Critical Release Notice

Publication number: 297-2621-360
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The content of this customer NTP supports the SN06 (DMS) software release.

Bookmarks used in this NTP highlight the changes between the baseline NTP and the current release. The bookmarks provided are color-coded to identify release-specific content changes. NTP volumes that do not contain bookmarks indicate that the baseline NTP remains unchanged and is valid for the current release.

Bookmark Color Legend

Black: Applies to new or modified content for the baseline NTP that is valid through the current release.

Red: Applies to new or modified content for NA017 that is valid through the current release.

Blue: Applies to new or modified content for NA018 (SN05 DMS) that is valid through the current release.

Green: Applies to new or modified content for SN06 (DMS) that is valid through the current release.

Attention!
Adobe® Acrobat® Reader™ 5.0 is required to view bookmarks in color.

Publication History

March 2004

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Change of phone number from 1-800-684-2273 to 1-877-662-5669, Option 4 + 1.

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Digital Switching Systems

UCS DMS-250

X.25 Data Transport Feature Application Guide

UCS06 Standard 02.07 March 1999

NORTEL

NORTHERN TELECOM

Digital Switching Systems

UCS DMS-250

X.25 Data Transport Feature Application Guide

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Standard release 02.07 for software release UCS06. This document was up-issued for minor technical changes to Chapter 4.

August 1998

Standard release 02.06 for software release UCS06.

September 1997

Standard release 02.05 for software release UCS06.

February 1997

Standard release 02.03 for software release UCS06.

July 1996

Standard release 02.02 for software release UCS05 (CSP04).

May 1996

Preliminary release 02.01 for software release UCS05 (CSP04).

This edition included these additions:

- tape archive option for automatic file transfer (AFT) session
- the remote login command session
- recommended configuration for maximum billing capacity

October 1995

Preliminary release 01.02 for software release UCS04.1 (CSP01).

This edition was up-issued to incorporate editorial changes to meet current documentation standards. There were no technical changes from the previous edition of this document.

June 1995

Preliminary release 01.01 for software release UCS04.1 (CSP01).

Contents

About this document

When to use this document

This document describes the X.25 Data Transport features for the UCS DMS-250 switch and provides the necessary datafill and administration information.

This document describes the data tables, office parameters, commands, and log reports that support X.25 Data Transport. Although these items may pertain to other applications, this document is limited to how these items support X.25 Data Transport. Therefore, only those aspects directly related to X.25 Data Transport are addressed. For example, when discussing datafill for the tables, this document includes only those fields that pertain to X.25 Data Transport.

For information on how the data tables, office parameters, commands, and log reports support other applications, refer to the appropriate publication shown in the related NTPs.

How to check the version and issue of this document

The version and issue of the document are indicated by numbers, for example, 01.01.

The first two digits indicate the version. The version number increases each time the document is updated to support a new software release. For example, the first release of a document is 01.01. In the *next* software release cycle, the first release of the same document is 02.01.

The second two digits indicate the issue. The issue number increases each time the document is revised but rereleased in the *same* software release cycle. For example, the second release of a document in the same software release cycle is 01.02.

To determine which version of this document applies to the software in your office and how documentation for your product is organized, check the release information in *UCS DMS-250 Master Index*, 297-2621-001.

This document is written for all DMS-100 Family offices. More than one version of this document may exist. To determine whether you have the latest version of this document and how documentation for your product is organized, check the release information in *UCS DMS-250 Master Index*, 297-2621-001.

References in this document

The following documents are referred to in this document:

- 297-1001-139, *Multi-Protocol Controller (MPC) General Description*
- 297-1001-312, *Device Independent Recording Package (DIRP) User Guide*
- 297-2621-001, *UCS DMS-250 Master Index*
- 297-2621-100, *UCS DMS-250 General Description*
- 297-2621-114, *UCS DMS-250 Operational Measurements Reference Manual*
- 297-2621-119, *UCS DMS-250 Call Detail Record Reference Manual*
- 297-2621-851, *UCS DMS-250 Data Schema Reference Manual*
- 297-2621-855, *UCS DMS-250 Office Parameters Reference Manual*
- 297-2621-840 *UCS DMS-250 Logs Reference Manual*
- 297-2621-819, *UCS DMS-250 Commands Reference Manual*

What precautionary messages mean

The types of precautionary messages used in NT documents include attention boxes and danger, warning, and caution messages.

An attention box identifies information that is necessary for the proper performance of a procedure or task or the correct interpretation of information or data. Danger, warning, and caution messages indicate possible risks.

Examples of the precautionary messages follow.

ATTENTION Information needed to perform a task

ATTENTION

If the unused DS-3 ports are not deprovisioned before a DS-1/VT Mapper is installed, the DS-1 traffic will not be carried through the DS-1/VT Mapper, even though the DS-1/VT Mapper is properly provisioned.

DANGER Possibility of personal injury

DANGER
Risk of electrocution
Do not open the front panel of the inverter unless fuses F1, F2, and F3 have been removed. The inverter contains high-voltage lines. Until the fuses are removed, the high-voltage lines are active, and you risk being electrocuted.

WARNING Possibility of equipment damage

WARNING
Damage to the backplane connector pins
Align the card before seating it, to avoid bending the backplane connector pins. Use light thumb pressure to align the card with the connectors. Next, use the levers on the card to seat the card into the connectors.

CAUTION Possibility of service interruption or degradation

CAUTION
Possible loss of service
Before continuing, confirm that you are removing the card from the inactive unit of the peripheral module. Subscriber service will be lost if you remove a card from the active unit.

How commands, parameters, and responses are represented

Commands, parameters, and responses in this document conform to the following conventions.

Input prompt (>)

An input prompt (>) indicates that the information that follows is a command:

>BSY

Commands and fixed parameters

Commands and fixed parameters that are entered at a MAP terminal are shown in uppercase letters:

>BSY CTRL

Variables

Variables are shown in lowercase letters:

>BSY CTRL ctrl_no

The letters or numbers that the variable represents must be entered. Each variable is explained in a list that follows the command string.

Responses

Responses correspond to the MAP display and are shown in a different type:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

The following excerpt from a procedure shows the command syntax used in this document:

1 Manually busy the CTRL on the inactive plane by typing

>BSY CTRL ctrl_no
and pressing the Enter key.

where

ctrl_no is the number of the CTRL (0 or 1)

Example of a MAP response:

```
FP 3 Busy CTRL 0: Command request has been submitted.
FP 3 Busy CTRL 0: Command passed.
```

X.25 Data Transport overview

The UCS DMS-250 X.25 Data Transport features enable file transfers across X.25 links. A file transfer takes data from a file on one host and transfers it across a data link to result in a file on another. To transfer files, the switch uses the X.25 level 2 and level 3 protocols.

The file transfer capabilities of the X.25 Data Transport features enable UCS subscribers to send data such as billing data, operational measurements (OM), and logs from the switch to a host. File transfers also enable a central host to update switch databases.

The X.25 Data Transport package provides the automatic file transfer (AFT) feature. AFT transfers files from the switch to a host without operator intervention.

The X.25 Data Transport Enhancements package provides these features:

- AFT-MNP—Automatic file transfer-multi-network protocol (AFT-MNP) transfers files from the switch to a host without operator intervention. With AFT-MNP, UCS customers can select either a single-link or multi-link configuration. A single-link configuration transfers files across one X.25 link. A multi-link configuration transfers files across up to four X.25 links.
- MFT—Manual file transfer (MFT) enables users to manually transfer files between the switch and a host. Users at either a switch or a host can initiate a manual file transfer.
- SPR—Spontaneous reporting (SPR) enables the switch to send logs to a host. Two modified SPR sessions—Short INterval Statistics (SINS) and Long INterval Statistics (LINS)—enable transfer of trunk group OMs.
- Remote login—Remote login command session enables a remote user to log onto the switch in order to print reports, view and change datafill, view logs, and enter the MAPCI levels on a limited basis.

Because these features implement only the switch side of the X.25 interface, this document includes message formats and data flow charts to help UCS customers develop software to interface with and receive messages from the switch.

Hardware requirements

The UCS DMS-250 X.25 Data Transport Enhancements package requires the following hardware:

- One NT1X89BB enhanced multi-protocol controller (EMPC) card for communication between the switch and the UCS host.

  For reliability and redundancy, provision two NT1X89BA cards. Each card can interface to a maximum of two physical X.25 links.

  The MPC file must be downloaded onto the NT1X89BA card. The file name is MPC0nnxx where nn is the software load stream number and xx is the release version of that software load. For example, MPC030BH is the MPC downloadable file for the BCS30BH software load.

- Modems are required to connect the switch to the host if the distance to the host is greater than the allowable Electronic Industries Association (EIA) standard for RS-232 or the CCITT recommendation for V.35.

Order code

X.25 Data Transport is part of the UCS Data package in the standard UCS05 software package.

Interactions

The X.25 Data Transport features use the DAIS, SST, and RASL interfaces.

Data access and information services (DAIS)

AFT-MNP uses DAIS as an interface to Safe Store Tap (SST). The DAIS system also provides AFT-MNP with windowing and buffering facilities.

Safe Store Tap (SST)

SST supplies a directory of device independent recording package (DIRP) files. This directory enables the X.25 Data Transport features to transfer files in the order in which they were created. The X.25 Data Transport packages use this interface to

- query information on DIRP recorded files
- modify the status of files in the DIRP system
- gain transparent file system access to DIRP files

Robust application and session layer (RASL)

RASL provides connectivity to a remote processor in the form of a RASL NetConn.

Automatic file transfer

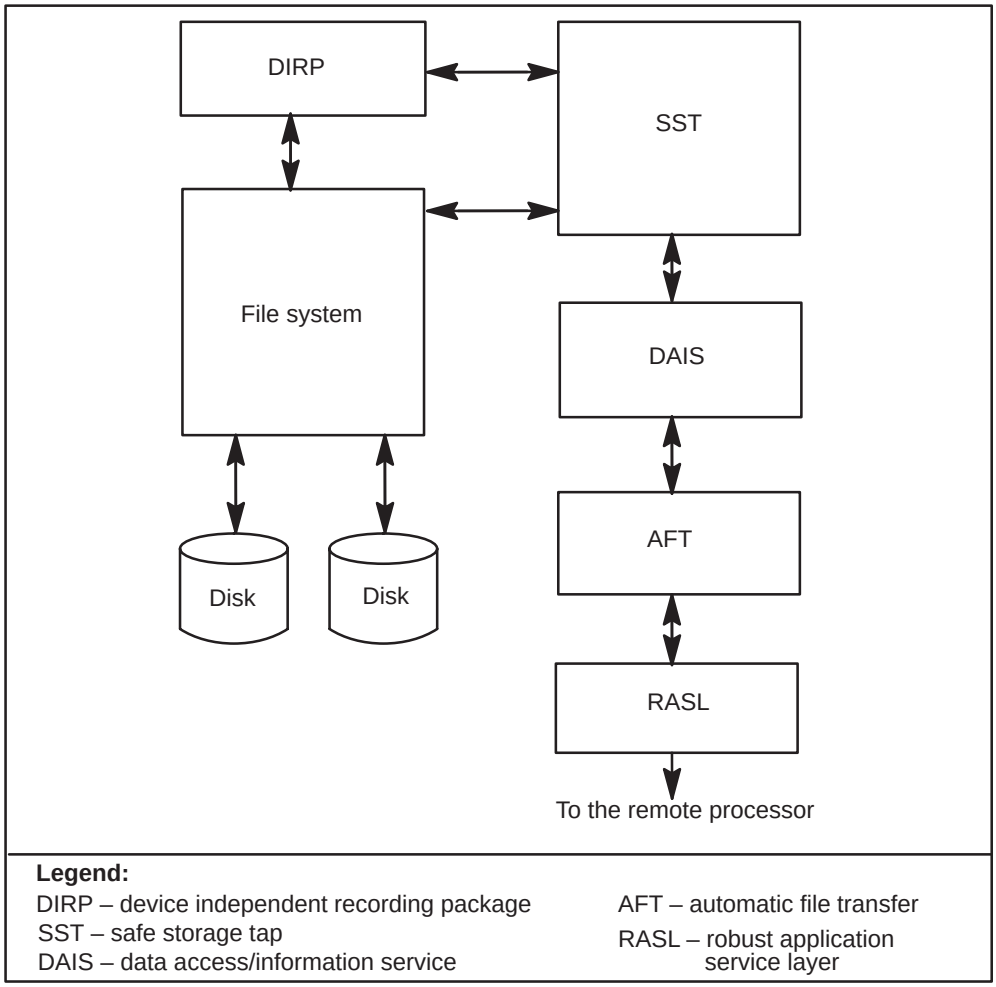
X.25 Data Transport software features enable you to transfer files generated by the device independent recording package (DIRP) from the switch to a host. The transfer takes place in near-real-time without manual intervention. Automatic file transfer (AFT) enables file transfers across a single X.25 link. Automatic file transfer-multi-network protocol (AFT-MNP) enables file transfers across up to four X.25 links.

Automatic file transfers (both AFT and AFT-MNP) are accomplished through datafill and AFT CI commands. Datafill in the DIRP control tables determines what files are transferred.

After the datafill is complete, executing the AFT CI command STARTAFT starts the AFT system and DIRP-recorded files begin to transfer. Files are transferred in the order in which they were created. When a DIRP file that needs to be transferred is found, AFT brings up a session with a remote processor by way of robust application session layer (RASL) and transfers the file. When the file transfer is complete, the process repeats for the next file.

Figure 2-1 shows the data flow for AFT and AFT-MNP.

Figure 2-1
AFT and AFT-MNP data flow



AFT-MNP selects between a single-link or a multi-link configuration. In a single-link configuration, files are transferred across one X.25 link. In a multi-link configuration, files are transferred across up to four X.25 links, increasing traffic capacity and reliability; if one link goes down, the data for that link is sent over the other links. If a failed link restores prior to the completion of the current AFT session, the restored link will not carry data again until the creation of a new AFT session.

AFT-MNP can transfer call detail records (CDRs) and operator services records (OSRs). Operational measurements (OMs) and logs are transferred by way of spontaneous reporting (SPR) sessions. Chapter 4, “Spontaneous reporting,” details SPR sessions.

Note: RASL is a generic interface that enables any application—in this case, AFT or AFT-MNP—to access any type of supported link.

Datafill table relationships

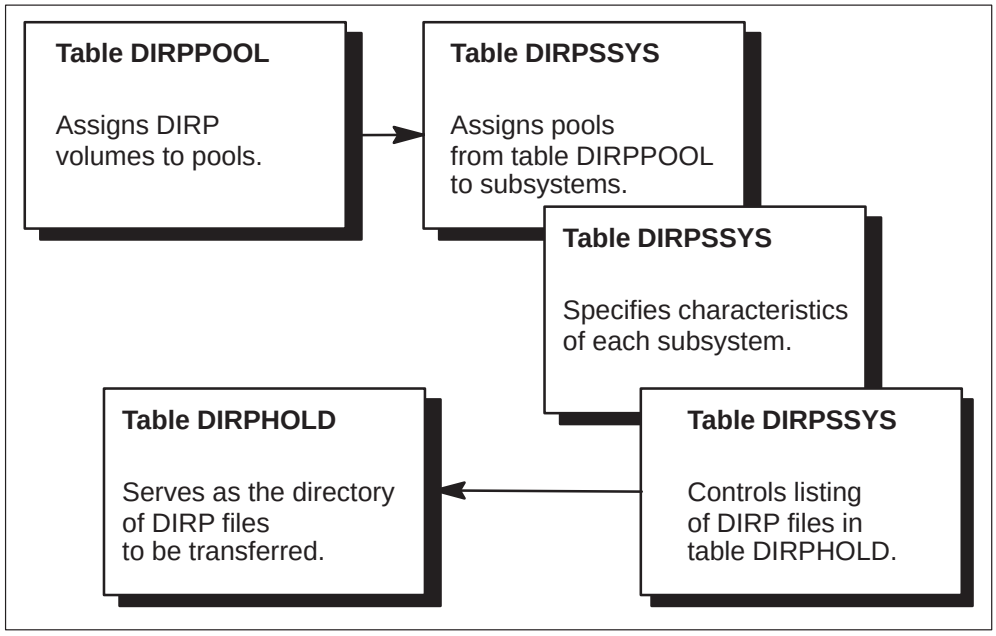
Tables DIRPPOOL, DIRPSSYS, and DIRPHOLD are the DIRP control tables. These tables ensure the proper management of data and recording resources. Table 2-1 describes their functions.

Table 2-1
DIRPPOOL, DIRPSSYS, and DIRPHOLD functions

Table	Function
DIRPPOOL	Lists the collection or pool of recording devices allocated to each contributing subsystem.
DIRPSSYS	Defines the operating parameters of each contributing subsystem. Table DIRPSSYS uses the POOLNAME field to index into table DIRPPOOL.
DIRPHOLD	Serves as a directory for all the closed files that require transmission. For AFT and AFT-MNP, table DIRPHOLD is datafilled by the software.

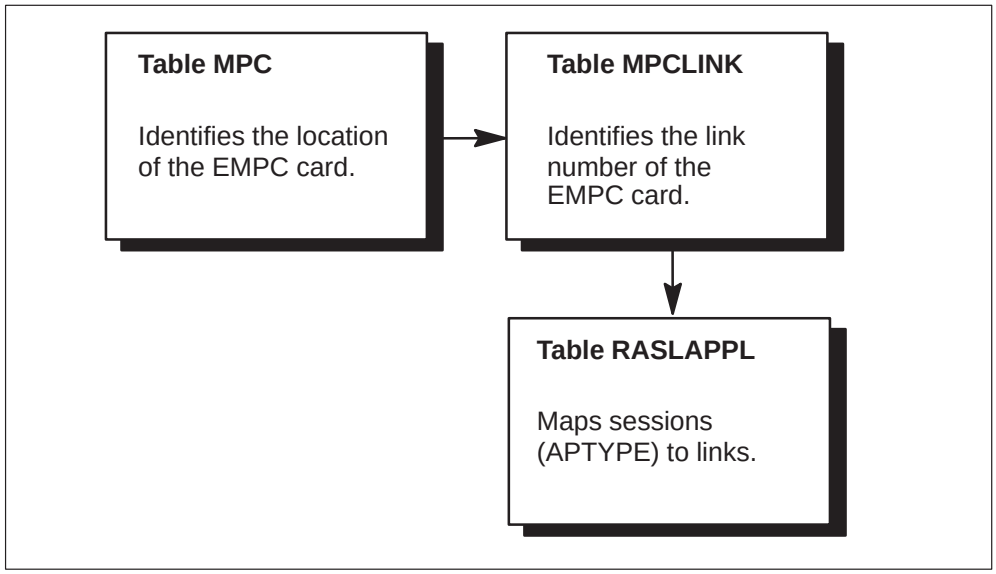
Figure 2-2 shows the relationship between tables DIRPPOOL, DIRPSSYS, and DIRPHOLD.

Figure 2-2
DIRPPOOL, DIRPSSYS, and DIRPHOLD relationships



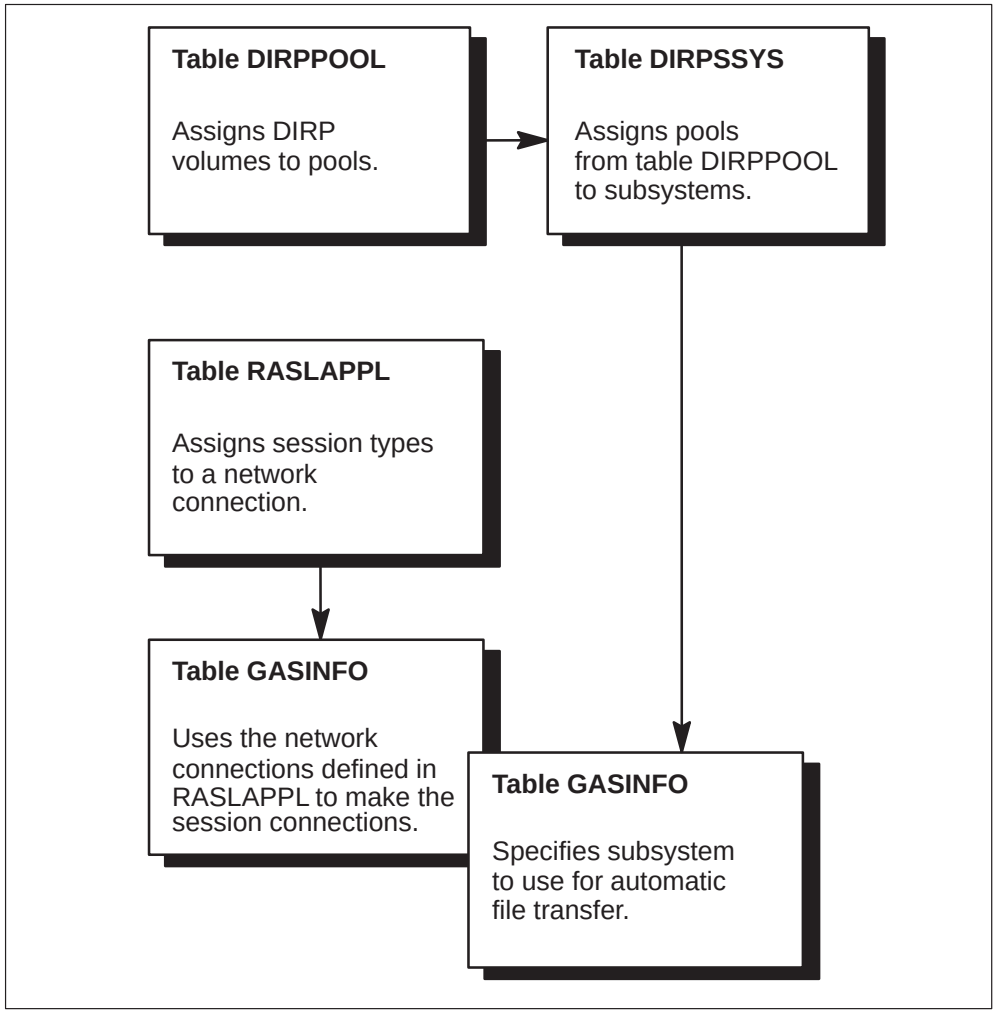
Additional datafill in table RASLAPPL maps the file transfer session to the physical links. Datafill in tables MPC and MPCLINK configures the links. Figure 2-3 shows the relationship between tables MPC, MPCLINK, and RASLAPPL.

Figure 2-3
MPC, MPCLINK, and RASLAPPL relationships



Datafill in table GASINFO uses the network connections defined in table RASLAPPL to make the session connection. The datafill in table GASINFO also specifies which subsystems defined in table DIRPPOOL are used for automatic file transfers. Figure 2-4 shows the relationships between tables DIRPPOOL, DIRPSSYS, RASLAPPL, and GASINFO.

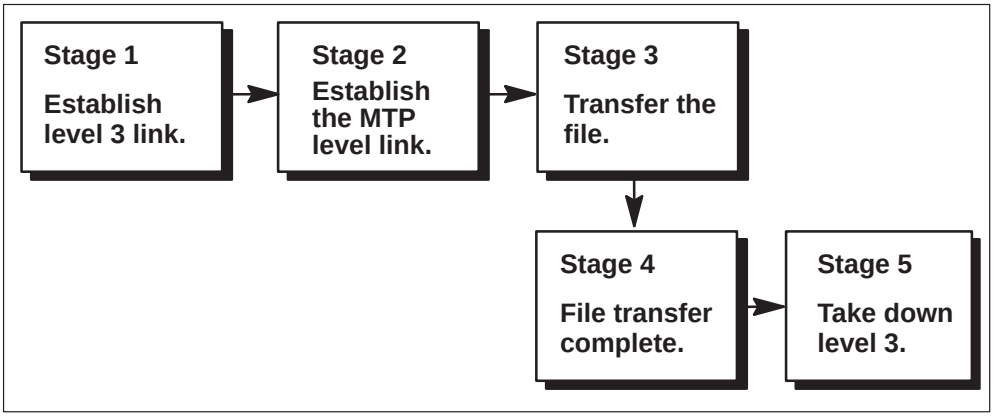
Figure 2-4
DIRPPOOL, DIRPSSYS, RASLAPPL, and GASINFO relationships



Stages of automatic file transfers

AFT-MNP transfers files from the switch to a host in five basic stages as shown in Figure 2-5.

Figure 2-5
AFT session



This section details the five stages of an automatic file transfer session.

Stage 1

The physical link is up, a virtual channel is available, and the host has the resources to handle the file transfer session.

Stage 2

The switch notifies the host of the name of the file to be transferred. The host acknowledges. The switch sends a CNT-PRT message to initiate input on the host. The host responds with a CNT-RED message.

Stage 3

The switch sends data blocks followed by an STS-EOB message. The host must respond with a CNT-RNB message before the timer expires. Otherwise, an error occurs. If the host responds with any other message, an error is assumed and the switch sends an STS-EOF message.

Stage 4

Once the file is sent or an error occurs, both sides agree to take down the MTP application level.

Stage 5

The virtual channel and all associated resources are released.

Once an AFT session is started by the STARTAFT command, DIRP files are transferred to the host in the order in which they were generated. The file transfers continue until the STOPAFT command is executed.

If a file transfer is aborted for any reason, such as the link connection goes down, the file transfer session closes and the file is marked as a partial file

transfer (PFT). After the link is established again, AFT resumes the file transfer at the last acknowledged block. PFT is discussed in more detail later in this chapter.

Timers

Table 2-2 describe the AFT and AFT-MNP timers during the file transfer process.

Table 2-2
AFT and AFT-MNP timers

Timer	Description
Tn	Timer Tn starts just after the message is sent. It detects MTP level errors. If any response from the other side takes more than Tn seconds, an error is assumed and the session is brought down.
T^0	Timer T^0 specifies how long the switch waits for an STS-ACK message. The timer value is one minute.
T^1	Timer T^1 specifies how long the host waits for a data block. The timer value is five to seven minutes.
T^2	Timer T^2 specifies how long the host waits for an STS-EOB message. The timer value is one minute.
T^3	Timer T^3 specifies how long the host or the switch waits for an STS-CPL message. The timer value is one minute.
T^5	Timer T^5 specifies how long the switch waits for a CNT-RED message. The timer value is one minute.
T^6	Timer T^6 specifies how long the switch waits for a CNT-RNB message. The timer value is three minutes.
T^7	Timer T^7 specifies how long the host waits for an ACS-SFO message. The timer value is five minutes.
T^8	Timer T^8 specifies how long the host waits for a CNT-PRT message. The timer value is one minute.

Data flow of automatic file transfers

Figure 2-6 shows how the AFT data flows and depicts where the timers apply.

Note: The messages shown in Figures 2-6, 2-7, 2-8, 2-10, and 2-11 are detailed in this chapter. See “Multi-Network Protocol” later in this chapter.

Figure 2-6
Data flow with timers depicted (single-link configuration)

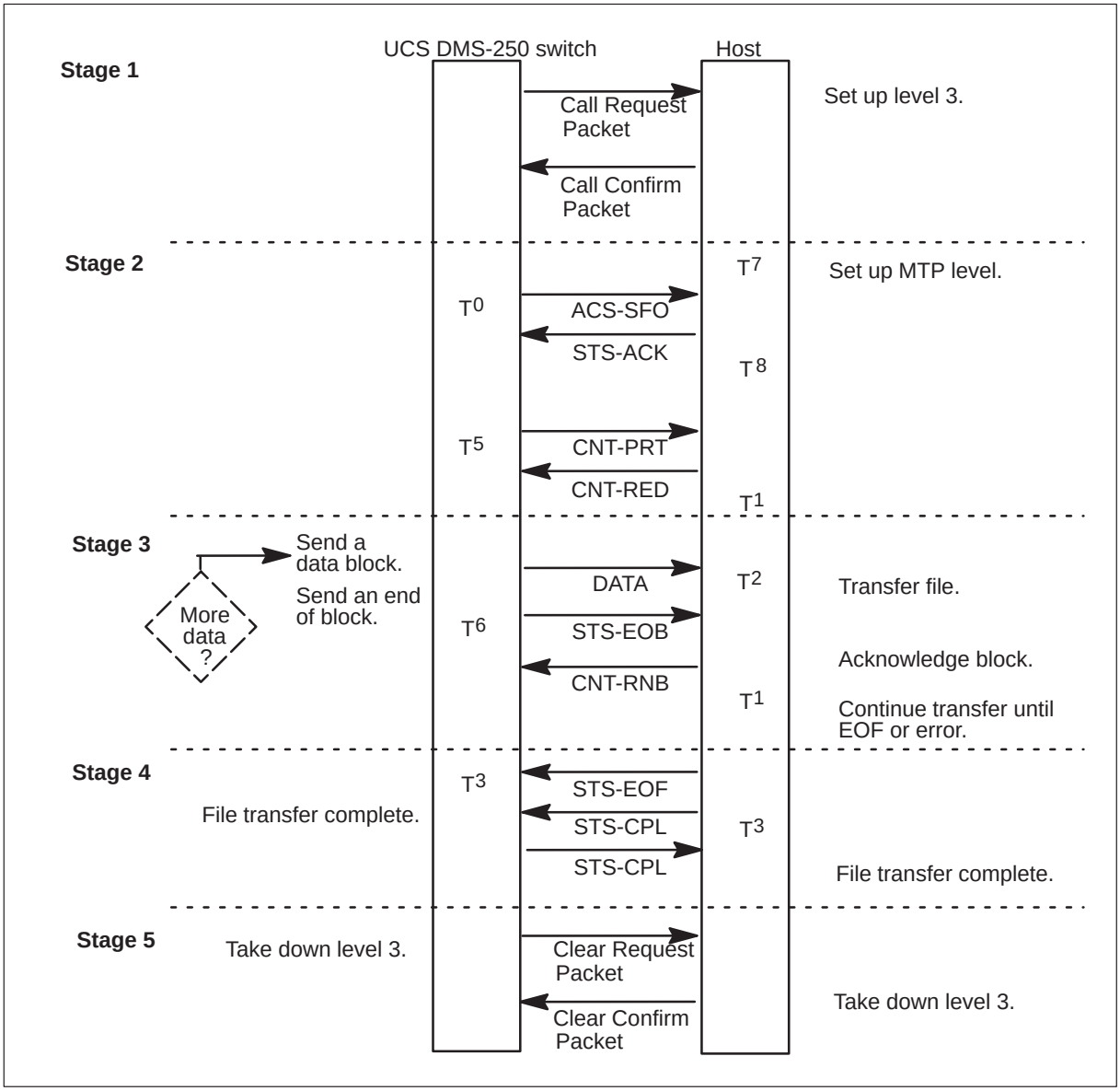
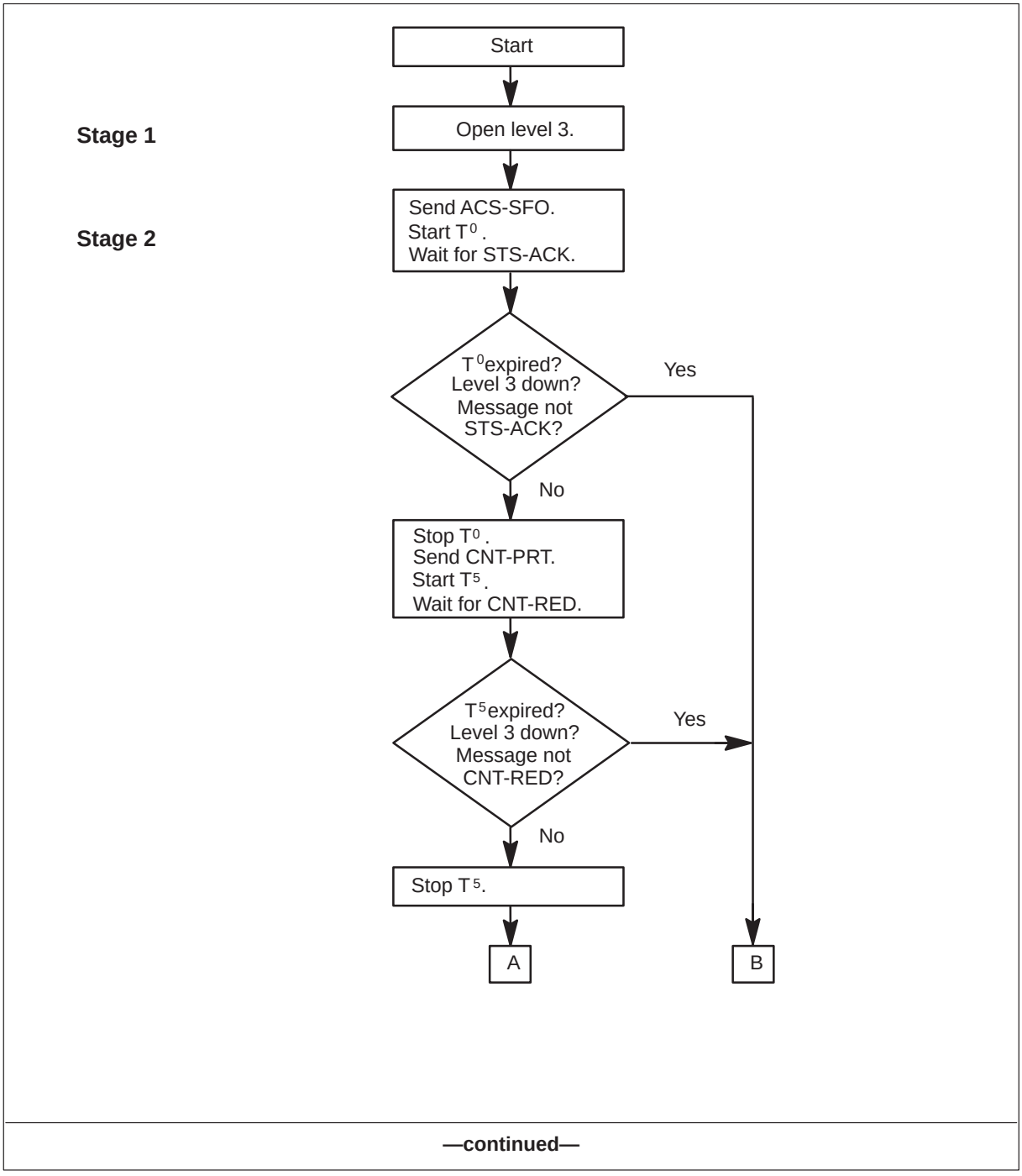


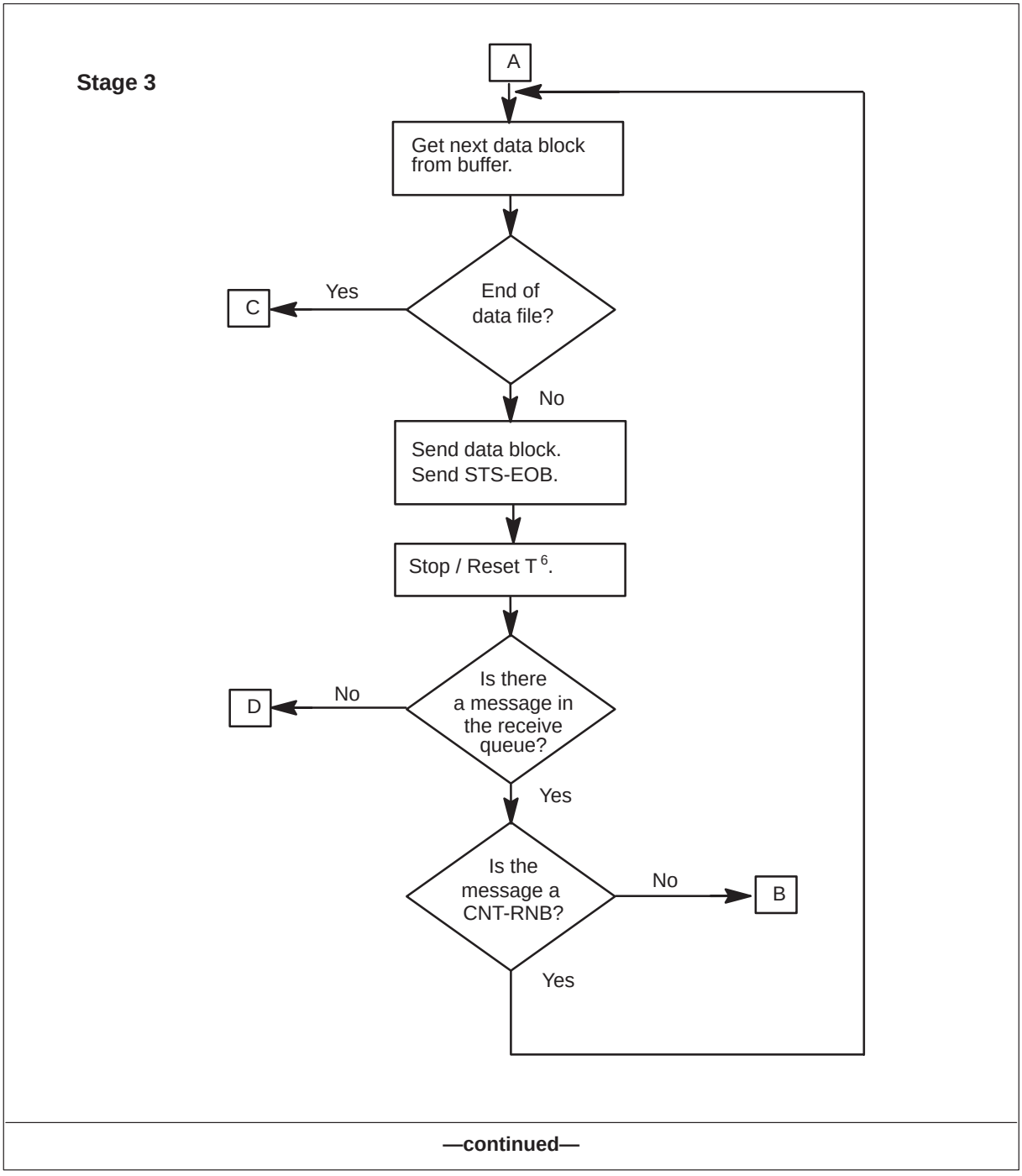
Figure 2-7 shows the five stages of an AFT from the perspective of the switch.

Figure 2-7
Data flow when the switch sends a file to the host



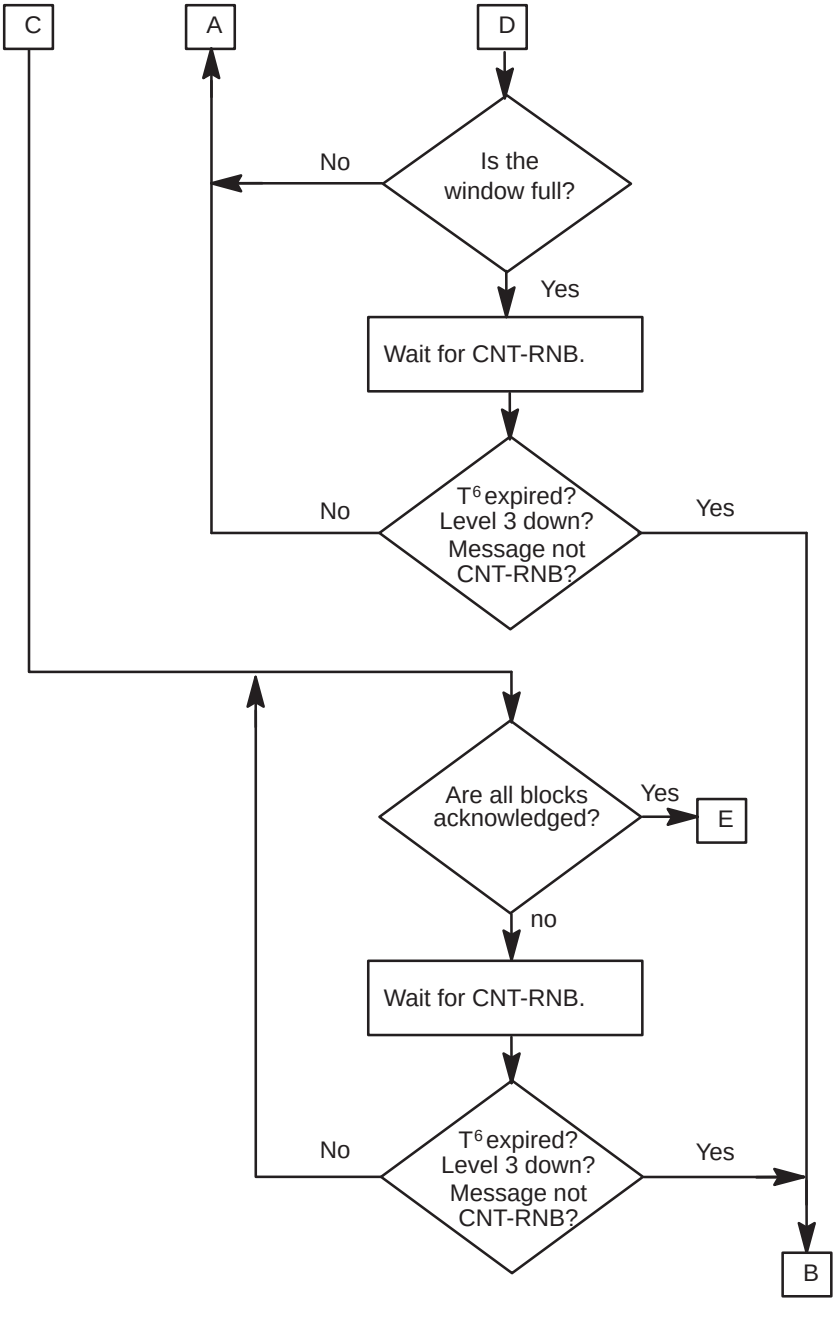
—continued—

Figure 2-7
Data flow when the switch sends a file to the host (continued)



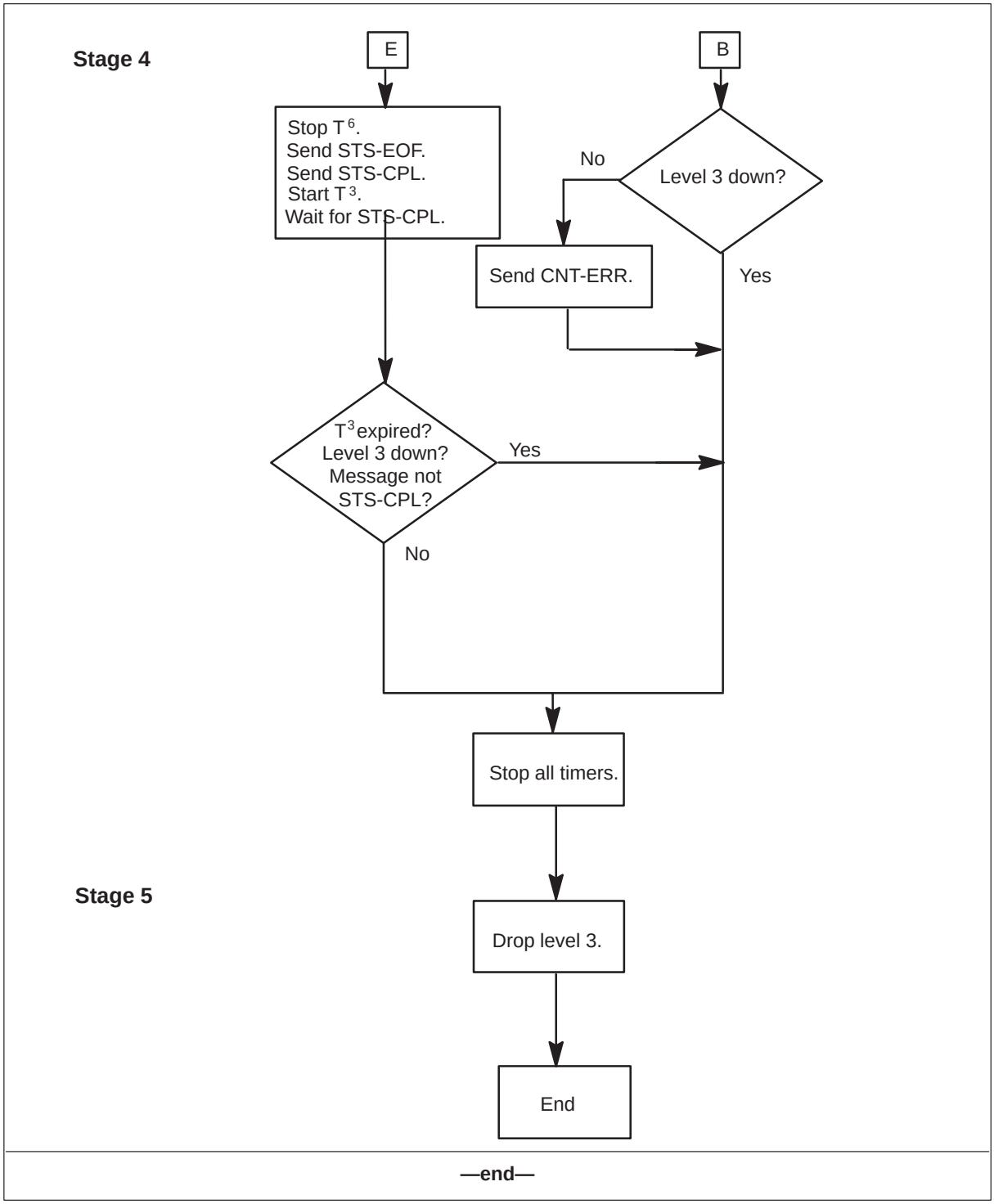
—continued—

Figure 2-7
Data flow when the switch sends a file to the host (continued)



—continued—

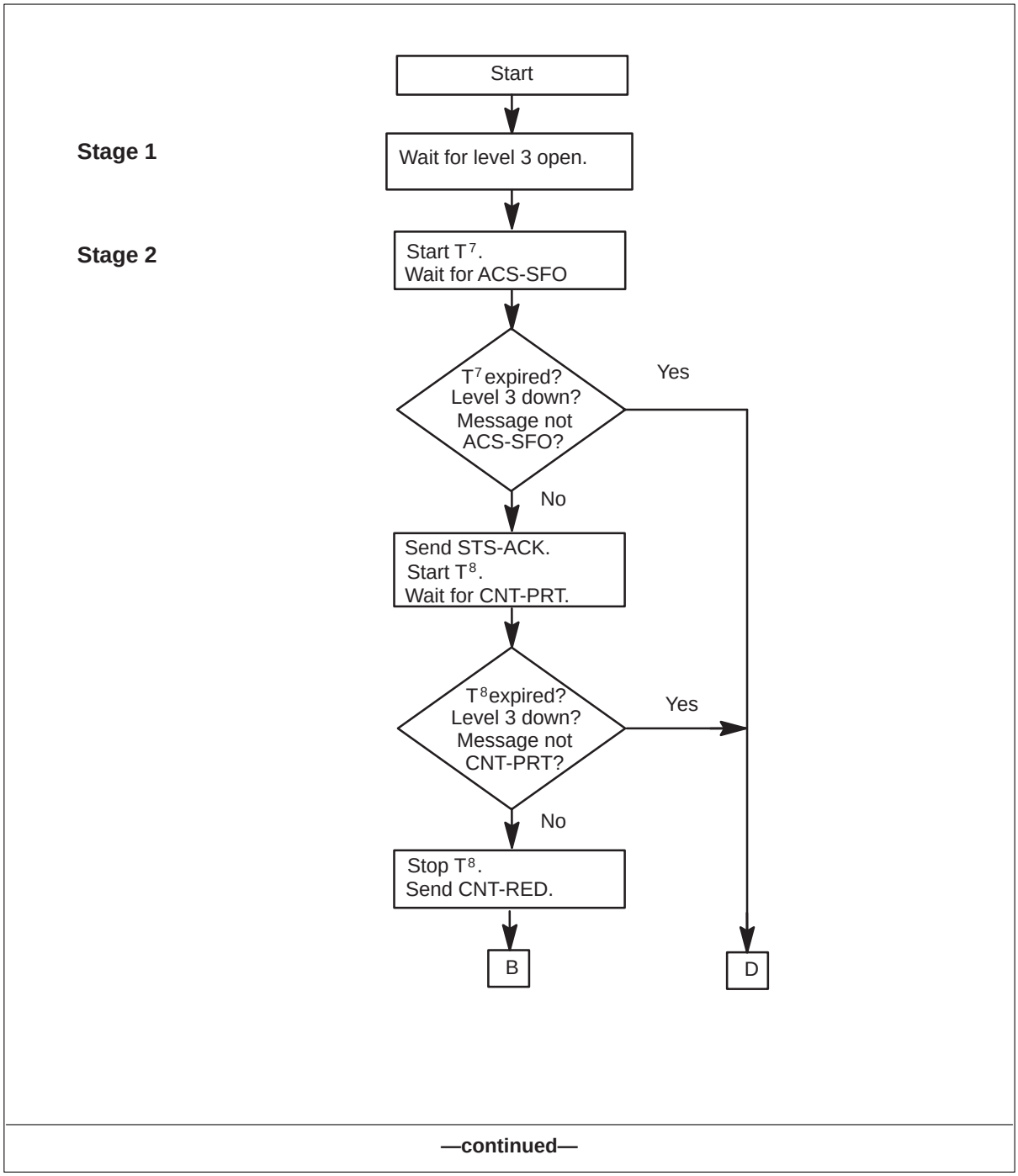
Figure 2-7
Data flow when the switch sends a file to the host (continued)



—end—

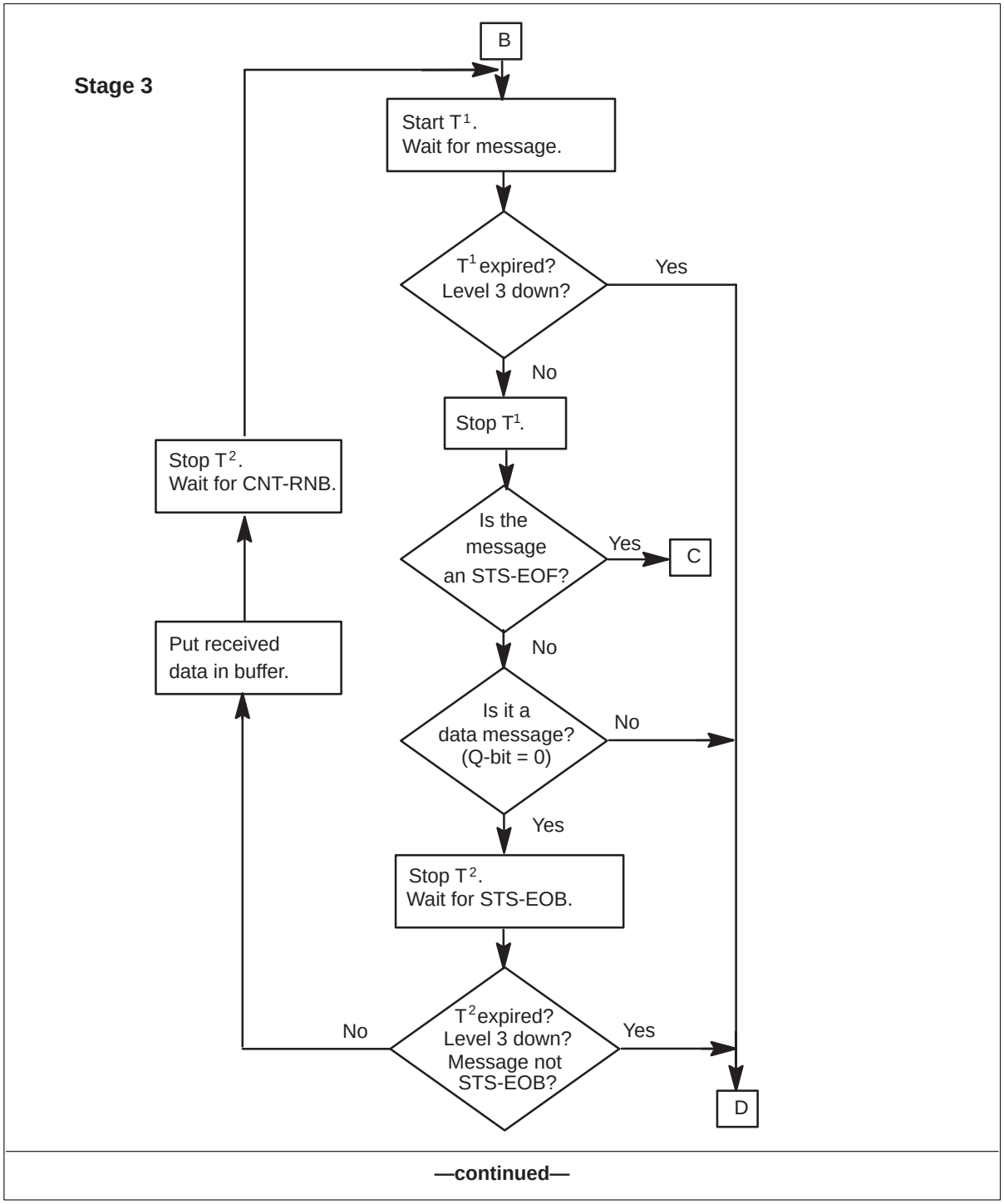
Figure 2-8 shows the five stages of an AFT from the perspective of the host receiving the file transfer.

Figure 2-8
Data flow when the host receives a file from the switch



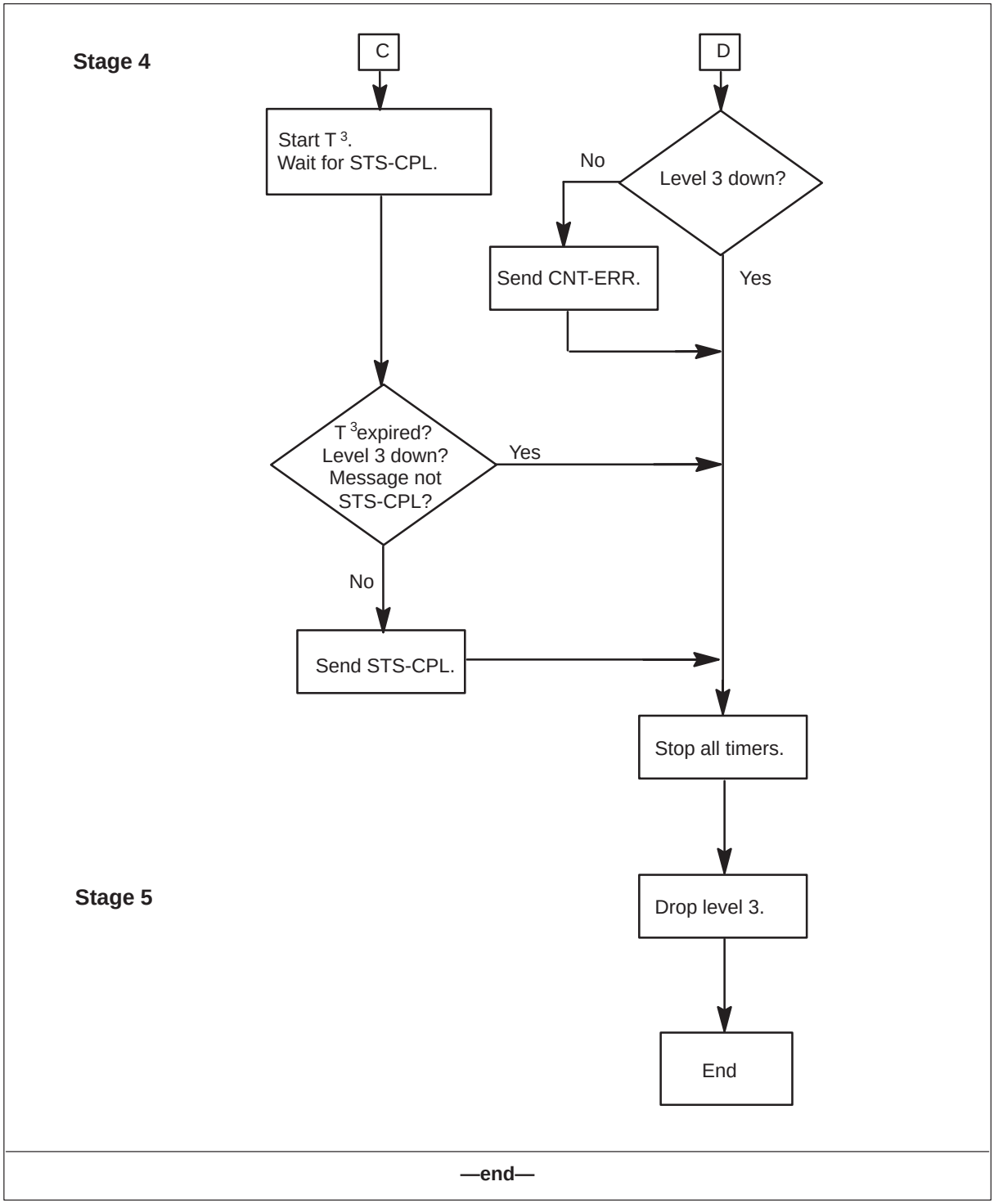
—continued—

Figure 2-8
Data flow when the host receives a file from the switch (continued)



—continued—

Figure 2-8
Data flow when the host receives a file from the switch (continued)



—end—

AFT-MNP configurations

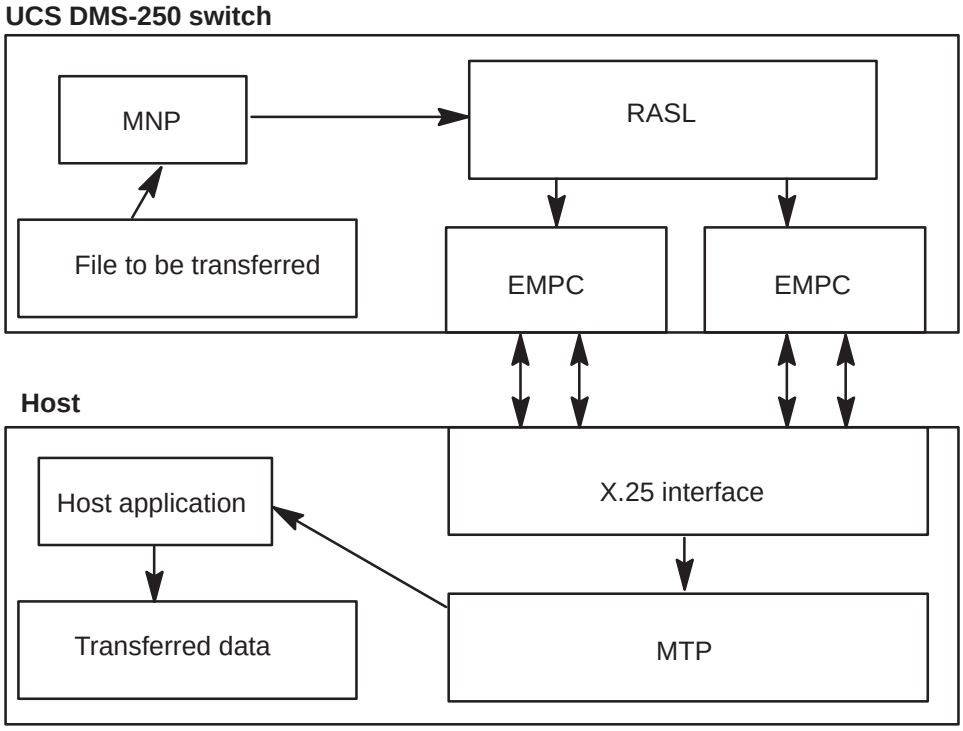
The AFT-MNP enables a switch to transfer files in near real time with either a single-link or multi-link configuration.

AFT-MNP provides load sharing and link recovery over up to four enhanced multi-protocol controller (EMPC) links that can be either V.35 or RS-232 ports. If one link goes down, traffic is distributed over the remaining links without manual intervention.

Traffic is sent over the EMPC links at either 9.6 kbit/s or 19.2 kbit/s on an RS-232 port; or at either 9.6 kbit/s, 19.2 kbit/s, or 56 kbit/s on a V.35 port.

Figure 2-9 shows data transfer over two EMPC links.

Figure 2-9
AFT-MNP data transfer over two links



Single-link configuration

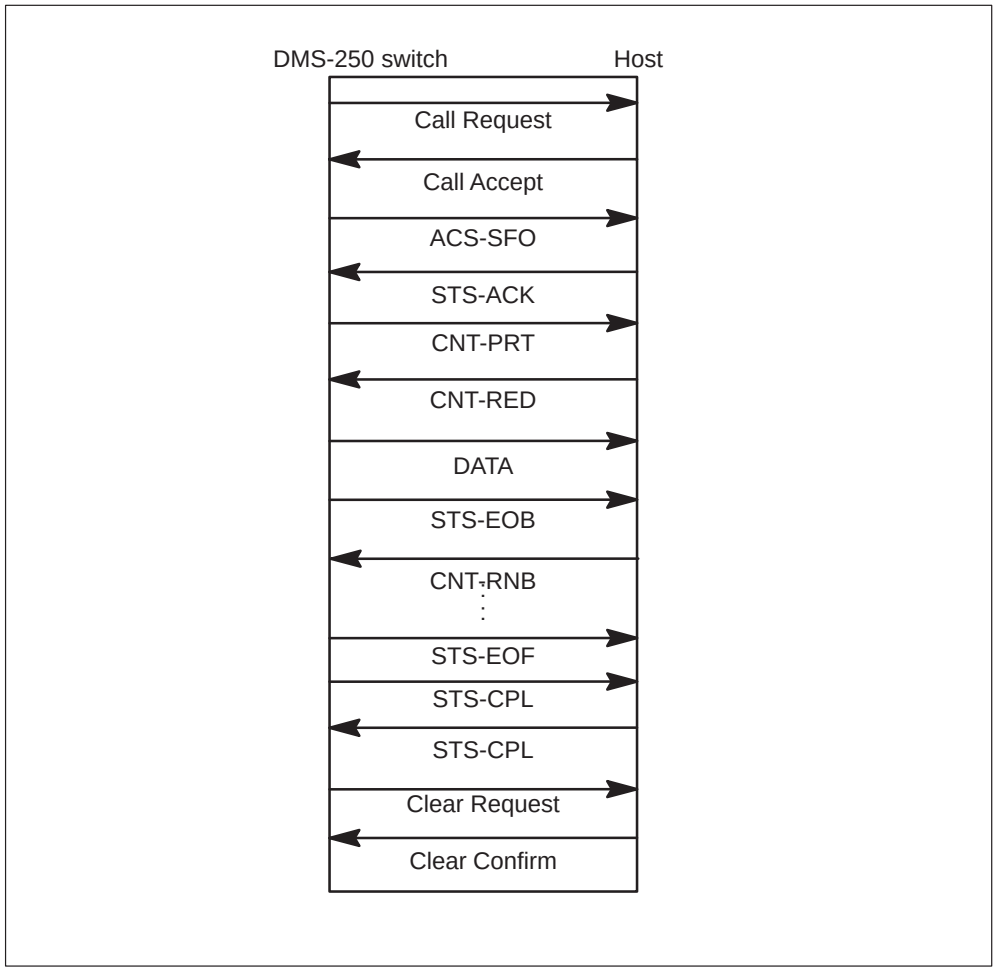
In a single-link AFT-MNP configuration, the network connection is established at the beginning of the file transfer process. If the link goes down during the data transfer stage, MNP tries to bring it back up.

When the STARTAFT command is executed, Message Transfer Protocol (MTP) starts the connection setup between the two ends. The connection

remains open until the STOPAFT command is executed. Figure 2-10 shows the message sequence for a single-link configuration.

Note: MTP is the application protocol that controls file transfers. See "Multi-Network Protocol" later in this chapter for details on MTP.

Figure 2-10
Message sequence (single-link configuration)



The sequence of events for the file transfer in a single-link configuration is as follows:

- The link performs the file transfer start-up message exchange. That is, messages ACS-SFO, STS-ACK, CNT-PRT, and CNT-RED are sent.
- The data is sent, up to the window size, over the link. Data transfer continues until all data is sent.
- The link performs the file transfer wrap-up message exchange. That is, messages STS-EOF and STS-CPL are sent.

- The network connection is closed.

Multi-link configuration

In an AFT-MNP configuration with multiple links, the network connection is established over up to four links at the beginning of the file transfer process. If a link goes down during the data transfer stage, the unacknowledged data for that link is retransmitted over the remaining links.

If a link goes down, the system attempts to bring it back up. Once the link is up, data is not transferred over the link until the next file transfer.

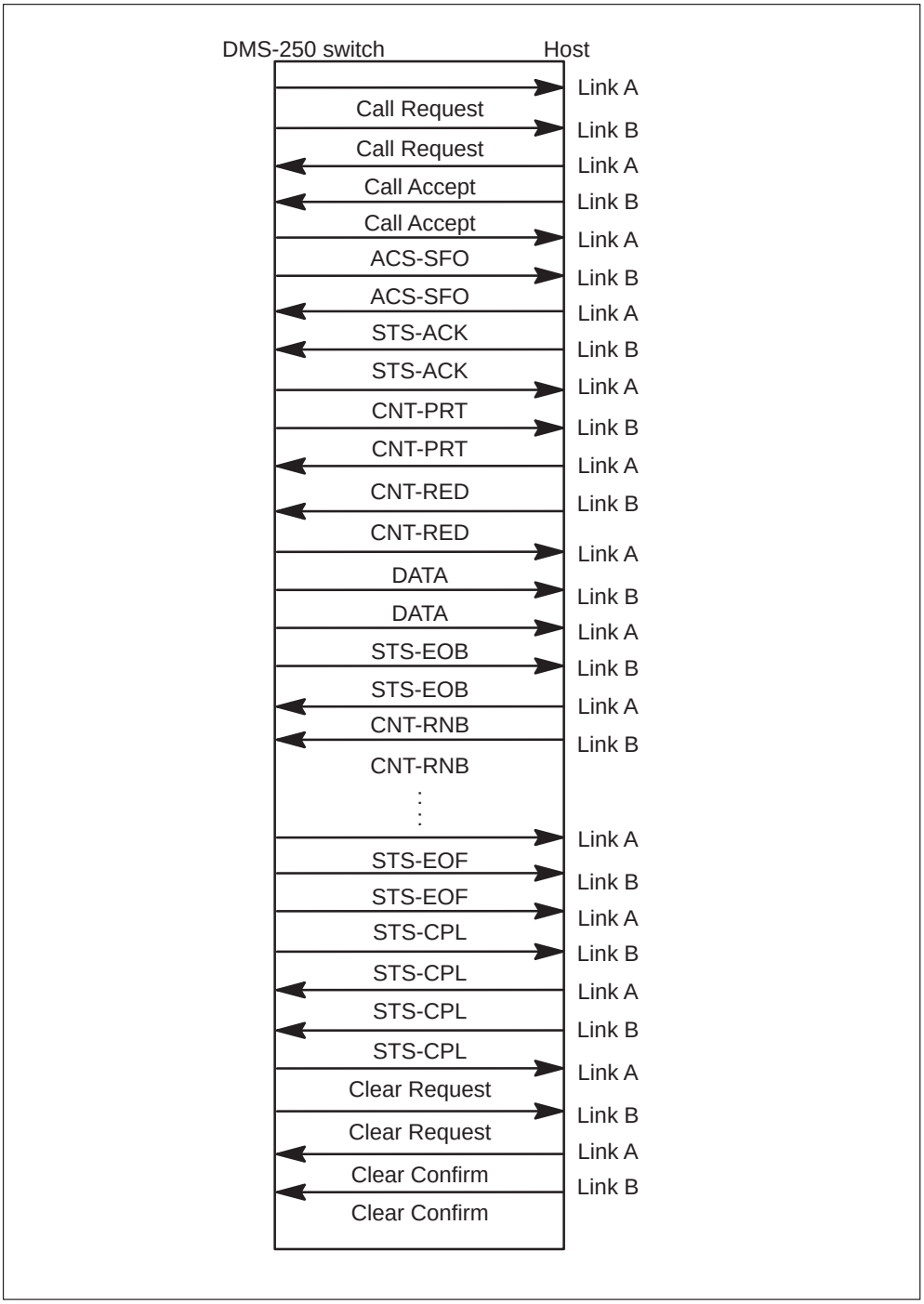
Figure 2-11 shows the data flow for an AFT-MNP configuration with two links.

The sequence of events for the file transfer in a two-link configuration is as follows:

- Both links perform the file transfer start-up message exchange. That is, messages ACS-SFO, STS-ACK, CNT-PRT, and CNT-RED are sent over both links.
- The data is sent, up to the window size, over both links. Data transfer continues until all data is sent.
- Both links perform the wrap-up message exchange. That is, messages STS-EOF and STS-CPL are sent over both links.
- The network connections are closed.

Note: MTP is the application protocol that controls file transfers. See "Multi-Network Protocol" later in this chapter for details on MTP.

Figure 2-11
Message sequence (dual-link configuration)



Windows and timers

For both AFT and AFT-MNP, data is sent across the X.25 link in 2k-octet blocks. A window sets the limit on how many blocks can be unacknowledged during data transfer. When the number of unacknowledged blocks equals the window size, data transfer stops until receiving an acknowledgment. Typically, the window size is one or two.

AFT-MNP windows and timers

MTP implements two windows for AFT-MNP: a network connection window and a global window. Datafill in table GASINFO determines the size of the network connection window. The size of the global window is the sum of the number of links in the network connection window when all links are in service. If the network connection window size is exceeded for a specific link, data transfer is suspended on that link.

If the number of unacknowledged data packets exceeds the global window size, the entire session is suspended. A global window timer that consists of a 1-minute establishment phase and a 3-minute, 15-second data transfer phase is started. When the global window timer expires, the link that caused the timeout is removed from the service list. All unacknowledged data for that link is sent to the remaining links for retransmission.

Note: If the network connection window size is one, a data block must be acknowledged with a CNT-RNB message before another data block can be sent. If the network connection window size is greater than one, CNT-RNB acknowledgments can arrive in any sequence.

File transfer process

DIRP records to disk the AFT and AFT-MNP transfer files. Files recorded to disk are listed in table DIRPHOLD. Safe Store Tap (SST) supplies a directory of DIRP files listed in creation order. Files are transferred in the order in which they are created. AFT and AFT-MNP also transfer the active DIRP file. When it needs to use the disk space, DIRP automatically removes files that have completed transfer from the disk .

File transfer status

DIRP assigns a status to each file on the disk. As a file moves through the transfer process, its status on the disk changes as follows:

- "Available"—A newly created, but not yet transferred file is marked as available (A) to take billing.
- "Unprocessed"—After the file is no longer able to take billing, DIRP marks its status as unprocessed (U).

- "Processed"—After the file is transferred successfully and stored according to the archive option (set by office parameter), it is marked as processed (P).

When disk space is required, processed files are automatically deleted from DIRP. This deletion occurs after the time set in the time window defined in table DIRPSSYS, field RETPD.

Archive to tape

AFT default settings allow you to write files to tape for backup purposes. With this option, DIRP marks all files as unprocessed until you manually write the files marked "U" to tape. DIRP will not remove unprocessed files from the disk. After the files are written, DIRP changes the file status to "P" and removes these processed files as it needs disk space.

No archive to tape

AFT offers the option of not requiring files to be manually archived. (However, the billing files that the switch captures under the CDR stream must be manually archived to tape.) This means DIRP marks all non-OCC files that have successfully transferred as processed. DIRP removes these processed files as it needs disk space.

You can set this option in table OFCVAR with the office parameter AFT_REMOVE_COPY_TO_TAPE. Refer to Chapter 6, "Setting up an AFT session," for more information on the settings for this option.

Note: OCC files cannot be changed by this feature. You must copy all OCC records to tape before DIRP marks them as processed.

File transfer order

File transfer order is determined by these rules:

- When an automatic file transfer session is initiated (by datafill in table GASINFO), AFT requests a directory from SST and selects the oldest file in the pending state as the next file to transfer.
- Before the start of each new file transfer, AFT requests a new directory from SST and merges the local directory with the new directory. AFT then transfers the files in the following order:
  - — Override files are chosen over all other files. Override files are indicated by the O–> pointer in the directory display. An override file can be set by the far-end processor or by executing the CI command SETOVR.

— If no file is designated as an override file, then the file with the N–> pointer (next) is selected for transfer. This file is the next oldest file available for transfer in the AFT directory. Each time a file transfer starts, a new next file is chosen. The next file to transfer can also be set by executing the CI command SETAFT. The A–> pointer indicates the file that is being transferred.

Note: Do not manually add file names to table DIRPHOLD when using AFT. Doing so can interfere with the way DIRPHOLD files are sorted in creation order.

Partial file transfer

If there is a break in the connectivity while a file is being tranferred, PFT enables the transfer to be recovered. A partial file transfer (PFT) is the transfer of the rest of a file that has not completely transferred. The file is marked as a “PFT” file.

AFT (or AFT-MNP) saves the number of the last block that he remote processor acknowledged. When connectivity is established again, the file transfer continues. The transfer starts with the block that is one greater than the last block acknowledged.

PFT recovery can occur only under one of these conditions:

- a warm or cold restart
- a break in connectivity with the remote processor
- a failure to communicate with SST
- an error condition that requires the session to be taken down

If a reload restart occurs, PFT cannot recover the file that is actively being transferred. The DIRP file information is added to table DIRPHOLD as an unprocessed file. The next file variable does not survive the reload restart. When a new SST directory is received, the oldest pending file is chosen as the next file. The files that existed before the reload restart are set to the manual transfer state. These files must be transferred manually.

DIRP naming conventions

The software generates the DIRP file name. The file status, time stamp, file sequence, and contributing subsystem make up the DIRP file name.

AFT sends DIRP files in real-time across the data link. DIRP supports a variable naming convention for DIRP files that uses this format:

ZYYMMDDHHNNSSXXXX

where:

Z	file status: A—available file, U—unprocessed file, P—processed file, R—retained file
YY	year
MM	month
DD	day
HH	hour
NN	minutes
SS	sequence number (0–99); this field identifies the file sequence number across all subsystems. For example, the first file might be allocated to AMA and be given sequence number 0. The next file allocated is given sequence number 1, even if it is for OM or JF.
XXXX	DIRP recording subsystem (for example, AMA, JF, OCC, OM)

When DIRP creates an active file, it assigns the file status "A" as part of the file name. When a new file is rotated to become an available file, the file status in the previous file name changes to "U." The status changes to "P" once the files are transferred across the data link. The status is the only portion of the file name that changes. The other characters remain constant and uniquely identify the file on the switch.

Imbedding the DIRP file name in the ACS-SFO message

Datafilling the FILENAME field in table GASINFO with a value of "$" causes the DIRP file name to be used in the file name field of the ACS-SFO message.

Message Transfer Protocol

Message Transfer Protocol (MTP) is the application protocol that controls file transfers for the AFT feature. MTP provides a simple interface between the operating systems of the switch and the host. X.25 level 2 and level 3 provide the reliable data communications protocol. AFT uses these message types:

- ACS-SFO—access request message, start file outgoing
- STS-ACK—status message, access request acknowledged
- CNT-PRT—control message, set device to print mode
- CNT-RED—control message, set device to read mode
- CNT-RNB—control message, request next block
- STS-EOB—status message, end of block
- STS-EOF—status message, end of file

- STS-CPL—status message, access complete
- CNT-ERR—control message, error message sent from either side on an error condition
- Data message—a 2k-octet block of data

Message formats

The following subsections show the format of the MTP messages that AFT uses.

ACS-SFO

ACS-SFO is the access request message that the switch sends to initiate a file transfer. The format of the ACS-SFO message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 1 1	03	ACS-SFO
Octet 2	0 1 1 0 0 1 0 1	65	ACS-SFO
Octet 3	0 0 0 0 0 0 0 0	00	ACS-SFO
Octet 4– Octet 15			File name: first 12 characters of the DIRP file name
Octet 16– Octet 20			Subfile name: last five characters of the DIRP file name
Octet 21	0 0 1 0 0 0 0 0	20	
Octet 22	0 0 1 0 0 0 0 0	20	
Octet 23	0 0 1 0 0 0 0 0	20	
Octet 24	0 0 1 0 0 0 0 0	20	
Octet 25	0 0 1 0 0 0 0 0	20	
Octet 26	0 0 1 0 0 0 0 0	20	
Octet 27	0 0 1 0 0 0 0 0	20	
Octet 28	0 0 1 0 0 0 0 0	20	Generation name
Octet 29	0 0 1 0 0 0 0 0	20	
Octet 30	0 0 1 0 0 0 0 0	20	
Octet 31	0 0 1 0 0 0 0 0	20	
Octet 32	0 1 1 1 1 1 1 1	7F	LBA indicator
Octet 33			Last block ack’d (byte 0)
Octet 34			Last block ack’d (byte 1)
Octet 35			Last block ack’d (byte 2)
Octet 36			Last block ack’d (byte 3)
Octet 37	0 0 1 0 0 0 0 0	20	

Table 2-3 describes the fields in the ACS-SFO message.

Table 2-3
ACS-SFO field descriptions

Field	Description
File name	The file name datafilled in table GASINFO. Datafilling a value of "$" in the FILENAME field in table GASINFO embeds the first 12 characters of the DIRP file name here.
Subfile name	Not used.
Generation name	The starting sequence number for the file transfer.
LBA indicator	The last block acknowledged indicator.
Last block acked	The sequence number of the last data block acknowledged (LBA) by the host. A new file transfer is assigned an LBA sequence number of 0. The range of LBA sequence numbers is 0–4,294,836,225 (4 octets.)

STS-ACK

The host sends the STS-ACK message in response to the ACS-SFO message to accept the file transfer request. The format of the STS-ACK message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-ACK
Octet 2	1 0 0 0 0 0 0 1	81	STS-ACK
Octet 3	0 0 0 0 0 0 0 0	00	STS-ACK

CNT-PRT

The switch sends the CNT-PRT message to the host when it is ready to transfer data. The format of the CNT-PRT message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-PRT
Octet 2	1 0 1 0 0 0 1 0	A2	CNT-PRT

CNT-RED

The host sends the CNT-RED message to start the file transfer. The CNT-RED message also sets the window size for the transfer. Bits 3–7 contain the window size minus 1. Bits 0–2 contain the type code. The window size is usually 1; type code should be 6. The format of the CNT-RED message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-RED
Octet 2	1 0 1 0 0 0 1 1	A3	CNT-RED
Octet 3		06	CNT-RED

Data message

The data message is a 2k-octet block of data. It contains the data that is retrieved from a data file on the disk. MTP differentiates the data message from other messages by setting the Q-bit to zero.

STS-EOB

The STS-EOB message follows the data message. The switch sends this message to describe the data block just sent. The last two octets contain the number of octets in the DATA message, binary coded. The format of the STS-EOB message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-EOB
Octet 2	1 0 0 0 0 1 0 0	84	STS-EOB
Octet 3			Number of octets (LSB)
Octet 4			Number of octets (MSB)

CNT-RNB

The host sends this message when it is ready to receive the next data block. In order to maximize throughput, the CNT-RNB should be sent before the sender's window fills up. To prevent an upper-level protocol error, the CNT-RNB must be received by the sender before timer T6 expires. The format of the CNT-RNB message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-RNB
Octet 2	1 0 1 0 0 0 0 1	A1	CNT-RNB
Octet 3	0 0 0 0 0 0 0 0	00	CNT-RNB

STS-EOF

The switch sends the STS-EOF message when the entire file is transferred. The format of the STS-EOF message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-EOF
Octet 2	1 0 0 0 0 0 1 1	83	STS-EOF

STS-CPL

The STS-CPL message is sent by both ends to complete the current session. The format of the STS-CPL message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-CPL
Octet 2	1 0 0 0 0 0 1 0	82	STS-CPL

CNT-ERR

The CNT-ERR message is sent when there is an MTP error. The format of the CNT-ERR message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 0	0 0 0 0 0 0 0 0	00	NUL
Octet 1	x x x x x x x x	XX	Error Code
Octet 2	x x x x x x x x	XX	Error Code

XX is the two-byte error code. Table 2-4 lists the possible error codes. All values are hexadecimal.

Table 2-4
CNT-ERR error codes

Error Code		Explanation
E0	00	Error not specified
E1	01	Out-of-sequence message
E2	02	Illegal user identification
E3	03	Reserved
E4	04	Record size maximum greater than buffer
E5	05	Access code not supported
E6	06	Syntax error in spec
E7	07	Illegal access
E8	08	No such device or unit
E9	09	Device in use
EA	0A	Hardware protection violation
EB	0B	Hardware fault
EC	0C	Data media fault
EE	EE	No current file available
EF	EF	Already set to current
F0	F0	Not specified file admin

—continued—

Table 2-4
CNT-ERR error codes (continued)

F1	F1	No such file
F2	F2	Duplicate file
F3	F3	Software protection violation
F4	F4	Access locked
F5	F5	Directory full
F6	F6	Device full

—end—

Multi-Network Protocol

Multi-Network Protocol (MNP) is a modified MTP implemented for the AFT-MNP feature. MNP uses these MTP message types:

- ACS-SFO—access request message, start file outgoing
- STS-ACK—status message, access request acknowledged
- CNT-PRT—control message, set device to print mode
- CNT-RED—control message, set device to read mode (modified)
- CNT-RNB—control message, request next block (modified)
- STS-EOB—status message, end of block (modified)
- STS-EOF—status message, end of file
- STS-CPL—status message, access complete
- CNT-ERR—control message, error message sent from either side on an error condition
- CNT-INT—control interrupt
- Data message—a 2k-octet block of data

The following pages show the format of the MTP messages that are modified and used by AFT-MNP.

CNT-RED

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-RED
Octet 2	1 0 1 0 0 0 1 1	A3	CNT-RED

STS-EOB

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-EOB
Octet 2	1 0 0 0 0 1 0 0	84	STS-EOB
Octet 3			Number of octets (LSB)
Octet 4			Number of outcasts (MSB)
Octet 5			Sequence number (LLSB)
Octet 6			Sequence number (LMSB)
Octet 7			Sequence number (MLSB)
Octet 8			Sequence number (MMSB)

Table 2-5 describes the fields in the STS-EOB message.

Table 2-5
STS-EOB field descriptions

Field	Description
Number of octets	The number of octets in the data block just sent. The range is 1–2048 (2 octets).
Sequence number	The sequence number of the data block just sent. The range is 1–4,294,836,225 (4 octets).

CNT-RNB

The host sends the CNT-RNB message when it is ready to receive the next data block. The CNT-RNB message contains the sequence number of the received data block. The format of the CNT-RNB message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-RNB
Octet 2	1 0 1 0 0 0 0 1	A1	CNT-RNB
Octet 3			Sequence number (LLSB)
Octet 4			Sequence number (LMSB)
Octet 5			Sequence number (MLSB)
Octet 6			Sequence number (MMSB)

Table 2-6 describes the fields in the CNT-RNB message.

Table 2-6
CNT-RNB field description

Field	Description
Sequence number	The sequence number of the data block just sent. The range is 1–4,294,836,225 (4 octets).

CNT-INT

The CNT-INT message is an interrupt message. The format of the CNT-INT message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 0	0 0 0 0 0 0 0 0	00	CNT-INT
Octet 1	1 0 1 0 0 1 0 0	A4	CNT-INT
Octet 2	0 0 0 0 0 0 0 0	00	CNT-INT

Logs

This section briefly describes the two log reports that AFT and AFT-MNP generate: AFT001 and AFT002. Refer to the *UCS DMS-250 Logs Reference Manual* for detailed descriptions of these logs.

AFT001 (AFT event log)

The switch generates an AFT001 the log at the start and the end of a file transfer. The log text describes the start or end of the file transfer.

AFT002 (AFT information log)

The AFT002 log provides information about the AFT system including normal events, such as a specific override, and error conditions, such as an error when sending data over the RASL netconn. The log text specifies the event or error. The switch can generate an AFT002 log at any time.

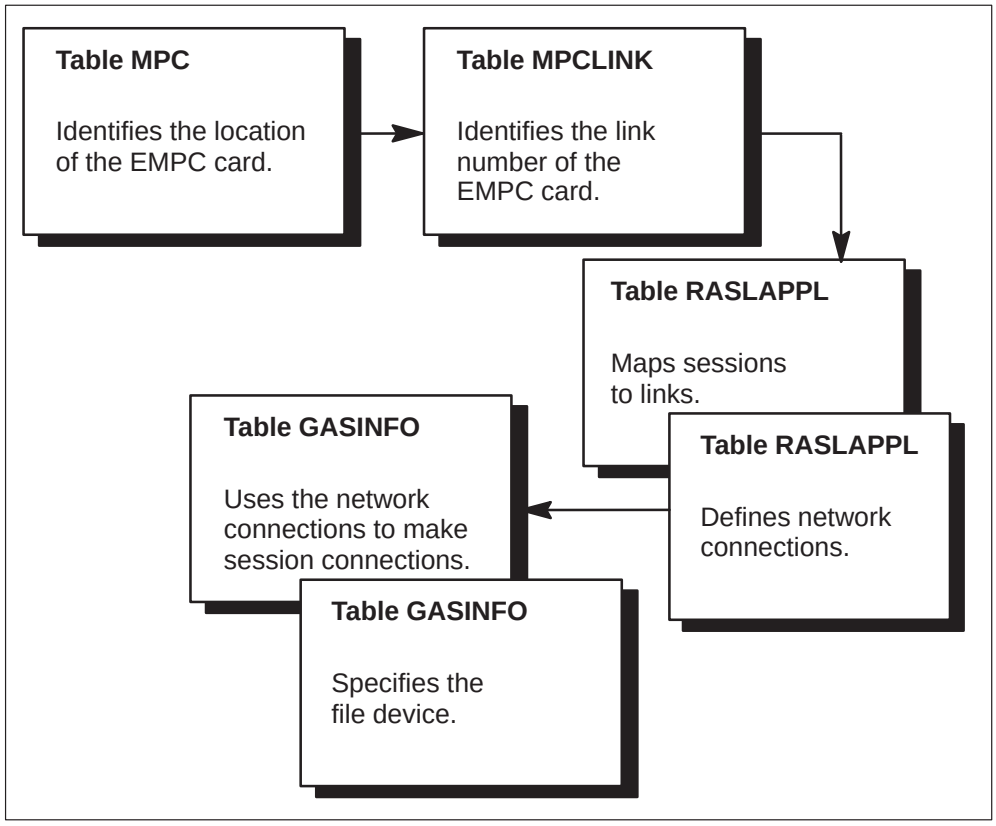
Manual file transfer

The manual file transfer (MFT) feature enables you to manually transfer files between the switch and the host. Either the switch or the host can initiate an MFT. MFTs are accomplished through datafill and CI commands.

Datafill table relationships

Datafill in table RASLAPPL maps the MFT session to the physical links, as shown in Figure 3-1.

Figure 3-1
MPC, MPCLINK, RASLAPPL, and GASINFO relationships



Datafill in tables MPC and MPCLINK configures the links. Datafill in table GASINFO uses the network connections defined in table RASLAPPL to make the session connections. Table GASINFO also specifies the device where files to be sent must reside and where files to be received by the DMS-250 switch are placed. The file device must be a disk volume or SFDEV.

Message Transfer Protocol (MTP) is the application protocol that controls file transfers. MTP provides a simple interface between the operating systems of the switch and the host. X.25 level 2 and level 3 provide the secure data communications protocol.

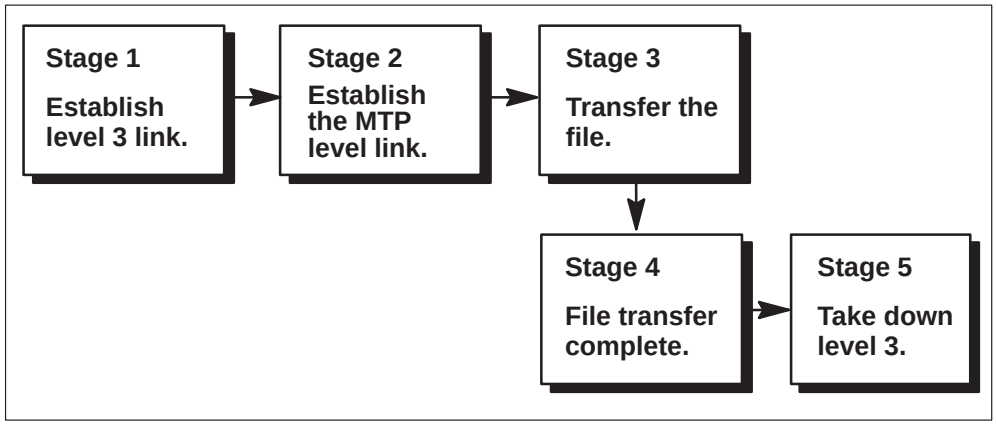
MFT provides these manual file transfer sessions:

- DMSSFI—the switch requests a file from the host
- DMSSFO—the switch sends a file to the host
- NEMSFI—the host requests a file from the switch
- NEMSFO—the host sends a file to the switch

You can datafill a maximum of one of each session type per switch. Each session type is mapped to one physical link.

MFT transfers files in the same five basic stages (Figure 3-2) as automatic file transfer (AFT). The details of the stages vary slightly depending on the MFT session type. This chapter details each of the four MFT sessions.

Figure 3-2
MFT session



DMSSFI session

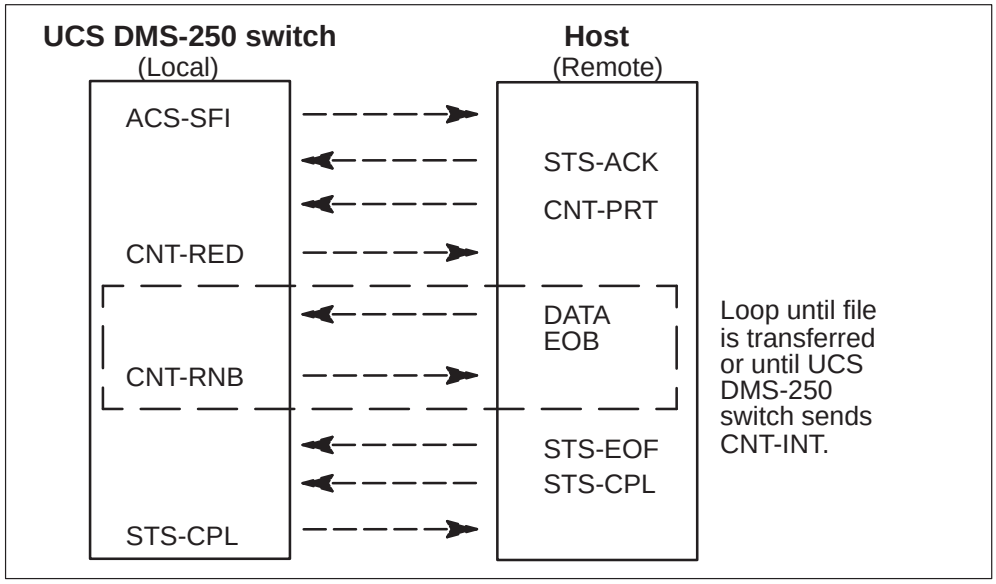
When the switch requests a file from the host, the file transfer session is called DMSSFI. You can datafill only one DMSSFI session per switch.

The DMSSFI file transfer session begins when the operator executes the CI command STARTAPPL RECV <filename>. The specified file is placed on the device datafilled in table GASINFO.

Note: The device must be a disk volume or SFDEV.

Figure 3-3 shows the message sequence for a DMSSFI session.

Figure 3-3
DMSSFI message sequence



The sequence of events for a DMSSFI file transfer session looks like this:

Stage 1

The first free virtual channel identifier (VCI) downwards from 15 is selected and a call request sequence is initiated to open the virtual channel.

Stage 2

An ACS-SFI packet containing the file name is sent through the virtual channel to initiate the file transfer sequence.

Stage 3

Records are received from the data link and written onto the created file.

Stage 4

The switch waits for the host to signal the end of file transfer by the CPL sequence. The created file is closed and becomes available to other switch users.

Stage 5

The level 3 clear request sequence is initiated to take down the virtual channel.

DMSSFO session

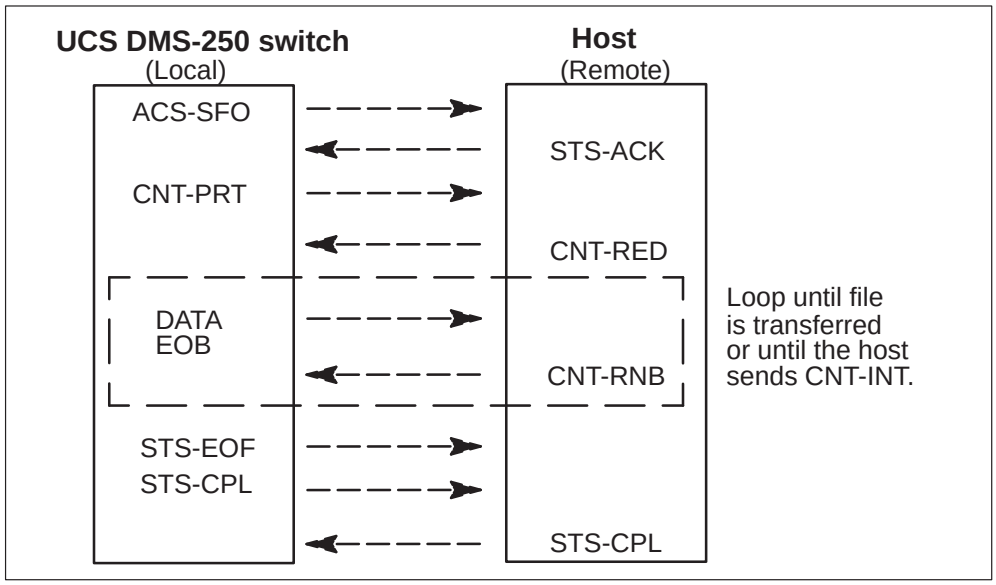
When the switch sends a file to the host, the file transfer session is called DMSSFO. You can datafill only one DMSSFO session per switch.

The DMSSFO file transfer session begins when the operator executes the CI command STARTAPPL XFER <filename>. The specified file must be on the device datafilled in table GASINFO.

Note: The device must be a disk volume or SFDEV.

Figure 3-4 shows the message sequence for a DMSSFO session.

Figure 3-4
DMSSFO message sequence



The sequence of events for a DMSSFO file transfer session looks like this:

Stage 1

The first free VCI downwards from 15 is selected and a call request sequence is initiated to open the virtual channel.

Stage 2

An ACS-SFO packet containing the file name is sent through the virtual channel to initiate the file transfer sequence.

Stage 3
The switch file records are read and transferred across the data link.

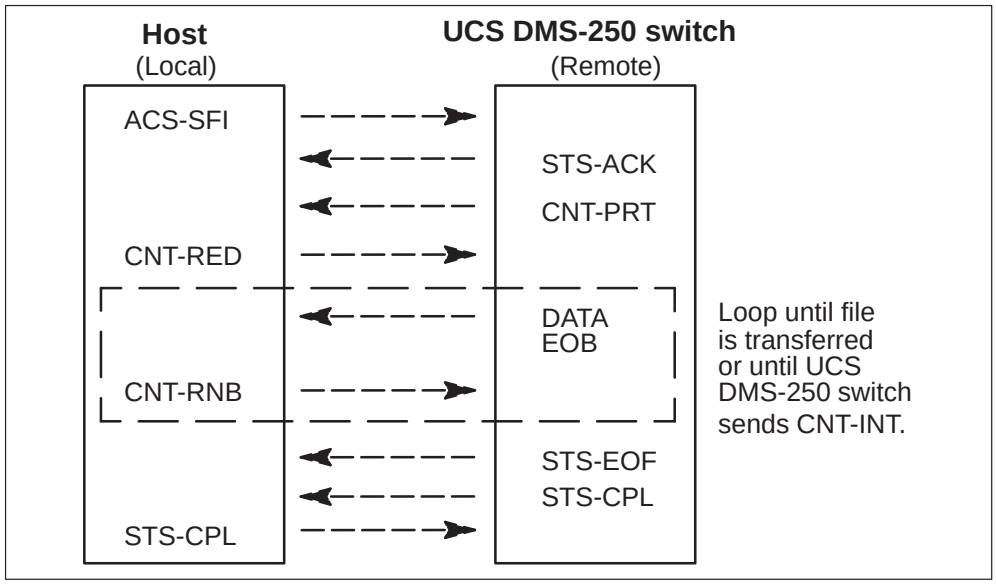
Stage 4
When the end of file is encountered, the switch initiates the CPL sequence and closes the file.

Stage 5
The level 3 clear request sequence is initiated to take down the virtual channel.

NEMSFI session
When the host requests a file from the switch, the file transfer session is called NEMSFI. You can datafill only one NEMSFI session per switch.

Figure 3-5 shows the message sequence for a NEMSFI session.

Figure 3-5
NEMSFI message sequence



The sequence of events for a NEMSFI file transfer session looks like this:

Stage 1
The host initiates the level 3 call request sequence. The call request packet specifies the VCI.

Stage 2
The host sends the ACS-SFI packet to start the NEMSFI session.

Stage 3

The file specified in the ACS packet is opened for reading on the device specified in table GASINFO.

The DMS file records are read and transferred across the data link.

Stage 4

When the end of file is encountered, the switch initiates the CPL sequence and closes the file.

Stage 5

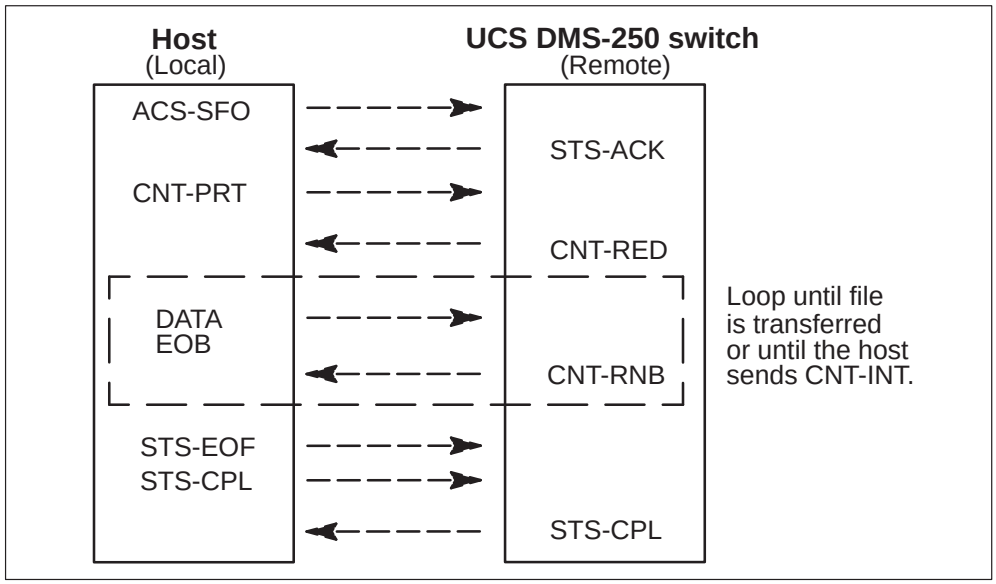
The switch expects a clear request from the host to take down the virtual channel.

NEMSFO session

When the host sends a file to the switch, the file transfer session is called NEMSFO. You can datafill only one NEMSFO session per switch.

Figure 3-6 shows the message sequence for a NEMSFO session.

Figure 3-6
NEMSFO message sequence



The sequence of events for a NEMSFO file transfer session looks like this:

Stage 1

The host initiates the level 3 call request sequence. The call request packet specifies the VCI.

Stage 2

The host sends the ACS-SFO packet to start the NEMSFO session.

Stage 3

The file specified in the ACS packet is created on the device specified in table GASINFO and opened for writing.

Records are received from the data link and written onto the created file.

Stage 4

The switch waits for the host to signal the end of file transfer by the CPL sequence. The created file is closed and becomes available for use by other switch users.

Stage 5

The switch expects a clear request from the host to take down the virtual channel.

MFT timers

Table 3-1 describes the MFT timers during the file transfer process:

Table 3-1
MFT timers

Timer	Description
Tn	Timer Tn starts just after the message is sent. It detects MTP level errors. If any response from the other side takes more than Tn seconds, an error is assumed and the session is brought down.
T^0	Timer T^0 specifies how long the local waits for an STS-ACK message. The timer value is one minute.
T^1	Timer T^1 specifies how long the remote or local waits for a data block. The timer value is five to seven minutes.
T^2	Timer T^2 specifies how long the remote or local waits for an STS-EOB message. The timer value is one minute.
T^3	Timer T^3 specifies how long the local waits after an STS-EOF message before sending an STS-CPL message. Timer T^3 also specifies how long the remote waits for an STS-CPL message before clearing a call. The timer value is one minute.
T^4	Timer T^4 specifies how long the remote waits for an ACS-SFI message. The timer value is two minutes.
T^5	Timer T^5 specifies how long the remote waits for a CNT-RED message. The timer value is one minute.

—continued—

Table 3-1
MFT timers (continued)

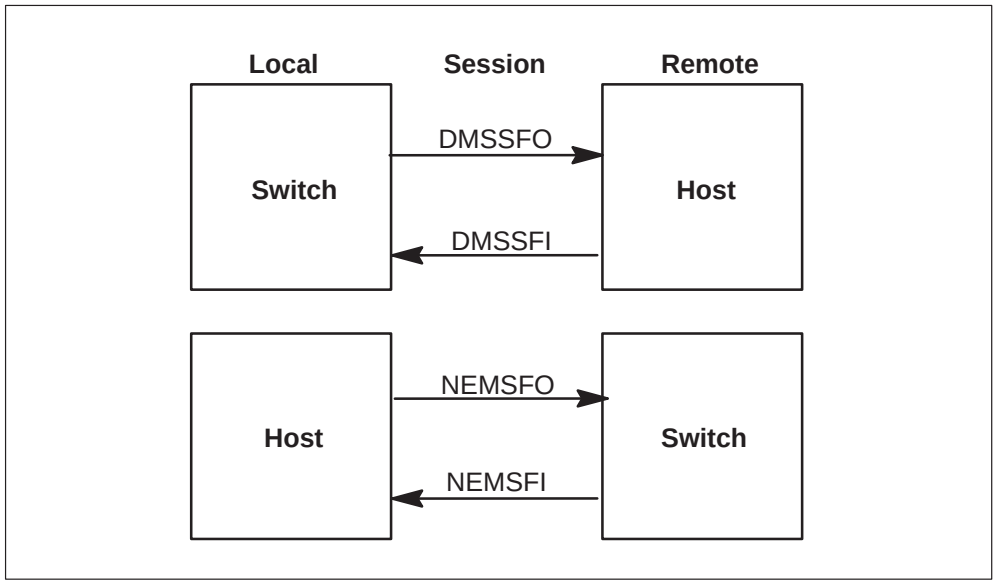
T^6	Timer T^6 specifies how long the remote waits for a CNT-RNB message. The timer value is three minutes.
T^7	Timer T^7 specifies how long the remote waits for an ACS-SFO message. The timer value is five minutes.
T^8	Timer T^8 specifies how long the remote waits for a CNT-PRT message. The timer value is one minute.

—end—

Note: For DMSSFO and DMSSFI sessions, the switch is the local end and the host is the remote. For NEMSFO and NEMSFI sessions, the host is the local end and the switch is the remote.

Figure 3-7 shows an overview of data flow from local (switch or host) to remote (host or switch).

Figure 3-7
Overview of data flow



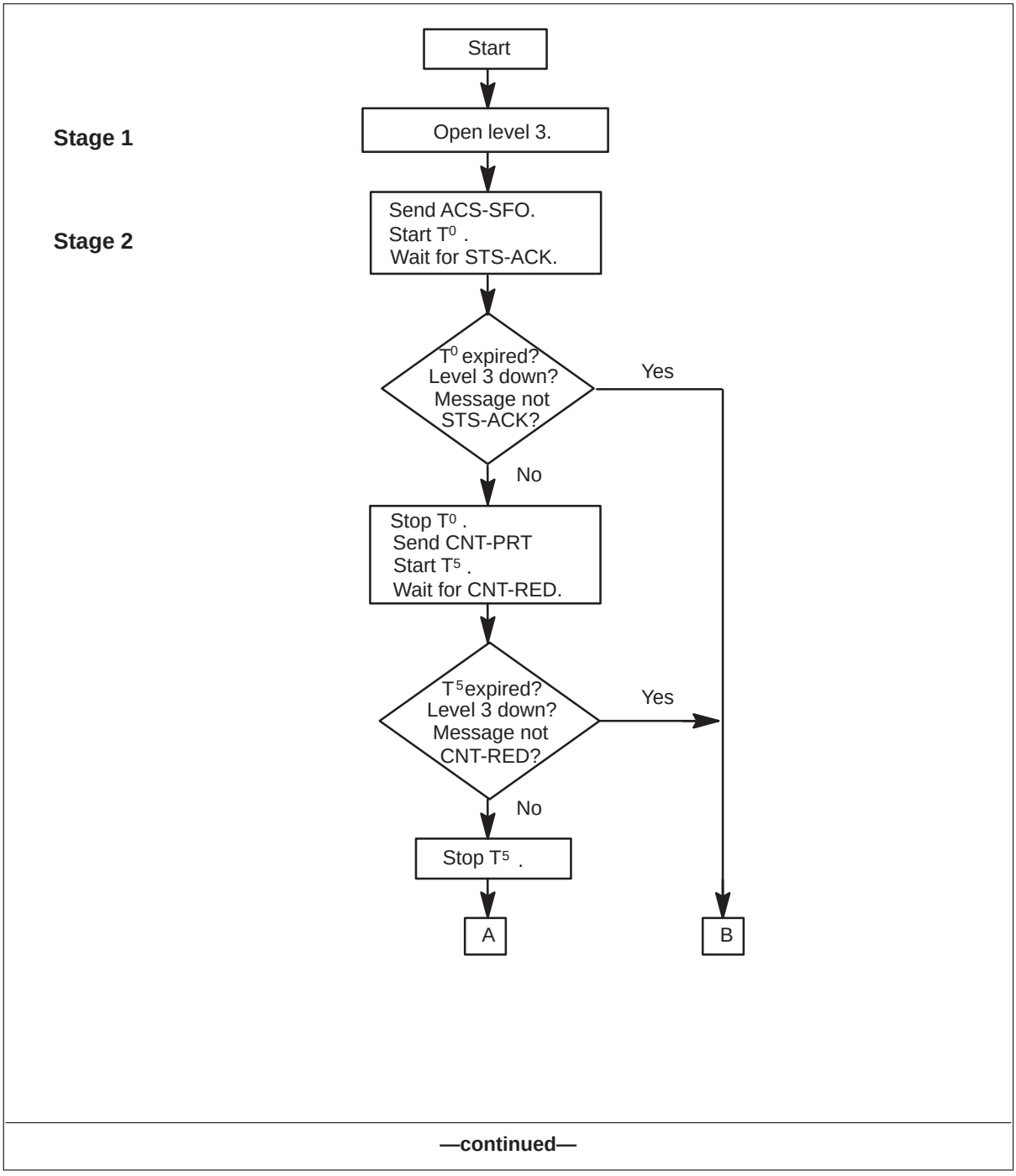
Data flow

This section depicts the MFT data flow when

- the host sends a file during a DMSSFO or NEMSFO session (Figure 3-8)
- the host receives a file during a DMSSFO or NEMSFO session (Figure 3-9)

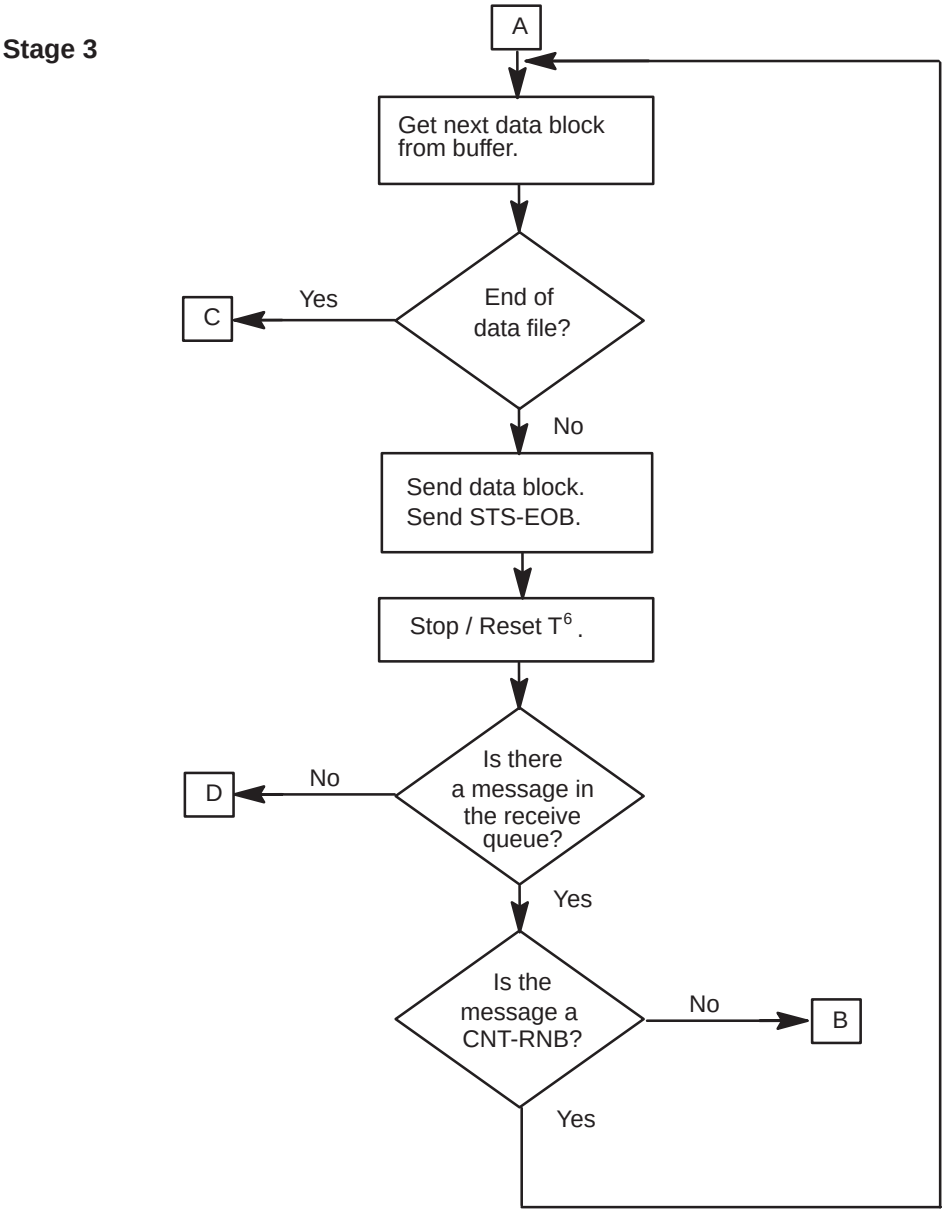
- the host requests a file during a DMSSFI or NEMSFI session (Figure 3-10)
- the host sends a file during a DMSSFI or NEMSFI session (Figure 3-11)

Figure 3-8
DMSSFO or NEMSFO session when host sends file



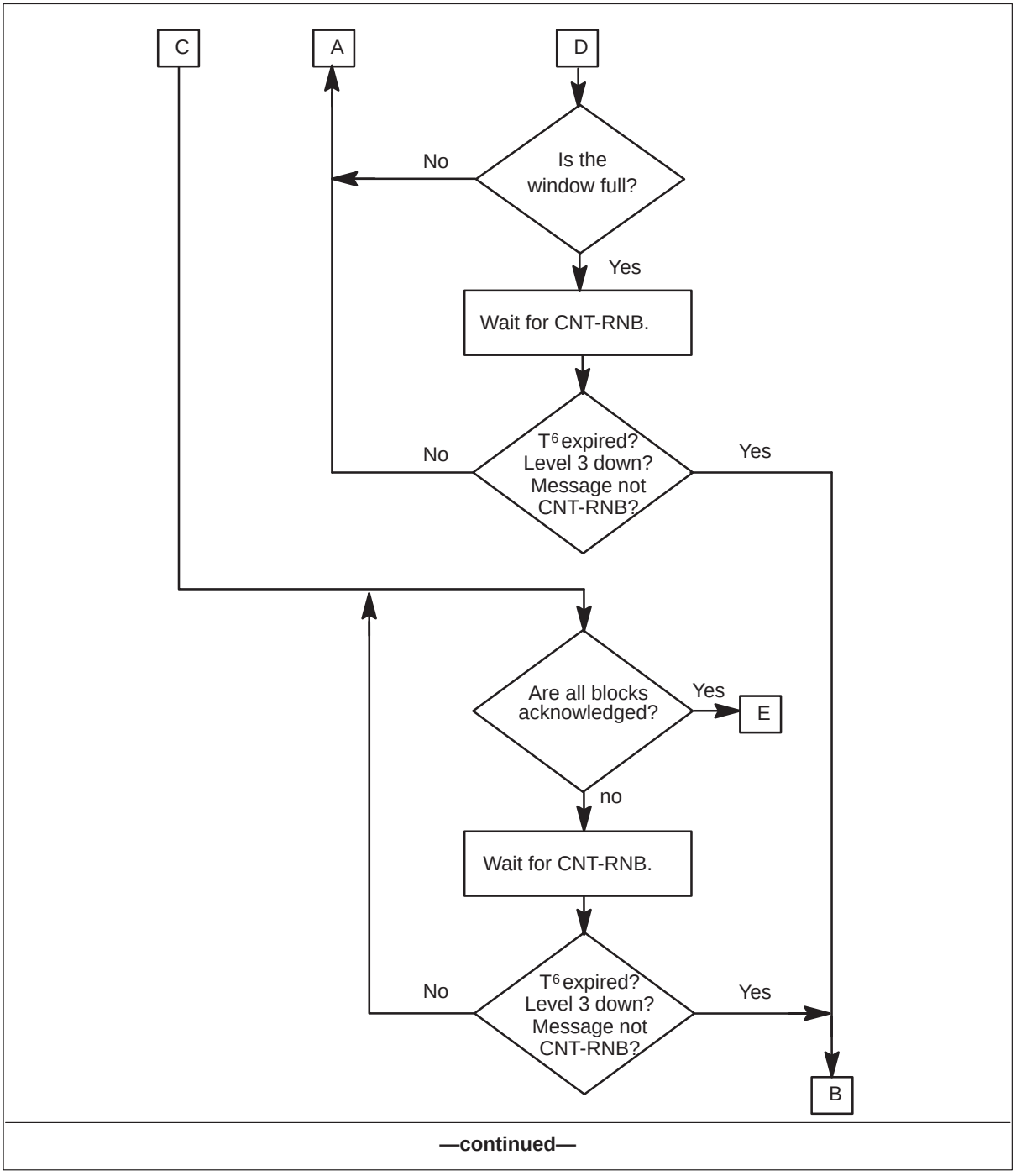
—continued—

Figure 3-8
DMSSFO or NEMSFO session when host sends file (continued)



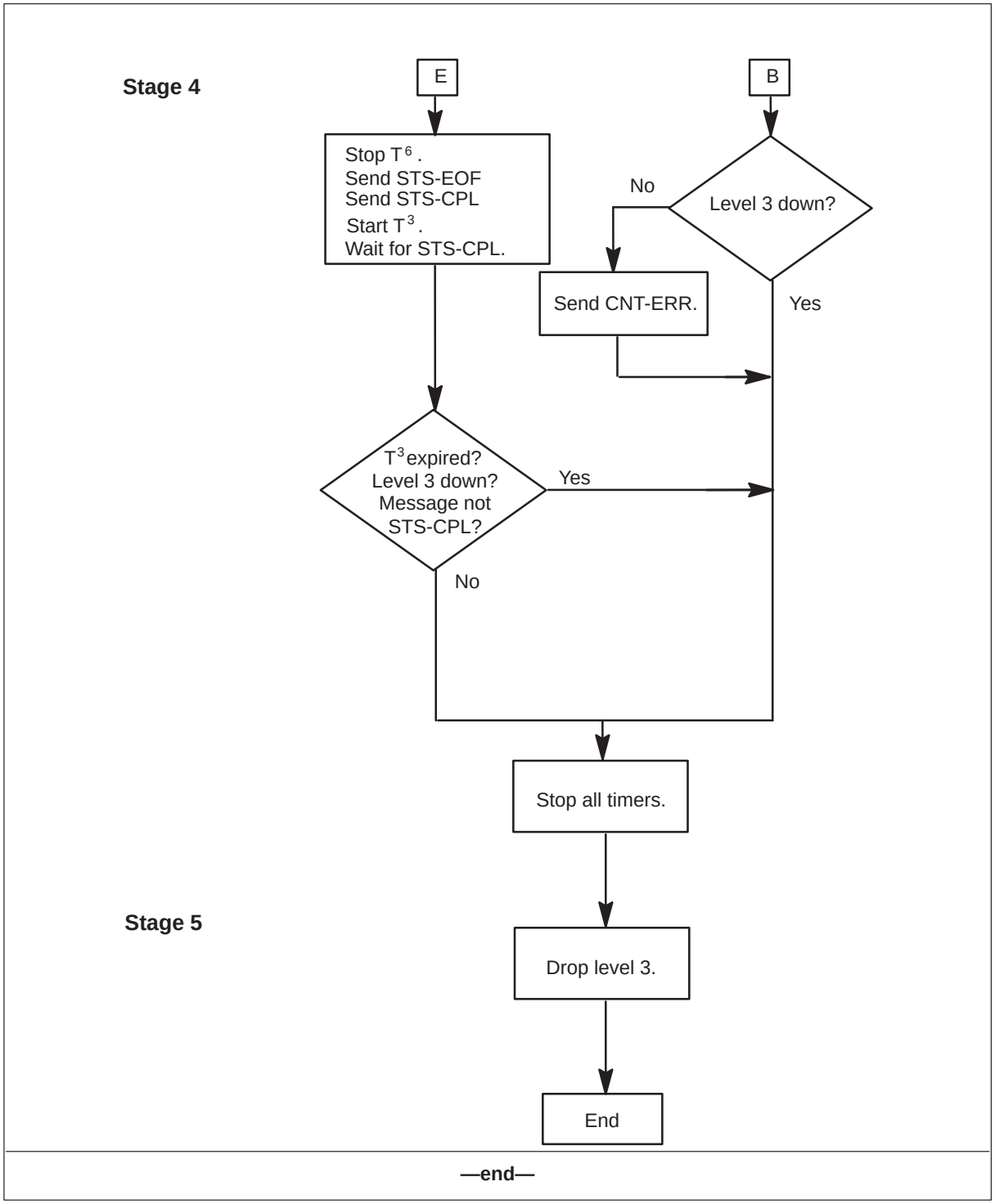
—continued—

Figure 3-8
DMSSFO or NEMSFO session when host sends file (continued)



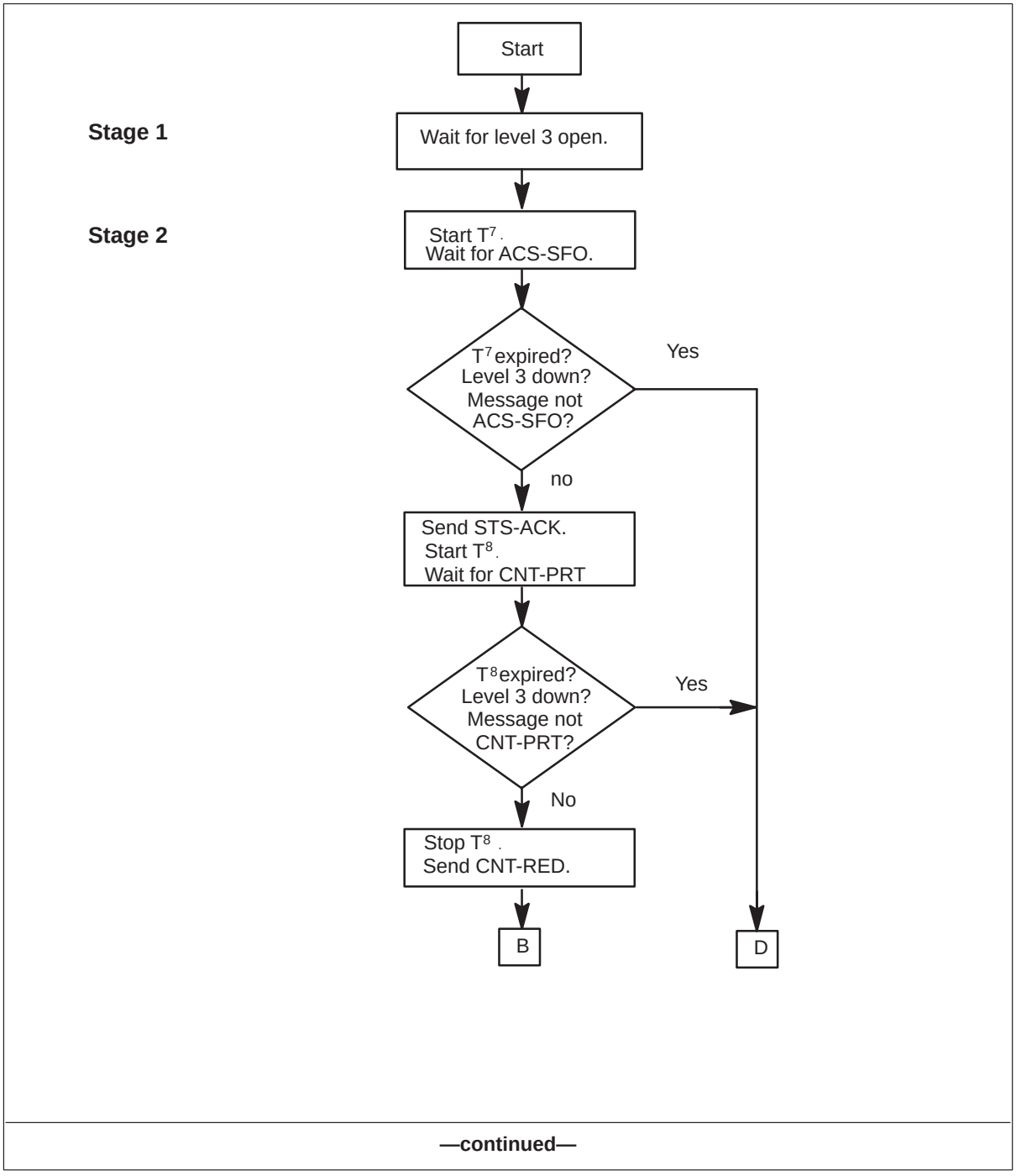
—continued—

Figure 3-8
DMSSFO or NEMSFO session when host sends file (continued)



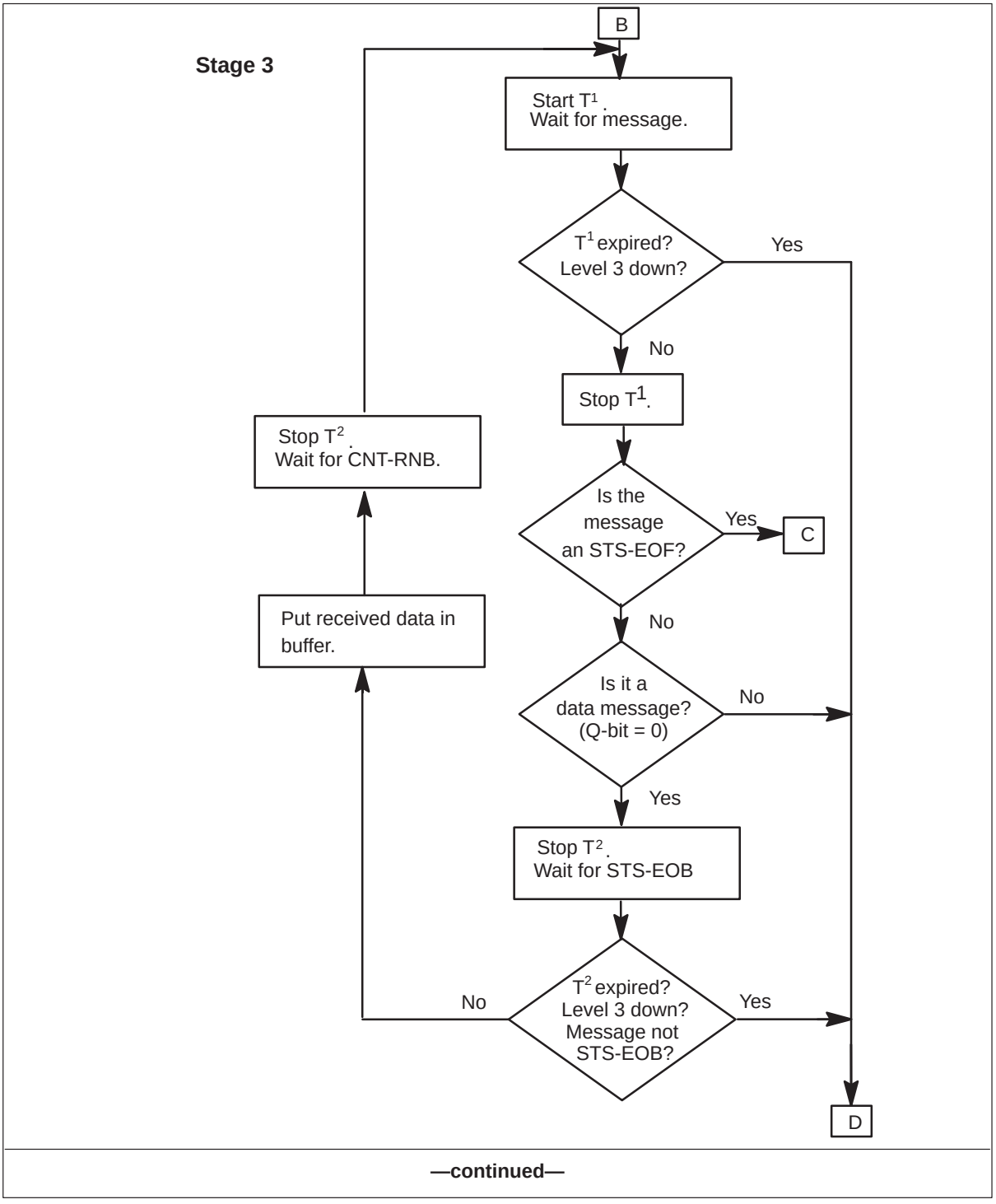
—end—

Figure 3-9
DMSSFO or NEMSFO session when host receives file



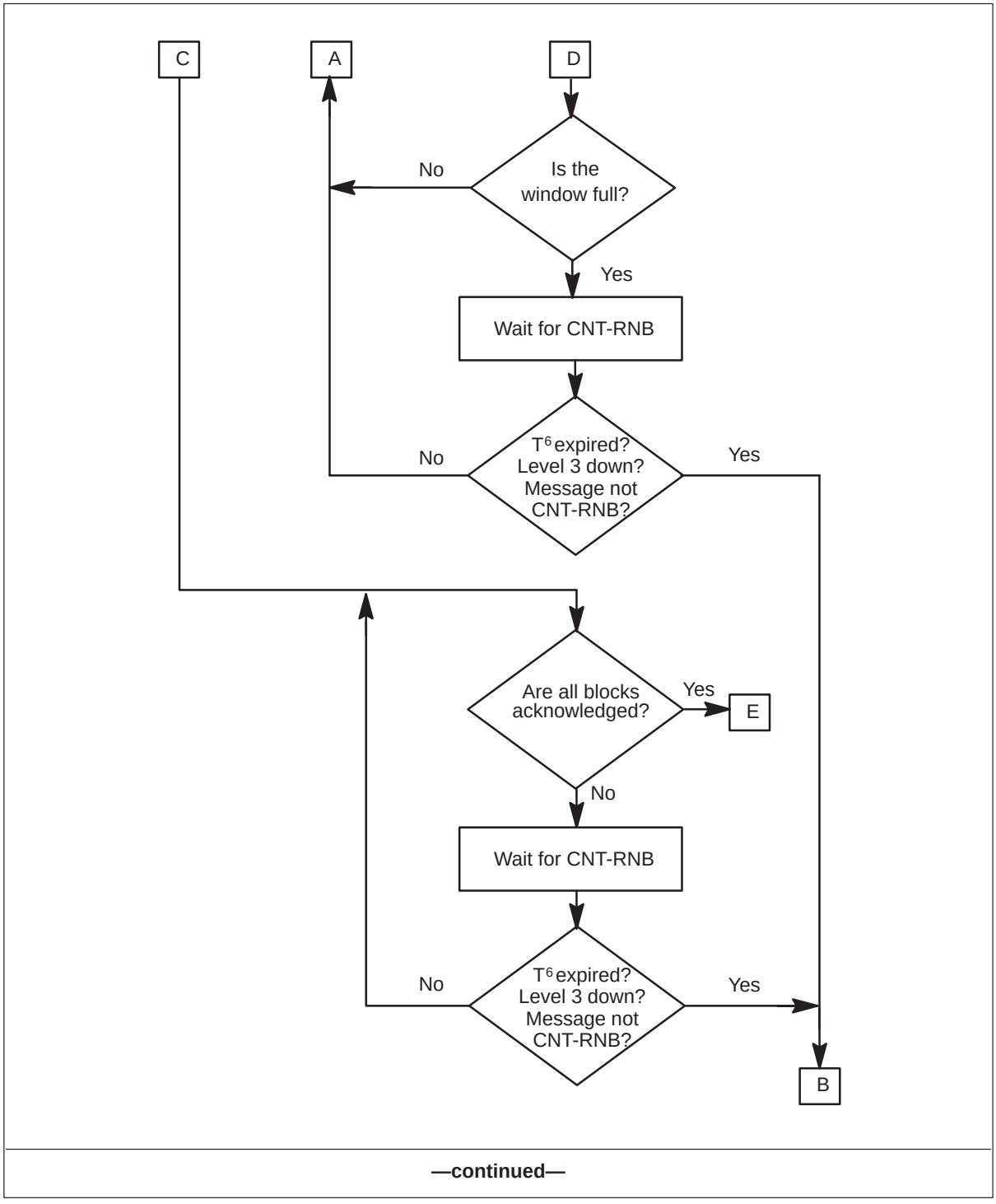
—continued—

Figure 3-9
DMSSFO or NEMSFO session when host receives file (continued)



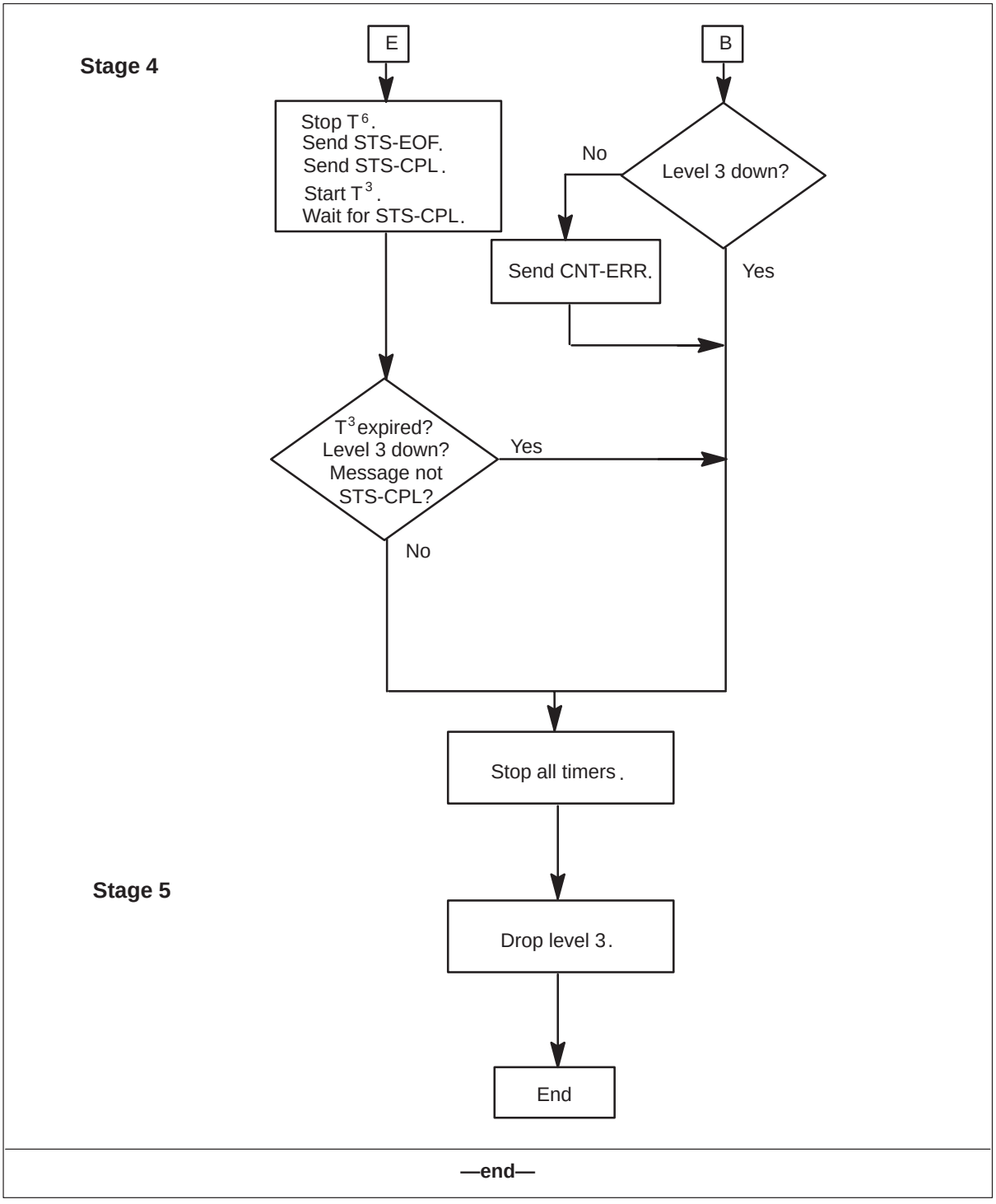
—continued—

Figure 3-9
DMSSFO or NEMSFO session when host receives file (continued)



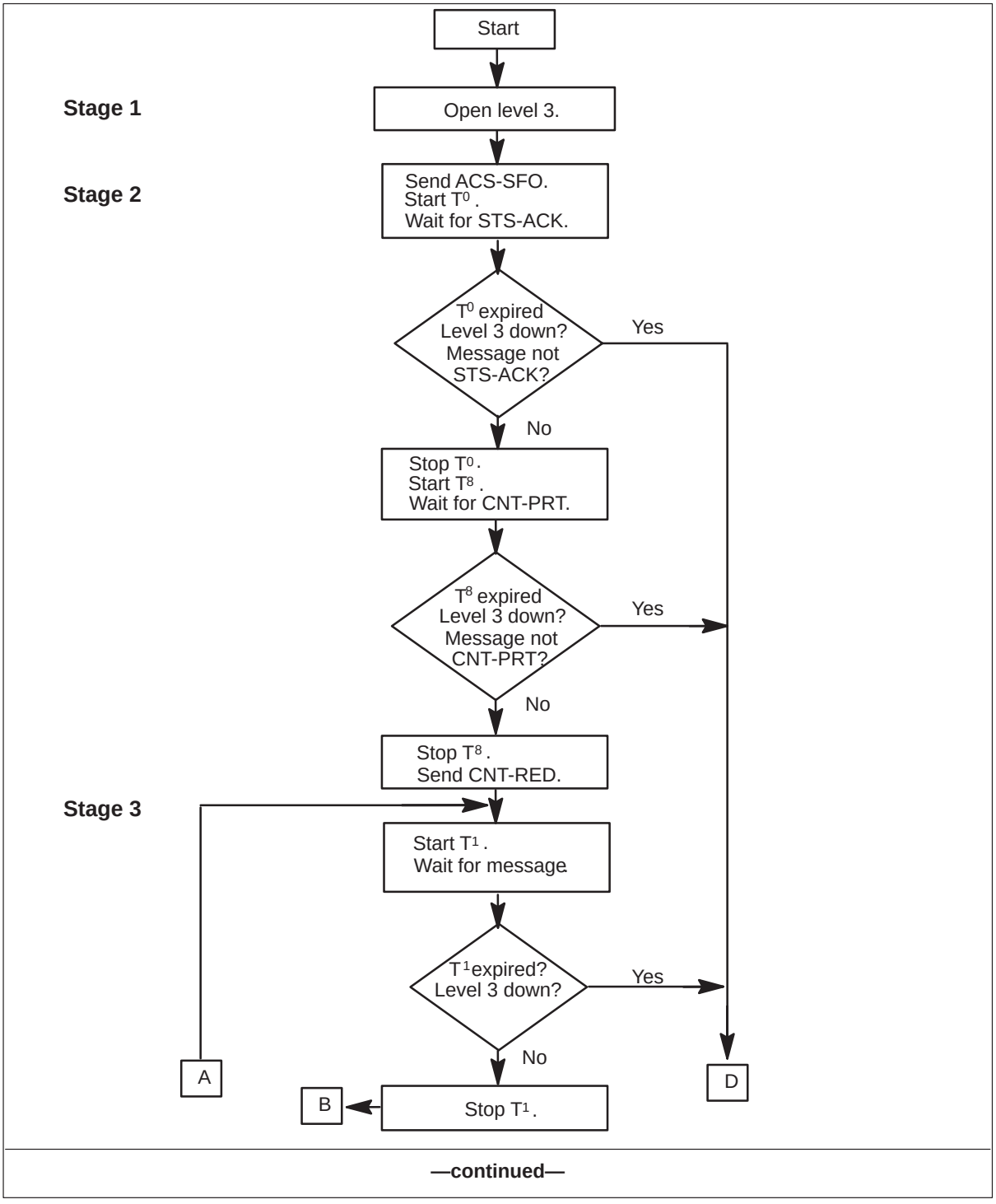
—continued—

Figure 3-9
DMSSFO or NEMSFO session when host receives file (continued)



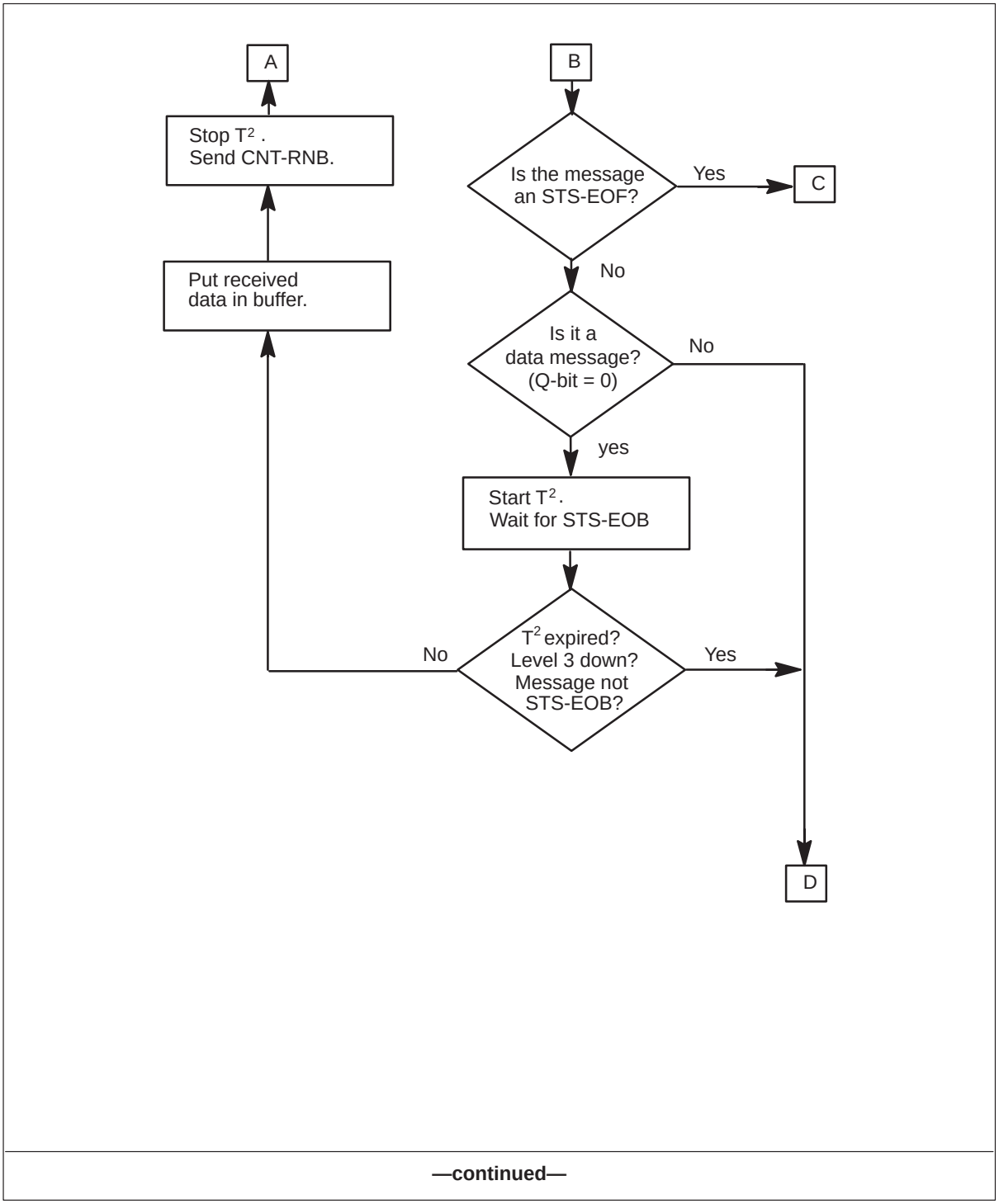
—end—

Figure 3-10
DMSSFO or NEMSFO session when host requests file



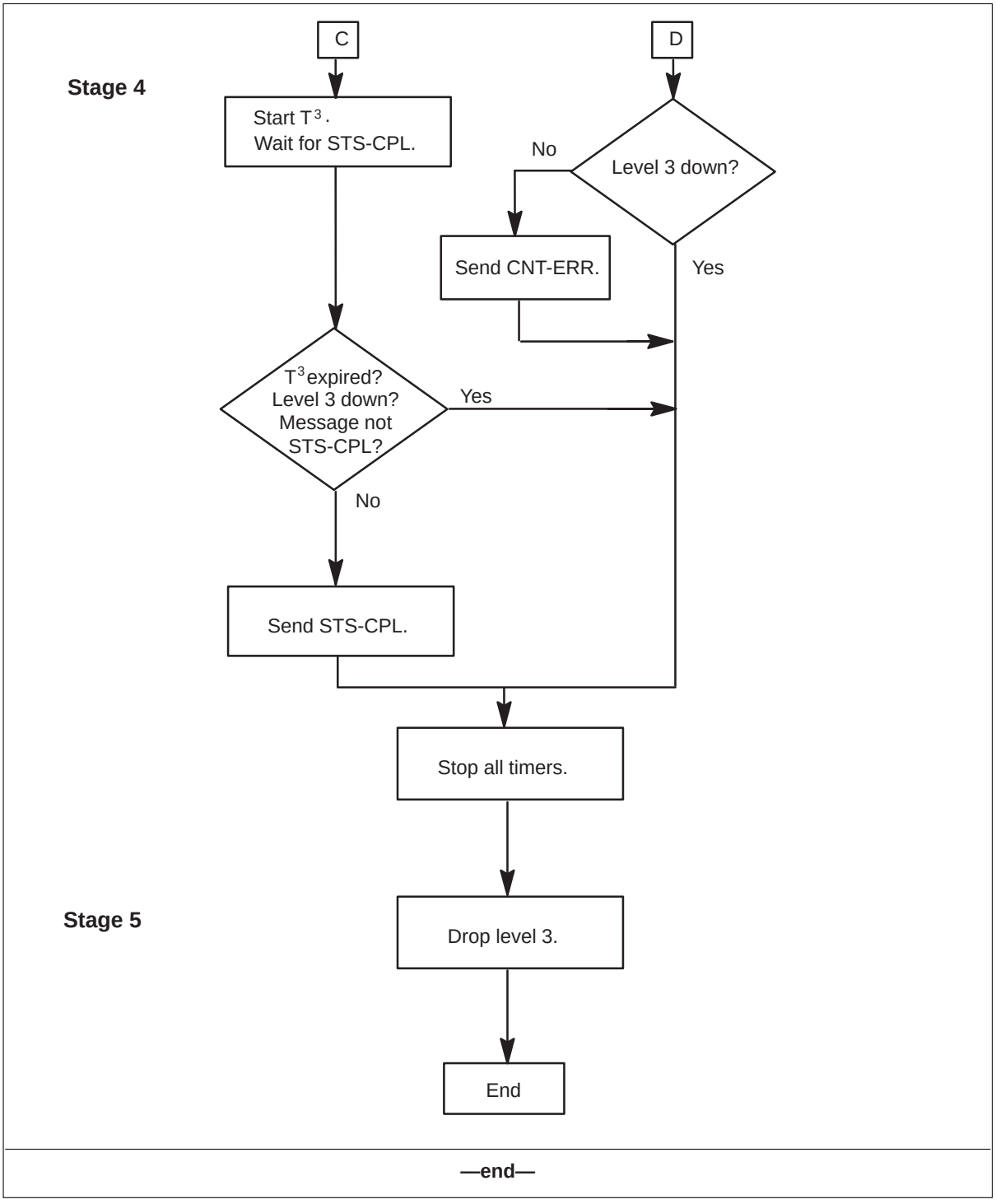
—continued—

Figure 3-10
DMSSFO or NEMSFO session when host requests file (continued)



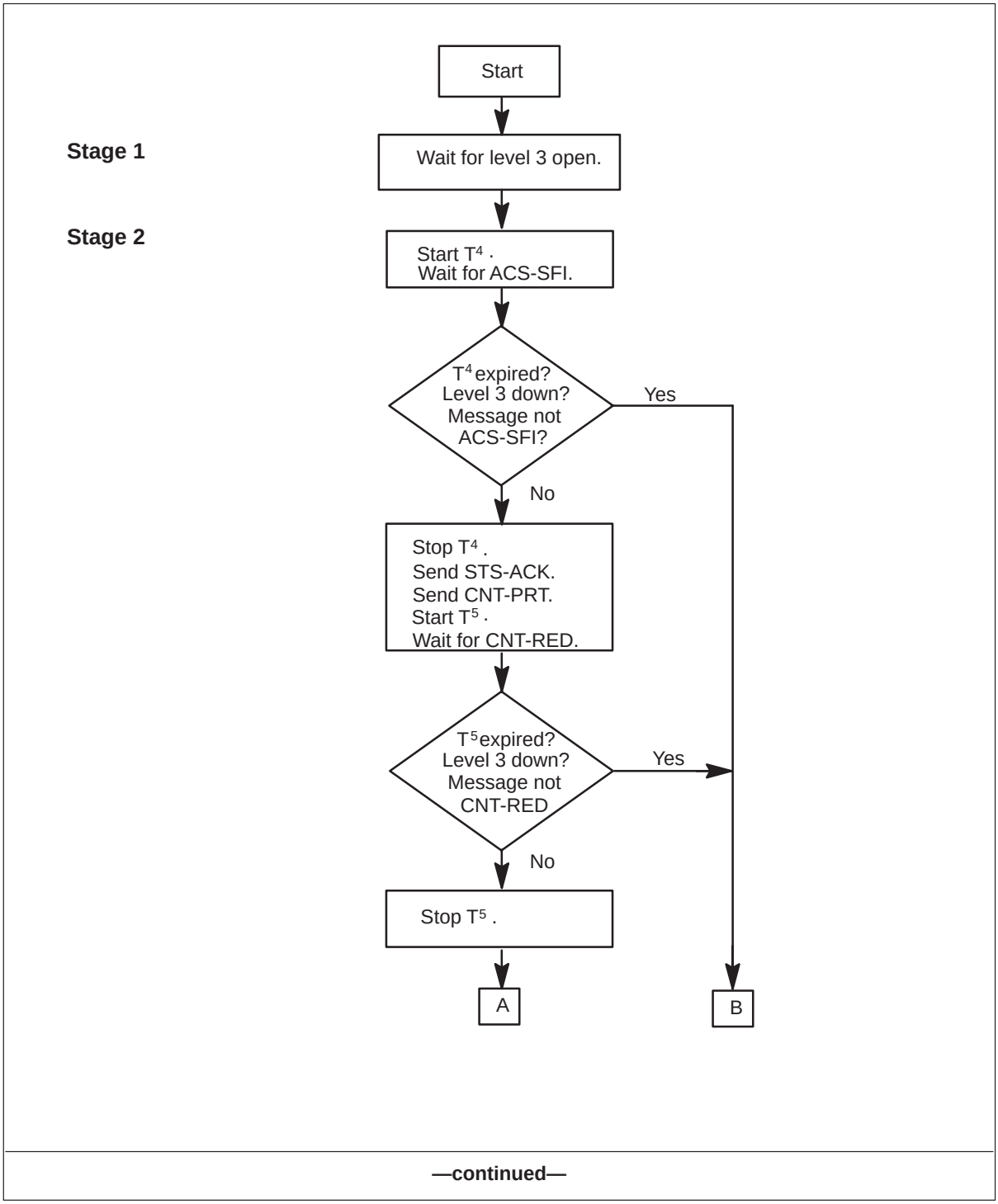
—continued—

Figure 3-10
DMSSFO or NEMSFO session when host requests file (continued)



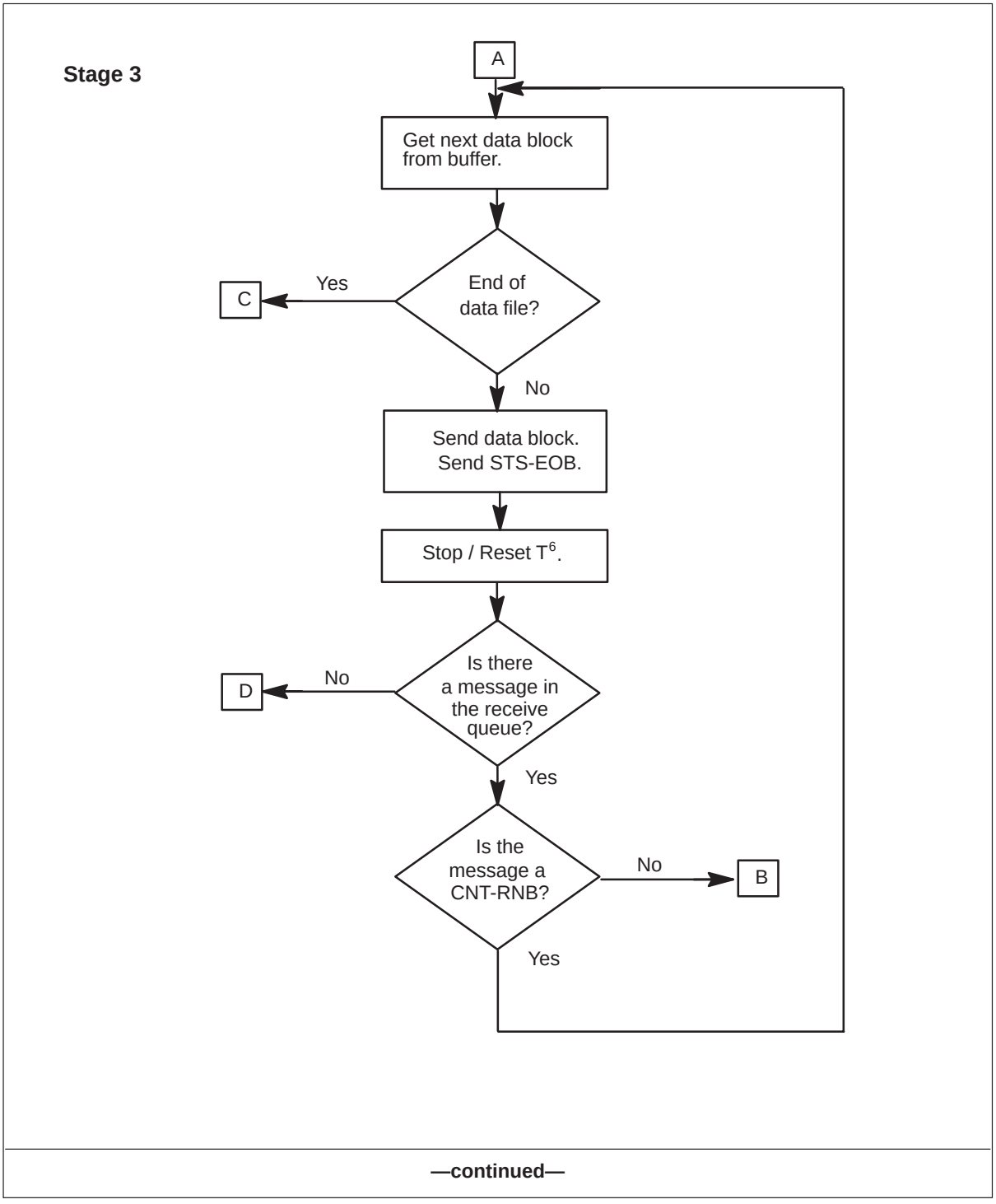
—end—

Figure 3-11
DMSSFI or NEMSFI session when host sends file



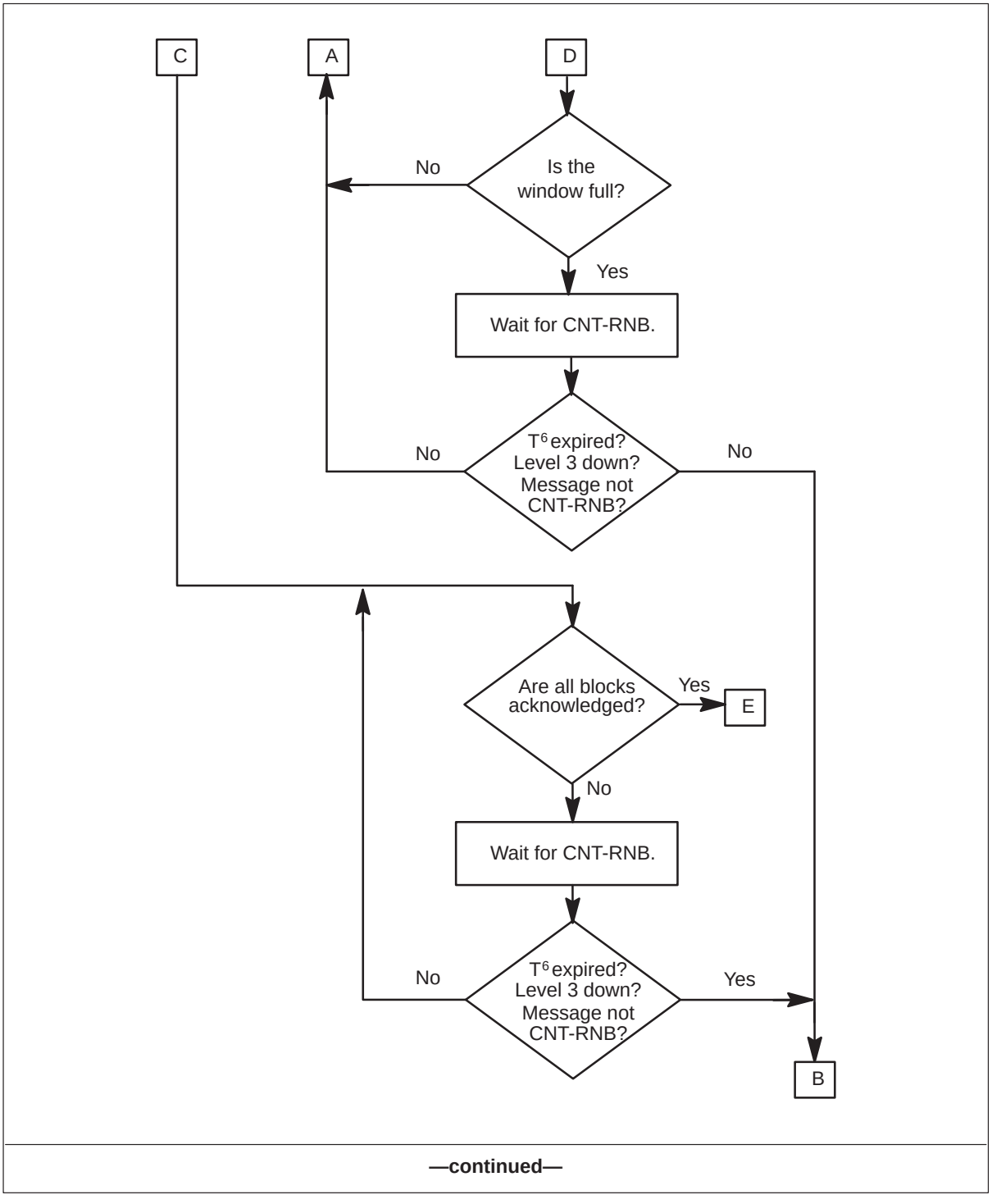
—continued—

Figure 3-11
DMSSFI or NEMSFI session when host sends file (continued)



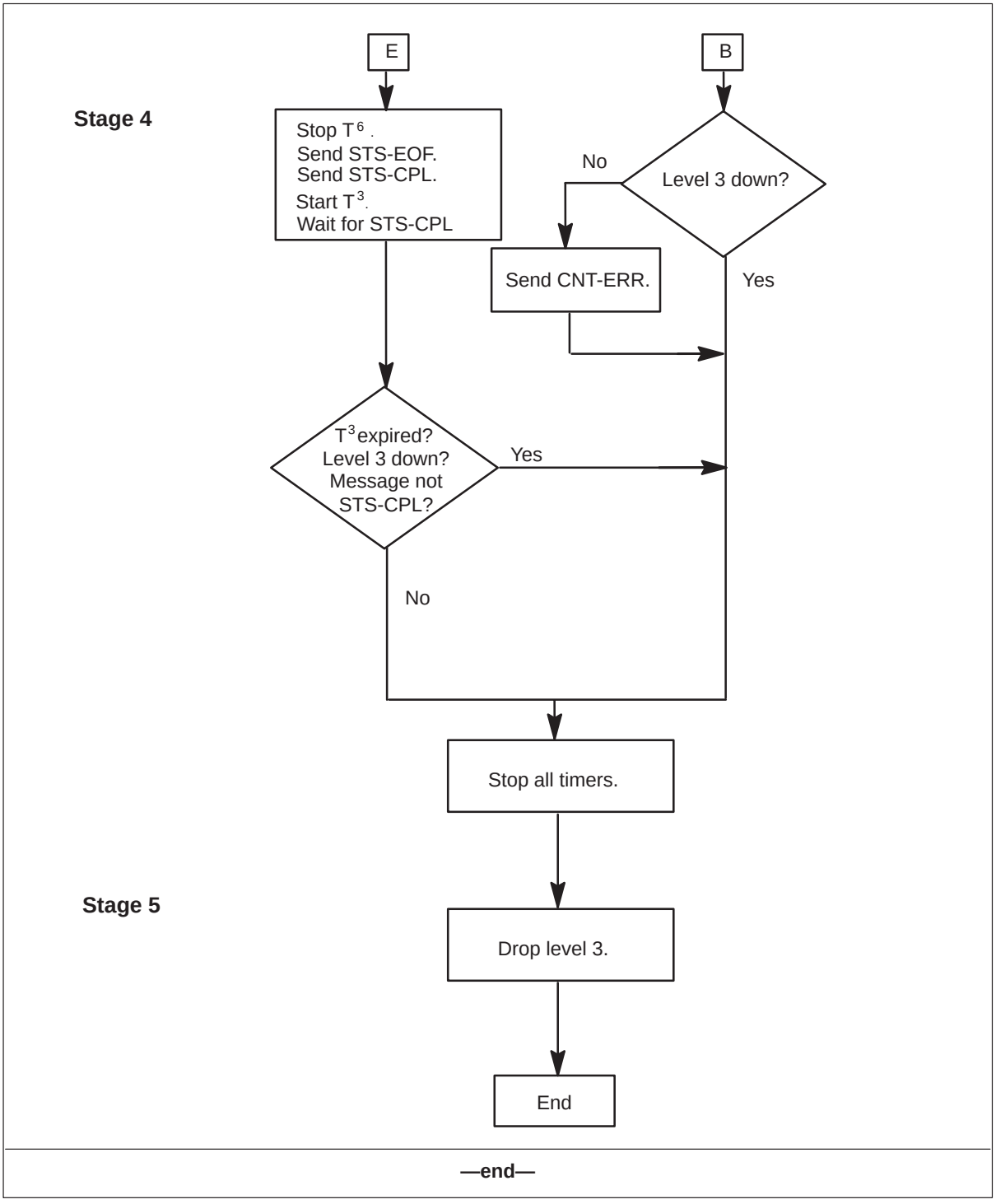
—continued—

Figure 3-11
DMSSFI or NEMSFI session when host sends file (continued)



—continued—

Figure 3-11
DMSSFI or NEMSFI session when host sends file (continued)



—end—

MFT message formats

The messages exchanged between the switch and the host for MFT are the same as the messages for AFT-MNP. Refer to Chapter 2, “Automatic file transfer,” for the message formats. MFT uses one additional message—the ACS-SFI message.

ACS-SFI

In a DMSSFI session, the switch sends an ACS-SFI message to request a file from the host.

In an NEMSFI session, the host sends an ACS-SFI message to request a file from the switch.

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 1 1	03	ACS-SFI
Octet 2	0 1 1 0 0 1 0 0	64	ACS-SFI
Octet 3	0 0 0 0 0 0 0 0	00	ACS-SFI
Octet 4– Octet 20			File name
Octet 21			Space
Octet 28	0 0 1 0 0 0 0 0	20	Generation name
Octet 29	0 0 1 0 0 0 0 0	20	
Octet 30	0 0 1 0 0 0 0 0	20	
Octet 31	0 0 1 0 0 0 0 0	20	
Octet 32	0 1 1 1 1 1 1 1	7F	LBA indicator
Octet 33			Last block acked (byte 0)
Octet 34			Last block acked (byte 1)
Octet 35			Last block acked (byte 2)
Octet 36			Last block acked (byte 3)
Octet 37	0 0 1 0 0 0 0 0	20	

Spontaneous reporting

Spontaneous reporting (SPR) sessions enable the switch to transfer logs and trunk group operational measurements (OM) to a host.

The SPR OUTLOG session enables log transfers. Two modified SPR sessions—Short INterval Statistics (SINS) and Long INterval Statistics (LINS)—enable the transfer of trunk group OMs. The sessions themselves only enable the flow of logs. CI commands and datafill of the log system turn on or off the flow of logs and allow log selection.

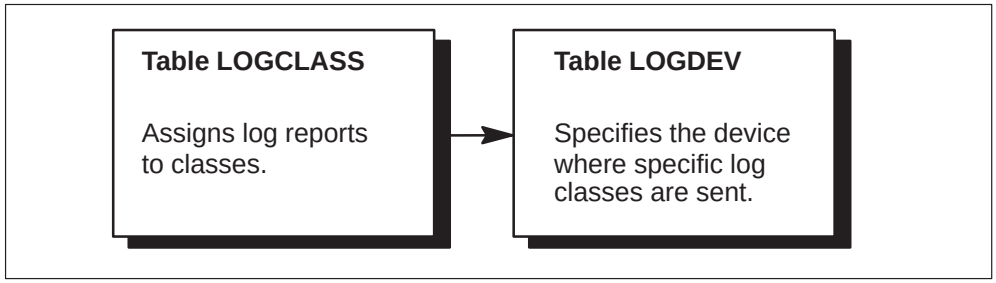
Once the datafill is set in tables RASLAPPL and GASINFO, the switch attempts to start the SPR sessions whenever they are not active for any reason.

The CI command STARTDEV <session name in GASINFO> begins the flow of logs across the data link to the specified session. Only those logs configured for a session are transferred. You configure logs for an SPR session by assigning them to a class, and assigning a particular class to the SPR session.

Datafill table relationships

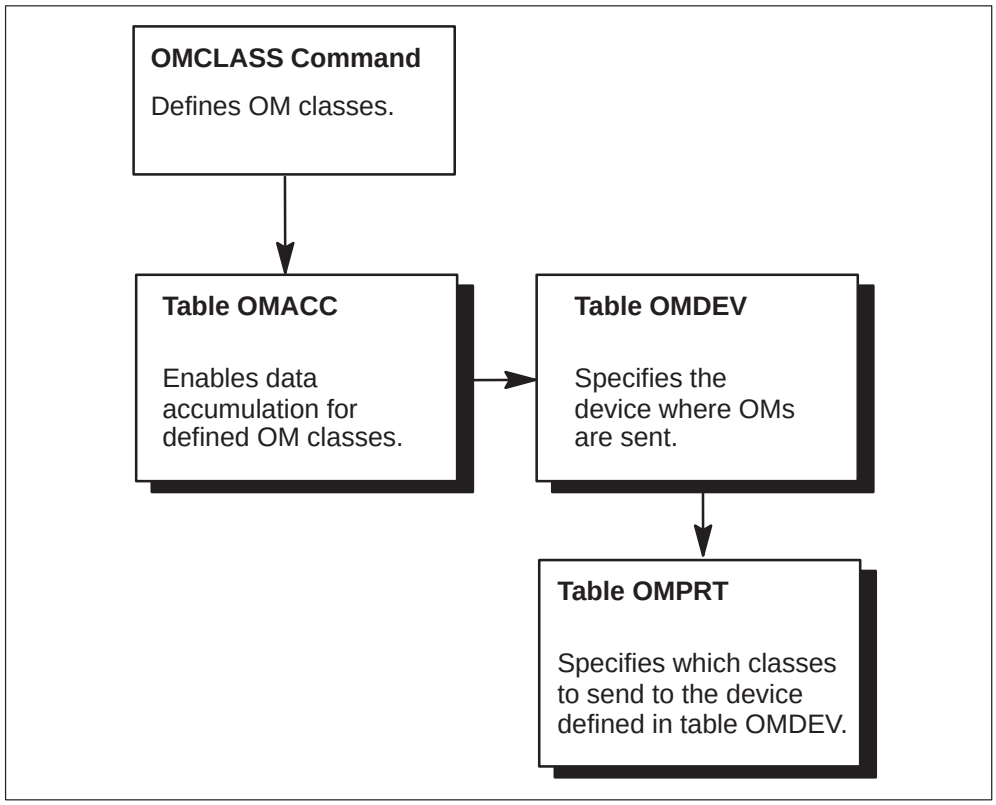
Datafill in tables LOGCLASS, LOGDEV, and TERMDEV configures the log system. Table LOGCLASS assigns a report class number to a log report. Table LOGDEV directs specific classes to a specified output device. For an SPR OUTLOG session, the session name is the output device specified. Figure 4-1 shows the relationship between tables LOGCLASS and LOGDEV.

Figure 4-1
LOGCLASS and LOGDEV relationship



Similarly, for trunk group OMs, datafill in tables OMACC, OMDEV, and OMPRT directs specified OM classes to a specified output device. Figure 4-2 shows the relationship between tables OMACC, OMDEV, and OMPRT.

Figure 4-2
OMACC, OMDEV, and OMPRT relationships

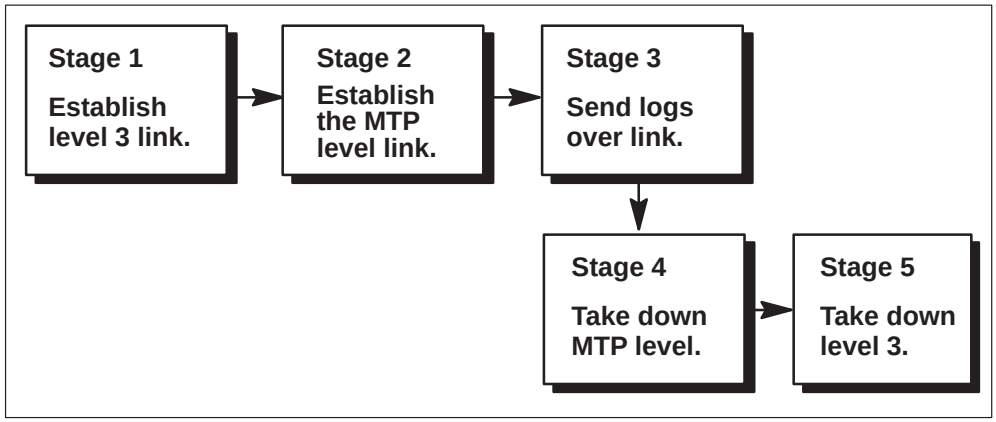


Datafill in table RASLAPPL maps the SPR OUTLOG and SINS and LINS sessions to the physical links. Datafill in tables MPC and MPCLINK configures the links. Datafill in table GASINFO uses the network

connections defined in table RASLAPPL to make the session connections. Table GASINFO also requires datafill to activate the sessions.

Logs are transferred in five basic stages as shown in Figure 4-3.

Figure 4-3
Five stages in SPR log transfers



This section details the five stages of an SPR OUTLOG session.

Stage 1

The physical link is up, a virtual channel is available, and both sides have the resources to handle the session.

Stage 2

The switch notifies the host that it is going to start sending logs. The host acknowledges. The switch initializes input to the host. The host responds and sets the window size.

Stage 3

The switch transfers logs to the host. The host must respond with a CNT-RNB message before the timer expires. Otherwise, an error occurs. If the host responds with any other message, an interrupt is assumed and the session is brought down.

Stage 4

After an error occurs or a CNT-INT is sent, both sides agree to take down the MTP application level.

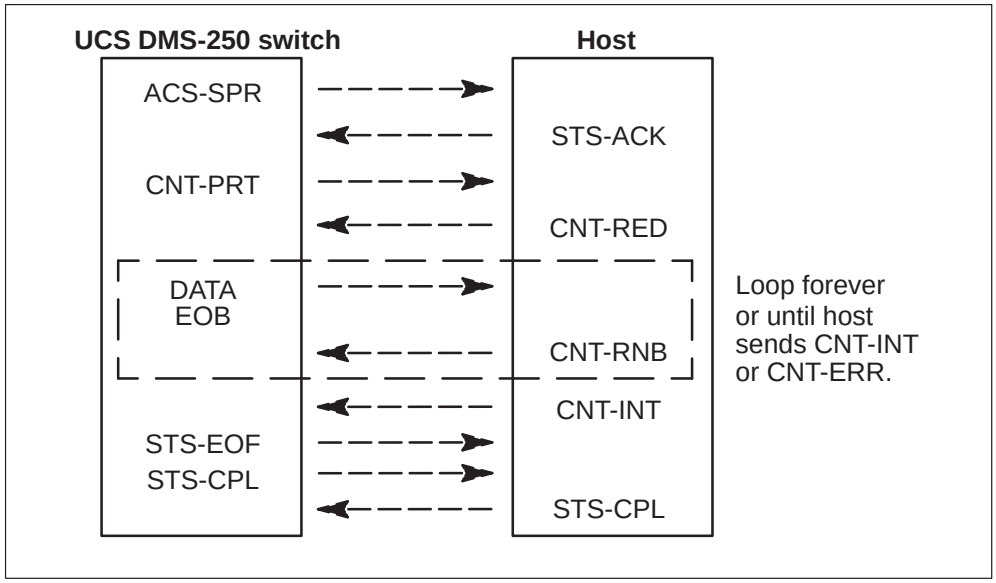
Stage 5

The virtual channel and all associated resources are released.

SPR OUTLOG session

Figure 4-4 shows the data flow of an SPR OUTLOG session. The switch sends the ACS-SPR message to the host to start the SPR OUTLOG session. The only field filled in the ACS-SPR packet is the first three bytes to identify the packet. The rest of the packet contains ASCII blanks. After the ACS-SPR packet is acknowledged, the switch enters a loop transmitting blocks of data containing logs.

Figure 4-4
SPR OUTLOG data flow

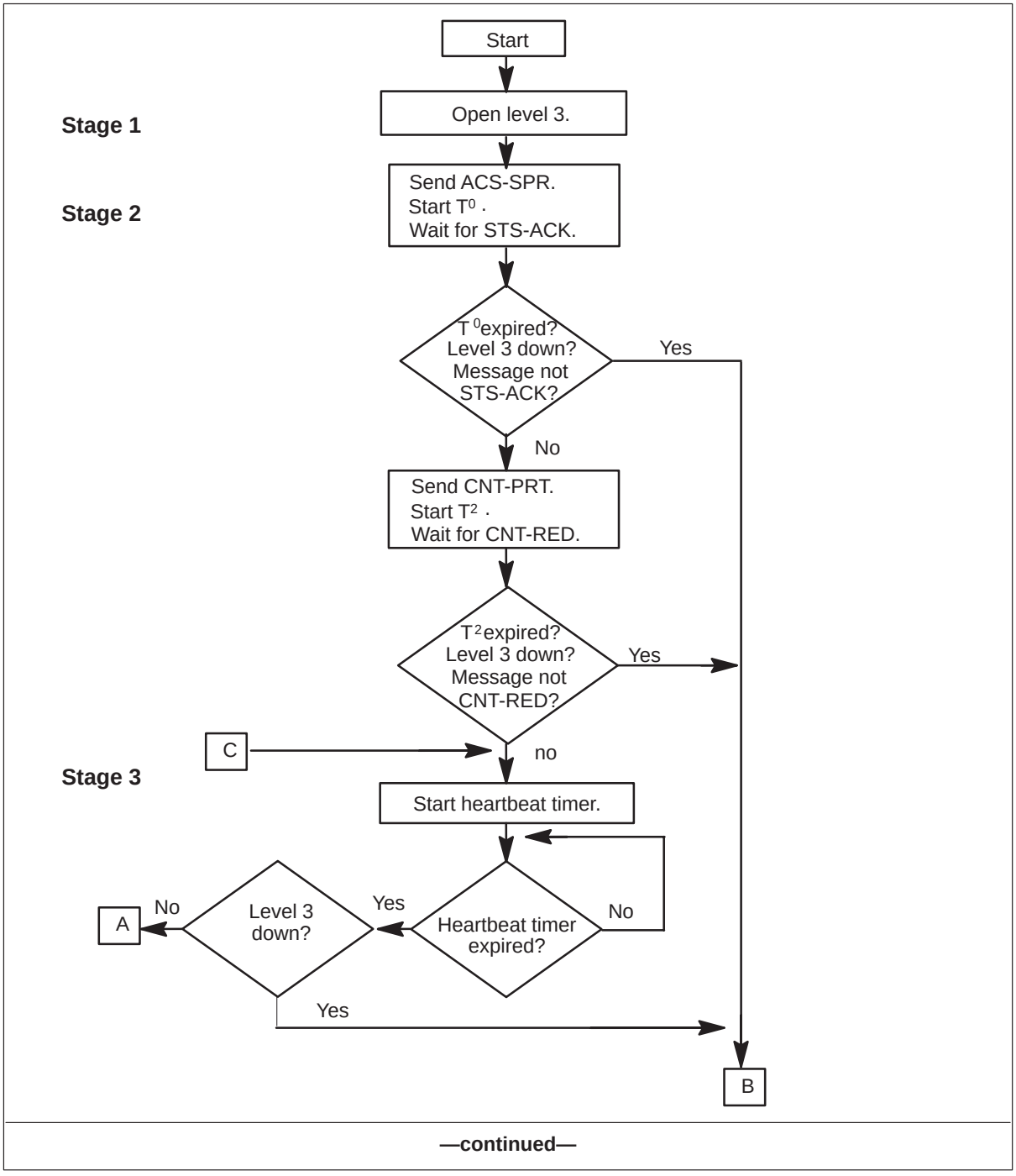


Once an SPR session is started, it runs until it is stopped by the CI command RASLCLOSE or by a protocol error.

SPR OUTLOG data flow

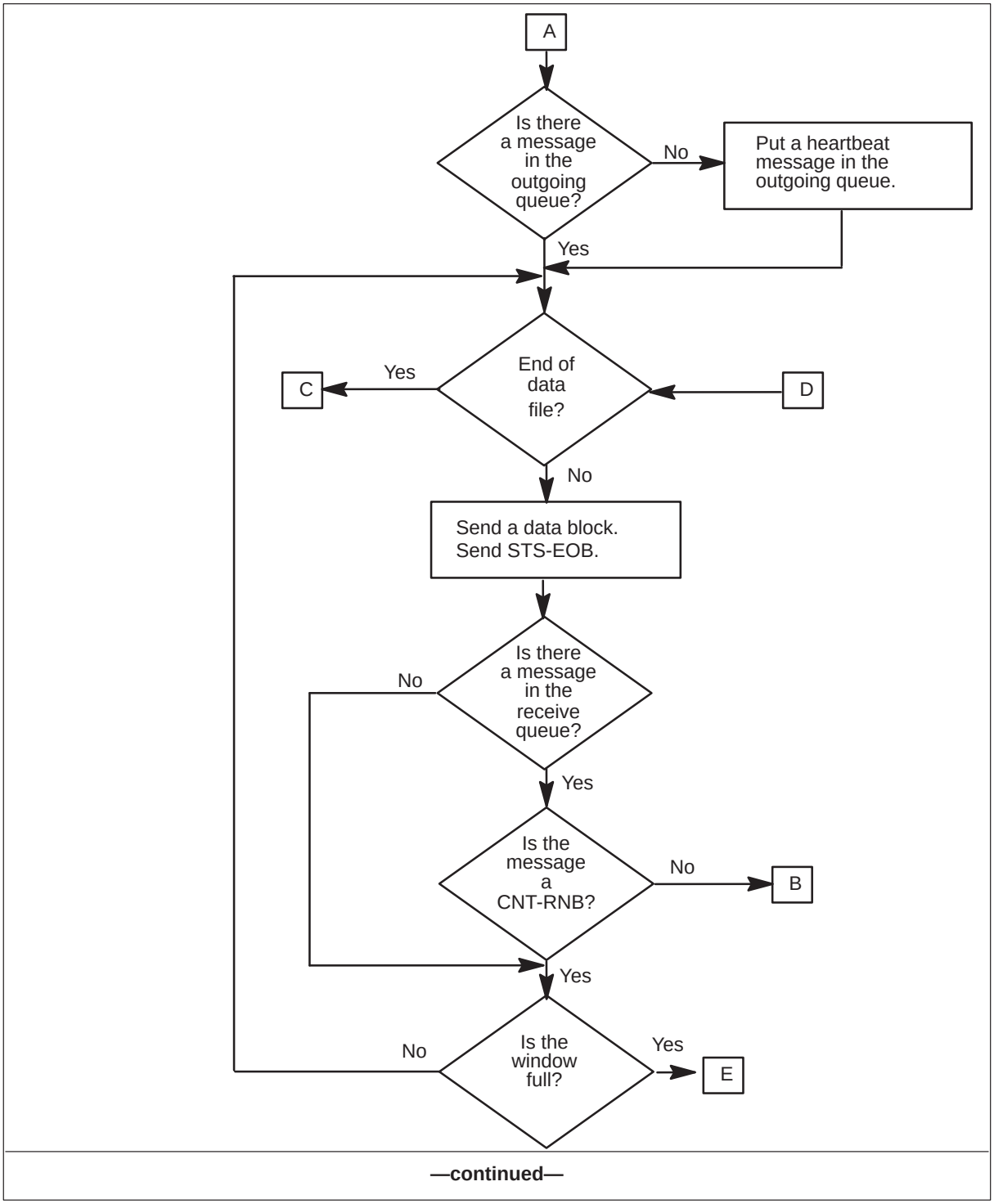
Figure 4-5 shows the data flow of the SPR OUTLOG session from the perspective of the local switch sending the logs to the remote host system.

Figure 4-5
SPR OUTLOG data flow from switch to host



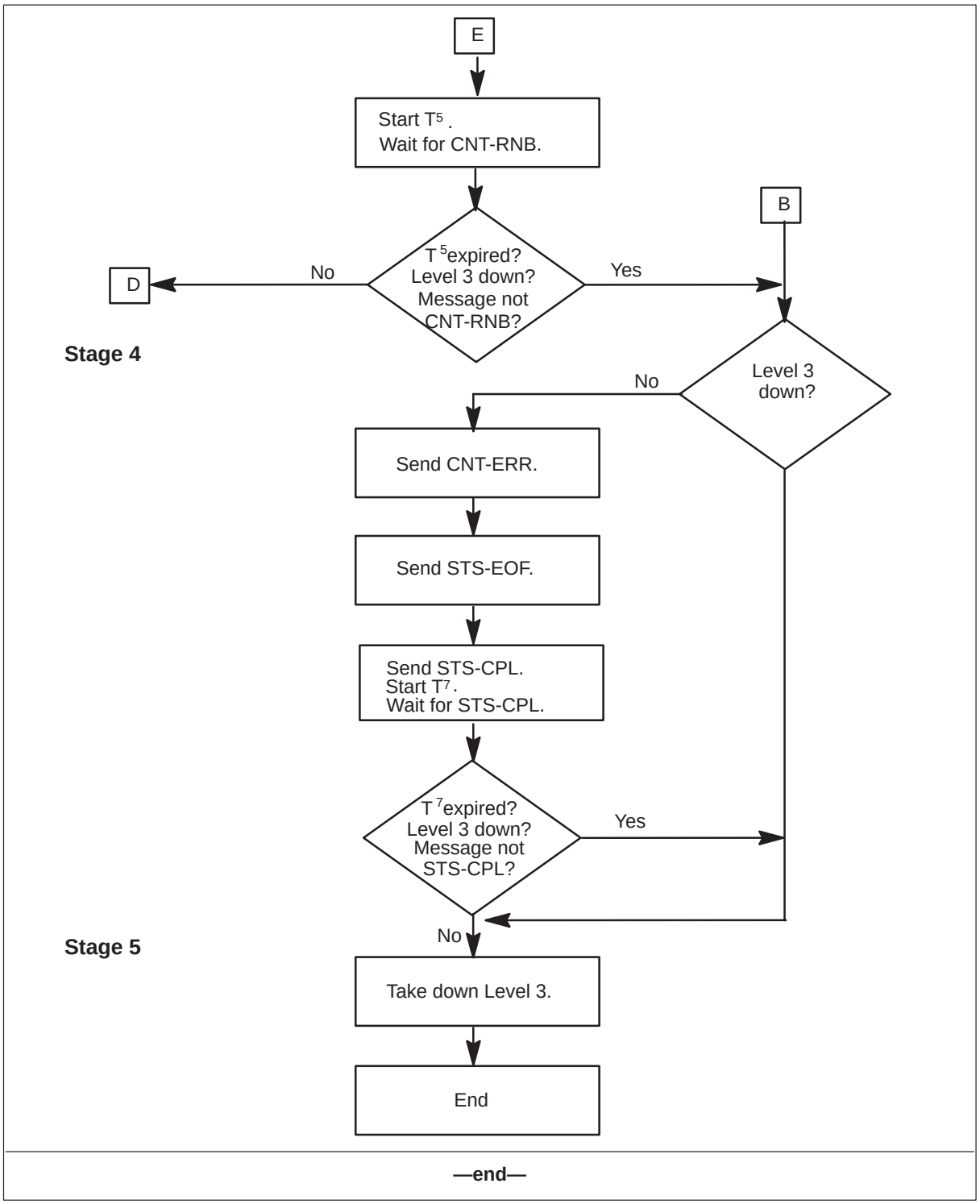
—continued—

Figure 4-5
SPR OUTLOG data flow from switch to host (continued)



—continued—

Figure 4-5
SPR OUTLOG data flow from switch to host (continued)



—end—

Message formats

The SPR protocol is based on the Message Transfer Protocol (MTP). The formats of the messages exchanged by the switch and the host during an SPR session are given in Chapter 2, "Automatic file transfer." One additional message—ACS-SPR—is specific to the SPR session. The switch sends the ACS-SPR message to the host to start the SPR session. The following table shows the format of the ACS-SPR message.

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 0	0 0 0 0 0 0 1 0	02	ACS-SPR
Octet 1	0 0 1 1 1 1 1 0	62	
Octet 2	x x x x x x x x	XX	
Octet 3	x x x x x x x x	XX	

The last octets are defined only when there is an alarm:

- Octet 2 is used by the receiver as routing information.
- Octet 3 contains three fields:
  - — Bit 7 (MSB) indicates whether the alarm is stopping or starting. If bit 7 equals 1, the alarm is stopping.
  - — Bits 6–4 contain the alarm class (1–5).
  - — Bits 0–3 contain the alarm category.

Heartbeat

A heartbeat is a special log generated periodically to indicate to the host that the switch is still alive. Each SPR session has a heartbeat. The interval at which the heartbeat is generated is from 15 seconds to 10 minutes, in 15-second increments. The parameter NEMHEARTBEAT in table OFCVAR sets the interval.

Packing logs

The SPR session packs logs from the switch to increase throughput. These MTP rules for packing logs are followed:

- Logs are packed into a 2048-byte block with these constraints:
  - — Each buffer contains a set of full logs. That is, one log of 2k bytes, or 2048 one-line logs, or many logs resulting in a 2k-byte buffer.
  - — The maximum log size is 2k bytes. Logs greater than 2k bytes are truncated.

— MTP inserts three control bytes at the start of the log:

  – Alarm length; least significant byte

  – Alarm length; most significant byte

  – Alarm type; 31 indicates heartbeat; 33 indicates alarms

  – The alarm length includes the control bytes and the end of log character.

— Alarms end with #7F as the end of log character.

— An ASCII carriage return line feed sequence specifies the end of line.

— All heartbeat expirations and critical alarms flush the current buffer.

- Heartbeat messages have these constraints:

— MTP inserts three control bytes at the start of the heartbeat message

  – Length; least significant byte (includes the control bytes and the end of log character)

  – Length; most significant byte (includes the control bytes and the end of log character)

  – Alarm type; 31 indicates heartbeat

— The format of the heartbeat is YYMMDDMM where YY is year, MM is month, DD is day, MM is minute.

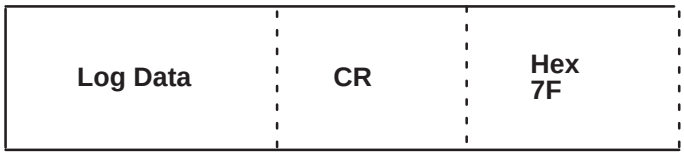
— Heartbeat messages are not normal logs. They are sent over only the data link.

— Heartbeat intervals are set after each transfer across the data link. The intervals are accurate to within 1/100th second to 2 seconds depending on queuing and link delay.

SINS and LINS

SINS and LINS are modified SPR sessions that enable trunk group OMs to be sent over the X.25 data link. In normal SPR sessions, logs are packed into 2k bytes. Logs that exceed 2k bytes are truncated. In SINS and LINS sessions, logs are still packed into 2048-byte blocks but are not truncated. The log continues into the next block. Figure 4-6 shows the format of a log block for a SINS or LINS session.

Figure 4-6
Log block for a SINS or LINS session



A log block is sent as soon as it is filled, or as soon as an end-of-log character (#7F) is encountered. Logs are padded with ASCII blanks for an even byte count. The ASCII carriage return specifies the end of line. The logs contain the same data that is sent to a printer in a standard UCS DMS-250 configuration.

SINS and LINS sessions guarantee that an entire log is sent. If there is a chance that part of a log may be lost due to an error or the link going down, the log is discarded. However, if the link is down for only a very short time—from 2 to 3 seconds—recovery is possible and the log may not be discarded. Recovery is possible because SINS and LINS route logs to an intermediate 10k-byte buffer. If the link is down long enough for the buffer to fill, the current log is discarded and the buffer is cleared.

SINS outputs 5-minute OM logs to the host, and LINS outputs 30-minute OM logs to the host. Configuring SINS and LINS for classes other than 5-minute and 30-minute OM classes is not recommended.

SINS and LINS sessions initiate within 2 minutes after a restart if their respective entries are datafilled in table GASINFO.

ACS-SFO message format

In a normal SPR session, the connect message sent from the switch to the host is an ACS-SPR. In a SINS or LINS session, the connect message is an ACS-SFO. Figure 4-7 shows the format of the ACS-SFO message. The second three bytes in the ACS-SFO contain the file name—either SINS or LINS.

Figure 4-7
ACS-SFO message format

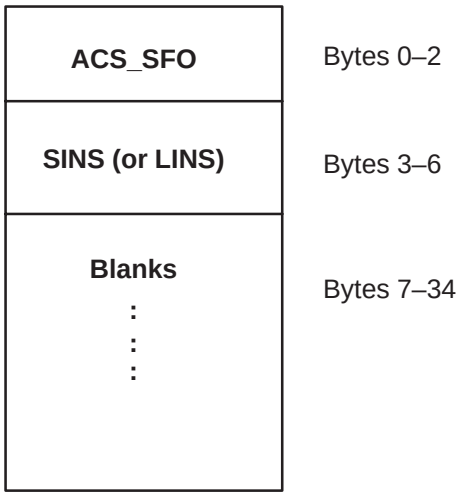
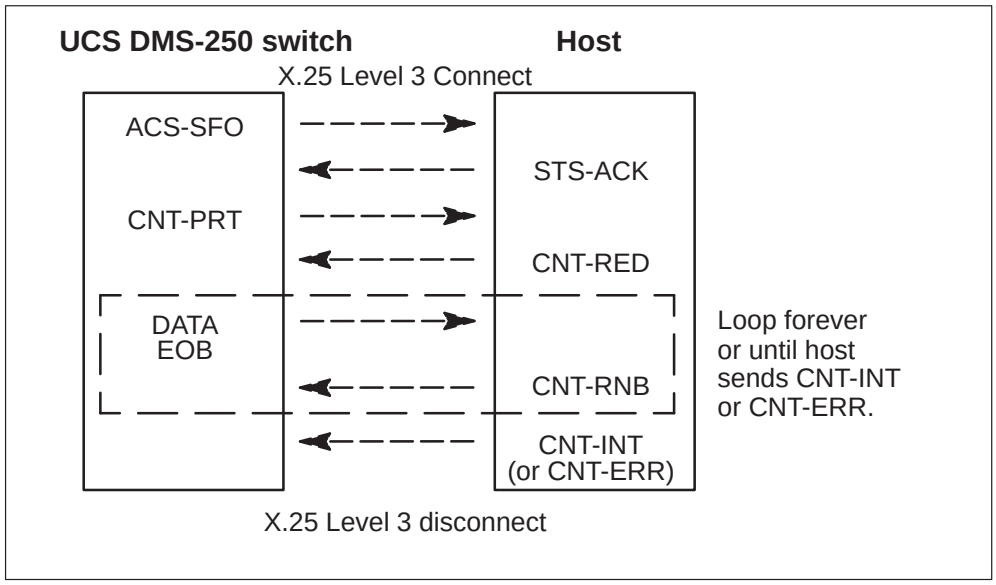


Figure 4-8 shows the SINS or LINS data flow.

Figure 4-8
SINS or LINS data flow



Configuring the EMPC

Configuring the enhanced multi-protocol controller (EMPC) card can

- identify the EMPC card hardware to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)

This chapter gives the datafill for tables MPC and MPCLINK, which support EMPC. Each of the file transfer sessions provided by the X.25 Data Transport Enhancements package requires that these two tables be datafilled.

Details on datafill for additional tables required to set up file transfer sessions and the datafill sequence for each are provided in these chapters:

- Chapter 6, “Setting up an AFT session”
- Chapter 7, “Setting up MFT sessions”
- Chapter 8, “Setting up SPR OUTLOG sessions”
- Chapter 9, “Setting up a SINS session”
- Chapter 10, “Setting up a LINS session”
- Chapter 11, “Remote login command session”

Datafill sequence

Datafill these tables in the order shown:

1 MPC

2 MPCLINK

Datafilling table MPC

Table MPC (Multi-Protocol Controller) enables you to datafill values the switch needs to implement the EMPC. This table identifies the EMPC card hardware to the UCS DMS-250 central control (CC). Each EMPC card requires one tuple in this table.

For each EMPC card, this data is specified:

- an index number for the EMPC
- the number of the input/output controller (IOC) shelf where the card resides
- the card circuit number
- the product engineering code (PEC)
- the identification for the preferred download file to use

If the device containing the download file is listed before the tuple in table MPC is datafilled, or before the first manual download is performed, a subsequent manual download or a return to service (RTS) usually succeeds without listing the download file.

Figure 5-1
Relationship between tables MPC and MPCLINK

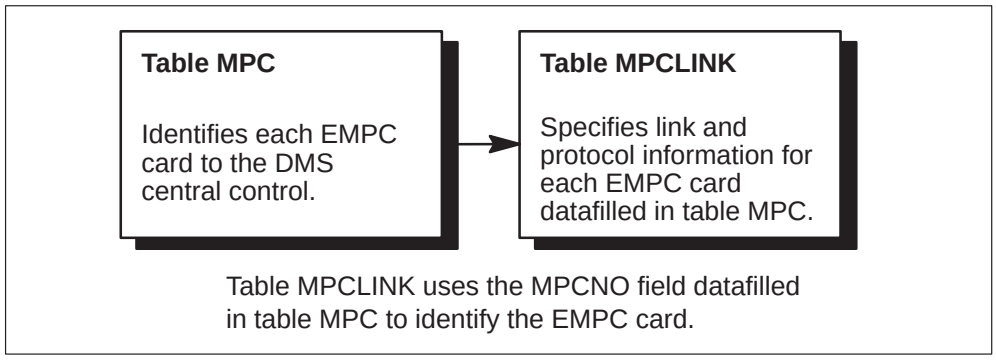


Table MPC field descriptions

Table 5-1 gives the field names and descriptions for table MPC. Some fields have additional values besides those given here.

Table 5-1
Table MPC field descriptions

Field	Subfield or refinement	Entry	Explanation and action
MPCNO		see subfield	*Multi-protocol controller number*. This field consists of subfield K.
	K	0–255	*Multi-protocol controller number key*. Enter a number for one EMPC. Number the EMPCs as desired.
MPCIOC		0–19	*Multi-protocol controller input/output controller*. Enter the number of the IOC shelf on which the EMPC card resides.
IOCCCT		0, 4, 8, 12, 16, 20, 24, 28, 32	*Input/output circuit number*. Enter the slot position on the IOC shelf multiplied by 4, from 0–32.
EQ		1X89AA 1X89BA 1X89BB	*Equipment code*. Enter the Northern Telecom PEC 1X89BA for the EMPC card.
DLDFILE		8 alphanumeric characters	*Download file*. Enter a file name that begins with MPC, followed by 4 for X.25, followed by four alphanumeric characters that designate the software release cycle and its load designation. For example, MPC433BW.

Restrictions for datafilling table MPC

These restrictions apply when datafilling table MPC from a MAP terminal:

- Tuples in table MPC can be deleted only if the corresponding EMPCs are offline and all associated tuples are deleted in table MPCLINK.
- DLDFILE is the only field that can be changed in a tuple in table MPC. To change other fields, delete and enter it again.
- Before a tuple is added, device directories for the download file must be listed to place the file in the user directory. The CC (Central Control) recognizes them at the time of datafill. If the device directories for the download file are not listed, a warning message appears when the tuple is written to table MPC. For example, the command interpreter (CI) command LISTVOL can be performed on a disk volume such as D000MPC, to list the download file.

The following is an example of datafill for table MPC.

```
MPCNO   MPCIOC  IOCCCT      EQ       DLDFILE
_____________________________________________
    0        0      12  1X89BA      MPC433BW
    1        1      12  1X89BA      MPC433BW
```

Datafilling table MPCLINK

Table MPCLINK (Multi-Protocol Controller Link) specifies link and protocol information for cards datafilled in table MPC. Table MPCLINK can be datafilled with any valid MPC link definition and protocol combination followed by a group of protocol-specific fields.

Table MPCLINK supports the application of the 1980 CCITT X.25 layered protocol in the MPC to ensure that links are established and maintained.

The fields in table MPCLINK identify the EMPC data links to the CC in the same way table MPC identifies the actual EMPC hardware to the CC. These fields have no default values and must be datafilled.

Protocol parameter definitions are based on the selected protocol. The NT1X89BA card complies fully with the 1980 CCITT X.25 protocol. Additionally, the card complies with a subset of the 1984 CCITT X.25 protocol. Refer to Appendix B, “Level 2 and level 3 functions supported,” for details on the parameters supported for the 1984 protocol.

Most parameter fields do not require datafill. Only those parameter fields that are adjusted from the default values on the peripheral module (PM) when it is downloaded require datafill. These fields contain timing and messaging specifications.

A variable-length list of parameters and their values can be entered. When datafilling parameters at a MAP terminal, a prompt continues to appear until a $ (dollar sign) is entered. Those parameters that are not entered retain the default values established when they are downloaded. Most of the fields in a tuple can be changed only when the affected link is busied.

To view all link parameter values on an EMPC card, enter the following command at the MPC level:

>QLINK linknum

Link number (linknum) specifies which link (2 or 3) on the EMPC is queried for parameter values.

Note 1: Command QLINK requires a datafilled link and an in-service EMPC.

The EMPC has a finite amount of buffer allocation space. The number of buffers normally dedicated to an activity on a single circuit depends on the data packet size. The default number of buffers is two. Requests for additional buffers are completed from a general buffer pool. This type of allocation indicates a single channel can use all remaining buffers.

Applications that have messages can receive an EMPC return code if no buffers are available, invoking a 10-s CC delay before the block is sent again to the EMPC. A variable length list of parameter entries and their values can be taken out of active service.

Certain parameters in table MPCLINK that apply to the X.25 protocol must be datafilled to correspond to the circuit subscription configuration for DATAPAC or the host data packet network (DPN).

The following parameters must match the circuit subscription exactly:

- local data network address (DNA)
- number of permanent virtual circuits (PVC)
- number of switched virtual circuits (SVC)
- packet window size

Because these parameters must correspond exactly to subscription requirements, it is important to know the requirements of features that use the EMPC. In addition, it is important to understand the circuit subscriptions or the environment in which they operate, and configure cards and links in tables MPC and MPCLINK to conform to the needs of higher-level applications.

Table MPCLINK field descriptions

Table 5-2 gives the field names and descriptions for table MPCLINK. Some fields have additional values besides those given here. This table shows those values that are valid for the X.25 Data Transport Enhancements package.

Table 5-2
Table MPCLINK field descriptions

Field	Subfield or refinement	Entry	Explanation and action
LINKKEY		See subfields	*Multi-protocol controller link key*. This field consists of subfields MPCNO and LINKNO.
	MPCNO	0–255	*Multi-protocol controller number*. This field specifies the existing enhanced multiprotocol controller (EMPC) card for this entry. Enter the EMPC number datafilled in table MPC. There is no default value.
	LINKNO	0–3	*Link number*. Enter the EMPC link number. Ports 2 and 3 are the only ports on the EMPC card supported by the protocols. There is no default value.
LINKALM		Y or N	*Link alarm*. Enter Y to enable the MPCLINK alarm for system busy (SYSB) EMPC links. Otherwise, enter N. The default value on dump and restore procedures for software releases prior to BCS35 is Y.
PRTCLDAT		see subfield	*Protocol data area*. This field consists of subfield PROTOCOL. There is no default value.
	PROTOCOL	X2584	*Protocol*. Enter X2584 and datafill subfield LINKNABL. Also enter the conditional datafill for Protocol = X2584 as described in Table 5-3. There is no default value. ***Note:*** The download file specified in table MPC must be consistent with the protocol entered in this field.

—continued—

Table 5-2
Table MPCLINK field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
	LINKNABL	0–32767	*Link enable*. Enter the time-out, in minutes, before a link that has failed to fully enable is SBSY'd and RTSed. This value must be a multiple of five. Enter 0 to disable the function. There is no default value. ***Note:*** If the entry is non-zero, one link is enabled; when the other link has reached the time-out threshold, both the enabled link and the EMPC card are SBSY'd and RTS'd. To prevent this, datafill 0 to disable the function.
		—end—	

PROTOCOL = X2584

When the entry in field PROTOCOL is X2584, datafill fields CONVNABL, PARMS, and EXINF as shown in Table 5-3.

Table 5-3
Conditional datafill for table MPCLINK

Field	Subfield or refinement	Entry	Explanation and action
CONVNABL		0–32767	*Conversation enable*. Enter the number of minutes a conversation is not in progress before corrective action is taken. This value must be a multiple of five. An entry of 0 indicates an indefinite period of time. There is no default value.
PARMS		See subfield	*Parameter selector (CCITT X25 CC protocol)*. This field consists of subfield PARM.
	PARM		*Parameter selector*. Subfield PARM and its refinements are described in Table 5-4. Datafill subfield PARM and its refinements before datafilling field EXINF.
		—continued—	

Table 5-3
Conditional datafill for table MPCLINK (continued)

Field	Subfield or refinement	Entry	Explanation and action
EXINF		See subfield	*Example information protocol*. This field consists of subfield EXINFO.
	EXINFO	SVCDNA, $	*Example information protocol*. If SVCs are used on the link, enter SVCDNA and datafill refinement DIGITS. If no SVCs are used, enter $ (dollar sign).
	DIGITS	0–9, (vector of up to 15 entries)	*Digits*. Enter the digits for the network address.
		—end—	

Refinements for subfield PARM

Table 5-4 describes the refinements for subfield PARM. This subfield is datafilled with a vector of up to 37 parameter options. To change a parameter default value, enter the parameter name at the PARM prompt. When the system prompts you with the refinement, enter the new value. Enter the parameters one at a time, in any order.

The following shows an example for table MPCLINK.

```
PARM:
>n2
VALUE:
>L5
PARM:
l2window
SIZE:
>1
PARM:
l2modulo
MODVAL:
>mod8
PARM:
>t1_s
VALUE:
>10
PARM:
>$
```

If fewer than 37 options are required, enter $ at the end of the list.

When all parameter options are datafilled, go to field EXINF described in Table 5-3.

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM

PARM	Refinement	Entry	Explanation and action
BAUDRATE	RATE	B300, B600, B1200, B2400, B4800, B9600, or B19200	BAUDRATE (baud rate) specifies the baud rate. Enter a baud rate value (representing bits per second) for data transmission that is compatible with both ends of the circuit. The default is B2400. ***Note:*** Datafill field BAUDRATE only if field CLKSRCE is datafilled as INTERNAL.
CLKSRCE	SOURCE	EXTERNAL	CLKSRCE (clock source) specifies the source for the EMPC system clock. Enter EXTERNAL for a modem device. Link 2 and link 3 must have the same clock source. If a different clock sources are datafilled for link 2 and link 3, an error message generates. The default is EXTERNAL.
ELECSPEC	SOURCE	RS232 or V35	ELECSPEC (physical link specification) specifies the electrical specification for links 2 and 3 on the EMPC card. The EMPC card supports either RS232 or V35. The default is RS232.
L2MODULO	MODVAL	MOD8 or MOD128	L2MODULO (frame level modulo counter) specifies a numbering scheme for end-to-end messaging at level 2. Modulo 8 frame sequencing (MOD8) supports a maximum level 2 window size of 7. The default is MOD8.
L2WINDOW	SIZE	1–127	L2WINDOW (frame window size) specifies the size of the frame window. The frame window specifies the maximum number of unacknowledged frames allowed to be outstanding at level 2. This is a flow control variable; the digital trunk controller (DTC) and the digital circuit-termination equipment (DCE) must agree on this parameter. The default is 2.

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
L3ACK	VALUE	0–255	L3ACK (level 3 packet acknowledgment) specifies packet acknowledgment. This level 3 timer is used with subfields T2_S and T2_10MS. The entry, in units of 10 ms, must be less than the values in subfields T2_S and T2_10MS (unless both are zero). The preferred value is at least 20 ms less than the values datafilled in subfields T2_S and T2_10MS. The default value of 0 means that the incoming data is immediately acknowledged at level 3. To conserve packets when L3ACK is not 0, the timer is started for an incoming packet in anticipation of reciprocal outgoing data that can carry the acknowledgment of the incoming data. If there is no outgoing data, incoming data is acknowledged when L3ACK expires. Datafilling L3ACK is not recommended unless a pattern of data exists and is recognized. If used improperly, level 3 packet acknowledgment can impede throughput from the remote node.
L3DATA	DATASIZE	P16, P32, P64, P128, P256, P512, P1024, P2048, or P4096	L3DATA (level 3 data packet size) specifies the maximum number of bytes of user data allowed in a data packet. The default value is P128.
L3MODULO	MODVAL	MOD8 or MOD128	L3MODULO (level 3 packet level modulo counter) specifies a protocol numbering scheme for end-to-end messaging at level 3. Modulo 8 frame sequencing (MOD8) supports a maximum level 3 window size of 7.
L3WINDOW	SIZE	1–127	L3WINDOW (level 3 packet window) specifies the maximum number of unacknowledged messages allowed to be outstanding at level 3. Both DTE and DCE must agree on this parameter.

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
N2	VALUE	1–255	N2 (retransmission counter) specifies how many times level 2 retransmits a frame for which no acknowledgment is received within the retransmission time (field PARM set to T1). A value of 255 indicates there is no limit on the counter size. The default is 10.
NODETYPE	NODE	DCE or DTE	NODETYPE (node type of address) specifies the node type of address of the EMPC. This parameter indicates to the EMPC that frame addressing is digital circuit-termination equipment (DCE) or data terminal equipment (DTE). The default is DTE.
NUMPVCS	NUMVCS	0–255	NUMPVCS specifies the number of PVCs. If no SVCs are configured on the link, up to 255 PVCs can be configured. NUMPVCS can be omitted only if one or more of the SVC parameters is datafilled. In that case, the number of PVCs configured on the link is considered to be 0. The default is 3.
PVCDBIT	BITSET	DOFF or DON	PVCDBIT (PVC bitset) enables the X.25 D-bit facility on PVC channels. Enter DOFF to disable the D-bit facility or DON to enable the D-bit facility. Over a network PVC, the network subscription must include the D-bit to use parameter PVCDBIT successfully. The EMPC sends all user data with the D-bit set, and acknowledges all incoming D-bit data appropriately. This applies only to PVCs on the link. Use of the D-bit for an SVC is determined at call setup. The default is DOFF.

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
R20	VALUE	1–255	R20 specifies the maximum number of expirations of the restart request timer (T20). Each time T20 expires, the level 3 restart request is re-sent, up to the value datafilled for parameter R20. Timing stops if confirmation of the request is received. Parameter T20 must be datafilled. The default is 1.
R22	VALUE	1–255	R22 specifies the maximum number of expirations of the reset request timer (T22). Parameter T22 must be datafilled. The default is 1.
R23	VALUE	1–255	R23 specifies the maximum number of expirations of the clear request response timer (T23). Enter the number of clear request retransmissions sent before the counter is cleared. Parameter T23 must be datafilled. The default is 1.
R25	VALUE	0–255	R25 specifies the maximum number of expirations of the packet acknowledgment timer (T25). A channel is reset based on which data is unacknowledged after T25 expires. Set the value to 0. Parameter T25 must be datafilled. The default is 0.
SVCS2WAY	NUMVCS	0–255	SVCS2WAY specifies the number of two-way SVCs configured on the link. ***Note:*** If the total number of SVCs on a link is not 0, enter SVCDNA in subfield EXINF80. If no SVCs are datafilled, a default of 0 for each type is configured, provided that some number of PVCs is datafilled. If no PVCs or SVCs are datafilled, the tuple is rejected. Up to 255 SVCs can be configured, but the combination of PVCs and SVCs cannot exceed 255 (NUMPVCS + SVCS2WAY + SVCSIN + SVCSOUT < = 255).

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
SVCSIN	NUMVCS	0–255	SVCSIN specifies the number of one-way incoming SVCs on the link. See the note for SVCS2WAY.
SVCSOUT	NUMVCS	0–255	SVCSOUT specifies the number of one-way outgoing SVCs on the link. See the note for SVCS2WAY.
T1_S	VALUE	1–255	T1_S specifies the value of timer 1 in seconds. See the note for T1_10MS.
T1_10MS	VALUE	0, or 5–255	T1_10MS specifies value of timer 1 in 10-ms increments. ***Note:*** Either timer T1_S or timer T1_10MS can be datafilled, but not both. If neither is datafilled, the value for timer 1 is 5 seconds. Timer T1 is a level 2 timer used in conjunction with entry N2 to determine wether the remote is responding correctly. If the T1 timer expires N2 times, without proper acknowledgment of a frame sent to the remote device, the link changes state and reinitializes. For the local T2 timer to be entirely accurate, the T1 value must equal the value of the remote DCE or DTE.
T20	VALUE	1–255	T20 (restart request timer) determines the sending of requests to restart level 3. The default is 180.
T21	VALUE	1–255	T21 (call restart response timer) times the remote response to a call request packet. This activity pertains to establishing an SVC. The default is 200.
T22	VALUE	1–255	T22 (reset request timer) times the remote response to a request to reset a particular channel. The request is re-sent if R22 allows.
T23	VALUE	1–255	T23 (clear request response timer) times the remote response to a request to clear a virtual call. This activity pertains to SVCs. The default is 180.

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
T25	VALUE	0–255	T25 (packet acknowledgment timer) specifies the maximum time for the remote to acknowledge receiving a level 3 packet. A value of 0 means an indefinite wait. The default is 0.
T26	VALUE	1–255	T26 (interrupt response timer) times the remote response if an interrupt packet is transmitted at level 3.
T2_S	VALUE	0–255	T2_S specifies the value of timer 2 in seconds. See the note for T2_10MS.
T2_10MS	VALUE	0, or 5–255	T2_10MS specifies the value of timer 2 in 10-ms increments. ***Note:*** Either timer T2_S or timer T2_10MS can be datafilled, but not both. If neither is datafilled, the default value is 3 seconds. Timer 2 is a guideline for sending an acknowledgment for data received. Its real value must be less than the value of T1.
T3_S	VALUE	1–255	T3_S specifies the value of timer 3 in seconds. See the note for T3_10MS.
T3_10MS	VALUE	5–255	T3_10MS specifies the value of timer 3 in 10-ms increments. ***Note:*** Either timer T3_S or timer T3_10MS can be datafilled, but not both. If neither is datafilled, the default value for timer 3 is 25 seconds. Timer 3 is the idle channel timer that determines when the link is logically disconnected after the idle channel state is detected. The idle channel state is entered when one end detects that no I-frames or flags are incoming on a channel from the remote device. The idle channel timer value must be greater than the inactive link timer value (T4) and greater than the timer values for timers T1 and T2.
T4_S	VALUE	1–255	T4_S specifies the value of timer 4 in seconds. See the note for T4_10MS.

—continued—

Table 5-4
Conditional datafill for table MPCLINK for subfield PARM (continued)

PARM	Refinement	Entry	Explanation and action
T4_10MS	VALUE	5–255	T4_10MS specifies the value of timer 4 in 10-ms increments. ***Note:*** Either timer T4_S or timer T4_10MS can be datafilled, but not both. If neither is datafilled, the default value for timer 4 is 10 seconds. Timer 4 is the inactive link timer used to time the periodic transmission of a frame to check remote responsiveness when there is no higher level of activity on the link. The inactive link timer value must always be less than the idle channel timer value (T3) and greater than the value for timer T1.
THRUPUT	RATE	NOVALUE, T75, T150, T300, T600, T1200, T2400, T4800, T9600, T19200, T48000	THRUPUT (throughput class) specifies the throughput class across the link for outgoing data. Enter NOVALUE to accept the throughput class transmission rate datafilled in refinement RATE. To select a throughput class other than the default value, enter one of the throughput values (T75 to T48000).
Note: When you finish entering the parameters in subfield PARM, remember to datafill field EXINF (described in Table 5-3).			
—end—			

The following is an example of datafill for table MPCLINK.

```
INDEX MPCNO LINKNO LINKNABL CONVNABL PARMS EXTRAINF
_____________________________________________________
2  3
X2584 55 55 (SVCS2WAY 16) (L3DATA P128) (NODETYPE DTE)
(ELECSPEC V35) (CLKSRCE EXTERNAL) (L2WINDOW 7) (L3WINDOW
7) $ (SVCDNA $) $

3  3
X2584 55 55 (SVCS2WAY 16) (L3DATA P128) (NODETYPE DTE)
(ELECSPEC V35) (CLKSRCE EXTERNAL) (L2WINDOW 7) (L3WINDOW
7) $ (SVCDNA $) $
```

Setting up an AFT session

Setting up an automatic file transfer (AFT) session for AFT or AFT-MNP requires datafill to

- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- configure the device independent recording package (DIRP) system (tables DIRPPOOL and DIRPSSYS)
- identify the network connection and map the file transfer session to an EMPC card and link (table RASLAPPL)
- specify the type of transfer and configure the subsystems to use for file transfer (table GASINFO)

This chapter gives the datafill for tables DIRPPOOL, DIRPSSYS, RASLAPPL, and GASINFO. Before datafilling these tables, datafill tables MPC and MPCLINK. Chapter 5, “Configuring the EMPC,” describes their datafill.

This chapter includes the datafill and examples for both AFT and AFT-MNP. The datafill is the same for both features except where noted.

After the required tables are datafilled, executing CI commands at the AFT level begins the AFT session. This chapter briefly discusses the commands to initiate an AFT file transfer session. Chapter 12, “Commands,” gives more details about the commands referenced in this chapter.

You can datafill a maximum of three AFT or AFT-MNP sessions.

Datafill sequence

To set up an AFT session, datafill these tables in the order shown:

1 MPC

2 MPCLINK

3 DIRPPOOL

4 DIRPSSYS

5 RASLAPPL

6 GASINFO

Datafilling table DIRPPOOL

Table DIRPPOOL (Device Independent Recording Package Pool) assigns a pool number, pool name, and device type to a group of volumes to be mounted to a DIRP subsystem. Table DIRPSSYS uses the pool name to specify which pool of volumes a particular subsystem uses. A pool can be referenced by more than one subsystem.

Table DIRPPOOL can contain up to 16 pools, and each pool can contain up to 8 recording volumes. Table 6-1 describes the fields in table DIRPPOOL.

Table 6-1
Table DIRPPOOL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
POOLNO		0–31	*Pool number*. Enter a value to represent the index number for the recording pool. Select POOLNO when creating individual pools.
POOLNAME		1–8 alphanumeric characters	*Pool name*. Enter up to eight alphanumeric characters to define the pool name. Table DIRPSSYS uses this name to index into table DIRPPOOL.
POOLTYPE		Regular, Parallel	*Pool type*. Enter the type of volume that the pool contains.
DEVTYPE		TAPE, TAPEX, DISK	*Device type*. Enter either TAPE, TAPEX, or DISK to specify the device type for the pool.
VOLUME0–7		alphanumeric, $	*Volumes 0–7*. Specify the volumes assigned within the pools (for example, T0, T1 for tape or D000VOL1, D000AMA1 for disk). Do not mix TAPE and DISK or TAPEX and DISK in one pool. Enter $ if no volume is to be entered.

Restrictions for datafilling table DIRPPOOL

These restrictions apply when datafilling table DIRPPOOL.

- Volumes can be changed only from a volume name to nil ($) or from nil to a volume name. To change a volume name, change the original name to nil. After the system generates a DIRP 1001 log report to confirm the change, change the nil entry to the new volume name.
- When a request is made to change a volume to nil ($), DIRP closes as many files as possible on that volume. The request remains pending until this process is completed. The system changes the volume nil only when there are no open DIRP files left on it.
- The device type can be changed if there are no volumes in the pool.
- A tuple in this table can be deleted only if all volumes are assigned as nil ($) and no subsystem references this pool from table DIRPSSYS.
- When a tuple is added or changed, DIRP confirms that the volumes assigned are valid and available.
- A particular volume can be assigned only once in all pools.
- A volume assigned to a pool cannot be assigned elsewhere as a parallel volume (see table DIRPSSYS), and vice versa.
- When more than one volume is assigned to a particular subsystem, arrange them in the table in a pattern of alternating IOC control.
- A volume cannot be deleted from a pool while files on it are being transmitted via the remote data polling feature.
- If a volume is deleted from a pool, all entries for files on the volume are deleted from table DIRPHOLD. Operating company personnel are responsible for transferring and processing these files.
- The pool name can be changed at any time.

The following is an example of datafill for table DIRPPOOL:

```
POOLNO POOLNAME POOLTYPE  DEVTYPE   VOLUME0   VOLUME1
 VOLUME2  VOLUME3  VOLUME4  VOLUME5  VOLUME6  VOLUME7
_____________________________________________________
     0  AMAPOOL  REGULAR     TAPE          $         $
       $         $        $        $       $         $
     1  OCCPOOL  REGULAR    DISK    D000AFT1  D000AFT2
D000AFT3  D000AFT4        $        $       $         $
```

Datafilling table DIRPSSYS

Table DIRPSSYS (Device Independent Recording Package Subsystem) configures each subsystem that will use DIRP to record the files that AFT transfers. Table DIRPSSYS can contain up to 24 subsystems.

The fields in this table describe functions that DIRP can perform. The datafill for a specific field determines how DIRP implements that function for the corresponding subsystem.

Table DIRPSSYS uses the pool name to index into table DIRPPOOL, the table that assigns DIRP volumes to pools. Table 6-2 describes the fields in table DIRPSSYS.

Table 6-2
Table DIRPSSYS field descriptions

Field	Subfield or refinement	Entry	Explanation and action
SSYSNAME		alphanumeric	*Subsystem name*. Enter a valid subsystem name to define the subsystem that indexes into table DIRPSSYS (for example, AMA, OM, JF, OCC, SMDR).
READRITE		Y or N	*Read after write*. Enter Y to specify data is to be read after it is written to device types TAPE or DISK (not TAPEX). Setting the value to Y ensures that the information was correctly received by the device before proceeding to the next I/O operation. Enter N if read after write is not needed.
NUMFILES		1–4	*Number of files*. Specifies how many subsystem files are open at any given time. If the value is greater than one, then one of the files serves as the available file, while the other files serve as the standby files. In an emergency, standby files enable a switch of recording duty to a standby device if the available file fails. To ensure correct file assignments across the IOC, do not enter a value of 3. If NUMFILES is assigned a value greater than one, at least one alarm level must be specified.

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
MINFILES		0–3	*Minimum number of files*. Specifies the minimum number of files that must be open at all times. The value must be at least one less than the value of NUMFILES. The system prevents the user from manually closing down the files of a contributing subsystem unless the number of files available for recording data is at least the value entered here.
POOLNAME		1–8 alphanumeric characters	*Pool name*. Defines the name of the collection, or pool, of volumes available to a contributing subsystem. Since this field indexes into DIRPPOOL, the entry here must be a valid pool name and must correspond to an entry in table DIRPPOOL. POOLNAME cannot be changed if there are any files open for the subsystem. ***Note:*** Only one subsystem can use a given pool name.
FILENAME		1–17 alphanumeric characters, $	*File name*. Enter a valid file name or $. If $ is entered, the system generates a file name that includes file status, a time stamp, file sequence, and a contributing subsystem name. If any of the allowed 17 characters are entered, FILENAME is set to device type TAPE or TAPEX. Disks ignore these 17 characters and always generate a system file name. If special characters are used, (such as a period), single quotes may be required to enclose them (‘’). The system file name is unique and is useful in managing files after DIRP has finished with them. It is recommended that $ always be entered for the JF subsystem to provide chronological ordering information so that a load can be reconstructed from multiple JF files.

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
ALARM0–3		CR, MJ, MN, NA	*File alarms 0 to 3*. These fields (ALARM0–ALARM3) control the alarm levels raised when the specified number of files associated with each field either do not exist or are not open for recording. The fields perform these functions: • ALARM0—Sets the alarm level when no files are open. • ALARM1—Sets the alarm level when one file is open. • ALARM2—Sets the alarm level when two files are open. • ALARM3—Sets the alarm level when three files are open. Enter one of these values in each alarm field: • CR—Critical • MJ—Major • MN—Minor • NA—No Alarm The specified severity of an alarm can be the same in one field as the field next to it; however, it cannot increase in severity as more files become open. For example, ALARM1 and ALARM2 can both be minor alarms, but ALARM2 cannot be major while ALARM1 is minor.

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
RETPD		1–499	*Retention period in days*. Specifies the retention period in days. This field enforces tape file security. If an attempt is made to erase a file before the expiration date, the system prompts the user. This warning prevents the user from accidentally destroying data. Once the expiration date passes, the file can be erased without special security prompts. This field applies to disk and tape files recorded directly by the DIRP utility. It does not apply to tape files that are copied. For files recorded to disk, this field determines whether the DIRP utility can reclaim the disk space for recording. For files recorded to magnetic tape, this field determines whether the file can be manually erased. This can affect downstream processing. The system erases a file on disk only if the file name begins with P, and then it erases the oldest file on the volume first.
CRETPD		1–499	*Retention period in days for copied-to files*. Specifies the retention period in days for copied-to files. The default value is the value entered in the RETPD field.
PARLPOOL		1–8 alphanumeric characters	*Parallel pool*. Enter a valid pool name from table DIRPPOOL to define the parallel pool.
PARCONC		Y or N	*Parallel concurrent*. Enter Y to activate concurrent parallel recording, if PARVOL is defined. (A subsystem must be datafilled before changing PARCONC from N to Y.) If no errors are discovered, then no new message is displayed. If an error is displayed, table control displays an appropriate message.

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
MANDPALM		NA, MN, MJ, CR	*Mandatory parallel alarm*. Once the MANDPALM field is set to a particular alarm level, Nortel technical support is needed to change to a less severe alarm level.
FILEDATE		OPENED, FIRSTACT, LASTACT, CLOSED	*File date*. This field allows the system to automatically redate the file. This facility applies only to disk because tape names cannot be renamed safely. Enter one of these values: • OPENED—Places the file name date/time stamp on the file when the file is first opened. • FIRSTACT—Places the date/time stamp on the file the first time the file becomes active. • LASTACT—Updates the file name each time the file becomes active. • CLOSED—Updates the file name when the file is closed.
Scheduled Rotation		see subfields	*Scheduled rotation*. Subfields SHEDDAYS, SHEDBASE, and SHEDINCR control the scheduled rotation, which rotates the recording duty from an active file to the first standby. Scheduled rotation stops recording in one file and starts recording in another file at a specified time. By this process, data recording duties are interchanged. Field ROTACLOS specifies whether to close the previously active file.
	SHEDDAYS	Seven Y or N	*Scheduled rotation days*. Specifies the days of the week for rotations. Enter Y or N for each day of the week (Monday through Sunday).

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
	SHEDBASE	0–23	*Scheduled rotation base*. Specifies the hour the first rotation occurs. More than one rotation can be scheduled per day; see the SCHEDINCR subfield described next.
	SHEDINCR	X1, X2, X3, X4, X6, X8, X12, X24, NOROTATE	*Scheduled rotation increments*. Specifies the number of hours between scheduled rotations, using the first rotation as a base. For example, to schedule rotations at 8:00 a.m. and 8:00 p.m., set SHEDBASE to 8 and SHEDINCR to X12. If no rotation is scheduled, enter NOROTATE in this field.
ROTACLOS		BOTH	*Rotate close*. This field closes the file automatically after a scheduled or manual rotation. Enter BOTH for AFT. This value specifies that the files are to be closed, if possible, after both manual and scheduled rotations.
AUTOXFER		FULL	*Automatic transfer*. Controls whether closed unprocessed files are listed in the DIRP directory table DIRPHOLD. Remote data polling and the DIRPAUTO utility both use this directory of closed files. Enter FULL for AFT. This value enables downstream users to interface the DMS by way of remote data polling to close active/standby files. The files are then identified in table DIRPHOLD. This indicates there are DIRPAUTO and XFER functions, and XFER can rotate and close files.
SPACROTE		Y or N	*Space rotate*. Enter Y or N to indicate whether the space rotation feature is used in the DIRP utility. If set to Y, files cannot be erased before the date set in the RETPD field. If set to N, the DIRP utility erases an unexpired file to reclaim the disk space for recording.

—continued—

Table 6-2
Table DIRPSSYS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
MAXDFSIZ		5–64	*Maximum disk file size*. Specifies the maximum size for the DIRP utility disk files in megabytes. This value corresponds to the maximum size the DIRP utility allows for files in the subsystem defined in that tuple.
PRIORTIO		Y or N	*Priority I/O file*. Enter Y or N to indicate whether files associated with this subsystem are high priority. Value Y specifies that files are high priority and have recording priority over other subsystems when writing to and from the I/O devices. Nortel recommends setting this field to Y for billing. For more information on maximum billing capacity, see Appendix C, “Maximum billing capacity.”
Note: Prior to adding a tuple to this table, the subsystem to which the tuple pertains to must identify itself to DIRP (bound in) .			
—end—			

Additional information about table DIRPSSYS:

- Adding a tuple may require a system warm-start.
- When a tuple is added, DIRP attempts to open up to a total of the vaule entered in field NUMFILES.
- Deleting tuples requires assistance from Nortel technical support.
- Deleting a tuple removes the ability of the subsystem to record.
- A tuple can be deleted only if there are no files open for that subsystem and PARVOL is assigned as $.
- If a tuple is deleted or the pool name is changed, all entries for files from that subsystem are deleted from table DIRPHOLD.
- For more information on billing capacity, see Appendix C, “Maximum billing capacity.”

The following is an example of datafill for table DIRPSSYS.

```
SSYSNAME READRITE NUMFILES MINFILES POOLNAME FILENAME
ALARM0 ALARM1 ALARM2 ALARM3 RETPD CRETPD PARLPOOL PARCONC
FILEDATE SHEDDAYS SHEDBASE SHEDINCR ROTACLOS AUTOXFER
SPACROTE MAXDFSIZE PRIORTIO
_____________________________________________________________

   AMA         Y          2         1  AMAPOOL         $
  CR      MJ    NA      NA     30    30           $      NO
 OPENED  NNNNNNN         0  NOROTATE    BOTH      FULL
      N        64          Y

   OCC         Y          2         1  OCCPOOL         $
  CR      MJ    NA      NA     30    30           $      NO
 OPENED  NNNNNNN         0  NOROTATE    BOTH      FULL
      N        64          Y
```

Datafilling table RASLAPPL

Table RASLAPPL (Robust Application Session Layer Application) maps sessions to links by assigning each session type to a network connection (field NETCONN). This network connection is then assigned to a link access type (field ACSINFO).

The ACSINFO field acts as a selector. That is, the remainder of the datafill depends on the chosen link access type. Because the link access type for an AFT session is always MPCSVC, this document includes only those fields that appear when field ACSINFO is datafilled with a value of MPCSVC.

Table 6-3 describes the fields in table RASLAPPL.

Table 6-3
Table RASLAPPL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the identifier for the network connection.
APTYPE		AFT, MNP	*Application type*. To set up an AFT session, enter AFT. To set up an AFT-MNP session, enter MNP. ***Note:*** You can datafill a maximum of three AFT sessions.
BUFFSIZE		2–4096	*Buffer size*. Enter the maximum number of bytes expected in a message received from the far end. Typically for AFT, BUFFSIZE=256.
NUMBUFFS		1–128	*Number of buffers*. Enter the number of buffers allocated. The value should be larger for higher traffic applications.
ACSINFO		MPCSVC	*Access selector*. Enter MPCSVC.
MPCNO		0–255	*Multi-protocol controller number*. Enter the number that corresponds to table MPC.
LINKNO		0–3	*Multi-protocol controller link number*. Enter the link number from table MPCLINK.
DNA		0–9 up to 15 digits	*Data network address*. For outgoing applications, enter the adderess of the remote node to which the connection is being made. For incoming applications, enter the only node address from which a request to establish a connection is accepted.
USERDATA		0–F up to 32 hex digits	*User data*. Enter user data.

The following is an example of datafill for table RASLAPPL for an AFT session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS        ACSINFO
_____________________________________________________
  AFT1    AFT     256         4  MPCSVC 2 3 $ $
```

The following is an example of datafill for table RASLAPPL for an AFT-MNP session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS        ACSINFO
_____________________________________________________
  MNP1    MNP     256         4  MPCSVC 2 3 $ $
  MNP2    MNP     256         4  MPCSVC 3 3 $ $
```

Datafilling table GASINFO

Table GASINFO (Generic Application Session Information) defines the network connections. This table uses the network connections defined in table RASLAPPL to make the session connection. The other fields in table GASINFO determine the DIRP subsystem that creates the files AFT transfers, the remote file name, window size, the SST node instance, and the node type.

The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the chosen transfer session type. Because the transfer type for an AFT session is always AFT, this document includes only those fields that appear when field TRANTYPE is datafilled with a value of AFT.

Table 6-4 describes the fields in table GASINFO.

Table 6-4
Table GASINFO field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the network connection name datafilled in table RASLAPPL.
	TRANTYPE	AFT	*Transfer type*. To set up an automatic file transfer session, enter AFT.
	SSYS	AMA, OCC, JF, OM	*Subsystem*. Enter the DIRP subsystem to use for the automatic file transfers. The subsystem must be defined in table DIRPSSYS.
	FILENAME	1–12 alphanumeric characters, $	*Filename*. Enter the filename to use in the MTP message. To imbed the DIRP file name in the ACS-SFO message, enter $.
	WINDOW	1–8	*Window*. Enter the window size for file transfers.
	RETRY	0–99	*Retry*. Enter the number of times that AFT should try to resend the file.
NODETYPE		EIOC_MP, CP_CORE, CFP, EIOC_FP, FOREIGN	*Node type*. Enter the DAIS node type of the machine where SST resides. ***Note:*** Office parameter NODE in table OFCENG contains the node type and node instance.
NODEINST		0–99	*Node instance*. Enter the DAIS node instance of the machine on which SST resides.

The following is an example of datafill for table GASINFO for an AFT session.

```
GASKEY                              SPECS
_____________________________________________________________________
AFT     AFT AMA $   4   3   FOREIGN 0
```

The following is an example of datafill for table GASINFO for an AFT-MNP session.

```
GASKEY                              SPECS
_____________________________________________________________________
MNP1    AFT AMA $   4   3   FOREIGN 0
```

Office parameter for tape archive option

The office parameter AFT_REMOVE_COPY_TO_TAPE in table OFCVAR controls the tape archive option. This option allows you to choose whether to archive successfully transferred files to tape. For more information on this option, see Chapter 2, “Automatic file transfer.”

If you want all files to be archived to tape prior to automatic deletion from DIRP, set AFT_REMOVE_COPY_TO_TAPE to no (N). With this setting, AFT waits to change the status of successfully transferred files to “processed” until you manually archive the files. DIRP does not automatically delete files with an “unprocessed” status. This means you may need to archive files to tape to free disk space for use by DIRP.

If you want non-OCC files automatically deleted after they have successfully transferred, set AFT_REMOVE_COPY_TO_TAPE to yes (Y). (Non-OCC files are non-billing files; for example, DLOG, JM, and OM files.) AFT marks these files as “processed” in table DIRPHOLD. These files are automatically deleted as disk space is needed. You must still copy to

tape OCC subsystem files (the billing files captured under the CDR stream) after their successful transfer before AFT will mark them as processed.

The following settings in table DIRPSSYS apply to the tape archive option:

- Set the field AUTOXFER to FULL; this places the file in table DIRPHOLD.
- Set ROTACLOS to BOTH; DIRP closes a subsystem's available file after each rotation.
- The RETPD field applies to disk and tape files that the DIRP utility records. It does not apply to tape files that are copied manually by the user.
  - — For files recorded to disk, the RETPD field determines whetheher the DIRP utility can reclaim the space for recording. If the SPACROTE field is set to Y, files cannot be erased before the expiration date set in the RETPD field. If SPACROTE is set to N, the DIRP utility erases an unexpired file to reclaim the space for recording.
  - — For files recorded automatically to magnetic tape by DIRP, the RETPD field determines whether the file can be manually erased. This can affect downstream processing.

CI commands to start an AFT or AFT-MNP session

After datafilling the required tables, execute the following CI commands to begin transferring files.

AFT

The CI commands specific to AFT are in the AFT CI directory. Enter "AFT" from any MAP level to enter the AFT level that enables you to enter the AFT CI commands.

STARTAFT <session>

The STARTAFT command starts the transfer of files in the AFT system. The parameter <session> specifies the name of an AFT session defined in table GASINFO. When this command is executed, a one-minute timer is started. You can enter the QUERYAFT command to verify that the correct file is going to be transferred. When the timer expires, AFT begins transferring files. If there is an override file in the AFT system, AFT transfers that file. Otherwise, AFT transfers the next file.

Example:

STARTAFT aft1

Setting up an MFT session

Setting up a manual file transfer (MFT) session requires datafill to

- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- identify the network connection and map the MFT session to an EMPC card and link (table RASLAPPL)
- specify the device to hold the transferring file and set the window size (table GASINFO)

This chapter gives the datafill for tables RASLAPPL and GASINFO. Before datafilling these two tables, datafill tables MPC and MPCLINK. Chapter 5, “Configuring the EMPC,” describes their datafill.

After the required tables are datafilled, executing CI commands at the GAS level enables an operator to manually transfer files. This chapter briefly discusses the commands to transfer files. Chapter 12, “Commands,” gives more details about the commands referenced in this chapter.

For each switch, you can datafill a maximum of one of each session type.

Datafill sequence

To set up an MFT session, datafill these tables in the order shown:

- MPC
- MPCLINK
- RASLAPPL
- GASINFO

Datafilling table RASLAPPL

Table RASLAPPL (Robust Application Session Layer Application) maps sessions to links by assigning each session type to a network connection

(field NETCONN). This network connection is then assigned to a link access type (field ACSINFO).

The ACSINFO field acts as a selector. That is, the remainder of the datafill depends on the link access type chosen. Because the link access type for an MFT session is always MPCSVC, this document includes only those fields that appear when field ACSINFO is datafilled with a value of MPCSVC.

Table 7-1 describes the fields in table RASLAPPL.

Table 7-1
Table RASLAPPL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the identifier for the network connection.
APTYPE		DMSSFI, DMSSFO, NEMSFI, NEMSFO	*Application type*. To set up an MFT session, enter the desired session type: • DMSSFI—The switch requests a file from the host. • DMSSFO—The switch sends a file to the host. • NEMSFI—The host requests a file from the switch. • NEMSFO—The host sends a file to the switch.
BUFFSIZE		2–4096	*Buffer size*. Enter the maximum number of bytes expected in a message received from the far end. Typically, for NEMSFI and DMSSFO, BUFFSIZE=256. Typically for NEMSFO and DMSSFI, BUFFSIZE=2048.
NUMBUFFS		1–128	*Number of buffers*. Enter the number of buffers allocated. The value should be larger for higher traffic applications.
ACSINFO		MPCSVC	*Access selector*. Enter MPCSVC.
MPCNO		0–255	*Multi-protocol controller number*. Enter the number that corresponds to table MPC.

—continued—

Table 7-1
Table RASLAPPL field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
LINKNO		0–3	*Multi-protocol controller link number*. Enter the link number from table MPCLINK.
DNA		0–9 up to 15 digits	*Data network address*. For outgoing applications, enter the remote node address to which the connection is being made. For incoming applications, enter the only node address from which a request to establish a connection is accepted.
USERDATA		0–F up to 32 hex digits	*User data*. Enter user data.
		—end—	

The following is an example of datafill for table RASLAPPL for MFT sessions.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS        ACSINFO
_____________________________________________________
DMSSFO DMSSFO      256         4  MPCSVC 2 3 $ $
DMSSFI DMSSFI     2048         4  MPCSVC 3 3 $ $
NEMSFO NEMSFO     2048         4  MPCSVC 2 3 $ $
NEMSFI NEMSFI      256         4  MPCSVC 3 3 $ $
```

Datafilling table GASINFO

Table GASINFO (Generic Application Session Information) defines the network connections. This table uses the network connections defined in table RASLAPPL to make the session connection. Table GASINFO also specifies the device that holds the transferring file.

The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the transfer session type chosen. Because the transfer type for an MFT session is always MFT, this document includes only those fields that appear when field TRANTYPE is datafilled with a value of MFT.

Table 7-2 describes the fields in table GASINFO.

Table 7-2
Table GASINFO field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the network connection name datafilled in table RASLAPPL.
TRANTYPE		MFT	*Transfer type*. To set up a manual file transfer session, enter MFT.
DEVNAME		SFDEV or 1–16 alphanumeric characters	*Device name*. Enter the name of the device to hold the transferring file. A DMS disk volume name, or SFDEV, can be used as the file transfer spooler.
WINDOW		1–4	*Window size*. Enter the window size for file transfers.

The following is an example of datafill for table GASINFO for MFT sessions.

```
GASKEY                                SPECS
_____________________________________________________________________
DMSSFO  MFT                  SFDEV    2
DMSSFI  MFT                  SFDEV    2
NEMSFO  MFT          S00DINFILES      2
NEMSFI  MFT          S00DOUTFILES     2
```

CI commands to manually transfer a file

After you datafill the required tables, CI commands enable you to manually transfer a file.

GAS

The CI commands specific to MFT are in the GAS CI directory. Type "GAS" from any MAP level to execute GAS CI commands.

STARTAPPL

The STARTAPPL command starts the specified application—transfer or receive—for a session initiated by the switch.

Execute the STARTAPPL XFER command to send a file from the switch to the host (DMSSFO session).

STARTAPPL XFER fname fefile BLOCK

Example:

STARTAPPL XFER MPCLINK$DMO MPCLINK$DMO BLOCK

Execute the STARTAPPL RECV command for the switch to receive a file sent by the host (DMSSFI session).

STARTAPPL RECV fefile fname BLOCK

Example:

STARTAPPL RECV U9404011357110CC U9404011357110CC BLOCK

Setting up an SPR OUTLOG session

The spontaneous reporting (SPR) OUTLOG session enables the transfer of logs from the switch to a host. Setting up an OUTLOG session requires datafill to

- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- identify the network connection and map the OUTLOG session to an EMPC card and link (table RASLAPPL)
- establish the type of transfer, activate the session, and specify the SPR function code (table GASINFO)

Before you begin to set up the OUTLOG sessions, configure the log system. Configuring the log system requires datafill to

- assign log reports to classes (tables LOGCLASS)
- designate an output device where specified classes are sent (table LOGDEV)

This chapter gives the datafill for tables LOGCLASS and LOGDEV. Refer to the *UCS DMS-250 Logs Reference Manual* and the *UCS DMS-250 Data Schema Reference Manual* for more help on configuring the log system.

This chapter also gives the datafill for tables RASLAPPL and GASINFO. Before datafilling these two tables, datafill tables MPC and MPCLINK. Chapter 5, “Configuring the EMPC,” describes their datafill.

You can datafill a maximum of three OUTLOG sessions.

After the required tables are datafilled, executing the CI command STARTDEV begins the flow of logs across the data link to the specified session. This chapter briefly discusses the STARTDEV command. Chapter 12, “Commands,” gives more details about the commands referenced in this chapter.

Datafill sequence

To set up an SPR OUTLOG session, datafill these tables in the order shown:

- LOGCLASS
- LOGDEV
- MPC
- MPCLINK
- RASLAPPL
- GASINFO

Datafilling table LOGCLASS

Table LOGCLASS (Log Class) assigns a log report to a class. This table also specifies for each log report

- the print threshold
- the time when the threshold register is reset to zero
- whether printing is enabled or disabled printing

Table 8-1 describes the fields in table LOGCLASS.

Table 8-1
Table LOGCLASS field descriptions

Field	Subfield or refinement	Entry	Explanation and action
REPNAME		see subfields	*Report name*. This field consists of subfields LOGNAME and REPNUM.
	LOGNAME	alphabetic	*Log name*. Enter the log name. For a list of log names, see the *Logs Reference Manual*.
	REPNUM	000–999 or -1	*Report number*. Enter the report number. To specify all report numbers, enter -1.
THRESHOLD		0–255	*Threshold*. Enter a value to specify the threshold for printing this log. A threshold of zero indicates this log is printed every time it occurs. For values from 1–255, the office parameter THRESHOLD_IS_SAMPLING in table OFCVAR controls the action for log thresholding.

—continued—

Table 8-1
Table LOGCLASS field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
SUPPRESS		Y or N	*Suppress*. Enter Y to suppress report output. Otherwise, enter N.
TUNITS		0–32767	*Time units*. Enter the time in minutes when the register counts associated with a threshold report is to be reset to zero. Enter zero if no reset is required.
		—end—	

The following is an example of datafill for table LOGCLASS for SPR sessions.

```
LOGNAME  REPNUM   THRESHOLD   SUPPRESS        TUNITS
_____________________________________________________
SYNC     203      0           N               0
```

Datafilling table LOGDEV

Table LOGDEV (Log Device) specifies the log classes that can be sent to each output device. For SPRs, that output device is OUTLOG.

Table 8-2 describes the fields in table LOGDEV.

Table 8-2
Table LOGDEV field descriptions

Field	Subfield or refinement	Entry	Explanation and action
DEV		alphanumeric	*Device*. Enter the name assigned in table TERMDEV to the terminal device.
ALT		alphanumeric or NONE	*Alternate*. Enter the name assigned in table TERMDEV to the terminal device to which logs are sent when the main terminal device is not operational. If no alternate device is required, enter NONE.
STMARK		(or blank	*Startmark*. If entry is the first record for the terminal device, enter ((open bracket). Otherwise, leave blank.
CLASSES		0–31	*Classes*. Enter the class numbers assigned to the terminal device.
CONTMARK		) or +	*Continuation mark*. Enter) (close bracket) if entry is the last record for the terminal device. Otherwise, enter + to indicate that additional classes for the terminal device are defined in the next entry.
FORMAT		STD	*Format*. Enter STD (standard).
PRIORITY		Y or N	*Critical message prioritization*. Enter Y to prioritize reports by alarm level. Enter N to output reports in chronological order without regard to alarm level.
GUAR		Y or N	*Guaranteed device*. Enter Y to specify that the device continues to run despite the call processing or maintenance load. Enter N if the device is not guaranteed. The default value is N.

The following is an example of datafill for table LOGDEV for SPR sessions.

```
DEV      ALT      STMARK   CLASSES CONTMARK     FORMAT
PRIORITY     GUAR
_____________________________________________________________
OUTLOG   NONE     0        0       )           STD
N            N
```

Datafilling table RASLAPPL

Table RASLAPPL (Robust Application Session Layer Application) maps OUTLOG sessions to links by assigning each session (field APTYPE) to a network connection (field NETCONN). This network connection is then assigned a link access type (field ACSINFO).

The ACSINFO field acts as a selector. That is, the remainder of the datafill depends on the link access type chosen. Because the link access type for an SPR OUTLOG session is always MPCSVC, this document includes only those fields that appear when field ACSINFO is datafilled with a value of MPCSVC.

Table 8-3 describes the fields in table RASLAPPL.

Table 8-3
Table RASLAPPL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the identifier for the network connection.
APTYPE		OUTLOG	*Application type*. To set up a session to send logs from the switch to the host, enter OUTLOG. ***Note:*** You can datafill a maximum of three OUTLOG sessions.

—continued—

Table 8-3
Table RASLAPPL field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
BUFFSIZE		2–4096	*Buffer size*. Enter the maximum number of bytes expected in a message received from the far end. Typically for OUTLOG, BUFFSIZE=256.
NUMBUFFS		1–128	*Number of buffers*. Enter the number of buffers allocated. The value should be larger for higher traffic applications.
ACSINFO		MPCSVC	*Access selector*. Enter MPCSVC.
MPCNO		0–255	*Multi-protocol controller number*. Enter the number that corresponds to table MPC.
LINKNO		0–3	*Multi-protocol controller link number*. Enter the link number from table MPCLINK.
DNA		0–9 up to 15 digits	*Data network address*. Enter the remote node address to which the connection is being made.
USERDATA		0–F up to 32 hex digits	*User data*. Enter user data.
		—end—	

The following is an example of datafill for table RASLAPPL for an SPR OUTLOG session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS        ACSINFO
_____________________________________________________
  LOGS OUTLOG     2048        4  MPCSVC 2 3 $ $
```

Datafilling table GASINFO

Table GASINFO (Generic Application Session Information) defines the network connections. This table uses the network connections defined in

table RASLAPPL to make the session connection. Table GASINFO also specifies the SPR function code for each OUTLOG session.

The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the datafill in this field. Because the transfer type for an OUTLOG session is always LOG, this document includes only those fields that appear when field TRANTYPE is datafilled with a value of LOG.

Subfield MOREFLDS also acts as a selector. For an OUTLOG session, the value of MOREFLDS is always FUNC. Therefore, this document includes only those fields that appear when the value of MOREFLDS is FUNC.

Table 8-4 describes the fields in table GASINFO.

Table 8-4
Table GASINFO field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the network connection name datafilled in table RASLAPPL.
TRANTYPE		LOG	*Transfer type*. To set up an OUTLOG session to transfer logs, enter LOG. ***Note:*** You can datafill a maximum of three OUTLOG sessions.
ACTIVE		Y or N	*Activate session*. Enter Y to activate the session. Enter N to deactivate the session. This field must be Y to begin a session.
LOG_MORE		see subfields	*Log more*. This field consists of subfields MOREFLDS and FUNCODE.
	MOREFLDS	FUNC	*Selector field*. Enter FUNC for an OUTLOG session.
	FUNCODE	1–255	*Function code*. Enter the SPR function code for the OUTLOG session.

The following is an example of datafill for table GASINFO for an SPR OUTLOG session.

```
GASKEY                          SPECS
_____________________________________________________________________
LOGS     LOG    Y    FUNC     255
```

CI commands to start an SPR OUTLOG session

After you datafill the required tables, the CI command STARTDEV starts the SPR OUTLOG session. Once an SPR session is started, it runs until it is stopped by the command RASLCLOSE or by a protocol error. If an error occurs, the switch attempts indefinitely to restart the session.

STARTDEV

Execute the STARTDEV command to turn on the flow of logs to the SPR OUTLOG session. The NetConn parameter specifies a network connection defined in table RASLAPPL.

STARTDEV netconn

Example:

STARTDEV logs

Setting up a SINS session

SINS (Short INterval Statistics) enables trunk group operational measurements (OM) to be transferred from the switch to a host. SINS is typically configured for a five-minute OM history class. Setting up a SINS session requires datafill to

- enable data accumulation for the OM class that was defined using the OMCLASS command (table OMACC)
- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- identify the network connection and map the SINS session to an EMPC card and link (table RASLAPPL)
- define the parameters for transferring data from an accumulating or holding register to an output device (table OMPRT)
- establish the type of transfer and activate the session (table GASINFO)

This chapter gives the datafill for tables OMACC, RASLAPPL, OMPRT, and GASINFO. Chapter 5, “Configuring the EMPC,” gives the datafill for two other tables required for a SINS session—tables MPC and MPCLINK. Be sure to follow the correct sequence for datafilling the tables.

In addition to datafilling the required tables, setting up a SINS session requires executing CI commands. The section “Configuring a SINS session” within this chapter describes how to set up a SINS session. Chapter 12, “Commands,” gives more details about the commands referenced in this chapter.

You can datafill a maximum of one SINS session.

Datafill sequence

This section shows the order in which the required tables must be datafilled. However, because setting up a SINS session also requires executing CI commands, you should refer to the section “Configuring a SINS session” for complete details on datafill and command sequences.

- OMACC
- MPC
- MPCLINK
- RASLAPPL
- OMPRT
- GASINFO

Datafilling table OMACC

Table OMACC (Operational Measurements Accumulator) shows the time period during which the accumulating registers collect data for a specific accumulating class of OMs.

The command OMCLASS defines the OM class to be used for SINS. When the OMCLASS command is executed, the system datafills the CLASS field in table OMACC. Additionally, the system datafills subfield REP and its refinements—SNAPSHOTS and XFER.

To set up a SINS session, the field ENABLED is the only field that requires datafill by the operator.

The REP field acts as a selector. That is, the remainder of the datafill depends on the value datafilled in the REP field. Because the value of REP for a SINS session is always HISTORY, this document includes only those fields that appear when field REP is datafilled with the value HISTORY.

Table 9-1 describes the fields in table OMACC.

Table 9-1
Table OMACC field descriptions

Field	Subfield or refinement	Entry	Explanation and action
CLASS		alphanumeric	*Class name*. Displays the name of the accumulating or history class for OMs for which accumulative periods are to be established. The system datafills this field when the command OMCLASS is executed to establish an OM class.
ENABLED		Y or N	*Enabled*. Enter Y to enable data accumulation for this class during the specified period. Otherwise, enter N.
WHEN		see subfield	*When*. This field consists of subfield REP.
	REP	HISTORY	*Repetition*. Displays the period of time over which OMs for an enabled class are accumulated. This value is read-only and cannot be changed. There are two refinements for the value HISTORY—SNAPSHOTS and XFER.
	SNAPSHOTS	1–6	*Number of snapshots*. This read-only field displays the number of history registers for each measurement.
	XFER	T5, T10, T15, T20, or T30	*Transfer attribute*. This read-only field displays the time, in minutes, that a single history register is current. If the value is T5, the history register is cycled every five minutes.

The following is an example of datafill for table OMACC for a SINS session.

```
CLASS     ENABLED            WHEN
_____________________________________________________
SHORTSTS        Y    HISTORY 1   T5
```

Datafilling table RASLAPPL

Table RASLAPPL (Robust Application Session Layer Application) maps SINS sessions to links by assigning each session (field APTYPE) to a network connection (field NETCONN). This network connection is then assigned a link access type (field ACSINFO).

The ACSINFO field acts as a selector. That is, the remainder of the datafill depends on the link access type chosen. Because the link access type for a SINS session is always MPCSVC, this document includes only those fields that appear when field ACSINFO is datafilled with a value of MPCSVC.

Table 9-2 describes the fields in table RASLAPPL.

Table 9-2
Table RASLAPPL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the identifier for the network connection.
APTYPE		SINS	*Application type*. To set up a session to send trunk group OMs from the switch to the host, enter SINS. ***Note:*** You can datafill a maximum of one SINS session.
BUFFSIZE		2–4096	*Buffer size*. Enter the maximum number of bytes expected in a message received from the far end. Typically for SINS, BUFFSIZE=256.
NUMBUFFS		1–128	*Number of buffers*. Enter the number of buffers allocated. The value should be larger for higher traffic applications.
ACSINFO		MPCSVC	*Access selector*. Enter MPCSVC.
MPCNO		0–255	*Multi-protocol controller number*. Enter the number that corresponds to table MPC.
LINKNO		0–3	*Multi-protocol controller link number*. Enter the link number from table MPCLINK.

—continued—

Table 9-2
Table RASLAPPL field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
DNA		0–9, up to 15 digits	*Data network address*. Enter the remote node address to which the connection is being made.
USERDATA		0–F, up to 32 hex digits	*User data*. Enter user data.
		—end—	

The following is an example of datafill for table RASLAPPL for a SINS session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS       ACSINFO
_____________________________________________
  SINS   SINS     256        4  MPCSVC 3 3 $ $
```

Datafilling table OMPRT

Table OMPRT (Operational Measurements Printer) defines parameters for transferring data from a holding or accumulating register to an output device. These parameters specify information such as OM class and how often and at what times OMs are transferred.

Table 9-3 describes the fields in table OMPRT.

Table 9-3
Table OMPRT field descriptions

Field	Subfield or refinement	Entry	Explanation and action
REPNO		200–232	*Report number*. Enter the number assigned to a particular output report. A maximum of 32 different output reports are allowed at one time.
ACTIVE		Y or N	*Active*. Enter Y if the report number is active. Enter N if the report number is inactive.
SUPZERO		Y or N	*Suppress zeros*. Enter Y to suppress the printout for trunk groups whose registers are zero. Enter N to include those trunk groups in the printout.
PRTSPEC		see subfield	*Print specification*. This field consists of subfield ID.
	ID	ALL, ALLCLASS, ALLGROUP, or ONETAB	*Identification*. Enter the type of output report required. • For all tables, enter ALL. Do not datafill refinements NAME, CLASS, or GROUP. • For all tables in a specific class, enter ALLCLASS and datafill refinement CLASS. Do not datafill refinements NAME or CLASS. • For all tables in a specific group, enter ALLGROUP and datafill refinement GROUP. Do not datafill refinements NAME or CLASS. • For one table specified by group and class, enter ONETAB and datafill refinements NAME, GROUP, and CLASS.
NAME		see subfields	*Name*. This field consists of subfields GROUP and CLASS.

—continued—

Table 9-3
Table OMPRT field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
	GROUP	alphanumeric	*Operational measurements group*. Enter the group of OMs to be transferred to the output device. See the *Operational Measurements Reference Manual* for a list of OM groups used in all switches except switches with office parameter OFFICETYPE in table OFCSTD set to OFF100OESD, OFF200OESD, or OFFCOMBOESD.
	CLASS	alphabetic	*Class name*. Enter the name of the accumulating or history class of OMs to be transferred to the output device.
CONTMARK		+	*Continuation mark*. Enter + to indicate that additional information for this tuple is contained in the next record.
WHEN		see subfield	*When*. This field consists of subfield REP. The values specify how often and at what times the OMs are transferred to the output device.
	REP	AUTO, HALFHOURLY, or HISTORY	*Repetition*. Enter the specific time or period of time over which transfers to the output device occur. • AUTO specifies that a report is transferred to the output device every time the holding registers are updated or when the accumulative period defined in table OMACC ends. • HALFHOURLY specifies that a report is transferred to the output device every half hour beginning at the time defined in refinement STARTUP. See Table 9-4. • HISTORY is specified for history classes. This read-only value cannot be changed. ***Note:*** These are the values that are typically used for SINS. Other values can be datafilled. Refer to the *Data Schema Reference Manual*.

—continued—

Table 9-3
Table OMPRT field descriptions

Field	Subfield or refinement	Entry	Explanation and action
BUFFOUT		Y or N	*Buffered output*. Enter Y if the report is buffered on disk. Otherwise, enter N. The default value is N.
OUTDEV		1–16 alphanumeric characters	*Output device*. Enter the output device datafilled in table OMDEV. The entry SINK is the null device and is always present in OMDEV. Field OUTDEV has no meaning if the entry in field BUFFOUT is N. The default value is SINK.
		—end—	

REP = HALFHOURLY

When the entry in subfield REP is HALFHOURLY, datafill refinement STARTUP, as shown in Table 9-4.

Table 9-4
Conditional datafill for table OMPRT

Refinement	Subfield	Entry	Explanation and action
STARTUP		C00, C15, C30, or C45	*Startup*. Enter the minute of the half hour when the collection of OMs for an active report is transferred to the output device.

The following is an example of datafill for table OMPRT for a SINS session.

```
REPNO ACTIVE SUPZERO                        PRTSPEC
                                 WHEN BUFFOUT OUTDEV
_____________________________________________________
200        Y       Y              ALLCLASS SHORTSTS
                                  AUTO      N    SINK
```

Datafilling table GASINFO

Table GASINFO (Generic Application Session Information) defines the network connections. This table uses the network connections defined in table RASLAPPL to make the session connection. Table GASINFO also specifies whether to activate or deactivate the SINS session.

The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the transfer type chosen. Because the transfer type for a SINS session is always NFT, this document includes only those fields that appear when field TRANTYPE is datafilled with a value of NFT.

Table 9-5 describes the fields in table GASINFO.

Table 9-5
Table GASINFO field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the network connection name datafilled in table RASLAPPL.
TRANTYPE		NFT	*Transfer type*. To set up a SINS session, enter NFT.
ACTIVE		Y or N	*Activate session*. Enter Y to activate the session. Enter N to deactivate the session. This field must be Y to begin a session.

The following is an example of datafill for table GASINFO for a SINS session.

```
GASKEY                          SPECS
_____________________________________________________________
SINS                        NFT     Y
```

Configuring a SINS session

Setting up a SINS session requires datafilling tables and executing CI commands. The following steps describe how to configure a SINS session.

1 Datafill office parameter OMHISTORYON in table OFCOPT with the value Y.

OMHISTORYON YES_NO Y

2 Execute the CI command OMCLASS to define the OM class. For example,

OMCLASS SHORTSTS HISTORY 1 5

3 Execute the CI command OMACCGRP to define the OM groups to be collected for SINS. For example,

OMACCGRP SHORTSTS ADD GROUP TRK

4 Datafill the ENABLED field in table OMACC with the value Y. The system datafills the other fields in table OMACC based on the parameters entered in the OMACCGRP command. For example,

SHORTSTS Y HISTORY 1 T5

5 Datafill tables MPC, MPCLINK, and RASLAPPL.

Note: SINS and LINS can be configured to go over the same link.

6 Datafill a tuple in table OMPRT to define a log report number. For example,

200 Y Y ALLCLASS SHORTSTS AUTO N SINK

7 Datafill table GASINFO. For example,

SHORTLOG NFT Y

8 Access the LOGUTIL system and execute the ADDREP command to add the defined log reports to the list of reports to be routed to the device SINS. For example,

ADDREP SINS OMPR 200

9 Execute the STARTDEV command to start the SINS session.

STARTDEV SINS

Setting up a LINS session

The LINS (Long INterval Statistics) session enables trunk group operational measurements (OM) to be transferred from the switch to a host. LINS is typically configured for a 30-minute OM class, preferably not a history class due to real-time considerations. Setting up a LINS session requires datafill to

- enable data accumulation for the OM class that was defined using the OMCLASS command (table OMACC)
- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- identify the network connection and map the LINS session to an EMPC card and link (table RASLAPPL)
- specify the dedicated output devices for OMs (table OMDEV)
- define the parameters for transferring data from an accumulating or holding register to an output device (table OMPRT)
- establish the type of transfer and activate the session (table GASINFO)

This chapter gives the datafill for tables OMACC, RASLAPPL, OMDEV, OMPRT, and GASINFO. Chapter 5, “Configuring the EMPC,” gives the datafill for two other tables required for a LINS session—tables MPC and MPCLINK. Be sure to follow the correct sequence for datafilling the tables.

In addition to datafilling the required tables, setting up a LINS session requires executing CI commands. The section “Configuring a LINS session” within this chapter describes how to set up a LINS session. Chapter 12, “Commands,” gives more details about the commands referenced in this chapter.

You can datafill a maximum of one LINS session.

Datafill sequence

This section shows the order in which the required tables must be datafilled. However, because setting up a LINS session also requires executing CI commands, refer to the section “Configuring a LINS Session” for complete details on datafill and command sequences.

- OMACC
- MPC
- MPCLINK
- RASLAPPL
- OMDEV
- OMPRT
- GASINFO

Datafilling table OMACC

Table OMACC (Operational Measurements Accumulator) shows the time period during which the accumulating registers collect data for a specific accumulating class of OMs.

The command OMCLASS defines the OM class to be used for LINS. When the OMCLASS command is executed, the system datafills the CLASS field in table OMACC. Additionally, the system datafills subfield REP.

To set up a LINS session, the field ENABLED is the only field that requires datafill by the operator.

Table 10-1 describes the fields in table OMACC.

Table 10-1
Table OMACC field descriptions

Field	Subfield or refinement	Entry	Explanation and action
CLASS		alphanumeric	*Class name*. Displays the name of the accumulating or history class for OMs for which accumulative periods are to be established. The system datafills this field when the command OMCLASS is executed to establish an operational measurements (OM) class.
ENABLED		Y or N	*Enabled*. Enter Y to enable data accumulation during the specified period. Otherwise, enter N.
WHEN		see subfield	*When*. This field consists of subfield REP.
	REP	AUTO, HALFHOURLY	*Repetition*. Enter the period of time over which OMs for an enabled class are accumulated. • Enter AUTO for holding classes. This value is read-only. The accumulative period is set in OMXFER in table OFCENG. • If AUTO appears in table OMACC, enter AUTO in subfield REP in tables OMPRT and OMTAPE. For an OMXFER rate of x 15, enter AUTO in subfield REP in tables OMACC and OMPRT. If the OMXFER rate is x 30 and a half-hourly report is required, the following datafill combinations for subfield REP are possible: — table OMACC set to AUTO and table OMPRT set to AUTO

—continued—

Table 10-1
Table OMACC field descriptions

Field	Subfield or refinement	Entry	Explanation and action
			— table OMACC set to HALFHOURLY and table OMPRT set to HALFHOURLY — table OMACC set to AUTO and table OMPRT set to HALFHOURLY — table OMACC set to HALFHOURLY and table OMPRT set to AUTO Enter HALFHOURLY to specify halfhourly accumulations of OMs. Datafill refinement STARTUP. See Table 10-2. ***Note:*** These are the values that are typically used for LINS. Other values can be datafilled. Refer to the *Data Schema Reference Manual.*
		—end—	

REP = HALFHOURLY

When the entry in subfield REP is HALFHOURLY, datafill refinement STARTUP, as shown in Table 10-2.

Table 10-2
Conditional datafill for table OMACC

Refinement	Subfield	Entry	Explanation and action
STARTUP		C00, C15, C30, or C45	*Startup*. This refinement defines the time past the hour that the first accumulative period starts. This time also depends on the value of OMXFER in table OFCENG. Enter the time of the hour, in 15-minute intervals, that data collection starts.

The following is an example of datafill for table OMACC for a LINS session.

```
CLASS     ENABLED            WHEN
_____________________________________________________
LONGSTS       Y    HALFHOURLY C00
```

Datafilling table RASLAPPL

Table RASLAPPL (Robust Application Session Layer Application) maps LINS sessions to links by assigning each session (field APTYPE) to a network connection (field NETCONN). This network connection is then assigned a link access type (field ACSINFO).

The ACSINFO field acts as a selector. That is, the remainder of the datafill depends on the link access type chosen. Because the link access type for a LINS session is always MPCSVC, this document includes only those fields that appear when field ACSINFO is datafilled with a value of MPCSVC.

Table 10-3 describes the fields in table RASAPPL.

Table 10-3
Table RASLAPPL field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the identifier for the network connection.
APTYPE		LINS	*Application type*. To set up a session to send trunk group OMs operational measurements from the switch to the host, enter LINS (Long INterval Statistics). ***Note:*** You can datafill a maximum of one LINS session.

—continued—

Table 10-3
Table RASLAPPL field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
BUFFSIZE		2–4096	*Buffer size*. Enter the maximum number of bytes expected in a message received from the far end. Typically for LINS, BUFFSIZE=256.
NUMBUFFS		1–128	*Number of buffers*. Enter the number of buffers allocated. The value should be larger for higher traffic applications.
ACSINFO		MPCSVC	*Access selector*. Enter MPCSVC.
MPCNO		0–255	*Multi-protocol controller number*. Enter the number that corresponds to table MPC.
LINKNO		0–3	*Multi-protocol controller link number*. Enter the link number from table MPCLINK.
DNA		0–9, up to 15 digits	*Data network address*. Enter the remote node address to which the connection is being made.
USERDATA		0–F, up to 32 hex digits	*User data*. Enter user data.
		—end—	

The following is an example of datafill for table RASLAPPL for a LINS session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS         ACSINFO
_____________________________________________________
  LINS   LINS     2048         4  MPCSVC 2 3 $ $
```

Datafilling table OMDEV

Table OMDEV (Operational Measurements Device) specifies dedicated output devices for OMs. That is, devices to which only OMs are sent. No other data are sent to a dedicated device.

Table 10-4 describes the fields in table OMDEV.

Table 10-4
Table OMDEV field descriptions

Field	Subfield or refinement	Entry	Explanation and action
DEVNAME		1–16 alphanumeric characters	*Device or volume name*. Enter the device or volume name of the dedicated output device that receives OM buffered reports.
EBCDIC		Y or N	*EBCDIC output character standard*. Enter Y if the EBCDIC output character standard applies. Enter N if the ASCII output character standard applies.

The following is an example of datafill for table OMDEV for a LINS session.

```
DEVNAME     EBCDIC
_____________________________________________________________
LONGLOG          N
```

Datafilling table OMPRT

Table OMPRT (Operational Measurements Printer) defines parameters for transferring data from a holding or accumulating register to an output

device. These parameters specify information such as OM class and how often and at what times OMs are transferred.

Table 10-5 describes the fields in table OMPRT.

Table 10-5
Table OMPRT field descriptions

Field	Subfield or refinement	Entry	Explanation and action
REPNO		200–232	*Report number*. Enter the number assigned to a particular output report. A maximum of 32 different output reports are allowed at any one time.
ACTIVE		Y or N	*Active*. Enter Y if the report number is active. Enter N if the report number is inactive.
SUPZERO		Y or N	*Suppress zeros*. Enter Y to suppress the printout for trunk groups whose registers are zero. Enter N to include in the printout trunk groups whose registers are zero.
PRTSPEC		see subfield	*Print specification*. This field consists of subfield ID.
	ID	ALL, ALLCLASS, ALLGROUP, or ONETAB	*Identification*. Enter the type of output report required. • For all tables, enter ALL. Do not datafill refinements NAME, CLASS, or GROUP. • For all tables in a specific class, enter ALLCLASS and datafill refinement CLASS. Do not datafill refinements NAME or CLASS. • For all tables in a specific group, enter ALLGROUP and datafill refinement GROUP. Do not datafill refinements NAME or CLASS. • For one table specified by group and class, enter ONETAB and datafill refinements NAME, GROUP, and CLASS.
NAME		see subfields	*Name*. This field consists of subfields GROUP and CLASS.

—continued—

Table 10-5
Table OMPRT field descriptions (continued)

Field	Subfield or refinement	Entry	Explanation and action
	GROUP	alphanumeric	*Operational measurements group*. Enter the group of OMs to be transferred to the output device. See the *Operational Measurements Reference Manual* for a list of OM groups used in all switches except switches with office parameter OFFICETYPE in table OFCSTD set to OFF100OESD, OFF200OESD, or OFFCOMBOESD.
	CLASS	alphabetic	*Class name*. Enter the name of the accumulating or history class of OMs to be transferred to the output device.
CONTMARK		+	*Continuation mark*. Enter + to indicate that additional information for this tuple is contained in the next record.
WHEN		see subfield	*When*. This field consists of subfield REP. The values for this field specify how often and at what times the OMs are transferred to the output device.
	REP	AUTO, HALFHOURLY	*Repetition*. Enter the specific time or period of time over which transfers to the output device occur. • AUTO specifies that a report is transferred to the output device every time the holding registers are updated or when the accumulative period defined in table OMACC ends. • HALFHOURLY specifies that a report is transferred to the output device every half hour beginning at the time defined in refinement STARTUP. See Table 10-6. ***Note:*** These are the values that are typically used for LINS. Other values can be datafilled. Refer to the *Data Schema Reference Manual.*

—continued—

Table 10-5
Table OMPRT field descriptions

Field	Subfield or refinement	Entry	Explanation and action
BUFFOUT		Y or N	*Buffered output*. Enter Y if the report is buffered on disk. Otherwise, enter N. The default value is N.
OUTDEV		1–16 alphanumeric characters	*Output device*. Enter the output device datafilled in table OMDEV. The entry SINK is the null device and is always present in OMDEV. Field OUTDEV has no meaning if the entry in field BUFFOUT is N. The default value is SINK.
		—end—	

REP = HALFHOURLY

When the entry in subfield REP is HALFHOURLY, datafill refinement STARTUP, as shown in Table 10-6.

Table 10-6
Conditional datafill for table OMPRT

Refinement	Subfield	Entry	Explanation and action
STARTUP		C00, C15, C30, or C45	*Startup*. Enter the minute of the half hour when the collection of OMs for an active report is transferred to the output device.

The following is an example of datafill for table OMPRT for a LINS session.

```
REPNO ACTIVE SUPZERO                          PRTSPEC
                           WHEN   BUFFOUT      OUTDEV
_____________________________________________________
201        Y       Y              ALLCLASS  LONGSTS
              HALFHOURLY C00          Y    LONGLOG
```

Datafilling table GASINFO

Table GASINFO (Generic Application Session Information) defines the network connections. This table uses the network connections defined in table RASLAPPL to make the session connection. Table GASINFO also specifies whether to activate or deactivate the LINS session. The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the datafill in this field.

The TRANTYPE field acts as a selector. That is, the remainder of the datafill depends on the transfer type chosen. Because the transfer type for a LINS session is always NFT, this document includes only those fields that appear when field TRANTYPE is datafilled with a value of NFT.

Table 10-7 describes the fields in table GASINFO.

Table 10-7
Table GASINFO field descriptions

Field	Subfield or refinement	Entry	Explanation and action
NETCONN		1–16 alphanumeric characters	*Network connection*. Enter the network connection name datafilled in table RASLAPPL.
TRANTYPE		NFT	*Transfer type*. To set up a LINS session, enter NFT.
ACTIVE		Y or N	*Activate session*. Enter Y to activate the session. Enter N to deactivate the session. This field must be Y to begin a session.

The following is an example of datafill for table GASINFO for a LINS session.

```
GASKEY                    SPECS
_____________________________________________________
LINS                   NFT    Y
```

Configuring a LINS session

Setting up a LINS session requires a combination of datafilling tables and executing CI commands. The following steps explain how to configure a LINS session.

1 Execute the CI command OMBR to create the OM buffer.

OMBR;CREATE dskvolname

The OM buffer takes up all free room on a disk volume. The larger the buffer, the longer it takes to initialize.

2 Execute the CI command OMCLASS to define the OM class. For example,

OMCLASS LONGSTS DOUBLE

3 Execute the CI command OMACCGRP to define the OM groups to be collected for LINS. For example,

OMACCGRP LONGSTS ADD GROUP TRK

4 Datafill table OMACC. The system datafills the CLASS field based on the parameters entered in the OMACCGRP command. For example,

LONGSTS Y HALFHOURLY C00

5 Datafill tables MPC, MPCLINK, and RASLAPPL.

Note: SINS and LINS can be configured to go over the same link.

6 Datafill the device name in table OMDEV. The device name tells the OMBUFFER where to send OMs. For example,

LONGLOG n

7 Datafill a tuple in table OMPRT to define a log report number. For example,

201 Y Y ALLCLASS LONGSTS HALFHOURLY C00 Y LONG LOG

8 Datafill table GASINFO. For example,

LINS NFT Y

9 Access the LOGUTIL system and execute the ADDREP command to add the defined log reports to the list of reports to be routed to the device LINS. For example,

ADDREP LINS OMPR 201

10 Execute the STARTDEV command to start the LINS session.

STARTDEV LINS

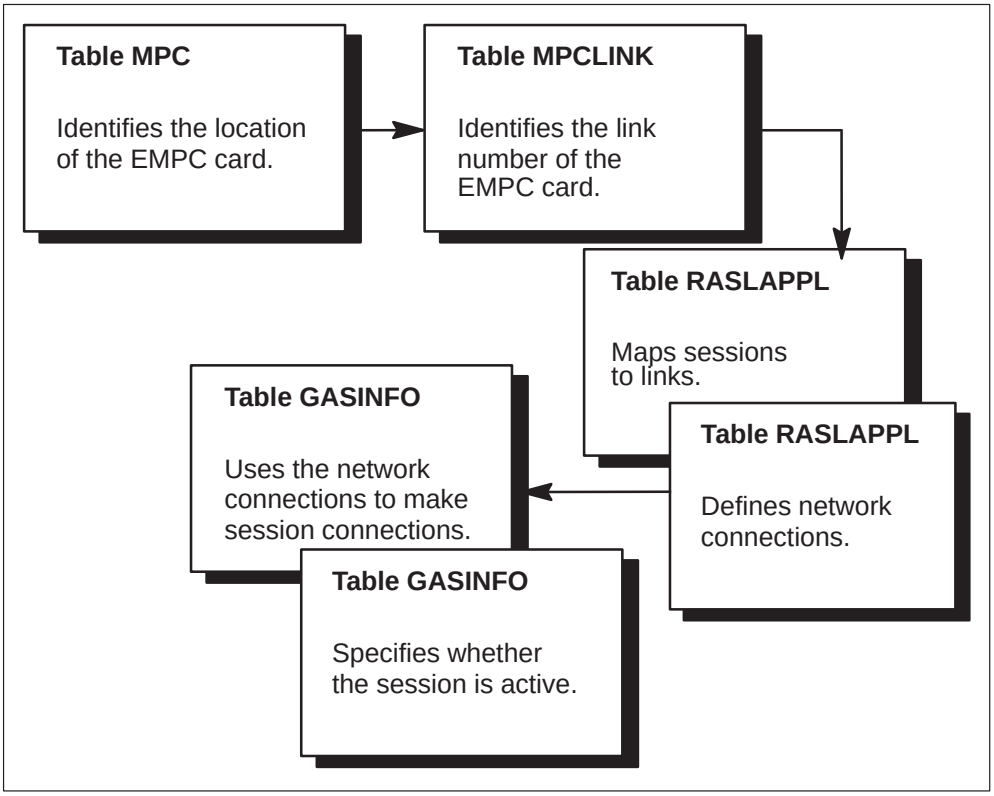
Remote login command session

The X.25 data communication command session allows a remote user to log onto the switch and have access to the CI system. With CI system access, the remote user is able to print reports, view and change datafill, view logs, and enter the MAPCI levels on a limited basis.

Datafill table relationships

This chapter includes the datafill examples for the remote login command session. Datafill in table RASLAPPL maps the command session to the physical links, as shown in Figure 11-1.

Figure 11-1
MPC, MPCLINK, RASLAPPL, and GASINFO relationships



Datafill in tables MCP and MCPLINK configures the links. Datafill in table GASINFO uses the network connections defined in table RASLAPPL to make the session connections.

You can datafill a maximum of three remote login sessions. An error message generates when attempting to datafill more than three REMLOGIN applications in table RASLAPPL.

Invalid login attempts

The session terminates after the fourth invalid password is attempted. An example of the error message received for an invalid password follows:

```
NPAC106 JUL11 10:11:42 5500 TBL GAS SESSION ABNORMAL
TERMINATION SESSION = RL       REMLOGIN NORMAL STAR CODE = 0
L3 VCI = 16
LINK   = MPCS 32
```

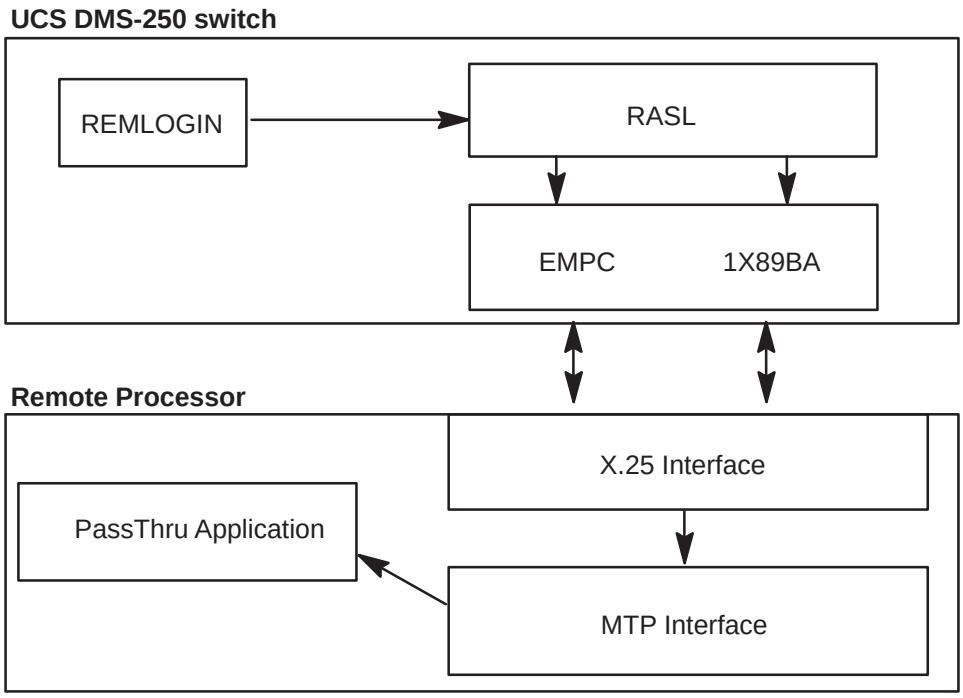
Command session protocol description

The command session protocol is based on the Message Transfer Protocol (MTP). MTP is the application protocol that controls remote login sessions. The command session is known to the switch as the REMLOGIN application. This X.25 data application is the interface to the customer command session.

The data rate can run at: 9.6 kbit/s or 19.2 kbit/s on an RS-232 port; or at 9.6 kbit/s, 19.2 kbit/s, or 56 kbit/s on a V.35 port on the MPC card NT1X89BA.

Figure 11-2 shows the data transfer between the switch and the remote host.

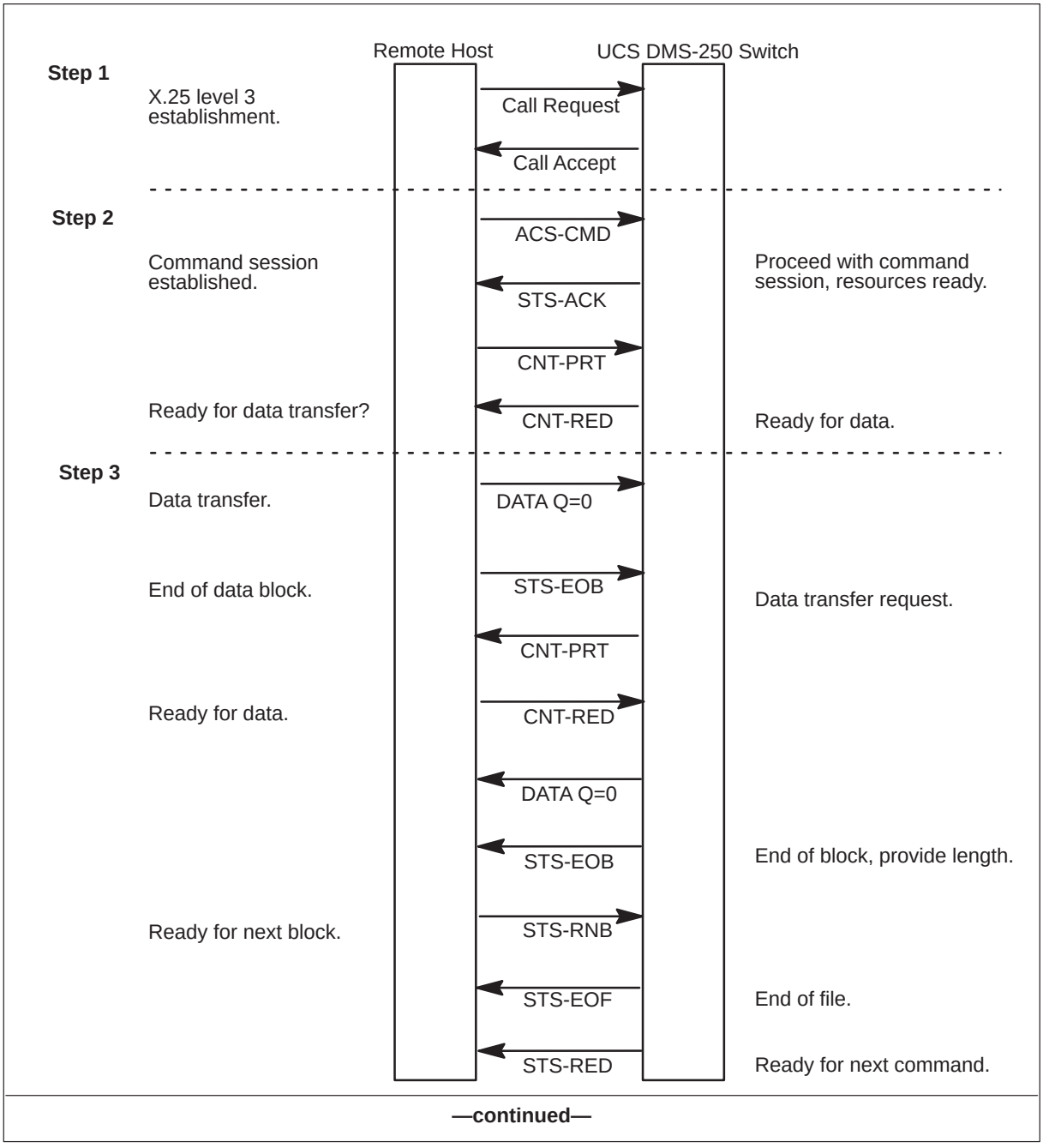
Figure 11-2
Remote login data transfer



Command session message sequencing

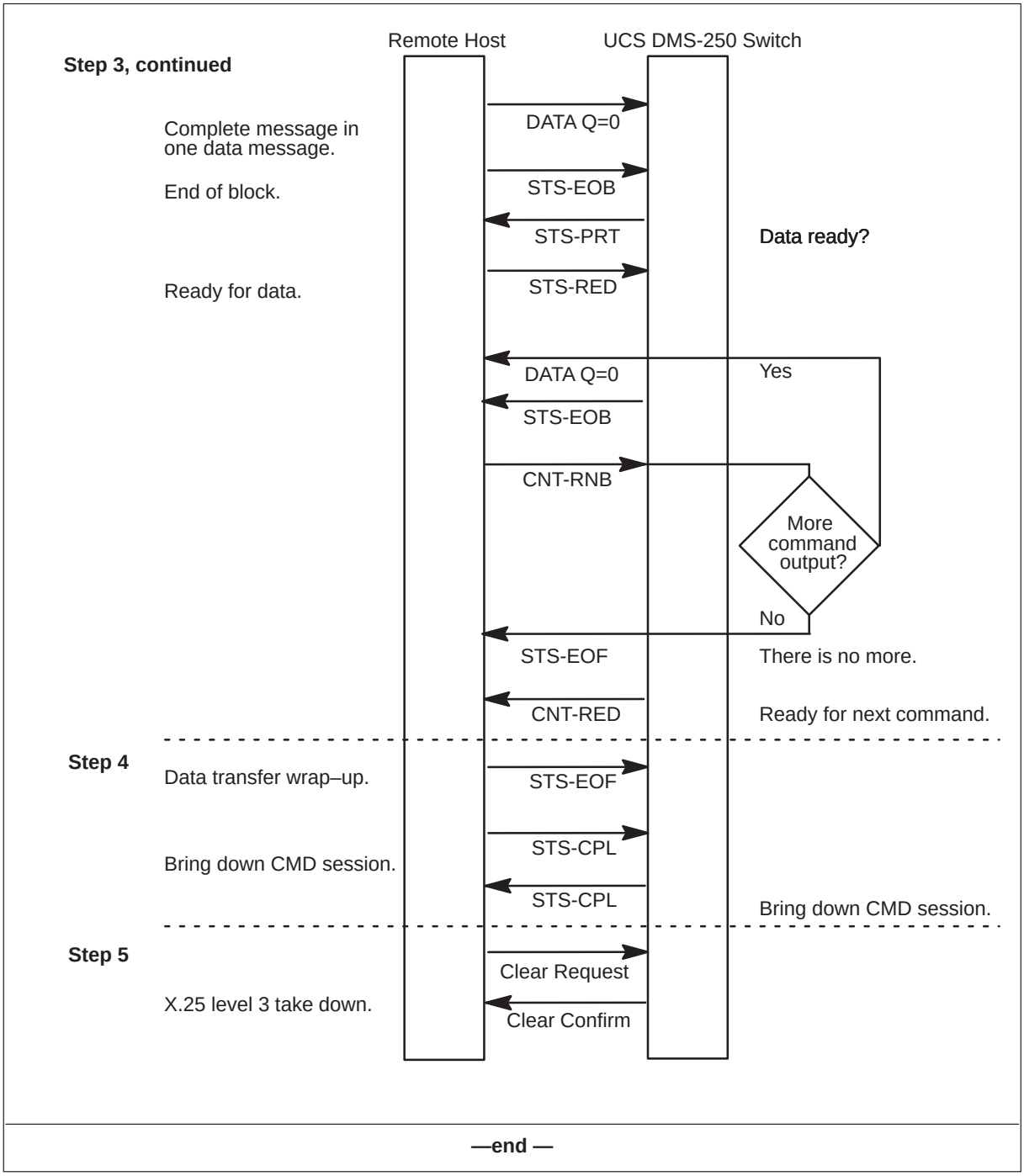
Figure 11-3 shows the flow of a command message sequencing session between the switch and the host. The host will initiate the command session.

Figure 11-3
ACS–CMD message sequencing flow



—continued—

Figure 11-3
ACS-CMD message sequencing flow (continued)



—end —

The command session message sequencing occurs in this way:

Step 1

The host has data ready to transfer. The switched virtual circuit of X.25 level 3 is set up between the switch and the remote host.

Step 2

The protocol messages are exchanged for the start-up. Both ends recognize the command session.

Step 3

The data blocks are sent from the remote host to the switch. In the opposite direction, acknowledgement messages are sent back to the switch to indicate the data blocks have been received successfully.

Step 4

When reaching the end of a data transfer, the STS-EOF message is sent to notify the data transfer is complete. Subsequently, the STS-CPL message is exchanged to end this session.

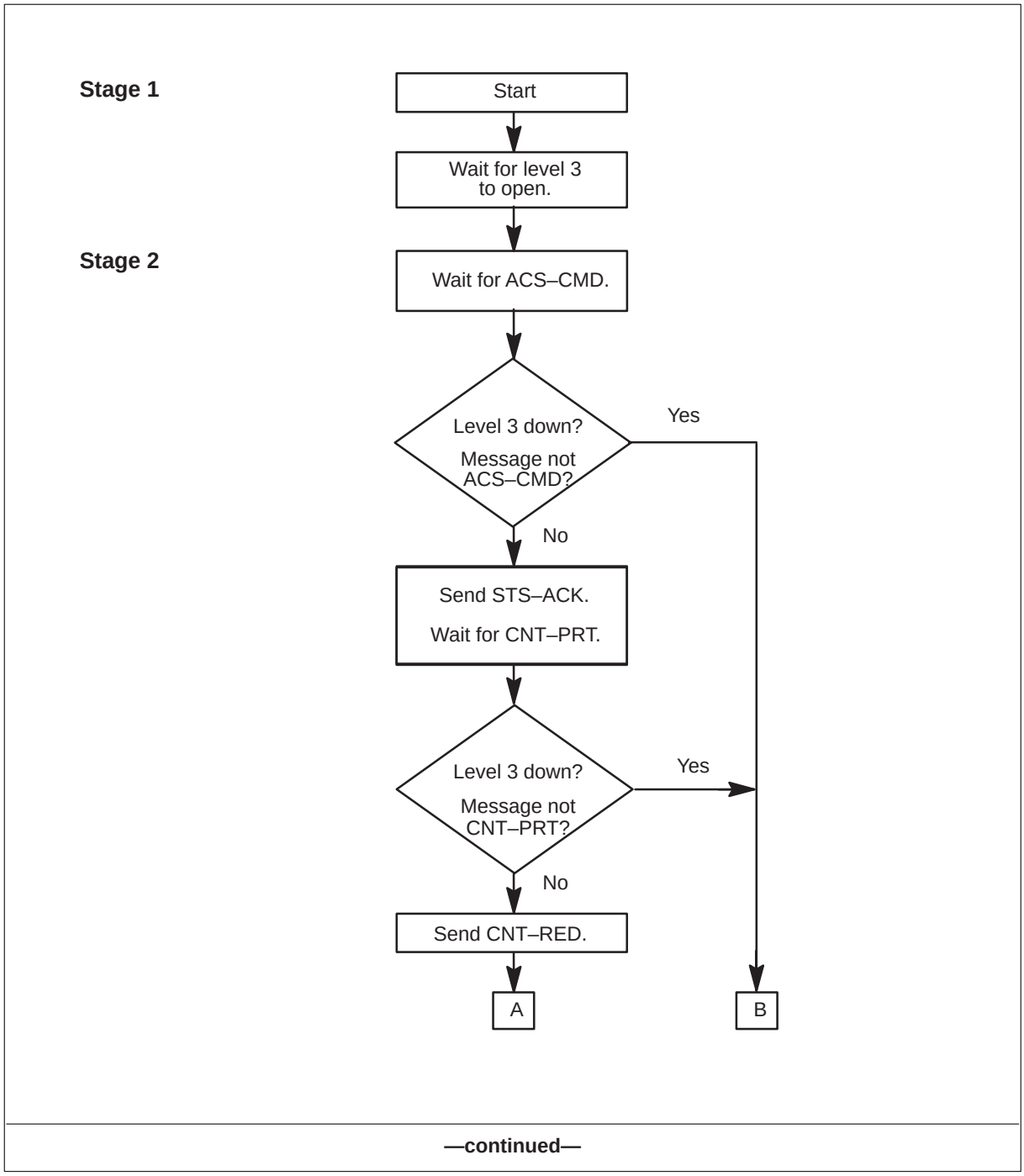
Step 5

The host shuts down the X.25 SVC link between the two ends. MTP-ERR is an MTP message send from either side due to error conditions.

Data flow of command session

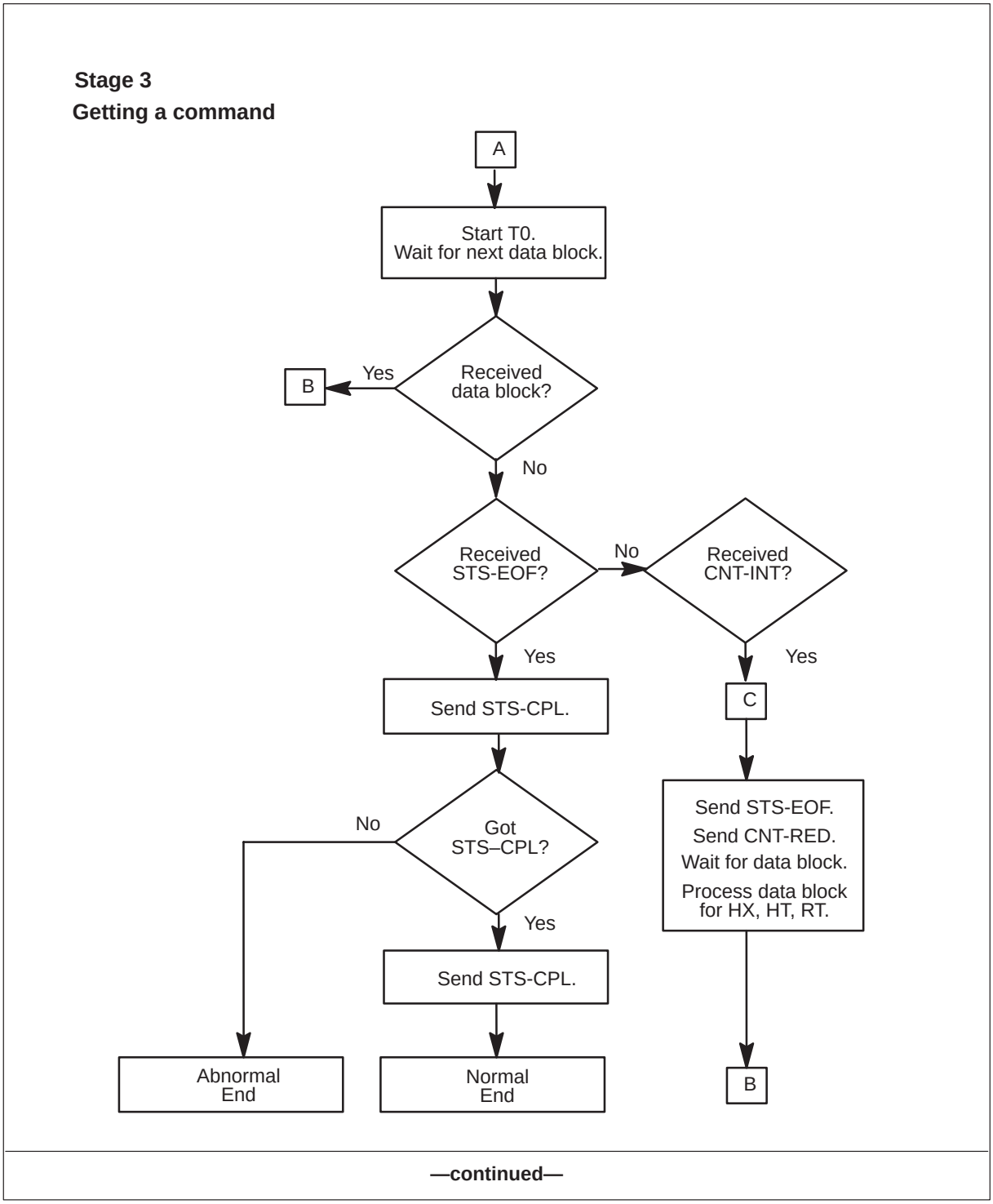
Figure 11-4 shows the four stages of a remote login from the perspective of the switch providing remote login capability.

Figure 11-4
Data flow when the host requests remote login



—continued—

Figure 11-4
Data flow when the host requests remote login (continued)

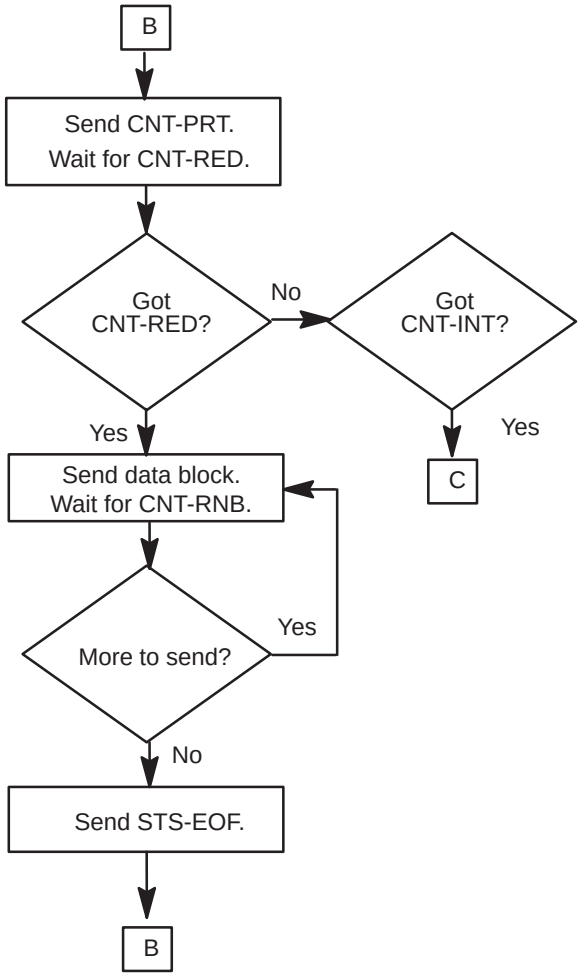


—continued—

Figure 11-4
Data flow when the host requests remote login (continued)

Stage 4

Sending a response

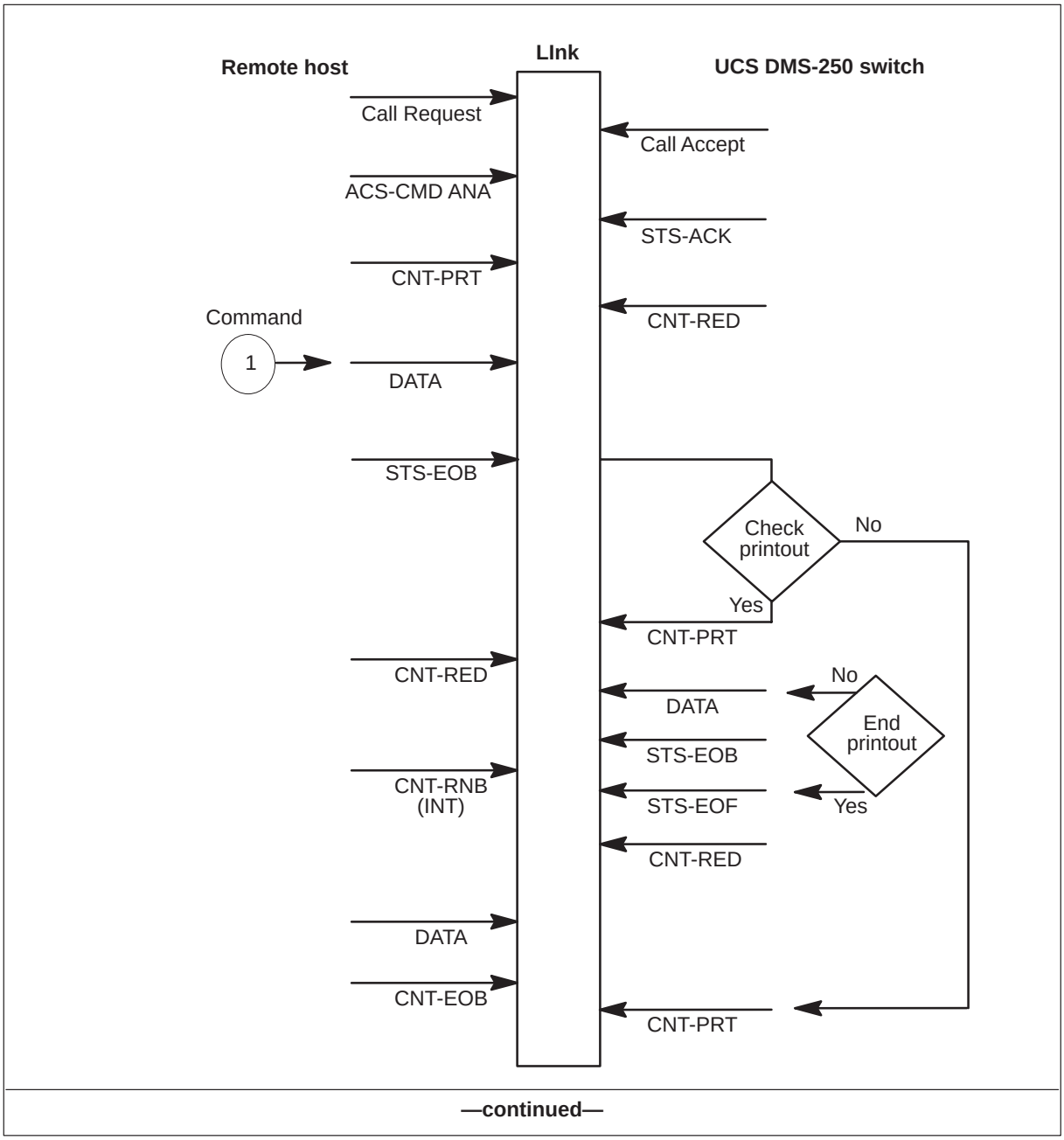


—end —

Command session protocol description

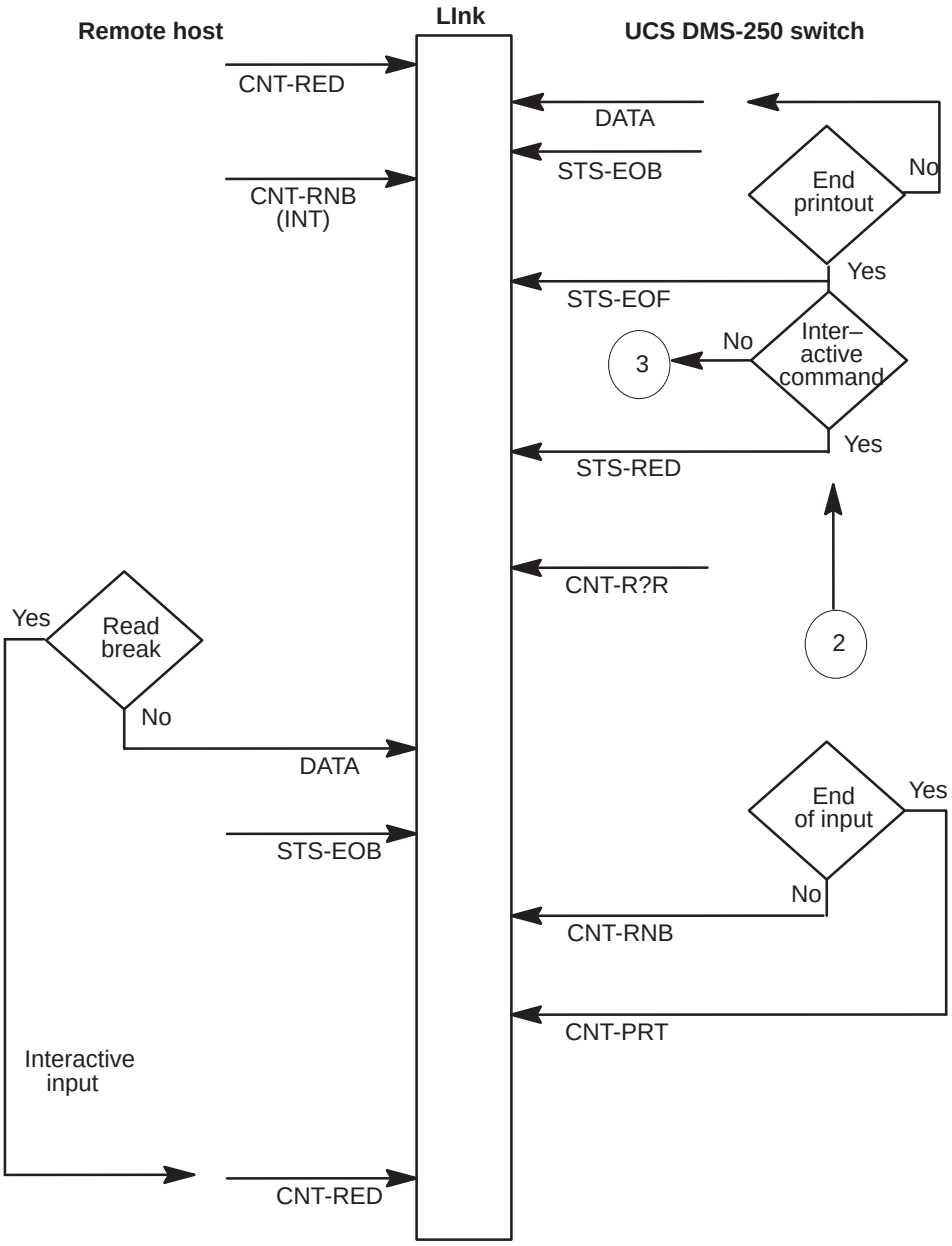
Figure 11-5 shows the reference standard used to design the command session application on the DMS and host.

Figure 11-5
Reference standard for designing the command session application



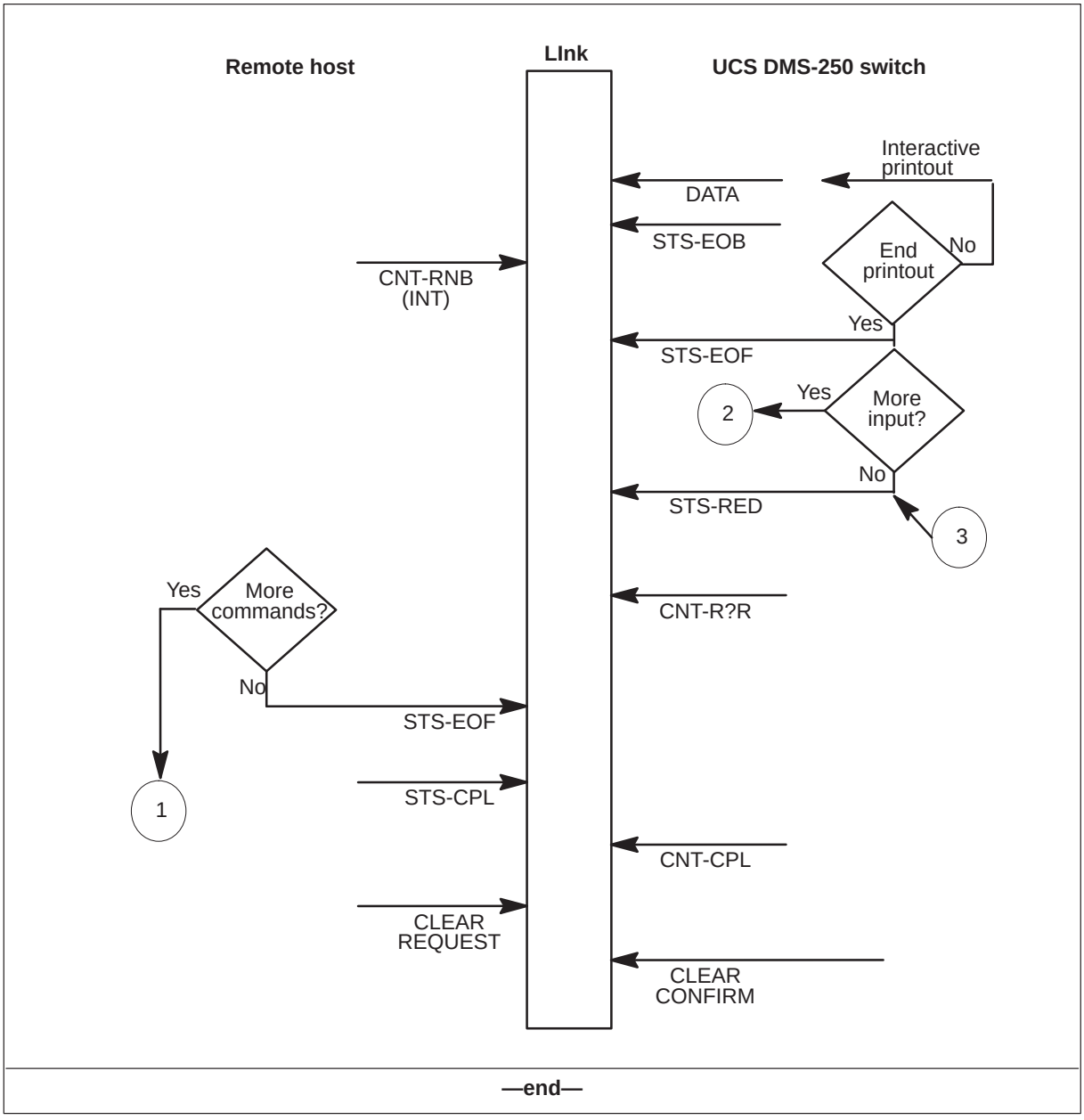
—continued—

Figure 11-5
Reference standard for designing the command session application (continued)



—continued—

Figure 11-5
Reference standard for designing the command session application (continued)



—end—

Timers

The remote login command session uses timers to detect MTP level errors. If any responses from the other side take more than four minutes, an error is assumed and the session is brought down. The timer starts just after the message is sent.

Command session message formats

MTP messages exchanged between the switch and the host for remote login are the same as the messages for AFT-MNP. Refer to Chapter 2, “Automatic file transfer,” for the message formats. Remote login uses the additional message ACS-CMD—access request message, start of command session. The following subsections show the format of the MTP messages that are modified and used by the remote login command session.

ACS-CMD

ACS-CMD tells the switch that the session is a command session. The format of the ACS-CMD message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 1 0	02	ACS-CMD (STX ascii)
Octet 2	0 1 1 1 1 1 0 1	61	ACS-CMD
Octet 3	0 0 0 0 0 0 0 0	00	ACS-CMD (null ascii); length of device address
Octet 4–X			Device address

Table 11-1 The following describes the fields in the ACS-CMD message.

Table 11-1
ACS-CMD field descriptions

Field	Description
Length of device address	The device address length determines the overall length of the message.
Device address	The ISO–coded device address.

STS-ACK

The STS-ACK message is sent in response to the ACS-CMD message when the switch has the resources for the command session. The format of the STS-ACK message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-ACK
Octet 2	1 0 0 0 0 0 0 1	81	STS-ACK
Octet 3	0 0 0 0 0 0 0 0	00	STS-ACK

STS-EOB

The STS-EOB message follows the data message. The switch sends this message to describe the data block just sent and provides the message length. The format of the STS-EOB message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	STS-EOB
Octet 2	1 0 0 0 0 1 0 0	84	STS-EOB
Octet 3			Message length; number of octets

Table 11-2 describes the fields in the STS-EOB message.

Table 11-2
STS-EOB field descriptions

Field	Description
Number of octets	The number of octets in the data block just sent. Data blocks up to the sequence number were successfully received. The range is 1—2048 (2 octets).

CNT-RNB

The remote host sends this message when it is ready to get the next data block. The format of the CNT-RNB message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 1	0 0 0 0 0 0 0 0	00	CNT-RNB
Octet 2	1 0 1 0 0 0 0 1	A1	CNT-RNB
Octet 3			Sequence number (LLSB)
Octet 4			Sequence number (LMSB)
Octet 5			Sequence number (MLSB)
Octet 6			Sequence number (MMSB)

CNT-INT

The CNT-INT message is an interrupt message used for the HX, HT, and RT commands. The format of the CNT-INT message is as follows:

Q-bit: 1	Bits 8 7 6 5 4 3 2 1	Hex	Description
Octet 0	0 0 0 0 0 0 0 0	00	NUL
Octet 1	1 0 1 0 0 1 0 0	A4	
Octet 2	0 0 0 0 0 0 0 0	00	

Datafill sequence

Setting up a remote login command session requires datafill to

- identify the enhanced multi-protocol controller (EMPC) card to the switch central control (table MPC)
- specify the link and protocol information for each EMPC card (table MPCLINK)
- identify the network connection and map the MFT session to an EMPC card and link (table RASLAPPL)
- activate the remote login session (table GASINFO)

This section gives the datafill for tables RASLAPPL and GASINFO. Before datafilling these two tables, datafill tables MPC and MPCLINK. Chapter 5, “Configuring the EMPC,” describes their datafill. After the required tables

are datafilled, executing CI commands at the GAS level enables you to activate the remote login session.

For each switch, you can datafill a maximum of three remote login command sessions.

To set up a remote login command session, datafill these tables in the order shown:

- MPC
- MPCLINK
- RASLAPPL
- GASINFO

Datafilling table RASLAPPL

The following is an example of datafill for table RASLAPPL for a remote login command session.

```
NETCON APTYPE BUFFSIZE  NUMBUFFS        ACSINFO
_____________________________________________________
 RMLGN  REMLOGIN   2048     4  MPCSVC 2 3 12345678 $
```

Note: The data message is equal to the buffer size in table RASLAPPL (for example, 2048). Each line is separated by #0d, #0a (<cr><lf>). End of block, length of data in previous message given as least significant byte <lsb> and <msb>.

Datafilling table GASINFO

The following is an example of datafill for table GASINFO for a remote login command session.

```
GASKEY                          SPECS
_____________________________________________________________
RMLGN                           NFT Y $
```

Logs

This section briefly describes the NPAC log reports that generate as a result of a command session start and termination (either normal or abnormal). NPAC logs indicate a data link is active or a problem has occurred during an attempt to establish connection. Refer to the *UCS DMS-250 Logs Reference Manual* for detailed descriptions of these logs.

NPAC100

The X.25 subsystem generates an NPAC100 log when a successful command session START occurs.

NPAC101

The X.25 subsystem generates an NPAC101 log when a normal command session termination occurs.

NPAC106

The X.25 subsystem generates this trouble log when an abnormal command session termination occurs.

NPAC550

The NPAC550 log generates each time a network connection is successfully opened or closed.

Commands

The CI system enables you to monitor and control the switch. This chapter describes commands you use with the X.25 Data Transport feature. These include

- automatic file transfer (AFT) commands
- manual file transfer (MFT) commands
- Robust Application Session Layer (RASL) commands used with MFT
- CI and LOGUTIL commands used with SPR OUTLOG, Short Interval Statistics (SINS) and Long Interval Statistics (LINS) sessions

For information on other commands, refer to the *UCS DMS-250 Commands Reference Manual*.

AFTCI commands

The AFTCI command level is an increment of the main CI level. At the main CI level, enter the following command to access the AFTCI command level:

AFT

Table 12-1 lists the AFTCI commands. The commands are described in detail on the pages that follow.

Table 12-1
AFTCI commands

Command	Description
COPYAFT	Copy an AFT file to tape.
DELAFT	Delete a file from AFT and table DIRPHOLD.
QUERYAFT	Query the status of AFT files.
QUIT	Exit the AFTCI level.

—continued—

Table 12-1
AFTCI commands (continued)

Command	Description
RESETOVR	Reset an override file in the AFT system.
RESETPFT	Reset a partial file transfer file in the AFT system.
SETAFT	Set the next AFT file to transfer.
SETOVR	Select an override file.
STARTAFT	Start AFT transferring files.
STOPAFT	Stop AFT transferring files.
—end—	

COPYAFT

COPYAFT copies a DIRP transfer file to a tape drive. The target tape drive must be mounted and online. This command does not copy an active file.

Once a file has been transferred and copied, it becomes a processed file and no longer appears in the AFT directory.

Syntax and parameters

COPYAFT filename drive

where

filename specifies the name of the DIRP file to be copied to tape. This is the name of the file as it appears in the table DIRPHOLD.

drive specifies the number of the tape drive onto which the file is to be copied. The tape drive should already be mounted (t0 to t8) and online.

Example

>COPYAFT U880531141059OCC T0

Responses

```
Copy completed.
```

Meaning: Copying the file to tape completed normally. The AFT system directory is updated to show a copy state of complete.

Action: None

```
Could not close source file.
```

Meaning: The file copied to tape but the file on the tape drive could not close. A SWERR is generated.

Action: Call the next level of support and notify them that files are not closing.

```
Could not close target file.
```

Meaning: The file copied to tape, but the file on the tape drive could not close. A SWERR is generated.

Action: Call the next level of support and notify them that files are not closing.

```
Could not create tape file.
```

Meaning: The command could not open a file on the tape drive to which the DIRP file is to be copied. The file is not copied to tape and a SWERR is generated.

Action: Verify that the tape drive is still online. If the tape drive is online and this response continues to display, contact the next level of support.

```
Error getting from file.
Copy aborted.
```

Meaning: An error occurred while copying the file to tape. Copying to tape is aborted and a SWERR is generated.

Action: Call the next level of support and receive recovery instructions. When the problem is resolved, erase the partial tape file and recopy the file to tape.

```
Error getting source VOLUME INFO.
No action taken – request aborted.
```

Meaning: The system cannot determine the location of the disk volume housing the file to be copied. The file is not copied to tape and a SWERR is generated.

Action: Check the state of the disk volume, recover the disk volume if possible, and try again to copy the file to tape. If the disk volume cannot be recovered, contact the next level of support.

```
Error getting target VOLUME INFO.
Request aborted.
```

Meaning: The system cannot determine the location of the disk volume housing the file to be copied. The file is not copied to tape and a SWERR is generated.

Action: Verify that the tape drive is online and mounted. If the tape drive is online, mounted, and this response continues to display, contact the next level of support.

```
Error putting to tape.
Copy aborted.
```

Meaning: An error occurred while writing the file to tape. Copying to tape is aborted and a SWERR is generated.

Action: Verify that the tape drive is online and mounted. If the tape drive is online, mounted, and this response continues to display, contact the next level of support.

```
Invalid file.
Request aborted.
```

Meaning: The SST system marked the file as invalid. The file is not copied to tape.

Action: Call the next level of support.

```
Source device must be a disk drive.
Request aborted.
```

Meaning: The name of a file you entered is not located on a disk drive. The file is not copied to tape.

Action: Check the name of the file to be copied and enter the command again with the correct file name.

```
System error.
Request aborted.
```

Meaning: The system could not obtain information on the file to be copied. The file is not copied to tape.

Action: Call the next level of support.

```
Target device is not a tape drive.
Request aborted.
```

Meaning: The device name you entered is not a tape drive. The file is not copied to tape.

Action: Determine the device name of the tape drive to receive the file and enter the command again with the correct device name.

```
The disk file cannot be accessed.
Request aborted.
```

Meaning: The system cannot access the disk drive on which the file is located because the disk drive is not in an appropriate state. The file is not copied to tape and a SWERR is generated.

Action: Check the state of the disk drive and recover the disk drive if possible. If the disk drive cannot be recovered (or if the disk appears to be in a ready state) and this response continues to display, contact the next level of support.

```
This is the DIRP ACTIVE file.
It cannot be copied to tape until it is rotated and closed.
```

Meaning: The file to be copied is the DIRP active file. The file is not copied to tape because it is not closed.

Action: Wait until the DIRP file has been rotated and closed before entering the command again.

```
Unable to allocate an event.
Safe store directory copy state may not be accurate.
```

Meaning: The system could not allocate an SST event for copying the file to tape. The file is not copied to tape.

Action: Try the command again a few times. If this response continues to display, contact the next level of support.

DELAFT

DELAFT deletes a file from the AFT directory and table DIRPHOLD. This command does not erase the file. The file is removed from table DIRPHOLD and renamed—the DIRP file name is changed so that instead of beginning with a “U,” it begins with a “P.”

This command does not delete these files:

- files currently being transferred

- files currently being copied
- the DIRP active file

If an unprocessed file is deleted, a data loss can occur. Be careful when deleting unprocessed files.

Syntax and parameters

DELAFT filename

where

filename specifies the name of the DIRP file to be deleted. This is the name of the file as it appears in the AFT directory or table DIRPHOLD. To view the file name in the AFTCI directory, execute the queryaft command.

Example

>DELAFT U880531141059OCC

Responses

```
Could not close source file.
```

Meaning: The system could not close the source file after it was renamed and deleted. The file is deleted, but left in an open state. A SWERR is generated.

Action: Contact the next level of support and notify them that files are not closing properly.

```
Error accessing DIRP.
Delete command may be retried.
The current request has been aborted.
```

Meaning: DIRP is not allowing the command to change the state of the file so that it can be deleted. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Reissue the command several times. If the command continues to fail, contact the next level of support.

```
Error deleting file from table DIRPHOLD.
```

Meaning: DIRP is not allowing the command to delete the file from table DIRPHOLD. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Contact the next level of support.

```
Error getting file from Safe Store.
Request aborted.
```

or

```
System error.
Request aborted.
```

Meaning: These two responses have the same meaning. SST failed to provide the command with the information necessary to delete the file. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Contact the next level of support.

```
File in use.
Retry delete command later.
```

Meaning: The file you want to delete is currently open by another user. The file cannot be deleted. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Contact the next level of support.

```
Invalid file.
Request aborted.
```

Meaning: An invalid file responded when the system attempted to open the file to be deleted. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Contact the next level of support.

```
This file is currently being copied.
It may not be deleted until its copy completes.
Request aborted.
```

Meaning: The file you want to delete is being copied and cannot be deleted. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Wait until the file copies completely and enter the command again.

```
This file is currently being transferred.
It may not be deleted until its transfer completes.
Request aborted.
```

Meaning: The file you want to delete is being transferred and cannot be deleted. The file is not deleted from the AFT system directory or table DIRPHOLD.

Action: Wait until the file transfers completely and enter the command again.

```
This is the DIRP ACTIVE file.
It cannot be deleted until it is rotated and closed and
appears in DIRPHOLD.
Request aborted.
```

Meaning: The file you want to delete is the DIRP active file. You cannot delete the DIRP active file. The file is not deleted from the directory or table DIRPHOLD.

Action: Determine whether the file should really be deleted. If the file does need to be deleted, it should be rotated out of the active DIRP position. When the file appears in table DIRPHOLD after the rotate, delete the file.

```
Unable to allocate an event.
Safe Store Directory Access may be affected.
```

Meaning: The system could not allocate an SST event in order to delete the file. The file is not deleted from the directory or table DIRPHOLD. The SST directory could be corrupted.

Action: Contact the next level of support.

HELP

HELP aft provides online documentation for the AFTCI directory.

Syntax and parameters

HELP aft

where

aft produces summary documentation for the commands in the AFTCI directory.

Responses

```
Module not loaded or needs other CI increment to be built.
```

Meaning: The directory you are trying to access is not loaded or must be accessed through another directory.

Action: None

```
No command in line.
```

Meaning: The command you entered is not spelled correctly or does not exist. For example, entering the string *help aftci* instead of *help aft* produces this message.

Action: Enter the command again using a valid command name.

```
Undefined command "HELP."
```

Meaning: Since there is no default parameter for the help command, entering the help command without additional parameters produces this message.

Action: None

QUERYAFT

QUERYAFT queries files in the AFT system. This command enables you to query all files or specific files based on transfer state and filename in the AFT system. When you execute this command, a message is sent to the AFT software instructing it to request a new directory from Safe Store Tap (SST). The AFT system displays a copy of the directory when it is received from SST to enable you to see a directory of the most current files.

Processed files are files that have been transferred and copied to tape. Once files are processed, they are automatically deleted from the AFT directory.

Syntax and parameters

QUERYAFT session display format

where

session specifies the name of the AFT session as defined in table GASINFO. This parameter is mandatory.

display (optional) specifies the type of filenames to display. The keyword values for this parameter are as follows:

ALL	(default) displays a directory of all files in the AFT system.
PFT	displays all the partial file transfers in the AFT system.
COM	displays all the files in the AFT system with a transfer state of complete. These are the AFT files that have completed transferring.
PEN	displays all the files in the AFT system with a transfer state of pending. These are the AFT files that have not been transferred.
ACT	displays information on the active transferring file.
ERR	displays all the files in the AFT system with a transfer state of error. These are the AFT files that have experienced an unrecoverable error while transferring.
SYS	displays information about the AFT system without displaying a directory. The information displayed shows whether the AFT system is started, the state of the software, and the AFT process class.
(fn)	When a filename is supplied, the QUERYAFT command supplies the information on only that file.

format (optional) determines the display output format of the QUERYAFT command. The keyword values for this parameter are:

SHORT	(default) displays information on the files in a short format.
LONG	displays information on the files in a long format. The long format takes longer to output than the short format. It is better to use the long format when a smaller number of files are to be displayed.

Example

>QUERYAFT aft1 all short

The following example shows the short format:

```
=AFT SYSTEM:   STARTED –AFT STATE: SENDING –AFT CLASS: GBKGCLASS=
    FILE NAME       FILE      LAST      XFER      COPY      START
                    SIZE      ACK       STATE     STATE     TIME
-------------       ------    ------    -------   ------    -------
O–>U880531123056OCC  5000      5000     COMPLETE  PENDING   31/22/33
A–>U880531125057OCC  4890      2380     ACTIVE    PENDING   31/22/45
N–>U880531133558OCC 12900         0     PENDING   PENDING
  U880531141059OCC  12900         0     PENDING   PENDING
  A880531143360OCC  12839         0     PENDING   PENDING
```

The first line of the display provides the AFT system status and state. If the system is started, files begin transferring and continue to do so. If the system is stopped, files do not continue to transfer. Starting and stopping the AFT system is controlled using the AFTCI directory commands startaft and stopaft.

Some of the file names in the response display are preceded by N–>, A–>, and O–> symbols. These flags point to the next file to transfer, the actively-transferring file, and the override file, respectively.

>QUERYAFT aft1 u880531133558OCC long

The following example shows the long format:

```
=AFT SYSTEM:   STARTED –AFT STATE: SENDING –AFT CLASS: GBKGCLASS=

N–>FILENAME:   U880531133558OCC
Far End Name:
Subsystem:          OCC
session:            AFT1
Last ACK:              0
File Size:          12900
XFER State:       Pending
COPY State:       Pending
Start Time:
Stop Time:
DIRPHOLD ID:           94
Retry:                  0
```

The long format provides all information displayed using the short format as well as the DIRP subsystem, the session, the retry count, the stop timer, and the DIRPHOLD ID.

Responses

```
AFT is not connected to SST!
```

Meaning: The connection between the AFT system and SST is lost.

Action: The AFT system attempts to bring up the connection every minute. Check the AFT system logs and enter the command again when the connection is established again. If all attempts to connect continue to fail, contact the next level of support.

```
Bad AFT message received
```

Meaning: The command received a corrupt message.

Action: Examine the AFT system logs. If this response happens frequently, contact the next level of support.

```
Could not contact AFT system
reason = (integer)
```

Meaning: This response displays if the command cannot contact the AFT system.

Action: Contact the next level of support.

```
Could not obtain directory from SST – See AFT logs
```

Meaning: This response displays if an error occurs while obtaining a directory.

Action: Examine the AFT system logs. If this response happens frequently, contact the next level of support.

```
Directory not available at this time.
Try again in a few minutes.
```

Meaning: A restart reload occurred within the past five minutes and the directory has not stabilized.

Action: Wait a few minutes and try to query a directory again.

```
Parameter 3 – ( ) is invalid.
```

Meaning: An invalid parameter was entered.

Action: Examine the command and enter the correct parameter.

```
<session name> is invalid.
```

Meaning: An invalid AFT session name was entered.

Action: Refer to table GASINFO and try the command with the correct session name.

```
There are no files in the AFT directory.
```

Meaning: This response displays if there are no files in the AFT system directory.

Action: None

```
There is no file transferring at this time.
```

Meaning: This response displays if you request information for the actively-transferring file and no file is transferring.

Action: None

QUIT

QUIT exits the AFT CI level.

Syntax and parameters

QUIT (1_level) (all) (n_levels) (name)

where

1_level specifies to exit one directory level. Entering the QUIT command with no parameters also exits one directory level.

all exits all directories and returns you to the main CI level.

n_levels specifies the number (n) of directory levels to exit. The default value is one.

name specifies the particular directory level from which you want to exit.

Example

>QUIT 2

where

2 specifies that you want to exit from two levels.

>QUIT dskut

where

dskut specifies that you want to exit the dskut directory.

Responses

`CI:`

Meaning: You have returned to the CI MAP level.

Action: Access another directory from the CI MAP level or end this session.

`QUIT –– Increment not found.`

Meaning: The system did not recognize the name variable as a valid directory level.

Action: Verify the entry. If the name you entered is not correct, try the command again. If the name is correct, check to see if the environment is active or if you have already left that directory.

`QUIT –– Unable to quit requested number of levels.`

Meaning: You entered an n_levels variable value that is too large.

Action: Enter the quit all command string or try the command with a smaller number of levels.

RESETOVR

RESETOVR resets the override status of an AFT file. An override file is noted by an O–> in the AFT directory. The override file is chosen as the next file to transfer over all of the files. This command removes the override status of the current override file in the AFT directory. The file with the N–> pointer now is the next file to transfer.

Syntax and parameters

RESETOVR session

where

session specifies the name of the AFT session that you want to reset the override status.

Example

>RESETOVR aft1

Responses

`Bad AFT message received.`

Meaning: The system did not recognize the message.

Action: If this happens frequently, contact the next level of support.

`Bad send of message to AFT session –– see SWERR.`

Meaning: The command cannot contact the AFT software. The override file is not reset and a SWERR is generated.

Action: Contact the next level of support and provide them with the data output in the SWERR.

`Could not contact the AFT system.`

Meaning: The AFT software does not respond to the command.

Action: Contact the next level of support.

`<session name> is invalid.`

Meaning: You entered an invalid AFT session name. The override file is not reset.

Action: Check the GASINFO table and enter the command again with a valid session name.

`The override file has been reset.`

Meaning: The command executed normally. The override status pointer is removed from the current file. This file is not deleted from the directory.

Action: Query the AFT system directory to confirm that the file no longer is marked by the override status pointer.

`The override file is transferring and cannot be reset.`

Meaning: You entered the command while the override file was transferring. The override file is not reset.

Action: Wait and try again.

```
There is no override file to reset.
```

Meaning: You executed the command on an AFT session with no override files in its directory. The override file is not reset.

Action: None.

RESETPFT

RESETPFT changes the transfer state of a file from partial to pending. When this command is executed, the PFT file specified by the command has a transfer state of pending and both the last acknowledged block and retry count are set to zero. When a file reset by this command is transferred, the transfer starts at the beginning of the file.

The RESETPFT command cannot be used to reset a file that is currently transferring.

Syntax and parameters

RESETPFT session filename

where

session specifies the name of the AFT session.

filename specifies the file to be reset. Enter the file name exactly as it appears in the AFT system directory. To view the file name in the AFTCI directory, execute the queryaft command.

Example

>RESETPFT aft1 u880531125057occ

Responses

```
Bad send of message to AFT session –– See SWERR.
```

Meaning: The command cannot contact the AFT software. The AFT system is not updated and a SWERR is generated.

Action: Contact the next level of support and provide them with the data in the SWERR.

```
Bad AFT message received.
```

Meaning: The command received a message that it did not recognize. The AFT system is not updated.

Action: Contact the next level of support.

`Could not contact AFT system.`

Meaning: The command does not receive a response from the AFT software. The AFT system is not updated.

Action: Contact the next level of support.

`File <file name> is ACTIVE and cannot be reset.`

Meaning: You entered a file name that is not in the AFT system directory. The AFT system is not updated.

Action: Enter the command with the correct file name.

`File <file name> is not a PFT file.`

Meaning: You entered a file name that is not a partial file. The AFT system is not updated.

Action: Enter the name of a partial file.

`<session name> is invalid.`

Meaning: You supplied an invalid session name. The AFT system is not updated.

Action: Check the GASINFO table and enter the command with the correct session name.

`<session name> is not an AFT session.`

Meaning: You entered a session name that is in the GASINFO table, but is not an AFT session. The AFT system is not updated.

Action: Check the GASINFO table and enter the command with the correct session name.

`The <file name> has been reset.`

Meaning: The command executed normally. The file specified by the command has its transfer state changed to pending, and both the last acknowledged block and retry count set to zero. The AFT system is not updated.

Action: Check the GASINFO table and enter the command with the correct session name.

SETAFT

SETAFT sets the next AFT file to transfer. This command does not interrupt a file currently transferring. When you execute this command, the specified file starts transferring when the current file transfer completes.

If you execute the command when the system is disabled, the file specified in the command is the first file to transfer when the AFT system starts.

Once the SETAFT command is executed successfully, files are chosen sequentially starting with the file specified by the command. When this command executes successfully, the N–> pointer appears next to the specified file.

Note: Be careful when using this command because it allows you to manipulate which files are sent across the NetConn.

You cannot set the next file pointer on a file in the complete, active, or error state.

An override file in the AFT directory at the time this command is executed is unaffected by this command. The file specified by this command transfers after the completion of the override file.

Syntax and parameters

SETAFT session filename

where

session specifies the name of the AFT session.

filename specifies the AFT file to be the next file to transfer. Enter the file name exactly as it appears in the AFT system directory. To view the file name in the AFTCI directory, execute the queryaft command.

Example

>SETAFT aft1 u880531141059occ

Responses

```
Bad AFT message received.
```

Meaning: The command received a corrupt message from the AFT system. The AFT system is not updated.

Action: Contact the next level of support.

```
Bad send of message to AFT system –– See SWERR.
```

Meaning: The AFT system cannot be contacted. The AFT system is not updated.

Action: Record the information in the SWERR and contact the next level of support.

```
Could not contact AFT system.
```

Meaning: The AFT system cannot be contacted. The AFT system is not updated.

Action: Contact the next level of support.

```
File is already transferring.
```

Meaning: You tried to set the next file while it is transferring. The AFT system is not updated.

Action: Wait and try again later.

```
File is in a non-transferrable state.
```

Meaning: The file you specified is in one of these states—manual, complete, active, or error. The AFT system is not updated.

Action: Enter the command again with the correct file name.

```
File is not in the AFT directory.
```

Meaning: The file you specified is not in the AFT system directory. The AFT system is not updated.

Action: Enter the command again with the correct file name.

```
<file name> will transfer next.
```

Meaning: The command completed normally. The AFT system modifies its internal data structures to reflect the change in the file transfer order.

Action: Examine the file name in the response to make certain that the next file the AFT system transfers is the correct file.

```
Session name is invalid.
```

Meaning: You entered an invalid AFT session name. The AFT system is not updated.

Action: Refer to table GASINFO and retry the command with the correct session name.

SETOVR

SETOVR manually sets an override file transfer. When this command is executed, the override file pointer (O–>) is moved to the specified file. When the AFT system restarts, the override file begins transferring. When the override file transfer has completed normally, the AFT system transfers the next file. This command can be used to transfer any file except files with a transfer state of manual.

Note: Be careful when using this command because it allows you to transfer any file in the AFT system except files with a transfer state of manual. Using this command improperly can result in duplicate files on the remote processor.

The results of the SETOVR command can be reversed by executing the RESETOVR command.

Syntax and parameters

SETOVR session filename

where

session specifies the name of the AFT session.

filename specifies the AFT file to be the next file to transfer. Enter the file name exactly as it appears in the AFT system directory. To view the file name in the AFTCI directory, execute the queryaft command.

Example

>SETOVR aft1 u880531141055occ

Responses

```
Bad AFT message received.
```

Meaning: The command received a corrupt message from the AFT system. The AFT system is not updated.

Action: Contact the next level of support.

```
Bad send of message to AFT system –– See SWERR.
```

Meaning: The AFT system cannot be contacted. The AFT system does not set the override pointer.

Action: Record the information in the SWERR and contact the next level of support.

```
Could not contact AFT system.
```

Meaning: The AFT system cannot be contacted. The AFT system does not set the override pointer.

Action: Contact the next level of support.

```
File <file name> is already transferring.
```

Meaning: You tried to set the file to override while it is transferring. The AFT system does not set the override pointer.

Action: Wait and try again later.

```
File <file name> is in a non-overridable state.
```

Meaning: The file you specified is in a manual transfer state. A file in a manual transfer state cannot be designated as the override file. The AFT system does not set the override pointer.

Action: Select another file or continue with the next task.

```
File <file name> is not in the AFT directory.
```

Meaning: The file you specified is not in the AFT system directory. The AFT system does not set the override pointer.

Action: Enter the command again with the correct file name.

```
File <file name> is set for override transfer.
```

Meaning: The command completed normally. The AFT system sets the override pointer on the file specified in the command.

Action: Query the AFT system directory to confirm that the override pointer is on the correct file.

```
<session name> is invalid.
```

Meaning: You entered an invalid AFT session name. The AFT system does not set the override pointer.

Action: Refer to table GASINFO and try the command with the correct session name.

```
<session name> is not an AFT session.
```

Meaning: You entered a session name that is in table GASINFO, but is not an AFT session. The AFT system does not set the override pointer.

Action: Refer to table GASINFO and try the command with the correct session name.

```
<session name> is invalid.
```

Meaning: You entered an invalid AFT session name. The AFT system does not set the override pointer.

Action: Refer to table GASINFO and retry the command with the correct session name.

STARTAFT

STARTAFT starts the transfer of files in the AFT system. When this command is executed, a one-minute timer starts. When the timer expires, AFT begins to transfer files. If there is an override file in the AFT system, AFT transfers that file. Otherwise, AFT transfers the next file.

Note: You can execute the QUERYAFT command to verify that the correct file is going to be transferred.

The STARTAFT command can be reversed by executing the STOPAFT command before the one-minute start timer expires.

Syntax and parameters

STARTAFT session

where

session specifies the name of the AFT session.

Example

>STARTAFT aft1

Responses

```
AFT is not connected with SST –– Cannot Start.
```

Meaning: The connection between the AFT system and SST is down. The AFT system attempts to bring up the connection every minute. The AFT system is not started.

Action: Contact the next level of support.

```
AFT session <session name> has been started.
```

Meaning: This is the normal response for the startaft command. The startaft command sets a one-minute timer. When the timer expires, the AFT system starts transferring files.

Action: To disable the AFT session before files begin transferring, execute the AFTCI directory STOPAFT command before the one-minute timer expires.

```
Bad send of message to AFT system –– see SWERR.
```

Meaning: The AFT system cannot be contacted. The AFT system is not started.

Action: Contact the next level of support.

```
<session name> is invalid.
```

Meaning: The session name you entered is not a valid AFT session. The AFT system is not started.

Action: Refer to table GASINFO for a valid AFT session name and enter the command again.

```
Session <session name> is already started.
```

Meaning: The AFT session name you entered is already started. The AFT system is not restarted.

Action: None

STOPAFT

STOPAFT stops the AFT system from transferring files. This command does not interrupt the active file transferring. When the current active file has been transferred and the STOPAFT command has been executed, AFT stops transferring files. To resume transferring files, execute the STARTAFT command.

Because this command does not interrupt the actively transferring file, it cannot be used to halt a file transfer.

Syntax and parameters

STOPAFT session

where

session specifies the name of the AFT session.

Example

>STOPAFT aft1

Responses

```
AFT session <session name> has been stopped.
```

Meaning: The command executed correctly. The stopaft command stops transferring files after the completion of the actively-transferring file.

Action: When you want the AFT system to begin transferring files again, the AFTCI directory startaft command must be executed.

```
Bad send of message to AFT system –– see SWERR.
```

Meaning: The AFT system cannot be contacted. The AFT system is not stopped.

Action: Contact the next level of support.

```
<session name> is invalid.
```

Meaning: The session name you entered is not valid. The AFT system is not stopped.

Action: Refer to table GASINFO for a valid AFT session name and enter the command again.

```
Session <session name> is already stopped.
```

Meaning: The AFT session name you entered is already stopped.

Action: Go to the next task.

MFT commands

The MFT commands are in the general application system (GAS) CI command level, an increment of the main CI level. To access the GAS CI level, enter the following command from the CI level.

GAS

Table 12-2 lists the MFT commands. The commands are described in detail on the pages that follow.

Table 12-2
MFT commands

Command	Description
DELFILE	Removes file transfer activity from current list.
SHOWAPPL	Shows files partially transferred.
SHOWSTATS	Displays transfer status for all files.
STARTAPPL	Starts the file transfer session.

DELFILE

DELFILE removes a specific file transfer activity from the list of running applications.

Syntax and parameters

DELFILE netconn index

where

netconn specifies the network connection defined in table RASLAPPL to delete.

index specifies the index number of the file to delete. The SHOWAPPL command displays the index number.

Example

>DELFILE dpft2 2

Responses

```
Invalid application.
```

Meaning: The application type (NetConn) is not a valid RASL application type. The system discards the command.

Action: Check the application type and enter the command again.

```
Invalid index.
```

Meaning: The index is not associated with an actual transfer application. The system discards the command.

Action: Check the index using the SHOWAPPL command and enter the DELFILE command again.

```
Delete entry number x.
In the PFT Record zzzzz.
Please Confirm?
```

Meaning: The system recognizes the application type and index. You must confirm the request to delete or abort the command.

Action: Enter YES or Y to delete the entry. Enter NO or N to abort the command.

```
Index deleted.
```

Meaning: The deletion was successful.

Action: None

```
Delete request aborted.
```

Meaning: The deletion was not successful.

Action: Two possible reasons for the abort are a transfer in progress or a nil entry.

SHOWAPPL

SHOWAPPL displays a table that lists the activities currently being managed by the RASL system.

This command displays the files that have been partially transferred (or are under transfer as a result of the previous partial transfer) by displaying an internal buffer system of all the DMS file transfer sessions that have ended

in an incomplete transfer of data. The internal buffer is a circular buffer with an upper bound of six entries per session.

The data viewed includes the block number where the file died, filename, and the network connection that is associated with this aborted transfer.

Syntax and parameters

SHOWAPPL netconn

where

netconn specifies the network connection defined in table RASLAPPL for which to display information. If you don't specify a network connection, the software displays information for all datafilled sessions.

Example

>SHOWAPPL dpft2

Responses

If a valid netconn is entered in the command, the system responds with one of the following displays:

```
#  Session  State   DMS Filename    FE Filename Block   Retry
-- -------  ------  -------------   ----------- ------  -----
No Partial File Transfers to Show
```

Meaning: There are no partial file transfers to be displayed.

Action: None

```
#  Session  State   DMS Filename    FE Filename Block   Retry
-- -------  ------  -------------   ----------- ------  -----
0           UNPROC  outfile         bigfile         0       0
```

Meaning: The # field indicates the index into this table, the Block field indicates the last block transmitted, and the Retry field reflects the number of retries performed for the transfer.

Action: None

SHOWSTATS

SHOWSTATS generates an NPAC109 statistics log. The GAS statistics log generates only if the session is active. This command displays the transfer status for all files.

Syntax and parameters

SHOWSTATS netconn

where

netconn specifies the network connection defined in table RASLAPPL for which to print an NPAC109 log. If a network connection is not specified, the software displays information for all datafilled sessions.

Example

>SHOWSTATS outgoing

Responses

```
Session not active.
```

Meaning: The session is not active. The system discards the command and no log report is generated.

Action: None

STARTAPPL

STARTAPPL starts the specified application—transfer or receive—for a session initiated by the switch.

Syntax and parameters

STARTAPPL XFER fname fefile BLOCK

where

fname specifies the name of the file to be transferred from the switch to the host.

fefile specifies the name of the file on the host.

BLOCK formats the file into 2k-byte buffers.

or

STARTAPPL RECV fefile fname BLOCK

where

fefile specifies the name of the file sent by the host.

fname specifies the name of the file on the switch.

BLOCK formats the file into 2k-byte buffers.

Example

>STARTAPPL XFER MPCLINK$DMO MPCLINK$DMO BLOCK

>STARTAPPL RECV U9404011357110CC U9404011357110CC BLOCK

Responses

The response shows logs that indicate the starting of the data transfer or the receiving of a file.

RASL commands

The RASL command level is an increment of the main CI level. To access the RASL command level, enter the following command from the CI level.

RASL

Table 12-3 lists the RASL commands. The commands are described in detail on the pages that follow.

Table 12-3
RASL commands

Command	Description
RASLCLOSE	Terminate a network connection.
RASLSTART	Enable a network connection again.
RASLSTOP	Disable a network connection for datafilled changes.
SHOWRASL	Summary of operational network connections.

RASLCLOSE

RASLCLOSE terminates a network connection when problems occur. The system automatically attempts to open the network connection again for AFT sessions. For MFT sessions, the system does not attempt to open the connection again.

Syntax and parameters

RASLCLOSE netconn

where

netconn specifies a network connection defined in table RASLAPPL.

Example

>RASLCLOSE netcon3

Responses

```
Warning netcon will be closed.
Please confirm (”YES,” ”Y,” ”NO,” N):
```

Meaning: The network connection will be closed.

Action: Enter YES or Y to close the network connection. Enter NO or N to abort the command.

```
Next par is: <NETCONN: > STRING.
Enter: <NETCONN: >
```

Meaning: You entered the raslclose command without specifying a network connection.

Action: Enter a valid network connection.

```
Unknown network connection.
```

Meaning: You entered an invalid network connection.

Action: Enter a valid network connection.

RASLSTART

RASLSTART re-enables a network connection. If a tuple is changed in table RASLAPPL, this command must be executed. If it is not executed, the link remains suspended and no operations can be performed on that connection.

Syntax and parameters

RASLSTART netconn

where

netconn specifies a network connection defined in table RASLAPPL.

Example

>RASLSTART netcon3

Responses

```
Warning netcon will be enabled for datafill change.
Please confirm (”YES,” ”Y,” ”NO,” N):
```

Meaning: The network connection will be re-enabled.

Action: Enter YES or Y to enable the network connection. Enter NO or N to abort the command.

```
Next par is: <NETCONN: > STRING.
Enter: <NETCONN: >
```

Meaning: You entered the raslstart command without specifying a network connection.

Action: Enter a valid network connection.

```
Unknown network connection.
```

Meaning: You entered an invalid network connection.

Action: Enter a valid network connection.

RASLSTOP

RASLSTOP disables a network connection. This command must be executed before a tuple in table RASLAPPL is changed or deleted. While the connection is suspended, no operations can be performed on that connection. Table RASLAPPL datafill can be changed at this time. The RASLSTART command must be executed after the changes are made.

Syntax and parameters

RASLSTOP netconn

where

netconn specifies a network connection defined in table RASLAPPL.

Example

>RASLSTOP netcon3

Responses

```
Warning netcon will be disabled for datafill change.
Please confirm (”YES,” ”Y,” ”NO,” N):
```

Meaning: The network connection will be disabled.

Action: Enter YES or Y to enable the network connection. Enter NO or N to abort the command.

```
Next par is: <NETCONN: > STRING.
Enter: <NETCONN: >
```

Meaning: You entered the raslstart command without specifying a network connection.

Action: Enter a valid network connection.

```
Unknown network connection.
```

Meaning: You entered an invalid network connection.

Action: Enter a valid network connection.

SHOWRASL

SHOWRASL displays an operational summary of all network connections datafilled in table RASLAPPL.

Syntax and parameters

SHOWRASL

There are no variables or parameters.

Example

>SHOWRASL

Responses

```
netconn        appl        acsinfo       status enabled
-----------------------------------------------------------
RL           REMLOGIN    MPCSVC 3 2      CLOSED    Y
RL2          REMLOGIN    MPCSVC 3 2      CLOSED    Y
RL3          REMLOGIN    MPCSVC 3 2      CLOSED    Y
```

CI and LOGUTIL commands

This section describes the CI and LOGUTIL commands that you execute when you set up SPR OUTLOG, SINS, and LINS sessions. OMACCGRP, OMCLASS, and STARTDEV are CI commands that you execute from the main CI level. You execute the ADDREP command from the LOGUTIL command level.

ADDREP

ADDREP enables you to add reports to those handled by a device.

Syntax and parameters

ADDREP io_device logname repnum

where

io_device specifies the output device.

logname specifies the log name or names.

repnum specifies the report number or numbers.

Example

>ADDREP SINS OMPR 200

Responses

```
<io–device> is not a valid device.
```

Meaning: You specified an invalid I/O device.

Action: You must start a device before it is a valid device. Use the STARTDEV command to make the device available and enter the command again.

```
Log <log> not found.
```

Meaning: You specified an invalid log name.

Action: Use the LISTLOGS command to find a valid log name and enter the command again.

```
First parameter must be a LOG – flushing . . .
```

Meaning: You specified an invalid log.

Action: Use the LISTLOGS command to find a valid log name and enter the command again.

OMACCGRP

OMACCGRP assigns or deletes OM groups to or from classes previously defined by the OMCLASS command.

Syntax and parameters

OMACCGRP class ADD|DELETE ALL

or

OMACCGRP class ADD|DELETE GROUP group

where

class specifies the name of the class.

ADD specifies to add OM groups to the specified class.

DELETE specifies to delete OM groups from the specified class.

ALL specifies that all OM groups are to be added or deleted.

GROUP specifies that a specific OM group is to be added or deleted.

group specifies the OM group that is to be added to or deleted from a class.

Example

>OMACCGRP SHORTSTS ADD GROUP TRK

Responses

```
OK.
```

Meaning: The command was successfully executed.

Action: None.

```
Active/holding store is not allocated for GROUP group.
```

Meaning: The OM group you specified is not recognized.

Action: Verify that the group name was entered correctly. Use the Q OMACCGRP, Q OMACCFLD, or Q OMSHOW commands to view valid OM group names.

```
GROUP group is already in CLASS class.
```

Meaning: The group you tried to add is already included in the specified class.

Action: None.

```
GROUP group is not in CLASS class.
```

Meaning: The group you tried to delete is not included in the specified class.

Action: None.

```
GROUP group not deleted from CLASS class because of tuple in
table OMGRPORD.
```

Meaning: The group you tried to delete is not included in the specified class.

Action: None.

OMCLASS

OMCLASS defines a new measurement class of accumulating registers and adds corresponding tuples to table OMACC. Once a class is defined, you can rename it but you cannot delete it.

For a class name to have meaning, registers or register groups must be assigned to the class through the use of the OMACCFLD or OMACCGRP commands.

Syntax and parameters

OMCLASS class SINGLE|DOUBLE|HOLDING

or

OMCLASS class RENAME class

or

OMCLASS class HISTORY snapshots transfer

where

class specifies the name to be assigned to a class of accumulating registers. The range is up to eight characters beginning with an alphabetic character. Up to 30 class names can be defined. This maximum is in addition to Active and Holding, which are predefined.

SINGLE specifies that registers assigned to the class are to be single precision, capacity 65 535 (2^{16}–1) counts. If the data accumulated is likely to exceed 65 536 counts during the proposed accumulative period as set in table OMACC, a double precision accumulating register should be used. Accumulating registers do not overflow to an extension register. To change a class precision, all OM groups must first be deleted from the class.

DOUBLE specifies that registers assigned to the class are to be double precision, with a capacity of 4 294 967 295 (2^{32}–1) counts. To change a class precision, all OM groups must first be deleted from the class.

HOLDING specifies that output is taken directly from the holding registers. Selection of fields using the command OMACCFLD is not possible. To be meaningful, the period of transfer of data should be set to AUTO (table OMACC).

RENAME specifies a new name is to be assigned to an existing class.

HISTORY defines a history class of registers. History classes can be defined only if the switch has the OM Transfer Period and History Class Enhancements feature, NTX099AA.

snapshots specifies the number of history registers per measurement. Range 1–6. (See note.)

transfer specifies the time, in minutes, that a single history register is current. For example, if the value is 5, the history registers are cycled every 5 minutes. Range 5, 10, 15, 20, or 30.

Note: When parameters snapshots and transfer are set using command OMCLASS, corresponding read-only fields are automatically datafilled in table OMACC. The fields in table OMACC cannot be changed by table editor commands.

Example

>OMCLASS SHORTSTS HISTORY 1 5

Responses

```
OK.
```

Meaning: The command was processed as entered; or the class name already exists but registers have not been assigned to it.

Action: You can now assign registers or register groups to the class by using the OMACCGRP or OMACCFLD commands.

```
Maximum number of classes already defined.
```

Meaning: The maximum number of operating company-defined classes (30) has been exceeded.

Action: Review existing classes for usefulness and redefine a class if possible.

```
OM class redefinition failed. Group(s) not deleted.
```

Meaning: An attempt has been made to redefine an existing class (for example, a request to change an existing class to determine if it fulfills the purpose of the intended new class. If not, establish a new name and enter the command again.

Action: Review the contents and collection parameters of the existing class to determine if it fulfills the purpose of the intended new class. If not, establish a new name and enter the command again.

```
OM class renamed.
```

Meaning: The renaming command has been processed as entered.

Action: Review and reassign registers to the class, as necessary, by using the OMACCGRP or OMACCFLD commands.

```
Rename failed. New OM class already defined.
```

Meaning: The class name is already in use.

Action: Review purpose of existing class, determine whether it can be used to meet the requirement, and redefine where applicable.

```
Rename failed. Old OM class undefined.
```

Meaning: The class name entered does not exist.

Action: Verify that the class name was entered correctly. Use Q OMACCGRP or Q OMACCFLD to view valid class names.

```
OM history class feature not enabled.
```

Meaning: Use of the history class is not authorized.

Action: Use the table editor commands to check the OMHISTORYON parameter in table OFCOPT. This parameter must be set to Y, but this can only be done using a nonresident program. Contact Northern Telecom if the feature is required.

STARTDEV

STARTDEV starts printing of logs at the specified devices.

Syntax and parameters

STARTDEV io_device

where

io_device specifies the output devices for the logs.

Example

>STARTDEV sins

Responses

```
From mode MS0.
Log device has started.
```

Meaning: The device has started.

Action: None.

```
From mode MS0.
Log device is already started.
```

Meaning: The device is already started on the node.

Action: None.

```
From mode MS0.
MS0: Node is not responding.
```

Meaning: The status of the node is not responding to the central node at the time the command is issued. You may not be able to start devices at this time on the node.

Action: Ensure that the node status is responding before you issue the command again.

```
From mode MS0.
Unable to start device.
```

Meaning: The system is unable to create a process for the device at this time.

Action: Wait and try the command again later.

`<io_device> is not a valid device.`

Meaning: You specified an invalid device.

Action: Specify a valid device and issue the command again.

`Local context cannot be set—defaulting to central context.`

Meaning: System resources cannot be allocated at this time.

Action: Ensure the system resources are available before you issue the command again.

Appendix A: AFT-MNP message sequences

This appendix shows the sequence of messages sent between the switch and the host during an automatic file transfer-multi-network protocol (AFT-MNP) session in each of the following instances:

- AFT-MNP sessions using a single link
  - — normal session
  - — session with acknowledgments sent out of order by the host
  - — re-established session
  - — session with local window timer shown
  - — session brought down when the switch receives an invalid acknowledgment from the host
- AFT-MNP sessions using two links
  - — normal session
  - — session with one link going down
  - — session with acknowledgments sent out of order by the host
  - — re-established session
  - — session with global window time-out on one link
  - — session with one link brought down when the switch receives an invalid acknowledgment from the host

Figure 13-1 shows a normal file transfer with two data blocks transferred over one link.

Figure 13-1
Single-link configuration—normal session

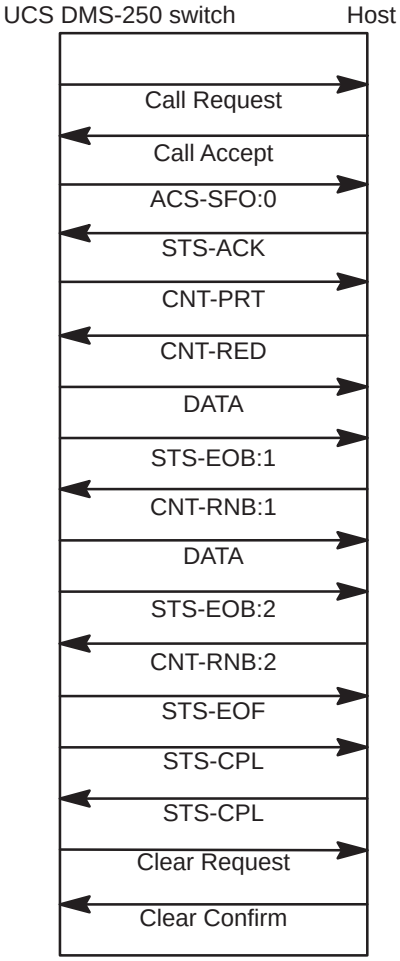


Figure 13-2 shows a file transfer with the acknowledgments to data blocks one and two sent out of order by the host.

Figure 13-2
Single-link configuration—out-of-order acknowledgment

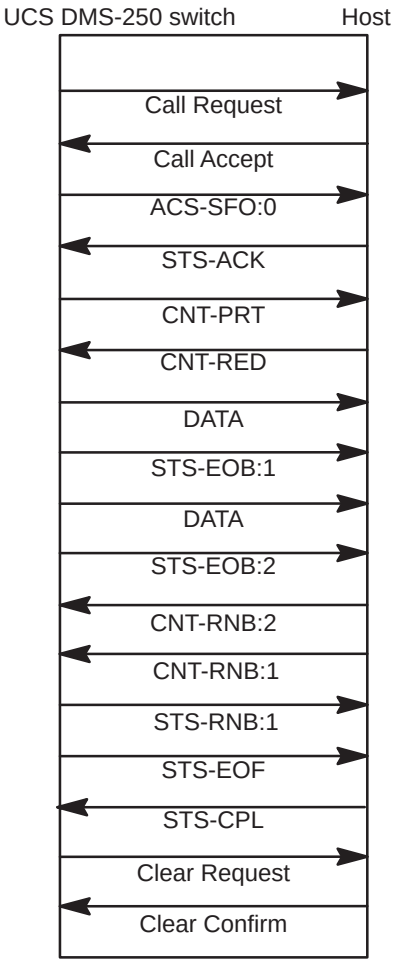


Figure 13-3 shows the transfer of the last two data blocks of a billing file.

Figure 13-3
Single-link configuration—session re-establishment

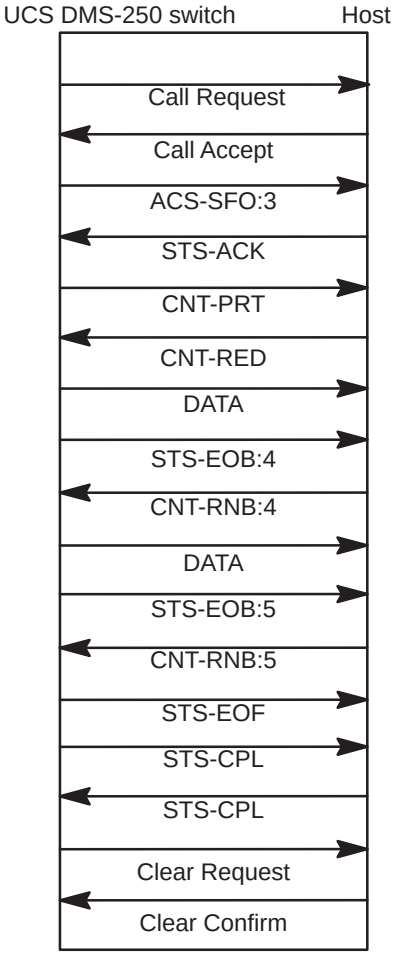


Figure 13-4 shows a normal file transfer with the acknowledgment to data block one received before the local window timer expires.

Figure 13-4
Single-link configuration—local window timer shown

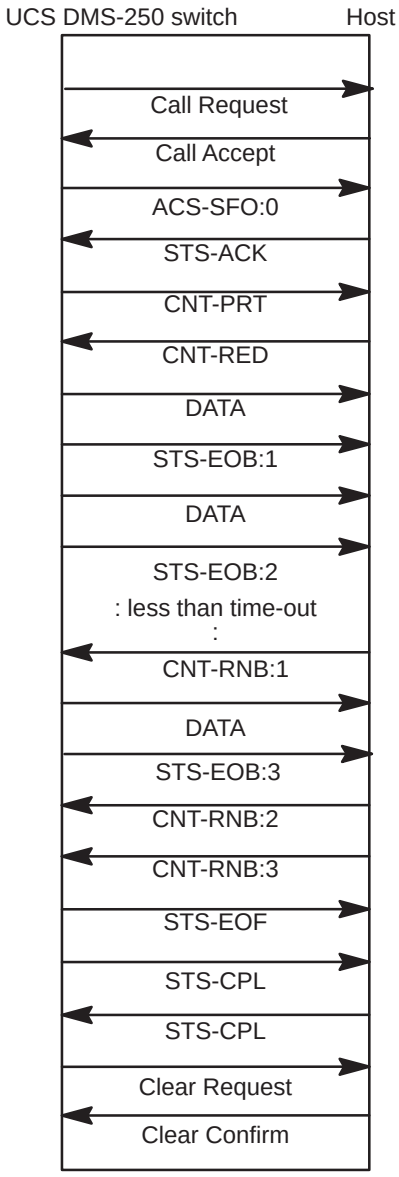


Figure 13-5 shows that the link is brought down when the switch receives an invalid acknowledgment message (CNT-RNB:3) from the host.

Figure 13-5
Single-link configuration—invalid acknowledgment

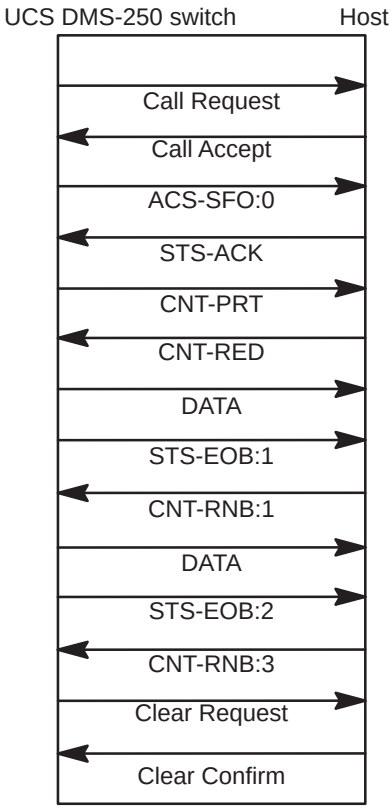


Figure 13-6 shows a normal file transfer with four data blocks transferred over two links.

Figure 13-6
Dual-link configuration—normal session

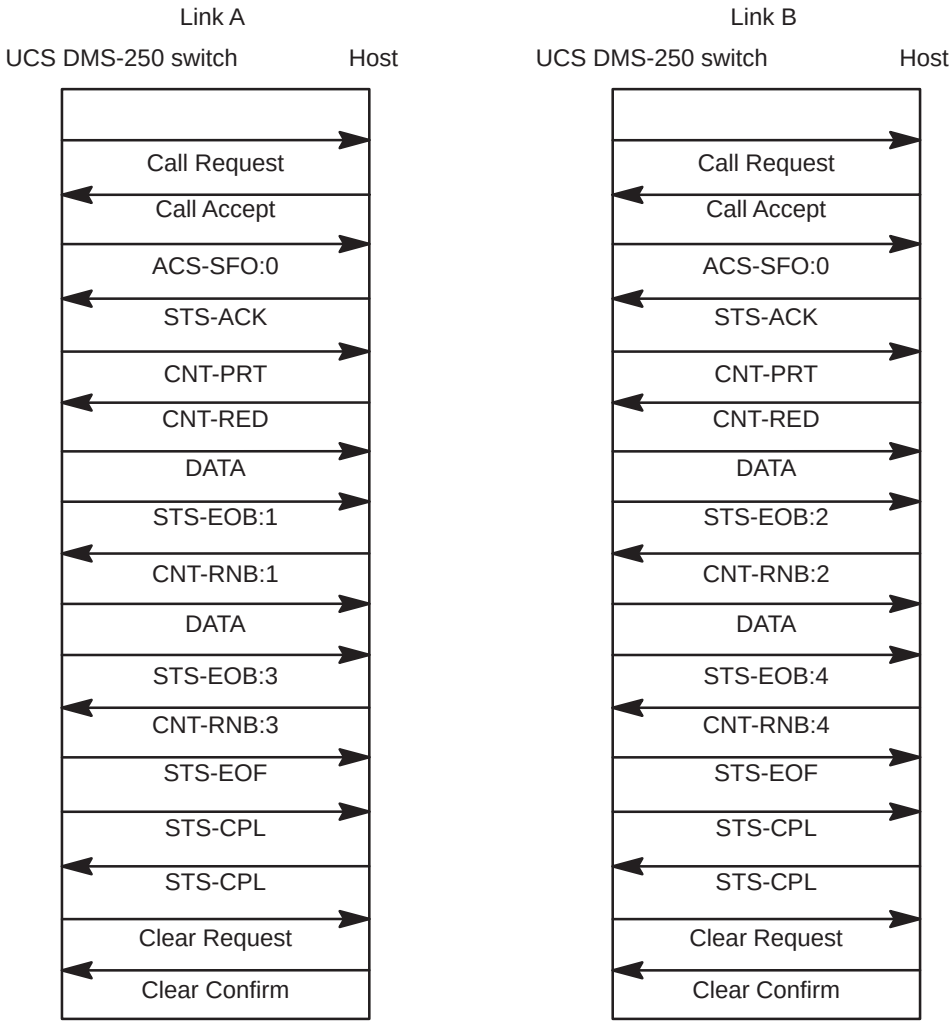


Figure 13-7 shows a file transfer with four data blocks being transferred over two links. When link B goes down, the unacknowledged data block (data block 3) is retransmitted over link A.

Figure 13-7
Dual-link configuration—one link goes down

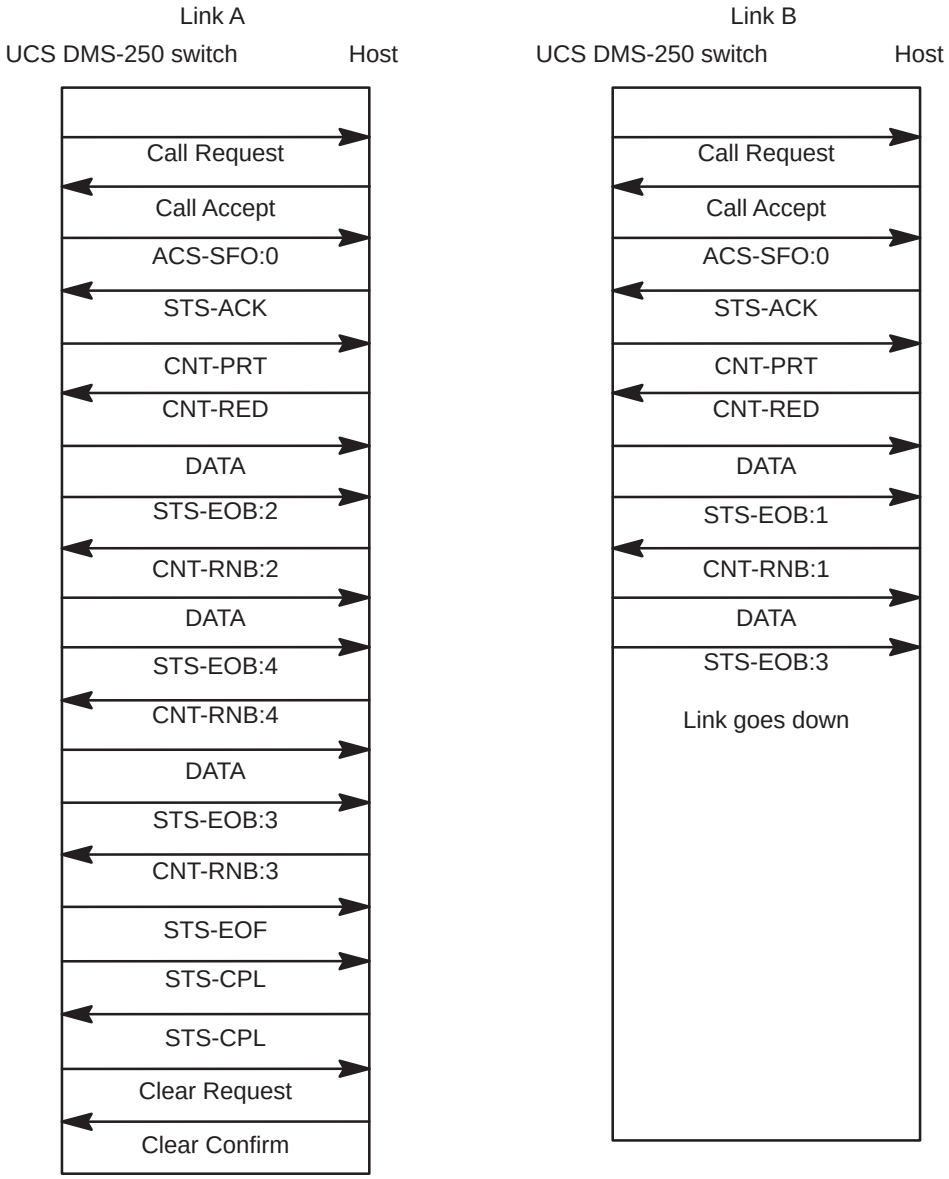


Figure 13-8 shows a file transfer over two links with the acknowledgments to data blocks one and two sent out of order by the host.

Figure 13-8
Dual-link configuration—out of order acknowledgements

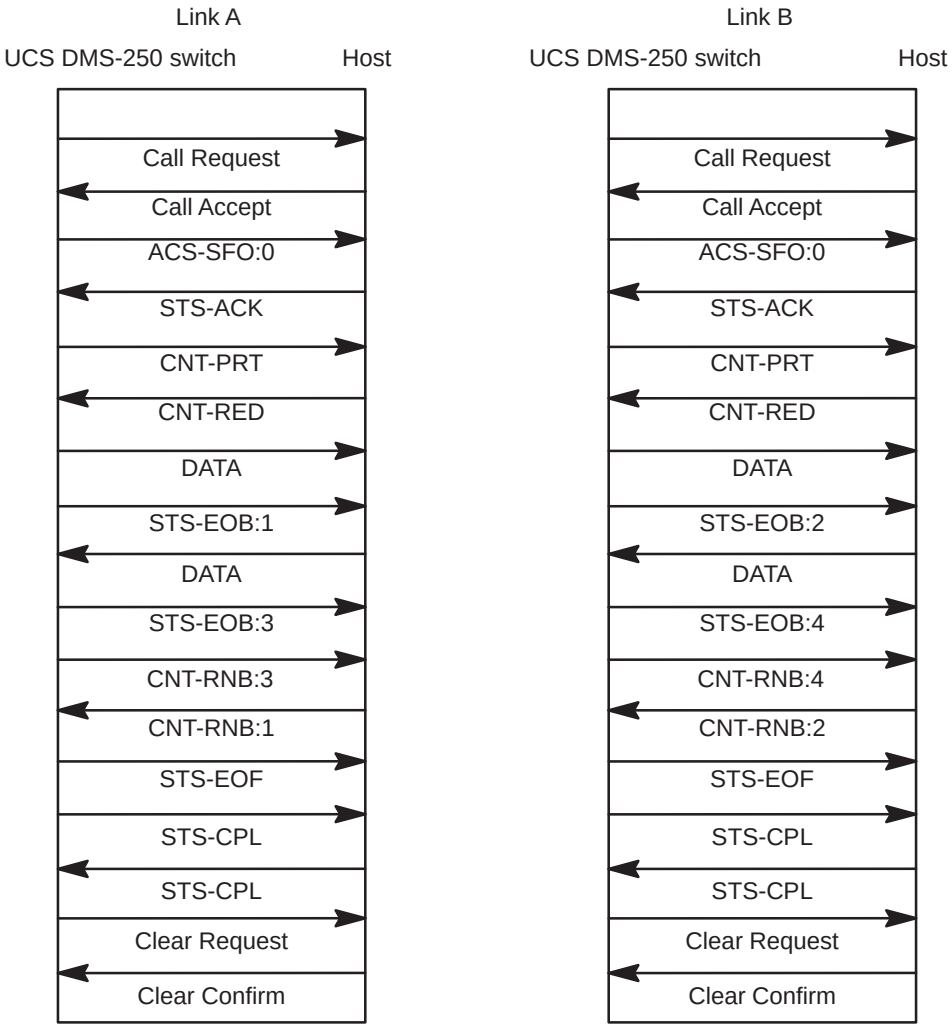


Figure 13-9 shows a file transfer session that is re-established after terminating abnormally.

Figure 13-9
Dual-link configuration—session re-establishment

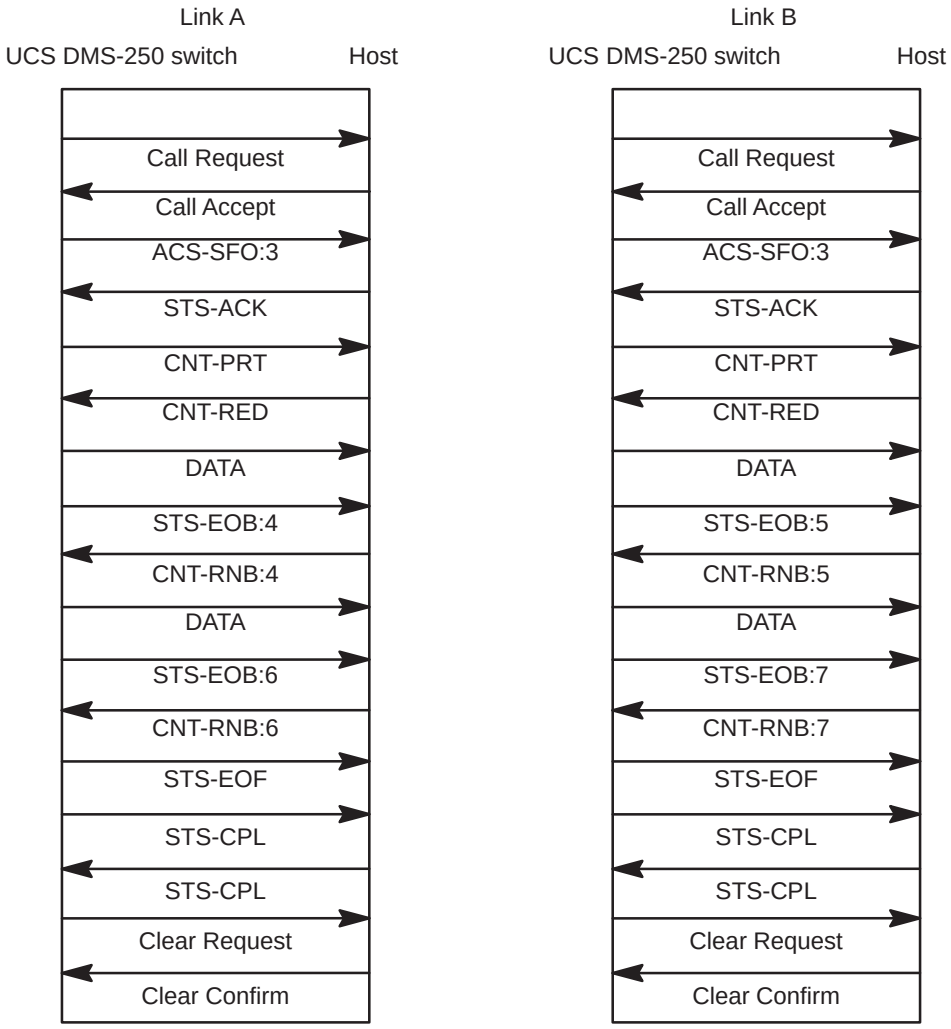


Figure 13-10 shows a file transfer with four data blocks being transferred over two links. When link A's global window timer expires, the link is taken

out of service and the unacknowledged data blocks (data blocks 1 and 3) are retransmitted over link B.

Figure 13-10
Dual-link configuration—global window timer time-out

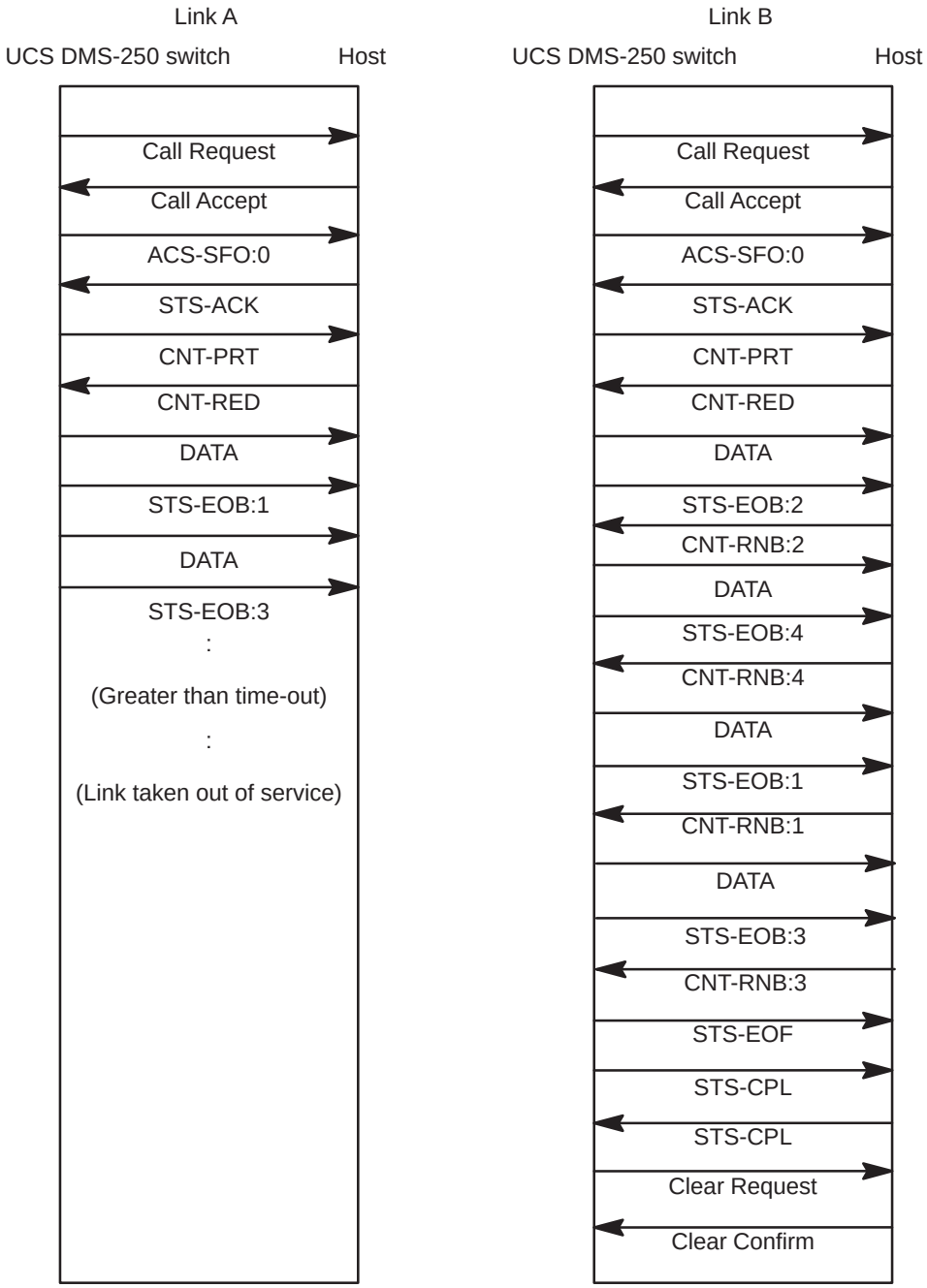
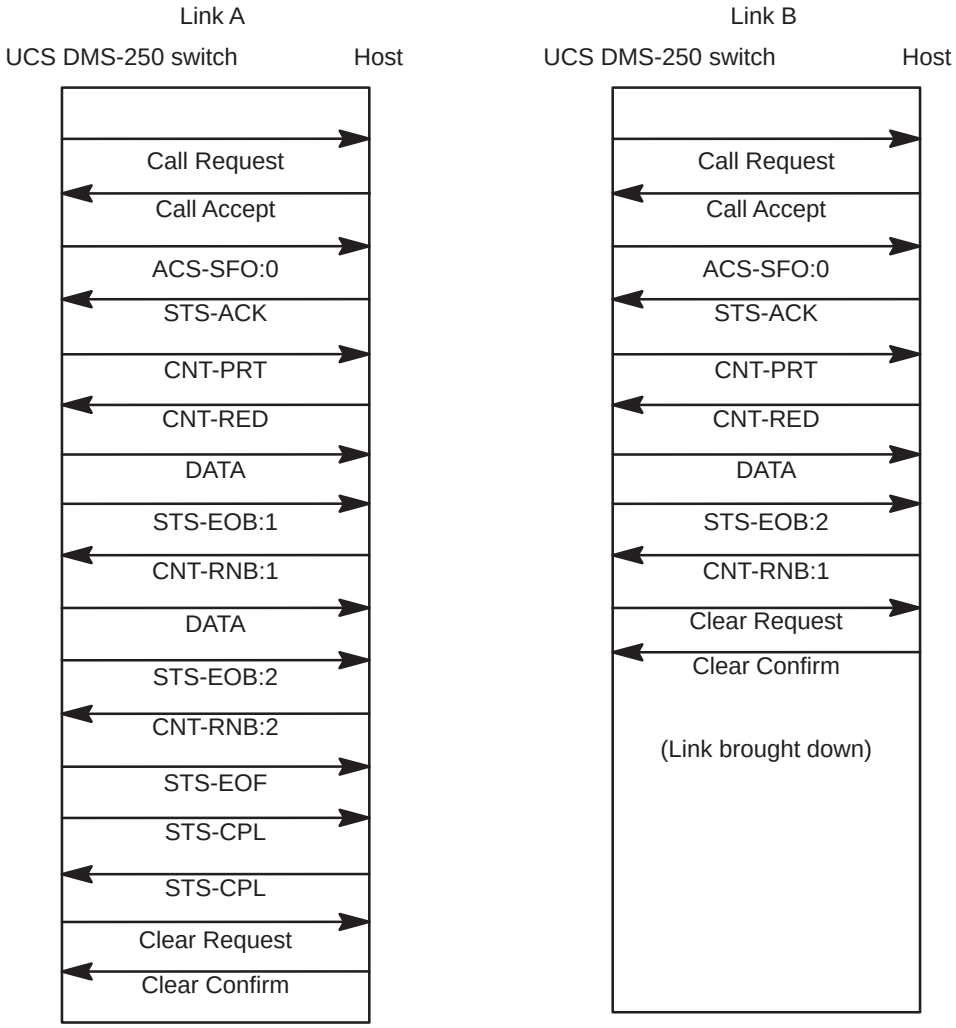


Figure 13-11 shows a file transfer with four data blocks being transferred over two links. When the switch receives an invalid acknowledgment from the host on link B, that link is brought down.

Figure 13-11
Dual-link configuration—invalid acknowledgment



Appendix B: Level 2 and level 3 functions supported

The NT1X89BA card complies fully with the 1980 CCITT X.25 protocol. Additionally, the card complies with a subset of the 1984 CCITT X.25 Recommendation.

The level 2 functions supported (Table 14-1) comply with both the 1980 and 1984 X.25 recommendations.

Level 3 functions that have been enhanced to comply with the 1984 X.25 recommendation are indicated by parentheses (1984) in the Supported column.

Level 2 procedures, frame types, and parameters

Table 14-1 shows the level 2 procedures, frame types, and parameters supported on the NT1X89BA card.

Table 14-1
Level 2 procedures, frame types, and parameters

Level 2 procedures, frame types, and parameters	Supported
Single link procedure (SLP)	Yes
Multiple link procedure (MLP)	No
Link setup procedures	Yes
Information transfer procedures	Yes
Flow control procedures	Yes
Error control procedures	Yes
Link disconnection procedures	Yes
SABM frame	Yes
UA frame	Yes

—continued—

Table 14-1
Level 2 procedures, frame types, and parameters (continued)

Level 2 procedures, frame types, and parameters	Supported
I frame	Yes
RR frame	Yes
RNR frame	Yes
REJ frame	Yes
FRMR frame	Yes
DISC frame	Yes
DM frame	Yes
Timer T1	Yes
Timer T2	Yes
Timer T3	Yes
Timer T4	Yes
Retransmission counter N2	Yes
Level 2 window K	Yes
Modulo 8 numbering	Yes
Modulo 128 numbering	Yes
—end—	

Level 3 procedures, frame types, and parameters

Table 14-2 shows the level 3 procedures, frame types, and parameters supported on the NT1X89BA card.

Table 14-2
Level 3 procedures, frame types, and parameters

Level 3 procedures, frame types, and parameters	Supported
Switched virtual calls (SVC)	Yes
Permanent virtual circuits (PVC)	Yes
Restart procedures	Yes
SVC setup procedures	Yes
—continued—	

Table 14-2
Level 3 procedures, frame types, and parameters (continued)

Level 3 procedures, frame types, and parameters	Supported
SVC clearing procedures	Yes
SVC and PVC data transfer procedures	Yes
SVC and PVC interrupt procedures	Yes
SVC and PVC flow control procedures	Yes
SVC and PVC reset procedures	Yes
SVC and PVC error control procedures	Yes
Restart request (indication) packet	Yes
Restart confirmation packet	Yes
Call request (incoming call) packet	Yes
Call connect (accepted) packet	Yes
Clear request (indication) packet	Yes
Clear confirmation packet	Yes
Data packet	Yes
Interrupt packet	Yes
Interrupt confirmation packet	Yes
RR and RNR packet	Yes
Reset request (indication) packet	Yes
Reset confirmation packet	Yes
Diagnostic packet (only if DCE)	Yes
Reject packet	No
Registration packet	No
Registration confirmation packet	No
Timer T20	Yes
Timer T21	Yes
Timer T22	Yes
Timer T23	Yes
Timer T24	No
Timer T25	Yes

—continued—

Table 14-2
Level 3 procedures, frame types, and parameters (continued)

Level 3 procedures, frame types, and parameters	Supported
Timer T26	Yes
Timer T27	No
Timer T28	No
Retransmission counter R20	Yes
Retransmission counter R22	Yes
Retransmission counter R23	Yes
Retransmission counter R25	Yes
Retransmission counter R27	No

—end—

Level 3 optional user facilities

Table 14-3 shows the level 3 optional user facilities supported on the NT1X89BA card.

Table 14-3
Level 3 optional user facilities

Level 3 optional user facilities	Supported
Packet size facility (in bytes)	Yes
Window size facility	Yes
D-bit facility	Yes
M-bit facility	Yes
Q-bit facility	Yes
Modulo 8 and 128 sequencing	Yes
D-bit modification facility	No
Packet retransmission facility	No
On-line registration facility	No
Incoming calls barred facility	Yes
Outgoing calls barred facility	Yes

—continued—

Table 14-3
Level 3 optional user facilities (continued)

Level 3 optional user facilities	Supported
One-way logical channel incoming	Yes
One-way logical channel outgoing	Yes
Non-standard default packet size	Yes
Non-standard default window size	Yes
Default throughput class assignment	Yes
Flow control parameter negotiation • window size negotiation • packet size negotiation	Yes
Throughput class negotiation	Yes
Fast select facility	Yes
Fast select acceptance facility	Yes
Reverse charging facility	Yes
Reverse charging acceptance facility	Yes
RPOA selection facility (basic only)	Yes
RPOA selection facility (extended)	Yes (1984)
Closed user group facility	Yes (1984)
Local charging prevention facility	Yes (1984)
Network user identification facility	Yes (1984)
Charging information facility	Yes (1984)
Hunt group facility	Yes (1984)
Call redirection facility	Yes (1984)
Called line address modified notification (CLAMN) facility	Yes (1984)
Call redirection notification facility	Yes (1984)
Transit delay selection and indication (TDS&I) facility	Yes (1984)
—end—	

In addition to the user facilities shown in Table 14-3, the following CCITT-defined DTE user facilities are supported. These DTE user facilities are applicable only to the 1984 protocol.

- calling address extension facility

- called address extension facility
- minimum throughput class negotiation facility
- end-to-end transit delay negotiation
- expedited data negotiation (interrupt procedures)

Also with the 1984 protocol, when the NT1X89BA card acts as a true DTE and is connected to a packet network, Calling and Called Network facilities are supported if they are present.

Appendix C: Maximum billing capacity

This appendix describes the configuration of the input/output controller (IOC) required to achieve the stated capacity for billing records per hour. Included as well are configurations and limiting factors that hinder this capacity.

Factors affecting capacity

The capacity of the input/output controller to process billing records can be affected by the capacity, configuration, and application of system components. Factors affecting capacity include:

- SuperNode processor
- IOC capacity
- office parameter settings
- IOC configurations
- disk drive read/write speed
- tape read/write speed

IOC optimal configuration

To achieve the maximum billing capacity, configure the system as follows:

- Configure each DIRP subsystem (for example, OCC, parallel, OM, DLOG, JF) to dedicated disk drives and separate IOCs.
- Ensure active OCC or parallel is routed only to disk; do not route parallel to tape.
- Do not route read/write activity to a disk drive that is currently an active OCC, parallel, or could potentially become active during the read/write activity (for example, CDR searches, copy to tape, file erasing). Real time billing transfer will reduce the billing capacity because of increased disk activity. (During periods when optimal capacity is not expected or possible, disregard this.)
- Remove from rotation any disk drives dedicated to active OCC or parallel experiencing read/write errors until the problem is resolved.

- In table DIRPSSYS, set the field name PARCONC to “Y”. This ensures that parallel and normal recording will happen concurrently instead of serially.
- Set the office parameter DIRP_PFILE_AUDIT to “Y 3 30”. This ensures that files that have processed and expired will be erased; this makes space available when a rotate occurs.
- In table DIRPSSYS
  - — in field RETPD, set the CDR retention period to a low enough value so that DIRP_PFILE_AUDIT can reclaim enough files for the following day’s billing. Another way to reclaim enough files is to increase the number of volumes assigned to billing or increase the volume size.
  - — in field CRETPD, set the retention period for copied-to files to the same value as that in field RETPD.
- In table OFCENG, calculate the NO_OF_DMS250_REC_UNITS recommended by the *UCS DMS-250 Office Parameters Reference Manual*, and then add 45,000. This additional amount provides additional buffer space to store billing records during peak IOC activity and increases the amount of data store used by 7.5 Mbyte.

Disk allocation and DIRP subsystem requirements

To engineer the disk allocation and DIRP subsystem requirements, you must consider

- the limitations to SuperNode processing capacity (listed in this section)
- user operational requirements, including retention period, billing backup requirements, and tape copies
- total amount of billing records and OM data that is projected to be processed

Limitations to SuperNode processing capacity

The limitations to the SuperNode’s capacity for processing billing records are based on the read/write speed of the disk drives, tape drives, and system load modules (SLM). Many factors affect the actual read/write speed; benchmarking (other than the optimal configuration) is misleading and deceptive. For example, to benchmark, you would need to know the amount of OM data per DLOG, distance between segments on disk, CPU occupancy, and so on. Any change in one of these factors alters the results. Consider the limitations described in the following paragraphs.

Disk drives

Disk drives become the limiting factor of processing billing records when multiple concurrent read/writes are being performed on the same disk drive.

This limitation is due to the speed of the read/write heads and the distance the heads must travel during read/writes of multiple files.

The following are examples of limitations due to disk drives:

- performing disk-to-tape billing copies on disks that are writing active billing
- performing disk-to-tape billing copies on disks that become active during the tape copy
- performing CDR searches on disks that are writing active billing
- performing CDR searches on disks that become active during search
- two DIRP subsystems simultaneously writing to the same disk drive (such as OCC and DLOG, OCC and OM, active and parallel OCC)
- any other activities not listed here that result in more than one read/write activity per disk drive

Tape drives

Tape drives that are used for active or parallel billing are significantly slower during read/writes than disk drives.

The following are examples of limitations due to tape drives:

- parallel OCC to tape; even though the active OCC is to disk, parallel to tape will be the limiting factor
- tape drive read/write errors while writing parallel billing to tape or copying disk files to tape; both will impact the capacity even more

SLM

The system load module (SLM) can be used for billing; however, its main purpose is for system recovery. Only one of the two SLMs should be used at the same time. This is because the other one must be reserved in case of an SLM failure.

The read/write capacity of the SLM is approximately double an IOC/DISC, and its storage capacity is 600 Mbyte. The maximum capacity is still limited by the IOC/DDU; this is because active OCC billing or parallel billing would still be on an IOC/DDU.

SLM configuration and CDR searches

If CDR searches are required and sufficient disk space exists on SLM after images, MS loads, and so on, are stored, the recommended configuration is as follows:

- parallel billing on SLM, with volumes configured to be the same size as the active billing volumes

- CDR search on SLM parallel billing files
- active OCC billing alternating between to dedicated 1x55FA disks located on two separate IOCs (for example, VOL 1 Disk 1 IOC 1, then VOL 1 Disk 2 IOC2, then Vol 2 Disk 1 IOC 1, then Vol 2 Disk 2 IOC 2)
- AFT real-time billing on the two dedicated OCC disks
- no other subsystem (other than AFT for real-time billing) using the OCC disks; the other subsystems (OMs, DLOGs, JF) share the remaining two IOC disks
- office parameter DIRP_PFILE_AUDIT to "Y 3 30"; this ensures files that are processed and expired will be erased, making space available when a rotate occurs
- in table DIRPSSYS
  - — in field RETPD, CDR retention period set to a low enough value to ensure that DIRP_PFILE_AUDIT can reclaim enough files for the following day's billing
  - — in field CRETPD, retention period for copied-to files set to the same value as RETPD
- In table OFCENG, calculate the NO_OF_DMS250_REC_UNITS recommended by the *UCS DMS-250 Office Parameters Reference Manual,* and then add 45,000. This increases the amount of data store used by 7.5 Mbyte.

Disk assignment procedure

The following assignment procedure prevents multiple activities from occurring on the same disk. The following assumes using the recommendation of two DDUs of 300 Mbyte each, configured only for OCC billing and two DDUs dedicated for the other subsystems. Each billing volume is allocated for 64 Mbyte.

Datafill table DIRPPOOL for OCC

The following is an example of datafill table DIRPPOOL for OCC:

```
POOLNO   POOLNAME   POOLTYPE   DEVTYPE
VOLUMEO   VOLUME1    VOLUME2    VOLUME3
VOLUME4   VOLUME5    VOLUME6    VOLUME7
VOLUME8   VOLUME9    VOLUME10   VOLUME11
VOLUME12  VOLUME13   VOLUME14   VOLUME15
VOLUME26  VOLUME17   VOLUME18   VOLUME19
VOLUME20  VOLUME21   VOLUME22   VOLUME23
_____________________________________________________________
1 OCCPOOL REGULAR  DISK
$           $            $           $
$           $            $           $
$           $            $           $
$           $            D010OCC4   D000OCC4
D010OCC3    D000OCC3      D010OCC2   D000OCC2
D010OCC1    D000OCC1      D010OCC0    D000OCCO
```

Datafill table DIRPPOOL for OM

The following is an example of datafill table DIRPPOLL for OM:

```
POOLNO   POOLNAME   POOLTYPE   DEVTYPE
VOLUMEO   VOLUME1    VOLUME2    VOLUME3
VOLUME4   VOLUME5    VOLUME6    VOLUME7
VOLUME8   VOLUME9    VOLUME10   VOLUME11
VOLUME12  VOLUME13   VOLUME14   VOLUME15
VOLUME26  VOLUME17   VOLUME18   VOLUME19
VOLUME20  VOLUME21   VOLUME22   VOLUME23
_____________________________________________________________
2 OMPOOL REGULAR  DISK
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $           D030OM       D020OM
```

Datafill table DIRPPOOL for JF

The following is an example of datafill table DIRPPOOL for JF:

```
POOLNO   POOLNAME   POOLTYPE   DEVTYPE
VOLUMEO   VOLUME1    VOLUME2    VOLUME3
VOLUME4   VOLUME5    VOLUME6    VOLUME7
VOLUME8   VOLUME9    VOLUME10   VOLUME11
VOLUME12  VOLUME13   VOLUME14   VOLUME15
VOLUME26  VOLUME17   VOLUME18   VOLUME19
VOLUME20  VOLUME21   VOLUME22   VOLUME23
_____________________________________________________________
3 JMPOOL REGULAR  DISK
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $          D030JF       D020JF
```

Datafill table DIRPPOOL for DLOG

The following is an example of datafill table DIRPPOOL for DLOG:

```
POOLNO   POOLNAME   POOLTYPE   DEVTYPE
VOLUMEO   VOLUME1    VOLUME2    VOLUME3
VOLUME4   VOLUME5    VOLUME6    VOLUME7
VOLUME8   VOLUME9    VOLUME10   VOLUME11
VOLUME12  VOLUME13   VOLUME14   VOLUME15
VOLUME26  VOLUME17   VOLUME18   VOLUME19
VOLUME20  VOLUME21   VOLUME22   VOLUME23
_____________________________________________________________
4 DLOGPOOL REGULAR  DISK
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $            $           $
$           $          D030DLOG     D020DLOG
```

Appendix D: Commonly asked questions

This appendix provides the answers to some commonly asked questions about the X.25 Data Transport feature.

Can I perform bi-directional file transfers?

With AFT and AFT-MNP, you can only transfer data from the switch to a host. However, you can use MFT to transfer data from a host to the switch.

MFT provides these manual file transfer sessions:

- DMSSFI—the switch requests a file from the host
- DMSSFO—the switch sends a file to the host
- NEMSFI—the host requests a file from the switch
- NEMSFO—the host sends a file to the switch

Refer to Chapter 3, “Manual file transfer,” for details on manual file transfers.

How can I determine on which card and port the link is located?

You can look at the datafill in tables MPC and RASLAPPL. Table MPC shows the IOC shelf where the card is located and table RASLAPPL shows the card and port number.

Refer to Chapter 5, “Configuring the EMPC,” for details on table MPC. Refer to the following chapters for details on table RASLAPPL:

- Chapter 6—“Setting up an AFT session”
- Chapter 7—“Setting up MFT sessions”
- Chapter 8—“Setting up SPR OUTLOG sessions”
- Chapter 9—“Setting up a SINS session”
- Chapter 10—“Setting up a LINS session”
- Chapter 11—“Remote login command session”

Is there any security with the X.25 Data Transport feature?

There is no security specific to the X.25 Data Transport feature. However, the initial log on to the switch is password protected.

Additionally, the switch will not establish a connection with a remote node unless the data network address (DNA) of the node is datafilled in table RASLAPPL (field DNA).

For outgoing applications, the DNA represents the remote node address with which the network connection is attempting to form a logical connection.

For incoming applications, the DNA represents the only node address from which this network connection will accept a request to form a logical connection.

What should I do when the link won't come up and my datafill is correct?

- Verify that the card is INSV and the link is ENBLD.
- Check the logs to see the type of error message.
- Ensure that the protocol on the switch matches the protocol on the host.
- Check to see whether the far-end is having problems.
- Check to see whether the DNA of the remote node is datafilled in table RASLAPPL (field DNA).
- Verify that the subsystem is active on the switch.

Appendix E: Restrictions and limitations

This appendix describes the restrictions and limitations to the X.25 Data Transport feature package.

Remote login command session

The following restrictions and limitations apply to remote login:

- The maximum number of remote login command sessions is three. An error message generates if you attempt to datafill more than three REMLOGIN applications in table RASLAPPL.
- The command session terminates after the fourth invalid password attempt.
- The command session will not operate when a target device does not match the supported target device. A SWERR generates with the text, “Bad Put LRCF to screen”.

List of terms

ACS-CMD
access request message; start of command session

ACS-SFI
access request message; start file incoming

ACS-SFO
access request message; start file outgoing

AFT
See automatic file transfer.

AFT-MNP
See automatic file transfer-multi-network protocol.

AMA
automatic message accounting

ASM
alarm and status message

asynchronous
Transmission in which a bit stream is interpreted by means of internal patterns.

automatic file transfer
A feature that automatically transfers DIRP files to downstream processors.

automatic file transfer-multi-network protocol
Automatic file transfer-multi-network protocol enables file transfers across up to four 56 kbit/s links.

automatic message accounting
An automatic recording system that documents all the necessary billing data of subscriber-dialed long distance calls.

bit synchronous

Transmission in which a clocking signal is provided simultaneously with a bit stream.

call processing

The software system that handles the processes involved in setting up connections through the DMS-100 Family network between calling and called parties.

CC

central control

CCITT

International Telegraph and Telephone Consultative Committee

CDR

call detail record

CI

See command interpreter.

CNT-ERR

MTP error message

CNT-INT

control interrupt

CNT-PRT

control message; set device to print mode

CNT-RED

control message; set device to read mode

CNT-RNB

control message; request next block

command interpreter

A support operating system component that functions as the main interface between machine and user. Its principal roles are to read lines entered by a terminal user, to break each line into recognizable units, to analyze the units, to recognize command item-numbers on the input lines, and to invoke these commands.

CP

See call processing.

DAIS

Data access/information service

data circuit-terminating equipment

The device that interfaces the computer data port with the telephone circuit or data link.

data terminal equipment (DTE)

The computer or intelligent I/O device terminating either end of a data circuit or conversation.

DCE

See data circuit-terminating equipment.

DDU

disk drive unit

device independent recording package (DIRP)

Software that directs data from the various administrative and maintenance facilities to the appropriate recording devices. DIRP records information on a per subsystem basis.

DIRP

See device independent recording package.

DIRPHOLD

DIRP table that provides a directory of currently unprocessed DIRP files; that is, a table that records the names of DIRP files to be transferred.

DIRP ROTATE

A rotation of DIRP files in which the active file is closed and given an entry in table DIRPHOLD, and a new file is opened and put into active recording position.

DIRP subsystem

A logical data division. For example, OCC for billing data, JF for journal files, OM for operational measurements.

DMS equipment

Telephone switching equipment, namely, digital switching units, for interconnecting telephone subscribers and control terminals. DMS is a Northern Telecom trademark.

DNA

data network address

DPN

data packet network

DTC

digital trunk controller

DTE

See data terminal equipment.

EIA

Electronic Industries Association

EIOC

enhanced input/output controller

EIOC-MP

EIOC master processor

EMPC

See enhanced multi-protocol controller.

enhanced multi-protocol controller

The EMPC is a software downloadable peripheral that supports port two at 19.2 kbit/s and port three at 56 kbit/s data rate transfer. The X.25 software is downloaded to the EMPC.

heartbeat

A special log generated periodically to indicate to NEMAS that the switch is still alive.

GAS

general application system

IOC

input/output controller

JF

See journal file.

journal file

A facility that preserves (on a recording device) changes made to the data tables of the DMS-100 Family systems. The journal file provides a way to restore the tables if the office software needs to be reloaded from a backup image.

LBA

last block acknowledged

LINS

Long INterval Statistics

LSB

least significant bit

MAP terminal or workstation

Testing and maintenance center for operating company switching equipment. MAP is a trademark of Northern Telecom.

manual file transfer

Procedure to manually transfer files between the switch and the application processor.

MAPCI

The software subsystem resident on theUCS DMS-250 switch that enables real-time switch status and updates.

Message Transfer Protocol

An applications level protocol for data communications built on top of X.25 level 3. This session protocol enables access and data transfer between two systems.

MFT

See manual file transfer.

MLP

multiple link procedure

MNP

See Multi-Network Protocol.

MPC

See multi-protocol controller.

MSB

most significant bit

MTP

See Message Transfer Protocol.

MTP-ERR

MTP error message

Multi-Network Protocol

A modified message transfer protocol (MTP) used by the AFT-MNP feature.

multi-protocol controller

MPC is a software downloadable peripheral that supports two ports of 19.2 kbps data rate transfer. The X.25 software is downloaded to the MPC.

OM

See operational measurements.

Open System Interconnection model

A seven-layer protocol model for communications networks developed by the International Standards Organization and adopted by CCITT for ISDN.

Operational measurement

The hardware and software resources of the DMS-100 Family systems that control the collection and display of measurements taken on an operating system. OM organizes the measurement data and manages their transfer to displays and records on which maintenance, traffic, accounting, and provisioning decisions are based.

OSI

See Open System Interconnection model.

OSR

operator services records

Partial file transfer

An algorithm used to recover a transfer that is interrupted by a warm restart or a break in connectivity with a remote processor.

PEC

product engineering code

PFT

See partial file transfer.

PM

peripheral module

PPSN

public packet switching network

PRU

protocol data unit

PVC

permanent virtual circuit

RASL

See Robust Application Session Layer.

RTS

return to service

Robust Application Session Layer

A generic interface to data communications facilities on the UCS DMS-250 switch. RASL enables any data communications application—such as AFT sessions and MFT sessions—to access any type of link that is supported.

Safe Store Tap

An interface that provides simplified communication with DIRP and the file system.

SINS

Short INterval Statistics

SLP

single line procedure

specific override

An AFT feature that enables the remote processor to request a specific file to be transferred.

spontaneous reporting

MTP session that enables the switch to send DMS logs and alarms to a host network management system over the X.25 interface on the NT1X89BA card.

SPR

See spontaneous reporting.

SST

See Safe Store Tap.

STS

serving translation scheme

STS-ACK

status message; access request acknowledged

STS-CPL

status message; access complete

STS-EOB

status message; end of block

STS-EOF

status message; end of file

SVC

See switched virtual circuit.

switched virtual circuit

A logical end-to-end connection between two remote applications using a packet network or point-to-point configuration.

UCS

Universal Carrier Service

user interface

The series of commands and responses that are used by operating company personnel to communicate with the switch. User interface is achieved through the MAP terminal and other input/output devices.

virtual channel

A software link that connects the switch and the host machine. Virtual channels are allocated as they are needed. At any given time, there is a direct mapping between allocated virtual channels and active MTP sessions.

VCI

virtual channel identifier

Digital Switching Systems

UCS DMS-250

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