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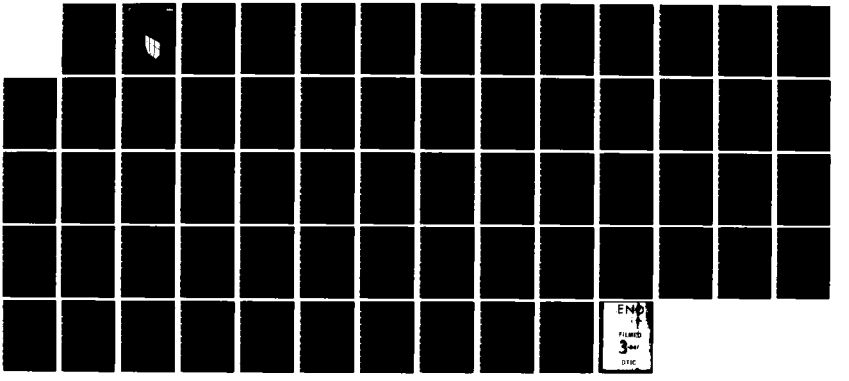

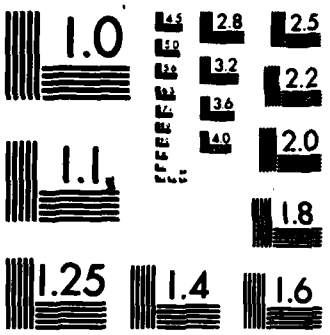

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US Army Corps
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TECHNICAL REPORT P-155
January 1984

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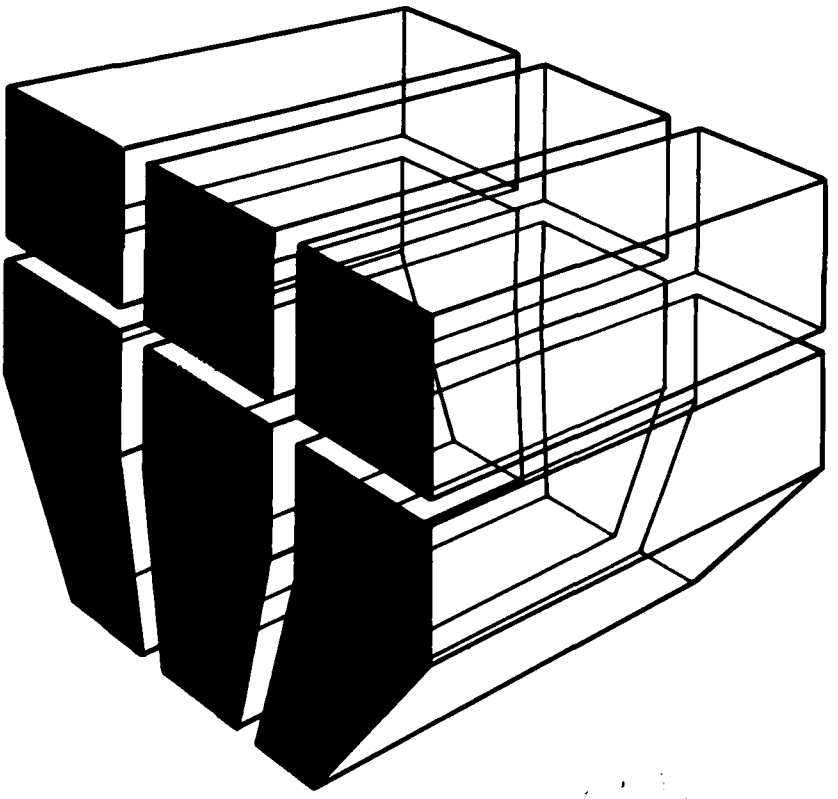
THE MICROCOMPUTER KNOWLEDGE BASE: INTRODUCTION AND USER INSTRUCTIONS

by
Frank Mabry
William Hohensee
Gregory Norris



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Access and user instructions are given for the Microcomputer Knowledge Base (MICROS), a vehicle for supplying general information about the applications of microcomputers in support of the Corps of Engineers Civil Works mission. MICROS is intended to foster interaction between Corps field personnel and experts in various areas of microcomputer applications.

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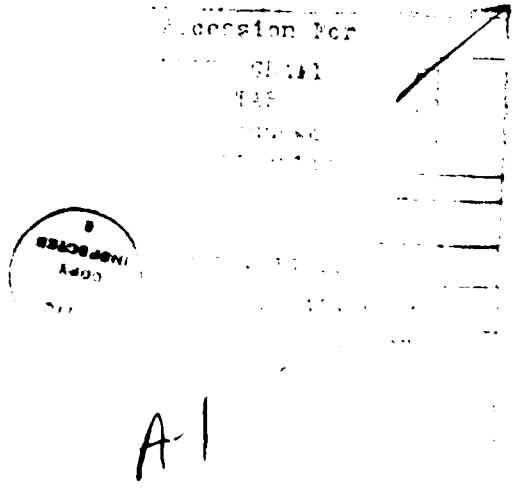
FOREWORD

This work was done for the Directorate of Civil Works, Office of the Chief of Engineers, under reimbursable task order E86823159, "Project Operations Management System." The technical monitor was Mr. Jack Bickley, DAEN-CWO-M.

The principal investigator for this work was John M. Deponai, III, of the Facility Systems Division (FS), U.S. Army Construction Engineering Research Laboratory. The authors of this manual are Gregory Norris of CERL-FS and Frank Mabry and William Hohensee of the Microcomputer Systems Laboratory, University of Illinois at Urbana-Champaign. Scott McCaughrin, Michael Levy, and David Schuster of the University of Illinois Medical Computing Laboratory contributed significantly to the development of the Knowledge Access System that supports the MICROS knowledge base.

Mr. E. A. Lotz is Chief of CERL-FS. Dr. L. R. Shaffer is Technical Director of CERL, and COL Paul J. Theuer is Commander and Director.



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THE MICROCOMPUTER KNOWLEDGE BASE:
INTRODUCTION AND USER INSTRUCTIONS

1 INTRODUCTION

Background

Microcomputers represent a major opportunity for significant improvement in the operation and management of many Corps activities. Due to the rapid proliferation of microcomputers and their associated software, Corps managers procuring microcomputer systems (hardware and software) are faced with difficult and confusing choices.

The means of getting information from experts at the research laboratories to users in the field has always revolved around written documents such as technical reports. This approach has its drawbacks, however. The time it takes to publish a written document--particularly one concerning an area as dynamic as microcomputer technology--is simply too long. A means is needed to give Corps decisionmakers up-to-date information on this fast-changing technology.

To address this problem, CERL was tasked with establishing a forum--a user's group--for identifying management information automation needs and for facilitating the sharing of lessons learned and of microcomputer-based solutions throughout the Corps Civil Works community. CERL's research was oriented to management information applications; specifically excluded were scientific and engineering applications, which are the responsibility of Waterways Experiment Station (WES).

A mechanism was developed to accomplish the users' group function electronically using knowledge base technology. This electronic medium--the Microcomputer Knowledge Base (MICROS)--should prove a much more efficient way of communicating ideas than holding physical meetings, although it does not preclude the use of meetings as an additional means of sharing information. MICROS is a vehicle for supplying general information about the applications of microcomputers in support of the Corps Civil Works mission and about specific information to solve specific problems. It is intended to support the ongoing interaction between Corps field personnel and experts in various areas of microcomputer applications. The system, which is installed on the VAX 11/780 at the University of Illinois, is available now for use as part of a developmental pilot project.

Objective

The objective of this report is to give access and user instructions for the Microcomputer Knowledge Base.

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Approach

Chapter 2 describes knowledge base technology in general and the role of the MICROS knowledge base in particular. The following chapters lead the user through system access and use, including example user sessions. Commands are synopsized in the appendices.

2 KNOWLEDGE MANAGEMENT SYSTEM

A knowledge management system has two major components: a knowledge base focusing on a particular topic, and the actual means to access the information in that knowledge base. This report focuses on one such knowledge base, MICROS, which addresses microcomputers, their applications, hardware and software issues, and a wide variety of related concerns. The means for accessing that knowledge base, the Knowledge Access System (KAS), is also described in detail.

What Is a Knowledge Base?

A knowledge base is a highly organized collection of information stored on a computer which focuses on one particular subject. The primary function of a knowledge base is as an information resource for focusing and refining an inquiry into a given topic. A knowledge base is not, however, simply a static collection of facts. It is an evolving and dynamic database which encourages a user to actively expand the available store of information through posing questions and making comments on specific topics. In this way a knowledge base is as much a means for managing new ideas as it is a place for storing existing facts.

In understanding how the knowledge access system actually works, it is often helpful to think of it as a "tree-type" structure. The trunk of a tree is a basic starting point from which there are many informational "branches" to explore. The solution to a user's problem will conceptually be found at some distant branch or leaf of the tree. The system's job is to move the user efficiently and painlessly to that point within the tree. The primary difference between the knowledge base and a tree-structure is that unlike the tree, the same logical leaf of the knowledge base may be found at the end of two different branches.

In the knowledge base each of the branches and the leaves are referred to as "frames." A frame generally corresponds to one particular topic, usually providing an expository statement about that topic. If the frame is a branch as opposed to a leaf, it will also provide menu-like access to other branches or frames representing further informational refinements of the current frame. (Throughout this document names of frames are indicated by enclosing them in brackets. For instance, the "start" frame will be referred to as <start>.)

What Is the Knowledge Access System?

The means by which one uses a knowledge base is through the Knowledge Access System (KAS). This system is a software package that makes information available to the user and manages the relationships among the various ideas within the knowledge base, while also giving the user a means to expand the knowledge base. The Knowledge Access System described here goes a step further by automatically routing a copy of a user's inquiry or comment about a specific topic directly to the designated content expert in that specific

area. In this way the Knowledge Access System provides a highly efficient form of communication with experts in the field.

The Knowledge Management System described here, while fully operational and available on-line, is a developmental pilot project. The long-range research goal of the project is to develop a generalized Knowledge Utility System that supports "knowledge engineering" in multiple problem domains, on a variety of different computing systems. As the system is developed it will constantly undergo changes as new capabilities are added. Because the system already supports user-friendly access to changing material, the system itself will be used to announce new features and capabilities as they become available.

3 USING THE MICROCOMPUTER KNOWLEDGE BASE

As of the date of this report, MICROS is composed of over 250 frames of information about microcomputers. It includes a comprehensive outline of the general area of microcomputers along with their current and potential uses in the Corps. It is also intended to use MICROS as an on-line library of applications programs that have proved useful to various field offices in the Corps.

Getting Access to the System

MICROS is installed on the University of Illinois' VAX 11/780 computer and operates on the UNIX* operating system (the same system as the Corps' Environmental Technical Information System). The VAX computer is accessible through Telenet, a nationwide public network service. Telenet will allow you to access the computer from most locations. Telenet numbers and procedures for accessing the VAX computer through Telenet are provided in Appendix A.

If you already have a permanent sign-on that allows you to access the VAX 11/780 for ETIS, you must still contact the Knowledge Base Support Center at the University of Illinois so that your login will be added to the list of users allowed to access MICROS.

To gain access privileges to the MICROS knowledge base, call the University of Illinois at (217) 333-Knowledge Base Support Center (333-5272), or Mr. J n Deponai of CERL at (217) 352-6511 or FTS 373-7271. You will be asked to give your name, address, organization, and your reasons for wishing to use the system; i.e., do you have some specific area of inquiry, or do you simply want to learn more about the system?

At the time of your request you will be issued a system "sign-on" and a password. (Throughout your sessions with the system you will be referred to by your sign-on name; the password is provided as a security check on your account.) Those using the system on a trial basis will be issued the guest sign-on, called "micros." When you enter the "micros" sign-on to the system login prompt, you will then be prompted for the password assigned to you at the time of your guest sign-on request. Upon typing the password you will immediately enter the Knowledge Access System for access to MICROS.

If you decide to use the system on an ongoing basis, you will be issued a permanent sign-on. One primary advantage of such a sign-on is to allow expert responses to the inquiries or comments you make when using the system to come directly to you via the "electronic mail" facility. A permanent sign-on usually requires about 2 weeks to process, so the guest sign-on account with limited capabilities can be used initially.

Figure 1 shows an example access to MICROS once the user has accessed the VAX 11/780.

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*Trademark of Bell Laboratories.

Using the System

Figures 1 through 11 outline various sessions in which MICROS is accessed via KAS. Characters typed by the user appear after the system prompt, "KAS>", and are indicated in boldface. Further annotation has been added with boxes to indicate the various system responses to user commands. It may be helpful to refer to these figures during your initial use of the system. Discrepancies between the text you see during an interactive session and the examples here are due to the changes constantly being incorporated into the knowledge base.

Selecting From the Menu

Figure 2 shows an example access to MICROS once the user has accessed the VAX 11/780. At the top of the listing is the initial banner for MICROS. Below the banner is the entry frame which is the logical starting point for access to the system. The name of this frame is <start>. (Remember, any time the name of a frame is referred to it will be enclosed in brackets.) In Figure 2 the user is faced with several options, each indicated by different numbers. These options conceptually refer to the branching of the knowledge tree mentioned earlier. In this case the user typed the number "1" to indicate he* wishes to see information for "first time users." The user presses RETURN and the system's response is shown at the bottom of Figure 2.

"Quitting" a Display

In Figure 3 the user indicates he is finished reading the help menu. The user could have inquired further about the specific commands by choosing any one of the various numbered options. Having typed the word "quit" followed by a carriage return, the user is returned to the frame from which he initiated access to a given frame, in this case the <start> frame. Conceptually, while choosing various menu options moves a user forward through the branches of the tree, each use of the "quit" command moves the user backwards along the branch of the tree he most recently went out on.

Note that the "quit" command like most other KAS commands may be abbreviated. The abbreviation for the "quit" command is the single letter "q."

"Redisplaying" a Frame

In Figure 4, the user indicates with the command "redisplay" (or "r") that he wants the frame he is currently in redisplayed from its beginning. The system's response is shown at the bottom of Figure 4. This response is a redisplay of the first screen of the active frame.

The contents of a frame may require a display area larger than can be accommodated on one screen. When this is the case, the system will pause after displaying the amount of information that will fit on the user's terminal, and indicate there is more at the bottom of the screen. To see more of the display, the user need only press RETURN. To return to the initial page of the display the user should use the "redisplay" command. Any other KAS

---

*The male pronoun is used throughout this document to refer to both genders.

command is also valid during this pause. Throughout this document the first screen of a display is called the "upper end," and the last screen is the "lower end."

"Trace" of How the User Got Here

Figure 5 again shows the help menu seen in Figures 3 and 4. However, this time the user has inquired about the path he had taken in getting to the current frame by typing the word "trace" (or "t") to the system prompt. This command gives a brief history of the user's passage through the various frames of the knowledge base. Again, conceptually this is a listing of the branches of the tree the user has visited. In this particular case, the system's response shown at the bottom of the page indicates the person is using the MICROS knowledge base, he has gone from the frame <start> to a lower display of the frame <help>, and that is where he currently is.

Directed Display of a Frame

In Figure 6 the user has asked to directly display the frame called <policy>. The importance of this particular command is that rather than going through the various frames that might lead ultimately to the frame <policy>, the user knows the name of the frame and can go directly to it. At the bottom of Figure 6 the system responds by displaying the frame called <policy>.

Are "Comments" Available?

In Figure 7 the user is shown viewing a frame called <dev.history>. On the last line of the display the system has indicated that comments on <dev.history> are available. To see if comments are associated with the current frame the user types "c?" The system indicates two comments are currently available with respect to the frame <dev.history>.

Seeing Comments

Also in Figure 7, the user issues the "sc" command to see the comments associated with the frame <dev.history>. The system's response is shown at the bottom of the figure. Along with the actual comment, the system also indicates the frame in which the comment resides, and the date and time the comment was made.

Making Comments

In Figure 8 the user is visiting a frame called <ord.policy.a>, and has used the "mc" or "make comment" command to indicate he wishes to comment on the material he is viewing. Upon issuing this command the user enters the Comment Editor of the Knowledge Access System. The user is now in the "insert mode." To enter a comment he simply begins typing the first line of the comment at the first editor line prompt, "1>". As each line of the comment is

completed with the RETURN key, the editor continues to prompt the user to type in successive lines of the comment with successive line number prompts.

When finished, the user types "done" to the editor line prompt, and the comment is then processed as indicated at the bottom of Figure 8. By typing a single period as the first character in a line, the user could have alternatively entered the "command mode" of the KAS editor indicated by the "mc" prompt. While in the command mode the user is provided with display, insert, and delete commands to edit the lines of comment text. Information about each of these commands is available through the extensive on-line help system of editor. To receive help with any of the commands, the user types the word "help" or a question mark ("?") to either the editor line prompt while in insert mode, or to the "mc" prompt while in the editor command mode. These commands are further described in Appendices B and C.

Upon completing the comment to the current frame, the system indicates a copy of the comment was sent to two different people. The first name is that of the content expert associated with the specific frame the command has been made about. The second is the name of the knowledge base administrator. Comments made in the Knowledge Access System are automatically routed via electronic mail to the specific person identified as the content expert for that specific area of the knowledge base, and the acting administrator of the knowledge base.

Electronically Mailed Comments

Figure 9 shows an example session in which a content expert receives the mail generated from users' comments. Users can also receive comments and responses from content experts, but this requires the assignment of a permanent rather than guest sign-on. Comments are sent via the electronic mail system of UNIX. Appendix D contains a brief outline on using the UNIX mail feature.

A Sample Interactive Session

Figure 10 shows a longer interactive session between the user and the Knowledge Access System. In this session the user directs the exploration of the knowledge base from the <start> frame through the <table of contents>. The user moves from the <table of contents> to the frame on <software>, and from there to operating systems, <os>. Finally, the user moves to the frame on the utility programs, <utility progs>, available on microcomputer operating systems.

Changing the Display for Your Terminal

The Knowledge Access System also allows you to modify the output appearing on your screen according to the capabilities of your terminal. The "options" command lets you interactively customize how any given frame will be displayed on the screen by varying the number of lines and columns used on the display. For example, the normal or "default" setting is to display 24 lines of output, each line containing 80 characters. On a terminal that is not set

up with 24 lines of 80 characters, you should invoke the "options" commnd. The system will then prompt you to enter the new line and column dimensions of your terminal, as shown in Figure 11. After receiving this information, the Knowledge Access System will dynamically reformat the text of frames as they are sent to the screen to not go beyond limitations you have indicated. Obviously, some displays will suffer in such a translation process, but significant efforts have been made to keep the system usable on terminals with smaller screens.

If you are using a hard copy terminal you will probably still want to establish some limit on the number of lines displayed before the system pauses to allow you to input a command.

Interrupting the Display of a Frame

Some frames are quite long and the information you want might appear in the first few lines. The "break" key allows you to indicate you don't want to see further output with respect to the frame, but instead want to immediately enter a command (for instance choose to see a specific choice from a menu). Just hit the break key, wait for the output process to stop, and then enter your command.

Exiting the System

To leave the system, you can use the "quit" command successively to move back through the path you came along or you can exit directly by using "control-d". This control character sequence is similar to typing a capital "d," except you hold the control key down instead of the shift key when typing the letter "d." This command causes the Knowledge Access System to immediately exit. If you are using a guest sign-on, the system will automatically sign you off at that point. Under a normal system-level sign-on you will be taken back to the command level of the UNIX operating system where you may choose to engage some other command.

A "Roadmap" to the Knowledge Base

The Knowledge Management System provides two dynamically maintained frames for use in finding your way around in the knowledge base. These frames are called <outline> and <short outline>. You may directly access either of these frames at any time by using the "display" command followed by the name of either frame. The <outline> frame contains the complete outline of the knowledge base, while <short outline> contains an abbreviated version. Appendix E gives a current copy of <outline>, while Appendix F lists the current <table of contents>.

Asking for Help

If you have any problems or questions involving the system, you are encouraged to call the Knowledge Base Support Center or the CERL POC named on page 11.

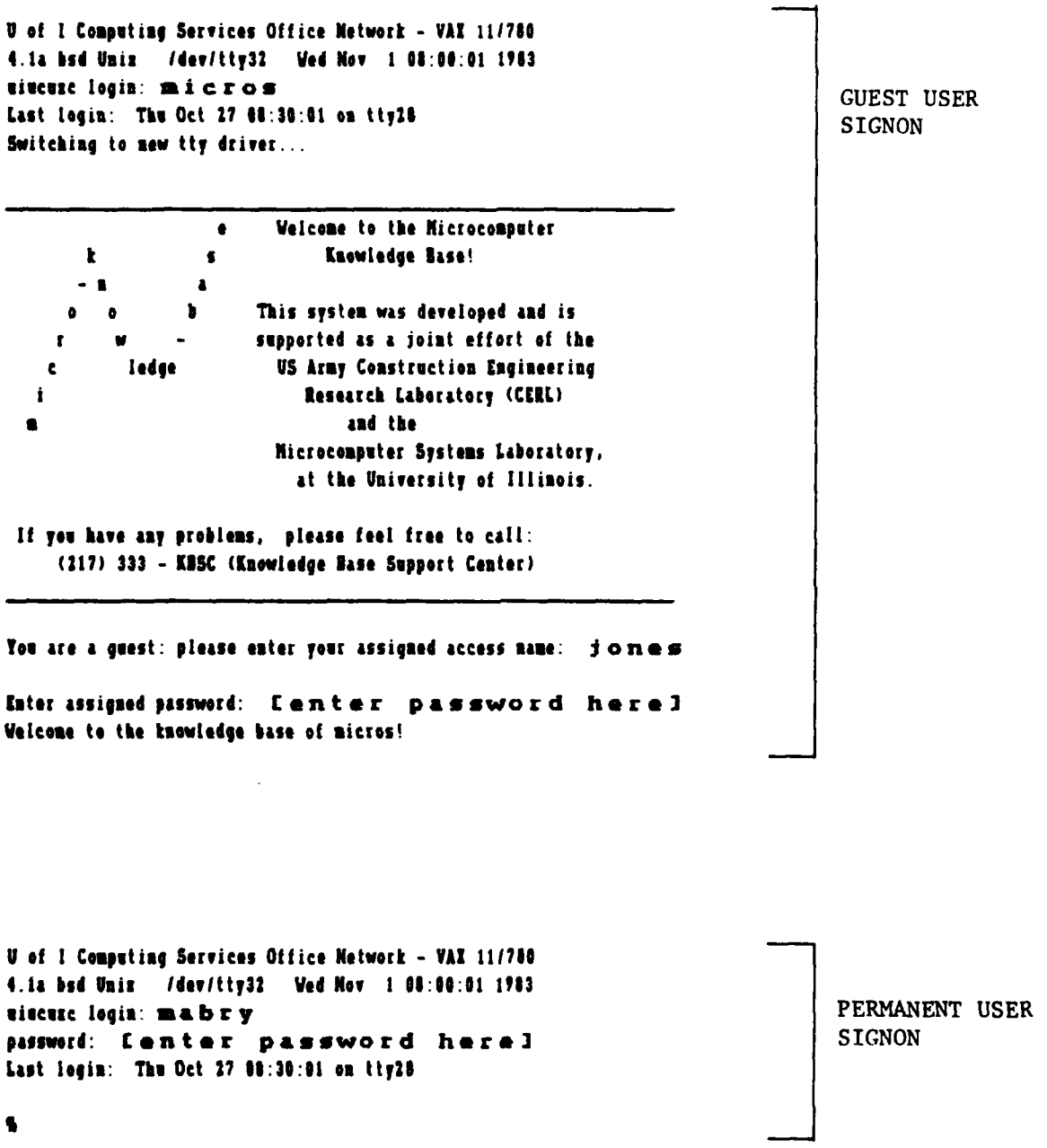

Figure 1. User login procedure for guest and permanent sign-ons.

```
1 micros
```

USER INPUTS COMMAND TO ACCESS "micros" KB

```
                    e     Welcome to the Microcomputer
        t           s           Knowledge Base!
      - a           a
     o   o         b       This system was developed and is
    r     w       -         supported as a joint effort of the
   c        ledge            US Army Construction Engineering
  i                            Research Laboratory (CERL)
 n                                and the
                             Microcomputer Systems Laboratory,
                               at the University of Illinois.

If you have any problems, please feel free to call:
    (217) 333 - KBSC (Knowledge Base Support Center)
```

SYSTEM RESPONSE

```
Enter the number of your choice, or a KAS Command:

    [1] .... For FIRST TIME USERS: a list of the KAS Commands.
    [2] .... For the knowledge base TABLE OF CONTENTS.
    [3] .... For the knowledge base complete OUTLINE.

In frame (start)

KAS) 1
```

USER SELECTS MENU ITEM 1

```
          <<<  KAS Command Help Menu  >>>

Option      For HELP with:
---------   ------------------------------------------
   [1] .... DISPLAYing a frame
   [3] .... REDISPLAYing the Current Frame
   [3] .... Seeing Frames of More than 1 Screen
   [4] .... Making Comments on the Current Frame
   [5] .... Seeing Comments on the Current Frame
   [6] .... TRACing a KAS Passage
   [7] .... OPTIONS for your Terminal
   [8] .... Accessing External Commands like Mail
   [9] .... QUITing a Frame or KAS Passage
---------   ------------------------------------------

Select an Option ...

   To obtain further information about a given KAS command,
                        — or —
       To make a comment about a given KAS Command.

In frame (help)

KAS)
```

SYSTEM RESPONSE

SYSTEM PROMPTS FOR INPUT

Figure 2. Entering the Knowledge Access System (KAS).

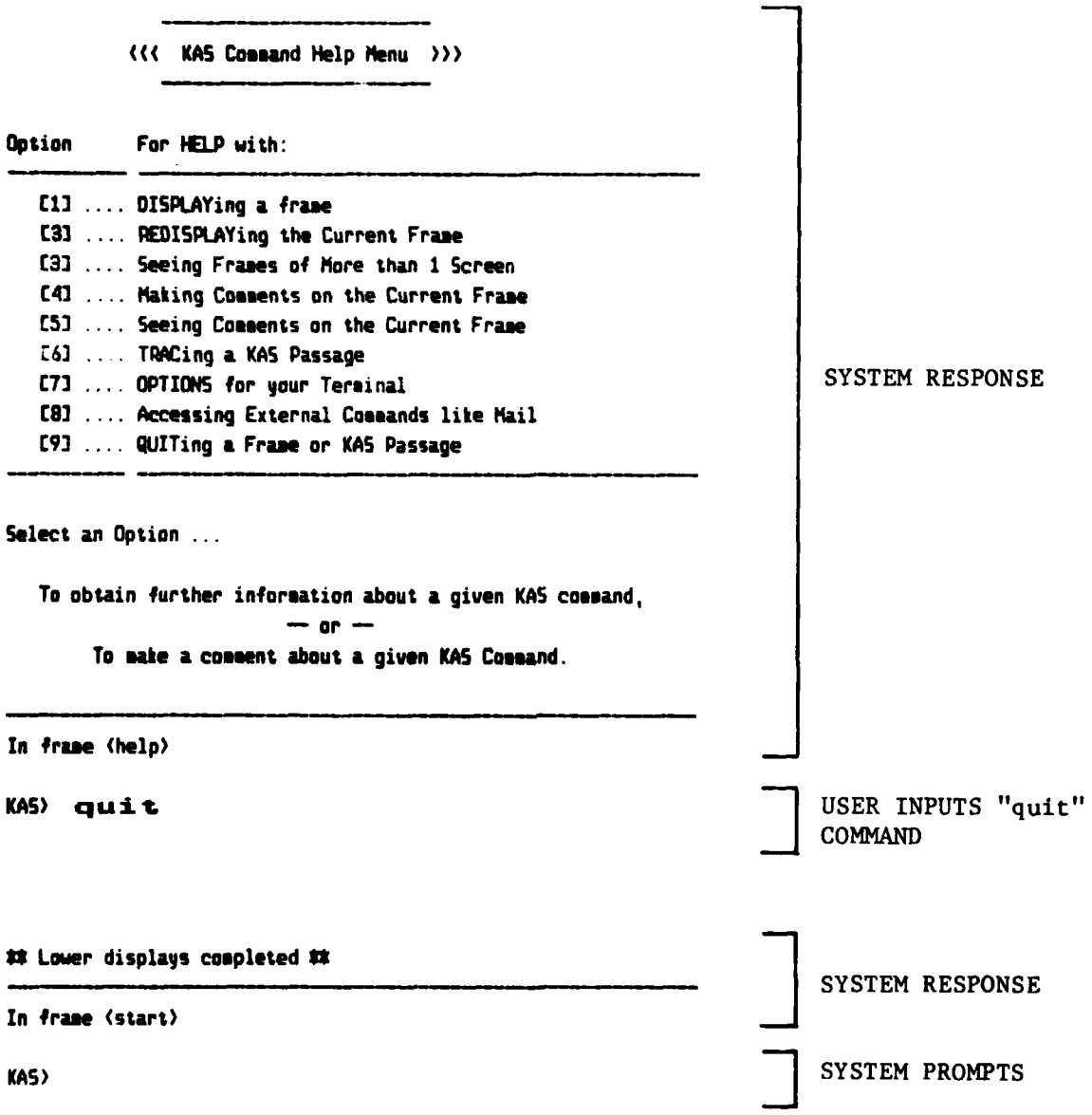

Figure 3. Use of the "quit" command to exit a frame.

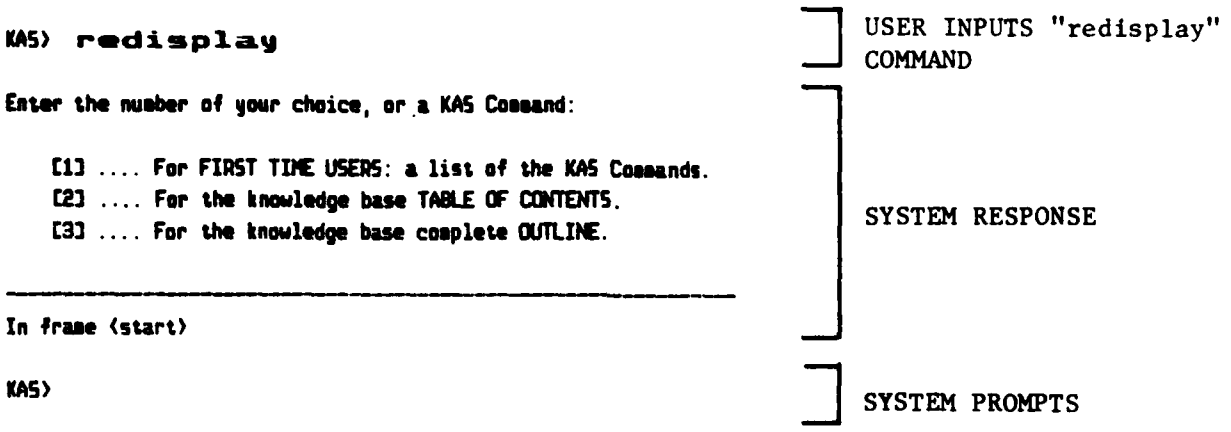

Figure 4. Use of the "redisplay" command to recover a display.

```
Enter the number of your choice, or a KAS Command:

   [1] .... For FIRST TIME USERS: a list of the KAS Commands.
   [2] .... For the knowledge base TABLE OF CONTENTS.
   [3] .... For the knowledge base complete OUTLINE.

-------------------------------------------------------------------

In frame (start)

KAS) 1

          ------------------------
        (((  KAS Command Help Menu  )))
          ------------------------

Option      For HELP with:
---------  ---------------------------------------
  [1] .... DISPLAYing a frame
  [3] .... REDISPLAYing the Current Frame
  [3] .... Seeing Frames of More than 1 Screen
  [4] .... Making Comments on the Current Frame
  [5] .... Seeing Comments on the Current Frame
  [6] .... TRACing a KAS Passage
  [7] .... OPTIONS for your Terminal
  [8] .... Accessing External Commands like Mail
  [9] .... QUITing a Frame or KAS Passage
---------  ---------------------------------------

Select an Option ...

   To obtain further information about a given KAS command,
                        -- or --
        To make a comment about a given KAS Command.

-------------------------------------------------------------------

In frame (help)

KAS) trace

You are reading in the MICROS knowledge base.
The current frames you are reading down into are:

  (start)
   *** last frame of lower displays ***
  (help)

*** End of trace ***

-------------------------------------------------------------------

In frame (help)

KAS)
```

INITIAL MENU

USER SELECTS MENU ITEM 1

SYSTEM RESPONSE

USER INPUTS TRACE COMMAND

SYSTEM RESPONSE

SYSTEM PROMPTS

Figure 5. Use of the "trace" command to list the frames of a KAS passage.

```
KAS) display policy
```

USER DIRECTS DISPLAY OF SPECIFIC-FRAME "policy"

```
This frame is the initial access point to various policy statements
made regarding the use of microcomputers in the CORPS.  For the most
part the policy documents will be available in 2 different forms in the
index frames you can access from here.  The first form is the document
in its entirety which is available in order to allow easier reading and
printing (should you want a copy for reference purposes).

The second form is an outline of the document which breaks the various
portions of the policy document down into smaller portions that are
intended to be of a more manageable size.  You are invited to make use
of the "mc" command (make comment) to make points about the various
frames of the second form.

  -Policy statement of the Ohio River Division [1]
  -Some additional remarks regarding policy [2]

-------------------------------------------------------------------

In frame (policy)

KAS)
```

SYSTEM RESPONSE

SYSTEM PROMPTS

Figure 6. Use of the "display" command to directly access a frame in the knowledge base.

```
KAS) display dev.history
```

USER DIRECTS DISPLAY OF FRAME "dev. history"

```
History of microcomputer development
(no specific content has been added for this topic yet ...
 use the comment facility[mc] to request information or
 ask a specific question)
-------------------------------------------------------
In frame (dev.history) (comments available)
```

SYSTEM RESPONSE

```
KAS) c?
```

USER INPUTS "c?" COMMAND

```
2 comments bewteen 09/13/83 at 14:29:35 and 09/14/83 at 14:02:11
-------------------------------------------------------
In frame (dev.history) (comments available)
```

SYSTEM RESPONSE

```
KAS) sc
```

USER ASKS TO "see comments"

```
*** Comment about frame (dev.history) on 13 Sep 83 at 14:29:35 by mabry

The developmental history of microcomputers is hard to trace because
manufactures must cloak their efforts to some extent, in response
to the high level of market place competition.
-------------------------------------------------------
Comment on 09/13/83 at 14:29:35 in frame (dev.history)
```

SYSTEM RESPONSE

```
KAS)
```

USER PRESSES RETURN TO SEE NEXT COMMENT

```
*** Comment about frame (dev.history) on 14 Sep 83 at 14:02:11 by mabry

The proceeding comment is not intended to imply that we will not be
extending the knowledge base in this area.
Frank Mabry (knowledge base administrator)
-------------------------------------------------------
Comment on 09/14/83 at 14:02:11 in frame (dev.history)
```

SYSTEM RESPONSE

```
KAS)
```

USER PRESSES RETURN TO SEE NEXT COMMENT

```
*** End of comments ***
-------------------------------------------------------
In frame (dev.history) (comments available)
```

SYSTEM RESPONSE

```
KAS)
```

SYSTEM PROMPTS

Figure 7. Displaying comments within a frame.

```
KAS) display ord.policy.a
```

USER DIRECTS DISPLAY OF FRAME "ord.policy.a"

```
   a. District Operations Division offices, area offices, repair
stations, repair fleets and project offices will make maximum use of
microcomputers where they are justified.

------------------------------------------------------------
In frame (ord.policy.a)
```

SYSTEM RESPONSE

```
KAS) mc
```

USER ASKS TO "make comment"

```
((((((((((((((((((((((((((  COMMENT EDITOR  ))))))))))))))))))))))))))
------------------------------------------------------------------------
                  -- You are now in INSERT mode --
 At the start of any line you may request assistance by typing either:
                              help or ?
------------------------------------------------------------------------
```

SYSTEM RESPONSE

```
 1) this is a demonstration comment
  2) made from inside the knowledge
 3) base to demonstrate the dynamic
 4) routing the system does
 5) automatically.
 6) dave
 7) done
```

USER INPUT
USER INDICATES THAT HE HAS COMPLETED THE ENTRY BY TYPING "done"

```
Comment sent contained 6 lines of text.
please wait for comment to be processed ...

Your comment or question was sent to the following signons:
deponai nabry
------------------------------------------------------------
In frame (ord.policy.a)
```

SYSTEM RESPONSE

```
KAS)
```

SYSTEM PROMPTS

Figure 8. Use of the "mc" command in making a comment.

```
>>>>> NOTE: The following is executed from <<<<<
>>>>>       the Unix operating system.      <<<<<
```

```
% mail
```

USER (CONTENT EXPERT) ASKS FOR HIS MAIL

```
2 messages:
   1 mabry      Wed Sep 21  11:54   9/324
   2 smith      Thu Sep 22  08:10  11/437
```

SYSTEM RESPONSE

```
_ 1
```

USER ASKS TO SEE MESSAGE 1

```
From mabry  Wed Sep 21  11:54:49 1983
To:  deponai

Comment made in directory /cerlsys/xpr/kames/kb/micros/frames/
It is stored in that directory under the name .c830921115439

*** Comment about frame (start) on 21 Sep 83 at 11:54:39 by mabry
Maybe a few more of the options should be shown on the
initial frame that everyone sees.
```

SYSTEM RESPONSE

```
_
```

USER INDICATES THAT HE WANTS TO GO ONTO THE NEXT MESSAGE BY TYPING A RETURN (THE UNDERSCORE CHARACTER IS THE PROMPT).

```
From smith Thu sep 22 08:10 1983
To: deponai mabry

 Comment made in directory /cerlsys/xpr/kames/kb/micros/frames/policy/
ord.policy/policy.ord.ind/policy.a/
 It is stored in that directory under the name .c830922081020

*** Comment about frame (ord.policy.a) on 22 Sep 83 at 08:10:20 by smith

this is a demonstration comment made from inside the
knowledge base to demonstrate the dynamic routing
the system does automatically.
dave
```

SYSTEM RESPONSE

```
_ q
```

USER INDICATES THAT HE HAS FINISHED WITH READING HIS MESSAGES BY INPUTTING "q" (FOR QUIT)

```
Saved 2 messages i  mbox

%
```

SYSTEM PROMPTS

Figure 9. Displaying comments mailed within KAS.

```
Enter the number of your choice, or a KAS Command:

    [1] .... For FIRST TIME USERS: a list of the KAS Commands.
    [2] .... For the knowledge base TABLE OF CONTENTS.
    [3] .... For the knowledge base complete OUTLINE.

In frame (start)
```

INITIAL MENU

```
KAS) 2
```

USER SELECTS MENU ITEM 2

```
      Microcomputer Knowledge Base:  Table of Contents

    -Introduction to microcomputers .................[1]
    -History of microcomputer development ...........[2]
    -Hardware informatioonn .........................[3]
    -General system architecture ....................[4]
    -Software .......................................[5]
    -The application program Library ................[6]
    -How to select a system .........................[7]
    -How to select software .........................[8]
    -User reviews ...................................[9]
    -Current CORPS applications of microcomputers ...[10]
    -Lessons learned ................................[11]
    -Training .......................................[12]
    -Definitions ....................................[13]
    -Useful references ..............................[14]

    -For detailed descriptions of KAS commands ......[15]

Select an Option, or type ? for Help

In frame (table.of.contents)
```

SYSTEM RESPONSE

```
KAS) 5
```

USER SELECTS MENU ITEM 5

```
Software:

   Software refers to the programs that are executed by the computer.
Rather than having functions implemented in unchangeable hardware
circuits, software is handled by the computer as both the material it
manipulates, and as the instructions which direct its actions.
   For more information about a specific area of software
select one of the options below:

   -what is it really[1]
   -operating systems[2]
   -assembly language and macro assembly language[3]
   -interpreters[4]
   -compilers[5]

In frame (software)
```

SYSTEM RESPONSE

```
KAS) 2  (system response shown on next page)
```

USER SELECTS MENU ITEM 2

Figure 10. A sample interactive session.

KAS) 2 (continued from previous page)

USER SELECTS MENU ITEM 2

Operating Systems

An operating system is actually a program that is executed by the computer and which directs the use of the computer's resources by other programs. If the hardware of the computer supports executions of some programs in a "privileged" state, then the operating system program will usually be run in this manner. In this state the operating system can direct the use resources of the system by applications programs and even "catch" application programs when they try to misuse a resource (such as trying to write in someone else's file.)

For more detail about some of the popular microcomputer operating systems select one of the areas below:

-cp/m[1]
-apple dos[2]
-ucsd[3]
-cp/m-86[4]
-mp.mp/m[5]
-ms/dos and pc/dos[6]
-turbo dos[7]
-unix[8]
-xenix[9]
-trs/dos[10]

-utilities[11]

SYSTEM RESPONSE

In frame (os)

KAS) 11 (system response shown on next page)

USER SELECTS MENU ITEM 11

Figure 10. Cont'd.

```
KAS> 11  (continued from previous page)

Utility Programs

     Utility programs on microcomputer operating systems vary
widely as to the relative capability and flexibility they provide.

     Most microcomputer operating systems provide utility programs
(or functions) that support:

          * file copying between media
          * printing on a local hard copy device
          * listing the various files that are associated with a
               disk or tape associated currently with a specific
               device.
          * removing files

     Sometimes vendors will associate programs such as editors,
compilers, and interpreters with the information they supply about
the utilities available with their hardware.  As "packaged" software
programs that support similar functions are marketed (often by other
companies), the distinction between the system specific utilities
and possible add-on programs needs to be more firmly maintained
to avoid confusion.

-------------------------------------------------------------------

In frame (utility.progs)

KAS>
```

USER SELECTS MENU ITEM 11

SYSTEM RESPONSE

SYSTEM PROMPTS

Figure 10. Cont'd.

```
KA5) options                                    ] USER EXECUTES
                                                  "options" COMMAND

Current number of lines in use is 24            ] SYSTEM RESPONSE
Enter a new value or enter nothing to leave the same:

                                                ] USER DIRECTS SYSTEM TO USE
16                                                16 LINES OF DISPLAY.
                                                  IF "return" ONLY WAS PRESSED,
                                                  THE NUMBER OF LINES WOULD
                                                  HAVE REMAINED 24.

Current number of columns in use is 80          ] SYSTEM RESPONSE
Enter a new value or enter nothing to leave the same.

40                                              ] USER DIRECTS SYSTEM TO
                                                  USE 40 COLUMNS ONLY

KA5)                                            ] SYSTEM PROMPTS
```

Figure 11. Use of the "options" command to modify terminal screen.

APPENDIX A:

ACCESS TO TELENET

1. Turn on the terminal.

2. Dial the Telenet phone number associated with the baud rate for your terminal, either 300 or 1200 baud. Telenet numbers are listed in Figure A-1. When you hear a highpitched tone, place the telephone in the acoustic coupler, or, if you have a dataphone, depress the DATA button.

3. For full duplex transmission type two carriage returns "<CR>". For half-duplex tranmission, enter "<CR>;<CR>".

4. The Telenet herald will be displayed, followed by your terminal port address and a prompt for you to input your terminal model. Enter the two-character identifier for your terminal and a <CR>. (Note: "D1" is the most common identifier.)

5. Telenet will print the prompt character "@". Enter the Telenet address for the VAX "C 21726<CR>". Note the space after "C".

6. The UNIX system's herald will then be displayed, followed by the UNIX login and password prompts.

a. If you are a guest user, enter "micros" to the UNIX login prompt. To the password prompt enter the password assigned to you by the Knowledge Base Support Center.

b. If you have a permanent user sign-on, enter your assigned login to the UNIX login prompt. To the password prompt enter your normal password.

7. If you are a permanent user, UNIX will prompt you for a command with a "$" or a "%". Enter "micros" in response to the prompt. If you are a guest user you will be taken directly to the MICROS Knowledge Access System.

8. When the MICROS system's herald is displayed, you are in the MICROS knowledge base and ready to begin your session.

7. When you are finished with your session, enter a "control-d" to log off from UNIX and hang up your receiver to disconnect from Telenet.

Sample screen displays for logging on to MICROS through Telenet are provided in Figures A-2 and A-3.

U.S. Access Locations

Public Dial-In Service

GTE Telenet provides local network access in these U.S. cities of 50,000 population or more. IN-WATS access is available in other locations. For the most up-to-date cities listing, GTE Telenet provides an on-line directory service.

Domestic Access Procedure

@ MAIL
User Name? PHONES
Password? PHONES

Overseas Access Procedure

@ 311020214175 (return)
or 311020214275 (return)
User Name? INTL/ASSOCIATES
Password? INTL

CITY	300 BPS	TCO[1]	CLASS	1200 BPS[2]
IN-WATS 800	424-9494			424-9494
AL 205 BESSEMER	328-2310	(BIRMINGHAM)	B	328-2310
AL 205 BIRMINGHAM	328-2310		B	328-2310
AL 205 FLORENCE	766-9101		B	766-9101
AL 205 HUNTSVILLE	539-2281		B	539-2281
AL 205 MOBILE	432-1680		B	432-1680
AL 205 MONTGOMERY	269-0090		B	269-0090
AL 205 SHEFFIELD	766-9101	(FLORENCE)	B	766-9101
AK 907 ANCHORAGE	276-0271		B	276-0271
AK 907 JUNEAU	586-9700		B	586-9700
AR 501 LITTLE ROCK	372-4616		B	372-4616
AZ 602 MESA	254-0244	(PHOENIX)	B	254-0244
AZ 602 PHOENIX	254-0244		B	254-0244
AZ 602 SCOTTSDALE	254-0244	(PHOENIX)	B	254-0244
AZ 602 TEMPE	254-0244	(PHOENIX)	B	254-0244
AZ 602 TUCSON	747-0107		B	747-0107
CA 213 ALHAMBRA	507-0909	(GLENDALE)	B	507-0909
CA 714 ANAHEIM	558-6061	(SANTA ANA)	B	558-7078
CA 805 BAKERSFIELD	327-8146		B	327-8146
CA 415 BURLINGAME	591-0726	(SAN CARLOS)	B	591-0726
CA 213 CANOGA PARK	306-2984	(MARINA DEL REY)	B	306-2984
CA 714 COLTON	824-9000		B	824-9000
CA 213 COMPTON	516-1007		C	516-1007
CA 415 CONCORD	676-2834		C	676-2834
CA 213 COVINA	330-2227		C	330-2227
CA 408 CUPERTINO	294-9119	(SAN JOSE)	B	294-9119
CA 619 ES CONDIDO	741-7756		B	741-7756
CA 213 EL MONTE	507-0909	(GLENDALE)	B	507-0909
CA 209 FRESNO	233-0961		B	233-0961
CA 714 FULLERTON	558-6061	(SANTA ANA)	B	558-7078
CA 714 GARDEN GROVE	898-9820		B	898-9820
CA 213 GLENDALE	507-0909		B	507-0909
CA 415 HAYWARD	881-1382		B	881-1382
CA 213 HOLLYWOOD	689-9040	(LOS ANGELES)	B	624-2251
CA 213 HOLLYWOOD	937-3580	(LOS ANGELES)	B	937-3580
CA 714 HUNTINGTON BEACH	558-6061	(SANTA ANA)	B	558-7078
CA 213 INGLEWOOD	689-9040	(LOS ANGELES)	B	624-2251
CA 213 INGLEWOOD	937-3580	(LOS ANGELES)	B	937-3580
CA 213 LOS ANGELES	689-9040		A	624-2251
CA 213 LOS ANGELES	937-3580		A	937-3580
CA 415 LOS ALTOS	856-9995	(PALO ALTO)	B	856-9995
CA 213 LONG BEACH	548-6141	(SAN PEDRO)	B	548-6141
CA 213 MARINA DEL REY	306-2984		B	306-2984
CA 209 MODESTO	576-2852		B	576-2852
CA 415 MOUNTAIN VIEW	856-9995	(PALO ALTO)	B	856-9995
CA 714 NEWPORT BEACH	558-6061	(SANTA ANA)	B	558-7078
CA 213 NORWALK	404-2237		C	404-2237
CA 415 OAKLAND	836-4911		B	836-4911
CA 805 OXNARD	656-6760	(VENTURA)	B	656-6760
CA 415 PALO ALTO	856-9995		B	856-9995
CA 213 PASADENA	507-0909	(GLENDALE)	B	507-0909
CA 415 REDWOOD CITY	591-0726	(SAN CARLOS)	B	591-0726
CA 714 RIVERSIDE	824-9000	(COLTON)	B	824-9000
CA 916 SACRAMENTO	448-6262		B	448-6262
CA 408 SALINAS	443-4940		B	443-4940
CA 714 SAN BERNADINO	824-9000	(COLTON)	B	824-9000
CA 415 SAN CARLOS	591-0726		B	591-0726
CA 619 SAN DIEGO	231-1922		B	233-0233
CA 415 SAN FRANCISCO	362-6200		A	956-5777
CA 408 SAN JOSE	294-9119		B	294-9119
CA 415 SAN MATEO	591-0726	(SAN CARLOS)	B	591-0726
CA 213 SAN PEDRO	548-6141		B	548-6141
CA 415 SAN RAFAEL	492-0752		C	492-0752
CA 714 SANTA ANA	558-6061		B	558-7078
CA 805 SANTA BARBARA	682-5361		B	682-5361
CA 408 SANTA CLARA	294-9119	(SAN JOSE)	B	294-9119
CA 408 SANTA CRUZ	425-8455		C	425-8455
CA 213 SANTA MONICA	306-2984	(MARINA DEL REY)	B	306-2984
CA 707 SANTA ROSA	578-9325		C	578-9325
CA 209 STOCKTON	473-2056		C	473-2056
CA 408 SUNNYVALE	294-9119	(SAN JOSE)	B	294-9119
CA 213 TORRANCE	548-6141	(SAN PEDRO)	B	548-6141
CA 213 WOODLAND HILLS	887-3160		B	887-3160
CA 415 WOODSIDE	856-9995	(PALO ALTO)	B	856-9995
CA 805 VENTURA	656-6760		B	656-6760
CO 303 AURORA	337-6000	(DENVER)	B	337-6060
CO 303 BOULDER	337-6000	(DENVER)	B	337-6060
CO 303 COLORADO SPRINGS	635-5361		B	635-5361
CO 303 DENVER	337-6000		A	337-6060
CO 303 LAKEWOOD	337-6000	(DENVER)	B	337-6060
CT 203 BRIDGEPORT	335-5055		B	335-5055
CT 203 DANBURY	794-9075		B	794-9075
CT 203 GREENWICH	348-0787	(STAMFORD)	B	348-0787
CT 203 HARTFORD	247-9479		B	247-9479
CT 203 MILFORD	624-5954	(NEW HAVEN)	B	624-5954
CT 203 NEW HAVEN	624-5954		B	624-5954
CT 203 STAMFORD	348-0787		B	348-0787
CT 203 WATERBURY	753-4512		C	753-4512
CT 203 WEST HARTFORD	247-9479	(HARTFORD)	B	247-9479

Notes:
[1] Cities listed in parentheses are actual locations of GTE Telenet facilities. In some cases, local access may require extended metro telephone service or involve message unit charges.
[2] Either Bell 212 or VADIC 3405 compatible modems are required. Exception: Honolulu, Bell 212 only.

Figure A-1. Telenet numbers.

CITY	300 BPS	TCO*	CLASS	1200 BPS*
DC 202 WASHINGTON	429-7896		A	429-7800
DE 302 WILMINGTON	454-7710		B	454-7710
FL 813 CLEARWATER	323-4026	(ST. PETE)	B	323-4026
FL 904 DAYTONA BEACH	252-9914		C	252-9914
FL 305 FT. LAUDERDALE	764-4505		B	764-4505
FL 904 JACKSONVILLE	353-1818		B	353-1818
FL 305 MIAMI	372-0230		A	372-0230
FL 305 ORLANDO	422-4088		B	422-4088
FL 904 PENSACOLA	438-4562		C	438-4562
FL 813 ST. PETERSBURG	323-4026		B	323-4026
FL 813 SARASOTA	346-0216		C	346-0216
FL 904 TALLAHASSEE	681-1902		B	681-1902
FL 813 TAMPA	224-9920		B	223-1088
FL 305 W PALM BEACH	833-6691		B	833-6691
GA 404 ATHENS	549-4524		C	549-4524
GA 404 ALANTA	577-8911		A	523-0834
GA 912 MACON	741-1011		C	741-1011
GA 912 SAVANNAH	236-2605		B	236-2605
HI 808 HONOLULU	524-8110		B	524-8221
IA 319 CEDAR RAPIDS	364-0911		B	364-0911
IA 402 COUNCIL BLUFFS	341-7733	(OMAHA, NE)	B	341-7733
IA 402 DAVENPORT	326-2007		C	326-2007
IA 515 DES MOINES	288-4403		B	288-4403
IA 319 IOWA CITY	351-1421		C	351-1421
ID 208 BOISE	343-0611		B	343-0611
IL 312 ARLINGTON HEIGHTS	938-0500	(CHICAGO)	B	938-0600
IL 217 CHAMPAIGN	384-6428	(URBANA)	B	384-6428
IL 312 CHICAGO	938-0500		A	938-0600
IL 312 CICERO	938-0500	(CHICAGO)	B	938-0600
IL 314 EAST ST LOUIS	231-8800	(ST LOUIS, MO)	B	421-3615
IL 815 JOLIET	722-0703		C	722-0703
IL 312 OAK PARK	938-0500	(CHICAGO)	B	938-0600
IL 309 PEORIA	637-8570		B	637-8570
IL 815 ROCKFORD	965-0400		B	965-0400
IL 312 SKOKIE	938-0500	(CHICAGO)	B	938-0600
IL 217 SPRINGFIELD	753-1373		B	753-1373
IL 217 URBANA	384-6428		B	384-6428
IN 812 BLOOMINGTON	332-4461		C	332-4461
IN 812 EVANSVILLE	424-7693		B	424-5250
IN 219 FT. WAYNE	426-2268		B	426-2268
IN 219 GARY	882-8800		B	882-8800
IN 317 INDIANAPOLIS	635-9630		B	634-5708
IN 317 KOKOMO	452-5645		C	452-5645
IN 219 MISHAWKA	233-7104	(SOUTH BEND)	B	233-7104
IN 219 OSCEOLA	233-7104	(SOUTH BEND)	B	233-7104
IN 219 SOUTH BEND	233-7104		B	233-7104
IN 812 TERRE HAUTE	234-8429		C	234-8429
KS 816 KANSAS CITY	221-9900	(KANSAS CITY, MO)	B	221-9900
KS 913 TOPEKA	233-9880		B	233-9880
KS 316 WICHITA	262-5669		B	262-5669

CITY	300 BPS	TCO*	CLASS	1200 BPS*
KY 502 BOWLING GREEN	782-7941		B	782-7941
KY 502 FRANKFORT	875-4654		B	875-4654
KY 606 LEXINGTON	233-0312		B	233-0312
KY 502 LOUISVILLE	589-5580		B	589-5580
LA 504 BATON ROUGE	343-0753		B	343-0753
LA 318 LAFAYETTE	234-1095		C	234-1095
LA 318 MONROE	387-6330		B	387-6330
LA 504 NEW ORLEANS	524-4094		A	524-4094
LA 318 SHREVEPORT	221-5833		B	221-5833
ME 207 AUGUSTA	622-3123		B	622-3123
ME 207 PORTLAND	733-4219		C	773-4219
MD 301 ANNAPOLIS	224-8550		B	224-8550
MD 301 BALTIMORE	962-5010		A	727-6060
MD 202 BETHESDA	429-7896	(WASH., D.C.)	B	429-7800
MD 301 DUNDALK	962-5010	(BALTIMORE)	B	727-6060
MD 202 ROCKVILLE	429-7896	(WASH., D.C.)	B	429-7800
MD 202 SILVER SPRING	429-7896	(WASH., D.C.)	B	429-7800
MD 301 TOWSON	962-5010	(BALTIMORE)	B	727-6060
MA 617 ARLINGTON	292-0600	(BOSTON)	B	292-0662
MA 617 BOSTON	292-0600		A	292-0662
MA 617 BROOKLINE	292-0600	(BOSTON)	B	292-0662
MA 617 CAMBRIDGE	292-0600	(BOSTON)	B	292-0662
MA 413 CHICOPEE	781-3811	(SPRINGFIELD)	B	781-3811
MA 413 HOLYOKE	781-3811	(SPRINGFIELD)	B	781-3811
MA 617 LEXINGTON	863-1550		B	863-1550
MA 617 MEDFORD	292-0600	(BOSTON)	B	338-0662
MA 617 NEWTON	292-0600	(BOSTON)	B	292-0662
MA 617 QUINCY	292-0600	(BOSTON)	B	292-0662
MA 617 SOMERVILLE	292-0600	(BOSTON)	B	292-0662
MA 413 SPRINGFIELD	781-3811		B	781-3811
MA 617 WALTHAM	292-0600	(BOSTON)	B	292-0662
MA 617 WORCHESTER	755-4740		B	755-4740
MI 313 ANN ARBOR	996-5995		A	996-5995
MI 616 BATTLE CREEK	968-0929		B	968-0929
MI 313 DETROIT	964-5538		A	964-2988
MI 313 FLINT	235-8517		B	235-8517
MI 616 GRAND RAPIDS	774-0966		B	774-0966
MI 616 KALAMAZOO	345-3088		B	345-3088
MI 517 LANSING	484-0062		B	484-0062
MI 517 SAGINAW	790-5166		B	790-5166
MI 313 SOUTHFIELD	353-4251		C	353-4251
MI 313 WARREN	575-9152		B	575-9152
MN 218 DULUTH	722-1719		B	722-1719
MN 612 MINNEAPOLIS	341-2459		A	341-2459
MN 612 ST. PAUL	341-2459	(MINNEAPOLIS)	B	341-2459
MO 314 FLORISSANT	421-4990	(ST. LOUIS)	B	421-4990
MO 314 JEFFERSON CITY	634-5178		C	634-5178
MO 816 KANSAS CITY	221-9900		A	221-9900
MO 417 SPRINGFIELD	887-0531		C	887-0531
MO 314 ST. LOUIS	421-4990		A	421-4990
MS 601 JACKSON	969-0036		B	969-0036
MT 406 HELENA	443-0000		B	443-0000

Figure A-1. Cont'd.

CITY	300 BPS TCO'	CLASS	1200 BPS'
NE 402 LINCOLN	475-8392	B	475-8392
NE 402 OMAHA	341-7733	B	341-7733
NH 603 CONCORD	224-1024	B	224-1024
NH 603 MANCHESTER	668-1420	C	668-1420
NH 603 NASHUA	889-8618	C	889-8618
NH 603 PORTSMOUTH	431-2302	B	431-2302
NV 702 LAS VEGAS	737-6861	B	737-6861
NV 702 RENO	827-6900	B	827-6900
NJ 609 ATLANTIC CITY	348-0561	B	348-0561
NJ 201 BAYONNE	623-6818 (NEWARK)	B	623-0469
NJ 201 JERSEY CITY	623-6818 (NEWARK)	B	623-0469
NJ 609 MARLTON	596-1500	B	596-1500
NJ 201 MORRISTOWN	455-0275	B	455-0275
NJ 201 NEW BRUNSWICK	246-1090	B	246-1090
NJ 201 NEWARK	623-6818	A	623-0469
NJ 201 PASSAIC	773-9640	B	773-9640
NJ 201 PATERSON	684-7560	B	684-7560
NJ 609 PRINCETON	799-5587	B	799-5587
NJ 609 TRENTON	989-8847	B	989-8847
NJ 201 UNION CITY	623-6818 (NEWARK)	B	623-0469
NM 505 ALBUQUERQUE	243-4479	B	243-4479
NY 518 ALBANY	465-8444	B	465-8444
NY 607 BINGHAMTON	772-6642	B	772-6642
NY 716 BUFFALO	847-1440	B	847-1440
NY 516 DEER PARK	667-5566	B	667-5566
NY 516 HEMPSTEAD	292-0320	B	292-3800
NY 212 NEW YORK	785-2540	A	785-3860
	736-0099	B	947-9600
NY 914 POUGHKEEPSIE	473-2240	B	473-2240
NY 716 ROCHESTER	454-3430	B	454-1020
NY 518 SCHENECTADY	465-8444 (ALBANY)	B	465-8444
NY 315 SYRACUSE	472-5583	B	472-5583
NY 518 TROY	465-8444 (ALBANY)	B	465-8444
NY 315 UTICA/ROME	797-0920	B	797-0920
NY 914 WHITE PLAINS	328-9199	B	328-9199
NC 704 ASHEVILLE	252-9134	B	252-9134
NC 704 CHARLOTTE	374-0371	B	332-3131
		B	377-6865
NC 919 DAVIDSON	549-8139 (RESEARCH TRI. PARK)	B	549-8139
NC 919 DURHAM	549-8139 (RESEARCH TRI. PARK)	B	549-8139
NC 919 FAYETTEVILLE	323-4501	C	323-4501
NC 919 GREENSBORO	273-2851	B	273-2851
NC 919 HIGH POINT	889-2253	B	889-2253
NC 919 RALEIGH	549-8139 (RESEARCH TRI. PARK)	B	549-8139
NC 919 RESEARCH TRI PARK	549-8139	B	549-8139
NC 919 WINSTON-SALEM	725-2126	B	725-2126
ND 701 MANDAN	663-6499	B	663-6499
OH 216 AKRON	678-5115 (KENT)	B	678-5115
OH 216 CANTON	452-0903	B	452-0903
OH 513 CINCINNATI	579-0390	A	579-0390
OH 216 CLEVELAND	575-1658	A	575-1658
OH 614 COLUMBUS	463-9340	B	463-9340
OH 513 DAYTON	461-5254	B	461-5254
OH 216 EUCLID	241-0940 (CLEVELAND)	B	696-4225

CITY	300 BPS TCO'	CLASS	1200 BPS'
OH 216 KENT	678-5115	B	678-5115
OH 216 PARMA	241-0940 (CLEVELAND)	B	696-4225
OH 419 TOLEDO	255-7881	B	255-7881
OH 216 YOUNGSTOWN	743-1296	B	743-1296
OK 405 BETHANY	232-4546 (OKLAHOMA CITY)	B	232 4546
OK 405 NORMAN	232-4546 (OKLAHOMA CITY)	B	232-4546
OK 405 OKLAHOMA CITY	232-4546	B	232-4546
OK 405 STILLWATER	624-1112	B	624-1112
OK 918 TULSA	584-3247	B	584-3247
OR 503 EUGENE	683-8387	C	683-8387
OR 503 PORTLAND	295-3028	A	295-3028
OR 503 SALEM	378-7712	B	378-7712
PA 215 ALLENTOWN	435-3330	B	435-3330
PA 814 ERIE	453-7561	B	899-2241
PA 717 HARRISBURG	236-6882	B	236-6882
PA 814 JOHNSTOWN	535-7576	B	535-7576
PA 215 KING OF PRUSSIA	337-4300	B	337-4300
PA 412 PENN HILLS	288-9950 (PITTSBURGH)	B	288-9974
PA 215 PHILADELPHIA	574-0620	A	574-9462
PA 412 PITTSBURGH	288-9950	A	288-9974
PA 717 SCRANTON	961-5321	B	961-5321
PA 215 UPPER DARBY	574-0620 (PHILADELPHIA)	B	574-9462
PA 717 YORK	846-6550	B	846-6550
RI 401 PROVIDENCE	751-7912	B	751-7912
RI 401 WARWICK	751-7912 (PROVIDENCE)	B	751-7912
SC 803 CHARLESTON	722-4303	B	722-4303
SC 803 COLUMBIA	254-0695	B	254-0695
SC 803 GREENVILLE	233-3486	B	233-3486
SD 605 PIERRE	224-6341	B	224-6341
TN 615 BRISTOL	968-1130	C	968-1130
TN 615 CHATTANOOGA	756-1161	B	756-1161
TN 615 KNOXVILLE	523-5500	B	523-5500
TN 901 MEMPHIS	521-0215	B	521-0215
TN 615 NASHVILLE	244-3702	B	244-3702
TX 915 ABILENE	676-9151	B	676-9151
TX 806 AMARILLO	372-6935	C	372-6935
TX 512 AUSTIN	928-1130	B	928-1130
TX 512 CORPUS CHRISTI	884-9030	B	884-9030
TX 214 DALLAS	748-0127	A	748-6371
TX 915 EL PASO	532-7907	B	532-7907
TX 817 FORT WORTH	332-4307	A	332-4307
TX 409 GALVESTON	762-3306	B	762-3306
TX 713 HOUSTON	227-1018	B	227-1018
TX 713 HOUSTON	222-1354	A	222-1354
TX 512 LACKLAND	225-8004 (SAN ANTONIO)	B	225-8004
TX 214 LONGVIEW	236-3196	C	236-3196
TX 806 LUBBOCK	792-4663	C	792-4663
TX 915 MIDLAND	563-0086 (TERMINAL)	C	563-0086
TX 409 NEDERLAND	722-3720	B	722-3720
TX 915 ODESSA	563-0086 (TERMINAL)	C	563-0086
TX 915 SAN ANGELO	944-7621	B	944-7621
TX 512 SAN ANTONIO	225-8004	B	225-8004
TX 915 TERMINAL	563-0086	B	563-0086
TX 817 WACO	757-1337	C	757-1337

Figure A-1. Cont'd.

CITY	300 BPS	TCO'	CLASS	1200 BPS'
UT 801 SALT LAKE CITY	359-0149		B	359-0149
VA 202 ALEXANDRIA	429-7896	(WASH . D C)	B	429-7800
VA 202 ANNANDALE	429-7896	(WASH . D C)	B	429-7800
VA 804 CHESAPEAKE	625-1186	(NORFOLK)	B	625-1186
VA 202 FAIRFAX	429-7896	(WASH . D C)	B	429-7800
VA 202 FALLS CHURCH	429-7896	(WASH . D C)	B	429-7800
VA 703 HERNDON	435-1800		B	435-1800
VA 804 NEWPORT NEWS	596-6600		B	596-6600
VA 804 NORFOLK	625-1186		B	625-1186
VA 804 PORTSMOUTH	625-1186	(NORFOLK)	B	625-1186
VA 804 RICHMOND	788-9902		B	788-9902
VA 703 ROANOKE	342-1513		C	342-1513
VA 202 SPRINGFIELD	429-7896	(WASH . D C)	B	429-7800
VA 202 VIENNA	429-7896	(WASH . D C)	B	429-7800
VA 804 VIRGINIA BEACH	625-1186	(NORFOLK)	B	625-1186
VT 802 BURLINGTON	864-0808		B	864-0808
VT 802 MONTPELIER	229-4966		B	229-4966
WA 206 AUBURN	939-9962		B	939-9962
WA 206 BELLEVUE	447-9012	(SEATTLE)	B	625-9612
WA 206 LONGVIEW	577-5835			
WA 206 SEATTLE	447-9012		A	625-9612
WA 509 SPOKANE	455-4071		B	455-4071
WA 206 TACOMA	627-1791		B	627-1791
WA 509 WENATCHEE	663-6227		B	663-6227
WI 715 EAU CLAIRE	832-1211		C	832-1211
WI 414 GREEN BAY	432-2786		C	432-2786
WI 608 MADISON	257-5010		B	257-5010
WI 414 MILWAUKEE	271-3914		A	271-3914
WI 414 RACINE	552-7217		C	552-7217
WV 304 CHARLESTON	345-6471		B	345-6471
WV 304 HUNTINGTON	523-2802		C	523-2802
WY 307 CHEYENNE	638-4421		B	638-4421
IN-WATS 800	424-9494		B	424-9494

Figure A-1. Cont'd.

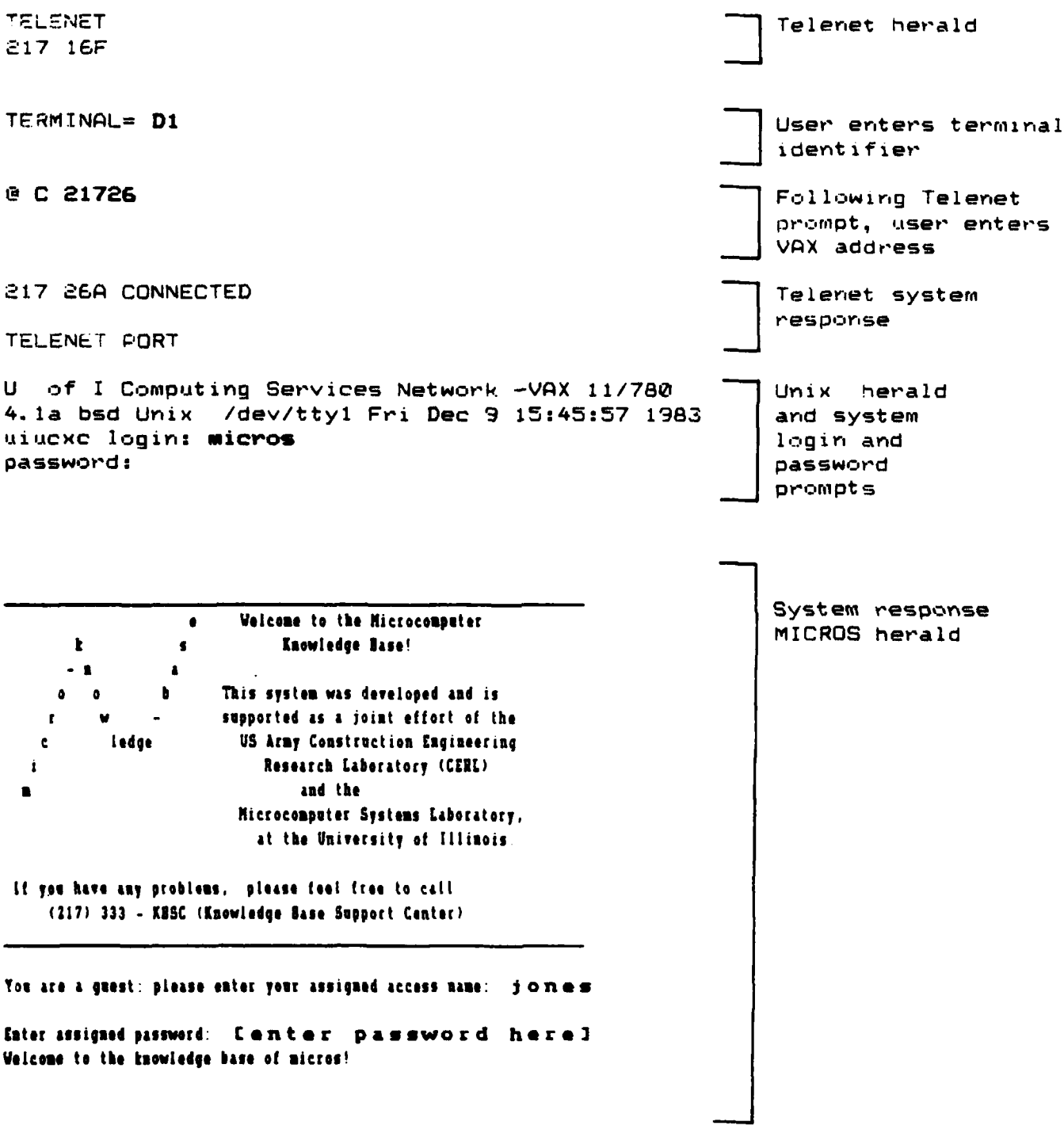

Figure A-2. Guest user login through Telenet.

```
TELENET
217 16F

TERMINAL= D1

@ C 21726

217 26A CONNECTED

TELENET PORT

U  of I Computing Services Network -VAX 11/780
4.1a bsd Unix  /dev/tty1 Fri Dec 9 15:45:57 1983
uiucxc login: norris
password:

% micros

                    e     Welcome to the Microcomputer
       k          s           Knowledge Base!
      - R         a
     o   o        b      This system was developed and is
    r     w       -      supported as a joint effort of the
   c       ledge          US Army Construction Engineering
  i                          Research Laboratory (CERL)
 n                              and the
                          Microcomputer Systems Laboratory,
                            at the University of Illinois.

 If you have any problems,  please feel free to call:
     (217) 333 - KBSC (Knowledge Base Support Center)

Enter the number of your choice, or a KAS Command:

    [1] .... For FIRST TIME USERS: a list of the KAS Commands.
    [2] .... For the knowledge base TABLE OF CONTENTS.
    [3] .... For the knowledge base complete OUTLINE.

In frame (start)
```

Telenet herald

User enters terminal identifier

Following Telenet prompt, user enters VAX address

Telenet system response

Unix herald and system login and password prompts

Following UNIX prompt, user enters "micros"

System response MICROS herald

Figure A-3. Permanent user login through Telenet.

APPENDIX B:

A SYNOPSIS OF THE COMMENT EDITOR COMMANDS

The Insert Mode Help Menu

The following is the help menu accessed from within the Comment Editor while the user is in "insert mode." To display this menu the user types either the word "help" or a question mark ("?") followed by a RETURN to the line prompt. For instance, the following interaction would display this help menu:

```
  1) this is the first line of the comment text
  2) and this is the second line
  3) help
```

Upon displaying the menu the Comment Editor would prompt the user once again to enter the third line ("3)") of the comment.

```
[ ********** QUICK HELP ************ ]
[ To:                    Type:       ]
[ -------------------- ------------ ]
[ Request Assistance     : help or ?  ]
[ Complete your Comment  : done       ]
[ Cancel your Comment    : abort      ]
[ Enter Command Mode     :            ]
[ ==================== ============ ]
[ -- You are still in INSERT mode -- ]


3)
```

The Command Mode Help Menu

The following is the help menu accessed from within the Comment Editor while the user is in the "command mode." The command mode of the editor is indicated by the "MC)" prompt. To display this menu the user types either the word "help" or a question mark ("?") followed by a RETURN to the command mode prompt.

Note that this is a menu from which all of the other help displays can be reached. As indicated at the bottom of the menu, each of the help displays can be reached by entering the number listed beside the command. Alternatively, to exit this help menu the user types the word "exit".

The help displays accessable from this help menu appear on the following pages.

```
****************************** COMMAND HELP ********************************

1.  help or ?          : Command to access further information on each of
                       : editor commands, with examples on how they are
                       : used.

2.  display [range]    : Command to display the specified range of lines.

3.  delete [range]     : Command to delete the specified range of lines.

4.  insert [number]    : Command allows the user to insert text following
                         the specified line number.

5.  done               : Command to quit comment editor, and send comment.

6.  abort              : Command to quit comment editor, without sending
                       : the comment.

========================================================================

TYPE:  "more" for the help menu, "exit" for command mode, or a number:
       1:help    2:display    3:delete    4:insert    5:done    6:abort
```

The Comment Editor "Display" Command

```
********************  COMMENT EDITOR COMMAND  ***************************

Command           Description
===============   ============================================================
display [range]   This command allows the user to display all or a
                  portion of the comment entered so far.  The display
                  command takes as its one argument the particular range
                  of lines the user wishes to see displayed.

Examples          System Response
---------------   ------------------------------------------------------------
display 3         Display comment line number 3.

display 3-5       Display comment line numbers 3 through 5.

display 3-5,8     Display comment line numbers 3 through 5, and line 8.

display all       Display the entire comment entered so far.

display 1-        Same as "display all" above.
===============   ============================================================

TYPE:  "more" for the help menu, "exit" for command mode, or a number:
       1:help    2:display    3:delete    4:insert    5:done    6:abort
```

The Comment Editor "Done" Command

```
********************  COMMENT EDITOR COMMAND  ***************************

Command          Description
===============  ============================================================
done             This command is used when the user is finished entering
                 his or her comment.  Upon issuing the done command, the
                 comment is sent to the appropriate people, and the user
                 is returned to the Knowledge Access System as indicated
                 by the "KAS)" prompt.

Example          System Response
---------------  ------------------------------------------------------------
done             Appends the currently entered comment to the knowledge
                 base, while also sending a copy of the comment to the
                 the knowledge base administrator and the content expert
                 identified with that frame of the knowledge base.

                 With this command the user exits the comment editor,
                 and returns to that frame in the knowledge base in
                 which the comment was made.
===============  ============================================================

TYPE:  "more" for the help menu, "exit" for command mode, or a number:
       1:help    2:display    3:delete    4:insert    5:done    6:abort
```

The Comment Editor "Delete" Command

```
********************  COMMENT EDITOR COMMAND  ***************************

Command           Description
===============   ============================================================
delete [range]    This command allows the user to delete all or a
                  portion of the comment entered so far.  The delete
                  command takes as its one argument the particular range
                  of lines the user wishes to see deleted.

Examples          System Response
---------------   ------------------------------------------------------------
delete 3          Delete comment line number 3.

delete 3-5        Delete comment line numbers 3 through 5.

delete 3-5,8      Delete comment line numbers 3 through 5, and line 8.

delete all        Delete the entire comment entered so far.

delete 1-         Same as "delete all" above.
===============   ============================================================

TYPE:  "more" for the help menu, "exit" for command mode, or a number:
       1:help    2:display    3:delete    4:insert    5:done    6:abort
```

The Comment Editor "Abort" Command

********** COMMENT EDITOR COMMAND **********

Command	Description
abort	This command is used when the user wishes to cancel entering his or her comment. Upon issuing this command the user is returned to the frame in the knowledge base from which the "mc" command was issued. No copy of the entered comment is saved.

Example	System Response
abort	Cancels the comment entered, exits the comment editor, and returns the user to the Knowledge Access System. The comment entered up to that point is lost.

TYPE: "more" for the help menu, "exit" for command mode, or a number:
1:help 2:display 3:delete 4:insert 5:done 6:abort

The Comment Editor "Insert" Command

********** COMMENT EDITOR COMMAND **********

Command	Description
insert [number]	This command allows the user to insert new lines of the comment preceeding the specified comment line number. The single argument of the insert command is that line number of the comment entered so far before which you wish to begin entering new lines of the comment.

Examples	System Response
insert 3	Begin inserting new lines of the comment in front of line 3 of the existing comment.

TYPE: "more" for the help menu, "exit" for command mode, or a number:
1:help 2:display 3:delete 4:insert 5:done 6:abort

APPENDIX C:

A SYNOPSIS OF THE KNOWLEDGE ACCESS SYSTEM (KAS) COMMANDS

This appendix contains a summary of all the KAS commands, followed by a description of the individual commands in more detail. Note that many references need not be limited to the choice of a single action from the available menu options on the screen. Possible menu choices are always bracketed in square brackets as they are displayed.

*** KNOWLEDGE ACCESS SYSTEM ***
-- Command Summary --

Command	Abbreviation	Description
display	d disp (null)	The primary means for displaying frames and advancing through the knowledge base.
redisplay	r	Instruction to re-display the "upper end" of the currently active frame.
trace	t	Command to list the series of frames visited by the user during his or her current session.
mc		The "make comment" command moves the user into the system editor so that he or she may make a comment about the currently active frame.
sc		Instructs KAS to display the comments associated with the currently active frame.
c?		Prompts the system for a list of who has comments and when the comments were made for the currently active frame.
options	o	KAS command to reset the line and column dimensions of the terminal.
help	?	Instructs the system to display the interactive help options currently available.
!		Prefix for Unix system level commands within the Knowledge Access System. (Not available for guest signons.)
quit	q	Causes the system to exit the currently active frame, and return to the parent frame.

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
display	d disp (null)	The primary means for displaying frames and advancing through the knowledge base.

[[[[EXAMPLES of display]]]]

display frame.name	Move to and display frame called "frame.name"
display 2	Move to and display the frame indicated by menu option #2.
2	Same as "display 2" above.
display 1,3	Move to and display the frames indicated by menu options 1 and 3.
display 3,7-9	Move to and display the frames indicated by menu options 3 and 7 through 9.
display all	Move to and display the frames indicated by all menu options.
display 1-	Same as "display all" above.

[[[[COMMENTS on display]]]]

Remember that frames may be much longer than what can be fit on a single screen of your terminal. In such cases the system will inform you of this by adding the otherwise cryptic comment "(more available)" to the line preceding the system prompt (which is "KAS)").

If your screen has a different number of lines or columns than the system is using you may wish to use the "options" command (see help specific to this command).

If you need to reach help information in the help menu without returning to the point you accessed it from then you can always type "display help" to get back to the menu.

There is a complete outline for the knowledge base stored in the frame (outline). This outline is regenerated by the system when modifications are made to the knowledge base. There is also a short form of the outline (just the highest levels of generality) in the frame (table.of.contents). You can reach either of these by using the "display" command.

[[[[SEE ALSO redisplay, options]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
!		Prefix for UNIX system level commands within the Knowledge Access System. (Not available for guest signons.)

[[[[EXAMPLES OF ! prefix]]]]

! ls	This command issued from within KAS will instruct the UNIX operating system to execute "ls" command, which will list the files on the current directory. Once executed, UNIX will return the user back to KAS.

[[[[COMMENTS ON ! prefix]]]]

The exclamation point (!) is used to instruct KAS that you wish to execute a UNIX level command. A valid UNIX operating system command must follow this prefix. Unlike the other KAS commands, this command is used as a prefix to other commands. Anything that follows the exclamation point will be interpreted and executed as a UNIX operating system command. Note that a blank space must separate the prefix and the UNIX command.

For instance, if you wanted to send a note about something you had just seen in the knowledge base to a person with the signon name of "smith" you would enter the following line:

```
! mail smith
```

(Please note the blank following the exclamation point).

After entering this command the system would send you to the UNIX mail system where you may write your note. When you sent the note off to "smith" you would be returned to the KAS in the frame in which you entered the UNIX command. If you enter a command which cannot be interpreted by the system then you will receive whatever diagnostic messages the system might issue. KAS would also indicate to you that an error was made in the command you tried to issue.

When you return to the knowledge base system you would be still be reading in the same frame at the same point you left off. You might wish to issue the redisplay command ("r") to get the current frame redisplayed from its beginning.

[[[[SEE ALSO the UNIX System Documentation]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
mc		The "make comment" facility. Issuing this KAS command invokes an editor to allow the user to enter a comment or question about the current frame.

[[[[EXAMPLES OF mc]]]]

mc	Invokes the editor to enter a comment or question regarding the currently active frame. The "mc" command takes no arguments.

[[[[COMMENTS ON mc]]]]

You can make a comment or ask a question in the knowledge base by using the "mc" command. This command will allow you to contribute a comment or question to either a frame or to one of the previously made comments associated with that frame. The comments are stored as separate entries and are kept in chronological order. You can view other's comments by using the "sc" (see comments) command.

After you have issued this command you will be sent to an editor in which you can enter the your question or comment. For more help with the editing commands, type either a question mark (?) or the word "help" upon entering the editor.

You don't need to identify yourself in the comment unless the signon to the system that you are using is used by others. The information about your signon and the place in the knowledge base your comment was made are automatically saved by the system. A copy of the comment or question is automatically forwarded to both the content expert(s) associated with the frame and to the knowledge base administrator. You will be sent a mail form of the response made to your question or comment (if one is required). The response will also be recorded in the string of comments and questions being saved with the frame so that others with a similar problem or concern can benefit from the interchange.

Upon completing your comment you will be returned to the same place that you were when you initially made your comment.

[[[[SEE ALSO c?, sc]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
RETURN		Command to display the another screen of the currently active frame. Used for displaying frames of more than one screen.

[[[[EXAMPLES OF a null response (RETURN)]]]]

RETURN	The user presses the RETURN key to indicate to KAS that he or she wishes to see the next screen screen of a frame which extends beyond what is shown.

[[[[COMMENTS ON a null response (RETURN)]]]]

When the display of a frame indicates that there is more information remaining to display about the frame and you would like to see it, you can do so by just pressing RETURN key on your terminal.

The reason that the system works this way is that it attempts to output only as much information as will fit on your terminal at once and some of the frames in the knowledge base may exceed the size of your display. You can reset the number of lines and the number of columns that the system uses in this determination by using the "options" command.

[[[[SEE ALSO options, display]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
options	o	KAS command to reset the line and column dimensions of the terminal.

[[[[EXAMPLES OF options]]]]

options	With this command the user indicates that he or she wish to alter the current line and/or column dimensions of the terminal. Upon issuing this command, KAS would indicate the current dimensions and prompt for changes.
o	Same as "options" above.

[[[[COMMENTS ON options]]]]

The "options" commands allows you to change the number of columns and lines the system uses for writing information to your terminal.

The system will first indicate the current line setting, and prompt you for the number of lines you wish to set that number to given the particular characteristics of your terminal. If you don't wish to change the number just enter a RETURN on the prompt line. The system will ask next for the number of columns on your display. Again, if you don't wish to change the number you need enter nothing; just press RETURN.

[[[[SEE ALSO display, redisplay]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
quit	q	Causes the system to exit the currently active frame, and return to the parent frame.

[[[[EXAMPLES OF quit]]]]

quit	The user indicates that he or she wishes to leave the currently active frame and return to frame from which the currently active one was accessed.
q	Same as "quit" above.

[[[[COMMENTS ON quit]]]]

The "quit" command causes the system to leave the current frame and to return to the parent of that frame. In other words, upon issuing this command you will return to that frame from which you entered the currently active frame. This command is used when you've finished seeing the contents of a frame, or if you decide not to see more of a frame which extends for more than the current physical display of your terminal.

If you find that you've lost your place in terms of what frame you are currently reading and how you got there you can use the trace command ("t" or "trace") to determine the order in which you have accessed frames in the knowledge base.

If you issue the quit command from the frame that you initiated your reading in the knowledge base (usually the (start) frame), you will exit the Knowledge Access System, and return to the UNIX operating system.

[Note: In the future we expect to allow for the quitting of multiple levels of frame reading, and thereby allow you to skip over the intervening frames you have been reading "down into".]

[[[[SEE ALSO trace]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
redisplay	r	Instruction to re-display the "upper end" of the currently active frame.

[[[[EXAMPLES OF redisplay]]]]

redisplay	Display the first page, or "upper end" of the frame that is currently active.
r	Same as "redisplay" above.

[[[[COMMENTS ON redisplay]]]]

The "redisplay" command allows a user to return to the first portion of a frame. This may be useful in the event that the user has forgotten the material originally displayed upon entering the frame. This command is also useful when "quitting" a frame by allowing the user to re-display the content of the frame the user is returning to.

This command redisplays the frame from its beginning using your current options for display on your terminal. You may wish to use the "redisplay" command after issuing the "options" command (changing the number of lines and columns associated with your display) when the previous display of the active frame did not properly fit on your screen.

We expect to add a command for moving back a relative number of logical screens (as defined for your terminal) in the future. At present the only way to return to information which has scrolled off the top of your display is to redisplay the first screen-full.

[[[[SEE ALSO display, quit, options]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
sc		Instructs KAS to display the comments associated with the currently active frame.

[[[[EXAMPLES OF sc]]]]

sc	The user indicates that he or she wishes to "see the comments" associated with the current frame.

[[[[COMMENTS ON sc]]]]

In order to see comments associated with the frame you are currently reading, you can enter the "sc" (see comment) command. As you view each comment frame, you can move on to the next comment in the sequence by pressing RETURN or entering "+" and RETURN. You may back up to the previous comment by pressing "-" and RETURN. If you wish to quit seeing the current comment you are reading but move onto the next then the "+" RETURN sequence is required. If you wish to stop view the comments altogether then you can enter "q" or "quit".

If you would like to make a comment while reading comments you can issue the make comment or "mc" command in order to enter the comment editor. When you complete your comment you will be back where you left off in reading comments.

In general the system will inform you that comments exist and when the last one was made when it reaches the end of displaying a frame. You may initiate reading the comments prior to that point if you wish.

[[[[SEE ALSO mc, c?]]]]

**** KNOWLEDGE ACCESS SYSTEM -- Command Summary ****

Command	Abbreviation	Description
trace	t	Command to list the series of frames visited by the user during his or her current session.

[[[[EXAMPLES OF trace]]]]

trace — "Trace" the order of frames visited during the current KAS session. If for instance you had been reading in (start), and then selected to visit the (help) frame, the system would respond as follows to the trace command:

```
You are reading in the MICROS knowledge base.
The current frames you are reading "down" into are:

  (start)
  (help)

*** end of trace ***
```

[[[[COMMENTS ON trace]]]]

We have tested the knowledge base and execution to 25 and 30 levels of descent depth through frames. The actual knowledge outline you will notice only requires descent to about 7 or 8 levels at most places. However because a direct display without numbered reference can be made you may have chosen to re-engage the start frame or the "outline" frame and read down from those without returning to the intermediate levels of frames. In such circumstances its quite easy to become confused as to where you are and how you got there. At first you will probably find it convenient in using the knowledge base to regularly use the trace command to find out the path of reference you have used to reach the current frame you are reading.

[[[[SEE ALSO quit]]]]

APPENDIX D:

USING THE UNIX MAIL FEATURE

Sending Mail

To send mail from the command level (the $ prompt), type:

mail login <cr>

(where login is the login name of the person you are sending mail to and <cr> is carriage return).

If you want to send the same message to several people, list all of their names on the same line, being sure to skip a space between names. For example, type:

mail wilson victor david <cr>

The computer will then prompt you by printing:

subject: (Here you should type in the main topic of your message [one line only], hit a <cr>, and type your message [as many lines as necessary].)

After typing your message, hit a <cr>. On the next line, type a period (.) and carriage return. The computer will then prompt:

Cc: (Here you may type login names of other recipients of your message.)

After doing this, hit a <cr> and your message will be sent.

Receiving Mail

When you login, if you have been sent mail, the computer will print:

$ you have new mail

To see your mail, type:

mail <cr>

The computer will then print numbered one-line headers of all the messages that you have been sent. To see the contents of a message, type in the number of that message and carriage return. To reply to a message you have just read, type:

r <cr>

The computer will then print the heading of that message and allow you to reply to it. The message can be sent in the usual fashion. (Note: When you use this method, your reply will go to all addressees of the original message.)

To delete a message, type:

d # <cr>

(where # is the number of the message). To "undelete" a message (recover a message you have just deleted), type:

u # <cr>

The message will then be reinstated. To save a message under a filename, type:

s # filename <cr>

(where filename is any name you choose with less than 11 characters). That message will then be stored in your home directory under that filename.

When you wish to leave the mail program, type:

q <cr>

You will then be returned to the command level (the "$" prompt). All looked-at mail, unless deleted or saved, will be stored in a file called "mbox."

If you want to leave your mailbox without having the system transfer your messages to your "mbox" file, type an "x" to exit "mail" instead of "q" and carriage return. If you used this procedure, all unlooked-at mail will be kept in "mail" so that when you login next time the computer will print:

$ you have old mail

You can see one-line headers of all messages stored in "mbox" by typing:

mail -f <cr>

You can interact with "mbox" exactly the same way as you do with "mail."

APPENDIX E:

A DETAILED OUTLINE OF THE MICROCOMPUTER KNOWLEDGE BASE

The following is the currently complete outline of the MICROS knowledge base. Following each of the topic headings is the name of the frame associated with the topic. For example, the name of the frame for referencing virtual memory is <virtual.mem>.

Note that the knowledge base is constantly being expanded, so what appears here may not be exactly what is found in the current MICROS knowledge base.

```
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Useful references-(references)

APPENDIX F:

"TABLE OF CONTENTS" OF THE MICROCOMPUTER KNOWLEDGE BASE

The following listing of the <table.of.contents> frame is included here as a quick reference to the various categories of information in the knowledge base. The numbers following each entry indicate the menu option of that entry within the frame <table.of.contents>.

Microcomputer Knowledge Base: Table of Contents

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ATTN: DAEN-ASI-L (2)
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ATTN: DAEN-CW
ATTN: DAEN-CWE
ATTN: DAEN-CWM-R
ATTN: DAEN-CWO
ATTN: DAEN-CWP
ATTN: DAEN-EC
ATTN: DAEN-ZCF
ATTN: DAEN-ECB
ATTN: DAEN-RD
ATTN: DAEN-RDC
ATTN: DAEN-RDM
ATTN: DAEN-RM
ATTN: DAEN-ZCZ
ATTN: DAEN-ZCE
ATTN: DAEN-ZCI
ATTN: DAEN-ZCM

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ATTN: DET III 79906

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ETL, ATTN: Library 22060

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Mabry, Frank
The Microcomputer Knowledge Base: introduction and user instructions / by Frank Mabry, William Hohensee, Gregory Norris. -- Champaign, Ill : Construction Engineering Research Laboratory ; available from NTIS, 1984.
27 p. (Technical report / Construction Engineering Research Laboratory ; P-155)

1. Microcomputer Knowledge Base. 2. U.S. Army Corps of Engineers -- Civil functions. 3. Microcomputers. I. Hohensee, William. II. Norris, Gregory. III. Title. IV. Series: Technical report / Construction Engineering Research Laboratory) ; P-155.

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