B1700 SOFTWARE SPECIFICATIONS

Rel		Detroit	Rel	
x	J. Cox - Corp. Prod. Mgmt.		x	D. Hill - TC, BM & SS
x	E. D. Earnest - CSG		x	V. Morton - GPS, BM & SS
x	B. Gould - International		x	E. A. Paulsen - TIO
x	H. R. Hayde - International		x	J. Shifman - CSG
x	W. Conlin - International		x	C. Nash - International
x	D. Kosinski-Prod. Mgmt.		x	J. G. Cleary - SSG

Rel   Plymouth

x   D. O. Calkins
x   D. R. Bookwalter

Rel   Downingtown

x   J. Berta

Rel   Paoli

x   W. Minarcik
x   G. Smolnik

Rel   McLean

x   A. Kosla

Rel   Irvine

x   L. DeBartello

Rel   Pasadena

x   R. Solt
x   H. M. Townsend
x   D. B. Prout - Patent Atty.

Rel   Mission Viejo

x   R. Waychoff
x   E. Sweaney

Rel   Westlake

x   J. J. Dowling

Rel   Gennevieliers

x   A. Isola

Rel   Cumbernauld

x   W. McKee
x   G. Dragffy

Rel   Villers

x   J. Cazanove

Rel   Pantin

x   J. Gerain

Rel   Seneffe

x   P. Cornil

Rel   Liege

x   J. C. Wery
x   A. W. Fell
x   R. Bouvier

Rel   Middlesex

x   P. R. Evans

Rel   Glenrothes

x   J. C. Allan

Rel   Wayne

x   B. Bell

Rel   Santa Barbara

x   R. S. Bunker
3   A. Goodman
x   J. Hale
x   K. Meyers
x   A. van der Linden
2   J. Casey
2   E. Munsch
x   E. Yardi
x   Quality Assurance
x   G. Hammond
x   R. Bauerle
x   A. Yardi

RECEIVED

MAR 3 - 1976

GENERAL MANAGER
SANTA BARBARA PLANT

RECEIVED

MAR 3 - 1976

GENERAL MANAGER
SANTA BARBARA PLANT

P. S. 2212 5249

Burroughs Corporation 🅱

BUSINESS MACHINES GROUP
SMALL SYSTEMS PLANT

RJE/TERMINAL (NDL)

PRODUCT SPECIFICATION

REVISIONS

REV LTR	REVISION ISSUE DATE	PAGES REVISED ADDED DELETED OR CHANGE OF CLASSIFICATION	PREPARED BY	APPROVED BY
A	3/14/75	ORIGINAL ISSUE	JER	*J Hale 3-17-75*
B	9/19/75	TRANSLATION TO UPPER CASE AND LOWER CASE 1-1 RELATED DOCUMENTATION UPDATED AND EXPANDED 2-1 FIGURE 2.1 UPDATED 3-1 SYSTEM REQUIREMENTS UPDATED AND EXPANDED 6-4 NOTE ON ".CLLP" AND ".CLCP" REMOVED	K. M. K.	*J Hale 3-22-75*
C	2/20/76	Updated for MARK V.1 level software HOST system now central computer 1-1 RELATED DOCUMENTATION updated 3-1 SYSTEM REQUIREMENTS changed to indicate variables by ?? 4-1 Program name requirements changed Specification for the "NIF" file name expanded 4-2 MCSQUEUE statement set added 4-3 MAXINWORK, MAXOUTWORK, MAXSTATIONS deleted from list of required statements in line section Remote file requirements updated Sample NDL RJE declaration updated 6-1 ESTABLISHMENT procedure updated 6-4 to 6-11 Presentation format of LOCAL CONTROL MESSAGES changed 6-11 to 6-15 Added RJE/MCS OUTPUT MESSAGES 6-15 to 6-16 Added RJE/NDLDCH OUTPUT MESSAGES 6-17 Restriction 2, 3, and 4 updated. 7-1 MCS QUEUE FILE updated PRINT PUNCH QUEUE added	K. M. K.	*J Hale*

TABLE OF CONTENTS:

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

GENERAL

The purpose of this document is to provide a functional description
of the RJE/TERMINAL system software package, NDL version, as
implemented for the Burroughs B1700 system. This manual, together
with the B6700, and B2700/3700/4700 RJE/HOST information manuals,
will provide the B1700 RJE user with a working knowledge of the RJE
system.

The Mark V.1 RJE package makes a B1710 or B1720 appear as a remote
terminal to either a B6700 or B2700/3700/4700 central computer,
enabling the B1700 user to enter a job at the remote system for
execution by the central computer, to monitor and control the
program via the B1700 console printer, and to receive all relevant
print and punch output back at the remote site.

The package consists of two programs, RJE/MCS and RJE/NDLDCH. The
latter program, the NDL network controller, performs all
transmitting and receiving of data to and from the central computer
and sends all messages received from the central computer to
RJE/MCS. RJE/MCS performs all I/O for the B1700 RJE/TERMINAL
system, sending all messages received to the appropriate output
devices, either console printer, printer, punch, or if desired, to
backup disk files. In addition, RJE/MCS exerts a partial control
over RJE/NDLDCH, forcing it to re-establish connection with the
central computer, causing it to idle waiting to answer a phone call
from the central computer, or to terminate.

RELATED DOCUMENTATION

B6700 RJE System Information Manual	5000300
B2700/3700/4700 RJE System Information Manual	
B1700 NDL Information Manual	1073715
B1700 System Software Operational Guide	1068731
B1700 System Data Communication Information Manual	1089992

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

SYSTEM FLOW

```
         |----------------------------------------------|
         |                                              |
         |                 B1700 MCP II                 |
         |                                              |
|-------|    |    *********         ***********         |
| CARD  | <-------  *       *       *         *         |
| PUNCH |    |      *       *       *         *         |
|-------|    |      *       *       *         *         |
         |          *       *       *         *         |
|-------|    |      *       *  <---------- *         *  |
| CARD  |-------->  *       *       *         *         |
| READER|    |      * RJE/  * "MCSQUEUE" *  RJE/   *<------
|-------|    |      * MCS   *       *  NDLDCH *   |  /
         |          *       * ----------> *         * |  ------->
|--------|   |      *       *       *         *         |
| LINE   |<-------  *       *       *         *         |
| PRINTER|   |      *       *       *         *         |
|--------|   |      *       *       *         *         |
         |          *       *       *         *         |
|--------|   |      *       *       *         *         |
| CONSOLE|<----->   *       *       *         *         |
| PRINTER|   |      *********         ***********       |
|--------|   |                                         |
         |----------------------------------------------|
```
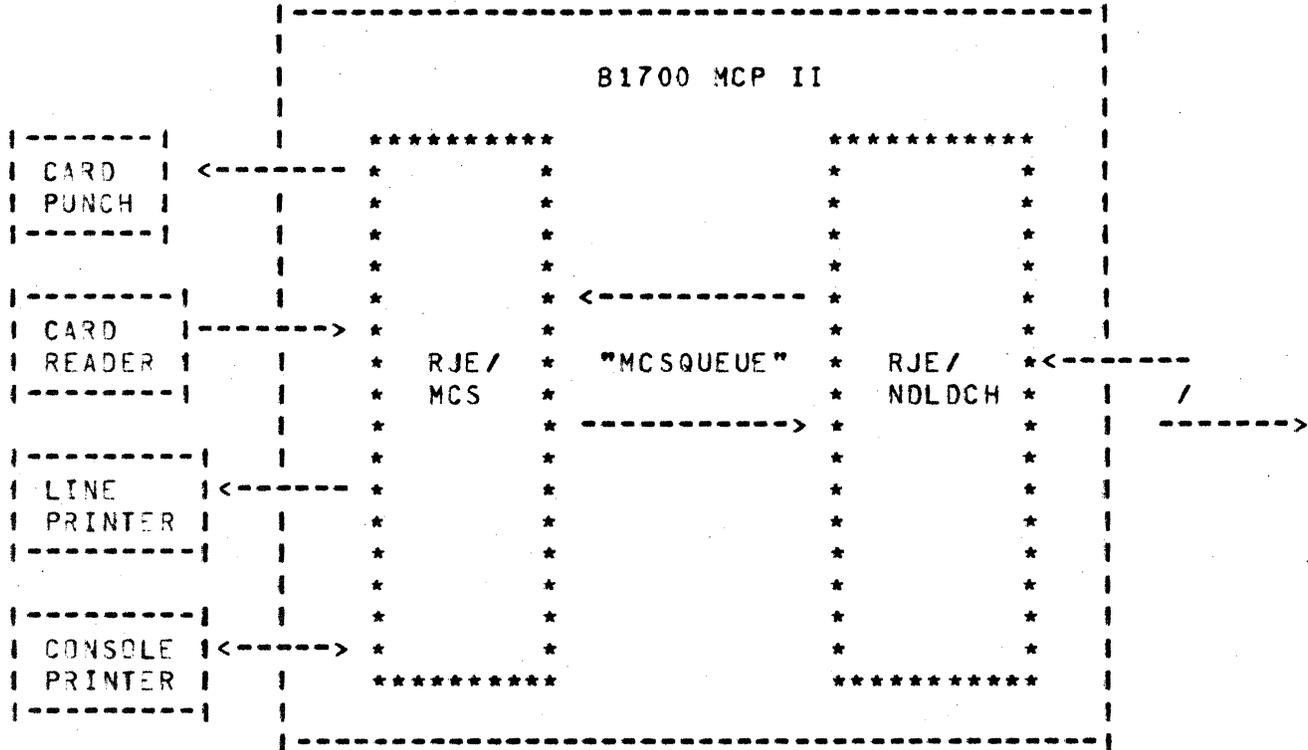
FIGURE 2.1   B1700 RJE NDL INTERFACE

The program RJE/MCS controls the B1700 peripherals. It reads cards,
accepts messages from the console printer, displays messages on the
console printer, prints output and punches cards. RJE/NDLDCH, on
the other hand, is responsible for data communications with the
central computer system. The two programs communicate with each
other through queues.

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

The transfer of data from the remote system to the central computer system and back occurs as follows:

The remote user prepares a card deck for transmission to the central computer system. The card deck is read by RJE/MCS and queued for RJE/NDLDCH. RJE/NDLDCH then begins to transmit the card images to the central computer system. This process continues until all cards are read and transmitted. The job is now under the control of the central computer MCP which processes the request and initiates the compile or execute function. The BOJ/EOJ messages and all other central computer messages pertaining to this job are sent to RJE/NDLDCH which in turn queues them for RJE/MCS. These messages are then displayed on the B1700 console printer. Central computer system messages can be keyed at the remote console printer to control the job.

When the job is completed, all associated printer and punch output created at the central computer system is transmitted to the B1700. RJE/NDLDCH accepts this output from the central computer system and queues it for RJE/MCS; it is then printed or punched on the local printer or punch respectively.

The above cycle describes the flow of data between the B1700 and the central computer system and is referred to as a job stream. Any number   of job streams may be initiated at the same time from the B1700; the number of jobs is limited only by any central computer system restrictions.

Pseudo-reader and printer and punch backup B1700 system functions may also be used in conjunction with RJE.

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

SYSTEM REQUIREMENTS

Following are the hardware requirements:

    ??K MEMORY

        34K MCP II

        07K RJE/MCS

        ??K RJE/NDLOCH

    80 OR 96 COLUMN CARD READER

    80 OR 96 COLUMN PUNCH

    120 OR 132 POSITION PRINTER

    CONSOLE PRINTER

    DISK (CARTRIDGE, DISK PACK OR HEAD-PER-TRACK)

    B1700 SINGLE-LINE CONTROL OR MULTI-LINE CONTROL

    B1700 STANDARD SYNCHRONOUS, ASYNCHRONOUS OR TWO
    WIRE DIRECT CONNECT ADAPTER

    LEASED, SWITCHED OR DIRECT CONNECTION WITH
    APPROPRIATE DATA SETS AND CABLES

When using 96 column equipment only 80 columns are used.

It is suggested that the timeout period be set to 2.5 seconds at the
B1700 and three seconds at the central computer system.

The B1700 RJE/TERMINAL package requires MARK V.1 level MCP II (or
higher) and NDL. It requires the following level of central
computer system software:

        B2700/3700/4700 MCP V   ASR 5.3 or higher
        B6700 MCP   MARK II.5 or higher

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

GENERATING THE NETWORK CONTROLLER (RJE/NDLDCH)

RJE/MCS is supplied as object code and requires no user generation.
However, RJE/NDLDCH, which is the network controller for RJE,
requires the user to write NDL specifications to generate the
specific network controller. The following list of guidelines is
intended to help the user to generate the correct NDL network
controller. Please refer to B1700 NDL manual, for extended
specifications and definitions.

1. Program name:

    The network controller is here defined RJE/NDLDCH, but it is not
    necessary for it to be so named.

2. Declaration section:

    The only required entry is the specification for the "NIF" file
    name:

                NIF="RJE"/"NDLDCHNIF".
                MAX FILES = 2.
                MAX BUFFERS = 2.
                MAX MESSAGES = 20.
                MAX MESSAGE SIZE = 405.

3. Request section:

    The required request section is contained in the NDL library. It
    is named "RJE".

                    $LIBRARY RJE

4. Control section:

    The required control section is contained in the NDL library. It
    is named "RJECTL".

                    $LIBRARY RJECTL

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

5. Terminal section:

Only one terminal entry in the terminal section is required; any other values may be used for the remaining statements possible within the terminal section ("TYPE" and the name specified for the terminal).

Note: Unless a user written MCS is supplied, the "TERMINAL DIAGNOSTIC REQUEST" statement cannot be utilized.

Required terminal section statements.

        BUFFERSIZE=410.
        ADDRESS=2.
        REQUEST=RJE:RECEIVE, RJE:TRANSMIT.
        TRANSMISSION=1.

Note: The RJE request section is used both for transmitting and receiving.

6. Station section:

Four stations are used with RJE, each of which references the one terminal section defined above. It is recommended that the retry limit be set at 25 and that the input and output frequencies be set to identical values.

The "MYUSE" statement must be set as follows:

        MYUSE=INPUT,OUTPUT.

The addresses for the four stations must have the following values:

        "00" for Station 1
        "01" for Station 2
        "02" for Station 3
        "03" for Station 4

If other stations are to be defined in the network controller it is absolutely necessary that these be the first four stations

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

declared in the NDL program.

7. Line section:

The address of the adapter of the line to be used is specified
in the line section. This address will vary from system to
system. The station statement must reference the four stations
defined above.

The following is a list of required statements in the line
section:

```
                    ADDRESS=P:C:A.   (Where  P =  port#,
                                             C =  channel#,
                                             A =  adapter#)
                    STATION=Station list.
                    CONTROL=RJECTL.
```


8. File section:

One remote file is required. It is necessary that the following
file section be used:

```
                    FILE MCSQUEUE:
                    FAMILY=S1,S2,S3,S4.
```

9.   Sample NDL RJE declaration:

The following is a sample NDL RJE declaration:

```
?CO RJE/NDLOCH NDL LI
?DATA CARDS
DECLARATION:
      NIF="RJE"/"NDLOCHNIF".
      MAX FILES = 2.
      MAX BUFFERS = 2.
      MAX MESSAGES = 20.
      MAX MESSAGE SIZE = 405.
$LIBRARY RJE
$LIBRARY RJECTL
TERMINAL B1700:
      TYPE=63.
      ADDRESS=2.
      BUFFERSIZE=820.
```

```
        TRANSMISSION=1.
        REQUEST=RJE:RECEIVE, RJE:TRANSMIT.

    STATION DEFAULT DF:
        TERMINAL=B1700.
        RETRY=25.
        FREQUENCY=255, 255.
        MYUSE=INPUT, OUTPUT.

    STATION S1:
        DEFAULT=DF.
        ADDRESS="00".

    STATION S2:
        DEFAULT=DF.
        ADDRESS="01".

    STATION S3:
        DEFAULT=DF.
        ADDRESS="02".

    STATION S4:
        DEFAULT=DF.
        ADDRESS="03".

    LINE CONVERSATIONAL:
        ADDRESS=7:12:0.
        CONTROL=RJECTL.
        STATION=S1, S2, S3, S4.

    FILE MCSQUEUE:
        FAMILY=S1,S2,S3,S4.

    FINI

    ?END
```

BURROUGHS CORPORATION   COMPANY CONFIDENTIAL
COMPUTER SYSTEMS GROUP   B1700 RJE/TERMINAL (NDL)
SANTA BARBARA PLANT   P. S. 2212 5249

QUEUE DEPTH CONTROL

In a computer-to-computer operation such as RJE there are two
significant data rates that affect performance and throughput:

     A)   Data Comm line speed
     B)   Peripheral speed

If the Data Comm line speed is relatively slow, when compared to the
peripheral speeds, the peripherals can usually process data faster
than the Data Comm line can transfer it.

If, in the case of input from the RJE terminal to the central
computer, the card reader can process data faster then the Data
Comm line can transmit the data to the central computer, the queue
between RJE/MCS and the network controller ("MCSQUEUE") will grow
larger and larger as the network controller waits for Data Comm
transmissions to complete.

To control the size that the input portion of "MCSQUEUE" can grow
to,   a marker record system has been implemented. When RJE/MCS is
inserting records into "MCSQUEUE", RJE/MCS includes a marker at
selected intervals. The marker is a special value in the header of
the record. The record that contains the marker will also contain
data read by RJE/MCS.

After inserting a marker record into the queue, RJE/MCS will suspend
all card reading until the network controller acknowledges receipt
of the marker record from RJE/MCS. The network controller
acknowledges the marker record by returning the record with the
marker in it to RJE/MCS.

When RJE/MCS receives the acknowledgement from the network
controller, RJE/MCS starts reading cards again until the next
marker record is sent.

The number of records allowed to be queued between RJE/MCS and the
network controller is limited by default to four. However the user
can change the maximum number by the ".QS" command (See Section 6:

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

LOCAL CONTROL MESSAGES).

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

OPERATING PROCEDURE

    ESTABLISHMENT

The RJE package is initiated by executing RJE/MCS and executing the
network controller. If switch 0 has been set ("EX RJE/MCS SW 0=1"),
then RJE/MCS will display the message:

        "ENTER ID FIELD PLEASE, FROM 0 TO 17 CHARACTERS."

This identification field must be obtained from the personnel at the
central computer site. RJE/MCS then displays the message:

        **** B1700 RJE (DATE) (TIME) ****

RJE/NDLDCH will establish communication with the central computer
system.   For switched lines, it is necessary to manually dial the
central computer system. A message is displayed to indicate central
computer connection, either

        "ONLINE." or "HOST ESTABLISHING."

depending upon which system sees the other's establishment first.

    LOG ON

The first function of an RJE session is the successful completion of
security tests. The user must enter a "USERCODE" and "PASSWORD"
that the central computer recognizes. Until such time as this is
accomplished and a "LOGGED ON" control message sent to the remote
site, an additional darkened field is printed following every
console printer message displayed. This field is used for entering
one's "USERCODE" and "PASSWORD" thereby providing remote system
security. An example of the log-on procedure is:

        **** B1700 RJE IV.I   07/15/74//10:09:07 ****
        ONLINE
        B 6700 SYSTEM/RJE 2.5.60 MIX = 6415.
        ⱭⱭⱭⱭⱭⱭⱭⱭⱭ
        # USERCODE?

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

```
           aaaaaaaaaa
           # AND YOUR PASSWORD?
           aaaaaaaaaa
           RJE LOGGED ON AT 10:09:31  01/21/74..
           SESSION 6417.
```

The darkened fields (aaa) are used for entering one's "USERCODE" and
"PASSWORD". Refer to the central computer's RJE manual for each
system's unique log-on requirements.

     REMOTE DECKS

All cards with invalid characters in the first column are considered
to be control cards for the B1700 MCP. Since decks to be sent to
the central computer system also have invalid characters in the
first column of control cards (see B6700 or B2700/3700/4700 system
information manual for the exact deck format), a special feature
has been implemented in B1700 MCP II permitting programs to read
control cards, namely the STREAM and TERMINATE super delimiters.
All remote decks must have the following format:

```
           ?STREAM RJE/CARDS
              REMOTE DECK(s)
           ?TERMINATE RJE/CARDS
```


All card images in the remote deck(s) with invalid characters in
column one will be passed to the central computer after RJE/MCS has
converted the invalid character to a null (a00a) character. MCP II
rejects cards with an invalid character in any column other than
column one.

All decks, regardless of size, must have the delimiters around them.
If the last card is not a terminate card, RJE/MCS will hang waiting
for another card. STREAM and TERMINATE super delimiters may also be
used with pseudo card readers; there is no difference in the format
of the remote deck(s). Only EBCDIC card decks may be read.

If the RJE user desires to file equate the card file to tape or
disk, that file must be built with the required central computer
control cards. It is an RJE requirement that all data cards and

control   cards for a particular job must be contiguous. When card
images are in a tape file or disk file there is no such thing as an
invalid character. Therefore it is necessary for the RJE user when
creating   disk or tape files for transmission by RJE to make sure
that   column one on all central computer control cards contains a
null code (200a).

The RJE user can create tape or disk files for RJE transmission by
using the STREAM and TERMINATE super delimiters. If a card file is
delimited by STREAM and TERMINATE, the MCP will return an exception
condition if column one is an invalid character on 80 column
equipment or a question mark on 96 column equipment. The card
reader exception procedure must check for a question mark in column
one and replace it with a null before writing the card image to
tape or disk.

When using 96 column readers, question marks (?) in column one are
treated the same as invalid characters by the B1700. The RJE user
must avoid having data cards with question marks in column one.

The B1700 converts invalid characters in column one of 80 column
readers to question marks.

CENTRAL COMPUTER SYSTEM CONTROL MESSAGES

Normal console printer input messages for transmission to the
central computer use the following form (up to 72 characters):

        <MIX INDEX>AX<MESSAGE>

where <MIX INDEX> refers to the mix number of the RJE/MCS program.

The content and format of these console printer messages is
dependent on the central computer system. In general, these
messages include all central computer system input messages which
allow the remote user to check the status of, and exert control
over, all programs and data files entered via the remote terminal.

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

LOCAL CONTROL MESSAGES

If a console printer message is entered with a ".." (period) as its
first character, it is considered to be a local control message
intended for the RJE/TERMINAL package. These are of the form:

        <MIX INDEX>AX.OPERATOR

Note: The first character after AX must be a ".".

If the operator does not conform to any of the six possible
commands, the message:

    "ERROR: INVALID OPERATOR IN "." INSTRUCTION, RE-ENTER."

is displayed.

.CLCP

The close card punch, .CLCP, command will close the card punch file.

```
        ************************************************************
        *                                                          *
        *                  <mix-index>AX.CLCP                      *
        *                                                          *
        ************************************************************
```

.CLLP

The close line printer, .CLLP, command will close the printer file.

```
        ************************************************************
        *                                                          *
        *                  <mix-index>AX.CLLP                      *
        *                                                          *
        ************************************************************
```

BURROUGHS CORPORATION   COMPANY CONFIDENTIAL
COMPUTER SYSTEMS GROUP   B1700 RJE/TERMINAL (NDL)
SANTA BARBARA PLANT   P. S.   2212 5249

.CP NR

The card punch not ready, .CP NR, command informs the B1700 RJE/MCS
program and the central computer system that the card punch has
become not ready. The central computer system will temporarily
suspend transmitting buffers for the punch device.

It is the responsibility of the B1700 RJE operator to inform the
B1700 RJE/MCS program and the central computer, that the card punch
is ready to receive data. The local control command ready card
punch, .RY CP, has been provided for this purpose. If the card
punch device has become inoperative, then the local control command
save card punch, .SV CP, has been provided.

```
    ***********************************************************
    *                                                         *
    *                 <mix-index>AX.CP NR                     *
    *                                                         *
    ***********************************************************
```


.EST

The establishment, .EST, command causes the B1700 RJE/NDLDCH program
to attempt to re-establish the line connection with the central
computer system. The message "ONLINE" is displayed when the line
connection is re-established.

The .EST command may be used in conjunction with the retry function.
The error message "RETRIES-UP" is displayed when the current buffer
being sent to the central computer system is not being received. By
entering the .EST command the buffer being sent will be discarded
and an attempt will be made to re-establish the line connection.

```
    ***********************************************************
    *                                                         *
    *                 <mix-index>AX.EST                       *
    *                                                         *
    ***********************************************************
```

.LP NR

The line printer not ready, .LP NR, command informs the B1700
RJE/MCS program and the central computer system that the line
printer has become not ready. The central computer system will
temporarily suspend transmitting buffers for the printer.

It is the responsibility of the B1700 RJE operator to inform the
B1700 RJE/MCS program and the central computer, that the line
printer is ready to receive data. The local control command ready
line   printer, .RY LP, has been provided for this purpose. If the
line printer has become inoperative, then the local control command
save line printer, .SV LP, has been provided.

```
***********************************************************
*                                                         *
*                   <mix-index>AX.LP NR                   *
*                                                         *
***********************************************************
```

.QS=NNNN

The queue size, .QS=NNNN, command allows the user to set the maximum
number   of buffers than can be queued between the RJE/MCS and the
network controller (See section on queue depth control). "NNNN" is
one to four decimal digits that the new queue depth limit will be
set to. A value of 0 for "NNNN" will set the queue depth to
infinity.

```
***********************************************************
*                                                         *
*                 <mix-index>AX.QS=NNNN                   *
*                                                         *
***********************************************************
```

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

.READ or .RE

The read, .READ or .RE, command causes the B1700 RJE/MCS program to
open a card file labelled "RJE/CARDS" and begin transmitting the
data to the central computer system. When the end of file condition
has been detected, the card file will be closed. The .READ or .RE
command is required to read each card file. A card file is any
group of cards whose first card is a STREAM card and whose last
card is a TERMINATE card.

The .READ or .RE command is only valid if the B1700 RJE/NDLDCH and
RJE/MCS programs have been properly logged on with the central
computer. It is possible to override this feature by entering the
local command .RY CR.

```
    ***********************************************************
    *                                                         *
    *              <mix-index>AX.READ                         *
    *                                                         *
    ***********************************************************

                        ---- or ----

    ***********************************************************
    *                                                         *
    *              <mix-index>AX.RE                           *
    *                                                         *
    ***********************************************************
```

.RY CP

The ready card punch, .RY CP, command informs the B1700 RJE/MCS
program and the central computer system that the card punch device
is now ready to receive data. Any data stream that was temporarily
suspended by using the .CP NR local control command will continue
without loss of data, if the local control command .SV CP was
entered, the data file will be transmitted beginning from the first
record of that file.

The .RY CP command is only valid if the .CP NR or .SV CP was issued
previously.

```
*********************************************************
*                                                       *
*                <mix-index>AX.RY CP                     *
*                                                       *
*********************************************************
```

.RY CR

The ready card reader, .RY CR, command will enable the B1700 RJE/MCS
program to read cards again, if the central computer has instructed
the B1700 RJE/MCS program to halt temporarily or abort its card
reader. The .READ or .RE local command is still required before the
B1700 RJE/MCS program can start reading cards.

If the B1700 RJE/MCS program has not been properly logged on with
the central computer, the .RY CR command will allow the B1700
RJE/MCS program to read cards and transmit the data file. In
addition, the darkened field that is displayed after every console
printer message sent from the central computer will be ignored.

```
*********************************************************
*                                                       *
*                <mix-index>AX.RY CR                     *
*                                                       *
*********************************************************
```

.RY LP

The ready line printer, .RY LP, command informs the B1700 RJE/MCS
program   and the central computer system that the line printer is
now ready to receive data. Any data stream that was temporarily
suspended by using the .LP NR local control command will continue
without loss of data. If the local control command .SV LP was
entered, the data file will be transmitted beginning from the first
record of that file.

The .RY LP command is only valid if the .LP NR or .SV LP was issued previously.

.SIZE=NNN

The size, .SIZE=NNN, command allows the B1700 operator to set the
maximum buffer size being transmitted to, and received from the
central   computer, where "NNN" is a three position decimal number
from 080 to 402.

```
*****************************************************************
*                                                               *
*                   <mix-index>AX.SIZE=NNN                       *
*                                                               *
*****************************************************************
```


.STOP or .ST

The stop, .STOP or .ST, command notifies the central computer system
that the B1700 system is terminating the RJE session. The B1700
RJE/NDLDCH programs breaks the Data Comm line connection and
terminates the B1700 RJE/MCS program.

```
*****************************************************************
*                                                               *
*                   <mix-index>AX.STOP                          *
*                                                               *
*****************************************************************
```

                        ---- or ----

```
*****************************************************************
*                                                               *
*                   <mix-index>AX.ST                            *
*                                                               *
*****************************************************************
```

BURROUGHS CORPORATION   COMPANY CONFIDENTIAL
COMPUTER SYSTEMS GROUP   B1700 RJE/TERMINAL (NDL)
SANTA BARBARA PLANT   P. S.   2212 5249

.SV CP

The save card punch, .SV CP, command informs the central   computer
that   the entire card punch data stream being transmitted is to   be
saved at the central   computer   site. The   .SV CP command will
permanently inhibit the transmission of any further punch   streams
from the central computer. To re-establish the punch stream, enter
the   local control command, .RY CP. This will   inform   the   central
computer   to start sending any punch streams that are available for
transmission.   All punch streams will start from the beginning of
the file.

```
*************************************************************
*                                                         *
*                  <mix-index>AX.SV CP                    *
*                                                         *
*************************************************************
```


.SV LP

The save line printer, .SV LP. command informs the central computer
that   the entire print stream being transmitted is to be saved   at
the central computer site. The .SV LP command will   permanently
inhibit   the transmission of any further print streams from   the
central computer. To re-establish the print stream, enter the local
control   command .RY LP. This will inform the central computer   to
start   sending any print streams   that   are   available   for
transmission.   All print streams will start at the beginning of the
file.

```
*************************************************************
*                                                         *
*                  <mix-index>AX.SV LP                    *
*                                                         *
*************************************************************
```

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

.WAIT or .WT

The wait, .WAIT or .WT, command will inform the central computer that the B1700 RJE/NDLDCH is going to break the Data Comm line connection and wait for a call from the central computer system. The B1700 RJE/NDLDCH program will issue a test-op for data-set-ready. When data-set-ready comes true, the B1700 RJE/NDLDCH will re-establish communication with the central computer.

The .WAIT of .WT can only be used when the Data Comm line connection between the central computer and the B1700 system is switched.

```
********************************************************
*                                                    *
*              <mix-index>AX.WAIT                     *
*                                                    *
********************************************************

              ---- or ----

********************************************************
*                                                    *
*              <mix-index>AX.WT                       *
*                                                    *
********************************************************
```

RJE/MCS OUTPUT MESSAGES

RJE/MCS may display a number of messages either in response to a local control message being entered, in response to a message being received from the central computer or when the program itself senses a condition of which the operator should be notified.

1. "ERROR: INVALID OPERATOR IN "." INSTRUCTION, RE-ENTER.".

    The control command just entered was found to be invalid. The operator should enter the correct command.

2. "ERROR: NO "=" IN ".QS" INSTRUCTION.".

This message occurs when a ".QS" command message is entered
which lacks an equal sign. The correct format is ".QS=NNNN".
The ".QS" request will be ignored. The operator should re-enter
the command correctly.

3. "ERROR: OPERATOR INVALID, DEFAULT VALUE USED.".

This error occurs when a non-numeric field is entered in a
".SIZE=NNN" control message. The default buffer size of 402
will be used. If this value differs from the current value, a
message will be sent to the central computer requesting a
change be made to the buffer size.

4. "ERROR: OPERAND OUT OF RANGE, CURRENT VALUE USED.".

This is displayed when a ".SIZE=NNN" control message is entered
and the three digit decimal in the instruction is not between
80 and 402 inclusive. The current buffer size is assumed and no
buffer size change is sent to the central computer.

5. "ERROR: ".QS" OPERAND INVALID.".

If a non-numeric field is entered in a ".QS" control message,
then this message is displayed. The control message will be
ignored and it will be necessary to re-enter the message
correctly.

6. "ERROR: ".QS" OPERAND TOO LONG.".

More than four numeric character were entered in a ".QS"
instruction. It will be necessary to re-enter the message
correctly to change the change the queue depth.

7. "HOST SYSTEM CARD READER ABORT.".

When a message is received from the central computer system
aborting the remote card reader, this message is displayed. If
a card file is active, the file is closed and flushed. It will
not be possible to enter any other cards to the program until
either a message from the central computer is received

indicating that it will once again accept cards or a ".RY CR"
control message is entered.

8.   "HOST SYSTEM CARD READER HALTED.".

     This indicates that a request has been received from the central
     computer to temporarily suspend the remote card reader. The
     remote card file will still be retained but no further card
     buffers will be transmitted until a card reader ready message
     is received from the central computer or a ".RY CR" message is
     entered on the remote console printer.

9.   "HOST SYSTEM CARD READER READY.".

     After either a "CARD READER ABORT" or "CARD READER HALT" message
     is sent by the central computer, when the central computer is
     able to receive data once again this message will be displayed.
     Cards will then by read by RJE/MCS.

10. "INPUT FILE EOF.".

     After processing an input file, the program will display this
     message   when end of file has been read on the input file and
     the file is closed. A special end of file control message will
     also be sent to the central computer at this time.

11. "LOG FEATURE NOT IMPLEMENTED IN NDL/RJE.".

     The NDL generated handler has no provision for counting line
     activity.

12. "PARITY ERROR ON CARD PLEASE READ LAST CARD AGAIN.".

     When processing an input file, should a parity error occur this
     message   will be displayed. The operator should re-submit the
     last card read.

13. "PRINTER EOF.".

     After an entire print file has been transmitted to the remote,
     the central computer transmits a special "EOF" control message.

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

The RJE/MCS will close the printer file and display this message when the control message is received.

14. "PUNCH EOF"."

After an entire punch file has been transmitted to the remote, the central computer will transmit a special "EOF" control message. The RJE/MCS program will close the punch file and display this message when the message is received.

15. "PRINT.PUNCH.QUEUE OVERFLOW: PROGRAM ABORT."

The RJE/MCS program maintains a disk file queue to store buffers received for the printer or punch after the device has become not ready and a ".LP NR" or ".CP NR" control message has been entered at the remote console printer to notify the central computer of a not ready condition. Should the central computer continue to send data to the remote site after receiving the not ready message, the disk file would eventually overflow. The RJE/MCS program will display this message, give a program dump of itself and go to end of job.

16. "REQUEST IGNORED: CARD FILE STILL OPEN."

If a ".READ" control message is entered while the RJE/MCS program has an input file active, this message will be displayed and the ".READ" message discarded.

17. "REQUEST IGNORED: CARD READER ABORTED."

If a ".READ" control message is entered while the card reader is aborted (the message "HOST SYSTEM CARD READER ABORTED" having been displayed but neither a ".RY CR" message entered nor a "HOST SYSTEM CARD READER READY." displayed), then this message is displayed. It will not be possible to enter cards until the card reader becomes ready.

18. REQUEST IGNORED: NOT LOGGED ON."

It is not possible to enter cards to the RJE/MCS program until a logged on control message has been received. If this is attempted, this message will be displayed in response to the

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S. 2212 5249

".READ" control message. It is possible to override this feature by entering a ".RY CR" control message if the RJE/MCS program is not logged on.

19. "WARNING: STILL LOGGED ON.".

If RJE/MCS detects an EOF on its remote file, indicating a "QC" system control message was entered to send the network controller to end of job, the RJE/MCS will display this message before going to end of job, if the B1700 was still logged on with the central computer.

RJE/NDLDCH OUTPUT MESSAGES

RJE/NDLDCH will display messages for certain error conditions which may be serious enough to require action by the operator; it will attempt to recover on its own if possible. The format of the error messages appears below.

1. "ESTABLISHMENT RETRIES UP.".

When trying to establish a connection with the central computer, after fifty transmissions of an "ENQ", if a valid reply is not received, this message is displayed. RJE/NDLDCH will then send a "DLE-EOT" and disconnect if switch lines are being used. If leased lines are being used, RJE/NDLDCH will send an "EOT" and return to trying to establish a connection.

2. "HOST ESTABLISHING.".

The receipt of an "ENQ" character from the central computer will cause this message to be displayed. It is an indication that the central computer system is re-establishing the connection between itself and the remote computer. RJE/NDLDCH acknowledges the message and continues.

3. "HOST TERMINATING.".

The receipt of an "EOT" when running on leased lines or a "DLE-EOT" when running on switched lines will cause this

message to be displayed. It is an indication that the central
computer   system is going down. RJE/NDLDCH will disconnect if
running on a switch line or will attempt to re-establish is
running on leased lines.

4.   "LOSS OF DATA SET READY.".

During the last I/O sequence, the data set went down. When this
occurs, if switched lines are being used, RJE/NDLDCH will
disconnect (if a connection had been established). The user
must then re-dial the central computer system.

5.   "ONLINE.".

When attempting to establish communications with the central
computer,   either at the start of an RJE session or after the
local   command ".EST" was entered. This message will be
displayed when a valid acknowledgement to the establishment
request is sent by the central computer system.

6.   "RETRIES UP.".

This indicates that the current buffer being sent to the central
computer is not being acknowledged, either due to the central
computer NAKing the message or because of line problems which
cause exceptions whenever the message is transmitted. After the
retry limit has been reached, the "RETRIES UP." message is
displayed by RJE/NDLDCH. RJE/NDLDCH then requeues the current
buffer. If a buffer is queued for another station then it
attempts to transmit it, otherwise, RJE/NDLDCH continues trying
to transmit the same buffer. Should an ".EST" message be
received   at this time, then the message being re-transmitted
will be discarded before the link is re-established.

BURROUGHS CORPORATION   COMPANY CONFIDENTIAL
COMPUTER SYSTEMS GROUP   B1700 RJE/TERMINAL (NDL)
SANTA BARBARA PLANT   P. S. 2212 5249

ASYNCHRONOUS DATA COMM WITH RJE

The NDL version of B1700 RJE/TERMINAL software allows the user to
define other terminals, stations, lines and files in RJE/NDLDCH
(the network controller). A user written program can then read and
write to these additional stations asynchronously with   the
execution of RJE. The following is a list of restrictions that the
user must adhere to in order to effect asynchronous data comm with
RJE.

1.   Any new stations added to RJE/NDLDCH must follow the fourth RJE
     station (Station S4).

2.   RJE/MCS will unconditionally approve all remote file opens with
     the MCS non-participating as long as there are stations
     involved   and the stations involved are not any RJE stations.
     Since RJE/MCS approves the "REMOTE FILE OPEN", it is necessary
     that   RJE/MCS be executing when the user program starts
     executing or the user program will be suspended by the
     condition "NO MCS OR NETWORK CONTROLLER PRESENT."

3.   RJE/MCS   unconditionally   approves   any   non-dummy   station
     attached, as long as the attached station does not involve any
     RJE stations.

4.   Whenever   RJE/MCS causes the execution of RJE/NDLDCH all
     controls and requests will be started, whether the user program
     is present or not. When no user program is present, any
     messages received from non-RJE stations will be discarded.
     However, non-RJE messages received when the user program is
     present will be transferred to the user program by the network
     controller.

FILES

RJE/MCS FILES

1. CARD FILE
    INTERNAL NAME = RJECARDS
    LABEL = RJE/CARDS
    DEVICE = CARD
    OPEN.OPTION = INPUT
    RECORDS = 80/1

2. PRINTER FILE
    INTERNAL NAME = RJEPRINT
    LABEL = RJE/PRINT
    DEVICE = PRINTER OR BACKUP DISK
    OPEN.OPTION = OUTPUT, LOCK
    RECORDS = 132/1

3. PUNCH FILE
    INTERNAL NAME = RJEPUNCH
    LABEL = RJE/PUNCH
    DEVICE = PUNCH OR BACKUP DISK
    OPEN.OPTION = OUTPUT, LOCK
    RECORDS = 80/1

4. MCS QUEUE FILE
    INTERNAL NAME = MCSQUEUE
    LABEL = MCSQUEUE
    DEVICE = REMOTE WITH HEADERS
    OPEN.OPTION = INPUT/OUTPUT
    RECORDS = 455/1

5. PRINT PUNCH QUEUE
    INTERNAL NAME = PRINT.PUNCH.QUEUE
    LABEL = "RJE.MCS"/"QUEUE"
    DEVICE = DISK, RANDOM

BURROUGHS CORPORATION
COMPUTER SYSTEMS GROUP
SANTA BARBARA PLANT

COMPANY CONFIDENTIAL
B1700 RJE/TERMINAL (NDL)
P. S.   2212 5249

```
RECORDS = 455/1
AREAS = 1/30
OPENED = INPUT, OUTPUT, NEW, LOCKOUT
```

ALPHABETIC INDEX: