

NOS 2.5.3 LEVEL 688 SOFTWARE RELEASE BULLETIN

Control Data Corporation recommends that the Software Release Bulletin be read in its entirety prior to any NOS installation.

SMD131530



4201 Lexington Avenue North
Arden Hills, Minnesota 55112

September 24, 1987

Dear NOS Customer:

In addition to the CIP, deadstart, and permanent file tapes you normally receive for a release, there is a new tape that contains the following files:

File 1: The Software Release Bulletin

File 2: The Feature Notes

File 3: A program library containing copies of NOS decks prior to being resequenced.

The tape is nine-track, 1600 density, internal format, and internally labeled with a VSN of SRB1.

Sincerely,

CONTROL DATA CORPORATION

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Chapter 1

SRB Introduction

This document is the NOS 2.5.3 L688 Software Release Bulletin (SRB). It is to be used in conjunction with the NOS Installation Handbook (IHB) for installing NOS and its products. Control Data recommends that the SRB be read in its entirety prior to software installation. You should also ensure that all of your hardware is at the FCA levels indicated in the Configuration Management section of the Software Availability Bulletin (SAB).

The NOS 2.5.3 L688 system described in this document is being released at the following levels:

Operating System	Level 688
Network Host Products	Level 688
Common Product Set	Level 688
CDCNET	Level 688

Audience

The SRB is written primarily for the site analyst. It contains notes and cautions about installation and usage of NOS 2.5.3 L688. Additionally, chapter 4 contains information intended for a system/operations administrator and chapter 5 contains end user information.

CYBER Software Support Hotline

CYBER Software Support maintains a hotline for assistance if you have trouble using our products. If you need help not provided by the documentation or find the product does not perform as described, call one of the following numbers. A support analyst will work with you.

From the USA and Canada: (800) 345-9903

From other countries: (612) 851-4131

Chapter 2

Installation

Notes and Cautions

This section highlights system and installation changes that may significantly affect the installation of NOS 2.5.3 L688.

Changes to Operating System Decks

The following decks were resequenced at NOS 2.5.3 L688:

COMCPFS	COMSPFS	IMS	MSM	PPR
IDS	IMV	HELPLIB	PFS	LMR

To aid in upgrading local modsets, a PL containing the pre-resequenced versions of these decks (containing all NOS 2.5.3 L688 code up to the time of resequencing) is available on the SRB tape as a file named PRESPL.

The following decks are new at NOS 2.5.3 L688:

- COMCGMS - Generalized matrix sort.
- COMCPFP - Permanent file utility preset routines.
- COMCSRI - Stage request interface.
- COMPCLC - Calculate device label checksum.
- GENPFD - Permanent file selection utility.
- PFAM - Permanent file archive file management utilities.
- PFDM - Permanent file disk management utilities.
- PFHELPR - MAGNET helper for tape alternate storage.
- PFMTXTS - Permanent file manager text for SYMPL.
- TAFLOG - Format TAF system journal file.

The following decks were deleted at NOS 2.5.3 L688 (NOTE: The entry points for these decks have been moved to deck PFAM).

- PFATC
- PFCOPY

PSR Summary Report

A summary report of all the NOS PSR modsets in NOS 2.5.3 L688 is available on the permanent file tapes. It is loaded to the installation user name INSTALL with a permanent file name of PSRRPT during the SYSGEN procedure call SYSGEN(SOURCE).

CDCNET Component Order Installation

If you are installing CDCNET for the first time as part of a component order, follow the instructions in the NOS IHB for installing CDCNET. However, if you are adding a CDCNET separate Terminal Interface Program (TIP) in a component order, use the following instructions rather than the instructions under Step 2: Set Up Installation Tools in chapter 4 of the NOS IHB:

- a. Log into user name INSTALL from an interactive terminal.
- b. Execute the following command:

```
RECLAIM,Z./DELETE,UN=NS2688,PF=*/PFGNDL1,PFGCHA1,PFGCHA2,PFGDCNS
```

This command deletes these files from the database. (The files are still there, but they are not processed during normal operations.)

- c. Update the RECLAIM database with information about the files on the component order tape by entering:

```
SYSGEN,UPGRADE,O.O,vsn,density.
```

Replace vsn with the VSN of the CDC supplied component order tape. The VSN is listed in the media number field of the external tape label. Replace density with the tape density of the permanent file tape (HY, HD, PE, or GE).

- d. Log into user name NETADMN from an interactive terminal.
- e. Execute the following command:

```
BEGIN,UPGRADE,DCNPLIB,NETADMN.
```

This command requests the permanent file tape and updates the files on user name NETADMN. Since the CDCNET version level is the same as the original release level of CDCNET, the existing files whose names contain the CDCNET version level are overwritten. The only file modified is the CDCNET object library, file L70vvvv, where vvvv represents the CDCNET version level.

Installation of the software is complete. You must now alter your DI configuration procedures to configure in the separate TIP. Consult the CDCNET Configuration and Site Administration Guide for details.

CODEPL Modsets

CODEPL is automatically loaded to disk on your installation user name by the SYSGEN(SOURCE) procedure call. This code is not on the program libraries, but was used to generate the binaries for this release. For this release, CODEPL contains one modset. The following paragraph describes its effect.

DDL3 An inadequate hashing algorithm is used by DDL3 when building a schema directory. At this release, DDL3 may go into a loop or abort with CRM error 356. Code to fix this problem is available under PSR DL30075.

NOTE

Use of the new algorithm requires that FDBF and CDCS be rebuilt after DDL3 so that they can locate names in the schema directory.

Dual State Support

NOS 2.5.3 L688 includes support of the Dual State product. A build procedure in DECKOPL, a source library, and permanent files are released with this product. Dual state binaries for NOS/VE 1.2.3 L688 are contained on the NOS deadstart tape for Dual State customers. Binaries for NOS/VE 1.2.3 L688 compiled to run on NOS 2.5.2 L678/670, NOS 2.5.1 L670, and NOS 2.5.1 L664/650 are contained on the permanent file tapes. For complete information, refer to the NOS IHB on how to obtain these binaries. Binaries for NOS 2.5.3 L688 compiled to run with NOS/VE systems prior to NOS/VE 1.2.3 L688 are not provided. A site may compile these binaries by following the instructions provided in the NOS IHB.

Dual State Upgrade Installations

When upgrading NOS/VE and/or NOS in a dual-state environment, it is important to first check for the existence of file DSTLIB on the user name used to execute the NVE subsystem. DSTLIB is often used to temporarily store changes to the RUNJOBS or ACCFILE job templates. If this file exists, it should either be purged or if local modifications have been added, renamed prior to executing the X.NVExxxx command from the NOS system console. (xxxx is the last four characters of one of the dual state procedure files.) Any local modifications to file DSTLIB should be migrated to the new NVELIB which matches the dual-state system being deadstarted prior to deadstarting the new NOS/VE level for the first time. If this is not done, DSTLIB, rather than the user library NVELIB on the NOS deadstart tape is used for performing a NOS/VE deadstart.

Significant Problems

The following section describes significant problems known at the time of the release.

NOS 2.5.3 L688 - NOS/VE 1.2.1 L670 Dual State Systems

Sites running NOS 2.5.3 L688 with NOS/VE 1.2.1 L670 will be unable to deadstart NOS/VE if a 721 console is used to deadstart NOS. If a site does not deadstart NOS from a 721 console, this problem will not occur. To avoid this problem when a 721 console is used to deadstart NOS, execute the following steps from an interactive terminal logged in to user name INSTALL.

1. As usual, you must build Dual State according to the instructions in the NOS Installation Handbook. This recompiles NOS/VE 1.2.1 L670 to run on NOS 2.5.3 L688 and leaves the binaries in file PRODUCT.
2. Copy the new released deadstart tape to a local file named NEWSYS:

```
REQUEST,TAPE,VSN=vsu,D=density,LB=KU,F=I,PO=R.
```

Replace vsu with the VSN of the L688 released deadstart tape (contained in the media number field of the external tape label) and density with the tape density of the tape (HY, HD, PE or GE).

```
COPYE1,TAPE,NEWSYS,V.  
UNLOAD,TAPE.
```

3. Obtain the L670 binaries that need to be corrected.

```
ATTACH,PRODUCT/M=W.  
GTR,PRODUCT,NVELIB,U.ULIB/NVELIB  
GTR,PRODUCT,NVERELS,U.ULIB/NVERELS
```

4. Obtain the L688 binaries that correct the mismatch problem.

```
GTR,NEWSYS,BIN.PP/SDA  
GTR,NEWSYS,LIBS,U.ULIB/NVELIB,NVERELS  
GTR,LIBS,ABS.ABS/DSMRUN,DSMDST,DSMTRM  
GTR,LIBS,RELS.REL/DSMRUN
```

5. Create L670 binaries that contain the correction.

```
LIBEDIT,P=NVELIB,B=ABS,N=NEWLIB,U=NVELIB,I=O.  
LIBEDIT,P=NVERELS,B=RELS,N=NEWRELS,U=NVERELS,I=O.
```

6. Put the corrected binaries back into file PRODUCT.

```
NOTE,IN.++*FILE NEWLIB+*FILE NEWRELS+*FILE BIN
LIBEDIT,P=PRODUCT,N=NEWPROD,I=IN.
COPYEI,NEWPROD,PRODUCT,V.
RETURN,*.
```

7. Write a new deadstart tape as directed in chapter 6 (Customizing Installations) of the NOS IHB.

Manual Errata

This section contains updated information for the NOS Version 2 Installation Handbook, Revision J.

CDCNET Host Application and Utilities Installation Parameters

The following section should be added to chapter 7 of the NOS IHB where CDCNET is discussed:

The following CHA1 installation parameters are defined in the common deck INPARU. To change these parameters, place the appropriate update directives in a user file and apply the file to the CHA1 build job.

Parameter	Default	Description
NFASNFILES	50	Number of CDCNET file entries the directory is expected to contain. This parameter is used by the NETBDF utility to build a directory file (NETDIR).
NFA\$PUN	NETOPS	Primary user name that is allowed WRITE permission on the directory file.
NF\$SALTUN	NETADMN	The user name that is permitted WRITE access to files created by the Network File Server. Alternate catlist of these files is also available to this user name.
NL\$SALTUN	NETADMN	The user name that is permitted READ APPEND (RA) access to created log files. Alternate catlist of the created log files is available to this user name.

The following CHA1 installation parameter is defined in the common deck NETCOM. To change this parameter, place the appropriate update directive in a user file and apply the file to the CHA1 build job.

Parameter	Default	Description
NFA\$CATALOG	NETDIR	Name of the CDCNET directory file.

The deck INPARU also contains installation parameters that enable the site to select retain timer values pertinent to Network File Server (NETFS) performance. The retain timer parameters and their default values are defined below.

Default NETFS Retain Timer Values

Installation Parameter	CDCNET File Type	Default Retain Timer Value (in seconds)
RTDUMP	DUMP	0
RTBOOT	BOOT	5
RTLIBRARY	MODULE LIBRARY	180
RTEXCEPTION	EXCEPTION	5
RTCONFPLIB	CONFIGURATION LIBRARY	30
RTTERMPLIB	TERMINAL_DEFINITION_PROCEDURE LIBRARY	30
RTUSERPLIB	TERMINAL_USER_PROCEDURE LIBRARY	30
RTLOADPLIB	LOAD_PROCEDURE LIBRARY	30
RTCONFIGUR	CONFIGURATION	5
RTTERMINAL	TERMINAL_DEFINITION_PROCEDURE	30
RTUSER	TERMINAL_USER_PROCEDURE	30
RTLOAD	LOAD_PROCEDURE	30
RTUNDEF	All others	0

Multimainframe Support Changes

The following changes should be made to the NOS IHB due to NOS multimainframe support.

- On page 7-134, the following line should be added between COMSMLS and COMSMSC:

COMSMMF CALLSYS Multimainframe parameters.

- On page 7-138, the following paragraph should be added between the paragraphs for COMSMLS and COMSMSC:

COMSMMF Parameters

COMSMMF contains parameters which define the multimainframe tables that reside on the link device. Assemble CALLSYS to obtain a listing of COMSMMF.

Parameter	Default	Description
MXMF	4	Maximum number of mainframes that can be present in a multimainframe configuration. Two to seven mainframes are allowed.

Tape Alternate Storage

The following changes should be made to the NOS IHB due to the Tape Alternate Storage feature:

- On page 3-11, a new file and PFGxxxx name should be added to the NOS 2 Package. The file STAGE is loaded to user name SYSTEMX and is associated with PFGNOS2.
- On page 7-3, the ENABLE command for file staging from MSE should be changed from ENABLE,FILE STAGING. to ENABLE,CARTRIDGE PF STAGING.
- On page B-11, the following line should be added between PFGNOSB and PFGNSS1:

PFGNOS2 NOS NOS2 Stage job startup procedure.

Miscellaneous Changes

The NOS IHB also requires updates in the following areas:

- On pages 2-12, 2-13, and 7-57, delete references to pfn in the ADDDI command. The Network Procedure Library Manager (NETPLM) now handles what used to be accomplished by the unique permanent file created by the ADDDI procedure.
- On page 7-13, the following note statement should be added after the CCL installation parameter list:

NOTE:

The field length allocated to CCLBRWE for prolog processing is defined in PPCOM by symbol CCFL. Changes to CCL installation parameters or local code added to CCL may require adjustment of the value of this symbol and reassembly of NOSTEXT and CHARGE.

- On page 7-149, the following parameter should be added to the PPCOM parameters:

CCFL	222B	Initial field length/100B assigned to CCLBRWE for prolog processing. Changes to CCL installation parameters may require adjustment of the value of this symbol.
------	------	---

On this same page, the parameter UEBS should be deleted and the paragraph below the parameters should read:

The assembly constant INSP\$ is defined in PPCOM. If the INSP\$ reference is deleted, 10 bytes become available for site code in both the DSD display and command overlays.

- On page 7-181, the following new parameter should be added to the TAF installation parameter list:

TYPEAH	0	Enables or disables a user to type ahead in TAF. If TYPEAH is given a value of 0 (default), type-ahead is enabled. If TYPEAH is given a value of 1, type-ahead is disabled.
--------	---	---

- On page 7-184, the description for parameter TLDMT should be changed to the following:

TLDMT	600	Maximum number of tasks allowed in a library. The maximum value for TLDMT is 1353.
-------	-----	--

- On page 7-185, the default value for parameter TDTR should be changed from:

$40B + 10B * DTTP + TDEN$

to the following:

$200B + 40B * DTTP + TDEN$

- On page B-2, the table should be updated to reflect the new residence of three libraries. SORT5 now resides in library 52, SYMPL resides in library 53, and TAF resides in library 54. Library 55 is now empty.

Chapter 3

Analysis

Notes and Cautions

This section highlights changes in the NOS 2.5.3 L688 operating system which may be of interest to the site analyst.

Mass Storage I/O Error Code Expansion

Mass storage error codes passed from the drivers to calling PP programs were limited to 4 bits in size. In order to allow expression of more error codes, the error code field size has been expanded to 6 bits. This change affects PP code that checks the error code in the accumulator or in cell RDCT following a call of the RDS or WDS driver routines.

Reading the TAF System Journal File

A program called TAFLOG is available for reading file JOUR0. This program produces a formatted listing of all the information contained in JOUR0 on a local file called JOURNAL. To execute TAFLOG, simply make JOUR0 local to your job and type:

```
TAFLOG.
```

For more information regarding TAFLOG, perform the following commands:

```
ATTACH,OPL=opl.  
MODIFY,S,Z./*EDIT,TAFLOG  
DOCUMENT,L=list.
```

where opl is the name of your composite opl and list is the name of the file to contain the program documentation.

Mainframes with ISHARED Devices Required to Run Same NOS Level

Due to changes in the label data, all mainframes sharing devices must run the same level of NOS. Devices and files are fully recoverable when upgrading to NOS 2.5.3 L688 or when dropping back to earlier versions of NOS after running NOS 2.5.3 L688. When deadstarting the first mainframe of a multmainframe configuration at a new level of NOS, all ISHARED devices should be PRESET.

Backwards Compatibility for Files Destaged to Tape Alternate Storage

If a site destages files to tape alternate storage at NOS 2.5.3 L688 and then later drops back to NOS 2.5.2 L678/670 or earlier and tries to access these files, problems can result. In particular, PFDUMP sets error idle on the family device when it encounters such a file and PFM hangs the PP.

To prevent this incompatibility, modset NS2544 (available on SOLVER under PSR NS2F744) can be installed on a NOS 2.5.2 L678/670 system or earlier. With this modset installed, a NOS 2.5.2 L678/670 or earlier PFDUMP dumps only the PFC and permits for tape alternate storage files, while issuing an ORPHAN PFC ENCOUNTERED error message. It does not set error idle. Similarly, a NOS 2.5.2 L678/670 or earlier PFM with NS2544 installed returns ALTERNATE STORAGE ERROR when a user attempts to access a tape alternate storage file.

Changes Required to TAF Tasks

The NOS 2.5.3 L688 system introduces a new tag called CMBL in NOSTEXT. Since TAF common deck COMKCBP already has a symbol named CMBL, any TAF applications written in COMPASS which contain an SST pseudo-op and reference common deck COMKCBP must include CMBL on the SST instruction as:

```
SST      CMBL
```

NOTE

This change does not affect the task binaries that are already in the task library.

Significant Problems

The following section describes significant problems known at the time of the release.

FTN5 Programs Abort When Using PMD

With the installation of PSRs PMD0198 and FL5A702, FTN5 programs that use a Post Mortem Dump (PMD) may encounter the following error when using a field length greater than 40000B.

```
REPRIEVE BLOCK ERROR.  
LIST OF FILES LENGTH TOO LONG OR ZERO.  
PROGRAM STOP AT XXXXXX.
```

To avoid this error, PSRs PMD0198 and FL5A702 should be deleted.

Recovering Disk Devices Written on Previous Levels of NOS

A problem has been introduced by feature code at NOS 2.5.3 L688 that may cause problems recovering disk devices written on previous levels of NOS.

When recovering a disk device, NOS first tries to read the device label in half track mode and, if that was not successful, then tries to read the label in full track mode. This is done to determine which mode the device was recorded in. However, at NOS 2.5.3 L688, if a disk error is encountered when trying to read the label in half track mode, NOS will then abandon recovery of the device instead of trying to read the device label in full track mode. This can lead to a situation where some full-track disk devices which worked correctly on earlier versions of NOS cannot be recovered on NOS 2.5.3 L688.

When such a failure occurs, the disk error which causes the problem is commonly the result of a sector which was never written by NOS (for example, if the pack was used as a NOS/VE device at some time in the past, and then was initialized as a NOS device at NOS 2.5.2 L678 or earlier). Once a disk device has been initialized at NOS 2.5.3 L688, the problem will not occur.

Code to correct this problem is available on SOLVER under PSR NS2F848 (modset MSM36).

Manual Errata

This section contains updated information for the NOS Administration Handbook, Revision C.

New Account File Messages

The following changes should be made to the NOS Administration Handbook due to the Tape Alternate Storage feature:

- On page 5-12, replace description of "T" type message with "Tape Alternate Storage staging requests".
- On page 5-17, the following line should be added immediately after the description of the SPSF message:

SPSP, filename, username, packname.

- On page 5-18, the following line should be added immediately after the description of the SPSF message:

SPSP Denotes permanent file STAGEPF operation.

- On pages 5-18 and 5-19, delete the descriptions of the following account file messages: STD1, STD2, STD3, STD4, STD5, STF1, STF2, STF3, STF4, STS2, STS3, STS4, STS5, STS6.
- On page 5-18, the following should be added:

The following is a list of the T activity messages:

STBS, filenam, userin, fampack, vsnvs, r.
STES, filenam, userin, fampack, vsnvs, r.
STTA, vsnvs, fampack, numreq.

Identifier	Description
STBS	Denotes stage request received by MAGNET.
STES	Denotes stage request successfully completed.
STTA	Denotes assignment of a staging tape.

Chapter 4 Operations

Notes and Cautions

This section highlights changes to the NOS 2.5.3 L688 system which may be of interest to the administrator responsible for performing user validations and accounting activities and/or the person responsible for operational activities.

Removal of the HD Parameter from the NDL

Since the HD parameter has been changed to be a one-time terminal user request, it is now invalid to specify it in the NDL. Therefore, network administrators must remove it from any TERM or DEVICE statements that may contain it.

At NOS 2.5.2 L678/670, NDLP ignored HD parameters in the NDL. It now issues a fatal error if an HD parameter is encountered.

DOWNed Tape Drive Processing Change

DOWNed tape drives are now included in the resource environment. For jobs that already have tapes assigned or are requesting just one tape, a * appears in the E,P. display next to the VSN to inform the operator that a DOWN or OFF resource is required. This asterisk previously indicated only OFF resources were needed. Also, RESOURC commands now appear in the E,P. display if the needed resources are DOWN. They appear as follows:

```
JSNX yy *RESOURC USERABC -- --
```

where yy is the density of the drive needed. If the requested density drive is not coming back, the operator has the option to drop the job. The RESOURC command jobs will roll out with the status RD (resource down) and issue the message WAITING FOR DOWN TAPE UNIT. The operator must be cautious when assigning tapes to any jobs with the * because potential deadlock situations exist with drives shared by NOS/VE.

DSD Display Changes

The following changes and additions have been made to the DSD displays:

1. H Display Change

The DSD H display is modified to include more information for each file displayed. For the system H display (H,.), the file's first track and length are displayed; and for the local file display (H,jsn.), the file position is displayed as well. For the DIS A and H displays, only the first track is added (space considerations do not allow displaying the length and position).

2. I Display Changes

The DSD I display is modified to include two new columns: SIZE, which indicates the length of each file being printed in PRUs; and DONE, which indicates the number of PRUs that have been printed.

3. New W,A. Display

The new DSD W,A. memory allocation display shows the amount of central memory present at deadstart. It also lists all the extended memory (EM) equipments and lists the following for each EM equipment:

- . Amount of User EM
- . File Space
- . I/O Buffer Space
- . Track Size
- . User EM Block Size

4. W,C. Display Change

The DSD W,C. display is modified to display the PP program name for each PP assigned to a channel. Also, the STATUS field is modified as follows for CYBER 180-class mainframes:

Channel status.

Old - DF CYBER 180-class mainframes only.

- D Indicates that the channel is down.
- F Indicates that the channel flag is set.

New - DCx CYBER 180-class mainframes only.

- D Indicates that the channel is down.
- C Indicates that the channel flag is set.
- x Can be:

- F Indicates that the channel is full.
- E Indicates that the channel is empty.

Change to SRU Limit Calculation Formula

The formula used to calculate the job step SRU limit has changed to the following:

old formula: $\text{SRU limit} = [(\text{index} * 100\text{B}) + \text{KSLI}] * 10\text{B}$

new formula: $\text{SRU limit} = [((\text{index}^{**2}) * 10\text{B}) + \text{KSLI}] * 10\text{B}$

where index represents the value of the index in the validation file and KSLI represents the default limit for SRU accumulation. (KSLI is a parameter in common deck COMSACC.)

Sample values:

Index	Old Validation	New Validation
0	64	64
1	576	128
2	1088	320
4	2112	1088
10B	4160	4160
20B	8256	16448
40B	16448	65600
76B	31808	246080
77B	infinite	infinite

Since existing validation index values now map to new actual SRU limit values, you may wish to adjust validation index values for existing users.

Incompatibilities

This section describes the operational changes made to the system which may be incompatible with previously released NOS systems. The intended audience is primarily the administrator responsible for performing user validations and accounting activities and/or the person responsible for operational activities.

Permanent File Utility Changes

The following changes have been made to the permanent file (PF) utilities:

1. K Display processing

On previous levels of NOS, an error detected during parameter processing automatically brought up the K Display to allow the operator to correct the error. On NOS 2.5.3 L688 systems, parameter and input file processing errors abort the utility unless the new OP=K parameter is specified. If OP=K is specified, such an error causes the K Display to come up.

2. Changes to the output file format

The format of the output file produced by the PF utilities has changed. Changes have been made to both the page headers and to the format of the entries for individual files. If a site has programs which post-process this output file, these programs may require modification.

New MTR Message

MTR hangs as a result of a central memory or extended memory storage overlap between control points or other unexpected storage allocation errors. MTR has been enhanced to issue the following message to the system control point when these situations occur:

MTR HUNG

Since MTR is hung, a deadstart is required. If an express deadstart dump is performed following an MTR hang, we recommend that the PP barrels be toggled to ensure that the contents of PPO are included in the dump. A level 3 deadstart should be tried following the express deadstart dump.

Dump/Restore ESM Changes

It is now possible to set a default parameter block flag to indicate whether or not an operator is prompted for dumping ESM when performing an Express Deadstart Dump (EDD) on a CYBER 180-class machine. Default parameter block values are set by selecting the D option on the Utilities Display. This flag replaces the use of bit 8 of word 13 in the deadstart panel. By default, the flag is not set and no Extended Storage Memory (ESM) prompt is issued. The low speed port channel used to dump ESM can also be set in the default parameter block. During an EDD, this channel is displayed and can be changed as part of the ESM prompt sequence. Since the default parameter block must be present to cause the ESM prompt sequence to be issued, it is not possible to deadstart from tape and perform an EDD that includes dumping ESM via the low speed port; however, dumping ESM via the CPU port on a 170 is unaffected by this change.

Additionally, the Restore CM option has been enhanced to allow restoration of ESM from an EDD dump tape. This option is selected by choosing R on the Operator Intervention Display. Three possible choices are then available: restore CM only, restore ESM only, or restore both. In order to restore CM only or both, a level 3 deadstart must be selected. To restore ESM only, select any nonzero level deadstart. The R option is available only on CYBER 180-class machines.

This feature is intended to allow preservation of the contents of ESM across a level 1 deadstart, where test or maintenance activities have caused the contents of ESM to be lost. After doing the CHECK POINT SYSTEM. command, an EDD dump is taken to save the contents of ESM on tape. When deadstarting to resume system activity, a level 1 is selected, then the Restore ESM option, which causes the contents of ESM to be restored from the EDD tape.

Tape Error Handling

In order to provide better operator notification of fatal tape errors, the system has been modified to set a new status for tape units. When a fatal media or hardware error is encountered while reading or writing a magnetic tape and MAGNET aborts the job, the system sets the tape unit to suspect state. The DSD E,P. display shows the new message MTxx(NTxx) UNRECOVERED ERROR and the E,T. display shows the new status SUSPCT after the tape has been released from the job. When the unit is in suspect state, it is not available for reassignment to any new jobs. At this time, the unit should be checked by a Customer Engineer according to the new procedures documented in the service bulletin for this release. The unit can be restored to service by setting the status to OFF or DOWN and then setting it back to ON via the appropriate DSD commands.

Chapter 5

End User

Incompatibilities

This section describes changes made to the NOS 2.5.3 L688 system which may be incompatible with previously released NOS systems.

Change in RECLAIM Behavior

RECLAIM now aborts if the files specifically selected for processing are not found or do not meet other selection criteria, unless RECLAIM was called with the NA (No Abort) parameter or the job is run interactively. Previously, RECLAIM would continue processing regardless of these conditions.

Batch jobs which call RECLAIM with lists of file names, some of which may legitimately not be present, must now use the NA parameter to avoid aborting in this case. There is no effect on interactive RECLAIM sessions or RECLAIM operations which do not use file names as selection criteria.

Example: A batch job containing the following commands aborts if any of the specified file names (for example, QFILE) are not present in the user's catalog.

```
NOTE,IN./DUMP,TN=TO1,PF=*/PFILE,QFILE,RFILE
RECLAIM,I=IN.
```

The job does not abort if the RECLAIM call is as follows:

```
RECLAIM,I=IN,NA.
```

CATLIST Output Changes

The format of the output file produced by CATLIST has changed in order to clearly identify the residence type of the user's files, that is, whether they reside on disk, on cartridge (MSE), or on magnetic tape. If a user has programs which post-process this output file, these programs may require modification.

FTN5 CHARACTER Variables On Systems With Large Memory

Existing FTN5 program binaries which use CHARACTER type LEVEL 2 variables may abort if the site has more than 2 million words of UEM defined. This is because the address which must be specified for a UEM read or write has a different format when more than 2 million words of UEM are defined. The FTN5 library routines did not set up this address correctly prior to NOS 2.5.3 L688.

This failure should only occur when running an existing absolute binary that was created prior to NOS 2.5.3 L688. The failure may be corrected by recompiling the FTN5 program at NOS 2.5.3 L688.

Chapter 6

Configuration Management

Notes and Cautions

This section highlights changes in configuration management at this release.

Testing Environment

The NOS 2.5.3 L688 system was tested in an environment containing the following components:

Hardware Component	Release Level	CIP Level
Model 810 Microcode	M14AA14	V8 L688
Model 815 Microcode	M11AA14	V8 L688
Model 825 Microcode	M12AA14	V8 L688
Model 830 Microcode	M13AA14	V8 L688
Model 835 Microcode	M20AA15	V8 L688
Model 840 Microcode	M340X08	V8 L688
Model 845 Microcode	M310X10	V8 L688
Model 850 Microcode	M330X11	V8 L688
Model 855 Microcode	M300X09	V8 L688
Model 860 Microcode	M320X10	V8 L688
Model 990 Microcode	M40AX19/20	V8 L688/688A
Model 990 Microcode	M41AX19/20	V8 L688/688A
800 Series Environment Interface (EI)	Level 19	V8 L688
MDD	V13	V8 L688
SCD	V05	V8 L688
DFT	V93	V8 L688
SCI	V02	V8 L688

NOTE

Microcode for the model 870 is the same as for the 860 and microcode for the model 995 is the same as for the 990.

PTF/QTF Transfer Facilities Interconnections

The following are the recommended systems for proper operation of the PTF/QTF Transfer Facilities through RHF/LCN, NAM/CCP, or NAM/CDCNET:

NOS 2.5.3 L688 to NOS 2.5.3 L688 (RHF/LCN, NAM/CCP, and NAM/CDCNET)
NOS 2.5.3 L688 to NOS 2.5.2 L678/670 (RHF/LCN, NAM/CCP, and NAM/CDCNET)
NOS 2.5.3 L688 to NOS/VE 1.2.3 L688 (RHF/LCN and NAM/CDCNET)
NOS 2.5.3 L688 to NOS/BE 1.5 L650 (RHF/LCN)
NOS 2.5.3 L688 to VSOS 2.3 L670 (RHF/LCN)
NOS 2.5.3 L688 to IBM RHF 1.2.2/2.2.2 L671 (RHF/LCN)
NOS 2.5.3 L688 to VAX RHF 1.7 L678 (RHF/LCN)
NOS 2.5.3 L688 to CYBER 120 AOS/VS (NAM/CCP and NAM/CDCNET)

Chapter 7

CDCNET

The information contained in this chapter pertains to CDCNET as used with NOS and NOS/VE systems. Material applies to CDCNET in all types of network environments.

Additional information pertaining to the amount of memory needed in device interfaces (DIs) for supported configurations is contained in appendix A, CDCNET DI Memory Requirements.

Notes and Cautions

The following items provide notes and cautions about CDCNET and associated hardware and software. They are intended to help avoid problems and difficulties in the operation, maintenance, and use of CDCNET.

Configuring the 537 Printer

The `TERMINAL_MODEL (TM)` parameter on the `DEFINE_BATCH_DEVICE (DEFBD)` command for a CDC 537 printer must be specified as `TM=C537`.

The asynchronous TIP discards certain characters in the control character code range (0 thru 1F(16)) from either normal or transparent batch data sent to a printer device configured with `TM=C537`. The characters discarded (that is, DC3, GS, RS, US, FS, CAN and SUB) cause problems with the printer which require operator intervention to correct.

PC To PC File Transfer Problems

Many of the available PC communication packages such as CROSSTALK and PROCOMM allow setting of different protocol timeouts for file transfers via XMODEM, etc. These modes of less strict timeouts are often defined as relaxed mode in the documentation with the indication that they may be needed with certain large networks that do not respond fast enough.

Testing with CDCNET as the interconnect network between PCs has shown that relaxed mode may be necessary even when the network is responding quickly. The problem being that some combinations of the PC communication packages and particular PCs have timeouts shorter than what the protocol specifications define. In general, if problems are encountered using protocols such as XMODEM in PC to PC connections or in PC to host connections, using the relaxed mode of timeouts may correct the problem.

Cost Change for Network Definition Commands

If a value greater than OFFFF(16) is specified for the COST parameter on the following commands, OFFFF(16) is used as the cost of the network.

```
DEFINE_CHANNEL_NET  
DEFINE_ETHER_NET  
DEFINE_HDLC_NET  
DEFINE_X25_NET
```

Additionally, if the trunk_speed parameter is set to 1200 on the DEFINE_HDLC_TRUNK or DEFINE_X25_TRUNK command and no cost is specified on the corresponding DEFINE_NETWORK command, OFFFF(16) is used as the cost of the network.

CYBER 18 Interprets Underscores as Backspaces

The CYBER 18 interprets underscores as backspaces. This causes problems for most NOS/VE commands unless the abbreviated form of the commands are used. Avoid using underscores when creating terminal definition procedures (TDPs) and terminal user procedures (TUPs) or obtain a patch for the 18-5 emulator from CYBER Software Support.

Eight Port LIM

At the time of release for L688, the certification testing of the 8 port RS232 asynchronous LIM was not completed. When certification testing is completed, an announcement will be issued stating the availability date and the process which will be used in the event any additional software is required to support the 8 port RS232 asynchronous LIM.

Configuration Support for TELNET

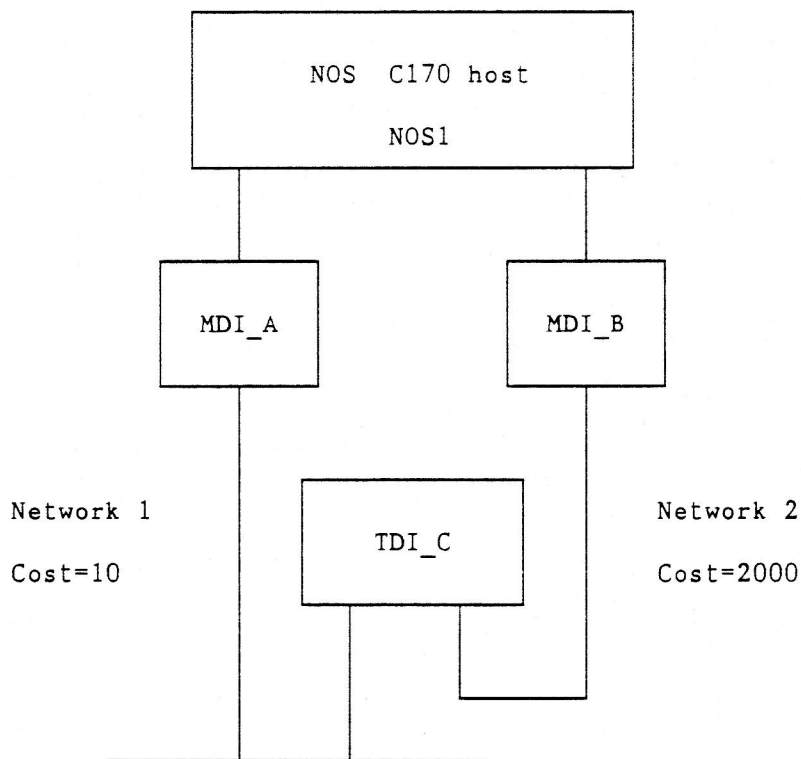
The TCP/IP TELNET capability is supported only on CYBER 930 NOS/VE systems in this release. We have tested with a variety of UNIX implementations and workstations; however, the overall exposure and production use of this capability by experienced TCP/IP users has been limited.

In order to allow us to expand our knowledge of how sites are configuring and using the TCP/IP TELNET capability, we would encourage sites to communicate to CYBER Software Support the types of usage they are making of this product and any difficulties encountered bringing it up in production.

Title Translations Disregard Cost

If a service title is defined in more than one MDI, any TDI that requests that title is given either translation at random without regard to cost (where $\text{cost} = 100,000,000 / \text{line_speed}$).

For example, in the diagram below, TDI_C is connected to MDI_A by a high speed 10 MB Ethernet (cost = 10). It is also connected to MDI_B by a lower speed 56 KB HDLC network (cost = 2000). The service title to access the NOS C170 host (NOS1) is defined in both MDI_A and MDI_B. If a user connected to TDI_C issues a CREATE_CONNECTION (CREC) for NOS1, the user will be given the translation for either MDI, even though the cost to access MDI_A (10) is much lower than MDI_B (2000).



Defining Batch I/O Stations Used with MODE 4A Terminals

When configuring batch I/O stations that may be used with MODE 4A terminals, it is recommended that the `DEFINE_I_O_STATION` (DEFIOS) or `DEFINE_USER_I_O_STATION` (DEFUIOS) commands include the parameter `DESTINATION_UNAVAILABLE_ACTION=DROP`. The default for this parameter is `STOP` and may cause batch input to stop in the middle of a deck if the job destination is unknown.

Frequently Accessed File Performance Improvement

Frequently accessed CDCNET files residing on NOS systems, such as terminal definition procedures (TDPs) and terminal user procedures (TUPs), should have the retain flag set (`RT=Y`) in their directory entries through NETFM. Although this configuration applies only to NOS hosts, the improvement will be seen throughout the network.

This causes NETFS to keep an accessed file local during a retain timer period. If the file is accessed again within that period, NETFS does not need to re-attach the file, thus saving time and PF utilization.

The retain flag for module libraries should be set by the installation procedures by default.

NOTE

See appendix B of the CDCNET Configuration and Site Administration Guide (60461550) for further information about NETFM and retain flags.

NETFS/NETPLM Procedure Library Interlock Problem

When attempting to update a CDCNET procedure library on a NOS host (TUP, TDP, VLP or SC), it is possible for the network procedure library manager (NETPLM) to wait with the library busy while the network file server (NETFS) accesses the library. The wait period may become excessive if:

1. The procedures are called continually (TUPs and TDPs are requested each time a line becomes active).
2. Multiple copies of NETFS access the same library files (shared RMS).
3. The retain timers (NETFS installation parameters) for the libraries are set too long.

The solution to this problem may require one or more of the following actions:

1. Use NETPLM when the system is less busy.
2. Specify a shorter retain timer for the library (rebuild NETFS with a modset changing the library retain timer parameter in INPARU).
3. Specify no retain for a procedure library which has this problem (update the library's entry using NETFM and specify RT=N).

Incompatibilities

This section identifies incompatibilities between this release and previous releases of CDCNET.

Changes in Response to Empty Terminal Command Line

The response to an empty terminal command line differs from that given for previous releases of CDCNET. The following describes the new responses.

1. When an empty terminal command line is entered from the `$CDCNET_COMMAND` connection, the response from CDCNET is as follows:

You may enter CDCNET commands.

2. When an empty terminal command line is entered from a `$INPUT/$OUTPUT` connection, the response from CDCNET is as follows:

Null CDCNET command ignored.

All input from the `$CDCNET_COMMAND` connection is processed as a terminal command. Only input preceded by the Network Control Character is processed as a terminal command from a `$INPUT/$OUTPUT` connection. An empty terminal command line is one which consists of any of the following:

1. Only an end of line character (usually carriage return).
2. Any number of spaces.
3. Only comments.
4. Any combination of spaces and comments.

585 Printer Incompatibilities

The following two items document incompatibilities with the CDC 585 printer:

Two Lines Skipped During Auto Page Eject

In previous releases of CDCNET, the CDC 585 printer defaulted to three skipped lines during auto page eject. In order to be more compatible with other CDCNET printers, the URI TIP has been modified to default the printer to two skipped lines. If auto page eject is in effect, this modification results in two skipped lines (not three) at the bottom of the page. Also, a format effector action of skip to bottom-of-form allows printing to occur on the bottom-of-form line before skipping to the top of the next page.

NOTE

If a vertical format unit (VFU) load procedure other than the released procedure CDC_VFU is used, a similar effect is obtained by placing the `AUTO_PAGE_EJECT_CHANNEL` in the line following the `BOTTOM_OF_FORM_CHANNEL`. If the `BOTTOM_OF_FORM_CHANNEL` does not occur in the VFU load procedure, the URI TIP puts the `BOTTOM_OF_FORM_CHANNEL` in line number = page_length minus 2 or in the line preceding the `AUTO_PAGE_EJECT_CHANNEL` if that channel is specified in the VFU. If the `AUTO_PAGE_EJECT_CHANNEL` does not occur in the VFU load procedure, the URI TIP puts the `AUTO_PAGE_EJECT_CHANNEL` in the line following the `BOTTOM_OF_FORM_CHANNEL`.

FCO 48892 is Needed for Unit Record Interface

A hardware modification (FCO number 48892) was made to the unit record interface (URI) boards used in driving the CDC 585 printer. Software modifications were made to the URI CIM code that depend on this FCO being in place. Therefore, this release of CDCNET software requires FCO number 48892 to drive the CDC 585 printers.

Configurable Batch Parity Feature

The DATA_PARITY (DP) parameter on the DEFINE_LINE (DEFL) command for asynchronous batch printers is no longer ignored. The DP parameter must be specified as ODD on the DEFL command for CDC 536 asynchronous batch printers. The TIP assumes EVEN parity if the parameter is omitted.

If your system supports asynchronous batch printers, any incompatibility in operation can be avoided by ensuring that the DP parameter on the DEFL command for these printers is set to the correct parity before CDCNET is installed.

NOTE

If DP=NONE, the asynchronous TIP transfers 8-bit data for transparent files and 7-bit data for coded files.

Changes to Configuration File Structure

In order to maintain similarity across operating systems for CDCNET configuration procedures and files, the NOS/VE procedures ATTACH_CONFIGURATION_FILE and REPLACE_CONFIGURATION_FILE have been renamed GET_CDCNET_PROCEDURE and REPLACE_CDCNET_PROCEDURE. Their aliases, GETCP and REPCP, match the new procedures available on NOS for managing libraries. The parameters for NOS and NOS/VE have been made as similar as possible. To maintain compatibility, the former command names and aliases have been kept.

To simplify managing the configuration libraries, GETCP now accepts a procedure name of ALL. This allows the site analyst to retrieve all configuration procedures from a library in one operation instead of retrieving them individually by name. Consult the CDCNET Configuration and Site Administration Guide (60461550) for details.

Changes to Configuration File Structure (NOS only)

NOS 2.5.2 L678 provided TUPvvvv, TDPvvvv, CFGvvvv and VLPvvvv (where vvvv represents the CDCNET version level) in ASCII format. These files contained all the released CDCNET configuration files. These files now reside in network procedure library manager (NETPLM) libraries. The new GETCP procedure is used to look at these procedures. Refer to the CDCNET Configuration and Site Administration Guide (60461550) for details about GETCP.

NETITF/Message Template Level Incompatibility (NOS only)

This applies only to sites NOT using current levels of CDCNET host applications and utilities.

You cannot build the NETOU message templates using the following combination of software.

1. A L664 or L670 NETITF
2. A L664, L670 or L678 host templates
3. A L678 BCU CDCNET templates

To correct this problem, the L664/L670 level NETITF must be rebuilt with correction sets CHAA172 and CHAA175 added. This allows NETITF to process all templates correctly. These correction sets are incorporated in level L678.

Changes to Z19 and Z29 Default Terminal_Model_Mapping

The operation of the DEFINE_NP_TERMINAL_GW command differs from that of previous releases in that the default value for terminal_model_mapping has been changed. The default value previously mapped terminal models ZEN_Z19, Z19, ZEN_Z29, and Z29 to terminal class 2. This was inappropriate because the form-feed-sequence for class 2 terminals (EM CAN) is not correct for Zenith terminals. The default mapping is now to the DEFAULT_TERMINAL_CLASS which is site configurable.

Asynchronous Batch Format Effector Actions

The processing for unsupported and undefined format effectors (FE) is changed for asynchronous batch devices. In previous releases, the default action in both cases was to print after spacing one line. Now the default action for unsupported FEs is to discard the line. The default action for undefined FEs is to print after spacing one line.

The unsupported FE action can be controlled with the UNSFA parameter on the DEFINE_BATCH_DEVICE (DEFBD) command and the undefined FE action can be controlled with the UNDFA parameter on the DEFBD command.

NOTE

See page 7-23 for a definition of undefined and unsupported format effectors for asynchronous printers.

Significant Problems

This section identifies significant problems associated with CDCNET. Problems are identified and tracked by Programming System Reports (PSRs).

INITMDI Must Be Run on a NOS Mainframe Connected to MDI

CDCNET added failure management support to the MCI software in L678. A side effect of these changes is that INITMDI must run on the mainframe to which the MDI is connected in order for the MCI to be placed into an appropriate state for communication with PIP, even if the MDI is loaded across an Ethernet or an HDLC trunk. This was not previously true.

To run INITMDI, the procedure INITDCN must be installed on NOS under UN=NETADMN. This procedure is installed as part of the CDCNET installation process. Therefore, CDCNET must also be installed on every NOS system in the network in order for communication to be established between MDIs and NAM, even if the MDIs are loaded across an Ethernet trunk. This also was not previously true.

If the NOS CDCNET products are not installed (that is, the network is managed from NOS/VE) then the following steps should be taken:

1. Create the following public, indirect access file INITDCN on user name NETADMN:

```
.PROC,INITDCN,TOOL.  
REVERT,INITDCN FOR TOOL=INMD (INITMDI) ONLY  
.DATA,ZINMD.  
.PROC,ZINMD,CIN.  
.* INITMDI CALL WITH DUMMY VERSION PARAMETER  
$REVERT,EX,INITMDI(L=OUTPUT,DT=ND,NIN=CIN,B=O,D=O,V=1111)
```

2. The CDCNET NAM application INITMDI and the PP routine PIM must be on the NOS deadstart tape.
3. The job record JOBINMD in the NAMSTRT file on UN=NETOPS and the PARAM records must include the command JOB(JOBINMD,IN,SY,NS)

Items 2 and 3 are installed with the CDCNET host applications product CHA1.

This problem was reported by PSR AC1G155.

NPA REFCLF Reprocesses a Previously Processed Log File

The network performance analyzer (NPA) subcommand REFORMAT_CDCNET_LOG_FILE (REFCLF) operates under an incorrect assumption that all log files are in increasing date and time order. Misleading reports result because REFCLF can reprocess or never process some data.

When a log file is reformatted to a database, NPA records the time of the last log message into the database. On a subsequent reformat, any log message with a time earlier than the time recorded in the data base is skipped. An example of a lost data situation is reformatting two log files separately and in the wrong order. Reformatting the same two log files in a single NPA reformat run does not result in a lost data situation since NPA sorts out the order.

This problem was reported by PSR AC1E105.

CREATE_CONNECTION (CREC) Command Lock Out Effect

The CREC command does not complete until the selected service accepts or rejects the user's connection attempt. Under some conditions, a service may be unable to immediately respond to a connection attempt. While the CREC command processor is waiting for a response from the service, the user's working connection is the connection from which the CREC command was issued. The user is put in solicited input mode where input is accepted by the network but is not processed until the CREC command completes. The user is essentially locked out until the CREC command completes.

During a CREC lock-out, the user may enter the BREAK or ATTENTION character to cause input to be processed. A message received from the network operator during this time also causes input to be processed. The input following either of these events is treated as a command and is discarded if the CREC command was issued from the \$CDCNET_COMMAND connection. If the CREC command is entered from a \$INPUT/\$OUTPUT connection, the input is forwarded on that connection. Any output from that \$INPUT/\$OUTPUT connection is delivered to the terminal. In either case, until the CREC command completes, the connection from which it was issued remains the working connection and no terminal user commands are processed.

This problem was reported by PSR AC1E560.

Explicit Configuration Causes Log/Alarm Messages

Configuration files containing commands defining the ETHER/CHANNEL/HDLC trunk and network that a DI is loaded over cause log and alarm messages indicating that the trunk and network are already defined. These commands are performed implicitly by the DI software load process. Explicit use of these commands does not permit redefinition of the trunk and network names which were implicitly defined. The presence of these commands in configuration files does not adversely affect the loading and configuration process. The log and alarm messages mentioned above can be ignored. However, any other commands in the configuration file which mention the trunk or network name fail if the default trunk and network names are not used and the configuration process is affected.

This situation is most likely to occur under the following circumstances.

1. When using TDI and NDI configuration files created by MANCC which contain `DEFINE_ETHER_TRUNK` and `DEFINE_ETHER_NET` commands for the trunk and network which was implicitly defined.
2. In configurations where the site has chosen to allow loading over multiple trunks (the boot enabled switch is set for multiple cards). In this case, all trunks and networks must be defined explicitly since it is not known which card slot will be configured implicitly. The above typically applies to dual ESCI/MCI/HDLC configurations where the site has chosen to allow loading over both ETHER/CHANNEL/HDLC trunks.

In the first case, it is recommended that the unnecessary commands be removed from the configuration files or that the network administration and operations personnel be advised that these log messages and alarms are not a cause for concern. Additionally, any other commands in the configuration files that mention the ETHER trunk or network which is implicitly defined must be changed to specify the trunk name assigned by the load process and to omit the network name parameter (allowing the default value to be used).

In the latter case, it is recommended that all commands in the configuration files that mention the ETHER/CHANNEL/HDLC trunks or networks be changed to specify the trunk names assigned by the load process and to omit the network name parameters (allowing the default values to be used). The log messages and alarms indicating that the trunk and network used to load the DI are already defined, are not a cause for concern. The load process assigns the following trunk names:

1. `$ESCIn` for an ETHER trunk, where *n* is the slot number in the DI that contains the ESCI card.
2. `$MCIn` for a CHANNEL trunk, where *n* is the slot number in the DI that contains the MCI card.
3. `$LIMn_PORTm` for an HDLC trunk, where *n* is the slot number in the DI that contains the LIM card and *m* is the number of the port on the LIM card to which the HDLC line is connected.

This problem was reported by PSR AC1F472.

The Fold_Line Terminal Attribute is Not Processed Correctly

When the fold_line (FL) terminal attribute is ON, an intermittent problem occurs that causes a line to get folded one character prior to the page width boundary.

It appears that the folded line is one character off of where it should be after the LF/CR sequence. However, there is no loss of data.

This problem was reported by PSR AC1F949.

Performance Degradation From Bad Modem, Cable, or LIM

A bad modem, cable, or LIM can cause an HDLC or X.25 link to continually change status, from link up to link down, thereby causing considerable performance degradation throughout the network. If changing the retransmission_limit parameter on the DEFINE_HDLC_TRUNK (DEFHT) or DEFINE_X25_TRUNK (DEFXT) command to 15 does not correct the problem, you should stop the trunk using the STOP_NETWORK (STON) or the STOP_X25_INTERFACE (STOXI) operator command or disconnect the cable from the LIM.

A large quantity of log 657 messages may be an indication this problem exists.

This problem was reported by PSR AC1F635.

DISPLAY_SERVICES Command Causes DI Congestion

The execution of the DISPLAY_SERVICES (DISS) command can cause excessive congestion in some network configurations. The congestion level is most severe in configurations which consist of many Ethernet and HDLC network solutions and where the site has elected to display many services. In some cases, the congestion is so severe that it causes DI resets.

A workaround for the problem is to configure only a few (3 or less) displayable services in each TDI.

An alternative workaround, which allows a site to display the status of all their interactive services, is to use the keyword value INFINITE for the STATUS_INTERVAL parameter on the CHANGE_SERVICES_DISPLAY command. This keyword value is new for this release and instructs the DISS command not to use the CDCNET Directory services for obtaining the status of the displayable services. It is the use of the directory service which causes the congestion problem. When the INFINITE keyword is used all services can be safely displayed; however, the accuracy of the reported status is reduced because the status of the displayable services is only updated based on the success or failure of CREATE_CONNECTION (CREC) attempts to the services.

This problem was reported by PSR AC1G294.

TDIs Must Be Reset If Ethernet Cable is Disconnected

If an Ethernet cable is disconnected, it causes the ESCI subsystem to be shutdown. The network can be restarted by issuing the following commands from NETOU:

```
CHANGE_ELEMENT_STATE DN=$ESCIvalue S=ON  
START_NETWORK NETWORK_NAME=name
```

The terms value and name refer to configuration specified parameters.

In a TDI with one ESCI, where ESCI is the only path to NETOU, the DI must be manually reset to restart the ESCI subsystem.

This problem was reported by PSR AC10277.

Metrics for HDLC and X.25 Trunks

The START_LINE_METRICS (STALM) and STOP_LINE_METRICS (STOLM) commands start and stop metrics for HDLC and X.25 trunks. These statistics cannot be controlled through the START_NETWORK_METRICS (STANM) and STOP_NETWORK_METRICS (STONM) commands.

To start statistics for an HDLC or X.25 trunk, enter a STALM command with the name of the trunk specified for the LINE_NAME parameter. To stop statistics for an HDLC or X.25 trunk, enter a STOLM command with the name of the trunk specified for the LINE_NAME parameter. Both summary and expanded statistics may be specified.

For example, to start expanded statistics on an HDLC trunk of name NEW_YORK_HDLC_TRUNK with a 10 minute reporting interval enter:

```
START_LINE_METRICS LINE_NAME=NEW_YORK_HDLC_TRUNK,...  
REPORT_INTERVAL=600, GROUP=EXPANDED
```

To stop these statistics enter:

```
STOP_LINE_METRICS LINE_NAME=NEW_YORK_HDLC_TRUNK,...  
GROUP=EXPANDED
```

This problem was reported by PSR AC1E912.

Least Cost Path Used for Internet Traffic

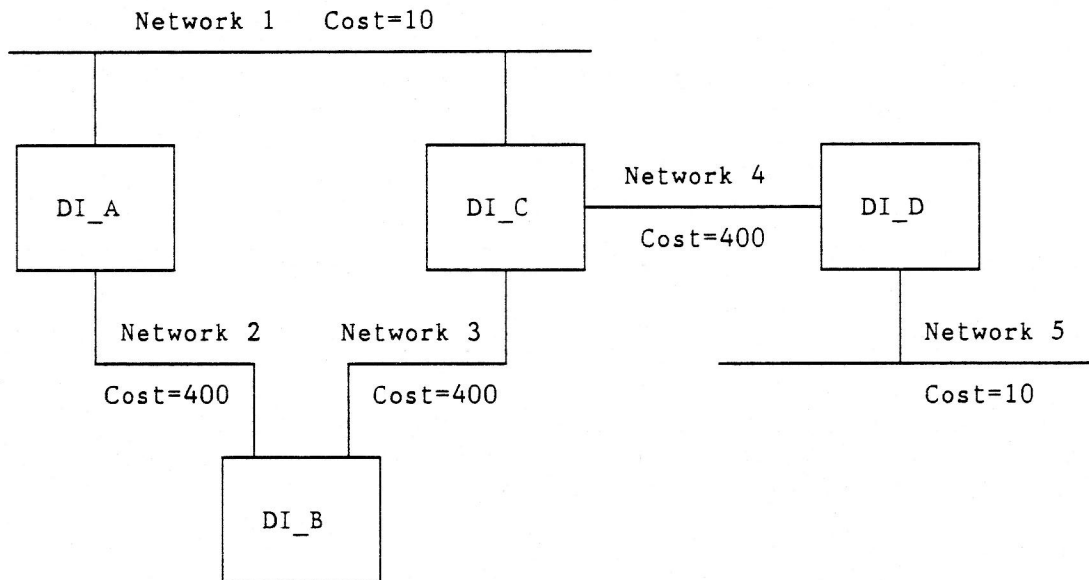
If more than one path exists between a source DI and destination network, the least cost path (or paths if some are equal) is used for Internet (3B) traffic between the two locations. For example, in the diagram below Internet messages sent from DI_A to Network 5 are sent via Network 1 since its cost ($10+400+10=420$) is lower than Networks 2 and 3 ($400+400+400+10=1210$).

If the least cost path is congested, other more costly paths are used to share the load in order to reduce the congestion. If Network 1 is congested, the path which includes Networks 2 and 3 is also used for messages destined for Network 5.

However, if the congestion is in a network which is common between the two paths, the higher cost path is still used to share the traffic. If Network 4 is congested, both paths are used but the congestion is not reduced and unnecessary traffic is added to slow Networks 2 and 3; this might cause congestion to those networks.

To prevent this, circular paths should be avoided if possible. An example is two slow networks that lead to a remote location from different DIs locally connected (Networks 2 and 3 in the diagram).

This problem was reported by PSR AC1G435.



Initial User TELNET Connection May be Discarded (NOS/VE only)

If two User TELNET connections occur simultaneously, one of the User TELNET connections may be discarded. The condition occurs when a CDCNET terminal user is connecting to a TCP/IP host. For example:

CDCNET Terminal Command	Description
CREC odeon ----->	CREATE_CONNECTION to TCP/IP host
Connection \$A created. ----->	CDCNET responds with connection created
You may enter CDCNET command. --->	CDCNET responds with CDCNET command mode prompt indicating that the connection has been disconnected (No banner from TCP/IP host).

If you see this condition, a reconnect to the TCP/IP host will typically be successful.

This problem was reported by PSR AC1G241.

Passwords not Overwritten on TELNET Connections (NOS/VE only)

Login passwords are not overwritten when logging into NOS/VE using a Server TELNET connection and a single line login. In order to have the login password overwritten, the user should log in by entering only the username in response to the User: prompt and then entering either the password or password and family in response to the Password: prompt.

This problem was reported by PSR AC1G182.

Avoid Using the TELNET ABORT_OUTPUT Command (NOS/VE only)

The Server TELNET command ABORT_OUTPUT (AO) and the CDCNET %A user interrupt do not work correctly and should not be entered.

The User TELNET command INTERRUPT_PROCESS (IP) or CDCNET command %2 through %9 may be used to discard output, but the user is warned that this also results in the termination of the user process.

This problem was reported by PSR AC1G407.

DEFINE_NP_TERMINAL_GW Only Registers 1st Batch Title (NOS only)

If a list is specified for the BATCH_TITLES (BT) parameter of the DEFINE_NP_TERMINAL_GW (DEFNTG) command, only the first title of the list is registered. The subsequent titles in the list are ignored and do not serve as aliases.

This problem was reported by PSR AC10242.

Card Input Problem With MODE 4A Terminals (NOS only)

A problem may occur when reading cards from a MODE 4A terminal on NOS. If the user logs out of RBF (RBF END command) all subsequent card input is discarded, even if the user logs back into RBF. If the line is disconnected then reconnected and the user logs back into RBF, card input is accepted again.

RBF corrective code for this problem is available under SOLVER, PSR RB5A141.

MCI Online Diagnostic May Fail Erroneously (NOS only)

The MCI online diagnostic may fail erroneously when testing a MCI connected to a NOS host. The failure, which results in an error code of 207xx (where xx can be any two digits) is due to the NOS MDI initialization program (PIM) not using a large enough timeout value when waiting for the MCI general status busy bit to clear.

This problem was reported by PSR CHAA228.

3270 Line Goes Down When Streaming Output

The console for a 3270 terminal emulator may get set to down status when output is streamed to the 3270 console without intervening user input. When this happens, the host appears to have stopped transmitting, all connections to hosts are deleted, and the keyboard may be locked. If the line is defined with a connection disconnect timeout, the line may also be disconnected. On a dedicated line, the device is reactivated by depressing the RESET key followed by the ENTER key. When the device is reactivated, the user may log in and recover the disconnected jobs. There is some indication that the problem may be caused or aggravated by line noise and/or protocol violations by a terminal emulator.

This problem was reported by PSR AC1F468.

NPA and NOS COLLECT File Name Conflict (NOS only)

There is a potential conflict between CDCNET NPA file names and the NOS COLLECT utility file names. This conflict can occur if your site changes the default residence of NPU dump files from NETOPS to NETADMN and the network invocation number (NIN) equals or exceeds the last three digits of the CDCNET build level at release. A subsequent COLLECT execution could result in the purging of NPA files NPAvvvv, NPBvvvv and NPEvvvv (where vvvv is the CDCNET version level).

This problem was reported by PSR AC10199.

PFDUMPs Lock Out CDCNET Access to Files

On NOS, when the File Server (NETFS) attempts to access a file on a user index that is interlocked by the PF Utilities, all file service stops until the PF Utility releases the interlock. The most commonly accessed files are terminal user procedures (TUPs), and terminal definition procedures (TDPs).

This problem was reported by PSR CHAA220.

GETCP problem when @ is in PN parameter (NOS only)

When using procedure GETCP and the PROCEDURE_NAME (PN) parameter has a commercial at sign (@) in it, the procedure must be called in line mode and the terminal must be in ASCII (as compared to NORMAL) mode.

To specify a procedure name which contains a (@) or an underscore (_), the procedure name must be enclosed in dollar signs, for example:

```
BEGIN,GETCP,DCNPLIB,tup1,TUP,$@PSUTUP$.
```

This problem was reported by PSR NS2F834 and AC1G397.

NJEF Log Messages

The NJEF TIP was modified to generate log messages reporting line down conditions such as excessive line errors, block control byte (BCB) errors and BSC protocol errors. These messages are not currently logged by default.

If you use the NJEF TIP, the following command should be added to your configuration file for the DI containing the NJEF line definition to assist in isolating these line errors.

```
CHANGE_SOURCE_LOG_GROUP ADD_MESSAGE_NUMBER=(1528,1529,1530)
```

This problem was reported by PSR AC1G371.

Error in DEFL Response When Invalid LINE_SPEED Specified

If an invalid LINE_SPEED (LS) is given on the DEFINE_LINE (DEFL) command, the command response received is:

```
Line speed xxx is not supported by the specified TIP.
```

The xxx value given is not the invalid line speed value entered.

This problem was reported by PSR AC1G349.

Manual Errata

This section documents information prior to publication in the CDCNET manuals.

Changes to ANALYZE_CDCNET_DUMP (ANACD) Utility

The following information was omitted from the CDCNET Network Analysis Manual (60461590).

Header Lines Added to ANACD Display Files

Paging improvements and headings are added to ANACD display files. The headings identify the ANACD level, the time and date of the execution of the dump analyzer, and the subcommand being processed.

The following is an example of the header lines displayed at the beginning of terminal output for an ANACD session:

```
COPYRIGHT CONTROL DATA CORPORATION 1985, 1986, 1987  ALL RIGHTS RESERVED
ANACD - Level 3502          September, 21, 1987  4:36 PM          PAGE          1
```

Subcommand output directed to mass storage files also has a similar header line along with an echo of the subcommand and its parameters at the top of each page of display output. The subcommand name is expanded regardless of how it was input, but the parameters are echoed exactly as they were entered. For example:

```
COPYRIGHT CONTROL DATA CORPORATION 1985, 1986, 1987  ALL RIGHTS RESERVED
ANACD - Level 3502          September, 21, 1987  4:36 PM          PAGE          1
DISPLAY_MEMORY 400 RC=128(10) O=MEMOUT
```

NOTE

Subcommand output displayed at the terminal does not have headers. Also note that subcommand lines up to 256 characters are accepted and written to the display file without truncation, although printing on paper designed for 80-columns may result in loss of visible data.

New Parameter on DISPLAY_MEMORY_USERS

An optional parameter has been added to the DISPLAY_MEMORY_USERS (DISMU) subcommand to direct the generation of a file of ANACD directives. When this file is processed, the contents of the memory extents associated with the owners is displayed. The new parameter is positioned after the existing output parameter; therefore, it does not introduce an incompatibility except for its displacement of the STATUS parameter, which still appears as the last parameter by SCL convention.

The new parameter name is ANACD_DIRECTIVES (AD). Its value is the name of a user file to receive the directive lines that DISMU generates. If the AD parameter is not specified, no directives are generated. An AD file is only written for DISPLAY_OPTION = FULL mode. The AD file contains directives for the extents associated with the memory owners that are selected for display by the selection parameters (MU, ET) on the DISMU subcommand. Extents which are heads of buffer chains generate DISPLAY_BUFFER_CHAIN (DISBC) directives and all memory extents generate DISPLAY_MEMORY (DISM) directives. Buffer extent types which are not heads of chains do not generate any directives since they should appear in the display of the buffer chain starting at their respective heads. The directive lines are legible and may be freely edited before submitting to ANACD for processing. There is no automatic submission of the directives file to ANACD for processing. When processed, the directives in turn direct their output to files called ZZZDABO (for DISBC) and ZZZDAMO (for DISM) unless these names are changed by editing.

NOTE

On NOS/VE, the directives files can be edited (EDIT_FILE) and included for ANACD processing (using the INCLUDE_FILE command) without leaving the ANACD session.

On NOS, the current session must be terminated before the directives file can be edited and processed by a later session.

Entries Added to DISPLAY_MEMORY_MAP

The display for the ANACD subcommand DISPLAY_MEMORY_MAP includes entries from the deloadable module list after the entries from the loaded module list. The lists have headings which differentiate one from another.

In addition, any requests to decode symbolic entry point names (either for subcommand parameters or internally) search the deloadable list after an unsuccessful search of the loaded list.

Changes to Stack Frame Layout in DISPLAY_CALL

The layout of the stack frame information displayed by the DISPLAY_CALL subcommand has undergone changes. The hex locator line at the top of the SF display is reversed to show:

0 1 2 D E F

The stack frame memory display is also reversed and is from low memory at the top of the page to high memory at the bottom (that is, the same order as DISPLAY_MEMORY). The header is changed to read:

STACK FRAME STARTING AT <low memory address>
AND ENDING AT <high memory address>

In addition, the offsets which were on the left hand side of the stack frame display are now replaced with the absolute addresses. This format now starts with the A6 pointer as the first 4-bytes of each frame. For the most recent frame, this A6 pointer is usually the same as A7; where it is not, the frame is considered to be a partial frame and only the part delineated by A6 and A7 is displayed. A new warning message is output if the A7 pointer is larger than the A6 pointer, since this would describe a stack frame of negative size and therefore indicate some sort of corruption of the stack pointers in the task control block (TCB).

Errors Added to DISPLAY_EXEC_ERROR_TABLE

Additional error information found in the Main Processor Board (MPB) status register is now displayed by the ANACD subcommand DISPLAY_EXEC_ERROR_TABLE.

1. For bus errors, the MPB status register is examined and a line is displayed that reports the first failure address and whether the error was dtack_time_out, bus_lock_time_out or parity_error. If the error was due to parity or dtack_time_out, the access code and type fields from the MPB status register are also extracted and displayed.
2. For System Main Memory (SMM) errors, the display is enhanced to show the device (slot number) that was accessing the SMM. This information is decoded from the SMM error log which is still displayed in full. In addition, the executive error code is checked against the bits in the SMM error log which also describe the error. A warning is issued if the SMM error log is not consistent with the executive error code.

Asynchronous Printer Support

The following table indicates the format effectors for asynchronous printers and the action that each performs.

Format Effector	Action Before Printing	Action After Printing
Space	Single Space	No Space
+	No Space	
-	Triple Space	
/		
0	Double Space	Page Eject
1	Page Eject	
A		
2-9	Unsupported	
B-N	Unsupported	
PM	Unsupported	
Q-Z	Unsupported	
!	Undefined	
"	Undefined	
#	Undefined	
\$	Undefined	
%	Undefined	
&	Undefined	
'	Undefined	
(	Undefined	
)	Undefined	
*	Undefined	
,	Undefined	
.	Undefined	
:	Undefined	
;	Undefined	
<	Undefined	
=	Undefined	
>	Undefined	
?	Undefined	
@	Undefined	
O	Undefined	
P	Undefined	

Diagnostics for Premature Termination of Input Jobs (NOS/VE only)

The following information was omitted from the CDCNET Batch Device User Guide (60463863).

The following messages are routed by NOS/VE to the operator console to indicate the reason for the premature termination of an input job.

RECEIVER ERROR

The receiving process in the destination host has violated the batch transfer protocol.

SENDER ERROR

An unrecoverable internal error has been detected in the DI's sending processes (TIP or BTF).

OPERATOR DROP

The user at the operator console has entered a command to terminate the input job transfer.

DEVICE DELETED

The input device has been deleted from the configuration as a result of a line down condition.

UNKNOWN DESTINATION

The destination host cannot be located.

BATCH COMMAND TOO LONG

The batch command prefixed by the /*BC string exceeded 256 characters.

BATCH COMMAND SYNTAX ERROR

The batch command prefixed by the /*BC string violated the SCL syntax.

UNKNOWN BATCH COMMAND

The batch command prefixed by the /*BC string is not recognized.

ROUJ PARAMETER ERROR

A bad parameter is specified on the ROUTE_JOB batch command.

ROUJ JOD ERROR

A control facility name was specified for the JOB OUTPUT DESTINATION parameter on the ROUTE_JOB batch command, but was not accompanied by both the USER NAME and the USER FAMILY parameters.

ROUJ JOUN ERROR

A USER NAME parameter was specified on the ROUTE_JOB batch command and was not accompanied by the JOB OUTPUT DESTINATION parameter.

ROUJ JOUF ERROR

A USER FAMILY parameter was specified on the ROUTE_JOB batch command and was not accompanied by the JOB OUTPUT DESTINATION parameter.

Configuring Printers

The following information was omitted from the CDCNET Configuration and Site Administration Guide (60461550).

When configuring printers for use on NOS/VE, the only difference between those printers with attached consoles (for example, HASP, Mode 4, 3270) and those without (CDC 533/536, CDC 537, CDC 585) is that the standalone printers (those without) are controlled by a console separate from the printer, usually an asynchronous terminal or the host console.

When configuring batch devices on NOS, there are several differences in the way printers are configured, depending upon whether they have attached consoles or are standalone.

When the I/O station is driven by RBF, it is treated as a private I/O station, that is, only files belonging to the user logged into the terminal console are sent to the printer. When the I/O station is driven by PSU, it is treated as a public I/O station, that is, only files routed to the central site are sent to the printer. The PSU printers are always controlled from the host console, not a network terminal.

The presence of an I/O station with a required operator device determines how it is controlled, by RBF or PSU. HASP, Mode 4, and 3270 printers are not supported by PSU and therefore must be configured with a required operator device, either explicitly with the `DEFINE_I_O_STATION (DEFIOS)` command or implicitly with a `DEFINE_USER_I_O_STATION (DEFUIOS)` or `DEFINE_NP_BATCH_STATION (DEFNBS)` command. The I/O station must have all devices on the same line. Operator configured I/O stations (defined using `DEFUIOS` or `DEFNBS`) must have a console, which automatically becomes the required operator device and therefore can be controlled only by RBF.

Printers without consoles must be auto-configured, using the `DEFIOS` command. Printers on more than one line, on more than one DI can comprise an I/O station. The CDC 537 and CDC 585 printers are not supported by RBF and therefore must not have required operator devices assigned to them on the `DEFIOS` command. Printers without consoles must be auto-logged into PSU by specifying the device name in an `NDL USER` statement.

When the required operator device of an I/O station creates a connection to a network products batch gateway, the gateway becomes the control facility of the I/O station, regardless of what control facility is specified on the `DEFIOS` command. That is, the control facility parameter appears to be ignored. If the control facility is specified and is also an `SCFS/VE` name, `SCFS/VE` becomes the control facility for the I/O station when the I/O station operator terminates the connection to the NOS gateway.

The CDC 533 and CDC 536 printers are also driven by PSU, but they should always be configured as interactive/VTP devices using the DEFINE_TERMINAL_DEVICE (DEFTD) command when they are connected to NOS. That is, they are not part of an I/O station and are not defined with the DEFINE_BATCH_DEVICE (DEFBD) command. The CDC 537 printer can be configured either as an interactive device, similar to the CDC 533/536 printers, or as a batch device, similar to how they are configured on NOS/VE. It is preferable to configure them as batch devices, as the performance is better using the batch interface.

Printers defined as interactive devices must be auto-logged into PSU, using either a PUTS command in a TUP or by specifying the terminal device name in an NDL USER statement in the LCF.

The following table summarizes the differences between configuring the two types of printers.

	With Console	Standalone
Host Application	RBF	PSU
Actual station usage	Private	Public
Printers supported as batch devices	HASP, Mode 4, 3270	C585, C537
Printers supported as interactive devices	None	C533, C536, C537
Controlled from	Terminal Console	Host Console
Configuration commands allowed	DEFIOS, DEFUIOS, DEFNBS	DEFIOS
I/O station types allowed	Auto-configured or operator configured	Auto-configured
I/O station extent	Devices must be on single line	Devices may be on more than one line
Control Facility determined by	Batch G/W to which user does %CREC	Batch G/W title specified on DEFIOS
Required Operator Device	Required	Not allowed
Can switch to VE	Yes	No

Future Considerations

This section documents changes to CDCNET for future releases.

Change in the Size of Network IDs

There will be a change in the range of values allowed for the network id used to identify a network solution.

The commands below include a parameter called NETWORK_ID which is used to specify the network identifier of a given network solution. At present, the value of this parameter can range from 1 to 7FFFFFFF(16).

```
DEFINE_ETHER_NET    (DEFEN)  
DEFINE_CHANNEL_NET  (DEFCN)  
DEFINE_HDLC_NET     (DEFHN)  
DEFINE_X25_NET      (DEFXN)
```

The values for the NETWORK_ID parameter in the above commands will be changed to range from 1 to 0FFFF(16). This will be done to facilitate support of International Standards Organization (ISO) Open Systems Interconnection (OSI) software.

Currently, a warning message is given if any network is defined with a network id greater than 0FFFF(16).

This change affects only those sites using values larger than 0FFFF(16) for the network identifier of one or more network solutions.

Changes to DEFINE_BATCH_DEVICE Parameter Names

In order to more closely follow NOS/VE system naming conventions, several parameter names for the DEFINE_BATCH_DEVICE command have been modified. The old parameter names are still supported in this release but will be removed in the next release. The changes are as follows:

Old Name and Abbreviation	New Name and Abbreviation
un_defined_fe_action (udfa)	undefined_fe_action (undfa)
un_supported_fe_action (usfa)	unsupported_fe_action (unsfa)
ext_characteristics_1 (ec1)	external_characteristics_1 (ec1)
ext_characteristics_2 (ec2)	external_characteristics_2 (ec2)
ext_characteristics_3 (ec3)	external_characteristics_3 (ec3)
ext_characteristics_4 (ec4)	external_characteristics_4 (ec4)

Appendix A

CDCNET DI Memory Requirements

The information contained here pertains to the amount of memory needed for CDCNET Device Interfaces (DIs) for supported configurations.

General Considerations

As with other computer systems, the size of configuration supported by a DI system is determined both by the memory installed in the system and by the processing needed to service the configuration. Typically, if the amount of memory installed in a system is small, memory establishes the limits of configuration. If the amount of memory installed is large, processing establishes the ultimate limits to configuration. However, the amount of memory needed for configuration varies by DI type, with some types requiring larger amounts of memory than others. The types requiring the smallest amounts of memory are limited by processing rather than memory requirements.

Essentially, two issues determine the memory requirements for a DI system.

The first issue is the type and number of devices connected to the DI. This issue includes the number of interactive and batch devices to be serviced by the DI, the terminal interface program (TIP) used to service the devices, and the number and type of network trunks serviced by the DI.

Note that the configuration limits expressed here assume that all devices are in active use. Some sites (for example, office environments) may rarely have half of the devices in use at the same time. For those sites, the configuration limits may be increased (for example by 50%) but at the risk of overloading a DI during peak use. Sites that involve constant terminal use (for example, ticket offices) should not exceed these limits.

For CDCNET L688, the supported types of devices and trunks include:

- Asynchronous interactive terminals
- Asynchronous terminals using X.PC protocols
- Asynchronous communications lines for interactive passthrough ports
- BSC 3270 interactive terminals connected via binary synchronous communications lines
- BSC 3270 printers
- Asynchronous interactive printers supported by NOS Printer Support Utility (PSU)
- Asynchronous batch printers supported by NOS/VE batch services
- HASP workstations and their attached devices
- Mode 4 workstations and their attached devices
- Unit Record Interface (URI) printers supported by NOS/VE batch services
- URI printers supported by NOS PSU
- X.25 PAD interactive support (X.29 PAD Server)
- Ethernet trunks
- X.25 trunks
- HDLC trunks
- Channel trunks to host (NOS or NOS/VE)
- Network Job Entry Facility (NJEF) communications lines
- TCP/IP Gateway (TELNET and/or FTP)

The second issue is the number of interactive, interactive passthrough, batch and/or application connections that can be simultaneously used through a DI. Generally, more memory is used as the number of active connections increases.

The number of active connections that can be established varies by device. Each interactive terminal may establish up to 16 simultaneous interactive connections (release default is 4) to either host interactive services or to passthrough ports. For X.PC terminals, each X.PC communication line is limited to 16 simultaneous interactive connections (again, the release default is 4).

Although the maximum number of connections per terminal is configurable, Control Data believes that four connections is sufficient for most users. The examples in this section are therefore based on a practical limit of four active connections per interactive user. Each batch device may have one batch connection or, for a NOS asynchronous printer, one interactive connection. Each passthrough port may have one connection. CDCNET applies no limits to the number of application-to-application connections that may be established. Typically, the number of simultaneous application to application connections through any DI system is small (less than four).

Reviewed Configurations

Only certain combinations of these devices and trunks are reviewed in detail here, though guidelines for calculating requirements for other configurations are given later. The combinations reviewed are as follows:

TDI

An Ethernet trunk for connection to the network, up to 64 communications lines to asynchronous, HASP, 3270 or URI devices, or passthrough ports serviced by one to three CIM boards.

NOS/VE MTI

A channel trunk for connection to a NOS/VE host, up to 64 communications lines to asynchronous, HASP or URI devices serviced by one to three CIM boards.

NOS MTI

A channel trunk for connection to a NOS host, up to 64 communications lines to asynchronous, HASP, 3270 or URI devices serviced by one to three CIM boards.

RTI

An HDLC trunk for connection to the network, up to 59 communications lines to asynchronous, HASP, 3270 or URI devices serviced by one to three CIM boards.

X.25 PAD NDI

An Ethernet trunk for connection to the network. Up to 16 X.25 trunks for X.29 PAD service (called X.25 AsyncTip) or for non-CDCNET connections (called X.25 Gateway).

X.25 PAD/NS NDI

An Ethernet trunk for connection to the network. Up to 16 X.25 trunks for X.29 PAD service, X.25 Gateway service or X.25 network connections (called X.25 network solution). This configuration may also include one or more HDLC trunks for network connections, though the total number of X.25 and HDLC trunks cannot exceed 16.

NOS MDI

Up to two channel trunks to NOS hosts and three Ethernet trunks to network.

NOS/VE MDI

Up to two channel trunks to NOS/VE hosts and to three Ethernet trunks to network.

ESCI NDI

Up to three Ethernet trunks used to interconnect a CDCNET network.

HDLC NDI

Up to three Ethernet trunks and up to 16 HDLC trunks used to interconnect a CDCNET network.

X.25 NDI

Up to three Ethernet trunks for connection to the network. Up to 16 X.25 trunks for additional CDCNET network connections.

TCP/IP Gateway DI (GDI)

Up to three Ethernet trunks to TCP/IP and CDCNET networks.

Types of Memory

For DI systems, configurable memory is divided into two types: System Main Memory (SMM) and Private Main Memory (PMM). These types have different installation limits. SMM memory can be installed in multiples of one megabyte (that is, 1MB, 2MB,...) as each SMM board contains 1MB. Only 1MB and 2MB of SMM are of interest for CDCNET L688 DIs, as 2MB of SMM is sufficient to support any configuration that can be reasonably supported by a DI's processing power. Only one PMM board can be installed. PMM can be accessed by the system faster than SMM memory and can increase the processing power of the DI by 10% to 40% depending on the DI's configuration. It is recommended that DI configurations supporting three or more of the communications line protocols (for example, asynchronous, HASP and URI) include PMM.

The combinations of memory to be considered are:

1. 1 MB SMM
2. 1 MB SMM with PMM
3. 2 MB SMM
4. 2 MB SMM with PMM

A DI uses the configurable memory left after processing the DI's configuration procedure for two main purposes: one, for device configuration and connection management and two, for the buffering of data on connections. For DI configurations that directly support terminal devices (that is, TDI, NOS MTI, NOS/VE MTI, RTI and X.25 PAD NDI), the memory required for device configuration and connection management usually determines the limits of configuration. For DIs that do not directly support terminal devices, the memory required for the buffering of data usually determines the limits of configuration.

The reservation of memory for buffering can occur before all software is loaded as some software is loaded on demand. On demand loading of software uses memory that would otherwise be available for device configuration and connection management. Therefore, the configuration limits for systems limited by device configuration and connection management are reduced by the on demand loading of software. On demand loading does not affect the amount of memory available for buffers, therefore, configuration limits for systems limited by the buffering of data are unaffected.

The following equation describes the relationship between the number of devices that can be configured from the amount of memory left after the initial load and configuration of software. The equation applies to DI configurations that are limited by device configuration and connection manag

Calculation of Number of Devices

$$\# \text{Devices} = \frac{(1 - \text{Buffer_Pct}) * \text{Config_Memory} - (\text{Software_Loaded_After} + \text{Reserve})}{(1 - \text{Buffer_Pct}) * \text{Memory_Configure_Device} + \text{Memory_Activate_Device}}$$

where:

Buffer_Pct	The DEFINE_SYSTEM command BUFFER_PERCENTAGE expressed as a decimal fraction.
Config_Memory	The memory left after the loading and configuration of software through initial loading and the execution of the DI's configuration procedure.
Software_Loaded_After	The memory required for the loading of software on demand for servicing devices. This memory does not include the loading of software for transient processes (for example, command processors and terminal user procedures).
Reserve	A reserve to permit the loading and execution of transient processes. For most DI configurations a reserve of 60K is adequate. For NOS MDI and NOS MTI configurations a reserve of 80K is adequate.
Memory_Configure_Device	The memory required to configure a device. Typically, 2K is required per device. The memory to configure a device is mainly allocated before memory is reserved for buffers. Therefore, the cost to configure a device is reduced by the buffer_percentage.
Memory_Activate_Device	The memory required to activate a device with one or more CDCNET connections. Depending on the configuration of the DI and the number of connections supported, 3K to 28K is required to activate a device.

If the default BUFFER_PERCENTAGE (50%) is used, the equation becomes as follows. Unless noted otherwise, the configurations reviewed here assume the default BUFFER_PERCENTAGE.

Number of Devices, Default Buffer Percentage

$$\# \text{Devices} = \frac{\text{Config_Memory} - 2 * (\text{Software_Loaded_After} + \text{Reserve})}{\text{Memory_Configure_Device} + 2 * (\text{Memory_Activate_Device})}$$

Typically, less than 5K of data is buffered in a DI for each terminal device that the DI supports. The configuration limits expressed in the following sections assume that, on average, no more than 5K of data is buffered per device. With normal terminal use, this allowance for data buffering is more than adequate as usually the data for a device is forwarded rapidly by the DI. However, all DI configurations require a minimum of 100K bytes for buffering to insure that software can be loaded and DI management can properly function.

More than 5K of data could be buffered for an interactive terminal under unusual conditions. If the terminal user establishes multiple interactive connections and has the DI hold output for all but the connection currently in use, more than 5K of output data could be buffered for the terminal. A number of fairly large messages (for example, six messages each greater than 300 bytes) would have to be held on the connections established by more than one terminal user to exceed the 5K average per terminal. Output is held, however, for a connection until the connection is selected as the connection in use. Each output message can be up to 2K bytes in length for NOS and NOS/VE hosts. For NOS hosts if the connection is to IAF the message size is limited to 1K bytes. Although such use of interactive connections should be rare, a site which plans to heavily utilize multiple connections per terminal should monitor the memory and buffer usage of the DIs to determine if additional memory is required.

Requirements by DI Type

TDI

The following configurations represent typical uses of TDIs.

TDI with Interactive Terminals Only

These TDIs include those configured with asynchronous interactive terminals, BSC 3270 terminals, and PSU supported asynchronous printers.

A TDI with only interactive terminals has 440K available for buffering, device configuration, and connection management if 1MB of SMM is installed or 570K if 1MB of SMM with PMM is installed. For these DIs, each asynchronous terminal, 3270 terminal, or PSU printer takes about 2K to configure. Each device takes 3K to activate with one interactive connection (each additional interactive connection will take an additional 1K bytes to manage). The 15K Asynchronous TIP is loaded after memory is reserved for buffering (the 3270 TIP is similar in size). Therefore, the equation for the number of devices that can be configured for one connection for a 1MB TDI becomes:

$$\text{\#Devices} = \frac{440K - 2*(15K+60K)}{2K + 2*(3K)}$$

This relation yields the result that 36 terminals can be supported if one connection is allowed per terminal. If two connections are allowed per terminal, the 3K figure is replaced by 4K, yielding 29 terminals supported.

The following chart illustrates the number of terminals versus connections for TDIs.

TDI

INTERACTIVE TERMINALS SUPPORTED NO BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	38	55	70	80
2 per Term	29	42	70	80
3 per Term	24	35	70	80
4 per Term	20	30	70	80

* Limited by processing power. Figures are rounded to nearest 5.

TDI with Asynchronous Batch Printers

A TDI with interactive terminals and asynchronous batch printers also has 440K available for buffering, device configuration, and connection management if 1MB of SMM is installed or 570K if 1MB of SMM with PMM is installed. As above, each device takes about 2K to configure, 3K to activate with one connection and each additional connection takes 1K. The 15K Asynchronous TIP and the 85K of Batch Services are loaded after memory is reserved for buffering. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB TDI with batch becomes:

$$\# \text{Devices} = \frac{440K - 2*(100K+60K)}{2K + 2*(3K)}$$

This relation yields the result that 14 terminals and one batch printer can be supported.

The following chart illustrates the number of terminals and connections allowed for one batch printer and two batch printer configurations. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 2 times 4K per printer from the memory left after deduction for the TIP and Batch Services.

TDI

	INTERACTIVE TERMINALS SUPPORTED							
	ONE ASYNC BATCH PRINTER				TWO ASYNC BATCH PRINTERS			
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	14	30	70	80	13	29	65	75
2 per Term	11	24	70	80	10	23	65	75
3 per Term	9	20	70	80	8	19	65	75
4 per Term	8	17	70	80	7	16	65	75

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

TDI with HASP, 3270, MODE 4 or URI Batch Devices

A TDI with HASP, 3270, Mode 4 or URI devices has 435K available for buffering, device configuration, and connection management if 1MB of SMM is installed or 565K if 1MB of SMM with PMM is installed. As above, each device takes about 2K to configure and 3K to activate with one connection and each additional connection takes 1K. The 15K Asynchronous TIP, the Batch TIP (for example, 25K for HASP) and the 85K of Batch Services are loaded after memory is reserved for buffering. Because of the large amount of software loaded after memory is reserved for buffering, a buffer_percentage of 40% is recommended for 1MB SMM systems. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB TDI with HASP becomes:

$$\# \text{Devices} = \frac{(1-.40)*435K - (125K+60K)}{(1-.40)*2K + 3K}$$

The equation for a 1MB SMM with PMM TDI becomes:

$$\# \text{Devices} = \frac{565K - 2*(125K+60K)}{2K + 2*(3K)}$$

The 1MB TDI relation yields the result that 16 terminals and one batch device can be supported.

The following charts illustrate the number of terminals and connections allowed for one, two and four HASP batch device configurations. For 3270, Mode 4 or URI devices, one additional interactive terminal can be supported. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 4.2K for 1MB TDIs or 2*4K for 1MB with PMM TDIs per device from the memory left after deduction for the TIP and Batch Services.

Batch devices are assumed to be running at 70% of capacity or about 1500 characters/second per device. Note that the minimum HASP workstation consists of an interactive and a batch device, therefore one interactive terminal must be reserved for each HASP workstation.

TDI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED ONE BATCH DEVICE				TWO BATCH DEVICES			
	1MB**	1MB PMM	2MB*	2MB* PMM	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	16	23	65	70	16	22	60	65
2 per Term	13	18	65	70	12	17	60	65
3 per Term	11	15	65	70	10	14	60	65
4 per Term	9	13	65	70	9	12	60	65

INTERACTIVE TERMINALS SUPPORTED FOUR BATCH DEVICES				
MEMORY CONNECTION	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	14	20	45	50
2 per Term	11	16	45	50
3 per Term	9	13	45	50
4 per Term	8	11	45	50

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** Calculated with a buffer_percentage of 40%

TDI with Passthrough Ports

A TDI with passthrough ports has 405K available for buffering, device configuration, and connection management if 1MB of SMM is installed or 535K if 1MB of SMM with PMM is installed. It is assumed that the TDI includes the Interactive Passthrough Gateway. For these DIs, each passthrough port takes about 2K and about 5K to activate with one connection (each port may support only one connection). The 15K Asynchronous TIP is loaded after memory is reserved for buffering. Therefore, the equation for the number of ports that can be configured for a 1MB TDI becomes:

$$\text{\#Devices} = \frac{405K - 2*(15K+60K)}{2K + 2*(5K)}$$

This relation yields the result that 21 ports can be supported.

The following chart illustrates the number of passthrough ports and interactive terminals supported for each memory configuration of a TDI. The chart assumes that each terminal is allowed three active connections and is equivalent to one passthrough port.

TDI

PASSTHROUGH PORTS AND TERMINALS NO BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM
1 per Port or 3 per Term	21	32	40	50

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

TDI with Passthrough and URI Printers

A TDI with passthrough ports and URI printers has 400K for buffering, device configuration and connection management if 1MB of SMM is installed or 530K if 1MB of SMM with PMM is installed. As above, each port takes about 2K to configure and 5K to activate with one connection. The 15K Asynchronous TIP, the 15K URI TIP and the 85K of Batch Services are loaded after memory is reserved for buffering. Therefore, the equation for the number of ports that can be configured for one connection on a 1MB TDI with URI printers becomes:

$$\text{\#Devices} = \frac{400K - 2*(115K+60K)}{2K + 2*(5K)}$$

This relation yields the result that three ports and one URI printer can be supported.

The following charts illustrate the number of passthrough ports and interactive terminals supported for one, two and four batch device configurations. The chart assumes that each terminal is allowed three active connections and is equivalent to one passthrough port. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 2 times 4K per device from the memory left after deduction for the TIP and Batch Services. Batch devices are assumed to be running at 70% of capacity or about 1500 characters/second per device.

TDI

MEMORY CONNECTION	PASSTHROUGH PORTS AND TERMINALS							
	ONE BATCH DEVICE				TWO BATCH DEVICES			
	1MB	1MB PMM	2MB*	2MB* PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Port or 3 per Term	3	14	40	45	2	13	35	40

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

PASSTHROUGH PORTS AND TERMINALS FOUR BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM
1 per Port or 3 per Term	1	12	25	30

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

NOS/VE MTI

NOS/VE MTIs are similar in configuration to TDIs, though the processing required for a NOS/VE MTI is greater and memory available for configuration is less. The memory required per device or per connection is the same for a NOS/VE MTI as for a TDI.

NOS/VE MTI with Interactive Terminals Only

A NOS/VE MTI with interactive terminals only has 390K for buffering and device configuration and connection management if 1MB of SMM is installed or 520K if 1MB of SMM with PMM is installed. The equation for the number of devices that can be configured for one connection for a 1MB NOS/VE MTI is:

$$\text{\#Devices} = \frac{390K - 2*(15K+60K)}{2K + 2*(3K)}$$

This relation yields the result that 30 terminals can be supported if one connection is allowed per terminal. If two connections are allowed per terminal, the 3K figure is replaced by 4K, yielding 24 terminals supported.

The following chart illustrates the number of terminals versus connections for NOS/VE MTIs.

NOS/VE MTI

INTERACTIVE TERMINALS SUPPORTED NO BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	30	46	60	70
2 per Term	24	37	60	70
3 per Term	20	30	60	70
4 per Term	17	26	60	70

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

NOS/VE MTI with Asynchronous Batch Printers

A NOS/VE MTI with interactive terminals and asynchronous batch also has 390K available for buffering, device configuration and connection management if 1MB of SMM is installed or 520K if 1MB of SMM with PMM is installed. The equation for the number of devices that can be configured for one connection for a 1MB NOS/VE MTI with batch is:

$$\text{\#Devices} = \frac{390K - 2*(100K+60K)}{2K + 2*(3K)}$$

This relation yields the result that seven terminals and one batch printer can be supported.

The following chart illustrates the number of terminals and connections allowed for one batch printer and two batch printer configurations. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 2 times 4K per printer from the memory left after deduction for the TIP and Batch Services.

NOS/VE MTI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED							
	ONE ASYNC BATCH PRINTER				TWO ASYNC BATCH PRINTERS			
	1MB	1MB PMM	2MB*	2MB* PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	7	24	60	70	6	23	55	65
2 per Term	6	19	60	70	5	18	55	65
3 per Term	5	16	60	70	4	15	55	65
4 per Term	4	13	60	70	3	13	55	65

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

NOS/VE MTI with HASP, MODE 4 or URI Batch Printers

A NOS/VE MTI with HASP, Mode 4 or URI devices has 385K for buffering, device configuration, and connection management if 1MB of SMM is installed or 515K if 1MB of SMM with PMM is installed. Because of the large amount of software loaded after memory is reserved for buffering, a buffer percentage of 40% is recommended for 1MB SMM systems. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB NOS/VE MTI with HASP becomes:

$$\text{\#Devices} = \frac{(1-.40)*385K - (125K+60K)}{(1-.40)*2K + 3K}$$

The equation for a 1MB SMM with PMM NOS/VE MTI becomes:

$$\text{\#Devices} = \frac{515K - 2*(125K+60K)}{2K + 2*(3K)}$$

The 1MB NOS/VE MTI relation yields the result that nine terminals and one batch device can be supported.

The charts on the following page illustrate the number of terminals and connections allowed for one, two, and four HASP batch device configurations. For 3270, Mode 4 or URI devices, one additional interactive terminal can be supported. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 4.2K for 1MB NOS/VE MTIs or 2*4K for 1MB with PMM NOS/VE MTIs per device from the memory left after deduction for the TIP and Batch Services.

Batch devices are assumed to be running at 70% of capacity or about 1500 characters/second per device. Note that the minimum HASP workstation consists of an interactive and a batch device, therefore one interactive terminal must be reserved for each HASP workstation.

NOS/VE MTI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED							
	ONE BATCH DEVICE				TWO BATCH DEVICES			
	1MB**	1MB PMM	2MB*	2MB* PMM	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	9	17	50	60	8	16	45	55
2 per Term	8	13	50	60	7	12	45	55
3 per Term	6	11	50	60	6	10	45	55
4 per Term	5	9	50	60	5	9	45	55

INTERACTIVE TERMINALS SUPPORTED FOUR BATCH DEVICES				
MEMORY CONNECTION	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	6	14	45	50
2 per Term	5	11	45	50
3 per Term	4	9	45	50
4 per Term	4	8	45	50

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** Calculated with a buffer_percentage of 40%.

NOS MTI

Due to the greater processing requirements of a NOS MTI configuration, these DIs are always configured with PMM and a larger memory reserve. The memory configurations of interest are 1MB SMM with PMM and 2MB SMM with PMM.

NOS MTI with Interactive Terminals Only

A NOS MTI with 1MB SMM and PMM has 370K for buffering, device configuration, and connection management. For these DIs, each asynchronous terminal, 3270 terminal, or PSU printer takes about 2K to configure. Each device takes 5K to activate with one interactive connection (each additional interactive connection will take an additional 3K bytes to manage). The 15K Asynchronous TIP is loaded after memory is reserved for buffering (the 3270 TIP is similar in size). Therefore, the equation for the number of devices that can be configured for one connection for a 1MB with PMM NOS MTI becomes:

$$\# \text{Devices} = \frac{370K - 2*(15K+80K)}{2K + 2*(5K)}$$

This relation yields the result that 15 terminals can be supported if one connection is allowed per terminal. If two connections are allowed per terminal, the 5K figure is replaced by 8K, yielding 11 terminals supported.

The following chart illustrates the number of terminals versus connections for NOS MTIs.

NOS MTI

INTERACTIVE TERMINALS SUPPORTED NO BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	NOT SUP- PORTED	12	NOT SUP- PORTED	45
2 per Term		10		45
3 per Term		7		45
4 per Term		6		45

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

NOS MTI with HASP, 3270 or URI Batch Devices

A NOS MTI with HASP, 3270 or URI devices and 1MB SMM and PMM has 330K for buffering, device configuration, and connection management. As above, each device takes about 2K to configure and 5K to activate with one connection. Each additional connection will take an additional 3K bytes to manage. The 15K Asynchronous TIP, the Batch TIP (for example, 25K for HASP) and the 85K of Batch Services are loaded after memory is reserved for buffering. Because of the large amount of software loaded after memory is reserved for buffering, a buffer_percentage of 30% is recommended for 1MB SMM with PMM systems. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB SMM with PMM NOS MTI with HASP becomes:

$$\# \text{Devices} = \frac{(1-.30)*330K - (125K+80K)}{(1-.30)*2K + 5K}$$

This relation yields the result that three terminals and one batch device can be supported.

The following charts illustrate the number of terminals and connections allowed for one, two, and four HASP batch device configurations. For 3270, Mode 4 or URI devices, one additional interactive terminal can be supported. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 6.4K for 1MB SMM with PMM NOS MTIs per device from the memory left after deduction for the TIP and Batch Services.

NOS MTI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED							
	ONE BATCH DEVICE				TWO BATCH DEVICES			
	1MB**	1MB PMM	2MB*	2MB* PMM	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	NOT SUP- PORTED	3	NOT SUP- PORTED	40	NOT SUP- PORTED	2	NOT SUP- PORTED	35
2 per Term		2		40		1		35
3 per Term		1		40		1		35
4 per Term		1		40		0		35

INTERACTIVE TERMINALS SUPPORTED FOUR BATCH DEVICES				
MEMORY CONNECTION	1MB**	1MB PMM	2MB*	2MB* PMM
1 per Term	NOT SUP- PORTED	0	NOT SUP- PORTED	30
2 per Term		0		30
3 per Term		0		30
4 per Term		0		30

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** Calculated with a buffer percentage of 30%.

RTI

RTIs are similar to TDIs in configuration and memory available. RTIs are similar to NOS/VE MTIs in the processing required for a configuration. The memory required per device or per connection is the same for a RTI as for a TDI or NOS/VE MTI.

RTI With Interactive Terminals Only

An RTI with only interactive terminals has 425K available for buffering, device configuration and connection management if 1MB of SMM is installed or 555K if 1MB of SMM with PMM is installed. The equation for the number of devices that can be configured for one connection for a 1MB RTI becomes:

$$\text{\#Devices} = \frac{425K - 2*(15K+60K)}{2K + 2*(3K)}$$

This relation yields the result that 34 terminals can be supported if one connection is allowed per terminal.

The chart on the following page illustrates the number of terminals versus connections for RTIs. One 56Kb HDLC trunk is necessary for configurations up to 40 interactive terminals. HDLC trunks with lower trunk speeds will support proportionately fewer terminals per trunk. Two 56Kb HDLC links are necessary for configurations with more than 40 terminals. The additional HDLC link requires 12K (that is, the 555K remaining for a 1MB SMM with PMM RTI is reduced to 543K).

RTI

INTERACTIVE TERMINALS SUPPORTED NO BATCH DEVICES				
MEMORY CONNECTION	1MB	1MB** PMM	2MB* **	2MB* PMM**
1 per Term	34	49	55	70
2 per Term	27	39	55	70
3 per Term	21	32	55	70
4 per Term	19	28	55	70

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** 2 HDLC trunks.

RTI With Asynchronous Batch Printers

An RTI with interactive terminals and asynchronous batch printers also has 425K available for buffering, device configuration and connection management if 1MB of SMM is installed or 555K if 1MB of SMM with PMM is installed. The equation for the number of devices that can be configured for one connection for a 1MB RTI with batch becomes:

$$\text{\#Devices} = \frac{425K - 2*(100K+60K)}{2K + 2*(3K)}$$

This relation yields the result that 12 terminals and one batch printer can be supported.

The following charts illustrate the number of terminals and connections allowed for one batch printer and two batch printer configurations. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 2 times 4K per printer from the memory left after deduction for the TIP and Batch Services. One 56Kb HDLC link is necessary for configurations up to 40 interactive terminals. Two 56Kb HDLC links are necessary for configurations with more than 40 terminals.

RTI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED							
	ONE ASYNC BATCH PRINTER				TWO ASYNC BATCH PRINTERS			
	1MB	1MB PMM	2MB* **	2MB* PMM**	1MB	1MB PMM	2MB* **	2MB* PMM**
1 per Term	12	28	55	70	11	27	50	65
2 per Term	9	22	55	70	8	21	50	65
3 per Term	8	18	55	70	7	18	50	65
4 per Term	6	16	55	70	6	15	50	65

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** 2 HDLC trunks.

RTI With HASP, 3270 or URI Batch Devices

An RTI with HASP, 3270 or URI devices has 410K for buffering, device configuration and connection management if 1MB of SMM is installed or 540K if 1MB of SMM with PMM is installed. These figures include the memory required for a second HDLC link to handle the batch traffic. Because of the large amount of software loaded after memory is reserved for buffering, a buffer_percentage of 40% is recommended for 1MB SMM systems. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB RTI with HASP becomes:

$$\text{\#Devices} = \frac{(1-.40)*410K - (125K+60K)}{(1-.40)*2K + 3K}$$

The equation for a 1MB SMM with PMM RTI becomes:

$$\text{\#Devices} = \frac{540K - 2*(125K+60K)}{2K + 2*(3K)}$$

The 1MB RTI relation yields the result that 13 terminals and one batch device can be supported.

The following charts illustrate the number of terminals and connections allowed for one, two, and four HASP batch device configurations. For 3270, Mode 4 or URI devices, one additional interactive terminal can be supported. Note that a batch printer requires only one connection, therefore the memory required to configure and activate the printer can be deducted as 4.2K for 1MB RTIs or 2*4K for 1MB with PMM RTIs per device from the memory left after deduction for the TIP and Batch Services.

RTI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED ONE BATCH DEVICE				TWO BATCH DEVICES			
	1MB**	1MB** PMM	2MB* **	2MB* PMM**	1MB**	1MB** PMM	2MB* **	2MB* PMM**
1 per Term	13	20	50	60	12	19	45	55
2 per Term	10	16	50	60	10	15	45	55
3 per Term	9	13	50	60	8	12	45	55
4 per Term	7	11	50	60	7	11	45	55

INTERACTIVE TERMINALS SUPPORTED FOUR BATCH DEVICES				
MEMORY CONNECTION	1MB**	1MB** PMM	2MB* **	2MB* PMM**
1 per Term	10	17	40	50
2 per Term	8	13	40	50
3 per Term	7	11	40	50
4 per Term	6	9	40	50

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** 2 HDLC trunks.

X.25 PAD NDI

X.25 PAD NDI With Interactive Terminals Only

An X.25 PAD NDI for interactive terminals only includes the X.25 AsyncTIP and the software to support X.25 communications. This NDI has 395K for buffering, device configuration and connection management if 1MB of SMM is installed or 525K if 1MB of SMM with PMM is installed. Each X.25 trunk requires 18K bytes to configure and activate. An X.25 trunk is activated during the configuration process, therefore the memory required for the trunk can be deducted directly from the memory left (for example, 395K or 525K). Each interactive terminal requires 2K for an X.25 virtual circuit and each CDCNET connection established by the terminal user requires 1K bytes to manage. The 17K X.25 PAD TIP is loaded after memory is reserved for buffering. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB X.25 PAD NDI with one X.25 trunk becomes:

$$\text{\#Devices} = \frac{(395K-18K) - 2*(17K+60K)}{0K + 2*(3K)}$$

This relation yields the result that 37 terminals can be supported if one connection is allowed per terminal.

The chart on the following page illustrates the number of interactive terminals supported for one and two X.25 trunk configurations. Note that the charts assume X.25 trunk speeds of 56Kb so that each trunk can support 40 virtual circuits.

X.25 PAD NDI

	INTERACTIVE TERMINALS SUPPORTED							
	ONE X.25 TRUNK				TWO X.25 TRUNKS			
MEMORY CONNECTION	1MB	1MB** PMM	2MB**	2MB** PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	37	40	40	40	34	42	45	55
2 per Term	27	40	40	40	25	41	45	55
3 per Term	22	35	40	40	20	33	45	55
4 per Term	18	29	40	40	17	27	45	55

* Limited by processing power. Figures are rounded to nearest 5. Only 64 communications lines can be connected to a DI, therefore limits greater than 64 terminals apply to TIPs supporting more than one terminal per line.

** Limited by the capacity of one X.25 trunk.

X.25 PAD/NS NDI With Interactive Terminals

An X.25 PAD/NS NDI includes the X.25 AsyncTIP and an X.25 (or HDLC) network solution to interconnect CDCNET networks. This NDI has 390K for buffering, device configuration, and connection management if 1MB of SMM is installed or 520K if 1MB of SMM with PMM is installed. As above, each X.25 or HDLC trunk requires 18K bytes that can be deducted directly from the memory left (for example, 390K or 520K). Each interactive terminal requires 2K for an X.25 virtual circuit and 1K for each CDCNET connection. The 17K X.25 PAD TIP is loaded after memory is reserved for buffering. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB X.25 PAD NDI with two X.25 trunks (1 reserved for the network solution) becomes:

$$\# \text{Devices} = \frac{(390K - 36K) - 2 * (17K + 60K)}{0K + 2 * (3K)}$$

This relation yields the result that 33 terminals could be supported if one connection is allowed per terminal. However, processing power limits the number of terminals to 30 if PMM is not installed.

The following chart illustrates the number of interactive terminals supported for two and three X.25/HDLC trunk configurations (one trunk is used as the X.25/HDLC network solution). Note that the charts assume X.25/HDLC trunk speeds of 56Kb so that each trunk can support 40 virtual circuits or CDCNET connections. The X.25 or HDLC network solution is assumed to require 40% of the NDIs processing power for 40 active CDCNET connections through the network solution.

X.25 PAD/NS NDI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED TWO X.25 TRUNKS				THREE X.25 TRUNKS			
	1MB	1MB PMM	2MB*	2MB* PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	30	35	30	35	30	35	30	35
2 per Term	25	35	30	35	22	35	30	35
3 per Term	20	33	30	35	18	31	30	35
4 per Term	16	27	30	35	15	26	30	35

* Limited by processing power. Figures are rounded to nearest 5. This relation yields the result that 33 terminals could be supported if one connection is allowed per terminal. However, processing power limits the number of terminals to 30 if PMM is not installed.

X.25 PAD NDI With Interactive Terminals and X.25 Gateways

An X.25 PAD NDI for interactive terminals and X.25 Gateways includes the X.25 AsyncTIP, X.25 Gateway, and the software to support X.25 communications. This NDI has 380K for buffering, device configuration and connection management if 1MB of SMM is installed or 510K if 1MB of SMM with PMM is installed. As above, each X.25 trunk requires 18K bytes that can be deducted directly from the memory left. Each terminal requires 2K for an X.25 virtual circuit and 1K per CDCNET connection. Each X.25 Gateway definition requires 5K bytes with up to four gateway outcall titles added per definition. Each A-A connection through an X.25 Gateway requires 2K bytes to activate. Finally, the 17K X.25 PAD TIP is loaded after memory is reserved for buffering. Therefore, the equation for the number of devices that can be configured for one connection for a 1MB X.25 PAD NDI with one X.25 trunk and one A-A connection becomes:

$$\text{\#Devices} = \frac{(380K - 18K) - 2*(17K + 60K) - 2*(2K)}{0K + 2*(3K)}$$

This relation yields the result that 34 terminals could be supported if one connection is allowed per terminal. However, the capacity of one X.25 trunk number of terminals to 30. Note that the memory for the A-A connection can be directly deducted as 2 times 2K per A-A connection.

The following chart illustrates the number of interactive terminals that can be supported with one or two X.25 trunks and one X.25 Gateway per trunk. The charts assume that no more than two simultaneous A-A connections are active through each X.25 Gateway. The A-A traffic is limited by the higher priority given to interactive traffic to sending about one 1500 byte message per second each way on each trunk. The charts assume X.25 trunk speeds of 56Kb; however, the simultaneous A-A traffic limits the number of interactive virtual circuits per trunk to 30.

X.25 PAD NDI

MEMORY CONNECTION	INTERACTIVE TERMINALS SUPPORTED ONE X.25 GATEWAY				TWO X.25 GATEWAYS			
	1MB**	1MB** PMM	2MB**	2MB** PMM	1MB	1MB PMM	2MB*	2MB* PMM
1 per Term	30	30	30	30	31	52	45	55
2 per Term	25	30	30	30	23	39	45	55
3 per Term	20	30	30	30	18	31	45	55
4 per Term	17	30	30	30	15	26	45	55

* Limited by processing power. Figures are rounded to nearest 5.
Only 64 communications lines can be connected to
a DI, therefore limits greater than 64 terminals apply to
TIPs supporting more than one terminal per line.

** Limited by the capacity of one X.25 trunk.

NOS MDI

As NOS MDIs are not directly connected to interactive or batch devices, the configuration limits for these DIs are established by the requirements for buffering the data on connections. Due to the greater processing required for a NOS MDI configuration, these DIs are always configured with PMM. A NOS MDI with 1MB SMM and PMM, one NOS channel and one Ethernet channel has 485K for NOS gateways, buffering and connection management. If all gateways are installed (IVT Gateway - 29K, NP Gateway - 20K and NP Batch Gateway - 38K), then approximately 400K remains for buffers and connection management. If the 400K is divided equally, a NOS MDI has 200K for buffers to service connections. If each connection requires about 5K to service, then about 40 active connections can be supported by a NOS MDI with 1MB SMM and PMM with one host channel. Each additional NOS host channel takes about 35K for management and for definition of the interactive, batch and application gateways to the host. Therefore, about 36 connections can be supported with two host channels. A NOS MDI with 2MB SMM and PMM is limited by processing power rather than memory to about 150 active connections if file transfer traffic does not pass through the NOS MDI. File transfer traffic may limit the number of connections to less than 150.

NOS/VE MDI

A NOS/VE MDI also has no directly connected devices. A NOS/VE MDI with 1MB SMM has 505K for buffers and connection management. If the 505K is divided equally, the NOS/VE MDI has 252K for buffers. These buffers are sufficient to support the configurations committed for CDCNET L688. A NOS/VE MDI without PMM can support the network traffic for about 220 active connections. A NOS/VE MDI with PMM can support the traffic for about 300 active connections if file transfer traffic does not pass through the NOS/VE MDI. File transfer traffic may limit the number of connections to less than 220 or 300.

Ethernet to Ethernet NDI

An Ethernet to Ethernet NDI with 1MB SMM (no PMM) has sufficient memory to support up to three Ethernet trunks. An Ethernet to Ethernet NDI without PMM can support the network traffic for about 350 active connections. An Ethernet to Ethernet NDI with PMM can support the network traffic for about 440 active connections if file transfer traffic does not pass through the NDI. File transfer traffic may limit the number of connections to less than 350 or 440.

Ethernet to HDLC NDI

For Ethernet to HDLC NDIs, the configuration limits are determined by the storage required for the buffering of network traffic in transmission queues. For HDLC trunks, the transmission queues are 30K bytes. An Ethernet to HDLC NDI with 1MB SMM has about 225K for the buffering of network traffic for the HDLC trunks. An Ethernet to HDLC NDI with 1MB SMM has sufficient memory for seven HDLC trunks. An Ethernet to HDLC NDI with 1MB SMM and PMM has sufficient memory for nine HDLC trunks. An Ethernet to HDLC NDI with 2MB SMM has sufficient memory for 16 HDLC trunks.

An Ethernet to HDLC NDI without PMM has the processing power to support the network traffic for about 140 active connections or three 56Kb HDLC trunks if file transfer traffic does not pass through the NDI. An Ethernet to HDLC NDI with PMM can support the traffic for about 170 active connections or four HDLC trunks without file transfer traffic. File transfer traffic may limit the number of connections to less than 140 or 170. The maximum character transmission rate is limited, however, to 65K characters/second for configurations with or without PMM.

Ethernet to X.25 NDI

For Ethernet to X.25 NDIs, the configuration limits are also determined by the storage required for buffering of the network traffic in transmission queues. For X.25 trunks, the transmission queues are 30K bytes. An Ethernet to X.25 NDI with 1MB SMM has about 215K for the buffering of network traffic for the X.25 trunks. An Ethernet to X.25 NDI with 1MB SMM has sufficient memory to support seven X.25 trunks. An Ethernet to X.25 NDI with 1MB SMM and PMM has sufficient memory to support nine X.25 trunks. An Ethernet to X.25 NDI with 2MB SMM has sufficient memory to support 16 HDLC trunks.

An Ethernet to X.25 NDI without PMM has the processing power to support the network traffic for about 100 active connections or two 56Kb X.25 trunks if file transfer traffic does not pass through the NDI. An Ethernet to X.25 NDI with PMM can support the traffic for about 130 active connections or three X.25 trunks without file transfer traffic. The maximum character transmission rate is limited, however, to 65K characters/second for configurations with or without PMM.

TCP/IP Gateway DI

For CDCNET L688, a TCP/IP Gateway DI must be configured with at least 2MB of SMM. A TCP/IP Gateway DI may be configured with 2MB SMM with PMM, though no performance improvement is specified for this DI configuration. The number of devices or TCP/IP connections supported by this configuration is not specified for this release.

Memory Requirements Table

The following table contains the memory costs of the base software for DI configurations, the costs of various software components that provide additional services, and the costs of additional trunks and networks. The table can be used to calculate the configurable memory left for buffering, device configuration and connection management and also to calculate the amount of software loaded after memory is reserved for buffers. If a DI could be considered as either of two or more base configurations, the base with the largest memory requirement should be used.

NOTE

The total requirements for a DI configuration may increase up to 8% a year.

Component	Loaded After	Memory Requirements
TDI Base	NO	480K - includes Ethernet SSR, one Ethernet trunk and network configuration software.
RTI Base	NO	495K - includes HDLC SSR, one HDLC trunk and network configuration software.
NDI Base	NO	480K - includes Ethernet SSR, one Ethernet trunk and network configuration software.
NOS MDI Base	NO	645K - includes NP interface software, one NOS channel and network configuration software. Does not include Ethernet SSR or trunk.
NOS MTI Base	NO	615K - includes NP interface software and one NOS channel.
NOS/VE MDI Base	NO	530K - includes MCI SSR, one NOS/VE channel and network configuration software. Does not include Ethernet SSR and trunk.
NOS/VE MTI Base	NO	530K - includes MCI SSR, one NOS/VE channel and network configuration software.

Component	Loaded After	Memory Requirements
ESCI SSR	NO	7K
HDLC SSR	NO	20K
MCI SSR	NO	25K
X.25 Interface	NO	27K
X.25 Network Support	NO	5K
Network Configuration	NO	30K
Ethernet trunk	NO	8K
HDLC trunk	NO	12K
X.25 trunk	NO	18K
NOS/VE Channel	NO	12K
NOS Channel	NO	35K
Interactive Services	NO	125K - loaded for both batch and interactive devices.
Batch Services	YES	85K
AsyncTIP	BOTH	4K before, 15K after
URI TIP	NO	14K
BSC 3270 TIP	BOTH	5K before, 20K after
NJEF TIP	BOTH	4K before, 11K after
HASP TIP	BOTH	4K before, 25K after
Mode 4 TIP	BOTH	4K before, 17K after
X.PC TIP	BOTH	3K before, 20K after
X.25 PAD TIP	YES	17K

Component	Loaded After	Memory Requirements
Interactive Passthrough	NO	33K
NOS Operator Support	NO	35K
NOS IVT Gateway	NO	29K
NOS NP Gateway	NO	20K
NOS Batch Gateway	NO	38K
X.25 Gateway	NO	16K
TCP/IP IP Services	NO	36K
TCP/IP TCP Services	NO	29K
TCP/IP Telnet Interface	NO	33K
TCP/IP User Telnet	NO	15K
TCP/IP Server Telnet	NO	19K
TCP/IP Gateway	NO	14K

Example Calculation:

- i. 1MB SMM with PMM TDI = 1180K bytes total memory
- ii. Two Ethernets
- iii. Interactive Services
- iv. Interactive Passthrough
- v. Asynchronous terminals

Config_memory = 1180K - TDI Base - Ethernet - Interactive Passthrough
- Interactive Services - AsyncTIP before

Config_memory = 1180K - 480K - 8K - 33K - 125K - 4K = 530K

$$\# \text{Devices} = \frac{530K - 2*(15K+60K)}{2K + 2*(3K)}$$

NOTE

An additional Ethernet requires 45K (300 data buffers) for the buffering of messages received from the Ethernet network. As a device requires about 5K for buffering data (35 data buffers), the addition of an Ethernet network to a DI configuration with just enough buffers to satisfy the number of configured devices will reduce the number of devices supported by 9.

