

Whether used in industrial process control, semiconductor manufacturing, or airline baggage-handling applications, touch screens are a viable, and in some cases, preferred, alternative to traditional data input devices. With the emergence of faster and more robust PCs, today's touch technology is right at home on the factory floor.

Keeping a Finger On the Pulse of Technology

BY MARTY WEIL

Increased market acceptance and an expanding range of applications have fueled the growth of touch technology (touch screens, touch terminals, etc.). With total U.S. sales of nearly \$200 million in the U.S. in 1994, touch technology vendors are enjoying a robust 17% compound annual growth rate, according to a recent study conducted by Venture Development Corp. (Natick, MA) on the U.S. market for keyboard alternative devices.

Currently, touch screens are used successfully in a range of applications as diverse as industrial process control, semiconductor manufacturing, airline baggage handling, integrated building control, and fast-food restaurants. However, one of the major application areas of touch screen growth, according to Anders Strom, project director of VDC's keyboard alternative study, is in the industrial arena. "On the factory floor, touch screens are used in factory automation and process control applications," he says. "During the past few years, industrial touch-screen users have seen the introduc-

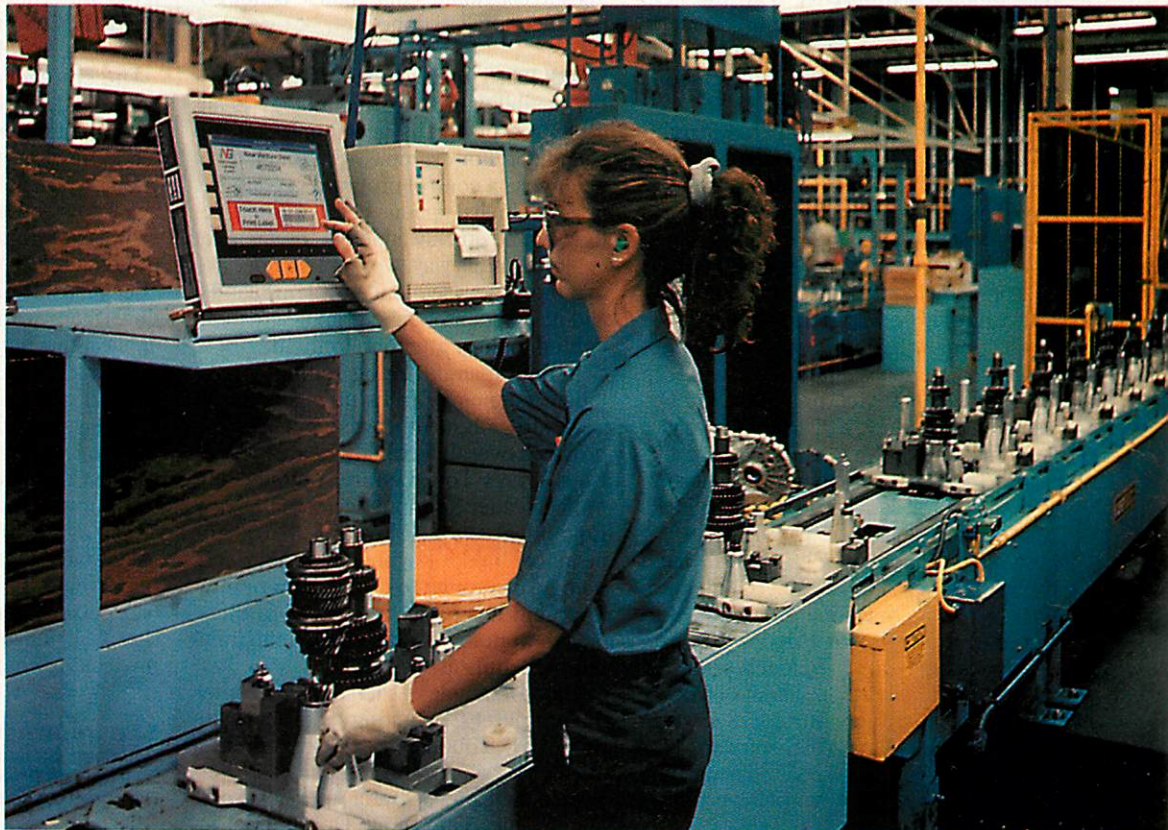
tion of improved touch-screen technology featuring lightning fast response times—many below 25 milliseconds. When combined with better and brighter displays, these improvements have had a dramatic impact on the acceptance of touch technology on the shop floor.

"Touch screens are ideal in applications where data or control actions must be input consistently and accurately, often by untrained users," he adds. "During our research, we found that touch screens often face little competition from other input devices, since they are primarily used in vertical markets where touch is superior to other methods."

Due to the maturation of the technology, touch screens are being used to replace not only the keyboard interface and numeric keypads, but even some logic controllers in industrial applications. For example, at the New Process Gear Division of New Venture Gear (Syracuse, NY), where they manufacture transfer cases and transaxle assemblies for Chrysler and General Motors automotive products, a key transaxle production line was recently updated with a real-time bar code printing system based on Dynapro Technologies Inc.'s (New Westminster, B.C., Canada) ErgoTouch computer and Intermec Corp.'s (Everett, WA) 4100 bar code printer.

At New Venture Gear, the networked ErgoTouch computer is used for parts and production tracking. When a tray of parts comes down the line, the operator presses a button on the ErgoTouch screen, and the Intermec printer prints a bar code label for the transaxle. The label includes an automatically-generated serial number, part ID, time and at-

Photo courtesy: Dynapro Technologies Inc.



At Corning's Blacksburg, VA, manufacturing plant, which produces ceramic elements for catalytic converters, ErgoTouch systems are mounted on booms or swing arms, allowing efficient use of plant floor space. This type of flexibility is an important reason for touch-screen technology's acceptance on the factory floor.

SECTION

AUTO ID

Digital Gets in Touch with Sensor Technology

While it's true that touch-sensitive monitor screens make it easy to interact with a computer, adding this capability to existing monitors has had drawbacks—mainly the expense and difficulty of installing membranes, screens, and sensors. Digital Equipment Corp. recently introduced a device called the DECtouch. Instead of relying on membranes or special screens, DECtouch relies on force measurement sensors located in a box about the size of a notebook that sits under the monitor. The sensors accurately measure both the location of the touch and the pressure exerted.

DECtouch's series of capacitor sensors allows any monitor to be used as the touch device, rather than retrofitting a specific monitor. "Because of the non-invasive nature of DECtouch, it is a cost-effective solution," says Digital's Tom Lemire. "There's no additional investment. With DECtouch, the user installs the device, like a mouse,



and uses the rest of the system as it exists."

DECtouch also provides flexibility to touch application development, according to Lemire. In addition to single-button mouse emulation available immediately upon installation, DECtouch can be used for existing applications to emulate other touch systems. Unlike traditional touch-input devices, developers using DECtouch can establish touch sensitivity by controlling pressure and accuracy requirements. With Digital's DECtouch device, the developer may also take advantage of touch sensitivity on the monitor housing surrounding the screen, leaving the entire screen display area available for viewing.

In manufacturing, DECtouch units are used for distributed shop-floor control to process information where keyboards do not make environmental sense, and shop-floor operators need quick and simple access to data.

tendance data, and production-line ID. As the label is printed, the central MIS database is updated. Next, the label is attached to the parts tray and later affixed to the completed transaxle. With the help of Dynapro's intelligent touch-screen system, all the operators need to know is the name of the part being assembled—the rest is automatic.

As the example illustrates, touch screens simplify the interface between people and their computer systems by providing an easy, natural way for users to effectively interact with computer-controlled machines and processes. "Touch is a technology that lends itself to human interaction with computers, especially in applications where the operators are not skilled or computer literate," says Tom Dodd, divisional vice president for Dynapro Technologies, a division of Dynapro Systems, one of the leading manufacturers of high-performance touch-screen computers for industrial and public-access applications.

Another proponent of shop-floor touch technology is MDSS Inc. (Cleveland, OH), a leading developer of manufacturing execution system (MES) software. "We are a big believer in touch screens," asserts John Leibert, president of MDSS. "We have designed our MES system around them. Many MES software vendors describe touch screens as being 'like a mouse device,' but we believe that is

the wrong way to look at the technology. On the factory floor, for a data-input device to be effective, what's needed is big buttons and bold colors—simply emulating the capabilities of a mouse is not going to get the job done."

HUMAN TOUCH. According to VDC's Strom, the flexibility of touch technology is another reason for its acceptance on the shop floor. For example, with touch technology, as a control program is changed or as additional options become available, they can be quickly added to the menu of choices. In this way, workers do not have to look up new sequences or commands, and new options can be graphically highlighted to draw attention to them.

"In tight manufacturing settings, using touch technology frees up space that a keyboard might otherwise occupy and provides overall flexibility in a variety of ways," says Tom Lemire, engineering project leader for input devices at Digital Equipment Corp. (Maynard, MA). "For instance, unlike keyboards, touch technology is immune to dirt; it is more intuitive; and it is easier to use. All of these factors work together to shorten the training cycle time as well."

A good example of such benefits comes in Computer Technology Corp.'s (Milford, OH) Touch-Only PowerStation, a smaller version of the company's PowerStation flat-panel operator interface workstation line. The Touch-Only model incorporates all function keys and numeric entry into the display itself, which allows for a compact size. The new model in-

cludes control panel replacement and alarming software and is expandable to run additional Interact software modules for enhanced features such as networking and data logging. The Touch-Only PowerStation can be used with all major brands of PLCs.

According to Digital's Lemire, virtually any software application which requires human choice or simple data entry can be simplified by the use of touch screens. Equally important, however, is that touch screens can be easily developed in any language, either computer or human.

Dodd concurs, as he explains, "Touch screens have an advantage over keyboards in that they don't have any moving parts; they don't collect dirt; and they don't take up any extra space."

According to Dynapro's Dodd, a direct correlation can be made between the growth of touch technology and the meteoric rise of the PC on the plant floor. "Although we have been shipping products backed by PCs for many years, the latest advancements in PC processor power enables these systems to be used in more places in the factory.

"In the past few years, we've seen a maturation of the touch-screen market, especially in the way people are applying the technology," says Dodd. "Touch technology is more accepted primarily due to the rise of enabling technologies that let people put it to work, such as enhanced PC computing power, flat-screen monitors, and the Windows GUI."

The emergence of Windows as the de facto GUI standard has come to play a significant role in the emergence of touch technology on the shop floor. However, Windows may be a double-edge sword, according to Lemire. "Touch technology requires a button or icon that is larger than standard Windows icons," he says. "Because it is difficult to manipulate Windows icons with a finger, Windows-based applications require the designer to make adjustments to the icons."

Dodd goes a step further: "With the Windows interface, there is a lot of information jammed into the screen, and a finer point than the fingertip is needed to select things. In that case, a mouse or track ball may be a better selection device." Eventually, Dodd predicts, Windows applications employing touch technology will be prevalent on the shop floor, but that GUI may look quite different from its desktop counterpart. MA

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Touch-Only PowerStation	RC# 74
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