

FingerWorks Installation and Operation Guide for the



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IMPORTANT – READ CAREFULLY BEFORE USING PRODUCT	3
Installation.....	5
System Requirements.....	5
Installing the TouchStream ST/LP on Your Computer	5
Configuring the TouchStream for your OS	6
Installing the MultiTouch Utilities.....	6
Caring for your MultiTouch Surface	6
How Does MultiTouch Work?.....	7
Using MultiTouch - the Golden Rules	7
Using the Gesture Quick Guide	8
Using the Animated Gesture Guide	8
Typing Guide	9
Touch Typing.....	10
Modifier Chords (for Shifting, etc.).....	12
Basic Modifier Chords.....	12
Combining Modifier Chords with Clicking	13
Combining Modifier Chords with Gestures.....	13
Enhanced Thumb & Zone Modifier Chords	14
Configuring your TouchStream ST/LP	16
4-Corners Manual Configuration Sequence.....	16
Table 1. Manual Configuration Settings	17
Operating System (OS) Compatibility Options	18
Mouse Emulation Options	19
Typing Options	20
Alternative Key Layouts	22
Optional Application Gesture Sets.....	22
Game Mode.....	24
Appendix A – Alternate Layouts	25
(Programmer’s) QWERTY Key Layout	25
DVORAK Key Layout	25
QWERAK Key Layout	25
Appendix B – RightHand Gesture/HotKey Mapping	26

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Installation

System Requirements

One free USB port on your computer or a free USB port on a hub that has an external (wall) power supply (**WARNING:** USB hubs that do not have external power cannot support MultiTouch products!). Also, an operating system that includes standard USB keyboard/mouse drivers such as:

- ☞☞ Windows 98, Windows 2000, Windows XP or ME
- ☞☞ Windows NT (with 'Legacy USB' BIOS option or BSquare third-party driver only!)
- ☞☞ Mac OS 9 or Mac OS X, BeOS, or OS/2
- ☞☞ Linux Kernel 2.4.3 or higher, or with the USB backport to the 2.2.x kernel series.

Installing the TouchStream ST/LP on Your Computer

- ☞☞ **Windows XP** should not require anything. Just plug the USB connector into the back of the computer and wait a second or two for the new hardware to be added.

- ☞☞ **Windows 98, Windows 2000, Windows ME:**

Plug the USB connector into the back of the computer. Depending on what USB devices you've installed in the past, Windows may prompt you to approve installation of several USB drivers. All of the drivers can be obtained from your Windows CD, the Windows driver archive on your hard drive, or from Windows update over the Internet.

Windows (98 especially) may prompt you to install a USB Composite Interface Driver and ask you to reboot. Windows will then prompt you to install two Human Interface Device (HID) drivers, one for USB Keyboard emulation and one for USB Mouse emulation.

Your unit should begin functioning after these HID driver installs without another reboot. If you plug your unit into a different USB root or hub port in the future, Windows may prompt you to install the HID Drivers again, but this time Windows should find them on the hard drive (CD not needed again). If you suspect trouble, check that all drivers listed above show up in the Device Manager, as discussed at <http://www.fingerworks.com/troubleshooting.html>

- ☞☞ **Mac OS X** should not require anything. Just plug in the USB connector into the back of the computer and wait a second or two for the new

hardware to be added. To verify driver installation, expand the USB bus in the Apple System Profiler. A TouchStream should be listed.

- ☞☞ **Mac OS 9** should also not require anything. However, you may have to plug and unplug the MultiTouch device a few times before OS 9 picks up all the interfaces. After plugging in the USB connector, wait 30 seconds or so before unplugging it.

- ☞☞ **Linux:** Recent distributions like RedHat 7.0 and Mandrake 8.0 should auto-detect both keyboard and mouse functionality of your unit. USB support and auto configuration has continued to improve in the 2.4.x kernel series, so success is most likely with the latest kernels.

Instructions for manual installation of the required USB kernel modules (usbcore, hid, usbmouse, usbkbd) and modifying X11's XF86Config file to use /dev/input/mice as the pointer can be found at:

<http://www.linux-usb.org>

See especially the USB User's Guide page on Human Interface Devices: <http://www.linux-usb.org/USB-guide/x194.html>

Configuring the TouchStream for your OS

All systems ship configured so that the gestures emit Windows-style hotkeys and allow 2-Button wheel-mouse emulation. To enable Mac-style hotkeys for use with MacOS, or Linux-style hotkeys or 3-Button wheel-mouse emulation, you will need to either use the manual configuration gestures discussed in the *Configuration* chapter, or install the MultiTouch Utilities and use the Feature Selector control panel.

Installing the MultiTouch Utilities

Installation of the MultiTouch Utilities (available for Mac OS X, Linux, Windows 2000 and Windows XP) is optional. They allow you to upgrade to the latest MultiTouch Firmware, run diagnostics on the sensing surface, and enable additional settings with a Feature Selector control panel (*e.g.*

Linux/Adobe/Adobe hotkey mode, game mode, button swapping, and palm slides for flipping OS modes). The latest version of the utilities can always be found at <http://www.fingerworks.com/downloads.html>. Or if your Internet is slow, you can install an (older?) copy from your FingerWorks CD.

Caring for your MultiTouch Surface

We recommend cleaning your surface with Lysol Disinfectant spray bottle or other non-abrasive household cleaner whenever it becomes grimy. Lysol in particular seems to leave the surface nice and slippery. **NOTE:** Unless you unplug while cleaning, spurious input (*e.g.* mouse clicks or gestures) could be generated while any liquid remains on the surface.

How Does MultiTouch Work?

Your MultiTouch unit consists of two main components: a Hand Imaging Surface (the touch surface) and a Gesture Processor. The MultiTouch Gesture Processor watches the touch surface all the time. It's always looking to see which fingers are touching and what they are doing. The Gesture Processor ignores touching and movement that are not valid gestures or valid typing, so this allows you to rest your hand on the surface without causing spurious input.

Interacting with MultiTouch is a form of communication. You generate gestures and the Gesture Processor reads them and tries to interpret the meaning of your gestures. You can easily confuse the Gesture Processor if you don't communicate clearly - just like you can confuse a careful listener if you garble your speech. The MultiTouch unit will serve you well if you communicate with it clearly. There are five rules that must be followed to ensure clear communication with your MultiTouch device. These are described on the following section

Using MultiTouch - the Golden Rules

1. **Touch the surface with the correct number of fingertips** (Note that this applies to only the initial contact; after the initial contact has been made the remaining fingers may touch down on the surface)
2. **Keep the fingers slightly spread** - keep them relaxed not tightly bunched
3. **Maintain contact with the surface during movement** - relax and let gravity do its job
4. **Keep the thumb separated from the other fingers**
5. **Finger taps should be light and crisp** - don't bang the keys, save your fingers

Additional information and guidance on each of these rules is given below.

Rule 1: Touch the surface with the correct number of fingertips. Clear communication involves touching the surface with the correct fingertips for the desired gesture. This is required because the system distinguishes gestures by the particular set of fingers that initially contact and move together across the surface. For example, the mouse operations of point, drag, and scroll are launched by initial contact of adjacent fingers: two finger tips initially touching means pointing, three mean drag, and four mean scroll. On iGesture products, pointing can also be initiated with five fingers if desired, but clicking must still be done with two.

Some of the gestures allow you to drop the non-involved fingers after initially touching the surface with the correct (involved) fingers. Practicing this helps to reduce hand fatigue. Note that you do not have to drop the non-involved fingers but you may find that it is more comfortable if you do. You can also lift all but one finger without interrupting the operation you started using more fingers. Here's an example of pointing using all five fingers.

1. Touch any two adjacent fingers on the MultiTouch surface.
2. Begin moving fingers in desired direction.
3. Drop remaining fingers and thumb onto surface and continue movement.

Rule 2: Keep the fingers slightly spread - keep them relaxed not tightly bunched. It's not easy to do, but it is possible to fool the Gesture Processor into thinking that one finger is touching the surface when in fact two are. This can occur if you have small fingers and you squeeze them so tightly together that they look like one large finger. Obviously, it isn't your intent to fool your system so relax your fingers and keep them slightly separated for all operations.

Rule 3: Maintain contact with the surface during movement. If all your fingers come off the surface during a gesture operation the Gesture Processor will interpret that as a signal from you that the operation in progress has concluded. Relax and let the weight of your hand keep your fingers on the surface as they slide across it.

Rule 4: Keep the thumb apart from the other fingers. The Gesture Processor might think that the thumb is just another finger if it "sees" it in a position where it should not be. For example, if you put your thumb right next to your index and middle fingers it may look to the MultiTouch software like you have touched down three fingers instead of two fingers and a thumb. Avoid confusing your MultiTouch unit by keeping the thumb comfortably away from the other fingers.

Rule 5: Finger taps should be light and crisp. Hitting the surface hard with your fingertips is not good for your fingers. For typing, the Gesture Processor pretty much ignores how hard you hit the surface and really only cares how long your finger tip stays on the key you are trying to type. If you stay too long the Gesture Processor will assume you are resting your finger and the key will not be entered. For reliable operation make sure your key taps and mouse clicks are light and reasonably quick.

Using the Gesture Quick Guide

Two Gesture Quick Guides that show static images of most of the active gestures for your TouchStream ST/LP should be included in the shipping box. Additional copies of the Gesture Quick Guides can be downloaded from our website under Customer Support/Downloads. While you are learning the gestures you may find it helpful to keep a copy of the Quick Guides near your computer.

Using the Animated Gesture Guide

A CD containing the animated Gesture Guide should be included in the shipping box. If the CD is missing you can run the guide from our web site. The guide runs on your Internet browser and provides animated videos of each gesture operation. We highly recommend that you take the time to run through the guide at least once so that you see the proper way to execute each gesture.

Typing Guide

HEALTH WARNING: If you experience symptoms such as persistent or recurring discomfort, pain, throbbing, aching, tingling, numbness, burning sensations or stiffness in your hands, arms, shoulders, neck, or other parts of your body when using a computer, *DO NOT IGNORE THESE WARNING SIGNS! PROMPTLY CONSULT YOUR DOCTOR OR PHYSICAL THERAPIST.* Ask them for guidance BEFORE trying any new input devices! Remember that pain is likely to increase during the first few days of trying a new device because your body tends to tense up as it is learning new motions and postures. You may also be more susceptible to further injury during this learning period. For this reason, your doctor will probably tell you to restrict use of new devices to short periods of a few minutes a day for the first few days or weeks while your body adjusts.

General Typing:

Tap each key's symbol lightly but crisply with one finger at a time. Do NOT bang on the keys. Try using the minimum force possible. Relax between words by resting all ten fingers on surface and resting palms on gel pads.

Hand Resting:

To rest a hand without activating keys, drop ALL FIVE fingers SIMULTANEOUSLY anywhere on the surface. Palms are ignored so they can rest either on the gel pads or anywhere on the touch surface.

Hunt & Peck Typing:

Tap each key's symbol lightly but crisply with one finger at a time, taking care not to accidentally tap unintended keys. (It may be easiest to float your hands above the surface while typing, but rest them during pauses).

Typematic:

To activate 'typematic' or auto-repeat, lift all fingers of a hand off the surface, then touch and hold one finger on the desired symbol. Once that key starts repeating, you can drop the other fingers back onto the surface. To stop typematic, lift any finger off the surface.

Touch Typing

The first day you get your TouchStream ST/LP, you may doubt that touch typing on a surface is even possible! However, your brain just needs time to adjust to the different feel and technique. By following the suggestions below, most touch typists reach moderate speeds of 30-40 wpm within a few days. Full proficiency takes 3-4 weeks of practice, resulting in speeds of 50-60 wpm for average typists and 60-70 wpm for accomplished typists, esp. with Dvorak.

Your TouchStream ST/LP supports several different styles of touch typing that differ by whether the fingers and palms rest intermittently or continuously. You may learn to switch subconsciously between styles depending on the intensity of your typing task:

?? Touch typing- For most of us:

We highly recommend that you follow these steps when you are just starting out. We've found through experience that most people reach a satisfactory level of accuracy and speed in the shortest training time by following these five steps.

1. Curl your fingers so there is roughly a 90-degree bend at the knuckles. Now rest the fingertips of each hand on their corresponding home row keys using the raised dot at the center of each home row key as a guide. Next drop your palms on the gel pads. Your fingers below the knuckles should now be roughly perpendicular to the surface with the left hand fingertips resting on ASDF & Backspace while the right hand fingertips rest on Space & JKL;
2. Now lift your fingers off the surface but leave your palms resting lightly. Reach for and lightly touch the desired symbols one at a time. You don't have to hit the exact center of each key--just try to use the proper reach between keys.
3. For keys distant from home row, reach with a whole arm motion, keeping your wrist straight while your palms slide across the pads. Then try to exactly reverse this arm motion so your hands "spring" back to home row, and your palms slide back to center on their pads. This is healthier than leaving palms firmly planted and reaching solely via large finger/wrist stretches! *Frequent finger stretching and wrist bending during typing may contribute to carpal tunnel syndrome.*
4. Be careful not to let stray fingers accidentally tap keys.
5. When pausing between words or sentences, drop your fingers back to the surface and use the raised dots to realign them with home row. You can also rest the full weight of your arms on the palm rests during pauses.

?? **Touch Typing- For the swiftest:**

Resting your palms reduces hand drift and arm fatigue, but fully floating them above the pads allows faster typing by increasing freedom of movement. After some practice you may be able to type long sequences of words at high speed without significant hand drift. From time to time you may find it necessary to realign your fingers with the home row keys to compensate for excessive hand drift.

?? **Touch typing- For those in serious pain:**

For people with serious, long-standing repetitive strain injuries, every little typing motion, or just briefly suspending the hands above the surface can be painful. The TouchStream ST supports a minimal effort, but slow, typing method for such people:

- From the ten-fingers resting position, lift one finger at a time, drop and leave the finger on desired key, and repeat for each letter. This way the hands are always fully supported by the surface, and motion is minimized.

Since only one finger moves at a time, speeds are limited to 10-20wpm.

This method works best on the DVORAK or QWERAK key layouts, where the most frequently typed keys are on home row, so you're just lifting and dropping in place most of the time. On conventional QWERTY layouts, it can feel a bit like 'twister' for the fingers, as half the fingers tend to end up resting on upper row keys and must slide back towards home row to proceed.

?? **Touch typing- Minimizing stress:**

Take advantage of our Zero-Force keys to reduce harmful stress. Always use the lightest touch when typing. Banging on the keys is unnecessary and is not good for your joints and tendons.

For faraway keys, lifting your palms and reaching with your arm while keeping the wrist as straight as possible helps avoid carpal tunnel syndrome.

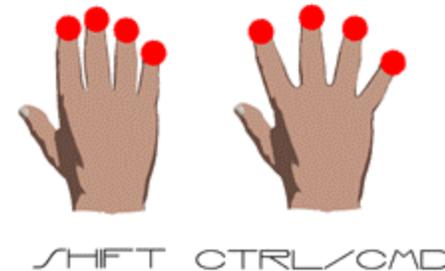
Relax and rest frequently!

Modifier Chords (for Shifting, etc.)

Reaching for *Shift* or other modifier keys can be even more awkward on a touch surface than on a normal keyboard. Therefore, FingerWorks invented a much more comfortable, zero-reach alternative called *Modifier Chords* that you'll *definitely* want to learn!

Basic Modifier Chords

Available only on our TouchStream line, the basic chords can be held anywhere on the surface so long as the fingertips stay in a horizontal line. Compared to the Enhanced chords, these basic chords make it easier for novices to activate Shift, but harder to activate Ctrl/Cmd. For *Alt*, *AltGr* and *Win/Meta* chords, see Enhanced Modifier Chords.



Here's how to use them:

1. When ready to capitalize a letter, just drop and hold 4 fingertips from one hand (excluding the thumb) on home row. This is the *Shift chord*.
2. Type the letter to be capitalized with the opposite hand.
 - ~~OR~~ OR: Lift one of the 4 fingertips from the *Shift chord* and use it to tap the letter (while the others stay on surface).
3. Lift all 4 of the fingertips off home row. This turns off *Shift*.

The timing is really the same as regular *Shift* keys. You're just holding 4 fingertips down instead of reaching with your pinky. Modifier chords are also just as flexible as modifier keys:

- The 4 fingertips don't actually *have* to drop on home row. Just drop them in a row fairly close together anywhere on the surface.
- To type whole words uppercase with a single *Shift* chord, just make sure at least 1 of the 4 fingertips remains on the surface as you type desired letters. (Lift one or two of the 4 fingertips at a time to reach for keys, and leave them down as they drop on target keys).
- Be careful not to roll the 4 fingertips as the *Shift* chord begins or you will get scrolling instead.
- When you want to rest a hand, make sure to drop all 5 fingers (including thumb) simultaneously. Resting just 4 fingers may be interpreted as a *Shift* chord.
- Regular modifier keys are still needed for multi-modifier hotkeys like Ctrl-Alt-Delete. Make sure the fingers come down on the Ctrl and Alt keys *one at a time*--if they strike simultaneously they could be misinterpreted as a two-finger click.

Combining Modifier Chords with Clicking

Shift-click can be done with modifier chords by holding the *Shift* chord with one hand and tapping 2 fingertips with the other hand. OR: *Shift*-click within one hand by dropping 4 fingertips, then lifting and tapping 2 of the 4 simultaneously.

Combining Modifier Chords with Gestures

Modifier chords also work with gestures. Say you want to do a *Shift+Ctrl+V* (Paste Special). On a normal keyboard you would hit three keys with the same hand. But with MultiTouch Technology you simply hold the 4-finger *Shift* chord with your left hand while your right hand performs the *Paste* gesture:



Other modifier/gesture combinations that work in many programmers' editors:

- ~~///~~ *Shift+Cut* for Append Cut
- ~~///~~ *Shift+Copy* for Append Copy
- ~~///~~ *Shift+Save* for Save As...
- ~~///~~ *Shift+Find* for find word at cursor.
- ~~///~~ Any other commands with a *Shift+Ctrl+letter* hotkey sequence!

Enhanced Thumb & Zone Modifier Chords

NOTE: If these enhanced chords are enabled, **Shift** can only be activated by dropping 4 fingertips **on** home row, not anywhere on the surface.

Available only on the two-handed TouchStream ST/LP, this Enhanced chord set provides 5 modifier chords for each hand: *Shift*, *Ctrl*, *Win/Cmd/Meta*, *Left Alt*, and *Right Alt (AltGr)*.

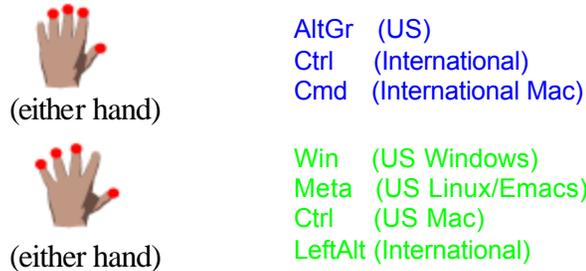
Right Alt (AltGr) is provided for both hands because it allows one to type accented characters on European Key Layouts and to access the programmers' punctuation pad, a behavior different than *Left Alt*, which can always be used as a menu shortcut.

Three of the 5 chords are Zone chords, which use four fingertips above, below, or on the Home Row keys of either hand:



For all but the Shift chord, which is always activated by 4 fingertips on home row, the chord/modifier mappings differ depending on whether the key layout is US or International (which need *AltGr* and *Shift+AltGr* for accent symbols), and whether Mac mode is enabled, since Macs use *Cmd* instead of *Ctrl* as their primary hotkey modifier. In International mode, the *Win/Meta* modifier may be available as a fourth zone below ZXCV.

The two additional chords below are performed by holding the thumb + 3 fingertips, with the hand either relaxed or spread, anywhere on the surface.



While not strictly modifier chords, these tap chords are also enabled when Enhanced modifier chords are turned on:



Enter/Esc-Tap 3F of both hands:
Above home for Escape,
On home row for Enter.



CapsWord-Tap 4F of both hands *above* home row. Turns CapsLock *on* while next word is typed, *off* when Space or punctuation typed.

Programmers' Punctuation Pad ( then <shift> U)

The Programmers' Pad is located under the right half of the ST and LP on US layouts only. Holding the **AltGr** chord with your left hand while pressing a right half key will produce the symbol shown in the lower right corner of the key.



Configuring your TouchStream ST/LP

Your TouchStream ST/LP has a variety of customization options that affect operating system (OS) compatibility, mouse emulation, typing behavior, advanced gesture sets, and game mode. The most important of these is the OS mode setting, which ensures that each command gesture generates the hotkey sequences expected by your OS. If you *don't* set the OS mode to match your operating system, the gestures may not work properly.

Most settings can be changed from any computer with the *4-corners Manual Configuration Sequence* described below, and will be remembered if the unit is moved to another computer. These same settings, plus a few others like mouse button swapping, can also be customized with the *Feature Selector* control panel included in the MultiTouch Utilities (available for Windows 2000, Windows XP, Linux, and MacOS X).

4-Corners Manual Configuration Sequence

- ?? **Step A:** Open a simple text editing program like Notepad.exe (any window or entry field that accepts text input from the keyboard will do), and place the text cursor on the page. You might want to make sure that keyboard input will be displayed by typing a few characters.
- ?? **Step B:** Pick the setting you want from Table 1, remembering what key enables/disables the desired setting.
- ?? **Step C:** Using your thumb and index fingers from both hands, *touch the four corners*  of the MultiTouch surface and hold them there for a second. The following message should appear in the text editing program:
- /* Enter a Gesture Map: 1=Mac 2=Win 3=ThreeButton 4=Linux ...**
- ?? **Step D:** Press the appropriate setting key on the *TouchStream* **within 30 seconds!**
- ?? **Step E:** Verify your changes were successful by examining the status completion message. For instance, if you pressed **4**, you should see:
- /* Enter a Gesture Map: 1=Mac 2=Win 3=ThreeButton 4=Linux ...
Linux/Adobe enabled */**

Table 1. Manual Configuration Settings

Setting	Ships Enabled?	Enables with  then:	Disables with  then:
Restore All Settings to Factory Defaults:		Home	
Operating System:			
Macintosh		1	N/A
Windows	Yes	2	N/A
Linux/Adobe		4	N/A
Linux/Emacs		7	N/A
Unix/BeOS		5	N/A
Horizontal Palm Slides for switching OS mode	No	Insert	Insert
Mouse Emulation:			
Three-Button	Linux only	3	3
Button Swaps	No	N/A	N/A
Left-Hand	No	<Shift>L	1
Typing Features:			
Punctuation Pad	No	<Shift>U	u
Enhanced Modifier Chords (Ctrl above home row "US")	No	<Shift>C	c
Enhanced Modifier Chords (AltGr above home row "Int.")	No	<Ctrl>C	c
International Key 102	No	<Shift>I	i
Independent Numlock Toggling	Yes, if Mac OS	NumLock	NumLock
Variable-Speed Typematic	Yes	<Shift>T	t
English Spelling Model	Yes	<Shift>E	e
BackSpace AutoCorrect	Yes	<Shift>B	b
Key Layouts:			
Qwerty	Yes	Q	
Dvorak		<Shift>V	x
Qwerak		v	Q

Setting	Ships Enabled?	Enables with  then:	Disables with  then:
Left Hand Application Gesture Sets:			
Text Formatting and Alignment	No	<Shift>F	f
Photoshop View/Zoom	No	<Shift>Z	z
Maya	No	<Shift>Y	y
Desktop/Tool Selection	No	<Shift>D	d
Programmer's Gestures	No	<Shift>P	p
Game Mode:			
Master Game Mode Switch	No	<Shift>G	g
Pinky Button	Yes	. (toggles on)	. (toggles off)
Inverted PgDn Action	No	, (toggles on)	, (toggles off)

Operating System (OS) Compatibility Options

All MultiTouch systems ship configured for Windows and 2-button wheel mouse emulation. If you are using Windows then you don't have to do anything. For other

operating systems, you will need to execute the  Configuration Routine and tap the number key corresponding to your selection from the list below:

- 1) **Mac mode** --for Mac OS 9 and Mac OS X. Uses *Cmd* (also known as *Open Apple*) as the hotkey modifier for most gestures, and 2-button wheel mouse emulation by default.
- 2) **Windows mode (Default)** -- for Windows 98, ME, 2000, XP. Uses *Ctrl* as the hotkey modifier for most gestures, and 2-button wheel mouse emulation by default.
- 3) **Pressing 3** toggles between Two & Three Button mouse emulation for all operating systems.
- 4) **Linux/Adobe mode**-- for Linux/Unix systems with modern window managers. Uses *Ctrl* as the hotkey modifier for most gestures, 3-button wheel mouse emulation, and enhanced modifier chords. The hotkeys follow the KDE Window Manager standard (the same as Windows mode hotkeys for the most part). Also works well with Gnome window manager and Adobe apps.
- 5) **Unix/BeOS mode** -- for BeOS and older Unix systems. Uses *Alt* as the hotkey modifier for most gestures, and 3-button wheel mouse emulation.
- 6) (Setting 6 is reserved for future OS support)
- 7) **Linux/Emacs mode** (*only available in firmware ver 1.12 and up*) -- for GNU Emacs hackers. Changes right hand Cut/Copy/Paste and Undo/Redo mappings to match Emacs hotkeys. Also provides left hand gestures for common Emacs command prefixes and escapes. Otherwise mimics Linux/Adobe mode.

Horizontal Palm Slides for switching OS mode. You can quickly switch between major OS modes if you have enabled horizontal palm slides. Note that mode changes made with palm slides are *not* remembered after power-down. They work like this:

?? On *right* half of TouchStream ST/LP:

Mac mode <-- Slide palm heel --> **Windows mode.**

?? On *left* half of TouchStream ST/LP:

Emacs mode <-- Slide palm heel --> **Linux/Adobe mode**

Key Disabling Palm Switches -- You can also set one hand's horizontal palm slides to toggle all surface keys on/off instead of switch OS modes. However, this key toggling option is not accessible via any manual configuration sequence, so it must be turned on from the Feature Selector dialog.

Mouse Emulation Options

3-Button Mouse Emulation. All Multi-Touch units can emulate either a 3-button wheel mouse or a 2-button wheel mouse. Three-button emulation is automatically turned on when you choose Linux/Adobe, Linux/Emacs, or Unix/BeOS modes, off for Windows

and Mac modes, but these defaults can be overridden with  then **3**.

Note: When 3-button emulation is enabled, the thumb & two-fingertip chord splits:



Button Swaps. With the Feature Selector dialog, you can swap the mouse buttons for compatibility with left-handed mice.

Left-Hand Mouse (ships right-handed). Lets lefties point, drag, and scroll on the left surface half rather than the right. Actually, this swaps ALL gesture mappings between left and right surface halves, so text pointing, selection and paging gestures moves to the right surface. File, window, and browser gestures move along with pointing to the left surface.

Typing Options

Programmers' Punctuation Pad (ships disabled). With the new punctuation pad, programmers can type common punctuation symbols right around home row, with minimal reach, when the left hand performs the *AltGr* (Right Alt) modifier chord. See the Modifier Chords chapter for pictures of the *AltGr* chord and the programmers' pad.

Enabling the punctuation pad also enables the Enhanced Thumb & Zone Modifier Chords for *AltGr*. Because International key layouts use *AltGr* to type accented and other special characters, Europeans may need to leave the punctuation pad disabled.

Enhanced Thumb & Zone Modifier Chords (ships disabled). Enables convenient Ctrl, AltGr (Right Alt), Left Alt, Windows (Cmd/Meta) modifier chords as 4-fingertip holds above/below home row and as compact or spread thumb+3-fingertip holds. The Shift modifier chord remains accessible as a 4-fingertip hold on home row.

You can select either "US" or "International" style mappings among the various modifier chords. The "International" style provides Shift-AltGr instead of LeftAlt below home row, AltGr above home row instead of on Compact Thumb+3-fingertips, and Win/Ctrl(Mac) way below home row instead of on Spread Thumb+3-fingertips.

Also enables two-handed chords for Enter, Escape and CapsWord. Tapping 3 fingertips from each hand simultaneously on home row gives Enter and above home row gives Escape; 4 fingertips from each hand on the key row above home row (QWER UIOP) activates CapsWord. CapsWord turns on CapsLock for the current word, but automatically turns it off as soon as you enter a Space or other punctuation. Good for typing capitalized variable names.

102nd International Key (ships enabled with International key layouts). An extra key active within the rightmost portion of the Left Shift key. Needed for European layouts, but can also be used as an alternate \backslash key placement with US layouts.

Independent NumLock Toggling (ships disabled) Allows the NumLock key to turn on/off the embedded numberpad internally (without syncing with the operating system). This is useful for Mac OS 9, which does not recognize the NumLock key properly. It's also useful for laptop users who want to use the embedded numberpad on the TouchStream without turning on the laptop's embedded numberpad.

Variable-Speed Typematic (ships enabled). With this feature enabled, held keys repeat faster if you press harder or flatten your fingertip on the key. As you begin to lift off, the key repeats slow down, so you are less likely to overshoot your intended number of repeats.

?? **NOTE:** With variable-speed typematic turned on, the MultiTouch unit, rather than the operating system, decides how fast to repeat the key. The operating system does not actually know that your finger is held on the key; the OS thinks the key is just getting tapped very quickly. This may cause compatibility problems with games and other applications that need to know exactly when your finger actually touches and releases the key. If this happens, disable variable-speed typematic.

English Spelling Model (ships enabled). Aids accuracy when typing English or English-derived programming languages.

?? **NOTE:** The English Spelling Model is not a spelling checker. It will not prevent you from typing misspelled words, names, passwords, or strings not found in the dictionary *so long as you strike with an even rhythm near the center of each key*. However, if your finger strikes in between keys, the English spelling model encourages the unit to choose the key that makes most sense as a proper English spelling. This helps typing accuracy considerably. If your primary language is English you probably don't want to disable this feature since it automatically weakens as you begin typing in a foreign or programming language, and comes back full-strength when you resume typing a few words of conventional English. You should only disable the English spelling model if you do most or all your typing in a foreign language.

BackSpace Auto-Correct (ships enabled). BackSpace Auto-Correct allows the MultiTouch unit to backspace and replace the last few characters in the current word if its guess as to what you are really trying to type suddenly improves. This can occur when you type sloppily so that the unit cannot accurately decide which keys you meant until you have typed the entire word. BackSpace Auto-Correct improves typing accuracy overall, but every once in awhile the word you intended could get erased and replaced with a different word. If this is a problem for you, disable Backspace Auto-Correct.

?? **NOTE:** Backspace Auto-Correct will not erase past the current word, will only erase characters typed within the last second or so, and will only replace with correct spellings.

?? **NOTE:** If you disable Backspace Auto-Correct, characters could occasionally be left on the screen from clicks or modifier chords that were initially misinterpreted as typing.

Alternative Key Layouts

QWERTY (Default) Layout (See Appendix A for images of this layout)

QWERTY is the standard key layout most people are used to, and which your TouchStream probably shipped with. It has been around over one hundred years but is not particularly efficient because the most frequently typed characters are scattered across all three rows of the layout. If you have switched to DVORAK or QWERAK and need to restore the QWERTY layout, do the *Configuration Gesture* and press **q**. If you have accidentally enabled DVORAK, the 'Q' key will have moved to the QWERTY 'X' key's location, so you'll actually have to press 'X'.

DVORAK Layout (See Appendix A for images of this layout)

DVORAK is a key layout designed to put the most frequently typed keys on home row. If you already know how to touch-type on QWERTY, relearning with DVORAK will take about 3 frustrating weeks, but after that much less finger movement will be necessary during typing.

QWERAK Layout (See Appendix A for images of this layout)

QWERAK is a hybrid between QWERTY and DVORAK that puts the most-frequently typed keys on home row like DVORAK, but leaves about half of the remaining keys in the same place as QWERTY.

Optional Application Gesture Sets

Text Formatting and Alignment Gesture Set (ships disabled). A variety of left-hand, thumb+2-fingertip gestures for text formatting and alignment within Microsoft Word and other word processors. These gestures produce generally useful hotkeys like Ctrl+A, Ctrl+I, and Ctrl+B that are not available from any right hand gestures. See the 'left-hand red' gesture guide for details.

Adobe/Photoshop Zooms (ships disabled). Left-hand five-finger and thumb+3-fingertip gestures for zooming and view selection within Photoshop and other Adobe applications like Acrobat. You will probably find the hotkeys included in the Text Formatting and Alignment gesture set useful for these Adobe apps too.

Maya (ships disabled). Left-hand spread and compact thumb+3-fingertip as well as five-finger gestures for camera zoom, pan and orbit manipulation within Alias Wavefronts' Maya animation & modeling tool. These intuitive left hand rotation, translation, and scaling motions map to Maya's conventional Alt + button 1 and/or button 3 drags to make the magic happen. The Maya 'hotbox' is conveniently activated from the left hand by holding down the thumb+2-fingertip chord (Text-Formatting gesture set must be enabled too). Maya mode

also disables variable-speed typematic and tunes left-hand key-hold/right-hand drag combinations for speedy operation of the Hotbox and Marking Menus.

Desktop/Tool Selection (ships disabled). Left-hand five-finger and thumb+3-fingertip gestures for Linux virtual desktop selection. Also enables left-hand five-finger gestures for Acrobat-style zooming, but otherwise cannot be enabled at the same time as Adobe/Photoshop Zooms. *NOTE:* Since Windows usually ignores *Win/Meta* when applied to function keys, in Windows these gestures essentially emulate the unmodified function keys *F1-F12*.

To use with Linux's KDE window manager, choose the "KDE Default for 4 Modifiers (Meta/Alt/Ctrl/Shift)" key binding, which uses *Meta+F1* thru *Meta+F9* for **Switch Desktop** on a 3x3 virtual desktop, and *Alt+Meta+F1* thru *Alt+Meta+F9* for **Move Window to Desktop**. The *Meta+F10*, *Meta+F11*, & *Meta+F12* gestures are free for mapping to additional operations like **Window Raise/Lower**, **Window Maximize**, and **Window Resize**.

Some window managers (e.g. Sawmill) allow hotkeys for snapping the active window to a particular corner or edge of the screen. *Shift+Meta+F?* (obtained by combining one of the left-hand desktop selection gestures with a right-hand Shift modifier chord) is available for this.

Programmers' Gestures (ships disabled). This is a catch-all category for:

- ?? Word completion (Visual SlickEdit) via translations of left-hand thumb+middle-fingertip chord.
- ?? *Ctrl*-arrows, *Ctrl-Shift*-arrows, and *Ctrl-PageUp/PageDn/Home/End* via spreading 2, 3, or 4 left-hand fingertips.
- ?? *Shift*-arrows and *PageUp/PageDn/Home/End* via spreading 3 or 4 right-hand fingertips (for compatibility with one-handed iGesture products).
- ?? *Middle-button-drag* for Sensiva (www.sensiva.com) symbolic gestures via 'pengrip' hand configuration (thumb touching, index straightened with tip touching, while middle, ring, and pinky curled under with knuckles touching).

NOTE: Emacs OS mode also enables all of the programmers' gestures above.

Game Mode

Right Hand Game Mode is designed for first-person shooters and other games where the player must move the mouse pointer (aim) and click (fire) simultaneously. It is not needed for all games (e.g. Solitaire).

Left Hand Game Mode is designed for games that require you to navigate by holding down combinations of arrow keys or their equivalents (which is clumsy with our zero-force keys). This mode allows you to hold arrow keys by sliding in particular directions, somewhat like a joystick.

Before you can enter either hand's game mode for the first time, you must turn on the *Master Game Mode Switch*, either with the Feature Selector, or



Thereafter, whenever you want to switch to game mode for a hand, firmly touch that hand's 'palm heels' on the center of the surface and slide them forward. The normal gesture set for that hand will be disabled and replaced with the game gestures shown on the 'Game Mode Quick Reference' card. The key action will also change subtly. Keys will press more quickly but cannot be activated if more than one finger from a hand is touching the surface.

To restore the normal gesture set and key action for a hand, firmly touch that hand's palm heels on the center of the surface and pull them back toward you.

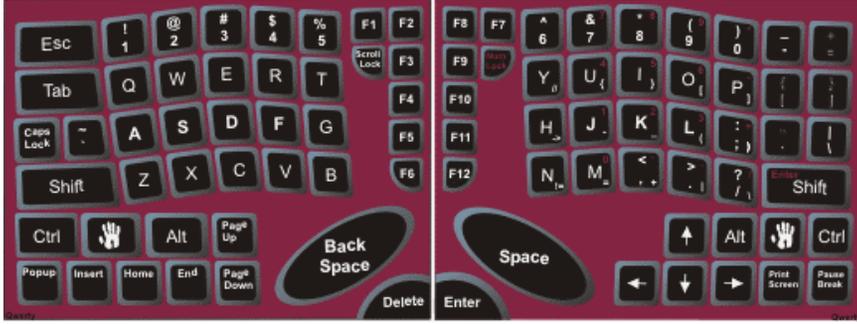
Master Game Mode Switch (ships disabled). Once this switch is on, you can use up/down palm heel slides to enter/leave game mode at any time. It's impossible to use game mode until this setting is on.

Pinky Game Button (ships enabled). Useful if the game maps the secondary mouse button to alternate weapon trigger or switch weapons. Lets the secondary (right) mouse button be activated by touching the pinky (in addition to the three base pointing fingers).

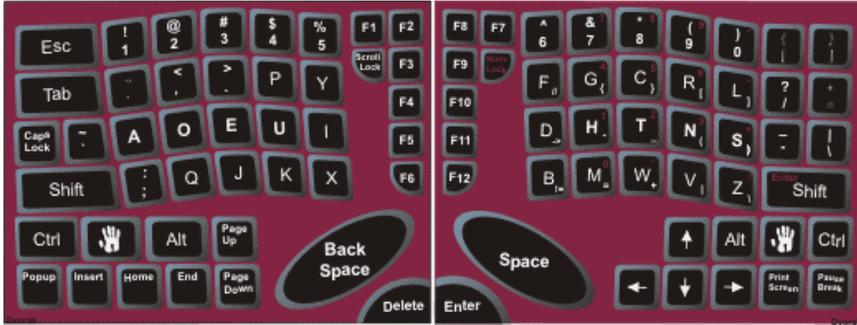
Inverted PgDn (Walk Key) Action (ships disabled). Useful as a 'downshift' from Run to Walk. Activates and holds the PgDn key when the left middle finger lifts off the surface (while the ring and index fingers remain touching, to control walk direction via arrow 'joystick' emulation).

Appendix A – Alternate Layouts

(Programmer's) QWERTY Key Layout



DVORAK Key Layout



QWERAK Key Layout



Right Hand Gesture/Hotkey Mappings for all TouchStream and iGesture Products w/firmware v1.18

Black -- Windows Mode, Defaults

Left Alt replaces **Ctrl** -- Unix/BeOS Mode

Blue -- Macintosh Mode (**Cmd** replaces **Ctrl**)

Red -- Linux/Adobe Mode

Green -- Emacs Mode (use w/touchstream.el script)

Clipboard, Editing, and Search Gestures

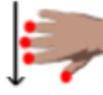
	Paste Ctrl + V Cmd+V Shift+Ins		Undo Ctrl + Z Cmd+Z		Copy Ctrl + C Cmd+C Ctrl+Insert		Redo Ctrl + Y ShiftCmd+Z ShiftCtrl+Z ShiftCtrl+Z		Cancel ESC Yank Prev Alt- Alt+Y
	OK Enter Yank Next Alt+Y		Tab Tab		Cut Ctrl+X Cmd+X Shift+Del		Humdinger Ctrl + H Cmd+D Ctrl + R		Middle Click/Drag (3-button Mode)
	Search Next Ctrl + G Cmd+G F3 Ctrl+N		Right Click/Dr (3-button Mode)		Right Click/Dr (2-button Mode)		Search Prev ShiftCtrl + G ShiftCmd+G Shift+F3 Ctrl+P		Find Ctrl + F Cmd+F



Print
Ctrl + P
Cmd + P



New
Ctrl + N
Cmd + N
Ctrl + T



Back
Alt + Left
Cmd + Left



Previous App
Shift Alt + Tab
Shift Cmd + Tab



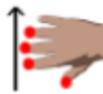
Maximize SubWindow
Ctrl + F10
Cmd + B



Parent Dir
Alt + Up
Cmd + I



Close File
Ctrl + F4
Cmd + W
Ctrl + W



Forward
Alt + Right
Cmd + Right



Next App
Alt + Tab
Cmd + Tab



Refresh/ Replace
Ctrl + R
Cmd + R



Save
Ctrl + S
Cmd + S



Open File
Ctrl + O
Cmd + O



Show Desktop
Win + D
Cmd + H



Minimize SubWindow
Ctrl + F9
Cmd + M

Scroll & Zoom



Zoom In
Ctrl + WheelUp
Cmd + =
Ctrl + =



Zoom Out
Ctrl + WheelDown
Cmd + -
Ctrl + -



Scroll
Wheel Up/Down

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