



TCAM

**Operation
(MVS)**

Second Edition (June 1985)

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Preface

The term **TCAM** is used throughout this publication to refer to Advanced Communications Function for TCAM Version 3, unless noted otherwise. TCAM is an IBM program product that resides in a host processor.

Notes:

- 1. The term network has two meanings. A public network is a network established and operated by communication common carriers or Telecommunication Administrations for the specific purpose of providing circuit-switched, packet-switched, and leased-circuit services to the public. A user application network is a configuration of data processing products, such as processors, controllers, and terminals, established and operated by users for the purpose of data processing or information exchange, which may use transport services offered by communication common carriers or telecommunication Administrations Network, as used in this publication, refers to a user application network.*
- 2. In this publication, the term system console is used for the console that receives unsolicited TCAM messages. For multiple TCAMs, the system programmer can use MVS's multiple console support to designate a unique console to receive unsolicited messages for each TCAM in a host processor.*

This publication is primarily a comprehensive reference for an experienced MVS system operator who has been designated as the TCAM operator. System programmers and application programmers may also occasionally use this publication. Anyone who uses this publication should have a thorough understanding of data processing concepts from the computer operator's standpoint as well as a fundamental understanding of data communication concepts.

Who Should Read This Book

TCAM uses the concepts of Systems Network Architecture (SNA).

The system programmer responsible for the TCAM system should provide the operator with a run book. The run book should describe various events that may be encountered by the operator in running this particular TCAM system and should set forth the commands to be issued by the operator when these events occur.

How to Use This Book

Although this is primarily a reference it is also tutorial. The information in this book is organized from general to specific. Once you become familiar with the TCAM system and with selecting, formatting, and entering operator commands, refer to Appendixes A and B. They are intended as quick reference summaries of basic operator commands, initiator commands, extended operator commands, and save/restore message queues (SMQ) commands.

This book contains four chapters and three appendixes:

- Chapter 1, “The Operator and the TCAM System ” defines the operator’s activities. This chapter also describes how to format and enter basic operator commands, and how to respond to TCAM messages that require operator action.
- Chapter 2, “Starting, Restarting, and Stopping TCAM,” describes the TCAM initiator and initiator commands. This chapter also describes restarting abnormally terminated subtasks and closing down TCAM.
- Chapter 3, “TCAM Basic Operator Commands,” describes the basic operator commands, including an explanation of the function of each basic command and its operands. This chapter also lists the messages you are likely to receive after entering a basic operator command.
- Chapter 4, “TCAM Extended Operator Commands,” describes the optional extended operator control system service program, the extended operator commands, and the messages that you are likely to receive after entering an extended operator command. This chapter also describes the save/restore message queues (SMQ) system service program and the SMQ commands.
- Appendix A, “Summary of Basic Operator and Initiator Commands,” is a quick reference summary of basic operator commands and initiator commands.
- Appendix B, “Summary of Extended Operator and SMQ Commands,” is a quick reference summary of extended operator commands and SMQ commands.
- Appendix C, “INTRO Macro Operand-to-Keyword Cross Reference,” lists the keywords that can be used in place of INTRO macro operands.

Conventions Used in This Publication

The TCAM message control program (MCP) is coded using basic assembler language. All coding examples included in this publication use assembler language coding conventions.

Related Publications

In addition to this publication, you may need to refer to other TCAM publications. For easier reading, this publication refers to the other TCAM publications with shortened titles. You can find out the full title and order number for each publication by referring to the following table:

Short Title	Title	Order No.
<i>TCAM Application Programming</i>	<i>Advanced Communications Function for TCAM, Version 3, Application Programming</i>	SC30-3233
<i>TCAM Diagnosis Guide</i>	<i>Advanced Communications Function for TCAM, Version 3, Diagnosis Guide</i>	SC30-3234
<i>TCAM Diagnosis Reference</i>	<i>Advanced Communications Function for TCAM, Version 3, Diagnosis Reference</i>	LY30-5560
<i>TCAM General Information</i>	<i>Advanced Communications Function for TCAM, Version 3, General Information</i>	GC30-3235
<i>TCAM Installation Guide</i>	<i>Advanced Communications Function for TCAM, Version 3, Installation, Resource Definition, and Customization Guide</i>	SC30-3237
<i>TCAM Installation Reference</i>	<i>Advanced Communications Function for TCAM, Version 3, Installation, Resource Definition, and Customization Reference</i>	SC30-3236
<i>TCAM Messages</i>	<i>Advanced Communications Function for TCAM, Version 3, Messages</i>	SC30-3238
<i>TCAM Migration</i>	<i>Advanced Communications Function for TCAM, Version 3, Migration</i>	SC30-3251
<i>TCAM Planning Guide</i>	<i>Advanced Communications Function for TCAM, Version 3, Planning Guide</i>	SC30-3240

Short Title	Full Title	Order No.
<i>TCAM Program Reference Summary</i>	<i>Advanced Communications Function for TCAM, Version 3, Program Reference Summary</i>	LY30-5561
<i>TCAM Utilities</i>	<i>Advanced Communications Function for TCAM, Version 3, Service Facilities, System Service Programs, and Utilities</i>	SC30-3241
<i>Service Aids</i>	<i>OS/VS2 MVS System Programming Library: (SPL) Service Aids</i>	GC33-5380
<i>System Messages</i>	<i>OS/VS Message Library: VS2 System Messages</i>	GC38-1008

Contents

Chapter 1. The Operator and the TCAM System	1-1
What This Chapter Offers	1-1
Operator Control Stations	1-2
Operator Control Commands	1-3
Defining the Operator's Activities	1-3
Formatting Basic Operator Commands	1-4
Basic Operator Command Syntax	1-4
Basic Operator Command Format	1-4
Correlation ID	1-5
Tailoring Commands	1-5
controlchars	1-5
operation	1-6
operandspecifiers	1-6
[nextline] ending.	1-7
Entering Basic Operator Commands	1-8
Input Source Considerations When Entering Basic Operator Commands	1-8
Considerations for Entering Commands When an ASCB-Based TCAM Is Active	1-10
Session Considerations When Entering Basic Operator Commands	1-11
Incorrectly Formatted Basic Operator Commands	1-11
Receiving TCAM Messages	1-12
The Format of TCAM Messages	1-12
Responding to TCAM Error Messages	1-14
Chapter 2. Starting, Restarting and, Stopping TCAM	2-1
Starting TCAM	2-2
Explanation of TCAM Startup Procedure	2-5
The TCAM Initiator Commands	2-9
Attach a Program (ATTACH)	2-9
Change System Console Identifier (CONSOLE)	2-10
Detach a Subtask (DETACH)	2-10
Display TCAM Initiator Subtask Execution Status (DISPLAY TASKS)	2-11
Display Console Identification (DISPLAY CONSOLE)	2-12
Replace an Entry in the TST (SWAPTST)	2-13
Restarting Abnormally Terminated Subtasks	2-13
Closing Down TCAM	2-14
Explanation of TCAM Closedown Procedure	2-15
Closedown of MCP (HALT)	2-19
Chapter 3. TCAM Basic Operator Commands	3-1
Displaying TCAM Status	3-1

Display Basic Primary Operator Control Station Name (D PRITERM)	3-2
Display Basic Secondary Operator Control Station Names (D SECTERM)	3-2
Display Intercepted LUs (D INTER)	3-2
Display Names of Pending LUs (D PEND)	3-3
Display Option Field (D OPTION)	3-3
Display Pool Statistics (D POOL)	3-4
Display Queue Control Block (D QUEUE)	3-5
Display Session Partners (D SESSION)	3-5
Display Status of LUs (D STATUS)	3-6
Display Status and Message Sequence Numbers of a Resource (D TERM)	3-6
The Status of TCAM Resources	3-7
Control Functions and Commands	3-7
TCAM Control Commands	3-8
Change Basic Primary Operator Control Station (F OPERATOR)	3-8
Insert Option Field Data (F OPT)	3-8
Intercept an LU (H TP)	3-9
Release Intercepted LU (A TP)	3-10
Rename an LU (F RENAME)	3-10
Send Message to Destination LU (F SEND)	3-10
Start Session or Access Method Interface (F START)	3-12
Stop Session or Access Method Interface (F STOP)	3-12
Activating and Deactivating Other Programming Functions	3-13
Start/Stop Access Method Interface (AMI) Trace (F AMITRACE)	3-13
Change Buffer Trace Parameters (F BUFFTR)	3-13
Start/Stop TCAM Service Aid Routine (F DEBUG)	3-14
Start/Stop Subtask and Dispatcher Post Trace (F DTRACE)	3-17
Chapter 4. TCAM Extended Operator Commands	4-1
The TCAM Extended Operator Control System Service Program	4-1
The Format of Extended Operator Commands	4-3
Displaying Components of the TCAM System	4-4
Display Basic and/or Extended Operator Commands (COM)	4-5
Display Length of All Queues above a Specific Length (QUEUE ALL)	4-6
Display Length of One Queue (QUEUE name)	4-6
Display Queue Status at Specified Location (QUEUE AUTO)	4-6
Display Resource Status (DATA)	4-7
Display Statistical Totals for Resources (DATA ALL,TOTALS)	4-7
Display Statistics for a Resource (DATA name)	4-7
Display Statistics for Resources (DATA ALL)	4-8
Display Statistics for Resources at Specified Location (DATA ALL,destname)	4-8
Display Status of TCAM Resources (NET)	4-8
Display Buffer Unit Status (UNITS)	4-9
Controlling TCAM Resources	4-10
Activate/Deactivate Automatic Rerouting of Messages (AUTO)	4-10
Copy Messages (AUTO name,COPY)	4-11
Purge a Queue (AUTO name,PURGE)	4-11
Redirect Messages on Error Conditions (AUTO name,ERR)	4-12
Transfer All Messages (AUTO name,TRAN)	4-12
Alter a Key-Table Entry (ALTER)	4-12

Contact Host Node In Another TCAM System (CONTACT)	4-13
Deactivate Application Programs (CLOSE)	4-14
Request Retransmission of Messages (RESEND)	4-14
Request Retrieval of Messages (SEND)	4-15
Special Retrieval-Request Options	4-19
Evaluating Your Need for Special Retrieval-Request Options	4-23
Examples of Using Special Retrieval-Request Options	4-24
Using the Retrieval Request for Testing	4-26
Set Sequence Number (SETSEQ)	4-26
Start Message Transmission for a Resource (START)	4-27
Start/Stop Automatic Extended Network Control (MANUAL)	4-27
Start Traffic To Specified Groups (ONLN)	4-28
Stop Message Transmission for a Resource (STOP)	4-28
Stop Traffic From Specified Groups (OFFLN)	4-29
The Save/Restore Message Queues System Service Program	4-29
Using the Save/Restore Message Queues (SMQ) System Service Program	4-30
TCAM Save/Restore Message Queues Commands	4-31
Print in EBCDIC Unsent Traffic (PRINT)	4-32
Print in Hexadecimal Unsent Traffic (SNAP)	4-32
Restore Unsent Message Queues (RESTORE)	4-32
Save Unsent Traffic (SAVE)	4-32

Appendix A. Summary of Basic Operator and Initiator Commands A-1

Basic Operator Commands	A-1
Initiator Commands	A-6

Appendix B. Summary of Extended Operator and SMQ Commands B-1

Extended Operator Commands	B-1
SMQ Commands	B-10

Appendix C. INTRO Macro Operand-to-Keyword Cross Reference C-1

Sorted by Keyword	C-1
Sorted by Operand	C-2

Glossary X-1

Reference Words Used in the Entries	X-1
-------------------------------------	-----

Index X-21



Figures

- 1-1. Example of Three TCAMs in One Host Processor 1-10
- 1-2. TCAM Message Format 1-13
- 2-1. The Initiator and Subtasks in a TCAM Storage Region 2-2
- 2-2. Example of TCAM Startup Procedure 2-6
- 2-3. Example of TCAM Closedown Procedure 2-17



Chapter 1. The Operator and the TCAM System

As a TCAM operator, your job is to control and monitor a TCAM system. This chapter provides an overview of how you as a TCAM operator interact with your TCAM system.

What This Chapter Offers

This chapter also explains how you format and enter basic operator commands depending on the input source. See chapter, “Optional TCAM Facilities for the Application Programmer,” in *TCAM Application Programming* publication for instructions on formatting and entering basic operator commands from an application program.

Next, this chapter describes the TCAM messages that you may receive including the operator awareness messages that are sent to the basic primary operator control station.

Note: Extended operator control is an optional system service program. This chapter, unless otherwise indicated, only describes the basic operator control system service program and basic commands. Information about the extended operator control system service program and the extended operator commands may be obtained from Chapter 4.

For information on components of a TCAM system see *TCAM General Information* publication.

See *VTAM Operation* for detailed operator instructions for network resources.

Several sets of commands are in this book to aid you in monitoring and controlling your TCAM system. For example, you can enter from the system console initiator commands (described in Chapter 2) that enable you to control the TCAM initiator and its subtasks. You can enter from a basic operator control station the basic operator commands (described in Chapter 3). If the extended operator control system service program is part of your TCAM system, you can enter extended operator commands (described in Chapter 4) from an extended operator control station. Additionally, if the save/restore message queues (SMQ) system service program is an active initiator subtask, you can issue commands from the system console SMQ (described in Chapter 4) to save and restore unsent messages.

Operator Control Stations

You enter TCAM operator commands from an operator control station. Usually this station is the system console (SYSCON). There are four types of operator control stations. Each can be a logical unit (LU) or an application program. The four types are:

A *basic primary operator control station* is sent all TCAM operator awareness messages and TCAM reply messages to basic operator commands. To designate a basic primary operator control station, code the name of an LU or application program on the PRIMARY operand of the INTRO macro. The basic primary operator control station can also serve as an extended operator control station.

A *basic secondary operator control station* is sent only the reply messages to basic operator commands entered from itself. To designate a basic secondary operator control station, code SECTERM = YES on the TERMINAL or TPROCESS macro defining the LU or application program that is to be the basic secondary operator control station.

An *extended primary operator control station* receives:

- The extended operator control startup and closedown messages
- Responses to extended operator commands entered from it
- Responses to extended operator commands that successfully modify the TCAM system
- The online retrieval system service program startup and closedown messages (if online retrieval is part of the TCAM system).

Note: The system console assumes the functions of an extended primary operator control station if the INTRO macro is coded with NETMON = SYSCON. (See the INTRO macro description in TCAM Installation Reference).

An *extended secondary operator control station* enters extended operator commands and receives the responses made to those commands. The system console is automatically designated as an extended secondary operator control station.

Note: A few extended operator commands that generate lengthy response texts cannot be entered from the system console.

For more information about basic and extended operator control stations, see *TCAM General Information* publication.

Operator Control Commands

TCAM provides you with operator control commands to effectively manage its resources. These commands are the means by which you control and monitor the TCAM system. You can start and stop various system resources and functions, and request a variety of statistical and status information.

Operator control commands include the basic operator commands that are described in Chapter 3. Extended operator control commands are described in Chapter 4. Initiator commands are described in Chapter 2. Save/restore message queues (SMQ) commands are also described in Chapter 4.

Instructions on when you interact with TCAM and specifically what you do come from either the operating system in the form of a TCAM message or from your own installation's operating procedures. Your supervisor controls what and when you interact with TCAM. This publication describes how.

Your responsibilities as the TCAM operator vary depending your location. Controlling and monitoring TCAM resources with operator commands can be done either as described in this publication or through an application program as described in *TCAM Application Programming* publication.

Defining the Operator's Activities

Before you can effectively use TCAM operator commands, you must understand your position in the TCAM system. As a TCAM operator, you may work either at the system console or at some station that has been designated as a TCAM operator control station. Activities that you can be involved in are:

- Starting and stopping TCAM (can be done from the system console only)
- Displaying status
- Controlling the delivery of user messages to specific destinations
- Responding to TCAM operator awareness (primary operator control station only) or command reply messages (can be done from the system console only)
- Starting and stopping TCAM resources.

To start TCAM, follow the procedure described in the next chapter. To perform other basic activities, use the following basic TCAM operator commands:

- Display (D)
- Halt (Z)
- Hold (H)
- Modify (F)
- Release (A).

For variations to basic operator commands, specify parameter combinations with a basic command. See Chapter 3 for lists of all the basic operator commands you can issue. See Appendix A for a quick reference summary of the commands.

You are most likely to:

1. Respond to an operator awareness message
2. Issue commands through your operator control station
3. Recognize the TCAM reply/ or operator awareness message.

Formatting Basic Operator Commands

This part of the chapter first describes the format rules or syntax for TCAM basic operator commands. Then the four fields *controlchars*, *operation*, *operandspecifiers*, [*nextline*] *ending* — that make up the format of an TCAM basic operator command are described.

Basic Operator Command Syntax

All fields of basic operator commands must be separated by one or more blanks and must be issued in a specific order. Basic commands cannot occupy more than one line. For example, if you enter a basic operator command from the system console, the command cannot be longer than 126 characters. If you enter basic commands from an external LU, the command cannot be longer than a single TCAM buffer. The TCAM system programmer can tell you the size of the buffers that are available to you if you are operating from an external LU.

Basic Operator Command Format

Basic operator commands can consist of up to four fields depending on the input source. The input source can be the system console, an external LU, or an application program. See “Optional TCAM Facilities for the Application Programmer” in *TCAM Application Programming* to enter basic operator commands from an application program.

When you enter a basic command with at least one blank use the following format:

<code>controlchars operation operandspecifiers [nextline] ending</code>
--

Enter all fields in a basic operator command in uppercase unless a translation table specified by a TCAM CODE macro in the MH processing the operator control command, permits lowercase input, or unless you enter the commands from the system console.

Enter the *controlchars*, *operation*, and *[newline] ending* fields using the same values related in the descriptions of the respective fields that follow.

Correlation ID

You can also insert from any basic operator control station except the system console a 4-character correlation ID to help you associate replies to basic operator commands with requests. The correlation ID must follow the *controlchars* field and be separated from it by at least one blank; the correlation ID should also be separated from the *operation* field by at least one blank. To use the correlation ID, the USERID operand of a CODE or IEDOPCTL macro must be coded for the message handler (MH) processing the operator control command. If you specify a correlation ID in an operator command, the correlation ID is included on the reply to the command; it is identified by operand ID (OID) following the message number.

Note: controlchars and [newline] ending are not applicable to commands entered from the system console.

Tailoring Commands

To tailor a command for your system, specify symbolic names and values in the *operandspecifiers* field. For example, you should replace the operandspecifier *luname* with the symbolic name of the specific external LU that you want to control or monitor. You can provide values only for the operands and expressions that are designated in lowercase in the command descriptions in Chapter 3. You must code all keywords, such as TRACE and TP, that are described in uppercase exactly as specified unless a translation table permits lowercase input, or unless you enter the command from the system console.

Never enter brackets [] and braces { } as part of a command. Brackets indicate an option; you can enter one or more of the enclosed items. Braces indicate that you must enter one of the items in the encoded stack. Enter parentheses and commas as part of a command if they are indicated. Following is a description of the format for each of the four command fields.

controlchars

The *controlchars* field is a character string of from one to eight nonblank characters that conforms to the rules for assembler language symbols. This character string identifies the remaining fields to TCAM as a basic operator command. Use this field only with basic operator commands entered from a source other than the system console. The *controlchars* field is not recognized by the operating system therefore; do not use this field when entering basic operator commands from the system console.

If you are operating from a resource other than the system console, enter the *controlchars* field; the TCAM system programmer provides you with the appropriate character string to enter. The same character string must precede every TCAM basic operator command. This character string may

be specified either by the CONTROL operand of the INTRO macro at TCAM generation or by the L operand in response to a TCAM message that solicits startup parameters at INTRO macro execution.

The TCAM system programmer can, however insert user-written code in the TCAM message control program to override the CONTROL operand so that you can change the character string at your discretion. See the chapter, "Designing the Message Handler," in *TCAM Installation Guide* for more information.

operation

The *operation* field is required with a basic operator command and must be separated from the *controlchars* field and *operandspecifiers* field by at least one blank. Enter one of the following operation types in the *operation* field:

{DISPLAY }	{MODIFY }
{D }	{F }
{HALT }	{RELEASE }
{Z }	{A }
{HOLD }	
{H }	

TCAM does not recognize any other value entered in the *operation* field. The braces indicate that you must choose how you want to specify the *operation*. For example, use either HOLD or H, not both. The shorter form provides convenience and coding efficiency.

operandspecifiers

The *operandspecifiers* field contains parameter options so you can tailor a command to your circumstances. For example, by specifying various *operandspecifiers* on the basic Display (D) command, you can find out the functional status of any one of several different TCAM message queues or an external LU. When you use more than one *operandspecifier* in a single basic operator command, you must separate the *operandspecifiers* by a comma with no intervening blanks.

In the descriptions of basic operator commands in Chapter 3, *operandspecifiers* described in uppercase, such as TP and OPERATOR, are keywords. You must code these keywords as specified in the description unless a translation table permits lowercase input, or unless you enter the command from the system console. If an *operandspecifier*, such as *address*, is indicated in lowercase, replace that variable operand with a parameter meaningful for your TCAM system. The TCAM system programmer can give you values for these variable operands. Additional values are provided through TCAM messages. Some are dictated by the circumstances under which you issue the command. A few of the more common command variable operands are:

- grpname:* The symbolic name of a group. It is the same as the name given to the GROUP macro that defines the logical grouping of LUs.
- id:* The abbreviation for identifier. The *procname[id]* variable is entered when the TCAM initiator is started from the system console. Its use in any subsequent TCAM command must be identical to the *procname.identifier* field of the MVS START command.
- For more information on using *id* when an ASCB-based TCAM is active, “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in this chapter.
- jobname:* The symbolic name of the job to which the Modify (F) operation applies. This symbolic name is identical to the *jobname* field in the JCL job statement that defines the starting of the TCAM initiator. The *jobname* operand is used only when TCAM is loaded and executed from the input stream (for example, from a card reader).
- For more information on using *jobname* when an ASCB-based TCAM is active, see “Source Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in this chapter.
- luname:* The symbolic name of a TCAM host LU or an external LU.
- opfldname:* The name of an option field for a particular resource as specified in the OPTION macro defining the field.
- procname:* The name of a cataloged procedure in SYS1.PROCLIB that starts the TCAM initiator.
- For more information on using *procname* when an ASCB-based TCAM is active, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in this chapter.

All other variable *operandspecifiers* are defined in Chapter 3. Separate the *operandspecifier* field from the *operation* field and the *[nextline] ending* field by at least one blank.

[nextline] ending.

Use both *nextline* and *ending* when you enter basic operator commands from a station other than the system console. Use only the *ending* subfield when you enter a command from the system console.

Replace the *nextline* subfield with the appropriate device control characters for either carriage return or new line operation. This ensures that a TCAM

message does not print over the previous line of output. The TCAM system programmer gives you the value for *nextline*.

(Note to TCAM system programmer: See IBM component description manual for the device that is being used as the control station. Find the correct control character for either a carriage return or a new-line operation.)

The *ending* subfield signals the end of the message to a basic operator command. It is required by all sources entering commands. Depending on the input source of the command, *ending* might be just pressing the ENTER key.

Separate the *[nextline] ending* field from the *operandspecifiers* field by one or more blanks; TCAM considers any characters appearing between the blank delimiter following the last *operandspecifiers* and the first character of the *[nextline] ending* field as comments. TCAM disregards these characters. When you use both subfields, enter them without intervening blanks. See the next part of this chapter for examples.

Entering Basic Operator Commands

This section describes what you need to consider when entering basic operator commands. Both input source and session considerations are described. There is also a description of what happens and what action to take if you enter an incorrectly formatted basic operator command.

Input Source Considerations When Entering Basic Operator Commands

As indicated previously, specification of basic operator commands varies slightly depending on whether you enter the command from the system console or from an external LU. When entering basic operator commands, separate the fields used (*controlchars*, *operation*, *operandspecifiers*, and *[nextline] ending*) with at least one blank. Enter all fields in uppercase unless you have a translation table or enter the commands from the system console.

When you enter basic operator commands from the system console, you must enter all required keyword characters. You can enter keywords in either uppercase or lowercase. Do not enter the *controlchars* field. For the *[nextline] ending* field, enter only the *ending* subfield.

If you enter basic operator commands from an external LU, you must also include all required keyword characters; however, you must enter keywords in uppercase unless the message handler that accepts basic operator commands can translate lowercase entries to uppercase. The *controlchars* field must be the first field entered for each command from a source other than the system console for TCAM to recognize the operation as a command. From some external LUs, you must use both *nextline* and *ending* when entering a command.

Two examples of how to enter basic operator commands through various input media are:

EXAMPLE 1:

Assume that TCAM is started. The *procname* field of the console START command specifies AQTPROC. The INTRO macro in the MCP specifies CONTROL=OPID as control characters. To change a basic operator control station from secondary to primary, enter:

- From the system console

```
MODIFY AQTPROC,OPERATOR=NYC  ending
or
F AQTPROC,OPERATOR=NYC  ending
```

- From an IBM 3275 terminal display

```
OPID MODIFY AQTPROC,OPERATOR=NYC  ending
or
OPID F AQTPROC,OPERATOR=NYC  ending
```

Note: NYC is the name of the external LU to be made primary. The 3275 is not a device that requires the *nextline* subfield. Also *ending* is the act of pressing the ENTER key. The spaces between the last character of the command and pressing ENTER are not required.

EXAMPLE 2:

Assume TCAM is being executed as a normal job in an input stream. For example, from a card reader, *jobname* is TCAMJOB. The INTRO macro in the MCP specifies CONTROL=OPID. Therefore, the command from example 1 becomes:

- From the system console

```
MODIFY TCAMJOB,OPERATOR=NYC  ending
or
F TCAMJOB,OPERATOR=NYC  ending
```

- From an IBM 3275 terminal display

```
OPID MODIFY TCAMJOB,OPERATOR=NYC  ending
or
OPID F TCAMJOB,OPERATOR=NYC  ending
```

See Chapter 3, "TCAM Basic Operator Commands," for entry formats of Display, Hold, and Release basic operator commands.

Considerations for Entering Commands When an ASCB-Based TCAM Is Active

When an ASCB-based TCAM is active, any Display, Hold, Release, or Halt command entered from the system console must contain an *id*, *procname*, or *jobname* qualifier. Use qualifiers as follows:

- Use the *id* qualifier if the TCAM to which the command is directed was started from the system console with an MVS START command specifying *procname.id*
- Use the *jobname* qualifier if the TCAM to which the command is directed was not started at the system console with an MVS START command (for example, if TCAM was started from a card reader).
- Use the *procname* qualifier if the TCAM to which the command is directed was started from the system console with an MVS START command specifying *procname*.

For a Display, Hold, Release, or Halt command, the TP operand should be followed by a period and the appropriate qualifier.

The following paragraphs show the correct use of a qualifier. Figure 1-1 shows the two TCAMs mentioned in these examples.

Assume that the CVT-based TCAM (TCAM1) in the host processor is started with an MVS START command specifying a *procname* of TCAM1. Also, assume that no ASCB-based TCAM is active in the same host processor. A command for TCAM1 to display its basic primary operator control station can now be entered from the system console with or without a *procname* qualifier. For example:

D TP.TCAM1,PRITERM (with the qualifier)

D TP,PRITERM (without the qualifier)

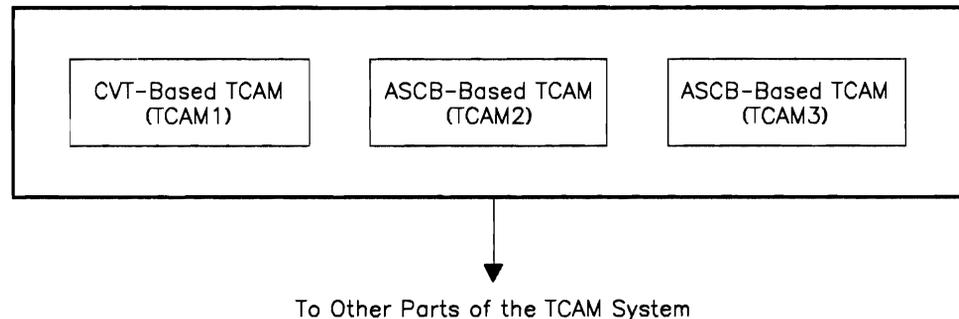


Figure 1-1. Example of Three TCAMs in One Host Processor

Next, assume that one of the ASCB-based TCAMs (for example, TCAM2) in the same host processor is started with an MVS START command specifying a *procname.id* of TCAM2.02. A command entered from the system console for TCAM2 to display its basic primary operator control station must contain an *id* qualifier. For example:

D TP.02,PRITERM

Because an ASCB-based TCAM is then active in the same host processor, any command entered from a system console for *any* TCAM in that host processor must contain a qualifier. For example, a command entered from the system console for TCAM1 (the CVT-based TCAM) to display its basic primary operator control station must contain the procname qualifier. For example:

```
D TP.TCAM1,PRITERM
```

Note: If all ASCB-based TCAMs in the same host processor are later deactivated, commands for the CVT-based TCAM (TCAM1) can again be entered from the system console with or without qualifiers.

For examples of commands that require the qualifiers in an actual operational situation, see “Explanation of TCAM Startup Procedure” and “Explanation of TCAM Closedown Procedure” in Chapter 2.

Session Considerations When Entering Basic Operator Commands

- A session must be in progress before you enter basic operator control commands from an external LU.
- The external LU must be in session with TCAM host LU.
- The device message handler (DMH) operation on this session must contain the appropriate macros, IEDOPCTL or CODE for recognizing basic operator commands. (See *TCAM Installation Guide*.)

Enter basic operator commands during the LU-LU session. Reply messages are returned during the same session.

Incorrectly Formatted Basic Operator Commands

You may occasionally make an error while entering a command. An operator message indicates that the operating system has recognized an incorrectly formatted basic operator command entered from the system console. You can cancel the incorrectly formatted command by using the console CANCEL key.

The format of a typical TCAM error message for an invalidly entered command may be as follows:

```
IED016I STATION resourcename NOT FOUND
```

or

```
IED018I cm COMMAND INVALID
```

The *resourcename* operand is a variable that you entered on the incorrect command. The *cm* is the command operation type and the first few characters of the *operandspecifiers* of the invalidly entered command. These two messages are just examples of what you may receive after

making an error in entering a command. You may receive other messages. See chapters 2, 3, and 4 for individual descriptions of the commands and a list of the messages that can be returned from TCAM after issuing a command.

Receiving TCAM Messages

TCAM issues a reply message to TCAM basic and extended operator commands so that you have some indication of how your command request was processed. With few exceptions, reply messages are returned to the origin of the command. Message text is preceded by a TCAM message identification consisting of the program component name identifier (DKJ or IED), message serial number, and message type code.

“The Format of TCAM Messages,” in this chapter, describes these elements of a TCAM message. Because you will be frequently receiving several different kinds of TCAM messages, possibly from different TCAMs, this part of the chapter describes the format of messages and how the format relates to the message type. Also, it describes how you can respond to error messages, including the operator awareness message.

See *TCAM Messages* for a complete list of all TCAM messages. The description of each message contains an explanation of the message, a description of what system action occurs, and what action, if any, you need to take.

TCAM messages may be preceded by a JES2 job number or a JES3 job name. For more information on the job number and job name, see “Explanation of TCAM Startup Procedure” in Chapter 2.

The Format of TCAM Messages

TCAM messages consist of two basic parts: the message identification (ID) and the message text. The message ID has three components:

1. The program component name
2. The message serial number
3. The message type code.

Note: The message ID also identifies the system program product that caused the message to be written. (See Figure 1-2 for an example of a TCAM message).

The component name identifies the IBM program component issuing the message. The component name for TCAM is IED or DKJ. These messages are described in *TCAM Messages*.

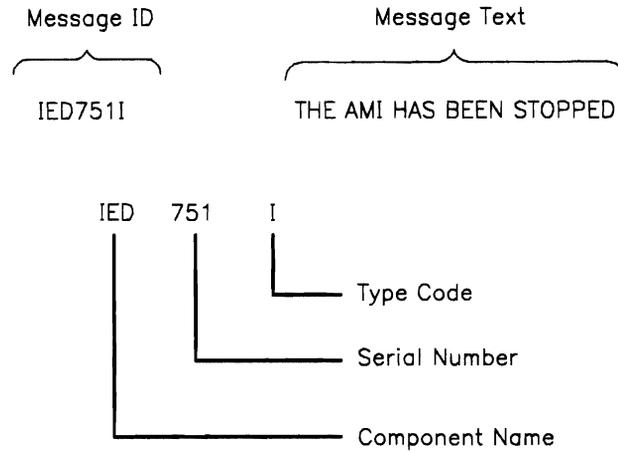


Figure 1-2. TCAM Message Format

The serial number is a three-character sequence number used to identify a particular message. Serial numbers range from 000 through 999.

The type code indicates of the urgency of a message. It tells you whether you must respond to a message immediately and, if so, how to respond. There are four different type codes. Each specifies a certain course of action. Most of the messages that you can receive are informational. However, you should also be aware of how to handle other messages. The type codes for messages are:

- A** Immediate Action—Action by the operator is required immediately; the associated task does not continue until the indicated action is taken.
- D** Immediate Decision—A decision and some action based on that decision are required immediately. The decision must be made by implementing one of the options listed in the message; the associated task does not continue until some action is taken.
- E** Eventual Action—The operator must eventually take some action associated with this task. However, the task continues independently of immediate operator action.
- I** Information—No operator action is required. The associated task continues unless the message explanation specifies otherwise. It may, however, be advisable to take action based on the contents of the message. See the description that follows on how to respond to TCAM error messages.

Responding to TCAM Error Messages

Not all TCAM messages can be classified as error messages. Most are only informational. However, several messages do indicate serious problems. For instance, if an irrecoverable input/output (I/O) error occurs while TCAM is attempting to open a data set, the following error message is displayed, and TCAM terminates:

```
IED008I TCAM OPEN ERROR cde-y IN DCB zzz descriptor
```

In attempting to open the data set represented by the DD statement *zzz*, an error occurred. See *TCAM Messages* for an explanation of this and other TCAM messages.

You may receive messages that are not issued by TCAM but rather by another component of the operating system. These messages usually deal with some kind of error that occurred outside the control of TCAM. Refer to the appropriate *System Messages* publication for details on what action to take.

Chapter 2. Starting, Restarting and, Stopping TCAM

To start TCAM, you must start the TCAM initiator. The initiator (IEDQTCAM) is executed as the job-step task in the TCAM address space. IEDQTCAM is part of SYS1.LINKLIB and must be identified as authorized to the authorized program facility (APF).

Note: If you have an MCP named IEDQTCAM, you must rename it. You can start the TCAM initiator in either one of two ways:

- 1. By entering the MVS START command if executing the initiator is cataloged as a procedure in SYS1.PROCLIB or*
- 2. By entering the start procedure for the initiator as SYSIN through the system input device.*

All of TCAM--the MCP, TCAM system service programs (including the basic operator control system services program and, if it is a part of your system, the extended operator control control system service program), and, optionally, other user-supplied system service programs--are executed as subtasks of the initiator. All initiator subtasks must be in an authorized library. Figure 2-1 shows how the initiator and its subtasks appear in the TCAM address space.

One advantage of this task structure is that a partial failure (that is, the abnormal termination of one of the subtasks) can occur without making it necessary to close down the TCAM MCP and usually without interfering with the continued operation of the MCP (unless the failed subtask is the MCP). The initiator continues to function when a subtask fails; it can reinitiate the MCP or any other failed subtask automatically, bypassing job management processing that would otherwise be required to restart the entire address space. In addition, the initiator accepts at any time commands to attach or detach subtasks and displays informational messages automatically or on command.

An initiator subtask is defined by an entry in the TCAM subtask table (TST). The system programmer prepares this table by coding a list of TASKDEF macros. One TASKDEF macro describes each initiator subtask. The system programmer can specify many functions provided by the initiator as options when defining an initiator subtask via the TASKDEF macro. Some of these initiator functions include:

- Starting a subtask automatically by issuing an MVS ATTACH macro once the initiator is active
- Displaying automatically at the system console the status of a subtask when abnormally terminated

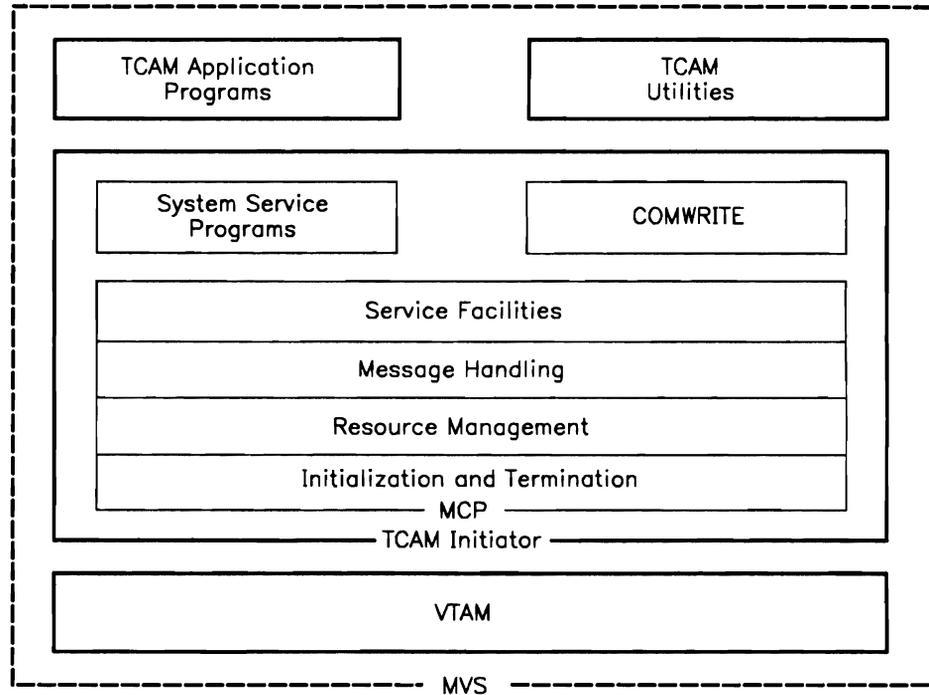


Figure 2-1. The Initiator and Subtasks in a TCAM Storage Region

- Attempting to restart an abnormally ended subtask for a specified number of times (restart count), or continually
- Starting automatically, after a subtask abnormally terminates, a backup program or a backup version of the same program.

The initiator also provides a group of initiator commands that you, the operator, can enter from the system console. These initiator commands are described later in this chapter. In addition to describing how to start TCAM, this chapter describes how to close down TCAM and how to restart the TCAM MCP after the abnormal termination of the MCP or another subtask.

Starting TCAM

The JCL for executing TCAM as a job begins with an EXEC statement; the PGM operand should specify IEDQTCAM, the name of the TCAM initiator. The PARM operand on the EXEC statement can specify the following operands, as necessary, all enclosed within single quotes:

- TABLE = tblname (The *tblname* operand is the load module name of the TST to be used by the initiator).
- MCP = (taskname,mcpname) (The *taskname* operand is the name of the entry in the TST for the MCP that is to be initiated, and *mcpname* is the load module name of the MCP to be initiated.) If MCP is not specified, the default is the first MCP defined in the TST specified by the TABLE operand.

- **CONSOLE = xx** specifies the console that is to receive all unsolicited TCAM messages. If **CONSOLE = *** is specified (and TCAM is not started as a job), TCAM uses the console from which the TCAM job was started. If **xx** is not a valid decimal console ID or if **CONSOLE = *** was specified and the job is started from a reader, TCAM uses the console from which the TCAM job was started and unsolicited TCAM messages will appear at one or more consoles defined to receive the route code numbers for that message. The route code numbers defined for TCAM messages are in Appendix B of the *TCAM Messages* publication.

The JCL required to invoke TCAM is described in *TCAM Installation Reference*. The DD statements required for system service programs and COMWRITE are described in the chapter, "Defining the MCP Data Sets," in *TCAM Installation Guide*.

If certain JCL parameters are incorrect, or if problems are encountered in locating required TCAM modules, the initiator may immediately terminate itself and issue message DKJ627I advising you of a TCAM initialization error. The initiator issues another message, either before or after the DKJ627I message, telling you that one of the following conditions caused the initialization error:

- The TST named in the JCL was not found or was not a valid TST (message DKJ622I).
- The MCP named in the JCL was not an MCP-type entry in the current TST (message DKJ626I).
- The MCP named in the JCL was not found in the current TST (message DKJ617I).
- An invalid keyword was found in the TCAM initiator parameter list (message DKJ628I).
- The value **xx** in **CONSOLE = xx** is invalid (message DKJ628I).
- One or more of the required TCAM modules could not be found in the TCAM module library dataset or in SYS1.LPALIB (message DKJ994I).
- One or more of the required TCAM modules were located in a different dataset from the remainder of the required modules (message DKJ995I).
- An error occurred while executing a BLDL macro in order to locate a TCAM module (message IED764I).

The TCAM initiator attaches each system service program that has a TST entry specifying **AUTO = YES**. System service programs are brought up in the following order:

1. The TCAM MCP
2. The basic operator control system service program
3. The extended operator control system service program (if it is part of your system)
4. Other subtasks in the order of their occurrence in the TST.

As the initiator starts subtasks whose TST entries specify **AUTO = YES**, you receive message DKJ601I confirming that each of these subtasks is active.

Depending on the coding of the MCP, the following messages requiring response could appear:

1. If the CPB= (provided DISK=YES is coded on the INTRO macro), LNUNITS=, STARTUP=, or UNITSZ= operand is omitted from the INTRO macro, TCAM issues the following operator response message:

```
nn IED002A SPECIFY TCAM PARAMETERS
```

Enter your response to this request based on specifications given to you by the TCAM system programmer or as detailed by your operating procedures.

2. If the TCAM startup/restart message-generating capability is used, the following operator response message is sent to the TCAM console to allow you to identify what startup (or restart) being performed:

```
nn DKJ750A SPECIFY STARTUP/RESTART CONDITION
```

Note: The nn notation indicates a message identifier that you should include in your response.

The response to message DKJ750A depends on the manner in which the TCSUP macro is coded in the MCP. Use information given to you by your system programmer or detailed in your operating procedures to respond to this message. If you are using the standard default message generating capability, enter one of the following responses:

- If you are performing a cold restart of the system for a new day's run or if you want to reset sequence numbers on a warm restart, enter:

```
R nn,SDAY
```

- If you are performing a warm restart of the system (during the same day in which you already performed an SDAY start of the system for a new day's run), enter:

```
R nn,RESTART
```

- If you are performing a warm restart of the system and do not want restart messages sent to any destinations, enter:

```
R nn,TEST
```

Note: A cold restart occurs when the MCP is started (following a flush closedown, a quick closedown, or system failure) as if this were the initial startup. This is the only kind of restart possible when no checkpoint/restart service facility is used. In a warm restart, the checkpoint/restart service facility restores the TCAM system as nearly as possible to its condition before closedown or failure. Replace nn in each of these commands with the message identification number preceding message DKJ750A.

Once startup is completed, you receive the TCAM initiator-ready message DKJ600D. You may also receive the extended-operator-control-ready message DKJ720D if the extended operator control system service program is included as a subtask in your system. Message DKJ600D indicates that the initiator is ready to accept initiator commands; message DKJ720D indicates that the TCAM extended operator control system service program is ready to accept extended operator commands. (Initiator commands are described later in this chapter. Extended operator commands are described in Chapter 4.) Initiator commands and extended operator commands issued from the system console must be entered in the form of responses to message DKJ600D and message DKJ720D, respectively. When replying (from the system console) to either of these messages, the correct identification number of the message must precede the response.

Until you receive the TCAM initiator-ready message, you can do nothing further. If the extended-operator-control-ready message is still missing, but you have received the initiator-ready message, you cannot enter extended operator commands. However, when traffic is routed; you can enter basic operator and initiator commands.

You should not however, regard the system as operational until you receive:

- Message DKJ601I (confirming that each subtask is active)
- The initiator-ready message
- The extended-operator-control-ready message (if appropriate).

At that point, the TCAM startup procedure is complete.

Explanation of TCAM Startup Procedure

Starting TCAM involves executing the initiator, starting the MCP and other initiator subtasks, starting any required online applications, starting the operator control stations, and starting the remainder of the TCAM system. MCP specifications can automate the procedure involving the network. In a large network, a more controlled startup may be desirable. This example presents such a procedure.

The easiest way to control more than one TCAM is to have each one assigned to a different system console. If more than one TCAM is running to the same console, there needs to be some way of determining which TCAM issued the message that appears at the console. The JES2 and JES3 prefixes are used to distinguish messages originating from the separate TCAMs. Figure 2-2 is a JES2 example; the JES2 command, \$D OSC_n,D=T, has been entered, causing the time and job number to be prefixed on every message to console *n*. In Figure 2-2, JES2 job number 4 refers to a TCAM job named MCP10.P0 and job number 5 to a TCAM job named MCP20.P1.

JES3 is similar, but simpler. JES3 uses job names in the prefix; job names are always displayed. You do not have to issue a JES3 command to cause the job names to be displayed.

Figure 2-2 is an example of the TCAM start procedure. An explanation of this procedure follows.

Line Number	Startup
1	00.00.00 S MCP10.P0
2	00.00.15 S MCP20.P1
3	00.00.30 STC 4 \$HASP373 MCP10 ON STCINRDR
4	00.00.35 STC 5 \$HASP373 MCP20 ON STCINRDR
5	00.00.40 STC 4*03 DKJ600D ENTER INITIATOR COMMAND FOR TCAM V3
6	00.00.45 STC 5*04 DKJ600D ENTER INITIATOR COMMAND FOR TCAM V3
7	00.00.50 STC 4 IED765I *** 5665-314 TCAM VERSION 3 ***
8	00.00.50 STC 4 IED001I TCAM JOB MCP10 , PO , ADDRESS of AVT 0014F4A8
9	00.00.51 STC 5 IED765I *** 5665-314 TCAM VERSION 3 ***
10	00.00.51 STC 5 IED001I TCAM JOB MCP20 , P1 , ADDRESS OF AVT 0014F608
11	00.01.00 STC 4*05 IED002A SPECIFY TCAM PARAMETERS
12	00.01.02 STC 5*06 IED002A SPECIFY TCAM PARAMETERS
13	r 05, s = icy,ba = cvt,u
14	r 06, s = icy,ba = ascb,u
15	00.07.00 STC 4 DKJ601I MCP ACTIVE 04/01/82 00:07:00
16	00.07.00 STC 4 DKJ601I SYSOPTCL ACTIVE 04/01/82 00:07:00
17	00.07.00 STC 4 DKJ601I OPCTL ACTIVE 04/01/82 00:07:00
18	00.07.00 STC 4 DKJ601I COMWRITE ACTIVE 04/01/82 00:07:00
19	00.07.00 STC 4 DKJ601I NODEPATH ACTIVE 04/01/00 00:00:00
20	00.07.00 STC 4 DKJ601I NODESYNC ACTIVE 04/01/82 00.07.00
21	00.07.00 STC 4 DKJ601I RETR ACTIVE 04/01/82 00.07.00
22	00.07.01 STC 4*07 DKJ750A SPECIFY START-UP/RESTART CONDITION
23	00.07.12 STC 4*08 DKJ720D ENTER EXTENDED OPCTL COMMAND
24	00.07.30 STC 5 DKJ601I MCP ACTIVE 04/01/82 00.07.30
25	00.07.30 STC 5 DKJ601I SYSOPCTL ACTIVE 04/01/82 00.07.30
26	00.07.30 STC 5 DKJ601I OPCTL ACTIVE 04/01/82 00.07.30
27	00.07.31 STC 5 DKJ601I COMWRITE ACTIVE 04/01/82 00.07.31
28	00.07.31 STC 5 DKJ601I NODEPATH ACTIVE 04/01/82 00.07.31
29	00.07.31 STC 5 DKJ601I NODESYNC ACTIVE 04/01/82 00.07.31
30	00.07.31 STC 5 DKJ601I RETR ACTIVE 04/01/82 00.07.31
31	00.07.31 STC 5*09 DKJ750A SPECIFY START-UP/RESTART CONDITION

Figure 2-2 (Part 1 of 2). Example of TCAM Startup Procedure

Line Number	Startup
32	00.07.46 STC 5*10 DKJ720D ENTER EXTENDED OPCTL COMMAND
33	r 07,sday
34	r 08,sday
35	d r,l,j
36	00.20.00 IEE1121 00.00.00 PENDING REQUESTS 003
37	RM=4 IM=0 EM=0 RU=0 IR=0 AMRF
38	RD:R/K T JOB ID MESSAGE TEXT
39	10 R STC 5*10 DKJ720D ENTER EXTENDED OPCTL COMMAND
40	04 R STC 5*04 DKJ600D ENTER INITIATOR COMMAND FOR TCAM V3
41	08 R STC 4*08 DKJ720D ENTER EXTENDED OPCTL COMMAND
42	03 R STC 4*03 DKJ600D ENTER INITIATOR COMMAND FOR TCAM V3
43	r 09,onln s
44	r 10,onln s
45	00.25.00 STC 4 DKJ856I ONLN S SCHEDULED
46	00.25.02 STC 5 DKJ856I ONLN S SCHEDULED
47	00.25.30 STC 4*11 DKJ720D ENTER EXTENDED OPCTL COMMAND
48	00.25.32 STC 5*12 DKJ720D ENTER EXTENDED OPCTL COMMAND
49	r 11,contact 20
50	r 12,contact 10
51	00.26.00 STC 4 DKJ951I CONTACTING 20
52	00.26.02 STC 5 DKJ951I CONTACTING 10

Figure 2-2 (Part 2 of 2). Example of TCAM Startup Procedure

Note: Commands to start the remainder of the TCAM system may be entered from basic or extended operator control stations.

Lines 1 through 4: The MVS START commands to start two MCPs, both in the same host. Both MCP10 and MCP20 are cataloged procedures started with the proname.id format (MCP10.P0 and MCP20.P1). The *id* (.P0) will be used to direct commands to the correct TCAM. This example uses JES2 (by using the \$TOSC1,D=T command) to cause all console messages to be prefixed with the time of issuance and the job number or started-task number. (A JES3 environment always has the job name prefixing messages.) Since more than one TCAM will be executing in this host processor, the job numbers (4 and 5) are necessary to differentiate the issuers of otherwise identical TCAM messages.

Lines 5 and 6: The initiator-ready messages for MCP10 and MCP20. After the READY macro has been executed (lines 27 and 28), this message can be replied to with a Change System Console Identifier (Console) command to direct that TCAM's messages to a console other than the present console for ease of operation and control.

Lines 7-8-9 and 10: For each TCAM, a message indicating the program product identification and a message informing the operator of the job name and step name for the job that was started and also the virtual address of the beginning of the address vector table (AVT).

Lines 11 and 12: Responses to IED002A to complete INTRO parameters. Both MCP10 and MCP20 are cold started, with MCP10 running in CVT mode and MCP20 in ASCB mode. From the point of responding to message 06, all D, H, A, and Z commands will have to be qualified in order to direct the command to the appropriate TCAM (that is TP.PO or TP.P1).

Lines 13 through 19: Display of subtasks started for job 4 (MCP10); that is, subtasks that include the MCP started, MCPREL=YES and AUTO=YES subtasks, and AUTO=MCP applications and system service programs.

Line 20: An operator response message generated by the start and restart message routine in MCP10. Responses depend on the way in which macros for this routine are coded and on the type of start or restart desired.

Line 21: The extended operator control ready message for MCP10.

Lines 22 through 28: Display of initiator subtasks started for job 5 (MCP20); that is, subtasks including the MCP started, MCPREL=YES and AUTO=YES subtasks, and AUTO=MCP applications and system service programs.

Line 29: An operator response message generated by the start and restart message routine in MCP20. Responses depend on the way in which macros for this routine are coded and on the type of start or restart desired.

Lines 31 and 32: Operator responses for both MCPs indicating that this is a cold start. For restart situations during the day, the reply generally is 'RESTART'.

Note: The operator normally starts any online application programs at this point, just prior to network activation. This is not a requirement and is suggested simply to prevent excessive reject messages from being generated for external LUs attempting to enter into session with inactive application programs. At this point also, the initiator-response message can be used to change the TCAM console ID.

Line 33: The extended operator control ready message for MCP20.

Lines 34 through 40: Before starting the extended network, the D R,L,J system command is issued to determine the outstanding extended operator control response message associated with each TCAM. In this case, response message 08 (job 4) is for MCP10, while message 10 (job 5) is for MCP20. The D A,L system command can then be used to associate the job number with procname.id in the JES2 environment.

Lines 41 and 42: A Start Traffic To Specified Groups (ONLN) extended operator command for each job to start the special stations. These special groups of external LUs are described in the TSPECGRP macro in the MCP and may include the operator control stations.

Lines 43 through 46: Responses to Start Traffic To Specified Groups (ONLN) extended operator commands from each TCAM and reissuance of the extended operator-control-ready message for each TCAM.

Line 47: An extended operator command to inform the internodal awareness system service program in host node 20 that host node 10 is active.

Line 48: An extended operator command to inform the internodal awareness system service program in host node 10 that host node 20 is active.

Lines 49 and 50: Responses from the extended operator control system service program to the Contact Host Node in Another TCAM System (CONTACT) extended operator commands entered for each TCAM.

The TCAM Initiator Commands

The TCAM initiator commands help you to control the TCAM initiator and its subtasks. Enter these commands only from the system console and only in response to the following outstanding initiator-ready message:

```
*nn DKJ600D ENTER INITIATOR COMMAND FOR TCAM V3
```

To reply, enter:

```
R nn,comname
```

Note: nn is the number associated with the outstanding message and comname is one of the initiator commands described in this chapter.

Each time you enter an initiator command, the initiator reissues message DKJ600D.

Attach a Program (ATTACH)

This command requests the TCAM initiator to begin executing a program as a subtask of the initiator. A program is eligible to become an initiator subtask if there is an entry for the program in the TCAM subtask table (TST).

Format:

```
{ATTACH } taskname  
{ATT      }
```

Replace *[taskname]* with the name of the selected entry in the TST for the program to be initiated.

Change System Console Identifier (CONSOLE)

This command requests the defined system-console identifier be changed. When you specify a valid multiple-console system-console identification, that console receives the unsolicited operator awareness messages from that TCAM. When you specify 0, normal TCAM message routing is used; all unsolicited console output is routed to available telecommunication consoles.

Use the Change System Console Identifier (CONSOLE) command in reply to the DKJ600D initiator message. An incorrect response produces the DKJ628I input parameter error message. If you enter an invalid console ID, TCAM continues to use the console set prior to this command. You can display the ID of the TCAM currently receiving TCAM messages by issuing the Display Console Identification (DISPLAY CONSOLE) initiator command.

Format:

CONSOLE=id

Replace *id* with a valid decimal multiple-console system-console ID.

Note: When CONSOLE=id is entered, all subsequent messages are sent to the new console. However, all write-to-operator with reply (WTOR) messages issued by TCAM prior to the change of consoles can be answered only at the old console and the master console.

To have these WTORs (an example is DKJ600D ENTER INITIATOR COMMAND) issued to the new console, a reply must be entered to the WTOR at the old console or at the master console. In some cases a “harmless” reply can be given (that is, no alterations are made to TCAM). Display Console Identification (DISPLAY CONSOLE) is a harmless reply to DKJ600D. In other cases, an invalid reply causes the WTOR to be reissued.

If possible, you should display the outstanding requests that are awaiting replies and decide which should be answered and how to answer them before changing the TCAM console id.

Detach a Subtask (DETACH)

This command requests that the TCAM initiator detach a subtask. Use this command for emergency termination of a malfunctioning subtask. This command causes the named subtask to abnormally terminate and prevents the subtask from being restarted automatically even if the system programmer specified a restart count in the named subtask’s TCAM subtask table (TST). However, if you subsequently issue a Attach a Program (ATTACH) initiator command to reattach the subtask, the restart count is restored to its original value. Depending on the coding of the DUMP operand of the TASKDEF macro, a dump may be provided for the terminated subtask.

Format:

```
{DETACH } taskname  
{DET     }
```

Replace *taskname* with the name of the selected entry in the TST for the program to be terminated.

Display TCAM Initiator Subtask Execution Status (DISPLAY TASKS)

This command requests the TCAM initiator to display the execution status of selected or all subtasks in the current or any other valid TCAM subtask table (TST).

Format:

```
{DISPLAY } taskname[,taskname,...,taskname]  
{DIS     }  
{D       }
```

Replace *taskname* with the name of a valid entry in the current TST being used by the initiator. Up to 24 *tasknames* can be requested in each Display TCAM Initiator Subtask Execution Status (DISPLAY TASKS) initiator command. TCAM returns a display consisting of each *taskname* and its execution status: active, not active, or complete.

Format:

```
{DISPLAY } TASKS  {ACTIVE   } [ {current TST } ]  
{DIS     }        {ACT      } {tstname   }  
{D       }        {INACTIVE }  
                  {INACT   }  
                  {ALL     }  
                  {APPL    }  
                  {COMPLETE }  
                  {COMP    }  
                  {SYSTEM  }  
                  {SYS     }
```

This form of the Display Tasks command provides a list of *all* subtask entries in a valid TCAM subtask table. The *tstname* operand is optional; omitting this operand in the command text causes the TCAM initiator to display the applicable subtasks in the TST currently being used by TCAM.

The various operands produce displays as follows:

No operand in command: All active subtasks in the current TST are displayed.

ACTIVE:

ACT All subtasks that are currently attached and running under the TCAM initiator. The start time and date are displayed for each active subtask.

INACTIVE:

INACT All subtasks that are not currently attached by the TCAM initiator. Subtasks are displayed as not active (subtask has not been attached by the TCAM initiator) or as complete (subtask was attached and is no longer attached). If the subtask is complete, the date and time that the subtask stopped running under the initiator is displayed.

ALL: All Subtasks in the TST table and their execution status are displayed.

APPL: All MCPs and non-IBM-supplied subtasks are displayed with their execution status: active, inactive, or complete.

COMPLETE:

COMP All subtasks that have completed execution as subtasks of the TCAM initiator.

SYSTEM:

SYS All IBM-supplied subtasks defined in the TST table are displayed with their execution status: active, inactive, or complete.

Subtask displays begin with DKJ609I indicating which TST is being displayed. The individual subtask displays follow unless NO ACTIV, NO INACT, NO SYSTEM, NO COMP, or NO APPL appears, indicating that no subtasks met the criteria in task table *tstname*.

Display Console Identification (DISPLAY CONSOLE)

This command requests that TCAM display the ID of the console scheduled to receive unsolicited output from TCAM.

Format:

```
{DISPLAY } CONSOLE  
{DIS      }  
{D        }
```

Replace an Entry in the TST (SWAPTST)

This command requests the TCAM initiator to replace from one to ten entries of the TST currently in use with entries from another TST. Note that this command only replaces entries in the TST; it does not affect the currently executing subtask.

Format:

```
{SWAPTST } tblname,(taskname[,taskname....])  
{SWAP    }
```

The *tblname* operand is the name of a load module containing the replacement TST entries, and the *taskname* operand is the name of at least one, but up to ten, TST entries that you want replaced.

Restarting Abnormally Terminated Subtasks

You receive message DKJ605I when a subtask abnormally terminates. This message gives you the name of the abnormally terminated subtask, the system or user abend code prefixed with S or U, and date and time of the abnormal termination. In addition, if the MCP is the subtask that abnormally terminated, then all IBM-written system service programs also terminate, and you receive message DKJ605I indicating that each of these subtasks is terminated.

The TCAM initiator attempts to restart the failed subtask automatically if a restart count is specified in the TST for the failed subtask. If a restart attempt is successful, you receive message DKJ613I advising you that the restart is in progress and then message DKJ601I, which advises you the subtask is active. If the basic operator control system service program is the failed subtask that restarted, operator commands being processed at the time of the failure are not remembered, and there is no cleanup of partially completed procedures. Operator commands issued for resources for which a command was pending at the time of failure may not execute successfully. Such resources may be lost to the TCAM system; you can use Display commands to try to determine resources with an incorrect status. In some cases, these conditions may be serious enough to necessitate a restart of the MCP while in other cases MCP restart is not required. If the MCP is the failed subtask that is successfully restarted, the initiator also restarts all system service programs terminated because of the MCP's abnormal termination; messages DKJ613I and DKJ601I are displayed for each of these restarted subtasks.

When the restart count for the failed subtask is reached with no successful restart of the failed subtask, the initiator determines whether the TST specifies that a backup subtask is to be started. If so, you receive message DKJ612I. This message indicates the restart limit is reached, and the backup subtask for the failed subtask is starting. You then receive message DKJ601I indicating the backup subtask is active. Also, if the backup subtask that is started is for the failed MCP, the initiator restarts all other subtasks that terminated because of the MCP's failure; for each subtask

started in this manner, you also receive message DKJ613I confirming that the restart is in progress, and message DKJ601I confirming that the subtask is active.

Note that, once the initiator has made all attempts to automatically activate the failed subtask and all attempts are unsuccessful (because no restart count and no backup program are specified in the TST for the subtask, or the restart count is reached and no backup program is specified in the TST), you receive message DKJ611I advising you the restart limit is reached with no restart. Once you receive this message, provided the failed subtask is not the MCP, you can initiate the same or another subtask by issuing (from the system console only, in response to the outstanding message DKJ600D) the Attach a Program (ATTACH) initiator command. (See the descriptions of the initiator commands in this chapter.) When the subtask named in this command is started, you receive message DKJ600D confirming the activation of the named subtask. If the failed subtask is the MCP, the outstanding DKJ600D message is cancelled and the following message is issued: DKJ607D TCAM INITIATOR WAITING — REPLY 'RESTART' or 'SHUTDOWN'. This message allows you to either close down the initiator and free up the address space, or attempt to restart the failed MCP or another MCP. For more information on responding to message DKJ607D, see the next part of this chapter. If an MCP is restarted, which is indicated by receiving message DKJ601I, then the initiator starts all subtasks terminated because of the failed MCP, and you receive message DKJ601I confirming that each of these subtasks is active.

If the MCP subtask abends before the READY macro executes, it is not restarted, regardless of the restart count or backup specification. No attempt is made to attach other subtasks. Message DKJ607D is issued to allow the operator the option of restarting another MCP or terminating.

No attempt is made to restart subtasks that abend after MCP closedown processing has completed.

Closing Down TCAM

To close down the TCAM MCP, issue the Closedown of MCP (HALT) command that is described later in this chapter.

After TCAM accepts a HALT command, you cannot use operator commands to determine the cause of any problem that prevents completion of the closedown process.

When the Closedown of MCP (HALT) command has been executed, you may receive the following message: DKJ607D TCAM INITIATOR WAITING — REPLY 'RESTART' OR 'SHUTDOWN', depending upon the TASKDEF entry for the MCP.

If you want to keep the address space for a restart procedure, your response should be in the form:

```
R nn,RESTART,MCP=(taskname,mcpname),TABLE=tblname,CONSOLE=xx
```

You may use the same MCP and TABLE parameters that were used in the JCL to start TCAM, or you may use different MCP and TABLE parameters. Following are some examples of how you might respond to message DKJ600D:

1. R nn,RESTART

This restarts the TCAM system just terminated using the same MCP and TST.

2. R nn,RESTART,MCP=(MCP2,MCP2)

This reply assumes you were previously running another MCP; for example, MCP1. A different MCP named MCP2 is started with this reply. The same TST previously used is used again since a new TABLE parameter is not included in this reply.

3. R nn,RESTART,MCP=(MCP3,MCP3),TABLE=TEST2,CONSOLE=3

This reply restarts the system using the TST named TEST2 and the MCP named MCP3. It also changes the ID of the console that receives unsolicited TCAM messages to the console whose ID is 3.

At this point, the startup procedure must be repeated. See “Starting TCAM” in this chapter.

Explanation of TCAM Closedown Procedure

Stopping TCAM involves stopping application programs, stopping the MCP, and terminating the initiator.

Just as the startup procedure can be automated to a one-step procedure, the closedown of TCAM can also be automated. TCAM provides a facility whereby an application program can specify in its input DCB that if a Closedown of MCP (HALT) basic operator command is entered, it is to take its end-of-data (EODAD) exit and terminate. The initiator may also terminate at this point if DKJ607D suppression has been chosen as an option on the TASKDEF macro entry for the MCP. If all of the online applications are coded to take an EODAD exit when a Closedown of MCP (HALT) basic operator command is entered, the Closedown of MCP (HALT) basic operator command causes all application programs to terminate and the MCP to terminate.

Although specifications in the MCP can automate the procedure of closing down the TCAM system, you may want a more controlled close down. This example presents such a procedure for a network with two MCPs in the same host. The topic “Explanation of TCAM Startup Procedures” earlier in the chapter describes the use of the JES2 job number and the JES3 job name to distinguish which MCP console responses refer to. In the Figure 2-3 example, JES2 job number 4 refers to a TCAM job named MCP10.P0 and job number 5 to a TCAM job named MCP20.P1; this is the end of the startup example shown earlier in this chapter.

Following is an explanation of Figure 2-3 using the TCAM model program, the same one used in Figure 2-2.



```

Line
Number  Closedown

1      d r,l,j
2      23.55.00      IEE112I 23.55.00 PENDING REQUESTS 243
3      RM=4 IM=0 EM=0 RU=0 IR=0 AMRF
4      ID:R/K T JOB ID
5      51 R STC 5*50 DKJ720D ENTER EXTENDED OPCTL COMMAND
6      31 R STC 5*31 DKJ600D ENTER INITIATOR COMMAND FOR TCAM
      V3
7      50 R STC 4*51 DJK720D ENTER EXTENDED OPCTL COMMAND
8      30 R STC 4*30 DKJ600D ENTER INITIATOR COMMAND FOR TCAM
      V3
9      r 50,offln all
10     r 51,offln all

11     23.56.00 STC 4 DKJ856I OFFLN ALL SCHEDULED
12     23.56.04 STC 5 DKJ856I OFFLN ALL SCHEDULED
13     23.56.30 STC 4*52 DKJ720D ENTER EXTENDED OPCTL COMMAND
14     23.56.32 STC 5*53 DKJ720D ENTER EXTENDED OPCTL COMMAND

15     r 52,close apgm
16     r 53,close apgm

17     23.57.00 STC 4 DKJ705I CLOSE MESSAGE SENT TO APM
18     23.57.03 STC 5 DKJ705I CLOSE MESSAGE SENT TO APM
19     23.57.10 STC 4 *54 DKJ720D ENTER EXTENDED OPCTL COMMAND
20     23.56.32 STC 5 *55 DKJ720D ENTER EXTENDED OPCTL COMMAND

21     23.57.15 STC 4 DKJ603I OPCTL   COMPLETE 04/01/82 23.57.15
22     23.57.15 STC 4 DKJ603I RETR   COMPLETE 04/01/82 23.57.15
23     23.57.15 STC 4 DKJ603I NODEPATH COMPLETE 04/01/82 23.57.15

24     23.57.15 STC 4 DKJ603I NODESYNC COMPLETE 04/01/82 23.57.15
25     23.57.18 STC 5 DKJ603I OPCTL   COMPLETE 04/01/82 23.57.18
26     23.57.18 STC 5 DKJ603I RETR   COMPLETE 04/01/82 23.57.18.

27     23.57.18 STC 5 DKJ603I NODEPATH COMPLETE 04/01/82 23.57.18
28     23.57.18 STC 5 DKJ603I NODESYNC COMPLETE 04/01/82 23.57.18
29     z tp.p0,quick

30     z tp.p1,quick
31     23.58.30 STC 4 DKJ603I SYSOPCTL COMPLETE 04/01/82 23.58.30
32     23.58.30 STC 4 DKJ603I COMWRITE COMPLETE 04/01/82 23.58.30

33     23.58.35 STC 5 DKJ603I SYSOPCTL COMPLETE 04/01/82 23.58.35
34     23.58.35 STC 5 DKJ603I COMWRITE COMPLETE 04/01/82 23.58.35
35     23.59.00 STC 4 IED097I TCAM IS CLOSED DOWN

36     23.59.05 STC 5 IED097I TCAM IS CLOSED DOWN
37     23.59.10 STC 4 DKJ603I MCP10  COMPLETE 04/01/82 23.59.10
38     23.59.12 STC 5 DKJ603I MCP20  COMPLETE 04/01/82 23.59.12

39     23.59.20 STC 4*56 DKJ607D TCAM INITIATOR WAITING-REPLY
      'RESTART' OR 'SHUTDOWN'

```

Figure 2-3 (Part 1 of 2). Example of TCAM Closedown Procedure

Line Number	Closedown
40	23.59.22 STC 5*57 DKJ607D TCAM INITIATOR WAITING-REPLY 'RESTART' OR 'SHUTDOWN'
41	r 56,shutdown
42	r 57,shutdown
43	23.59.45 STC 4 DKJ616I TCAM INITIATOR CLOSED
44	23.59.48 STC 5 DKJ616I TCAM INITIATOR CLOSED

Figure 2-3 (Part 2 of 2). Example of TCAM Closedown Procedure

Lines 1 through 8: The D R,L,J system command is issued to determine the outstanding extended operator control response message associated with each TCAM. In this case, response messages 51 and 31 (job 5) are for MCP20, while messages 50 and 30 (job 4) are for MCP10.

Lines 9 and 10: A Stop Traffic From Specified Groups (OFFLN) extended operator command is issued for each TCAM to stop all of the external LUs in the system with the exception of the special LUs identified by the TSPEGRP macro in the MCPs.

Lines 11 through 14: Messages indicating that the commands on lines 9 and 10 are scheduled for execution, and the reissuance of the extended-operator-control-ready message for each TCAM.

Lines 15 and 16: Deactivate Application Programs (CLOSE) extended operator commands requesting that the application programs listed in the distribution lists named APGM (in each MCP) be closed.

Lines 17 through 20: Messages notifying the operator that the CLOSE message has been accepted by each MCP and has been routed to the distribution lists (APGM) and the reissuance of the extended-operator-control-ready message for each TCAM.

Lines 21 through 28: Initiator messages from each TCAM indicating that the programs sent close messages have closed and completed execution. Job 4 indicates MCP10's tasks and job 5 indicates MCP20's tasks. If they had not all been deactivated, the FORCE option of the VTAM VARY NET INACT command, would have to be issued. (See VTAM Operation Publication.)

Lines 29 and 30 Issue Closedown of MCP (HALT) basic operator commands to close down MCP10 and MCP20.

Line 31: An initiator message informing the operator that the basic operator control system service program is complete for MCP10 (job 4).

Line 32: An initiator message informing the operator that COMWRITE is complete for MCP10 (job 4).

Line 33: An initiator message informing the operator that the basic operator control system service program is complete for MCP20 (job 5).

Line 34: An initiator message informing the operator that COMWRITE is complete for MCP20 (job 5).

Lines 35 and 36: Messages informing the operator that the MCPs are closed for each TCAM.

Lines 37 and 38: Initiator messages informing the operator that the MCPs have completed execution in each TCAM.

Line 39: Because MCP10's TASKDEF macro entry did not have the suppress DKJ607D option, DKJ607D is issued indicating that the initiator has no active subtasks. This gives the operator the option of deactivating the initiator or of restarting an MCP without freeing up the address space.

Line 40: Because MCP20's TASKDEF macro entry did not have the suppress DKJ607D option, DKJ607D is issued indicating that the initiator has no active subtasks. This gives the operator the option of deactivating the initiator or restarting an MCP without freeing up the address space.

Lines 41 and 42: Operator responses to deactivate the initiator and free the address space.

Lines 43 and 44: Messages indicating that the initiator has accepted the operator's responses. The initiator is now closed.

Closedown of MCP (HALT)

You can stop a TCAM MCP (system closedown) by issuing the Closedown of MCP (HALT) command. You can specify closedown in one of two modes: quick or flush. A *quick* closedown becomes effective when TCAM completely sends or receives the message currently being processed. A *flush* closedown allows all completely queued messages in TCAM to be sent before closedown takes place.

Format:

```
Z TP[ {.id      }], {QUICK }
      {.jobname } {FLUSH }
      {.procname }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id.jobname*, or *procname* qualifier. For information on which qualifier to use, see "Considerations for Entering Commands When an ASCB-Based TCAM Is Active" in Chapter 1.



Chapter 3. TCAM Basic Operator Commands

This chapter describes the basic operator commands. Commands are grouped under two topics. They are:

1. Displaying TCAM status
2. Starting and stopping other programming functions.

The table of contents for this chapter lists basic operator commands that are applicable for controlling and monitoring your TCAM System. Appendix A provides a quick reference summary of the basic operator commands. Also, in TCAM systems with extended operator control, the basic operator control commands (along with the extended operator control commands) are included in a quick online reference summary. See the description of the Display Basic and/or Extended Operator Commands (COM) in Chapters 3 and 4 of this book for more information.

In a multiple TCAM system, TCAM operator commands affect resources for the MCP in the system that processes the operator command. However, multiple TCAMs can execute in the same host simultaneously (if during system definition, this mode of operation has been specified). Operator commands can be executed simultaneously by multiple TCAMs, and output messages can be generated simultaneously by multiple TCAMs. The section titled, "The Format of TCAM Messages" in Chapter 1 of this book explains the information given by the various parts of output messages. Chapter 3 gives the details of what must be specified when operator commands are entered in a multiple-TCAM host.

Displaying TCAM Status

Display (D) commands request TCAM to send information to the origin from which the command was entered. Use these commands to display information about control blocks, message queues, or TCAM resources.

After entering a Display (D) command, you may receive some information that is intended for the TCAM system programmer. However, much of the information is intended for you. For example, you can ask for the status of an LU, that is, whether the LU is started, stopped, or intercepted. You can also determine the names of all operator control stations from which it is possible to enter TCAM basic operator commands.

Note: Message IED018I may be received for any display command. Message IED016I may be received for any display command that expects a resourcename to be specified.

Display Basic Primary Operator Control Station Name (D PRITERM)

This command requests that TCAM display the name of the currently active basic primary operator control station.

Format:

```
D TP [ {.id      }],PRITERM
      {jobname  }
      {procname }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, See “Considerations for Entering Commands When an ASCB-Based TCAM is Active” in Chapter 1.

Display Basic Secondary Operator Control Station Names (D SECTERM)

This command requests that TCAM display the names of all currently specified basic secondary operator control stations. The list includes all basic operator control stations except SYSCON even if one of these stations is currently designated primary. If the only basic operator control station is the system console, SYSCON is the station name included in the reply message.

Format:

```
D TP [ {.id      }],SECTERM
      {jobname  }
      {procname }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

Display Intercepted LUs (D INTER)

This command requests that TCAM display the names of all LUs to which transmission from TCAM is suspended. An LU is intercepted when transmission of all messages to the LU from the MCP is suspended through the use of the HOLD macro or the Intercept an LU (H TP) basic operator control command.

Format:

```
D TP [ { .id          } ],INTER
      { .jobname     }
      { .procname    }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, See topic “Considerations for Entering Commands When an ASCB-Based TCAM is Active” in Chapter 1.

Display Names of Pending LUs (D PEND)

This command requests that TCAM display the name of the session partners of pending sessions involving the specified host LU or external LU, any LU in a specified group of external LUs, or the session partners of all pending sessions. A pending session is a session that is in the process of initiating or terminating. TCAM displays the status of the session and the session partners for the pending session.

Format:

```
D TP [ { .id          } ],PEND, { ALL      }
      { .jobname     }          { luname   }
      { .procname    }          { grpname  }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see the topic “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

Display Option Field (D OPTION)

This command requests that TCAM display the option table field reserved for a particular LU or application program.

Format:

```
D TP [ { .id          } ],OPTION, { luname     },opfldname, { C }
      { .jobname     }          { tprocessname }      { D }
      { .procname    }          {                }      { X }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

You must replace *opfldname* with the name of the option field in the option table. The symbolic name is identical to the label of the OPTION macro that initially reserved space in the option table for this resource.

TCAM displays the option field in character format if you enter C, in decimal if you enter D, or in hexadecimal if you enter X. The largest numeric value that can be displayed in decimal format is 2,147,483,647.

Leading blanks are not displayed for character fields. Leading zeros are dropped from decimal and hexadecimal fields; however, TCAM displays hexadecimal fields whose contents are 0001 as 01. If the field cannot be displayed in the format that you specify in the command, then the command is rejected. Enter C or D only for option fields whose contents are in character or decimal format respectively.

To further explain the importance of specifying the proper format, assume the OPTION and TERMINAL macros in an MCP are coded as follows:

```
EX OPTION H
```

```
TRM TERMINAL ...OPDATA = (20)
```

Entering D TP,OPTION,TRM,EX,D causes the decimal value 20 to be displayed while entering D TP,OPTION,TRM,EX,X causes the hexadecimal value 14 to be displayed. However, entering D TP,OPTION,TRM,EX,C causes the command to produce an unprintable character, X'20'.

Display Pool Statistics (D POOL)

This command requests that TCAM display statistics about receive any RPL (ARPL), buffer units (BFR), channel program blocks (CPB), line buffer units (LNU), main-storage buffer units (MSU), resource management block (RMB), and session information blocks (SIB).

Format:

```
D TP [ {.id      }],POOL, {ALL  } [,CLEAR]
      {.jobname }      {ARPL }
      {.procname }      {BFR  }
                          {CPB  }
                          {LNU  }
                          {MSU  }
                          {RMB  }
                          {SIB  }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM is Active” in Chapter 1.

You can request statistics for all pools common to the entire TCAM system by specifying ALL as the pool type. If you specify the CLEAR option, the peak count (that is, the greatest usage of pool elements since the last time the counter was reset) is retrieved and displayed in message IED602I and then set to the current in-use count.

Note: When you receive message IED602I containing the requested statistics for main-storage buffer units, the in-use count, the peak count, or both may exceed the total count.

Note: The peak number is not given for the LNU pool. When you receive message IED602I containing the requested statistics for main-storage buffer units, the sum of the free count and the in-use count may be greater than the total count. This occurs, for example, when TCAM runs out of main-storage buffer-units and “borrows” line-buffer units. This “borrowing” is not reflected in the statistics for the line-buffer units.

The number of buffer units (BFR) should equal the number of line buffer units (LNU) and main-storage buffer units (MSU).

If all the statistics for a particular pool are zero, then the pool does not exist for your system. All statistics are positive decimal integers.

Display Queue Control Block (D QUEUE)

This command requests TCAM to display selected fields of the queue control block for an LU or application program. The information displayed includes the number of messages queued for the named LU or application program, the queue type, the queue status, and the priority levels permitted for that queue.

Format:

```
D TP [ { .id          } ], QUEUE, { externalluname }
      { .jobname     }           { tprocessname   }
      { .procname    }           { logtype        }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

Display Session Partners (D SESSION)

This command requests TCAM to display the names of all resources currently in session with the named host LU or external LU.

Format:

```
D TP [ { .id          } ], SESSION, luname
      { .jobname     }
      { .procname    }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

To indicate the status of a session, an “A” for “active” or a “P” for “pending” follows each session partner listed.

Display Status of LUs (D STATUS)

This command requests a display of the status of a host LU, an external LU, or a group of external LUs.

Format:

```
D TP [ { .id          } ], STATUS, { luname   }, [ { STARTED } ]
      { .jobname    }             { grpname  } { STOPPED }
      { .procname   }             { AMI      } { ALL      }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-based TCAM is Active” in Chapter 1.

When an external LU is specified, the start/stop state of the LU and the group name to which the LU belongs are displayed. If this command is issued for a group, a display of the start/stop status of each LU in that group is displayed. AMI results in the display of the status of each host LU in a TCAM system. ALL results in the display of the status of each external LU and host LU.

Note: When this command is issued for a host LU, the started/stopped state of the related ACB is displayed. If the ACB is not open, any OPEN or SETLOGON error code which has been encountered is also displayed.

STARTED limits the display to the status of only those LUs in the specified collection which are started and do not have STOP in progress. STOPPED limits the display to the status of only those LUs in the specified collection that are stopped or have a STOP in progress.

Note: STARTED/STOPPED has no effect if the status of a single LU is requested.

If neither STARTED nor STOPPED is specified, the states of all resources in the specified collection are shown.

Display Status and Message Sequence Numbers of a Resource (D TERM)

This command requests a display of resource type and status. For example, the display for an LU includes the input sequence number of the next message to be received from that LU, and the output sequence number of the last message that was sent to that LU. The display also shows if the resource is intercepted, has option fields, is currently in LU-LU session and if it is a secondary operator control station.

Format:

```
D TP [ { .id          } ], TERM, { externalluname }
      { .jobname     }          { tprocessname   }
      { .procname    }          { listname       }
      { .grpname     }
      { .logtype     }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1.

Note: Message IED033I, in addition to describing the type of resource named, indicates if the resource:

- Is intercepted
- Has option fields
- Is not currently in LU-LU session (for external LUs only)
- Is a secondary operator control station.

The Status of TCAM Resources

In general, an external LU is *started* when it is able to enter into an LU-LU session. The existence of the LU-LU session provides the capability that enables the LU to enter and accept messages. *Stopped* means that an LU is unable to enter into an LU-LU session. An LU is said to be stopped when it is not started. For an external LU, stopped means that the external LU is not capable of entering into an LU-LU session.

An external LU is intercepted if it can enter messages but not accept messages. Stopping an external LU terminates all LU-LU sessions involving the LU and prevents the initiation of new LU-LU sessions involving that LU.

Control Functions and Commands

You can change the status of a basic control station from secondary to primary by using a MODIFY (F) command. (Use the Display Basic Primary Operator Control Station Name (D PRITERM) and the Display Basic Secondary Operator Control Station Names (D SECTERM) commands to determine the names of the basic primary operator control station and secondary operator control stations.) You can stop transmission to a destination by using a Hold (H) command. You can resume transmission to a destination by using a Release (A) command.

To intercept an LU, use the Hold (H) command. When an LU is intercepted, the LU can enter messages into the TCAM system but is not eligible to accept messages. The Display Intercepted LUs (D TP,INTER) command can be used to determine the LUs that are currently intercepted. All messages stored on disk queues for a particular LU are held by TCAM until the LU is released. (Message storage on disk versus main storage is

described in *TCAM Installation Guide*.) To release an LU that is intercepted (that is, the LU's message queue is intercepted), you can use the Release Intercepted LU (A TP) command.

If you are an operator, this capability allows you to leave your station unattended for short periods of time without having to risk missing any messages sent to the station.

TCAM Control Commands

The remainder of this chapter describes the basic TCAM commands you may use for controlling your TCAM system.

Change Basic Primary Operator Control Station (F OPERATOR)

This command requests TCAM to specify either a basic secondary operator control station or the system console as the basic primary operator control station.

Format:

```
F {procname.id },OPERATOR = {luname      }
   {id           }           {SYSCON     }
   {jobname     }           {tprocessname }
   {procname    }
```

luname is the name of a basic secondary operator control station, application program, or LU (other than the system console) that you want to become the basic primary operator control station. See *TCAM Planning Guide* for an explanation of the use of application programs.

Note: There is no way to automatically revert to SYSCON if a basic extended primary operator control station becomes inoperative. You must issue the Change Basic Primary Operator Control Station (F OPERATOR) command to make such a change.

Insert Option Field Data (F OPT)

This command requests that TCAM allow you to insert new data in the option field for a specific resource.

Format:

```
F {procname.id },OPT = {luname      },opfldname,data
   {id           }           {tprocessname }
   {jobname     }
   {procname    }
```

Replace *opfldname* with the name of the resource's option field, as specified in its related OPTION macro. The variable operand *data* is the new option field value. It can be enclosed in C' ' or X' ' framing characters, or it can

be unframed. Option fields defined as character format can be modified using character format and C' ' framing characters or hexadecimal format and X' ' framing characters. Option fields not defined as character format can only be modified using hexadecimal format and X' ' framing characters or unframed decimal integers. The largest decimal integer that you can enter in this command is 2,147,483,647.

The total number of characters of *data* can be no greater than the size of the existing option field; if greater, the command is rejected. If the replacement data is shorter in length than the size defined for the existing option field, padding is done according to assembler language specifications. The results may not be what you want. This command is also rejected if the format of the data you enter conflicts with the definition of the option field format.

Intercept an LU (H TP)

This command requests TCAM to intercept the specified LU. To intercept means to suspend the transmission of all messages addressed to that resource. An intercepted LU can still enter messages; only traffic to the LU is suspended. The LU remains intercepted until one of the following:

- Another operator command is issued to release the messages queued for that resource (see the Release Intercepted Resource (A TP) command)
- An MRELEASE macro is issued in an application program
- An IEDRELS macro is issued in the named resource's message handler.

This command is not valid for LUs using main-storage-only queuing.

Note to the TCAM System Programmer: If a HOLD macro has not been specified in the MCP, this command does not execute.

Format:

```
H TP [ { .id          } ] = luname
      { .jobname     }
      { .procname    }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id.jobname*, or *procname* qualifier. For information on which qualifier to use, see "Considerations for Entering Commands When an ASCB-Based TCAM Is Active" in Chapter 1.

Release Intercepted LU (A TP)

This command requests TCAM to release the queue for a specified LU.

Format:

```
A TP [ { .id          } ] = luname
      { .jobname     }
      { .procname    }
```

If an ASCB-based TCAM is active, this command entered from the system console must contain an *id*, *jobname*, or *procname* qualifier. For information on which qualifier to use, see the topic “Considerations for Entering Commands When An ASCB-Based TCAM Is Active” in Chapter 1.

Rename an LU (F RENAME)

This command requests that TCAM change the name in the terminal name table specified by *oldname* to *newname*. When you enter this command, the LU that you are renaming must not be started and cannot be in a LU-LU session.

Use this command primarily to move an application program from one TCAM system to another TCAM system. This is done by swapping the terminal-name-table (TNT) entry of a TPROCESS LU with the terminal-name-table entry of another TCAM system LU. You can also use this command to correct name errors made during assembly.

Format:

```
F { procname.id }, RENAME = oldname, newname
  { id           }
  { jobname      }
  { procname     }
```

The variable operand *oldname* can be the name of a TPROCESS entry or an LU.

Send Message to Destination LU (F SEND)

This command requests TCAM to send the message specified by *text* to the destination specified by *destname*.

Format:

```
F { procname.id }, SEND, DEST = { destname }, TEXT = { text }
  { id           }             { SYSCON   }         { 'text' }
  { procname     }             { PRITERM  }
  { jobname      }
```

The message can be sent to any LU or GET/READ TPROCESS entry known to the MCP. The message can also be sent to the system console if you

specify SYSCON or to the basic primary operator control station if you specify PRITERM. A confirmation that the message has been placed on the queue for the destination is returned to the requestor.

If you want to send a message with quotes in it, you must code double quotes. When the message is processed single quotes will appear. The text of a message is processed according to the following rule: If the message text is not enclosed in quotes, a single period (.) is replaced by a blank and double periods (..) are replaced by a single period (.).

If the message text you want to send contains no blanks, quotes are not required. You can specify TEXT=text. However, if the text of the message does contain blanks, it must be in quotes. For example, TEXT='EXAMPLE OF BLANKS'.

The following example shows how you can send a message to the system console or basic primary operator control station.

Note: In this example, the message text for a nested F SEND command cannot contain blanks.

Assume that you enter:

```
F id1,SEND,DEST = mh2,TEXT = 'opct12 F id2,SEND,DEST = SYSCON,
TEXT = hi.from.TCAM1'
```

id1 is the procname.id, id, jobname, or procname of TCAM running in this TCAM (TCAM1). *mh2* is a TCAM2 host LU (most likely a message handler), which is known to TCAM1; it can have sessions with a TCAM1 host LU, from which it also accepts operator commands. *opct12* is the string of characters that identify an operator command in TCAM2. *ID2* is the procname.id, id, jobname, or procname of TCAM running in TCAM2.

Specifying PRITERM instead of SYSCON sends the message to the basic primary operator control station in TCAM system 2 instead of the system console. Naming any other destination in TCAM system 2 in the place of SYSCON gets the message to that destination in TCAM system 2 without establishing a session between the ultimate destination and an LU in TCAM system 1. Specifying PRITERM saves time if there is already a session between *mh2* and an LU in TCAM system 1.

The text of the command entered in TCAM system 1 looks to TCAM system 2 like an operator command entered from an external LU; that is, in TCAM system 2, the text of the command entered in TCAM system 1 looks like this:

```
opct12 F id2,SEND,DEST = SYSCON,TEXT = hi.from.TCAM1
```

The operator command received in TCAM system 2 is processed according to the same syntax rule described earlier so that the message text of the command processed in TCAM system 2 contains no blanks when it arrives at its destination, the system console. At the system console, the message text appears as follows:

hi from TCAM1

Note: When the message text of the command entered in TCAM system 1 is processed, single periods are replaced by blanks and double periods are replaced by single periods because the message text is not enclosed in quotes.

So, in this example the text of the command entered in TCAM system 1 appears as follows in TCAM system 2:

```
opct12 F id2,SEND,DEST=SYSCON,TEXT=hi.from.TCAM1
```

Once this command is processed in TCAM system 2, the message text arrives at its destination, the system console, appearing the same way the message text did in the example illustrating the first part.

Start Session or Access Method Interface (F START)

This command requests TCAM to enable an LU or all LUs in the group for establishing LU-LU sessions or to open the ACB for each host LU.

Format:

```
F {procname.id },START= {luname }  
  {id           }      {grpname }  
  {jobname     }      {AMI     }  
  {procname    }
```

If an external luname is specified on this command, that LU is enabled for an LU-LU session with a host LU.

If a groupname is specified on this command, each external LU in the group is enabled for an LU-LU session with a host LU.

If AMI is specified, the interface to VTAM is established by opening all unopened ACBs for TCAM host LUs.

Stop Session or Access Method Interface (F STOP)

This command requests TCAM to terminate all LU-LU sessions involving the external LU, all LUs in the group, or all TCAM host LUs.

Format:

```
F {procname.id },STOP= {luname }  
  {id           }      {grpname }  
  {jobname     }      {AMI     }  
  {procname    }
```

Each session will be terminated at the completion of processing for its current SNA chain. The resulting state is the same as is initially set by ACTIVE=NO on the TERMINAL macro defining an LU.

Note: If AMI is specified, all ACBs for TCAM host LUs are closed.

Activating and Deactivating Other Programming Functions

You can use several Modify commands to start, stop, or alter other TCAM programming functions. These programming functions include:

- TCAM service aid routines
- TCAM traces.

Start/Stop Access Method Interface (AMI) Trace (F AMITRACE)

This command requests TCAM to start or stop the access method interface (AMI) trace for an external LU, each LU in a group, or all external LUs.

Format:

```
F {procname.id },AMITRACE = {luname  }. {START }
   {id           }           {grpname } {STOP  }
   {jobname     }           {ALL     }
   {procname    }
```

The trace is recorded automatically on a sequential data set using the Generalized Trace Facility (GTF) when GTF is active. If ALL, START is specified, all external LUs are traced regardless of the trace status of the individual LUs. If ALL, STOP is specified, trace activity is stopped for all external LUs for which no individual or group AMI trace has been requested. Trace activity continues for those LUs for which an individual or group trace has been requested.

Change Buffer Trace Parameters (F BUFFTR)

This command requests TCAM to change the operands that were specified for the BUFFTR parameter of the INTRO macro.

Format:

```
F {procname.id },BUFFTR=[ {FULL     }][, {CONDIT }]
   {id           }           {PARTIAL } {UNCOND }
   {jobname     }
   {procname    }
```

FULL specifies that the buffer trace record the entire data contents of a buffer; PARTIAL specifies that the buffer trace record only the data contents of the first unit of a buffer. For CONDIT, the STARTMH macro

records a trace entry only if the external LU associated with the buffer has the AMI trace active; for UNCOND, the buffer trace entry from the STARTMH macro occurs for all buffers. You can specify one operand from the FULL or PARTIAL grouping and one operand from the CONDIT or UNCOND grouping (for example, BUFFTR = FULL,UNCOND). You can also specify only one operand from either of the two groupings as in the example BUFFTR = CONDIT; the condition currently in effect for the other grouping (in this example, either FULL or PARTIAL) remains in effect when the command is executed. Note also that in the example BUFFTR = CONDIT, no comma is necessary. A comma is required only when you specify an operand from each grouping as in the first example BUFFTR = FULL,UNCOND.

Notes:

1. *The BUFFTR operand of the INTRO macro must be coded with a positive integer for the BUFFTR = FULL operand of this command to have any effect. The positive integer must be within the acceptable range of greater than 0 but less than or equal to 65,535.*
2. *If the Change Buffer Trace Parameters (F BUFFTR) basic operator command is issued when BUFFTR = 0 is specified on the INTRO macro, buffer tracing occurs as if PARTIAL is defined on this command.*

Following are examples of the coding of this operand, and the results that will occur, if BUFFTR = 0 is specified on the INTRO macro.

<i>Coding</i>	<i>Results</i>
F BUFFTR = FULL	F BUFFTR = PARTIAL,CONDIT
F BUFFTR = PARTIAL	F BUFFTR = PARTIAL,CONDIT
F BUFFTR = CONDIT	F BUFFTR = PARTIAL,CONDIT
F BUFFTR = UNCOND	F BUFFTR = PARTIAL,UNCOND

The condition that is currently in effect (CONDIT or UNCOND), remains in effect, when F BUFFTR = FULL or F BUFFTR = PARTIAL is entered.

Start/Stop TCAM Service Aid Routine (F DEBUG)

This command requests that TCAM start one of the different TCAM service aid routines.

Each of these routines provides an interface to the TCAM COMWRITE subtask for the purpose of spooling the contents of trace tables in storage to the COMWRITE subtask.

Each of these service aid routines records one of the following:

- IEDQFE10 Dispatcher subtask trace table (STCB) information
- IEDQFE30 Buffer trace table (BUFF) information
- IEDQFE50 Operator control trace table (OPCT) information
- IEDQFE90 Debugging tool, invoked by the user to document corruption in:
 - Ready Queue Chain
 - Buffer Chain
 - Buffer return chains
- IEDQFEXX Debugging tool, used by software support to develop code to specifically trap data to document a problem.

Format:

```
F {procname.id },DEBUG= {L }, {IEDQFE10 }
   {id           }      {D } {IEDQFE30 }
   {jobname     }      {IEDQFE50 }
   {procname    }      {IEDQFE90 }
                       {IEDQFEXX }
```

This command does not initiate a trace; you must issue one of the other operator commands to initiate a trace. Use this command to spool the trace information from any of the above named types of traces onto the COMWRITE data set. The routines that you can specify are IEDQFE10, IEDQFE30, IEDQFE50, IEDQFE90 and IEDQFEXX.

The IEDQFE10 routine causes the STCB trace table to be spooled to a permanent storage device if the COMWRITE subtask is active. To use this routine, the DTRACE operand of the INTRO macro in the MCP must specify a positive value large enough to allow the trace to be spooled to an external data set.

The DTRACE operand on the INTRO macro must be a positive value to create the trace table area. The size of this area has no relationship to whether or not the data is allowed to be spooled to COMWRITE. It does have a relationship to whether or not TCAM can successfully spool *all* STCB trace data to COMWRITE (no lost data). DTRACE operand parameters, along with resulting processing, are shown below.

DTRACE > 0: Allocate a table, begin tracing.

DTRACE = (n,ON) : If n > 0, allocate a table; begin tracing.

DTRACE = (n,ALL): If n > 0, allocate a table; begin tracing using all currently existing traces. The traces started will be the normal dispatcher subtask trace (flow of dispatched elements), the dispatcher post trace (records elements as they are placed on the ready queue), and the extended STCB trace (additional information such as time-of-day clock, module name, etc.).

DTRACE = (n,OFF): If n > 0, allocate a table; do not trace. No trace will be started until you enter the Start Subtask and Dispatch Post Trace (F DTRACE) command.

Trace activity occurs with no interface to COMWRITE until you enter the Start TCAM Service Aid Routine (F DEBUG) for the IEDQFE10 routine. The IEDQFE10 routine *allows* STCB trace information to be sent to the COMWRITE subtask. The IEDQFE10 routine is the interface between the STCB trace routine (TCAM dispatcher) and the COMWRITE subtask that handles I/O to secondary storage. Therefore, the IEDQFE10 routine does not *write* to the COMWRITE data set; this is done by the COMWRITE subtask. The IEDQFE10 routine *spools* or provides data to COMWRITE.

If the trace table is small, the IEDQFE10 routine has to spool data to COMWRITE more often. This increases the likelihood that COMWRITE will not be available at a given time (that is, it might be executing previous I/O requests), and, because the IEDQFE10 routine cannot wait for COMWRITE, data will be lost.

The IEDQFE30 routine causes buffer trace table records to be spooled to the COMWRITE subtask when the table is full. However, for buffer tracing to occur for an external LU, the AMI trace must be active for that external LU. See *TCAM Utilities* for a description of which utility program to use to get a formatted listing of either the STCB trace or a buffer trace.

IEDQFE50 causes the routine that creates operator control trace records to spool the trace table to the COMWRITE subtask when the table is full.

IEDQFE90 is *not* a tracing routine that sends data to comwrite. It is a debugging tool that is invoked by the user to document a corruption in one of the following:

- Ready Queue Chain
- Buffer Chain
- Buffer return Chain

If a chain is bad, this routine documents the problem for eventual resolution. This routine is activated when the DISPATCHER trace is started or specified (INTRO) as DTRACE = ON or POST.

IEDQFEXX is *not* a tracing routine that sends data to comwrite. It is a debugging tool usually used by software support to develop certain code in order to document a problem. This routine is activated when the DISPATCHER trace is started or specified (INTRO) as DTRACE = ON or POST.

If either a closedown or a failure of the TCAM system occurs while one of the TCAM service aids associated with this command is still active, the functions provided by this command are not reactivated automatically when TCAM restarts. You must reenter the command with its appropriate operands after TCAM is restarted to continue the service aid. See *TCAM Diagnosis Guide* for more details on these and other diagnostic aids, including information for specifying where you want your output to go

(tape or disk) and for executing the command and print utilities to get printed copies of any of the traces.

L causes the service aid routine to be loaded and activated, and D causes the routine to be deactivated and deleted.

Start/Stop Subtask and Dispatcher Post Trace (F DTRACE)

This command requests that TCAM start or stop a normal dispatcher subtask trace, or a normal dispatcher subtask trace in combination with a dispatcher post trace, or both these traces in combination with the extended STCB trace. The dispatcher subtask trace records the flow of all dispatched elements. The dispatcher post trace records elements as they are placed on the ready queue. The extended STCB trace delivers additional information including time-of-day (TOD) clock, module name, buffer size, TTCIN, and MH address.

Format:

```
F {procname.id },DTRACE= {ON  }
   {id           }         {POST}
   {jobname     }         {ALL  }
   {procname    }         {OFF  }
```

ON activates only a normal dispatcher trace. POST activates a normal dispatcher trace and a dispatcher post trace. ALL activates all three traces. OFF terminates the traces started by the ON, POST, or ALL parameters.



Chapter 4. TCAM Extended Operator Commands

The first part of this chapter describes the TCAM extended operator commands. To use these commands, the extended operator control system service program must be part of your installation and an initiator subtask must be active. The save/restore message queues (SMQ) commands are described in the last part of this chapter. To use these commands, the SMQ system service program must be an active initiator subtask. The table of contents for this chapter is a complete list of the extended operator commands and the SMQ commands. Appendix B provides a quick reference summary of these commands. Also, these commands (along with the basic operator control commands) are included in a quick online reference summary. Refer to the description of the Display Basic and/or Extended Operator Commands (COM) extended operator control command for more information.

In a multiple-TCAM system, operator commands affect resources for the MCP in the MCP that processes the command.

The TCAM Extended Operator Control System Service Program

If the extended operator control system service program is part of your system, you can use the extended operator commands described in this chapter to aid you in monitoring and controlling your TCAM system. See "Starting TCAM" in Chapter 2 for a description of how the extended operator control system service program is activated as an initiator subtask.

In general, extended operator commands can be entered from primary or secondary operator control stations including the system console. (For more information on extended operator control stations, see the description of stations in Chapter 1.) The procedure for entering extended operator commands, however, varies slightly depending on whether the commands are entered from the system console or some other extended operator control station.

The system console is automatically designated as an extended secondary operator control station, but may also be designated as the extended primary operator control station. Most extended operator commands, except those that generate lengthy responses, can be entered from the system console. Extended operator commands are entered from the system console in response to the outstanding extended-operator-control-ready

message (message DKJ720D), which is issued to the system console once the extended operator control system service program is initialized. See the heading "Starting TCAM" in Chapter 2 for more information. Since the system console is automatically designated as both a basic and extended operator control station, you can also enter (as described in Chapter 1) basic operator commands from the system console. Extended operator commands entered in response to message DKJ720D are routed to the extended operator control system service program; basic operator commands are routed to the basic operator control system service program.

If you are located at an extended operator control station other than the system console, you must establish an end-to-end session with the extended operator control system service program in accordance with session-management techniques utilized in your local TCAM node's MCP (for example, by entering a logon message). For more information on end-to-end session requirements, see the chapter, "Designing the Message Handler," in *TCAM Installation Guide*. You must establish an LU-LU session before establishing an end-to-end session with the extended operator control system service program. To enter into an end-to-end session with the extended operator control system service program, your station must be defined as an extended operator control station in its own TCAM system; or, if your station is in an LU-LU session with a host LU in another TCAM system your station must be defined as an extended operator control station in the TCAM system of the extended operator control system service program that will process the commands. Once you have established the end-to-end session with the extended operator control system service program, any messages you enter are routed directly to the extended operator control system service program until you terminate the session by entering a message containing the logoff sequence.

For example, assume that the routing key for the extended operator control system service program is named OPCTL and that the logoff sequence is LOGOFF. To establish an end-to-end session with the extended operator control system service program, to enter extended operator commands, and then to terminate the session, you might enter the following commands:

OPCTL	(establish the session with extended operator control)
DATA ALL	(enter extended operator command)
STOP TERM1	(enter extended operator command)
LOGOFF	(terminate the session with extended operator control)

A station can also be designated as a *dedicated extended operator control station*; this means that the station is in perpetual session with the extended operator control system service program. You can enter only operator commands from such a station. In this case, it is not necessary to establish and terminate the session with the extended operator control system service program; that is, no logon or logoff sequences are required. Note also that you can enter basic operator commands (preceded by the *controlchars* field) when you are in session with the extended operator control system service program if your station is also designated as a basic operator control station and is located in the same TCAM system as the extended operator control system service program that you are in end-to-end session with.

If extended networking is implemented as part of your installation, the system programmer can design your system to take advantage of TCAM's internodal operator control capabilities. These capabilities enable an extended operator control station to go into an end-to-end session with the extended operator control system service program and to enter extended operator commands affecting TCAM resources. In other words, the extended operator control system service program in the TCAM node that controls the affected resource executes the extended operator command even though the command is entered from another TCAM system. For example, assume there is a network with two TCAM systems involving host 10 and host 20, and you are at an extended operator control station in the TCAM system controlled by host 10. Also assume that the routing key for the extended operator control system service program in host 10 is named TCAM10, and the routing key for the extended operator control system service program in host 20 is named TCAM20. If you want to issue an extended operator command for a resource that is in the TCAM system controlled by host 20, you must enter into an end-to-end session with TCAM20. Then, any extended operator commands you enter while in session with TCAM20 are routed to TCAM20 in host 20 to be executed; responses to the commands are sent to you at your extended operator control station in the TCAM system controlled by host 10.

The Format of Extended Operator Commands

The extended operator commands can be entered at the system console, an extended LU, or from an application program. For more information on entering extended operator commands from an application program, see the chapter, "Optional TCAM Facilities for the Application Programmer" in *TCAM Application Programming*. Extended operator commands consist of two fields, the *operation* field and the *operandspecifiers* field. (Note that the *controlchars* and *nextline* fields are not required for extended operator commands.) Separate the *operation* and the *operandspecifiers* fields by at least one blank. You can enter all fields in an extended operator command in either uppercase or lowercase. Do not enter brackets and braces as part of an extended command. (See "Basic Operator Command Format" in Chapter 1 for a description of brackets and braces.) You must enter commas shown as part of an extended operator command. For extended operator commands, enter one of the following operation types in the operation field:

ALTER	ONLN
AUTO	QUEUE
CLOSE	RESEND
{COMMAND }	SEND
{COM }	
CONTACT	SETSEQ

DATA	START
MANUAL	STOP
{NETWORK }	UNITS
{NET }	

OFFLN

The *operandspecifiers* field contains parameter options that tailor an extended operator command to your requirements. You must replace operands that are indicated in lowercase with a parameter that is meaningful to your TCAM system. In addition to the variable operands described for the basic operator commands in Chapter 1, the following variable operands also apply to extended operator commands:

- altdest:* The alternate destination of a message when rerouting is in effect. Unless otherwise indicated, *altdest* can be the name of a single terminal entry, a GET/READ TPROCESS entry, or a cascade list.
- comname:* The name of a valid basic or extended operator command.
- destname:* The destination of a valid response to the command. Unless otherwise stated, *destname* can be the name of any entry in the terminal table.
- intvl:* The interval, expressed in minutes, between each action taken by a command requesting repeated action.
- thresh:* The threshold showing the minimum number of items required for a display.

You can cancel partially entered extended operator commands from the system console with the CANCEL key. There is no reply for a canceled command.

Displaying Components of the TCAM System

The extended operator control system service program allows you to display information about queues, extended LUs, buffer units, and basic and extended operator commands. Extended operator commands that you can use to display this information are described next.

Display Basic and/or Extended Operator Commands (COM)

This command requests that TCAM display the basic and extended operator commands.

Format:

```
{COMMAND } [ {ALL      } ]  
{COM      } {D        }  
              {F        }  
              {comname }
```

This command provides two levels of display for the extended operator commands. If you specify nothing or ALL, TCAM displays all extended and basic operator commands with a brief description of each. If you replace *comname* with the name of an extended operator command (its operation field; for example, ALTER), TCAM displays the specified command with a description of the command. If you replace *comname* with UNITS, the UNITS extended operator command is executed. That is, the status of buffer units is returned as the requested display. See the Display Buffer Unit Status (UNITS) extended operator command in this chapter.

There are three levels of display for the basic operator commands. Specifying ALL causes display of all basic and extended operator commands and a brief description of the commands. The D and F operands allow you to request an intermediate-level display for all Display and Modify basic operator commands.

A brief description is included for each command in a specified intermediate-level display. For a display of an individual basic operator command, replace *comname* with the operation field and the significant operand that distinguishes the command that you want from other basic operator commands; for example, D TERM.

Each level of display (proceeding from the highest level that displays all the operator commands to the lowest level that displays the individual commands) provides you with the information you need to request the next level of display. For example, if you enter D, TCAM displays all display commands. You can see that the D SESSION command displays sessions that are active with this resource. To obtain a D SESSION display you enter COM D SESSION. This display shows the format of D SESSION and gives you a more detailed description of the command.

In the displays for basic and extended operator commands, optional operands are indicated by parentheses instead of brackets. After you enter the COM command correctly, the specified display appears with DKJ919I or DKJ852I. Otherwise, you receive message DKJ920I advising you that the command you entered is invalid.

Display Length of All Queues above a Specific Length (QUEUE ALL)

This command requests that TCAM display the queue type and queue length for each queue that does not contain fewer messages than specified by *thresh*. This command can be entered from any extended operator control station including the system console.

Format:

```
QUEUE ALL,thresh
```

Replace *thresh* with the number of messages in a queue that qualifies the queue length to be displayed. A threshold of 1 allows every queue with any unsent traffic to be displayed. You can specify any decimal integer through 999.

Data about queues for external LUs, along with queue names for application programs are displayed in alphabetical order.

Display Length of One Queue (QUEUE name)

This command requests TCAM to display how many messages are queued for the specified LU or for the application program. You can enter this command from any extended operator control station, including the system console.

Format:

```
QUEUE {luname      }  
      {tprocessname }
```

Display Queue Status at Specified Location (QUEUE AUTO)

This command requests that TCAM display repeatedly at regular intervals the information described in the Display Length of All Queues above a Specific Length (QUEUE ALL) command. Enter this command from any extended operator control station including the system console.

Format:

```
QUEUE AUTO, {destname }  
            {SYSCON  }  
            {STOP    }
```

```
,intvl,thresh
```

Replace *destname* with the name of an LU or application program for which you want to display the requested information. Specify SYSCON if you want the display at the system console. The *intvl* operand must be the interval between displays expressed in minutes from 1 to 59. The *thresh* operand represents the number of messages on a queue that qualifies the queue name to be displayed. Note that a threshold of 1 lets displays occur for every queue containing traffic; any decimal integer through 999 can be used. Specifying STOP causes the display to be discontinued.

Display Resource Status (DATA)

This command requests that TCAM provide you with status information about an extended LU. Also, if you are entering this command from an extended operator control station, you can request status information about a specified LU or application program. The display for a specified resource includes the following information: the name of the resource, the sequence number that should be used in the next message entered from the resource, the sequence number of the last message accepted by the resource, the type of terminal table entry that the name of the resource represents, the resource identifier for the specified resource, and the name of the program with which the resource is currently in end-to-end session. This command can be entered at any station in the system except the system console.

Format:

DATA [luname,S]

To display status information about your own extended LU, specify only DATA. From any extended operator control station you can request this display for a specified resource by entering the *luname* operand with the S operand; for example, DATA luname,S. For this command, you can replace *luname* with the name of an LU or an application program.

Display Statistical Totals for Resources (DATA ALL,TOTALS)

This command requests that TCAM display statistical totals for all LUs and application programs. The display contains the same heading and message information described in the Display Statistics for a Resource (DATA name) command. This command can be entered at any extended operator control station including the system console.

Format:

DATA ALL,TOTALS

Display Statistics for a Resource (DATA name)

This command requests TCAM to display the following statistics for an LU or application program: the name of the specified resource; the number of messages that the resource has entered; the number of messages that the resource has accepted; the number of detected errors in messages entered from the resource; the percentage of messages with a detected logical error calculated in relation to the total number of messages entered by the resource; the name of the program with which the resource is currently in end-to-end session (or an asterisk if the resource is not currently in end-to-end session); and the current alternate destination (if any) for the resource specified in its ALTDEST option field. Statistics for the specified resource are compiled from the start of the day. This command can be entered only by an extended operator control station including the system console.

Format:

DATA luname

For this command, *luname* can be the name of an LU or an application program.

Display Statistics for Resources (DATA ALL)

This command requests that TCAM display for all LUs and application programs the same statistics that are described in the Display Statistics for a Resource (DATA name) command. You can enter this command from any extended operator control station. You cannot enter this command from the system console.

Format:

DATA ALL

Each resource's data is printed on a separate line; the printout ends with totals for the MCP in the TCAM system that processes this command. Note that, depending on the size of the TCAM system, the display generated by this command may be large.

Display Statistics for Resources at Specified Location (DATA ALL,destname)

This command requests TCAM to display the same information described in the Display Statistics for Resources (DATA ALL) command at the location specified by *destname*, not at the external LU entering the command. (If you want the statistics displayed at the external LU entering the command, then use the Display Statistics for LUs.) This command can be entered by any extended operator control station including the system console.

Format:

DATA ALL,destname

The *destname* operand must be the name of an LU.

Display Status of TCAM Resources (NET)

This command requests that TCAM display the status of the TCAM system by listing: (1) external LUs with an exception status and (2) inactive TCAM nodes.

An external LU with an exception status is a valid external LU that has a status of one of the following (the letters are shown on the display to indicate the status):

- (C) Redirected through copy
- (E) Not entering or unable to log on to TCAM
- (H) Held

- (I) Inactive or
- (N) Pending
- (P) Redirected through purge
- (R) Redirected (including copy and redirected based on error conditions)
- (X) Redirected through transfer
- (+) If node was active
- (-) If node was stopped.

Only a station designated as an extended operator control station, including the system console, can enter this command.

Format:

```
{NETWORK } [ {N } ]
{NET      } {T }
```

You can cause all external LUs with an exception status and inactive TCAM nodes to be displayed by entering NETWORK or NET only. Specify N for a display of the node identifiers for inactive TCAM nodes. If you want to display just the external LU with an exception status, use the T operand.

Display Buffer Unit Status (UNITS)

This command requests TCAM to provide now and during peak utilization an analysis of the disposition of buffer units (both main storage and line). The analysis includes the time, the total units defined, the total units in use, the total units not in use (that is, free), and the main-storage units in use; and the line units in use. The units count is updated when FHPBUILD or EDUNITS macros are executed in message handlers. If the system programmer codes FHPBUILD or EDUNITS macros for all device message handlers, the display generated by this command will be accurate provided that certain non-MH driven functions (such as the system console-involved operator control) have not used system units. The node identifier of the processing node is shown on the first line of the display provided the NODEID operand is coded on the INTRO macro.

Any external LU designated as an extended operator control station, including the system console, can enter this command.

Format:

```
UNITS or COM UNITS
```

Message DKJ852I confirms execution of this command and provides the requested information.

Controlling TCAM Resources

Some extended operator commands that can assist you in controlling your system are described next.

Activate/Deactivate Automatic Rerouting of Messages (AUTO)

This command requests that TCAM activate or deactivate any one of the following functions depending on the command format specified:

- The redirecting of messages to an alternate destination if a permanent error condition exists for an external LU.
- The transferring to an alternate destination of all messages on a destination queue for an external LU.
- The copying of all messages successfully transmitted to an LU and the sending of copies to an alternate destination
- The purging of all messages queued for a particular LU.

Note: This operator command only activates or deactivates the function (that is, sets appropriate option field values to be acted upon later); the actual rerouting is dependent upon relevant coding in the message handlers in the MCP. For a description of the selective purging, transferring, and copying of messages, see “Designing the Message Handler” in *TCAM Installation Guide*.

Even when this command has been issued and there is coding in the MCP that performs the desired operation, the complete execution of the command must wait until messages to be rerouted are sent. The wait time can vary depending upon several factors. Among these factors are the number and length of messages queued to the resource and the current status of the resource. An operator procedure to minimize the time it takes to execute this command is explained in the description of the Transfer All Messages (AUTO name,TRAN) command format.

This command works on a destination basis rather than on a name basis. If there are many different alternate names (as specified by ALTNAME macros in the MCP) for a destination, all the messages destined for that destination are affected by this command. Messages queued to an application program are not affected by this command.

In the following descriptions of variations of the AUTO command, the *altdest* operand (where shown) is optional. If you do not specify *altdest*, messages for *luname* are redirected to the currently defined alternate destination (specified in the ALTDEST option field associated with the LU or destination station). If you do specify *altdest*, messages for *luname* are redirected to *altdest*, and *altdest* becomes the new alternate destination for *luname*.

The *altdest* operand, if specified, must name a valid entry in the terminal table. A valid entry is a single terminal entry, a GET TPROCESS entry, or a cascade list. If *altdest* is a cascade list, it must have at least one entry

and must not contain the resource name that appears as *luname*. Also, the cascade list must not contain an entry that is currently being redirected.

Note: The use of a cascade list can help balance message flow because messages are routed to entries in the cascade list that have the least traffic.

The various formats in this command can be entered only by an extended operator control station, including the system console. Each command format can be deactivated by resetting the option field value before issuing the command or by specifying OFF as shown in the command formats that follow.

Copy Messages (AUTO name,COPY)

This format of the command requests that the MCP send to an alternate destination a copy of all successfully transmitted messages for an LU.

Format:

```
AUTO luname, {COPY } [,altdest]
              {OFF  }
```

Purge a Queue (AUTO name,PURGE)

This format of the command requests the MCP to purge the destination queue for the specified LU of all currently enqueued and newly arriving messages. If you want the purge to proceed rapidly, follow the procedure outlined for the Transfer All Messages (AUTO name,TRAN) command format.

Note: The purge function continues until deactivation; that is, all messages currently queued and arriving are purged until you deactivate this command with the OFF operand. However, output sequence numbers are still assigned to purged messages. If there is an error, purged messages are still retrievable. For example, assume the last message to arrive at an external LU before you enter the command to purge its queue has an output sequence number of 10. After the purge is deactivated, the first message to appear has an output sequence number of 20. If necessary, any of the purged messages between these numbers (10 through 20) can be retrieved using the normal retrieval methods (that is, the Request Retrieval of Messages (SEND) extended operator command provided the online retrieval system service program is part of your system and initiated active initiator subtask).

Format:

```
AUTO luname, {PURGE }
              {OFF  }
```

Redirect Messages on Error Conditions (AUTO name,ERR)

This format of the command requests the MCP to redirect messages when an external LU is unavailable because of a permanent error condition. In this case, errors refer to those errors that occur when a host processor tries to *send* a message to an external LU, not when a host processor tries to *receive* a message from an external LU. Therefore, use this format only for those external LUs that respond to sending. If it is determined at the time of sending (after you have previously issued this command) that an error condition exists for the specified external LU then messages are redirected to an alternate destination.

Format:

```
AUTO luname, {ERR }[,altdest]
              {OFF }
```

Transfer All Messages (AUTO name,TRAN)

This format of the command requests that the MCP transfer all messages on the queue for an external LU to an alternate destination regardless of the presence or absence of errors for the specified external LU. The messages go only to the alternate destination; the MCP makes no attempt to send the messages to the original destination.

Format:

```
AUTO luname, {TRAN }[,altdest]
              {OFF }
```

luname cannot have OPRA defined as its alternate destination.

If you want the transfer to occur rapidly, issue the Transfer All Messages (AUTO name,TRAN) command format or the Purge a Queue (AUTO name,PURGE) command format as appropriate.

Note: The transfer remains in effect for all messages arriving after you issue this command until the function is terminated by deactivating the command with the OFF operand.

Alter a Key-Table Entry (ALTER)

This command requests that TCAM alter the TCAM system address in a key-table entry for an application program or external LU station by changing the node identifier or resource identifier of the TCAM system address in the entry. The key-table entry in the TCAM node executing this command is altered. This command can be entered from any extended operator control station, including the system console, if the Extended Networking Facility is part of your installation and the internodal awareness system service program is an active initiator subtask.

Format:

```
ALTER KEY = key[,NODE = nodeid][,RESOURCE = resid]
```

Replace *key* with the name of the routing key that is to be altered. If the routing key named is for an application program, the application program must be inactive. To find the current TCAM network address associated with a particular routing key, use the KEY operand only. The *nodeid* is a decimal integer from 1 to 245 representing a new node identifier that is to be placed in the key table. The *resid* is a decimal integer from 100 to 65,535 representing a new resource identifier that is to be placed in the key table.

To illustrate one of the ways you might use this command, assume there is an application program named CASH running on TCAM node 10, and you want to run the application program on TCAM node 30. To move the application program and alter its TCAM network address, you must first deactivate the application program on TCAM node 10 and then enter into end-to-end session with the extended operator control system service program on TCAM node 30. Once you are in end-to-end session with the extended operator control system service program on TCAM node 30, enter the following commands:

```
DATA TPROCASH
```

TPROCASH is the TPROCESS entry name corresponding to the key CASH on TCAM node 30. This command causes information about CASH, including CASH's resource identifier, to be displayed.

```
ALTER KEY = CASH,NODE = 30,RESOURCE = 3050
```

This command alters the TCAM system address and places the new TCAM node identifier and resource identifier in the key table.

Finally, you must activate the CASH application program on TCAM node 30. Note that you can use this sequence of commands to move an application program from one TCAM node to another TCAM node without using the Rename an LU (F RENAME) basic operator command because the internodal awareness system service program automatically monitors the status of programs and broadcasts a change in status to all TCAM nodes.

Contact Host Node In Another TCAM System (CONTACT)

This command requests TCAM to generate an awareness message to a specified TCAM node's internodal awareness system service program informing that internodal awareness system service program that the originating TCAM node is active. The internodal awareness system service program should be activated before this command is issued. If the contact operation is successful, the involved internodal awareness system service programs exchange key-table and status information and notify the internodal awareness control operator (identified by the routing key NPMESSAGE) of the change in network status. Use this command when your TCAM node is brought online for the day and is ready for contact with other TCAM nodes or when contact has been lost with other TCAM

nodes for some reason. You can enter this command from any extended operator control station, including the system console, and the internodal awareness system service program is an active initiator subtask.

```
CONTACT {nodeid      }
        {ALLNODES }
```

Replace *nodeid* with a decimal integer from 1 to 245 representing the node identifier for the TCAM node to be contacted. (Node identifiers 246 through 255 are reserved for TCAM system use.) If you want to send a contact message to all TCAM nodes currently flagged as unavailable in this TCAM node's node table, use ALLNODES. NET T shows only LUs having TCAM exception status.

Deactivate Application Programs (CLOSE)

This command requests that TCAM generate a close message and queue the message to the specified user application program. Any TCAM-provided system service program (for example, extended operator control) can also be closed by this command. You can enter this command from any extended operator control station including the system console.

Format:

```
CLOSE {name          }
      {NODEPATH     }
      {NODESYNC     }
      {OPCTL        }
      {RETR         }
```

The variable operand *name* specifies the name of the application program that is to be deactivated (that is, the name of a GET/READ TPROCESS macro of the program that is to be deactivated); note that the application program you specify must be coded to accept the close message generated by this command. More than one application program may be deactivated by specifying the name of a TLIST macro instruction defining a TCAM distribution list. Specifying NODEPATH causes the internodal awareness system service program to be deactivated; specifying NODESYNC causes the internodal sequence number synchronization (ISNS) system service program to be deactivated; specifying OPCTL causes the TCAM extended operator control system service program to be deactivated; or specifying RETR causes the TCAM online retrieval system service program to be deactivated.

Request Retransmission of Messages (RESEND)

This command requests TCAM to retransmit disk-queued, sequence-numbered messages for a given destination queue. The messages to be retransmitted must contain a fixed header prefix that allows internodal retrieval in a multiple-TCAM system.

Unlike messages retrieved using the Request Retrieval of Messages (SEND) command, messages retransmitted by this command do not contain a special retrieval header and are sent only to their original destination.

You can enter this command from any extended operator control station that is authorized to enter retrieval requests (as designated in the TCSOPTS {TCAM station option} option field) provided the sequence number synchronization system service program that processes this command is an active initiator subtask.

Format:

```
RESEND {QNAME= }destname, {OUTSEQ= }lowseq[-highseq]
        {Q=      }          {O=      }
```

The name of the destination queue (that is, the queue's terminal-table entry) from which retransmission is being requested is *destname*. The *lowseq* operand is the output sequence number of the first message (or only message) for which retransmission is being requested; the *highseq* operand is the output sequence number of the last of a span of messages for which retransmission is being requested. The *lowseq* and *highseq* operands must be decimal integers from 1 through 9,999. No more than 50 messages can be requested for retransmission at a single time.

Request Retrieval of Messages (SEND)

This command requests that TCAM send copies of selected disk-queued messages from one to four destinations and/or to a tape data set. Each request must contain the name of either the origin of the messages to be retrieved or the destination of the messages to be retrieved, or both. Specifying both restricts the retrieval to traffic from one origin to one destination. You can further restrict the number of messages retrieved based on input sequence number, output sequence number, time of day, and date that messages were entered. Also, you can retrieve either the whole message or only the first part of the message (called an abstract). For this command to execute, the online retrieval system service program must be an active initiator subtask.

This command can be entered only from an extended operator control station that is authorized to enter retrieval requests as designated in the TCSOPTS option field for the system. Note that the request should be entered in the indicated format, maintaining the sequential order of the retrieval parameters as shown.

Format:

SEND [date] [A]

```
    {ORIG origname [ {sequence[-sequence] }] DEST destname}
      {time[,time]          }
```

```
  {[ORIG origname] DEST destname [ {sequence[-sequence] }] }
                                     {time[,time]          }
```

```
  [TO {rcvrname [TAPE]  } ]
      {TAPE              }
```

Note: Later in this chapter, after the following descriptions of the usual retrieval-request parameters, special options for the retrieval request are described in “Special Retrieval-Request Options” and in “Using the Retrieval Request for Testing.”

The parameters in the retrieval request must be separated by one to four space characters.

The *date* operand specifies the date that the requested traffic was entered from the origin. It is expressed by the number of days that have elapsed from the date the message was entered until the date of your retrieval request. This operand must be a decimal integer from 0 to 9. If you specify 0, no date checking occurs. If you do not specify anything for *date*, then the default is the date of the retrieval request. Note that the *date* always refers to the day that the message was entered even if you are specifying retrieval by destination. Thus a message entered on day 21 and accepted by station AZ on day 22 as number 2 would be retrieved (by destination) as number 2 to AZ with *date* specified as 1.

To retrieve messages without FHPs, *date* must be specified as 0.

For retrievals by time, date checking is assumed. In this case, 0 means the date of the request. Messages without FHPs are not retrievable with time and date specifications.

If you specify A, only the beginning (abstract) of each message is retrieved. A request for a message abstract retrieves the message header and text up to a maximum of 196 characters. If you do not enter A, then the full message is retrieved.

The size of the abstract for any particular message is the lesser of:

- 196
- The number of characters in the message
- The number of characters in the message beyond the logical start of the header indicated in the FHP (if present)
- The difference between 244 and the size of the FHP (if present) or the number of reserve bytes.

origname represents the name of the external LU or application program that originated the message to be retrieved, and *destname* represents the name of the external LU or application program that was the destination

for the message to be retrieved. Only one of these operands, not both, is required. However, you can specify both if you want to restrict the message retrieved to the message sent from one origin to one destination. The *name* that follows both ORIG and DEST must be a valid external LU or application-program name, or an alternate name entry in the terminal table.

The *sequence* operands specify a single message sequence number (*sequence*) or a range of message sequence numbers (*sequence-sequence*). Following ORIG *origname*, *sequence* refers to input sequence numbers; following DEST *destname*, *sequence* refers to output sequence numbers. For a multiple-message retrieval request consisting of two entries (*sequence-sequence*), specify the low number first and the high number last, separated by a hyphen. You can enter *sequence* or *time*, but not both. However, if you enter neither, then the default is all messages. If you are attempting to retrieve messages based on a sequence-number range, all messages within the specified range might not be retrieved by the one retrieval request. If the retrieved output is incomplete, then you must reenter a retrieval request for each "missing" message. This situation might occur if several high-priority messages were sent to a queue that had a backlog of unsent messages at the time the high-priority messages were entered.

If an apparently incomplete multiple-retrieval request is terminated by NOMOMSGS, the queue has already been completely scanned and the message is not there. This termination may be because a sent message was in the reusable queue area or because the sequence number range includes numbers not yet sent. If you see the ending NOMOMSGS, the end of the queue was reached and it is pointless to try again.

The *time* operands specify the time of day (one given minute [*time*,] or a range of minutes [*time,time*]) that the requested traffic was received from *origname* or queued (not necessarily sent) to *destname*. This means that if message retrieval is based on a specific time of day following the DEST operand (for example, DEST *destname time*, the *time*, or *time,time* specifies the time of day that the outgoing messages were queued to *destname*. The *time* operand is four decimal integers, followed by a comma (for example, 1359,). Leading zeros may be omitted. The two leftmost digits express the hour of the day; the two rightmost digits express the minute within the hour. The minimum value you can specify is hour 00, minute 00; the maximum value is hour 23, minute 59. For a time-range request consisting of two entries (*time,time*), specify the earlier time first and the later time last separated by--but not followed by--a comma. However, remember that the comma is also required after *time* if you specify only one time of day (for example, 1259,). You can enter either *time*, or *sequence* not both; however, if you enter neither, then the default is all messages meeting date, origin, and/or destination criteria.

If you want to send the retrieved information somewhere other than to your extended operator control station, use the TO operand. You can specify the name of a terminal table entry to which retrieved messages are to be sent by following TO with from one to four receiver names (*rcvrnames*), each separated by one to four space characters. Follow the *rcvrnames* operand with TAPE if you are also requesting tape write. If only tape write is requested, the format is TO TAPE.

Following are some examples that show how you might use this command in your TCAM system.

To retrieve all message traffic received today for application program AB and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND DEST AB

To retrieve all traffic received today from external LU OMN and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND ORIG OMN

To retrieve all traffic received today for external LU FE entered between 2:45 and 2:49 p.m., and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND DEST FE 1445,1449

To retrieve all traffic received from external LU QRSTUV entered during the minute of 9:12 a.m. today and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND ORIG QRSTUV 0912,

To retrieve messages numbered 5 through 13 (output sequence numbers) sent to application program NML and to send the retrieved messages to external LU BC, enter:

SEND DEST NML 5-13 TO BC

To retrieve message numbered 1012 (input sequence number) entered from external LU GF today and to send the retrieved message to external LU NNN and MMMM, enter:

SEND ORIG GF 1012 TO NNN MMMM

To retrieve messages numbered 9 through 11 (input sequence numbers) that were entered yesterday from external LU GHI for application program TS and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND 1 ORIG GHI 9-11 DEST TS

To retrieve messages numbered 298 through 300 (output sequence numbers) sent today to external LU XWV from station HIJ and to send the retrieved messages to the extended operator control station originating the request, enter:

SEND ORIG HIJ DEST XWV 298-300

To retrieve messages without FHPs, such as TCAM basic operator control replies to an application program queue named OPPGU, enter:

```
SEND 0 DEST OPPGU
```

All retrieved messages are preceded by a special retrieval header that appears as follows:

```
{origname} RETR  
{destname}  
I = inseq, O = outseq[, date/time]  
retrieved message
```

RETR is preceded by the name of the message destination if retrieval is by origin or by the name of the message origin if retrieval is by destination. If in the retrieval request you specified both an origin and a destination name, the following applies: if you specified sequence number or time in the request, the name preceding the sequence number or time is used; if you did not specify sequence number or time in the request, the origin name is used.

The input sequence number of the found message is *inseq*. The output sequence number of the found message is *outseq*. If the message had not been sent, the output sequence number is shown as 0000.

The date that the found message was entered is *date* in *yddd* format, where *y* is the last digit of the year and *ddd* is the day number. The time of day that the found message was entered is *time* in TCAM clock time format. For messages without FHPs, this field is absent.

The *retrieved message* starts with the first message's first character, normally the start of the message header. For messages with FHPs, header information scheduled for removal when the message was originally entered is absent.

A summary message follows the retrieved messages. The format of the summary message is:

```
{origname} RETR OF nn MESSAGES COMPLETE  
{destname}
```

Special Retrieval-Request Options

To meet certain requirements of administrative message switching applications and for operators who are responsible for providing special services, several additional options are available. These options may also be helpful in testing and in problem determination. Each option is simple and performs a very specific function. Using these options, you can make a request that specifies more closely what information or messages you wish to retrieve. You can use an option alone or in combination with any other option. With these options you can, for example:

- Retrieve only one or a very few most-recent messages to or from an external LU without needing to know message times or sequence numbers
- Retrieve only messages that are unsent
- Retrieve messages by sequence number after message sequence numbers have gone from 9999 to 1 during the same day
- Retrieve unsent messages by origin, sequence number, or time after a restore operation or queue reorganization has taken place
- Obtain information about multiple-destination messages: whether they are sent or unsent, or the output sequence number for each destination that has received them
- Change the amount of header and text information included in message abstracts
- Restrict retrieval to a specific priority level or range
- Restrict retrieval to a specific message mode
- Force an extended search for multiple “missing” messages
- Obtain a count of messages that meet retrieval criteria without actually sending them
- Annotate to the TCAM system monitoring console the reason for a retrieval.

To use the special options, you specify them alone or in combination, separated by commas and enclosed in parentheses immediately following the SEND operation field and *before* the date, abstract, origin, and destination information.

Format:

```
SEND [ {(m) } ] [date] ... etc.
      {(m,n) }
      {(n, ) }
```

or

```
SEND [([U] {,P=c }],[M=c],[A =1],[I],[X],[F],[O] [,E] [ {,m } ])] [date] ....
      {,P=cc }                               {,m,n }
                                              {,,n }
```

Following is a description of each option. Additional details and examples are shown after the descriptions of the options.

The following two options must be specified *last*, if used:

m (number of messages to be selected)

m is a decimal integer indicating the number of messages desired. This option must be last or next to last (if the next option is used). It overrides the limit implied by sequence number range. It does not override the retrieve message limit established by parameters of the online retrieval system service program when attached. If the number is zero or null (initial or adjacent commas), there is no effect. For example, (1) requests only the most recent message meeting criteria. When 1 is used, no summary message (an unnumbered DKJ806I) is sent following the selected message.

n (number of most recent messages to skip)

n is a decimal integer indicating the number of messages meeting all specified criteria beginning with the most recent that you wish to be skipped before beginning selection. This operand must be specified last. The default is 0. For example, (1,1) requests only the next most recent message meeting meeting criteria. (,1) requests messages other than the most recent one.

The following options can be specified in any order:

U (only messages that are unsent)

U indicates that only unsent messages are to be considered for selection.

P=*c* or P=*cc* (only messages of a particular priority or range of priorities)

With a single character, P=*c* indicates that only messages of priority *c* are to be considered for selection. Two characters indicate a range of priority levels. *c* is any character other than a comma or closing parenthesis. The binary value of the EBCDIC character code is converted to decimal and used for the priority value; for example, P=4 means internal priority 244. If the priority option is specified more than once, the last is the one that is used.

M=*c* (only messages of a particular mode)

M=*c* indicates that only messages of mode *c* are to be considered for selection. *c* is any character other than a comma or closing parenthesis. If the mode option is specified more than once, the last is the one that is used.

A=*l* (size of abstract desired)

A=*l* indicates the abstract size for a particular request. *l* is the size in bytes of information you wish abstracted in retrieved messages. Larger than normal abstracts can be requested up to approximately 2500 bytes and will be effective on requests that do not send to tape. If *l* is 0, only the retrieval header is sent. (See "I" below.) If the abstract size option is specified more than once, the last is the one that is used.

I (only retrieval header information)

I indicates that you want only the special retrieval header information that indicates name, input and output sequence numbers, and date and time (for messages with FHPs). You can also use this option to obtain information about a message that cannot be displayed on your terminal.

X (count, but do not send)

X indicates that messages meeting all criteria are to be counted, but not sent out. The count is indicated on a DKJ806I message to the originator. When X is specified, the TO keyword is ignored.

F (force to completion)

F indicates a forcing option and should be used only when absolutely necessary. A record is made on the TCAM system monitoring console when processing begins and ends. This option suspends *all* controls on the time that may be needed and the number of messages that may need to be selected in order to satisfy this request. No other SEND commands are processed until this one is finished.

O (send messages only - no summary message)

O suppresses the summary message that is sent to recipients following the last message sent by a SEND command that sends at least one message. This option is implied when the number-of-messages option, *m*, is 1.

E (extras for multiple destinations)

For origin requests (no DEST specified), E indicates that any message sent to multiple destinations or redirected to additional destinations is to be treated as if it were a separate message to each (a duplicate copy or abstract is retrieved for each). If DEST is specified, there is no effect. Be careful in using this option to retrieve broadcast messages because multiple copies can result even when you specify only one input sequence number.

Note: The E option is effective only for messages that are contained in a single TCAM buffer. Buffer sizes may vary depending on origin type or application.

Values other than the preceding ones will be ignored and can be used for annotation purposes. The = symbol and single characters between commas should be avoided. Nonnumeric options or annotations can be specified in any order as long as they precede the numeric options (if any). An initial comma or two adjacent commas will be taken as a null value for the numeric option *m*.

Almost everything in the special retrieval options has an interpretation. Checking is done for valid single characters between commas and correct length of mode and priority options. Numeric options must be 6 characters or less to be recognized as numeric. An option such as X will override I or A = 1 regardless of whether it precedes or follows. TO TAPE with X or I is considered an error. If you do not obtain the results you expect, you should check what you entered.

The *m* option can be used either to *limit* or to *extend* the retrieval process. If *m* is smaller than the number of messages that meet retrieval criteria,

only that number of the most recent messages will be selected. If *m* is larger than the number of messages that meet criteria, the retrieval process will continue until (1) all messages on the queue have been considered, (2) the retrieval message limit is reached, or (3) the retrieval time limit is reached. If you use the *m* option in conjunction with the E option on an origin (no DEST specified) retrieval, your count should include a provision for extra occurrences as a result of multiple destination messages.

For any of the options (except F by itself), the DKJ801I message indicates how the process terminated:

OPTNERR - Error in requesting special options.

MSGNTFND - No messages were found. The search was not exhaustive.

NOMSGFND - No messages were found. The search was exhaustive.

NOMOMSGS - All messages were found. The search was exhaustive.

No DKJ801I - Some or all messages were found, but all messages were not or did not have to be considered.

If M=c and/or P=c is specified, only messages with FHPs are eligible for selection.

If U is specified on a request with destination sequence numbers, the result will always be a DKJ801I message with MSGNTFND.

Evaluating Your Need for Special Retrieval-Request Options

To help you evaluate the need for the special options, especially the numeric ones, the following paragraphs describe the retrieval process, how it works, and why messages sometimes may seem to be "missing."

The online retrieval system service program considers the most recent message first and proceeds backward until either the requested message or messages have been located, or it appears that they should have been located. This means that, in most cases, multiple messages will be retrieved and sent in descending order of sequence numbers, dates, and times. When, in this sequence, messages not meeting criteria fall *below* the requested range, the process is terminated.

Several conditions may cause termination of a multiple-message retrieval request before all desired messages are found. These may or may not be normal for your installation. The following describes some reasons for not finding messages and how the special options can be used to retrieve these messages:

- When priorities are used, delivery may be out of entry-time sequence. Output sequence numbers may be discontinuous. The online retrieval system service program rarely misses any messages because they were delivered out of entry-time sequence. Messages delivered at some previous time from reusable disk queues may have been overlaid because queue space is reclaimed during automatic queue reorganization. Considering this, if you feel there are messages remaining, you can retrieve them by output sequence number one at a time or in multiples using the special option *m*.

- When relatively old undelivered messages must be moved during automatic queue reorganization, a discontinuity of input sequence numbers and times can result. This discontinuity may affect retrievals if many messages (more than 10) were moved during an inactive period and these are later found to be ahead of or within the range of a retrieval request. (This condition does not affect the order in which they will be transmitted.) Missing messages on a retrieval request can be retrieved one at a time by sequence number or through use of the special option *m*.
- When messages are restored by the SMQ system service program, the entry sequence reflects the order in which they were restored (by destination). Therefore, the original input sequence is not preserved for multiple retrievals by origin only (no DEST specified). The same method as above can be used to retrieve “missing” messages (if there are any).
- If sequence numbers wrap from 9999 to 1, there is an obvious discontinuity in sequence numbers. Again, missing messages can be retrieved one at a time by sequence number or through use of the special option *m*. If the requested message or messages are in an immediately previous sequence number cycle and the requested sequence number or numbers are more than 1000 greater than the most recent one assigned, nothing special is required.

Examples of Using Special Retrieval-Request Options

Following are some examples of how you might use the special options in combination with the regular parameters of the retrieval request:

SEND (5) DEST LA

retrieves the five messages most recently queued for LA.

SEND (1,1) ORIG LA DEST CICS

retrieves the next to the last message entered by LA for CICS.

SEND (U) ORIG LA DEST SF

retrieves only messages on the SF queue that originated from LA today that are yet to be sent out.

SEND (I,U,E) ORIG HQ 3

sends information about which destinations have not received message number 3 sent from HQ today (perhaps a short, urgent, broadcast).

Suppose that a QUEUE SD command indicates that 15 unsent messages for external LU SD are in the system but the retrieval message limit is 10. External LU SD is stopped.

SEND (U,10) 0 A DEST SD
SEND (U,5,10) 0 A DEST SD

retrieves abstracts of all 15.

SEND (M=C,3) ORIG OPR1

retrieves the last three extended operator control commands entered by OPR1 today.

SEND (M=E,3) DEST TRP

retrieves the last three generated exception messages to external LU TRP that originated neither from programs nor external LUs.

SEND (X,U) ORIG LA DEST SF

sends a count of messages on SF's queue that originated from LA today but are still unsent.

SEND (X,U,P=9) DEST LA

sends a count of internal priority 249 (priority 9) messages placed today on LA's queue that are still unsent.

SEND (FG SEZ NEED COPY OF LAST ONE YSTDY,1)
1 ORIG FG TO FG

annotates reason to NETMON and sends the last message entered yesterday by FG to FG. As usual, the retrieval header will indicate the destination and output sequence number.

Suppose the sequence numbers for today have wrapped past 9999 and are now near 300 for an application program origin named CONFIRMW.

SEND (6) ORIG CONFIRMW 8901-8906

retrieves the six messages from the prior sequence and, in addition, indicates on the retrieval header to which destination the messages were or will be sent and the output sequence number for each that has been sent. Note that because the difference between 8901 and 300 is more than 1000, the (6) is not necessary.

SEND (M=O,U) DEST INPUTQ

retrieves messages unprocessed by application INPUTQ that are of mode O.

SEND (M=O,5) ORIG LA

sends the last five mode-O messages entered by LA today.

Using the Retrieval Request for Testing

the retrieval request for testing

For special testing or problem determination, you can use the online retrieval system service program in a test mode. After the test mode is enabled, you can enter retrieval requests to display particular disk-queued EBCDIC messages at the TCAM console. The test mode should be used only on a nonproduction TCAM MCP; it is not recommended for a production MCP.

To enable the test mode, you enter the command SEND TEST at the TCAM console. You can then enter retrieval requests at the console, using any of the parameters and special options previously described except the TO option.

To disable the retrieval-request test mode and return to the normal mode, the extended operator control system service program must be closed and then reinitialized.

Set Sequence Number (SETSEQ)

This command requests that TCAM allow you to specify the next input or output sequence number for (1) a message entered by or sent to a specified external LU or application program, or (2) a message sent during a utility session. (A utility session is a pair of SNA LU-LU sessions between internodal message handlers in an extended network. One utility session is established between each pair of TCAM nodes for each transmission category defined for the pair of TCAM nodes. Data messages being routed from host to host flow on the utility session corresponding to their transmission category.) Any resource designated as an extended operator control station, including the system console, can enter this command if the Extended Networking Facility is part of your installation.

Format:

```
SETSEQ {QNAME = } luname, {INSEQ=  } number
        {Q=          }      {I=          }
                               {OUTSEQ= }
                               {O=          }
```

For this command, *luname* can be an external LU or application program. INSEQ or I specifies the next input sequence number; OUTSEQ or O specifies the next output sequence number. The *number* operand is a decimal integer from 1 to 9,999 that resets the sequence number field for the specified LU, station, or application program.

Start Message Transmission for a Resource (START)

This command requests TCAM to start a specified resource. Any extended operator control station, including the system console, can request that an external LU station be started for accepting and entering traffic.

Format:

START [luname]

Luname specifies the name of an external LU.

If the specified LU is not started, the F ,START command will be issued for that LU. Subsequently, the RELEASE TP command will be issued to begin sending traffic to the LU if it was held.

If luname is omitted when the command is entered from an LU, the name of the entering LU is used for executing the command. Luname cannot be omitted when issued from the SYSCON.

The extended operator control system service program initially checks to see if function you requested can be performed and sends message DKJ856I advising you this command is scheduled for execution. However, when this command is converted to the appropriate basic operator command, you do not receive any responses confirming that the requested action has been taken. You can, however, enter the Display Status of Network Resources (NET) TCAM System Resources (NET) extended operator command to display SNA resources with an exception status. If your station is also a basic operator control station, you can enter basic Display commands.

Start/Stop Automatic Extended Network Control (MANUAL)

This command requests that TCAM indicate to the extended operator control system service program whether to honor extended operator commands issued from within an MH via the extended message generation facility. Such commands may be issued to start or stop an external LU without operator intervention. This procedure is explained in detail in *TCAM Installation Guide* in the chapter, "Detecting Errors Using the Message Error Record". Only a station designated as an extended operator control station, including the system console, can enter this command.

Note: All commands generated are based on relevant coding in the MCP. This command only indicates that an extended command originating in an MH may be honored; it does not actually issue any command.

Format:

```
MANUAL {ON  }  
        {OFF }
```

You must specify either ON or OFF. Specifying ON causes manual mode to be set. A detected error or the detected correction of an error situation is displayed only. A command automatically sent to the extended operator

control system service program requesting the starting or stopping of external LUs will not be honored; you must request these actions. If you specify OFF, nonmanual (automatic) mode is set. In addition to the display of error detection and correction conditions, the proper command is automatically sent to TCAM extended operator control where it is executed.

Start Traffic To Specified Groups (ONLN)

This command requests that TCAM start traffic on a specific group, or all special groups, or all groups including the special group(s) that you specify. Any extended operator control station, including the system console, can enter this command.

Format:

```
ONLN {grpname }  
      {ALL      }  
      {S        }
```

Grpname specifies the name of a group of external LUs.

The S operand starts all groups specified in the TSPECGRP macro. Special groups are defined with the TSPECGRP macro; see *TCAM Installation Reference* for a detailed description of this macro. If you want to start traffic only for the special groups, specify S. ALL starts all groups specified. If you want to start traffic to all TCAM groups, specify ALL. The extended operator control system service program initially checks to see if the groups you requested can be started, and sends message DKJ856I advising you this command is scheduled for execution. However, when this command is converted to the appropriate basic operator control command (F ,START), you will not receive any responses confirming that the requested action was taken. However, you can enter the Display Status of TCAM System Resources (NET) extended operator command to display LUs. If your station is also a basic operator control station, you can enter basic Display commands.

Stop Message Transmission for a Resource (STOP)

This command requests that TCAM stop all transmissions to an LU.

Format:

```
STOP [{luname},{D}]
```

Luname specifies the name of an external LU.

If luname is omitted when the command is entered from an LU, the name of the entering LU is used for executing the command. Luname cannot be omitted when issued from the SYSCON.

STOP luname specifies the name of an external LU and causes a HOLD TP command to be issued to suspend message traffic to the LU.

STOP luname,D causes a F STOP basic operator command to be issued to end any current sessions for the LU.

You can enter the Display Status of TCAM System Resource (NET) extended operator command to display resources with an exception status.

Stop Traffic From Specified Groups (OFFLN)

This command requests that TCAM stop traffic for specified groups of LUs. You can enter this command only from an extended operator control station including the system console.

Format:

```
OFFLN {grpname }
      {S      }
      {ALL    }
      {ALL[,S] }
```

Groupname specifies the name of a group of external LUs and requests TCAM to stop the specified group of LUs by issuing a Stop Session or Access Method Interface (F STOP) basic operator control command for the designated group.

S requests TCAM to stop all groups specified in the TSPECGRP macro.

ALL requests TCAM to stop all groups specified in TCAM except those in the TSPECGRP macro. See *TCAM Installation Reference* for a detailed description of the TSPECGRP macro.

The extended operator control system service program initially checks to see if the groups you requested can be stopped and sends a message advising you this command is scheduled for execution. You can enter the Display Status of TCAM Resources (NET) extended operator command to display inactive groups. If your station is also a basic operator control station, you can enter basic Display commands.

The Save/Restore Message Queues System Service Program

Save/restore message queues (SMQ) is an optional system service program that can be initiated as a subtask of the initiator. If the SMQ system service program is part of your TCAM System, you can use it to dump unsent messages on disk message queues to tape or other sequential storage devices. At startup, these saved messages can be restored to the disk message queues. The remainder of this chapter describes the SMQ system service program and the SMQ commands.

Note that the SMQ commands are not extended operator commands; that is, only the SMQ system service program (not the extended operator control system service program) must be an active initiator subtask for you to use the SMQ commands, which can be issued only from the system console.

Using the Save/Restore Message Queues (SMQ) System Service Program

The SMQ system service program allows you to (1) save unsent messages on a sequential storage device, (2) print unsent message queues in EBCDIC or hexadecimal, and (3) restore saved messages to message queue data sets on disk. Note that the SMQ system service program is usually used to restore the queues when the following day's warm start is either not wanted or impossible because of an alteration of the MCP.

You can start the SMQ system service program like any other initiator subtask. To start the SMQ system service program, enter:

```
R nn,ATTACH SMQ
```

For this command, SMQ is the task name of an entry in the TCAM subtask table for this system service program (DKJSMQ), and nn is the message identification number preceding the outstanding TCAM initiator-ready message DKJ600D. (For more information on activating initiator subtasks, refer to the description in Chapter 2 on starting subtasks.)

Once attached, the SMQ system service program issues the following message: DKJ895A SMQ ACTIVE - (ENTER ('SIZE=' or 'U')). Possible replies to this message include:

- SIZE = n, in which case you enter the desired size parameter. n must be equal to or less than the size of the application work area specified by the APWAS on the INTRO macro. (For more information about the INTRO macro see *TCAM Installation Reference*.) The maximum value for the APWAS is 32,695, and the minimum value is 184. The default is 4,024. It determines the size of the message segments written on the save data set. If the value is entered incorrectly or is too large, you will be informed by message DKJ902I.
- U, in which case the size parameter defaults to the size of the largest application program work area as specified on the APWAS operand of the INTRO macro. Your answer affects how fast the operation is performed. For MVS systems, use the default unless you are doing save/restore in a special case while TCAM activity is in progress.

The SMQ system service program proceeds to the next message, DKJ896A ENTER SMQ COMMAND -- (SAVE,RESTORE,PRINT, SNAP). The commands that you can enter in response to this message are described in the next section on SMQ commands. If you use the NAMES operand when entering one of those commands, message DKJ899A is issued; reply to this message with at least one, but not more than 20, valid names and separate each name with a comma or a blank.

Note that message DKJ901A is issued to you as a warning that all external LUs should be stopped and all application program operations that could trigger reusable queue reorganization should be quiesced before requesting the save function of the SMQ system service program. The save function is requested by entering the Save Unsent Traffic (SAVE) command that is

described later in this section. The following are possible replies to message DKJ901A:

- STOP (to stop the SMQ system service program and terminate the job)
- U (to allow the SMQ system service program to continue processing).

Note: Before replying U to this message, you should, if you have not already done so, stop all external LUs. Although the save function operates with started external LUs, the messages saved when external LUs are started may be sent out later. This means that, when the saved messages are restored the next day, some of the messages may be duplicates.

At this point, the SMQ system service program begins processing and issues the DKJ900A SMQ - REPLY 'STOP' TO TERMINATE. You can reply STOP to this message request if you want to terminate SMQ processing; however, normally do not enter a STOP request.

TCAM Save/Restore Message Queues Commands

This section describes the SMQ commands that are entered in response to the outstanding TCAM save/restore-ready message. You can enter SMQ commands only from the system console. The following description of operands applies to all the SMQ commands:

- The P operand causes all disk message queues for application programs to be saved, restored, or printed.
- The T operand causes all disk message queues for external LUs to be saved, restored, or printed.
- The ALL operand causes all disk message queues for LUs and application programs to be saved, restored, or printed.
- The NAMES operand causes the disk queues for a list of individual names of LUs, application programs, and the logging service facility to be saved, restored, or printed.
- On SAVE ALL,T, or P, queues named in the SMQ DONTSAVE list will not be saved. (For more information on the DONTSAVE capability, see the description of the SMQ system service program in *TCAM Utilities*.) Alternatively, queues for which a TCSOPTS option field is initialized will not be saved if bit 3 of the fourth byte (the TCDONTSV flag) is on. This bit corresponds to the mask X'00000010'. The D TP,OPTION command can be used to display this value.

Note: If you specify NAMES, a separate message (DKJ899A) is issued, and you can key in a maximum of 20 names (separating each name with a comma or a blank), which are checked for validity; you can correct any invalid names. If you specify a queue that uses an alternate name (specified by the ALTNAME macro) when the SAVE command is issued, you must use the same name when RESTORE, PRINT, or SNAP is issued.

Print in EBCDIC Unsent Traffic (PRINT)

This command requests that the TCAM SMQ system service program print in EBCDIC unsent disk message queues that have been saved as a result of a SAVE command.

Format:

```
PRINT {P      }
      {T      }
      {ALL    }
      {NAMES  }
```

Print in Hexadecimal Unsent Traffic (SNAP)

This command requests that TCAM SMQ system service program print in hexadecimal unsent disk message queues that have been saved as a result of a SAVE command.

Format:

```
SNAP {P      }
     {T      }
     {ALL    }
     {NAMES  }
```

Restore Unsent Message Queues (RESTORE)

This command requests that the TCAM SMQ system service program restore unsent message queues to the TCAM message queue data sets on disk at TCAM startup time.

Format:

```
RESTORE {P      }
        {T      }
        {ALL    }
        {NAMES  }
```

Save Unsent Traffic (SAVE)

This command requests that TCAM SMQ system service program dump unsent messages, which are on disk queues, to a sequential storage device.

Format:

```
SAVE {P      }
     {T      }
     {ALL    }
     {NAMES  }
```

Appendix A. Summary of Basic Operator and Initiator Commands

The following tables list TCAM basic operator commands (described in Chapter 3) and initiator commands (described in Chapter 2). These tables are intended as quick reference summaries for an experienced operator. The initiator commands can be entered only from the system console. Should you require more information about a command, see the page number reference accompanying the description of each command. The commands are listed by operation type and then by significant operand within the command code.

If an ASCB-based TCAM is active, see “Considerations for Entering Commands When an ASCB-Based TCAM Is Active” in Chapter 1 for more information on the Display, Halt, Hold, and Release Commands.

Basic Operator Commands

Operation	Command	Command Format	Function
{Display } {D }	Display Intercepted LUs. See 3-2.	D TP [{.id }],INTER {.jobname } {.procname }	Displays the names of all LUs to which transmission from TCAM is suspended.
{Display } {D }	Display Option Field. See 3-3.	D TP [{.id }] {.jobname } {.procname } ,OPTION, {luname } {tprocessname } ,opfldname, {C } {D } {X }	Displays the option table field reserved for a particular resource in character (C), decimal (D), or hexadecimal (X).

Operation	Command	Command Format	Function
{Display } {D }	Display Names of Pending LUs. See 3-3.	D TP [{id } {jobname } {procname } ,PEND, {ALL } {luname } {grpname }	Displays the name of pending LUs; that is, LUs whose sessions are in the initiation or termination process.
{Display } {D }	Display Pool Statistics. See 3-4.	D TP [{id } {jobname } {procname } ,POOL, {ALL }[,CLEAR] {ARPL } {BFR } {CPB } {LNU } {MSU } {RMB } {SIB }	Displays statistics about the pools for receive any RPLs (ARPL), buffer units (BFR), channel program blocks (CPB), line buffer units (LNU), main-storage units (MSU), resource management blocks (RMB), and session information blocks (SIB). CLEAR causes the peak count (that is, the greatest usage of pool elements since the last time the counter was reset) to be retrieved and displayed in the message and then set to the current in-use count.
{Display } {D }	Display Basic Primary Operator Control Station Names. See 3-2.	D TP [{id }],PRITERM {jobname } {procname }	Displays the name of the currently designated basic primary operator control station.
{Display } {D }	Display Queue Control Block. See 3-5.	D TP [{id }],QUEUE, {jobname } {procname } {externalluname } {tprocessname } {logtype }	Displays selected fields of the queue control block (QCB) for the named LU or application program.
{Display } {D }	Display Basic Secondary Operator Control Station Names. See 3-2.	D TP [{id }],SECTERM {jobname } {procname }	Displays the names of all basic secondary operator control stations. Displays all basic operator control stations (including the basic primary operator control station) except SYSCON unless SYSCON is the only basic operator control station.

Operation	Command	Command Format	Function
{Display } {D }	Display Session Partners. See 3-5.	D TP [{ .id }] { .jobname } { .procname } ,SESSION,luname	Displays the names of all resources currently in session with the named resource, and whether the session is active or pending.
{Display } {D }	Display Status of LUs. See 3-6.	D TP [{ .id }]STATUS { .jobname } { .procname } ,{luname } {grpname } {AMI } {ALL } [{STARTED }] {STOPPED }]	Displays the status of the specified host or external LU, all host LUs, or all host and external LUs. Display may be limited to those LUs which are STARTED or STOPPED.
{Display } {D }	Display Status and Message Sequence Numbers of a Resource. See 3-6.	D TP { .id },TERM, { .jobname } { .procname } { externalluname } { tprocessname } { listname } { grpname } { logtype }	Displays the resource type of the named resource, several status messages, and the input and output sequence numbers for external LUs, tprocess entries, and logtype entries.
{Halt } {Z }	Closedown of MCP. See 2-19.	Z TP [{ .id }], { .jobname } { .procname } {QUICK} {FLUSH}	Closes down a TCAM MCP as soon as the messages currently being processed are completely sent or received (quick closedown), or after all completely queued messages are sent (flush closedown.)
{Hold } {H }	Intercept an LU. See 3-9.	H TP [{ .id }]= luname { .jobname } { .procname }	Causes TCAM to intercept (that is, to suspend transmission of all messages queued to) that LU. ● Not valid for resources using main-storage only queueing.

Operation	Command	Command Format	Function
{Modify } {F }	Start/Stop Access Method Interface (AMI) Trace. See 3-13.	F {procname.id } {id } {jobname } {procname } ,AMITRACE = {luname } {grpname } {ALL } , {START } {STOP }	Start or stop the access method interface trace for an external LU, each LU in a group, or all external LUs.
{Modify } {F }	Change Buffer Trace Parameters. See 3-13.	F {procname.id } {id } {jobname } {.procname } ,BUFFTR = [{FULL }] {PARTIAL } [, {CONDIT }] {UNCOND }	Changes the operands that were specified on the BUFFTR parameter of the INTRO macro.
{Modify } {F }	Start/Stop TCAM Service Aid Routine. See 3-14.	F {procname.id } {id } {jobname } {procname } ,DEBUG = {L }, {IEDQFE10 } {D } {IEDQFE30 } {IEDQFE50 } {IEDQFE90 } {IEDQFEXX }	Starts (L) or stops (D) the TCAM service aid routine that writes the STCB trace table (IEDQFE10), records an TCAM buffer to the buffer trace table (IEDQFE30), or causes the subtask that creates operator control trace records to spool the trace table to the COMWRITE subtask when the table is filled (IEDQFE50). (IEDQFE90) is a debugging tool invoked by the user to document a corruption in the ready queue chain, the buffer chain, or the buffer return chain. (IEDQFEXX) is a debugging tool used by (FE) Field Engineering to develop certain code in order to document a problem.

Operation	Command	Command Format	Function
{Modify } {F }	Start/Stop Subtask and Dispatcher Post Trace. See 3-17.	F {procname.id } {id } {jobname } {procname } ,DTRACE = {ON } {POST } {ALL } {OFF }	Starts a dispatcher subtask trace in combination with a dispatcher post trace, or both these in combination with the extended STCB trace; or stops the traces, if they are active.
{Modify } {F }	Change Basic Primary Operator Control Station. See 3-8.	F {procname.id } {id } {jobname } {procname } ,OPERATOR = {luname } {SYSCON } {tprocessname }	Changes either a current basic secondary operator control station or the system console to the basic primary operator control station.
{Modify } {F }	Insert Option Field Data. See 3-8.	F {procname.id } {id } {jobname } {procname } ,OPT = {luname } {tprocessname } ,opfldname,data	Inserts new option data in the option field for a specific resource.
{Modify } {F }	Rename an LU. See 3-10.	F {procname.id } {id } {jobname } {procname } ,RENAME = oldname,newname	Changes the name in the terminal name table specified by <i>oldname</i> to <i>newname</i> . Resource being renamed must not be started. The <i>oldname</i> operand can be the name of a TPROCESS entry or an LU.
{Modify } {F }	Send Message to Destination LU. See 3-10.	F {procname.id } {id } {jobname } {procname } ,SEND,DEST = {destname } {SYSCON } {PRITERM } ,TEXT = {text } {'text' }	Sends the messages by <i>text</i> to the destination specified by <i>destname</i> . Valid for any LU or TPROCESS entry known to the MCP.
{Modify } {F }	Start Session or Access Method Interface. See 3-12.	F {procname.id } {id } {jobname } {procname } ,START = {luname } {grpname } {AMI }	Enables the named external LU or all external LUs in a group for LU-LU session or opens the ACB for each host LU.

Operation	Command	Command Format	Function
{Modify } {F }	Stop Session or Access Method Interface. See 3-12.	F {procname.id } {id } {jobname } {procname } ,STOP= {luname } {grpname } {AMI }	Terminates all LU-LU sessions involving the external LU or all LUs in the group, or all TCAM host LUs. If AMI is specified, all of the ACBs for TCAM host LUs are closed.
{Release } {A }	Release Intercepted LU. See 3-10.	A TP [{.id }] = luname {.jobname } {.procname }	Releases all intercepted messages queued for an LU.

Initiator Commands

Operator	Command	Command Format	Function
{Attach } {Att }	Attach a Program. See 2-9.	ATT taskname	Starts a program as a subtask of the initiator. A program is eligible to become an initiator subtask if there is an entry for the program in the TST.
Console	Change System Console Identifier. See 2-10.	CONSOLE = id	When a valid multiple-console system-console identification is specified, that console receives the unsolicited operator awareness messages from that TCAM system. When 0 is specified, normal TCAM message routing is used. The console currently receiving TCAM messages may be displayed by the Display Console Identification (DISPLAY CONSOLE) initiator command.
{Detach } {Det }	Detach a Subtask. See 2-10.	DET taskname	Terminates and detaches a subtask without cancelling the initiator.

Operator	Command	Command Format	Function
{Display } {DIS } {D }	Display Console Identification. See 2-12.	D CONSOLE	Requests that TCAM display the id of the console scheduled to receive unsolicited output from TCAM.
{Display } {DIS } {D }	Display TCAM Initiator Subtask Execution Status. See 2-11.	D TASKS taskname,taskname,..., taskname D TASKS {ACTIVE } {ACT } {INACTIVE } {INACT } {ALL } {APPL } {COMPLETE } {COMP } {SYSTEM } {SYS } [{current TST }] {tstname }	Displays the execution status of selected or all subtasks in the current or any other valid TCAM subtask table. Displays a list of: ALL active tasks in the subtask table (ACTIVE); all tasks in the subtask table that are not active or are complete (INACTIVE); all subtasks in the subtask table that have completed execution (COMPLETE); all IBM-supplied subtasks in the subtask table(SYSTEM); all MCPs and non-IBM-supplied subtasks in the subtask table (APPL); or all subtasks in the subtask table (ALL).
Swap	Replace an Entry in the TST. See 2-13	{SWAP } tblname, (taskname [,taskname....])	Replaces from one to ten entries of the TST currently in use with entries from another TST.



Appendix B. Summary of Extended Operator and SMQ Commands

The extended operator control and the SMQ system service programs are optional. The following tables that list the extended operator commands and the SMQ commands (described in Chapter 4) are intended as quick reference summaries for an experienced operator. The SMQ commands can be entered only from the system console. Should you require more information on a command, see the page number reference accompanying the description of each command. The commands are listed by operation type and then by significant operand within the command code.

Extended Operator Commands

Operation	Command	Command Format	Function
Alter	Alter a Key-Table Entry. See 4-12.	ALTER KEY = key[,NODE = nodeid] [,RESOURCE = resid]	Alters the TCAM network address in a key-table entry for an application program or external LU by changing the node identifier or resource identifier of the TCAM network address in the entry. Displays the current TCAM network address associated with a particular routing key if only the KEY operand is used. The <i>key</i> operand is the routing key to be altered; <i>nodeid</i> is the new node identifier to be placed in the key table (decimal 1 to 245); and <i>resid</i> is the new resource identifier to be placed in the key table (decimal 100 to 65,535).
Auto	Copy Messages. See 4-11.	AUTO luname, {COPY } {OFF } [,altdest]	Sends a copy of all successfully transmitted messages for an LU to an alternate destination.

Operation	Command	Command Format	Function
Auto	Redirect Messages on Error Conditions. See 4-12.	AUTO luname, {ERR } {OFF } [,altdest]	Redirects messages to an alternate destination when an external LU unavailable because of a permanent transmission error. Use this command only for external LUs that respond to sending.
Auto	Purge a Queue. See 4-11.	AUTO luname, {PURGE } {OFF }	Purges the destination queue for the specified LU of all currently enqueued and newly arriving messages.
Auto	Transfer All Messages. See 4-12.	AUTO luname, {TRAN } {OFF } [,altdest]	Transfers all messages on the queue for an external LU to an alternate destination regardless of the presence or absence of transmission errors. No attempt is made to send messages to the original destination.
Close	Deactivate Application Programs. See 4-14.	CLOSE {name } {NODEPATH } {NODESYNC } {OPCTL } {RETR }	Generates a close message and queues the message to the specified user application program (<i>name</i>) or the internodal awareness system service program (NODEPATH), internodal sequence number synchronization system service program (NODESYNC), extended operator control system service program (OPCTL), or online retrieval system service program (RETR). The application program be coded to specified must be coded to accept the close message generated by this command.

Operation	Command	Command Format	Function
{Command } {COM }	Display Basic and/or Extended Operator Commands. See 4-5.	COM {ALL } {D } {F } {comname }	Display all basic and extended operator commands (ALL); an intermediate display of basic Display (D), Modify (F) commands available. If you replace comname with the name of an extended or basic operator command, TCAM describes the specified command.
Contact	Contact a Host Node in Another TCAM System. See 4-13.	CONTACT {nodeid } {ALLNODES }	Valid if the internodal awareness system service programs is an active initiator subtask. Generates an awareness message informing the specified host node's internodal awareness system service programs that the originating host node is active. If the contact operation is successful, the involved internodal awareness system service programs exchange key-table and status information and notify the internodal awareness control operator of the change in status. The <i>nodeid</i> operand is the node identifier (1 to 245) for the host node to be contacted. ALLNODES causes a contact message to all host nodes currently marked as unavailable in this host node.

Operation	Command	Command Format	Function
Data	Display Resource Status. See 4-7.	DATA [luname,S]	Displays the following status information for an LU or application program: the name of the resource; the sequence number that should be used in the next message entered from the resource; the sequence number of the last message accepted by the resource; the type of terminal entry that the name of the resource represents; resource identifier for the specified resource; and the name of the program with which the resource is currently in end-to-end session (or an asterisk if the resource is not currently in end-to-end session). This command can be entered by any resource except the system console to obtain its own status or by any extended operator control station except the system console to obtain the status of a specified LU or application program.
Data	Display Statistics for Resources. See 4-8.	DATA ALL	Displays the same statistics for LUs and application programs as described in the Display Statistics for a Resource (DATA name) command. This command cannot be entered from the system console.
Data	Display Statistics for Resources at Specified Location. See 4-8.	DATA ALL,destname	Displays the same information described in the Display Statistics for all Resources (DATA ALL) command at the location specified by <i>destname</i> .

Operation	Command	Command Format	Function
Data	Display Statistical Totals for Resources. See 4-7.	DATA ALL,TOTALS	Displays statistical totals for all LUs and application programs. The display contains the same information described in the Display Statistics for a Resource (DATA name) command.
Data	Display Statistics for a Resource. See 4-7.	DATA luname	Displays the following statistics for a specified LU or application program: the name of the specified resource; the number of messages that the resource has entered; the number of messages that the resource has accepted; the number of detected logical errors in messages entered from the resource; the percentage of messages with a detected error calculated in relation to the total number of messages entered by the resource; the name of the program with which the resource is currently in end-to-end session (or an asterisk if the resource is not currently in end-to-end session); and the current alternate destination (if any) for the resource named in the resource's ALTDEST option field.

Operation	Command	Command Format	Function
Manual	Start/Stop Automatic Network Control. See 4-27.	MANUAL {ON } {OFF }	Indicates to the extended operator control system service program whether or not to honor extended operator commands issued from within an MH via the extended message generation facility. ON causes manual mode to be set and displays error detection and correction conditions, but does not honor any extended operator commands automatically issued from within an MH. OFF causes automatic mode to be set and displays error detection and correction conditions and honors extended operator commands automatically issued from within an MH.
{Network } {Net }	Display Status of TCAM Resources. See 4-8.	NET {N } {T }	Displays the status of external LUs with an exception status, inactive TCAM nodes, and active TCAM nodes to be displayed by entering NETWORK or NET only. N displays node identifiers for inactive TCAM nodes. T displays just the external LU with an exception status.
Offln	Stop Traffic From Specified Groups. See 4-29.	OFFLN {grpname } {S } {ALL } {ALL[,S] }	Stops traffic to specified groups. Grpname stops the specified group of LUs. S stops all specified groups in TSPECGRP macro. ALL stops all groups except those in TSPECGRP macro. ALL,S, stops all groups specified.

Operation	Command	Command Format	Function
Onln	Start Traffic To Specified Groups. See 4-28.	ONLN {grpname } {ALL } {S }	Starts traffic to specified groups by using an F ,START basic operator command. S starts all groups specified in the TSPECGRP macro. ALL starts all groups.
Queue	Display Length of All Queues above a Specific Length. See 4-6.	QUEUE ALL,thresh	Displays the queue type and queue length for each queue that does not contain fewer messages than specified by <i>thresh</i> (decimal 1 to 999).
Queue	Display Queue Status at Specified Location. See 4-6.	QUEUE AUTO, {destname } {SYSCON } {STOP } ,intvl,thresh	Display repeatedly at regular intervals the information described in the Display Length of All Queues above a Specific Length (QUEUE ALL). <i>destname</i> is the destination at which the information is to be displayed. The <i>intvl</i> operand is the time between displays in minutes from 1 to 59. The <i>thresh</i> operand is the number of messages (decimal 1 to 999) on a queue that qualifies the queue name to be displayed; 1 causes the display for any queue containing traffic.
Queue	Display Length of One Queue. See 4-6.	QUEUE {luname } {tprocessname }	Displays how many messages are queued for the specified LU or for the application program.
Resend	Request Retransmission of messages. See 4-14.	RESEND {QNAME = }destname, {Q = } {OUTSEQ = }lowseq[-highseq] {O = }	Valid if the internodal awareness system service program is an active initiator subtask. Retransmits disk-queued, sequence-numbered messages for a given destination queue in a multiple-node network. The extended operator control station entering this command must be authorized to enter retrieval requests as designated in the TCSOPTS option field.

Operation	Command	Command Format	Function
Send	Request Retrieval of Messages. See 4-15.	<pre>SEND [date] [A] {ORIG origname [{sequence[-sequence] }} {time[,time] } DEST destname} {[ORIG origname] DEST destname [{sequence[-sequence] }}] {time[,time] } [TO {rcvrname [TAPE] }} {TAPE } SEND TEST</pre>	<p>Retransmits disk-queued messages to one to four destination and/or a tape data set. The extended operator control station entering this command must be authorized to do so via the TCSOPTS option field.</p> <p>TEST enables the test mode for testing a nonproduction MCP at the TCAM console.</p>
Setseq	Set Sequence Number. See 4-26.	<pre>SETSEQ {QNAME = } {luname}, {Q = } {INSEQ = }number {I = } {OUTSEQ = } {O = }</pre>	<p>Valid with extended networking. Specifies the next input or output sequence number for a message entered by or sent to a specified LU or application program or sent during a utility session.</p>
Start	Start Message Transmission for a Resource. See 4-27.	<pre>START [luname]</pre>	<p>Starts message transmission to and/or from a specified resource. Luname specifies the name of the external LU. If the specified LU is not started, the F ,START command is issued for that LU. The RELEASE TP command begins sending traffic to the held LU. If luname is omitted when the command is entered from an LU, the name of the entering LU is used for executing the command.</p>

Operation	Command	Command Format	Function
Stop	Stop Message Transmission for a Resource. See 4-28.	STOP [luname[,D]]	Stops message transmission to an LU. If luname is omitted when the command is entered from an LU the name of the entering LU is used for executing the command. Luname cannot be omitted when issued from the SYSCON. STOP luname specifies the name of an external LU and causes a HOLD TP command to be issued to suspend message traffic to the LU. STOP luname,D causes a F STOP basic operator command to be issued to end any current sessions for the LU.
Units	Display System Buffer Unit Status. See 4-9.	UNITS	Provides now and during peak utilization an analysis of the disposition of system buffer units (both main storage and line). The system units count is updated when FHPBUILD or EDUNITS macros are executed in message handlers. If FHPBUILD or EDUNITS macros are coded for all device message handlers, this display will be accurate provided certain non-MH driven functions have not used system units.

SMQ Commands

Operation	Command	Command Format	Function
Print	Print in EBCDIC Unsent Traffic See 4-32.	PRINT {P {T {ALL {NAMES }	Prints in EBCDIC unsent disk message queues saved on a sequential storage device.
Restore	Restore Unsent Message Queues See 4-32.	RESTORE {P {T {ALL {NAMES }	Restores unsent disk message queues to the message queue data sets on disk at TCAM startup.
Save	Save Unsent Traffic See 4-32.	SAVE {P {T {ALL {NAMES }	Dumps unsent messages, which are on disk queues, on a sequential storage device.
Snap	Print in Hexadecimal Unsent Traffic See 4-32.	SNAP {P {T {ALL {NAMES }	Prints in hexadecimal unsent disk message queues saved on a sequential storage device.

Note: For SMQ commands the operands and their meanings are:

Operand Explanation

- P *Causes all message queues for application programs, except those named in the SMQ DONTSAVE macros or having the TCSOPTS DONTSAVE bit on, to be saved, restored, or printed.*
- T *Causes all message queues for LUs except those named in the SMQ DONTSAVE macros or having the TCSOPTS DONTSAVE bit on, to be saved, restored, or printed.*
- ALL *Causes all message queues for LUs and applications to be saved, restored, or printed.*
- NAMES *Causes disk queues for a list of individual names of LUs, application programs, and the logging service facility to be saved, restored, or printed. (Up to 20 names can be specified in response to message DKJ899A.)*

TCAM Operation

Appendix C. INTRO Macro Operand-to-Keyword Cross Reference

This appendix lists keywords that can be used in responding to message IED002A. "SPECIFY TCAM PARAMETERS." Each keyword corresponds to, and can be used in place of, an operand of the INTRO macro (with an appropriate operand value added as needed). For information on using these keywords, see the description of the INTRO macro in *TCAM Installation Reference*. For information on responding to message IED002A, see the description of the IED002A message in *TCAM Messages*.

The keywords in this appendix are presented in two lists. One list is sorted by keyword; the other is sorted by operand.

Sorted by Keyword

Keyword	Operand	Keyword	Operand
A	DTRACE	N	RESTART
AL	ACCLIM	OP	OPMASK
AS	AMISTR	P	PRIMARY
AT	AMITRCE	Q	DLQ
AU	AUTHA	R	CKREQS
B	LNUNITS	RM	REUSMSG
BA	BASED	S	STARTUP
BB	BFRRTN	V	CPINTVL
BR	BRACKET	W	PASSWORD
BF	BUFFTR	WA	APWAS
C	CIB	X	MSMAX
D	CPB	Y	MSMIN
E	CPRCDS		
K	KEYLEN		
K	UNITSZ		
L	CONTROL		
M	MSUNITS		

Sorted by Operand

Operand	Keyword	Operand	Keyword
ACCLIM	AL	MSMAX	X
AMISTR	AS	MSMIN	Y
AMITRCE	AT	MSUNITS	M
APWAS	WA	OPMASK	OP
AUTHA	AU	PASSWORD	W
BASED	BA	PRIMARY	P
BFRRTN	BB	RESTART	N
BRACKET	BR	REUSMSG	RM
BUFFTR	BF	STARTUP	S
CIB	C	UNITSZ	K
CKREQS	R		
CONTROL	L		
CPB	D		
CPINTVL	V		
CPRCDS	E		
DLQ	Q		
DTRACE	A		
KEYLEN	K		
LNUNITS	B		

Glossary

This glossary includes terms and definitions from the *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems, GC20-1699*. Definitions from the *American National Dictionary for Information Processing* are identified by an asterisk (*).

Reference Words Used in the Entries

The following reference words are used in this glossary.

Contrast with. Refers to a term that has an opposed or substantively different meaning.

Deprecated term for. Indicates that the term should not be used. It refers to a preferred term, which is defined.

See. Refers to multiple-word terms that have the same last word.

See also. Refers to related terms that have similar (but not synonymous) meanings.

Synonym for. Appears in the commentary of a less desirable or less specific term and identifies the preferred term that has the same meaning.

Synonymous with. Appears in the commentary of a preferred term and identifies less desirable or less specific terms that have the same meaning.

ACB. In VTAM, access method control block.

accept. In a VTAM application program, to accept a CINIT request from a system services control point (SSCP) to establish a session with a logical unit; the application program acts as the primary end of the session. Contrast with *acquire (1)*.

Note: The accept process causes a BIND request to be sent from the primary end of the session to the logical unit that will act as the secondary end of the

session, requesting that the session be established and passing session parameters. For example, the session-initiation request that originally caused the SSCP to send the CINIT request may have resulted from a logon by the terminal operator, from a macro instruction issued by a VTAM application program, or from a VTAM operator command.

access method. A technique for moving data between main storage and input/output devices. See *Basic Direct Access Method, Basic Sequential Access Method, TCAM (Version 2 and previous releases), and VTAM*.

access method control block (ACB). A control block that links an application program to VSAM or VTAM.

access method interface (AMI). The TCAM function for managing communication on the access method control block (ACB) interface between TCAM and VTAM.

ACF. Advanced Communications Function.

ACF/TCAM. Advanced Communications Function for TCAM. Synonym for *TCAM*.

ACF/VTAM. Advanced Communications Function for VTAM. Synonym for *VTAM*.

acquire. (1) In VTAM, the operation in which an authorized VTAM application program initiates and establishes a session with another logical unit; the application program acts as the primary end of the session. Contrast with *accept*. (2) In relation to VTAM resource control, to take over resources (communication controllers or other physical units) that were formerly controlled by a data communication access method in another domain, or to assume control of resources that were controlled by this domain but released. Contrast with *release*. See also *resource takeover*.

active. In VTAM, the status of a resource that makes the resource known to VTAM (for major nodes) or makes it available for use in the network (for minor nodes). For a logical unit (LU) minor

node, it also enables the LU to participate in LU-LU sessions. Contrast with *inactive*.

address space. The area of virtual storage that is available for a particular job.

Advanced Communications Function (ACF). A group of IBM program products, principally VTAM, TCAM, NCP, and SSP.

Advanced Communications Function for the Network Control Program (NCP). An IBM program product that provides communication controller support for single-domain, multiple-domain, and interconnected network capability. Programs (SSP)

Advanced Communications Function for Systems Support Programs (SSP). An IBM program product made up of a collection of utilities and small programs. SSP is required for the operation of the NCP.

Advanced Communications Function for TCAM (TCAM). An IBM program product that provides queued message handling. TCAM, Versions 1 and 2, are telecommunications access methods, but TCAM, Version 3, is a message handling subsystem.

Advanced Communications Function for VTAM (VTAM). An IBM program product that controls communication and the flow of data in an SNA network. It provides single-domain, multiple-domain, and interconnected network capability. VTAM runs under MVS (OS/VS1 and OS/VS2), VSE, and VM/SP. It supports direct control application programs and subsystems such as VSE/POWER.

affinity-based routing. Message routing in which a temporary relationship, or routing affinity, is established between a source and a destination; all messages from the source are routed to the destination for the duration of the relationship. See also *invariant routing*, *transaction-based routing*, *routing by destination*, *routing by key*.

AMH. Application message handler.

AMI. Access method interface.

application message handler (AMH). A user-defined routine that processes messages that are received by the message control program (MCP) from an application program or that are sent by the MCP to an application program. See *message handler*, *device message handler*, *internodal message handler*. See also *Message control program*.

application program. (1) A program written for or by a user that applies to the user's work. (2) A program used to connect and communicate with resources in a network, enabling users to perform application-oriented activities.

asynchronous. Without regular time relationship; unexpected or unpredictable with respect to the execution of a program's instructions.

automatic purge/copy/redirect. A collection of message-handler and extended operator control functions that permits messages to be conditionally or unconditionally redirected to another destination, copied to another destination, or purged (that is, not sent to any destination).

Basic Direct Access Method (BDAM). An access method used to directly retrieve or update particular blocks of a data set on a direct access device.

basic information unit (BIU). In SNA, the unit of data and control information that is passed between half-sessions. It consists of a request/response header (RH) followed by a request/response unit (RU).

basic operator command. An operator command directed to the basic operator control system service program. Synonymous with *basic operator control command*.

basic operator control. The function of a particular system service program that processes a set of basic operator commands. These commands allow the operator to determine the status of the TCAM system and to alter, start, and stop TCAM and its resources by entering appropriate commands from either the system console or a basic operator control station. The basic operator control system service program is required in order to execute a TCAM message control program (MCP).

basic operator control command. Synonym for *basic operator command*.

basic operator control station. A system console, external logical unit (LU), or application program that is authorized to enter operator commands to be executed by the basic operator control system service program.

basic primary operator control station. A basic operator control station that is sent all TCAM error-recovery messages and TCAM reply messages to basic operator commands. See *basic secondary operator control station*, *extended primary operator control station*, *extended secondary operator control station*.

basic secondary operator control station. A basic operator control station that is sent only the reply messages to basic operator commands entered from it. See *basic primary operator control station*, *extended primary operator control station*, *extended secondary operator control station*.

Basic Sequential Access Method (BSAM). An access method for storing or retrieving data blocks in a continuous sequence, using either a sequential access or direct access device.

BDAM. Basic Direct Access Method.

begin bracket. In SNA, the value (binary 1) of the begin-bracket indicator in the request header (RH) of the first request in the first chain of a bracket; the value denotes the start of a bracket. Contrast with *end bracket*. See also *bracket*.

bidder. In SNA, the LU-LU half-session defined at session activation as having to request and receive permission from the other LU-LU half-session to begin a bracket. Contrast with *first speaker*. See also *bracket protocol*.

binary synchronous communication (BSC). Communication using binary synchronous line discipline. See also *binary synchronous transmission*.

binary synchronous transmission. Data transmission in which synchronization of characters is controlled by time signals generated at the sending and receiving stations. Contrast with *start-stop transmission*, *synchronous data link control*.

bind image. Synonym for *logon mode*.

bind image table. Synonym for *logon mode table*.

BIU. Basic information unit.

BIU segment. In SNA, a portion of a basic information unit (BIU) that is contained within a path information unit. It consists of either a request/response header (RH) followed by all or a portion of a request/response unit (RU), or of only a portion of an RU. See also *segment*.

bracket. In SNA, one or more chains of request units (RUs) and their responses that are exchanged between two LU-LU half-sessions and that represent a transaction between them. A bracket must be completed before another bracket can be started. Examples of brackets are data base inquiries/replies, update transactions, and remote

job entry output sequences to work stations. See *begin bracket*, *end bracket*. See also *RU chain*.

bracket protocol. In SNA, a data flow control protocol in which exchanges between two LU-LU half-sessions are achieved through the use of brackets, with one logical unit (LU) designated at session initiation as the first speaker and the other LU as the bidder. The bracket protocol involves bracket initiation and termination rules. See also *bidder*, *first speaker*.

bracket state manager. A TCAM routine that enforces the bracket protocol by making proper bracket state changes and detecting bracket errors.

broadcast. The simultaneous transmission of data to a number of destinations.

BSAM. Basic Sequential Access Method.

BSC. Binary synchronous communication.

buffer. (1) * A routine or storage area used to compensate for a difference in rate of flow of data, or time of occurrence of events, when transferring data from one device to another. (2) An area of storage that is temporarily reserved for use in performing an input/output operation, into which data is read or from which data is written.

buffer list. In VTAM, a contiguous set of control blocks (buffer list entries) that allow an application program to send function management data (FMD) from a number of discontinuous buffers with a single SEND macro instruction.

buffer prefix. A control area within each buffer that contains buffer control information. A user must allow room for the buffer prefix when specifying buffer size.

buffer unit. The smallest block of main storage from which TCAM buffers and main storage message queues can be built. Synonymous with *main storage unit*.

buffer-unit pool. All the buffer units in a particular TCAM system.

cascade entry. A terminal-table entry associated with a cascade list.

cascade list. A list of pointers to single entries. When a cascade entry is named as the destination for a message, the message is sent to the valid entry in the list with the fewest messages queued for it.

chain. See *RU chain*.

channel program block (CPB). A TCAM control block used in the transfer of data between buffer units and message queues maintained on disk.

checkpoint data set. An optional TCAM data set that contains the checkpoint records used to reconstruct the message control program (MCP) environment after closedown or system failure when the TCAM checkpoint/restart service facility is used.

checkpoint records. Records that contain the status of a job and the system at the time the records are written by the checkpoint routine. These records provide the information necessary for restarting a job without having to return to the beginning of the job. There are four types: checkpoint request record, control record, environment record, and incident record.

checkpoint request record. A checkpoint record taken as a result of the execution of a CKREQ macro instruction in an application program; the record contains the status of a single destination queue for the application program. See *control record, environment record, incident record*.

checkpoint/restart service facility. A TCAM service facility that records the status of the TCAM system at designated intervals or following certain events. After system failure, the TCAM system can be restarted and can continue without loss of messages.

CIB. Command input buffer.

clear data. Data that is not enciphered.

clear session. A session in which only clear data is transmitted or received. Contrast with *cryptographic session*.

closed subroutine. A subroutine of which one replica suffices for the subroutine to be linked by calling sequences for use at more than one place in a computer program. Contrast with *open routine*.

closedown. The orderly termination of the message control program. See *flush closedown, quick closedown*.

cold restart. Startup of a message control program (MCP) following either a flush closedown, a quick closedown, or a system failure. A cold restart ignores the previous environment; that is, the MCP is started as if this were the initial startup. A cold restart is the only type of restart possible when no checkpoint/restart service facility is used. Contrast with *warm restart*.

command. (1) In SNA, any field set in the transmission header, request header (RH), and sometimes portions of a request unit (RU), that initiates an action or begins a protocol; for example, (a) Bind Session (session-control request unit), a command that activates an LU-LU session; (b) the change-direction indicator in the RH of the last RU of a chain; (c) the virtual route reset window indicator in an FID4 transmission header. (2) Loosely, a request unit. (3) In SDLC, the control information (in the C-field of the link header) sent from the primary station to the secondary station. (4) In TCAM, an operator control command.

command input buffer (CIB). A buffer-like area that contains operator commands entered at the system console. Main storage space is allocated for it dynamically and is freed once the operator command contained within the CIB has been processed. Only one CIB need be specified for operator commands entered from the system console.

communication common carrier. In the USA and Canada, a public data transmission service that provides the general public with transmission service facilities; for example, a telephone or telegraph company.

COMWRITE. An IBM-supplied subtask of the TCAM initiator that formats and writes trace records to the COMWRITE data set.

COMWRITE data set. A data set on a sequential storage device in which trace information is written.

connection point manager. In SNA, a component of the transmission control layer that (a) performs session-level pacing of normal-flow requests; (b) checks sequence numbers of received response units; (c) verifies that request units do not exceed maximum permissible size; (d) routes incoming request units to their destinations within the half-session; and (e) enciphers and decipheres function management data (FMD) request units when cryptography is selected. The sending connection point manager within a half-session builds the request/response header for outgoing request units, and the receiving connection point manager interprets the request headers that precede incoming request units.

control record. A checkpoint record included in a checkpoint data set that keeps track of the correct environment records, incident records, and checkpoint request records to use for restructuring the message control program environment during restart. See *environment record, incident record, checkpoint request record*.

conversational mode. A mode in which the next message received by an external logical unit (LU) after it enters an inquiry message is a reply to that message. See *lock mode*.

CPB. Channel program block.

cryptographic. Pertaining to the transformation of data to conceal its meaning.

cryptographic session. An LU-LU session in which a function management data request may be enciphered before it is transmitted, and deciphered after it is received. Contrast with *clear session*. See also *mandatory cryptographic session*, *selective cryptographic session*.

DASD. Direct access storage device.

data control block (DCB). A control block used by access method routines in storing and retrieving data.

Data Encryption Standard (DES) algorithm. A cryptographic algorithm designed to encipher and decipher 8-byte blocks of data using a 64-bit cryptographic key, as specified in the *Federal Information Processing Standard Publication 46*, January 15, 1977.

data flow. (1) In SNA: any of four flows in a given session: primary-to-secondary flow, secondary-to-primary flow, normal flow, or expedited flow. (2) The type of route or extended route that a message takes from its origin to its destination, including the host nodes that process the message while it is enroute to its destination. See *level 1 data flow*, *level 2 data flow*, *level 2+ data flow*, *level 3 data flow*.

data flow control (DFC) layer. In SNA, the layer within a half-session that (a) controls whether the half-session can send, receive, or concurrently send and receive request/response units (RUs); (b) groups related RUs into RU chains; (c) delimits transactions via the bracket protocol; (d) controls the interlocking of requests and responses in accordance with control modes specified at session activation; (e) generates sequence numbers; and (f) correlates requests and responses.

data set. (1) The major unit of data storage and retrieval in the operating system, consisting of a collection of data in one of several prescribed arrangements and described by control information to which the system has access. (2) * Deprecated term for *modem*.

data staging. An extended networking technique in which high-volume, low-priority message traffic is

moved from one TCAM node to another, progressively approaching the destination TCAM. Data staging allows such traffic to be moved at a convenient time to avoid overloading the network to protect response times for high-priority inquiries.

DCB. Data control block.

dead-letter queue. In TCAM, a queue containing messages that could not be placed in the appropriate destination queue.

decipher. To convert enciphered data into clear data. Contrast with *encipher*. Synonymous with *decrypt*.

decrypt. To convert encrypted data into clear data. Contrast with *encrypt*. Synonym for *decipher*.

definite response. In SNA, a form of response requested in the request header (RH) for a request unit (RU). The receiver is requested to return a response indicating whether the request is acceptable as received. Contrast with *exception response*, *no response*.

delayed-request mode. In SNA, an operational mode in which the sender may continue sending request units on the normal flow after sending a definite-response chain on that flow, without waiting to receive the response to that chain. Contrast with *immediate-request mode*. See also *delayed-response mode*.

delayed-response mode. In SNA, an operational mode in which the receiver of normal-flow request units can return responses to the sender in a sequence different from that in which the corresponding request units are sent. Contrast with *immediate-response mode*. See also *delayed-request mode*.

delimiter macro instruction. A TCAM message-handler macro instruction that classifies and identifies sequences of functional message-handler macro instructions and directs control to the appropriate sequence of functional macro instructions. Contrast with *functional macro instruction*.

DES. Data Encryption Standard. See also *Data Encryption Standard algorithm*.

DES algorithm. Data Encryption Standard algorithm.

destination. An external logical unit (LU) or application program to which a message or other data is directed.

destination queue. A queue on which messages bound for a particular destination are placed after being processed by the incoming group of the message handler. See also *process queue*.

device message handler (DMH). A user-written routine defined in a TCAM message control program (MCP) that processes messages being received from or sent to an external logical unit (LU). See also *application message handler*, *internodal message handler*, *message handler*.

DFC. Data flow control.

direct access storage device (DASD). A storage device in which the access time is effectively independent of the location of the data.

distribution entry. A terminal-table entry associated with a distribution list.

distribution list. A list of pointers to single or cascade entries. When a distribution entry is named as the destination for a message, the message is sent as separate transmissions to all items in the list.

DMH. Device message handler.

domain. In SNA, a system services control point (SSCP) and the physical units (PUs), logical units (LUs), links, link stations, and all the associated resources that the SSCP has the ability to control by means of activation requests and deactivation requests. Synonymous with *single-domain network*.

dynamic accounting facility. A TCAM service facility that gathers resource utilization data for processing by user-supplied applications.

EBCDIC. Extended binary-coded decimal interchange code.

encipher. (1) To scramble data or convert it, prior to transmission, to a secret code that masks the meaning of the data to any unauthorized recipient. (2) In VTAM, to convert clear data into enciphered data. Contrast with *decipher*. Synonymous with *encrypt*.

enciphered data. Data that is intended to be illegible to all except those who legitimately possess the means to reproduce the clear data.

encrypt. In VTAM, to convert clear data into enciphered data. Contrast with *decrypt*. Synonym for *encipher*.

end bracket. In SNA, the value (binary 1) of the end bracket indicator in the request header (RH) of

the first request of the last chain of a bracket. The value denotes the end of the bracket. Contrast with *begin bracket*. See also *bracket*.

end-of-address (EOA) character. A character that must be placed in a message if the system is to route that message to several destinations. The character must immediately follow the last destination coded in the message header.

end-to-end session. In TCAM a logical connection in which an affinity-based routing relationship has been established between a source and a destination. Either the source or destination can be either a logical unit (LU) or an application program. End-to-end sessions require routing by key.

end user. The ultimate source or destination of application data flowing through an SNA network. An end user may be an application program or a terminal operator.

environment record. A checkpoint record of the total TCAM system at a single point in time. See *checkpoint request record*, *checkpoint/restart service facility*, *control record*, *incident record*.

EOA. End-of-address. See *end-of-address character*.

error record. Five bytes assigned to each message processed by a message handler. These bytes indicate physical or logical errors that have occurred during transmission or during subsequent processing or queuing of the message. In addition, a message error record may be created when a session cannot be established. Error records are checked by error-handling macro instructions in the in-message and out-message subgroups of a message handler. Synonymous with *message error record*.

error-recovery procedures. A set of internal TCAM routines that attempt to recover from transmission errors.

exception request. In SNA, a request that replaces another message unit in which an error has been detected.

exception response. In SNA, a value in the form-of-response requested field of a request header. The receiver is requested to return a response only if the request is unacceptable as received or cannot be processed. That is, a negative response, but not a positive response, may be returned. Contrast with *definite response*, *no response*. See *negative response*.

expedited flow. In SNA, a data flow designated in the transmission header that is used to carry

network control, session control, and various data flow control request/response units (RUs). The expedited flow is separate from the normal flow (which carries primarily end-user data) and can be used for commands that affect the normal flow on the path. Contrast with *normal flow*. See also *isolated pacing response*.

extended lock mode. A type of lock mode in which an external logical unit (LU) remains in lock mode for the duration of several inquiry/reply cycles. Contrast with *message lock mode*. See *lock mode*.

extended network. A network that includes two or more TCAM systems using extended networking facilities.

extended networking. A TCAM function that uses a collection of TCAM macro instructions, system service programs, and message-handler facilities to simplify TCAM system definition, management, and error recovery in a network with two or more TCAM systems.

extended operator command. An operator command directed to the extended operator control system service program. Synonymous with *extended operator control command*.

extended operator control. The function of a particular system service program that processes a set of extended operator commands. These commands are not required in order to control a TCAM system, but are useful in some environments. The extended operator control system service program is required if the message control program (MCP) uses one or more of the following functions: (a) extended networking, (b) online retrieval system service program, or (c) automatic purge/copy/redirect.

extended operator control command. Synonym for *extended operator command*.

extended operator control station. A system console, external logical unit (LU), or application program that is authorized to enter extended operator commands. See *basic operator control station*, *extended primary operator control station*, *extended secondary operator control station*.

extended primary operator control station. An extended operator control station that receives the extended operator control startup and closedown messages; responds to extended operator commands entered from it; responses to extended operator commands that successfully modify the TCAM system; and, optionally, the online retrieval system service program startup and closedown messages (if

online retrieval is part of the TCAM system). See *basic primary operator control station*, *basic secondary operator control station*, *extended secondary operator control station*.

extended secondary operator control station. An extended operator control station that enters extended operator commands and receives the responses made to those commands. See *basic primary operator control station*, *basic secondary operator control station*, *extended primary operator control station*.

extended route. In TCAM extended networking, a series of one or more routes that involves an intermediate TCAM node.

external LU. A logical unit (LU) that communicates with a TCAM message control program (MCP) through VTAM. Each external LU is defined to the MCP with a TERMINAL macro instruction.

FHP. Fixed header prefix.

first speaker. In SNA, the LU-LU half-session defined at session activation as (a) able to begin a bracket without requesting permission from the other LU-LU half-session to do so, and (b) winning contention if both half-sessions attempt to begin a bracket simultaneously. Contrast with *bidder*. See also *bracket protocol*.

fixed header prefix (FHP). An optional control block that provides a place to keep message-related information needed by certain optional TCAM functions.

flush closedown. A closedown of TCAM during which incoming message traffic is suspended and queued outgoing messages are sent to their destinations ("flushed" from the message queues) before closedown is completed. Contrast with *quick closedown*.

FM. Function management.

FMD. Function management data.

FMD services layer. In SNA, the layer within a half-session that routes function management data (FMD) requests and responses to particular network addressable unit (NAU) services manager components and that provides session network services or session presentation services, depending on the type of session.

function management data (FMD) services. A general term for session network services and

session presentation services, both of which process FMD requests and responses.

function management (FM) header. In SNA, one or more headers, optionally present in the leading request units (RU) of an RU chain, that allow one half-session in an LU-LU session to: (a) select a destination (for example, a program or a device) as the session partner and control the way that the end-user data it sends is handled at the destination, (b) change the destination or the characteristics of the data during the session, and (c) transmit between session partners status or user information about the destination (for example, a program or a device).

function management (FM) profile. In SNA, a specification of various data flow control protocols (such as request unit chains and data flow control requests) and function management data (FMD) options (such as use of FM headers, compression, and alternate codes) supported for a particular session. Each function management profile is identified by a number.

functional macro instruction. A TCAM macro instruction that performs the specific operations required for messages directed to the message handler. Contrast with *delimiter macro instruction*.

group entry. A terminal-table entry associated with a group of logical units (LUs).

group of logical units (LUs). In TCAM, a set of external LU definitions that are associated with the same group entry. See also *group entry*.

half-session. In SNA, a component that provides FMD services, data flow control, and transmission control for one of the sessions of a network addressable unit. See *primary half-session*, *secondary half-session*.

header. That portion of a message containing control information for the message; a header might contain one or more destination fields, the name of the originating station, an input sequence number, a character string indicating the type of message, and a priority level for the message. The message header is operated on by macro instructions in the inheader and outheader subgroups of the message handler. See *message header*.

header buffer. A buffer containing either all or the first part of a message header. Contrast with *text buffer*.

host computer. Synonym for *host processor*.

host logical unit (LU). An SNA logical unit (LU) located in a host processor, for example, a VTAM application program. See *TCAM host logical unit (LU)*.

host node. In SNA, a subarea node that contains a system services control point (SSCP).

host processor. The controlling processor with its operating system, access methods, and application programs. A system services control point is located in a host processor. Synonymous with *host computer*.

IMH. Internodal message handler.

immediate-request mode. An operational mode in which the sender, after sending a definite-response request chain on a given flow, stops sending request units on the flow until the chain has been responded to. Contrast with *delayed-request mode*. See *immediate-response mode*.

immediate-response mode. An operational mode in which the receiver responds to request units on a given normal flow in the order it receives them: that is, in a first-in, first-out sequence. Contrast with *delayed-response mode*. See *immediate-request mode*.

inactive. In VTAM, pertaining to a resource that has never been activated or has been deactivated by a VTAM operator command. Contrast with *active*.

inblock subgroup. The part of a message handler (MH) incoming group that, if used, precedes the inheader subgroup and blocks several physical messages into a longer, logical message or unblocks a physical message into a shorter, logical message.

inbuffer subgroup. The part of a message handler (MH) incoming group that operates on each segment of an incoming message.

incident record. A checkpoint record that logs a change in external logical unit (LU) or application program status, and in the contents of an option field that occurred since the last environment record was taken. It is used to update the information contained in environment records at restart after a shutdown or system failure. See *checkpoint request record*, *control record*, *environment record*.

incoming group. That portion of a message handler that is designed to handle incoming messages for the message control program (MCP). Contrast with *outgoing group*.

incoming message. A message sent from an external logical unit (LU) or application program to the message control program (MCP).

inheader subgroup. The part of a message handler (MH) incoming group that operates on all or part of an incoming message header.

initial chaining value (ICV). An eight-byte, pseudo-random number used to verify that both ends of a session with cryptography have the same session cryptography key. The initial chaining value is also used as input to the Data Encryption Standard (DES) algorithm to encipher or decipher data in a session with cryptography.

initiation. Synonym for *LU-LU session initiation*. See also *session-initiation request*.

initiator. The component of TCAM that is executed as the job-step task. The initiator starts, monitors, and restarts the message control program (MCP), TCAM system service programs, and user-supplied system service programs. It can also display status information at the system console.

inmessage subgroup. The part of a message handler (MH) incoming group that specifies actions to be taken after a complete message has arrived at the message control program (MCP).

input data set. A data set that contains all messages or records sent to an application program from a single process queue. Contrast with *output data set*.

inquiry/reply. A TCAM application in which a device message handler receives a message from an external logical unit (LU) and then routes it to an application program that processes the message and generates a reply. The reply is routed back to the inquiring external LU.

intercepted resource. An external logical unit (LU) to which no messages may be sent for a specified time interval or until an operator command or an application-program macro instruction is issued to release messages. An intercepted resource can enter messages, but messages destined for it are not sent.

intermediate function. In SNA, a path control capability within a subarea node that receives and routes path information units that neither originate in nor are destined for the network addressable units in that subarea node.

intermediate TCAM node. In TCAM extended networking, a TCAM node that processes messages flowing along the extended route but does not

provide the queuing for the originating or destination resources for those messages. Processing by an intermediate TCAM node includes processing by the incoming group of the internodal message handler, queuing of each message on the internodal destination queue for the next TCAM node on its extended route, and processing by the outgoing group of the internodal message handler (IMH). See *TCAM node*.

internodal awareness. In TCAM extended networking, a function used by TCAM systems to share information about each other. This information includes the status of TCAM systems, the status of application programs in TCAM systems, and the contents of selected key-table entries. This function is provided by node path system service programs in the various TCAM systems that communicate with each other.

internodal destination queue. In TCAM extended networking, a destination queue for an external logical unit (LU) that is a partner in a utility session.

internodal message handler (IMH). In TCAM extended networking, a message handler that processes messages flowing on utility sessions.

internodal sequence number synchronization. In TCAM extended networking, the function of a particular system service program that operates in conjunction with the internodal message handler. Internodal sequence number synchronization is used to request retransmission from any TCAM node of sequence-numbered messages not received on that utility session and retransmit sequence-numbered messages flowing on a utility session when requested to do so by another TCAM node or an extended operator command.

internodal sequence prefix. In TCAM extended networking, a control block that is used to contain sequence-number information for messages flowing on utility sessions.

invariant routing. Message routing in which messages from the same source are always sent to the same destination. See *affinity-based routing*, *transaction-based routing*. See also *routing by destination*, *routing by key*.

key. A character string that matches a definition in the key table. This key identifies the destination of a message or special processing to be done on that message. See also *key table*.

key table. A main-storage table of keys and their definitions, which contain information on routing

and special processing to be done on a message. See also *key*.

layer. In SNA, a grouping of related functions that are logically separate from the functions in other layers; the implementation of the functions in one layer can be changed without affecting other layers. See *data flow control layer*, *FMD services layer*.

LCB. Line control block.

level 1 data flow. In SNA, a data flow (within a single-domain network) in which each message's origin and destination logical units (LUs) reside in the same domain.

level 2 data flow. In TCAM extended networking, a data flow on an extended route in which each message enters the TCAM node that provides queuing for the originating resource, another TCAM node that provides queuing for the destination resource, and one or more intermediate TCAM nodes.

level 2 + data flow. In TCAM extended networking, a data flow on an extended route in which each message enters both the TCAM node that provides queuing for the originating resource and the TCAM node that provides queuing for the destination resource, but does not pass through any intermediate TCAM nodes.

level 3 data flow. In SNA, a data flow (within a multiple-domain network) in which each message's origin and destination logical units (LUs) reside in different domains.

line. Any physical medium, such as a wire or telephone circuit, that connects one or more stations to a communication control unit or connects one communication control unit with another. See also *link*.

line control block (LCB). A control block used for scheduling, sending, and receiving.

link. In SNA, the combination of the link connection and the link stations joining network nodes; a serial-by-bit connection under the control of SDLC. A link connection is a physical medium of transmission, such as a telephone wire or a microwave beam. A link includes a physical medium of transmission (a line), a protocol (SDLC), and associated communication devices and programming; it is both logical and physical.

load balancing. In TCAM extended networking, the technique for balancing the message flow between any pair of TCAM nodes by assigning

different paths to different messages flowing between them.

lock mode. A mode in which an external logical unit (LU) entering an inquiry message for an application program is ensured that the next message it receives is a reply from the application program. See *conversational mode*, *extended lock mode*, *message lock mode*.

log. A collection of messages or message segments placed on a secondary-storage device for accounting or data collection purposes.

log data set. A data set consisting of the messages or message segments recorded on a secondary-storage medium by the TCAM logging facility.

logging service facility. A TCAM service facility that selectively causes incoming or outgoing messages or message segments to be copied onto tape or disk. The log produced by the logging service facility provides a record of message traffic through the message control program (MCP).

logical message. A user-defined message, consisting of one or more related units of data in a transmission, ending with an end-of-message code. Contrast with *physical message*.

logical unit (LU). In SNA, a port through which an end user gains access to the SNA network to communicate with another end user and through which the end user uses the functions provided by the SSCP. An LU can have at least two sessions--one with the SSCP, and one with another LU--and may be able to have many sessions with other LUs. Contrast with *physical unit*. See *host LU*, *auxiliary LU*, *primary logical unit*, *secondary logical unit*. See also *system services control point*.

logical unit (LU) services. In SNA, capabilities in a logical unit to: (a) receive requests from an end user and, in turn, issue requests to perform the requested functions, typically for session initiation; (b) receive requests from the SSCP to activate LU-LU sessions through Bind Session requests; and (c) provide session presentation and other services for LU-LU sessions.

logon mode. In VTAM, a set of session parameters specified in a logon mode table entry for communication with a logical unit. See also *session parameters*. Synonymous with *bind image*.

logon mode table. In VTAM, a set of entries for one or more logon modes. Each logon mode is identified by a logon mode name. Synonymous with *bind image table*.

logtype entry. A terminal-table entry associated with a queue on which complete messages reside while awaiting transfer by the logging service facility. A logtype entry is not needed if message segments only are to be logged.

LU. Logical unit.

LU-LU half-session. A half-session in which the session involved is an LU-LU session.

LU-LU session. In SNA, a session between two logical units (LUs) in an SNA network. It provides communication between two end users, or between an end user and an LU services component.

LU-LU session initiation. The process that begins with a session-initiation request from a logical unit (LU) to a system services control point and culminates in activation of an LU-LU session. See also *session activation*.

LU-LU session termination. The process that begins with either a session-termination request from a logical unit to a system services control point, or an Unbind request from one logical unit to another, and that culminates in deactivation of an LU-LU session. See also *session deactivation*.

LU-LU session type. The classification of an LU-LU session in terms of the specific subset of SNA protocols and options required by the logical units for that session. LU-LU session types 0, 1, 2, 3, 4, 6, and 7 are defined in SNA.

LU services. See *logical unit services*.

LU services manager. An SNA component that provides a logical unit (LU) with network services and end-user to end-user services. The LU services manager provides services for all half-sessions within the LU.

main storage unit. Synonym for *buffer unit*.

mandatory cryptographic session. A cryptographic session in which all outgoing data is enciphered and all incoming data is deciphered. Contrast with *selective cryptographic session*.

MCP. Message control program.

MCP definition. The collection of macro-language statements by which the network is defined to TCAM in the resource-definition section of the message control program (MCP).

message. In TCAM, a unit of data transmitted from one point to another. See *logical message*, *physical message*.

message control program (MCP). A general term referring to any specific implementation of TCAM, including initialization and termination routines, resource management routines, message handling routines, and service facilities.

message error record. Synonym for *error record*.

message handler (MH). A sequence of user-specified macro instructions and basic assembler language instructions that invoke routines that examine and process control information in message headers and perform functions necessary to prepare messages for forwarding to their destinations. See *application message handler*, *device message handler*, *internodal message handler*. See also *delimiter macro instruction*, *functional macro instruction*.

message header. The leading part of a message that contains information such as the source or destination code of the message, the message priority, and the type of message. See also *header*.

message lock mode. A type of lock mode in which an external logical unit (LU) is in lock mode for the duration of a single inquiry and reply. Contrast with *extended lock mode*. See also *station lock*.

message priority. The order in which messages in a destination queue are transmitted to a destination. Higher-priority messages are forwarded before lower-priority messages. See also *route transmission priority*, *station transmission priority*.

message queue data set. A TCAM data set that contains one or more destination queues. A message queue data set contains messages that have been processed by the incoming group of a message handler and are waiting for TCAM to dequeue them, route them through an outgoing group of a message handler, and send them to their destinations. Up to three message queue data sets (one in main storage, one on reusable disk, and one on nonreusable disk) may be specified for a TCAM message control program.

message routing. A message control program (MCP) function that determines the correct destination for each message received by the MCP and places the message on the appropriate destination queue. See *affinity-based routing*, *invariant routing*, *transaction-based routing*. See also *routing by destination*, *routing by key*.

message segment. The portion of a message that is contained in a single request unit (RU).

message text. Synonym for *text*.

message unit. In SNA, a general term for the unit of data processed by any layer; for example, a basic information unit, a path information unit, or a request/response unit (RU).

MH. Message handler.

mode name. The name of an entry in the logon mode table.

multiple-domain network. A network with more than one system services control point (SSCP). Contrast with *single-domain network*.

Multiple Virtual Storage (MVS). An IBM program product whose full name is the Operating System/Virtual Storage (OS/VS) with Multiple Virtual Storage/System Product for System/370. It is a software operating system controlling the execution of programs.

MVS. Multiple Virtual Storage operating system.

NAU. Network addressable unit.

NAU services. In SNA, the functions provided by the NAU services manager layer and the FMD services layer.

NCP. (1) Advanced Communications Function for the Network Control Program. An IBM program product that provides communication controller support for single-domain, multiple-domain, and interconnected network capability. (2) A general term for a program that is generated by the user from a library of IBM-supplied modules and controls the operation of a communication controller.

negative response. In SNA, a response indicating that a request did not arrive successfully or was not processed successfully by the receiver. Contrast with *positive response*. See *exception response*.

negotiable bind. In SNA, a function that allows two LU-LU half-sessions to negotiate the parameters of a session when the session is being activated.

network. In data processing, a user application network. See *public network*, *SNA network*, *user application network*.

network address. In SNA, an address, consisting of subarea and element fields, that identifies a link, a link station, or a network addressable unit (NAU). Subarea nodes use network addresses; peripheral nodes use local addresses. The boundary function in the subarea node to which a peripheral node is

attached transforms local addresses to network addresses and vice versa. See *local address*, *TCAM network address*. See also *network name*.

network addressable unit. In SNA, a logical unit (LU), a physical unit (PU), or a system services control point (SSCP).

network control program. A program, generated by the user from a library of IBM-supplied modules, that controls the operation of a communication controller.

Network Control Program (NCP). An IBM program product that provides communication controller support for single-domain, multiple-domain, and interconnected network capability. Officially, the Advanced Communications Function for the Network Control Program.

network operator. In SNA, a person or program responsible for controlling the operation of all or part of a network.

network services procedure error (NSPE). A request unit that is sent by a system services control point (SSCP) to a logical unit (LU) when a procedure requested by that LU has failed.

Network Terminal Option (NTO). An IBM program product that allows certain non-SNA devices to participate in sessions with SNA application programs in the host processor. NTO converts non-SNA protocol to SNA protocol when data is sent to the host from a non-SNA device and reconverts SNA protocol to non-SNA protocol when data is sent back to the device.

networking. In a multiple-domain network, communication between domains. See *extended networking*.

NIB. Node initialization block.

no response. In SNA, a value in the form-of-response-requested field of the request header (RH) indicating that no response is to be returned to the request, whether or not the request is received and processed successfully. Contrast with *definite response*, *exception response*.

node. In SNA, a junction point in a network that contains a physical unit (PU). A node contains network addressable units, path control components, and may contain boundary function. See *TCAM node*.

node identifier. That portion of the TCAM network address of a resource that indicates which

TCAM node provides the message queuing for that resource. See *resource identifier*.

node initialization block (NIB). In VTAM, a control block associated with a particular node or session that contains information used by the VTAM application program to identify the node or session and to indicate how communication requests on a session are to be handled by VTAM.

node table. For TCAM extended networking, a main-storage table that associates each node identifier with internodal destination queues.

non-SNA terminal. A terminal that supports non-SNA protocols; for example, channel-attached 3270 Information Display System or devices supported by Network Terminal Option (NTO) that use binary synchronous protocols. Contrast with *SNA terminal*.

normal flow. In SNA, a data flow that is used for most requests and responses. The expedited flow is independent of and used to control the normal flow. Requests and responses on a normal or expedited flow are processed sequentially within the path, but the expedited flow traffic may be moved ahead of the normal flow traffic within the path. Contrast with *expedited flow*.

NSPE. Network services procedure error.

NTO. Network Terminal Option.

OEF. Origin element field.

online retrieval. The function of a system service program that allows system operators to retrieve disk-queued messages based upon origin or destination, time of entry, or input or output sequence number.

OPCE. Operator control element.

open subroutine. A subroutine of which a replica must be inserted at each place in a computer program at which the subroutine is used. Contrast with *closed routine*.

operator command. Synonym for *operator control command*.

operator control. Synonym for *basic operator control, extended operator control*.

operator control command. A command entered from an operator control station to examine or alter the status of the TCAM system during execution of TCAM.

operator control element (OPCE). A unit assigned to each operator control command that is used by the operator control routines to process the command.

operator control station. Synonym for *basic operator control station, basic primary operator control station, basic secondary operator control station, extended operator control station, extended primary operator control station, extended secondary operator control station*.

option field. A storage area containing data relating to a particular external logical unit (LU) or application program. Certain message-handler routines that need origin- or destination-related data to perform their functions have access to data in an option field. User-written message-handler exit routines also have access to data in an option field.

option table. A table that contains option fields of user-provided information, using certain TCAM macro instructions, related to external logical units (LUs) or application programs.

origin. An external logical unit (LU) or application program from which a message or other data originates. See also *destination*.

outbuffer subgroup. The part of a message handler (MH) outgoing group that operates on each segment of an outgoing message.

outgoing group. That portion of the message handler that handles messages sent from the message control program (MCP) to any external logical units (LUs) or application programs. Contrast with *incoming group*.

outheader subgroup. The part of a message handler (MH) outgoing group that operates on all or part of an outgoing message header.

outmessage subgroup. The part of a message handler (MH) outgoing group that specifies actions to be taken after the entire message has been sent to an external logical unit (LU), or when special processing or error conditions are detected.

output data set. A data set that contains the messages or records returned from an application program to the message control program by a process entry in the terminal table. Contrast with *input data set*.

path switch. A field in the option table that determines whether a given subgroup is to be executed for a message.

PCB. Process control block.

physical message. The data entered on a link during a complete transmission sequence, from the first byte of data to the end of the transmission character. Contrast with *logical message*. In SNA, synonym for *RU chain*.

PLU. Primary logical unit.

POF restart. Point-of-failure restart.

point-of-failure (POF) restart. A type of warm restart of the message control program (MCP) that uses incident records to update an environment record when the system is restarted following closedown or system failure. Contrast with *point-of-last-environment restart*. See *cold restart*, *warm restart*.

point-of-last-environment (POLE) restart. A type of warm restart of the message control program (MCP) that ignores incident records when the system is restarted following closedown or system failure. Contrast with *point-of-failure restart*. See *cold restart*, *warm restart*.

POLE restart. Point-of-last-environment restart.

positive response. In SNA, a response unit that indicates that a request was successfully received and processed. Contrast with *exception response*, *negative response*.

prefix. Synonym for *buffer prefix*.

presentation services. Synonym for *session presentation services*.

primary end of a session. Deprecated term for *primary half-session*.

primary half-session. The half-session that sends the session-activation request. Contrast with *secondary half-session*. See also *primary logical unit*.

primary logical unit (PLU). In SNA, a logical unit that contains the primary half-session for a particular LU-LU session. A PLU issues a Bind Session command to establish an LU-LU session. Contrast with *secondary logical unit*. See also *logical unit*.

primary operator control station. See *basic primary operator control station*, *extended primary operator control station*.

priority. Synonym for *message priority*, *station transmission priority*.

process control block (PCB). A message control program (MCP) data area that is necessary for communication between the MCP and an application program.

process entry. A terminal-table entry that represents an application program. One entry must be defined for each queue to which an application program can issue a GET or READ macro instruction, and at least one entry must be defined for all PUT and WRITE macro instructions issued from the same application program.

process queue. A destination queue for an application program. See *destination queue*.

protocol. In SNA, the meanings of, and the sequencing rules for, requests and responses used for managing the network, transferring data, and synchronizing the states of network components. SDLC, BSC, and start-stop (SS) are link protocols.

public network. A network established and operated by communication common carriers or telecommunication Administrations for the specific purpose of providing circuit-switched, packet-switched, and leased-circuit services to the public. Contrast with *user application network*.

QCB. Queue control block.

queue. (1) A line or list formed by items in a system waiting for service; for example, tasks to be performed or messages to be transmitted in a message-routing system. (2) To arrange in, or form a queue. See also *queuing*.

queue control block (QCB). A control block that is used to regulate the sequential use of a programmer-defined facility among requesting tasks.

queuing. The programming technique used to handle messages that are awaiting delivery. See also *queue*.

quick closedown. A closedown in which message traffic is stopped as soon as any messages in the process of being sent or received at the time the request for closedown is received are transmitted. Contrast with *flush closedown*.

read-ahead queue. An area of main storage from which an application program obtains work units in advance of their being requested by the application program.

record. A collection of related data or words, treated as a unit; for example, in stock control, each invoice could constitute one record.

reply. (1) In TCAM, response to an inquiry. (2) In SNA, a request unit sent only in reaction to a received request unit. For example, Quiesce Complete is the reply sent after receipt of Quiesce at End of Chain.

request. In SNA, a message unit that signals initiation of a particular action or protocol. For example, Initiate Self is a request for activation of an LU-LU session.

request header (RH). In SNA, an RU header that precedes a request unit.

request/response header (RH). In SNA, control information preceding a request/response unit (RU) that specifies the type of RU (request unit or response unit) and contains control information associated with that RU. See also *request/response unit*, *connection point manager*.

request/response unit (RU). In SNA, a general term for a request unit or a response unit.

request parameter list (RPL). In VTAM, a control block that contains the parameters necessary for processing a request for data transfer, for establishing or terminating a session, or for some other operation.

request unit (RU). In SNA, a message unit that contains control information such as a request code or function management (FM) headers, end-user data, or both.

resource identifier. That portion of the TCAM network address of a resource that uniquely identifies the resource within the message control program (MCP) providing the message queuing for that resource. See also *node identifier*.

resource management block (RMB). A collection of control blocks all of which are associated with a particular external logical unit (LU). The RMB contains a line control block (LCB), a station control block (SCB), a savearea/workarea (SAU), and a request parameter list (RPL).

resource table. In TCAM extended networking, a main-storage table that associates each resource identifier with an external logical unit (LU) or application program.

response. In SNA, a message unit that acknowledges receipt of a request. A response consists of a response header, a response unit, or both.

response header (RH). A header, optionally followed by a response unit, that indicates whether the response is positive or negative and may contain a pacing response. See also *isolated pacing response*, *negative response*, *pacing response*, *positive response*.

response unit (RU). In SNA, a message unit that acknowledges a request unit; it may contain prefix information received in a request unit. If it is positive, the response unit may contain additional information (such as session parameters in response to a Bind Session request). If it is negative, the response unit may contain sense data that defines the exception condition.

RH. Request/response header.

RMB. Resource management block.

routing. Synonym for *message routing*.

routing affinity. A temporary relationship between a source and a destination.

routing by destination. Message routing based upon a destination name. Contrast with *routing by key*.

routing by key. Message routing based upon a key, which matches a definition in the key table. The key identifies the destination of a message or special processing to be done on that message. Contrast with *routing by destination*.

routing key. Synonym for *key*.

routing key table. Synonym for *key table*.

RPL. Request parameter list.

RU. Request/response unit.

RU chain. In SNA, a set of related request units (RU) that are consecutively transmitted on a particular normal or expedited data flow. The request unit (RU) chain is the unit of recovery. If one of the request units (RUs) in the chain cannot be processed, the entire chain is discarded.

save/restore message queues (SMQ). The function of a system service program that saves unsent messages on sequential storage devices and restores them to an altered message control program (MCP) following a cold restart. This program also assists in recovery when the message queue data set on nonreusable disk becomes full. The program may be used to obtain an online dump of unsent messages from one or more destination queues on disk.

scan pointer. A pointer that refers to the proper header field when the macro instruction that acts upon that field is given control. Some user-specified macro instructions use this pointer to locate the field on which they act and automatically move the pointer to the next field before passing control to the next macro instruction. The user must be aware of positioning of the scan pointer when designing the message handler.

SDLC. Synchronous data link control.

secondary end of a session. Synonym for *secondary half-session*.

secondary half-session. In SNA, the half-session that receives the session-activation request. Contrast with *primary half-session*. See also *secondary logical unit*.

secondary logical unit (SLU). In SNA, the logical unit that contains the secondary half-session for a particular LU-LU session. Contrast with *primary logical unit*.

secondary operator control station. Synonym for *basic secondary operator control station, extended secondary operator control station*.

segment. A portion of a message that can be contained in a buffer. See *BIU segment*.

selective cryptographic session. A cryptographic session in which an application program is allowed to specify the request units to be enciphered. Contrast with *mandatory cryptographic session*.

service facility. An auxiliary routine that runs under control of the message control program (MCP) and is invoked when needed by user code in the MCP. on an as-needed basis. Contrast with *system service program, utility*.

session. In SNA, a logical connection between two network addressable units that can be activated, tailored to provide various protocols, and deactivated, as requested. The session-activation request and response can determine options relating to the rate and currency of data exchange, the control of contention and error recovery, and the characteristics of the data stream. Sessions compete for network resources such as the links within the path control network. See *half-session, LU-LU session*. See also *LU-LU session type, PU-PU flow*.

session activation. In SNA, the process of exchanging a session activation request and a positive response between network addressable

units. Contrast with *session deactivation*. See also *start*.

session-activation request. In SNA, a request that activates a session between two network addressable units and specifies session parameters that control various protocols during session activity. Contrast with *session deactivation request*.

session control. (1) One of the components of transmission control. Session control is used to purge data flowing in a session after an unrecoverable error occurs, to resynchronize the data flow after such an error, and to perform cryptographic verification. (2) A request/response unit (RU) category used for requests and responses exchanged between the session control components of a session and for session activation or deactivation requests or responses.

session count. (1) The number of currently active LU-LU sessions for a particular logical unit. (2) The number of currently active sessions for a particular virtual route.

session deactivation. The process of exchanging a session-deactivation request between two network addressable units. Contrast with *session activation*. See also *stop*.

session deactivation request. A request that deactivates a session between two network addressable units. Contrast with *session activation request*.

session end. Synonym for *half-session*.

session information block (SIB). A control block that contains information about a particular SNA session.

session initiation. Synonym for *LU-LU session initiation*. See also *LU-LU session termination*.

session-initiation request. An initiate or logon request from a logical unit (LU) to a systems services control point (SSCP) so that an LU-LU session can be activated.

session parameters. In SNA, the parameters that specify or constrain the protocols (such as bracket protocol) for a session between two network addressable units. See also *logon mode*.

session presentation services. A component of the function management data (FMD) services layer that provides, within LU-LU sessions, services for the application programmer or terminal operator such as formatting data to be displayed or printed.

session sequence number. In SNA, a sequentially incremented identifier that is assigned by data flow control to each request unit on a particular normal flow of a session, typically an LU-LU session, and is checked by transmission control. The identifier is carried in the transmission header of the path information unit and is returned in the transmission header of any associated response.

session termination. Synonym for *LU-LU session termination*.

SIB. Session information block.

single-domain network. A network with one system services control point (SSCP). Contrast with *multiple-domain network*.

single entry. A terminal-table entry associated with a single external logical unit (LU) or application program. Contrast with *distribution entry*.

SLU. Secondary logical unit.

SMQ. Save/restore message queues.

SNA. Systems Network Architecture.

SNA network. The part of a user-application network that conforms to the formats and protocols of Systems Network Architecture. It makes possible reliable transfer of data among end users and provides protocols for controlling the resources of various network configurations. An SNA network consists of network addressable units, boundary function components, and the path control network.

SNA node. A node that uses SNA protocols.

SNA session. A logical connection, established between two network addressable units (NAUs), to allow them to communicate. The session is uniquely identified by a pair of network addresses identifying the origin and destination NAUs of any transmissions exchanged during the session. See *LU-LU session*, *pseudo LU-LU session*.

SNA terminal. A terminal that supports SNA protocols. Contrast with *non-SNA terminal*.

SSCP. System services control point.

SSP. (1) In TCAM, a system service program. (2) Advanced Communications Function for the Systems Support Programs. An IBM product program made up of a collection of utilities and small programs. SSP is required for operation of the NCP.

start. For external logical units (LUs) in TCAM, the state in which an LU is able to enter an LU-LU session.

start-stop (SS) transmission. Asynchronous transmission in which a group of bits is preceded by a start bit that prepares the receiving mechanism for the reception and registration of a character and is followed by at least one stop bit that enables the receiving mechanism to come to an idle condition pending the reception of the next character. Contrast with *binary synchronous transmission*, *synchronous data link control*.

startup/restart message generation facility. A TCAM service facility that generates and sends tailored messages to external logical units (LUs) when the message control program (MCP) is started or restarted.

station. One or more terminals or devices at a particular location; for example, an external logical unit (LU).

station lock. A facility that maintains a connection between a station and an application program to ensure that the next message received by the station, after it enters an inquiry message, is a reply to that inquiry. See also *extended lock mode*, *lock mode*, *message lock mode*.

station transmission priority. The relative order of the host sending and receiving messages. Host sending has priority over host receiving. See *message priority*.

stop. In TCAM, the state in which a logical unit (LU) is not able to enter an LU-LU session. This state also terminates any existing LU-LU sessions involving that LU.

symbol. In assembler language, a character or character string that represents addresses or arbitrary values. A symbol must meet the following requirements: (a) A symbol may consist of no more than eight characters, the first character being a letter (A through Z, \$, #, or @) and the other characters being either letters or digits. (b) No blanks or special characters are allowed in a symbol.

synchronous data link control (SDLC). A discipline conforming to subsets of the Advanced Data Communication Control Procedure (ADDCP) of the American National Standards Institute and High-Level Data Link Control (HDLC) of the International Standards Organization, for managing synchronous, code-transparent, serial-by-bit information transfer over a link connection.

Transmission exchanges may be duplex or half-duplex over switched or nonswitched links. The configuration of the link connection may be point-to-point, multipoint, or loop. Contrast with *binary synchronous transmission, start-stop transmission*.

system service program (SSP). An IBM-supplied or user-supplied program that performs system-oriented auxiliary functions in support of the MCP. System service programs run under the control of the initiator as attached subtasks. Contrast with *service facility, utility*. See also *basic operator control, extended operator control, online retrieval, save/restore message queues, internodal awareness, internodal sequence number synchronization*.

Note: The abbreviation SSP has two references. See also SSP.

system services control point (SSCP). In SNA, a focal point within an SNA network for managing the configuration, coordinating network operator and problem determination requests, and providing directory support and other session services for end users of the network. Multiple SSCPs, cooperating as peers, can divide the network into domains of control, with each SSCP having a hierarchical control relationship to the physical units and logical units within its domain.

Systems Network Architecture (SNA). The description of the logical structure, formats, protocols, and operational sequences for transmitting information units through and controlling the configuration and operation of networks.

TCAM. Advanced Communications Function for TCAM. An IBM program product that provides queued message handling. TCAM, Versions 1 and 2, are telecommunications access methods, but TCAM, Version 3, is a message handling subsystem.

TCAM application program. A program that is user written and interfaces with the message control program (MCP) using READ, WRITE, CHECK, GET, or PUT macro instructions.

TCAM destination address field (TDAF). A field in the fixed header prefix of a message that contains the TCAM network address of the destination of the message. Contrast with *TCAM origin address field*.

TCAM host logical unit (LU). A TCAM-generated logical unit (LU) that is the access method control block (ACB) interface to VTAM, for example, PROGID. External LUs must establish a

session with a TCAM host LU in order to use TCAM services. See *host logical unit (LU)*.

TCAM network address. A unique identifier for an application program or an external logical unit (LU) in an extended networking environment. A TCAM network address consists of a node identifier and a resource identifier. See also *node identifier, resource identifier*.

TCAM node. A message control program (MCP) to which there has been assigned a node identifier. See also *node identifier*.

TCAM origin address field (TOAF). A field in the fixed header prefix of a message that contains the TCAM network address of the originator of the message. Contrast with *TCAM destination address field*.

TCAM subtask table (TST). A table containing entries for programs eligible to run as initiator subtasks.

TCAM system. A subsystem controlled by a single message control program (MCP) that communicates with a collection of external logical units (LUs) and application programs.

TDAF. TCAM destination address field.

terminal table. In TCAM, an ordered collection of information about each origin or destination of messages in the network. See also *terminal-table entry*.

terminal-table entry (TTE). The information in the terminal table that identifies each origin or destination of messages in the network. See *cascade entry, logtype entry, process entry, single entry*.

termination. Synonym for *LU-LU session termination*.

text. That part of the message that is not the header or control information.

text buffer. A buffer containing any segment of a message other than the first segment, which is contained in a header buffer. Contrast with *header buffer*.

TOAF. TCAM origin address field.

transaction-based routing. Message routing in which messages are routed to their destinations individually, according to one or more destination names or routing keys entered in the message header by the originator. See *affinity-based routing*,

invariant routing. See also *routing by destination*, *routing by key*.

transmission category. In TCAM extended networking, utility sessions. All messages in the same transmission category have similar characteristics and should be handled similarly. For example, messages flowing in an inquiry/reply application and messages flowing in a high-volume, low-priority data collection application are placed in different transmission categories. Different versions of the following TCAM techniques and capabilities may be applied to messages in different transmission categories: queuing medium, message priority, sequence checking, error handling, load balancing, and data staging.

transmission services profile. In SNA, a specification in a session-activation request of transmission control protocols (such as session-level pacing and the usage of session-control requests) to be supported by a particular session. Each defined transmission services profile is identified by a number.

TST. TCAM subtask table.

TTE. Terminal-table entry.

unit. Synonym for *buffer unit*, *work unit*.

user application network. A configuration of data processing products, such as processors, controllers, and stations, established and operated by users for the purpose of data processing or information exchange, which may use services offered by common carriers or telecommunications Administrations. Contrast with *public network*.

utility. In TCAM, an auxiliary routine designed to support the message control program (MCP), which runs under the control of the operating system. Contrast with *system service program*, *service facility*.

utility session. In TCAM extended networking, a pair of LU-LU sessions between TCAM nodes. One utility session is established between each pair of TCAM nodes for each transmission category defined

for the pair. Data messages being routed from TCAM node to TCAM node flow on the utility session corresponding to their transmission category.

VTAM. (1) Advanced Communications Function for VTAM, an IBM program product. (2) Virtual Telecommunication Access Method.

VTAM application program. A program that has opened an access method control block (ACB) to identify itself to VTAM and can now issue VTAM macro instructions. See *TCAM application program*.

warm restart. Restart of TCAM following either a quick or a flush closedown. The TCAM checkpoint/restart service facility restores the TCAM environment as nearly as possible to its condition before closedown or failure. Contrast with *cold restart*. See *point-of-failure restart*, *point-of-last-environment restart*.

WATS. Wide Area Telephone Service, which provides a special line on which the subscriber may make unlimited calls to certain zones on a direct-distance-dialing basis for a flat monthly charge.

work area. An area of storage related to an application program that receives messages or records transferred to the application program from TCAM by GET or READ macro instructions, and from which messages or records are transferred to TCAM by PUT or WRITE macro instructions.

work unit. The amount of data transferred from TCAM to an application program by a single GET or READ macro instruction or transferred from an application program to TCAM by a single PUT or WRITE macro instruction. A work unit may be a message or a record.

zero-length buffer. A buffer that is sent to the message handler to indicate that there is an error on the link. If user code does not execute correctly for a zero-length buffer, the programmer must check for zero length and branch around the code that does not execute correctly.

Index

A

A TP (release intercepted LU) 3-10
abnormally terminated subtasks
 how to restart 2-13
abstract (first part of message) 4-15
activate/deactivate automatic rerouting of messages (AUTO)
 explanation of 4-10
activating and deactivating other programming functions 3-13
active ascb-based TCAM
 entering commands when active 1-7
 use of qualifiers 1-10
activities of the operator 1-3
address space
 how to keep it 2-14
address vector table (AVT) 2-8
ALTER (alter a key table entry) 4-12
alter a key-table entry B-1
alter a key-table entry (ALTER)
 explanation of 4-12
alter TCAM system address 4-12
AMI trace
 function of 3-13
APF (authorized program facility) 2-1
APWAS default 4-30
APWAS maximum value 4-30
APWAS minimum value 4-30
ARPL (receive any RPL) 3-4
ATTACH (attach a program) 2-9
attach a program A-6
attach a program (ATTACH) 2-9
authorized program facility (APF) 2-1
AUTO (activate/deactivate automatic rerouting of messages) 4-10
AUTO name,COPY (copy messages) 4-11
AUTO name,ERR (redirect messages on error conditions) 4-12
AUTO name,PURGE (purge a queue) 4-11
AUTO name,TRAN (transfer all messages) 4-12
automatic syscon revert 3-8
AVT (address vector table) 2-8
awareness message
 operator 1-1

B

basic operator command format 1-4
basic operator command syntax 1-4
basic operator commands A-1
 entering 1-1
 fields 1-1
 how to enter 1-4
 incorrectly formatted 1-11
 input source 1-4
 input source considerations 1-8
 session considerations 1-11
 variations to 1-4
basic operator commands formatting 1-4
basic operator control station
 change from secondary to primary 1-9
basic primary operator control station 1-2
basic secondary operator control station 1-2
braces 1-5
brackets 1-5
buffer units
 borrowing 3-5
BUFFTR parameter, and changing buffer trace parameters 3-13

C

CANCEL key (console) 1-11
change basic primary operator control station A-5
change basic primary operator control station (F OPERATOR) 3-8
change buffer trace parameters 3-13, A-4
Change Buffer Trace Parameters (F BUFFTR) 3-13
change name of LU 3-10
change system console identifier A-6
channel program blocks (CPB) 3-4
character string 1-5
 how to specify 1-6
character string function 1-5
checkpoint/restart facility 2-4
CLOSE (deactivate application programs) 4-14
closedown
 modes 2-19
 flush 2-19
 quick 2-19
closedown of MCP A-3
closedown of MCP (HALT) 2-19
closing down TCAM 2-14
CODE macro 1-11
cold restart(new day) 2-4
cold, warm (restart) 2-4

COM display basic and/or extended operator
 commands 4-5
 command variable operands (common) 1-7
 commands for basic activity 1-3
 common command variable operands 1-7
 COMWRITE
 description of 3-14
 console CANCEL key 1-11
 CONTACT (contact host node in another TCAM
 system) 4-13
 contact a host node in another TCAM system B-3
 contact host node in another TCAM system
 (CONTACT)
 explanation of 4-13
 when to use this command 4-13
 control functions and commands 3-7
 CONTROL operand
 how to override 1-6
 controlchars 1-5
 controlling multiple TCAMs 2-5
 controlling TCAM resources 4-10
 conventions used in this publication iv
 copy messages B-1
 copy messages (AUTO name,COPY)
 explanation of 4-11
 correlation ID 1-5
 how to use 1-5
 CPB (channel program blocks) 3-4

D

D INTER display intercepted lus 3-2
 D OPTION (display option field)
 explanation of 3-3
 D PEND display names of pending LUs 3-3
 D POOL (display pool statistics)
 explanation of 3-4
 D PRITERM (display basic primary operator control
 station name)
 explanation of 3-2
 D QUEUE (display queue control block) 3-5
 D SECTERM (display basic secondary operator
 control station names)
 explanation of 3-2
 D SESSION (display session partners) 3-5
 D STATUS (display status of LUs) 3-6
 D TERM (display status and message sequence
 numbers of a resource) 3-6
 D TP INTER (display intercepted lus) A-1
 D TP,OPTION (display option field) A-1
 D TP,PEND (display names of pending lus) A-2
 D TP,POOL (display pool statistics) A-2
 D TP,QUEUE (display queue control block) A-2
 D TP,SECTERM (display basic secondary operator
 control station names) A-2
 D TP,SESSION (display session partners) A-3
 D TP,STATUS (display status of LUs) A-3
 D TP,TERM (display status and message sequence
 numbers of a resource) A-3
 DATA (display resource status) 4-7
 DATA ALL (display statistics for resources) 4-8
 DATA ALL,destname 4-8
 DATA ALL,TOTALS (display statistical totals for
 resources) 4-7
 DATA name (display statistics for a resource) 4-7
 dd statements for system service programs and
 COMWRITE 2-3
 deactivate application programs B-2
 deactivate application programs (CLOSE)
 explanation of 4-14
 DEBUG 3-14
 default if MCP is not specified 2-2
 defining the operator's activities 1-3
 definition iii
 definition of intercepted lu 3-2
 definiton of procname 1-7
 description of format for the four command
 fields 1-5
 DETACH (detach a subtask) 2-10
 detach a subtask A-6
 detach a subtask (DETACH) 2-10
 DETACH command
 emergency use 2-10
 differentiating issuers of identical TCAM
 messages 2-7
 display statistics for a resource (DATA name)
 explanation of 4-7
 dispatcher post trace 3-17
 display basic and/or extended operator
 commands B-3
 display basic and/or extended operator commands
 (COM) 4-5
 display basic primary operator control station name
 (D PRITERM) 3-2
 explanation of 3-2
 display basic secondary operator control
 station 3-2
 Display Basic Secondary Operator Control Station
 Names (D SECTERM)
 explanation of 3-2
 display basic secondary operator control station
 names (D TP,SECTERM) A-2
 display buffer unit status (UNITS)
 explanation of 4-9
 display console identification A-7
 display intercepted lus (D INTER) 3-2
 display intercepted lus (D TP INTER) A-1
 display length of all queues above a specific length
 (QUEUE ALL) 4-6
 display length of one queue B-7
 display length of one queue (QUEUE name) 4-6
 display names of pending LUs (D PEND) 3-3
 display names of pending lus (D TP,PEND) A-2
 display number of messages queued 3-5
 display option field (D OPTION)
 explanation of 3-3
 display option field (D TP,OPTION) A-1

display pool statistics (D POOL)
 explanation of 3-4
 display pool statistics (D TP,POOL) A-2
 display queue control block (D TP,QUEUE) A-2
 display queue control block (D QUEUE) 3-5
 display queue status 3-5
 display queue status at specified location B-7
 display queue status at specified location (QUEUE
 AUTO) 4-6
 display resource status B-4
 display resource status (DATA) 4-7
 display session partners (D SESSION) 3-5
 display session partners (D TP,SESSION) A-3
 display statistical totals for resources B-5
 display statistical totals for resources (DATA
 ALL,TOTALS) 4-7
 explanation of 4-7
 display statistics for a resource B-5
 display statistics for a resource (DATA name) 4-7
 display statistics for resources B-4
 display statistics for resources (DATA ALL)
 explanation of 4-8
 display statistics for resources at specified
 location B-4
 explanation of 4-8
 display status and message sequence numbers of a
 resource (D TERM) 3-6
 display status and message sequence numbers of a
 resource (D TP,TERM) A-3
 display status of LUs (D STATUS) 3-6
 display status of LUs (D TP,STATUS) A-3
 display status of TCAM resources B-6
 display status of TCAM resources (NET)
 explanation of 4-8
 display system buffer unit status B-9
 display TCAM initiator subtask execution
 status A-7
 displaying components of the TCAM system 4-4
 displaying TCAM status 3-1
 DTRACE operand and IEDQFE10 routine 3-15
 DUMP operand 2-10

E

end-of-data (EODAD) 2-15
 end-to-end session requirements 4-2
 ending
 use of 1-7
 ENTER key
 entered from external IU 1-8
 entering basic operator commands
 considerations when entering 1-8
 entering commands when an ASCB-Based TCAM is
 active 1-10
 EODAD

exit of 2-15
 EODAD (end-of-data) 2-15
 evaluating your need for special retrieval-request
 options 4-23
 eventual action (E) 1-13
 I 1-13
 example of TCAM closedown procedure 2-15
 example of TCAM startup procedure 2-6
 examples of using special retrieval-request
 options 4-24
 EXEC statement
 PARM operand 2-2
 executing IEDQTCAM (initiator) 2-1
 executing the initiator (IEDQTCAM) 2-1
 explanation of F SEND command 3-10
 explanation of TCAM closedown procedure 2-15
 explanation of TCAM startup procedure 2-5
 extended operator commands B-1
 two fields
 operandspecifiers 4-3
 operation 4-3
 extended operator commands format 4-3
 extended operator commands operation types 4-3
 extended primary operator control station 1-2
 what it receives 1-2
 extended secondary operator control station 1-2
 external lu with exception status 4-8

F

F AMITRACE (start/stop access method
 interface) 3-13
 F BUFFTR change buffer trace parameters 3-13
 F DEBUG start/stop TCAM service aid
 routine 3-14
 F DTRACE dispatcher subtask trace/post trace
 start/stop 3-17
 F OPERATOR (change basic primary operator
 control station) 3-8
 F OPT (insert option field data) 3-8
 F RENAME (rename an LU) 3-10
 F SEND (send message to destination lu) 3-10
 F SEND command explanation 3-10
 F START (start session or access method
 interface) 3-12
 F STOP (stop session or access interface) 3-12
 figure 1-1 1-10
 figure 2-1 2-1
 figure 2-2 2-6
 figure 2-3 2-16
 first part of message (abstract) 4-15
 format of extended operator commands 4-3
 formatting basic operator commands 1-4
 four types of operator control stations 1-2
 function of character string 1-5

G

generalized trace facility (GTF) 3-13
GROUP macro 1-7
grpname
 definition of 1-7
GTF (generalized trace facility) 3-13

H

H TP (intercept an LU) 3-2, 3-9
HOLD macro 3-9
HOLD macro and intercepting LUs 3-2
how message text is processed 3-11
how the operator interacts with TCAM 1-1
how to bring up system service programs 2-3
how to close down TCAM 2-14
how to enter basic operator commands through
 various input media
 two examples 1-9
how to format and enter basic operator
 commands 1-1
how to intercept an lu 3-7
how to send message with quotes 3-11
how to start TCAM initiator
 two ways 2-1
how to tailor commands 1-5
how to transmission to a destination 3-7
how to use special retrieval-request options 4-20
hung (pending) LUs
 description of 3-3
 display name 3-3

I

ID
 what ID stands for 1-7
IEDOPCTL macro 1-11
IEDQFE10 routine
IEDQFE30 routine
 what it does 3-16
IEDQFE50 routine
 what it does 3-16
IEDQTCAM (initiator)
 how it is executed 2-1
IEDRELS macro 3-9
immediate action (A) 1-13
 D 1-13
immediate decision (D) 1-13
 E 1-13
information (I) 1-13
information supplied by display for a specified
 resource 4-7

initialization error
 conditions that cause 2-3
initiator (IEDQTCAM) 2-1
initiator commands A-6
 ATTACH (attach a program) 2-9
 CONSOLE (change system console
 identifier) 2-10
 DETACH (detach a subtask) 2-10
 DISPLAY CONSOLE (display console
 identification) 2-12
 DISPLAY TASKS (display TCAM initiator
 subtask execution status 2-11
 HALT (closedown of mcp) 2-19
 SWAPTST (replace an entry in the TST) 2-13
initiator functions 2-1
initiator-ready message 2-5
insert option field data A-5
Insert Option Field Data (F OPT) 3-8
intercept 3-2
Intercept an LU 3-2, A-3
Intercept an LU (H TP) 3-9
intercepted lu
 definition of 3-2
INTRO macro
 and changing buffer trace parameters 3-14
 and IEDQFE10 routine 3-14

J

JCL job statement 1-7
jobname
 definition of 1-7
 use of 1-7

K

keyword characters 1-8
keywords
 uppercase or lowercase 1-8
 when to use 1-8

L

largest numeric value that can be displayed in
 decimal format 3-4
line buffer units (LNU) 3-4
line-by-line explanation of closedown
 procedure 2-18
list of special retrieval-request options 4-19
list of subtask entries in a valid TCAM subtask
 table 2-11
LNU (line buffer units) 3-4

lowseq and highseq operands 4-15
luname
 definition of 1-7
luname (definition of) 3-8

M

main-storage buffer units (MSU) 3-4
MANUAL (start/stop automatic extended network control) 4-27
message code types
 A 1-13
message text processing 3-11
MSU (main-storage buffer units) 3-4

N

nested F SEND command 3-11
NET (display status of TCAM resources) 4-8
network
 two meanings iii
nextline
 use of 1-7
nextline ending 1-7
nextline subfield
 appropriate device control characters
 value for 1-7
nn notation
 how it is used 2-4
node identifiers reserved for TCAM system
 use 4-14

O

OFFLN (stop traffic from specified groups) 4-29
ONLN (start traffic to specified groups) 4-28
operation 1-6
operation types of extended operator commands 4-3
operator
 activities defined 1-3
 job responsibility 1-1
operator activities 1-3
operator awareness messages
operator control commands
 functions 1-3
operator control stations 1-2
 four types 1-2
 how to designate a station 1-2
operator responsibilities 1-3
operator's position in the TCAM system 1-3
opfldname
 definition of 1-7

option field
 display 3-8
 insert new data 3-8
OPTION macro
 inserting new data in option field 3-8

P

partners, session, display 3-5
post trace
 dispatcher 3-17
 explanation 3-17
PRINT (print in EBCDIC unsent traffic) 4-32
print in EBCDIC unsent traffic B-10
print in EBCDIC unsent traffic (PRINT)
 explanation of 4-32
print in hexadecimal unsent traffic B-10
print in hexadecimal unsent traffic (SNAP)
 explanation of 4-32
processing a message 3-11
procname
 definition of 1-7
programming functions
 TCAM service aid routines 3-13
 TCAM traces 3-13
purge a queue B-2
purge a queue (AUTO name,PURGE)
 explanation of 4-11
purge function 4-11

Q

QUEUE ALL display length of all queues above a specific length 4-6
QUEUE AUTO display queue status at specified location 4-6
QUEUE name (display length of one queue 4-6

R

receive any RPL (ARPL) 3-4
receiving TCAM messages 1-12
redirect messages on error conditions B-2
redirect messages on error conditions (AUTO name,ERR)
 explanation of 4-12
related publications v
release intercepted lu A-6
release intercepted LU (A TP)
 description of 3-10
rename an LU A-5
rename an LU (F RENAME) 3-10

- explanation of 3-10
- replace an entry in the TST A-7
- replace an entry in the TST (SWAPTST) 2-13
- request retransmission of messages B-7
- request retransmission of messages (RESEND)
 - explanation of 4-14
- request retrieval of messages B-8
- request retrieval of messages (SEND)
 - explanation of 4-15
- RESEND (request retransmission of messages) 4-14
- resource management block (RMB) 3-4
- resourcename
 - definition 1-11
- responding to TCAM error messages 1-14
- restart
 - how it occurs 2-4
 - types (cold, warm) 2-4
- restarting abnormally terminated subtasks 2-13
- restarting TCAM 2-1
- RESTORE (restore unsent message queues) 4-32
- restore unsent message queues B-10
- restore unsent message queues (RESTORE)
 - explanation of 4-32
- RMB (resource management block) 3-4

S

- SAVE (save unsent traffic) 4-32
- save unsent traffic B-10
- save unsent traffic (SAVE)
 - explanation of 4-32
- save/restore message queues system service program 4-29
- SEND (request retrieval of messages) 4-15
- send message to destination lu A-5
- send message to destination lu (F SEND) 3-10
- serial number range 1-13
- session information blocks (SIB) 3-4
- set sequence number B-8
- set sequence number (SETSEQ)
 - explanation of 4-26
- SETSEQ (set sequence number) 4-26
- SIB session information blocks 3-4
- SMQ commands B-10
 - operands and meanings B-10
- SNA (Systems Network Architecture) iii
- SNAP (print in hexadecimal unsent traffic) 4-32
- special retrieval-request options 4-19
- START (start message transmission for a resource) 4-27
- start message transmission for a resource B-8
- start message transmission for a resource (START)
 - explanation of 4-27
- start session or access method interface A-5
- Start Session or Access Method Interface (F START) 3-12
- start traffic to specified groups B-7

- start traffic to specified groups (ONLN)
 - explanation of 4-28
- start/stop access method interface (AMI) trace A-4
- start/stop access method interface (F AMITRACE) 3-13
- start/stop automatic extended network control (MANUAL)
 - explanation of 4-27
- start/stop automatic network control B-6
- start/stop status of LU 3-6
- start/stop subtask and dispatcher post trace A-5
- start/stop subtask and dispatcher post trace (F DTRACE) 3-17
- start/stop TCAM service aid routine (F DEBUG) 3-14
- starting TCAM 2-1, 2-2
- starting, restarting and, stopping TCAM 2-1
- STARTMH macro and changing buffer trace parameters 3-14
- statistics
 - display 3-4
- status of an LU
 - intercepted 3-1
 - started 3-1
 - stopped 3-1
- status of TCAM resources 3-7
- STOP (stop message transmission for a resource) 4-28
- stop message transmission for a resource B-9
- stop message transmission for a resource (STOP)
 - explanation of 4-28
- Stop Session or Access Method Interface 3-12, A-6
- stop traffic from specified groups B-6
- stop traffic from specified groups (OFFLN)
 - explanation of 4-29
- stopping TCAM 2-1
- subtasks trace
 - explanation of 3-17
- swapping function 3-10
- swapping terminal-name-table entries 3-10
- SWAPTST (replace an entry in the TST) 2-13
- SYSCON (system console) 1-2
- system console
- system console (SYSCON) 1-2
- system service programs
 - order brought up 2-3
- Systems Network Architecture (SNA) iii
- SYS1.PROCLIB 1-7

T

- TABLE operand 2-2
- tailoring commands 1-5
- TASKDEF macro 2-10
- TASKDEF macros 2-1
- TCAM
 - definition of iii

- how to restart 2-1
- how to start, 2-1
- how to stop 2-1
- TCAM closedown 2-14
- TCAM closedown procedure (example) 2-15
- TCAM closedown procedure explanation 2-15
- TCAM control commands 3-8
- TCAM control functions and commands 3-7
- TCAM error message response
- TCAM extended operator control system service program 4-1
- TCAM initiator commands
 - ATTACH (attach a program) 2-9
 - CONSOLE (change system console identifier) 2-10
 - DETACH (detach a subtask) 2-10
 - DISPLAY CONSOLE (display console identification) 2-12
 - DISPLAY TASKS (display TCAM initiator subtask execution status) 2-11
 - functions of 2-9
 - HALT (closedown of mcp) 2-19
 - SWAPTST (replace an entry in the TST) 2-13
- TCAM message format
 - message ID
 - components 1-12
- TCAM message identification
 - DKJ 1-12
 - IED 1-12
- TCAM operator activities 1-3
- TCAM operator responsibilities 1-3
- TCAM resources
 - status of 3-7
- TCAM save/restore message queues
 - commands 4-31
- TCAM service aid routines 3-13
- TCAM startup procedure
 - explanation of 2-5
- TCAM startup procedure (example) 2-6
- TCAM status display 3-1
- TCAM subtask table (TST) 2-1
- TCAM system
 - components of 4-4
- TCAM traces 3-13
- terminal-name-table (TNT) 3-10

- terminate all LU-LU session 3-12
- time operand explanation 4-17
- TNT (terminal-name-table) 3-10
- TP operand 1-10
- trace tables
 - contents of 3-14
- transfer all messages B-2
- transfer all messages (AUTO name,TRAN)
 - explanation of 4-12
- translation table
 - use of 1-8
- TST (initiator subtask table) 2-1
- two topics 3-1
- type code
 - what it indicates 1-13

U

- UNITS (display buffer unit status) 4-9
- unprintable character 3-4
- using the save/restore message queues (SMQ)
 - system service program 4-30

V

- variable operand 3-8

W

- wait time variation 4-10
- warm restart (same day) 2-4
- ways to start TCAM initiator (two ways) 2-1
- what ending subfield signifies 1-8
- what it does 3-16
- what the operator does 1-1
- when to enter procname.id variable 1-7
- where TCAM resides iii
- where to enter 2-9



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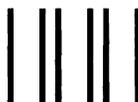
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