Can / Am EMTP News

Voice of the Canadian/American EMTP User Group

Publishers and Mailers:
Kwang-yi and Kwang-chien Ger
3179 Oak Tree Court
West Linn, Oregon 97068
United States of America

Authorized by Co-chairmen :
Dr. W. Scott Meyer, Editor
Dr. Tsu - huei Liu

Vol. 92-2; April, 1992

Salford Compiler & DOS Extender

DBOS/486 Version 2.60 is being distributed to the general public by the user group under Salford license number 902. For more information, see the story about Prof. Carroll's Florida EMTP short course. In the ENHANCEMENTS.DOC file we find big news for those who like Microsoft Windows: *"10) FTN77 will now run under Windows 3.0 in enhanced mode. Users wishing to use FTN77 under Windows 3.0 should copy WDBOS.386 into their Windows system directory and add the line "device=wdbos.386" into the system.ini under the [386Enh] entry. Once this has been done DBOS can be run in a DOS window. When running under Windows, the /DISK_CACHE option is not available."* Prof. Saul Goldberg of Cal Poly in San Luis Obispo was sent a new Salford EMTP and also DBOS on March 31st in order to test this detail. Unfortunately, unexpected delays including hardware trouble prevented him from reporting anything by May 3rd, however.

The Salford copyright notice that now is being stuck to floppy disks was produced by WordPerfect disk file DBOS525.LST for 5.25-inch disks. An alternate file DBOS35.LST is used for 3.5-inch disks. Glyphix soft fonts for the H-P LaserJet series II printer were used. The license number as well as the user group name have been built into the label ahead of the Salford boiler-plate text. After reducing the size to be able to print within the narrower column of this publication, the beginning of our new label for 5.25-inch floppy disks appears as follows:

Salford DBOS / 486 **Version No. 2.60**
Multiple Copy User License Agreement Number 2-000902
paid for by the Canadian / American EMTP User Group.

Both labels were Air Mailed to Salford for inspection as described in 3 pages of FAX dated April 16th.

Graphics for H-P LaserJet series II should be available in the next Salford release, Rev. 2.66, according to E-mail from Salford to Bruce Mork on April 9th. The sender, Tony Webster, wrote: *"We are about to release 2.66 -- there have been a number of internal releases which haven't gone to the outside world."* So, both American and German (Hannover) eyes are looking for this next significant step with hard copy graphics by Salford. For background of the promise, see the lead story of the January, 1991, issue. This was entitled *"Salford Graphics Should Improve."*

The compiler switch /ZEROISE is being used to zero variables that otherwise would not be defined at the start of program execution. Fortunately, this does apply to EMTP tables of START AGAIN usage since these are preserved in COMMON blocks. But it does not apply to local variables that appear neither in a DATA nor in a SAVE statement, it is important to remember. It is easy to forget this limitation. But a data case from Harald Wehrend of the University of Hannover in Germany clearly illustrated the shortcoming for your Editor early in the morning of March 12th (see separate mention of BCTRAN use).

Japanese computer incompatibility with Salford software does not extend to neighboring Korea as a serious problem, it would seem. This good news arrived in FAX from Tae Won Kwon of KEPCO (Korea Electric Power Corporation) on April 2nd. *"Almost all 386-based microcomputers manufactured in Korea are Salford-compatible"* according to information that has been gathered from *"some manufacturers in Korea."* For background of the problem, see the final paragraph on page 1 in the preceding (January) issue.

Networking compatibility with Salford EMTP had for several weeks been the concern of Prof. Leonard Bohmann of Michigan Technological Institute in Haughton when he finally telephoned your Editor on March 30th. Prof. Bohmann was invited to share his understanding of

problems and solutions with other users by writing about his experience. According to Bruce Mork, who had been monitoring traffic on the NDSU ATP E-mail party line (see pages 5-8 of the October, 1991, issue), Guido Empereur of LEC already had encouraged a paper for *EMTP News*, which your Editor further encouraged. Your Editor also expressed a willingness to pass any such text along to others as a WordPerfect file in the form of one section of some future BPA *EMTP Memorandum*. To satisfy the needs of networking in Haughton, one former limit of Salford EMTP has been relaxed. Beginning the same day, |KTRPL4| now is allowed to have any value between 1 and 26 (corresponding to disk drives A: through Z:).

Lost data files can be recovered from .LIS output files using utility LISTODAT that comes from Bruce Mork in Fargo. Your Editor first received a copy on April 13th, and immediately added it to the GIVE1 disk of Salford distribution. It is hoped that no reader ever has need for the service. But if he does, it now is available. The only shortcoming observed by your Editor was that LISTODAT might possibly pass along extra, extraneous records from a PRINTER PLOT that had the time axis at or close to the column-51 separator (the vertical bar "|"). Fortuitously, this trouble was discovered using the first and only disk file (DC25.LIS) that was used for testing in Portland. On April 14th, Mr. Mork agreed to add a little extra logic to skip through printer plots.

Use of /DISK_CACHE as a DBOS switch was proven to be both compatible and also highly desirable for the AT&T 80486-based computer that is used by your Editor at BPA. This first was done during the early morning hours of April 8th. RUN.BAT is the command file that will execute Salford EMTP for each DC-XX test case. Before making the change, execution required 67 : 31 (minutes : seconds) . The use of /DISK_CACHE decreased this to 27:17. Every single DC*.LIS file that resulted was proven to be unchanged by comparisons using FC (shareware by Mike Albert). For DC-1, typical times from the case summary statistics are (first without, then with disk caching) :

19.891	3.242	2.855	70.938	2.527	99.453
6.978	1.099	1.428	67.088	.550	77.143

No, the rate of simulation is not much shortened (see the numbers of column four), but the time to start the program (column one) certainly is. This is the most noticeable aspect of disk caching: the opening prompt appears much quicker because the front of the program is being paged from RAM rather than from disk for the second or later usage. Even the first usage seems significantly faster. Disk fragmentation no longer is noticeable, either (changing disk position was slow but changing memory location in RAM is fast)! The only conflict that seemed to result from the addition of /DISK_CACHE was the following error message: *"disk cache cannot be run with the VCPI."* Not knowing what caused this complaint, your Editor examined AUTOEXEC . BAT and CONFIG . SYS for clues. In CONFIG . SYS he found the suspicious line DEVICE=D:\QEMM\QEMM386.SYS RAM that was for Quarterdeck's Extended Memory Manager QEMM . When this was removed, operation was normal except that DOS HIGH was rejected during booting (not a serious concern for our use).

Library functions were forced in-line beginning April 25th in the hope of speeding Salford EMTP execution a little. Previously, every time SIN or SQRT or any other library function was required, control was passed to an external subroutine. For slow computers, this did not seem to make a noticeable difference. But for more powerful processors, the numerical computation itself requires much less time, so it is possible that the time to jump to a separate subroutine will dominate. This first was pointed out late in the 1980s by researchers at the University of Illinois who were using a Cray supercomputer. Well, with the 80586 to be available later this year, it is time to begin thinking in supercomputer terms.

The need for virtual scratch files (see page 2, column 1 of the preceding issue) has been greatly diminished by the use of /DISK_CACHE to provide disk caching. Translation (from the UTPF to FORTRAN) has been sped substantially.

Improvements to Salford TPPLOT

TPP.BAT replaced the original TPP.EXE on March 24th. There should be no effect on the user since he continues to begin the execution of Salford TPPLOT by keying TPP followed by a <CR> in response to a DOS prompt. The reason for the change is interesting. As long as the /DEBUG qualifier was used to compile TPPLOT, it was found that the 4-line DOS program TPP.EXE worked flawlessly. But when /DEBUG was not used, the program response to a STOP command was opening of the debugger window with the complaint *"Program terminated normally."* So, the same technique from Bruce Mork that solved this problem for Salford EMTP now has been applied to Salford TPPLOT : disk file TPP.BAT contains the line RUN77 TPPLOT.EXE . For new users, there is no confusion. But old users are reminded of the necessity to remove TPP.EXE because otherwise TPP.BAT will not be used. We have seen the problem before: a .EXE file takes precedence over a .BAT file if both exist. The first victim of this confusion would seem to be Mr. Mork himself as reported during the 2nd week of April. So, be careful, users, it can happen to the best of you!

There has been further consolidation of explicit plot commands in order to reduce the size of the yellow MENU. The first entries to be removed were FONT and PURGE, during the weekend of March 21-22. For mouse users, FONT is now a subcommand to LABEL : it is

another alternative in the heading line of the LABEL window. Otherwise, operation is unchanged. PURGE has been subordinated to PL4 at the same time it has been generalized and renamed to DELETE .

The new DELETE alternative of the PL4 command allows the mouse user to assemble a list of .PL4 file numbers interactively. This is a list of disk files that then can be deleted by a single subcommand. Operation was modeled after the interactive selection of output variables from the CHOICE display using a mouse. Alternatives BACK, FLUSH, and ABORT allow the correction of any error during the assembly of file numbers. It now is quick and easy to delete a handful of .PL4 files. Before, each file to be deleted had to be connected one at a time, and this was tedious for more than one file. This is just one more small indication that the *mouse revolution* continues.

The LEVEL command still appears in the OUTPUT submenu, and it could be used separately in a command file if needed. But the interactive mouse user will find it easier to use this latest addition to the CURVE window. Recall that there is one entry for every curve, so the change is natural. If numbers are visible, the binary flag for a table of level crossings is on. To turn this off, the user merely clicks on the OFF button, and he will observe that the numerical values disappear (the line become blank). This is different than any of the other entries of the level command, so is worthy of note.

The EXTREMA command produced a table in which the second of two variable names of a branch quantity was incorrect if polarity reversal was involved. Bruce Mork in Fargo first called the problem to the attention of your Editor on March 30th, and the problem was corrected later that same day. To see the symptom, use DC3.PL4 with "# 5 -6" (the minus sign requests the 6th variable with sign reversal).

DICE is a new, partly-hidden command of Salford TPPLOT (see the .PL4 submenu in any version dated March 20 or newer). Work began Saturday, March 14, after an early morning power outage that disrupted regular work by damaging BPA's 286-based computer that is used mainly for publishing. DICE produces bar charts of the statistical tabulations (character output) of .LIS files. Printed tables are considered in order (from top to bottom). One at a time, another table is identified to the user by number and variable names, and the user is asked whether it should be plotted or skipped. Alternatively, the user can change the .LIS file or exit the DICE command.

The failure of BPA computer repairers to do their duty promptly is noteworthy. This is a problem with personal computers that now are so cheap and simple that companies no longer want to pay manufacturers to maintain them. Voice mail describing the trouble was first left with the HELP desk of BPA's computer establishment on Saturday, March 14th. After no acknowledgement through the close of business (COB) on Monday, a second, equivalent voice mail message was left late Monday afternoon, March 16th. This time, the computer establishment responded: voice mail at 6:54 the following morning provided a "track number 80447." But there was no further contact through COB Thursday, so Dr. Liu inquired of HELP Friday around 8:20 in the morning. The HELP switchboard found the record numbered 80447, and referred Dr. Liu to Ext. 5092 for more information. But the person answering this number had no record of any problem with our computer. Dr. Liu referred this person at 5092 back to the HELP desk for details! Apparently that worked because within an hour, a serviceman with a cart visited our area and removed the system unit for testing at some central site. The following Monday afternoon, March 23rd, the computer was returned in working order but without any indication of what had been corrected. Nine days of down time is **not** satisfactory.

Sending an EPSON plot directly to a dot-matrix printer rather than to an intermediate disk does now seem to work correctly using DBOS Version 2.60 as distributed by the Can/Am user group. This was confirmed in a verbal report by Bruce Mork on April 6th. We seem to have a successful conclusion to the trouble that was reported 10 months ago (see the top of page 72 of the June, 1991, issue of *EMTP News*). On the other hand, there seems to be no progress with the screen wrap-around associated with 768 by 1024-pixel screen graphics. But it works in Budapest! See Laszlo Prikler's report in March *EMTP News*, pages 57-68.

WINDOW is the new plot command that was added during the weekend of April 18-19. Contrary to what most readers might be thinking, WINDOW has nothing to do with the scrollable dialogue window of the program. Rather, it provides a gateway to what once was a separate, special-purpose window plotting program WINDOWPLT (see Section I-L-2 of the ATP Rule Book). As initially implemented (April), WINDOW is a hidden, undocumented command. Yet, two fully-commented batch-mode illustrations have been provided. The user need only key @TWO.WIN or @THREE.WIN in order to see 2- and 3-window examples, respectively. Later, there will be more work on, and writing about, this powerful and important extension to TPPLOT. About hard copy, HP-GL and POST are not yet usable for a window plot, although EPSON should work, as do **Page Up** and **Page Down** and .PCX files.

THD and RMS of the FOURIER command are summary statistics that immediately follow the table showing harmonic content. Until April 29th, these two statistics were erroneously switched. The first report of trouble came during the short course in Florida: Tom Grebe told fellow faculty member Tsu-huei Liu that the

THD value "did not look right" for his .PL4 file. On the other hand, for your Editor, the complaint was vague and second hand, so it was not pursued at the time. It was 5 or 6 weeks later that a student of the Florida course, Del Ventruello of General Electric in Birmingham, Alabama, provided a precise complaint (both statistics seemed believable, but simply had been switched so as to be mislabeled) that allowed immediate confirmation and correction. Thanks, Del!

The HPGL command is useful with the old MS Word for Windows according to Prof. Saul Goldberg of Cal Poly in San Luis Obispo, California. Where others (e.g., BPA's Gerald Lee) failed, Prof. Goldberg claimed on May 3rd to have succeeded by persistence. The secret is said to be use of the file type . HGL !

LEC and Other EMTP User Groups

LEC (the Leuven EMTP Center in Belgium) has shared its UTPF with the North American user group for the first time since October of 1990. Recall that we had sent our UTPF to Belgium for the first time since 1990 by Federal Express on January 14th (see page 6, column 1, paragraph 3 of the preceding issue). This was in response to an LEC request just before the Christmas holidays. In FAX that accompanied our UTPF, we had asked LEC for its copy in exchange. On March 20th, a floppy disk containing files dated March 10th was received. This contained only 13 of the 314 total segments of the UTPF --- apparently the only ones that had been changed. Look in the next (July) issue for further discussion of these materials, which have not yet been merged with our UTPF.

Requests for ATP licensing elsewhere in the world have begun arriving slowly. The first was validated on March 10 for a gentleman in Slovenia, the former northern province of Yugoslavia. This was complicated because an address in Germany was supplied in the space reserved for *"Mailing address of intermediary in USA who ..."* Also, rather than enclose a check, the person asked whether cash would be acceptable. This is illustrative of what has become a serious problem: attempted modification of the service that has been offered by the user group. It can not and will not be allowed. Anyone who tries to do this will be gaining nothing, and will merely be delaying our response because a letter of explanation will be required. Eventually the Slovenian found a cooperative contact in Cleveland, Ohio, who should have himself carried the materials to Yugoslavia during a trip that was to begin on April 17th. The second ATP licensee in Europe was a Hungarian doctoral student in Berlin, Germany, who was forwarded ATP materials (ATP Rule Book and computer disks) by a brother in Louisiana. The first European company to approach the user group through its American subsidiary is Siemens of Germany. On May 1st, Siemens Energy and Automation of Jackson, Mississippi, inquired about Salford EMTP, and was mailed the usual information.
So, it looks like the new system is working for those who want to take advantage of it.

The Korean EMTP Committee (KEC) was *"established on 15 July 1986 and at present it is composed on 25 members (each member stands for his organization) ..."* according to FAX from Tae Won Kwon, Manager of the Power System Department of KEPCO , dated April 2nd. It would appear that KEC operation is compatible with Can/Am principles. To simplify ATP licensing in Korea, it was proposed on April 11th that KEC modify the 6-page form letter dated January 30th that is used in North America.

Printed copies of this newsletter finally were distributed to foreign user groups and cooperating individual developers during a 6-day period that began April 11th. Issues begin with January, 1990, and end with April, 1992. The corresponding disk files of all issues except the first are available, although they have not yet been distributed. Any recipient of these who has his own copy of WordPerfect might be tempted to reprint from the *.WP5 files, of course. Just be aware that Glyphix soft fonts by SWFTE International, Ltd., have been used, so most likely any other soft fonts will not result in precisely the same layout of paragraphs and lines (this is tricky). Printing from the photocopy probably is preferred unless one has the Glyphix fonts. To browse or search such files without concern for fonts and other variations of the basic ASCII characters, the simple and quick utility WP5LOOK by David Seidman is available (see the next issue for details). As Co-Chairman Liu demonstrated, an equally effective technique for WordPerfect users is simply to kill the columns so that the full 80 columns on the screen will be used for display. This is very simple. Use the F11 key ("Reveal Codes") to locate and delete the control [Col Def:Newspaper ....] that immediately precedes the first column on the first page.

More about Electronic Mail (E-mail)

CompuServe advertising covers page 183 of the April issue of Byte magazine. This was pointed out by BPA's Fred Elliott, who was mailing a request for more information on April 13th. Information about fees should be of interest to everyone: *"For a low one-time membership fee and $7.95 a month, you can use our most popular services as often as you like: news, sports, weather, shopping, reference materials, our electronic mail service of up to 60 messages a month, and more."* Of course, it is the final item that is of the greatest interest. When told of this on April 29th, Laurent Dubé confirmed that this is the same offer about which he had informed your Editor weeks ago. He received details in the form of "junk E-mail" one day while logged into CompuServe, and

subscribed immediately. EMTP developers at BPA are wondering why BPA could not do the same thing. This is current thinking about E-mail: Forget about grand schemes that would involve network access and high-speed links. Instead, begin small and simple to demonstrate enormous value for the cost. Mr. Elliott's photocopy was passed to the ADP Coordinator for System Planning, Laura Young, along with this recommendation. Before your Editor pays $100/year out of his own pocket, we want to give BPA's computer establishment one last chance to make a reasonable decision about E-mail.

The Great Newsletter Purge II

This is a continuation of the story in the preceding issue about purging the mailing list for this newsletter (see the final paragraph on page 9). As time passes, more thoughts have occurred to all concerned.

First, a surprising number of ATP users who are active contributors failed to request a renewal of their subscriptions. The best example probably was Prof. Ned Mohan of the University of Minnesota , who continues to apply EMTP creatively to problems of power electronics. For example, read the story in column 1 on page 13 of the preceding issue. The user group cooperated with Prof. Mohan's short courses last summer (San Diego and Dallas), and will be doing so again this summer in Seattle (see separate story). Clearly, we want Prof. Mohan to receive news about ATP, so his subscription was extended in spite of the missing request. Power Technologies represents a second example. See the closing paragraph of the preceding issue for PTI's most recent contribution. To conclude, active contributors were accorded special, privileged treatment that is not available to the general public. Readers who do not appreciate the reason for this are advised to think of our user group as *The House Bank* in our nation's capitol, and the active contributors as Representatives who have been kiting (i.e., writing) bad checks!

Multiple subscriptions for the same plant of a company, or campus of a University, have been a continuing problem. Somewhat arbitrarily, we select whom we believe to be the better contact, and refer all others to that first person. Remember, readers, it is the obligation of the principal contact to make ATP materials available to others of the organization who have interest. If this is not working as intended, let us in Portland know. It is easy for us to switch from some deadbeat to a more promising alternative --- but only if we are informed of the problem.

Although not a problem particular to newsletter subscriptions, your Editor nonetheless will take this opportunity to explain a more critical policy regarding individual requests for anything. This resulted from four individual requests for MS-DOS versions of ATP that arrived earlier this year from Littleton and Aurora, Colorado. Eventually, it was learned that all were inspired by a class that was being given at Metropolitan State College in Denver. Although the four Denver-area requests were filled eventually, this should be the last time that your Editor wastes valuable time and effort in this fashion. In the future, an institutional name (company or university, typically) will be asked of any person who requests materials. We simply can not take the time to supply redundant copies of anything.

Mohan Course in Seattle July 16-17

Prof. Ned Mohan of the University of Minnesota will be giving his 1.5-day EMTP short course in Seattle, Washington, immediately following the IEEE PES Summer Meeting. This course is scheduled to begin at 13:00 on Thursday, July 16th, and run through 17:00 the following day. Due to difficulty obtaining space (including rooms for students) at a reasonably-priced hotel downtown, it was decided to move the course to the airport. The address is to be: Radisson Hotel; 17001 Pacific Highway South; Seattle, Washington 98188. Telephone numbers for hotel reservations are: (206) 244-6000 or (800) 333-3333. Advertising from Minneapolis says: *"In addition to complimentary shuttle service to and from the airport, amenities include a restaurant, outdoor pool, sauna, and exercise room."* Faculty is expected to be larger than ever before. Prof. Riaz, the rotating machinery expert, and Dr. Liu expect to participate. This is in addition to those who always have: Profs. Mohan and Albertson, John Kappenman of Minnesota Power, and your Editor (Dr. Meyer).

Advertising has been reduced to a single sheet of paper, although that sheet has been expanded to legal size (8.5 x 14 inches). As a first for US-based ATP short courses, Prof. Mohan decided to mail to IEEE PES members in Europe (some 1500 in number). Of course, it remains to be seen whether significant numbers respond. ATP materials including the printed Rule Book could be made available at the course to ATP-licensable persons who come from afar if the need were known ahead of time. Also, Salford EMTP files could be copied for any ATP-licensable person Thursday night, so students are encouraged to bring four blank (but formatted!) 3.5-inch, 1.44-Mbyte disks.

"Computer Exercises for Power Electronics Education" is the name of Prof. Mohan's workbook that is sold by University of Minnesota Media Distribution. If interested in this popular soft-cover book and associated set of 63 EMTP data cases, do not write or call Portland. We have nothing to do with it. The book and accompanying floppy disk can be obtained only from Minneapolis. To telephone for more information, anyone answering (612) 624-7906 should know about the product, although Sheri Carlson

may be the most experienced. To send FAX, use 626-2376. To write, the postal code for the University of Minnesota is 55455 within Minneapolis.

Multi - Phase Transformer Modeling

Both North Dakota State University in Fargo and Seattle University in the state of Washington now are working under contracts with BPA on different aspects of the same problem of simulation: the low-frequency, nonlinear modeling of multiphase transformers. In the previous (January) issue, only specifics of the NDSU contract were available. Those for Seattle University now can be added. As a private university, a regular, full, BPA contract (as opposed to the simpler and shorter intergovernmental agreement) apparently was required. Having number DE-AC79-92BP26702, this contract became effective April 20th. Both contracts provide for about half a man-year of work.

The work in Fargo and Seattle is expected to be complementary rather than similar and competitive. Later, more precise technical details should be made available by the researchers themselves. But here, in the limited space of this newsletter, only the philosophy of the two contracts will be summarized.

In Fargo, Prof. Don Stuehm and former doctoral student Bruce Mork will be developing EMTP models for transformers based on laboratory measurements of several distribution transformers. Although a lot of data already has been accumulated in recent years, a new, 5-legged, stacked-core transformer rated 150 KVA should be studied as part of the contract. The end result that should interest the average program user the most is expected to be templates for EMTP data to represent the transformers. There also should be rules that will allow approximation of parameters that might not easily be obtained for higher-power transformers of the industry. To summarize, those in Fargo will be working in their high-voltage laboratory, and with EMTP data rather than EMTP code. At the end of the contract (August?), Bruce Mork should fly to Portland for a public presentation of results. Most likely this will be held in the BPA headquarters building, and the general public will be invited. Look in the next issue for more information if you might be interested in attending.

In Seattle, Prof. Xusheng Chen will begin by interfacing to ATP his own, existing, separate, independent FORTRAN program that represents just a single transformer. Whereas in the past Prof. Chen could simulate little more than a single transformer, the graft of his program to EMTP will allow the one transformer to be surrounded by an arbitrary electric network. For test purposes, this should be general enough for Prof. Chen to study important cases of the industry --- including those that should be studied by researchers in Seattle. This should allow independent scrutiny and criticism of the results from Fargo. Yet, Prof. Chen need not be the sole critic of the project! BPA welcomes the contributions and participation of other knowledgeable ATP users who have access to an Intel 386- or 486-based computer (only object files or an executable version of Salford EMTP will be made available by Prof. Chen). Specifically, it is expected that researchers in Fargo, and Bob Meredith of New York Power Authority, will be among the first to be supplied with the Chen-modified program. Any other interested readers are advised to contact your Editor at BPA : (503) 230-4404 for voice or 230-3212 for nearby FAX .

Note that Prof. Chen will be available during the IEEE PES Summer Meeting, which will be held very close to his school in downtown Seattle. The timing is ideal. University stationary gives the address of the Electrical Engineering Department as Broadway and Madison. Should a general meeting of developers also be held on this site (we are thinking about it)?

Florida ATP Short Course March 9 -13

Prof. Dennis Carroll's annual EMTP short course was given on schedule during the second week of March. In spite of less than booming times and the lack of expected mailing to IEEE PES members (see column 2 on page 9 of the previous issue), 17 students showed up. So, there was no problem with finances!

The Can/Am user group copy of the Salford DOS extender, DBOS / 486 Version No. 2.60, was received from Salford distributor OTG Systems on Thursday in time for its testing and distribution to all students. To be used henceforth is this new license number 2-000902 (hereafter referred to simply as license number 902). Thursday, March 9, 1992, then, marks the official and final end of the previous Can/Am attachment to LEC.

A color VGA monitor was used by each student this year for the first time. The last of the old amber Hercules monitors finally has disappeared. This is an important detail because Salford never was compatible with Hercules graphics. Each computer had a mouse (different species were observed) that functioned correctly with Salford TPPLOT.

Overhead projection of the instructor's computer, and dot-matrix printers, were the only remaining monochrome displays. This projection was crisp and bright VGA, and the mouse worked perfectly with Salford TPPLOT, so it would be hard to complain.

Unlike the preceding year, Intel Erratum 21 was not observed on any computer at any time during the course. Whether the newer DBOS/486 deserves credit for the

perfect Salford EMTP execution is not known. The trouble comes and goes for old hardware that has not been corrected (e.g., using an Ironwood card as used at home by your Editor). Curiously, the most recent complaint comes from Leuven which recently upgraded its Salford FORTRAN compiler. It is a Toshiba portable, the older model 5100, that suddenly would fail during EMTP execution. The error message mentions possibly not having a D-step chip. By telephone, your Editor assured Guido Empereur of LEC not to worry, that this was a very old problem.

Networking was available at the course for the first time. This is an important development as learned during 1988 and 1989 summer courses at Cal Poly in San Luis Obispo. Dr. Liu reported that it had been used to load software on student computers by course management. For the record, the first Salford EMTP user in North America to report successful coexistence of Salford DBOS and networking was Prof. Carroll.

Rotating machinery was an important, new subject that was covered for the first time at the course in Florida. This began with graduate student Yin Yuexin, the former LEC employee, who lectured on the U.M. Tuesday afternoon. Prof. Carroll lectured the Type-59 S.M. Friday morning completing a total of some 4 or 5 hours of lectures about rotating machinery.

Boris Lerner was the new (different) laboratory manager who gave the Monday morning introduction ("This is a floppy disk"), and maintained computer equipment throughout the course, which went well. Fortunately, every year there seem to be fewer problems, surprises, and compromises. Once again Prof. Carroll was understood to be happy with the result, and prepared (after a year's rest!) to repeat the offering next year at about the same time.

No ATP Short Course in Madison !

Having concluded observations about our preferred EMTP short course (preceding story), your Editor will write a few words about another course --- one that is **not** recommended for the average ATP user. This is the EMTP short course that is offered every summer by the University of Wisconsin in Madison.

The tradition of obfuscation in matters related to the DCG / EPRI EMTP would seem to continue in advertizing that reached your Editor during February. The Program Director, Prof. Willis Long, would seem to be responsible for content. Nowhere in the 4 pages of detailed description of the course is there any mention of which version of EMTP will, and will not, be used for the course! The advertising mentions many other details about the course such as the Cash Bar at 6:00 on June 17 in the Wisconsin Center, which has address 702 Langdon Street! Or consider the typical boilerplate of Affirmative Action : *"UW - Madison provides equal opportunities in employment and programming, including Title IX requirements."* But somehow advertising never mentioned which computer program was to be used for the course, which happens to be entitled *"Power Systems Analysis Using the Elecromagnetic Transients Program."* **The** EMTP ? **Which** EMTP, Professor?! Is the DCG / EPRI EMTP such an embarrassment or liability that its use can not even be revealed to potential students?

The reader is encouraged to contrast the Madison advertizing with Prof. Dennis Carroll's description of ATP and Salford EMTP as used for his own short course at the University of Florida. Prof. Carroll told what dialect of EMTP he was using in his 2 pages, whereas Prof. Long did not in his own 4 pages.

The closest Prof. Long comes to acknowledging his predicament (of being tied to the commercial EMTP of DCG and EPRI) is a single sentence. Under a blue headline that reads *"You Can Benefit"*, Prof. Long's advertizing boldly proclaims that *"users of any version of EMTP can benefit from this course."* Taken literally, the statement probably is true. But then, it also would be true to claim that EMTP users could benefit from a free trip to the public library!

Such tricky wording brings to mind the current slogan of supermarket giant Safeway: *"See the difference and expect the best."* The implication is that Safeway **has** the best, and that its customer can see this. But in fact, Safeway's slogan does not state this at all! Returning to EMTP short courses, that alternative visit to the public library would have the advantage of costing a whole lot less than $250 per day (which seems to be about the average rate for EMTP education in Madison).

For the record, the resident faculty in Madison are **not** licensed to use ATP for Prof. Long's EMTP short course! With one exception, no faculty member of the EMTP short course in Madison is licensed to receive ATP information of any kind, for any purpose, at any time. The only exception is Dr. Kurt Fehrle, who **is** a licensed ATP user. But Dr. Fehrle is not authorized to convey ATP information to any other faculty member. Dr. Fehrle will **not** be using ATP at the course in Madison, nor will he be disclosing any ATP secrets (classified information) during his lectures there. Dr. Fehrle is encouraged to notify students of the existence of Salford EMTP, however, as he has in the past. Conclusion: do **not** attend the course in Madison to learn how to use ATP since most details about ATP are prohibited by law from being taught there.

News about Laurent Dubé's MODELS

The variable-dimensioning of MODELS was given priority following Laurent Dubé's return to Portland from Europe on April 20th (he left Portland March 26th). Your Editor and Mr. Dubé agreed upon the corrected design for storage of MODELS variables during discussions April 29th, and Mr. Dubé delivered his 3 modified UTPF segments May 3rd. Any version translated on or after May 5th offers this important structural advance. Simulation tables of TP3 have been reduced from LTLABL = 444863 4-byte words to 227363 words as a result (important progress).

The inclusion of MODELS error messages within the EMTP framework (KILL codes) is to be the next task for BPA contractor Dubé. Principles have been agreed upon (no theoretical problems). Yet, the handling of MODELS text, which temporarily has been placed at the end of regular EMTP data of BENCHMARK DC-68, will be a big job. The work is straightforward, but demanding of time. Well, the time for such industrial-strength improvements is long overdue. Readers can expect important changes to MODELS during the final 2/3rds of 1992.

List Size 28, which documents the non-character storage used by MODELS, finally is shown as part of the heading that begins EMTP execution. This began April 30th. Previously, List Size 6 began a row of 22 numbers (for 132-column output). List Size 6 has been moved to the end of the previous line (which was shorted to make room) in order to allow the addition of one more number at the end. Also, the field widths have been adjusted to ensure that adjacent numbers of TP20 are separated by at least one blank (previously, 3 or 4 pairs of numbers ran together).

LINE MODEL FREQUENCY SCAN

Co-Chairman Liu has finished moving the code of her LINE MODEL FREQUENCY SCAN (LMFS) from BPA's EMTP to ATP. While awaiting her own 486-based PC with the Salford FORTRAN compiler (a better environment for both development and EMTP usage), Dr. Liu employed equipment that has been left over from years past. Initial debugging was done using her old Sun-3 workstation that also offered a window to VAX / VMS computers (but difficult editing of VAX disk files). Only after operation seemed to be correct using these two systems was the job passed to your Editor, who then applied the *Salford test* using his 486-based computer. As expected, several local variables that had not been SAVEd, but which should have been to satisfy other computers, were discovered. Also, special installation-dependent code for SUBROUTINE HEADFS had to be written in order to support the preferred C-like .PL4 files (which are being used). Finally, on March 27th, victory over insects (bugs) was declared.

LMFS data structure for ATP is different than it was for BPA's EMTP, so considerable explanation and illustration is required. Although the concept and general principles are unchanged, details for ATP differ from what was originally published for BPA's EMTP (see the paper by Hasibar, Goldsworthy, and Liu in the March, 1990, issue of *EMTP News*). New instructions have been written by Dr. Liu, and the plan is to make these available via *EMTP Memorandum* (published by BPA) . Critically important for the average user are illustrative data cases and program output. Initially, these can be found on the GIVE2 disk of Salford EMTP distribution as a file FSCAN.ZIP. Included are output files *.PL4 and *.LIS corresponding to both single and double-circuit examples (see input data files FSTHREE . DAT and FSDOUBLE . DAT) . Although the single-circuit output is unverified as first created on March 28th, the double-circuit illustration has been carefully checked by Dr. Liu.

Do not worry about DISK PLOT DATA (to change the sign of LUNIT4) because it makes no difference whether this is used or not. LMFS is a special case of FREQUENCY SCAN which forces plot data to be written to disk rather than stored in RAM as the user might want. This is just one of many program restrictions that probably could be removed at some later time if there is interest. As far as your Editor can recall, there is no fundamental reason that would prevent the storage of plot points in RAM .

Printed (.LIS file) output of LMFS has not yet been optimally encoded as the initial program release is made on March 27th. Yet, this is a natural and obvious enhancement. With the number of columns fixed at 12, width is at a premium. Until optimal encoding, precision of most printed numbers is less than it could be due to use of FORMAT (E11.3) .

Network loss P_{loss} appears at the end of a single line of output following each phasor solution. For either ordinary FREQUENCY SCAN or LMFS , this has been modified in three important ways: 1) the blank following line has been eliminated (a big waste of vertical space on screens or printers in cases of many frequencies); 2) each line shows the associated frequency in Hz; and 3) each line is numbered. The latter two items are important for LMFS because there is no other output during the frequency scans. With numbering and frequency, the user knows precisely where the solution is at any moment (assuming output is sent to the screen).

C-like .PL4 files of FREQUENCY SCAN were corrected on May 2nd following telephone conversation with Del Ventruello of General Electric in Birmingham. Your Editor was trying to demonstrate that there was no general problem by modifying DC51.DAT to create a

.PL4 file that then would be plotted using TPPLOT. To his astonishment, TPPLOT issued the warning about an inconsistent header, and showed a negative beginning time (frequency). The logic to create the header was made correct for LMFS, but not regular FREQUENCY SCAN ---- until May 2nd.

Intel Microprocessor Selection

Intel-compatible choices of the future are the subject of a column entitled *"Picking a microprocessor gets more complex."* By Peter H. Lewis of the New York Times News Service, this was printed on page D3 of Portland's daily newspaper, The Oregonian, on March 17th. So where do Intel-compatible computer users go from here? Mr. Lewis explains that the progression *"... is no longer easy to predict."* He quotes Dean McCarron of a market research firm who says that *"in a couple of years you'll have 25 to 50 different choices in microprocessors, just in terms of what the PC is based on."* Intel's clock-doubling i486DX2 (25 MHz externally but 50 MHz internally) is said by Tandy to operate *"about 70 percent faster than"* than its regular 25-MHz computer. The double-precision, CPU-bound EMTP might be expected to perform even better. According to columnist Lewis, *"Intel is expected to introduce this summer an entirely new family of chips, code-named P5. Many analysts suspect that P5 eventually will be rechristened the i586 ..."* Then there is the 386 SLC chip which is said to be *"based on Intel design, but IBM has souped it up for higher performance."* AMD's penetration of the 386-based clone computer market is said to be 20%, and *"soon it will not be the only computer company cloning Intel's chips. Chips and Technologies ..., Texas Instruments, Cyrix, Nextgen, and perhaps others have said they will offer 386-like chips."*

Miscellaneous Small Items

Publisher's Powerpak by Atech Software is a collection of soft fonts that first was described a year or so ago at the time of purchase by Dr. Liu for home use. A dominant advantage over SWFTE Glyphix fonts as used to publish this newsletter is that virtually any printer (including dot-matrix printers) is supported. The good news now is that the price of Powerpak would seem to have dropped dramatically. Page 160 of the March, 1992, issue of *Computer Shopper* was sold to Software Add-ons, a company that advertises hundreds of products and their prices. Dr. Liu noted Publisher's Powerpak among these for just $44. It's amazing how competitive this market has become. Last year, we thought it was a steal at $75!

A new virtual CDC (Control Data) translation is being worked on in cooperation with the Harald Wehrend of the University of Hannover in Germany. Look for a separate story in the next (July) issue.

Dr. Mustafa Kizilcay has reported trouble with the review of his IEEE PES paper that was submitted for presentation this summer in Seattle. Although the paper is being reviewed as submitted, it will require reprinting with a larger font if it is accepted. Of course, reprinting is easy using WordPerfect and a laser printer, so this is no serious problem. But it does raise an interesting point: with proportional spacing, how does the PES limit of a certain number of characters per inch apply? The author's guide clearly has not kept pace with technology (characters of uniform width are the exception rather than the rule today). Clarification by any knowledgeable reader would be appreciated.

Harald Wehrend of the University of Hannover supplied a simple 2-winding case involving ACCESS MODULE BCTRAN upon which Salford EMTP sometimes would choke. For some hardware, Salford EMTP would quickly terminate with a floating-point exception. Although the code in question, SUBROUTINE BCTRAN , had been compiled with /DEBUG , execution was conventional: RUN77 TP3. After normal output associated with the reading of data cards, the Salford debugger would open its little window and complain of *"Invalid floating point number .... in BCTRAN at line 1092."* Following Esc one would see the execution arrow pointing two lines above S.N. 4216 to: RWIN2(K3) = RWIN2(K3) - H1 . Using PRINT quickly revealed that H1 is normal, K3 has value 3, and RWIN2(K3) has value "*Invalid*" (usually meaning that the variable in question never was initialized).

C-like .PL4 files as connected automatically by Salford EMTP (as opposed to being connected by the user in CIMAGE to satisfy $OPEN) no longer are overlaid. The problem was analyzed by Bruce Mork on 19 Mar 1992, and corrected immediately (SYSDEP always deletes before opening). The same day, Prof. Saul Goldberg telephoned with the same question ("I wasted about an hour before figuring out that an old .PL4 file should be erased before a new one of the same name is created.").

The BOTH command at the beginning of EMTP execution no longer (after March 28th) results in duplicate output being sent to the screen prior to the prompt for a disk file name. Bruce Mork in Fargo first noticed the year-old phenomenon a few days earlier, and he mentioned it thinking that it was an error. Your Editor explained that it was not. But thereafter, every time the duplication would be seen by your Editor, it seemed to be more of an irritant than it was previously. So, Mr. Mork deserves credit for being the catalyst that finally prompted your Editor to do the additional programming that suppressed the redundant screen output without slowing subsequent output at all.

Careful validation of all BENCHMARK DC-XX test cases occurred for Salford EMTP during the weekend of March 28th and 29th. This involved the comparison with

other Salford EMTP solutions dating to April and September of 1991. Mike Albert's superior DOS shareware utility FC.EXE was used. Recalling that the September solutions were not all compared with the April solutions, this means it has been 11 months since such an exhaustive verification has been performed. Well, finally we are current.

Load flow output corresponding to each power constraint is requested by giving NPRINT a value of unity. Well, prior to April 2nd, this did not work properly for multi-phase power constraints. Two days earlier, Prof. Juan Martinez in Barcelona, Spain, had advised your Editor that he could see the trouble himself using Salford EMTP after changing NPRINT to unity in the first subcase of DC-26. It was true: execution terminated within load flow SUBROUTINE FXSOUR with an illegal floating-point operation. After studying the trouble, correction was easy enough: the addition of one line of FORTRAN to define the otherwise-undefined local variable D16 .

$PUNCH and $STARTUP declarations are separated from file names that follow by one comma. In the past, the file name that followed the first comma could not be terminated by a second one. If it were, program execution would end after a short error message from CIMAGE. Why? The prohibited ending comma has been a source of confusion for some time. Users often terminate free-format numerical values with one or more extra commas (just to be sure), so the tendency to add a trailing comma to a file name is understandable. Beginning April 17th, this has been legalized. Now, any trailing commas are identified and erased within the file name prior to its use.

BPA has decided not to use DECstation to support EMTP. This was the good news conveyed to EMTP developers on March 24th by Dan Goldsworthy, Acting Chief of the Analysis Section. Gene Davis is expected to swap his DECstation 5000 for the VAXstation 3100 now used by BPA Power Flow developer Jay Coleman. To conclude, BPA will not be writing installation-dependent ATP code for DECstation. Nor will it even complete the validation of test cases.

BPATOATP is a utility that has been written to convert BPA EMTP .PL4 files into FORMATTED ATP .PL4 files. Although BPATOATP could be used on any computer, the practical use is on VAX / VMS computers at BPA. The inspiration for this new utility came from Timothy Tibbles of Schweitzer Engineering Laboratory in Pullman, Washington. Schweitzer wanted some 129 of Dan Goldsworthy's .PL4 files. But Schweitzer does not use BPA's EMTP which produced the .PL4 files, nor does Schweitzer have any computer that runs VAX / VMS. So, it was agreed that the universal FORMATTED alternative of ATP would be used for the transfer of BPA signals to Schweitzer.

The 79-page March issue of *EMTP News*, the quarterly journal of LEC, is being reprinted on May 3rd at the same time as this issue of the newsletter. It should be mailed as soon as copies are available. Your Editor must admit that Dr. Liu was right when she said that he exaggerated the required effort. In fact, the burden was easily manageable. Yet, the reason was quite unexpected : only two subscribers remain!

Final editing note: Some 3 pages of stories that were either incomplete or less time-critical have just been transferred to the following (July) issue on May 3rd as this present issue is being rushed to printing. The decision was made to trim in order to allow mailing in a normal legal-size envelope with a single 29-cent stamp. Note 10 pages are possible (a first)!