



**PRODUCT SPECIFICATION**

REV LTR	REVISION ISSUE DATE	APPROVED BY	REVISIONS
F	3/15/79	<i>J. Hale</i>	<p>MARK VIII.0 RELEASE</p> <p>3-2 Added CANDE to DECLARATIONS Added SYCOM to DECLARATIONS</p> <p>3-5 Added "Only stations with TOG(14) false are placed"... Added "While TOG(10) is true, the POLL string includes"...</p> <p>3-6 Added Name: CANDAUDPOL Section</p> <p>3-11 Added Name: CANDAUDSEL Section</p> <p>3-12 Deleted A and renumbered remaining output requests. Added Name: CANDAUDFSL Section</p> <p>3-23 Added SYCOMREQ Section</p> <p>3-30 Updated exceptions A and B in CANDETDCTL Section</p> <p>3-31 Added Name: CANDAUDCTL Section</p> <p>3-34 Added SYCOM Section</p> <p>4-1 Updated diagram of Request vs. Control</p> <p>4-3 Updated diagram of Request vs. Terminal</p>
G	10/12/79	<i>J. Hale</i>	<p><u>Changes for MARK 9.0 Release</u></p> <p>2-1 Rewrote ACCESSING THE LIBRARY section.</p> <p>3-2 Added COBOL74 section.</p> <p>3-3 Added "TIME (TALLY) is set" to "Line (TOG[1]) is set" paragraph.</p> <p>3-10 Added COBOL SELECT section.</p> <p>3-19 Deleted REMOTE JOB ENTRY(RJE) section.</p> <p>3-31 Deleted RJE from "Only the special input/output" paragraph.</p> <p>4-2 Deleted RJE from table.</p> <p>4-4 Deleted RJE from table.</p> <p>A-1 } Updated LIBRARY STATISTICS. A-3 }</p>

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### GENERAL

The Network Definition Language (NDL) Library consists of procedures used in the operation of terminals that interface with B1800/B1700 series computers. The library is a source language library that contains the REQUESTS and CONTROLS necessary to handle common line disciplines for the terminal devices referenced herein. By utilizing the library, users should find it unnecessary to write their own REQUESTS and CONTROLS.

### RELATED PUBLICATIONS

<u>NAME</u> ----	<u>NUMBER</u> -----
NDL Manual	1073715
Network Definition Language	P.S. 2212 5223
COMMUNICATION PROCEDURES	P.S. 1284 9006
RJE3780	P.S. 2219 0391

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### ACCESSING THE LIBRARY

The library of line disciplines described herein is a released product in the NDL system and is named NDL/LIBRARY.

This library consists of a number of groups of source statements coded in NDL (Network Definition Language). Each source image is a 90-character record. Positions 1 through 72 contain the NDL code, while positions 73-80 contain a unique sequence number. A patch information field begins in column 81 of the record image. The format displayed is the same as for SDL:

I.E., <BASE> <VERSION> <ID>

WHERE <BASE>        := <DIGIT> <DIGIT> (E.G., "90")  
       <VERSION>     := <CHARACTER> <CHARACTER> (E.G., "01" OR "A " OR " A")  
       <ID>            := ANY STRING OF SIX CHARACTERS.  
                       (E.G., "T02344")

The printed patch would appear on the library listing as:

"9.0 01 T02344"

The patch field is printed only during a \$CREATE or \$UPDATE compile; it does appear on listings where library decks are extracted via the \$LIBRARY control card directive.

Each group of source statements constitutes a procedure (declarative or executable). These procedures fall into three classes: those called REQUESTS, DECLARATIONS, and CONTROLS.

Including the appropriate \$LIBRARY statement in a compile deck places any of these procedures, intact, into an NDL compile. For instance, \$LIBRARY POLLTCTD, when placed correctly in a compilation deck passed to the NDL Compiler, causes all source statements in the procedure named POLLTCTD from the NDL/LIBRARY file, to be included into the source passed to the compiler.

A typical compilation deck will appear as follows:

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?COMPILE HANDLER WITH NDL TO LIBRARY;  
?DATA CARDS  
DECLARATION:

NIF = "HANDLER"/"NIF".

\$LIBRARY POLLTCTD  
\$LIBRARY SELECTCTD  
\$LIBRARY POLSELCTL

<TERMINAL SECTION STATEMENTS>  
<STATION SECTION STATEMENTS>  
<LINE SECTION STATEMENTS>  
<FILE SECTION STATEMENTS>

FINI.

?END;

The Network Controller generated by this deck with the <SECTION STATEMENTS> appropriately completed and with the aid of an applications program, communicates to a network composed of TC-, TD-, TT-, TU-, and AE-type terminals.

NOTE: The \$LIBRARY cards take the place of NDL executable statements in the deck. The compiler replaces these \$LIBRARY cards with actual source statements found in the NDL/LIBRARY file under their respective name (POLLTCTD, or SELECTCTD, etc.).

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### NDL/LIBRARY FILE

The NDL/LIBRARY file contains a number of DECLARATIONS, REQUESTS and CONTROLS each designed to be used with a certain class or type of terminal.

Additionally, these REQUESTS and CONTROLS fall into general groupings as to the line discipline employed.

Each of the following descriptions indicate the type of line discipline for which it is intended (underlined) and the name(s) of the REQUEST(s) which it describes.

The purpose of this approach is to provide a detailed description of the action in a REQUEST or CONTROL which may be used in conjunction with a full listing of that REQUEST or CONTROL to obtain a more complete understanding of a particular line discipline and its implementation.

### DECLARATIONS

The purpose of a DECLARATION is to assign values to constant names, declare an audit file, name the NIF file, define a signal character for an MCS, and establish the maximum number of TOGGLES and TALLYS. Some CONTROLS and REQUESTS may require the use of a DECLARATION from the NDL/LIBRARY.

#### RJE3780

NAME: RJE3780DCLS

This DECLARATION section contains the constants used in the RJE3780 REQUESTS and CONTROLS sections. It is invoked by a "\$LIBRARY RJE3780DCLS" card in the NDL source deck.

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CANDE

NAME: CANDEDEC

This DECLARATION section contains the defined constants used in the CANDE REQUESTS and CONTROLS.

SYCOM

NAME: SYCOMDECL

This DECLARATION section contains the defined constants used in the SYCOM REQUESTS and CONTRJLS. (Included also are the defined character strings which are treated as pseudo-procedures, i.e. they are expanded into inline code at compile time).

COBOL74

NAME: COBOL74DEC

This DECLARATION section contains the defined constants used in the COBOL74 REQUEST.

REQUESTS

The purpose of a REQUEST is to perform a particular communication procedure with the assigned station.

INPUT REQUESTS

The input REQUEST performs basically two functions:

- a. Querying a terminal for messages it may have READY to transmit.
- b. Receiving messages and routing them to the remote file to which the terminal is attached.

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### POLL OR AUTOPOLL

NAME: POLLTCTD

This REQUEST issues one POLL (when AUTOPOLL is not in operation) to a station and receives either a message, or an EOT indicating no messages ready.

Line (TOG(1)) is set by the initiating CONTROL if AUTOPOLL was initiated; otherwise it is reset. This TOGGLE is used to avoid issuing another POLL if AUTOPOLL was in process. TIME (TALLY) is set upon input to correspond to COBDL74 requirements.

The REQUEST code is exited if no message is received in response to the POLL. If a message is received, then it is acknowledged, queued for the MCS or passed on to the User Program's remote file with which the assigned station is associated. The REQUEST is then exited.

I/O errors, other than ENDOFBUFFER, LOSSOFDSR, and TIMEOUT, cause the RETRY count to be decremented and the REQUEST exited. If the line is a switched-line, TIMEOUTs cause the RETRY count to be decremented to allow a line disconnect when RETRY = 0. Consecutive errors that cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or a TERMINATE DISCONNECT. This exiting of the REQUEST on a leased-line leaves the station READY and queues an error message for the MCS, if present. If there is no MCS in the system then the station remains READY and a message is passed on to the User Program's remote file which causes the EXCEPTION branch to be taken on the READ of the remote file.

If the User Program attempts to receive a message which is too large for the Network Controller to communicate, this REQUEST informs the intended sender by the following error notice and then proceeds to the next Datacomm transfer:

\*\*\*ABORT/XMIT: MSG GTR BUFFERSIZE\*\*\*.

This REQUEST checks incoming messages for a transmission number, if one is declared in the TERMINAL Section. If two consecutive messages have the same transmission number, the second message is

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discarded.

### DYNAMIC

NAME: POLTCTDDYN

This special-purpose REQUEST is intended to be used only with AUTODYNCTL Library CONTROL to provide dynamic reconfiguration of the AUTOPOLL POLL list of stations on a given line. Lines may have more than one line address (referred to as LINE GROUPS). Refer to the discussion of the CONTROL for further information.

The REQUEST performs similarly to POLLTCTD when no exceptions occur on any station.

When a polled station incurs a TIMEOUT exception, an indicator is checked to determine its status prior to the exception. If the terminal has never been recognized as having been ON-LINE it is polled once again. If the station TIMES OUT again, it is removed from the POLL list. If the station has been in use without error, it is single-polled once. If it TIMES OUT again, it is removed from the POLL list and marked to be re-tried in three (3) minutes.

If the exception incurred is LOSSOFDSR and if the line was established as switched, it is disconnected; otherwise the exception is treated as any other non-TIMEOUT exception.

The effect of the special action taken on a TIMEOUT is that when a station is powered on, the Network Controller determines how many stations are responding and re-creates the AUTOPOLL POLL list accordingly. When a station is powered off, the AUTOPOLL POLL list is similarly re-created, including only those stations that are actively responding.

If a station has been marked as ONCE ACTIVE BUT NOW POWERED OFF and is to be re-tried in three (3) minutes, the entire list of stations is re-tested for availability and the POLL list is created accordingly. Criteria for acceptance to the new POLL list are: (1) it has never been used by any line or is not now in use by any line and (2) it does not TIMEOUT when polled.

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The value of three (3) minutes for RETRY is a constant set in the Library CONTROL code for AUTODYNCTL and may be altered by the user if desired.

Messages which are too large for the Network Controller to communicate are handled as in the POLLTCTD REQUEST.

NAME: CANDEPOLTD

The CANDE input REQUEST performs similarly to the standard REQUEST POLLTCTD with the following additions.

An input control system is implemented which determines whether or not a station is to be included in the AUTOPOLL POLL string based on TIMEOUTS on POLL. TOG[14] is the flag indicating that this station has had RETRY consecutive TIMEOUTS on POLL and is to be deleted from the POLL string. Only stations with TOG[14] false are placed in the POLL string. Every minute, by default, one of those stations with TOG[14] true is given one single POLL. If the station has not responded with EOT after 100 milliseconds, by default, the read is cancelled and the station is left marked "down". The above mentioned "default" values along with some others are declared in a library declaration section for CANDE named "CANDEDEC". These values may be overridden at compile time by including a "DEFINE" statement after the "\$LIBRARY CANDEDEC" statement. See documentation in "CANDETCTL" for a more complete explanation.

An output control system prevents output messages bound to a station which is not allowing them to be received (terminal is in LOCAL or message has an unrecoverable error) from being retried forever to the detriment of the response time of the rest of the stations. TOG[10] tells the CONTROL that this station is not receiving output; the CONTROL does not attempt output until this flag is off. The receipt of a ? in the first position followed immediately by an ETX (of the input message from a station), resets TOG[10] for that station and allows output to be sent. Also, any input including valid CANDE commands enables the output queue again. While TOG[10] is true, the POLL string includes a select sequence for the station. This means the station will be constantly "NAK"ing the select until the terminal is placed in "RECEIVE" at which time the message is sent and the select sequence is removed from the POLL string.

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Scrolling is available to TD820/830 type terminals when TYPE is set correctly in the TERMINAL Section of the Network Controller. An input of ?+ enables scrolling, ?- disables scrolling. Scrolling may also be controlled programatically by setting the value of TALLY[0]. When TALLY[0] is set to 254, scrolling is enabled if the TYPE is correct, and when TALLY[0] is set to 255, scrolling is disabled. Scrolling of input is performed as follows. After receipt of input:

- a. Clear to the end of the line.
- b. Move cursor to Home.
- c. Leave terminal in RECEIVE mode.
- d. Scroll up one line. This puts the top line on the bottom of the screen and brings the second line up to the top of the screen.
- e. Clear the top line.

Error recovery is similar to the standard POLLCTD REQUEST. ENDOFBUFFER conditions are handled the same with small modifications to accommodate CANDE. TIMEOUTS are handled by the dynamic input control system. If a station is marked INPUT DISABLED by the input control system then a TERMINATE ERROR is performed to inform CANDE that it must recover any user active at this station.

If the terminal is in use only by CANDE (no other job executed through CANDE is attached to it), the REQUEST maintains the cursor position as required by CANDE. If the terminal is in use by any other job, then the cursor position is not maintained in any way.

NAME: CANDAUDPOL

This request performs exactly like "CANDEPOLTD" with the addition that it uses an audit file to trace its operation. It is included in the library so that it may be used in diagnosing the line activity or documenting any suspected problem in the request.

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### POINT-TO-POINT

NAMES: TCTUPTRCV, TDPTRCV

These input REQUESTS establish communication on a master/slave basis. Initially the REQUEST waits (without TIMEOUT) for the station to bid for status. Upon the station bidding, communication is established and the input message is passed on to the User Program's remote file or queued for the MCS, if present. When the transaction is completed, master status must be re-established by the terminal for the next message.

When in the output REQUEST and trying to establish master status, the input REQUEST also bids for master status, the output REQUEST code is exited and control given to the input REQUEST. The input REQUEST now waits (without TIMEOUT) for the station to bid again for master status.

For the TCTUPTRCV REQUEST, I/O errors other than TIMEOUT cause the RETRY count to be decremented and the REQUEST exited. The TDPTRCV REQUEST operates similarly except that exception conditions upon establishing communication do not directly decrement the RETRY counter. Consecutive errors that cause the RETRY count to go to zero cause the REQUESTS to perform a TERMINATE ERROR or a TERMINATE DISCONNECT. This exit from the REQUEST on a leased-line leaves the station READY and queues an error message for the MCS, if present. If there is no MCS in the system then the station remains READY and a message is passed on to the User Program's remote file, which causes the EXCEPTION branch to be taken on the READ of the remote file.

Should a message be received by an User Program which exceeds the BUFFERSIZE as defined in the Network Controller, the partial message which does not exceed the BUFFERSIZE is passed on to the intended receiver as if no errors had occurred.

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### TELETYPE

NAME: READTTY

A READ with NO TIMEOUT is issued and upon receipt of ENQ, CR or ETX, the carriage is automatically positioned in the far left margin and advanced one line. Since the REQUEST is sensitive to a Carriage Return, an ETX, or an ENQ (as ending control codes), the REQUEST must check which code was actually received before returning the carriage. If an ENQ was received then the message is discarded and a READ with NO TIMEOUT is initiated. If an ETX or CR was received then the message is queued for the User Program or MCS and the REQUEST is exited.

Any error, whether an I/O exception or receipt of an invalid response, causes the RETRY count to be decremented and the REQUEST exited. Consecutive errors which cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or TERMINATE DISCONNECT which notifies the User Program through the EXCEPTION branch of the READ. If an MCS is present, an error message is queued for it.

Attempts to transmit messages from the teletype keyboard which exceed the BUFFERSIZE defined in the Network Controller are aborted. The message:

\*\*\*ABORT/XMIT: MSG GTR BUFFERSIZE\*\*\*

is displayed on the teletype console to indicate this error.

### QUIPUT REQUESTS

The output REQUEST performs the function of transmitting to the terminal any message designated as output from the system.

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SELECT

NAME: SELECTCTD

The basic purpose of this REQUEST is to transmit messages to an assigned station by means of the standard SELECT line discipline.

If an ACK is received in response to the SELECT, the output message is sent. When the acknowledgement is received for the message, the transmission number is updated, the output message is cleared from memory and the REQUEST is exited. If a NAK is received in response to the SELECT then the output message is re-queued and the REQUEST is exited.

I/O errors other than ENDOFBUFFER, LOSSOFDSR and TIMEOUT cause the RETRY count to be decremented and the REQUEST exited. However, TIMEOUTS on a switched line cause the RETRY counters to be decremented to eventually allow a line disconnect when RETRY = 0. Consecutive errors that cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or TERMINATE DISCONNECT. If an MCS is present, this exiting of the REQUEST on a leased-line leaves the assigned station READY and queues an error message for the MCS. If there is no MCS in the system then the assigned station remains READY and a message is passed on to the User Program's remote file, which causes the EXCEPTIUN branch to be taken on the next READ of the remote file.

This REQUEST sends a transmission number with the output message if TRANSMISSION is declared in the TERMINAL Section for the assigned station. The TC terminals (TC500, TC700, etc.) transmission numbers are incremented consecutively (i.e., 0, 1, 2, 3, etc.) whereas the TD terminals (TD700, TD800, etc.) alternate transmission numbers between 0 and 1.

If the User Program attempts to send a message which is too large for the Network Controller, this REQUEST notifies the intended receiver of the message by the following error notice and then proceeds to the next Datacomm transfer.

\* ABORT/RCV: MSG GTR BUFFERSIZE \*

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COBOL SELECT

NAME: COBOL74SEL

The purpose of this output request is to implement the carriage control specified in a COBOL WRITE statement. The overall action of the REQUEST is similar to the SELECTCTD REQUEST.

The carriage control feature of this REQUEST is handled via TOGs and TALLYs. TOG[2] represents SKIP or SPACE with values of 0 and 1, respectively. TUG[3] represents BEFORE and AFTER with values of 0 and 1, respectively. TALLY[0] is used as the value associated with the SKIP or SPACE. TALLY[2] is used internally as a temporary counter.

SKIP to "channel" has been implemented as a SKIP to screen line number. In the special condition that SKIP to LINE NUMBER 1 is used, first the screen is cleared.

The values for representing line number or channel number have the range of 1-99 for SKIP and 0-255 for SPACE. Their validity is not checked by this REQUEST.

The only valid INPUT REQUEST to use with this REQUEST is "POLLTCTD". The valid CONTROLS are POLSELCTL", "AUTOPOLCTL", and any of the CANDE CONTROLS.

DYNAMIC

NAME: SELTCTDDYN

This special purpose REQUEST is intended to be used only with AUTODYNCTL CONTROL and in conjunction with input REQUEST POLTCTDDYN to provide dynamic reconfiguration of stations on a line.

This REQUEST performs similarly to SELECTCTD when communicating with a TD830 Series terminal. If TERMINALTYPE is not set to a value of 45 or 46, then the REQUEST attempts a FAST-SELECT. Upon an EXCEPTION or FORMAT error occurring on the READ of the FAST-SELECT, the REQUEST sets TUG[3] to 1 and normal SELECTs the station until the station is READY to receive. If TOG[3] is true and TERMINALTYPE equals 45 or 46, the REQUEST always normal

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SELECTs as does the SELECTCTD REQUEST.

NOTE: TIMEOUTs do not decrement the RETRY counter unless the line has been established as switched; thereby allowing disconnect when RETRY = 0. If LOSSOFDSR is detected and the line is switched, immediate disconnect is performed on the line. Otherwise, the RETRY counter is decremented.

This REQUEST sends a transmission number with the output message if a transmission number is declared in the TERMINAL Section for the assigned station. The TC terminals (TC500, TC700, etc.) transmission numbers are incremented consecutively (i.e., 0, 1, 2, 3, etc.) whereas the TD terminals (TD700, TD800, etc.) alternate transmission numbers between 0 and 1.

If the User Program attempts to send a message which is too large for the Network Controller to communicate, this REQUEST notifies the intended receiver of the message by the following error notice, then proceeds to the next Datacomm Transfer.

\*ABORT/RECV: MSG GTR BUFFERSIZE\*

NAME: CANDESELTD

The CANDESELTD REQUEST performs similarly to the standard SELECT REQUEST with the same additions as discussed in the FASTSELECT CANDE REQUEST. See CANDEFSLTD.

In addition, the this REQUEST discards an output to a station when the station responds with an ACK to SELECT, but responds with a NAK to TEXT (RETRY consecutive times). This is to prevent messages containing irrecoverable errors in the TEXT from degrading the rest of the system.

NAME: CANDAUDSEL

This is the same as the "CANDESELTD" request with the addition of audit statements.

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### FAST SELECT

NAME: FASTSELTCO

The FASTSELTCO REQUEST functions similarly to the SELECT REQUESTs with the following differences:

Instead of issuing one I/O to SELECT the terminal and receive a response (ACK or NAK) and then issuing another I/O to transmit the output message, a single I/O is issued which notifies the destination terminal that an output message is coming and immediately following the control sequence is the message itself. The terminal then returns ACK or NAK indicating receipt or non-receipt of the message.

Error recovery is similar to that in the SELECT REQUESTs.

Messages which are too large for the Network Controller to communicate are handled as in the SELECTCTO REQUEST.

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NAME: CANDEFSLTD

This output REQUEST performs similarly to the standard FASTSELECT REQUEST with the following additions:

- a. Scrolling, when enabled, is performed on any output as follows:
  1. Move the cursor to Home.
  2. If less than 23 consecutive outputs have occurred, then leave the terminal in RECEIVE.
  3. Delete the top line.
  4. Move the cursor up one line. (This places it at the left, on the bottom line of the screen.)
  5. Transmit the TEXT.
  6. Move the cursor to Home.
- b. If the terminal receiving the output is defined as a TD830 series (TYPE = 45 or 46), then, before the FASTSELECT occurs, a SELECT is performed. If the response is an ACK, the REQUEST proceeds as usual; otherwise, the error section is executed.
- c. After one TIMEOUT on a FASTSELECT, the station is marked as temporarily disabled for output and a select sequence for the station is placed in the POLL string. When the SELECT is ACKed the message is sent and, if no more messages are queued for the station, the SELECT sequence is removed from the POLL string.
- d. If there is one or more lines of output from some program other than CANDE currently on the screen of a station with scrolling enabled, the station is placed in LOCAL before a page of output from CANDE is displayed.

NAME: CANDAUDFSL

This request is the same as "CANDEFSLTD" with the addition of audit statements.

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POINTO-IO-POINTO

NAMES: TCTUPTXMIT, TDPTXMIT

These output REQUESTs establish communication on a master/slave basis. The REQUESTs initially attempt to obtain master status upon having an output message queued. If upon bidding for master status the remote station is likewise bidding for status, the output REQUEST is exited allowing the remote station to again bid for master status. Should the station fail to rebid for status within the adapter TIMEOUT period, the output REQUEST again attempts to establish master status before outputting its queued message.

For the TCTUPTXMIT REQUEST, I/O errors other than TIMEOUT cause the RETRY count to be decremented and the REQUEST exited. However, TIMEOUTs on a switched-line cause the RETRY counter to be decremented to allow a line disconnect when RETRY = 0. The TDPTXMIT REQUEST operates similarly except all I/O errors cause the RETRY counter to be decremented. Consecutive errors that cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or a TERMINATE DISCONNECT. This exiting of the REQUEST on a leased-line leaves the assigned station READY and queues an error message for the MCS, if present. If there is no MCS in the system then the assigned station remains READY and a message is passed on to the User Program's remote file. This causes the EXCEPTION branch to be taken on the next READ of the remote file.

If the User Program attempts to send a message which is too large for the Network Controller to communicate, this REQUEST notifies the intended receiver of the message by the following error notice and then proceed to the next Datacomm transfer.

\*\*\*ABORT/RCV: MSG GTR BUFFERSIZE\*\*\*

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NAME: TDBATCHXMT

This output REQUEST establishes communication on a master/slave basis. The REQUEST initially attempts to obtain master status upon having an output message queued. If upon bidding for master status the remote station is likewise bidding for status, the output REQUEST is exited allowing the remote station to again bid for master status. Should the station fail to rebid for status within the adapter TIMEOUT period, the output REQUEST again attempts to establish master status before outputting its queued message. Upon outputting its message, a check is made to determine whether or not other output messages have been QUEUED. If the answer is yes the REQUEST continues to output messages until the queue is empty, otherwise the REQUEST is exited immediately.

I/O errors other than TIMEDOUT and ENDOFBUFFER, cause the RETRY count to be decremented and the REQUEST exited. However, TIMEOUTS on a switched-line cause the RETRY counter to be decremented to allow a line disconnect when RETRY = 0. Consecutive errors that cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or TERMINATE DISCONNECT. This exiting of the REQUEST on leased-lines leaves the assigned station READY and queues an error for the MCS, if present. If there is no MCS in the system, then the assigned station remains READY and a message is passed on to the User Program's remote file. This causes the EXCEPTION branch to be taken on the next READ of the remote file.

If the User Program attempts to send a message which is too large for the Network Controller to communicate, this REQUEST notifies the intended receiver of the message by the following error notice and then proceeds to the next Datacomm transfer:

\*\*\*ABORT/RCV: MSG GTR BUFFERSIZE\*\*\*

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### TELETYPE

NAME: WRITETTY

This REQUEST transmits every message appended with a Carriage Return and a Line Feed character. If the WRITE operation is completed without error, the output message is de-allocated and the REQUEST is exited.

Any error except a BREAK causes the RETRY count to be decremented, the message re-queued and the REQUEST exited. Consecutive errors cause the REQUEST to perform a TERMINATE ERROR or a TERMINATE DISCONNECT, requeue the message, report the error to the MCS or the User Program, and exit the REQUEST. If the error was a BREAK during the WRITE, the REQUEST automatically positions the carriage to the far left, advances one line, and exits the REQUEST after de-allocating the output message.

Attempts to transmit messages to the teletype keyboard which exceed the BUFFERSIZE defined in the Network Controller are aborted. The following message is displayed on the teletype console to indicate this error.

\*\*\*ABORT/RCV: MSG GTR BUFFERSIZE\*\*\*

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### INPUT/OUTPUT REQUEST

An input/output REQUEST performs the functions of both input and output without the need to be initiated by the CONTROL more than once, except under certain error conditions.

### POLL/SELECT

NAME: DIAGTCTDIO

The purpose of this REQUEST is to provide a minimal diagnostic capability in a readily available form in the LIBRARY.

This REQUEST performs both input and output functions for MULTI-POINT terminals and provides a trace of all activity between the system and the terminal. The trace is effected by making use of an AUDITFILE named 'DIAG' which must be declared in the DECLARATION Section of any Network Controller which includes this REQUEST from the LIBRARY.

Example: AUDITFILE DIAG (DEVICE=PRINTER OR BACKUP).

The operations of the input and output sections of this REQUEST are identical to that of the POLL and SELECT REQUESTS (POLLTCTD and SELECTCTD), respectively.

Although the diagnostic REQUEST can be specified in a non-MCS configuration in the TERMINAL Section as REQUEST = DIAGTCTDIO : RECEIVE, DIAGTCTDIO : TRANSMIT, it is also an optional statement in a system utilizing an MCS, by specifying in the TERMINAL Section:

DIAGNOSTIC = DIAGTCTDIO: RECEIVE, DIAGTCTDIO: TRANSMIT

This option allows, through a DCWRITE from the MCS, the ability to exit the current REQUEST, enter the diagnostic REQUEST, and return to the original REQUEST if desired.

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POINT-TO-POINT

NAME: TCTUPTIO

This REQUEST establishes communication on a master/slave basis. Initially the REQUEST waits without TIMEOUT for either an output message to be queued (which then cancels the TIMEOUT), or for a station to request permission to transmit its message buffer. Upon acknowledging the station's request, its message buffer is received and passed to the User Program's remote file, or queued for the MCS, if present.

All output operations (e.g., TRANSMIT ACK, TRANSMIT NAK, TRANSMIT TEXT, etc.) are determined by the value placed in LINE (TALLY[1]) which is constantly being updated by the REQUEST according to I/O communication.

Any errors, except ENDOFBUFFER, whether an I/O error or receipt of an incorrect message or response, cause the RETRY count to be decremented and the REQUEST exited. Consecutive errors that cause the RETRY count to go to zero cause the REQUEST to perform a TERMINATE ERROR or a TERMINATE DISCONNECT. This exiting of the REQUEST on leased-lines leaves the assigned station READY and queues an error message for the MCS, if present. If there is no MCS in the system then the assigned station remains READY and a message is passed on to the User Program's remote file. This causes the EXCEPTION branch to be taken on the next READ of the remote file.

This REQUEST should be used only with CONVERCTL line CONTROL with STATION(MYUSE) declared as INPUT/OUTPUT.

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### TELETYPE

NAME: CANDEIDTTY

This is an input/output conversational POINT-TO-POINT teletype REQUEST. It performs similarly to the standard teletype REQUESTs with the following additions:

- a. This REQUEST is sensitive to Carriage Return (CR) as an ending code on input.
- b. If a BREAK is detected during a WRITE, the REQUEST transmits to the terminal (BRK). A flag is set to indicate to CANDE that a BREAK was requested.
- c. If an ENQ is sent, the REQUEST transmits to the terminal (DEL) to indicate that the last keyed-in message was discarded.
- d. Error recovery is similar to that of the other CANDE REQUESTs.
- e. Carriage position is controlled by the needs of CANDE, when the terminal is attached only to CANDE; otherwise, carriage position is maintained at the left margin on a clean line for the next input or output.

### RJE/HOST

The RJE/HOST REQUEST is similar to the RJE REQUEST, but has the ability to communicate to the MCS. By setting TALLY[0] to a value before sending a message to the MCS (which may be a dummy message), the Network Controller may inform the MCS of any status changes concerning any of the stations accessed by the REQUEST. The settings for TALLY[0] are:

- 0 LOSS OF DSR detected
- 1 "DLE-EOT" either sent or received
- 2 "DLE-ENQ" received
- 3 "ACK" received
- 4 Message received

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### 5 DIALOUT failed

Cases 0 and 1 inform the MCS that the current station has disconnected and should be removed from the system. Cases 2 and 3 inform the MCS that the current station has established and is entering the RJE system. Case 4 flags the message as a DATA message received from the station. Cases 0 through 3 are dummy stations.

In addition, the RJE/HOST REQUEST has the ability to go into a READ NO-TIMEOUT state when a particular station fails to establish a connection. After 100 attempts to establish a connection, the Network Controller goes into a READ NO-TIMEOUT situation until a user becomes active on that station, if the line is a leased line, otherwise, it is disconnected.

The RJE/HOST REQUEST also contains a mechanism where if a line becomes established and after 100 READS no indication of activity is seen, the line is disconnected. A message received with TOG[3] set turns this mechanism off, while a message received with TOG[4] set or a termination of the connection cause the mechanism to be turned on. LINE(TALLY[5]) is used as the counter for this retry mechanism.

This REQUEST also supports DIALOUT. LINE(TOG[7]) is used to indicate a DIALOUT state. Should DIALOUT fail, a dummy message is queued for the MCS.

LINE(TOG[8]) is used as an indication that a termination request was received from the MCS.

### SYCOMREQ

The SYCOMREQ request is derived from the RJE/HOST request and uses the same basic RJE line discipline. It contains the following extra features:

TALLY[0] now means error information sent to SYCOM

TALLY[6] used to "CONNECT" a virtual (server) terminal (Type=61)

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TALLY[7] used to "DISCONNECT" a virtual (server) terminal  
(Type=61)

Error handling has been improved. This request needs the SYCOMDECL declaration and is designed to run in conjunction only with the SYCOMCTL control.

### RJE3780

NAME: RJE3780RQST

The RJE3780/HANDLER REQUEST section handles the input and output for a Binary-Synchronous line discipline (BISYNC). It is one big case statement, driven by the value of 'LINE(TALLY[0])'. In this section responses to the Host are built and sent, data is packed and sent to the Host, and line errors are handled. The REQUEST is designed to relieve the MCS of the ordinary processing of messages (except for data), line bidding, and error handling as it pertains to auto-dialout and line control. The REQUEST is designed to accept input from one or two stations. For a complete description of how this REQUEST interfaces with the RJE3780 package, refer to the RJE3780 Product Specification, #2219 0391. This REQUEST requires the RJE3780CLS DECLARATION section.

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## CONTROLS

The purpose of a CONTROL is to assign a station for activity and initiate the proper REQUEST to perform a communication procedure.

### MULTI-POINT CONTROLS

This class of CONTROL can handle a line with more than one station attached.

### POLL/SELECT

NAME: POLSELCTL

The basic purpose of this CONTROL is to initiate the appropriate input (POLL) or output (SELECT) REQUEST after having assigned a station to the line that is READY to communicate. LINE (TOG(1)) is set false indicating that AUTOPOLL is not being initiated.

Upon completion of a previous REQUEST, (LINE(CONTROL KEY) = 0) or upon notification of system reconfiguration, (LINE(CONTROL KEY) = 1) the CONTROL checks each station on the line starting at the next station. If the station is READY, QUEUED, and MYUSE is not INPUT ONLY, the output REQUEST is initiated. If the station is READY, ENABLED, and MYUSE is not OUTPUT ONLY, the input REQUEST is initiated. The failure to find any station on the line whose REQUEST can be initiated causes the line to be put in the IDLE state. LINE (TALLY(1)) is used to determine when all the stations on the line have been checked.

When the line has a READ with NO TIMEOUT pending and a message is QUEUED for the line where there was no prior message in the queue, the CONTROL is entered with LINE (CONTROL KEY) = 2 and the CONTROL cancels the I/O in process. The CONTROL is then re-entered with LINE (CONTROL KEY) = 0.

If the station establishes itself on a switched-line, the CONTROL is entered with LINE (CONTROL KEY) = 3 or LINE (CONTROL KEY) = 5 if

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ACU; the CONTROL sets LINE (TOG[5]) = 1. Upon failure to initiate any REQUEST for the station, if LINE(TOG[5]) = 1 and the line is QUEUED, the line is disconnected; otherwise it is idled.

If a REQUEST performs a TERMINATE OUTPUT(RETURN), the CONTROL is entered with LINE (CONTROL KEY) = 4. The CONTROL performs a CONTINUE which assigns an output message buffer to the line for the same station, if one is queued, and returns to the REQUEST from which the TERMINATE OUTPUT(RETURN) was executed.

LINE(TOG[4]) has been provided for the convenience of the User Program for flagging an "ACU" line. This TOG is not set or reset in the REQUESTs or CONTROLs.

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### AUTOPOLL

NAME: AUTOPOLCTL

The basic purpose of this CONTROL is to initiate the appropriate input (AUTOPOLL) or output (SELECT) REQUEST after having assigned a station to the line that is READY to communicate. LINE (TOG[1]) is set true if the line is to be autopollled and if the AUTOPOLL string has already been created. LINE (TOG[0]) is used to save the contents of LINE (TOG[1]) indicating that the POLL string has already been created when a normal POLL is to be initiated.

Upon completion of a previous REQUEST, (LINE(CONTROL KEY) = 0) or upon notification of system reconfiguration, (LINE(CONTROL KEY) = 1) (which also sets LINE (TOG[0]) and LINE (TOG[1]) false thereby indicating the AUTOPOLL string is to be recreated), the CONTROL determines if the line has any messages QUEUED for any of its stations. If there are messages QUEUED, the CONTROL checks each station on the line starting at the next station. If the station is READY, QUEUED, and MYUSE is not INPUT ONLY, the output REQUEST is initiated. If the station is READY, ENABLED, and MYUSE is not OUTPUT only, LINE (TOG[1]) is saved and set false to indicate no AUTOPOLL, and the input REQUEST is initiated. LINE (TALLY[1]) is used to determine how many stations have been checked.

If there are no messages QUEUED for output on the line and LINE (TOG[1]) is true, AUTOPOLL is initiated. If LINE (TOG[1]) is false, an AUTOPOLL string is created for the line. Each station on the line that is READY, ENABLED, and MYUSE is not OUTPUT ONLY, is put into the AUTOPOLL string until all the stations have been checked, or the AUTOPOLL buffer, defined in the LINE Section, is filled. If at least one station was put into the AUTOPOLL string, LINE (TOG[1]) and LINE (TOG[0]) are set true. This CONTROL allows a station to appear only once in the AUTOPOLL string. If LINE (TOG[1]) is true AUTOPOLL is initiated. If LINE (TOG[1]) is false, and LINE(TOG[5]) is true, the line is disconnected. Otherwise it is put into the IDLE state.

When the line has an AUTOPOLL I/O in process and a message is QUEUED for the line where there was no prior message in the queue, the CONTROL is entered with LINE(CONTROL KEY) = 2 and the

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CONTROL cancels the I/O in process. The CONTROL is then re-entered with LINE(CONTROL KEY) = 0.

If the AUTOPOLL I/O continues in process without any output message being initiated at the terminals for a period of 30 seconds, the Skeletal Network Controller automatically enters the CONTROL with LINE(CONTROL KEY) set to a value of 2. The CONTROL determines that no message is QUEUED and does not cancel the I/O, allowing it to continue as before. The purpose of this automatic WAKE-UP is to allow a CONTROL to cancel an I/O that may continue FOREVER if no terminal or system activity occurs to interrupt it. AUTOPOLL and READ with NO TIMEOUT are two such FOREVER I/O's. See the description for the AUTODYNCTL CONTROL for an implementation of this feature.

If the station establishes itself on a switched-line, the CONTROL is entered with LINE(CONTROL KEY) = 3 or with LINE(CONTROL KEY) = 5 if the line is Automatic Dial-Up (ACU) at which time the CONTROL sets LINE (TOG[5]) = 1. Upon failure to initiate any REQUEST for the station, if LINE(TOG[5]) = 1 and the line is QUEUED, the line automatically disconnects. Otherwise, it is put into the IDLE state.

If a REQUEST performs a TERMINATE OUTPUT(RETURN), the CONTROL is entered with LINE(CONTROL KEY) = 4. The CONTROL performs a CONTINUE which lets an output message buffer be assigned to the line for the same station, if one is QUEUED, and returns to the REQUEST from which the TERMINATE OUTPUT(RETURN) was executed.

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## DYNAMIC

NAME: AUTODYNCTL

This special CONTROL is intended to provide dynamic re-configuration of the AUTOPULL POLL list when stations defined on a line are not responding or when any of a defined set of stations may become attached to any of the lines of a group as in switched operation on dial-in lines.

The CONTROL performs four basic functions:

- a. Determine the responding stations on a line by single polling each station.
- b. Build a POLL list containing only the responding stations and initiate AUTOPOLL for the line.
- c. If any station was found not responding, to initiate and maintain a three (3) minute timer which performs steps 1 and 2 again.
- d. Initiate output to a station as necessary if the station is READY and VALID ( TALLY[LINE] = 0 or 4).

If no stations are found ENABLED then the CONTROL resets TALLY[LINE] to 0.

This CONTROL has several enhancements over the AUTOPOLL CONTROL:

- a. Stations which are not ONLINE (powered off), are deleted from the autopoll POLL string.
- b. If output cannot be sent (terminal in LOCAL or XMT), all terminals are AUTOPULLED once before going back and SELECTing again.
- c. The first time output is attempted, a FASTSELECT is used. If the FASTSELECT fails, a normal SELECT is used to conserve line time.
- d. This CONTROL is designed to handle line groups and switched-lines.

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- e. If a station has output and it is powered off or taken off line, no more attempts are made to send output to it until can be successfully POLLED again.

This CONTROL does an automatic reconfiguration every three (3) minutes. For larger configurations, the user should increase this interval to avoid continuous reconfigurations. Reconfiguration is accomplished by placing perviously dead stations into the POLL string. In order to avoid interfering with active stations, the dead stations are put in at the end of the POLL string. These stations are removed from the POLL string if they TIMEOUT again.

Once a station is active, it is not removed from the POLL string unless it TIMES OUT three (3) consecutive times, or is made NOT READY.

The AUTOPOLL buffer declared in the LINE Section of the Network Controller must be five (5) times the number of stations on the line plus five (5).

If the Boolean LINE(QUEUED) is set and no stations are responding, and the line was established as switched, it is disconnected, otherwise all stations are again single polled to determine if any stations have come on line or changed status to allow LINE(QUEUED) to become false. Exception on output is reported to the User Program when RETRY is exhausted.

See the comments at the head of the Dynamic REQUESTS and CONTROL POLTCTDDYN, SELTCTDDYN, and AUTODYNCTL for a full explanation of the purpose of each variable used by this CONTROL.

Because TALLY is indexed by line (TALLY[LINE]) MAX TALLY must be set in the DECLARATION section. If the REQUEST is not modified further, MAX TALLY should be set to the number of lines in the network. E.g.; MAX TALLY [5] for five lines.

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NAME: CANDECTL

The CANDE control is intended to service stations with terminals of type TD or TC series. The CONTROL and the REQUESTs perform similarly to the standard CONTROL AUTOPOLCTL with the following exceptions.

- a. If five consecutive outputs, by default, are sent to a station and more outputs to that station are still QUEUED, output activity is temporarily interrupted, and AUTOPOLL is initiated in order for input to be handled. CANDE queues only one screen-full of messages to a terminal at a time; CANDE can be informed of a terminal's screen size in number of 80-character lines. Typically only one message is sent in response to one input from the terminal.
- b. The AUTOPOLL POLL string containing the station addresses is maintained dynamically as explained in the comments of the CANDECTL listing. Basically, only those stations that are ON-LINE (responding with an EOT or SOH when polled) are kept in the POLL string. Every fixed time period (1 minute), one station previously considered not ON-LINE is single-polled once in order to redetermine its ON-LINE/OFF-LINE status. If none of the stations respond as being ON-LINE, each one is single-polled (rather than autopoll) in turn until all have been tried once. If none were found online then the line is idled for 2 minutes, by default.

AUTOPOLL is initiated with a TIMER value depending on the current condition of the line. This TIMER value is set as follows :

1. One (1) second if output is queued for any station on the line; else
  2. Two (2) minutes if input from any station is disabled; else
  3. Infinite, but interruptible.
- c. If no output is queued for a line, and all stations are NOT READY or input is disabled, each station is single-polled once then the line is idled for two (2) minutes after which the CONTROL is re-entered.

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NAME: CANDAUDCTL

This control is the same as "CANDETDCtrl" with the addition of audit statements.

### POINT-TO-POINT CONTROLS

This class of CONTROL handles a line with more than one station attached except in the case of the CONVERCTL CONTROL which may only have one station defined per line.

### CONVENTION

NAME: PTPTCONCTL

The basic purpose of this CONTROL is to initiate the appropriate input or output REQUEST to a station on the line. Currently, there may be only one station assigned to a line using this CONTROL if REQUESTs TCTUPTXMIT, TCTUPTRCV, or TCTUPTIO are utilized. However, several stations may be concatenated on a single line if REQUESTs TDPTXMIT, TDPTRCV, or TDBATCHXMT are used.

Upon completion of a previous REQUEST (LINE (CONTROL KEY) = 0) or notification of system reconfiguration (LINE (CONTROL KEY) = 1), the CONTROL checks the station on the line. If the station is READY, QUEUED, and MYUSE is not INPUT ONLY, the output REQUEST is initiated. If the station is READY, ENABLED, and MYUSE is not OUTPUT ONLY, the input REQUEST is initiated. The failure to initiate either REQUEST for the station causes the line to be put in the IDLE state.

When the line has a READ with NO TIMEOUT pending (input PT-TO-PT contention REQUEST) and a message is QUEUED for the line where there was no prior message in the queue, the CONTROL is entered with LINE (CONTROL KEY) = 2 and the CONTROL cancels the I/O in process. The CONTROL is then re-entered with LINE (CONTROL KEY) = 0.

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If the station establishes itself on a switched-line, the CONTROL is entered with LINE (CONTROL KEY) = 3 or LINE (CONTROL KEY) = 5 if the line is Automatic Dial-Up (ACU) at which time the CONTROL sets LINE (TOG[5]) = 1. Upon failure to initiate any REQUEST for the station, if LINE (TOG[5]) = 1 and the line is QUEUED, the line automatically disconnects. Otherwise, the line is put into the IDLE state.

If a REQUEST performs a TERMINATE OUTPUT (RETURN), the CONTROL is entered with LINE (CONTROL KEY) = 4. The CONTROL performs a CONTINUE which assigns an output message buffer to the line for the station, if one is QUEUED, and returns to the REQUEST from which the TERMINATE OUTPUT (RETURN) was executed.

### CONVERSATIONAL

NAME: CONVERCTL

The basic purpose of this CONTROL is to initiate the appropriate input or output REQUEST to the station on the line. There may be only one station assigned to a line using this CONTROL since this is a POINT-TO-POINT conversational line CONTROL.

Upon completion of a previous REQUEST, (LINE (CONTROL KEY) = 0), or notification of system reconfiguration, (LINE (CONTROL KEY) = 1), this CONTROL checks the station on the line. If the station is READY, ENABLED, and MYUSE is INPUT/OUTPUT, the CONTROL obtains an input/output buffer and initiates the REQUEST. If the station is QUEUED but not ENABLED, the CONTROL initiates output only.

If the station establishes itself on a switched-line, the CONTROL is entered with LINE (CONTROL KEY) = 3 or LINE (CONTROL KEY) = 5 if the line is Automatic Dial-Up (ACU) at which time the CONTROL sets (TOG[5]) = 1. Upon failure to initiate any REQUEST for the station, if LINE (TOG[5]) = 1 and the line is QUEUED, the line automatically disconnects. Otherwise, the line is put into the IDLE state.

If a REQUEST performs a TERMINATE OUTPUT (RETURN), the CONTROL is entered with LINE (CONTROL KEY) = 4. The CONTROL performs a CONTINUE which assigns an output message buffer to the line for the station, if one is QUEUED, and returns to the REQUEST from

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which the TERMINATE OUTPUT(RETURN) was executed.

### REMOTE JOB ENTRY(RJE)

NAME: RJECTL

This special RJE CONTROL operates in a manner similar to the CONVERCTL CONTROL except that it may be used to handle a line which has more than one station attached.

Four (4) stations must be declared for each line in the Network Controller, and only one (1) line group is permitted. LINE(TALLY[6]), LINE(TALLY[7]), and LINE(TALLY[8]) are used by this CONTROL to govern the stations on the line or the stations on each line within the line group.

Only the special input/output REQUEST named RJEHOST are recommended for use with this CONTROL.

See the comments at the head of the REQUESTs RJE and RJEHOST for a complete description of the purpose of each variable used by this CONTROL.

### SYCOM

NAME: SYCOMCTL

This SYCOM control is based on the RJE/HOST control with an extra interface to SYCOMREQ to improve error handling. The line group facility has been deleted.

This control requires the SYCOMDECL declaration and is designed for use only with the SYCOMREQ request.

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RJE3780

NAME: RJE3780CNTRL

The RJE3780/HANDLER CONTROL section is designed to drive the RJE3780RQST input/output REQUEST. The CONTROL begins with a case statement which is driven by the value of 'LINE(CONTROL KEY)'. In this case statement, TOGGLES and TALLYS are preset so that the proper actions will be executed in the request section. For a complete description of how this CONTROL interfaces with the RJE3780 package, refer to the RJE3780 Product Specification, #2219 0391. This CONTROL requires the RJE3780DCLS DECLARATION section.

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ASSOCIATIVE MATRICES

REQUEST VS. CONTROL

C O N T R O L

	1	2	3	4	5	6	7	8	9	10
POLLCTD	X	X								
POLTCTDDYN						X				
SELECTCTD	X	X								
SELTCTDDYN						X				
FASTSELCTD	X	X								
R TCTUPTXMIT			X							
E TCTUPTRCV			X							
Q TCTUPTIO				X						
U TDPTXMIT			X							
E TDPTRCV			X							
S TDBATCHXMT			X							
T WRITETTY			X							
READTTY			X							

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REQUEST VS. CONTROL (Cont.)

C O N T R O L

	1	2	3	4	5	6	7	8	9	10
R					X					
E							X		X	
Q							X		X	
U				X						
E	X	X								
S								X		
T							X		X	
							X		X	
										X

X = RECOMMENDED USAGE

CONTROLS

- 1 = POLSELCTL
- 2 = AUTOPOLCTL
- 3 = PTPTCONCTL
- 4 = CONVERCTL
- 5 = RJECTL
- 6 = AUTODYNCTL
- 7 = CANDETCTL
- 8 = RJE3780CNTRL
- 9 = CANDAUDCTL
- 10 = SYCOMCTL

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REQUEST VS. TERMINALS CURRENTLY SUPPORTED

T E R M I N A L S

		1	2	3	4	5	6	7	8	9	10
	POLLCTD	X	X	X	X	X	X	X			
	POLTCTDDYN	X	X	X	X	X	X	X			
	SELECTCTD	X	X	X	X	X	X	X			
R	SELTCTDDYN	X	X	X	X	X	X	X			
E	FASTSELTCD	X	X	X	X	X	X	X			
Q	TCTUPTXMIT	X		X							
U	TCTUPTRCV	X		X							
E	TCTUPTIO	X		X							
S	TDPTXMIT					X					
T	TDPTRCV					X					
	TDBATCHKMT	X	X								
	WRITETTY								X		
	READTTY								X		

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REQUEST VS. TERMINALS CURRENTLY SUPPORTED (Cont.)

T E R M I N A L S

		1	2	3	4	5	6	7	8	9	10
	RJEHOST									X	
R	CANDEPOLTD		X			X					
E	CANDESELTD		X			X					
Q	CANDEFSLTD		X			X					
U	CANDEIOTTY								X		
E	DIAGTCTDIO	X	X	X	X	X	X	X			
S	IRJE3780CNTRL									X	
T	CANDAUDPOL							X		X	
	CANDAUDEL							X		X	
	CANDAUDFSL							X		X	
	SYCOMREQ									X	X

X = RECOMMENDED USAGE

TERMINALS

- 1 = TC500, TC700
- 2 = TC3500, TC4000, TC5000
- 3 = TU500
- 4 = TU700
- 5 = TD700, TD800, TD820, TD830
- 6 = TT142, TT602
- 7 = S1200, S.700
- 8 = TELETYPE, REDACTOR I (TTY)
- 9 = REMOTE APPLICATIONS, SYSTEM TO SYSTEM
- 10 = REMOTE APPLICATIONS, SYSTEM TO SYSTEM (VIRTUAL STATIONS)

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### APPENDIX A

To obtain a listing of all the DECLARATIONS, REQUESTS, and CONTROLS contained within NDL/LIBRARY, the user should employ the following deck.

```
$ CONTROL
$ LIBINFO
? END
```

The output of this deck will be 3 listings: a list of compiler error messages which should be ignored, a list of program statistics which also should be ignored, and the list of library statistics shown below.

#### LIBRARY STATISTICS:

##### EXTERNAL FILE NAME:

```
PACK ID          =
MULTI-FILE ID   =  NDL
FILE ID         =  LIBRARY
```

CREATION DATE: 6/1/79

LAST ACCESS: 8/23/79

#### DIRECTORY: (CONTAINS 41 ACTIVE ENTRIES)

NO.	SUB_FILE_NAME	LENGTH	TYPE
=====			
1	COPYRIGHT	27	DECLARATION
2	RJE3780DCL	33	DECLARATION
3	CANDEDEC	22	DECLARATION
4	CANDAUDDEC	26	DECLARATION
5	SYCOMDECL	208	DECLARATION
6	COBOL74DEC	43	DECLARATION
7	POLLTCTD	128	REQUEST
8	POLTCTDDYN	213	REQUEST
9	SELECTCTD	101	REQUEST
10	SELTCTDDYN	153	REQUEST
11	FASTSELTCO	77	REQUEST
12	TCTUPTXMIT	93	REQUEST
13	TCTUPTRCV	110	REQUEST
14	TCTUPTIO	196	REQUEST
15	TDPTXMIT	121	REQUEST
16	TDPTRCV	137	REQUEST
17	TDBATCHXMT	102	REQUEST
18	WRITETTY	55	REQUEST

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## D I R E C T O R Y : (CONT.)

NO.	SUB_FILE_NAME	LENGTH	TYPE
19	READTTY	70	REQUEST
20	RJEHOST	477	REQUEST
21	SYCOMREQ	336	REQUEST
22	CANDEPOLTD	308	REQUEST
23	CANDEFSLTD	260	REQUEST
24	CANDESELTD	262	REQUEST
25	CANDAUDPOL	331	REQUEST
26	CANDAUDFSL	277	REQUEST
27	CANDAUDSEL	279	REQUEST
28	CANDEIOTTY	146	REQUEST
29	DIAGTCTDIO	240	REQUEST
30	RJE378ORQS	618	REQUEST
31	COBOL74SEL	138	REQUEST
32	POLSELCTL	116	CONTROL
33	AUTOPOLCTL	150	CONTROL
34	AUTODYNCTL	367	CONTROL
35	PTPTCONCTL	39	CONTROL
36	CONVERCTL	73	CONTROL
37	RJECTL	83	CONTROL
38	SYCOMCTL	103	CONTROL
39	CANDETDCTL	514	CONTROL
40	CANDAUDCTL	541	CONTROL
41	RJE378OCNT	75	CONTROL

## PROGRAM STATISTICS:

MEMORY REQUIRED TO RUN: 23893 BITS PLUS MESSAGE-QUEUE SPACE  
 MEMORY REQUIRED FOR NIF TABLES: 329 BITS  
 NUMBER LINES: 0  
 NUMBER STATIONS: 0  
 NUMBER TERMINALS: 0  
 NUMBER FILES: 0  
 NAME STACK SIZE: 1 ENTRIES  
 CONTROL STACK SIZE: 15 ENTRIES  
 PROGRAM POINTER STACK SIZE: 25 ENTRIES  
 EVALUATION STACK SIZE: 20 ENTRIES  
 VALUE STACK SIZE: 17329 BITS  
 PROGRAM STATIC MEMORY: 20369 BITS  
 PROGRAM DYNAMIC MEMORY: 0 BITS

REQUEST PAGE: 10  
 SEGMENT SIZE IN BITS  
 00 0

CONTROL PAGE: 9  
 SEGMENT SIZE IN BITS  
 00 0

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COMPILE STATISTICS:

NUMBER OF ERRORS DETECTED:	6
NUMBER OF WARNINGS:	0
NUMBER OF CARDS SCANNED:	9
NUMBER OF TOKENS SCANNED:	7
ELAPSED TIME	:00:00:09.9
PROCESSOR TIME	:00:00:00.8

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