



PC TAP

Consumer Report

**Microsoft Windows 3.0
Part II: A Closer Look**

Open Forum

**2.88MB Extra-High Density
3½-Inch Disk Drive**

This & That

**PC TAP Consumer Report Index
New ERN Reps**

**Report #9
October 1990**



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PC TAP CONSUMER REPORTS

From the Editor's Desk

Shortly after the last PC TAP Consumer Report was published, we received an anonymous piece of mail addressed to "Editor, PC TAP." The only return address was a zip code in an EPA Regional Office city. Here in its entirety is our unnamed correspondent's message:

While your pub. is printed on recycled paper (at a higher cost to taxpayers!); because it was dyed blue (not inked), it is no longer recyclable (*sic*) as white ledger (which has a high value). It's now considered mixed waste with a low value. . . . & EPA does not recycle this type of paper. What a waste!

We usually ignore the opinions of those who don't have enough confidence in what they're saying to identify themselves. And we didn't think anyone would want to recycle our reports anyway, but would keep them indefinitely for reference! But because of the seriousness of the allegation that we're environmentally irresponsible, we decided to investigate the validity of this charge. We called the EPA print shop, where our *Consumer Reports* are printed, and we talked to the folks at the EPA Headquarters Recycling Office. The lessons we learned in paper recycling put us at ease about our publication.

For recycling purposes, paper falls into one of three categories. White paper is "high grade," and it usually brings the highest price from recycling companies. An intermediate grade includes colored bond paper. Then there's a "low grade" category into which everything else falls; newsprint is a familiar example of low grade recyclable paper. Some organizations, and some recycling companies, eliminate the intermediate grade; they just classify paper for recycling as *high grade* or *low grade*. Although recyclers pay more for high grade, the cost difference isn't significant enough to warrant discontinuing use of other papers; besides, the initial cost of low grade papers often is lower. Generally, EPA recycles all grades of paper, although at some sites there may be local exceptions to this practice.

PC TAP Consumer Reports are printed on recycled paper, and that paper (even though it's blue) is recyclable again. We have been assured that our use of this paper is economically and environmentally responsible, and that there's no reason for us to change. The EPA Headquarters Recycling Office invites anyone who has questions about recycling to call them at FTS 382-6980.

On a brighter note, this *Consumer Report* focuses again on Microsoft Windows 3.0. It includes more in-depth testing than was discussed in our preliminary report on Windows in July, and it reflects input from many more people. We're grateful for the product assessment feedback we received from our PC TAP External Resource Network representatives in the regional offices and some labs. These folks are what PC TAP is all about: users telling their peers about their experiences using microcomputer technology.

Open Forum begins on page 19. It contains a report about extra-high density disk drives for PCs. In *This & That*, beginning on page 16, you will find an index of reports published during the first year of *PC TAP Consumer Reports*. We're pleased to have passed the one-year milestone, and look forward to continuing to research and write about microcomputer technology.

David A. Taylor
PC TAP Coordinator

Microsoft Windows 3.0: A Closer Look

Introduction

Along with our *First Impressions* of Microsoft Windows, published in July, we promised a more detailed evaluation would follow. This *Closer Look* includes results of additional testing by PC TAP and others within the National Data Processing Division, as well as input from a diverse group of end users around the Agency through the PC TAP External Resource Network.

This report is aimed at readers who have at least an acquaintance with Microsoft Windows 3.0. No fundamentals will be presented, and it's assumed that you're familiar with the terminology of graphic user interfaces in general and Windows 3.0 in particular. If you don't have that background, we recommend you read our earlier report, *Microsoft Windows 3.0 Part I: First Impressions* (PC TAP Consumer Report #8, July 1990). Copies are available from Anne Harrison at the Washington Information Center, FTS 382-7412 or Email A.HARRISON.

In the previous report on Windows we discussed the tremendous amount of printed material we had gathered about the product. Well, the avalanche hasn't let up yet, and our stack of Windows articles keeps growing. Before examining the results of our own testing and that of users around the Agency who have been participating in our Windows evaluation project, we'll present a synopsis of information we've gathered from the media since our first report was prepared. With that background in mind, we then will discuss our own recent experiences, and those of others within NDPD, as we've probed Windows further than we had when we prepared our first report. Finally, we'll see how the feedback from others correlates with our own assessment.

The Ongoing Saga of Windows 3.0

Articles about Windows continue to occupy prominent space in many of the trade publications. We thought the hoopla that began in May with the announcement of Microsoft Windows 3.0 would subside after the initial wave of new-product information passed. However, as we've already mentioned, the media blitz continues. The opinions expressed in the trade press are overwhelmingly favorable, but there have been some grumbles as well. First, lets look at excerpts from some negative comments.

Problems With Windows

In our first report on Windows we noted that incompatibilities had been discovered between Windows 3.0 and Ontrack's DMDRVR disk manager, when running on a 386 machine. This problem, along with some others, received some media attention during July and August.

. . . Windows 3.0 users concerned about hang-ups or data loss because of disk utility conflicts can run one of several tests to determine their systems' status, Microsoft said. The problems occur only in several very specific configurations . . . —"Disk Utility Conflicts With Windows Acknowledged," *InfoWorld*, July 9, 1990, p. 3.

Three months after Microsoft Corp.'s flashy Windows 3.0 release, some users putting the new environment through its paces are reporting a slew of minor problems in getting the software up and running. . . . Though few of the reported problems are bugs in Windows, the complexity of the environment and the

demands it makes on system resources are exposing conflicts that previously went unnoticed, users said. . . . —"Early Users Face Ups and Downs Of Windows 3.0," *PC Week*, August 13, 1990, pp. 1, 6.

Just about every PC manufacturer claims its computers are '100 percent IBM compatible.' But as the programmers and users of Windows 3.0 have recently discovered, 100 percent compatibility is not a foregone conclusion. . . . Because not all PC hardware is completely compatible, software vendors must detect differences and accommodate them . . . Whether Windows 3.0 overcomes these incompatibilities, however, is a point of contention between Microsoft, which has spent thousands of hours trying to weed out bugs, and frustrated users, who are having difficulty running Windows.—"Windows 3.0 Exposes Hardware Incompatibilities," *PC Week*, August 20, 1990, p. 19.

Although there seems to be no question that some users are having difficulty running Windows 3.0, it appears the problems aren't within Windows; they're specific to particular configurations of hardware and/or software. We explained the DMDRVR problem in our previous *Consumer Report*, and we haven't seen a more definitive treatment of that issue since then. Remember, though, that problem is specific to running Windows 3.0 in 386 enhanced mode on a 386 processor that is also running Ontrack's DMDRVR software. Since relatively few EPA users currently are running on 386 machines, this should not be a significant issue around the Agency. Those of you who are fortunate enough to have 386 PCs, or who may have upgraded 286 PCs with 386sx or true 386 chips (especially the Epson Equity III+, which was shipped with DMDRVR installed), should carefully investigate this issue before installing Windows on such machines.

More Kudos

No single product will ever satisfy all the people all the time, and Windows is no exception. However, the majority opinion of Windows 3.0 seems to be quite favorable. Here are quotes from some of the articles we've read that express that opinion.

. . . Here at last is an elegant, smoothly working interface that multitasks, takes full advantage of the extended memory in a 286 or 386, and supports networks, yet requires as little as 1MB of RAM for efficient operation. . . . Even if you dislike icons and windows, Windows 3.0's solution to DOS's 640K memory limit is too compelling to ignore.—"DOS Updated for the '90s," *PCResource*, July, 1990, pp. 20-21.

. . . Yes, we're stuck with Windows, but I'm smiling as I say this . . . My favorite DOS tools . . . fly like eagles in the 386 Enhanced mode of Windows 3.0, with its disk-based virtual memory and EMS emulation. Under Windows, my 386 acts as if it has twice its actual RAM.—"Users Stuck in the GUI Gumdrops May Not Want To Escape," *PC Week*, July 23, 1990, p. 33.

. . . it's true that more and more semi-power users are moving to Windows 3.0 every day. . . . Windows is here to stay, and that's good news too.—"Career Opportunity: Windows 3.0 Configurations Engineer," *InfoWorld*, August 13, 1990, p. 25.

At \$149 [list price—Ed.], *Microsoft Windows 3.0* is a real bargain, when you consider all the functionality it offers. . . . *Windows* is, of course, a graphical environment, and while it can multitask DOS applications gracefully, that is hardly its primary focus. The graphical user interface . . . conveys an image of refined quality.—"386 Multitasking Environments," *PC Magazine*, October 16, 1990, p. 202.

To summarize what we've read, there certainly are mixed reviews on Windows. The predominant opinion seems to be that it is a strong product that's destined to be a trend setter for some time. Forecasts of just how long that influence will prevail vary widely; we've seen figures ranging from one to ten years. Ultimately, time and user demand probably will dictate the answer.

PC TAP Test Results

PC TAP's primary test machine is an Epson Equity III+ with 640K of memory and a 40mb hard drive. We use that configuration because it is typical of most machines in use throughout EPA. Much of the data for our earlier Windows report resulted from our experience running Windows in *real mode* on this machine. You may remember that Windows operates in *real mode* on a 286 processor with no more than 640K of memory.

Running Windows in Standard Mode

Standard mode is the next step up from real mode as you climb the Windows performance ladder. A 286 processor with at least a megabyte of memory (640K conventional memory and at least 256K of extended memory) is required for standard mode. The primary advantages of standard mode over real mode are increased performance and the capability to run more applications concurrently. The significance of the actual increase in performance depends upon several factors, as does the limit on the number of concurrent applications you can run. Applications written specifically for the Windows 3.0 environment can be multitasked in all Windows' modes.

Adding Memory

To enable us to run Windows in standard mode on our test machine, we installed an Intel Above Board with two megabytes of memory, all of which was configured as extended memory. Although we didn't detect any noticeable improvement in the speed of Windows' operation, we did gain increased capacity. Within Windows, Microsoft defines *capacity* as "how many applications you can run simultaneously, and how much data applications can store in memory at a time." Before we installed the Above Board, the initial amount of available "memory" reported by the Windows Program Manager was around 390K. With the 2K of added memory, this figure increased to something in the neighborhood of 2500K!

The reason why *memory* is enclosed within quotation marks in the previous paragraph, and why the amounts of available memory in real and standard modes are given as approximations, requires some explanation. The "available memory" value reported by the Windows Program Manager is based on two factors: (1) the actual amount of conventional and extended memory that's available for applications; and (2) the amount of hard disk space that's available to Windows. This becomes apparent if you have a volatile hard disk. For example, we've added several more applications since we installed the Above Board, and the "available memory" has decreased accordingly. The additional applications didn't eat up memory, but they do occupy disk space that Windows could otherwise use for temporary files, and for application swapping.

To give you an idea of how this process works, we started Windows and checked available memory and disk space. Then we started loading applications and data files, while keeping tabs on memory and disk space as we went along. Here are the steps we went through:

1. Start Windows, check values: Disk space available, 2,498,560 bytes; memory available, 2236K.
2. Launch WordPerfect 5.1; bring in a 179-page document.
3. Switch from WordPerfect to Windows Program Manager.
4. Launch Lotus 1-2-3 from Windows desktop; load a 31,275-byte spreadsheet.
5. Switch from Lotus 1-2-3 to Windows Program Manager.

At this point, Windows Program Manager reported 1,077,248 bytes of free disk space and 2076K of memory still available. The memory-resident portions of the applications and data files we had activated occupied only 160K of memory. But when we switched out of the applications, Windows swapped them to disk where they consumed a megabyte and a half of space. This shows how Windows keeps memory available for the application in which you happen to be active at a given time, but it also illustrates why you need lots of free disk space if you want to get optimum performance from Windows in standard mode. You can keep starting applications and switching out of them. But eventually you'll try to switch out when there's no longer enough hard disk space to hold any more applications, and Windows will issue a message instructing you to terminate the active application because there's not enough *memory* available to accommodate the switching operation. In fact, disk space is the constraint, not memory.

One final note on the memory issue. Even though you might have plenty of memory and disk space available, it's still possible to get a "not enough memory" message if you try to load an application that doesn't recognize any memory above 640K, and there's not enough available memory below 640K to hold that application. We experienced this with Freelance Plus (version 3.0), which needs 520K of memory available to run at all. Although we ran Freelance under Windows earlier in our testing, after installing an additional device driver, which is always memory-resident, we no longer had enough memory to load Freelance. *Even though Windows said there was over two megabytes of memory available.* Freelance only recognizes memory addresses up to 640K, and 520K was no longer available below 640K.

Speed Tests

We've mentioned already that we didn't detect any noteworthy improvement in the execution speed of Windows in standard mode over that of Windows in real mode on the same PC. However, we had heard it said that DOS programs run slower under Windows than they do outside the Windows environment. We set out to check into this allegation with respect to WordPerfect, and found some slight basis for it. The table below illustrates our findings. The test document was 179 pages long.

Function	Windows WordPerfect	Standalone WP
Reposition from beginning to end of document	10 Seconds	10 Seconds
Global replace. 27 occurrences, last occurrence on last page.	22 Seconds	20 Seconds

As the table shows, it took two seconds longer for the global replace function when WordPerfect was running under Windows. We repeated the test several times, and the results were consistent—the 2-second gap was preserved. While this test confirms that some functions take longer when a program is running under Windows, it also indicates the magnitude of the differences we're talking about.

In another test of operating speed under Windows, we started up three applications—WordPerfect, Lotus 1-2-3, and DOS—and switched between them. Here are the times for the switching operations.

From-To Applications	Time-To-Switch
WordPerfect to Lotus 1-2-3	11-13 Seconds
Lotus 1-2-3 to Windows File Manager	8 Seconds
Lotus 1-2-3 to DOS	11-13 Seconds

In our first Windows report we listed context-switching times of from 8 to 10 seconds, and these times are in the same ballpark. Again, whether you consider these times OK or not depends on your perspective. If you've never had a context switching capability before, 12 seconds to switch from Lotus to Windows Program Manager, or from Lotus to dBase or WordPerfect, is probably quite satisfactory. But if you've been running on a 386 PC where you can switch between windows applications about as fast as you can hit the keys, then 12 seconds can seem like an eternity.

To summarize our findings relative to moving from real mode to standard mode in Windows 3.0, the primary gain is an increased processing *capacity*. In other other words, you can launch more applications before you exhaust your machine's resources, and you can accommodate larger files. The magnitude of the capacity increase depends upon how much free disk space and memory is available in your machine. Performance improves as the amount of available memory and disk space increase. But the really significant performance boost occurs when you move up to a 386 processor.

Running Windows in 386 Enhanced Mode

Windows' *386 enhanced mode* provides access to the 386 processor's virtual memory capabilities. A 386 processor with a minimum of 2 megabytes of memory is the minimum required hardware configuration. (A 386 machine with less than 2MB of memory operates in standard mode.) In enhanced mode, true Windows applications have access more memory than is physically present in the machine. For example, Softmart® Inc., a software retailer, tested Windows 3.0 on a 386 machine with eight megabytes of RAM. In that configuration, Windows provided access to 16 megabytes of expanded memory to Lotus 1-2-3 Release 2.2 (*Microsoft Windows Version 3.0*, Softmart® Product Review, September 1990). Another advantage of 386 enhanced mode is the capability to multi-task Windows 3.0 versions of non-Windows applications.

We ran Windows in 386 enhanced mode on an IBM PS/2 Model 70 with 6 megabytes of memory. As with the move from real mode to standard mode, this is another step up in the Windows performance ladder. That's where reasonable comparisons end, however. The performance improvement from real or standard mode to enhanced mode could be likened to moving from a shetland pony to a race horse.

We've established that Windows will run on a basic 286 machine with 640K, and that it runs better on a 286 with additional extended memory and several megabytes of available hard disk space. With the move to a 386 machine, Windows doesn't get better; it moves into another performance dimension. While context switching definitely beats having to exit from one application in order to start up another, having several applications (including Windows 3.0-compatible non-Windows applications) running simultaneously with all visible in windows on your screen at the same time is something else!

Let's consider an example. From Windows in 386 enhanced mode, we started up the Windows *Write* program, a basic word processor. Then we activated the Windows Clipboard and copied the text from *Write* to the Clipboard. If you have the windows positioned such that you can see them both on your screen, you can actually watch the text as it's written onto the Clipboard. Next, we launched WordPerfect in a third window, and pasted the text from the Clipboard into a WordPerfect document. Finally, we cleared the clipboard, entered new text in WordPerfect, and reversed the process.

The cut-and-paste capabilities vary, depending on the types of applications you're working with. That is, Windows application to Windows application, Windows application to non-Windows application (with other variations depending on whether the non-Windows application is running within a window or in full-screen mode), and so on. You can cut and paste text, graphics, or a combination of text and graphics; but these operations are constrained by the applications involved. In other words, you can't paste graphics into an application that doesn't recognize the graphic image. In the exercise described in the preceding paragraph, we tried to paste a graphic image into *Write*, and what we got was a solid black square where the image should have been. *Write* didn't recognize the graphic image. The user's guide is quite clear on how each alternative is accomplished, and with a little practice one could easily master the technique for often-needed operations.

With respect to speed, there's no point in preparing comparison charts. For all practical purposes, just assume that tasks like context switching, moving between active windows on the screen, and performing cut-and-paste operations will happen about as fast as you can strike the necessary keys or click the mouse. After spending some time on the PS/2, we gained some insight into why people who are used to such machines say Windows on a 286 is too slow. It's easy to get spoiled by the power and speed of the 386.

In summary, 386 enhanced mode provides more computing power and a lot more speed. It also offers capabilities, like multiprocessing of non-Windows applications, for example, that aren't possible in real or standard modes. Enhanced mode presents the Windows environment at its best, and it's easy to understand why Microsoft (and a lot of others who've evaluated Windows 3.0) recommend the 386 processor for optimum Windows performance. Keep in mind, however, that the basic system on the American Coastal Industries (ACI) contract is a 386sx with only 1 megabyte of RAM. So if you buy that system and intend to run Windows in 386 enhanced mode, you must order additional memory. The standard and high-performance systems come with 6 and 8 megabytes of RAM, respectively.

Windows' Appetite for Resources

In some circles, Windows has been given the rather indelicate label of "resource hog." It's true that it requires significant amounts of memory and disk space; the *User's Guide* recommends 6-8 megabytes of free disk space. On the other hand, you get a lot back in performance: memory management, context switching or multitasking, a file manager, a print manager, and lots of other goodies, some of which we've already discussed. By contrast, OS/2 Extended Edition version 1.2 with all the its options requires around 20 megabytes of hard disk space.

On our Epson Equity III+ we were hurting for disk space, so we devised our own version of "Windows optimization"—we deleted some nonessentials. Windows comes with a lot of "nice but not necessary" features. First, there are two games, Solitaire and Reversi; they're neat, but hardly a requirement to get the job done. There are also quite a few bitmaps that you can use to put a fancy background on your desktop. Within Windows, they're called "wallpaper." Pretty, but unessential. You might also consider deleting some of the accessories. (Do you really need another calendar? Calculator? How about the Clock?) There are files that are specific to running in 386 enhanced mode that you don't need if your machine is a 286. We deleted a number of such files, along with Windows' *Help*, and reduced our Windows directory down to a little over 3MB. By contrast, the Windows directory on our PS/2 test machine, which includes all the files that come with the package, occupies 5.3 megabytes on the hard disk. In Chapter 13, "Optimizing Windows," the *User's Guide* provides guidance for selecting files that can be eliminated to free up disk space.

More Test Data

Some interesting test data on Windows 3.0 performance was just published in a *Software Digest Ratings Report*[®] (Volume 7, Number 10, October 1990). The Software Digest publisher, NSTL, Inc., of Plymouth Meeting, PA, has generously granted permission for us to pass along the following information from that report.

Data for the report was gathered while testing four applications under Windows 3.0 (Microsoft Excel, Ami Pro, PageMaker, and Word for Windows) on a variety of computer configurations (IBM PS/2 286, 386, and 486; Compaq 286 and 386). The performance of Excel and PageMaker under Windows also was compared with Mac versions of those packages running on Macintosh IIfx, IICI, and SE computers.

Windows 3.0's performance was considered totally acceptable, and significant improvements in performance over previous versions of Windows and other environments were noted. For multitasking, OS/2 was found to offer advantages over Windows, but in terms of cost and single-application performance Windows was considered superior. On a 286 or 386 processor, Windows outperformed comparable Macintosh systems. This was attributed to Windows' superior memory management capabilities. However, a Mac IIfx beta system was found to be slightly faster than Windows on a 486 machine. The following quotation from the report's conclusions concisely summarizes the findings.

. . . Users do not have to add memory because *Windows 3.0* runs in 640KB, but adding memory lets *Windows* take advantage of extended memory. . . . *Windows* provides an environment that is truly easy to learn and use, and one that comes bundled with enough extras to justify the cost. The costs of upgrading applications to run under version 3.0 are minimal, especially when weighed against performance benefits (p. 14).

Running Windows on a LAN

One obvious solution to the problem of limited resources is to run Windows as a local area network application. From a resource point of view, the advantage of Windows on the LAN is that you don't have to install it on your own hard disk. The program files go into the LAN system directories, and certain user-specific files can be placed in your LAN user directory. On our LAN at the RTP information centers, the Windows subdirectory for an individual user occupies about 1.1 megabytes. It should be noted, however, that if you want to, you can install the user-specific files on the PC's hard disk.

Unlike previous releases of Windows, version 3.0 is very "LAN aware." For example, if your LAN drivers are in memory when you start up Windows, the Windows File Manager displays your LAN drives along with those that are physically on your PC. You can list directories and manipulate files on the LAN drives in the same way you do the files on your own machine. With this approach, you get all the advantages of running under Windows without having to pay the penalty in terms of impact on your own machine's resources.

Windows' performance on a LAN is determined in part by the capabilities of your workstation. In other words, Windows will operate in the mode appropriate for the amount of memory and the microprocessor in your PC. And since networked Windows uses the file server in the ways the standalone version uses your hard disk, you can run LAN Windows from a diskless workstation. Based on our experience running LAN Windows in RTP, and on industry reports, Windows is well suited for use as a networked application.

The End Users Speak

To support our evaluation of Windows 3.0, Microsoft Corporation supplied copies of Windows to all the PC TAP External Resource Network (ERN) representatives. There are ERN representatives in each regional office and in a number of laboratories (see *This & That* on page 16). Along with Windows, Microsoft also shipped copies of their software suite for Windows 3.0: Word, Excel, PowerPoint, and Project. Although the main thrust of the PC TAP assessment project was to evaluate Windows as a platform for EPA's supported PC application software (Lotus, dBASE, WordPerfect, and CrossTalk), we asked our evaluators to optionally consider testing Microsoft's application software. Feedback from those who were willing and able to do so is included in the following discussion.

PC TAP provided a questionnaire to help evaluators record their assessments of Windows 3.0. The questionnaire divides the evaluation of Windows into these broad areas:

- Installation of Windows
- The Windows File Manager
- Running non-Windows Applications (DOS applications)
- Running Windows Applications
- Rating Prominent Windows Features

Finally, we asked each participant to assign an *overall rating* based on their own testing of Windows.

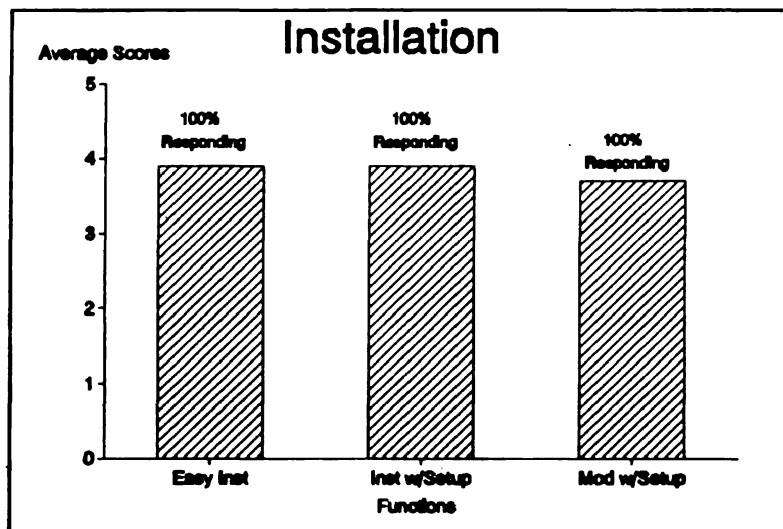
Interpreting the Evaluation Data

Twenty-two questionnaires were returned to PC TAP from project participants in Regions II-IV and VII-X; the labs in Ada, Ann Arbor, Athens, Cincinnati, and Corvallis; Washington, DC; and RTP. However, all the evaluators did not respond to every questionnaire item. Within the graphs that accompany the discussions that follow, the percentages of evaluators responding to each item are given. On the bar graphs, the bar indicates the mean score for a product, on a 5-point scale with 5 being the most favorable rating. The number of respondents who actually rated that particular package is indicated by a percentage atop each bar.

In the following paragraphs, we'll see how the participants in our study rated Windows in each of the five broad evaluation areas we defined earlier. In some cases, when our own experiences illuminate the evaluation data or when our conclusions differ from those of our evaluators, we may elaborate on those aspects of the study.

Installing Windows 3.0

We said in our preliminary report that the Windows installation process was easy and straightforward. Data from our evaluators supports our original position on this issue. All 22 participants responded to the questions about using Windows' setup program to install the product, or to modify the original configuration sometime later. On a 1-to-5 scale, with 5 being the most favorable rating, here's how the installation process fared:

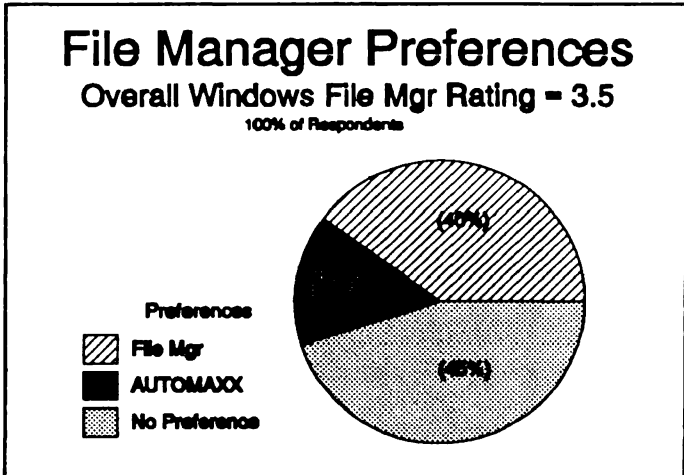


A frequent comment about the installation process was that there is a lot of documentation and general information on the disks (in *read-me* files) that is not included in the manual, particularly information about Windows' disk space requirements. Although a number of people commented on Windows' capability during the installation process to recognize executable files on the hard disk as programs the user might want to install under Windows, several commented that programs had been *mis-*identified during the process. In one case *PCWrite* was identified as *Multimate*; in another, a program named *Quicken* was labeled *Quattro*. As the graph shows, however, our evaluators were generally well satisfied with the installation process and with Windows' Setup program.

The Windows File Manager

We asked evaluators to compare the Windows File Manager with AUTOMAXX for file management functions. Not surprisingly, responses to this item on the questionnaire varied widely. Some people thought File Manager was the greatest; others preferred AUTOMAXX. The majority fall into a third

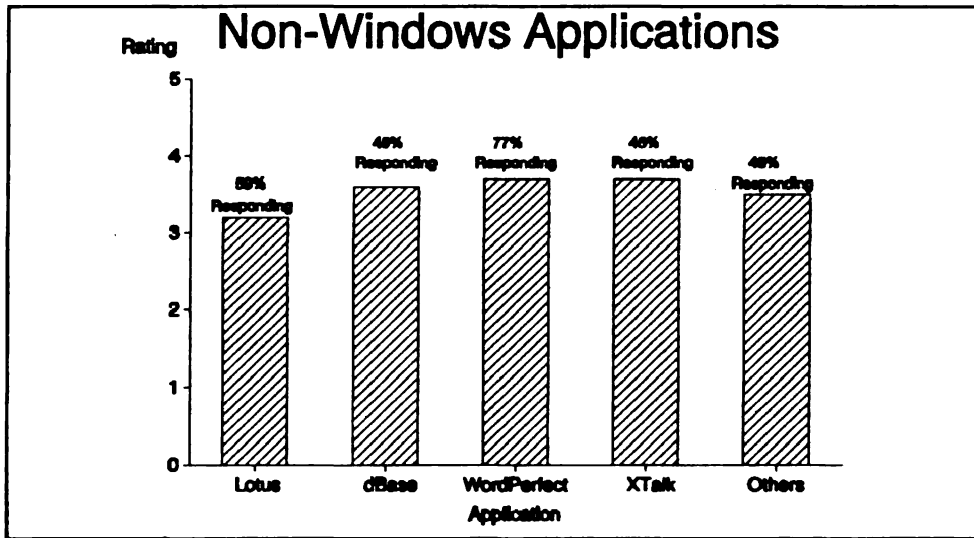
group, many of whom prefer to do file management from the DOS prompt, who are indifferent about File Manager versus AUTOMAXX. The accompanying chart shows how the responses were distributed. One person said File Manager is "very nice, easy to understand, easy to navigate," but pointed out that it shouldn't read the directory structure each time it's started. The latter comment refers to the fact that the first time you call up File Manager, it builds a directory tree for your primary drive (normally C). If you exit from File Manager, then immediately call it up again, the program rebuilds the tree again as if you'd never been there before. It would be more efficient if the tree were retained in memory for the duration of the Windows session.



Running non-Windows Applications

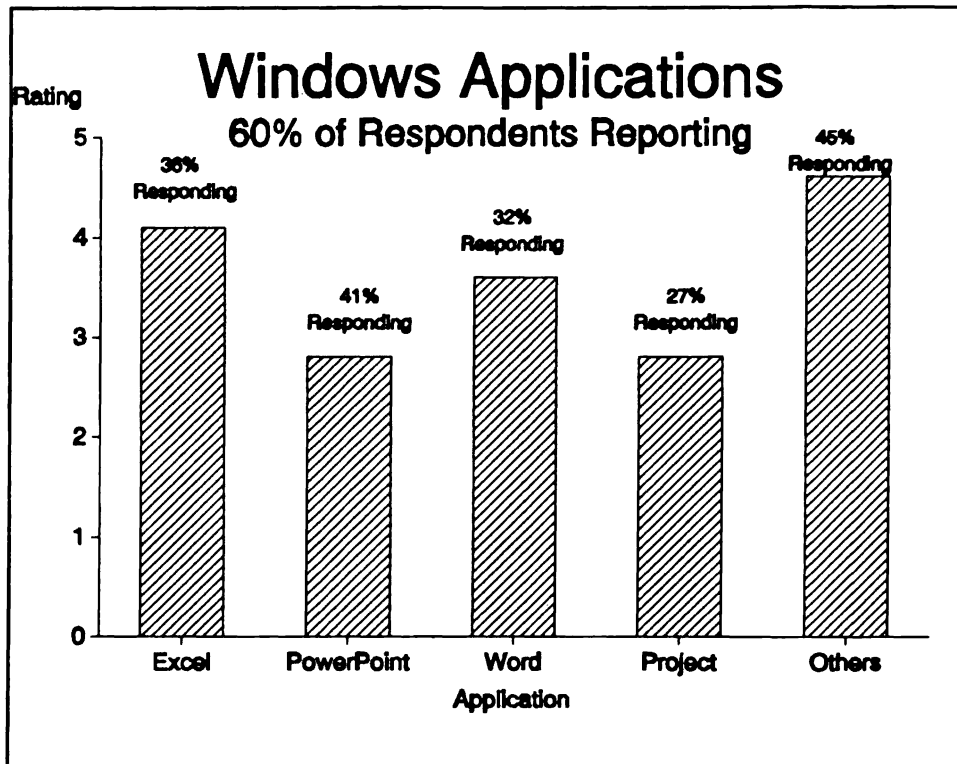
One of the major objectives of this evaluation project was to dig further into the question, "Is Windows 3.0 a viable platform on which to run EPA's current standard menu of products?" To help answer this question, we asked all our evaluators to exercise the software on the AUTOMAXX menu under Windows. While not everyone reported on every product, all our respondents rated one or more of them.

In addition to the standard products, we also inquired about other non-Windows applications that respondents may have tested. Among those "others" respondents reported testing were the following (in alphabetic order): Arbiter, DrawPerfect, First Publisher, FOCUS, GoScript, Harvard Graphics, Kermit, Knowledge Pro, Novell Utilities, PageMaker, PCWrite, Procomm, Q&A, Turbo Pascal, and WordPerfect Office. Some of these were noted by more than one respondent. Here are the ratings.



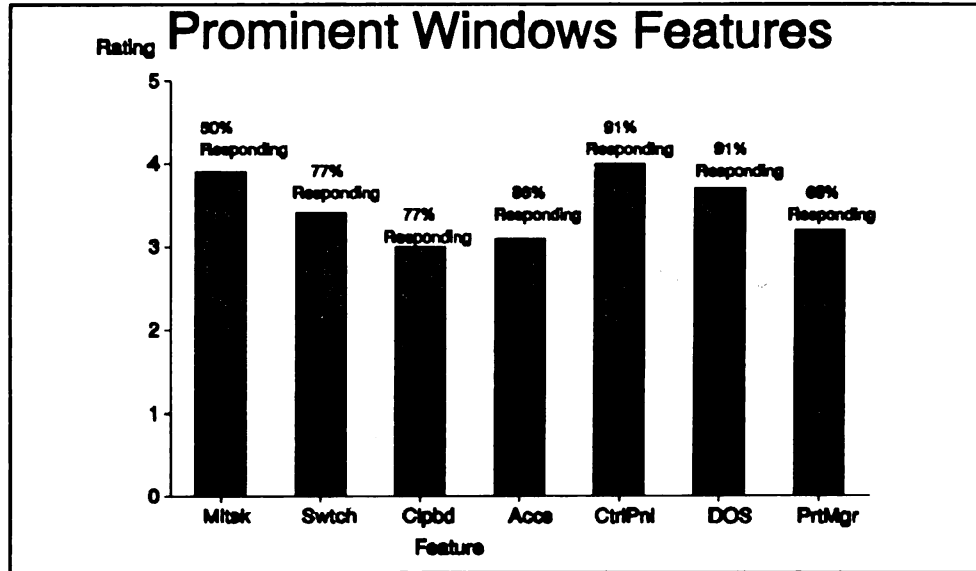
Running Windows Applications

A "Windows" application is one that's designed to run under Windows 3.0. It takes full advantage of the Windows graphical environment, and uses Windows' conventions for pull-down menus and dialog boxes. Although all the ERN representatives received the four Microsoft products for Windows we mentioned earlier, we were pleased that several respondents reported testing other Windows applications as well. Packages mentioned in this category included CorelDRAW, Kappa, Knowledge Pro, Level 5 Object, and Ventura Publisher. Sixty percent of all respondents rated Windows applications. Within the following chart, the percentages atop the bars indicate how many of that sixty percent rated each package.

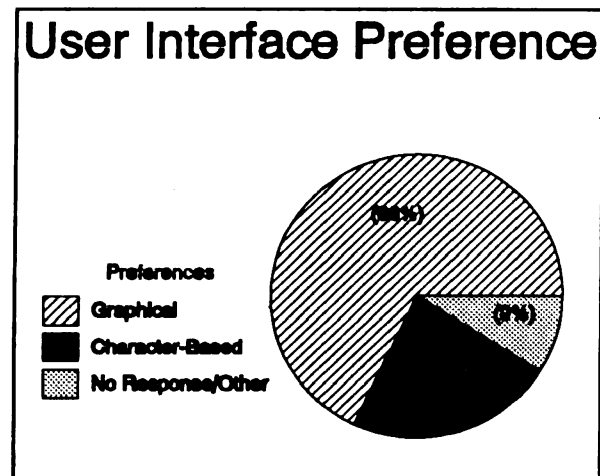
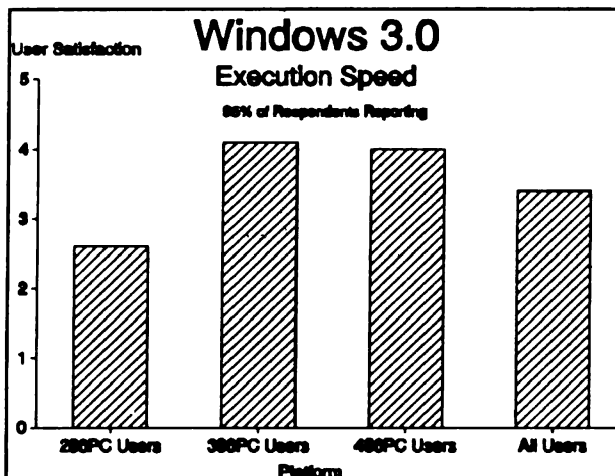


Prominent Windows Features

One part of the evaluation asked for respondents' opinions about the major features and capabilities that set Windows apart from other environments. The primary items are reflected in the graph on the following page. The "Accs" category included the Windows accessories (Write, Paintbrush, Notepad, Recorder, Cardfile, Calendar, PIF Editor, Terminal, Calculator, and Toolbook). While some of the accessories were rated by a majority of respondents, others were not. For example, 86% tried the Write accessory, while only 23% said they looked at the Recorder.

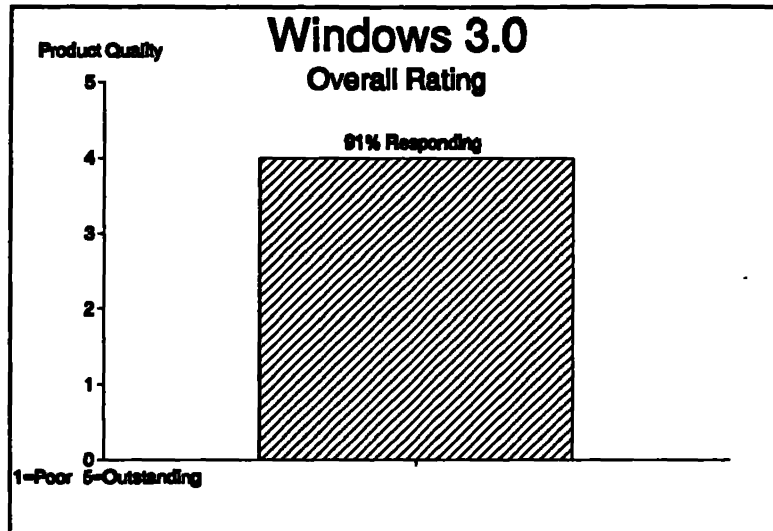


Other significant items on the questionnaire dealt with whether using function keys and arrow keys, as opposed to operating with a mouse, is a viable way to function within Windows; with the merits of the graphical interface as opposed to a menu-driven character-based system; and with Windows' operating speed. Eight respondents had done their evaluations of Windows without benefit of a mouse. Seven of those eight people felt that a mouse should be considered a necessity for Windows' GUI environment. One person felt that using Windows without a mouse is an OK situation. On the five-point scale, with 1 being "I like commands" and 5 representing "GUI beats entering commands," the average score with all participants responding was 3.8. Opinions about use of a GUI vs. a menu system and about Windows' operating speed are reflected in the graphs below. It should be noted that the speed rating for 486 machines reflects input from only one person.



An Overall Rating

Last but not least, we asked all respondents to indicate their overall assessment of Microsoft Windows. Here is a graphical representation of the overall mean rating.



In conjunction with the overall product rating, we asked for general comments. Here are some quotations from those comments:

Have you thought about the cost of converting to Windows? Mouse, extra memory, cost of Windows software itself? Windows is nice, but it's not for everyone.

I'm very disappointed that Windows doesn't run under my DOS emulator (from within Unix).

I feel Windows is an outstanding product which is destined to become a de facto industry standard.

I currently prefer PC Tools over Windows because of memory and disk space limitations.

I like Windows 3.0 for most tasks, but for some it really does not add much of value . . .

Windows 3.0 is a vast improvement over earlier versions, but as an everyday operating environment it does not represent a step forward on the type of machines we currently use.

On a 640K 286 PC, I prefer to use a traditional menu system.

After our users learned the mouse and mastered hand-eye coordination, Windows received a favorable response. In fact, it is now the platform of choice for graphics and desktop publishing.

On our 8MHz PC/AT, the response was too slow to fully realize Windows' potential. Furthermore, most of the EPA-supported software would not be immediately enhanced by installing Windows.

Windows' greatest benefit, outside its beauty, may be to the less experienced user.

Windows is really easy and very intuitive, but the hardware requirements are hard to satisfy.

Windows is a good GUI on a platform with lots of disk space, lots of memory, 12MHz or better speed, a mouse, VGA monitor, and ALL Windows-compliant software.

I do not use Windows on a 286 PC. On a 386 with at least 4 MB of memory, I would definitely use Windows.

Much improved over previous versions of Windows. Should use on a 386 PC. Highly recommended, since protected mode negates memory headaches . . . no more RAM cram!

Summary

We haven't encountered anyone who was ambivalent about Windows 3.0; most users express clear opinions about it. Many of those who are critical of Windows come from the "power user" camp. They've tailored their systems using a variety of sophisticated software tools, many of which may not be compatible with the Windows environment. They say, "Why should I give up this, this, and this, in order to be able to operate under Windows? I don't like GUIs and mice anyway."

The obvious answer for this group is, "Windows probably isn't a good choice for you at this time." On the other hand, some of those people may find that the functions they're getting from several other products can be performed by a single product, Windows. Memory management, multitasking or context switching, cut-and-paste between applications, and a graphical user interface are examples of such functions.

The longer Windows 3.0 has been around, the less vocal its detractors seem to have become. The product clearly is a success in the marketplace. Reports of alleged bugs have quieted. The advantages and viability of the product, both in its own right and as a transitional environment on the way to OS/2, are widely touted in the trade press. Examples of successful implementations of Windows as an organizational standard are common. Our opinion is that the Agency should give serious consideration to supporting Windows 3.0 as an available alternative environment for MS-DOS microcomputers. The feedback from participants in our PC TAP evaluation of Windows indicates that in general they agree.

Certainly there's no urgency to replace AUTOMAXX with Windows in the installed base of machines that use the 286 microprocessor, although we think it's a viable option in that environment for those who wish to do so. However, all the workstations on the current PC contract have at least a 386sx processor, and Windows certainly is worth considering on that platform. Furthermore, a general trend toward graphical user interfaces appears to be developing. Regardless of whether Windows is or should be a "standard" in the Agency or industrywide, it would be prudent to consider it carefully as we develop computing strategies for the next several years.

This & That

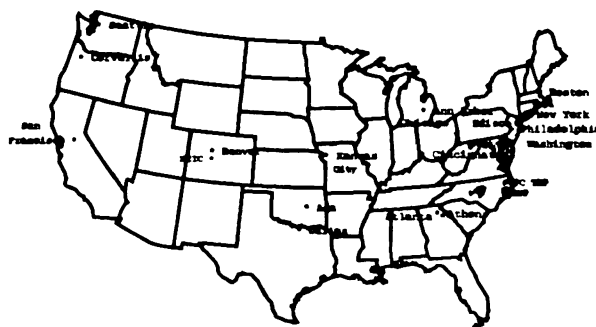
In *This & That* we bring you the latest developments in areas we have reported on before, tell you about announcements of interesting new products, or present other timely items of interest.

PC Technology Assessment Program New External Resource Network Representatives

The PC TAP External Resource Network (ERN) is made up of people in the Regions and Labs who are interested in technology assessment, and who are willing to serve as local contacts for PC TAP at their respective sites. In our last *Consumer Report* (#8, published in July) we printed a list of all the ERN representatives. Since then, Erica Duval, our Washington representative, has left her position at the Washington Information Center, so we have a new ERN rep in DC. Also, the labs in Ann Arbor, Michigan, and Edison, New Jersey, have joined the ERN. Here are the representatives at these three locations:

<u>Site</u>	<u>Representative</u>	<u>Phone/EMAIL</u>
Ann Arbor	Mitch Cumberworth Motor Vehicles Lab 2565 Plymouth Road Ann Arbor, MI 48105	8-374-8342 M.CUMBERWORTH
Edison	Rich Koustas EPA RREL, Mail Stop 104 3890 Woodbridge Ave. Edison, NJ 08837-3679	8-340-6898 RCB/STDD/RREL
Washington	Leslie Yambor EPA WIC 401 M Street SW Washington, DC 20460	8-475-7414 L.YAMBOR

We also note with sorrow the recent sudden passing of Diana Smith, our Region IV representative. Her replacement will be announced later.



PC TAP Consumer Reports Index August '89 thru July '90

Eight PC TAP Consumer Reports have been published since the first one appeared in August 1989. Here's a listing of the reports that have been published to date.

<i>By Issue</i>		
<u>Report</u>	<u>Date</u>	<u>Features</u>
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#2	Sep. 89	Graphics Software for Scientific Applications Desktop Printers Open Forum: MS Windows DOS Extension Macintosh 35mm Slides
#3	Oct. 89	Color Hardcopy Output Technology Assessment Around EPA Open Forum: PC 386 Upgrades
#4	Nov. 89	PC Graphics File Transfers
#5	Jan. 90	Desktop Scanners
#6	Feb. 90	WordPerfect 5.1 Evaluation Open Forum: Scientific Graphics Followup
#7	May 90	Text Retrieval Software Open Forum: PacificPage PostScript Cartridge This & That: HP LaserJet III
#8	July 90	Microsoft Windows 3.0— Part I: First Impressions Open Forum: ChemDraft II Chemical Structures This & That: The PC TAP ERN
#9	Oct 90	Microsoft Windows 3.0— Part II: A Closer Look Open Forum: Low-Cost Macintosh Printers This & That: Consumer Report Cumulative Index

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Color Hardcopy Output	3	Oct. 89
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Macintosh 35mm Slides	2	Sep. 89
Microsoft Windows 3.0— Part I: First Impressions	8	Jul. 90
MS Windows DOS Extension	2	Sep. 89
PacificPage PostScript Cartridge	7	May 90
PC Graphics File Transfers	4	Nov. 89
PC TAP External Resource Network	8	Jul. 90
PC 386 Upgrades	3	Oct. 89
Personal Information Management Systems	1	Aug. 89
Sun Workstation/DOS Windows	1	Aug. 89
Technology Assessment Around EPA	3	Oct. 89
Text Retrieval Software	7	May 90
WordPerfect 5.1 Evaluation	6	Feb. 89

Open Forum

Open Forum provides an opportunity for users to share with others their own innovations, or the results of their own technology assessments. The PC Technology Assessment Program neither verifies nor endorses the contents of *Open Forum* items, but we are pleased to offer them as a service to users.

2.88MB Extra-High Density 3½-Inch Disk Drive for PCs

This report was submitted by Glenn Piper, a former Graduate Student intern in the RTP Library. Glenn has since left the library to accept a position with American Coastal Industries, the winner of the Interim PC Contract. PC TAP appreciates Glenn's contribution.

The TEAC disk drive kit is intended for installation in IBM PCs and compatibles. The kit includes the drive, a controller board, mounting hardware, installation instructions, and a 5¼-inch diskette containing the necessary software. According to the documentation, the drive will read, write, and format 720K (double density), 1.44MB (high density), and 2.88MB (extra-high density) 3½-inch diskettes. The drive will read 720K and 1.44MB diskettes formatted on other drives, but in order to format diskettes the special formatting program that comes with the kit must be used.

We installed the TEAC drive in an Epson Equity III+. The only problem we encountered was that the mounting bracket that came with the kit would not fit in the Epson. Except for this problem, which we overcame by obtaining the proper bracket, the installation was trouble-free. The instructions were clear and obviously thought-out.

Although the physical installation of the controller card was simple, getting it to work was more difficult. The factory settings for the controller card were incompatible with the Epson's configuration (several other boards had previously been installed in the machine). After two calls to Computer Technologies' technical support line, the correct jumper settings on the controller board were determined, and the installation was completed successfully.

With the hardware installation behind us, we began testing to see if the drive would perform as advertised. The Practidisk software was very easy to install, and its automatic configuration option worked well. In many ways, we found the Practidisk formatting utility easier to use than the DOS formatting commands. We had no problems reading from and writing to 3½-inch diskettes of all three densities. Diskettes of all three densities that were formatted and written upon on other drives were handled with no problems by the TEAC drive. Furthermore, on other computers we had no problem reading or writing upon diskettes that had been formatted and written to on the TEAC drive.

All things considered, the TEAC extra-high density drive lived up to its advertised capabilities, and it passed all our tests with flying colors. For the most part, the documentation was clear, understandable, and easy to follow, and Computer Technologies' fast and courteous technical support staff more than made up for the gaps we found in the literature. However, those who plan to install this drive in an Epson Equity III+ should be sure they have the proper mounting hardware on hand before beginning the installation.

How to Submit Items for Open Forum

In keeping with the PC Technology Assessment Program's objective to have the user community actively involved in TAP projects, users are encouraged to submit items for inclusion in future *PC TAP Consumer Reports*. If you have independently investigated the capabilities of a software product or a hardware component, we would like to hear from you. We'd also like you to share with others your solutions to any problems you may have encountered with a particular application or device, and about tricks, shortcuts, or unique applications you have devised. Although we can't promise to publish every contribution, we will evaluate them all in terms of their potential interest to our readers and their conformance to the spirit and intent of PC TAP.

There are no additional rules for *Open Forum* contributions, but here are some guidelines:

1. Contributions must be typed. Our first preference is that they be submitted on a floppy disk in WordPerfect format. If that isn't possible, the next best method is to EMAIL the text to PCTAP, EPA30647. The least preferable method, but still acceptable, is to mail a typewritten article to TAP at the address on the cover of this publication.
2. The length of your contribution will be determined somewhat by its complexity. However, keep in mind that we're primarily interested in the purpose of your study project and how pleased you were with the results, not in the nitty-gritty details of how you did it. We will publish your name, address, and phone number for those who want more details. Two to three pages is probably a reasonable maximum length. On the other hand, a paragraph containing a nugget that may be useful to others would be equally welcome.
3. All material submitted by users is subject to our editing, and you will not be given an opportunity to review the final manuscript before publication. Sorry, you'll just have to trust us. If we have questions or don't understand any part of your text, we'll contact you for clarification.

We hope you enjoy *PC TAP Consumer Reports*, and we look forward to hearing from individuals who have insights or discoveries to share with others. Thanks for your interest and your participation in the PC Technology Assessment Program.