Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

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Note : The present file is a modern recreation of the original 3-column manuscript produced at Virginia Power by Editor Grebe using keyboard text (no fonts, etc.) that was supplied by W. Scott Meyer. Editor Grebe wrote the first story and the subscription form at the end (shown in somewhat collapsed form, without graphics). During July of 1994, the old issues published by Virginia Power were recreated in Portland using 1994 newsletter publishing standards. I.e., Dr. Meyer used Word-Perfect with two, non-threaded columns. The January, 1990, issue was completed first, using an optical scanner. Then BPA's Dr. Tsu-huei Liu made the critical observation: maybe this step could be avoided by directly processing the almost-forgotten Ventura Publisher files that had been received from Mr. Grebe toward the end of 1989. It was found that Ventura Publisher is more compatible with the rest of the world than WordPerfect. Each story was found as a separate, normal, edit (ascii) file, so the scanning could be avoided completely. Instead of 8 or 10 hours as for JAN89, this SEP88 disk file might have required half that time to complete. Spelling and other minor mistakes were corrected as they were discovered. The subscription form (no longer valid) has had the blanks shortened. Finally, Editor Grebe's clip art. Each such drawings exists as a separate .GEM file that Dr. Meyer did not know how to handle using WordPerfect.

Creation of the Can/Am Newsletter

During 1987 an informal newsletter was distributed among EMTP users in the southeast (USA). Robert Mechler of Florida Power Corporation created the newsletter hoping that it would aid in the formation of a regional EMTP user group. The purpose of the user group was to provide a forum for the free exchange of EMTP related information. After several issues of the newsletter Thomas Grebe of Virginia Power agreed to handle the publication. It was during a conversation with Dr. Meyer (of BPA) that the possibility of including the newsletter as another service of the Can/Am User Group was discussed.

The newsletter will be printed quarterly (during the same months as "EMTP News") and will deal with EMTP/ATP related subjects and developments. The next issue of the newsletter (December) will include a directory of the users responding to the subscription form. Any announcements or items of interest should be forwarded to Thomas Grebe by December 15. Also, note that the subscription form should also be returned before the same date. Subsequent issues of the newsletter will only be provided to registered users of ATP. (who have returned the subscription form) Information concerning registration can be obtained from Dr. Scott Meyer.

Any suggestions or comments concerning the subject material or format of the newsletter may be included on the back of the subscription form. Please note that in order to keep costs to a minimum, only one copy of the newsletter will be sent to the same address. If there are several users interested in the newsletter we ask that each user complete a subscription form (so name will be included in directory) and then specify one user as the recipient. Subscription forms and other newsletter information may be sent to:

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2400 Grayland Avenue
P. O. Box 26666
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Two Week EMTP Short Course in California Uses MS - DOS ATP

San Luis Obispo, California, was the site of the first EMTP short course ever to use no computer more expensive than an MS-DOS machine. Offered by the Electric Power Institute of Cal Poly (see names and address toward the end of this article), two semi-independent parts were presented during the two weeks between June 20th and July 1st, 1988. This course was offered in the Tandem Laboratory of the Computer Science building, one of two special 16-computer laboratories donated by Tandem Cooperation. Each participant had his own PC AT-compatible Tandem computer with an EGA-compatible color graphic monitor and an inexpensive, narrow-carriage, Epson dot-matrix printer --- plus the MS-DOS version of ATP, of course.

When the course is repeated next summer (1989), more hardware will be utilized. First, a quality projection system soon will be available to reproduce the display of the instructor's color computer monitor on a big screen at the front of the room. It should be a great tool for teaching EMTP interactivity (SPY), interactive plotting, etc. Second, all 32 Tandem computers can be tied together by a UNIX network that is driven by a server having a big disk. The network should be utilized next year to provide easier distribution of EMTP materials, and also easier access to the laser printer at the front of the laboratory for high-resolution plots. Also, there should be a demonstration of the extended-memory (OS/286) version of ATP, which avoids overlaying and table dumping/restoring, and allows arbitrarily large EMTP table sizes (within available memory). As for an 80386-based UNIX EMTP, one can hope (no commitment has yet be made).

A repeat of the EMTP short course has been scheduled for next summer, and ATP developers expect to support it fully. Since the 1989 IEEE PES Summer Meeting is scheduled for Los Angeles (perhaps 170 miles away), some thought is being given to offering the course either immediately before or immediately after the IEEE meeting. Those having a clear preference as to the date, or those wanting more information, are invited to contact:

Marguerite Maxwell
Short Course Administrator
Cal Poly Electric Power Institute
California Polytechnic State University
San Luis Obispo, California 93407 U.S.A.
Phone: (805) 756-2319

Profs. Saul Goldberg and William F. Horton are regular faculty members of the Electronic and Electrical Engineering Department of Cal Poly, and they were the Course Coordinators. Prof. Ramon Betancourt of San Diego State University (located in San Diego, California) was the third full-time faculty member of the 1988 course. Industrial experience was contributed in lectures by Mr. Mark McGranaghan of Electrotek Concepts, and Dr. Dariush Shirmohammadi and Mr. Demetrious Tziouvaras of Pacific Gas & Electric. Finally, Dr. Meyer participated in the initial two days of the course. For a few additional observations by Dr. Meyer while at Cal Poly, see Section III of the paper by Liu, Ger, and Meyer in the September issue of EMTP News.

Summary Information About MS-DOS ATP EMTP Version

Existence of the MS-DOS version of ATP already is known to most readers, although some probably have not followed development since its introduction to North America at the end of last year. Demand for the MS-DOS version has been overwhelming, with usage already licensed for more than 120 sites in the USA, Canada, and Europe. Responding to this interest, considerable work has been done to finish the MS-DOS version of ATP, which finally has matured. Documentation is contained in three papers:

1) 22-page report by Herbert Konkel (1st printed in February, 1987);
2) 17-page report by Drs. Meyer and Liu in EMTP News, March, 1988;
3) 11-page report by Liu, Ger, and Meyer in EMTP News, Sept., 1988.

Since the last of these is brand new and has not yet been seen by the average reader, it is worth summarizing (the next four paragraphs). Unlike most papers, copies of all three of those listed above are available from your User Group upon written request.

The MS-DOS version of ATP has progressed since the last status report of six months ago. Batch-mode vector-graphic plotting finally is available. This uses software by GEOCOMP Corporation that satisfies the CalComp interface of the second (or non-simulation) half of the program (TP2.EXE) for almost any graphic device in common use. Also, the SPY "PLOT" command has been activated for the first (or simulation) half of the program (TP1.EXE), thereby allowing plotting of going simulations in both the vector and character modes. Disk file archiving using the product PKARC from PKWARE, Inc. has allowed the revision of ATP distribution procedures: no longer do we rely on the BACKUP command of MS-DOS. Development peculiar to the MS-DOS version has nearly ended. Whereas one could wish for anything, remaining enhancements seem to be either impossible or impractical due to the 640-Kbyte address limitation of MS-DOS.

GEOGRAF is the name of the GEOCOMP software that provides vector-graphic output for either monitors, pen plotters, or printers (both dot-matrix and laser, with maximum resolution of the device). It comes from:

GEOCOMP Corporation
66 Commonwealth Avenue
Concord, Massachusetts 01742 U.S.A.
Phone: 1 (800) 822-2669

But for a reader to use such vector-graphic plotting of ATP, GEOCOMP requires that the user be licensed ($75 for the first MS-DOS computer of use). The choice among all possible display devices is made by the appropriate selection of drivers. Prior to EMTP execution, the MS-DOS ATP user should select one screen driver and one printer/plotter driver from the numerous choices that are provided on the GEOGRAF Utilities Disk. A menu-driven program named DRIVERS.EXE simplifies this process. If the reader has any question about compatibility of his particular computer, he is advised to check with the factory (note the toll-free telephone number).

Future distributions of the MS-DOS version of ATP will use the excellent and inexpensive file-archiving product named PKARC from:

Pkware, Inc.
7032 North Ardara Avenue
Glendale, Wisconsin 53209 U.S.A.
Phone: (414) 352-3670

The Can/Am EMTP User Group purchased PKARC for $48.50 on June 16th, and has since been authorized by PKWARE President Phil Katz to distribute copies free of all charge via the User Group. On behalf of the numerous MS-DOS EMTP users who are expected to receive this excellent PKWARE software in the near future, we thank Mr. Katz. Effectiveness for the EMTP is astounding. It was Dave Szymanski who first discovered this, and called it to the attention of the User Group. For example, the biggest of all files, the 2395-Kbytes TP1.EXE, can be compressed to a mere 1035 Kbytes (43% of the original size). Since the compressed file easily will fit on a single 1.2-Mbyte PC AT-compatible floppy disk, there no longer is any need for reliance upon the BACKUP command of MS-DOS to distribute ATP materials to owners of PC AT-compatible computers. At the same time the User Group economizes on magnetic media (only 3 high-density diskettes will be required, compared with the original 5), the simpler COPY command of MS-DOS can be used for all files. No longer will there be a potential compatibility problem for users of MS-DOS Version 3.3.

Readers may be interested in an associated new product of PKWARE that is named PKFIND, which is described by advertising as follows: "... PKFIND searches through all your directories and archive files, too! PKFIND can help you find any file, archived or not, simply, easily, and efficiently." PKFIND is priced at $20 (it is not part of the PKARC package, so will not be distributed along with ATP). Any MS-DOS user who is short of hard disk space is advised to consider archiving via PKWARE. But this creates the potential new problem of concealing individual files --- unless one either keeps good records, or uses PKFIND. The latter alternative (PKFIND) is attractive.

Ir. Mustafa Kizilcay of the University of Hannover in West Germany has continued to improve his interactive plotting program. The version of late last year did not support CGA graphics, whereas a new version does. The old version required interactive input, whereas a new version offers a batch-mode alternative. The old version had size limited by the 65-Kbyte barrier of program size, whereas the new one does not. Etc. The first of two rounds of improvements was described by Mr. Kizilcay in the March issue of EMTP News, and it is hoped that text describing the second will be available in time for the September issue. Of course, the Can/Am EMTP User Group will be switching to the new version soon.

SPY (interactive observation and control) is available in the MS-DOS version of ATP, although it is restricted by the need for overlaying. Any command that requires either time-sharing (e.g., the ROLL-ing "EXAMINE") or a call to SPY from a particular location that is interior to the time-step loop (e.g., the "SM" command) has necessarily been disabled. But most SPY commands remain in effect, including the all-important "EXAMINE" and "DEPOSIT" commands for accessing arbitrary variables of COMMON blocks, and the "PLOT" command to provide graphs of the ongoing simulation.

A new MS-DOS version should be ready for general distribution by the time this newsletter is available to the general public. Distribution of the old version is being discontinued. Since old Rule Books can continue to be used, only floppy disks are needed for an existing user to update his program. For ten dollars, an update will be provided using either high-density or low-density disks in response to written requests by registered owners of the complete package. Payment must be made in U.S. currency, by check or money order made payable to "Tsu-huei Liu." As in the past, it is Tsu-huei's computer (an IBM PC AT) and kids who will create the floppy disks.

Free EMTP Theory Book Available From BPA

Available free of charge from the Bonneville Power Administration is its "EMTP Theory Book" (known as "Reference Manual" by procurement personnel). Some 600 pages in length, this was prepared for BPA by Prof. Hermann W. Dommel of the University of British Columbia in Vancouver, B.C. (Canada). Despite some

early deceptive advertising to the contrary, BPA's EMTP Theory Book should have nothing to do with the commercial competition (DCG/EPRI), and is not a proprietary item. Rather, the EMTP Theory Book is in the public domain, having been paid for entirely by U.S. government money via a BPA contract that dates back to September of 1981 (one year before the creation of DCG). Rules for BPA distribution of the Theory Book within the United States or Canada are simple enough, as first published by Drs. Meyer and Liu in their September, 1986, article in EMTP Newsletter. Each independent company or organization is entitled to one free copy, which will be mailed by surface mail (Fourth Class) in response to a written request only. Requests should be mailed to

Dr. W. Scott Meyer or Dr. Tsu-huei Liu
BPA, Route EOHC
P. O. Box 3621
Portland, Oregon 97208 U.S.A.
Phone: (503) 230-4402

"EMTP News" : The Journal of ATP EMTP Usage and Development

"EMTP News" is the name of the quarterly EMTP journal that is published by LEC of K.U. Leuven, Belgium. Formerly entitled "EMTP Newsletter," the name was changed at the time of disassociation from a former co-Editor who had participated in EMTP commerce. Since the end of 1987, this publication has been explicitly rededicated to users of royalty-free EMTP versions of both BPA and LEC (the latter implying ATP). Beginning with the first "new" issue dated March, 1988, ATP developers once again have contributed substantially (the boycott has ended), and it is expected that this will continue. EMTP News is seen by ATP developers as the primary medium for the communication of "declassified" ATP news to the general public around the world. It is to be stressed that the present free newsletter of the Can/Am EMTP User Group is not intended as an alternative, since full-length articles will continue to appear only in EMTP News.

Subscription to EMTP News is on a yearly basis covering the four quarterly issues of any one calendar year. The months of publication are March, June, September, and December. A North American subscriber should receive his copy by Air Mail, usually toward the end of the month of publication. The yearly cost in U.S. dollars is forty-five ($45), payable by check to "K.U. Leuven Research and Development." Subscribers are asked to add some mention such as "for EMTP News" somewhere on their checks, as well as the year for which payment is being made. Orders should be mailed by air, since surface mail has been known to take nearly three months, as unbelievable as this may sound. From the USA, postage is 45 cents for half an ounce. Be sure to mark the envelope prominently with "Air Mail." Finally, mail to LEC, which has persons and address:

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Ir. Guido Empereur, Research Assistant
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The Birth and Evolution of ATP and LEC

The birth of LEC (the Leuven EMTP Center of the European EMTP User Group) occurred about a year after the plan by DCG (the EMTP Development Coordination Group) and EPRI (the Electric Power Research Institute) to remove the EMTP from the public domain and sell EMTP as a commercial product for whatever the market would bear. Since many readers still are not aware of such basic historical facts about LEC, which is the licensing agent for ATP, a quick summary will be provided.

It was in the spring of 1984 that DCG and EPRI agreed informally to try to sell EMTP. A draft copy of the joint DCG / EPRI MOU (Memorandum of Understanding) was available for discussion in Leuven, Belgium, during the 1984 EMTP short course that began at the end of July, 1984. Whereas at that time Dr. Meyer was encouraging resistance to the proposed commercialization of EMTP, the dominant European sentiment would seem to have favored technical cooperation with DCG/EPRI. Such an idea was formally endorsed that year at the Fall Meeting in Milano (Italy), and was proposed in writing by a letter from the European Chairman (Prof. Van Dommelen) shortly thereafter. However, the reaction in North America (by DCG/EPRI) was not sympathetic. Europeans were informed that they could cooperate by paying for EMTP -- either individually
or collectively. Following earlier written communication, this disillusioning news was carried to Europe in person by DCG Chairman Mader during the spring of 1985, and it would seem to have provided the incentive for rapid defensive organization. This included Article 10 of the LEC Agreement, which prohibits the disclosure of LEC EMTP information to nonmembers. Hope of assistance from BPA was provided by relevant U.S. law (the Freedom of Information Act, or FOIA), which was used during April of 1985 to ensure that BPA's EMTP would be given freely to others contrary to DCG/EPRI designs.

The roots of ATP had nothing to do with either LEC or the commercial inclinations of DCG, however. Rather, the beginning dates to January and February of 1984, when Drs. Meyer and Liu were not supported by BPA

management in their attempts to enforce key provisions of the DCG Agreement. Initial design work occurred shortly after Dr. Liu resigned as DCG Chairman in protest, and Dr. Meyer halted his unpaid overtime work for BPA and instead began to devote his personal time to alternatives. The "alternative" became formalized upon Dr. Meyer's return from Europe in August of 1984, when a personal computer (IBM PC AT) was purchased, and when work began on ATP in earnest with the assistance of a Chinese visitor (Ma Ren-ming of the Wuhan High Voltage Institute in Wuhan, China).

Within one year, ATP had become a distinct, new program with substantial advantages. It was carried to Europe at the beginning of November, 1985, and proposed to the first annual LEC Meeting as the basis of cooperative, noncommercial EMTP development. Requirements of ATP development included honesty in all dealings and non-participation in EMTP commerce. The fall of 1986 saw Dr. Meyer upgrade his home computer facilities to a 32-bit Apollo workstation, after which his PC AT was sold to Dr. Liu. ATP was well established by July of 1987, when user documentation (the 680-page ATP Rule Book) was available and the program was used on three different computers (an IBM-compatible mainframe, Apollo workstation, and MS-DOS personal computer). This was for the 1-week EMTP short course offered in Leuven by LEC. By October of that year, at the annual LEC meeting, problems with BPA's EMTP were dismissed because LEC had completed the switch to ATP. Following this meeting, there was wide distribution of the MS-DOS version of ATP (beginning in the USA and Canada with the form letter dated December 2nd, 1987). At the end of 1987, the DCG Agreement (including a one-year extension) expired, and BPA ties with commercial EMTP development were ended. The following month, BPA formally and officially requested ATP from LEC, and has been evaluating and testing ATP ever since.

The concept of the membership of a foreign User Group in LEC is important. This began in the fall of 1987, when it was agreed that LEC would admit a foreign EMTP User Group on the same conditions as an industrial member. This fixed the terms by which ATP would be made available throughout the rest of the EMTP-organized world: Latin America, Japan, Korea, Australia, and India. The Can/Am EMTP User Group was exempted from the usual industrial membership fee in return for contributions to ATP.

Intel 80386 - Based UNIX Support of EMTP

The 80386 is Intel's 32-bit microprocessor that already powers many high-end personal computers including Models 70 and 80 of the IBM PS/2 line. When coupled with the 80387 numeric coprocessor, a quality 80386-based PC should outrun a DEC VAX-11/780 for number-crunching applications. The 80386 also boasts hardware to support multitasking and virtual memory management -- both of which can be exploited using the industry-standard operating system UNIX. Whereas Motorola has provided such capability in its 32-bit 68020 microprocessor for years, power-hungry EMTP users may prefer the Intel alternative. Likely reasons include better compatibility with MS-DOS (which offers superior software at lower prices), and lower hardware prices. These are important advantages of the enormous Intel-based market that grew from the original IBM PC and later IBM PC AT. Once the choice of Intel has been made, an 80386-based computer that runs UNIX should be best for support of the EMTP by heavy users. Specifically, the performance of 80386-based UNIX should be decidedly superior to the performance of any DOS extender. Although testing is not yet complete, recent experimentation has confirmed this theoretical attractiveness of UNIX for the 80386.

Most of the preceding paragraph has been taken from the Summary section that begins a 5-page paper in the September issue of EMTP News. Entitled "ATP EMTP for Intel 80386-based computers: ...," the authors are Messrs. Szymanski, Leskovich, and Pierce. For addresses and telephone numbers, see the article about the DOS extender. It is important to add that all testing thus far has been confined to UNIX System V, Release 3, which can be obtained in generic form from any of four established companies in the USA. Prices begin at $145 for a two-user license from Bell Technologies. Add $50 for printed UNIX documentation. An executable EMTP version should be portable without royalty among any of the different versions of UNIX System V, Release 3.

Interested readers are warned about a potentially-fatal hazard of the 80386 microprocessor: Intel Erratum 21. For chips containing this defect, it has been found that EMTP execution under UNIX will "hang" (freeze, hibernate). The Pennsylvania researchers were able to cure this trouble of their aged Zenith 386 using a small hardware addition (a so-called "Kluge" card) from Bell Technologies. Potential purchasers of new machines are warned to avoid old microprocessors. Informed speculation suggests that Intel chips serialized "386 D-16" or newer should be correct for the case of 16 MHz, although this has yet to be confirmed experimentally. In any case, an indeterminate number of old chips remain to be flushed from existing supply lines. Other restrictions, too, should be carefully noted by the reader: 2 Mbytes of RAM (as used with the Zenith 386) would seem to be a practical minimum for UNIX, and no hard disk smaller than 40 Mbytes is recommended (70 Mbytes is more reasonable for heavy users).

Later issues of EMTP News should contain more information about various aspects of development and testing of the ATP version for 80386-based computers. The 386 version is expected to have great impact on the industry, and lead naturally to still more powerful Intel alternatives (the 80486 should debut soon). Windows and graphics are expected to be the next ATP preoccupation, now that basic execution has been proven using a variety of standard BENCHMARK test cases. The selection of 386-based hardware that is optimal for EMTP use is being given some thought, too.

Japanese Provide Large-Signal EMTP Model for Transistors

A way to model transistors using the EMTP has been discovered by Naoto Nagaoka, a colleague of Prof. Akihiro Ametani at Doshisha University in Kyoto, Japan. It was during Mr. Nagaoka's attendance at the 1988 IEEE PES Summer Meeting in Portland that ATP collaborators in the USA first learned of this revolutionary work, and assisted with its documentation in the September issue of *EMTP News*. Interested persons are referred to the 10-page article entitled *"Large-signal transistor modeling using the ATP version of EMTP,"* from which the following summary paragraph has been copied:

Although designed for power systems, the ATP version of the EMTP also can model transistors. This is important because it opens the door to general electronic simulations using the EMTP. There is no restriction to small signals , either : Saturation and switching are inherent in the proposed model. Except for a conventional, fixed, Type-92 saturable resistor R(i) on the electrical side, nonlinearities of a transistor can be confined to the control system half of the EMTP (the TACS feature). The output of this TACS modeling then is applied to electrical components using compensation in the form of a TACS-controlled, Type-91, time-dependent resistance R(t). In the absence of distributed lines to decouple two or more such EMTP branches that use compensation, all must be solved at each time step as a single coupled set along with any other true nonlinear elements that might be present. Initialization involves further innovation. The phasor solution for initial conditions of the electric network frequently requires a linear approximation for each Type-91 element, and this is ideally suited for the new feature of STARTUP variable SSONLY. Sample results are provided for a simple single-transistor inverter and amplifier. Numerical results were obtained using the author's Intel 80386-based Toshiba 5100 portable computer, which also is described.

Different Computers : Inquiry About User Interest

ATP should be compatible with any modern computer of engineering significance, with more than 15 distinct versions having been tested during the past two years. None has been found to be incompatible. But it does not follow from this fact that current versions will be available from the Can/Am EMTP User Group at any time for any computer. Half a dozen or more should be. These are: DEC VAX/VMS, DEC UNIX, Apollo Aegis, MS-DOS, SUN-3, OS/286, and Intel 80386-based UNIX. Later, OS/2 probably will be added to this list. But for many other systems, continuous support is uncertain because user interest is uncertain. Let's review questions about some of the more popular remaining systems:

IBM mainframes continue to be supported by LEC, which still has some 10 users in Europe. Hence such an ATP version should be available -- provided some cooperating organization of the USA or Canada were interested enough to copy tapes for others in addition to using the IBM mainframe version for itself. We can not expect LEC to provide more than one copy to the Can/Am User Group. But is there sufficient interest to warrant even a single acquisition? The need seems to be disappearing rapidly as EMTP users switch to much smaller, cheaper, and more convenient alternatives --- including some from IBM (thinking of both personal computers and workstations)!

IBM workstations (RT PC running AIX, which is IBM UNIX) will be supported if a good home can be found. Provided IBM continues to improve the CPU and coprocessor (its own proprietary chips) at a rate that will keep RT PC competitive with other engineering workstations, there soon should be a loyal following for ATP use. Any reader who has interest in an ATP version of RT PC is invited to contact ATP developers in Portland.

Apple Macintosh II would seem to be capable of supporting ATP well, since it uses the same hardware (Motorola 68020) as workstations from Apollo, SUN, H-P, etc. Also, windows and graphics (needed for SPY) are a known strength. But no testing has yet been performed because of a lack of demand by users, and also concerns about system-level software (operating system, FORTRAN compiler, and linker). In the absence of user demand, there is little incentive to test the standard non-virtual operating system and associated compilers that do not exploit virtual memory capabilities of the hardware. Assuming that UNIX (Apple A/UX) must do so, ATP developers in Portland would like to make contact with a Macintosh UNIX user who also has production interest in the EMTP, and would be willing to collaborate on the testing of a Macintosh II version of ATP. But could such a user read an MS-DOS floppy disk (either 5.25-inch or 3.5-inch could be provided)? In the absence of such a working connection, the next opportunity might occur when the standard Apple operating system begins to use

virtual memory management. An informed user indicates that this might be early in 1989.

IBM PC AT - Compatible (Intel 80386 - based) EMTP Uses DOS Extender

The June issue of EMTP News contained a 10-page report applicable to 80286-based computers with lots of memory. For 3 Mbytes or more (including the 640 Kbytes of real-mode RAM), the use of a "DOS extender" allows larger dimensioning of EMTP tables. Also, there is elimination of the time for overlaying and most table dumping/restoring of the MS-DOS version (indicated by continuous illumination of the hard disk light during input phases of the program). Not yet implemented, however, are scrollable windows and vector-graphics -- important ingredients for the quality use of SPY (interactive observation and control). More development work is needed for these details. But the basic batch-mode program TP1.EXE (for simulation) works well, and is available for use by the general public. A license for the DOS extender (OS/286 by A. I. Architects) will be required for each computer of usage, however. Since these can be purchased from Lahey Computer for $40 each in quantities of 10, whereas a single copy costs $100, it would pay to have the Can/Am User Group purchase such licenses in bulk and pass the savings along to members. But no such purchase has yet been made. To summarize the June report, the title, authors, and abstract will be reproduced (remainder of this article):

ATP FOR IBM PC AT-COMPATIBLE COMPUTERS (INTEL 80286) BREAKS THE 640-KBYTE BARRIER OF MS-DOS BY USING AN INEXPENSIVE "DOS EXTENDER" NAMED OS/286

Abstract

Previously, ATP EMTP for IBM PC XT- or PC AT-compatible personal computers was constrained by the 640-Kbyte memory limit of MS-DOS operating systems from Microsoft [1, 2]. The limit remains in effect for PC XT-compatible machines (based on the Intel 8088 or 8086 microprocessor), for which the alternative presented in this paper is inapplicable. But for the newer and more powerful PC AT-compatible computers based on the Intel 80286 (or the 80386) microprocessor, this limit has been broken. Using the new LAHEY F77L-EM compiler and its "DOS extender" named OS/286 that addresses up to 15 Mbytes of Intel extended memory in the protected mode, a new ATP formulation for PC AT-compatible computers forgoes the overlaying and table transfers that were required for MS-DOS. Practically speaking, EMTP table sizes now are limited only by available extended memory, with 2.4 Mbytes providing default dimensions, and each additional megabyte providing about another 1.4 times such dimensions. All functions of interactive observation and control (SPY) are available, including those that require time-sharing and were impossible using MS-DOS. Important details of the new formulation are discussed, and performance is documented. Finally, previous predictions about the EMTP future of Intel-based microcomputers are updated.

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SUBSCRIPTION INFORMATION

Date: _____
First Name: _____ Last Name: _____ Title: _____ Initials: _____
Company: _____ Phone: _____
Mailing Address: _____ Country: _____
Do you wish to have your name printed in a user group directory? (Yes / No)
Would you be willing to respond to EMTP related questions in your specified area(s) of study? (Yes / No)
Computer system(s) used: _____
Operating system(s) used: _____
Primary area(s) of study: _____