Comm-Pro Associates
Host Network Access Support

HNAS

Datafono
ISARX25
Product Support

V2R3M0.C

Please see next page for important
information concerning your
Host NAS distribution materials.

This file revised February 9, 2006 2:37 pm, includes maintenance thru 2300183.

General Information

Comm-Pro Associates is the designer and developer of the X.25 Host Network Access Support host resident Program Product (Commonly referred to as **Host NAS** or **HNAS**). The Host NAS product provides support for X.25 connectivity over router based networks using IBM's X.25 through TCP/IP (**XTP**) or Cisco's X.25 over TCP/IP (**XOT**) transport protocols. The HNAS implementation was designed to avoid application changes by providing a transparent migration from IBM 3745 NSPI based communication controllers to the HNAS router based solution. The product offering provides a robust suite of non-SNA NPSI type support. Please refer to Chapter 1 (Introduction) for a complete list of products and Applications supported.

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For additional documentation and up-to-date information, please refer to member @README in the Comm-Pro distribution macro library. See our WEB site for the latest information.

Important Notes

1) Please refer to the optional README/@README file included with the HNAS product distribution media (separate file or HNASMAC macro member) for additional product information and documentation not included in this manual. Additional information can also be located on our web site (Please refer to Contact Information section for contact details).

Preface

Special Notices

This book is furnished as is. Comm-Pro assumes no responsibility for the use of the functions described in this book in any manner.

The Host NAS licensed program described in this documentation and all license material available for it are provided by Comm-Pro under terms of the Software Use Agreement provided by Comm-Pro or it's Business Partner's.

Trademarks

IBM is a registered trademark of the International Business Machines Corporation.

Cisco is a registered trademark of Cisco Systems, Inc.

Microsoft, Windows, are trademarks or registered trademarks of Microsoft Corporation.

Other company, product, and service names may be trademarks of service marks of others.

X.25 Host NAS is fully year 2000 compliant.

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Related Publications

Related publications, providing reference material for this product are:

RFCs
- RFC1613 - XOT (X25 Over TCP)

Comm-Pro Associates
- Host NAS Configuration Guide and Reference
- Host NAS Product Installation Using SMP/E Guide (supplemental) **(new for V2R3M0)** (Effective 2005-12-20 this section was merged into Chapter2 (Installation) of the Host NAS Configuration Guide and Reference).
- Host NAS Messages and Codes Debugging Guide
- Host NAS Console Subsystem Operations Guide
- Host NAS Console Subsystem Operations Guide & Trace Formats
- Host NAS Datafono Guide (supplemental) **(custom feature, new for V2R3M0.c)**
- Host NAS Master Index (Including Master Revision Index)

Please refer to the Documentation Overview section for additional information on the HNAS documentation organization and edistribution locations.

Cisco Systems

Keywords - XOT (X.25 over TCP/IP, formerly tunneling), X.25 Switching and X.25 LAPB)
- Cisco IOS Configuration Fundamentals, Network Protocols and various modules
- Cisco IOS Wide-Area Networking Configuration Guide - X.25 and LAPB (78-11751-01)
- Cisco IOS Wide-Area Networking Command Reference - X.25 and LAPB (78-011752-01)
- Cisco IOS Software Command Summary
- Cisco IOS Software Error Messages
- Cisco Debug Command Reference (Use with Internetwork Troubleshooting Guide)

Cisco Connection online documentation is available online at the following Web Site link:

www.cisco.com/univercd/home/home.htm

IBM Corporation

Keywords - XTP (X.25 through TCP/IP), X.25 MAS and X.25 LAPB)
- IBM Communication Controller Migration Guide (/redbooks/SG246298.html)
- IBM NCP and NPSI - X.25 Planning and Installation (SC30-3470-nn)
- IBM NCP and NPSI - X.25 Diagnosis, Customization and Tuning (LY30-5610-nn)
- IBM - IP Application Programming Interface Guide (SC31-8788)
  (TCP/IP Stack information, including the list of TCP/IP Stack **ERRNO** return codes
- IBM - Access Integration Services - Software User's Guide (SC30-3988/SC30-3998)
  (NWAYS Multiprotocol Access Services - IBM 22nn)

Several IBM documentation manuals relating to **ACF/NCP, ACF/SSP, ACF/VTAM, EP** and **NPSI** are available for viewing or downloading at the following IBM Web Site link:

www.networking.ibm.com/375/public.html

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HNAS Documentation Overview

The HNAS product documentation manuals (currently 4 primary publications and a master index guide) are provided below with their respective sections listed for ease of information source retrieval and viewing. Supplemental booklet references (as applicable) are also provided in this section.

Documentation manuals for the HNAS products are available in PDF format for individual books (vrm_HNASBook|MsgCodes|Console|ConsTrc|MasterIndex_yyyy-mm-dd.pdf) and collectively in zip archive files (vrm_HNASBooks_yyyy-mm-dd.zip).

These manuals are primarily available on our FTP server (userid required) or can be obtained by contacting a HNAS marketing and support representative for an alternate form of PDF documentation delivery. The PDF files were designed for duplex printing although the content can be printed in simplex (one sided) mode.

All HNAS documentation manuals and books provide the revision date on the bottom left corner of the header page "**This file revised Month, day (dd), year (yyyy) time (hh:mm) am|pm"**. As of July 6, 2005, "**,includes maintenance thru 2300nnn.**" is also provided the the header page to reflect the maintenance level that the documentation level reflects.

The documentation manuals are downward compatible with older HNAS releases. Every effort is made to identify and label new features or changes at the HNAS vrm level that the change was introduced. As we add APARs fixes and enhancement content, we denote the APAR numbers associated with the new parameters, alert messages and content whenever possible.

HNAS APAR Maintenance Level included in this Documentation:

2300nnn	APAR maintenance level included in this documentation series. Refer to HNAS book cover page 'includes maintenance thru 2300nnn' text.

HNAS Guide and Reference:

-Book File-	230_HNASBook_yyyy-mm-dd.pdf - PDF Format
Prefix	(Prefix) General Information, Contact Information and important Notes. *
Preface	(Preface) Special Notices, Trademarks and Related Publications. *
DocOView	(Documentation Overview) Descriptive list of HNAS Documentation manuals (books) and Sections. *
Chapter 1	(Introduction) describes the features of the HNAS software.
Chapter 2	(Installation, Activation and Runtime Guide) describes the procedures used to install the Comm-Pro software from its distribution medium and how to generate and execute an HNAS load module program.

HNAS Guide and Reference:

Chapter 3	(Configuration Guide) describes the operational characteristics of Comm-Pro's HNAS software and illustrates how to use configuration definition statements to define HNAS resources.
Chapter 4	(Configuration Reference) describes the configuration definition statements and parameters that are used to define HNAS resources.
Chapter 5	(Migration Reference) describes the configuration operands and run time functions that have changed in this release of HNAS. **Note**: It is important that you review this section prior to refreshing/upgrading from an older HNAS release.
Chapter 6	(Maintenance and APAR Summaries) provides information on maintenance types, installation and APAR (PTF) maintenance memo formats. Memo's are available on the HNAS maintenance Web site FTP Server or via E-mail subscription.
Appendix A	(X.3 PAD Parameters) describes X.3 PAD parameters.
Appendix B	(Configuration Examples) provides an example HNAS configuration data file and the resulting SYSPRINT log files.
Appendix C	(Router Checklist Overview) currently provides a basic overview for defining XOT and X.25 support in a Cisco router for HNAS connectivity. Also describes some of the Cisco diagnostic show and debug commands.
Appendix D	(Changes & New Features) provides an overview of new features provided in the current release as well as historical data for previous releases. In 220 and earlier releases of HNAS this content was provided in the Preface section.
Glossary	(Glossary of Terms) currently provides a reference list and some brief definitions for terms, abbreviation and acronyms that may be used in the HNAS documentation manuals, ftp or web page content.

HNAS Product Installation Using SMP/E:

-Book File-	230_HNASsmpe_yyyy-mm-dd.pdf - PDF Format
HNASsmpe	(Installation Using SMP/E) describes the steps necessary to install & generate the HNAS software product from the SMP/E format distribution medium. This is a supplement to Chapter 2.
Notice:	Effective 2005-12-20 this booklet was merged into Chapter2 (Installation) of the Host NAS Configuration Guide and Reference and is no longer produced.

HNAS Messages and Codes Debugging Guide:

-Book File-	230_MsgCodes_yyyy-mm-dd.pdf - PDF Format
CnfgMsgs	(Configuration Messages) provides information for HNAS configuration messages (Information, Default, Warning, Error, etc.) that can be encountered during HNAS initialization when processing the Configuration Data File (CDF).
AlrtMsgs	(Alert Messages) provides information for HNAS alert messages (Info, Warning, Error and Severe) that can be encountered during HNAS activation (after the CDF scan) and during “run time” operation.
BindfCodes	(BIND Failure User Sense Codes) describes reason for BIND failures.
TcpipErrno	(TCP/IP Error Numbers ERRNO) describes reason for TCPIP Errors.
PvcssCodes	(PVC Setup Status Codes RFC-1613) describes PVC Setup Ending Status.
RstCodes	(X.25 Reset Cause and Diagnostic Codes) describes the X.25 Reset Cause and Diagnostic codes that are present in the HNAS environment.
ClrCodes	(X.25 Clear Cause and Diagnostic Codes) describes the X.25 Clear Cause and Diagnostic codes that are present in the HNAS environment. In 230 Extended Diagnostic reason codes were added to the respective clear code entries to further define the cause of the event.
CisMsgs	(Cisco Messages Relating to HNAS Events) describes common Cisco codes in relationship to HNAS events.
HaltMsgs	(HNAS HALT/NASHALT Messages Relating to HNAS ABEND Events)
ConsMsgs	(Console Command Error Messages) provides diagnostic error messages for some HNAS console subsystem commands.

HNAS Console Subsystem Operations Guide:

-Book File-	230_Console_yyyy-mm-dd.pdf - PDF Format
Console	(Console Subsystem) This document contains the same Console section content as the primary Console Subsystem Operations Guide but does not contains the Trace Entry Formats section. This section was designed for users who prefer to view or print the guide but don’t require use of the estimated 70 pages of Trace Entry Formats.
ConsMsgs	(Console Command Error Messages) provides diagnostic error messages for some HNAS console subsystem commands.

HNAS Console Subsystem Operations Guide & Trace Formats:

-Book File-	230_ConsTrc_yyyy-mm-dd.pdf - PDF Format
Console	(Console Subsystem) includes the Console Users Guide that describes the operation of the HNAS console subsystem for local or optional remote consoles.
ConsMsgs	(Console Command Error Messages) provides diagnostic error messages for some HNAS console subsystem commands.
Trace	(Trace Entry Formats) this section provides HNAS trace table entry identifiers, layouts and descriptions of the various trace entries provided by HNAS.

HNAS Datafono Support.

-Book File-	23c_Datafono_yyyy-mm-dd.pdf - PDF Format
Datafono	(DataFono Support) describes the steps necessary to configure the HNAS software product for DataFono support (Spain). This is a supplemental guide for Chapter 3 and Chapter 4 and is currently a special order item.

HNAS Master Index - Index Entries for All HNAS Manuals:

-Book File-	230_MasterIndex_yyyy-mm-dd.pdf - PDF Format
Master-Index	(Master Indexes) This document contains the master index. The master index contains the combined book indexes for all of the above referenced HNAS manuals and guides. On 03-17-2004 the Master Revision Index section was removed to avoid confusion that some customers were encountering when searching through the index. This section is now available upon request. **Note**: The master revision index was designed for documentation change control and doesn't contain content suitable for indexing.

HNASBooks in Pkware ZIP Format - All HNAS Manuals:

HNASBooks	This zip file contains a collection of HNAS documentation manuals for single file transfer download operation. File CONSTRC is not included is this set, download separately.

***** - Denoted sections available in all documentation manuals.

All HNAS manuals and guides include Prefix sections (General Information, Important Notes), Preface sections (Special Notices, Trademarks, Related Publications), Documentation Overview, Table of Contents and Index sections. See 'Vendor Reference' index entries for additional vendor documentation references.

In 220, The Revision Index was removed from the individual manuals on 07/11/2003 in an effort to eliminate confusion. The Revision Index is still available for viewing in the Master Index manual.

HNAS Documentation Format

Documentation manuals for the HNAS products are available in PDF book format for individual books ***(vrm_book-name_yyyy-mm-dd*.pdf)** and collectively in zip archive file format **(*vrm*_HNASBooks_*yyyy-mm-dd*.zip)**. The PDF files were designed for Adobe Reader viewing and duplex printing although the content can be printed in simplex (one sided) mode. Some documentation content is available in HTML format on our Web site.

HNAS Documentation Locations

HNAS documentation manuals are available for customer download (using registered HNAS FTP server userid/password) at the following FTP Site address:

ftp://ftp.comm-pro4ftp.com/

HNAS documentation information is available online at the following Web Site link:

www.comm-pro.com/hostnas/docs/docindx.htm

Alternate forms of documentation delivery (e-mail file attachment or physical media) can be arranged by contacting your HNAS marketing and support representative. For Comm-Pro directly supported customers, we suggest that you send an e-mail request to the following address with the text 'HNAS Documentation Request' in the subject field of the E-mail:

support@comm-pro.com

HNAS Documentation Maintenance

Every effort is made to provide accurate and up-to-date product documentation for our users. Please don't hesitate to contact us with any corrections or recommendations regarding any of our documentation content. We appreciate your input and efforts.

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Table of Contents

Datafono Product Overview

This section describes the Datafono products implemented into the Host Network Access Support (**HNAS**) XOT program product. This is a supplement guide to the standard HostNAS V2R3 Guide and Reference manual.

This document doesn't discuss or address the technical or operational characteristics of the Datafono devices but rather the session set-up and data transfer as it relates to the HNAS environment. The HNAS Datafono implementation is based upon the 'NPSI like' ISARX25 Datafono support.

Familiarity with the basic structure of a HNAS Configuration Data File (CDF) is assumed.

Datafono

Introduction

HNAS Datafono support allows PLUs to communicate with Datafono devices using HNAS to provide the virtual SLU support formerly provided by NPSI VIRTUAL=YES resources.

On the inbound flow the Datafono device communicates with an X25 PAD attached to a Cisco router via an X25 link. XOT support in the router forwards the X25 packets in TCP/IP datagrams over a WAN. HNAS receives the datagrams, removes the X25 control information, translates the data to EBCDIC and forwards the data in FMD PIUs using a VTAM application to application session (one session per active Datafono device). In the APPL-to-APPL session HNAS is the SLU.

On the outbound flow the above is reversed. HNAS is receives PIUs from the PLU. Data is packetized in XOT datagrams carrying X25 packets. The router receives the XOT datagrams and generates X25 packets which are sent via an X25 link to the Datafono PAD. The PAD forwards the data to the remote device.

The X25 protocol (processing of call request packets, X25 window rotations, etc.) is provided by HNAS.

Because HNAS uses APPL-to-APPL VTAM sessions to exchange data with the PLU there are some differences in the configuration process. The HNAS SLUs are defined to VTAM in an Application Major Node. There are no Switched Major Node's associated with HNAS. The Application Major Node is normally generated by HNAS (Start parameter FASTRUN option). The customer is responsible for placing the node in a VTAM data set and activating the node. HNAS has facilities for defining the switched and leased resources expected by the PLU.

Please refer to the HNAS CDF Datafono Operands section of this guide for information regarding new Datafono operands for the TYPE=MCH REMOTE as well as the new TYPE= DFL, DFS and DFX REMOTE types resources.

Installation Overview

HNAS Datafono support does not require any special product installation instructions. The support is included in the HNAS 230 product under enhancement APAR 2300DTF. Custom distributions containing the enhancement APAR are created for installations needing Datafono support.

HNAS CDF Datafono Operands

New operands for the TYPE=MCH REMOTE statement define the mechanisms used to create a Datafono session and to specify the session attributes. Three new remote types have been introduced (they are described in detail, below):

TYPE=DFL defines a pool of pseudo-leased resources.
TYPE=DFS defines a pool of switched resources.
TYPE=DFX defines session characteristics (leased, switched, NRI table name, etc.).

rmt-name **REMOTE TYPE=MCH**
...
CTCP=(*v1,,,vn*)
CUD0=(*cv1,,,cvn*)
DFLNAME=(*dfl1,...,dfln*)
DFXNAME=(*dfx1,...,dfxm*)
GATE=GENERAL

This statement is used to define an HNAS logical MCH (Multi CHannel link). Inbound XOT call requests are routed to a logical MCH by the BUILD statement's RTEIN= parameter. The operands listed above are required for Datafono support, other non-Datafono specific parameters were omitted.

The **CTCP** and **CUD0** operands are used to convert a CUD0 value in an inbound call request packet to a CTCP or LLC value for an inbound call. The relationship between the CUD0 and CTCP lists is positional (GATE=GENERAL is required and the two lists must have the same length). If the CUD0 value from a call request packet is found at the i-th position in the CUD0= list then the value coded at the i-th position in the CTCP= list determines the session type as follows:

0-27 creates a GATE (LLC4) session. The value selects one of 28 CTCP Control Session LUs specified on the LUNAME= operand to receive the call request packet.

80, 83 or 85 creates an LLC0, LLC3 or LLC5 session (respectively).

100-120 creates a Datafono session and generates an index (0 through 20) used in the DFXNAME= operand to address a TYPE=DFX REMOTE statement which provides Datafono session parameters.

Caution must be used if SUBADDRESS=YES is used in conjunction with LLCi= operands to establish the LLC type. Because subaddress processing precedes CUD0 processing, if a subaddress digit match is found in an LLCi= then the session type is set to LLC0, LLC3, LLC4 or LLC5 and CUD0 byte is not processed (even if it's value would have created a Datafono call). This means that if LLC5=(1) is coded then an inbound call with a subaddress digit of 1 cannot be a Datafono call.

DFXNAME=(*dfx0,...,dfxn*)
Specifies the names of up to 21 TYPE=DFX REMOTEs used to provide Datafono session parameters. If the CTCP value is 100, the TYPE=DFX REMOTE named dfx0 is used. If the CTCP value is 120 the 21st TYPE=DFX REMOTE name is used. If there is no DFXNAME= entry for a given CTCP value then the call is cleared.

DFLNAME=(*dfl1,...,dfln*)
Specifies the names of up to 64 TYPE=DFL REMOTE statements.
These statements provide a POOL of pseudo-leased resources that can be used by Datafono calls routed to this MCH. A leased resource is used when the TYPE=DFX REMOTE has the XID=NO option specified (see below). If this operand is omitted, pseudo-leased resources are not supported on this MCH.

GATE=GENERAL
CUD0= and CTCP= require this operand (NPSI rule).

Example:

```
MCH1   REMOTE TYPE=MCH
                  GATE=GENERAL
                  CUD0=(22,23,FF)
                  CTCP=(100,101,100)
                  DFXNAME=(DFX001,DFX002)
                  DFLNAME=DFL001
```

An inbound call with a CUD0 value of 22, 23, or FF is a Datafono call (associated CTCP value is in the range 100 to 120). If the CUD0 value is 22 or FF, session parameters come from the TYPE=DFX REMOTE named DFX001. If the CUD0 value is 23, session parameters come from the TYPE-DFX REMOTE named DFX002.

If either DFX001 or DFX002 specifies a call to a pseudo-leased resource (XID=NO) then the LU for the call will be allocated from resources created by the TYPE=DFL REMOTE named DFL001.

***rmt-name* REMOTE TYPE=DFX**
OPTIONS=(DATAFAM|DATAF,
EMSGE,
IMS,
NRITAB=*name*,
RETPIU,
XID=NO|STD|TAB|TABSTD|
(*nnnnn,mmm*))

The TYPE=DFX remote provides operating characteristics for Datafono calls. The DFX remote used for a particular call is determined by the CUD0 byte in an inbound call request

packet used in conjunction with the CUD0=, CTCP=, and DFXNAME= parameters on a TYPE=MCH REMOTE (see above).

The OPTIONS= parameters have the same meaning as the identically named parameters on the XAI.ZGEN and XAI.ZSWTC ISARX25 statements. The ISARX25 **SWCTCP=** parameter is not presently supported.

DATAFAM|DATAF
Select one of the two values shown to specify the processing for terminal responses to type 'M' messages from the PLU.

DATAFAM when an 'M' message is sent to a remote HNAS waits for the D(9) response from the remote. When the D(9) response arrives it is discarded and a DR+ response (if requested) is sent to the PLU. The PLU does not need logic for the D(9) message.

DATAF when an 'M' message is sent to the remote HNAS delivers the DR+ (if requested) to the PLU as soon as the 'M' message is transmitted. When the D(9) response is received from the remote it is sent to the PLU as an input message.

The NATIVE and NATIVENV device types supported by XAI.ZSWTC define LLC0 resources. HNAS does not support these types in the OPTIONS= list. Most ISARD LLC0 support options are available in the base HNAS product. Changes may be required because functions provided by NRI tables are provided by SVC0= operands on HNAS TYPE=MCH REMOTE statements. Pseudo leased-support is not provided for HNAS LLC0 devices.

EMSGE
When this option is coded HNAS sends a 'ESPERE POR FAVOR' 'M' message if the PLU does not deliver a response in 26 seconds. If the option is not coded HNAS will not generate the message.

IMS
Code this option if the PLU is IMS.
With this parameter, instead of a DR- HNAS will send a DR+ (if solicited) and will ignore the application response in the following cases:

1) When receiving 'M' messages from the PLU and the RETPIU option is set (see below).

2) When a message of incorrect type is sent to HNAS by the PLU. A message that does not start with 'M', 'R', 'D' or 'L' has an incorrect type.

3) When a message is received outside of the normal sequence of the Datafono protocol.

If the option is not coded the above actions are not taken.

NRITAB=*name*
Specifies the name of an NRI table used to convert a calling DTE address to an IDNUM value. HNAS loads the table from a library identified by the VTAMLIB DD statement. OPTIONS=TAB|TABSTD must also be coded.

RETPIU
This option control the actions taken when a dataphone terminal session ends in an unexpected manner, i.e., without the transmission of an 'L' message. When there is an unexpected termination (e.g. clear packet received), HNAS would normally send a -RSP to the PLU and close the HNAS VTAM ACB for the session. This causes a NOTIFY PIU to be delivered to the PLU. The recovery mechanisms of the IMS will make the PLU indefinitely attempt the sending of queued responses to the terminal. When the RETPIU and IMS options are coded the following steps are taken when there is an unexpected clear:

1) The HNAS LU resource is marked ‘busy’ so it is not available for another call.

2) HNAS sends +RSP to messages from IMS and discards the messages until a non-’M’ message is received from the PLU.

3) The first message that was not sent to the remote is sent to the PLU as input. The message will be prefixed by a ‘?’ character

If the option is not coded the above actions are not taken.

XID=NO|STD|TAB|TABSTD|(*nnnnn,mmm*)
This option specifies how HNAS is to locate an SLU resource for the Datafono session. The SLU will look like the VIRTUAL=YES resources used in a NPSI environment. XID=STD is assumed if XID= is omitted.

NO
Specifies that there is no XID for the session. HNAS locates an available pseudo-leased LU from one of the TYPE=DFL REMOTEs addressed by the DFLNAME= parameter on the TYPE=MCH REMOTE with the call request. A pseudo-leased resource is available if the HNAS SLU has no session with a remote and if the LU is active (BIND, SDT received from the PLU).

STD
Locate an available LU for the session by searching the switched LU pool for a resource with an IDNUM value matching the IDNUM value in call user data bytes 1 through 3. IDNUMs are 5 (hex) digit values. The 6 digit value taken from CUD1-3 is right shifted four bits to obtain the search value. When an appropriate resource is located HNAS opens the HNAS ACB for the resource and requests a session with the PLU associated with the resource. The switched LU pool is created by TYPE=DFS REMOTE statements (see below).

TAB
Generate an IDNUM value by searching the NRI table addressed by NRITAB= for an entry with a DTE address matching the calling DTE address in the call request packet. The call is cleared if no entry is found.

TABSTD
Same as TAB except that if the IDNUM value located in the NRI table is zero then act as though STD were coded (generate IDNUM from CUD1-3).

(*nnnnn,mmm*)
Search the switched LU pool for an available LU with an IDNUM in the range nnnnn to nnnnn+mmm. nnnnn is a 5 digit hexadecimal number. mmm is a decimal number with a range of 0 to 25.

Samples:

```
DFX001  REMOTE TYPE=DFX
                    OPTIONS=(DATAFAM,          ; 'M' message response processing
                             EMSGE,            ; send please wait messages
                             IMS,              ; PLU IS IMS
                             RETPIU            ; return 1st PIU not sent
                              XID=NO)          ; allocate leased resource from
                                               ; TYPE=DFX REMOTE addressed
                                               ; DFLNAME= parameter

DFX002  REMOTE TYPE=DFX
                    OPTIONS=(XID=STD)          ; allocate switched resource from
                                               ; switched resource pool created by
                                               ; TYPE=DFS REMOTE statements.
                                               ; use 5 digits from CUD1 to CUD3
                                               ; to supply the IDNUM to locate the
                                               ; resource.
```

rmt-name REMOTE TYPE=DFL LUNAME=(slu-nm1/plunm1,...,slu-nmn/plu-nmn)

The TYPE=DFL REMOTE is used to create a pool of pseudo-leased resources. The resources are available for XID=NO calls received on any MCH that addresses this DFL remote with its DFLNAME= operand.

LUNAME=(...,slu-nmi/plu-nmi,...)
slu-nmi/plu-nmi specifies the HNAS SLU name and, optionally, the plu name that the SLU will communicate with. Up to 64 names may be specified in the LUNAME= parameter. All HNAS SLU names must appear in an APPL statement in an active application major node. plu-nmi is optional. If the name is present HNAS will request a session with the PLU when HNAS activates. If the name is omitted then the PLU must acquire the HNAS SLU. Normally the plu name is provided.

rmt-name REMOTE TYPE=DFS LUNAME=(slu-nm1/plunm1/idnum1,...,

slu-nmn/plu-nmn/idnumn)

The TYPE=DFS REMOTE is used to create a pool of switched resources. The resources are available for non-XID=NO calls received on any MCH.

LUNAME=(...,slu-nmi/plu-nmi/idnumi,...)
slu-nmi/plu-nmi/idnumi specifies the HNAS SLU name, the PLU name and the IDNUM value associated with the resource. IDNUM should be coded as a 5 digit hexadecimal number.

Up to 64 names may be specified in the LUNAME= parameter on a TYPE=DFS remote. Any number of DFS remotes may be coded (there is a system wide limit of 510 REMOTEs). All DFS switched resources are placed in a common pool used for all Datafono calls.

Datafono Event Alert Messages

Following are the supplemental Datafono event alert messages that are generated under various conditions. These messages will be provided in the standard HNAS Messages and Code Alert Messages section in the next release (240):

NAS3750W DISCARDING MSG FROM PLU *pluname* to SLU *sluname* ON MCH *mchname*

(new for V2R3M0.C)

This alert message indicates that the PLU has sent an invalid message to an HNAS datafono LU. Messages must begin with 'R', 'D', 'L' or 'M'. NAS3751W displays the first 80 characters of the message.

The PLU name ***pluname***, MCH name ***mchname*** and LU name ***sluname*** identify the resources affected by the error condition.

NAS3751W *text*

(new for V2R3M0.C)

This message ID is used to provide the message content associated with the NAS3750W DISACARDING MSG FROM PLU alert message.

text provides the first 80 characters of the message.

NAS4720W WAIT FOR NON-M MESSAGE TIMEOUT ON LU *luname*

(new for V2R3M0.C)

When the IMS option is specified HNAS may enter a flush state waiting for IMS transmit queues to empty. This is signified by receipt of a non-M message from the PLU. If such a message is not received in 4 minutes this alert is issued. This message was originally NAS4710W.

NAS5720I DATAFONO SESSION STARTING ON LEASED LU *luname* MCH *mchname (act-vc-count)* DFX *dfxname*

(new for V2R3M0.C)

Informational message indicating the start of a pseudo-leased session.

luname, mchname and ***dfxname*** name the HNAS SLU resource, the TYPE=MCH REMOTE and the TYPE=DFX REMOTE used for the session.

NAS5721I DATAFONO SESSION ENDED ON LEASED LU *luname (CLR* RECV'D) CAUSE/DIAG=(*ccc/ddd)* (*cc/dd*) DIAGX=xxxx

(new for V2R3M0.C)

Informational message indicating the end of a pseudo-leased session caused by a Clear packet.

luname	identifies the LU.
ccc/ddd =	clear cause & diagnostic in decimal.
cc/dd =	clear cause & diagnostic in hex.
xxxx=	HNAS clear diagnostic extension.

Please refer to the Datafono Clear Cause and Diagnostic codes in this booklet and the HNAS Messages and Codes Guide for additional information on HNAS Clear Cause, Diagnostic and DIAGX= code descriptions and formats.

NAS5722I DATAFONO SESSION ENDING ON LEASED LU *luname* (UNEXP'D CLEAR RECV'D) CAUSE/DIAG=(*ccc/ddd)* (*cc/dd*) DIAGX=*xxxx*

(new for V2R3M0.C)

Informational message indicating the end of a pseudo-leased session caused by an unexpected Clear packet.

luname	identifies the LU.
ccc/ddd =	clear cause & diagnostic in decimal.
cc/dd =	clear cause & diagnostic in hex.
xxxx=	HNAS clear diagnostic extension.

Please refer to the Datafono Clear Cause and Diagnostic codes in this booklet and the HNAS Messages and Codes Guide for additional information on HNAS Clear Cause, Diagnostic and DIAGX= code descriptions and formats.

NAS5727E RECEIVED 2ND MESSAGE FROM RMT *rmtname* FOR LU *luname* ON MCH *mchname* DATA=*xxxxxxxx*

(new for V2R3M0.C)

An unexpected message was received by HNAS from the remote for the named SLU.

rmtname, ***luname*** and ***mchname*** identify the remote, LU and the MCH.

xxxxxxxx provides the first 8 characters of the message.

This message indicates the remote sent data when HNAS was not expecting it because of Datafono protocol rules. Contact Comm-Pro Customer Support. This message was originally NAS5720E.

NAS5728E RECEIVED INV MESSAGE FROM RMT *rmtname* FOR LU *luname* ON MCH *mchname* DATA=*xxxxxxxx*

(new for V2R3M0.C)

A message that did not start with a valid Datafono protocol character was received from the remote.

rmtname, ***luname*** and ***mchname*** identify the remote, the HNAS SLU and the HNAS MCH used for the session.

xxxxxxxx is the first 8 characters from the remote.

The REMOTE may not be a Datafono device. If it is, Contact Comm-Pro Customer Support. This message was originally NAS5721E.

NAS5729E RECEIVED INV *msgtype* MESSAGE FROM RMT *rmtname* FOR LU *luname* ON MCH *mchname* RECV ST=*rcvst* SEND ST=*sndst*

(new for V2R3M0.C)

A Datafono message received from the remote is not valid for the current SEND/RECEIVE state of the HNAS SLU. Contact Comm-Pro customer support. This message was originally NAS5722E.

msgtype is the inbound message type (see below).

rmtname, luname and mchname identify HNAS resources.

rcvst is the current HNAS receive state (see below).

sndst is the current HNAS send state (see below).

Datafono messages types are located on the following page:

Datafono Message Types (*msgtype*)

Host	Flow	Terminal	Description
	<---	R(3)	REQUEST REINITIALIZATION
R(4)	--->		RESPONSE REINIALIZATION
	<---	D(5)	DATA RESPONSE
D(6)	--->		DATA DEMAND
L(7)	--->		RESPONSE AND DISCONNECT
M(8)	--->		MULTIPLE RESPONSES
	<---	D(9)	MULTIPLE SYNCHRONISM

rcvst = R(3), D(5), D(9)) if last message received was of the type shown

sndst = R(4), D(6), M(8), L(7) if last message sent was of the type shown.
LWT if HNAS flushing IMS send queue.

NAS7801W LU luname ON MCH mchname LUBST1/2=xxxx MAY BE HUNG

(new for V2R3M0.C)

HNAS has located a pseudo-leased LU with no VC (X25 session) that is attached to a TYPE=MCH REMOTE. An LU in this state may be hung.

luname and ***mchname*** identify the LU and the MCH.
xxxx is the current LU state from the LU control block.

Please contact your customer support representative to report the problem.

NAS7802W LU luname ON MCH mchname LUBST1/2=xxxx STATE INVALID

(new for V2R3M0.C)

HNAS has located a pseudo-leased LU that is not bound but is attached to a TYPE=MCH REMOTE. This state is invalid.

luname and ***mchname*** identify the LU and the MCH.
xxxx is the current LU state from the LU control block.

Please contact your customer support representative.

Datafono Clear Cause and Diagnostic Codes

Following are the supplemental Datafono Clear Cause and Diagnostic codes that are generated under various conditions. These codes will be provided in the standard HNAS Messages and Codes Clear Cause and Diagnostic codes section in the next release (240):

X.25 Clear Diagnostic Codes - Datafono

Dec	Hex	<- Hex	Clear Diagnostic Reason Codes (Dec/Hex) Extended Event Reason Codes (Hex) (**new for V2R3M0**)
223	DF		HNAS Datafono Clears (VCCDDTF). (230.c)
		01	Unexpected message received from remote. (VCDAT)
		02	Invalid (non-datafono) message received from remote.
		03	Invalid state for remote's R(3). (see Datafono Message Types, above)
		04	Invalid state for remote's D(9).
		05	Invalid state for remote's D(6).
		06	Unexpected Clear received from remote. (VCCLR)
		07	Wait for non-M message timer expired IMS queue flush). (MCHTMR)

Please refer to the HNAS Messages and Codes Guide for additional information on HNAS Clear Cause, Diagnostic and DIAGX= code descriptions and formats.

SAMPLE CDF Configuration File

```
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*        HNAS V2R3M0 - SAMPLE DATAFONO CONFIGURATION.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
         BUILD ,                    ;
               BFRLMT=500           ; BUFFER POOL REQUIREMENT.
               CONCMDQ=(DNAS,       ; START COMMANDS.
                        'TRCMCH ICR')
               CONLMT=2             ; NUMBER OF REMOTE CONSOLES
               CONPRMT='ZDTFCS1> '  ; CONSOLE PROMPT.
               CONPSWD=PASS         ; CONSOLE PASSWORD
               NASNAME=NAST0TSO     ; OUR NAME
               PRTLMT=2250000       ; TOTAL NUMBER PRINT RECORDS
               TCPNAME=TCPIP        ; TCP/IP ADDRESS SPACE NAME
               TRCLMT=4000          ; INTERNAL TRACE TABLE SIZE
               USSTAB=ISTINCDT      ; IBM STANDARD USSTAB
               VCLMT=100            ; SYSTEM WIDE VC LIMIT.
*
*
*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*        LOCAL XOT HOST PCSERVER/P390 - ETHERNET
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
LXOT     LOCAL TYPE=XOT               ; TYPE
               IPADDR=10.117.56.170   ; LOCAL IP ADDRESS
               PORT=1998              ; XOT PORT NUMBER
               RTEIN=(MCH1)           ; ALL CALLS GO TO MCH1
*              RTEIN=(MCH1/2300,MCH2/7700,MCH3),
*                                     ; FOLLOWING WOULD ROUTE
*                                     ; CALLS TO AN MCH BY
*                                     ; BY CALLED DTE ADDR
                 RTEOUT=NONE         ; NO CALLOUT
               TCPNAME=TCPIP          ; TCPIP IS DEFAULT.
*
*
*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*        REMOTE XOT - CISCO ROUTER PORTS (ROUTER INITIATED CONNECT)
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
R1CNIN   REMOTE TYPE=XOT              ; ROUTER TRANSPORT PROTOCOL
               HOME=LXOT              ; THIS DEFAULT IS LXOT.
               INIT=ACTIVE            ; ACTIVATE AT STARTUP
               IPADDR=10.117.56.100   ; ROUTER IP ADDRESS
               PORT=DYNAMIC           ; ROUTER INITS CONNECT
               VCLMT=50               ; ROUTER VC COUNT
*
*
*
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
*        DEFINE LOGICAL MCH.
* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
MCH1     REMOTE TYPE=MCH           ; REMOTE TYPE
```

SAMPLE CDF Configuration File

```
                APPLNAME=(TSO)       ; PLU FOR LLC5 SESSIONS
                CONNECT=NO           ; NO FAST CONNECT
                CTCP=(100,101,102,103,104); CUD0 TO LLC/CTCP MAP.
                                     ; A CTCP VALUE OF 100 THRU 120
                                        ; INDICATES A DATAFONO CALL WITH
                                     ; ATTRIBUTES SUPPLIED BY A
                                     ; TYPE=DFX REMOTE. IF THE CTCP
                                        ; NUMBER IS 100 THE FIRST DFXNAME
                                     ; IS USED.  101 = SECOND NAME,
                                     ; 120 = 21st NAME.
                CUD0=(20,21,22,23,24); CUD0 VALUES.
                                     ; ABOVE CUD0 VALUES ESTABLISH
                                     ; A DATAFONO CALL BECAUSE THE
                                     ; CORRESPONDING CTCP SLOT IS
                                     ; IN THE RANGE 100-120.
                                     ; STD NPSI VALUES STILL APPLY
                                     ; (E.G. 01=LLC5).
                DFLNAME=(DFL001)     ; LEASED LU POOL. UP TO 15
                                     ; POOLS MAY BE ADDRESSED.
                                     ; EACH POOL PROVIDES UP TO 64
                                     ; LEASED LU NAMES USED WHEN
                                     ; XID=STD.
                                     ; SEE TYPE=DFL REMOTE, BELOW.
                DFXNAME=(DFX001,     ; LEASED DFX.
                         DFX002,     ; XID=STD DFX.
                         DFX003,     ; XID=(NNNNN,MM) DFX.
                         DFX004,     ; XID=TAB,NRITAB=ZDTFT01 DFX.
                         DFX005)     ; NO OPTIONS = XID=STD
                                     ; SEE TYPE=DFX REMOTES, BELOW.
                GATE=GENERAL         ; GATE SUPPORT
                IDLETO=0             ; NO INACTIVITY TIMER
                LLC0=NONE
                LLC4=NONE
                LLC5=(5)             ; 5 SETS LLC5
                MBITCHN=YES          ; BUILD M-BIT CHAINS
                PAD=INTEG            ; IPAD
                PADPARM=(13/7)       ; INSERT LF'S
                PVC=NONE             ; NO PVC SUPPORT.
                SUBADDRESS=YES       ; SUBADDRESS CAN SET LLC
                SVC0=NONE            ; NO LLC0
                SVC4=NONE            ; NO LLC4
                SVC5=(3,             ; CALL IN LU'S.
                      MCH15001,MCH15002,MCH15003)
                TRAN=SPACE           ; LLC5 TRANSLATE TABLE.
*
*
*        DFX REMOTES
*        SELECTED BY CUD0 VALUE IN CONJUNCTION WITH CTCP=
*        AND DFXNAME=
DFX001   REMOTE TYPE=DFX
                OPTIONS=(DATAF,EMSGE,RETPIU,XID=NO,IMS)
DFX002   REMOTE TYPE=DFX
                OPTIONS=(DATAFAM,XID=STD)
DFX003   REMOTE TYPE=DFX
```

```
               OPTIONS=(DATAFAM,XID=(77771,7))
DFX004    REMOTE TYPE=DFX
               OPTIONS=(DATAF,XID=TAB,NRITAB=ZDTFT01)
DFX005    REMOTE TYPE=DFX
               OPTIONS=DATAF
*
*
*         DFL (DATAFONO LEASED) REMOTES
*         WHEN AN MCH RECEIVES A DATAFONO CALL AND CUD0=, CTCP= &
*         DFXNAME= INDICATE XID=NO, THEN THE MCH'S DFLNAME= PARM
*         IS USED TO LOCATE A LEASED RESOURCE IN A TYPE=DFL REMOTE.
*         THE ENTRY FORMAT IS ...,SLU-NM/PLU-NM.
*         IF THE PLU NAME IS CODED HNAS ISSUES A REQSESS TO ASK FOR
*         A SESSION.  IF THERE IS NO PLU-NM THE PLU MUST ACQUIRE
*         THE HNAS SLU.
DFL001    REMOTE TYPE=DFL
               LUNAME=(MCH10001/NASCTCP,MCH10002)
*
*
*         DFS (DATAFONO SWITCHED) REMOTES
*         WHEN AN MCH RECEIVES A DATAFONO CALL AND CUD0=, CTCP= &
*         DFXNAME= INDICATE XID=YES, THEN THE HNAS SWITCHED LU POOL
*         IS SEARCHED TO LOCATE A RESOURCE WITH THE CORRECT IDBLK.
*         EACH TYPE=DFS REMOTE CAN SPECIFY 64 LUS.  ANY NUMER OF
*         THESE MAY BE CODED.
*         THE ENTRY FORMAT IS ...,SLU-NM/PLU-NM/IDNUM,...
*         ALL 3 OPERANDS ARE REQUIRED.
DFS001    REMOTE TYPE=DFS
               LUNAME=(MCH10003/NASCTCP/77777,
                       MCH10004/NASCTCP/77778)
DFS002    REMOTE TYPE=DFS
               LUNAME=(MCH10005/NASCTCP/77779
                       MCH10006/NASCTCP/7777A)
*
*
          END
```

SAMPLE CDF Configuration File

DataFono Index

Numerics

A

B

C

D

E

F

G

H

I

M

N

P

R

S

T

V

W

X

Y