



# Information Technology

Everyone is talking about the higher "technology" products now being manufactured. Advances in avionics computers, space and telecommunications products are driving manufacturing technology. I believe that the difficulty in our industry comes not in building a higher technology product, but with using this new technology within the process to build a better (i.e., cheaper, faster, more robust) product. The incorporation of new technologies into the manufacturing process typically focuses on bigger and better equipment, neglecting the all-important facet of information technology.

All product characteristics and processes in the manufacturing environment are controlled by the feedback of information from operators, equipment indicators, and the results of experimental analysis. We dutifully collect information and store it away in log books, data sheets, process sheets and, occasionally, on a computer. Companies perform dozens of tests writing down results because the "specification" says so, never using this information to improve the manufacturing process. Sadly, when you actually need specific information, someone typically points to an overgrown filing cabinet and says, "It's in there somewhere...good luck finding it."

Information technology has made rapid advances and there is nowhere that it can be used better than in the lab. A substantial amount of the experimental data that is generated for manufacturing comes from either an internal or independent test facility. Advances in data acquisition, storage and retrieval have made handling the vast amounts of data generated in the lab an easier task.

There are many ways in which data can be gathered and evaluated using a computer. The current level of word processing (Word, WordPerfect, AMIPro), spread-

sheet (Excel, 1-2-3, etc.) and database (Access, Dbase, Foxpro, etc.) programs provide great tools for the gathering and analyzing of data. All of these programs are different in subtle ways, but data and information can readily be transferred between them.

### Automatic Data Input

One of the difficulties implementing computer technology is that raw data must still, in many cases, be gathered by hand and then input into the appropriate software program. Many of today's measurement instruments now come with either a Serial (RS-232) port or a Parallel (Centronics) printer port. With either of these accessories, it is possible to directly input the data into your computer. A popular Windows-based Serial port monitor, Software Wedge (800-722-6004), can read the input from your instrument(s), filter the data to remove unwanted characters and then place it in any Windows-based software program. If you only have a Parallel Printer port output on your instrument, a converter cable can be used to change from Parallel to Serial, and then data can be input into your computer



through the Serial port. I do this with several of the instruments in my lab facility.

### Video Capture

Pictures tell a story, and can be input into a computer by using a video capture board. You can capture video images from the camera on your microscope or even a home video camera. These images can then be stored within a report (i.e., word processor or presentation program) and can be electronically saved and delivered to interested parties.

### Apples and Oranges

There has always been a problem with the use of different computer platforms, I have a PC, everyone at CircuitTree is Mac(ed) and some of my customers still use UNIX machines. One solution to this multi-platform problem comes from programs which produce universal format presentation files. Each computer platform has its own version of a "reader" program which will display the universal data file. You can then distribute a file created on your platform to anyone with the reader program. With this program they can view, print and search my document regardless of what type of computer they are using. We use Adobe Acrobat (<http://www.adobe.com>) internally for this task, and routinely provide electronic copies of test reports, data sheets and military specifications to our customers.

### Gigabytes

Storage of all this data can be difficult to manage. The availability of large hard drives, removable drives and tape back-up units make management a little easier. A scheme for back-up and off-site storage is a must for safety and security of the files. Video capture files take up the most space and can easily run a couple of megs in size.

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## The Internet

The Internet is one of the easiest ways to move data between you and your customers/suppliers. We've all heard at least some of the "Internet hype," but the question remains, how much of it is true and/or really practical to use in the manufacturing environment? I will briefly explain some tangible benefits of the Internet, and if you are interested, there are volumes of information available on the subject.

### *E-Mail*

Electronic mail (e-mail) is your personal mailbox on the Internet. Having e-mail allows you to communicate in "hard copy," reviewing and sending mail at your leisure. This works extremely well with overseas contacts or anyone with a time zone out of sync with yours. You can also attach your word processor, spreadsheet, graphics or database files to e-mail so the person on the other end can view it on his computer. I attach electronic copies of test reports with embedded pictures so customers can view the information the same day I create it. I now e-mail more than I fax, which saves a considerable amount in phone charges. Mail is typically delivered within the U.S. in

a few minutes, and can be as quick as a few seconds! International e-mail can take a little longer, but delivery is seldom more than a couple of hours. One of the strongest reasons for getting e-mail is the IPC TechNet Forum. TechNet is only available through e-mail and provides an indispensable service to our industry!

Getting an e-mail address is easy. You can get an address through any of the big service providers (America On-line, CompuServe, etc.) or you can go with an "Internet only" provider for your connection. You can also get e-mail for free with services like JUNO which pay for the service by displaying advertising while you are online retrieving or sending mail.

### *World Wide Web*

The world wide web (WWW) is your personal picture-book encyclopedia of the world. Information about companies, services, research, commercial products and more can be found on the web. Companies can set-up a web page which will allow both potential and current customers to view information about their products and services at their leisure from anywhere in the world. At my last count, there were more than 50 sites with direct ties to the printed

circuit industry and an untold amount about the electronics industry in general. In the last 30 days, I have had more than 350 visits from at least 25 countries to my site: <http://www.TheTestLab.com>. Some PWB shops even have their web site set-up so you can get a quote for a PWB. In inputting the parameters of your board.

## FTP

File Transfer Protocol (FTP) is the Internet's way to move data files from one site to another. Many PWB manufacturers use FTP to transfer CAD data, electrical test data and photoplot files to and from their customers/suppliers.

## The Future

The Information Age is upon us. Electronic commerce, audio, video and teleconferencing are all in their information highway infancy, but will soon be the common tools for business. Computer technology can make our jobs easier and more efficient. It's your choice: take part in the information technology revolution or be left in the dust. If you have any questions, please don't hesitate to e-mail me: [BobNeves@TheTestLab.com](mailto:BobNeves@TheTestLab.com) or call me at 714-999-1616.