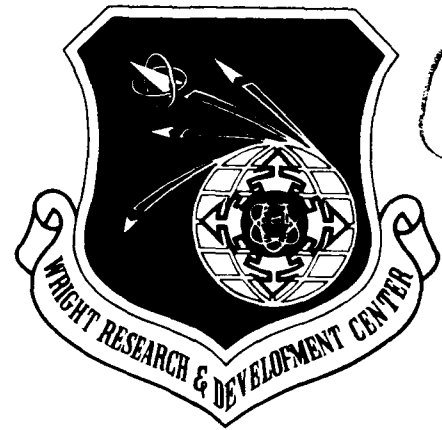


WRDC-TR-90-8007
Volume VI
Part 3



AD-A248 907



INTEGRATED INFORMATION SUPPORT SYSTEM (IISS)
Volume VI - Network Transaction Manager Subsystem
Part 3 - Network Transaction Manager (NTM) Operator's Manual

S. Barker

Control Data Corporation
Integration Technology Services
2970 Presidential Drive
Fairborn, OH 45324-6209



September 1990

Final Report for Period 1 April 1987 - 31 December 1990

Approved for Public Release; Distribution is Unlimited

92-10050



MANUFACTURING TECHNOLOGY DIRECTORATE
WRIGHT RESEARCH AND DEVELOPMENT CENTER
AIR FORCE SYSTEMS COMMAND
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433-6533

92 4 20 078

**Best
Available
Copy**

NOTICE

When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever, regardless whether or not the government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data. It should not, therefore, be construed or implied by any person, persons, or organization that the Government is licensing or conveying any rights or permission to manufacture, use, or market any patented invention that may in any way be related thereto.

This technical report has been reviewed and is approved for publication.

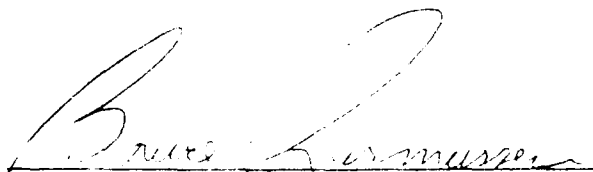
This report is releasable to the National Technical Information Service (NTIS). At NTIS, it will be available to the general public, including foreign nations



DAVID L. JUDSON, Project Manager
WRDC/MTI
Wright-Patterson AFB, OH 45433-6533

25 July 91
DATE

FOR THE COMMANDER:



BRUCE A. RASMUSSEN, Chief
WRDC/MTI
Wright-Patterson AFB, OH 45433-6533

25 July 91
DATE

If your address has changed, if you wish to be removed from our mailing list, or if the addressee is no longer employed by your organization please notify WRDC/MTI, Wright-Patterson Air Force Base, OH 45433-6533 to help us maintain a current mailing list.

Copies of this report should not be returned unless return is required by security considerations, contractual obligations, or notice on a specific document.

REPORT DOCUMENTATION PAGE

| | | | |
|--|--------------------------------------|--|---|
| 1a. REPORT SECURITY CLASSIFICATION Unclassified | | 1b. RESTRICTIVE MARKINGS None | |
| 2a. SECURITY CLASSIFICATION AUTHORITY | | 3. DISTRIBUTION/AVAILABILITY OF REPORT Approved for Public Release; Distribution is Unlimited. | |
| 2b. DECLASSIFICATION/DOWNGRADING SCHEDULE | | | |
| 4. PERFORMING ORGANIZATION REPORT NUMBER(S) OM 620342000 | | 5. MONITORING ORGANIZATION REPORT NUMBER(S) WRDC-TR-90-8007 Vol. VI, Part 3 | |
| 6a. NAME OF PERFORMING ORGANIZATION Control Data Corporation; Integration Technology Services | | 6b. OFFICE SYMBOL (if applicable) WRDC/MTI | 7a. NAME OF MONITORING ORGANIZATION WRDC/MTI |
| 6c. ADDRESS (City, State, and ZIP Code) 2970 Presidential Drive Fairborn, OH 45324-6209 | | 7b. ADDRESS (City, State, and ZIP Code) WPAFB, OH 45433-6533 | |
| 8a. NAME OF FUNDING/SPONSORING ORGANIZATION Wright Research and Development Center, Air Force Systems Command, USAF | | 8b. OFFICE SYMBOL (if applicable) WRDC/MTI | 9. PROCUREMENT INSTRUMENT IDENTIFICATION NUM. F33600-87-C-0464 |
| 8c. ADDRESS (City, State, and ZIP Code) Wright-Patterson AFB, Ohio 45433-6533 | | 10. SOURCE OF FUNDING NOS. | |
| 11. TITLE (Include Security Classification) See Block 19 | | PROGRAM ELEMENT NO. 78011F | PROJECT NO. 595600 |
| 12. PERSONAL AUTHOR(S) | | TASK NO. F95600 | WORK UNIT NO. 20950607 |
| 13a. TYPE OF REPORT Final Report | 13b. TIME COVERED 4/1/87-12/31/90 | 14. DATE OF REPORT (Yr., Mo., Day) 1990 September 30 | 15. PAGE COUNT 22 |
| 16. SUPPLEMENTARY NOTATION WRDC/MTI Project Priority 6203 | | | |
| 17. COSATI CODES | | 18. SUBJECT TERMS (Continue on reverse if necessary and identify block no.) | |
| FIELD | GROUP | SUB GR. | |
| 1308 | 0905 | | |
| 19. ABSTRACT (Continue on reverse if necessary and identify block number) This manual provides detailed instructions for operating the Integrated Information Support System (IISS). Instructions are also included for initiating and shutting down the Network Transaction Manager (NTM) and describing error codes, and for maintaining the NTM tables. Block 11 (Cont) - INTEGRATED INFORMATION SUPPORT SYSTEM (IISS) Vol VI - Network Transaction Manager Subsystem Part 3 - Network Transaction Manager (NTM) Operator's Manual | | | |
| 20. DISTRIBUTION/AVAILABILITY OF ABSTRACT UNCLASSIFIED/UNLIMITED x SAME AS RPT. DTIC USERS | | 21. ABSTRACT SECURITY CLASSIFICATION Unclassified | |
| 22a. NAME OF RESPONSIBLE INDIVIDUAL David L. Judson | | 22b. TELEPHONE NO. (Include Area Code) (513) 255-7371 | 22c. OFFICE SYMBOL WRDC/MTI |

FOREWORD

This technical report covers work performed under Air Force Contract F33600-87-C-0464, DAPro Project. This contract is sponsored by the Manufacturing Technology Directorate, Air Force Systems Command, Wright-Patterson Air Force Base, Ohio. It was administered under the technical direction of Mr. Bruce A. Rasmussen, Branch Chief, Integration Technology Division, Manufacturing Technology Directorate, through Mr. David L. Judson, Project Manager. The Prime Contractor was Integration Technology Services, Software Programs Division, of the Control Data Corporation, Dayton, Ohio, under the direction of Mr. W. A. Osborne. The DAPro Project Manager for Control Data Corporation was Mr. Jimmy P. Maxwell.

The DAPro project was created to continue the development, test, and demonstration of the Integrated Information Support System (IISS). The IISS technology work comprises enhancements to IISS software and the establishment and operation of IISS test bed hardware and communications for developers and users.

The following list names the Control Data Corporation subcontractors and their contributing activities:

| <u>SUBCONTRACTOR</u> | <u>ROLE</u> |
|--|--|
| Control Data Corporation | Responsible for the overall Common Data Model design development and implementation, IISS integration and test, and technology transfer of IISS. |
| D. Appleton Company | Responsible for providing software information services for the Common Data Model and IDEF1X integration methodology. |
| ONTEK | Responsible for defining and testing a representative integrated system base in Artificial Intelligence techniques to establish fitness for use. |
| Simpact Corporation | Responsible for Communication development. |
| Structural Dynamics Research Corporation | Responsible for User Interfaces, Virtual Terminal Interface, and Network Transaction Manager design, development, implementation, and support. |
| Arizona State University | Responsible for test bed operations and support. |

TABLE OF CONTENTS

| | | <u>Page</u> |
|-----------|--|-------------|
| SECTION 1 | INTRODUCTION | 1-1 |
| 1.1 | MAINFRAME DEPENDENT STARTUP | 1-1 |
| 1.1.1 | VAX ENVIRONMENT | 1-1 |
| 1.1.1.1 | RUNTIME MODULE LOCATION | 1-1 |
| 1.1.1.2 | SYSGEN PARAMETERS | 1-1 |
| 1.1.1.3 | NTM STARTUP | 1-1 |
| 1.1.2 | IBM ENVIRONMENT | 1-2 |
| 1.1.2.1 | IBM STARTUP | 1-2 |
| 1.2 | STARTUP COMMON PROCEDURES | 1-3 |
| SECTION 2 | NTM OPERATOR COMMANDS | 2-1 |
| 2.1 | GENERAL | 2-1 |
| 2.2 | DISPLAY STATUS | 2-1 |
| 2.3 | DISPLAY APC | 2-2 |
| 2.4 | START APC | 2-2 |
| 2.5 | START LINK | 2-2 |
| 2.6 | START NEWLOG | 2-2 |
| 2.7 | STOP APC | 2-3 |
| 2.8 | STOP LINK | 2-3 |
| 2.9 | SHUTDOWN TIME | 2-3 |
| 2.10 | SHUTDOWN CANCEL | 2-3 |
| 2.11 | ENABLE SIGERR | 2-3 |
| 2.12 | DISABLE SIGERR | 2-3 |
| SECTION 3 | SHUTTING DOWN THE NTM | 3-1 |
| SECTION 4 | NTM ERROR CODES | 4-1 |
| 4.1 | MPU PROCESSING ERROR CODES | 4-1 |
| 4.2 | INTERFACE ERROR CODES | 4-1 |
| 4.3 | COMM Error Codes | 4-2 |
| SECTION 5 | NTM TABLE MAINTENANCE | 5-1 |
| 5.1 | OVERVIEW | 5-1 |
| 5.1.1 | NTM INITIALIZATION TABLE (NTMINIT) | 5-1 |
| 5.1.2 | AP CHARACTERISTICS TABLE (NTMAPPS) | 5-3 |
| SECTION 6 | MESSAGE INDEX | 6-1 |
| SECTION 7 | NTM LOG FILE | 7- |
| 7.1 | Message Log Format | 7-1 |
| 7.2 | Message Types | 7-2 |

SECTION 1

INTRODUCTION

This manual provides instructions to the Network Transaction Manager (NTM) Operator. Instructions are included which cover all supported host CPUs. Instructions which are unique to a CPU are separated from those which apply generally to all supported systems.

Each different mainframe on which the NTM is run presents a different interface for startup. These differences include the operating system commands and the library structure. Each mainframe's instructions for starting the NTM is presented as a separate subsection.

1.1 MAINFRAME DEPENDENT STARTUP

The startup procedures for each mainframe computer are different. The following subsections will discuss the VAX and IBM nodes and the specific startup procedure for each node.

1.1.1 VAX ENVIRONMENT

1.1.1.1 RUNTIME MODULE LOCATION

In order to run NTM, data files for the NTM tables must reside in a directory that is pointed to by the logical name NTMDIR. The logical name NTMDIR is defined in the command procedure NTM_SETUP.COM. Before starting the NTM, be sure that the logical name NTMDIR is correct (see the NTM Installation Guide for additional detail) and that the NTM_SETUP.COM procedure has been executed. It is suggested that the NTM_SETUP.COM be executed in the system wide login. The Network Transaction Manager (NTM) executable modules NTMMON, NTNTMMPU, NTERRLOG, NTMSGLOG, and all executable modules of applications to be run in the NTM environment must be in directories known to the NTM.

1.1.1.2 SYSGEN PARAMETERS

Prior to running the NTM, an ID must be assigned to the NTM. This ID allows multiple NTM environments to run simultaneously. To assign an ID, modify the NTMDIR:[EXE]NTMINIT. file and change the NTMID= record as shown in the NTM Installation Guide. The default NTM ID is "A", which should be sufficient for most environments that will only be running a single instance of the NTM.

1.1.1.3 NTM STARTUP

The NTM environment on each host within the NTM system is started individually under control of the local host operating system. Once the NTM Operator has logged on to the local host under the appropriate system directory, the invocation of a command file will cause the local operating system to load and execute the Monitor AP. It is the NTM system component responsible for coordinating NTM start up. On the VAX, the command file NTM_SETUP should be executed during user login. The NTM can then be invoked as follows:

\$NTM

NTM START-UP at <date> <time>

NTM INITIALIZATION STARTED

NTM-C>

APC VAX is not active

```
*****  
***  
***          NETWORK TRANSACTION MANAGER          ***  
***          Version 2.00                          ***  
*****
```

1.1.2 IBM ENVIRONMENT

The normal installation of the NTM will result in the NTM start-up procedure being made available as a member of the PDS NTMver.BUILD(NTM). This procedure may be transferred to a system procedure library such as SYS1.PROCLIB in which case the CPU Operator enters the start command to initiate the NTM as a batch process. The exact form of this command varies with the local operating procedures. If it is left as a member of NTMver.BUILD, the NTM is run as a user job.

1.1.2.1 IBM STARTUP

If the NTM start-up procedure has been transferred to a system procedure library, the command to start-up is:

S NTM

or

START NTM

If the start-up procedure has not been transferred to a system procedure library, submit the NTMver.BUILD(NTM) JCL.

If the standard procedure is used without local modification, the required datasets will be allocated and accessed under the name NTMver.xxx. The low level qualifier xxx is the type of data.

NOTE: When establishing a communications link between an IBM and VAX node, the NTM on the VAX node must be started first. The DECnet/SNA COMM implements a passive connect request, which informs the DECnet/SNA Interface that the VMS application is ready to engage in a session when the session is initiated by the IBM application. For this reason, the NTM must be started on the VAX side first for the Version 2.0 release of the DECnet/SNA COMM in order to establish an LU 2 connection. This limitation will be removed in a future release of the DECnet/SNA COMM.

1.2 STARTUP COMMON PROCEDURES

After NTM start up has begun, start up status messages are displayed to the NTM Operator console. These messages indicate which NTM components have been successfully initiated and where errors have occurred in start up processing.

If, during NTM start-up, any or all of the communication link start-up requests fail, start-up processing will continue and normal NTM processing will be available to the local host.

| Accession For | |
|------------------------------|-------------------------------------|
| NTIS GRA&I | <input checked="" type="checkbox"/> |
| DTIC TAB | <input type="checkbox"/> |
| Unannounced Justification | <input type="checkbox"/> |
| By _____ | |
| Distribution/ | |
| Availability Codes | |
| Dist | Avail and/or Special |
| A-1 | |

SECTION 2

NTM OPERATOR COMMANDS

2.1 GENERAL

The NTM supports the following Operator commands:

| | |
|----------|-------------------------------|
| Display | Status |
| | Pending |
| | Apc,xxx |
| Start | Apc,xxx |
| | Link,xxxxxxxx |
| | Newlog,xxx (xxx - MSG or ERR) |
| Stop | Apc,xxx |
| | Link,xxxxxxxx |
| | Host,xxxxxxxx |
| Shutdown | Time,nn (nn - no of minutes) |
| | Cancel |
| Enable | Sigerr |
| Disable | Sigerr |
| Help | |

"Help" will display the list of Operator commands. The processing of these commands is fairly straightforward. "Shutdown Time" is more complex and will be covered in the section of this manual on shutting down the NTM (Section 4). Commands may be abbreviated to the least number of characters that uniquely identify them. Commands that include ",xxx..." or ",nn" mean that additional information such as an APC name or a Link ID is required. This information must be entered as part of the command (i.e., NTM-A>disp apc vax). If a command requiring this information is entered without it, the message "INVALID OPTION - MISSING" is displayed. The command must be reentered with the missing information. This data is verified and the command is executed. Between the time the Operator enters the requested command data and the time at which the command processing is complete, the Operator console is disabled for further input. Therefore, there may be no overlapping of Operator commands. The results of the command will be displayed at the console.

Note that in the case of an IBM mainframe, commands shown here are entered as text in reply to a numbered WTOR message. Any time that entry of an Operator command is permissible, there will be an outstanding WTOR message. The MVS Operator command 'D R,L' will redisplay information about messages awaiting reply.

2.2 DISPLAY STATUS

This command displays the current status of all NTM components.

NTM-A>disp stat

```
* * * * * * * * * System Status * * * * * * * * *
* * * * * * * * * NTM-A VAX is ACTIV * * * * * * * * *
```

```
Host VAX      Status - ACITV   Desired - ACTIV
  APC QQQ     Status - INACT   Desired - INACT
  APC VAX     Status - ACTIV   Desired - ACTIV
```

Links

```
VQ To IBM    Status - INACT   Desired - INACT
VI To IN2    Status - INACT   Desired - INACT
```

Msglog - ACTIV, Errlog - ACTIV, Sigerr ENABLED
NTM-A>

2.3 DISPLAY APC

This command enables the NTM Operator to see a list of the active AP's on a particular APC.

NTM-A>disp apc vax

The active applications on VAX are as follows

| Ap Name | Original Source | Status | A/C | Chldn | Msgs |
|--------------|-----------------|--------|-----|-------|------|
| NTNTMONITV00 | NTNTMONITV00MRV | ACTIVE | RTC | NO | 0000 |

where A/C is the abort characteristics and CHLDN is an indicator that this AP has spawned one or more sub APs.

2.4 START APC

This command enables the NTM Operator to start an APC. Only non-component APC's on the local host may be started via this Operator command.

```
NTM-A>start apc qqq
NTM-A>
APC QQQ is now active
```

2.5 START LINK

This command is invoked to start the communications link to a remote host.

```
NTM-A>start link vi
Starting Link VI To Host IN2
NTM-A>
```

2.6 START NEWLOG

```
NTM-A> start newlog msg
NTM-A>
```

A new logfile will be started. This allows the Operator to isolate the log files for specific tests or time periods.

2.7 STOP APC

This command causes an APC anywhere in the NTM environment to be shutdown. Only non-component APC's (other than MRx, COx, and UIx) Application Clusters may be shutdown via this Operator command.

```
NTM-A>stop apc qqq  
APC QQQ has ended  
NTM-A>
```

2.8 STOP LINK

This command is invoked to shutdown the communications link to a remote host.

```
NTM-A>stop link vi  
Stop Link VI To Host IN2 requested
```

2.9 SHUTDOWN TIME

This command is discussed in the separate section on shutting down NTM.

2.10 SHUTDOWN CANCEL

This command may only be used during the NTM shutdown process. It is discussed further in the section covering the shutdown process.

2.11 ENABLE SIGERR

This command sets the condition that all SIGERR messages that arrive at the MONITOR will be displayed on the Operator's console.

```
NTM-A>enable sigerr  
Sigerr message displan enabled.  
NTM-A>
```

2.12 DISABLE SIGERR

This command prevents SIGERR messages from being displayed at the NTM Operator's console. As most SIGERR messages are notifications of internal AP problems, the Operator may choose this option to restrict console displays to NTM errors only. This modification is the default one. When the NTM starts up, the display of SIGERR messages at the operator's console is disabled.

```
NTM-A>disable sigerr  
Sigerr message display disabled.  
NTM-A>
```

SECTION 3

SHUTTING DOWN THE NTM

The Operator command "Shutdown Time" is invoked when the NTM system is to be shutdown.

The time value (in minutes) entered by the Operator will determine the elapsed time until shutdown processing of the NTM system components actually begins. User applications will be notified of shutdown pending only if time until shutdown is one minute or more. Otherwise, shutdown will proceed immediately, shutting down active AP's according to their characteristics.

NTM Application Processes (APs) are notified that a system shutdown is pending and they should prepare to close their session. After shutdown has been requested, only Operator commands "Display Status", "Display APC", and "Shutdown Cancel" will be accepted. It is only during a timed shutdown that the Operator may choose to cancel the shutdown request.

If the Operator enters the "Shutdown Cancel" command, NTM APs are notified that the shutdown has been cancelled and normal NTM processing is resumed. After the elapsed time until shutdown has expired, shutdown processing begins with the shutdown of all active APC's, notification of shutdown to remote hosts and network communications are terminated. Finally, when all NTM components have terminated, the Monitor AP concludes shutdown processing and ends execution. Control is returned to the host operating system.

SECTION 4

NTM ERROR CODES

4.1 MPU PROCESSING ERROR CODES

MPU processing codes are those errors which are detected by an MPU during its normal processing activities. Upon the occurrence of an MPU processing error, the following error message is displayed to the NTM Operator console:

```
Error in APNAME on APC xxx: Code: yyyyy Severity: z  
Description of error
```

The "APNAME" is the name of the MPU that detected the error condition. "APC" is the three character name of the host, "Code" is the error code and "Severity" is F for fatal or W for warning. The "Description of error" is data relevant to the error condition. As an example, on a 31001 error (Mailbox Write) the name of the mailbox where the error occurred is given. Table names, file names, and (host) system return codes are other examples of information supplied in an MPU processing error message. In most cases, it will be necessary to call the NTM system programmer to investigate the cause of the problem.

The MPU processing error codes are as follows:

```
31001 MAILBOX WRITE ERROR  
31002 NO READ ON MAILBOX  
31003 MAILBOX DISCONNECT ERROR  
31004 CALL WAIT ERROR  
31005 SET TIME ERROR  
31006 PROCESS START ERROR  
31007 PROCESS ABORT ERROR  
31008 TIMEOUT ERROR  
31009 TABLE ENTRY NOT FOUND  
31010 STATE MESSAGE CONFLICT  
31011 INVALID MSG STRUCTURE
```

4.2 INTERFACE ERROR CODES

AP interface errors are those errors occurring in the AP interface (to the NTM) and detected by the MPU during message processing. All errors of this type involve invalid message header field values. For example, upon the occurrence of an AP interface error where an invalid message category is given in the header, the following message will be displayed to the NTM Operator console:

```
Error in APNAME on APC xxx: Code: yyyyy Severity: z  
Description of error
```

The "APNAME" indicates the name of the application process sending the message where the error has occurred. These errors are caused by the AP or the AP Interface providing invalid data in the message header. The application designer should check to insure that proper "Data Length", "Message Type", and "Destination AP Name" arguments are passed to the AP Interface. Otherwise, it will be necessary for the NTM system programmer to investigate the errant AP Interface.

The AP interface error codes are as follows:

| | |
|-------|-----------------------------|
| 32001 | INVALID MESSAGE CATEGORY |
| 32002 | INSTANCE UNAVAILABLE |
| 32003 | NO AUTHORITY |
| 32004 | INVALID DESTINATION |
| 32005 | INVALID SOURCE |
| 32006 | RESOURCE UNAVAILABLE |
| 32007 | RESOURCE UNAVAILABLE MEMORY |
| 32008 | RESOURCE UNAVAILABLE APC |
| 32009 | RESOURCE UNAVAILABLE LINK |
| 32010 | RESOURCE UNAVAILABLE SYSTEM |
| 32011 | ILLEGAL MESSAGE TYPE |

4.3 COMM Error Codes

COMM error codes are associated with errors detected by the COMM module. The following is a list of all currently defined COMM error codes:

| | |
|-------|--------------------------------------|
| 20001 | NETWORK LINK DISCONNECTED |
| 20006 | UNABLE TO WRITE TO NETWORK |
| 20007 | ILLEGAL NTM MESSAGE |
| 20016 | NETWORK CONNECT FAILURE |
| 20017 | ASYNCHRONOUS READ FAILED |
| 20019 | DECNET IOS\$DEACCESS FAILED |
| 20020 | LOAD ERROR |
| 20021 | VTAM CLOSE ERROR |
| 20022 | VTAM OPEN ERROR |
| 20023 | VTAM SETLOGON ERROR |
| 20024 | VTAM OPENDST ERROR |
| 20025 | INTERFACE NOT INITIALIZED |
| 20030 | NETWORK SEND ERROR |
| 20040 | NETWORK RECEIVE ERROR |
| 20050 | VTAM CANCEL ERROR |
| 20060 | VTAM SIGNAL ERROR |
| 20061 | VTAM TIMEOUT ERROR |
| 20070 | VTAM CLSDST ERROR |
| 20080 | VTAM TP END ERROR |
| 20081 | VTAM LOSTTERM ERROR |
| 20082 | VTAM NEGATIVE RESPONSE RECEIVED |
| 20101 | UNABLE TO PARSE COMM INFO FROM NTM |
| 20102 | MVS ASSIGN W/MBX FAILED |
| 20103 | DECNET DECLARE NETWORK OBJECT FAILED |
| 20104 | DECNET IOS\$ACCESS FAILED |
| 20813 | NOT YOUR TURN TO TRANSMIT |
| 21111 | LAN TRACE INFORMATION |

SECTION 5

NTM TABLE MAINTENANCE

5.1 OVERVIEW

This section describes the procedures for maintaining the NTM tables. The NTM uses the tables described in this section to maintain system information and current status. Some of the NTM tables are global to all MPU components on a host while some are local to each MPU. When a change is made to the NTM which affects the system configuration (for example, the addition of a new AP), certain tables must be manually updated to reflect these changes.

The tables which are to be maintained by the NTM System Operator are:

| | |
|---------|--|
| NTMINIT | Provides system configuration information |
| NTMAPPS | Provides the processing characteristics of all application processes in the NTM environment. |

Given a change to the NTM system configuration, one or both of the tables will need to be updated. The modification of either of these tables is a simple and straightforward procedure involving editing the file to make the necessary changes. These table files are maintained in the NTM system directory on each host in the NTM environment.

The specific table file names are as follows:

| VAX | IBM (DDNAME) |
|----------|--------------|
| NTMINIT. | NTMINIT |
| NTMAPPS. | NTMAPPS |

The table files contain data which appears as a string of characters. Each record in the file represents one table entry. Therefore, to add a new entry to a table, one has only to add another entry to the table initialization file. Similarly, to delete or modify a table entry, the specific record in the initialization file should be deleted or modified. It is critical that the alignment of data in these records remain intact. Any errors introduced during the editing process will cause problems at system run time. For this reason, great care should be taken when modifying any table initialization file. When editing a file, check to make sure the new or modified entry is in line with all of the other file entries.

5.1.1 NTM INITIALIZATION TABLE (NTMINIT)

The NTM operator may edit the NTMINIT file to set runtime values of the following data items:

- NTMID
- HOSTNAME
- MPU Mailbox Size (sets the size of all mailboxes)
- MONITOR Mailbox Size

The NTMID may be modified in order to run multiple NTM images at one time. Any changes made become effective during the next execution of the start NTM command. No recompilation is necessary.

The NTMINIT file also defines additional MPU's and communication links for multi-host configurations of the NTM.

A sample NTMINIT file follows:

```
* Comment
*
NTMID=A
HOSTNAME=VAX
*
LINKNAME=VI,NOSTART
DESTHOST=IN2
COMMAP=NTCOMTOIN2
COMMINFO=CAE8:
*
LINKNAME=VQ,NOSTART
DESTHOST=IBM
COMMAP=NTCOMTOIBM
COMMINFO=SNAGTY:IISSNIV:7:
*
APC=QQQ,NOSTART
MPUMBXSIXE=4096
MBXQSIZE=2048
*
ALLCAPS
```

All lines beginning with "*" are comments.

The NTMID and HOSTNAME entries are required.

Additional MPU's may be defined with the APC entry. APC is a three character identifier for the MPU. This is also the apc value for the MPU's entry in the NTMAPPS file.

MPUMBXSIXE is the number of bytes in the MPU mailboxes.

MBXQSIZE is the number of bytes in the MONITOR mailbox. The default for both of these is 10000.

The ALLCAPS entry tells the monitor to display messages in all capital letters.

Each communication link is defined with the LINKNAME, DESTHOST, COMMAP and COMMINFO entries.

LINKNAME is a two character identifier for the link. The first letter of each host in the link may be used. NOSTART is optional and means that the link must be started with the "Start Link" operator command. If NOSTART is not specified, the link will attempt to be started automatically when the NTM is started.

DESTHOST is the HOSTNAME in the destination host's NTMINIT file.

COMMAP is the apname in the NTMAPPS table for the communication application.

COMMINFO is communication application specific information required for connecting to the destination host.

5.1.2 AP CHARACTERISTICS TABLE (NTMAPPS)

The NTMAPPS file contains AP processing characteristic information. Each entry in the NTMAPPS file has the following format:

| NAME | SIZE | TYPE |
|-----------------------|------|--------------|
| ---- | ---- | ---- |
| AP NAME | 10 | ALPHANUMERIC |
| MAX. INSTANCES | 2 | NUMERIC |
| NUMBER OF PARENTS | | |
| PER INSTANCE | 2 | NUMERIC |
| INITIATION NEEDS | 1 | NUMERIC |
| ON ABORT | 1 | NUMERIC |
| NUMBER OF MAILBOXES | 1 | NUMERIC |
| ON SHUTDOWN | 1 | NUMERIC |
| ON CHILD NORMAL TERM. | 1 | NUMERIC |
| ON CHILD ABNORM TERM. | 1 | NUMERIC |
| ON CHILD SHUTDOWN | 1 | NUMERIC |
| TIMEOUT HANDLING | 1 | NUMERIC |
| AP PRIORITY | 1 | NUMERIC |
| ENABLE | 1 | ALPHANUMERIC |
| ACCESS FLAG | 1 | NUMERIC |
| APC | 3 | ALPHANUMERIC |
| PATH | 9 | ALPHANUMERIC |

Number of Parents

01 except for queue servers

Enable Values

0 Application may not be accessed
1 Application available

Access Flag Possible Values

0 Don't do authorization checking
1 Do authorization checking
(currently not implemented, 0 should be used)

AP Priority Possible Values

- 0 Default AP Priority (at present all NTM AP's will be assigned the same priority)

Initiation Needs - Possible Values

- 0 No special needs
- 1 Needs specific init message
- 2 Must be started from terminal (never initiate)
- 3 Must be started by the monitor

Number of Mailboxes - Possible Values

- 0 AP Does Not Require Mailboxes
- 1 AP Supports a Cold and an ACK Mailbox only
- 2 AP Supports Cold, ACK, and Hot Mailboxes

On Abort - Possible Values

- 1 Run to Completion
- 2 Send Abort Message to AP
- 3 Abnormally Terminate AP

On Child Abnormal Termination - Possible Values

- 0 No Message to AP
- 1 Message to AP Required
- 2 Terminate Parent AP

On Child Normal Termination - Possible Values

- 0 No Message to AP
- 1 Message to AP Required
- 2 Terminate Parent AP

On Child Shutdown - Possible Values

- 0 No Message to AP
- 1 Message to AP Required
- 2 Terminate Parent AP

On Shutdown - Possible Values

- 0 AP Has No Shutdown Logic
- 1 AP Has Logic To Gracefully Shut Itself Down

Timeout Handling - Possible Values

- 0 Paired Messages Not Handled
- 1 Cancel Message Pair On Timeout
- 2 Abort AP On Timeout
- 3 Do Not Cancel Pair (Renew Timeout Period)

SECTION 6
MESSAGE INDEX

This section contains a list of all possible error messages in numeric order.

| Message Code | NTM Component | Message Meaning |
|--------------|---------------|---------------------------------|
| 10001 | IPC | EVENT BLOCK NOT INIT |
| 10002 | IPC | NO MESSAGE FOUND IN MAILBOX |
| 10003 | IPC | EVENT NUMBER ZERO |
| 10004 | IPC | INVALID DATA COUNT |
| 10005 | IPC | INPUT BUFF TOO SMALL |
| 10006 | IPC | MAILBOX NOT FOUND |
| 10007 | IPC | NUM OF BYTES EQUAL ZERO |
| 10008 | IPC | ELASPED TIME EQUAL ZERO |
| 10009 | IPC | NO RECEIVE MESSAGE OUTSTANDING |
| 10010 | IPC | EVENT-BLOCK IN USE |
| 10011 | IPC | MAILBOX FULL |
| 10012 | IPC | INVALID EVENT-BLOCK FOR MAILBOX |
| 10013 | IPC | NOT A RECEIVE EVENT-BLOCK |
| 10014 | IPC | EVENT NUMBER EXCEEDS MAX |
| 10015 | IPC | INPUT MAILBOX ALREADY EXISTS |
| 10016 | IPC | NUMBER OF BYTES EXCEEDS MAX |
| 10017 | IPC | BUFFER SIZE ZERO |
| 10018 | IPC | BUFFER SIZE EXCEEDS MAX |
| 10019 | IPC | RECEIVE OUTSTANDING |
| 10020 | IPC | NO RECEIVE LAN OUTSTANDING |
| 10021 | IPC | EVENT (RCVMSG) NOT SATISFIED |
| 10022 | IPC | INVALID EVENT-BLOCK FOR TIMER |
| 10023 | IPC | INVALID EVENT-BLOCK FOR LAN |
| 10024 | IPC | RECEIVE LAN OUTSTANDING |
| 10025 | IPC | RECEIVE LAN NOT SATISFIED |
| 10026 | IPC | TIMER OUTSTANDING |
| 10027 | IPC | EVENT NUM NOT UNIQUE |
| 10028 | IPC | NO REQUESTS OUTSTANDING |
| 10029 | IPC | NUM OF EVENT-BLOCK EXCEEDS MAX |
| 10030 | IPC | NUM OF EVENT-BLOCK ZERO |
| 10031 | IPC | INVALID MAILBOX NAME |
| 10032 | IPC | MAILBOX SIZE ZERO |
| 10033 | IPC | MAILBOX SIZE EXCEEDS MAX |
| 10034 | IPC | TIME INTERVAL EXCEEDS MAX |
| 10035 | IPC | NOT A TIMER EVENT-BLOCK |
| 10036 | IPC | NOT A LAN EVENT-BLOCK |
| 10037 | IPC | NOT A CONSOLE EVENT-BLOCK |
| 10038 | IPC | INPUT MAILBOX NOT FOUND |
| 10039 | IPC | * KES OSIETXR ABEND MESSAGE |
| 10040 | IPC | TOO FEW EBS PASSED |
| 10041 | IPC | IPC SYSTEM ERROR |
| 10042 | IPC | RCV CONSOLE NOT SATISFIED |
| 20001 | COMM | NETWORK LINK DISCONNECTED |

| Message Code | NTM Component | Message Meaning |
|--------------|---------------|--------------------------------------|
| 20006 | COMM | UNABLE TO WRITE TO NETWORK |
| 20007 | COMM | ILLEGAL NTM MESSAGE |
| 20016 | COMM | NETWORK CONNECT FAILURE |
| 20017 | COMM | ASYNCHRONOUS READ FAILURE |
| 20019 | COMM | DECNET IO\$DEACCESS FAILED |
| 20020 | COMM | LOAD ERROR |
| 20021 | COMM | VTAM CLOSE ERROR |
| 20022 | COMM | VTAM OPEN ERROR |
| 20023 | COMM | VTAM SETLOGON ERROR |
| 20024 | COMM | VTAM OPENDST ERROR |
| 20025 | COMM | INTERFACE NOT INITIALIZED |
| 20030 | COMM | NETWORK SEND ERROR |
| 20040 | COMM | NETWORK RECEIVE ERROR |
| 20050 | COMM | VTAM CANCEL ERROR |
| 20060 | COMM | VTAM SIGNAL ERROR |
| 20061 | COMM | VTAM TIMEOUT ERROR |
| 20070 | COMM | VTAM CLSDST ERROR |
| 20080 | COMM | VTAM END ERROR |
| 20081 | COMM | VTAM LOSTTERM ERROR |
| 20082 | COMM | VTAM NEGATIVE RESPONSE RECEIVED |
| 20101 | COMM | UNABLE TO PARSE COMM INFO FROM NTM |
| 20102 | COMM | VMS ASSIGN W/MBX FAILED |
| 20103 | COMM | DECNET DECLARE NETWORK OBJECT FAILED |
| 20104 | COMM | DECNET IO\$ACCESS FAILED |
| 20813 | COMM | NOT YOUR TURN TO TRANSMIT |
| 21111 | COMM | LAN TRACE INFORMATION |
| 31001 | NTM | MAILBOX WRITE ERROR |
| 31002 | NTM | NO READ ON MAILBOX |
| 31003 | NTM | MAILBOX DISCONNECT ERROR |
| 31004 | NTM | CALL WAIT ERROR |
| 31005 | NTM | SET TIME ERROR |
| 31006 | NTM | PROCESS START ERROR |
| 31007 | NTM | PROCESS ABORT ERROR |
| 31008 | NTM | TIMEOUT ERROR |
| 31009 | NTM | TABLE ENTRY NOT FOUND |
| 31010 | NTM | STATE MESSAGE CONFLICT |
| 31011 | NTM | INVALID MESSAGE STRUCTURE |
| 32001 | NTM | INVALID MESSAGE CATEGORY |
| 32002 | NTM | INSTANCE UNAVAILABLE |
| 32003 | NTM | NO AUTHORITY |
| 32004 | NTM | INVALID DESTINATION |
| 32005 | NTM | INVALID SOURCE |
| 32006 | NTM | RESOURCE UNAVAILABLE |
| 32007 | NTM | RESOURCE UNAVAILABLE MEMORY |
| 32008 | NTM | RESOURCE UNAVAILABLE APC |
| 32009 | NTM | RESOURCE UNAVAILABLE LINK |
| 32010 | NTM | RESOURCE UNAVAILABLE SYSTEM |
| 32011 | NTM | ILLEGAL MESSAGE TYPE |

SECTION 7
NTM LOG FILE

7.1 Message Log Format

Each message log entry contains a time, date stamp, a message header and the message data. The following table shows the fields an NTM message log entry.

| Field Name | Length |
|---------------------|--------|
| Time/Date Stamp | 23 |
| Header Format | 01 |
| Header Length | 03 |
| Data Length | 04 |
| Data Format | 01 |
| Message Priority | 01 |
| Message Type | 02 |
| Message Destination | 15 |
| Message Source | 15 |
| Message Serial No. | 07 |
| Header Status | 01 |
| Message Category | 01 |
| AP Priority | 01 |
| Integrity Check | 01 |
| Log Message Req | 01 |
| Statistics Collect | 01 |
| Test Mode Flag | 01 |
| Delayed Trigger | 01 |
| Trigger Time | 15 |
| Trigger Condition | 01 |
| Original Source | 15 |
| Channel | 03 |
| Continuation Ind. | 01 |
| User Data | 1908 |

7.2 Message Types

The following table contains all message types that are used by the NTM for communication to and from the various components (Monitor, MPU, COMM). The NTM message log will contain messages with the message type field equal to one of these values when NTM internal messages are logged.

| <u>Type</u> | <u>Description</u> |
|-------------|------------------------|
| AB | ABORT-AP |
| AA | ACTIVE-LIST |
| AD | AP-DYING |
| SR | AP-STATUS-REQUEST |
| LV | APC-ALIVE |
| CS | CANCEL-SHUTDOWN |
| CL | CLEANUP |
| CA | CHILD-AP-STATUS |
| EX | EXTERNAL-CONNECTION |
| UA | APC-TABLE-UPDATE |
| UH | HOST-TABLE-UPDATE |
| HU | HOST-ACTIVE |
| HA | HOST-AVAILABLE |
| LA | LINK-ACTIVE |
| LF | LINK-FAIL |
| LR | LIST-REQUEST |
| OF | LOGOFF |
| LO | LOGON |
| HS | OFF-HOST-SHUTTING-DOWN |
| OA | OPERATOR-ABORT |
| PE | PROCESSING-ERROR |
| RE | RECOVERABLE-ERROR |
| DS | SHOW-SYSTEM-STATE |
| DA | SHUTDOWN-AP |
| DC | SHUTDOWN-APC |
| SH | SHUTDOWN-HOST |
| TR | SHUTDOWN-LINK |
| SP | SHUTDOWN-PENDING |
| SL | START-LINK |
| TE | TIMEOUT-EXPIRED |
| IA | UNSOL-INIT-ACK |
| NI | UNSUCC-INIT |
| HT | HOST-TERM |
| CR | CHANGE-ROLE |
| HN | HOST-NAME-REQ |
| CD | CONNECTION-DISCONNECT |