NCAR DATA COMMUNICATIONS

NCAR TECHNICAL NOTE

April 1985

NCAR DATA COMMUNICATIONS

TBM
(Mass Storage)

CRAY, CI

CRAY, CA

NCAR LOCAL NETWORK

IBM 4341's

IA

IO

RSCS

TELEPHONE LINES

PACX

TELEPHONE LINES

TERMINALS

TELEPHONE LINES

UNINET

SCIENTIFIC COMPUTING DIVISION

NATIONAL CENTER FOR ATMOSPHERIC RESEARCH
BOULDER, COLORADO
This updated User’s Guide is designed to provide you with information and assistance regarding access to the Scientific Computing Division’s computers from your remote location. In addition to the chapters covering specific access gateways such as the PACX port selection device, the UNINET national packet switching network, and the IBM Remote Spooling Communications Subsystem (RSCS), a new chapter on “Special Features” has been added covering new features, products and procedures.

This version of the data communications guide contains no reference to the MODCOMP system since this computer is being phased out. MODCOMP users are being directed to the IBM batch facility (RSCS). Current MODCOMP users should retain the previous edition of the data communications manual for reference. Besides correcting errors in the old manual, this manual contains items concerning updates to the RSCS command language, new UNINET PAD parameters, graphics metacode file transmission, asynchronous file transfer features, new telephone numbers, and full screen interactive facilities.

At the end of this guide you will find a "Reader Response Form" designed to provide our editor and author with feedback on the effectiveness of this guide. We hope you will avail yourself of the opportunity to let us know if this guide meets your needs. You may also use this form to forward recommendations or suggestions on how the data communications facilities could be improved or enhanced.

ACKNOWLEDGMENTS

Don Morris was the principal author of this manual; Robert Nicol was the editor. The author and editor wish to thank both Greg MacArthur and Dave Fulker for their work on an earlier edition of this manual. We also wish to acknowledge the efforts of Ann Cowley, Buck Frye, Barb Horner, Bill Ragin, Steve Storm and Marie Working for their careful reading of draft versions of this guide. They greatly assisted the author and editor in pointing out technical discrepancies which otherwise would have escaped into print. Also, thanks go to those users who have taken the time to point out errors and inconsistencies that escaped initial scrutiny in the earlier edition.
NCAR Data Communications

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The National Center for Atmospheric Research (NCAR) provides remote users of Scientific Computing Division (SCD) computing systems with several methods of access to batch and interactive computing through both the dial-up telephone system and through leased telephone lines.

Batch access refers to the direct submission of job files and the receiving of output without significant user interaction during the course of processing. Batch access typically involves the use of a remote work station (or computer) that is the logical equivalent of a card reader and printer. Data communications between such a remote system and an NCAR system are often on a high-speed line using one of several synchronous protocols.

Interactive access refers to a processing mode during which the user engages in a dialogue with a computer system, even though that dialogue may be for the purpose of preparing a job for batch submission to a second computer. Interactive access merely requires a "dumb" terminal. The associated data communications occur at a low speed via the universally accepted asynchronous ASCII protocol.

Batch computing is provided on the two CRAY-1 computers, referred to throughout this guide as the CRAY,C1 and CRAY,CA machines. The IBM 4341 computers, accessible via the IBM 3705 and the IBM 7171 controllers, provide an interactive environment for code development, job preparation, and job output perusal for programs run on these CRAY-1's.

This guide deals with the methods used to gain access to these computers and does not address the procedures for running jobs on the CRAY-1 machines or working in the interactive environment of the IBM 4341 system. The manuals listed below contain detailed information on every aspect of the SCD computing environment.

- THE CRAY-1 SUPERCOMPUTERS: A Guide to Supercomputing at NCAR (NCAR/TN-226+IA) provides information about batch computing on the CRAY-1 computers Sections on CRAY-1 Job Control Language (JCL) commands and special IBM 4341 directives are included when needed to describe the routing of your computer jobs or files through the system.
The NCAR IBM 4341 Gateway Computers (NCAR/TN-234+IA) provides information on the interactive computing environment.

MANAGING DATASETS AND PROGRAMS AT NCAR: The Mass Storage Subsystem (NCAR/TN-218+IA) describes the management of large amounts of data at NCAR.

The NCAR Local-Network (NCAR/TN-228+IA) provides information on NCAR's local area network.

Copies of these guides are available in the User Area and the Computing Library at the Mesa Laboratory; personal copies may also be obtained from the Documentation Specialist (see Table 1.4).

TELEPHONE ENTRY POINTS

Depending upon your needs and equipment, there are several points or "gateways" through which the remote user may enter the NCAR system via telephone. Although not all logically equivalent, they are referred to as the PACX, UNINET, and RSCS.

The PACX
The Private Automatic Computer eXchange (PACX) is a port selection device that the remote user dials directly to gain interactive access to the IBM 4341 machines.

UNINET
UNINET is a national packet switching network service to which NCAR subscribes to provide interactive access to the IBM 4341 computers.

RSCS
RSCS (Remote Spooling Communications Subsystem) is a component of the IBM 4341 operating system that handles remote batch entry.

The procedures for using each of these gateways are explained in subsequent chapters of this guide.

LOGICAL PATH CONNECTIONS

Figure 1.1 shows the logical path connections through the various access gateways. The following points should be noted in regard to this diagram: since UNINET is routed through the IBM 3705 controller, line mode is the default mode of operation; however, a pseudo-screen-mode facility implemented by software is available. Furthermore, the current UNINET routing access is restricted to the IBM 4341 CMS operating system. Dialing through the PACX allows routing through the IBM 7171 which in turn permits full-screen mode for a certain set of terminal types. RSCS is intended for batch job submission and is not accessible through the UNINET packet switching network. Subsequent chapters contain detailed information on these and other features.
Figure 1.1
Logical Path Connections

PHONE LINES

RSCS

CRAY, CI
OR
CRAY, CA

PHONE LINES

UNINET

IBM 3705

IBM 4341
( IO)

CRAY, CI
OR
CRAY, CA

PHONE LINES

PACX

IBM 3705

IBM 4341
( IO)

CRAY, CI
OR
CRAY, CA

IBM 7171

IBM 4341
( IA)
You must have a suitable terminal or computer with a protocol emulator, as well as a modem that is compatible with one of the protocols and modems at NCAR. The protocols, modem types and speeds currently supported by NCAR for dial access are listed in Table 1.2.

### Table 1.2
Features of the Remote Telephone Access System

<table>
<thead>
<tr>
<th>PROTOCOL</th>
<th>PROCESSING</th>
<th>MODEM TYPE</th>
<th>SPEED</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC UT200</td>
<td>batch (RSCS)</td>
<td>Bell 201A</td>
<td>2000 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 201C</td>
<td>2400 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 208B</td>
<td>4800 bps</td>
</tr>
<tr>
<td>IBM 2780/3780</td>
<td>batch (RSCS)</td>
<td>Bell 201A *</td>
<td>2000 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 201C *</td>
<td>2400 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 208B</td>
<td>4800 bps</td>
</tr>
<tr>
<td>IBM HASP</td>
<td>batch (RSCS)</td>
<td>Bell 201A</td>
<td>2000 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 201C</td>
<td>2400 bps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bell 208B</td>
<td>4800 bps</td>
</tr>
<tr>
<td>Asynchronous</td>
<td>interactive</td>
<td>any asynchronous</td>
<td>≤2400 bps</td>
</tr>
<tr>
<td>ASCII TTY</td>
<td>(UNINET or PACX)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Available upon MODCOMP phase-out.
Table 1.3 briefly compares some of the features available on the three remote job access systems via the telephone system.

<table>
<thead>
<tr>
<th>Feature</th>
<th>RSCS</th>
<th>UNINET</th>
<th>PACX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interactive Computing</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Transparency/ Graphics</td>
<td>Yes-except UT200</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Metacode</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protocol(s)</td>
<td>CDC UT200</td>
<td>Async ASCII</td>
<td>Async ASCII</td>
</tr>
<tr>
<td></td>
<td>2780/3780</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IBM HASP</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Leased Lines</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Synchronous Line Speeds</td>
<td>2000</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td>(in bits per second)</td>
<td>2400</td>
<td>none</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td>4800</td>
<td>leased</td>
<td></td>
</tr>
<tr>
<td></td>
<td>up to 56K</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asynchronous Line Speeds</td>
<td>none</td>
<td>≤2400</td>
<td>300</td>
</tr>
<tr>
<td>(in bits per second)</td>
<td></td>
<td></td>
<td>1200</td>
</tr>
</tbody>
</table>
For those of you with both interactive and batch terminals, a combination of interactive and batch access may prove to be advantageous. The following scenario depicts such a combination:

You perform most of the programming functions interactively on the NCAR/SCD IBM 4341 machines, including:

- job preparation and submission to one of the CRAY-1 computers
- observation of job progress
- correction of program errors and re-submission of programs
- perusal of job results
- final editing of printed and graphical output

This type of interactive computing is efficient because of the access available through the UNINET packet switching network. Finally, bulk transmission (most likely for large printouts or for transferring graphics files) is performed through the RSCS gateway, preferably during hours when the telephone rates are low.

The advantage of this scenario is that your output is not transmitted (at expensive phone rates) until it has been examined interactively, at which time its value and integrity can be ascertained. Furthermore, you can easily route your output to the RSCS gateway for subsequent high-speed transmission to your site.

There are several policies that specifically affect you as a remote user. The principal ones are based on the fact that there are no classes of users who receive special service. All who may use computer resources have equal access to the NCAR/SCD system. The following policies were developed with this assumption in mind:

1. No differentiation in treatment is made between remotely and locally submitted jobs on the CRAY-1 computers. All jobs entering the machine use the same scheduling algorithm which does not contain any parameters governing "remoteness".

2. All costs for the equipment at the remote site, including the remote terminal and modem, are borne by the user. Telephone calls directly to NCAR are paid by the user. If the user accesses NCAR via UNINET, the user also pays the cost (if any) for the call to the nearest UNINET node.
3. The normal method of communication from the remote site is over the dial-up phone system. When total connect time from a site reaches more than 80 hours a month, a leased line may prove more cost-effective. Requests for a leased line and the associated dedicated port on an NCAR/SCD gateway computer are processed by the Computer Communications Planning Group. All costs and maintenance for the leased lines and for modems at both ends will be borne by the user.

4. Any output produced at NCAR is mailed to the site automatically. Printing of large output listings at NCAR is discouraged. Output is mailed once a day. Microfilm, microfiche, and printer output of less than 50 pages are mailed first class. Printer output exceeding 50 pages is mailed parcel post.

5. When job output is ready for transmission to a remote site, the output will be available for printing at a terminal for a specified time period, currently set to seven days for output in an IBM 4341 virtual reader or in the RSCS output queue. If it is not requested within the time period, output in a virtual reader or in the RSCS queue is purged by the system and lost to the user.

FUTURE PLANS

The Scientific Computing Division is constantly striving to upgrade its data communication and related services. To this end the Division welcomes your recommendations. As a result of user input, the following features are planned for implementation in the future or are being considered.

- UNIX operating system support on the IBM 4341 computers with user access through UNINET.
- An error correcting protocol system for UNINET users at certain locations.
- 2400 bps asynchronous line speed available at certain UNINET locations.
- Expanded file transfer support for mini and micro computers.
- Internetwork electronic mail facilities.
The Scientific Computing Division maintains telephone consultation service on a regular schedule to help with any problems that you may encounter and will advise you on available services. See An Overview of the Scientific Computing Division (NCAR/TN-240+IA) for advisory services or consult The Record, SCD's monthly newsletter, for the most recent listing of people to contact and their telephone numbers.

Table 1.4 lists the contacts at the Scientific Computing Division for specific data communication services. All phone numbers can be called direct by dialing (303)-497-xxxx where "xxxx" is the extension listed. FTS users should dial 320-xxxx. Users currently accessing the IBM 4341 system can also send electronic mail addressed to the userid listed in the table.

<table>
<thead>
<tr>
<th>Service</th>
<th>Contact</th>
<th>Ext.</th>
<th>IBM 4341 userid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policy Information</td>
<td>Joe Choy</td>
<td>1222</td>
<td>CHOY</td>
</tr>
<tr>
<td>Troubleshooting</td>
<td>Consulting Office</td>
<td>1278</td>
<td>CONSULT1</td>
</tr>
<tr>
<td></td>
<td>Don Morris</td>
<td>1282</td>
<td>MORRIS</td>
</tr>
<tr>
<td></td>
<td>Bill Ragin</td>
<td>1258</td>
<td>BILLR</td>
</tr>
<tr>
<td>RSCS Signon Assignment</td>
<td>Bill Ragin</td>
<td>1258</td>
<td>BILLR</td>
</tr>
<tr>
<td>Documentation Distribution</td>
<td>Sal Farfan</td>
<td>1292</td>
<td>SAL</td>
</tr>
<tr>
<td>General Liaison</td>
<td>Joe Choy</td>
<td>1222</td>
<td>CHOY</td>
</tr>
<tr>
<td>UNINET Information</td>
<td>Don Morris</td>
<td>1282</td>
<td>MORRIS</td>
</tr>
<tr>
<td>IBM 4341 VM Assignment</td>
<td>Rosemary Mitchell</td>
<td>1235</td>
<td>ROSEMARY</td>
</tr>
<tr>
<td>Mailing List Changes</td>
<td>Rosemary Mitchell</td>
<td>1235</td>
<td>ROSEMARY</td>
</tr>
<tr>
<td>Site Mailings</td>
<td>Sue Long</td>
<td>1245</td>
<td>SUELONG</td>
</tr>
<tr>
<td>Remote Hardware/Software</td>
<td>Don Morris</td>
<td>1282</td>
<td>MORRIS</td>
</tr>
<tr>
<td>Compatibility Questions</td>
<td>Consulting Office</td>
<td>1278</td>
<td>CONSULT1</td>
</tr>
<tr>
<td>Questions about information</td>
<td>Bill Ragin</td>
<td>1258</td>
<td>BILLR</td>
</tr>
</tbody>
</table>

in this guide
CHAPTER 2: THE PACX SYSTEM

INTRODUCTION

The GANDALF Corporation's PACX (Private Automatic Computer eXchange) is NCAR's port selection device. Users accessing the IBM 4341 computers by a direct phone call to NCAR are routed through the IBM 3705 or the IBM 7171 routing computers via the PACX. The PACX automatically assigns you to an available port or access channel on the routing computer that you select. You must first interact with the PACX before logging on to the IBM 4341 machines. After the establishment of a communications link between your terminal and the routing computer, communication through the PACX is transparent to you.

In what follows, an important distinction between line mode and full-screen mode must be noted: whereas almost any terminal can communicate with the IBM 4341 computers in line mode, only certain terminals, as noted in Table 2.4, can communicate in full-screen mode. However, users with certain terminal types can log on in line mode and then run in a simulated full-screen mode by invoking software described in Chapter 4.

HOW TO ESTABLISH A COMMUNICATIONS LINK

Depending upon the access route you are using (see Table 2.2), the following parity settings are necessary to permit you to establish a communications link to the IBM 4341 computers through the PACX:

<table>
<thead>
<tr>
<th>Entry Class</th>
<th>Parity</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3705</td>
<td>MARK parity</td>
</tr>
<tr>
<td>io, i3705</td>
<td>SPACE parity</td>
</tr>
<tr>
<td></td>
<td>(7 data bits, 8th bit always 1)</td>
</tr>
<tr>
<td></td>
<td>(7 data bits, 8th bit always 0)</td>
</tr>
</tbody>
</table>
If there is no space parity setting on your terminal you should try setting your terminal to seven data bits with no parity or eight data bits with no parity. A connection with the PACX may then be initiated by dialing one of the numbers listed in the Table 2.1.

### Table 2.1
**PACX Telephone List**

All phone numbers transfer data at 300 or 1200 bits per second and are compatible with Bell 103, 212, and Vadic 3400 modems. The area code is (303). There are two rotary banks. Dialing the first number of a rotary bank causes the first non-busy modem to answer.

<table>
<thead>
<tr>
<th>Number</th>
<th>Rotary</th>
<th>Number</th>
<th>Rotary</th>
</tr>
</thead>
<tbody>
<tr>
<td>494-0472</td>
<td>1 of 12</td>
<td>499-7482</td>
<td>1 of 8</td>
</tr>
<tr>
<td>494-0486</td>
<td>2 of 12</td>
<td>499-7503</td>
<td>2 of 8</td>
</tr>
<tr>
<td>494-0490</td>
<td>3 of 12</td>
<td>499-7504</td>
<td>3 of 8</td>
</tr>
<tr>
<td>494-0539</td>
<td>4 of 12</td>
<td>499-7506</td>
<td>4 of 8</td>
</tr>
<tr>
<td>494-0473</td>
<td>5 of 12</td>
<td>499-7507</td>
<td>5 of 8</td>
</tr>
<tr>
<td>494-0488</td>
<td>6 of 12</td>
<td>499-7512</td>
<td>6 of 8</td>
</tr>
<tr>
<td>494-0528</td>
<td>7 of 12</td>
<td>499-7514</td>
<td>7 of 8</td>
</tr>
<tr>
<td>494-0551</td>
<td>8 of 12</td>
<td>499-7515</td>
<td>8 of 8</td>
</tr>
<tr>
<td>494-1946</td>
<td>9 of 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>494-1947</td>
<td>10 of 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>494-2267</td>
<td>11 of 12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>494-6444</td>
<td>12 of 12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After dialing the selected number, press the <RETURN> key (sometimes labeled <ENTER>).

The PACX will respond with:

`enter class`
The response should be one of the class codes listed in Table 2.2, followed by <RETURN>.

### Table 2.2

<table>
<thead>
<tr>
<th>Class Code</th>
<th>Device</th>
<th>Description</th>
<th>Duplex</th>
</tr>
</thead>
<tbody>
<tr>
<td>i3705</td>
<td>IBM 3705</td>
<td>Permits access to an IBM 4341 machine, with line mode editing. Full-screen simulation possible with some terminals.</td>
<td>Half</td>
</tr>
<tr>
<td>io</td>
<td>IBM 7171</td>
<td>Permits access to one of the IBM 4341 machiness with full-screen editing capabilities.</td>
<td>Full</td>
</tr>
</tbody>
</table>
The PACX will return one of the following responses:

<table>
<thead>
<tr>
<th>System Response</th>
<th>Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLASS xxx START</td>
<td>You are connected (xxx is the class entered).</td>
</tr>
<tr>
<td></td>
<td>NOTE: A CONNECTION IS AUTOMATICALLY BROKEN</td>
</tr>
<tr>
<td></td>
<td>AFTER A TEN MINUTE IDLE PERIOD!</td>
</tr>
<tr>
<td>CLASS xxx UNASSIGNED ENTER CLASS</td>
<td>No ports are assigned in that class.</td>
</tr>
<tr>
<td></td>
<td>Select another class.</td>
</tr>
<tr>
<td>CLASS xxx UNAVAILABLE ENTER CLASS</td>
<td>This class is temporarily unavailable.</td>
</tr>
<tr>
<td></td>
<td>Select another class.</td>
</tr>
<tr>
<td>CLASS xxx RESTRICTED ENTER CLASS</td>
<td>Access to that class is restricted.</td>
</tr>
<tr>
<td></td>
<td>Select another class.</td>
</tr>
<tr>
<td>CLASS xxx BUSY QUEUE SIZE xxxx DO YOU WISH TO QUEUE?</td>
<td>All ports of that class are busy, but you may queue. Enter Y[es] to queue, N[o] to select a new class.</td>
</tr>
</tbody>
</table>

NOTE: Queued terminals receive periodic queue position reports. When service is available, the START message will be received. Should service of that class fail or become unavailable while you are on the queue, you will receive an appropriate message and will be prompted to select a new class.

LOGGING ONTO THE IBM 4341 COMPUTERS

Once you have received the message:

CLASS xxx START

you are ready to log on to the IBM 4341 machines.
If you are accessing the IBM 4341 computers through the IBM 7171 machine you will have full-screen editing capabilities. If your access is through the IBM 3705 machine, you may be using the equivalent of a teletype (TTY) terminal and have line editing capabilities only. The logon procedure looks quite different depending on the available mode of access.

**Line Mode Logon**

If "i3705" is the CLASS CODE you enter, access to the IBM 4341 machines is through the IBM 3705 and you are in line mode. The PACX will respond:

```
CLASS i3705 START
```

followed by the logon prompt.

```
WARNING: U.S. GOVERNMENT PROPERTY, UNAUTHORIZED USE ....
!
.
```

If just "WARNING: U.S. GOVERNMENT ..." appears, press <RETURN> (in some cases pressing <BREAK> is necessary). This response should bring up the "!" and "." prompts, after which you can log onto the IBM 4341 computers. If you have one of a certain class of ASCII terminals, or an IBM PC or a micro computer that emulates one of a certain class of ASCII terminals, you may enter a software system before you log on that permits you to run in a simulated full-screen mode. Details regarding this feature are described in Chapter 4.

**Full-Screen Logon**

If you have entered CLASS CODE io you are put into full-screen mode, and you will be queried for your terminal-type by the message

```
ENTER TERMINAL TYPE
```

One of the terminal-type codes listed in Table 2.4 must be entered. If you type <RETURN> the terminal-type codes will be displayed for your reference.
Table 2.4 below gives a list of all terminals currently acceptable for entry to the IBM 4341 computers through the IBM 7171. If your terminal is not on this chart or is not compatible with one on the chart, you cannot use the full-screen mode and must enter the IBM 4341 machines through the IBM 3705 in line mode.

After you have entered your terminal-type code, the NCAR logo will appear. To initiate the logon sequence, press <RETURN>. This will clear the NCAR logo from the screen and place you in the Control-Program (CP) environment. You may then log onto the IBM 4341 computers.

<table>
<thead>
<tr>
<th>IBM 7171 Terminal·Types</th>
<th>Terminal·Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perkin-Elmer 1100 Fox</td>
<td>PE1100</td>
</tr>
<tr>
<td>Hewlett-Packard 2648A</td>
<td>HP2648A</td>
</tr>
<tr>
<td>IBM 3101</td>
<td>IBM3101</td>
</tr>
<tr>
<td>IBM 31ALT</td>
<td>IBM31ALT</td>
</tr>
<tr>
<td>Digital Equipment VT100</td>
<td>VT100</td>
</tr>
<tr>
<td>Digital·Equipment VT100N</td>
<td>VT100N</td>
</tr>
<tr>
<td>Lear-Seigler ADM 3A</td>
<td>ADM3A</td>
</tr>
<tr>
<td>Soroc IQ 120</td>
<td>SOROC</td>
</tr>
<tr>
<td>IBM Personal·Computer</td>
<td>IBMPC</td>
</tr>
<tr>
<td>(with YTERM software)</td>
<td></td>
</tr>
</tbody>
</table>
CHAPTER 3: THE UNINET NETWORK

INTRODUCTION

One of the easiest ways to access the NCAR/SCD computers is through UNINET, a nationwide packet switching network. If you have an ASCII terminal, or a personal computer that can emulate an ASCII terminal, and a standard modem, the UNINET network provides interactive computing on the two IBM 4341 systems. This chapter offers both introductory and advanced information on the use of UNINET.

PRELIMINARIES

UNINET, part of United Telecommunications, Inc., is a public packet switching network available in most cities via a local telephone call. Access is gained by calling the nearest UNINET Packet Assembler/Disassembler (PAD) computer, each of which is configured to converse with conventional ASCII terminals using common modems. These PADs are interconnected with one another and with NCAR via high-speed lines utilizing the standard X.25 protocol of the Consultative Committee on International Telegraphy and Telephony (CCITT). This network offers inexpensive, relatively error-free, nationwide access to interactive computing on the NCAR/SCD IBM 4341 system. Access to NCAR from other countries is also possible via UNINET links to foreign networks.

Before accessing UNINET, you should understand the nature of the service provided and have the proper equipment for making the local connection to UNINET. You should take particular note of the following points:

* At present, UNINET is configured to provide interactive service for ASCII terminals only (or computers that emulate such terminals). Users of the IBM RSCS remote batch systems (2780/3780, HASP and UT200 protocols) must place direct-dial phone calls to NCAR for access.

* Users of UNINET will have access to the IBM 4341 computers through their common 3705 communications controller in line mode. In the jargon of IBM manuals, a UNINET user’s terminal (also called a virtual console) is designated as a TTY, typewriter, or 3101 terminal, but NOT a display, screen, full-screen, or 327n terminal. Users of display mode through the IBM 7171 must place direct-dial phone calls to access these systems as outlined in Chapter 2. However, full-screen mode is available for a wide range of terminals and personal computers as detailed in Chapter 4.

* The various UNINET access locations (PADs) are configured to support the most common data rates and
modem types. Data rates from 110 to 1200 bits per second (bps) are supported at all locations and 2400 at selected locations, the most common being 300 baud (30 characters per second) and 1200 baud (120 characters per second). Your modem must be compatible with one of the Bell System 103 modems for 300 bps transmission rates or compatible with a Bell 212A modem or with the Vadic 3400 series modem for 1200 bps data rates. 2400 bps rates requires a modem conforming to the CCITT V.22 bis standard. Certain UNINET PADS have modems that support an error correcting protocol between the PAD and the user's terminal. This facility requires you to have a MICROCOM modem with the Microcom Network Protocol feature.

* The UNINET PADS are configured to support user terminals with the common asynchronous protocols and the ASCII character set. Each character datum is assumed to comprise seven bits of information, with various parity and stop bit configurations handled automatically by UNINET. The seven information bits represent characters according to the American Standard Code for Information Interchange (ASCII). Most asynchronous terminals in use today are compatible with this protocol.

* The UNINET PAD echoes each character back to the user's terminal as it is typed. There is no facility for the host IBM 4341 to echo characters. If necessary, "local-echo" mode (also called "half-duplex" or "no echo-plex" mode), in which the PAD does not echo the characters back but instead the characters are echoed by the terminal, is obtainable by modifying a PAD parameter which is set by the user. (See later sections on PAD parameters.)

* International users of UNINET typically gain access from some other network in the country of origin (for example, the Canadian packet switching network called Datapac). Thus, the characteristics of the local PAD will vary from network to network, and are not under the control of UNINET. For the same reasons, access procedures will also vary, so please contact the UNINET Information Consultant listed in Table 1.4 of this guide. Because international connections often involve International Record Carriers (IRCs) and other packet switching networks, there may be additional costs borne by you.
The procedures for accessing the IBM 4341 computers via UNINET are quite simple. First, you must determine the telephone number of the nearest UNINET PAD. This phone number can be obtained by calling the UNINET toll-free customer service center number: 800-821-5340 (in Missouri, call 800-892-5915). A current list of UNINET access numbers can also be obtained on-line from a data base accessible from UNINET and described in the Network Information section below. Once a telephone connection has been established with the local PAD (as indicated by a standard modem tone or whistle), you should begin data transmission through the modem.

At this time, a few characters such as "1?" should appear on the terminal, but they may be garbled because the network requires some input to become fully matched to your terminal. The first data you transmit should be: a carriage return, followed by a period, followed by a carriage return. For example:

```
<RETURN> . <RETURN>
```

Having received these data, UNINET will respond with some network identifiers:

```
uninet pad XXXX port YY
```

and a service prompt:

```
service :
```

to which you are expected to respond. If this fails for some reason (such as phone line noise), you should make repeated attempts of the form:

```
<BREAK> <RETURN> . <RETURN>
```

until the service prompt is received. It is possible at this point to enter commands affecting the behavior of the PAD, but most commonly, you would initiate a connection to NCAR by entering:

```
NCR <RETURN> (upper or lower case)
```

where NCR identifies the intended host computer location.
Once the service request has been entered, UNINET should respond with:

\*u001 000 connected to 30300007

and the designated host IBM 4341 should respond:

WARNING: U.S. GOVERNMENT PROPERTY, UNAUTHORIZED USE ... !

which indicates readiness for log on. If you should fail to get the "." prompt, try entering <RETURN> or pressing the <BREAK> key.

At the end of an interactive session, the CP commands LOGOFF or DISCONNECT will cause UNINET to respond:

\*u013 XXX disconnected by host

service:

at which point you simply hang up the telephone.

PROBLEMS AND ERRORS

There are a variety of possible causes for failure to establish a connection. The following examples contain the most common symptoms:

* Fast busy signal. Usually indicates overloaded telephone circuits. Try again.
* Slow busy signal. The UNINET access number is busy. Try again. If this occurs with regularity, report the problem to the UNINET Customer Service Center (see below). UNINET is under contract to provide enough lines so that busy signals are encountered no more than once per 100 calls.

* Modem carrier detected, but it is unable to communicate. Possibly a mismatch between the terminal and modem speeds. Be sure that the data rate for the terminal is set to that of the modem (300 or 1200 bits per second). Also check power switches and cable connections.

* Unable to obtain the "service" prompt, even with repeated attempts of the <BREAK> <RETURN> sequence. Mismatch of equipment (see above) or PAD malfunction. Call the UNINET Service Center for assistance (see below).

* Random data errors. This is generally caused by noisy telephone lines. Try re-dialing. If this problem occurs with regularity, report it to the UNINET Service Center (see below). UNINET works with the local telephone operating company to maintain satisfactory line quality. NOTE: Such errors occur almost exclusively on the connection between the terminal and the PAD. Communications within UNINET sustain error rates of less than one error per billion characters transferred.

* Ring but no answer. Problems with the PAD or telephone rotaries. Try re-dialing and report the problem to the UNINET Service Center (see below).

* Connection established but unexpectedly disconnected. Typically caused by problems with the PAD or local telephone service. Try re-dialing and report the problem if recurrent.

* UNINET responds: "*u010 XXX not obtainable." This is usually a misspelled NCR or other accessibility problems. If the corrected spelling does not solve the problem, report it.

* UNINET responds: "*u005 XXX network congestion" or "*u033 000 route unavailable." The network is unable to establish or maintain a route to NCAR. Wait and try again. Report the problem if it persists (see below). UNINET is under contract to provide enough routes so that route failures occur less than once per 100 attempts.
* UNINET responds: "*u011 XXX out of order." The leased line between NCAR and UNINET is down (inoperative) or the IBM 3705 communications processor at NCAR is down.

* UNINET responds: "*u004 XXX host busy." The connection at NCAR is configured to support a maximum of 32 simultaneous UNINET users, and all 32 positions are occupied. Wait and try again.

* UNINET responds: "*u009 XXX remote procedure error." The host system at NCAR is down or malfunctioning.

* UNINET responds: "*u033 XXX route unavailable." The node in Denver through which all NCAR traffic must pass is down or malfunctioning.

The IBM 3705 responds: "NCAR IO IS DOWN (or BUSY)" or "NCAR IA IS DOWN (or BUSY)." The IBM 4341 system you selected is unavailable. Try again later.

* UNINET responds: "*u012 XXX disconnected at request of host" or "*u013 XXX disconnected by host." The host system at NCAR has terminated the connection. This occurs normally when you log off. Other occurrences probably indicate host malfunction.

REPORTING PROBLEMS AND GETTING HELP

UNINET maintains a Customer Service Center, accessible via a WATS number, that provides assistance and solves network problems 24 hours per day. For network-related problem reporting, information, and assistance, call the following toll-free number:

800-821-5340 - in Missouri: 800-892-5915

at any hour. For UNINET problems that appear related to the NCAR computers, or if the UNINET customer assistance is not completely satisfactory, call the RJE troubleshooting consultant listed in Table 1.4.

NETWORK INFORMATION

A data base of information about access phone numbers, international connections, logging on, trouble reporting, and current UNINET messages may be accessed in the following way:

Instead of responding to the "service" prompt with "ncr", enter:

\[ nni <RETURN> \]

The network will then respond with four lines of host connect information followed by the prompt:

The UNINET Network 3-6 April 1985
[ENTER YOUR 3 CHAR HOST ACCESS CODE]
*

You should then respond with:

ncr <RETURN>

You will then be directed by a series of prompts to obtain the desired information.

**Usage Notes**

Users of the IBM 4341 computers through UNINET have access to certain features that are provided by the PAD computer. Many of these features are somewhat complicated and unlikely to be required, but a few of them are quite convenient. For example, some of these features allow simple editing of the current line you are typing. (See below for detailed information concerning PAD parameters 15, 16, 17, and 18.)

**Line Editing**

The most useful line editing function is character deletion, whereby you can erase the most recently typed characters using <BACKSPACE> (or LEFT ARROW on some terminals). Similarly, the entire current line can be deleted using <DEL> (or <RUB> on some terminals). In either of these cases, the deleted character or line is never transmitted to the host. Typing <CTRL-E> (or <ALT-E> on some terminals) will display the current line.

**Flow Control**

Another very useful PAD feature is "flow control" which permits you to stop and re-start the flow of data from the PAD. For example, you can display a long listing on the terminal and temporarily halt the display as desired. To stop the flow of data from the PAD, you must transmit a special "Xoff" character to the PAD. The character used is the ASCII DC3, obtained as:

<CTRL-S> or <ALT-S>

on most terminals. To resume the flow (exactly where it stopped) you must transmit a special "Xon" character to the PAD. The character used is the ASCII DC1, obtained as:

<CTRL-Q> OR <ALT-Q>

on most terminals.
There is another way to halt the flow of data from the IBM 4341 machines to your terminal. This is to actually interrupt the IBM 4341 communications by depressing the <BREAK> key, causing the IBM 4341 system to cease output and wait for your input. An advantage of this approach is that you can issue certain "immediate commands" that are described in the CMS Command and Macro Reference manual published by IBM. The most common immediate commands are the HT (Halt Typing) and HX (Halt eXecution) instructions. For example, during a TYPE operation:

```
<BREAK>
```

will cause the typing to halt, and:

```
HT <RETURN>
```

will terminate the process. The CMS prompt will appear. Alternatively, instead of using HT, a simple:

```
<RETURN>
```

will cause typing to resume. However, using this method, output data are usually lost, so the recommendations are as follows:

1. If the output is to be interrupted temporarily (for examination), use the <CTRL-S>, <CTRL-Q> (Xoff, Xon) sequence.

2. If the output is to be terminated, use the <BREAK> HT (or HX); <RETURN> sequence.

**CONTROL OF PAD FUNCTIONING**

You can control the functioning of the PAD by setting certain parameters. The parameters are described in Table 3.1. These PAD parameters can be set while being prompted for "service" by UNINET, and this can occur either at log on time (prior to connecting with NCAR), or during a session. To obtain the service prompt during the course of a session, you must transmit a special signal that is itself defined by a PAD parameter. The default signal for this purpose is an ASCII control character, DLE, which is obtained as: <CTRL-P> or <ALT-P> on most terminals. The PAD computer temporarily suspends the session with the host, and sets up an interactive exchange with you, permitting the modification of the PAD parameters. Simply typing <RETURN> will re-establish the host session.
Functions most commonly modified by setting PAD parameters include echo-plex, flow control, character deletion, line deletion, and insertion of line feeds or fill (padding) characters. Most users find the default PAD settings satisfactory, so the following information will be of the most value if you prefer to operate in local-echo (half-duplex) mode, if you wish the PAD to exercise flow control against the terminal, or if you otherwise need special control over the functioning of the local PAD system.

A typical sequence for setting the PAD parameters occurs during an interactive session as follows:

Type:

\[ <\text{CTRL}-P> \]

which never arrives at NCAR because it is intercepted by the PAD. This signal character cannot come from the host; the PAD recognizes this form of signal character only from the terminal. Furthermore the signal character itself can be modified by setting PAD parameter #1. The default character is DLE, obtained as \[ <\text{CTRL}-P> \text{ or } <\text{ALT}-P> \] on most terminals. The PAD responds:

\[ \text{service :} \]

to which you respond:

\[ \text{SETpp:nn } <\text{RETURN}> \quad (\text{upper or lower case}) \]

where pp represents the index of a particular (CCITT Standard X.3) PAD parameter, and nn represents the value to which it is set. The host responds:

\[ \text{service :} \]

to which you may respond with additional PAD control commands, or simply restore the interactive host session by typing:

\[ <\text{RETURN}> \]

All PAD control functions are entered in similar fashion, when the PAD is waiting for a response to the "service"
An Example of PAD Parameter Modification

You may prefer to operate your terminal in "local-echo" or "half-duplex" mode. In this mode the terminal displays its own characters as they are typed, so it is redundant for the PAD to echo these characters back to you. In fact, each character typed will appear twice if a half-duplex terminal is operated with UNINET's preset PAD parameters. For example, when responding to the service prompt with a request for connection to NCAR IO, you type NCR;O but the following will appear on the terminal:

```
service :NNOCRR;;O0
```

To turn off the echoing of terminal input, PAD parameter #2 should be changed from 1 to 0. This can occur before attaching to NCAR (at the first service prompt), or it can occur later in the session as illustrated below. The parameter setting sequence is begun when you suspend host interaction by typing:

```
<CTRL-P>
```

The PAD responds:

```
service :
```

to which you respond:

```
SET2:0 <RETURN>  (upper or lower case)
```

If the terminal is set for half-duplex operation, this will appear as:

```
service :SSEETT22:00
```

Subsequently, the PAD responds:

```
service :
```

to which a simple <RETURN> will cause the host
interaction to resume. Thus changed, the PAD will no
longer echo characters from the terminal.

Table 3.1 lists the PAD parameters implemented by UNINET.
Most of these are from the CCITT standard X.3 protocol,
so their meanings and the associated values are presented
in brief form. The table is organized by parameter
number. Those PAD parameters most commonly changed by
SCD users are marked with an asterisk (*). The "Preset"
column indicates the parameter's initial default value.

**NOTE:** Whenever the value of a PAD parameter is used to
specify an ASCII character, the DECIMAL representation
must be used, not the octal or hexadecimal codes. For
example, the values 0-31 represent control characters,
and the values 32-126 represent graphical symbols. De-
cimal tables of ASCII codes are given in Tables 3.2a and
3.2b of this chapter. Table 3.2a lists the control char-
acters, their names, and the keyboard sequences for their
invocation. Table 3.2b lists the printable ASCII charac-
ters. The hexadecimal equivalent of any character in the
tables can be found by converting the decimal value for
the character to hexadecimal.

---

**Table 3.1**

<table>
<thead>
<tr>
<th>#</th>
<th>Parameter Description</th>
<th>Allowable Values/Meanings</th>
<th>Preset</th>
</tr>
</thead>
</table>
| 1 | What keystroke permits terminal operator to escape data transfer mode to set/inspect PAD params? | 0=No escape permitted  
1=Escape via DLE <CONTROL-P>  
17-126=ASCII char for escape | 1 |
|   | *2 Should the PAD echo typed characters back to the terminal?                           | 0=No  
1=Yes |
|   | 3 Which characters should trigger the PAD into sending a partially full packet?         | 0=Only send full packets  
2=CR (Carriage Return)  
4=ESC,BEL,ENQ,ACK  
6=CR,ESC,BEL,ENQ,ACK  
8=DEL,CAN,DC2  
16=ETX,EBT  
18=CR,BOT,ETX  
126=All control chars + DEL | 2 |
|   | 4 How fast should the PAD time out and send a partially full packet?                    | 0=No time out  
1-255=Time in 50 ms units | 0 |
Table 3.1 (cont.)

<table>
<thead>
<tr>
<th>#</th>
<th>Parameter Description</th>
<th>Allowable Values/Meanings</th>
<th>Preset</th>
</tr>
</thead>
<tbody>
<tr>
<td>*5</td>
<td>Can the PAD assert flow control against data from the terminal? (Often necessary if</td>
<td>0=No</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>terminal is a computer used to transmit files).</td>
<td>1=Yes (Xon/Xoff protocol)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Is the PAD allowed to send service prompts and network messages to the terminal?</td>
<td>0=No</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=Yes (network messages only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4=Yes (prompts only)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5=Yes (prompts &amp; messages)</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>What should the PAD do upon receiving a <code>&lt;BREAK&gt;</code> signal from the terminal?</td>
<td>0=Nothing</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=Send interrupt to host</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2=Send reset to host</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>8=Enter PAD command mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>21=Discard current host output &amp; send interrupt</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Should PAD discard output data from host or deliver it? (Used in conjunction with</td>
<td>0=Normal delivery to terminal</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>parameter 7)</td>
<td>1=Discard output from host</td>
<td></td>
</tr>
<tr>
<td>*9</td>
<td>How many fill characters should PAD append to CR sent to terminal?</td>
<td>0=None</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-127=Number of (NUL) fillers</td>
<td></td>
</tr>
<tr>
<td>*10</td>
<td>At what length should PAD fold output lines to terminal?</td>
<td>0=No line folding</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-255=Number of chars in line</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Terminal speed (automatically detected by the PAD at the time of the initial connect)</td>
<td>0=110 4=600 12=2400</td>
<td></td>
</tr>
<tr>
<td></td>
<td>in bits per second.</td>
<td>2=300 6=150 13=4800</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3=1200 7=1800</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Can the terminal assert flow control against data from the PAD?</td>
<td>0=No</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1=Yes (Xon/Xoff protocol)</td>
<td></td>
</tr>
<tr>
<td>*13</td>
<td>Should the PAD transmit linefeeds (LF) when carriage returns (CR) are encountered</td>
<td>0=No LF insertion</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>from the terminal or from the host?</td>
<td>1=LF appended to CR from host</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>4=LF echoed when CR from host</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>5=LF appended to CR from host and LF from term echoed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>6=LF appended to CR from term and LF from term echoed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>7=combination of 5 and 6</td>
<td></td>
</tr>
<tr>
<td>*14</td>
<td>How many fill characters should PAD append to LF sent to terminal?</td>
<td>0=None</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1-127=Number of (NUL) fillers</td>
<td></td>
</tr>
<tr>
<td>#</td>
<td>Parameter Description</td>
<td>Allowable Values/Meanings</td>
<td>Preset</td>
</tr>
<tr>
<td>----</td>
<td>--------------------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>*15</td>
<td>Should PAD provide line editing features of params 16, 17, 18 &amp; 19?</td>
<td>0=No, params 16, 17, 18, &amp; 19 ignored</td>
<td>1</td>
</tr>
<tr>
<td>16</td>
<td>Keystroke to delete a character (The default value is BACKSPACE or LEFT ARROW)</td>
<td>0-127=ASCII character code (see below)</td>
<td>8</td>
</tr>
<tr>
<td>*17</td>
<td>Keystroke to delete current line (The default value is DEL or RUB on most terminals)</td>
<td>0-127=ASCII character code (see below)</td>
<td>127</td>
</tr>
<tr>
<td>*18</td>
<td>Keystroke to display current line (The default value is ENQ, ALT-E or CONTROL-E)</td>
<td>0-127=ASCII character code (see below)</td>
<td>5</td>
</tr>
<tr>
<td>19</td>
<td>What response do you want to a DEL (line delete) and a BS (backspace) character?</td>
<td>1=Append XXX to line for DEL. 1 Echo BS, do not erase char. 2=Erase line for DEL.</td>
<td>1</td>
</tr>
<tr>
<td>20</td>
<td>What characters should be echoed back to the terminal? (In effect only if parameter 2 is set to 1)</td>
<td>0=Echo all characters 1=Alphanumeric characters 2=CR 4=ESC,BEL,ENQ,ACK 8=DEL,CAN,DC2 16=ETX,EOT 32=HT,LF,VT,FF 64=All other CTRL characters 128=All other characters</td>
<td>0</td>
</tr>
<tr>
<td>*200</td>
<td>What ASCII character can also be used for the &lt;BREAK&gt; key function?</td>
<td>0=None 1-127 ASCII character code</td>
<td>0</td>
</tr>
<tr>
<td>201</td>
<td>Should user be disconnected from the network if the user disconnects from the host?</td>
<td>0=No 1=Yes</td>
<td>0</td>
</tr>
<tr>
<td>254</td>
<td>Is parity for terminal determined automatically by PAD at logon?</td>
<td>0=No, specified by host 1=Yes, detected by PAD</td>
<td>1</td>
</tr>
<tr>
<td>255</td>
<td>What parity is used for data transmitted to the host?</td>
<td>0=As received from terminal 4=Space (parity bit zero) 5=Mark (parity bit one) 6=Even parity 7=Odd parity</td>
<td>4</td>
</tr>
<tr>
<td>Decimal</td>
<td>Character</td>
<td>Description</td>
<td>ASCII Code</td>
</tr>
<tr>
<td>---------</td>
<td>-------------------</td>
<td>----------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>0</td>
<td>NUL</td>
<td>Null</td>
<td>&lt;Ctrl-@&gt;</td>
</tr>
<tr>
<td>1</td>
<td>SOH</td>
<td>Start-of-Heading</td>
<td>&lt;Ctrl-A&gt;</td>
</tr>
<tr>
<td>2</td>
<td>STX</td>
<td>Start-of-Text</td>
<td>&lt;Ctrl-B&gt;</td>
</tr>
<tr>
<td>3</td>
<td>ETX</td>
<td>End-of-Text</td>
<td>&lt;Ctrl-C&gt;</td>
</tr>
<tr>
<td>4</td>
<td>EOT</td>
<td>End-of-Transmission</td>
<td>&lt;Ctrl-D&gt;</td>
</tr>
<tr>
<td>5</td>
<td>ENQ</td>
<td>Enquiry</td>
<td>&lt;Ctrl-E&gt;</td>
</tr>
<tr>
<td>6</td>
<td>ACK</td>
<td>Acknowledgement</td>
<td>&lt;Ctrl-F&gt;</td>
</tr>
<tr>
<td>7</td>
<td>BEL</td>
<td>Bell</td>
<td>&lt;Ctrl-G&gt;</td>
</tr>
<tr>
<td>8</td>
<td>BS</td>
<td>Backspace</td>
<td>&lt;Ctrl-H&gt;</td>
</tr>
<tr>
<td>9</td>
<td>HT</td>
<td>Horizontal Tabulation</td>
<td>&lt;Ctrl-I&gt;</td>
</tr>
<tr>
<td>10</td>
<td>LF</td>
<td>Line Feed</td>
<td>&lt;Ctrl-J&gt;</td>
</tr>
<tr>
<td>11</td>
<td>VT</td>
<td>Vertical Tabulation</td>
<td>&lt;Ctrl-K&gt;</td>
</tr>
<tr>
<td>12</td>
<td>FF</td>
<td>Form Feed</td>
<td>&lt;Ctrl-L&gt;</td>
</tr>
<tr>
<td>13</td>
<td>CR</td>
<td>Carriage Return</td>
<td>&lt;Ctrl-M&gt;</td>
</tr>
<tr>
<td>14</td>
<td>SO</td>
<td>Shift Out</td>
<td>&lt;Ctrl-N&gt;</td>
</tr>
<tr>
<td>15</td>
<td>SI</td>
<td>Shift In</td>
<td>&lt;Ctrl-O&gt;</td>
</tr>
<tr>
<td>16</td>
<td>DLE</td>
<td>Data Link Escape</td>
<td>&lt;Ctrl-P&gt;</td>
</tr>
<tr>
<td>17</td>
<td>DC1</td>
<td>Device Control 1 (X-ON)</td>
<td>&lt;Ctrl-Q&gt;</td>
</tr>
<tr>
<td>18</td>
<td>DC2</td>
<td>Device Control 2</td>
<td>&lt;Ctrl-R&gt;</td>
</tr>
<tr>
<td>19</td>
<td>DC3</td>
<td>Device Control 3 (X-OFF)</td>
<td>&lt;Ctrl-S&gt;</td>
</tr>
<tr>
<td>20</td>
<td>DC4</td>
<td>Device Control 4</td>
<td>&lt;Ctrl-T&gt;</td>
</tr>
<tr>
<td>21</td>
<td>NAK</td>
<td>Negative Acknowledgement</td>
<td>&lt;Ctrl-U&gt;</td>
</tr>
<tr>
<td>22</td>
<td>SYN</td>
<td>Synchronous Idle</td>
<td>&lt;Ctrl-V&gt;</td>
</tr>
<tr>
<td>23</td>
<td>ETTB</td>
<td>End of Transmission Block</td>
<td>&lt;Ctrl-W&gt;</td>
</tr>
<tr>
<td>24</td>
<td>CAN</td>
<td>Cancel</td>
<td>&lt;Ctrl-X&gt;</td>
</tr>
<tr>
<td>25</td>
<td>EM</td>
<td>End-of-Medium</td>
<td>&lt;Ctrl-Y&gt;</td>
</tr>
<tr>
<td>26</td>
<td>SUB</td>
<td>Substitute</td>
<td>&lt;Ctrl-Z&gt;</td>
</tr>
<tr>
<td>27</td>
<td>ESC</td>
<td>Escape</td>
<td>&lt;Ctrl-&gt;</td>
</tr>
<tr>
<td>28</td>
<td>FS</td>
<td>File Separator</td>
<td>&lt;Ctrl-/&gt;</td>
</tr>
<tr>
<td>29</td>
<td>GS</td>
<td>Group Separator</td>
<td>&lt;Ctrl-</td>
</tr>
<tr>
<td>30</td>
<td>RS</td>
<td>Record Separator</td>
<td>&lt;Ctrl-}</td>
</tr>
<tr>
<td>31</td>
<td>US</td>
<td>Unit Separator</td>
<td>&lt;Ctrl-_&gt;</td>
</tr>
</tbody>
</table>
Whenever the UNINET PAD is awaiting your response to the "service" prompt, various commands can be entered that will affect the behavior of the PAD. (During the course of an interactive session, you can usually obtain the "service" prompt by typing <CTRL-P> or <ALT-P> as discussed in previous sections). Each of the following commands may be entered either in upper or lower case:

1. Null command --

<RETURN>

If the response to the "service" prompt is null, i.e., a simple carriage return, the PAD will return you to the (suspended) interactive host session. If no host session is in progress (for example, before a host connection has been established) a null response is interpreted as a command error.

### Table 3.2b

<table>
<thead>
<tr>
<th>Decimal Table of Printable ASCII Characters</th>
</tr>
</thead>
<tbody>
<tr>
<td>32</td>
</tr>
<tr>
<td>33</td>
</tr>
<tr>
<td>34</td>
</tr>
<tr>
<td>35</td>
</tr>
<tr>
<td>36</td>
</tr>
<tr>
<td>37</td>
</tr>
<tr>
<td>38</td>
</tr>
<tr>
<td>39</td>
</tr>
<tr>
<td>40</td>
</tr>
<tr>
<td>41</td>
</tr>
<tr>
<td>42</td>
</tr>
<tr>
<td>43</td>
</tr>
<tr>
<td>44</td>
</tr>
<tr>
<td>45</td>
</tr>
<tr>
<td>46</td>
</tr>
<tr>
<td>47</td>
</tr>
<tr>
<td>48</td>
</tr>
<tr>
<td>49</td>
</tr>
<tr>
<td>50</td>
</tr>
<tr>
<td>51</td>
</tr>
<tr>
<td>52</td>
</tr>
<tr>
<td>53</td>
</tr>
<tr>
<td>54</td>
</tr>
<tr>
<td>55</td>
</tr>
</tbody>
</table>

(DEL) (non-printing)
2. Set parameter(s) --

SETpp:nn <RETURN>

or

SETpl:nl,p2:n2, ... <RETURN>

This command sets one or more PAD parameters to specified values. The arguments pp, pl, p2, etc. are specific PAD parameter numbers, and the arguments nn, nl, n2, etc. are the (decimal integer) values to which the corresponding parameters are to be set.

3. Set and read parameter(s) --

SET?pl:nl,p2:n2, ... <RETURN>

This command, in addition to setting one or more parameters as above, also causes the PAD to display the (resultant) values of the referenced parameters.

4. Read parameter(s) --

PAR?pl,p2, ... <RETURN>

This command causes display of the current values for one, several, or all of the PAD parameters. The arguments pl, p2, etc. are specific PAD parameter numbers. In the absence of arguments, the PAD will display current settings for the entire set of parameters.

5. Set parameter profile --

PROFnn <RETURN>

This command sets all PAD parameters to one of several pre-defined profiles, where the argument nn refers to the desired profile. The available profiles are listed below, but NCAR users will probably find profile 2 to be the most useful. The default settings for the PAD parameters are those of profile 2.
6. Host disconnect --

**BYE <RETURN>**

This command causes UNINET to terminate your connection with the host system. The effect is similar to issuing the CP command DISCONNECT on the IBM 4341 system.

7. Host interrupt --

**INT <RETURN>**

This command causes UNINET to transmit a special interrupt package to the host system. Under default conditions (see parameter #7 in Table 3.1) this is equivalent to typing <BREAK> on your terminal.
8. Network status --

STAT <RETURN>

This command queries the current status of your connection on the network, including the PAD and the host. The messages are similar to those received during the initial access procedures.

9. Reset connection --

RESET <RETURN>

This command re-initializes your connection with the host system, clearing all data in transit, but not clearing the connection itself. This command is used only when a channel is blocked.
Making the physical connection from a remote site to NCAR is only one part of successfully conducting a dialogue with the interactive computer systems. Certain software tools have been implemented to help you use the system efficiently. Although some of the tools mentioned in this chapter are mentioned in other guides, they are included here because they are of special importance to remote users. The features mentioned only apply to users accessing SCD computers through UNINET or through the PACX in the interactive access mode.

**FULL-SCREEN EMULATION - SIM3278**

If you access the IBM 4341 system through UNINET or through the PACX via class i3705, you do not automatically have the full-screen functionality provided by entry through class io. In fact, at a transmission rate of 300 bits per second (bps), full-screen editing features are a hindrance, and some users find that even at 1200 bps, waiting while the video display screen is refreshed is an annoyance. Other full-screen features such as BROWSE, FLIST, and HELP are beneficial at any modem speed.

To provide such full-screen capabilities to users whose NCAR access is through UNINET, or to users who must enter through the PACX class i3705 because their terminals do not permit access via the IBM 7171 through class io, a product called SIM3278 is provided.

SIM3278, a SIMWARE Inc. product, is a program running on the IBM 4341 computers that allows ASCII video display terminals and microcomputers emulating ASCII terminals to function as simulated IBM 3270-type terminals. SIM3278 is referred to as a 3270 emulator or as an ASCII-to-3270 protocol converter. This program allows you to enter an IBM 4341 computer in line mode, yet still access the full-screen facilities. Most, but not all, ASCII terminals will function with SIM3278. A SIM3278 manual is available from the User Services Documentation Specialist (see Table 1.4). The SIM3278 documentation in this guide is sufficient to perform all full-screen tasks, provided the user is familiar with the functionality of the PF and PA keys (see The NCAR IBM 4341 Gateway Computers, NCAR/TN-234+IA). Table 4.1 details the acceptable terminals and the identification code (ID) required when entering the SIM3278 software.

**SIMPC/AZPC2 – The IBM PC Package**

Users with IBM PCs also have the ability to perform file transfers to and from the host IBM 4341 machine with a software package from SIMWARE, INC. called AZPC2 (the new version is called SIMPC). More information on SIMPC/AZPC2 may be found later in this chapter.
### Table 4.1
**SIM3278 Identification Codes**

<table>
<thead>
<tr>
<th>Terminal Type</th>
<th>SIM3278 ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADDS Viewpoint</td>
<td>31</td>
</tr>
<tr>
<td>ADDS Viewpoint 60</td>
<td>36</td>
</tr>
<tr>
<td>ADM - see Lear Siegler</td>
<td></td>
</tr>
<tr>
<td>Annarbor Ambassador</td>
<td>37</td>
</tr>
<tr>
<td>Beehive DM-5/5A</td>
<td>16</td>
</tr>
<tr>
<td>CCG Vucom-4 (Bell Canada)</td>
<td>12</td>
</tr>
<tr>
<td>Concept HDS AVT-100</td>
<td>32</td>
</tr>
<tr>
<td>Control Data VIKING-721</td>
<td>34</td>
</tr>
<tr>
<td>Cybernex MDL-S110</td>
<td>25##</td>
</tr>
<tr>
<td>Cybernex XL84</td>
<td>10</td>
</tr>
<tr>
<td>Cybernex XL87-M</td>
<td>21</td>
</tr>
<tr>
<td>Cybernex XM-3270</td>
<td>39</td>
</tr>
<tr>
<td>Datamedia 1520/21</td>
<td>2</td>
</tr>
<tr>
<td>Datamedia 3000/45</td>
<td>1</td>
</tr>
<tr>
<td>Datamedia Excel 22</td>
<td></td>
</tr>
<tr>
<td>Digital (DEC) VT52</td>
<td>9#</td>
</tr>
</tbody>
</table>

# Full duplex terminal; requires diode switch or modem with "local echo" feature, unless used through UNINET.

## Manufacturer's enhancement required.
<table>
<thead>
<tr>
<th>Terminal Type</th>
<th>SIM3278 ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Digital (DEC) VT100</td>
<td>8#</td>
</tr>
<tr>
<td>Digital (DEC) VT100 w/ VT640 graphics by Digital Eng.</td>
<td>8#</td>
</tr>
<tr>
<td>GTE XT300</td>
<td>43</td>
</tr>
<tr>
<td>Hazeltine 1420/1520</td>
<td>33#</td>
</tr>
<tr>
<td>Hazeltine ESPRIT III see TeleVideo 950</td>
<td></td>
</tr>
<tr>
<td>Hewlett-Packard 2382A/2622A</td>
<td>30</td>
</tr>
<tr>
<td>Hewlett-Packard 2621A</td>
<td>14</td>
</tr>
<tr>
<td>IBM 3101 Model 20, BLOCK mode</td>
<td>11</td>
</tr>
<tr>
<td>IBM 3101 Model 10/20, CHAR mode</td>
<td>26#</td>
</tr>
<tr>
<td>IBM PC running AZPC2 software, available from NCAR</td>
<td>38</td>
</tr>
<tr>
<td>Infotron 100</td>
<td>28</td>
</tr>
<tr>
<td>Kimtron ABM-85</td>
<td>22</td>
</tr>
<tr>
<td>Lanpar VISION - see Digital VT100</td>
<td></td>
</tr>
<tr>
<td>Lear Siegler ADMA</td>
<td>17</td>
</tr>
<tr>
<td>Lear Siegler ADMA+/ADM5</td>
<td>20</td>
</tr>
<tr>
<td>Lear Siegler ADMA+/ADM5 w/ RG512 graphics by Digital Eng.</td>
<td>20</td>
</tr>
</tbody>
</table>

# Full duplex terminal; requires diode switch or modem with "local echo" feature, unless used through UNINET.

## Manufacturer's enhancement required.
### Table 4.1 (cont.)

<table>
<thead>
<tr>
<th>Terminal-Type</th>
<th>SIM278 ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lear Siegler ADM42</td>
<td>15</td>
</tr>
<tr>
<td>Microterm ACT5A, native mode</td>
<td>35</td>
</tr>
<tr>
<td>Northern Telecom Displayphone, ANSI/VT100 mode</td>
<td>27</td>
</tr>
<tr>
<td>Northern Telecom Displayphone, IBM/3101 mode</td>
<td>13</td>
</tr>
<tr>
<td>Soroc Challenger 530</td>
<td>44</td>
</tr>
<tr>
<td>Teleray 10M</td>
<td>19</td>
</tr>
<tr>
<td>Teleray 16M</td>
<td>40</td>
</tr>
<tr>
<td>TeleVideo 910-Plus, 912/920 mode</td>
<td>18</td>
</tr>
<tr>
<td>TeleVideo 920</td>
<td>3</td>
</tr>
<tr>
<td>TeleVideo 925</td>
<td>4</td>
</tr>
<tr>
<td>TeleVideo 925/950, Formatted</td>
<td>23</td>
</tr>
<tr>
<td>TeleVideo 950</td>
<td>5</td>
</tr>
<tr>
<td>TeleVideo 970</td>
<td>42</td>
</tr>
<tr>
<td>Tymshare SCANSSET 415</td>
<td>24</td>
</tr>
<tr>
<td>Visual 300</td>
<td>41</td>
</tr>
<tr>
<td>VT100 - see Digital</td>
<td></td>
</tr>
<tr>
<td>Volker-Craig VC404</td>
<td>6</td>
</tr>
<tr>
<td>Volker-Craig VC415</td>
<td>7</td>
</tr>
<tr>
<td>Zenith Z19</td>
<td>45</td>
</tr>
</tbody>
</table>
How to Enter SIM3278

You may enter SIM3278 via UNINET or through PACX class i3705. If you enter through the PACX, your terminal must be set for half-duplex (or "local echo") and your terminal parity must be MARK or SPACE. For UNINET access set your terminal to full duplex. Upon receiving the initial UNINET "service:" prompt enter

```
set15:0
```

otherwise the XEDIT prefix area will not work with most terminals. You may still use half-duplex or local-echo with UNINET, but to avoid every character that you enter from appearing twice on your screen you must also enter "set2:0" while in the PAD command mode. The parity setting for UNINET is immaterial. However it is convenient and often necessary to have the ability to send a <BREAK> signal to the host. If your terminal does not have a <BREAK> key, or if the <BREAK> signal is not of the necessary duration to be interpreted by UNINET, or if the signal is not passed on to UNINET but causes some action in your local terminal or PC, you can implement the <BREAK> signal through UNINET by a <CTRL-^> keystroke (or any other keystroke - see Chapter 3, PAD parameter 200). To do this, upon receiving the initial "service:" prompt from UNINET, enter

```
set200:30 <RETURN>
```

Then signon to NCAR with the subsequent "service:" prompt. Upon receiving the prompt:

```
WARNING: U.S. GOVERNMENT PROPERTY, UNAUTHORIZED USE...
```

respond with:

```
DIAL SIM3278 <RETURN>
```

If the response is "restart", press <RETURN> and re-enter the DIAL command. You will then be prompted with the message
Now enter the ID associated with your terminal as listed in Table 4.1, followed by <RETURN>. If your terminal is not listed in Table 4.1, it may have been added after this guide was published. You may enter the single character '?' and then <RETURN> to get a list of all supported terminals and their IDs. If your terminal is not listed, or you wish to escape from the SIM3278 mode, enter the single character 'Q' then <RETURN> and you will receive the message:

DROP FROM SIM3278 xxx
WARNING: U.S. GOVERNMENT PROPERTY ......

at which time you can enter <RETURN>, or, if your access is through UNINET, the <BREAK> signal that you have defined by <CTRL-^> as described above. You will then receive the '.' prompt that will allow you to log on in line mode.

Graphics and SIM3278

At this time, you are not able to view graphics output while connected to SIM3278; however, viewing may be done by entering another mode without breaking your telephone or PACX connection. To do this, enter the command DISC HOLD <RETURN>

Then log back onto class i3705 in the line mode and retrieve your graphics files. You may need the <CTRL-^> keystroke for the <BREAK> signal to get the '.' prompt that allows you to enter the logon sequence. You may return to SIM3278 by again issuing a DISC HOLD command and repeating the DIAL SIM3278 sequence.

Keystroke Definitions For ASCII Terminals

Each terminal listed above will have different keystroke sequences to implement the PF, PA, and other control keys that are used in the full-screen mode. You will need to know these keystroke definitions before you make efficient use of SIM3278. To do this enter the SIM3278 command

#HELP <RETURN>

The needed keystroke sequences will be listed.
Unless your IBM PC can emulate one of the ASCII terminals listed in Table 4.1, you must use a software package called AZPC2 (or SIMPC) which runs on an IBM PC with at least 128K of memory. The floppy diskette and documentation for AZPC2 or SIMPC is available for a nominal fee from the Documentation Specialist (see Table 1.4). Besides permitting your IBM PC to interface with SIM3278, a major feature of this package is the inclusion of two IBM 4341 commands that permit easy file transfers between the IBM PC and the IBM 4341 host system. The file transfer system is not error correcting. There is also a facility for automatic dialing if you have a Hayes Smartmodem. If you enter through UNINET, you should change the duplex setting from HALF to FULL when you are initially prompted with a menu.

To utilize the file transfer features of SIMWARE on your IBM PC you must access the SIMWARE disk by invoking the IBM 4341 exec

```
GETDISK SIM3278 <RETURN>
```

You will then receive a request for the read password. Respond with "READ".

### Accessing SIM3278 Through UNINET

Using SIM3278 with UNINET should pose no special problems. SIMWARE was designed with public packet switching networks in mind. When using an IBM PC, control sequences (keystrokes of the form <CTRL-x> and the PF keys) are appended with carriage returns so that packets are sent whenever these keys are struck. Other terminals require carriage returns to terminate control sequences. Some minor performance degradation in features such as character insertion while editing may occur and the results will be delayed rather than immediate, since UNINET will not send a packet until <RETURN> is entered. As mentioned earlier, when the the initial UNINET "service:" prompt is received, you should enter "set200:30" so that the keystroke <CTRL-^> acts as a <BREAK> signal to the IBM 4341. This is often a useful method of causing the system to produce a "." prompt so that commands may be issued while still in the line mode.

### PC-TALK

PC-TALK is a public domain software package for the IBM PC that only works through PACX class i3705 or through UNINET and supports file transfer to and from the IBM 4341 host. This file transfer system is not error correcting. PC-TALK does have an error correcting file transfer facility for use between two personal computers running PC-TALK. The floppy diskette and documentation for PC-TALK are available from FREEWARE, P.O. Box 862, Tiburon, CA 94920, for a modest fee. However PC-TALK is
not a licensed product and can be copied from anyone who has the diskette. Special software to support file transfers to and from the IBM 4341 system and an IBM PC have been implemented on the IBM 4341 computers; details are included below. If you already have the PC-TALK software you should configure your communications table as follows:

```
<table>
<thead>
<tr>
<th></th>
<th>Data Bits</th>
<th>Stop Bit</th>
<th>Parity</th>
<th>Echo</th>
<th>Stripped</th>
<th>Stripped</th>
<th>Stripped</th>
<th>Pacing Character</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>017</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>019</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>127</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
```

**PC-TALK Through UNINET**

PC-TALK file transfers pose no problem through UNINET, but the default PAD profile should be changed so that UNINET does not append null characters to carriage returns and line feeds sent by the IBM 4341. To change to the proper profile, respond to the initial UNINET "service:" prompt with

```
prof3 <RETURN>
```

At the next "service:" prompt you can sign on to NCAR. You may, of course, invoke this profile at any time by first entering the PAD command mode and then issuing the prof3 command.

**PC-TALK: IBM PC to NCAR File Transfer**

To move a file from your IBM PC to the IBM 4341 at NCAR while using the PC-TALK software, enter the command

```
PCTALKUP <filename> <filetype> <filemode> <RETURN>
```

You will then be prompted by the message

```
ENTER ALT-T TO BEGIN TRANSMISSION OF FILE
ENTER 'ENTER' TWICE WHEN FILE IS DONE
DMSM706I TERM INPUT-TYPE NULL LINE FOR END OF DATA
```

You should respond with

```
<ALT-T>
```
The system then replies with

```
== TRANSMIT A FILE ==
specification:
```

to which you type

```
local-filename <RETURN>
```

where `local-filename` is the file on your IBM PC. The last line containing specification: `local-filename` should then reappear on your screen with the `local-filename` appended with the three characters "=" indicating that the "." pacing character is in effect. If this does not appear you must change your program default parameters to include this pacing parameter. Then to start the actual data transmission, enter

```
<RETURN>
```

The file transfer then takes place and upon completion the IBM PC replies with

```
=== END OF FILE ===
```

You should then type

```
<RETURN> <RETURN>
```

If you do not get the "." prompt to allow you to enter commands to the IBM 4341, type

```
<CTRL-END>
```
PC-TALK: NCAR to IBM PC file Transfer

To move a file from the IBM 4341 to your IBM PC while using the PC-TALK software, issue the IBM 4341 command

```
PCTALKDN <filename> <filetype> <filemode> <RETURN>
```

You will then be prompted by the message

```
ENTER ALT-R TO BEGIN RECEIVING THE FILE, THEN ENTER WHEN THE FILE HAS BEEN RECEIVED, ENTER ALT-R AND ENTER AGAIN
```

You should respond with

```
<ALT-R>
```

after which you will get the prompt to enter the file name you want to call the down-loaded file on your IBM PC disk:

```
==== RECEIVE A FILE ====
Specification:
```

Respond with

```
local-filename <RETURN>
```

You will then observe a short period of activity on your disk. Wait until the disk is no longer active; then enter

```
<RETURN>
```

The file transfer will then take place and can be observed on your screen. When the file is transfered the prompt R;T=... will appear. At that time terminate the transmission by entering

```
<ALT-R>
```
You should then get the message

```
=== RECEIPT OF FILE local-filename TERMINATED ===
```

NOTE: The file will contain the CMS prompt R;T=... as its last line. As usual, a <CTRL-END> will get you into the CMS command mode.

YTERM

YTERM is a software package for the IBM PC and its close imitators that may be used to access the IBM 4341 only through PACX class io. YTERM cannot be used through UNINET. YTERM may also be migrated to other 8088 or 8086 based machines that run MS-DOS or Single User CP/M-86 operating systems, but knowledge of 8086 architecture and assembly language is required for a successful migration. Besides providing terminal emulation and "programmer tools", YTERM provides full error-correcting file transfers to and from the IBM 4341. Since YTERM entry to the IBM 4341 is through PACX class io, the terminal parity must be set to SPACE.

Unlike the SIMWARE and PC-TALK packages mentioned above, the NCAR Scientific Computing Division does not distribute YTERM. The YTERM software and documentation are available from the Yale University Computer Center, 175 Whitney Avenue, P.O. Box 2112, Yale Station, New Haven, CT 06520.

FILE TRANSFERS:

UPLOADING AND DOWNLOADING

The AZPC2, SIMPC, PCTALK, and YTERM software systems mentioned above all have support software on the IBM 4341 that permit you to transfer files to and from the IBM 4341 (known as uploading and downloading) with an IBM PC. However, it is possible for you to write communications software for your computer system that will upload your local files to the IBM 4341 with no special support software on the IBM 4341. This will usually require an intimate knowledge of the software on your computer. The key to this process is the IBM 4341 line mode editor XEDIT. Since this editor accepts input only one line at a time (a line is a string of characters followed by a carriage return) and only after it has issued a "." prompt, the procedure that you would follow in constructing uploading software would be as follows:

1. Invoke XEDIT on the IBM 4341.
2. Enter the INPUT mode.
3. Send one line of your file.
4. Wait for the "." prompt. (Actually the prompt string consists of six characters, CR (carriage return), LF (line feed), DC3 (device control 3), . (period), DEL (delete), and lastly, DC1 (device control 1). The decimal values for these characters may be found in Table 3.2).

5. Repeat the third and fourth step above until file transfer is complete.

6. Issue the FILE command to close the file.

Since this process must use the line editor, entry must be through UNINET or the PACX class i3705.

Downloading can be accomplished in line mode by issuing the TYPE command and specifying the desired file. The file will then be sent to your terminal or computer. However, you must be aware that each line is prepended with the string of four control characters CR (carriage return), LF (line feed), DC3 (device control 3), DEL (delete). Furthermore, if you are connected through UNINET with the default profile, each carriage return and line feed sent to the terminal is followed by six null characters (all zero bits).

Graphics file transfer from NCAR to the local user's terminal is possible through UNINET or through direct phone connection through all PACX classes. Graphics file transmission at this time is not possible while connected through SIM3278. A wide class of graphics terminals will soon be supported by NCAR for display of metacode plot files created on the NCAR mainframes. The metacode file transfer is initiated through the PLT EXEC or the new PLTNEW EXEC. (See The NCAR IBM 4341 Gateway Computers, NCAR/TN-234+IA and the April 1985 RECORD)

UNINET users receiving graphics metacode should set their X.3 PAD parameters to guarantee transparent pass-through of the metacode file. There are two ways to do this. On receiving the service: prompt on initial connection to UNINET, or after a <CTRL-P> sequence to get into the PAD command mode (see Chapter 3), issue either

```
prof <RETURN>
```
or,

```
set6:0, set9:0, set14:0 <RETURN>
```

The first of these commands has the disadvantage that the local character echo from the PAD is disabled. It is also impossible to return to the PAD command mode after this command has been issued.
A data communications path can be established between two personal computers using the PACX. The PACX thus performs the function of a "null modem". The service is implemented by the PACX classes pc1, pc2, and pc3. The following requirements must be met in order to effect the communication:

* Both computers must be connected to the same PACX class pcx and the two connections must be made within ten minutes of each other to avoid the PACX time-out feature.

* The terminal profiles of each computer must be the same, i.e., the parity setting, the number of data bits, baud rate, etc., must be identical.

* Both computers must have file transfer packages to communicate files.

WARNING: If two other users are trying to connect at the same time to the same PACX class pcx as you and the one you are trying to communicate with, it is possible that you may make a connection with the wrong person. For this reason it is advisable for each party in a connection to send a message of identification. Access to this feature through UNINET is not yet possible.
CHAPTER 5: RSCS: THE REMOTE SPOOLING COMMUNICATIONS SUBSYSTEM

INTRODUCTION

The Remote Spooling Communication Subsystem (RSCS) is a single purpose operating system for a virtual machine on the IBM 4341 computers that is dedicated to accepting your files and transferring them to the destination you specify. Typical destinations include the CRAY,CA and CRAY,C1 computers or the reader of a virtual machine.

The most common use of RSCS is as a store-and-forward data communications system for remote batch job entry to one of the two NCAR CRAY-1 computers. Combining the use of RSCS and a personal virtual machine on the IBM 4341 system provides a powerful tool for interactive editing, job entry to a CRAY-1 computer, interactive perusal of results, and file routing to your remote printer.

SUPPORTED PROTOCOLS AND LINE SPEEDS

RSCS is a batch entry system that supports synchronous line transmission only. The dial-up line speeds and protocols supported are shown in Table 5.1. In addition, leased-line connections of up to 56 kilobits per second can be supported with any of the protocols listed. RSCS is not accessible through UNINET.

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Speed (bps)</th>
<th>Area (303)</th>
<th>Line No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UT200</td>
<td>4800</td>
<td>494-6665</td>
<td>03A</td>
</tr>
<tr>
<td></td>
<td>4800</td>
<td>494-6668</td>
<td>039</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>499-6467</td>
<td>038</td>
</tr>
<tr>
<td>2780/3780</td>
<td>4800</td>
<td>494-0636</td>
<td>029</td>
</tr>
<tr>
<td></td>
<td>4800</td>
<td>494-4022</td>
<td>02D</td>
</tr>
<tr>
<td>HASP</td>
<td>4800</td>
<td>494-0618</td>
<td>028</td>
</tr>
<tr>
<td></td>
<td>4800</td>
<td>494-6662</td>
<td>02B</td>
</tr>
<tr>
<td></td>
<td>2400</td>
<td>494-6667</td>
<td>02A</td>
</tr>
<tr>
<td></td>
<td>2000</td>
<td>494-6111</td>
<td>02C</td>
</tr>
</tbody>
</table>

Note: UT200 refers to Control Data Corporation's User Terminal 200 protocol described in CONTROL DATA 200 USER TERMINAL Publication No. 82128100.

2780/3780 refers to IBM's bisynchronous protocols as described in the IBM publications IBM Systems Reference Library: General Information-Binary Synchronous Communications, GA27-3004-2; and Component Information for the IBM 3780 Data Communication Terminal, GA27-3063-3.
HASP refers to the IBM bisynch Multi-Leaving protocol described in the IBM publication IBM VM/370: RSCS Networking Logic, LY24-5203.

Once it has been determined that you have the proper terminal hardware and software to use RSCS, you will need to request an "RSCS signon" from SCD's Data Communications Group. Contact Bill Ragin at (303) 497-1258 for help.

You are then assigned an RSCS site identification, referred to in this guide as a linkid, and a site profile is created that is tailored to your particular needs.

To assist you in routing jobs to and from your site and to allow you access to status information about jobs and news items from NCAR, RSCS has been modified by SCD to allow added commands. In addition to routing and status commands, other commands described in the "NCAR ADDED COMMANDS" section of Chapter 6 in this guide are also available. Some of the commands are specific to a particular protocol and are noted as such. The standard IBM RSCS commands are also available and are described in the section "RSCS STANDARD COMMANDS" in Chapter 6. A detailed description of these IBM RSCS commands along with a description of system messages is found in the IBM publication: IBM Virtual Machine/System Product: Remote Spooling Communications Subsystem Networking Program Reference and Operations Manual, SH24-5005.

1. Check Table 5.1 for the proper telephone number for your protocol and line speed.

2. After the carrier tone is detected, enter the proper SIGNON record for your protocol as described in the SIGNON Record section below. RSCS will not prompt you for the SIGNON record unless you are configured for use of the UT200 protocol. The SIGNON record must be the first record RSCS receives and must be correct; otherwise you must hang up and re-dial.

3. When the SIGNON record is accepted, RSCS will reply with the message:

```
DMTxxx905I SIGNON OF LINK linkid COMPLETE
```

4. The system is now ready to accept commands.

April 1985
SIGNING ONTO RSCS

Only dial-up users need to sign onto RSCS; users connected by leased lines are "automatically" signed on. Signon procedures vary slightly for each protocol. In the following SIGNON records, described in the SIGNON Record section below,

SIGNON or /* SIGNON must begin in column 1.

linkid is your RSCS site id.

rscupwd is your RSCS optional user password.

The SIGNON record allows you to control certain parameters that tailor your linkid to your particular needs. The SIGNON parameters are specified in a site profile when the site linkid is created, but they can be overridden with the SIGNON command. The parameters can also be respecified in the site profile by contacting the General Liaison listed in Table 1.4. The current SIGNON parameter configuration can be determined by the DIS,SIT command described below in the "NCAR ADDED COMMANDS" section. The optional parameters are defined below. In the SIGNON record, if a parameter has a default it is underlined. The optional parameters must precede the PWD parameter in the SIGNON record.

SIGNON Optional Parameters

SINM. Place remote station in single output mode. This causes all print output to be held until solicited with the WRI,PRI command.

MULM Place the terminal in multiple output mode. Any output will be immediately printed or queued for the printer upon receipt in the RSCS output queue.

P120 Width of print line is 120 columns.

P132 Width of print line is 132 columns.

CMPR Blank compression in effect for 3780 protocol.

CRT8 Dimensions of terminal display are 80 columns by 13 lines.

CRT5 Dimensions of terminal display are 50 columns by 20 lines.

HDRY Print a one page separator between output files.
Do not print a one page separator.

Print a one line trailer.

Print a five line trailer. If neither TRA1 or TRA5 is specified, then no trailer is printed.

Configure linkid to contain a virtual punch unit.

No virtual punch unit included.

Transparent mode (binary data mode) active.

Transparent mode inactive.

SIGNON Record For HASP

/*SIGNON linkid [optional parameters] [PWD=rscupwd]

optional-parameters:
[SINM] [HDRY] [TRA1]
[MULM] [HDRN] [TRA5]

SIGNON Record For 2780/3780

SIGNON linkid [optional parameters] [PWD=rscupwd]

optional-parameters
[SINM] [P120] [HDRY] [TRA1] [PCHY] [TRSY] [CPR]
[MULM] [P132] [HDRN] [TRA5] [PCHN] [TRSN]

SIGNON Record For UI200

SIGNON linkid [optional parameters] [PWD=rscupwd]

optional-parameters:
[SINM] [P120] [CRI8] [HDRY] [TRA1] [PCHY]
[MULM] [P132] [CRI5] [HDRN] [TRA5] [PCHN]
Job files submitted to one of the CRAY-1 computers (CRAY,CL or CRAY,CA) must contain a first record which specifies:

<table>
<thead>
<tr>
<th>CLJOB</th>
<th>CAJOB</th>
</tr>
</thead>
</table>

depending upon whether the job is to be run on the CRAY,CL or CRAY,CA machine.

Note: For UT200 protocol users, the REA,RDR command must precede the job file and the job file must have *END as the last record.

FOR UT200 USERS ONLY, once the job file has completed its entry, RSCS responds with the message:

```
DMTUT2966I LINK linkid CARD FILE SENT TO NCARIO RSCSNET
```

After further processing by the IBM 4341 system, a message detailing the sequence number assigned to the job file is returned:

```
DMTxxxx171I FROM NCARIO RSCSNET:
SEQUENCE NUMBER ASSIGNED IS IOnnnn
```

where "nnnn" is a four-digit number.

When the job file is successfully transferred to the target CRAY-1, the following message is returned:

```
DMTxxxx171I FROM NCARIO RSCSNET:
4341 JOBON Cx WORKED.
CODE 0. mm/dd/yy hh/mm/ss IOnnnn
```

where "x" is A or L for the CRAY,CA or CRAY,CL machines respectively, and "mm/dd/yy hh/mm/ss" is the date and time and "nnnn" is the sequence number of the job.

Note: RSCS does not check the validity of the job file sent to the CRAY-1 computers. In other words, RSCS does not check for a valid scientist number, project number, or valid syntax in the JOB record. Any file following a CLJOB or CAJOB record is sent to the designated CRAY-1 machine without modification or error-checking. If the CRAY-1 computer finds a syntax error in the JOB record, the job will be rejected and the file will be lost.
Job files must also contain a DISPOSE record directing the job output back to an RSCS output queue, a virtual machine, or some other destination. The basic form of a job file, then, is:

```
CxJOB
JOB,JN=jobname,US=sci\#proj\.
DISPOSE,DN=$OUT,DEFER,MF=mf,DC=dc,[TEXT=`...options`...],[TID=tid].

.... Program File and other JCL ....

*END (for UT200 protocol only)
```

CxJOB is either CLJOB or CAJOB depending upon whether the file is to be sent to the CRAY,Cl or the CRAY,CA computer.

### Disposing Job Output

The DISPOSE record specifies where you want the output of the job to go. Typical variations are described below. For more detailed information about the DISPOSE record and other CRAY-1 JCL, refer to *The CRAY-1 Computers: A Guide to Supercomputing at NCAR* (NCAR/TN-226+1A).

### Disposing to the Local NCAR Printer for Mailing

Output disposed to the NCAR printer will automatically be tagged with the site mailing code that is associated with the scientist number of the job. This tag allows Operations personnel to affix the proper shipping label to the output. If you change your work site and you want your output mailed to your new site, you must notify the Mailing List Change consultant (see Table 1.4, chapter 1 of this guide) to update your site mailing code. To have your output printed at NCAR and mailed to you, the DISPOSE record syntax should be:

```
DISPOSE,DN=$OUT,MF=IO,DC=PR,DEFER.
```

### Disposing to the Output Queue of Your Remote Site

The DISPOSE record syntax is shown below. The TEXT parameter directs CMS to send your file to the RSCS output queue associated with your (or someone else’s) linkid.

```
DISPOSE,DN=$OUT,MF=IO,DC=RS,DEFER,^
TEXT=`LOC=linkid,[DIST=identifier]`.
```

If the "DIST=" parameter is included, identifier will be displayed when a DIS,SIT command is issued. This will assist you in uniquely identifying your output file from others in the output queue.

April 1985
Disposing to Your Virtual Machine
If in addition to having a batch terminal for entry to RSCS, you also have an interactive terminal for entry to CMS, you may want to have jobs disposed to your virtual machine so that you may peruse, edit, or print them, or possibly transfer them to the output queue of your RSCS linkid. To dispose a job to your virtual machine, use:

```
DISPOSE,DN=$OUT,MF=IO,DEFER.
```

Disposing to Any Virtual Machine
You are not restricted to disposing output to your own virtual machine. Output can be directed to any virtual machine userid using:

```
DISPOSE,DN=$OUT,DEFER,MF=IO,TEXT="USER=userid".
```

Disposing Metacode
Metacode plot files cannot be disposed directly through RSCS as they are created by the CRAY-1 machines. The 1440 byte plot records must first be broken into 80 byte records. This new 80 byte record file is known by the name $PLTC. The original $PLT file remains intact. You must concatenate the 80 byte records into 1440 byte records to use your local metacode translator. The sequence to split up and dispose the metacode file is:

```
PLTCONV.
DISPOSE,DN=$PLTC,DF=BI,DEFER,
TEXT="LOC=linkid,[DIST=identifier]".
```

Note that the DISPOSE record syntax is similar to that for the $OUT file with the file name changed to $PLTC and the data format, DF, changed to binary. The $PLTC file is a PUNCH file. Since $PLTC files are binary they cannot be sent to a UT200 site. Also $PLTC files cannot be routed from a virtual machine to RSCS.

Making an Error in the DISPOSE Record
If the CRAY-1 computer finds a syntax error in the DISPOSE record containing the $OUT parameter, the entire DISPOSE record is rejected. Any information created in the $OUT file is sent to the virtual reader of the virtual machine associated with the sci# appearing in the JOB record. If there is no virtual machine associated with the sci# the $OUT file is printed on the NCAR printer and mailed to you.
Files can be sent from an RSCS remote site to the reader of a virtual machine on either IBM 4341. However, it is not possible to append a file name or file type to a transferred file. Furthermore, a fixed length record format and a record length of 80 bytes will be assigned to the file by RSCS. The file to be sent must have as its first record:

ID NCARIx userid

where x is 0 or A and userid is the virtual machine id of the user to receive the file.

FOR UT200 USERS ONLY, successful transfer is indicated by the following RSCS response:

DMTUT2966I LINK linkid CARD FILE SENT TO NCARIx userid

with no further messages.

For HASP users and those using 2780/3780 protocols, there is no response. A failure mode elicits another message whose content depends on the type of failure.

Note: Files moved using the UT200 protocol must have as the last record *END.

Messages can be sent from RSCS to any virtual machine that is logged on. The message format is:

MSG NCARIO userid ...message text...

where userid is the virtual machine logon name of the recipient. CP1 is the userid for messages to the NCAR operations personnel. Messages sent with this command will be displayed immediately on the recipient's terminal.

Messages using this command cannot be sent to a userid that is not logged on. To send a message to a userid that is not logged on, refer to the above section on sending files to a virtual machine.

There are no acknowledgements from RSCS about the success or failure of the message transfer.
On occasion the NCAR operator may need to send you a message informing you of an event that will affect you as an RSCS user. These messages will appear as spool files in your RSCS output queue. You can identify a spool file as an NCAR operator message by the title OP1MESSG appearing in the file descriptor displayed when a DIS,SIT command is issued (See Chapter 6 for command descriptions).

If, in addition to having an RSCS linkid, you also have a virtual machine userid, while you are logged onto the virtual machine you can interrogate RSCS about its status and the status of jobs in its queues, send messages to RSCS users, and route jobs from the virtual machine to RSCS, among other things.

To do this you must send a message to RSCS of the form:

```
SMSG RSCS ... message text ...
```

where the message text is itself a command to RSCS. The QUERY command allows you to obtain RSCS status information. Particular variations of interest are as follows:

To determine the status of the RSCS ports:

```
SMSG RSCS QUERY SY A
```

To determine the status of your jobs in your RSCS output queue:

```
SMSG RSCS QUERY linkid Q
```

To determine the load in all the RSCS output queues

```
SMSG RSCS QUERY SY Q
```

Refer to the IBM RSCS command QUERY for further options.
Sending A Message
To A Signed-on RSCS Site
You may send a message to any RSCS linkid provided that linkid is signed on. You may use the above SMSG RSCS QUERY SY A command to determine if the linkid is signed on. The command format to send a message to an RSCS linkid is:

SMSG RSCS MSG linkid ... message text...

Routing Files From Your Virtual Machine
The ROUTE EXEC gives you a wide range of options for routing jobs from your virtual reader or disk to RSCS, to another virtual reader, or to the printer.

The format of the ROUTE command is:


"[ ]" indicates optional keywords and parameters.

Parameter Values

file_name is either the file name of the CMS fileid to be routed or, if a reader spool file is to be routed, the new file name assigned to a created CMS file.

file_type is either the file type of the CMS fileid to be routed or, if a reader spool file is to be routed, the new file type assigned to a created CMS file.

file_mode is either the file mode of the CMS fileid to be routed or, if a reader spool file is to be routed, the new file mode assigned to a created CMS file. If the file is to be routed, then any valid file mode letter or an "*" may be used (in which case, minidisks are searched alphabetically). If the file is to be created, then the default value is "A".
destination is a required value specifying where the routed file is to be sent. Acceptable values are USER, SITE, DISK, PRINTER, or TERMINAL. If USER or SITE is specified, then "id" must be specified. If DISK is specified, then "spoolid" must be specified. The DISK option creates a CMS file with a fileid of either "file_name file_type file_mode" (see above) or a form of the reader spool file fileid. If PRINTER or TERMINAL is specified, then either a CMS file or a reader spool file is either printed or displayed on the terminal.

id is the user ID of a user's Virtual Machine. If USER is specified for "destination", the file will be sent to that user's virtual reader. If SITE is specified, then "id" is the RSCS linkid where the file will be sent.

spoolid is the spoolid of a file in your virtual reader to be routed.

hold_spool_file is an option to retain or not to retain the spool file in your reader. Acceptable values are YES or NO. If the value is NO, the file will be deleted from your spool file. The default value is YES.

Examples:

Send the CMS file MYJOB OUTPUT A to an RSCS linkid of COJEFF:

ROUTE MYJOB OUTPUT A SITE COJEFF

Print a reader spool file with SPOOLID of 1234 and do not retain it in your reader:

ROUTE TO=PRINTER SPOOLID=1234 NO
Send a reader spool file with SPOOLID of 1234 to the virtual reader with a user ID of MORRIS:

\[ \text{ROUTE TO=USER MORRIS 1234} \]

Create a CMS file with fileid of MYFILE MYTYPE A from reader spool file with SPOOLID 1234 and hold the file in your reader:

\[ \text{ROUTE MYFILE MYTYPE TO=DISK SPOOLID=1234} \]

Usage Notes:
You may determine if there have been any updates to the command by typing:

\[ \text{HELP ROUTE or ROUTE ?} \]

which will also give you information on how to use the command.
INTRODUCTION

The RSCS command language allows you to control a variety of functions from your terminal and obtain status information about your job and the RSCS system. NCAR's implementation of RSCS contains additional locally defined commands as well as the standard IBM RSCS commands. Some of the NCAR-implemented commands are protocol-specific and are noted as such. For most users, the NCAR-implemented commands will suffice, since several of these commands invoke IBM RSCS commands. In fact, some of the IBM RSCS commands require advanced knowledge of IBM file structure, so the NCAR commands facilitate easy use of RSCS.

Minimal Command Set

Once you are able to sign onto RSCS, you can operate the system and perform the most basic functions of sending and receiving a job file by using the following minimal command set:

- **DIS,SIT** Display the RSCS output queue status to obtain spool file numbers needed to retrieve job file.
- **WRI,PRI** Initiate the transfer of a designated RSCS output spool file to the remote terminal.
- **END** Terminate an RSCS session.
- **REA,RDR** Initiate the transfer of a file from the remote site to NCAR (for UT200 users only - other protocols simply send file without a prologue).
The following table summarizes the commands and their functions. Detailed syntax information for these commands is included in the following sections.

### Table 6.1
**RSCS Commands Summary**

<table>
<thead>
<tr>
<th>Command Name</th>
<th>Function</th>
<th>Command Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACKSPAC</td>
<td>Restart or reposition in a backward direction the file currently being transmitted</td>
<td>IBM</td>
</tr>
<tr>
<td>CHANGE</td>
<td>Alter one or more attributes of a file.</td>
<td>IBM</td>
</tr>
<tr>
<td>CLOSE</td>
<td>Requeue files in send or receive state (NCAR operator command only).</td>
<td>IBM</td>
</tr>
<tr>
<td>DIS,Cl</td>
<td>Display CRAY,Cl job status.</td>
<td>NCAR</td>
</tr>
<tr>
<td>DIS,CA</td>
<td>Display CRAY,CA job status.</td>
<td>NCAR</td>
</tr>
<tr>
<td>DIS,HEL</td>
<td>Display IBM RSCS command HELP file.</td>
<td>NCAR</td>
</tr>
<tr>
<td>DIS,NEW</td>
<td>Display current Daily Bulletin.</td>
<td>NCAR</td>
</tr>
<tr>
<td>DIS,SIT</td>
<td>Display RSCS output queue status.</td>
<td>NCAR</td>
</tr>
<tr>
<td>DRAIN</td>
<td>Stop file transfer and deactivate an active communication link.</td>
<td>IBM</td>
</tr>
<tr>
<td>DRO,RDR</td>
<td>Interrupt file transfer to NCAR for UT200.</td>
<td>NCAR</td>
</tr>
<tr>
<td>END</td>
<td>Terminate an RSCS session.</td>
<td>NCAR</td>
</tr>
<tr>
<td>FLUSH</td>
<td>Discontinue processing of the currently active file.</td>
<td>IBM</td>
</tr>
<tr>
<td>FREE</td>
<td>Resume transmission on a communication link previously in HOLD status.</td>
<td>IBM</td>
</tr>
<tr>
<td>FWDSPACE</td>
<td>Reposition in a forward direction the file currently being transmitted.</td>
<td>IBM</td>
</tr>
<tr>
<td>Command Name</td>
<td>Function</td>
<td>Command Origin</td>
</tr>
<tr>
<td>--------------</td>
<td>--------------------------------------------------------------------------</td>
<td>----------------</td>
</tr>
<tr>
<td>HDR</td>
<td>Add a header file to output files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>HO</td>
<td>Suspend file transmission without deactivating the link.</td>
<td>IBM</td>
</tr>
<tr>
<td>HOL</td>
<td>Suspend receipt or transmission of files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>MSG</td>
<td>Send a message line to a user's console.</td>
<td>IBM</td>
</tr>
<tr>
<td>MUL</td>
<td>Request that files be transmitted on the link when they arrive in the output queue.</td>
<td>NCAR</td>
</tr>
<tr>
<td>NOHDR</td>
<td>Do not add a header file to output files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>NOTRA</td>
<td>Discontinue appending trailer records.</td>
<td>NCAR</td>
</tr>
<tr>
<td>ORDER</td>
<td>Reorder files in the output queue.</td>
<td>IBM</td>
</tr>
<tr>
<td>PURGE</td>
<td>Remove and discard all or specified inactive files.</td>
<td>IBM</td>
</tr>
<tr>
<td>QUERY</td>
<td>Request system information for a link, a file, or the system in general.</td>
<td>IBM</td>
</tr>
<tr>
<td>RDY</td>
<td>Activate receipt or transmission of files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>REA,RDR</td>
<td>Initiate file transfer to NCAR for UT200.</td>
<td>NCAR</td>
</tr>
<tr>
<td>REW,PRI</td>
<td>Position file being transmitted to beginning of file.</td>
<td>NCAR</td>
</tr>
<tr>
<td>SIN</td>
<td>Require that output queue files be solicited for transmission.</td>
<td>NCAR</td>
</tr>
<tr>
<td>START</td>
<td>Start file transmission for designated class of files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>TRA</td>
<td>Append trailer records to output files.</td>
<td>NCAR</td>
</tr>
<tr>
<td>TRANSFER</td>
<td>Move file from one RSCS linkid to another (NCAR operator command only).</td>
<td>IBM</td>
</tr>
<tr>
<td>WRI,PRI</td>
<td>Solicit transfer of an RSCS output queue file.</td>
<td>NCAR</td>
</tr>
</tbody>
</table>
NOTATIONAL
CONVENTIONS

The following notation is used to define the command syntax in this chapter:

1. Truncations and abbreviations of commands:

   Where truncation of a command name is permitted, the shortest acceptable version of the command is represented by uppercase letters. Operands and options are specified in the same manner. Where truncation is permitted, the shortest acceptable version of the operand or option is represented by uppercase letters in the command format box. If no minimum truncation is noted, the entire word must be entered (indicated by all capital letters).

2. The following symbols define the command format and should never be typed when the actual command is entered:

   underscore _   brackets [ ]
   braces {}     ellipsis ...

3. Uppercase letters and words, and the following symbols, should be entered as specified in the format box:

   asterisk *   parentheses ()
   comma ,      period .
   hyphen -     colon :
   equal sign =

4. Lowercase letters, words, and symbols in the command format box represent variables for which specific information should be substituted.

5. Choices are represented in the command format boxes by stacking:

   A
   B
   C
6. An underscore indicates an assumed (default) option. If an underscored choice is selected, it need not be specified when the command is entered. For example:

   A
   B
   C

indicates that A, B, or C may be selected. If B is selected, it need not be specified. B is assumed if nothing is specified.

7. The use of brackets denotes choices, one or more of which may be selected. For example:

   A
   [B]
   [C]

indicates that you must specify A, and that you may specify either, both, or neither B nor C.

8. The use of braces with options denotes choices, one of which must be selected. For example {A|B|C} or:

   [A]
   <B>
   [C]

indicates that you must specify either A, or B, or C.

9. The use of brackets with options denotes choices, one of which may be selected. For example, [A|B|C] or:

   [A]
   [B]
   [C]

indicates that you may enter A, B, or C, or you may omit the field.

10. An ellipsis indicates that the preceding item or group of items may be repeated more than once in succession. For example, (options ...) indicates that more than one option may be coded within the parentheses.

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6-5

RSCS COMMANDS
The terse forms of command responses are shown following each command. While these are usually sufficient to diagnose problems, it may be necessary to refer to the verbose explanations of these commands given in Appendix B of IBM Virtual Machine/System Product: Remote Spooling Communications Subsystem Networking Program and Operations Manual, SH24-5005. Portions of the following sections have been taken from this document.

**DESCRIPTION OF TERMS**

The following terms are used in the definitions of the commands in the following sections:

- **link**: The transmission path between the NCAR RSCS virtual machine and a remote terminal system. A link is active when the remote terminal has signed on to RSCS.

- **active file**: A file being transmitted via the link.

- **inactive file**: A file queued for transmission via the link.

- **spoolid**: A four-digit number assigned to identify queued files.

- **userid**: A logon code for an interactive virtual machine.

- **line driver**: RSCS software that services a particular protocol. There are three line driver identifiers:

  - SML - for HASP
  - UT2 - for UT200
  - NPT - for 2780/3780

- **NCAR-ADDED COMMANDS**: A description of the commands that NCAR has added to RSCS follows. Some of these commands directly invoke IBM RSCS standard commands but have been added to the command repertoire to assist users who are converting to RSCS from the MDDCOMP.
DIS,Cx Where x is 1 or A. Display status of jobs or subset of jobs on the CRAY,C1 or CRAY,CA.

\[
\begin{array}{l}
\text{DIS,<C1> | [ identifier1 identifier2 ... ]} \\
\text{[CA]}
\end{array}
\]

identifier specifies character string(s) that can be used to identify your job or jobs. This is limited to the sequence number assigned or the logon name of the virtual machine associated with your scientist number (or if you do not have a virtual machine, the user identification associated with your scientist number). When the optional parameters are used, only lines containing these strings are displayed. Omission of the parameters gives a display of all jobs on the designated CRAY-1 computer.

Responses:

DMTxxx980I CRAYCx JOB STATUS FROM mm/dd/yy hh:mm:ss
DMTxxx982I JOB PGMR CPU JOB
DMTxxx983I IDENT NAME LEFT MEM PRI STATUS
DMTxxx984I
DMTxxx981I seq name time mem prior status text
DMTxxx204E INVALID KEYWORD keyword

Explanation:
The variables of message DMTxxx981I are defined as follows:

seq - the sequence number assigned to your job and returned to you upon successful submission.

name - the logon ID of the virtual machine associated with your scientist number, or, if you have no virtual machine, your user ID.

time - the CPU time remaining for the job, in seconds.

mem - the number of 512K words of memory used.

prior - the relative priority of the job.

status text - description of the state the job is in currently.
**DIS,NEW** Display the current Daily Bulletin.

**DIS,NEW**

Responses:

DMTxxx981I ...news file text...
DMTxxx204E INVALID KEYWORD keyword

**DIS,HEL** Display a HELP file for the IBM RSCS command.

**DIS,HEL** [command]

command is the IBM RSCS command for which the HELP file is requested. If this parameter is not given, the response is a list of all available IBM RSCS command HELP files.

Responses:

DMTxxx981I ...help file text...
DMTxxx204E INVALID KEYWORD keyword

**DIS,SIT** Display the status and descriptors of files queued on your linkid and number of files being transmitted. See also: IBM RSCS command "QUERY linkid QUEUE." You may also want other detailed information about your files. Refer to the IBM RSCS command "QUERY FILE."

**DIS,SIT**

Responses:

DMTxxx990I SITE linkid PORT nnn RDR {IDLE | ACTV } PRT MODE [SIN | MUL] [HDRY | HDRN] {NTRA | TRA1 | TRA5} class

Refer to the IBM RSCS command "QUERY linkid Q" for format of status display and other responses.
Explanation:

nnn - three-character RSCS port code.
IDLE - the transmission link from the site to NCAR is idle.
ACIV - the transmission link from the site to NCAR is active.
SIN - the output mode is set to single mode.
MUL - the output mode is set to multiple mode.
HDRY - header records are added to output files.
HDRN - no header records added to output files.
NTRA - no trailer records added to output files.
TRA1 - one trailer record added.
TRA5 - five trailer records added.
class - printer class.

WRI,PRI Request transmission of file residing in your RSCS output queue. The file cannot be in HOLD status and its CLASS must match the current printer class.

<table>
<thead>
<tr>
<th>WRI,PRI</th>
<th>spoolid</th>
</tr>
</thead>
</table>

spoolid is the four-digit identifier for the file to be transmitted.

Responses:

DMTxxx970I LINK linkid MISSING PARAMETER
DMTxxx526E FILE spoolid NOT FOUND - NO ACTION TAKEN
DMTxxx204E INVALID KEYWORD keyword

REW,PRI Restart the current file transmission from your RSCS output queue at the beginning of the file. See also: the IBM RSCS command "BACKSPAC".

Responses:

DMTxxx511E NO FILE ACTIVE ON LINK linkid
DMTxxx510I FILE spoolid BACKSPACED
HOL Suspend receipt or transmission of files from the remote site.

PRI suspend receipt of files from NCAR.
RDR suspend transmission of files to NCAR. RDR does not apply to the 2780/3780 protocol.

Responses:
DMTxxx963I LINK linkid READER HELD
DMTxxx611I LINK linkid FILE TRANSMISSION SUSPENDED
DMTxxx612E LINK linkid ALREADY IN HOLD STATUS
DMTxxx204E INVALID KEYWORD keyword

RDY Release previously suspended file activity that was stopped by a "HOL" command.

PRI re-activate receipt of files from NCAR.
RDR reactivate transmission of files to NCAR. RDR does not apply to 2780/3780 protocol. See also: IBM RSCS command "FREE."

Responses:
DMTxxx511E NO FILES ACTIVE ON LINK linkid
DMTxxx204E INVALID KEYWORD keyword
DMTxxx590I LINK linkid RESUMING FILE TRANSFER

SIN Configure your linkid so that transmission of files in your RSCS output queue must be solicited by the WRI,PRI command. See also: SINM parameter on SIGNON record.

Responses:
DMTxxx961I LINK linkid SINGLE OUTPUT MODE SET

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**MUL** Configure your linkid so that files in your RSCS output queue are transmitted to your site as soon as they arrive in the queue. See also: MULM parameter on SIGNON record.

Responses:

**DMTxxx962I** LINK linkid MULTI OUTPUT MODE SET

**NOTRA** Discontinue the addition of trailer record(s) to files transmitted from your RSCS output queue.

Responses:

none - use DIS,SIT to validate.

**TRA** Add a one-line or five-line trailer record to files transmitted from your RSCS output queue.

```
TRA  |   n
```

n is either 1 or 5 depending upon whether a one-line trailer or five-line trailer is desired.

Responses:

**DMTxxx204E** INVALID KEYWORD keyword

note: use DIS,SIT to validate.

**NOHDR** Discontinue the addition of a separator file and header record to files sent from your RSCS output queue.

Responses:

none - use DIS,SIT to validate.
HDR  Add a separator file and header record to files sent from your RSCS output queue.

END  Logoff the remote RSCS session. If leased line, reset all parameters to default status. See also: IBM RSCS command "DRAIN".

REA, RDR  Ready your "reader" to initiate the transfer of a file from your site to NCAR. Note: Applies to UT200 protocol only.

DRO, RDR  Purge the current "reader" input file. Note: Applies to UT200 protocol only.

-----

Responses:
none - issue DIS, SIT to validate.

Responses:
DMTxxx570I LINK linkid NOW SET TO DEACTIVATE

Responses:
DMTUT2965I LINK linkid READY THE CARD READER
DMTxxx204E INVALID KEYWORD keyword

Responses:
DMTxxx511E NO FILES ACTIVE ON LINK linkid

-----

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A detailed description of IBM RSCS commands follows:

**BACKSPAC**

BACKSPAC causes the current file being transmitted to be restarted or repositioned backward.

<table>
<thead>
<tr>
<th>BACKspac</th>
<th>File nnn</th>
</tr>
</thead>
</table>

File specifies that the file being transmitted is to be restarted from the beginning.

nnn is the number of pages (or punch records) to be backspaced. The file must contain page ejects.

**Responses:**

DMTMY204E INVALID KEYWORD keyword
DMTxxx510I FILE spoolid BACKSPACED
DMTxxx511E NO FILE ACTIVE ON LINK linkid

**CHANGE**

CHANGE alters one or more attributes of an inactive file. The link must not be transmitting the file.

<table>
<thead>
<tr>
<th>Change</th>
<th>spoolid (options...*) [ Name fn [ft] ]</th>
</tr>
</thead>
</table>

* At least one of the following options must be selected:

  [ PRIority nn ]
  [ CLass c ]
  [ COpy [*]nnn ]
  [ DIst identifier ]
  [ HOLD|NOHold ]

spoolid is the four-digit identifier for the file to be changed.
PRIority nn  designates the new transmission priority for the file. nn is a decimal number from 0-99 with 0 signifying the highest priority. The files in the queue may be reordered to reflect the new priority.

CLASS c  designates the new class for the file. c is a one-character alphabetic field from A to Z or from 0-9.

COpy [*]nnn  alters the number of copies of the file to be made. The maximum value of nnn (number of copies) is 255. (The WRI, and PRI, commands will only print one of the copies).

DIst identifier  changes the identification code of the specified file. Identification is a one- to eight-character identification to be associated with the file.

HOld  prevents the transmission of the file until it is released by a CHANGE command specifying NOHOLD.

NOHold  releases the specified file that was in HOLD status.

NAme fn [ft]  changes the file name. If specified, this operand must be the last entry in the command line.

Responses:

DMTCMX203E INVALID SPOOL ID spoolid
DMTCMX204E INVALID KEYWORD keyword
DMTCMX205E CONFLICTING KEYWORD keyword
DMTCMX206E INVALID OPTION keyword option
DMTCMX207E CONFLICTING OPTION keyword option
DMTCMX211E INVALID OPTION keyword option1 option2
DMTAXM520I FILE spoolid CHANGED
DMTAXM521I FILE spoolid HELD FOR LINK linkid
DMTAXM522I FILE spoolid RELEASED FOR LINK linkid
DMTAXM523I LINK linkid QUEUE REORDERED
DMTAXM524E FILE spoolid ACTIVE -- NO ACTION TAKEN
This command is used when files are frozen in the send or receive state. You cannot issue this command, but you may request the NCAR RSCS Operator to do so (see below). CLOSE deactivates one or more active files on an inactive link. Active input files are re-queued as inactive files, and later retransmission begins at the start of each input file. Active output files, which are normally incomplete, are discarded.

<table>
<thead>
<tr>
<th>Close</th>
<th>linkid</th>
<th>[ALL]</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>[IN]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[OUT]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>[spoolid]</td>
</tr>
</tbody>
</table>

linkid identifies the link on which the files to be closed are queued. The specified link must be inactive when CLOSE is issued.

ALL specifies that all active input and output files are to be deactivated. Active input files are deactivated and re-queued. Active output files are deactivated and purged.

INput specifies that all active input files for the specified link are to be deactivated and re-queued.

OUTput specifies that all active output files for the specified link are to be deactivated and purged.

spoolid ... specifies particular input file(s) to be deactivated and re-queued.

Note: To make use of the CLOSE facility, you must contact the NCAR RSCS Operator and request that this command be issued from the system console. Specify the exact text of the command in the request. The CLOSE command must be prefaced by SMSG RSCS. For example:

PLEASE ENTER "SMSG RSCS CLOSE linkid"

is a request to reset all the files on the specified linkid to the queued, inactive state.
DRAIN  DRAIN deactivates the link after the file currently being transmitted is completed. The link is deactivated immediately if no file is being transmitted when the DRAIN command is issued. For a leased line link, DRAIN re-initializes the link to its default site profile parameters. If a START command is issued for the link before final file transmission is completed, the link is not deactivated and normal transmission is continued.

Responses:

DMTxxx570I LINK linkid NOW SET TO DEACTIVATE
DMTxxx571E LINK linkid ALREADY SET TO DEACTIVATE

FLUSH  FLUSH halts the transmission of a file. The file is either purged or held, and transmission continues with the next file queued for transmission. If the file is purged, all copies of the file are purged.

Flush | < spoolid > [ ALL ]
      [ * ] [ Hold ]

spoolid  is the four-digit identifier for the file to be flushed. This field is provided to assure that the wrong file is not inadvertently destroyed through a timing error.

*       specifies that the file currently being transmitted is to be flushed.

ALL     specifies that all copies of the file being transmitted are to be deleted. If this option is not specified, only the current copy is deleted and the next copy, if any, is transmitted.

Hold    specifies that the file being transmitted is not to be purged, but rather is to be saved and placed in system hold status. Transmission of the file may be restarted after the file has been taken out of hold status by a CHANGE command.
FREE
FREE resumes file transmission. The hold status for each of the files queued is not affected. FREE has no effect for file transmission which was not suspended by a HOLD command.

FRee |

Responses:
DMTxxx590I LINK linkid RESUMING FILE TRANSFER
DMTxxx591E LINK linkid NOT IN HOLD STATUS

FWDSPACE
FWDSPACE causes the file currently being transmitted to be repositioned forward.

FWdspace | [nnn]

nnn is the number of pages (or punch records) to be forward spaced (if none is specified, a default of 1 is assumed). If nnn is greater than the number of pages (or punch records) remaining to be transmitted, FWDSPACE acts as a FLUSH command. The file must contain page ejects.

Responses:
DMTxxx511E NO FILE ACTIVE ON LINK linkid
DMTxxx600I FILE spoolid FORWARD SPACED
**HO**HO temporarily suspends file transmission without deactivating the link. Transmission is suspended when the currently active file is completed or, optionally, it may be suspended immediately, and later resumed from that point by a FREE command. The HO command does not affect the hold status of any file queued for transmission.

<table>
<thead>
<tr>
<th>HO</th>
<th>[IMMED]</th>
</tr>
</thead>
</table>

**IMMED** specifies that active file transmission, if any, is to be suspended immediately.

**Responses:**

- DMTxxx20E INVALID KEYWORD keyword
- DMTxxx610I LINK linkid TO SUSPEND FILE TRANSMISSION
- DMTxxx611I LINK linkid FILE TRANSMISSION SUSPENDED
- DMTxxx612E LINK linkid ALREADY IN HOLD STATUS

**MSG** MSG causes a line of arbitrary text to be presented to a user or operator as a message.

<table>
<thead>
<tr>
<th>Msg</th>
<th>locid</th>
<th>userid</th>
<th>[msgtext]</th>
</tr>
</thead>
</table>

**locid** is the location identifier of the user ID to receive the specified text line. Valid location identifiers are NCARIO and NCARIA.

**userid** is the virtual machine identifier of a user at that locid. The user ID for the operator is OPl.

**msgtext** is an arbitrary string of up to 120 alphabetic characters composing the message to be sent.

**Responses:**

- DMTCMX310E LOCATION locid IS NOT DEFINED

---

RSCS COMMANDS 6-18 April 1985
ORDER

ORDER causes the output queue to be reordered as specified. The effect of the command is to redefine the order in which particular files are to be transmitted on the link when the MULM parameter is in effect. The specified files are placed at the beginning of the queue in the specified order, and the file priority attribute is automatically set to zero (top priority) for each specified file.

ORDER | spoolid1 [ spoolid2 ... ]

spoolid specifies the affected file(s), and defines the new order in which they are to be queued.

Responses:

DMICMX203E INVALID SPOOL ID spoolid
DMICMX204E INVALID KEYWORD keyword
DMTAXM523I LINK linkid QUEUE REORDERED
DMTAXM524E FILE spoolid ACTIVE -- NO ACTION TAKEN
DMTAXM526E FILE spoolid NOT FOUND -- NO ACTION TAKEN

PURGE

PURGE causes specified files to be removed from the output queue. Any file may be purged, regardless of its status, as long as it has not been selected for transmission. All copies of the file are purged.

PURGE | < ALL >

[ spoolid1 spoolid2 ... ]

ALL specifies that the entire queue of files is to be removed from the system.

spoolid specifies the particular file(s) to be removed from the system.

Responses:

DMICMX203E INVALID SPOOL ID spoolid
DMICMX204E INVALID KEYWORD keyword
DMTAXM524E FILE spoolid ACTIVE -- NO ACTION TAKEN
DMTAXM526E FILE spoolid NOT FOUND -- NO ACTION TAKEN
DMTAXM640I nn FILE(S) PURGED ON LINK linkid
QUERY displays linkid, file, or RSCS status information. The linkid does not have to be your own. Information for any linkid can be requested.

<table>
<thead>
<tr>
<th>Query</th>
<th>linkid [&lt; Files &gt;]</th>
<th>[ Queue ]</th>
<th>[ Sum ]</th>
<th>[ Active ]</th>
<th>[ Files ]</th>
<th>[ Queue ]</th>
<th>[ STAT ]</th>
<th>[ RSCS ]</th>
<th>[ VM ]</th>
</tr>
</thead>
</table>

Only one item (a linkid, a file, or the system) may be queried at any one time, and only one keyword may be specified.

linkid Active requests information pertaining to the active file descriptors for the link specified by linkid. Activity information includes the VM/370 spool file ID, originating VM/370 spool file ID, destination location and user ID, spool file class, file transmission priority, number of file records left to transmit, and total records, of the file currently being transmitted. (See the descriptions of messages DMTCMX656I and DMTCMX665I which follow).

linkid Files requests information pertaining to the file status of the link specified by linkid. File information includes the number of files being transmitted, the number of files being received, the number of files accepted and in the queue, and the number of files pending. (See the description of message DMTCMX654I which follows).

linkid Queue requests a list of brief descriptions of each inactive file queued for transmission, in the current queue order, on the link specified by linkid. Queue information includes the number of files in the queue and the number waiting to be entered in the queue. In addition, for each file currently in the queue, an additional response is issued containing the spool file identification number, origin location, destination location, destination user ID (if any), spool file class, current transmission priority, the number of records in the file, user and operator form names, and the file HOLD status.
linkid Sum requests summary information about the transaction and error counters maintained by the line driver concerning activity on the communications adapter. (See the description of message DMTxxx149I which follows).

File spoolid STAT requests certain information pertaining to the particular file specified by the numeric spoolid. Status information includes activity status and the linkid of the link on which the file is queued or being transmitted.

File spoolid RSCS requests a description of the RSCS control-related attributes and status of the file specified by spoolid. RSCS-related attributes include originating location and user ID, originating VM/370 spoolid, date and time of creation, time zone reference for time of day, and the destination location and user ID. (See the descriptions of messages DMTCMX662I and DMTCMX664E which follow).

File spoolid VM requests a description of the VM/370 spool system-related attributes of the file specified by spoolid. VM/370 spool-related attributes include transmission priority, spool file class, number of copies requested, HOLD status, distribution code, filename and type, user and operator form names, and dataset name. (See the description of message DMTCMX663I which follows).

SYstem Active requests information pertaining only to active links. Active link information includes link identification, link status, line driver type, line address, and hold status, drain status, and trace status. (See the descriptions of message DMTCMX670I which follows).

SYstem Links requests brief descriptions of each link currently defined in the system. Inactive link information includes link identification, activity status, default line driver type, and default line address. Active link information includes link identification, link status, line driver type, line address, and hold status, drain status, and trace status. (See the descriptions of messages DMTCMX670I and DMTCMX671I which follow).

SYstem Queue requests that message DMTCMX654I be issued for each link with a non-zero queued or pending file count. Queue information includes the number of files being transmitted and received, the files accepted and queued, and the files pending for each linkid with a non-zero queue.
Responses:

QUERY linkid ACTIVE:
DMTCMX656I FILE spoolid (orgid) locid userid CL FO uuuuuuuuu fffffffff a PR pp LEFT mmmmmmm OF mmmmmmm
DMTCMX656I NO FILE ACTIVE

QUERY linkid FILES:
DMTCMX654I LINK linkid S=s R=r Q=q P=p

QUERY linkid QUEUE:
DMTCMX654I LINK linkid S=s R=r Q=q P=p
DMTCMX665I FILE spoolid (orgid) locid identifier CL FO uuuuuuuuu fffffffff a PR pp NEC mmmmmmm [HO|NOH]

QUERY linkid SUM:
DMTCMX149I LINK linkid LINE ACTIVITY; TOT=mmmmmmm; ERRS=mmmmmmm; TMOUTS=ppppppppp

QUERY FILE spoolid STAT:
DMTCMX660I FILE spoolid INACTIVE ON LINK linkid
DMTCMX661I FILE spoolid ACTIVE ON LINK linkid
DMTCMX664E FILE spoolid NOT FOUND

QUERY FILE spoolid RSCS:
DMTCMX662I FILE spoolid ORG locid1 userid1 ORGID orgid mm/dd/yy hh:mm:ss z.z.z. TO locid2 userid2
DMTCMX664E FILE spoolid NOT FOUND

QUERY FILE spoolid VM:
DMTCMX663I FILE spoolid PR pp CL a FO uuuuuuuuu fffffffff CO [*]nnn [HO|NOH] DI distcode, NA {fn ft|dsname}
DMTCMX664E FILE spoolid NOT FOUND

QUERY SYSTEM ACTIVE:
DMTCMX670I LINK linkid [CONNECT|ACTIVE] -- LINE vaddr [HO|NOH] [DR|NOD] [NOT|TRS|TRL|TSL]
DMTCMX672I NO LINK ACTIVE
DMTCMX673I NO LINK DEFINED

QUERY SYSTEM LINKS:
DMTCMX760I LINK linkid [CONNECT|ACTIVE] -- LINE vaddr [HO|NOH] [DR|NOD] [NOT|TRS|TRL|TSL]
DMTCMX761I LINK linkid INACTIVE
DMTCMX763I NO LINK DEFINED

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QUERY SYSTEM QUEUE:
DMICMX654I LINK linkid S=s R=r Q=q P=p
DMTCMX674I NO FILES QUEUED

QUERY ... (general):
DMTCMX202E INVALID LINK linkid
DMTCMX203E INVALID SPOOL ID spoolid
DMTCMX204E INVALID KEYWORD keyword
DMTCMX206E INVALID OPTION keyword

DMTxxx149I LINK linkid LINE ACTIVITY:  TOT=nnnnnnnnnn;
ERRS=nnnnnnnnn; TMDUTS=pppppppp

Explanation: This message is issued in response to a
QUERY linkid SUM command.

nnnnnnnnnn - the total number of successful transactions
that have taken place on the identified link
since the last similar message was issued, or
since the link was initially activated.

nnnnnnnnn - the total number of transactions that have
ended in error since the last similar message
was issued, or since the link was initially
activated.

pppppppp - the total number of time-outs that have
occurred while waiting for response from the
remote station since the last similar message
was issued, or since the link was initially
activated.

DMTCMX654I LINK linkid S=s R=r Q=q P=p

Explanation: This message is issued in response to a
QUERY linkid QUEUE command, and is issued in response to
a QUERY SYSTEM QUEUE once for each link on which at least
one file is either queued or active. The status of the
file queue for the link identified by linkid is
described.

s - the number of files being actively transmitted (sent)
on the link.

r - the number of files being actively received on the
link.

q - the number of files accepted and queued for transmis-
sion on the link.
p - the number of files pending but not yet accepted for the active link.

System Action: In response to a QUERY linkid QUEUE command, an additional message (DMTCMX655I) is issued for each file accepted and queued on the link, describing the status of each such file.

DMTCMX655I FILE spoolid {orgid} locid userid CL a FO STANDARD STANDARD PR pp REC nnnnnnn [HO|NOH]

Explanation: A message of this form is issued for each file accepted and queued for transmission on the link specified by linkid in the preceding "QUERY linkid QUEUE" command.

spoolid - the VM/370 spool file ID for the file.
orgid - the originating VM/370 spool file ID (or the origin job number) of the file.
locid - the destination location ID to which the file is addressed.
userid - the destination user ID (if any) to which the file is addressed.
a - the spool file class.
pp - the file's current transmission priority.
nnnnnnn - the total number of records in the file.
HO - indicates that the file is in hold status.
NOH - indicates that the file is not in hold status.

DMTCMX656I FILE spoolid (orgid) locid identifier CL a FO STANDARD STANDARD PR pp LEFT nnnnnnnn OF nnnnnnnn

Explanation: This message is issued in response to a QUERY linkid ACTIVE command. The response describes the state of the file that was being actively transmitted on the link specified by linkid when the QUERY command was executed.

spoolid - the VM/370 spool file ID for the active file.
orgid - the originating VM/370 spool file ID (or the origin job number) of the file.
locid - the destination location ID to which the file is addressed.

terminator - for file returned from the CRAY-1, either the value in the DIST parameter of the DISPOSE record or, if no DIST parameter, the scientist number from the JOB record. Otherwise SYSTEM.
a - the spool file class.
pp - the file's current transmission priority.
mmmmmm - the number of records in the file which remain to be transmitted.
nnnnnn - the total number of records in the file.

DMTCMX662I FILE spoolid ORG locidl userid1 ORGID orgid
mm/dd/yy hh:mm:ss z.z.z. TO locid2 userid2

Explanation: This message is in response to the RSCS command "QUERY FILE spoolid RSCS". The RSCS control-related attributes of the file identified by spoolid are described.

locidl - the location ID of the location at which the file originated.

userid1 - the user ID of the originator of the file.
orgid - the originating VM/370 spoolid, or the origin job number, of the file.
mm/dd/yy - the file creation date.

hh:mm:ss - the file creation time of day.
z.z.z. - the time zone with reference to which the time of day is expressed.

locid2 - the destination location ID to which the file is addressed.

userid2 - the destination user ID (if any) to which the file is addressed.

DMTCMX663I FILE spoolid PR pp CL a PO STANDARD STANDARD CD
[*]nnn {HO|NOH} DI distocode, NA {fn ft|dsname}

Explanation: This message is issued in response to the RSCS command "QUERY FILE spoolid VM". The VM/370 spool system related attributes of the file identified by spoolid are described.

pp - the file's priority.
a - the file's spool file class.
nnn - the file's copy count.
HO - indicates that the file is in hold status.
NOH - indicates that the file is not in hold status.

distocode - if the file is a job returned from the CRAY-1, this is the value of the DIST parameter of
the DISPOSE record or, if no DIST parameter, the scientist number from the JOB record. If the source is not the CRAY-1, this is the scientist number of the originator.

fn ft - the file's filename filetype.
dsname - the file's dataset name.

DMTCMX670I LINK linkid (CONNECT|ACTIVE) -- type LINE vaddr
{HO|NOH} {DR NOD} NOT

Explanation: This message is issued in response to a QUERY SYSTEM command, or to a QUERY SYSTEM ACTIVE command. One such message is produced for each active link in the RSCS facility at the time of command processing. The active link described by the message is identified by linkid. The CONNECT keyword indicates that the line driver successfully received a satisfactory response from the remote station on the last attempted exchange. The ACTIVE keyword implies that the line driver's last attempted exchange failed due to line or remote system failure, or that local telecommunications equipment has not been dialed or is not properly set, or the link has not been started at the other end.

type - the name of the line driver in use by the active link.
vaddr - the virtual device address of the line port in use by the active link.
HO - indicates that the active link is in hold status.
NOH - indicates that the active link is not in hold status.
DR - indicates that the active link is in the process of draining, and will terminate when there is no more line activity.
NOD - indicates that the active link is not in the process of draining.

DMTCMX671I LINK linkid INACTIVE -- DEFAULT type LINE vaddr

Explanation: This message is issued in response to a QUERY SYSTEM command. One such message is produced for each inactive link in the RSCS facility at the time of command processing. The inactive link is identified by linkid; its default line driver type is identified by "type", and its default line port virtual address is identified by "vaddr".
START causes an active link to begin transmitting files of a specified set of classes.

Class c specifies classes of files which may be processed after execution of the command. c can be either *, meaning all file classes may be processed, or from one to four classes (single characters with no intervening blanks). If * is specified, no other classes may be specified. If multiple classes are specified, files are processed in the order that the classes are specified, and in priority order within each particular class. If * is specified, files are processed in priority sequence only.

Responses:

DMTxxx204E INVALID KEYWORD keyword
DMTCMY751I LINK linkid ALREADY ACTIVE
-- NEW CLASS(ES)/FORM SET AS REQUESTED

TRANSFER (For NCAR RSCS Operator Only)

TRANSFER moves inactive files specified by spoolid from one linkid to another or from a linkid to the virtual reader of a user. You cannot issue this command but can request the NCAR operator to do so by telephone or electronic mail.

linkid1 is the link identifier of the link from which files are to be transferred.
linkid2 is the link identifier of the link that is to receive the files.
spoolid specifies the particular file(s) to be transferred from the specified link.
RSCS is used when transfer is to be made to the reader of a virtual machine (used with userid parameter only).
userid is the user ID of the destination virtual machine.
Note: If the file is to be transferred from a linkid to another linkid, the operator must preface the TRANSFER command with SMSG RSCS. If the file is to be transferred from a linkid to the reader of a virtual machine, the SMSG RSCS prefix is not allowed. To use this facility, you contact the operator and request that this command be issued from the operator console. Specify the exact text of the command when you make the request. For example, the message text to the operator for a linkid-to-linkid move request would be:

PLEASE ENTER "SMSG RSCS TRANSFER linkid1 spoolid TO linkid2"

And, for a linkid-to-virtual machine reader transfer request, the message would be:

PLEASE ENTER "TRANSFER RSCS spoolid TO userid"

To check that the operator has completed the request, use a QUERY linkid QUEUE command for the destination linkid. If the requested transfer is to a virtual machine, you may request a confirmation from the operator that the command was completed.
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