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SpaceWare 9.2 for Windows

These help files require a browser that supports JavaScript
(Netscape 3.0 and later or Internet Explorer 4.0)

SpaceWare 9.2 for Windows

FCC Compliance
Hardware Warranty
Software Media Warranty
Software License Agreement

SpaceWare 9.2 for Windows
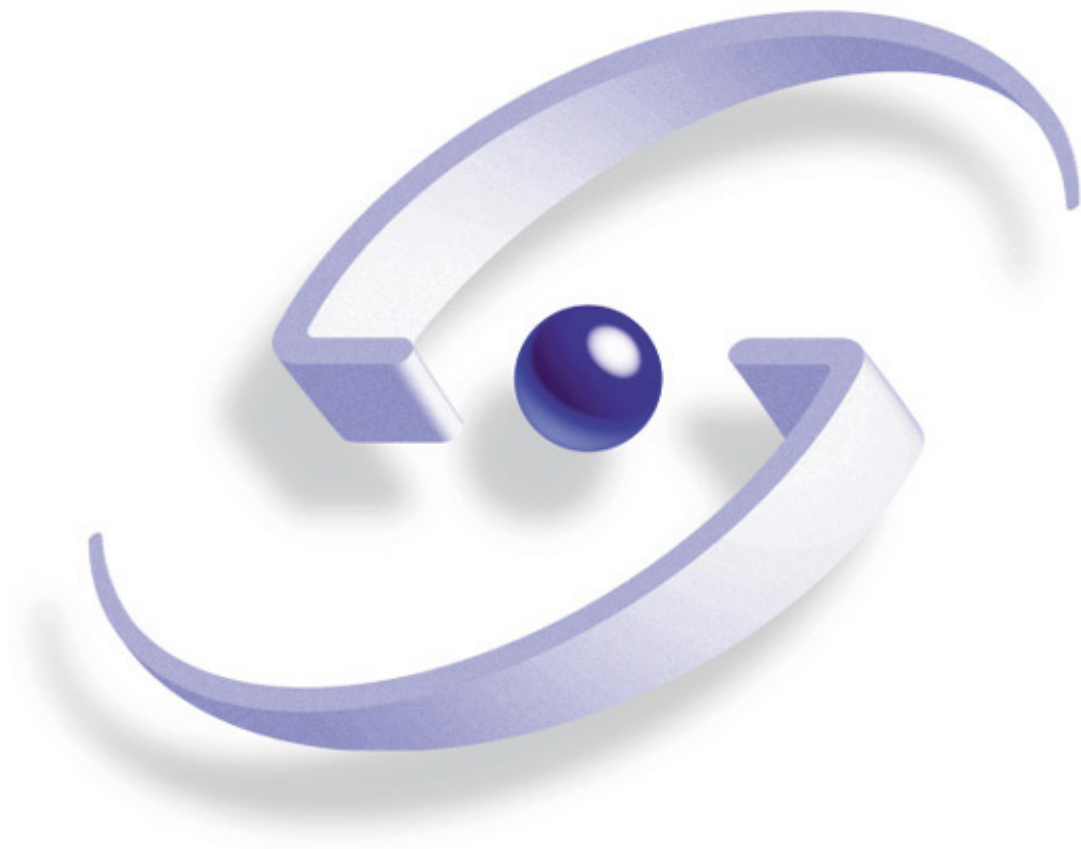
Select a topic from the list at the left to begin

Introduction

The Spaceball is a true 3D input device that detects the slightest fingertip pressure applied to it and resolves the pressure into X, Y, and Z translations and rotations, moving your 3D images instantaneously and simultaneously. This provides intuitive, interactive six degrees-of-freedom control of 3D graphical images and objects. The Spaceball's SpaceWare software is a valuable configuration utility for the Spaceball. The software supports three styles of Spaceballs each with a unique number series 4000, 3003 and 2003.

## Spaceball Modes

Using the Spaceball 4000 FLX can be natural and intuitive. There are two basic ways to move objects with it:

- **Object mode**: Manipulate the Spaceball PowerSensor® ball as if you were holding the 3D model in your hand. Push left and the image moves left. Push right and it moves right. Lift up or push down and the image moves accordingly. Push the PowerSensor ball away from or toward you and the image responds similarly. Twist in any direction and the image rotates in that direction.

- **Eyepoint mode**: Manipulate the Spaceball PowerSensor ball as if it were your head or a camera. Push left and the scene moves to the right. Push right and the scene moves to the left. Lift up and the scene moves down. Push down and the scene moves up.

See Moving with the Spaceball for graphic illustrations of axis movement in each mode.

If you are a new Spaceball user, you might want to open the Tutorial to try a few exercises designed to help you "get the feel" of the Spaceball.

> **Note about Printing Help Files**:
> Because of a problem with "topic creep" when accessing sections of larger files, blank pages have been added at the end of some of the larger files. Before printing, check the number of pages containing text and print only those pages.

Spaceball 4000 Information
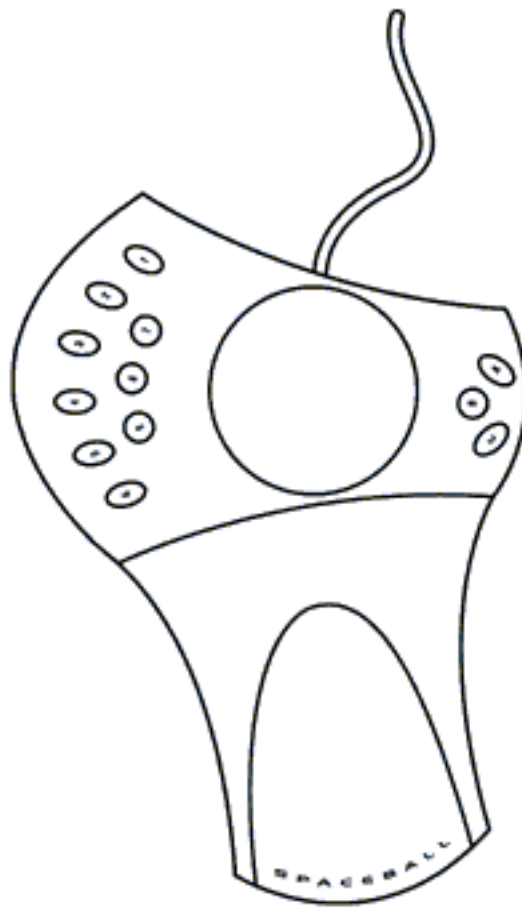
The Spaceball 4000 FLX

The Spaceball 4000 FLX is designed to be used with either your right hand or your left hand. The default setup is for the left hand. The nine buttons on the left are designed to be used with your fingers. The three buttons on the right are used by your thumb. To use it with your right hand, remove the palm rest and insert it on the other side of the ball platform so the buttons can still be used by the fingers and thumbs as designed.

The Spaceball 4000 FLX is adaptable to suit your dominant hand as described in the following section.

Changing the Spaceball 4000 FLX for Hand Preference

The Spaceball comes assembled for use with the left hand (for right-handed people). The palm rest, the extension on the lower right in the following graphic, can be detached and reattached to the other side of the core unit.

To change the Spaceball setup for use with the right hand, follow these steps:

1. Hold the PowerSensor® ball in your hand and turn the Spaceball device over so that you are looking at the bottom of it. Be careful not to drop it.
2. Gently lift up the palm rest to detach it.
3. Remove the Spaceball cable from its current path and change the direction so that it exits from the opposite side of the core unit.
4. Attach the palm rest to the other side of the core unit, turn the Spaceball device over, and place beside your computer.

Place your wrist on the palm rest with the thumb near the three button group. This placement leaves the other fingers available for buttons 1-9.

The buttons near your middle finger are buttons 1 and 2 and the ones near your little finger are 5 and 6. The three round buttons are buttons 7 - 9. This is true no matter whether you have the Spaceball set up for the left hand or the right. When you change the hand setup, SpaceWare detects the change and reorients the button numbering. The Spaceball Windows (the user interface) reflects the way you have the palm rest attached to the Spaceball. For more information, see The Spaceball Windows.

Spaceball 3003 Information
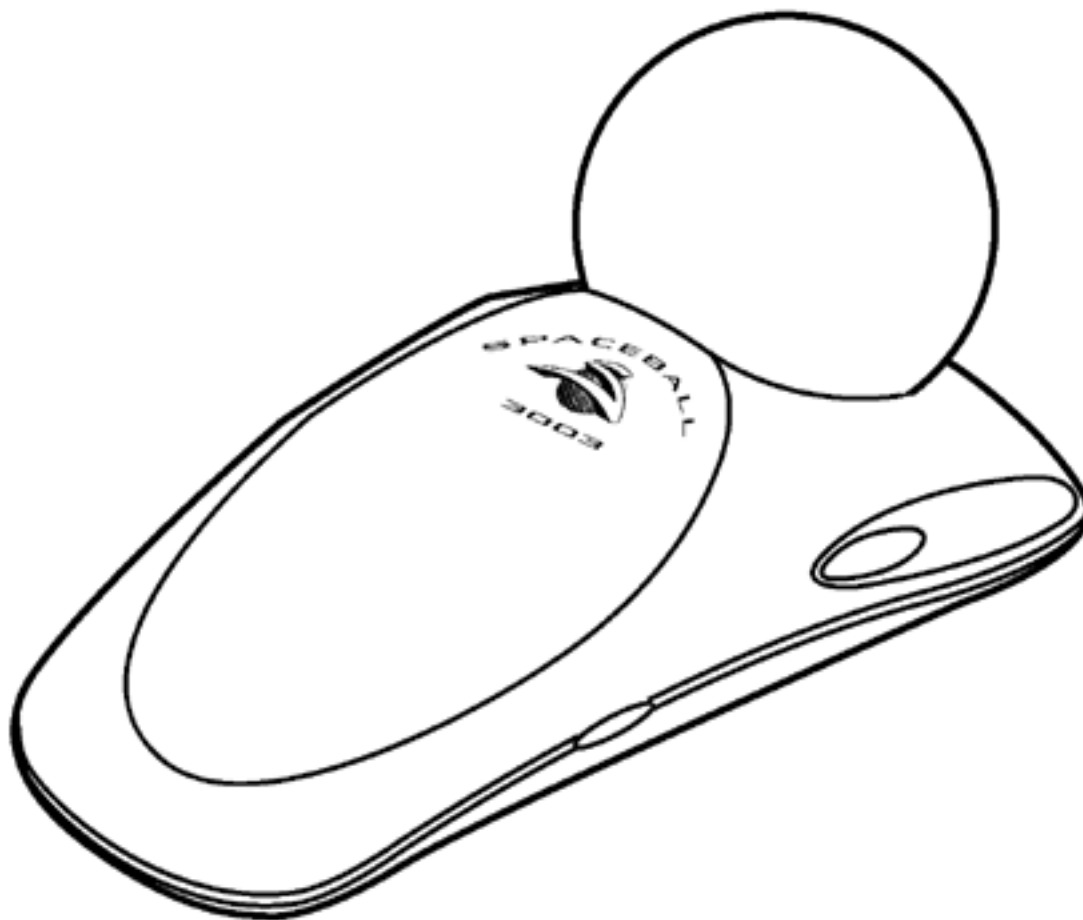
The Spaceball 3003 FLX

The Spaceball 3003 has two models a Spaceball 3003 and Spaceball 3003 FLX, with a stiff and soft PowerSensor respectively. Both models of Spaceball 3003 have two buttons to be used in applications and a Rezero button on the side of the device. If your image moves without applying pressure on the PowerSensor, press the Rezero button on the side of the device to stop the movement.

Spaceball 2003 Information
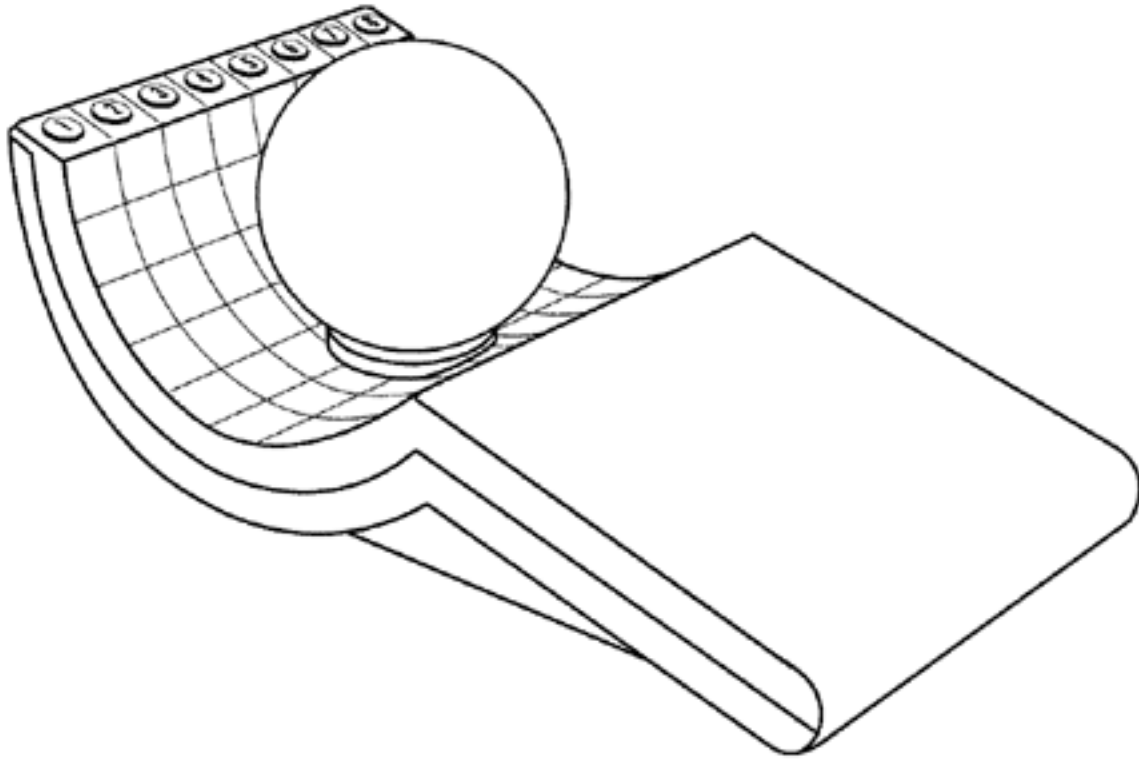
The Spaceball 2003 FLX

The Spaceball 2003 has three separate version designated by Spaceball 2003, Spaceball 2003B and Spaceball 2003 FLX. The difference between the Spaceball 2003 and Spaceball 2003B is the Spaceball 2003 requires an external power supply, while the Spaceball 2003B requires external power on only some systems. The Spaceball 2003 FLX has a soft PowerSensor compared to the Spaceball 2003 and Spaceball 2003B.

All three version have 8 buttons in front of the device. On the Spaceball 2003 FLX, the button to Rezero the ball is located on the right side of the device. For the Spaceball 2003 and 2003B the Rezero function is mapped within the SpaceWare user interface. As a default press the #7 button followed by the #8 button to Rezero, the device.

If you have question on the requirement of a power supply check the Spacetec web site or contact Technical support.

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Using these Help Files

First, install the Spaceball. See Hardware Installation for more information.

Then, install the software. See Software Installation for instructions on installing and uninstalling the software. Software installation is specific to the CD-ROM.

Refer to the topic for your application: The Spaceball and (your application name). Each topic contains a table showing the functions assigned to each button and any other information pertinent to that application.

Buttons to be pressed are in bold face type. Anything you need to type or enter is in a `mono-spaced bold font`.

File names and directory designations are in **bold face type**.

If you are not familiar with how to use the Spaceball, refer to Moving with the Spaceball for additional instructions and try the demos provided with this software.

If you encounter any problems during installation or with the Spaceball operation, refer to Troubleshooting. If that doesn't resolve your problem, contact Technical Support.

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Systems Supported

The following operating systems are supported by the Spaceball 4000 FLX:

Windows NT 4.0, Alpha and Intel
Windows 95 OSR2, Intel
Windows NT 4.0, Alpha and Intel (Kanji)
Windows 95, Intel
Windows 98, Intel
Windows 95 with Exceed X Windows
Windows NT 4.0 Alpha with Exceed X Windows
Windows NT 4.0 Intel with Exceed X Windows

Hardware Installation

Install

Follow the instructions and illustrations below to connect the Spaceball to your system:

1. The Spaceball has a Serial Interface Cable with a 9-pin female connector. The Spaceball Serial Interface Cable may plug directly into the serial port of your system or it could require an adapter cable or a port adapter (which is included when specified by the customer at time of order). This is because serial interface connections differ among systems.
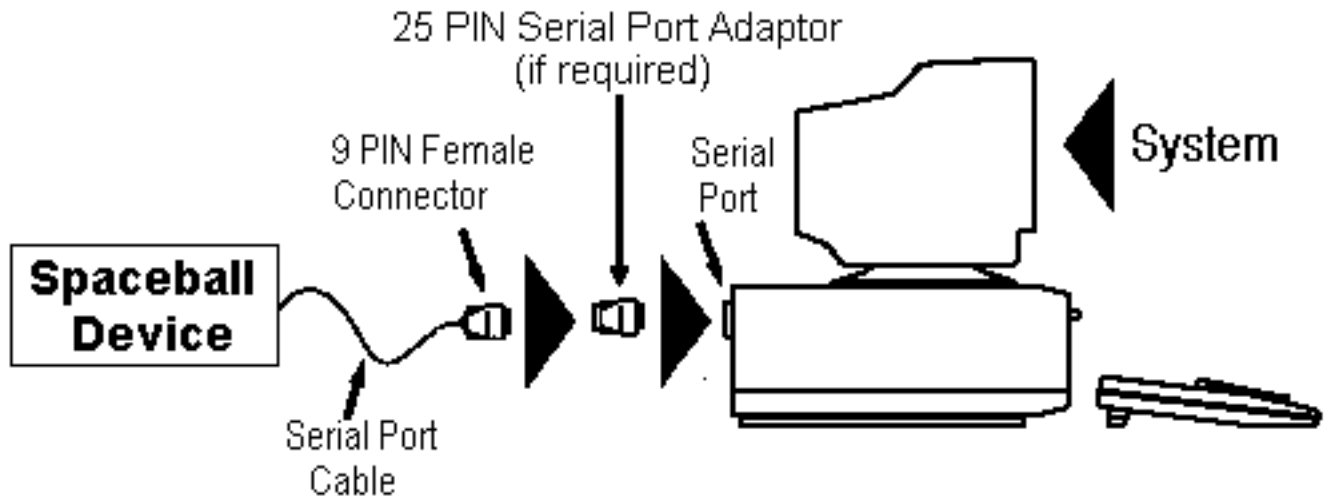
2. The Spaceball should respond with two beeps when you plug it in. This indicates it is receiving power and working properly.

Note:

If the Spaceball device does not beep at all, performs a modulating or "weak" sounding beep, or repeatedly beeps an SOS message in Morse code (dot-dot-dot, dash-dash-dash, dot-dot-dot), refer to the Troubleshooting topic.

If you see the message "New Hardware Detected, Spaceball 4000 FLX" (after you connect the Spaceball 4000 FLX to a working serial port) and a dialog box asking for the location of the driver, change the directory to <place location of spw4000.inf> and click on **OK**. You should see the Spaceball 4000 FLX in a window. Highlight it and click on **OK**. The .inf file should now install and keep the message from reappearing.

Uninstall

Windows 95/98

Use the uninstall from the **Start > SpaceWare 9.2 > unInstall SpaceWare**

If the Spaceball 4000 FLX was detected by Plug and Play, uninstall the Spaceball follow these steps:

1. Unplug the Spaceball 4000 FLX from your computer.
2. Choose **Start > Settings > Control Panel**.
3. In the Control Panel window, click on **System** to bring up the System Properties window.
4. Choose the **Device Manager** tab. You should see numerous items listed (for example, Disk Drives).

5. Click on the **+** next to the "Other" selection (looks like a yellow question mark) to get a list of other devices attached to your computer.

6. Select the **Spaceball 4000 FLX** and click on **Remove**.

7. In the Confirm Device Removal window, click on **OK**. This removes the Spaceball 4000 FLX from your system.

Windows NT (4.0)
To uninstall the Spaceball from your system, unplug it.

Software Installation

Install

Install the SpaceWare software after you have connected the Spaceball to your system.To install the software, follow these steps:

1. Insert the SpaceWare software media into the CD-ROM drive.
2. Click on **Start > Run**. Make sure the command line `e:\setup.exe` appears in the edit box and click on **OK**. If you install from another drive, substitute that drive letter for `e`.
3. Select the installation language. The choices available are based on the locales the computer supports and the locales available for the install program. In this release, the only supported locale is US English.
4. Follow the Installation program prompts.

If your application uses Exceed X Windows select Yes when asked during the Installation. "Do you wish to install the Exceed X11 Driver?"

If you are upgrading the SpaceWare software, the Installation program automatically overwrites versions 8.0 and 8.1.

Uninstall

To uninstall the software follow these steps:

1. Close the application that is using the Spaceball.
2. Click on the **Start** button in the task bar and choose **Programs > SpaceWare** and click on the **unInstall SpaceWare** icon.
3. Click on **Yes** in the Confirm Program Deletion dialog box. unInstall removes the SpaceWare files from your hard drive. It does not delete any configuration files users have created.

The unInstall program removes the SpaceWare files from your hard drive following these rules:

- unInstall deletes only files that were copied to the hard disk during the SpaceWare installation.
- unInstall looks for files and directories in the setup location. If you changed names or moved files, directories, or icons from their original location, unInstall will not be able to locate and delete them.

unInstall removes all the SpaceWare files and registry entries but does not remove any configuration files you created.

After you have removed the software, uninstall the Spaceball using the uninstall directions in Hardware Installation.

SpaceWare Tutorial

Congratulations on your purchase of a Spaceball. This device, developed by Spacetec IMC Corporation, is a true 3D input device that detects the slightest fingertip pressure applied to it and resolves the pressure into X, Y, and Z translations and rotations, moving your 3D images instantaneously and simultaneously. This provides intuitive, interactive six degrees-of-freedom control of 3D graphical images and objects.

This tutorial is designed to acquaint you with the Spaceball and provide examples of how to use it. Before you begin, make sure you have attached the Spaceball device to your computer and have installed the SpaceWare software. If you haven't, follow the instructions in <u>Hardware Installation</u> and <u>Software Installation</u>.

Getting Ready

Placing the Spaceball
For optimum efficiency, use the Spaceball device with another pointing device like a mouse or digitizer stylus. The Spaceball device is for 3D control; the pointing device is for normal pointing and menu selection. You will find it more productive and efficient to use both devices simultaneously - controlling your pointing device with the hand you normally use and the Spaceball device with the opposite hand.

If you are right-handed, set up your computer system with the Spaceball device to the left of your computer keyboard and the mouse to the right of your keyboard as shown in the diagram below.
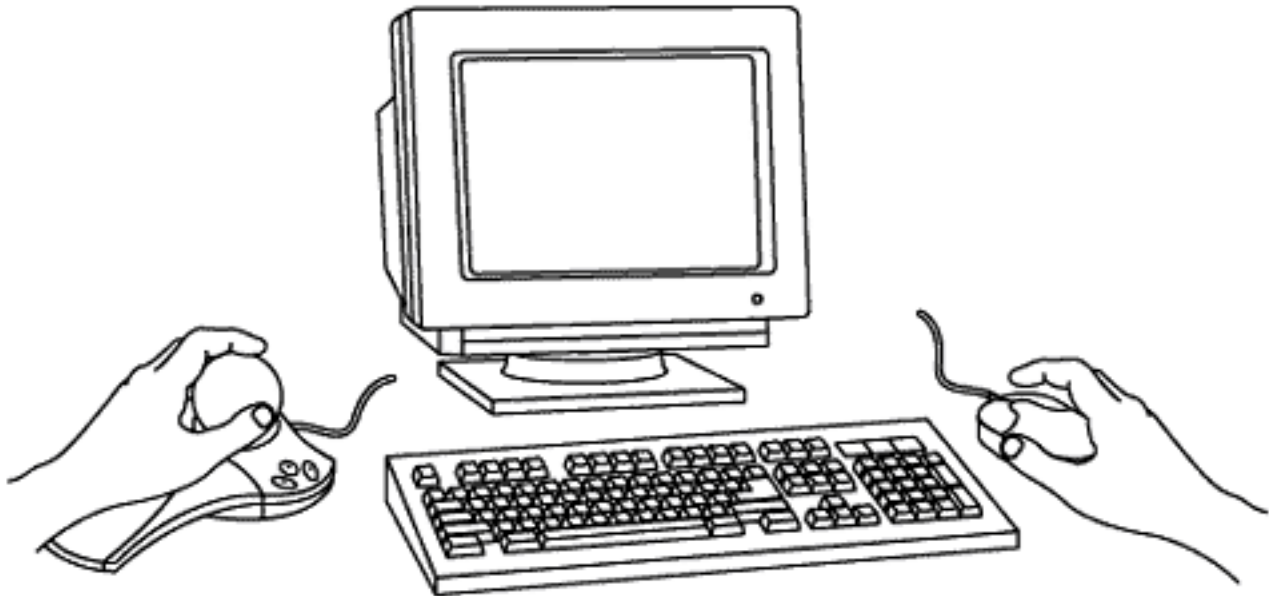
If you are left-handed, reverse the setup shown above so that the mouse is on the left and the Spaceball device is on the right.

Placing the Hand for Optimal Ease of Use
The Spaceball is designed to be a comfortable fit for your hand and fingers. Lightly grasp the PowerSensor ball with the thumb and forefinger.

The graphic below shows proper placement of the hand on a Spaceball.
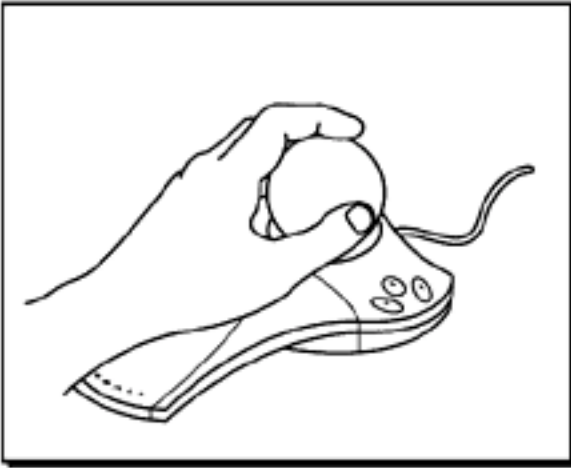
The Correct Way To Hold
The PowerSensor Ball
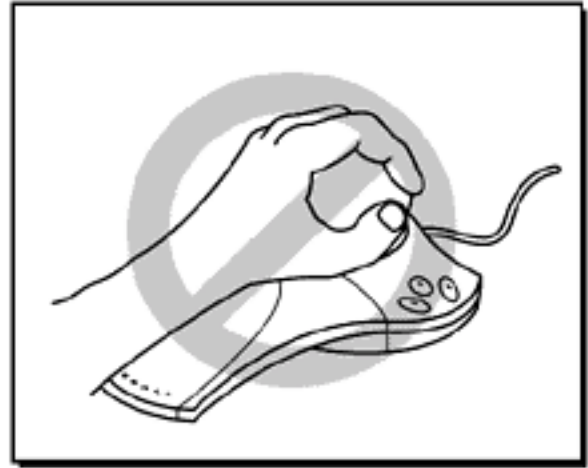
The Incorrect Way To Hold
The PowerSensor Ball

Practicing Basic Spaceball Movements

To begin getting a "feel" for the way the Spaceball moves 3D models on screen, open the Sbdemo.exe file in **Program Files/Spacetec IMC Corporation/SpaceWare Driver**. This opens as a small window in the top left of your screen containing three 3D models and the Small Spaceball Window. You can enlarge the demo window by clicking on the Maximize button in the upper right corner of the window but object movement will be slower.

The demo window contains three objects (a red cube, a yellow pyramid, and a purple "gem") enclosed in a bounding box marked by white corners. When you first open the demo, all objects are selected as a group.

Experience One - Movement in Object Mode

In Object mode, you manipulate the Spaceball PowerSensor ball as if you were holding the 3D model in your hand. Push left and the model moves left. Push right and it moves right. Lift up or push down and the image moves accordingly. Push the PowerSensor ball away from or toward you and the image responds similarly. Twist in any direction and the image rotates in that direction. To begin:

1. Open the Sbdemo.exe file (Program Files/Spacetec IMC Corporation/SpaceWare Driver).

2. Place your hand lightly on the PowerSensor ball, and push slowly to the right to move the screen object to the right. Push the PowerSensor ball to the left; pull up and push down gently. The object on screen moves in the same direction as you move the PowerSensor ball.

3. Twist the ball gently to the right and then to the left and the object rotates in the same direction as you twist the ball. If one or more of the models seem to go behind a black part of the background, it is moving behind the clipping box. Pull the ball toward you to bring the model forward and continue rotating and it will reappear.

4. Pull the PowerSensor ball toward you and the model zooms toward you; push it away from you and the object moves away from you.

If you feel that the model on screen moves faster or slower than you would like it to move, you can adjust the Spaceball sensitivity. You should need only a light pressure on the Spaceball to move the model. If you frequently loose the model off screen or you feel your hand or fingers straining, reduce the sensitivity of the Spaceball. See Adjusting the Spaceball Sensitivity for directions.

Experience Two - Movement in Eyepoint Mode

In Eyepoint (or Camera) mode, you manipulate the PowerSensor ball as if it were your head or a camera looking at a scene. Push left and the scene moves to the right. Push right and the scene moves to the left. Lift up and the scene moves down. Push down and the scene moves up.

To change the mode of the Spaceball, press **Button 4**. The white bounding corners disappear to indicate that you are in Eyepoint mode. (**Button 4** is a toggle switch that toggles between Object and Eyepoint mode.)

1. With very gentle motion on the PowerSensor ball, push forward and see the model move closer to you. It is as if you were a camera zooming in on a subject.

2. Push the ball to the left to see the model move to the right and then to the right to have it move to the left.

3. Gently pull up on the ball and the model moves down as if you were raising your camera above the model.

4. Continue experimenting with movement in this mode.

If you find that you are loosing the model off the screen, decrease the sensitivity of the Spaceball. If you feel your hand or fingers straining or the model moves too slowly, increase the sensitivity. See Adjusting the Spaceball Sensitivity for directions.

Experience Three - Moving One Part of a Group
So far, the tutorial has moved all models on the screen as one unit. You can separate the parts of the model and move any one of them. Press **Button 7** to move a single object. Each time you press the button, you move to another part of the model beginning with the red cube. After you have cycled through the parts, the entire group is selected.

1. Press **Button 4** to put the Spaceball into Object Mode (**Button 4** is a toggle switch, toggling between Object and Eyepoint mode). You know you are in Object mode in this demo when you see the white bounding corners around the selected model.

2. Press **Button 7** to select the red cube.

3. With gentle pressure on the Spaceball, move the red cube so that it circles the yellow pyramid. Do this several times to perfect your control. Try to keep it from disappearing behind the clipping box.

4. Move the red cube to the lower left part of the window and rotate it so that it appears as a 2D red square sitting parallel to the sides of the window.

5. Press **Button 7** to select the purple "gem" and move it around the yellow pyramid. Move it to the lower left corner of the screen adjacent to the red cube. Rotate it until it appears as a 2D octagon with a light colored octagonal center.

6. Press **Button 7** again to select the yellow pyramid. Move it to the lower left corner of the window beside the purple "gem". Rotate it until it appears as a yellow triangle.

Note:
To gain more control as you rotate the red cube or any model, turn translations Off so that the model will only rotate. Pressing **Button 1** on the Spaceball or clicking on **Button 1** in the Spaceball window turns Translations Off. Turn Translations On again before going to the next step. (**Button 1** is a toggle switch, toggling between On and Off.)

Understanding the Axes
The Spaceball gives you six degrees-of-freedom movement. This is movement along or around the X, Y, and Z axes. Generally, the X axis goes left and right, the Y axis goes up and down, and the Z axis goes toward you and away from you. This is only generally true because it can vary in applications depending on the location of the model on the screen and other settings you may have chosen.

The help files contains two tables showing Spaceball axis directions and the resulting model movement when you move the ball in the direction indicated. The tables illustrate the movements for Object and Eyepoint mode using a teapot positioned between two posts. The first table shows the movements for translations and the second for rotations. The tables are in the Moving with the Spaceball topic.

Adjusting the Spaceball Sensitivity
There are several ways to adjust the sensitivity of the Spaceball:

1. Press either **Button 5** (Decrease Sensitivity) or **Button 6** (Increase Sensitivity) on the Spaceball to change the sensitivity of the Spaceball. This same functionality is available by clicking on the button in the Spaceball windows. Each press on **Button 5** decreases the sensitivity of the Spaceball by half, requiring more pressure on the Spaceball to move the model. Each press on **Button 6** doubles the sensitivity and requires less pressure on the Spaceball to move the model.

2. Move the slider in the Overall Sensitivity box in the lower right corner of the [General Spaceball Window](). This slider adjust the sensitivity for all Spaceball movements: panning, rotating, and zooming. Moving it to the left requires more pressure on the Spaceball to move the screen model.

3. Select the **Sensitivity and Filters** tab in the General Spaceball Window. In this window you can fine tune the Spaceball sensitivity for individual types of movements (panning, rotating, and zooming) by adjusting the slider for that type of movement. Slider movement toward **Min** decreases the sensitivity of the Spaceball.

Button Mapping for Sbdemo.exe

Each demo shipped with SpaceWare and the applications supported by it come with a set of functions mapped to the buttons on the Spaceball. The functions mapped to the buttons for the Sbdemo are shown in the following table. When you press **Button B**, the Spaceball enters Shift Mode in which Spaceball buttons 1-9, A, B, and C send values associated with the virtual buttons 13-24 to the application or demo. When the Spaceball is in Shift Mode, the button designations contain an Asterisk (for example, 9*). For more information, see [Shift Mode]().

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Translations**	Toggles Translations On/Off	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Mode Toggle -AP4**	Toggles between Object and Eyepoint mode.	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z

7	**Select Object**	Cycles through the objects in the scene	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Help -AP8**	Toggles help files Open/Closed.	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP31**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Less**	Opens the next smaller Spaceball window

You can change the functions mapped to the buttons in any demo or application. See Button Mapping Window for more information.

Using the Spaceball Windows

When you first open the Sbdemo, the Small Spaceball Window opens along with the demo window. The Small Spaceball Windows shows only labeled buttons. When you pass the mouse pointer over the function buttons (1-9, and A-C) a ToolTip displays the name of the function mapped to that button. The **More** button opens the next larger Spaceball Window - the General Spaceball Window. The **Less** button opens the next smaller Spaceball Window - the Tiny Spaceball Window.

The button layout in a Spaceball window reflects the way you attached the palm rest to the Spaceball.

The following sections are only brief descriptions of the Spaceball windows. Each section ends with a link to a more complete description of that window.

Global Window Controls
There are certain buttons and controls common to the larger Spaceball windows. They are described in Global Window Controls.

Tiny Spaceball Window
This window is the smallest version of the Spaceball window. It was designed small so you could keep it on the screen without interfering with your work space.

It contains unlabeled function buttons, an unlabeled checkbox, and a **More** button. A ToolTip displays the

function mapped to a button when you move the mouse pointer over it. The More button opens the next largest window, the Small Spaceball Window. See Tiny Spaceball Window for more information about this window.

The Small Spaceball Window

This window is the next to the smallest window. You access it by clicking on the **More** button in the Tiny Spaceball Window or the **Less** button in the General Spaceball Window. This window contains function buttons with number and letter designations, a More and a Less button, two radio buttons, and a text box at the bottom of the window that displays the function of the most recently pressed button.

A more detailed description can be found in Small Spaceball Window.

The General Spaceball Window

You access the General Spaceball Window by clicking on the **More** button in the Small Spaceball Window. This window contains several sections:

- **Left Buttons**: buttons on the left side of the Spaceball (in either the left or right hand setup) with their button designation and assigned function
- **Right Buttons**: buttons on the right side of the Spaceball (in either the left or right hand setup) with their button designation and assigned function
- **Filters**: filters that determine how much of the data coming from the Spaceball is applied to the active model. These filters mirror the default functions assigned to buttons 1-3. The checkbox to the left of the filter name indicates its On/Off state.
- **Overall Sensitivity**: a slider you can use to increase/decrease the sensitivity of the Spaceball
- Global Controls: buttons at the bottom of the window that are common to all three large Spaceball windows: General, Sensitivity and Filters, and Button Mapping Windows.

You can find a more detailed description and a graphic in General Spaceball Window.

The Sensitivity and Filters Window

This window enables you to fine tune the Spaceball. It contains three sliders that adjust the sensitivity for panning, rotating and zooming. There are individual axis filters enabling you to determine which axis' data can affect the active model. A Miscellaneous Filter reverses the Y and Z translations.

You can find a more detailed description and a graphic in the Sensitivity and Filters Window.

The Button Mapping Window

This window contains a drop-down list box for each button (in both the shifted and unshifted state). When you click on the down arrow in any list box you see a list of functions you can map to that button. Choose the function you want to map to any button. Click on the **Save** button if you want to save the changes for future use, otherwise the changes only apply to the current work session.

You can find a more detailed description and a graphic in the Button Mapping Window.

Technical Support

Spacetec IMC provided technical support every week day (except major holidays) between the hours of 8:30 A.M. and 5:30 P.M. For more information, see Technical Support Services.

The Spaceball and 3D Studio MAX

After you have installed SpaceWare for Windows, install SpaceWare AniMotion.

To start SpaceWare AniMotion, follow these steps:

1. From within 3D Studio MAX, click on the **Utilities** tab.
2. Click on the **Configure Button Sets** button.
3. In the Configure Button Sets dialog box, choose **SpaceWare AniMotion** from the list of utilities.
4. Click on the **>** button to create a SpaceWare AniMotion utility button.
5. In the Sets: edit box, enter a name by which to save the settings.
6. Click on **Save** and then **OK** to close the Configure Button Sets dialog box. SpaceWare AniMotion now appears on a button in the Utilities list.
7. Click on the **SpaceWare AniMotion** button to see the SpaceWare AniMotion command panel.
8. Click on **Enable** in the command pane. This starts the flow of data between the Spaceball device and AniMotion. The Spaceball device beeps twice to show it is working properly. The **Enable** button turns green to signify the Spaceball device's ready state.

   If the Spaceball device does not beep twice check to see that it is securely plugged into your computer. If it beeps an SOS message, check the Troubleshooting section of the AniMotion help files.
9. When you are temporarily done using AniMotion, click on **Suspend**. This makes AniMotion ignore any movement made until you click on **Suspend** again to resume using the Spaceball device. **Suspend** is a safeguard against accidentally moving the Spaceball device and disturbing your animation.

> **Note**:
> When you leave your workstation, you should suspend AniMotion.

Consult the AniMotion online help files for more information about using AniMotion with 3D Studio MAX.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for 3D Studio Max

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with 3D Studio Max

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Translations**	Toggles Translations On/Off	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Set Save Point Marker -AP30**	Sets an Undo marker in the animation to which you can return	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits all movement to X and Y axes	**7***	**Restore Defaults**	Restores settings to default settings
8	**Zoom Only**	Limits movement to Z axis	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	**9***	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**More**	Opens the next larger Spaceball window	**A***	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode

C	Menu Toggle	Toggles Small Spaceball Window Open/Closed	C*	Less	Opens the next smaller Spaceball window

Spaceball 3003 buttons with 3D Studio Max

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Set Save Point Marker -AP30**	Sets an Undo marker in the animation to which you can return	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Less**	Opens the next smaller Spaceball window	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	9*	**Keep On Top**	Keeps the current button window on top of all open windows

A	More	Opens the next larger Spaceball window	A*	More/Less	Switches between Small Spaceball Window and General Window
B	Shift	Switches the Spaceball into Shifted Mode	B*	Shift	Switches the Spaceball into Shift Lock Mode
C	Zoom Only	Limits movement to Z axis	C*	Save	Opens the Save dialog

Spaceball 2003 buttons with 3D Studio Max

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	Menu Toggle	Toggles Small Spaceball Window Open/Closed	1*	Tx	Toggles translations On/Off on all axes except X
2	Rotations	Toggles Rotations On/Off	2*	Ty	Toggles translations On/Off on all axes except Y
3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Set Save Point Marker -AP30	Sets an Undo marker in the animation to which you can return	4*	Rx	Toggles rotations On/Off on all axes except X
5	Decrease Sensitivity	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y
6	Increase Sensitivity	Doubles sensitivity with each consecutive button press	6*	Rz	Toggles rotations On/Off on all axes except Z
7	Shift	Switches the Spaceball into Shifted Mode	7*	Shift	Switches the Spaceball into Shifted Mode

8	**Less**	Opens the next smaller Spaceball window	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

The Spaceball and CADDS5

The Spaceball is supported with CADDS5 (release 5 and later) on Digital Equipment (DEC), Hewlett-Packard (HP) host, IBM, Silicon Graphics (SGI), and Sun Microsystems (Sun) Solaris platforms. On Windows NT platforms, use the Windows Spaceball driver with the Exceed X11option.

Using the Spaceball with CADDS5

The Spaceball is only active in CADDS5 when you activate a 3D model, then activate a drawing, and then attach dynamics to a viewport. To do this in either Parametric or Explicit modes:

Parametric	Enable Dynamics by clicking the middle mouse button in the main drawing area.
Explicit	Use ATTach DYNamics command and then digitize a viewport and press **ENTER**.

Refer to your CADDS5 documentation for additional instructions. Also, revisions 5.0 and 5.1 require the use of accelerated graphics in Explicit mode. This is set in the **.caddsrc-local** file.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for CADDS5

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with CADDS5

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	**Translations**	Toggles Translations On/Off	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y

3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Model Space Filter -AP4**	Toggles Model Space Filter On/Off	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits translations to X and Y axes	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Zoom Only**	Limits movement to Z axis	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More/Less**	Switches between Small Spaceball Window and General Window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Save**	Opens the Save dialog

Spaceball 3003 buttons with CADDS5

Primary Mapping			**Shifted Mapping**		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**

L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View**	Resets Current view to the original view	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Model Space Filter -AP4**	Toggles Model Space Filter On/Off	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	**7***	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	**9***	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More/Less**	Switches between Small Spaceball Window and General Window	**A***	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	**C***	**Save**	Opens the Save dialog

Spaceball 2003 buttons with CADDS5

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	Menu Toggle	Toggles Small Spaceball Window Open/Closed	1*	Tx	Toggles translations On/Off on all axes except X
2	Rotations	Toggles Rotations On/Off	2*	Ty	Toggles translations On/Off on all axes except Y
3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Model Space Filter -AP4	Toggles Model Space Filter On/Off	4*	Rx	Toggles rotations On/Off on all axes except X
5	Decrease Sensitivity	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y
6	Increase Sensitivity	Doubles sensitivity with each consecutive button press	6*	Rz	Toggles rotations On/Off on all axes except Z
7	Shift	Switches the Spaceball into Shifted Mode	7*	Shift	Switches the Spaceball into Shifted Mode
8	Reset View -AP9	Resets current view to the original view	8*	Rezero Spaceball	Instructs the Spaceball to assume a rest position in case of image drift
9	Reset View -AP9	Resets current view to the original view	9*	Keep On Top	Keeps the current button window on top of all open windows
A	More/Less	Switches between Small Spaceball Window and General Window	A*	More/Less	Switches between Small Spaceball Window and General Window

B	Translations	Toggles Translations On/Off	B*	Restore Defaults	Returns all settings to the originally installed settings
C	Zoom Only	Limits movement to Z axis	C*	Save	Opens the Save dialog

The Spaceball and CADKEY

SpaceWare for Windows and the Spaceball are supported in CADKEY 97 version 1.2.

After you install SpaceWare for Windows, install the SpaceWare CADKEY Driver.

To use the Spaceball device without setting up CADKEY Autoload, which would load the SpaceWare driver automatically whenever you load CADKEY, follow these steps:

1. Start CADKEY.
2. Click on the **Applications** menu option and select **CDE Load**.
3. From the list of available CDEs, choose **spacebal.cde** and click on **OK**.

Autoload for CADKEY

To have SpaceWare automatically load when you start CADKEY, follow these steps:

1. Start CADKEY.
2. From the Tools menu, choose **Options**.
3. In the Default Options dialog box, select the **Start Up** tab.
4. In the Automatically Load CDE dialog box, click on the **Browse** button.
5. In the Open dialog box, select **spacebal.cde** and click on **OK**.
6. Click on **OK** in the Default Options dialog box.

The next time you start CADKEY, the SpaceWare driver will load automatically.

To use the Spaceball device the first time after setting up Autoload but without restarting CADKEY, follow the steps for using it without Autoload.

> **Note**:
> You will need to choose the center of rotation each time you open a new drawing in CADKEY.

Currently, CADKEY does not use the SpaceWare driver interfaces and sends a message to the driver to hide the Spaceball window when it starts. When the driver receives this message, it closes the Spaceball window and displays the SpaceWare Settings dialog box shown below.
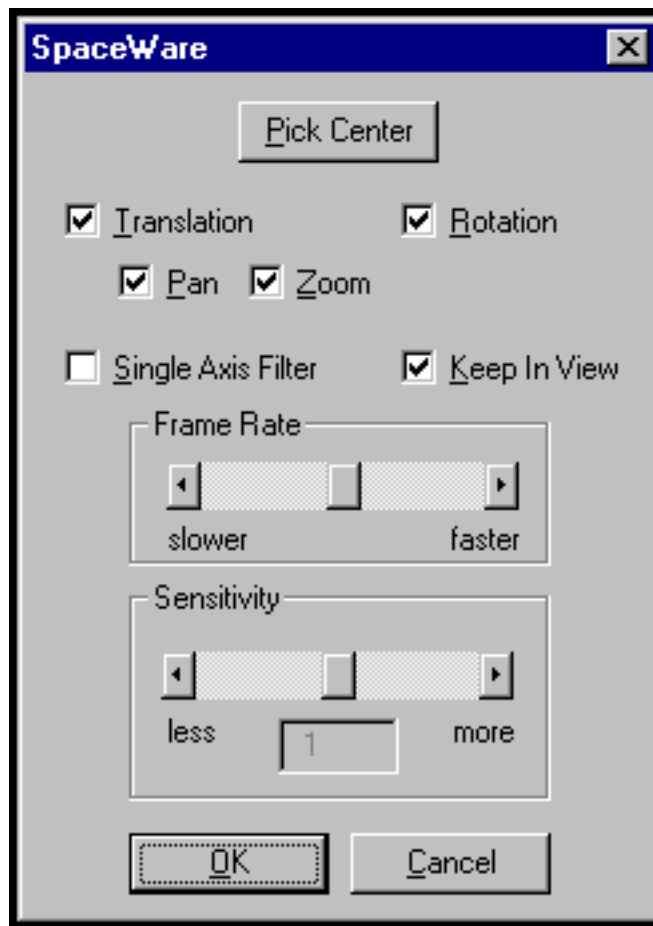
If you do not see the Frame Rate slider in your SpaceWare Settings dialog box, you may not have chosen the 3D Display List option when you installed CADKEY. If you did not choose that option, the SpaceWare Settings dialog box will offer Entity Selection instead of Frame Rate selection. If your SpaceWare Settings dialog box does not offer Frame Rate selection and you want that capability, reinstall CADKEY and choose the 3D Display List option.

Although CADKEY instructs the SpaceWare driver to hide the SpaceWare windows, you can open the Spaceball windows by pressing button **C** on the Spaceball (default button mapping for the menu toggle) or by clicking on the **Spacetec icon** in the system tray and choosing **Open**.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for CADKEY

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with CADKEY

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Translations -AP1**	Toggles Translations On/Off	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep in View -AP4**	Enables/Disables Keep In View	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits all movement to X and Y axes	**7***	**Restore Defaults**	Restores settings to default settings
8	**Zoom Only**	Limits movement to Z axis	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP31**	Resets current view to the original view	**9***	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**Toggle CADKEY Menu -AP7**	Toggles the Spaceball menu in CADKEY	**A***	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode

C	Menu Toggle	Toggles Small Spaceball Window Open/Closed	C*	Less	Opens the next smaller Spaceball window

Spaceball 3003 buttons with CADKEY

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View -AP31**	Resets current view to the original view	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep in View -AP4**	Enables/Disables Keep In View	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity - AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations -AP1**	Toggles Translations On/Off	**7***	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations -AP2**	Toggles Rotations On/Off	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	**9***	**Keep On Top**	Keeps the current button window on top of all open windows

A	**Toggle CADKEY Menu -AP7**	Toggles the Spaceball menu in CADKEY	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

Spaceball 2003 buttons with CADKEY

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep in View -AP4**	Enables/Disables Keep In View	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity-AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	**7***	**Shift**	Switches the Spaceball into Shifted Mode

8	**Reset View -AP31**	Resets current view to the original view	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP31**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations -AP1**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

The Spaceball and CAMAND

SpaceWare for Windows and the Spaceball are supported in CAMAND version 12.0 and 12.2.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for CAMAND

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with CAMAND

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	Translations	Toggles Translations On/Off	1*	Tx	Toggles translations On/Off on all axes except X
2	Rotations	Toggles Rotations On/Off	2*	Ty	Toggles translations On/Off on all axes except Y
3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Model Space Filter -AP4	Toggles Model Space Filter On/Off	4*	Rx	Toggles rotations On/Off on all axes except X
5	Decrease Sensitivity	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y

6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits translations to X and Y axes	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Zoom Only**	Limits movement to Z axis	8 *	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP9**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Save**	Opens the Save dialog

Spaceball 3003 buttons with CAMAND

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View -AP9**	Resets Current view to the original view	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z

4	**Model Space Filter -AP4**	Toggles Model Space Filter On/Off	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

Spaceball 2003 buttons with CAMAND

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X

2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Model Space Filter -AP4**	Toggles Model Space Filter On/Off	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	7*	**Shift**	Switches the Spaceball into Shifted Mode
8	**Reset View -AP9**	Resets current view to the original view	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP9**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

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The Spaceball and I-DEAS Master Series

The Spaceball is supported with I-DEAS Master Series on Digital Equipment (DEC), Alpha Digital UNIX, Hewlett-Packard (HP-UX) host, IBM RS/6000, Silicon Graphics (SGI) IRIX, and Sun Microsystems (Sun) Solaris. On Windows NT platforms, use the Windows Spaceball driver with the Exceed X11option.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for I-DEAS Master Series

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with I-DEAS Master Series

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	Translations	Toggles Translations On/Off	1*	Tx	Toggles translations On/Off on all axes except X
2	Rotations	Toggles Rotations On/Off	2*	Ty	Toggles translations On/Off on all axes except Y
3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Keep On Top	Keeps the current button window on top of all open windows	4*	Rx	Toggles rotations On/Off on all axes except X

5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits translations to X and Y axes	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Zoom Only**	Limits movement to Z axis	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP9**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Save**	Opens the Save dialog

Spaceball 3003 buttons with I-DEAS Master Series

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View -AP9**	Resets Current view to the original view	2*	**Ty**	Toggles translations On/Off on all axes except Y

3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Keeps the current button window on top of all open windows	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

Spaceball 2003 buttons with I-DEAS Master Series

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**

1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Keeps the current button window on top of all open windows	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	**7***	**Shift**	Switches the Spaceball into Shifted Mode
8	**Reset View -AP9**	Resets current view to the original view	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP9**	Resets current view to the original view	**9***	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	**A***	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations**	Toggles Translations On/Off	**B***	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	**C***	**Save**	Opens the Save dialog

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The Spaceball and MCAD

SpaceWare for Windows and the Spaceball are supported in MCAD version 2.0 and above.

For the Spaceball to work with MCAD, you must start the Spaceball driver before you open MCAD. If you did not choose to have the driver start automatically at log on, you can start it by choosing **Start > Programs > SpaceWare > Start SpaceWare Driver**.

Reference links for Spaceball windows

[The Spaceball Windows](#)
[Tiny Spaceball Window](#)
[Small Spaceball Window](#)
[General Spaceball Window](#)
[Button Mapping Window](#)
[Sensitivity and Filters Window](#)
[Custom Functions Window](#)
[Remove User Configuration Window](#)

Button Mappings for MCAD

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in [Shift Mode](#). Each device's button mapping is listed separately under [4000 FLX](#), [3003](#), and [2003](#).

Spaceball 4000 FLX buttons with MCAD

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	**Translations**	Toggles Translations On/Off	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window	4*	**Rx**	Toggles rotations On/Off on all axes except X

5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	Rz	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits all movement to X and Y axes	7*	**Restore Defaults**	Restores settings to default settings
8	**Zoom Only**	Limits movement to Z axis	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**More**	Opens the next larger Spaceball window	A*	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Less**	Opens the next smaller Spaceball window

Spaceball 3003 buttons with MCAD

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	Tx	Toggles translations On/Off on all axes except X
R	**Less**	Opens the next smaller Spaceball window	2*	Ty	Toggles translations On/Off on all axes except Y

3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Keep on Top	Causes the Spaceball Window to rise to the top if obscured by another window	4*	Rx	Toggles rotations On/Off on all axes except X
5	Decrease Sensitivity	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y
6	Increase Sensitivity	Doubles sensitivity with each consecutive button press	6*	Rz	Toggles rotations On/Off on all axes except Z
7	Translations	Toggles Translations On/Off	7*	Restore Defaults	Returns all settings to the originally installed settings
8	Rotations	Toggles Rotations On/Off	8*	Rezero Spaceball	Instructs the Spaceball to assume a rest position in case of image drift
9	Pan Only	Limits translations to X and Y axes	9*	Keep On Top	Keeps the current button window on top of all open windows
A	More	Opens the next larger Spaceball window	A*	More/Less	Switches between Small Spaceball Window and General Window
B	Shift	Switches the Spaceball into Shifted Mode	B*	Shift	Switches the Spaceball into Shift Lock Mode
C	Zoom Only	Limits movement to Z axis	C*	Save	Opens the Save dialog

Spaceball 2003 buttons with MCAD

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function

1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Causes the Spaceball Window to rise to the top if obscured by another window	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	7*	**Shift**	Switches the Spaceball into Shifted Mode
8	**Less**	Opens the next smaller Spaceball window	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings

C	Zoom Only	Limits movement to Z axis	C*	Save	Opens the Save dialog

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The Spaceball and Pro/ENGINEER

SpaceWare for Windows and the Spaceball are supported in Pro/ENGINEER version 20 (final release version only) and above.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for Pro/ENGINEER
The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with Pro/ENGINEER

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Translations -AP1**	Toggles Translations On/Off	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window	**4***	**Rx**	Toggles rotations On/Off on all axes except X

5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits all movement to X and Y axes	7*	**Restore Defaults**	Restores settings to default settings
8	**Zoom Only**	Limits movement to Z axis	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**More**	Opens the next larger Spaceball window	A*	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Less**	Opens the next smaller Spaceball windows

Spaceball 3003 buttons with Pro/ENGINEER

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Less**	Opens the next smaller Spaceball window	2*	**Ty**	Toggles translations On/Off on all axes except Y

3	Dominant Axis Filter -AP3	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Keep on Top	Keeps the current button window on top of all open windows	4*	Rx	Toggles rotations On/Off on all axes except X
5	Decrease Sensitivity -AP5	Halves sensitivity with each consecutive button press	5*	Ry	Toggles rotations On/Off on all axes except Y
6	Increase Sensitivity -AP6	Doubles sensitivity with each consecutive button press	6*	Rz	Toggles rotations On/Off on all axes except Z
7	Translations -AP1	Toggles Translations On/Off	7*	Restore Defaults	Returns all settings to the originally installed settings
8	Rotations -AP2	Toggles Rotations On/Off	8*	Rezero Spaceball	Instructs the Spaceball to assume a rest position in case of image drift
9	Pan Only	Limits translations to X and Y axes	9*	Keep On Top	Keeps the current button window on top of all open windows
A	More	Opens the next larger Spaceball window	A*	More/Less	Switches between Small Spaceball Window and General Window
B	Shift	Switches the Spaceball into Shifted Mode	B*	Shift	Switches the Spaceball into Shift Lock Mode
C	Zoom Only	Limits movement to Z axis	C*	Save	Opens the Save dialog

Spaceball 2003 buttons with Pro/ENGINEER

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function

1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Keeps the current button window on top of all open windows	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	**7***	**Shift**	Switches the Spaceball into Shifted Mode
8	**Less**	Opens the next smaller Spaceball window	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	**9***	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	**A***	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations -AP1**	Toggles Translations On/Off	**B***	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	**C***	**Save**	Opens the Save dialog

The Spaceball and Pro/ENGINEER

The Spaceball and SolidWorks

SpaceWare for Windows and the Spaceball are supported in SolidWorks 96, 97, 97Plus, 98 and 98Plus.

Loading the Add-in

After you have installed SpaceWare and SpaceWare for SolidWorks, you need to load the add-in into SolidWorks. To load the add-in, follow these steps:

1. Start SolidWorks.
2. Open a part.
3. From the menu, choose **Tools > Add-Ins…**.
4. In the Add-Ins list box, place a check mark in the box to the left of **SpaceWare for SolidWorks**.

Once you have completed these steps, the SpaceWare add-in will be available in SolidWorks.

Currently, SolidWorks does not use the SpaceWare driver interface and sends a message to the driver to hide the Spaceball window when it starts. When the driver receives this message, it closes the Spaceball window and displays the SpaceWare Settings dialog box shown below.
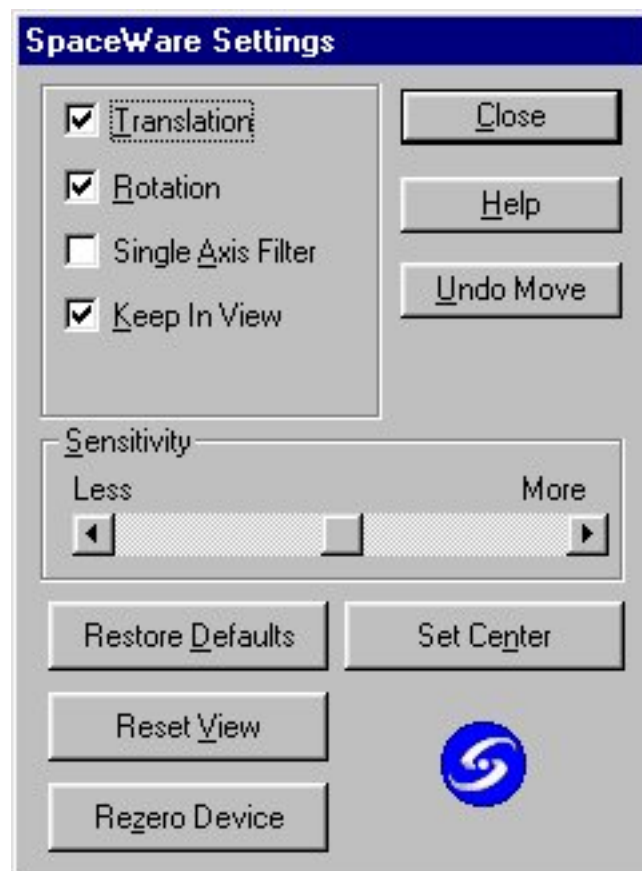
Although SolidWorks instructs the SpaceWare driver to hide the SpaceWare window, you can open it by pressing button **C** on the Spaceball (default button mapping for the menu toggle) or by clicking on the **Spacetec icon** in the system tray and choosing **Open**.

Reference links for Spaceball windows

Button Mappings for SolidWorks

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in [Shift Mode](#). Each device's button mapping is listed separately under [4000 FLX](#), [3003](#), and [2003](#).

You can map the following SolidWorks functions to a Spaceball button:

Spaceball Function Number	SolidWorks Add-In Function
Function 1:	Toggles Translations On/Off. Off restricts image movement to rotations only. Default is On. Rotations are automatically switched On when this function is Off.
Function 2:	Toggles Rotations On/Off. Off restricts image movement to translations only. Default is On. Translations are automatically switched On when this function is Off.
Function 3:	Toggles Single Axis Filter On/Off. On restricts image movement to the single largest piece of data coming from the PowerSensor ball. Off provides full, simultaneous control of all six axes. Default is Off.
Function 4 and 30:	Opens/closes the SpaceWare Settings dialog box.
Function 5:	Decreases sensitivity. It halves the sensitivity of the Spaceball device with each consecutive button press.
Function 6:	Increases sensitivity. It doubles the sensitivity of the Spaceball device with each consecutive button press.
Function 7:	Returns the Spaceball 3D control functions to the default settings.
Function 8:	Display the HTML help for the SpaceWare SolidWorks Add-In
Function 9 and 31:	Resets the view. If the entire view is selected, it is resized to fit in the window. If a part is selected, the part is reoriented back to the center of the screen.
Function 10:	Move View Only - to be enabled in future releases.
Function 11:	Sets the Center of Rotation of the object.
Function 12:	Keep in View to prevent objects from being translated off the screen with the Spaceball.
Function 13:	Undo moves performed with the Spaceball.

Spaceball 4000 FLX buttons with SolidWorks

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**

1	**Translations -AP1**	Toggles Translations On/Off	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Single Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Toggle SolidWorks Menu -AP4**	Toggles the SolidWorks menu Open/Closed	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Turns Off rotations on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits all movement to X and Y axes	**7***	**Restore Defaults**	Restores settings to default settings
8	**Zoom Only**	Limits movement to Z axis	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP31**	Resets current view to the original view	**9***	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**More**	Opens the next larger Spaceball window	**A***	**More**	Opens the next larger Spaceball window
B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	**C***	**Less**	Opens the next smaller Spaceball window

Spaceball 3003 buttons with SolidWorks

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View -AP31**	Resets current view to the original view	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Single Axis Filter -AP3**	Toggles Single Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Toggle SolidWorks Menu -AP4**	Toggles the SolidWorks menu Open/Closed	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window

B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	**C***	**Save**	Opens the Save dialog

Spaceball 2003 buttons with SolidWorks

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -AP2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Toggle SolidWorks Menu -AP4**	Toggles the SolidWorks menu Open/Closed	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	**7***	**Shift**	Switches the Spaceball into Shifted Mode
8	**Reset View -AP31**	Resets current view to the original view	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift

9	**Reset View -AP31**	Resets current view to the original view	**9***	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	**A***	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations -AP2**	Toggles Translations On/Off	**B***	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	**C***	**Save**	Opens the Save dialog

The Spaceball and Unigraphics

The Spaceball is supported with Unigraphics (version 9.I and later) on Digital Equipment (DEC) Digital UNIX, Hewlett-Packard (HP) host, IBM RS/6000, Silicon Graphics (SGI), Sun Microsystems (Sun) Solaris, and Windows NT platforms. On Windows NT platforms install the Exceed X11 option for the Spaceball Windows driver.

> **Note**:
> The Spaceball interactive 3D Control functionality is only applicable in the 3D Work View mode in Unigraphics. If necessary, use the Unigraphics select function **Edit Work View** to set your application in this mode.

If you previously used Unigraphics version 9 (or earlier), type `/etc/SpaceWare/spaceball` and select **Turn Spaceball Off** from the menu.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for Unigraphics

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with Unigraphics

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Translations -AP1**	Toggles Translations On/Off	**1***	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations -Ap2**	Toggles Rotations On/Off	**2***	**Ty**	Toggles translations On/Off on all axes except Y

3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep In View -AP4**	Enables/Disables Keep In View	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Set Attention Point -AP7**	Sets the Attention Point for object manipulation	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Pan Only**	Limits translations to X and Y axes	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Reset View -AP9**	Resets current view to the original view	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Save**	Opens the Save dialog

Spaceball 3003 buttons with Unigraphics

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**

L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	**1***	**Tx**	Toggles translations On/Off on all axes except X
R	**Reset View -AP9**	Resets Current view to the original view	**2***	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	**3***	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep in View -AP4**	Enables/Disables Keep In View	**4***	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	**5***	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	**6***	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations -AP1**	Toggles Translations On/Off	**7***	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations -AP2**	Toggles Rotations On/Off	**8***	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Set Attention Point -AP7**	Sets the Attention Point for object manipulation	**9***	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	**A***	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	**B***	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Pan Only**	Limits movement to X and Y axes	**C***	**Save**	Opens the Save dialog

Spaceball 2003 buttons with Unigraphics

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations-AP2**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter -AP3**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep in View -AP4**	Enables/Disables Keep In View	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity -AP5**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity -AP6**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	7*	**Shift**	Switches the Spaceball into Shifted Mode
8	**Reset View -AP9**	Resets current view to the original view	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Set Attention Point -AP7**	Sets the Attention Point for object manipulation	9*	**Keep On Top**	Keeps the current button window on top of all open windows

A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations -AP1**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Pan Only**	Limits movement to X and Y axes	C*	**Save**	Opens the Save dialog

[<<] [>>]

The Spaceball and Other Applications

If you are using an application not specifically listed in these help files, there is a default configuration file you can use.

Reference links for Spaceball windows

The Spaceball Windows
Tiny Spaceball Window
Small Spaceball Window
General Spaceball Window
Button Mapping Window
Sensitivity and Filters Window
Custom Functions Window
Remove User Configuration Window

Button Mappings for Other Applications

The following table shows the functions mapped to the buttons on the Spaceball. The button designations followed by an Asterisk (*) are buttons in Shift Mode. Each device's button mapping is listed separately under 4000 FLX, 3003, and 2003.

Spaceball 4000 FLX buttons with Any Application

Primary Mapping			Shifted Mapping		
Button	Function	3D Control Function	Button	Function	3D Control Function
1	Translations	Toggles Translations On/Off	1*	Tx	Toggles translations On/Off on all axes except X
2	Rotations	Toggles Rotations On/Off	2*	Ty	Toggles translations On/Off on all axes except Y
3	Dominant Axis Filter	Toggles Dominant Axis Filter On/Off	3*	Tz	Toggles translations On/Off on all axes except Z
4	Keep On Top	Keeps the current button window on top of all open windows	4*	Rx	Toggles rotations On/Off on all axes except X

5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Pan Only**	Limits translations to X and Y axes	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Zoom Only**	Limits movement to Z axis	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	C*	**Save**	Opens the Save dialog

Spaceball 3003 buttons with Any Application

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
L	**Toggle Menu**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
R	**Less**	Opens the next smaller Spaceball window	2*	**Ty**	Toggles translations On/Off on all axes except Y

3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Keeps the current button window on top of all open windows	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Translations**	Toggles Translations On/Off	7*	**Restore Defaults**	Returns all settings to the originally installed settings
8	**Rotations**	Toggles Rotations On/Off	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Pan Only**	Limits translations to X and Y axes	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Shift**	Switches the Spaceball into Shifted Mode	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

Spaceball 2003 buttons with Any Application

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**

1	**Menu Toggle**	Toggles Small Spaceball Window Open/Closed	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Rotations**	Toggles Rotations On/Off	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Dominant Axis Filter**	Toggles Dominant Axis Filter On/Off	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Keep on Top**	Keeps the current button window on top of all open windows	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Decrease Sensitivity**	Halves sensitivity with each consecutive button press	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Increase Sensitivity**	Doubles sensitivity with each consecutive button press	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Shift**	Switches the Spaceball into Shifted Mode	7*	**Shift**	Switches the Spaceball into Shifted Mode
8	**Less**	Opens the next smaller Spaceball window	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift
9	**Less**	Opens the next smaller Spaceball window	9*	**Keep On Top**	Keeps the current button window on top of all open windows
A	**More**	Opens the next larger Spaceball window	A*	**More/Less**	Switches between Small Spaceball Window and General Window
B	**Translations**	Toggles Translations On/Off	B*	**Restore Defaults**	Returns all settings to the originally installed settings
C	**Zoom Only**	Limits movement to Z axis	C*	**Save**	Opens the Save dialog

<< >>

Moving With the Spaceball
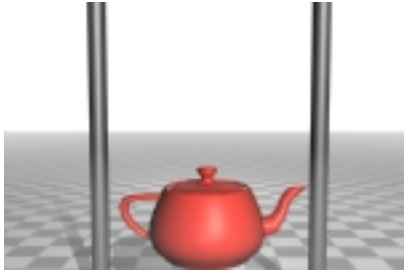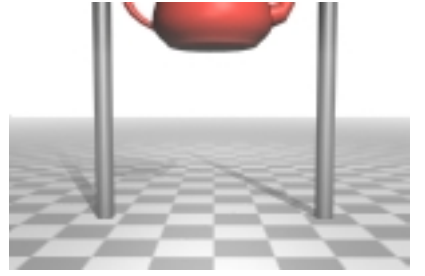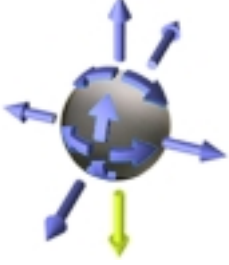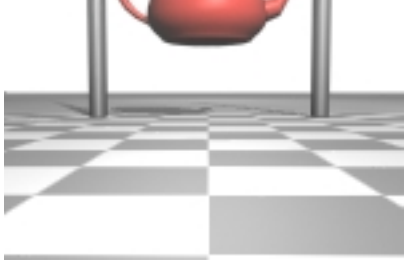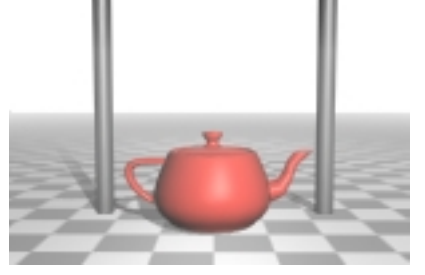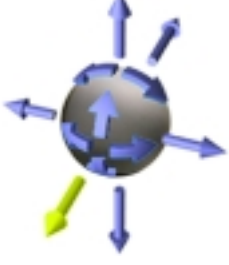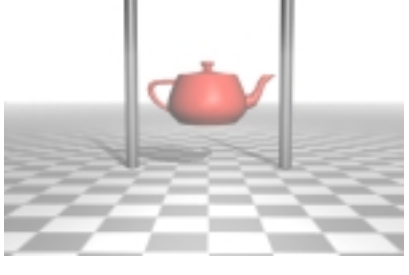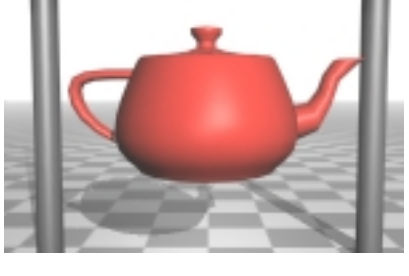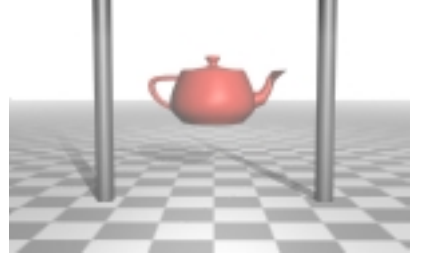
When you work with the Spaceball device, the active image responds to the movement you make with the PowerSensor ball. The following two tables illustrate the kind of object movement that results from movements to the PowerSensor ball.

Note:
The home position for the device is with the negative Z-axis pointing towards the screen. The teapot in these illustrations, when at home or rest, is between the two posts, slightly above the surface with the spout pointing to the right as shown in the graphic below.
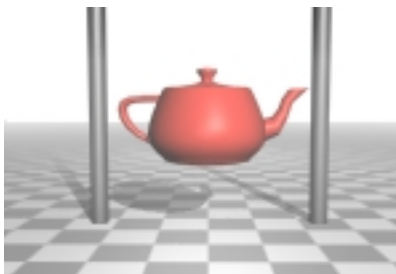
Teapot at Rest

Spaceball Axis Value	Camera Control	Object Control
Translate X-axis (+)	Right	Right
Translate X-Axis (-)	Left	Left
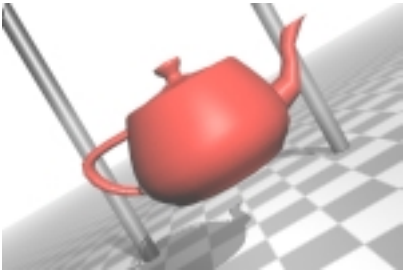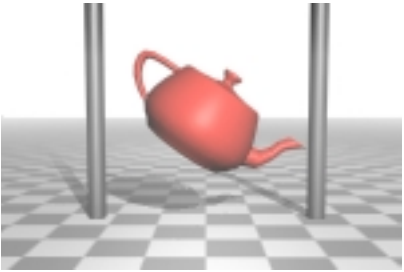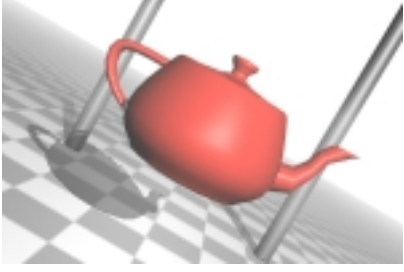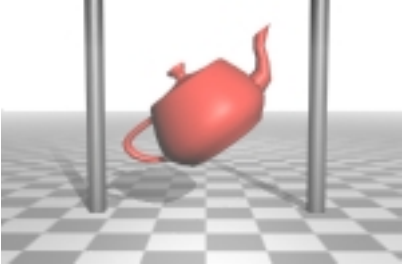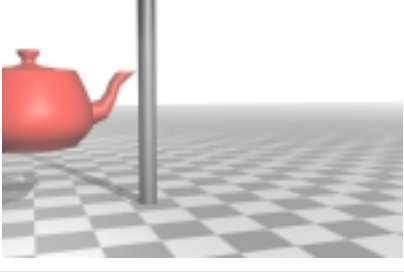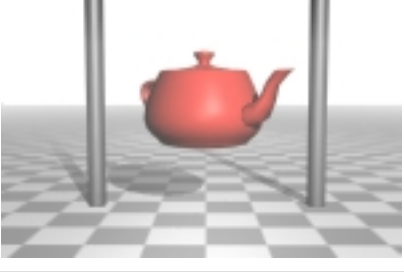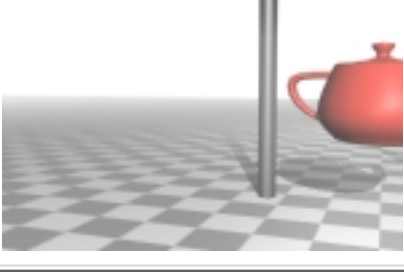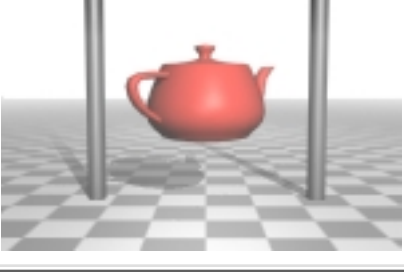
Translate Y-axis (+)	Up or Jump	Move Up
Translate Y-axis (-)	Down or Crouch	Move Down
Positive Translate Z-axis	Zoom Out	Forward
Negative Translate Z-axis	Zoom In	Backward

X, Y, and Z Rotation		
Axis Movement	**Eyepoint Control**	**Object Movement**

Rotate Z-axis	Right Cartwheel or Barrel Roll	Spins Clockwise
Rotate Z-axis	Left Cartwheel or Barrel Roll	Spins Counterclockwise
Rotate Y-axis	Spin Counterclockwise	Spins Clockwise
Rotate Y-axis	Spin Clockwise	Spins Counterclockwise
Rotate X-axis	Pitch Up or Look Up	Top of the object spins towards you

Rotate X-axis	Pitch Down or Look Down	Bottom of the object spins towards you
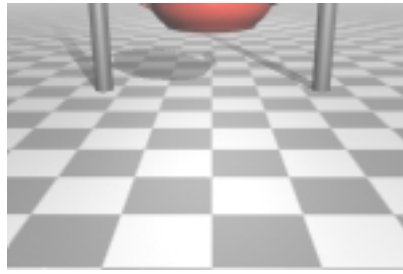
<< >>
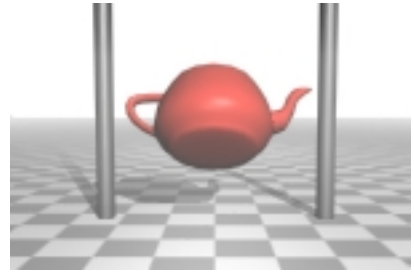
SpaceWare - The Basics

Basic Driver Functionality

The driver will start automatically when a user logs on if you selected that option during the installation. If you are running Windows NT, only a System Administrator can set up the automatic start at log on.

If you did not choose the automatic startup option, you start the driver by choosing **Start > Programs > SpaceWare > Start SpaceWare Driver**.

The driver supports the following command line arguments:

-quiet   Displays no warnings or errors

-shutdown   Turns off all running drivers

The SpaceWare driver places an icon in the system tray while it is running. This icon's ToolTip indicates: "SpaceWare Driver". When the user right clicks on this icon, a menu pops up presenting these options:

Open/Close Window
About
Help
Exit

The **Open Window** menu item appears only if none of the Spaceball Windows is open and it opens the Small Spaceball Window. The **Close Window** option appears only if one of the Spaceball Windows is open. When chosen, it closes the window but does not shut down the driver. The **About** option displays the version number, date and name information. The **Help** option brings up the first page of the online documentation. The **Exit** menu option shuts down the driver.

User Profiles

SpaceWare enables individual users to create custom configuration files for the application they are using. A custom configuration file is a file containing specific button mappings and other changes you made to the default settings in the Spaceball Windows. When you save these changes to a file it becomes your user profile. The Save dialog asks you to name it and this name appears in the "SpaceWare for" drop-down list box when you click on the down arrow. Your User Profiles are available only to you. The maximum number of new user profiles you can create is 100.

For more information about configuration files see Customizing Configuration Files.

Applications with Configuration files

The SpaceWare software has built in configuration files for the support of the following applications:

- 3D Studio Max

- CADDS5

- CADKEY

- CAMAND

- EAI

- I-DEAS

- MCAD - Mechanical Desktop

- [Pro/ENGINEER](#)
- [SolidWorks](#)
- [Unigraphics](#)
- [Spaceball Demonstrations](#)

The driver will automatically switches to the configuration file for an applications when running and in focus. Configuration files saved with an application will only appear with the application it was saved. The "any application" configuration file will run for SpaceWare applications that do not have a specific configuration file.

Spaceball Devices with Configuration files

Each application configuration has unique button mappings for each Spaceball device, 2003, 3003, and 4000. When a new Spaceball device is configured and used, the existing configuration settings will show default button mappings for the new device. When the previous Spaceball device is reconfigured and used again, the settings used with that device will appear again.

SpaceWare Button Colors

The SpaceWare GUI alters the color of the buttons for the number of physical button on the device. All the buttons are accessible from the GUI, but only the blue buttons are accessible from the hardware.

SpaceWare Button -AP Designations

The SpaceWare GUI will display an -AP# representing buttons that are passed through the SpaceWare Window to an application where they are utilized. The AP stands for application function with the number corresponding to a specific button number being passed to the application. Applications which control the sensitivity or filters within the application prevent the SpaceWare Window from accurately displaying filters. The SpaceWare Window's filters and sensitivity are applied to prior to an applications filter or sensitivity.
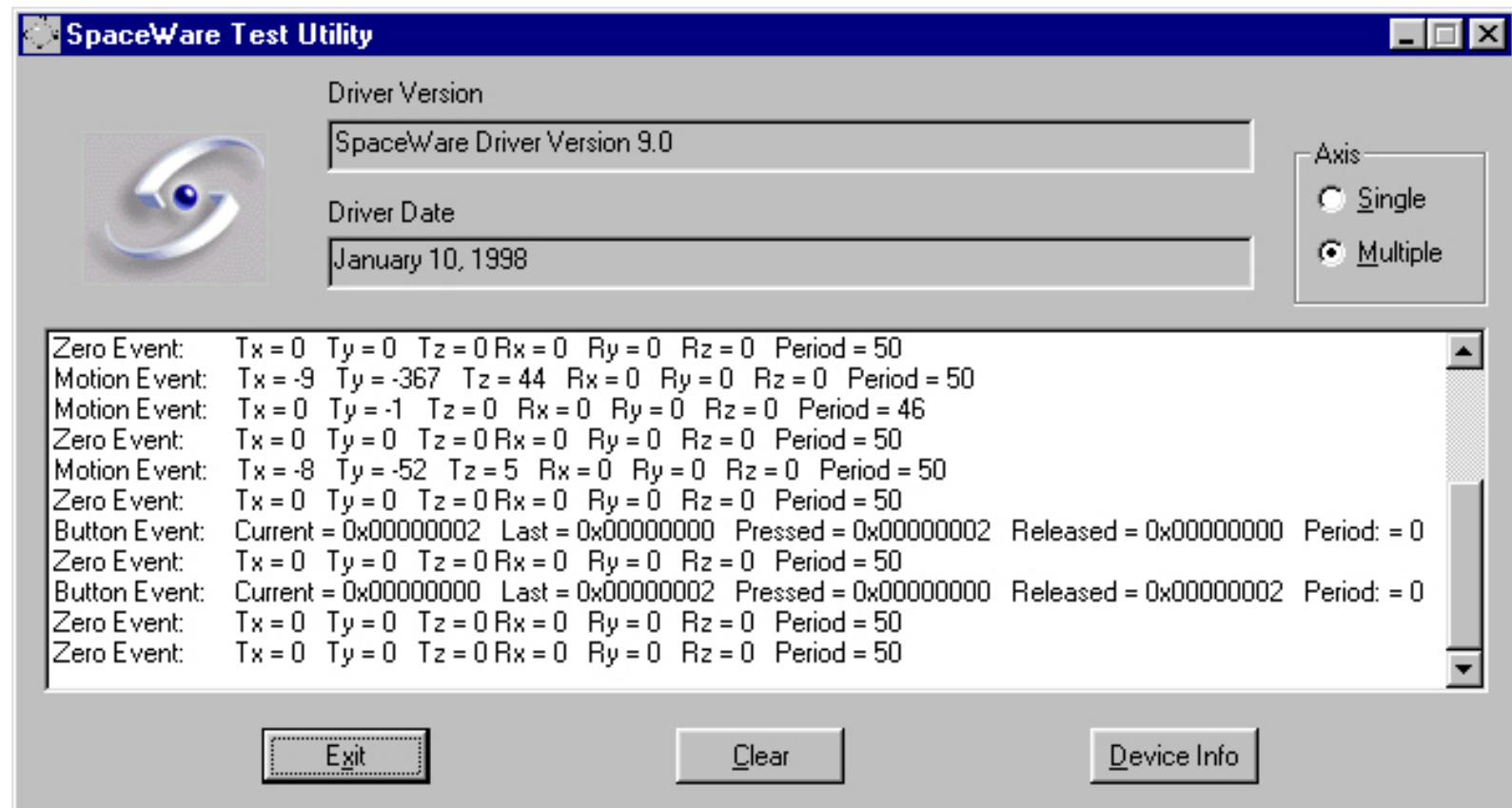
For Example:

Turning Translations off in the SpaceWare window will disable translations even in applications that have Spaceball specific windows that show the translations on.

SpaceWare Test Utility

SpaceWare for Windows includes a test program, spwtest. It is a diagnostic utility for checking that the Spaceball device and driver software are functioning correctly. When this program starts it displays the driver version, date information, and a blank area. The blank area displays the events coming from the Spaceball. When you move the Spaceball or press any button, a corresponding message appears in the window. To clear the display press the **Clear** button. If for some reason the program could not connect with the driver or the Spaceball, the Test Utility displays an error message. To exit this program, press the **Exit** button.

```
SpaceWare Test Utility                                              _ □ ✕

              Driver Version                                    ┌Axis──────┐
              SpaceWare Driver Version 9.0                      │ ○ Single │
                                                                │          │
              Driver Date                                       │ ⦿ Multiple│
              January 10, 1998                                  └──────────┘

Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50
Motion Event:   Tx = -9  Ty = -367  Tz = 44  Rx = 0  Ry = 0  Rz = 0  Period = 50
Motion Event:   Tx = 0  Ty = -1  Tz = 0  Rx = 0  Ry = 0  Rz = 0  Period = 46
Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50
Motion Event:   Tx = -8  Ty = -52  Tz = 5  Rx = 0  Ry = 0  Rz = 0  Period = 50
Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50
Button Event:   Current = 0x00000002  Last = 0x00000000  Pressed = 0x00000002  Released = 0x00000000  Period: = 0
Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50
Button Event:   Current = 0x00000000  Last = 0x00000002  Pressed = 0x00000000  Released = 0x00000002  Period: = 0
Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50
Zero Event:     Tx = 0  Ty = 0  Tz = 0 Rx = 0  Ry = 0  Rz = 0  Period = 50

         Exit                  Clear                  Device Info
```

In addition to displaying the Spaceball events this utility has two other features.

The first is a single/multiple axis filter located in the upper right corner of the window. When the **Multiple** radio button is selected, the window displays information from all axes. When the **Single** radio button is selected only the most dominant axis information appears.

The second feature is the capability to display the information about your Spaceball device. You access this feature by clicking on the **Device Info** button in the window shown above. Once pressed, this button brings up the window shown below which displays the Device type, name, number of buttons, number of Degrees Of Freedom, device beeping turned On or Off, and the firmware string. This screen may be closed by using the **Close** button.
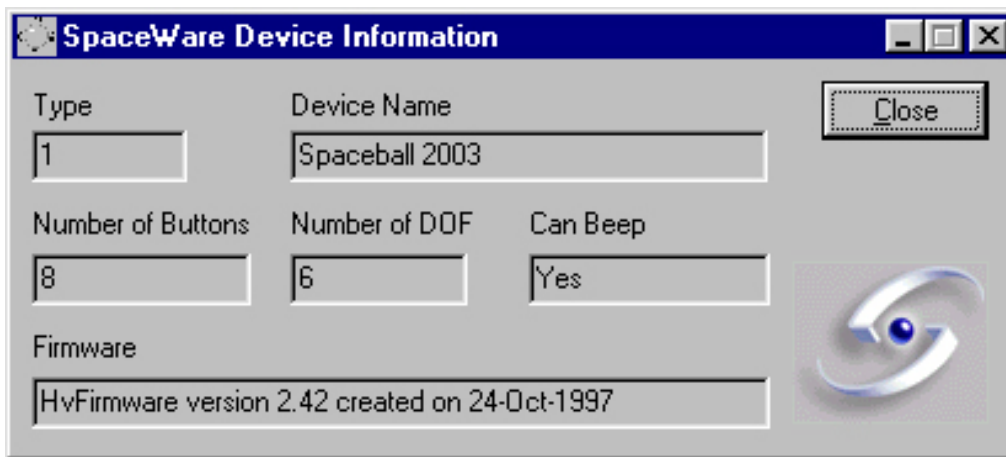
The **F1** key will bring up the Help file.

The **ESC** key will exit the program.

The following table shows the functions mapped to the buttons on the Spaceball 4000 FLX. The button designations followed by an Asterisk (*) are buttons in Shift Mode.

Primary Mapping			Shifted Mapping		
Button	**Function**	**3D Control Function**	**Button**	**Function**	**3D Control Function**
1	**Function 1**	Sends message to Spaceball that Button 1 was pressed	1*	**Tx**	Toggles translations On/Off on all axes except X
2	**Function 2**	Sends message to Spaceball that Button 2 was pressed	2*	**Ty**	Toggles translations On/Off on all axes except Y
3	**Function 3**	Sends message to Spaceball that Button 3 was pressed	3*	**Tz**	Toggles translations On/Off on all axes except Z
4	**Function 4**	Sends message to Spaceball that Button 4 was pressed	4*	**Rx**	Toggles rotations On/Off on all axes except X
5	**Function 5**	Sends message to Spaceball that Button 5 was pressed	5*	**Ry**	Toggles rotations On/Off on all axes except Y
6	**Function 6**	Sends message to Spaceball that Button 6 was pressed	6*	**Rz**	Toggles rotations On/Off on all axes except Z
7	**Function 7**	Sends message to Spaceball that Button 7 was pressed	7*	**Restore Defaults**	Restores settings to default settings
8	**Function 8**	Sends message to Spaceball that Button 8 was pressed	8*	**Rezero Spaceball**	Instructs the Spaceball to assume a rest position in case of image drift

9	**Function 9**	Sends message to Spaceball that Button 9 was pressed	9*	**Keep On Top**	Causes the Spaceball Window to rise to the top if obscured by another window
A	**Function 10**	Sends message to Spaceball that Button 10 was pressed	A*	**More**	Opens the next larger Spaceball window
B	**App Dialog Toggle**	Sends the Menu Toggle command directly to the application.	B*	**Shift**	Switches the Spaceball into Shift Lock Mode
C	**App Pick**	Sends a Pick Button command to the application. This button generally performs a Reset View or Refit to Screen.	C*	**Less**	Opens the next smaller Spaceball window

The Spaceball Windows

The Spaceball Windows:

- Give you access to the functions mapped to the buttons on the Spaceball
- Provide you with the capability to remap the button functions
- Make it possible to adjust the sensitivity of the Spaceball and select various filters

All windows have a [X] button in the upper right hand corner of the window. When you click on this button, it closes the window but does not shut down the SpaceWare driver. None of the windows are resizable. You can reopen the windows by right-clicking on the Spacetec icon in the system tray and choosing **Open Window**.

As the mouse cursor tracks across the different items in a window, each item evokes a ToolTip label describing its function. The buttons representing the Spaceball buttons show the label for whatever function is currently mapped to that button.

Changes made in any of the windows take effect immediately and remain in effect until either the driver shuts down or the user selects another configuration. If the user does either of those things and has not saved the configuration, a Dialog prompts to save or lose the changes.

Because the wrist platform of the Spaceball can be changed from one side to the other to accommodate a user's hand preference, the Spaceball Windows have a left and right hand version. The version of the Windows that appear on the screen automatically reflect the way you have the wrist platform attached to the Spaceball.

More and Less Buttons

These two buttons take you to the next larger or smaller Spaceball window. Going from smallest to largest, they are: Tiny Spaceball Window, Small Spaceball Window, General Spaceball Window. Briefly, these windows are:

1. **The Tiny Spaceball Window** - contains 12 unlabeled buttons, a blank checkbox and a **More** button. The group of 9 buttons represents buttons 1-9. The group of three buttons represents buttons A-C. The empty checkbox is the Keep On Top option. The **More** button takes you to the next larger window, the Small Spaceball Window.
2. **The Small Spaceball Window** - contains twelve labeled buttons representing buttons 1-9 and A-C, a **More** button to take you to the largest Spaceball window (the General Spaceball Window), a **Less** button to take you to the smallest window (the Tiny Spaceball Window), a Shift Lock checkbox, a Keep On Top checkbox, and a ToolTip box giving the name of the most recently executed function or the currently loaded configuration file if you have not yet pressed a button.
3. **The General Spaceball Window** - contains global controls and tabs for the General Spaceball Window, the Button Mapping Window, and the Sensitivity and Filters Window. This is the largest window.

Global Window Controls

On each of the large windows (General Spaceball Window, Button Mapping Window, Sensitivity and Filters Window, Custom Functions and the Remove User Configurations) there are controls that are common to each of them.

The pull-down menu under **SpaceWare 9.1 for** lets you choose the configuration file to use with your application. Making a choice here does not start the application, it loads the SpaceWare 9.1 configuration file for that application. When you start the driver for the very first time, the configuration file for Any Application appears listed in the edit box. You change the configuration file by clicking on the down arrow in the edit box and choosing the file for your application. Once you have made a choice, that configuration file appears in the

edit box until you change it, even after you shut down your system and restart it. If you change applications, you need to select the correct file for that application.

The row of tabs (**General**, **Sensitivity and Filters**, and **Button Mapping**) are a means of switching to another window. Select the one you want.

The **Help** button displays the online help by opening the HTML help files in the default Internet browser.

The **Less** button returns you to the [Small Spaceball Window](#).

Keep On Top puts the Spaceball window in a mode so it will always rise to the surface if obscured by another window.

The **Restore Defaults** returns the button mappings and sensitivity settings to the originally installed settings for the selected application.

The **Reload** button restores the settings to the last saved version of the configuration file.

The **Save** button saves the change you made in this window to a configuration file. A dialog prompts you for a file name. See [Customizing Configuration Files](#) for more information about making changes to the default settings.

When you choose any tab to open a window (**General**, **Sensitivity and Filters**, and **Button Mapping**), these options are always available.

Shift Mode

SpaceWare 9.1 provides a Shifted Mode in which Spaceball buttons 1-9, A, B, and C send values associated with the virtual buttons 13-24 to the application.

These virtual buttons appear in the [Button Mapping Window](#), [Small Spaceball Window](#) (Shifted), Tiny Window, and the [General Spaceball Window](#) (Shifted) as 1* through C*. To access the Shifted Mode and these virtual buttons, you must map one of the buttons (1-9, A, B, or C) to the Shift function. **B** and **B*** are the default mappings for the Shift function.

The **Shift Lock** toggle button, when checked, locks the driver into Shift Mode and, when you press a button, sends the functions mapped to the virtual buttons to the application. To exit Shift Mode you can either uncheck the **Shift Lock** toggle or press the button mapped to the Shift function.

When you click on the button mapped to the Shift function (in a non-shifted state), the driver enters the Shift Mode only for the next button press. After that, it reverts to the unshifted mode. If you press the **Shift** button while in Shift Mode, the driver becomes locked in the Shift Mode the same as if you press the **Shift Lock** toggle. To exit Shift Mode, click on the **Shift Lock** toggle or the button mapped to the Shift function.

Tiny Spaceball Window

This is a version of the Small Spaceball Window, about the size of an icon, that the user can leave on the screen at all times without obscuring the application window.
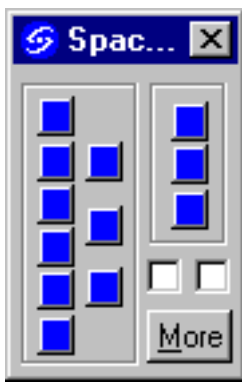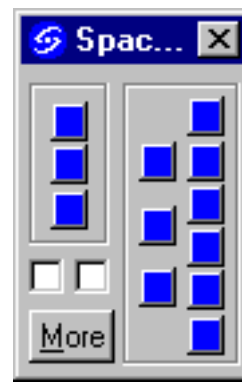
For the Left Hand   **For the Right Hand**

The twelve unlabeled buttons are the Spaceball buttons and appear in the appropriate left/right handed version. The group of nine buttons corresponds to buttons 1-9 on the Spaceball. The group of three corresponds to buttons A-C. They perform the same functions as the buttons on the device. When you move the cursor over them, they display ToolTips reflecting the current button mappings.
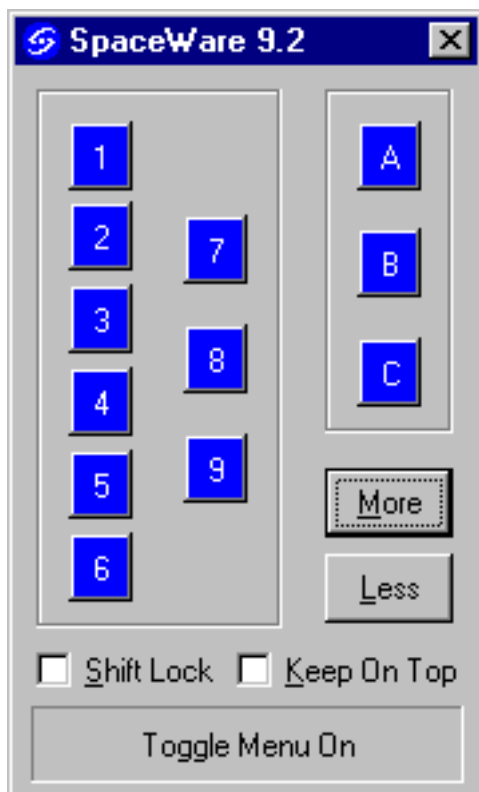
The **More** button opens the Small Spaceball Window.

The unlabeled checkbox is **Keep on Top**. When it is checked, the window always rises to the top if obscured by another window. It is disabled by default.

A single '*' character appears next to the this unlabeled toggle if the buttons are in Shift Mode. The ToolTip describes the state as Shifted or Shift Locked.

Small Spaceball Window
You access the Small Spaceball Window by pressing the Spaceball button mapped to Menu Toggle or by selecting **Open Window** from the system tray menu.
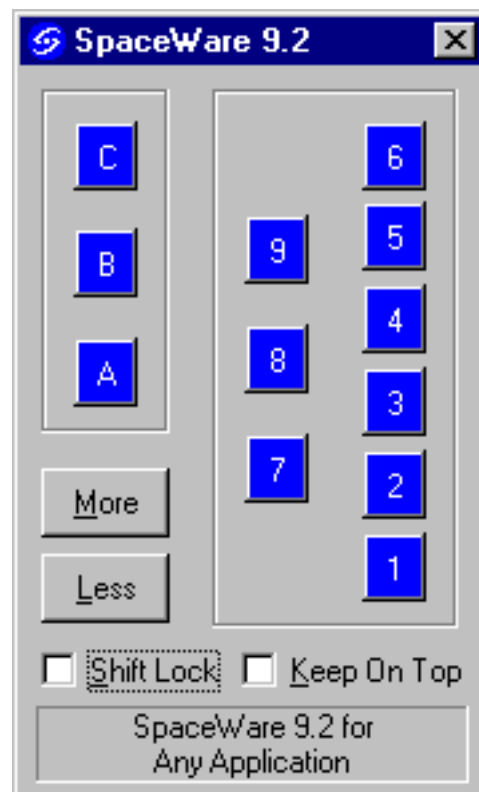
For the Left Hand   **For the Right Hand**

By default, the Small Spaceball Window is mapped to **Button C**. From this window, you can go to the [General Spaceball Window](#) (by clicking on the **More** button) or the [Tiny Spaceball Window](#) (by clicking on the **Less** button).

You can activate buttons 1-9, A, B, and C from this window by clicking on them with the mouse. They activate the functions assigned to the buttons on the Spaceball device. The layout of the buttons is slightly different if you are using the Spaceball with the right hand. If you are in [Shifted Mode](#), the button designations contain an asterisk (*).

The **More** button opens the [General Spaceball Window](#). The **Less** button opens the Tiny Spaceball Window.

The **Keep On Top** button puts the Spaceball window in a mode so it will always rise to the surface if obscured by another window.

The **Shift Lock** button, when checked, puts the driver into Shifted Mode. Removing the check returns it to the unshifted state.

The **Status Bar** is the text area below the **Shift Lock** and **Keep On Top** checkboxes which initially has the message *SpaceWare 9.1 for Any Application*. When you press a button, this message changes to reflect the function of the button pressed. The text from the button press remains in the Status Bar until the you press another button.

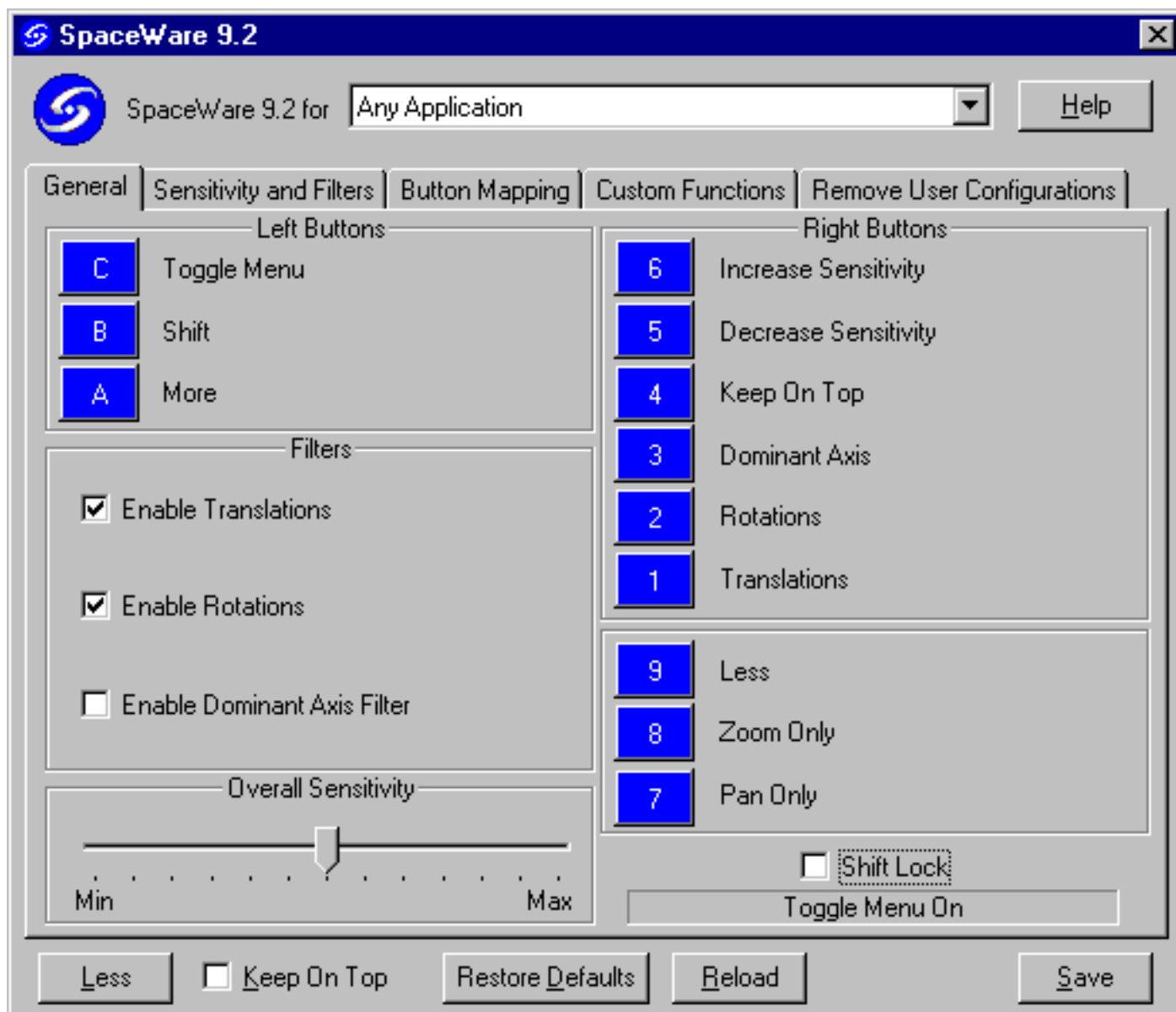As the cursor tracks over the buttons, the label changes to show the function name for that button.

General Spaceball Window

Accessed by clicking on the **More** button, the General Spaceball Window consists of a group of windows divided using tabs. The tabs are labeled: **General**, **Sensitivity and Filters**, and **Button Mapping**. The layout of the buttons in each tabbed window reflects the left/right orientation of the Spaceball.

The General Spaceball Window shows the mapping of all the Spaceball buttons in the non-shifted mode, provides control over the sensitivity of the Spaceball, and lets you choose certain standard data filters. All the filters are applied to the data immediately upon selecting them or adjusting the sensitivity slider.

SpaceWare 9.2

SpaceWare 9.2 for | Any Application ▼ | Help

General | Sensitivity and Filters | Button Mapping | Custom Functions | Remove User Configurations

Left Buttons

1	Translations
2	Rotations
3	Dominant Axis
4	Keep On Top
5	Decrease Sensitivity
6	Increase Sensitivity

7	Pan Only
8	Zoom Only
9	Less

☐ Shift Lock

Toggle Menu On

Right Buttons

A	More
B	Shift
C	Toggle Menu

Filters

☑ Enable Translations

☑ Enable Rotations

☐ Enable Dominant Axis Filter

Overall Sensitivity

Min — — — — — — — — — — — — Max

Less | ☐ Keep On Top | Restore Defaults | Reload | Save

For the Left Hand

For the Right Hand

Buttons 1-9, A-C perform the same function as the buttons on the Spaceball device. The text labels next to the buttons reflect the current function mapped to the button. When the buttons are in Shifted Mode, the button labels change to include an Asterisk (*) after the button number (for example **1***, **A***). The text next to the button also changes to show the Shifted Function.

The **Enable Translations** checkbox toggles the translation filters applied to the Spaceball motion data On/Off. When enabled all three translations (Tx, Ty, and Tz) are passed on to the application. If this toggle is disabled, none of the translations are passed on to the application. If this toggle is disabled and the **Enable Rotations** toggle is disabled, this toggle will become enabled. This toggle also reflects the state of the **Enable Translations** toggle in the Sensitivity and Filters Window. This checkbox is enabled by default.

The **Enable Rotations** checkbox toggles the rotation filters applied to the Spaceball motion data On/Off. When enabled all three rotations (Rx, Ry, and Rz) are passed on to the application. If this toggle is disabled, none of the rotations are passed on to the application. If this toggle is disabled and the **Enable Translations** toggle is disabled, this toggle will become enabled. This toggle reflects the state of the **Enable Rotations** toggle on the Sensitivity and Filters Window. This checkbox is enabled by default.

When the **Enable Dominant Axis** checkbox is enabled, the driver restricts rotations and translations to pure motion along or around a single axis. Only the largest piece of data coming from the Spaceball is passed along

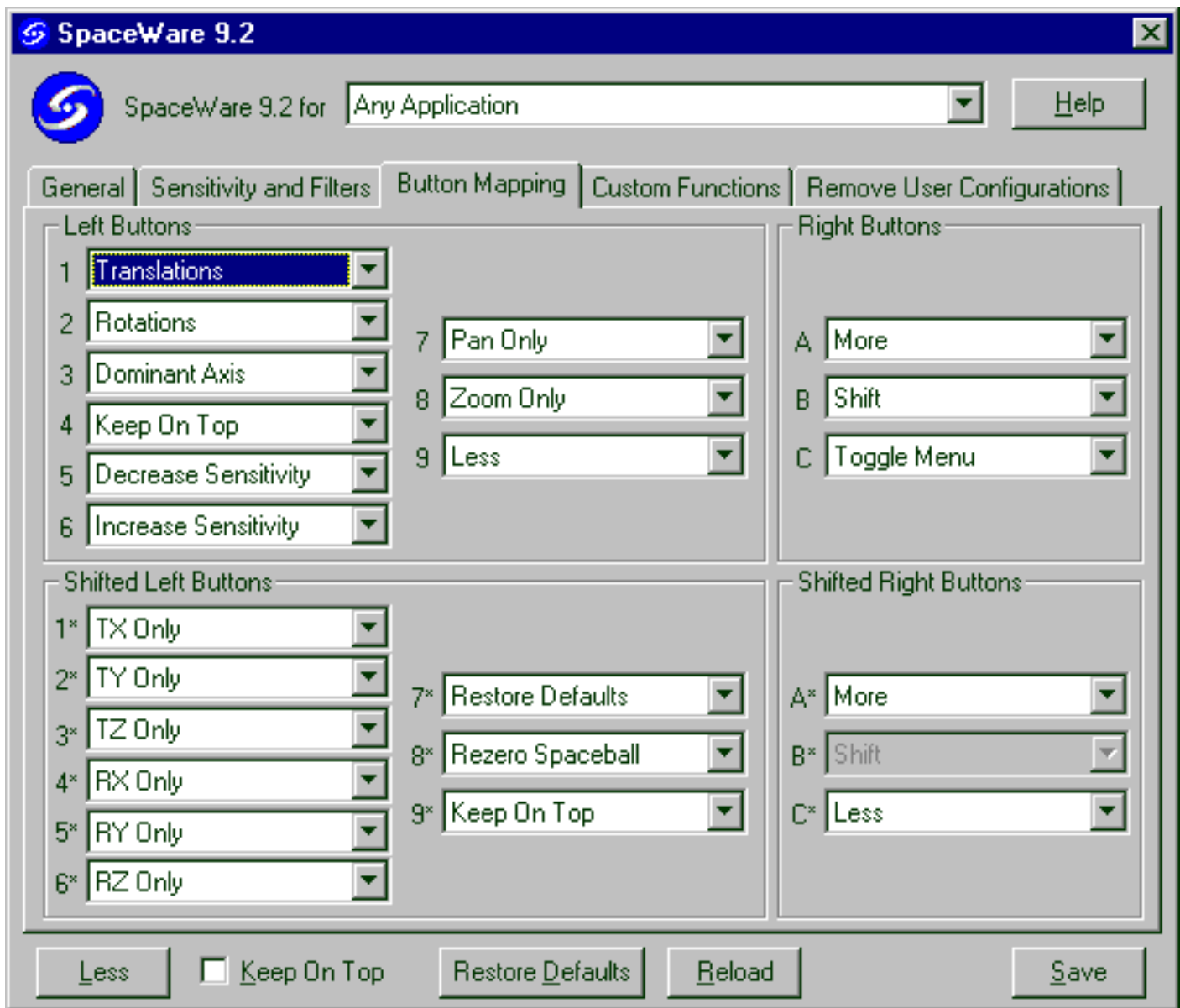to the application. This checkbox is disabled by default.

The **Overall Sensitivity** slider controls a scalar value that is applied to all Spaceball motion data before it is sent to an application, effectively changing the amount of force or torque that needs to be applied to the PowerSensor ball to move a model or scene in an application. The slider starts in the middle and has six positions to the left and right of its starting position. Each position to the right doubles the sensitivity. Each position to the left halves the sensitivity. This gives the user a multiplier of 1/64 to 64 of the original starting data.

The **Shift Lock** toggle, when checked, locks the driver into Shifted Mode. All buttons will send their shifted function to the application. The button labels and text change to reflect the shifted state, and the ToolTips reflect the shifted functions. If the user presses the **Shift** key while the toggle is checked, the toggle is deactivated and the buttons revert to their primary mapping. Pressing the **Shift** button twice while the toggle is not check causes the toggle to be activated. If no button is mapped to the Shift function, this toggle will be grayed out and the shifted functions will be unavailable. This toggle is disabled by default.

The **Status Bar** is the text area below the **Shift Lock** checkbox that has the message "Button 1 Pressed". When the user presses a button this message is changed to reflect the function of the button pressed. The text from a button press remains in the **Status Bar** until the user presses another button. If the user pressed the **Shift** button, the **Status Bar** displays "Shift Mode". Pressing a button in Shift Mode causes that function name to appear. If the driver is still in Shift Mode after the function is executed, the Status Bar displays "Shift Mode: <function name>".

Button Mapping Window

Use this window to change the functions mapped to any of the Spaceball buttons. You can map any pre-defined function onto a Spaceball button.

SpaceWare 9.2

SpaceWare 9.2 for [Any Application ▼]   [Help]

General | Sensitivity and Filters | **Button Mapping** | Custom Functions | Remove User Configurations

Left Buttons

1 [Translations ▼]
2 [Rotations ▼]   7 [Pan Only ▼]
3 [Dominant Axis ▼]   8 [Zoom Only ▼]
4 [Keep On Top ▼]   9 [Less ▼]
5 [Decrease Sensitivity ▼]
6 [Increase Sensitivity ▼]

Right Buttons

A [More ▼]
B [Shift ▼]
C [Toggle Menu ▼]

Shifted Left Buttons

1* [TX Only ▼]
2* [TY Only ▼]   7* [Restore Defaults ▼]
3* [TZ Only ▼]   8* [Rezero Spaceball ▼]
4* [RX Only ▼]   9* [Keep On Top ▼]
5* [RY Only ▼]
6* [RZ Only ▼]

Shifted Right Buttons

A* [More ▼]
B* [Shift ▼]
C* [Less ▼]

[Less]   ☐ Keep On Top   [Restore Defaults]   [Reload]   [Save]

For the Left Hand

For the Right Hand

The Primary Mapping pull-down menus labeled 1-9, A-C contain the possible mappings for the selected location. This window initially shows the current mappings for all the buttons. The user can select a new function for a button by choosing it from the pull-down menu. These changes take place immediately.

The Shifted Mapping pull-down menus labeled 1*-9*, A*-C* are only active if Shift is mapped to one of the buttons 1-9 or A-C. When active, the shifted button that corresponds to the one that has the shift function (as button B* corresponds to button B in the above graphic) also displays Shift and is not active. This change occurs as the user is doing the remapping.

Sensitivity and Filters Window
This window gives the user access to more advanced filters for fine control of the Spaceball. This window does not reflect the Left/Right orientation of the device.
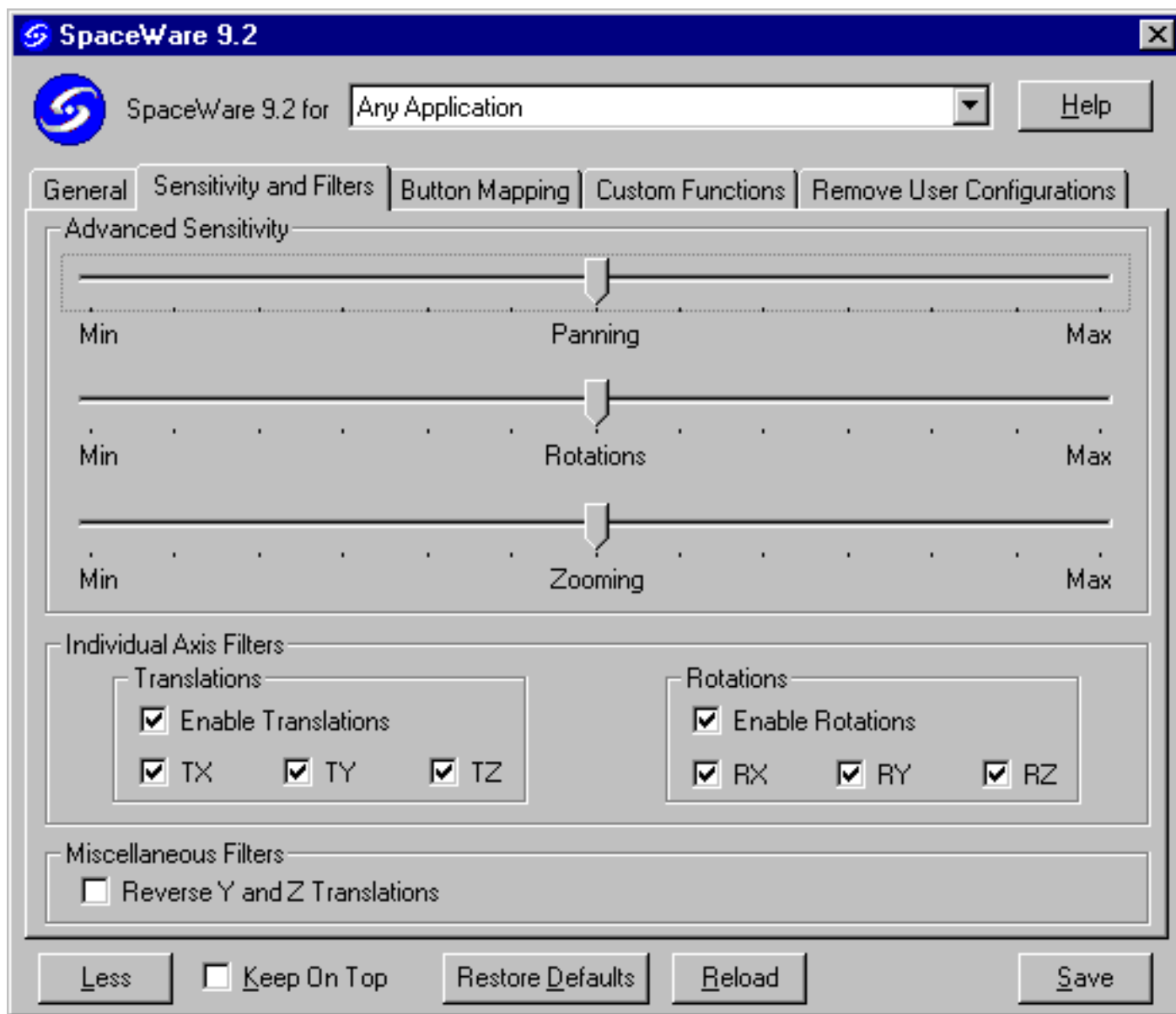
The **Panning** slider controls the sensitivity for the translations along the X and Y axes. This control is in addition to the Sensitivity on the General Spaceball Window. This slider controls the amount of force needed to move a 3D model.

The **Rotations** slider controls the sensitivity for all three rotations axes (Rx, Ry, and Rz). This slider controls the amount of torque need to rotate the 3D model. This control is in addition to the sensitivity on the General Spaceball Window.

The **Zooming** slider controls the translation sensitivity along the Z axis. This slider controls the amount of force required to move. It is in addition to the sensitivity slider on the General Tab.

All three sliders start in the middle and have six positions to the left and right of its starting position. Each position to the right doubles the sensitivity. Each position to the left halves the sensitivity. This gives the user a multiplier of 1/64 to 64 of the original starting data.

The **Individual Axis Filters** toggles control which axes of the Spaceball can send data to an application. The **Enable Translations** and **Enable Rotations** toggles reflect the settings on the General Tab. The user can toggle the state of each individual axis (Tx, Ty, Tz, Rx, Ry, and Rz) On/Off. When the **Enable Translations** toggle is disabled, it will turn all the individual translation axes' toggles Off. The **Rotations** toggles work in the same manner. It is not possible to have all individual axes turned Off at the same time. If the user attempts to do this, the toggle will not work and an Error Dialog appears on screen.

The **Reverse Y/Z Translations** toggle swaps the translations of the Y and Z axes when enabled. This toggle is disabled by default.

Custom Functions Window

Use this window to configure custom functions. The functions consist of recorded keyboard macros that can be played back within an application.
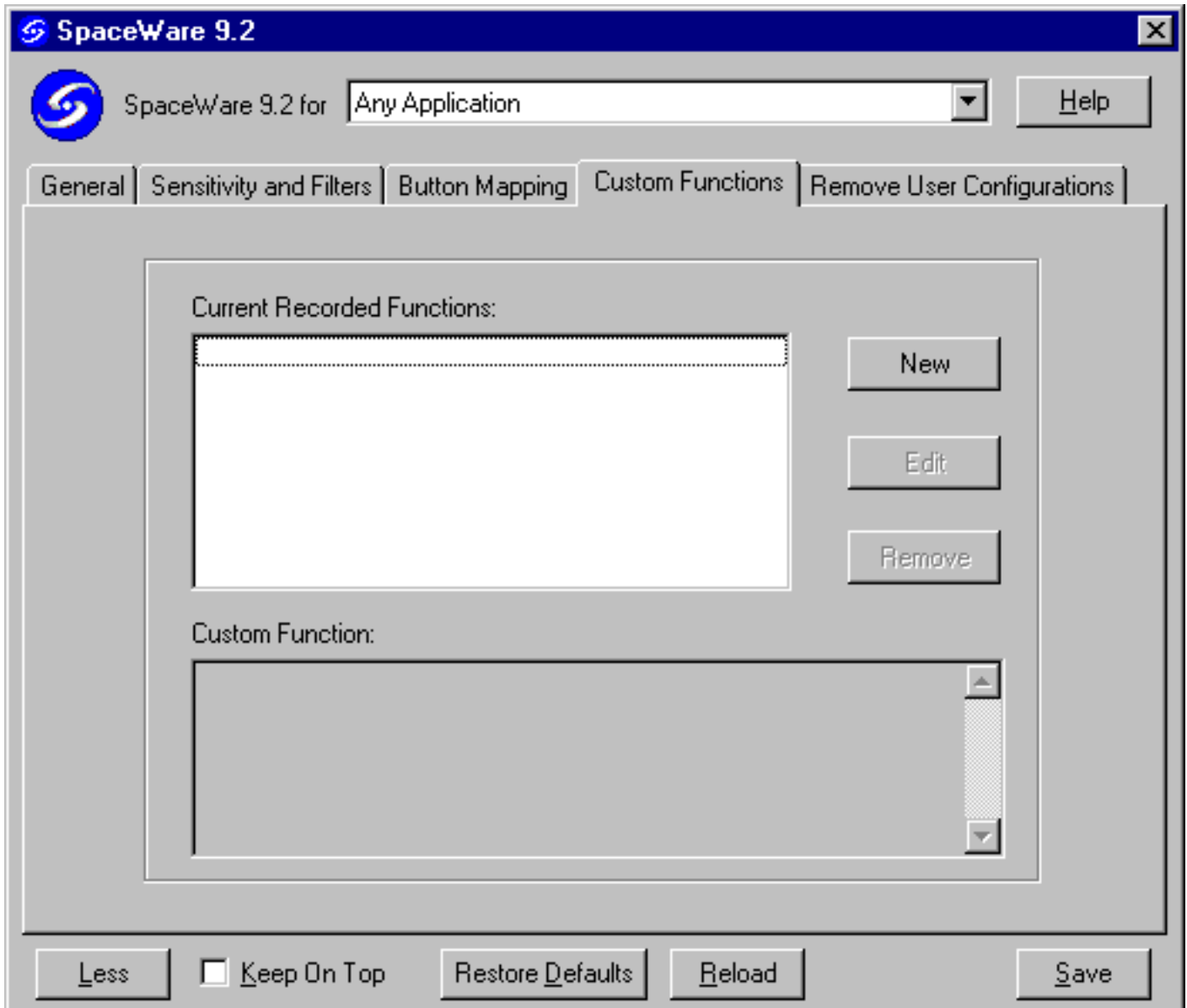
The **Current Recorded Functions** edit box lists the names of the functions created within the configuration. The names listed within this box can be placed on individual buttons using the Button Mapping Window.

The **Custom Function** box lists the keyboard macro that will execute when the button is pressed.

The **New** button is pressed to create a new keyboard macros to be created. See the Custom Function Editor Window for more details.

The **Edit** button with edit a selected Current Recorded Function. See the Custom Function Editor Window for

more details.

The **Remove** button erased the custom function from the configuration.

Remove User Configuration Window

Use this window to remove a specific user configurations created with the SpaceWare software.
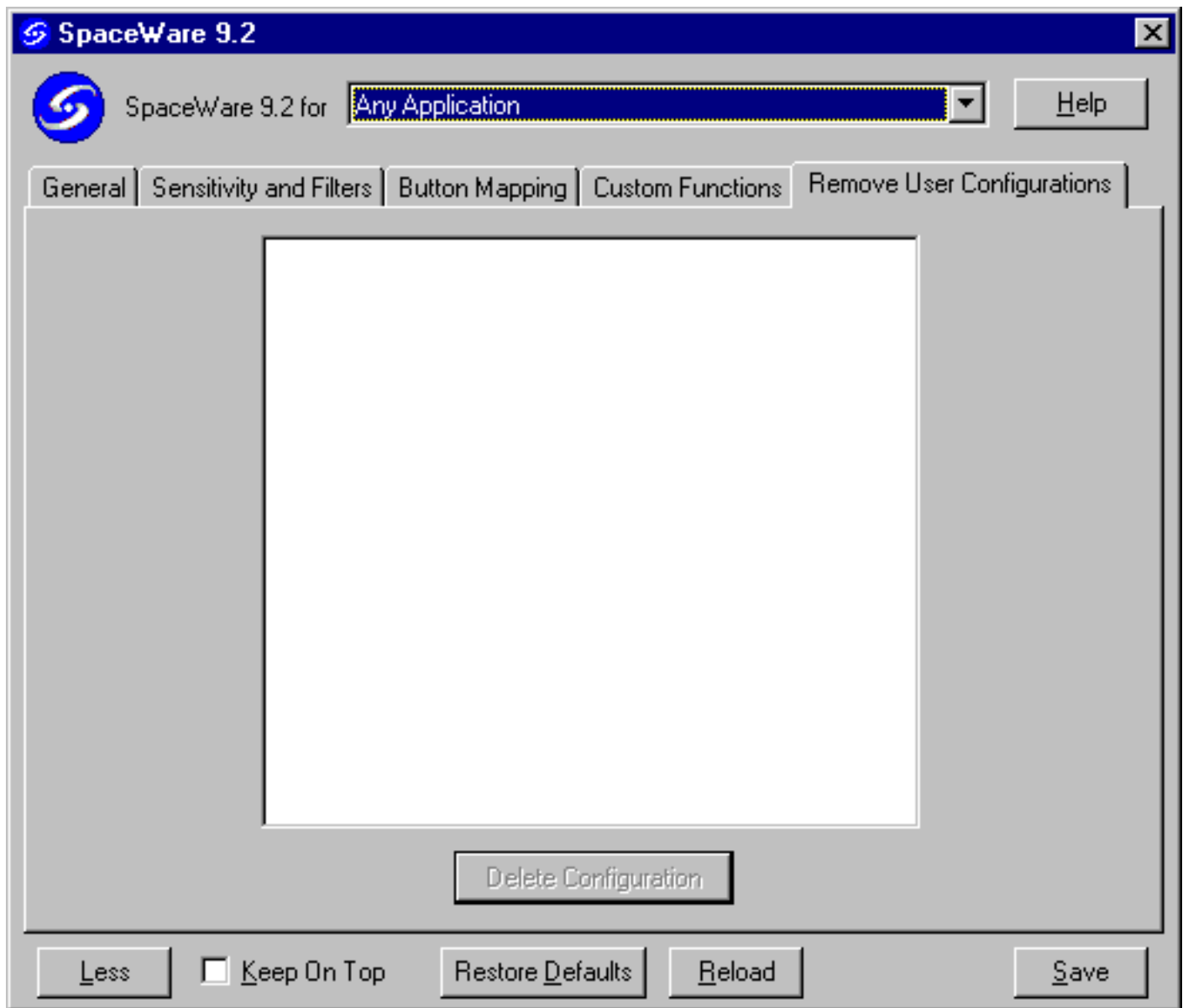
The **Delete Configuration** button removes a configuration from the list of possible configurations. The button will remain grayed out until a configuration is selected.

Custom Function Editor Window

Use this window to add a individual custom functions.

Custom Function Editor ☒

Function Name: [   ]

Custom Function:

[   ]

| Insert Pause | Delete Last | Clear All | Save | Cancel |
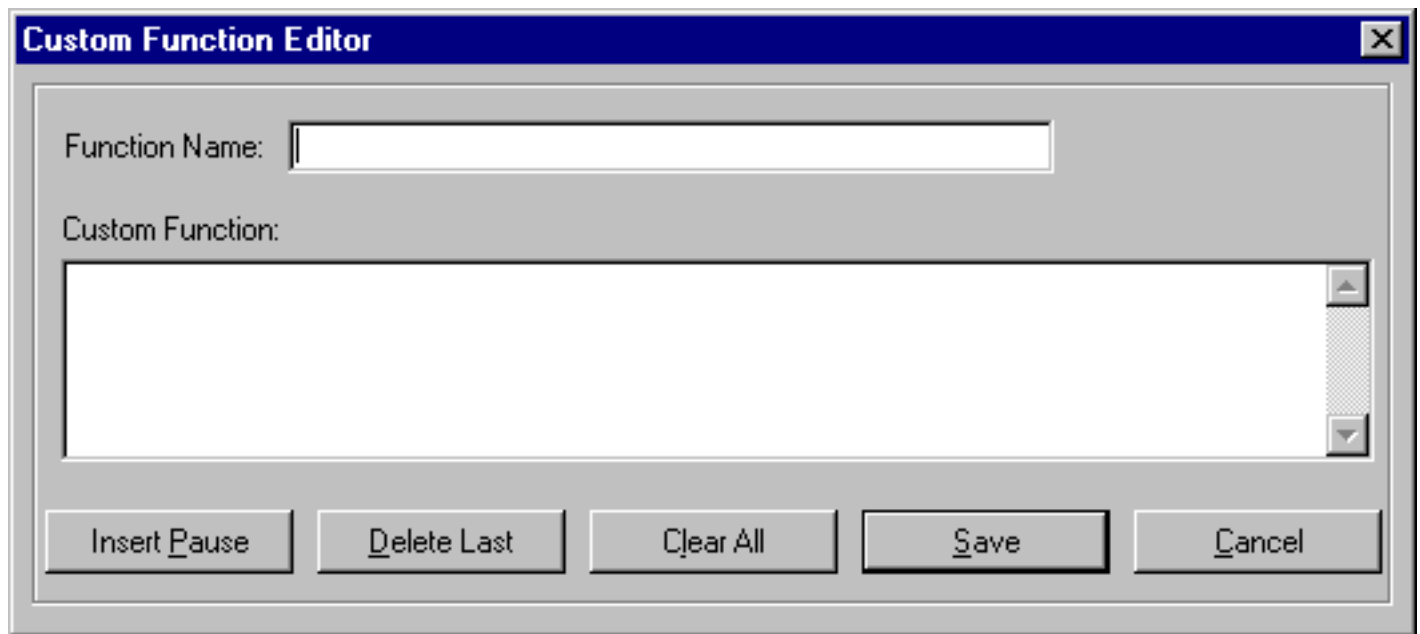
The **Function Name** is an edit box. for entering the name of the keyboard function. This name will be displayed in the Button Mappings pull down list for selection.

The **Custom Function** will display the keyboard sequence as it is entered. Use the Mouse to select the Custom Function dialog box to begin to enter your keyboard commands. The following commands are not accepted in a Custom Function: Ctrl Alt Del, Ctrl Esc, Alt Esc, Ctrl Break, and Alt Tab.

The **Insert Pause** button will add a ½ sec time delay between key presses when the custom function is used. A pause is displayed as {Wait} in the Custom Function window.

The **Delete Last** button will remove the most recently entered keyboard function.

The **Clear All** button will erase all the key presses entered for the function being edited.

The **Save** button will store the custom function for use in the Button Mapping Window.

The **Cancel** button exits the Custom Function Editor without saving the keyboard macro.

Available Button Mapping Functions

The following functions are available for mapping to a button.

Functions Available to All Applications

Menu Toggle

Toggles the current Spaceball window Open/Closed.

Toggle Translations

Toggles translations On/Off.

Toggle Rotations

Toggles rotations On/Off.

Pan Only

Toggles Panning On/Off. When On, it limits all movement to X and Y axes.

Zoom Only

Toggles Zooming On/Off. When On, it limits movement to Z axis.

TX Only

Toggles translations On/Off on all axes except X.

TY Only

Toggles translations On/Off on all axes except Y.

TZ Only

Toggles translations On/Off on all axes except Z.

RX Only

Toggles rotations On/Off on all axes except X.

RY Only

Toggles rotations On/Off on all axes except Y.

RZ Only

Toggles rotations On/Off on all axes except Z.

Dominant Axis Filter

Toggles Dominant Axis Filter On/Off. When Dominant Axis Filter is On, the active model responds only to the single largest piece of data coming from the Spaceball 4000 FLX.

Decrease Sensitivity

Halves the sensitivity of the Spaceball device with each consecutive button press.

Increase Sensitivity

Doubles the sensitivity of the Spaceball device with each consecutive button press.

Rezero Spaceball

Instructs the Spaceball to assume a rest position in case of image drift.

Shift Mode

Causes the driver to enter the Shift Mode only for the next button press. After that, it reverts to the unshifted mode. If you press the Shift button while in Shift Mode, the driver becomes locked in the Shift Mode the same as if you press the Shift Lock toggle. To exit Shift Mode, click on the Shift Lock toggle or the button mapped to the Shift function.

Keep On Top

Causes the Spaceball Window to rise to the top if obscured by another window.

More

Opens the next larger Spaceball window.

Less

Opens the next smaller Spaceball window.

Save

Opens the Save dialog box for saving the current configuration.

Restore Defaults

Returns the current configuration settings to the factory default for the initial application.

Reload

Returns the current configuration settings to the last saved state.

Functions Available only to the Any Application configuration

Functions 1-29

Sends the function mapped to the corresponding button number to the current application. These functions vary in each application. Check your application documentation.

App Dialog Toggle

Sends the Menu Toggle command directly to the application. If the application has its own button window, this button opens and closes the window.

App Pick

Sends a Pick button command to the application. This button generally performs a Reset View or Refit to Screen.

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Customizing Configuration Files

If you want to create a customized configuration file, follow these steps:

1. Open the General Spaceball Window, Button Mapping Window, Sensitivity and Filters Window, Custom Functions Window and/or Remove User Configuration Window and make the changes you want.

2. Click on the **Save** button when you have finished choosing the settings. This brings up the Save Configuration dialog box.

3. Enter a name for your configuration file and click on the **Save** button to save the configuration or **Cancel** to abort the save.

If the original configuration was a default configuration, the name field of the Save Configuration dialog box will be blank, otherwise it will contain the current configuration name. The name you enter for the customized configuration file is the name that will appear in the pull-down list in the **SpaceWare 9.2 for…** list box. This name is not the actual file name and can thus be anything. The configuration is saved in the **config/username** subdirectory and saved with the prefix *user* followed by a file number (for example **user1**). This file number is always be one greater than the last one saved. You can create up to a total of 100 new configurations.

 See Applications with Configuration files for more details on the predefined and user configuration files.

Spaceball Demos

To become accustomed to using the Spaceball device, use the demos included with SpaceWare.

Three demos are available:

- **CityFly** - Shows you how to use the Spaceball to interact with geometry from a first person view. When you first start the program, a wire-frame city model appears with a grid below it representing the ground. The CityFly demo uses Eyepoint Mode. Hit **F1** when running the CityFly demonstration to see the help file for more information.

- **Jet** - Shows you how to use the Spaceball to interact with geometry as you would with a CAD system. When you start the demo you see a wire-frame model of a jet. This demo uses Object Mode. Hit **F1** when running the Jet demonstration to see the help file for more information.

- **Puzzle** - Shows you how to use the Spaceball to interact with a simple 3D puzzle. When you start the program you see a wire-frame cube and several multicolored pieces. The object is to fit all the pieces back into the white wire-frame cube. Hit **F1** when running the Puzzle demonstration to see the help file for more information.

Troubleshooting

Error Messages

The configuration has been modified. Save these changes? Yes   No

You are changing application configuration files after making changes to at least one of the tabs in the General Spaceball Window and have not saved the changes.

Custom Configuration not saved. OK

For some reason (not enough disk space, do not have save permission, etc), you cannot save the file.

Overwrite the existing configuration with this name? Yes   No

You are trying to save a configuration with the same name as an existing configuration file.

The dynamic link library XLIB.DLL could not be found in the specified path

This message appears when you selected to install the optional XCM driver, but have not restarted your system prior to starting SpaceWare. The XCM driver is an X11 client and requires the eXceed X server installed on your computer.

If Exceed is installed on the system prior to installation of the SpaceWare drivers, you must reboot the machine before being able to use the SpaceWare Driver.

If Exceed is not installed on the system but is going to be installed after the SpaceWare driver, the system path must include the path to the Exceed driver to prevent the error box from appearing.

If Exceed is not installed and is not required. Uninstall the SpaceWare drivers and re-install the SpaceWare drivers selecting No when asked "Do you wish to install the Exceed X11 Driver?".

The following .dll file is missing, opengl32.dll.

This message may appear when you are trying to run the GL demo. It indicates that you need to install OpenGL on your machine. The OpenGL files are available on the SpaceWare CD in **X:/OpenGL/win95**, where **X** is your CD drive letter. Copy the **opengl32.dll** and **glu32.dll** files into your Windows 95 System directory. These files are also available for ftp from: ftp://ftp.microsoft.com/softlib/mslfiles/opengl95.exe.

Other Problems

The Spaceball device does not appear to be working or does not beep when power is applied.

Check to make sure that all cables are fastened securely and your PC is receiving power. If this does not solve the problem, try operating the Spaceball device from a different port.

The Spaceball device repeatedly beeps an SOS message in Morse code (dot-dot-dot, dash-dash-dash, dot-dot-dot).

When the Spaceball device beeps an SOS message it normally indicates an internal device fault.

Contact your supplier.

Image movement is very slow.

The Spaceball device does not accelerate performance on your PC. You can improve image movement dynamics by reducing the number of entities displayed during movement.

There is a lapse of time between when you touch the Spaceball device and when the 3D model is redrawn.

Your 3D model could be too large for real-time movement. You can improve image movement dynamics by reducing the number of entities displayed during movement.

You frequently lose the 3D model off the screen.

Decrease the sensitivity settings for the Spaceball device or select **Keep in View** if that option is available for your application.

The Spaceball device is hard to push or the platform base moves when you are pushing it.

Increase the PowerSensor ball sensitivity.

Your image drifts without your touching the ball.

Press the **Rezero** button to stop this condition. Disconnecting and reconnecting the Spaceball device also causes the Spaceball to rezero itself.

Custom functions do not work in an Exceed application.

The Spaceball Exceed Driver sends Alt keys to applications, but some applications require separate left and right Alt keys which is not supported in the Spaceball Driver.

My application doesn't respond to the Spaceball and I can not open the Spaceball button window by double clicking the icon in the icon tray.

If you installed SpaceWare with XCM, you may need to click on the Exceed icon in the taskbar to re-focus Spaceball data.

Unigraphics is too sensitive.

Set the Application configuration to the Unigraphics configuration to adjust the default sensitivity of the driver.

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Maintenance

The Spaceball device does not require any specific maintenance. Reasonable care will, however, extend its operational life. The following preventive and periodic measures are recommended:

Precautions

Do not apply unnecessary force to the PowerSensor ball. This stresses the sensors and can cause mechanical damage. Light fingertip pressure is all you need to achieve complete interactive control.

Keep all liquids away from the Spaceball device. Accidental spillage of corrosive liquids will cause severe damage.

Do not drop or knock the Spaceball device. Severe shock to the device will damage it.

Periodic Care

Clean the plastic housing and PowerSensor ball with a slightly damp cloth. Be sure to disconnect any power to the unit before cleaning.

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Downloading Files

Spacetec IMC Corporation maintains a Web site with SpaceWare software releases, updates, and patches. To down load files, follow these steps:

1. Open your Internet browser and enter **http://www.spacetec.com/** in the location field.

2. From the opening screen, choose **Support**.

3. From the Support listings, choose either **Software** or **FTP** to down load from the FTP site.

If you choose Software, from the listings under Support - Software, choose your operating system. Continue making choices until you reach the driver that you want to download. Click on the item you want and a standard File Save As dialog appears. Make the appropriate responses and the file will download to your system. Be sure to read the Readme file for installation instructions and other information about the driver.

If you choose FTP, this puts you in the /pub directory. Continue making choices until you reach the driver you want to download. Click on the item you want and a standard File Save As dialog appears. Make the appropriate responses and the file will download to your system. Be sure to download the .txt file with the same name as the driver. Read it before you install the driver.

Web sites change frequently and it is possible that the Spacetec Web site you see may not match the description given above. However, somewhere on the opening page there will be a way to get to the software, support, and FTP pages. Explore the Spacetec pages and you will find access to the drivers that you can download. If you are unable to locate the drivers that you can download, call Technical Support for information.

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Technical Support Services

Labtec formerly Spacetec IMC Corporation provides telephone technical support Monday through Friday, 8:00 A.M. to 5:00 P.M. Pacific Standard Time, except major US holidays.

You can contact technical support services by:

- TEL: (360) 896-2000
- FAX: (360) 896-2020 , Attn: Feeback
- Email: spaceball@labtec.com

When you call Technical Support, please be at your computer. If you think you're dealing with a software bug, try to duplicate the problem and make note of the steps involved.

Please have the following information available when you call:

- Your name, company name, and telephone number
- Product name and version number
- Where you purchased the product
- Your computer configuration: CPU type, speed, memory, pointing device, video card (its memory and resolution)
- The platform and operating system you are running
- Your application name and version
- The SpaceWare driver you are using (if you are using one)

You can also send email or a detailed fax. Clearly state your problem and include the information listed above.

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Copyright

Spacetec IMC Corporation
The Boott Mills
100 Foot of John Street
Lowell, MA 01852-1126, USA
TEL (978) 275-6100 - FAX (978) 275-6200

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FCC Compliance

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. This device requires shielded interface cables to ensure compliance. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used according to the instructions, may cause harmful interference to radio communications. There is, however, no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

Caution: Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

German Notice
Hiermit wird bescheinigt, dass der Spaceball Model SpaceController, der Spaceball Model 2003B, der Spaceball Model 2003 FLX, der Spaceball Model 3003, und der Spaceball Model 4000 FLX sind in Ubereinstimmung mit die Bestimmungen der Vfg 1046/1984 Funkentstort. Der Deutschen Bundespost wurde das Inverkehrbringen diese Gerates angezeigt und die Berechtigung zur Uberprufung der Serie auf Einhaltung der Bestimmungen eingeraumt.

Hardware Warranty

The Spaceball® Hardware Warranty

Spacetec IMC Corporation warrants that the Spaceball 4000 FLX hardware is free from defective material and workmanship and agrees to repair or replace any part of the enclosed hardware which proves to be defective by reason of improper workmanship or materials for a period of three (3) year from the date of purchase, without charge for parts and labor, subject to the following conditions:

● The Warranty Registration Card enclosed with Spaceball 4000 FLX shall have been mailed to Spacetec IMC Corporation, The Boott Mills, 100 Foot of John Street, Lowell, MA 01852, USA, within 30 days of receipt of hardware.

● This warranty is limited to the original purchaser of the product and is not transferable.

● The product was purchased from a dealer or distributor or other reseller authorized to resell this product.

● The product shall not have been altered, subject to accident, misuse, or abuse, or operated contrary to the instructions contained in the accompanying manual(s).

● The product shall be shipped, freight paid, in either the original package or a similar package affording suitable protection to Spacetec IMC Corporation, The Boott Mills, 100 Foot of John Street, Lowell, MA 01852, USA, to provide the services referred to herein.

Spacetec IMC Corporation shall not be liable for direct, indirect, incidental, consequential, or other types of damages resulting from the use of this product, other than the liability stated herein. These warranties are in lieu of all other warranties, express or implied, including, but not limited to, the implied warranties of merchantability or fitness for a particular purpose.

Limited Software Media Warranty

Spacetec IMC Corporation warrants the SpaceWare software media provided by Spacetec IMC Corporation to you and only you, the original end-user purchaser, against physical defects for a ninety (90) day period from the date of receipt by the original end-user from the seller. Spacetec IMC Corporation will replace defective media at no charge to you, provided it is returned postage prepaid to Spacetec IMC Corporation at the address shown below within the warranty period. This shall be your exclusive remedy and Spacetec IMC Corporation's sole obligation and liability for defective media.

This limited media warranty covers normal use. It does not apply if the media has been damaged by accident, abuse, misuse, or misapplication, or if you or any other party have modified the media.

The above limited media warranty is in lieu of all other warranties, express or implied, including, but not limited to, any warranty against infringement and the implied warranties of merchantability and fitness for a particular purpose. The remedies provided under this limited software media warranty are your sole and exclusive remedies. Spacetec IMC Corporation, its dealers, and its distributors are not responsible or liable for any special, incidental, or consequential damage, including, but not limited to, lost profits, downtime, or damages to property resulting from the use of this software.

No dealer, agent, reseller, or OEM is authorized to make any modification or addition to this warranty.

In the event of a defect or malfunction within the warranty period, you may contact the Customer Service Department:

Spacetec IMC Corporation
The Boott Mills
100 Foot of John Street
Lowell, MA 01852 USA
TEL (978) 275-6100 - FAX (978) 275-6263
E-mail: support@spacetec.com

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