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## P R E F A C E

This document describes the TERM III Communication System. The operational concept is overviewed herein, and the various commands are described in detail.

The initial release of the TERM III System differs from the information presented in this document in the following ways:

- o the T3FILER program is not yet complete
  - the TERM III protocol is not implemented
  - the KERMIT and CIS protocols are not implemented
  - the Batch transfer option under MODEM7 is not implemented
  
- o the following programs are not provided and the information presented on them is subject to change (more so than the other commands):
  - T3DO
  - T3MASTER
  - T3SERVER
  
- o the selection of modems under T3SELMOD (the file T3MODCAP.MCP) is not yet complete

A second release (phase 2) of the TERM III System is planned in which these features will be included. This initial release (phase 1) is presented due to user desire, and Echelon will distribute the second release without any additional charge to all users who placed original orders for the TERM III System. The documentation on these features is subject to change since design changes may be later made during final implementation and testing. Minor documentation changes and feature changes may be made to the other TERM III System commands as well.

The creation of the TERM III System has taken over a year, and this effort has been on the order of the creation of the ZCPR3 System itself. Take time to study thoroughly this document and the supplied examples before installing the TERM III System and adapting it to your applications.

Thank you for your interest and support.

Richard Conn  
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## 1. The TERM III System

TERM III is a communications system which runs under the Z-System (the ZCPR3 command processor with, optionally, the ZRDOS CP/M BDOS replacement). TERM III consists of over twenty programs which provide the following capabilities:

- o interactive communication with remote computer systems
- o reliable file transfer between the user's computer and remote computers
- o control of an auto-dial/auto-answer modem
- o access control for remote system applications (the user's system can be set up to be dialed into by outside users)
- o rapid and easy reconfiguration of the communications environment for different applications

TERM III is integrated with ZCPR3 and provides the Z-System user with a communications capability that can be adapted to a wide variety of needs and can be used in conjunction with his other Z-System tools. The TERM III programs return their result codes (which indicate the success or failure of their operation) in a manner which can be examined using the IF command. TERM III programs can be employed in menus and aliases that provide commands and applications environments which are tailored to a user's specific needs.

TERM III programs rely upon the environment provided by a Z-System for support. Some aspects of this support include:

- o All screen-oriented displays obtain terminal-specific information from the ZCPR3 TCAP.
- o Many of the programs return result codes (via the Program Error Message in most cases) through the ZCPR3 Environment Descriptor.
- o File references can be prefixed with the ZCPR3 directory reference forms (DIR or DU).
- o Path searches or direct ROOT accesses are employed as required.
- o Messages and other attributes of the ZCPR3 environment are used extensively.

A large number of features were built into the TERM III System in order to provide the user with flexibility of use and adaptability to different communications requirements. Ease of

use and user-friendliness are also key elements of the design. An outline of the features of the TERM III System follows:

### 1. Interactive Communications

- o terminal mode - the user "feels" like he is directly connected to the remote computer via a terminal
- o conversation mode - the screen is divided, with incoming characters printed in the top half and outgoing characters printed in the bottom half
- o translation tables - all incoming and outgoing characters pass through translation tables, supporting parity transmissions, masking of selected characters (such as escape sequences), and using different character sets (such as EBCDIC)
- o macro tables - ten predefined strings can be transmitted at will
- o printer output - displayed characters can be queued to the printer
- o buffer load and dump - displayed characters can be stored in a memory buffer and dumped to disk, printer, or the remote computer
- o XON/XOFF recording - displayed characters can be stored in a disk file, using XON/XOFF handshaking to ensure no loss of data
- o dynamic setting and displaying of environment variables for ease of selection of features

### 2. File Transfer

- o several communications protocols available, including XMODEM with Checksum, XMODEM with CRC, and KERMIT
- o batch file transfer (sending lists of files using wild cards) available with some protocols
- o communications server - remote system access and control from the user's system without the need for the user to issue commands to the remote system directly

### 3. Modem Control

- o answer the telephone and drop into the Z-System environment with a result code (phone rang or user abort)
- o dial the telephone based on mnemonics or specific telephone numbers
- o rotary dialing - dial all numbers in a directory file in sequence until one answers
- o multiple telephone number directories

#### 4. Access Control

- o LOGIN program
- o selecting the attributes of a user's environment based on the user's ID; attributes include:
  - command search path
  - ZCPR3 System Segments loaded
  - startup command line
  - various Environment Descriptor data
  - wheel byte and quiet flag
- o loading a TCAP entry based on the user's ID

#### 5. Environment Configuration

- o use of Comm Sets (Communications Sets) which define the aspects of an environment and can be quickly loaded as needed
- o screen-oriented editors to create and tailor Comm Sets easily
- o automated program installation procedure with installation configuration files

The TERM III System was designed to meet the communications needs of the serious Z-System user, and knowledge of the Z-System is required to make effective use of TERM III. The reader is referred to ZCPR3: The Manual for a detailed discussion of ZCPR3 and to Echelon, Inc., and its newsletters and other supporting activities for information on the Z-System. See the References appendix for more information.

This document is designed to provide the reader with information on how the programs in the TERM III System are intended to be used under a Z-System. It includes information on the basic concepts of the TERM III System and how TERM III and ZCPR3 can work together. Details on each program in the TERM III System are presented, including details on installation.

The information in this document is presented with the assumption that the reader is currently using ZCPR3 and is familiar with many of its fundamental concepts. The use of aliases, menus, flow control commands (IF, ELSE, FI), and the command search path should be understood by the reader. See the references for help in finding information on these and other topics.

## 2. TERM III Basic Concepts

This chapter discusses several concepts that are fundamental to the design of the TERM III System. The reader must understand these ideas in order to use TERM III effectively.

In summary, these concepts are:

- o Use of Menus vs Command Lines
- o Applications Environments
- o Remote Access Systems and ZCPR3
- o Input/Output Packages on a Remote Access System
- o Time Logging on a Remote Access System
- o Comm Sets
- o Result Codes

### 2.1. Use of Menus vs Command Lines

Most of the TERM III programs provide the user with the option of issuing commands from a menu or directly from a command line. The key functions of these programs can be invoked by either method, and the method employed generally depends on the user's application.

Command lines are useful when menus or aliases are employed. For instance, the TERM III System can be set up to perform operations like this:

```
Dial the Telephone Number for System X (*)
If answered
    Log into it (*)
    Send File F1 to System X (*)
    If transfer failed
        Note failure of transfer (*)
    end if
    Test System X for File F2 (*)
    If File F2 available
        Get File F2 from System X (*)
    else
        Note lack of File F2 (*)
    end if
    Hangup the Telephone (*)
else
    Note failure (*)
end if
```

Each line of pseudo-code listed above corresponds to one command to ZCPR3. The Z-System is used as the executive for the processing of this command stream. Those lines marked with an asterisk (\*) are performed by TERM III System commands.

This command sequence could have been invoked by a menu, alias, or command file (ZEX or SUB) under the Z-System.

Command lines are also handy when the user is at the ZCPR3 command level and wants to issue a command to perform a function

on the remote system while staying at the command level for his next command. The following scenarios illustrate this (steps done using TERM III System commands are marked with an asterisk):

Scenario 1: User wants to send file to remote system

Send command to display dir on remote system (\*)  
 Look at results (\*)  
 Based on results, send command to change name (\*)  
     of a file on the remote system if it duplicates  
     the name of the file to be sent  
 Send the local file (\*)

Scenario 2: User wants to get a file from a remote system

Send command to display dir on remote system (\*)  
 Look at results (\*)  
 Look for disk with enough room for file  
 Get the remote file to the target disk (\*)

## 2.2. Applications Environments

The TERM III System was designed with three applications in mind:

- o use as a Remote Access System (RAS) -  
     users dial into this system, interact  
     with it, and transfer programs into and  
     out of it
- o use as an originating Communications System -  
     the user dials out to other computers and  
     communicates with them, performing functions  
     which include file transfers
- o use as a Configuration System -  
     the user configures the attributes of the  
     other two types of systems

Each type of system requires only some of the files that make up the TERM III System. The other files can be omitted, resulting in a savings in disk space and an increase in security (the users of the RAS cannot run programs that can do damage).

Some files associated with these systems are:

### Remote Access Systems (Z-NODEs)

T3ANSWER - to answer the telephone  
 T3HANGUP - to hang up the telephone  
 T3INIT - (optional) to init the interfaces  
 T3LOGCHG - to allow a user to change his password  
           or terminal definition  
 T3LOGIN - to log users in  
 T3NOTE - to log activity of users  
 T3SERVER - to send and receive files

### Systems Used to Call Out

T3DIAL - to dial the telephone, answer the  
           phone, and hang up the phone  
 T3INIT - (optional) to init the interfaces

T3TERM or - to communicate  
 T3TERMB or T3FILER  
 T3MASTER - to communicate (with T3SERVER)

#### Systems Used to Establish Environments

T3INS - to install Comm Sets in programs  
 T3LOGCK - to check syntax of LOGIN.TXT files  
 T3TEST - to test MODEM.BIN segments  
 EDCST - Comm Set editor  
 EDTMC - Macro Names Editor  
 EDTXD - Telephone Directory Editor  
 EDXLT - Translation Table Editor

### 2.3. Remote Access Systems and ZCPR3

ZCPR3 and the TERM III System can integrate to create a secure Remote Access System (RAS). The aspects of such an integration which enhance its security include:

- o Path search can restrict the commands accessed by a user
- o Disallowing the DU form and permitting the DIR form of directory reference only automatically provides password protection on directories
- o Many ZCPR3 commands pay attention to the Wheel byte, and privileged functions are disabled if the Wheel byte is turned off

ZCPR3 commands are resolved by searching along a command search path. Only those COM files along the path may be executed. Hence, by carefully placing harmless commands in the directories along the path, the user is not granted access to commands which could do damage.

ZCPR3 allows the user to access directories by disk-user references or by name. The disk-user references feature can be disabled, leaving only the name. This presents the SYSOP with two major advantages:

- o named directories can have passwords associated with them, and these passwords must be given in order to complete the directory reference
- o only directories which are named can be accessed; hence, if a directory contains files but does not have a name, the files in it cannot be accessed

The PATH and LDR commands are used to change the path and the load different named directories (or environment descriptors). Access to these commands by a normal user has the potential of causing damage. Consequently, the TERM III System provides a program called T3LOGIN which performs these functions and more without requiring a PATH or LDR command to be available.

When T3LOGIN executes, its only inputs from the user are a user name and password. It searches through a LOGIN.TXT file, processing environment definition commands and looking for a user name - password match. When a match is found, the environment is configured by T3LOGIN as instructed from the LOGIN.TXT file. Aspects of the ZCPR3 environment which can be configured by T3LOGIN include:

- o the command search path
- o which system segments (including named directory files, RCPs, FCPs, and IOPs) are loaded in the user's environment
- o whether DU forms are allowed
- o whether the Wheel byte is set

Consequently, the user can freely access and run T3LOGIN at both login time and any time during his session. Who he logs in as determines the attributes of his environment. The other ZCPR3 programs (with the exception of LDR, which is still used at cold boot time) used to manipulate the user's environment can be removed.

#### 2.4. Input/Output Packages on a Remote Access System

Input/Output Packages (IOPs) are segments of the Z-System which contain groups of Input/Output device drivers for the Console, Reader, Punch, and List logical devices. A Z-System may be implemented with or without IOPs. For a Remote Access System, IOPs provide a convenient mechanism to further enhance the operation and security of the system as a whole.

Different I/O environments are required for different types of communications applications of a Z-System. Some of the common I/O environments include:

- o the environment of a "normal" user of a RAS
- o the environment of a "privileged" user of a RAS
- o the environment of a SYSOP calling into his RAS
- o the "booting" environment when a RAS is cold-booting
- o the user-to-user environment when a person is dialing into a Z-System that is attended by its owner, and the two people are going to work together through the Z-System

##### 2.4.1. "Normal" User Environment

A "normal" user is one which should not be allowed access to commands that can disrupt the operation of the Z-System. These "dangerous" commands may be physically removed from the RAS, but certain classes of users, such as a SYSOP who is dialing into his system to perform maintenance, may need them. The Z-System provides two convenient mechanisms which combine to protect the "dangerous" commands from execution by the "normal" user:

- o the command search path for a "normal" user can be set up in such a way that it does not include the directory containing the "dangerous" commands
- o the DU (Disk/User) form may be disabled, and the "dangerous" commands may be placed in a directory which has a name and password associated with it or a directory which does not have a name

The TERM III program T3LOGIN has the ability to configure the Z-System's environment based on the user's name and password.

T3LOGIN accepts as input ONLY a user name and password, and, if the pair is verified, then an environment can be established. Passwords can be omitted from user names in the LOGIN.TXT file, permitting T3LOGIN to support commands like "T3LOGIN INIT." T3LOGIN can be viewed not only as a program to control access to the system, but also as a general-purpose environment controller, where operational environments are related to a single keyword. It may be wise to employ two copies of T3LOGIN for this type of application so that users cannot log in using user names like INIT; one T3LOGIN controls access, and a second (under a different name) controls the environment via keywords.

T3LOGIN has the ability to affect the entire Z-System, including the command search path and the named directory segment. Consequently, T3LOGIN is intended to be one of the first programs run when a user dials into a RAS and it should be available publically to all users. T3LOGIN establishes the user's environment, and the user can later change his environment (assuming that all of the "dangerous" commands are properly protected) only by running T3LOGIN and providing a different user name and password.

The communications environment of the "normal" user of a RAS is one in which no device selection on the part of the user is allowed, the printer is not available (typing a ^P does nothing), and the console is timed and monitored for loss of carrier. An IOP can accomodate this by containing a NULL device (which performs a simple return rather than outputting a character) as a printer and a console device (call it REMOTE) which monitors the user's carrier detect line and monitors an elapsed time counter. The Input/Output Package (IOP) can contain a List device named NULL and a console device named REMOTE, and T3LOGIN has the ability to select these devices by name.

The console device REMOTE may be extended to include a monitor for activity from a CRT. This monitor would look for a special character to come in from the CRT and switch the IOP console to another device. This other console device, called REMOTEM (for REMOTE Monitor), ties this CRT to the modem being used by the caller. This tie-in could take a variety of forms, with two common forms being:

1. the CRT and modem could share the I/O; ie, input could come from either the CRT or the modem, and output would go to both the CRT and modem in parallel
2. the CRT could dominate the I/O; ie, input could come only from the CRT and output would go to both the CRT and modem

As a further extension, REMOTE could look for two different inputs from the CRT, and select REMOTEM1, which provides for the shared I/O of the first case (above), or REMOTEM2, which provides for the CRT-dominated I/O of the second case.

#### 2.4.2. "Privileged" User Environment

T3LOGIN is flexible to the point of allowing the SYSOP to define a different environment for EACH USER. Consequently, there can be as many classes of privileged users as desired, each class having different capabilities and Z-System environments. For example, one class can have command-search path A and named-directory set 1 while another class can have command-search path B and named-directory set 2. The SYSOP himself can have a third command-search path and named-directory set.

The IOP can further support this by providing another type of REMOTE console device. This console (call it REMOTENT for Remote No Timeout) is like the one before, except that the elapsed time is not monitored. Consequently, one or more classes of privileged users can be established which have no time restriction on the RAS.

#### 2.4.3. SYSOP Environment

The SYSOP can enter the system as a remote or a local user (call in or direct line). It is a logical extension of the concepts presented above to allow for one or more SYSOP environments. As a minimum, the local SYSOP environment would assign the console to a device (call it CRT) which does not monitor the elapsed time or carrier and have the ability to reboot the system. Also, the remote SYSOP environment would use REMOTENT as the console so that time limits would not be a problem for the SYSOP.

#### 2.4.4. Booting Environment

A good way to ensure that a Z-System environment is properly initialized each time a user logs in is to have the Z-System environment cold boot when a user hangs up on it. This can disrupt a modem in the extreme, however, if all of the text which is normally sent during the cold boot process is sent to the modem. For this reason, it is recommended that the output console driver which is employed during cold boot be a NULL console (like the NULL printer). No output is sent to the modem.

The cold boot sequence could consist of the following steps:

1. use BIOS console output driver which is NULL
2. load system segments, and have the IOP come up with a NULL console output driver
3. set up environment attributes as desired and change the path to not include directories which contain "dangerous" commands (we are now in a "normal" user mode); T3LOGIN could be used to do this as an environment controller (like "T3LOGIN INIT")
4. run T3ANSWER to answer the phone; the console input driver should allow the local CRT to abort T3ANSWER so the SYSOP can take control if he desires

5. run T3LOGIN after T3ANSWER terminates (even the SYSOP should log in, or this may be skipped for the SYSOP, but the environment for the SYSOP may not be properly established if T3LOGIN is skipped)
6. exit to the Z-System from T3LOGIN or delay and then reboot if login failed (abort command from T3LOGIN could be a delay/reboot sequence)

The execution of T3LOGIN in step 5 results in the complete establishment of the user's environment based on his user name and password.

#### 2.4.5. User-to-User Environment

A user may wish to configure his host computer to allow another person to call in and interact with him through the one system. An IOP console device for this scenario would be similar to REMOTEM1 (both consoles share equally) or REMOTEM2 (the user's console only provides input and both consoles view the output) except that the modem carrier would be monitored and output to and input from the modem would be suspended if the carrier was dropped. This prevents problems with modem interaction on loss of carrier from occurring.

#### 2.4.6. Summary of Console Devices

The IOP provides a flexibility not found under conventional implementations of device I/O in the BIOS. While designing ZCPR3, I found the need for the IOP to be pronounced. Relying on the BIOS for all the device I/O support was too restrictive:

1. the BIOS had to fit on the system tracks, so it was tight on space
2. the BIOS had no hooks to provide for more than four console, four reader, four punch, and four list devices

By implementing the IOP concept, several advantages were realized:

1. a buffer of 1K or 2K outside the BIOS which contained all of the I/O device drivers would remove these drivers (or all but the simplest of them) from the BIOS, thereby shrinking the BIOS, and simultaneously provide more space in which to implement more complex device drivers
2. the I/O Byte of CP/M need no longer be employed; the IOP jump table can be a mirror of the BIOS jump table with extensions to provide for other mechanisms to select the devices (such as by NAME rather than bit-field in a byte)
3. more than four physical device drivers can be assigned to each logical device

The IOP concept can be extended and employed in a Z-System which supports TERM III. As outlined in this section, the IOP for such a system can support devices such as the following:

- NULL printer
- REMOTE console
  - o monitors the carrier detect line and reboots or otherwise restarts the system if the carrier is lost
  - o monitors an elapsed time counter and reboots or otherwise restarts the system if the time elapses
  - o monitors the CRT line for one or more command characters, and invokes one or more other devices based on these commands
- REMOTEM1 console
  - o monitors the carrier detect line like REMOTE
  - o may or may not monitor elapsed time
  - o input comes from the CRT and modem in parallel and goes to the CRT and modem in parallel
- REMOTEM2 console
  - o like REMOTEM1, but input comes only from the CRT
- REMOTEM3 console
  - o like REMOTEM1, but if carrier drops, input from and output to the modem is simply ignored (only the CRT is active when the modem carrier drops)
- REMOTENT console
  - o like REMOTE, but does not monitor elapsed time
- CRT console
  - o no monitoring; CRT input and output only

This list is by no means complete, but it should serve to give the reader some initial ideas on what types of device drivers he would like to set up in his IOP.

## 2.5. Time Logging on a Remote Access System

The TERM III System programs serve to replace BYE, a popular program used to run Remote Access Systems, in its entirety. Almost. The one aspect of BYE which has not been addressed directly by TERM III System programs is that of user time logging. It is frequently desirable to track the amount of time a user spends on a system and to kick him off after an hour.

Time logging can be shown by the following pseudo code:

At user login, start the timer and reset it to zero  
Throughout the session, periodically check the  
timer

If the user logs out, turn off the timer

If the timer expires, break the connection,  
optionally pause for a period of time, turn  
off the timer

The timer, then, must be polled throughout the user's session, and this is best done by some aspect of the resident system or an executive (such as BYE). This segment of the system should check the timer at quiescent moments, such as during a wait for output.

The solution proposed in this document for the implementation of the timer is as a part of an I/O Package. This I/O Package (IOP) would provide a device driver which uses the Modem as a console and monitors the timer. The REMOTE device discussed above is one such implementation, but there are other possibilities. The console record function (or printer record function, for that matter) of the IOP can be used to turn the timer on and off. Hence, when a user logs in, a part of the user's default command line would be to turn on the timer ("RECORD CONSOLE ON" command) and to select the correct MODEM device ("DEV CONSOLE TMODEM" command, where TMODEM is the Modem with a timer controlled by RECORD CONSOLE directives). For the sake of security, T3LOGIN can perform the same functions as the DEV and RECORD commands.

## 2.6. Comm Sets

All programs in the TERM III System which communicate with a remote computer use Comm Sets. At installation time, each program is loaded with a Comm Set (the built-in Comm Set) that tells it what to do when it is invoked. The options at invocation are:

1. load the Comm Set named on the command line
2. load a Comm Set from disk
3. use the built-in Comm Set

All programs used for communication, such as T3FILER and T3TERM, contain a Comm Set within themselves (the built-in Comm Set). Upon execution, these programs examine certain flags in this Comm Set, and may perform one of the following three Comm Set selection functions:

1. load a Comm Set specified on the command line
2. if no Comm Set is specified on the command line, load a Comm Set specified in the built-in Comm Set if the ILOAD (Initial Load) flag is set in the built-in Comm Set
3. if no Comm Set is specified on the command line, use the built-in Comm Set if the ILOAD flag is not set

At this point, the Comm Set which is present within the communication program is the Comm Set used for the session. This Comm Set is called the default Comm Set.

If a Comm Set is explicitly named on the command line (option 1), options (2) and (3) are overridden. Additionally, a Comm Set is loaded by searching along the ZCPR3 command search path or by logging into a specific directory, as per a flag in the Comm Set which was installed in the body of the program. The chapter on Installation discusses the Comm Set loading options in more detail.

The Comm Set is a data block (stored in a file of type CST or stored directly in a program) which contains details on the communications environment. Some of these details are:

- o an Input Translation Table - all incoming characters are passed through this table and possibly translated into other characters as indicated (parity can be dropped, EBCDIC can be translated to ASCII, lower-case to upper-case, etc)
- o an Output Translation Table - all outgoing characters are passed through this table
- o the Macro Buffer - contains ten text strings which can be transmitted by striking a single digit from certain programs
- o the Exit Character - the character used to attract the attention of the host TERM III program
- o the Break Character - the character used to tell the TERM III program to send a break if it can
- o the Echo Flag - instructs the TERM III program to echo outgoing characters to the user
- o commands and options for various TERM III programs
- o commands which control the Comm Set loading as described above
- o names of various TERM III programs and data files

Comm Sets are further described in the section on Comm Set Editor commands.

## 2.7. Result Codes

Many of the TERM III programs return Result Codes in the form of ZCPR3 messages which can be examined by ZCPR3 tools and acted upon. The "Program Error" message is the most common Result Code returned, and it can be conveniently picked up by the IF ERROR command in most applications. For example, code sequences like the following can be easily employed in an alias or menu:

```

TERM III Command
IF ^ERROR          | Command succeeded
commands
ELSE               | Command failed
commands
FI                 | End of IF

```

One good practical example of this is with T3DIAL, the program used to dial the telephone:

```
T3DIAL FRED          | Dial the indicated number
IF ~ERROR           | RCP/M Answered
T3FILER T FRED      | Enter T3FILER with Comm Set FRED.CST
ELSE                | No Answer
ECHO NO ANSWER      | Say so
FI
```

The T3LOGIN program can return a large number of result codes, and these codes are determined by the ID of the user that just logged in. The "Program Error" code can be set as before, but so can the Register values. T3LOGIN can make radical changes to the system environment, depending on the user's ID. See the detailed description of the T3LOGIN program for more details.

### 3. Command Summary

This chapter and the chapter on installation present all of the programs which make up the TERM III System. The programs are grouped into functional areas and alphabetized within these sections:

- o Communication
- o Telephone Control
- o Access Control
- o Command File Processing
- o Communications Server
- o Editors
- o Miscellaneous
- o Installation

Each program is presented in the following fashion:

Program Name  
 Syntax  
 Brief Description  
 Discussion and Notes  
 Result Codes Returned  
 Examples of Use

Quantities placed in []'s are optional. For example,  
 COMMAND [option [filename]]  
 can take these forms:

```
COMMAND
COMMAND option
COMMAND option filename
```

while  
 COMMAND [option] [filename]  
 can be any of these:

```
COMMAND
COMMAND option
COMMAND filename
COMMAND option filename
```

#### Notes:

1. Those commands whose names are followed by an asterisk (\*) require a DC Hayes Smartmodem to operate. These commands are T3ANSWER, T3DIAL, T3HANGUP, and T3INIT.
2. All commands may be executed with the form "COMMAND //" to print an ID and built-in documentation summary
3. All COM files except for T3INS.COM supplied with the TERM III System must be installed before use by running T3INS on them.
4. All commands respond to the Quiet Flag.
5. The form "^c" is used consistently throughout this document to represent the two-character sequence consisting of a caret followed by a letter. Some commands require this two-character sequence to be used in order to obtain control

character sequence to be used in order to obtain control characters, where ^c (without the quotes) represents a control character (like ^A).

6. The term host computer refers to the computer employed by the user. The user dials out from the host computer, for example. The remote computer is the computer dialed into by the user.

3.1. Communication

This section covers TERM III System programs which are employed for user communication (via a terminal mode, conversation mode, or file transfer). The programs covered in this section are:

T3FILER

Supports Terminal Mode, Conversation Mode, and File Transfer

T3FLUSH

Simply flushes incoming characters from the remote system until no characters are received for a certain period of time

T3SEND

Sends a command line to the remote system

T3TERM

Supports Terminal Mode and Conversation Mode

T3TERMB

Supports Terminal Mode

T3TEST

Supports simple character I/O

Terminal Mode

Terminal Mode is the "normal" means of communication between a user and a remote computer. Under the TERM III System, Terminal Mode is more involved than what one would normally think.

For each outgoing character, the following sequence of events takes place:

1. Input the character from the user
2. Send it through the Output Translation Table and then to the modem
3. If local echo is on,
  - Send the character to the console
  - Queue the character to the printer (if on)
  - Store the character in the memory buffer (if on)

For each incoming character, the following sequence of events takes place:

1. Input the character from the modem
2. Send it through the Input Translation Table and then to the console
3. Queue the character to the printer (if on)
  - Store the character in the memory buffer (if on)

The three communications programs, T3FILER, T3TERM, and T3TERMB, do not all possess the same features for incoming and outgoing character processing. The following table summarizes:

<u>Program</u>	<u>Available Features</u>	
	<u>Printer</u>	<u>Memory Buffer</u>
T3FILER	Y	N
T3TERM	Y	Y
T3TERMB	N	Y

Conversation Mode

Conversation Mode is the split-screen communication mode available in the T3FILER, T3TERM, and T3TERMB programs. The

characters coming in from the remote computer appear in the upper half of the screen, and the characters typed by the user appear in the lower half. Each half of the display uses eight (8) lines, and wrap-around from top to bottom occurs.

While the user is communicating in this fashion, the following commands are available to him:

<u>Command</u>	<u>Comments</u>
Exit Char	Issue Menu Command (^E is used in the distribution programs)
^O	Set Transmit Line Feed option If this option is on, each RETURN typed by the user is sent as CRLF; if off, each RETURN is sent as CR; this is for remote users who are in a normal terminal mode
^R	Clear screen
^X	Clear the 8 SEND lines
^Y	Clear the 8 RECEIVE lines
^Z	Clear both sets of lines

#### Exit Character

While in the Terminal or Conversation Modes, the Exit Character is used to bring up a program's prompt, thereby allowing the user to issue a command to the program. The Y command (available in T3FILER, T3TERM, and T3TERMB) can be used to change the Exit Character if it proves to be inconvenient for the editor being used or some such reason.

#### 3.1.1. T3FILER

##### Syntax (Form 1):

T3FILER [option [filename]]

Option (Select only one):

- C - Enter Conversation Mode
- F - Enter File Transfer Menu
- M - Enter Main Menu
- T - Enter Terminal Mode

Filename:

Name of Comm Set to load

##### Syntax (Form 2):

T3FILER [sroptions [filename]]

SROptions (Select only one):

- R - Receive File
- S - Send File

Suboptions (Select zero or more, immediately after R or S):

- 1..6 - Select Protocol
- B - MODEM7 Batch File Transfer
- C - Completion Alarm
- M - Monitor Transfer
- Q - Quiet Transfer (only Diagnostics)

Filename:

Name of file to send or receive; DIR or DU form allowed

##### Brief Description:

T3FILER is used for normal communication and to send and

receive files. Terminal (like a terminal interface) and Conversation (split-screen) Modes are available for communication, and six file transfer protocols are available for sending and receiving files.

T3FILER contains two menus. The Main Menu provides a group of commands similar to those provided under T3TERM. The File Transfer menu allows option selection for the transfer and sending and receiving files.

Discussion and Notes:

The following commands are available from the Main Menu in T3FILER. The user types the Exit Character from Terminal or Conversation modes in order to issue these commands. This causes the command prompt to appear. Once at the command prompt, the space bar or ^R refreshes the screen and displays the menu.

<u>Command</u>	<u>Comment</u>
0..9	Send Macro Text 0..9 The text of Macro 0 to 9 is transmitted (thru the translation tables) to the remote computer
@	Send Exit Char The Exit character is sent to the remote computer (this provides the ability to send the Exit character)
C	Enter Conversation Mode This is the split-screen mode
E	Toggle Local Echo All characters typed by the user are sent to his screen along with the characters coming in from the remote computer
F	Enter File Transfer Menu
G	Get new Comm Set This allows a Comm Set to be loaded
H	Hang up Telephone and exit to Z-System
L	List macros This provides a listing of the macros contained in the current Comm Set
P	Toggle Printer All characters displayed are sent to the LST: device if this toggle is enabled
Q	Exit to T3DIAL (Telephone Control System) Control is transferred to T3DIAL; T3DIAL can hang up the phone, dial new numbers, and answer the phone
R	Receive a File Receive a file using the current settings of the protocol and options

<u>Command</u>	<u>Comment</u>
S	Send a File Send a file using the current settings of the protocol and options
T	Enter Terminal Mode
V	File Handler (File Manipulation Tool) Control is transferred to a tool like VFILER
X	Exit to Z-System
Y	Set Exit Character The Exit character can be changed to any desired 7-bit character
Z	Exit and Run ZCPR3 command The user is prompted for a command line, which is run before control returns to Z

The following commands are available from the File Transfer menu:

<u>Command</u>	<u>Comment</u>
1..6	Select File Transfer Protocol
B	Toggle MODEM7 Batch File Transfer The MODEM7 Batch File Transfer function allows wild cards to be used in sending files using the MODEM7 protocols
C	Toggle Completion Alarm The Completion Alarm rings a bell when the transfer is finished
M	Toggle Monitor of File Transfer The Monitor function displays the data as it is being transferred
Q	Quit to Caller Return to the section (Terminal Mode, Conversation Mode, Main Menu) of T3FILER from which the File Transfer Menu was entered, ie, if the File Transfer Menu was entered from Terminal Mode, Q returns to Terminal Mode, while if the File Transfer Menu was entered from the Main Menu, Q returns to the Main Menu
R	Receive a File Receive a file using the options selected; wild cards may be used, depending on the protocol and other options selected
S	Send a File Send a file using the options selected
X	Exit to Z-System

Only file transfer protocol 4 (XON/XOFF) uses the Translation Tables in the Comm Set. The other five protocols do not use the Translation Tables.

As with the other programs used for communication, T3FILER contains a Comm Set within itself (the built-in Comm Set). Upon execution, T3FILER examines certain flags in this Comm Set, and

it may perform one of the following three Comm Set selection functions:

1. load a Comm Set specified on the command line
2. if no Comm Set is specified on the command line, load a Comm Set specified in the built-in Comm Set if the ILOAD (Initial Load) flag is set in the built-in Comm Set
3. if no Comm Set is specified on the command line, use the built-in Comm Set if the ILOAD flag is not set

At this point, the Comm Set which is present within T3FILER is the Comm Set used for the session. This Comm Set is called the default Comm Set.

#### Result Codes Returned: Program Error message

If one or more file transfers are performed using one of the six protocols, the success or failure of the last transfer is reflected in the Program Error message (IF ERROR can be used to detect the status of this message). If no file transfer is done, the Program Error message is not affected.

#### Examples of Use:

```
T3FILER
  -- Enter Terminal Mode; either use the built-in Comm
      Set or load the default Comm Set (T3.CST) from disk
T3FILER T MYCST
  -- Enter Terminal Mode using the Comm Set MYCST.CST
T3FILER S FILE.TXT
  -- Send FILE.TXT using the default protocol and other
      settings
T3FILER R2CM FILE.TXT
  -- Receive FILE.TXT using protocol 2; toggle Completion
      Alarm and Transfer Monitor from the default
```

#### 3.1.2. T3FLUSH

##### Syntax:

```
T3FLUSH [options]
```

##### Options:

```
None      Set timeout for 10 seconds
M         Monitor characters received while T3FLUSH runs
nn        Set timeout for nn (decimal number) seconds
```

##### Brief Description:

T3FLUSH is used to flush incoming characters from the modem line. T3FLUSH will run until the user aborts it, by striking the Exit Character (normally ^E) defined in the default Comm Set, or until no characters are received for a certain number of seconds.

##### Discussion and Notes:

T3FLUSH uses the default Comm Set to determine the Exit Character. This Comm Set is installed by T3INS. Unlike T3FILER and T3TERM, T3FLUSH always uses its built-in Comm Set as the default Comm Set.

Input character translation is performed by T3FLUSH. In the interest of keeping T3FLUSH as small as possible, CST\_ILOAD

(Initial Load of Comm Set from disk) is not supported. T3FLUSH must be installed with the proper input translation table by T3INS.

T3FLUSH is usually used in conjunction with T3SEND, where T3SEND was first used to send a command to a remote system and T3FLUSH is used to wait for the remote system to settle down (stop sending characters to the user) after receiving this command. For instance, if T3SEND sends an XMODEM command to the remote system, T3FLUSH can then be executed to receive the characters sent by XMODEM until XMODEM stops sending characters and starts waiting for activity from the user (ie, the file transfer to begin).

The time specified may not necessarily equate to seconds on a particular system. Each unit, for example, may be closer in value to two seconds (ie, T3FLUSH 2 would wait for 4 seconds), depending on the overhead imposed by the Z-System's BIOS.

Result Codes Returned: None

Examples of Use:

```
T3FLUSH M
    -- flush characters for 10 secs or user abort; monitor
    incoming characters
T3FLUSH 2
    -- flush characters for 2 secs or user abort
T3SEND XMODEM S FILE.TXT;T3FLUSH M3
    -- send the command line "XMODEM S FILE.TXT" to the
    remote system and then flush and monitor the
    incoming characters until 3 secs or user abort
```

### 3.1.3. T3SEND

Syntax:

```
T3SEND text
```

Text:

The text to be sent to the remote system

Brief Description:

T3SEND sends text to the remote system. This text is specified on the command line, as in "T3SEND XMODEM S FILE.TXT".

Discussion and Notes:

T3SEND provides a convenient method to send text to a remote computer without bothering to invoke one of the main interactive communications programs (T3TERM, T3FILER, etc). It can be used in conjunction with T3FLUSH to allow commands to be issued which affect both the remote system and the local system from a menu or alias.

The output translation tables in the Comm Set within T3SEND are used. In order to keep T3SEND as small as possible, CST\_ILOAD (initial load of Comm Set from disk) is not supported. The built-in Comm Set is the only Comm Set used by T3SEND. T3SEND must be installed with the proper output translation table by T3INS.

T3SEND sends all characters from the command line, so they enter the output translation table as upper-case. Control characters may be send by entering the two-character "^c"

sequence, such as "^M" (caret followed by M) to send a RETURN. "^^" sends a single "^".

.uj 0

Result Codes Returned: None

Examples of Use:

```
T3SEND XMODEM R FILE.TXT^M
    -- send "XMODEM R FILE.TXT^M" to the remote system
       (^M is caret followed by M)
T3SEND XMODEM S FILE.TXT^M;T3FLUSH M3;T3FILER R FILE.TXT
    -- send "XMODEM S FILE.TXT^M" to the remote system,
       pause and wait for no characters to be received
       for three seconds, and then use T3FILER to
       receive the file FILE.TXT (^M is caret followed
       by M)
```

### 3.1.4. T3TERM

Syntax:

```
T3TERM [option [filename]]
```

Options (Select only one):

```
C - Enter conversation mode
M - Enter menu
T - Enter terminal mode
```

Filename:

```
Name of Comm Set to load
```

Brief Description:

T3TERM is one of the two basic communications programs of the TERM III System. T3TERMB is the other. T3TERM allows the user to communicate interactively with the remote computer in one of two modes: (1) Terminal Mode, which appears like normal terminal communication, and (2) Conversation Mode, which is split-screen, allowing both the remote and local systems to send and receive simultaneously with the displays being kept separate.

Discussion and Notes:

The following commands are available from within T3TERM. The user types the Exit Character from Terminal or Conversation modes in order to issue these commands. This causes the command prompt to appear. Once at the command prompt, the space bar or ^R will refresh the screen and display the menu.

<u>Command</u>	<u>Comment</u>
0..9	Send Macro Text 0..9
@	Send Exit Char
B	Toggle Buffer Load (with optional status msg) The memory buffer can be loaded from disk or modem via this command; if load occurs from modem, the number of 256-byte pages remaining in the memory buffer may be displayed if this option is enabled
C	Enter Conversation Mode

D Dump Buffer to Disk, Modem, or Printer  
 The contents of the memory buffer are sent to a disk file, out to the modem, or to the printer

E Toggle Local Echo (all outgoing characters typed by the user are echoed back to him)

G Get new Comm Set

H Hang up Telephone and exit to Z-System

L List macros

P Toggle Printer

Q Exit to T3DIAL (Telephone Control System)

T Enter Terminal Mode

V File Handler (File Manipulation Tool)

X Exit to Z-System

Y Set Exit Character

Z Exit and Run ZCPR3 command

See the section on T3FILER for a more detailed explanation of the commands.

Note that T3FILER does not support the Buffer Load and Dump Buffer commands.

Note that T3TERM allows a buffer load from modem or disk and a buffer dump to modem, printer, or disk. If the load is from a modem, the number of 256-byte pages remaining in the buffer may be displayed in the upper right-hand corner of the screen. The presence of this display is controlled by a flag in the Comm Set, and this display is enabled by running the Comm Set Editor (EDCST) on the desired Comm Set and setting this flag.

Result Codes Returned: None

Examples of Use:

T3TERM

-- Enter Terminal Mode; either use built-in Comm Set or load a Comm Set from disk if ILOAD is enabled

T3TERM C

-- Enter Conversation Mode; either use built-in Comm Set or load a Comm Set from disk if ILOAD is on

T3TERM T MYCST

-- Enter Terminal Mode after loading the Comm Set MYCST.CST

T3TERM M

-- Enter Menu; either use built-in Comm Set or load default Comm Set

T3TERM M C1.CST

-- Enter Menu after loading Comm Set C1.CST

### 3.1.5. T3TERMB

Syntax:

T3TERMB [option [filename]]

Options (Select only one):

M - Enter Menu

T - Enter Terminal Mode

Filename:

Name of Comm Set to load

Brief Description:

T3TERMB supports a subset of the commands available under T3TERM, and it offers a larger memory buffer for buffer load functions.

Discussion and Notes:

The commands available under T3TERMB are:

<u>Command</u>	<u>Comments</u>
B	Toggle Buffer Load from Modem
D	Dump Buffer to Disk
E	Toggle Echo
G	Get Comm Set
H	Hang up Telephone and exit to Z-System
T	Enter Terminal Mode
X	Exit to Z-System
Y	Change Exit Character

See the section on T3FILER for a more detailed explanation of the commands.

Note that the Buffer Load function loads only from the modem into memory and Dump Buffer dumps only to disk. Under T3TERM, Buffer Load loads from modem or disk, and Dump Buffer dumps to modem, disk, or printer. If the option is set in the default Comm Set (use EDCST to set the Buffer Load status display flag), Buffer Load may display the number of 256-byte pages remaining in the memory buffer.

Result Codes Returned: None

Examples of Use:

```
T3TERMB
    -- Enter Terminal Mode; either use the built-in Comm
        Set or load the default Comm Set from disk
T3TERMB T MYCST
    -- Enter Terminal Mode, loading the Comm Set MYCST.CST
```

3.1.6. T3TEST

Syntax:

```
T3TEST
```

Brief Description:

T3TEST is a very simple Terminal Mode program. Its primary purpose is to act as a test program for the MODEM interface of the user's system.

Discussion and Notes:

T3TEST simply acts as a Terminal Mode. No Comm Set is used. The only command is ^E, which exits T3TEST and returns control to the Z-System.

Result Codes Returned: None

Examples of Use:

```
T3TEST
    -- Run T3TEST and exit with ^E
```

## 3.2. Telephone Control

The TERM III System programs covered in this section are used to control the telephone interface. A DC Hayes Smartmodem (300 or 1200), or compatible, is required to run these programs.

The programs covered in this section are:

```
T3ANSWER
    -- Answer the telephone
T3DIAL
    -- Dial the telephone, answer the telephone,
       hang up the telephone, and initialize
       (performs the functions of T3ANSWER,
        T3HANGUP, and T3INIT)
T3HANGUP
    -- Hang up the telephone
T3INIT
    -- Initialize the communication speed and the
       modem
```

## 3.2.1. T3ANSWER

Syntax:

```
T3ANSWER
```

Brief Description:

T3ANSWER is used to answer the telephone. There are two ways that T3ANSWER will terminate:

1. When the telephone rings
2. When the user types a ^C

Discussion and Notes:

The Program Error message is returned to indicate why T3ANSWER terminated. The following pseudo-code illustrates how T3ANSWER's Program Error message can be used.

```
T3ANSWER;      ; Run T3ANSWER
IF ER;        ; Check for Error Message
cmds;         ; Do these commands if user aborts
ELSE;         ; Toggle IF
cmds;         ; Do these commands if phone rings
FI
```

In the environment of a Remote Access System (Z-NODE), T3ANSWER may be used in the following command sequence:

```
T3ANSWER;      ; Run T3ANSWER
IF ^ER;        ; If the phone rang ...
DEV C MODEM;   ; Define the console to be the MODEM
T3LOGIN;       ; Run the T3LOGIN program
FI
```

Result Codes Returned: Program Error

Program Error message is SET (ERROR) if the user aborts T3ANSWER; Program Error message is RESET (No ERROR) if the telephone rings.

Examples of Use:

```
T3ANSWER
-- Run T3ANSWER
```

## 3.2.2. T3DIAL

Syntax:

```
T3DIAL [option [filename]]
```

Options (Select one only):

```
NAME Dial the indicated name from the telephone directory
/A  Answer the telephone
/H  Hang up the telephone
/I  Initialize the modem
/M  Enter the menu
/N# Dial the indicated telephone number
/R  Rotary dial through the telephone directory
```

Filename:

Name of the telephone directory to load; if none, the default telephone directory (T3.TXD) is loaded

Brief Description:

T3DIAL provides the main interface to the telephone. It can answer the telephone, hang up the telephone, and dial the telephone. Rotary dialing (dialing all numbers in a telephone directory until one answers or all numbers are exhausted) is supported.

Discussion and Notes:

"T3DIAL /N NUMBER" dials the indicated telephone number. Commands to the user's modem, such as the comma (pause) command recognized by the DC Hayes Smartmodem, may be included in the telephone number.

"T3DIAL /M FILE" enters a menu with the indicated telephone directory file (FILE) loaded.

"T3DIAL NAME" loads the telephone directory file T3.TXD and dials the indicated name. "T3DIAL NAME FILE" loads the indicated telephone directory file (FILE) and dials the indicated name --

```
T3DIAL FRED           ; Dial FRED from T3.TXD
T3DIAL Z-NODE1 Z-NODES ; Dial Z-NODE1 from Z-NODES.TXD
```

The name of a telephone number is the first word in the text description for a particular telephone directory entry (each entry has a text description and a number).

"T3DIAL /R" dials thru all entries in the telephone directory file T3.TXD until one answers. "T3DIAL /R FILE" dials thru all entries in the indicated telephone directory file (FILE) until one answers.

If a "T3DIAL NAME" or "T3DIAL /R" form is used and no answer is received, the Program Error Message is set. Example:

```
T3DIAL FRED;      | Dial FRED from T3.TXD
IF ER;           | Test Error Message
cmds;           | Commands if no answer
ELSE;           | Toggle IF
cmds;           | Commands if answer
FI
```

or

```
T3DIAL /R LOCALBBS; | Find an answer in LOCALBBS.TXD
IF ER;             | Test Error Message
cmds;             | Commands if no answer
ELSE;             | Toggle IF
cmds;             | Commands if answer
FI
```

T3DIAL can, by itself, perform the functions of T3ANSWER, T3HANGUP, and T3INIT:

```
T3DIAL /A = T3ANSWER
T3DIAL /H = T3HANGUP
T3DIAL /I = T3INIT
```

If "T3DIAL /A" is used and the user aborts via ^C, the Program Error Message is set (IF ER test can be done).

EDTXD is used to create and edit Telephone Directory (TXD) files.

Result Codes Returned: Program Error message

ERROR is set if T3DIAL fails to get an answer.

Examples of Use:

```
T3DIAL
  -- Menu is entered; T3.TXD is loaded
T3DIAL FRED
  -- FRED is dialed from T3.TXD
T3DIAL FRED FRIENDS
  -- FRED is dialed from FRIENDS.TXD
T3DIAL /N 555-1212
  -- dials the telephone number 555-1212
T3DIAL /R BBS
  -- rotary dials over all numbers in BBS.TXD until
  one answers or the last number is dialed
```

### 3.2.3. T3HANGUP

Syntax:

```
T3HANGUP
```

Brief Description:

The telephone is hung up.

Discussion and Notes:

No error messages are returned.

Result Codes Returned: None

Examples of Use:

```
T3HANGUP
  -- Hang up the telephone
```

## 3.2.4. T3INIT

Syntax:

T3INIT [speed]

Speed:

Speed is a number from 1 to 7, indicating the speed of the communications link. The possible speed values are:

1 - 300  
2 - 1200  
3 - 2400  
4 - 4800  
5 - 9600  
6 - 19200  
7 - 38400

Not all installations will support all of the possible speed values. T3INIT // prints a table showing the available speed values for your particular installation.

Brief Description:

T3INIT sets the speed (baud rate) of the communications link and initializes the DC Hayes Smartmodem. Depending on how the modem driver was set up, speeds up to 38,400 baud can be selected (usually used in direct computer-to-computer links).

Discussion and Notes:

If the speed is not specified, the user is prompted with a menu.

Run "T3INIT //" to find out what the valid speed values are for a particular installation.

Result Codes Returned: NoneExamples of Use:

T3INIT  
-- Menu appears  
T3INIT 2  
-- Select speed 2

### 3.3. Access Control

The TERM III System can be configured to support a Remote Access System (RAS), which is a computer system that users dial into, such as an RCP/M, RBBS, etc. The T3LOGIN program is used to control access to a Remote Access System. T3LOGIN prompts the user for a user name and password, and, if a valid user name - password pair is entered, T3LOGIN establishes the user's environment under a Z-System and returns control to the operating system. If a valid user name - password pair is not entered after three tries, T3LOGIN runs an Abort command, which is defined at installation time or in the LOGIN.TXT file read by T3LOGIN.

When T3LOGIN executes, it prompts the user for a user name and password, and it then reads through an ASCII text file (referred to as LOGIN.TXT in this documentation), processing commands and looking for a user name - password pair which matches the input from the user.

It is most important that the LOGIN.TXT file contain valid commands and options, and the program T3LOGCK is provided to perform such an analysis on LOGIN.TXT. T3LOGCK is run by the SYSOP before he allows T3LOGIN to process the LOGIN.TXT file, and T3LOGCK will perform a complete syntactic and semantic analysis of the LOGIN.TXT file. T3LOGCK generates a report on its findings, and this report can be sent to the console or to the console and printer.

The program T3LOGCHG is provided to allow the user to change his password and/or terminal definition. It edits the LOGIN.TXT file for a particular user, leaving the rest of the LOGIN.TXT file intact.

#### 3.3.1. T3LOGCHG

##### Syntax:

```
T3LOGCHG
or T3LOGCHG SID
or T3LOGCHG user[,pass]
```

##### SID:

System File Name ID (1..4) which is used to identify the user name from the indicated System File Name

##### USER:

Any valid user name

##### PASS:

The password associated with that user name

##### Brief Description:

T3LOGCHG allows a user to change his password and/or terminal definition at any time.

If the form "T3LOGCHG" is used, the user is prompted for his user name (which he can input as USER,PASS or just USER), and, if he did not specify a password, he will be prompted for his password (without echo). The form "T3LOGCHG SID" or "T3LOGCHG USER" causes the user to be prompted for his password, and the form "T3LOGCHG USER,PASS" accepts both user name and password.

If the password and user name match, the user is presented with his current user name, password, and terminal definition and

allowed to change either the password or the terminal definition. He can do this as many times as desired, and, when satisfied, the LOGIN.TXT entry for this user will be updated.

Discussion and Notes:

If an alias is established containing the form "T3LOGCHG SID", then running this alias will only allow the user to change his own password and terminal definition. The only way he can change that of another user is to know the name of the T3LOGCHG program as it resides outside the alias.

T3LOGCHG combines with the I option of T3LOGIN to allow T3LOGIN to establish the user's ID and T3LOGCHG allow the user to change only his password or terminal definition.

In modifying LOGIN.TXT, the original LOGIN.TXT is read and processed into the file LOGIN.\$\$\$ if the user and password match. LOGIN.\$\$\$ is built as the new LOGIN.TXT, and, if it is built successfully, the original LOGIN.TXT is deleted, and LOGIN.\$\$\$ is renamed to LOGIN.TXT. It is recommended that the SYSOP backup the LOGIN.TXT file from time to time should an error occur in the building of new LOGIN.TXT files via the T3LOGCHG command.

Result Codes Returned: None

Examples of Use:

```
T3LOGCHG
    -- user is prompted for user name and password
       (password is not echoed)
T3LOGCHG 1
    -- user name is established from System File Name 1
       (this was supposedly set by T3LOGIN), and the
       user is prompted for his password (not echoed)
T3LOGCHG MYNAME
    -- user name MYNAME is used, and the user is prompted
       for his password (not echoed)
T3LOGCHG MYNAME,MYPASS
    -- all information required is presented; if matched
       against the current entry in LOGIN.TXT, the user
       is allowed to make his desired changes
```

### 3.3.2. T3LOGCK

Syntax:

```
T3LOGCK filename [options]
```

Options:

```
none      Send output to console
L         List lines of source file
P         Send output to printer as well as console
```

Brief Description:

T3LOGCK checks the syntax of a LOGIN.TXT file, which is read and processed by the T3LOGIN program. The check is very complete and useful in detecting possible problems before T3LOGIN runs. T3LOGCK should be used after a LOGIN.TXT file has been composed, and does not need to be used again until a change is made to the LOGIN.TXT file.

Discussion and Notes:

T3LOGCK verifies the following items:

- o all commands in the login file are syntactically correct
- o no invalid commands are present
- o all required arguments for commands are correct

T3LOGCK counts the number of users listed in the file and provides a report on this.

T3LOGCK does NOT verify that the arguments are semantically correct; for example, if a file is referenced (ie, A14:NOTE.TXT) and does not exist, this is not detected until T3LOGIN runs.

All error messages are self-explanatory; the error lines are listed with the error messages.

Lines are numbered in the listing.

Result Codes Returned: None

Examples of Use:

T3LOGCK LOG1.TXT P

-- check LOG1.TXT and output to console and printer

T3LOGCK LOGIN.TXT LP

-- check LOGIN.TXT, output to console and printer, and include a listing of the source to LOGIN.TXT

## 3.3.3. T3LOGIN

Syntax:

T3LOGIN

or T3LOGIN USER[,PASS]

USER:

A User Name, consisting of a series of characters containing no spaces

PASS:

A Password, consisting of a series of characters containing no spaces

Note:

If a password is presented, no spaces are allowed in the "USER,PASS" character sequence (for example, "BLOW, JOE" is not permitted but "BLOW,JOE" is).

Brief Description:

T3LOGIN prompts the user for a user name and password if a user name is not presented on the command line. If a user name - password pair (the password is optional and taken to be blank if not given) is present on the command line, the initial prompt is aborted. T3LOGIN then scans thru the LOGIN.TXT (directory and actual name of file are set by T3INS at installation time) for a match of the user name and password. If matched, the environment is established and control is returned to the operating system. If not matched after three tries, an abort command (defined by default via T3INS or redefined in LOGIN.TXT) is executed.

Discussion and Notes:

Three tries are permitted; upon failure, an abort command (set by T3INS at installation time or specified by the LOGIN.TXT file) is executed.

T3LOGIN prompts the user with

User Name:

to which the user may type in "USER" (his user name) or "USER,PASS" (his user name and password). If just "USER" is entered, a second prompt

Password:

appears, and the password may be entered now without echo. The input to these two prompts is not case-sensitive. Input during either prompt may be edited by the conventional line editing commands (BS, DEL, ^U, etc).

The LOGIN.TXT file is a text file which consists of three types of lines:

- o Comments - any line with a ";" in column 1
- o Commands - any line with a "-" in column 1
- o USER data - any other line

USER data is of the form: USER,PASS,TERM. Both PASS and TERM are options. Examples:

```

USER          <-- user with no password or terminal
USER,         <-- same as USER
USER,PASS     <-- user with password
USER,PASS,TERM <-- user with password and terminal
USER,,TERM    <-- user with terminal (no password)

```

A user name (USER) is a sequence of non-space characters. A password (PASS) is also a sequence of non-space characters. The number of characters allowed is very large (256), so any reasonable user name and password is allowed. The terminal name (TERM) is restricted to eight (8) characters (for file name purposes). If the System File Names are to be used to carry USER names, the USER names should be restricted to eight (8) characters also (see the I command below).

If a TERM is specified, this file (it should be named TERM.Z3T) is loaded into the ZCPR3 System Environment Descriptor as the terminal configuration file for this particular user unless the T command, which names a ZCPR3 TCAP file, is given (in which case the entry matching the name TERM is loaded from the Z3TCAP.TCP file). If the user "CONN,RICK,TVI950" logs in, the System Segment TVI950.Z3T will be loaded if the Z3TCAP entry has not been selected (TVI950 in the Z3TCAP will be loaded if the Z3TCAP entry has been selected).

Command lines contain a "-" followed by zero or more commands. Commands are separated by zero or more spaces. Examples:

```

- xw1q0c"ROOT:;XD"p"A$ A15 A14"
- x w1 q0 c"ROOT:;XD" p"A$ A15 A14"

```

The general structure of LOGIN.TXT is with commands, user data, and comments interspersed as desired. All commands previously defined apply to the user data currently being processed (which is why the X command is available). Commands are processed in the order they are given. Example:

```

; comments
- xq1 p"A$ A15"
user1,pass1,term1
- w1 p"A$ A15 A14"
sysop,syspass

```

The following single-letter commands (and indicated arguments) are recognized and processed by the T3LOGIN program:

Command	Notes and Examples
-----	-----
1 r=value	Set register r (0..9) to 8-bit value 1=20 2=34h 9=0ffh 8=177q
2 A"command line"	Set the command line (multiple commands allowed) to be run if T3LOGIN aborts. This overrides the default set at installation time during the T3INS run. A"t3hangup" A"reset;t3hangup"
3 C"command line"	Set the command line (multiple commands allowed) to be run if T3LOGIN succeeds. C"menu" C"tcselect;menu"
4 Dd	Set the maximum disk reference allowed (d=A..P). DC
5 Edname	Select a physical I/O device from an IOP (d = logical ID, where C=CON, R=RDR, P=PUN, and L=LST, and name = physical ID as stored in the IOP) ECCRTMOD ELNULL EPCLOCK
6 Fldir:fn.ft	Turn on I/O Recording thru the IOP, where d=C for CON or L for LST, and dir:fn.ft is a file to record into FClroot:console.log FLlroot:printer.log
7 Fd0	Turn off I/O Recording thru the IOP, where d=C for CON or L for LST FC0 FL0
8 If	Set the number of system file f (1..4) in which to store user's signon name if T3LOGIN succeeds. See the T3NOTE command for an explanation of why this is particularly useful. I1
9 Ldir:	Log into the indicated directory (DU: or DIR: form allowed), and use this as the default from which to extract all files referenced from this point on. LA14: LT3:
10 Nffn.ft	Set the name of system file f (1..4) if T3LOGIN succeeds. N2NORMAL.USER N4SYSOP.USER

Command	Notes and Examples
11 P"path"	Define the path which will be set if T3LOGIN succeeds. P"A\$ ROOT" P"A\$ ROOT A14"
12 Qo	Set the quiet flag on or off (o=1 if on, o=0 if off). Q0 Q1
13 Sdir:fn.ft	Load the indicated system segment. File types MUST be one of: ENV, FCP, IOP, NDR, RCP, Z3T Ssys.env Ssysop.rcp Sa15:sysop.ndr
14 Tdir:fn.ft	Define Z3TCAP file to be used to resolve terminal references; if this file is defined, all terminals specified for each user or S*.Z3T command (see S command above) are loaded from this Z3TCAP.TCP file rather than from Z3T files, meaning that all terminals can be stored in one TCP file rather than several Z3T files Troot:Z3TCAP.TCP
15 Un	Define maximum user number which may be referenced (n=0..31). U8 U17
16 Wo	Set the wheel byte on or off (o=1 if on, o=0 if off). W0 W1
17 X	Reset all flags and options (see next note).
18 Yo	Set the DUOK flag on or off (o=1 if on, o=0 if off).

The X (reset options) command resets the following options. By this reset, these option values will not be affected upon exit from T3LOGIN (they will have the same values they had when T3LOGIN was entered).

- o command line to run upon normal exit
- o name of directory T3LOGIN is running from (see L cmd)
- o path
- o DUOK flag
- o maximum disk
- o maximum user
- o wheel byte
- o quiet flag
- o ID file number (system file containing user's name)
- o RCP to load
- o FCP to load

- o IOP to load
- o NDR to load
- o ENV to load
- o Z3T to load
- o Z3TCAP.TCP file used to resolve terminal references
- o I/O Device selection (see E cmd)
- o I/O Recording state (see F cmd)
- o system file name 1
- o system file name 2
- o system file name 3
- o system file name 4

See the sample LOGIN.TXT file provided in the TERM III distribution for an example.

The T3LOGIN program can be invoked when a user first logs into a system, and it may also be later invoked (the form "T3LOGIN USER,PASS" is convenient for this) if a user wishes to change his ID or status during a session. Note that this latter convenience can open the door to many extended applications, such as using T3LOGIN to change the user's environment. T3LOGIN, then, can be of use in both secure and non-secure environments.

Result Codes Returned: Many (see discussion)

Examples of Use:

T3LOGIN

-- the user is prompted for the user name and password

T3LOGIN NEWUSER

-- the login process begins with the user name  
"NEWUSER" and a blank password

T3LOGIN SYSOP,SECRET

-- the login process logs in user "SYSOP" with  
password "SECRET"

### 3.4. Command File Processing

The TERM III System supports an automated command file processing facility that can be used to perform repeated or mundane tasks, such as logging into a Remote Access System, for the user. Sequences of commands which are complex or hard to remember can be placed into a command file and invoked with ease. The programs associated with the command file facility are:

```
T3DO      -- the command file processor
T3MONRPT  -- session activity report generator
T3VIEW    -- session activity recorder
```

The use scenario of the command file processing facility is to perform the following steps:

1. Connect to a Remote Access System
2. Run T3VIEW in Monitor Mode and perform the activities you wish to record, such as logging into the system, reading your mail, sending files, etc
3. Use the Dump command of T3VIEW to save the session activity record to disk in a file after you have recorded what you want
4. Terminate the connection with the Remote Access System
5. Run T3MONRPT to generate a report of the session (use the printer output option); this report shows every character received by the computer and every character you typed in order
6. Write a T3DO command file to duplicate your activity
7. Test the T3DO command file against the Remote Access System by connecting to it and running T3DO on the command file rather than using a normal terminal program

T3DO command files can contain a wealth of commands for string matching, error recovery and timeouts, and other functions useful in duplicating the human activity. Nesting of command files is permitted, so only one command file, for example, needs to be created to log into a system, and it can be processed by T3DO while running another command file.

#### 3.4.1. T3DO

##### Syntax:

```
T3DO FILE1[,FILE2,FILE3,...]
```

##### FILEN:

The name of a file to read T3DO commands from.

##### Brief Description:

T3DO is a command file processor for the TERM III System. It reads text files containing T3DO commands, and acts on these commands. T3DO provides a convenient way to execute frequently

used command sequences on a remote system, such as logging into that remote system and reading mail from it.

Discussion and Notes: (this information subject to change)

T3DO processes commands from conventional text files. These commands can specify text strings to send or wait to receive. They can also name other T3DO command files to execute, and T3DO command files can be nested 20 levels deep. The following table summarizes the commands available to T3DO. See the sample T3DO files (of type T3D) supplied in the distribution for examples.

<u>Command</u>	<u>Comments and Examples</u>
1   :label	Specify a label for use with GOTO; the first eight characters of the label are significant, and case is not important :LOGIN
2   "string"	Send the indicated string to the remote system; control characters may be specified in a string by the two-character "^c" sequence "XMODEM S FILE.TXT^M"
3   ;comment	Comment line ; This is a comment
4   CONSOLE	Send all incoming characters to the user's console
5   DEC r	Decrement value in register "r", where 0..9 is range for "r" DEC 0    DEC 9
6   DO file1,file2,...	Execute one or more T3DO files in the sequence indicated; the default file type of T3D is assumed DO LOGIN,MAILER.T3D
7   ELSE	Toggle the current IF state
8   FI	End the innermost IF
9   FLUSH n	Flush incoming characters until no characters are received for "n" seconds; the timeout value of "n" may not necessarily be seconds, depending on the BIOS complexity FLUSH 2

## T3DO Commands, Continued

	<u>Command</u>	<u>Comments and Examples</u>
10	GOTO label	Branch to the indicated label in the file; this label is defined by the ":label" command and must be defined in the current T3DO file GOTO RETRY
11	IF 'c'	If the last character received was "c" (the two-char "^c" sequence is allowed), the following statements are performed IF 'z' IF '^Z'
12	IF ~'c'	If the last character received was not "c", the following are performed IF ~'z' IF ~'^Z'
13	IF ERROR	If the error flag is set, the following statements are performed
14	IF ~ERROR	If the error flag is not set, the following statements are performed
15	IF r=n	If register "r" (0..9 = "r") is equal to the value "n", the following statements are performed IF 0=2 IF 9=0
16	IF ~r=n	If register "r" (0..9 = "r") is not equal to the value "n", the following statements are performed IF ~0=23H
17	INC r	Increment register "r" (0..9 = "r") INC 0
18	MONITOR filename	Send all incoming characters to the indicated file; XON/XOFF handshaking is used to prevent character lossage MONITOR SESSION.TXT
19	MONITOR	Turn off the monitor and close the file
20	MONITOR /OFF	Suspend the monitor process but do not close the file
21	MONITOR /ON	Resume the monitor process if suspended

## T3DO Commands, Continued

	<u>Command</u>	<u>Comments and Examples</u>
22	PRINTER ON or OFF	Turn ON or OFF sending all incoming characters to the printer
23	RETURN	Exit the current T3DO file
24	SET COMM_SET filename	Load the indicated Comm Set and use it for transmission and reception from this point forward
25	SET ERROR n	Set the Program Error Message (which can be tested by T3DO's "IF ERROR" or ZCPR3's "IF ER") to a value (0 = no error) SET ERROR 0
26	SET r n	Set the value of register "r" (0..9 = "r") SET 0 23H      SET 9 100
27	TYPE "string"	Send the string to the console; if MONITOR or PRINTER is ON, it will be sent to the disk file or printer as well TYPE "Attempt Failed"
28	TYPENL "string"	Same as TYPE, but the string is followed by a new line (CRLF) TYPENL "Goodbye"
29	WAIT n	Wait for up to "n" seconds of no input for the next character to be received WAIT 5
30	WAIT "string" n	Wait for up to "n" seconds of no input for the indicated string to be received (set the Error Flag if string not received - IF ERROR can test this flag)

Result Codes Returned: Program Error Message may be set  
ZCPR3 Registers may be affected

Examples of Use:

```
T3DO SYSTEMA
-- run T3DO on SYSTEMA.T3D
```

## 3.4.2. T3MONRPT

Syntax:

T3MONRPT filename [option]

FILENAME:

Name of file generated by the T3VIEW program

Option:

None        Output report is sent to the console  
P            Output report is sent to the printer

Brief Description:

T3MONRPT generates a report from a file created by T3VIEW. This report is a copy of the terminal session, with the inputs from the remote system and the outputs from the user specifically annotated.

Discussion and Notes:

T3MONRPT and T3VIEW are used to assist the user in creating T3DO command files. They provide a convenient method by which a record of the exact character sequences sent and received during a terminal session can be created and used later for reference.

Result Codes Returned: NoneExamples of Use:

```
T3MONRPT SESSION.TXT P
    -- report on SESSION.TXT and send output to the printer
```

## 3.4.3. T3VIEW

Syntax:

T3VIEW [option [filename]]

Options:

M    Enter T3VIEW at menu  
T    Enter T3VIEW at terminal mode

Filename:

Name of Comm Set file to load

Brief Description:

T3VIEW is similar in concept to T3TERMB -- its main purpose is to record both incoming and outgoing characters in a memory buffer. This buffer can then be written to disk, and the program T3MONRPT can generate a report of the session activity from this disk file.

Discussion and Notes:

T3VIEW supports a subset of the T3TERM commands with two additions. The commands of T3VIEW are:

<u>Command</u>	<u>Comments</u>
@	Send Exit Character
B	Toggle Buffer Load; the user is given the options to clear the buffer and display status

<u>Command</u>	<u>Comments (Continued)</u>
C	Clear translation table to Pass-all (all incoming characters are passed thru as-is)
D	Dump memory buffer contents to a disk file
E	Toggle the local echo
G	Get a new Comm Set
H	Hang up the telephone and exit
M	Toggle Monitor Mode; this combines the buffer load and monitor functions; data which is to be reported by T3MONRPT should be recorded under Monitor Mode
T	Enter Terminal Mode
X	Exit to Z-System
Y	Set a new Exit Character

The best way to find out what T3VIEW does is to use it in Monitor Mode and then run T3MONRPT on the file generated by T3VIEW.

Result Codes Returned: None

Examples of Use:

T3VIEW

-- Enter terminal mode with the default Comm Set

T3VIEW M SPCST

-- Enter the menu after loading SPCST.CST

### 3.5. Communications Server

The TERM III System includes a pair of programs, namely T3MASTER and T3SERVER, which combine to form the TERM III Communications Server (Comm Server for short).

The TERM III Communications Server provides a convenient mechanism for repeated file transfer activity between two systems. It allows the user to perform functions such as:

- o automatic transfer of batches of files between the two systems
- o controlled execution of commands on the remote system
- o redirection of console output on the host computer into files on the remote computer (the remote computer records all incoming characters from the user's host computer into a file)

In order to invoke the Communications Server, the user will typically run T3MASTER in Terminal Mode. He then issues the command

T3SERVER

on the remote system, and he then returns to T3MASTER. At this point, the user issues commands to T3MASTER which are executed by the Communications Server, acting as one program over both machines.

#### 3.5.1. T3MASTER

##### Syntax:

T3MASTER [device [filename]]

##### Device:

None	To enter T3MASTER at Command Level
C	To enter T3MASTER at Command Level
T	To enter T3MASTER at Terminal Mode
Name	Name of device to assign to the console via an IOP A "terminate record" command is sent to the remote system before the assignment is made

##### Filename:

The name of the Comm Set to be employed

##### Brief Description:

T3MASTER is the Master, or user interface, of the TERM III Communications Server. In order to establish this server, the user executes T3SERVER on the remote system, returns to his system, and executes T3MASTER. From that point forward, the user can issue commands as he desires, and T3SERVER and T3MASTER coordinate their execution.

##### Discussion and Notes: (this information is subject to change)

The operational scenario of the TERM III Communications Server is as follows:

1. The user runs T3SERVER on the remote system
2. The user runs T3MASTER on his host computer
3. The user then issues commands through T3MASTER that are processed by the T3MASTER/T3SERVER combination (T3MASTER/T3SERVER = Comm Server)
4. The user issues the FINISH command to T3MASTER, which shuts down T3SERVER and T3MASTER

Commands issued to T3MASTER take the form of conventional Z-System command lines. Multiple commands per line, separated by semicolons, are allowed. Each command is examined by T3MASTER, and, if it is recognized, it is acted upon. If T3MASTER does not recognize the command, it is passed on to T3SERVER for execution. The following commands are recognized by T3MASTER:

<u>Command</u>	<u>Comments and Examples</u>
1    CD dir:	Change directory on the remote system; password may be required CD UPLOAD:
2    CD dir: L	Change directory on the local (host) system; password may be required CD ROOT: L
3    EXIT	Exit T3MASTER to the user's host computer, leaving T3SERVER running
4    FINISH	Shut down T3SERVER and T3MASTER
5    GET afn1[,afn2,...]	Get files matching the ambiguous file name references from the remote system GET *.TXT,MYFILE.DOC
6    GETS ufn	Get the session recorded by T3SERVER into the local file (ufn) named; this session was created by the RECORD command (see below)
7    HELP	Get help on commands from T3MASTER
8    LOCAL command_line	Execute the indicated command line as a local command on the user's host system LOCAL VFILER
9    PUT afn1[,afn2,...]	Put files matching the ambiguous file name references to the remote system PUT F1.TXT,F2.TXT,*.DOC

<u>Command</u>	<u>Comments and Examples</u>
10 RECORD device	Cause T3SERVER to record all chars it receives into a session file and assign the indicated device as the local console driver; exit T3MASTER RECORD CRTREM
11 RECORD OFF [device]	Turn off recording and optionally assign the indicated device as the local console driver RECORD OFF CRT
12 REMOTE command_line	Send the indicated command line to the remote system for execution; this command is available for cases where the desired command is one of those recognized by T3MASTER; T3MASTER is thrown into Terminal Mode by this command, and is automatically returned to command mode when the remote command completes and T3SERVER is reinvoked
13 SET COMM_SET filename	Load the indicated Comm Set SET COMM_SET SPECIAL
14 SET CONSOLE device	Assign the indicated device as the local console driver SET CONSOLE CRT2
15 SET EXIT_CHAR char	Set the Exit Character, which is used to exit Terminal Mode of T3MASTER; the indicated character may be a single character or a two-character control sequence, like "^c" SET EXIT_CHAR ^A
16 STATUS	Show status of the Communications Server and check for T3SERVER operation
17 TERM [filename]	Enter terminal mode in T3MASTER; if a file name is specified, the session is recorded in that file on the host system using XON/XOFF handshaking

The record feature of the Communications Server is tied directly into the I/O Package (IOP) on the user's host computer. The IOP must support a console driver which performs the following functions:

1. Accepts input from the user's console

2. Sends output to the user's console and remote system in parallel
3. Does NOT allow the ^Z character to be sent to the remote system
4. Pays attention to XON/XOFF commands from the remote system

Result Codes Returned: None

Examples of Use:

T3MASTER

-- enters T3MASTER at command level; the default Comm Set is used

T3MASTER T MYCST

-- enters T3MASTER in Terminal Mode after loading the Comm Set MYCST.CST

T3MASTER CRT MYCST

-- enters T3MASTER at command level after loading the Comm Set MYCST.CST and assigning the console to the device CRT

### 3.5.2. T3SERVER

Syntax:

T3SERVER [options] [filename]

Options:

/Rn - Receive File using protocol n (n = 1..6, see T3FILER)

/Sn - Send File using protocol n (n = 1..6)

Filename:

The name of the Comm Set to load if no option specified, or the name of the file to send/receive if option specified

Brief Description:

T3SERVER acts as the remote side of the Communications Server formed by T3MASTER and T3SERVER. Commands are processed as received from T3MASTER.

Discussion and Notes: (this information is subject to change)

If T3SERVER is invoked by accident, the sequence  
^A^C

will terminate it if this option is allowed at installation time. See the SERVER\_ABORT variable of the T3INS command (not available until the second release, phase 2, of the TERM III System).

See the discussion of T3MASTER for more details.

Result Codes Returned: None

Examples of Use:

T3SERVER SPECIAL

-- T3SERVER is invoked with SPECIAL.CST

## 3.6. Editors

The Comm Set is a very important concept under the TERM III System. It is used constantly by the communications programs (T3TERM, T3TERMB, T3FILER, etc), and the TERM III System provides three screen-oriented editors which allow the user to easily review the contents of a Comm Set and edit it as desired. A fourth editor is also provided to edit Telephone Directory data files that are read and processed by the T3DIAL program.

These four editors are:

EDCST	Edits a Comm Set and integrates the components of a Comm Set
EDTMC	Edits a Macro Buffer and stores the result in a file of type TMC. This file is the Macro Buffer component that can be placed into a Comm Set by EDCST.
EDTXD	Edits a Telephone Directory and stores the result in a file of type TXD. TXD files can be read by T3DIAL.
EDXLT	Edits a Translation Table and stores the result in a file of type XLT. This file is the Translation Table component that can be placed into a Comm Set by EDCST.

## 3.6.1. EDCST

Syntax:

EDCST

Brief Description:

EDCST is a screen-oriented Comm Set Editor. It allows the user to read components (Macro Buffer and Translation Tables) into a Comm Set and to manually set the variety of flags and variables that are present in a Comm Set. Once the user is satisfied, he can save the Comm Set he was working on in a file of type CST.

Discussion and Notes:

EDCST provides two editing screens: the default menu, which is used to load Comm Set components (files) and set selected values, and a second menu, which is used to set a variety of Comm Set values.

The Comm Set defines the communications environment for the Terminal and Conversation modes of T3TERM, T3TERMB, and T3FILER. This environment consists of the following items:

- o Input Translation Table - translates all incoming characters from one value to another, like EBCDIC to ASCII or Odd Parity to Space Parity

- o Output Translation Table - translates all outgoing characters from one value to another, like ASCII to EBCDIC or Any Parity to Odd Parity
- o Macro Buffer - 10 text strings that can be transmitted by striking a single digit (0..9) while in T3TERM or T3FILER
- o Exit Character - the character that is typed to exit Terminal or Conversation mode in order to issue a command
- o Break Character - the character that is typed to send a break to the modem
- o Protocol - the default communications protocol to be used to send and receive files by T3FILER
- o M7Batch - whether T3FILER will use batch file transfers with Modem 7 protocol
- o Monitor - whether T3TERM or T3FILER will display the data being transferred during the transfer
- o Completion Alarm - whether a completion alarm will be sounded at the end of a file transfer
- o Echo - whether a local echo of outgoing characters is provided
- o Line Feed Skip - tells Conversation Mode to ignore incoming line feed characters
- o Control-S Flag - tells Buffer Load to send a control-S when the buffer is almost full
- o Buffer Status Display - Buffer Load will display a number in the upper right corner of the screen which indicates how many pages (128 bytes each) of the memory buffer are left during a buffer load
- o Delay on CR during buffer dump to modem
- o Do or do not send line feeds on buffer dump to modem
- o Delay on every character during buffer dump to modem
- o Monitor transfer during buffer dump to modem
- o Load default Comm Set from disk when the program starts if a Comm Set has not been specified
- o Load Comm Sets only from the Comm Set Directory (else, load Comm Sets from along the path)
- o Name of the Comm Set Directory (DU or DIR form)

- o Name of current Comm Set
- o Name of current Translation Table
- o Name of current Macro Text Table
- o Names of T3TERM, T3DIAL, T3FILER, T3HANGUP, T3ANSWER, and VFILER programs
- o Carrier Force - sets set the carrier detect true

A default Comm Set is installed in each TERM III program which requires it when T3INS is run. Given this information, the menu prompts and operation should be self-explanatory.

Result Codes Returned: None

Examples of Use: None

### 3.6.2. EDTMC

Syntax:

EDTMC [filename]

Filename:

Name of FILE.TMC to edit. If file name is omitted, an empty buffer is created.

Brief Description:

EDTMC is used to edit a Macro Buffer file. The ten macros and their transmission options can be edited as desired.

Discussion and Notes:

EDTMC provides for a printout of a Macro Text File (TMC file).

Each macro text entry has three attributes:

- o Echo characters to the user as they are sent out
- o Delay after sending each character
- o Send or not send a RETURN after the last character

EDTMC forces all file types (specified for Load or Store) to be TMC.

Result Codes Returned: None

Examples of Use: None

### 3.6.3. EDTXD

Syntax:

EDTXD [filename]

Filename:

The name of FILE.TXD to edit. If no file name is given, the default file T3.TXD is loaded.

Brief Description:

EDTXD allows the user to edit the 26 entries of a Telephone Directory (TXD) file. Names and numbers can be changed as desired, and the order of the entries in the file can be changed.

Discussion and Notes:

EDTXD provides for a printout of a Telephone Directory (TXD) file.

All commands should be self-explanatory except for the Move Command. To Move an entry, point to the entry to be moved and tag it. Then point to the entry to move the tagged entry before or after and type the Move command.

Wordstar or Arrow Keys are used to move the pointer (forward and backward only).

EDTXD allows the user to read in a telephone directory (TXD) file in two ways: L (Load), which clears the current workspace and loads the file, and U (Appnd), which appends the indicated file to the end of the current workspace. The U (Appnd) command reads in as much of the file as possible, and, if there is not enough room for all the entries, the read will be truncated (leaving only the first N entries from the appended file).

The S (Store) command of EDTXD stores the contents of the entire workspace out to a disk file.

File types are forced to be of type TXD.

If an entry name is to be referenced through T3DIAL with a command of the form

T3DIAL NAME

the user should structure the name field of each telephone directory entry as follows:

NAME text

Any text may follow the name. The NAME begins in the first column of the field and is terminated by a space. It should be no more than eight characters long.

Result Codes Returned: None

Examples of Use: None

## 3.6.4. EDXLT

Syntax:

EDXLT [filename]

Filename:

The file FILE.XLT is loaded if specified. No action is taken otherwise.

Brief Description:

EDXLT is used to edit a Translation Table. The user can edit the Input Translation Table or Output Translation Table with this command (an XLT file contains both tables).

Discussion and Notes:

EDXLT is workspace oriented. The user is always editing a workspace copy. He edits a workspace to be used as either an input translation table or an output translation table.

Loaded input translation tables must be copied into the workspace before they can be edited. They must then be copied back from the workspace to the input translation table buffer after the user has finished editing the workspace copy. Output translation tables must be copied, edited, and copied back also in order to be modified.

Translation tables are loaded and stored between disk files and their memory buffers. Both translation tables (input and output) are stored in one disk file.

Workspaces may be initialized to Even, Odd, Mark (MSB set), Space (MSB not set), and No (MSB not affected) Parity. They may be copied then into input or output translation tables in order to initialize the translation tables to these parities.

A special translation table, EBCDIC.XLT, is provided to convert ASCII to EBCDIC and back. It may be loaded and edited if desired. It is possible to print EBCDIC.XLT from the main menu of EDXLT (any translation table can be printed from this menu).

During an edit, when prompted to input a character, the user may type the following inputs:

- o nn<RETURN> - up to 2 hex digits followed by a RETURN
- o 'char - a single quote followed by a character
- o SPACE or RETURN - no change

Result Codes Returned: None

Examples of Use: None

## 3.7. Miscellaneous

This section covers commands which do not fit into any of the other subject areas. The commands presented here are:

<u>Command</u>	<u>Comment</u>
T3NOTE	Activity Message Log program

## 3.7.1. T3NOTE

Syntax:

```
T3NOTE
or T3NOTE o
or T3NOTE text
or T3NOTE o text
```

Options:

- 1..4        The number of the System File which is to provide an ID prefix in the ACTIVITY.TXT file for the entry.

Brief Description:

T3NOTE places a log entry into a file (referred to as ACTIVITY.TXT in this documentation). The directory and name of this file are set at installation time by T3INS. This log entry consists of one or more text lines.

Discussion and Notes:

If an option number is given, the text lines will be prefixed by the contents of a System File as follows:

- o if the file type of the system file is blank --  
"FILENAME : "
- o if the file type of the system file is not blank --  
"FILENAME.TYP : "

The contents of the system files are set by the ZCPR3 SETFILE command or by TERM III's T3LOGIN command (the I command).

If the identity of the user is to always be included in the ACTIVITY.TXT file, an alias can be created which runs T3NOTE with the proper System File Name number:

```
NOTE Alias:
T3NOTE 1 $*            ; Use System File Name 1
```

T3NOTE can be employed by the user to make entries into the system activity log file. The simple form

```
"T3NOTE" or "T3NOTE o"
```

causes a prompt

```
"T3NOTE> "
```

to appear, and the user may type as many lines as he wants, ending by typing an empty line (just hitting a RETURN).

T3NOTE can be used as a part of an ALIAS to log the operations a user performs. For example, an XMODEM alias:

```
T3NOTE 1 XMODEM command with options - $*;XM $*
```

System File 1 contains the user's ID set by the command "I1" executed by T3LOGIN in this example. "XM" is the renamed XMODEM (XMODEM.COM is now XM.COM) program.

Result Codes Returned: None

Examples of Use:

T3NOTE This is a test

-- "THIS IS A TEST" is entered into the file

T3NOTE 4 This is a test

-- The contents of System File Name 4 followed by

"THIS IS A TEST" are entered into the file

T3NOTE 2

-- The user is prompted for lines to enter, and he may enter as many as he wishes. Each entry is prefixed with the contents of System File Name 2.

#### 4. Examples of Use of the TERM III System

This chapter presents several examples which illustrate the use of the TERM III System as intended by the author. It is by no means comprehensive, especially since the Z-System in conjunction with TERM III is extremely versatile. They are adaptable to a wide variety of needs, well beyond those envisioned by the author for his personal applications, or for Echelon's business-running functions.

##### 4.1. Initialization

There are many ways to telephone a remote computer system. In all cases, the T3INIT command must be issued first to select the baud rate:

T3INIT 2

initializes the system at 1200 baud (T3INIT 1 initializes at 300 baud).

##### 4.2. Calling a Computer

I have found several different scenarios in which I need to dial a remote computer:

1. to dial a specific computer which I have an entry in the telephone directory for:  
T3DIAL Z-NODE
2. to dial a specific computer which I do not have an entry in the telephone directory for:  
T3DIAL /N999-9999
3. to dial any one of a number of lines available for a given computer:  
T3DIAL /R RCPM1
4. to dial a given computer which has only one line and is busy a lot of the time (using a ZEX command file):

Line Number	<u>ZCPR3 Command</u> <u>Line</u>
1	:=LOOP
2	XIF
3	SAK /P60Z
4	T3DIAL Z-NODE
5	IF ER
6	GOTO LOOP
7	FI

Scenario 1: T3DIAL Z-NODE

This example dials the phone number assigned to the name Z-NODE in the default telephone directory (T3.TXD). I could also have issued a command like:

```
T3DIAL Z-NODE LIST1
```

where the number assigned to the name Z-NODE in the telephone directory LIST1.TXD would be dialed.

Scenario 2: T3DIAL /N999-9999

This example dials the indicated telephone number. As many digits as requirement may be specified.

Scenario 3: T3DIAL /R RCPM1

This example dials all telephone numbers listed in the telephone directory file RCPM1.TXD. The numbers are dialed in sequence until an answer is encountered or the list is exhausted. Note that the Error Message is returned to ZCPR3 which indicates the success of this command (see the next scenario).

Scenario 4: ZEX Command File Loop

The ZEX command file is repeated here for convenience:

<u>Line</u> <u>Number</u>	<u>ZCPR3 Command Line</u>
1	;=LOOP
2	XIF
3	SAK /P60Z
4	T3DIAL Z-NODE
5	IF ER
6	GOTO LOOP
7	FI

Line 1 defines a label, which is used by the GOTO in line 6.

Line 2 exits all pending IFs. Under ZCPR3, IF statements may be nested only eight levels deep, and execution of the IF in line 5 raises the IF level without reducing it. The XIF clears all pending IFs and makes sure the IF level does not overflow.

Line 3 does two things:

1. It causes a 60 second delay (the SAK P60 option)
2. It allows the user to abort the command file's execution (SAK's Z option)

If the 60 second delay elapses, the command file is resumed at line 4.

Line 4 dials the desired telephone number.

If the dialing process in line 4 does not succeed, the ZCPR3 Error Message is set, and the IF ER statement in line 5 results in a TRUE condition, causing the GOTO LOOP statement in line 6 to execute and the loop resume. If the dialing in line 4 succeeded, the IF ER in line 5 is FALSE, and control resumes after the FI (end IF) statement in line 7.

In this case, there is no line after line 7, so the ZEX command file aborts. It may be nice to place a SAK /B command after line 7 to sound an alarm to indicate that the connection has been made.

## 4.3. Answering the Telephone

There are two main scenarios that I have come across when it comes to answering the telephone with the TERM III System:

1. answer the telephone as a Remote Access System
2. answer the telephone when I expect someone to call in and I want to interact with them

Scenario 1: Answering as a Remote Access System

My STARTUP alias for the Remote Access System looks something like the following:

<u>Line</u>	<u>Statement</u>
1	T3INIT 2
2	DEV C CRT
3	T3ANSWER
4	IF ~ER
5	DEV C CRTMOD
6	T3LOGIN
7	FI

Line 1 initializes the modem and telephone interface overlays to 1200 baud. This is done just to ensure that all is properly initialized for the next call.

Line 2 selects the CRT as the console device. This command sets me up so that I, as a SYSOP, can abort T3ANSWER and gain control of the system from the Main Console (see next paragraph).

Line 3 runs T3ANSWER, which waits for a user abort (from the console) or the telephone to ring. If the telephone rings, it answers the telephone. If the SYSOP aborts T3ANSWER from the Main Console, T3ANSWER returns with the ZCPR3 Error Message set, so the IF ~ER in line 4 is not true and lines 5 and 6 are skipped (the SYSOP does not have to log in). If the telephone rings and is answered, T3ANSWER returns with no error, so IF ~ER in line 4 is true.

If the telephone rings, the CRT and Modem combination is selected as the console in line 5. This allows the SYSOP to monitor the activity of the user and interrupt him if desired. This particular driver allows CRT and Modem input and output in parallel.

Finally, line 6 runs T3LOGIN to log in the user. If the user fails to log in after three tries, T3LOGIN runs an abort commands which reboots the system and causes the sequence to start over with the telephone interface hung up (it would run T3HANG followed by REBOOT, where REBOOT causes a cold boot of the system to occur).

This example just scratches the surface of what is possible. The Input/Output Package (IOP) can play a key role in the Remote Access System, providing timeouts for when the user is on the system for too long and other useful features. See the document ZCPR3 and IOPs, available from Echelon (check Appendix A).

Scenario 2: Calling Into an Active System

In this scenario, somebody is to call into my system and interact with me. There are two principal ways addressed here:

1. when the caller is also running TERM III and can invoke Conversation Mode
2. when the caller is not running TERM III or what we want to do is better suited at command level than Conversation Mode

If the caller is also running TERM III and we want to communicate via Conversation Mode, I usually use a command sequence like:

<u>Line</u>	<u>ZCPR3 Command Line</u>
1	T3INIT 2
2	T3ANSWER
3	IF ~ER
4	T3FILER /C
5	FI

Line 1 initializes the modem and telephone interface overlays to 1200 baud. This is mainly to make sure that proper initialization is done before communication begins.

Line 2 answers the telephone. If I abort, the Error Message is set and the T3FILER command in line 4 is not executed. If the telephone rings, there is no error, and T3FILER runs, entering the split-screen conversation mode, in line 4.

If the caller is not running TERM III or we need to go immediately to the command line for what we want to do, a command sequence like the following is used:

<u>Line</u>	<u>ZCPR3 Command Line</u>
1	T3INIT 2
2	T3ANSWER
3	IF ~ER
4	DEV C CRTMOD
5	SH C
6	FI

This is similar to above, but if the telephone rings, the console is selected to be the device CRTMOD. CRTMOD may provide for input to come from my CRT and the modem in parallel and output to go to my CRT and the modem in parallel, or CRTMOD may provide for input to come from my CRT and output to go to the CRT and modem in parallel. In the first case, the caller can type text and communicate with me, run commands, etc, as though he was at the console. In the second case, the caller can only watch what I do.

The SH C command in line 5 enters the SH shell in Comment Mode. All text entered is simply flushed as comments by this shell unless the text is prefixed with the character "!", in which case the text following the "!" is executed as a command:

```
!SHEXIT      -- causes the SH shell to exit (pop)
!SHCMT      -- toggles the comment mode
!command line -- causes the indicated command line
              to be executed (!DIR for dir display,
              !DBASE to run dBASE II, etc.)
```

Note that the CRTMOD driver should be set up to stop sending output to the modem or receiving input from the modem if the carrier drops. This facility will prevent inconveniences if the line is accidentally lost (see ZCPR3 and IOPs, Appendix A).

#### 4.4. Transferring Files

I mainly use T3FILER to send files between a remote system and myself. The send and receive file functions of T3FILER can be invoked from Conversation Mode (where I may be chatting directly with someone), from Terminal Mode (where I may be interacting as a terminal with a Remote Access System), or from the command line.

The command line option is particularly useful. T3FILER can combine with T3SEND to provide a useful alias:

```
T3SEND XMODEM S $1;T3FILER /R3 $1
```

where \$1 is the name of the file for the XMODEM program on the remote system to send and for T3FILER to receive (via protocol 3, which is XMODEM with CRC). Likewise, I can send files from my system to the remote system via:

```
T3SEND XMODEM R $1;T3FILER /S3 $1
```

## 5. Installation

The program T3INS is used to install all of the files in the TERM III System. T3INS reads a text file containing commands (which are interpreted by T3INS), comments, and names of files to be installed. It then processes those commands and installs each of the files named.

The installation process requires the use of the following files:

T3INS.COM	The Installation Program
T3SELMOD.COM	The Modem Selection Program (optional)
T3MODCAP.MCP	The Modem Data Base for T3SELMOD (optional)
SYS.ENV	A ZCPR3 Environment Descriptor for the target system
*.CST	A Comm Set file (a standard Comm Set, T3.CST, is provided with the distribution)
*.BIN	A modem overlay for the user's microcomputer (there are several ways to generate this overlay)
*.T3I	An installation file to be read by T3INS

### 5.1. Installation Instructions

The following steps are to be performed in order to install your TERM III System.

A. Copy the TERM 3 Distribution files (all of them) into a working directory. You may also want to back them up at this time.

B. Copy the SYS.ENV (ZCPR3 Environment Descriptor) for the target system into this working directory. This is the only file not provided in the distribution. (Use Z3 or ZC.ENV if using Z3-Dot-Com or Z-Com.)

C. Run T3SELMOD and select the Modem overlay for your system from its menu or edit MODEM.ASM for your modem ports if your system is not given in the T3SELMOD menu. The built-in comments should be adequate for an experienced assembly language programmer to follow. If you create your own MODEM.ASM, assemble it with any assembler (it is a generic assembly program that should assemble on any 8080 assembler) and load it with MLOAD. Rename the COM file to MODEM.BIN ("REN MODEM.BIN=MODEM.COM"). See Appendix B for details on all of the modem overlays in the T3MODCAP.MCP file, and see the later sections describing in detail the modem and telephone interfaces if you are considering modifying or writing your own overlays. The sources to all modem overlays are provided in T3MODCAP.LBR.

D. Type out the file T3TEST.T3I and look it over. This is a simple installation file for the test program, T3TEST.COM.

E. Install the test program T3TEST.COM. To do so, issue the command:

```
"T3INS T3TEST.T3I"
```

F. Run T3TEST.COM (i.e., command is "T3TEST") with something active on your modem port. You should be able to communicate by simply typing at your keyboard if all is well. Note that carrier detect is IMPORTANT, and you may have to force the carrier detect routine in MODEM.ASM to return a true value at all times. It is important for your TERM III system to be able to detect carrier though, and you should implement the carrier detect function if at all possible.

G. If T3TEST.COM ran correctly, you are ready to install the rest of the TERM III System. To do this, issue the command:

```
"T3INS INSTALL.T3I"      | Messages go to console
or  "T3INS INSTALL.T3I P" | Messages to console and printer
or  "T3INS INSTALL.T3I Q" | Only error messages (quiet)
```

H. All is installed! You are now ready to run the editors to set up your \*.CST (Comm Set), \*.TMC (Macro Names), \*.XLT (Translation Tables), and \*.TXD (Telephone Directories) as you desire and use the system. You may wish to create your own customized Comm Sets and repeat this installation process at a later date. For now, try out your TERM III System by using it on a Z-Node or conventional RCP/M system.

## 5.2. T3INS

### Syntax:

```
T3INS filename [option]
```

### Filename:

The name of FILE.T3I that contains the installation commands and file names. This file and the commands it contains are described in detail in the following paragraphs.

### Options:

```
None      List of installation file and messages sent to
           console
P         List of installation file and messages sent to
           console and printer
Q         Only messages sent to console (or console and
           printer) - quiet mode
```

### Brief Description:

T3INS is the installation program for the TERM III System. It processes commands in the specified installation file and installs the files named in the installation file.

### Discussion and Notes:

The file name is required. It is from this file that T3INS takes its commands for configuration and the names of the files it is to install.

All files to be installed must reside in the current directory. All files referenced by T3INS commands must also reside in the current directory.

T3INS does not need to be installed before use.

T3INS.T3I is a T3INS file which installs all of the TERM III System. Read it for further instructions.

T3TEST.T3I is a T3INS file which installs the T3TEST.COM program, which is used to test your MODEM overlay.

Installation files (of type T3I) contain four types of lines:

- o Comment lines (first character is a ";")
- o Variable Definition lines (VARIABLE = VALUE)
- o Directive lines; INSTALL is the only directive
- o Files (FILENAME.TYP) to be installed

The following variables are recognized by the T3INS program and are processed as indicated. All variables are placed in the T3I file, one variable per line, in equations like:

VARIABLE = VALUE

Spaces are not significant. The variable name must be specified in full. Case is not significant. The VALUE starts with the first non-blank character after the "=".

### 5.2.1. Key Variables

These variables should ALWAYS be defined in the T3I file.

Variable	Comments and Examples
-----	-----
1A ENVIRONMENT	Defines the name of the Environment Descriptor File (SYS.ENV); the address of the Environment Descriptor as it resides in memory will be extracted from this file; this variable is required ENVIRONMENT = SYS.ENV
1B MODEM	Defines the name of the Modem Segment; all programs which require use of the MODEM will be loaded with this segment; this variable is required MODEM = MODEM.BIN
1C COMM_SET	Defines the name of the Comm Set to be placed in all programs that require a Comm Set; this variable is required if the default Comm Set in T3INS is not to be used COMM_SET = T3.CST
1D INSTALL	Specifies that all lines which follow (except for comment lines) contain the names of files to be installed INSTALL

### 5.2.2. Variables that modify the Comm Set

In all cases, the Comm Set specified by COMM\_SET is loaded or, if COMM\_SET is not defined, the Comm Set inside T3INS is copied for use in the installation; these variables then redefine sections of the working Comm Set.

Variable -----	Comments and Examples -----
2A CST_BREAK	Sets the value of the break character; follow the equal sign with no chars (no break char set), a single character (such is the new break char), or a two-char sequence representing a control char (ie, ^E) CST_BREAK =
2B CST_EXIT	Sets the value of the exit character; followed by a characters as for CST_BREAK CST_EXIT = ^E
2C CST_DIR	Defines the name of the directory from which to load Comm Sets if the CST_LDIR flag is set TRUE CST_DIR = A14:
2D CST_ILOAD	Sets the flag which tells the program to load its Comm Set each time it runs; only Y and N are valid arguments CST_ILOAD = N
2E CST_LDIR	Sets the flag which tells the program to load its Comm Set only from the directory named by CST_DIR; if Y, Comm Sets are loaded only from CST_DIR; if N, Comm Sets are loaded from path CST_LDIR = Y
2F CST_MACRO	Defines the name of the Macro Names File to be placed in the Comm Set CST_MACRO = EMPTY.TMC
2G CST_XLATE	Defines the name of the Translation Table File to be placed in the Comm Set CST_XLATE = PARITYSP.XLT
2H CARRIER_FORCED	Sets the flag which tells the program to ignore the carrier detect routine in the modem interface; if Y, carrier detect is always TRUE; if N, carrier detect is provided through the modem interface CARRIER_FORCED = N

### 5.2.3. Variables for T3NOTE

Variable -----	Comments and Examples -----
3A ACTIVITY_LOG	Defines the name of the Activity Log File to which all information will be written; a DU: or DIR: form may prefix this name ACTIVITY_LOG = A14:ACTIVITY.TXT

## 5.2.4. Variables for T3LOGIN

Variable	Comments and Examples
-----	-----
4A LOG_FILE	Defines the name of the LOGIN.TXT file to be read by the T3LOGIN program; this file name may be prefixed by a DU: or DIR: form LOG_FILE = A14:LOGIN.TXT
4B LOG_ABORT	Defines the command to be run if T3LOGIN aborts (ie, user did not give a correct user name and password after three tries) LOG_ABORT = T3HANGUP;RESET
4C LOG_OPTIONS	Defines the initial options line to be processed by T3LOGIN before it begins processing commands from the LOG_FILE LOG_OPTIONS = X W1 P"A\$ A15 A14"
4D LOG_USERPW	Defines the user name and password of the SYSOP; this is used if the LOG_FILE cannot be found for some reason LOG_USERPW = SYSOP,SYSPASS

Result Codes Returned: None

Examples of Use: None

## 5.3. T3SELMOD

Syntax:

T3SELMOD [filename]

Filename:

Name of file to be created (default file type is BIN)

Brief Description:

T3SELMOD reads the Modem Capabilities file T3MODCAP.MCP and displays one or more menus to the user. These menus name the various entries in the Modem Capabilities file. The user may then move from one menu to another, select the option for his computer, and T3SELMOD will create a MODEM.BIN file which contains the modem driver required by T3INS.

Discussion and Notes:

If a file name is specified, the modem driver will be so named. If no file type is given, the file type will be BIN. If no file name is given, the output file will be named MODEM.BIN.

The MODEM variable in the T3INS installation file should be set equal to the name of the file created by T3SELMOD. That is,

MODEM = MODEM.BIN

should be in the T3I file to be read by T3INS (MODEM.BIN is the name of the file created by T3SELMOD).

Result Codes Returned: None

Examples of Use: None

## 5.4. Discussion of Sample Modem Overlay

This section provides a running commentary on the sample modem overlay listed in Appendix C. The lines in the listing are numbered and referenced in this commentary. If you have to create your own modem overlay or modify an existing overlay from T3MODCAP.LBR, this commentary may be of value.

All modem overlays begin at the same base address, which is given on lines 5 and 6 in the symbol BASE. Starting at this address is a jump table which gives access to the routines in the overlay. This table is summarized:

<u>Mnemonic</u>	<u>Offset</u>	<u>Lines</u>	<u>Comment</u>
M1\$INIT	0	11-12	Initializes the overlay
M1\$ISTAT	3	13-14	Returns input status (RDA)
M1\$OSTAT	6	15-16	Returns output status (TBE)
M1\$IN	9	17-18	Returns next character
M1\$OUT	12	19-20	Sends character to modem
M1\$BREAK	15	21-22	Causes a break signal
M1\$CST	18	23-24	Detects carrier status
M1\$SPTAB	21	25-26	Available baud rate byte
	22	27	0.1 Sec Delay Routine access

The rest of the modem overlay after this table contains the supporting code for the overlay. In each case, the routines are to affect ONLY the indicated registers. The values in all other registers are to be left unchanged when these routines are called. For example, if register pair HL contains the value 405H before the called to M1\$INIT, it should also contain this value after the return from M1\$INIT.

The routine M1\$INIT (lines 39-75) initializes the UART or USART. The baud rate is also set by this routine. In all modem overlays, the UART or USART must be set to support 8 data bits with 1 stop bit and no parity. This initialization must be done in the M1\$INIT routine if it is not done elsewhere, such as in the BIOS. In this case, the BIOS has already done this initialization.

The baud rate is set by the M1\$INIT routine. The desired baud rate is passed to this routine in the A register:

<u>Register</u>	<u>Value</u>	<u>Baud Rate</u>
	0	No baud rate selected
	1	300 baud
	2	1,200 baud
	3	2,400 baud
	4	4,800 baud
	5	9,600 baud
	6	19,200 baud
	7	38,400 baud

If the specified baud rate is successfully set, M1\$INIT returns with register A containing the value the baud rate was set at (also as per the table above). If the specified baud rate was not set or was invalid, register A is returned containing a value of 0. The Zero Flag is set according to the value in

register A (Zero Flag is ON if A=0, Zero Flag is OFF if A<>0). Only the A register is affected by M1\$INIT.

Lines 76-88 contain the M1\$ISTAT routine. This routine returns a flag indicating if a character is available at the UART or USART port (it reflects the RDA - Receive Data Available - bit). On output, register A is 0 and the Zero Flag is ON (set) if no character is pending. Register A is 0FFH and the Zero Flag is OFF (clear) if a character is pending. Only the A register is affected by this routine.

Lines 89-101 contain the M1\$OSTAT routine. This routine returns a flag indicating if the last character sent to the UART or USART has completed transmission and the next character may be output (it reflects the TBE - Transmit Buffer Empty - bit). On output, register A is 0 and the Zero Flag is ON (set) if the last character is still being transmitted. Register A is 0FFH and the Zero Flag is OFF (clear) if the next character may be output. Only the A register is affected by this routine.

Lines 102-113 contain the character input routine M1\$IN. This routine returns the next byte available from the modem (and waits for a byte if one is not available immediately). The full 8 bits is returned by this routine, only A register affected.

Lines 114-128 contain the character input routine M1\$OUT. This routine outputs the byte contained in the A register to the modem. The full 8 bits is output by this routine. No registers are affected by this routine.

Lines 129-139 contain the break transmit routine M1\$BREAK. The A register contains an input code, where A = 0 if just the status of the break function is to be returned and A = 0FFH if the break is to be transmitted. On exit, register A = 0 and the Zero Flag is ON (set) if break is not supported or the break could not be transmitted. Register A = 0FFH and the Zero Flag is OFF (clear) if break is supported or the break was transmitted. Only the A register is affected by M1\$BREAK.

Lines 140-152 contain the carrier detect routine M1\$CST. If the carrier is present, M1\$CST returns with register A = 0FFH and the Zero Flag is OFF (clear). If not present, register A = 0 and the Zero Flag is ON (set). Only the A register is affected.

Line 153 contains a safeguard. If the overlay is too large (more than 256 bytes in size), this DB instruction will cause the assembler to issue an error message.

The byte at M1\$SPTAB (lines 25-26) indicates the baud rates supported by this modem overlay (which may be set by the M1\$INIT routine). Each bit of this byte indicates a baud rate. If a particular bit is set (1), the associated baud rate is available. If the bit is reset (0), the associated baud rate is not available. The byte at M1\$SPTAB is structured as follows:

Bit Number:	7	6	5	4	3	2	1	0	
	\	\	\	\	\	\	\	\	300 baud
	\	\	\	\	\	\	\	_____	1,200 baud
	\	\	\	\	\	\	\	_____	2,400 baud
	\	\	\	\	\	\	\	_____	4,800 baud
	\	\	\	\	\	\	\	_____	9,600 baud
	\	\	\	\	\	\	\	_____	19,200 baud
	\	\	\	\	\	\	\	_____	38,400 baud
	\	\	\	\	\	\	\	_____	designer-assigned (other) baud

The jump instruction following this byte (at address BASE+22, line 27 in the listing) is an entry point for a 0.1 second delay routine. The TERM III program containing this overlay will fill in the address (which is currently set to 0) to be a routine which delays for 0.1 seconds without affecting any registers. The routines within the modem and telephone interface overlays may use this entry point for a 0.1 second delay routine if they need one.

### 5.5. Discussion of Sample Telephone Interface Overlay

Appendix C also contains a listing of a sample Telephone Interface overlay. This overlay provides an interface to an auto-dial and auto-answer modem. The sample overlay can be assembled as-is by using the MAC assembler of Digital Research, or converted to Zilog mnemonics using Echelon ZCON and assembling with ZAS.

The base address of this overlay is shown by the ORG statement on line 38. This overlay follows the Modem Overlay, and may be up to 512 bytes in size.

A jump table begins at this base address, as in the Modem Overlay. This jump table is shown in lines 40-50:

<u>Mnemonic</u>	<u>Offset</u>	<u>Line</u>	<u>Comments</u>
TI\$INI	0	43	Initialize the TI Overlay
TI\$ANS	3	44	Answer Telephone
TI\$HANG	6	45	Hang up Telephone
TI\$RST	9	46	Ring Status Detect
TI\$DSTRT	12	47	Start Dialing
TI\$DSTOP	15	48	Stop Dialing
TI\$DIGIT	18	49	Dial Digit
TI\$PREPANS	21	50	Prepare to Answer Telephone

TI\$INI, the routine which initializes the telephone interface overlay, is in lines 238-278. This routine affects no registers and has no input parameters. Its purpose is to initialize the interface for use by the other routines. In the DC Hayes Smartmodem telephone interface overlay, for example, TI\$INI sets the Smartmodem to return its result codes in non-verbose mode.

The routines in lines 279-296 work together to answer the telephone. The TERM III programs which can answer the telephone first call the TI\$PREPANS routine, whose function is to prepare the telephone interface to answer an incoming call. In this example, TI\$PREPANS simply hangs up the telephone. In the DC Hayes Smartmodem telephone interface overlay, the modem is set to answer the telephone.

After TI\$PREPANS is called, the TERM III program loops on the TI\$RST (Ring Status Detect) routine (lines 374-382). TI\$RST returns with register A = 0 and the Zero Flag set (ON) if the phone is NOT ringing and register A = 0FFH and the Zero Flag clear (OFF) if the phone is ringing. In this example, the carrier comes on when the modem answers the telephone, so TI\$RST simply monitors the carrier status (as returned by M1\$CST in the Modem Overlay). Also, during the loop on TI\$RST, all TERM III programs also check for an abort from the user.

If TI\$RST detects a ring, TI\$ANS (lines 288-296) is called to actually answer the telephone. In this example, a positive return code is set. TI\$ANS returns with register A = 0 and the Zero Flag set (ON) if answering did not succeed, and register A = OFFH and the Zero Flag clear (OFF) if answering succeeded.

In summary, the sequence of events which occurs when a TERM III program is instructed to answer the telephone is:

1. TI\$PREPANS is called
2. the TERM III program loops on TI\$RST and a check for a user abort
3. if TI\$RST comes true (the ring is detected) before the user abort, TI\$ANS is called

TI\$ANS may play a role in setting the baud rate. Several newer auto-dial and auto-answer modems (such as the DC Hayes Smartmodem) return a result code which indicates the baud rate of the caller. TI\$ANS could look for this code and call the M1\$INI routine (in the Modem Overlay) with a baud rate selection. If the M1\$INI routine does not cause the telephone interface device to hang up the telephone, this should work nicely.

TI\$HANG is used to hang up the telephone (lines 297-336). No input or output parameters are provided, and the sole function of this routine is to hang up the telephone.

The routines TI\$DSTRT, TI\$DIGIT, and TI\$DSTOP are used to dial the telephone. A TERM III program dials the telephone as follows:

1. TI\$HANG is called to make sure the phone is hung up
2. TI\$DSTRT is called to start the dialing process
3. TI\$DIGIT is called, passing one digit at a time
4. TI\$DSTOP is called to terminate dialing and wait for a response

TI\$DSTRT (lines 384-400) simply initialize the telephone interface for the dialing process. No input parameters are required, and TI\$DSTRT returns with register A = 0 and the Zero Flag set (ON) if no dial tone is detected on the telephone line. No other registers are affected.

TI\$DIGIT (lines 416-428) is called for each digit to be dialed. Control characters for the telephone interface, such as a comma (used by a DC Hayes Smartmodem to pause), may also be passed with the digit stream to TI\$DIGIT. Each digit is passed as an ASCII character in the A register. No registers are affected by TI\$DIGIT.

TI\$DSTOP (lines 401-415) is called to indicate that the last digit has been transmitted and dialing is complete. TI\$DSTOP requires no input parameters and returns with register A = 0 and the Zero Flag set (ON) if there was no answer or register A = OFFH and the Zero Flag clear (OFF) if the remote system answered.

The Telephone Interface Overlay may require a delay routine, and the delay routine in the Modem Overlay is available for this. The entry point to this routine is at BASE+22, where BASE is the base address of the Modem Overlay. This routine provides a 0.1 second delay, affecting no registers. Lines 429-439 show a sample interface to the delay routine in the Modem Overlay.

**A. References****A.1. ZCPR3 and Z-System**

Echelon, Inc.  
 101 First Street  
 Los Altos, CA 94022  
 415/948-3820

-- Echelon is the commercial agent for ZCPR3 and provides many services for ZCPR3 and Z-System users. ZCPR3, the Z-System, Z-System tools, ZCPR3: The Manual, ZCPR3: The Libraries (not yet released), and many other ZCPR3 and Z-System products can be purchased from Echelon. Echelon publishes a newsletter to the ZCPR3 user community every two weeks. It monitors and supports ZCPR3 users through Remote Access Systems (Electronic Bulletin Boards) such as Z-Node Central and other (over forty) Z-Nodes around the world.

Z-Node Central  
 415/489-9005

-- Z-Node Central is the main Remote Access System used by Echelon. It supports electronic mail facilities and file transfer. Questions regarding ZCPR3 and the Z-System can be submitted via electronic mail. Data on Echelon (including lists of services and prices for products) is available. A list of people willing to spend time in helping others in bringing up a ZCPR3 and a Z-System is maintained here. Much of the information on Z-Node Central is distributed to all the other Z-Nodes around the world.

**BOOKS and PAMPHLETS**

Conn, Richard. ZCPR3 and IOPs, copyright 1985, published by Echelon, Inc., 50 pages (free from Z-Nodes).

Conn, Richard. ZCPR3: The Libraries, copyright 1985, not yet published, 400+ pages (contact Echelon for price).

Conn, Richard. ZCPR3: The Manual, copyright 1985, published by Zoetrope, Inc., 351 pages, typeset, bound (contact Echelon for price).

Gaude', Frank. Z-News (Echelon Newsletter), published every two weeks by Echelon, Inc., 4 to 12 pages (free from Z-Nodes).

McCord, David. Z3&BYE, copyright 1985, published by Echelon, Inc., 10 pages (free from Z-Nodes).

McCord, David. ZNODE.CFG, copyright 1985, published by Echelon, Inc., 10 pages (free from Z-Nodes).

Wright, Dennis. ZRDOS Programmer's Guide, copyright 1985, published by Echelon, Inc., 35 pages (contact Echelon for price).

## A.2. CP/M

Hogan, Thom. Osborne CP/M User Guide, copyright 1981, published by Osborne/McGraw-Hill, 200+ pages (contact Osborne/McGraw-Hill).

Johnson-Laird, Andy. The Programmer's CP/M Handbook, copyright 1983, published by Osborne/McGraw-Hill, 400+ pages (contact Osborne/McGraw-Hill).

## A.3. Other

Booch, Grady. Software Engineering with Ada, copyright 1983, published by Benjamin/Cummings, 450+ pages (contact Benjamin/Cummings).

Kernighan, Brian and Plauger, P.J. The Elements of Programming Style, 2nd Edition, copyright 1978, published by McGraw-Hill, 150+ pages (contact McGraw-Hill).

Kernighan, Brian and Plauger, P.J. Software Tools, copyright 1976, published by Addison-Wesley, 300+ pages (contact Addison-Wesley).

Leventhal, Lance. Z80 Assembly Language Programming, copyright 1979, published by Osborne/McGraw-Hill, 400+ pages (contact Osborne/McGraw-Hill).

Osborne, Adam. An Introduction to Microcomputers, Volume 1: Basic Concepts, 2nd Edition, copyright 1980, published by Osborne/McGraw-Hill, 400+ pages (contact Osborne/McGraw-Hill).

## A.4. Addresses of Some Publishers

Benjamin/Cummings Publishing Company  
2727 Sand Hill Road  
Menlo Park, CA 94025

Osborne/McGraw-Hill  
2600 Tenth Street  
Berkeley, CA 94710

**B. Devices Supported by T3MODCAP 1.1**

The following discusses the interfaces provided by the T3MODCAP.MCP, Version 1.1, data base. Each device is named as it appears in the menu displayed by the T3SELMOD program. The entries numbered 1, 2, and 3 under the comments column refer to the notes below the table. The entries numbered B3, B12, B24, and B96 indicate the supported baud rates, where B3 is 300 baud, B12 is 1200 baud, B24 is 2400 baud, and B96 is 9600 baud.

<u>Menu Name</u>	<u>UART</u>	<u>Baud Rate Generator</u>	<u>Comments</u>
Ampro Little Bd	Z80-DART	Z80-CTC	1, B3, B12, B24, B96
Apple-Cat			2, B3
Apple Mountain	2651	2651	1, B3, B12, B24
Big Board I	Z80-SIO	Z80-CTC	B3, B12
CCS 2719	Z80-SIO	8253	1, B3, B12, B24
Datapoint 1560	8251A	8253	B3, B12, B24
Epson QX-10	Z80-SIO	8253	B3, B12, B24
Hayes MM100			2, B3
Heath H89	8250	8250	B3, B12, B24
Heath H100	2661B	2661B	1, B3, B12, B24
Interfacer 3/4	2651	2651	1, B3, B12, B24
Kaypro	Z80-SIO	8116	B3, B12, B24
MicroDecision,R1	8251A	8251A	B3, B12
MicroDecision,R2	8251A	8253	B3, B12, B24
Phillips P2000C	Z80-SIO	8253	B3, B12, B24
SDS Z80-SIO	Z80-SIO	8253	B3, B12, B24
Seattle SCP400/0	8251A	BR1941/BR2941	3, B3, B12, B24
Seattle SCP400/1	8251A	BR1941/BR2941	3, B3, B12, B24
Seattle SCP400/2	8251A	BR1941/BR2941	3, B3, B12, B24
Seattle SCP400/3	8251A	BR1941/BR2941	3, B3, B12, B24
Super Quad/Six	Z80-DART	8116	B3, B12, B24
Superbrain	8251A	BR1941	B3, B12, B24
System Support 1	2651	2651	1, B3, B12, B24
Televideo TS-802	Z80-SIO	8253	B3, B12, B24
TRS-80 Model I	TR1602	BR1941	B3, B12, B24
TRS-80 Model II	Z80-SIO	Z80-CTC	B3, B12, B24
TRS-80 Model III	TR1602	BR1941	B3, B12, B24
TRS-80 Model IV	TR1865	BR1943	B3, B12, B24
US Robotics S100			2, B3, B12
ZORBA	8251A	8253	B3, B12, B24

Explanation of Comments

1. Rewiring required; see individual descriptions below
2. This is a unique, plug-in modem card
3. These four separate entries for the SCP400B,C are provided in support of channels 0, 1, 2, and 3; the base address is 80H

This data base is provided from the BYE inserts. Thanks to all of the people who put forth effort in providing these inserts to the public domain:

Norman Beeler	Tom Brady	Ken Brown
Jerry Haigwood	Irv Hoff	K. Robesky
Jon Schneider	Jim Sinning	John Sojak
Paul Traina	Joe Wright	Bill Wood

The following paragraphs outline specific information on each of the implementations. Information is also presented in the source code for each overlay (the file T3MODCAP.LBR contains all source code to all overlays).

#### B.1. Ampro Little Bd

Target: AMPRO Little Board, Channel B

The AMPRO computer does not implement DTR or DCD (CTS and RTS are used instead). Make up an RS-232 cable per the table:

<u>Modem</u>		<u>AMPRO</u>
Pin 1	-	Pin 1
Pin 2	-	Pin 3
Pin 3	-	Pin 2
Pin 6	-	Pin 20
Pin 7	-	Pin 7
Pin 20	-	Pin 5

These pin assignments assume that your Little Board RS-232 female connector is wired the same as the AMPRO assembled connectors.

#### B.2. Apple-Cat

Target: Apple II with a Novation Apple-Cat modem card

The Apple-Cat must reside in Slot #2.

#### B.3. Apple Mountain

Target: Apple II with Mountain CPS Serial Card

The Mountain CPS Serial Card must reside in Slot #2.

Carrier detect (DCD) from the modem must go to Data Set Ready (DSR) input on the 2651 to provide proper operation.

#### B.4. Big Board I

Target: Big Board I

#### B.5. CCS 2719

Target: California Computer Systems CCS-2719 (S-100)

Target: Sierra Data Science SDS Z80-SIO (S-100)

The header block on the 2719 must be turned over so the port configuration is for DTE (Data Terminal Equipment). The standard CCS-2719 presents DSR from the RS-232 interface to DCD of the Z80-SIO.

Remove the jumper in the header block from pins 1 and 15 and add a wire from pin 15 of the flat cable header (pin 8 of the RS-232 interface) to pin 1 of the header block. This will connect the modem's DCD signal to the Z80-SIO's DCD input.

B.6. Datapoint 1560  
Target: Datapoint 1560

B.7. Epson QX-10  
Target: Epson QX-10

B.8. Hayes MM100  
Target: Hayes Micromodem 100 and 80-103A cards

B.9. Heath H89  
Target: Heath H89 and Zenith Z89

B.10. Heath H100  
Target: Heath H100 and Zenith Z100

The DCD (Data Carrier Detect) signal from the modem must be connected to the DSR (Data Set Ready) input on the computer, rather than to the computer's DCD input. If using the Heath HCA-11 RS-232 cable between the modem and the computer, do the following:

Push pins 6 (blue) and 8 (black) from the male connector at the modem end and put the blue wire in pin 8, leaving the black wire unconnected (tape it and replace the connector). This connects pin 8 at the modem end to pin 6 at the computer end, leaving nothing connected to pin 6 at the modem end. The computer's DSR input is connected to the modem's DCD:

<u>Modem</u>		<u>Computer</u>
Pin 1	-	Pin 1
Pin 2	-	Pin 2
Pin 3	-	Pin 3
Pin 6	n/c	Pin 8 (n/c means not connected)
Pin 7	-	Pin 7
Pin 8	-	Pin 6
Pin 20	-	Pin 20

B.11. Interfacer 3/4  
Target: Compupro Interfacer 3/4 and System Support 1

Pin 8 (DCD) of the modem should be hooked to DSR on the Interfacer board. The Interfacer also supports both a "master" and "slave" setting. The connecting cable between the Interfacer and the modem should be wired as follows:

<u>Modem (DTE)</u>		<u>Interfacer (in Slave Mode)</u>
Pin 1	-	Pin 1
Pin 2	-	Pin 3
Pin 3	-	Pin 2
Pin 7	-	Pin 7
Pin 8(DCD)-		Pin 20(DSR)
Pin 20	-	Pin 6

<u>Modem (DTE)</u>		<u>Interfacer (in Master Mode)</u>
Pin 1	-	Pin 1
Pin 2	-	Pin 3
Pin 3	-	Pin 2
Pin 7	-	Pin 7
Pin 8	-	Pin 6
Pin 20	-	Pin 20

B.12. Kaypro  
Target: Kaypro

B.13. MicroDecision,R1  
Target: Morrow Micro Decision (Rev 1)

This is for Revision 1.x boards only.

Pin 8 (DCD) from the modem must be connected to the USART's DSR input. This may be done either on the internal jumper block or in the modem connecting cable.

B.14. MicroDecision,R2  
Target: Morrow Micro Decision (Rev 2)

This is for Revision 2.x boards only.

Pin 8 (DCD) from the modem must be connected to the USART's DSR input. This may be done either on the internal jumper block or in the modem connecting cable.

B.15. Phillips P2000C  
Target: Phillips "Happy Man" P2000C

B.16. SDS Z80-SIO  
Target: Sierra Data Science SDS Z80-SIO

See CCS 2719.

B.17. Seattle SCP400/0  
Target: Seattle Computer Products SCP400B,C Multiport S-100 Card

The SCP400B,C should be configured as DTE (Data Terminal Equipment) in order to interface to the modem (DCE - Data Communications Equipment).

This overlay is configured for an SCP400B,C with a base I/O address of 80H.

The /n in the title of the overlay indicates the channel number (0, 1, 2, or 3). For example, SCP400/0 refers to channel 0.

## B.18. Seattle SCP400/1

Target: Seatttle Computer Products SCP400B,C Multiport S-100 Card

See SCP400/0.

## B.19. Seattle SCP400/2

Target: Seatttle Computer Products SCP400B,C Multiport S-100 Card

See SCP400/0.

## B.20. Seattle SCP400/3

Target: Seatttle Computer Products SCP400B,C Multiport S-100 Card

See SCP400/0.

## B.21. Super Quad/Six

Target: Advanced Digital Super Quad and Super Six CPU Boards

Baud rate is provided from a parallel port which supplies both the console and modem baud rates. The SETBAUD routine sets the modem and leaves the console unchanged.

## B.22. Superbrain

Target: Intertec Superbrain

## B.23. System Support 1

Target: Compupro System Support 1

See Interfacer 3/4.

## B.24. Televideo TS-802

Target: Televideo TS-802

This overlay applies to the Televideo 802 (not the 802-H) with the TS-802 CBIOS Version 2.1. It may not necessarily work with other versions.

## B.25. TRS-80 Model I

Target: TRS-80 Model I

## B.26. TRS-80 Model II

Target: TRS-80 Model 2/12/16/16B

This overlay works with the TRS-80 Model II (2) and Model 12 with versions of CP/M 2.2 (Z-System also) except for Pickles and Trout CP/M 2.2m. Will work on CP/M 2.2m ONLY if running ZCPR3.

## B.27. TRS-80 Model III

Target: TRS-80 Model III

## B.28. TRS-80 Model IV

Target: TRS-80 Model IV

Model III overlays do NOT work with Model IV.

B.29. US Robotics S100

Target: US Robotics S100 Modem Interface

B.30. ZORBA

Target: ZORBA Computers

### C. Listings of Sample Overlays

This appendix contains a listing of a sample modem overlay and a sample telephone interface overlay. These are the same as the source files MODEM.ASM and TI.ASM provided on the distribution disks.

#### C.1. Sample Modem Overlay

```

1: ;
2: ; Modem Package for TERM III
3: ; Target: ARIES-I Modem Port (8251)
4: ;
5: base equ 600h ;base address of modem packages
6: org base
7:
8: ;
9: ; Modem Support Package
10: ;
11: M1$INIT:
12: JMP SM1$INIT
13: M1$ISTAT:
14: JMP SM1$ISTAT
15: M1$OSTAT:
16: JMP SM1$OSTAT
17: M1$IN:
18: JMP SM1$IN
19: M1$OUT:
20: JMP SM1$OUT
21: M1$BREAK:
22: JMP SM1$BREAK
23: M1$CST:
24: JMP SM1$CST
25: M1$SPTAB:
26: DB 00000011B ; 300 AND 1200 BAUD AVAILABLE
27: JMP 0 ; FILLED IN BY TERM 3 INIT
28:
29: ;
30: ; Modem Routines
31: ;
32: QIO$BASE equ 080H ; Quad I/O Board Base Address
33: QIO$TBE equ 1 ; TBE Bit for Quad I/O
34: QIO$RDA equ 2 ; RDA Bit for Quad I/O
35: M1$STAT equ QIO$BASE+5 ; M1 Status Port
36: M1$DATA equ QIO$BASE+4 ; M1 Data Port
37: M1$BAUD equ QIO$BASE+10 ; M1 Baud Rate Port
38:
39: ;
40: ; Modem 1 Initialization
41: ; Function: To initialize the Modem 1 Port
42: ; Input Parameters: A=Speed

```

```

43: ;           0=no set
44: ;           1= 300
45: ;           2= 1200
46: ;           3= 2400
47: ;           4= 4800
48: ;           5= 9600
49: ;           6=19200
50: ;           7=38400
51: ;           Output Parameters: A=Set Speed (same table as above)
52: ;           ZERO FLAG SET
53: ;
54: SM1$INIT:
55:           PUSH   B
56:           MVI    B,5           ; 300 BAUD
57:           CPI    1           ; SLOW?
58:           JZ     M1$INI1
59:           MVI    B,7           ; 1200 BAUD
60:           CPI    2           ; FAST?
61:           JZ     M1$INI1
62:           JMP    M1$NOSET
63: M1$INI1:
64:           PUSH   PSW           ; SAVE SPEED
65:           MOV    A,B
66:           OUT    M1$BAUD
67:           POP    PSW           ; GET SPEED
68:           ORA    A           ; RETURN WITH NZ
69:           POP    B
70:           RET
71: M1$NOSET:
72:           XRA    A           ; RETURN WITH ZERO FLAG SET
73:           POP    B
74:           RET
75:
76: ;
77: ; Modem 1 Input Status
78: ;           Function: To return byte ready (RDA) status
79: ;           Input Parameters: None
80: ;           Output Parameters: A=0 if no byte, A=0FFH if byte ready
81: ;
82: SM1$ISTAT:
83:           IN     M1$STAT       ; GET STATUS BYTE
84:           ANI    QIO$RDA      ; DATA AVAILABLE?
85:           RZ
86:           MVI    A,0FFH       ; LOAD WITH FF
87:           RET
88:
89: ;
90: ; Modem 1 Output Status
91: ;           Function: To return buffer empty (TBE) status
92: ;           Input Parameters: None
93: ;           Output Parameters: A=0 if buffer full, A=0FFH if buffer
94: ;           empty (TBE)
95: SM1$OSTAT:
96:           IN     M1$STAT       ; GET STATUS BYTE
97:           ANI    QIO$TBE      ; BUFFER EMPTY?

```

```

98:          RZ                      ; ZERO IF NOT EMPTY
99:          MVI      A,0FFH          ; LOAD WITH FF
100:         RET
101:
102: ;
103: ; Modem 1 Input
104: ;      Function:  To return a byte in the A Reg from Modem 1
105: ;      Input Parameters:  None
106: ;      Output Parameters:  A=byte (MSB NOT cleared)
107: ;
108: SM1$IN:
109:         CALL      M1$ISTAT          ; GET STATUS
110:         JZ        M1$IN             ; CONTINUE UNTIL DATA AVAILABLE
111:         IN        M1$DATA           ; GET CHAR
112:         RET
113:
114: ;
115: ; Modem 1 Output
116: ;      Function:  To output the byte in the A Reg to Modem 1
117: ;      Input Parameters:  A=byte
118: ;      Output Parameters:  None
119: ;
120: SM1$OUT:
121:         PUSH      PSW               ; SAVE BYTE
122: M1$LOOP:
123:         CALL      M1$OSTAT          ; CHECK OUTPUT STATUS
124:         JZ        M1$LOOP           ; WAIT UNTIL EMPTY
125:         POP       PSW               ; GET BYTE
126:         OUT       M1$DATA           ; OUTPUT IT
127:         RET
128:
129: ;
130: ; Modem 1 Break
131: ;      Function:  To return the status of the break function for
132: ;                  Modem 1 and to execute the break if available
133: ;      Input Parameters:  A=0 to return status, A=0FFH to break
134: ;      Output Parameters:  A=0 and Zero Flag Set if Break not supported
135: ;
136: SM1$BREAK:
137:         XRA      A                  ; NOT IMPLEMENTED
138:         RET
139:
140: ;
141: ; Modem 1 Carrier Status Detect
142: ;      Function:  Determine if carrier is present
143: ;      Input Parameters:  None
144: ;      Output Parameters:  A=0 if no carrier, A=0FFH if carrier
145: ;
146: SM1$CST:
147:         IN        M1$STAT           ; GET STATUS
148:         ANI      80H                ; CHECK CARRIER DETECT BIT
149:         RZ
150:         MVI      A,0FFH            ; OK
151:         RET
152:
153:         db      $-base              ; check for overflow

```

```

154:
155:         END

```

## C.2. Sample Telephone Interface Overlay

```

1: ;
2: ; MODULE: T3TI-TM (Telephone Interface) for Transmodem 1200
3: ; Author: Richard Conn
4: ; Version: 1.1
5: ; Date: 3 July 85
6: ; Previous Versions: 1.0 (10 Nov 84)
7: ;
8: ; Replaced Rick's code with Hal's code from SPTTM.ASM used in
9: ; TERM2A. 4 July 1985 H. Carter
10: ;
11: ;
12: CPM$BASE      EQU      0          ; BASE ADDRESS OF CPM SYSTEM
13: WBOOT        EQU      CPM$BASE+1 ;
14: CPM$BDOS     EQU      CPM$BASE+5
15: ;
16: CR           EQU      0DH
17: LF           EQU      0AH
18: ;
19: SIO$BASE     EQU      4          ; SIO BASE ADDRESS FOR BIGBOARD
20: M1$STAT     EQU      SIO$BASE+2  ; MODEM STATUS PORT
21: M1$DATA     EQU      SIO$BASE    ; MODEM DATA PORT
22: ;
23: ; VECTOR ADDRESSES TO THE MODEM SUPPORT PACKAGE
24: ;
25: M1$BASE     EQU      600H        ; BASE OF JUMP TABLE IN
26: ;                               ; MODEM SUPPORT PKG
27: M1$INIT     EQU      M1$BASE     ; MODEM INITIALIZATION
28: M1$ISTAT    EQU      M1$BASE+3   ; MODEM INPUT STATUS
29: M1$OSTAT    EQU      M1$BASE+6   ; MODEM OUTPUT STATUS
30: M1$IN       EQU      M1$BASE+9   ; MODEM DATA INPUT
31: M1$OUT      EQU      M1$BASE+12  ; MODEM DATA OUTPUT
32: M1$BREAK    EQU      M1$BASE+15  ; MODEM BREAK ROUTINE (NOT USED)
33: M1$CST      EQU      M1$BASE+18  ; MODEM CARRIER STATUS DETECT
   : M1$WAITP1S EQU      M1$BASE+22  ; MODEM DELAY ROUTINE
34: ;
35: TDELAY     EQU      5          ; 2 FOR 2 MHZ, 4 FOR 4 MHZ, ETC.
36: ;
37: ;
38:           ORG      700H        ; LOCATION OF TELEPHONE INTERFACE
39: ;                               ; IN T3DIAL, T3ANSWER, T3INIT, &
   : ;                               ; T3HANGUP
40: ;
41: ; Telephone System Interface Routines
42: ;
43:           JMP      TI$INI      ; INITIALIZATION
44:           JMP      TI$ANS      ; SET ANSWER MODE
45:           JMP      TI$HANG     ; HANG UP PHONE
46:           JMP      TI$RST     ; RING STATUS DETECT
47:           JMP      TI$DSTRT    ; START DIALING
48:           JMP      TI$DSTOP    ; STOP DIALING

```

```

49:          JMP      TI$DIGIT          ; DIAL DIGIT
50:          JMP      TI$PREPANS       ; PREPARE FOR ANSWERING PHONE
51: ;
52: *
53: *   CONSOLE STATUS ROUTINE
54: *
55: CON$ISTAT:
56:          PUSH     H                  ; SAVE REGS
57:          PUSH     D
58:          PUSH     B
59:          LHLD     WBOOT              ; GET ADDRESS OF BIOS
60:          INX      H                  ; PT TO CONSOLE STATUS
61:          INX      H
62:          INX      H
63:          LXI      D,CONIS1
64:          PUSH     D
65:          PCHL
66: CONIS1:
67:          POP      B                  ; RESTORE REGS
68:          POP      D
69:          POP      H
70:          ORA      A                  ; CHAR?
71:          RZ
72:          CALL     SP$CIN             ; GET CHAR
73:          ORA      A                  ; SET FLAGS
74:          RET
75: *
76: *   CONSOLE INPUT STATUS ROUTINE
77: *
78: ST$CIN:
79:          PUSH     B                  ; SAVE REGS
80:          PUSH     D
81:          PUSH     H
82:          MVI      C,11              ; CONSOLE STATUS
83:          CALL     CPM$BDOS
84:          POP      H                  ; RESTORE REGS
85:          POP      D
86:          POP      B
87:          ORA      A                  ; NZ MEANS KEY HIT
88:          PUSH     PSW                ; SAVE FLAGS
89:          CNZ      SP$CIN             ; FLUSH CHAR IF SO
90:          POP      PSW                ; GET FLAGS
91:          RET
92: *
93: *   CONSOLE INPUT ROUTINE
94: *
95: SP$CIN:
96:          PUSH     H                  ; SAVE REGS
97:          PUSH     D
98:          PUSH     B
99:          MVI      C,1              ; CONSOLE INPUT
100:         CALL     CPM$BDOS           ; CALL BDOS
101:         POP      B                  ; RESTORE REGS
102:         POP      D
103:         POP      H
104:         RET

```

```

105: *
106: *  CONSOLE OUTPUT ROUTINE
107: *
108: SP$SCOUT:
109:     PUSH    H                ; SAVE REGS
110:     PUSH    D
111:     PUSH    B
112:     PUSH    PSW
113:     MVI     C,2                ; CONSOLE OUTPUT
114:     MOV     E,A                ; CHAR IN E
115:     CALL    CPM$BDOS           ; CALL BDOS
116:     POP     PSW                ; RESTORE REGS
117:     POP     B
118:     POP     D
119:     POP     H
120:     RET
121: *
122: *  SEND ^E <CR> COMMAND TO TRANSMODEM
123: *
124: CMD$SEND:
125:     PUSH    PSW                ; SAVE CMD
126:     ;     CALL    TI$HANG        ; HANG UP IF CARRIER PRESENT
127:     ;     CALL    TI$ATTN       ; GET ATTENTION OF MODEM
128:     POP     PSW                ; GET CMD
129: *
130: *  SEND FURTHER COMMAND CHARS
131: *
132: CMD$SEND1:
133:     PUSH    PSW                ; SAVE CHAR
134:     CALL    M1$OUT             ; SEND CHAR IN A
135:     ;
136: CMD$SEND2:
137:     CALL    M1$ISTAT           ; CHAR AVAILABLE?
138:     JNZ     CMD$SEND3
139:     CALL    CON$ISTAT         ; CHAR AVAIL?
140:     JZ      CMD$SEND2
141:     POP     PSW                ; RETURN
142:     RET
143: CMD$SEND3:
144:     CALL    M1$IN              ; GET CHAR
145:     POP     PSW
146:     RET
147: *
148: *  END COMMAND SEQUENCE
149: *
150: CMD$END:
151:     PUSH    PSW                ; SAVE A
152:     MVI     A,CR              ; SEND <CR> AND WAIT FOR <CR>
153:     CALL    CMD$SEND1         ; SEND CHAR WITH ECHO
154:     POP     PSW                ; RESTORE A
155:     RET
156: *
157: *  GET ATTENTION OF MODEM
158: *
159: TI$ATTN:
160:     CALL    FLUSH              ; FLUSH CHAR IF ANY

```

```

161:      MVI      A,'E'-'@'      ; SEND ^E <CR>
162:      CALL     M1$OUT
163:      CALL     RESPONSE      ; IN WEIRD STATE?
164:      CPI      0FFH          ; SHOULD TIMEOUT
165:      JNZ      TI$ATTN1
166:      MVI      A,CR
167:      CALL     CMD$SEND1
168: TI$ATTN1:
169:      CALL     RESPONSE      ; WAIT FOR ASTERISK
170:      CPI      0FFH          ; TIMEOUT?
171:      RZ
172:      CPI      '*'
173:      JNZ      TI$ATTN1
174:      RET
175: *
176: *   WAIT FOR RESPONSE FROM TRANSMODEM COMMAND
177: *   RETURN DIGIT UNLESS UNREASONABLE DELAY, WHICH RETURNS 0FFH
178: *
179: RESPONSE:
180:      PUSH     H              ; SAVE HL
181:      PUSH     B              ; SAVE BC
182: RESP0:
183:      MVI      B,TDELAY      ; DELAY DEPENDS ON PROCESSOR SPEED
184: RESP1:
185:      LXI      H,200H        ; DELAY FOR RESPONSE
186: RESP2:
187:      CALL     M1$ISTAT      ; INPUT CHAR FROM MODEM?
188:      JNZ      RESPM
189:      CALL     CON$ISTAT    ; CHECK CONSOLE STATUS
190:      JNZ      RESPM1
191:      DCX     H              ; COUNT DOWN
192:      MOV     A,H            ; DONE?
193:      ORA     L
194:      JNZ      RESP2
195:      DCR     B              ; COUNT DOWN MAJOR LOOP
196:      JNZ      RESP1
197:      POP     B
198:      POP     H
199:      MVI     A,0FFH        ; TIMEOUT CODE
200:      RET
201: RESPM:
202:      CALL     M1$IN        ; GET CHAR
203:      ANI     7FH           ; MASK
204:      JZ      RESP1        ; FLUSH NULL
205: RESPM1:
206:      POP     B              ; RESTORE BC
207:      POP     H              ; RESTORE HL
208:      RET
209: *
210: *   FLUSH ANY GARBAGE CHARS FROM COMMAND LINE
211: *
212: FLUSH:
213:      CALL     M1$ISTAT      ; ANY CHARS?
214:      RZ                  ; RETURN IF NONE
215:      CALL     M1$IN        ; GET CHAR
216:      RET

```

```

217:
218: *
219: * 2 SEC DELAY
220: *
221: WAIT2:
222:     CALL    TIME1           ; FALL THRU TO 2ND TIME1
223: *
224: * 1-SEC DELAY
225: *
226: TIME1:
227:     PUSH    PSW             ; SAVE A
228:     PUSH    B               ; SAVE B
229:     MVI     B,10            ; 1 SEC WAIT
230: TIME2:
231:     CALL    TI$TIME        ; DELAY 0.1 SEC
232:     DCR     B
233:     JNZ     TIME2
234:     CALL    FLUSH          ; FLUSH GARBAGE
235:     POP     B
236:     POP     PSW
237:     RET
238: *
239: * Telephone Interface Initialization
240: *     Function: Initialize the Modem/UART Interface
241: *     Input Parameters: None
242: *     Output Parameters: None
243: *
244: TI$INI:
245:     PUSH    PSW
246:     MVI     A,'0'           ; SELECT OPTION
247:     CALL    CMD$SEND
248:     CALL    CMD$END
249: TI$INI1:
250:     CALL    RESPONSE        ; LOOP UNTIL TIMEOUT
251:     CPI     0FFH
252:     JNZ     TI$INI1
253:     MVI     A,'2'           ; DIAL MODE - OPTION 22
254:     CALL    CMD$SEND1
255:     MVI     A,'2'
256:     CALL    CMD$SEND1
257:     CALL    CMD$END
258: TI$INI2:
259:     CALL    RESPONSE        ; LOOP UNTIL TIMEOUT
260:     CPI     0FFH
261:     JNZ     TI$INI2
262:     MVI     A,'2'           ; OPTION 2
263:     CALL    CMD$SEND1
264:     CALL    CMD$END
265: TI$INI3:
266:     CALL    RESPONSE        ; LOOP UNTIL TIMEOUT
267:     CPI     0FFH
268:     JNZ     TI$INI3
269:     CALL    CMD$END        ; RETURN TO COMMAND MODE
270: TI$INI4:
271:     CALL    RESPONSE        ; LOOP UNTIL TIMEOUT
272:     CPI     0FFH

```

```

273:      JNZ      TI$INI4
274:      MVI      A,'I'          ; IDLE
275:      CALL     CMD$SEND1
276:      CALL     CMD$SEND
277:      JMP      TI$HANG2
278:
279: *
280: *   Prepare Modem to Answer Phone
281: *       Function:  To condition modem for answering phone
282: *       Input Parameters:  None
283: *       Output Parameters:  None
284: *
285: TI$PREPANS:
286:      JMP      TI$HANG ; HANG UP
287:
288: *
289: *   Set Modem to Answer
290: *       Function:  Set Modem to Answer Mode
291: *       Input Parameters:  None
292: *       Output Parameters:  A=0 IF NOT SUCCESSFUL, A=0FFH IF SUCCESSFUL
293: *
294: TI$ANS:
295:      JMP      TI$YES
296:
297: *
298: *   Hang up telephone
299: *       Function:  Place the telephone on hook
300: *       Input Parameters:  None
301: *       Output Parameters:  None
302: *
303: TI$HANG:
304:      PUSH     PSW
305:      CALL     M1$CST          ; DO NOT HANG UP IF NO CARRIER
306:      JZ       TI$HANG1
307: *
308: *   THIS CODE TOGGLES THE DTR LINE TO ATTRACT THE ATTENTION OF THE
309: *   TRANSMODEM 1200
310: *
311:      MVI      A,00010101b    ; Select write reg 5 on Z80 SIO
312:      OUT      M1$STAT
313:      MVI      A,01101010b    ; 8-bits, Tx char, No DTR, RTS
314:      OUT      M1$STAT
315:      CALL     WAIT2          ; DELAY
316:      CALL     WAIT2
317:      MVI      A,00010101b    ; Select write reg 5 on Z80 SIO
318:      OUT      M1$STAT
319:      MVI      A,11101010b    ; *-bits, Tx char, DTR, RTS
320:      OUT      M1$STAT
321: *
322: *   THIS CODE PLACES THE TRANSMODEM 1200 INTO AN IDLE STATE
323: *   WHICH ALSO PERMITS BAUD RATES TO BE SWITCHED ON THE NEXT COMMAND
324: *
325: TI$HANG1:
326:      CALL     TI$ATTN        ; GET MODEM'S ATTENTION
327:      MVI      A,'I'          ; ENTER IDLE MODE
328:      CALL     CMD$SEND1      ; SEND COMMAND

```

```

329:          CALL    CMD$END          ; SEND <CR>
330: TI$HANG2:
331:          CALL    RESPONSE         ; WAIT UNTIL RESPONSE TEXT IS COMPLETE
332:          CPI      OFFH              ; TIMEOUT?
333:          JNZ      TI$HANG2
334:          POP      PSW                ; DO NOTHING SINCE WE ARE ALREADY
:                                     ; OFFLINE
335:          RET
336:
337:
338: *
339: *   Wait for Answer
340: *   Function:  Wait for answer on telephone for 15 secs
341: *   Input Parameters:  None
342: *   Output Parameters:  A=0 if no answer, A=OFFH if answer
343: *
344: TI$WANS:
345:          PUSH     B
346:          MVI      B,15                ; 15 SEC WAIT
347: TI$WANS0:
348:          CALL     MI$CST              ; CARRIER?
349:          JNZ      TI$WANS3           ; GOT IT!
350:          CALL     ST$CIN              ; USER ABORT?
351:          JNZ      TI$WANS2
352: TI$WANS1:
353:          CALL     WAIT2               ; DELAY 1 SEC
354:          DCR      B
355:          JNZ      TI$WANS0
356: TI$WANS2:
357:          POP      B
358:          JMP      TI$NO               ; NO RESPONSE
359: TI$WANS3:
360:          POP      B
361:          JMP      TI$YES
362:
363: *
364: *   YES AND NO RETURN CODES
365: *
366: TI$YES:
367:          MVI      A,OFFH              ; OK
368:          ORA      A                  ; SET FLAGS
369:          RET
370: TI$NO:
371:          XRA      A                  ; NO ANSWER
372:          RET
373:
374: *
375: *   Ring Status Detect
376: *   Function:  Determines if phone is ringing or not
377: *   Input Parameters:  None
378: *   Output Parameters:  A=0 if no ring, A=OFFH if ring
379: *
380: TI$RST:
381:          JMP      MI$CST              ; USE CARRIER DETECT
382:
383:

```

```

384: *
385: *   Start Dialing
386: *       Function:  Initiate the dialing process
387: *       Input Parameters:  None
388: *       Output Parameters:  A=0 if no dial tone, A=0FFH if dial tone
389: *
390: TI$DSTRT:
391:     CALL    FLUSH                ; FLUSH CHAR IF PRESENT
392:     MVI     A,'D'                ; START DIALING
393:     CALL    CMD$SEND            ; SEND COMMAND
394:     CALL    CMD$END
395: TI$DWAIT:
396:     CALL    RESPONSE            ; WAIT FOR TIMEOUT
397:     CPI     0FFH
398:     JNZ     TI$DWAIT
399:     JMP     TI$YES                ; WE ARE READY FOR DIGITS
400:
401: *
402: *   Stop Dialing
403: *       Function:  Terminate the dialing process with answer or user
404: *                   abort
405: *       Input Parameters:  None
406: *       Output Parameters:  A=0 if no answer, A=0FFH if answer
407: TI$DSTOP:
408:     CALL    CMD$END                ; END COMMAND
409: TI$DS1:
410:     CALL    RESPONSE            ; ANSWER?
411:     CPI     0FFH                ; TIMEOUT?
412:     JNZ     TI$DS1
413:     CALL    CMD$END                ; TELL TRANSMODEM TO PROCEED
414:     JMP     TI$WANS
415:
416: *
417: *   Dial Digit
418: *       Function:  Dial an individual digit
419: *       Input Parameters:  A=ASCII for digit to dial
420: *       Output Parameters:  None
421: *
422: TI$DIGIT:
423:     PUSH    PSW
424:     CPI     ' '                    ; DON'T SEND SPACES
425:     CNZ     CMD$SEND1            ; SEND DIGIT WITH ECHO
426:     POP     PSW
427:     RET
428:
429: *
430: *   0.1 Sec Delay Routine -- TI$TIME
431: *       Function:  Pause for 0.1 Sec
432: *       Input Parameters:  None
433: *       Output Parameters:  None
434: *
435: *
436: WAITP1S EQU    M1$WAITP1S
437: TI$TIME:
438:     JMP     WAITP1S                ; USE ROUTINE IN MODEM OVERLAY
439:

```

```
440: *  
441: * End of Support Package  
442: *  
443:      DS      4      ; 4 BYTES BEFORE END OF PACKAGE  
444:  
445:      END
```

## D. Distribution Files

<u>Disk 1 of 2</u>						
Filename.	Typ	Size	Recs	CRC	Comment	
1	EBCDIC	.XLT	1K	4	462B	EBCDIC Translation Table
2	EDCST	.COM	8K	59	F774	Comm Set Editor
3	EDTMC	.COM	5K	40	DD32	Macro Table Editor
4	EDTXD	.COM	7K	56	3C56	Telephone Directory Editor
5	EDXLT	.COM	7K	51	B0AA	Translation Table Editor
6	EMPTY	.TMC	1K	4	33DB	Empty Macro Table
7	INSTALL	.T3I	2K	14	18BC	TERM III Installation File (for T3INS)
8	LOGIN	.TXT	2K	11	8B73	Sample LOGIN.TXT File
9	MENU	.MNU	3K	18	3529	Sample TERM III Menu
10	MODEM	.ASM	4K	25	DC12	Sample Modem Overlay
11	PARITYEV	.XLT	1K	4	DB83	Even Parity Translation Table
12	PARITYMK	.XLT	1K	4	DBFB	Mark Parity Translation Table
13	PARITYNO	.XLT	1K	4	6F22	No Parity Translation Table
14	PARITYOD	.XLT	1K	4	3535	Odd Parity Translation Table
15	PARITYSP	.XLT	1K	4	663B	Space Parity Translation Table
16	SAMIOP	.ASM	11K	84	F0CF	Sample Input/Output Package
17	SAMPLE	.TXD	2K	14	5FFF	Sample Telephone Directory
18	T3	.CST	2K	9	B7C7	TERM III Comm Set
19	T3ANSWER	.COM	4K	28	F4EB	Answer Telephone Program
20	T3DIAL	.COM	8K	61	1C24	Dial Telephone Program
21	T3FILER	.COM	15K	113	9572	File Transfer Program
22	T3FLUSH	.COM	4K	26	1CAF	Flush Noise Program
23	T3HANGUP	.COM	4K	27	BBC7	Hang Up Telephone Program
24	T3INIT	.COM	4K	29	C890	Initialize Program
25	T3INS	.COM	7K	54	3CF0	TERM III Installation Program
26	T3LOGCHG	.COM	5K	38	B7C4	Change Login Parameters Program
27	T3LOGCK	.COM	5K	39	C4CF	Check LOGIN.TXT File Program
28	T3LOGIN	.COM	9K	65	4BD2	Login Program
29	T3MODCAP	.MCP	8K	64	20B8	Modem Capabilities (Overlay) File
30	T3MONRPT	.COM	3K	21	F064	Monitor Report Program
31	T3NOTE	.COM	4K	28	8C24	Note/Comment Program
32	T3SELMOD	.COM	4K	27	403B	Select Modem Program (used T3MODCAP.MCP)
33	T3SEND	.COM	3K	23	4F81	Send Text Program
34	T3TERM	.COM	10K	78	2EBB	Terminal Communications Program
35	T3TERMB	.COM	7K	54	8E21	Terminal with Large Buffer Program
36	T3TEST	.COM	3K	24	C717	Test Program
37	T3VIEW	.COM	8K	57	E837	Communications Report Program
38	TESTINS	.T3I	1K	3	D771	Install Test Program (T3TEST.COM)
39	TI	.ASM	10K	76	B723	Sample Telephone Interface Overlay
40	Z3TCAP	.TCP	9K	66	26CC	Terminal Capabilities File

<u>Disk 2 of 2</u>						
Filename.	Typ	Size	Recs	CRC	Comment	
1	T3MODCAP	.LBR	195K	1560	A143	Source to T3MODCAP.MCP

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