Burroughs

Rdok 12251

B 5000/B 6000/ B 7000 Series

Remote Job Entry

REFERENCE MANUAL

PRICED ITEM

Printed in U.S. America

January 1982

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Hans Vlems
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(RELATIVE TO THE 3.2 SYSTEM SOFTWARE RELEASE)

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Description: This PCN is relevant to the Mark 3.4 System Software Release.

This PCN includes changes to the following areas described in the B 5000/B 6000/B 7000 Series Remote Job Entry Reference Manual:

- A new *CHARGECODE message to interrogate or change a chargecode during a session.
- A new ATTACH control message, which is used to connect a specified LSN to RJE.
- Enhancements to the CLEAR control message.
- A new HEADLINE control message, which is used to control or specify text as a headline at log-on.

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1. INTRODUCTION

The capability for distant locations to input data to a central data processing system and to receive the required output is provided by a Remote Job Entry (RJE) system. An RJE system provides convenient access to a central processing capability located at some distance from the remote site mainly through the use of high-speed transmission lines and small terminal processors used at the remote location.

The Burroughs large systems RJE system provides routing and control capabilities that ensure the proper input of data to the main system and the proper output of data to the correct originator.

SCOPE OF THE MANUAL

Purpose

This manual presents information regarding RJE capabilities for existing large systems. The manual has been designed to provide information both for users of the RJE MCS and for system programmers who are responsible for tailoring and maintaining RJE for particular installations. Thus, the material in this manual varies in its level of complexity and in its preassumptions about the knowledge of the reader. In particular, the descriptions of RJE input messages (in Section 4), RJE control messages (in Section 5), sample RJE sessions (in Appendix A), and RJE-related ODT messages (in Appendix B) are primarily of interest to RJE users; while the RJE design description (in Section 2), information regarding the user and MCP interfaces to RJE (in Sections 3 and 6, respectively), and sample NDL and NDLII declarations for RJE (in Appendix B) are primarily of interest to programmers who are responsible for maintaining RJE.

Related Documents

The following manuals contain information related to the material in this manual:

Manual	Form No.
B 7000/B 6000 Series CANDE Reference Manual	5011398
B 5000/B 6000/B 7000 Series DCALGOL Reference Manual	5011430
B 7000/B 6000 Series NDL Reference Manual	5001522
B 5000/B 6000/B 7000 Series Operator Display Terminal (ODT) Reference Manual	5011687
B 7000/B 6000 Series System Software Operational Guide	
Volume 1	5011661
Volume 2	5011679
B 5000/B 6000/B 7000 Series Work Flow Language Reference Manual	5011794

Organization

The information is divided into seven sections and three appendices; these divisions are briefly described below.

Section 1 INTRODUCTION

This section discusses the material presented in the manual, the organization of the manual, the syntax notation used in the manual, and the heading-level conventions used in the manual.

Section 2 GENERAL INFORMATION

This section discusses the RJE concept and design; the RJE line discipline; and the functional interface between the remote computer, NDL, DCC, and RJE.

Section 3 USER INTERFACE

User interfaces with RJE are described in this section. Information about security conventions, RJE log-on and log-off, remote decks, RSC terminals, types of input/output messages, backup file handling, file transfer, terminal transfer, and Halt/Load restarts is also included.

Section 4 RJE INPUT MESSAGES

A list of RJE input messages, including syntax, is presented in this section.

Section 5 RJE CONTROL MESSAGES

A list of RJE control messages, including syntax, is presented in this section.

Section 6 RJE/MCP INTERFACE

A summary description of the interface between the RJE system and the MCP is presented in this section. A brief explanation is given of RJE task attributes, WFL statements, ODT messages, job decks, and backup and internal interface messages.

Section 7 RJE COMPILATION

A list of special RJE compile-time options and source defines, and a sample job deck for compiling RJE, are presented in this section.

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Appendix A SAMPLE RJE SESSIONS

Examples of RJE sessions are shown in this appendix.

Appendix B SYSTEM INPUT MESSAGES

A summary of valid ODT messages for use with RJE is presented in this appendix.

Appendix C NDL/NDLII DEFINITIONS

A few examples of NDL and NDLII definitions for RJE are presented in this appendix.

An acronym list, glossary, and index follow the appendices.

RAILROAD DIAGRAMS

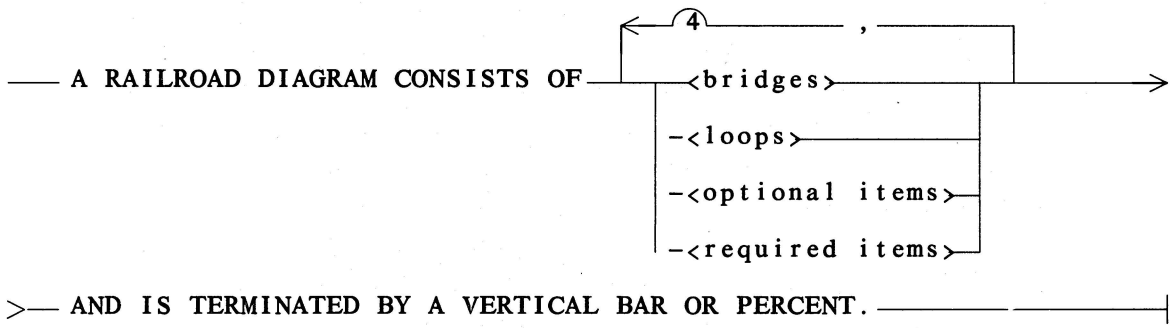
Railroad diagrams are graphic representations of the syntax.

The railroad diagrams are traversed left to right or in the direction of the arrowhead. Adherence to the limits illustrated by bridges produces a syntactically valid statement. Continuation from one line of a diagram to another is represented by a right arrow (>) appearing at the end of the current line and the beginning of the next line. The complete syntax diagram is terminated by a vertical bar (|) or a percent sign (%).

Items contained in broken brackets (<>) are syntactic variables which are defined in the manual or are information which the user is required to supply.

Uppercase items not enclosed in broken brackets must appear literally; the minimum abbreviations are underlined.

Example



The following are some of the syntactically valid constructs that may be generated from the above diagram:

A RAILROAD DIAGRAM CONSISTS OF <bridges> AND IS TERMINATED BY A VERTICAL BAR OR PERCENT.

A RAILROAD DIAGRAM CONSISTS OF <optional items> AND IS TERMINATED BY A VERTICAL BAR OR PERCENT.

A RAILROAD DIAGRAM CONSISTS OF <bridges>, <loops> AND IS TERMINATED BY A VERTICAL BAR OR PERCENT.

A RAILROAD DIAGRAM CONSISTS OF <optional items>, <required items>, <optional items>, <bridges>, <loops> AND IS TERMINATED BY A VERTICAL BAR OR PERCENT.

Railroad Components

<required items>

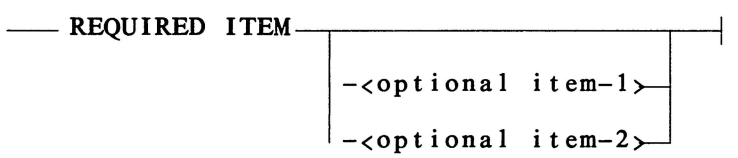
No alternate path through the railroad diagram exists for required items or required punctuation.

Example

<optional items>

Items shown as a vertical list indicate that the user may make a choice of the items specified. An empty path through the list allows the optional item to be absent.

Example



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The following valid constructs may be generated from the above diagram:

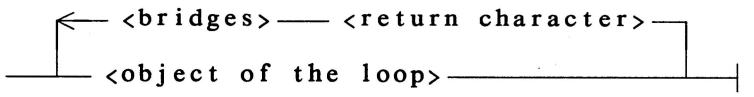
REQUIRED ITEM

REQUIRED ITEM <optional item-1>

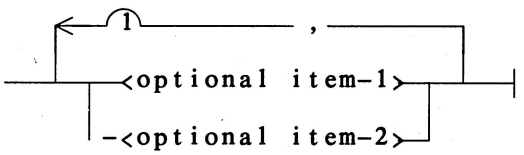
REQUIRED ITEM <optional item-2>

<loops>

A loop is a recurrent path through a railroad diagram and has the following general format:



Example



The following are some of the valid constructs that may be generated from the above diagram:

<optional item-1>

<optional item-1>,<optional item-1>

<optional item-2>,<optional item-1>

The loop must be traversed in the direction in which the arrowhead points, and the limits specified by bridges cannot be exceeded.

<bridges>

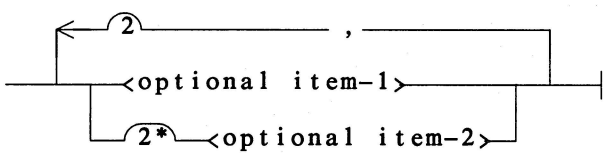
A bridge illustrates the minimum or maximum number of times a path may be traversed in a railroad diagram.

Two forms of bridges exist:

/n\ n is an integer that specifies the maximum number of times the path may be traversed.

/n*\ n is an integer that specifies the maximum number of times the path may be traversed. The asterisk (*) indicates that the path must be traversed at least once.

Example



The loop may be traversed a maximum of two times, and the path for <optional item-2> must be traversed at least once but no more than twice.

The following are some of the valid constructs that may be generated from the above diagram:

<optional item-1>,<optional item-2>

<optional item-2>,<optional item-2>,<optional item-1>

<optional item-2>

HOW TO READ THIS MANUAL

The information in this manual is presented in a logical hierarchy organized from general topics to specific subtopics. The level headings in this manual provide a guide to this organizational hierarchy of specifying the relative level of generality (or specificity) of the material associated with the heading.

Because the headings appear in the Table of Contents, a general outline of the major topics in the manual, arranged according to their levels in the logical hierarchy, may be found in the Table of Contents.

Major topics in the manual are discussed in separate sections. Section headings appear in all capital letters entered at the top of the first page of a section and indented one space in the Table of Contents. A section head appears as follows:

1. SECTION HEADING

Major subtopics within each section of the manual are indicated by first-level headings. First-level headings appear in all capital letters indented one space on the page and indented four spaces in the Table of Contents. Usually, a first-level head appears at the top of a new page in the section. A first-level head appears as follows:

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FIRST-LEVEL HEADING

Subtopics of the major subtopics within a section are indicated by second-level headings. Second-level headings appear with initial capital letters indented one space on the page and indented seven spaces in the Table of Contents. A second-level heading appears as follows:

Second-level Heading

Third-level subtopics in the manual are indicated by third-level headings. Third-level headings appears in all capital letters indented one space on the page and indented ten spaces in the Table of Contents. Third-level headings appear as follows:

THIRD-LEVEL HEADING

The lowest level of subtopics in the manual are indicated by fourth-level headings. Fourth-level headings appear in initial capital letters indented one space on the page and indented 13 spaces in the Table of Contents. Fourth-level headings appear as follows:

Fourth-level Heading

THIS PAGE IS INTENTIONALLY LEFT BLANK FOR FORMATTING PURPOSES.

2. GENERAL INFORMATION

RJE CONCEPT

The concept of Remote Job Entry (RJE) involves a system that consists of a remote satellite system or station connected to a central system through a communications line. Peripheral devices such as card readers or line printers are connected to the remote satellite system. A configuration for such a system is shown in Figure 2-1.

The objective of an RJE system is to allow the following activities:

1. Introduction of complete jobs from a remote card reader for processing by the central system.

2. Introduction of data from a remote card reader for processing by programs that are resident in the central system.

3. Output of data produced by the central system to the remote peripherals.

4. Monitoring and control of programs on the central system through a Remote Supervisory Console (RSC).

A Message Control System (MCS) titled SYSTEM/RJE is available for implementing RJE capabilities on large systems. In addition to the functions described above, this MCS can handle communications between two central systems. File transfers from one system to the other are allowed; also, terminal transfers between hosts are possible. For example, if a terminal or station on one system is connected to an MCS and/or programs on another host through RJE, the transfer station appears local to the remotely connected host.

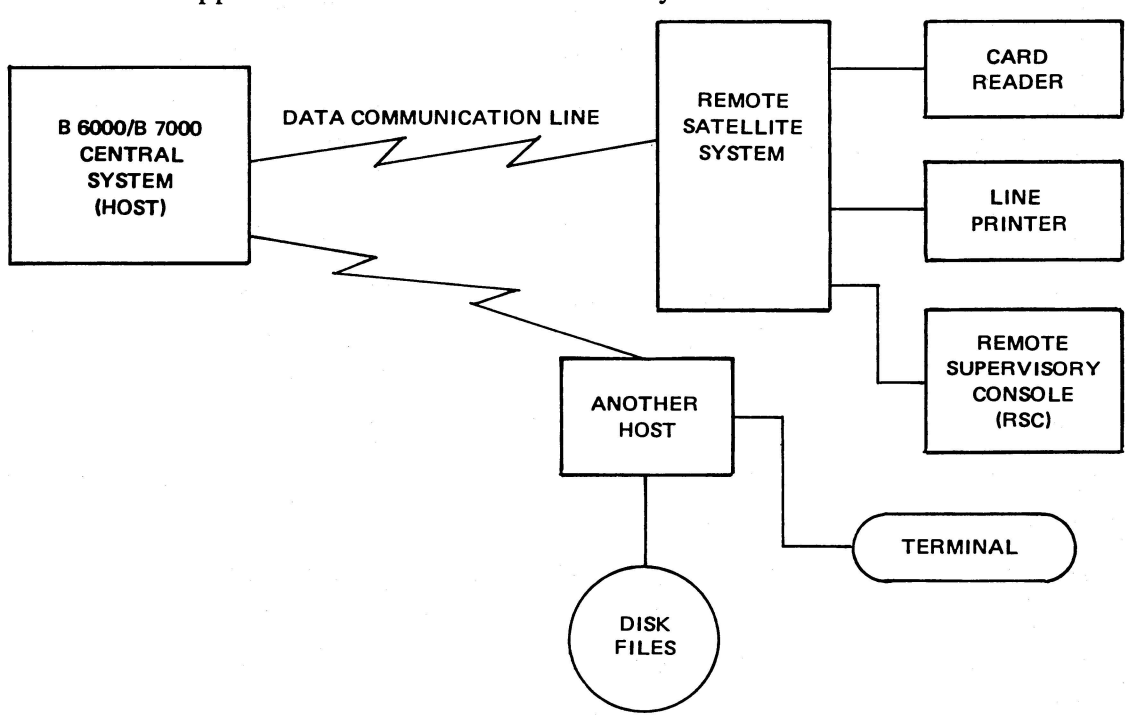

Figure 2-1. Typical RJE System

DESIGN CONSIDERATIONS

The design of an efficient RJE system hinges on two primary considerations: the communications line interface and the functional interfaces between the various components of the system. This subsection discusses these two important design considerations as they apply to the Burroughs large systems RJE system.

Communications Line Interface

The data communications (Data Comm) line interface or line protocol provides the link between a remote terminal and the central system. The design of this important link should take into consideration (1) the maximum throughput of the line and (2) error detection and recovery from line errors. Some factors that influence line throughput are discussed in the following paragraphs.

LINE TURNAROUND PER MESSAGE

A reduction in line turnarounds per message can enhance line throughput. However, the reduction must not occur at the expense of error detection and recovery.

BLOCKING OF MESSAGES

Sending multiple records per message can also enhance line throughput. However, the messages should not be large enough to cause excessive retransmission because of line errors.

FIELD COMPRESSION/EXPANSION TECHNIQUES

Several techniques can be used to reduce the transmission time of certain fields of data: for example, sending three characters to represent a field of several adjacent blank characters. This type of technique reduces the line time required to transmit long strings of repetitious data.

DIRECTIONAL ENHANCEMENT

If messages are sent in one direction while error recovery proceeds in the opposite direction, line throughput can be enhanced.

In addition, error recovery and retry capabilities must be implemented for conditions such as those described in the following paragraphs.

LINE COLLISION

This condition results when both ends of the communication line attempt to transmit at the same time with a contention-mode line routine or a polled-mode line routine during recovery cycles.

LOSS OF MESSAGES

Messages are lost when modems fail to operate synchronously with the computer site. This condition results in a time-out on receive.

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PARTIAL MESSAGES

Reception of partial messages is caused when modems drop out of synchronous operation in the middle of a message. This condition results in vertical or horizontal parity errors or in the loss of the carrier frequency.

GARBLED MESSAGES

Reception of garbled messages is caused by the reception of erroneous bit patterns in such a way that the line control characters cannot be recognized. This condition results in vertical and horizontal parity errors.

NOISE

Electrical interference may cause noise patterns on the line to be detected as garbled messages.

LINE INTERFACE IMPLEMENTATION

The following subsection describes the B 5000/B 6000/B 7000 implementation of the RJE line protocol.

Line Routine

The basic line configuration for the B 5000/B 6000/B 7000 RJE system is illustrated in Figure 2-2 (without recovery aspects). The line routine employed is a contention-mode routine. (Contention mode is illustrated because polling is not an overhead problem for the B 5000/B 6000/B 7000 systems, although it may be for the remote satellite.)

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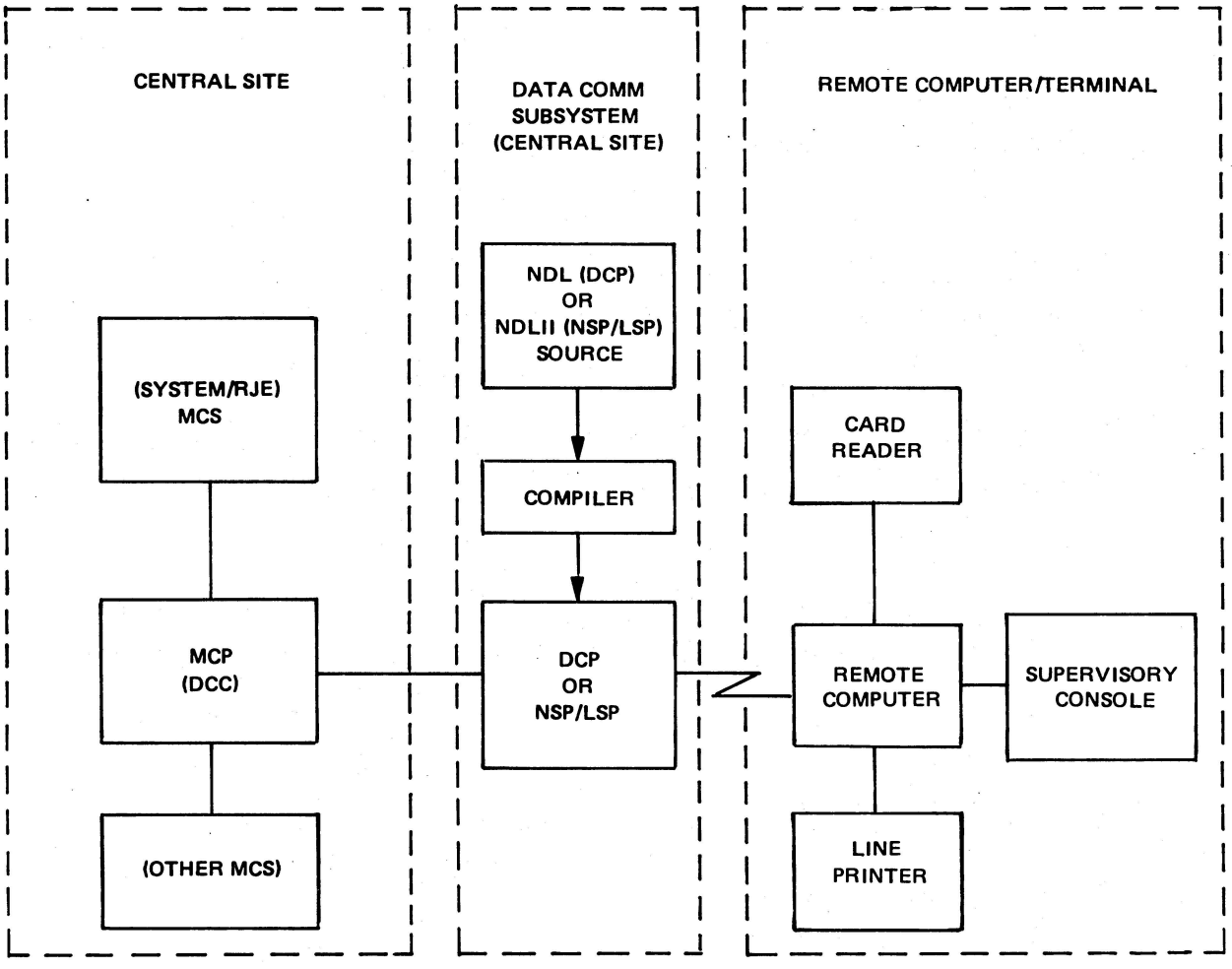

Figure 2-2. RJE Configuration

The line routine contains the following features:

1. If the receiver has a message, the message is sent as an acknowledgement, thus reducing line turnarounds per message.

2. If the receiver does not have a message, an ACK message is sent as the acknowledgement, thus minimizing the length of time the line is tied up.

3. If a remote I/O device (card reader or line printer) goes not ready, the device does not tie up the remaining remote stations.

A line routine with error detection and recovery is illustrated in Figure 2-3. The line routine, including the error detection and recovery aspects, is further expanded by the use of flags that establish communications between the NDL transmit and receive requests and record the sequence of line routine operations. The use of the various characters illustrated in the line discipline is described under Message Format in this section.

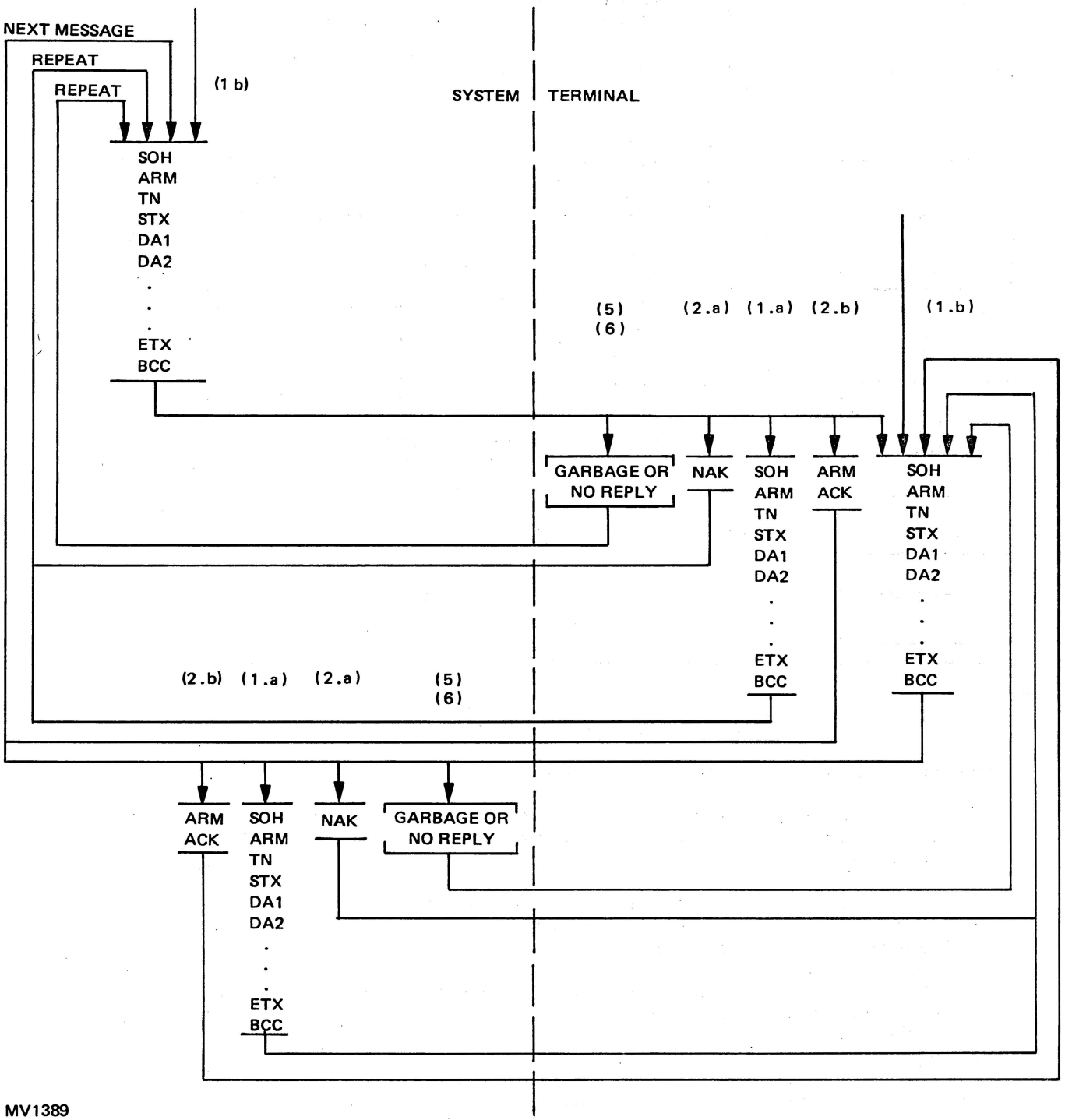

Figure 2-3. Flow of RJE Line Discipline

Notes for Figure 2-3

The following notes refer to Figure 2-3. The parenthesized numbers in Figure 2-3 relate portions of the diagram to the following paragraphs.

In these notes, the terms "system" and "terminal" may be interchanged without destroying the accuracy of the text. In following discussion, the system transmits a message to the terminal and expects a response from the terminal in response to the tranmission.

1. If the receiving terminal has data to transmit to the system after receiving a message from the system, the terminal acknowledges receipt of the message positively or negatively, as described below.

   a. Negative acknowledgement

      The message received contained parity errors or was in an invalid format. As a result, the TN character from the last valid message received is returned in the ARM field of the message transmitted to the system.

   b. Positive acknowledgement

      The message received was valid, and the TN character from the received message is returned in the ARM field of the message transmitted to the system.

2. If the terminal has no data to transmit to the system after receiving a message from the system, the terminal acknowledges the receipt of the message positively or negatively, as described below.

   a. Negative acknowledgement

      The message received was invalid; as a result, a single ASCII NAK control character is transmitted to the system.

   b. Positive acknowledgement

      The message received was a valid, and a two-character message consisting of the TN character from the received message followed by an ASCII ACK control character is transmitted to the system.

The system responds to the acknowledgement messages from the terminal in the following manner:

3. If a NAK character is received from the terminal (case 2a) or if the terminal response is a message containing text (case 1a) with an ARM character that does not match the last TN character sent, then the system retransmits the last message sent without changing the TN character. Data may still be received from the terminal. The system positively or negatively acknowledges response messages by appropriately setting the ARM character of

the retransmitted message to the TN character of the last valid message received from the terminal.

4. If the ARM field of the message received from the terminal matches the TN character of the last transmitted message (cases 1b and 2b), the system must increment the TN character stored and transmit the next message to the terminal.

5. If the system cannot recognize the response from the terminal, the system assumes that a negative acknowledgement has been received. This assumption causes a retransmission of the last message sent without any change in the the TN character. If the terminal had been trying to positively acknowledge the last message received, the terminal ignores the retransmitted message and issues an acknowledgement.

6. If the terminal does not respond within a one-second timeout period to the last message sent by the system, the system retransmits the message without changing the TN character. Thus, the cycle reverts back to step (1).

Message Format

The message format is consistent with the goals of maximizing line throughput and detecting and recovering from errors. The format of a message, in ASCII-67, is illustrated in Figure 2-4.

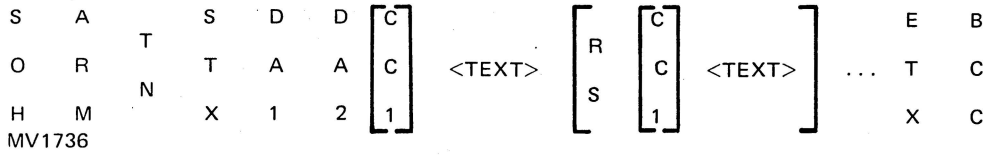

Figure 2-4. Message Format: ASCII-67

Each column of capital letters indicates a single character. Brackets ("[","]") indicate an optional element (which will be discussed in the following paragraphs), and (...) indicates repetitions of the preceding optional element.

SOH is the standard ASCII SOH character (01), which indicates that data are being transmitted.

The ARM (acknowledgement received message) character indicates positive or negative acknowledgement of the previous message received. ARM is initialized to a NUL character during the establishment phase of the routine. When an ARM sequence (SOH-ARM) is received, it is compared with the last tranmission number (TN) sent. If the ARM character agrees with that TN, the last message sent was positively acknowledged. If the characters do not agree, the previously sent message is negatively acknowledged and is retransmitted. When a valid text message is received, the transmission number contained in that message is stored for use as the next ARM character transmitted. 026

TN is considered the "transmission number" portion of the message and is used to positively or negatively acknowledge a message. Each end of the Data Comm line uses only two alternating characters as transmission numbers. The transmission numbers selected for remote terminals are "F" and "U." The lowercase characters "f" and "u" are used by the DCP. (Refer to the discussion of ARM above.)

STX is the standard ASCII STX (02) character, which serves as the delimiter between the preceding header portion and the text portion of a message.

DA1 and DA2 are two "device address" characters which associate a message with a particular remote device on an RJE terminal. These characters are used by the remote computer to route data to the remote device and are inserted in messages containing data transmitted from these devices. The addressing convention for the use of these characters is shown on the following page.

DA1	DA2	Device Designation
0	0	System control
0	1	To or from a remote supervisory console (RSC)
0	2	To a card punch (CP); from a card reader (CR)
0	3	To a line printer (LP); "from" is an error
0	4	To a file transfer link (FTS)
0	5 - 8	(Reserved for future expansion)
0	9	Terminal transfer pseudo-stations
1 - 9		(Reserved for future expansion)

The CC1 (carriage control) character is used only for a remote output device such as a line printer. (Refer to the preceding paragraph regarding DA1 and DA2.) This character indicates that carriage control is to be performed by the remote computer according to the following convention:

CC1	Meaning
0	Print; do not space.
1	Print and single-space.
2	Print and double-space.
A	Print and skip to channel 1 (top of page).
B	Print and skip to channel 2.
C	Print and skip to channel 3.
D	Print and skip to channel 4.
E	Print and skip to channel 5.
F	Print and skip to channel 6.
G	Print and skip to channel 7.
H	Print and skip to channel 8.
I	Print and skip to channel 9.
J	Print and skip to channel 10.
K	Print and skip to channel 11.
L	Print and skip to channel 12 (end of page).

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RS is the standard ASCII RS character (1E) which separates records within a single message. Two adjacent RS characters or two RS characters separated by a CC1 character (if the device is a line printer) indicate a blank record.

ETX is the standard ASCII ETX (03) character, which indicates the end of the text of a message.

BCC (block check character) is the longitudinal parity character of the message, which represents the "exclusive-or" of all characters in the message following the SOH character up to, and including, the ETX character. The BCC character ensures proper reception of messages. Messages containing incorrect BCC characters are negatively acknowledged.

The line routine suppresses the transmission of long strings of blank characters by using the ASCII control character, ESC(27), followed by two characters representing a two-digit decimal number to replace a string of blanks whose length is given by that decimal number. Consecutive repetitions of this ESC convention are used to represent strings of more than 100 blanks. (For example, "ESC 9 9 ESC 0 5" appearing in the text portion of a message represents 104 consecutive blank characters.)

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Functional Interface

The following subsection provides a brief description of each element of a B 5000/B 6000/B 7000 RJE system and of the interfaces among these elements.

REMOTE COMPUTER

The remote satellite is a small terminal computer to which an 80-column or 96-column card reader, a line printer (120 characters minimum), a 72-character supervisory console, and optionally, an 80-column or 96-column card punch can be connected. This group of remote devices can be viewed from the main system as a group of remote stations on a single Data Comm line which are controlled by the RJE MCS.

If the remote computer is another host, communication between the two hosts allows only disk file transfers and terminal transfers (connection of a terminal of one host to the other host in the RJE MCS). The remote host can be a Burroughs small, medium or large system.

NDL AND DCP (B 6700/B 6800)

Certain requirements must be stated in a Network Definition Language (NDL) definition in order to establish an RJE system. First, the RJE MCS must be specified as the controlling MCS. Second, the user must specify in the NDL how the remote computer is connected to the system, including:

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1. Definition of the pertinent data set characteristics.
2. Physical attributes of the remote computer.
3. Logical attributes of the user station.
4. Physical attributes of the connecting line.

NOTE

For examples of RJE terminal definitions, refer to the released SYMBOL/SOURCENDL file.

NDLII AND NSP/LSP (B 6900/B 5900)

Certain requirements must be stated in an NDLII definition in order to establish an RJE system. First, the RJE MCS (SYSTEM/RJE) must be specified as the controlling MCS. Second, the user must specify in the NDLII how the remote computer is connected to the system, including:

1. Algorithm and Editor used.
2. Physical attributes of the remote computer.
3. Logical attributes of the user station.
4. Physical attributes of the connecting line.

NOTE

For examples of RJE terminal definitions, refer to the released SYMBOL/SOURCENDLII file.

DATA COMM CONTROLLER (DCC)

The Data Comm Controller (DCC) is a set of MCP procedures which controls the interface between the Data Communications subsystem (DCP or NSP/LSP) and the central system. The DCC performs the following functions:

1. Activates the controlling MCS for a station when the station first becomes active.
2. Transfers messages between the Data Comm subsystem and the central system.
3. Ensures that network control instructions executed by the MCS are in the correct formats and sequences.
4. Informs the MCS of exception conditions that occur on stations attached to the controlling MCS.

RJE MCS

The RJE MCS coordinates activity at the remote terminal in the following way:

1. RJE establishes security requirements that require the remote user to initiate activity at the main system in the same way as the user logs on at the remote terminal.
2. The RJE MCS interfaces between the user input statements at the RSC or terminal and the MCP that services these input statements as system input messages. RJE handles job decks read from the remote card reader and sends copies of the job decks to the Work Flow Language (WFL) compiler, which either rejects the decks as syntactically incorrect or accepts them and locks job files that cause the job to be executed at the main system. (The jobs may also be compiled for syntax in the same way as at the main site.) The MCS then handles system output messages that are directed to the remote user by the MCP.
3. RJE then handles the output of backup files produced by jobs initiated by the remote user by printing or punching these jobs at the remote terminal.

3. USER INTERFACE

RJE INITIALIZATION

RJE can be initialized explicitly by the operator, using the WFL RUN SYSTEM/RJE statement, or automatically by the DCC when the DCC detects activity in a station associated with the RJE MCS.

RJE protects itself from accidental DSes by performing a "lock program" request during initialization. This request causes any ODT request that would DS RJE to return the response with PROGRAM IS LOCKED. The "<mix number> SM QUIT" command should always be used to cause RJE to go to EOJ (refer to SM in Section 5). If RJE must be DSed, the program can be unlocked using the "<mix number> LP-" ODT command.

SECURITY CONVENTIONS

A remote user can select names for files and, at the same time, can address site files without having to be aware of the use of those file names by other remote users. However, all file names must be unique if the main site is to perform library maintenance on all types of files.

To allow remote users to be isolated from each other so far as file name selection is concerned, and at the same time to maintain a system of unique names for the central system, the data processing manager can assign user identification to each user of the system. The RJE MCS obtains this user identification either by station log-on or by a user control card.

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RJE LOG-ON/LOG-OFF

The activation of an RJE terminal is known as log-on procedure. Log-on is accomplished by supplying the RJE MCS with a valid usercode and password combination or by initiating activity at the RSC using the NOLOGON compile-time option (described under RJE COMPILE-TIME OPTIONS in Section 7) or the LOGON run-time option (described under *SO in Section 4.). Log-on and Log-off Messages in this section contains information on the manner in which the MCS must be supplied with the user identification.

The usercode obtained from the log-on procedure, if any, is the default usercode associated with job decks that are read from the remote reader and such keyins such as PD entered from the RSC. Any USER control cards contained in the job decks override this default usercode for the tasks involved.

REMOTE DECKS

Decks that are acceptable to the RJE card reader are the same as decks that are acceptable to the central site, except that binary card decks are not allowed.

A discussion of card decks that are acceptable to RJE is contained in the B 5000/B 6000/B 7000 Series Work Flow Language Reference Manual.

The RJE MCS does not examine the contents of remote card decks; RJE processes a copy of the WFL compiler to perform this function and to generate job files for syntactically correct decks. Such RJE tasks are given the name "WFLCOMPILER[<LSN>]"; a different copy of this WFL task is provided to service each remote reader under RJE control, and communication with these tasks is handled internally by the queue mechanism. The WFL compiler task is activated when a card is read at the remote reader and goes to EOT when a job file is locked and no further cards have been read in (this is, when an END or END JOB statement terminating a job deck is encountered) or when the remote user enters "*CL CR" at the RSC. (Refer to Section 4, RJE INPUT MESSAGES.)

All decks are read in EBCDIC; the WFL compiler performs translation to BCL as required.

REMOTE SUPERVISORY CONSOLE (RSC)

A remote operator/system interface is required to make decisions that cannot be preprogrammed. This interface is provided through messages that are output and input at the RSC.

Non-RJE terminals (those whose NDL TERMINALTYPE identifier does not start with the letters "RJE"; for example, TD800s and TELETYPEs) can be connected to the RJE MCS. These terminals have usually been released to RJE from another MCS and do not belong to an RJE family of stations (PROCESSOR, RSC, CARDREADER, LINEPRINTER, or FTS).

When a non-RJE terminal is released to RJE, any log-on and or station-id checks required by RJE are performed. After a successful log-on, the terminal responds in the same way as an RSC of any RJE family of terminals, including all restrictions placed on the terminal SYSTEM/SCTABLEGEN. All RJE "*" commands are valid, and access to WFL through CONTROLCARD is allowed. The *RE or BYE command is required in order to return the terminal to the original MCS. In subsequent discussions in this manual, non-RJE terminals that are released to RJE are considered to be RSCs.

OUTPUT MESSAGES

The four basic types of RSC output messages are local, log-on and log-off, RJE, and system messages. The following subsections discuss these message types.

Local Messages

Messages generated by the remote computer pertain to its own control and error handling; examples of these messages are "READER HOPPER EMPTY," "PRINTER OUT-OF-PAPER," and "MODEM TRANSMISSION ERROR." The formats of these messages depend on the type of RJE satellite used.

Log-on and Log-off Messages

The following procedure must be used in order to employ RJE in a secured-terminal environment (an environment in which every user of an RJE terminal is required to supply the MCS with an acceptable usercode and password and, possibly, with an accesscode and/or a chargecode).

In this discussion, the remote computer is assumed to be a B 776. First, a valid usercode must be recorded in the SYSTEM/USERDATAFILE resident in the main system. If an accesscode is required for that usercode, the ACCESSCODENEEDED indicator for the usercode should be set in the USERDATAFILE. If a chargecode is required for that usercode, the CHARGEREQ indicator for the usercode should be set in the USERDATAFILE.

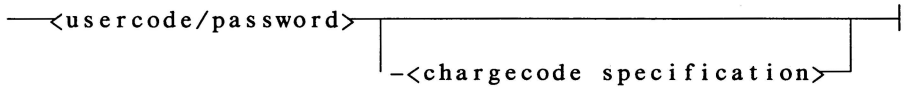
Next, after establishing contact between the RJE terminal and the Data Comm subsystem (for example, by dialing-in), the RJE operator enters HELLO at the RSC. This HELLO message is a "handshake" message to the RJE MCS, and any other keyin is interpreted as a usercode. If the central system or Data Comm line is not operating, the RJE terminal displays the following message at the RSC (after a brief delay):

```
.MDM-RETRY ERR
```

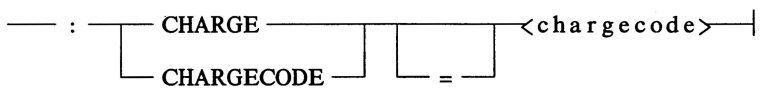
If a connection exists, RJE displays the following messages at the RSC:

```
B6700 SYSTEM/RJE SYSTEM#<system id> HOSTNAME = <system hostname>
<version number>

MIX=<MCS mix number>

#USERCODE?
```

The syntax for logging on is as follows:



<chargecode specification>



The RJE operator may then enter the usercode and password on the same line, separated by a slash ("/") or a blank space. (A chargecode may also be required.) If the usercode or password is not supplied, RJE displays the prompt "ENTER USERCODE PLEASE." or "ENTER PASSWORD PLEASE." If no password is designated, a period is placed after the usercode. For remote terminals that use the period as a control character (for example, B 700 series machines), the NOPASSWORD RJE command may be used to allow running without specifying a password. If the usercode or password is invalid, RJE responds with the following RSC message:

#SECURITY ERROR, ENTER USERCODE.

The usercode and password pair must then be reentered. If an accesscode is required for all users because RJE was compiled with ACCESSDEFAULT set (refer to RJE COMPILE-TIME OPTIONS in Section 7), because the RJE control message "SO ACCESSCODE" was used (refer to SO in Section 5), or because the ACCESSCODENEEDED indicator was set for that user in the USERDATAFILE, RJE displays the prompt "ACCESSCODE?". After an accesscode is entered, RJE displays the following message:

AND YOUR ACCESSCODE PASSWORD

A period may be entered if the accesscode has no password. The accesscode and password are validated in the USERDATAFILE. If valid, the accesscode and password are applied to all jobs entered at the RSC unless an explicit accesscode or usercode specification appears in the job input. If the accesscode and password are not valid, RJE responds with the following prompt:

INVALID ACCESSCODE/PASSWORD, ENTER ACCESSCODE

RJE is not logged on until a valid accesscode and password have been entered. If HELLO is entered, RJE aborts the log-on attempt and asks for the usercode again.

If RJE does not require log-on and no default usercode is assigned, no default accesscode can be assigned.

RJE records accesscodes at the beginning and end of session messages.

If RJE is logged on with a default usercode, the RJE *ACCESS command (refer to *ACCESS in Section 4) may be used to change the accesscode, to add the accesscode if no accesscode is present, or to delete the accesscode.

After the user identification and accesscode (if requested) are found to be valid, RJE displays the following RSC message:

<RJE station name> LOGGED ON AT <time> <date>
SESSION <session number>.

The RJE user may then proceed with job introduction and RSC activity. If user identification is not required for log-on, the MCS does not ask for the operator's usercode but issues the logged-on message immediately after RJE identifies itself.

NOTE

LOGONCHECK is used to validate log-on attempts, chargecode changes, and accesscode changes; it can also be used to examine security violations. Violations detected by LOGONCHECK are displayed at RJE stations. The display indicates whether LOGONCHECK is going to clear, save, or disconnect the station at which the violation has occurred.

If the LOGONCHECK entry point to the SECURITYSUPPORT library is enabled, the following message is displayed:

```
#WILL USE LOGONCHECK ENTRY POINT
 IN SECURITY SUPPORT LIBRARY
```

If the <chargecode> is required and not specified after the <usercode/password>, the user receives the following message:

```
#ENTER CHARGECODE PLEASE
```

If an invalid or syntactically incorrect chargecode is entered, the <usercode/password> must be reentered.

If the run-time option STATIONID is used, entry of a valid station name is a required part of the log-on sequence. (Refer to STATIONID under *SO in Section 4.)

The MCS notifies the newly logged-on terminal of any pending printer or punch backup files. Printing or punching starts automatically if the AUTOBACKUP terminal option is set.

The remote operator enters "BYE" or "*BYE" to terminate a session at an RJE terminal.

RJE Output Messages

The RJE MCS presently issues two types of RSC output messages: RJE status messages and messages issued in response to RJE input messages.

RJE status messages include the "card reader not ready" message and run-time messages resulting from central operator activity. The card reader message has the form "#CR NOT READY." and indicates that the copy of the WFL compiler processed by RJE to service this card reader has not yet gone to EOT and that an unacceptable amount of time has passed since RJE has received card input from the remote reader. This message usually indicates one of two things: either the job deck just read in did not end with an appropriate END or END JOB control card, or the combination of a slow card reader and line errors slowed the rate at which RJE was sent blocks of card images. The card reader may be cleared using the "*CL" RJE input message (which discards the cards already read in), or the remainder of the job deck may be read in.

The RJE messages issued in response to central operator activity include text directed to a terminal by the system operator, notices that indicate the system operator has changed the run-time RJE environment, and notices that RJE has been forced out of the job mix. These messages are preceded by a "#".

The RSC messages issued by the MCS in response to RJE keyins are discussed for the individual commands in Section 4.

System Output Messages

035 All other messages displayed at the RSC are generated by the MCP. These messages have formats identical to those displayed at the main system and include RSVPs, displays, task status messages, and replies generated in response to system input messages entered at the RSC. (Refer to System Input Messages in this section.)

INPUT MESSAGES

The three basic types of RSC input messages are RJE input messages, RJE control messages, and system input messages. The following subsections discuss these message types.

RJE Input Messages

The RJE MCS is designed to provide an interface between the RJE user and the MCP that services the user's RSC keyins. Complete transparency of this interface is impossible because many RSC keyins must be provided in order to communicate directly with the MCS; therefore, any RSC input message beginning with the character "*" is handled directly by RJE. These RJE input messages provide control over the following areas of MCS activity:

1. Session log-off.
2. MCS debugging aids.
3. AUTOBACKUP routine activity.
4. States of RJE terminal run-time options.
5. Data Comm reconfiguration.
6. Interterminal communication.
7. MCS environment interrogation.

A complete list of RSC keyin statements including a detailed discussion of each statement is contained in Section 4.

RJE Control Messages

The activity of the RJE MCS can be interrogated or controlled using control messages. These messages are preceded by an SM and can be entered through the main system operator console using the "<RJE mix#> SM ODT" message or through an RSC (either an RJE RSC or an independent station) terminal using the *SM message if that terminal is allowed to do so (that is, if the station is defined in NDL with SPO = TRUE or if the RSC or SPO RJE control message is used; refer to RSC and SPO in Section 5 and to RJE COMPILE-TIME OPTIONS in Section 7). A complete list of RJE control messages including a detailed discussion of each statement is presented in Section 5.

System Input Messages

All RSC input messages not prefixed by an asterisk or the control character of the remote site are sent to the MCP in the form that are keyed in. The MCP then generates appropriate responses, which are issued to the RSC at which the input message was keyed in. The RSC is designed to resemble the main system ODT as closely as possible. However, security restrictions impose certain constraints on RSC keyins. For example, the usercode under which the session is active is imposed on the PD input message so that only the user's own usercode directory may be interrogated. Also, certain keyins such as those which alter main system options or purge or clear main system peripherals are disallowed when entered at an RSC. The legal system input messages are indicated in SCTABLEGEN, and the imposed constraints may be altered by altering SYMBOL/SCTABLEGEN (the input to SYSTEM/SCTABLEGEN). The output of

SYSTEM/SCTABLEGEN is a patch file for the CONTROLLER (used in the MCP compilation); refer to SPO REQUESTS in Section 6 and to Section 14 of the B 5000/B 6000/B 7000 Series System Software Operational Guide, Volume 2.

WFL statements may be entered at an RSC in the same way as at a main system ODT. Mix-related ODT input messages may refer only to jobs initiated by the terminal at which the BEGIN is entered.

As of the 3.2 release, the following ODT messages are available to the RJE user (mainly for inquiry): A, AX, C, CU, DBS, DS, DUMP, FA, FR, HI, IB, J, LOG, MM, MSG, MX, NS, OF, OK, OL, OT, PD, PER, PF, PR, PV, QF, QT, RM, S, SM, SP, SQ, SS, ST, SUPPRESS, TD, TERM, TF, THAN, TI, W, WM, and WY. The interrogative forms only of the following ODT messages are legal: CS, DQ, FORM, HN, ID, LL, ML, NET, OP, SB, SC, SI, SL, and UQ.

The following non-mix keyins are legal as of the 3.2 release: this time: LOG, MM, OL, PC, PD, PER (or P), PI, QF, SP, SQ, SS, TF, TO, WD, WI, WM, WS, and WT. The interrogative forms only of the following keyins are legal: CF, CM, DC, DM, DQ, FORM, LL, MIXL, RO, SB, SO and UQ.

Appendix B contains summary descriptions of ODT messages that are legal for RJE.

BACKUP FILE HANDLING

Backup files generated by RJE-initiated jobs are placed in directories separate from those employed at the main system. All printer backup is placed in the "REMLP<MCS number>" directory, and all punch backup is placed in the "REMCP<MCS number>" directory. For example, if task 1235 of job 1234 initiated by an RJE terminal generates a printer file with the name LINE, and RJE has the MCS number 2 assigned by default in the NDL software, then that printer file is on disk with the following title:

REMLP02/0001234/0001235/000LINE

When job 1234 goes to EOJ and the terminal option AUTOBACKUP of the RJE terminal that initiated the job is set, then the AUTOBACKUP routine of RJE is processed to output backup for this job. If the terminal has LSN number 38, this task has the following name:

AUTOPRINT/LSN038/#1234.

If a FORMMESSAGE is associated with the backup file, RJE associates a printer with this FORMMESSAGE. The task outputs the printer file at the remote printer after the execution summary of the job has been printed and along with the other printer files generated by the tasks of the job which are destined for the originating terminal. Messages indicating the removal of these backup files are issued at the RSC by the MCP as the files are output.

RJE searches DISK, PACK, and the DLBACKUP families (refer to *SB in Section 4) for REMLP and REMCP files. The location of the DLBACKUP is tested only at RJE BOJ and is used only if it points to a family other than DISK or PACK. If DLBACKUP is changed to a family other than DISK or PACK with RJE active, then RJE does not find any REMLP file created on the new family. The REMLP files can only be found by issuing a QUIT to RJE and reinitializing with the correct DLBACKUP. This procedure causes RJE to rebuild its print queues from DISK, PACK, and the new DLBACKUP family. RJE does not find any files on the old DLBACKUP family (if the family is not DISK or PACK) which have not been printed.

If a task running under SYSTEM/CANDE directs a printer file to an RJE printer (refer to DESTNAME in Section 6), the pound sign ("#") is replaced by a "C" in the job number of the AUTOPRINT or AUTOPUNCH routines (for example, "AUTOPRINT/LSN038/C1234").

HOST-TO-HOST COMMUNICATION

The RJE MCS can be used to perform certain operations between a Burroughs large system and another host (another Burroughs large system, a medium system, or a small system). Two special operations are available: file transfer and terminal transfer. For two hosts to have these capabilities, a hardware link must exist between the two hosts, and certain NDL/NDLII specifications must be met. These requirements are explained under File Transfer and Terminal Transfer in this section.

File Transfer

SYSTEM/RJE allows files to be transferred between two host systems or between a host system and a terminal. Files are transferred through a station added to a site's NDL for each RJE station family. This new station has a device address of "04" but no other special attributes. (An example of this new station can be found in the 3.2 SYMBOL/SOURCENDL file; refer also to Appendix C.)

Because file transfer is symmetric, it may be invoked between any two systems without regard to "host" status as opposed to "terminal" status; thus, the term "host" is used in the reminder of this manual. The two classes of connection between hosts are "peer" and "non-peer." A peer host is a system of the same software type; for example, B 6700, B 6800, and B 7700 are peers, but a B 1800 connected to a B 6800 is a non-peer. In the remainder of this manual, a peer host refers to two large system hosts.

039 File transfer is supported for disk and pack files with the following restrictions:

1. Only code and eight-bit data files (including text files) may be transferred.

2. Only one file at a time may be transferred in each direction.

3. File titles cannot be longer than 100 characters.

4. The following restriction applies only to non-peer connections. To support code file (and, in same cases, data file) transfers, RJE must scan every record looking for characters that are outside the "valid character" set. When a record with an invalid character is found, the whole record is translated into a new form that contains only valid characters but is twice the original length. If this new record length or the original record length (MAXRECSIZE) is larger than the allowed file-transfer BLOCKSIZE, the transfer is terminated.

A file transfer is initiated by entering an RJE COPY control message (refer to COPY in Section 5) on the terminal (if permitted) or at the host ODT. This command specifies the source and destination hosts and file titles. The hosts are specified using the respective hostnames. In the case of a large system host (for example, a B 6800, B 6900, or B 7700), if the HN ODT command has not been used, then SYSTEM/RJE creates a hostname at run time. This hostname is the letter "B" followed by the four-digit system model number (6900, 6800, and so forth) and the three- or four-digit system serial number. Sites that have specified a hostname using the HN ODT command use the specified hostname. If two sites are connected to a host with the same hostname, requests to transfer files may not produce the desired results.

The actual transfer of a file is initiated by the exchange of control information between the hosts. If the specified source host is the user's local host, the transfer is a "put"; if the source host is the remote host, then the transfer is a "fetch". Thus, if the file to be transferred from a local host to a remote host is on the local host, a copy request generates a put control message; if the file is on the remote host, the copy request generates a fetch control message. All file transfers occur as "puts"; if one host wishes to do a fetch, it sends a fetch message to the other host, causing the other host to initiate a put sequence. The put message elicits a put reply, which signals that data transfer may begin, or supplies a reason for the rejection of the put request. If the transfer is OKed, the sending host then sends one or more data messages followed by an end-of-file message to device address "04". The sending host processes a task called "FILEX[<LSN>], where <LSN> is the LSN of the station connected to the remote host. This task, which runs independently of SYSTEM/RJE, opens the requested source file and performs any data compaction or translation required in the course of the transfer. The receiving host processes a task called "FILER[<LSN>]", which also runs independently for the destination file. When the file transfer has completed, the receiving host informs the requestor that the request has completed.

NOTE

All MAXRECSIZE and BLOCKSIZE values in RJE put or fetch records are the same as if the requested file were of type CHARACTERS. When a file with UNITS EQUAL 0 (WORDS) is requested for transfer, the MAXRECSIZE and BLOCKSIZE are adjusted to the UNITS EQUAL 1 (CHARACTERS) values for transmission. If the receiving host is a B 6000/B 7000 series system and UNITS EQUAL 0, the destination file has its MAXRECSIZE and BLOCKSIZE adjusted back to WORDS. For non-B 6000/B 7000 series destination hosts, no record type of WORDS exists, and all files remain in CHARACTERS format.

Any file transfer requests that occur while another transfer is in progress are queued and then executed when possible. When a request is queued, the following message is displayed:

#FILE TRANSFER STATION IN USE - COPY REQUEST WILL BE QUEUED.

All requests are queued as puts; thus, if a user requests a copy that causes a fetch to be generated, the request is sent to the other host and may be queued for the reason given above. If the COPY request is syntactically correct and passes resident and security checks, the following message is displayed:

#COPY REQUEST VALID - WILL FORWARD.

The other host responds with either an error display or a "request accepted" display; in the latter case, the transfer then starts.

All files from non-peer hosts are locked as type DATA; files from peers are locked with as many of the attributes of the original file as possible (including FILEKIND).

RJE locks with CRUNCH all files that are crunched on the source host.

FILE TRANSFER ABORT

RJE aborts a file transfer when any of the following conditions occur:

1. Program fault in either FILEX or FILER tasks (for example, SEG ARRAY or INVALID INDEX errors).
2. Operator DS of either FILEX or FILER tasks.
3. Parity error while reading the input file in FILEX.
4. The result of expanding a record because of an invalid character (non-graphic) produces a record greater than the file transfer BLOCKSIZE.
5. The file has become unavailable before the file transfer has begun.

All of these error conditions produce a message to the originator stating the reason for the abort. This error message has the following format:

#FT ABORT @ <hostname> - <abort reason>

<hostname> is the hostname at the site where the abort occurred. <abort reason> is one of the following:

1. OPERATOR DS
2. PROG FAULT(TYPE=X, CAUSE=Y, REASON=Z)

NOTE

X, Y, Z are fields of the HISTORY task attribute.

3. EXPANDED RECORD > FT BLOCKSIZE
4. PARITY READING REQUESTED FILE
5. FILE NOT AVAILABLE

FILE TRANSFER SECURITY

RJE file transfer correctly handles the source and destination files with regard to security. The following restrictions are enforced:

1. A nonprivileged usercode cannot use the "*" syntax to copy nonusercode files. If this syntax is used, the following error message is displayed:

   # FILE MUST BE IN OWN DIRECTORY.

2. A nonprivileged usercode cannot use the "*" syntax to create a nonusercode file. If this syntax is used, the following error message is displayed:

   # FILE MUST BE CREATED IN OWN DIRECTORY.

3. A nonprivileged usercode may only copy other usercode files if the security of the file allows it. If the security requirements are not met, the following error message is displayed:

   # FILE <filename> NOT RESIDENT.

4. A nonprivileged usercode may not create a file under a different usercode. If such an attempt is made, the following error message is displayed:

   # FILE MUST BE CREATED IN OWN DIRECTORY.

None of the preceding restrictions applies to privileged usercodes.

FILE TRANSFER RECOVERY

During a file transfer, if one or both of the hosts stops (for example, because of a Halt/Load, RJE fault, or DCP failure), SYSTEM/RJE stores enough information about the transfer to restart the transfer at the point that the transfer left off. This restart is done by storing the current record counts and copy requests in the RJE linkfile (refer to RJE HALT/LOAD RESTORE in this section).

On the receiving host, the destination file is not created directly, but a temporary file is created to allow restart and recovery. This temporary file is called "FILERFILE[<LSN>]" and is created under the destination usercode unless it is a system file (*) on the destination <volume name>. When the transfer has successfully completed, the temporary file is retitled and locked.

At initialization, RJE checks to see if any file transfers involving RJE were not completed. The following conditions are required in order to continue a file transfer:

1. Connection is made to the same host on the same station (Data Comm line) which was last using that station.

2. The linkfiles on both hosts are still intact (and have not been removed).

3. The temporary output file on the receiving host is available.

If these conditions are met, at initialization the receiving host requests that the file transfer continue. The SEND and RECV lines displayed in response to an FTS control command (refer to FTS in Section 5) have the word RESTARTED in parentheses for any file transfer that has been continued.

If the Data Comm line is to be reconnected to a different host, all queued requests and active requests are deleted and all restart information is discarded.

RJE MESSAGES FOR FILE TRANSFER

A set of RJE messages and control messages is available to use and control the file transfer capabilities. Sections 4 and 5 contain complete syntax and semantics for these messages; a summary of these messages follows.

RJE Messages

*SF	Specifies the sizes of various buffers used by RJE. (This message is similar to the SF control message.)
*TF	Displays the RJE buffer sizes.

RJE Control Messages

COPY	Request to initiate a file transfer.
ABORT	Request to abort a file transfer.
ONLINE	Initiates the connection between two hosts.
OFFLINE	Causes the termination of the Data Comm connection between two hosts.
PH	Displays, clears, changes, or retries the auto-call unit (ACU) phone number associated with the station.
SF	Specifies the characters per transmission blocking factor buffer of a remote printer and the maximum number of characters allowed in a file transfer block.
TF	Displays the information specified by the SF control command.
FTS	Monitors file transfer activity.

Terminal Transfer

In this manual, the terms "local" host and "remote" host have the following meanings: the "local" host is the system to which the terminal is physically attached; the "remote" host is the system where the desired application is located.

Because terminal transfer requires the use of a File Transfer Link, the user should be familiar with the RJE control messages ONLINE, OFFLINE, FTS, and WH (refer to Section 5). Also, some NDL conventions must be followed in order to use terminal transfer.

The following restrictions apply to terminal transfers:

1. A "break" cannot be sent over the SYCOM link to stop output from being generated on the remote host.

2. Unpaged CANDE sequence mode is not supported for transferred terminals.

3. Logical I/O carriage control (SKIP, SPACE, STOP, and NO) is ignored.

Two types of stations must be declared in NDL to handle terminal transfer: "virtual" stations and "pseudo-stations."

VIRTUAL STATION

First, a virtual station must be declared in the NDL for both hosts connected to the same line as the RJE family. (This family includes devices "00" [processor], "01" [RSC], "02" [card reader], and "04" [FTS]). The method for conveying terminal data between hosts uses the device address field (DA1 and DA2) of this virtual station. "DA1, DA2" in this context is termed a "virtual station address" and is used by the local and remote hosts to refer to a particular terminal. The following addressing scheme is used:

1. DA1 and DA2 are ASCII letters, one uppercase and the other lowercase.

2. If "DA1, DA2" is the transmit address for a particular terminal, then "DA2, DA1" is the receive address for that terminal.

3. When the local host refers to a terminal (by transmit address), "DA1" is a lowercase letter and "DA2" is an uppercase letter. When the remote host refers to the same terminal, because the transmit and receive roles of the terminal are reversed, "DA1" is an uppercase letter and "DA2" is a lowercase letter.

4. If a local host supports <n> different terminals connected to a particular remote host, the local host refers to these terminals by the following virtual station addresses (as transmit addresses):

   aA, bA, cA,..., zA, aB, bB, cB,...,

The remote host refers to the same terminals by the following virtual station addresses (also as transmit addresses):

Aa, Ab, Ac, ..., Az, Ba, Bb, Bc,...,

(These last addresses are the receive addresses of the local host.)

The local and remote hosts decide independently how many terminals each supports; thus, these numbers are likely to be different. Examples of virtual station declarations are found in Appendix C and in the SYMBOL/SOURCENDL file under the RJE1 family of stations. In the SYMBOL/SOURCENDL example, four virtual stations are declared: VSIN1RJE1 and VSIN2RJE1 (receiving stations) and VSOUT1RJE and VSOUT2RJE1 (transmitting stations used when RJE1 is acting as the local host). The number of stations and their types (input or output) determine the number of terminals that can be transferred at any time. In the RJE1 family in the examples in SYMBOL/SOURCENDL and Appendix C, the host can support two input terminals as a remote host and two output terminals as a local host. The virtual stations described previously have a terminal type of VSRJEA for asynchronous and VSRJES for synchronous operation. Because terminal classes cannot be assigned in the NDL, the terminal type is used to distinguish stations within RJE. Any terminal type that starts with letters "RJE" is assumed to be an RJE terminal with device addresses in the range "00" to "04" (for example, RSCs and line printers). Terminal types that do not start with "RJE" are assumed to be virtual stations. This addressing scheme may require users implementing terminal transfer whose NDL specifications do not conform to those listed previously to change and recompile their NDL.

PSEUDO-STATION

A remote host uses a "pseudo-station" to transfer data from the RJE File Transfer Link (input virtual station) to a station controlled by another MCS (for example, CANDE or APL). A pseudo-station has the same characteristics as a virtual station, except that the device addresses are "09", "09". (The RJE1 family station in the SYMBOL/SOURCENDL file example has two examples of this type of station.) The pseudo-stations are handled in a pool by RJE; thus, all pseudo-stations are available to any virtual station attached to RJE on the host, and a pseudo-station need not be assigned to a particular line. However, a line assignment is required. One pseudo-station should be declared and assigned to a line for every input virtual station attached to RJE.

RJE MESSAGES FOR TERMINAL TRANSFER

A set of RJE messages and control messages is available to use and control terminal transfer in addition to the messages normally used with file transfer. A summary of these messages follows. (Refer to Sections 4 and 5 for complete descriptions of these messages.)

RJE Messages

*CT	Causes an attempt to attach the user's terminal to RJE on the remote host.
*DT	Unconditionally disconnects the station from a remote host.
*RE	Releases the terminal to a specified MCS.

RJE Control Messages

VS	Displays the status of all virtual stations associated with RJE.

SAMPLE RJE TERMINAL TRANSFER SESSION

The following paragraphs illustrate terminal transfer between two B 6800 systems.

SYS1 Stations	SYS2 Stations
RJE1 (device address "00")	RJE2 (device address "00")
RJE1RSC ("01")	RJE2RSC ("01")
RJE1CR ("02")	RJE2CR ("02")
RJE1LP ("03")	RJE2LP ("03")
RJE1FTS ("04")	RJE2FTS ("04")
VSOUT1 ("Aa", "aA")	VSIN2 ("aA", "Aa")
	PSEUDO2 ("09", "09") LSN 19
TD83XX ("XX") LSN 296	

The stations described in the preceding table form the Data Comm network on two systems with hostnames SYS1 and SYS2. All the stations on SYS2 are assigned to a single line and form an RJE family. The TD83XX station on SYS1 is a TD830 terminal attached to SYSTEM/CANDE; the remaining stations form an RJE family.

The two hosts are assumed to be connected by a File Transfer Link between RJE1FTS on SYS1 and RJE2FTS on SYS2. The user at station TD83XX wishes to use SYSTEM/CANDE on host SYS2 and enters the following:

```
?MCS SYSTEM/RJE
```

This message causes CANDE to release control of the station to SYSTEM/RJE, and the following messages are displayed:

```
#END SESSION 4567 ET=2:13:49 PT=0:0 IO=0:0
#USER = MIKE 11:40:31 04/28/80
[296] RELEASE COMPLETED
```

The "#END SESSION" and "#USER" messages are from CANDE. The third response is from RJE and shows that the release was successful. RJE then controls TD83XX and responds to any input from that terminal. The RJE input HELLO should be used at this point to activate the station; RJE then gives the following response:

```
B6800 SYSTEM/RJE SYSTEM #456 HOSTNAME = SYS1 32.82.48
MIX = 6019.
```

At this point, RJE either asks for a usercode and password or assigns a session, depending on the setting of the run-time option LOGON. (Refer to LOGON under SO in Section 5.) In this example, LOGON is not set, and RJE displays the following messages:

```
TD83XX LOGGED ON AT 11:41:02 04/28/80.
SESSION 6282.
```

The terminal user may then use any RJE input command (refer to Section 4) or system input message (refer to Appendix B). The following examples show several commands and RJE responses.

```
WT
    TIME IS 11:50:23


*TF
    #BLKSZ = 400 BUFSZ = 830 FTBLK = 1500



*BACKUP
    #NO BACKUP FILES.
    #END BACKUP REQUEST


A
    --- NO ACTIVE ENTRIES ---
```

If TD83XX has the NDL SPO bit set, the *SM command is also valid for use (refer to Section 5). The following examples illustrate uses of this command and the resulting RJE responses.

```
*SM WH
    [084] ACTIVE RJE @ SYS2 (6800) (TTP, FTS[RS], HOST, VER=2)

*SM FTS
    [084] RJE1 @ SYS2 NO ACTIVE FILE TRANSFER
```

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Once the terminal is released to RJE on SYS1, the connection to SYS2 is made using the "*CT <hostname>" command (refer to *CT in Section 4).

```
*CT SYS2
```

If the transfer is successful, RJE on host SYS1 displays the following response:

```
#SUCCESSFUL TERMINAL TRANSFER TO HOST SYS2.
```

RJE on SYS1 has associated TD83XX with the virtual station VSOUT1 and is transferring all input and output between them, while RJE on host SYS2 is reading and writing to station VSIN2. At this point, the terminal user can use any RJE commands or the system input commands allowed on the remote host SYS2.

If the terminal user then wishes to use SYSTEM/CANDE (or any other MCS) or the remote host SYS2, the *RE command (refer to *RE in Section 4) is used as illustrated below:

```
*RE SYSTEM/CANDE
```

If the release to CANDE is successful, the following response is displayed:

```
#B6800  :678 CANDE 32.58: YOU ARE PSEUDO2(19)
#RELEASE COMPLETED
#ENTER USERCODE PLEASE
```

At this point, the terminal user is attached to SYSTEM/CANDE on the remote host SYS2. On SYS2, the virtual station VSIN2 is then associated with the pseudo-station PSEUDO2, which had been released to CANDE. For the duration of the connection, all input from the terminal goes to CANDE on SYS2 while all

output from CANDE goes to the user's terminal on SYS1.

When the user is finished with CANDE on SYS2, he must release the pseudo-station to RJE by entering the message "?MCS SYSTEM/RJE" to CANDE. At this point, the user is again connected to RJE on SYS2. The following responses are displayed:

```
#END SESSION 2645  ET=6.3  PT=0.0  IO=0.0
#USER=MIKE  09:01:39  09/14/81
B6800 SYSTEM/RJE SYSTEM # 678 HOSTNAME=SYS2 32.082.42 MIX=2139
[19] RELEASE COMPLETED
```

To break this connection, the *DT command is entered (refer to *DT in Section 4); the following response is displayed:

```
#TERMINAL TRANSFER TO HOST SYS2 HAS BEEN TERMINATED
```

The user is then communicating with RJE on the local host SYS1; the BYE message returns the user to SYSTEM/CANDE.

HALT/LOAD EFFECTS

If the remote host Halt/Loads while a terminal is connected to it, association between the remote virtual station and pseudo-station is lost, and any tasks using these stations are DSed. The user should use the *DT command (refer to DT in Section 4) tc free his terminal from the local virtual station in order to be able to communicate with the local RJE. Once the remote host is back up and the File Transfer Link is active, the terminal can be retransferred.

If the local host Halt/Loads, the user's terminal is released back to its original MCS by the reinitializing DCP. At this point, the remote pseudo-station is still released to the MCS that last owned it and remains released until the station is manually released back to RJE by that MCS or when the remote host next Halt/Loads. Until the pseudo-station is released back to RJE, the pseudo-station is not available to any virtual station.

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RJE HALT/LOAD RESTORE

The RJE MCS employs a disk file with the internal name LINK and the title "SYSTEM/<MCS name>/LINKFILE" to save information regarding the terminals under its control in the event of a Halt/Load.

Including the MCS name in the linkfile title allows multiple copies of RJE (with different names) to run at the same time and not interfere with each other through their link files. For example, SYSTEM/RJE has the linkfile title "SYSTEM/RJE/LINKFILE." If another copy of the RJE MCS is present with the name SYSTEM/RJEXX, this second copy must have a linkfile with the title "SYSTEM/RJEXX/LINKFILE (in order to be declared in the site's NDL).

Such items as the states of the various run-time terminal options, usercodes, and phone numbers are saved in the linkfile. The linkfile is always created and sought on the family where the MCS is running. The linkfile consists of a minimum of two 240-word records. The first record contains the mix number and version for RJE and the date and time of the latest NIF and DCPCODE files. The remaining records consist of 60-word blocks containing information about each terminal followed by 60-word blocks containing restart information for AUTOBACKUP and file transfer.

The present layout of the linkfile is as follows:

Record 0: Linkfile Information Record

(240 words per record)

Word	[0]	= RJE mix number.
	[50]	= NDL compilation date.
	[51]	= NDL compilation time.
	[52] - [53]	= RJE level (version).
	[54]	= MAXTERMINALS.
	[55]	= Number of attached stations.
	[56]	= Linkfile version.
	[57]	= Run-time options.
	.[03:01]	= SPO.
	.[02:01]	= RSC.
	.[01:01]	= FTSBUG.
	.[00:01]	= Wait state.
	[58]	= MAXRJETERMINALS.

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Record 1: Terminal Information Blocks

These records contain five blocks of 48 words each, as follows:

Word	[0]	= Terminal status word.
	[1]	= Session number.
	[2] - [3]	= Not used.
	[4] - [7].[47:24]	= Usercode.
	[7].[23:24] - [10]	= Accesscode.
	[11]	= Callback information.
	[12] - [13]	= File transfer information (FTQARRAY).
	[14]	= Print queue information word.
	[15] - [47]	= Job numbers queued for output.

Record (RESTARTRECORDLINK): AUTOBACKUP Restart Records

These records contains five blocks of 48 words each, as follows:

Word [0].[15:16]	= Job number being printed.
[23:08]	= RJE-supplied uniqueness number.
[1].[47:16]	= Backup record at which to resume.
[31:12]	= Index within backup record.
[2].[47:08]	= # of characters in directory PBed.
[38:12]	= User-specified number of copies.
[27:12]	= User-specified save or not.
[23:04]	= # of levels in directory.
[19:04]	= Directory full file name.
[3].[47:12]	= Copies printed.
[35:12]	= # of characters of current file.
[5] - [47]	= Name of file currently printing.

Record (CALLBACKRECORDLINK): Callback Phone Numbers

These records consist of 20 blocks of 12 words each. Each record contains the callback phone number for a specific UNITNUMBER.

Word [0].[47:08]	= Length of phone number.

Record (RECVSTORE): FILER Restart Recovery Records

This record consists of 3 blocks of 80 words each, containing a copy of FTRECV for restart capabilities. One record is present for each file transfer station.

Record (COPYQUEUE): Queued Copy Requests (FILEX)

These records consist of 240 words and contain all link heads and tails pointers and all queued counts. One word is present for each file transfer station, with UNITNUMBER the index into the record; each word has the following format:

[47:08]	= Number of entries in list (puts queued).
[39:04]	= Relative block number of tail of list.
[35:16]	= Relative record number of tail of list.
[19:04]	= Relative block number of head of list (current).
[15:16]	= Relative record number of head of list.
Word [238]	= Points to last record and block in use.
Word [239]	= Points to head and tail of the available record and block list.

Record (COPYQUEUE + 1)

These records contain three blocks of 80 words each, as follows:

Word [0]	= Link to next entry in list (0 = last entry).
.[19:04]	= Relative block number of next entry.
.[15:16]	= Relative record number of next entry.
Word [1] - [79]	= Copy of FTSEND.

NOTE

The structure of this file is subject to change on future releases.

If the RJE MCS is terminated with a fault, the linkfile should be removed before the MCS is reactivated.

To ensure the correct linkfile format, SYSTEM/RJE checks the "linkfile version" stored in word 56 of record 0 at initialization. If the version of SYSTEM/RJE and its linkfile do not agree, the linkfile is discarded. In addition, the linkfile is discarded whenever a possibility exists that it is incompatible with a new Data Comm environment. Currently, an old linkfile may be discarded for any of the following reasons:

1. NDL file (DCPCODE and NIF) changes.
2. MAXTERMINALS in SYSTEM/RJE has changed.
3. Linkfile version not correct.
4. Parity error in reading old file.

Each of these conditions causes SYSTEM/RJE to display an appropriate message.

NOTE

The RJE run-time options (WAIT, FTSBUG, SPO, and RSC; see Section 5) are maintained at BOJ, even if the old linkfile is being purged due to incompatibility.

Following a Halt/Load, RJE automatically restarts a session to a remote terminal at the host site, provided that the following statements are true:

1. The remote terminal was active before the Halt/Load.
2. The remote terminal had the run-time option LOGON reset (no usercode was required).
3. The linkfile was inactive after the Halt/Load.
4. The remote terminal was on a leased (non-switched) line.

RJE then displays its header message followed by the word "RESTARTING." Any AUTOBACKUP that was running at Halt/Load time is continued or restarted, depending on the setting of the user terminal option CONTBACKUP (refer to CONTBACKUP under *SO in Section 4). Any card input or "WFLCOMPILER[xx]" task that was active is lost.

RJE does not restart automatically after a Halt/Load if it was initiated in either of the following ways:

1. Run using the ODT primitive "??RUN".
2. Run by the DCP in response to new station activity.

In the preceding cases, RJE restarts only when:

1. Station activity is present.
2. RJE is forced to run using the WFL RUN command (or ??RUN ODT primitive).
3. EOT or EOJ notification from the CONTROLLER of an AUTORECOVERY has restarted an RJE task or job.

For RJE to restart automatically, the AUTORECOVERY and AUTODC run-time ODT options must be set and RJE must have been run (not using the "??RUN" ODT primitive).

Regardless of how RJE restarts, if the conditions described in the preceding paragraphs are met, the remote terminal restarts. Also, RJE marks a station as active if all of the following conditions are true when RJE is restarted:

1. The station was active at the termination of the prior execution of RJE.
2. The station is on a leased (nonswitched) or direct connect line.
3. NOLOGON is set (station does not require usercode/password).
4. No accesscode or station ID is required.

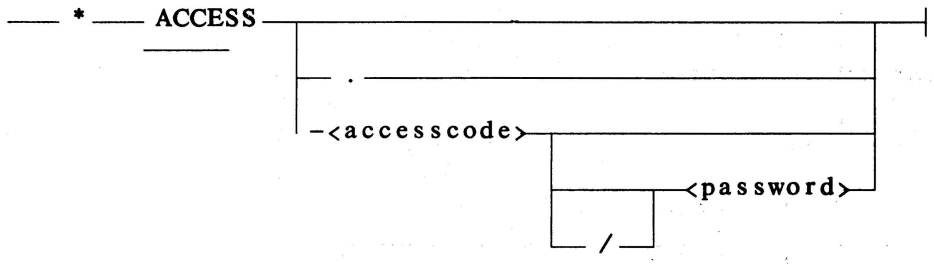
4. RJE INPUT MESSAGES

INTRODUCTION

Three types of input messages are accepted by RJE: RJE input messages, RJE control messages, and system ODT input messages. In order to avoid conflict with the system ODT messages, which are forwarded to the MCP CONTROLLER, all messages that are handled directly by the RJE MCS must begin with the character "*". These RJE input messages are presented in this section with syntax and semantics descriptions.

*ACCESS

Syntax



Semantics

The *ACCESS command interrogates or changes the accesscode of a session.

ACCESS returns the current accesscode for the session (not including the password).

ACCESS . assigns a null accesscode to the session.

ACCESS <accesscode>/<password> assigns or changes the session accesscode after validation in the USERDATAFILE.

Changes of accesscodes to a session are logged.

Example

```
* ACCESS  AC/PW
```

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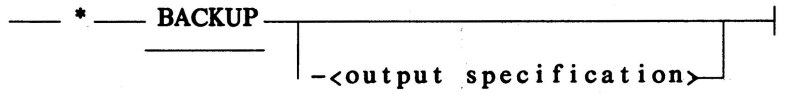
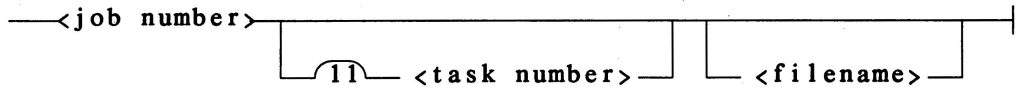
*BACKUP

Syntax



<output specification>



<job number>

Any number between 1 and 9999, inclusive.

<task number>

A slash followed by a number between 1 and 9999, inclusive.

<filename>

A slash followed by a three-digit number and the internal file name. If the internal file name contains nonalphanumeric characters, it must be enclosed in quotes.

Semantics

The *BACKUP command can be used to list all RJE printer output available, printer output associated with a particular job, or a subset of the printer output for a particular job which can be printed at the station. This verb does not show which jobs are queued for output. An estimate of the number of pages required to print the specified file and, if appropriate, the form required are printed along with the output name.

The *BACKUP command is primarily used to display the output available so that a selective subset can be printed using the *ME command.

The "*BACKUP RJE" request runs asynchronously with RJE, allowing the other stations in the RJE network to continue working when large numbers of REMLP and REMCP files are involved.

A "*BACKUP RJE" request that is entered while another such request is in progress results in the following message:

#BACKUP REQUEST ALREADY ACTIVE.

When the RJE print queue is being rebuilt at RJE initialization, BACKUP requests are not allowed and result in the following message:

```
#NOT ALLOWED WHILE PRINT QUEUE REBUILD IN PROGRESS.
```

Any station that requests information during the rebuild is notified that the rebuilding operation is complete by the following message:

```
#PRINT QUEUE REBUILD FINISHED.
```

Examples

The following directory on disk or pack is used in the examples below:

```
REMLP02
.       0000503
.       .       0000520
.       .       .       000CHECKS
.       .       000SUMMARY
.       0000524
.       .       0000531
.       .       .       "000REPORT FOR JOE"
.       .       000SUMMARY
.       0000545
.       .       0000563
.       .       .       000LINE
.       .       .       001LINE
.       .       000573
.       .       .       000F
.       .       000SUMMARY
```

NOTE

"SUMMARY" files are special system files used by RJE to print headings and not shown in output from the BACKUP verb.

The following command is used to show all printer output for this station:

```
*BACKUP

      PRINTER BACKUP
      503/520/000CHECKS,22 PAGES,FORM="CHECKS"
      524/531/"000REPORT FOR JOE",2000 PAGES
      545/563/000LINE,20 PAGES
      545/563/001LINE,25 PAGES
      545/573/000F,10 PAGES
      #
```

The following command is used to show all printer backup for job 545:

```
*BACKUP 545

      PRINTER BACKUP 545
      563/000LINE,20 PAGES
      563/001LINE,25 PAGES
      563/000F,10 PAGES
      #
```

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The following command is used to show printer backup for a subset of the entire job:

```
*BACKUP 545/563

      PRINTER BACKUP 545/563
      000LINE,20 PAGES
      001LINE,25 PAGES
      #
```

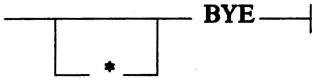
The following command is used to show a specific file:

```
*BACKUP 545/563/001LINE

      PRINTER BACKUP 545/563/001LINE
      25 PAGES
      #
```

BYE

Syntax



Semantics

The BYE message terminates the current session. Any active jobs initiated by the terminal that ends the session are left active. If a copy of the AUTOBACKUP routine is servicing this terminal, the routine is allowed to go to EOT and remove the backup file. But if the remote reader is currently reading a job deck (that is, if a copy of the WFL compiler is currently active and servicing the terminal), then the card reader is cleared and the deck is discarded. When the logged-off terminal is idle and switched, the terminal is disconnected. If no other RJE terminals are currently active, the RJE MCS then goes to EOT.

The MCS responds to a keyin of BYE with the following output message:

<station name> LOGGED OFF AT <time> <date>.

If the card reader had to be cleared, RJE also issues the message:

#CR CLEARED.

The terminal is also notified to disable the remote card reader if it is secured. (The user is required to supply a valid usercode and password before activity may be resumed.)

SYSTEM/RJE may refuse a log-off from a terminal if terminal-initiated jobs are still running and: (1) RJE has no dial-out capabilities; (2) no phone number has been supplied; or (3) the terminal option CALLBACK has not been set. If log-off is refused, RJE issues the following message:

#BYE ABORTED, NEED PHONE NUMBER.

The proper response to this message is either to supply RJE with the terminal <phone number> using the *PH keyin or to reset the CALLBACK option using the *RO keyin. The BYE keyin may then be repeated.

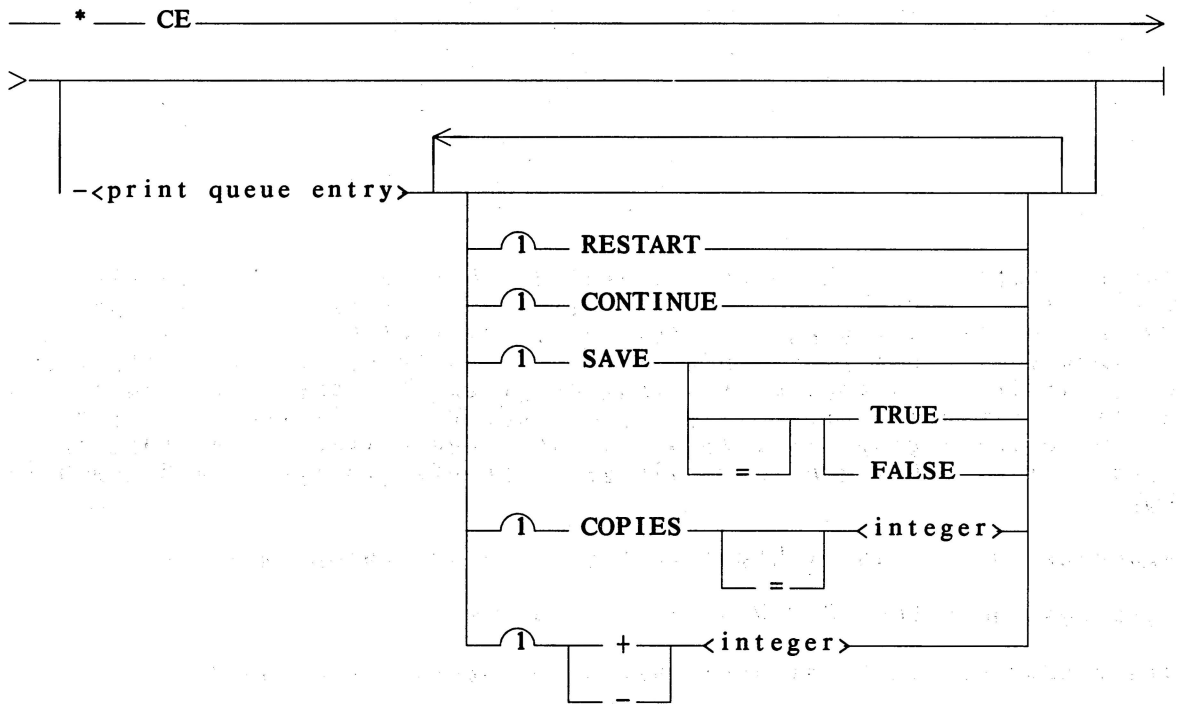
BYE is the only RJE input message for which the initial "*" is optional.

Example

```
* BYE
```

*CE

Syntax



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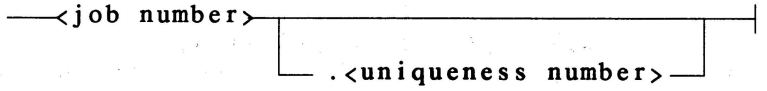
<print queue entry>



Semantics

The *CE (Change Entry) command modifies or interrogates entries in the print queue. The format of the output is similar to that of output from the *SP command. The values of RESTART, CONTINUE, SAVE, and COPIES have no effect on punch output. For example, if SAVE is specified for the <print queue entry>, the punch output for that entry is output once and then the corresponding files are removed. The printer output is printed the number of times specified by COPIES and retained. RJE verifies that the *CE command results in physical action. The semantics associated with some of the uses of *CE are discussed in the following paragraphs.

***CE**

This message returns the following information:

1. A print queue identification number. If this entry is continued after an interruption, then a "C" precedes this number.
2. If the entry is a result of a *CE or *ME command (refer to *ME in this section), that command is reconstructed and displayed within parentheses.
3. The file name and page number of the file currently being printed.
4. If the number of copies specified is greater than one, the number of the currently printing copy.

***CE <print queue entry>**

The information given for *CE is returned for the specified job in the print queue.

***CE <print queue entry> SAVE**

AUTOPRINT does not remove any files when performing the request specified by the given print queue entry.

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***CE <print queue entry> COPIES=<integer>**

The number of copies specified by <integer> are printed for the specified job.

***CE <print queue entry> CONTINUE**

The specified job is to be continued if it is interrupted, regardless of the value of CONTBACKUP.

***CE <print queue entry> RESTART**

The specified job is marked to be restarted rather than continued, regardless of the value of CONTBACKUP.

***CE <print queue entry> + <integer>**
***CE <print queue entry> - <integer>**

For one of these forms of the command to be useful, the specified job number must be marked as CONTINUE and must have been previously interrupted. The printer position (stored by RJE) of the job is moved ahead (+) or back (-) the number of pages specified by <integer>. If entry of this command causes the page number to be less than or equal to zero, RJE continues printing at the beginning of the current backup file. If entry of the command causes the page number to be greater than the number of pages in the current print file, RJE resumes printing at the next print file.

For example, file 001LINE of the following backup directory is being printed:

```
545/563/000LINE
545/563/001LINE
545/573/000F
```

If an interruption occurs and use of the *CE command causes the page count to be decreased to a value less than or equal to zero, printing resumes at the beginning of 001LINE. If the page count from AUTOPRINT is increased past the size of 001LINE, printing restarts with 000F.

Care should be taken when manipulating print queues to prevent the removal of files that are required for printing at some later time. For example:

```
*ME 545
     #  545.3 QUEUED(ME 545)

*ME 545/563 SAVE
     #  545.4 QUEUED(ME 545/563 SAVE)
```

If no other queue manipulation is done, then when queue entry 545.4 is about to be printed, AUTOPRINT discovers that no output files are available to be printed because queue entry 545.3 removed all the files under its directory, thus removing the files 545.4 would have printed. To avoid this situation, either 545.4 should have been entered before 545.3 or SAVE should have been specified for 545.3. No situation should ever arise where the operator cannot prevent the unwanted removal of backup files if the appropriate *ME commands and the features provided for manipulation and interrogation of the print queue are used.

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A very important point must be made about the representation of printer position. Although communication to RJE is in terms of pages, internal storage is performed in terms of backup records. RJE uses approximating formulas that transform pages into backup records or backup records into pages. Page numbers indicate where printing is to start, but RJE may not go back the exact number of pages specified or even start at the beginning of a page. (Access could be given to the backup record number, but such access would not be useful; in any event, manual correlation of pages and backup records would be much less accurate than the RJE formulas.)

Examples

```
*SP
     PRINT QUEUE
     C 545.2(ME 545/563 SAVE) FILE=000LINE(0)
     C 524
     #
*CE
     C 545.2(ME 545/563 SAVE) FILE=545/563/000LINE(1)

*CE 545.2 RESTART

     545.2 (ME 545/563 SAVE) FILE=545/563/000LINE(2)

*CE 545.2 CONTINUE

     C 545.2(ME 545/563 SAVE) FILE=545/563/000LINE(3)

*CE 545.2 COPIES=5 SAVE=FALSE

     C 545.2(ME 545/563 COPIES=5) FILE=545/563/000LINE(4) COPY=1

*CE 545.2 COPIES=1 SAVE

     C 545.2(ME 545/563 SAVE) FILE=545/563/000LINE(5)

*CE 524

     C 524

*CE 524 RESTART

     C 524

*CE 524 CONTINUE

     C 524
```

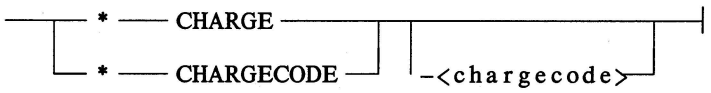
```
*SP

     PRINT QUEUE
     C 545.2(ME 545/563 SAVE) FILE=000LINE(13)
     C 524
     #
```

After a Halt/Load occurs:

```
*SP

     PRINT QUEUE
     C 545.2(ME 545/563 SAVE) FILE=000LINE(13)
     C 524
     #

*PB 524

     #

*SP

     PRINT QUEUE
     C 524
     C 545.2(ME 545/563 SAVE) FILE=000LINE(13)
     #


*CE 545.2 +3

     C 545.2(ME 545/563 SAVE) FILE=545/563/000LINE(16)
```

*CHARGECODE

Syntax



Semantics

The *CHARGECODE message is used to interrogate or change a chargecode during a session. If the <chargecode> is omitted, the current setting is queried. If a valid or syntactically correct chargecode is specified, one of the following results is true:

1. The chargecode of the previous session is billed for the elapsed usage.
2. The <chargecode> specifies the new chargecode of the new session.
3. A message is displayed showing elapsed time charged to the session's old chargecode and the time and that the new chargecode was logged on.

If the <chargecode> is not syntactically correct, one of the following error messages is returned:

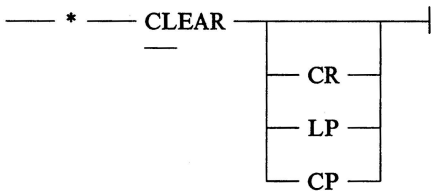
#CHARGECODE NAME ERROR

If the <chargecode> is invalid, the following error message is returned:

#INVALID CHARGECODE

*CLEAR

Syntax



Semantics

The *CLEAR message clears the remote card reader or specified remote device. When the card reader is cleared (by specifying CR or by omitting the device mnemonic), the copy of the WFL compiler currently servicing the terminal is DSed and the job deck being read in is discarded. RJE responds to the "*CL CR" keyin with the following message:

#CR CLEAR.

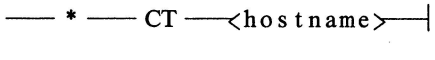
Printing and/or punching of the current backup file may similarly be discontinued by specifying the line printer (LP) or card punch (CP) as the device to be cleared. The CP device mnemonic is acceptable only if RJE was compiled with the REMOTEPUNCH compile-time option set. (Refer to REMOTEPUNCH under RJE COMPILE-TIME OPTIONS in Section 7.) If LP is specified, the backup file is discarded.

Example

```
* CL

    CR CLEAR
```

*CT

Syntax



Semantics

The *CT (Connect Terminal) message causes an attempt to attach the user's terminal to the RJE MCS (or to SYCOM on small systems) on the remote host specified by <hostname>. To use this message, the NDL must be properly defined (refer to TERMINAL TRANSFER in Section 3).

The local host must first approve the *CT request. If not, RJE on the local host responds with one of the following responses:

1. #HOST <hostname> DOES NOT SUPPORT THIS FUNCTION.

   The requested host is not capable of terminal transfer.

2. #NOT ALLOWED FOR THIS STATION.

   The station at which the *CT was entered cannot be transferred. (This case occurs for RJE terminals with device addresses of "00" to "04".)

3. #HOST <hostname> IS NOT CONNECTED TO THIS HOST.

   No File Transfer Link to the requested host exists. (Refer to ONLINE in Section 5.)

4. #HOST <hostname> CANNOT SUPPORT ANOTHER STATION AT THIS TIME.

   All virtual stations (output stations on the local host) are in use.

5. #STATION ALREADY CONNECTED TO <hostname>.

   The station has already been transferred.

6. #*CT NOT ALLOWED WHILE TERMINAL TRANSFERRED. |

   The station has already been terminal-transferred. |

7. #*CT REQUEST PENDING, PLEASE WAIT OR ENTER *DT |

   The "Connect Reply" has not been received. |

If the local host accepts the *CT request, the request is forwarded to the remote host for additional checks. If the remote host does not accept the request, one of the following messages is displayed:

1. #UNABLE TO TRANSFER TERMINAL BECAUSE OF INVALID ADDRESS OR SYSTEM FULL

   The remote host cannot accept another station, or the virtual station address is invalid.

2. #UNABLE TO TRANSFER TERMINAL NO MCS READING ON STATION.

   This message can only be received from a B 800 or B 1800 host.

3. #UNABLE TO TRANSFER TERMINAL STATION INUSE.

   The virtual station address is already in use on the remote host.

4. #UNABLE TO TRANSFER TERMINAL FOR REPLY VALUE = xx.

   The *CT request is of an unknown value (given by xx).

If the remote host accepts the *CT request, the following message is displayed:

#SUCCESSFUL TERMINAL TRANSFER TO HOST <hostname>.

However, if *DT is entered before a "Connect Reply" is processed, the following message is displayed:

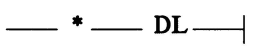
*CT REQUEST CANCELLED

Example

```
* CT SYS456
```

*DL

Syntax



Semantics

The *DL (Display DCP and Line) message is an MCS debugging aid available only when RJE is compiled with the RAID compile-time option set. (Refer to RJE COMPILE-TIME OPTIONS in Section 7.) RJE responds to the *DL message by displaying the number of the DCP controlling the terminal and the number of the Data Comm line on which the terminal is located in the following format:

#DCP <DCP number> LINE <line number>.

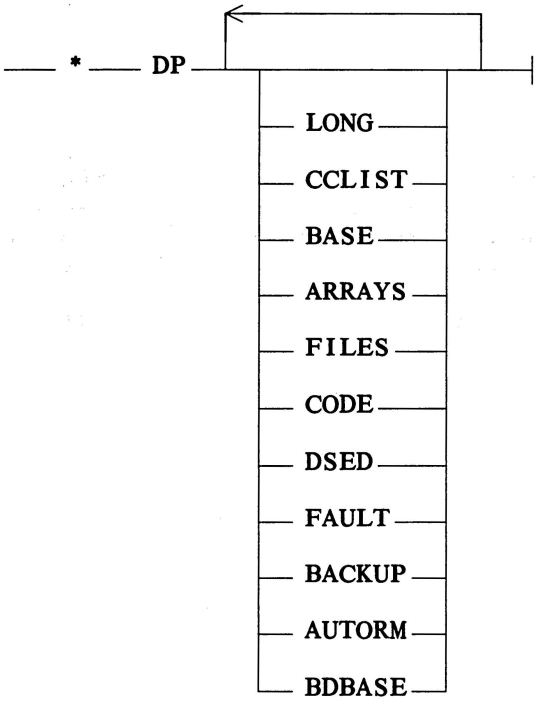
Example

```
* DL

    # DCP: 1 LINE: 2
```

067

*DP

Syntax



Semantics

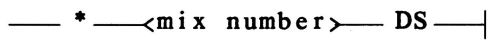
The *DP (Dump Program) message is an MCS debugging aid available only when RJE is compiled with the RAID compile-time option set. (Refer to RJE COMPILE-TIME OPTIONS in Section 7.) RJE responds to the *DP message by invoking a program dump of the MCS and producing a dump of the RJELINKED file on the PRINTFILE line printer listing. When this activity is complete, a "#" is issued at the RSC.

Example

```
*DP
```

DS

Syntax



Semantics

The DS (DiScontinue) message causes the AUTOBACKUP routine to stop printing (or punching) the current backup file and to purge this file from the directory. The user should employ this message rather than the DS system input message when discontinuing an execution of AUTOBACKUP because the routine does not fire up automatically when DS is used until a *PB message is entered. (the *CL message may also be used.) If the <mix number> indicated is not the <mix number> of a copy of AUTOBACKUP that is currently servicing the terminal, RJE responds with the following message:

```
#INV KEYIN.
```

Example

```
* 1234 DS
```

690

*DT

Syntax

Semantics

The *DT (Disconnect Terminal) command unconditionally disconnects a station from a remote host. After a terminal is transferred and connection has been made to a remote host (refer to *CT in this section), *DT is the only message to which the local RJE responds without forwarding the message as text to the remote RJE.

The following are the responses to the *DT command:

1. #INVALID REQUEST - TERMINAL IS NOT TRANSFERRED.

   The *DT command was entered at a station that was not transferred to a remote host.

2. #TERMINAL TRANSFER TO HOST <hostname> HAS BEEN TERMINATED.

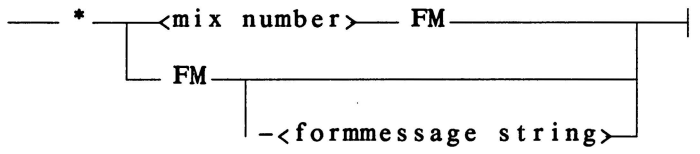
   The terminal transfer terminated successfully.

Example

```
*DT
```

*FM

Syntax



Semantics

The *FM (Form Message) message is a "form message" keyin directed to a copy of the AUTOBACKUP routine that is currently servicing the terminal. The *FM message resumes AUTOBACKUP activity after a backup file has been encountered with a value assigned to the FORMMESSAGE attribute.

*<mix number>FM resumes printing at the RJE terminal. If the <mix number> indicated is not the <mix number> of a copy of AUTOBACKUP currently servicing the terminal, RJE responds with the following message:

```
#INV KEYIN.
```

*FM displays the current FORMMESSAGE string.

071

*FM <formmessage string> FORMs the terminal printer with the given <formmessage string>.

When the remote printer is FORMed, all output files have the FORMMESSAGE attribute checked against the FORMed message of the printer. If the attribute and message match, the "FM REQD" message is displayed followed by "(CONTINUED)", and printing proceeds. If the attribute and message do not match, printing stops and the "FM REQD" message is displayed.

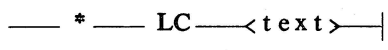
The use of *FM <formmessage string> does not reactivate an AUTOPRINT job that is waiting for FORMMESSAGE specification. All printer output that does not have an associated FORMMESSAGE attribute is assumed to require standard one-part paper. (Refer to the discussion of the remote site option IGNOREFM under *SO in this section.)

Example

```
* FM

  # LP NOT FORMED.
```

*LC

Syntax



Semantics

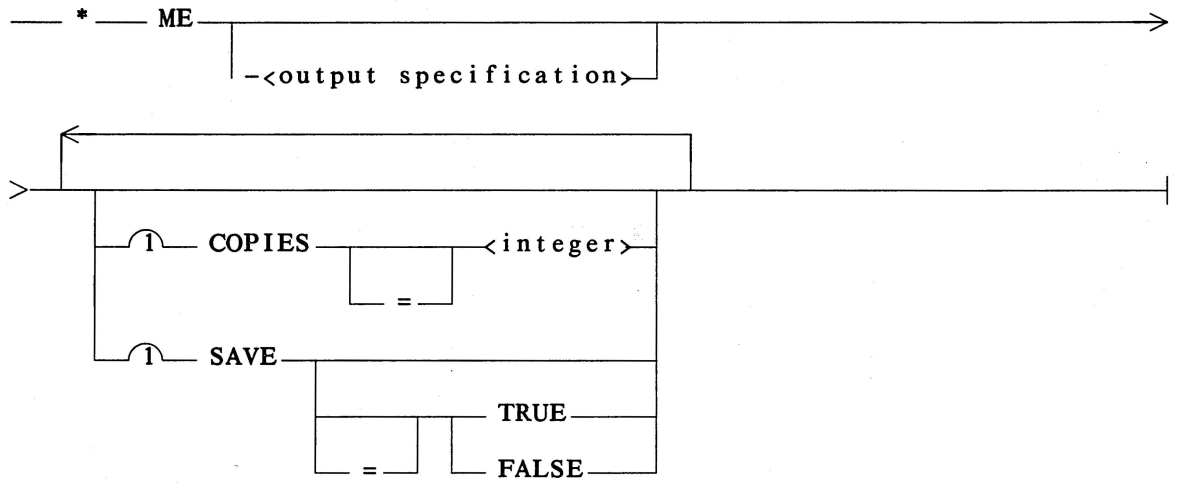
The *LC (Log Comment) message enters the given <text> in the system log as an MCS message entry associated with the current session number. The MCS responds by displaying "#" at the RSC.

Example

```
* LC BEGIN TEST
```

*ME

Syntax



Semantics

073

The *ME (Make Entry) command creates a new entry in the print queue. This new entry only causes output to be directed to the printer (and does not punch any output). RJE responds to an *ME command with one of the messages "NO BACKUP ON DK OR PK", "JOB ACTIVE", or "<queue entry> QUEUED." Queued backup is placed at the end of the print queue. The <queue entry> is used to distinguish between print requests from the same job and is of the form "YYYY.XX", where "YYYY" is the number of the job that created the printer backup and "XX" is an RJE-supplied "uniqueness" number. A special heading, containing the word "PRINT" in block letters along with "<job number>.<uniqueness number>" and the *ME command that was used, is printed before the associated files are printed.

After the backup files are printed, they are purged unless the *ME command specifies SAVE. The value of COPIES determines the number of copies of the listing that are be printed at the RJE station; the default value is 1, and the valid range of values is between 1 and 1023, inclusive. The use of SAVE alone or "SAVE TRUE" causes the files to be saved; use of "SAVE FALSE" cause the backup files to be purged.

Examples

```
*ME 545 COPIES=2 SAVE

     545.1 QUEUED(ME 545 COPIES=2 SAVE)


*SP

    PRINT QUEUE
    C 503
    C 545.1(ME 545 COPIES=2 SAVE)
    #
```

```
*BACKUP 545

    PRINTER BACKUP 545
    563/000LINE,20 PAGES
    563/001LINE,25 PAGES
    573/000F,10 PAGES
    #


*ME 545/563 SAVE

    545.2 QUEUED(ME 545/563 SAVE)


*SP

    PRINT QUEUE
    C 503
    C 545.2(ME 545/563 SAVE)
    #
```

NOPASSWORD

Syntax

Semantics

The NOPASSWORD message allows remote terminals (B 700 series) which use "." as a control character for their own RJE firmware to log on without a password. This message should be entered when RJE requests a password during the log-on sequence.

Example

RJE output message:

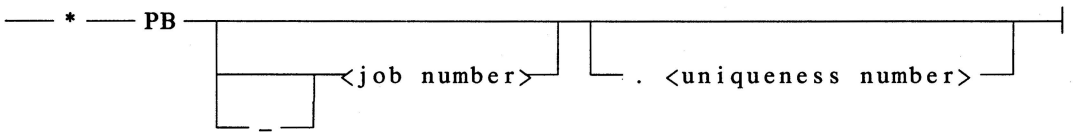
```
# ENTER PASSWORD PLEASE
```

User response:

```
NOPASSWORD
```

*PB

Syntax



Semantics

The *PB (Print/punch Backup) command changes the relative positions of entries in the print queue and can be used to create an additional print queue entry. The semantics for each use of *PB are discussed in the following paragraphs.

*PB

When AUTOPRINT suspends itself after printing a FORMed backup file, *PB is used to resume AUTOPRINT.

*PB <job number>

*PB <job number> causes the backup produced by <job number> to be the next backup files output to the printer. Only completed tasks are printed.

*PB <job number>.<uniqueness number>

*PB <job number>. <uniqueness number> moves entries created by an *ME command to the head of the print queue.

*PB - <job number>
*PB - <job number>.<uniqueness number>

The two *PB - commands remove the specified entries from the print queue. Any print queue entry that is already printing may not be deleted.

If CONTBACKUP is set (the default value), listings are automatically continued across an interruption. This default continuation may be changed using a *CE command. (Refer to *CE in this section.)

If no such file is in the backup directory, RJE responds by displaying the following message at the RSC:

#FILE NOT ON DISK.

If the specified job is still active, the keyin is ignored and RJE responds with the following message:

#JOB IS ACTIVE.

If the request is accepted, RJE responds with "#" or "#PENDING." if AUTOBACKUP is already active.

Example

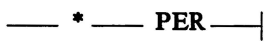
```
*SP

    PRINT QUEUE
    C 503 FILE=503/520/000CHECKS(22)
    C 545.1(ME 545 COPIES=2 SAVE)
    C 545.2(ME 545/563 SAVE)
    #


*STATUS

    #0200 AUTOPRINT/LSN038/"#0200" -- ENTER "*PB" TO CONTINUE
    #NO TASKS ACTIVE


*PB

    #


*SP

    PRINT QUEUE
    C 545.1(ME 545 COPIES=2 SAVE)
    C 545.2(ME 545/563 SAVE)


*PB 524

    #


*SP

    PRINT QUEUE
    C 524
    C 545.1(ME 545 COPIES=2 SAVE)
    C 545.2(ME 545/563 SAVE)
    #


*PB 545.2

    #


*SP

    PRINT QUEUE
    C 545.2(ME 545/563 SAVE)
    C 524
    C 545.1(ME 545 COPIES=2 SAVE)
    #
```

077

```
*PB -545.1

    545.1 DELETED


*SP

    PRINT QUEUE
    C 545.2(ME 545/563 SAVE)
    C 524
    #
```

*PER

Syntax



Semantics

The *PER (PERipherals) message displays the ready/not ready status of peripheral devices for a remote station. *PER only reports the status of devices whose status is reported to the host system by the remote processor; thus, not all occurrences of devices going ready or not ready are reported for most systems.

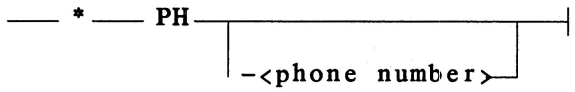
Example

```
* PER

    [053] RSC  READY
    [054] CARD READY
    [055] PRINT READY
    [056] FTS READY
```

079

*PH

Syntax



Semantics

The *PH (PHone) message causes the specified 1- to 71-character <phone number> to be associated with the terminal for call-back. If the <phone number> and terminal are successfully associated, RJE displays the following response:

```
#PHONE NUMBER: <phone number>.
```

If the <phone number> and terminal cannot be associated, RJE displays the following response:

```
#INV KEYIN.
```

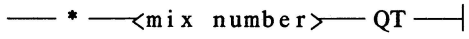
If *PH is entered without a <phone number>, the current <phone number> is returned.

Example

```
* PH 123456

    # PHONE NUMBER: 123456...
```

QT

Syntax



Semantics

The QT (QuiT) message causes the AUTOBACKUP routine to stop printing (or punching) the current backup file but to leave that backup file in the directory. If the specified <mix number> is not the <mix number> of a copy of AUTOBACKUP that is currently servicing the terminal, RJE responds with the following message:

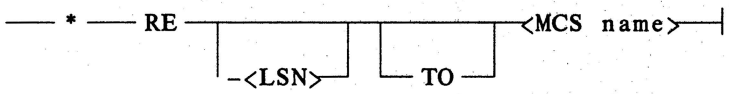
```
#INV KEYIN.
```

Example

```
* 1234 QT
```

*RE

Syntax



Semantics

The *RE (RElease) command causes the station indicated by the optional <LSN> or, if no <LSN> is specified, the station at which the request is entered to be released (detached from RJE and attached) to the indicated MCS. The MCS number and the LSN of any input virtual station that has been released to another MCS is displayed. If the <LSN> does not belong to one of the stations of the terminal at which the keyin was entered, RJE responds with the following message:

#INVALID LSN

If the requested <MCS name> is not declared in the host NDL, RJE responds with the following message:

INVALID MCS

If the terminal has been transferred to a remote RJE using the "*CT <hostname>" statement, only the non-LSN version of the request is allowed, and specification of an <LSN> causes RJE to return the following message:

#LSN NOT ALLOWED

If the remote RJE is unable to complete the release because of an insufficient number of pseudo-stations (refer to Terminal Transfer in Section 3), RJE responds with the following message:

NO PSEUDO STATION AVAILABLE

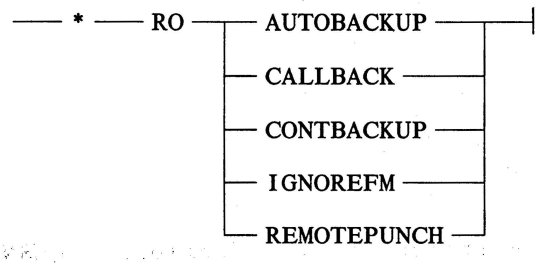
Examples

*RE 39 SYSTEM/APL

*RE SYSTEM/CANDE

*RO

Syntax



Semantics

The *RO (Reset Option) message resets the specified RJE terminal option. RJE responds to an *RO message by displaying the following message at the RSC:

<option name> RESET

If the option name specified is illegal, RJE responds with:

#INV KEYIN.

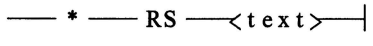
(Refer to *SO in this section.)

Example

```
*RO CONTBACKUP

    CONTBACKUP RESET
```

*RS

Syntax



Semantics

The *RS (Response Solicited) message is used when the remote terminal requires main system operator intervention. The MCS processes a task named RJE/RSVP/LSN<LSN> in response to this message which hangs in the mix displaying the <text> until the operator AXes the task. The <text> can consist of up to 418 characters (430 with a fixed heading), and the output up to 960 characters. The response is returned to the RSC in the following form:

```
#SPO REPLY: <returned text>
```

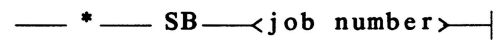
The *RS command should be used only for critical service requests.

Example

```
* RS PLEASE LOAD THE TAPE
```

*SB

Syntax



Semantics

The *SB (System Backup) message is similar to the *PB message, except that the *SB message initiates the printing or punching at the main system printer or card punch of all backup files destined for the terminal and generated by the job indicated by the specified <job number>. This printing or punching is initiated by zipping SYSTEM/BACKUP.

RJE responds to an *SB message displaying a "#" at the RSC.

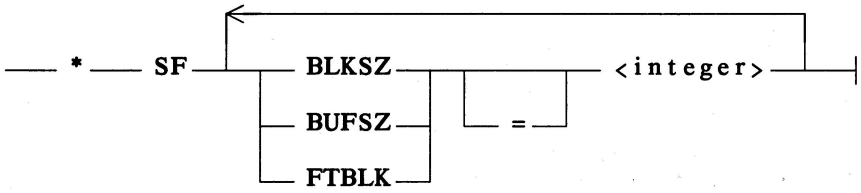
Example

```
* SB 1234
```

085

*SF

Syntax



Semantics

The *SF (Set Factors) message specifies certain buffers sizes that are used by RJE for the terminal.

BLKSZ indicates the characters per transmission blocking factor (that is, the number of characters that may be shipped over the Data Comm line per transmission).

BUFSZ indicates the buffer size, in characters, of remote printer output, punch output, or both (that is, the number of characters to be buffered in core when sending output to the remote printer or punch).

FTBLK indicates the maximum number of characters that are allowed in an output file transfer block. The value of FTBLK should be the same on both host systems involved in a file transfer. If both hosts are B 6000 or B 7000 series systems, RJE allows the transfer of files whose MAXRECSIZEs are greater than FTBLK by splitting the record across several blocks.

The following defaults and limits are imposed on the values of these buffer sizes:

	Default	Limit
BLKSZ	400	132 thru 1500 (inclusive)
BUFSZ	820	132 thru 2000 (inclusive)
FTBLK	1500	400 thru 2000 (inclusive)

Changing any of these values should be done with the utmost care in order to avoid exceeding the limits of the remote terminal or Data Comm line.

Example

```
*SF BLKSZ = 400
```

*SM

Syntax

Semantics

The *SM (Send MCS) message allows the terminal to enter any RJE control message that normally would be valid only if entered using the ODT SM command. (Refer to Section 5 for descriptions of RJE control messages.)

The use of the *SM command is controlled by the control messages RSC (for the station with device address "01" on an RJE family of stations) or SPO (for non-RJE terminals; refer to Section 5 for descriptions of these control messages). If the corresponding option is not set for the terminal (RSC for an RJE station or SPO for a non-RJE station), the *SM message is controlled by the NDL SPO station bit.

If the RSC or SPO option is reset and the NDL SPO bit is not set (SPO = FALSE) for the station, the *SM message is invalid for that station, and any attempt to use this message causes the following error message to be displayed:

```
# NOT ALLOWED
```

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NOTE

Two RJE compile-time options, RSC and SPO, are reset by default and have the same meanings as the corresponding run-time options. (Refer to RJE COMPILE-TIME OPTIONS in Section 7.)

Examples

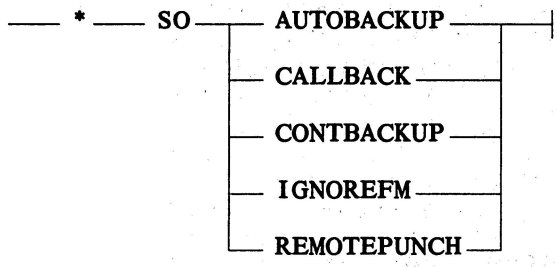
```
*SM WH

*SM COPY A (USER=X/Y) FROM DISK (HOST=SYS1) TO FRED (HOST=SYS2)

*SM TF
```

*SO

Syntax



Semantics

The *SO (Set Option) message sets the specified RJE terminal options. RJE responds by displaying the following message at the RSC:

<option name> SET

If the option name specified is illegal, RJE responds with the following message:

#INV KEYIN.

The five run-time terminal options have the following effects:

AUTOBACKUP — When AUTOBACKUP is set, the RJE AUTOBACKUP routine is fired up automatically to output backup files to the remote terminal when RJE is notified of an EOJ, or when AUTOBACKUP goes to EOT after handling the output files of a previous job and other jobs are queued to be serviced. A job is queued whenever an RJE terminal is notified of an EOJ.

CALLBACK — When CALLBACK is set and an ACU is present on the line, RJE dials-out to a terminal in order to transmit backup files produced by a job that has just gone to EOJ. The phone number used is specified using the *PH message. (Refer to *PH in this section.)

CONTBACKUP — The CONTBACKUP option is set by default; the value of this option may be displayed by using the *TO command or changed by using the *RO and *SO commands. If CONTBACKUP is set and a listing is interrupted, the listing continues at a point close to, and prior to, the point of interruption rather than restarting from the beginning. If CONTBACKUP is reset, the listing restarts at the beginning of the current copy. A special header containing "CONT" (an abbreviation for "continue") in block letters along with the job number is

printed before the listing is continued. Thus, listings that have been continued may be easily identified. This default continuation may be overridden at print time. As RJE AUTOBACKUP is printing a listing, the linkfile is updated periodically to reflect the last page printed. When RJE recovers from an interruption, the number from the linkfile is used to continue the listing. The RJE operator is granted read/write access to this number. Listings may be restarted or continued on a per-job basis. Punch output is not continued regardless of the value of CONTBACKUP.

IGNOREFM — The IGNOREFM remote site option causes the RJE MCS to ignore all forms requests from the AUTOPRINT and AUTOPUNCH routines for FORMed printers and punches. RJE display requests from an *FM message but does not halt printing or punching.

REMOTEPUNCH — When REMOTEPUNCH is set, all punch backup files are output to the remote card punch, which must be present and handled properly by the remote computer. Otherwise, punch backup files are output to the central system card punch.

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Example

```
*SO CONTBACKUP

     CONTBACKUP SET
```

*SP

Syntax

Semantics

The *SP (Show Print queue) message displays a list of the job numbers in the print queue for the terminal. If no backup files are queued, RJE displays the response "NO ENTRIES."

The display may include the following information for each print queue entry:

1. If the entry is continued after an interruption, a "C" precedes the identification number. This continuation/restart flag is set by the value of CONTBACKUP when the entry is inserted in the print queue and may be modified by the *CE command once the entry is in the print queue.

2. If the entry is the result of an *ME command, the current specifications (that is, the SAVE values, COPIES values, or both) are used to reconstruct the *ME command for display. This reconstructed command is enclosed in parentheses and follows the print queue identification number.

3. If the entry is not the result of an *ME command but has been modified from the default value by the execution of a *CE command, the *CE command is reconstructed from the current specifications. The reconstructed command is enclosed in parentheses and follows the print queue identification number.

4. If the entry has begun printing (that is, if the entry is the currently printing job or a job that was interrupted), the display includes the file name and, in parentheses, the page number where continuation might occur.

During RJE initialization, the print queue is rebuilt asynchronously (thus, allowing RJE to handle activities such as log-on and job initiation). If an *SP request is made while the print queue is being rebuilt, the RJE response to the request displays the following extra line showing that the print queue list may be incomplete:

(PRINT Q REBUILD IN PROGRESS LIST MAY NOT BE COMPLETE.)

060

Example

In the following examples, AUTOPRINT has a mix number of 200.

```
*SP

     PRINT QUEUE
     C 503
     C 545.1(ME 545 COPIES=2 SAVE)
     C 545.2(ME 545/563 SAVE)
     #


*STATUS

     #0200 AUTOPRINT/LSN038/"#0200" --FM REQD:CHECKS
     #NO TASKS ACTIVE


*200FM


*SP

     PRINT QUEUE
     C 503 FILE=503/520/000CHECKS(22)
     C 545.1(ME 545 COPIES=2 SAVE)
     C 545.2(ME 545/563 SAVE)
     C 500.1(ME 500 COPIES=5) FILE=501/000LINE(20) COPY=3
     #
```

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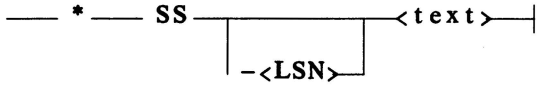
*SS

Syntax



Semantics

The *SS (Send to Station) message is used to communicate with the main system ODT or with another RJE terminal. When the <LSN> portion of the message is omitted, the text is displayed at the main system ODT. When the <LSN> is present, the <text> is sent to the terminal that contains a station with the given <LSN>. If the station is not currently active, RJE displays the following message at the sending RSC:

```
#INACTIVE STATION.
```

RJE indicates an invalid <LSN> by displaying the following message:

```
#UNKNOWN STATION.
```

RJE displays a "#" at the sending RSC to indicate successful communication.

Example

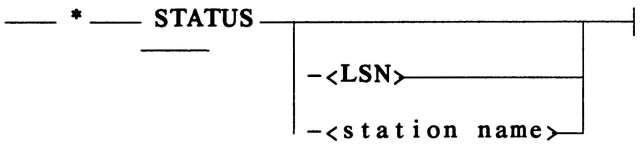
When the first statement below is executed at station 50, the second statement below is displayed at station 53.

```
*SS 53 BOM DIA

     # SS FROM 50: BOM DIA
```

*STATUS

Syntax



Semantics

The *STATUS message displays the mix numbers of the WFL compiler, the AUTOPRINT or AUTOPUNCH job currently servicing the terminal (if no further text follows the command), or both.

When a Data Comm station is specified by use of an <LSN> or <station name>, the current status of the station is displayed in the same format as that displayed by the CANDE "?STATUS" command. The following mnemonics are used to indicate the station status:

RDY or UNRDY	Station is ready or not ready.
ENAB or DISABL	Station is enabled or not enabled for input.
ATT or UNATT	Station is attached or unattached to an MCS.
SW=CONN or SW=DISCON	Line is switched and connected or switched and disconnected.

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Example

```
*STATUS 4

    RJE2(4) = 0:22:0 RDY ENAB ATT  [SYSTEM/RJE]
```

In the preceding example, the station with LSN 4 is named RJE2, is on DCP0, and is station 0 of line 22. The station is READY, ENABLED, and ATTACHED to SYSTEM/RJE.

```
* STATUS

    # NO ACTIVE WFL TASK.
    # AUTOPRINT NOT RUNNING
    # AUTOPUNCH NOT RUNNING
```

*TF

Syntax

Semantics

The *TF (Tell Factors) message yields a response indicating the current setting of the line-transmission factors for the terminal. The line-transmission factors are BLKSZ (characters per transmission blocking factor), BUFSZ (buffer size, in characters, of remote printer output, punch output, or both) and FTBLK (maximum number of characters allowed in a file transfer block). *SF in this section contains a more detailed discussion of these line-transmission factors.

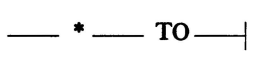
Example

```
*TF

    # BLKSZ = 400        BUFSZ = 820        FTBLK = 1500
```

*TO

Syntax



Semantics

The *TO (Tell Options) message yields a response indicating the current setting of the five run-time terminal options. (Refer to *SO in this section for a discussion of these options.)

Example

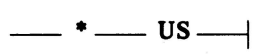
```
*TO

REMOTEPUNCH     RESET
CALLBACK        RESET
AUTOBACKUP      SET
IGNOREFM        RESET
CONTBACKUP      SET
```

095

*US

Syntax



Semantics

The *US (USers) message yields a response indicating the LSN and station name of every active and inactive remote terminal under the control of RJE. The terminal from which the keyin was received is indicated by a ">"; the LSNs of the devices of this terminal are also given along with this indication.

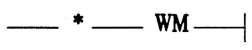
Example

```
*US

    [065] DUMMYRJE.
    [053] TD1800.
       [053] RSC
```

*WM

Syntax



Semantics

The *WM (What MCS) message yields a response indicating the identification of the current RJE MCS which contains the MCS name, host system number, hostname, level of the software, mix number of the MCS, and MCS number. If RJE was compiled with the compile-time option RAID set (refer to RJE COMPILE-TIME OPTIONS in Section 7), then "(RAID)" appears after the software level.

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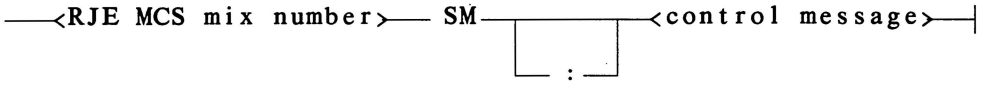
5. RJE CONTROL MESSAGES

INTRODUCTION

The activity of an active RJE MCS may be interrogated or controlled in two ways:

1. From the main system ODT, using the SM ODT message. This message has the following syntax:



Refer to SM in Section 2 of the B 5000/B 6000/B 7000 Series Operator Display Terminal Reference Manual for details on the use of this message.

2. From a terminal attached to RJE (an RSC or a non-RJE terminal) using the RJE input message *SM. This message is valid only if the RSC or SPO option is set for the terminal (refer to RSC and SPO in this section) or if the station was declared in NDL with "SPO=TRUE." A discussion of the syntax and semantics of the *SM message is found under *SM in Section 4.

Examples

The following example illustrates the use of the ODT SM command. In this example, the RJE MCS executes at mix number 1234.

```
1234 SM: SAVE 53
```

After the SM command above is entered, the RJE SAVE control command is executed. (Refer to SAVE in this section.) RJE displays "#OK" at the RSC when the SM command has been successfully serviced.

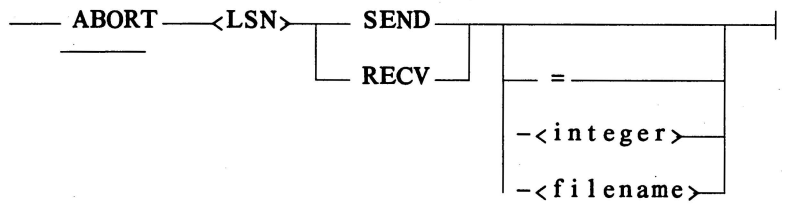
The following example illustrates the use of the RJE *SM message to initiate execution of the same RJE SAVE command as in the preceding example. The RJE response returns to the same terminal that keyed in the *SM message.

```
*SM SAVE 53
```

This remainder of this section presents the forms and functions of the control messages that may be executed through the RJE MCS.

ABORT

Syntax



Semantics

The ABORT control message stops an active file transfer or deletes one or all of the entries that are queued for a host. The key words SEND and RECV specify the type of transfer to be aborted. <LSN> is the LSN of the station to which the remote host is connected.

The second example under FTS in this section contains illustrations of the format and meaning of <integer> and <filename>.

Examples

The following message aborts the current active FILEX task (the sender):

```
1234 SM ABORT 20 SEND
```

The following message aborts the current active FILER task (the receiver):

```
1234 SM ABORT 20 RECV
```

The following message deletes all requests queued at this host for LSN 20:

```
1234 SM ABORT 20 SEND =
```

The following message deletes all requests queued at the remote host for transmission to LSN 20:

```
1234 SM ABORT 20 RECV =
```

The following message deletes the fourth entry from the queued list but does not delete the active entry (entry 0 in the queue):

```
1234 SM ABORT 20 SEND 4
```

The following message deletes the fourth entry from the queued list of the remote host connected to LSN 20 but does not delete the active entry (entry 0 in the queue):

```
1234 SM ABORT 20 RECV 4
```

The following message deletes the first queued entry from the queued list for LSN 20 requested where the queued source filename matches <filename>:

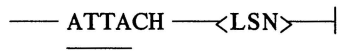
```
1234 SM ABORT 20 SEND <filename>
```

The following message deletes the first queued entry from the queued list of the host that is using LSN 20, where the queued source filename matches <filename>:

```
1234 SM ABORT 20 RECV <filename>
```

ATTACH

Syntax



Semantics

The ATTACH control message connects the specified <LSN> to RJE. If the ATTACH is successful, RJE responds with the following message:

```
#OK
```

However, if the station is not attached, RJE responds with the following message (where <int> designates the number of the DCWRITE error):

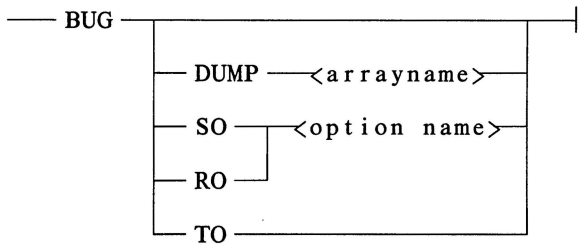
```
#DCWRITE ERROR # <int> DURING ATTACH OF LSN # <LSN>
```

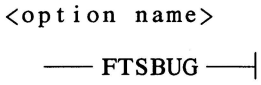
Example

```
* SM ATTACH 34
```

BUG

Syntax





Semantics

The BUG control message facilitates run-time control of MCS activity monitoring. BUG is valid only when the MCS is compiled with the RAID option set. (Refer to RAID under RJE COMPILE-TIME OPTIONS in Section 7.)

The DUMP <arrayname> option causes the dumping to the printfile of a global array (specified by <arrayname>) used by RJE. Use of the DUMP <arrayname> option allows "snap shots" of the arrays used by RJE to be taken in real time.

The SO, RO, and TO options set, reset, and interrogate, respectively, the run-time BUG options. Currently, the only BUG option is FTSBUG; this option causes all file-transfer records to be fully displayed on the RAID output (instead of truncating these records at 10 words).

Example

When the following statement is entered, the array specified by <arrayname> is dumped in HEX and ALPHA.

```
<RJE mix#> SM BUG DUMP <arrayname>
```

If <arrayname> does not exist, the following message is displayed:

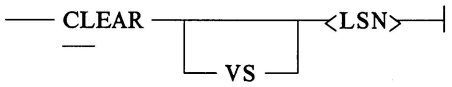
```
NO SUCH ARRAY: <arrayname>
```

If the request is correct, the following message is displayed:

```
#OK
```

CLEAR

Syntax



Semantics

The CLEAR control message clears all the stations on a line. This statement performs the following actions:

1. Saves all stations on the line.
2. Recalls all messages.
3. Forces the line to go not ready.
4. DSes any WFLTASK, AUTOBACKUP, or SERVICETASK (*RS) that is associated with the line.
5. Resets all RJE control states.
6. Logs off stations, giving the cause as "STATION CLEARED."
7. Updates the linkfile.
8. Clears all virtual station information for the specified <LSN>.

The CL VS version of this message is a psuedo-clear. When VS is specified, RJE to resets all the tables for that station, but no attempt is made to communicate with any other host associated with the station. This message should be used only when both ends of the virtual connection are being monitored.

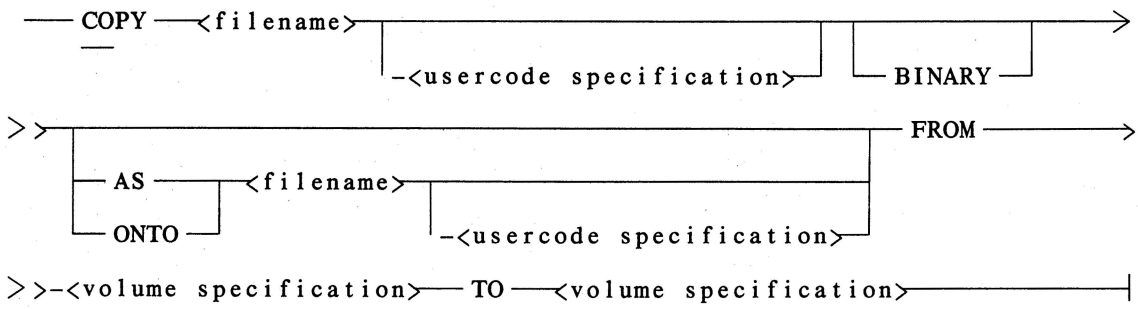
The stations on the line are left not ready and must be readied in order to be used.

Example

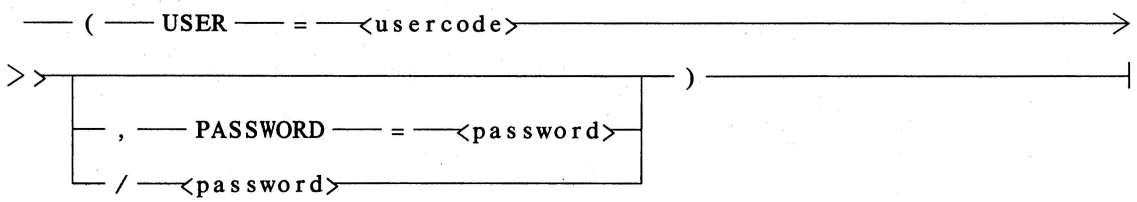
```
* SM CLEAR 51
```

COPY

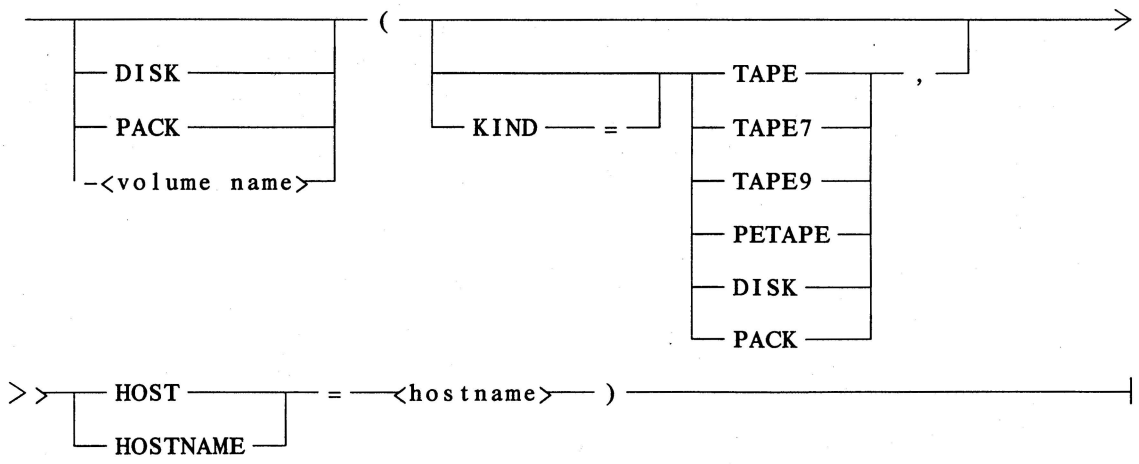
Syntax



<usercode specification>



<volume specification>



Semantics

The COPY control message transfers the file specified by <filename> from a source host to a destination host. Requests can be made to non-B 6000/B 7000 systems using SYCOM. RJE syntax-checks only the part of the request involving the RJE host; the remainder of the request is forwarded as supplied by the user.

The BINARY option causes RJE to transmit the requested data (noncode) file in an encoded fashion. This encoding is required in some cases when the requested transfer is between ASCII (B 800) and EBCDIC (B 1800 or B 6000/B 7000 series systems) hosts because of differences in allowable characters. In transfers of data files between ASCII and EBCDIC hosts where the BINARY option is not used, all nongraphic characters are replaced by a graphic question mark. The BINARY option has no effect on the transfer of code files, as code files are always encoded between ASCII and EBCDIC hosts.

The COPY control message does not overwrite an existing file on the destination host unless the ONTO modifier is used.

The <usercode specification> verifies access rights to the specified file and to the use of the file transfer station and may also affect defaults for parts of the <filename>. For <filename>s that start with the characters "*" or "(", the <usercode specification> is not used as a prefix . However, the <usercode specification> is required for any source or destination that is a B 6000/B 7000 series system host. A blank space is not between the <filename> and the <usercode specification>.

The default volume KIND is PACK. The <volume name> may be omitted from either the source part or the destination part of the request for non-B 6000/B 7000 systems; the affected host handles any defaults required for such a system.

The following error messages may result from the use of an invalid COPY command:

```
FILENAME GTR 100 CHAR.
INVALID FILENAME: <filename>
NO FROM OR TO PARTS.
NO FROM PART.
INVALID VOLUME NAME: <volume name>.
MISSING VOLUME NAME.
VOLUME NAME AND KIND MISMATCH.
MISSING EQUAL.
INVALID MEDIA TYPE: <media type>.
NO HOSTNAME.
EXPECTING PARENTHESIS.
NO TO PART.
NO USERCODE/PASSWORD.
INVALID USER/PASS SYNTAX.
SOURCE AND DEST HOSTNAMES THE SAME.
THIS HOST NOT SOURCE OR DEST.
USERDATAFILE FROZEN - TRY LATER.
SECURITY ERROR ON USER = <usercode>.
FILE <filename> NOT AVAILABLE.
FILE <filename> NOT RESIDENT.
FILE <filename> ALREADY EXISTS.
FILE <filename> IS OPEN EXCLUSIVE AND CANNOT BE REPLACED.
FAMILY <familyname> IS NOT PRESENT.
```

Examples

The following example transfers "(MIKE)TESTFILE" from a pack called MCPMAST on host B6700282 to a pack named DISK on host B68001004. Usercode MIKE (with no password) must be a valid usercode on both hosts.

```
1234 SM COPY TESTFILE (USER=MIKE) AS X (USER=RJE/RJE)
FROM MCPMAST (HOST=B6700282) TO DISK (HOST=B68001004)
```

The following example is the same as the first example, except that the destination file title is "(RJE)X ON DISK." Usercode MIKE is used for all security and resident checks on host B6700282, and "RJE/RJE" is used for these checks on host 68001004.

```
1234 SM COPY TESTFILE (USER=MIKE) AS X (USER=RJE/RJE)
FROM MCPMAST (HOST=B6700282) TO DISK (HOST=B68001004)
```

The following example transfers the system file "*WFL" from DISK on host B6700282 as a file called "(WHY)TEMP ON PACK" on host B7700003. (RJE overwrites this file if it already exists.)

```
1234 SM COPY *WFL (USER=MIKE) ONTO TEMP (USER=WHY,PASSWORD=ME)
FROM DISK (HOST=B6700282) TO PACK (HOST=B7700003)
```

The following example transfers the system file "*WFL" from MCPMAST on HOST "B6700282" to a B 1800 system with the hostname of "B1800XX." The B 1800 uses whatever defaults it has defined for destination family.

```
1234 SM COPY *WFL (USER=MIKE) FROM MCPMAST (HOST=B6700282)
TO (HOST=B1800XX)
```

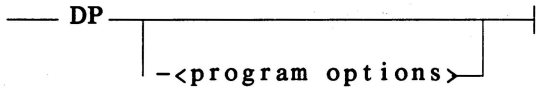
The two following examples both cause syntax errors because of missing volume names. (Both hosts are B 6000/B 7000 systems.)

```
1234 SM COPY *WFL (USER=MIKE) FROM MCPMAST (HOST=B6700282)
TO (HOST=B6800135)

1234 SM COPY *WFL (USER=MIKE) FROM (HOST=B6700282)
TO PACK (HOST=B6800135)
```

DP

Syntax



Semantics

The DP (DumP) control message causes the MCS to take a program dump with the specified <program options> and to dump the current contents of the RJE-linked file to the line printer file. This message is valid only when the MCS has been compiled with the RAID option set. (Refer to RAID under RJE COMPILE-TIME OPTIONS in Section 7.) The DP control message has the same function as the *DP RSC input message. (Refer to *DP in Section 4.)

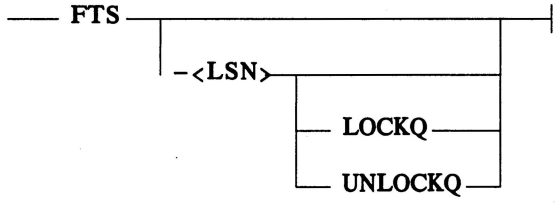
Examples

```
* SM DP

* SM DP ARRAYS
```

FTS

Syntax



Semantics

The FTS (File Transfer Status) control message monitors file-transfer activity. This command without the optional <LSN> displays one or three lines for each active station attached to SYSTEM/RJE. If the station has no hostname, or if no file transfer is active on the station, one line is displayed showing the LSN, station name, and hostname (if any) along with the comment "NO ACTIVE FILE TRANSFER." For stations with an active file transfer, three lines are displayed showing the status of the station and of the active file transfers.

If an <LSN> is specified, only the information for that station is displayed. In this case, the display is either one line or four or more lines, depending on the number of queued requests.

The modifiers LOCKQ and UNLOCKQ cause RJE to stop and start, respectively, the file-transfer send queue for the selected station. Once the queue is locked, RJE continues to queue new entries. (The queue is also locked if the EOJ modifier of the OFFLINE control message is specified; refer to OFFLINE in this section.)

Examples

The following messages are displayed in response to the entry of the FTS control message with no <LSN> specification:

```
[034] RJE1 @ B6800282 NO ACTIVE FILE TRANSFER
[039] RJETIO NO HOSTNAME NO ACTIVE FILE TRANSFER
[044] RJEGMM @ B6700282 2 REQUEST QUEUED
  RECV: FILER ACTIVE (4321) 21 OF 54
  SEND: FILEX ACTIVE (4401) 1053 OF 10049 (PACING)
```

The first line of this example contains the following information:

```
[034]      = Base LSN of the RJE station.
RJE1       = Station name.
B6800282   = Remote host name that is connected to this
             station.
```

The second line of the example indicates that the host or terminal using station RJETIO has not sent its host name (if it has one), and no file transfers are allowed.

The third, fourth, and fifth lines of the example indicate that the host B6700282 is active on station RJEGMM and that a file transfer is running in each direction. The RECV line shows the status of the receiving task FILER. The number in parentheses (4321) is the mix number of FILER, and "21 OF 54" indicates that 21 records of the 54 total records in the file have been transferred.

The SEND line shows the status of the sending task FILEX. The number in parentheses (4401) is the mix number of FILEX, and "1053 OF 10049" indicates that 1053 records of the 10049 total records in the file have been transferred. The word PACING indicates that FILEX is waiting for a pacing flag before continuing with the next file transfer block of records.

The information in the following example is displayed when LSN 44 in the previous example is specified in the FTS control command:

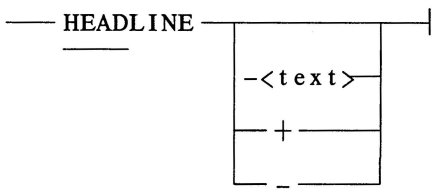
```
[044] RJEGMM @ B6700282 2 REQUEST QUEUED
  RECV: FILER ACTIVE (4321) 21 OF 54
    <00> (MIKE)TESTFILE ON TESTPACK
       AS (MIKE)NEW/TESTFILE ON MCPMAST.
  SEND: FILEX ACTIVE (4401) 1053 OF 10046 (PACING)
    <00> (MIKE)RJEX ON MCPMAST.
    <01> *SYMBOL/WFL
       AS (MIKE)WFL ON TESTPACK.
    <02> (RJE)DUMMY ON PACK
       ONTO (MIKE)SAVE/THIS/FILE/FOREVER.
```

The lines that start with the "[044]", "RECV:", and "SEND:" have the same meanings as in the previous example. "(MIKE)TESTFILE" and "(MIKE)RJE/X" are the filenames associated with the active file transfers, and the counts displayed in the RECV and SEND lines refer to these file transfers.

The lines that start with "<01>" and "<02>" are requests that have been queued. The "01" and "02" displayed within the broken brackets and the file names on those lines are examples of the <integer> and <filename> variables used as options in the ABORT control message. (Refer to ABORT in this section.)

HEADLINE

Syntax



Semantics

The HEADLINE control message is used to control and specify text to be displayed as a headline at log-on.

*SM HEADLINE

Displays the current setting of HEADLINE and any headline text.

*SM HEADLINE <text>

Causes the first 72 characters of <text> to be stored as the log-on headline.

*SM HEADLINE +

Causes the headline text to be displayed between the RJE banner and the session number messages at the time of log-on.

*SM HEADLINE -

Disables the headline text display at the time of log-on, but does not change the text stored in the LINKFILE.

Example

```
* SM HEADLINE
* SM HEAD +
```

HELP

Syntax

```
──HELP <RJE control message>──┤
```

Semantics

The HELP control message is provided to help the operator to remember the syntax for control messages. The MCS responds to a HELP request by displaying a one-line diagram describing the syntax of the indicated message.

Examples

* SM HELP RELEASE

* SM HELP SS

HI

Syntax

Semantics

The HI control message closes the printer file, invokes SYSTEM/BACKUP to print the printer file, and then reopens the printer file. Thus, MONITOR, DCERRFILE, and TASKFILE output may be printed while the MCS is still active. The HI control message is valid only when the MCS has been compiled with RAID compile-time option option set. (Refer to RAID under RJE COMPILE-TIME OPTIONS in Section 7.)

Example

```
* SM HI
```

LEVELS

Syntax

Semantics

The LEVELS control message displays the following information:

RJEPROTOCOLVERSION	The version of file-transfer and terminal-to-program protocols.
SYMBOLICHEADERLEVEL	The level of the symbolic header used in a file transfer.
LINKFILEVERSION	The version of the RJE Halt/Load recovery linkfile.
MAXTERMINALS MAXRJETERMINALS MAXNONRJETERMINALS MAXVIRTUALSTATIONS	Compile-time defines that control the number of stations controlled by RJE.

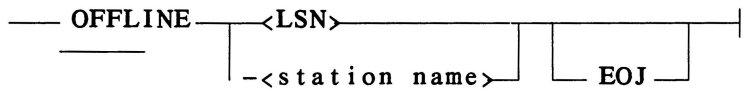
Example

```
* SM LEVELS

    RJEPROTOCOLVERSION=2,SYMBOLICHEADERLEVEL=2,LINKFILEVERSION=4
    MAXTERMINALS=20, MAXRJETERMINALS=10, MAXNONRJETERMINALS=10
    MAXVIRTUALSTATIONS=50
```

OFFLINE

Syntax



Semantics

The OFFLINE control message terminates the Data Comm connection between two host systems previously connected by execution of the the ONLINE control message. (Refer to ONLINE in this section.)

The <station name> must be that of the base station (device address "00") in the RJE family. If an invalid LSN or station name is used, the following error message is displayed:

```
# UNKNOWN STATION.
```

If no LSN or station name is supplied, the following error message is displayed:

```
# LSN OR STATIONNAME REQUIRED.
```

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The OFFLINE control message has different effects depending on the type of Data Comm connection. If this connection is a switched line, OFFLINE causes log-off and disconnects the line. If this connection is a direct or leased line, OFFLINE causes log-off but leaves the line active.

If EOJ is specified, RJE completes the current file transfer (if one is active) and then terminates the session.

RJE responds to the OFFLINE command with the following message:

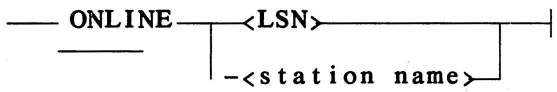
```
# OK.
```

Example

```
* SM OFFLINE GO
```

ONLINE

Syntax



Semantics

The ONLINE control message initiates a connection between two hosts.

The <station name> must be that of the base station (device address "00") in the RJE family. If an invalid LSN or station name is specified, the following error message is displayed:

```
# UNKNOWN STATION.
```

If no LSN or station name is supplied, the following error message is displayed:

```
# LSN OR STATIONNAME REQUIRED.
```

The ONLINE message has different effects depending on the type of the Data Comm connection. If this connection is a switched line without an ACU, ONLINE has no effect. In this case, the following response is displayed:

```
# NON DIALOUT CAPABLE STATION.
```

If this connection is a switched line with an ACU, ONLINE causes dialout if a phone number is set up. (Refer to *PH in Section 4.) If no phone number is set up, the following response is displayed:

```
#NO DIALOUT PHONE NUMBER
```

If a phone number is set up, the following response is displayed:

```
#DIALING OUT STARTED
```

If the connection is a direct or leased line, ONLINE causes the station-id messages to be sent in order to initiate the connection. In this case, RJE displays the following message:

```
#OK
```

If the <LSN> is already connected and active, RJE displays the following message:

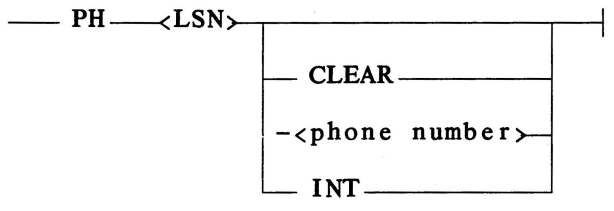
```
#STATION ALREADY ACTIVE.
```

Example

```
* SM ONLINE 60
```

PH

Syntax



Semantics

The PH control message is used to display, clear, change, or retry the ACU phone number associated with a station. The semantics associated with use of PH are listed below.

<RJE mix#> SM PH <LSN>

This message displays the current phone number (if any).

<RJE mix#> SM PH <LSN> CLEAR

This message clears the phone number.

<RJE mix#> SM PH <LSN> <phone number>

This message enters the specified new phone number.

<RJE mix#> SM PH <LSN> INT

This message causes dialout retry if the CALLBACK option is set for the station specified by <LSN>. (Refer to *SO in Section 4.)

If the specified <phone number> contains more than 71 characters, the following error message is displayed:

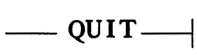
#PHONE NUMBER GTR 71 CHARACTER

Example

```
* SM PH 123456
```

QUIT

Syntax



Semantics

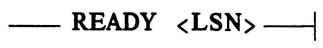
The QUIT control message causes the MCS to terminate and log off all active terminals after displaying the message "#RJE QTED."

Example

```
* SM QUIT
```

READY

Syntax



Semantics

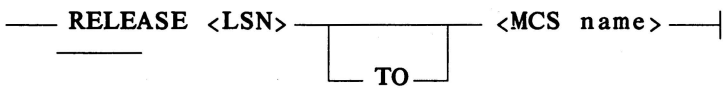
The READY control message causes the terminal associated with the specified <LSN> to be made ready. This statement negates the effect of the SAVE command. (Refer to SAVE in this section.)

Example

```
* SM READY 53
```

RELEASE

Syntax



Semantics

The RELEASE control message releases the indicated <LSN> to the specified MCS. The specified MCS is activated if it is not already active. Failure to release the station is indicated by the display of one of the following messages:

INV. MCS.

DCWRITE ERR#<error number>.

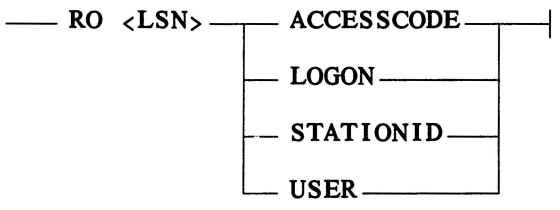
Example

```
* SM RELEASE 118 TO SYSTEM/CANDE
```

118

RO

Syntax



Semantics

The RO control message resets the indicated run-time option for the terminal associated with the indicated <LSN>. (Refer to SO in this section.) Unrecognized options are indicated by the following display message:

INV. OPTION

The state of the run-time options can be inquired using the "WHERE<LSN>" RJE control message. (Refer to WHERE in this section for information about this message.)

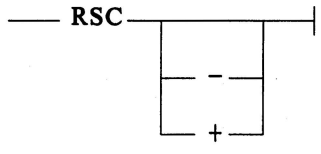
119

Example

```
*SM RO 123 LOGON
```

RSC

Syntax



Semantics

The RSC control message controls the use of the *SM message (refer to *SM in Section 4) by RJE terminals with device address "01" in an RJE family of stations (RSCs). The same control for non-RJE terminals (for example, terminals transferred to RJE from other MCSes) can be achieved by using the SPO control message (refer to SPO in this section). If RSC is set (+), the affected terminals are able to use the *SM message regardless of the setting of the SPO NDL bit. If RSC is reset (-), the setting of the SPO NDL bit controls access to the *SM message. RSC without modification displays one of the following messages indicating of the current setting of the RSC run-time option:

RSC IS SET

RSC IS RESET

An RSC compile-time dollar option (refer to RJE COMPILE-TIME OPTIONS in Section 7) is reset by default and has the same meaning as the RSC run-time option.

Examples

*SM RSC +

*SM RSC

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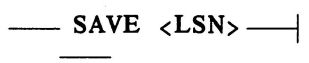
SAVE

Syntax



Semantics

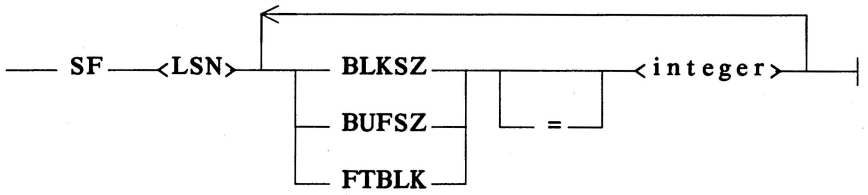
The SAVE control message causes the terminal associated with the specified <LSN> to be made not ready. Any active terminal is logged-off.

Example

```
*SM  SA  14
```

SF

Syntax



Semantics

The SF control message specifies buffer sizes used by RJE for the terminal defined by <LSN>.

BLKSZ indicates the characters per transmission blocking factor (this is, the number of characters which may be shipped over the Data Comm line per transmission).

BUFSZ indicates the buffer size, in characters, of remote printer output, punch output, or both (that is, the number of characters to be buffered in core when output is sent to the remote printer or punch).

FTBLK indicates the maximum number of characters allowed in an output file transfer block. This value should be the same on both host systems involved in a file transfer. If both hosts are B 6000/B 7000 systems, RJE allows the transfer of files whose MAXRECSIZEs are greater than FTBLK by splitting the records across several blocks.

The following defaults and limits are imposed:

	Defaults	Limits
BLKSZ	400	132 thru 1500 (inclusive)
BUFSZ	820	132 thru 2000 (inclusive)
FTBLK	1500	400 thru 2000 (inclusive)

Changing any of these values should be done with the utmost care in order to avoid exceeding the limits of the remote terminal or of the Data Comm line.

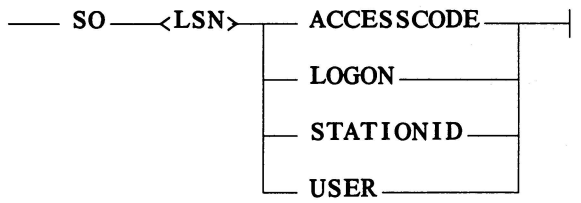
Examples

```
*SM SF 51 BLKSZ 500

*SM SF 60 FTBLK 2000
```

SO

Syntax



Semantics

The SO control message sets the indicated run-time option for the terminal associated with the specified <LSN>. The state of the run-time options can be inquired using the "WHERE <LSN>" control message; the meanings of these options are given below.

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ACCESSCODE — If ACCESSCODE is set for a terminal, a default accesscode is required on all log-ons with a default usercode. If the LOGON option is not set, ACCESSCODE is meaningless. The RJE compile-time option ACCESSDEFAULT is reset by default and has the same meaning as the run-time ACCESSCODE SO option. (Refer to RJE COMPILE-TIME OPTIONS in Section 7 and to Log-on and Log-off Messages in Section 3.)

LOGON — If LOGON is set for a terminal, the terminal is secured; that is, no user may activate that terminal until a log-on sequence has been performed in which RJE is supplied with a valid usercode and password, and the usercode and password are then associated by default with all decks read at the terminal which do not contain a USER WFL control statement.

USER — If USER is set for a terminal, all job decks read at that terminal must contain a USER WFL control statement. The following message notifies the remote user that the card reader has been secured:

```
#CR SECURED.
```

STATIONID — STATIONID may be set and reset in the same manner as the ACCESSCODE, LOGON, and USER options. If STATIONID is set for a terminal, a user may not log on at that terminal until a valid RJE station name has been entered at the user's RSC. STATIONID is reset by default. Because the use of STATIONID involves possible Data Comm reconfiguration, this option should be employed as sparingly as possible.

If STATIONID and LOGON are both set, the following request is added to the log-on sequence:

#AND YOUR STATION NAME.

If STATIONID is set and LOGON is reset, the user must satisfy the following request before being logged on by RJE:

#ENTER STATION NAME PLEASE

Each terminal that can call up RJE on a line must be assigned a unique station name. To facilitate this assignment, each such station must be described as a complete RJE terminal in the NDL description of the network. All lines bearing these terminals must be of dial-in/dial-out type with appropriate ACUs.

The RJE run-time option STATIONID allows the reconfiguration of RJE stations that are not assigned to a line in the NDL of the host system. The compile-time RJE defines MAXTERMINALS and MAXRJETERMINALS must be large enough to encompass the number of terminals placed under the control of this MCS. (Refer to SOURCE RJE DEFINES in Section 7 for discussions of these defines.) For proper operation, STATIONID must be set for each of these stations, and these station names must be the only station names entered in response to a request during the log-on sequence. MAXTERMINALS must be large enough to handle all RJE stations declared in the NDL, regardless of line assignments.

If any of the terminals referenced are active when STATIONID is first set, these terminals are not logged off (as is the case with the LOGON option).

When a user attempts to log on at a terminal for which STATIONID is set, RJE indicates that it has accepted the station name that was keyed in by displaying the following message (or the standard log-on message) at the user's RSC:

#RECONFIGURATION COMPLETED.

The message above is displayed if any Data Comm reconfiguration was required. Any aborted reconfiguration attempts from which RJE was able to recover are noted by the display of appropriate messages at the RSC. (Compilation with the RAID option set provides additional aids; refer to RJE COMPILE-TIME OPTIONS in Section 7 for a description of this option.)

RJE does not allow reconfiguration to a station that has logged off but still has an active AUTOBACKUP task. In this case, the following error message is displayed at the site that attempts to log on:

STATION IN USE, ENTER STATION NAME

A reconfigured RJE network may be examined using the *US RSC input message. (Refer to *US in Section 4.)

If a station is erroneously left with no line assignment, the following message is displayed at the system ODT:

<LSN> : NOT ATTACHED.

Such a condition requires reinitialization of the DCP.

Because of the pitfalls involved in reconfiguration, the RJE MCS should be compiled with the RAID compile-time option set for initial operation. (Refer to RAID under RJE COMPILE-TIME OPTIONS in Section 7.)

NOTE

Changing the status of the run-time options STATIONID or USER using the SM, SO or RO control commands causes an update of the RJE linkfile.

Examples

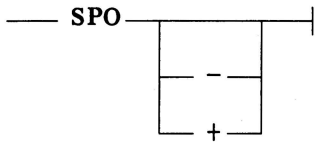
```
*SM SO   53  ACCESSCODE

*SM SO   53  LOGON
```

125

SPO

Syntax



Semantics

The SPO control message controls the use of the *SM message (refer to *SM in Section 4) by non-RJE terminals (for example, terminals transferred to RJE from another MCS). The same control for RJE terminals (stations with device addresses of "01") can be achieved by the using the RSC control statement. (Refer to RSC in this section.)

If SPO is set (+), the affected terminals are able to use the *SM message regardless of the setting of the SPO NDL bit. If SPO is reset (-), the setting of the SPO NDL bit controls access to the *SM message. If SPO is entered unmodified, one of the following messages is displayed indicating the current setting of the SPO run-time option:

```
SPO IS SET

SPO IS RESET
```

The SPO compile-time dollar option is reset by default and has the same meaning as the SPO run-time option. (Refer to RJE COMPILE-TIME OPTIONS in Section 7.)

Examples

```
*SM  SPO +

*SM  SPO
```

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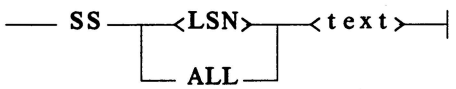
SS

Syntax



Semantics

The SS control message causes the specified <text> to be displayed at the RSC of the terminal associated with the specified <LSN>. If ALL is specified, the <text> is displayed at all active terminals.

<LSN> can be a station of another connected host system, in which case, the <text> of the message is prefixed by "# FROM <hostname>:" before it is written to the RSC station of the host system. The <text> of messages from non-host systems is prefixed by "#FROM SPO:", even if the *SM message was entered at a station.

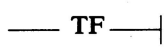
Examples

```
*SM SS 123 IS YOUR TASK IN A LOOP

*SM SS ALL DCP WILL BE STOPPED IN 5 MIN#
```

127

TF

Syntax



Semantics

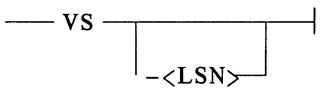
The TF control message displays the current values of the characters-per-transmission blocking factor (BLKSZ); of the buffer size, in characters, of remote printer output, punch output, or both (BUFSZ); and the maximum number of characters allowed in a file transfer block (FTBLK) for all active stations. (Refer to SF in this section for more detailed descriptions of these line-transmission factors.)

Example

```
*SM  TF

    [082] BLKSZ = 400      BUFSZ = 820      FTBLK = 1500
    [067] BLKSZ = 400      BUFSZ = 820      FTBLK = 1500
    [033] BLKSZ = 400      BUFSZ = 820      FTBLK = 1500
```

VS

Syntax



Semantics

The VS control message displays the base LSN and summary information for RJE terminal transfer lines. To display all the virtual stations on an RJE line, the base <LSN> of that line must be specified.

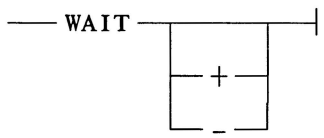
Example

```
*SM VS 84

     [084] RJEXXX @ SYS1073 (3 TOTAL, 1 INUSE STATIONS)
       [089] INPUT STATION NOT CONNECTED
       [090] INPUT STATION NOT CONNECTED
       [091] OUTPUT STATION NOT CONNECTED
       [092] ON STATION CONNECTED TO REMOTE TD471 (MCS=1 [152])

*SM VS 124

     [124] RJE1 @ B68001244 (2 TOTAL, 1 INUSE STATIONS)
       [130] INPUT STATION NOT CONNECTED
       [131] OUTPUT STATION CONNECTED TO TD426361 [199]

*SM VS 153

     [153] RJE2 NO HOSTNAME (1 TOTAL, 0 INUSE STATIONS)
       [160] INPUT STATION NOT CONNECTED
```

In the preceding examples, all the numbers in brackets ([,]) are LSNs. The identifiers RJEXXX, RJE1, and RJE2 are the names of the stations with device addresses of "00" which are in control of a File Transfer Link. The identifiers SYS1073 and B68001244 are the hostnames of the systems to which the File Transfer Links are connected. The remaining lines show the virtual stations along with their status (CONNECTED, NOT CONNECTED, or OUT OF SERVICE) and type (INPUT or OUTPUT). In this example, LSN 91 is processing a *CT request and has not yet received a reply from remote host, as SYS1073. Virtual station LSN 99 is in use by station TD471 from host SYS456 and has been released to MCS number 1 using a psuedo-station, LSN 152. LSN 131, which is an output station, is currently being used by a station called TD426361 at LSN 153. Station RJE2 is currently not connected to any remote host, as indicated by the "NO HOSTNAME" display.

WAIT

Syntax



Semantics

The WAIT control message causes the MCS to remain active even if no terminals are currently active. (By default, RJE goes to EOT when all terminals are found to be inactive.) The QUIT control message may be used to force the MCS to terminate. (Refer to QUIT in this section.)

WAIT displays the current setting of the WAIT run-time option; WAIT+ sets this option, and WAIT- resets this option.

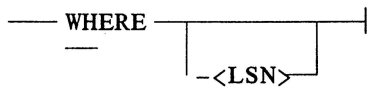
The state of an "*SM WAIT" command is maintained over both Halt/Loads and termination of RJE by the QUIT control command. The WAIT state is stored in the linkfile. (Refer to RJE HALT/LOAD RESTORE in Section 3.)

Examples

```
*SM WAIT +

*SM WAIT -
```

WHERE

Syntax



Semantics

The WHERE control message displays the status (ACTIVE, INACTIVE, or SAVED) of all terminals. If an <LSN> is specified, the status, configuration, and run-time options of the terminal associated with that <LSN> are displayed. The abbreviations used in the display are listed and defined in the following paragraphs.

TTP	The station is able to support terminal-to-program connections (terminal transfer).
FTS[RS]	The station is capable of file transfer. The [RS] displays the status of the file transfer initialization. The brackets are present only for readability purposes. R indicates that the 09 control message has been received from the other host; S indicates that the 09 control message has been sent to the other host.
TERM	The station is acting as a terminal.
HOST	The station is acting as a host.
VER=<n>	The protocol version number is specified by <n>.

Examples

```
*SM WH

   [163] INACTIVE  RJEUIO
   [028] ACTIVE    RJEIIB771
   [089] ACTIVE    RJE5457 @ MV4 (6900) (TTP, FTS[RS], HOST,
                             VER=2)
   [053] ACTIVE    TD1853T3 (TD830TERM) BY USERA
```

```
*SM WH 89

    [089] RJESYS7
    HOSTNAME = MV4
    PROTOCOL (TTP, FTS, HOST, VER=2)
    8 VIRTUAL STATIONS-1 INUSE
    LOGON NOT REQUIRED
    NO UC REQUIRED
    NO ACCESSCODE REQUIRED
    STATION ID NOT REQUIRED
    NON-SWITCHED
    ACTIVE
    [089] DC1000
    [090] RSC
    [091] CARD
    [092] PRINT
    [093] FTS

*SM WH 53

    [053] TD1853T3
     UC = USERA
     NO ACCESSCODE
     LOGON REQUIRED
     DEFAULT US IS USED
     NO ACCESSCODE REQUIRED
     NON-SWITCHED
     ACTIVE
     [053] DC1000
     [053] RSC
```

WM

Syntax

Semantics

The WM (What MCS) control message displays the level of the MCS.

Example

```
*SM WM
    #B6900 SYSTEM/RJE SYSTEM # 7 HOSTNAME =MV4 32.0.67
```

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6. RJE/MCP INTERFACE

INTERFACE CHARACTERISTICS

The following section describes the interface between the RJE system and a host system.

The heart of the RJE/host interface is the expansion of the origination word, PATHCONTROL, in the task of a process. This word contains information concerning the origination of the task along with information describing the destination of any printer or punch backup. PATHCONTROL has the following format:

Field	Meaning
[47:24]	DESTCONTROLF
[45:06]	DESTMCSF
[39:16]	DESTINATIONUNITF
[39:01]	DESTISREMOTEF
[38:15]	DESTUNITF
[23:24]	ORGCONTROLF
[21:06]	ORGMCSF
[15:16]	ORGINALUNITF
[15:01]	ORGISREMOTEF
[14:15]	ORGUNITF

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PATHCONTROL is divided into two parts. The high-order 24 bits of this word describe the backup destination, and the low-order 24 bits describe the origin of the task. 16 bits are allocated to the description of unit numbers because a task originating from a remote station has a unit number that is actually an LSN. To differentiate site unit numbers from LSNs, the top bits (that is, bits 15 and 39) are used, thus leaving a maximum of 15 bits for an LSN. In addition to the LSN information, the DESTMCSF field is provided to specify the number of the MCS controlling that LSN. This MCS number may not exceed 47, even though the fields in the path control word allow a maximum value of 63. (The reason for this restriction is explained under Backup in this section.)

PATHCONTROL TASK ATTRIBUTES AND WFL STATEMENT

A number of task attributes, along with a Work Flow Language (WFL) statement, are available to set up the path control word.

DESTNAME

DESTNAME is a pointer that may be set either to any station name defined in the NDL or to the word "SITE." If DESTNAME is set to a station name, the NDL description is interrogated and the destination LSN (DESTUNITF) and currently controlling MCS number (DESTMCSF) are set in the path control word. If DESTNAME is set to SITE, then the destination control portion of the path control word (DESTCONTROLF) is set to zero.

DESTNAME may also be read, in which case, it returns the station name associated with the destination unit. If DESTNAME is interrogated and a remote destination has not been specified, the string "SITE." is returned.

DESTSTATION

DESTSTATION is a real-valued attribute that sets or returns the destination station (DESTUNITF). DESTSTATION can be set by any program; if it is set, the destination MCS number (DESTMCSF) is set using the number associated with the currently controlling MCS.

SOURCESTATION

SOURCESTATION is an integer-valued attribute that sets or returns the origination station (ORGUNITF). SOURCESTATION may only be set by an MCS. (Refer to DESTSTATION.)

SOURCEKIND

SOURCEKIND is an integer-valued attribute that returns the unit type associated with the originating unit (for example, CARDREADER = 9, REMOTE = 3, SPO = 2).

BACKUPDESTINATION WFL Statement (synonym DESTNAME)

The WFL statement BACKUPDESTINATION works in the same way as the task attribute DESTNAME. When set at the job level, BACKUPDESTINATION applies to all subtasks unless overridden.

Example

In the following example, the job SITEJOB is initiated from the main site and directs backup from its two subtasks to the indicated stations, which may or may not be under control of the same MCS.

```
<I> JOB SITEJOB;
      BEGIN
      RUN X; BACKUPDESTINATION = STA1;
      RUN Y; BACKUPDESTINATION = STA2;

<I> END JOB
```

In the following example, the job RJEJOB is initiated from a remote entry station and directs the backup from the first task to the main site. The backup for the second task is sent back to the remote station by default.

```
<I> JOB RJEJOB;
     BEGIN
     RUN X; BACKUPDESTINATION = SITE;
     RUN Y;

<I> END JOB
```

ODT REQUESTS

All ODT requests from a remote station are directed to the system CONTROLLER along with the origination LSN number and usercode, if present. When requests are handled from a remote site, only commands that are marked FREE in SYSTEM/SCTABLEGEN (refer to Section 14 of B 6000/B 7000 Series System Software Operational Guide, Volume 2) are honored. A value of FREE is the default with the word "SITE" imposing the restriction. These two words may be set either at the section level or on the specific word. (The example at the end of this subsection illustrates how the input to the table generation program may be set up.) SYMBOL/SCTABLEGEN, the input to SYSTEM/SCTABLEGEN, contains definitions of the default values. After changing the SCTABLE, the CONTROLLER (bound in the MCP) must be recompiled with the patches generated by SYSTEM/SCTABLEGEN. Thus, by appropriate use of these attributes, an installation may give a remote input station as much or as little control as desired. If a request is denied because the command is marked SITE, the error message "NOT ALLOWED" is given.

If a request is honored, it is further restricted by the originating <LSN number> to tasks that have the same <LSN number>. Thus, a MIX request only shows jobs and tasks that originated from that <LSN> (the LSN of the remote RJE terminal). This restriction also applies such requests as COMPLETED, WAITING, SCHEDULED, and MESSAGES. Any attempt to act on a job or task that did not originate from the appropriate LSN gives the error message "INVALID NUMBER." Therefore, the RJE user is unaware of other users of the system.

The formats of ODT requests are given in the B 5000/B 6000/B 7000 Series Operator Display Terminal Reference Manual. All replies are formatted exactly as they are formatted at the central site. For jobs and tasks initiated from a remote site, a backslash ("\") is used to separate job and task numbers; this change was made so that the site operator could tell that the process originated from a remote station and that the user at the remote station may be handling any RSVP messages if the process is waiting. Thus, to the RJE user, the list of active items would appear as follows: 138

```
1234\1235 50 ALGOL A/B
```

The backslash character appears as a multiplication sign (x) on a Conrac or TD800.

Example

```
UNIT SECTION SITE.
PG CASE 0 VALUE 20,
OL CASE 2 FREE,
IV CASE 4 VALUE 62.
```

In this example, all requests in the section are marked to indicate that they are honored from the site console only. The request OL, however, is marked FREE; thus, this request is honored from a remote station.

JOB DECKS

The RJE system allows any job deck to be entered from a remote station except a binary card file. (A complete description of the Work Flow Language [WFL] used to write job decks is contained in the B 5000/B 6000/B 7000 Series Work Flow Language Reference Manual.)

The RJE system maintains a number of DCALGOL type queues for communications with the WFL compiler. Each queue is associated with a different active input terminal and a different copy of the WFL compiler. The RJE system starts the compiler using the following DCALGOL statement:

```
CONTROLCARD (Q[I], B) [WFLTASK[I]];
```

A one-to-one correspondence exists between the passed queue and the task variable associated with the process. The RJE MCS sets the appropriate task attribute to cause the compiler to run in a swap space if the swapping mechanism is enabled. The second parameter is a Boolean which, if TRUE, causes the WFL compiler to expect a usercode to accompany all jobs.

A new Boolean queue attribute, QREMOVEWAIT, has been added which, if TRUE, causes a remove or an empty queue process to wait until a message is inserted. This attribute is assigned values as illustrated below:

```
<queue-id>.QREMOVEWAIT := <Boolean expression>
```

If this attribute is set, a remove on an empty queue functions differently from a HOLD in that, if the removing process is running in a swap space, that process is swapped out.

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The WFL compiler performs remove operations on the passed queue. All data are in EBCDIC; the WFL compiler makes necessary translations for all types but BINARY (because binary decks are not allowed and no RJE line convention exists for such decks).

The MCP informs the RJE system of all decks that are queued or discarded because of syntax errors or illegal queue assignments.

BACKUP

When a printer or punch backup file is opened, the path control word in the task associated with the file is interrogated. If the destination in this word is specified as remote (DESTISREMOTEF), then the name of the file is "REMLPxx" or "REMCPxx" instead of "BD" where xx is the MCS number (DESTMCSF) from the path control word. (For example, if job # 1234 produced printer output for MCS # 2, the backup name would be "REMLP02/0001234/...")

Word three of the first record in a backup file contains the path control word for the task owning the file. This information may then be used by the controlling MCS for any unit correspondence.

As backup is produced for a remote site, two bit maps are kept in the job stack which indicate which MCS receives print backup and punch backup. To make the manipulation of these maps convenient, they are each one word long; this is the reason for limiting the maximum MCS number to 47.

During job termination, the print map (REMPRINTMASK) is examined and for each bit that is set, the job formatter is invoked to produce a printer backup file whose external name is SUMMARY. After this file is generated, a message is sent to the MCS as indicated by the bit map informing the MCS that printer backup has been produced and is now ready for output. The punch map (REMPUNCHMASK) is examined in a similar manner, and a corresponding notice is sent to the controlling MCS. The job formatter is not invoked for punch backup.

As many copies as necessary of the job summary listing are produced; thus, if a site job directs ouput to a remote station, or a remote job directs output to the site, a job summary is produced at both the site and the remote station.

The title of the summary file is of the following form (where "xx" is the MCS number):

```
REMLPxx/<JOB #>/000SUMMARY
```

When the MCS receives the print notice, it first prints the summary file, then prints all remaining backup files. The summary file is formatted exactly as it would be at the central site. After all backup is printed for a job, the MCS prints an END message in block letters to indicate this condition.

Example

Job 7569 has one task (7570) which produces a printer backup file called LINE. The directory structure for MCS number 2 would appear as follows:

```
REMLP02
. 0007569
.. 0007570
... 000LINE
.. 000SUMMARY
```

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INTERFACE MESSAGES

The RJE MCS, WFL compiler, and MCP interface through various DCALGOL queues. The following subsection describes the different formats for each type of interface message.

The first word of all interface messages has the following format:

```
[47:08] = Type (=21).
[39:08] = Variant.
[31:08] = ADDLINFO (type-dependent information).
[23:24] = LSN.
```

The variant field ([39:08]) of word zero is used to differentiate the various messages.

WFL Card Image (Variant = 1)

This message is passed to the WFL compiler through a DCALGOL queue using the following DCALGOL statement:

```
CONTROLCARD (<queue>, <Boolean> [<task>]);
```

This message has the following format:

```
Word [0].[47:08] = 21.
         [39:08] = 1.
         [31:08] = Unused.
         [23:24] = LSN of remote terminal.

Word [1]         = Number of card images in the message.

Word [2] - end   = Card image text in EBCDIC with each
                   card preceded by an eight-bit length byte. Bit
                   [7:1] of this length character is set if the
                   first character of the card is invalid. Bit
                   [6:7] of the character contains the length, in
                   characters, of the card image.
```

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RJE Operator Request (Variant = 2)

This message and following message are passed to the MCP through a DCALGOL queue using the following DCALGOL construct:

```
INSERT (<message>, <size>, INTERCOMQUEUES [0]);
```

INTERCOMQUEUES is a queue array reference. Before inserting a message into element zero of INTERCOMQUEUES (the MCP input queue), the communication links must be established using the following DCALGOL construct:

```
SETUPINTERCOM (INTERCOMQUEUES, MYINPUTQ);
```

The SETUPINTERCOM statement allows an MCS to communicate with other MCSes or with the CONTROLLER. A message is sent to the MCS with number N by inserting a message in the queue array reference indexed by N (INTERCOMQUEUES). The MCP CONTROLLER implicitly has an MCS number of zero. Received messages are found in the queue specified by the <queue designator> (MYINPUT). After the SETUPINTERCOM statement is executed, INTERCOMQUEUES [N] gives a sending link to other MCSes (where N is the MCS number). MYINPUTQ receives messages from other

MCSes when they insert messages into their output queue array reference indexed by the MCS number associated with MYINPUTQUEUE.

The format of an RJE operator request message is:

```
Word [0].[47:08] = 21.
         [39:08] = 2.
         [31:08] = Number of originating MCS.
         [23:09] = This field may be used by the sending MCS
                   for internal purposes.  When a reply to an RJE
                   operator request message is sent, this field
                   included in the reply.  (Refer to CONTROLLER
                   Reply [Variant = 3].)
         [14:15] = LSN of remote terminal.

Word [1].[47:01] = 1 if the reply is to be truncated at
                     line width.
         [46:01] = 0 if the user is to be restricted to these
                     commands marked FREE in the input to
                     SYSTEM/SCTABLEGEN. (Refer to ODT REQUESTS in
                     this section.)
                 = 1 if the user may use any command. This bit could
                     be set for a privileged user.
         [19:04] = 1, no response to message.
                 = 2, concise response (that is, "OK").
                 = 3, expanded response.
         [15:08] = Line width, where 2 < line width < 80.
         [07:08] = Number of lines on page, where 0 < lines
                   < or = 24.

Word [2-4]       = Usercode. If a usercode exists, then
                   word [2].[46:7] is the length of the usercode to
                   be applied to all PDs and control cards
                   received.  If [2].[47:1] = 1, then a validity
                   check must be performed on the usercode being
                   passed.  If word [2].[47:8] =0, then no usercode
                   is used.

Word [5]         = Length of input string, in characters.
Word [6] - end   = Input string.
```

CONTROLLER Reply (Variant = 3)

This message is received back from the MCP CONTROLLER and has the following format:

```
Word [0].[47:08] = 21.
         [39:08] = 3.
         [31:08] = Number of originating MCS.
         [23:09] = This field is set from the input
                   request. (Refer to RJE Operator
                   Request [Variant = 2].)
         [14:15] = LSN of remote terminal.
```

In constructing this message, the MCS sets [31:32] from [31:32] of the input request message (variant=2).

```
Word [1]         = Number of characters in message.

Word [2] - end   = Output string.
```

Next Message (Variant = 4)

This message follows a series of variant=3 messages if a NEXT condition exists. The MCS stores this message; when a NEXT is used to signal that the next page of output is desired, the MCS sends the variant=4 message back to the MCP. The variant=4 message has the following format:

```
Word [0].[47:08] = 21.
         [39:08] = 4.
         [31:32] = Set from [0].[31:32] of the original
                   variant=2 message.

Word [1]         = Terminal information word. (Refer to word [1]
                   format under RJE Operator Request [Variant=2].)

Word [2] - end   = Contents set up by MCP.
```

Task Message (Variant = 5)

This message is generated by the MCP procedure MESSER when a message is generated for the computer operator and has the following format:

```
Word [0].[47:08] = 21.
         [39:08] = 5.
         [31:08] = MCS number.
         [23:24] = LSN of target remote terminal.

Word [1]         = Date in binary Julian.

Word [2-3]       = To be ignored (logging information) unless
                   word [2].[47:01] = 1, in which case, a usercode
                   appears after the message whose length is in
                   [2].[46:07].

Word [4]         = Number of characters in message.

Word [5] - end   = Message.
```

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Status Change (Variant = 6)

This message is used to notify an MCS of changes in the status of jobs or tasks initiated from a remote site.

```
Word [0].[47:08] = 21.
         [39:08] = 6.
         [31:08] = Subtype (described below).
         [23:09] = 0.
         [14:15] = LSN of target remote terminal.
```

Subtype = 1: WFL deck accepted by system.

```
Word [1]         = Job number.

Word [2]         = Job queue into which job was placed.
```

Subtype = 2: Backup ready for output.

Word [1] = Job number.

Word [2] = 1, printer backup. REMLPxx directory contains backup. The "xx" following REMLP is the MCS number.

= 2, punch backup. REMCPxx directory contains backup.

Unsolicited Message (Variant = 7)

This message results from actions of a task initiated from a remote source. The message format is the same as that of the variant=3 message except for the format of word [0].[23:09].

Word [0].[47:08] = 21.
[39:08] = 7.
[31:08] = Number of MCS.
[23:09] = 0.
[14:15] = LSN of remote terminal.

Word [1].[47:01] = Usercode, present where the length is in [1].[46:07]. The usercode, however, appears one word past the end of the message.

BOJ/BOT Message (Variant = 8)

This message notifies the controlling MCS of the beginning of jobs and tasks and has the following format:

Word [0].[47:08] = 21.
[39:08] = 8.
[31:08] = Number of MCS.
[23:09] = 0.
[14:15] = LSN.

Word [1] = Job serial word.
[45:10] = Stack number.
[31:16] = Job number.
[15:16] = Task number. (If job number = task number, then task number refers to a job.)

Word [2] = Priority.

Word [3] = Not used.

Word [4, 5, 6] = Usercode.

Word [4].[47:08] = Length of name.

Word [7, 8, 9] = Compiler name.

Word [7].[47:08] = Length of name.

Word [10] - end = Name of job or task (in standard form).

Scheduled Message (Variant = 9)

This message notifies the MCS that a job has been scheduled to run. The variant=9 message has the following format:

```
Word [0].[47:08] = 21.
         [39:08] = 9.
         [31:08] = MCS number.
         [23:24] = LSN of remote terminal.

Word [1]         = Same as for variant=8 message.

Word [2] - [4]   = Usercode, if [2].[47:1] is set and the length
                   of the usercode is in [2].[46:7].
```

Restarted Message (Variant = 10)

This message is a notice that a job is being restarted from the suspended state. (For example, the job may have been suspended as the result of operator action.) The format of this message is identical to the format of the variant=9 message, except that the variant field in this message equals 10.

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7. RJE COMPILATION

RJE COMPILE-TIME OPTIONS

The RJE MCS must be compiled from the SYMBOL/RJE symbolic with the DCALGOL compiler. Eleven compile-time options are provided to alter or add code to the resulting MCS. Nine of these options are reset by default in the released symbolic. The options are discussed in the following paragraphs; the default for each option is indicated in parentheses following the option name.

ACCESSDEFAULT (RESET)

If compiled with the ACCESSDEFAULT compile-time option set, RJE requires a default accesscode for logging on. (Refer to RJE LOG-ON/LOG-OFF in Section 3 and to SO in Section 5.)

LINEINFO (SET)

If RJE is compiled with the LINEINFO compile-time option set, the DCALGOL compiler captures the sequence numbers of symbolic statements and associates these numbers with the generated object code. If the program terminates abnormally, the last three sequence numbers related to the last executed object code are associated with the fault-termination message.

NEWLINE (SET)

If RJE is compiled with the NEWLINE compile-time option set, the MCS is able to function properly when communicating with terminal operating systems produced after the DC1000 (for example, B 776 systems). Pre-DC1000 and DC1000 systems require NEWLINE to be reset.

NDLLOGIN (SET)

If RJE is compiled with the NDLLOGIN compile-time option set, the setting of the NDL LOGIN bit is used to control station log-on either with or without a USERCODE/PASSWORD. This option overrules the NOLOGON compile-time option.

NOLOGON (RESET)

If RJE is compiled with the NOLOGON compile-time option set, all terminals are allowed to log on without supplying RJE with a usercode and password. These terminals can "see" any non-secured files on the system. Selective terminals may be secured (that is, may be required to supply a valid user identification when logging on) by using the "SM SO" control message to set the LOGON run-time option for those terminals. (Refer to LOGON under SO in Section 5.)

PASS96COLCARDS (RESET)

If RJE is compiled with the PASS96COLCARDS compile-time option reset, all card images sent from RJE to the remote card punch are limited to 80 columns in length. If the option is set, the limit is 96 columns.

PASSLOWERCASE (RESET)

If RJE is compiled with the PASSLOWERCASE compile-time option set, RJE permits lowercase letters to be printed at remote terminals that are capable of lowercase-letter display.

RAID (RESET)

If RJE is compiled with the RAID compile-time option set, all activity of RJE stations is monitored on a printer file with the name PRINTFILE. Any results of a DCSYSTEMTABLES request for a DCWRITE error are also printed to the printer file. In addition, the *DL and *DP keyins are enabled. Because additional disk is required when RAID is set, this option should be used sparingly and only when MCS errors are suspected.

RSC (RESET)

If RJE is compiled with the RSC compile-time option set, the *SM input message is allowed to all device-address "01" stations (RSCs) in the RJE families of stations. (Refer to *SM in Section 4 and to RSC in Section 5.)

SPO (RESET)

If RJE is compiled with the SPO compile-time option set, the *SM input message is allowed on all non-RJE terminals (for example, terminals transferred to RJE from another MCS). Refer to *SM in Section 4 and to SPO in Section 5.

STATIONID (RESET)

If RJE is compiled with the STATIONID compile-time option set, terminals require STATIONID information at log-on time. (This option can be set for individual terminals using the SO control message; refer to SO in Section 5.)

USER (RESET)

If RJE is compiled with the USER compile-time option set, all card decks entered to RJE are required to include a WFL USER card.

SOURCE RJE DEFINES

The user may be required to change a number of RJE defines in order to handle network configuration or to decrease the RJE overhead. These defines are listed and described in the following paragraphs.

MAXTERMINALS

This define must be set to a value that is at least equal to the number of RJE stations declared in the NDL for the site. Declaration of a value much greater than the number of RJE stations causes increases in overhead and memory requirements for RJE. MAXTERMINALS is the sum of MAXNONRJETERMINALS and MAXRJETERMINALS.

MAXNONRJETERMINALS

This define specifies the maximum number of non-RJE terminals allowed at any time. A non-RJE terminal is a terminal whose NDL TERMINALTYPE identifier does not start with the letters "RJE" (for example, TD800s and TELETYPEs). These terminals have usually been released to RJE from another MCS and do not belong to an RJE family of stations (PROCESSOR RSC, CARDREADER, LINEPRINTER, or FTS).

MAXRJETERMINALS

This define specifies the maximum number of RJE terminals allowed at any time. RJE terminals are terminals that belong to an RJE family of stations (PROCESSOR, RSC, CARDREADER, LINEPRINTER, or FTS).

MAXVIRTUALSTATIONS

This define specifies the maximum number of virtual stations declared for the MCS in the NDL for the site. If the number declared in the NDL is greater than MAXVIRTUALSTATIONS, RJE aborts at the time of initialization.

COMPILING THE RJE MCS

The following cards represent a typical deck employed to compile SYSTEM/RJE:

```
<I>BEGIN JOB RJECOMPILATION;
<I>COMPILE SYSTEM/RJE DCALGOL LIBRARY
<I>DCALGOL FILE TAPE(TITLE=SYMBOL/RJE)
<I>EBCDIC
   $SET MERGE NOLOGON PASSLOWERCASE
   (other $ cards and patch cards go here)
<I>END JOB
```

APPENDIX A. SAMPLE RJE SESSIONS

INTRODUCTION

Two examples are shown in this section. The first example shows a typical RJE session using a B 771 terminal. In this example, a number of programs are run, and backup files are printed on the B 771 printer under the control of the RSC operator.

The second example shows a CANDE terminal that is attached to RJE and connected to another host. A code file is transferred from the local host to the remote host and then executed in the remote host.

Appendix C contains the NDL and NDLII declarations for these examples.

B 771 EXAMPLE

In this example, messages that start with a period (".") are B 771 firmware input/output messages. Although this example constitutes a full RJE session, a text paragraph precedes each message as explanation.

The messages preceded by a "->" are operator input messages.

The B 771 is first placed on-line, and a new RJE session is initiated.

```
-> .ONLINE
   .HOST EST
-> HELLO
   B6800 SYSTEM/RJE SYSTEM #456 HOSTNAME = SYS456 32.0.67 MIX = 7564.
   .CR-NR
   RJEIIB771 LOGGED ON AT 13:21:25   07/01/81.
   SESSION 7885.
```

A check is made to see if the files are present using the PD message.

```
-> PD (FS)=
   (FS) (DIRECTORY)
   . PROGRAMA (ALGOLCODE)
   . PROGRAMB (ALGOLCODE)
```

The state of the terminal options is interrogated using the *TO input message.

```
-> *TO
   REMOTEPUNCH RESET
   CALLBACK RESET
   AUTOBACKUP SET
   IGNOREFM RESET
   CONTBACKUP SET
```

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PROGRAMA is executed, and the listing produced by this execution is automatically printed on the B 771 printer (because the AUTOBACKUP option is set).

```
-> RUN (FS)PROGRAMA
   #JOB 7887 INSERTED: IN Q#00
   7887/7887 BOJ 50 "?BEGIN JOB;"
   7887/7888 BOT 50 (FS)PROGRAMA
   7887/7888 EOT (FS)PROGRAMA
   7887/7887 EOJ JOB ?BEGIN JOB;
   7564/7889 BOT 85 AUTOPRINT/LSN023/"#7887"
   7889 REMLP14/0007887/0007888/000PRINT REMOVED ON PACK PK103.
   7889 REMLP14/0007887 REMOVED ON PACK PK103.
   7564\7889 EOT AUTOPRINT/LSN023/#7887
```

No backup files are present.

```
-> *BACKUP
   #NO BACKUP FILES.
   #END BACKUP REQUEST.
```

The AUTOBACKUP option is reset; thus, no more automatic backup printing occurs.

```
-> *RO AUTOBACKUP
   AUTOBACKUP RESET
```

PROGRAMB is run.

```
-> RUN(FS)PROGRAMB
   #JOB 7898 INSERTED: IN Q#00
   7898/7898 BOJ 50 "?BEGIN JOB;"
   7898/7899 BOT 50 (FS)PROGRAMB
```

The A ODT message is entered; this message inquires only about active programs initiated by RJE.

```
-> A
   ----1 ACTIVE ENTRY ----
   2 7898\7899 50 (FS)PROGRAMB
```

PROGRAMB finishes. Because AUTOBACKUP is reset, no backup printing occurs.

```
   7898\7899 EOT (FS)PROGRAMB
   7898\7898 EOJ JOB ?BEGIN JOB;
```

PROGRAMA runs again.

```
-> RUN (FS) PROGRAMA
   #JOB 7902 INSERTED: IN Q#00
   7902/7902 BOJ 50 "?BEGIN JOB;"
   7902/7903 BOT 50 (FS)PROGRAMA
   7902\7903 EOT (FS) PROGRAMA
   7902\7902 EOJ JOB ?BEGIN JOB;
```

The C ODT message is used to verify the completed tasks.

```
-> C
   ---- COMPLETE ENTRIES ----
   *7902\7902 EOJ JOB ?BEGIN JOB;
   *7902\7903 EOT (FS)PROGRAMA
   *7898\7898 EOJ JOB ?BEGIN JOB;
   *7898\7899 EOT (FS)PROGRAMB
   *7564\7889 EOT AUTOPRINT/LSN023/#7887
   *7887\7887 EOJ JOB ?BEGIN JOB;
   *7887\7888 EOT (FS)PROGRAMA
```

The backup files created by PROGRAMA and PROGRAMB are verified. These files are kept under the directory "REMLP14" in this example (MCS = 14).

```
-> PD REMLP14/=ON PACK
   REMLP14 (DIRECTORY)
   . 0007898 (DIRECTORY)
   ... 0007899 (DIRECTORY)
   ... 000LINE (BACKUPDISK)
   ..000SUMMARY (BACKUPDISK)
   .0007902 (DIRECTORY)
   .. 0007903 (DIRECTORY)
   ... 000PRINT (BACKUPDISK)
   .. 000SUMMARY (BACKUPDISK)
-> *BACKUP
   PRINTER BACKUP
   7898/7899/000LINE,1 PAGE
   7902/7903/000PRINT,1 PAGE
   #END BACKUP REQUEST.
```

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The RJE print queue is checked.

```
-> *SP
   PRINT QUEUE
   C 7898
   C 7902
```

Two more entries are made in the print queue.

```
-> *ME 7902 COPIES=2 SAVE
   7902.1 QUEUED(ME 7902 COPIES=2 SAVE)
-> *SP
   PRINT QUEUE
   C 7898
   C 7902
   C 7902.1(ME 7902 COPIES=2 SAVE)
   #
-> *ME 7902/7903 SAVE
   7902.2 QUEUED (ME 7902/7903 SAVE)
-> *SP
   PRINT QUEUE
   C 7898
   C 7902
   C 7902.1(ME 7902 COPIES =2  SAVE)
   C 7902.2(ME 7902/7903 SAVE)
```

An entry is changed in the print queue.

```
-> *CE 7902.2 COPIES=3
   C 7902.2(ME 7902/7903 COPIES=3 SAVE)
-> *SP
   PRINT QUEUE
   C 7898
   C 7902
   C 7902.1(ME 7902 COPIES=2 SAVE)
   C 7902.2(ME 7902/7903 COPIES=3 SAVE)
   #
```

The position of the entries in the print queue is changed.

```
-> *PB 7902.2
   #
-> *SP
   PRINT QUEUE
   C 7902.2 (ME 7902/7903 COPIES=3 SAVE)
   C 7898
   C 7902
   C 7902.1 (ME 7902 COPIES=2 SAVE)
```

Entries are deleted from the print queue.

```
-> *PB - 7902.2
   #7902.2 DELETED
-> *PB - 7902.1
   #7902.1 DELETED
-> *PB - 7902
   #7902 DELETED
-> *SP
   PRINT QUEUE
   C 7898
```

Backup from job 7898 is printed at the main system printer.

```
   *SB 7898
   #
```

The session is terminated.

```
-> BYE.
   RJEIIB771 LOGGED OFF AT 13:27:28  07/01/81.
   .HOST TERM
```

TERMINAL AND FILE TRANSFER EXAMPLE

In the following example, all operator input is indicated with a "->". A text paragraph precedes each message as explanation.

```
-> ?WRU
   #B6900:7 CANDE 32.341; YOU ARE DIABSTA1(18)
-> ?MCS SYSTEM/RJE
-> HELLO
   B6900 SYSTEM/RJE SYSTEM #7 HOSTNAME = MV4 32.0.67 MIX = 4309.
   DIABSTA1 LOGGED ON AT 10:22:54 06/26/81.
   SESSION 4553.
```

The PD ODT message is entered. (This message does not start with an "*".) The linkfile FILEKIND is DATA.

```
-> PD SYSTEM/RJE/= ON DISK
   SYSTEM (DIRECTORY)
   . RJE (DCALGOLCODE) & (DIRECTORY) IN USE
   . . LINKFILE (DATA) IN USE
```

*WM and *TF are RJE input messages (as indicated by the "*" preceding each message).

```
-> *WM
   #B6900 SYSTEM/RJE SYSTEM #7 HOSTNAME = MV4 32.0.67 MIX = 4309. MCS
    01.

-> *TF
   #BLKSZ = 400  BUFSZ = 820  FTBLK = 1500
```

WH is an RJE control message (as indicated by the *SM input command preceding the control message). The SPO option is set, allowing this terminal to enter control commands. The connection to SYS456 (B 6900) is inactive (LSN 68).

```
-> *SM WH
   [083] ACTIVE RJ2TOSYS6 @ MV (6900) (TTP, FTS[S], HOST, VER=2)
   [068] INACTIVE RJETOSYS456
   [018] ACTIVE DIABSTA1 (TTYTERMDIAB)
   [054] ACTIVE TD185T3 (TD830TERM)
```

Because LOGON is reset, a usercode is not required.

```
-> *SM WH 18
   [018] DIABSTA1
   LOGON NOT REQUIRED
   NO UC REQUIRED
   NO ACCESSCODE REQUIRED
   STATION ID NOT REQUIRED
   DIALIN
   ACTIVE
   [018] DC1000
   [018] RSC
```

No file transfer is taking place to SYS456 (LSN 68).

```
-> *SM FTS
   [083] RJ2TOSYS6 @ MV  NO ACTIVE FILE TRANSFER
```

A connection is established with SYS456 (remote host).

```
-> *SM ONLINE 68
   #OK

-> *SM WH
   [083] ACTIVE RJ2TOSYS6 @ MV (6900) (TTP,FTS[S],HOST,VER=2)
   [068] ACTIVE RJETOSYS456 @ SYS456 (6800) (TTP,FTS[RS],HOST,VER=2)
   [018] ACTIVE DIABSTA1 (TTYTERMDIAB)
   [054] ACTIVE TD1853T3 (TD830TERM)
```

Eight virtual stations are present (two for input and six for output). Appendix C contains an example of the NDL definitions for this connection.

```
-> *SM VS 68
   [068] RJETOSYS456 @ SYS456 (8 TOTAL, 0 INUSE STATIONS)
      [073] INPUT STATION NOT CONNECTED
      [074] INPUT STATION NOT CONNECTED
      [075] OUTPUT STATION NOT CONNECTED
      [076] OUTPUT STATION NOT CONNECTED
      [077] OUTPUT STATION NOT CONNECTED
      [078] OUTPUT STATION NOT CONNECTED
      [079] OUTPUT STATION NOT CONNECTED
      [080] OUTPUT STATION NOT CONNECTED
```

Code file PROGA is copied to SYS456 (as PROGRAMA).

```
-> *SM COPY PROGA(USER=FS) AS PROGRAMA (USER=FS)FROM
   TIOADMIN(HOST=MV4)TO DISK(HOST=SYS456)
   #COPY REQUEST VALID - WILL FORWARD
   #FILE (FS)PROGRAMA ON DISK ALREADY EXISTS
```

A copy of SYSTEM/COBOL is requested.

```
-> *SM COPY *SYSTEM/COBOL(USER=FS) AS C(USER=FS) FROM DISK(HOST=MV4)
    TO DISK(HOST=SYS456)
    #COPY REQUEST VALID - WILL FORWARD
    #COPY REQUEST OK-ED OF (FS)C ON DISK
```

40 segments of 6695 have already been copied.

```
-> *SM FTS
   [083] RJ2TOSYS6 @ MV  NO ACTIVE FILE TRANSFER
   [068] RJETOSYS456 @ SYS456
     RECV:  NOT ACTIVE
     SEND:  FILEX ACTIVE (4574) 40 OF 6695 (PACING)
```

The request is aborted.

```
-> *SM ABORT 68 SEND
   #OK

-> *SM FTS
   [083] RJ2TOSYS6 @ MV NO ACTIVE FILE TRANSFER
   [068] RJETOSYS456 @ SYS456 NO ACTIVE FILE TRANSFER
```

The terminal is still attached to RJE in the local host (SYSTEM 7).

```
-> *WM
   #B6900  SYSTEM/RJE SYSTEM #7 HOSTNAME = MV4 32.0.67 MIX = 4309.
    MCS 01.
```

The terminal is transferred to the remote host (SYS456). and then attached to RJE in the remote host.

```
-> *CT SYS456
   #
   #SUCCESSFUL TERMINAL TRANSFER TO HOST SYS456

-> *WM
   #B6800 SYSTEM/RJE SYSTEM #456 HOSTNAME = SYS456 33.0.89 (RAID)
    MIX = 8999. MCS 14.
```

The remote host is a dual B 6800. (The WM ODT message is used here.)

```
-> WM
   LOCAL 2 MCP: SYSTEM/MCP33104TC/FMLYINX002 33.104.1018
   H/L UNIT: 203 BACKUP UNIT:  197
   LOCAL 3 MCP: SYSTEM/MCP33104TC/FMLYINX002 33.104.1018
   H/L UNIT: 203 BACKUP UNIT: 197
   COMPILED: 06/23/81 @ 18:09:17 (NEWP 33.102)
        COMPILE TIME OPTIONS ARE:
          TRACE                DIAGNOSTICS          EXPERIMENTAL
          LINEINFO             LOCKTRACE            SWAPTRACE
   H/L REASON: MANUAL
   H/L TIME: FRIDAY JUN 26, 1981 (81177) 8:53 AM.
   GROUP ID.: DEFAULT
   HOSTNAME:  SYS456
   SYSTEM SERIAL NO: 456
   CATALOG LEVEL: 0
   NEXT MCP: NOT SPECIFIED
```

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The connection line on SYS456 is LSN 89. Appendix C contains the NDL declarations for this example.

```
-> *SM WH
   [163] ACTIVE    RJEUIO @ SYS2073 (6900) (TTP,FTS[RS],HOST,VER=2)
   [127] INACTIVE  RJESYS6
   [108] INACTIVE  RJESYS5
   [089] ACTIVE    RJESYS7 @ MV4 (6900) (TTP,FTS[RS],HOST,VER=2)
   [033] INACTIVE  RJEDIAL456
   [028] ACTIVE    RJEIIB771

-> *SM WH 89
   [089] RJESYS7
   HOSTNAME=MV4
   PROTOCOL (TTP,FTS,HOST,VER=2)
   8 VIRTUAL STATIONS - 1 INUSE
   LOGON NOT REQUIRED
   NO UC REQUIRED
   NO ACCESSCODE REQUIRED
   STATION ID NOT REQUIRED
   NON-SWITCHED
   ACTIVE
   [089]  DC1000
   [090]  RSC
   [091]  CARD
   [092]  PRINT
   [093]  FTS
```

The terminal is attached to CANDE on the remote host.

```
-> *RE SYSTEM/CANDE

   #B6800:456 CANDE
   #RELEASE COMPLETED

-> HELLO FS.

   #B6800:456 CANDE 33.103; YOU ARE PSEUDO6RJESYS6(145)
   (6/25) DSGN RVW CNCLD;ARCH FILE PURGE TONIGHT; CLAIM TAPES;
    EXTENDED PM
   #SESSION 9335 10:43:33 06/26/81
   #FAMILY TIOADMIN NOT PRESENT
```

The file transferred is on DISK. (The CANDE FILES message is used here.)

```
-> FILES ON DISK
   (FS) ON DISK
   .  PROGRAMA : ALGOLCODE
   #
```

PROGRAMA is executed.

```
-> R $PROGRAMA
   #RUNNING 9347
   #ET=1.9 PT=0.4 IO=0.5
```

The CANDE session is finished, and the terminal returns to RJE in the remote host.

```
-> BYE
   #END SESSION 9335 ET=1:10.2 PT=0.6 IO=0.5
   #USER = FS 10:44:44  06/26/81
   #B6800 SYSTEM/RJE SYSTEM #456 HOSTNAME =SYS456 33.0.089 MIX =8999.
     [145] RELEASE COMPLETED.
```

The terminal returns to the local host under control of RJE.

```
-> *DT
   #TERMINAL TRANSFER TO HOST SYSA456 HAS BEEN TERMINATED

-> *WM
   #B6900 SYSTEM/RJE SYSTEM #7 HOSTNAME = MV4 32.0.67 MIX = 4309.
    MCS 01.
```

The RJE session in the local host is finished, and the terminal returns to CANDE in the local host.

```
-> *BYE
   DIABSTA1 LOGGED OFF AT 10:44:55  06/26/81.

   #B6900:7 CANDE
   #RELEASE COMPLETED
   #ENTER USERCODE PLEASE
```

APPENDIX B. SYSTEM INPUT MESSAGES

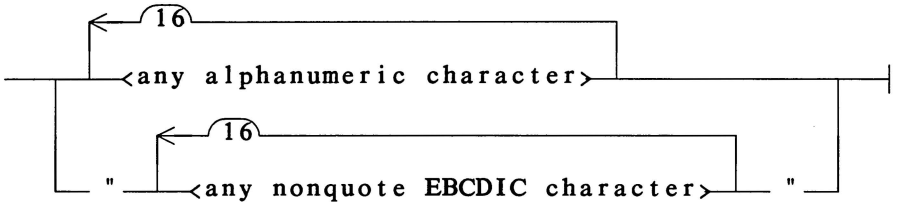
INTRODUCTION

This appendix presents summaries of the ODT messages that are valid for use through RJE under the standard 3.2 MCP, including syntax for each message. These messages are not checked by the RJE MCS, and they are sent directly to the MCP (refer to SYSTEM INPUT MESSAGES in Section 3). For detailed descriptions of these messages, refer to the B 5000/B 6000/B 7000 Series Operator Display Terminal (ODT) Reference Manual.

BASIC CONSTRUCTS

The following basic constructs appear in syntactic variables in ODT message syntax diagrams:

<identifier>



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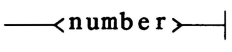
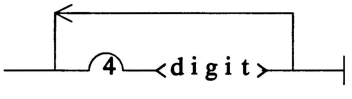
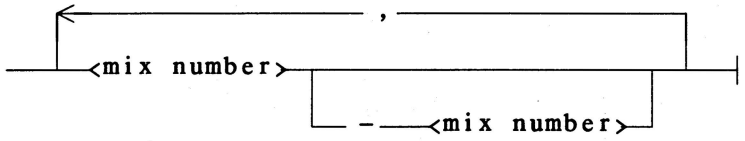
<mix number>



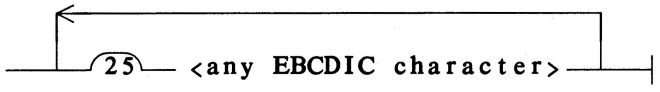
<number>



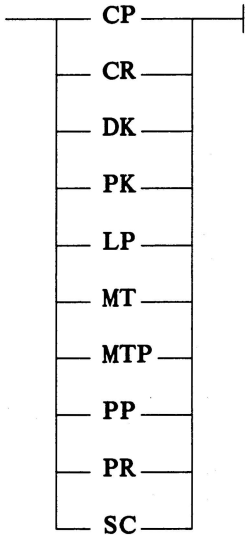
<mix number list>

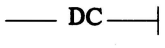


<text>



<device>





The above syntax (DC) applies only to MLIP systems as a valid device.

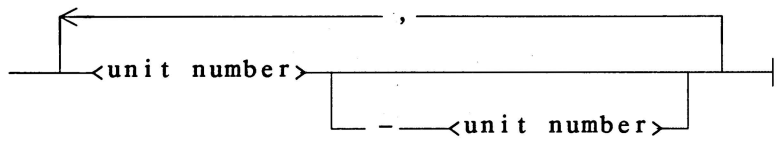
The following device synonyms are permitted:

CR = READER
DK = DISK
PK = PACK
LP = PRINTER
MT = TAPE
MTP = PETAPE
SC = SPO

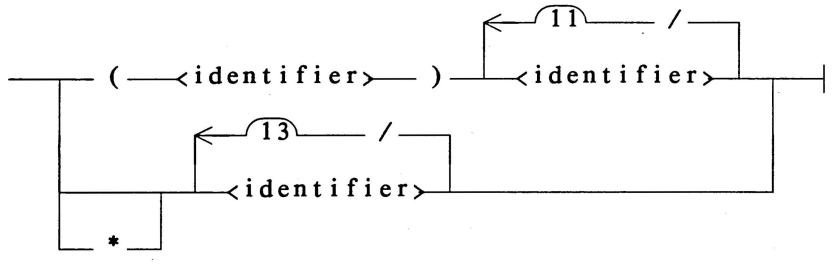
<unit number>

Number greater than zero and less than 256.

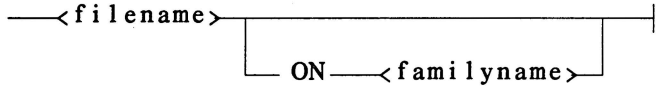
<unit number list>



<filename>



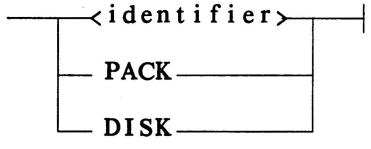
<file title>



<family index>

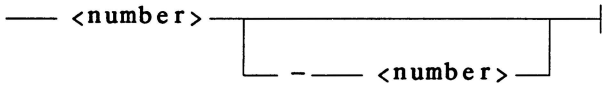
A base unit-relative integer between 1 and 255.

<familyname>



A "family" is a logical way to group mass-storage devices together to appear to function as one unit. A system-resource diskpack comprises a family named PACK. A named native-mode diskpack (with any continuation packs) comprises a family whose name is the familyname. A file with KIND=DISK refers, by default, to the DISK family; a file with KIND=PACK refers to the family whose name is the familyname (by default, PACK). File titles containing the suffix ON <familyname> may be used to specify a family other than the default family.

<range>

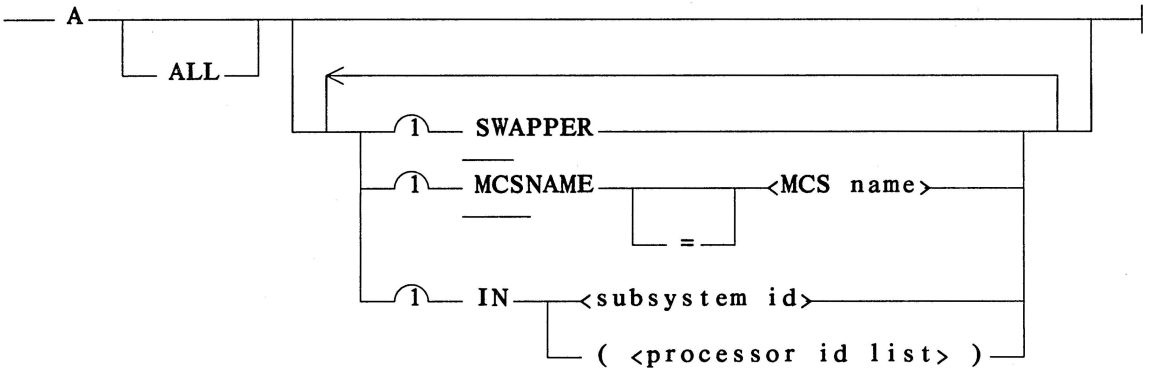


ODT MESSAGES

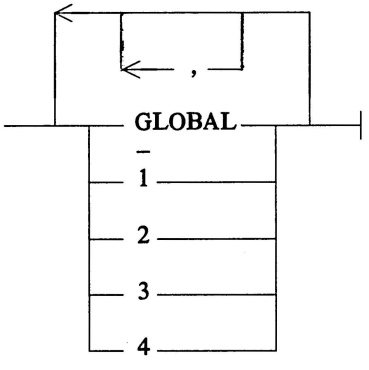
The following valid ODT messages are listed alphabetically with corresponding syntax. A number of these ODT messages are valid only in the forms used for inquiry. The syntax diagrams show only the syntax that is valid for use with RJE.

A

Syntax



<processor id list>

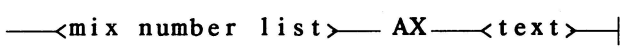


Semantics

The A (Active mix entries) message lists all active jobs and tasks initiated by RJE.

AX

Syntax

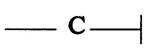


Semantics

The AX (Accept) message passes the specified <text> to the program(s) specified in the <mix number list>.

C

Syntax

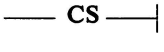


Semantics

163 The C (Completed mix entries) message lists recently completed jobs and tasks initiated by RJE.

CS

Syntax

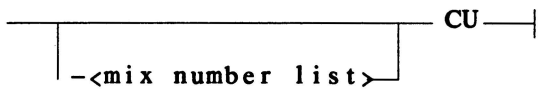


Semantics

The CS (Change Supervisor) message displays the "supervisor" program.

CU

Syntax

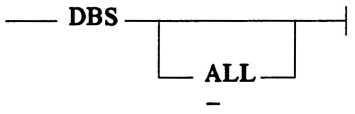


Semantics

The CU (Core Usage) message obtains information regarding the core usage of the system or of the job(s) specified in the <mix number list>.

DBS

Syntax

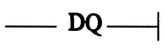


Semantics

The DBS (Data Base Stack entries) message lists all active database stacks.

DQ

Syntax

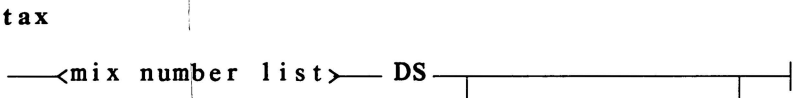


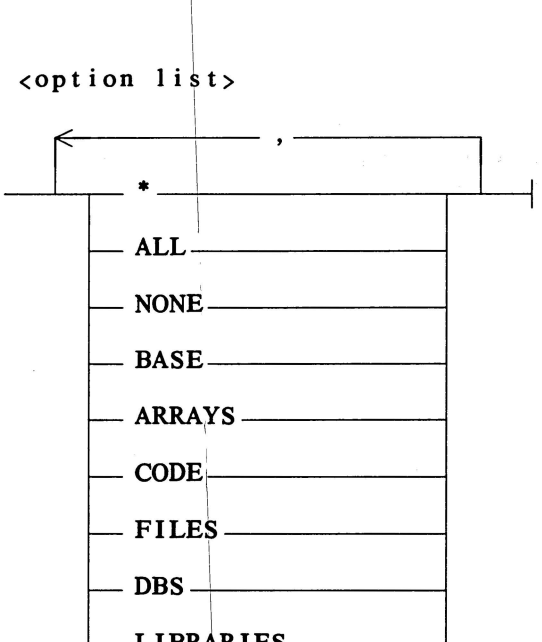
Semantics

The DQ (Default Queue) message indicates which queue is the system default queue.

DS

Syntax





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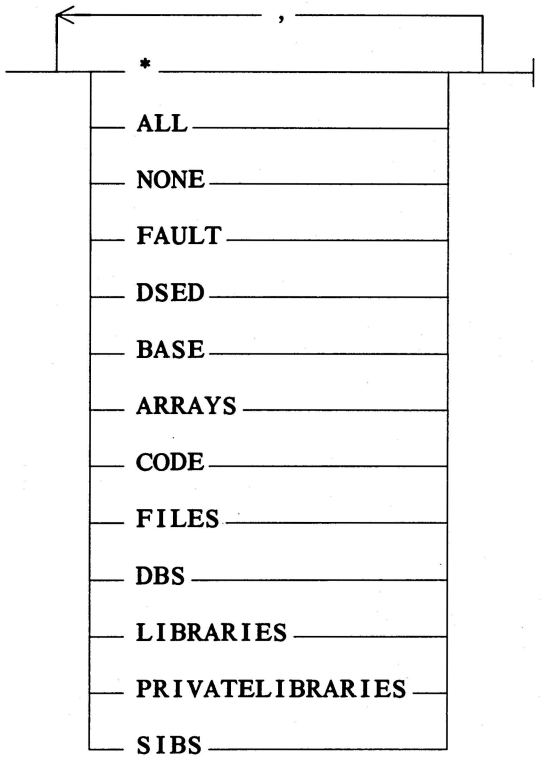
Semantics

The DS (DiScontinue) message terminates all programs associated with given <mix number list> or removes these programs from the mix schedule or scheduling queue.

DUMP

Syntax

<option list>

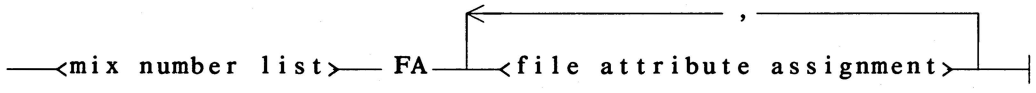


Semantics

The DUMP message invokes the program dump procedure for the program(s) specified in the <mix number list>.

FA

Syntax

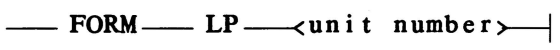


Semantics

The FA (File Attribute) message changes any file attribute that may be set.

FORM

Syntax

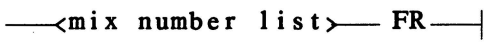


Semantics

The FORM message displays the FORMMESSAGE associated with the printer specified by <unit number>.

FR

Syntax

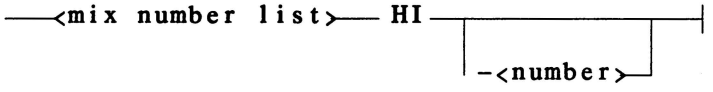


Semantics

The FR (Final Reel) message specifies that the input tape reel just read by the job denoted by the mix number is the final reel of an unlabeled tape file.

HI

Syntax



Semantics

The HI message causes the EXCEPTIONEVENT of the running stack denoted by each mix number in the <mix number list> and sets the VALUE task attribute of the program.

HN

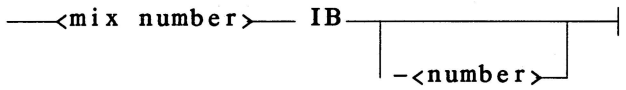
Syntax

Semantics

The HN (HostName) message displays the current hostname of the system.

IB

Syntax

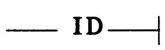


Semantics

The IB (Instruction Block) message displays the requested instruction for the job specified by <mix number>.

ID

Syntax

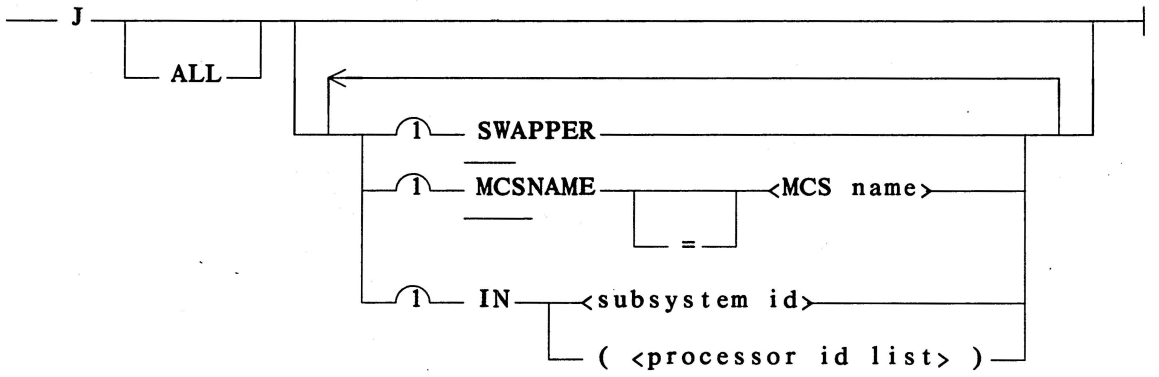


Semantics

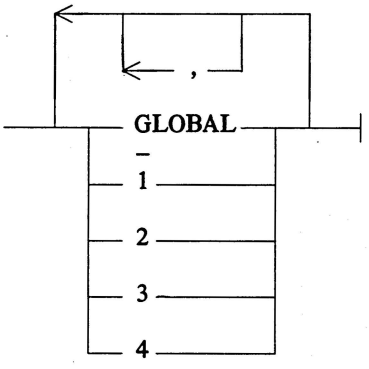
The ID (Initialize Data Comm) message displays the current Data Comm software in use by the system.

J

Syntax



<processor id list>



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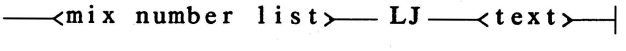
Semantics

The J (Job and task structure display) message lists, by job structure, the tasks initiated by RJE.

LJ

Syntax



Semantics

The LJ (Log to Job) message enters the specified <text> in the job log for the job specified in the <mix number list>.

LL (B 5000/B 6000 Series Systems with MPX)

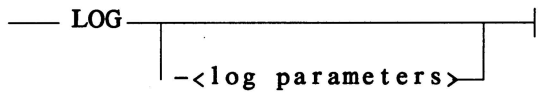
Syntax

Semantics

The LL (Load Limit) message interrogates the load level contained in the threshold register of the specified multiplexor(s).

LOG

Syntax

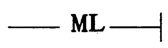


Semantics

The LOG message initiates the utility SYSTEM/LOGANALYZER.

ML

Syntax



Semantics

The ML (Mix Limit) message interrogates the current system mix limit.

MM

Syntax

170

Semantics

The MM (Memory Module) message lists the ready, to-be-saved, and not-used memory modules.

MSG

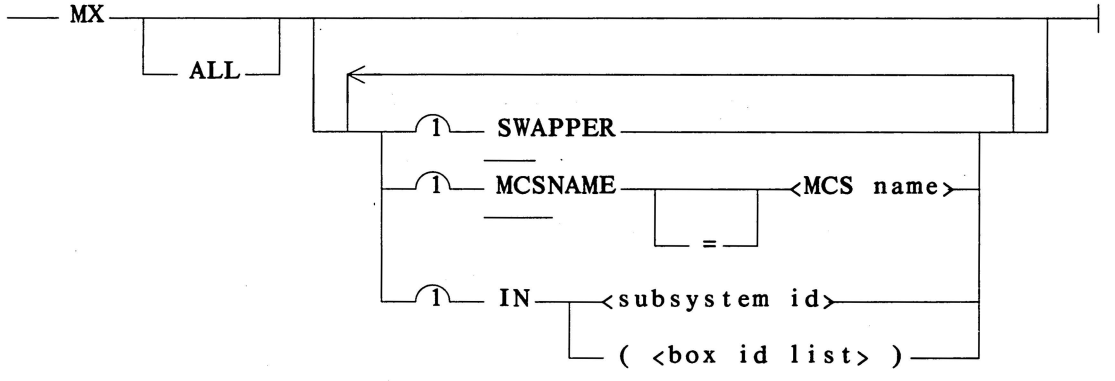
Syntax

Semantics

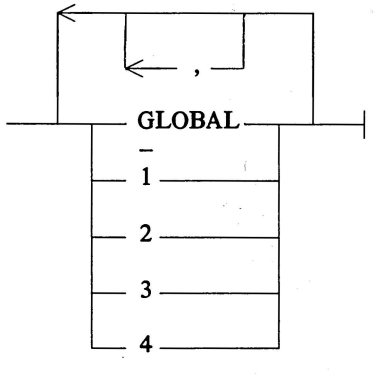
The MSG (MeSsaGes) message displays the most recent messages returned by the system from jobs initiated by RJE.

MX

Syntax



<box id list>



171

Semantics

The MX (MiX entries) request yields the same response as the ODT J request, except that display lines (RSVP and DISPLAY messages) are printed with each task. The response includes only jobs initiated by RJE.

NET

Syntax

Semantics

The NET (NETwork) message interrogates the setting of the network initialization file.

NS

Syntax

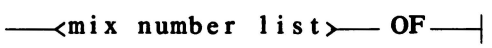
or:

Semantics

The NS (Next Screen) message brings up the next screen, if any, on a screen terminal.

OF

Syntax

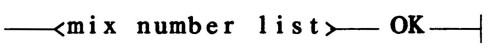


Semantics

The OF (Optional File) message is entered in response to a NO FILE message if the file sought has the file attribute OPTIONAL set equal to TRUE.

OK

Syntax

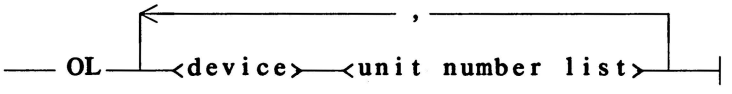


Semantics

The OK (reactivate) message reactivates the suspended jobs whose mix numbers are specified in the <mix number list>.

OL

Syntax

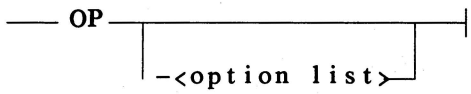


Semantics

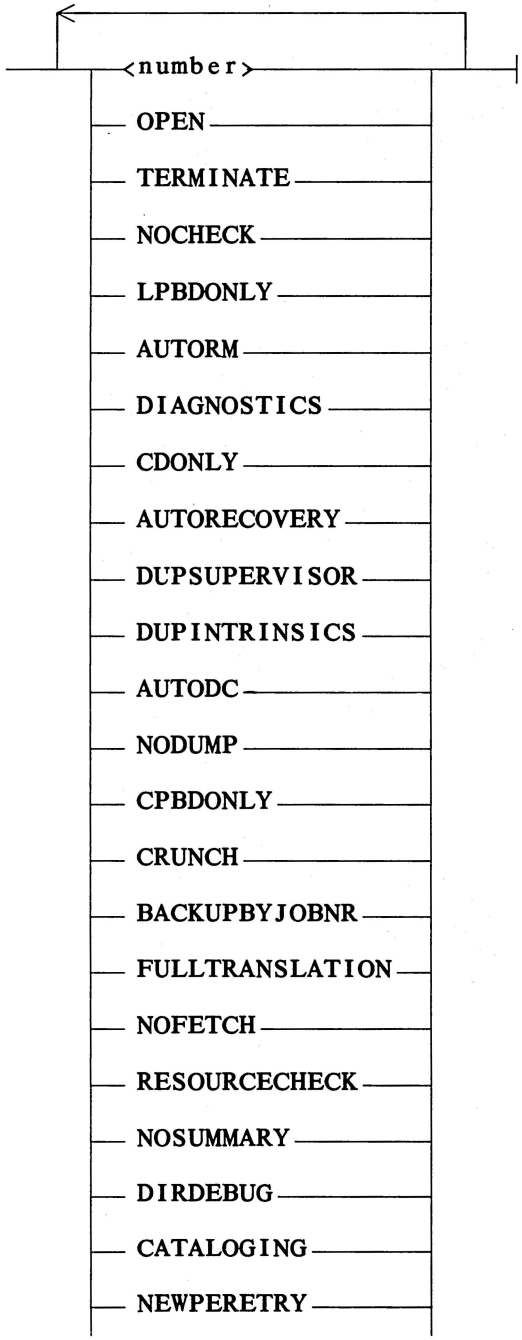
The OL (label table) message displays the label table for the specified peripheral devices at the supervisory console from which the message was entered.

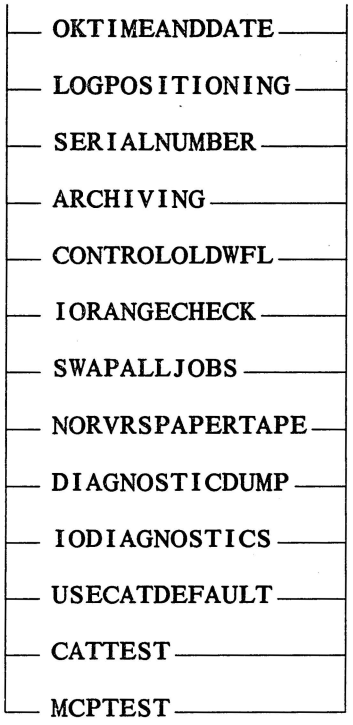
OP

Syntax



<option list>



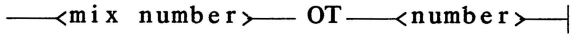


Semantics

The OP (OPtions) message displays the states of the specified system options (or, if no options are specified, of all system options).

OT

Syntax



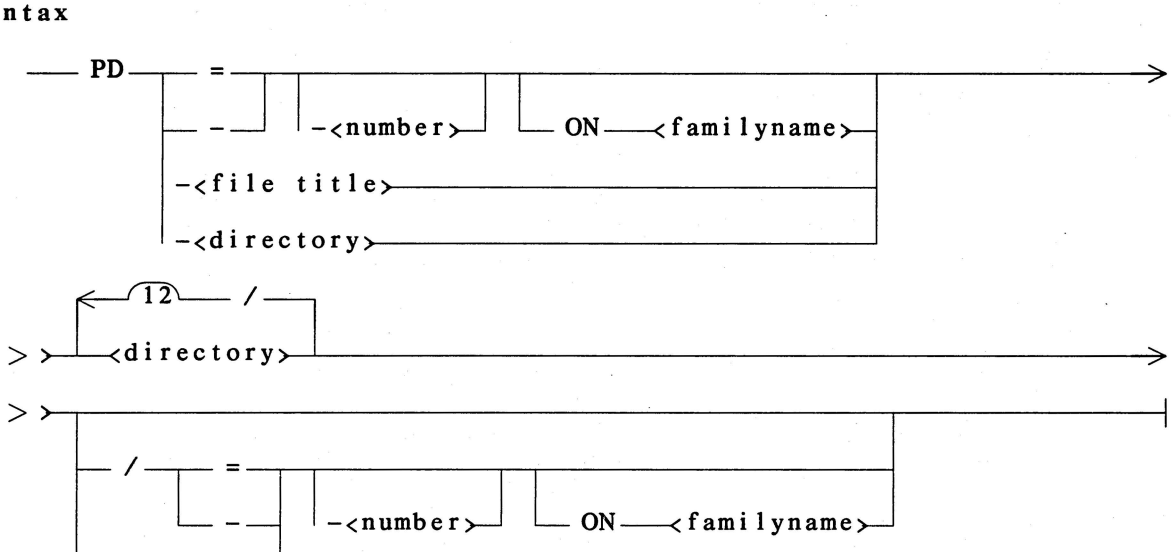
Semantics

The OT (stack cell inspection) message displays a message on the console which has the following format:

```
<stack number> STACK CELL <cell number>=<tag>
<contents of cell in hexadecimal> <message>
```

PD

Syntax

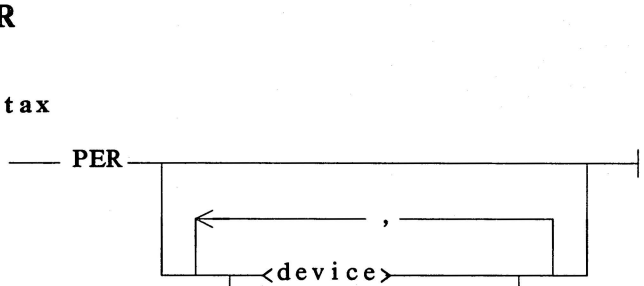


Semantics

The PD (Print Directory) message displays lists of files contained in the system disk directory.

PER

Syntax



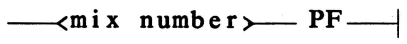
176

Semantics

The PER (PERipheral status) message displays the status of the specified peripheral unit(s).

PF

Syntax



Semantics:

The PF (Print Fetch) message displays instructions or messages, given by the programmer in a FETCH WFL statement, concerning the job specified by <mix number> before this job is executed.

PR

Syntax

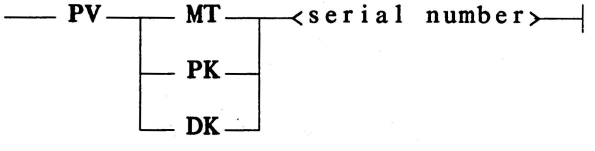
177

Semantics

The PR (PRiority) message alters the current priority of the indicated scheduled or executing job(s) in the mix to the value specified by <number> or alters a job waiting in a scheduling queue.

PV

Syntax

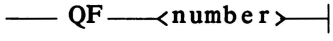


Semantics

The PV (Print Volume) message displays all the information that the volume library contains about the specified volume and volume family.

QF

Syntax

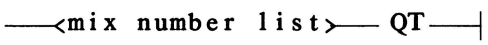


Semantics

The QF (Queue Factors) message displays the current value of all attributes associated with the job queue specified by <number>.

QT

Syntax

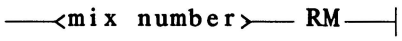


Semantics

The QT (QuiT) message terminates the printing or punching of a backup file.

RM

Syntax

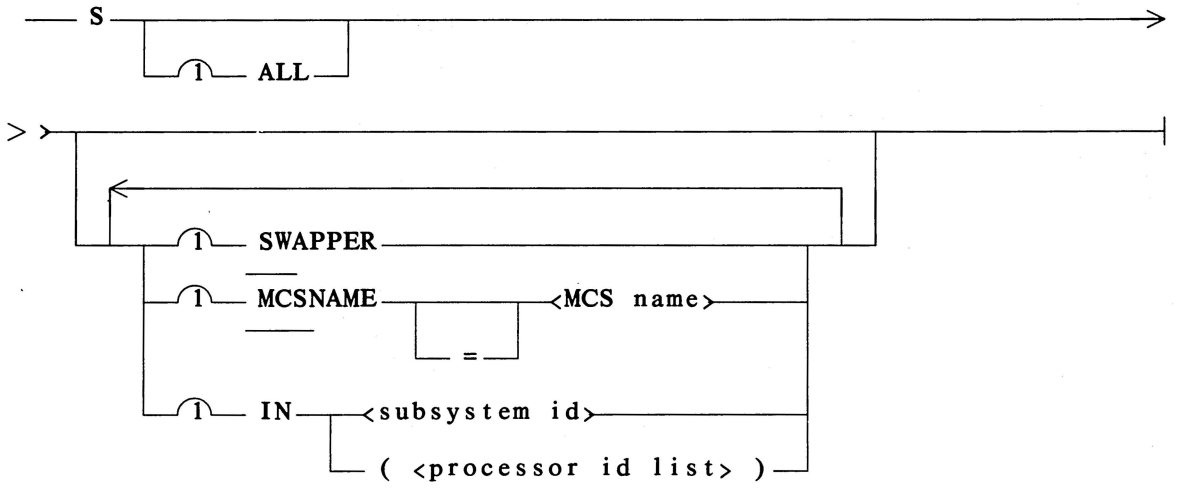


Semantics

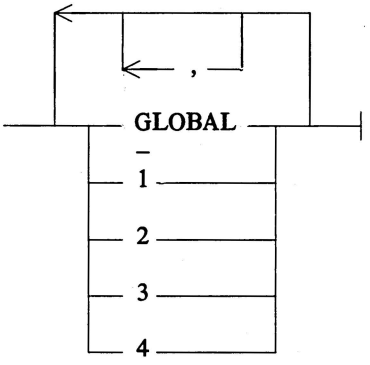
The RM (ReMove) message is used in response to a DUP LIBRARY message to remove the old file.

S

Syntax



<processor id list>



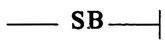
179

Semantics

The S (Scheduled mix entries) message displays a list of scheduled tasks.

SB

Syntax

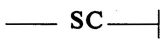


Semantics

The SB (Substitute Backup) message interrogates the backup medium substitution.

SC

Syntax



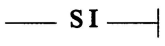
Semantics

The SC (System Configuration) message displays the current system configuration.

180

SI

Syntax

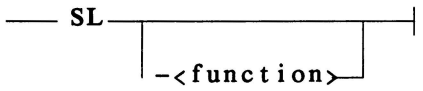


Semantics

The SI (System Intrinsics) message displays the current system intrinsics.

SL

Syntax

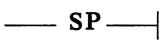


Semantics

The SL (System Library) message displays the functional names of specific libraries.

SP

Syntax



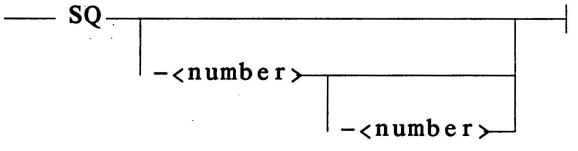
181

Semantics

The SP (Show Print queue) message shows which job files are waiting to be printed.

SQ

Syntax

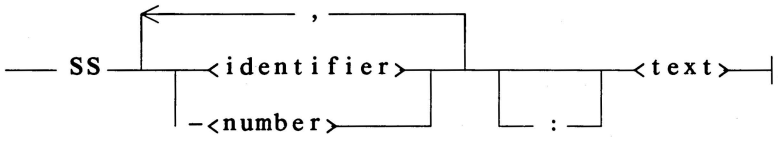


Semantics

The SQ (Show Queue) message displays information regarding the jobs in the queue specified by <number> (or in all job queues if no <number> is specified).

SS

Syntax

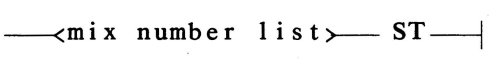


Semantics

The SS (Send to Station) message sends a message from the supervisory console to the Data Comm station(s) identified by the <identifier> (station name) or <number> (LSN).

ST

Syntax

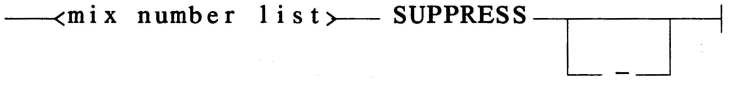


Semantics

The ST (STop) message temporarily suspends the jobs specified in the <mix number list>.

SUPPRESS

Syntax



Semantics

The SUPPRESS message prevents the RJE-initiated jobs specified in the <mix number list> from appearing in a display of the job mix when these jobs are active.

TD

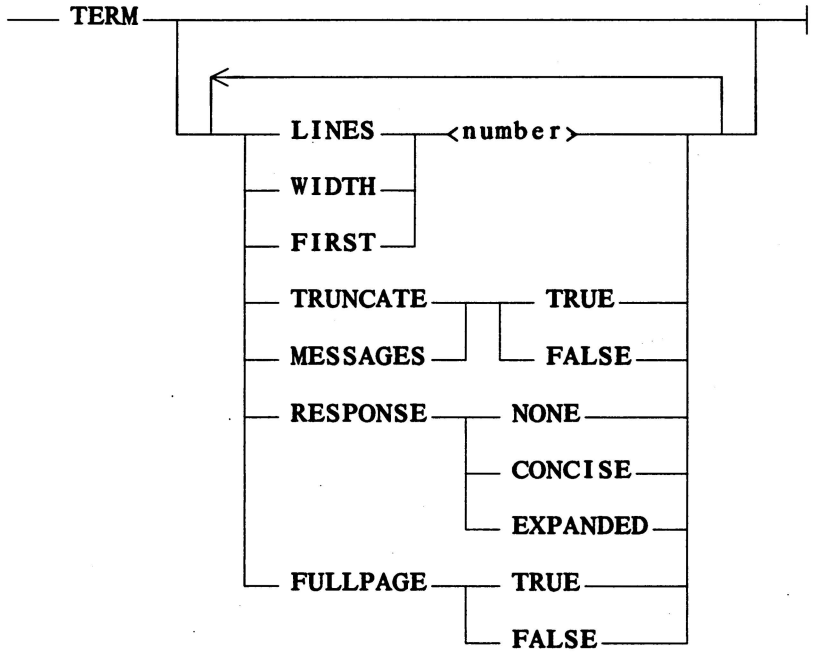
Syntax

Semantics

The TD (Time and Date) message displays the current time and date for the system.

TERM

Syntax



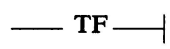
183

Semantics

The TERM (TERMinal) message controls the format of all displays appearing at the terminal at which the message is entered.

TF

Syntax

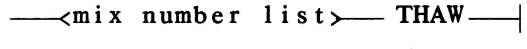


Semantics

The TF (Type Factors) message displays the current values of the four working set parameters.

THAW

Syntax

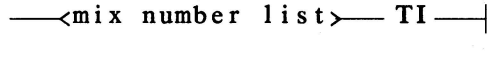

<mix number list>
THAW

Semantics

The THAW message changes permanently frozen libraries to temporary libraries.

TI

Syntax

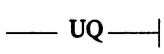

<mix number list>
TI

Semantics

The TI (TImes) message displays the current processor and I/O times charged to the job(s) specified in <mix number list>, the READYQ time of the task(s), the PBIT time accounting and number of operations, and the elapsed time since the job(s) entered the mix.

UQ

Syntax

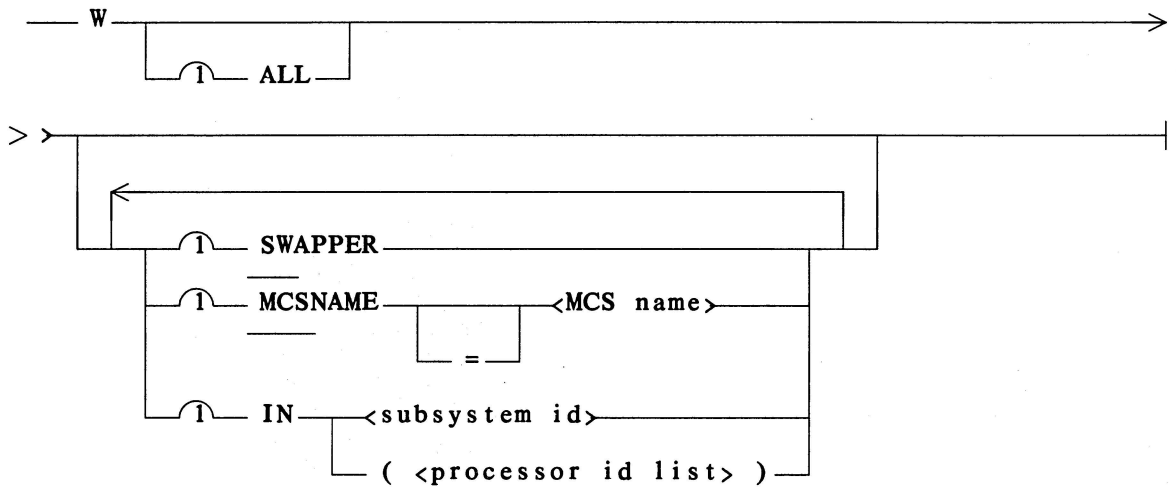


Semantics

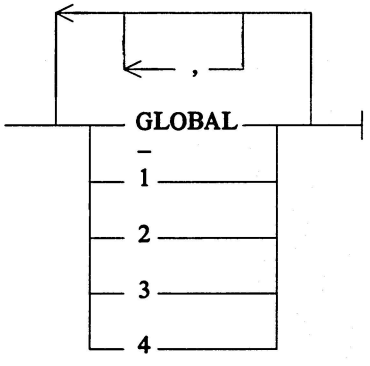
The UQ (Unit Queue) message allows interrogation of assignments of peripherals to queue.

W

Syntax



<processor id list>



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Semantics

The W (Waiting mix entries) message displays tasks that require operator action in order to continue (that is, tasks that are suspended on an RSVP condition).

WM

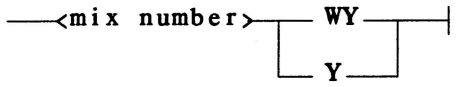
Syntax

Semantics

The WM (What MCP) message displays information regarding the current MCP.

WY

Syntax



Semantics

The WY (status interrogation) message displays the current status of the task specified by <mix number>.

APPENDIX C. NDL/NDLII DEFINITIONS

This appendix shows examples of NDL and NDLII definitions for RJE. Complete NDL and NDLII examples are contained in the SYMBOL/SOURCENDL and SYMBOL/SOURCENDLII files on the large system release tapes.

CONFIGURATION

In the examples, the NDL and NDLII declarations are shown for the following RJE configuration:

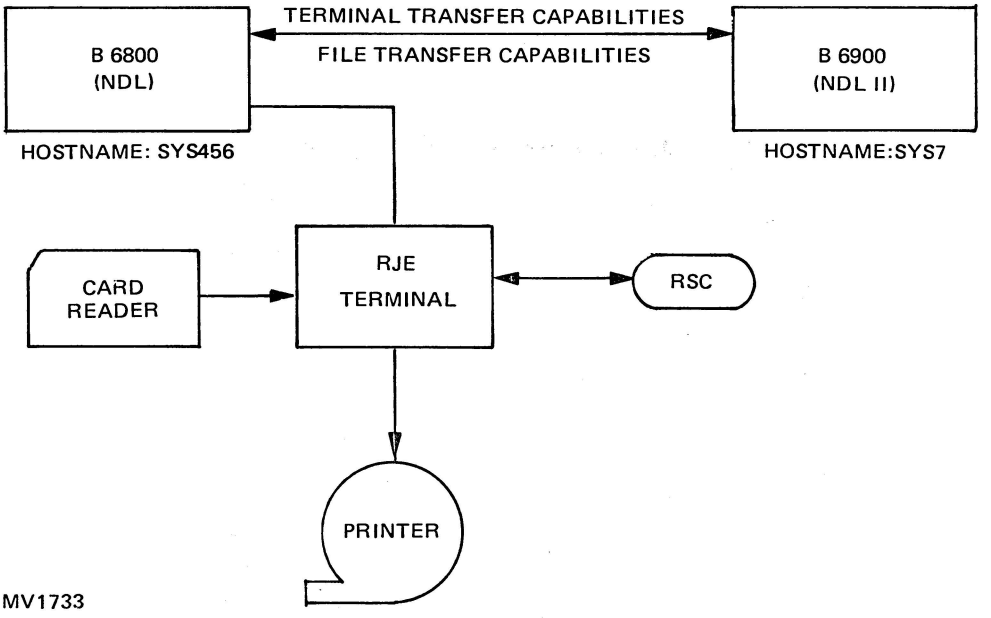


Figure C-1. RJE Configuration (Appendix C Examples)

In this configuration, two large systems (a B 6800 and a B 6900) are connected with terminal-transfer and file-transfer capabilities. In addition, an RJE terminal with peripherals (B 771) is connected to the B 6800.

RJE NDL DEFINITIONS: B 6800

The following paragraphs present the NDL definitions used for RJE on a DCP Data Comm system (in this example, the B 6800).

Control and Request Procedures

The line control procedure used in this example is the standard RJE control (CONCENTRATE) found in the SYMBOL/SOURCENDL file.

The request procedures used are the standard RJE requests (READRJE and WRITERJE) found in the SYMBOL/SOURCENDL file.

Terminal Declarations

```
%************************   GENERAL TERMINAL DEFAULTS   **************%

TERMINAL DEFAULT TERMDEF:
         CONTROL       = CONTENTION.
         CODE          = ASC67.
         BLOCK         = FALSE.
         SYNCS         = FALSE.
         DUPLEX        = FALSE.
         SCREEN        = FALSE.
         TURNAROUND    = 0.
         ICTDELAY      = 0.
         PAGE          = NULL.
         TRANSMISSION  = NULL.
         ADDRESS       = NULL.

TERMINAL DEFAULT RJETERMDEF:
         DEFAULT       = TERMDEF.
         CONTROL       = CONCENTRATE.
         SCREEN        = TRUE.
         ADDRESS       = 2.
         WIDTH         = 420.
         MAXOUTPUT     = 1500.
         TIMEOUT       = 1500 MILLI.
         TURNAROUND    = 40 MILLI.
         ADAPTER       = 9,11,12,14,15,17,20,23.

%************************** RJE TERMINALS ****************************%

TERMINAL RJEA:
         DEFAULT       = RJETERMDEF.
         PARITY        = VERTICAL:EVEN,
                         HORIZONTAL:EVEN.
         REQUEST       = WRITERJE:TRANSMIT.
                         READRJE:RECEIVE.

TERMINAL RJEAFTS:
         DEFAULT       = RJETERMDEF.
         PARITY        = VERTICAL:EVEN,
                         HORIZONTAL:EVEN.
         MAXOUTPUT     = 2200.
         REQUEST       = WRITERJE:TRANSMIT,
                         READRJE:RECEIVE.

TERMINAL VSRJEA:
         DEFAULT       = RJETERMDEF.
         WIDTH         = 80.
         PAGE          = 24.
         MAXOUTPUT     = 2200.
         MAXINPUT      = 2200.
         ADDRESS       = 2(DIFFERENT).
         PARITY        = VERTICAL:EVEN,
                         HORIZONTAL:EVEN.
         REQUEST       = WRITERJE:TRANSMIT,
                         READRJE:RECEIVE.
```

The terminal VSRJEA, whose name does not begin with the letters "RJE", has been declared for the virtual and pseudo-stations (refer to Terminal Transfer in Section 3) in order to distinguish these stations from the RJE family of

terminals (devices with addresses in the range "00" to "04", including RSC and LINEPRINTER), whose terminal names must start with the letters "RJE." (RJEA and RJEAFTS are the RJE terminals in this example.)

Station Declarations

```
%******************** GENERAL STATION DEFAULTS ************************%

STATION DEFAULT STADEF:
        ENABLEINPUT     = TRUE.
 $
        LOGICALACK      = FALSE.
        MYUSE           = INPUT, OUTPUT.

STATION DEFAULT RJESTADEF:
        DEFAULT         = STADEF.
        MCS             = SYSTEM/RJE.
        RETRY           = 10.
        CONTROL         = QM.

STATION DEFAULT RJEASYDEF:
        DEFAULT         = RJESTADEF.
        TERMINAL        = RJEA.
        ADAPTER         = 15.

%***************SYS456 RJE STATIONS FOR RJE TO B771 ******************%

STATION RJEIIB771:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "00".
        MCS             = SYSTEM/RJE.

STATION RJEIIB771SC:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "01".
        WIDTH           = 72.
        CONTROL         = QM.
        MCS             = SYSTEM/RJE.

STATION RJEIIB771CR:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "02".
        MCS             = SYSTEM/RJE.

STATION RJEIIB771LP:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "03".
        MCS             = SYSTEM/RJE.

STATION RJEIIB771FTS:
        DEFAULT         = RJEASYDEF.
        TERMINAL        = RJEAFTS.
        ADDRESS         = "04".
        MCS             = SYSTEM/RJE.

%************SYS456 RJE STATIONS FOR RJE TO SYS7***********************%

STATION RJESYS7:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "00".             ADAPTER = 14.  %4800 ASYC
        MCS             = SYSTEM/RJE.
```

```
STATION RJESYS7SC:
        DEFAULT         = RJEASYSDEF.
        ADDRESS         = "01".             ADAPTER = 14.
        WIDTH           = 72.
        CONTROL         = QM.
        MCS             = SYSTEM/RJE.

STATION RJESYS7CR:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "02".             ADAPTER = 14.
        MCS             = SYSTEM/RJE.

STATION RJESYS7LP:
        DEFAULT         = RJEASYDEF.
        ADDRESS         = "03".             ADAPTER = 14.
        MCS             = SYSTEM/RJE.

STATION RJESYS7FTS:
        DEFAULT         = RJEASYSDEF.                 SPO = TRUE
        ADDRESS         = "04".           TERMINAL = RJEAFTS.
        MCS             = SYSTEM/RJE.      ADAPTER = 14.

%*********SYS456 VIRTUAL STATIONS FOR TERMINAL TRANSFER TO SYS7******%

STATION VSIN1RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("aA","Aa").  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSIN2RJESYS7:
        DEFAULT         = RJEASYDEF. TERMINAL=VSRJEA. SPO = TRUE.
        ADDRESS=("bA", "Ab"). MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSIN3RJESYS7:
        DEFAULT=RJEASYSDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS ("cA", "Ac")  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSIN4RJESYS7:
        DEFAULT=RJEASYSDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("dA","Ad").  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSIN5RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("eA","Ae").  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSIN6RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("fA","Af").  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSOUT1RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("Aa","aA").  MCS=SYSTEM/RJE.  ADAPTER = 14.

STATION VSOUT2RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.
        ADDRESS=("Ab","bA").  MCS=SYSTEM/RJE.  ADAPTER = 14.
```

```
%*********SYS456 PSEUDO STATIONS FOR TERMINAL TRANSFER TO SYS7********%

STATION PSEUDO1RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09").  MCS=SYSTEM/RJE.  CONTROL = QM.

STATION PSEUDO2RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09").  MCS=SYSTEM/RJE.  CONTROL = QM.

STATION PSEUDO3RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09").  MCS=SYSTEM/RJE.  CONTROL = QM.

STATION PSEUDO4RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09").  MCS=SYSTEM/RJE.  CONTROL = QM.

STATION PSEUDO5RJESYS7:
        DEFAULT=RJEASYDEF.  TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09")   MCS=SYSTEM/RJE.  CONTROL = QM.

STATION PSEUDO6RJESYS7:
        DEFAULT=RJEASYSDEF. TERMINAL=VSRJEA.  SPO = TRUE.  ADAPTER =14.
        ADDRESS=("09","09")   MCS=SYSTEM/RJE.  CONTROL = QM.
```

The complete RJE family (devices with addresses in the range "00" to "04") is declared for both the B 771 and the 4800-BPS line connecting SYS456 (the B 6800) to SYS7 (the B 6900).

Devices with addresses of "04" are used for file transfer (stations RJEIIB771FTS and RJESYS7FTS in this example).

Eight virtual stations (six for input [VSIN1RJESYS7 to VSIN6RJESYS7] and two for output [VSOUT1RJESYS7 and VSOUT2RJESYS7]) plus six pseudo-stations (address "09" [PSEUDO1RJESYS7 to PSEUDO6RJESYS7]) were declared for terminal transfer, allowing up to six terminals transferred from SYS7 (B 6900) to be attached to MCSes on SY456 (B 6800).

Line Declarations

```
%LINE FOR B771
LINE L29:
        ADDRESS =               2:1:13.
        ADAPTER =               5 (DIRECT).

        STATION =               RJEIIB771,RJEIIB771SC,RJEIIB771CR,
                                RJEIIB771LP,RJEIIB771FTS.
```

```
%LINE FOR RJE TO SYS7
LINE L36:
          ADDRESS =              2:2:04.
          ADAPTER =              5 (DIRECT).
          STATION =              RJESYS7,RJESYS7SC,RJESYS7CR,RJESYS7LP,
                                 RJESYSFTS,
                                 VSIN1RJESYS7,VSIN2RJESYS7,VSIN3RJESYS7,
                                 VSIN4RJESYS7,VSIN5RJESYS7,VSIN6RJESYS7,
                                 VSOUT1RJESYS7,VSOUT2RJESYS7,
                                 PSEUDO1RJESYS7,PSEUDO2RJESYS7,
                                 PSEUDO3RJESYS7,PSEUDO4RJESYS7,
                                 PSEUDO5RJESYS7,PSEUDO6RJESYS7.
```

All the stations declared for the SYS7 connection are on the same line, although this condition is not required for the pseudo-stations, which are part of a common pool available to any virtual station attached to RJE.

DCP Declaration

```
%***************************** DCP SECTION ******************************%

DCP 2:
          EXCHANGE =       3.
          MEMORY   =       16384.
          OPTIONS  =       LOCALTABLES, SECUREDLINES, TIMESTAMP.
          TERMINAL =       TELETYPE, SPEEDSENSETTY, BSCDIDIRECT,
                           TD830, TD830E(MSGSPACE=6), TD820, TD800TERM,
                           SCREENITY, BDLCTERMINAL(MSGSPACE = 3),
                           RJEA,RJES,VSRJEA,VSRJES,
                           RJEAFTS(MSGSPACE = 3,MAXMSGSPACE = 20),
                           RJESFTS(MSGSPACE = 3,MAXMSGSPACE = 20),
                           MONITORA, MONITORS.

AUXILIARY =                READPAPERTAPE, PUNCHPAPERTAPE,
                           READTELETYPE,WRITETELETYPE,
                           READRJE, WRITERJE,
                           RECEIVE2741,TRANSMIT2741.
```

RJE NDLII DEFINITIONS: B 6900

The following paragraphs present the NDLII definitions used for RJE on an NSP/LSP Data Comm system (in this example, a B 6900).

Editor and Algorithm

The Editor used in this example is the standard RJE Editor (RJE) found in the SYMBOL/SOURCENDLII file. The Algorithm used in this example is the standard RJE Algorithm (RJECONTROL) found in SYMBOL/SOURCENDLII.

Class Declaration

```
RJE4800CLASS                % FOR 4800 BAUD RJE
    (MODE      = ASYNC;
     CODE      = ASCII;
     BITRATE   = 4800;
     STOPBITS  = SHORT;
     PARITY    = VERTICAL: EVEN, HORIZONTAL: CRC=X7+1,0,0),
```

As in the B 6800 (SYS456) example, this line is an asynchronous line of 4800 BPS.

Terminal Declarations

```
%*************** RJE TERMINAL AND STATION DEFAULTS *********************%

DEFAULT TERMINAL RJETERMDEF:          % DEFAULT RJE TERMINAL
     ADDRESSLENGTH = RECEIVE: 2, TRANSMIT: 2;
     CLASS         = RJE4800CLASS;          % TDI, 4800 BAUD
     DUPLEX        = FALSE;
     SCREEN        = TRUE;
     TYPE          = RJETYPE;
     WRAPAROUND    = FALSE;

%********************* RJE TERMINAL DECLARATIONS ***********************%

TERMINAL RJESYSTERM:                  % RJE CONTROLLER TERMINAL
     DEFAULT       = RJETERMDEF;
     LINEWIDTH     = 255;
     MAXINPUT      = 255;
     MAXOUTPUT     = 255;

TERMINAL RJESPOTERM:                  % RJE SPO TERMINAL
     DEFAULT       = RJETERMDEF;
     LINEWIDTH     = 72;
     MAXINPUT      = 150;
     MAXOUTPUT     = 150;

TERMINAL RJEPRINTERTERM:              % RJE LINE PRINTER TERMINAL
     DEFAULT       = RJETERMDEF;
     LINEWIDTH     = 132;
     MAXINPUT      = 420;
     MAXOUTPUT     = 420;
```

```
TERMINAL RJEREADERTERM:                 % RJE CARD READER TERMINAL
     DEFAULT        = RJETERMDEF;
     LINEWIDTH      = 80;
     MAXINPUT       = 420;
     MAXOUTPUT      = 420;

TERMINAL RJEFTSTERM:                    % RJE FILE TRANSFER TERMINAL
     MAXINPUT       = 2200;
     MAXOUTPUT      = 2200;

%************** RJE VIRTUAL AND PSEUDO STATIONS TERMINALS ************%

TERMINAL VSRJETERM:                     % RJE VIRTUAL STATION TERMINAL
    DEFAULT         = RJETERMDEF;
    LINEWIDTH       = 80;
    MAXINPUT        = 1920;
    MAXOUTPUT       = 1920;
    PAGESIZE        = 24;
    WRAPAROUND      = TRUE;
```

The RJE family terminal names start with the letters "RJE" (RJESYSTERM to RJEFTSTERM in this example); the virtual station terminal name starts with letters different from "RJE" (VSRJETERM in this example).

Station Declarations

```
%DEFAULT STATION DECLARATION
DEFAULT STATION RJESTADEF:                  % DEFAULT RJE STATION
    EDITOR          = RJE;
    CONTROL         = 8'?';
    MCS             = "SYSTEM/RJE";
    ALGORITHM       = RJECONTROL;
    INITIALIZE        TALLY:= 0 & 0 & 0, TOGS := 0,
                      APPLICATION:= RJE_EDITOR;
%SYS7 RJE STATIONS FOR RJE TO SYS456
STATION RJETOSYS456:                        % RJE TO SYSTEM 456
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "00", TRANSMIT: "00";
    TERMINAL        = RJESYSTERM;

STATION RJESPO1:                            % RJE SPO STATION
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "01", TRANSMIT: "01";
    TERMINAL        = RJESPOTERM;

STATION RJEREADER1:                         % RJE CARD READER STATION
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "02", TRANSMIT: "02";
    TERMINAL        = RJEREADERTERM;

STATION RJEPRINTER1:                        % RJE LINE PRINTER STATION
    DEFAULT         = RJESTADEF;
    ADDRESS         = TRANSMIT: "03", RECEIVE: "03";
    TERMINAL        = RJEPRINTERTERM;

STATION RJEFIS1:                            % RJE FILE TRANSFER STATION
    DEFAULT         = RJESTADEF;
    ADDRESS         = TRANSMIT: "04", RECEIVE: "04";
    TERMINAL        = RJEFISTERM;
```

```
%SYS7 RJE VIRTUAL STATIONS FOR TERMINAL TRANSFER TO SYS456
STATION RJEVSIN1:                          % RJE INPUT VIRTUAL STATION 1
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "aA", TRANSMIT: "Aa";
    TERMINAL        = VSRJETERM;

STATION RJEVSIN2:                          % RJE INPUT VIRTUAL STATION 2
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "bA", TRANSMIT: "Ab";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT1:                         % RJE OUTPUT VIRTUAL STATION 1
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "Aa", TRANSMIT: "aA";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT2:                         % RJE OUTPUT VIRTUAL STATION 2
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "Ab", TRANSMIT: "bA";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT3:                         % RJE OUTPUT VIRTUAL STATION 3
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "Ac", TRANSMIT: "cA";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT4:
    DEFAULT         = RJESTADEF;           % RJE OUTPUT VIRTUAL STATION 4
    ADDRESS         = RECEIVE; "Ad", TRANSMIT "dA";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT5:                         % RJE OUTPUT VIRTUAL STATION 5
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "Ae", TRANSMIT: "eA";
    TERMINAL        = VSRJETERM;

STATION RJEVSOUT6:                         % RJE OUTPUT VIRTUAL STATION 6
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "Af", TRANSMIT: "fA";
    TERMINAL        = VSRJETERM;

%SYS7 RJE PSEUDO-STATIONS FOR TERMINAL TRANSFER TO SYS456
STATION RJEPSEUDO1:                        % RJE PSEUDO STATION 1
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "09", TRANSMIT: "09";
    TERMINAL        = VSRJETERM;

STATION RJEPSEUDO2:                        % RJE PSEUDO STATION 2
    DEFAULT         = RJESTADEF;
    ADDRESS         = RECEIVE: "09", TRANSMIT: "09";
    TERMINAL        = VSRJETERM;
```

As for the B 6800 declarations in the NDL example in this appendix, eight virtual stations (two for input [RJEVSIN1 and RJEVSIN2] and six for output [RJEVSOUT1 to RJEVSOUT6]) plus two pseudo-stations (RJEPSEUDO1 and RJEPSEUDO2) are declared, allowing up to two terminals that were transferred from SYS456 (the B 6800) to be attached to MCSes on SYS7 (the B 6900).

Line Declaration

```
%LINE FOR RJE TO SYS456
LINE RJETO456:                                  % RJE LINE - TDI
    ALGORITHM      = RJECONTROL;
    CLASS          = RJE4800CLASS;
    STATIONS       = RJETOSYS456,RJESPO1,RJEREADER1,RJEPRINTER1,RJEFTS1,
                     RJEVSIN1,RJEVSIN2,RJEVSOUT1,RJEVSOUT2,RJEVSOUT3,
                     RJEVSOUT4,RJEVSOUT5,RJEVSOUT6,RJEPSEUDO1,RJEPSEUDO2;
    TIMEOUT        = 1500;
    TRANSMITDELAY= 40;
```

The line declared above connects the two systems.

Hardware Definition (NSP/LSP)

```
HARDWARE DEFINITION:
    NSP 108:                                    % VISIBLE TO HOST SYS7
        EDITOR    = PAPERTAPE, LOGICALID, RJE;
        LSP 112:
            ALTERNATES = HOST 109;
            ADAPTOR 0:                          % OTHER LINES
                .
                .
                .
            ADAPTOR 5: RJETO456;                % FILE TRANSFER TO 456
                                                % CHAR LA
                                                % PRIVATE
```

ACRONYM LIST

The following is a list of acronyms used in this manual.

Acronym	Meaning
ACU	auto-call unit
ASCII	American Standard Code for Information Interchange
APL	A Programming Language
BCC	block check character
BOJ	beginning-of-job
BOT	beginning-of-task
BPS	bits per second
CANDE	Command and Edit Language
COBOL	Common Business-Oriented Language
DCALGOL	Data Communications ALGOL
DCC	Data Communications Controller
DCP	Data Communications Processor
EBCDIC	Extended Binary Coded Decimal Interchange Code
EOJ	end-of-job
EOT	end-of-task
GEMCOS	Generalized Message Control System1
LSN	Logical Station Number
MCP	Master Control Program
MCS	Message Control System
MLIP	Message-Level Interface Port
MPX	multiplexor
NDL	Network Definition Language
NDLII	Network Definition Language II
NIF	Network Information File
NSP	Network Support Processor
ODT	Operator Display Terminal

Acronym	Meaning
RJE	Remote Job Entry
RSC	Remote Supervisory Console
SPO	Supervisory Printout
SYCOM	System Communications Module
VS	Virtual Station
WFL	Work Flow Language

GLOSSARY

This glossary defines terms used in this manual.

accesscode
One of a list of names that may be specified in the USERDATAFILE as required along with a usercode/password combination (and, possibly, with an associated password of its own) when logging on to RJE.

address
A unique sequence of characters used to identify a station or group of stations.

Algorithm
A block in an NDLII program which contains the Line Control and Adaptor Control procedures for a single line and handles the line protocol for that line.

ASCII
American Standard Code for Information Interchange, a seven- or eight-level code representing a set of 128 control and graphic characters.

asynchronous (transmission mode)
A mode of data transmission in which the time of the occurrence of each character or block of characters is arbitrary. Once started, the time of occurrence of each signal representing a bit within the character or block has the same relationship to significant instants of a fixed time frame.

auto-call unit (ACU)
A device that permits a data terminal to dial calls automatically and, in this way, to establish a dialed link over the communication network.

backup file
A printer or punch file assigned to a backup peripheral (by default, disk).

BCL
Burroughs Common Language code, a six-bit, alphanumeric code used for internal data representation.

block
A group of characters or bits sent as an integral information unit.

block check character (BCC)
A character appended to transmitted data blocks, used for error detection and parity control.

blocking factor
The number of logical records stored in a physical record.

buffer
A device used for temporary storage during the transfer of data from one device to another.

carrier frequency
A continuous frequency that can be modulated, or impressed, with a second, information-carrying signal.

character
A set of bits arranged in an orderly group to represent digits, symbols, or letters.

connection
The established path between two or more terminal installations. A permanent connection is established without using switched facilities; a temporary connection is established using switched facilities.

contention mode
A line condition in which no station is designated a master station, and each station on the line must monitor signals on the line and wait for an idle condition before bidding for master status.

control character
A functional character that controls or facilitates transmission of information over communication networks.

control message
In RJE, a message used to interrogate or control RJE activity.

CONTROLLER
The part of the MCP responsible for queue-level scheduling and communications with the system operator.

Data Communications Controller (DCC)
A subset of the MCP, operating as a group of independent tasks or stacks (each associated with one DCP), which is the basic interface between the Data Comm subsystem and the main system.

Data Communications Processor (DCP)
The processor that executes instructions compiled from an NDL source program to control the Data Comm network.

data set
A device serving as an interface between a line and a station (for example, a modem).

DCALGOL
A high-level Burroughs language used to write MCSes and other specialized system programs.

DCWRITE
A DCALGOL intrinsic that passes a specified message to the DCC.

dial-in
Use of a dial or touchtone data set to establish a switched connection. (Synonymous with "dial-up.")

drop
A connection made available for a terminal on a line.

EBCDIC
Extended Binary Coded Decimal Interchange Code, an eight-bit code representing 256 graphic characters.

Editor
An NDLII program module that defines an input process and an output process that implement application-dependent editing on the text portions of input and output messages according to the requirements of particular terminal types.

fetch operation
Operation in which a file is obtained from a remote host.

file transfer
Transfer of files between two host systems, or between a host system and a terminal, using RJE.

File Transfer Link
An input virtual station used for RJE file transfer.

FORMMESSAGE
An attribute whose value is a string that associates the printer containing the value with output files that specifies that value.

Halt/Load
A system-initialization procedure that loads a fresh version of the MCP from disk or pack to main memory.

header
A sequence of characters preceding the text of a message, containing routing or other communication-related information.

input message
In RJE, a message beginning with an "*" which is handled directly by RJE.

interrupt
An interruption in the normal system or program flow which allows this flow to be resumed later at the point of interruption. Interrupts are initiated by signals from outside the computer system which synchronize the operations of the various system components.

leased line
A non-switched connection established for the exclusive use of two stations.

line
A data transmission line linking two computers or a computer and its associated terminals.

line control procedure
In NDL, a procedure that determines the order in which stations receive attention and the functions to be performed for each station.

Line Support Processor (LSP)
On MLIP systems, the Data Comm subsystem processor that manages communications with the host and initiates processes that control input of messages to, and output of messages from, Data Comm lines.

linkfile
A disk file that saves information regarding RJE terminals (including run-time terminal options, usercodes, and phone numbers) to use for recovery in the event of a Halt/Load.

log-on
The process by which a user is identified as a valid user by entering a valid usercode/password/accesscode combination to RJE.

Logical Station Number (LSN)
A unique integer assigned in NDL to each station in a network.

message
A sequence of bits arranged in a form suitable for conveying information from an originator to one or more destinations or addresses. A message contains the information (known as the "text" portion of the message) and may, in addition, contain communication information to aid in the routing or handling of the message (known as the "header" of the message).

Message Control System (MCS)
A special-purpose DCALGOL program that controls the flow of messages between terminals and the main system. Burroughs MCSes include SYSTEM/CANDE, SYSTEM/RJE, SYSTEM/GEMCOS, and SYSTEM/DIAGNOSTICMCS.

Message-Level Interface Port (MLIP)
On MLIP systems (B 5900 and B 6900), the I/O processor housed in the central processing unit.

modem
A device that modulates and demodulates signals transmitted over communications facilities.

Network Definition Language (NDL)
The Burroughs language used to physically, logically, and functionally describe the Data Comm subsystem on DCP-based systems (B 6700, B 6800, B 7700, and B 7800).

Network Definition Language II (NDLII)
The Burroughs language used to physically, logically, and functionally describe the Data Comm subsystem on NSP/LSP-based systems (B 5900 and B 6900).

Network Information File (NIF)
The file generated from an NDL or NDLII program compilation.

Network Support Processor (NSP)
On MLIP systems, The Data Comm subsystem processor that controls the MLI and handles the code for line-control and editor procedures generated by the NDLII compiler.

noise
Any signal present on a line other than the desired signal.

non-peer host
In RJE terms, a host of a different software type than the host connected to it (for example, a medium system connected to a large system).

parity
An error-detection method that tests whether the number of ones or zeros in an array of bits is odd or even. Horizontal parity checks verify the validity of individual characters in a data block. Vertical parity checks use the appended block check character (BCC) to cumulatively verify the validity of all preceding characters in the block.

parity check
A check that tests whether the number of ones or zeros in an array of bits is odd or even.

password
One of a list of names associated with each usercode or accesscode in the USERDATAFILE, identifying the user as a valid user and required along with a usercode when logging on to RJE.

path
A route between any two nodes.

PATHCONTROL
The origination word in the task of a process, containing information concerning the origination of the task along with information describing the destination of any printer or punch backup. PATHCONTROL has the following format:

peer host
In RJE terms, a host of the same software type as the host connected to it (for example, a large system connected to another large system).

polling
The process of inviting data stations to transmit, one at a time.

pseudo-station
A remote host uses a pseudo-station to transfer data from the RJE File Transfer Link (input virtual station) to a station controlled by another MCS (for example, CANDE or APL). A pseudo-station has the same characteristics as a virtual station, except that the device addresses are "09", "09". (Refer to "virtual station" in this glossary.)

put operation
Operation in which a file is placed on a line for transmission to a remote host.

queue array reference
An identifier declared in DCALGOL to reference a queue array (an array in main memory containing information about a DCALGOL physical queue).

remote computer
A system whose components are viewed by the main system as a set of stations on a line controlled by RJE.

remote supervisory console (RSC)
A terminal released to RJE which provides a remote operator/system interface through input and output messages.

request procedure
NDL line protocols used to communicate with the various terminal types in a Data Comm network.

SCTABLEGEN
A system table-generating program that creates a table of recognized commands for the MCP CONTROLLER.

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secured-terminal environment
An environment in which every user of an RJE terminal is required to supply the MCS with an acceptable usercode and password and, possibly, with an acceptable accesscode (with or without associated password).

snap shot
A hardcopy of specified arrays obtained when the RAID compile-time option is set.

station
The functional units constituting a data terminal, the DTE, and their common interface.

status
The capability, at a given instant, of a station to transmit or receive data.

swap space
The area of main memory used for job swapping. (Refer to Section 16 of the B 5000/B 6000/B 7000 Series System Software Operational Guide, Volume 2, for a description of job swapping.)

switched line
A line on which a temporary communication channel has been established.

SYCOM
A small-systems program that provides file-transfer, interprogram communication, remote-supervisory, and remote job entry capabilities.

synchronous (transmission mode)
A mode of data transmission in which the time of the occurence of each signal representing a bit is related to a fixed time frame.

system input message
In RJE, RSC input messages handled directly by the MCP.

terminal
An input/output device designed to receive or send source data in a Data Comm network.

terminal transfer
Connection through RJE of a terminal on one host to an interactive application program on another host, at which point, the terminal is used as if it were locally attached to the program.

text
The part of a message containing substantive information or higher-level control.

throughput
The total useful information processes during a specified time period.

turnaround
The operation of reversing the direction of transmission from send to receive or from receive to send. "Turnaround time" is the time required to perform this operation.

usercode
An entry in the USERDATAFILE identifying the user as a valid user and identifying files in the user's library.

USERDATAFILE
A system database that defines valid usercodes and contains various data about the population of users for a particular installation.

virtual station
A station declared in the NDL for both hosts connected to the same line as the RJE family. Terminal data conveyed between hosts during terminal transfer uses the device address field (DA1 and DA2) of a virtual station.

WFL
The Burroughs language used to write jobs that control the flow of programs and tasks on the system.

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