Can / Am EMTP News

Voice of the Canadian / American EMTP User Group

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Salford Compiler and DOS Extender

Anonymous DBOS is a recent improvement, as Salford Software de-emphasizes DOS-related tools while adapting to Win32. Previously, DBOS was licensed to a particular organization or person, and there was a serial number (see the January, 1992, issue, for mention of the user-group's first license number 902). Well, no longer for version 3.16 as supplied by Thomas Field of Nashville Electric in Tennessee. Received August 10th, this version of DBOS outputs a line that reads *"Serial number,"* but no number is to be found; and where the licensee normally would be named, one sees: *"This copy of Salford DBOS is licenced for use as a run-time system only."* But does the newer DOS extender solve any previous problem of graphic incompatibility? Recall your Editor speculated as follows last time: "Maybe current Salford logic better accounts for graphic cards that have been introduced during the last 3 years." Unfortunately, no improvement was seen using Dr. Liu's 486 DX2 / 66 at BPA . TPPLOT graphics were generally invisible using version 2.71, and this remains true using the new version 3.16 of DBOS. September 11th closure: the replacement 486 (see later mention of Pentium and Windows NT) seems fully compatible with DBOS version 2.71 as distributed to others. Both ATP and TPPLOT graphics are visible using standard VGA (all that is needed). Hallelujah!

The GRAPHICS file was substantially changed by BPA's Dr. Tsu-huei Liu to provide better control over colors of the different CALCOMP PLOT outputs. This is a continuation of the story last time about HP-GL for brain-damaged MS Word for Windows. The default background color of bright white places new demands on the choice of colors. For example, yellow and green are great colors on a black background, but are hard to see on a white background. So, separate controls are provided beginning August 21st as the revised Rule Book chapter H01E.WP5 soon should clarify. As distributed by the user group, screen plotting should be unchanged from past months and years. About the Rule Book, the reader having interest is referred to Prof. Bruce Mork's aFTP server at Michigan Tech in Houghton, of course.

MOUSET of STARTUP is used to indicate whether or not the mouse is to be used. Unfortunately, avoidance (the zero choice) was not possible prior to correction on September 30th in response to a complaint by Prof. Laszlo Prikler of the Technical University of Budapest in Hungary. Mouse buttons were not being checked, but the cursor could be seen at the opening prompt, and its location moved with the mouse. Prof. Prikler observed some highly-disturbing symptoms while attempting to use a higher-resolution display : *"using a 132-character display in a VESA mode, ... I have at least 6 or 8 mouse cursors in different colours at the same time; and moving the mouse, I see nice colorful garbage. Each mouse movement generates a new mouse cursor, but the old one remains also visible."* So, avoidance of the text cursor is important for some, and it now is possible.

Unexpected keyboard characters should be ignored at the opening prompt beginning October 3rd. This follows yet another of Prof. Prikler's observations: if he pressed one of the arrow keys at the opening prompt, Salford EMTP would crash. What was happening? The arrow keys are used for the windowed environment of SPY, and the program was attempting to scroll a nonexistent window. The solution was to ignore all window-related keys if no Salford DBOS windows are open.

Salford execution under Win95 or WinNT (as opposed to DBOS) has some unfortunate limitations according to Salford's June newsletter *Source File*. The second question of *Questions and Answers* on page 3 mentions *"a stack fault when I try to run under Windows NT."* The answer shows superiority of DOS : *"Under DBOS, the pages used by your program are 'demand paged'. .... DBOS treats all memory as demand paged. This is true for both stack and heap memory. Under Win32 we must live within the restrictions placed upon us by the operating system (Windows 95 or Windows NT)."* Salford proceeds to show how modification of the code avoids the problem. But why bother? *If it ain't broke, don't fix it* (who needs this Win32 aggravation?).

PostScript output of CALCOMP PLOT usage is produced by code that comes from Robert Meredith of New York Power Authority (NYPA) in White Plains. On August 30th, the last of this was modularized without changing results. Neither BPA's Dr. Tsu-huei Liu nor your Editor understands the nuances well enough to constructively change the PostScript that Mr. Meredith creates. But the need to simplify maintenance for several different translations is understood well, and this imposes structural demands. Finally, Salford screen plotting has been separated and isolated from both PS and HP-GL with PSGRID being the final separate module. Beginning in September, all 3 possible plot outputs are done separately, using separate modules in most cases. No doubt execution is slowed somewhat -- particularly for drawing the curves themselves, since three separate modules (LINEXX , PSLINE, and HPLINE) now are used. But nobody much cares. Those who use plotting will just have to pay for what they use. Plotting is so fast anyway that speed is not believed to be much of an issue any more. Easier support for several platforms is believed to be more important, and this provided motivation for the changes.

Positive LU6VRT in STARTUP was required to have PostScript output parallel to the input data file. This was prior to reform of SYSDEP on Sept 11th. With zero LU6VRT, the internally-generated name POSTPLOT.PS was being used. But this contradicted the idea of negative KTRPL4 resulting in all output files being parallel to the input data file. LU6NAM is the storage involved, and this now is being defined whether or not LU6VRT is positive.

YHLOFF of GRAPHICS was one of the parameters that control PostScript output by Robert Meredith of NYPA (New York Power Authority in White Plains). It served to locate the horizontal-axis label (e.g., milliseconds), and this function is preserved. But its sophistication was raised on September 23rd when it was converted from absolute inches below the axis tic marks to lines below the numbers. For example, the 1.6 as distributed by the user group is a compromise between single-spacing (1.0) and double-spacing (2.0). There should be 6/10ths of a line of blank space between the axis numbers and its labeling. Note that the new control is independent of the height of the lettering.

MS-DOS SCANDISK might be incompatible with /DISK_CACHE of Salford DBOS. This possibility was confirmed by Prof. Laszlo Prikler of the Technical University of Budapest in Hungary. His public E-mail dated August 28th explained that *"SCANDISK reported a couple of troubles. It has found a 'data error while reading the FAT' on disk E, an 'incorrect file size' on drive D, and a 'copy #2 of FAT was out of date' error in drive C. All errors have disappeared after unloading DBOS by KILL_DBO. Without /DISK_CACHE no error was found. .... It is also interesting that while SCANDISK reports many conflicts, the Norton Disk Doctor (my standard disk keeper) finds everything OK."*

But why use Salford /DISK_CACHE when MS-DOS SMARTDrive is available? Dr. Vitaly Faybisovich of FPS Consulting in Los Angeles had issued the challenge in public E-mail that began on August 21st. It seems that files had become corrupted, and Dr. Faybisovich had been forced to reformat his hard disk. He wondered whether this might be due to disk caching : *"It is well known that simultaneous operation of two disk cache drivers can cause file system failure .... a) Did somebody really experience filing system crash during ATP operation due (to a) SMARTDrive and DISK_CACHE conflict?"* According to Prof. Prikler, DBOS protects against such simultaneous use: *"Since the /DISK_CACHE qualifier of DBOS does not load the cache if either EMM386 or SMARTDRV or both is active, (see the first line on the screen when DBOS is loading :"..cache can not be run with VCPI/SMARTDRV.."), these components of DOS have to*

be REMoved." For the record, the user group recommends SMARTDrive over /DISK_CACHE as long as the user is not short of memory (e.g., 4 Mbytes or less of RAM). No one responded publicly with a report of trouble comparable to Dr. Faybisovich's, so it must be concluded that he has some isolated and as yet unexplained problem with his computer.

QUARTER PLOT is the declaration that allows screen plotting (possibly redirected to disk for use with Epson or LJ2 printers) to display 4 plots simultaneously in the four quadrants of the screen. This is not new (see the April, 1993, newsletter), and it continues to function as before except for one small improvement. No longer are all plot cards after the first missing in the .LIS file. Now they are only missing on the screen (when there is such output, the need to inhibit it during plotting remains). For any output that goes to disk, interpretation of all data cards associated with QUARTER PLOT should be seen thanks to a new, third status (value 2) for old switch NOUTPR as used with $LISTOFF and $LISTON .

Improvements to Salford TPPLOT

X-Y PLOT underreported the number of plot points in the lower right hand corner of a plot. This was prior to correction on July 10th in response to a complaint by Prof. Bruce Mork of Michigan Tech in Houghton. There is not yet any discarding of visually-redundant points (smoothing), so the number of points reported should equal the number of time steps that are plotted. For a single curve, 2/3rds of this value was reported prior to correction. Prof. Mork had been using 20251 time steps whereas his X-Y PLOT reported only 13500.

New Trident output cards require only a missing freeware driver to be compatible with Salford DBOS graphics. This important discovery by Cornel Brozio at the University of Stellenbosch in South Africa is detailed in a separate story.

The SHAFT command allows the user to estimate loss of life of a generator shaft as explained in a separate story.

Height of the time axis of HP-GL output was moved from the middle of the Y-axis to the zero level on July 26th in response to observation of the need by Gabor Furst of suburban Vancouver, British Columbia, Canada. The screen plot always has positioned the time axis to pass through any zero on the Y-axis, but such intelligence never was used for HP-GL logic, it was found. Mr. Furst was right (his E-mail dated July 24th first called the problem to the attention of developers in Portland). It is curious that HP-GL output for the case of X-Y PLOT had the axis repositioning, but somehow this was not extended to time plots. So, in fact, the code for axis repositioning did not need to be added; relocation of an IF-statement that bypassed the code was all that was required. Any users who might be disturbed by the change are encouraged to make their case. If there is a good reason to prefer the original logic, the change could be made conditional (e.g., a TPPARAM switch). But your Editor can not yet imagine any such need, so the change now is unconditional.

News from Outside USA and Canada

A printed copy of the July newsletter has not yet been mailed by BPA to any of its 9 primary EMTP contacts. Is there any longer a need, with computer storage and E-mail (the aFTP servers in Houghton and Hannover)? Placement of JUL96.ZIP on these aFTP file servers was announced by Mathias Noe of the University of Hannover and Prof. Bruce Mork of Michigan Tech in public E-mail dated August 14th and 15th, respectively. Actually, it was the copy for MS Word, named JUL96MSW.ZIP by Prof. Mork, that first was made available. The WP 5.1 version was sent to both sites on August 18th following manual conversion as described in the preceding issue.

Singapore might be supplied by the Australian user group, if one can believe E-mail dated August 5th. Chan Tat Wai of Nanyang Technological University wrote from address **dchan@pacific.net.sg** that *"we get our support from Dr. Brian Elliott of Australia. Please update your WEB page to include our contact person and address as follows ...."* Your Editor's response four days later was as follows: *"Interesting. For years we have been writing that Hong Kong and Singapore were serviced from Taipei. Since any two licensed ATP users are encouraged to share information, there is no conflict; there are no ATP monopolies, now that LEC is gone (RIP 1993). If the Australians want to supply Singapore, too, the appropriate thing for them to do is send a message to Prof. Bruce Mork in Houghton. He is the one who maintains the Web page for ATP on the MTU campus."*

Japan is another area of the world where Salford EMTP and TPPLOT now are available by E-mail. A separate story documents this important initiative by Masahiro Kan of the Hamakawasaki Works of Toshiba Corp.

"419 subscribers representing 45 countries" is the way Prof. Bruce Mork of Michigan Tech summarized the success of his Fargo list server. This was in E-mail dated October 11th, which also contained ideas about improving his ATP web site. To conclude, the avalanche of E-mail usage for ATP information continues to grow beyond the wildest beginning speculation years ago.

A Web (WWW) page for Japanese users of ATP was announced by Masahiro Kan of the Hamakawasaki Works of Toshiba Corp. His short public E-mail of the Fargo list server dated August 18th contained the address **http://club.infopepper.or.jp/~kanmasahiro** Advice or comments *"will be appreciated,"* according to the author,

whose parallel home address for ordinary E-mail is **kanmasahiro@ppp01.infopepper.or.jp** So, your Editor connected later that same day, and he was favorably impressed. While the page obviously is designed for those having Japanese-language software, perhaps half of the bytes on the home page are English, and they look fine using the English-language Mosaic on Dr. Liu's computer at BPA. Following several incomprehensible Japanese-language hyperlinks, there are the following:

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ATP-EMTP Web Site of Can/Am EMTP Users Group ..
Master ftp Archive (Manual, Utility, NewsL ...
ATP User's Forum - News/Help/Information ...
Latest Licensing Form on aFTP Server at MTU
User's Groups and Distributors in the World
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The first is for Prof. Bruce Mork's ATP home page in Houghton, the second his aFTP site, the third his Fargo list server, and the fifth his summary of user groups of the world. Very nice, and useful for persons having ATP interest in Japan. Truncated on the right of the second line is added clarification that *"ATP is not included"* in the aFTP storage.

More about Electronic Mail (E-mail)

Cable modems (see the January issue) continue to offer great promise for high-end Web users. *"Cable companies step up cable-modem tests"* is the headline of a story on page 65 of the October issue of *Computer Shopper*. The initiatives of one company, Continental Cablevision, is summarized : *"Continental, which recently placed an order for 50,000 cable modems from LANcity Corp., has launched trials in several Boston-area suburbs. The cable company says it may initially price its service at $50 to $60 per month in markets such as Boston, Chicago, ... lowering prices and adding content as more subscribers sign on."* So what is this *content* about? *"... Web surfing is only the first of a line of broadband products that could include video-conferencing, multiplayer gaming networks, and even live video-streaming ...."*

"Compiled TACS speeds SVC simulation" was the Subject of important public E-mail dated November 2nd. A separate story should provide details next time.

Satellites provide another high-speed alternative for Web surfing. Advertising by GeoSat Communications occupies the entire page 301 of the October issue of *Computer Shopper*. For $849, the reader can acquire *"the Hughes Network System Direct PC with Turbo Internet"* which will assist the telephone connection with a satellite connection: *"Instead of sending all those graphical home pages and downloads back through your 28.8 modem, the information is shot down to your computer via your DirecPC satellite dish. The result: Now you can tour the internet at 400 kbps ... 14 times faster than your 28.8 modem running at its fastest."*

The history of online services is the subject of Stan Veit on page 617 of the October issue of *Computer Shopper*. Many interesting details will be found. For example, *"Then when video terminals, which were called 'Glass Teletypes' at the time, were developed and connected to 300-baud modems, we thought we were witnessing amazing speed."* Well, yes, those preceding mechanical typewriters generally were much slower (110 baud, as your Editor recalls). CompuServe, *"the first successful online service,"* had a reason for being where it is: *"CompuServe was the outgrowth of a smaller effort known as MicroNet, which utilized excess capacity of the big DEC 20 computers used for time-sharing in the Columbus, Ohio, area."*

That power-globe mailer of Purdue and Carnegie-Mellon Universities may have preceded Prof. Bruce Mork's Fargo list server, but its technical management and control were obviously inferior. Bounced mail was one of its problems as explained in the January, 1993, newsletter. Well, three and a half years latter, the superiority of what Prof. Mork has been doing for ATP finally seems to be recognized on the Purdue campus. The following public explanation by Prof. G. T. Heydt on August 7th was contributed by BPA's Robert Hasibar: *"Prof. Ramesh and I have been looking at various ways to improve the Power Globe management. The most likely scenario is to move the Power Globe to a machine that supports automated listservers -- namely allowing the subscribers and potential subscribers to change their own email addresses. .... Professor Bruce Mork at Michigan Tech University has been extremely helpful in this matter -- many thanks to him."* Then, five days later, there was confirmation of the move to Fargo : *"North Dakota State University has graciously agreed to be a host for the Power Globe."* About the importance of self-service as opposed to manual address changes, Prof. Heydt explained: *"Once when I was out for a few weeks, I had over 100 changes to make! The automated system will solve that problem."* About the transition, Prof. Heydt advised : *".... watch soon for a notation in email messages that the message is coming from .nodak.edu rather than .cmu.edu In fact, this message should come from the NDSU listserver. Many thanks to Marty Hoag at NDSU and Bruce Mork at Michigan Tech for their help in the changeover."*

"On-line airline auctions offer travelers savings" is the headline of a story on page T2 of *The Oregonian* dated August 4th. What is involved? *"Cathay Pacific is auctioning off all 387 seats on a Boeing 747-400 .... as of a few weeks ago, 10,783 bids had been made. .... American Airlines has been conducting its own silent auctions online, also as something of a promotional effort .... Perhaps more interesting .... are American's new NetSAAver fares that cover specific markets ... They are about the same -- or lower -- than the best price you could get on the same flight if you had bought the tickets several weeks in advance. The American fares are e-mailed on Wednesday for the upcoming weekend."*

America **Off** Line was the best way to describe AOL nearly all day August 7th. According to the big account the

following day on page D1 of *The Oregonian*, *"the nation's largest on-line service crashed about 4 a.m. EDT during routine maintenance and installation of a new software program. Service was restored at 10:45 p.m. EDT. .... The system failure is probably the biggest in on-line history."* Yeah, to crash is one thing; not to be able to restore service within 18 hours --- a period that included one complete business day --- is quite another. Any business that uses America On Line must be having second thoughts. The announced refund (*"customers will get a day's free service to make up for the inconvenience"*) does not begin to compensate for the damage, obviously.

300 bps was the speed of the first modems because this *"was thought to be the fastest speed you could reliably use over the dial-up telephone network."* This bit of history can be found in the "What ever happened to" section on page 598 and 599 of *Computer Shopper* for July. Yet, even these early, primitive devices did not appear until the AT&T monopoly was broken: "The first modem communications were strictly controlled by AT&T through a series of Bell specifications. AT&T rented only the data set (DA), and it required a special direct access attachment (DAA) installation at an additional cost. This constituted a stiff charge for all computer communications. ... Then the acoustical coupler was invented. Users of the acoustic couplers did not need the direct access attachment or the DA, which AT&T rented. The telephone company also refused to permit the transmission of computer data unless the DAA and DA were used. This resulted in a long legal battle known as the Carterphone Case. It finally reached the U.S. Supreme Court, where AT&T lost."

Speeds in excess of 5000 cps have been observed during the downloading of large disk files from Agora using the ZMODEM protocol under HyperTerminal of Win95. This demonstrates the effectiveness of newer modems with data compression. The average daytime speed is around 2400 cps according to the "throughput" box. But sometimes transfers run substantially faster. The 5K barrier was exceeded around 01:25 AM during mid-July using BPA's ordinary analog telephone line that dates to 1991 and acquisition of the AT&T 486 / 33 from David Szymanski.

Junk mail from Rocoil (see the January newsletter) was back September 6th. This time, essentially the same form letter was broadcast by the Fargo list server, but by another employee. Business exploiting Rogowski coils must not be very good (Rocoil seems desperate for free advertising).

"Too much junk e-mail? AOL begins crackdown" is the headline of a story on page B2 of *The Oregonian* dated September 5th. *"AOL said it has taken steps to block five sites that serve as clearing houses for the unsolicited, commercial mailings and have refused to work with the on-line service to address the problem."* But the junk mailers are fighting back in the courts. It is not yet obvious that AOL has beaten the junk mailers.

Segmentation of UUENCODE-d Salford EMTP files by Eudora was the problem of Dr. Lance Grainger of A. Comeau Associates in Edmonton, Alberta, Canada, as summarized in the preceding issue. But Eudora does not always cause such trouble, as explained by John Aspden, Network Manager of The Internet Centre (a new name for CCInet) of Corporate Computers Inc. in Edmonton. This is Dr. Grainger's Internet provider. Mr. Aspden offered the following opinion in E-mail dated July 25th : *"First, the message is being broken up because the file attachment was sent as the body of a message - it's your Eudora program which is breaking it up when it gets to your machine, because it can only handle message segments of a certain size. I don't know why it's not being flagged as a message attachment - that will depend upon the sending software. If you select all the messages and then choose 'Save' from Eudora's File menu, it will save the messages back into a single file again. If the file is a .ZIP file, chances are that you won't be able to unzip it successfully -- because it's been treated as message-body it will have been treated as text, and things like line-wrapping might have been done. If it's a UUencoded ZIP file, then you'll first have to UUdecode it, then unzip it, in which case it should be ok.."*

Old public E-mail of the Fargo list server is available for the asking. This reminder came from Prof. Laszlo Prikler of the Technical University of Budapest in Hungary. His public E-mail dated June 6th explained that *"mailings on that list are archived by the LISTSERV program itself"* since the beginning of this service in September of 1991. To obtain a copy of list server mail *"originally distributed during July, 1993, just send an E-mail to address* ***listserv@listserv.nodak.edu*** *The body of this mail should have a single line : GET ATP-EMTP LOG9307"*

A 1-Mbyte size limitation on outgoing E-mail seems to be in effect at BPA as explained in a separate story. Unfortunately, segmentation now is required to send ATP from BPA using E-mail. The good old days are gone.

Romania has provided an informative E-mail contact in the form of Liliana Oprea at Universitatea Politehnica Timisoara (UPT), who was successfully contacted using address **loprea@mb.sorostm.ro** This is not a university address, although doctoral student and lecturer Oprea has one. Her initial inquiry about EMTP was by air mail, and it showed two E-mail addresses at the bottom. Your Editor's first attempt to respond by E-mail used the campus address **oprea@edison.et.utt.ro** but the mail was returned within perhaps 10 seconds with the complaint *"host unknown .... edison.et.utt.ro ...."* So, a second attempt was made using the aforementioned home address. Ms. Oprea explained that this is provided by *"the SOROS Foundation for a Open Society .... free of charge for students or academic staff."* For those unfamiliar with the name, George Soros is the global financier who has used substantial parts of his fortune to do good deeds in Eastern Europe. About FTP use, it seems that Prof. Mork's server in North America may be more accessible than its mirror to the north in

Germany. Ms. Oprea wrote: *"I have already downloaded ATPDRAW from the Michigan Tech. Univ. ftp-server. I have better experience with sites in America than their mirrors in Europe. We can download much faster from ftp-servers in USA than in Europe (I needed 25 minutes to bring ATPDRAW from Michigan Tech ...)."*

News about TACS and MODELS

Should an IF-THEN-ELSE block be added to TACS ? This was your Editor's question in public E-mail dated October 4th in response to an inquiry by Dr. Mike Ennis of S&C Electric in Chicago, Illinois, USA, who wanted to know about *"using IF blocks in ATP."* Your Editor wrote: *"The IF statement is not yet in TACS of ATP, but perhaps could be added easily enough. Is there sufficient interest? In more general form, an IF - THEN - ELSE block of FORTRAN 77 might be provided. Would potential users be satisfied with a limitation of the new block to those 'algebraic and logical FORTRAN expressions,' with evaluation of the whole block at one point in the solution of the control network for any given time-step? I.e., the block would be treated like a TACS device (which is evaluated at one point). Who is familiar with the implementation of IF in DCG / EPRI EMTP? Are the rules of this progress public? If so, what are DCG / EPRI EMTP restrictions on usage, if any?"*

The SN=xxxx tag can be used to place a 4-digit statement number on any TACS supplemental variable or device card. Embedded blanks are not allowed, and all 4 digits should be used (i.e., make the number between 1000 and 9999). Then this structure can be placed anywhere to the right of column 11 on the first card (rather than on any seldom-used continuation card). The in-line comment symbol "{" is needed if the SN= tag is to be seen on interpreted card image. This requirement is like that of Noda frequency-dependent branch cards --- a peculiarity that later might be removed.

A new GO TO statement provides the first use of the new statement numbers (preceding paragraph). The user can not yet key GO TO, but syntax of the request is just a detail. For simplicity of programming, a special relay (a type-51 device) is being used for the internal representation. Then the unconditional GO TO was extended by allowing a conventional IF statement to precede it. Why not the more modern IF-THEN-ELSE of two paragraphs above? Your Editor explained in public E-mail dated October 14th: *"Implementation has proceeded without any knowledge of what DCG / EPRI might have done, and also without the burden of structured programming (IF-THEN-ELSE) . Instead, statement numbers (cols. 1-5) will be allowed, and both conditional (IF) and unconditional jumps to them have been provided. This is more flexible than structure, note (e.g., control can jump backwards). Of course, structure such as IF-THEN-ELSE could be allowed by a preprocessor, but such 'higher level' (also, weaker!) constructions would not be the basis of actual, internal operation of TACS. There is some similarity to the saturable TRANSFORMER (this, too, is a figment of the user's imagination, remember)."*

SPY DEPOSIT capability was added to TACS as yet another modification. This was October 13th, using yet another special relay for the internal representation. This work complements the MODELS addition earlier in the year (see the story about the Type-26 TACS source in the April issue). Also, it illustrates a more general proposition. Many features of MODELS could just as well be applied to TACS. In fact, they have nothing particular to do with MODELS at all. For example, consider those user-defined WRITE statements of the 4th subcase of DC-68 : output can be allowed by TACS just as easily as MODELS .

"Using the type-94 Norton component as a transmission device" was the title of a MODELS technical note by author Laurent Dubé that was broadcast by the Fargo list server on September 15th. It began: *"The type-94 Norton component of ATP represents the operation of a component by providing a Norton equivalent as seen by the rest of the circuit between the terminals of the component and ground. This means that when connecting this component to the circuit, only the left nodes are connected, and the right nodes are not used. A connection to ground is automatically implied. This gives the opportunity to use the unused side, the right nodes, to connect another Norton equivalent to another part of the circuit, with the implied meaning that there is a transmission delay between the two points of connection."*

The slowness of MODELS simulation was emphasized in that previously-mentioned public E-mail dated October 4th : ".... consider the static var (SVC) modeling of BENCHMARK DC-22 . The 4th subcase , originally assembled by Gabor Furst and then improved by Dr. Kurt Fehrle (see comment cards near the beginning), uses TACS. This was the original SVC representation that was added in February of 1992. Three years later, Mr. Furst converted ATP data for his simulation from TACS to MODELS, and this then was added as a new, 5th subcase. Simulated using this writer's 133-MHz Pentium using Salford EMTP (RUNTP DISK DC22. * -R), times for the time-step loop are :

	Time-steps	Wall-clock sec
DC-22d (TACS)	5400	6.099
DC-22e (MODELS)	2160	26.59

The ratio of simulation rates is an enormous 10.90 ...."

MODELS author Dubé did respond to your Editor's public challenge to either *"put up or shut up"* (concerning possible optimization of Gabor Furst's MODELS data). Mr. Dubé was able to speed the simulation somewhat, but nothing like what he claimed in public E-mail dated October 15th: *"... I looked more closely at the example, and saw that the control sections of the two subcases are*

functionally very different. The control algorithm modeled in dc22-5 is much more elaborate than the one in dc22-4. I include below a rewritten version of dc22-5, as a straightforward translation to MODELS of the TACS section of dc22-4. Results from the two data cases are identical. The speed difference is down to a factor of 4.8, as should be expected with the present version of the MODELS interpreter." The following day, your Editor concluded: *"Unless Mr.* Dubé *has benchmarked using a Pentium of moderate speed (note he wrote no such thing), he is to be charged with comparing apples with oranges. His comparison is defective."*

Your Editor's explanation continued (slightly modified in places for brevity) : Separate disk files DC22D and DC22E were created to hold the 4th and 5th subcases, and T-max of DC22E was extended to .25 seconds in order that both subcases take 5400 steps. Each case was simulated five times in succession in order to remove uncertainty about randomness. The results of these two sets of 5 trials are as follows (time spent in the time-step loop as reported in case-summary statistics of Salford EMTP) :

```
DC-22d :  6.484   5.989   6.099   6.154   5.879
DC-22e : 56.758  57.253  58.132  56.868  55.769
```

Finally, this writer simulated using Mr. Dubé's improved data (call this DUBE22) without modification. Five successive simulations of this yield :

```
DUBE22 : 45.604  42.143  42.527  43.187  44.286
```

This completes acquisition of the experimental data. Using averages from each group yields :

```
Furst  TACS   of  DC-22d :  6.121    Ratio
Furst MODELS  of  DC-22e : 56.956    9.305
Dube  MODELS  of  DUBE22 : 43.549    7.115
```

The ratio of MODELS time to TACS time, shown on the right, has been decreased from 9.305 to 7.115 by Mr. Dubé's expert recoding of Mr. Furst's original MODELS data. This is the apples-to-apples comparison for a 133-MHz Pentium. The Dubé apple is not 4.8 as he stated, but rather 7.1

MODELS is much slower than the above ratios would indicate because all times include the fixed effort that has nothing to do with control system modeling. Also, DEC Alpha running Open VMS at BPA and TransGrid displays even more of a handicap for MODELS simulation than your Editor's Pentium. More about this next time, along with a plausible explanation by NYPA of the cause, and a new standard of comparison : compiled TACS .

European EMTP User Group

The 1996 annual EEUG meeting is to occur November 10-12 in Budapest, Hungary. This may well be the largest European meeting ever, based on public E-mail from Prof. Laszlo Prikler dated 25 Oct 1996 : *"Up to now we have 49 registrations and 26 papers accepted. The Web page of the meeting has recently been updated. The URL of the EEUG Web is* ***http://www.vmt.bme.hu/eeug*** *You will find the following news there : 1) Agenda of the Meeting; 2) Time schedule of technical sessions; 3) List of papers; 4) List of participants; 5) Travel information."*

BPA Reinvention Stalled Again

The sale of consulting and professional services is the latest area of dispute between BPA management and the rest of the world. This is a continuation of political troubles that were mentioned in the preceding issue. As usual, despite its ongoing and enormous propaganda effort, management at BPA claims once again that it has been misunderstood. *"It's a communications problem"* is the explanation that is read in the column by Mike Francis on page E1 of *The Oregonian* dated August 11th.

Congress (the national politicians) again are involved. According to Mr. Francis, *"The power agency has distributed brochures that advertise its professional expertise, and the brochures have fueled the tempest in the consulting sector. .... 'They look just like the kind of thing that people in our industry put out,' said Andrew Franklin, the executive vice president of Century West Engineering Corp. of Portland. 'It seems to us that we are competing with the government.' The local professionals have complained loudly to the offices of U.S. Rep. Jim Bunn and Sen. Mark O. Hatfield, who have key roles on the committees that review the BPA's borrowing authority each year. As a result, the BPA failed to win congressional approval for its operations before the August recess, ..."*

So, why allow BPA to continue at all? Why not end such conflict by liquidating BPA? *"In an ideal world, we could talk seriously about pulling the plug on an agency that in some ways has outlived its purpose. But in the real world, the BPA is too big to disappear, with stewardship of too many regional assets and obligations to too many creditors,"* Mr. Francis explains. Yes, it would seem to be those **obligations** that particularly trouble the politicians in Washington. BPA's huge debt provides almost-invincible protection. Under current law, the net asset value of BPA probably is negative. BPA could not be sold profitably to anyone. At the same time, BPA is immune from the mergers and hostile takeovers that have swept the private sector. BPA could never actually go bankrupt, of course, no matter how irresponsibly it might be managed, because its owner, the U.S. government, prints whatever money is needed (another sort of irresponsibility)! What a deal for the wacko reinventors in Portland.

Meanwhile, blackouts involving BPA have proven to be embarrassing to all in the region. WSCC (the Western Systems Coordinating Council) is a weak association of the dozens of different systems involved from the Rocky Mountains to the Pacific Ocean. It is supposed to insure that blackouts do not happen, of course. So, after two big ones this summer, it tried to reassure the public, and place the blame elsewhere. The WSCC press release dated

August 13th came three days after a disruption that made national news. It contains several items that are interesting. The third of several remedial measures in the second paragraph is: *"BPA has agreed to report all outages of 500,000-volt transmission lines and other key facilities on its system."* The obvious implication is that BPA has **not** been informing others when its highest-voltage lines were unavailable. Possibly the new BPA is so busy with its reinvention, press releases, water spilling (see newsletters from April of 1994 through October of 1995), and law suits (the April, 1996, issue) that it no longer has time or money for real engineering reports? Web surfers can obtain the full report by beginning at **http://www.wscc.com** and clicking on the link marked *"News regarding August 10, 1996, disturbance."* Of course, *disturbance* is used rather than *blackout* (spin doctors work for WSCC as well as for BPA , it would seem). After all, only some 7.5 million persons were without power during peak summer afternoon temperatures. Hey, the WSCC glass remained almost 90% full. The system only broke into pieces, and dropped a lot of load; it did not collapse (the *disturbance* could have been much worse) !

"Recent outages result in changes on BPA's system" is the headline of BPA's own newspaper, *Circuit* , dated September, 1996. If WSCC and others blamed BPA, whom did BPA blame? God, apparently (joke)! First, he sent too much rain (*"... a very wet spring, which sent trees on a growth spurt"*) . Then he made the conductors sag (*"During hot weather, power lines can sag as much as ...."*). Then the conductors touch the trees (probably due to wind, which is more of God's work, obviously). Nowhere do the BPA spin doctors take responsibility for lousy maintenance. But they do express guilt about killing some fish. With nuclear generators off-line for extended periods, there was need for an immediate increase in the transmission to California using surplus hydro power. But it did not happen. Why? *"The Dalles Dam was spilling for fish .... The Dalles generation was unavailable to pick up the slack."* Of course, eventually (later, after it was too late to avert the blackout) the politicians decided that generation might be a better idea : *".... BPA Administrator Randy Hardy thought of the consequences before he consulted with the National Marine Fisheries Service and requested curtailment of the spill for fish at The Dalles Dam so more power could be generated to help California. .... Although it still wasn't an easy choice to make, the number of wild fish going through the system at the time was very small ...."* As has been written before, until the law is changed, the wacko environmentalists remain in control.

Szymanski uses Windows 95 for ATP

The shift of David Szymanski's attention from Unix to MS Windows is emphasized by the following short announcement that was received on August 8th. As Bill G continues his drive to control software of the industry, he now is certifying consultants, and is **very** precise about representations that can and can not be made by those who pass his examination. It is understood that the following from Szymanski conforms to MS dictates : *"Thursday, July 1, 1996 Szymanski Consulting, Inc. announces that they have been accepted as a member of the Microsoft Solution Provider program. Microsoft Solution Providers are independent organizations that work closely with Microsoft to design, develop, integrate, support, and deploy business solutions using the latest information technology from Microsoft and independent vendors. David Szymanski is also a Microsoft Certified Professional. As a Microsoft Certified Professional David is recognized by Microsoft as an expert with the technical skills and knowledge needed to design, implement and support solutions with Microsoft products. Szymanski Consulting, Inc. offers training, consulting, technical support and migration planning for Microsoft Windows 95, NT, NT Server, MS Visual C++, MS Access, MS Visual Basic."*

David Szymanski and his wife Cathy visited Portland on August 15th and the 16th following work in the Seattle area the preceding week. He advised about details of the GUI of BPA's Interactive Power (load) Flow , and also about Win95 and ATP running under it.

Threads are Szymanski's latest idea for ATP running under Win95 or WinNT using MS compilers. This was outlined during his visit. The critical detail not previously understood by your Editor is this : threads of Win95 or WinNT should perform much better than threads of Salford DBOS. Because DOS was a simple operating system without timesharing, Salford threads were simple in that control passed from one thread to another only if and when the first process relinquished control by CALL YIELD@ or its equivalent. Not so for programs created by MS compilers such as MS PS. Szymanski says that newer MS threads should timeshare just as separate processes would (i.e., based on time slices and priorities rather than location in the code). Under WinNT, there would be the added attraction of possible parallel hardware (each thread could run on a separate processor). Szymanski sees this as coming for several reasons. First and most obviously, Intel processors themselves are cheap, and tools to support two or more of them are improving with time. Second, as increases in speed eventually become more expensive (the microprocessor revolution finally might be approaching fundamental limits to its continuing evolution), it may be more cost effective to use **more** hardware than it will be to use **faster** hardware. Cray and Sandia were mentioned in the July newsletter as examples of high-performance, expensive, specially-designed, parallel alternatives. Now, it seems unlikely that such complicated designs ever will replace conventional PCs for the average user. But simple, standardized designs involving few (e.g., two) processors might. Why for P6 or P7 rather than Pentiums during the past year (remember Robert Meredith's summary of NYPA's experience in the April newsletter)? Szymanski says that multiprocessor designs become more cost effective with each Intel generation. For example, Pentium Pro is

better than Pentium because Intel has increased the hardware inside, which means that less is required externally (on the motherboard). Recall an important earlier stage of this evolution : Intel 386 and earlier processors used external floating-point hardware. A math coprocessor was both external and expensive for early 386s, but the 486 put an end to this market. Well, the same such quantum leap should soon make multiple processors cost-effective, Szymanski believes. ATP could be ready, when that time comes, by further work on threads. Even though multiple processors might never be supported by Win95, the required changes to ATP could be developed using this simpler, available environment. The most important single conclusion drawn from Szymanski's visit is this : ATP restructuring is needed to prepare for a possible multi-processor future. Better threads from MS might be a promising tool for this.

Inefficiency of MS PS QuickWin windows was documented in the April newsletter (recall those 111 seconds to complete a small illustration). Well, use of C should speed the display and manipulation of windows, according to Szymanski. This is the general plan, then: ATP itself will remain in FORTRAN, but its output could be done using C. SPY output that now goes to Salford DBOS windows would instead be communicated to C display routines via simple subroutine calls --- just as was the case using Unix on PCs during the late '80s.

Input from the keyboard or the mouse similarly would come from C routines. Here the issue is not efficiency, but rather that error MS PS had reading the keyboard using PEEKCHARQQ (see the April issue). The mouse, too, could be supported from C, and all associated windows could be opened and closed in that language. Note the similarity to what Szymanski was doing nearly a decade ago using AT&T Unix. Then, separate processes with shared COMMON were being used. By using threads, the need for shared COMMON is eliminated. Threads do not need **shared** COMMON since they have the **same** COMMON (they are linked together in the same program). As long as an MS thread can be spawned (Salford terminology) two or more times, and time sharing among them is done in quality fashion by the operating system, this looks like the best of both worlds. It should be simpler than the separate processes of Unix while retaining all flexibility and functionality of that earlier design by Szymanski.

Plotting is expected to be the last operation to be implemented for the new threaded design. Conceptually, plotting is just another form of display. So, plotting, too, would be on the C side of the dividing line. But details are not yet clear. Remember OLE : other MS programs such as Excel already have sophisticated graphics, and should be available to ATP or SPY via subroutine calls. The interface may not be easy, but it is sort of a detail. The plan is to delay vector plotting until after the basic threaded timesharing has been proven. No one wants to invest time in graphics unless Szymanski's C-generated and controlled windows function well. After the deception of MS PS QuickWin, it is appropriate to be skeptical.

Windows NT is not being ignored, even though there are no plans to develop ATP under it. September 4th, Dr. Liu was given another PC in an attempt to solve the stability problems that have plagued her use of Windows for Workgroups. The new machine says "Dell; OptiPlex GXMT 5133" and "intel inside; pentium" on the front, and it runs WinNT only. Because NT is Salford DBOS-incompatible, and booting under MS-DOS seems not to be possible (somehow this detail was forgotten by those who provided the computer), another 486 DX2 / 66 was provided for EMTP use. Unfortunately, this is a different computer, with a big, empty hard disk. So, in order to support network-connected publishing and E-mail reliably and smoothly, NT with 32 Mbytes of RAM is being used. The replacement 486 DX2 is an island. It has no connection to the outside world other than its floppy disk drives. Yet, this is one of its strengths: it provides the 5.25-inch floppy disk drive that is missing on Dr. Liu's Pentium, and on your Editor's Pentium. In a sense, this is the best of both worlds. With neither networking nor MS Windows, the old 486 seems perfectly reliable for Salford DBOS use.

DOS under WinNT is inconsistent with DOS under Win95 in important and troublesome ways. An example is the output of DIR to inventory files. Dr. Liu and your Editor now have 4 different computers (two 486s and two Pentiums) with 4 different versions of MS DOS : Real 5 and 6.22 and the DOS emulation under Win95 and WinNT. Would the reader believe these four different versions of DOS produce four different formats for DIR output, with DIR from NT being the most different? Another difference is DOSKEY which under NT does not allow a return to the blank starting prompt (the user is trapped in the history of preceding commands). Finally, that powerful EDIT command of Win95 (see April and July issues) is lacking under WinNT. An attempt to EDIT a single 900-Kbyte file failed with the familiar "Out of memory" error message of old DOS. BPA paid more, and uses 32-Mbytes, for this progress? Incidentally, for all the hype about preemptive multitasking, quality of the time-sharing under WinNT seems no better than it was --- unless lack of crashing counts as better time-sharing. The old problem of the operating system locking permanently seems to have been solved. But the old problem of extremely poor (although not fatal) time-sharing of some processes remains. Presumably this somehow is related to the networking, which still seems to control the operating system rather than vice-versa. Your Editor remembers one embarrassing demonstration of Adobe Acrobat for Jules Esztergalyos: changing from one page to another must have taken a minute or more. Yet, both Acrobat and the file it was displaying were local.

MS Windows keyboards have this new key that shows the MS logo (the waving MS flag). For Win95, it is useful as a "pop" key (Apollo Aegis lingo) --- particularly

for exiting the MS-DOS window. Well, the keyboard of Dr. Tsu-huei Liu's Pentium at BPA has this key. It runs WinNT, so there is no reason it should not be used the same way. But the key is dead (more good work, Bill)!

Your Editor's Win95 writes to disk about once each second even when the computer is doing nothing. The disk light shows a single strong but brief pulse about once each second. Is there any reason your Editor should approve of this unnecessary wear and tear on his disk? WinNT on Dr. Liu's computer exhibits no such wasteful behavior. It is hard to believe that a laptop PC supplied by batteries would access the disk continually? How long would batteries last?

IBM OS / 2 Warp Used by NYPA

IBM's OS / 2 is being used for the support of ATP by Robert Meredith and Robert Schultz of NYPA (the New York Power Authority in White Plains).

Threads are Szymanski's latest idea for ATP running under Win95 or WinNT using MS compilers. Thus began a paragraph of the story about Windows 95. But what about OS / 2 and Watcom? Mr. Schultz responded as follows in E-mail dated September 3rd: *".... no, I don't object to threads. In fact, 'detached' processes are preferred. The only sticky point with OS/2 is the fact that a PM program will be required, and as I pointed out quite a while back, this will not likely be in the form of a thread but as a separate session with interprocess communication. The character mode execution of ATP must not change for obvious good reasons -- it works, works fast and reliably. As I understand it, I can not start a PM thread under a character mode application. Once you have a thread based version working, the implementation under OS/2 should not be too hard to accomplish (SMOMP), given the above scheme."*

OS / 2 sales to industry are spectacular compared with the new MS competition of Win95 and WinNT. This information came from Mr. Schultz by E-mail dated Aug 28th. This is a third-hand report that is said to have originated with one **bgorrell@radix.net** as can be confirmed in the article **4vu15p$gd8@news1.radix.net** The report describes a pie chart in an article entitled *"One year later: Win 95 in corporate America"* in the August 26th issue of : *PC Week* magazine. The title of the chart is said to be: *"1996 projected worldwide OS installed base."* Would you believe :

DOS/Windows	43%
OS/2	25%
DOS only	10%
Windows NT	7%
Mac OS	7%
Unix/Other	5%
Windows 95	3%

Giga Information Group is the source that is credited for this information. Note the qualification *"in corporate America."* This is not the division of the total computer market, then, but rather the division of an important sector within it. Also, it is limited to the United States. Nonetheless, can readers now better understand why MS has not been disclosing details of its Windows sales lately?

PCPLOT by Prof. Mustafa Kizilcay would seem to need modification to allow for null bytes in the header of C-like .PL4 files. This is comparable to what already has been done for PL42MAT (see preceding issue). The report of trouble was from Michael Steurer of TU-Vienna in Austria, in public E-mail of the Fargo list server dated August 6th.

Hewlett - Packard (HP) Unix ATP

Hewlett-Packard (HP) Unix has a new ATP version thanks to the work of Prof. G. Corwin Alexander of Oregon State University in Corvallis (USA).

HP-GL and PostScript output of CALCOMP PLOT graphics now are available. The same GRAPHICS disk file of Salford EMTP is used even though there are not yet any screen graphics. This is the novel aspect : rather than HP-GL and PS outputs being an approximation to the screen plot, they are the **only** graphical output. Since the supporting FORTRAN is essentially universal (file OPEN and INQUIRE are the only installation-dependent aspects), the same code is available for use with any other ATP translation that does not yet have any graphics.

About installation-dependence that is associated with file connection, Prof. Alexander's experimentation led to avoidance of ERR= on the OPEN statement as a way of detecting the non-existence of a file. In E-mail dated the 19th of August, the Prof. wrote: *"You'll never believe this! I mentioned on Friday that I received no header ... I discovered that the Sun compiler code actually opens a non-existent file when STATUS='OLD' is used ...."* That is, for a nonexistent file "ERR =" was properly used. However, subsequent INQUIRE would report that a file was connected even though it had not been. Well, the installation-dependence of read-only access remains, but at least operation is consistent on all machines tested following the modifications.

HEADPOST.LIS was the optional, external header file of years past (see the October, 1993, newsletter). This was used before Robert Meredith of NYPA recently had the program build the header itself using parameters that the user can specify in the GRAPHICS disk file. How practical is continued existence of the external file, then? Mr. Meredith offered the following explanation on August 21st: HEADPOST.LIS *"is one of two ways the user has to customize the appearance of Postscript output. Although some of the variables can be set in ATP, many cannot. Notably: paper size (letter or A4 in paphgt), plot positioning and scaling on the sheet in landx/landy/yaxl, relative positioning of multiple plots in shiftx2 and others,*

all color definitions, font selections and line trace patterns. .... Psplot has always had the ability to substitute a header file of the user's choice, but using postplot/psplot is another step that can be avoided by having ATP do the work. This is particularly true for WNT users who use Ghostview to automatically display the Postscript plots at the end of execution. Ghostview appears to be an integral part of ATP in this process. The ability to select viewable colors (including yellow) for the display on black background may provide the flexibility some user needs. Others may only want colors that display on white background." So, the HEADPOST concept remains. But the dated .LIS file is gone. In its place, a .LST file will be found on the Salford GIVE1 disk. This is just a shell of comments that remind the user of the feature.

SALFPLOT.INC is a special INCLUDE file that is not produced by translation. It began as a way to communicate among Salford EMTP plotting modules. But variables associated with the addition of HP-GL and PostScript output have been added to SALFPLOT, and today it is used for several translations. Well, Prof. Alexander reported on September 4th that the file *"defined two labeled commons of the same name, which upset the SUN4 compiler."* In the interest of uniformity, the repeated use of the block definition (e.g., COMMON /BLOCK/) was replaced by the use continuation marks in column 6.

Electrotek Concepts Asks for ATP

Electrotek Concepts of Knoxville, Tennessee, USA, is interested in ATP following involvement as EPRI's EMTP agent that dates to the late '80s. This further sign of disintegration of the DCG / EPRI EMTP cartel was learned on August 7th when Susan Brockman first telephoned, and then sent E-mail, about the subject.

Is Electrotek still EPRI's EMTP agent, and does Electrotek still enjoy free access to DCG / EPRI EMTP? The answer is not obvious. Ms. Brockman wrote: *"In April, I was given the project management of the EPRI /Electrotek Users Groups. At that time there were two Users Groups. EMTP and HarmFlo. With the latest version of EMTP being released by Ontario Hydro EPRI/DCG wanted Ontario Hydro to provide the 'official' support for EMTP since they were directly involved with the code. OH invited Electrotek to co-sponsor the group with them with EPRI's blessing, but we chose not to."* Since Thomas Grebe began the user group activity for EPRI (e.g., see mention of him as Editor in the January, 1994, issue), where is Grebe today? About the only obvious bet is that EPRI money for EMTP no longer is flowing to Electrotek as it once did. Another EPRI *commercializer* (don't look for this EPRI jargon in any dictionary) bites the dust.

Ms. Brockman continued: *"During the process, the HarmFlo Users Group was renamed PATH (Power Applications for Transient and Harmonics) and expanded to include transient analysis. Our group is applications based and not software specific as Ontario Hydro's is. Many of our users are not in the EPRI business unit that targets funds to the business unit which has developed Version 3.0. These utilities are asking us what to use. Electrotek is in the process of evaluating transient software, both for our studies and for supporting our user group members. I understand that your ATP version is public domain, but that I would need a license agreement from you to actually use the software. We are also looking at MicroTran and EMTDC at this time. Our goal is to provide support for a variety of programs for our members. Please let me know if you would consider allowing Electrotek to obtain a license for ATP and what the requirements would be."*

Electrotek was welcomed to join the ATP user community, of course. In E-mail from Dr. Liu and your Editor later that same day, Ms. Brockman was informed: *"ATP is available to Electrotek, but not without charge. Instead, reciprocity would apply, just as it does to EPRI itself. The price to Electrotek would be the same as the price charged by EPRI (or by its agents such as Electrotek) for DCG / EPRI EMTP."* For an idea of what that price might be, see the mention of $14,550 in that same January, 1994, newsletter. Joke : Note the obvious advantage of Microtran, which would not cost Electrotek this much (see preceding issue) !

Because Ms. Brockman seemed to understand little if anything about ATP, and why Electrotek did not enjoy free access, this was reviewed for her. The complete story in the July, 1995, newsletter (see title "IREQ / Hydro-Quebec ATP Interest") was included along with the following explanation of when Electrotek troubles began (an excerpt from public E-mail of the Fargo list server dated June 5th, 1995) : *"It was at Prof. Saul Goldberg's Cal Poly EMTP short course in San Luis Obispo, California, during July of 1989, that a representative of Electrotek (Mark McGranaghan) acknowledged for the first time (to the Can/Am User Group) Electrotek's involvement with EPRI concerning EMTP. Of course, this was a violation of the ATP AFFIRMATION that Electrotek had signed. So, at least by then (how much earlier is not known), Electrotek was legally obligated to destroy or return any ATP materials that then were in its possession, and to cease using all such information. ...."*

LICENSE.ZIP (the user group's 8-page form letter) was attached to E-mail that was sent to Ms. Brockman later that same day. If Electrotek did not understand before, it certainly should understand now, the EMTP hole that it has dug for itself.

Meanwhile, is EPRI doing anything with EMTP? If so, it is not obvious. BPA's Robert Hasibar provided two pages of EPRI advertising that he had been mailed. The

first was an *Announcing* sheet dated May and having title *"Enhanced version of Electromagnetic Transients Program (EMTP)."* After the usual misinformation and disinformation (e.g., "EMTP is used worldwide by over 230 utilities, manufacturers, universities and laboratories ..."), the interested reader is referred to the Web page **http://www.emtp96.com** This is worth investigating, provided one is sufficiently skeptical. Immediately, one notes a difference from any previous EPRI-sponsored writing of which your Editor knows: the former EPRI / DCG has been reversed to become DCG / EPRI. Also, there is no mention of Electrotek or its former Editor Tom Grebe. Who knows what might have happened to EPRI's former EMTP agents? Does EPRI still have any EMTP agent? If so, whom? From the Web page, it is not obvious that EPRI is paddling the EMTP boat at all.

BPA's Robert Hasibar tried to acquire the new EPRI EMTP, but was told that it is not yet available. E-mail to John Brunke on September 16th documents details for the record. After *"Subject: Request for EPRI Version 3 of EMTP,"* Mr. Hasibar noted: *"I ordered Version 3 of EPRI's version of the EMTP. .... After talking to Ram Adapa in Palo Alto and discovering that this version would not be available until November (1996), he told me to place this order with the Center."* Needless to say, that May announcement mentioned no such delay. It began : *"EPRI is releasing Version 3.0 .... in May 1996."* To conclude, the year 1996 will be mostly if not all gone before EMTP96 will be seen by EPRI members.

New S. M. Model from Tokyo Electric

The Type-59 synchronous machine (S.M.) soon should have some direct competition thanks to machine modeling that is to be contributed for ATP use by the Tokyo Electric Power Company (TEPCO) in Japan. Dr. Hiroshi Okamoto of the Power Engineering R&D Center first raised the possibility in E-mail dated August 26th from address **okamoto@rd.tepco.co.jp** Dr. Okamoto wrote: *"My research field is power system control and power system analysis ranging from transient analysis to long-term dynamics. My colleagues and I have been working on improvement of transients simulation. .... 2) Development of phase-domain synchronous machine model. We proved that the use of phase-domain SM model instead of conventional dq-phase model can improve numerical accuracy and stability. Regarding this subject, we have submitted a paper to IEE Japan. ... We have tested the above new functions using old EMTP source code (maybe it is M39) and obtained encouraging results. We are willing to contribute our improvements to ATP and hope they will be used widely."*

ATP developers in Portland were interested, all right. Curiously, the idea of phase-domain representation in EMTP is more than two decades old. As your Editor explained to Dr. Okamoto later that same day: *"This really does surprise me. The phase-domain alternative was the first that came to mind back in 1974 when S.M. modeling first was contemplated for EMTP. I wrote a 29-page EMTP Memorandum this way (see Vol. I, pagination GFI, 10 March 1974). But no one else seemed to believe the idea was worth pursuing. I vaguely recall that Prof. Dommel later had a graduate student test such a formulation, but I can recall no claims that it was superior."* Of course, in the beginning, no one seemed concerned about stability. As originally implemented by SCE (Mike Hall and John Alms) with PG&E guidance, EMTP S.M. modeling relied upon compensation. Stability certainly was a concern later, however, at the time Dr. Brandwajn was finishing his Type-59 model. It became a bigger issue following removal of the old SCE Type-50 modeling during the early '80s. With removal of the SCE S.M. code, those who simulated power system generators lost their easiest standard of comparison (use of the U.M. can be more complicated).

About that JIEE paper, Dr. Okamoto wrote that it *"was presented at Power Engineering Meeting of IEE Japan in October 1995."* The title is *"Improvement of Numerical Stability of Electro-Magnetic Transients Simulation by Use of Phase-Domain Synchronous Machine Model."* An English translation of the Abstract follows: *"The present paper proposes the use of phase-domain (abc frame) generator model in the electro-magnetic transient analysis instead of conventional dq0-domain generator model in order to improve numerical accuracy and stability. The drawback of the conventional dq0-domain machine model is that the prediction of a number of electrical variables as well as machine speed is needed in order to interface the circuit of a machine model with the rest of the power system network and the prediction of these variables leads to numerical inaccuracy and instability. In contrast, the prediction of electrical variables is not needed in the proposed phase-domain model. In the paper, the phase-domain machine model including saturation is developed. The proposed model is validated by comparisons with an existing EMTP type-59 machine model. The paper makes it clear that the numerically stable solutions are obtained by using the proposed model even in the cases where numerical instabilities occur when using the existing type-59 model."*

The TEPCO modeling **will** simulate slower than Type-59 modeling, users are to be forewarned. This is believed to be the primary reason for using Park's equations (dq0 representation) back in 1974: improved efficiency. But computer usage has changed greatly since then. For one thing, all compilers of interest allow virtual memory, so adding more code is not a problem. Also, computation is so cheap and fast using Pentium PCs that the additional burden of using the TEPCO S.M. model no longer is of much concern to many. So, how much slower might the TEPCO S.M. code be? Dr. Okamoto provided the following two illustrations for cases of linear S.M. simulation to 5 sec using time steps of 100 usec:

	Case 1	Case 2
Size of the system		
No. of nodes	34	190
No. of branches	30	270
No. of NL elements	0	6
No. of S.M.s	1	3
Computation time in [sec]		
dq0-domain S.M.	26.8	70.1
phase-domain S.M.	44.4	308.3
No. of times of triangularization		
dq0-domain S.M.	11	1580
phase-domain S.M.	50001	50001

Masahiro Kan of the Hamakawasaki Works of Toshiba Corp. in Japan must be credited with suggesting this beneficial collaboration. The first sentence by Dr. Okamoto mentioned Mr. Kan's recommendation.

Mohan : No Course in New York City

Early February --- the weekend immediately before the IEEE PES Winter Meeting --- was when Prof. Ned Mohan of the University of Minnesota originally had hoped next to teach his 2-day course. The New York Hilton Hotel was to be the location, according to 4 pages of advertising that were available at the Summer Meeting in Denver. But after looking closely at economics, it was decided that such a move from western airports to the heart of the nation's largest city would be risky. The decision not to offer the course was made around the end of October.

Rooms in hotels of midtown Manhattan, the heart of New York City, are priced high enough to frighten your Editor. In E-mail dated October 24th, Prof. Mohan explained : *"Lori Graven is very disappointed about the availability of reasonable conference rooms. At the Hilton it's 5 k$/day and at the nearby Sheraton, it's 3.5 k$/day."* So, following some free E-mail advertising (both Prof. Heydt's **power-globe** and Prof. Mork's **atp-emtp**) that mentioned no precise location, a decision was made not to offer the course. Who needs the aggravation of worrying about attendance at these prices? There was substantial response to the E-mail announcement, but not by persons who indicated they were willing to travel to New York City, Prof. Mohan reported! Your Editor observed that omission of a precise location may have been counterproductive. It is not clear how many persons unfamiliar with the area, which is served by 3 airports, would welcome the thought of local travel to an unknown location. Someone local to the area probably could plan and advertise a reasonably-priced course. But it is difficult from 1000 miles away, trying to gather information, and negotiate, by telephone.

So, New York City provided a learning experience that probably also would apply to Berlin (some have asked why Prof. Mohan does not teach his course in Germany this summer, prior to the PES meeting there). If someone on-site wanted to take responsibility for all arrangements, as Prof. Laszlo Prikler did for the EEUG meeting in Budapest, Hungary (see separate story), that would be one set of circumstances. If not, the prospect is frightening. The trans-Atlantic IPST'97 may have run into such trouble in Seattle, as a story in the next issue should summarize.

Power quality and power electronics were to be emphasized more, and ATP less, it is noted. As mentioned a year ago, Mohan is following what he believes to be industry demand, and changes to his proposed course were substantial. The course title became *"Power quality, power electronics in power systems, and modeling using EMTP (ATP version on PCs)."* ATP has become an afterthought --- merely a convenient tool that is used to obtain numerical results. The course description began: *"It is now certain that power electronics technologies will play an important role in the power industry. The applications range from end-use of electrical power to power quality, to custom power, to FACTS (Flexible AC Transmission Systems) . The purpose of this course is threefold: 1) Provide a basic understanding of power electronics; 2) Discuss its various applications in power systems; and 3) for analysis and design of such systems, show their modeling using ATP ...."*

Laboratory sessions using paper and pencil were to be scattered throughout the course. Most are 15 minutes, and these represent a radical departure from the past. What is the claimed advantage? *"Active Participation: Participants will learn by preparing input data files on paper in 11 different labs. They will then compare their results with the instructor's solution supplied as part of the course notes .... Participants are asked to bring a simple scientific calculator for this phase of the course."* This is different, all right.

Data modularization using special $INCLUDE files is the basis of the new organization. The former 2-hour demonstration of graphic data assembler ATPDRAW has been replaced by a 15 minute demonstration at the end of the course. ATPDRAW has become an optional luxury that now is an appendix to the core curriculum. MODELS no longer is taught at all as a separate subject, although the word is seen once in the course outline (*"the controller will be modeled using MODELS which is a very powerful means ...."*) Data modularization has made all of this possible : *"In this course, we will use the data-module approach which makes the input data files easy to prepare; they appear almost like the netlist for very popular versions of SPICE used commonly in undergraduate electrical engineering education."*

Prof. Juan Martinez of Universitat Politecnica de Catalunya in Barcelona, Spain, is understood to have played a critical role in the structural change to Prof. Mohan's course. Prof. Martinez worked with the concept of simple $INCLUDE files years ago, and he worked with Prof. Mohan on the simplified ATP instruction manual that

is to be used. The draft that was mailed to Portland during August for consideration is 20 pages in length and has title *"Beginner's instruction set for EMTP (ATP version on PCs) using data modules."* The authors are Profs. Martinez and Mohan. This is worth watching, readers.

MIPSYCON (Minnesota Power Systems Conference) is another ATP involvement of faculty of the University of Minnesota. The program for this year shows a tutorial from 8:30 to 12:00 noon on October 3rd. The title is *"Power quality and modeling of power electronics in power systems using EMTP (ATP version for PCs using MS-DOS or Windows,"* and instructors are Profs. Ned Mohan, Vern Albertson, and Mahmoud Riaz. *"Space is limited .... There is no fee for this session."* At least here there would seem to be no worry about economics!

Linux ATP by Walter Powell

This is a continuation of the story having the same title in the preceding issue. Recall that BPA's Walter Powell had been evaluating the GNU compilers at home using his 100-MHz Pentium that runs Linux.

A 90-MHz Pentium-based PC has been available for many months in the cramped and otherwise-unused space between your Editor's cubicle and building windows. This computer was originally provided for developers of BPA's Interactive Power Flow (IPF), which ran under Novell's UnixWare 2 Unix. Well, the addition of Linux, followed by the GNU FORTRAN compiler g77, proved to be an important change because it allowed involvement of your Editor at any hour of the day or night, 7 days a week. This freed Mr. Powell from work on someone else's program in an environment (his home) that offered many distractions. With BPA's Dr. Tsu-huei Liu and your Editor studying test cases, and Mr. Powell supplying program enhancements in C, and advising about Unix and use of the GNU symbolic debugger, progress has been rapid. It was over the final weekend of November (Thanksgiving Day plus extensions) that the last of the test cases was made to work correctly as verified by machine comparison with Salford EMTP solutions (shareware FC following TRUNCATE). As this paragraph is being frozen in early December, all modeling seems to run, and run well. Those pioneering expectations of Masahiro Kan (see the April issue) seem to have been realized. Look for details in the next issue.

Credit for the GNU compiler g77 has not previously been given. Mr. Powell is right in suggesting that it should be, since without this free compiler there would not be successful GNU ATP for Linux. Well, from disk file g77.info of the Free Software Foundation in Boston, Mass.: *"Work on GNU Fortran is still being done mostly by its author, James Craig Burley, ... who is a volunteer for, not an employee of, the Free Software Foundation (FSF). .... many people have helped create and improve GNU Fortran. ... The packaging and compiler portions of GNU Fortran are based largely on the GNU CC compiler ... The run-time library used by GNU Fortran is a minor repackaging of the libf2c library .... available for free from .... sites on the Internet. Cygnus Support and The Free Software Foundation contributed significant money and/or equipment to Craig's efforts."*

Freeware GNUPLOT is to be used for vector graphics of ATP, according to current thinking. Any reader who expects to try GNU ATP for Linux is advised to have a copy of this ready, and be familiar with its use. A disk file having all hyperlinks begins with the BASE HREF **http://www.cm.cf.ac.uk/Latex/Gnuplot / gnuplot . html** (world-wide Internet access for Web surfers). It was Bill Hewitt of BPA who kindly provided this useful file, which begins with title *"GNUPLOT, An Interactive Plotting Program"* followed by the names Thomas Williams and Colin Kelley. Version 3.4 is *"organized by Alex Woo,"* whose name is followed by those of many contributors.

SHAFT Command of TPPLOT

The SHAFT subcommand of the PLOT command of SPY is described on pages 16C-9 and 10 of the Rule Book. Obviously, this same function could be added to Salford TPPLOT, the interactive plotting program for MS-DOS PCs. It has been, and is available via the SHAFT command of TPPLOT beginning September 22nd.

Nothing has been done with SHAFT or its simple logic during the past decade, and this is precisely the reason it is being mentioned now. BPA's Robert Hasibar had inquired about it during the preceding week, and no one could remember much of anything. Eventually the logic was found in SPY, but the average interactive user today would prefer to use TPPLOT, now doubt. So, the binary switch SHAFT was added to allow the user to toggle such computation on or off (the latter being the default state). Unfortunately, the pulldown aqua **Output** menu already was full, so the new SHAFT could be added in parallel with FOURIER where it belongs only after JOIN was moved to the preceding green **.PL4** menu. Also, ECHO was moved to the final violet **Execute** menu in order to leave one blank space in **Output** for future expansion. Of course, a summary will be found in the HELP file, and disk file SHAFT has been added to illustrate usage (if DC53.PL4 is present, just send @SHAFT to execute).

Richard Rose of Portland General Electric (PGE, across the river in downtown Portland) must be credited with supplying the simple logic of SHAFT. This assumes the user has a curve of shaft torque vs. cycles to crack. Each relative extrema of the torque then is viewed as one cycle, so the fatigue curve contributes a percentage loss of life due to it. Logic of the SHAFT command simply adds all such contributions as relative extrema of the torque are passed.

Should any reader believe that more sophisticated formulas can be used practically, he is advised to lead an informed discussion using the public E-mail of Prof. Bruce Mork's Fargo list server. Closure: *"Dick Rose is Retiring"* is the headline of posters seen recently around System Planning at BPA. A farewell party has been scheduled for December 17th, it would seem.

Cornel Brozio Sees Trident Graphics

New Trident output cards of Intel-based PCs were reported to be incompatibile with Salford EMTP and TPPLOT graphics. The January issue summarizes one report of trouble, and recent public E-mail of the Fargo list server has reported others. Finally, there seems to be a solution to the troubles. It is a long story that comes from half way around the world.

Cornel Brozio, formerly with the national power company ESKOM of South Africa, but more recently a doctoral student at the University of Stellenbosch, provided further information in public E-mail of the Fargo list server dated August 20th: *"My home PC was delivered with a Trident MVGA T9440 card and I soon discovered that TPPLOT graphics did not work. I then removed the Tseng Labs ET4000/W32P card from my office PC and installed it in place of the Trident card. No problems with TPPLOT! I then compared the specifications of the two cards (from the rather crummy manuals that accompany them): Both offer register compatibility with VGA mode and various other standards, etc. However, only the ET4000 card offered 'BIOS support for VESA Standard Extended VGA mode', the mechanism via which DBOS seems to support graphics. The Trident manual mentions that the 'VESA BIOS Extension' is available via a software driver, which I could not locate on the Trident driver disks or obtain from the supplier of the card. The BIOS in question is the BIOS on the video card, and not the BIOS on the PC motherboard. This is exactly what Prof. Mork had to say on the topic (see Jan 1996 newsletter)! So, until a suitable device driver is found for the Trident card, your options are:*

1) Assuming that you are willing to spend the money, replace your graphics card with a card that supports the VESA standard, such as the ET4000 card (This is obviously a problem if the graphics of your system have been integrated on the motherboard, but maybe the motherboard video system can be disabled?), or

2) Use an alternative plotting program such as PCPLOT (it works with the Trident card on my machine). I will continue hunting for the mysterious VESA driver for the Trident card, if it actually exists..."

About the PCPLOT alternative from Prof. Mustafa Kizilcay of FH Osnabrueck in Germany, Mr. Brozio reported success of version 6.40 following failure of old version 6.10 for a FREQUENCY SCAN case. Private E-mail dated August 20th reported: *"Before, when using a PL4 file (created with L4BYTE = 0 and FMTPL4 = 10E8.0) PCPLOT would read the various node names correctly and display them in the f-resp window, allowing the user to select up to three curves for plotting. Then PCPLOT displays 'Searching for the min. and max. values...', followed by the error message: 'Runtime error 106 at 1260:2CA5'. According to my Turbo Pascal manual this means 'Invalid numeric format'. Anyway, the problem is solved. Thanks for sending 6.40! BTW, PCPLOT does not seem to like unformatted or C-like files. Using BLANK for FMTPL4 and L4BYTE = 1 or 0 produces the error message 'unknown structure of FMTPL4'."* Of course, BTW is an abbreviation for *by the way*.

One day later, Mr. Brozio reported success using his Trident output card for Salford graphics. From his public E-mail dated August 21st : *"... I spent some time browsing through the local Simtel FTP archive .... From the **simtel/msdos/graphics** directory I retrieved vesadrv2.zip (about 370 kb). This archive contains VESA drivers for a number of video cards, including Trident. (You need to unzip this archive with the -d command line directive to ensure that the directory structure in the zip file is created on your disk: 'pkunzip vesadrv2 -d'. You then get a number of directories, each containing a VESA driver for a different card.) I got a little worried when I ran VESA.EXE for the Trident card. The program informed me that it was designed for TVGA 8800, 8900 and 9000. (My card is based on the T9440 chipset!) Anyway, I ran the program and was given a message saying that the driver had been installed correctly. I started DBOS, and then TPPLOT -- and the graphics **worked**! I tested TPPLOT in various modes, using SET DATA. Normal EGA and VGA work fine, with the mouse cursor visible. The 800 x 600 and 1024 x 768 modes also worked, but without the mouse cursor (which is a known problem). .... The Trident VESA.EXE seems to come from the OEM, so there are no registration costs, etc."*

About Simtel, your Editor knew nothing. So, he connected to **www.yahoo.com** and searched for this name using the box near the top of the home page. The response was: *"Found 8 matches containing simtel. Displaying matches ...."* Among the more promising was: "Oak Software Repository - Simtel Archive for MS-Dos, Windos, and Windows NT." Transferring here, it was learned that *"The OAK Software Repository (**oak.oakland.edu**) is a public service of Oakland University's Office of Computer and Information Services. OAK offers many collections of computer software and information to Internet users free of charge. .... The original collections mirrored from **wsmr-simtel20.army.mil** .... Simtel.Net is a registered service mark of Walnut Creek CDROM."* So, Simtel files certainly are available here in North America, too.

Mr. Brozio commented as follows, upon reading the preceding paragraph : *"My apologies, I assumed that most people were aware of the Simtel FTP sites. There*

are a number of Simtel mirror sites across the globe, including one here at Stellenbosch University. Generally, the Simtel sites contain a large number of shareware programs and utilities for MS-DOS and Windows. You can find anything from editors to a fancy clock for your Windows desktop... I must admit, however, that the VESA driver was the first ***really*** *useful program that I have downloaded from Simtel. The Internet has certainly proved its worth. Consider how long it could have taken to solve the Trident problem without Internet resources (including e-mail)."* Amen.

Jorge Amon Filho, writing from Furnas in Rio de Janeiro, Brazil, was the first to provide confirmation of the preceding. In public E-mail dated August 23rd, he wrote that he had acquired an earlier version of the driver from **ftp.cdrom.com/mir02 / SimTel / msdos / graphics** Disk file VESADRV2.ZIP was smaller (only 81 kbytes), yet seemed to work as well: *"I've tried both versions with success. 4) As a suggestion, I'd recommend that the user place the file VESA.EXE in the directory c:\ATP (for example) and include the following line command in the AUTOEXEC.BAT: C:\atp\vesa.exe. 5) Then, just run TPPLOT normally."* This useful report came from address **jorgamon@furnas.gov.br**

Hoidalen Improves ATPDRAW

ATPDRAW is the graphical data assembler from Hans Kristian Hoidalen of Trondheim, Norway. Prof. Bruce Mork of Michigan Tech in Houghton announced the availability of new version 3.22 in public E-mail of his Fargo list server dated September 24th. About the new file ATPDRAW.ZIP in directory **pub/atp/gui/atpdraw** of **ftp.ee.mtu.edu** he wrote the following (remainder of this story): "I attach the following upgrade notes from H. K. Hoidalen:

WHAT'S NEW IN VERSION 3.22

* Connection. The Draw/Mode/Delete options are removed from the Connection menu. The old Connection menu thus has nothing to do with connections and has changed name to 'Probes & 3-phase'.

To draw a connection: Click on a node with right mouse button. A line is drawn between the node and the mouse cursor. Click on left button to place and right to cancel.

To move a connection: Click on it's endpoint with left button to resize. Select to connection with left button to select. Click left button and hold on a selected conn. to move. Click left button on a selected conn.'s node to resize. To delete a connection. Select and press Del / Backspace.

* MOV 3-phase error (missing '5555.')) corrected.
* Models DATA error (formatting problem (0.0, 0.003)) corrected.
* Some action modes removed (due to more simple connection procedure)
* Mark group. Double click left in open space to start the mark group operation.
* Update help files. The old help files for Comp., Model and TACS are replaced by a single file called BUILD.HLP which explains how to build up a circuit.
* Group number window. Double click left on group.
* Node names moveable (just as labels). Not written to .CIR file however. (A complete new .CIR file format is required in next version)"

ATP Load Flow (FIX SOURCE)

An overflow error was observed by BPA's Robert Hasibar while performing a typical FIX SOURCE (load flow) study. Since typical for BPA is not at all typical, it is worth summarizing the circumstances. Case summary statistics show the first four lists to have the following sizes : 375 356 1517 15 . Although limiting list sizes (the .BPA file) should have been more than adequate, the very first iteration produced overflow, and this in turn corrupted the solution, which automatically turns on diagnostic printout. Usually, this is a good idea since diagnostic output is useful in determining why the iteration has not converged. But for this case, where numbers immediately exceeded 10**20, there were no useful clues to be seen. Furthermore, the output was so voluminous as to be overpowering. Well, logic changes in FXSOUR and VECRSV were made on September 28th, and resulting output file TUMBLECR.LIS seems to fully satisfy Mr. Hasibar. Certainly convergence of the load flow is speedy enough:

```
Max del-V: 7.729 7.75 7.769 5.576 3.049 1.67 ...
Source No.     1    1     1     1     1    1 ...
Max del-V: .3E-3 .2E-3 1.E-4 .6E-4 .3E-4 .2E-4 .
Source No.     1    1     1     1     1    1 ...
```

That second pair of rows shows iterations 21-26. There is no mystery about why the same source (number 1) always produced the largest correction: Hasibar's data, which he said was typical of BPA usage, involved only a single 3-phase power constraint. This was at a (P, V) bus.

Difficulty using the ATP load flow was mentioned by *"a team of 6 Japanese engineers from Tokyo Electric Power Company, their affiliated software company Toden, and universities who are planning to visit BPA on Sept. 19"* (from BPA E-mail about the visit). During the half hour or so that Dr. Liu and your Editor spent with the group, advice about FIX SOURCE was given. Your Editor stated that he has yet to see documentation of a practical case involving high-voltage networks that failed to converge. Most often the user makes a data error (i.e., he is not asking ATP to solve the real problem). If problem description is correct, then the most common trouble is with acceleration factors of the iteration: typically the corrections will oscillate, and acceleration factors need to be reduced. Diagnostic printout sometimes needs to be turned on, and the code needs to be studied, in order to understand the trouble and decide upon a modification. In conclusion, the controls are not very user friendly, and the algorithm should be redesigned.

New 1 - Mbyte E - mail Limit at BPA

A 1-Mbyte size limitation on outgoing E-mail was first experienced at BPA on September 14th when GIVE1.ZIP (Salford EMTP for Intel-based PCs running MS-DOS) was refused with the message: *"Your mail could not be delivered to the following recipients ... Maximum outbound message size exceeded."* The response from BPA's computer establishment to Dr. Liu's telephone inquiry was simple enough : BPA E-mail has been having problems, and the limit was imposed in the hope of ameliorating these. Not too bright (it looks like a shot in the dark by people who have no idea what they are doing). The unlucky guinea pig was William Veerkamp of Dow U.S.A. in Freeport, Texas. Yet, the trouble should be only temporary.

Avoidance by means of file segmentation remains a viable strategy. No one wants to return to those 40-Kbyte (approximately) files produced by shareware UUENCODE within EMAIL.ZIP on the GIVE2 disk of Salford distribution, but two pieces of nearly one Mbyte each should be satisfactory for most including AOL users (see Dr. Yin's problem in the April issue). Prof. Laszlo Prikler of the Technical University of Budapest in Hungary recommended an MS Windows shareware program named UUCODE from Sabasoft of Naperville, Illinois (USA), and he supplied a copy on September 20th. This was used successfully ten days later. On the other hand, there is a troubling complication for the recipient: the two pieces are not yet reassemble automatically on the receiving end. Manual manipulation is required (next paragraph).

About decoding, Prof. Prikler wrote: *"This job can be done in a simple way (point 2/a and 3/a below), but it also has a more difficult way (point 2/b and 3/b), ..."* Believing in the simpler and free alternative, the more complicated alternative using UUCODE has been removed. Prof. Prikler's resulting, modified recipe for extraction follows: 1) Place the two E-mail messages in disk files E1.UUE and E2.UUE (arbitrary names). The headers do not need to be removed. 2) Copy the two .UUE files into a single output file using the DOS copy command. For example, COPY E1.UUE + E2.UUE E.UUE 3) Uudecode the resulting E.UUE using Theodore Kaldis' UUDE.EXE (UUDE is freeware that can be found in EMAIL.ZIP).

Controls of UUCODE are as follows. Clicking on the **Configure** button, we select "SIMTEL Format" (the second of the three choices). Then a maximum segment size is seen, and this is changed from the default 60K to 900 Kbytes. These are the only changes. Then, to proceed with the encoding, click on the **File** button, then the **Encode** button, and finally name the input file (e.g., GIVE1.ZIP). Then DIR GIVE1* will show both the input and output files as follows:

```
10/01/96  11:00p  1,133,116 GIVE1.ZIP
10/01/96  11:02p    900,053 GIVE101.UUE
10/01/96  11:02p    686,495 GIVE102.UUE
```

If this tabulation looks strange, it is: WinNT is being used. More about this complication in the Szymanski story.

The first beta tester (a.k.a. guinea pig) of the preceding explanation was Prof. Laurie Snider in Hong Kong. There was trouble, however, so changes were made. Details next time.

News about Apple Macintosh ATP

Stu Cook of JUST Services in suburban Montréal, Québec, Canada, has been compiling new Macintosh ATP FORTRAN using the Language Systems compiler on his Apple Quadra (a Motorola 68040-based Mac).

CALCOMP PLOT screen graphics are being added to Macintosh ATP as the first major installation-dependent enhancement. The parallel PostScript and HP-GL of Salford EMTP (recall the NOPOST and NOHPGL switches of the STARTUP file) should also be available. Details next time.

The Linux alternative to the usual Macintosh operating system does exist, it must be remembered. Mr. Cook provided the following news release ("MailBITS / 30-Sep-96") in response to your Editor's mention of Linux for Intel PCs in public E-mail of the Fargo list server dated October 4th: *"Last week, Apple released DR2 of MkLinux, a version of the Linux operating system for Power Macintosh they're describing as a 'beta quality' release. MkLinux DR2 is a significant improvement on DR1, offering much better performance, better serial, SCSI, and networking support (including AppleTalk), and many bug fixes, although support for PCI Power Macs has yet to arrive. MkLinux DR2 is available via FTP and CD-ROM, but due to its huge size, I recommend the $20 CD-ROM from Prime Time Freeware. [GD]"* On a more personal level, Mr. Cook observed: *"I had a look at the GNU Fortran compiler last summer in August and found that it didn't do a very good job on a reasonable sized program that I had written. Compilation was slow and execution faulty. I didn't spend the time to investigate. Maybe the compiler has been improved since then."*

Free Adobe Acrobat shows PDF Files

Acrobat Reader is the name of a freeware document viewer that can be obtained from Adobe Systems, the PostScript people. It allows the user to view, search, and print any Portable Document Format (PDF) file on most computers of interest.

Glenn Wrate of Michigan Tech in Houghton deserves the credit for making program developers in Portland aware of Adobe PDF and its attractiveness. His E-mail dated September 17th proposed the consideration of Adobe PDF

as follows: *"I have finally finished my doctorate and I am working for Northern States Power Company on a research contract. Lately I have been thinking about how to improve the Rule Book. What do you think of publishing a revised version of the Rule Book on CD-ROM? The software I used for my dissertation, Adobe PageMaker, can create Adobe Acrobat files. Acrobat is a form of PostScript that allows text searching and linking. Several recent conference proceedings have been published on CD-ROM using this format. There are Acrobat readers for DOS, Windows, Macintosh, and Unix. The readers can also print portions or the entire file on any printer, not just PostScript printers. You can get an Acrobat reader at* ***www.adobe.com*** *under Free Software."*

So, the debate no longer is between WordPerfect and MS Word as in the preceding two newsletters. Now, the thinking is much broader. Rather than be tied to any one cheap, proprietary standard, why not instead switch to another format such as PDF that has a free reader?

FrameMaker from Frame Technology Corporation in San Jose, California, is a powerful, high-end (expensive) publishing program that is widely used in industry. BPA used FrameMaker to document its IPF (Interactive Power Flow) program. After BPA's Walter Powell was shown Acrobat, your Editor emphasized how much he was missing by the lack of a freeware viewer. So Mr. Powell checked a FrameMaker 4 manual dated September, 1993, but he found nothing about PDF files. He did not give up, however. A newer FrameMaker Release 5 manual for Unix, dated May, 1995, was found to devote 4 pages to the subject at the end of Chapter 27. The section heading on page 27-36 is *"Converting Frame-Maker files to Adobe Acrobat files."* So, developers at BPA could create Adobe PDF files today, if they really wanted to do so.

But what about more common MS Word or Corel WordPerfect (i.e., publishing programs for the masses)? Since no such output choice was noted under the "Save As" alternative of MS Word Version 7.0 on your Editor's Pentium, Dr. Liu turned her attention to WordPerfect. She discovered that the new Corel WP 7.0 will output PDF, and only $100 must be paid to upgrade from BPA's existing version 6.0 of WP (the Novell debacle). When informed of this, the response from Dr. Wrate was quite unexpected: *"FrameMaker is also an Adobe product, so it makes sense that it should also produce PDFs. I just checked at the bookstore. They have a student version of the WordPerfect Suite for $40, so I bought one. .... The question is, can it handle large documents as easily as FrameMaker or PageMaker?"*

No Need to Resubscribe

Free printing and mailing of this newsletter ends with the year, users are reminded. This present issue is the last to be mailed free of charge by the user group using snail mail. Paper as a distribution medium is ending. Acquire MS Word or WordPerfect 5.1 disk files from **pub/atp/canam** on Prof. Bruce Mork's aFTP server at MTU, and print your own, if paper copies are wanted.

So, there is no need to resubscribe (as announced several times during the past 6 years). All subscriptions are being terminated following mailing of this present issue.

Miscellaneous Intel PC Information

Packard Bell has *"become the No. 1 PC maker in the United States, beating Compaq by several percentage points."* This at the end of a table on page 102 of the June 10th issue of *PC Week* magazine. How was this possible, and where did PB come from? The table begins with 1989 when *"France's Groupe Bull buys Zenith Data Systems for $511 million."* Then in 1993 GB bought a 20% chunk of PB . In July of 1995, PB and NEC *"combine manufacturing and development forces for NEC's proprietary multimedia desktops sold in Japan"* and NEC acquired a 20% share of PB. Finally, in June of 1996, NEC announced plans to merge its own PC operations outside of Japan into PB. So, today, PB really is NEC. The new name is Packard Bell NEC, and it expects revenue to reach $8 billion dollars during its first year, according to President Beny Alagem.

IBM-compatible mainframe computers have been abandoned by HP according to a story on pages 43-48 of *HP Professional* magazine for July. What is HP doing? *"Our large integrated apps, what most people would describe as mission-critical applications -- supporting finance, manufacturing, personnel and order fulfillment -- are on HP-UX servers. For our LANs and for departmental file servers, it's Windows NT. If you have enough users in one place and can take advantage of the scalability of HP-UX, then that's our preferred choice. In a more isolated environment where you don't have as many users, NT can be a good choice."* Of course, that HP-UX is HP Unix (so much for the late-'80s hype about unifying Unix via OSF; even HP itself has not switched to its OSF Unix?).

Miscellaneous Small Items

Free printed copies of the 20-page July newsletter have not yet been mailed to subscribers of the US and Canada as this paragraph is being frozen for publication on December 12th. This is the third of four issues this year, which is expected to be the final year that news on paper will be mailed free of charge by the user group. Beginning with 1997, individual users are expected to pick up their own copies electronically (by aFTP transfers from the Houghton server or its Hannover mirror). If readers want paper, they can print their own. But July and October issues should be mailed before the end of the year. That is the plan.

Office Depot, which continues to print Rule Books for Dr. Ger, is the largest chain of discount office supply stores in the country with 539 stores which total about $5 billion a year in business. Yet, it is about to be purchased by its biggest competitor: Staples Inc., which has 517 stores and does just over $3 billion of business. According to a story on page B1 of *The Oregonian* dated September 5th, *"Staples and Office Depot control about 10 percent of the U.S. retail office supply business, triple the share of OfficeMax Inc., their nearest competitor. The new company will rename its stores as Staples The Office Depot."* Both companies have been amazingly successful since their humble beginnings in 1986. The head of Staples is Thomas Stemberg. *"Recently fired and looking for work in 1985, Stemberg needed a ribbon for his printer but found that stores weren't open or didn't have the right size. So he opened the first superstore that sells business supplies from computers to copier paper to printer ribbons at a deep discount."*

Comment cards within data of NEW LIST SIZES were first permitted July 8th. This was for users who did not kill such information as soon as it was recognized (using NOCOMM = 1). The first user to observe the misoperation when NOCOMM = 0 was Masahiro Kan of the Hamakawasaki Works of Toshiba Corp. in Japan. He had imbedded one comment, and found that during the restart, the data card immediately following the last of the NLS data lines was ignored.

A neutral earthing compensator (NEC) was of interest to Dayalin Padayachy of ESKOM in South Africa. His public E-mail dated July 23rd asked how to model this. It explained: *"A NEC is a Z-winding transformer that is connected between a three phase line and earth. It is used to earth delta systems."* But what is the problem (other than possible general unavailability of data, as for any transformer)? In his response later that same day, Michel Belanger of Seidel Inc. clarified the devices, and he seemed to agree: *"There are two grounding transformer configurations, one is Zig Zag and the other is star-delta. .... the three legged core star-delta transformer is a zig-zag transformer and this is already modeled in EMTP."* The point is, coupled-coil modeling dates back to Prof. Dommel in year one. In its simplest form, a transformer of any number of phases can be modeled by Type-51, 52, etc. branches [Z] = [R] + j w [L] . Any number of these can be interconnected arbitrarily, and mixed with nonlinearities. A good illustration of this is the NDSU transformer model of Prof. Don Stuehm as mentioned in newsletters beginning with the January, 1993, issue. The challenge was not with ATP, but rather with gathering of the data. For Prof. Stuehm, graduate student Bruce Mork, and others, this required innovative measurement on actual distribution transformers in the NDSU high-voltage laboratory. But when might such measurements be made on high-power devices (i.e., hundreds of MVA rather than KVA) ? This would be for sophisticated, multi-phase, saturable transformer models. If such data is not available, simpler models must be used, of course. An excellent example was provided a decade and a half ago by Frank Lembo of Long Island Lighting Company (LILCO) in Hicksville, New York. Pages 2-6 of the June, 1981, issue of Prof. Dommel's *EMTP Newsletter* carry the paper entitled *"Development and testing of a 138kV +/- 25^o phase shifter transformer model."*

NOCOMM = 1 in STARTUP took precedence over $BEGIN PL4 COMMENTS prior to correction on July 27th. James Randall of BPA is the user who first reported trouble (the preceding day). The problem was simple : NOCOMM was all-powerful, destroying all comments --- including those that the user obviously wanted to preserve for his .PL4 file. So, the power of NOCOMM was restricted to comment cards preceding the $BEGIN and following the $END PL4 COMMENTS card.

Center Journal by the Manitoba HVDC Research Centre contains the following second sentence of its lead story in the Summer 1996 issue: *"Those who are familiar with the system size limitations imposed on emtp because of its detailed representation have asked the following question ...."* As BPA's Robert Hasibar noted in the newsletter margin : what? Has Salford EMTP ever been unable to simulate any realistic, practical data? Your Editor knows of no such documented usage. If any reader does, he is invited to share his understanding. In the absence of such evidence, it must be concluded that the Manitoba peddlers have confused space with time. It is true that EMTP remains slow for large networks, by **real-time** standards. But that is not the objection that was made by the Manitoba writers. They referred to size, not time. They seem to be locked in real-time thinking.

$LISTOFF and $LISTON are not paired. This was explained to BPA's James Randall on August 14th when he had complained that operation was incorrectly restored upon exit from a $INCLUDE file. True, true, true (there is no automatic restoration anywhere). Mr. Randall's idea is interesting, even if developers were **not** sympathetic enough to make a change. Remember, there now is no history. The user can have as many $LISTON or $LISTOFF as he wants, in any order. Each is an absolute command (either list or do not list). But other schemes can be imagined. One could pair the OFF and ON requests just as a FORTRAN compiler pairs IF-THEN with ENDIF. This would not be as easy to program, but it could be done. Another alternative would be automatic restoration upon exit from a disk file of $INCLUDE (the idea here would be that status at an outer level could not be changed at an inner level). So, other rules are possible, and would be considered if there is broad-based support. But, at the very least, any such proposal would require preliminary explanation and discussion in public E-mail of Prof. Bruce Mork's Fargo list server. This is what Mr. Randall was told: if you believe such changes to be important, first argue the need publicly. Build a consensus.

Conversion of the July newsletter from MS Word to WP 5.1 was much more difficult than conversion of the April issue three months earlier. Real WordPerfect 5.1 on Dr. Liu's 486 DX2 / 66 at BPA was crashing regularly --- dozens of times. Because recovery was especially painful under MS Windows (rebooting was required each time, and networking made this slow), the work was quickly switched to plain old DOS which allowed repeated reentry into WP 5.1 without rebooting.

NCOMP is list size 24 --- the number of phases of compensation as explained in Section I-G-1 of the Rule Book. Well, use was limited to 50 prior to correction on Sept. 11th following the analysis of a data case that was supplied by Masahiro Kan of the Hamakawasaki Works of Toshiba Corp. in Japan. The data was said to originate with Dr. Hiroshi Okamoto of Tokyo Electric Power Company (TEPCO) in Japan, so correction was easy. The changes were confined to SUBR16 where VOLTBC(50) had overflowed. Only 6 correction lines to the fortran already in Dr. Okamoto's possession (see separate story) were required to switch to variably-dimensioned VOLTK . Confirmation of the correction came in E-mail from Mr. Kan on September 13th : *"I received the new TPBIG.EXE compiled by Dr. Okamoto, and this worked fine. The results coincided with that by M39. The simulation times are as follows for a 200-MHz Pentium PC :*

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Salford ATP   : 123 seconds
M39 of djgpp : 165 seconds"
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This benchmark is interesting for two reasons. Not only is this the first indication of 200-MHz performance (compare the 123 sec shown here with 197 for your Editor's 133-Mhz Pentium), it also shows that Salford ATP is fast compared with "M39." EMTP dating to 1984. Most of the advantage is believed to have resulted from that Schultz Revolution (Robert of NYPA) in the fall of 1993. Times shown are for the time-step loop, with total job times of Salford ATP being slightly longer (127 and 201 seconds). Win95 was used for both Salford ATP solutions. Curiously, the ratio of times (197 / 123 = 1.60) is slightly larger than the ratio of clock speeds (200 / 133 = 1.50), which indicates that something else besides frequency is superior.

Lower-case labeling of CALCOMP PLOT output was first seen September 13th. Previously, labeling used input text after case conversion (assuming no exclamation point to disable the process). This was partly right : one does want node names to be upper case. But labeling? No way. It makes much more sense to give the user whatever he keys, without any change of case, ever (i.e., ignoring any exclamation point). Credit for this reform goes to Prof. Corwin Alexander of Oregon State University in Corvallis. Although the need was realized during his work on HP Unix ATP (see separate story), the changes to SUBR28 are in fact universal, and affect all computers. The HP-GL and PostScript output will be affected, of course, and one standard data case was changed : exclamation points ("!") within DCNEW-15 were removed.

Those sample, one-inch, horizontal lines in the upper-right corner of CALCOMP PLOT output were another subject of interest to Prof. Alexander. He observed that the concept serves little if any purpose for a single curve. In the absence of a second or later curve, there is little need to distinguish one pen from another. So, beginning September 13th, the horizontal lines will be seen only on plots having 2 or more curves. Also, the accompanying curve number (to the left of the line) will be different because NUMBXX is being replaced by SYMBXX in order to remove the decimal point. For example, curve 2 henceforth will be marked by "2" rather than "2." as in years past.

The SUPERIMPOSE feature of CALCOMP PLOT has been activated to satisfy yet another request from Prof. Alexander: the desirability of having two or more variable types (node voltages, branch voltages, and branch currents) on the same graph. Of course, interactive plotting programs for PCs, such as TPPLOT or PCPLOT, have allowed such variable mixing for many years. But batch-mode plotting of ATP itself never has. On the other hand, the SUPERIMPOSE feature is probably two decades old. It was important during the mid-'70s when real pen-and-ink plotters dominated. This was prior to interactive plotting. It was easy to activate SUPERIMPOSE as illustrated in test case DC-35 beginning September 15th. To review general concepts, SUPERIMPOSE allows an arbitrary number of the following plot cards to produce graphics that will be superimposed on one plot rather than isolated on separate plots (normal use). There are no changes in the rules for component plot cards other than that all output except the curves is ignored for the second or later components. The time axis will normally be the same for each, so no problem with this. But the second or later vertical axis typically will be different (e.g., amps or foot-pounds rather than volts), so it is the user's responsibility to keep track of these scalings himself. The axis extrema will not appear anywhere on the plot, although they will be documented by a special line in the .LIS file if one is created, and if automatic rather than manual scaling is being used. Of course, operation of SUPERIMPOSE includes HP-GL and PostScript output, which are practically universal. The screen plotting was done for Salford EMTP that runs on MS-DOS PCs although these changes, too, are nearly universal (only BEGPLT is installation-dependent).

/STATISTICS is the slash card that is used to sort data by class for a STATISTICS or SYSTEMATIC data case. But sorting died while attempting to process any such marker prior to September 19th when the problem first was pointed out in E-mail from Prof. Laszlo Prikler of the Technical University of Budapest in Hungary. Operation seems to be particularly important for users of ATPDRAW because this data assembler from Hans Høidalen relies upon such sorting. So, a correction to the sorting logic of OVER1 was made, and corrected TPBIG eventually (see separate explanation of UUCODE) was sent to Prof. Prikler using two pieces of E-mail on September 30th.