3D SYSTEMS®

Touch™ and Touch X™

Haptic Device

User Guide

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1 INTRODUCTION

1.1 Copyright

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1.2 FCC Notice

Touch

This Equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference

when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at their expense.

TouchX

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. 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 in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try 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 into 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.

1.3 Compliance

Touch

This equipment conforms with EN 61326-1:2013, IEC 61000-3-2:2014, IEC 61000-3-3:2013, and EN 60950-1:2006 (Second Edition) +A11:2009 +A1:2010 +A12:2011 +A2:2013 and meets the requirements of the applicable EU Directives.

TouchX

This section is not applicable for the TouchX as it is a Class B device.

1.4 Warranty

No warranties of any kind are created or extended by this publication. 3D Systems warrants that the Touch and TouchX haptic device will be free from defects in materials and workmanship, during the applicable warranty period, when used under the normal conditions described in the documentation provided to you, including the respective User Guide. 3D Systems will promptly repair or replace the Touch or TouchX, if required, to make it free of defects during the warranty period. This warranty excludes repairs required during the warranty period because of abnormal use or conditions (such as riots, floods, misuse, neglect or improper service by anyone except 3D Systems or its authorized service provider). The warranty period for the Touch and TouchX is twelve (12) months and shall start the date your device is purchased. For consumers who are covered by consumer protection laws or regulations in their country of purchase or, if different, their country of residence, the benefits conferred by our standard warranty are in addition to, and operate concurrently with, all rights and remedies conveyed by such consumer protection laws and regulations, including but not limited to these additional rights.

THIS WARRANTY IS THE ONLY WARRANTY PROVIDED FOR THE TOUCH AND TOUCHX DEVICES. TO THE MAXIMUM EXTENT PERMITTED BY LAW, 3D SYSTEMS EXPRESSLY DISCLAIMS ALL OTHER WARRANTIES FOR THE TOUCH DEVICE AND EACH OF ITS COMPONENTS, WHETHER THOSE WARRANTIES ARE EXPRESS, IMPLIED OR STATUTORY, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR INTENDED OR PARTICULAR PURPOSES.

1.5 Limitation of Liability

3D SYSTEMS WILL NOT BE RESPONSIBLE FOR CONSEQUENTIAL, EXEMPLARY OR INCIDENTAL DAMAGES (SUCH AS LOSS OF PROFIT OR EMPLOYEE'S TIME) REGARDLESS OF THE REASON. IN NO EVENT SHALL THE LIABILITY AND/OR OBLIGATIONS OF 3D SYSTEMS ARISING OUT OF THE PURCHASE, LEASE, LICENSE AND/OR USE OF THE EQUIPMENT BY YOU OR OTHERS EXCEED THE PURCHASE PRICE OF THE TOUCH OR TOUCHX DEVICE.

2 GETTING STARTED

2.1 Overview

Congratulations on your purchase of the 3D Systems Touch haptic device!

This guide covers information about the 3D Systems Touch haptic device. The information contained in this manual was current at the time of publication. Visit https://softwaresupport.3dsystems.com for the latest information.

This chapter describes the following:

- About this guide
- What comes with your device
- The 3D Systems Touch haptic device features
- System requirements

2.2 About This Guide

The 3D Systems Touch Device Guide describes the process of installing the required device drivers for your new 3D Systems haptic device and connecting the hardware device to your computer. You will also find information on how to use the device and other information about the device.

For the most current device information please visit the Geomagic website at https://softwaresupport.3dsystems.com.

We've worked extensively to ensure that the 3D Systems haptic device and device drivers install and work smoothly. If you experience any problems during the installation or use of your device, please contact Customer Support.

2.3 What Comes With Your Device

The following documentation and other materials are provided to assist you in learning about your haptic device:

The 3D Systems Haptic Device: The haptic device uses high-fidelity force feedback to make it possible to touch and manipulate virtual objects.

The Quick Start Guide: A quick start to attaching the haptic device, installing the drivers and using the device. For detailed information, see the 3D Systems Touch and Touch X User Guide.

The User Guide: This guide (available online at https://softwaresupport.3dsystems.com), describes the process of connecting the haptic device as well as how to work with the device including proper handling, troubleshooting, and device specifications. It also includes the process of installing the device drivers.

USB Type A to Type B Cable: This cable is used to connect the haptic device to the USB 2.0 or 3.0 port on the computer.

Universal Power Supply: The power supply can be used on any standard circuit, using the supplied power cord.

Power Cord: The power cord connects the Universal Power Supply to the wall outlet.

Wrist Rest (TouchX Only): The wrist rest comes with the TouchX device and provides wirst support when using the device

2.4 The 3D Systems Haptic Device

The 3D Systems haptic device enhances productivity and efficiency by enabling the most intuitive human/computer interaction possible, the ability to solve problems by touch. The haptic device employs high fidelity force feedback that senses motion in 6 degrees of freedom providing the best, most realistic 3D touch sensation for any application. You can feel the point of the stylus in all axes, and track its orientation (pitch, roll and yaw). The haptic device's portable design, compact footprint, and an USB interface ensures quick installation and ease-of-use.

General Features

- Dexterous Serial manipulator design
- Six degree-of-freedom positional sensing
- Portable design and compact footprint for workplace flexibility
- Compact workspace for ease-of-use
- Multi-function indicator light

Touch Features

- Textured paint on plastic stylus to assist with grip
- Two switches on the stylus for ease of use and end-user customization

TouchX Features

- Wrist-rest to maximize user comfort
- One switch on the stylus for ease of use and end-user customization
- Comfortable molded-rubber stylus to provide secure grip

2.5 System Requirements

The haptic device requires certain hardware and software components to be able to function properly. This section describes the minimum requirements for operating the haptic device.

NOTE: Visit https://softwaresupport.3dsystems.com to get the latest and most complete system requirements for the applications you will be using with your haptic device. Please refer to the support page for specifications of legacy versions of the haptic device hardware.

- Intel i5/i7 5th generation, or equivalent CPU
- Win 7 64-bit, Win 8.1 64-bit, Win 10 64-bit
- Minimum 256 MB VRAM graphics card (Make sure you have the latest drivers)
- 4 GB of RAM and 512 MB of installation disk space
- Minimum display resolution of 1280 x 800
- USB 2.0 / 3.0 compatible port or USB hub

2.6 Customer Support

WARNING: DO NOT OPEN THE DEVICE. Attempting to open or repair the device by anyone other than a certified authorized service center voids the manufacturer warranty and hardware maintenance contract. There are no serviceable components in the haptic device or power supply. Return to 3D Systems for servicing.

If you encounter any difficulties within your warranty period, you can obtain Technical Support through the three channels listed below. If you are out of warranty and do not have active maintenance, Technical Support is limited. If you purchased your 3D Systems haptic device from a distributor, please contact them first.

Visit the support section at https://softwaresupport.3dsystems.com

E-mail: Software.Support.Americas@3DSystems.com

Customer Support can also be reached via telephone: 1-978-494-8241

3 USING THE HAPTIC DEVICE

3.1 Overview

This chapter introduces you to working with the haptic device and the physical limits of the device's range of motion. It is important to understand these limitations so that you do not inadvertently damage the device by forcing it past its designed limits.

3.2 Working in 3D Space

We have become so accustomed to using a mouse to move around a computer monitor that we don't think twice as we move our hand around a desk to move the cursor on the computer screen. But there was a time not long ago when this seemingly simple task was not second nature; some even found it challenging and were often frustrated as they learned. If you are new to working in 3D digital space and haptics, working with the haptic device may take a little getting used to. Understanding where objects are in 3D space may take some practice before you are able to move and manipulate objects with ease and certainty. Be patient with yourself.

3.3 Proper Handling and Positioning of the Haptic Device

### 3.3.1-Handling the Haptic Device

Lifting the device (Touch): To properly lift the device grasp the base of the unit on both sides and lift as shown in the image below. DO NOT lift by grasping the stylus or arm. The stylus is detachable by design. Lifting the unit by the stylus or arm could result in severe damage to the device.

Lifting the device (TouchX): To properly lift the device use one hand to grasp the back of the device, and the other to grasp the base portion, as shown in the image below. DO NOT lift by grasping the stylus or arm. The stylus is detachable by design. Lifting the unit by the stylus or arm could result in severe damage to the device.
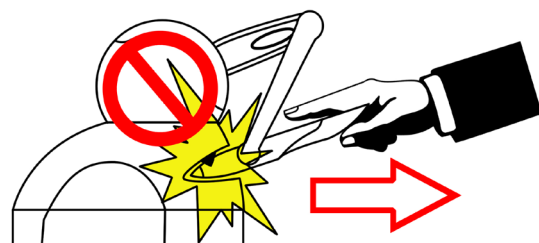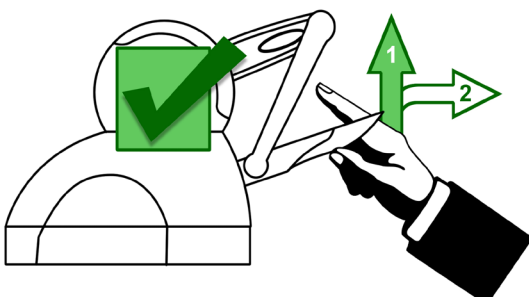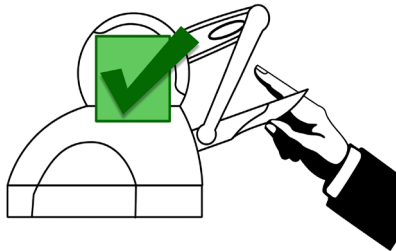
Touch

Touch X
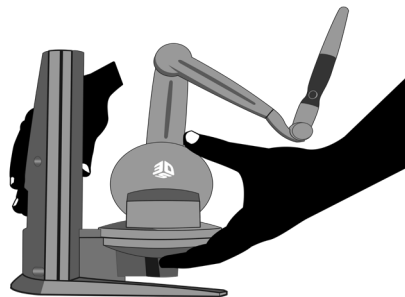
Lifting the stylus out of the inkwell (Touch): Grasp the end of the stylus and lift UP, to disengage, and then OUT as show below in the image on the left. Do NOT attempt to pull the stylus straight out as shown on the right.

Be sure to lift the stylus in a two step motion.

Calibrating the device (Touch): The haptic device may need to be re-calibrated from time to time, particularly if it has lost power. To calibrate the device, place the stylus in the inkwell and start your haptically enabled application. The indicator light in the inkwell of the haptic device will be lit a steady blue when the device is properly calibrated. Alternatively, you can use the Touch Diagnostic Utility (Start>All Programs>3D Systems>Touch Device Drivers).

Touch Calibration

NOTE: For additional calibration instructions, please refer to the RUN 3D SYSTEMS TOUCH SMART SETUP section

Storing the stylus: After the device is calibrated, the stylus may be eft resting on the desk or kept in the inkwell (Touch only). Keep in mind that storing the stylus in the inkwell increases the risk that the device will be knocked over or that the stylus will be damaged.
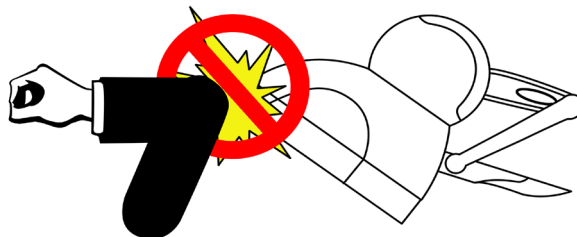
Touch
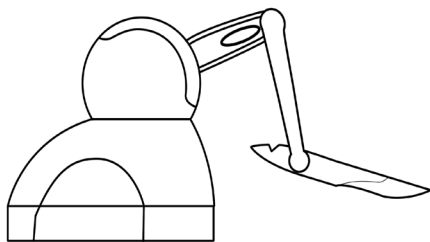
Touch X
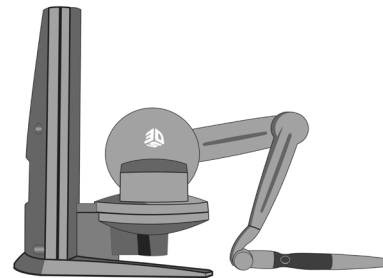
Protecting the device from damage: It is best to place the unit firmly on the desktop and away from edges to reduce the risk of damage to the device from a direct, unintentional elbow hit. The stylus is particularly vulnerable to sustaining damage when it is in the inkwell.

To reduce the risk of damage, keep the device out of harms way. Pay extra attention if the stylus is stored in the inkwell.

Reassembling the detachable stylus: The Touch stylus is detachable by design. Reassemble it by aligning the blade on the shaft with the slot in the stylus and inserting it till it snaps in place as shown in the image below.

Align the blade and shaft to reassemble the Touch stylus.
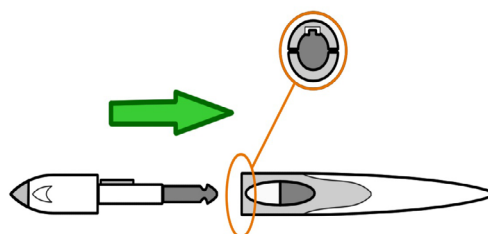
3.3.2-Positioning the 3D Systems Haptic Device

The correct placement of the device will vary from one user to another. You may want to experiment to find a placement that feels right for you.

- The device should be positioned so that you are comfortable when working with it.
- You should not feel any strain on your wrist or forearm when working with the device.
- If you are left-handed, you may find it easier to work with the haptic device placed to the left of the keyboard.
- Remember to take breaks often to stretch your hands, wrists, and elbows.

3.4 Physical Limits of the Device

The haptic device has six degrees of motion provided by six axis points. All the degrees of motion have physical limits. When you reach one of these limits you will feel a sudden stop; this is the mechanical stop designed into the device. Forcing the device past any of these stops risks damaging the device. Take some time to become more familiar with the physical limits of the haptic device before using the device by moving the device through its full range of motion at each axis point.

1. First make sure the device is not active; the inkwell should not be lit. If the inkwell is lit, close any haptic applications you have open.

2. Grasp the stylus as you would a pen, with the free end of the stylus (the eraser end of a pencil) pointing toward you and the point of the stylus (the end connected to the arm) pointing toward the unit. Using the following illustration as a guide, gently move the stylus in all directions to feel each mechanical stop. Now, you will perform macro movements. That is, you will move the device at the "body," "shoulder," and "elbow" of the haptic device.

Encoder articulation: Macro movements. Showing movement of the haptic device arm and the body.

Touch

Touch X
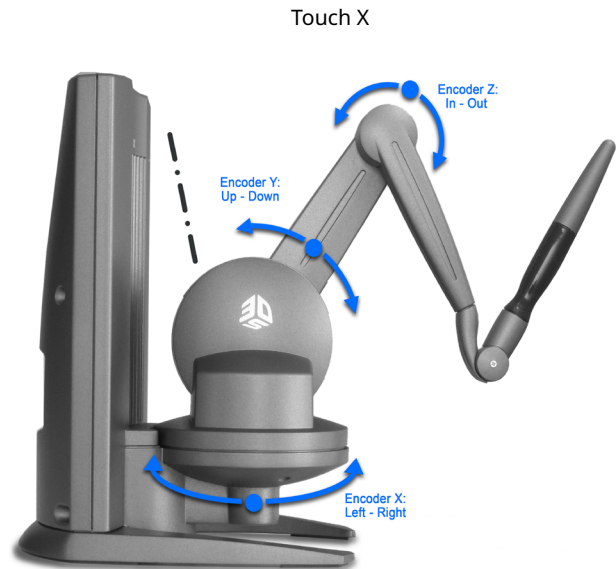
3. Perform macro movements, as follows:

   a. Start with large-but gentle-movements. See the Figure above. Beginning at the top, move the arm of the device left/right. The body, sometimes referred to as the turret, of the haptic device will pivot until it reaches a physical limit. Again, do not try to force the device past any of the mechanical stops.

   b. Next, move the stylus up/down. The primary movement will happen in the shoulder of the haptic device.

   c. Next move it in/out with the primary movement happening in the elbow. When you reach a physical limit, you'll feel one of the
   device's mechanical stops. Don't force the device past any of these stops.

4. Next, perform micro movements further down the haptic device, moving the device at the stylus:

   a. Holding the stylus with one hand rotate left/right at the top of the yoke.

   b. Next pivot it up/down at the bottom of the yoke where it joins the stylus.

   c. Finally, gently twist the stylus back/forth.

Gimbal articulation: Micro movements. Showing movement of the haptic device stylus.

Touch

Touch X
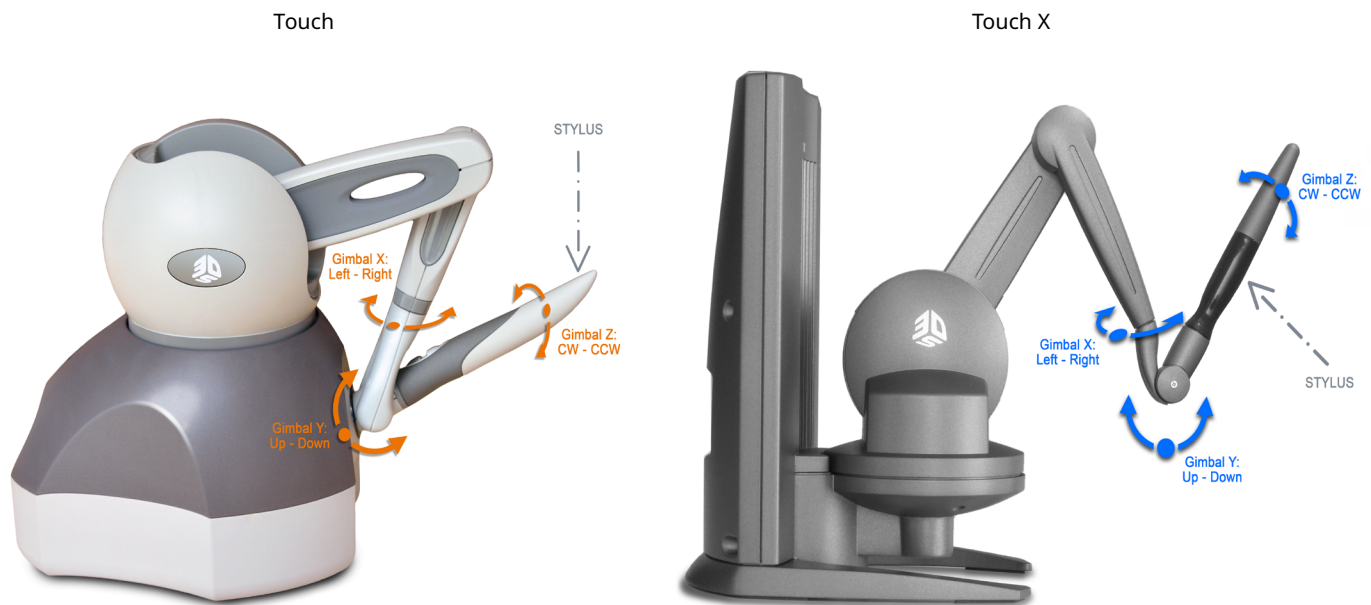
You should now have an understanding of the range of motion of the haptic device at each axis point and where its limits are.

WARNING: ALWAYS WORK WITH THE CONNECTED END OF THE STYLUS POINTING AWAY FROM YOU. NEVER ROTATE THE STYLUS WITH THE POINT FACING YOU.

④ INSTALLING THE 3D SYSTEMS HAPTIC DEVICE

4.1 Overview

This chapter describes, step by step, how to install the haptic device and drivers:

- Install the Touch Device Driver software to allow your computer to communicate with the haptic device.
- Connect the haptic device to your power source and computer.

4.2 Important Information for Existing Users Upgrading to 3D Systems Touch™ or Touch X™

If you are an existing user with a haptic device and want to upgrade, before you run the Touch Setup (on the next page), you must follow these procedures prior to setup.

4.2.1-Uninstall the Previous Version of the Device Driver

Before installing the new Touch Device Driver, you MUST first uninstall any previous versions of the Phantom Device Driver (PDD) that you have installed on your system.

1. From the Control Panel, click Programs and Features.

2. Locate, select and uninstall the 3D Systems Touch Device Drivers.

3. Delete all files in the following location: C:\Users\Public\Documents\3DSystems\

4. Reboot the computer prior to performing the following steps.

4.3 Connecting the 3D Systems Touch Device

In this section you will setup the haptic device and plug in all of the cables. The following steps detail the recommended connection process (Connection Setup below).

NOTE: Exact appearance of your equipment may vary from that shown in the figures.

1. Remove the haptic device from the packaging, as shown in the following image. Position the haptic device in your workspace, using both hands to grasp the covers and base of the device. See PROPER HANDLING AND POSITIONING OF THE HAPTIC DEVICE section for instructions on how to handle the device to reduce the risk of damage.

Touch Extraction

Touch X Extraction
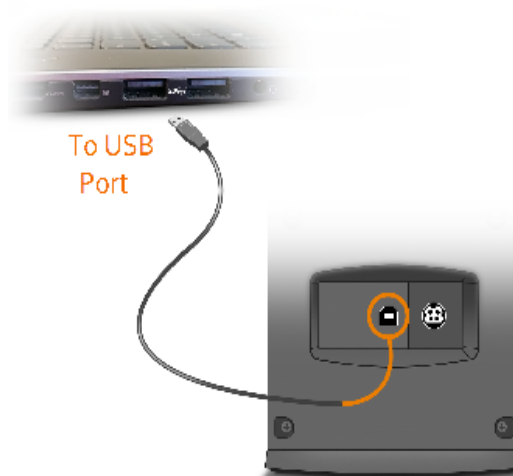
2. Connect the supplied USB cable to both the device and the host computer.

Touch USB Connection Setup   TouchX USB Connection Setup

3. Plug the power cord into an available outlet (for 110V the outlet must be rated for at least 2 Amps, for 220V: 1 Amp). Next, plug the power connector into the connector (Power) on the back of haptic device. Hook up the Power Supply (use only the supplied power supply with the haptic device). Plug the power cord into the power supply. The blue inkwell LED should quickly blink twice to indicate proper performance.

Touch Power Cord Connection   TouchX Power Cord Connection
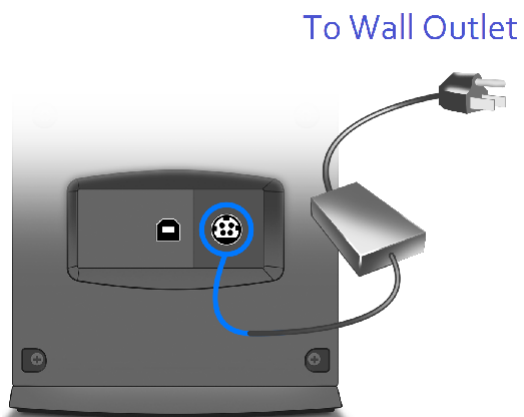
4.4 Installing the Touch Device Drivers

1. Download the Touch Device Driver from the 3D Systems website. Go to www.3Dsystems.com/haptics-devices/touch/documents, locate Touch Device Driver, and select Downloads.

   NOTE: As with most other software packages, you must have administrator privileges on the machine in order to install system software.

2. If the installation wizard does not start, you will need to manually start the installation. Using Windows Explorer, locate and double-click the Touch Device Driver Installer .exe file.

3. Follow the Install Wizard to start the installation of the Touch Device Driver.
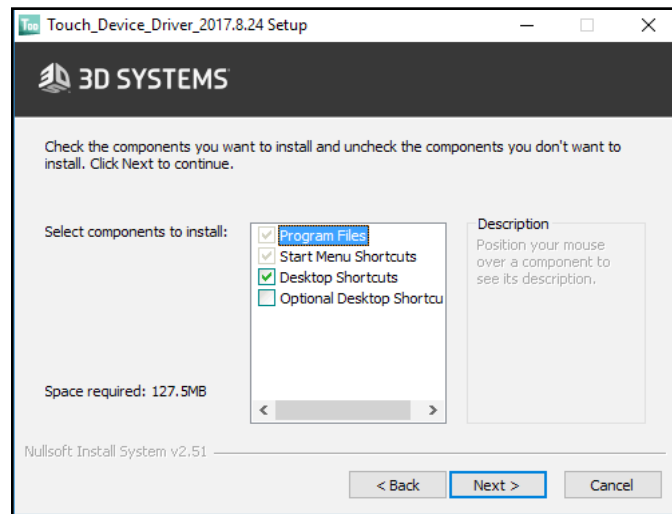

4. In the Select components to install, be sure the check box, "Desktop Shortcuts" is selected. This will create desktop shortcuts for the Touch Smart Setup Application. If you do not install the Desktop Shortcuts, you will need to go to Start>All Programs>3D Systems>Touch Smart Setup to run the Touch Smart Setup Application.

   NOTE: Selecting the Optional Desktop Shortcuts checkbox will install the optional Touch Setup application, outlined in the RUN 3D SYSTEMS TOUCH SMART SETUP section.

5. Reboot your machine upon completion of this process. The device and drivers will not work properly until this has been completed.

4.5 Run 3D Systems Touch Smart Setup

1. Select the Touch Smart Setup desktop icon to open the Touch Smart Setup application. Wait for the Smart Setup application to scan for connected devices. If no device is detected, ensure that your touch device is properly connected to your computer.
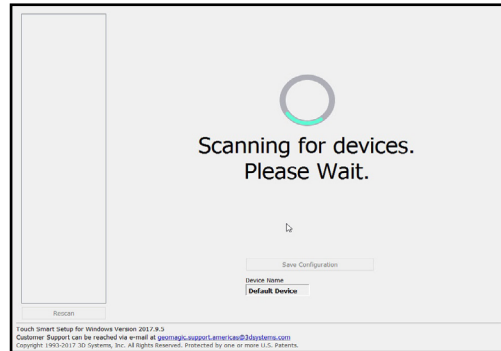
2. Follow the calibration instructions as they are displayed in the application.

Touch Calibration
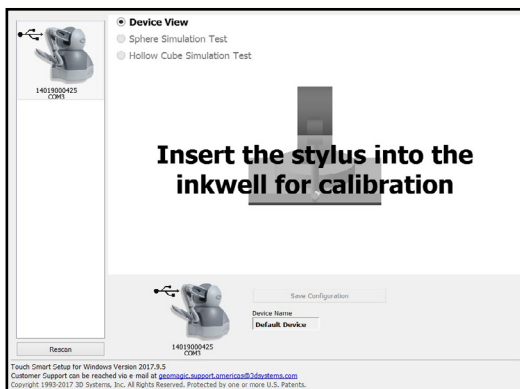
Touch X Calibration

3. Perform the steps presented in the Device View section of the Smart Setup. Move the stylus in all directions while taking note of the visual representation in the application. Select the Sphere Simulation checkbox and perform the steps presented in this section of the Smart Setup. Attempt to touch the sphere with virtual stylus tip. Take note of the feel of the haptic feedback device in this process and verify that the feedback feels correct.
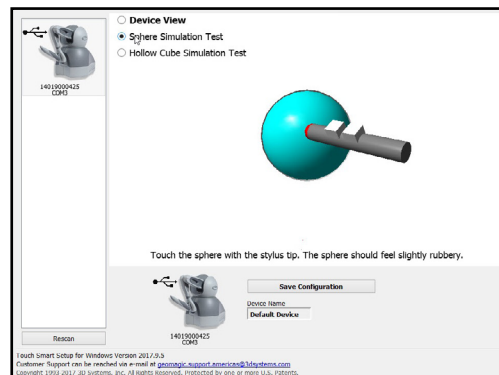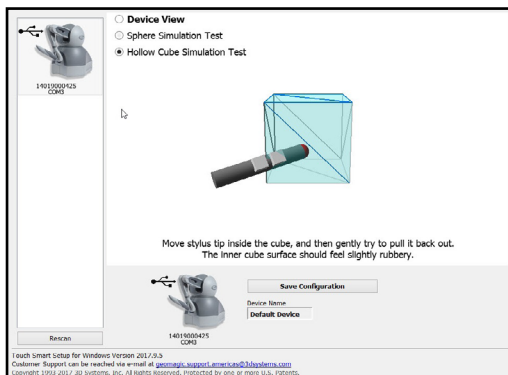
4. Select the Hollow Cube Simulation Test checkbox and perform the steps presented in this section of the Smart Setup. Attempt move the stylus tip into the cube, then gently pull it back out. Take note of the feel of the haptic feedback device in this process and verify that the feedback feels correct.

5. When these tests have been completed, select Save Configuration to complete the Touch Smart Setup.

APPENDIX A: SPECIFICATIONS AND REQUIREMENTS

Device Specifications (Touch)

NOTE: Product specifications are subject to change without notice.

Force Feedback Workspace	~ 6.4 W x 4.8 H x 2.8 D in	> 160 W x 120 H x 70 d mm
Footprint (physical area the base of the device occupies on a surface)	~ 6 5/8 W x 8 D in	~ 168 W x 203 D mm
Weight (device only)	3 lbs 15 oz	~1.42 kg
Range of Motion	Hand movement pivoting at wrist	
Nominal Position Resolution	> 450 dpi	~0.055 mm
Backdrive Friction	< 1 oz	< 0.26 N
Maximum Exertable Force (at nominal orthogonal arms position)	.75 lbf	3.3 N
Continuous Exertable Force (24 hrs)	> 0.2 lbf	> .88 N
Stiffness	X axis > 7.3 lbs./in Y axis > 13.4 lbs./in Z axis > 5.9 lbs./in	X axis > 1.26 N/ mm Y axis > 2.31 N/mm Z axis > 1.02 N/mm
Inertia (apparent mass at tip)	~ 0.101 lbm	~ 45 g
Force Feedback	X, Y, Z	
Position Sensing	X, Y, Z (digital encoders)	
Stylus gimbal	Pitch, roll, yaw (± 5% linearity potentiometers)	
Interface	USB 2.0	
OpenHaptics® SDK compatibility?	Yes	

Device Specifications (Touch X)

Force Feedback Workspace	~ 6.4 W x 4.8 H x 4.8 D in	> 160 W x 120 H x 120 d mm
Footprint (physical area the base of the device occupies on a surface)	~ 5 5/8 W x 7 1/4 D in	~ 143 W x 184 D mm
Weight (device only)	7.1805 lbs	~3.257 kg
Range of Motion	Hand movement pivoting at wrist	
Nominal Position Resolution	> 1100 dpi	~0.023 mm
Backdrive Friction	< 0.23 oz	< 0.06 N
Maximum Exertable Force (at nominal orthogonal arms position)	1.8 lbf	7.9 N
Continuous Exertable Force (24 hrs)	> 0.4 lbf	> 1.75 N
Stiffness	X axis > 10.8 lbs./in Y axis > 13.6 lbs./in Z axis > 8.6 lbs./in	X axis > 1.86 N/ mm Y axis > 2.35 N/mm Z axis > 1.48 N/mm
Inertia (apparent mass at tip)	~ 0.077 lbm	~ 35 g
Force Feedback	X, Y, Z	
Position Sensing (Base X,Y,Z)	X, Y, Z (digital encoders)	
Position Sensing (Stylus Gimbal)	Pitch, roll, yaw (Magnetic absolute position sensor, 14-bit precision.)	
Interface	USB 2.0	
OpenHaptics® SDK compatibility?	Yes	

System Requirements

Operating System	64-bit Windows 7, 8.1, and 10
Processor	Intel i5 / i7, 5th Generation or greater CPU, Minimum 2.5 GHz frequency
RAM	4 GB
Graphics Card	Minimum 256 MB VRAM (Install the latest drivers)
Disk Space	512 MB
Display Resolution	1280 x 800 (Minimum)
Interface	USB 2.0 / 3.0 port or USB Hub that supports USB 2.0/ 3.0. (Use only USB A to B cable provided by 3D Systems).
OpenHaptics ® SDK Compatibility	Yes

* Please visit the Support and Resources section of our website for more information: (https://softwaresupport.3dsystems.com).
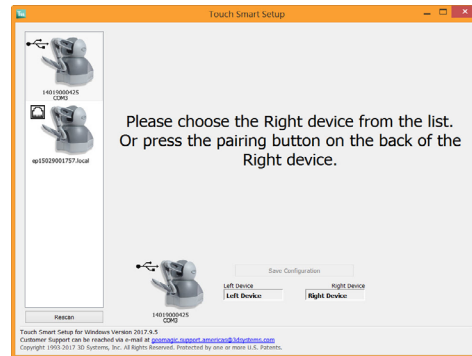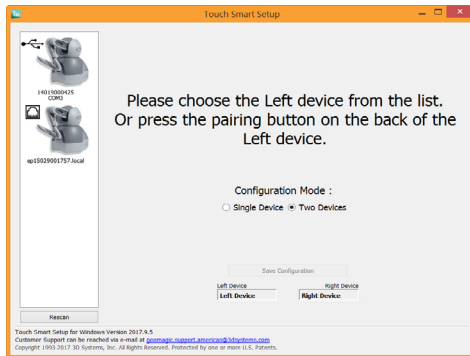
Dual Unit Configuration

The haptic device may be configured in a dual unit setup. In this scenario, two units are connected upon beginning the Smart Setup application.

1. With two devices connected, select the Touch Smart Setup desktop icon to open the Touch Smart Setup application.

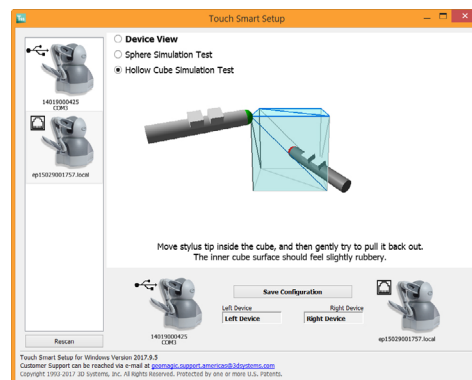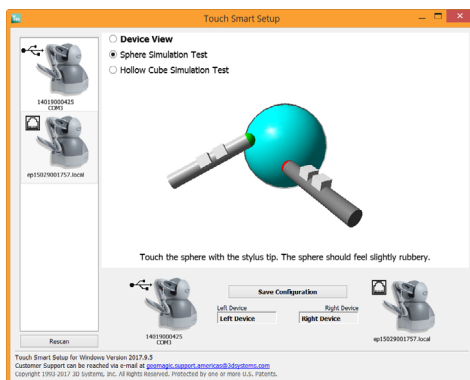2. When prompted, select both the Right and Left devices from the list.

3. Insert the stylus for both devices into each inkwell for calibration.

   NOTE: Please refer to the Run 3D Systems Touch Smart Setup section for detailed calibration steps.

4. Perform the Sphere Simulation and Hollow Cube tests on each device to verify proper performance.

5. Select Save Configuration to complete the dual unit configuration process.

APPENDIX C: ADVANCED SETUP STEPS

Run 3D Systems Touch Setup (Optional)

If you have already configured the device using smart setup, please skip this step. Touch Setup and Diagnostic tools are for advanced users.

NOTE: The following statement is only applicable for LAN devices.

In this section you will identify your 3D Systems haptic device and pair it with your host PC. This process only needs to be executed once. There is a safety key exchange during the pairing process. The safety key will be saved to host PC hard drive and the NV-Ram of the 3D Systems Touch after the pairing process is properly done.

NOTE: For existing users, see the following section before proceeding: IMPORTANT INFORMATION FOR USERS UPGRADING TO 3D SYSTEMS TOUCH OR TOUCH X.
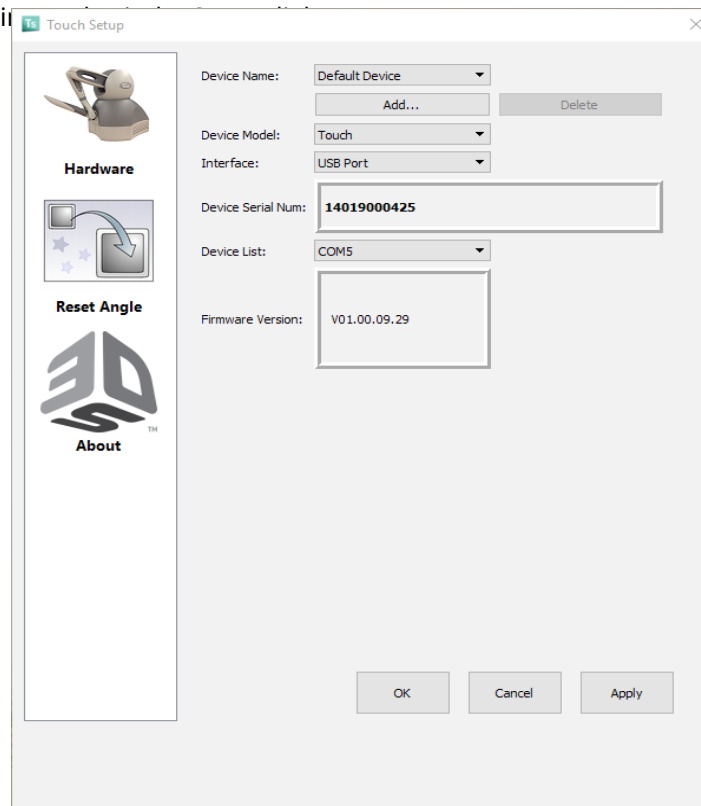
1. Double-click the 3D Systems Touch Setup icon on your desktop, or if you chose not to install desktop shortcuts click Start>All Programs>3D Systems>3D Systems Touch>3D Systems Touch Setup.

    Make sure that the correct 3D Systems Touch Model (Touch or TouchX) is selected on the Hardware tab. From the Host Name drop-down list on the Hardware Tab, do the following:

    a. Match the name of the device or the serial number on the bottom of the device with a device in the list.

2. After you have identified your device you will need to lock or "Pair" it with your host PC. NOTE: This step is applicable to LAN Devices only.

    a. Press the Pair button on the back of your 3D Systems Touch device. The device and your computer are now paired together.

    NOTE: You will only need to Pair the device again if you move the device to a different computer. If you run out of time, a timeout error will appear. In this case repeat steps 4 and 5 again.

3. Click OK to apply the pairing

Run 3D Systems Touch Diagnostic (Optional)

If you have already configured the device using smart setup, please skip this step. Touch Setup and Diagnostic tools are for advanced users.

In this section you will run the 3D Systems Touch Diagnostic application to confirm that the device is properly connected and installed.

1. Click the 3D Systems Touch Diagnostic icon on your desktop, or if you chose not to install desktop shortcuts click Start>All Programs>3D Systems>Touch Diagnostic.

2. The 3D Systems Touch Diagnostic application will open and you will be in the Mode dialog.

3. Click the Next arrow in the bottom right of the dialog or click the Select tab to move on to the next step.

4. The Select tab initializes the 3D Systems Touch device and begins to run to the Servoloop. Click the Next arrow when the six remaining test tabs appear in the dialog to move on to the Calibration stage.

5. You will have to place the stylus in the ink well to properly calibrate the device. The icon changes from red to green when the calibration is complete.
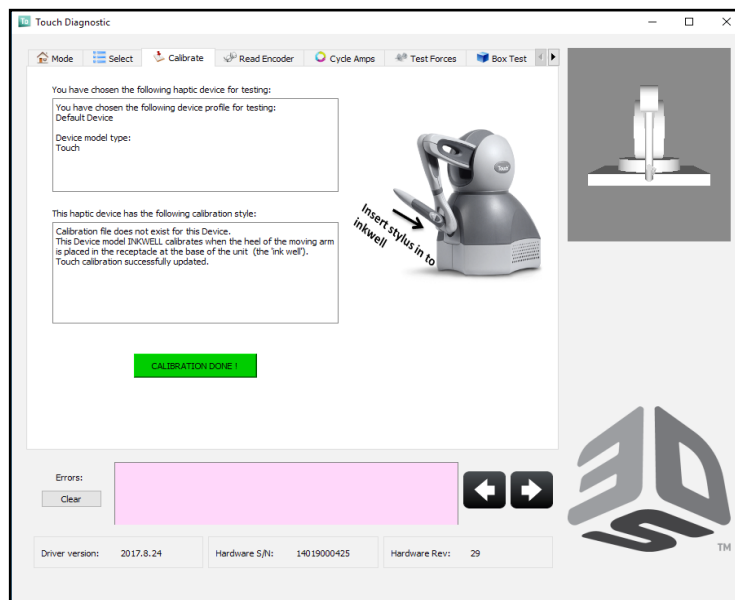
6. Click Next to move on the next test.

7. The Read Encoder dialog displays the range of the devices read and gimbal encoders.

8. The Cycle Amps tab will cycle the device amps. When the results dialog states that the device amplifiers are OK click Next to move on to the next test.

9. The Test Forces dialog contains a slider for the Motor DAC values and a Celsius field to estimate the heat of motors using a determined force. When you are comfortable with the motor levels click Next to move on to the Box Test.

10. On the Box Test dialog, take the stylus and move it around the box in the dialog. You will notice a Force meter on the right hand side that displays the force in Newtons. Click Next to move on to the Servoloop.

11. The final diagnostic is the Servoloop. The Servoloop demonstrates statistics on the timing intervals of the servo loop; these statistics are then written to this dialog (you can copy and send to support if needed). The device driver requires by default that the haptic device forces be updated at a rate of 1000 times a second (1000 Hz).

APPENDIX D: TROUBLESHOOTING

This section provides tips for correcting some common problems encountered with the 3D Systems haptic device.

If after following these steps, you cannot resolve the problem, please contact Customer Support.

The haptic device light does not come on at all.

The light on the haptic device should be on if it is receiving power. Check that the power supply is plugged into a working outlet. Then check that the connection between the power supply and the haptic device is made correctly.

NOTE: The inkwell LED should quickly blink twice upon powering up the device.

The LED states and their meaning.

The inkwell LED states for the device are as follows:

Touch LED States	Touch X LED States
Fast blinking Blue for 2 seconds: Occurs once upon powering up the device	Fast blinking Amber LED for 2 seconds: Occurs upon powering up device
Dim Blue: Device is in standby mode, or connected to power but not in use	Slow alternation between Green and Amber: Occurs after the device powers up and before setup
Solid Blue: The application is running and the device is in use	Slow blinking green: Indicates that the device requires calibration
Slow blinking Blue: The device requires calibration	Solid Amber: Device is calibrated and in standby mode
-	Solid Green: The application is running, the device forces are on and the device is in use
-	Fast blinking Amber LED for 2 secondss: USB has been disconnected whole power is connected

When I start a demo I get an error.

This can happen if the device is not plugged in properly or is not configured properly. Execute the following steps, checking at each point for proper operation:

• Verify power supply - Check to make sure the haptic device is plugged in properly. The light should align with a state listed above if properly functioning.
• Verify USB port connection - Check that the USB cable plugged into the Touch device. Check that the other end is plugged into the USB port on your computer.

I am able to start a demonstration application, but even though the light is solid blue, the device behaves strangely when I move it around in a scene

WARNING: DO NOT ATTEMPT TO OPEN THE DEVICE. It is possible that there is a defect or a loose connection inside the haptic device.

Contact Customer Support. When contacting Support, you may be asked to run the 3D Systems Touch Diagnostic utility to help with diagnosis. To start the Touch Diagnostic, go to the Start menu and select All Programs>3D Systems>Touch Diagnostic.

The following items describe the basic features of this diagnostic utility which you should be prepared to run:

• Select the haptic device which you want to test. Usually this will be "Default Device."

• Read Encoders - Allows you to check all the position sensors and stylus switches on the device.

• Cycle Amps - This will simply turn the amplifiers off then on again repeatedly to test their functioning.

• Test Forces - IMPORTANT: Hold onto the stylus when executing this test. Move the sliders with your mouse to generate forces which push against your hand. X controls force parallel to the table. Y controls force up and down. Z controls force in and out.

• Box Test - Provides a box which you can feel with your Touch device. The sides of the box should feel flat and the corners sharp.

• Quit - Quits the diagnostic utility.

APPENDIX E: TOUCH RE-PACKAGING INSTRUCTIONS

If you need to transport or ship the haptic device, please follow these packaging guidelines to reduce the risk of damage to the device.

IMPORTANT: Remember the haptic device is a sensitive piece of electronic equipment and must be handled with care. Lifting the device by any of the moving parts may adversely affect the unit's performance and risks damaging the device. The haptic device has a limited range of motion. Forcing the device past these limits risks damaging the device. If you have not already done so, please review the section on Using the 3D Systems Touch Device.

Shipping Checklist/Packing Materials:

You will need the following items to ship the device safely. The following are the packaging materials with which the device was originally shipped:

- 1 Medium shipping box
- 1 Set of foam inserts (cradles the device)
- Shipping Tray
- Packing tape

Packing the Device and Accessories:

- If necessary, reassemble the box and arrange the foam inserts. Fit the bottom foam insert into the bottom of the box.
- Orient the Touch device to fit neatly inside the foam insert. You may need to grasp the Touch device by the upper arm, the piece with the oblong cutout, in order to position it properly. DO NOT grab the stylus.
- Gently lower the Touch device into the insert, while maintaining alignment of the Touch arm to the cutout.
- Ensure that the Touch device is fully seated by pressing firmly on the Touch label.
- Check to see that the Touch arm is fully seated by carefully pressing on the elbow joint.
- Place the top half of foam insert over the Touch device.
- Place the stylus, power supply, power cord, and Ethernet cable into the Shipping Tray on the top of the foam insert.
- Place the Shipping Tray over the foam insert.
- Close the box and tape shut.