



Touchscreen Support for the IBM Network Station Version 1 Release 3

Version 1.2.3 - September 28, 1999

IBM Network Computer Division

This document is updated regularly. To ensure that you have the latest copy, please check <http://www.ibm.com/nc>. Click on the Library link and then follow the link to White Papers.

Touchscreen support is being released as a PTF on Network Station Manager for Version 1 Release 3. This is the enabling documentation for that support. The features described in this document pertain only to IBM Network Station Manager Version 1 Release 3 with enabling PTFs.

1. Introduction

A touchscreen is a CRT or flat panel monitor that has been enabled with a transparent, touch-sensitive surface. This touch surface can be used in environments where a mouse or other pointing device is inconvenient, environmentally unsuitable, or not intuitive for the user. Touchscreens are operated using a selection device, typically the user's finger, rather than a mouse.

Types of Touchscreens

The two most popular touch technologies are analog capacitive and resistive membrane. Analog capacitive is noted for providing a unique combination of superior durability, optical clarity and sensitivity to touch. Resistive provides exceptional touch flexibility, responding to a wide range of touch input.

Analog Capacitive

Analog capacitive touchscreens are made adding conductive coatings to a clear glass sensor. Voltage is applied to the four corners of the screen along an X-Y axis. When the screen is not in use, electrodes spread out the voltage, creating a uniform field. When the screen is touched by a finger, the field recognizes a disturbance. The X-Y coordinate of the touch is then sent from the controller to the serial port.

Because the glass and the bezel that mounts it to the monitor can be sealed, the touchscreen is both durable and resistant to contaminants like water, dust, dirt, and grease. This makes all capacitive touchscreens ideal for harsh environments like gaming, vending, retail displays, public kiosks, and industrial applications.

Resistive

Resistive touchscreens are made by overlaying a hard-coated, conductive polyester topsheet 1/10,000-inch on a conductive clear glass sensor. When the surface of this flexible, polished-finished polyester topsheet is touched, it is compressed into contact with the stable glass sensor. When contact is made, voltage flows to each of the four corners in proportion to the distance from the edge. As in capacitive technology, the controller uses the current flows along the X-Y axis to calculate the position of the touch and communicates this as input to the Network Station's serial port.

The flexible topsheet enables the touch to be registered by any input -- including gloved hand, fingernail, stylus, or credit card. And because the touch is actually registered on the stable glass bottom layer. The touchscreen continues to work, even if the topsheet is accidentally torn. The versatility of this resistive technology makes it ideal for many industrial, point-of-sale, and medical applications.

Touchscreen Operational Characteristics

A touchscreen attached to an IBM Network Station functions as a one-button mouse and provides all of the operations normally performed by the left mouse button, including single-click selection, drag and drop, and double-click. The application program receives and interprets the input as if it were seeing a mouse with only a left button. There is no way to perform tasks normally associated with a right mouse button via a touchscreen unless the application is reprogrammed.

The touchscreen monitor's video input is connected to the standard video output of the Network Station just like any other monitor while the touch sensor itself connects to the Network Station via an RS-232C serial communication connection. Some touchscreen models attach via a PS/2 mouse port, but these devices are not supported on the Network Station.

Touchscreens Supported

The touchscreen code supports IBM G-series monitors with touchscreens. These are developed jointly with [MicroTouch](http://www.microtouch.com) (<http://www.microtouch.com>) and generally have a 'T' suffix on the model number to indicate that they are touchscreens. A list of MicroTouch-enabled IBM monitors can be found at http://www.microtouch.com/mthtml/03c2_ibm-alliance-mon.htm. Further information on IBM touchscreens can be located at <http://www.pc.ibm.com/us/infobrf/ibmicrof1.html>.

Other touchscreen products, such as those from ELO, may work with this code. However, only the IBM products have been tested and these are the only supported monitors.

References

- [*IBM Network Station Manager Installation and Use*](#).
This document may be ordered in the US as publication SC41-0664 or accessed on the web at <http://www.ibm.com/nc/pubs>.

2. Enabling the Network Station Touchscreen Support

Enabling the IBM Network Station to support a touchscreen is fairly straightforward. While there is no built-in Network Station Manager support for touchscreen, the procedure is very easy and is documented below. Since it involves changes to configuration files, it should only be done by a system administrator who is knowledgeable about Network Station setup.

Prerequisites

The prerequisites for this support are an IBM touchscreen monitor and the IBM Network Station Release 3 code with PTF set 1 applied.

Hardware Setup

To set up the touchscreen with the Network Station, follow the installation instructions that came with your monitor. This will include the following steps:

1. Power off the Network Station.
2. Connect the touchscreen video cable to the video output connector on the back of the Network Station.
3. Connect the touchscreen input cable to the 9-pin serial port on the Network Station. Note: The touchscreen **must** be connected to the native serial port on the Network Station. It cannot be connected to one of the ports on a PCMCIA multiple serial port card.
4. Connect the power cable.

Software Setup

1. Add the following lines to to the configuration file **defaults.dft**. This file can be found in the **configs** directory.

```
set serial-interfaces-table = {
    { 1 input-device input-device 9600 8 1 none none none }
}
set xserver-input-extension-device = ibm-touchscreen
set pref-xserver-current-pointing-device = mouse-and-extension-device
set xserver-retain-x-settings = true
```

2. By default, the *Setup* option on the Network Station Console is disabled. To enable the *Setup* menu, add the following lines to the file **defaults.dft**. If your system has a **configs/debug.nsm** file, this line is already included and you just need to specify **debug.nsm** as the Configuration File when booting.

```
set exec-disabled-commands = { }
set xserver-initial-x-resources = "ncdconsole.disableSetupMenu: false\n"
```

3. Boot the Network Station.

Touchscreen Calibration

Before using the touchscreen it must be calibrated. Calibration is a software setup that serves two purposes:

- Sets the active area of the touchscreen
- Aligns the touchscreen's active area to the underlying video

The calibration is saved in NVRAM and there is no need to recalibrate unless NVRAM has been cleared or the touchscreen is moved to another Network Station. If the cursor moves to the wrong position or behaves erratically when the screen is touched, then calibration has been lost.

To calibrate or recalibrate the touchscreen:

1. Boot the Network Station and bring up the Console window (usually via the `Alt-Shift-Home` key sequence or whatever sequence `pref-console-key-sequence` setting in the config files) to bring up the Console window.
2. From the Console, select *Setup => Change Setup Parameters*. When the Setup screen appears, click on the `Input Devices` button.
3. Click on `Calibrate Touchscreen` under the `Input Extension Device` heading.
4. A calibration box will appear. Touch your finger on the box. That box will disappear and another box will appear. Again touch this box. Calibration is now complete.
5. Click on the `Apply` button at the bottom of the window.
6. Select the *File* pull down menu item and select *Save to NVRAM* to save the touchscreen calibration

setting to NVRAM. If you do not do this, the settings will not be in effect the next time the Network Station is rebooted.

7. If you added lines to **defaults.dft** to enable the *Setup* menu, you should remove those lines and reboot to ensure that the end-user will not be able to get access to the *Setup* information.

*** End of Document ***