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.TITLE CZLIA - RSX ONLINE NIE
.IDENT /01.01/
.ENABL LC
.REM †

IDENTIFICATION

PRODUCT CODE: AC-FF94A-MC
PRODUCT NAME: CZLIAAO RSX ONLINE NETWORK INTERCONNECT EXERCISOR
PRODUCT DATE: JUNE 1985
MAINTAINER: MERRIMACK DIAGNOSTIC ENGINEERING
AUTHOR: ADAM KOJNOK

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RSX ONLINE NETWORK INTERCONNECT EXERCISER

USER'S GUIDE

ISSUED BY: Adam J. Kojnok

AC-FF94A-MC

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1.0 INTRODUCTION

The Network Interconnect Exerciser (NIE) provides online diagnostic exerciser for Ethernet networks. The NIE determines node ability on the network and provides the operator with error analysis. Node installation, verification, and problem isolation can be performed using the NIE.

The NIE is device independent. The NIE will run with any Ethernet device that can be accessed using the DLX interface mechanism. Also, the NIE may be run on RSX-11M+, 11M and 11S systems.

NOTE:

The DLX (Direct Line Access) interface was designed to enable user programs to use direct, high-level interface to a physical line protocol, bypassing the higher level layers of DECnet. The RSX DEUNA/DELUA QIO Driver uses this interface to communicate with user programs.

The RSX online NIE may be used in the following configurations:

With DECnet

The NIE runs concurrently with DECnet software. The NIE uses two NI protocol types: loopback and remote console. The NIE interfaces to DECnet via the Direct Line Access (DLX) functionality of DECnet. NIE communicates with the DECnet Ethernet driver via the NX: pseudo device driver.

Without DECnet

The RSX online NIE can be run using the RSX stand alone DEUNA driver. This configuration was provided for systems without DECnet. DECnet may be present, however, the Ethernet device to be used may not be accessed via DECnet. The NIE was developed using the RSX stand alone DEUNA driver which implements the DLX interface used by DECnet.

Node table on disk or in memory

The node table may be built on disk into a temporary file. Using disk, the node table may have up to 1024(10) entries. The maximum size of a memory resident node table is around 70(10) node entries.

2.0 BUILDING THE NIE

NOTE

DEV:[USER-UIC] refers to device and UIC where the files were copied to from the distribution kit.

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2.1 NIE BUILD PARAMETERS

[1,1]NETLIB.MLB

If the network macro library is not present in account [1,1], the DECnet interfaces are not built into the NIE. The absence of this file will define NONETL=0 in prefix file D.MAC. If NONETL is defined, the network related code will not be included.

M\$\$NET

If not defined in [11,10]RSXMC.MAC, the DECnet interfaces are not built into the NIE.

R\$\$11S

If defined in [11,10]RSXMC.MAC, all code concerned with disk storage is conditionalized out.

2.2 PROCEDURE TO BUILD THE NIE

NOTE - The build command file uses the following non-NIE files:

```
SY:[11,10]RSXMC.MAC ; Required RSX macro prefix file!!!
                    M$$NET is in this file when defined
                    R$$11S is in this file when defined
SY:[1,1]NETLIB.MLB ; Not required. If not there no DECnet
                    ; interface code will be generated.
SY:[1,54]RSX11M.STB ; Required to build NIE
```

Magnetic media contains the following files:

```
CZNIA.SEQ           ; NIE documentation file.
NIEBLD.CMD          ; NIE build command file, used to build
                    ; the NIE.
DEUNA.MLB           ; DLX/Ethernet macros (required for both
                    ; NIE and XE: Driver
```

; The following are NIE macro files

```
NIESUP.MAC          ; NIE support task code
NIESUB.MAC          ; NIE task subroutines
NIECMD.MAC          ; NIE task command processing routines
NIEPRS.MAC          ; NIE command parser modules and data
                    ; structures.
```

; The following are XE: (DEUNA/DELUA) Driver files.

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XEDRV.MAC      ; XE: Driver code
XETAB.MAC      ; XE: Driver RSX Database
UNAMC.TSK      ; XE: Driver DEUNA ECO microcode file
LUAMC.TSK      ; XE: Driver DELUA ECO microcode file
```

Building command sequence:

NOTE

```
DEV: for Magtape = MT:
DEV: for DL       = DLx:[3,3]
```

```
>MOU DEV:NIE      ; Mount distributions kit
>PIP /NV=DEV:CZNIA.SEQ ; Copy documentation file
>PIP /NV=DEV:NIEBLD.CMD ; Copy NIE build command file from distro kit
>@NIEBLD          ; Do the build
```

Answer questions asked by build command file.

*** NOTE ***

See APPENDIX A for sample build print out!

2.3 INSTALLING NIE

NIEBLD.CMD will do the installation at the end of the build. However, if the system is re-started, the following must be installed:

```
MCR>INS [USER-UIC]NIE
MCR>INS [USER-UIC]NI1
```

NOTE

The XE: driver must be installed (LOADED) if a non-DECnet system is being used.

3.0 RSX QIO UNA DRIVER BUILD

The following command lines will assemble the driver code and the driver RSX database:

Assemble driver code -

```
[11,24]xedrv,[11,34]xedrv/cr/-sp=[1,1]exemc/ml,dev:[user-uic]d,-
deuna/ml,[11,10]rsxmc/pa:1,dev:[user-uic]xedrv
```

Assemble driver RSX data base -

```
[11,24]xetab,[11,34]xetab/cr/-sp=[1,1]exemc/ml,-
```

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deuna/ml,[11,10]rsxmc/pa:1,dev:[user-uic]xetab

3.1 RSX QIO UNA DRIVER PARAMETERS

The following parameters are to be defined in the sy:[11,10]RSXMC.MAC file. These parameters will be defined in the D.MAC prefix file also. The values for these parameters in the D.MAC file will be set to the default. These parameters will be redefined by their definitions in sy:[11,10]RSXMC.MAC.

NOTE

Normally, there should be no reason to define/redefine these parameters for building the XE Driver! The parameters are presented here for documentation purposes.

The following are default definitions:

U\$NCT=1 ; Number of controller on system
U\$NPC=8. ; Number of ports per controller
U\$NRS=8. ; Number of receive ring entries
U\$NTS=3. ; Number of transmit ring entries

3.2 BUILDING XE: THE DRIVER

The DEV:[USER-UIC]NIEBLD.COM command file will generate DEV:[USER-UIC]XEDRVBLD.COM command file. This file contains the TRB lines to build the XE: driver.

3.3 INSTALLING (LOADING) THE DRIVER

RSX11M-PLUS
MCR>CON SET VEC=vvv CSR=xxxxxx ; Set vector and CSR
MCR>CON ONLINE XEA,XEO: ; Set unit and controller online
MCR>INS UML ; Install DEUNA/DELUA microcode
; .. loader support task

RSX11M
MCR>LOA XE:/PAR=PARTION ; Load driver
MCR>INS UML ; Install DEUNA/DELUA microcode
; .. loader support task

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4.0 NIE COMMANDS

NOTES

Notation in left and right square brackets is optional.

i.e. - M[ESSAGE] /TY[PE]=ASCII<CR>

is equivalent to

M /TY=ASCII<CR>

Also, spelling errors in optional text are ignored.

i.e. - MEZZAGE /TYTE=ASCII<CR>

will be parsed to mean

M /TY=ASCII<CR>

4.1 HELP

A help file showing a summary of NIE commands can be displayed by typing "Help" or "H" in response to the NIE prompt. For example:

NIE>he[lp]

or

NIE>?

4.2 EXITING THE NIE

The Exit command exits the NIE task. There are no switches or qualifiers for the Exit command. The format is:

NIE>e[xit]

4.3 BUILDING A NODE TABLE

The current node table is a data structure which the NIE uses to determine which nodes are available for testing. When the node table is saved on a disk file, it is saved in ASCII format to allow the node table data to be examined off line. In addition, the saved node table disk file includes the logical node names.

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Data in the node table includes the following:

1. Current node physical address.
2. Default node physical (hardware) address.
3. NIE assigned logical node address. Node data can be accessed via the NIE assigned logical address. When the node table is saved in an ASCII text file the logical node addresses are also saved in ASCII format.

As nodes are added to the node table the NIE assigns logical addresses in the sequence n1, n2, n3,....etc. In cases where some nodes have been removed there may be a gap in the logical addresses. In this case when new nodes are added their logical addresses are first assigned from the gap. For example, if the current node table has logical addresses n1, n2, and n5 assigned, new nodes would be assigned logical addresses n3, n4, n6, n7...etc.
4. DECNET address. Phase 4 node addresses have the DECnet address (area.node-number) encoded within the current physical address of the node. The DECnet address is displayed for phase 4 nodes. For non-phase 4 nodes "UNKNOWN" is displayed in place of the DECnet node address.
5. Node device type. (i.e. - DEUNA, DELUA, etc.) In some cases the node device type may not be known.

4.4 BUILD COMMAND

The build command builds the node table by listening to system ID messages sent out by each node in 8 minute intervals.

Command format is:

```
NIE>BU[uild] [/m[in]=xxx]
```

Where the switch /MIN is an optional switch to specify the number of minutes to wait before the build is terminated.

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4.5 SAVING THE CURRENT NODE TABLE

The Save command will save the contents of the current node table. The format is:

NIE>ss[ve]

When a mass storage device is used the node table is saved in [1,2]NIE.TBL file. The file then can be printed or viewed using the editor.

NOTE: With this version of the NIE you cannot specify a file name to be used for the save file. The file name is forced to be sy:[1,2]NIE.TBL.

When not using a mass storage media, the current node table is copied to a secondary buffer. The node table then can be modified without destroying the original node table.

4.6 UNSAVE

The unsave command will restore the contents of the node table. If a disk is used by the NIE, the node table is restored from [1,2]NIE.TBL file. If no disk is used by the NIE, the secondary buffer is copied over to the primary buffer.

NOTE: With this version of the NIE you cannot specify a file name from which to do the unsave (restore) from.
The command format is:

NIE>u[nsave]

4.7 SHOW

The Show command will print the physical addresses of nodes selected for testing and the message parameters to be used (either default or operator input).

The format is:

NIE>show <argument>

i.e. -

NIE>sh[ow] n[odes] ; Will display the node table
NIE>sh[ow] m[essage] ; Will display message parameters

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NIE>sh[ow] c[ounters] ; Will display counter information

There can be three arguments for Show. They are: Nodes, Messages, Counters.

The Show Nodes command lists all nodes in the Node table. The list will include the default physical address, the current physical address and a logical address assigned to the node by the exerciser. The node can be referenced by either of the physical addresses or the logical address. Logical addresses will be assigned as n1, n2, n3,.....etc.

NOTE:

The node table display can be stopped with any character from the keyboard.

The Show Messages command will list the message type, message size and the number of copies to be sent which are currently selected. Also the Print/Noprint status will be displayed indicating the error message output mode.

The Show Counters command will list the counter contents of the host node.

EXAMPLES:

NIE>show message

THE CURRENT MESSAGE PARAMETERS ARE:
TYPE=ASCII , SIZE=292 , COPIES=1, PRINT

NIE>show nodes

CURRENT ADR	DEFAULT ADR	NAME	DECNET	DEVICE
AA-00-04-00-0A-10	AA-00-03-00-00-01	N0	4.10	DEUNA
AA-00-04-00-1B-10	AA-00-03-00-00-02	N1	4.27	DELUA
AA-00-04-00-0B-10	AA-00-03-00-00-03	N2	4.11	DECNA
AA-00-04-00-9C-10	AA-00-03-00-00-04	N3	4.156	DEQNA

NIE>show counters

ETHERNET COUNTER SUMMARY

```

SECONDS SINCE LAST ZEROED      : 13257
PACKETS RECEIVED                : 91847
MULTICAST PACKETS RECEIVED     : 81793
PACKETS RECEIVED IN ERROR (BIT MAP) : 0
DATA BYTES RECEIVED            : 10491573
MULTICAST BYTES RECEIVED       : 9913460
RCVS LOST - INTERNAL BUF ERROR : 46
RCVS LOST - LOCAL BUFFER ERROR : 0
PACKETS TRANSMITTED            : 12601

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MULTICAST PACKETS TRANSMITTED      : 2675
PKTS XMITTED WITH 3+ COLLISION     : 13
PKTS XMITTED WITH 2+ COLLISION     : 9
PKTS XMITTED BUT DEFERRED          : 169
BYTES TRANSMITTED                  : 1131157
MULTICAST BYTES TRANSMITTED        : 406378
TRANSMIT PACKETS ABORTED (BIT MAP) : 0
TRANSMIT PACKETS ABORTED COUNTER   : 0
XMIT COLLISION CHECK FAILURE       : 0

```

4.8 RUN

NOTE

The RUN command performs the specified test on all entries of the node table. This may cause problems on Extended LANs (multiple LANs connected by Bridges). This means that running a test on all nodes in the node table may not verify that the LAN in question has been properly tested. The node table may not even contain all the nodes on the LAN in question.

Also, on large LANs, running tests against all nodes on the network may be prohibitive.

The run command will cause the execution of the test specified by the argument. The results of the RUN command are used to update the Summary log as well as to output error information. The format is:

```
NIE>r[un] <argument>/pass=nm
```

The argument for Run can be either D[irect], P[attern], L[ooppair] or All.

The qualifier Pass=nn will allow the operator to select the number of passes for the particular test selected. If -1 is specified for the passcount the test will run continuously. If no passcount is specified, the passcount defaults to the passcount set up with the Message command.

The following are standard NIE data patterns:

1. ASCII - The ascii data pattern.
2. ONES - A pattern of all binary 1's.
3. ZEROS - A pattern of all binary 0's.
4. 1ALT - A pattern of alternating binary 1's and 0's starting with 1 (1010...).
5. 0ALT - A pattern of alternating binary 0's and 1's starting with 0 (0101...).

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6. CCITT - The ccitt data pattern PDP-11 assembler format.

ASCIDATA:: ;ASCII alphanumeric data pattern

```
.ASCII \ !"#%&'()*+,-./012345\ -
\6789:;<=>?@ABCDEFGHIJ\ -
\KLMNOPQRSTUVWXYZ[abcd\ -
\efghi jklmnopqrstuvwxyz\ -
\zi)0 \
```

CCITTDATA:: ;CCITT 512 bit test pattern

```
.WORD 177603, 157427, 031011, 047321, 163715, 105221
.WORD 143325, 142304, 040041, 014116, 052606, 172334
.WORD 105025, 123754, 111337, 111523, 030030, 145064
.WORD 137642, 143531, 063617, 135075, 066730, 026575
.WORD 052012, 053627, 070071, 151172, 165044, 031605
.WORD 166632, 016741
```

EXAMPLES OF RUN COMMAND OUTPUT:

NIE>run direct

DIRECT LOOP TESTING STARTED

```
PASS 1
TESTING NODES: NIE HOST TO N1 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N2 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N3 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N4 TO NIE HOST -- RESPONSE OK
```

NIE>run looppair

RUN LOOPPAIR STARTED

```
PASS 1
TESTING NODES: NIE HOST TO N1 TO N2 TO N1 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N2 TO N3 TO N2 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N3 TO N4 TO N3 TO NIE HOST -- RESPONSE OK
TESTING NODES: NIE HOST TO N4 TO N1 TO N4 TO NIE HOST -- RESPONSE OK
```

NIE>run pattern

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STARTING ASCII PATTERN TEST

PASS 1

TESTING NODES:	NIE HOST TO N1	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N2	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N3	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N4	TO NIE HOST -- RESPONSE OK

STARTING ONES PATTERN TEST

PASS 1

TESTING NODES:	NIE HOST TO N1	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N2	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N3	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N4	TO NIE HOST -- RESPONSE OK

etc

NIE>run all

PASS 1

TESTING NODES:	NIE HOST TO N1	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N2	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N3	TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N4	TO NIE HOST -- RESPONSE OK

RUN ALL STARTED

PASS 1

TESTING NODE N1	WITH REMAINING TABLE ENTRIES	
TESTING NODES:	NIE HOST TO N1	TO N2 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N2	TO N1 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N1	TO N3 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N3	TO N1 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N1	TO N4 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N4	TO N1 TO NIE HOST -- RESPONSE OK

PASS 1

TESTING NODE N2	WITH REMAINING TABLE ENTRIES	
TESTING NODES:	NIE HOST TO N2	TO N3 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N3	TO N2 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N2	TO N4 TO NIE HOST -- RESPONSE OK
TESTING NODES:	NIE HOST TO N4	TO N2 TO NIE HOST -- RESPONSE OK

PASS 1

TESTING NODE N3	WITH REMAINING TABLE ENTRIES	
TESTING NODES:	NIE HOST TO N3	TO N4 TO NIE HOST -- RESPONSE OK

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TESTING NODES: NIE HOST TO N4 TO N3 TO NIE HOST -- RESPONSE OK

4.9 BOUNCE

The Bounce command allows the operator to select the path for sending a packet from the NIE host, through the NI then back to the host. The nodes identified in the command will be sequentially placed into the data field of the packet with the forward command. The nodes may be specified by physical or logical addresses. The NIE host node should not be included in the node list for the Bounce command. The results of the BOUNCE command have no effect on the Summary log. The format is:

NIE>bo[unce] addr1,addr2,...,addrn

The limit on the number of nodes to which the packet can be forwarded is related to the remaining size of the data field. This command is useful for testing across repeaters or quickly testing endnodes.

4.10 MESSAGE

The Message command allows the operator to change the default parameters of message type, message size, and message number. The Format is:

NIE>m[essage] /ty[pe]=ascii/s[ize]=n/c[opies]=n

The message size will be variable, between 46 and 1500 bytes. Message size is defined as the size of the packet data field and excludes the source, destination, packet type and CRC fields.

The message copies is the number of times the message is to be transmitted and is a positive integer. A -1 indicates that packets are to be looped continuously. Default is 1.

4.11 NODES

The Nodes command is used to allow the operator to enter nodes for testing into the current node table. The format is:

NIE>nodes addr1,addr2,...,addrn

The addr argument is the physical address of the node on the NI. The NIE will assign a logical address for each entry in the current node table. Duplicate nodes may be added in this manner although the NIE assigned

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logical addresses will always be unique.

4.12 PRINT/NOPRINT

The PRINT command causes all errors to generate error messages which are output to the operator. If the NOPRINT command is issued error reporting stops after the first five errors. In both cases the Summary log will continue to be updated. The PRINT and NOPRINT commands have no arguments and the default is PRINT. The command stays in effect until changed by the operator. The print status is displayed via the SHOW MESSAGE command.

4.13 NOHOE/HOE

i.e. -

NIE>noh[oe] ; Do not halt on error

or

NIE>hoe ; Halt on error (DEFAULT)

Halt on Error (HOE) causes the current RUN to halt when an error is encountered inspite the pass count. The NO Halt on Error will cause the run to run to completion inspite of errors.

4.14 SUMMARY

The Summary command prints the summary message of conditions and errors as a result of testing. Summary information is obtained by typing Summary when the NIE is running. There are no switches or qualifiers for the summary command.

NIE>su[mmary]

4.15 CLEAR

The Clear command will have three arguments, node, message and summary.

The format is:

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NIE>c[lear] <argument>

The Clear Node/Addr will remove a node from the node table. The node may be specified by either its physical or logical address. OPTIONALLY some implementations may allow a list of physical and logical addresses to be specified.

The "C[lear] N[ode]/A[ll]" will clear the entire node table.

The "C[lear] M[essage]" will reset the message parameters to the default state.

The "C[lear] Su[mmary]" command will clear the node summary table.

4.16 IDENTIFY

The Identify command will perform a request ID to the physical or logical address included in the command line. The resulting data will then be displayed.

The format is:

NIE>i[dentify] <address>

EXAMPLE:

NIE>identify 00-04-00-00-00-bc

NODE CURRENT ADDRESS: 00-04-00-00-00-BC
NODE DEFAULT ADDRESS: 00-00-AB-00-00-0C
RECEIPT NUMBER: A045
MAINTENANCE VERSION: 03
ECO: 00
USER ECO: 00
FUNCTION VALUE 1: 05
FUNCTION VALUE 2: 00
DEVICE: 01

OR, using a logical node name -

NIE>identify N5

NODE CURRENT ADDRESS: 00-04-00-00-00-BC
NODE DEFAULT ADDRESS: 00-00-AB-00-00-0C
RECEIPT NUMBER: A045
MAINTENANCE VERSION: 03
ECO: 00
USER ECO: 00
FUNCTION VALUE 1: 05

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FUNCTION VALUE 2: 00
DEVICE: 01

4.17 SUMMARY

A log of events is maintained during RUN command processing. These statistics can be displayed with the SUMMARY command.

NIE>su[mmary]

NODE	RCV NOT COMPLETED	RCV COMPLETED	LENGTH ERRORS	COMPARE ERRORS	BYTES COMPARED	NUMBER BYTES TRANSFERED
00-04-00-00-00-10	0	10	1	1	2000	2000
00-04-00-00-00-11	0	10	1	1	2000	2000
00-04-00-00-00-12	0	10	1	1	2000	2000
00-04-00-00-00-13	0	10	1	1	2000	2000

5.0 ERROR MESSAGES

COMMAND OR SWITCH NOT IMPLEMENTED

Command or switch is an optional NIE function. However, this implementation does not support the command.

COMPARE ERROR - BYTE EXPECTED = XXX, BYTE RECEIVED = YYY

This error is displayed when the data sent in a loop message does not match the data received in the response message.

INVALID COMMAND

Invalid or syntactically incorrect command given.

INVALID COUNTER DATA

SHOW COUNTERS error message when running under DECnet. The format of the counter data received from DECnet is incorrect. Internal program error.

INVALID DISK NAME

The has tried to accessed the specified disk. The disk does not exist on the current system. Enter correct device name.

INVALID ETHERNET DEVICE NAME

NX: and XE: are the only Ethernet devices possible with this version of the NIE. NX: requires DECnet present and running. XE: device uses the stand alone RSX QIO DEUNA/DELUA Driver. You must use one of these Ethernet devices.

INVALID HEX CHARACTER

Character specified is not a Hex digit.

INVALID MESSAGE SIZE

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Maximum message size on a non-DECnet system is 1498(10). Maximum message size on a DECnet system is the same as that used by DECnet.

INVALID MESSAGE TYPE

Message type specified is not valid.

INVALID NODE ADDRESS

Node address as specified is invalid. Node address specified must be a hex string or a logical node number.
i.e. - AA-00-00-00-00-02 or Nxxx (where, Nxxx is logical node number assigned by NIE)

INVALID OPTION

Option specified is invalid.

INVALID PASS NUMBER

The pass switch specified with one of the RUN command is invalid. Max pass is 100.

INVALID PROGRAM PARAMETER - NOT ENOUGH BUFFERS

The number of receive buffers is a hard wired program parameter. This message is given if this parameter is incorrect.

INVALID PROGRAM PARAMETER - INVALID BUFFER SIZE

If no mass storage media is being used, the minimum buffer size is 514 bytes (disk buffer size plus link word). Physical buffer size is hard wired into the program. This should not normally be seen.

NIE EXITING

Just what it says.

???? NODE ENTRIES ADDED TO NODE TABLE

UNSAVE indicates the number of node entries added to the node table.

NODE NOT FOUND

Node number specified (logical or hex) was not found in the node table. The command requires a node address which is in the node table.

NODE TABLE EMPTY

A command was given that requires that the Node Table be not empty. No further action is taken.

NODE TABLE FULL

Indicates the NIE was unable to add an entry to the node table. i.e. - BUILD, UNSAVE, or adding new entries to the node table (NODE...).

NO NODES SPECIFIED

Command requires a node address to be specified. (i.e. CLEAR NODE/"node")

NUMBER OF COPIES INVALID

Number of copies specified is not valid. Currently Max of copies is set at 10,000.

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NOT ENOUGH NODES IN NODE TABLE FOR "LOOPPAIR" OR "RUN ALL" COMMANDS
There must be at least 2 node entries in the nodetable to RUN LOOPPAIR or RUN ALL commands.

NOT ENOUGH RECEIVE BUFFERS AVAILABLE
Internal program error. The NIE has lost track of it's receive buffers.

OPEN ERROR ON NIE SAVE FILE
The user attempted to do A SAVE command but NIE was unable to create a save file.

RESPONSE OK
This message indicates that the response expected by the NIE was received by the NIE and that the test data returned was verified to be correct.

PROGRAM ERROR - NO BUFFERS AVAILABLE
This message should not be seen during normal operation. The NIE does some internal buffer management for send and receive messages. The buffer manager is out of buffers and the NIE is unable to continue the requested operation.

READ COUNTERS REQUEST TO DECNET FAILED
Read counters request to DECnet failed. This is an internal error for SHOW COUNTERS request.

RECEIVE DECNET COUNTERS FAILED
Receiving DECnet counters failed. This is an internal error for SHOW COUNTERS request.

SET CHARACTERISTICS FAILED
This message indicates that the set characteristics QIO has been rejected. This would occur if two NIEs were to run on the same system and each would try to select the same protocol/address pairs.

If only one NIE is being run, then this error is an internal program error.

TEXT NOT DEFINED - COMMAND IGNORED
MESSAGE /TYPE=TEXT was given before defining the text. Do a MESSAGE /TEXT=xyz (xyz is a string of ascii characters) to define the text string before issuing MESSAGE /TYPE=TEXT command.

TIME OUT - REMOTE NODE NOT RESPONDING
This message is displayed when the NIE wait time expires while waiting for a response from a remote node. All the connectivity commands will result in this message if the remote node being tested is not responding.

During a RUN command execution, this message indicates that the node(s) being tested are displayed in the message on the previous line.

TRANSMIT ERROR - COMMAND TERMINATED
This error message only indicates that there has been an error when the

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NIE has attempted to transmit a message. It does not indicate what the error was. Transmission errors are caused by some hardware malfunctioning. When running under DECnet an error log message on the console may indicate what the error was.

UNABLE TO OBTAIN LOCAL ADDRESS FROM ETHERNET DEVICE DRIVER

This message may be received in a non-DECnet environment only. At initialize time NIE tries to read the current physical address of the Ethernet device. This is needed for source address determination. The source address is used in MOP messages to specify return address of responses. This is a driver/system error. Should not normally occur!

UNABLE TO OPEN ETHERNET PORT

This message indicates that the RSX QIO Driver is not present or that (if running with DECnet) DECnet is not up and running. The error may also indicate that the Ethernet device cannot be initialized.

UNABLE TO OPEN SAVED NODE TABLE FILE

UNSAVE command is unable to open saved node table file.

UNABLE TO READ COUNTERS FROM DEVICE

NIE was unable to read counters from non-DECnet driver. This is an internal program error.

UNABLE TO READ SAVED NODE TABLE FILE

UNSAVE command is unable to read saved node table file.

UNABLE TO READ WORK FILE

If the user specified a disk to be used at initialize time, NIE will create a temporary (work file) file on that disk for it's node table. An error while trying to read this disk will produce the above message.

UNABLE TO TALK TO DECNET

This message can occur while doing a SHOW COUNTERS command when running under DECnet. The NIE is trying to create a Network Data Queue and fails. This may be caused by system resources not available or DECnet is going down.

6.0 COUNTERS INTERPRETATION

DELUA/DEUNA Counter Specification:

The counter values are unsigned integers. Counters latch at their maximum values to indicate overflow.

Seconds Since Last Zeroed -

16 bits for the number of seconds since the counters were last zeroed.

Packets Received -

32 bits for the total number of datagrams received error free.

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Multicast Packets Received -
32 bits for the total number of multicast datagrams received error free.

Packets Received with Error - Bitmap -
1. Bit <00> - CRC. Block Check Error - A datagram failed the CRC check.
2. Bit <01> - FRAM. Framing Error - A datagram failed the CRC check and did not contain an integral multiple of 8 bits.
3. Bit <02> - MLEN. Message Length Error - A datagram was larger than 1518 bytes.
4. Bits <15:03> = 0.

Packets Received with Error -
16 bits for the total number of datagrams received with one or more errors logged in the bitmap. Includes only datagrams that passed destination address comparison.

Data Bytes Received -
32 bits for the total number of data bytes received error free, exclusive of data link protocol overhead.

Multicast Bytes Received -
32 bits for the total number of multicast data bytes received error free, exclusive of data link protocol overhead.

Receive Packet Lost -
Internal Buffer Error - 16 bits for the total number of times there was a discard of an incoming packet due to lack of internal buffer space. Incoming packets must be error free to be counted.

Receive Packet Lost -
Local Buffer Error - 16 bits for the total number of times there was a problem with a receive ring data buffer. This counter is incremented on one of more of the following occurrences.

1. Buffer Unavailable - A datagram was lost because there was no available buffer on the receive ring.
2. Buffer too Small - A datagram was truncated because it was larger than the available buffer space on the receive ring.

Packets Transmitted - 32 bits for the total number of datagrams successfully transmitted, including transmissions in which the collision test signal failed to assert.

Multicast Packets Transmitted -
32 bits for the total number of multicast datagrams successfully transmitted, including transmissions in which the collision test signal failed to assert.

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Packets Transmitted -

3 Attempts - 32 bits for the total number of datagrams successfully transmitted on three or more attempts, including transmissions in which the collision test signal failed to assert.

Packets Transmitted -

2 Attempts - 32 bits for the total number of datagrams successfully transmitted on two attempts, including transmissions in which the collision test signal failed to assert.

Packets Transmitted -

Deferred - 32 bits for the total number of datagrams successfully transmitted on the first attempt after deferring, including transmissions in which the collision test signal failed to assert.

Data Bytes Transmitted -

32 bits for the total number of data bytes successfully transmitted, exclusive of data link protocol overhead and not counting data link generated retransmissions, but including transmissions in which the collision test signal failed to assert.

Multicast Bytes Transmitted -

32 bits for the total number of multicast data bytes successfully transmitted, exclusive of data link protocol overhead and not counting DELUA generated retransmissions, but including transmissions in which the collision test signal failed to assert.

Transmit Packets Aborted - Bitmap -

1. Bit <00> - RTRY. Excessive Collisions - Retry error. 16 unsuccessful transmission attempts.
2. Bit <01> - LCAR. Loss of Carrier - Retry error (16 unsuccessful transmission attempts), loss of carrier flag, and non-zero TDR value on last attempt.
3. Bit <02> - 0.
4. Bit <03> - 0.
5. Bit <04> - MLEN. Data Block too Long - The DELUA aborted the transmission process because the datagram exceeded the maximum packet size.
6. Bit <05> - LCOL. Remote Failure to defer - Late collision on the last transmission attempt.
7. Bits <15:06> = 0.

Transmit Packets Aborted -

16 bits for the total number of datagrams that were aborted during transmission for one or more of the bitmapped errors.

Transmit Collision Detect Failure -

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16 bits for the total number of times the collision test signal failed to assert following an apparently successful transmission.

DELUA ONLY COUNTERS

PORT DRIVER ERROR -

16 bits for the total number of times the Port Driver attempts to issue another Port/Ancillary command while one is still being processed.

BABBLE COUNTER -

16 bits counter for the total number of times the LANCE reported the babble condition on the channel.

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APPENDIX A
SAMPLE NIE BUILD OUTPUT

```

>MOU MTO:NIE/DENS=1600 ; Mount mag tape kit
>PIP /NV=MTO:CZNIA.SEQ ; Copy documentation file to you area
>PRINT CZNIA.SEQ ; Print doc file for your information
>PIP /NV=MTO:NIEBLD.CMD ; Copy NIE build file to your area
>@NIEBLD
>
> ;!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
> ; NOTE:
> ; ! This command file must be run from a privileged account as it needs
> ; ! to copy some files to the SY:[1,1] area.
> ; !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
>
> ; The format for the input device and UIC is DEV:[XXX,YYY]. The command
> ; file does not do extensive syntax checking. Therefore, if specified, the
> ; format of the device-UIC string must be correct.
>
>* Input device and UIC of source files [D=DR0:[6,6]] [S]: mt:
>
> ; The format for the destination device and UIC is DEV:[XXX,YYY]. The command
> ; file does not do extensive syntax checking. Therefore, if specified, the
> ; format of the device-UIC string must be correct.
>
>* Output device and destination UIC [D=DR0:[6,6]] [S]: <cr>
>PIP DR0:[6,6]/NV=MT:NIESUP.MAC
>PIP DR0:[6,6]/NV=MT:NIESUB.MAC
>PIP DR0:[6,6]/NV=MT:NIECMD.MAC
>PIP DR0:[6,6]/NV=MT:NIEPRS.MAC
>PIP SY:[1,1]/NV=MT:DEUNA.MLB
>PIP /NV=MT:DEUNA.MLB
>INS $MAC
>INS $TKB
>INS $CRF
>MAC $DR0:[6,6]NIEASH
>TKB $DR0:[6,6]NIETKB.CMD
>REM NIE
>REM NI1
>INS DR0:[6,6]NIE
>INS DR0:[6,6]NI1

```

SAMPLE NIE BUILD OUTPUT

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>* Do you want to build the DEUNA/DELUA driver?
>PIP SY:[1,1]/NV-MTO:UNAMC.TSK
>PIP DRO:[6,6]/NV-MTO:UNAMC.TSK
>PIP SY:[1,1]/NV-MTO:LUAMC.TSK
>PIP DRO:[6,6]/NV-MTO:LUAMC.TSK
>PIP DRO:[6,6]/NV-MTO:XEDRV.MAC
>PIP DRO:[6,6]/NV-MTO:XETAB.MAC
>PIP DRO:[6,6]/NV-MTO:UML.MAC
>MAC @DRO:[6,6]XEDRVASM.COMD
>TKB @DRO:[6,6]XEDRVBLD.COMD
>;
>; We have completed building the driver and the ECO microcode loader
>; support task.
>;
>; *** NOTE ***
>; If DECnet is running and is using your DEUNA or DELUA device then you
>; must not try to LOAD the XE: (DEUNA/DELUA) driver as the device Vector
>; and RSX Device Control Block are already taken and this will cause an
>; error.
>;
>; However, if DECnet is not running and you wish to use the the RSX QIO
>; DEUNA/DELUA driver (XE: Driver) then you can have this command file
>; load it for you. at this time.
>;
>* Do you want to LOAD the XE: (DEUNA/DELUA) driver? Y
>REM UML...

; RSX-11M

>LOAD XE:/PAR=GEN/HIGH
>INS DRO:[6,6]UML

; RSX-11M-PLUS

>INS $CON
>LOAD XE:/PAR=GEN/HIGH
>CON SET XEA VEC=120 CSR=174510
>CON ONLINE XEA,XEO:
>INS DRO:[6,6]UML

>@ <EOF>
†
.END

```

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CZNIA - RSX ONLINE NIE MACRO M1200 10-JUL-85 14:24 PAGE 26-1
SYMBOL TABLE

Page 27

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000000 001
ERRORS DETECTED: 0

VIRTUAL MEMORY USED: 29 WORDS (1 PAGES)
DYNAMIC MEMORY: 20324 WORDS (78 PAGES)
ELAPSED TIME: 00:00:17
.CZNIA.SEQ/-SP=CZNIA