SOFTEK™
Simplifying Storage Management

Softek™ TDMF

Installation and Reference Guide for z/OS

Version 3.6.0

ML–145133–001

www.softek.com

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Version 3 Release 6.0

ML–145133–001 10/2004

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REVISION NOTICE
This is the first release of this manual. A complete revision history is provided at the end of this manual.

ABSTRACT
Softek TDMF Version 3 Release 6.0 (ML-145133) software is a vendor independent, non-disruptive software solution that can help perform critical tasks needed in today's IT centers.

FOR FURTHER INFORMATION
If you wish to obtain further information about the Softek product discussed in this publication, contact your Softek marketing representative, or write to Softek, Marketing Communications, Mail Stop 215, P.O. Box 3470, Sunnyvale, CA 94088-3470.

TECHNICAL SUPPORT
To obtain technical support on the Softek Storage Solutions Corporation product discussed in this publication, please call 1-800-66SOFTEK.

RESTRICTIONS ON USE
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Summary of Changes

This edition contains information from previous releases of this manual and has additions to this book for Version 3 Release 6 of the Softek TDMF base product.

Softek TDMF 3.6

Increase in the Number Of Volumes Supported In a TDMF Session

With this release, Softek TDMF now supports up to 512 volumes in a session. For information regarding this capability, refer to *Number of Volumes per Session* on page *86*.

Support for the z/OS 1.6 Operating Environment

This release officially supports the IBM z/OS 1.6 operating system.

Support for Expected Higher Capacity Storage Devices

This release provides support for storage devices that may exceed the current twenty-seven (27) gigabyte level of high capacity 3390s. As storage vendors strive to provide higher capacity devices, Softek TDMF is positioned to fully support these environments.

Support for IBM's Dataset Flashcopy II

Softek TDMF provides tolerance for IBM's Dataset Flashcopy II, ensuring data integrity during swap sessions.

Communications Dataset Performance Improvements

Softek TDMF now detects and can exploit Parallel Access Volumes (PAV) and Cache Fast Write (CFW) capabilities for the Softek TDMF Communications Dataset.

About This Guide

This manual is an introduction to Softek TDMF. It describes the features and functions of Softek TDMF.

Contents of this Manual

Chapter/Appendix	Description
Chapter 1: Softek TDMF Overview	This chapter introduces Softek TDMF.
Chapter 2: Softek TDMF Installation	This chapter describes how to install Softek TDMF.
Chapter 3: Performance Considerations	This chapter discusses the various options within Softek TDMF and how they may affect the customer's environment.
Chapter 4: Planning Considerations	This chapter presents information related to specific program products or functions that need to be taken into consideration when planning or executing a Softek TDMF session.
Chapter 6: Batch Utilities	This chapter describes the Softek TDMF batch utilities included with the base product.
Chapter 7: Softek TDMF TSO Monitor Feature	This chapter describes the Softek TDMF TSO Monitor which is used to manage active or previous sessions.
Appendix A: DASD Space Requirements	This appendix gives all space requirements for the Softek TDMF files.
Appendix B: Determining CPU Serial Number	This appendix provides detail on how to determine the serial number of a specific mainframe server.
Appendix C: Authorization Return Codes	This appendix provides all possible return codes and their meaning from authority checking.
Appendix D: Messages for Automated Operations	This appendix gives a table of messages that are intended for use with automated operations packages.
Appendix E: Determining DASD Subsystem Serial Number	This appendix provides detail on how to determine the serial number of a specific DASD subsystem.
Appendix F: REXX Execs:	This appendix gives an example of the REXX Exec.
Appendix G: Session Examples:	This appendix provides examples on how to code for various types of sessions.
Appendix H: How to Read Syntax Diagrams	This appendix describes the format of Softek TDMF syntax.

The following table describes the different offerings of Softek TDMF, including the corresponding StorageTek product names.

Softek	StorageTek	Product Description
Softek TDMF	TDMF/Full	Full function Softek TDMF.
Softek TDMF – Express Offering	TDMF/ Volume Optimizer	This product provides the ability to migrate a specified number of volumes or terabytes of storage within a specified period of time. Only one CPU requires a key, as all Master systems must run on the same CPU. This product is also available as a 16-volume trial (see Softek TDMF - Trial Express Offering).
Softek TDMF – Vendor Offering	TDMF/ Virtual	This product provides the ability to migrate volumes to a specific DASD subsystem such as Amdahl's Platinum or other specified vendor DASD subsystems.
Softek TDMF - Trial Express Offering	TDMF Trial Express	This product provides the ability to migrate a specified number of volumes within a specified period of time. Only one CPU requires a key, as all Master systems must run on the same CPU. This offering has the same functionality as Softek TDMF –Express Offering.

Contacting Softek Technical Support

At Softek, we work hard to provide products and service that anticipate and solve our customers' increasingly complicated application management challenges. In addition, we try to provide clear and easy-to-use online and printed documentation to enable you to work independently in managing application recovery issues.

If you have a technical issue that you can't answer with the provided resources, please contact Softek Global Support Center by telephone or the web.

On the Web:

1. Visit www.softek.com/en/support/tdmf/zos/ for:
   - Severity 2, 3, or 4 problems and tracking status of calls
   - Problem ownership and management throughout resolution
   - Asking questions
   - Seeking product-specific information via FAQs, user libraries, patches, discussion forums, and to download documentation. License requests should come via your Account Executive.
   - Submit enhancements requests
   - Reviewing and updating your user contact and site location information.

2. Click the **Call Tracking Center** link.

NOTE

You must have a User ID and Password to access the Softek Call Tracking and Problems Reporting database pages. To request access, go to the Call Tracking web page: www.softek.com/en/support/tracking/newaccount.html

For severity 1 problems and around-the-clock mission-critical support:

Contact Softek Storage Solutions Corporation using the following phone number:

- Contact Softek Global Support Center using the following toll free phone number:
  - **North America:** 1-800-66SOFTEK (1-800-667-6383)
  - **Europe:** 00-800-66SOFTEK (00800-667-63835)
    - Country code is not required.
    - From **Austria**, dial 0800 200 236, then enter 05, and then 8006676383.
  - **Australia:** 0011-800-6676-3835
  - **Hong Kong:** 001-800-6676-3835
  - **Japan:** 001-800-667-63835
  - **Korea:** 002-800-6676-3835
  - **Phillipines:** 00-800-6676-3835
  - **All Other Countries:** +800-66SOFTEK (+800-667-6383)
  - During weekends and holidays, you will be asked if you require assistance before the next business day. If so, Softek Storage Solutions Corporation will respond within stated response time commitments.

NOTE

Other phone numbers may be used within European countries where local language capability exists. Contact your local Softek Storage Solutions Corporation Sales Representative. Major issues can be addressed to Softek Storage Solutions Corporation management by a request through the Alert Centers.

Registering for Email Notifications

You can register to receive an email notification when new support information is available for Softek TDMF, including new hotfixes/patches, documentation updates, and other support related updates.

▶ To register for email notifications:

1. Visit http://www.softek.com/en/support/
2. Select Softek TDMF from the drop-down list box to open its support homepage.
3. Click the link under **Notification Registry**.

NOTE

You must have a User ID and Password to access the Notification Registry page. To request access, go to the Call Tracking web page: http://www.softek.com/en/support/tracking/newaccount.html

4. Follow the on-screen instructions to complete registration.

Related Publications

The following publications contain related information.

- Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)
- Softek TDMF 1.2 Session Assistant for z/OS (ML-144996)
- Softek TDMF, Mainframe Edition, Version 3.6.0, Software Installation and Release Notes (ML-145135)

Ordering Hardcopy Documentation

To order hardcopy documentation, visit our online order form at:
http://www.softek.com/en/support/docorder/

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Chapter 1

Softek TDMF Overview

The Need for Non-disruptive Data Migration

As data storage capacity requirements grow rapidly, data availability demands increase. At the same time, there is a strong need to control costs. Data center management faces a dilemma; the introduction of new storage technology is traditionally disruptive. This conflicts with the need to ensure maximum availability of the data.

What is needed is a tool that allows the customer to non-disruptively relocate or migrate data within the data center, in periods of full production and demand.

The purpose of this section is to discuss the issues of data movement or migration. More than a decade has passed since IBM Corporation's technical advisory group (GUIDE) issued a document that describes the requirements and capabilities of efficiently managing and maintaining storage in a modern large data center. In the interim, IBM and third party vendors created a standard set of tools to allow data automatically to be copied, archived, and restored. The passage of time has seen evolutionary improvements in the areas of performance and usability, as well as data availability.

The problem remains that the abilities of existing data migration tools have not kept pace with the requirements of today's data centers. A site's storage administrator must be able to support continuous 24 X 7 data availability. Although other vendors have developed migration techniques, their implementations are based on the vendors' hardware capabilities.

The following paragraphs will show how z/OS based Softek TDMF supports the requirements for non-disruptive data migration.

Data Migration Tool: Definitions and Characteristics

- Data migration is the copying of data from one device (the source) to another device (the target) and redirecting the I/O to the new device.
- A migration is the logical relationship between a source and target device.
- The user initiates and controls the migrations. The user identifies the "from" (source) volumes and the "to" (target) volumes.
- Multiple volume migrations may be established during any one session.
- The tool is dynamically activated and terminated.
- Applications remain unaware that migration is underway. The data is continuously and fully accessible for read and write activity.
- After migration and synchronization are complete, the takeover of the target device is non-disruptive.
- The tool supports a multiple system shared data environment.
- The tool guarantees complete physical data integrity.
- The use of the tool is not restricted to any control unit model type or device type. Except as noted all devices in the data center may participate in a migration session as required.
- All volumes of a migration must be on-line.
- No user may be allocated to a target volume during migration.
- A source volume may not contain an active local page data set or swap data set.
- The source and target volumes must be of the same track geometry.

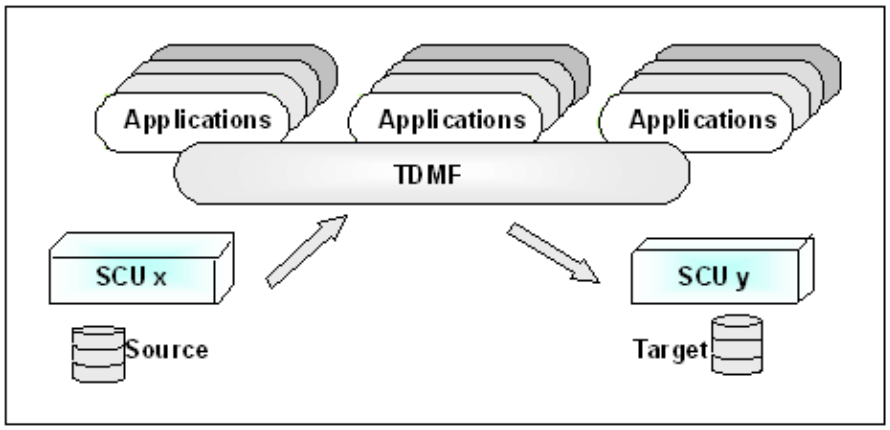
Of course, the above characteristics represent the ideal of a totally transparent and non-disruptive migration facility. After surveying the state of the industry today, Softek believes that Softek TDMF takes the lead in meeting these requirements.

Softek TDMF

Softek TDMF is designed to offer many benefits. New storage subsystem technologies can be brought into the data center with an absolute minimum of disruption. Softek TDMF is user-initiated and controlled. Softek TDMF allows for full system sharing throughout the data center. Softek TDMF guarantees full access to the data at any point during a migration operation. Softek TDMF supports dynamic takeover on the part of the target device, an important consideration in integrity and completeness of data migration. Softek TDMF is completely model and vendor independent within the supported architecture.

The following *figure: Softek TDMF Host-Based Data Migration*; diagrams the principles of host-based data migration as carried out by Softek TDMF.

Softek TDMF Host–Based Data Migration



- Softek TDMF offers full target and source flexibility. All Count Key Data/Extended (CKD/E) capable control units in the data center can participate in migration sessions. This functionality includes Hyper-Volumes and Flexi-volumes.
- Softek TDMF installs dynamically; no IPL is required.
- Softek TDMF sessions are parameter driven.
- Softek TDMF asynchronously copies data to target volumes, in order to minimize performance impact.
- The migration is invisible to applications. Applications continue to access and update the source volume. Softek TDMF asynchronously reflects updates onto the target device.
- Softek TDMF supports multiple system data-sharing environments.
- Softek TDMF guarantees physical data integrity with ongoing internal heartbeat monitoring, error detection, and recovery capability.
- Softek TDMF ensures that the target device dynamically takes over in a swap migration and disconnects from the source when the synchronization point is reached.
- Softek TDMF supports multiple concurrent Softek TDMF sessions, each containing its own Communications Data Set (COMMDS) and parameter inputs. Agent systems only access the COMMDS; they have no parameter input.

Softek TDMF is initiated as an MVS batch job or Started Task (STC) on the Master system and all Agent systems. The MVS Job Control Language (JCL) for a Softek TDMF for z/OS session identifies the parameter input and the COMMDS. The Softek TDMF statements identify the source volume(s), the target volume(s), the Master system, the attached Agent system(s),

and all other overrides and options. The COMMDS allows all systems that are attached to the source and target volumes to communicate and monitor the health of the migration in progress. The COMMDS also is used as an event log and a repository for messages, diagnostic and performance information.

The COMMDS may NOT be allocated upon a volume being migrated within that specific session.

Benefits Offered

- The ability to introduce new storage subsystem technologies without significant disruption of service.
- Protection of the value of existing storage equipment because all devices at the site can participate in a migration, except as previously noted.
- Designation of any subsystem as either source or target.
- Lower continuing costs of operation by maintaining a multiple-vendor, non-model specific environment.
- Conducting Parallel to ESCON or FICON migrations, a very important consideration when implementing RAID storage technologies.

Operating System Support

Softek TDMF supports operating system environments of OS/390 R2.10 and z/OS Version 1. The link to the Operating Systems Support Matrix is located at

www.softek.com/en/support/tdmf/zos/matrix.html

Storage Requirements

Refer to *Chapter 2: Softek TDMF Installation* for details on storage requirements to install and execute Softek TDMF.

Performance Considerations

Refer to *Chapter 3: Performance Considerations* for details on performance considerations.

Master/Agent(s) Relationship

There is only one Master system for any one session. Multiple Agent system(s) may be involved in a session.

CAUTION

Possible data integrity exposure: all systems accessing migration volumes must be identified to the Master system.

Softek TDMF includes various controls and check to ensure that the user does not assign or direct conflicting migrations to the same devices, attempt migrations to non–existent devices, or attempt to use the same Communications Dataset for two simultaneous or overlapping migration sessions.

Master System Responsibilities

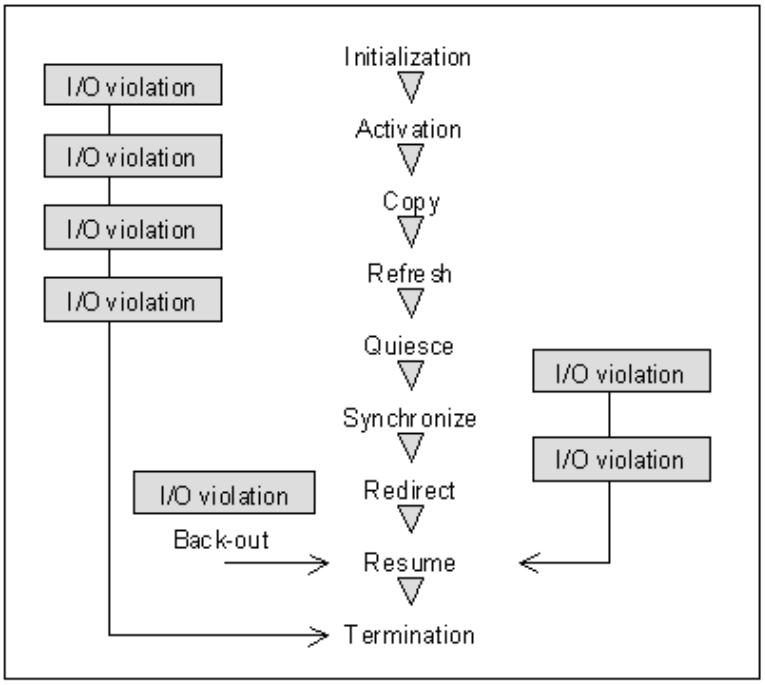
- Initialize the Softek TDMF Master system environment and the COMMDS.
- Establish the Cross-System Coupling Facility (XCF) environment for the session.
- Start and control the session for all participating systems.
- Monitor source volume user I/O activity to detect updates.
- Monitor target volume user I/O activity to prevent access.
- Copy data from the source volume to the target volume.
- Process detected source volume updates from all systems.
- Perform refresh operations to the target volume to reflect the update activity on the source volume.
- Check the internal health of the Master environment and the health of all Agent systems.

Agent System Responsibilities

- Initialize the Softek TDMF Agent environment and establish communications to the Master system, via the COMMDS.
- Acknowledge and process migration requests from the Master system.
- Monitor source volume user I/O activity and detect updates.
- Monitor target volume user I/O activity to prevent access.
- Notify the Master system of source volume update activity through the COMMDS.
- Check the internal health of the Agent environment(s) and the health of the Master system.

The following *figure:* Phases of a Softek TDMF Session on page 7; summarizes the Softek TDMF migration process flow.

Phases of a Softek TDMF Session



Major Phases of Migration

The SYSTEM INITIALIZATION Phase

Only after successful initialization of all systems in a Softek TDMF session does migration proceed asynchronously. If any violation occurs during system initialization on any system defined in the session, no migrations are performed.

Successful system initialization is the result of all participating systems performing error-free validation for all volumes within a session. If all systems in the session are not started within a 15-minute interval, then the session will not complete system initialization. If a system is started that is not defined as a part of an active session, Softek TDMF will terminate the Master job on the Master system and all started and pertinent Agent jobs (jobs on other systems that are using the same COMMDS as the Master).

Volumes in a session may be terminated via the Softek TDMF TSO Monitor or Batch Monitor on the Master system prior to the successful system initialization of all Agent systems. If the security option has been selected to provide use of the System Authorization Facility (SAF), and any volume involved in the migration session fails SAF, the migration session will fail system initialization.

SAF requirements are:

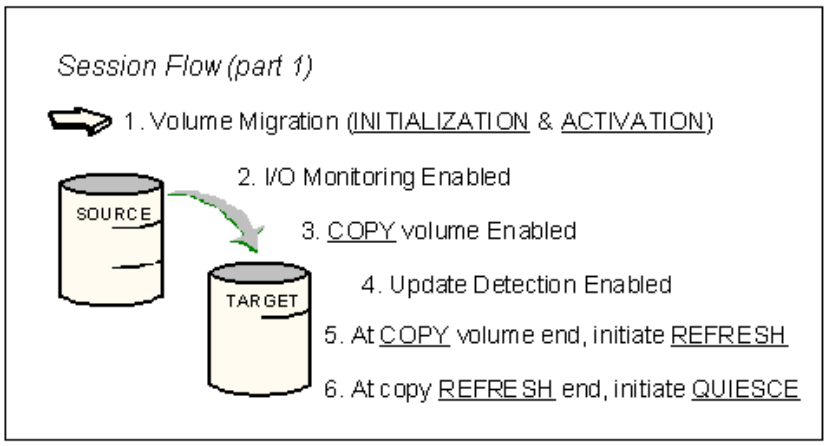
- Swap type migrations require ALTER authority on the source and target volumes.

In addition, if the History option has been selected to automatically record information about the migration session, the actual recording requires UPDATE authority for the data set specified in the History option entry. For more information regarding these functions, refer to *System Authorization Facility* on page *22*.

The Master system initiates and controls all migrations. The Master initiates each phase and all Agents must acknowledge this in order to proceed. If any system detects a violation, that specific migration terminates. Depending on the state of the current migration, it may then be necessary to perform back-out processing.

It is useful to break out a migration into major phases, as explained in the following paragraphs. The following *figure:* Session Flow - part 1 on page *8*; depicts the Initialization, Activation, Copy and Refresh phases of a Session Flow.

Session Flow – part 1



The INITIALIZATION Phase

All participating systems confirm the validity of the source and target volumes. Volume confirmation, selection, and initialization occur prior to the ACTIVATION phase. Use of the volume confirmation option, or specifying a limit to the number of concurrently active volumes can delay group and volume selection.

Volume Confirmation: Any volume or group of volumes that require confirmation will not be eligible for volume or group selection until a confirmation is received via the Softek TDMF TSO Monitor, a batch monitor or the MVS Write-to-Operator/Write-to-Operator with Reply (WTO/WTOR). The order of confirmation will determine the order of volume selection. In other words, if volumes ABC123 and SYSDBR require confirmation, volume selection for those volumes will not occur until confirmation has been received.

Volumes or groups that do not require confirmation are immediately available for volume or group selection.

Volume Selection: By default all volume pairs defined in a session are automatically selected during the Initialization phase. However, volume selection is affected when certain user options are specified. Those options which affect volume selection are volume confirmation, number of concurrent volumes, active in copy, and group options. These options are discussed later in this manual. Additionally, migration of a mirrored volume to another manufacturer's device may also require user intervention before the volume can be selected.

Volume Initialization: Initialization of all volume level control blocks and page fixing of all real storage frames necessary for a volume migration.

The ACTIVATION Phase

Start the copy task and enable user I/O activity monitoring, at which time all systems in the session attempt to allocate each source and target volume, preventing them from being inadvertently varied offline.

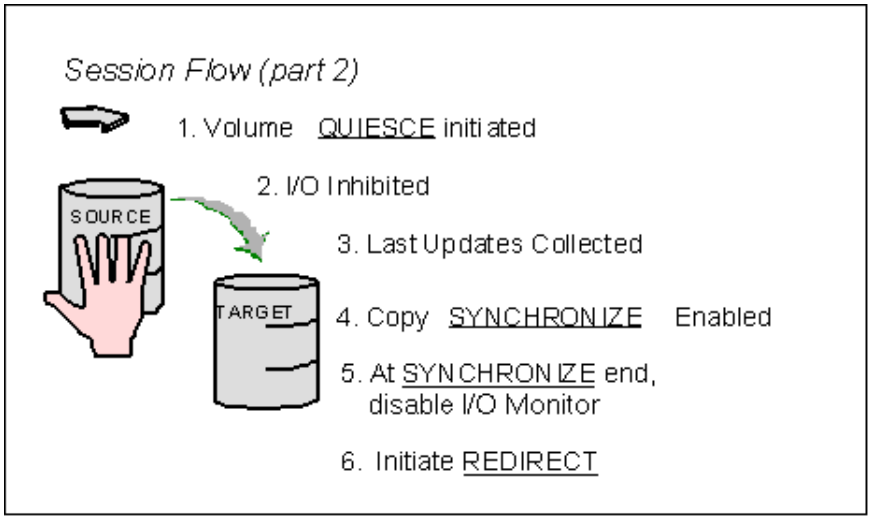
Next the Master system begins a COPY volume task to copy data from the source volume to the target volume. There is an independent COPY volume task for each source volume in the migration session.

During the course of the COPY volume phase, if any of the participating systems detects source volume updates, the Master system will collect the updated information to be processed in the copy REFRESH phase.

When the COPY volume task completes one pass of the source volume, the Master initiates the copy REFRESH task. During this phase, the target volume receives the updates made to the source volume. Multiple refresh phases will occur until Softek TDMF determines that synchronization of the target volume may be achieved, at which time the Master system will signal quiesce of the source volume.

The following *figure:* Session Flow - part 2 on page 9; depicts the QUIESCE and SYNCHRONIZATION phases of the Session Flow.

Session Flow – part 2



The QUIESCE Phase

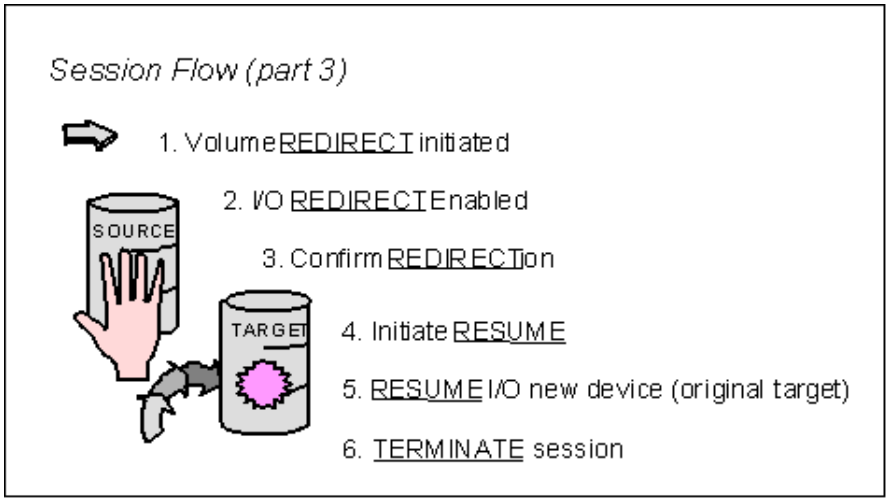
At this point, the Master system tells all systems to stop all I/O activity to the source volume.

When an Agent system receives a Quiesce request, the Agent system sends to the Master system the final group of detected updates. This is necessary for the Master system to perform synchronization.

When all the systems comply with the Quiesce request, copy SYNCHRONIZE begins. At the conclusion of the SYNCHRONIZE phase, the Master system disables the I/O monitor and starts the volume REDIRECT phase.

The following *figure:* Session Flow - part 3 on page *10*; shows the REDIRECT, the RESUME, and TERMINATION phases of the Session Flow.

Session Flow – part 3



The Volume I/O REDIRECT Phase

Softek TDMF causes I/O activity for the source volume to be permanently redirected to the target device.

The Master system requests that all systems do a redirect, and confirm that the redirect is successful. Upon successful completion of the Agent system redirects, the Master system rewrites the volume labels to change the source and target devices serial numbers and performs redirect processing.

The RESUME Phase

Immediately after successful I/O redirect processing, the Master system performs RESUME processing and initiates the RESUME request for the Agent systems, so that user I/O can continue to the volume on its new device. After all systems process the RESUME request, the original (source) device is marked off-line and the session enters TERMINATE phase.

The TERMINATE Phase

When a volume completes a migration, that volume's fixed storage will be freed for possible re-use within the current session.

■ ■

Chapter 2

Softek TDMF Installation

Installation Introduction

Distribution Media and Methods of Unloading

Softek TDMF is distributed on a standard label tape in SMP/E format. Softek TDMF may be installed using SMP/E or unloaded from the Softek TDMF distribution tape using IEBCOPY.

Softek TDMF can be downloaded from the FTP server. Instructions for using the Softek FTP server are provided when license keys are issued.

Pre-Installation Considerations

Product Requirements

The basic distribution tape contains the product in SMP/E format as well as the complete load modules for those who do not wish to use SMP/E to install the product. Softek TDMF will install with SMP/E on any MVS system meeting the maintenance level specified in "Operating System Requirements" later in this chapter.

Files on the Product Tape

The product tape has an IBM standard tape label and the volume serial is indicated on the external label of the tape cartridge. The following table shows the list of files on the tape:

Softek TDMF Files, Names, and Contents

File#	Data Set Name	Description
1	SMPMCS	TDMF SMP/E Modification Control Statements
2	TDF3600.F1	TDMF SMP/E JCLIN
3	TDF3600.F2	TDMF Load Modules
4	TDF3600.F3	TDMF REXX Execs
5	TDF3600.F4	TDMF Monitor Panels
6	TDF3600.F5	TDMF Monitor Keylists
7	TDF3600.F6	TDMF Monitor Messages
8	TDF3600.F7	TDMF JCL Skeletons
9	TDF3600.LOAD	TDMF Load Modules
10	TDF3600.SAMPLIB	TDMF Sample Library
11	TDF3600.SMP.PTF	TDMF SMP/E PTF File
12	TDF3600.NONSMP.PTF	TDMF non-SMP/E PTF File
13	TDF3600.TIB	TDMF TIBs – PDF Format

Softek TDMF Files, Names, and Contents *(Continued)*

File#	Data Set Name	Description
14	ML145133.BOOK	TDMF Installation & Reference Guide – BookManager format
15	ML145133.PDF	TDMF Installation & Reference Guide – PDF Format
16	ML145133.PDF.A4	TDMF Installation & Reference– PDF Format– A4
17	ML145134.BOOK	Messages & Codes – BookManager Format
18	ML145134.HTML	Messages & Codes – HTML Format
19	ML145134.PDF	Messages & Codes – PDF Format
20	ML145134.PDF.A4	Messages & Codes – PDF Format - A4
21	SMPMCS	Session Assistant SMP/E Modification Control Statements
22	TSW1200.F1	Session Assistant SMP/E JCLIN
23	TSW1200.F2	Session Assistant Load Modules
24	TSW1200.F3	Session Assistant REXX Execs
25	TSW1200.F4	Session Assistant Monitor Panels
26	TSW1200.F5	Session Assistant Monitor Messages
27	TSW1200.F6	Session Assistant JCL Skeletons
28	TSW1200.SMP.PTF	Session Assistant SMP/E PTF File
29	TSW1200.NONSMP.PTF	Session Assistant non-SMP/E PTF File
30	ML144996.BOOK	Session Assistant manual - BookManager Format
31	ML145996.HTML	Empty Data Set
32	ML144996.PDF	Session Assistant manual - PDF Format
33	ML144996.PDFA4	Session Assistant manual - PDF Format -A4
34	R3.ALTLIB	Release 3 REXX Alternate Library
35	R4.ALTLIB	Release 4 REXX Alternate Library

NOTE

For those users choosing to install TDMF Session Assistant, please refer to the *Softek TDMF 1.2 Session Assistant for z/OS (ML–144996)* for instructions.

Operating System Requirements

Softek TDMF supports all MVS-based operating systems that are currently supported by IBM. This product is not suitable for use with native z/VM and VM/ESA, native VM/XA, native VSE/ESA, native VSE/XA or DOS. The Operating Systems Support Matrix is located at www.softek.com/en/support/tdmf/zos/matrix.html

Special considerations must be taken when MVS is running under VM when allocating the COMMDS. See *MVS Running under VM* on page *85*, for details on this topic.

NOTE

It is recommended that periodic checks of the Required IBM Maintenance and Technical Information Bulletins (TIBs) be performed. These requirements must be implemented to ensure successful Softek TDMF operation.

Required IBM Maintenance:

www.softek.com/en/support/tdmf/zos/apars.pdf

Technical Information Bulletins:
www.softek.com/en/support/tdmf/zos/v3/tibs.html

It is highly recommended for those customers using IBM Enterprise Storage Servers (ESS | d/t2105) to check the IBM PSP bucket for this storage subsystem to ensure that the proper maintenance is installed.

Storage Requirements

The basic ECSA, CSA, and Extended Private storage requirements for Softek TDMF are as follows:

Softek TDMF Storage Requirements

LOCATION SUBPOOL KEY	ABOVE OR BELOW 16 MB LINE	SIZE	MASTER AGENT OR BOTH	PAGE FIXED WHEN	PAGE FREED WHEN	USAGE
ECSA 228	Above	16K to 20K	Both	System initialize	System terminate	Softek TDMF main control block
ECSA 241 key 8	Above	24K	Both	Short term		Softek TDMF TSO Monitor
ECSA 228	Above	16K to 392K	Both	System initialize	System terminate	Softek TDMF main control record
ECSA 228	Above	4K	Both	System initialize	Volume terminate	Softek TDMF WORK control block – per volume pair
ECSA 228	Above	4K	Both	System initialize	Volume terminate	Softek TDMF VMSG control block – per volume pair
ECSA 228	Above	1K to 12K	Both	System initialize	System terminate	Softek TDMF DDTV control block
CSA 228	Below	256 bytes	Both	System initialize	System terminate	Softek TDMF DDTR control block
Private[4]	Above	nK	Master	System initialize	System terminate	Softek TDMF MSVE record -nK[1] *# of Agents

Softek TDMF Storage Requirements *(Continued)*

LOCATION SUBPOOL KEY	ABOVE OR BELOW 16 MB LINE	SIZE	MASTER AGENT OR BOTH	PAGE FIXED WHEN	PAGE FREED WHEN	USAGE
ECSA 228	Above	24K - 84K	Both	System initialize	Volume terminate	Softek TDMF VRBM control block – per volume pair
ECSA 228	Above	4K	Both	System initialize	System terminate	Softek TDMF communications with EMC API
ESQA	Above	(#vols* 524) + 544	Master	Volume initialize	Volume terminate	Softek TDMF syscomm and SRB/ IOSB/ENF
ESQA	Above	(#vols* 252) + 544	Agent	Volume initialize	Volume terminate	Softek TDMF syscomm and SRB/ IOSB/ENF
Private[4]	Above	4K (min) 64K (max)	Master	System initialize	System terminate	Softek TDMF communications CCW – Number of systems / 2 * 4K (rounded up)
Private[4]	Above	4K to 20K	Agent	System initialize	System terminate	Softek TDMF communications CCW
Private[4]	Above	12K	Both	System initialize	System terminate	Softek TDMF common I/O areas
Private[4]	Above	4K (min) 8MB (max)	Master	System initialize	System terminate	Softek TDMF VRNQ I/O area - Number of systems * Number of volume pairs * 4K[2]

Softek TDMF Storage Requirements *(Continued)*

LOCATION SUBPOOL KEY	ABOVE OR BELOW 16 MB LINE	SIZE	MASTER AGENT OR BOTH	PAGE FIXED WHEN	PAGE FREED WHEN	USAGE
Private[4]	Above	nK	Master	Volume terminate	Volume terminate	Softek TDMF VRBM control block – per volume pair[3]
Private[4]	Above	900K	Master	Volume initialize	Volume terminate	Softek TDMF cylinder I/O – per volume pair[5]
Private[4]	Above	60K	Master	Volume initialize	Volume terminate	Softek TDMF track I/O area – per volume pair
Private[4]	Above	32K	Master	Volume initialize	Volume terminate	Softek TDMF copy task CCW area – per volume pair
Private[4]	Above	64K	Both	System initialization	System terminate	Softek TDMF Trace Table

1. For the Master system, where 'n' is the number of volumes in the session.
10 or less volumes = 4K
10 to 32 volumes = 4K to 12K
32 to 64 volumes = 12K to 24K
64 to 128 volumes = 24K to 48K
128 to 256 volumes = 48K to 96K
256 to 512 volumes = 96K to 192K
2. When possible, Softek TDMF will obtain storage above the 2GB bar for these control blocks
3. 48K for a 3390-3
120K for a 3390-9
408K for a 3390-27
4.When possible, Softek TDMF will obtain storage above the 2GB bar (64 bit real) for these control blocks.
5. If Full Speed Copy is selected, two 900K Buffers will be allocated.

If the Compare option or Full Speed Copy is requested, an additional 900K buffer for each volume's migration will be allocated.

Therefore, if 16 3390-3 volumes are being migrated with two systems involved, the storage requirements for the Master (16 LPs) and Agent (8 LPs) system are:

Master system:

Fixed common storage: 612K ECSA, 9K ESQA, 256bytes CSA

Pageable common storage: 28k ECSA

Fixed extended private area storage: 16,600K

Agent system:

Fixed common storage: 617K ECSA, 5K ESQA, 256bytes CSA

Pageable common storage: 28k ECSA

Fixed extended private area storage: 656K

NOTE

Storage requirements can be calculated via an Excel spreadsheet located at: www.softek.com/en/support/tdmfmainframe/tools.html

DASD Space Requirements

Refer to *Appendix A: DASD Space Requirements* for all DASD space requirements.

SMP Naming Conventions

SYSMOD Naming Conventions

The following paragraphs describe the conventions used by Softek to avoid conflict with IBM and user written SYSMODs. Use this information to develop and maintain the installations SYSMOD naming convention.

Function SYSMOD IDs

The FMID for TDMF V3R6.0 is TDF3600, which is registered with IBM Corporation.

PTF and APAR SYSMOD IDs

There are two types of system modifications for Softek TDMF; they are PTFs and APARs:

- **PTF**: A set of module replacements. The Softek convention for the SYSMOD ID of a service SYSMOD is TD*vrynn*, where *vry* represents the version, release and last digit of the year, and *nn* identifies the Softek fix number, in the range of 01-99. Example: **TD36401**.
- **APAR**: Provided in Superzap format. Example: PR*xxxxx* (where *xxxxx* is the Problem Report number)

Installing Softek TDMF

" To install Softek TDMF:

1. File 10 of the installation tape contains sample JCL that can be used to install Softek TDMF. Use the following JCL to unload SAMPLIB.

```
//COPY       EXEC PGM=IEBCOPY
//SYSPRINT   DD  SYSOUT=*
//INSAMP     DD  DSN=TDF3600.SAMPLIB,
//               VOL=SER=tvolser,
//               UNIT=unit,
//               LABEL=(10,SL),
//               DISP=OLD
//OUTSAMP    DD  DSN=HLQ.TDM360.SAMPLIB,
//               VOL=SER=dvolser,
//               UNIT=SYSALLDA,
//               SPACE=(CYL,(1,1,5)),
//               DISP=(,CATLG)
//SYSUT3     DD  UNIT=SYSALLDA,
//               SPACE=(CYL,1)
//SYSUT4     DD  UNIT=SYSALLDA,
//               SPACE=(CYL,1)
//SYSIN      DD  *
 COPY INDD=INSAMP,OUTDD=OUTSAMP
/*
//
```

2. Modify the TDMFEDIT EXEC.

This step is necessary only if the optional edit tool is desired. Member TDMFEDIT in the sample JCL can be used to edit the installation JCL. Modify TDMFEDIT initially and invoke it whenever the JCL requires editing.

TDMFEDIT contains an ISREDIT macro. ISREDIT variables start in column 16. The value used to replace the variable starts in column 34 and cannot contain imbedded spaces. If the change is to be global, the word “ALL” appears in column 57. If the value field is not required or will be manually edited, the value field should match the variable field. TDMFEDIT is length sensitive and case sensitive. For example, VOLSER cannot exceed six characters. The parameters are self-explanatory, with the following exceptions:

- `HLQ` is the high level qualifier of the Softek TDMF data set names.
- TDM360 is the second level qualifier of the data set names (TDM360 stands for Softek TDMF Version 3 Release 6 Modification 0).
- `USER-CAT-NAME` is the user catalog that will contain the catalog entries for the Softek TDMF data sets.
- `SYSTEM-CAT-NAME` is the Master catalog that owns the user catalog.
- `CNT` is the level of the Communications Data Set (COMMDS). Since several COMMDS’s may be defined for different sessions, this parameter is useful for keeping track of the various data sets.

  Copy TDMFEDIT to a library that is concatenated to the SYSPROC DD in the installation TSO logon procedure. Each time a job is submitted, edit the member JCL, type TDMFEDIT on the command line and press the ENTER key. The updated JCL will contain those specifications.

3. Create a user catalog.

The member DEFUCAT in SAMPLIB can be used to create a user catalog to contain the alias for the Softek TDMF data sets. The member IMPUCAT can be used to import the user catalog to the Master catalog on the Agent system(s). This step is optional. If this option is selected, the user catalog must be created before running any jobs.

4. Allocate the Softek TDMF data sets.

   The sample JCL in SAMPLIB member ALLOC performs the allocation of the Softek TDMF libraries. If SMP/E is not used to install Softek TDMF, there is no need to allocate the distribution libraries.

5. Select the type of install to perform: SMP/E or non-SMP/E.

Installing Softek TDMF Using SMP/E

An installation standard SMP/E procedure must be provided in order to indicate to SMP/E where to locate all the required data sets. Unless they have been pre-defined within the CSI using DDDEFs, be sure to allocate all the DDnames for the Softek TDMF target and distribution libraries.

The following members in the distributed SAMPLIB may be copied and tailored to install Softek TDMF. The DLIBZONE and TARGZONE must be updated in the samples to reflect the zone definitions for the site.

ALLCSMP will create SMP/E files LOG, LOGA, MTS, PTS, SCDS, and STS.

INITCSI will create and initialize the CSI, global, target and distribution zones.

DDDEF will create the DDDEF entries in SMP/E.

SMPE is the sample procedure that the following jobs execute.

SMPEREC performs an SMP/E RECEIVE of the Softek TDMF product.

SMPEAPK performs an SMP/E APPLY CHECK of the Softek TDMF product.

SMPEAPP performs an SMP/E APPLY of the Softek TDMF product.

SMPEACK performs an SMP/E ACCEPT CHECK of the Softek TDMF product.

SMPEACC performs an SMP/E ACCEPT of the Softek TDMF product.

CLEANUP will delete the previous release of Softek TDMF from SMP/E.

The following procedure will create a complete and separate SMP/E environment for Softek TDMF. Alternatively, users may install the product in any other SMP/E structure of their choice and will have to edit the jobs for the proper tailoring to fit their environment. The order of installation for Softek TDMF using SMP/E is the following:

1. Edit ALLCSMP with the TDMFEDIT exec and submit (allocates MTS, PTS, SCDS, STS, LOG and LOGA data sets).

2. Edit SMPE with the TDMFEDIT exec and copy to PROCLIB.

NOTE

In JES3 environments, it may be necessary to separate this job into multiple jobs.

3. Edit INITCSI with the TDMFEDIT exec and submit (calls SMPE).

4. Edit DDDEF with the TDMFEDIT exec and submit.

5. Edit SMPEREC with the TDMFEDIT exec and submit.

6. Edit SMPEAPK with the TDMFEDIT exec and submit.

7. Edit SMPEAPP with the TDMFEDIT exec and submit.

8. Edit SMPEACK with the TDMFEDIT exec and submit.

9. Edit SMPEACC with the TDMFEDIT exec and submit.

Installing Softek TDMF without SMP/E

If SMP/E is not be used to install the product, member INSTALL in the sample library performs an IEBCOPY unload of the modules. Softek TDMF maintenance is provided in object module format and PE zaps. Please refer to *Maintenance Overview* on page 22 for more detail.

Security

If the installation has a security package such as RACF or ACF2 on the MVS system on which Softek TDMF is installed, it is necessary to make the appropriate modifications to the security package in order for Softek TDMF to execute properly: specifically profiles and/or command tables should be checked.

Limiting access to the Softek TDMF authorized library in order to prevent unauthorized use of the Softek TDMF system may be accomplished through security packages. The user associated with the SYSOPTN batch job must have UPDATE authority for the library pointed to by the SECCOM DD statement. The Master migration job will also need UPDATE authority for the SECCOM file if a Trail Express key is used. To update keys via Option 9 of the Softek TDMF TSO Monitor, the user must have UPDATE authority for the TDMLLIB library, which must have been allocated as SECCOM in the SYSOPTN job.

If the History option is selected, UPDATE authority is required for the data set specified in order for Softek TDMF to update that data set. When viewing the history file (and any COMMDS) via the Softek TDMF TSO Monitor, the user must have READ authority.

System Authorization Facility

For those installations wishing to utilize the System Authorization Facility (SAF), this option, VOLUME SECURITY = YES, can be selected via the SYSOPTN batch job in SAMPLIB. For more information on the Softek TDMF system defaults, please see *Softek TDMF System Defaults* on page 43, or the table: *Softek TDMF System Defaults and Options* on page 44.

For a Swap migration, ALTER authority or the equivalent must be in effect for the source and target volumes. Error messages will be issued for all volumes not meeting these requirements in a session.

Softek TDMF checks for two different types of classes: CLASS=DATASET for the COMMDS history data set and the Softek TDMF load library defined on the SECCOM DD statement, and CLASS=DASDVOL for volumes allowed in a pairing.

If Trial Express keys are in use, the TDMLLIB (SECCOM DD statement) must have update authority to include the user id submitting the jobs.

For more information on SAF, please refer to one of the following manuals: *Security Server (RACF) Security Administrator's Guide (SC28-1915), CA-ACF2 Administrator Guide (MVS)*, or *CA-Top Secret User Guide (MVS)*.

CAUTION

If any volume is determined by the security mechanism not to be eligible for migration, the entire session will terminate.

Maintenance Overview

Softek TDMF is available for installation in two formats:

- Tape cartridge

- Web download.

Both product installation formats provide all current PTFs at the time of product shipment or download. However, it is possible that additional maintenance could be released following the shipment or download. To ensure the product is brought up to date following installation, review and apply all additional maintenance (PTFs and/or PE zaps). PTFs and PE zaps can be found at www.softek.com/en/support/tdmf/zos/v3/ptf.html or www.softek.com/en/support/tdmf/zos/v3/pe3.html.

CAUTION

Important:
An up to date installation consists of the following:

1. Tape or Web download at the most current PTF and
2. Web download to the very latest PE zap.

Determining the Product PTF Level

If the product was previously installed, the PTF level of the installed Softek TDMF software can be determined in one of the following ways:

- **Option U.7** - Support Utilities, System Change Summary
- **Option 9** - Display/Modify Installation Security Environment
- Messages TDM1722I, TDM1727I and TDM1728I contained within the sysout or the Communications Data Set (COMMDS) from a previous execution of Softek TDMF for z/OS.

If the base product is being installed from tape or web download, refer to one of the following to identify the PTF level:

- Tape cartridge: refer to the Software Installation and Release Notes (SIRN), which is included with the product tape cartridge. The SIRN specifically identifies what the PTF level is for the product tape.
- Web download: within the zipped file, refer to a file named PTF.txt. This file identifies the PTF level of the software.

Maintenance Terms

- **PR**: Problem Report. A PR is a correction to a problem that may be distributed as part of a PTF or as a PE zap. Not all PRs become PE zaps.
- **PTF**: a collection of PRs. May be considered a “level set”.
- **PE zap**: PTF in Error (in AMASPZAP format) that will be included in a future PTF.

Maintenance Packaging

PTFs are released periodically and are cumulative—that is, all previous maintenance is included in the new PTF. This simplifies the maintenance of Softek TDMF in that any PTFs that are skipped are automatically included at a higher-level PTF.

PTFs are supplied in object format for SMP/E or non-SMP/E installations. PTFs are available by web download or tape cartridge. Each PTF contains a README file, which contains a list of all PRs for the current PTF with a brief description for each. Following the installation of a PTF, please refer to the entry “Applying maintenance between PTFs”.

Maintenance Frequency

Softek strongly recommends that each PTF and/or PE zap be downloaded as it becomes available. The actual application of the maintenance can be scheduled for a later time that is convenient to the user.

Applying Maintenance Between PTFs

Any maintenance to the current PTF is supplied as a PE zap, and is packaged for use with AMASPZAP. The PE zap is identified by a PR number and is available in both SMP/E and non-SMP/E formats. PE zaps are typically marked as Highly Pervasive (HIPER), and can include a reference to a Technical Information Bulletin (TIB) at the same time. PE zaps are available on the Softek TDMF Technical Support web page only, and as part of the PTF download package.

NOTE

Subsequent PE zaps can be created and posted to the Technical Support web site, requiring a new download of the entire PTF/PE zap package or individual download of each PE zap as it is released.

Notification of Updates

Softek TDMF uses e-mail notifications to inform registered users of Softek TDMF that an update has been made to the web page.

CAUTION

Softek strongly recommends that all Softek TDMF users register for automatic notification. A Group ID can be used. Registration ensures that whenever a new PTF, PE zap or other update occurs, our customers can take appropriate action. If filtering is used within the e–mail system, messages from the softek.com domain must be allowed.

Important URLs

Use the following web page URLs to access maintenance information and downloads:

- Automatic Notification:
  www.softek.com/en/support/tdmf/zos/register.html
- PTF downloads:
  www.softek.com/en/support/tdmf/zos/v3/ptf.html
- PE zap downloads:
  www.softek.com/en/support/tdmf/zos/v3/pe3.html
- Softek TDMF home page:
  www.softek.com/en/support/tdmf/zos/
- Maintenance Methodology:
  www.softek.com/en/support/tdmf/zos/pm.pdf

Post-Installation Tailoring

1. Apply the most current Softek TDMF PTF as described in *Maintenance Overview* on page *22*.

2. Review the README file and the *Software Installation Release Notes* (SIRN) for any special instructions.

3. Make the TDMLLIB library an authorized program library.

   It is recommended that HLQ.TDM360.TDMLLIB library **not** be placed in the system linklist (LNKLSTxx) for performance considerations. If the HLQ.TDM360.TDMLLIB is to be placed in the system linklist (LNKLSTxx), the STEPLIB DD card may be removed from the JCL when executing Softek TDMF. If HLQ.TDM360.TDMLLIB is to be placed in PROGxx or IEAAPFxx of SYS1.PARMLIB, then the STEPLIB DD statement is necessary.

4. Allocate the Communications Data Set.

   The Communications Data Set (COMMDS) is used to pass information between systems participating in a Softek TDMF session. This data set contains the status and messages related to a specific session. The COMMDS also serves as the input file to the Softek TDMF TSO monitor.

   Member ALLOCCM in SAMPLIB allocates the COMMDS. This data set must be physically located on a cylinder boundary with contiguous space. The data set must reside on a device that supports CKD/E. The COMMDS cannot be on a volume that is involved in the same session (see *Placement of the Communications Data Set* on page *63*).

   Softek TDMF periodically issues a RESERVE macro for the COMMDS to serialize communication between the Master and Agent systems. Please refer to *Unicenter CA-MIM Resource Sharing* on page *71* or *Global Resource Serialization* on page *78* for details.

   The size (number of required cylinders) of the COMMDS is determined by the following formula:

   CYLS = V * (S + K)

   Where:

   V = the number of volumes, where

   64 volumes = 2.5

   128 volumes = 5.0

   256 volumes = 7.5

   512 volumes = 10.0

   S = the number of participating systems

   K = is the size of the source volumes involved

   3390-3 K = 4

   3390-9 K = 6

   3390-27 K = 15

   For example: 128 3390-3 and 128 3390-9 volumes across 8 LPARs, using largest device type in session and therefore setting K = 15,

   CYLS = 7.5 * (8 + 6) (always use the largest device type in session)

   CYLS = 7.5 * 14

   CYLS = 105 < -- round down if required

5. Allocate the COMMDS history file.

   This is an optional step. Member HISTORY in SAMPLIB will create this file. Retain the data set name for use in the SYSOPTN batch job (See *Softek TDMF System Defaults* on page *43*).

6. Modify member TDMF in data set HLQ.TDM360. TDMEXEC which was unloaded in the installation step. Enter the correct high-level qualifier.

   If the TDMEXEC library name is to be changed, then modification must be made to member TDMF within that library (see *REXX Execs* on page *227* for an example). Please note that the Softek TDMF TSO Monitor may create two additional members in the user's ISPF Profile data set (userid.ISPF.ISPPROF). They are as follows:

   TDMEDIT: This member is normally present, but not required. It contains the information necessary for the EDIT panels that the Softek TDMF TSO Monitor presents. This member is created the first time the user edits a member using Option 0 – Change or Submit Data Migrations Jobs, or uses the panels within Option 12 – Build Data Migration Jobs.

   TDMPROF: This member is normally present, but not required. It contains information that the Softek TDMF TSO Monitor saves for use between sessions. This member is created the first time navigation through the Monitor panels is done where information may be needed for subsequent sessions.

NOTE

If the TSO profile prefix is set to a specific user id, the following statement in member TDMF of HLQ.TDM360.TDMEXEC must appear as,

secty = "'HLQ.TDM360.TDMLLIB'"

otherwise, the monitor will fail to start properly. If the TSO profile is set to NOPREFIX, either single quote marks or double quote followed by single quote marks may be used.

7. If this is the first time that Softek TDMF will be executed, authorization key(s) must be requested for each CPU authorized to execute Softek TDMF. The can be requested from the technical support web page at
   www.softek.com/en/support/tdmf/zos/

   Please be prepared to provide the following information:

   - CPU Serial Number(s) and CPU Model Number(s) [see *Determining CPU Serial Number* on page *205*]
   - DASD Subsystem Serial Number(s) [see *Determining DASD Subsystem Serial Number* on page *223*]
   - Site ID or number
   - Company Name
   - Location of Site
   - Name
   - Phone Number

   Softek TDMF support can be reached as follows:

   - Log calls directly on the web Call Tracking Center at
     www.softek.com/en/support/tracking/
   - E-mail technical support at tdmfsupport@softek.com
   - Call technical support directly. The phone number to call for the Softek Global Support Center (world-wide) is:
     - North America:
       1 800 66 SOFTEK (1 800 667 63835)
     - Europe:
       00800 66 SOFTEK (00800 667 63835)
     - Austria:

0800 200 236 then: 05 800 667 6383

8. To invoke the monitor feature of Softek TDMF, enter the following command from Option **6** of ISPF: EXEC 'HLQ.TDM360.TDMEXEC(TDMF)'. If the keylist option is not enabled, the Softek TDMF TSO Monitor will issue a message stating that the keylist is not active.

   To enable the keylist function, select Option **0** of ISPF. At the top of the screen, 'Function Keys' is displayed. Place the cursor on the "F" and press enter. If keylists are enabled, the last entry will show an "*0". If keylists are not enabled, the number 10 will be displayed.

Preparing to execute Softek TDMF

Sample Jobs

Member SYSOPTN contains the input statements for the Softek TDMF System Defaults as well as examples of Softek TDMF keys. Software keys must be provided in order for Softek TDMF to execute in the installation.

The Softek TDMF V3 load library (TDM360.TDMLLIB) may be updated with the SYSOPTN batch job. The SYSOPTN batch job will re-initialize the security record with PARM=NEW or update the security record using PARM=UPDATE.

Review and select the Softek TDMF System Defaults listed in the tables *Softek TDMF System Defaults and Options* on page 44. This applies to those installations using Softek TDMF for demonstrations or services.

Member MASTER in SAMPLIB contains JCL to run on the Master system. Change the data set names to the correct names for STEPLIB, SECCOM, and system communications (SYSCOM or COMMDS) data set.

The SYSIN input file is where input parameters will be specified. The SESSION control statement is used to specify the Master and Agent systems that will participate in the data migration, as well as the options for the session itself and the default options for the volumes in the session. All systems that have access to the source and target volumes must be included in the Agent parameter list and must be active during the session. Softek TDMF will not monitor I/O from a system that is not specified on the SESSION control statement. All source and target volumes must be online to the Master and Agent systems.

Member AGENT in SAMPLIB contains the JCL to run on Agent system(s). Change the data set names to the correct names for STEPLIB, SECCOM, and SYSCOM data set. This JCL must be submitted from all Agent systems, which are specified in the Master system JCL, otherwise, the session will not start.

CAUTION

The keyword TIME=1440 or TIME=(mm,ss) may be specified on jobcards in order to avoid system abend 322 (S322). TIME=1439 is recommended as TIME=1440 will disable SMF time recording for that job, whereas TIME=(mm,ss) will allow recording of SMF times but limit the amount of CPU time to be used by the Softek TDMF session. Please ensure that a reasonable amount of time is allowed for each Softek TDMF session especially if the COMPARE option is used. Refer to members MASTER and AGENT in SAMPLIB for examples. For more information on the TIME parameter, please refer to the MVS JCL Reference manual.

Key Types

There are three different types of authorization keys for Softek TDMF:

- license keys

- express keys
- trial express keys

NOTE

License keys generated for previous product versions do not work with Softek TDMF Version 3.6.0.

License Keys

The first license key must be installed using batch job SYSOPTN. Subsequent license keys may be added or deleted via the Softek TDMF TSO Monitor using Option 10. A license key has the format of KEYnn=xxxxxxxxxxxxxxxx. A license key has no expiration date. However, the maintenance period displayed is set to one year. Softek TDMF Full Function license keys may be deleted via the Softek TDMF TSO Monitor. See *Option 9 - Display/Modify Installation Security Environment* on page *160* for details. The SYSOPTN batch job may be executed on a CPU that will not be running Softek TDMF.

If a license key is issued and the KEYnn value is changed from what was provided by Softek, message "`TDM4611 00000008 was the return code from authority checking`" will be issued. Correct the key number to what was provided and re-run the job.

Volume and Terabyte Express Keys

Volume and Terabyte Express keys to be used with the Softek TDMF – Express Offering, can only be added via the SYSOPTN job. The SYSOPTN batch job must be executed on the CPU that will be running Softek TDMF as the Master system. Express keys will limit the number of volumes migrated or the total number of terabytes migrated, depending on the Express Key purchased.

The format of an Express key is KEYnn=xxxxxxxxxxxxxxxx. An additional control card precedes this key, which defines when the Express keys will expire.

If an Express key is issued and the KEYnn value is changed from what was provided by Softek, message "`TDM4611 00000008 was the return code from authority checking`" will be issued. Correct the key number to what was provided and re-run the job.

Express keys may not be deleted via the Softek TDMF TSO Monitor.

NOTE

Only ONE key is issued and all Softek TDMF Master system batch jobs must be run on the CPU authorized to execute Softek TDMF.

Trial Express Keys

Trial Express keys, for use with a trial or demo, can only be added via the SYSOPTN job. The SYSOPTN batch job must be executed on the CPU that will be running Softek TDMF as the Master system. Trial Express keys will only allow a certain number of DASD volumes to be migrated within a specified time frame.

The format of a Trial Express key is KEYnn=xxxxxxxxxxxxxxxx. An additional control card precedes this key, which defines when the Trial Express keys will expire. Trial Express keys may not be deleted via the Softek TDMF TSO Monitor.

Softek TDMF will issue an informational message indicating that a Trial Express key is in use.

If a Trial Express key is issued and the KEYnn value is changed from what was provided by Softek, message "`TDM4611 00000008 was the return code from authority checking`" will be issued. Correct the key number to what was provided and re-run the job.

NOTE

Only ONE key is issued and all Softek TDMF Master system batch jobs must be run on the CPU authorized to execute Softek TDMF.

When Keys Expire

As stated previously, Softek TDMF Full Function license keys and keys for vendor specific DASD, do not expire. However, all other key types will expire.

The Softek TDMF authorization program (TDMFAKEY) uses the value of the internal hardware clock (TOD clock) to check the time and date, without regard to the local time zone offset or current leap second value.

It is recommended that the keys be verified prior to submission of the job. This job must be executed in order for Softek TDMF to operate. Return codes from the SYSOPTN batch job can be found in *Authorization Return Codes* on page *209*.

Softek TDMF Control Statements

There are three Softek TDMF control statement record types, which are used with the following syntax rules:

- Each control statement can continue over multiple input records.
- The control statement ends at end of file, or when a new control statement is recognized.
- The first 71 character positions of each input record are assumed to contain control statement information, except that if an asterisk is found in the record only the character positions to its left (if any) will be parsed.
- Individual fields in a statement, and items within bracketed lists, must be delimited by spaces or commas.
- Only those options desired need to be specified on control statements; however, if a particular option is not specified, the defaults specified in the SYSOPTN batch job take precedence.

For information about reading control statements, refer to *How to Read Syntax Diagrams* on page *247*.

Required and Optional Control Statements

This section describes required and optional control statements that can be used with Softek TDMF.

Required Control Statements

The required control statements in the local Softek TDMF job are as follows:

- **SESSION**

  For information about the SESSION statement, refer to *SESSION Control Statement* on page *30*.

- **MIGRATE**

  For information about the MIGRATE control statement, refer to *MIGRATE Control Statement* on page *39*.

CAUTION

For volumes that are ***not*** part of a group, the MIGRATE control statements must precede the GROUP control statement:

Optional Control Statement

The optional control statement is as follows:

- GROUP

For information about the GROUP control statement, refer to *GROUP Control Statement* on page *37*

Ordering the Input of Control Statements

This section describes the correct order to use when specifying Softek TDMF control statements.

1. The SESSION control statement must appear first. For information, refer to *SESSION Parameters* on page *30*.
2. A GROUP control statement can precede a number of MIGRATE statements. The volumes in these subsequent statements will be synchronized together. Options specified on this control statement apply to the volumes in the group, and are discarded when a new GROUP control statement is encountered.

   A maximum of 32 GROUP statements may be supplied in a session.
3. A MIGRATE control statement specifies a volume swap migration. If it is to be treated as a single (ungrouped) volume the control statement must precede any GROUP statements in the input stream. The statement provides the source and target volume for the migration and may supply a new volume serial number to be written to the source volume after the swap, and options that apply to this volume migration alone.

SESSION Control Statement

The SESSION control statement must appear as the first control statement.

SESSION Format

```
>>--SESSION--+------+--Master(sysid)--+-------------------+--------->
             +-name-+                  |         {-,---+   |
                                       +-Agents(--sysid--)-+

>-------+----------------------+---------------------------------->
        +-SYSCOM(dataset_name)-+

>-------+-------------------------------------------------+--------->
        +-OPTions(-|Common Options|---|Session Options|-)-+
```

SESSION Parameters

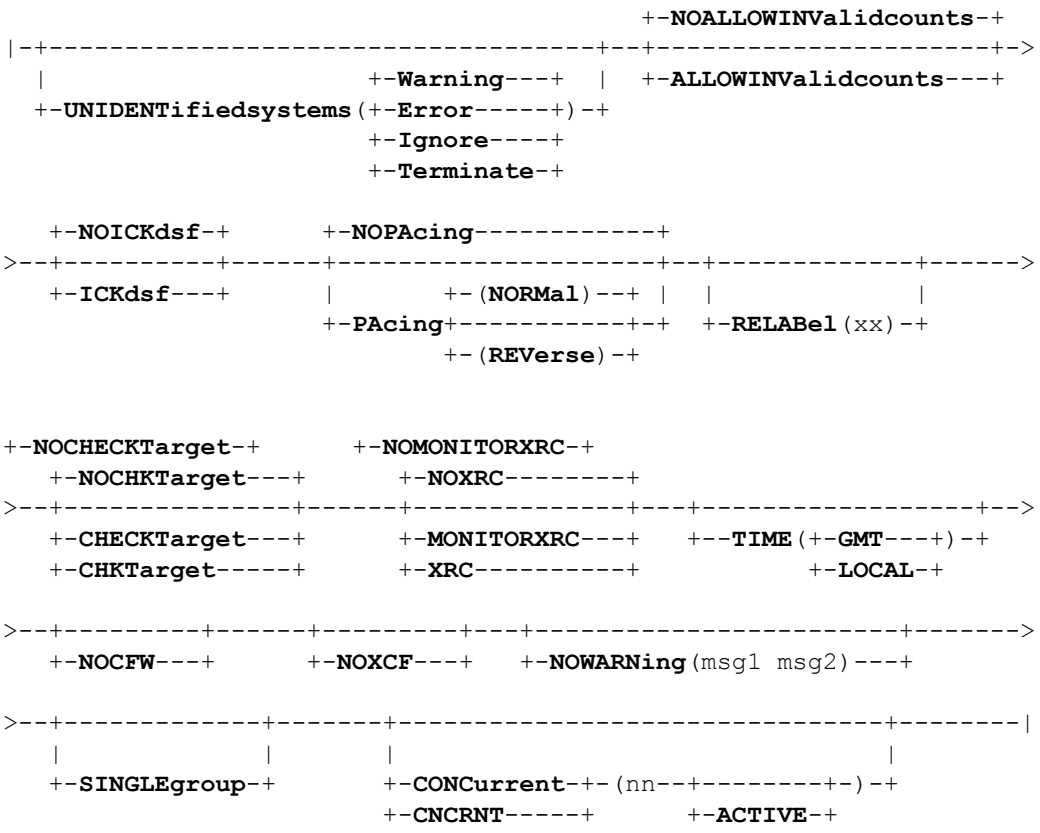
Use the following rules when specifying SESSION Control Record parameters:

- *name*: Specify an optional session name. If supplied, the session name must not exceed eight characters in length.
- Master (*sysid*): The Master system identifier. The Master system ID must be supplied, and must match the SMF id of the system on which the Master job is executing.
- Agents (*sysid*): The agent(s) identifier(s). Up to 31 Agent systems can be specified.

- SYSCOM(*dataset name*):Specify an optional Communications Dataset name. If the Communications Dataset name is provided, it must match the dataset specified on the SYSCOM DD statement; however, if the Communications Dataset is a member of a generation data group, the root name of the group should be provided, rather than the actual generation name.

SESSION Options

Session options can be used to override the installation defaults (implemented with the SYSOPTN job), and can also be used to provide volume migration defaults with session-wide applicability. Following are the options that can be specified on the SESSION control statement:



Session Options Table

SESSION Options

Parameter	Description	Function	Options	Default[1]
UNIDENTifiedsystems	Unidentified systems	Sets a severity for detection of systems that have logical paths to a subsystem or volume but which have not been defined as Agents.	**Warning** Error Ignore Terminate	Warning
ALLOWINValidcounts/ NOALLOWINValidcounts	Allow invalid count records	Allows a volume copy to continue after an input record is encountered that has a non-standard count field.		A count field with a CCHH that does not match its physical disk location will cause volume termination.
ICKdsf/NOICKdsf	ICKDSF invoked for VTOC and index correction	Causes ICKDSF to be loaded and invoked after a successful swap migration, where the source volume VTOC does not match the target device.		ICKDSF will not be automatically invoked and a warning message will be issued where there is a VTOC/ device mismatch.

SESSION Options *(Continued)*

Parameter	Description	Function	Options	Default[1]
NOPACing/PACing	Volume Pacing	Sets normal or reverse volume pacing to limit the length of time taken by source device I/O operations and real storage usage, in accordance with other system activity. In normal pacing, a single read operation starts at 15 tracks and is reduced if contention is detected. With reverse pacing, a single read is initially limited to one track and the limit is increased if there is no contention.		No volume pacing.
RELABel(xx)	Relabel source volume after swap	Provides a two alphanumeric character prefix for each new volume serial number. The new volser is derived by appending the source device number.		Source volume will be relabeled with the target volume serial.
NOCHECKTarget, NOCHKTarget/ CHECKTarget, CHKTarget	Check target volume is empty	Causes initialization to fail if a target volume contains user data.		No check is performed.
NOMONITORXRC, NOXRC/ MONITORXRC, XRC	Monitor XRC sessions	Provides a session name when XRC session participation causes termination of a migration.		No XQUERY is issued: an active XRC volume will cause termination.

SESSION Options *(Continued)*

Parameter	Description	Function	Options	Default[1]
TIME	Time display	Determines whether system TOD clock values will be converted to local time before being displayed.	**GMT** or LOCAL	No local time zone conversion.
NOCFW	No Cache Fast Write	Prevents Cache Fast Write from being used for Communications Dataset I/O.		Cache Fast Write will be utilized for VRNQ I/O if the session contains a large number of Agent systems or volumes and the SYSCOM device supports it.
NOXCF	Prevents XCF communications being utilized	Prevents the Master system from establishing an XCF group for communications with Agent systems in a parallel sysplex environment.		XCF will be used to speed communications during volume initialization and termination.
SINGLEgroup	Single group	Treats all volumes in the session as a single group, with a group id of **SINGLE**.		Volumes are processed individually, or grouped using the GROUP statement.

SESSION Options *(Continued)*

Parameter	Description	Function	Options	Default[1]
NOWARNING[2]	Suppress warning message(s)	Enables the suppression of certain Softek TDMF warning messages. Using this option keyword causes the system to disregard the warning message about the migration, and resets the completion code to zero.	The following messages can be suppressed by specifying the message numeric characters following the NOWARNing (*nnnn*): • TDM1370W • TDM1372W • TDM1384W • TDM1385W • TDM1387W • TDM1444W • TDM1445W • TDM1446W • TDM1447W • TDM1485W • TDM1574W • TDM1670W • TDM1733W • TDM1824W • TDM2667W • TDM2668W • TDM3769W • TDM3771W	Any warning messages will result in a condition code of at least 4.

SESSION Options *(Continued)*

Parameter	Description	Function	Options	Default[1]
CONCurrent, CNCRNT	Concurrent volume limit	Provides a maximum number of concurrently migrating volumes and, optionally, an indication that this limit should only apply to "active" volumes (in their copy or first refresh phases).	(nn) ACTIVE	All volumes can be initialized and be migrated concurrently. If a number is provided without the **active** option, an initialized volume will be counted as part of the concurrent limit until its migration terminates.

1. Most of the defaults described in this table can be modified in the SYSOPTN job.
2.Before deciding to degrade a warning condition, pleas refer to the message description in the manual or the TSO Monitor message help. The message must specifically state that it may be neutralized by NOWARN or the session will be failed.

GROUP Control Statement

A GROUP control statement can precede a number of MIGRATE statements. The GROUP statement enables the volumes in subsequent statements to be synchronized together. Use the following guidelines when specifying a GROUP control statement:

- Options specified on this control statement apply to the volumes in the group, and are discarded when a new GROUP control statement is encountered.
- A maximum of 32 GROUP statements may be supplied in a session.

CAUTION

For volumes that are *not* part of a group, the MIGRATE control statements must precede the GROUP control statement:

GROUP Format

The format of the GROUP control statement is as follows:

```
>>--GROUP---group_name-------------------------------------------->

>------+-------------------------------------------------+---------->
       +-OPTions(-|Common Options|---|Volume Options|-)-+
```

GROUP Parameters

The GROUP statement provides a group name, and can also supply migration options for MIGRATE requests that follow a GROUP statement. Follow these guidelines:

- The group name (**group_name**) and statement options remain in force until a new GROUP statement is encountered, although options can be overridden by the MIGRATE statement for volumes in the group.
- A GROUP statement cannot be used when the **SINGLEGROUP** option is specified in the SESSION control statement.

Volume Options

The volume options available on the GROUP statement, in addition to those options that can be specified on the SESSION control statement as described in page *SESSION Options* on page *31*, are as follows:

```
                                +-NOPAcing-------------+
|--+-------------------+-------+----------------------+--------------|
   +-MAXTRacks(+15+)--+       +-PAcing+------------+-+
                      +-5+               +-(Fullspeed)+
                      +-3+
                      +-1+
```

NOTE

For convenience, any option that is valid for the individual MIGRATE control statements for grouped volumes can be specified instead on the associated GROUP statement.

Volume Options

Parameter	Function	Options	Default
Maximum tracks per write.	Restrict the maximum duration of each I/O request independently of the source volume pacing mechanism.	1, 3, 5 or 15	A read or write of up to 15 tracks is allowed.
Volume pacing	Sets volume pacing, either normal or reverse as described in the SESSION statement pacing option. The Fullspeed copy option can be specified together with volume pacing.	Normal Fullspeed	No volume pacing

NOTE: These options are also valid on the individual MIGRATE control statements.

Full Speed Copy Impact

If the Full Speed Copy option is requested, either the source or target device will be driven at 100% of its capacity. Without this option, the volume reads and writes will be performed alternately, reducing to half the real storage requirement, and reducing the impact of the migration on the users of the source volume and the source and target DASD subsystems.

NOTE

The Full Speed Copy feature can be used to shorten the duration of a volume migration. The Full Speed Copy feature is requested using the **fullspeed** subparameter of the **volume pacing option**. Using Full Speed Copy causes the volume cylinder read and write requests to be overlapped, thereby reducing the time taken by the volume's copy phase, and reducing the number of updated tracks that must be refreshed. This process significantly decreases the refresh and synchronization times required for the volume. In practice, however, the additional load on the source and target subsystems will adversely affect the I/O response times for both the migration itself and all other users of the source volume, as well as users of other volumes in the source and target subsystems. Without considering this probable performance degradation, the duration of the volume copy phase *could* be reduced by up to 50%. The actual rate of copy speed increase will be less; for example, if 1,000 cylinders are being copied and the average source and target volume response times are 120msecs and 180msecs respectively, the copy phase will take five minutes, with no overlap (1000 x (0.120+0.180) seconds). Running the same migration with Full Speed Copy might result in average source and target response times of 150msecs and 240msecs; this would reduce the copy phase duration to about four minutes (0.120 + 1000 x 0.240 seconds). In this example, the I/O of the source volume is faster than the I/O of the target, so the Softek TDMF does not need to wait for any read operation to complete, except the first read operation.

MIGRATE Control Statement

A MIGRATE control statement specifies a volume swap migration. Use the following guidelines when specifying a MIGRATE control statement:

- If it is to be treated as a single (ungrouped) volume, the control statement must precede any GROUP statements in the input stream.
- The MIGRATE statement provides the source and target volume for the migration, and can supply a new volume serial number to be written to the source volume after the swap, and options that apply to this volume migration alone.

CAUTION

For volumes that are *not* part of a group, the MIGRATE control statement must precede the GROUP control statement:

MIGRATE Format

The format of the MIGRATE control statement is as follows:

```
>>--MIGRATE---source_volume---------------------------------------->

>-------+-target_volume-----------+-----+--------------------------->
        |                          +-new_volser------------+ |
        +-TARget-+(target_volume)-------+-------------------+-+
        +-TGT----+                      +-RELABel-+(new_volser)-+
                                        +-NEWvsn--+

>-------+-------------------------------------------------+---------->
        +-OPTions(-|Common Options|---|Volume Options|-)-+
```

MIGRATE Parameter Guidelines

Follow these guidelines when specifying the MIGRATE control statement:

- Each MIGRATE statement specifies a swap migration volume pair, with an optional new volume serial number to which the source volume will be *clipped* after the swap.
- The source and target volume serial numbers must be supplied.
- If the new volume serial number is not specified, one of the following will occur: 1) a new volume serial number will be generated, using the RELABEL prefix supplied on the SESSION statement and the source device number, or 2) the source volume will be relabeled with the original target volume serial number.

Common Options for the SESSION, GROUP and MIGRATE Statements

Common options that can be specified on the SESSION control statement as well as the GROUP and MIGRATE statements are as follows:

NOTE

As a general rule, any option that applies to all the volumes in the session and that is valid for the SESSION control statement should be specified on the associated SESSION statement.

Common Options Table

Common Options for SESSION, GROUP and MIGRATE Control Statements

Parameter	Description	Function	Options	Default
NOCONFirm/ CONFirm	Confirmation at volume/group initialization	Request confirmation using the TSO monitor or system operator reply before initializing a volume or group.		No confirmation required.
NOPRompt/PRompt	Synchronization prompt	Request confirmation using the TSO monitor or system operator reply before synchronizing a volume or group.		No prompt issued.
NOCOMPARE/ COMPARE	Volume comparison	Compare the source and target volumes after synchronization.This is not intended for production use.		No volume comparison.
NOAUTOOPerations, NOAUTOOPS/ AUTOOPS, AUTOOPerations	Auto operations	Issue console messages and accept responses to prompts from the operator. Provide non-displayed WTO messages for automated operations scheduling.		No operator messages issued.
NOTERMGRoup/ TERMGRoup	Terminate volume group on error	Terminate an entire group if migration fails for one of its volumes.		The group will continue to completion after termination of individual group volumes.
NOFASTcopy/ FASTcopy	Fast copy	Restrict the cylinders being copied from the source volume to those allocated for datasets.		The entire volume, including unallocated cylinders, is copied.

Common Options for SESSION, GROUP and MIGRATE Control Statements *(Continued)*

Parameter	Description	Function	Options	Default
NOPUrge/ PUrge	Target volume purge	Erase data on the target volume(s) from those cylinders into which source volume data will not be copied.This option is relevant in the case of a "small to large" migration or when Fastcopy is specified.		The target volume is not erased unless it is an RVA/SVA type.
NOALLOWmirrorchange /ALLOWmirrorchange	Mirroring change	Allow or disallow migrations between devices that employ different mirroring techniques (PPRC to SDRF, SDRF to PPRC)	NOACKnowledge/ ACKnowledge	Initialization will fail if a PPRC source volume will be swapped to a non-PPRC device.
NOEXTVtoc NOXVToc EXTVtoc XVToc	Resizing VTOC on target device	Provides required VTOC size for a swap migration to a larger device when the ICKDSF option will be performed.	(nn) is the number of tracks the VTOC will be sized to. If (0) specified, only REFVTOC will be done. See *ICKDSF on page 78* for more details.	By default, if the ICKDSF option is selected, the volume will be resized based on the device type (TDMF driven).
SYNCgoal	Synchronization goal	Provide the maximum number of seconds that the source device may be quiesced in order for volume synchronization to occur.	005-999	Five seconds.

Softek TDMF System Defaults

The following descriptions concerning System Defaults (SYSOPTN batch job) are for the Softek TDMF licensed product, other vendor offerings, Softek TDMF Express and Trial Express Offerings. For examples of the SYSOPTN batch job, please refer to member SYSOPTN in SAMPLIB.

System defaults set in previous versions or releases of Softek TDMF may be displayed via the Softek TDMF TSO Monitor by selecting *Option 8 - Display Installation Options and Environment* on page *159*. Data sets used for Version 1 or 2 are not compatible with Version 3.

System Defaults

Softek TDMF System Defaults and Options

Parameter	Function	Option	Default
PARM= `(on the EXEC PGM= statement)`	NEW specifies that this is the first time the SYSOPTN batch job is being executed. Selection of this value will rewrite the entire key record. UPDATE specifies that an entry is being updated.	NEW UPDATE	No default
TDMF VERSION	Must be the first non-comment entry. Specifies what version of Softek TDMF is being executed.	3	Must be specified
TDMF FUNCTION	Specifies what Softek TDMF offering is being executed. Only one function may be specified. It is provided by the Softek TDMF key Administrator.	FULL EXPRESS VENDOR VIRTUAL TRIAL EXPRESS	Must be specified
KEYxx=	Keys provided by Softek in order for Softek TDMF to execute. Additionally, starting in column 38, description of what key is related to (CPU, etc.) may be specified (up to 20 characters).	16-digit key provided by Softek	Must be specified
SYSCOM HISTORY DATASET NAME =	Record all COMMDS usage in all Softek TDMF sessions. These entries can be accessed via the TSO Monitor (see *Option 7 - Past Sessions: Display Communication Data set History* on page *158* for details). Must have UPDATE authority. To remove a data set entry, specify DELETE.	Data set name Blank	No history logging
SITE NUMBER =	5-digit customer number issued by Softek. Used in Monitor display and sysout listing.	Site Number	Site number must be specified

Softek TDMF System Defaults and Options *(Continued)*

Parameter	Function	Option	Default
CORPORATION =	Customer Corporation name. Used in Monitor display and sysout listings. Up to 64 characters allowed.	Customer name	Corporation name must be specified
SITE NAME =	Local customer site name for a specific site, for example. Up to 64 characters allowed.	Name	Site name must be specified
SMF RECORD ID =	User specified SMF record to be created for SMF recording purposes. A value of 128-255 is valid (see *SMF Recording* on page *60* for details).	SMF record number Blank	No SMF recording
DISPLAY TIME AS =	Softek TDMF defaults to GMT time on sysout. Can be set to local time (for information on setting displays to local time, see *Option 10 - Display/Modify User's TSO Monitor Options* on page *162*).	GMT LOCAL Blank	GMT time display
VOLUME PACING REQUIRED =	If pacing is selected, Softek TDMF will dynamically determine the impact to real storage on the Master system and I/O operations on all source volumes selected in the session. If there is an impact, attempts will be made to decrease the impact upon the resource dynamically and then return to normal levels after the resource bottleneck has been alleviated. See *Dynamic Volume Pacing* on page *55* for more information.	YES NO Blank	No pacing

Softek TDMF System Defaults and Options *(Continued)*

Parameter	Function	Option	Default
STARTUP CONFIRMATION REQUIRED =	A volume confirmation screen with warning messages (if applicable) for review and approval before a volume migration proceeds. If WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = is set to yes, a Write-to-Operator with Response (WTOR) will be issued to the system console as well as the Softek TDMF TSO Monitor.	YES NO Blank	No volume confirmation
TERMINATE ALL VOLUMES IN GROUP ON ERROR =	If an error on any volume occurs within a specific "group" of volumes, the entire group will terminate.	YES NO Blank	No group termination
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED=	If an automated operations package is in use and it is desired that Softek TDMF use this, Softek TDMF will display specific messages related to start, confirmation, prompts for synchronization and termination on the system console. See *Auto-Operations Interface* on page *55* for more detail.	YES NO Blank	No WTO or WTOR issued to console
WTO AUTO OPERATION MVS ROUTCDE =	Write to Operator MVS route codes. Values are 1 through 28. Multiple values may be specified and must be separated by a comma and ended with a ')'.	(x, x, x)	WTO route codes 2, 4, 6 and 10.
VOLUME SECURITY=	If a security package is installed, it is possible to have volume level security via (SAF) calls. See System Authorization Facility for more information.	YES NO	No SAF calls

Softek TDMF System Defaults and Options *(Continued)*

Parameter	Function	Option	Default
REVERSE PACING =	If "YES" is specified, volumes migrated with the pacing option will begin the copy phase using single-track buffers. The buffer size will only increase if volume activity and performance meet Softek TDMF criteria.	YES NO Blank	No
ACTIVE IN COPY =	If "YES" is specified, only volumes in the copy or first refresh phases will be considered as "active". This will only affect migrations in which volume activation is delayed by the setting of a maximum concurrent volumes limit.	YES NO Blank	No
AUTOMATIC ICKDSF =	If "YES" is specified, the ICKDSF program will be called when necessary to synchronize a migrated volume's VTOC with its target device.	YES NO Blank	No
ALLOW INVALID COUNT FIELDS =	If "YES" is specified, the presence of non-standard record count fields will not cause termination of a volume migration.	YES NO Blank	No
UNIDENTIFIED SYSTEMS ACTION =	Determines what action should be taken by Softek TDMF when a source volume is found to which logical paths have been established by a system that is not defined on a SYSTEMS control statement. For information about this option, see *Verifying that Required Softek TDMF Agents are Running* on page *48*.	Ignore Warn Error Terminate	Warn

Softek TDMF System Defaults and Options *(Continued)*

Parameter	Function	Option	Default
CHECK TARGET EMPTY =	If "YES" is specified, target volumes will be examined during session initialization and the migration job will fail if any contains user data.	YES NO Blank	No
MONITOR XRC SESSIONS =	Monitor XRC to determine whether a volume is an XRC primary or secondary.	YES NO	No

Verifying that Required Softek TDMF Agents are Running

To maintain data integrity, it is essential that a Softek TDMF Agent job is running on all shared systems that have the volumes online. The Unidentified Systems Action option can be used to verify that the correct number of Agents is being executed.

At session initialization, Softek TDMF attempts to obtain the logical path status information from any storage controller reflecting 3990-6 compatibility.

CAUTION

Be aware that some storage controllers do not provide logical path status data, and the support may be vendor dependent. To check whether the data are available, execute ICKDSF with the ANALYZE NOSCAN NODRIVE option. If logical path status data are available, a logical path status table will be printed. The logical path status data identifies the CPU Serial and Model number of the systems connected to that volume. Softek TDMF cannot determine whether the volume is online to those systems.

Softek TDMF checks the logical path status table to ensure that Agents are active on all systems. Those processors not running an Agent are listed under message TDM2382I. The action taken depends upon the value set for the **Unidentified Systems Action** setting in the SYSOPTN job, unless this is overridden in the SESSION control statement options list.

Running Softek TDMF

NOTE

Softek strongly recommends that each Softek TDMF session use a unique COMMDS for reasons of history logging, audit trails, diagnostics, and messages.

Softek TDMF batch jobs or STCs can be submitted in any order and Agent systems will not be initialized until the Master system has initialized the Communications dataset. Each Agent system will wait for a maximum period of 15 minutes for the Master system and all Agent systems to initialize. If after 15 minutes, the Master or any attached Agent job has not properly initiated for any reason, the session will be terminated, including any Master or Agent system(s) that have initiated successfully.

CAUTION

If this situation occurs, *the entire session must be restarted.*

If multiple sessions are to be run, each session must have a unique COMMDS. As previously stated an active COMMDS volume may not participate in the same Softek TDMF session, but may be migrated in a separate Softek TDMF session. However, the volume containing the TDMLLIB may participate in a session.

Warning messages will be issued during a migration session for the following reasons:

- migrating an UCB below the 16-MB line to an UCB above the 16MB line.
- migrating a three-digit UCB to a four-digit UCB.
- if the alternate cylinder count does not match on the source and target volumes (infers that an ICKDSF REFVTOC job needs to be run if Dynamic ICKDSF is not selected).
- if migrating an ESCON channel attached volume to a parallel channel attached volume.

NOTE

The non–zero step completion code usually associated with these warning messages can be suppressed by specifying the message numbers in the NOWARNING session option.

CAUTION

If multiple Softek TDMF sessions are active, the MVS systems must have an active Global Resource Serialization (GRS) facility unless all Masters run on the same LPAR.

Terminating Softek TDMF

Using the Softek TDMF TSO Monitor or Batch Monitor, it is possible to terminate a specific volume pairing, volume groups or all volumes within a session dynamically. Once a termination request for a volume pairing has been made, it may take a few minutes for this request to be processed by Softek TDMF. See *Option 2 - Current Sessions: User Interaction and Status* on page *140* for more details.

NOTE

If a Softek TDMF session (Master or Agent system) must be terminated for whatever reason, it is strongly recommended that the Softek TDMF TSO Monitor be used.

Under extreme conditions, the MVS Cancel command may be used. If the Master system fails leaving an Agent system active, it is recommended that the 15-minute interval be allowed to expire so that the Agent system will shutdown automatically. It is, however, possible to cancel the Agent system job.

CAUTION

Do not issue a MVS Cancel command to a Softek TDMF session more than once. When a Softek TDMF session is canceled, Softek TDMF goes through standard termination procedures, invoking Extended Specify Task Abnormal Exits (ESTAEs) and Functional Recovery Routines (FRRs), which take time to complete. Allow the proper amount of time (approximately 3 minutes) for these functions to complete. Issuance of a second MVS Cancel command will result in unpredictable results such as source and/or target volumes will be left with an invalid DDTSIO pointer or in a quiesced state. If this does occur, follow the procedures in the next section, *Recovering Softek TDMF Devices* on page *49*.

Recovering Softek TDMF Devices

If a Softek TDMF session was canceled and the source and/or target volumes were left with an invalid DDTSIO pointer or in a quiesced state, then there are two ways to recover these volumes without an IPL.

1. Resubmit the original JCL for the session with the PARM=RECOVERMASTER or PARM=RECOVERAGENT specified, which will cause Softek TDMF will attempt to correct the UCBs for those volumes.

   To utilize this recovery technique, the following conditions MUST be true:

   - The original COMMDS must be available
   - No VARY ONLINE | OFFLINE commands have been issued to the volumes.
   - The original JCL must be available.

2. If the devices can not be recovered by using the above technique, the TDMFCLUP Batch Utility may be utilized. Additionally, if TDMF failed to pagefree and/or release common area virtual storage (SQA/ECSA), the TDMFCLUP utility can also be used to recover that virtual storage. For more details on the TDMFCLUP utility, see *TDMFCLUP* on page *106*.

How to check the DDTSIO pointer

1. Start the TDMF TSO Monitor on the system where TDMF was not properly terminated.
2. Select option **U**, then Select **Option 8—Unit Control Block (UCBs) Display**.
3. In the command line, enter
   `LISTUCB xxxx`

   where *xxxx* is the device address of any suspect volume.
4. From the command output, find the dump of the DDT section of the UCB. It may be necessary to scroll forward.

Valid DDT Example

```
00FC1BE4 C4C4E340  00000000  EF740000  00200000  *DDT ............*
DDT      C9C5C3D3  01013448  0100EA40  0100CD78  *IECL.......  ....*
         00000000  01017008  00FD0D68  93940A78  *............lm..*
         01019728  00000000  017DB210  C4C4D9C4  *..p.........DDRD*
         8100D160  40404040  01015210            *a.J.    ....    *
```

If the DDT “eye catcher” at offset X'0' displays TDMFDDTR in the EBCDIC translation, then the volume has not been properly terminated. It is possible to recover from this situation as detailed in the section *Recovering Softek TDMF Devices* on page *49*.

Accessing Softek TDMF Manuals

Softek TDMF manuals are available in multiple formats. All Softek TDMF Messages and Codes are contained within the Softek TDMF TSO Monitor. The *Softek TDMF* 3.6 *Installation and Reference Guide for z/OS (ML-145133)* and the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)* are available in the formats listed below. Member MANUALS in the Softek TDMF sample library (SAMPLIB) will create the data sets necessary for these files.

BookManager Read

If BookManager Read is installed on the customer operating system, it can be used to access the *Softek TDMF* 3.6 *Installation and Reference Guide for z/OS (ML-145133)* and the *Softek TDMF 3.6 Messages and Codes for* z/OS *(ML-145134)* manual. The data set names for the manuals are:

- HLQ.ML145133.BOOK: *Softek TDMF* 3.6 *Installation and Reference Guide for z/OS (ML-145133)*
- HLQ.ML145134.BOOK: *Softek TDMF 3.6 Messages and Codes* for z/OS *(ML-145134)*

- When using a file transfer program to upload or download these files, ensure that the BINary or IMAGE option is specified for the transfer process.
- Use of the BookManager Library Reader is *not* supported, although some versions can display and print the manuals.
- To create a bookshelf for Softek TDMF documentation, please refer to the manual *BookManager Read/MVS: Displaying Online Books (SC38-2034)*.

Hypertext Markup Language (HTML)

Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134) is provided in HTML format. After the HTML file has been uploaded to a server or downloaded to a personal computer, use an Internet Browser to view the manual. The data set name of the HTML format is:

- HLQ.ML145134.HTML: *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134).*

- When using a file transfer program to upload or download these files, ensure that the ASCII or EBCDIC option is specified for the transfer process.
- Use an internet browser that supports HTML 4.0 to vie and print this book.

Portable Document Format (PDF)

Softek TDMF documentation is provided in Portable Document Format (PDF) form. After the PDF files have been uploaded to a server or downloaded to a personal computer, use the Adobe Acrobat Reader to view and print these manuals. The data set names for the Softek TDMF manuals in PDF format are:

- HLQ.ML145133.PDF – *Softek TDMF* 3.6 *Installation and Reference Guide for z/OS (ML-145133)*
- HLQ.ML145133.PDF.A4 – *Softek TDMF* 3.6 *Installation and Reference Guide for z/OS (ML-145133)* in A4 format
- HLQ.ML145134.PDF – *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*

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1. When using a file transfer program to upload or download these files, ensure that the BINary or IMAGE option is specified for the transfer process.
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Chapter 3

Performance Considerations

This chapter discusses the various options within Softek TDMF and how they may affect the customer's environment.

Auto-Operations Interface

An auto-operations interface has been provided in Softek TDMF. This is a user-selected option, either as the system default, as an option within a migration session, or on a volume level. The intent of this interface is to provide the ability to control Softek TDMF sessions. This may be achieved by using an automated operations package, the user or operator.

If the auto-operations interface is selected, certain Softek TDMF messages will be routed to the MVS system console as well as the Softek TDMF TSO Monitor. Action messages may be responded to from either function. Softek TDMF will note and display where the response was from. The messages issued to the MVS system console for auto-operations use are listed in *Messages for Automated Operations* on page *217*.

The messages issued to the MVS system console will either be requiring action (response) designated by TDMnnnnA, informational messages designated by TDMnnnnI, or error messages designated by TDMnnnnE. Action messages may be canceled by responding with the word **CANCEL**. If a volume or group is terminated due to receipt of a cancel request from the MVS system console or Softek TDMF TSO Monitor, or if a volume pairing fails, message TDMnnnnE will be issued with a brief explanation.

Dynamic Volume Pacing

Softek TDMF will dynamically monitor its effect on real storage and source volume utilization. If, during a session, Softek TDMF detects that there is an impact to real storage or source volume I/O operations, Softek TDMF will dynamically attempt to decrease its utilization of that resource until such time that the degradation is alleviated.

Use of dynamic volume pacing may cause a volume migration to run more slowly due to adjustments made dynamically to real storage or Softek TDMF internal I/O operations. If time is an issue in regard to a volume migration, then it is recommended that dynamic volume pacing not be utilized for that volume, or that the Full Speed Copy option be selected.

NOTE

The Full Speed Copy feature can be used to shorten the duration of a volume migration. The Full Speed Copy feature is requested using the **fullspeed** subparameter of the **volume pacing option**. Using Full Speed Copy causes the volume cylinder read and write requests to be overlapped, thereby reducing the time taken by the volume's copy phase, and reducing the number of updated tracks that must be refreshed. This process significantly decreases the refresh and synchronization times required for the volume. In practice, however, the additional load on the source and target subsystems will adversely affect the I/O response times for both the migration itself and all other users of the source volume, as well as users of other volumes in the source and target subsystems. Without considering this probable performance degradation, the duration of the volume copy phase *could* be reduced by up to 50%. The actual rate of copy speed increase will be less; for example, if 1,000 cylinders are being copied and the average source and target volume response times are 120msecs and 180msecs respectively, the copy phase will take five minutes, with no overlap (1000 x (0.120+0.180) seconds). Running the same migration with Full Speed Copy might result in average source and target response times of 150msecs and 240msecs; this would reduce the copy phase duration to about four minutes (0.120 + 1000 x 0.240 seconds). In this example, the I/O of the source volume is faster than the I/O of the target, so the Softek TDMF does not need to wait for any read operation to complete, except the first read operation.

I/O Pacing

Volume pacing is done for I/O contention between customer application I/O operations to the source volume on all systems and Softek TDMF I/O operations to the source volume during the copy and refresh phases.

Using Device Service Time as a percentage of elapsed time[1], Softek TDMF will assume that it is adversely impacting application performance if the sum of customer and Softek TDMF I/O operations approaches 95 percent (if customer I/O is less than five percent, this assumption is not made). As a result, Softek TDMF will decrement the number of tracks read/written in a single I/O operation. If the sum of customer and Softek TDMF I/O operations falls below 75 percent, Softek TDMF will increase the number of tracks read/written per I/O.

If there is an adverse real storage impact in effect within the Softek TDMF Master system, Softek TDMF will not increase its I/O operations until the real storage shortage has been alleviated.

CAUTION

When Full Speed Copy is specified as a pacing option for a volume or group, Softek TDMF can exceed the pacing threshold (94%) that is set for the source volume, regardless of the level of customer I/O activity on the volume. When using Full Speed Copy:

- the number of tracks per read or write will increase only if there was no customer activity on the volume in the preceding 30 second interval
- the number of tracks per read or write will decrease only if the customer I/O can generate a device busy percentage, in competition with the migration itself, in excess of 5%.

Because an application with frequent, short duration I/O requests could be seriously delayed by a Full Speed Copy migration, use caution when requesting this option for the migration of data base volumes. Either reverse pacing, or setting a maximum number of tracks per I/O request (see *Reverse Pacing* on page *57*, below, and *User Specified Pacing Values* on page *57*), can be used to reduce the risk of performance problems arising in conjunction with a Full Speed Copy migration.

The impact of Softek TDMF I/O operations is ignored on the target. If performance is an issue on the target subsystem, it is recommended that the **User Specified Pacing** option be employed.

Real Storage Pacing

After all I/O pacing decisions have been made, pacing for real storage will come into effect. If the Softek TDMF session(s) real storage frames being used by the Master system exceed 12.5 percent of all available real storage frames in MVS that exist above the line, Softek TDMF will dynamically lower the amount of real storage frames by decreasing the number of tracks read or written in a single I/O operation. If the number of real storage frames used by the Master system falls to 6.25 percent, Softek TDMF will dynamically increase the amount of real storage frames by increasing the number of tracks read or written in a single I/O operation.

Any value between the limits of 75 - 95 percent of I/O operations and 6.25 - 12.5 percent of real storage frames will not incur a change in the pacing of Softek TDMF. Softek TDMF may not attempt to increase pacing, for RSM resources, to a source volume that is currently constrained by application I/O operations.

NOTE

The amount of storage that is fixed at each pacing increment is doubled by using the Full Speed Copy option.

1.All percentages are device service time as a fraction of the Softek TDMF measurement interval.

Reverse Pacing

For those volumes experiencing heavy channel utilization, the **Reverse Pacing** option may be specified (this option is only valid on the Session control statement or may be specified as SYSOPTN as a default). Reverse pacing means that Softek TDMF will start the volume copy process at one track per I/O operation rather than 15 tracks per I/O.

NOTE

Softek TDMF will continue to dynamically adjust the number of tracks read in a single I/O dependent upon utilization.

When Pacing is not in Effect

Pacing is not in effect during the QUIESCE, SYNCHRONIZATON, and RESUME phases; normal real storage and I/O operation requirements will be in effect. This is done in order to ensure that these phases are completed in as short a time period as possible.

The amount of real storage frames and tracks read in a single I/O operation are displayed in the following table.

Table for Real Storage and I/O Pacing Operations

	# OF TRACKS READ/WRITE IN A SINGLE I/O			
Storage Requirement	**15**	**5**	**3**	**1**
900K (225 frames)	X			
300K (75 frames)		X		
180K (45 frames)			X	
60K (15 frames)				X

Information related to the number of pacing decisions made by Softek TDMF (increase/decrease I/O operations and real storage frames) is documented in *Option 4 - Current/Past Sessions: Display Performance Data* on page *150*.

User Specified Pacing Values

This allows the end user to specify to Softek TDMF the maximum number of tracks per I/O operation. This number can be specified as **1**, **3**, **5** or **15** in the **MAXTRACKS** option of the **GROUP** or **MIGRATE** control statement. For example, if pacing or reverse pacing are already specified, and **MAXTRACKS** is specified as **5**, I/Os will either start at five tracks and pace down (in the case of pacing) or start at one track and pace up (in the case of reverse pacing), but, in either case will never exceed five tracks per I/O operation. If pacing is not specified for a volume or group and a **MAXTRACKS** value of **5** is supplied, all I/O for the volume will be performed at five tracks per operation.

Pacing with Channel Extenders

Softek TDMF checks for the presence of **Channel Extenders** and the size of the buffers.

When Softek TDMF detects that a Channel Extender is present, it will dynamically adjust the number of tracks read or written in a single I/O operation based upon the buffer size within the Channel Extender equipment to prevent buffer overflow. This, in effect, is forced pacing. Softek TDMF will not increase the number of tracks read in a single I/O operation beyond that of the buffer size. However, if the pacing option has been selected, it may dynamically scale down the number of tracks read/written in an I/O operation based on the amount of update activity on the source volume.

In the following example, Softek TDMF displays information related to the source device being attached to a Channel Extender.

NOTE

In this case the maximum buffer size is 320KB, which will force pacing to five (5) tracks read per I/O operation.

Pacing with Source Attached to Channel Extender

```
                              VOLUME INFORMATION

--------------------------------------------------------------------------

Source Target  New    ---- Current ----   Cylinders      ---- Number ----
 VSN    VSN    VSN       Phase     Wait   Num   Curr  %%% Req   Compl Wait
TDMS9A TDMS9B           Copy       0030  02226 00134   06 00000 00000 0000
Source Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226
Target Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226

                                                    Source
Remote Device Information                           Device

 Largest  Buffer Allocation Unit                     16 KB
 Smallest Buffer Allocation Unit                     16 KB
 Smallest Maximum Buffer Size                       320 KB
 Maximum track reads without I/O split               05

Volume Pacing Active using 05 Tracks per Operation.
                                                     --- T R A C K S ---
                                                    15     5     3     1
Percent of TDMF Copy Phase I/O using           :     0   100     0     0
Percent of TDMF Refresh Phase I/O using        :
```

In the next example, the target volume is attached to a Channel Extender and the maximum buffer size is 256KB thereby forcing pacing to operate at three (3) tracks per I/O operation. Although the displayed information indicates that four (4) tracks can be written to the target without buffer overflow, Softek TDMF will use the next lowest value of pacing available.

Pacing with Target Attached to Channel Extender

```
--------------------------------------------------------------------------

 Source Target  New     ---- Current ----   Cylinders      ---- Number ----
  VSN    VSN    VSN        Phase     Wait   Num   Curr  %%% Req   Compl Wait
 TDMS9A TDMS9B           Copy        0030  02226 00023   02 00000 00000 0000
 Source Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226
 Target Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226

                                                                      Target
 Remote Device Information                                           Device

  Largest  Buffer Allocation Unit                                     16 KB
  Smallest Buffer Allocation Unit                                     16 KB
  Smallest Maximum Buffer Size                                       256 KB
  Maximum track writes without I/O split                              04

 Volume Pacing Active using 03 Tracks per Operation.
                                                        --- T R A C K S ---
                                                       15     5     3     1
Percent of TDMF Copy Phase I/O using            :       0     0   100     0
Percent of TDMF Refresh Phase I/O using         :
```

In this last example, both the source and target volumes are attached to Channel Extenders.

NOTE

The buffer size on the source device is 960KB whereas the target device buffer size is 256KB. Softek TDMF will always select the smallest buffer size in order to avoid a buffer overflow situation.

Pacing with Source and Target Attached to Channel Extender

```
                          VOLUME INFORMATION

--------------------------------------------------------------------------------

 Source Target  New    ---- Current ----   Cylinders      ---- Number ----
  VSN    VSN    VSN       Phase     Wait   Num   Curr  %%% Req   Compl Wait
 TDMS9A TDMS9B          Copy        0030  02226 00245   11 00000 00000 0000
 Source Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226
 Target Control Unit = 3990-CC Device = 3390-06 Cylinders = 02226

                                                    Source         Target
Remote Device Information                           Device         Device

 Largest  Buffer Allocation Unit                     16 KB          16 KB
 Smallest Buffer Allocation Unit                     16 KB          16 KB
 Smallest Maximum Buffer Size                       960 KB         256 KB
 Maximum track reads without I/O split               15
 Maximum track writes without I/O split                              04


Volume Pacing Active using 03 Tracks per Operation.
                                                      --- T R A C K S ---
                                                    15     5     3     1

Percent of TDMF Copy Phase I/O using          :       0     0   100     0
Percent of TDMF Refresh Phase I/O using       :
```

SMF Recording

During a Softek TDMF session, no SMF records are written unless so specified in the system options.(Refer to *Softek TDMF System Defaults and Options* on page 44). If SMF recording is desired, a user specified SMF record number will be generated for each volume migration. If no SMF recording is specified only basic information related to EXCP counts is generated (SMF record type 4, 14, 15, 30, 32 40, and 64). Valid SMF record numbers are 128 - 255. The SMF record is not written until volume termination and is written to the Master system only.

For details of the SMF record generated, please refer to the TDMSLIB library member TDMFSMF for assembler, TDMFSASD for SAS. SAMPLIB member SMFSAS contains sample JCL.

COPY Functions

A Swap migration is usually done to move data onto new devices or for performance reasons. The user controls when a Swap migration completes by using the MIGRATE control statement as described in *MIGRATE Control Statement* on page 39. By default, volume synchronization starts without any user intervention, as soon as the synchronization goal can be met. To cause the volume or group to wait for a user response, the common option PROMPT must be specified. This option forces a prompt from the Master system to the **Softek TDMF TSO Monitor** (or the MVS system console if the auto-operations option has also been selected). This requires an action from the user via **Option 2** of the **Softek TDMF TSO Monitor**, from the MVS system console, or from the installation's automated operations package.

At the end of a migration the original source volume's UCB is marked offline via a bit in the UCB and all I/O is redirected to the target device. The new volume serial number (default is the original target VOLSER) is placed into the original source volume's UCB for MVS Display Unit command purposes to help distinguish the offline volume from Softek TDMF versus the normal vary offline which clears the VOLSER. An example of the Display Unit responses follows:

Softek TDMF after a migration display unit response (differences have been marked with bold and underscore):

```
D U,,,C73,1
IEE457I 21.30.58 UNIT STATUS 153
UNIT TYPE STATUS        VOLSER     VOLSTATE
0C73 3390 OFFLINE       TDMC73     PRIV/RSDNT
```

Normal MVS display unit response

```
D U,,,C73,1
IEE457I 21.33.43 UNIT STATUS 159
UNIT TYPE STATUS        VOLSER     VOLSTATE
0C73 3390 F-NRD                        /RSDNT
```

Application I/O Performance

Application I/O operations during the Copy and Refresh phases are impacted no more than if a backup utility is backing up the source volume at the same time as the application is executing, although volume pacing or reverse pacing may decrease this impact if selected.

Synchronization Goals

The Synchronization goal parameter may be specified for each volume pairing, allowing the customer to specify the amount of time (in seconds) that he will allow the Synchronization phase to execute. This is the **maximum** amount of time.

If there are multiple REFRESH phases during a migration, it is due to the inability of Softek TDMF to meet the SYNCHRONIZATION goal or the prompt option has been requested and a reply has not been received. This is usually because of high write activity on the Source volume. If there are no issues with this, then there is no reason to change the SYNCHRONIZATION goal parameter. If the prompt is not responded to, Softek TDMF will refresh continuously.

Prior to the Synchronization phase, a QUIESCE is issued to the Source volume. In the instance of a multi-system session, the Master system issues a request to the Agent(s) to Quiesce all I/O to the Source volume (from the Agent side). At this time the last updates are collected and applied to the Target volume (SYNCHRONIZATION). At the end of Synchronization, the Master system starts the volume REDIRECT (swap) phase. When all systems have verified the Redirect, the Master system initiates the RESUME phase so that user I/O can continue to the new Source volume. The elapsed time between the last QUIESCE phase and the RESUME phase is approximately four (4) seconds plus the **ACTUAL** SYNCHRONIZATION time (which should always be less than the specified synchronization goal).

The Synchronization Goal default is five (5) seconds. Synchronization will not occur unless the calculated synchronization time is less than the goal. If the synchronization goal is increased, then the time the Customer I/O is queued or quiesced is greater. If the value 999 is used, this equates to synchronize as soon as possible; it does not matter how long it takes. This can be a significant amount of time depending on the write activity of the source volume. Therefore, use discretion when changing this value. This value may be changed dynamically for a volume or group using the Softek TDMF TSO Monitor (Z or ZG command - see *Option 2 - Current Sessions: User Interaction and Status* on page *140* for examples).

Channel Utilization

As indicated in *Application I/O Performance* on page *61*, Softek TDMF should not impact normal customer I/O operations adversely. However, Softek TDMF performs I/O operations for one cylinder at a time, thus an increase in channel utilization will be seen. Therefore, plan accordingly for these types of sessions. Check the channel utilization via a real-time monitor (RMF, Omegamon, etc.) prior to starting a session. If it is at all possible, these types of sessions should be done during a low activity period.

If channel utilization is 30 to 35 percent busy prior to a migration, then Softek TDMF will drive the channel to over 80 percent utilization with little to no impact to the application(s). However, if channel utilization is 85 percent busy prior to a migration, there will be an application impact. As a general rule-of-thumb, no more than one volume per channel path should be migrated at a time, as two volumes per channel path will saturate the channel path to 100 percent busy.

CAUTION

Use caution when specifying the Full Speed copy option for a volume migration; when the Full Speed Copy option is selected, Softek TDMF will attempt to drive each source or target volume at 100% usage. This increased activity will cause heightened path utilization for channels, switches and the internal DASD subsystem data paths. Extremely high device utilization can cause performance degradation for other volumes in the source and target subsystems; TDMF volume pacing can neither detect nor rectify this condition.

Even if caching is active on a source volume during a migration, there will be an increase in normal device response time. This is because although Softek TDMF reads the data directly from the volume and by-passes the loading of cache, Softek TDMF reads a cylinder of data per I/O request, unless limited by volume pacing, which will cause application I/O to appear to be queued. Cache normally has customer data in it and Softek TDMF does not want to interfere with customer application I/O response time by polluting the cache. If DASD Fast Write (DFW) is on for the target volume, the device response time will be decreased because Softek TDMF will issue the write for a cylinder of data per I/O request taking advantage of DFW if available.

If Full Speed Copy is specified as a pacing option, sequential access caching will be requested from the source volume's DASD subsystem during the volume copy phase. In addition, if this is supported by the subsystem, cache track pre-staging will be performed during the refresh and synchronization phases.

Performance Impact by Phase

The Master and Agent(s) systems poll for processing at specific times. These times are determined by the actual phase that the volume pairing is in. The phases of a volume migration and their associated time intervals are listed below.

Example Phases of Volume Migration and Time Intervals

Phase	Time Interval
Copy	30 seconds
Refresh pass #1	30 seconds
Refresh pass #2… n	Interval is halved until the synch goal can be met
Group Option/Monitor Prompt	30 seconds
Quiesce	1 second
Synchronize	1 second
Compare	1 second
Swap	1 second

Example Phases of Volume Migration and Time Intervals

Phase	Time Interval
Resume	1 second
Termination	30 seconds

This allows Softek TDMF to be responsive with a minimum of CPU overhead.

The CPU overhead associated with executing Softek TDMF is less than 3 percent on average for the Master system. This is dependent upon the number of volumes within a session and the write activity against the source volumes. An Agent system's CPU overhead will be almost non-measurable.

For example, if the Master job takes 44 minutes, 22 seconds to migrate 16 volumes, and the TCB time is 63.5 seconds, and the SRB time is 2.92 seconds, then the CPU overhead is equal to 2.49 percent ((63.5 + 2.92) / 2662) for that session.

When multiple volumes are running in a Softek TDMF session, not all volumes will be in the same phase at the same time. This is because different volumes may have different activity against them or the volumes may be of different capacities. The number of channels available to each Control Unit (CU) will also be a factor in this. Therefore, it is entirely possible to have a 4-volume session running with volume 1 in the Copy phase, volume 2 in a 4th Refresh phase, volume 3 is completed, and volume 4 is in the Synchronization phase.

Placement of the Master System

The Master system should be placed on the system that has the most updates or on the system where the owning application is executing. If multiple Softek TDMF Master sessions is being executed on multiple operating systems, then the MVS system(s) must have a global facility like GRS or MIM. This is to prevent inadvertent usage of the same volumes in a multi-session environment. If a GRS type facility is not available in the complex, then all Master sessions MUST run on the same operating system.

Placement of the Communications Data Set

It is strongly recommended that each Softek TDMF session use a unique COMMDS for reasons of history logging, audit trails, diagnostics, and messages.

The Communications Data Set (COMMDS) should be placed on a volume with low activity and the volume must not be defined to Softek TDMF as a Source volume in the session. It is recommended that the COMMDS not be placed on a volume where other control data sets (i.e., MIM, the StorageTek LSM Control data set) reside.

Softek TDMF periodically issues a RESERVE macro for the volume containing the COMMDS and this might impact other applications if this RESERVE is not being converted to a global ENQ by GRS.

The resource major name used by Softek TDMF is TDMFRESV and the minor name is the COMMDS name. The appropriate adjustments to MIM or GRS should be made. See *Unicenter CA-MIM Resource Sharing* on page *71* and *Global Resource Serialization* on page *78*.

It is possible to define the COMMDS as a Generation Data Group (GDG) which can ease the tracking of these data sets. In this case, each new COMMDS generation would probably be defined before the Master and Agent jobs were submitted, allowing reference by relative generation number zero in the JCL.

Some benefits will be obtained in a large migration session (many volumes and many Agent systems) if the COMMDS is allocated on a PAV capable volume, as Softek TDMF will then perform each interval read and write as two concurrent I/O requests, one of which will utilize Cache Fast Write.

NOTE

Softek also recommends that the COMMDS files be backed up to tape periodically as these represent a history/audit trail as well as providing information for performance and diagnostic purposes.

CAUTION

Re–use of a COMMDS will cause the loss of previous session status and message information. In the event of an error, the COMMDS is the primary tool used for problem determination and/or system recovery.

Raid Subsystems and Rank Contention

Raid subsystems consist of one or more physical volumes with a possible volume for parity. This is referred to as a “rank” or an “array”. Data may be “striped” across the physical rank to create multiple logical volumes or multiple logical devices may use the same physical device. The number of internal device paths to each rank or array will vary. However, there is only one actuator per physical device. Because of this, if more than one volume per rank or array is being read or written to during a Softek TDMF migration, the performance of that volume migration may be adversely impacted.

When reading from or writing to a raid subsystem, it is recommended that only one volume per rank be involved in a session so that a timely session can be ensured. Failure to do so may cause severe performance problems.

It is recommended that a review of the mapping of logical to physical volumes on a Raid subsystem be done in order to avoid overloading a physical volume within the array or rank.

Storage Subsystem Performance

Multiple operating systems may be attached to any one storage subsystem and any or all of the volumes within that subsystem may or may not be shared. The execution of a Softek TDMF session where the source and/or the target volumes are ‘seen’ on one operating system and not another should not create an adverse impact for applications on other operating systems attached to that storage subsystem.

Softek TDMF bypasses the loading of cache so that customer application I/O is not impacted during an active migration session.

It is important to note that, dependent upon the vendor architecture and implementation of a DASD storage subsystem, not all storage subsystems will honor cache commands related to turning cache off or by-passing the loading of cache. Cache is normally shared within a DASD subsystem, as a pool, that is accessed by all connected operating systems and cannot be fenced (partitioned) or allocated on a per volume basis. Therefore, it is possible that a Softek TDMF session on one operating system can impact the application I/O on another operating system that is not involved in the session itself. It is recommended that a pacing option be selected in order to minimize this impact. Alternatively, limiting the number of concurrent volumes that are active in a session will lessen this impact as well.

Suspend/Continue of a Migration

If real storage utilization is an issue, it is possible to dynamically suspend the volume or group migration until the storage issue is resolved.

NOTE

If there is an issue with real storage utilization, dynamic volume pacing is recommended. See *Dynamic Volume Pacing* on page *55* for this topic.

If the ‘suspend’ command is issued during the copy phase of the volume migration, the command will take effect with the start of the next read I/O operation. If the volume pairing is in the refresh phase when the ‘suspend’ command is issued, the suspension will take effect on the next read I/O operation if there are updates occurring on the source volume. If there are no updates to the source volume, the command will be ignored until the next write I/O operation to the target volume. Once the ‘suspend’ command goes into effect, the storage used for Softek TDMF I/O operations will be released.

Softek TDMF will continue to monitor the source volume(s) for updates until such time that the migration(s) may be continued. Once the command to continue the migration(s) has been received, the real storage requirements for Softek TDMF I/O operations will be re-acquired at the level Softek TDMF was last using if the pacing option was selected.

The Softek TDMF Hang Monitor

The purpose of the Softek TDMF Hang Monitor is to detect a failure in Softek TDMF processing and to instigate the appropriate error routine and terminate the migration.

A “hang” is detected if the Master or Agent system has not performed volume processing within the previous minute. Volume processing has four components: a timed wait, from one to 30 seconds, a COMMDS read operation, processing of changes in status for each volume then a write of messages and acknowledgements to the COMMDS.

Termination of the session is scheduled if a “hang” has been detected, while at least one volume in the session has been quiesced by Softek TDMF.

NOTE

With a volume quiesced, for example, while synchronizing the source and target volumes, Softek TDMF attempts to perform volume processing once per second; the Hang Monitor interval remains at one minute.

A wait for completion of a volume or a COMMDS I/O operation is not considered a “hang.” Message TDM9472I, TDM9473I or TDM9474I will be issued to alert the user in this case. The “heartbeat” is updated after the processing of each volume in the session.

Dynamic Suspension of a Migration

Softek TDMF sets a timeout limit on most volume I/O requests. When the MVS I/O Timing facility detects that the operation has exceeded this limit, the operation is terminated with a meaningful failure code. Softek TDMF includes a ‘dynamic suspension’ facility, which prevents further I/O operations being attempted to the volume pair, until the problem has been corrected and the user has requested that the volume copy should continue.

The Missing Interrupt Handler Interval (MIHI) in effect for the specific device determines the timeout value. These values are:

- MIHI less than 170 seconds, timeout is 1.5 x MIHI.
- MIHI less than or equal to four minutes, timeout is 255 seconds.
- MIHI greater than four minutes, I/O timing is suppressed.

The MVS operator command “D IOS,MIH,DEV=/xxxx” will display a device’s MIHI. MVS operator command “SETIOS DEV=/xxxx,TIME=mm:ss” will alter the MIHI of a device.

I/O timing is now also in effect for most COMMDS I/O operations, using a timeout interval derived from the device’s MIHI. If a timeout occurs, processing continues as if there were no messages from other systems to be processed. If at least one device is quiesced or if the I/O operation is of a type that must complete, COMMDS I/O timing will be suppressed.

For Agent systems that must send details of updates performed on each source volume (refresh notification), additional control blocks and logic exist to reduce the risk of migration failure.

If, during an I/O operation, Softek TDMF detects an I/O timeout condition, Softek TDMF will dynamically place that volume migration in a suspended state. Possible messages that may be issued are TDM3554W, TDM3555W, TDM3556I and TDM3557I. Messages TDM3562W and TDM3563W indicate when dynamic suspension is caused by the failure of an I/O request due to an invalid device status.

It is the user’s responsibility to issue the ‘continue’ command from the Softek TDMF TSO Monitor or via the batch utility TDMFBMON in order to re-start the volume pairing.

When the ‘continue’ command is issued, Softek TDMF will retry the I/O operation that caused the timeout condition. If a timeout condition occurs again, the dynamic suspension mechanism will be invoked once again. If a volume can never be successfully continued due to repetitive I/O timeouts, it may be terminated using the Softek TDMF TSO Monitor or using the Batch Monitor.

Chapter 4

Planning Considerations

Overview

This chapter presents information related to specific program products or functions that need to be taken into consideration when planning or executing a Softek TDMF session. Possible user action subsequent to a Softek TDMF session is also documented in this chapter.

CA Products

BrightStor CA-ASTEX Performance

ASTEX V2.7 has maintenance fixes which are required to be compatible with Softek TDMF. Please contact Computer Associates ASTEX Technical Support for details.

ASTEX V2.8 will dynamically detect Swap migrations; no user interaction is necessary.

Unicenter CA-OPS/MVS Event Management and Automation

CA-OPS/MVS intercepts WTO/WTORs issued by program products including Softek TDMF when the auto-ops feature has been requested. In order to migrate a volume containing the OPSLOG data set the following recommendations are made:

1. Place this volume in a single volume session if possible.
2. Turn the auto-ops feature off for all volumes in the session (specify "OPTIONS(NOAUTOOPS)" on the SESSION, GROUP or MIGRATE control statement).

For information related to this file, refer to the *CA-OPS/MVS Administrator Guide*.

Unicenter CA-Scheduler Job Management

The supported releases of CA-Scheduler support the use of four (4) digit UCBs or UCBs above the 16-MB line.

When migrating volumes related to CA-Scheduler, the started task (STC) must be inactive during the session. Once the migration is complete, the STC may be re-activated. The commands to accomplish this follow:

```
P CASCHD - stops CA-Scheduler
S CASCHD - starts CA-Scheduler
```

BrightStor CA-1 Tape Management

When migrating volumes that contain the CA-1 Tape Management Catalog (TMC) and Audit Files, it is recommended that CA-1 be inactive. Once the migration has completed, TMSINIT must be executed. CA-1 Release 5.2 genlevel 9901 supports UCBs above the 16-MB line.

Alternatively, a Swap migration with the prompt option could be used. This method would signal when the volume is ready to synchronize at which time CA-1 would then be made INACTIVE. Once CA-1 is INACTIVE, respond to the Softek TDMF prompt. When the swap has completed, TMSINIT would then be executed to re-activate CA-1. The amount of time that the TMC and / or the Audit files would be unavailable (and that CA-1 is INACTIVE) would be very brief.

For more information on this topic, please refer to the *CA-1 Administrator and Operator Guide*.

BrightStor CA-HYPERBUF VSAM Buffer Optimization

When migrating volumes that contain a catalog, and the Auto-ICKDSF feature has been selected, an ENQ lockout situation can occur between Softek TDMF and the Catalog Address Space (CAS).

Users of the CA-HYPERBUF product are recommended to either exclude Softek TDMF from CA-HYPERBUF processing or implement constraint list changes.

- If running CA-HYPERBUF V4.3.0, PTFs QO15832, QO21795 and QO27604 should be installed. At this level CA-HYPERBUF will look fro the statement

  //CAHBEXCL DD DUMMY

  This statement will cause CA-HYPERBUF to bypass all of its subsequent activities.
- If running earlier levels of CA-HYPERBUF, modifications to the constraint list will be required.

  MODE=EXCHANGE

  PROGRAM=ARC+

  PROGRAM=IEH+

  PROGRAM=EDG+

  PROGRAM=ADR+

  PROGRAM=ICK+

  PROGRAM=TDMF+

For more information on this topic, please refer to the appropriate CA-HYPERBUF documentation or contact CA-HYPERBUF technical support.

Unicenter CA-7 Job Management

If a volume containing the Communications Data Set for use with CA-7 and the Independent Communications Manager (ICOM) is selected for a Swap migration, both the CA-7 and ICOM started task must be shut down. Once the migration has completed, these tasks may be restarted.

Alternatively, a Swap migration with the prompt option could be used. This method would signal when the volume is ready to synchronize at which time the application would then be shutdown. Once the application has shutdown, respond to the Softek TDMF prompt. When the swap has completed both the CA-7 and ICOM tasks would be restarted. This would keep the time that CA-7 and the ICOM are down to a minimum.

For more information on this topic, please refer to the *CA-7 Systems Programmer Guide*.

Unicenter CA-11 Job Management

If a volume containing the Job Execution History File (JEHF) is to be migrated, then the JEHF I/O must be shut down prior to the migration. Once the migration has completed, the task may be restarted.

Alternatively, a Swap migration with the prompt option could be used. This method would signal when the volume is ready to synchronize at which time the application would then be shutdown. Once the application has shutdown, respond to the Softek TDMF prompt. When the swap completes the JEHF I/O task would be restarted. This would reduce the time that the JEHF is unavailable.

For information related to this topic, please refer to the *CA-11 Systems Programmer Guide*.

Unicenter CA-MIM Resource Sharing

Softek TDMF will periodically issue a reserve macro (TDMFRESV) to the volume where the Communications data set (COMMDS) is resident. Dependent on how certain parameters are set within Multi-Image Manager (MIM), this could cause the reserve to be converted by MIM to a global enqueue.

CAUTION

CAUTION:

Softek recommends that the physical device reserve mechanism be used to ensure serialization of the Communications Dataset. In situations when the volumes suitable for the Communications Dataset are shared across sysplexes and must not be physically reserved, the TDMFRESV resource can be converted by CA–MIM and propagated to the Agent systems using GDIF.

The following procedure will help determine what actions will need to be taken in order to avoid this reserve conversion. This information has been supplied courtesy of CA-MIM Technical Support.

Go into the MIMINIT deck and search for PROCESS=

The options available are SELECT or ALLSYSTEMS. The differences between these two options are described below:

PROCESS=SELECT tells MIM to only manage and convert the enqueues and reserves that are indicated in the MIMQNAMES list and GDIEXMPT list.

PROCESS=ALLSYSTEMS directs MIM to manage all enqueues and reserves that have a SCOPE=SYSTEMS unless the qname is specified in the MIMQNAMES list with GDIF=NO, or the dataset is specified in the GDIEXMPT list via a LOCAL statement.

To prevent MIM from converting the RESERVE to a global enqueue for the COMMDS data set, do one of the following:

- If running with GDIINIT PROCESS=SELECT:

  Do not define the TDMFRESV qname to MIM via the MIMQNAME member.

- If running with GDIINIT PROCESS=ALLSYSTEMS:

  Define the following to the MIMQNAME member

  TDMFRESV GDIF=NO

If assistance is required to code the MIM parameters, please contact CA-MIM Technical Support.

Multi-Image Manager (MIM) release 4.1 and above supports four (4) digit UCBs. Support for UCBs above the 16-MB line for disk and tape is available at maintenance level 9608. Support for CTC UCBs above the 16-MB line is available at maintenance level 9706. For those customers using GRS, please refer to *Global Resource Serialization* on page *78*.

Moving Multi-Image Manager Control Data Sets

If a Swap migration is to take place for a volume that contains one or more Multi-Image Manager (MIM) control data sets, it is recommended that prior to the migration, the data sets be deallocated and reallocated after the Swap migration. For more information regarding these commands, please refer to the *CA-Multi-Image Manager Statements and Commands manual.*

Cache Fast Write and Sort Programs

Softek recommends that Cache Fast Write (CFW) be turned off for those source volumes involved in swap migration sessions, if possible.

A swap migration could be terminated with the TDM2363I message identifying that Cache Fast Write (CFW) activity has been detected on the source volume. This will only occur if the target volume is not part of the same DASD subsystem as the source volume. The accompanying TDM2596I message will identify the jobname responsible. Most often it is a sort program which causes the CFW activity although there are other applications which can use CFW.

To circumvent this situation, a number of options are available:

- Turn off the CFW feature at the DASD subsystem level. Be aware that not all subsystems have the facility to do this. Please consult the hardware manufacturer's documentation.
- For sort work data sets allocated on work volumes in a DFSMS environment the volume can be set to a status of DISNEW (Disable new allocations) see *DFSMS* on page *73* for more details.

Some applications that use CFW have a facility for turning the option off.

Class Names and Esoteric Names

Softek TDMF is not aware of DFSMS class names or system esoteric names that have been defined within an operating system. DFSMS Class Name definitions are based on volume serial number. Therefore, no action need be taken after a Swap migration since the volume serial number and class name is retained. Esoteric names are defined by device address. Therefore, it is the user's responsibility to ensure that the esoteric names are updated to include any device addresses that may be involved in a Swap migration.

Device States: Before and After a Swap Migration

The states of a device are related back to the subsystem it is connected to. The states in question are Caching (and CFW), and DASD Fast Write (DFW). A device cannot have CFW or DFW on at the volume level if it is not on at the subsystem level.

Softek TDMF will note what the status of CFW and DFW for each source and target volume involved in a migration, **but will not modify the states** of CFW or DFW to any subsystem. Therefore, if CFW and DFW are on for the source subsystem and devices, but is off on the target subsystem and devices at the start of a volume migration, the status at the end of the swap migration will be that the new source volume (original target) will now show that CFW and DFW is off.

It is possible to determine the status of CFW and DFW via the Softek TDMF TSO Monitor Feature using Option 3, Current Sessions: Display Messages.

Data Facility Products

Control Data Sets

If the any of the Data Facility Product's (HSM, SMS, RMM) control data sets (ACDS, BCDS, MCDS, OCDS, etc.) are to be migrated using Softek TDMF, it is recommended that the control data set should not be active at swap time. If the particular DFP product has no means of freeing up an active control data set (by using an alternate), then it is recommended that the synchronization prompt option be used to minimize the time the DFP application needs to be down.

DFSMS

If DFSMS is in use, all target volumes involved in a session and that are DFSMS managed must have the DISNEW (disable new allocation) command issued against them. This can be accomplished via the ISMF panels prior to the start of a volume migration.

NOTE

DFSMS is an umbrella for products such as HSM, DSS, RMM and DFP. With the exception of DFP, all have control data sets. This guide refers to control data sets as xCDS because the control data set can be ACDS, BCDS, OCDS, or MCDS.

CAUTION

If any Control Data Sets (xCDS) are to be migrated using Softek TDMF, it is strongly recommended by IBM that specific application within DFSMS be shutdown. Movement of any xCDS will result in a failure of that application if it is active.

With the exception of a few non-disruptive inquiries, any I/O operation to the target volume by anything other than Softek TDMF will be rejected and a message will be issued with IOSB completion code 4A (the I/O has been prevented). The message issued may be IOS000I or some other MVS message indicating an error via the application or MVS system component.

If the DCOLLECT function is used against the target volume(s) it will fail.

The following error messages are examples:

Example Failure Messages Related To DFSMS xCDS Migrations

IDC21807I	FAILURE DURING LSPACE SERVICE (SVC 78)PROCESSING - RETURN CODE WAS 4
IDC11813I	ERRORS WERE DETECTED FOR VOLSER volser. ERRORBYTE WAS X'A0'
IDC21804I	FAILURE DURING VVDS/VTOC ACCESS SERVICE PROCESSING - RETURN CODE WAS X’08’
IDC11808I	ERRORS WERE DETECTED FOR data.set.name ON volser ERROR BYTE WAS X'28'
IEE498I	SWITCH LSPACE ERROR. RETURN CODE = 004 REASON CODE = 059 DEVICE NUMBER = dev msgtxt

NOTE

After the session, the DISNEW command should be disabled as well as any other command(s), such as the QUIENEW command, issued against the original source volume(s). Failure to do so will cause errors such as those noted above.

CAUTION

DFSMS operates on volume serial number; therefore the status of the volume(s) does NOT change during a Swap migration and will be the same as before the session started. If the original source volume is optionally renamed to a new name, this new name may not be recognized by DFSMS, so that the original target volume serial is still in a pool, but the new volume serial is not included in a pool.

Duplexing Functions

If there are volumes that are involved in a primary/secondary duplexing function such as Dual Copy that may be detected by standard architectural techniques Softek TDMF will terminate the migration. This includes a duplexing function that is started mid-way through a migration. This is done to ensure that the customer does not jeopardize their secondary copies in a Disaster Recovery situation.

In order to ensure that secondary copies remain intact, it is recommended that these sessions be suspended during the Softek TDMF session. It is the user's responsibility to ensure that these session types are not active on any volume that is targeted for a Softek TDMF session.

Extended Functions

If data striping and VSAM data compression is supported on the source subsystem, it is the users' responsibility to ensure that these extended functions are supported on the target subsystem as well.

It is the responsibility of the user to ensure that the following extended function is not active on a source volume:

- a Concurrent Copy session

The LISTSESS operation will report if a Concurrent Copy session exists for a volume. The MODIFY command can be issued from a system that has the XRC software installed, and has the ANTAS000 address space active. The command syntax for this command is:

```
F ANTAS000,LISTSESS addr
```

For more information about this command and the ANTAS000 address space, please refer to the *DFSMS/MVS Remote Copy Administrator's Guide and Reference (SC35-0169)*.

EMC DASD

Application Program Interfaces

Using EMC DASD may require the installation of EMC Application Interfaces, obtained from EMC, if the source or target volumes use the Symmetrix Remote Data Facility (SRDF), with or without the EMC Consistency Group software installed or if any EMC SAR function is used.

If the EMC dasd uses standard Peer-to-Peer Remote Copy (PPRC) functions in lieu of SRDF, then the EMC application program interface code is not required.

EMC API code can provide three different functions:

- EMCSAI The low level Application Program Interface (API) which provides the Symmetrix Control Facility (SCF) interface.
- CGRPQDEV A low level Application Program Interface (API) for EMC Consistency Group support in CGRPQDEV
- EMCSARQ A low level Application Program Interface (API) for EMC SAR support in SARQDEV

Consistency Groups

Softek TDMF, in conjunction with the proper microcode and EMC Consistency Group software, provides support for the swap migration of source volumes that reside on EMC DASD devices utilizing the Symmetrix Remote Data Facility (SRDF), and optionally can exist as a part of an EMC Consistency Group.

EMC Symmetrix Remote Data Facility (SRDF), with or without Consistency Group support, ensures that a customer's disaster recovery environment is not inadvertently destroyed or changed. Softek TDMF is designed to be consistent with that type of data protection. At session initialization, Softek TDMF ensures that the characteristics of the source and target volumes involved in a swap migration appear to be the same on all systems in the TDMF session. Throughout the migration, Softek TDMF ensures that the volume characteristics do not change. If Softek TDMF detects inconsistencies in the SRDF session, then the migration session is terminated.

When using source or target volumes controlled by EMC Symmetrix Manager, Softek TDMF supports Consistency Groups at level 6.0.0 (FMID SCGP600).

EMC Configuration Guidelines

When defining EMC devices as members of a Consistency Group, all systems in the shared DASD complex must activate the EMC CONGROUP started task, and the parameters must agree.

EMC DASD devices should be defined via the device-number parameter for the CONGROUP configuration, not by volume serial-number. An EMC CONGROUP configuration should not be changed while a migration session is active. If any changes occur that may inadvertently modify the status of an EMC DASD volume that is a part of a Consistency Group, Softek TDMF will dynamically terminate the volume migration.

Symmetrix Manager

If the source or target volumes are controlled by the EMC Symmetrix Manager, those volumes must be removed from the Symmetrix Manager's control, or the Symmetrix Manager must be shut down during a migration session. Failure to do so will cause Softek TDMF to terminate the migration(s) with an error message (TDM2362) indicating an invalid operation code when the Symmetrix Manager issues either a Diagnostic Write (73) or Diagnostic Control (F3) operation code. Message TDM2596I will follow the error message indicating where the invalid operation code came from.

NOTE

Target volumes may not be assigned to EMC Symmetrix if Softek TDMF For Platinum is in use.

Migrating from SRDF to PPRC Volumes

Softek TDMF will allow the migration of a device involved in an SRDF session to a volume that is involved in a PPRC session. In order to allow swaps from SRDF volumes to PPRC volumes, the common option **ALLOWmirrorchange** must be specified as described in this section.

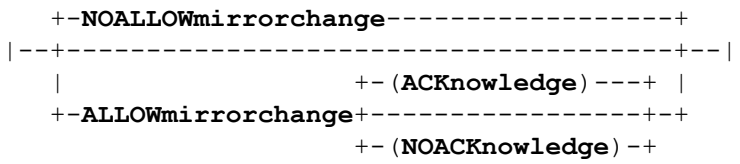
For general information about Common Options, refer to *Common Options for the SESSION, GROUP and MIGRATE Statements* on page *40*.

Softek TDMF will require volume confirmation for each volume requesting the **ALLOWmirrorchange** option. Confirmation can be supplied using the Softek TDMF TSO Monitor, Option 2, "**A**" command, or the MVS console, if the auto-operations interface has been enabled. This confirmation must be supplied before subsequent 'normal' volume or group confirmation or volume or group selection will take place.

The **ALLOWmirrorchange** option is not required to be specified in the same way for all volumes in a group.

Syntax Example

Following is a syntax example for the **ALLOWmirrorchange/NOALLOWmirrorchange** option keyword, which is part of the Common Options. The option parameter is (**ACK**)/(**NOACK**).



SRDF Session Types Allowed

Softek TDMF supports sessions where a source or target volume may be involved in an SRDF session. The following types of active SRDF sessions will be allowed at initialization of a Softek TDMF session:

- Swap migrations, where the source and target volumes are involved in an active SRDF session, and neither volume is a member of a Consistency Group.
- Swap migrations, where the source volume and target are involved in an active SRDF session and both are members of the *same* Consistency Group on all systems in the TDMF session.
- Swap migrations, where the source volume is *not* involved in an active SRDF session, and the target volume is involved in an SRDF session that may or may not be a member of a Consistency Group.

The following table indicates availability when migrating from a source volume using one mirroring technique to a target volume using the same or different mirroring technique, and when the use of the **ALLOWmirrorchange** option is required.

Source and Target Availability

Source Device \ Target Device	Non–mirrored	PPRC Primary	SRDF Primary	SRDF and Consistency Group
Non–mirrored	Y	Y	Y	Y
PPRC Primary	N Change the mirroring status of the source volume or choose a different target device.	Y	Y Available if **ALLOWmirrorchange** option is used	Y Available if **ALLOWmirrorchange** option is used

Source and Target Availability *(Continued)*

Source Device \ Target Device	Non–mirrored	PPRC Primary	SRDF Primary	SRDF and Consistency Group
SRDF Primary	N Change the mirroring status of the source volume or choose a different target device.	Y Available if **ALLOWmirrorchange** option is used.	Y	Y
SRDF and Consistency Group	N Change the mirroring status of the source volume or choose a different target device.	N	N	Y Source and target volumes must be members of same Consistency Group.

Migrating to SRDF Volumes

Softek TDMF will allow the migration of a device involved in a PPRC session to a volume that is involved in an SRDF session. In order to allow swaps from PPRC volumes to SRDF volumes, the common option **ALLOWmirrorchange** must be specified. For information about using the **ALLOWmirrorchange** option, refer to *Common Options for the SESSION, GROUP and MIGRATE Statements* on page 40.

Softek TDMF will require Volume Confirmation for each volume requesting this option. Confirmation may be supplied via the Softek TDMF TSO Monitor, Option 2, "**A**" command or the MVS console if the auto-operations interface has been enabled. This confirmation must be supplied before subsequent 'normal' volume or group confirmation or volume or group selection will take place.

The **ALLOWmirrorchange** option is not required to be specified in the same way for all volumes in a group.

File Allocation Managers

The Softek TDMF COMMDS must be allocated in contiguous cylinders. If a product that actively manages file allocation (e.g., ProSMS or SAMS:Vantage) is installed, please be aware that the possibility of message TDM1080S may be issued causing the migration session to terminate. This message states that the COMMDS space is not contiguous. The COMMDS will need to be re-allocated outside of the control of the file allocation manager

Global Resource Serialization

Softek TDMF will periodically place a hardware reserve on the volume where the Communications data set (COMMDS) is resident.

CAUTION

Softek recommends that the TDMF reserves are *not* converted. Softek TDMF will fail to initialize when there is any question about the integrity of the serialization environment.

In order to ensure that the reserves Softek TDMF issues are not converted to global enqueues by GRS, it is recommended that the following parameter be used in GRSRNLxx.

```
RNLDEF RNL(EXCL) TYPE(GENERIC) QNAME(TDMFRESV)
```

Host Software Component

In those installations using StorageTek's Host Software Component (HSC) for Library Storage Module (LSM), the following should be noted.

Softek TDMF will successfully migrate the HSC's Primary or Shadow Control Data Sets (CDS). However, if a CDS is subsequently disabled and re-enabled WITHOUT recycling (P HSC and S HSC) the HSC Address Space of ALL Systems that share it, the HSC will be unable to successfully allocate the CDS being enabled and will generate a dynamic allocation error 228 or 22C.

CAUTION

Softek recommends that only one Control Data Set be moved at a time in order to avoid a deadly embrace.

For information about other Control Data Sets, see *DFSMS* on page *73*.

HCD and IODF Files

If a volume containing Input/Output Definition Facility (IODF) files is to be migrated, the following require changing prior to the next IPL:

- Load Parameter Definition - can be changed via the Operator Control (OPRCTL) frame, or the System Control (SYSCTL) frame.
- Load Profile(s) - for CMOS mainframes.
- JES3 Initialization Stream Checker - via the Create JES3 INISH Stream Checker Data panel.

It is the responsibility of the user to ensure that the new device address(es) be communicated to the appropriate areas prior to the next IPL. Failure to do so may result in a Wait State during IPL. Softek TDMF issues a warning message when an IODF or load-parms volume is migrated.

For more information on this topic, please refer to the *MVS/ESA SP V5 HCD: User's Guide (SC33-6468)* or the *OS/390 HCD User's Guide (SC28-1848)*.

ICKDSF

Do not run ICKDSF against any volumes involved in an active session. Softek TDMF will dynamically detect the CCW operation codes from this program and terminate that volume's migration. If an ICKDSF function is necessary, terminate the migration for that specific volume via the Softek TDMF TSO Monitor, and then restart the volume migration using the Softek TDMF TSO Monitor or the Batch Monitor.

Dynamic ICKDSF REFVTOC/EXTVTOC

After a migration, Softek TDMF can invoke ICKDSF to dynamically reformat or expand a volume's VTOC. This function is performed when the source volume's characteristics do not match the target device, and if requested by an installation or migration session option (see the following paragraphs in this section and the description of the *Softek TDMF System Defaults* on page *43*).

It is recommended that DD statement DSFPRINT be added to the migration session (Master) JCL if the automatic ICKDSF option is requested.

NOTE

The ICKDSF program requires that the source volumes for which it might be invoked be mounted as PRIVATE.

If SYSVTOC is not specified in the GRS SYSTEMS Exclusion RNL it should be added to the Reserve Conversion RNL.

Migrating Volumes Containing Catalogs and selecting the Auto-ICKDSF Option

When migrating a volume that contains a catalog and the Auto-ICKDSF option is selected, it is possible that a deadly embrace situation may occur if the enqueues for SYSVTOC, SYSZVVDS and SYSIGGV2 are not treated the same.

Thus the recommendation is that SYSVTOC, SYSZVVDS and SYSIGGV2 either be put in the exclusion list or conversion list as in the following examples (or be treated identically by CA-MIM, if applicable):

Exclusion Example:

```
RNLDEV RNL(EXCL) TYPE(GENERIC) QNAME(SYSVTOC)
RNLDEV RNL(EXCL) TYPE(GENERIC) QNAME(SYSZVVDS)
RNLDEV RNL(EXCL) TYPE(GENERIC) QNAME(SYSIGGV2)
```

Conversion Example:

```
RNLDEV RNL(CON) TYPE(GENERIC) QNAME(SYSVTOC)
RNLDEV RNL(CON) TYPE(GENERIC) QNAME(SYSZVVDS)
RNLDEV RNL(CON) TYPE(GENERIC) QNAME(SYSIGGV2)
```

For more information on this topic, the following references may be used:

- OS/390 V2R10.0 MVS Planning: Global Resource Serialization (GC28-1759), topic: RNL Candidates, Table 4 - SYSTEMS Exclusion RNL Recommendations
- z/OS V1R3.0 MVS Planning: Global Resource Serialization (SA22-7600), topic: RNL Candidates, Table 4 - SYSTEMS Exclusion RNL Recommendations
- IBM Informational APAR ll10752 (Item 7 under Catalog Enqueue and Dequeue Resources)

How Dynamic ICKDSF REFVTOC or EXTVTOC functions affect a Migration

ICKDSF is invoked on the Master system for each applicable volume immediately after the successful swap on all systems, if the VTOC can be reserved on the target device (new source).

NOTE

While this process is occurring, the volume is available to other jobs on the Master system, but is unavailable to the Agent system(s) due to a volume reserve. However, if the SYSVTOC reserve was converted to a global ENQ, the volume will be immediately available on the Agent systems – except for access to the VTOC.

By default, ICKDSF message output is discarded. If a //DSFPRINT DD statement is supplied, Softek TDMF will group the ICKDSF output messages for each volume and write them out. The //DSFPRINT DD statement should not refer to an existing dataset.

The Master system will continue to wait until the last copy task has completed before terminating the volume migration or session.

The order of events is as follows:

1. At quiesce time, the SYSVTOC ("SYSVTOC/volser") resource is acquired on the Master system.
2. The volume is swapped.
3. ICKDSF is invoked on the Master system, with the source volume reserved.
4. The volume is resumed on all systems while ICKDSF is processing.
5. The volume is terminated on all Agent systems.
6. The volume is terminated on the Master system.

The Softek TDMF Master system will not end until all ICKDSF tasks have completed, although the Softek TDMF TSO Monitor will not depict it as an active session once the last volume has terminated. In a multi-system environment, the interval between items three and six is a matter of a few seconds. The larger the VTOC, the more time it will take for ICKDSF to complete.

It is recommended that a Softek TDMF session that will invoke dynamic ICKDSF have a minimum region size of 96M and no more than 16 volumes executing concurrently.

IMS Write Ahead Data Sets

IMS Write Ahead Data Sets (WADS) may be involved in a Softek TDMF session, however, it is important to be aware of the type of channel the source and target volumes are connected to. If the session is a Swap migration and is going from parallel channels to ESCON channels, Softek TDMF will continue to migrate the volume. However, if the direction of the migration is going from ESCON channels to parallel channels, Softek TDMF will terminate that migration session, or the group migration session if the group termination option was specified, with message TDM2297 return code 98, indicating an invalid operation code or parameter regarding the Locate Record Extended operation code.

Please refer to manuals, *IBM 3990 Storage Control Reference (GA32-0099-04)* or *IBM 3990 Storage Control Reference (Models 1, 2, and 3) (GA32-0099-06)*, for more information.

IPL Volumes

Active IPL volumes should be migrated during a low activity period. It is recommended that the user test this function in their test environment before migrating in a production environment.

It is the responsibility of the user to ensure that the new device address(es) be communicated to the appropriate areas prior to the next IPL. Failure to do so may result in an invalid IPL.

Invalid Count Fields

The Count-Key-Data (CKD) and Extended-Count-Key-Data (ECKD) channel command sets write data out to a volume in a CKD format. The count field is in the format of CCHHR, where CC is cylinder, HH is head (or track) and R is the record. Softek TDMF checks the CCHH portion of the count field. If the cylinder and track address in any source record count field is not equal to its physical location on the volume, then Softek TDMF will normally stop copying data, scan the remainder of the source volume (volume analysis) and terminate the volume pairing with message TDM3540E - Invalid count field.

An invalid count field can occur in a free space area of the volume. In that case, select the FastCopy option which may prevent this error from reoccurring or execute program IEBDG or IEBGENER in order to populate a data set (FastCopy will copy unallocated tracks if they share a cylinder with a data set). Either of these programs will re-write the count field, then delete the temporary data set. If the free space area is large, it is recommended to allocate a data set large enough to span the entire area. If there is data in the area, a re-write of the data set will be required.

If the error occurs in the middle of a data set, it could potentially be a "broken" data set. This does not mean that the data is inaccessible. Frequently, the data can still be accessed. If it is impractical to repair a data set on the source volume that contains invalid count fields, the user can request that Softek TDMF migrate the volume, including the non-standard count fields, after issuing a warning message (See the options specifications that are valid only on the SESSION control statement). Whether the migration was terminated or completed with a warning message, the disk locations of all instances of records with an invalid count field can be reviewed using the Softek TDMF TSO Monitor (Option U.13 - Detected Source Volume I/O Errors).

If records with invalid count fields are known, or suspected, to exist on the source volume, it is recommended that program TDMFSCAN be executed against the volume in order to determine where the invalid count fields are.

NOTE

Bad count fields are checked when the data is written to the target volume. Therefore, for a Swap Migration involving TCP/IP the SESSION statement on the Remote system must specify OPT(ALLOWINV). For a migration with both a local and remote target volume, the option would need to be specified for both sessions.

JES Checkpoint and Spool Volumes

Softek TDMF will migrate JES2/3 checkpoint and spool volumes. However, it is recommended that the appropriate JES command be issued to drain the spool in order to limit the amount of activity for that volume. If there are multiple spool volumes, *it is recommended that one spool volume or checkpoint volume per migration session* be moved during a low activity period of time to keep a potential JES performance impact to a minimum.

NOTE

In a JES3 environment only one checkpoint or spool volume can be migrated per session.

If the WTO/WTOR (auto-operations) option has been set to yes, it is necessary to set this option to No in order to ensure a successful Swap migration of the spool or checkpoint volumes.

The user is urged to test this function in their test environment prior to migrating spool volumes in a production environment.

JES2 Considerations

When planning to migrate a volume that contains the JES2 Checkpoint data set, it is important to check the HOLD parameter on the MASDEF statement in the JES2 parameters. The HOLD parameter specifies the length of time that the checkpoint is reserved and unavailable to other requesters.

If the HOLD parameter is not specified, the default is HOLD=99999999, which means that JES2 will never release the reserve. This will, in effect, cause the volume migration to "hang" during refresh processing. Softek TDMF cannot successfully quiesce the I/O when any task has a reserve on the source volume. In order to avoid this situation, it is recommended that the JES2 command

$T MASDEF,HOLD=100 (one second) be issued until the migration is complete.

For more information on this subject, please refer to the *OS/390 JES2 Initialization and Tuning Guide (SC28-1791)* or *z/OS JES2 Initialization and Tuning Guide (SA22-7523)*.

JES3 Considerations

In order to ensure that JES3 system defined volumes will migrate in a Softek TDMF (or P/DAS) environment, APARs OW23271, OW28455, and OW28457 must be applied. These APARs provides JES3 DDR support for P/DAS and therefore, will allow the swapping of volumes.

CAUTION

All systems sharing devices where JES3 manages the devices must be involved in the Softek TDMF session running. This ensures that all JES3 internal tables are properly updated. Failure to do so will cause unpredictable results.

It is recommended that the user check the UCB for the following bit prior to copying volumes in a JES3 environment.

```
UCBJ3DV - device is defined to JES3.
```

If the bit is off, Softek TDMF will migrate the volume(s) with no errors. If the bit is on, Softek TDMF will make the appropriate calls to JES3 to notify JES3 of the volume redirection needed.

CAUTION

Prior to migrating volumes in a JES3 environment, all target volumes that are JES3 system defined must be varied offline to JES3 and online to MVS.
The following commands will perform these functions:

```
*V addr mainproc OFF <-JES3 command
*V addr,ONLINE <-MVS command
```

If any of the original source volumes are to be reused after a Swap migration, the following command must be issued:

```
*V addr RECOVER mainproc
```

If any of the original target volumes are to be reused after a Point-In-Time migration, the following command must be issued:

```
*V addr RECOVER mainproc
```

The following JES3 command will display the status of a volume before or after a migration:

```
*INQUIRY,S,V=volser
```

If the XTYPE parameter is used with the SETNAME and DEVICE statements, the source and target volumes must have the same XTYPE name. If the XTYPE names are not the same, Softek TDMF will terminate the migration session with message TDM1228S.

NOTE

JES3 does not support the optional New Volume Serial (NEWVSN) for the original source volume migration.

If a system is not a participant in a migration, prior to that system joining the complex, the original source volume(s) must have the following command issued to them:

```
*V addr RECOVER mainproc
```

Failure to issue this command will result in JES3 possibly corrupting the information related to those volumes that had been migrated.

LISTDATA Information

When using the LISTDATA command via IDCAMS to verify the status of the subsystem or volumes (e.g. CFW on or off), there are some commands that query the physical controller and others that obtain the information from memory. Specifically, the

```
LISTDATA DSTATUS SUBSYSTEM
```

command gets its information from memory. Therefore, if CFW has been turned off at the device level, it may not show up in this report. The commands that do physically query the controller are:

```
LISTDATA COUNTS DEVICE
LISTDATA STATUS
```

Migration of Control Data Sets

Softek TDMF will migrate a volume containing Control Data Set (CDS) for any product. However, it is ***strongly recommended that only one CDS per product be migrated at a time.*** This practice ensures that no lockouts or deadly embraces will occur.

Those products or subsystems that may be affected by this activity are:

- CA-MIM
- StorageTek's Host Software Component
- Couple Datasets related to a Parallel Sysplex environment.
- JES checkpoint and spool volumes

There may be additional products or subsystems affected that are not listed. Please refer to the appropriate sections of this manual for more information on this topic.

Migration of RAID and Non-RAID Devices

Softek TDMF will migrate volumes that are RAID or non-RAID devices. However, there are technology differences between non-RAID, RAID-S, RAID-3 and RAID-1 devices. Traditional non-RAID devices (33x0) normally have an alternate cylinder for assignment at the track level for those times when a track went "bad". Some RAID-S and RAID-3 devices also have this ability or are configured to look like the ability is present. RAID-1 devices normally do not have an alternate cylinder. This presents a compatibility issue when moving between the different technologies. Use of the Dynamic ICKDSF REFVTOC function remedies this situation.

Migration of Unlike Device Types

It is now possible to move larger devices to smaller devices in a Swap migration only. In order to achieve this, the following must be true:

- Swap migration only
- Dynamic ICKDSF option selected
- The source volume must have a valid indexed VTOC
- "excess" cylinders must be shown as available for allocation in VPSMs at initialization AND throughout the migration until synchronization time.

Softek TDMF will copy the number of cylinders from the source volume equal to that of the target volume. Data beyond the size of the target volume will not be copied.

If a volume has been moved to a larger target device and ICKDSF REFORMAT has not been performed, it is possible to reverse the original swap migration.

NOTE

The source and target volumes must be of the same track geometry. Softek TDMF does not support the migration of 3380 device types (track size 47476) to 3390 device types (track size 56664).

When migrating from a smaller to larger device, the VTOC information may need to be updated to reflect the extra cylinders for later use. For more information on this topic, please refer to *ICKDSF on page 78*.

Migration of Volumes Formatted for VM Use

VM volumes can now be copied and relabeled using Softek TDMF on MVS. However, Softek TDMF cannot monitor updates to the source volume from VM while the migration session is in progress, nor can VM (CP and CMS) control blocks be manipulated to achieve a non-disruptive Swap migration.

To migrate a VM formatted volume it must be varied offline from all attached VM systems. In the instance of system, spool, or page volumes designated for migration, the associated VM system(s) must be shut down and later IPL'd.

CAUTION

If a VM system is not detached from the source volume during a Softek TDMF session, the data integrity of that migration cannot be guaranteed.

Model 204 Considerations

Model 204 will take advantage of Cache Fast Write (CFW) for files CCASERV and CCATEMP if the DASD subsystem supports CFW, caching is active at the volume level, and the default Model 204 CACHE parameter has been changed from X'00'.

If the update activity is enough for CFW to be invoked during a migration, Softek TDMF will detect the fact and terminate the volume with error message TDM2363E – TDMFIMON error due to the detection of a Cache Fast Write operation.

However, it is possible that during the life a migration the level of update activity does not warrant I/O operations to be performed against the previously mentioned files. Subsequent to the swap of the volume, an I/O operation could be started to the files using CFW, which will cause the following Model 204 error messages to be issued.

2163 – TROUBLE WITH DISK I/O ON FILE% C POST CODE = X'%X' CSW X'%X'

2164 – TROUBLE WITH DISK I/O ON POST CODE = X'%X' CSW X'%X'

These error messages are issued because the Subsystem Identifier (SSID) for the target volume (new source) is different from the original source volume.

It is recommended that the Model 204 CACHE parameter be set to X'00' prior to a Softek TDMF migration. Please note that this requires a re-cycle of the Model 204 address space and could have a performance impact to the address space.

NOTE

If CFW is off at the subsystem level or if caching is off at the device level when Model 204 is started, this action should not be necessary. For more information on this topic, please refer to the *Model 204 Command Reference Manual* and the *Model 204 Messages Manual*.

MVS Running under VM

COMMDS Dataset Considerations

If the COMMDS is allocated on a device that is defined to VM as a mini-disk, then the mini-disk statement should read as follows:

```
MDISK vdev type 000 END volser MW↑
```

Do not place a "V" as a suffix to the statement above, unless the volume is shared between more than one MVS Guest virtual machines, and one or more native MVS systems. For more information regarding this subject, refer to "*Restrictions for Reserve/Release" in the VM/ESA Planning and Administration Guide (SC24-5521)* and "*Sharing DASD among Multiple Virtual Machines by Using Virtual Reserve/Release" in the z/VM Planning and Administration Guide (SC24-5948)*.

The real device statement regardless of disk definition should appear as follows:

```
RDEVICE rdev type DASD SHARED YES
```

This defines the device as shared DASD.

Other Control Data Set Considerations

Volumes containing control data sets that are shared between MVS and VM such as control data sets that is used for StorageTek's LSM Host Software Component (HSC) or MIM control data sets should not be migrated using Softek TDMF.

Softek TDMF has no way to detect the VM usage. Furthermore, if such volumes are moved (either with or without Softek TDMF) with VM down, there is still an exposure, as VM links to these volumes by DEVICE ADDRESS rather than Volume Serial Number.

PAV Capable Device Considerations

In environments where PAV (Parallel Access Volumes) support is being utilized, TDMF requires that the OPTION MAINTCCW must be specified (or OPTION DEVMAINT which includes all the functions of DEVINFO and MAINTCCW) for TDMF to successfully execute.

If you do not specify the OPTIONS MAINTCCW, you will receive message "HCPDDP1017I A channel command was rejected because you do not have MAINTCCW Authorization" on the VM Guest MVS system console.

Number of Softek TDMF Sessions

Softek TDMF will support any number of sessions. The number of sessions is dictated only by the amount of available real storage (see Storage Requirements) the customer has available to use for these sessions.

The maximum number of Agent systems/jobs is 31 in a single session.

Number of Groups per Session

A group must consist of at least two volume pairings and cannot exceed the number of volumes per Softek TDMF session. It is recommended that the SINGLE group option be used only if there is one active session. If there are multiple active sessions, no two concurrently active sessions should contain identically name volume groups.

Number of Volumes per Session

The maximum number of volume pairings per Softek TDMF session is 512. but the number of LPARs participating in a session multiplied by the number of volume pairs in a session can not exceed 2048.

Page and Swap Data Sets

Softek TDMF will migrate a source volume containing an active PLPA and/or Common page data set. A volume that contains an active page data set must be the only volume in the migration session. A volume containing a page data set that is active for an Agent system can not be migrated.

It is strongly recommended that page volumes be migrated during a low activity period of operation.

Softek TDMF will not migrate a volume containing an active Local page data set or swap data set, while volumes containing only inactive page or swap data sets may be moved in a multi-volume session.

NOTE

This function is not available in a JES3 system managed device environment.

Parallel Sysplex Considerations

Softek TDMF will migrate Sysplex Couple Data Sets (CDS). Dependent upon how often XCF expects each system within a Sysplex to update the CDS (default: 15 seconds), it is possible that, during the Quiesce and Synchronization phases of a volume migration containing a CDS, a system update to the CDS will not be met. This condition could result in the System Failure Manager (SFM) partitioning the “failing” system out of the Sysplex, causing a wait state 0A2 on the partitioned system.

NOTE

It is recommended that the alternate CDS be moved first then switch the active CDS to the alternate, and then move the primary CDS.

After moving a CDS, it may be necessary to re-initialize the data set in order to ensure the device number of the CDS displayed in message IXC357I in response to the D(isplay) XCF,COUPLE MVS operator command is updated. Though the display may be incorrect, the data sets perform properly. The MVS command ‘SETXCF COUPLE,ACOUPLE=’ may be used to point to another couple data set and again to bring back the primary. For more information regarding this command, please refer to the *OS/390 MVS System Commands manual*.

In a SYSPLEX environment, Softek TDMF will establish an XCF group called “TDMF”, with each Master and Agent job as a member. This group's message traffic is very sparse and the message length is typically only four (4) bytes, so it can safely be left in the DEFAULT transport class. The NOXCF session option can be used to suppress XCF processing by Softek TDMF. This may cause volume activation and termination, as well as the gradual reduction of the refresh interval to meet the synchronization goal, to proceed more slowly.

The first time Softek TDMF is executed on an MVS system, a system linkage index (LX) is retained for the use of subsequent Softek TDMF sessions, using the MVS name/token facility, and will be valid until the system is next IPLed. The program call linkage the Softek TDMF constructs using this LX enables the Softek TDMF TSO Monitor to instantly notify the Master job when action is required for a volume or group. The default value for the NSYSLX variable (number of available system linkage indexes) in the IEASYSxx PARMLIB member is 165, so the use of one of these will not cause a problem.

Peer-to-Peer Remote Copy Support

IBM Peer-to-Peer Remote Copy (PPRC) ensures that a customer's disaster recovery environment is not inadvertently destroyed or changed. Softek TDMF is designed to be consistent with that type of data protection.

At session initialization, Softek TDMF ensures that the characteristics of the source and target volumes involved in a swap migration appear to be the same on all systems in the TDMF session. Throughout the migration, Softek TDMF ensures that these characteristics do not change. If Softek TDMF detects inconsistencies in the PPRC session, then the TDMF session is terminated.

PPRC Session Types Allowed

Softek TDMF supports sessions where a source or target volume may be involved in a PPRC session. The following types of active PPRC sessions will be allowed at initialization of a Softek TDMF session:

- Swap migrations where the source and target volumes are involved in an active PPRC session.
- Swap migrations where the source volume is *not* involved in an active PPRC session and the target volume is involved in an active PPRC session.

Once a Softek TDMF session has started, the following conditions apply:

- The status of the target volume cannot be changed.
- A PPRC session may be stopped on the source volume. This assumes that the target volume is involved in an active PPRC session.
- A PPRC session may be started on the source volume so long as the target volume is involved in an active PPRC session.

For an understanding of when migration can be used with various mirroring techniques, refer to the Table: *Source and Target Availability* on page *76*.

PPRC/GDPS Environments with HyperSwap enabled

Softek TDMF cannot execute migrations in a PPRC Geographically Dispersed Parallel Sysplex (GDPS) environments if HyperSwap is enabled.

To perform a migration in a PPRC/GDPS environment, you will be required to turn HyperSwap off before initiating the Softek TDMF migration session. Once completed, HyperSwap can be reactivated. The following IBM HyperSwap commands facilitate these actions:

- HYPERSW OFF will disable HyperSwap in all systems
- HYPERSW ON will enable HyperSwap in all systems

CAUTION

These actions should not be performed while an active SOFTEK TDMF migration session is in progress. Unpredictable results may occur.

- GDPS initialization (IPL or NetView recycle) will enable HyperSwap in the initializing system if mirroring status is OK
- GDPS Config will enable HyperSwap in all systems, if mirroring status is OK when Config completes.

NOTE

Once issuing the HYPERSW ON command, the following TDM alert will be generated in the controlling system.

GEO551I HYPERSWAP IS DISABLED, HYPERSWOFF EXECUTED IN sysname
HYPERSW ON will clear this alert.

Monitor1 in the controlling system will create TDM alerts saying HyperSwap is disabled, one alert for each system.

If the mirroring status is OK, the freeze will still be enabled.

NOTE

The GDPS maintenance is supplied to GDPS customers via the GDPS FTP site and is limited to GDPS customers. When maintenance is added to the FTP site, a “GDPS Newsletter” is sent to all GDPS customers with information on the APAR fixes that are available.

Information on GDPS fixes are available only to GDPS customers and cannot be found in IBMLINK.

Migrations between a PPRC Device and a SRDF Device

Softek TDMF will allow the migration of volumes in a PPRC pair to volumes in a SRDF pair (EMC Symmetrix Remote Data Facility). A migration from an SRDF volume to a PPRC primary device is also permitted.

Softek TDMF requires that the ALLOWMIRRORCHANGE session option or volume option be specified. Acknowledgement of the device mirroring architecture mismatch will be requested before the volume will be selected for migration if the NOACKNOWLEDGE parameter was not also specified.

For more details, see *Migrating from SRDF to PPRC Volumes* on page *75*

Real Time Monitors

After a migration, Softek TDMF will notify the operating system that a swap has occurred via the Event Notification Facility (ENF). Real-time monitors such as Omegamon, Omegamon II, MainView, The Monitor for MVS (TMON/MVS), CMF or Allocation Control Center (ACC) may not “listen” for these events. As a result, various error messages may appear after a Softek TDMF migration.

Please contact the appropriate vendor to determine if there is a fix for this issue.

Shared Versus non-Shared Devices

As stated in *CA Products* on page *69* - *Multi-Image Manager* and *Global Resource Serialization* on page *78*, Softek TDMF will periodically place a hardware reserve on the volume containing the COMMDS.

If the COMMDS for a multi-system session is not placed on a device that is defined as SHAREd, Softek TDMF will issue message TDM1386S and initialization will fail.

Enterprise Storage Server (ESS) Support

The IBM Enterprise Storage Server (ESS - device type 2105) with the Parallel Access Volume (PAV) feature is supported. Support for the PAV feature is in exploitation mode. This means that during the life of a Softek TDMF migration the PAV feature is dynamically disabled and dynamically re-enabled when the migration completes for that volume only.

The ESS subsystem may be defined with “Transparent” mode, “Toleration” mode or “Exploitation” mode.

TRANSPARENT mode is defined as:

- IODEVICE macro instruction with UNIT=3390

If the above is true, then the PAV feature is not enabled. Softek TDMF will function with no issues.

TOLERATION mode is defined as:

- CNTLUNIT macro instruction with UNIT=2105
- IODEVICE macro instruction with UNIT=3390B

If the above is true, Softek TDMF will migrate this volume as if it were in exploitation mode.

- IODEVICE macro instruction with UNIT=3390A

If the above is true, then the device is defined as an alias PAV volume. Softek TDMF will not migrate these volumes.

EXPLOITATION mode is defined as

- CNTLUNIT macro instruction with UNIT=2105
- IODEVICE macro instruction with UNIT=3390B

If the above is true and the proper levels of MVS maintenance is installed, Softek TDMF will migrate/ this volume as if it were in exploitation mode, and the device is eligible as a base PAV volume. Softek TDMF supports both standard and dynamic PAV(s).

Before migrating data to, or establishing data on, an IBM 2105 (ESS) device, customers should ensure that they understand these I/O functions.

Messaging

Additional messages have been added to Softek TDMF in support of the ESS control unit.

NOTE

These messages are issued during the initialization phase of the volume migration and that the volume migration will continue on to subsequent migration phases.

Migration from ESS to non-ESS

Softek TDMF will issue message TDM1670W during initialization, indicating possible errors may occur to application I/O operations, if the following is true:

- Swap migration
- Source volume resident on the ESS in Exploitation mode
- Target volume resident on a subsystem that is non-ESS (3990) control unit.

Message TDM1670W is issued to warn of a migration from a device, which supports non-3990 features to a device, which does not. The message is only a warning and the migration is allowed to commence. During the volume initialization phase Softek TDMF modifies the information in the source volume’s DCE (DASD Class Extension) to temporarily mask the advanced features of its storage controller. MVS’s IOS (Input/Output Supervisor) dynamically builds channel programs to

detect and exploit these features by a customer or system application channel program. Channel programs constructed subsequent to the DCE modification will only use those features, which are also supported on the target volume. Upon termination of the volume migration, the information dynamically modified in the DCE will be restored.

There is no guarantee that the above process will always be successful based upon timing conditions although it is felt that the alternative of ONLY being able to perform the swap migration of an inactive volume from a 2105 control unit to a 3990 control unit was totally unacceptable. It should be realized that a channel program built before the modification of the DCE or by an I/O driver using a private copy of the DCE, may be rejected by the Softek TDMF I/O Monitor, which will dynamically terminate the volume migration.

Migration from non-ESS to ESS

Softek TDMF will issue message TDM2668W stating that PAV exploitation will not be available for this volume until the next IPL if the following is true:

- Swap migration
- Source volume resident on a non-ESS subsystem or
- “Source volume resident on an ESS subsystem defined as Static PAV and PAV is not currently active or
- “Source volume resident on an ESS subsystem defined as Dynamic PAV and PAV is not currently active
- Target volume resident on an ESS that is in Exploitation mode
- Source Unit Control Bock (UCB) is NOT defined as a 3390B.

Softek TDMF will NOT issue message TDM2668W if the source UCB is defined a 3390B, and PAV access will be immediately available upon completion of the migration.

Softek TDMF will issue message TDM2667W stating that the target device does not support PAV functionality and PAV access will NOT be available for this volume if the following is true:

- Swap migration
- Source volume resident on an ESS subsystem
- Target volume resident on a non-ESS subsystem
- Swap migration completes normally.

The Softek TDMF I/O monitor will terminate a migration if unsupported CCWs are detected on the source volume. In addition, the I/O monitor can terminate a Swap migration if I/O operations are detected on the source volume, which are not supported on the target device.

The following table outlines the expected outcome when moving volumes with different attributes related to PAV.

Expected Outcomes for Volume Migrations in a PAV Environment

From Device	To Device	Result
non-PAV (defined as 3390)	PAV (defined as 3390B)	PAV non available until next IPL
non-PAV (defined as 3390B)	PAV (defined as 3390B)	PAV available after swap completes
PAV (defined as 3390B)	PAV (defined as 3390B)	PAV available after swap completes
PAV static	PAV dynamic	PAV dynamic

Expected Outcomes for Volume Migrations in a PAV Environment

From Device	To Device	Result
PAV dynamic	PAV static	PAV static
PAV (defined as 3390B)	non-PAV (defined as 3390B)	PAV disabled

When migrating volumes from a non-PAV capable subsystem to a PAV capable subsystem, PAV will not be available if the source devices are not defined in advance as 3390B type devices; an IPL will be required. This requirement is due to the fact that a PAV UCB is larger than a non-PAV UCB. It is recommended that when adding a PAV capable subsystem that the non-PAV capable IODEVICE macros be changed to 3390B.

FlashCopy Support

Softek TDMF does not currently support migration of data, which can be modified by the FlashCopy feature. To prevent this from occurring during a volume migration, the FlashCopy feature will be temporarily disabled for the source and target volumes.

NOTE

During a volume migration involving FlashCopy, once Softek TDMF has disabled FlashCopy, any customer jobs utilizing FlashCopy will proceed as though the feature was not supported by the source device. More specifically, if using DF/DSS dataset copy the following will occur based on the option specified:

- FASTREPLICATION(PREFERRED), replication will proceed.
- FASTREPLICATION(REQUIRED), replication will fail.

Static, Installation Static and Dynamic Devices

With MVS/ESA SP V4, the ability to define I/O devices as dynamic, static, or installation static was introduced via HCD.

A Static device is a device that cannot be dynamically added, deleted or modified in the **software** configuration definition. Therefore, the device is not available for use until the next IPL of MVS.

An Installation Static device is a device that can be dynamically added to the **software** definition but cannot be modified or deleted dynamically. Or, the device can be dynamically added, deleted and modified in the **hardware** configuration definition.

A Dynamic device is a device whose device definition can be dynamically added, deleted and modified in the **software** and **hardware** definition.

IBM does not allow the swapping of a device with different device attributes. This means that a device with an attribute of Dynamic cannot be swapped to a device with an attribute of Installation Static, or vice versa. Attempts to do so will result in message `IGF513I - DEVICE ddd INVALID FOR SWAP - DYNAMIC/STATIC INCOMPATIBLE` being issued.

When a device attribute is changed from Installation Static to Dynamic, its UCB address changes. Programs within the system that save UCB addresses will encounter problems if an attempt to use that UCB that was valid when the device was Installation Static.

The following table describes the type of swap migrations allowed by the MVS operating system:

Dynamic, Static and Installation Static Matrix

	TARGET VOLUME		
Source Volume	**Dynamic**	**Static**	**Installation Static**
Dynamic	yes	no	no
Static	no	yes	yes
Installation Static	no	yes	yes

The type of device configuration is determined by the Unit Information Modules (UIM) of the operating system in conjunction with the Dynamic=No or Dynamic=Yes parameter in HCD. DASD devices are allowed to be Dynamic or Installation Static based upon the Dynamic parameter. Therefore, Softek TDMF is not concerned with Static devices.

How to determine the device configuration of a volume:

1. Open an IPCS session. Set the default to ACTIVE.
2. Go to option 6 and issue LISTUCB *addr* for the specific device.
3. Locate the NXUCB data field in the display of the control block (UCBOB + 8).

If the NXUCB data field is zero, the device has a configuration of Dynamic. If the NXUCB data field contains an address, the device has a configuration of Static or Installation Static. This can be determined by scrolling to the bottom of the display. There will be a comment stating if the device is Static, Installation Static or Dynamic.

If a Softek TDMF Swap migration is attempted with different device configurations, message: "TDM1230S - Both volumes of a Swap migration must be either Dynamic or Installation Static", will be issued.

For more information on this topic, please refer to *OS/390 HCD Planning (GC28-1750)* or *MVS/ESA HCD: Planning (GC28-1445),* topics "Defining Whether an I/O Device Will be Dynamic" and "Redefining the Dynamic Parameter for an I/O Device".

Shared Virtual Array (SVA) / RAMAC Virtual Array (RVA) Support

At the start of the copy phase, the storage subsystem is instructed to release all data associated with the target volume, with the exception of track zero. It should be noted that Softek TDMF always constructs a pseudo VTOC on track zero of the target volume.

When a track is read from the source device containing no user records, no I/O is performed to the equivalent track on the virtual target volume. During the refresh and synchronization phases, deletion of a data set and its allocated space on a virtual source volume will cause Softek TDMF to instruct the storage subsystem to also release the space on the virtual target volume.

Customers who maintain 'permanent' SnapShot data sets on their virtual DASD will need to take these data sets into account when calculating the space required for a copy to another virtual device array.

Softek TDMF Ownership of Target Volume

Softek TDMF "owns" the target volume during the life of the migration session in order to preserve physical data integrity. With the exception of a few non-disruptive inquiries, any I/O operation to the target volume by anything other than Softek TDMF will be rejected and a message will be issued with IOSB completion code X'4A' (the I/O has been prevented). The message issued may be IOS000I or some other MVS message indicating an error via the application or MVS system component.

Softek TDMF and Volume Table of Contents

Selection of the dynamic ICKDSF option will cause Softek TDMF to reformat the Volume Table of Contents (VTOC) by dynamically invoking the ICKDSF REFVTOC or EXTVTOC function when the target volume device characteristics do not match that of the VTOC. For more information related to this topic, please refer to *ICKDSF* on page *78*.

Unit Control Blocks Above the 16Mb Line

Softek TDMF supports Unit Control Blocks (UCBs) above the 16Mb line. This feature was introduced in MVS/ESA V5.2.0 (using HCD). However, not all program products or files within those program products will support UCBs above the 16Mb line.

NOTE

Please check with other vendors in order to ensure that their program products (or specific files) will support UCBs above the 16Mb line.

Using Devices Previously Formatted for VM

For target volumes that have been previously used in a VM environment, it is recommended that an ICKDSF batch job be executed with the INIT, VALIDATE and NOCHECK parameters. This function will perform a medial initialization of the device. The home address and record zero for each track are read, validated and rewritten. **The data remaining on a track is erased.**

NOTE

This function is not applicable for 3390–9 device types.

For more information related to this subject, please refer to the *Device Support Utilities User's Guide and Reference R16 (GC35-0033-22)*.

VM Volume Tolerance

VM volumes can now be copied and relabeled using Softek TDMF in an MVS environment. However, Softek TDMF cannot monitor updates to the source volume while the migration is in progress, nor can the VM (CP and CMS) control block be manipulated to achieve a non-disruptive Swap migration.

To migrate a VM formatted volume; it must be varied offline from all attached VM systems. In the case of a system, spool, or page volume, the associated VM system(s) must be shutdown and later IPL'd.

CAUTION

For volume migrations, updates to the source volume made during the migration by users other than the z/OS guest system(s), might not be copied to the target. These users will continue to access the obsolete source volume after the swap, and users that link to the source volume by it original device address, and not its volume serial number, will need to change their profiles.

XRC Support

Softek TDMF does not support the migration of source volumes that are also the primary in an XRC session.

Suppressing Warning Messages in Softek TDMF

The **NOWARNing** option allows users to suppress the effect of individual warning message on the completion code of the TDMF session. Using this option keyword causes the system to disregard the warning message(s) about the migration, and resets the completion code to zero.

Syntax Example

The following provides an example of the syntax used for the **NOWARNing** option keyword to suppress message **TDM1574**. The option parameter is 1574.

```
|--+------------------+--|
   +-NOWARNing(1574)-+
```

Chapter 6

Batch Utilities

Overview

There are eight Softek TDMF batch utilities included with the base product. These utilities have been developed to aid the user in various ways. Each utility will be documented in this chapter. The batch utilities are:

Softek TDMF Batch Utilities

TDMFBMON	a batch monitor utility to control Softek TDMF sessions at the volume or session level.
TDMFCFTP	a batch job which prepares the COMMDS file(s) for shipment via a File Transfer Program or as an attachment in e-mail.
TDMFCLIP	generates the necessary ICKDSF REFORMAT control statements as input to a subsequent ICKDSF execution.
TDMFCLUP	a batch utility to clean up after a TDMF session that failed to pagefree and/or release common area (SQA/ECSA) virtual storage, or to restore the UCBDDT field in migration device UCBs.
TDMFMUCB	an application program interface (API) to Softek TDMF, which checks Softek TDMF control blocks, to determine if a device is involved in a Softek TDMF session. Devices may be specified using volume serial, UCB device address or the 16-bit unsigned binary device number.
TDMFQDSK	a query device configuration utility that scans all attached DASD subsystems for online UCBs and presents the information related to these UCBs in a format similar to the DEVSERV QDASD MVS command.
TDMFSCAN	a batch utility that will scan one or more potential source volumes for possible I/O errors and count field mismatches prior to a Softek TDMF session being executed.
TDMFVTOC	extracts device information for each online device in the DASD configuration. The report from this batch job assists the user to easily identify those devices whose Volume Table of Contents (VTOC) do not accurately describe their physical characteristics.
TDMFEXTV	for use when migrating from smaller to larger devices. TDMFEXTV will report on the likely effect of Softek TDMF and ICKDSF EXTVOC processing.

TDMFBMON

The Batch Monitor facility provides the user with an alternative to the Softek TDMF TSO Monitor Facility method of controlling the progress of a Softek TDMF migration.

The Batch Monitor is initiated as either a batch job or a started task. In either case, if a control statement input stream is provided (using the SYSIN DD statement) the Monitor processes all these statements and then terminates. If no SYSIN DD statement is provided the Monitor waits for and reacts to operator *modify* and *stop* commands. When processing control statement input, all informational and error messages are written to the SYSPRINT data set, so it is recommended that this DD statement always be provided.

The following is an example of the JCL required to execute the Batch Monitor with control statement input.

```
//<---------------- job card ----------------->
//BMON      EXEC PGM=TDMFBMON
//STEPLIB   DD DISP=SHR,DSN=<program library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSUDUMP  DD SYSOUT=<sysout class>
//SYSIN     DD *
  <control statements>
/*
```

The following is an example of the JCL, which could be installed in a system procedure library (*PROCLIB*) to enable the Batch Monitor to be started and used interactively by the system operator. The SYSPRINT DD statement is optional, and if provided will be used to record the operator commands and their resulting program actions.

```
//BMON      PROC
//BMON      EXEC PGM=TDMFBMON
//STEPLIB   DD DISP=SHR,DSN=<authorized program library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSUDUMP  DD SYSOUT=<sysout class>
```

Operational Considerations

The Batch Monitor will recognize volumes and groups, which are being migrated by a Softek TDMF session whose Master system is not running in the same MVS system as the Batch Monitor. However, the "query" command may not accurately report the status of these volumes, and requests for actions to these volumes will be rejected.

It is important for predictable operation of the Batch Monitor that the user adhere to two simple naming standards for migration groups; group names must be unique across all the concurrently active Softek TDMF sessions and group names and volume serial numbers must not match.

Only one copy of the Batch Monitor can be active at any one time. A monitor using control statements is deemed to be active while the input records are being read and processed. A monitor reacting to operator "modify" commands is active when processing any command other than a "query volume status".

TDMFBMON - Command processing

The Batch Monitor accepts the following operator commands when entered through a system console. Note that "P" is the abbreviation for the MVS "stop" command, while "F" is the short form of "modify".

.

Softek TDMF Batch Monitor Operator Commands

Command	Response
P stepname	Monitor Processing is immediately terminated.
F stepname,Q *operand* F stepname,QUERY operand	The Monitor displays the status of volumes currently active in Softek TDMF sessions. Operands are: volume | group – query the status of a volume or group. copy | copying – display volumes in copy phase. wait | waiting – display that are suspended or waiting for confirmation. inact | inactive – display volumes that are complete, suspended, or waiting for confirmation. refresh – display volumes in refresh or synchronization phases. active – display volumes which are active. complete – display volumes that are complete or have been terminated.
F stepname,T *volser* F stepname,TERM *volser* F stepname,TERMINATE *volser*	Migration of volume "volser" is terminated. NOTE: If the volume is part of a migration group, and if the option "terminate group on error" is set for the volumes in this group, the "T" command will terminate the entire group, exactly as would be the case in the TSO Monitor.
F stepname,T *grpname* F stepname,TERM *grpname* F stepname,TERMINATE *grpname*	Migration of group "grpname" is terminated.
F stepname,S *volser* F stepname,SUSPEND *volser*	Migration of volume "volser" is suspended.
F stepname,S *grpname* F stepname,SUSPEND *grpname*	Migration of group "grpname" is suspended.

Softek TDMF Batch Monitor Operator Commands

Command	Response
F stepname,A *volser* F stepname,ALLOW volser	Migration of volume "volser" from one manufacturer's mirroring technology to another manufacturers technology (e.g. PPRC to SRDF) is confirmed.
F stepname,F *volser* F stepname,CONF *volser* F stepname,CONFIRM *volser*	Migration of volume "volser" is initiated. **NOTE:** If the volume is part of a migration group, the "F stepname,F volser" command will be rejected. In this case the "F stepname, F grpname" command is required.
F stepname,F *grpname* F stepname,CONF *grpname* F stepname,CONFIRM *grpname*	Migration of group "grpname" is initiated.
F stepname,Z *volser secs* F stepname,SYNC *volser secs* F stepname,SYNCH *volser secs* F stepname,SYNCHRONIZE *volser secs*	The Synchronization target of volume "volser" is set to "secs" seconds. **NOTE:** If the volume is part of a migration group, the "F stepname,Z volser secs" command will be rejected. In this case the "F stepname,Z grpname secs" command is required. The time operand, "secs" must be a one to 16 character numeric string with a value not less than five or greater than 999.
F stepname,Z *grpname secs* F stepname,SYNC *grpname secs* F stepname,SYNCH *grpname secs* F stepname,SYNCHRONIZE *grpname secs*	The Synchronization target of group "grpname" is set to "secs" seconds.
F stepname,C *volser* F stepname,CONT *volser* F stepname,CONTINUE *volser*	Migration of volume "volser" is continued.

Softek TDMF Batch Monitor Operator Commands

Command	Response
F stepname,C *grpname* F stepname,CONT *grpname* F stepname,CONTINUE *grpname*	Migration of group “grpname” is continued.
F stepname,P *volser* F stepname,PROMPT *volser*	Synchronization of volume “volser” is confirmed.
F stepname,P *grpname* F stepname,PROMPT *grpname*	Synchronization of group “grpname” is confirmed.
F stepname,I *volser*	Reinitialize the migration of volume “volser”.

TDMFBMON - Control Statement Processing

The following control statements are acceptable in the input stream. Commands and operands can start anywhere on the input record, except that the entire statement must be completed by column 71 of the input record. No continuation of a control statement is allowed. An input record that is blank in the first 71 positions and records containing an asterisk in the first character position are treated as comments. Comments can also be appended to control statements, leaving at least one blank character after the operand.

In the following table, the single character in parentheses is the acceptable abbreviation for the command.

TDMFBMON Control Statements

Command	Short Form	Purpose
QUERY	(Q)	Report on volume status in active Softek TDMF migration session. Operands are: volume | group – query the status of a volume or group. copy | copying – display volumes in copy phase. wait | waiting – display that are suspended or waiting for confirmation. inact | inactive – display volumes that are complete, suspended, or waiting for confirmation. refresh – display volumes in refresh or synchronization phases. active – display volumes which are active. complete – display volumes that are complete or have been terminated.
TERMINATE volser	(T)	migration of volume “volser” is terminated. **NOTE:** If the volume is part of a migration group, and if the option “terminate group on error” is set for the volumes in this group, the “TERMINATE” command will terminate the entire group, exactly as would be the case in the TSO Monitor.
TERMINATE grpname		Migration of group “grpname” is terminated
ALLOW volser	(A)	Migration of volume “volser” from one manufacturer’s mirroring technology to another manufacturers technology (e.g. PPRC to SRDF) is confirmed.
CONFIRM volser	(F)	Migration of volume “volser” is initiated. **NOTE:** If the volume is part of a migration group, the “CONFIRM volser” command will be rejected. In this case the “CONFIRM grpname” command is required.
CONFIRM grpname	(F)	Migration of group “grpname” is initiated.

TDMFBMON Control Statements

Command	Short Form	Purpose
SYNCHRONIZE volser secs	(Z)	The Synchronization target of volume “volser” is set to “secs” seconds. The time operand, “secs” must be a one to 16 character numeric string with a value not less than five or greater than 999. **NOTE:** If the volume is part of a migration group, the “SYNCHRONIZE volser secs” command will be rejected. In this case the “SYNCHRONIZE grpname secs” command is required.
SYNCHRONIZE grpname secs	(Z)	The Synchronization target of group “grpname” is set to “secs” seconds
SUSPEND volser	(S)	Migration of volume “volser” is suspended
SUSPEND grpname	(S)	Migration of group “grpname” is suspended
CONTINUE volser	(C)	Migration of volume “volser” is continued
CONTINUE grpname	(C)	Migration of group “grpname” is continued
PROMPT volser	(P)	Synchronization of volume “volser” is confirmed. **NOTE:** This command will be rejected if the volume is part of a migration group.
PROMPT grpname	(P)	Synchronization of group “grpname” is confirmed
REINIT volser	(I)	Reinitialize the migration of volume “volser”.

TDMFBMON Messages

Please refer to the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)* for these messages.

TDMFBMON - Printed Output

If a SYSPRINT DD statement is provided, operator messages issued by the authorized version of the Batch Monitor (driven by operator *modify* commands) will also appear in the printed report. When the Batch Monitor is executed with control statement input, some of the printed messages are identical with these operator messages. Those print messages, are contained in the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFCFTP

This program is part of the process to send information to the Softek Global Support Center for problem resolution related to Softek TDMF sessions. Two items of documentation are necessary for problem determination and resolution by this group of people: 1) the output listings from the Softek TDMF session and 2) the Communications Data Set (COMMDS).

NOTE

Other information may also be requested.

There are multiple ways in which to send the data to the Softek public server. The following process assumes that the local operating system is MVS. If other processes are available, ensure that the data transfer maintains the proper characteristics as specified in the instructions below.

1. Create a sequential data set of the Master system sysout.
2. Create a sequential data set of the Agent(s) system sysout.
3. Condense the COMMDS using the JCL below.

```
//CONDENSE JOB
//CFTP     EXEC PGM=TDMFCFTP
//STEPLIB  DD  DSN="hlq".TDM360.TDMLLIB,DISP=SHR
//INPUT    DD  DSN="hlq".TDM360.SYSCOM,DISP=SHR
//OUTPUT   DD  DSN="hlq".TDM360.FTP,
//             DISP=(,CATLG,DELETE),
//             UNIT=SYSDA,
//             SPACE=(CYL,(5,1)),
//             DCB=(BLKSIZE=20500,LRECL=4100,RECFM=FB)
```

4. Send an e-mail to the Softek Global Support Center using address tdmfsupport@softek.com with the following information:
   - Softek Customer Site ID (if known)
   - Customer Site Name
   - Contact person phone number and e-mail address
   - Softek Case number (if known)
   - Attach the sysout and COMMDS to E-mail

For more information on this process, please refer to
www.softek.com/en/support/mainframe/tdmf/ftphelp.html

TDMFCLIP

The program can be used after a Swap migration to generate “INIT” statements for ICKDSF to re-initialize the original source volumes. In this case, the user can provide a “MODEL” DD statement referring to an online volume with the VTOC and index size and locations that ICKDSF will apply. If no "MODEL" DD statement is supplied, TDMFCLIP will initialize each source volume with its previous VTOC and index size and location.

The input file is a single TDMF Communications Dataset generated by a previous Softek TDMF session, specified by the SYSCOM DD statement.. TDMFCLIP reads the Softek TDMF control blocks in this data set and will produce an “INIT” statement for each successful volume Swap.

By default, the TDMFCLIP program will generate control statements to initialize each swap migration source volume as if it were to be deinstalled, erasing customer data from every track. An optional execution parameter can be used to prevent this time consuming process, or to reinitialize the volume as system-managed.

The supported parameters are:

- PARM=NOVAL

  Initialize the volume at the minimal level.

- PARM=STGR

  Initialize the volume as system-managed.

NOTE

The Softek TDMF I/O service routine (TDMFCDIO) does not support concatenated input files.

The output file, with a DDname of TDMFOUT, is sequential with 80 byte records and will contain the generated ICKDSF control statements. It is expected that these card images will usually be written to a direct access or VIO data set for input to the ICKDSF program.

The following is an example of the JCL required to execute TDMFCLIP:

```
//<---------------- job card ----------------->
//FIXIT     EXEC PGM=TDMFCLIP
//STEPLIB   DD DISP=SHR,DSN=<program library>
//SYSCOM    DD DISP=SHR,DSN=<TDMF Communications Dataset>
//TDMFOUT   DD DISP=disp,DSN=<ICKDSF control statements>
//* Model DD statement only required for INIT (Swap) type COMMDS
//MODEL     DD DISP=OLD,UNIT=SYSALLDA,VOL=SER=<model volume>
//*
//* OPTIONAL CLIP STEP FOLLOWS
//*
//CLIPIT    EXEC PGM=ICKDSF,PARM=NOREPLYU,COND=(0,LT)
//SYSPRINT  DD SYSOUT=*
//SYSIN     DD DSN=*.FIXIT.TDMFOUT
```

TDMFCLIP - Return codes

TDMFCLIP issues an explanatory message prior to setting a non-zero return code. These messages and their associated codes can be found in the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFCLUP

The TDMFCLUP program can be used to clean up after a TDMF session that failed to pagefree and/or release common area (SQA/ECSA) virtual storage, or to restore the UCBDDT field in migration device UCBs. Under the control of execution parameters, the program will also clean up the UCB for a single device that has an incorrect DDT pointer or is incorrectly set to the "DDR" quiesce level.

TDMFCLUP has two primary modes of operation:

1. Scan and repair the entire system.

   TDMFCLUP will scan the entire system for common virtual storage that was not pagefreed and/or released by a TDMF session and will then scan the devices in every installed DASD subsystem and repair devices found to have an incorrect DDT pointer or incorrectly set to the "DDR" quiesce level. To execute TDMFCLUP in this mode, see *TDMFCLUP: Scanning Entire System* on page *106* for more details.

2. Scan and repair a specific device.

   TDMFCLUP will scan and repair a specific device if the device is found to have an incorrect DDT pointer or incorrectly set to the "DDR" quiesce level. To execute TDMFCLUP in this mode, see *TDMFCLUP: Repairing a Single Device* on page *108* for more details.

TDMFCLUP: Scanning Entire System

Execution JCL

To execute TDMFCLUP to clean up storage and devices from a failed session, and then to validate all the DASD UCBs in the system, only the following JCL is required:

```
//CLUP     EXEC PGM=TDMFCLUP
//STEPLIB    DD DISP=SHR,DSN=<TDMF load library>
//SYSPRINT   DD SYSOUT=*
//SYSSNAP    DD SYSOUT=*
```

To clean up a session which did not initialize, or which was at a different version of the product, add the PARM='FORCE' option to the execution statement:

```
//CLUP     EXEC PGM=TDMFCLUP,PARM='FORCE'
//STEPLIB    DD DISP=SHR,DSN=<TDMF load library>
//SYSPRINT   DD SYSOUT=*
//SYSSNAP    DD SYSOUT=*
```

Control Block Search Scanning Entire System

Common Area Virtual Storage Scan and Repair

When started without any execution parameter, the program uses the VSMLIST service to map ECSA and then searches every storage range that is allocated in subpool 228, protect key zero, non-fetch protected, storage for a TDMF main control block. For each control block that is found, representing a migration session that is/was active in the system, the program performs the following processing.

1. Version check

   The V3.6 level of the program will attempt to clean up storage left allocated by an earlier release of TDMF.

2. Communications Dataset serialization

   The program extracts the dataset name and volume serial number from the TDMF control block and issues an exclusive ENQ with SYSTEM scope for the volser/dsname resource. If the dataset is still owned by a migration session, the ENQ will fail, the TDMF block is ignored and the search of allocated ECSA continues.

3. Communications Dataset allocation

   The program attempts to dynamically allocate, then OPEN for update, the session's Communications Dataset. If either the allocation or the OPEN fails, the dataset will be discarded but processing of the orphaned control blocks will continue.

4. Communications Dataset currency check

   The first two records are read from the newly allocated Communications Dataset and the TDMFMSE for the executing system is found, using the relative system number field from the TDMF block. The TDMF block for this system is then read from the Communications Dataset and its latest heartbeat TOD clock value is compared with the control block found in ECSA. If the heartbeat time on disk is later than the value in storage, the dataset is discarded but storage cleanup processing continues.

5. Communications Dataset update

   If the Communications Dataset has been successfully ENQueued, and the TDMF heartbeat time in virtual storage is not earlier than the equivalent time in the dataset for this system, the session being cleaned up is assumed to "own" the dataset and the program will attempt to bring the dataset up to date by writing the session's control blocks to disk, as they are found in ECSA.

6. Session and volume message processing

   The session level messages from the TDMF and TSOM control blocks are formatted and written to SYSPRINT, immediately following the program's own status messages.

   The ECSA control blocks for each volume in the session are accessed and the volume messages are printed for the system. If possible, these control blocks are also written to the SYSCOM dataset, so that they can be displayed by the TSO Monitor (Display Details or Merged Messages option).

7. Control block SNAP

   If a SYSSNAP DD statement was provided, the orphaned control blocks will be snapped as they are found and processed.

8. UCB cleanup

   For each volume in the session, the source, target and duplex UCBs will be examined and, if necessary, the UCBDDT and UCBLEVEL fields will be corrected.

   If the associated DDT is invalid, the UCBDDT pointer will be changed to point to one of the DDTs in the nucleus (IGGDDT01 or IGGDDTA1).

   If the DDT is imbedded in a DDTR control block for the session being cleaned up, the DDT address in the DDTR will be stored back into the UCBDDT field.

   If a UCB that had an invalid DDT, or one that was imbedded in an orphaned TDMFDDTR control block, has the DDR quiesce level set, the IOSLEVEL service will be used to reset this quiesce level. However, if the program can not determine whether swap processing was started for the volume, the UCB will be left quiesced for processing by the final UCB scan.

9. Storage cleanup

The program will unfix and release the ECSA and SQA storage owned by the session. The total number of bytes of storage cleaned up is displayed in a message at termination.

10. DASD UCB scan

    As a final check, the program attempts to validate the UCB for every installed Direct Access device. This processing is described in detail in the next section.

Scan all installed DASD UCBs

Once the common area virtual storage scan has completed, the program scans the devices for every installed DASD subsystem. This processing involves the following validation and repair operations:

1. Dynamic LPA check

   If there is a TDMF I/O Monitor module loaded in dynamic LPA and it is not being shared by a migration session, its start address will be saved and any DDT found in the UCB scan with a DDTSIO field that points to this module will be considered to be invalid.

2. DDT Address check

   If a device's UCBDDT field points to one of the four DDTs at label IGGDDT01 in the nucleus, it is assumed to be valid.

3. DDT format check

   If the DDTNAME field does not contain the characters "DDT" followed by a space, the DDT is assumed to be invalid and the UCBDDT field will be corrected to point to one of the nucleus resident DDTs.

4. DDTSIO address check

   If the DDTSIO field points to IECDPRFX or KDFSSIOE (Candle Corporation), the DDT is assumed to be valid. If the DDT is part of a TDMFDDTR control block for a session that is no longer active, the UCBDDT pointer will be repaired. If the DDT is not imbedded in a TDMFDDTR block, but the DDTSIO field points to a TDMF I/O Monitor module, the DDTSIO field will be changed to point to IECDPRFX.

5. DDR quiesce level check

   If there is an active migration session the quiesce level will not be reset for any device. In this case, the program must be resubmitted with a "FIXUCB" parameter for each device to be repaired.

6. Volume Label check

   If there are no active TDMF sessions and there is an online volume with the DDR quiesce level set in its UCB, the program will generate a DCB and DEB and attempt to read the serial number from the volume label. If the device is offline or boxed, or the volume serial number in the label matches the serial number in the UCB, the DDR quiesce level will be reset.

TDMFCLUP: Repairing a Single Device

Execution JCL

To execute TDMFCLUP to repair a single device, the following JCL is required. You must specific the 'FIXUCB=unit' parameter on the execution statement, where the unit is the device address needing repaired.

```
//CLUP    EXEC PGM=TDMFCLUP,PARM='FIXUCB=unit'
//STEPLIB   DD DISP=SHR,DSN=<TDMF load library>
```

```
//SYSPRINT  DD SYSOUT=*
//SYSSNAP   DD SYSOUT=*
```

When executed with an execution parameter of "FIXUCB=xxxx", the program will locate the UCB and DDT for device "xxxx" and attempt to repair it:

1. DDT address check

   If the UCBDDT field points to an inaccessible or invalid DDT it will be changed to point to one of the standard nucleus resident DDTs. If the DDT is part of a TDMFDDTR control block for a session that is no longer active, the UCBDDT pointer will be replaced with the DDT address from the TDMFDDTR control block.

2. DDR quiesce level check

   It is possible to reset the quiesce level for a single device, even if there is an active TDMF session, so great care must be taken. Before using the IOSLEVEL RESET service, the program will attempt to acquires SYSTEMS scope control of the "MIGRTDMF/volser" ENQ resource. This will only protect a device that is active in a TDMF session (but not currently being monitored) if the Master system for the session is executing on a system in the same GRS- or MIMplex as the TDMFCLUP program.

TDMFCLUP - Program Abend Codes

TDMFCLUP can issue one of the following user abends:

TDMFCLUP Abend Codes

U0001	An invalid data area was returned by the VSMLIST macro. In the dump for this abend, register 14 points to the 1MB workarea passed to the VSMLIST service.
U0101	A non-zero return code was received from a DEBCHK (ADD) macro. This return code is used as the abend reason code.

TDMFCLUP - Program Messages

The following messages might be issued by the TDMFCLUP program. Message variables are indicated by the variable name encased in "<>". Program completion code will be set in accordance with the highest severity message issued:

TDMFCLUP Program Messages

Message	Description
CLUP001S The program must be APF Authorized.	This message is issued via a WTO. Relink the program with "SETCODE AC(1)" or "PARM='AC=1'" into an APF authorized library.
CLUP002I This system, <smf-id>, **was IPLed on** <date> **at** <time>.	This is the system IPL (local) time from the SMCA control block.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP003I Found TDMF block at address <address>	A piece of alocated ECSA storage appears to contain a TDMF control block. This control block will be snapped if the SYSSNAP DD statement is supplied.
CLUP004I Communications Dataset: <dataset name> **on** <volume>	The TDMF control block found in ECSA storage refers to this communications dataset.
CLUP005W TDMF Session was not initialized	The TDMF control block found in ECSA appears to belong to a session that did not successfully initialize. The control blocks for this session will not be processed unless “PARM=FORCE” was specified.
CLUP006W A TDMF session is active on this dataset	The communications dataset identified in message CLUP004I is owned by an active session. Further processing of the control blocks for this session is abandoned.
CLUP007I Communications Dataset updated	The communications dataset identified in message CLUP004I has been updated with the TDMF, WORK and VMSG control blocks found in ECSA.
CLUP008I Freed <nnnn>**KB real,** <nnnn>**KB ECSA,** <nnnn> **bytes SQA**	This message is issued on completion of the ECSA allocated storage scan and indicates how much abandoned real and virtual storage was reclaimed by the program.
CLUP009I Session started on <date> **at** <time> **(**<**TOD/ LOCAL**>)	This message displays the session start time from the TDMF control block identified in message CLUP003I. If the local time option was specified for the session itself, the TOD clock value in the control block time will be converted to local time.
CLUP012I This TDMF session most recent for Communications Dataset	The session described by the TDMF control block found in ECSA has the same numbers of agents and volumes as the TDMF block for this system found in the communications dataset. The program will attempt to update the dataset.
CLUP013I Mismatch between TDMF blocks in storage and on disk	The session described by the TDMF control block found in ECSA is not the one that most recently initialized its communications dataset. The program closes and deallocates the dataset and will not attempt to update it.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP020E Allocation of Communications Dataset failed; RC='<code>'. **S99ERROR='**<code>**', S99INFO='**<code>**', S99ERSN='**<code>'	An attempt to allocate the communications dataset identified in message CLUP004I was unsuccessful. The program continues to examine the storage left allocated by the session but will not be able to update the dataset.
CLUP021E Abend <code> **during OPEN for Communications Dataset**	The communications dataset identified in message CLUP004I was successfully allocated but encountered a severe error in OPEN processing. The program will issue message CLUP022W then continue to examine the storage left allocated by the session.
CLUP022W OPEN failed for Communications Dataset	The communications dataset identified in message CLUP004I was successfully allocated but could not be opened for update. The program continues to examine the storage left allocated by the session but will not be able to update the dataset.
CLUP023E READ request failed for block at CCHHR: <cccchhhhrr>	An attempt to read the MSE or TDMF control block from the communications dataset identified in message CLUP004I was unsuccessful. The program closes and deallocates the dataset and will not attempt to update it.
CLUP024W MSE control block for this system is invalid	The MSE for the relative system number as found in the TDMF block in ECSA has been read from the communications dataset identified in message CLUP004I. The MSE does not have a valid eyecatcher, there is a mismatch of system SMD ids or the MSE record does not have a valid heartbeat value. The program closes and deallocates the dataset and will not attempt to update it.
CLUP025W TDMF control block for this system is invalid	The MSE record read from the communications dataset identified in message CLUP004I contains a pointer to the TDMF block which was written by this session at initialization time. The record found at this disk address is not a valid TDMF block. The program closes and deallocates the dataset and will not attempt to update it

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP026W WRITE request failed for block at CCHHR: <cccchhhhrr>	An attempt to write a TDMF, TSOM, WORK or VMSG control block to the communications dataset identified in message CLUP004I was unsuccessful. The program closes and deallocates the dataset and will not attempt to update it further.
CLUP031I DDT pointer corrected for device '<device>**'**	The program has detected an invalid or orphaned DDT and replaced the UCBDDT pointer for the indicated device.
CLUP032I UCBLEVEL pointer corrected for device '<device>**'**	The program has detected a device with the DDR quiesce level flag set in its UCB. The UCB has been repaired, and queued I/O requests redriven, using the IOSLEVEL service routine.
CLUP033E Unable to validate DDT pointer for device '<device>**'**	The program has detected a device whose DDT can no longer be accessed or has been overlaid. The program will point the UCB to one of the nucleus DDTs and issue message CLUP031I.
CLUP034S No CSA virtual storage found in subpool 228	The program is unable to locate the storage area descriptors for CSA subpool 228. This must be a logic or system error, so the program terminates without attempting the UCB scan.
CLUP035S VSMLIST macro failed. Return code: X'<code>**'**	The VSMLIST macro set a non-zero return code, or returned an empty storage list. This must be a logic or system error, so the program terminates without attempting the UCB scan.
CLUP038W Serialization failed for volume <volume>	The program is cleaning up the control blocks and devices for a previous session and has detected that a new migration is in progress using the indicated volume. The UCB will not be modified, although the volume will be examined again in the UCB scan routine.
CLUP039W TDMF block is not for Version 3 migration.	The session described by the TDMF control block found in ECSA did not use the version of the TDMF product that this product is part of. If the version field is neither “3” or “2”, or if the “PARM=FORCE” execution parameter was not specified, the program will ignore the session represented by this TDMF block and continue the examination of allocated ECSA.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP040S Execution parameter invalid	The execution parameter is not valid. Supported parameters are: • FORCE • FIXUCB=xxxx This message is written into the job log using a WTO macro and the program terminates with a completion code of 12.
CLUP041S UCBLOOK macro failed for device '<device>**'**	The program is being executed with the 'FIXUCB=<device>' parameter. The UCBLOOK macro could not return the UCB address for the device specified in the execution parameter.
CLUP042W Quiesce level not reset for device '<device>**'. TDMF is active in system.**	During the final UCB scan, a device was encountered with the DDR quiesce level set in its UCB. This UCB will not be repaired since it might be have been quiesced by an active migration session. If this device's must be repaired before the currently active migration sessions complete, the program can be resubmitted with the "PARM='FIXUCB=<device>'" execution parameter.
CLUP043W Quiesce level not reset for device '<device>**'. GQSCAN error: '<**return code>**'/ '<**reason code>**'**	During the final UCB scan, a device was encountered with the DDR quiesce level set in its UCB. An attempt use the GQSCAN macro to determine whether there were any active migration sessions in the system was unsuccessful and this UCB will not be repaired. To circumvent this problem, the program can be resubmitted with the "PARM='FIXUCB=<device>'" execution parameter.
CLUP044S Error finding IECVPRFX address	The program is unable to locate the standard DASD Start Subchannel exit routine address. This must be a logic or system error, so the program terminates immediately.
CLUP045S Error finding DDTs in Nucleus	The program is unable to find the DDTs, located at IGGDDT01 and IGGDDTA1 in the system nucleus. This must be a logic or system error, so the program terminates immediately.
CLUP046S DFA control block invalid	The program is attempting to scan all the active DASD subsystems, but is unable to validate the DFA control block. This must be a logic or system error, so the program terminates without completing the UCB scan.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP047S DFVT control block invalid	The program is attempting to scan all the active DASD subsystems, but is unable to validate the DFVT control block. This must be a logic or system error, so the program terminates without completing the UCB scan.
CLUP048S SSSVT control block invalid	The program is attempting to scan all the active DASD subsystems, but is unable to validate the SSSVT control block. This must be a logic or system error, so the program terminates without completing the UCB scan.
CLUP049S SSSCT control block invalid	The program is attempting to scan all the active DASD subsystems, but either the pointer to the SSSCT control block in the SSSVT is zero, or the count of SSSCB entries in the SSSCT control block itself is zero. This must be a logic or system error, so the program terminates without completing the UCB scan.
CLUP050S SSSCB control block invalid	The program is in the process of scanning all the active DASD subsystems, but there is an SSSCB control block which does not have a valid eyecatcher. This must be a logic or system error, so the program terminates without completing the UCB scan.
CLUP051S SSCBDH control block invalid	The program is in the process of scanning all the active DASD subsystems, but the current SSSCB control block points to an SSCBDH control block which does not have a valid eyecatcher. This must be a logic or system error, so the program terminates without completing the UCB scan.
CLUP052I SSSCB and UCB scan successfully completed	The program has completed the scan of active DASD subsystems.
CLUP054I Migration session active for device '<device>**'** **CLUP054E Migration session active for device '**<device>**'**	The UCB for the indicated device points to a TDMFDDTR block that is owned by an active migration session. The program will not attempt to repair this UCB. If this condition is detected as part of the final UCB scan it is not considered an error and the message is informational. If the program is being executed to specifically repair this device ('FIXUCB=<device>' parameter) then this is an error.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP055I DDT for device '<device>**' imbedded in orphaned TDMFDDTR block**	The UCB for the indicated device points to a TDMFDDTR block that does not appear to still be valid. The DDT pointer will be repaired to point to either the DDT whose address was stored in the DDTR (if this is valid) or to one of the DDTs in the system nucleus.
CLUP056I DDT at <address> **for device '**<device>**' is not valid**	The program is being executed with the 'FIXUCB=<device>' parameter. The UCB for the specified device points to a DDT which is either inaccessible, does not have a valid eyecatcher or points to a Start Subchannel exit routine that is inaccessible. If this message follows CLUP055I, the DDT that is invalid is the one pointed to by the orphaned TDMFDDTR block. In either case, the DDT pointer will be repaired to point to one of the DDTs in the system nucleus.
CLUP057W Device '<device>**' using non-standard DDT at** <address>	The program is being executed with the 'FIXUCB=<device>' parameter. The UCB for the specified device points to a DDT which appears to be valid, but which is neither imbedded in a TDMFDDTR block nor one of the two nucleus resident DASD DDTs. The DDT pointer will be not be modified.
CLUP058I Device '<device>**' uses a standard DDT**	The program is being executed with the 'FIXUCB=<device>' parameter. The UCB for the specified device points to a DDT which is resident in the system nucleus. The program will examine the UCB quiesce level but will not modify its UCBDDT field.
CLUP059E Device '<device>**' active in TDMF session with unrecognized version number**	The program is performing the DASD subsystem scan or is being executed with the 'FIXUCB=<device>' parameter and has encountered a UCB whose DDT is imbedded in a TDMFDDTR control block. However, the TDMF control block for the owning session does not have a supported version number. The program can not determine whether this session is still active and will not attempt to repair this device.

TDMFCLUP Program Messages *(Continued)*

Message	Description
CLUP063E UCBLEVEL not reset for volume <volser>**: error reading volume label**	The program is performing the DASD subsystem scan and has encountered an online UCB with the DDR quiesce level set. In order to determine whether the device can be made available again, the program attempts to match the volume serial number in the device's UCB with the serial number in the physical volume label. The EXCPVR to read the label record from DASD was unsuccessful. The program will not perform further processing for this device and continue with the scan. If it is known that the volume label is correct, the quiesce level can be reset by executing the program with the 'FIXUCB=<device>' parameter.
CLUP064E UCBLEVEL not reset for volume <volser>**: Volume labeled as** <*volser*>	The program is performing the DASD subsystem scan and has encountered an online UCB with the DDR quiesce level set. In order to determine whether the device can be made available again, the program has read the physical volume serial number from disk. The volume serial number in the device's UCB does not match the serial number in the physical volume label. The program will not perform further processing for this device and continue with the scan. The device should be varied offline with "force" and after termination of the applications using the volume, the correct device should be varied online. Otherwise the device can be varied offline and the serial changed using ICKDSF on another system, after which the quiesce level can be reset by reexecuting the program.
CLUP065E Read of label for volume <volume> **timed out (one second)**	The program is performing the DASD subsystem scan and has encountered an online UCB with the DDR quiesce level set. In order to determine whether the device can be made available again, the program attempts to match the volume serial number in the device's UCB with the serial number in the physical volume label. The EXCPVR to read the label record from DASD did not complete within one second. The program uses the PURGE macro to fail the I/O operation, so this message will be followed by CLUP063E.

TDMFMUCB

The TDMFMUCB application program interface (API) examines Softek TDMF control blocks for active migrations and returns information related to caller-specified devices. The program can be invoked using the LINK macro, or can be called as either a linkage-edited subroutine or a dynamically loaded module.

TDMFMUCB must be entered and always returns in 31 bit addressing mode.

Operation

TDMFMUCB is passed either a parameter structure or the address of a single UCB by the calling program. If general-purpose register one (R1) is non-zero, it must point to a control structure as described below. Within this structure the caller can specify up to 65,535 devices to be processed by the routine. Each device must be specified using its UCB address, its 16-bit unsigned binary device number or its volume serial. All devices in the list must be specified in the same way, and a code describing this specification must be stored in the third byte of the structure.

The parameter structure has the following format:

TDMFUCB Parameter Structure

OFFSET (BYTES)	LEN	Field Description
0	2	Number of devices in the list. If this field is zero, the device list is assumed to contain one entry, else it should contain a binary half-word of the number of devices in the list.
2	1	Device specification type. The format of the device information in the attached list. This is a one-byte binary value. Supported values are: 0: UCB address. This can be a captured or actual address. 1: Device number. 2: Volume serial number.
3	1	Function code. This is a one-byte binary value; supported values are: 0: Return device status information 1: Return extended device status
4	varies	Device list. Each entry in the list comprises a two-byte return code, a two-byte address space id and a two, four or six byte field containing a hexadecimal device number, a 31-bit UCB address or a volume serial number.

Return Codes for TDMFMUCB

On return from TDMFMUCB, register 15 contains return codes. Return codes reflect the status of a source volume (copy, refresh, synch ready, etc.) The return codes vary, depending on whether function code 0 or function code 1 is being used. Note that if more than one of the following conditions are met, the resulting return code will be the highest of those applicable. For more information about return codes and messages, please refer to *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

Return Codes for TDMFMUCB

Function Code	Return Code	Description
0	0[a]	The device is not involved in a migration.
0	4[b]	A source volume is being migrated.
0	8[c]	The device is the target of a migration.
0	12	The device is offline or the volume serial could not be located on an online device.
1	32	Activated (copy phase).
1	36	First refresh phase.
1	40	Suspended.
1	44	Subsequent refresh phase.
1	48	Ready to synch.
1	52	Volume swapped.

a.If R1 is zero at entry to TDMFMUCB, R0 is assumed to point to a UCB.
b.For each device entry whose return code is four or eight, the ASID of the associated Softek TDMF session is returned in bytes two and three of the entry.
c.For each device entry whose return code is four or eight, the ASID of the associated Softek TDMF session is returned in bytes two and three of the entry.

For every device for which a migration is not currently active or pending, but which is found to be "completed" or "terminated" in an active Softek TDMF session, the ASID of the Softek TDMF job for this session is returned, together with a device return code of zero.

TDMFQDSK

The Query Device Configuration utility provides the Softek TDMF user with a convenient method of extracting configuration data from a device in each DASD subsystem. This information contains equipment serial numbers and is described in detail in the section entitled "Read Configuration Data" in the manual, *IBM 3990/9390 Storage Control Reference (GA32-0274)*.

TDMFQDSK is initiated as a batch job. The DF/SMS control blocks describing the attached DASD subsystems and for each subsystem the associated Unit Control Blocks (UCBs) are examined. When a unit has been found which is online and has a standard VTOC pointer (the program can not allocate volumes formatted for VM/390 use), the volume is dynamically allocated, using the special data set name "FORMAT4.DSCB", opened for input and the device and configuration data are read. This data is formatted in a manner similar to the response from the DEVSERV MVS command in the SYSPRINT output file. Once a usable volume has been found, processing continues with selection of the next subsystem.

The following is an example of the JCL required to execute TDMFQDSK.

```
//<---------------- job card ----------------->
//QDSK      EXEC PGM=TDMFQDSK
//STEPLIB   DD DISP=SHR,DSN=<program library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSUDUMP  DD SYSOUT=<sysout class>
/*
```

TDMFQDSK - Printed Output

Messages may be written to the SYSPRINT file and can be found in the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFQDSK - User Abends

User Abend codes are documented in the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFSCAN

The TDMFSCAN program scans one or more volumes, reporting on I/O errors and count field mismatches. The program outputs a report on the suitability of the volume for migration using Softek TDMF.

TDMFSCAN must be installed and executed as an APF-authorized program. TDMFSCAN must not be linkage edited with the "RENT" or "REFR" attributes.

There are no input files to the program; an execution parameter controls which unit(s) will be processed and the program then uses dynamic allocation.

The report is written to the output file defined by the SYSPRINT DD statement. Because an I/O error condition can trigger an ABEND with the dump option, a SYSUDUMP DD statement should be provided.

The following is an example of the JCL required to execute TDMFSCAN:

```
//<---------------- job card ----------------->
//FIXIT     EXEC PGM=TDMFSCAN,PARM='uuuu'
//STEPLIB   DD DISP=SHR,DSN=<authorized program library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSUDUMP  DD SYSOUT=<sysout class>
/*
```

Execution Parameter

The TDMFSCAN execution parameter is used to specify the device(s) to be scanned ("uuuu" in the example above). It must be supplied and must be a valid device number. Wild card values are allowed by use of an asterisk. By using the asterisk as a wild card, the low order device range is replaced with zeroes and the high order device range is replaced with 'FF'. For example, `PARM='213C'` directs processing to one specific unit while `PARM='1F**'` causes all the online DASD units in the range 1F00 through 1FFF to be scanned.

Operation

TDMFSCAN reads each specified device, a cylinder at a time, and examines each record. Processing of the volume proceeds as follows:

TDMFSCAN Volume Processing

Volume Label	If the CCHH component of the VTOC pointer in the label is zero, Softek TDMF will treat this as a VM volume during migration.
Record zero	The record zero on every track must have a count field whose CCHH (bytes zero through three) matches its physical location and whose record number (byte four) is zero, key length (byte five) is zero and data length (bytes six and seven) is eight.
All Records	The track number (bytes two and three of every count field) must match the physical track number.
First data record on track zero	For a VM volume it is permissible for the cylinder number (bytes zero and one of the count field) in the first data record on track zero of a cylinder to be lower than the physical cylinder on which it resides.
Other data records	Except for VM volumes, all count fields' CCHH must match the physical cylinder and track, or select the **Tolerate Invalid Count Fields** option. For volumes recognized as being formatted for CP or CMS use, the cylinder number in the count fields of all the data records on a cylinder must match either the physical cylinder or the count field of record one on track zero of the cylinder.

TDMFSCAN - Messages, Return Codes and ABEND Codes

Messages written to the sysprint file are documented in *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFTERA

Softek TDMF license charges can be based on CPUs, CPU Model Types, or total online storage on your systems. Softek may request that the TDMFTERA utility be run on every system in order to determine these charges.

Sample JCL for TDMFTERA

The following is an example of the JCL required to execute the TDMFTERA utility.

```
//<---------------------- job card -------------------->
//TERA     EXEC PGM,TDMFTERA
//STEPLIB  DD   DISP=SHR,DSN=<program library>
//SYSPRINT DD   SYSOUT=<sysout class>
//SYSUDUMP DD   SYSOUT=<sysout class>
/*
```

Sending Printed Output to Softek

Mail

Output from SDRPTERA can be mailed to:
Softek Storage Solutions Corporation
1255 East Arquest Avenue
Sunnyvale, CA 94085
USA
Attn: Contracts Administration

FAX

(408) 746-6092

E-Mail

Output can be e-mailed as a text attachment to:

conadmin@softek.com

TDMFTERA—User Abends

User Abend codes are documented in the *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFTERA Sample Output

```
Softek TDMF
Version 3.6.0

Operating Environment

CPU Serial / Model   : 0001232E 2066
CPC Node Description : 002066.0A2.IBM.02.00000001232E
CPC STSI Description : 2066.0A2.IBM.02.000000000001232E
IODF Data Set        : Z800.IODF20
Machine Hardware Name: Z800
Machine Configuration: Logical Partition
Machine MSUs         : 00000046
LPAR MSUs            : 00000046
LPAR Name            : Z8L1
System Name          : TDM1
Sysplex Name         : TDMFPLEX
System ID ( SMFID )  : TDM1
SCP Name             : z/OS 01.03.00
SCP FMID             : HBB7706
SCP PID              : 5694-A01
SCP Product Owner    : IBM CORP
JES SUBSYSTEM        : JES2
ETR ID               : 09
Local Time           : 01/29/2003 08:45:49.22
GMT Time             : 01/29/2003 16:45:49.22
Local Offset         : -08:00:00
Leap Seconds         : +015
```

SSID	MFG	Serial No.	SCU Type	UCBs Defined	UCBs Online	GB Online
C100	HTC	30396	3990006	47	45	79
C200	HTC	30396	3990006	15	14	119
0002	AMH	40103	3990006	28	28	338
0003	AMH	40103	3990006	24	21	320
0004	AMH	40103	3990006	26	26	333
0005	AMH	40103	3990006	23	23	293
0006	AMH	40103	3990006	28	28	338
0007	AMH	40103	3990006	23	23	322
0008	AMH	40103	3990006	64	60	164
0009	AMH	40103	3990006	24	23	325
0058	AMH	30258	3990G03	16	15	94
1000	IBM	14468	2105F20	15	13	0
1002	IBM	14468	2105F20	01	01	5
1003	IBM	14468	2105F20	32	28	168
2000	AMH	30355	3990006	64	64	153
2001	AMH	30355	3990006	64	63	167
2002	AMH	30355	3990006	64	53	127
2003	AMH	30355	3990006	64	64	168
2004	AMH	30714	3990006	64	64	164
2005	AMH	30714	3990006	64	64	128
2006	AMH	30714	3990006	64	64	168
2007	*****	30714	3990	64	00	0
4650	AMH	30345	3990006	64	64	148
4651	AMH	30345	3990006	64	64	152
4652	AMH	30345	3990006	64	64	128
5130	AMH	30363	3990006	64	64	64
5131	AMH	30363	3990006	64	64	56
6545	IBM	92361	3990006	04	04	167
7C00	AMH	20104	3990006	28	28	169
7C01	AMH	20104	3990006	28	28	168
7D00	AMH	20104	3990006	28	28	168
7D01	AMH	20104	3990006	28	28	168
7E00	AMH	20104	3990006	28	28	48
7E01	AMH	20104	3990006	28	28	68
7F00	AMH	20104	3990006	28	28	167
7F01	AMH	20104	3990006	28	28	0
7140	IBM	90233	3990006	17	17	63
8801	AMH	00001	3990006	18	18	33

Number of DASD subsystems	:	38
Number of DASD volumes defined	:	2,961
Number of DASD volumes online	:	2,867
Amount of online storage (GB)	:	6,285

TDMFVTOC

The Softek TDMF Device Characteristics Report program extracts device information for each online device in the DASD configuration then outputs either a full or exception report. The purpose of these reports is to allow the user to easily identify those devices whose Volume Table of Contents (VTOC) do not accurately describe their physical characteristics and may be eligible for invocation of dynamic ICKDSF in a Softek TDMF session.

TDMFVTOC is initiated as a batch job. The program uses the Unit Control Block scan service (UCBSCAN) to find the serial number of every online direct access volume. Using the volume serial number, the program dynamically allocates and opens the VTOC. The program then executes two or more I/O operations; the first reads the device characteristics, the second reads the first track of the VTOC. If the VTOC has an index, subsequent I/O operations may continue to read tracks from the VTOC, to locate the index, and then to read the index itself, in order to analyze the VPSM records.

Information from the UCB, the device characteristics data and the Format 4 DSCB are formatted on the report line. Three flags also appear for each device, of which two are considered to indicate an error condition on the device. An example of the output data appears at the end of this document.

The following is an example of the JCL required to execute TDMFVTOC program.

```
//<---------------- job card ----------------->
//VTOC      EXEC PGM=TDMFVTOC,PARM='parm1,parm2'
//STEPLIB   DD DISP=SHR,DSN=<program library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSUDUMP  DD SYSOUT=<sysout class>
/*
```

The allowable parameters are:

TDMFVTOC Control Statements

BRIEF	Indicates that only devices with an apparent mismatch between the VTOC and the physical device characteristics and those for which TDMFVTOC encounters an error while opening the VTOC will be reported. The default is that the status of every online volume will be reported.
LINECT=nnn	Controls page skipping in the output report. The minimum value for the number of lines on the page (including headings) is 25 and the maximum is 999. The default value for LINECT is 55.

TDMFVTOC - Printed Output

For each device, the following information is displayed in the output file defined by the SYSPRINT DD statement:

TDMFVTOC Device Level Output

Unit	The four-digit device number. Only devices, which are online and not flagged as “changing status” (pending offline) are selected.
Volser	The volume serial number.
Primary Cyls - Device	The number of primary cylinders returned in the *Read Device Characteristics* data.
Primary Cyls - VTOC	The number of primary cylinders calculated from fields in the Format 4 DSCB. If the DS4DEVAC field (number of alternate cylinders) is valid, this is subtracted from DS4DEVSZ (the number of logical cylinders). In older VTOCs, the number of alternate cylinders is calculated by dividing DS4NOATK (the number of available alternate tracks) by 15 and rounding up.
Alt. Tracks - Device	The number of alternate tracks returned in the *Read Device Characteristics* data.

TDMFVTOC Device Level Output

Alt. Tracks - VTOC	The number of available alternate tracks from the VTOC, taken from field DS4NOATK. If the format four DSCB also contains the number of alternate cylinders and there is a mismatch between DS4NOATK and DS4DEVAC multiplied by 15, this column will contain both values separated by a slash.
DS4DEVAV set	Blank, or a flag indicating that the VTOC contains a valid DS4DEVAC.
Primary Cylinder Mismatch*	Blank, or a flag to draw attention to the fact that the values in fields, Primary Cyls - Device and Primary Cyls - VTOC are different.
Alternate Track Mismatch[a]	Blank, or a flag indicating that the calculated number of alternate tracks does not match the value returned in the *Read Device Characteristics* data. **NOTE:** Note that the numbers of alternate tracks are not compared, and this field will be blank, if the numbers of primary cylinders are unequal.
Other Messages*	Blank, or a message reporting an index error or explaining why no counters or flags could be reported for the device.

a.Note that if any of the last three items in the table are non-blank for a device, an entry will be listed even if the "BRIEF" parameter was specified.

Messages which might appear in the Other Messages field are:

TDMFVTOC Messages

Volume has non-standard VTOC	The pointer to the Volume Table of Contents in the UCB indicates that the VTOC does not start at the beginning of a track, so TDMFVTOC will not attempt to allocate to the volume. This might be a VM volume.
Device has no operational paths	The online device is unusable.
Device is TDMF target	The device is currently the target of a Softek TDMF volume migration. It would be impossible to OPEN the VTOC, as Softek TDMF will not allow access to the volume.
OPENJ Abend S*xxx-rr*	The DCB Abend exit was called during OPEN TYPE=J processing for the VTOC or VTOC index. The system completion and reason codes encountered by OPEN are formatted into the message. TDMFVTOC will de-allocate the volume and continue with the next device.

TDMFVTOC Messages

OPENJ time out	More than five seconds elapsed during execution of the OPEN TYPE=J. Cause may be another system having reserved the device, or a hardware/pathing error. TDMFVTOC will de-allocate the volume and continue with the next device.
I/O Error (RDC). Sense: '*ssss*'	The VTOC was opened successfully, but the control unit rejected the *Read Device Characteristics* request. The contents of the first two sense bytes are displayed in the message.
I/O Error (Read). Sense: '*ssss*'	The VTOC was opened successfully and the device characteristics have been obtained from the control unit. The I/O operation to read a track from either the VTOC or its index has failed. The contents of the first two sense bytes are displayed in the message.
VTOC format error	An invalid DSCB was encountered during the read of the VTOC
Unable to open VTOC index	An OPENJ of the VTOC index whose name was found in the VTOC itself was unsuccessful.
VTOC index format error	An invalid VIR record was found in the index, or the number of tracks mapped by the VPSM records was not a multiple of 15.
Index size error; *nn,nnn* Cyls	The number of logical cylinders described in the index's VPSM records (displayed in this message) differs from the value found in the format four DSCB.

TDMFVTOC - Return Codes and ABEND Codes

All TDMFVTOC Return Codes and ABEND Codes are documented in *Softek TDMF 3.6 Messages and Codes for z/OS (ML-145134)*.

TDMFEXTV

Users migrating volumes to devices with a greater number of primary cylinders can use the "automatic ICKDSF EXTVTOC" facility of Softek TDMF to invoke the REFORMAT function without the necessity of varying these volumes offline to sharing systems. The TDMFEXTV program can be executed before the start of a migration to report on the likely effect of this Softek TDMF and ICKDSF processing. In particular, the program will report:

1. Volume status that would prevent a VTOC reformat attempt by Softek TDMF.

2. The “optimum” extended VTOC size, as calculated by Softek TDMF.
3. The data set(s) that must be moved to facilitate the “optimal” VTOC extension.

The following JCL is required to execute the TDMFEXTV program:

```
//step      EXEC PGM=TDMFEXTV
//STEPLIB   DD DISP=SHR,DSN=<authorized library>
//SYSPRINT  DD SYSOUT=<sysout class>
//SYSIN     DD *
-- control statements --
/*
```

The control statements processed by TDMFEXTV have the same format as for a Softek TDMF Swap migration. That is to say migration statements contain:

- The word "MIGRATE".
- A source volume serial number.
- A target volume serial number.

These three items must appear on the same input record.

The program uses the EXCP macro to read the VTOCs of each source and target volume. The source volume's mount status and VTOC indicators are checked for compatibility with the ICKDSF REFORMAT function.

Where a target device has more primary cylinders than are described by the source volume's VTOC, the optimum size to which the VTOC should be extended is:

- is extracted from the EXTVTOC (tracks) option if present in the input stream, or
- set to be the same as the size of the target volumes, or
- calculated using the algorithm described in *ICKDSF on page 78*.

If the tracks into which the VTOC would need to extend to achieve this optimum size are currently occupied by data sets, the names of these data sets are reported.

TDMFEXTV - Program Abend Codes

A failure to OPEN the input control statement or output message files or an unsuccessful EXCP request will cause abnormal termination of the TDMFEXTV program. The abend codes used are:

TDMFEXTV Abend Codes

U0103	OPEN error. Probably a missing SYSIN or SYSPRINT DD statement
U0135	I/O Error on a Read Device Characteristics CCW for a migration target volume. The Program issues message XTV035S before the Abend.
U0136	I/O Error on a Read Data CCW for the first VTOC record on a migration target volume. The Program issues message XTV036S before the Abend.
U0137	I/O Error on a Read Device Characteristics CCW for a migration source volume. The Program issues message XTV037S before the Abend.
U0138	I/O Error on a Read Track CCW for a migration source volume. The Program issues message XTV038S before the Abend.

TDMFEXTV - Program Messages

The following messages might be issued by the TDMFEXTV program. Message variables are indicated by the variable name encased in "<>".

TDMFEXTV Program Messages

Message	Description
XTV004E Allocation failed for source volume: <S99ERROR>,<S99INFO>.	An attempt was made to allocate to the source volume from the preceding MIGRATE statement, in order to read the Volume Table of Contents. Dynamic Allocation was not successful; the S99ERROR and S99INFO fields provide further information.
XTV005E Allocation failed for target volume: <S99ERROR>,<S99INFO>.	An attempt was made to allocate to the target volume from the preceding MIGRATE statement, in order to read the format four DSCB from the VTOC. Dynamic Allocation was not successful; the S99ERROR and S99INFO fields provide further information.
XTV006E OPEN failed for source volume.	After allocation of the source volume the program failed to OPEN the VTOC for input processing.
XTV007E OPEN failed for target volume.	After allocation of the target volume the program failed to OPEN the VTOC to access the Format Four DSCB.
XTV008I Target device has <RDCPRCYL> primary cylinders, <RDCNOATK> alternate tracks.	The program has used the Read Device Characteristics CCW to obtain the physical configuration of the target device.
XTV009I Source device has <RDCPRCYL> primary cylinders, <RDCALTRX> alternate tracks.	The program has used the Read Device Characteristics CCW to obtain the physical configuration of the target device.
XTV010I Source volume has <DS4DSCYL-DS4DEVAC> primary cylinders, <DS4NOATK> alternate tracks.	The source volume's VTOC provides the number of logical cylinders (DS4DSCYL), the number of alternate cylinders (DS4DEVAC) and the number of alternate tracks still available for assignment (DS4NOATK). In an older VTOC the DS4DEVAC field may not be valid, and in this case the number of alternate cylinders is calculated by rounding up the number of remaining alternate tracks and dividing by 15.
XTV011I Target device and source volume are identical.	The values supplied in messages XTV008I and XTV010I are identical. The volume can be migrated to this target device and no subsequent ICKDSF REFORMAT processing will be required.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV012I Volume REFORMAT required: <reason>.	The source volume's VTOC does not match the physical target device. Softek TDMF might attempt to invoke ICKDSF if this option is specified. The reason can be one of the following: • Alternate track count mismatch. There is a difference between the number of alternate tracks configured on the target device and the number specified in the source volume's VTOC. • Migration to larger capacity device. There is a difference between the number of primary cylinders configured on the target device and the number specified indirectly in the source volume's VTOC. • Migration to smaller capacity device. There is a difference between the number of alternate tracks configured on the target device and the number specified in the source volume's VTOC.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV013W No automatic REFVTOC: <reason>.	The migration appears to require that Softek TDMF invokes the ICKDSF program to rebuild the VTOC and its index, without increasing the size of these data sets. An error condition has been detected that would prevent Softek TDMF from performing this function. The reason can be one of the following: • Source volume not mounted PRIVATE. — The mount attribute of the source volume is not "PRIVATE". ICKDSF will not reformat the VTOC of a PUBLIC or STORAGE volume. • Source volume has non-standard VTOC. — The Volume Table of Contents is located on track zero, the volume label track. This might be a volume formatted for VM use. • Source volume has free space error. — The VTOC indicators flag byte, DS4VTOCI has DS4DOSBT set, but the VTOC index is not valid. • Session option NOICKDSF specified — ICKDSF will not be invoked to rebuild the VTOC

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV014W No automatic EXTVTOC: <reason>.	The migration appears to require Softek TDMF to invoke the ICKDSF program to rebuild the VTOC and its index, increasing their size. An error condition has been detected that would prevent Softek TDMF from performing this function. After this message is issued the program will determine whether Softek TDMF would invoke ICKDSF to perform a REFORMAT REFVTOC for the volume. The reason can be any valid reason for message XTV013W, with the addition of the following:
	• Source volume does not have a valid VTOC index. — Softek TDMF calculates volume and VTOC utilization by analysis of the bit maps in the volume index dataset. The source volume in the preceding MIGRATE statement does not have a valid index.
	• Session option NOEXTVTOC specified — ICKDSF will not be invoked to rebuild the VTOC
XTV015I Target VTOC size exceeds source by <delta> tracks.	On a migration to a larger target device, the VTOC will be extended, if necessary, to at least the current size of the VTOC on the target volume. The difference in size of the two VTOCs is displayed in the message.
XTV016I Source volume is <util-percent>% utilized, VTOC is <util-percent>%.	The program has read the Volume Table of Contents from the source volume and calculated two utilization percentages. Volume utilization is the ratio of the tracks occupied by data sets to the total number of tracks on the volume. Tracks occupied by the VTOC and its index are subtracted from both numbers. VTOC utilization is the ratio of the number of DSCBs in use to the total. The two first DSCBs and the Format One DSCB for the VTOC index are not counted.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV017I VTOC extension not required.	After a migration to the larger target device, the current size of the VTOC will be considered adequate by Softek TDMF. If possible, Softek TDMF will invoke ICKDSF for REFVTOC processing only. If an extension is required, the VTOC on the target volume can be increased to the desired size.
XTV018I VTOC extension of <extension> tracks required.	After a migration to the larger target device, Softek TDMF will calculate the "optimum" new VTOC size as being the current size plus the number of tracks provided in the message. The program will investigate the volume to determine whether this number of unallocated tracks can be found contiguous to the VTOC.
XTV019W Dataset allocated at +<offset> tracks: <dataset name>	The program is examining the tracks contiguous to the Volume Table of Contents, to determine whether the VTOC can be extended to its "optimum" size. A dataset has been found occupying one or more of the tracks earmarked for the VTOC expansion. The offset provided in the message is the limit to the number of tracks by which the VTOC can be extended unless this dataset is deleted or moved.
XTV020E Ownerless data extent at CCHH <cchh>; FMT3 DSCB at CCHR <cchr>.	The program is examining the tracks contiguous to the Volume Table of Contents, to determine whether the VTOC can be extended to its "optimum" size. A Format Three DSCB describing one or more of these tracks exists in the VTOC, but it does not appear to be chained to a Format One or Format Three DSCB. This situation can occur on a volume with frequent allocation activity, because the program does not RESERVE the VTOC while reading it. Before attempting to migrate such a volume with the automatic ICKDSF function, it would be advisable to prevent further allocations to the volume and to re-execute the TDMFEXTV program. If this message still appears, there is an error in the VTOC. Because Softek TDMF uses the VTOC index rather than the DSCBs to determine whether tracks are allocated, this error might not prevent a successful VTOC extension.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV021I REFORMAT EXTVTOC(nnnnn) is possible.	There appears to be no reason to prevent successful ICKDSF EXTVTOC processing. Note however that reasons not checked by this program, for example difficulties with the SYSVTOC RESERVE, might cause Softek TDMF to abandon this function.
XTV023E Dataset allocated at CCHH <cchh>: <dataset name>	The program is examining the cylinders on the source volume which are not configured on the target device (large to small migration). The dataset in the message must be moved or deleted before this migration would be possible.
XTV024I REFORMAT REFVTOC is possible.	The program has determined that ICKDSF REFORMAT REFVTOC processing would be needed after the volume migration in the previous MIGRATE statement. It is expected that, if the automatic ICKDSF option is specified for the Softek TDMF session, Softek TDMF will invoke ICKDSF for this volume after a successful swap.
XTV025E Invalid count field at CCHR <ccccchhrr>: <count field>.	A record that is not a valid DSCB was found in the VTOC on the source volume. Either the key length is not 44 or the data length is not 96. The message displays the location on the volume and the count field contents of this record.
XTV026S Insufficient virtual storage for VTOC map; current region size is <region size>.	The TDMFEXTV program copies the source volume's VTOC into virtual storage. A minimum of 72 bytes will be required for each dataset on the volume, allowing up to 465,000 data sets with the standard 32MB extended region size. The message displays the current extended region (field LDAEVVRG). The program will terminate.
XTV027I Source volume is empty	This message is issued when there are no data sets on the volume (except the volume index). In this case, no data sets need to be moved in order to facilitate any required VTOC and index expansion.
XTV028S Error parsing MIGRATE statement	The program could not find a valid source and target volume on the first record of the MIGRATE control statement.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV035S Read Device Characteristics failed for target.	An I/O error occurred when the program attempted to read the device characteristics for the target device. The program terminates with a U0135 abend and a dump will be taken if there is a SYSUDUMP DD statement. General purpose register two contains the address of the Input/ Output Block (IOB) for the failed EXCP request.
XTV036S Read Data for Format Four DSCB failed on target volume.	An I/O error occurred when the program attempted to read the first record in the target VTOC. The program terminates with a U0136 abend and a dump will be taken if there is a SYSUDUMP DD statement. General purpose register two contains the address of the Input/ Output Block (IOB) for the failed EXCP request.
XTV037S Read Device Characteristics failed for source.	An I/O error occurred when the program attempted to read the device characteristics for the source device. The program terminates with a U0137 abend and a dump will be taken if there is a SYSUDUMP DD statement. General purpose register two contains the address of the Input/ Output Block (IOB) for the failed EXCP request.
XTV038S Read Track of VTOC failed on source; CCHH: <cccchhhh>.	An I/O error occurred when the program attempted to read a track of data from the source VTOC. The address of the track being read is provided in the message. The program terminates with a U0138 abend and a dump will be taken if there is a SYSUDUMP DD statement. General purpose register two contains the address of the Input/Output Block (IOB) for the failed EXCP request.
XTV039I Source volume VTOC matches smaller target device.	This is a “reverse” migration, where no invocation of ICKDSF will be required—even though the volume resides on a device with more primary cylinders than the target.
XTV040E Volume not indexed. No migration to smaller device	This is an invalid “shrink” migration. The source device has more cylinders than the target, but because there is no valid VTOC index, TDMF will be unable to detect and monitor dataset allocations on cylinders that can not be copied to the target device.
XTV041E Authorization failed for volume. R15:xx,RACROUTE return/reason code: xx/xx	The user does not have ALTER authority for the source volume (in the DASDVOL resource class.

TDMFEXTV Program Messages *(Continued)*

Message	Description
XTV042E VTOC at too high an address for smaller target device	The volume can not be migrated to the specified target volume because the source VTOC was defined at a cylinder address that is not supported by the target device.
XTV045S Read Subsystem Data (CFWid) failed for target	The program is attempting to determine whether customer I/O operations using Cache Fast Write will be permitted during the migration, but an attempt to extract the target device's CFW identifier was unsuccessful.
XTV046I Target Subsystem Cache Fast Write id:xxxx	The message displays the CFW for the target device. If the source and target CFW are not equal, Cache Fast Write should be disabled for the source volume before initiating the migration.
XTV047S Read Subsystem Data (CFWid) failed for source	An attempt to extract the CFW identifier was unsuccessful when trying to determine whether customer I/O operations using Cache Fast Write will be permitted during the migration.
XTV048I Source Subsystem Cache Fast Write id:xxxx	The message displays the CFW for the source device. If the source and target CFW are not equal, Cache Fast Write should be disabled for the source volume before initiating the migration.
XTV049I Cache Fast Write will be allowed during this volume migration	The source and target subsystems have identical CFW identifiers (or the two devices might be defined within the same subsystem). Because of this, Softek TDMF will ensure that an application using Cache Fast Write on the source volume will be able to continue without any problem after the swap has completed. All data written with Cache Fast Write will be committed to the source volume before the swap occurs.
XTV051S Unable to extract EXTVTOC parameter	The EXTVTOC(tracks) option was detected on a SESSION or MIGRATE control statement, but he "tracks" parameter was not found.

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Chapter 7

Softek TDMF TSO Monitor Feature

Overview

The Softek TDMF TSO Monitor is a feature that is installed at the same time as the Softek TDMF program product. The Softek TDMF TSO Monitor Feature consists of REXX execs, which requires ISPF Version 3.6 and TSO/E Version 2.4 at the minimum. The Monitor may be used to view active or past sessions.

Once the Monitor (EXEC '*HLQ*.TDM360.TDMEXEC(TDMF)') has been brought up, it provides complete control over Softek TDMF session(s). The first panel displayed is the Softek TDMF Selection Panel. This panel has Action and Help Selections. Under Action, the following options are available:

- Change or Submit Data Migration Jobs
- Current Sessions: Monitor Progress
- Current Sessions: User Interaction and Status
- Current Sessions: Display Messages
- Current Sessions: Display Associated Address Spaces
- Current/Past Sessions: Display Performance Data
- Past Sessions: Display Summary
- Past Sessions: Display Details
- Past Sessions: Display Communication Dataset History
- Display Installation Options and Environment
- Display/Modify Installation Security Environment
- Display/Modify User's TSO Monitor Options
- Build Data Migration Jobs
- TDMF Support Utilities
- TDMF Help and Message Detail Facility

Under Help, the options available:

- Display TDMF Messages
- Introduction of TDMF
- Support Information
- Monitor Line Commands

NOTE

The keylist function must be enabled in order for the Softek TDMF TSO Monitor to work properly. Failure to enable this function will result in message "TDMF keylist not active" with a tone when using the monitor. If this occurs see *Maintenance Overview* on page *22*, item 7 to correct the situation.

As a result of the execution of the Softek TDMF TSO Monitor, the users' ISPF Profile data set may be updated. See *Maintenance Overview* on page *22*, item 5 for a description of the members that may be added.

Help panels are available for all actions within the Softek TDMF TSO Monitor. Some panels have multiple help panels dependent upon the location of the cursor.

If the Softek TDMF TSO Monitor is executed without the proper security settings, or if the security environment has not been defined, the following panel will be displayed.

Softek TDMF Security Warning Panel

```
                    S o f t e k   T D M F   F O R   z / O S
            (C) Copyright Softek Storage Solutions Corporation 2004


There is a problem with the installation's Security environment.
The problem is most likely one of the following conditions:

1. This user doesn't have authority to read the security record.
2. The security environment hasn't been defined.  Run SYSOPTN



Press Enter to terminate.
```

Correct the security settings and re-execute the REXX exec to start the Monitor. The following is a sample of the **Softek TDMF Monitor Menu**:

Softek TDMF Monitor Menu

```
                    Softek TDMF Monitor Menu

   0  Change or Submit Data Migration Jobs
   1  Current Sessions: Monitor Progress
   2  Current Sessions: User Interaction and Status
   3  Current Sessions: Display Messages
   4  Current/Past Sessions: Display Performance Data
   5  Past Sessions: Display Summary
   6  Past Sessions: Display Details
   7  Past Sessions: Display Communication Dataset History
   8  Display Installation Options and Environment
   9  Display/Modify Installation Security Environment
   10 Display/Modify User's TSO Monitor Options
   11 Build Data Migration Jobs
   U  TDMF Support Utilities
   H  TDMF Help and Message Detail Facility


Option ===>
 F1=Help    F3=Exit   F12=Cancel
```

From this panel it is possible to create, submit, monitor or terminate volume and session migrations. These panels will be displayed in the following sections.

Option 0 - Change or Submit Data Migration Jobs

Using this option, the user can create, change and submit data migration sessions without ever leaving the Softek TDMF TSO Monitor. The samples provided include jobs to allocate the COMMDS, a Master system batch job, an Agent sample batch job, and the SYSOPTN batch job. The first panel is a brief overview of the jobs contained within this option.

Softek TDMF Change/Submit Jobs Panel Overview

```
                        Change/Submit Jobs Panel

  When you press the enter key from this screen a dataset containing a
  collection of TDMF jobs used to accomplish Transparent Data Migrations
  will be edited.  You may browse, edit, submit and/or change any member
  as long as it is not being edited by another user.  You can select a
  new member and copy the desired member into it as you may do in any
  edit session.  The reason this capability is provided in TDMF is to
  enable you to accomplish all TDMF tasks from within the Monitor.  This
  is not, however, a requirement.


 Press Enter to continue




 Command ===>
  F1=Help    F2=Split   F3=Exit    F9=Swap    F12=Cancel
```

The second panel displayed contains the sample jobs necessary to create, change and submit a Softek TDMF session. Please review *Preparing to execute Softek TDMF* on page *27*, for a description of each job and the actions necessary before submitting these jobs.

Softek TDMF Sample Batch Jobs

```
Menu  Functions  Utilities  Help
 ------------------------------------------------------------------------------
 EDIT     TDMS1.TDM360.TDMSLIB                              Row 00001 of 00005
    Name                VV MM  Created     Changed     Size  Init   Mod   ID
 . AGENT
 . ALLOCCM
 . MASTER
 . SYSOPTN
 . TDMFSASD
 . TDMFSMF
    **End**

Command ===>                                                  Scroll ===> CSR
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Option 1 - Current Sessions: Monitor Progress

This option provides the ability to watch active migration sessions in progress. A bar chart is displayed with an arrow (-->) to indicate how far along a specific volume migration is in the copy phase and subsequently what phase each volume pairing is in. Each point represents two percent (2%) of a volume.

Note that PF10 will automatically transfer the display to **Option 2 – Current Sessions: User Interaction and Status**. An example follows.

Softek TDMF Sessions Monitor Panel

```
                              Sessions Monitor                    Row 1 to 14

 ------------------------------------------------------------------------------

Softek TDMF       Master V3.6.0 Session Active.
ComDataSet : ALT00.TDMF.SYSCOM
Source    Migration   Percent Complete --------->
VolSer      Phase     0...10...20...30...40...50...60...70...80...90..100
TDM373    Terminated
TDM378    Copy        ------------>


Command ===>                                              Scroll ===> PAGE
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F10=Status   F12=Cancel
```

In the panel above, volume TDM373 shows that it is terminated while volume TDM378 shows that it is in the Copy phase. By pressing **PF10** (for status) and then "M", the user can determine why volume TDM373 terminated.

Option 2 - Current Sessions: User Interaction and Status

Using this option will allow the user to terminate a specific volume migration or an entire group of migrations, respond to a prompt for migrations, change the Synchronization goal parameter, confirm migrations and suspend or continue migrations.

The following table describes each field of the panel.

TDMF Sessions Monitor Panel Option 2 Field Descriptions

Sessions	the number of active Softek TDMF sessions
Number of volumes migrating	the number of volumes migrating in this session
Number of volumes complete	the number of volumes that have completed the migration process in this session
Number of concurrent volumes	the number of concurrent migration tasks in a single session
Number of volumes waiting	the number of volumes waiting for a response (prompt or confirmation) or initialization

TDMF Sessions Monitor Panel Option 2 Field Descriptions

Requested Action	action desired for a volume or group migration. See help panel following the session status (Refer to *SESSION Control Statement* on page *30*).
Volume Serial	the source and target volume serial numbers
Device Number	the source and target device number on the Master system
Group Name	the group name provided for a multi-volume group
Migration Status	what phase the volume migration is in
Migration Type Synchronization Type	Swap Prompt or Automatic
Error Information/ System Message	any error or system messages for that volume. Errors and Severe error messages will be displayed. System indicates which LPAR determined the error. If no messages are displayed then the migration completed with no errors however warning messages may have been issued.
Sync Goal	the synchronization goal for the volume or group migration

Information regarding other active sessions may be obtained by pressing PF4.
Panels related to this option are shown below.

Softek TDMF User Interaction and Status Panel

```
                              Session Status                  Row 1 to 2 of 2

System: Master                  Softek TDMF                Version: 3.6.0
ComDataSet NZD00.T360A.SYSCOM                                 Sessions 02
Number of volumes migrating : 02        Number of concurrent volumes  : 02
Number of volumes  complete : 00        Number of  volumes   waiting  : 02

Requested   Volume Device  Group     --- Migration --- - Error Info - Sync
 Action     Serial Number  Name      Status      Type  System Message Goal

   __        TD239A  239B  TEST1     Inactive    Swap P                005
             TD239B  239A

   __        HDS106  C106  TEST1     Terminated Swap P TDM1 TDM2348E 005
             HDS107  C107



Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F4=Next      F5=Rfind     F6=Options
 F7=Back      F8=Forward   F9=Swap     F10=Monitor  F12=Cancel
```

In the above panel, a two-volume session is in progress. These two volumes are in a group named “TEST1” where volume HDS106 has terminated on system TDM1 with message TDM2348E.

An explanation of message TDM2348E can be displayed using Option H.1 – TDMF Help and Message Detail Facility, or select Option 3 – Current Sessions: Display Messages for a display of the message.

Softek TDMF User Interaction and Status Panel – Migration Options

```
  Session Status                 Migration Options

System: Master                  Softek TDMF                Version: 3.6.0
ComDataSet NZD00.T360A.SYSCOM                                 Sessions 01
Number of volumes migrating : 02        Number of concurrent volumes  : 02
Number of volumes  complete : 00        Number of  volumes   waiting  : 02

Requested   Volume Device  Group     --- Migration --- - Error Info - Sync
 Action     Serial Number  Name      Status      Type  System Message Goal

   __        TD239A         ActCopy = N PACING = Y AUTOOPER = Y TIME =  GMT
             TD239B         CONFIRM = Y PURGE  = N TERMGRP  = Y COMPARE = Y
                                                   FASTCOPY = Y nonPPRC = N
   __        HDS106         ActCopy = N PACING = Y AUTOOPER = Y TIME =  GMT
             HDS107         CONFIRM = Y PURGE  = N TERMGRP  = Y COMPARE = Y
                                                   FASTCOPY = Y nonPPRC = N









Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F4=Next      F5=Rfind     F6=Options
  F7=Back      F8=Forward   F9=Swap     F10=Monitor  F12=Cancel
```

This panel shows all options for each volume in the active session. These options are either set as a system default using the SYSOPTN batch job, or can be overridden with the **OPTIONS** keyword on the **SESSION**, **GROUP**, or **MIGRATE** control cards used in the **MASTER** system batch job.

A help panel for **User Interaction and Status** is available. To access this panel, tab to a volume pair under the heading **Requested Action** and press **PF1**. An example follows.

Softek TDMF User Interaction and Status – Help Panel

```
                          Session Actions
                                                          More:     +
*******       Following valid on all Systems                  *******
Display       Migration Messages                          : M
Display       Migration Performance Data                  : D

*********     Following valid on MASTER System                *******
Acknowledge   Mirror Change on Swap                       : A
Continue      Volume Migration or its Group               : C or CG
Confirm       Start Volume Migration or its Group         : F or FG
Confirm       Synchronization for Volume or its Group     : P or PG
Reinitialize Migration of terminated Volume               : I
Set Goal      Synchronization Goal for Volume or its Group: Z or ZG
Suspend       Volume Migration or its Group               : S or SG
Terminate     Volume Migration or its Group               : T or TG


PF4  will display the next active session.

PF6  is a toggle key for displaying the Session options.

PF10 will immediately display the Session Monitor Panel.

PF11 is a toggle key for filtering the volumes.


 F1=Help      F2=Split     F3=Exit      F4=Resize    F5=Exhelp
 F6=Keyshelp  F7=PrvTopic  F8=NxtTopic  F9=Swap     F10=PrvPage
```

By placing an 'M' on the Requested Action area of a volume pair, all messages for that specific pairing will be displayed (see *figure:* Softek TDMF Current Sessions: Display Messages on page *149*). If a 'D' is entered, the performance data for that migration will be displayed (see figures: *Softek TDMF Performance Data Panel - Part 1* on page *151* through *Softek TDMF Performance Data Panel - Part 5* on page *155*).

The following panels will depict other options available to the Master System noted in the above panel.

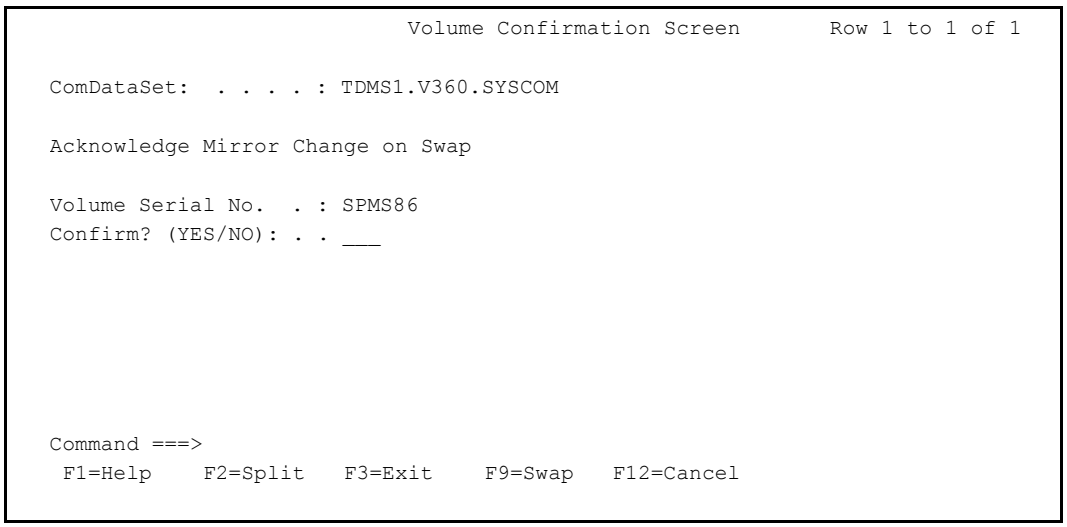
NOTE

Commands entered on this panel for a volume or group will usually be presented to the relevant session immediately. However, if there are Softek TDMF sessions active at different maintenance levels, or if the library containing the I/O Monitor module (TDMFIMON) is not referenced with a STEPLIB DD statement for the session containing the volume to be manipulated, the command might not be processed by the TDMF session for up to 30 seconds.

If a volume being migrated is the primary in a PPRC or SRDF session and the migration target is mirrored using a different hardware technique, it is necessary to select the ALLOWmirrorchange option for the volume. This option can be specified on the SESSION, GROUP, or MIGRATE control statements and will usually require that the user "Allow" or "Acknowledge" this situation before the volume will be selected and activated. This user intervention will not be required if the option was supplied with the "NOACKnowledge" parameter. If the option is specified but is not applicable, it will not cause volume selection to be delayed.

By placing an 'A' for that volume pairing under Requested Action, the following confirmation screen will be displayed. Confirmation requires a YES or NO response. Note that PF3 will exit out of this panel without action.

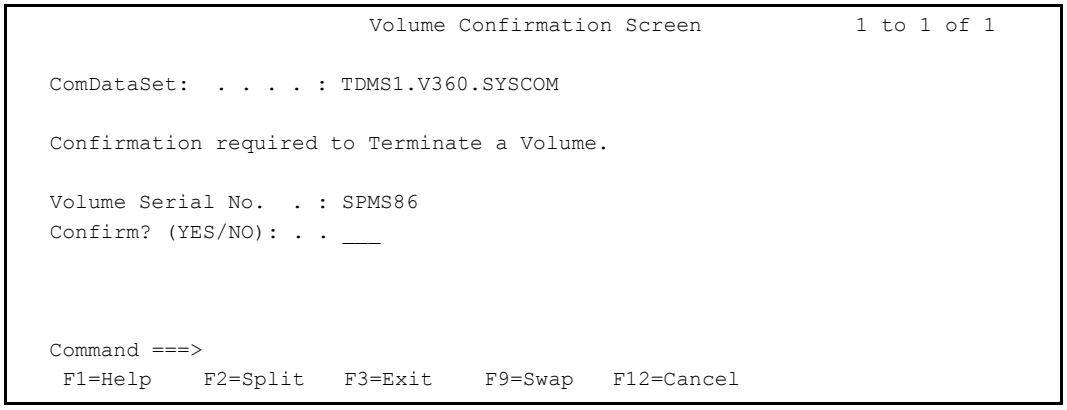
Softek TDMF Acknowledge Mirror Change on Swap



A Softek TDMF volume pairing may be dynamically terminated be entering 'T' for terminate volume or 'TG' for terminate group under requested action and pressing the enter key. Note that if the option Terminate Group on Error is used, a selection of 'T' will default to 'TG'.

This panel is displayed below.

Softek TDMF Confirm Termination



The Softek TDMF default for volume synchronization is five (5) seconds. This value may be changed dynamically by entering either a 'Z' for a specific volume or 'ZG' for a volume group under the Request Action and pressing the Enter key. The following is an example of the Set Synchronization Goal confirmation panel.

Softek TDMF Set Synchronize Goal Panel

```
                          Set Volume Synchronize Goal    Row 1 to 1 of 1

ComDataSet:  . . . . : TDMS1.V360.SYSCOM

Confirmation required to set Sync Goal.

Synchronization Volume Serial No.  . . : AMEB81
Synchronization Time . . . . . . . . . . ___
Confirm? (YES/NO): . . . . . . . . . . . ___



Command ===>
 F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

If the user desires to suspend a volume pairing, this can be accomplished via the Suspend command. Using the value 'S' for a specific volume or 'SG' for the entire group will cause Softek TDMF to stop the migration for a volume or volume group. These commands are valid during the copy and refresh phases of a volume migration. Softek TDMF will monitor the source volume for updates until such time that the Continue command is issued.

When volume suspension will occur for the copy and refresh phases are described below:

Copy Phase: the volume migration will be suspended at the start of the next I/O operation.

Refresh Phase: if the suspend command is issued during this phase, and no updates to source volume are occurring, the command will be queued until the next update I/O operation occurs. At that time the volume migration will be suspended.

The following is an example of the suspend confirmation screen:

Softek TDMF Suspend Volume Confirmation Display

```
                          Volume Confirmation Screen        Row 1 to 1 of 1

ComDataSet:  . . . . : TDMS1.V360.SYSCOM

Confirmation required to Suspend a Volume.

Volume Serial No.  . : TD9C2J
Confirm? (YES/NO): . . ___




Command ===>
 F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

If Softek TDMF has suspended per user request or a volume's migration dynamically, in order for the migration to complete, the Continue command must be issued. By selecting either 'C' for a volume, or 'CG' for a volume group, Softek TDMF will continue that volume or volume group from where it left off. The display below shows an example.

Softek TDMF Continue Volume Confirmation Display

```
                              Volume Confirmation Screen        Row 1 to 1 of 1

ComDataSet:  . . . . : TDMS1.V360.SYSCOM

Confirmation required to Continue a Volume.

Volume Serial No.  . : TD9C2J
Confirm? (YES/NO): . . ___



Command ===>
 F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

If volume confirmation was selected via the system defaults (SYSOPTN batch job) or using the OPTIONS keyword on an input control statement, a response must be received by Softek TDMF via the Volume Confirmation screen or MVS system console if auto-operations has been selected. Under Requested Action for the volume pair or volume group enter either 'F' for volume pair or 'FG' for volume group and press the enter key. The following panel is displayed.

Softek TDMF Volume Confirmation Display

```
                           Volume Confirmation Screen        Row 1 to 1 of 1


ComDataSet:  . . . . : TDMS1.V360.SYSCOM

Confirmation required to Continue a Volume.

Volume Serial No.  . : SPMS86
Confirm? (YES/NO): . . ___




Command ===>
```

If the prompt option was requested for the volume or volume group migration, the message 'SYNC Volume Needed.' will be displayed in the upper right hand corner of any active session panel of the Softek TDMF TSO Monitor or via the MVS console if auto-operations has been selected. Additionally, an asterisk (*) will appear next to the volume pairing or group requiring the response. Note that in a group of volumes the message will not be displayed until all volumes within the group have reached the synchronization ready point.

The following panels are examples of this discussion.

Softek TDMF Sync Volume Needed Display

```
                              Session Status            SYNC Volume Needed.

Transparent Data Migration Facility.  Master V3.6.0 Session Active
ComDataSet : TDMS1.V360.SYSCOM
Source                   Migration          Percent     Complete     --------->
VolSer      Phase    0...10...20...30...40...50...60...70...80...90..100
DMC87     Refresh 29 ------------------------------------------------->
TD9C2J    Refresh  1 ------------------------------------------------->
TD8E01    Refresh 34 ------------------------------------------------->
SPMS86     Refresh 59 ------------------------------------------------>


Command ===> ____________________________________________________________
 F1=Help      F2=Split     F3=Exit     F5=Rfind     F7=Back     F8=Forward
 F9=Swap     F10=Status   F12=Cancel
```

In the above example, the 'SYNC Volume Needed' message is displayed and all volumes have reached the synchronization ready point (all volumes in refresh phase). By pressing PF10 or selecting Option 2 from the primary panel, the following panel is display so that the user may respond to the prompt.

Softek TDMF Sync Volume Needed Display – Session Status

```
                              Session Status               SYNC Volume Needed.

 System: Master                  Softek TDMF                Version: 3.6.0
 ComDataSet NZD00.T360A.SYSCOM                                 Sessions 01
 Number of volumes migrating : 02        Number of concurrent volumes  : 02
 Number of volumes  complete : 00        Number of  volumes   waiting  : 00

 Requested   Volume Device  Group     --- Migration --- - Error Info - Sync
  Action     Serial Number  Name      Status      Type  System Message Goal

    __       *TD239A  239B  TEST1    Waiting Sync  Swap P                005
              TD239B  239A

    __        HDS106  C106  TEST1    Refresh 1     Swap P                005
              HDS107  C107


Command ===>                                            Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F4=Next      F5=Rfind     F6=Options
  F7=Back      F8=Forward   F9=Swap     F10=Monitor  F12=Cancel
```

In the above example, the volume group has reached the synchronization ready point and the prompt has been issued. Note the asterisk (*) at the first volume pairing of TEST1. Only one (1) response is necessary for the entire group to go into the synchronization phase. By entering either 'P' or 'PG' under Requested Action for the first pairing of that volume group, the following panel is displayed for confirmation.

Softek TDMF Sync Volume Confirmation Display

```
                          Group Confirmation Screen              Row 1 to 2 of 2

 ComDataSet:  . . . . : NZD00.T360A.SYSCOM

 Confirm Synchronization for Group Migration.

 Group  . . . . . . . : TEST1
 Confirm? (YES/NO)  . . ___


Command ===>                                                Scroll ===> CSR
```

NOTE

This confirmation display will appear for any Swap migration, if the Prompt option is specified in the control record.

Option 3 - Current Sessions: Display Messages

This option will display all messages for a specific session. The messages are displayed from the perspective of the system where the Softek TDMF TSO Monitor is invoked. An example of this panel follows.

Softek TDMF Current Sessions: Display Messages

```
                              Session Messages            Start CONFIRM Needed

 ------------------------------------------------------------------------------
Softek TDMF Master V3.6.0 Session Active.
ComDataSet : NZD00.T360A.SYSCOM

This is a Master system.

Current Messages for this session are as follows:

The current messages for SMFID TDM1 follow.
 11/24/2003 08:50:20.748 TDM1732I The I/O Monitor module has been loaded
                                  into Dynamic LPA.
 11/24/2003 08:50:20.771 TDM1728I Installed software for this system is:
                                  Softek TDMF 3.6 Base Level.
 11/24/2003 08:50:20.806 TDM4172I The Reverse Pacing option has been set
                                  to OFF.
 11/24/2003 08:50:20.806 TDM4151I The Volume Comparison option has been
                                  set.
 11/24/2003 08:50:20.806 TDM4152I The Synchronization Prompt option has
                                  been set.
 11/24/2003 08:50:20.806 TDM4157I The Display Time Option has been set to
                                  GMT.
 11/24/2003 08:50:20.806 TDM1452I The Pacing System Option was specified
                                  as ON.
 11/24/2003 08:50:20.806 TDM4159I The Automated Operations option has
                                  been requested.
 11/24/2003 08:50:20.806 TDM4161I The Startup Confirmation option has
                                  been requested.
 11/24/2003 08:50:20.806 TDM1461I Terminate All Volumes in Group on Error
                                  Option was specified as OFF.
 11/24/2003 08:50:20.806 TDM4165I The Fastcopy option has been requested.
 11/24/2003 08:50:20.952 TDM1380I The application program interface (API)
                                  for STK is not available.
The current messages for SMFID TDM1 follow.
 11/24/2003 08:50:20.810 TDM1740I By user request, no write operation
                                  will exceed 3 track(s).
 11/24/2003 08:50:20.810 TDM1481I A volume TermGrp option was changed to
                                  ON by a Migrate card option.
 11/24/2003 08:50:21.211 TDM1177I The source volume TD239A is mounted on
                                  device 239A on this system.
Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

NOTE

The ‘find’ and ‘repeat find’ functions are available in these panels so that the user may search for specific volumes, messages, or systems without going through all messages, unless so desired.

Option 4 - Current/Past Sessions: Display Performance Data

Users can view current or past performance data by selecting the appropriate COMMDS either by entering the data set name of a specific COMMDS or if the History Data Set option has been selected, selecting Option 7 from the TSO Monitor Primary Panel. If a session is active, the panel will default to the COMMDS currently in use. If this is not the COMMDS desired, overtype the current COMMDS with the appropriate data set name and press the enter key.

The information presented shows the amount of real storage used, volume pacing (if selected), the number of pacing changes due to real storage constraints and I/O contention, device type, read and write statistics, elapsed time of each phase, and all messages issued by Softek TDMF. The information is presented as SYSTEM information and VOLUME information.

Under System Information, the following is displayed:

System Information

Type	Type of Job, Master or Agent System
SMFID	the SMFID of each LPAR each job is running on
ASID	the Address Space ID for each job
System Number	the relative system number. Master system is always relative system number 00
Current Interval	the length of time between Softek TDMF polls
Heartbeat	a timer (GMT) that will increase for every current interval that the Master or Agent system is active on that specific system
Expires In	the amount of time a system is allowed to be inactive to other systems
Fixed Storage Frames	the amount of available fixed storage frames within the LPAR at system initialization that may be dynamically adjusted if pacing is selected
TDMF Fixed Storage Frames	the amount of fixed storage frames that Softek TDMF has used and is currently using
TDMF Fixed Storage Thresholds	the high and low water marks of fixed storage that Softek TDMF for z/OS uses during the session (obtained at system initialization). These values may change from one session to another.

An example of the Softek TDMF System Information panel follows on the next page.

The following is an example of the System Information:

Softek TDMF Performance Data Panel – Part 1

```
                            Performance Data Panel          Row 1 to 12 of 69

ComDataSet: . . TDMS1.V360.SYSCOM
VOL Interval: : 0030.00
Init Status:  : All systems initialized.

 ------------------------------------------------------------------------

 Softek TDMF Version 3.6.0
 Communication Data Set: TDMS1.V360.SYSCOM

                            SYSTEM INFORMATION

  Type  SMFID Asid System Current
                  Number Interval   ------ Heartbeat ------ --Expires In--
 Master TDM1  0075   00     0030     02/28/2003 12:17:06.803   00900  Secs
 Agent  TDM2  0073   01     0030     02/28/2003 12:17:06.114   00900  Secs

                                        Previous Count      Current Count
 TDM1's Fixed Storage Frames                    13,828             13,287
  TDMF session Fixed Storage Frames                175                175
  TDMF session Fixed Storage Threshold - low    32,767             32,767
  TDMF session Fixed Storage Threshold - high   65,534             65,534

 TDM2's Fixed Storage Frames                    11,600             11,600
  TDMF session Fixed Storage Frames                 72                 46
  TDMF session Fixed Storage Threshold - low    31,423             31,423
  TDMF session Fixed Storage Threshold - high   62,846             62,846



Command ===>
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

The section that is marked as Volume Information contains the following:

Volume Information

Source VSN	the source volume serial number
Target VSN	the target volume serial number
New VSN	the new volume serial number the original source volume is to be renamed
Current Phase	what phase that volume pairing is in
Current Wait	the current interval for that phase
Cylinders Num	the total number of cylinders to be processed for a specific phase
Cylinders Current	the number of cylinders that has been processed for that phase
Number %	the percentage complete for this volume pairing

Volume Information *(Continued)*

Number Req	an indication of the amount of update activity detected by Softek TDMF
Number Compl	the number of update requests completed
Number Wait	an indication of contention on the source volume when Softek TDMF is attempting to quiesce the I/O in order to SYNChronize

The following is an example of the Volume Information:

Softek TDMF Performance Data Panel – Part 2

```
                          VOLUME INFORMATION

------------------------------------------------------------------------------

 Source Target  New     ---- Current ----   Cylinders      ---- Number ----
  VSN    VSN    VSN        Phase     Wait   Num   Curr  %%% Req   Compl Wait
 TDE972 TDE973           Complete    0030  03339 03339      00000 00000 0000
 Source Control Unit = 3990-E9 Device = 3390-0A Cylinders = 03339
 Target Control Unit = 3990-E9 Device = 3390-0A Cylinders = 03339


Command ===>
 F1=Help       F2=Split      F3=Exit       F5=Rfind      F7=Back       F8=Forward
 F9=Swap      F12=Cancel
```

The section that is marked as Volume Pacing contains the following:

Volume Pacing

Volume Pacing	if volume pacing is active, what level of read operations is currently in effect (15, 5, 3, and 1). If volume pacing is inactive, it will be so stated.
Percent of TDMF Copy Phase I/O	shows the percentage of I/O operations that used 15 tracks, 5 tracks, 3 tracks, and 1 track in a single I/O operation during the copy phase.
Percent of TDMF Refresh Phase I/O	shows the percentage of I/O operations that used 15 tracks, 5 tracks, 3 tracks, and 1 track in a single I/O operation during the refresh phase.
Number Pacing Changes Due to Real Storage Manager (RSM)	the number of pacing changes made due to RSM constraints. NOTE: The amount of storage used will automatically change the number of tracks read/written in a single I/O operation.
Number Pacing Changes Due to I/O Contention	the number of pacing changes made due to application I/O contention.

The next panel displays volume pacing (if selected)

Softek TDMF Performance Data Panel – Part 3

```
Volume Pacing Active using 01 Tracks per Operation.
                                                    --- T R A C K S ---
                                                   15     5     3     1

Percent of Copy Phase I/O using                 :    1    23    43    33
Percent of Refresh Phase I/O using              :   12    31    33    24
Number Pacing Changes Due to Real Storage Manager.
                                      Raise to :    3     2     0     0
                                      Lower to :    0     3     2     0

Number Pacing Changes Due to I/O Contention.
                                      Raise to :    2     3     4     0
                                      Lower to :    0     1     4     3

Command ===>
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

If reverse pacing was selected for the volume pairing, it will be indicated at the beginning of the session on this panel where the number of tracks per operation will be 01. If the level of activity permits, Softek TDMF will increase the number of tracks read per I/O operation.

Part of the performance data provided by Softek TDMF is Customer Performance on the source volume. The data presented is cumulative for the migration as well as for the last interval (30 seconds). This includes:

TDMF Sessions Monitor Panel Performance Data

Total Elapsed Device Response Time	These values represent the sum of the I/O response times across all monitored systems. Because I/O requests from multiple MVS systems can be “active” in the I/O subsystems, the storage controller or the device at any one time, it is possible for the reported device response time to now exceed the elapsed time.
Percent of Device used by Customer/ TDMF	The sum of the I/O service times across all systems divided by the length of the volume interval. The Softek TDMF I/O response times no longer include an IOS queue component. It is possible to exceed 100% utilization of the device. If the sum of the Softek TDMF and Customer initiated I/O response times exceeds the monitoring interval; the individual percentages are scaled to total 101.

The following panel displays Customer Performance.

Softek TDMF Performance Data Panel – Part 4

```
Customer Performance on Volume                Cumulative     Last Interval
 Total Elapsed Time Available                   00:15:03       00:00:30
 Total Elapsed Device Response Time             00:17:09       00:00:33
 Average Device Response Time                     00.092 Secs    00.088 Secs
 Average No. of I/O Operations per system          5,616            191
 Percent of Device used by Customer                   63             61
 Percent of Device used by TDMF                       38             40

Command ===>
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

In the above example, the customer is currently using the volume 110%[1] of the time (percent of device used by customer).

Softek TDMF used approximately 1.1 seconds to read a cylinder, so has used roughly 10 minutes 30 seconds[2] so far. The percentages are scaled to total 101; the raw cumulative percentages would be 68.5%[3] for Softek TDMF and 114.4%[4] for customer I/O.

The next section covers Average Device Response Times. This includes the read and write times for the following operations:

- Copy
- Refresh
- Copy Cylinder
- Refresh Cylinder
- Estimated Sync Time

The *figure:* Softek TDMF Performance Data Panel - Part 5 on page *155* provides the following information:

- **Volume Refresh and Synchronization Information**: Displays the number of tracks and cylinders refreshed and synchronized for that specific migration.
- **Sync Goal in Seconds**: The value that was set at job submission or modified via the Monitor.
- **Estimated Sync Time Required in Seconds**: Displays the calculated value for the synchronization phase. This value should be less than the total **Estimated Sync Time** (read and write) in the **Average Device Response Time**.
- The last display is the start and end times for each phase, as well as the total elapsed time for the copy, refresh, and synchronization phases as well as the total elapsed time for that specific volume pairing.

NOTE

The estimated synchronization time is normally be the sum of the predicted synchronization read and write times. However, if the Full Speed Copy option was requested, the read and write operations will be overlapped, so the estimate will be the greater of the two times, rather than their sum.

The following panel depicts the above explanations:

1. 110% is the interval service time divided by the interval length.
2. 10 minutes 30 seconds is the average time to read a cylinder (1.095 secs) multiplied by the number of cylinders read (in this case 565).
3. 68.5% is 10:30 divided by 15:03
4. 114.4% is I/O per system multiplied by the number of systems (2) multiplied by the average response time (0.092 secs) divided by 15:03.

Softek TDMF Performance Data Panel – Part 5

```
 Average Device Response Time by Operation:          Read          Write
 Copy                                             00.018 Secs    00.034 Secs
 Refresh                                          00.019 Secs    00.035 Secs
 Copy Cylinder                                    00.270 Secs    00.510 Secs
 Refresh Cylinder                                 00.285 Secs    00.525 Secs
 Estimated Sync Time                              03.230 Secs    05.925 Secs


Refresh and Synchronization Information.         Refresh         Sync.
Refresh and Synchronization I/O counts
Tracks                                           00123           00020
Cylinders                                        00017           00010

Synchronization Goal in Seconds         :                         005
Estimated Sync time required in seconds :                         010


Command ===>
 F1=Help       F2=Split      F3=Exit       F5=Rfind      F7=Back       F8=Forward
 F9=Swap      F12=Cancel
```

Note that each volume in the session will be listed in the order specified on the MIGRATE control record in the Master batch job. Therefore, the previous five (5) panels will be displayed for each volume. If the user wishes to see performance data for a specific volume within the session, the find command may be used or scrolling through the panels may be used.

If a different session is desired, all that is required is to change the entry on the ComDataSet line at the top of the panel.

NOTE

Full Speed Copy Effect:

Using the Full Speed Copy option can reduce the elapsed time of the copy sub–phases of each volume being migrated. This is accomplished by acquiring additional real memory for an additional data buffer, thereby allowing I/O operations for the read and write I/O operations to overlap or take place simultaneously. The impact of using Full Speed Copy is reflected in the **Average Device Response Time by Operation** times displayed in the **Performance Data Panel**. As an example, assume that the device service times of the read and write cylinder operations for the copy and refresh phases were equal; in this example, 510 milliseconds. In this case, using the Full Speed option would decrease the time for I/O operations required exactly in half. The migration should execute in about one–half the usual elapsed time.

Option 5 - Past Sessions: Display Summary

From this panel previous session summaries can be displayed. All that is required is the COMMDS name of the session desired.

NOTE

This option is also available via Option 7, Past Sessions: Display Communication Dataset History, by moving the cursor to a specific COMMDS and pressing PF5.

An example follows.

Softek TDMF Past Session Summary

```
Past Session Summary              Row 1 to 12 of 12

 ComDataSet : NZD00.T360A.SYSCOM

 ------------------------------------------------------------------------

 Softek TDMF Version 3.6.0
 Session started 11/25/2003 09:11:44.547

 Volume Device  Group    --- Migration --- - Error Info - Sync
 Serial Number  Name     Status      Type  System Message Goal

 TD239A  239B  TEST1     Terminated  SWAP   TDM1 TDM2348E  005
 TD239B  239A

 HDS106  C106  TEST1     Terminated  SWAP   TDM1 TDM2397E  005
 HDS107  C107



Command ===>                                          Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F6=Options   F7=Back
  F8=Forward   F9=Swap     F12=Cancel
```

Option 6 - Past Sessions: Display Details

This option will display all data related to the COMMDS, the source and target volumes, and all messages issued by the Master and Agent systems from previously run migration sessions. In order to display a past session, enter the COMMDS name or alternatively, it can be selected via Option 7 – Past Sessions: Display Communication Dataset History. For more detail on how Option 7 functions, see *Option 7 - Past Sessions: Display Communication Data set History* on page *158*.

An example of the panel follows:

Softek TDMF Past Session Detail Display

```
 Past Session Display             Row 1 to 34 of 285

 ComDataSet : NZD00.T360A.SYSCOM

  ------------------------------------------------------------------------

 Softek TDMF Version 3.6.0     Completed Migration

 ComDataSet : NZD00.T360A.SYSCOM
              Volume serial number SPMS15 on 3390 device 23F5
              Starting Cylinder is x'0000087D', 02173 decimal
              Pin Token = 019BD940  UCB = 00EE2D80

 Number of Systems active = 02.  Volumes active = 02.

 MSE for SMFID TDM1, ASID:  0046, Relative System Number 00
 MSE for SMFID TDM2, ASID:  0025, Relative System Number 01

 The current messages for SMFID TDM1 follow.
  11/24/2003 08:50:20.748 TDM1732I The I/O Monitor module has been loaded
                                   into Dynamic LPA.
  11/24/2003 08:50:20.771 TDM1728I Installed software for this system is:
                                   Softek TDMF 3.6 Base Level.
  11/24/2003 08:50:20.806 TDM4172I The Reverse Pacing option has been set
                                   to OFF.
  11/24/2003 08:50:20.806 TDM4151I The Volume Comparison option has been
                                   set.
  11/24/2003 08:50:20.806 TDM4152I The Synchronization Prompt option has
                                   been set.
  11/24/2003 08:50:20.806 TDM4157I The Display Time Option has been set to
                                   GMT.
  11/24/2003 08:50:20.806 TDM1452I The Pacing System Option was specified
                                   as ON.
  11/24/2003 08:50:20.806 TDM4159I The Automated Operations option has
                                   been requested.
  11/24/2003 08:50:20.806 TDM4161I The Startup Confirmation option has
                                   been requested.
  11/24/2003 08:50:20.806 TDM1461I Terminate All Volumes in Group on Error
                                   Option was specified as OFF.
  11/24/2003 08:50:20.806 TDM4165I The Fastcopy option has been requested.

Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Option 7 - Past Sessions: Display Communication Data set History

If the HISTORY batch job is run and a SYSCOM History Dataset Name was specified in the System defaults, Softek TDMF will keep a history log of all COMMDS' used. The history log will show the date and time the COMMDS was used, if it was re-used and if there was an x37 error. An example follows:

Softek TDMF History Data set Display

```
                          History DataSet Display             Row 1 to 4 of 4

                            Softek TDMF
                           Version 3.6.0

Company Name         : Softek Technology Corporation
Site Number and Name : 50069 M2 Data Center
History DataSet Name : 'TDMS1.TDM360.LOG'
Report Date and Time : 03/08/2003 11:45:17

TDMS1.V360A.SYSCOM                              03/07/2003 10:25:30
TDMS1.V360B.SYSCOM                              03/07/2003 12:19:02 ReUsed
TDMS1.V360C.SYSCOM                              03/06/2003 12:47:42
TDMS1.V360X.SYSCOM                              02/27/2003 09:46:56

Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F4=Detail    F5=Summary   F6=Perform
 F7=Back      F8=Forward   F9=Swap     F10=Updates  F11=Trace    F12=Cancel
```

Navigation of the History Dataset Display is accomplished using PF keys. For example, to see performance statistics simply move the cursor (no tabbing) to the COMMDS desired and press PF6. Additionally, there is a help panel to aid navigation through this display. An example follows.

Softek TDMF History Dataset Display – Help

```
               Help for Communication DataSet Display
                                                          More:     -
Displays information logged into history file.

o   Placing cursor on a given dataset line and depressing ENTER or
    PF4 displays that communication dataset's messages.

o   Placing cursor on a given dataset line and depressing PF6
    displays that communication dataset's performance information.

o   Placing cursor on a given dataset line and depressing PF10
    displays time and dates of updates to the User's Install Option
    information.

o   Placing cursor on a given dataset line and depressing PF11
    displays that communication dataset's trace data.

If you use any of the above options to display different
information, when you depress PF3 to exit that display you will be
returned to the History DataSet Display.

 F1=Help       F3=Exit       F5=Exhelp     F6=Keyshelp   F7=PrvTopic
 F8=NxtTopic  F10=PrvPage   F11=NxtPage   F12=Cancel
```

Option 8 - Display Installation Options and Environment

With this display the user may review the current default options set by the SYSOPTN batch job. Additionally, the operating system environment in which the Softek TDMF TSO Monitor is executing is displayed. From this panel it is possible to display the installation security environment by pressing PF10. The Installation Options panel is displayed first.

Softek TDMF Installation Options Display

```
                          Installation Options              Row 1 to 14 of 14

 Company : Software Technology Corporation
 Site  . : Softek TDMF for z/OS V3.6.0 Testing
 Site ID : 05656  Date Initialized  . . . : November 17, 2003
 History DataSet  . . . . . : ALT00.TDM360.LOG
 Security package volume protection . . . : No
 WTO/WTOR for automated operations  . . . : Yes
 Automatic ICKDSF REFORMAT on swap  . . . : No
 Check target volumes are empty . . . . . : No
 Volume counted as active only in copy  . : No
 Unidentified connected systems . . . . . : Warn
 WTO AutoOps Route Codes  . : 2,4,6,11,27
 SMF Record Type  . . . . . : 205  Use Startup Confirmations  . . : Yes
 Use Local Time on Messages . . : Yes  Terminate group on error . . . : Yes
 Use Pacing during Migrations . : Yes  Use Reverse Pacing algorithm . : No
 Allow invalid count fields . . : No   Monitor XRC sessions . . . . . : No

                         Operating Environment

 Softek TDMF
 Version 3.6.0
 USER ID.     : NZD00
 CPU ID.      : 0001232E 2066
 SCP NAME     : SP7.0.3
 SCP FMID     : HBB7706
 ETR ID.      : 09
 Local Time   : 11/25/2003  08:57:34.80
 GMT Time     : 11/25/2003  16:57:34.80
 Local Offset : -08:00:00
 Leap Seconds : +015



Command ===>                                            Scroll ===> PAGE
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F10=Access   F12=Cancel
```

NOTE

In order to see all information listed under Operating Environment may require scrolling forward. The default installation options do not scroll off the screen.

Option 9 - Display/Modify Installation Security Environment

From this panel the security keys set by the SYSOPTN batch job are displayed as well as the Softek TDMF feature in use. There are four different types of authorization keys. For a description of key types, please refer to *Preparing to execute Softek TDMF* on page *27*.

The Softek TDMF authorization program (TDMFAKEY) uses the internal hardware clock to check the date and time. This internal hardware clock operates on Greenwich Mean Time (GMT). Therefore, GMT is used to determine the effective date or expiration date of certain types of keys. Leap seconds are ignored.

Adding License Keys

If adding a license key, type an 'A' under Requested Action at the bottom row and then the license key under Security Key and the CPU number (01-16) under Key Number and press enter. Multiple keys can be added from this panel. When entries have been made, type yes or no to Commit the Changes (save or no save) and press PF3. A message stating if the change(s) were accepted or not accepted will be displayed under the Commit Changes line.

NOTE

License keys for the Vendor Offering cannot be added using this method.

KEY**nn** must be entered as specified by Softek, otherwise Softek TDMF will not function on that CPU.

Deleting Keys

To delete a key, type in a 'D' under Requested Action and press enter. To commit the change(s), type yes on the appropriate line and press PF3. Only Softek TDMF Full Function license keys may be deleted from the Monitor.

The table on the following page describes the fields in the Security Panel:

Softek TDMF Installation and Security Environment

Company	Company name where Softek TDMF is installed.
Site	Location where Softek TDMF is installed.
Site ID	Five- (5) digit value assigned by Softek.
Date Initialized	Date when SYSOPTN batch job was executed.
Maintenance Expiration Date	Date when maintenance for Softek TDMF will expire or when a specific feature will expire.
Commit Changes	'Yes' commit changes. 'No' do not commit changes.
Return Code from TDMF Security	nnnnnnnn was the rc from TDMFAKEY. See *Appendix C: Authorization Return Codes* for Softek TDMF authorization return codes.
__	'A' to add a key; 'D' to delete a key

Softek TDMF Installation and Security Environment *(Continued)*

Security Key	The 16-digit security key assigned by Softek.
Key Description	User supplied description of each key assigned.
Added	Date and time (GMT) the security record was updated.
By	Batch job name (SYSOPTN) or TSO UserID that updated the security record via the Monitor.

Return Codes from the security and authorization programs are listed in *Appendix C: Authorization Return Codes*.

An example of the panel is shown below.

Softek TDMF Installation Security Environment

```
                      Softek TDMF Full Function                Row 1 to 3 of 3

Company : Softek Technology Corporation
Site  . : Data Center
Site ID : 50069  Date Initialized  . . . . . : November 27, 2003
Maintenance Expiration Date  . . . . . : November 27, 2004
Return Code from TDMF Security . . . . . : 00000000
Additional Features Purchased  . . . . . : None

Commit Changes? (yes/no) . . . . . ___
Transparent Data Migration Facility Version 3.6.0 Base Level.

   No    Security Key    Key Description      Added Date/Time    By

_  01  41B3115CA53326B4  S/N 4089 2000 TDM1 V 11/27/2003 17:43 SYSOPTN
_  02  B8D7C88544475376  S/N 4143 2000 TDM2 V 11/27/2003 17:43 SYSOPTN


Command ===>                                            Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F10=Options  F12=Cancel
```

In the above panel, the Softek TDMF Full Function feature is noted at the top of the panel.

Option 10 - Display/Modify User's TSO Monitor Options

From this panel default user monitor options may be set. These options include monitor time display, default first panel display and how volumes are displayed within the session. An example follows.

Softek TDMF User Monitor Options Panel

```
                          User's Monitor Options

                    PF3 to exit ---- PF5 to save changes

User's ID  TDMS1     Display Monitor Messages in Local or GMT Time  LOCAL

User's First Monitor Function - with cursor on the field, depress PF1
for list of valid specifications. . . . . . . . . . . . . . . . . . . . x

Display Preference (1 or 2, (if 2, define priority below))  . . . . . . 1
Waiting Allow  01           Swap           08           Terminating    15
Waiting Reply  02           Quiesce        09           Terminated     16
Refresh        03           Suspended      10           Complete       17
Activation     04           Inactive       11
Copy           05           Uninitialized  12
Resume         06           Synchronize    13
Backed out     07           Compare        14

Qualified Dataset for saving
JCL members -- Optional  . . ____________________________________________

Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Those areas that may be modified are marked in bold. Help panels are available for each entry on the panel.

By specifying LOCAL for Monitor Messages, this will inform the Softek TDMF TSO Monitor to display all dates and time with local timestamp values. A value of GMT will cause the monitor to display all timestamps with GMT values.

It is possible to set a specific default panel for the Monitor. This means that whenever the Softek TDMF TSO Monitor is activated, the first panel to be displayed will be what the user specifies. For example, if monitoring the progress of a current session is desired then an entry of 1 should replace the default value of 'X' (no default panel selected).

The next entry relates to Monitor Options 1 (Monitor Progress) and 2 (User Interaction and Status). The default display preference of '1' sets the display of all volumes within a session to how they are defined within the Master batch job. If the display preference is set to a value of '2' this causes the display to show the volumes within a session in an order specified by the user. By setting the priority order for each phase or action required, the user can group volumes within a session to be displayed according to those priorities.

The last field in this panel that can be changed by the user is the Dataset Name for saving JCL members when using Option 11 – Build Data Migration Jobs. The data set must be fully qualified but quote marks are not necessary. The default for this entry is the Softek TDMF Skeleton library (HLQ.TDM360.TDMSLIB).

If the user chooses to set the default display preference to a value of '2', then the user also has the ability to change the order the volumes within a migration session to be displayed. For example, the values are set as such that all suspended migrations are displayed first then volumes waiting replies, then those volumes in copy phase. The following screen changes would be made.

Softek TDMF User Monitor Options Panel with Changes

```
                          User's Monitor Options

                    PF3 to exit ---- PF5 to save changes

User's ID  TDMS1     Display Monitor Messages in Local or GMT Time  LOCAL

User's First Monitor Function - with cursor on the field, depress PF1
for list of valid specifications. . . . . . . . . . . . . . . . . . . 1

Display Preference (1 or 2, if 2 define priority below) . . . . . . . . 2
Waiting Allow  01           Swap           08           Terminating    15
Waiting Reply  02           Quiesce        09           Terminated     16
Refresh        03           Suspended      10           Complete       17
Activation     04           Inactive       11
Copy           05           Uninitialized  12
Resume         06           Synchronize    13
Backed out     07           Compare        14

Qualified Dataset for saving
JCL members -- Optional  . . ____________________________________________


Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

As a result of the above changes, the Monitor Progress panel would cause the default first panel to be shown. Additionally, the volumes in a session displayed on that panel would be sorted in the order specified under Display Preference.

Softek TDMF Sessions Monitor Panel with User Options Set

```
                          TDMF Sessions Monitor              Row 1 to 10 of 10

 ------------------------------------------------------------------------------

Transparent Data Migration Facility.   Master V3.6.0 Session Active
ComDataSet : TDMS1.V360.SYSCOM
Source    Migration   Percent Complete --------->
VolSer      Phase     0...10...20...30...40...50...60...70...80...90..100
SCB083    Waiting Reply
SMPS05    Refresh 52  ------------------------------------------------->
AME744    Copy        ---------------------->
AME78B    Copy        ---------------------->
AMEE95    Suspended   -------------------->
AMEE92    Suspended   ---------------------->
AME794    Terminated









Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F10=Status   F12=Cancel
```

Dependent upon the status of a specific migration, some of the values set may not be displayed. It is recommended that if the user has a preference for what panel is displayed first either Option 1 – Current Session: Monitor Progress or Option 2 – Current Session: User Interaction and Status be selected.

Option 11 - Build Data Migration Jobs

All Softek TDMF Master and Agent batch jobs may be created and submitted using the Softek TDMF TSO Monitor. JCL generated using the following panels will be saved in a user-defined data set in Option 11 (*figure:* Softek TDMF User Monitor Options Panel on page *162*) or by default in the skeleton library TDMSLIB. Pressing PF11 will display the installation defaults as set by the SYSOPTN batch job (*figure:* Softek TDMF Installation Options Display on page *159*).

NOTE

Data sets created or used with previous versions of Softek TDMF are not compatible with Softek TDMF V3.6.0.

CAUTION

The control statements built by this TSO Monitor function do not use the same format as those described in *Softek TDMF Control Statements* on page *29*. They are accepted by the Master job, but not all the available combinations of options are accepted, and Softek does not document how to modify or customize the control statements that are generated.

Softek TDMF Build/Submit Jobs Panel

```
                          Build/Submit Jobs


                  PF 4  --> Enter/Update/Review
                            Job Cards

                  PF 5  --> Build/Submit
                            Master Migration Job

                  PF 6  --> Build/Submit
                            Agent(s) Migration Job

                  PF 10 --> Build JCL to Create a
                            Communication Dataset

                  PF 11 --> Display Current
                            User Installation Options



Command ===>
 F1=Help      F2=Split     F3=Exit      F4=Define    F5=Master    F6=Agent
 F9=Swap     F10=ComDaSet F11=Options  F12=Cancel
```

Selection of PF4 will display the following panel. A sample job card has been entered and saved. Press PF3 to return to the previous menu.

Softek TDMF Enter/Update/Review Job Cards Panel

```
                   Enter/Update/Review Job Cards         TDMF JCL saved

     Enter Job Control Statements, insure correctness prior to saving
                    PF3 to exit ----- PF5 to save data


> //EXAMPLE  JOB 'SOFTEK TDMF SESSION',

> //            CLASS=A,MSGCLASS=Y,NOTIFY=USERID

> //*



Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back     F8=Forward
 F9=Swap     F12=Cancel
```

Building a Master System Batch Job

Once a job card has been created and saved, selection of PF5 will start the process to where the user may create, update, review or submit a Master system batch job. In the following example, a new migration session is to be built (PF4).

Softek TDMF Master System Confirmation Screen

```
                        Master Confirmation Screen


You have requested to Build a New TDMF Job.

The old job will be deleted, unless you requested during
its build that it be saved in the TDMSLIB library.

Confirm with "YES" to continue building a New TDMF job.


Confirm? (YES/NO): . . ___




Command ===>                                              Scroll ===> CSR
 F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel
```

Once confirmation is accepted the following panel is displayed. In this case confirmation is 'yes'.

Softek TDMF Master System Job Build Menu

```
                         Master Job Build Menu              Reply was YES

                  PF 4  --> Enter/Update/Review
                            Job Name, Libraries, & SMF IDs

                  PF 5  --> Enter/Update/Review
                            Session Job Options

                  PF 6  --> Enter/Update/Review
                            Migration Information

                  PF 7  --> Final Review/Submit/Save
                            Session Job



Command ===>                                              Scroll ===> CSR
 F1=Help       F2=Split      F3=Exit       F4=Library    F5=Session    F6=Migrate
 F7=Review     F9=Swap     F12=Cancel
```

If PF4 is pressed, the following panel is displayed. Fill in all appropriate area.

NOTE

Until PF5 is pressed, the message '** UNSAVED record **' will be displayed. Once PF5 has been pressed, the message will change to 'SAVED record'.

Softek TDMF Master System – Define Libraries & SMF IDs

```
                        Define Libraries & SMF IDs

                    PF3 to exit ----- PF5 to save data

Member name for saving . . . EXAMPLE_
TDMF Load Library  . . . . . TDMS1.TDM360.TDMLLIB
TDMF Security Library  . . . TDMS1.TDM360.TDMLLIB
Communication DataSet  . . . TDMS1.V360.SYSCOM_____________________________
Master Complex Execution
Affinity JCL Statement . . . ____________________________________________

Master SMF ID . . . . . TDM1
Agent SMF IDs (optional)  . . . . TDM2  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____

                                                      ** UNSAVED record **
Command ===>
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Once **PF5** is pressed the following panel is displayed.

Softek TDMF Master System – Define Libraries & SMF IDs; Saved

```
               Define Libraries & SMF  Master Information Saved

                    PF3 to exit ----- PF5 to save data

Member name for saving . . . EXAMPLE
TDMF Load Library  . . . . . TDMS1.TDM360.TDMLLIB
TDMF Security Library  . . . TDMS1.TDM360.TDMLLIB
Communication DataSet  . . . TDMS1.V360.SYSCOM
Master Complex Execution
Affinity JCL Statement . . . ____________________________________________

Master SMF ID . . . . . TDM1
Agent SMF IDs (optional)  . . . . TDM2  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____
> ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____  > ____

                                                          SAVED record

Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Once the Softek TDMF libraries and SMF IDs have been defined and saved, press PF3, which will bring up the following panel for definition of Session Options. These session options may override the default system options that were selected when the SYSOPTN batch job was executed. When the session options have been selected, press PF5 to save these options then PF3 to continue to the next panel.

NOTE

The session options default to what the SYSOPTN batch job has been set to. Only those options that may be overridden are displayed.

Softek TDMF Master System – Define Session Options

```
                          Define Session Options

                     PF3 to exit ----- PF5 to save data


Migration Session time display in local time . . . Y
Migration Session Pacing Requested . . . . . . . . N
Reverse Pacing Requested . . . . . . . . . . . . . N
Confirmation Required at Initialization  . . . . . N
Terminate group on error . . . . . . . . . . . . . N
MVS operator messages issued . . . . . . . . . . . N
Treat all volumes as a single group  . . . . . . . N
Maximum number of concurrent migrations  . . . . . __
Check for empty Target VTOC  . . . . . . . . . . . N
Invoke ICKDSF for REFORMAT after swap  . . . . . . N
Control Response to unidentified systems . . . . . W
                                                    ** UNSAVED record **
Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Once the session options have been defined, press **PF5**, which will save the session options that have been selected and mark the record as saved. An example follows.

Softek TDMF Master System – Define Session Options; Saved

```
                          Define Session Option    Session Options Saved

                     PF3 to exit ----- PF5 to save data


Migration Session time display in local time . . . Y
Migration Session Pacing Requested . . . . . . . . N
Reverse Pacing Requested . . . . . . . . . . . . . N
Confirmation Required at Initialization  . . . . . N
Terminate group on error . . . . . . . . . . . . . N
MVS operator messages issued . . . . . . . . . . . N
Treat all volumes as a single group  . . . . . . . _
Maximum number of concurrent migrations  . . . . . __
Check for empty Target VTOC  . . . . . . . . . . . N
Invoke ICKDSF for REFORMAT after swap  . . . . . . N
Control Response to unidentified systems . . . . . W
                                                              SAVED record



Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Once the session options have been saved, press **PF3**, which will bring up the migration definition panel. From this panel, a volume migration may be defined; additional volume migrations may be defined by pressing **PF6**.

Softek TDMF Master System – Define a Volume Migration

```
                            Define a Migration                Row 1 to 1 of 1

 PF4 Previous Migration       PF5 Save         PF6 Next Migration

 Migration Number  . . . . . . . . . 01
 Source Volume         Target Volume         New Source Volume (opt) ______

 Type of Migration . . . . . . . . .    Type of Synchronization . . . . . _
 Volume Purge  . . . . . . . . . . . _  Volume Comparison . . . . . . . . _
 Synchronization Goal  . . . . . . 005  Group Name . . . . . . . . ________
 Volume Pacing . . . . . . . . . . . _  Automated Operation Messages  . . _
 Volume Confirmation Requested . . . _  Terminate Group on Error  . . . . _
 Allow PPRC to non-mirrored device   _  Copy Only Allocated Data  . . . . N
                                                      ** UNSAVED record **
 Current Time is  . . . . .  11/25/2003 12:54:12.71

Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F4=Previous  F5=Save      F6=Next
  F7=Back      F8=Forward   F9=Swap      F12=Cancel
```

Enter all necessary information on the above panel and press **PF5** when complete. If there are errors in the migration definition, they will be so noted on the panel. An example follows.

Softek TDMF Master System – Define a Volume Migration; with errors

```
                            Define a Migration               *** ERROR(s) ***

 PF4 Previous Migration       PF5 Save         PF6 Next Migration

 Migration Number  . . . . . . . . . 01
 Source Volume TD239A  Target Volume TD239B  New Source Volume (opt) ______

 Type of Migration . . . . . . . . . _  Type of Synchronization . . . . . _
 Volume Purge  . . . . . . . . . . . _  Volume Comparison . . . . . . . . _
 Synchronization Goal  . . . . . . 005  Group Name . . . . . . . . ________
 Volume Pacing . . . . . . . . . . . Y  Automated Operation Messages  . . Y
 Volume Confirmation Requested . . . N  Terminate Group on Error  . . . . N
 Allow PPRC to non-mirrored device   _  Copy Only Allocated Data  . . . . Y
                                                      ** UNSAVED record **

 There are errors in this record, you can not
 move to another record.  Must fix or PF3

 "Type of Migration          " value in error.

 Position cursor in the error field.
 Depress PF1 to get an explanation of valid parameters.

 Current Time is  . . . . .  11/25/2003 12:57:28.96
```

Correct the identified errors, press enter or **PF5**. Once all errors have been corrected, the following panel will be displayed.

Softek TDMF Master System – Define a Volume Migration; saved

```
                            Define a Migration            Migration Data Saved

 PF4 Previous Migration       PF5 Save         PF6 Next Migration

 Migration Number  . . . . . . . . . 01
 Source Volume TD239A  Target Volume TD239B  New Source Volume (opt) ______

 Type of Migration . . . . . . . . . S  Type of Synchronization . . . . . _
 Volume Purge  . . . . . . . . . . . _  Volume Comparison . . . . . . . . _
 Synchronization Goal  . . . . . . 005  Group Name . . . . . . . . ________
 Volume Pacing . . . . . . . . . . . Y  Automated Operation Messages  . . Y
 Volume Confirmation Requested . . . N  Terminate Group on Error  . . . . N
 Allow PPRC to non-mirrored device   _  Copy Only Allocated Data  . . . . Y
                                                                SAVED record
 Current Time is  . . . . .  11/25/2003 12:59:15.48

Command ===>                                              Scroll ===> CSR
```

Once all volume migrations have been defined and saved, press PF3, which will bring up the Master Job Build Menu (*figure:* Softek TDMF Master System Job Build Menu on page *166*). From this panel press **PF7**: information related to when the JCL is to be saved will be displayed. If job submission is desired, press **PF5**.

Softek TDMF Master System Migration Job Review; saved information

```
                                 Job Review                    Row 1 to 4 of 4

                    PF3 exit ------ PF5 Review/Submit JCL


  ------------------------------------------------------------------------
  JCL will be saved in 'TDMS1.TDM360.TDMSLIB', Member : EXAMPLE

  Current Time is : 03/02/2003 14:03:34.47









Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Review    F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

From the above panel, press **PF5** for review of the JCL that has been created based upon information entered in the previous panels. An example follows.

Softek TDMF Master System Migration Job – ISPF Display

```
Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
BROWSE    TDMS1.TDM360.TDMSLIB(TEMPNAME) - 01.01     Line 00000000 Col 001 080
******************************** Top of Data ********************************
//EXAMPLE  JOB 'SOFTEK TDMF SESSION',
//    CLASS=A,MSGCLASS=Y,NOTIFY=TDMS1
//*
//TDMF     EXEC PGM=TDMFMAIN,PARM=MASTER
//STEPLIB  DD DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SECCOM   DD DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SYSCOM   DD DISP=SHR,DSN=TDMS1.V360.SYSCOM
//SYSPRINT DD SYSOUT=*
//SYSIN    DD *
 TDMF OPTIONS TDM1 MASTER Y N N N N N N   N W
 TDMF SYSTEMS TDM1 MASTER TDMS1.V360.SYSCOM
 TDMF SYSTEMS TDM2
 TDMF MIGRATE SPMS03 SPMS05        S       005          Y Y N N   Y N N
 TDMF END
/*
****************************** Bottom of Data ******************************
   Command ===>                                                Scroll ===> CSR
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

The Master system batch job has now been defined and saved. If Agent systems have been identified in the Master batch job, one or more Agent system batch jobs must be defined.

NOTE

The control statements built by this TSO Monitor function are not the same format as those described in *Softek TDMF Control Statements* on page *29*. They are accepted by the Master job, but not all the available combinations of options are accepted. Softek does not provide any documentation for modifying or customizing the control statements that are generated from the TSO monitor.

Building an Agent System Batch Job

Agent system batch jobs are defined from the Build/Submit panel (*figure:* Softek TDMF Build/Submit Jobs Panel on page *165*) by pressing **PF6**, which displays the following panel:

Softek TDMF Agent System Migration JCL Build

```
                        Agent Migration JCL Build        Row 1 to 3 of 3

                       PF3 exit ---- PF5 Continue


  After building the input needed to generate a TDMF Master Migration,
  all the data is available to generate the JCL needed for starting
  Agent jobs.  Remember, all systems that have access to the source
  volume MUST have either a Master or Agent job running.  All jobs
  must be started with in 15 minutes of each other.

  Two of the parameters for the Agent jobs are optional.  If there are
  no errors and you wish to continue, the program will prompt you for
  these parameters.

  ------------------------------------------------------------------------

  Current Time is : 03/02/2003 14:08:35.83


Command ===>                                                Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Continue  F7=Backward  F8=Forward
 F9=Swap     F12=Cancel
```

Press **PF5** to continue to the next panel in order to create the Agent system JCL.

The only required field in the following panel is a member name to save the JCL to in the specified library.

Softek TDMF Agent System Optional Parameters Panel

```
                    Define Agent Optional Parameters    Row 1 to 5 of 5

            PF3 to exit ------- PF5 to Review/Submit JCL

Member name for saving . . . EXAMPLES

TDMF Load Library  . . . . : TDMS1.TDM360.TDMLLIB
TDMF Security Library  . . : TDMS1.TDM360.TDMLLIB
Communication DataSet  . . : TDMS1.V360.SYSCOM
Agent Complex Execution
Affinity JCL Statement . . . ____________________________________________
Master SMF ID  . . . . . . : TDM1
Agent SMF ID . . . . . . . : TDM2
 ------------------------------------------------------------------------

 Current Time is : 03/02/2003 14:09:01.96

 JCL will be saved in 'TDMS1.TDM360.TDMSLIB', Member : EXAMPLES



Command ===>                                           Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Save      F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Once the above panel has been filled in, press **PF5** to save and review the JCL generated; otherwise, press **PF3** to exit without saving the JCL. The following panel appears when **PF5** is pressed.

Softek TDMF Agent System Migration Job – ISPF Display

```
Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
 BROWSE    TDMS1.TDM360.TDMSLIB(TEMPNAME) - 01.01     Line 00000000 Col 001 080
******************************** Top of Data ********************************
//EXAMPLE  JOB 'SOFTEK TDMF SESSION',
//    CLASS=A,MSGCLASS=Y,NOTIFY=TDMS1
//*
//*
//* This AGENT job is for SMF ID:  TDM2
//*
//TDMF     EXEC PGM=TDMFMAIN,PARM=AGENT
//STEPLIB  DD DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SECCOM   DD DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SYSCOM   DD DISP=SHR,DSN=TDMS1.V360.SYSCOM
//SYSPRINT DD SYSOUT=*
//SYSIN    DD DUMMY
/*
******************************* Bottom of Data ********************************
  Command ===>                                                Scroll ===> CSR
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

From the preceding panel, the Agent system can be saved (**PF3**) or submitted. If it is saved, the panel shown in *figure:* Softek TDMF Agent System Migration Job – ISPF Display on page *175* is displayed so that other Agent systems may be defined. If all Agent systems have been defined, press **PF3** again, which will display the Build/Submit Jobs panel (*figure:* Softek TDMF Build/Submit Jobs Panel on page *165*) once again.

Building a COMMDS

If a Communications Data Set (COMMDS) has not been previously defined, it must be defined prior to submission of the Master and Agent batch jobs. Failure to do so will result in the Master and Agent batch jobs failing. Press **PF10** from the Build/Submit Jobs panel in order to create a COMMDS. The following panel is displayed.

Softek TDMF JCL Create for COMMDS Panel

```
               Create JCL to Allocate a Communication DataSet    Row 1 to 5 of 5

                  PF3 to exit ----- PF5 to generate jcl

 Member name for saving . . . COMMDS
 No of Systems in Migration   01
 No of Volumes in Migration   01
 Communication DataSet Name   TDMS1.V360.SYSCOM
 Unit Name  . . . . . . . . . SYSDA
 Volume Serial Number . . . . TDMF01
 Complex Execution Affinity
 JCL Statement  . . . . . . . _____________________________________________

  ------------------------------------------------------------------------

  Current Time is : 03/02/2003 14:14:24.85

  JCL will be saved in 'TDMS1.TDM360.TDMSLIB', Member : COMMDS

 Command ===>                                                Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Review    F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Once all the necessary fields have been filled in, press **PF5** in order to view the JCL created for the COMMDS allocation. A sample of the previous panel is shown below. The JCL may be saved for later use or submitted from this panel.

Softek TDMF Allocate JCL COMMDS Panel

```
Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
 BROWSE    TDMS1.TDM360.TDMSLIB(TEMPNAME) - 01.01     Line 00000000 Col 001 080
******************************** Top of Data ********************************
//EXAMPLE  JOB 'SOFTEK TDMF SESSION',
//    CLASS=A,MSGCLASS=Y,NOTIFY=TDMS1
//*
//* This creates a COMMUNICATION DATASET
//*
//TDMF     EXEC PGM=IEFBR14
//SYSCOM   DD  DISP=(NEW,CATLG,DELETE),
//             DSN=TDMS1.V360.SYSCOM,
//             DCB=(LRECL=4096,BLKSIZE=4096,RECFM=F),
//             SPACE=(CYL,004,,CONTIG),
//             VOL=SER=TDMF01,
//             UNIT=SYSDA
//SYSPRINT DD  SYSOUT=*
//SYSIN    DD  DUMMY
/*
****************************** Bottom of Data ******************************
      Command ===>                                                Scroll ===> C
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Through the use of the previous panels, a migration session has been defined and is ready to be executed.

The remaining option listed on the Build/Submit Jobs panel is **PF11**, which displays the current user environment and installation options as shown in *figure:* Softek TDMF Installation Security Environment on page *161*.

Option U - Softek TDMF Support Utilities

The Support Utilities menu provides a number of functions to aid the user and technical support staff in problem resolution. Functions such trace table entries have been added to enhance the level of support provided. The primary panel is shown below.

Softek TDMF Support Utilities Panel

```
                              Support Utilities

 Select an Action:
__   0.  Display Memory.
     1.  View Internal Details for Active Migrations.
     2.  Active Session   - Display/Alter Tracing Bit Settings.
     3.  Active Session   - Display Trace Table.
     4.  Previous Session - Display Trace Table.
     5.  Module Version Levels in defined load library.
     6.  Current/Past Session Module Version Levels from
         Communications Data Set.
     7.  System Change Summary.
     8.  Unit Control Block (UCBs) Display.
     9.  Communication Data Set Control Blocks.
     10. Communication Data Set Navigator.
     11. Communication Data Set Volume Refresh Bit Maps.
     12. Communication Data Set Merged System Messages.
     13. Detected Source Volume I/O Errors.


Command ===>
  F1=Help    F2=Split   F3=Exit    F9=Swap   F12=Cancel
```

Option U.0 - Display Memory

With this option, active memory may be displayed by specifying an address and length related to the operating system that the Softek TDMF TSO Monitor is executing in. An example follows.

Softek TDMF Memory Display

```
                                Memory Display           Row 1 to 8 of 8

Address . . 00f4c008
Length  . . 80

00F4C008  D7C3C3C1  F0F9F0F3  F8F0F0F3  F5F9F9F5  :PCCA090380035995:
00F4C018  00008000  00FCF1E8  00F8B000  0C293000  :  .  .1Y 8. ... :
00F4C028  FF000000  FE000000  00585503  00006FC4  :.   .    ...  ?D:
00F4C038  3D184240  00001000  00000000  00000000  :...   .         :
00F4C048  00000000  00000000  00000000  00000000  :                 :
00F4C058  00000000  00000000  00000000  00000000  :                 :
00F4C068  00000000  00000000  00000000  00000000  :                 :
00F4C078  00000000  00000000  00000000  00000000  :                 :

Command ===>                                            Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

In the previous example, the Physical Configuration Communication Area (PCCA) is displayed which contains information related to the physical facilities associated with each processor in the system.

Option U.1 - View Internal Details for Active Sessions

This panel will display specific data related to active Softek TDMF sessions. This information includes the location of specific control blocks within Softek TDMF. An example follows.

Softek TDMF Internal Details Display

```
                        Internal Details Display     Row 1 to 16 of 16

  ------------------------------------------------------------------------

Transparent Data Migration Facility.   Master V3.6.0 Session Active.

ComDataSet : TDMS1.V360.SYSCOM
             Volume serial number STOR0A on 3390 device DE4F
             Starting Cylinder is x'000002C6', 00710 decimal
             Pin Token = 02155730  UCB = 00F1E940

Master System. Relative System Number=00, SMFID=TDM1, ASID=0032

Number of Systems active = 02  Volumes active =  01

MSV Control Block is at 07F15000.
MSV  Control Block is at 07F17000.
MSVE Control Block is at 07F1D000.

Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap      F12=Cancel
```

The control block addresses may then be displayed using Option 0, Display Memory for review or diagnosis.

Option U.2 - Active Session - Display/Alter Tracing Bit Settings

This panel shows the default trace bit settings for a Softek TDMF session. These bits may be set to other values per instruction from Softek TDMF Technical Support. Please note that the bit values must first be entered then **PF5** pressed before the settings will take effect. Once this has been accomplished, press **PF3** to exit the panel.

Each entry represents various tracing functions within Softek TDMF for analysis by Softek TDMF Technical Support. These trace functions may be viewed by pressing **PF1** from each Flag entry. An example of the trace status panel follows.

Softek TDMF Trace Table Status

```
                                Trace Status                Row 1 to 6 of 6

ComDataSet :  TDMS1.V360.SYSCOM                                  01  of  02
Environment :  Master System

Tracing Flag 1 . . . . . . . . . 1    1    1    1    1    1    1    1
Tracing Flag 2 . . . . . . . . . 1    1    1    1    1    1    1    1
Tracing Flag 3 . . . . . . . . . 1    1    1    1    1    1    1    1
Tracing Flag 4 . . . . . . . . . 0    0    0    0    0    0    0    0
Diagnostic Flag 1  . . . . . . . 0    0    0    0    0    0    0    0
Diagnostic Flag 2  . . . . . . . 0    0    0    0    0    0    0    0
Initialization Flag 1  . . . . . 0    0    0    0    0    0    0    0
Recovery Flag 1  . . . . . . . . 0    0    0    0    0    0    0    0

TDMF Display/Update Tracing Bits
Transparent Data Migration Facility
Version 3.6.0
User ID: TDMS1
Date and Time : 03/02/2003 09:42:36.95


Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F4=Next      F5=Update    F7=Back
 F8=Forward   F9=Swap
```

Option U.3 - Active Session – Display Trace Table

This function will display a Softek TDMF trace table with the most current entries at the beginning of the display. Softek TDMF Technical Support uses these trace table entries for problem determination. An example of this panel is shown below.

Softek TDMF Trace Entries – Active Session

```
                              Trace Entries         Row 1 to 15 of 4,610

ComDataSet :  TDMS1.V360.SYSCOM                                 01  of  01
Environment :  Master System  Tracing Bits : FF  FF  FF  00  00  00  00  00
-------------------------------------------------------------------------------
03/02/2003       E6E2C930 8986C316 B2C6276A DE8FE282  *WSI.ifC..F....Sb*
09:42:36.953230  0986C000 00000316 00000000 00000000  *.f..............*
              1  00000000 00000000 00000000 00000000  *................*
                 00000000 00000000 00000000 00000000  *................*
                 23000000 07F554E4 00F78100 07F554E4  *.....5.U.7a..5.U*
                 00F742E8 00F74314 00EF8A40 07F55000  *.7.Y.7..... .5..*
                 00FCF3C0 07F4A000 07F48000 0986D000  *..3..4...4...f..*
                 8986C000 7F70D000 8986C29A 00000000  *if......ifB.....*

03/02/2003       E6E2C930 8986C316 B2C6276A C73BC200  *WSI.ifC..F..G.B.*
09:42:36.957676  0986C000 00000316 00000000 00000000  *.f..............*
              0  00000000 00000000 00000000 00000000  *................*
                 00000000 00000000 00000000 00000000  *................*
                 23000000 07F554E4 00F78100 07F554E4  *.....5.U.7a..5.U*
                 00F742E8 00F74314 00EF89C0 07F55000  *.7.Y.7....i..5..*

Command ===>                                             Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F4=Next      F5=Rfind     F6=Refresh
 F7=Back      F8=Forward   F9=Swap
```

Option U.4 - Previous Session – Display Trace Table

This function will display a trace table for a specific session that has completed with the most current entries at the beginning of the display. Softek TDMF Technical Support uses these trace table entries for problem determination. An example of this panel is shown below.

Softek TDMF Trace Entries – Completed Session

```
                        Past Session Trace Entries  Row 1 to 16 of 4,613

ComDataSet :  TDMS1.V360.SYSCOM
-------------------------------------------------------------------------
Trace Entries for System : TDM1
Final Trace Bit Settings : F7 FE FE 00 00 00 00 00

02/06/2003       C5E5D330 97894100 B726BB1C 79E21900  *EVL.pi.......S..*
16:46:38.533729  17894000 00000100 00000000 00000000  *.i .............*
              0  00000009 00000000 004A0000 00000000  *.................*
                 FFFFFFFF E3F1E9F1 C3F0ED48 20CFC000  *....T1Z1C0......*
                 00000027 00000644 00000000 00000009  *.................*
                 17487000 17489000 1748F000 15F7A000  *..........0..7..*
                 15F7D000 17425000 17424000 17895000  *.7........ ..i..*
                 97894000 17424048 978940B6 1788BF30  *pi ... .pi ..h..*

02/06/2003       E4D5D930 9789E670 B726BB1C 79DE9300  *UNR.piW.......l.*
16:46:38.533673  1789E000 00000670 00000000 00000000  *.i..............*
              0  00000000 00000000 00000000 00000000  *.................*
                 00000000 00000000 00000000 00000000  *.................*

Command ===>                                              Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap
```

Option U.5 - Module Version Levels in Defined Load Library

This panel displays the assembly date and time of all Softek TDMF load modules in the defined Softek TDMF load library. The version level of each load module reflects the PR level applied as shown below.

Softek TDMF Module Version Level Display

```
                        Module Version Level Display      Row 1 to 17 of 110

Version 3.6.0

Report Date and Time  : 03/13/2003 18:58:43.29

Load Library Name : 'TDMS1.TDM360.TDMLLIB'

            TDMFADDT level 30037 assembled on 2003-03-13 at 05.38 PT.
            TDMFAKEY level 29925 assembled on 2002-08-01 at 11.03 PT.
            TDMFAMAP level 30021 assembled on 2003-02-28 at 03.53 PT.
            TDMFASPP level 30009 assembled on 2003-02-12 at 05.33 PT.
            TDMFASSO level 29963 assembled on 2003-03-13 at 10.32 PT.
            TDMFAVOL level 30025 assembled on 2003-03-12 at 07.38 PT.
            TDMFBDDT level 30037 assembled on 2003-03-13 at 08.03 PT.
 Command ===>                                                Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Option U.6 - Current/Past Session Module Version Levels from COMMDS

This panel will display the Softek TDMF load module version levels based on an active or completed communications data set. This panel is very similar to the load module version display shown in *figure:* Softek TDMF Module Version Level Display on page *184*, however, it is possible to have more than one load library.

Softek TDMF Module Version Level Display Based on COMMDS

```
                              Module Version Level Display    Row 1 to 14 of 5

ComDataSet : TDMS1.V360H.SYSCOM

 ------------------------------------------------------------------------------


                                  Version 3.6.0

                Report Date and Time  : 02/13/2003 19:03:08.57

               Comm DataSet (inactive):  TDMS1.V360.SYSCOM

            TDMFTERM level 29960 assembled on 2002-10-05 at 04.02 PT.
            TDMFTRAC level 28584 assembled on 2000-10-13 at 17.00 PT.
            TDMFRTNM level 29952 assembled on 2002-10-02 at 11.04 PT.
            TDMFMSGN level 29882 assembled on 2002-10-16 at 04.58 PT.
            TDMFCMSG level 29882 assembled on 2002-08-02 at 07.58 PT.
            TDMFRTNV level 29967 assembled on 2002-10-19 at 05.09 PT.

Command ===>
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

NOTE

The communications data set is listed as ‘inactive’. This panel is showing the modules from a completed migration session. If a current session is desired, change the data set name for that session. The communications data set selected will be listed as ‘active’.

Option U.7 - System Change Summary

This display shows which PTFs have been installed for the Softek TDMF system. The PTFs are identified by a fix number. In the following example, no PTFs have been applied; the Softek TDMF system is at base level.

Softek TDMF System Change Summary

```
                        System Change Summary Display    Row 1 to 10 of 10

Version 3.6.0

                        System Change Summary

            Report Date and Time : 04/12/2003 09:00:36.97



Base System released April 12, 2003
```

Option U.8 - Unit Control Block Display

This function displays all Unit Control Blocks (UCBs) that are in use by a Softek TDMF for z/OS session. Additionally, the total number of DASD UCBs addressable from an LPAR is listed. An example follows.

Softek TDMF Unit Control Blocks Display

```
                    Unit Control Blocks Display     Row 1 to 14 of 14


                      DASD Unit Control Block Display
Version 3.6.0
                           02/28/2003 14:38:49.79

  Volume TDMF03 UCB 8503 is being used by SOFTEK TDMF.
  Volume HOT812 UCB 8512 is being used by SOFTEK TDMF.
  Volume SPMS95 UCB 8794 is being used by SOFTEK TDMF.
  Volume SPMS94 UCB 8795 is being used by SOFTEK TDMF.

  Number of DASD UCBs  :     7,997

  To display data about a particular UCB
  Enter on the command line: LISTUCB xxx or xxxx


 Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

If more information is desired for a specific UCB, the command LISTUCB followed by the device address on the command line may be entered. This will display a copy of the UCB specified as shown below.

Softek TDMF LISTUCB Display

```
                      Unit Control Blocks Display     Row 1 to 17 of 27


                     DASD Unit Control Block Display
Version 3.6.0
 03/06/2003 04:32:51.54

  176970A0 0088CC84  22F80000  00000000  00E4C3C2  *.h.d.8.......UCB*
  UCBAREA  3030200F  00000000  00000500  E3C4D4C6  *............TDMF*
   (COPY)  F9F51000  00000000  00000000  00000000  *95..............*

  176970D0 00040040  00000000  00000000  0001167D  *... ............*
  UCBPAREA 289C0F11  E00020E0  BE707100  00000000  *.................*
   (COPY)  01080000  00000001  00000000  00F76E00  *.............7..*

  17697100 00000940  202A0000  00000000  00000000  *... ............*
  CMXTAREA 00000000  00FCCBEC  17697130  00000000  *.................*
   (COPY)  00000000  00000000  00000000  00000000  *.................*

  17697130 38788074  16C92FE0  00000000  020F9898  *.....I........qq*
  DCEAREA  D9000D0B  0D1A2424  15960000  05EB0000  *R........o......*
   (COPY)  00FCCEC0  9400F0E0  F8153400  00030000  *....m.0.8.......*
           00000000  00000000                      *........        *

  00FCCBEC C4C4E340  00000000  EF740000  00200000  *DDT .............*
  DDT      C9C5C3D3  010111F8  0100C7F0  0100AB28  *IECL...8..G0....*
           00000000  01014DA8  00FDAD68  972B0A78  *.......y....p...*
           010174C8  00000000  016C9210  C4C4D9C4  *...H......k.DDRD*
           8100AF10  40404040  01012FC0            *a...    ....    *




 Command ===>                                          Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Option U.9 - Communication Data Set Control Blocks

From this panel Softek TDMF control blocks may be displayed. Specific volumes may be selected from an active or completed session. The relative system number may also be specified so that control blocks for a specific volume may be viewed from either the Master or Agent system.

Softek TDMF COMMDS Control Block Display – Master System

```
                    ComDataSet Control Blocks Panel   Row 1 to 10 of 18

ComDataSet . . . . . TDMS1.V360.SYSCOM
Control Block  . . . TDMFMSE
Source Volume  . . . TDE972
System number  . . . 00

 ------------------------------------------------------------------------

ComDataSet is in use: TDMS1.V360B.SYSCOM

DISP                    HEX DUMP                      CHAR DATA
0000   E3C4D4C6   D4E2C514   E3C4D4F1   F0F00000   :TDMFMSE.TDM100  :
0010   B6A2AD32   C6D40300   B6A2AD32   BBB7EE01   :¶sÝ.FM. ¶sÝ.]¼Ó.:
0020   00000052   0BF764F5   000003B1   00083D60   :   ê.7À5  .£ ..-:
0030   000802C8   00000BB8   00008000   15DCD000   : ..H  .½  Ø .ü} :
0040   3703E000   0000E406   0000E401   00000000   :..\   U.  U.    :
0050   00080008   00016000   15DB7000   32E7F000   : . . .- .ûø .X0 :
0060   0000E404   0000E401   00000000   00160016   :  U.  U.     . .:

Command ===>                                            Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

In the above example the Softek TDMF Master System Entry (TDMFMSE) control block is displayed for relative system number 00 (TDM1) which is the Master system. In the following example the TDMFMSE control block is displayed for relative system number 01 (TDM2) which is an Agent system.

Softek TDMF COMMDS Control Block Display – Agent System

```
                  ComDataSet Control Blocks Panel   Row 1 to 10 of 17

ComDataSet . . . . . TDMS1.V360.SYSCOM
Control Block  . . . TDMFMSE
Source Volume  . . . TDE972
System number  . . . 01

 ------------------------------------------------------------------------

ComDataSet is in use: TDMS1.V360H.SYSCOM

DISP                    HEX DUMP                        CHAR DATA
0000   E3C4D4C6   D4E2C514   E3C4D4F2   F0F10001   :TDMFMSE.TDM201 .:
0010   B6A2AD16   66956000   B6A2AD16   66956000   :¶sÝ.Ãn- ¶sÝ.Ãn- :
0020   00000001   3CB52A07   00000377   00015F90   :   ..§..  .Ï .¬°:
0030   00015F90   00000BB8   00008000   16514000   : .¬°  .½  Ø .é  :
0040   4DDEB000   0000E406   0000E401   00000000   :(ú^   U.  U.    :
0050   00080008   00016000   164FE000   4DDBD000   : . . .- .|\ (û} :
0060   0000E404   0000E401   00000000   00160016   :  U.  U.     . .:
Command ===>                                            Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Option U.10 - Communication Data Set Navigator

Using this function allows the user to step through the communications data set by entering either the TTRZ or CCHR value and pressing enter. This function works with either active or completed sessions.

Softek TDMF COMMDS Navigator Display

```
                          ComDataSet Navigator Panel     Row 1 to 11 of 28

ComDataSet: . . TDMS1.V360.SYSCOM
TTRZ: . . . . . 00000300
CCHR: . . . . . 0003

 ------------------------------------------------------------------------


ComDataSet is in use: TDMS1.V360D.SYSCOM

DISP                    HEX DUMP                        CHAR DATA
0000   E3C4D4C6   D4E2E540   E3C4C5F9   F7F2E3C4   :TDMFMSV TDE972TD:
0010   C5F9F7F3   40404040   40400F01   29000BB8   :E973      ... .½:
0020   0000D0B0   00000000   FFFFFFFF   01FFFFFF   :  }^    ........:
0030   01FFFFFF   01FFFFFF   01FFFFFF   FFFFFFFF   :................:
0040   FFFFFFFF   FFFFFFFF   00000401   92541CD6   :........  ..kè.O:
0050   000000AC   85CA7127   00000000   00000000   :   Ðe-É.         :
0070   00000000   00000000   00000000   3C535CFC   :            .ë.Ü:
0080   00000000   00000000   000008D4   F8C00000   :          .M8{  :
Command ===>                                            Scroll ===> CSR
 F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
 F9=Swap     F12=Cancel
```

Option U.11 - Communication Data Set Volume Refresh Bit Maps

This function is not intended for an active COMMDS. It will possibly display the following different types of bit maps for each volume in the session, depending on the type of situations encountered within the session.

- The Miscellaneous Refresh bit map will show locations where compare errors may have occurred.
- The Cumulative Refresh bit map will indicate those cylinders and tracks that have been updated during the migration session by customer application I/O operations. The number of times a specific track or cylinder is not indicated.
- The FastCopy Refresh bit map will indicate those cylinders and tracks that have been identified as having data and will be copied if the FastCopy option has been specified for this session.
- The Target Empty Tracks bit map shows those cylinder and tracks that are empty (have no data allocated on them).
- ECAM/DDSR Space Release bit map will indicate those cylinders and tracks that have been released during a session and should no longer be copied to the target volume.

The following example will show where one volume had no entries for both the Miscellaneous Refresh bit map and the Cumulative Refresh bit map and another volume where the Cumulative Refresh bit map has entries.

Softek TDMF COMMDS Volume Refresh Bit Map Display

```
                        Display Refresh Bit Maps   Row 1 to 14 of 2,221

ComDataSet: . . TDMS1.V360.SYSCOM

 ------------------------------------------------------------------------

                Transparent Data Migration Facility
                           Version 3.6.0


Report Date and Time  : 02/12/2003 13:00:07.22

Communication DataSet : TDMS1.V360.SYSCOM
              Created   02/05/2003 08:24:09.19

-------------------------------------------------------------------------


Miscellaneous Refresh Bit Map for volume SPMS84 for SMFID TDM1

All bit map locations were zero for this volume

-------------------------------------------------------------------------

Cumulative Refresh Bit Map for volume SPMS84 for SMFID TDM1

All bit map locations were zero for this volume


-------------------------------------------------------------------------

Miscellaneous Refresh Bit Map for volume TD9C2J for SMFID TDM1

All bit map locations were zero for this volume

-------------------------------------------------------------------------
Cumulative Refresh Bit Map for volume TD9C2J for SMFID TDM1

Cylinder :        0 (x'00000000')
  Tracks :        5, 6, 7, 8, 9

Cylinder :       34 (x'00000022')
  Tracks :        0

Cylinder :      103 (x'00000067')
  Tracks :        1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14
```

```
 Cylinder :      104 (x'00000068')
   Tracks :        0, 1, 2, 3

 Cylinder :      200 (x'000000C8')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      500 (x'000001F4')
   Tracks :        2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Option U.12 - Communication Data Set Merged System Messages

This function will display messages in date time sequence. By pressing PF10 a date time filter may be specified; PF11 will deactivate the filter. This option will also display the External Time Reference (ETR) status for a complex.

Softek TDMF COMMDS Merged System Messages Display

```
                        Past Session Merged Messages     Row 1 to 5 of 62

 Communication Data Set : TDMS1.V360.SYSCOM

  ------------------------------------------------------------------------

 Transparent Data Migration Facility Version 3.6.0     Completed Migration


 28/02/2003 10:07:46.960815 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1731I The I/O Monitor module was found in Dynamic LPA.

 28/02/2003 10:07:47.268883 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1448I The Time-of-Day System Default Option is GMT.

 28/02/2003 10:07:47.268885 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1451I The TOD Option has been overridden by the OPTIONS
                  statement and set to LOCAL.
 28/02/2003 10:07:47.268888 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1453I The Pacing System Option was specified as OFF.


 28/02/2003 10:07:47.268890 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1455I Pacing has been changed to ON by the OPTIONS
                     statement in TDMF job stream.
 28/02/2003 10:07:47.268892 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1465I The Operator Messages Option was specified as OFF.

 28/02/2003 10:07:47.268894 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1466I The Operator Messages Option has been changed to ON.

 28/02/2003 10:07:47.313190 SMFID = TDM1 TOD synchronized on ETR ID 09
            TDM1380I The application program interface (API) for STK is
                     not available.
 28/02/2002 10:07:47.506132 SMFID = TDM1 Volume Serial Number = TD6005
            TDM1177I The source volume TD6005 is mounted on device 3005 on
                     this system.
 28/02/2002 10:07:47.506136 SMFID = TDM1 Volume Serial Number = TD6005
            TDM1182I At TDMF initialization, the source volume has caching
                    (CFW) activated.
Command ===>                                              Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap      F10=A_Filter F11=D_Filter F12=Cancel
```

Option U.13 - Detected Source Volume I/O Errors

While Softek TDMF is copying a volume, it checks the CCHH value of each track and cylinder that it is reading and writing. If the CCHH value does not match the location as specified by the Count Key Data protocol, Softek TDMF will stop the volume migration at that point and scan the remainder of the volume for any other potential error situations. When this occurs it could be due to an Invalid Count Field in which message TDM3540E will be issued or a physical I/O error on the source volume exists in which message TDM3536E will be issued. In either case Softek TDMF will not migrate the volume until these errors are corrected (see *Invalid Count Fields* on page *81* for corrective procedures).

This function displays those locations where an error situation exists for each volume within a session.

NOTE

This function is not active when a COMMDS is in use.

Softek TDMF COMMDS Source Volume I/O Error Display

```
                    Display Source Volume I/O Errors    Row 1 to 14 of 2,038

 ComDataSet: . . TDMS1.V360.SYSCOM

  ------------------------------------------------------------------------

Version 3.6.0

 Report Date and Time  ; 02/05/2002 12:53:08.96

 Communication DataSet : TDMS1.V360.SYSCOM
               Created   02/05/2003 08:24:09.19

 ------------------------------------------------------------------------

 Detected I/O Error locations for volume SPMS84 for SMFID TDM1

 No errors detected on this volume

 ------------------------------------------------------------------------

 Detected Invalid Count locations for volume SPMS84 for SMFID TDM1

 Cylinder :      137 (x'00000089')
   Tracks :        2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      138 (x'0000008A')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      139 (x'0000008B')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      140 (x'0000008C')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      141 (x'0000008D')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

 Cylinder :      242 (x'000000F2')
   Tracks :        0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

Command ===>                                          Scroll ===> CSR
  F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back      F8=Forward
  F9=Swap     F12=Cancel
```

Option H - Softek TDMF Help and Message Detail Facility

This selection brings up a panel that will display detailed information for Softek TDMF messages, support information, an overview of the Softek TDMF TSO Monitor line commands available and a brief introduction to Softek TDMF and the process necessary to start a session. An example follows.

Softek TDMF Help Selection Panel

```
                              Help Selection

Help Selection:
__   1.  Display Message Details
     2.  Introduction
     3.  Support Information
     4.  Monitor Line Commands

Command ===>
 F1=Help     F2=Split    F3=Exit     F9=Swap    F12=Cancel
```

Option H.1 - Display TDMF Message Details

This function contains all Softek TDMF messages within the system. These messages provide a more detailed explanation that what is displayed in the Softek TDMF TSO Monitor or in the output listing.

NOTE

These messages are also available via program product BookManager Read if installed.

Softek TDMF Message Display

```
                              Message Display


Within the message text there may be special string variables
that will be replaced when the message is generated.
_____________________________________________________________

Message Number:  ____




Command ===>                                          Scroll ===> CSR
 F1=Help       F2=Split      F3=Exit       F5=Rfind      F7=Back       F8=Forward
 F9=Swap      F12=Cancel
```

To search for a message use the 4-digit value within the message, for example TDM1447W would be searched as 1447 as shown below.

Softek TDMF Message Display Example

```
                              Message Display          Row 1 to 16 of 16


Within the message text there may be special string variables
that will be replaced when the message is generated.
_____________________________________________________________

Message Number:  1447

TDM1447W
Message Text:
The devices involved contain a different number of alternate cylinders.

Explanation:
At SOFTEK TDMF initialization, the source volume is being swapped to a
device that contains a different number of alternate cylinders.

This warning indication can be suppressed by using the NOWARNING(1447)
option on the SESSION control statement.

User Response:
The execution of ICKDSF REFORMAT VTOC may be required after the
completion of the migration.

See the TDMF Installation and Reference manual for more details.

System Action:
TDMF continues normally.
```

The last character in a Softek TDMF message indicates the severity of the message.

Softek TDMF Message Severity Table

Character	Return Code	Description
A		Action message – WTO/WTOR option selected; requires a response from the MVS console or the Softek TDMF TSO monitor.
I	0000	Informational message – all volume migrations successful; no action required.
W	0004	Warning message – all volume migrations successful; one or more warning messages was issued; an action may be required.
E	0008	Error message – a volume migration did not complete successfully; a corrective action may be necessary.
S	0012	Severe error – the session did not start or complete successfully; a corrective action must be taken.

Softek TDMF will display the highest return code for a session in the output listing. For example, a five-volume session is started and one volume pairing fails; the return code will be 0008.

Option H.2 - Introduction to Softek TDMF

This selection provides a brief overview of Softek TDMF and how it works. It also provides a quick reference list of what is necessary to create, execute and monitor a session.

Softek TDMF Introduction

```
 Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
 BROWSE    TDMS1.TDM360.TDMMLIB(INTRO)               Line 00000000 Col 001 080

                              Softek TDMF

TDMF is a software based "volume" level asynchronous disk to disk
data migration solution capable of performing non-disruptive "swap"
migrations and "point in time" backups across multi-vendor DASD
platforms.

It is a requirement that the input to the migration process (the
SOURCE) be the same geometry and size as the output (the TARGET).
However, the SOURCE and TARGET may be of different vendors or different
channel configurations.

Several phases are traversed during the migration process.  If all
phases complete without internally detected errors, then the TARGET
volume becomes, effectively, the SOURCE volume.  This is done via an
IOS Swap mechanism.
The system on which the migration/swap work is done is referred to
as the 'MASTER' system.  The system which may access the SOURCE volume
during the migration is called the AGENT.  There can be 1 to 31
AGENTS in a migration.  There must be no activity on the TARGET volume
from any of the MASTER or AGENT systems.

Sample JCL is available in libraries TDMSLIB (which may be accessed
using Option 0 under the TDMF Action Selection Panel), SAMPLIB, or
may be independently created in another library.

To setup for a migration, the following steps are followed:

1.  Define the Installation defaults using SYSOPTN batch job.
    Note: Selected defaults may be overridden for specific
          migration sessions in job MASTER.

2.  Allocate a Comm Dataset.  See job ALLOCCM for an example.  Catalog
    the Comm Dataset on each system that will be involved in the
    migration session.

3.  Set up the job for the Master System using job MASTER
    as a guide.
```

```
4.  Set up the job(s) for the Agent system(s) using job AGENT
    as a guide.

5.  Submit the MASTER batch job on the Master System.
    Note: Steps 5 and 6 may be reversed.

6.  Submit the AGENT batch job(s) on the Agent System(s).
    Note: Steps 5 and 6 may be reversed.

Migration status during and after processing can be obtained
from the Monitor menu system.
 Command ===>                                                Scroll ===> CSR
  F1=Help    F3=Exit    F5=Rfind  F12=Cancel
```

Option H.3 - Support Information

This function provides information of where to call and what information will be necessary in order to provide technical support in case of questions or problems. An example follows.

Softek TDMF Support Information

```
 Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
 BROWSE    TDMS1.TDM360.TDMMLIB(SUPPORT) - 01.00      Line 00000000 Col 001 080
******************************** Top of Data ********************************

                      Softek Support Panel

             Softek Global Support Center (world-wide)
                    800 66SOFTEK (763835)

 Contact Softek Support when in need of
        - Access Control Functions
        - Problem determination
        - Questions

 A variety of information is available on the Softek
 TDMF, Mainframe Support Web Page:
 www.softek.com/en/support/tdmf/zos/


In order to provide responsive support, please have the following
 information ready:

        - Company name
        - Site number
        - Site location
        - Contact name and phone number

 Access to the Communications Data Set (COMMDS) via the TDMF Monitor
 is also recommended as well as access to the job listings from each
 system and/or migration session.

******************************** Bottom of Data ********************************
Command ===>                                                  Scroll ===> CSR
 F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Option H.4 - Monitor Line Commands

The Softek TDMF TSO Monitor does not support the standard ISPF commands on most screen displays. This selection discusses the line commands that the Softek TDMF for
Softek TDMF TSO Monitor does support and how they may be different from stand ISPF commands.

Softek TDMF Monitor Line Commands

```
 Menu  Utilities  Compilers  Help
 ------------------------------------------------------------------------------
 BROWSE    TDMS1.TDM360.TDMMLIB(MONITORC)             Line 00000000 Col 001 080
******************************** Top of Data ********************************

                        Monitor Line Commands

    Most screens presented by the monitor will not perform the
    normal ISPF commands.  Detailed below is the line commands that
    the Monitor does support and the differences in their action.

    Monitor functions that invoke the ISPF "browse" support all
    ISPF line commands normally.

    Monitor functions that build panel display support the
    following commands as described.


FIND
    Enter FIND followed by your search argument(s).  Unlike ISPF, the
    TDMF FIND doesn't require a ' (hex '7d') if the user wished to
    specify more than one word.  Both of the following FINDs are valid.

    FIND copy
    FIND average seek time

    Both the FIND argument and data are translated to uppercase
    prior to the comparison.  The line containing the match will be
    the first line displayed.

    FIND supports no parameters (ie: PREVIOUS).


  RFIND (set to PF5).
    Entering RFIND as a line command will give the ISPF message
    "RFIND not active".  The ISPF RFIND command is NOT passed to the
    TDMF monitor.  The monitor simulates this function by entering
    FIND with no search argument.  Depressing PF5 will present a
    FIND command with no search argument.  When used, the first line
    searched is the 2nd line on the display.  Once at the bottom of the
  data, the next PF5 will cause the search to wrap to the top.

  PRINT
    PRINT is a ISPF command and will only print the current physical
    screen.

  TDMFPRT (P is the short command)
    Unlike ISPF, TDMFPRT will print all the lines contained in that
    panel to ISPF's print dataset.  Each invocation of TDMFPRT starts
    on a new page.

 Command ===>                                                Scroll ===> CSR
  F1=Help    F2=Split   F3=Exit    F5=Rfind   F7=Up      F8=Down    F9=Swap
 F10=Left   F11=Right  F12=Cancel
```

Appendix A

DASD Space Requirements

DASD Space Requirements

The following table gives all space requirements (3390) for the Softek TDMF files.

DASD Space Requirements

Data Set Name	DSORG	RECFM	LRECL	BLKSIZE	DIRBLKS	SPACE
HLQ.TDM360.ATDMEXEC	PO	FB	80	6160	1	1 trk
HLQ.TDM360.ATDMLLIB	PO	U	0	6144	20	5 cyl
HLQ.TDM360.ATDMMLIB	PO	FB	80	6160	2	1 cyl
HLQ.TDM360.ATDMPLIB	PO	FB	80	6160	20	1 cyl
HLQ.TDM360.ATDMSLIB	PO	FB	80	6160	5	1 cyl
HLQ.TDM360.ATDMTLIB	PO	FB	80	6160	1	1 trk
HLQ.TDM360.TDMEXEC	PO	FB	80	6160	1	2 trk
HLQ.TDM360.TDMLLIB	PO	U	0	6144	20	5 cyl
HLQ.TDM360.TDMMLIB	PO	FB	80	6160	2	1 cyl
HLQ.TDM360.TDMPLIB	PO	FB	80	6160	20	1 cyl
HLQ.TDM360.TDMSLIB	PO	FB	80	6160	5	1 cyl
HLQ.TDM360.TDMTLIB	PO	FB	80	6160	1	1 trk
HLQ.ML145133.BOOK	PS	FBS	4096	4096	0	10 cyl
HLQ.ML145133.PDF	PS	VB	260	6160	0	3 cyl
HLQ.ML145133.PDF.A4	PS	VB	260	6160	0	3 cyl
HLQ.ML145134.BOOK	PS	FBS	4096	4096	0	5 cyl
HLQ.ML145134.HTML	PS	VB	260	6160	0	2 cyl
HLQ.ML145134.PDF	PS	VB	260	6160	0	1 cyl
HLQ.ML145134.PDF.A4	PS	VB	260	6160	0	1 cyl

Appendix B

Determining CPU Serial Number

Determining CPU Serial Number

In order to determine the serial number of a specific mainframe, authorization to issue MVS commands will be necessary. The command can be issued from the operator console or via a product like System Display and Search Facility (SDSF).

Issue the MVS command Display Matrix for CPU. The command syntax is:

```
D M = CPU
```

The operating system will issue a Store CPU ID (STIDP) instruction which returns a double word (8 bytes; 16 digits) of information. The format of this information is as follows:

Deciphering D M=CPU Output

00	an	xxxx	mmmm	0000
0 1	2 3	4 7	8 11	12 15
Version Code	Logical Partition Identifier (LPID)	CPU Serial Number	CPU Model Number	zeros

The operating system will display the following information:

```
RESPONSE=MVS1
IEE174I 13.48.57 DISPLAY M 803
PROCESSOR STATUS
ID  CPU                 SERIAL
0    +                  4055525995
2    +                  6055525995

CPC ND = 05995A.140.AMH.05.000000050686
+ ONLINE    - OFFLINE    . DOES NOT EXIST
 CPC ND  CENTRAL PROCESSING COMPLEX NODE DESCRIPTOR
```

The serial number displayed is 4055525995. Using the above chart the CPU serial number maps out to the following:

Version Code is not displayed

40 is the LPID

5552 is the CPU serial number

5995 is the CPU model type

Zeros are not displayed

For more information on the Store CPU ID instruction, refer to the *ESA/390 Principles of Operations (SA22-7201)*.

Appendix C

Authorization Return Codes

Authority Checking

The following documents all possible return codes and their meaning from authority checking.

Softek TDMF Authority Checking Return Codes

Return Code	Description	Reason
00 (00)	Passed authority checking with license key.	Normal return code. Authorization is good.
04 (04)	Passed authority checking with a Trial Express key.	Normal return code. Authorization is good. Limited to Trial Feature.
08 (08)	Failed authority checking.	CPU is not defined to Softek TDMF. Verify that CPU is authorized to run Softek TDMF.
28 (1C)	Failed authority checking.	Softek TDMF feature has expired. Verify that key is correct, check expiration date of key, or that key was installed within 5 days of issuance.
64 (40)	Program check	Verify input statements. Contact the Softek Global Support Center.
516 (204)	Error loading TDMFUKEY	Verify that correct library is pointed to.
520 (208)	Error locating CPU PCCA	Re-run job. Contact the Softek Global Support Center.
524 (20C)	Error in caller identification	Verify input statements. Contact the Softek Global Support Center.
528 (210)	Error in date conversion	Verify that Express statement and key is correct. Re-run failing batch job or contact the Softek Global Support Center.
532 (214)	Error with Enterprise key	Verify that key is correct or check expiration date of key.
536 (218)	Error with Basic Express key	Verify that key is correct and the expiration date of key.
544 (220)	Error with Express key	Verify that key is correct and the expiration date of key.
548 (224)	Error with Vendor key	Verify that key is correct and that DASD subsystem ID is valid
540 (21C)	Error with Trial Express key	Verify that key is correct or check expiration date of key.
552 (228)	Error with TDMF version definition	Verify that the proper Softek TDMF version is specified.

Softek TDMF Authority Checking Return Codes

Return Code	Description	Reason
556 (22C)	Program error	Verify input statements. Contact the Softek Global Support Center.
4096 (1000)	No valid keys detected	Un-initialized keys data set. Run SYSOPTN batch job

Reading/Writing the Softek TDMF Security Record

The following documents all possible return codes and their meaning from the program for reading/writing the Softek TDMF security record.

Softek TDMF Security Record Return Codes

Return Code	Description	Reason
00 (00)	Successful	Normal return code. Authorization is good.
200 (C8)	BLDL error	Missing SECCOM DD statement or data set does not exist or is misspelled.
204 (CC)	BLDL list in error	TDMFKEYS load module has multiple text records or the format is invalid. Contact the Softek Global Support Center.
208 (D0)	TTR conversion error	Verify that JCL is correct. Contact the Softek Global Support Center.
212 (D4)	Unsuccessful I/O operation (read)	The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/MVS documentation. Contact the Softek Global Support Center.
216 (D8)	Unsuccessful I/O operation (write)	The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/MVS documentation. Contact the Softek Global Support Center.
220 (DC)	GETMAIN error	Unable to allocate required storage. Re-run job.
224 (E0)	RDJFCB error	Data set does not exist or misspelled

Softek TDMF Security Record Return Codes

Return Code	Description	Reason
228 (E4)	Bad Buffer address	Verify that JCL is correct. Contact the Softek Global Support Center.
232 (E8)	Invalid Function code	Verify that JCL and input statements are correct. Contact the Softek Global Support Center.

Reading/Updating/Writing Softek TDMF - Express Feature Information

The following documents all possible return codes and their meaning from program for reading, updating or writing Softek TDMF - Express information.

Softek TDMF – Express Return Codes

Return Code	Description	Reason
00 (00)	Successful	Normal return code. Authorization is good.
300 (12C)	BLDL error	Missing SECCOM DD statement or data set does not exist or is misspelled
304 (130)	BLDL list in error	TDMFKEYS load module has multiple text records, or its format is invalid. Contact Softek Global Support Center.
308 (134)	TTR conversion error	Verify that JCL is correct. Contact Softek Global Support Center.
312 (138)	Unsuccessful I/O operation (read)	The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/MVS documentation. Contact Softek Global Support Center.
316 (13C)	Unsuccessful I/O operation (write)	The first eight bits of RC are copied from the ECB used for the EXCP request. Refer to description of IOBECBCC field in the DFSMS/MVS documentation. Contact Softek Global Support Center.
320 (140)	GETMAIN error	Unable to allocate required storage. Re-run job.

Softek TDMF – Express Return Codes

Return Code	Description	Reason
324 (144)	RDJFCB error	Data set does not exist or misspelled
328 (148)	Express information error	Verify that input statements are valid. Re-run job.

History File Recording

The following documents all possible return codes and their meaning from history file recording.

Softek TDMF History File Return Codes

Return Code	Description	Reason
00 (00)	Successful	Normal return code. Authorization is good.
400 (190)	History logging not installed	This option was not specified in the SYSOPTN batch job. If desired re-run the job with this option.
404 (194)	RACF authority checking failed	Update authority required for history data set. See *Security* on page *22*.
408 (198)	ESTAE recovery	Contact Softek Global Support Center.
412 (19C)	ENQ for History dataset failed	An attempt to acquire exclusive control of the History data set was not successful; if RC is 04, the program's 30-second time elapsed while waiting for the dataset to become available. This code is only returned to APF authorized callers, for others, the DYNALLOC SVC performs the ENQ and code 424 will be returned. Contact Softek Global Support Center.
416 (1A0)	RDJFCB error for the SYSCOM dataset.	TDMFLOGS completed in error. The reason code in bits 0-15 is the RC from the RDJFCB macro request. Evaluate the RC from RDJFCB and respond accordingly.
420 (1A4)	Parsing of dataset name failed	TDMFLOGS completed in error. Contact Softek Global Support Center.

Softek TDMF History File Return Codes

Return Code	Description	Reason
424 (1A8)	DYNALLOC error during allocation of dataset.	History dataset is in use by another job or TSO user. Evaluate the RC fro DYNALLOC and respond accordingly. Contact Softek Global Support Center.
428 (1AC)	RDJFCB error for History Logging data set	SECCOM data set does not exist or misspelled
432 (1B0)	Open of History Logging data set failed	Missing SECCOM DD statement or data set does not exist or is misspelled.
436 (1B4)	DYNALLOC error during de-allocation of dataset	Missing SECCOM DD statement or data set does not exist or is misspelled.
440 (1B8)	History Logging data set defined incorrectly	Incorrect allocation. See member HISTORY in SAMPLIB.
444 (1BC)	Invalid call	Contact Softek Global Support Center.
448 (1C0)	Error writing log entry	Contact Softek Global Support Center.

Appendix D

Messages for Automated Operations

Messages for Automated Operations

The following messages are intended for use with automated operations packages.

Messages for Automated Operations

Message Number	Text
TDM2411A	Confirmation requested, reply CANCEL, or volume <volser>.
Explanation	A reply is required prior to migration of this volume because this option was selected.
Action	Reply with the volume serial number located in the message or CANCEL if the migration of this volume is not to be allowed.
TDM2412A	Confirmation requested, reply CANCEL, or group <groupid>.
Explanation	A reply is required prior to migration of this group of volumes because this option was selected.
Action	Reply with the group name located in the message or CANCEL if the migration of this group is not to be allowed.
TDM2413A	Ready to synchronize, reply CANCEL, or volume <volser>.
Explanation	A reply is required prior to synchronization of this volume because this option was selected.
Action	Reply with the volume serial number located in the message or CANCEL if the migration of this volume is not to start synchronization.
TDM2414A	Ready to synchronize, reply CANCEL or group <groupid>.
Explanation	A reply is required prior to synchronization of this group of volumes this option was selected.
Action	Reply with the group name located in the message or CANCEL if the migration of this group is not to start synchronization.
TDM2415E	Migration is being terminated by request for volume <volser>.
Explanation	This volume migration is being terminated due to operator CANCEL reply to message TDM2411A, or via a request from the TDMF TSO monitor. Migration of this volume continues termination.
Action	None
TDM2416E	Migrations are being terminated by request for group <groupid>.
Explanation	This group of volume migrations is being terminated due to operator CANCEL reply to message TDM2412A, or via a request from the TDMF TSO Monitor. Migration of this volume group continues termination.
Action	None

Messages for Automated Operations *(Continued)*

Message Number	Text
TDM2419I	Migration initialization process starting for volume <source-volser>.
Explanation	This volume migration is being initialized. Migration of this volume continues.
Action	None
TDM2420I	Migration initialization process starting for group <groupid>.
Explanation	This group of volume migrations is being initialized. Migration of this group's volumes continues.
Action	None
TDM2421I	Swap Migration process completed successfully for volume <source-volser>.
Explanation	This volume migration is being completed successfully.
Action	None
TDM2422I	Swap Migration has completed successfully for group <groupid>.
Explanation	This group of volume's migrations has completed successfully.
Action	None
TDM2423I	Swap Migration was not completed successfully volume <source-volser>.
Explanation	This volume migration was not completed successfully.
Action	Error messages issued; review output.
TDM2424I	Swap Migration not completed successfully for group <groupid>.
Explanation	This group of volume's migrations has not completed successfully due to errors.
Action	Error messages issued; review output.
TDM2579A	Allow swap to non-PPRC requested, reply CANCEL, or volume <volser>.
Explanation	Confirmation is required for the migration of a PPRC primary volume to a device, which does not seem to have a remote mirroring function active.
Action	Reply with the volume serial number located in the message or CANCEL if the migration of this volume is not to be allowed.
TDM2580I	PPRC to non-PPRC confirmation received from console <consoleid>.
Explanation	This volume's migration confirmation was received from the console indicated.

Messages for Automated Operations *(Continued)*

Message Number	Text
Action	None
TDM2666E	Volume <source-volser> in group <groupid> has been terminated.
Explanation	During a TDMF migration, a volume has been prematurely terminated due to an error. The group has option terminate group on error off and auto-ops on.
Action	Volume may be re-submitted in another group if necessary.

Appendix E

Determining DASD Subsystem Serial Number

Determining DASD Subsystem Serial Number

In order to determine the serial number of a specific DASD subsystem, authorization to issue MVS commands will be necessary. The command can be issued from the operator console or via a product like System Display and Search Facility (SDSF).

The DEVSERV QDASD command can be issued against a volume to determine the serial number of a subsystem. The following is an example of the command and response:

```
DS QDASD,0A90,RCD,1

IEE459I 14.51.17 DEVSERV QDASD 338
UNIT VOLSER SCUTYPE DEVTYPE   CYL  SSID SCU-SERIAL DEV-SERIAL EF-CHK
0A90 SPMS90 3990Q03 3390A2F  2226  0088 XXF1-30896 XXF1-00000 **OK**
  READ CONFIGURATION DATA
D40101004040F3F3 F9F0C1F2C6C1D4C8 C6F1F0F0F0F0F0F0 F0F0F0F0F0F00010
D40000004040F3F3 F9F0C1E7C6C1D4C8 C6F1F0F0F0F0F0F0 F0F0F0F0F0F00000
D40200004040F3F9 F9F0D8F0F3C1D4C8 C6F1F0F0F0F0F0F9 F0F3F0F8F9F60000
F00000014040F3F9 F9F0F0F0F0C1D4C8 C1F9F0F0F0F0F0F9 F0F3F0F8F9F60000
0000000000000000 0000000000000000 0000000000000000 0000000000000000
0000000000000000 0000000000000000 0000000000000000 0000000000000000
0000000000000000 0000000000000000 0000000000000000 0000000000000000
8000008000000000 0088C09010000000 0000000000000000 0000000000000000
****      1 DEVICE(S) MET THE SELECTION CRITERIA
****     0 DEVICE(S) FAILED EXTENDED FUNCTION CHECKING
```

The bold and underscored area is the serial number of the subsystem.

For more information on this, please see the *IBM 3990/9390 Storage Control Reference (GA32-0274)*, Read Characteristics Data.

For those customers whose operating systems do not support this command, please refer to *Chapter 6: Batch Utilities*. This batch program will provide the same information as the DEVSERV QDASD command.

Appendix F

REXX Execs

TDMF REXX Exec

Softek TDMF REXX Exec

```
/* REXX */

/************************************/
/***                              ***/
/*** TDMF REXX exec for TDMF 3.6.0 ***/
/***                              ***/
/*** All use variables and defined ***/
/*** in this REXX                 ***/
/***                              ***/
/************************************/

/* Get the user's high level qualifier */
parse upper arg hlq


if hlq = "" then
   hlq = "hlq.TDM360"

Upper hlq

/* Define the dataset and variables for TDMF LOAD LIBRARY
*/
address ISPEXEC "LIBDEF ISPLLIB DATASET
ID('"hlq".TDMLLIB')"
megtb  = "'"hlq".TDMLLIB'"



/* Define the dataset where the security key resides.
   May be defined to reside in the TDMF load library (def-
inition above)
   or a different library with like attributes.  If the
security
   record is contained in the load library, a definition
  is still required.                                      */


/* Define the SECURITY RECORD                            */
/* secty  = "'"hlq".TDMLLIB'"   */
secty  = "'"hlq".TDMLLIB'"
```

Softek TDMF REXX Exec

```
/* Define the dataset and variables for TDMF MESSAGE LIBRARY
*/
address ISPEXEC "LIBDEF ISPMLIB DATASET
ID('"hlq".TDMMLIB')"
msgtb  = "'"hlq".TDMMLIB(TDMFMSG)'"
intro  = "'"hlq".TDMMLIB(INTRO)'"
suptf  = "'"hlq".TDMMLIB(SUPPORT)'"
moncmd = "'"hlq".TDMMLIB(MONITORC)'"



/* Define the dataset TDMF PANEL LIBRARY
*/
address ISPEXEC "LIBDEF ISPPLIB DATASET
ID('"hlq".TDMPLIB')"


/* Define the dataset and variable for TDMF SKELETON LIBRARY
*/
address ISPEXEC "LIBDEF ISPTLIB DATASET
ID('"hlq".TDMSLIB')"
wrkfl  = "'"hlq".TDMSLIB'"

/* Define the dataset TDMF TABLE INPUT LIBRARY
*/
address ISPEXEC "LIBDEF ISPTLIB DATASET
ID('"hlq".TDMTLIB')"



/* Start the main REXX and pass the user's parame-
ters           */
address TSO "ALTLIB ACTIVATE APPLICATION(EXEC)",
 "DATASET('"hlq".TDMEXEC') UNCOND"
address ISPEXEC
 "SELECT CMD(%TDMFMON "wrkfl"
                      "msgtb"
                      "megtb"
                      "intro"
                      "suptf"
                      "moncmd"
                      "secty" ) NEWAPPL(TDM) PASSLIB"
```

Softek TDMF REXX Exec

```
address TSO "ALTLIB DEACTIVATE APPLICATION(EXEC)"

address ISPEXEC "LIBDEF ISPMLIB"
address ISPEXEC "LIBDEF ISPLLIB"
address ISPEXEC "LIBDEF ISPTLIB"
address ISPEXEC "LIBDEF ISPPLIB"
address ISPEXEC "LIBDEF SECCOM"

exit 0
```

Appendix G

Session Examples

Loading Softek TDMF Keys

SYSOPTN is located in SAMPLIB. The same member is contained in TDMSLIB for use within the Softek TDMF TSO Monitor. Either member may be used. For information regarding the different types of keys, please refer to *Preparing to execute Softek TDMF* on page *27*. Before keys may be loaded, an email from Softek with the proper keys should be in receipt. The proper format for each type of key is provided within that email.

NOTE

Comments have been removed in all examples.

Full Function Keys

The following example shows how to load Softek TDMF Full Function Base keys. The fields are filled in as an example and will not work in the customer's environment. Refer to *Maintenance Overview* on page *22* and *Softek TDMF System Defaults and Options* on page *44* for more information.

```
JOBCARD
//SYSOPTN  EXEC PGM=TDMFLKEY,PARM='NEW'
//*YSOPTN  EXEC PGM=TDMFLKEY,PARM='UPDATE'
//STEPLIB  DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSIN    DD   *
*
TDMF VERSION 3
*
TDMF FUNCTION BASE
KEYnn=87F455AD7398437C Description = Sample key

CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SITE NUMBER = 99999
*
SYSCOM HISTORY DATASET NAME =
*
VOLUME SECURITY = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = NO
*
AUTOMATIC ICKDSF = NO
*
CHECK TARGET EMPTY = NO
*
ACTIVE IN COPY = NO
*
UNIDENTIFIED SYSTEMS ACTION = WARN
*
WTO AUTO OPERATION MVS ROUTCDE = (2,4,6,11)
*
SMF RECORD ID = 0
*
```

```
DISPLAY TIME AS = LOCAL
*
VOLUME PACING REQUIRED = YES
*
ALLOW INVALID COUNT FIELDS = NO
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
REVERSE PACING = NO
*
Monitor XRC SESSIONS = NO
*
//
```

Express Keys

The Softek TDMF – Express Offering keys have a specific number of volume migrations allowed as well as an expiration date. Only one key is issued for one Master CPU; Agent CPUs are automatically authorized. This job must be executed on the CPU the key is issued for. The fields have been filled in as an example and will not work in the customer's environment. Please refer to *Maintenance Overview* on page *22*.

```
JOBCARD
//SYSOPTN  EXEC PGM=TDMFLKEY,PARM='NEW'
//*YSOPTN  EXEC PGM=TDMFLKEY,PARM='UPDATE'
//STEPLIB  DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSIN    DD   *
*
TDMF VERSION 3
*
TDMF EXPRESS VOLUMES = 001024 EXPIRES = 12/19/2003
KEY01=87F455AD7E98437C Description = Sample key
*
CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SITE NUMBER = 99999
*
SYSCOM HISTORY DATASET NAME =
*
VOLUME SECURITY = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = NO
*
AUTOMATIC ICKDSF = NO
*
CHECK TARGET EMPTY = NO
*
ACTIVE IN COPY = NO
*
```

```
UNIDENTIFIED SYSTEMS ACTION = WARN
*
WTO AUTO OPERATION MVS ROUTCDE = (2,4,6,11)
*
SMF RECORD ID = 0
*
DISPLAY TIME AS = LOCAL
*
VOLUME PACING REQUIRED = YES
*
ALLOW INVALID COUNT FIELDS = NO
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
REVERSE PACING = NO
*
Monitor XRC SESSIONS = NO
*
//
```

Trial Express Keys

The Softek TDMF – Trial Express keys have a specific number of volume migrations allowed as well as an expiration date. Only one key is issued for one Master CPU; Agent CPUs are automatically authorized. This job must be executed on the CPU the key is issued for. The fields have been filled in as an example and will not work in the customer's environment. Refer to *Maintenance Overview* on page *22*.

```
JOBCARD
//SYSOPTN  EXEC PGM=TDMFLKEY,PARM='NEW'
//*YSOPTN  EXEC PGM=TDMFLKEY,PARM='UPDATE'
//STEPLIB  DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD   DSN=hlq.TDM360.TDMLLIB,DISP=SHR
//SYSPRINT DD   SYSOUT=*
//SYSUDUMP DD   SYSOUT=*
//SYSIN    DD   *
*
TDMF VERSION 3
*
TRIAL EXPRESS VOLUMES = 000016 EXPIRES = 12/19/2003
KEY01=87F455AD7E98437C Description = Sample key
*
CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SITE NUMBER = 99999
*
SYSCOM HISTORY DATASET NAME =
*
VOLUME SECURITY = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = NO
*
```

```
AUTOMATIC ICKDSF = NO
*
CHECK TARGET EMPTY = NO
*
ACTIVE IN COPY = NO
*
UNIDENTIFIED SYSTEMS ACTION = WARN
*
WTO AUTO OPERATION MVS ROUTCDE = (2,4,6,11)
*
SMF RECORD ID = 0
*
DISPLAY TIME AS = LOCAL
*
VOLUME PACING REQUIRED = YES
*
ALLOW INVALID COUNT FIELDS = NO
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
REVERSE PACING = NO
*
Monitor XRC SESSIONS = NO
*
//
```

Creating the Communications Data Set

In order to create the Communications Data Set (COMMDS), member ALLOCCM is necessary which, is located in SAMPLIB. The same member is contained in TDMSLIB for use within the Softek TDMF TSO Monitor. Either member may be used.

NOTE

The communication dataset must be on a cylinder boundary with contiguous space. It must reside on a device that supports CKD/E.

NOTE

Softek TDMF may attempt to exploit the Parallel Access Volume (PAV) and/or Cache Fast Write (CFW) features if available for the Communications Dataset device. This processing comes into effect for Agent systems if the device supports PAV and there are at least 11 volumes in a session. For the Master system, the trigger for PAV/CFW utilization is more complicated and involves both the number of volumes and the number of Agent systems. For a large migration session, therefore, a performance improvement can be expected if the Communications Dataset is allocated on a device that supports both PAV and CFW.

Formula for Determining Data Set Size

The size (number of required cylinders) of the COMMDS is determined by the following formula:
CYLS = V * (S + K)
Where:

V = the number of volumes, where

64 volumes = 2.5

128 volumes = 5.0

256 volumes = 7.5

512 volumes = 10.0

S = the number of participating systems

K = is the size of the source volumes involved

3390-3 K = 4

3390-9 K = 6

3390-27 K = 15

For example: 128 3390-3 and 128 3390-9 volumes across 8 LPARs, using largest device type in session and therefore setting K = 15,

CYLS = 7.5 * (8 + 6) (always use the largest device type in session)

CYLS = 7.5 * 14

CYLS = 105 < -- round down if required

This procedure is discussed in *Post-Installation Tailoring* on page *24* in *Step 4 on page 25*.

```
JOBCARD
//STEP1   EXEC PGM=IEFBR14
//SYSPRINT DD  SYSOUT=*
//SYSCOM   DD  DSN=HLQ.TDM360.SYSCOM,DISP=(NEW,CATLG,DELETE),
//             SPACE=(CYL,10,,CONTIG),UNIT=SYSDA,
//             VOL=SER=COMVOLSER,
//             DCB=(LRECL=4096,BLKSIZE=4096,RECFM=F,DSORG=PS)
//
```

In the preceding example, the COMMDS has been created to support up to 64 3390-3 volumes in a single Master session. The following example is for a COMMDS where there is a mix of 3390-3 and 3390-9 volumes in the session and 9 systems participating. The value of 'K' in this example will be 15 as the largest device size is always used in the calculation.

```
JOBCARD
//STEP1   EXEC PGM=IEFBR14
//SYSPRINT DD  SYSOUT=*
//SYSCOM   DD  DSN=HLQ.TDM360.LOG,DISP=(NEW,CATLG,DELETE),
//             SPACE=(CYL,(5,1)),UNIT=SYSDA,
//             VOL=SER=COMVOLSER,
//             DCB=(LRECL=80,BLKSIZE=6160,RECFM=FB,DSORG=PS)
//
```

Creating the History Log Data Set

Member HISTORY is used which, is located in SAMPLIB. This JCL creates the file which tracks each and every COMMDS used or reused in a Softek TDMF session. This data set is input to the SYSOPTN job deck, entry SYSCOM HISTORY DATASET NAME.

```
JOBCARD
//STEP1    EXEC PGM=IEFBR14
//SYSPRINT DD   SYSOUT=*
//SYSCOM   DD   DSN=TDMS1.V360.HISTORY,
//              DISP=(,CATLG,DELETE),
//              SPACE=(CYL,(5,1)),
//              UNIT=SYSDA,
```

```
//              VOL=SER=(volser),
//              DCB=(LRECL=80,BLKSIZE=6160,RECFM=FB,DSORG=PS)
```

Performing a Swap Migration

The JCL (MASTER or AGENT) necessary to perform a Swap migration is located in SAMPLIB. The same members are contained in TDMSLIB for use within the Softek TDMF TSO Monitor. Either member may be used.

NOTE

Comments have been removed in the examples for brevity.

Single System Swap Migration Session

If only one system is connected to the DASD devices to be migrated, only one job, MASTER need be submitted. In the following example, 16 volumes are to participate in a Swap migration.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=MASTER,TIME=1440
//STEPLIB  DD  DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SECCOM   DD  DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SYSCOM   DD  DISP=SHR,DSN=TDMS1.TDM360.SYSCOM
//SYSPRINT DD  SYSOUT=*
//DSFPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSSNAP  DD  SYSOUT=*
//SYSIN    DD  *
  SESSION SESSION1
          Master(TDM1)
          SYSCOM(TDMS1.TDM360.SYSCOM)
          OPTIONS(TIME(LOCAL)
                  PACING(NORMAL)
                  NOAUTOOPS
                  NOCONF
                  CHECKTARGET
                  CONCURRENT(04 ACTIVE)
                  ICKDSF
                 )
  MIGRATE SRC000 TGT100
  MIGRATE SRC004 TGT104
  MIGRATE SRC008 TGT108
  MIGRATE SRC00C TGT10C
  MIGRATE SRC001 TGT101
  MIGRATE SRC005 TGT105
  MIGRATE SRC009 TGT109
  MIGRATE SRC00D TGT10D
  MIGRATE SRC002 TGT102
  MIGRATE SRC006 TGT106
  MIGRATE SRC00A TGT10A
  MIGRATE SRC003 TGT103
  MIGRATE SRC007 TGT107
  MIGRATE SRC00B TGT10B
  MIGRATE SRC00F TGT10F
  MIGRATE SRC010 TGT110
```

In the preceding example, 16 volumes have been defined for swap migrations. Unless the OPTIONS parameter is specified, the statement options will default to the system defaults that are specified in the SYSOPTN batch job.

In this example, the following options are in effect:

- Local Time display
- Pacing
- No WTO/WTOR messaging
- No volume confirmation
- The target volumes may only have VTOC, VTOCIX and VVDS entries
- Reverse pacing is turned off
- Active in Copy has been set on
- The Dynamic ICKDSF option has been set on
- The SYSTEMS statement has set the maximum number of volumes to be concurrently migrating to 4. This works in conjunction with the Active in Copy option.
- The FastCopy option is specified.

Multiple System Swap Migration Session

If multiple systems are connected to the DASD devices to be migrated, then the MASTER JCL requires submission as well as AGENT JCL for each participating system. Using the previous example of 16 volumes participating in the Swap migration with the same options specified.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=MASTER,TIME=1440
//STEPLIB  DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SYSCOM   DD  DSN=TDMS1.TDM360.SYSCOM,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//DSFPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSSNAP  DD  SYSOUT=*
//SYSIN    DD  *
 SESSION SESSION1 Master(TDM1)AGENT(TDM2 TDM3 TDM4)
         SYSCOM(TDMS1.TDM360.SYSCOM)
         OPTIONS(TIME(LOCAL)
                 PACING(NORMAL)
                 NOAUTOOPS
                 NOCONF
                 CHECKTARGET
                 CONCURRENT(04 ACTIVE)
                FASTCOPY
                 ICKDSF
                 )
 MIGRATE SRC000 TGT100
 MIGRATE SRC004 TGT104
 MIGRATE SRC008 TGT108
 MIGRATE SRC00C TGT10C
 MIGRATE SRC001 TGT101
 MIGRATE SRC005 TGT105
 MIGRATE SRC009 TGT109
 MIGRATE SRC00D TGT10D
 MIGRATE SRC002 TGT102
 MIGRATE SRC006 TGT106
 MIGRATE SRC00A TGT10A
```

```
 MIGRATE SRC003 TGT103
 MIGRATE SRC007 TGT107
 MIGRATE SRC00B TGT10B
 MIGRATE SRC00F TGT10F
 MIGRATE SRC010 TGT110
/*
//
```

The following JCL is what would be submitted for each of the participating systems: TDM2, TDM3 and TDM4.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=AGENT,TIME=1440
//STEPLIB  DD  DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SECCOM   DD  DISP=SHR,DSN=TDMS1.TDM360.TDMLLIB
//SYSCOM   DD  DISP=SHR,DSN=TDMS1.TDM360.SYSCOM
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSSNAP  DD  SYSOUT=*
//SYSIN    DD  DUMMY
```

Swap Migration Session with Rename

Using the previous example of 16 volumes participating in the Swap migration with the same options specified. In this case the original source devices are to be relabeled as if the subsystem were to be removed. By using 'XXnnnn' as the "new" volser for the original source device (where 'nnnn' is the device address), it is very easy to determine what devices remain on the old subsystem that require migration. Note that this function is not supported in an environment where JES3 manages the devices.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=MASTER
//STEPLIB  DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SYSCOM   DD  DSN=TDMS1.V360.SYSCOM,DISP=SHR
//SYSPRINT DD  SYSOUT=($)
//SYSUDUMP DD  SYSOUT=($)
//SYSSNAP  DD  SYSOUT=($)
//SYSIN    DD  *
 SESSION SESSION1 Master(TDM1)AGENT(TDM2 TDM3 TDM4)
         SYSCOM(TDMS1.TDM360.SYSCOM)
         OPTIONS(TIME(LOCAL)
                 PACING(NORMAL)
                 NOAUTOOPS
                 NOCONF
                 CHECKTARGET
                 CONCURRENT(04 ACTIVE)
                FASTCOPY
                 ICKDSF
                 )
* Example using RELABEL keyword
 MIGRATE SRC500 HDF001 RELABEL(XX2300)
 MIGRATE SRC504 HDF002 RELABEL(XX2304)
 MIGRATE SRC508 HDF003 RELABEL(XX2308)
 MIGRATE SRC50C HDF004 RELABEL(XX230C)
* Example using positional parameter
 MIGRATE SRC501 HDF005 XX2301
 MIGRATE SRC505 HDF006 XX2305
 MIGRATE SRC509 HDF007 XX2309
 MIGRATE SRC50D HDF008 XX230D
 MIGRATE SRC502 HDF009 XX2302
 MIGRATE SRC506 HDF00A XX2306
 MIGRATE SRC50A HDF00B XX230A
```

```
 MIGRATE SRC50E HDF00C XX230E
 MIGRATE SRC503 HDF00D XX2303
 MIGRATE SRC507 HDF00E XX2307
 MIGRATE SRC50B HDF00F XX230F
 MIGRATE SRC510 HDF010 XX2310
/*
//
```

Swap Migration Session with Prompt

In this example, only one volume is in the session as the volume may contain a control data set that has a high utilization rate and cannot have a dynamic swap take place due to the application saving UCB information.

Since it is not practical to stop such an important application (such as resource sharing) for the length of time it may take to migrate the volume from start to end, alternative ways may be used. Use of the prompt option will allow the application to remain active during the copy phase. Once Softek TDMF determines that the Synchronization Goal can be met, a prompt will be issued notifying the user of this. At that time it is possible to stop the application, respond to the prompt at which time Softek TDMF will pick up the last of the updates to the source volume, write them to the target volume and then perform the swap. Once the swap is complete, the application may be restarted. In this way, the time the application is unavailable is for a very brief period of time.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=MASTER,TIME=1440
//STEPLIB  DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SYSCOM   DD  DSN=TDMS1.TDM360.SYSCOM,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//DSFPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSSNAP  DD  SYSOUT=*
//SYSIN    DD  *
 SESSION SESSION1 MASTER(TDM1)AGENT(TDM2)
         SYSCOM(TDMS1.TDM360.SYSCOM)
         OPTIONS(TIME(LOCAL)
                 PACING(REVERSE)
                 NOAUTOOPS
                 NOCONF
                 CHECKTARGET
                 ICKDSF
                )
 MIGRATE CDS001 NEWCDS OPT(FAST PROMPT)
/*
//
```

NOTE

There is a second system participating in the session, so an Agent session must be executing on TDM2 as well.

Swap Migration Session with Unidentified Systems Tolerance

In this example, one or more volumes may be connected to other systems not included in the session. While this may not be an issue, Softek TDMF will issue a warning message (TDM2377W) and post a return code 04 at session termination. If a different action is preferred, Softek TDMF may be directed to treat this condition as an error, which terminates the volume migration (RC=08), or as an informational message (RC=00). Please refer to the table: *Softek TDMF System Defaults and Options on page 44* for more detail.

```
//STEP1   EXEC PGM=TDMFMAIN,PARM=MASTER
//STEPLIB  DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
```

```
//SYSCOM   DD  DSN=TDMS1.V360.SYSCOM,DISP=SHR
//SYSPRINT DD  SYSOUT=($)
//SYSUDUMP DD  SYSOUT=($)
//SYSSNAP  DD  SYSOUT=($)
//SYSIN    DD  *
 SESSION SESSION1 MASTER(TDM1)
          SYSCOM(TDMS1.TDM360.SYSCOM)
          OPTIONS(TIME(LOCAL)
                  PACING(NORMAL)
                  NOAUTOOPS
                  NOCONF
                  NOTERMGROUP
                  CHECKTARGET
                  CONCURRENT(04 ACTIVE)
                  ICKDSF
                  FASTCOPY
                  UNIDENT(I)
                 )
 MIGRATE SRC000 TGT100
 MIGRATE SRC004 TGT104
 MIGRATE SRC008 TGT108
 MIGRATE SRC00C TGT10C
 MIGRATE SRC001 TGT101
 MIGRATE SRC005 TGT105
 MIGRATE SRC009 TGT109
 MIGRATE SRC00D TGT10D
/*
//
```

Performing a SCAN ONLY

The SCAN parameter allows the validation of options, volumes, and the migration environment, without actually copying the volume. During a scan, the Softek TDMF copy task does not start and the target volume remains unchanged. If the WTO option is specified, automated operations messages (TDM*xxxx*A) are issued. If the Confirmation option is specified, this prompt needs to be satisfied before SCAN will start.

The SCAN feature assists users in preparing for migrations by ensuring that all options selected are valid, and that the source and target volume pairing is valid.

The SCAN ONLY can be specified in the following ways:

- By specifying a //TDMFSCAN DD DUMMY Statement in the JCL stream.
- By specifying SCAN on the EXEC statement in the JCL stream, such as PARM=MASTER,SCAN

When the SCAN parameter is specified as shown in the following example JCL, Softek TDMF simulates the INITIALIZATION and ACTIVATION phases. As a result of this simulation, the normal Softek TDMF messages are issued, as well as message TDM2722I, **Volume termination requested by "SCAN ONLY."**

The //TDMFSCAN DD DUMMY statement is shown in *Sample SCANONLY JCL* on page *245*

Sample SCANONLY JCL

```
JOBCARD1
//*STEP1   EXEC PGM=TDMFMAIN,PARM='MASTER'
//STEP1   EXEC PGM=TDMFMAIN,PARM='MASTER'
//STEPLIB  DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//SECCOM   DD  DSN=TDMS1.TDM360.TDMLLIB,DISP=SHR
//TDMFSCAN DD DUMMY
//SYSCOM   DD  DSN=TDMS1.TDM360.SYSCOM,DISP=SHR
//SYSPRINT DD  SYSOUT=*
//SYSUDUMP DD  SYSOUT=*
//SYSSNAP  DD  SYSOUT=*
//SYSIN    DD  *
 SESSION SESSION1 MASTER(TDM1)
                SYSCOM(TDMS1.TDM360.SYSCOM)
                OPTIONS(PROMPT
                              PURGE
                              COMPARE
                              NOCHECKT
                              FASTCOPY
                              CONC(03 ACTIVE)
                              )
 GROUP TESTGRP OPT(NOPU NOCOMPARE)
 MIGRATE TDE972 TDE973
/*
//
```

Appendix H

How to Read Syntax Diagrams

Reading Syntax Diagrams

To read syntax diagrams, follow one line at a time from the beginning to the end, and code everything you encounter on that line.

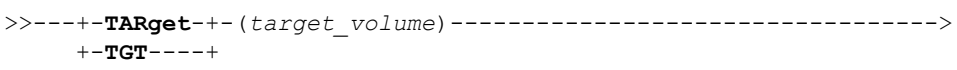
The following conventions apply to all syntax diagrams for control cards:

- Read the syntax diagrams from left to right and top to bottom.
- Each syntax diagram begins with a double arrowhead (>>) and ends with opposing arrows (><).
- An arrow (->) at the end of a line indicates that the syntax continues on the next line. A continuation line begins with an arrow (>-).
- Commands and keywords are shown in uppercase and lowercase letters. The uppercase portion is the minimum needed to code the command properly; the lowercase portion is optional. For example, **FASTcopy** can be coded in any of the following ways: **FAST**, **FASTC**, **FASTCO**, **FASTCOP**, or **FASTCOPY**.

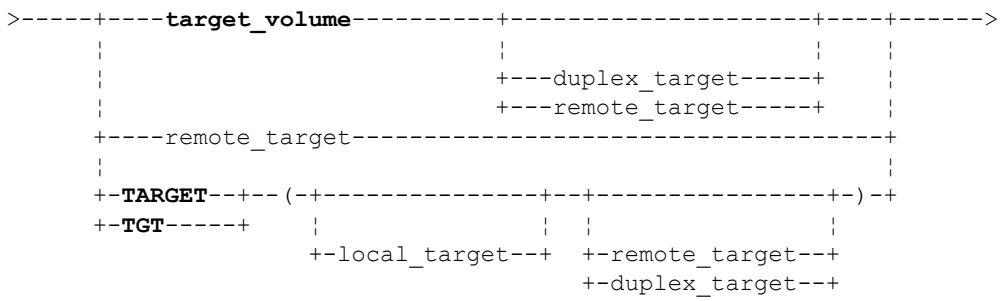
NOTE

Commands must be entered in uppercase. Lowercase is not recognized.

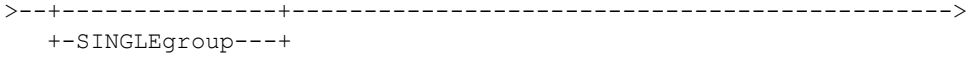
- Some commands and keywords have alternative abbreviations; these appear as part of the stack for that command or keyword. For example, the alternative abbreviation for TARget is TGT.



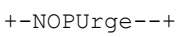
- Words in all lowercase letters represent information you supply. For example, **target_volume**, or **seconds**.
- You must provide all items enclosed in parentheses, ( ), and you must include the parentheses.
- Where you can choose from two or more keywords, the choices are stacked one above the other. If one choice within the stack lies on the main path, you must choose a keyword. In the following example you must choose either **target_volume, TARGET**, or **TGT**.



- If one or more keywords are below the main path, they are optional. You can choose one, or the other, or none. In the following example **SINGLEgroup** is an optional keyword.



- If a stack of keywords are below the main path and one keyword is above the main path, the use of the keyword is optional, and the above item is the default. In the following example, if no keywords are specified, the default **NOPUrge** is taken.



```
>--+----------+-------------------------------------->
   +-PUrge----+
```

- The repeat symbol appearing above keywords and variables indicates that you can specify those keywords and variables more than once. If a comma appears in the repeat symbol, you must separate repeated keywords or variables with a comma or a blank.

  For example, after the keyword **Agents**, you can enter multiple system identifiers separated by commas.

```
                <-,---+
>--Agents--(----sysid----)--------------------------------------->
```

- Substitution blocks are used to simplify the diagrams. They indicate that blocks of the syntax diagram are located outside of the main diagram. You insert the keywords for that block where the symbol appears, and return to the main diagram to continue with the command. This technique is used for Options.

Glossary

A

asynchronous

Pertaining to two or more processes that do not depend upon the occurrence of specific events such as common timing signals.

asynchronous data transfer

A physical transfer of data to or from a device that occurs without a regular or predictable time relationship following execution of an I/O request.

C

cache fast write (CFW)

A form of fast write to cache where the data is written directly to cache without using nonvolatile storage and is available for later de-staging. This function is used for data of a temporary nature, or data that is readily recreated, such as the sort work files created by sort programs.

channel command word (CCW)

A mechanism in which a channel command for I/O can be issued. One or more CCWs make up the channel program that directs data channel operations.

concurrent copy

An extended function that produces a back up copy and allows concurrent access to data during the copy.

count–key–data (CKD)

A DASD data recording format employing self-defining record formats in which each record is represented by a count area that identifies the record and specifies its format, an option key area that may be used to identify the data area contents, and a data area that contains the user data for the record. CKD is also used to refer to a set of channel commands that are accepted by a device that employs the CKD recording format.

count–key–data (CKD) device

A disk storage device that stores data in a format consisting of a count field, usually followed by a key field, followed by the actual data of a record.

D

DASD fast write (DFW)

A form of fast write to cache where the data is written concurrently to cache and nonvolatile storage and automatically scheduled for de-staging to the DASD. Both copies are retained in the storage control unit until the data is completely written to the DASD, providing data integrity equivalent to writing directly to the DASD.

data sharing

The ability of concurrent subsystems (such as DB2 or IMS DB) or application programs to directly access and change the same data while maintaining data integrity.

dual copy

A high availability function made possible by the nonvolatile storage (NVS) in cached 3990 models. Dual copy maintains two functionally identical copies of designated DASD volumes in the logical 3990 subsystem, and automatically updates both copies every time a write operation is issued to the dual copy logical volume.

E

extended control and monitoring (ECAM) device

A device on an StorageTek ICEBERG storage subsystem, SVA storage subsystem, or an IBM RAMAC Virtual Array (RVA) subsystem.

extended count–key–data

A set of channel commands that use the CKD track format. Extended count-key-data uses the Define Extent and Locate Record commands to describe the nature and scope of a data-transfer operation to the storage control to optimize the data-transfer operation.

extended count–key–data device

A disk storage device that has a data transfer rate faster than some processors can utilize and that is connected to the processor through use of a speed matching buffer. A specialized channel program is needed to communicate with such a device.

extended remote copy (XRC)

A hardware- and software-based remote copy option that provides an asynchronous volume copy across storage subsystems for disaster recover, device migration, and workload migration.

extended specify task abnormal exit (ESTAE)

A macro-instruction that specifies a routine to receive control in the event of abnormal termination of the issuing task.

G

global resource serialization (GRS)

A function in which resources can be shared across multiple operating systems and still maintain data integrity.

M

multi–image manager (MIM)

A program product by Computer Associates that provides GRS functionality.

P

P/DAS

PPRC dynamic address switching.

PPRC dynamic address switching (P/DAS)

A software function that provides the ability to dynamically redirect all application I/O from one PPRC volume to another PPRC volume.

pacing

A transfer protocol that controls data transfer by waiting for a specified character, or waiting a specified number of seconds between transfers.

parallel processing

The simultaneous processing of units of work by many servers. The units of work can be either transactions or subdivisions of large units or work (batch).

parallel sysplex

A sysplex that uses one or more coupling facilities.

path group id

A unique identifier for a host system control program (SCP) that is sent to every path to a device.

peer–to–peer remote copy (PPRC)

A hardware-based remote copy option that provides a synchronous volume copy across 3990 Model 6 storage subsystems for disaster recovery, device migration, and workload migration.

S

sense path group id

A channel command that queries the DASD subsystem for the path group id in order to determine that the correct I/O interfaces are to be used for data transfer.

sequential data striping

An extended function where the system writes consecutive tracks from data sets on different volumes and reads or writes them in parallel.

set path group id

A command that forms path groups for each I/O interface for each SCP.

source volume

One device of a migration pair. All channel commands to copy the volume are directed to the source volume. The data on the source volume is duplicated on the target volume.

synchronization

The action of forcing certain points in the execution sequences of two or more asynchronous procedures to coincide in time.

synchronous data transfer

A physical transfer of data to or from a device that has a predictable time relationship with the execution of an I/O request.

system authorization facility (SAF)

Provides an interface between a product, subsystem, or component requesting access to a resource within the system and a security product (i.e., RACF, ACF2, and Top Secret).

T

target volume

One of the devices of a migration pair that will contain a duplicate of the data on the source volume.

TDMF For Platinum (TFP)

A version of TDMF licensed with a restriction that all target volumes are limited to an associated Platinum subsystem.

W

write–ahead data set (WADS)

An IMS data set containing log records that reflect completed operations and are not yet written to an online log data set.

X

XRC

See *extended remote copy (XRC)*.

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