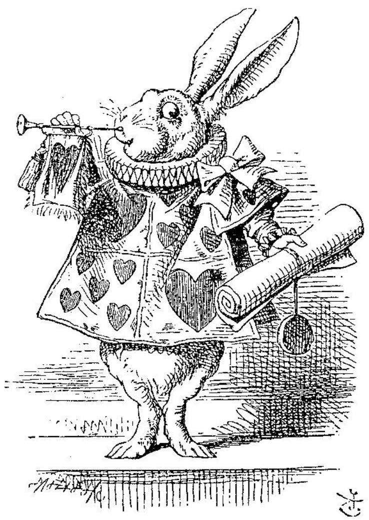
Volume 8, Number 3 — May 1983

NETwords

the NETWORKS SIG newsletter

Flash! The World is Ending!!

Flash! The World is Ending!!



An Important Announcement

AS THE BASIC SIG NEWSLETTER EDITOR SAID AT A RECENT EDITOR'S MEETING...

THE WORLD, AS WE KNOW IT, ENDS ON JULY 1, 1983!!!

BUT THE NETWORKS SIG HAS MADE A SPECIAL ARRANGEMENT WHERE BY...

THE WORLD DOES NOT HAVE TO END FOR YOU!!!

YES FRIENDS AND FELLOW NETWORK SIG MEMBERS, IF YOU GET YOUR ACT TOGOTHER AND RETURN THE SUBSCRIPTION FORM AT THE REAR OF THIS ISSUE, YOU CAN CONTINUE TO RECEIVE NETWORDS...THE DEFINITIVE DECUS NETWORKS SIG NEWSLETTER.

EFFECTIVE JULY ONE, ALL DECUS NEWSLETTERS GO ON A PAID SUBSCRIPTION BASIS. IF YOU HAVEN'T SUBSCRIBED, THE GREAT VAX COMPUTER IN THE DECUS OFFICE WILL STOP GIVING OUT MAILING LABELS WITH YOUR NAME!

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YOU CAN GO A NUMBER ONE FIRST CLASS -- BETTER THAN DELUXE! -- AND GET EVERYTHING FOR ONLY $120 (GET YOUR COMPANY TO PAY, THEY'RE THE ONES WHO SPENT ALL THAT MONEY ON THE COMPUTER THAT THEY NOW EXPECT YOU TO RUN!) (HECK, FOR $120 YOU CAN'T EVEN BUY A MODULE FOR AN LSI ELEVEN)

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TRY FOR THE $120 EVERYTHING PLAN AND IF YOUR BOSS TELLS YOU YOUR HUMOROUS WRITING HAS IMPROVED GREATLY, SETTLE FOR THE $45 PLAN.

BUT WHATEVER YOU DO, DO IT SOON. WE DON'T WANT THE WORLD, AS WE KNOW IT, TO END FOR YOU. JULY ONE IS JUST AROUND THE CORNER.

NOTE FOR NON-US CHAPTER MEMBERS: ALL OF THE ABOVE MAY NOT APPLY TO YOU. CONTACT YOUR NATIONAL CHAPTER FOR DETAILS.

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Subscription Form in the Rear

Remote Terminal Front-End (cont.)

Tools and Techniques

Part of the purpose in building the initial, restricted implementations of the CAM and Tops-20 software was to determine what tools to use and what techniques to follow. A major early decision was that an implementation language other than assembly language was to be used wherever possible. The reasons for such a choice have been elaborated upon for years in many forums and we will not duplicate them here. However, for some reason the use of high-level systems implementation languages is much like the weather: everyone talks about using them but no one does anything about it. The choice of language was quite restricted, in that a desire to use the same language on both the '20 and the '11 effectively limited it to Bliss. In retrospect, even if we had had more choices Bliss would still have been the best choice we could have made. The facilities and power of the language allowed us to do all of the implementation without any assembly coding whatsoever. The following features are notable reasons why we found it so successful:

- the ability to specify different entry/call linkage techniques made it easy to adapt it to the various conventions employed within existing Tops-20 code;
- the language generates efficient code, although some care is needed on the part of the programmer to maximize that efficiency; in general, we found that claims by Bliss afficionados of code "as good as hand-coded" were justified;
- the very powerful macro facilities of the language made it possible for us to use notations and operations in exactly the same manner and with the same conventions used by assembly-language coders.

The latter point was extremely important for the code that interfaced to Galaxy, as it was possible for us to write functions which accessed the formatted-text and Write-to-Operator capabilities available within Galaxy and which were generated by the compiler exactly like those generated by the macro assembler. This was true for coding within the monitor as well and renders the code easily understandable to those who know other sections of the system.

Finally, the use of a higher-level language led to a very quick implementation and checkout. All told, only three man-months were expended building, testing, and putting into production both the Tops-20 and CAM implementations, including the necessary implementation tools. We have a fairly nice set of routines for setting up code which either resides in the monitor or interfaces with Galaxy and are in the process of cleaning them up a little bit. We expect these will appear on a future LCG symposia tape.

For the next and future implementations we are planning to utilize a number of tools we have either "acquired" or developed along the way with this and other projects to make the use, maintenance, and operation of CAMs much easier. Specifically, the next version of CAMs shall employ a remote symbolic debugging capability, the ability to operate the system remotely from the central site, and most importantly, the ability to install new versions of software from remote sites. CAM hardware events will also be integrated into a comprehensive error and uptime reporting system based on the SYSERR files currently produced by Tops-20. These latter points are quite important from a cost standpoint as they have the potential to save many staff hours and to make those that are spent quite productive, and should ultimately result in extremely high availability. These items were not heavily employed in the initial, restricted system as it was quite simple and has proven to be extremely reliable (attributable, we believe, to the use of Bliss for coding it).

Implementation Status and Short-Term Futures

The current Version 1 CAM and associated systems have been in place for a little over a year. The Tops-20 Transport Service runs on both of our 2060's and the 2020. At present, two CAMs (the original PDP-11/34A and a PDP-11/44) supporting a total of 96 ports are in production operation at CWRU. One CAM drives three line-printers. The CAMs are linked to one or more '20s utilizing DECnet lines running at 56Kbits/second. Users who access the systems through CAMs utilize a simple command language with much of the flavor of the Tops-20 Mini-Exec. Commands are available to select a system to which to connect a terminal, obtain status of all of the ports on the CAM, and control the activation of CAM-to-terminal flow-control. A privileged command (based on where the terminal resides) exists which releases the terminal to general RSX usage. Both CAMs have floppy disks which are used for bootstrapping but which are not available for general use. One of the CAMs also supports the gateway to OCLC (see [KUKU 82] for more information). A third CAM is expected to be installed in late spring.

Version 1 CAM performance in terms of response has varied from good to marginal. Early problems with CAM performance and reliability were traced to a questionable technique for handling packet acknowledgement and queuing in the Tops-20 implementation of DECnet for Version 4, which has been redone for Phase III of DECnet-20. However, getting around the problem in the interim forced us to restrict message sizes between CAMs and the '20 artificially constricting data flow and causing the Transport Daemon to occasionally demand excessive amounts of the system. We are confident that the changes for Phase III will solve those problems. Further, since we are presently running Phase

II of DECnet-20 and because the CAMs and '20s are not fully-connected, some traffic is routed through the intermediate '20s using a "poor-man's routing process" resident in the '20. Traffic routed in this manner is substantially less responsive than that which goes directly to the destination system with no route-through. Again, we expect that Phase III will eliminate those problems. Response for CAM terminals which are not routed to their destination using "poor man's routing" is quite comparable to hardwired lines. When the load is very high, response on CAM terminals is sometimes better.

Although a couple of weeks of shakedown were required, performance in terms of reliability and robustness has been excellent. The early weeks of shakedown provided us with several marvelous examples of some of the consequences of distributed computing, such as distributed crashes. However, since that time, CAMs have gone down only when their hardware fails, or maintenance is being performed, or (on the CAM which also supports development) someone gets careless and crashes RSX. Uptimes of over a month are normal, and one string of three months has been recorded. Both the CAMs and the Tops-20 Transport Service have proven to be quite fault-tolerant in terms of handling communications drops and other outages. Finally, Version 1 is also capable of handling sustained, long-term input at 1200 baud provided that the data is being consumed by processes on a '20 which is lightly loaded.

We are preparing to begin implementation of Version 2 of the system, which shall employ a full transport service and CAM-side implementation. The major functions to be provided by Version 2 were described in the introduction. The command language employed by Version 2 will have all of the features of the COMND% Jsys, in fact users will not need to specify a system to use, they can simply give a LOGIN command which will hunt out the right system for them. The user interface shall also be enhanced with a number of commands that allow users to determine global status. One use for this is to provide information about expected up-times for systems which are down for some reason. Another feature for Version 2 is a terminal load-control facility which will arbitrate access to ports on the CAM (and other CAMs) to ensure that all users receive a fair opportunity to access the systems.

Beyond Version 2, our "wish list" anticipates the following developments:

- implementation of a powerful, distributed screen-editor;
- CAM/Transport Service implementations on both larger and smaller processors (such as VAXes and personal computers) and under different operating systems (such as Unix, VAX/VMS, RT-11);
- implementations employing multiple processors which have no local mass storage but which employ Transport Service techniques to access a common file-server; simple minor experiments utilizing an LSI-11 running a disk-less RT-11 have already been carried out.
- special-purpose workstation configurations probably constructed out of hardware such as small VAX's and VAXstation displays;
- expansion to fully-configured departmental clusters including such items as tape drives and other major shared peripherals;
- further gateways similar to that used with OCLC to other information services.

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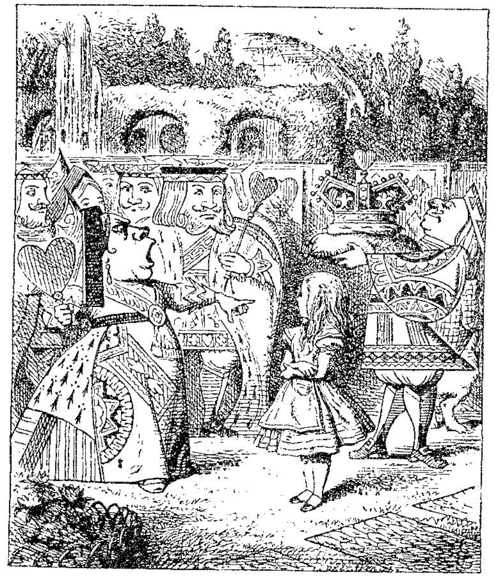


The Queen turned crimson with fury, and, after glaring at her for a moment like a wild beast, began screaming 'Off with her head! Off with——'

Accessing Telex . . . (cont.)

of the call. Having a TWX or telex line is all that is needed as the international record carriers are true common carriers and bill back to the Western Union subscriber without the need for the subscriber to have previously entered into a service agreement with the IRC.

As in domestic TWX-to-telex direct connection, ASCII-based word processors connected to the TWX network encounter the same problems with the idiosyncratic TWX restraint issued by the international record carrier ASCII-to-Baudot code and speed converters. As of this writing, none of the IRCs provide the more standard XON/XOFF flow control over the TWX network.

Thanks to deregulation, an alternative method of achieving direct connection with overseas telex stations is now being offered. IRT Telecommunications, among others, is offering 300- and 1200-bit-per-second telephone dial-up numbers using conventional ASCII code and XON/XOFF flow control. However, unlike access via TWX, for this type of service the user must enter into an agreement with the IRC and obtain an account number and password for billing purposes.

International Store-and-Forward

Both Graphnet and Western Union Infomaster offer international telex store-and-forward in an essentially identical mode as domestic store-and-forward.
In addition, periodic traffic status reports can be provided to the originating TWX or telex terminal in the case of Infomaster, or by mail or messenger in the case of Graphnet. These reports list each message, and date and time of final delivery to its international telex destination.

The international record carriers each have their own version of store-and-forward service. Most of these services can be accessed via TWX, telex or telephone dial-up lines. Dedicated tie lines are also available for users whose volume justifies such.

One of the more sophisticated of the IRC store-and-forward services is RCA Global Communication's Telextra service. Telextra may be accessed by TWX, telex or telephone dial-up at data rates of up to 1200-bits-per-second. Telextra has two unique features. First, Telextra can give immediate confirmation of delivery by return TWX or telex. This means that upon completing transmission of each store-and-forward message, the Telextra computer automatically dials the sender's TWX or telex machine and transmits a brief message identifying the message number, date and time of delivery and the answerback of the overseas telex terminal to which the message was delivered. Unlike most store-and-forward services, Telextra does not aggregate these confirmations for transmission once or twice per day, but sends them upon completion of each individual delivery. A second feature of Telextra is the ability for the sender to specify the length of time for which the Telextra computer will continue to attempt delivery to the overseas telex terminal. This allows the sender to automatically trigger a report of non-delivery of time-sensitive messages which cannot be handled promptly.

Most store-and-forward services, both domestic and international, also allow the sender to specify automatic upgrading of the telex message to a telegram or cablegram should the store-and-forward service be unable to deliver via the telex network.

Other International Services

Finally, it is worthy to note that the United States is unusual in its postal delivery of electronic messages. Mailgrams and ECOM letters generally do not exist in most foreign countries. At present, the British Post Office is experimenting with a Mailgram-like product and this soon may be accessible through the international record carriers.

For overseas delivery to addressees not having their own telex terminals, Cablegrams (also known as Cables) are available through the international record carriers. This service is roughly equivalent to domestic telegrams wherein the message is printed at an overseas telegraph office and delivered by messenger to the recipient. Some businesses who receive many Cablegrams register a unique alphabetic "cable address" with their national telecommunications service. This saves senders money as cablegrams are billed by the word, including the address.

ACCESS TO THE COMMON CARRIERS

Access to the various networks may be achieved through dial-up service or through a dedicated direct line.

Until recently, dial-up service to the common carriers had to be made over the Western Union telex or TWX network. This was because AT&T was prohibited from providing domestic or international record carrier service under an anti-trust ruling. Several store-and-forward services, such as RCA Telextra, were set up to receive messages over the telephone lines for later re-transmission overseas.

Deregulation has now put an end to this artificial limitation and it is now possible to access most of the international record carriers via a local dial-up telephone number or via an "800" toll free number. However, when access was through Western Union, international record carrier charges could be easily billed back to the TWX or telex subscriber. When accessing an international record carrier via telephone lines, it is necessary to have established credit with the carrier and to have made arrangements for a password to gain access.

The Western Union TWX network remains an excellent way to gain access to many telecommunications services. Obtaining TWX service is done in approximately the same way as obtaining telephone service. There is an installation charge, a basic monthly charge, and various charges for services used. The customer can provide his own terminal equipment, or lease equipment from Western Union. TWX service is compatible with most communicating word processors utilizing 110-bit-per-second ASCII. A word of caution however: while connection can be made to the TWX network using most "Bell 103" compatible modems, including simple acoustic couplers, Western Union's TWX utilizes its own unique "restraint" technique for telling its customers to pause transmission under certain circumstances. (This type of flow control was mentioned briefly above and will be discussed further in the section on Speed and Code Conversion below.)

The Western Union Telex network offers similar services to TWX but utilizes the 50-bit-per-second Baudot code rather than ASCII. As such, the telex network is not compatible with most communicating word processors without some type of specialized interface which translates between ASCII and Baudot. These interfaces may be simple code converters such as those made by NuData Corporation (Little Silver, NJ) and Expandor (Pittsburgh, PA), or more complex devices such as those made by CHAT Communications Corporation (Mountain View, CA) or ENVAX (Dallas, TX). The latter provide editing capabilities and internal memories which can store messages for later transmission as well as receive messages when the communicating word processor is turned off or busy with other tasks.

Most of the common carriers also offer dedicated direct lines. The dedicated direct line consists of a pair of wires, usually leased from the local telephone company, which connect the user's site to the particular common carrier. These lines usually entail an initial installation charge plus a monthly cost paid to the local telephone company over and above the common carrier's per-message tariffs. A dedicated direct line has the advantage of providing immediate access to the common carrier and, in some cases, can be tailored to the specific technical requirements of the customer site.

SPEED AND CODE CONVERSION

With a number of different data transmission rates, as well as the differing ASCII and Baudot codes, the ability to interconnect the wide range of computers and telecommunications services often depends on appropriate speed and code conversion. This conversion may be accomplished by the originating terminal station, by the network itself, by a gateway between two networks, or, in some instances, by the receiving terminal.

To be totally compatible with all networks would require a considerable range of hardware and software beyond economic feasibility for most users. Fortunately, most businesses make use of only a few of the wide range of networks and services available for most of their telecommunications. For example, some businesses are heavy users of international telex for short, time-critical messages; others may use domestic Mailgrams and ECOM letters; still others may need to send lengthy reports on a regular basis.

Various services lend themselves to each of these applications. Short, time-critical international messages can best be handled by direct connect international telex; Mailgrams and ECOM letters are easily sent by Western Union Electronic Mail, Incorporated; lengthy reports often can best be handled by the store-and-forward services who receive transmission at a high data rate and re-send during off-peak hours.

A company would do best to select a network and a common carrier service most closely suited to the bulk of its telecommunications requirements and select its word processing hardware and software for the easiest access to and interface with that network. For example, if 50-bit-per-second Baudot telex is the primary service used, it may be worth the extra cost and trouble to select an appropriate interfacing device which makes the typical ASCII-based communicating word processor appear to be a slower, Baudot telex terminal.

Nonetheless, virtually all services discussed in this paper are available one way or another through all of the carriers. The choice of carrier and network ultimately becomes one of cost and convenience.

For the vast majority of communicating word processor users, simple dial-up connections via the telephone network or the TWX network will provide maximum flexibility at minimum cost.

TYPES OF PUBLIC NETWORKS

Given the purpose of the public networks to deliver messages from one location to another, the common carriers utilize three basic types of network services: line switched, message switched, and packet switched.

In a line switched service, the originating terminal is, in effect, directly connected to the destination terminal for the duration of the transmission. This is similar to a conventional telephone connection wherein one individual speaks to another over the phone. Some technical magic, such as dialing, occurs to establish the line switched connection after which the network becomes transparent and what is spoken into one telephone is reproduced at the other. Just as in a telephone connection it is necessary for the individuals at each end of the line to understand the same language, in a line switched service it is necessary that the machines on opposite ends of the line communicate at the same data speed in the same code.
The domestic networks of AT&T and Western Union are line switched as are the primary services of the international record carriers.

Message switching generally takes the form of "store-and-forward" services such as traditional telegrams and cablegrams. In a store-and-forward mode, the common carrier accepts a message for later delivery. Sometimes the common carrier processes this message in some way as part of the service. For example, one may telephone Western Union with a voice message which an operator will transcribe for later delivery as a printed telegram. Some store-and-forward services accept messages at high data rates from ASCII computers and then perform the conversions necessary to re-send these messages in slow speed Baudot code to telex stations.

Message switched networks include Western Union's Infomaster, Easylink, and Western Union Electronic Mail, Incorporated (WUEMI), RCA Telextra, TRT's Stortex, Graphnet and others. (The "mailbox" services of Compuserve and Source Telecomputing may be considered message switched networks but are limited to use by their own subscribers.)

Packet switched networks function by accepting messages in varying codes and varying speeds and converting those messages into a series of "data packets" each having an imbedded address identifying their destination. Prior to leaving the network, these packets are converted into a form understood by the recipient in an appropriate code and speed. From the user's perspective, the packet switched network may have some of the characteristics of a line switched network because the conversions to and from network standard packets happens so rapidly that the network appears transparent. Similarly, the packet switched network can provide access to various "host" computers which, in turn, can perform a message switching function.

Graphnet recently introduced its Freedom Network as a packet switched network. It allows users to "connect" their terminals to other users on the Freedom Network as well as to the domestic telex and TWX networks, the international record carriers, and to Graphnet's own store-and-forward computer.

CONFIGURING THE COMMUNICATING WORD PROCESSOR

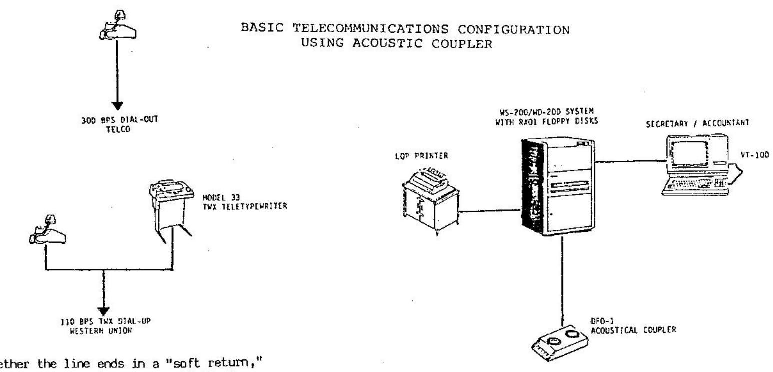
Users of Digital Equipment Corporation's various word processing systems have three basic communications modes available through the WPS software family: AX, DX, and CX. AX and DX modes are specially designed methods by which one DEC machine communicates with another. AX and DX utilize a communications procedure unique to DEC and can only be used with DEC systems or non-DEC systems which can emulate AX or DX.

CX, or Character Transmission, is the mode in which DEC word processors emulate "dumb" ASCII terminals and make themselves appear to other devices as relatively simple telecommunications terminals.

CX has some additional features which are of great help in using most telecommunications systems. For example, as a word processor, the DECmate WS-78 and WS-200 systems deal with a number of special formating commands such as tabs, rulers, boldfacing, underlining and so forth. Telex machines are far less sophisticated and can only print character by character. In fact, most telex printers have to be told to stop at the end of the line, return the carriage to the beginning of the line and then advance to the next line on the paper. This "carriage return/line feed" sequence must be sent by the DEC word processor at the end of each

Accessing Telex . . . (cont.)

BASIC TELECOMMUNICATIONS CONFIGURATION
USING ACOUSTIC COUPLER



printed line whether the line ends in a "soft return," a "hard return" or a "paragraph marker." Similarly, a telex printer has no tab stops and, even if it did, it would have no way of understanding the DEC word processor concept of a ruler.

CX overcomes these problems by allowing the DEC user to specify a "control document" which instructs the DEC word processor to send various special word processing functions as commonly understood ASCII characters. It also allows the DEC word processor to respond to other telecommunications terminals as if it were one of their own kind. For example, an ASCII Control-E character is accepted both internationally and domestically as a "who are you" (sometimes called "WRU" or enquire character). Receipt of a Control-E provokes an identifying answerback from any TWX or telex terminal. Similarly, an ASCII Control-G character rings a bell or beep tone to attract the attention of a human operator at the receiving terminal.

A typical telecommunications CX protocol document might look like this:

```
-----------------START PRINT CONTROL-----------------
CX
RECEIVE 005 SEND CR LF çANSWERBACKç CR LF
SEND EOL CR LF
SEND TAB 040
SEND EOP CR LF LF LF LF çPAGEç CR LF LF
SEND EOD 008
------------------END PRINT CONTROL------------------
```

When named as the control document in the DEC System Options (SO) menu, this document would instruct the DEC word processor to do the following:

1. Whenever a Control-E is received, send a carriage return and a line feed followed by the word "ANSWERBACK" and then another carriage return and line feed.
2. Whenever an end of line (EOL) appears in a document, send it as a carriage return and line feed.
3. Whenever a tab occurs, send it as a series of spaces.
4. Send each end of page (Page Marker or New Page) as a carriage return, four line feeds, the word "PAGE", another carriage return and two more line feeds.
5. When the end of the document (EOD) is reached, send an ASCII Control-G character to ring a bell or beep.

Notice that the ASCII Control-E is represented as "005", the space character as "040", and the Control-G as "008" in the document. These numbers are the numeric equivalent of those characters expressed in the base eight octal system. A table of the octal equivalents of all ASCII characters is given in the section on using communications in the various DEC word processing system documentation packages.

Control documents can be created to adapt to various needs. For example, one may wish to ignore page markers altogether in the control document as most telex printers print their output on continuous rolls of paper.

In addition to the control document, DEC word processors permit imbedding non-printing ASCII characters and instructions within documents to be sent under CX mode. Western Union Infomaster users must utilize Control-A, Control-B, and Control-C to indicate the start of address, start of text, and end of text. This is achieved on the word processor by using the "print control" invoked with the gold key and left bracket ¤ and the letters CX. Thus a typical Infomaster message would look as follows:

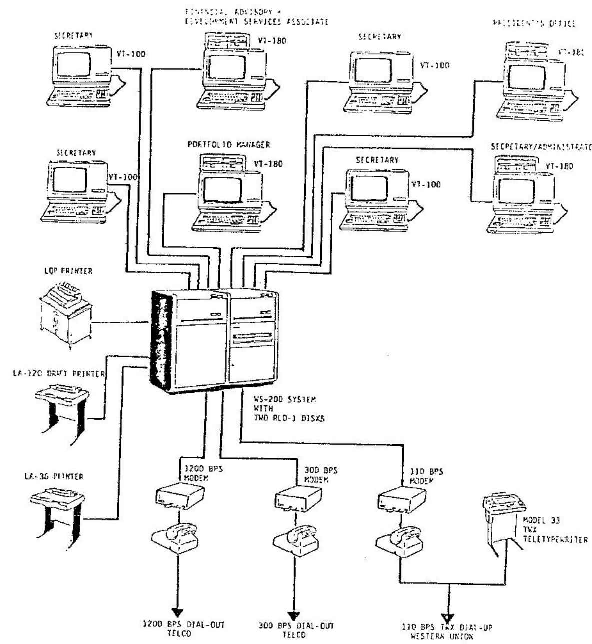
```
-----------------START PRINT CONTROL-----------------
CX
SEND 001
------------------END PRINT CONTROL------------------
00 SAN FRANCISCO CA 10 DEC 82
TLX 4354312
ATTN: JOHN SMITH
-----------------START PRINT CONTROL-----------------
CX
SEND 002
------------------END PRINT CONTROL------------------
DEAR JOHN:

PLEASE SEND DOCUMENTS PER OUR DISCUSSION TUESDAY.

SINCERELY,
FRANK
-----------------START PRINT CONTROL-----------------
CX
SEND 003
------------------END PRINT CONTROL------------------
```

The 001, 002, and 003 within the print controls are automatically sent by the DEC word processor as Control-A, Control-B, and Control-C respectively.

MULTI-USER TELECOMMUNICATIONS CONFIGURATION
INTEGRATING PERSONAL COMPUTERS AND AUTO-DIAL MODEMS



The imbedded CX instruction can also be used to cause the DEC word processor to pause and wait for a specific character to be received prior to proceeding. This can be very useful for presenting passwords and access codes upon request. For example, upon logging onto the Western Union Electonic Mail system, the WUEMI computer requests a user identification number. It makes this request by sending: YOUR ID PLEASE:> As this always happens at the beginning of a log-on, the DEC word processor can be instructed to send a "null" character and wait for the ">" symbol (an octal 076) to appear. Once ">" is received, the identification number can be automatically sent. The CX instructions look like this:

```
-----------------START PRINT CONTROL-----------------
CX
SEND 000 WAIT 076
------------------END PRINT CONTROL------------------
-----------------START PRINT CONTROL-----------------
CX
SEND ç005431ç
------------------END PRINT CONTROL------------------
```

Because these CX print control instructions are used repeatedly in each telecommunications message document, it is worthwhile to create them once in an abbreviation library and invoke them using the gold key and "abbrv" as needed.

In addition to the control document and imbedded CX characters and instructions, each common carrier has its own requirements for message format. The marketing, sales and technical people as well as the carrier's user manuals and instruction sheets are helpful in understanding the specific formats. Many common carriers such as WUEMI and Graphnet provide "800" numbers for technical support and are happy to run over the network trials of user systems as part of initiating new subscribers.

Worth mentioning is the use of User Defined Keys (UDKs) on the various DEC word processing systems. This feature of DEC software can save a lot of operator time and inconvenience in setting up the CX menu options and invoking certain log-on procedures. For access to some carriers, it may be possible to store a standard document which handles the log-on exchange between the DEC system and the common carrier. After this exchange is completed, the word processing operator enters any manual information such as dialing instructions, returns to the communications menu using "çR" and elects the actual document to be transmitted.

Users should consult the DEC publication, Using Communications (AA-5264D-TK) for more detailed discussion of some of the communications methods and procedures discussed herein.

SOME WARNINGS ABOUT DOCUMENTATION

While quite detailed, the DEC word processing documentation does not tell you everything you may need to know in dealing with some common situations. While there may be many secrets to the DEC software, three items have posed frustration and difficulty for many DEC users:

DECNET-20 Tutorial (cont.)

1.3 NRT - Network Remote Terminals

Support for Network Remote Terminals was added in the release 5.0 TOPS-20 monitor. The SETHOST program initiates the connection and does not fondle the characters sent across the link, thus reducing overhead in the user's host (compared with the HOST/NRTSRV combination of release 4), while the MCBNRT program handles the connection in the server host (it no longer uses PTYs on the remote end, it uses NRTs). This implementation supports NRT connections between DEC-20 systems only. An unsupported utility (HOST) will be distributed with release 5.1 to handle NRT connections between DEC-20's and VAXen.

1.4 Remote PRINT And Remote SUBMIT

This facility allows a file to be entered into the print queue or input queue on the remote system. The file must be on the remote system before the PRINT or SUBMIT command is given, but it can of course be sent across the network with NFT just before the queue command is given.

2.0 Q AND A

1. Can an old DN20 used for IBM Comm be used for DECNET?

   Yes, if it has 128K and the IBM Comm lines are removed.

2. Will DECNET-20 interface to both the CI and the NI in the future?

   Yes, the DN20 will be used to interface to the NI.

3. Have the small limits on Passwords and User Names been removed?

   Yes

4. Will the TOPS-10 implementation of DECNET be similar to the TOPS-20 version?

   Yes, but TOPS-10 will be a full routing node, ie: it can have multiple DN20's.

5. Please add switches to the remote PRINT and SUBMIT commands

   Noted.

6. Please add RMS support in DECNET-20, so that a program can do an OPEN of a file on a remote host.

   Noted.

7. Please, when RMS support is added, allow GTJFN to work too, so that programs are not forced to use RMS.

   Noted.

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MESSAGE: ____________________

CONTACT:

NAME ____________________

ADDRESS ____________________

TELEPHONE ____________________

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SIGNATURE ____________________ DATE __________

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