NOS 2.5.1
FEATURE NOTES

SMD110168

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Introduction

NOS version 2.5.1 is the latest in Control Data Corporation's on-going effort to provide efficient, reliable, and usable products to its customers.

The NOS 2.5.1 Feature Notes Bulletin (FNB) contains information of interest to NOS users and site support analysts which is not documented in the NOS Installation Handbook or Software Release Bulletin. This document contains descriptions for most of the features and enhancements which are new with NOS version 2.5.1.

As a part of recent release document changes, a new section has been added to the Feature Notes Bulletin. This section, Miscellaneous Feature Notes, contains information about features added to NOS that were either minor additions or additions with few ramifications for, but still of interest to, the site analyst/operator/user. For some items, the feature was introduced when a PSR was answered, in which case the modset is available on SOLVER as well as being integrated into NOS 2.5.1.

Generally, the articles are targeted for the analyst level audience. However, due to the variety of topics covered, other groups should also benefit from this information. As an aid to identifying the additional audience(s) for a particular subject, the Feature Note Audience Matrix was developed. For each article, the matrix indicates the group (site analyst, operations or end user) for which that article will be most useful. In this way, the information contained herein may be distributed to those who need it, for the maximum benefit.

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Copies of the Software Release Bulletin and Feature Notes Bulletin are also available on the permanent file tapes as multi-file file PFGSRB1 in RECLAIM format. It is loaded to the installation user name INSTALL by the SYSGEN procedure call X.SYSGEN(FULL). The permanent file name of the file is SRB and it is an ASCII file (uppercase and lowercase). For sites that have only an uppercase printer, the file can be converted to uppercase by using FCOPY (See NOS Version 2, Reference Set, Volume 3).

Feature Notes Audience Matrix

Article Title	Site Analyst	Operations	End User
NOS RMS/RAM Enhancements	X	X	
Low Speed Port MMF	X	X	
Concurrent I/O Subsystem	X	X	
Miscellaneous Feature Notes	X	X	X

CHAPTER 1

NOS RMS RAM Enhancements

1.1 Description

NOS 2.4.2 contained several enhancements to improve mass storage reliability for 834, 836, 844, 885-11, 885-12, Federal Standard Channel (FSC), and extended memory devices (UEM and ECS/ESM including DDP). NOS 2.5.1 includes the following enhancements to support 885-42 and 895 devices:

- Improved Diagnostic Access to RMS devices. Concurrent maintenance of 885-42 and 895 disk subsystems may be performed without requiring the drives to be globally unloaded. This means that online repair of non-removable drives is now possible.

- Idle Disk & Restricted Access. When a mass storage subsystem component (drive, channel or controller) begins to fail, the use of the failing hardware is temporarily eliminated, allowing online repair. Only those jobs requiring access to files on a failing device are affected. Processing of these jobs is suspended until the device is repaired and returned to system use.

- Device Verification. Device verification is performed (by the PP program 1MV) for certain device state changes, when a hardware error persists after three driver retries and when a media error is suspected in released file space. It consists of hardware verification, media verification and label verification.

Hardware verification attempts to find any hardware problems that might render the device unusable, even though the data on the device may be valid. Media verification attempts to verify that a logical track on the device can be written or read. (Media verification is not supported on 885-42 devices.) Label verification attempts to determine if the data on the device is intact and if the device can be accessed through all channels assigned to it. The following table shows when the various types of verification are performed:

Condition	Hardware	Media	Label
DOWN to OFF	No	No	Yes
DOWN to IDLE	Yes	No	Yes
DOWN to ON	Yes	No	Yes
OFF to IDLE	Yes	No	Yes
OFF to ON	Yes	No	Yes
IDLE to ON	No	No	No
Suspect flag	Yes	No	Yes
Media error	No	Yes	No

These enhancements are described in more detail in the article RMS RAM Enhancements in the NOS 2.4.2 Feature Notes (SMD130899). The EOI verification described in that article is being considered for a future release. NOS 2.5.1 also includes the following enhancements:

- The 885-42 driver (1HP) and the 895 driver (1XM) have been rewritten to provide improved error recovery.
- Mass storage error retry on both channels of dual access configurations is extended to 885-42 and 895 devices.
- Device error log messages are now issued for unrecovered errors on an 885-42 device.

1.2 Configuration Notes

This feature's effectiveness is enhanced by redundancy characteristics of a site's disk subsystem configuration. The improvements are most noticeable in large disk subsystem configurations. The following configuration considerations are most important for improving mass storage reliability:

- Multiple system devices on different access paths.
- Dual access to as many devices as possible.
- Multiple devices for job rollout on different access paths.

1.3 1HP/1XM Rewrite

Prior to NOS 2.5.1, all drivers performed unique error processing. There was little uniformity in error detection, recovery, operator communication and dayfile message issuance. Error processing in 1HP and 1XM are now virtually identical and similar to that used by 6DI for other devices. To the greatest extent possible, the 819 interrupt handler has also been changed to process errors as done by 6DI.

BML message formats for 885-42 and 895 devices have been changed to be similar to those for 6DI driven divices, such as 844 and 836 devices. All table structures involved with error processing are managed through common deck COMSMSP symbols and macros.

1.4 1HP/1XM Dual Channel Error Retry

A new BIOM subfunction (SETS) is used by 1HP and 1XM to report errors and provide error retry on both channels of dual access configurations. When the driver detects an error, it attempts to retry the I/O request until it reaches the halfway mark in the retry sequence for the error type. For example, the retry count defined in COMSMSP for a media failure (error code PARE) is 10D. If the driver detects such an error, it will retry the read or write request up to 5 times before issuing the SETS BIOM subfunction.

If another channel access is available, CPUMTR forces continuation of the retry sequence through the other channel. All retries are done on the same channel for single access configurations. The driver scan routines are sensitive to requests that must be processed on a particular channel and will select only those requests to be serviced on the channel to which that driver is assigned. When the second driver selects the request, it continues the error processing using half of the maximum retry limit as the current retry count.

When the retry limit of 10D is reached (each driver has performed 5 retries), the second driver issues the SETS BIOM subfunction. This time, CPUMTR senses that all retries have been completed and terminates the request. The buffer is delinked unless the error code is NRDE (not ready) and the operation is a write. This allows unlimited retry of write operations on not-ready devices; thus no data is lost while waiting for a drive to spin up.

Since all retries in this example have been completed without recovering from the failure, CPUMTR informs the driver that the error is considered unrecovered. The driver reports the error to the BML and error log (885-42 only). It also increments the unrecovered error count in the MST.

1.5 885-42 Error Log Messages

1HP issues the following message block to the error log for any unrecovered error on an 885-42 device.

```
 DBest,UNRECOVERED MASS STORAGE ERROR.
 DBest,OPERATION=rd/wr   ERROR CODE=ec.
 DBest,CH=ch UN=un CY=cyln TK=tk SC=sc.
 DBest,LAST FUNCTION ISSUED = func.
 DBest,GENERAL STATUS = gggg.
 DBest,DETAILED STATUS =
 DBest,   01=xxxx 02=xxxx 03=xxxx 04=xxxx
 DBest,   05=xxxx 06=xxxx 07=xxxx 08=xxxx
 DBest,   09=xxxx 10=xxxx 11=xxxx 12=xxxx
 DBest,   13=xxxx 14=xxxx 15=xxxx 16=xxxx
 DBest,   17=xxxx 18=xxxx 19=xxxx 20=xxxx
```

Field definitions are as follows:

est	EST ordinal.
rd/wr	READ or WRITE.
ec	Error code, as follows: CP Channel parity error. CS Controller stop (cannot respond to any function). RA Controller memory parity error. FT Function timeout (controller not responding to func). CF Channel Failure. ID Data transfer error. ME Media error at physical address cyln,tk,sc. ST Drive or controller failure. The general status and detailed status fields may give more information about the cause of the failure. NR Drive is not ready. RS Drive reserve cannot be obtained. CR Controller reserve cannot be obtained.
ch	Channel number.
un	Physical unit number.
cyln	Cylinder number accessed at time of failure.
tk	Physical track number accessed at time of failure.
sc	Physical sector number accessed at time of failure.
func	Last function issued to the controller.
gggg	Last general status (7777 specifies that the controller did not respond to the last general status function).
xxxx	One 12 bit byte of detailed status, preceeded by the byte number. All bytes will be 7777 if the controller did not respond to the last detailed status function. The detailed status block only appears for error codes ME, ST and NR.

CHAPTER 2

Low Speed Port Multi-Mainframe Support

2.1 Introduction

This feature allows the inclusion of CYBER 180 machines in a NOS multi-mainframe cluster, where Extended Memory (EM) is the link device. EM is either Extended Semiconductor Memory (ESM) or Extended Core Storage (ECS). CYBER 180 machines could not previously be included in a multi-mainframe cluster due to the lack of a CPU coupler to EM, and due to software dependence on the CPU coupler. This feature allows the low speed port (LSP) access (or DDP for ECS) to EM to be used instead of the CPU coupler. This form of multi-mainframe is referred to as MMF/LSP. Machines with CPU couplers (CYBER 170s) may continue to use these high-speed paths to EM, while the low speed port may be used from machines without CPU couplers or as a backup mode.

The general approach in providing MMF support for machines without an EM CPU access is to have all interfacing with extended memory done via a dedicated PP. This PP is called MTE (monitor extended memory requests) and is used due to the critical time nature of the processing. MTE will read and write the multi-mainframe tables that reside on the link device in response to requests passed to it by CPUMTR.

2.2 Configuration Requirements

At least one 170 mainframe with a CPU access to extended memory is required in a multi-mainframe cluster. This is to ensure that the customer engineers can provide adequate diagnostic support for the extended memory hardware.

A CYBER 180 mainframe in a MMF/LSP cluster cannot use Unified Extended Memory (UEM) for anything other than user EM. In order to use UEM for such things as ASR, rollout, or 895 disk I/O buffers, a separate EST entry must be present. Since equipment 5 is already defined as the link device (type DP with no CPU access), a separate entry for UEM is not possible. In particular, this means that 895 disks cannot be present on any machine in a MMF/LSP cluster. This restriction will be removed in a future release by increasing the number of EM equipments that can be entered in the EST.

If only a single channel access is present to the link device, then it should not be used for anything else. Since all access to the multi-mainframe tables is via this channel, any contention would adversely affect performance. However, if dual channel access is present, it is possible to use the link device for those purposes (ASR, rollout, etc.) for which UEM would ordinarily be used.

2.3 NOS Changes to Support MMF/LSP

Changes were made in the DP equipment definition, the multi-maiframe status word and the machine state table in low core, the MST words SDGL, DILL, and MCLL, and the communication sector in order to support MMF/LSP on NOS.

2.3.1 DP Equipment Definition

To indicate that a DP equipment does not have a CPU coupler, an option has been added to the ET (extended storage type) parameter of the DP equipment EQPDECK entry. The format of

this parameter is ET=xmem/ddp/NC. The memory type (xmem) and DDP type (ddp) options have not changed. The NC option is not valid for a DE equipment entry.

Also, the default DDP type for memory type ES has been changed to D2 (DC 145 DDP/LSP) because DDP type D1 (DC 135) cannot be connected to ESM.

2.3.2 Low Core Changes

. MMFL, Multi-Mainframe Status

Bit 46 of MMFL indicates MMF/LSP mode. The down machine mask in bits 16 to 19 has been removed. The machine state table pointed to by EFRL replaces the down machine bits.

. EFRL, Machine State Table

A machine state table has been defined to aid in the communication required during down machine processing. This table is located inside CPUMTR memory and is pointed to by bytes 0 and 1 of EFRL. COMSMMF defines the table format and the state values.

Following the MMF state table is the MTE request queue. Space for the MTE request queue is only allocated when running in MMF/LSP mode. This table is also documented in COMSMMF.

2.3.3 MST Changes

. SDGL

For MMF/LSP bits 1 through 5 of MST word SDGL are used to indicate the MST/TRT in CM are current and that the device is interlocked in EM. The field is set to the machine index +1 of the machine which has the interlock. This field is used by CPUMTR to tell if it can perform MST/TRT update functions.

. DILL

MST word DILL bits 15 through 17 contain the CPU path type for EM. A value of zero in this field implies no CPU path is present. Prior to this feature, zero could never be set into this field.

. MCLL

MST word MCLL in the extended MST (the portion not written to the label) is defined to provide the communication necessary between CPUMTR and MTE.

2.3.4 Communication Sector

The communication sector on the link device has been removed.

2.4 New Deadstart Messages

For MMF/LSP deadstarts, additional messages are displayed during preset on the console(s) of the MMF/LSP machine(s). The increased time taken for portions of the preset makes it desirable to let the operator know how the deadstart is proceeding. The following are informative messages added during preset only when in MMF/LSP mode. Normal MMF mode still has blank screens during preset.

. CHECKING FOR ACTIVE MACHINES.

This message is displayed during the approximate two second interval that EM is being statused to detect the presence of active machines.

. CLEARING EXTENDED MEMORY.

This message is displayed while EM is being written with all zeroes.

. LINK DEVICE PRESET COMPLETE.

This message is displayed after preset is complete by MTE.

The following messages are issued for communication problems with EM. They indicate a fatal error in accessing EM.

. PORT PRESET FAILED ON MMF LINK.

This message is issued when the port master clear fails. This indicates a bad channel definition for the port or a hardware problem with the port. Deadstart halts on this error.

. LINK DEVICE HARDWARE ERROR.

This message is issued when unrecoverable errors occur during MTE initialization. Deadstart halts on this error.

2.5 Operator Interface

When a machine running in MMF/LSP mode is suspected of being down, the following message appears at the system control point of all other machines in the cluster.

IF XX DOWN ENTER *DOWN,MID=XX*

If the machine is in fact down (the machine could appear to be down if an analyst placed the system in STEP mode), then the operator responds with the command "DOWN,MID=xx.", where "xx" is the machine ID of the down machine. If the machine is not down, then the operator enters "GO,SYS.".

2.6 EDD Changes

EDD (Express Deadstart Dump) has been changed to allow dumping EM using the PP channel attached to a Low Speed Port. To select this option, a bit must be set on the deadstart panel. Bit 8 of word 13 is used for all deadstarts except for a CYBER 70 or 6000 that is deadstarting from a channel with an active PP. In this case bit 8 of word 12 is used.

If the option is selected on a 180 mainframe, the operator is prompted for the size of extended memory to dump and the channel to use.

If the option is not selected on a 180 mainframe, then no EM prompts appear.

If the option is not selected on a 170 mainframe, EM size is still prompted for, but not a channel number.

CHAPTER 3

Concurrent I/O Subsystem

NOS version 2.5.1 now supports the concurrent I/O subsystem (CIO). New changes allow NOS to support concurrent PPs, DMA channels and the loading of 16-bit PP programs into the concurrent PPs. The concurrent I/O subsystem may be installed on the CYBER 180 model 840, 850, 860 or 990 mainframes.

3.1 Glossary

. Non-concurrent I/O subsystem (NIO)

This refers to the non-concurrent PPs and the non-concurrent channels of the I/O subsystem. This portion of the I/O subsystem is functionally the same as the I/O subsystem on earlier CYBER 180 systems.

. Concurrent I/O subsystem (CIO)

This refers to the concurrent PPs and the concurrent channels of the I/O subsystem.

. Direct Memory Access (DMA)

This is ability of a device to start a block transfer to/from central memory and then continue processing independently of the data transfer.

. Concurrent PP (CPP)

The peripheral processors that reside in the CIO subsystem. There are a maximum of 10 concurrent PPs, (2 barrels of 5 CPPs), each having 8192, 16-bit words of memory. The CPPs use the CYBER 170 PP instruction set. Each barrel has access to 5 concurrent DMA channels. Access to a DMA channel is restricted to the CPPs in that barrel. CPPs are identified as CPP0 thru CPP11.

. Concurrent Channel (CCH)

The channels that reside in the CIO subsystem. The CPP can initiate a data transfer on these DMA channels and then continue execution. These channels are referred to as CCH0 thru CCH11.

. Non-concurrent PP (NPP or PP)

These are the PPs that reside in the NIO subsystem and are similar to CYBER 170 PPs. Each of the NPPs has 4096 16 bit words of memory. These PPs are identified as PP0 thru PP31 or NPP0 thru NPP31.

. Non-concurrent channel (NCH or CH)

These channels reside in the NIO subsystem and are similar to the CYBER 170 channels. They are identified as CH0 thru CH33 or NCH0 thru NCH33.

3.2 Characteristics of a CPP

CPPs are not intended to be used as pool PPs. They are primarily used as dedicated drivers or for maintenance and diagnostic activity. The characteristics of a NOS routine that is loaded into a CPP are:

. It is loaded at deadstart time or when a device is brought online.

- Once loaded, a CPP routine would execute until the device is taken down or the system is deadstarted.

- A CPP routine will do little overlay loading.

CPPs do not execute an 'idle loop' like the NPPs. Instead, they are always placed in a hardware 'idle state' when not executing. In order to load a program into the CPP, it must be deadstarted and have PP resident loaded. This deadstart is performed via the maintenance channel. Once PP resident is loaded, it will load the requested routine and begin execution. When the CPP routine issues a DPPM (drop PP) request, NOS will again place the CPP into a hardware idle state via the maintenance channel.

3.3 NOS Changes to Support CPPs

In order to support CPPs NOS has been modified in the following areas:

- Length of channel interlock, channel assignment and channel controlware tables have been increased by three words. The concurrent channels CCH0-CCH11 are mapped into positions 40-51 of all the channel tables.

- A PP communication area for each CPP will be allocated during deadstart. SET uses the information returned from CIP to determine how many CPPs are present on the system. The CPP communication area is located between the last NPP and the pseudo PP.

- Bit 53 in word EQDE of all EST entries indicates if the channel numbers in byte 1 refer to concurrent channels. If the bit is set, then the channels are concurrent channels. For dual access devices, both channels must be of the same type.

- The monitor functions CCHM, DCHM, RCHM and SEQM have been changed to indicate whether the requested channels are concurrent channels or non-concurrent channels. Users of these functions should check the exact format of each request, but in general, if the upper bit of the channel field is set, then the channel requested is a concurrent channel. If the bit is clear, then the request is for a

non-concurrent channel.

. In order to conserve time in MTR, CPPs output registers will not be scanned with the NPPs. When a CPP routine makes a MTR request, it sets byte 0 of PPRL (word 51 of low memory) non-zero. MTR checks this flag whenever it scans the NPPs output registers. If the flag is set, then MTR scans all the CPPs output registers for a request.

. Word PPAL has been changed to hold the count of available CPPs in byte 3.

. Word PPUL has been changed to define a field which holds the number of physically present CPPs and CCHs. This field is bits 12-17. A symbol CPPL has been defined that is equated to PPUL.

3.3.1 Support for 16-bit CPP routines

NOS will support the loading and execution of 16-bit CPP routines. SYSEDIT, CATALOG, LIBEDIT and GTR have been modified to support 16-bit binaries. The identifier PPL is used on utility output to indicate a 16-bit binary record. Only CM resident 16-bit binaries may be loaded into a CPP. The following matrix shows what type of binaries may be loaded into the different types of PPs.

Binary Type	NPP	CPP
12-bit CM resident	yes	yes
12-bit MS resident	yes	no
16-bit CM resident	no	yes
16-bit MS resident	no	no

As you can see from the chart, loading a MS resident CPP routine is not supported at this time.

A future version of COMPASS will support the generation of 16-bit CPP binaries.

3.3.2 Operator Interface Changes

The operator interface has changed very little. The changes are in the following areas:

- The UP and DOWN commands have been enhanced to allow the operator to specify a concurrent channel. These commands function the same for concurrent channels as they do for non-concurrent channels. The formats of the DOWN and UP commands for concurrent channels are:

```
DOWN,CCH=ch.
DOWN,CCH=ch,EQ=est.

UP,CCH=ch.
UP,CCH=ch,EQ=est.
```

- The P display has been changed to show the status of the CPPs. In addition to the input register, the output register of each PP and CPP will be displayed. Because of the expanded space required for this display, paging has been added and if the P display is brought up on both the left and right displays, the right display will start where the left display ended.

- The W,C display has been changed to display the status of the CCHs.

- The W,R display has been changed to show the number of free CPPs and the FWA of the CPP communication area.

3.3.3 DSDI and EDD

EDD (Express Deadstart Dump) has been modified to dump the memory of the CPPs and the contents of the CIO subsystem channel registers. This data is placed between the last NPPs memory dump and the label record for central memory.

DSDI has been modified to correctly read the new format of the EDD dump tape and to process the CPPs. Two new commands have been added to allow the analyst to dump the CPPs and the CCH registers.

. SETIOU. This command is used to set the type of PP the AP directive is to process. The format of the command is:

    SETIOU,type.

  The parameter is either a 'C' for CPPs or an 'N' for NPPs. The default value is 'N' for NPPs.

. IOUCR. This parameter will dump the channel registers of the CIO subsystem. The format of the command is:

    IOUCR,cch1,cch2,...cchn.

  The parameters specify which concurrent channels should be processed. If no parameters are specified, then all concurrent channels are processed.

3.4 Known Incompatibilities

Routines that execute in a CPP cannot issue a dayfile message if the first word address of the message text is greater than 10000B.

3.5 NOS use of CPPs

As of this release, NOS will not use the CPPs and CCHs. In a future release of NOS, the driver for the 887 disk subsystem will take advantage of the CPP and the CCH hardware. The primary reason for implementing this feature at this time is to support NOS/VE's use of this hardware.

CHAPTER 4

Miscellaneous Feature Notes

This section of the Feature Notes Bulletin (FNB) is new with the release of NOS Version 2.5.1. Previously, some of the information in this section was contained in the SRB. This information has been moved to the FNB in an effort to present all new feature information in the FNB while providing only notes and cautions regarding system installation and usage in the SRB.

4.1 New NOS Libraries

Control Data has added eight new system libraries to allow users to specify more than two user libraries in their global library set. These libraries are called USRLIB1 - USRLIB8. For further information, refer to the LIBRARY command in the NOS Version 2 Reference Set, Volume 3, System Commands.

4.2 CYBER 180 Automatic Date and Time from CTI

All CYBER 180-class machines now get the date and time from CTI during deadstart. Previously, only CYBER 810/815/825/830 mainframes did not require operator date/time input. If CTI is unable to determine the correct date and time, it prompts for date and time entries just prior to CMRDECK processing.

4.3 CYBER 180 and 865/875 Microsecond Clock

CYBER 180-class machines and CYBER 170-865/875 mainframes always use the CPU microsecond clock to maintain the date and time. Previously, this was used only on CYBER 180 mainframes and only when NOS/VE was enabled at deadstart.

4.4 Site Changeable Error Thresholds

New common deck COMSDFT provides site-changeable error thresholds which are passed to DFT during all levels of deadstart. Previously, the DFT error thresholds were hard-coded within DFT and could not be easily changed.

4.5 IPRDECK Entry Change

A maximum of 60 characters may now be specified on the DSD IPRDECK entry. Previously, the maximum was 40 characters per entry.

4.6 New FET Parameter RTM

A new parameter, RTM, has been defined to set the real-time bit via the FET creation macros. Having this bit defined for a file residing on a device allows a user job to get immediate control back if the device is currently inaccessible.

4.7 TAF CRMTASK,CRMSTAT Display Paging on a Terminal

It is now possible to page through the TAF CRMTASK,CRMSTAT display from a terminal. The '+' key displays next screen (if available) and the '-' key displays the first screen of the available screens.

4.8 IAF Up-line Buffering for High Speed Data Transfers

The new up-line buffering feature of the Applications Interface Program (AIP) is now used by the Interactive Facility (IAF). This buffering minimizes the CPU overhead involved in processing network messages. High speed data transfers between microcomputers and hosts will benefit from this code due to decreased transfer time.

4.9 DSP and QAC Extended Get Function

DSP and QAC now return the charge number and project number to the caller on an Extended GET function. QTF and QTFS utilize this information. Any computer link software which operates in a NOS 2.5.1 to NOS 2.5.1 environment may take advantage of this feature. Note that any program which performs QAC Extended Get calls must accommodate three additional words in the parameter block.

4.10 DSD Command SCHEDULE Added to System

The new operator command SCHEDULE has been added to the DSD command list. SCHEDULE allows scheduling of jobs after a deadstart without initiating subsystems as does the DSD AUTO command.

4.11 Print Train Subsets (Print Image Support)

The Print Image Support feature allows those sites using print trains containing more than the normal complement of characters (such as those containing special European and/or national characters) to define special subsets of those characters contained on the print train. These pre-defined subsets can be selected by users of the system without operator intervention, by means of the new PI parameter on the ROUTE command or through a DSP call. This allows users to have listings printed using characters usually pre-empted by the European and/or national characters. To make use of this new feature requires that the site define new 1IO print image overlays to supplement the normal ones.

Those sites likely to be affected by this change may have already defined special print image overlays, selected by means of special TRAIN definitions and forms codes. This feature allows the user to select the print image subset required without operator intervention. Proper use may require restructuring the site's 1IO print image overlays and 1IO's Table of Image Overlays (TIMO).

4.12 Status and Control Register Environmental Shutdown Change

This change modifies the processing of status and control register bit 37 (environmental condition or power failure) for those machines which have status and control registers.

If status and control register bit 37 is set, 1MB will monitor the bit for about three seconds before a system checkpoint is done. If bit 37 clears before this delay period has expired, 1MB will complete normally and will not perform the checkpoint. If the bit remains set for the delay period, then 1MB will checkpoint the system as before.

This change reduces the likelihood of a premature or unnecessary automatic system shutdown for environment or power fluctuations.

4.13 QTRM Enhancements

The following changes have been made to enhance QTRM.

- QTRM applications can now selectively poll specific connections for data.

- QTRM applications which are using the NAM K-Display feature can have their operator typeins (i.e. HOP/CMD supervisory messages) suppressed from the system dayfile.

- QTRM applications can modify, reset, or deactivate the connection inactivity timer (i.e. QTRM supports new feature FN6865).

4.14 Control of the Connection Inactivity Timer

NAM applications can now modify, reset, or deactivate the connection inactivity timer for one or all connections. The modification to the inactivity timer can be a one time change or a permanent change.

4.15 Password Blanking Feature

Access security has been tightened by blanking (or removing) the characters entered for the User's Password. All characters of the User's password are removed (blanked) from the screen when end-of-line is entered.

4.16 User Breaks During Transparent Input

User breaks (1 and 2) are now supported for the ASYNC, X25 and MODE4 TIPs. This is accomplished by defining FN/FV pair 149 to engage the feature.

4.17 International Character Support

The structure of the character conversion table (COMTVDT) has been changed to allow special mapping of characters in NORMAL mode. This allows non-English characters to be supported by the Interactive Facility (IAF) and Screen Formatting.

The commercial at, open/closed bracket, tilde, reverse slant, vertical bar, open/closed brace, grave accent, and circumflex are now correctly mapped to their display code equivalent. For additional information refer to Character Set Anomalies in appendix A of the NOS Reference Set, Volume 3.

4.18 CCL FAMILY Name Repositioned

The family name is now right-justified in the CCL FAMILY variable to facilitate comparisons and other uses. Users who have been using multiplication or some other alignment technique on previous NOS releases should take note of the change and modify their procedures accordingly.

4.19 TRMDEF Changes

TRMDEF has changed such that literal string processing is disabled for the CDCNET terminal attributes CRS, EOS, FFS, LFS, TFC, and TTC.

4.20 Free Running Counter Usage Warning

For sites running dual state, NOS/VE will under some circumstances request that the CPU microsecond clock (Free Running Counter) be adjusted. Therefore, user programs should avoid using the free running counter since it may change without warning.

4.21 Fast Overlay Loader

NOS 2.5.1 allows the fast overlay loader capability of the CYBER Loader to be used when the main overlay is loaded from a global user library.

As stated in the CYBER Loader Reference Manual under the Fast Overlay Loader section, the structure of the overlay file must remain intact as generated for the proper functioning of fast overlay loading.

The structure of the overlay file generated by the CYBER Loader can be corrupted by the improper use of LIBEDIT directives when the overlays are added to the file that is to become the user library. For example, adding a record of any kind between the ABS type record that starts the overlay structure and the last OVL type record of the overlay structure will cause problems.

Users should ensure that the overlay structure of the file is unchanged when it is placed on a LIBGEN source file.

4.22 New DSDI BML Format Conversion.

At NOS 2.5.1, the command DSDI,B=BML will convert to BML format an EDD tape record containing DFT Buffer information as well as any Maintenance Register data not passed to the DFT buffers because of a catastrophic error. NORM and HPA can be run against this BML format data to produce an HPA output of the information.

4.23 MDD may be initiated from CTI.

With NOS 2.5.1 and CIP L006, MDD can be initialized from CTI to be used as a support tool. Successful execution of MDD depends on the MDD overlays being present in CM at the time of MDD intialization.