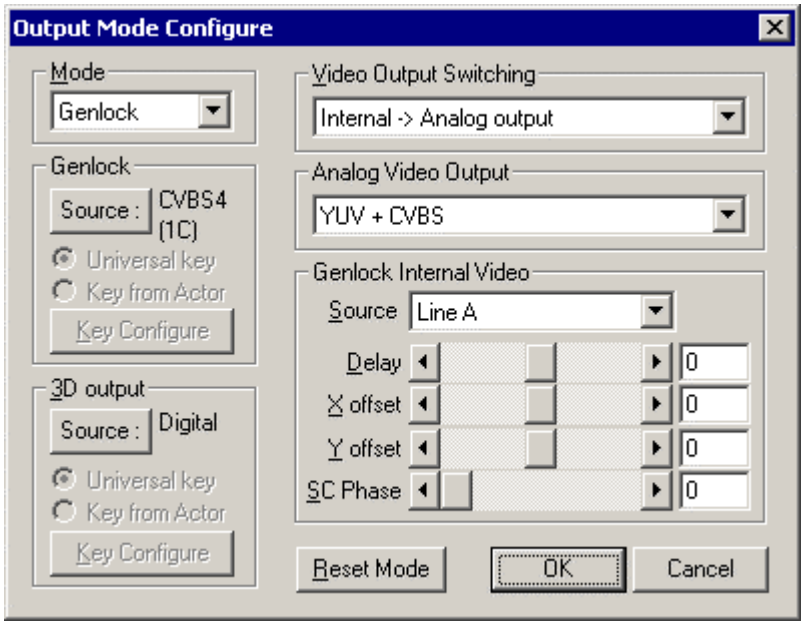


Figure 6. ***Output Mode Configure*** **dialog for selected** ***Genlock*** **mode**

Now the adjustment of output video is completed. If the format (see 2.2) and type of the output signal (Figure 6) are correctly specified there should be a background of *Windows* desktop on the second monitor. Move to it the *Render Output* window. If the image on the second monitor is absent turn to section **6.4.4**.

For adjustment of input video group **Input(s)** serves (panel **Live Video** of *Options* dialog (Figure 5). It allows adjusting parameters for input boards.

Drop-down list in **Input(s)** allows choosing a board to adjust. The number of items in this list (**LIVE_1**, **LIVE_2** etc.) correspond with the number of input boards in system. To each input board may be connected up to two independent video sources. It is only possible to get input from one source at a time, switching between input channels however is possible. Thus, the maximum number of independent streams of live video in any scene is equal to double the number of input boards.

If your configuration provides several boards, on ***Input(s)*** *list the boards appropriate to them should be determined by practical consideration. For this purpose it is necessary to choose any number from the list and, having determined a correct input and its format to try to receive the image. If it is not possible, the number is chosen incorrectly. Please notice, that the format of input video is determined by format of output video.*

Also for input video, from **Input(s)** list it is possible to establish the effective resolution by **Full Resolution** (720 pixels) or **Half Resolution** (352 pixels).

For example, choose **LIVE_1** for adjustment of the first input board and set mode **Full resolution**. Click **Source** in **Line A** group to select the first channel of the board. Dialog *Select Video Source* (Figure 7) will open. In drop-down **Input** list of this dialog select correct input of the switching panel on for the signal. Other parameters of the dialog are intended for adjustment of brightness, contrast etc. To check input settings of *VS2000*, you can set these values to their defaults by clicking **Default**. If you get an image from the camera in *Select Video Source* dialog, you can exit the dialog with a click on **OK**.

Figure 7. ***Select Video Source*** **dialog**

Now it is necessary to adjust keying parameters (chroma key) for the chosen channel. On panel **Live Video** (Figure 5) of the dialog *Options* in the group for **Line A**, choose **Universal Key** algorithm from the keying table. After pressing **Key Configure** the *KeyConfigPro* dialog (Figure 8) will open. Detail for this dialog and its adjustment mechanisms are described further in this document . Press the  button for an automatic method of construction of the table of adjustments. This usually yields good results with sufficient illumination and a high quality background. Press button  **Close** to close *KeyConfigPro* dialog and to load the constructed table for keying.

It is necessary to make similar adjustments to the second channel of input board **LIVE_1** – **Line B**. In *Select Video Source* (Figure 7) you can choose the same signal as for **Line A**.

When you close *HotActions* all parameters for adjustment of the video, including those for the input signals and adjustments of a keying are saved. At the subsequent start of *HotActions* all adjustments are automatically restored. It is recommended after adjusting both video channels for any input board to keep the configuration parameters as a ***Preset***. For this purpose it is necessary to type any name without spaces in drop-down list in the **Presets** group of panel **Live Video** (Figure 5) and to click on the **Save** Button. For more details see the document on adjustment of video.

Note that it is necessary to set different names for configurations of different boards (**LIVE_1**, **LIVE_2** etc.). If the configurations are not kept with an obviously useful name, after closing the *HotActions* these configurations are stored with the predefined names like «**AutoSaveN**», where **N** (1, 2 etc.) corresponds to number of input board **LIVE_N**.

If the **Input (s)** drop-down list has other input boards (**LIVE_2** etc.), it is necessary to repeat the adjustment procedures for each of them.

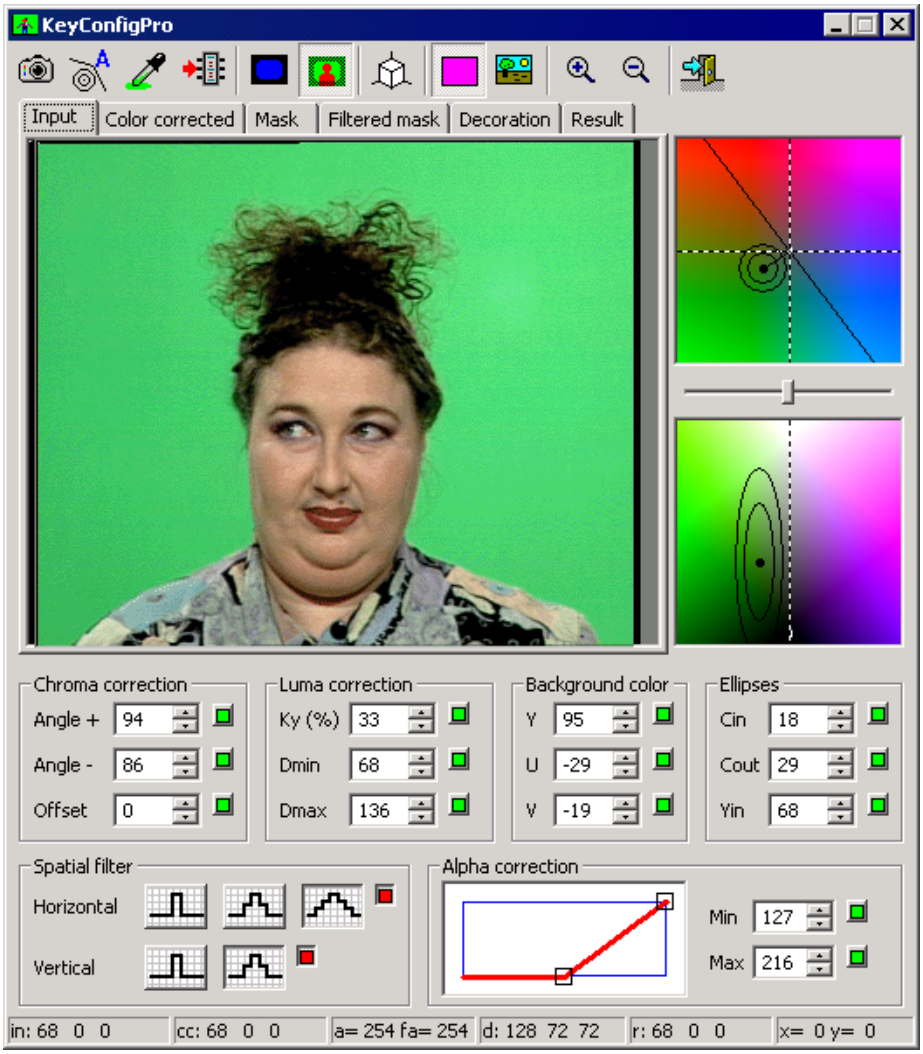


Figure 8. *KeyConfigPro* dialog for *Universal key* algorithm

2.4 Sound settings

Connection of external audio equipment is made with the help of the Breakout Box (see 8). All sound files playbacked by *HotActions*, for example wav-files started from commands of a script, will play back on the sound card chosen in the system by default. To combine this audio stream with sound from cameras or other sources, it is necessary to make adjustments to the system:

In **Start->Settings->Control Panel->Sounds and Multimedia->Audio** from **Preferred Device** drop-down list (of group **Sound Playback**) select as the output device one of the output channels of *FD300* board. The mixing mode of a sound in VS2000 can be set in the *Sound Configure* dialog (see the document on adjustment of video and a sound).

2.5 Work with sample project

Once input and output video as well as sound settings are properly adjusted and components and external equipment connected to the system, you are ready to create a project with *HotActions*. We will create a sample project to illustrate how to use *HotActions*.

From the **File** menu of the main window of *HotActions* choose command **Open Project...** this will open the standard **Open** dialog where you can choose one of the sample projects that come with *HotActions*. Select the project Sport. (Figure 9) Once a project is opened, it will appear in the contextual menu command **Recent Projects**. You can use the Recent Projects command to reopen the project.

While loading the ***Sport*** project position all windows and observe that all settings, files and documents associated with the project are referenced and available. They are sorted by groups, in the project window with heading ***Sport.vsp***. For more detail about projects, turn to section 3.6.

The window with the heading ***Sport.hot*** directly controls the scene. This window is referred to as the ***Hotset***. ***Hotset*** contains floating panels of tools called ***HotBars***. Later you learn how to create customize floating panels and also how to change names and functionality of all buttons on the floating panels (see section 3.5).

Now we are ready to work with the Sport project.

- Press button **Init**  for initialization of a scene. If the previous steps are done correctly, the *Render Output* window with the first frame of the Sport project video is displayed.
- Press button **Start LiveAction**  . This button is on the toolbar of the main window and used for switching the program between edit and live action modes. When engaged, the **Start Live Action** button will change its appearance to  .

Figure 9. An example of work with studio with loaded *Sport* project

In ***LiveAction*** mode the program by default switches to the full screen mode (***Fullscreen***), and all windows, except for ***Hotset***'s windows, are hidden or minimized. Adjustments to the display in ***LiveAction*** mode are detailed in section 5.1.

- Press button **Play Sport** on the ***Hotset*** floating toolbar to show the scene with its tracks (Figure 9). For other projects the Play button usually refers to the associated project: i.e. **Play**+the name of project. Buttons on other floating toolbars of this project such as **Camera** are intended for management of the virtual cameras.
- Press the button  . This will switch you from operating condition (live action) to editing mode. Note when in Edit mode, the buttons on the floating tool bars are not available for use. However, you can utilize any button on the floating tool bars if you first press the **Alt** key as you click on the button. You will then be able to see the result in the Render Output window.

You have now successfully started the Sport example and we will now go through a detailed step by step working session with the system in the subsequent sections.

3 Application *HotActions*

Application *HotActions* is intended for creation and control of 3D computer rendered scenery for interaction with real-time live video. It also configures the environment for interactive control of the 3D-scene under operating conditions.

Working with *HotActions* includes three basic stages:

- Preparation of animated objects (position, parameters, textures etc.) and virtual cameras for use in three-dimensional scenes along with creation of appropriate interface elements for management of studio while in live action mode.
- Configuring of input and output video through the **Live Video** panel for use with *HotActions*.
- Operation in ***LiveAction*** mode with the help of the created interface elements either by manual control or by for execution of a script.

3.1 Basic *HotActions* concepts

To understand the workings of the *HotActions* program, we shall describe a few basic concepts: ***Project, Action***, ***Actions Library***, ***Hotset***, ***Hotbar***, ***LiveAction***.

3.1.1 What is a *Project*?

HotActions creates projects. References to all associated files, scripts, settings are saved in a project file. The project file ends in (*.vsp). It also contains information on the condition of files (open, hidden or closed), windows, tools panels and other settings. It is a convenient way of accessing all the files associated with a particular project. (Figure 10)

In *HotActions* only one project can be open at a time. Closing a window of the project will close all windows connected to it.

The window of each project contains standard groups. ***Standard Groups*** are separate folders for each standard type of files with which *HotActions* works. As files are added to the project they automatically saved in the appropriate folder/group. Also the user can create ***Custom Groups***, i.e. groups that do not adhere to a certain file type. References to any files used by a *HotActions* project are saved with the project file.

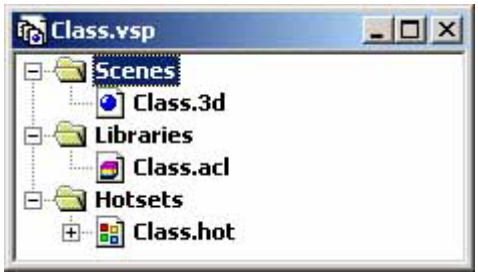


Figure 10. The example of the project open window

The contextual menus appear with a right mouse right button click on a group name or a file in it. Control details for the project appear in section 3.6.

3.1.2 What is an *Action*?

Action is one or several text commands which result in any updating of a virtual scene. This concept is basic to *HotActions*. ***Actions***, in particular, concern:

- loading of files, scenes, textures, sound etc.;
- switching of virtual cameras;
- start/stop of animation of one or several objects;
- playback/stop of sound;
- change of any properties of scene elements (for example, visibilities, scale, position, color etc.).

One ***Action*** can effect others ***Actions*** to create scene sequences.

An ***Action*** is initiated by the user (the operator of 3D-scenery) by pressing one button on ***Hotbar*** or a hot key during interactive control of the scene (***LiveAction***).

A group with special attributes is the startup ***Actions*** group. They represent the sets of commands, which are automatically carried out during a transition to operating conditions - ***LiveAction***. The task of startup ***Actions*** is initiating a scene to an initial (base) condition, as well as loading and naming necessary components. For more about creation of startup ***Actions*** look in section 3.11.2.

Actions are kept in the system as text documents in ***Actions Libraries.*** Details about ***Action Libraries*** is given below.

3.1.3 What is an *Actions Library*?

Actions Library is the set (library) made up of several ***Actions***, incorporated in one document (a file with extension **.acl**).

As a rule, ***Actions*** are united in libraries by common attribute; for example, they concern one 3D-scene in the project. In the majority of projects there is only one ***Action***'s library.

More often the designer/animator or the program director creates the ***Actions Library*** and are thus familiar with its structure.

Every ***Action*** represents an executed script of commands. Any ***Action*** can be associated with a certain button on the floating tools panel ***Hotbar***. Thus when making a new project, it is necessary to create at least one ***Hotbar***.

3.1.4 What are *Hotbars* and *Hotsets*?

Hotbars – the push-button panels associated with the ***Hotset*** for a project. These are directly used in ***Live Action*** mode as the basic interface for control of a scene.

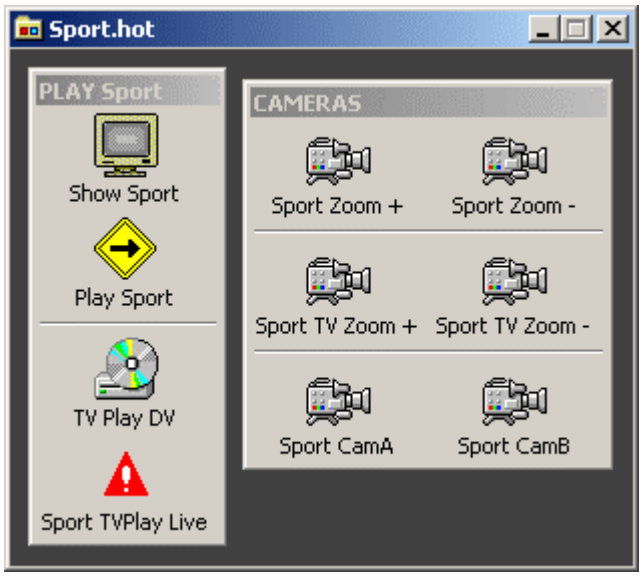


Figure 11. *Hotbar* and *Hotset* – the basic tools of *HotActions*

Hotsets – sets of ***Hotbars***. The appearance of the ***Hotset*** can be altered by the display of ***Hotbars.*** They can be hidden, shown or moved simultaneously. (Figure 11)

Each button of a ***Hotbar*** corresponds to a certain ***Action***. By default their names include the project name. On any ***Hotbar*** you can add buttons and associated any ***Action*** from the ***Actions*** libraries. If you simply put them on an empty seat on ***Hotset,*** a new ***Hotbar*** will be created. Look at sections 3.4.2 and 3.5.2 for more about working with ***Actions.***

HotActions works with following file types:

- scenes (files with extension ***.3d**);

- ***Hotsets*** (files with extension ***.hot**);
- library of ***Actions*** (files with extension ***.acl**);
- projects (files with extension ***.vsp**);
- text documents (files with extension ***.txt**).

The Project file maintains references to the other file types and allows working with them simultaneously.

All files for the project open at once as the project is opened. Existing projects can be opened from **File** menu of the main *HotActions* window by the command **Open Project…**. After first opening a project, the name of ***Project*** appears in the local menu of command **Recent Project**, and the project can be re-opened from there.

For each type of file the project window contains separate folders – ***Standard Groups***. Also it is possible to create ***Custom Groups*** – these are groups that do not adhere to specific file types. More detail about working with files in the project is in section 3.6.2.

To open a file, which is not associated with the Project, in **File** menu choose command **Open…**. In the *Open* dialog choose the desired file name. Displayed files can be limited to a certain file extension. Once a file has been opened, it can be re-opened faster by selecting it under the command **Recent Files** on the **File** menu. When a new file is opened the program always will ask if you would like to add it to the current project if any project is loaded.

If unsaved changes have been created in an open file, the file name appear in the heading of the window with the symbol * after the file name. This symbol will disappear after the first saving of the current condition of the file.

For saving of changes to any type of choose command **Save** on the **File** menu or its equivalent – the button  on the tools panel. If want to save a file with a different name, use the command **Save As…**. In all open files, except for scene files, the button  saves changes to all open files.

Features about the use of each file type appear in later sections of this document.

3.1.5 The *Properties* dialog

The *Properties* dialog for any window or object is available by either pressing the keys **Alt-Enter** or using the button  on the tool bar of the main window. The properties dialog for any object or window will then be displayed. To make the *Properties* dialog disappear, perform a repeat pressing of these buttons.

By default the properties dialog appears attached to a right edge of the main window (***Docking View***) but it can be transformed into a floating dialog by clicking on the top border of the dialog while holding the **Ctrl** key. A double click on its heading will re-attach the *Properties* dialog to the right edge of the main window.

3.1.6 Work modes *Edit* and *LiveAction*

HotActions works in two modes: ***Edit*** (editing) and ***LiveAction*** (operating). The program opens in ***Edit*** mode but all associated files such as ***Actions Libraries, Hotsets, and Hotbars*** are open and available for work in ***LiveAction*** mode.

When changing to ***Live Action*** mode, the program always asks if you wish to save changes to the project and its contents. In ***LiveAction*** mode, there is an option which allows interactive management of the 3D scene (i.e. either shooting or demonstration). The application default is ***Fullscreen*** while in ***LiveAction*** mode, and all windows for adjustments of parameters are hidden or minimized (see 5.1). In addition, access to the special folder ***$STARTUP $*** is initiated. Here the program will find ***Actions*** required for the initial performance of some special actions on the three-dimensional scene, for example, the starting trajectories of objects, etc. (section 3.11.1).

As a rule, the user in this mode is controlling a virtual scene. By pressing buttons on the ***Hotbar***, the operator starts certain ***Actions***. An ***Action*** can also be invoked by pressing a pre-assigned hot key on the keyboard. Simultaneously control of objects in the scene can be carried out by use of a joystick or other control devices, either directly or over a network – with the help of the application for on-air automation.

☝ *Strongly recommended to close all other active applications before switching to **LiveAction** mode!*

Note in ***LiveAction*** mode:

- files, are not closed, but only are hidden and are available by a click on the dagger in a corner of their window;
- a double click on the heading of a library window, a scene or alternative representation of ***Hotset*** (section 3.5.5) results in expansion of this window to full screen. To return these windows to their usual condition, use **Ctrl-Tab**.
- .In Live Action mode, Hot Keys can be used to initiate actions. To assign Hot Keys, click on a Button in a Hot Bar and then perform a right mouse button click to present a Contextual Menu and access Hot Key panel the Properties dialog (Figure 12).

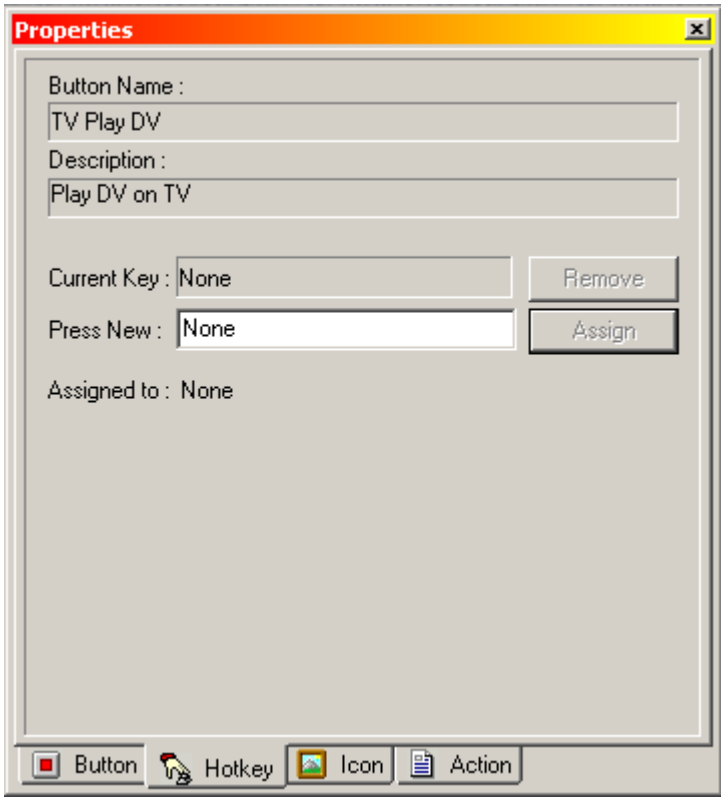


Figure 12. Hot Key Panel on Button Properties Dialog

In the following sections detailed information on all components of *HotActions* is presented.

3.2 *HotActions* main window

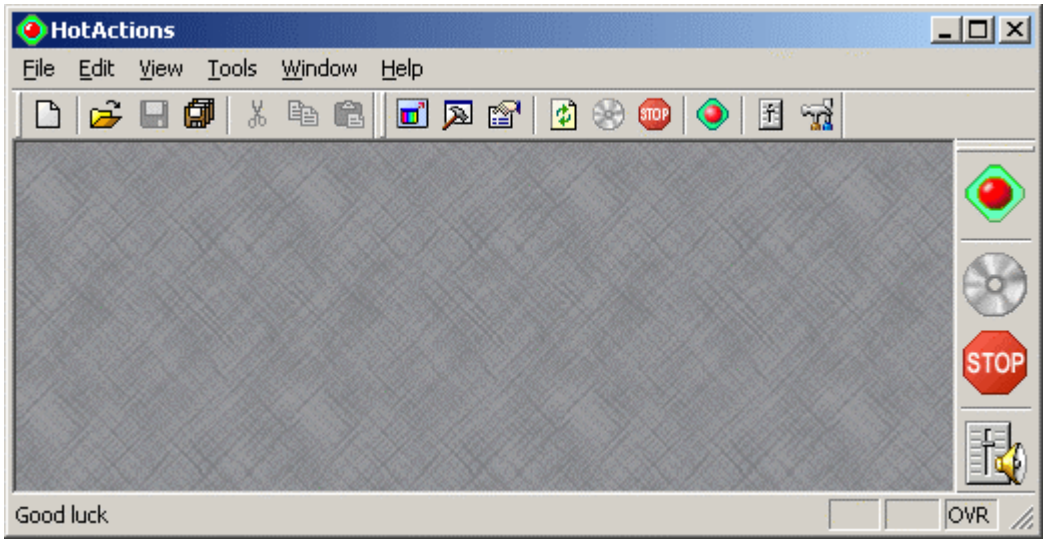


Figure 13. *HotActions* main window

The main window of the application *HotActions* (Figure 13) contains tool bars, standard menus, which contain commands for opening, editing, copying and saving of all type files. Additional dynamic menus will appear when specific modules are utilized such as ***Action Libraries***, ***Projects***, ***Hotsets*** and their accompanying ***Hotbars***, **3D Scenes and Sound Editor**.

3.2.1 Tool Bars

The main window of *HotActions* contains three tool bars: *Standard, General* and *LiveAction*. Display of any tool bar is controlled through the submenu **Toolbars** on the **View** menu.

By default panels *Standard* and *General* (the following figure) appear attached to the top edge of the main window (***Docking View***), and panel *LiveAction* is hidden.

Any panels of the main window, and also *Properties* dialog, can be placed in a detached condition by pressing on the **Ctrl** key and can they be placed on the screen where it is convenient to the user. A double click on its heading will return any window to the attached position.

Buttons on the tools panels carry out the functions listed in the following sections. For all buttons we show their equivalent menu commands.

3.2.2 *Standard* Tool Bar


(command **New** from menu **File**) creates a new file for use in *HotActions*;


(command **Open** from menu **File**) shows dialog listing files that can be opened;


(command **Save** from menu **File**) saves changes in the current active window and in the file appropriate to it;


saves changes in all open windows and in the files appropriate to them, except for scene files;


(command **Cut** from menu **Edit**) clears clipboard and moves chosen object or text to the clipboard;


(command **Copy** from menu **Edit**) copies chosen object or text from active window to clipboard;

(command **Paste** from menu **Edit**) adds contents of the clipboard to the current window and in the file appropriate to it.

3.2.3 *General* Tool Bar

(option **FullScreen Render** from menu **View**) switches to full-screen mode and back to window mode for **Render Output**;

(option **Debug Output** from menu **View**) opens and hides a window of diagnostic messages output *Debug Output*, error messages and system events (section 5.3);

(option **Properties** from menu **View**) opens the *Properties* dialog;

(command **Update All** from menu **Tools**) updates and reloads all open files;

(command **Init All** from menu **Tools**) starts ***Actions*** from **Startup** folder (section 3.11.2);

(command **Stop All** from menu **Tools**) stops performance of all ***Actions*** and playing of all tracks;

(option **LiveAction Mode** from menu **Tools**) switches application to operating condition (section 3.8);

(option **Sound Configure...** from menu **Tools**) opens dialog for audio settings;

(command **Options** from menu **Tools**) opens the *Options* dialog (section 4).

3.2.4 *LiveAction* Tool Bar

The ***LiveAction Bar*** is usually attached to the right edge of the main window and contains commands for control of ***LiveAction*** mode. Buttons on this panel have the following functions:

switches application from editing mode to operating mode in ***LiveAction*** and back;

if a ***Hotset*** is open this starts ***Actions*** from ***$STARTUP$*** folder;

stops executing of all ***Actions*** and any buttons that have been pressed will be restored to their default positions.

opens the settings in audio dialog.

3.2.5 Menus

The main window contains the standard menus: **File**, **Edit**, **View**, **Tools, Window** and **Help.** Many commands on these menus are duplicates of buttons on the tools panel of the main window as described above.

Commands on the **File** menu execute standard operations, for example, creations of a new file or opening an existing file. It is the menu that also lists most frequently used files. Command **Exit** finishes all work with the program.

Menu **Edit** contains commands of standard editing.

The **View** menu commands display or hide in windows for tools panels, condition line, output result window and the window for diagnostic messages. The contents of the ***View*** menu vary with different windows.

Menu **Tools** contains the basic execution commands of *HotActions*.

Commands the **Window** menu arrange all open working windows as desired by the user.

Command **About HotActions...** from menu **Help** shows the information about the current version of the application.

Additional menus such as **Project**, **Track**, **Action**, **Hotset**, appear in conjunction with specific windows.

The contextual menu (Figure 14) appears with a click of the right mouse button on any area of the main window. It contains commands for control of ***LiveAction*** mode. Thus there are a variety of methods of control conveniently available to the user.

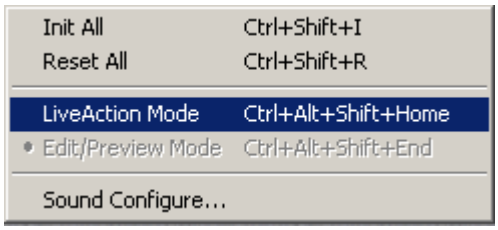


Figure 14. The contextual menu

3.3 Operations with 3D-scene

The primary purpose of *HotActions* is to control computer generated sets that can dynamically interact with a live video source. The 3D Scene module contains the tools to control the 3D scenes. These files are saved with the file extension .3D. Since we are in the sample project Sport, from the Open command on the File menu select the file sport.3D.

3.3.1 Operating with a scene file

Scenes, as well as other files used by *HotActions*, simultaneously open as the project is opened. To add a scene to an open project, use the contextual menu for standard group **Scenes** in the window of the project.

To open a scene not associated with the project, use the **Open...** on the **File** menu. This file will now be listed under the command **Recent Files** on the **File** menu for faster access. Before opening a new file the program will ask if it is necessary to add it to the current project.

For saving changes in a scene choose the command **Save** from menu **File** or its equivalent – the button  on the tools panel. If it is to be saved as a different file name, use the command **Save As...**.

HotActions will not preservation manipulations of objects in a scene, i.e. concealment, change of their sizes and positions. You must perform a save to keep any changes. The symbol «*» will appear in the heading name of the window to remind you when changes have occurred. This symbol will disappear after saving the current scene.

3.3.2 Organization of scene objects

When working with a scene in the main window of the *HotActions* there is a window displaying a file tree structure for objects used by the scene. This window has the scene name in its heading. All scene objects are organized in the tree structure in the following manner. This structure can be found in Figure 15.

 root object of scene tree (***World***), there is only one for each scene;

 empty (***Dummy***) scene objects which have no sides, are not drawn and are used for auxiliary purposes. For example the control of a camera in a scene by a joystick or mouse is not directly on the camera but via empty objects. Thus for control purposes cameras should be connected to a ***Dummy*** object;

 the scene units referred to as solid object, these are objects with rendered sides;

 the cameras available in a scene;

 the light sources in a scene.

You can hide objects in a scene with a double click of the left mouse button on the object or objects group.

There are additional graphical badges for objects:

- the small green triangle, for example  , means, that the object has a track in the common scene track;
- the small yellow triangle, for example  , means, that descendants of object have tracks in the common scene track.

Use of tracks is described in section 3.11.2 of this document and also in the ***Script Commands Guide***.

3.3.3 Tool bar of scene window

Buttons on the active scene window tool bar are:

- the button  represents all scene objects as a tree (Figure 15). A contextual menu for each object or group on the tree appears by clicking the right mouse button. From the contextual menu you can hide/show the chosen object in a scene, copy its name to generate commands in a script describing the current site of object (see below the description of action of the button  further) or display properties dialog.

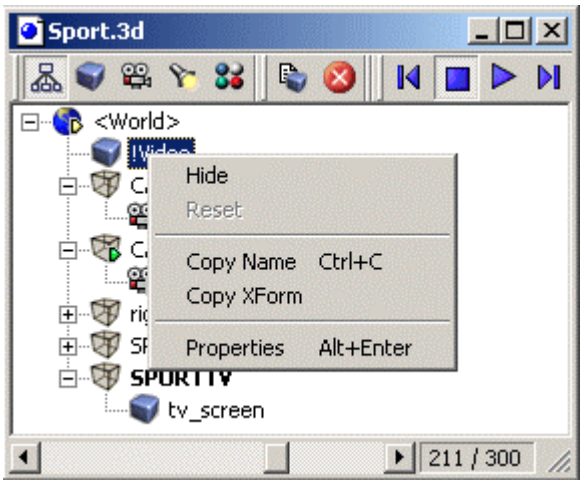


Figure 15. Working window of a scene and the contextual menu for its objects

The contextual menu of scene window contains the following commands:

Hide	hides the current element in a scene;
Reset	restores position and the size of the current elements in a scene, setting their values to what they were at opening the current scene. Accordingly, the command only becomes accessible after a change of position and/or the size of object. The symbol «*» is added at the end of the object name in the scene window whenever any unsaved changes have been created;
Copy Name	this command copies the name of the chosen element to the clipboard for further use, for example, in the script commands. To insert the object name copied by this command, use command **Paste** from the contextual menu;
Copy XForm	corresponds to actions executed by pressing the button  ;
Properties	calls the *Properties* dialog (section 3.3.5) for chosen element.

- the button  represents all grids or ***Meshes*** available for scene objects (Figure 16);

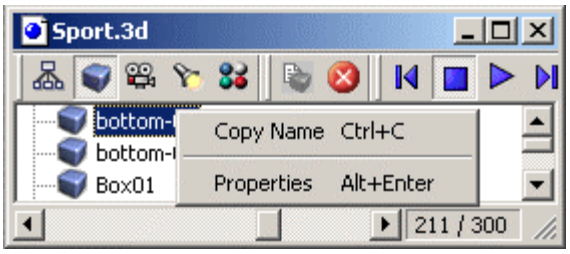


Figure 16. Representation of all scene grids and the contextual menu for grids

- the button  shows all cameras in the scene (Figure 17);

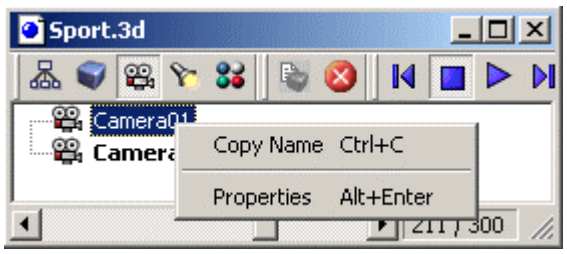


Figure 17. Representation of all scene cameras and the contextual menu for camera

- the button  shows all light sources in the scene (Figure 18);

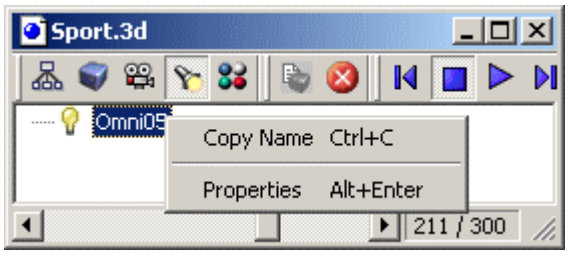


Figure 18. Representation of all scene light sources and the contextual menu for lights

- the button  shows all materials for scene objects (Figure 19);

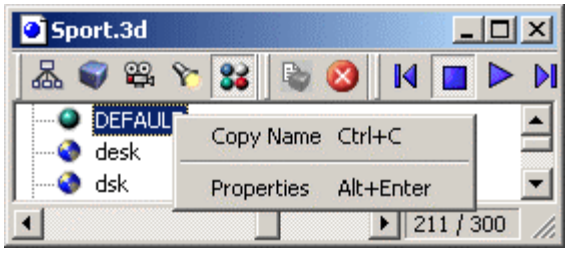


Figure 19. Representation of all scene materials and the contextual menu for materials

- the button  generates script commands describing the current position of object and its size (***XForm***). Use this button for creation of a command to note any change of position and size of a chosen object from its initial settings. The commands will be created and copied to the clipboard. Then the script lines can be inserted into the **Body** field in *Properties* panel for ***Action*** by the command **Paste** on the contextual menu. Note that the button  in Figures 15 – 18 is inaccessible, since the editing tools panel of the main window is intended for files, in this case – scenes, and for this **Paste** is not available;
- the button  restores position of all scene objects, but does not cancel their concealment if this has been applied to an object;
- the buttons  serve for playback, rewind and a stop of the scene track. These buttons can be used before you initialize a scene. They are used for viewing a scene track taken separately – without ***Action***

Libraries and etc. Thus, as a rule, the tracks of solid named objects used in commands will be excluded from play by these buttons of the tool bar. They are intended for playing the common scene track as defined.

A right mouse button click on any scene objects will display the contextual menu shown in Figure 20. The menu contains commands similar to buttons on the tool bar of the scene window, and also **View** menu for the scene window.

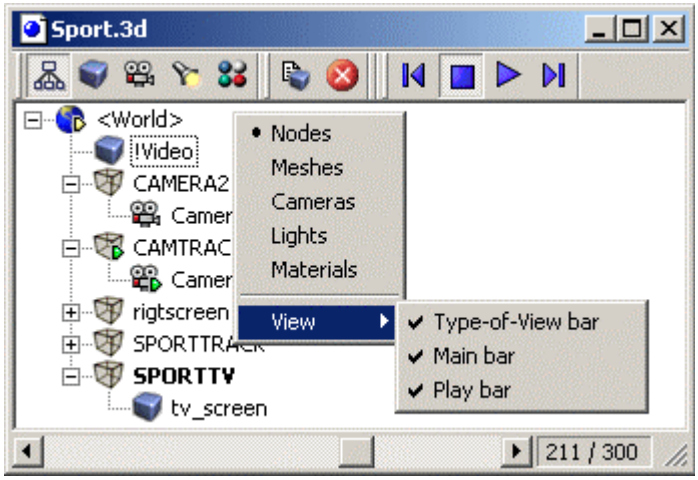


Figure 20. The scene contextual menu

3.3.4 Dynamic Menu – Scene

When working with the 3D Scene module in the *HotActions* main window a special menu **Scene** (Figure 21) will appear and the contents of the **Edit** menu is slightly altered. Commands of the **Scene** menu include: **Play**, **Rewind**, **Reset All Nodes** and **Stop** duplicate buttons of a working scene window. And commands of menu **Edit** have the additional commands **Copy Name** and **Copy Xform** which duplicate buttons of a working scene window described above.

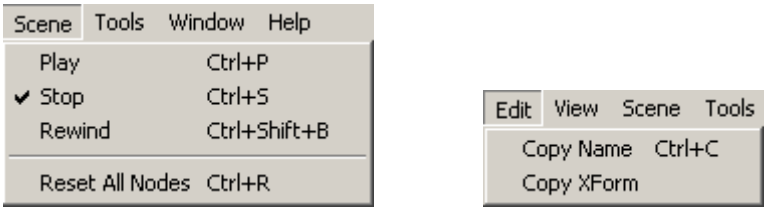


Figure 21. Menus *Scene* and *Edit* of main window for scene

3.3.5 *Properties* dialog for different types of scene objects

The *Properties* dialog can be displayed for any object, camera, light source, grids and scene materials by first clicking on the icon for the object, camera etc and then performing a right mouse click. The *Properties* dialog provides detailed information for the selected item.

This information is divided for convenience between the appropriate panels, which are accessed by tabs at the bottom of the dialog.

The **Node** Panel (Figure 22), which is on the Properties dialog for every type of object, shows the name, position, the size (this parameter has no value for cameras), and positions shifts for the scene object. It is possible to change these parameters and to accept changes, by pressing **Apply** or to restore to starting position of object, by pressing **Reset**.

With a click on **Hide**, it is possible to hide the object in a scene.

A click on the button **Control**, as well as double click on object, makes it controllable by a joystick, the mouse or arrow keys. More about manipulation of objects by use of a Joystick, is described in section 3.9.

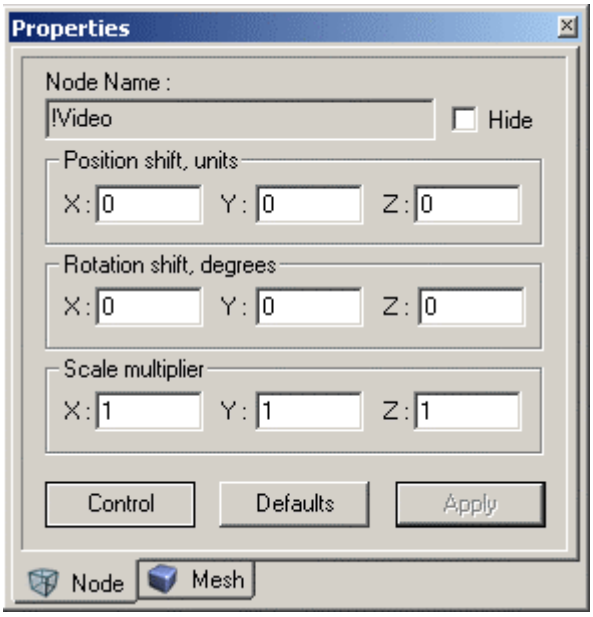


Figure 22. Panel *Node* of dialog *Properties*

The **Node** panel is the only panel for empty ***Dummy*** objects, designated by . The *Properties* dialog for all other objects have additional panels.

CAMERAS

For cameras the **Camera** panel (Figure 23) allows the user to set the parameter **FOV** (angle of sight) in degrees or a focal length of a lens in millimeters – if button **Lens** is engaged. Also the panel allows to set the parameters ***Clipped Planes*** and simulate fog through the parameter ***Environment Ranges*** for the chosen camera.

Button **Set Active** sets the camera for the current scene, but does not choose it as an object for a manipulation. For this purpose it should be selected on the **Node** panel from the tree of objects for the scene (Figure 20).

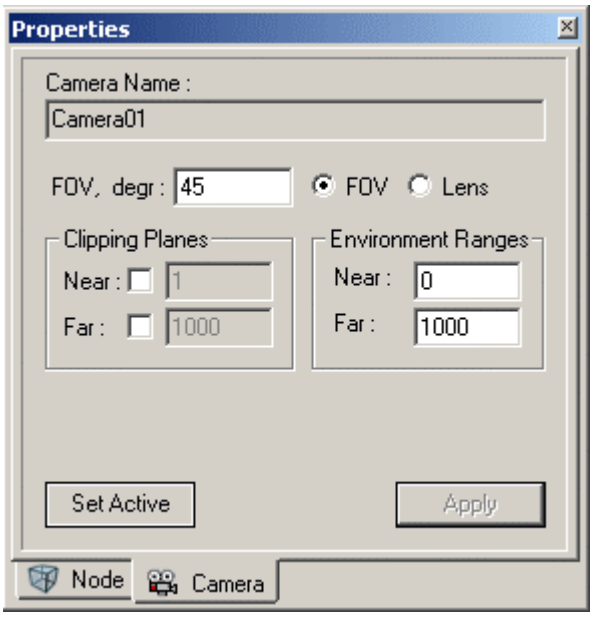


Figure 23. Panel *Camera* of dialog *Properties* for camera in a scene

Solid (Rendered) Objects

For solid (rendered) scene objects (those having sides), the additional **Mesh** panel (Figure 24) presents information on number of sides (faces) and corners (vertices) for the object and material used. Button **Find in Scene** helps locate the object in the scene by causing a grid of the object to blink.

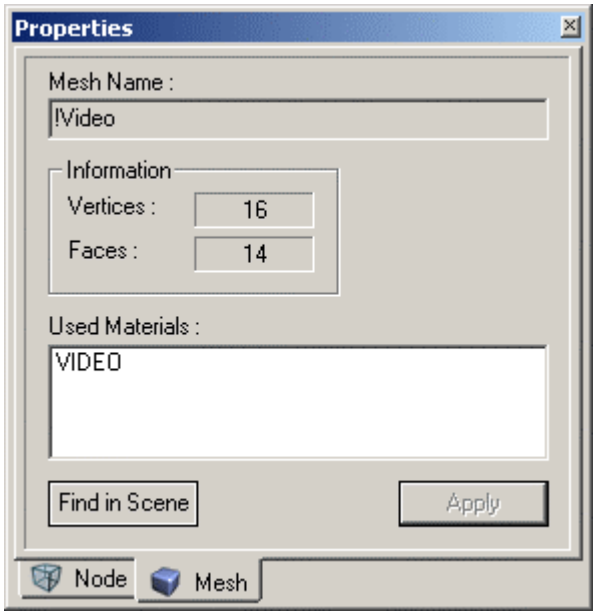


Figure 24. Panel *Mesh* of dialog *Properties*

LIGHT SOURCES

For light sources in a scene the **Light** panel (Figure 25) includes the option **On** to set color of light source. A click on the field **Color** presents a dialog for selecting a color. Also the panel permits specification of intensity by setting the **Multiplier** value.

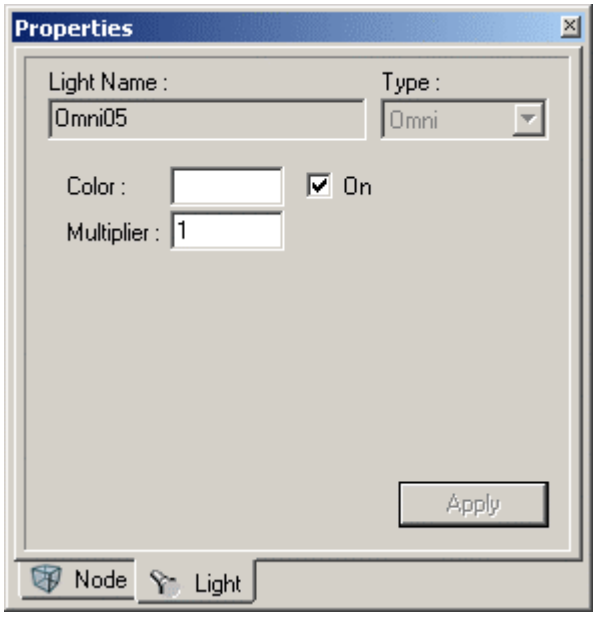


Figure 25. Panel *Light* of dialog *Properties* for light sources in a scene

For any object not represented either on the scene tree (Figure 15), and in groups (Figure 16, Figure 17, Figure 18,Figure 19), *Properties* dialog contains information appropriate to type of object as described for the additional panels listed above – only without the **Node** panel.

MATERIALS

Since materials are not assigned to concrete objects in a scene they do not have the **Node** panel. Their properties (Figure 19) can be looked at in the panel shown in Figure 26, simply select a concrete material from the list of available scene materials. To access the ***Material Properties dialog***, click on the Material Button in the 3D Scene window, and then execute a ***ALT+ENT*** key combination.

Figure 26 displays the parameters for the material that are available to you: its **Colors – Ambient, Diffuse** and **Specular**, **Self-Illum**. (luminosity), **Opacity** (transparency) and degree of display of patches of light in field **GLOSSINESS**. If the material is a texture map it is represented in dialog with information on its sizes and type. It is possible to find materials in a scene, by pressing button **Find in Scene**.

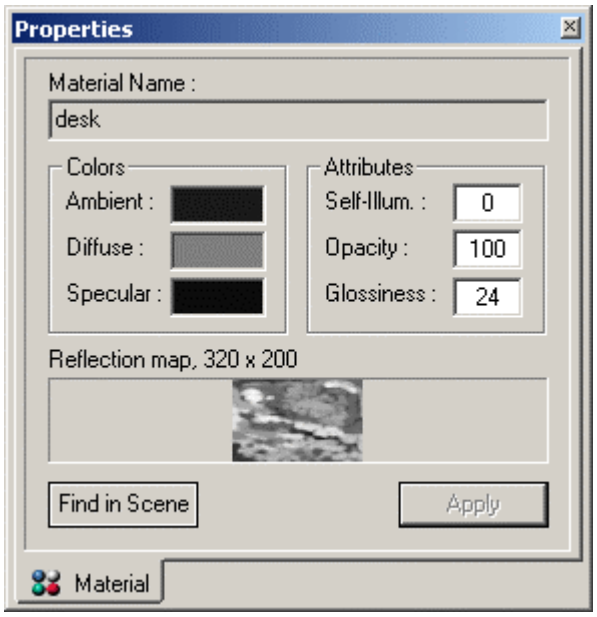


Figure 26. Panel *Material* for the materials in scene

TRACK

If the scene object or at its descendants has a separate track in the common scene track, in the *Properties* panel anther button is added - **Track** (Figure 27).

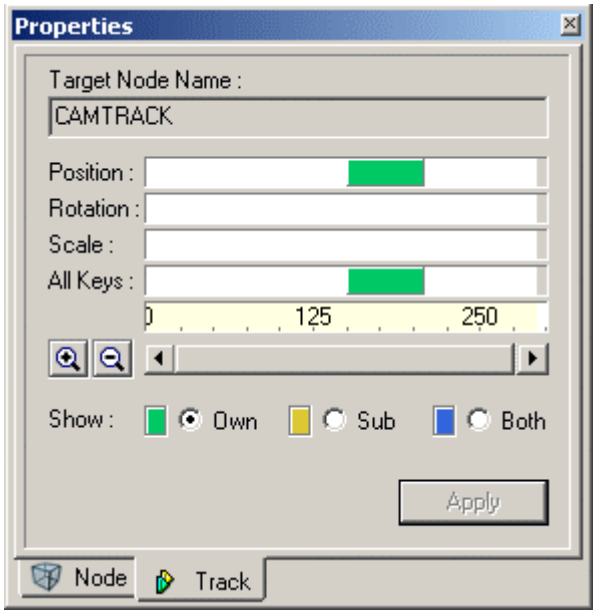


Figure 27. Panel *Track* of *Properties* dialog

The Track panel contains the information on the object's track separate from its components. Changes of a position, an angle of rotation (turning and spinning) and scale of the object (size) are represented on the panel by corresponding color rectangulars on the appropriate line of the track (Figure 27). The color of the rectangulars depends on which radio-button is chosen from group parameters **Show**.

The group of radio-buttons **Show** allows to group and show the following tracks:

- **Own** – (green) own tracks of object
- **Sub** – (yellow) information on tracks of object's descendants
- **Both** – (blue) data for object's own tracks together with information about the tracks of it's descendants

ENVIRONMENT

For the root object of a scene tree (***World***), designated by the icon , the *Properties* dialog contains the additional panel **Environment** shown in Figure 28.

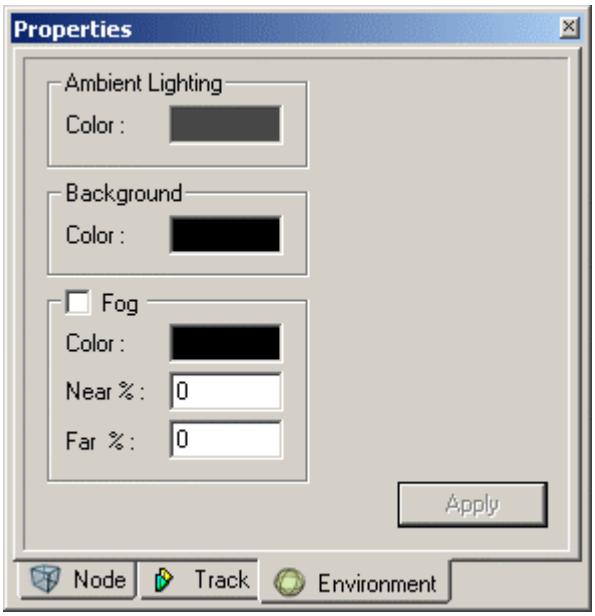


Figure 28. Panel *Environment* of dialog *Properties* for object *World*

On this panel are three parameter groups:

- **Ambient Lighting** - illumination level of the scene by a diffused light is controlled. Click with the left mouse button on field **Color** to open a dialog for selection of a color.
- **Background** - similarly you can set color of a background, i.e. the space, which is not occupied within the scene by objects.
- **Fog** allows use of a fog effect in the scene. For this purpose set option **Fog** and also set the color for **Fog** in field **Color**. Parameters **Near** and **Far** set, in percentage, a factor of mixing of the fog with the stage on a near and distant plane of each virtual camera. These planes are set in parameters group **Environment Ranges** of *Properties* dialog for the **Camera** panel (Figure 28) and you can assign different environments for each virtual scene cameras.

3.4 Operations with *Actions Library*

The Actions Library refers to the files that control the movement of objects in a scene. Actions can be named, copied, pasted, deleted just like other files. They are controlled on the Actions Properties dialog discussed in section 3.4.2 and shown in Figure 33.

3.4.1 Utilizing library files

To create a new **Actions Library** library select the **New** in the **File** menu of the main window of *HotAction* and then choose **Actions Library** in *New* dialog (Figure 29). This dialogue can also be opened by pressing the keys **Ctrl+N** or clicking on the button  on the tools bar of the main window.

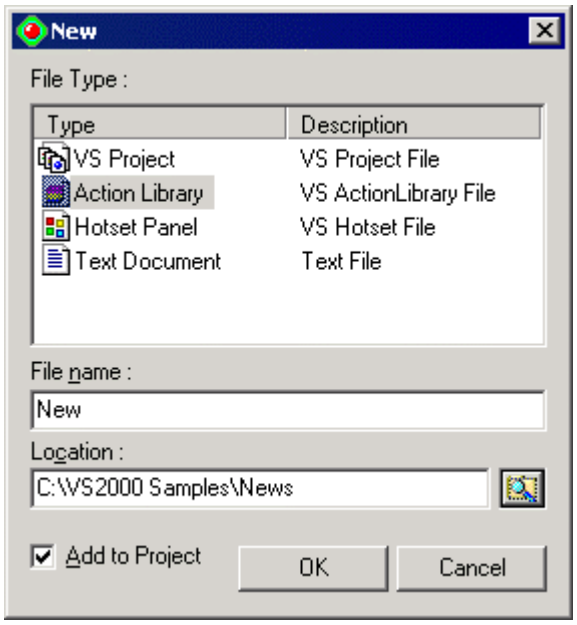


Figure 29. Dialog of a choice such as a new file for creation

Usually libraries, as well as other files used by *HotActions*, open as the project is opened. A contextual menu for standard group **Libraries** is available in the project window.

It is possible to open a library created earlier through the Open command on the File Menu instead of switching to it from within an open project. You may want to do this for example, for copying some ***Actions*** from the previously created library. For this purpose in menu **File** of window *HotActions* choose command **Open...** then in *Open* dialog replace type of files to be *Action Library Files* (***.acl**) (Figure 30). Then select the desired file and click on **Open** button. A request will appear in the dialog asking you to confirm if you want the file included in the current project – click on **No**. The *Action Library File* will now open faster – by selecting its name from the list of **Recent Files** also on **File** menu.

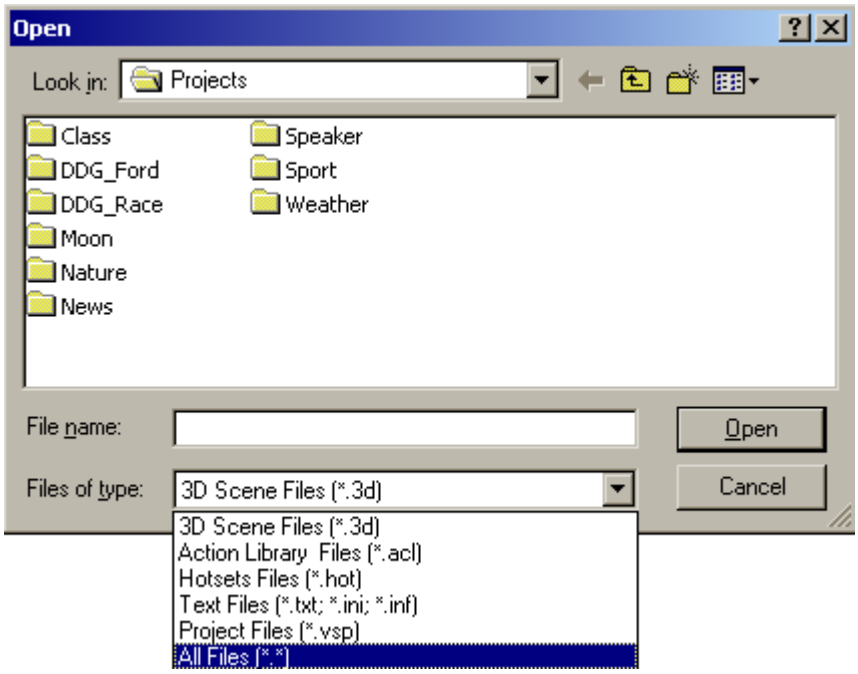


Figure 30. Standard dialog for opening file

For preservation of changes in a library choose **Save** command in the **File** menu or its equivalent – the button on the tool bar. If you want to save it using a different name use the command **Save As...**.

3.4.2 Using *Actions* in the library

In the ***Actions Library*** it is possible to address files in a folder using the usual commands copy, delete etc. It is possible to access these actions or a group of ***Actions*** in the standard way using arrow keys or holding the **Ctrl** or **Shift** keys.

A click of the right mouse button on an empty place within the ***Actions Library*** window opens the contextual menu shown in Figure 31. This menu is a combination of commands for the **Action** and **View** menus in the main window, described in detail in section 3.4.3.

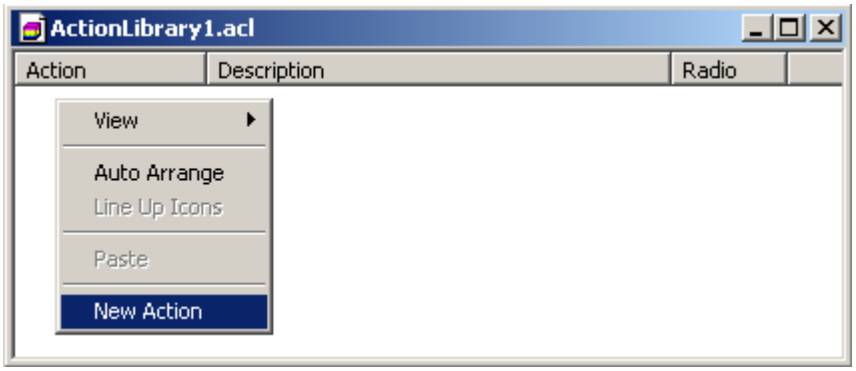


Figure 31. Contextual menu of *Actions Library*

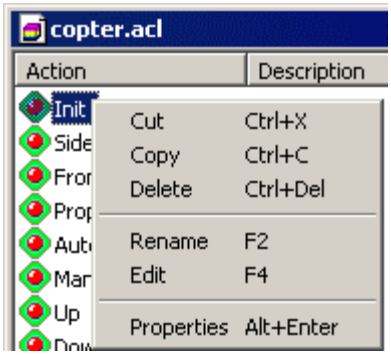


Figure 32. Contextual menu for *Action* in library

If a right mouse click is executed on an Action listed in the ***Action Libraries*** window, a different contextual menu illustrated in Figure 33 is presented. If the command **Edit** is chosen from this contextual menu, the *Properties* dialog shown in Figure 33 is presented. It is possible to display the *Properties* dialogue by choosing the command **Properties** from the contextual menu for ***Action***, or by pressing keys **Alt+Enter**.

After the display of the ***Action*** *Properties* dialog, it is possible to test the script for the action by pressing the **Test** button in the *Properties* dialog. The **Body** panel of this dialog shows the actual script used to effect the Action. The script is comprised of commands that are described in detail in the ***Script Commands Guide***. The **Apply** button simply keeps any changes to the ***Action*** script without executing the ***Action*** (Figure 33). To keep all global changes in the library, it is possible to use the keys **Ctrl+S**. If you turn on **Auto** by checking the box next to **Auto** any changes in the body (script) of ***Action*** are automatically saved.

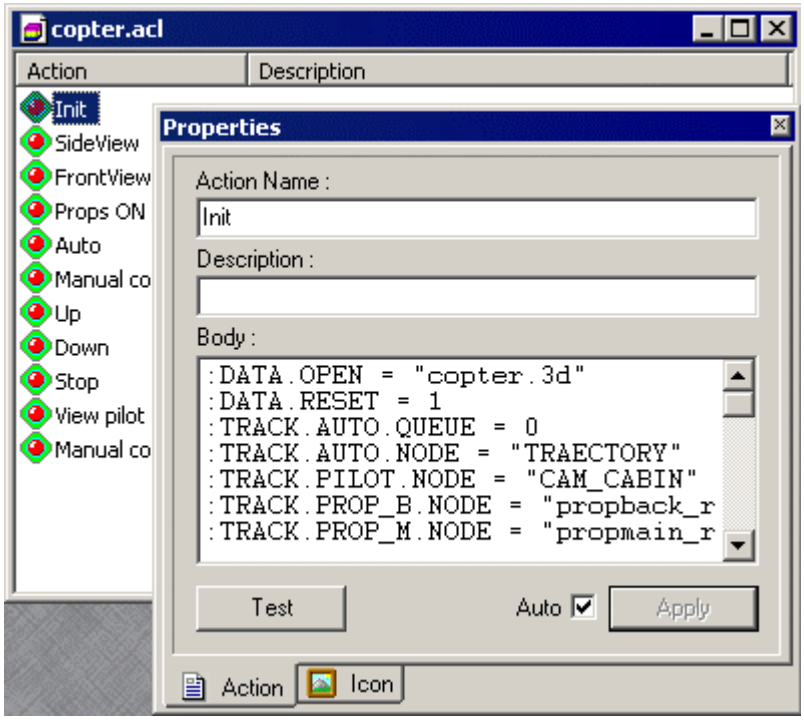


Figure 33. Dialog *Properties* for *Action*

The appearance of the icon of an ***Action*** can be altered if it is used by a different ***Hotsets*** . Plus it is also possible to drag-n-drop icons between open libraries as a copy method.

When moving ***Actions*** on the ***Hotbar*** the appropriate buttons are automatically added. If placed on an empty seat on ***Hotset*** a new ***Hotbar*** will be created (more on this topic in section 3.5).

3.4.3 Working menus of *Actions Library* window

Along with the standard menus, the Action Library window has the added menu **Action** and the **View** menu is altered as well. See (Figure 34).

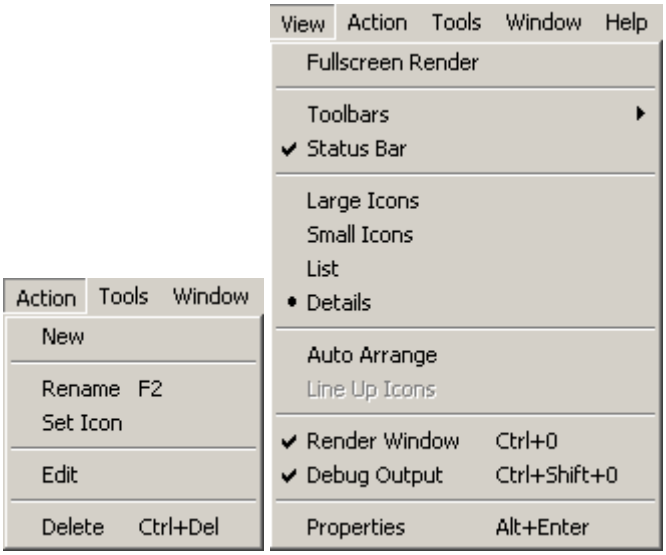


Figure 34. Menus *Action* and *View* of main window

Menu **Action** contains the following commands:

- **New** creates a new ***Action***
- **Rename** changes the name of existing ***Action***
- **Edit** opens the dialog *Action Properties* for editing script of ***Action.***
- **Delete** deletes the chosen ***Action***.

The **View** menu contains the following items for working with the ***Actions Libraries***:

- **Large Icons, Small Icons**, **List** and **Details** changes the appearance of the ***Action Library*** window.
- **Auto Arrange** automatically arranges icons in the ***Actions Library*** window.
- **Line up** places icons in rows in the ***Actions Library*** window.

To look at the ***Actions Library*** you can execute the View command on the contextual menu of library window (Figure 31).

3.5 Operations with *Hotset*

3.5.1 Using *Hotset's files*

Hotsets are created and opened similarly to the ***Actions Library*** files:

A new ***Hotset*** can be created by accessing the command **New** on the **File** menu and then selecting **Hotset Panel** in *New* dialog (Figure 35). This dialog can also be invoked by pressing the keys **Ctrl+N** in the *HotActions* main window.

As with all project files, ***Hotsets*** are opened as the project is opened. But, unlike other types of files that work with *HotActions*, ***Hotsets*** are seldom used outside the project for which they are created.

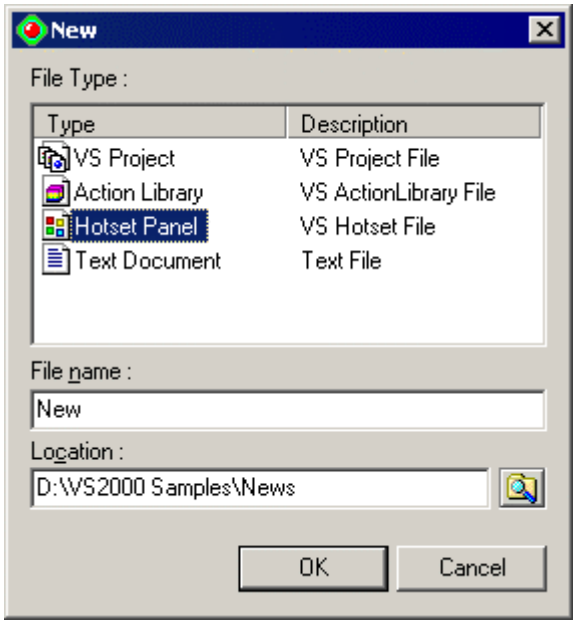


Figure 35. Dialog to make a new file for creation of a *Hotset*

It is possible to open a ***Hotset*** without opening its project by using the command **Open** on the **File** menu. Once open, the ***Hotset*** file will appear on the list of **Recent Files** on **File** menu.

The contextual menu is available for the ***Hotset*** is in the project window.

To save a ***Hotset*** under a different name use the command **Save As...** on menu **File**. The button  or command **Save** keeps it under its current name.

3.5.2 Manipulation *HotBar* buttons and their properties in *Hotset*

In edit mode, the control environment for *HotActions* (see 3.1), it , it is possible to alter ***HotBar*** buttons in ***Hotset***. On any ***Hotbar*** it is possible to add buttons by moving the button directly on to it from the ***Actions Library.*** If they are moved to an empty spot on ***Hotset*** a new ***Hotbar*** will be created.

Buttons can also be freely manipulated:

- to change their text or create icons or snapshots equivalent to hot keys (keyboard shortcut) access the *Properties* dialog (seeFigure 37);
- to delete, add, copy buttons use the contextual menu (Figure 36);
- to change their order on ***Hotbar*** or move them between ***Hotbars*** and ***Hotsets*** you can drag the icons.

Thus to ***Edit*** a button, simple click on the selected button instead of pressing. To test action of the button, click on it, while holding the **Alt** key.

From ***Hotbars*** it is also possible to move the mouse between ***Hotsets***.

Remember that Hotset does not contain actual Actions – it contains only references to libraries of Actions. When opening Hotset the program automatically loads required libraries. For this reason Hotset is not dependent on the description of any particular Action.

To change properties of buttons use the *Properties* dialog shown in Figure 37). It is opened with the command **Properties** of the contextual menu in Hotsets (Figure 36) or pressing the keys **Alt+Enter**. Other commands of the contextual menu serve for control of buttons as well.

Figure 36. Contextual menu for buttons

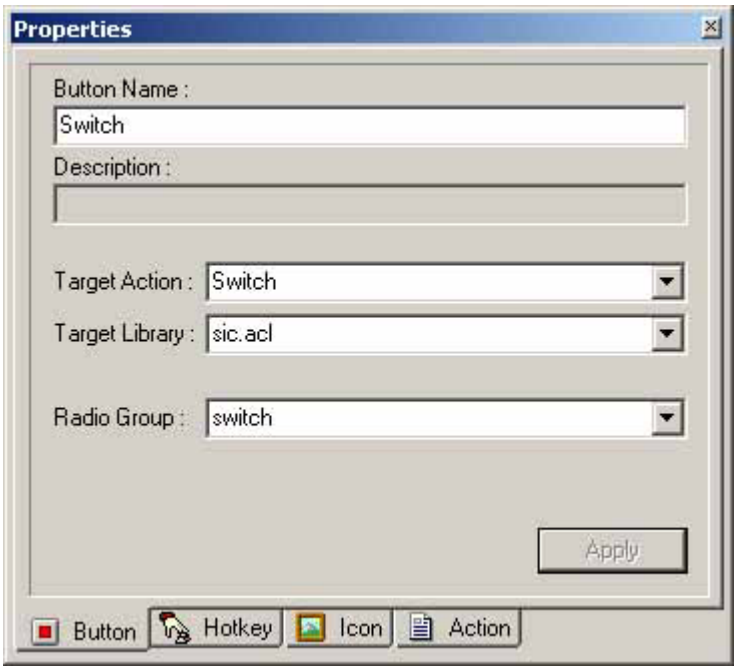


Figure 37. Dialog *Properties* for buttons

The ***Properties*** dialog has four tabs, which access four different panels:

- Button – for naming buttons and associating with an Action
- Hotkey – for assigning Actions to specific keyboard key sets
- Icon – for altering the appearance of a button by either assigning a graphic or a snapshot from the Render Output window
- Action – for creating and editing actions.

Button Panel

In field **Button Name** it is possible to change the name of the button. The description of the button in the field **Description** is obtained from the ***Action*** associated with the button. Reference to this ***Action*** is found on drop-down list **Target Action**. In the drop-down list for **Target Library** can be found the library for the *Target Action*. To replace this library, first change the Action using the drop-down list **Target Action**, then use the **Target Library** drop-down list.

To change the **Radio Group** for the ***Action*** use the drop-down list **Radio Group**. It is possible to create new radio-group or to choose from existing Radio Group from the drop-down list.

Clicking on the **Apply** button of *Properties* dialog keeps all changes but does not close the dialog.

Hotkey Panel

You use the **Hotkey** Panel to make a key board button equivalent to an **Icon** on the **HotBar**. This panel is also used to replace any **Hotkey** for a different hot key (keyboard shortcut).

Icon Panel

The **Icon** Panel controls the appearance of button on any **HotBar**. New actions can be assigned to a button from the **Icon** panel as well. You can use customized graphics or even a captured image (**Snapshot**) from the project video. Changing the appearance of an icon involves the use of two *Properties* dialogs.

- Click on the title bar for the ***HotBar*** to which the button belongs and then access the *Properties* dialog for the ***HotBar*** by pressing ALT+ENT. This will present the ***HotBar*** *Properties* dialog below (Figure 38).

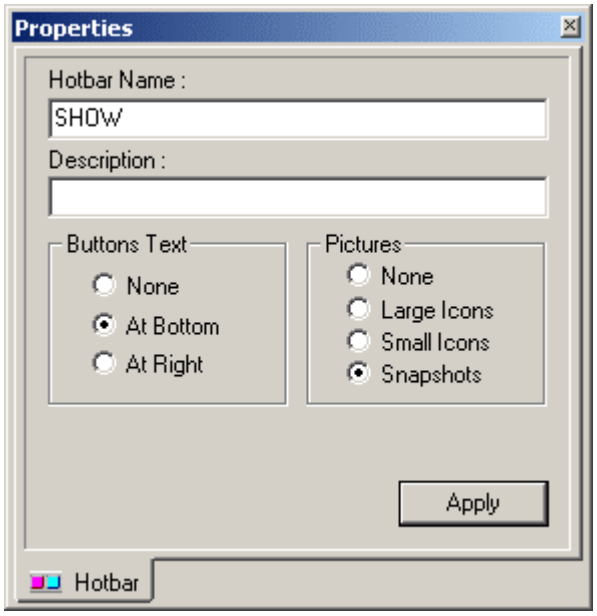


Figure 38. *Hotbar* Properties Panel

- In the ***HotBar*** Properties dialog, you can set or change the ***HotBar*** name (***Hotbar Name***) , add a description (***Description***), specify if text is used with the button and its placement (***Buttons Text***) and if graphical icons or snapshot pictures are used for the buttons (***Pictures***). The ***Apply*** button saves any changes made in this dialog.
- To select a different icon or create a snapshot you must access the Icon Panel ***Button Properties*** dialog (see Figure 37). This is done by first doing a single click on the button and then pressing the right mouse button to bring up the contextual menu for the button (Figure 36) and accessing the *Properties* command or by using the keys ALT+ENT. Then click on the Icon tab and the Icon panel in (Figure 41) will be available for use.
- The name of the *Button* in the ***HotBar*** you clicked on appears in the dialog and next to it is a drop-down list where you will find folders in the system containing a variety of graphics that can be used for icons. As you select different folders, the contents of the folders will be shown in the main window of the dialog. Choose a graphic image and then press the *Apply* key. This will now become the new icon in the ***HotBar*** for this button.
- Utilizing *Snapshot* images copied from the *Render Output* windows for the HotBar buttons is described in detail in section 3.5.3.

3.5.3 Use of Snapshots

The use of **Snapshots** requires three basic steps:

- Selecting the Snapshots option
- Capturing a Snapshot image from the Render Output Window
- Assign the Snapshot image to the button

Snapshots are images copied from the *Render Output* window for use on button on the **HotBar** (see Figure 41). These buttons use images instead of icons but function like buttons. To use **Snapshots** for the buttons in a ***HotBar***, you must first select Snapshots in the ***Hotbar*** *Properties* dialog. (see Figure 38). To open this dialog, click on the title bar for the ***Hotbar*** and press ALT+ENT. Select *Snapshots* and click on the *Apply* button to activate the other tools needed to create and use snapshots as buttons. The icons for the ***Hotbar*** will now look like 35mm cameras.

The next step to create a Snapshot is to click on one of the 35mm icons and press the right mouse button to display the contextual menu for the button. On this menu you will find the menu **Take&Set Snapshot** (Figure 39 below).

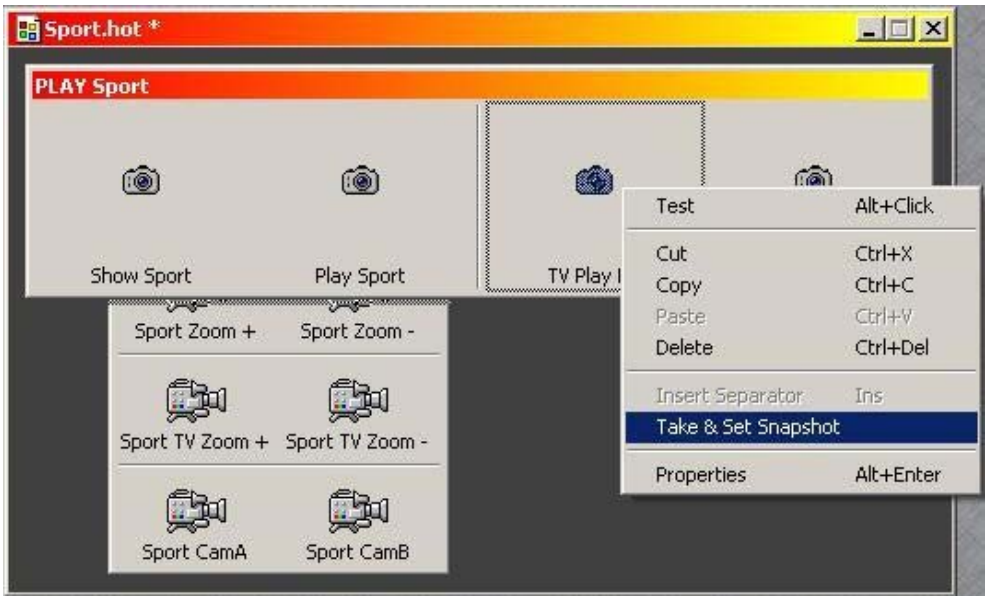


Figure 39. Contextual Menu with Take & Set Snapshot Command

Selection of the **Take&Set Snapshot** command in the contextual menu first captures the current image in the **Render Output** window and then displays the *Save As* dialog shown below (Figure 40). Here you can define which directory to save the capture image (the default directory is **Shots**) and the file name. The only file type option available is bitmap so files are saved with the extenstion .bmp. The default file name is the button description specified in the ***Button*** Properties dialog (see Figure 37). The ***Save*** button saves the name and path for the image file and the ***Cancel*** button aborts the snapshot process.

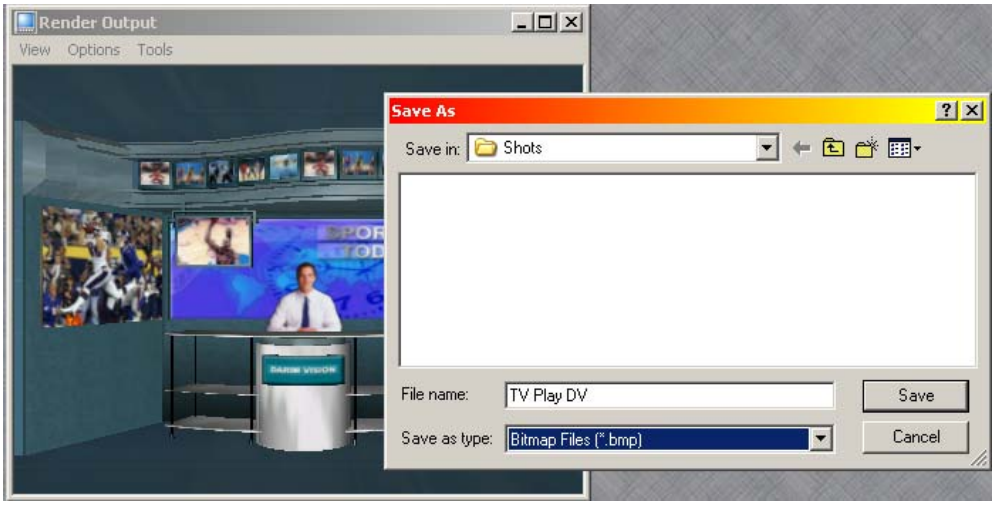


Figure 40. Save As dialog for Snapshots

To perform additional captures and assignment of an image to a button, you must use the **Icon** panel of Button *Properties* dialog (Figure 41).

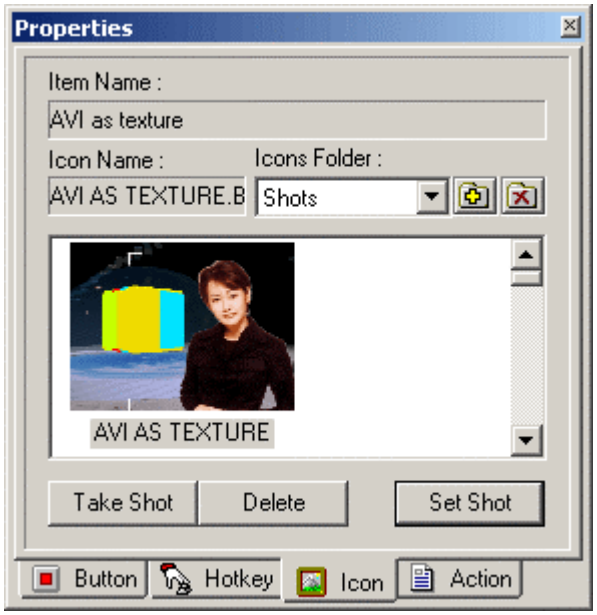


Figure 41. Icon Panel of Button Properties Dialog

In the drop-down list of the **Icon Folder** allows choosing a directory to which images for the button are saved. As additional images are saved, they will be displayed in the window for the dialog.

Using the **Set Shot** button assigns the selected image in the dialog window. This image will immediately become the button on the ***Hotbar***. Note, that pressing of button **Delete** deletes the chosen image as well as from your system hard drive.

Action Panel

The name, description and script for an ***Action*** assigned to the button are displayed on the **Action** panel. The changes developed here are immediately reflected in the original script. Similarly, changes edited in the script of ***Action*** in the library are immediately reflected in the button Properties panel by pressing the button  . Turn to section 3.4.2 for a detail description on the use of the **Action** panel.

3.5.4 Contextual menu and dialog *Properties* for *HotBars* and *Hotsets*

Contextual menu of ***Hotset*** contains the basic commands of manipulation of ***HotBars***. These commands are identical to commands of menu **HotBar** of the *HotActions* main window (see section3.5.6), except for presence of the command **Properties**. To access this contextual menu do a single click on the title bar of the ***HotBar*** and then do a right mouse click. (See Figure 42)The contextual menu shown will be available.

Figure 42. Contextual Menu for *HotBar*

The *Properties* dialog of any ***HotBar*** in ***Hotset***, is shown in (Figure 43). More detail about working with buttons is found in sections 3.5.2 and 3.5.3.

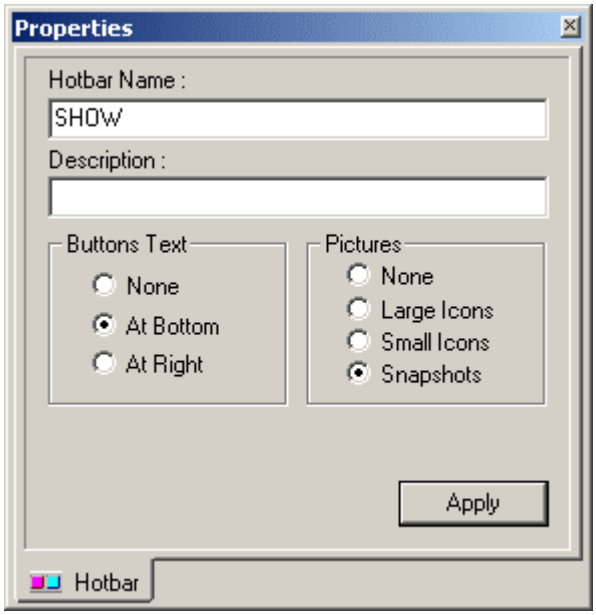


Figure 43. HotBar Properties Panel

3.5.5 Alternative representation of *Hotset* as an Outline

For configuration of a ***Hotset*** it is possible to use its alternative representation as an Outline document.

This document contains one or several folders for each ***Hotbar*** in the ***Hotset*** (Figure 45). To access this version of ***Hotset***, do a right mouse click on any empty area of the ***Hotset*** and a contextual menu will be displayed with the command **Configure** (Figure 44).

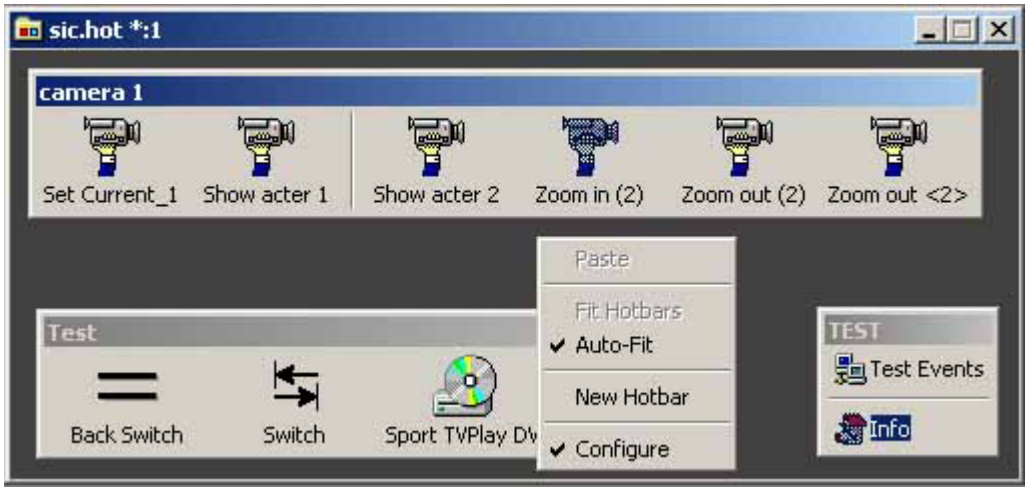


Figure 44. Contextual Menu for *Hotset*

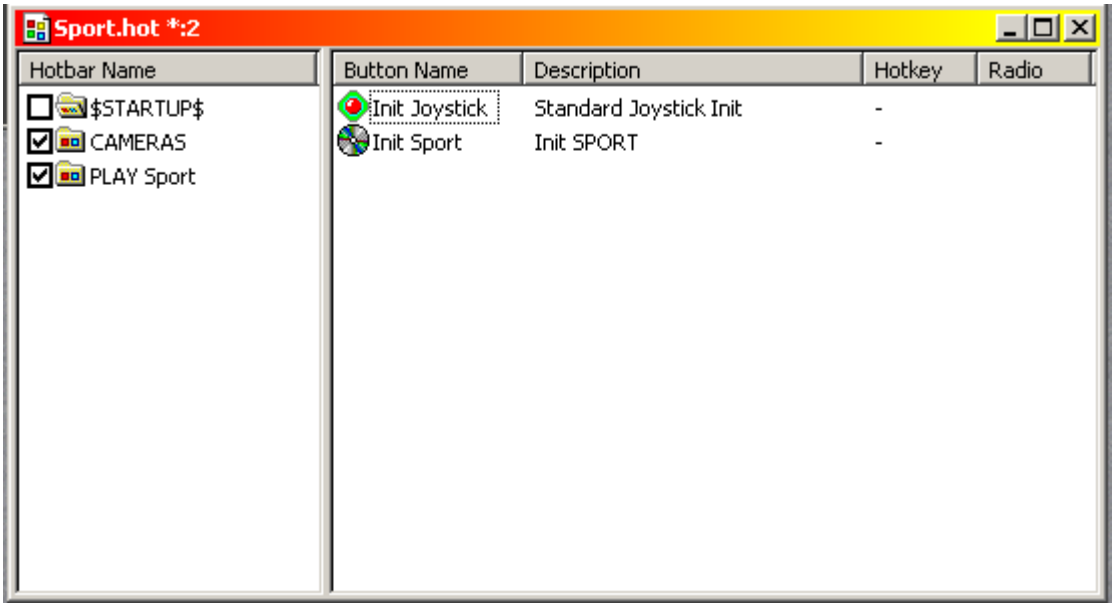


Figure 45. Outline version of *Hotset*

Accessing the **Configure** command presents the outline version of the ***Hotset*** shown above in Figure 45. A click on the different ***Hotbar*** names on the left side of the screen displays the contents for that ***Hotbar*** folder on the right side of the screen. Using the contextual menu for a button in this screen (see Figure 46), lets you perform all button management activities.

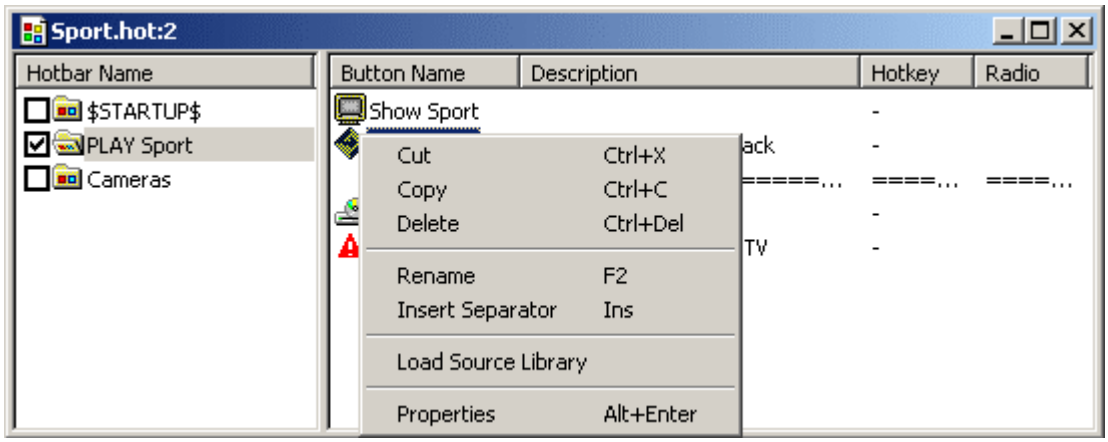


Figure 46. Contextual menu of Outline window for a *Hotset*

The check marks next to the ***Hotbar*** names indicate if the ***Hotbar*** can be displayed (checked) or is hidden (unchecked).

The order of references in the folders corresponds to the order of buttons. To add references in folders (and buttons on ***Hotbar***) it is possible to drag ***Actions*** from an open ***Action Library***, use references from other folders, or buttons from others ***Hotbars***.

Other activities can be done from the contextual menu. For example, the divider between buttons of of ***Hotbar*** is inserted by pressing of button **Insert** or using command of contextual menu **Insert Separator**. The similar command is in the contextual menu for the button (Figure 46). The divider appears before the chosen (button) and can be removed by pressing keys **Ctrl+Del** or use the command **Delete** from the same menu.

References to ***Actions*** which are executed at each initialization of a scene, are located in a folder ***$STARTUP$***, available in every ***Hotset***. Usually in this folder is located startup ***Action***, and its ***Hotbar*** is usually hidden. More about startup ***Actions*** is in section 3.11.2.

3.5.6 *Hotset* and *Hotbar* Menus in Main *HotActions* window

Hotset Menu

When working with a ***Hotset*** in the main *HotActions* window the dynamic menu ***Hotset*** (Figure 45) appears. It is identical to contextual menu of ***Hotset*** with the following commands:

- **New Hotbar** – creates a new ***Hotbar***.
- **Fit Hotbars** – changes sizes of ***Hotset*** such that all ***Hotbars*** are completely visible. It does not stop the overlapping of ***Hotbars***. To avoid overlapping, use the **Auto-Fit** command.
- **Auto-Fit** – this option changes all sizes of ***Hotbars*** such that all are completely visible and there is no overlapping of the ***Hotbars***.
- **Open All Source Libraries** – this command opens all ***Actions Libraries*** referenced in the ***Hotset***.
- **Background Color…** – opens dialog for choosing background area color of ***Hotbar***.
- **Configure** – represents ***Hotset*** as an outline document containing one or several folders for each ***Hotbars*** (see section 3.5.5).

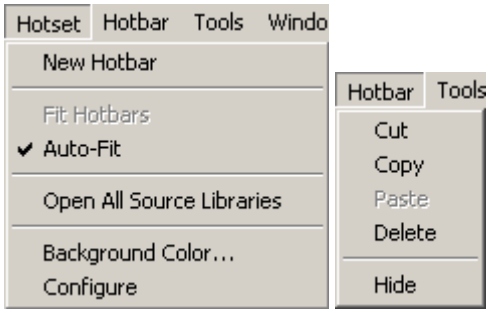


Figure 47. Hotset and Hotbar Menus of main window

Hotbar Menu

Also in the menu bar of the main HotActions window is the ***HotBar*** menu (Figure 47) that contains commands of manipulation of ***HotBars***:

- **Cut** – deletes chosen ***HotBar***, placing it to the clipboard;
- **Copy** – copies chosen ***HotBar*** to the clipboard;
- **Paste** – inserts chosen ***HotBar*** from the clipboard to ***Hotset***; this command is accessible if a ***HotBar*** is in the clipboard as the result of using the *Cut* or *Copy* commands;
- **Delete** – removes chosen ***HotBar***.

Commands of the ***Hotbar*** menu are identical to commands on the local menu ***HotBar***.

3.6 Operations with *Project*

HotActions organizes all its activities within the **Project** file. ***HotActions*** only works with one project file at a time. When opening another **Project** file, the system first asks if the current changes should be saved.

3.6.1 Operations with project file

To open any existing *Projects* choose the command **Open Project…** from **File** menu of the main *HotActions* window. This opens a standard file dialog where you can select the file type ***Project*** so that only files with the extension .vsp are listed. After the first opening a *Project*, the name of ***Project*** will appear under the command **Recent Projects** in the **File** menu.

New *Projects* are created by the command **New Project** in menu **File** (Figure 48).

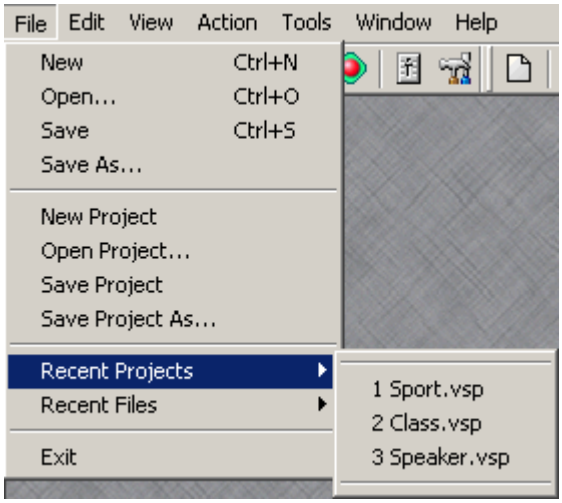


Figure 48. File Menu of main window

To save the current *Project* you should use the commands **Save Project** or **Save Project As…** in the **File** menu (Figure 49) Save Project As… command allows saving the project with a new name. Also it is possible to use the button  if the main window to execute **Save Project**.

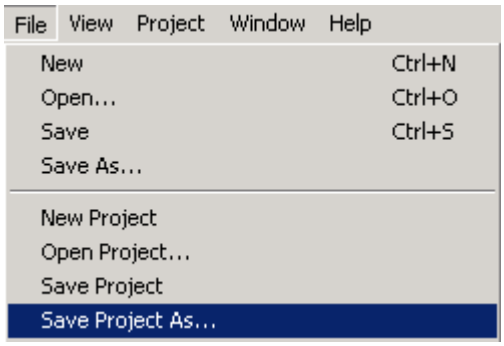


Figure 49. File Menu of Open Project

Note: If you transfer a Project file by a method outside of the HotActions program, for example, the folder references to all files in the Project may now appear wrong, and to you will have to specify the path for each file. Therefore to copy a Project and preserve its connections to other files and folders, it is best to use the command ***Save Project As…*** *All references to files will be updated automatically.*

3.6.2 Working with files and file groups in Project

The window of each Project contains ***Standard Groups*** – with separate folders for each standard type of file used by *HotActions*:

- Group **Scenes** for scenes (files with extension ***.3d**).
- Group **Hotsets** for ***Hotset*** (files with extension ***.hot**).
- Group **Libraries** for libraries of ***Actions*** (files with extension ***.acl**).

HotActions also supports text documents (files with expansion ***.txt**). In the Project, an addition or creation of a text document causes the creation of the group **Texts**. It is also possible to create a group for any type of file as is described further.

At creation of files in the Project they are automatically saved to the appropriate group. If you try to add a file to a standard group that is not the same type as a file it will be placed automatically by the program in the group of files of that type.

Standard groups for files used by *HotActions* can not be removed nor renamed. However, a ***Custom Group*** can be created for non-standard file types. To create a ***Custom Group***, perform a right mouse click in an empty area of the Project window. This will bring up the contextual menu shown in (Figure 50).

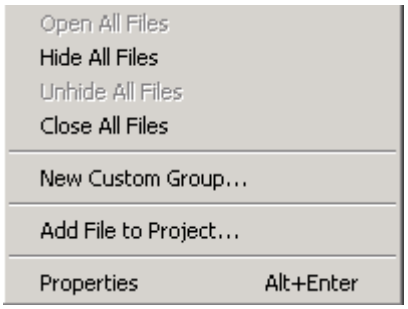


Figure 50. Contextual Menu for Project

Selecting the **New Custom Group...** command will display the panel below in Figure 51. Here you can enter a name for the ***Custom Group*** and save it by clicking on the **OK** button. **Cancel** button stops the creation of a ***Custom Group***. In any ***Custom Group*** you can hold references to files of different types simultaneously.

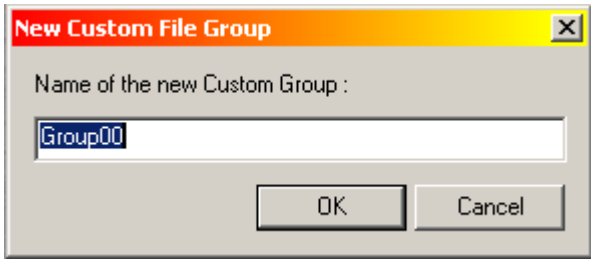


Figure 51. Custom Group Name Dialog

- Commands **Open All Files** and **Close All Files** of the contextual menu of the *Project* window open and close all files accordingly, which are associated with the project.
- Commands **Unhide All Files** and **Hide All Files** hide and show all files, which are included in the *Project*.
- Command **New Custom Group...** creates a new custom file group (Figure 50 and Figure 51).
- Command **Add File to Project** adds a file to the open project. However it is necessary to specify the path to the file in dialog.
- Command **Properties** causes dialog *Properties* for last chosen group to be displayed (Figure 51).

Contextual Menu for a Specific Group

A click with the right mouse button on the icon for a specific presents the contextual menu for the file group shown in (Figure 50). Commands available for working with groups include:

- commands **Open Group** and **Close Group** open and close all files which are included in group.

Note: It is desirable to not close files used in the project since re-opening a file (particularly scene files)_can require a great amount of time. If you do not want a particular file to be opened, it is recommended to hide files with the help of the commands described below.

- Commands **Unhide Group** and **Hide Group** hide and show all documents which are included in group;
- commands **Delete Group** and **Rename...** accordingly delete and rename Custom groups (standard groups can not be renamed or deleted);
- command **Properties** causes the display of the *Properties* dialog for the group (Figure 52).

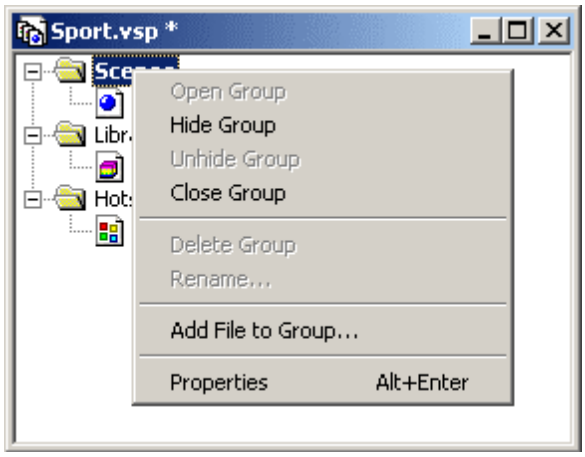


Figure 52. Contextual menu for a Group

In the *Properties* dialog on the contextual menu for **Group** in the *Project* window, there are two panels **File** and **Directories.** (Figure 53) Under the **File** panel you can a description for the group, which can help you find files.

In the **Directories** it is possible to specify additional search paths for file types in the current project. This panel concerns to the project as a whole and is identical to files and groups shown on the right in Figure 53.

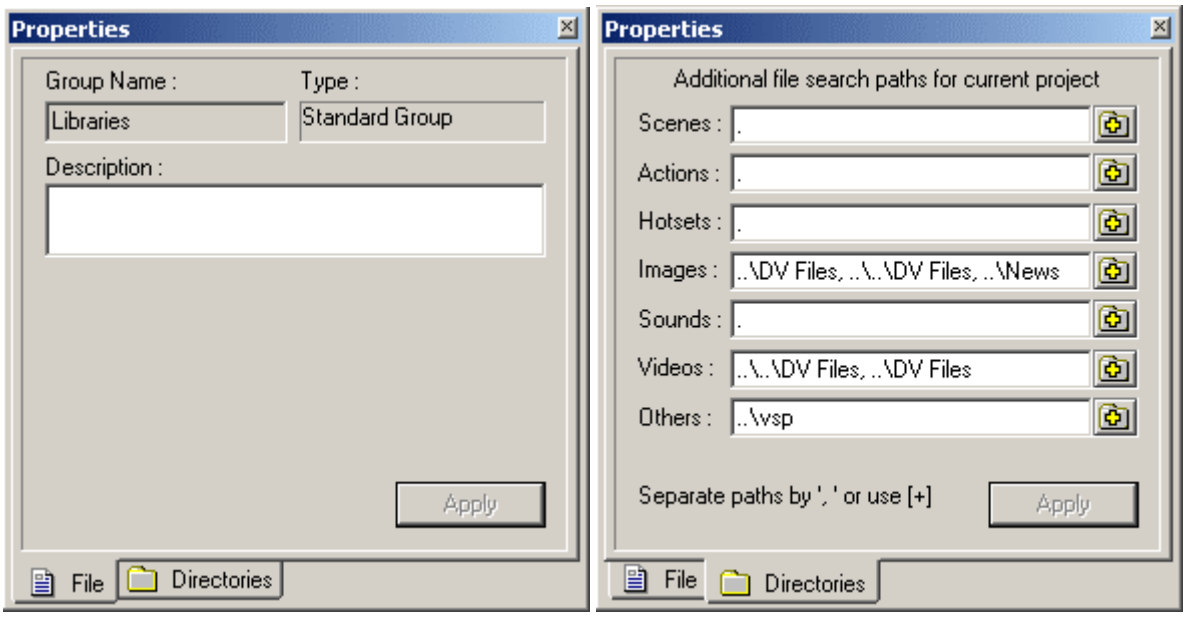


Figure 53. Panels File and Directories of the Group Properties Dialog

If the file specified in the project is not found, the program searches for it, using the following methods:

1. It looks in the current folder of the project.
2. In the folders for the given type of file as specified in (Figure 53, on the right)
3. In the **Default Directories** in *Options* dialog (See 5.2),

If the file can not be found then the message in Figure 54 is displayed.

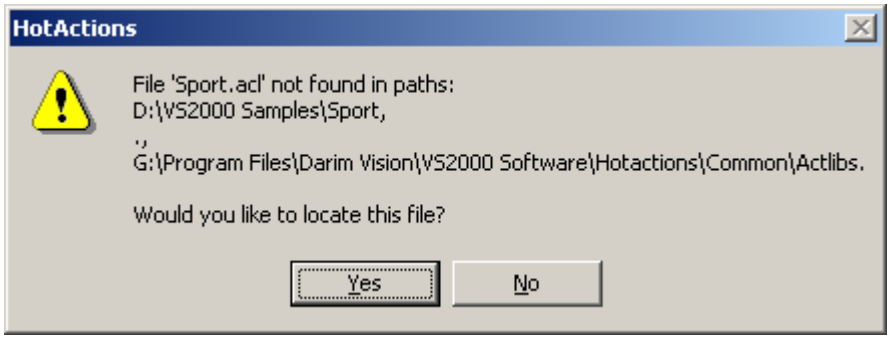


Figure 54. Message displayed when File not found

The **Yes** button opens a dialog to manually find the file.

3.6.3 Project Menu of *HotActions* main window

When a *Project* is opened, then the dynamic menu **Project** (Figure 55) is added to the menu bar for the main *HotActions* window. Commands of the **Project** menu duplicate commands on contextual menu for the *Project* window (Figure 50 and Figure 52).

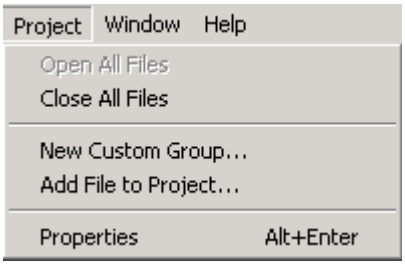


Figure 55. Project menu of main HotActions window

3.7 Operations with text documents

HotActions supports standard operations with text documents (files with expansion ***.txt**). At addition or creation of the text document, it is saved in the standard group **Texts**.

For opening a file not in structure of the Project use the **Open...** command in **File** menu. Then in the *Open* dialog choose the folder and the name of a file to be used. You can confine the list of files displayed to those with the extension «**.txt**» in the drop-down list. Once opened the file will now appear on the list of files under the command **Recent Files** on **File** menu. At opening a file the program will ask, whether you would like to add it to the current Project.

For saving changes in a file choose command **Save** from menu **File** or its equivalent – the button on the tool bar. To save a file with other name use command **Save As...**.

Using a new text document adds the choice of **Text Document** to the *New* dialog that is invoked with the command **New** in menu **File** of the main window or pressing of keys **Ctrl+N**.

3.8 Control of *HotActions* in *Live Action* mode

As discussed earlier (see section 3.1.6) *HotActions* has two modes of operation: ***Edit*** (editing) and ***LiveAction*** (operating conditions).

To place the program in operating conditions (***LiveAction***) press the button (**Start LiveAction**) on the tool bar of the main window. When engaged the image of the button is replaced by – . To return to edit mode, press .

In ***Live Action*** mode, by default the main window passes into a **Fullscreen** display, and if a second monitor is used an image of a scene will appear. Adjustments to ***LiveAction*** mode are discussed under the details for the

Options dialog (see chapter 5). Note that in ***LiveAction*** mode a dagger in a right corner of a window designates the file is hidden.

The contextual menu for ***Live Action*** mode will appear with a click of the right mouse button of the mouse on the empty area of the main window.

3.9 Use of mouse and joystick for control of objects

3.9.1 Selection of Object for manipulation

When you only have just opened a scene, in the structure of the Project, the object chosen for a manipulation, by default, is the object of a scene with the name **ALL**. If an object with the name **ALL** does not exist, the object, which was chosen last at the previous opening the scene is used.

In the working window of a scene (see Figure 56 below) it is possible to choose any object for manipulation, for example, the camera, by clicking on it twice with the left mouse.

Figure 56. Output of selected object Camera01

The name of the object chosen for manipulations is displayed in a window of a scene with a bold font. In Figure 56 **Camera01** is the selected object and its output is displayed in the Render Output window. Note there is a special of script command **<Current>,** which indicates the current chosen object is to be acted upon by the script. A change of the selected object changes the object addressed by the **<Current>** command.

The following keys manipulate the chosen object:

Tab	cycles through the axes of rotation/moving;
Space	«blank», stops movement, reduces speed of object equal to zero;
+ / –	increase/reduce speed of movement of object, i.e. at the speed equal to zero, on movement of the mouse or joystick (or on pressing arrows of the keyboard), the object rotates around of the current axis.

Modifiers:

Ctrl	on movement of the mouse or joystick or on pressing arrows of the keyboard the object is scaled along the current axis;
Alt	the object moves along the current axis in space of a scene.

If the chosen object is the **Camera** the following keys are also available:

Home	sets the focal length (Zoom) of camera in default;
PgUp / PgDown	increases/reduces the focal length.

Control of the camera by a joystick should be carried out not directly, but via empty objects (***Dummy***) to which the camera is connected for control of a scene created in *3D Studio Max*.

3.9.2 Joystick initialization

If a joystick is to be used as a control device, it must be initialized as a ***Startup Action*** (see 3.11.2). The Action script must use the command **«Init Joystick»** from *Action Library* «**Joystick.acl**». This library is comes with *VS2000* as an example of working with a joystick and can be found in the folder **C:\Program Files\Darim Vision\VS2000 Software\HotActions\Common\ActLibs** if the studio is loaded on disk **C**.

The program's ***Actions*** are made to manipulate an object by a joystick, and it also accept reactions of the program by engaging the joystick buttons. In ***Actions*** using a joystick the object for manipulations always is the current chosen object in a scene – and in script commands is referred to by the name **<Current>**.

If it is necessary to change the reaction of *HotActions* to manipulations with a joystick turn to the document **Script Commands Guide**.

3.10 Use of *Debug Output window*

In *HotActions* it is possible to display diagnostic messages, error messages, warnings and other system information for purposes of tracing the source of problems with the system. For this purpose the output window *Debug Output* is used. The Debug Output window appears by selecting the option **Debug Output** in menu **View** or pressing **Ctrl-Shift-0**. It is also available by pressing the button  on the tools bar of the main window of *HotActions*: (See Figure 57)

Figure 57. Debug Window Output button

The types of messages displayed in the Debug Output window are determined in the Debug Output panel on the Options dialog. Details on the use of this panel are described in section 5.3. Debug messages and error message are also automatically saved to a log file. The name of the log file is set in the Options Debug Output panel. This file can be emailed to technical support if necessary.

When invoked, the window *Debug Output* appears across the bottom of the screen. To detach and turn this window into a floating condition, perform a double click on the windows left border with the left mouse button. It can be restored to a fixed position by using the command **Docking View** in the contextual menu for the Debug Output window or a double left mouse click on the top border of the window. (Figure 57)

Options **Show Columns** of the contextual menu allows to inclusion of two additional columns: *sending time* and *module name*. The sending time is in the format «minutes:: seconds:: milliseconds» (column head **Time**), and information on which module of the program initiated the debug message is shown under the column headed **Module**.

Command **Clear** clears the window of all received messages, but does not delete them from the log file. Command **Hide** is equivalent to closing of the Debug Output window. Icons to the left of the message correspond to its category (Figure 58).

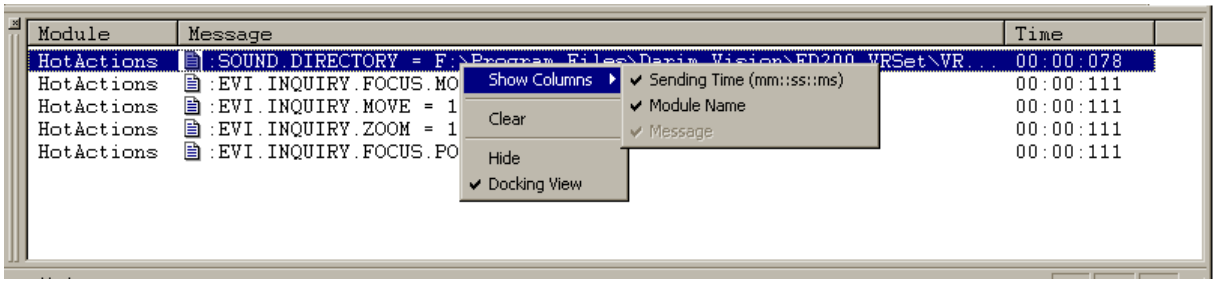


Figure 58. Debug Window

3.11 Use of scene files (*.3d) in *HotActions*

A full example of working with scenes for use during the creation of a Project is depicted in the document **3D Scene Creation Guide**. To learn more about creating objects that can be used in scenes created in *HotActions*, turn to the manual for *3D Studio Max*. Scene files created by *HotActions* have the file extension **.3d**.

Scene files can be used in existing projects of *HotActions* or used in the creation of a new project. Tools to control actions of objects in scenes are described in the following sections. An Action is a series of text commands. They are universal, easily changed and transferable. Every ***Action*** can be executed by a pre-assigned specific button.

3.11.1 The function of startup *Actions*

Actions are organized in ***Actions Libraries*** (files with expansion *.acl). The Project file contains references to all files used by the Project including ***Action Libraries***.

Actions that initiate a scene are found in the folder ***$STARTUP$***. The folder ***$STARTUP$*** is created automatically in every ***Hotset***. By default this folder is hidden, but it can be made visible through the configure command on the ***Hotset*** contextual menu. (see section 3.5.5). *HotActions* automatically executes the contents of ***$STARTUP$*** folder when ***HotActions*** is put into ***LiveAction*** mode or on pressing the button  on the tool bar of the main window. Note, this button is accessible only when a project is open in ***Hotset***.

Actions in the ***$STARTUP$*** folder are carried out in a precise order – but it is possible to change the order of execution by changing references in the ***$STARTUP$*** folder. It is possible to alter the contents of an existing ***$STARTUP$*** folder as a basis for creating a new ***$STARTUP$*** folder in a new project. Some of the advantages to re-using startup ***Actions*** are uniformity of work between projects and it may be possible to execute an unfamiliar project to get a feel for how it looks by pressing the button  .

3.11.2 Creation of startup *Actions*

The primary task of startup ***Actions*** is to set the initial working conditions. The basic required actions are listed below. The example is startup ***Actions*** for a scene in the sample project ***Sport***. They are in the script – «**Init Sport**»:

- First required action is to load a scene

  :DATA.OPEN = «Sport.3d»

- Objects of a scene can be animated. These movements are controlled by trajectories (also known as tracks). For control of trajectories in *HotActions* it is necessary for them to have assigned names. This is important since objects created in *3D Studio Max* do not have set names for trajectories.

  :TRACK.CAM_SPORT.NODE = CAMTRACK

This command assigns trajectories of object «CAM_SPORT» the name «CAMTRACK» for further reference in the Action script for this object.

- After transfer and naming of all trajectories, it is necessary to place the following command, to start the tracks:

  :DATA.PLAY = 1

- Another requirement at startup is the specification of video streams for a scene and their connection with available materials:

  :RENDER.VIDEO.LIVE_1.CREATE = 1

  This command creates a video stream connected to first board *FD300* in system **LIVE_1** in drop-down list **Input(s)** (Figure 5)

  :RENDER.VIDEO.LIVE_1.LINE = A

  This command selects first channal (**Line A**, Figure 5) of board *FD300*

  :RENDER.VIDEO.LIVE_1.FORMAT = ALPHA

  Establishes the format of the video stream as alpha - mixing is set.

  :RENDER.VIDEO.LIVE_1.START = 1

  Begins video stream.

  :RENDER.MATERIAL.VIDEO.SOURCE = LIVE_1

  Assigns a material with name VIDEO a video texture from the video stream **LIVE_1**, which will be imposed on all objects in the scene with this material.

In startup ***Actions*** after loading a scene and naming of tracks any typical ***Action*** can be part of the ***$STARTUP$*** folder.

Detail about each command is found in the manual **Script Commands Guide.**

4 *Render Output* window

The *Render Output* instantly displays the results of working in the *HotSet* of *VS2000*. Ideally when working with *VS2000* this window is seen on a second monitor by utilizing the expanded display in Windows. The system comes with a graphic accelerator, which allows the additional monitor for enhanced productivity. In ***LiveAction*** mode the *Render Output* window will be rendered in full screen on the additional display.

4.1 Menu commands of Main Window for *Render Output* window

Two menus of the main window have commands that affect the Render Output window.

Window menu

Command **Center Render Window** in menu **Window** of main window *HotActions* (Figure 59) places window *Render Output* in the center of a window. This is used primarily in one-monitor system configurations.

View menu

The command **Render Window** in menu **View** (Figure 59, on the right) dictates whether the *Render Output* window is displayed or hidden. The key combination **Ctrl+0** toggles between the hidden and displayed states for the *Render Output* window.

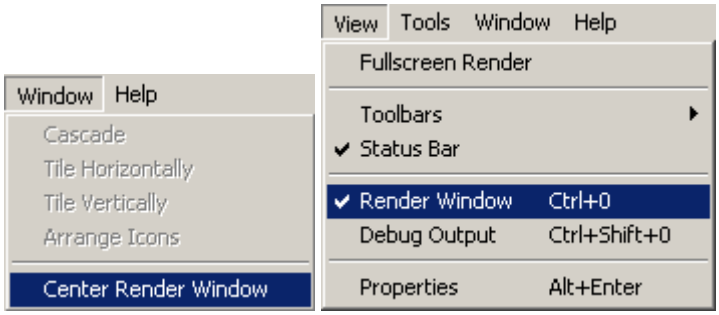


Figure 59. Window and View menus of main HotActions window

4.2 Menus on the *Render Output* Window

Three menus are available on the Window *Render Output* window – **View, Options and Tools**.

View Menu

Menu **View** (Figure 60 left) of window *Render Output* contains the following commands:

- **Frame Rate**, which allows to output some average information on productivity of studio at the given sanction;
- Three different **Screen Resolutions** each available with a hot key combination.
    - 320 x 240 – ALT+1
    - 640 x 480 – ALT+2
    - 768 x 576 – ALT +3
- **Fullscreen** allows display in a full screen mode. To exit full-screen mode use the hot key combination **Ctrl-Shift-End**.

4.2.1 Options Menu

In menu **Options** (Figure 60, on the right) command **Engine** opens dialog with information render engines used by *VS2000*. Command **Render** opens *Render Options* dialog with the information about the graphic display settings used with the *VS2000* system. Both dialogs are described in section 4.3 below.

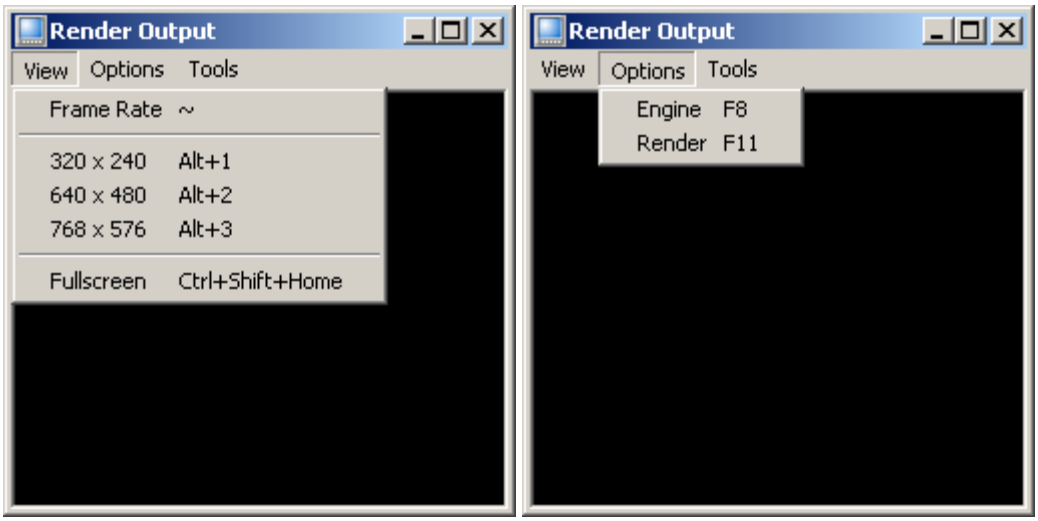


Figure 60. View and Options menus of Render Output window

4.2.2 Tools Menu

Using the commands of menu **Tools** (Figure 61) it is possible to print or save a bmp-file of the current image in window *Render Output*.

Figure 61. Tools menu of Render Output window

4.3 Dialogs of image settings

Note: It is not recommended to change the default setting of the dialogs described below without assistance of technical support. This information is given for the purpose acquainting you with the dialogs.

Dialog *Render Options* (Figure 62) contains information about settings of the display module of *VS2000*. It is presented by pressing of button **F11** on the keyboard or using the command **Engine** in menu **Options** of window *Render Output*.

*Note: In drop-down list **Mode** on panels **Devices** it is possible to change the resolution of video under operating conditions (**LiveAction**). Value **Auto** provides correct setting in required by selected TV standard (PAL or NTSC). Setting of the resolution from list **Mode** does not change the resolution established in the dialog for **Display Properties** of operational system (Figure 1).*

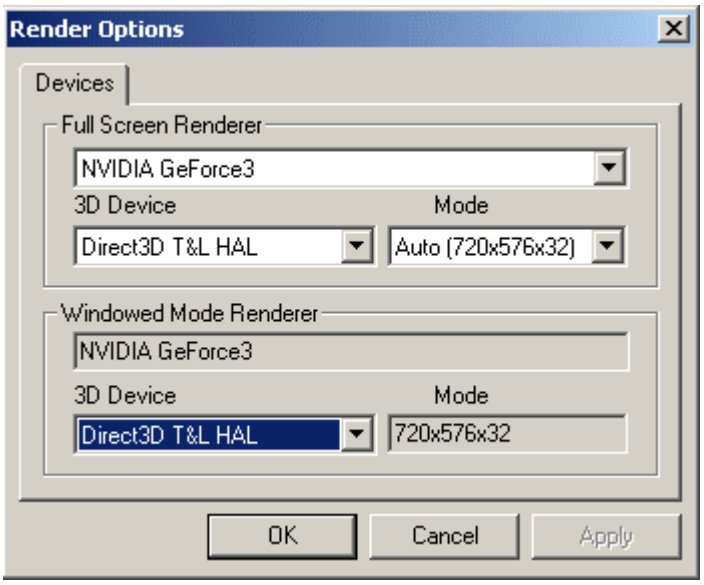


Figure 62. Panel Devices of the Render Options dialog

Dialog *Choose Render Engine* (Figure 63) displays information on the version and path for display library of *VS2000*. The dialog is displayed by pressing of button **F12** on the keyboard or accessing the command **Render** in menu **Options** of window *Render Output*. The information is required technical support.

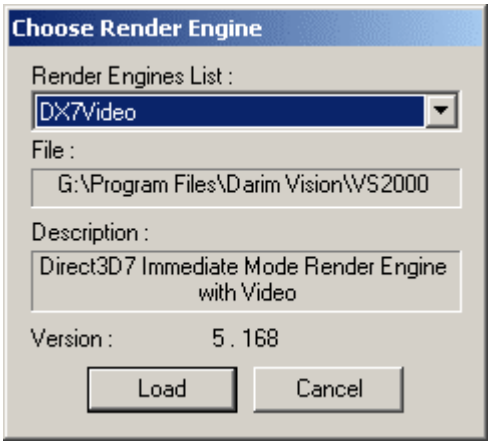


Figure 63. Dialog Choose Render Engine

5 Dialog *Options* – general settings of studio

The button  on tools panel of *HotActions* main window (Figure 64) opens dialog *Options* for installation of working settings of *VS2000* application.

Figure 64. The tools button of HotActions main window

Settings on the panel **Live Video** of dialog *Options* is described in the document "*Video and Sound Settings Guide*" for *VS2000*. Other panels of dialog *Options* are described in this chapter.

5.1 Settings of *LiveAction* mode

Panel **LiveAction Mode** (Figure 65 and Figure 66) of *Options* dialog is used for settings of ***LiveAction*** mode.

Note: It is not recommended to change the default values. The default values can be restored by pressing the button ***Default***.

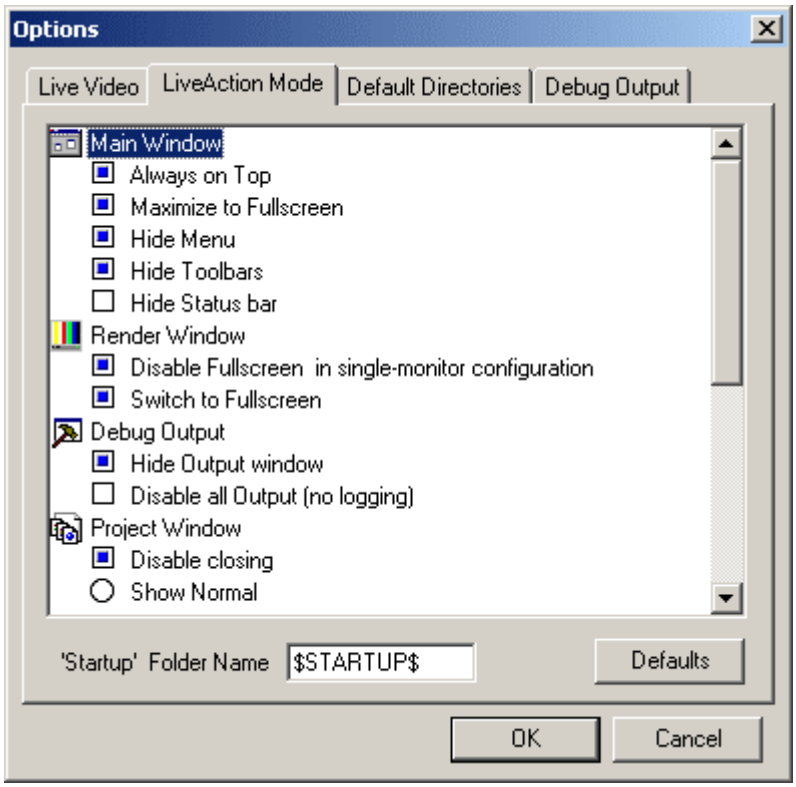


Figure 65. Panel LiveAction Mode of Options dialog

5.1.1 Main Window Parameters

In the **Main Window** group you can set the following parameters of **LiveAction Mode** mode:

Always On Top selects of the basic window to be atop windows of other applications;

Maximize to Fullscreen causes the basic window to cover the whole screen;

Hide Menu hides the menu bar of the basic window;

Hide Toolbars hides the tool bar in the basic window;

Hide Status Bar hides the status bar in the basic window;

5.1.2 Render Window Parameters

The **Render Window** group controls the following parameters:

Disable Fullscreen in single-monitor configuration

prevents switching to full screen mode in single monitor configurations. The option **Full screen** in menu **View** of window *Render Output* becomes inaccessible.

Switch to Fullscreen

dictates switching to full screen mode in the *Render Output* window. On one-monitor configurations, selection of this option will not occur, if the Disable Full-screen option has been selected;

5.1.3 Debug Output Parameters

Options available in **Debug Output** group:

Hide Output window

Hides the window of *Debug Output* dialog in ***LiveAction*** mode;

Disable all Output (no logging)

when selected cuts off the output of error and debugging message to the log file. See section 5.3.

Project Window Parameters

Settings group for **Project Window** :

Disable Closing prevents closing of the project while in **LiveAction Mode**;

Show Normal displays windows in usual mode;

Show Minimized minimizes project window.

Hide hides project window.

Scenes Window Parameters

Controls for **Scenes Windows**:

Show Normal shows scene window as usual window;

Show Minimized minimizes scene window;

Hide hides scene window.

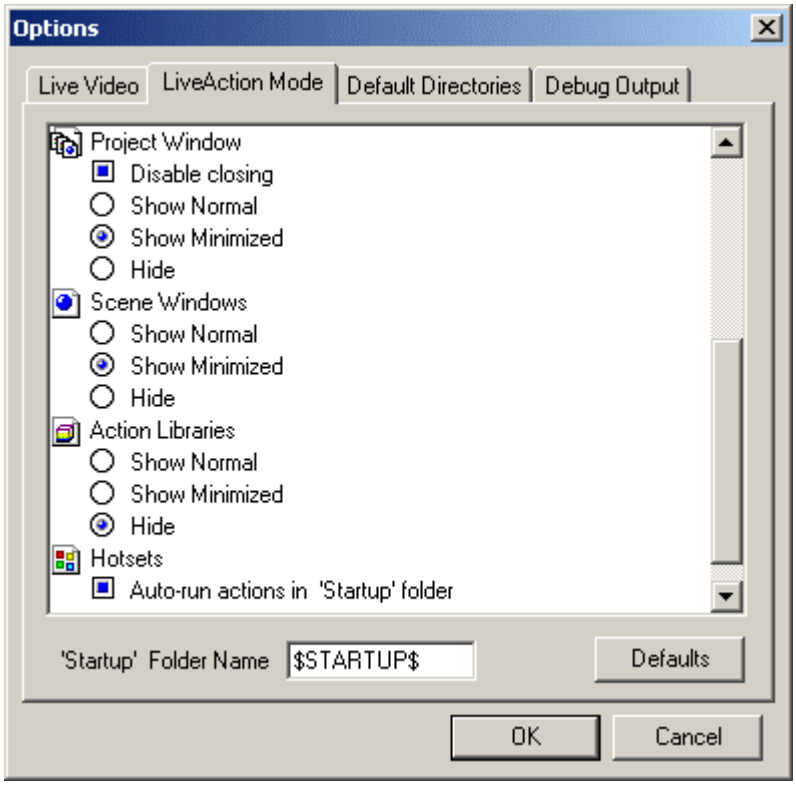


Figure 66. Panel LiveAction Mode of Options dialog

Hotsets Parameters

The parameters of the **Hotsets** group control the initial settings for ***Actions***:

Auto-run actions in 'Startup' folder

Sets the automatic performance of ***Actions*** from folder ***«STARTUP»*;**

Always open if included in Project

automatically activates windows of all ***Hotsets*** during transition to **LiveAction mode**.

The text field **Startup' Folder Name** installs the name of the folder containing startup ***Actions*** in ***Hotsets***. Actions in the folder with this name are carried out automatically each time the application is switched to ***LiveAction mode*** (section 3.11.1).

Button **Default** restores default settings.

5.2 Settings for *Default Directories*

On the panel **Default Directories** (Figure 67) are the settings for determing the order the application searches for files such as icons, pictures, libraries etc. The default order for searching for files by type used is the following sequence:

1. In the current folder of the project, i.e. where the file (*.vsp) is located.
2. In the additional folders specified in the project for a given type of file (Figure 53, on the right).
3. In the default for a given file type specified on **Default Directories** panel (Figure 67) with the indicated path.

Note: The task of directories is more than just grouping files, it is grouping them by file type as well.. Files of the certain type will only be searched for in the designated directories of the project.

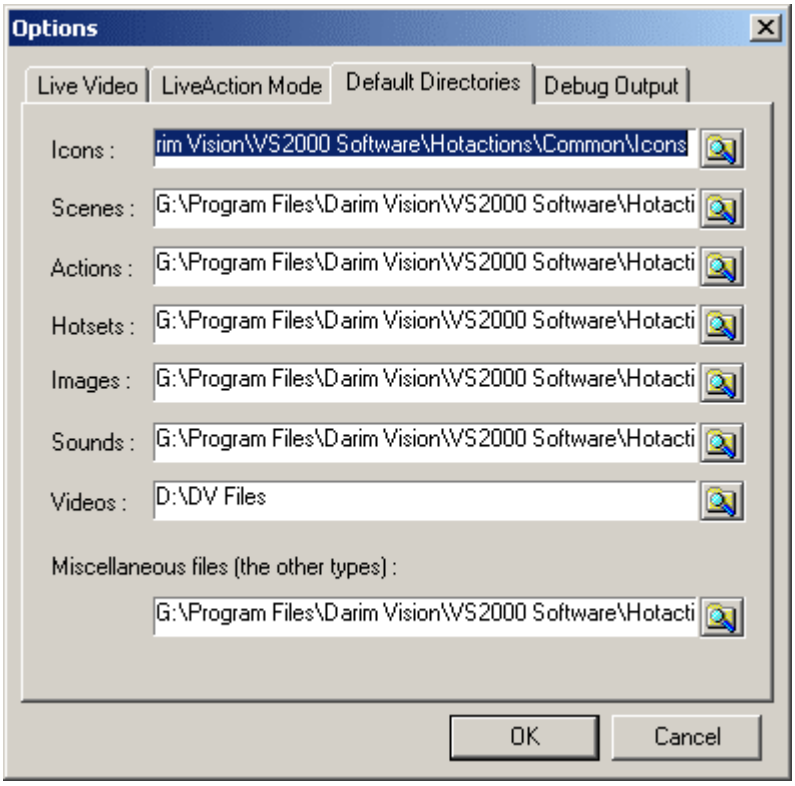


Figure 67. Panel Default Directories of Options dialog

Paths for scenes, ***Action Libraries*** and ***Hotsets*** are saved as designated by the settings in the **Default Directories** panel. Files are only searched for by the specified order if the file is not found at opening the project. If requested file is not be found, then an error message similar to that in Figure 68 is presented.

If the program does not find graphic, sound and video-files, the referenced by script commands the program will generate error messages. If the option **Script Trace** (section **5.3**) is selected, these messages appear in window *Debug Output* (Figure 69).

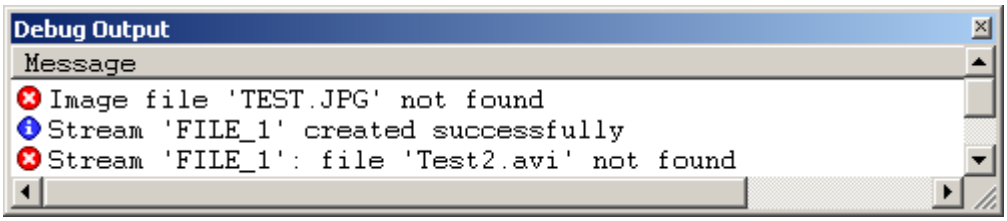


Figure 68. Error messages when specified files are not by an executed command

Note that the message for file not found also occurs if the file is damaged. Details on working with video are specified in the document **Script Commands Guide**.

5.3 Panel *Debug Output*

The last panel of the *Options* dialog is **Debug Output.** This determines which types of messages are displayed in the **Debug Output** window (Figure 69). The icons located at the left of a category will appear in the message window of *Debug Output* (see 3.10).

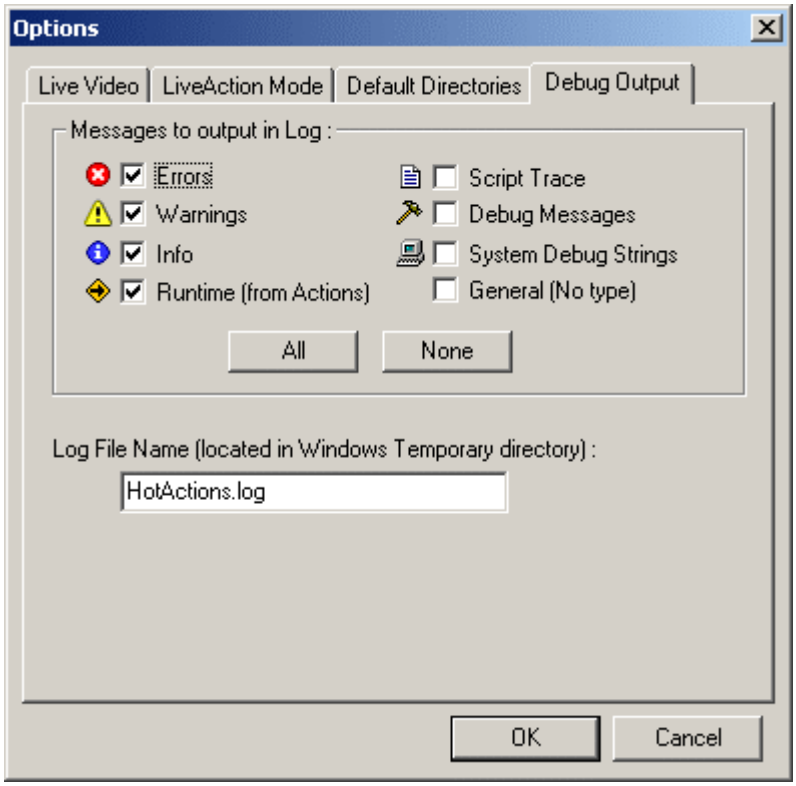


Figure 69. Panel Debug Output

Errors displays error messages;

Warnings displays warnings;

Info displays the various information: about productivity of the system, the loaded data etc.

Runtime (from Actions)
displays messages upon executing ***Action*** (see the chapter about the script command SYS.OUTPUT, used to deduce such message);

Script Trace displays the information during the course of execution ***Action***. Serves for debugging scripts;

Debug Messages option for developers, displays messages of debugging;

System Debug Strings
option for developers; displays the system debugging information (*OutputDebugString*). Note that selection of this option causes the application to intercept and deduce all messages *Windows*, including those from other applications;

General (No type)
displays all remaining types of messages.

Buttons **None** and **All** set or reset all options simultaneously.

The input field **Log File Name** sets the name for the file to record messages. The file is saved to the specific directory *Windows* for times. This directory is adjusted for each user with the variable environments for *Windows*. You can find a path to this directory in the dialog *Environment Variables*. This dialog is displayed by the following sequence of actions:

- Click the right button of the mouse on the icon **«My Computer»** on the *Windows* desktop.
- The *System Properties* dialog is displayed, select the tab **Advanced** (Figure 70, at the left) and press button **Environment Variables**.
- In the *Environment Variables* dialog look at list **User Variables for ...** (Figure 70, on the right) where there should be the name of the current user logged into *Windows*.
- Look in field **Variable** for the variable with name **Temp**. The field **Value** of this variable contains the path to directory for time file in *Windows*. This is where the log file for recording of debug messages is saved.

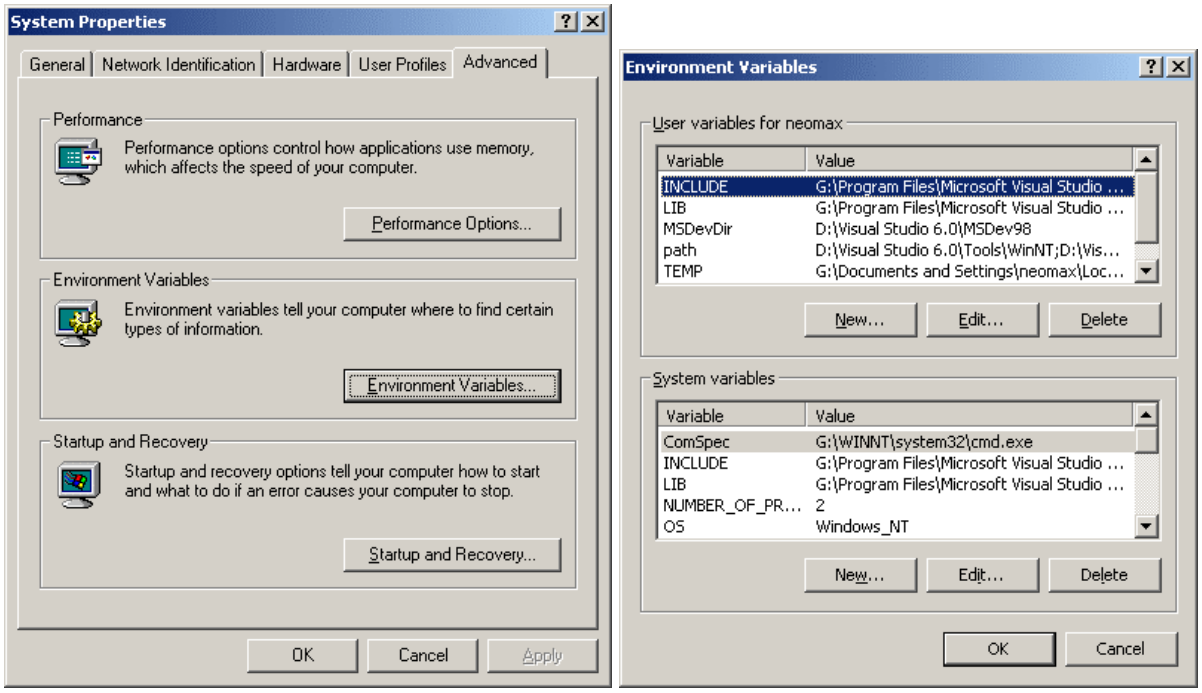


Figure 70. Systems Properties dialog (left) and its Environmental Variables dialog (right)

6 Troubleshooting

If you encounter a problem for which you can not find a solution in this chapter, you should contact to technical support. Information that is required for solution of a problem technical support may be in the file **Output.log** (see use of debugging messages is section 3.10).

6.1 Problems with working directories

Upon starting the program may ask to specify the working directories for icons (Figure 71), plug-ins, files for scene, libraries, ***HotSets***, sound and image files.

This occurs if during the installation of the program (as well as installation of updates) it could not create the folder **Common** in which all standard working directories are placed, or this folder was removed in error.

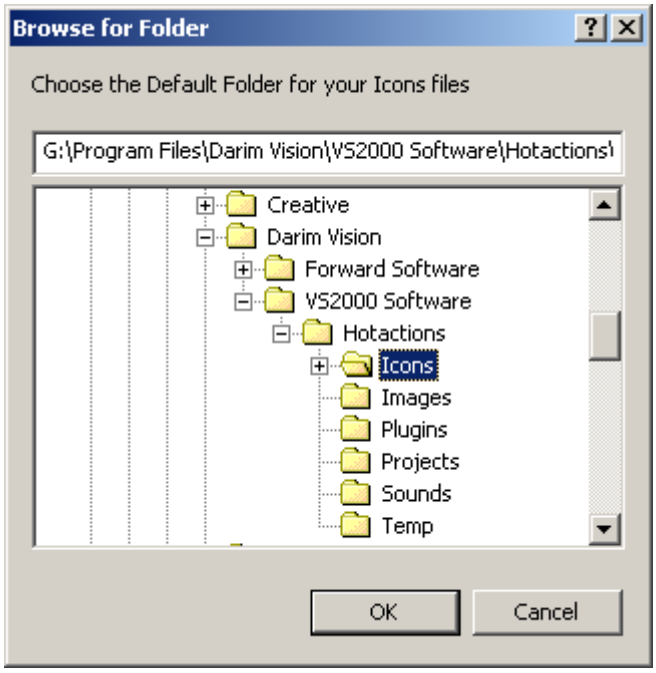


Figure 71. Dialog for setting of an icon's directory

If you have always used the standard installation method and this problem occurs you should reinstall *HotActions*. If reinstallation does not help, or you if have used some other, non-standard installation procedure, it is possible to set required directories manually.

If the application is on disk **G**, dialogs (like the one shown on Figure 71), display a path to the directory **G:\Program Files\Darim Vision\VS2000 Software\HotActions**. You can, however, specify any directory path you like. Any path to working directories can always be changed on the **Default Directories** panel (see section 5.2).

6.2 Problems with *FD300* board

6.2.1 One or several boards are not found in system

If in the **Sound, video and game controllers** section of the *Device Manager* dialog accessed by the menu commands (**Start/Settings/Control Panel/System/Hardware/Device Manager**) there is no board available or the  icon is next to the device name, most likely the board is not properly seated in the slot and it is not making a good contact with slot. Completely turn off the computer, open the box and check to see if all boards are snuggly fitted in their slots.

If the same message occurs when the computer is rebooted and *VS2000* is initiated, it is then possible that the *FD3000* board is faulty. You should contact technical support immediately.

If the board is now listed on under the **Sound, video and game controllers** of the *Device Manager*, but it is not identified as **DarimVision FDXXX Video Board** do the following steps:

- Remove all incorrectly installed boards from the list of devices. For each board click on its icon with the right button of the mouse and in the pop-up menu choose **Uninstall...**.
- Right-click on the **Sound, video and game controllers** section and in the pop-up menu choose **Scan for hardware changes**.
- *Windows* will find new devices and if the software was installed correctly, will find appropriate driver.

6.2.2 Problems with the image from cameras while adjusting input or output video

If the **Input** window of *KeyConfigPro* dialog remains grey while input and format are correctly set, reload the computer.

If the camera image problem has arisen after installation of a board, most likely the install registration for the board is incorrect.

Reinstall the board (as described in previous section) and registration (*.reg) file.

6.3 Problems with keying

6.3.1 Message Unspecified error in *KeyConfigPro* dialog

In some cases, if there is an incorrect adjustment of *VS2000* or a board, the following message (Figure 72) will appear with repeated attempts to adjust keying with *KeyConfigPro* dialog.

Figure 72. The error message while working with KeyConfigPro dialog

If you use a second computer monitor as the device for output video see chapter 4, otherwise, restart of *HotActions* does not help then completely reboot the computer.

6.4 Problems with output video

6.4.1 Single monitor configuration

At startup the program finds all graphic accelerators available in system. In a one-monitor configuration if the monitor is not connected to an output accelerator, the program, nevertheless, still uses this accelerator for the rendering. It may cause error messages similarly to those shown in Figure 74 if the output for error messages is selected for the **Debug Output** window (section 3.10).

A possible solution is to connect the monitor to an output of the graphic accelerator. The following step describe how it to connect it correctly:

- Set the monitor **Softlab DVI to Video Convertor on NVIDIA GeForce Ti 4600** to the setting **Primary** in the *Display Settings* dialog (see Figure 1).
- Physically connect the monitor to an output of an accelerator.
- In *Display Settings* dialog (see Figure 1) uncheck **Extend my Windows desktop onto this monitor** option. If you this is not done, the system will show windows such as *Windows Security* dialog for the password during the *Windows* loading.

6.4.2 Double monitor configuration

If you want to use a second computer monitor for output video, it must be connected it to the output of the graphic accelerator. To properly connect the second monitor do the following adjustments:

- In properties of the monitor for output video (as described in section 2.2), select **Analog Monitor** instead of **Digital Display** (Figure 1).
- Start *HotActions* and select **Internal->Analog encoder** in **Video Output Switching** drop-down list of **Output Mode Configure** dialog (Figure 6, see also the document **Video and Sound Settings Guide**). Otherwise the keying message shown in shown in Figure 72 will be displayed while working with *KeyConfigPro* dialog.

6.4.3 Changes in setting of input video from studio not accepted

If **DVM** panel of *Format* dialog (displayed after clicking on the **Format** button in the *Options* dialog) stays inactive, or its adjustments are not accepted, you must reboot the system. This will help guarantee that management from *VS2000* has been enabled for **DVM** board.

6.4.4 No output image

If the output image is absent, check cable connections and output connection of the graphic accelerator of **DVM** board.

In properties of the monitor for output video (as described in chapter 2.2) double check that the device of output video selected is **Digital Display**. Note this option is only available if the cable for **DVM** is connected to the DVI output connector of the graphic accelerator.

Also check in the **DVM** panel of the *Format* dialog (displayed after clicking **Format** button of *Options* dialog) mode **Mode 1** or **Mode 2** is selected in **Video Conversion** drop-down list. This dialog is described in detail in the document **Video and Sound Settings Guide**.

6.4.5 Display problem after change of format of output video

If a display problem occurs when format of output video is changed (see adjustments of **DVM** board in the document **Video and Sound Settings Guide**) and the image on the output monitor begins to shake, it is necessary to reboot the computer. Also there may be a message (Figure 73) pointing out the discrepancy of formats.

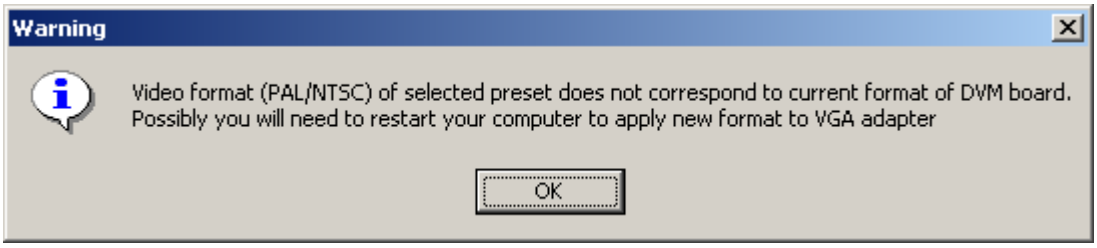


Figure 73. The message with the warning about discrepancy of formats

6.4.6 Problems with use of modes of the boards which are distinct from No *Genlock*

If in any of the modes of a board are distinct from **No Genlock**, you may get unnatural, green or crimson colors and flashes of the image. Set the parameters **XOffset** and **Yoffset** in the *Output Mode Configure* dialog (Figure 6) to zero. This dialog is described in the document **Video and Sound Settings Guide**.

6.4.7 Shaking of fragments of the output video

If the output image shakes this may mean that at startup the DVM board is incorrectly accepting DVI signal from the graphic accelerator. To make it work correctly you need to restart the system in desired mode.

For this purpose go to the **DVM** panel of *Format* dialog (displayed after clicking **Format** button of *Options* dialog) and replace the mode with a new mode, for example **Mode7**, the click on the **Apply** button. If you still

have a shaky image try a different mode until you find the one that works for you and press **Ok**. Dialog *Options* is described in the document **Video and Sound Settings Guide**.

6.5 For *DDClip* and *Forward Software* users

Playback of DV-files with script commands can fail with an error message similar to that shown in Figure 60 if an earlier version of the *Future* software or *DDClip* is installed.

This can occur during installation of software that uses shared program's components and are replaced with an older version that is not compatible with *VS2000*. The problem is solved by reinstallation of *VS2000* software after updating of the above-stated programs.

6.6 Problems caused by switching off the second monitor

6.6.1 Error message or program failure

If you have disconnected the second monitor for output video and had switched off the **Extend my Windows desktop onto this monitor** option from **Start->Settings->Control Panel->Display Properties** but have not moved the *Render Output* window to the first monitor,

the following error message typically occurs.

Figure 74. Render error message

If you try to initialize the scene loaded by the project after pressing **OK**, the program continues to work, but the results will not be displayed in the *Render Output* window. To return *Render Output* window to your working monitor, use the **Center Render Output** command in **View** menu.

6.6.2 While working with one monitor scene doesn't rendered correctly in Render Output window

In menus of the main widow **Start->Settings->Control Panel->Display Properties** select the option **Extend my Windows desktop onto this monitor** as the option for your second monitor. Move *Render Output* window to the second monitor and return it back by **Center Render Output** command in **View** menu.

6.7 Technical support

You can receive technical consultation by contacting us at the following email addresses.

7 Appendix

7.1 Schematic for connecting components of studio

For *VS2000* to work correctly, its components must be connected correctly.

VS2000 comes delivered with the computer with both hardware and software completely configured. The only installation procedure required of you is to connect of the components with appropriate cables to the back panel of the computer.

The following connections are required:

- The DVI-output of AGP graphic accelerator (***GeForce***) must be connected to a DVI-connector of the **DVM** board (Figure 75 at the left).
- If the graphic accelerator is working with two monitors, it is possible that both its connectors will be digital (DVI). If there is no additional video adapter, then the top DVI connector is used for *Windows* desktop and the bottom is connected to **DVM**.
- Connect the VGA-monitor that is used as the monitor for *Windows* desktop to a connector of the video adapter. With the help of this monitor you can operate *VS2000*. The following variants of the video adapter are now possible:
  - Additional PCI VGA adapter (Figure 73).
  - The on-board video adapter (motherboard). Its DSUB connector should be on the back panel in the same place where there are connectors for the keyboard and the mouse.
  - Support of two monitors by video accelerator with AGP. As a rule, top DVI connector is used for *Windows* desktop and the bottom is connected to **DVM**.

☝ *Note that the second connector of the AGP accelerator should not be used for connection of the VGA-monitor if there is another VGA-adapter!*

- The switching panel (***BREAKOUT BOX*** see Figure 74, passive or active) must be connected to the connectors of each *FD300* board. This allows you to connect input and output video and sound.

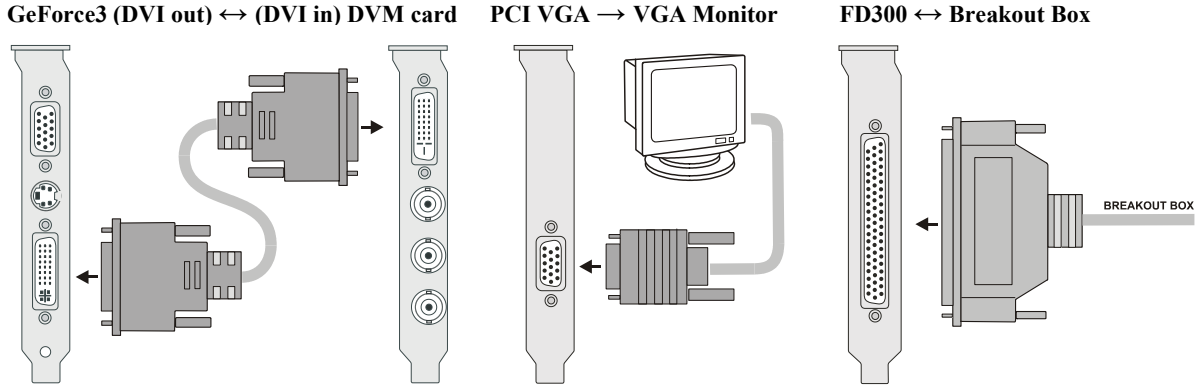


Figure 75. Connections between studio's components to the its computer environment

8 The passive switching panel *BREAKOUT BOX*

The passive switching panel ***BREAKOUT BOX*** (Figure 76, Figure 77) is for connection of analog audio and video signals. This panel is connected to *FD300* board socket by the special cable delivered together with the panel.

Figure 76. Appearance of the passive switching panel (*BREAKOUT BOX*)

Appearance of the passive switching panel is on Figure 76. All video inputs are parted for convenience into 3 identical groups. Each of them has inscription **VIDEO INPUT** and number of input group. Each group contains 4 coaxial sockets (**A**, **B**, **C**, **D**). Depending on device operating mode the following signals can give on video inputs:

- on input **A** – CVBS-A, LUMA-AB, CSYNC;
- on input **B** – CVBS-B, CHROMA-AB, Y, YS, G, GS;
- on input **C** – CVBS-C, LUMA-CD, U,B;
- on input **D** – CVBS-D, CHROMA-CD, V, R;

where:

- CVBS – composite video signal;
- LUMA, CHROMA –S-Video signal components;
- Y, U, V –YUV signal components;
- R, G, B –RGB signal components;
- CSYNC – separate synchro-signal of component input;
- YS, GS – synchro-signal of component input contains in component Y or G.

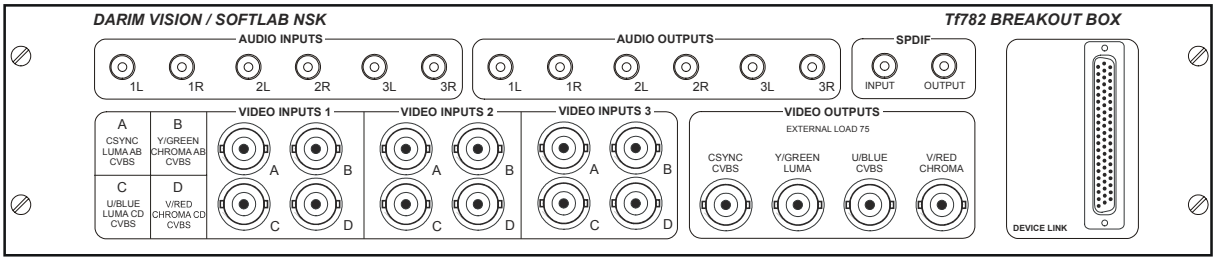


Figure 77. The passive switching panel (*BREAKOUT BOX*)

Video outputs are in the **VIDEO OUTPUTS** group. There are four video outputs RED/V/C, GREEN/Y, BLUE/U/CVBS and CVBS/CSYNC. All possible combinations are submitted in the table (Figure 78).

	VIDEO OUTPUTS connectors			
Possible combinations	**RED**	**BLUE**	**GREEN**	**CVBS**
Y/C+CVBS	C(Chroma)	CVBS	Y(Luma)	CVBS
YUV+CVBS	V	U	Y	CVBS
YUVS	V	U	Y	Sync

RGBS	R	G	B	Sync
YUV+Key/α	V	U	Y	Key/α

Figure 78. The table of video output combinations

Signal YC (S-Video) it is IMPOSSIBLE to remove simultaneously from socket miniDIN-4 ***S-VIDEO*** *and sockets* ***GREEN*** *(Y – a brightness signal) and* ***RED*** *(C – the color signal). The chroma signal (C) should be loaded on 75 Ohm. Some equipment SONY (monitors, video recorders) HAVE NOT this loading and it should be provided.*

The audio signals are parted on 2 groups: output signals – **AUDIO OUTPUTS**, input signals – **AUDIO INPUTS**. In each group six sockets are located as three L-R stereo signal.

9 The active switching panel *BREAKOUT BOX*

Appearance of the active switching panel is on Figure 79.

Figure 79. Appearance of the active switching panel (*BREAKOUT BOX*)

All video inputs are parted for convenience into 3 identical groups (Figure 80). Each of them has inscription **VIDEO INPUT** and number of input group. Each group contains 4 pairs of passing parallel coaxial BNC-sockets (**A**, **B**, **C**, **D**) and 2 sockets as MiniDIN4 for connection with S-Video signals (inputs **AB** and **CD**). With help of switches **COAXIAL/S-VIDEO** the choice of used sockets is carried out. Switches **OFF/ON** serve for switching on/off of terminal resistors 75Ohm corresponding coaxial video input.

Depending on device operating mode the following signals can give on video inputs:

- on input **A** – CVBS-A, LUMA-AB, CSYNC;
- on input **B** – CVBS-B, CHROMA-AB, Y, YS, G, GS;
- on input **C** – CVBS-C, LUMA-CD, U,B;
- on input **D** – CVBS-D, CHROMA-CD, V, R,

where:

- CVBS – composite video signal;
- LUMA, CHROMA –S-Video signal components;
- Y, U, V –YUV signal components;
- R, G, B –RGB signal components;
- CSYNC – separate synchro signal of component input;
- YS, GS – synchro signal of component input contains in component Y or G.

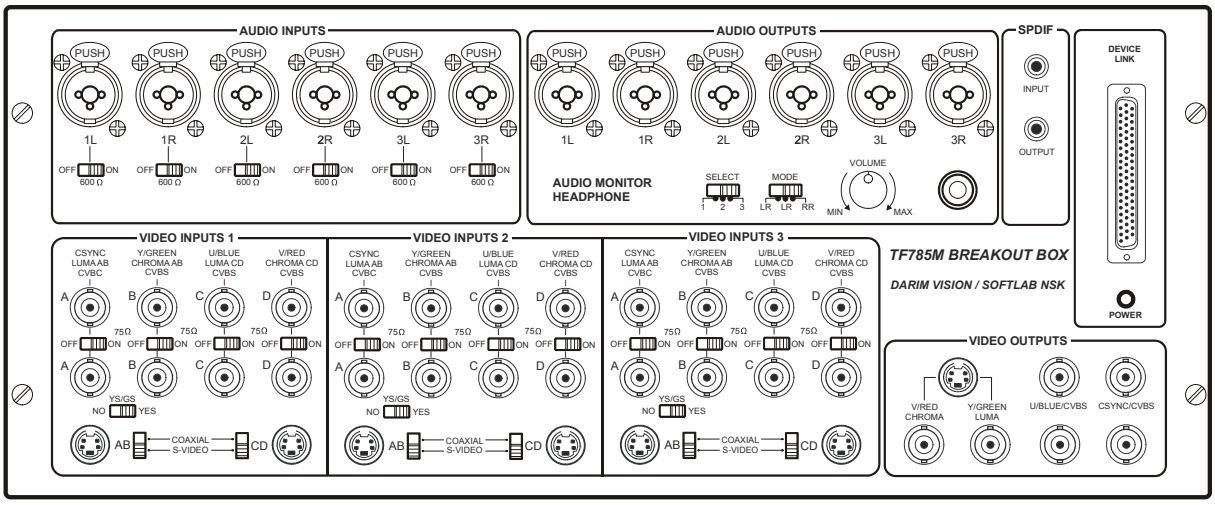


Figure 80. The active switching panel (*BREAKOUT BOX*)

When on video input of channel component signal with YS or GS component is given, switch **YES/NO** should be settled in position **YES**. In other cases it should be in normal position **NO**.

On the panel there are also four video outputs RED/V/C, GREEN/Y, BLUE/U/CVBS, CVBS/CSYNC, incorporated in functional group **VIDEO OUTPUTS**. Each video output is duplicated, that allows to connect simultaneously with a working signal the monitor of preliminary viewing.

Functional group **AUDIO INPUTS** is formed by six sockets, which are grouped as three L-R stereo pairs. All audio inputs are organized as symmetric (balancing) to what apply three-polar (stereo) sockets. Switches **OFF/ON** serve for connection / switching-off of terminal resistors 600 Ohm at a corresponding audio input.

Functional group **AUDIO OUTPUTS** is formed 6 symmetric (balancing) audio outputs. They can be used as asymmetrical by grounding one balancing line the same as also audio inputs.

In group **AUDIO MONITOR HEADPHONE** it is located socket for connection of a stereo headphones. The level of output can be settled by the regulator of loudness **VOLUME**. The choice of audio output number (1, 2 or 3) for cross talking is carried out by the switch **SELECT**. Switch **MODE** allows to set the necessary mode: LR – stereo, LL – only left channel, RR – only right channel.

The light-emitting diode indicator **POWER** inform about power presence.

If after *FD300* board connection to the active switching panel light-emitting diode indicator **POWER** does not burn, it is necessary to address to the developer.

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