DEUNA

DEUNA RSX NI EXER
CZNIAA0

AH-FF95A-MC
1 OF 1   OCT 1985
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 1          .TITLE  CZNIA  - RSX ONLINE NIE
 2          .IDENT  /01.01/
 3          .ENABL  LC
 4          .REM +
 5
 6          IDENTIFICATION
 7          ---------- ---
 8
 9   PRODUCT CODE:   AC-FF94A-MC
10
11   PRODUCT NAME:   CZNIAAO  RSX ONLINE NETWORK INTERCONNECT EXERCISOR
12
13   PRODUCT DATE:   JUNE 1985
14
15   MAINTAINER:     MERRIMACK DIAGNOSTIC ENGINEERING
16
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46      REV    DATE          AUTHOR        REASON
47      ---    ----          ------        ------
48
49      A      10-JUN-85     ADAM KOJNOK   ORIGINAL ISSUE, RSX ONLINE
50                                         NETWORK INTERCONNECT EXERCISOR
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RSX ONLINE NETWORK INTERCONNECT EXERCISER

USER'S GUIDE

ISSUED BY: Adam J. Kojnok

AC-FF94A-MC

REV A

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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 wothout
      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.

167
168
169
170   2.1   NIE BUILD PARAMETERS
171
172
173   [1,1]NETLIB.MLB
174   If the network macro library is not present in account [1,1], the DECnet
175   interfaces are not built into the NIE. The absence of this file will
176   define NONETL=0 in prefix file D.MAC. If NONETL is defined, the network
177   related code will not be included.
178
179   M$$NET
180   If not defined in [11,10]RSXMC.MAC, the DECnet interfaces are not built
181   into the NIE.
182
183   R$$11S
184   If defined in [11,10]RSXMC.MAC, all code concerned with disk storage is
185   conditionalized out.
186
187
188
189
190   2.2   PROCEDURE TO BUILD THE NIE
191
192
193   NOTE - The build command file uses the following non-NIE files:
194
195   SY:[11,10]RSXMC.MAC   ; Required RSX macro prefix file!!!
196   M$$NET is in this file when defined
197   R$$11S is in this file when defined
198   SY:[1,1]NETLIB.MLB   ; Not required. If not there no DECnet
199   ; interface code will be generated.
200   SY:[1,54]RSX11M.STB   ; Required to build NIE
201
202
203   Magnetic media contains the following files:
204
205   CZNIA.SEQ   ; NIE documentation file.
206
207   NIEBLD.CMD   ; NIE build command file, used to build
208   ;   the NIE.
209   DEUNA.MLB   ; DLX/Ethernet macros (required for both
210   ;   NIE and XE: Driver
211
212   ;
213   ; The following are NIE macro files
214   ;
215   NIESUP.MAC   ; NIE support task code
216   NIESUB.MAC   ; NIE task subroutines
217   NIECMD.MAC   ; NIE task command processing routines
218   NIEPRS.MAC   ; NIE command parser modules and data
219   ;   structures.
220
221   ;
222   ; The following are XE: (DEUNA/DELUA) Driver files.
223   ;

```
225
226
227
228            XEDRV.MAC                    ; XE: Driver code
229            XETAB.MAC                    ; XE: Driver RSX Database
230            UNAMC.TSK                    ; XE: Driver DEUNA ECO microcode file
231            LUAMC.TSK                    ; XE: Driver DELUA ECO microcode file
232
233
234         Building command sequence:
235         ------------------------ -
236
237         NOTE
238         DEV: for Magtape = MT:
239         DEV: for DL      = DLx:[3,3]
240
241         >MOU DEV:NIE                  ; Mount distributions kit
242         >PIP /NV=DEV:CZNIA.SEQ            ; Copy documentation file
243         >PIP /NV=DEV:NIEBLD.CMD           ; Copy NIE build command file from distro kit
244         >@NIEBLD                      ; Do the build
245
246            Answer questions asked by build command file.
247
248         *** NOTE ***
249         See APPENDIX A for sample build print out!
250
251
252
253         2.3  INSTALLING NIE
254
255
256         NIEBLD.CMD will do the installation at the end of the build.  However,  if
257         the system is re-started, the folowing must be installed:
258
259               MCR>INS [USER-UIC]NIE
260               MCR>INS [USER-UIC]NI1
261
262         NOTE
263               The  XE:  driver  must  be  installed  (LOADED)  if  a
264               non-DECnet system is being used.
265
266
267
268         3.0  RSX QIO UNA DRIVER BUILD
269
270
271         The following command lines will assemble the driver code and  the  driver
272         RSX database:
273
274         Assemble driver code -
275
276            [11,24]xedrv,[11,34]xedrv/cr/-sp=[1,1]exemc/ml,dev:[user-uic]d,-
277            deuna/ml,[11,10]rsxmc/pa:1,dev:[user-uic]xedrv
278
279         Assemble driver RSX data base -
280
281            [11,24]xetab,[11,34]xetab/cr/-sp=[1,1]exemc/ml,-
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283
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285
286                      deuna/ml.[11,10]rsxmc/pa:1.dev:[user-uic]xetab
287
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291        3.1  RSX QIO UNA DRIVER PARAMETERS
292
293            ——
294        The following parametes are to be defined in the sy:[11,10]RSXMC.MAC file.
295        These  parameters  will  be  defined  in  the D.MAC prefix file also.  The
296        values for these parameters in the D.MAC file will be set to the  default.
297        These  parameters  will  be  redefined  by  their  definitions   in
298        sy:[11,10]RSXMC.MAC.
299
300        NOTE
301                Normally, there should be no reason  to  define/redefine
302                these  parameters  for  building  the  XE  Driver!   The
303                parameters  are  presented  here  for  documentation
304                purposes.
305
306
307        The following are default definitions:
308
309        U$$NCT=1                          ; Number of controller on system
310        U$$NPC=8.                         ; Number of ports per controller
311        U$$NRS=8.                         ; Number of receive ring entries
312        U$$NTS=3.                         ; Number of transmit ring entries
313
314
315
316        3.2  BUILDING XE:  THE DRIVER
317
318
319        The    DEV:[USER-UIC]NIEBLD.CMD    command     file     will     generate
320        DEV:[USER-UIC]XEDRVBLD.CMD command file.  This file contains the TKB lines
321        to build the XE:  driver.
322
323
324
325
326        3.3  INSTALLING (LOADING) THE DRIVER
327
328
329        RSX11M-PLUS
330          MCR>CON SET VEC=vvv CSR=xxxxxx                ; Set vector and CSR
331          MCR>CON ONLINE XEA,XEO:                       ; Set unit and controller online
332          MCR>INS UML                                   ; Install DEUNA/DELUA microcode
333                                                        ; .. loader support task
334
335        RSX11M
336          MCR>LOA XE:/PAR=PARTION                       ; Load driver
337          MCR>INS UML                                   ; Install DEUNA/DELUA microcode
338                                                        ; .. 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>sr[ve]

When a mass storage dev ce 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 tobe 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 distroying
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 paramaters to be used (either default or operator
input).

The format is:

        NIE>show <argument>

      i.e. -

        NIE>sh[ow] n[odes]   ; Will dispaly the node table

        NIE>sh[ow] m[essage]   ; Will display message parameters

```
509
510
511
512                              NIE>sh[ow] c[ounters]           ; Will display counter information
513
514               There can be three  arguments  for  Show.   They  are:   Nodes,  Messages,
515               Counters.
516
517               The Show Nodes command lists all nodes in the Node table.  The  list  will
518               include  the  default physical address, the current physical address and a
519               logical address assigned to the node by the exerciser.  The  node  can  be
520               referenced  by  either  of  the physical addresses or the logical address.
521               Logical addresses will be assigned as n1, n2, n3,.....etc.
522
523                   NOTE:
524                       The node table display can be stopped with any character
525                       from the keyboard.
526
527               The Show Messages command will list the message type, message size and the
528               number  of  copies  to  be  sent  which  are currently selected.  Also the
529               Print/Noprint status will be displayed indicating the error message output
530               mode.
531
532               The Show Counters command will list the counter contents of the host node.
533
534
535               EXAMPLES:
536
537
538               NIE>show message
539
540               THE CURRENT MESSAGE PARAMETERS ARE:
541               TYPE=ASCII , SIZE=292 , COPIES=1, PRINT
542
543
544               NIE>show nodes
545
546                  CURRENT ADR          DEFAULT ADR       NAME  DECNET    DEVICE
547               AA-00-04-00-0A-10  AA-00-03-00-00-01  N0    4.10      DEUNA
548               AA-00-04-00-1B-10  AA-00-03-00-00-02  N1    4.27      DELUA
549               AA-00-04-00-0B-10  AA-00-03-00-00-03  N2    4.11      DECNA
550               AA-00-04-00-9C-10  AA-00-03-00-00-04  N3    4.156     DEQNA
551
552
553               NIE>show counters
554
555               ETHERNET COUNTER SUMMARY
556
557               SECONDS SINCE LAST ZEROED              : 13257
558               PACKETS RECEIVED                       : 91847
559               MULTICAST PACKETS RECEIVED             : 81793
560               PACKETS RECEIVED IN ERROR (BIT MAP) : 0
561               DATA BYTES RECEIVED                    : 10491573
562               MULTICAST BYTES RECEIVED               : 9913460
563               RCVS LOST - INTERNAL BUF ERROR         : 46
564               RCVS LOST - LOCAL BUFFER ERROR         : 0
565               PACKETS TRANSMITTED                    : 12601
```

```
567
568
569
570     MULTICAST PACKETS TRANSMITTED       : 2675
571     PKTS XMITTED WITH 3+ COLLISION      : 13
572     PKTS XMITTED WITH 2+ COLLISION      : 9
573     PKTS XMITTED BUT DEFERRED           : 169
574     BYTES TRANSMITTED                   : 1131157
575     MULTICAST BYTES TRANSMITTED         : 406378
576     TRANSMIT PACKETS ABORTED (BIT MAP)  : 0
577     TRANSMIT PACKETS ABORTED COUNTER    : 0
578     XMIT COLLISION CHECK FAILURE        : 0
579
580
581
582     4.8  RUN
583
584
585         NOTE
586         The RUN command performs the specified test on all
587         entries of the node table. This may cause problems on
588         Extended LANs (multiple LANs connected by Bridges).
589         This means that running a test on all nodes in the node
590         table may not verify that the LAN in question has been
591         properly tested. The node table may not even contain
592         all the nodes on the LAN in question.
593
594         Also, on large LANs, running tests against all nodes on
595         the network may be prohibitive.
596
597
598     The run command will cause the execution of the test specified by the
599     argument.  The results of the RUN command are used to update the Summary
600     log as well as to output error information.  The format is:
601
602         NIE>r[un] <argument>/pass=nm
603
604     The argument for Run can be either D[irect], P[attern], L[ooppair] or All.
605
606     The qualifier Pass=nn will allow the operator to select the number of
607     passes for the particular test selected.  If -1 is specified for the
608     passcount the test will run continuously.  If no passcount is specified,
609     the passcount defaults to the passcount set up with the Message command.
610
611     The following are standard NIE data patterns:
612
613         1.  ASCII - The ascii data pattern.
614
615         2.  ONES - A pattern of all binary 1's.
616
617         3.  ZEROS - A pattern of all binary 0's.
618
619         4.  1ALT - A pattern of alternating binary 1's and 0's starting
620             with 1 (1010...).
621
622         5.  OALT - A pattern of alternating binary 0's and 1's starting
623             with 0 (0101...).
```

```
625
626
627
628
629              6.   CCITT - The ccitt data  pattern PDP 11 assembler format.
630
631
632         ASCIDATA::                              ;ASCII alphanumer c data pattern
633
634             .ASCII   \ !"#$%&'()*+,-/012345\-
635                      \6789:;<=>??ABCDEFGHIJ\-
636                      \KLMNOPQRSTUVWXYZ[abcd\-
637                      \efghijklmnopqrstuvwxy\
638                      \z|}0 \
639
640         CCITTDATA::                             ;CCITT 512 bit test pattern
641
642             .WORD    177603, 157427, 031011, 047321, 163715, 105221
643             .WORD    143325, 142304, 040041, 014116, 052606, 172334
644             .WORD    105025, 123754, 111337, 111523, 030030, 145064
645             .WORD    137642, 143531, 063617, 135075, 066730, 026575
646             .WORD    052012, 053627, 070071, 151172, 165044, 031605
647             .WORD    166632, 016741
648
649
650
651    EXAMPLES OF RUN COMMAND OUTPUT:
652
653
654    NIE>run direct
655
656
657    DIRECT LOOP TESTING STARTED
658
659    PASS 1
660    TESTING NODES:   NIE HOST TO N1      TO NIE HOST -- RESPONSE OK
661    TESTING NODES:   NIE HOST TO N2      TO NIE HOST -- RESPONSE OK
662    TESTING NODES:   NIE HOST TO N3      TO NIE HOST -- RESPONSE OK
663    TESTING NODES:   NIE HOST TO N4      TO NIE HOST -- RESPONSE OK
664
665
666
667    NIE>run looppair
668
669
670    RUN LOOPPAIR STARTED
671
672    PASS 1
673    TESTING NODES:   NIE HOST TO N1      TO N2     TO N1 TO NIE HOST -  RESPONSE OK
674    TESTING NODES:   NIE HOST TO N2      TO N3     TO N2 TO NIE HOST -- RESPONSE OK
675    TESTING NODES:   NIE HOST TO N3      TO N4     TO N3 TO NIE HOST -- RESPONSE OK
676    TESTING NODES:   NIE HOST TO N4      TO N1     TO N4 TO NIE HOST -- RESPONSE OK
677
678
679
680    NIE>run pattern
681
```

```
683
684
685
686
687        STARTING ASCII PATTERN TEST
688
689        PASS 1
690        TESTING NODES:  NIE HOST TO N1    TO NIE HOST -- RESPONSE OK
691        TESTING NODES:  NIE HOST TO N2    TO NIE HOST -- RESPONSE OK
692        TESTING NODES:  NIE HOST TO N3    TO NIE HOST -- RESPONSE OK
693        TESTING NODES:  NIE HOST TO N4    TO NIE HOST -- RESPONSE OK
694
695
696        STARTING ONES  PATTERN TEST
697
698        PASS 1
699        TESTING NODES:  NIE HOST TO N1    TO NIE HOST -- RESPONSE OK
700        TESTING NODES:  NIE H'ST TO N2    TO NIE HOST -- RESPONSE OK
701        TESTING NODES:  NIF  JST TO N3    TO NIE HOST -- RESPONSE OK
702        TESTING NODES:  NIL HOST TO N4    TO NIE HOST -- RESPONSE OK
703                           .
704                           .
705                   etc
706
707
708
709        NIE>run all
710
711
712        PASS 1
713        TESTING NODES:  NIE HOST TO N1    TO NIE HOST  - RESPONSE OK
714        TESTING NODES:  NIE HOST TO N2    TO NIE HOST -- RESPONSE OK
715        TESTING NODES:  NIE HOST TO N3    TO NIE HOST -- RESPONSE OK
716        TESTING NODES:  NIE HOST TO N4    TO NIE HOST -- RESPONSE OK
717
718
719        RUN ALL STARTED
720
721        PASS 1
722        TESTING NODE N1    WITH REMAINING TABLE ENTRIES
723        TESTING NODES:  NIE HOST TO N1    TO N2    TO NIE HOST -- RESPONSE OK
724        TESTING NODES:  NIE HOST TO N2    TO N1    TO NIE HOST -- RESPONSE OK
725        TESTING NODES:  NIE HOST TO N1    TO N3    TO NIE HOST -- RESPONSE OK
726        TESTING NODES:  NIE HOST TO N3    TO N1    TO NIE HOST -- RESPONSE OK
727        TESTING NODES:  NIE HOST TO N1    TO N4    TO NIE HOST -- RESPONSE OK
728        TESTING NODES:  NIE HOST TO N4    TO N1    TO NIE HOST -- RESPONSE OK
729
730        PASS 1
731        TESTING NODE N2    WITH REMAINING TABLE ENTRIES
732        TESTING NODES:  NIE HOST TO N2    TO N3    TO NIE HOST -- RESPONSE OK
733        TESTING NODES:  NIE HOST TO N3    TO N2    TO NIE HOST -- RESPONSE OK
734        TESTING NODES:  NIE HOST TO N2    TO N4    TO NIE HOST    RESPONSE OK
735        TESTING NODES:  NIE HOST TO N4    TO N2    TO NIE HOST -- RESPONSE OK
736
737        PASS 1
738        TESTING NODE N3    WITH REMAINING TABLE ENTRIES
739        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 defa   paramaters
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 posative 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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802              logical addresses will always be unique.
803
804
805
806
807              4.12  PRINT/NOPRINT
808
809
810              The PRINT command causes all errors to generate error messages  which  are
811              output  to the operator.  If the NOPRINT command is issued error reporting
812              stops after the first five errors.  In both cases  the  Summary  log  will
813              continue  to be updated.  The PRINT and NOPRINT commands have no arguments
814              and the default is PRINT.  The command stays in effect untill  changed  by
815              the operator.  The print status is displayed via the SHOW MESSAGE command.
816
817
818
819
820              4.13  NOHOE/HOE
821
822
823              i.e. -
824
825                      NIE>noh[oe]                    ; Do not halt on error
826
827                        or
828
829                      NIE>hoe                        ; Halt on error (DEFAULT)
830
831              Halt on Error (HOE) causes the current  RUN  to  halt  when  an  error  is
832              encountered  inspite  the pass count.  The NO Halt on Error will cause the
833              run to run to completion inspite of errors.
834
835
836
837
838              4.14  SUMMARY
839
840
841              The Summary command prints the summary message of conditions and errors as
842              a  result  of  testing.  Summary information is obtained by typing Summary
843              when the NIE is running.  There are no  switches  or  qualifiers  for  the
844              summary command.
845
846                      NIE>su[mmary]
847
848
849
850              4.15  CLEAR
851
852
853              The Clear command will have three arguments, node, message and summary.
854
855                      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 paramaters 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

```
915
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918          FUNCTION VALUE 2: 00
919          DEVICE: 01
920
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922
923          4.17  SUMMARY
924
925
926          A log of events is maintained during RUN command processing.  These
927          statistics caN be displayed with the SUMMARY command.
928
929
930          NIE>su[mmary]
931
932              NODE          RCV NOT    RCV       LENGTH  COMPARE  BYTES     NUMBER BYTES
933                            COMPLETED  COMPLETED ERRORS  ERRORS   COMPARED  TRANSFERED
934          00-04-00-00-00-10     0         10       1       1       2000      2000
935          00-04-00-00-00-11     0         10       1       1       2000      2000
936          00-04-00-00-00-12     0         10       1       1       2000      2000
937          00-04-00-00-00-13     0         10       1       1       2000      2000
938
939
940
941          5.0  ERROR MESSAGES
942
943
944          COMMAND OR SWITCH NOT IMPLEMENTED
945             Command or switch is an optional NIE function.  However, this
946             implementation does not support the command.
947
948          COMPARE ERROR - BYTE EXPECTED = XXX, BYTE RECEIVED = YYY
949             This error is displayed when the data sent in a loop message does not
950             match the data received in the response message.
951
952          INVALID COMMAND
953             Invalid or syntactically incorrect command given.
954
955          INVALID COUNTER DATA
956             SHOW COUNTERS error message when running under DECnet.  The format of
957             the counter data received from DECnet is incorrect.  Internal program
958             error.
959
960          INVALID DISK NAME
961             The has tried to accessed the specified disk.  The disk does not exist
962             on the current system.  Enter correct device name.
963          INVALID ETHERNET DEVICE NAME
964             NX:  and XE:  are the only Ethernet devices possible with this version
965             of the NIE.  NX:  requires DECnet present and running.  XE:  device uses
966             the stand alone RSX QIO DEUNA/DELUA Driver.  You must use one of these
967             Ethernet devices.
968          INVALID HEX CHARACTER
969             Character specified is not a Hex digit.
970
971          INVALID MESSAGE SIZE
```

H2

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Maximum message size on a non DECnet system is 1498(10). Maximum
message size on a DECXnet 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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1033    NOT ENOUGH NODES IN NODE TABLE FOR "LOOPPAIR" OR "RUN ALL" COMMANDS
1034       There must be at least 2 node entries in the nodetable to  RUN  LOOPPAIR
1035       or RUN ALL commands.
1036
1037    NOT ENOUGH RECEIVE BUFFERS AVAILABLE
1038       Internal program error.  The NIE has lost track of it's recieve buffers.
1039
1040    OPEN ERROR ON NIE SAVE FILE
1041       The user attempted to do A SAVE command but NIE was unable to  create  a
1042       save file.
1043
1044    RESPONSE OK
1045       This message indicates  that  the  response  expected  by  the  NIE  was
1046       recieved  by  the NIE and that the test data returned was verified to be
1047       correct.
1048
1049    PROGRAM ERROR - NO BUFFERS AVAILABLE
1050       This message should not be seen during normal operation.  The  NIE  does
1051       some  internal  buffer  management  for  send and receive messages.  The
1052       buffer manager is out of buffers and the NIE is unable to  continue  the
1053       requested operation.
1054
1055    READ COUNTERS REQUEST TO DECNET FAILED
1056       Read counters request to DECnet failed.  This is an internal  error  for
1057       SHOW COUNTERS request.
1058
1059    RECEIVE DECNET COUNTERS FAILED
1060       Receiving DECnet counters failed.  This is an  internal  error  for  SHOW
1061       COUNTERS request.
1062
1063    SET CHARACTERISTICS FAILED
1064       This message  indicates  that  the  set  characteristics  QIO  has  been
1065       rejected.   This would occure if two NIEs were to run on the same system
1066       and each would try to select the same protocol/address pairs.
1067
1068       If only one NIE is being run, then this error  is  an  internal  program
1069       error.
1070
1071    TEXT NOT DEFINED - COMMAND IGNORED
1072       MESSAGE /TYPE=TEXT was given before defining the  text.   Do  a  MESSAGE
1073       /TEXT=xyz  (xyz  is  a  string  of  ascii  characters) to define the text
1074       string before issuing MESSAGE /TYPE=TEXT command.
1075
1076    TIME OUT - REMOTE NODE NOT RESPONDING
1077       This message is displayed when the NIE wait time expires  while  waiting
1078       for  a  response  from a remote node.  All the conectivity commands will
1079       result  in  this  message  if  the  remote  node being tested is  not
1080       responding.
1081
1082       During a RUN command execution, this message indicates that the  node(s)
1083       being tested are displayed in the message on the previous line.
1084
1085    TRANSMIT ERROR - COMMAND TERMINATED
1086       This error message only indicates that there has been an error when  the
```

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 evironment 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 specifiy return address of responses. This is a driver/system error. Should not normally occure!

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 occure while doing a SHOW COUNTERS command when running under DECnet. The NIE is trying to create a Network Data Queue and failes. 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.

K2

Multicast Packets Received -
  32 bits for the total number of cmulticast 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 occurences.

  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 -

```
1261
1262
1263
1264                        16 bits for the total number of times the collision test signal failed
1265                        to assert following an apparently suscessful transmission.
1266
1267
1268            DELUA ONLY COUNTERS
1269
1270                PORT DRIVER ERROR -
1271                    16 bits for the total number of times the Port Driver attempts to
1272                    issue another Port/Ancilliary command while one is still being
1273                    processed.
1274
1275                BABBLE COUNTER -
1276                    16 bits counter for the total number of times the LANCE reported the
1277                    babble condition on the channel.
```

```
1279
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1289
1290                                           APPENDIX A
1291
1292                                      SAMPLE NIE BUILD OUTPUT
1293
1294
1295
1296   >MOU MTO:NIE/DENS=1600          ; Mount mag tape kit
1297   >PIP /NV=MTO:CZNIA.SEQ          ; Copy documentation file to you area
1298   >PRINT CZNIA.SEQ               ; Print doc file for your information
1299   >PIP /NV=MTO:NIEBLD.CMD         ; Copy NIE build file to your area
1300   >@NIEBLD
1301   >;
1302   >; !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!:!!!
1303   >; ! NOTE:                                                              !
1304   >; ! This command file must be run from a privileged account as it needs !
1305   >; ! to copy some files to the SY:[1,1] area.                           !
1306   >; !!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!
1307   >;
1308   >;
1309   >; The format for the input device and UIC is DEV:[XXX,YYY].  The command
1310   >; file does not do extensive syntax checking.  Therefore, if specified, the
1311   >; format of the device-UIC string must be correct.
1312   >;
1313   >* Input device and UIC of source files [D=DRO:[6,6]] [S]:  mt:
1314   >;
1315   >; The format for the destination device and UIC is DEV:[XXX,YYY].  The command
1316   >; file does not do extensive syntax checking.  Therefore, if specified, the
1317   >; format of the device-UIC string must be correct.
1318   >;
1319   >* Output device and destination UIC [D=DRO:[6,6]]          [S]: <cr>
1320   >PIP DRO:[6,6]/NV=MT:NIESUP.MAC
1321   >PIP DRO:[6,6]/NV=MT:NIESUB.MAC
1322   >PIP DRO:[6,6]/NV=MT:NIECMD.MAC
1323   >PIP DRO:[6,6]/NV=MT:NIEPRS.MAC
1324   >PIP SY:[1,1]/NV=MT:DEUNA.MLB
1325   >PIP /NV=MT:DEUNA.MLB
1326   >INS $MAC
1327   >INS $TKB
1328   >INS $CRF
1329   >MAC @DRO:[6,6]NIEASM
1330   >TKB @DRO:[6,6]NIETKB.CMD
1331   >REM NIE
1332   >REM NI1
1333   >INS DRO:[6,6]NIE
1334   >INS DRO:[6,6]NI1
```

B3

```
1336
1337
1338
1339                    >* Do you want to build the DEUNA/DELUA driver?
1340                    >PIP SY:[1,1]/NV=MTO:UNAMC.TSK
1341                    >PIP DR0:[6,6]/NV=MTO:UNAMC.TSK
1342                    >PIP SY:[1,1]/NV=MTO:LUAMC.TSK
1343                    >PIP DR0:[6,6]/NV=MTO:LUAMC.TSK
1344                    >PIP DR0:[6,6]/NV=MTO:XEDRV.MAC
1345                    >PIP DR0:[6,6]/NV=MTO:XETAB.MAC
1346                    >PIP DR0:[6,6]/NV=MTO:UML.MAC
1347                    >MAC @DR0:[6,6]XEDRVASM.CMD
1348                    >TKB @DR0:[6,6]XEDRVBLD.CMD
1349                    >;
1350                    >; We have completed building the driver and the ECO microcode loader
1351                    >; support task.
1352                    >;
1353                    >; *** NOTE ***
1354                    >; If DECnet is running and is using your DEUNA or DELUA device then you
1355                    >; must not try to LOAD the XE: (DEUNA/DELUA) driver as the device Vector
1356                    >; and RSX Device Control Block are already taken and this will cause an
1357                    >; error.
1358                    >;
1359                    >; However, if DECnet is not running and you wish to use the the RSX QIO
1360                    >; DEUNA/DELUA driver (XE: Driver) then you can have this command file
1361                    >; load it for you. at this time.
1362                    >;
1363                    >* Do you want to LOAD the XE: (DEUNA/DELUA) driver? Y
1364                    >REM UML...
1365
1366                                      ; RSX-11M
1367
1368                    >LOAD XE:/PAR=GEN/HIGH
1369                    >INS DR0:[6,6]UML
1370
1371
1372                                      ; RSX-11M-PLUS
1373
1374                    >INS $CON
1375                    >LOAD XE:/PAR=GEN/HIGH
1376                    >CON SET XEA VEC=120 CSR=174510
1377                    >CON ONLINE XEA,XE0:
1378                    >INS DR0:[6,6]UML
1379
1380                    >@ <EOF>
1381                    ↑
1382        000001                .END
```

C3

. ABS. 000000   000
        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