

# Softek™ Replicator

## Installation & Reference Guide for z/OS

Version 3.5



# Installation and Reference Guide for z/OS

## Version 3 Release 5.0

---

# Softek™ Replicator

**SOFTEK**

Simplifying Storage Management

The information contained in this manual is the licensed property of Softek Technology Corporation. Use of the information contained herein is restricted to the terms and conditions of a license agreement.

ML-145060-001

**REVISION NOTICE**

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

**ABSTRACT**

Softek Replicator Version 3 Release 5.0 (ML-145060) software is a vendor independent, non-disruptive software solution that can help perform critical tasks (Point-In-Time migrations and easy access to the Point-In-Time copies of your data) 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 Technology Corporation product discussed in this publication, please call 1-800-66SOFTEK.

**RESTRICTIONS ON USE**

The information contained in this manual is the licensed property of Softek Technology Corporation. Use of the information contained herein is restricted pursuant to the terms and conditions of a license agreement.

Softek and Softek Replicator for z/OS are trademarks of Softek Technology Corporation.

All other trademarks and product names are the property of their respective owners.

©2003 Softek Technology Corporation

All rights reserved. Printed in U.S.A.

All specifications are subject to change without notice.

# CONTENTS

---

<b>Chapter 1: Softek Replicator Overview</b> .....	<b>1</b>
The Need for Non-disruptive Data Replication .....	3
Data Migration and Replication Tool: Definitions and Characteristics .....	3
Softek Replicator .....	4
Benefits Offered .....	5
Operating System Support .....	6
Storage Requirements .....	6
Performance Considerations .....	6
Master/Agent(s) Relationship .....	6
Master System Responsibilities .....	6
Agent System Responsibilities .....	7
Major Phases of Replication .....	7
The SYSTEM INITIALIZATION Phase .....	7
The INITIALIZATION Phase .....	9
The ACTIVATION Phase .....	9
The QUIESCE Phase .....	10
The Volume I/O REDIRECT Phase .....	11
The RESUME Phase .....	11
The TERMINATE Phase .....	11
<b>Chapter 2: Softek Replicator Installation</b> .....	<b>13</b>
Installation Introduction .....	15
Distribution Media; Methods of Unloading .....	15
Pre-Installation Considerations .....	15
Product Requirements .....	15
Files on the Product Tape .....	15
Operating System Requirements .....	17
Storage Requirements .....	18
DASD Space Requirements .....	21
SMP Naming Conventions .....	21
SYSMOD Naming Conventions .....	21
Function SYSMOD IDs .....	21

PTF and APAR SYSMOD IDs .....	21
Installing Softek Replicator .....	22
Installing Softek Replicator Using SMP/E .....	23
Installing Softek Replicator without SMP/E .....	24
Security .....	24
System Authorization Facility .....	25
Maintenance Overview .....	25
Determining the Product PTF Level .....	26
Maintenance Terms .....	26
Maintenance Packaging .....	26
Maintenance Frequency .....	26
Applying Maintenance Between PTFs .....	27
Notification of Updates .....	27
Important URLs .....	27
Post-Installation Tailoring .....	27
Preparing to execute Softek Replicator .....	30
Sample Jobs .....	30
Key Types .....	31
License Keys .....	31
Vendor Keys .....	31
Express Keys .....	32
Trial Express Keys .....	32
When keys expire .....	32
Replicator Control Statements .....	33
Required and Optional Control Statements .....	33
Required Control Statements .....	33
Optional Control Statements .....	33
Ordering the Input of Control Statements .....	34
SESSION Control Statement .....	35
SESSION Format .....	35
SESSION Parameters .....	35
SESSION Options .....	36
Common Options .....	39
REMOTE Control Statement .....	41
REMOTE Format .....	41
REMOTE Parameters .....	41
GROUP Control Statement .....	41
GROUP Format .....	42
GROUP Parameters .....	42
Volume Options .....	43
MIGRATE Control Statement .....	44
MIGRATE Format .....	45
MIGRATE Parameters .....	45
REPLICATE Control Statement .....	46
REPLICATE Format .....	46
REPLICATE Parameters .....	46

Softek Replicator System Defaults . . . . .	47
System Defaults . . . . .	48
Running Softek Replicator . . . . .	52
Terminating Softek Replicator . . . . .	53
Recovering Softek Replicator Devices . . . . .	53
How to check the DDTSIO pointer . . . . .	53
Accessing Softek Replicator Manuals . . . . .	54
BookManager Read . . . . .	54
Hypertext Markup Language (HTML) . . . . .	55
Portable Document Format (PDF) . . . . .	55
<b>Chapter 3: Softek Replicator Performance Considerations . . . . .</b>	<b>57</b>
Auto-Operations Interface . . . . .	59
Dynamic Volume Pacing . . . . .	59
I/O Pacing . . . . .	60
Real Storage Pacing . . . . .	61
Reverse Pacing . . . . .	61
When Pacing is not in Effect . . . . .	62
User Specified Pacing Values . . . . .	62
Pacing with Channel Extenders . . . . .	62
SMF Recording . . . . .	65
Copy Functions . . . . .	65
Point-In-Time Replication . . . . .	66
Point-In-Time Replication and Data Bases . . . . .	66
Application I/O Performance . . . . .	67
Synchronization Goals . . . . .	68
Channel Utilization . . . . .	68
Performance Impact by Phase . . . . .	69
Placement of the Master System . . . . .	70
Placement of the Communications Data Set . . . . .	70
Raid Subsystems and Rank Contention . . . . .	71
Storage Subsystem Performance . . . . .	72
Suspend/Continue of a Replication . . . . .	72
The Softek Replicator Hang Monitor . . . . .	72
Dynamic Suspension of a Replication . . . . .	73
<b>Chapter 4: Softek Replicator Planning Considerations . . . . .</b>	<b>75</b>
Overview . . . . .	79
CA Products . . . . .	79
BrightStor CA-ASTEX Performance . . . . .	79
Unicenter CA-OPS/MVS Event Management and Automation . . . . .	79
Unicenter CA-Scheduler Job Management . . . . .	79
BrightStor CA-1 Tape Management . . . . .	79
Unicenter CA-7 Job Management . . . . .	80
Unicenter CA-11 Job Management . . . . .	80
Unicenter CA-MIM Resource Sharing . . . . .	80

Moving Multi-Image Manager Control Data Sets .....	81
Cache Fast Write and Sort Programs .....	82
Class Names and Esoteric Names .....	82
Device States: Before and After a Swap Migration .....	82
Data Facility Products .....	83
Control Data Sets .....	83
DFSMS .....	83
DFSort .....	84
Duplexing Functions .....	84
Extended Functions .....	85
EMC Symmetrix Manager .....	85
Consistency Groups .....	85
File Allocation Managers .....	85
Global Resource Serialization .....	86
Host Software Component .....	86
HCD and IODF Files .....	86
ICKDSF .....	87
Dynamic ICKDSF REFVTOC/EXTVTOC .....	87
Intent of Dynamic ICKDSF REFVTOC function: .....	87
Intent of Dynamic ICKDSF EXTVTOC Function .....	88
How Dynamic ICKDSF REFVTOC or EXTVTOC Functions Affect a Softek Replicator Migration .....	88
IMS Write Ahead Data Sets .....	90
IPL Volumes .....	90
Invalid Count Fields .....	90
JES Checkpoint and Spool Volumes .....	91
JES2 Considerations .....	91
JES3 Considerations .....	91
LISTDATA Information .....	92
Migration of RAID and Non-RAID Devices .....	93
Migration of Unlike Device Types .....	93
Migration/Replication of Volumes Formatted for VM Use .....	94
Model 204 Considerations .....	94
MVS Running under VM .....	94
Number of Softek Replicator Sessions .....	95
Number of Groups per Softek Replicator Session .....	95
Number of Volumes per Softek Replicator Session .....	95
Page and Swap Data Sets .....	95
Parallel Sysplex Considerations .....	96
Peer-to-Peer Remote Copy Support .....	96
PPRC Device to a Non-PPRC Device .....	97
Real Time Monitors .....	97
Shared versus non-Shared Devices .....	97
Enterprise Storage Server (ESS) Support .....	98
Messaging .....	98
Migration from ESS to non-ESS .....	98



Migration from non-ESS to ESS .....	99
FlashCopy Support .....	100
Static, Installation Static and Dynamic Devices .....	100
Shared Virtual Array (SVA) / RAMAC Virtual Array (RVA) Support .....	101
Softek Replicator Ownership of Target Volume .....	102
Softek Replicator and Volume Table of Contents .....	102
Unit Control Blocks Above the 16Mb Line .....	102
Using Devices Previously Formatted for VM .....	102
VM Volume Tolerance .....	102
XRC Support .....	103

**Chapter 5: Softek Replicator Advanced Functions ..... 105**

Overview .....	107
Softek Replicator Offline Volume Access .....	107
OVA Purpose .....	108
Starting an OVA Session .....	108
Using OVA on different subsystems .....	108
Multi-volume data sets .....	109
Functions of the Softek Replicator Interface Program .....	109
Exclusion List .....	109
Inclusion List .....	109
Softek Replicator Interface Program Processing .....	110
Initialization .....	110
Registration .....	110
Registration Report .....	111
I/O Redirection .....	111
De-registration .....	111
I/O Redirection Report .....	111
Using the Softek Replicator Interface Program .....	112
Delayed Offline Volume Access .....	114
Purpose of Delayed OVA .....	114
Perpetual Point-In-Time .....	117
Setting up for PPIT .....	118
During an Active PPIT Session .....	118
Softek Replicator TCP/IP Support .....	121
Terminology .....	122
TCP/IP Password Option .....	122
Password example .....	122
TCP/IP Migration Requirements and Considerations .....	122
Operating System Requirement .....	122
Fast Copy Requirement .....	123
Configuration Considerations .....	123
TCP/IP DD Statement Requirement .....	124
Adding the TCP/IP DD Statement .....	124
PORT Number Requirement .....	124
Documenting the Softek Replicator TCP/IP Port Number .....	124

## **Chapter 6: Softek Replicator Batch Utilities . . . . . 127**

Overview . . . . .	129
SDRPBMON . . . . .	129
Operational Considerations . . . . .	130
SDRPBMON - Command processing . . . . .	131
SDRPBMON - Control Statement Processing . . . . .	132
SDRPBMON Messages . . . . .	135
SDRPBMON - Printed Output . . . . .	135
SDRPCFTP . . . . .	135
SDRPCLIP . . . . .	136
SDRPCLIP - Return codes . . . . .	136
SDRPMUCB . . . . .	137
Operation . . . . .	137
Return Codes for SDRPMUCB . . . . .	138
SDRPQDSK . . . . .	138
SDRPQDSK - Printed Output . . . . .	139
SDRPQDSK - User Abends . . . . .	139
SDRPSCAN . . . . .	139
Execution Parameter . . . . .	139
Operation . . . . .	140
SDRPSCAN - Messages, Return Codes and ABEND Codes . . . . .	140
SDRPTERA . . . . .	141
Sample JCL for SDRPTERA . . . . .	141
Sending Printed Output to Softek . . . . .	141
Mail . . . . .	141
FAX . . . . .	141
E-Mail . . . . .	141
SDRPTERA—User Abends . . . . .	141
SDRPTERA Sample Output . . . . .	142
SDRPVTOC . . . . .	143
SDRPVTOC - Printed Output . . . . .	144
SDRPVTOC - Return Codes and ABEND Codes . . . . .	146
SDRPEXTV . . . . .	146
Program Abend Codes . . . . .	147
Program Messages . . . . .	147

## **Chapter 7: Softek Replicator TSO Monitor Feature . . . . . 155**

Overview . . . . .	157
Option 0 - Change or Submit Data Migration Jobs . . . . .	160
Option 1 - Current Sessions: Monitor Progress . . . . .	161
Option 2 - Current Sessions: User Interaction and Status . . . . .	162
Option 3 - Current Sessions: Messages . . . . .	171
Option 4 - Current Sessions: Offline Volume Access (OVA) . . . . .	173
Option 5 - Current/Past Sessions: Performance Data . . . . .	174
Option 6 - Past Sessions: Summary . . . . .	183

Option 7 - Past Sessions: Details .....	185
Option 8 - Past Sessions: Communication Data set History .....	187
Option 9 - Installation Options and Environment .....	189
Option 10 - /Modify Installation Security Environment .....	190
Adding License Keys .....	190
Deleting Keys .....	190
Option 11 - Display/Modify User's TSO Monitor Options .....	192
Option 12 - Build Data Migration .....	195
Building a Master System Batch Job .....	196
Building an Agent System Batch Job .....	203
Building a COMMDS .....	205
Option U - Softek Replicator Support Utilities .....	207
Option U.0 - Display Memory .....	208
Option U.1 - View Internal Details for Active Sessions .....	209
Option U.2 - Active Session - Display/Alter Tracing Bit Settings .....	210
Option U.3 - Active Session - Display Trace Table .....	211
Option U.4 - Previous Session - Display Trace Table .....	212
Option U.5 - Module Version Levels in Defined Load Library .....	213
Option U.6 - Current/Past Session Module Version Levels from COMMDS ...	214
Option U.7 - System Change Summary .....	215
Option U.8 - Unit Control Block Display .....	215
Option U.9 - Communication Data Set Control Blocks .....	218
Option U.10 - Communication Data Set Navigator .....	220
Option U.11 - Communication Data Set Volume Refresh Bit Maps .....	221
Option U.12 - Communication Data Set Merged System Messages .....	223
Option U.13 - Detected Source Volume I/O Errors .....	224
Option H - Softek Replicator Help and Message Detail Facility .....	226
Option H.1 - Display Replicator Message Details .....	227
Option H.2 - Introduction to Softek Replicator .....	229
Option H.3 - Support Information .....	230
Option H.4 - Monitor Line Commands .....	231

## Appendices

<b>Appendix A: DASD Space Requirements .....</b>	<b>233</b>
<b>Appendix B: Determining CPU Serial Number .....</b>	<b>237</b>
<b>Appendix C: Authorization Return Codes .....</b>	<b>241</b>
<b>Appendix D: Messages for Automated Operations .....</b>	<b>249</b>
<b>Appendix E: Determining DASD Subsystem Serial Number .....</b>	<b>255</b>
<b>Appendix F: Configurable REXX Execs .....</b>	<b>259</b>
<b>Appendix G: Session Examples .....</b>	<b>263</b>
<b>Appendix H: How to Read Syntax Diagrams .....</b>	<b>285</b>

<b>Index</b> .....	<b>293</b>
--------------------	------------

<b>Revision History</b> .....	<b>301</b>
-------------------------------	------------

## Tables

Softek Replicator Files, Names, and Contents .....	15
Softek Replicator Storage Requirements .....	18
SESSION Options .....	36
Common Options .....	39
Volume Options .....	44
Softek Replicator System Defaults and Options .....	48
Table for Real Storage and I/O Pacing Operations .....	62
Dynamic, Static and Installation Static Matrix .....	101
Return Codes for SDRPMUCB .....	138
Program Messages .....	147
System Information .....	174
Volume Information .....	176
Volume Pacing .....	178
Softek Replicator Installation and Security Environment .....	190
Softek Replicator Message Severity Table .....	228
DASD Space Requirements .....	235
Messages for Automated Operations .....	251

## Figures

Host-Based Data Replication .....	4
Phases of a Softek Replicator Session .....	7
Session Flow - part 1 .....	8
Session Flow - part 2 .....	10
Session Flow - part 3 .....	10
Pacing with Source Attached to Channel Extender .....	63
Pacing with Target Attached to Channel Extender .....	64
Pacing with Source and Target Attached to Channel Extender .....	65
REPLICATE Control Statement and JCL .....	114
Delayed OVA Session Display .....	115
Delayed OVA Session Status .....	116
Delayed OVA Session Options .....	117
Halt OVA Registrations Confirmation Panel .....	117
PPIT Option Display .....	119
Recycle/Waiting PPIT Prompt Display .....	120
Recycle/Waiting PPIT Prompt with Response Display .....	120
Recycle/Waiting PPIT Prompt Confirmation Display .....	121
After Recycle/Waiting PPIT Prompt Confirmation Display .....	121
Softek Replicator Security Warning Panel .....	158
Function Menu .....	159
Change/Submit Jobs Panel Overview .....	160
Sample Batch Jobs .....	160
Sessions Monitor Panel .....	161
User Interaction and Status Panel .....	163
User Interaction and Status Panel – Migration Options .....	164

User Interaction and Status – Help Panel - Part 1 . . . . .	165
Confirm Swap from PPRC to Simplex Device . . . . .	167
Confirm Termination . . . . .	167
Set Synchronize Goal Panel . . . . .	168
Suspend Volume Confirmation Display . . . . .	168
Continue Volume Confirmation Display . . . . .	169
Volume Confirmation Display . . . . .	169
Sync Volume Needed Display . . . . .	170
Sync Volume Needed Display – Session Status . . . . .	170
Sync Volume Confirmation Display . . . . .	171
Current Sessions: Display Messages . . . . .	172
Current Sessions: OVA not selected . . . . .	173
Current Sessions: OVA not active . . . . .	173
Current Sessions: Display Active OVA jobs . . . . .	174
Performance Data Panel - Part 1 . . . . .	176
Performance Data Panel - Part 2 . . . . .	178
Performance Data Panel - Part 3 . . . . .	179
Performance Data Panel - Part 4 . . . . .	181
Performance Data Panel - Part 5 . . . . .	182
Past Session Summary . . . . .	184
Past Session Detail Display . . . . .	185
History Data Set Display . . . . .	187
History Dataset Display – Help . . . . .	188
Installation Options Display . . . . .	189
Installation Security Environment . . . . .	191
User’s Monitor Options Panel . . . . .	192
User Monitor Options Panel with Changes . . . . .	193
Sessions Monitor Panel with User Options Set . . . . .	194
Build/Submit Jobs Panel . . . . .	195
Enter/Update/Review Job Cards Panel . . . . .	196
Master System Confirmation Screen . . . . .	196
Master System Job Build Menu . . . . .	197
Master System – Define Libraries & SMF IDs . . . . .	197
Master System – Define Libraries & SMF IDs; Saved . . . . .	198
Master System – Define Session Options . . . . .	199
Master System – Define Session Options; Saved . . . . .	199
Master System – Define a Volume migration/replication . . . . .	200
Master System – Define a Volume migration/replication; with errors . . . . .	200
Master System – Define a Volume migration/replication; saved . . . . .	201
Master System migration/replication Job Review; saved information . . . . .	201
Master System migration/replication Job – ISPF Display 202	
Agent System migration/replication JCL Build . . . . .	203
Agent System Optional Parameters Panel . . . . .	204
Agent System Migration/Replication Job – ISPF Display . . . . .	204
JCL Create for COMMDS Panel . . . . .	205
Allocate JCL COMMDS Panel . . . . .	206
Support Utilities Panel . . . . .	207
Memory Display . . . . .	208
Internal Details Display . . . . .	209
Trace Table Status . . . . .	210
Trace Entries – Active Session . . . . .	211
Trace Entries – Completed Session . . . . .	212
Module Version Level Display . . . . .	213
Module Version Level Display Based on COMMDS . . . . .	214

System Change Summary Display . . . . .	215
Unit Control Blocks Display . . . . .	216
LISTUCB Display . . . . .	217
Communication Data Set Control Blocks – Master System . . . . .	218
COMMDS Control Block Display – Agent System . . . . .	219
COMMDS Navigator Display . . . . .	220
COMMDS Volume Refresh Bit Map Display . . . . .	221
COMMDS Merged System Messages Display . . . . .	223
COMMDS Source Volume I/O Error Display . . . . .	225
Help Selection Panel . . . . .	226
Message Display Example . . . . .	227
Message Display Example . . . . .	228
Softek Replicator Introduction . . . . .	229
Support Information . . . . .	230
Softek Replicator Monitor Line Commands . . . . .	231
Sample SCANONLY JCL . . . . .	280
Remote Master JCL Example . . . . .	281
Local Master JCL Example . . . . .	282
Remote Agent JCL Example . . . . .	283
Local Agent JCL Example . . . . .	284

# About This Guide

---

This manual is an introduction to Softek Replicator. It describes the Softek Replicator's features and functionality.

## *Audience*

The *Softek Replicator 3.5 Installation and Reference Guide for z/OS (ML-146060)* is for storage administrators, system programmers and managers, who use Softek Replicator to manage storage environments.

## *Contents of this Manual*

<b>Chapter/Appendix</b>	<b>Description</b>
<i>Chapter 1: Softek Replicator Overview</i>	This chapter describes what Softek Replicator does and the benefits of it.
<i>Chapter 2: Softek Replicator Installation</i>	This chapter describes how to install Softek Replicator.
<i>Chapter 3: Softek Replicator Performance Considerations</i>	This chapter discusses the various options within Softek Replicator and how they may affect the customer's environment.
<i>Chapter 4: Softek Replicator Planning Considerations</i>	This chapter presents information related to specific program products or functions that need to be taken into consideration when planning or executing a Softek Replicator session.
<i>Chapter 5: Softek Replicator Advanced Functions</i>	This chapter presents information on Softek Replicator Advanced Functions which are a set of specialized features that exploit the basic functionality of Softek Replicator.
<i>Chapter 6: Softek Replicator Batch Utilities</i>	This chapter describes the eight Softek Replicator for z/OS batch utilities included with the base product.
<i>Chapter 7: Softek Replicator TSO Monitor Feature</i>	This chapter describes the Softek Replicator TSO Monitor which is used to manage active or previous sessions.

Chapter/Appendix	Description
<i>Appendix A: DASD Space Requirements</i>	This appendix gives all space requirements for the Softek Replicator files.
<i>Appendix B: Determining CPU Serial Number</i>	This appendix provides detail on how to determine the serial number of a specific mainframe server.
<i>Appendix C: Authorization Return Codes</i>	This appendix provides all possible return codes and their meaning from authority checking.
<i>Appendix D: Messages for Automated Operations</i>	This appendix gives a table of messages that are intended for use with automated operations packages.
<i>Appendix E: Determining DASD Subsystem Serial Number</i>	This appendix provides detail on how to determine the serial number of a specific DASD subsystem.
<i>Appendix F: Configurable REXX Execs</i>	This appendix gives an example of the REXX Exec.
<i>Appendix G: Session Examples</i>	This appendix provides examples on how to code for various types of sessions.
<i>Appendix H: How to Read Syntax Diagrams</i>	This appendix describes how to specify Softek Control Statements.

### *Contacting Technical Support*

To obtain technical support for Softek Replicator, please call:

- Softek Global Support Center (World-Wide) 800-66 SOFTEK  
(763835)
- From North America, please dial 1-800-66 SOFTEK.
- From Europe, please dial 00800-66 SOFTEK (country code is not required).
- From Austria, please dial 0800 200 236 then: 05 800 667 6383.

---

**NOTE** StorageTek customers should contact the StorageTek Customer Support Center for support on this product.

---

### *Notices*

The following notices are used throughout this manual.



**CAUTION:**

Alerts readers to a situation that could damage the software or interrupt operations.



**NOTE**

Gives readers additional significant information about the subject to increase their knowledge or to guide their actions.

### *Related Publications*

The following publications contain related information:

<b>Title</b>	<b>Part Number</b>
Softek Replicator 3.5 Messages and Codes for z/OS	ML-145061
Softek Replicator 1.2 Session Assistant for z/OS	ML-145094
Softek Replicator 3.5 Software Installation and Release Notes for z/OS	ML-145062





# Softek Replicator Overview

---

The Need for Non-disruptive Data Replication	3
Data Migration and Replication Tool: Definitions and Characteristics	3
Softek Replicator	4



## The Need for Non-disruptive Data Replication

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 face 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 MVS-based Softek Replicator supports the requirements for non-disruptive data migration.

## Data Migration and Replication 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.
- Data replication is the copying of data from one device (the source) to another device (the target) with no I/O redirection: that is, the source device remains online during the copy.
- A replication is the logical relationship between a source and target device.
- A request may be for Point-in-Time replication. In this case, volume redirection of I/O operations to the new device does not take place.
- The user initiates and controls the replications. The user identifies the "from" (source) volumes and the "to" (target) volumes.
- Multiple volume replications may be established during any one session.
- The replication tool is dynamically activated and terminated.
- Applications remain unaware that replication 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.
- After replication and synchronization are complete, the pairing is broken, leaving the target device in an offline state, and the data within congruent to a specific point in time.
- The tool supports a multiple system shared data environment.
- The tool guarantees complete physical data integrity.

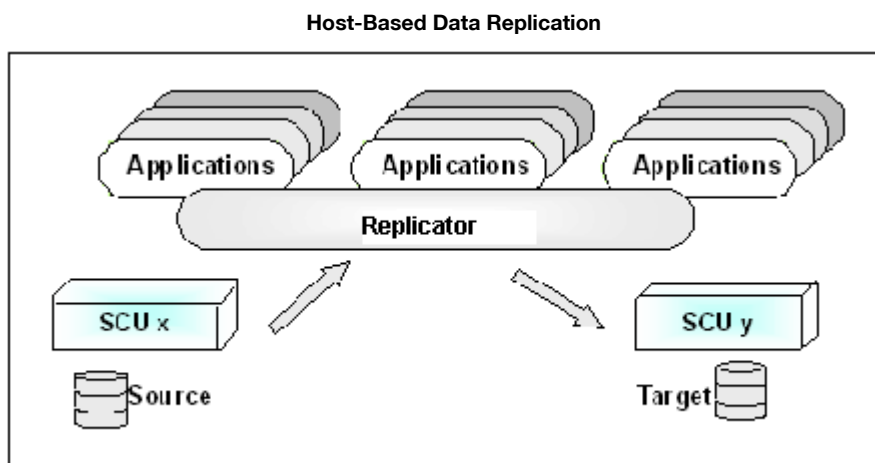
- The use of the tool is not restricted to any control unit model type or device type. Except as noted all devices in the data center may participate in a replication session as required.
- The Replicator Duplex Option enables users to create a new DASD volume or device on a local MVS system simultaneously with the creation of a normal target DASD volume or device. The Replicator Duplex Option is in effect when two target volume serial numbers are supplied on the Softek Replicator REPLICATE control statement.
- Remote target volume. A volume used as the target for a Point-in-Time copy replication, which is not directly accessible by the Replicator Master System. Softek Replicator performs the replication by transmitting volume data to a remote Replicator session, using TCP/IP.
- All volumes of a replication must be on-line.
- No user may be allocated to a target volume during replication.
- 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 replication facility. After surveying the state of the industry today, Softek believes that Softek Replicator takes the lead in meeting these requirements.

## Softek Replicator

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

The following figure: *Host-Based Data Replication*; diagrams the principles of host-based data replication as carried out by Softek Replicator.



- Softek Replicator offers full target and source flexibility. All Count Key Data/Extended (CKD/E) capable control units in the data center can participate in replication sessions. This functionality includes Hyper-Volumes and Flexi-volumes.

- Softek Replicator installs dynamically; no IPL is required.
- Softek Replicator sessions are parameter driven.
- Softek Replicator asynchronously copies data to target volumes, in order to minimize performance impact.
- The migration/replication is invisible to applications. Applications continue to access and update the source volume. Softek Replicator asynchronously reflects updates onto the target device.
- Softek Replicator supports multiple system data-sharing environments.
- Softek Replicator guarantees physical data integrity with ongoing internal heartbeat monitoring, error detection, and recovery capability.
- Softek Replicator ensures that the target device dynamically takes over in a swap replication and disconnects from the source when the synchronization point is reached.
- Softek Replicator supports multiple concurrent Softek Replicator sessions, each containing its own Communications Data Set (COMMDS) and parameter inputs. Agent systems only access the COMMDS; they have no parameter input.

Softek Replicator 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 Replicator session identifies the parameter input and the COMMDS. The Softek Replicator 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 replication 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 involved 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 replication, 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.
- Conduct Parallel to ESCON or FICON replications, a very important consideration when implementing RAID storage technologies.
- Batch window reduction.

## Operating System Support

Softek Replicator supports operating system environments R2.10.0 and z/OS Version 1. The link to the Operating Systems Support Matrix is located at

[www.softek.com/en/support/replicator/zos/matrix.html](http://www.softek.com/en/support/replicator/zos/matrix.html)

## Storage Requirements

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

## Performance Considerations

Refer to *Chapter 3: Softek Replicator 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 Replicator includes various controls and checks that ensure that the user does not assign or direct conflicting migrations to the same devices, or attempt migrations to non-existent devices.

Softek Replicator 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

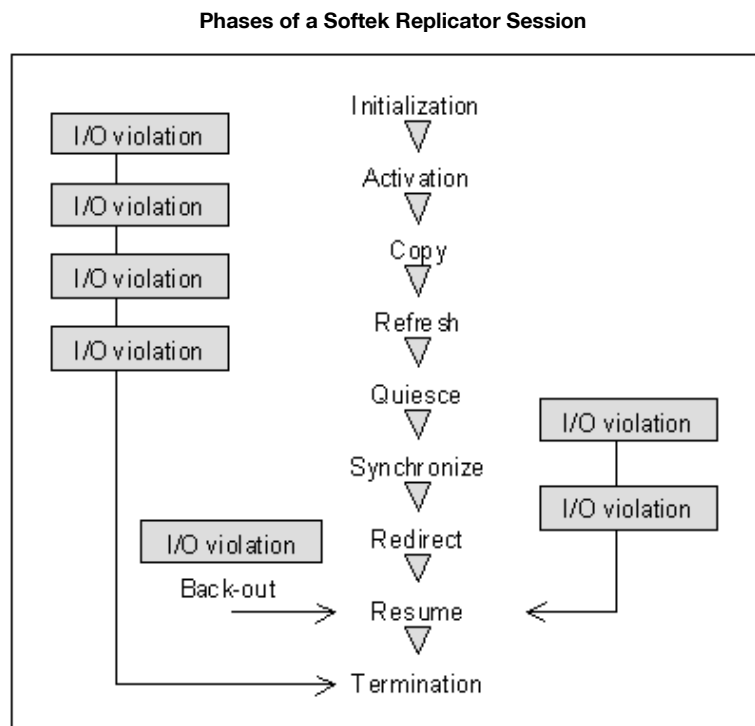
- Initialize the Softek Replicator Master system environment and the COMMDS.
- Start and control each session for all participating systems.
- Monitor source volume user I/O activity to detect updates.
- Monitor target volume user I/O activity to prevent updates.
- Copy data from the source volume to 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 Replicator Agent environment and establish communications to the Master system, via the COMMDS.
- Acknowledge and process replication requests from the Master system.
- Monitor source volume user I/O activity and detect updates.
- Monitor target volume user I/O activity to prevent updates.
- 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 Replicator Session*; summarizes the Softek Replicator replication process flow.



## Major Phases of Replication

### The SYSTEM INITIALIZATION Phase

Only after successful initialization of all systems in a Softek Replicator session does migration/replication proceed asynchronously. If any violation occurs during system initialization on any system defined in the session, no replications or replications 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 Replicator 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 Replicator 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 replication session fails SAF, the replication session will fail system initialization.

SAF requirements are:

1. Swap type replications require ALTER authority on the source and target volumes.
2. Point-in-Time replications require READ authority for the source volume and UPDATE authority for the target volume.

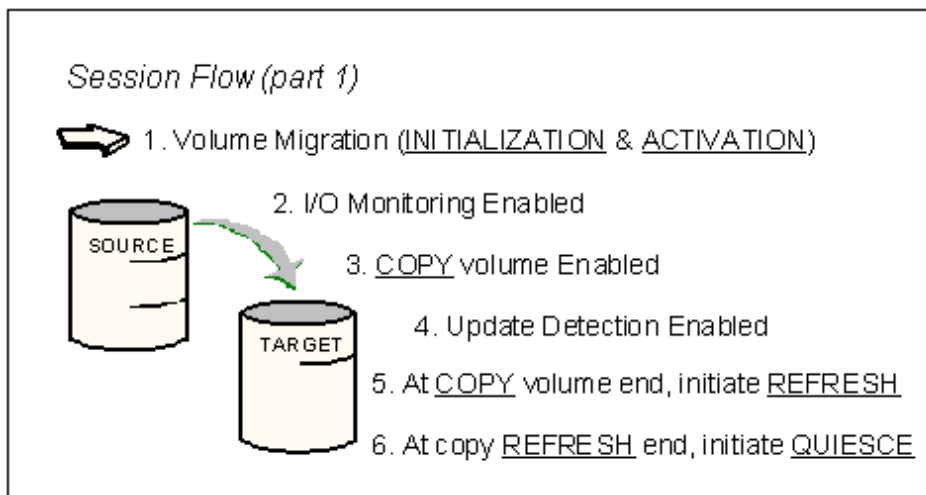
In addition, if the History option has been selected to automatically record information about the replication session, the actual recording requires UPDATE authority for the data set specified in the History option entry. For more information regarding these functions, refer to the Security and System Authorization Facility entries in Chapter 2.

The Master system initiates and controls all replications. It is useful to break out a replication into major phases, as explained in the following paragraphs.

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

The following figure: *Session Flow - part 1*; 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 Replicator 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, group options and Bypass PPRC. These options are discussed later in this manual.

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

## The ACTIVATION Phase

Start the copy task and enable user I/O activity monitoring.

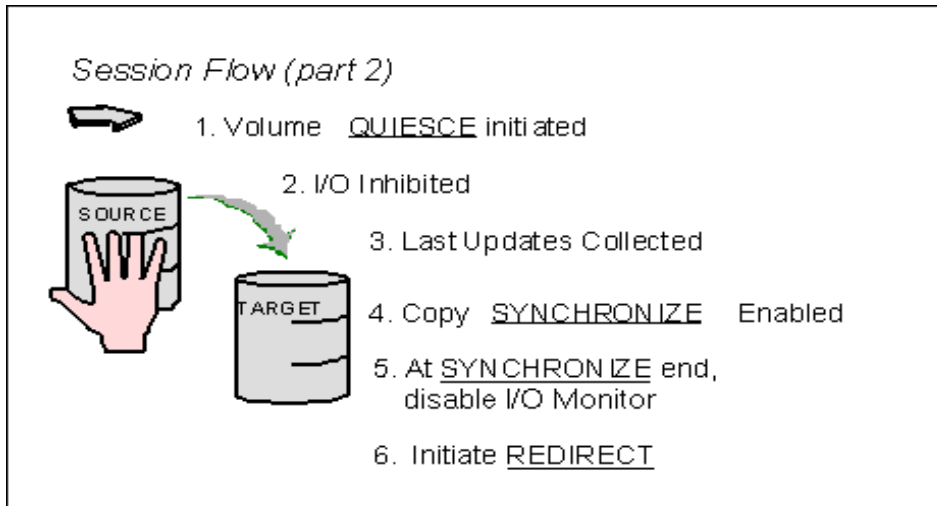
Next the Master system begins a COPY volume task to copy data from the source volume to the target volume. There is an independent COPY volume task for each source volume in the replication session.

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 Replicator 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*; depicts the QUIESCE and SYNCHRONIZATION phases of the Session Flow.

### Session Flow - part 2



### The QUIESCE Phase

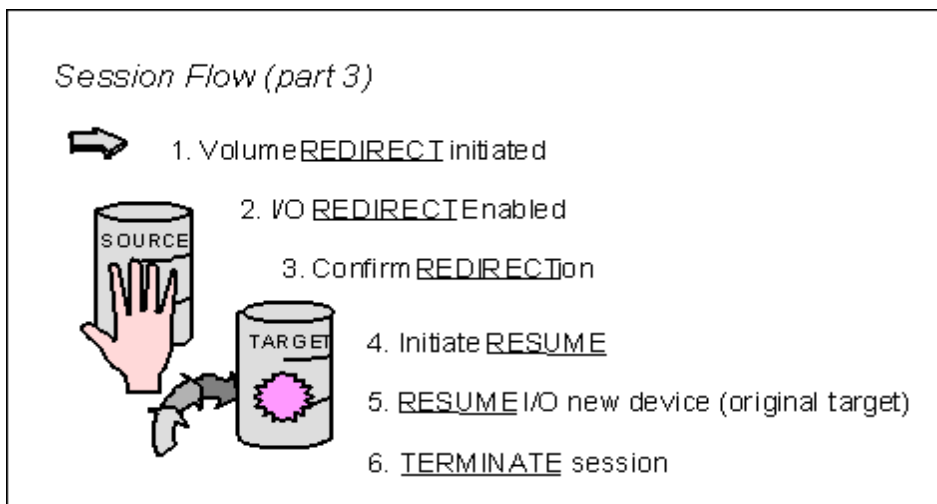
At this point, the Master system tells all systems to stop all I/O activity to the source volume.

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*; shows the REDIRECT, the RESUME, and TERMINATION phases of the Session Flow.

### Session Flow - part 3



## The Volume I/O REDIRECT Phase

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 performs redirect processing.

Softek Replicator causes I/O activity to redirect to the target volume. This makes the target volume the new source volume in a replication. In a Point-In-Time replication session, this phase does not take place.

## 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 appropriate volume is marked off-line and the session enters TERMINATE phase.

## The TERMINATE Phase

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





# Softek Replicator Installation

---

Pre-Installation Considerations	15
SMP Naming Conventions	21
Installing Softek Replicator	22
Maintenance Overview	25
Post-Installation Tailoring	27
Preparing to Execute Softek Replicator	30
Replicator Control Statements	47
SESSION Control Statement	35
REMOTE Control Statement	41
GROUP Control Statement	52
MIGRATE Control Statement	44
REPLICATE Control Statement	46





# Installation Introduction

## Distribution Media; Methods of Unloading

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

Softek Replicator can be downloaded from the FTP server. The URL for the FTP server is furnished upon request 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 Replicator 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 Replicator Files, Names, and Contents**

File#	Data Set Name	Description
1	SMPMCS	Replicator SMP/E Modification Control Statements
2	TDR3500.F1	Replicator SMP/E JCLIN
3	TDR3500.F2	Replicator Load Modules
4	TDR3500.F3	Replicator REXX Execs
5	TDR3500.F4	Replicator Monitor Panels
6	TDR3500.F5	Replicator Monitor Keylists
7	TDR3500.F6	Replicator Monitor Messages
8	TDR3500.F7	Replicator JCL Skeletons
9	TDR3500.LOAD	Replicator Load Modules
10	TDR3500.SAMPLIB	Replicator Sample Library
11	TDR3500.SMP.PTF	Replicator SMP/E PTF File
12	TDR3500.NONSMPTF	Replicator non-SMP/E PTF File
13	TDR3500.TIB	Replicator TIBs – PDF Format

### Softek Replicator Files, Names, and Contents *(Continued)*

File#	Data Set Name	Description
14	ML145060.BOOK	Replicator Installation & Reference Guide – BookManager format
15	ML145060.PDF	Replicator Installation & Reference Guide – PDF Format
16	ML145060.PDF.A4	Replicator Installation & Reference– PDF Format– A4
17	ML145061.BOOK	Messages & Codes – BookManager Format
18	ML145061.HTML	Messages & Codes – HTML Format
19	ML145061.PDF	Messages & Codes – PDF Format
20	ML145061.PDF.A4	Messages & Codes – PDF Format - A4
21	SMPMCS	Session Assistant SMP/E Modification Control Statements
22	TXA1200.F1	Session Assistant SMP/E JCLIN
23	TXA1200.F2	Session Assistant Load Modules
24	TXA1200.F3	Session Assistant REXX Execs
25	TXA1200.F4	Session Assistant Monitor Panels
26	TXA1200.F5	Session Assistant Monitor Messages
27	TXA1200.F6	Session Assistant JCL Skeletons
28	TXA1200.SMP.PTF	Session Assistant SMP/E PTF File
29	TXA1200.NONSMP.PTF	Session Assistant non-SMP/E PTF File
30	ML145094.BOOK	Session Assistant manual - BookManager Format
31	ML145094.HTML	Session Assistant manual - HTML Format
32	ML145094.PDF	Session Assistant manual - PDF Format
33	ML145094.PDF.A4	Session Assistant manual - PDF Format -A4

**NOTE** For those users choosing to install Replicator Session Assistant, please refer to the *Softek Replicator 1.2 Session Assistant for z/OS (ML-145094)* for instructions.

## Operating System Requirements

Softek Replicator 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/replicator/zos/matrix.html](http://www.softek.com/en/support/replicator/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 94, 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 Replicator operation.

Required IBM Maintenance:

[www.softek.com/en/support/replicator/zos/apars.pdf](http://www.softek.com/en/support/replicator/zos/apars.pdf)

Technical Information Bulletins:

[www.softek.com/en/support/replicator/zos/v350/tibs.html](http://www.softek.com/en/support/replicator/zos/v350/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 Replicator are as follows:

### Softek Replicator 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	96K	Both	System initialize	System terminate	MAIN control block
ECSA 241 key 8	Above	8K	Both	System initialize	System terminate	Replicator TSO Monitor
ECSA 228	Above	64K	Both	System initialize	System terminate	MAIN control record
ECSA 228 See Footnotes	Above	nK	Master	System initialize	System terminate	MSVE record -nK <sup>1</sup> *# of Agents
ECSA 228	Above	20- 112KB	Both	System initialize	Volume terminate	VRNQ control block – per volume pair
ECSA 228	Above	4K	Both	System initialize	Volume terminate	WORK control block – per volume pair
ECSA 228	Above	4K	Both	System initialize	Volume terminate	VMSG control block – per volume pair
ECSA 228	Above	1K	Both	System initialize	System terminate	DDTV control block

**Softek Replicator Storage Requirements** *(Continued)*

<b>LOCATION SUBPOOL KEY</b>	<b>ABOVE OR BELOW 16 MB LINE</b>	<b>SIZE</b>	<b>MASTER AGENT OR BOTH</b>	<b>PAGE FIXED WHEN</b>	<b>PAGE FREED WHEN</b>	<b>USAGE</b>
CSA 228	Below	256 bytes	Both	System initialize	System terminate	DDTR control block
Private	Above	4K (min) 64K (max)	Master	System initialize	System terminate	Replicator communications CCW – Number of systems / 2 * 4K (rounded up)
Private	Above	4K	Agent	System initialize	System terminate	Replicator communications CCW
Private	Above	12K	Both	System initialize	System terminate	Replicator common I/O areas
Private	Above	4K (min) 8MB (max)	Master	System initialize	System terminate	VRNQ I/O area - Number of systems * Number of volume pairs * 4K <sup>2</sup>
Private	Above	nK	Master	Volume initialize	Volume terminate	VRBM control block – per volume pair <sup>3</sup>
Private	Above	900K <sup>4</sup>	Master	Volume initialize	Volume terminate	Cylinder I/O – per volume pair <sup>5</sup>
Private	Above	60K	Master	Volume initialize	Volume terminate	Track I/O area – per volume pair

**Softek Replicator 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	Above	32K	Master	Volume initialize	Volume terminate	Copy task CCW area – per volume pair

1. For the Master system, where 'n' is the number of volumes in the session.
  - 10 or less volumes = 4K
  - 21 or less volumes = 8K
  - 32 or less volumes = 12K
  - 42 or less volumes = 16K
  - 53 or less volumes = 20K
  - 64 or less volumes = 24K
2. When possible, Softek Replicator 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 Replicator will obtain storage above the 2GB bar 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 replication will be allocated.

Therefore, if 16 3390-3 volumes are being replicated with two systems involved, and Offline Volume Access has not been selected, the storage requirements for the Master and Agent system are:

**Master system:**

**Base storage:** 329K above the 16MB line  
256B CSA below the 16MB line

**Plus volumes:** 17472K above the 16MB line (1092K per volume)

**Total:** 17801K above the line plus 256B CSA below the line

**Agent system:**

**Base storage:** 193K above the 16MB line  
256B CSA below the 16MB line

**Plus volumes:** 832K above the 16MB line (52K per volume)

**Total:** 1025K above the line plus 256B CSA below the line

**NOTE**

Storage requirements can be calculated via an Excel spreadsheet located at:  
[www.softek.com/en/support/replicator/zos/tools.html](http://www.softek.com/en/support/replicator/zos/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 Softek Replicator V3R5.0 is TDR3500, which is registered with IBM Corporation.

### PTF and APAR SYSMOD IDs

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

- **PTF:** A set of module replacements. The Softek convention for the SYSMOD ID of a service SYSMOD is TRvrynn, 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: TR35301
- **APAR:** Provided in Superzap format. Example: PRxxxxx (where xxxxx is the Problem Report number)

## Installing Softek Replicator

### ► Step by Step installation of Softek Replicator:

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

```
//COPY          EXEC PGM=IEBCOPY
//SYSPRINT      DD  SYSOUT=*
//INSAMP        DD  DSN=TDR3500.SAMPLIB,
//              VOL=SER=tvolsesr,
//              UNIT=unit,
//              LABEL=(10,SL),
//              DISP=OLD
//OUTSAMP       DD  DSN=HLQ.SDR350.SAMPLIB,
//              VOL=SER=dvolsesr,
//              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 SDRPEDIT EXEC.

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

SDRPEDIT contains an ISREDIT macro. ISREDIT variables start in column 16. The value used to replace the variable starts in column 36 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. SDRPEDIT 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 Replicator data set names.
- SDR350 is the second level qualifier of the data set names (SDR350 stands for Softek Replicator Version 3 Release 5 Modification 0).
- USER-CAT-NAME is the user catalog that will contain the catalog entries for the Softek Replicator 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 SDRPEDIT 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 SDRPEDIT 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 Replicator 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 Replicator data sets.

The sample JCL in SAMPLIB member ALLOC performs the allocation of the Softek Replicator libraries. If SMP/E is not used to install Softek Replicator, 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 Replicator 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 Replicator target and distribution libraries.

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

---

**NOTE** HLQ.SDR350.ATDMLLIB has new DCB attributes. If a prior release of Softek Replicator is being replaced, it is important that this file is recreated. Failure to do so will result in errors during ACCEPT processing.

---

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 Replicator product.

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

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

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

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

The following procedure will create a complete and separate SMP/E environment for Softek Replicator. 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 Replicator using SMP/E is the following:

1. Edit ALLCSMP with the SDRPEDIT exec and submit (allocates MTS, PTS, SCDS, STS, LOG and LOGA data sets).
2. Edit SMPE with the SDRPEDIT 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 SDRPEDIT exec and submit (calls SMPE).
4. Edit DDDEF with the SDRPEDIT exec and submit.
5. Edit SMPEREC with the SDRPEDIT exec and submit.
6. Edit SMPEAPK with the SDRPEDIT exec and submit.
7. Edit SMPEAPP with the SDRPEDIT exec and submit.
8. Edit SMPEACK with the SDRPEDIT exec and submit.
9. Edit SMPEACC with the SDRPEDIT exec and submit.

## Installing Softek Replicator 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 Replicator maintenance is provided in object module format and PE zaps. For more information, refer to *Maintenance Overview* on page 25.

## Security

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

Limiting access to the Softek Replicator authorized library in order to prevent unauthorized use of the Softek Replicator system may be accomplished through security packages.

The library pointed to by the SECCOM DD statement (SDRLLIB) must have UPDATE authority for the SYSOPTN batch job or, when updating keys via Option 10 of the Softek Replicator TSO Monitor.

When Trial Express keys are in use, the user must have UPDATE authority for the load library (SDRLLIB).

If the History option is selected, UPDATE authority is required for the data set specified in order for Softek Replicator to update that data set. When viewing the history file (and any COMMDS) via the Softek Replicator 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 Replicator system defaults, please see Softek Replicator System Defaults and Control Records on page 29, the table; Softek Replicator System Defaults and Options on page 30.

For a Swap migration, ALTER authority or the equivalent must be in effect for the source and target volumes. For a Point-in-Time replication, the source volume must have READ authority and the target volume must have UPDATE authority. Error messages will be issued for all volumes not meeting these requirements in a session.

Softek Replicator checks for two different types of classes: CLASS=DATASET for the COMMDS history data set and the Softek Replicator 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 SDRLIB (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/replication, the entire session will terminate.

## Maintenance Overview

Softek Replicator 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/replicator/zos/v350/ptf.html](http://www.softek.com/en/support/replicator/zos/v350/ptf.html) or [www.softek.com/en/support/replicator/zos/v350/pe.html](http://www.softek.com/en/support/replicator/zos/v350/pe.html).



### Important:

An up to date installation consists of the following:

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

## Determining the Product PTF Level

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

- Option U.7 - Support Utilities, System Change Summary
- Option 10 - Display/Modify Installation Security Environment
- Messages SDR1722I, SDR1727I and SDR1728I contained within the sysout or the Communications Data Set (COMMDS) from a previous execution of Softek Replicator.

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

**CAUTION:**  
Softek strongly recommends that all Softek Replicator 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/replicator/zos/register.html](http://www.softek.com/en/support/replicator/zos/register.html)
- PTF downloads:  
[www.softek.com/en/support/replicator/zos/v350/ptf.html](http://www.softek.com/en/support/replicator/zos/v350/ptf.html)
- PE zap downloads:  
[www.softek.com/en/support/replicator/zos/v350/pe.html](http://www.softek.com/en/support/replicator/zos/v350/pe.html)
- Softek Replicator home page:  
[www.softek.com/en/support/replicator/zos/index.html](http://www.softek.com/en/support/replicator/zos/index.html)
- Maintenance Methodology:  
[www.softek.com/en/support/replicator/zos/pm.html](http://www.softek.com/en/support/replicator/zos/pm.html)

## Post-Installation Tailoring

1. Apply the most current Softek Replicator PTF as described in *Maintenance Overview* on page 25.
2. Review the README file and the *Software Installation Release Notes* (SIRN) for any special instructions.

3. Make the SDRLLIB library an authorized program library.

If the HLQ.SDR350.SDRLLIB is to be placed in the system linklist (LNKLSTxx), the STEPLIB DD card may be removed from the JCL when executing Softek Replicator. If HLQ.SDR350.SDRLLIB is to be placed in PROGxx or IEAAPFxx of SYS1.PARMLIB, then the STEPLIB DD statement is necessary.

The Softek Replicator modules (the members in HLQ.SDR350.SDRLLIB) can also be copied to an existing authorized library, if HLQ.SDR350.SDRLLIB is not APF authorized.

4. Allocate the Communications Data Set.

The Communications Data Set (COMMDS) is used to pass information between systems participating in a Softek Replicator 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 Replicator TSO and Batch Monitors.

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 70).

Softek Replicator 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 80 or *Global Resource Serialization* on page 86 for details.

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

$$CYLS = (2.5 * N) + K$$

Where:

N = the number of participating systems

K = is the size of the source volumes involved

3390-3, K = 10

3390-9, K = 15

3390-27, K = 36

For example: 5 3390-3 and 5 3390-9 volumes across 7 LPARs,

$$CYLS = (2.5 * 7) + 15 \text{ (always use the largest device type in session)}$$

$$CYLS = (17.5) + 15$$

$$CYLS = 32 < \text{-- note round down}$$

---

**NOTE** The formula calculates for 64 volumes in a session, therefore, there is no variable for the number of volumes in a session.

---

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 (*Softek Replicator System Defaults* on page 47).

6. Modify member SDRP in data set HLQ.SDR350. SDREXEC which was unloaded in the installation step. Enter the correct high-level qualifier.

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

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

**SDRPROF:** This member is normally present, but not required. It contains information that the Softek Replicator 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 SDRP of HLQ.SDR350.SDREXEC must appear as, secty = “HLQ.SDR350.SDRLLIB” 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 Replicator will be executed, authorization key(s) must be requested for each CPU authorized to execute Softek Replicator. The keys can be requested from the technical support web page at [www.softek.com/en/support/replicator/zos/index.html](http://www.softek.com/en/support/replicator/zos/index.html).

Please be prepared to provide the following information:

- CPU Serial Number(s) [see *Appendix B: Determining CPU Serial Number*] and CPU Model Number(s) [also from *Appendix B: Determining CPU Serial Number*]
- DASD Subsystem Serial Number(s) [see *Appendix E: Determining DASD Subsystem Serial Number*]
- Site ID or number
- Company Name
- Location of Site
- Name
- Phone Number

Softek Replicator support can be reached as follows:

- Log calls directly on the web Call Tracking Center at [www.softek.com/en/support/tracking/](http://www.softek.com/en/support/tracking/)
- E-mail technical support at [ReplicatorSupport@softek.com](mailto:ReplicatorSupport@softek.com)
- Call technical support directly. The phone number to call for the Softek 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 Replicator, enter the following command from Option 6 of ISPF: EXEC 'HLQ.SDR350.SDREXEC(SDRP)'. If the keylist option is not enabled, the Softek Replicator 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 Replicator

### Sample Jobs

Member SYSOPTN contains the input statements for the Softek Replicator System Defaults as well as examples of Softek Replicator keys. Software keys must be provided in order for Softek Replicator to execute in the installation. Options that can be over-ridden in a session are marked in bold. Any option not in bold cannot be overridden for a session and must be reset via the SYSOPTN batch job.

The Softek Replicator V3.5 load library (SDR350.SDRLLIB) may be updated with the SYSOPTN batch job. The SYSOPTN batch job will reinitialize the security record with PARM=NEW or update the security record using PARM=UPDATE.

Review and select the Softek Replicator System Defaults listed in the tables *Softek Replicator System Defaults and Options* on page 48. This applies to those installations using Softek Replicator 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.

In the SYSIN control statement, there is an optional OPTIONS card, followed by the SYSTEMS card. There is only one MASTER SYSTEMS card which may be followed by one or more Agent SYSTEMS card(s). All systems that have access to the source and target volumes must be included. Softek Replicator will not monitor I/O from a system that is not specified in SYSIN. Source and target volumes must be online to the Master system and all 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 Replicator session. Please ensure that a reasonable amount of time is allowed for each Softek Replicator 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 four different types of authorization keys for Softek Replicator:

- license keys
- vendor keys
- express keys
- trial express keys

## LICENSE KEYS

The first license key must be installed using batch job SYSOPTN. Subsequent license keys may be added or deleted via the Softek Replicator 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 Replicator Full Function license keys may be deleted via the Softek Replicator TSO Monitor. See *Option 10 - Modify Installation Security Environment* on page 190 for details. The SYSOPTN batch job may be executed on a CPU that will not be running Softek Replicator.

If a license key is issued and the KEYnn value is changed from what was provided by Softek, message “SDR4611 00000008 was the return code from authority checking” will be issued. Correct the key number to what was provided and re-run the job.

## VENDOR KEYS

Vendor keys, such as those used with “Softek Replicator For Platinum” (RFP) or SDRF/Virtual, can only be added via the SYSOPTN job. The SYSOPTN batch job may be executed on a CPU that will not be running Softek Replicator. Vendor keys will only allow the migration/replication of any vendor DASD device to a specified vendor device. Vendor keys may not be deleted via the Softek Replicator TSO Monitor.

The format of a Vendor key is KEYnn=xxxxxxxxxxxxxxxx. An additional control card precedes this key which defines the vendor DASD subsystem.

Softek Replicator will issue an informational indicating that a vendor key is in use.

If a vendor key is issued and the KEYnn value is changed from what was provided by Softek, message “SDR4611 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

Express keys to be used with the Softek Replicator – 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 Replicator as the Master system. Express keys will only allow a certain number of DASD volumes to be migrated/replicated within a specified time frame. Express keys may not be deleted via the Softek Replicator TSO Monitor.

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 “SDR4611 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 Replicator Master system batch jobs must be run on the CPU authorized to execute Softek Replicator.

---

## 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 Replicator as the Master system. Trial Express keys will only allow a certain number of DASD volumes to be migrated/replicated 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 Replicator TSO Monitor.

Softek Replicator 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 “SDR4611 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 Replicator Master system batch jobs must be run on the CPU authorized to execute Softek Replicator.

---

## WHEN KEYS EXPIRE

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

The Softek Replicator authorization program (SDRPAKEY) 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.

Enter the above information as well as the appropriate key(s). It is recommended that the keys be verified prior to submission of the job. This job must be executed in order for Softek Replicator to operate. Return codes from the SYSOPTN batch job can be found in *Appendix C: Authorization Return Codes*.

## Replicator Control Statements

There are five Softek Replicator 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 syntax, refer to *Appendix H: How to Read Syntax Diagrams*.

## Required and Optional Control Statements

**NOTE** In a remote Replicator session, only the SESSION statement can be used.

### Required Control Statements

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

- **SESSION**  
For information about the SESSION statement, refer to *SESSION Control Statement* on page 35.
- **MIGRATE and/or REPLICATE**  
For information about the REPLICATE control statement, refer to *REPLICATE Control Statement* on page 46. For information about the MIGRATE control statement, refer to *MIGRATE Control Statement* on page 44.



**CAUTION:**

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

### Optional Control Statements

Optional control statements are as follows:

- **REMOTE**  
For information about the REMOTE control statement, refer to *REMOTE Control Statement* on page 41
- **GROUP**

For information about the GROUP control statement, refer to *GROUP Control Statement* on page 41

## Ordering the Input of Control Statements

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

1. The SESSION control statement must appear first; it provides an optional session name, the SMF identifiers of the Master and Agent systems, the Communications Dataset name (if omitted, the name is extracted from the session's JCL), options applicable to the session itself, and default settings for volume migration and replication options.
2. The REMOTE control statement must immediately follow the SESSION control statement. It provides a remote system name for subsequent GROUP and REPLICATE control statements as well as TCP/IP network address and port information for connection to the remote system and an optional connection password.
3. A GROUP control statement can precede a number of MIGRATE or REPLICATE 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. The grouped volumes must not be specified using a mixture of MIGRATE and REPLICATE control statements. A maximum of 32 GROUP statements may be supplied in a session.
4. 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. The MIGRATE statement also provides options that apply to this volume migration alone. No MIGRATE statements may be specified in a session that contains a REMOTE statement.
5. A REPLICATE control statement specifies a volume Point-in-Time replication. If it is to be treated as a single (ungrouped) volume, the REPLICATE control statement must precede any GROUP statements in the input stream. If a remote system is provided on the control statement, the second or only target volume is assumed to be located at the remote system. If two target volumes are supplied, but there is no remote system, a duplex local volume copy will be made. Options specified on this control statement are applicable only to this single volume replication and override any options specified on the preceding GROUP and SESSION statements as well as the installation default options.

## SESSION Control Statement

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

### SESSION Format

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

      +-NOPASSword-----+
      +-NOPSWD-----+
>--+-----+-----+-----+----->
  +-+PASSword+(remote_password)-+ +-SYSCOM(dataset_name)-+
  +-PSWD-----+

>-----+-----+-----+----->
      +-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.



#### CAUTION:

The TCP/IP connection password can be specified only in a remote Master job.

## 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 and replication defaults with session-wide applicability.

Following are the options that can only be specified on the SESSION control statement:

```

                    +-NOALLOWINValidcounts-+
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| |                               +-Warning---+ | +-ALLOWINValidcounts---+
+-UNIDENTifiedsystems (+-Error-----) -+
| |                               +-Ignore----+
| |                               +-Terminate-+
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-NOICKdsf-+      +-NOPAcIng-----+
>-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-ICKdsf---+ |          +- (NORMal) --+ | | |
| |          +-PACing+-----+ | | +-RELABeL (xx) -+
| |          +- (REVerse) -+
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-NOCHECKTarget-+      +-NOMONITORXRC-+
+-NOCHKTarget---+      +-NOXRC-----+
>-----+-----+-----+-----+-----+-----+-----+-----+-----+
+-CHECKTarget---+      +-MONITORXRC---+      +---TIME (+-GMT---+) -+
+-CHKTarget-----+      +-XRC-----+                  +-LOCAL-+
|-----+-----+-----+-----+-----+-----+-----+-----+-----+
| | | | | |
+-SINGLEgroup-+ | | | +-CONCurent+-+ (nn---+-----+---) -+
| | | | | | +-CNCrNT-----+      +-ACTIVE-+

```

## SESSION Options

Parameter	Function	Options	Default
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.	Ignore Warning Error Terminate	Warning
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.

**SESSION Options** (Continued)

Parameter	Function	Options	Default
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.
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 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.
Check target volume is empty	Causes initialization to fail if a target volume contains user data.		No check is performed.
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.
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.

**SESSION Options** *(Continued)*

Parameter	Function	Options	Default
Single group	Treats all volumes in the session as a single group, with a group id of <b>SINGLE</b> .		Volumes are processed individually, or grouped using the <b>GROUP</b> statement.
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).		All volumes can be initialized and be migrated concurrently. If a number is provided without the <b>active</b> option, an initialized volume will be counted as part of the concurrent limit until its migration terminates.
<hr/> <p><b>NOTE:</b> Most of the defaults described in this table can be modified in the <b>SYSOPTN</b> job.</p> <hr/>			



## Common Options

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

```

+-NOCONFirm-+      +-NOPRomp t-+      +-NO COMPARE-+
|-----+-----+-----+-----+----->
+-CONFirm---+      +-PRomp t---+      +-COMPARE---+

+-NOAUTOOperatiOns-+
+-NOAUTOOPS-----+      +-NOTERMGRoup-+      +-NOFASTcopy-+
>-----+-----+-----+-----+----->
+-AUTOOPS-----+      +-TERMGRoup---+      +-FASTcopy---+
+-AUTOOperatiOns---+

+-NOPurge-+      +-NOCOMPRESSiOn-+      +-NOOVA-+      +-NOPPIT-----+
>-----+-----+-----+-----+----->
+-Purge---+      +-COMPRESSiOn---+      +-OVA---+      +-PERPetual---+
+-PPIT-----+

+-NOALLOWTOnonpprc-+
>-----+-----+-----+-----+-----|
+-ALLOWTOnonpprc---+      |      +---005--+      |
                               +-SYNCgoal (+seconds)-+
    
```

### Common Options

Parameter	Function	Options	Default
Confirmation at volume/group initialization	Request confirmation using the TSO monitor or system operator reply before initializing a volume or group.		No confirmation required.
Synchronization prompt	Request confirmation using the TSO monitor or system operator reply before synchronizing a volume or group.		No prompt issued.
Volume comparison	Compare the source and target volumes after synchronization. This is not intended for production use.		No volume comparison.
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.

### Common Options *(Continued)*

Parameter	Function	Options	Default
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.
Fast copy	Restrict the cylinders being copied from the source volume to those allocated for datasets.		The entire volume, including unallocated cylinders, is copied.
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.
TCP/IP data compression	Utilize software data compression to reduce the amount of physical data transmitted in a TCP/IP replication.		No data compression.
Offline Volume Access (OVA)	Allow OVA registration on Point in Time target volumes in the session.		No OVA.
Perpetual Point-in-Time (PPIT)	Continuously perform new refresh and synchronization cycles on every PIT volume in the session.		No PPIT.
Allow to non-PPRC	Allow migration from a PPRC primary volume to a non-mirrored device.		Initialization will fail if a PPRC source volume will be swapped to a non-PPRC device.
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.

## REMOTE Control Statement

The REMOTE control statement must immediately follow the SESSION control statement. It provides a remote system name for subsequent GROUP and REPLICATE control statements, as well as TCP/IP network address and port information for connection to the remote system and an optional connection password.

### REMOTE Format

The format of the REMOTE control statement is as follows:

```
>>--REMOTE---remote_name---ADDRESS(ip_address)---PORT(port_number)-->
      +-NOPASSword-----+
      +-NOPSWD-----+
>+-----+-----+-----+-----+-----+-----+-----+-----+-----+<<
      +-+PASSword+(remote_password)-+
      +-PSWD-----+
```

### REMOTE Parameters

Specify parameters for the REMOTE Control Record as follows:

- **remote\_name**: The remote system name is required and must not exceed eight characters in length. It need not correspond exactly to any characteristic of the remote system; it is merely used as a label to connect subsequent GROUP and/or REPLICATE control statements to the TCP/IP information on this statement.
- **ip\_address**: The address is a 32-bit IP address specified in the usual manner of four, one to three digit numbers (zero to 255), separated by periods.
- **port\_number**: The port number is a decimal number not greater than 32767 and must correspond to that specified in the remote Master system's execution parameter.
- **remote\_password**: The remote password is a one to 8-character alphanumeric string that will be compared with the password provided on the remote system's SESSION control statement.

## GROUP Control Statement

A GROUP control statement can precede a number of MIGRATE or REPLICATE 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.
- Grouped volumes must not be specified using a mixture of MIGRATE and REPLICATE control statements.

- A maximum of 32 GROUP statements may be supplied in a session.



**CAUTION:**

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

## GROUP Format

The format of the GROUP control statement is as follows:

```
>>--GROUP---group_name-----+-----+----->
                               +-REMote (remote_name) -+
>-----+-----+-----<
      +-OPTions (-|Common Options|---|Volume Options|-) -+
```

## GROUP Parameters

The GROUP statement provides a group name, and can also supply migration options for MIGRATE or REPLICATE 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 or REPLICATE statements for volumes in the group.
- A GROUP statement cannot be used when the SINGLEGROUP option is specified in the SESSION control statement.
- If a **remote\_name** is used, it must match the **remote\_name** used in a previous REMOTE statement. Only one REMOTE control statement can be supplied for a session, and every volume must refer to the remote system name, either directly in the REPLICATE control statement or in the preceding GROUP statement.

## Volume Options

These options can be these can be specified on the GROUP, REPLICATE or MIGRATE statements. The 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 36, are as follows:

```

+-----+
+--NOPacing-----+
|-----+-----+-----+-----+-----+
+-MAXTRacks (+15+) --+   +-PACING+-----+--+
      +-5+
      +-3+
      +-1+
      +- (Fullspeed) +
  
```

### NOTE

For convenience, any option that is valid for the individual MIGRATE or REPLICATE control statements for grouped volumes can be specified instead on the associated GROUP statement. Also, 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 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. If the Fullspeed copy option is requested, either the source or target device(s) will be driven at 100% of its capacity. Without this option, the volume reads and writes will not be performed concurrently, halving the real storage requirement and reducing the impact of the migration on the volumes and associated subsystems.	Normal Fullspeed	No volume pacing

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

## 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.
- No MIGRATE statements can be specified in a session that contains a REMOTE statement.

## MIGRATE Format

The format of the MIGRATE control statement is as follows:

```
>>--MIGRATE---source_volume----->
>-----+target_volume-----+-----+----->
      +-TARget--+(target_volume)--+      +-RELABel--+(new_volser)--+
      +-TGT-----+                      +-NEWvsn---+
>-----+-----><
      +-OPTions (-|Common Options|---|Volume Options|-)-+
```

## MIGRATE Parameters

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.

## REPLICATE Control Statement

A REPLICATE control statement specifies a volume Point-in-Time replication. If it is to be treated as a single (ungrouped) volume, the control statement must precede any GROUP statements in the input stream. If a remote system is provided on the control statement, the second or only target volume is assumed to be located at the remote system. If two target volumes are supplied, but there is no remote system, a duplex local volume copy will be made. Options specified on this control statement are applicable only to this single volume replication and override any options specified on the preceding GROUP and SESSION statements as well as the installation default options.

### REPLICATE Format

The format of the REPLICATE control statement is as follows:

```
>>--REPLICATE---source_volume----->
>--+target_volume--+-----+-----+----->
|                +-duplex_target--+         |
|                +-remote_target--+         |
+-remote_target-----+
|
+-TARGET--+ (-+-----+-----+-----+)-+
+-TGT-----+ +-local_target--+ +-duplex_target--+
              +-remote_target--+

>--REMOte (remote_name) ----->

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

### REPLICATE Parameters

Follow these guidelines when specifying the REPLICATE control statement:

- Each REPLICATE statement defines a Point-in-Time volume migration (replication). The source volume and at least one target volume must be supplied. If a REMOTE statement was supplied and the preceding GROUP statement did not include the REMOTE parameter, then each REPLICATE statement must refer to the remote system name using the REMOTE parameter.
- If two target volumes are specified, the first is a LOCAL target volume and the second is either a volume at a remote location (“REMOTE” specified for volume or group) or a duplex local target. If one target volume serial number is specified, the “REMOTE” specification is used to determine whether it is a local or remote target volume.
- The options that may be supplied on the REPLICATE statement have already been described under *Common Options* on page 39 and *Volume Options* on page 43.



- Any options that are specified in a control statement, which do not apply to the function, will be ignored.

## Softek Replicator System Defaults

The following descriptions concerning System Defaults (SYSOPTN batch job) are for the Softek Replicator licensed product, RFP, other vendor offerings, Softek Replicator 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 Replicator can be displayed via the Softek Replicator TSO Monitor by selecting **Option 9 -Display Installation Options and Environment**.

## System Defaults

## Softek Replicator 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
Replicator VERSION	Must be the first non-comment entry. Specifies what version of Softek Replicator is being executed.	3	Must be specified
Replicator FUNCTION	Specifies what Softek Replicator offering is being executed. Only one function may be specified. It is provided by the Softek Replicator key Administrator.	FULL EXPRESS VENDOR VIRTUAL TRIAL EXPRESS	Must be specified
KEYxx=	Keys provided by Softek in order for Softek Replicator 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 Replicator sessions. These entries can be accessed via the TSO Monitor (see <i>Option 8 - Past Sessions: Communication Data set History</i> on page 187 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 Replicator 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 <i>SMF Recording</i> on page 65 for details).	SMF record number Blank	No SMF recording
DISPLAY TIME AS =	Softek Replicator defaults to GMT time on sysout. Can be set to local time (for information on setting displays to local time, see <i>Option 11 - Display/Modify User's TSO Monitor Options</i> on page 192).	GMT LOCAL Blank	GMT time display
VOLUME PACING REQUIRED =	If pacing is selected, Softek Replicator 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 <i>Dynamic Volume Pacing</i> on page 59 for more information.	YES NO Blank	No pacing
STARTUP CONFIRMATION REQUIRED =	A volume confirmation screen with warning messages (if applicable) for review and approval before a volume migration/replication proceeds.  <b>NOTE:</b> 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 Replicator TSO Monitor.	YES NO Blank	No volume confirmation

**Softek Replicator System Defaults and Options** *(Continued)*

Parameter	Function	Option	Default
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. If this option is selected, group synchronization is implied. Therefore, regardless of prompt or automatic being specified, the volume group will not attempt synchronization until all volumes have reached the synch-ready point. Additionally, the resume phase will not ensue until all volumes are ready to resume (not unlike group synchronization). This is done so that in the event of an error, the proper back-out procedures will occur on those volumes.	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 Replicator use this, Softek Replicator will display specific messages related to start, confirmation, prompts for synchronization and termination on the system console. See <i>Auto-Operations Interface</i> on page 59 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
OVA REGISTRATION INTERVAL =	For every OVA volume, provides a time interval (in minutes) after completion of the Point-In-Time replication during which the 15-minute OVA inactivity time-out will not take effect.	one to four digit number (max is 1440)	Zero
REVERSE PACING =	If “YES” is specified, volumes migrated/replicated 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 Replicator criteria.	YES NO Blank	No

**Softek Replicator System Defaults and Options** *(Continued)*

Parameter	Function	Option	Default
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 Replicator 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.	Ignore Warn Terminate	Warn
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

## Running Softek Replicator

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

Softek Replicator batch jobs or STCs can be submitted in any order. It is recommended that the Master batch job is submitted first, however, if an Agent batch job is submitted before the Master batch job, the Agent job(s) will wait until the Master has started. There is a 15-minute window after any job being submitted that the other batch jobs must be submitted. If after 15 minutes, the Master or any attached Agent job has not properly initiated for any reason, the session will be terminated. This will include any Master or Agent system(s) that 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 Replicator session, but may be migrated/replicated in a separate Softek Replicator session. However, the volume containing the SDRLLIB 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.



**CAUTION:**

If multiple Softek Replicator 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 Replicator

Via the Softek Replicator 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 might take up to a minute for this request to be processed by Softek Replicator, unless the Master and all the Agent systems are active in the same parallel sysplex. See *Option 2 - Current Sessions: User Interaction and Status* on page 162 or page 239 for more details.

**NOTE** If a Softek Replicator session (Master or Agent system) must be terminated for whatever reason, it is strongly recommended that the Softek Replicator 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 Replicator session more than once. When a Softek Replicator session is canceled, Softek Replicator 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 section that follows, Recovering Softek Replicator Devices.

## Recovering Softek Replicator Devices

If a Softek Replicator session was canceled and the source and/or target volumes were left with an invalid DDTSIO pointer or in a quiesced state, it is possible to recover those volumes without an IPL. The following conditions must be true:

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

If the above conditions are true, then resubmit the JCL with PARM=RECOVERMASTER or PARM=RECOVERAGENT. Softek Replicator will attempt to correct the UCBs for those volumes.

If the above conditions are not true, an IPL will be necessary to reset the devices.

## How to check the DDTSIO pointer

1. Start the Replicator TSO Monitor on the system where Replicator 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.....DDR*
          8100D160 40404040 01015210          *a.J. .... *
```

If the DDT “eye catcher” at offset X'0' displays DDTR 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 Replicator Devices.

## Accessing Softek Replicator Manuals

Softek Replicator manuals are available in multiple formats. All Softek Replicator messages and codes are contained within the Softek Replicator TSO Monitor. The *Softek Replicator 3.5 Installation and Reference Guide for z/OS (ML-145060)* and the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)* manuals are available in the formats listed below. Member MANUALS in the Softek Replicator 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 Replicator 3.5 Installation and Reference Guide for z/OS (ML-145060)* and the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)* manual. The data set names for the manuals are:

- HLQ.ML145060.BOOK: *Softek Replicator 3.5 Installation and Reference Guide for z/OS (ML-145060)*
- HLQ.ML145061.BOOK: *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)s*

---

**NOTE**

- 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 Replicator documentation, please refer to the manual *BookManager Read/MVS: Displaying Online Books (SC38-2034)*.

---



## Hypertext Markup Language (HTML)

*Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)* 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.ML145061.HTML: *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

---

**NOTE**

- 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 view and print this book.
- 

## Portable Document Format (PDF)

Softek Replicator 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 Replicator manuals in PDF format are:

- HLQ.ML145060.PDF – *Softek Replicator 3.5 Installation and Reference Guide for z/OS (ML-145060)*
- HLQ.ML145060.PDF.A4 – *Softek Replicator 3.5 Installation and Reference Guide for z/OS (ML-145060)* in A4 format
- HLQ.ML145061.PDF – *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*
- HLQ.ML145061.PDF.A4 – *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)* in A4 format

---

**NOTE**

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.
  2. Use the Adobe Acrobat Reader (Version 4.0 or higher) to view and print these books. If the Adobe Acrobat Reader is not installed, or information is needed for installing and using the Acrobat Reader, refer to the Adobe web site at [www.adobe.com](http://www.adobe.com).
- 





## Softek Replicator Performance Considerations

---

Auto-Operations Interface	59
Dynamic Volume Pacing	59
SMF Recording	65
Copy Functions	65
Application I/O Performance	67
Synchronization Goals	68
Channel Utilization	68
Performance Impact by Phase	69
Placement of the Master System	70
Placement of the Communications Data Set	70
Raid Subsystems and Rank Contention	71
Storage Subsystem Performance	72
Suspend/Continue of a Replication	72
The Softek Replicator Hang Monitor	72
Dynamic Suspension of a Replication	73



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

## Auto-Operations Interface

An auto-operations interface has been provided in Softek Replicator. This is a user-selected option, either as the system default, or 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 Replicator sessions. This may be achieved by using an automated operations package, the user or operator.

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

The messages issued to the MVS system console will either be requiring action (response) designated by SDRnnnnA, informational messages designated by SDRnnnnI, or error messages designated by SDRnnnnE. 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 Replicator TSO Monitor, or if a volume pairing fails, message SDRnnnnE will be issued with a brief explanation.

## Dynamic Volume Pacing

Softek Replicator will dynamically monitor its effect on real storage and source volume utilization. If, during a session, Softek Replicator detects that there is an impact to real storage or source volume I/O operations, Softek Replicator 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/replication to run more slowly due to adjustments made dynamically to real storage or Softek Replicator internal I/O operations. If time is an issue in regard to a volume migration/replication, 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 ( $1000 \times (0.120 + 0.180)$  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 ( $0.120 + 1000 \times 0.240$  seconds). In this example, the I/O of the source volume is faster than the I/O of the target, so the Softek Replicator does not need to wait for any read operation to complete, except the first read operation.

The impact of Softek Replicator 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.

## 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 Replicator I/O operations to the source volume during the copy and refresh phases.

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

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

---

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

**CAUTION:**

When Full Speed Copy is specified as a pacing option for a volume or group, Softek Replicator 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*, below, and *User Specified Pacing Values* on page 62), can be used to reduce the risk of performance problems arising in conjunction with a Full Speed Copy migration.

## Real Storage Pacing

After all I/O pacing decisions have been made, pacing for real storage will come into effect. If the Softek Replicator 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 Replicator 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 Replicator 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 Replicator. Softek Replicator 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 with Full Speed Copy.

## Reverse Pacing

For those volumes experiencing heavy channel utilization, the **Reverse Pacing** option may be specified (see **OPTIONS** or **System Defaults** control card). Reverse pacing means that Softek Replicator will start the volume copy process at one track per I/O operation rather than 15 tracks per I/O.

**NOTE**

Softek Replicator 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**

Storage Requirement	# OF TRACKS READ/WRITE IN A SINGLE I/O			
	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 Replicator (increase/decrease I/O operations and real storage frames) is documented in *Option 5 - Current/Past Sessions: Performance Data* on page 174 or page 246

## User Specified Pacing Values

This enhancement allows the end user to specify to Softek Replicator the number of tracks per I/O operation. The MAXTRacks option of the GROUP, MIGRATE or REPLICATE control statement can be used to set this limit to one, three or five tracks.

## Pacing with Channel Extenders

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

When Softek Replicator 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 Replicator 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 Replicator 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
SDRS9A SDRS9B          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

Remote Device Information                               Source
                                                         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 ---
Percent of Replicator Copy Phase I/O using           :   15    5    3    1
Percent of Replicator Refresh Phase I/O using        :    0   100    0    0
    
```

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 Replicator 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
SDRS9A SDRS9B 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

Remote Device Information Target
Device 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 Replicator Copy Phase I/O using : 0 0 100 0
Percent of Replicator 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 Replicator 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
SDRS9A	SDRS9B			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											
Remote Device Information						Source	Target				
						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 Replicator Copy Phase I/O using :						0	0	100	0		
Percent of Replicator Refresh Phase I/O using :											

## SMF Recording

During a Softek Replicator session, no SMF records are written unless so specified in the system options (*Softek Replicator System Defaults and Options* on page 48). If SMF recording is desired, a user specified SMF record number will be generated for each volume migration/replication. 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 SDRSLIB library member SDRFSMF for assembler, SDRFSASD for SAS. SAMPLIB member SMFSAS contains sample JCL.

## Copy Functions

The user controls when a Point-In-Time replication completes. By default, synchronization starts without user intervention as soon as the synchronization goal can be met. To cause the volume or group to wait for a user response, the session, group or volume PROMPT option must be specified. This option forces a prompt from the Master system to the **Softek Replicator TSO Monitor** (or using 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 Replicator for z/OS TSO Monitor, from the MVS system console, or from the installation's automated operations package.

At the end of a replication, 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 target VOLSER is left in the original source volume's UCB for MVS Display Unit command purposes to help distinguish the offline volume from Softek Replicator versus the normal vary offline which clears the VOLSER. An example of the Display Unit responses follows:

Softek Replicator after a replication 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
```

## Point-In-Time Replication

A Point-In-Time replication is considered a back-up facility only. No swap function occurs between the Source and Target volumes.

At the end of a Point-In-Time replication the original target volume's UCB is marked offline via a bit in the UCB. The target VOLSER is left in the original target volume's UCB for MVS Display Unit command purposes to help distinguish the offline volume from Softek Replicator versus the normal vary offline which clears the VOLSER.

### CAUTION:

Point-in-Time copies should be used on a different operating system from where they were created. MVS will not allow duplicate volume serial numbers, nor will MVS allow duplicate VSAM files due to catalog issues. Please refer to *Chapter 5: Softek Replicator Advanced Functions* for information about Offline Volume Access (OVA) and how this function may be used to access the Point-In-Time copy.

### NOTE

Softek Replicator will allow an Agent system to have target volumes (UCBs) offline in a Point-in-Time session.

## Point-In-Time Replication and Data Bases

When using Point-In-Time with databases, make sure that all volumes are included in the same session, if possible. If a database exceeds the maximum number of volumes per session, a second session may be used to replicate the remaining database volumes. For operational reasons, it would be advantageous to run the Master jobs for all the sessions on the same MVS system. All volumes within the session should be GROUPed, with each session using a different GROUP name. The prompt option is a must in order to ensure logical data integrity.

Before responding to the prompt in a database Point-In-Time session, it is strongly recommended that the application which updates the database, has logically completed all transactions and subsequent transactions are quiesced (or queued) for the brief period of time that is required for the synchronization and termination phases of this process. These actions will not only ensure complete data integrity, but ensures that all logical transactions are correct (for example, no broken chains).

Before using a Point-In-Time replicated volume on another system, the target volume MUST be re-labeled using ICKDSF to the original source name if it contains a VVDS, VVR entries or Indexed VTOC. This is because the entries of these items will contain the source volume name.

The following is an example of how to re-label a volume using the original source volume serial number. If the target volume is larger than the source volume, refer to *ICKDSF* on page 87.

---

**NOTE** This example is for a volume that is OFFLINE.

---

```
//STEP1      EXEC PGM=ICKDSF
//SYSPRINT DD  SYSOUT=*
//SYSIN      DD  *
  REFORMAT UNIT(xxxx) VERIFY(tgtvsn) VOLID(srcvsn)
/*
```

If the target volume serial number is to be used and the target volume is larger than the source volume, the following steps MUST be taken:

1. vary the target volume online to the system
2. run an ICKDSF REFORMAT REFVTOC job

These steps must be done in order. See *ICKDSF* on page 87 for more information. If the source and target device sizes are the same, step 2 above is not necessary.

## 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 replication, it is due to the inability of Softek Replicator 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 Replicator 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.

---

**NOTE** During a replication session, the swap phase is skipped.

---

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 Replicator TSO Monitor (Z or ZG command - see *Option 2 - Current Sessions: User Interaction and Status* on page 162 for examples).

## Channel Utilization

As indicated in *Application I/O Performance* on page 67, Softek Replicator should not impact normal customer I/O operations adversely. However, Softek Replicator 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 Replicator 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 Replicator 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; Replicator 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 Replicator reads the data directly from the volume and by-passes the loading of cache, Softek Replicator 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 Replicator 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 Replicator 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 prestaging 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/replication and their associated time intervals are listed below.

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/Point-in-Time	1 second

Phase	Time Interval
Resume	1 second
Termination	15 seconds

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

The CPU overhead associated with executing Softek Replicator 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 Replicator 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 Replicator Master sessions are 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 Replicator 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 Replicator 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, StorageTek's LSM Control data set) reside.

Softek Replicator periodically issues a reserve macro for the device where the COMMDS is resident and this could impact other applications using the device if the reserve is not converted to an ENQ by GRS. The resource major name used by Softek Replicator is SDRPRESV 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 80 and *Global Resource Serialization* on page 86.



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. The “History” data set, specified using the SYSOPTN job, is a good idea when GDGs are used, as reviewing migration status from the individual data sets can then begin with the **Past Sessions: Display Communication Dataset History** panel on the Softek Replicator TSO Monitor, from which individual generations can be selected for viewing.

**NOTE** Softek recommends that every COMMDS file should be retained or archived until it is certain that the migration or replication was completely successful.



**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 Replicator replication, the performance of that volume replication 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. 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 Replicator 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 Replicator 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 Replicator 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 Replication

If there is a problem with a channel extender or real storage utilization is an issue, it is possible to dynamically suspend the volume or group migration/replication until the network problem or 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 59 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 Replicator I/O operations will be released.

Softek Replicator 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 Replicator I/O operations will be re-acquired at the level Softek Replicator was last using if the pacing option was selected.

## The Softek Replicator Hang Monitor

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

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 Replicator.

**NOTE** With a volume quiesced, for example, while synchronizing the source and target volumes, Softek Replicator 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 SDR9472I, SDR9473I or SDR9474I 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 Replication

Softek Replicator 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 Replicator 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 Replicator detects an I/O timeout condition, Softek Replicator will dynamically place that volume replication in a suspended state. Possible messages that may be issued are SDR3554W, SDR3555W, SDR3556I and SDR3557I. Messages SDR3562W and SDR3563W 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 Replicator TSO Monitor or via the batch utility SDRPBMON in order to re-start the volume pairing.

When the ‘continue’ command is issued, Softek Replicator 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 via the Softek Replicator TSO Monitor or via the Batch Monitor.



# Softek Replicator Planning Considerations

---

CA Products	79
Cache Fast Write and Sort Programs	82
Class Names and Esoteric Names	82
Device States: Before and After a Swap Migration	82
Data Facility Products	83
DFSORT	84
Duplexing Functions	84
Extended Functions	85
EMC Symmetrix Manager	85
File Allocation Managers	85
Global Resource Serialization	86
Host Software Component	86
HCD and IODF Files	86
ICKDSF	87
IMS Write Ahead Data Sets	90

IPL Volumes	90
Invalid Count Fields	90
JES Checkpoint and Spool Volumes	91
JES2 Considerations	91
JES3 Considerations	91
LISTDATA Information	92
Migration of RAID and Non-RAID Devices	93
Migration of RAID and Non-RAID Devices	93
Migration of Unlike Device Types	93
Migration/Replication of Volumes Formatted for VM Use	94
Model 204 Considerations	94
MVS Running under VM	94
Number of Softek Replicator Sessions	95
Number of Groups per Softek Replicator Session	95
Number of Volumes per Softek Replicator Session	95
Page and Swap Data Sets	95
Parallel Sysplex Considerations	96
Peer-to-Peer Remote Copy Support	96
Real Time Monitors	97
Shared versus non-Shared Devices	97

Enterprise Storage Server (ESS) Support	98
Static, Installation Static and Dynamic Devices	100
Shared Virtual Array (SVA) / RAMAC Virtual Array (RVA) Support	101
Softek Replicator Ownership of Target Volume	102
Softek Replicator and Volume Table of Contents	102
Unit Control Blocks Above the 16Mb Line	102
Using Devices Previously Formatted for VM	102
VM Volume Tolerance	102
XRC Support	103





## 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 Replicator session. Possible user action subsequent to a Softek Replicator 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 Replicator. Please contact Computer Associates ASTEX Technical Support for details.

ASTEX V2.8 supports Offline Volume Access in Softek Replicator V2R2.0 and higher.

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 Replicator, 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`, `MIGRATE` or `REPLICATE` 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 Replicator 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*.

## 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 Replicator 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 Replicator 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 Replicator will periodically issue a reserve macro (TDMFRESV) 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:

The reserves for TDMFRESV must not be converted by CA-MIM. Softek Replicator will fail to initialize when CA-MIM is active, and the RESERVE macro does not result in a hardware reserve.

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:

1. 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 86 .

## 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 SDR2363I 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 SDR2596I 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 83 for more details.
- Some applications that use CFW have a facility for turning the option off.

---

**NOTE** Point In Time replications are not terminated if CFW activity is detected. All CFW data will be committed to the source volume by Softek Replicator before being copied to the target.

---

## Class Names and Esoteric Names

Softek SDRF 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. A Point-in-Time session will not require an action so long as the target volume is re-labeled to the original source volume's serial number on a different system and the volume serial number is defined to a class name.

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 either a Swap migration or Point-In-Time replication.

## 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 Replicator 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 Replicator TSO Monitor Feature using Option 3, Current Sessions: Display Messages.

## Data Facility Products

### Control Data Sets

If any of the Data Facility Product's (HSM, SMS, RMM) control data sets (ACDS, BCDS, MCDS, OCDS, etc.) are to be migrated using Softek Replicator, 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.

If any Control Data Sets (xCDS<sup>1</sup>) are to be migrated using Softek Replicator, it is strongly recommended 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 Replicator 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:

IDC21807I	FAILURE DURING LSPACE SERVICE (SVC 78) PROCESSING - RETURN CODE WAS 4
IDC11813I	ERRORS WERE DETECTED FOR VOLSER volser. ERROR BYTE 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 QUIENNEW command, issued against the original source volume(s). Failure to do so will cause errors such as those noted above.

<sup>1</sup>.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.

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.

## DFSort

When using JCL to temporarily turn off CFW, use either the DFSPARM or SYSIN DD statement to do so. This is only valid on 3990 controllers.

Examples:

```
//DFSPARM DD * DEBUG NOCFW or //SYSIN DD * DEBUG NOCFW
```

If the DFSPARM DD statement is used, the SYSIN DD statement is not necessary unless the job requires link editing. For other examples of turning off CFW, please refer to *Cache Fast Write and Sort Programs* on page 82.

For more information on this topic, please refer to the *DFSort Application Programming Guide (SC33-4035)* and the *IBM 3990/9390 Operations and Recovery Guide (GA32-0253)*.

---

**NOTE** Point In Time replications are not terminated if CFW activity is detected. All CFW data will be committed to the source volume by Softek Replicator before being copied to the target.

---

## 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 Replicator will terminate the migration/replication. This includes a duplexing function that is started mid-way through a migration/replication. 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 Replicator 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 Replicator 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)*.

Softek Replicator will terminate a swap migration if concurrent copy I/O is detected on the source volume by the I/O Monitor.

## EMC Symmetrix Manager

If the source or target volumes are controlled by EMC's 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 Replicator to terminate the migration(s)/replication(s) with an error message (SDR2362) indicating an invalid operation code when the Symmetrix Manager issues either a Diagnostic Write (73) or Diagnostic Control (F3) operation code. Message SDR25961 will follow the error message indicating where the invalid operation code came from.

## Consistency Groups

Softek Replicator does not support volumes participating in a Consistency Group at this time. Softek Replicator does plan on supporting this function as soon as possible.

## File Allocation Managers

The Softek Replicator 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 SDR1080S 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

In a multi-system session, Softek Replicator will periodically issue a RESERVE macro for the volume where the Communications Dataset (COMMDS) is resident. If all the participating systems are active in a single GRS configuration, this RESERVE can be converted to a global ENQ by adding the TDMFRESV resource major name to the *Reserve Conversion Resource Name List (RNL)*.



### CAUTION:

Softek Replicator will fail to initialize a session if the Master system is converting the TDMFRESV RESERVE and an Agent system is outside the Master's GRS configuration.

In order to ensure that the reserves Softek Replicator 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 Replicator 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.

For information about other Control Data Sets, see *DFSMS* on page 83.

## 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 Replicator 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 Replicator will dynamically detect the CCW operation codes from this program and terminate that volume's migration/replication. If an ICKDSF function is necessary, terminate the migration/replication for that specific volume via the Softek Replicator TSO Monitor, and then restart the volume migration/replication using the Softek Replicator TSO Monitor or the Batch Monitor.

### Dynamic ICKDSF REFVTOC/EXTVTOC

After a migration, Softek Replicator 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 Replicator System Defaults* on page 47).

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.

---

It is recommended that the following RNL definition be in effect for the migrating systems:

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

If SYSVTOC is not specified in the GRS SYSTEMS Exclusion RNL it should be added to the Reserve Conversion RNL. For successful ICKDSF processing of catalog volumes, the SYSVTOC and SYSIGGV2 resource major names should appear together in either the SYSTEMS Exclusion or Reserve Conversion GRS RNLs (or be treated identically by CA-MIM, if applicable).

### Intent of Dynamic ICKDSF REFVTOC Function

This option is only in effect for migrations where the number of alternate cylinders in the source volume VTOC does not match that of the target device. If a mismatch is not present, no action will be taken.

If a REFVTOC is not performed to tailor the VTOC and its index to the target device, any programs dependent on the alternate track information being correct may fail after the swap, including older versions of DF/DSS (for full volume backups) and DCOLLECT. Later releases of these programs and related z/OS components have become more tolerant of incorrect "device characteristics" information in the VTOC to such a degree that the ICKDSF Release 17 INIT and REFORMAT functions no longer place the device's actual alternate track configuration data into the VTOC: the DS4NOATK and DS4DEVAC fields are always set to zeros (this is fully documented in IBM APAR II11078). As a consequence of this: if ICKDSF Release 17 is installed on the Master system, Softek Replicator will only invoke REFVTOC processing to correct alternate track information in the VTOC when these fields are not already zero.

REFVTOC processing of a volume with an indexed VTOC may change the location and size of the index dataset. In this situation, ICKDSF will indicate to the z/OS allocation component that the description of the VTOC index in the Volume Information Block (VIB) in virtual storage must be refreshed. In order to cause the in-storage description of the index dataset to be reinitialized on each of the other z/OS systems that share the volume, it is a documented requirement to vary the volume offline and online again. Softek Replicator avoids this possible

disruption by processing the VIB on each of the Agent systems while ICKDSF processing is active on the Master system. What can not be prevented is a certain amount of disruption caused by the SYSVTOC reserve being held for the source volume throughout the synchronization, swap and REFVTOC phases.

If a volume has an index dataset that has been disabled for any reason, ICKDSF will consider the volume to be non-indexed:

- The index dataset will be deleted by normal ICKDSF processing.
- The Volume Table of Contents (VTOC) will be rebuilt in OSVTOC format.

To prevent this from occurring, Softek Replicator will invoke ICKDSF for a “BUILIDIX IXVTOC” function before the ‘REFORMAT REFVTOC’. This ‘BUILIDIX’ is only performed if a VTOC index dataset exists on the volume, and if the volume is under SMS control or the index was disabled by a DADSM function.

## Intent of Dynamic ICKDSF EXTVTOC Function

The ICKDSF EXTVTOC option will only be invoked in the case of migrating from a smaller device to a larger device or if a volume had been previously migrated and no REFVTOC had been performed. Only indexed VTOCs are extended. Non-indexed VTOCs, including volumes with damaged indexes, will be ‘REFVTOCed’.

The minimum size of the new VTOC is the greater of the current VTOC size on the source and target. The VTOC may be extended further depending on the number of datasets on the volume:

- If the volume is less than half full, the VTOC will be extended to contain the current numbers of datasets multiplied by the ratio of target to source device size, plus 25%.
- If the volume is more than half full, the VTOC will be expanded to handle the situation where the target volume is full of datasets with the same average size.

If the index needs to be extended, but the VTOC does not, Softek Replicator will attempt to extend the VTOC by one track. If the VTOC cannot be extended because there is a dataset adjacent to it, REFVTOC will be performed unless there is insufficient space in the index for the additional VPSMs.

## How Dynamic ICKDSF REFVTOC or EXTVTOC Functions Affect a Softek Replicator Migration

ICKDSF is invoked on the Master system only 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 SYSVTOC is in RNL(CON), 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 Replicator 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 Replicator Master system will not end until all ICKDSF tasks have completed, although the Softek Replicator 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 Replicator 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 Replicator 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 Replicator will continue to migrate the volume. However, if the direction of the migration is going from ESCON channels to parallel channels, Softek Replicator will terminate that migration session, or the group migration session if the group termination option was specified, with message SDR2297 return code 98, indicating an invalid operation code or parameter regarding the Locate Record Extended operation code.

---

**NOTE** This consideration does not apply to Point-In-Time migrations.

---

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 Replicator 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 Replicator will normally stop copying data, scan the remainder of the source volume (volume analysis) and terminate the volume pairing with message SDR3540E - 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 Replicator migrate/replicate 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/replication 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 Replicator 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 SDRPSCAN be executed against the volume in order to determine where the invalid count fields are.

## JES Checkpoint and Spool Volumes

Softek Replicator 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 per 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 volume per session can migrated/replicated.

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/replicate 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/replication to “hang” during refresh processing. Softek Replicator 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/replication 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 (not required for a Point-in-Time replication) in a Softek Replicator (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 Replicator 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 Replicator will migrate/replicate the volume(s) with no errors. If the bit is on, Softek Replicator 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 replication, 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 Replicator 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 RAID and Non-RAID Devices

Softtek Replicator 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. To avoid this situation, use the Dynamic ICKDSF REFVTOC function.

## 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.

Softtek Replicator 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. Softtek Replicator 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 87.

## Migration/Replication of Volumes Formatted for VM Use

VM volumes can now be copied and relabeled using Softek Replicator on MVS. However, Softek Replicator 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 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 Replicator session, the data integrity of that migration or replication 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 Replicator will detect the fact and terminate the volume with error message SDR2363E – SDRPIMON 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 Replicator 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*.
- Point In Time replications are not terminated if CFW activity is detected.

## MVS Running under VM

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.

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 Replicator.

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

## Number of Softek Replicator Sessions

Softek Replicator 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 Softek Replicator Session

A group must consist of at least two volume pairings and cannot exceed the number of volumes per Softek Replicator 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 Softek Replicator Session

The number of volume pairings per Softek Replicator session is now 64 regardless of the number LPARs participating in the session.

## Page and Swap Data Sets

Softek Replicator will migrate/replicate 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.

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

Softek Replicator will not migrate/replicate 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.

---

---

**TIP** When cloning a system or during a data center relocation/consolidation, we recommend creating these data sets outside the session.

---

## Parallel Sysplex Considerations

Softek Replicator will migrate/replicate 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/replication 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,ACOUPL=’ 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 Replicator will establish an XCF group called “SDRP”, 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 first time Softek Replicator is executed on an MVS system, a system linkage index (LX) is retained for the use of subsequent Softek Replicator sessions, using the MVS name/token facility, and will be valid until the system is next IPLed. The program call linkage the Softek Replicator constructs using this LX enables the Softek Replicator 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 Softek Replicator's use of one of these will not cause a problem.

## Peer-to-Peer Remote Copy Support

Softek Replicator supports sessions where a source or target volume may be involved in a Peer-to-Peer Remote Copy (PPRC) session. The following types of active PPRC sessions will be allowed at initialization of a Softek Replicator session:

- Point-in-Time replications are allowed, regardless of a volume being in a PPRC session or not.

- 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 Replicator migration/replication 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.

## PPRC Device to a Non-PPRC Device

Softek Replicator will allow the migration/replication of a device involved in a PPRC session to a volume not involved in a PPRC session. The ALLOWTONONPPRC option on the SESSION, GROUP or MIGRATE control statement will cause this particular target device validation function to be bypassed. Softek Replicator will require Volume Confirmation for each volume requesting this option. Confirmation may be supplied via the Softek Replicator 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 source volume must be the primary in an active PPRC session if the bypass PPRC option is selected. If it is not, message SDR1581S will be issued and initialization will fail. If the source volume subsequently becomes a primary in a PPRC session, that volume's migration will be dynamically terminated as part of the current Softek Replicator implementation.

Confirmation to allow the migration/replication of a device in a PPRC session to a device that is not part of a PPRC session is to ensure that it is understood that Softek Replicator is not responsible for the potential destruction of the customer's disaster recovery environment.

The "allow swap to non-PPRC device" option is not required to be the same for all volumes in a group.

\*Includes Peer-to-Peer Remote Copy (APRC) on Platinum subsystems.

## Real Time Monitors

After a migration, Softek Replicator 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 Replicator 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 - Multi-Image Manager* and *Global Resource Serialization*, Softek Replicator will periodically place a hardware reserve on the volume containing the COMMDS.

If the COMMD5 for a multi-system session is not placed on a device that is defined as SHARED, Softek Replicator will issue message SDR1386S 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 Replicator migration/replication the PAV feature is dynamically disabled and dynamically re-enabled when the migration/replication 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 Replicator 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 Replicator will migrate/replicate 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 Replicator will not migrate/replicate 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 Replicator will migrate/replicate this volume as if it were in exploitation mode, and the device is eligible as a base PAV volume. Softek Replicator supports both standard and dynamic PAV(s).

Before migrating/replicating 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 Replicator in support of the ESS control unit.

## Migration from ESS to non-ESS

Softek Replicator will issue message SDR1670W 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 SDR1670W 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 Replicator 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 Replicator I/O Monitor, which will dynamically terminate the volume migration.

## Migration from non-ESS to ESS

Softek Replicator will issue message SDR2668W 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 Replicator will NOT issue message SDR2668W if the source UCB is defined a 3390B, and PAV access will be immediately available upon completion of the migration.

Softek Replicator will issue message SDR2667W 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 Replicator 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.

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
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 Replicator does not currently support migration/replication of data, which can be modified by the FlashCopy feature. Customer use of the FlashCopy feature will create a data integrity issue for EITHER volume of a Softek Replicator session. If FlashCopy is invoked during the life of a Softek Replicator session the volume pairings will be terminated.

## 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 Replicator 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 Replicator Swap migration is attempted with different device configurations, message: “SDR1230S - 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 Replicator 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 Replicator 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 Replicator Ownership of Target Volume

Softek Replicator “owns” the target volume during the life of the migration/replication 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 Replicator 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 Replicator and Volume Table of Contents

Selection of the dynamic ICKDSF option will cause Softek Replicator 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 87.

## Unit Control Blocks Above the 16Mb Line

Softek Replicator 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 Replicator in an MVS environment. However, Softek Replicator 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.



Considerations for VM volumes being migrated with Softek Replicator:

Point-in-Time replications:	a copy of the volume contents to another volume which is then marked offline to all MVS systems involved in the replication. Updates to the source may or may not be copied to the target volume.
Swap migrations:	a copy of the volume contents to another volume which is then relabeled with the source volume's serial number. The source volume is also relabeled and marked offline from all MVS systems involved in the migration. Updates to the source volume, which may occur during the migration, may or may not be copied to the target. VM systems, which have access to the source volume at the time of the swap will continue to use the source device until they have cause to reread the physical volume label for example an IPL or vary online command.

## XRC Support

Softek Replicator will allow a volume that is the primary in an XRC session to participate in a Point-In-Time session. This support is part of the Softek Replicator system defaults and is selected in the SYSOPTN batch job. The default for this support is no. Each operating system in the session must support the required level of the ANTRQST macro and its capability to provide the XQUERY (level 5) functions. Softek Replicator will dynamically determine if the proper level is installed and execute accordingly.





# Softek Replicator Advanced Functions

---

Overview	107
Softek Replicator Offline Volume Access	107
Delayed Offline Volume Access	114
Perpetual Point-In-Time	117
Softek Replicator TCP/IP Support	121



## Overview

Softek Replicator Advanced Functions are a set of specialized features that exploit the basic functionality of Softek Replicator. Each advanced function can be separately licensed and purchased. Following is a brief description of what each feature provides.

- The Softek Replicator Offline Volume Access feature acts as an interface between the offline target volume(s) in a Point-In-Time or Perpetual Point-In-Time session and the user specified program.
- Perpetual Point-In-Time expands upon the Point-In-Time copy feature, which allows multiple synchronization points to be taken within the same session. This provides the ability for multiple backups to be taken at various points within the batch cycle, for example.
- Softek Replicator TCP/IP Support enables users to perform a DASD replication using the existing TCP/IP connections within a business environment. Because TCP/IP requires no specialized hardware or dedicated telecommunication circuits, this TCP/IP support enables the elimination of expenses associated with replicating data using specialized channel extension hardware and a telecommunications data link.

## Softek Replicator Offline Volume Access

The Softek Replicator Offline Volume Access feature (OVA) allows for easy processing of a Point-In-Time (PIT) volume copy. With OVA data may be read from the offline target volume(s) while normal processing continues to update the source volume(s). Using OVA, for example, customers can copy or backup to tape full DASD volumes and/or the data bases on them, creating a PIT consistent archived copy, without halting updates to those data bases for the length of time required for backup jobs.

OVA is enabled by specifying the OVA option on the SESSION control statement, or on the GROUP or REPLICATE control statements for the volumes within the Softek Replicator job that are to participate in an OVA session.

The Softek Replicator Interface program (SDRPIPGM) is used to *register* each OVA job to the Softek Replicator session(s) creating (or have created) the PIT copies. Once registration has been completed, a user-specified program is invoked via SDRPIPGM. While this program is active, I/O requests from the OVA job that are directed towards an OVA source volume will be *redirected* to the PIT target volume.

Control statements for SDRPIPGM specify volume serial numbers, which will be included in, or excluded from, I/O redirection. It is also permissible to specify data set names rather than volume serial numbers for the inclusion or exclusion functions, however the entire volume upon which such a data set is resident will always be included or excluded from the I/O redirection.

SDRPIPGM also intercepts reserve and DEQ requests from the invoked program and modifies these to act on the PIT target device.

Explanations of the messages may be accessed using the message help facility (Option H.1 – Softek Replicator Message Detail) within the Softek Replicator TSO Monitor or the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## OVA Purpose

OVA has been designed to allow read access to the Point-In-Time target copy. However, the mechanism does permit updates to be made to the target volume.

---

**NOTE** As soon as the target volume has been changed, it is no longer a valid Point-in-Time volume copy—so, extra care must be taken when scheduling update jobs.

---

One data set, which may be modified on the target volume using OVA, is the Volume Table of Contents (VTOC). This allows the user to rename data sets, for example, on the target volume so that different security profiles may be acquired. In practice, however, because data set allocation for OVA is usually performed before I/O redirection is enabled, most application programs will use data sets that are catalogued as resident on the source volume.

Data sets that are created on the source volume after the Point-in-Time copy has completed are not available to a program using OVA. An attempt to open such a data set will result in Abend code S213-04. For this reason, it is recommended that the source volumes be made ineligible for new data set allocations before the migration is synchronized.

## Starting an OVA Session

A SDRPIPGM job would normally be submitted when migration of its OVA Point-In-Time volumes has completed. In fact it is possible to submit the OVA job up to 15 minutes before submitting the associated Softek Replicator session(s). Once an OVA volume has been synchronized it becomes available for registration by the SDRPIPGM program and remains available until 15 minutes have elapsed without an OVA session registered to any volume in its migration group.

For situations where job scheduling considerations could lead to a delay in starting the first OVA job, or might result in an interval of more than 15 minutes in the OVA job stream with SDRPIPGM not active, the “OVA Registration Interval” installation option should be specified. This guarantees the availability of OVA volumes for registration, from the time the Point-In-Time copy was made, for the number of minutes specified. Once the registration interval has elapsed, the Softek Replicator session(s) will begin normal termination for a migration volume, or prompt the user for a Perpetual Point-In-Time (PPIT) recycle, if the volume or group has already been idle for at least 15 minutes.

The SDRPIPGM is used to register volumes on either the Softek Replicator Master or Agent sessions. A maximum of 85 SDRPIPGM jobs in each Softek Replicator system may be registered to a volume concurrently.

Registration of OVA jobs may be stopped dynamically for a volume or group via the Softek Replicator TSO Monitor (Option 2 – User Interaction and Status) by using the “H” command. If the PPIT option has not been selected, the OVA volume will be terminated as soon as there are no longer OVA jobs registered to it. If the PPIT option has been selected, the Softek Replicator session will issue the “Recycle PPIT” prompt for the volume or group.

In order to access a Point-In-Time target volume via OVA, the volume replication must have been performed with the OVA option enabled. This is achieved by selecting the option on the SESSION, GROUP or REPLICATE control statement.

## Using OVA on different subsystems

Care must be used when defining the source and target volumes for use with OVA. Different subsystems support different functions. For example, a Point-In-Time copy is started where the source is on an ESS subsystem (defined with extended functionality) and the target is resident on a non-ESS subsystem. When the OVA job is started, it will fail due to a mismatch of support functions.

## Multi-volume data sets

It is recommended that all volumes that are to participate in an OVA session should be in the same group. If it is not possible to do so, then the multiple Softek Replicator sessions should be synchronized together. Customer applications should not be restarted until all the sessions are in “OVA Waiting” status.

## Functions of the Softek Replicator Interface Program

The Softek Replicator Interface program (SDRPIPGM) performs the registration and de-registration functions and then attaches the user specified program for which I/O is to be redirected to the target volume. The JCL and control statements necessary for that program must be included to control this processing.

Before registration is attempted, SDRPIPGM builds two lists of volume serial numbers: *inclusion* and *exclusion* lists. The purpose of these lists is as follows.

### Exclusion List

The exclusion list is made up of those volumes that may be allocated to during the course of the job step but is not to be considered for I/O redirection. A volume serial number is placed on the exclusion list for one of these reasons:

1. An EXCLUDE control statement specifies the volume serial number.
2. An EXCLUDE control statement specifies a data set name that is catalogued as resident on the volume.
3. The JCL includes a new data set allocated on the volume.
4. The JCL includes a new data set with disposition MOD, allocated on the volume.

### Inclusion List

The inclusion list contains the volume serial numbers for which the program will locate the appropriate Softek Replicator session(s) and register those volumes for I/O redirection. **Registration will not occur unless** Softek Replicator sessions are found for **all volumes on the list**. Therefore, it is essential that only those volumes, for which I/O redirection is required, be on the list. A volume is placed on the inclusion list for one of the following three reasons:

1. An INCLUDE control statement specifies the volume serial number.
2. An INCLUDE control statement specifies a data set name that is catalogued on the volume.
3. The JCL includes a data set, with disposition of OLD or SHR, allocated on the volume, and there is no EXCLUDE control statement for the volume or a data set catalogued on it.

If a volume appears on both lists, an error message is printed and execution is terminated.

## Softek Replicator Interface Program Processing

The Softek Replicator Interface Program (SDRPIPGM) performs the following functions:

### Initialization

SDRPIPGM issues an ENQ for every OLD or SHR data set specified in the JCL, which does not reside entirely on excluded volumes. The resource major name is “SDRP\_DSN”; the minor name is the data set name. Shared control is requested if the data set disposition is SHR, otherwise exclusive control is requested. To ensure OVA data set serialization between jobs on multiple systems, the appropriate system inclusion entries should be added to the GRS or MIM resource name list. These entries would closely resemble those for SYSDSN, but the major name must be specified in single quotes due to the underscore character. If there is another OVA job using the same data set(s) and there is ENQ contention, a “waiting for (OVA) data sets” message will be issued.

---

**NOTE** This contention can only occur if the other job dynamically allocated the data sets; otherwise the normal allocation “waiting for data set” message will be issued by the initiator.

---

### Registration

The program locates all active Softek Replicator sessions by checking every ten seconds. Active or completed replications slated for use by OVA for all volumes on the inclusion list must be found within 15 minutes or the job will terminate. When all selected volumes have been synchronized, a registration request is enqueued for each Softek Replicator session.

If a volume is found only in a “terminated” state within a Softek Replicator session and has not been resubmitted in a different Softek Replicator session, the 15-minute registration countdown begins.



## Registration Report

Once all volumes have been registered the program prints a table listing, for each volume:

- The volume to which the I/O operations will be redirected.
- The job name of the responsible Softek Replicator session
- The time of day at which the two volumes were synchronized.

If registration was unsuccessful, explanatory messages will be issued.

## I/O Redirection

The specified program is attached by SDRPIPGM. The Softek Replicator session(s) are then responsible for redirecting all included source volume I/O operations issued by the OVA invoked program to operate on the target volume PIT copy. The program intercepts RESERVE, DEQ and DYNALLOC requests from the selected program and performs the following functions:

- RESERVE and DEQ requests to a volume for which I/O redirection is being performed are issued to the PIT target volume instead.
- A warning message is issued if the selected program successfully allocates a volume, which is not on the inclusion or exclusion lists.

SDRPIPGM redirects Reserve macros for the source volume to the target device. ENQ requests for certain system resources, where the minor name is the source volume serial number, will be dynamically modified to serialize the target volume. The resource major name of ENQ requests for SYSDSN and SYSVSAM, where the data set being serialized resides on INCLUDED volumes, will be changed to "AASF\_DSN" and "AASF\_VDS" respectively.

Allocation requests for the target volume, or for data sets on an OVA source volume which was not INCLUDED are failed with error code 0220.

Because OVA may be used to make a full volume backup of the PIT target volume, this infers that a restore from this PIT tape backup would be easier if it contained the source volume serial number. As a result, the I/O redirection mechanism detects the reading of the volume label from the PIT target volume and then substitutes the source volume serial number into the data buffer in real storage.

## De-registration

After termination of the selected program within OVA, the Softek Replicator session(s) are notified to de-register OVA from each volume. As part of this process, the session(s) returns I/O redirection statistics to SDRPIPGM.

## I/O Redirection Report

The program prints a table listing for each volume:

- The volume to which I/O operations were redirected.
- The total number of redirected I/O requests.
- The number of redirected I/O requests that modified the target volume.

The number of I/O requests is a count of the I/O operations that were redirected to the PIT target volume. This value is a reflection of the amount of activity directed to the PIT target volume, not the actual number of modified records, blocks or tracks. If the number of updates is zero, the PIT copy is intact. The count value is an indication that the target volume has changed.

If serial number substitution was performed for the PIT target volume, a message is issued noting this change.

## Using the Softek Replicator Interface Program

The Softek Replicator Interface program (SDRPIPGM) is a batch job that identifies included and excluded volumes to SDRPIPGM, and provides program JCL. The JCL statements necessary for SDRPIPGM are:

DDNAME	DESCRIPTION OF STATEMENT
IPGMOUT	Messages and I/O redirection statistics output stream.
IPGMIN	Control statement input stream.

The following table explains the control statements necessary for SDRPIPGM.

CONTROL STATEMENT	DESCRIPTION OF STATEMENT
PROGRAM	<p>The name of the program for which I/O redirection will be performed.</p> <hr/> <p><b>NOTE:</b> Following the program name with NOWARN will suppress message SDR8009W, if the invoked program has not been certified for OVA use by Softek.</p> <hr/>
PARM	<p>Parameter string which would normally be specified on the EXEC PGM= statement if the specified program were being executed independently. A parameter, which is too long to be completed on one control statement, can be specified using multiple PARM statements. The parameter string is constructed by simply concatenating the strings – without supplying commas or other delimiters.</p>

CONTROL STATEMENT	DESCRIPTION OF STATEMENT
INCLUDE	<ol style="list-style-type: none"> <li>1. A volser or list of volsers enclosed within parentheses.</li> <li>2. A data set name. Either DSN= or DSNAME= is acceptable. SDRPIPGM will use the system catalog to determine which volume(s) the data set is resident on and registration will occur for those volumes.</li> <li>3. A data set name level or mask. The user must supply an INCLUDE statement, such as INCLUDE LEVEL(dataset.prefix) or INCLUDE ENTRIES(generic.entry.name). Then, SDRPIPGM will invoke IDCAMS LISTCAT to extract the individual dataset names from the catalog.</li> </ol> <hr/> <p><b>NOTE:</b> SDRPIPGM will automatically generate inclusion list entries for those volumes that are allocated in the JCL (STEPLIB and/or JOBLIB DD statements excepted). It is imperative that INCLUDE statements be provided for any volume for which I/O redirection is to be done and that will be dynamically allocated by the selected program.</p>
EXCLUDE	<ol style="list-style-type: none"> <li>1. A volser or list of volsers enclosed within parentheses.</li> <li>2. A data set name. Either DSN= or DSNAME= are acceptable. SDRPIPGM will use the system catalog to determine which volume(s) the data set is resident on. Typically a DD statement allocating this data set, however I/O redirection is not required for the volume(s).</li> <li>3. A data set name level or mask. The user must supply an INCLUDE statement, such as INCLUDE LEVEL(dataset.prefix) or INCLUDE ENTRIES(generic.entry.name). Then, SDRPIPGM will invoke IDCAMS LISTCAT to extract the individual dataset names from the catalog.</li> </ol> <hr/> <p><b>NOTE:</b> The user must provide EXCLUDE statements for all the volumes which are allocated through the JCL, and for which I/O redirection is not required, except for data sets with a disposition of “new”. Additionally, it is recommended that EXCLUDE statements are present for any other volume that might be dynamically allocated during the course of the selected program’s execution.</p>

The following is an example of the Softek Replicator REPLICATE control statements specifying that an OVA session will take place, and the actual OVA JCL (DF/DSS full volume backup).

**REPLICATE Control Statement and JCL**

```

SESSION MASTER(MVS1) AGENT(MVS8)
OPTIONS(PROMPT NOPACING AUTOOPS FASTCOPY OVA)
REPLICATE PROD90 SDRT33

//DUMP      EXEC PGM=SDRPIPGM
//STEPLIB  DD DISP=SHR,DSN=<Softek Replicator library>
//SYSPRINT DD SYSOUT=*
//IPGMOUT  DD SYSOUT=*
//IPGMIN   DD *
          PROGRAM ADRDSSU
          INCLUDE PROD90
//OUTPUT   DD DISP=(NEW,CATLG),DSN=.....
//SYSIN    DD *
          DUMP FULL INDYNAM(PROD90) OUTDDNAME(OUTPUT) -
              ALLDATA(*) ALLEXCP CANCELEROR

```

In the preceding example, the volume that is being backed up is production volume PROD90. During execution of the backup job, requests from the ADRDSSU program to read data from PROD90 are redirected to the Point-in-Time copy on volume SDRT33. The INCLUDE statement for the PROD90 volume is needed because it will be dynamically allocated after OVA registration. No EXCLUDE statement is necessary for the OUTPUT file, even it is allocated on another DASD volume, because it has a disposition of "NEW".

## Delayed Offline Volume Access

If it is so desired, it is possible to delay the use of Offline Volume Access (OVA) to a later time rather than immediately after the Point-In-Time (PIT) copy has completed.

### Purpose of Delayed OVA

The intent of Delayed OVA is to provide a mechanism whereby an OVA session may be executed at a later time once a Softek Replicator session has completed. A Delayed OVA job is the equivalent of a single system Softek Replicator session, that can be controlled using the Softek Replicator TSO or Batch Monitors. The requirements for a Delayed OVA session are the following:

- The Communications Data Set (COMMDS) from the original session.
- All PIT target volumes remain offline.
- A Delayed OVA session.
- Execution of the SDRPDOVA program.

Any system that was a participant of the original session may have the Delayed OVA batch job executed on it: Master or Agent. Once the Delayed OVA batch job has started, the Softek Replicator I/O Monitor (SDRPIMON) will be invoked. The COMMDS of the original session will be scanned and all completed PIT pairings will become eligible for the OVA job. OVA need not be specified in the original session in order to be eligible for Delayed OVA. The OVA batch job may be executed immediately after the Delayed OVA job has started. The Softek Replicator TSO Monitor may also be used for these sessions, except the displayed information for the offline target volume is the device address and not the volume serial number.

Volume and group initialization proceeds as if a regular Softek Replicator session were executing. The SDRPDOVA program reads the Communication Dataset and generates REPLICATE statements that each contain a source volume serial number and its PIT target device address. If the Delayed OVA job is executing on what was an Agent system in the original replication, the target volumes must have been available to Softek Replicator at the time of the replication. To prevent corruption of the Point in Time copy data resident on the offline target volumes, they should not be varied online to any system in the complex until all the OVA backup jobs have been completed.

Once the Communication Dataset has been scanned, a temporary COMMDS dataset will be created for the Delayed OVA job. This temporary COMMDS can be preallocated with a DDNAME of DOVACOM, if this is preferred, in which case the dataset must be large enough for a single system migration.

The Delayed OVA job will remain active for 15 minutes or until an OVA job is submitted. There is no limit to the number of executions of Delayed OVA so long as the Communications Data Set and the offline target volumes are available.

An example of the screen displays for a Delayed OVA session as seen from the Softek Replicator TSO Monitor follows.

#### Delayed OVA Session Display

```

Sessions Monitor                               Row 1 to 6 of 6
Command ===>                                   Scroll ===> CSR

-----

Softek Replicator Master V3.5.0 Session Active.
ComDataSet : SYS03321.T021016.RA000.SWH10DVA.R0105353
Source      Migration  Percent Complete ----->
VolSer      Phase      0...10...20...30...40...50...60...70...80...90...100
TDMF92      Waiting OVA
TDMF94      Waiting OVA

F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back     F8=Forward
F9=Swap      F10=Status  F12=Cancel

```

The above example shows a Delayed OVA session. Note that the COMMDS has a temporary name. Any OVA session can now be started within 15 minutes of the Delayed OVA session starting. The original Softek Replicator session did not have OVA specified in the JCL; only the Point-In-Time option was selected.

If F10 is pressed, the status of the job is shown.

### Delayed OVA Session Status

```

          Session Status                               Row 1 to 2 of 2
Command ==>>                                       Scroll ==>> CSR

System: Master                Softek Replicator        Version: 3.5.0
ComDataSet SYS03321.T021016.RA000.SWH10DVA.R0105353    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

  _         TDMF92  22FB                Waiting OVA  DOVA
           22F5

  _         TDMF94  22F8                Waiting OVA  DOVA
           22F6

F1=Help    F2=Split    F3=Exit    F4=Next    F5=Rfind   F6=Options
F7=Back    F8=Forward  F9=Swap    F10=Monitor F11=ActionTy F12=Cancel
    
```

If F6 is depressed, then the options for this session are displayed. Note that OVA is yes.

#### Delayed OVA Session Options

```

                                Session Status                               Row 1 to 2 of 2
Command ==>                               Scroll ==> CSR

System: Master                          Softek Replicator                          Version: 3.5.0
ComDataSet SYS03321.T021016.RA000.SWH10DVA.R0105353              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

  ___      TDMF92      ActCopy = N PACING = N AUTOOPER = N TIME =LOCAL
                                CONFIRM = N PURGE = N TERMGRP = N COMPARE = N
                                OVA = Y PPIT = N FASTCOPY = N nonPPRC = N
  ___      TDMF94      ActCopy = N PACING = N AUTOOPER = N TIME =LOCAL
                                CONFIRM = N PURGE = N TERMGRP = N COMPARE = N
                                OVA = Y PPIT = N FASTCOPY = N nonPPRC = N

```

As with any OVA session, it may be terminated via the session status panel and entering “H” on the requested action line. Confirmation will be requested that this termination should take place.

#### Halt OVA Registrations Confirmation Panel

```

                                Volume Confirmation Screen                       Row 1 to 2 of 2
Command ==>                               Scroll ==> CSR

ComDataSet: . . . . : SYS03321.T021016.RA000.SWH10DVA.R0105353

Confirmation required to Halt OVA registrations.

Volume Serial No. . . : TDMF92
Confirm? (YES/NO): . . ___

Command ==>                               Scroll ==> CSR
F1=Help F2=Split F3=Exit F9=Swap F12=Cancel

```

## Perpetual Point-In-Time

Perpetual Point-In-Time (PPIT) expands on the Point-In-Time (PIT) copy feature, which allows multiple synchronization points (synch-points) to be taken within the same Softek Replicator session. This means that a target volume may be updated multiple times picking up only those updates to the source volume since the last synchronization.

## Setting up for PPIT

The PPIT option can be requested on the SESSION, GROUP or REPLICATE control statement. This option is valid only for those customers who have full function Softek Replicator, or who are in a Softek Replicator Trial. The **PROMPT** option must also be specified for all PPIT volumes, and if a PPIT volume is a member of a **REPLICATE** group, all other member volumes must also have PPIT specified. If the option is specified as a session or group default it will be ignored for volumes specified in MIGRATE control statements.

Options such as OVA and FastCopy are allowed. There are no restrictions so long as the options specified are not in conflict with each other and the customer is licensed for those options.

Once the synchronization prompt has been responded to, Softek Replicator will mark the target volume offline and is ready for use with OVA if so desired. The Softek Replicator session will not terminate once the initial PIT copy is complete. Instead a “Waiting PPIT” prompt is issued and Softek Replicator will keep track of all updates to the source and target volume(s) until such time that the “Waiting PPIT” prompt is responded to. Softek Replicator will then go into the REFRESH phase, honoring Pacing values and Active in Copy values if specified. Once Softek Replicator has determined that it can synchronize the volume(s), the synchronization prompt will be issued again. There is no limit to the number of synch-point that may be taken within a single session.

**CAUTION:**

Use of devices that exploit the Parallel Access Volume (PAV) feature will have this feature **DISABLED** during the session until volume termination. This may or may not affect application I/O operations

## During an Active PPIT Session

During the Copy and Refresh phases of an active PPIT session, there is nothing displayed on the panels that inform the user that a PPIT session is in progress. This information can be determined by selecting Option 2 – Current Session: User Interaction and Status of the Softek Replicator TSO Monitor then selecting PF6 – Options. This will display the options specified for the volume or session. An example follows.



**PPIT Option Display**

```

                                Session Status                Migration Options
Command ===>                                Scroll ===> CSR

System: Master                Softek Replicator                Version: 3.5.0
ComDataSet SWH10.TEST01.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

---      TDMF92                ActCopy = N PACING = S AUTOOPER = N TIME =LOCAL
          TDMF93                CONFIRM = N PURGE = N TERMGRP = Y COMPARE = N
          OVA = N PPIT = Y FASTCOPY = Y nonPPRC = N
---      TDMF94                ActCopy = N PACING = S AUTOOPER = N TIME =LOCAL
          TDMF95                CONFIRM = N PURGE = N TERMGRP = Y COMPARE = N
          OVA = N PPIT = 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 F11=ActionTg F12=Cancel
    
```

**NOTE** Once the user responds to synchronization prompt, Softek Replicator issues a “Recycle PPIT” or “Waiting PPIT” prompt when the target volume(s) have been marked offline.

### Recycle/Waiting PPIT Prompt Display

```

Session Status                      Recycle Volume Needed
Command ==>                          Scroll ==> CSR

System: Master                      Softek Replicator                      Version: 3.5.0
ComDataSet SWH10.TEST01.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

  _      +TDMF92  22FB  PPIT_GRP  Recycle PPIT  PIT  P                          005
         TDMF93  22F5
         TDMF94  22F8  PPIT_GRP  Waiting PPIT  PIT  P                          005
         TDMF95  22F6

Command ==>                          Scroll ==> CSR
F1=Help    F2=Split    F3=Exit    F4=Next    F5=Rfind    F6=Options
F7=Back    F8=Forward  F9=Swap    F10=Monitor F11=ActionTg F12=Cancel

```

Respond to the Recycle Volume Needed prompt with an R or RG in the case of a group of volumes.

### Recycle/Waiting PPIT Prompt with Response Display

```

Session Status                      Recycle Volume Needed
Command ==>                          Scroll ==> CSR

System: Master                      Softek Replicator                      Version: 3.5.0
ComDataSet SWH10.TEST01.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

  RG    +TDMF92  22FB  PPIT_GRP  Recycle PPIT  PIT  P                          005
         TDMF93  22F5
         TDMF94  22F8  PPIT_GRP  Waiting PPIT  PIT  P                          005
         TDMF95  22F6

Command ==>                          Scroll ==> CSR
F1=Help    F2=Split    F3=Exit    F4=Next    F5=Rfind    F6=Options
F7=Back    F8=Forward  F9=Swap    F10=Monitor F11=ActionTg F12=Cancel

```

A confirmation screen is then presented for the volume or group.

**Recycle/Waiting PPIT Prompt Confirmation Display**

```

Group Confirmation Screen                               Row 1 to 2 of 2
Command ==>                                           Scroll ==> CSR

ComDataSet: . . . . : SWH10.TEST01.SYSCOM

Confirmation required to Recycle a PPiT group

Group . . . . . : PPIT_GRP
Confirm? (YES/NO) . . ____

```

Once Softek Replicator has completed processing the Confirmation, the User Interaction and Status panel will display the following information.

**After Recycle/Waiting PPIT Prompt Confirmation Display**

```

Session Status                                       Row 1 to 2 of 2
Command ==>                                         Scroll ==> CSR

System: Master           Softek Replicator           Version: 3.5.0
ComDataSet SWH10.TEST01.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

  _         TDMF92  22FB  PPIT_GRP Refresh 2    PIT  P                005
           TDMF93  22F5

  _         TDMF94  22F8  PPIT_GRP Refresh 2    PIT  P                005
           TDMF95  22F6

Command ==>                                         Scroll ==> CSR
F1=Help      F2=Split      F3=Exit      F4=Next      F5=Rfind      F6=Options
F7=Back      F8=Forward    F9=Swap      F10=Monitor  F11=ActionTg F12=Cancel

```

To end a PPIT session, under Requested Action, enter either an E or EG to terminate at the Recycle prompt or alternatively, T or TG to terminate the session.

## Softek Replicator TCP/IP Support

With Softek Replicator, users can perform DASD replication using the existing TCP/IP connections within the business environment. Because TCP/IP requires no specialized hardware or dedicated telecommunication circuits, this TCP/IP support enables the elimination of expenses associated with replicating data using specialized channel extension hardware and a telecommunications data link.

Softek Replicator enables the replication of a DASD volume from a source device located upon a local MVS system to a new device located upon a remote MVS system, using the current point-in-time capabilities existing within Softek Replicator.

## Terminology

The following list describes some of the terms used in this section:

Term	Description
Local MVS system	The MVS system that is sending data located on a source DASD volume and/or device.
Remote MVS system	The MVS system that is receiving data for a new DASD volume and/or device.
Duplex Replication	The creation of a new DASD volume and/or device on a local MVS system simultaneously with the creation of a normal target DASD volume and/or device.

## TCP/IP Password Option

An optional TCP/IP password can be specified to provide security by permitting or denying local access to a remote system for TCP/IP functions.

The TCP/IP password is specified as an optional parameter on the REMOTE control statement of the local Master job and the SESSION control statement of the remote Master job. If required, the password must be specified for both the local and remote systems. For information about the SESSION and REMOTE control statements, see *SESSION Control Statement* on page 35 and *REMOTE Control Statement* on page 41.



### CAUTION:

The password specified for the local and remote systems must match for a successful connection to be permitted.

## Password example

The following example shows a password specified for the local Softek Replicator Master system that requests a migration to a remote system.

```
REMOTE rem_sys ADDR(xxx.xxx.xxx.xxx) PORT(nnnnn) PASSWORD(password)
```

## TCP/IP Migration Requirements and Considerations

### Operating System Requirement

The Softek Replicator TCP/IP feature requires that the operating system is z/OS, with the installed TCP/IP processing components.

## Fast Copy Requirement

When transferring data using the internet, the Fast Copy option should be specified on the **SESSION**, **GROUP** or **REPLICATE** control statement as described in *Chapter 2: Softek Replicator Installation*. The Fast Copy option can reduce the amount of data transferred, which will decrease the duration of the migration and the resulting load on the internet connection.

## Configuration Considerations

To replicate volumes using the TCP/IP feature, there must be two Softek Replicator master systems, each running on its own MVS system. There are two ways to implement a migration using TCP/IP:

- TCP/IP to a Remote System only

This implementation requires two Softek Replicator systems, each executing as a Softek Replicator master system, with the local or sending MVS system having access to the source dasd device, that may be shared by other Softek Replicator agent systems. The remote or receiving MVS system must have access to the remote target device.

- TCP/IP to a remote volume and a local target volume

This implementation requires two Softek Replicator, Mainframe systems, each executing as a Softek Replicator Master system. The local master must have access to all the source and local target volumes. The remote master must have access to all the remote targets.

**CAUTION:**

A TCP/IP replication cannot be combined with any other Softek Replicator session type. Softek Replicator sessions that provide TCP/IP facilities shall contain *only* volume pairings involving TCP/IP.

## TCP/IP DD Statement Requirement

Ensure that Softek Replicator uses the same configuration file as the TCP/IP started task. To do so, a DD statement is added to the Softek Replicator job used to initiate the IP copy.

### Adding the TCP/IP DD Statement

► **To add the TCP/IP DD statement:**

1. Include the following DD statement in the Softek Replicator job used to initiate the IP copy:

```
//SYSTCPD DD DISP=SHR,DSN=HLQ.TCPPARMS(TCPDATA)
```

2. Change DSN=HLQ to match the installation-defined high level qualifier used by the TCP/IP started task.

The TCP/IP started task procedure can have the TCPPARMS dataset specified either by JCL via the SYSTCPD DD name or the dataset name can be passed as an environment variable for as variable "RESOLVER\_CONFIG" on the EXEC PARM as shown below:

```
//TCPIP EXEC PGM=EZBTCPIP,REGION=0M,TIME=1440,
// PARM=('&PARMS',
// 'ENVAR("RESOLVER_CONFIG=//'HLQ.TCPPARMS(TCPDATA)
OR
//SYSTCPD DD DISP=SHR,DSN=HLQ.TCPPARMS(TCPDATA)
```

If the SYSTCPD DD statement is omitted from the Softek Replicator job, TCP/IP will attempt to use dynamic allocation to allocate and access the configuration file.

---

**NOTE** The TCP/IP started task can be any name; it is not required to be TCPIP.

---

## PORT Number Requirement

A port number must be specified on the EXEC PARM of the remote master job. For an example of remote master job, see the following example, or refer to *REMOTE Master JCL* on page 281. The port number in the Softek Replicator IP control statement must match the port number specified in the REMOTE master job.

## Documenting the Softek Replicator TCP/IP Port Number

The TCP/IP port number is specified in the PORT parameter of the REMOTE control statement, as described in *Chapter 2: Softek Replicator Installation*.

To ensure that the chosen PORT number is identified for Softek Replicator IP use, the port number to be used for Softek Replicator IP should be documented in the HLQ.ETC.SERVICES data set. The HLQ.ETC.SERVICES data set is used to document all port numbers used during product installation.

► **To document the Softek Replicator TCP/IP port number:**

1. Add a statement for each of the port numbers that is being set aside for use by Softek Replicator/IP; each statement should be in the following format:

SDRP/IP nnnnn/tcp # SDRP IP Remote System Port 1

---

**NOTE** Including this statement in the *HLQ.ETC.SERVICES* data set does not reserve the port number, only documents its use.

---

2. If an installation of any product restricts port number usage, the mechanism used to implement that restriction must be modified to allow Softek Replicator TCP/IP port access and usage.







## Softek Replicator Batch Utilities

---

Overview	129
SDRPBMON	129
SDRPCFTP	135
SDRPMUCB	137
SDRPQDSK	138
SDRPSCAN	139
SDRPTERA	141
SDRPVTOC	143
SDRPEXTV	146



## Overview

There are eight Softek Replicator 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:

SDRPBMON	a batch monitor utility to control Softek Replicator sessions at the volume or session level.
SDRPCFTP	a batch job which prepares the COMMDS file(s) for shipment via a File Transfer Program or as an attachment in e-mail.
SDRPCLIP	generates the necessary ICKDSF REFORMAT control statements as input to a subsequent ICKDSF execution.
SDRPMUCB	an application program interface (API) to Softek Replicator, which checks Softek Replicator control blocks, to determine if a device is involved in a Softek Replicator session. Devices may be specified using volume serial, UCB device address or the 16-bit unsigned binary device number.
SDRPQDSK	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.
SDRPSCAN	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 Replicator session being executed.
SDRPVTOC	extracts device information for each online device in the DASD configuration. The report from this batch job provides the user to easily identify those devices whose Volume Table of Contents (VTOC) do not accurately describe their physical characteristics.
SDRPEXTV	for use when migrating from smaller to larger devices. SDRPEXTV will report on the likely effect of Softek Replicator and ICKDSF EXTVOG processing.

## SDRPBMON

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

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=SDRPBMON
//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=SDRPBMON
//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 Replicator 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/replication groups; group names must be unique across all the concurrently active Softek Replicator 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”.

## SDRPBMON - 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”.

Command	Response
P stepname	Monitor Processing is immediately terminated.
F stepname,Q <i>operand</i>	The Monitor displays the status of volumes currently active in Softek Replicator 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 <i>volser</i>	Migration/replication of volume “volser” is terminated.  <b>NOTE:</b> If the volume is part of a migration/replication 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 <i>grpname</i>	Migration/replication of group “grpname” is terminated.
F stepname,S <i>volser</i>	Migration/replication of volume “volser” is suspended.
F stepname,S <i>grpname</i>	Migration/replication of group “grpname” is suspended.
F stepname,A <i>volser</i>	Migration/replication of volume “volser” from the primary device in a PPRC session to a non-mirrored device is permitted.
F stepname,OVA LISTJOBS	Displays the included volumes and registration status for all active or pending OVA jobs.

Command	Response
F stepname,F <i>volser</i>	Migration/replication of volume “volser” is initiated.  <b>NOTE:</b> Note that if the volume is part of a migration/replication group, the “F stepname,F volser” command will be rejected. In this case the “F stepname, F grpname” command is required.
F stepname,F <i>grpname</i>	Migration/replication of group “grpname” is initiated.
F stepname,Z <i>volser secs</i>	The Synchronization target of volume “volser” is set to “secs” seconds.  <b>NOTE:</b> Note that if the volume is part of a migration/replication 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 <i>grpname secs</i>	The Synchronization target of group “grpname” is set to “secs” seconds.
F stepname,C <i>volser</i>	Migration/replication of volume “volser” is continued.
F stepname,C <i>grpname</i>	Migration/replication of group “grpname” is continued.
F stepname,P <i>volser</i>	Synchronization of volume “volser” is confirmed.
F stepname,P <i>grpname</i>	Synchronization of group “grpname” is confirmed.

## SDRPBMON - 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.

Command	Short Form	Purpose
QUERY	(Q)	Report on volume status in active Softek Replicator migration/replication 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.
TERMINATE volser	(T)	migration/replication of volume “volser” is terminated.  <b>NOTE:</b> Note that if the volume is part of a migration/replication 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/replication of group “grpname” is terminated
ALLOW volser	(A)	Migration/replication of volume “volser” from the primary device in a PPRC session to a non-mirrored device is permitted.
CONFIRM volser	(F)	Migration/replication of volume “volser” is initiated.  <b>NOTE:</b> Note that if the volume is part of a migration/replication group, the “CONFIRM volser” command will be rejected. In this case the “CONFIRM grpname” command is required.

Command	Short Form	Purpose
OVA		Report on OVA jobs status. Operands are: - Listjobs - display the included volumes and registration status for all active or pending OVA jobs.
CONFIRM grpname		Migration/replication of group “grpname” is initiated.
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.  <b>NOTE:</b> Note that if the volume is part of a migration/replication group, the “SYNCHRONIZE volser secs” command will be rejected. In this case the “SYNCHRONIZE grpname secs” command is required.
SYNCHRONIZE grpname secs		The Synchronization target of group “grpname” is set to “secs” seconds
SUSPEND volser	(S)	Migration/replication of volume “volser” is suspended
SUSPEND grpname		Migration/replication of group “grpname” is suspended
CONTINUE volser	(C)	Migration/replication of volume “volser” is continued
CONTINUE grpname		Migration/replication of group “grpname” is continued
PROMPT volser	(P)	Synchronization of volume “volser” is confirmed.  <b>NOTE:</b> Note that this command will be rejected if the volume is part of a migration/replication group.
PROMPT grpname		Synchronization of group “grpname” is confirmed



## SDRPBMON Messages

Please refer to the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)* for these messages.

## SDRPBMON - 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 Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPCFTP

This program is part of the process to send information to the Softek Global Support Center for problem resolution related to Softek Replicator sessions. Two items of documentation are necessary for problem determination and resolution by this group of people: 1) the output listings from the Softek Replicator 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=SDRPCFTP
//STEPLIB DD DSN="hlq".SDR350.SDRLLIB,DISP=SHR
//INPUT DD DSN="hlq".SDR350.SYSCOM,DISP=SHR
//OUTPUT DD DSN="hlq".SDR350.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 [ReplicatorSupport@softek.com](mailto:ReplicatorSupport@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 email

For more information on this process, please refer to [www.softek.com/en/support/replicator/zos/ftphelp.html](http://www.softek.com/en/support/replicator/zos/ftphelp.html)

## SDRPCLIP

The SDRPCLIP program allows the user to easily change the serial numbers of Softek Replicator Point-in-Time Copy target volumes to match their original source volumes. The program produces “REFORMAT” control statements for a later ICKDSF program execution. This facility can speed up data center relocation, for example, by automating the volume re-labeling process, which is necessary before IPLing with the target configuration.

The user should be aware, however, that after the execution of the ICKDSF program with the input statements generated by SDRPCLIP, there would be duplicate volume serial numbers in the configuration. The facility is intended for use in an environment where access to the source volumes is not possible from the IPLing processor(s).

The program can be used after a migration to generate “INIT” statements for ICKDSF to reinitialize 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, SDRPCLIP will initialize each source volume with its previous VTOC and index size and location.

The input file is a single COMMDS generated by a previous Softek Replicator session, specified by the SYSCOM DD statement. This session must not have contained a mixture of Swap and Point-In-Time migration/replications. SDRPCLIP reads the Softek Replicator control blocks in this data set and will produce a “REFORMAT” control statement for each successful Point-in-Time volume copy or an “INIT” statement for each successful volume Swap.

---

**NOTE** The Softek Replicator I/O service routine (SDRPCDIO) does not support concatenated input files.

---

The output file, with a DDname of SDRPOUT, 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 SDRPCLIP:

```
//<----- job card ----->
//FIXIT      EXEC PGM=SDRPCLIP
//STEPLIB    DD DISP=SHR,DSN=<program library>
//SYSCOM     DD DISP=SHR,DSN=<SDRP Communications Dataset>
//SDRPOUT    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.SDRPOUT
```

### SDRPCLIP - Return codes

SDRPCLIP issues an explanatory message prior to setting a non-zero return code. These messages and their associated codes can be found in the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPMUCB

The SDRPMUCB application program interface (API) examines Softek Replicator control blocks for active migration/replications 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.

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

### Operation

SDRPMUCB 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:

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 value 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 SDRPMUCB

On return from SDRPMUCB, register 15 contains return codes. Return codes reflect the status of a source volume (copy, refresh, synch ready, OVA ready, PPIT 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 Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

### Return Codes for SDRPMUCB

Function Code	Return Code	Description
0	0 <sup>a</sup>	The device is not involved in a migration/replication.
0	4 <sup>b</sup>	A source volume is being migrated/replicated.
0	8 <sup>c</sup>	The device is the target of a migration/replication.
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 SDRPMUCB, 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 Replicator 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 Replicator session is returned in bytes two and three of the entry.

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

## SDRPQDSK

The Query Device Configuration utility provides the Softek Replicator 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)*.

SDRPQDSK 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 SDRPQDSK.

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

## SDRPQDSK - Printed Output

Messages may be written to the SYSPRINT file, and can be found in the *Softtek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPQDSK - User Abends

User Abend codes are documented in the *Softtek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPSCAN

The SDRPSCAN 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/replication using Softtek Replicator.

SDRPSCAN must be installed and executed as an APF-authorized program. SDRPSCAN 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 SDRPSCAN:

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

## Execution Parameter

The SDRPSCAN 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

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

Volume Label	If the CCHH component of the VTOC pointer in the label is zero, Softek Replicator will treat this as a VM volume during migration/replication.
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 <b>Tolerate Invalid Count Fields</b> 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.

## SDRPSCAN - Messages, Return Codes and ABEND Codes

Messages written to the sysprint file are documented in *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPTERA

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

### Sample JCL for SDRPTERA

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

```
//<----- job card ----->
//TERA      EXEC PGM,SDRPTERA
//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

5000 Executive Parkway, Suite 175

San Ramon, CA 94583

Attn: Linda Pedrazzi

#### FAX

(925) 867-2790

#### E-Mail

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

ReplicatorSupport@softek.com

### SDRPTERA—User Abends

User Abend codes are documented in the *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPTERA Sample Output

Softek Replicator  
Version 3.5.0

Operating Environment

```

CPU Serial / Model      : 0001232E 2066
CPC Node Description   : 002066.0A2.IBM.02.00000001232E
IODF Data Set         : Z800.IODF20
LPAR Name              : Z8L1
System Name           : SDR1
Sysplex Name          : SDRPPLEX
System ID ( SMFID )   : SDR1
SCP Name              : z/OS 01.03.00
SCP FMID              : HBB7706
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
C100	HTC	30396	3990006	47	45
C200	HTC	30396	3990006	15	14
0002	AMH	40103	3990006	28	28
0003	AMH	40103	3990006	24	21
0004	AMH	40103	3990006	26	26
0005	AMH	40103	3990006	23	23
0006	AMH	40103	3990006	28	28
0007	AMH	40103	3990006	23	23
0008	AMH	40103	3990006	64	60
0009	AMH	40103	3990006	24	23
0058	AMH	30258	3990G03	16	15
1000	IBM	14468	2105F20	15	13
1002	IBM	14468	2105F20	01	01
1003	IBM	14468	2105F20	32	28
2000	AMH	30355	3990006	64	64
2001	AMH	30355	3990006	64	63
2002	AMH	30355	3990006	64	53
2003	AMH	30355	3990006	64	64
2004	AMH	30714	3990006	64	64
2005	AMH	30714	3990006	64	64
2006	AMH	30714	3990006	64	64
2007	*****	30714	3990	64	00
4650	AMH	30345	3990006	64	64
4651	AMH	30345	3990006	64	64
4652	AMH	30345	3990006	64	64
5130	AMH	30363	3990006	64	64
5131	AMH	30363	3990006	64	64
6545	IBM	92361	3990006	04	04
7C00	AMH	20104	3990006	28	28
7C01	AMH	20104	3990006	28	28
7D00	AMH	20104	3990006	28	28
7D01	AMH	20104	3990006	28	28
7E00	AMH	20104	3990006	28	28
7E01	AMH	20104	3990006	28	28
7F00	AMH	20104	3990006	28	28
7F01	AMH	20104	3990006	28	28
7140	IBM	90233	3990006	17	17
8801	AMH	00001	3990006	18	18
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



## SDRPVTOC

The Softek Replicator 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 Replicator session.

SDRPVTOC 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 SDRPVTOC program.

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

The allowable parameters are:

BRIEF	Indicates that only devices with an apparent mismatch between the VTOC and the physical device characteristics and those for which SDRPVTOC 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.

## SDRPVTOC - Printed Output

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

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 <i>Read Device Characteristics</i> 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 <i>Read Device Characteristics</i> data.
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 <sup>a</sup>	Blank, or a flag indicating that the calculated number of alternate tracks does not match the value returned in the <i>Read Device Characteristics</i> data.  <b>NOTE:</b> 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:

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 SDRPVTOC 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 SDRP target	The device is currently the target of a Softek Replicator volume migration/replication. It would be impossible to OPEN the VTOC, as Softek Replicator will not allow access to the volume.
OPENJ Abend <i>Sxxx-rr</i>	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. SDRPVTOC will de-allocate the volume and continue with the next device.
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. SDRPVTOC 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 <i>Read Device Characteristics</i> 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; <i>nn,nnn</i> 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.

## SDRPVTOC - Return Codes and ABEND Codes

All SDRPVTOC Return Codes and ABEND Codes are documented in *Softek Replicator 3.5 Messages and Codes for z/OS (ML-145061)*.

## SDRPEXTV

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

1. Volume status that would prevent a VTOC reformat attempt by Softek Replicator.
2. The “optimum” extended VTOC size, as calculated by Softek Replicator.
3. The data set(s) that must be moved to facilitate the “optimal” VTOC extension.

The following JCL is required to execute the SDRPEXTV program:

```
//step      EXEC PGM=SDRPEXTV
//STEPLIB  DD DISP=SHR,DSN=<authorized library>
//SYSPRINT DD SYSOUT=<sysout class>
//SYSIN    DD *
-- control statements --
/*
```

The control statements processed by SDRPEXTV have the same format as for a Softek Replicator 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. *ICKDSF* on page 87

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 calculated using the algorithm described in *ICKDSF* on page 87. 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.

## 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 SDRPEXTV program. The abend codes used are:

U0103	OPEN error. Probably a missing SYSIN or SYSPRINT DD statement
U0135	I/O Error on a Read Device Characteristics CCW for a migration/replication 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/replication target volume. The Program issues message XTV036S before the Abend.
U0137	I/O Error on a Read Device Characteristics CCW for a migration/replication source volume. The Program issues message XTV037S before the Abend.
U0138	I/O Error on a Read Track CCW for a migration/replication source volume. The Program issues message XTV038S before the Abend.

## Program Messages

The following messages might be issued by the SDRPEXTV program. Message variables are indicated by the variable name encased in "<>".

### 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 REPLICATE 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.

**Program Messages** *(Continued)*

Message	Description
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.
XTV012I Volume REFORMAT required: <reason>.	The source volume's VTOC does not match the physical target device. Softek Replicator might attempt to invoke ICKDSF if this option is specified. The reason can be one of the following: <ul style="list-style-type: none"> <li>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.</li> </ul>

**Program Messages** (Continued)

Message	Description
	<ul style="list-style-type: none"> <li>• migration/replication 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.</li> </ul>
	<ul style="list-style-type: none"> <li>• migration/replication 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.</li> </ul>
<p>XTV013W No automatic REFVTOC: &lt;reason&gt;.</p>	<p>The migration/replication appears to require that Softek Replicator 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 Replicator from performing this function. The reason can be one of the following:</p> <ul style="list-style-type: none"> <li>• Source volume not mounted The mount attribute of the source volume is not "PRIVATE". ICKDSF will not reformat the VTOC of a PUBLIC or STORAGE volume.</li> <li>• 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.</li> <li>• Source volume has free space error. The VTOC indicators flag byte, DS4VTOCI has DS4DOSBT set, but the VTOC index is not valid.</li> </ul>

### Program Messages *(Continued)*

Message	Description
XTV014W No automatic EXTVTOC: <reason>.	The migration/replication appears to require Softek Replicator 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 Replicator from performing this function. After this message is issued the program will determine whether Softek Replicator 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:
	<ul style="list-style-type: none"> <li>Source volume does not have a valid VTOC index. Softek Replicator calculates volume and VTOC utilization by analysis of the bit maps in the volume index dataset. The source volume in the preceding REPLICATE statement does not have a valid index.</li> </ul>
XTV015I Target VTOC size exceeds source by <delta> tracks.	On a migration/replication 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.
XTV017I VTOC extension not required.	After a migration/replication to the larger target device, the current size of the VTOC will be considered adequate by Softek Replicator. If possible, Softek Replicator 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.



**Program Messages** (Continued)

Message	Description
XTV018I VTOC extension of <extension> tracks required.	After a migration/replication to the larger target device, Softek Replicator 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 SDRPEXTV program. If this message still appears, there is an error in the VTOC. Because Softek Replicator uses the VTOC index rather than the DSCBs to determine whether tracks are allocated, this error might not prevent a successful VTOC extension.
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 Replicator to abandon this function.

**Program Messages** *(Continued)*

Message	Description
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/replication). The dataset in the message must be moved or deleted before this migration/replication would be possible.
XTV024I REFORMAT REFVTOC is possible.	The program has determined that ICKDSF REFORMAT REFVTOC processing would be needed after the volume migration/replication in the previous REPLICATE statement. It is expected that, if the automatic ICKDSF option is specified for the Softek Replicator session, Softek Replicator will invoke ICKDSF for this volume after a successful swap.
XTV025E Invalid count field at CCHR <cccchrr>: <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 SDRPEXTV 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.
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.

**Program Messages** (Continued)

Message	Description
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/replication, 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/replication to smaller device.	This is an invalid “shrink” migration/replication. The source device has more cylinders than the target, but because there is no valid VTOC index, SDRP will be unable to detect and monitor dataset allocations on cylinders that can not be copied to the target device.





# Softek Replicator TSO Monitor Feature

---

Option 0 - Change or Submit Data Migration Jobs	160
Option 1 - Current Sessions: Monitor Progress	161
Option 2 - Current Sessions: User Interaction and Status	162
Option 3 - Current Sessions: Messages	171
Option 4 - Current Sessions: Offline Volume Access (OVA)	173
Option 5 - Current/Past Sessions: Performance Data	174
Option 6 - Past Sessions: Summary	183
Option 7 - Past Sessions: Details	185
Option 8 - Past Sessions: Communication Data set History	187
Option 9 - Installation Options and Environment	189
Option 10 - Modify Installation Security Environment	190
Option 11 - Display/Modify User's TSO Monitor Options	192
Option 12 - Build Data Migration	195
Option U - Softek Replicator Support Utilities	207
Option H - Softek Replicator Help and Message Detail Facility	226



## Overview

The Softek Replicator TSO Monitor is a feature that is installed at the same time as the Softek Replicator function. The Softek Replicator TSO Monitor Feature consists of REXX execs, which requires ISPF Version 3.5 and TSO/E Version 2.4 at the minimum. The Monitor may be used to view active or past migrations/replications.

Once the Monitor (EXEC 'HLQ.SDR350.SDREXEC(SDRP)') has been brought up, it provides complete control over Softek Replicator session(s). The first panel displayed is the Softek Replicator Selection Panel. This panel has Action and Help Selections. Under Action, the following options are available:

- Change or Submit Data Migration/Replication 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/Replication Jobs
- Replicator Support Utilities
- Replicator Help and Message Detail Facility

Under Help, the options available:

- Display Replicator Messages
- Introduction of Replicator
- Support Information
- Monitor Line Commands

**NOTE** The keylist function must be enabled in order for the Softek Replicator TSO Monitor to work properly. Failure to enable this function will result in message "Replicator keylist not active" with a tone when using the monitor. If this occurs see *Maintenance Overview* on page 25, item 7 to correct the situation.

As a result of the execution of the Softek Replicator TSO Monitor, the users' ISPF Profile data set may be updated. See *Maintenance Overview* on page 25, item 5 for a description of the members that may be added.

Help panels are available for all actions within the Softek Replicator TSO Monitor. Some panels have multiple help panels dependent upon the location of the cursor.

If the Softek Replicator 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 Replicator Security Warning Panel**

```

S o f t e k   R e p l i c a t o r
(C) Copyright Softek Technology Corporation 1996-2003

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 Replicator Function Menu:

#### Function Menu

```
Function Menu
Option ==>>

 0 Change or Submit Data Replicator or Migration Jobs
 1 Current Sessions: Monitor Progress
 2 Current Sessions: User Interaction and Status
 3 Current Sessions: Display Messages
 4 Current Sessions: Display Offline Volume Access (OVA)
 5 Current/Past Sessions: Display Performance Data
 6 Past Sessions: Display Summary
 7 Past Sessions: Display Details
 8 Past Sessions: Display Communication Dataset History
 9 Display Installation Options and Environment
10 Display/Modify Installation Security Environment
11 Display/Modify User's TSO Monitor Options
12 Build Data Replicator or Migration Jobs
 U Support Utilities
 H Help and Message Detail Facility

Option ==>>
```

From this panel it is possible to create, submit, monitor or terminate volume and session migrations/replications. 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 Replicator 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.

### Change/Submit Jobs Panel Overview

```

Change/Submit Jobs Panel

When you press the enter key from this screen a dataset containing a
collection of Replicator 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 Replicator is to
enable you to accomplish all Replicator 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 Replicator session. Please review *Preparing to execute Softek Replicator* on page 30, for a description of each job and the actions necessary before submitting these jobs.

### Sample Batch Jobs

```

Menu  Functions  Utilities  Help
-----
EDIT      SDRS1.SDR350.SDRSLIB          Row 00001 of 00005
  Name                VV MM  Created    Changed    Size  Init  Mod  ID
. AGENT
. ALLOCCM
. MASTER
. SYSOPTN
. SDRPSASD
. SDRPSMF
  **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/replication sessions in progress. A bar chart is displayed with an arrow ( --> ) to indicate how far along a specific volume migration/replication 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.

### Sessions Monitor Panel

```

Sessions Monitor                               Start CONFIRM Needed

Softek Replicator Master V3.5.0 Session Active.
ComDataSet : SDRS1.V350A.SYSCOM
Source      Migration  Percent Complete ----->
VolSer      Phase      0...10...20...30...40...50...60...70...80...90...100
SDRS9A      Waiting OVA

Softek Replicator                               Master V3.5.0 Session Active.
ComDataSet : SDRS1.V350.SYSCOM
Source      Migration  Percent Complete ----->
VolSer      Phase      0...10...20...30...40...50...60...70...80...90...100
TD9C2J      Refresh 2      ----->
TD8E01      Refresh 1      ----->
SPMS90      Copy          ----->
AME794      Terminated
SDRP43      Copy          ----->

Command ===>                               Scroll ===> CSR
F1=Help      F2=Split      F3=Exit      F5=Rfind      F7=Back      F8=Forward
F9=Swap      F10=Status    F12=Cancel
```

In the panel above, volume AME794 shows that it is terminated. By pressing PF10 (for status), the user can determine why this volume terminated.

## Option 2 - Current Sessions: User Interaction and Status

Using this option will allow the user to terminate a specific volume migration/replication or an entire group of migrations/replications, respond to a prompt for migrations/replications, change the Synchronization goal parameter, confirm migration/replications and suspend or continue.

The following table describes each field of the panel.

Sessions	the number of active Softek Replicator sessions
Number of volumes Migrating/replicating	the number of volumes migrating/replicating in this session
Number of volumes complete	the number of volumes that have completed the migration/replication process in this session
Number of concurrent volumes	the number of concurrent tasks in a single session (refer to <i>SESSION Control Statement</i> on page 35).
Number of volumes waiting	the number of volumes waiting for a response (prompt or confirmation) or initialization
Requested Action	action desired for a volume or group. See help panel following the session status (figure: <i>User Interaction and Status – Help Panel - Part 1</i> on page 165).
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/replication Status	what phase the volume migration/replication is in
Migration/replication Type Synchronization Type	PIT (Point-In-Time) or Swap Prompt or Automatic
Error Information/System Message	any error or system messages for that volume migration/replication. Errors and Severe error messages will be displayed. System indicates which LPAR determined the error. If no messages are displayed then the migration/replication completed with no errors however warning messages may have been issued.
Sync Goal	the synchronization goal for the volume or group migration/replication

Information regarding other active sessions may be obtained by pressing PF4.

Panels related to this option are shown below.

**User Interaction and Status Panel**

```

Sessions Status                               Start CONFIRM Needed
Softek Replicator Master V3.5.0 Session Active.
ComDataSet : SDRS1.V350.SYSCOM                Sessions 01
Number of volumes migrating . : 06  Number of concurrent volumes : 06
Number of volumes complete . : 01  Number of volumes waiting : 00

Requested Volume Device Group   --- Migration --- - Error Info - Sync
Action   Serial Number Name     Status      Type System Message Goal

  ---    AMEE95  B081  GROUP1   Copy        Swap A                007
         AME741  B095
  ---    AMEE92  B082  GROUP1   Copy        Swap A                007
         AME742  B092
  ---    SCB083  B083  GROUP2   Copy        PIT  A                007
         AME793  B093
  ---    AME744  B084  GROUP2   Copy        PIT  A                007
         AMEE94  B094
  ---    AME794  B087  GROUP2   Terminated PIT  A SDR1 SDR3537E 007
         AME791  B091
  ---    SDRS9A  879A                Waiting OVA PIT  P                010
         SDRS9B  879B

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 six-volume session is in progress. Of those six volumes, two are in a group named “GROUP1”; one volume is not part of a group; three are in a group named “GROUP2” where volume AME794 has terminated on system SDR1 with message SDR3537E.

An explanation of message SDR3537E may be displayed using Option H.1 – Replicator Help and Message Detail Facility, or select Option 3 – Current Sessions: Display Messages for a display of the message.

### User Interaction and Status Panel – Migration Options

```

Sessions Status                               Migration Options
Softek Replicator Master V3.5.0 Session Active.
ComDataSet : SDRS1.V350.SYSCOM                Sessions 01
Number of volumes migrating . : 06  Number of concurrent volumes : 00
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

  |         SDRP80         ActCopy = N PACING = Y AUTOOPER = N TIME =LOCAL
  |         SDRP81         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N NonPPRC = N
  |         SDRP82         ActCopy = N PACING = Y AUTOOPER = N TIME =LOCAL
  |         SDRP83         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N NonPPRC = N
  |         AMEE95         ActCopy = N PACING = Y AUTOOPER = N TIME = LOCAL
  |         AME741         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N NonPPRC = N
  |         AMEE92         ActCopy = N PACING = Y AUTOOPER = N TIME = LOCAL
  |         AME742         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N NonPPRC = N
  |         SCB083         ActCopy = N PACING = Y AUTOOPER = N TIME = LOCAL
  |         AME793         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N NonPPRC = N
  |         AME744         ActCopy = N PACING = Y AUTOOPER = N TIME = LOCAL
  |         AMEE94         CONFIRM = N PURGE  = N TERMGRP  = N COMPARE = N
  |         OVA           = N PPIT   = N FASTCOPY = N 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, REPLICATE 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 of a portion of the help panel follows.

User Interaction and Status – Help Panel - Part 1

```

                                Session Status                                Row 1 to 2 of 2
Command ==>                                Scroll ==> CSR

System: Master                        Softek Replicator                        Version: 3.5.0
ComDataSet SWH10.TEST01.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

  ___      *TDMF92  22FB  PPIT_GRP Waiting Sync  PIT  P                                005
-----
| TDMGMSH                Session Actions                                |
|                                                                More:  + | 5
| ***** Following valid on all Systems                ***** |
| Display Migration Messages                                : M |
| Display Migration Performance Data                      : D |
| Display Volume's Offline Volume Access (OVA) Job(s) : X |
|
| ***** Following valid on MASTER System                ***** |
| Continue Volume Migration or its Group                  : C or CG |
| Confirm Migration of PPRC volume to non-PPRC           : A |
| Confirm PPIt Recycle for Volume or its Group            : R or RG |
| Confirm Start Volume Migration or its Group             : F or FG |
| Confirm Synchronization for Volume or its Group         : P or PG |
| Disallow OVA registrations for Volume or its Group     : H or HG |
| Discontinue PPIt migrations at "Recycle" prompt        : E or EG |
| 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 |
|
| F1=Help      F2=Split    F3=Exit    F4=Resize    F5=Exhelp
| F6=Keyshelp  F7=PrvTopic F8=NxtTopic F9=Swap     F10=PrvPage
-----

```

### User Interaction and Status – Help Panel - Part 2

```

Command ==>
Session Status
Row 1 to 2 of 2
Scroll ==> CSR

System: Master          Softek Replicator          Version: 3.5.0
ComDataSet SWH10.TEST01.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

-----
*TDMF92 22FB PPIT_GRP Waiting Sync PIT P 005

-----
| TDMGMSH0          Session Actions
|
| Terminate Volume Migration or its Group          More: - | 5
| : 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: *Current Sessions: Display Messages* on page 172). If a 'D' is entered, the performance data for that migration/replication will be displayed (see figures: *Performance Data Panel - Part 1*, *Performance Data Panel - Part 2*, *Performance Data Panel - Part 3*, *Performance Data Panel - Part 4*, and *The following panel depicts the above explanations*).

The following panels will depict other options available to the Master System noted in the above panel.

If a volume is being replicated that is involved in a PPRC or SDRF/SMDS session to a volume that is not in a PPRC or SRDF/SMDS session, it is necessary to select the **Bypass PPRC Checking** option (ALLOWTONONPPRC) on the MIGRATE statement for that volume. This option can also be specified on the SESSION or GROUP control statement, setting a default for subsequent MIGRATE statements. As a result, pairing confirmation is necessary before Softek Replicator will select that specific volume.

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.



**Confirm Swap from PPRC to Simplex Device**

```

                                Volume Confirmation Screen          Row 1 to 1 of 1

ComDataSet: . . . . : SDRS1.V350.SYSCOM

Confirm SWAP from PPRC to simplex device

Volume Serial No. . . : SPMS86
Confirm? (YES/NO): . . ____

Command ==>
  F1=Help   F2=Split  F3=Exit   F9=Swap   F12=Cancel

```

A Softek Replicator volume pairing may be dynamically terminated by 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.

**Confirm Termination**

```

                                Volume Confirmation Screen          Row 1 to 1 of 1

ComDataSet: . . . . : SDRS1.V350.SYSCOM

Confirmation required to Terminate a Volume.

Volume Serial No. . . : SPMS86
Confirm? (YES/NO): . . ____

Command ==>
  F1=Help   F2=Split  F3=Exit   F9=Swap   F12=Cancel

```

The Softek Replicator 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.

### Set Synchronize Goal Panel

```

Set Volume Synchronize Goal          Row 1 to 1 of 1

ComDataSet: . . . . . : SDRS1.V350.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 may be accomplished via the Suspend command. Using the value ‘S’ for a specific volume or ‘SG’ for the entire group will cause Softek Replicator to stop the migration/replication for a volume or volume group. These commands are valid during the copy and refresh phases of a volume migration/replication. Softek Replicator 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/replication 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/replication will be suspended.

The following is an example of the suspend confirmation screen:

### Suspend Volume Confirmation Display

```

Volume Confirmation Screen          Row 1 to 1 of 1

ComDataSet: . . . . . : SDRS1.V350.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 Replicator has suspended per user request or a volume’s migration/replication dynamically, in order for the migration/replication to complete, the Continue command must be issued. By selecting either ‘C’ for a volume, or ‘CG’ for a volume group, Softek Replicator will continue that volume or volume group from where it left off. The display below shows an example.

**Continue Volume Confirmation Display**

```

                                Volume Confirmation Screen          Row 1 to 1 of 1

ComDataSet: . . . . : SDRS1.V350.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 Replicator 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.

**Volume Confirmation Display**

```

                                Volume Confirmation Screen          Row 1 to 1 of

ComDataSet: . . . . : SDRS1.V350.SYSCOM

Confirmation required to Continue a Volume.

Volume Serial No. . . : SPMS86
Confirm? (YES/NO): . . ____

Command ==>
F1=Help   F2=Split  F3=Exit   F9=Swap   F12=Cancel

```

If the prompt option was requested for the volume or volume group, the message 'SYNC Volume Needed.' will be displayed in the upper right hand corner of any active session panel of the Softek Replicator 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.

### Sync Volume Needed Display

```

                                Session Status          SYNC Volume Needed.
System: Master                    Softek Replicator          Version: 3.5.0
ComDataSet : SDRS1.V350.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.

### Sync Volume Needed Display – Session Status

```

                                Session Status          SYNC Volume Needed.
System: Master                    Softek Replicator          Version: 3.5.0
ComDataSet : SDRS1.V350.SYSCOM          Sessions 02
Number of volumes migrating . : 04  Number of concurrent volumes : 04
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

_          *AME780 B080  GROUP01  Waiting Reply PIT  P              007
           AMEB81 B090

_          AMEA81 B081  GROUP01  Waiting Reply PIT  P              007
           AME791 B091

_          AMEB82 B082  GROUP01  Waiting Reply PIT  P              007
           AME79E B09E

_          SCB083 B083  GROUP01  Waiting Reply PIT  P              007
           AME793 B093

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 GROUP01. 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.

### Sync Volume Confirmation Display

```
GroupConfirmation Screen          Row 1 to 1 of 1

ComDataSet: . . . . . : SDRS1.V350.SYSCOM

Confirm Synchronization for GroupMigration.

Group . . . . . : GROUP01
Confirm? (YES/NO) . . ____

Command ==>
F1=Help   F2=Split  F3=Exit   F9=Swap   F12=Cancel
```

**NOTE** This confirmation display will appear for both Point-In-Time and Swap migration/replications, if the Prompt option is specified in the control records.

## Option 3 - Current Sessions: Messages

This option will display all messages for a specific session. The messages are displayed from the perspective of where the Softek Replicator TSO Monitor is invoked. If the Monitor is executed on the Master system, all messages will be display from all defined LPARs in the order they were defined on the SESSION control record in the Master JCL. An example of this panel follows.

### Current Sessions: Display Messages

```

Session Messages                               Row 1 to 38 of 158
Command ==>                                   Scroll ==> CSR
-----

Softek Replicator Master V3.5.0 Session Active.
ComDataSet : SWH10.TEST01.SYSCOM

This is a Master system.

Current Messages for this session are as follows:

The current messages for SMFID TDM1 follow.
11/17/2003 02:16:05.142 SDR1732I The I/O Monitor module has been loaded
                               into Dynamic LPA.
11/17/2003 02:16:05.163 SDR1728I Installed software for this system is:
                               Softek Replicator Base Level.
11/17/2003 02:16:05.186 SDR1279I The installation option to call ICKDSF
                               for VTOC and index maintenance is set.
11/17/2003 02:16:05.186 SDR1278I The installation option to count
                               volumes active only in their copy phase
                               is set.
11/17/2003 02:16:05.186 SDR4152I The Synchronization Prompt option has
                               been set.
11/17/2003 02:16:05.186 SDR1449I The Time-of-Day option was specified as
                               LOCAL.
11/17/2003 02:16:05.186 SDR1453I The Pacing System Option was specified
                               as OFF.
11/17/2003 02:16:05.186 SDR1465I The Operator Messages Option was
                               specified as OFF.
11/17/2003 02:16:05.186 SDR1457I Confirmation on Initialization system
                               option was specified as OFF.
11/17/2003 02:16:05.186 SDR1460I Terminate All Volumes in Group on Error
                               Option was specified as ON.
11/17/2003 02:16:05.186 SDR4164I The Perpetual Point in Time option has
                               been requested.
11/17/2003 02:16:05.186 SDR4165I The Fastcopy option has been requested.
11/17/2003 02:16:05.236 SDR1380I The application program interface (API)
                               for STK is not available.

The current messages for SMFID TDM1 follow.
11/17/2003 02:16:05.187 SDR1509I A volume Pacing option was changed to
                               ON by a Migrate card option.

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 Sessions: Offline Volume Access (OVA)

When Option 4 is selected, Softek Replicator displays any Softek Replicator Offline Volume Access (OVA) batch jobs running on the same MVS system that is running the Softek Replicator TSO Monitor. If OVA was not specified in the Softek Replicator Master session for a volume, the following panel is displayed.

```

Current Sessions: OVA not selected
Session Associated Address Spaces          Row 1 to 6 of 6
-----
Softek Replicator Version 3.5.0
Communication Dataset: SDRS1.V350.SYSCOM

Volume SDRS9A migrating to volume SDRS9B didn't specify OVA.
-----
Command ==>                               Scroll ==> CSR
F1=Help      F2=Split      F3=Exit      F5=Rfind     F7=Back     F8=Forward
F9=Swap      F10=Status   F12=Cancel

```

If the OVA option was in effect for a volume replication but no OVA batch job has been submitted for the volume, the message within the panel will appear as shown in figure: *Current Sessions: OVA not active*, below.

```

Current Sessions: OVA not active
Offline Volume Access (OVA) ** no sessions active **
Command ==>                               Scroll ==> CSR
-----
OVA job: SWH10IPG  Program: IEHLIST      2 Volumes

Source  Target  SDRP job  Reg?  I/O Count
SDRP92          - none -   NO
SDRP94          - none -   NO
-----
No Softek Transparent Data sessions are active.

```

Once the OVA batch job has started, information will be displayed describing the following:

- The source volume I/O that is being redirected to the target volume
- Total number of active OVA jobs on each system
- Total number of redirected I/O requests on each system
- Total number of updates redirected on each system
- The jobname, program and I/O count for the active OVA job(s).

### Current Sessions: Display Active OVA jobs

```

Session Associated Address Spaces      Row 1 to 14 of 14
-----
Softek Replicator Version 3.5.0
Communication Dataset: SDRS1.V350.SYSCOM

Volume SDRS9A I/O being redirected to SDRS9B (Device Number 879B)
Copy valid at 12/13/2003 14:55:20.671 Local Time
Total active OVAjobs on system SDR1 = 1
Total active OVAjobs on system SDR2 = 0
Total redirected I/O Requests on SDR1 = 56
Update redirected I/O Requests on SDR1 = 0

Currently active OVAjobs on SDR1.
Jobname      Program      I/O Count
SDRS1IPG     ADRDSSU      28

Command ==>
F1=Help      F2=Split     F3=Exit      F5=Rfind     F7=Back     F8=Forward
F9=Swap     F10=Status  F12=Cancel

Scroll ==> CSR

```

Note that this information is displayed during the time that active OVA jobs are executing. Once all OVA jobs have completed executing, the panel shown in figure: *Current Sessions: OVA not active* on page 173 is displayed.

## Option 5 - Current/Past Sessions: 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 8 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, overwrite 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 Replicator. 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 Replicator polls



**System Information** *(Continued)*

Type	Type of Job, Master or Agent System
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
Replicator Fixed Storage Frames	the amount of fixed storage frames that Softek Replicator has used and is currently using
Replicator Fixed Storage Thresholds	the high and low water marks of fixed storage that Softek Replicator uses during the session (obtained at system initialization). These values may change from one session to another.

An example of the Softek Replicator System Information panel follows on the next page.

The following is an example of the System Information:

### Performance Data Panel - Part 1

```

Performance Data                               Row 1 to 34 of 91
Command ==>>                               Scroll ==>> CSR

ComDataSet: . . SWH10.TEST01.SYSCOM
VOL Interval: : 0004.62
Init Status: : All systems initialized.

-----

Softek Replicator Version 3.5.0
Communication Data Set: SWH10.TEST01.SYSCOM

                                SYSTEM INFORMATION

Type  SMFID Asid System Current
      Number Interval  ----- Heartbeat ----- --Expires In--
Master TDM1 0046 00 0004 11/12/2003 04:13:29.008 00895 Secs
Agent  TDM2 0045 01 0004 11/12/2003 04:13:24.394 00900 Secs
Agent  TDM3 0025 02 0004 11/12/2003 04:13:24.449 00900 Secs

                                Previous Count      Current Count
TDM1's Fixed Storage Frames                28,616                28,616
  Session Fixed Storage Frames                205                    205
  Session Fixed Storage Threshold - low       17,479                17,479
  Session Fixed Storage Threshold - high      34,958                34,958

TDM2's Fixed Storage Frames                28,513                    63
  Session Fixed Storage Frames                 63                      63
  Session Fixed Storage Threshold - low       13,956                13,956
  Session Fixed Storage Threshold - high      27,912                27,912

TDM3's Fixed Storage Frames                28,495                    63
  Session Fixed Storage Frames                 63                      63
  Session Fixed Storage Threshold - low       13,957                13,957
  Session Fixed Storage Threshold - high      27,914                27,914

                                VOLUME INFORMATION

-----

Source Target New  ---- Current ----  Cylinders  ---- Number ----

```

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
DUPLEX	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

**Volume Information** *(Continued)*

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
Number Req	an indication of the amount of update activity detected by Softek Replicator
Number Compl	the number of update requests completed
Number Wait	an indication of contention on the source volume when Softek Replicator is attempting to quiesce the I/O in order to SYNChronize

The following is an example of the **Volume Information**:

### Performance Data Panel - Part 2

```

Performance Data                               Row 30 to 63 of 91
Command ==>                                   Scroll ==> CSR

ComDataSet: . . SWH10.TEST01.SYSCOM
VOL Interval: : 0004.62
Init Status: : All systems initialized.

-----
                                VOLUME INFORMATION
-----

Source Target New    ---- Current ----  Cylinders    ---- Number ----
VSN   VSN   VSN      Phase   Wait  Num  Curr  %% Req  Compl Wait
TDMF94 TD6006 TDMF95 Refresh 00003 0004  00093 00031  33 00475 00475 0000
Source Control Unit = 3990-E9 Device = 3390-0A Cylinders = 03339
Target Control Unit = 2105-E8 Device = 3390-0C Cylinders = 10017
Duplex Control Unit = 3990-E9 Device = 3390-0A Cylinders = 03339

I/O on this volume is currently being limited due to I/O contention.

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      :   0   0   0  100
Percent of Refresh Phase I/O using    :   0   0   0  100

Number Pacing Changes Due to Real Storage Manager.
                                Raise to :   0   0   0   0
                                Lower to :   0   0   0   0

Number Pacing Changes Due to I/O Contention.
                                Raise to :   0   0   0   0
                                Lower to :   0   0   0   0

Customer Performance on Volume          Cumulative      Last Interval
Total Elapsed Time Available            00:01:30         00:00:30
Total Elapsed Device Response Time      00:01:26         00:00:29
Average Device Response Time             00.012 Secs     00.013 Secs
    
```

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 Replicator 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.

**Volume Pacing** (Continued)

Percent of Replicator 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.  <b>NOTE:</b> 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.  <b>NOTE:</b> The number of tracks read/written in a single I/O operation will not affect the amount of storage used.

The next panel displays volume pacing (if selected)

**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 Replicator will increase the number of tracks read per I/O operation.

Part of the performance data provided by Softek Replicator is Customer Performance on the source volume. The data presented is cumulative for the migration/replication as well as for the last interval (30 seconds). This includes:

<p>Total Elapsed Device Response Time</p>	<p>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.</p>
<p>Percent of Device used by Customer/Replicator</p>	<p>The sum of the I/O service times across all systems divided by the length of the volume interval. The Softek Replicator 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 Replicator and Customer initiated I/O response times exceeds the monitoring interval; the individual percentages are scaled to total 101.</p>

The following panel displays Customer Performance.

```

Performance Data Panel - Part 4
Performance Data                               Row 59 to 91 of 91
Command ==>                                   Scroll ==> CSR

ComDataSet: . . SWH10.TEST01.SYSCOM
VOL Interval: : 0004.62
Init Status: : All systems initialized.

-----

Customer Performance on Volume                  Cumulative      Last Interval
Total Elapsed Time Available                   00:01:30        00:00:30
Total Elapsed Device Response Time            00:01:26        00:00:29
Average Device Response Time                  00.012 Secs     00.013 Secs
Average No. of I/O Operations per system      2,346           744
Percent of Device used by Customer            74              69
Percent of Device used by session             27              32

Average Device Response Time by Operation:    Read           Write
Copy                                          00.010 Secs   00.012 Secs
Refresh                                     00.011 Secs   00.011 Secs
Copy Cylinder                               00.150 Secs   00.180 Secs
Refresh Cylinder                            00.165 Secs   00.165 Secs
Estimated Sync Time                         07.854 Secs   07.854 Secs

Refresh and Synchronization Information.      Refresh        Sync.
Refresh and Synchronization I/O counts
Tracks                                       01861          00000
Cylinders                                   00051          00000

Synchronization Goal in Seconds             :              005
Estimated Sync time required in seconds :              016

Copy Phase started                          : 11/12/2003  04:11:31.00
Copy Phase ended                            : 11/12/2003  04:12:09.06
Copy Elapsed Time                           :              00 Mins 38.06 Secs
Refresh Phase started                       : 11/12/2003  04:12:30.53
Refresh Phase ended                         : 11/12/2003  04:13:23.68
Refresh Elapsed Time                        :              00 Mins 53.15 Secs

```

In the preceding example, the customer is currently using the volume 110%<sup>1</sup> of the time (percent of device used by customer).

Softtek Replicator used approximately 1.1 seconds to read a cylinder, so has used roughly 10 minutes 30 seconds<sup>2</sup> so far. The percentages are scaled to total 101; the raw cumulative percentages would be 68.5%<sup>3</sup> for Softtek Replicator and 114.4%<sup>4</sup> for customer I/O.

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.

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

Volume Refresh and Synchronization Information displays the number of tracks and cylinders refreshed and synchronized for that specific migration/replication.

The Sync Goal in Seconds is the value that was set at job submission or modified via the Monitor.

Estimated Sync Time Required in Seconds is 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.

The following panel depicts the above explanations:

**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
F9=Swap	F12=Cancel	F5=Rfind
		F7=Back
		F8=Forward

Note that each volume in the session will be listed in the order specified on the MIGRATE or REPLICATE 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 reducing 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 6 - Past Sessions: 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 8, Past Sessions: Display Communication Dataset History, by moving the cursor to a specific COMMDS and pressing PF5.

---

An example follows.

### Past Session Summary

		Past Session Summary				Row 1 to 14 of 51	
ComDataSet : SDRS1.V350.SYSCOM							
-----							
Softek Replicator				Version 3.5.0			
Session started 02/28/2003 10:07:47.313							
Volume	Device	Group	--- Migration ---	- Error	Info	- Sync	
Serial Number	Name	Status	Type	System	Message	Goal	
SPMS84	8784	DASD1	Terminated	SWAP	SDR1 SDR3537E	005	
SPMS85	8785						
TD9C2J	8411	DASD1	Complete	SWAP		005	
TD8D0J	8410						
TD8E01	8421	DASD1	Complete	SWAP		005	
TD8E11	8420						
SPMS90	8790	DASD2	Terminated	PIT	SDR1 SDR3537E	005	
SPMS91	8791						
SDRP43	8C04	DASD2	Terminated	PIT	SDR2 SDR2268E	005	
SDRP44	8C03						
CEVLE2	8422	DASD2	Terminated	PIT	SDR1 SDR3537E	005	
CEVLE3	8423						
SDRP3C	E43C	DASD2	Terminated	PIT	SDR2 SDR2268E	005	
SDRP3D	E43D						
SPMS86	8787		Complete	SWAP		005	
SPMS87	8786						
SDRP3E	E43F		Complete	SWAP		005	
SDRP3F	E43E						
SPMS94	8794		Complete	PIT		005	
SPMS95	8795						
AAL00E	E9BE		Complete	SWAP		005	
AAL00F	E9BF						
SDRPB0	87B0		Complete	SWAP		005	
SDRPB1	87B1						
SDRPB2	87B2		Complete	SWAP		005	
SDRPB3	87B3						
Command ==>				Scroll ==> CSR			
F1=Help	F2=Split	F3=Exit	F5=Rfind	F6=Options	F7=Back		
F8=Forward	F9=Swap	F12=Cancel					

## Option 7 - Past Sessions: 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 sessions. In order to display a past session, enter the COMMDS name or alternatively, it can be selected via Option 8 – Past Sessions: Display Communication Dataset History. For more detail on how Option 7 functions, see *Option 8 - Past Sessions: Communication Data set History* on page 187.

An example of the panel follows:

### Past Session Detail Display

```
Softek Replicator Past Session Display Row 1 to 14 of 96

ComDataSet : SDRS1.V350.SYSCOM

-----

Softek Replicator Version 3.5.0      Completed Migration

ComDataSet : SDRS1.V350.SYSCOM
      Volume serial number TD2398 on 3390 device 2398
      Starting Cylinder is x'00000270', 00624 decimal
      Pin Token = 02A259C8   UCB = 0274E9F0

Number of Systems active = 02.  Volumes active = 02.

MSE for SMFID SDR1, ASID: 0075, Relative System Number 00
MSE for SMFID SDR2, ASID: 0073, Relative System Number 01

The current messages for SMFID SDR1 follow.
02/28/2003 10:07:46.960 SDR1731I The I/O Monitor module was found in
                          Dynamic LPA.
02/28/2003 10:07:47.268 SDR1448I The Time-of-Day System Default Option
                          is GMT.
02/28/2003 10:07:47.268 SDR1451I The TOD Option has been overridden by
                          the OPTIONS statement and set to LOCAL.
02/28/2003 10:07:47.268 SDR1453I The Pacing System Option was specified
                          as OFF.
```

Volume Migration summaries follow:

Src=TDE972 Target=TDE973 100% Done MaxCyl=03339 CurCyl=03339

Messages for volume TDE972 SMFID SDR1 follow.

02/28/2003 16:17:49.615 SDR1478I A volume AutoOper option was changed to ON by a Migrate card option.

02/28/2003 16:17:49.615 SDR1469I The Perpetual Point-in-Time option was specified for a volume.

02/28/2003 16:17:49.716 SDR1177I The source volume TDE972 is mounted on device E973 on this system.

02/28/2003 16:17:49.716 SDR1182I At Replicator initialization, the source volume has caching (CFW) activated.

02/28/2003 16:17:49.716 SDR1184I At Replicator initialization, the source volume has dasd fast write allowed.

Command ==>

Scroll ==> CSR

F1=Help

F2=Split

F3=Exit

F5=Rfind

F7=Back

F8=Forward

F9=Swap

F12=Cancel

## Option 8 - Past Sessions: Communication Data set History

If the HISTORY batch job is run and a SYSCOM History Dataset Name was specified in the System defaults, Softek Replicator 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:

```
History Data Set Display
History DataSet Display Row 1 to 4 of 4
Softek Replicator
Version 3.5.0

Company Name      : Softek
Site Number and Name : 50069 M2 Data Center
History DataSet Name : 'SDRS1.SDR350.LOG'
Report Date and Time : 03/08/2003 11:45:17

SDRS1.V350A.SYSCOM      03/07/2003 10:25:30
SDRS1.V350B.SYSCOM      03/07/2003 12:19:02 ReUsed
SDRS1.V350C.SYSCOM      03/06/2003 12:47:42
SDRS1.V350X.SYSCOM      02/27/2003 09:46:56

Command ==>
F1=Help      F2=Split      F3=Exit      F4=Detail      F5=Summary      F6=Perform
F7=Back      F8=Forward      F9=Swap      F10=Updates      F11=Trace      F12=Cancel

Scroll ==> CSR
```

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 PF7. Additionally, there is a help panel to aid navigation through this display. An example follows.

**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 9 - 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 Replicator 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.

### Installation Options Display

```

                                Installation Options                                Row 1 to 14 of 14
Command ===>                                                                Scroll ===> CSR

Company : Softek Technology Corporation
Site   . : User1 3.5.0 Testing
Site ID : 99999 Date Initialized . . . : October 08, 2003
History DataSet . . . . . : SWH10.HISTORY
Security package volume protection . . . : Yes
WTO/WTOR for automated operations . . . : No
Automatic ICKDSF REFORMAT on swap . . . : Yes
Check target volumes are empty . . . . . : No
Volume counted as active only in copy . . : Yes
Unidentified connected systems . . . . . : Ignore
OVA Registration Interval (minutes) . . . : 60
WTO AutoOps Route Codes . . : 2,4
SMF Record Type . . . . . : 204 Use Startup Confirmations . . : No
Use Local Time on Messages . . : Yes Terminate group on error . . : Yes
Use Pacing during Migrations . . : No Use Reverse Pacing algorithm . . : No
Allow invalid count fields . . : No Monitor XRC sessions . . . . . : No

                                Operating Environment

Softek Replicator
Version 3.5.0
USER ID.      : SWH10
CPU ID.       : 0001232E 2066
SCP NAME      : SP7.0.3
SCP FMID      : HBB7706
ETR ID.       : 09
Local Time    : 11/17/2003 03:27:58.26
GMT Time      : 11/17/2003 11:27:58.26
Local Offset  : -08:00:00
Leap Seconds  : +015
```

#### 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 10 - Modify Installation Security Environment

From this panel the security keys set by the SYSOPTN batch job are displayed as well as the Softek Replicator feature in use. There are four different types of authorization keys and multiple features. For a description of key types and features, please refer to *Preparing to execute Softek Replicator* on page 30.

The Softek Replicator authorization program (SDRPAKEY) 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.

KEYnn must be entered as specified by Softek, otherwise Softek Replicator 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 Replicator Full Function license keys may be deleted from the Monitor.

The table on the following page describes the fields in the Security Panel:

#### Softek Replicator Installation and Security Environment

Company	Company name where Softek Replicator is installed.
Site	Location where Softek Replicator 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 Replicator will expire or when a specific feature will expire.
Commit Changes	'Yes' commit changes. 'No' do not commit changes.
Return Code from Replicator Security	nnnnnnnn was the rc from SDRPAKEY. See <i>Appendix C: Authorization Return Codes</i> for Softek Replicator authorization return codes.



**Softek Replicator Installation and Security Environment** *(Continued)*

—	'A' to add a key; 'D' to delete a key
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.

**Installation Security Environment**

```

                                Full Function                                Row 1 to 2 of 2
Command ==>                                Scroll ==> CSR

Company : Softek Technology Corporation
Site . : User1 3.5.0 Testing
Site ID : 99999 Date Initialized . . . . . : October 08, 2003
Maintenance Expiration Date . . . . . : October 07, 2004
Return Code from Replicator Security . . . . . : 00000000
Additional Features Purchased . . . . . : PPIT OVA TCP/IP

Commit Changes? (yes/no) . . . . . ___
Softek Replicator Version 3.5.0 Base Level.

   No   Security Key   Key Description   Added Date/Time   By
_  01  B6CF3FF0C703C60E  232E MODEL 2066   10/08/2003 09:19  SYSOPTN
-

Command ==>                                Scroll ==> CSR
F1=Help   F2=Split   F3=Exit   F5=Rfind   F7=Back   F8=Forward
    
```

In the above panel, the Softek Replicator Full Function feature is noted at the top of the panel.

## Option 11 - 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.

```

User's Monitor Options Panel
-----
User's Monitor Options
Command ==>                               Scroll ==> CSR
PF3 to exit ---- PF5 to save changes

User's ID  SWH10      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      Copy                08      Uninitialized  15
Waiting Reply  02      Resume                09      Synchronize   16
Waiting PPIT   03      Backed out          10      Compare       17
Waiting OVA    04      Swap                11      Terminating  18
OVA Active     05      Quiesce             12      Terminated   19
Refresh        06      Suspended           13      Complete      20
Activation     07      Inactive            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 Replicator 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 Replicator 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 12 – 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 Replicator Skeleton library (HLQ.SDR350.SDRSLIB).

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/replication session to be displayed. For example, the values are set as such that all suspended migrations/replications are displayed first then volumes waiting replies, then those volumes in copy phase. The following screen changes would be made.

#### User Monitor Options Panel with Changes

```

Softek User's Monitor Options

PF3 to exit ---- PF5 to save changes

User's ID  SDRS1      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      Copy 08      Uninitialized 15
Waiting Reply 02      Resume 09      Synchronize 16
Waiting PPIT 03      Backed out 10      Compare 17
Waiting OVA 04      Swap 11      Terminating 18
OVA Active 05      Quiesce 12      Terminated 19
Refresh 06      Suspended 13      Complete 20
Activation 07      Inactive 14

Qualified Dataset for saving
JCL members -- Optional . . _____

Command ==>
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.

### Sessions Monitor Panel with User Options Set

```

Sessions Monitor                               Row 1 to 10 of 10
-----
Softek Replicator.  Master V3.5.0 Session Active
ComDataSet : SDRS1.V350.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

```

Depending on the status of a specific migration/replication, 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 12 - Build Data Migration

All Softek Replicator Master and Agent batch jobs can be created and submitted via the Softek Replicator TSO Monitor. JCL generated using the following panels will be saved in a user-defined data set in Option 11 (figure: *User's Monitor Options Panel* on page 192) or by default in the skeleton library SDRSLIB. Pressing PF11 will display the installation defaults as set by the SYSOPTN batch job (figure: *Installation Options Display* on page 189).



### CAUTION:

The control statements built by this TSO Monitor function do not use the same format as those described in *Replicator Control Statements* on page 33. 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.

### Build/Submit Jobs Panel

```
Softek 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.

**Enter/Update/Review Job Cards Panel**

```

Softek Enter/Update/Review Job Cards                                JCL saved

Enter Job Control Statements, insure correctness prior to saving
PF3 to exit ----- PF5 to save data

> //EXAMPLE JOB 'Softek Replicator SESSION',
> //
           CLASS=A,MSGCLASS=Y,NOTIFY=USERID
> //*

Command ==>
F1=Help      F2=Split    F3=Exit      F5=Save      F7=Back      F8=Forward
F9=Swap      F12=Cancel

Scroll ==> CSR

```

**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/replication session is to be built (PF4).

**Master System Confirmation Screen**

```

Softek Replicator Master Confirmation Screen

You have requested to Build a New Replicator Job.

The old job will be deleted, unless you requested during
its build that it be saved in the SDRSLIB library.

Confirm with "YES" to continue building a New Replicator job.

Confirm? (YES/NO): . . ____

Command ==>
F1=Help      F2=Split    F3=Exit      F9=Swap      F12=Cancel

Scroll ==> CSR

```

Once confirmation is accepted the following panel is displayed. In this case confirmation is 'yes'.

**Master System Job Build Menu**

```

Softek 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'.

**Master System – Define Libraries & SMF IDs**

```

Softek Replicator Define Libraries & SMF IDs

PF3 to exit ----- PF5 to save data

Member name for saving . . . EXAMPLE_
Replicator Load Library . . SDRS1.SDR350.SDRLLIB
Replicator Security Library SDRS1.SDR350.SDRLLIB
Communication DataSet . . . SDRS1.V350.SYSCOM_____
Master Complex Execution
Affinity JCL Statement . . . _____

Master SMF ID . . . . . SDR1
Agent SMF IDs (optional) . . . . SDR2 > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____

** 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.

```

Master System – Define Libraries & SMF IDs; Saved

Softek Replicator Define Libraries & SMF Master Information Saved

PF3 to exit ----- PF5 to save data

Member name for saving . . . EXAMPLE
Replicator Load Library . . SDRS1.SDR350.SDRLLIB
Replicator Security Library SDRS1.SDR350.SDRLLIB
Communication DataSet . . . SDRS1.V350.SYSCOM
Master Complex Execution
Affinity JCL Statement . . . _____

Master SMF ID . . . . . SDR1
Agent SMF IDs (optional) . . . . SDR2 > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____
> ____ > ____ > ____ > ____ > ____ > ____ > ____ > ____

SAVED record

Command ==>
F1=Help      F2=Split    F3=Exit     F5=Save     F7=Back     F8=Forward
F9=Swap      F12=Cancel

Scroll ==> CSR
```

Once the Softek Replicator 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.

---



**Master System – Define Session Options**

```

Softek Replicator 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.

**Master System – Define Session Options; Saved**

```

Softek Replicator 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/replication definition panel. From this panel, a volume migration/replication may be defined; additional volume migrations/replications may be defined by pressing PF6.

### Master System – Define a Volume migration/replication

```

Softek Replicator 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
Allow Offline Volume Access(OVA) N Perform Perpetual Point-In-Time N
** UNSAVED record **

Current Time is . . . . . 03/02/2002 13:58:14.88

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/replication definition, they will be so noted on the panel. An example follows.

### Master System – Define a Volume migration/replication; with errors

```

Softek Replicator Define a Migration                               *** ERROR(s) ***
PF4 Previous Migration      PF5 Save          PF6 Next Migration

Migration Number . . . . . 01
Source Volume SMPS03 Target Volume SPMS05 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
Allow Offline Volume Access(OVA) N Perform Perpetual Point-In-Time N
** 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.

Command ==>                               Scroll ==> CSR
F1=Help      F2=Split      F3=Exit      F4=Previous  F5=Save      F6=Next
F7=Back      F8=Forward     F9=Swap      F12=Cancel
    
```

Correct the identified errors, press enter or PF5. Once all errors have been corrected, the following panel will be displayed.

**Master System – Define a Volume migration/replication; saved**

```
                Softek Replicator Define a Migration          Migration Data Save

PF4 Previous Migration          PF5 Save          PF6 Next Migration

Migration Number . . . . . 01
Source Volume SMPS03 Target Volume SPMS05 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
Allow Offline Volume Access (OVA) N Perform Perpetual Point-In-Time N

                                SAVED record

Current Time is . . . . . 03/02/2003 14:02:21.95

Command ==>                                Scroll ==> CSR
F1=Help      F2=Split      F3=Exit      F4=Previous  F5=Save      F6=Next
F7=Back      F8=Forward    F9=Swap     F12=Cancel
```

Once all volume migration/replications have been defined and saved, press PF3, which will bring up the Master Job Build Menu (figure: *Master System Job Build Menu* on page 197). 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.

**Master System migration/replication Job Review; saved information**

```
                Softek Replicator Migration Job Review          Row 1 to 4 of 4

                PF3 exit ----- PF5 Review/Submit JCL

-----
JCL will be saved in 'SDRS1.SDR350.SDRSLIB', 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.

**Master System Migration/replication Job – ISPF Display**

```

Menu  Utilities  Compilers  Help
-----
BROWSE      SDRS1.SDR350.SDRSLIB (TEMPNAME) - 01.01      Line 00000000 Col 001 080
***** Top of Data *****
//EXAMPLE JOB 'Softek Replicator SESSION',
//  CLASS=A,MSGCLASS=Y,NOTIFY=SDRS1
//*
//SDRP      EXEC PGM=SDRPMAIN, PARM=MASTER
//STEPLIB DD DISP=SHR, DSN=SDRS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=SDRS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=SDRS1.V350.SYSCOM
//SYSPRINT DD SYSOUT=*
//SYSIN DD *
TDMF OPTIONS SDR1 MASTER Y N N N N N N N N W
TDMF SYSTEMS SDR1 MASTER SDRS1.V350.SYSCOM
TDMF SYSTEMS SDR2
TDMF MIGRATE SPMS03 SPMS05          S          005          Y Y N N  Y N N
SDRP 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 *Replicator Control Statements* on page 33. 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: *Build/Submit Jobs Panel* on page 195) by pressing PF6, which displays the following panel:

### Agent System migration/replication JCL Build

```
          Softek Replicator Agent Migration JCL Build          Row 1 to 3 c
          PF3 exit ---- PF5 Continue

After building the input needed to generate a Replicator 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.

### Agent System Optional Parameters Panel

```

Softek Replicator Define Agent Optional Parameters      Row 1 to 5 c

PF3 to exit ----- PF5 to Review/Submit JCL

Member name for saving . . . EXAMPLES

Replicator Load Library . . : SDRS1.SDR350.SDRLLIB
Security Library . . . . . : SDRS1.SDR350.SDRLLIB
Communication DataSet . . . : SDRS1.V350.SYSCOM
Agent Complex Execution
Affinity JCL Statement . . . _____
Master SMF ID . . . . . : SDR1
Agent SMF ID . . . . . : SDR2
-----

Current Time is : 03/02/2003 14:09:01.96

JCL will be saved in 'SDRS1.SDR350.SDRSLIB', 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.

### Agent System Migration/Replication Job – ISPF Display

```

Menu Utilities Compilers Help
-----
BROWSE      SDRS1.SDR350.SDRSLIB(TEMPNAME) - 01.01      Line 00000000 Col 001 080
***** Top of Data *****
//EXAMPLE JOB 'Softek Replicator SESSION',
//  CLASS=A,MSGCLASS=Y,NOTIFY=SDRS1
//*
//*
/** This AGENT job is for SMF ID: SDR2
/**
//SDRP      EXEC PGM=SDRPMAIN,PARM=AGENT
//STEPLIB DD DISP=SHR,DSN=SDRS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR,DSN=SDRS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR,DSN=SDRS1.V350.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: *Agent System Migration/Replication Job – ISPF Display* on page 204 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: *Build/Submit Jobs Panel* on page 195) 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.

### 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 SDRS1.V350.SYSCOM
Unit Name . . . . . SYSDA
Volume Serial Number . . . . SDRP01
Complex Execution Affinity
JCL Statement . . . . . _____

-----

Current Time is : 03/02/2003 14:14:24.85

JCL will be saved in 'SDRS1.SDR350.SDRSLIB', 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.

## Allocate JCL COMMDS Panel

```

Menu  Utilities  Compilers  Help
-----
BROWSE      SDRS1.SDR350.SDRSLIB(TEMPNAME) - 01.01      Line 00000000 Col 001 080
***** Top of Data *****
//EXAMPLE JOB 'Softek Replicator SESSION',
//  CLASS=A,MSGCLASS=Y,NOTIFY=SDRS1
//*
//* This creates a COMMUNICATION DATASET
//*
//SDRP      EXEC PGM=IEFBR14
//SYSCOM DD  DISP=(NEW,CATLG,DELETE),
//          DSN=SDRS1.V350.SYSCOM,
//          DCB=(LRECL=4096,BLKSIZE=4096,RECFM=F),
//          SPACE=(CYL,004,,CONTIG),
//          VOL=SER=SDRP01,
//          UNIT=SYSDA
//SYSPRINT DD  SYSOUT=*
//SYSIN DD  DUMMY
/*
***** Bottom of Data *****
Command ==>
F1=Help    F2=Split  F3=Exit   F5=Rfind  F7=Up     F8=Down   F9=Swap
F10=Left   F11=Right  F12=Cancel
Scroll ==> C

```

Through the use of the previous panels, a migration/replication 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: *Installation Security Environment* on page 191.



## Option U - Softek Replicator 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.

### Support Utilities Panel

```

                                Softek Replicator 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 Replicator TSO Monitor is executing in. An example follows.

### Memory Display

```

                                Softek Replicator 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 Replicator sessions. This information includes the location of specific control blocks within Softek Replicator. An example follows.

### Internal Details Display

```

Softek Replicator Internal Details Display      Row 1 to 16 of 16
-----
Softek Replicator.  Master V3.5.0 Session Active.

ComDataSet : SDRS1.V350.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=SDR1, ASID=0032

Number of Systems active = 02  Volumes active =  01

SDRP Control Block is at 07F2B000.
MSE  Control Block is at 07F15000.
MSV  Control Block is at 07F17000.
MSVE Control Block is at 07F1D000.

Command ==>>
F1=Help      F2=Split    F3=Exit      F5=Rfind     F7=Back     F8=Forward
F9=Swap      F12=Cancel

                                Scroll ==>> CSR
```

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 Replicator session. These bits may be set to other values per instruction from Softek Replicator 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 Replicator for analysis by Softek Replicator Technical Support. These trace functions may be viewed by pressing PF1 from each flag entry. An example of the trace status panel follows.

**Trace Table Status**

Softek Replicator Trace Status								Row 1 to 6 of 6
ComDataSet : SDRS1.V350.SYSCOM							01	of 02
Environment : Master System								
Tracing Flag 1 . . . . .	1	1	1	1	1	1	1	
Tracing Flag 2 . . . . .	1	1	1	1	1	1	1	
Tracing Flag 3 . . . . .	1	1	1	1	1	1	1	
Tracing Flag 4 . . . . .	0	0	0	0	0	0	0	
Diagnostic Flag 1 . . . . .	0	0	0	0	0	0	0	
Diagnostic Flag 2 . . . . .	0	0	0	0	0	0	0	
Initialization Flag 1 . . . . .	0	0	0	0	0	0	0	
Recovery Flag 1 . . . . .	0	0	0	0	0	0	0	
Replicator Display/Update Tracing Bits								
Softek Replicator								
Version 3.5.0								
User ID: SDRS1								
Date and Time : 03/02/2003 09:42:36.95								
Command ==>				Scroll ==> CSR				
F1=Help	F2=Split	F3=Exit	F4=Next	F5=Update	F6=Back	F7=Back		
F8=Forward	F9=Swap							

## Option U.3 - Active Session – Display Trace Table

This function will display a Softek Replicator trace table with the most current entries at the beginning of the display. Softek Replicator Technical Support uses these trace table entries for problem determination. An example of this panel is shown below.

### Trace Entries – Active Session

```

Softek Replicator Trace Entries                               Row 1 to 15 of 4,610

ComDataSet : SDRS1.V350.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 ==>
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 Replicator Technical Support uses these trace table entries for problem determination. An example of this panel is shown below.

### Trace Entries – Completed Session

```

Softek Replicator Past Session Trace Entries  Row 1 to 16 of 4,613

ComDataSet :  SDRS1.V350.SYSCOM
-----
Trace Entries for System :  SDR1
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 ==>
F1=Help      F2=Split    F3=Exit     F5=Rfind    F7=Back     F8=Forward
F9=Swap

                                Scroll ==> CSR
    
```

## Option U.5 - Module Version Levels in Defined Load Library

This panel displays the assembly date and time of all Softek Replicator load modules in the defined Softek Replicator load library. The version level of each load module reflects the PTF level applied as shown below.

### Module Version Level Display

```
Module Version Level Display          Row 1 to 39 of 133
Command ==>                          Scroll ==> CSR

      Softek Replicator
      Version 3.5.0

      Report Date and Time
      11/17/2003 03:32:46.23

Load Library Name : 'SWH10.TDM350.TDMLLIB'

SDRPADDT level 30426 assembled on 2003-11-14 at 00.55 PT.
SDRPAKEY level 30421 assembled on 2003-11-12 at 00.53 PT.
SDRPAMAP level 30388 assembled on 2003-11-12 at 01.16 PT.
SDRPASPP level 30338 assembled on 2003-08-12 at 13.36 PT.
SDRPASSO level 30338 assembled on 2003-11-12 at 01.16 PT.
SDRPAVOL level 30318 assembled on 2003-10-09 at 00.36 PT.
SDRPBDDT level 30420 assembled on 2003-11-11 at 07.37 PT.
SDRPBMON level 30339 assembled on 2003-09-14 at 23.04 PT.
SDRPBUPM level 30339 assembled on 2003-09-14 at 22.26 PT.
SDRPBVOL level 30338 assembled on 2003-09-02 at 11.16 PT.
SDRPCDDT level 30378 assembled on 2003-10-17 at 08.15 PT.
SDRPCDIO level 30388 assembled on 2003-09-29 at 04.49 PT.
SDRPCFTP level 30338 assembled on 2003-08-12 at 13.37 PT.
SDRPCCLIP level 30398 assembled on 2003-10-14 at 23.32 PT.
SDRPCMSG level 30391 assembled on 2003-11-12 at 01.18 PT.
SDRPCNAV level 30338 assembled on 2003-11-12 at 01.19 PT.
SDRPCOMF level 30388 assembled on 2003-11-12 at 01.19 PT.
SDRPCOMM level 30338 assembled on 2003-08-12 at 13.37 PT.
SDRPCOM1 level 30376 assembled on 2003-09-15 at 02.09 PT.
SDRPCOM2 level 30426 assembled on 2003-11-14 at 00.55 PT.
SDRPCOPY level 30318 assembled on 2003-10-09 at 00.35 PT.
SDRPCRCV level 30338 assembled on 2003-09-01 at 00.32 PT.
SDRPCSEL level 30318 assembled on 2003-10-09 at 00.34 PT.
SDRPCVOL level 30338 assembled on 2003-09-01 at 00.32 PT.
SDRPDDDT level 30378 assembled on 2003-10-17 at 08.15 PT.
SDRPDOVA level 30335 assembled on 2003-08-29 at 01.42 PT.
SDRPEDDT level 30378 assembled on 2003-10-17 at 08.15 PT.
SDRPEMC level 30378 assembled on 2003-10-17 at 09.01 PT.
SDRPEVOL level 30336 assembled on 2003-08-29 at 01.53 PT.
SDRPEXTV level 30332 assembled on 2003-11-05 at 07.38 PT.
```

## Option U.6 - Current/Past Session Module Version Levels from COMMDS

This panel displays the Softek Replicator 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: *Module Version Level Display* on page 213; however, it is possible to have more than one load library.

### Module Version Level Display Based on COMMDS

```

Module Version Level Display                               Row 1 to 36 of 75
Command ==>
ComDataSet : SWH10.TEST01.SYSCOM

-----
                Softek Replicator
                Version 3.5.0

Report Date and Time : 11/17/2003 03:33:12.72

Comm DataSet (inactive): SWH10.TEST01.SYSCOM

SDRPTERM level 30415 assembled on 2003-11-03 at 07.23 PT.
SDRPTRAC level 30338 assembled on 2003-11-12 at 23.28 PT.
SDRPRTNM level 29991 assembled on 2003-11-17 at 01.31 PT.
SDRPMSGN level 30423 assembled on 2003-11-17 at 01.22 PT.
SDRPCMSG level 30391 assembled on 2003-11-12 at 01.18 PT.
SDRPRTNV level 29991 assembled on 2003-11-17 at 01.31 PT.
SDRPIMON level 30378 assembled on 2003-11-13 at 01.59 PT.
SDRPSIO level 30399 assembled on 2003-10-15 at 00.19 PT.
SDRPVOL level 30364 assembled on 2003-09-12 at 00.54 PT.
SDRPAVOL level 30318 assembled on 2003-10-09 at 00.36 PT.
SDRPBVOL level 30338 assembled on 2003-09-02 at 11.16 PT.
SDRPCVOL level 30338 assembled on 2003-09-01 at 00.32 PT.
SDRPEVOL level 30336 assembled on 2003-08-29 at 01.53 PT.
SDRPMVOL level 30339 assembled on 2003-11-12 at 23.24 PT.
SDRPNVOL level 30339 assembled on 2003-09-01 at 00.52 PT.
SDRPQVOL level 30356 assembled on 2003-09-01 at 02.25 PT.
SDRPRCVR level 30336 assembled on 2003-09-01 at 02.38 PT.
SDRPVOL level 30427 assembled on 2003-11-14 at 04.41 PT.
SDRPSVOL level 30339 assembled on 2003-11-12 at 07.30 PT.
SDRPTVOL level 30339 assembled on 2003-09-01 at 02.00 PT.
SDRPUVOL level 30339 assembled on 2003-09-01 at 02.02 PT.
SDRPWVOL level 30388 assembled on 2003-09-29 at 04.55 PT.
SDRPASFP level 30338 assembled on 2003-08-12 at 13.36 PT.
SDRPXVOL level 30318 assembled on 2003-10-09 at 00.29 PT.
SDRPZVOL level 30363 assembled on 2003-09-04 at 01.30 PT.
SDRPVOL level 30399 assembled on 2003-10-15 at 00.22 PT.
SDRPICOM level 30413 assembled on 2003-11-12 at 00.55 PT.
    
```

**NOTE** The communications data set is listed as **inactive**. This panel shows the modules from an active migration/replication 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 Replicator system. The PTFs are identified by a fix number. In the following example, no PTFs have been applied; the Softek Replicator system is at base level.

```
System Change Summary Display
System Change Summary Display          Row 1 to 11 of 11
Command ==>                          Scroll ==> CSR

      Softek Replicator
      Version 3.5.0

      System Change Summary

      Report Date and Time
      11/17/2003 03:33:56.62

Base System released December 1, 2003
```

## Option U.8 - Unit Control Block Display

This function displays all Unit Control Blocks (UCBs) that are in use by a Softek Replicator session. Additionally, the total number of DASD UCBs addressable from an LPAR is listed. An example follows.

**Unit Control Blocks Display**

```
Softek Replicator Unit Control Blocks Display      Row 1 to 14 of 14

DASD Unit Control Block Display
Softek Replicator
Version 3.5.0
02/28/2003 14:38:49.79

Volume SDRP03 UCB 8503 is being used by Replicator.
Volume HOT812 UCB 8512 is being used by Replicator.
Volume SPMS95 UCB 8794 is being used by Replicator.
Volume SPMS94 UCB 8795 is being used by Replicator.

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.

LISTUCB Display

```
Softek Replicator Unit Control Blocks Display      Row 1 to 17 of 27

      DASD Unit Control Block Display
Softek Replicator
      Version 3.5.0
03/06/2003 04:32:51.54

176970A0 0088CC84 22F80000 00000000 00E4C3C2 *.h.d.8.....UCB*
UCBAREA 3030200F 00000000 00000500 E3C4D4C6 *.....SDRP*
(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)  00FCCECO 9400F0E0 F8153400 00030000 *...m.0.8.....*
        00000000 00000000 *.....*

00FCCBEC C4C4E340 00000000 EF740000 00200000 *DDT .....*
DDT      C9C5C3D3 010111F8 0100C7F0 0100AB28 *IECL...8..G0...*
        00000000 01014DAB 00FDAD68 972B0A78 *.....y...p...*
        010174C8 00000000 016C9210 C4C4D9C4 *...H.....k.DDRD*
        8100AF10 40404040 01012FC0 *a... ..*

Command ==>
F1=Help      F2=Split    F3=Exit     F5=Rfind    F7=Back     F8=Forward
F9=Swap      F12=Cancel

                        Scroll ==> CSR
```

## Option U.9 - Communication Data Set Control Blocks

From this panel Softek Replicator 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.

### Communication Data Set Control Blocks – Master System

```

Communication Data Set Control Blocks          Row 1 to 15 of 15
Command ==>>                               Scroll ==>> CSR

Communication Data Set . . SWH10.TEST01.SYSCOM
Control Block . . . . . MSE
Source Volume . . . . . TDMF92
System number . . . . . 00

-----

DISP          HEX DUMP          CHAR DATA
0000  E2C4D9D7  D4E2C535  E3C4D4F1  F0F00000  :SDRPMSE.TDM100 :
0010  BA560411  47C82720  BA560411  3D49CF80  :.....H.....:
0020  F7FBFE00  00000000  00000000  94B0171E  :7..          m...:
0030  FFFF94B6  2E000000  0000000E  4E1C0000  :..m..      .+. :
0040  010003D0  00180001  232E2066  BA4512CA  :. .} . . . . .:
0050  00007380  00006FCC  116D116D  44454445  : .. ?.._...:
0060  000000A3  00015F90  00015F90  00000BB8  : t .^ . ^ . ..:
0070  00008000  1224F000  1DE78000  0000E406  : . .0 .X.  U.:
0080  0000E401  00000000  00080008  00010000  : U.      . . . :
0090  121D8000  1B0B6000  0000E404  0000E401  :... ..-  U.  U.:
00A0  00000000  00100010  80000000  00000000  : . . . . .:
00B0  0001002E  00000000  01E10011  FFFF8009  : . . . . .:
00C0  48280880  00000000  00000000  00000000  :.....      :
=====
    
```

In the above example the Softek Replicator Master System Entry (SDRPMSE) control block is displayed for relative system number 00 (SDR1) which is the Master system. In the following example the SDRPMSE control block is displayed for relative system number 01 (SDR2) which is an Agent system.

COMMDS Control Block Display – Agent System

```

Softek Replicator ComDataSet Control Blocks Panel  Row 1 to 10 of 17

ComDataSet . . . . SDRS1.V350.SYSCOM
Control Block . . . SDRPMSE
Source Volume . . . TDE972
System number . . . 01

-----

ComDataSet is in use: SDRS1.V350H.SYSCOM

DISP          HEX DUMP          CHAR DATA
0000  E3C4D4C6  D4E2C514  E3C4D4F2  F0F10001  :SDRPMSE.SDR201 ..
0010  B6A2AD16  66956000  B6A2AD16  66956000  :ŦsŸ.Ăn- ŦsŸ.Ăn- :
0020  00000001  3CB52A07  00000377  00015F90  : ..$.. .İ .-°:
0030  00015F90  00000BB8  00008000  16514000  : .-° .½ Ø .é :
0040  4DDEB000  0000E406  0000E401  00000000  : (ú^ U. U. :
0050  00080008  00016000  164FE000  4DDBD000  : . . .- .|\ (ú} :
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 will allow 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.

### COMMDS Navigator Display

```

Softek Replicator ComDataSet Navigator Panel      Row 1 to 11 of 28

ComDataSet: . . SDRS1.V350.SYSCOM
TTRZ: . . . . . 00000300
CCHR: . . . . . 0003

-----

ComDataSet is in use: SDRS1.V350D.SYSCOM

DISP          HEX DUMP          CHAR DATA
0000  E3C4D4C6  D4E2E540  E3C4C5F9  F7F2E3C4  :SDRPMSV 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-Ē.      :
0070  00000000  00000000  00000000  3C531CFC  :           .ë.Û:
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 display two different types of bit maps for each volume in 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 session by customer application I/O operations. The number of times a specific track or cylinder is not indicated.

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.

### COMMDS Volume Refresh Bit Map Display

```
Display Refresh Bit Maps  Row 1 to 14 of 2,221

ComDataSet: . . SDRS1.V350.SYSCOM

-----

Softek Replicator
Version 3.5.0

Report Date and Time ; 02/12/2003 13:00:07.22

Communication DataSet : SDRS1.V350.SYSCOM
Created 02/05/2003 08:24:09.19

-----

Miscellaneous Refresh Bit Map for volume SPMS84 for SMFID SDR1

All bit map locations were zero for this volume

-----

Cumulative Refresh Bit Map for volume SPMS84 for SMFID SDR1

All bit map locations were zero for this volume
```

-----  
Miscellaneous Refresh Bit Map for volume TD9C2J for SMFID SDR1

All bit map locations were zero for this volume

-----  
Cumulative Refresh Bit Map for volume TD9C2J for SMFID SDR1

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.

### COMMDS Merged System Messages Display

```

                                Past Session Merged Messages          Row 1 to 5 of 62

Communication Data Set : SDRS1.V350.SYSCOM

-----

Softek Replicator Version 3.5.0                                Completed Migration

28/02/2003 10:07:46.960815 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1731I The I/O Monitor module was found in Dynamic LPA.

28/02/2003 10:07:47.268883 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1448I The Time-of-Day System Default Option is GMT.

28/02/2003 10:07:47.268885 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1451I The TOD Option has been overridden by the OPTIONS
                statement and set to LOCAL.

28/02/2003 10:07:47.268888 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1453I The Pacing System Option was specified as OFF.

28/02/2003 10:07:47.268890 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1455I Pacing has been changed to ON by the OPTIONS
                statement in Replicator job stream.

28/02/2003 10:07:47.268892 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1465I The Operator Messages Option was specified as OFF.

28/02/2003 10:07:47.268894 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1466I The Operator Messages Option has been changed to ON.

28/02/2003 10:07:47.313190 SMFID = SDR1 TOD synchronized on ETR ID 09
                SDR1380I The application program interface (API) for STK is
                not available.

28/02/2002 10:07:47.506132 SMFID = SDR1 Volume Serial Number = TD6005
                SDR1177I The source volume TD6005 is mounted on device 3005 on
                this system.

28/02/2002 10:07:47.506136 SMFID = SDR1 Volume Serial Number = TD6005
                SDR1182I At Replicator 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 Replicator 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 Replicator will stop the volume migration/replication 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 SDR3540E will be issued or a physical I/O error on the source volume exists in which message SDR3536E will be issued. In either case Softek Replicator will not migrate the volume until these errors are corrected (see *Invalid Count Fields* on page 90 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.

---

### COMMDS Source Volume I/O Error Display

```
Display Source Volume I/O Errors      Row 1 to 14 of 2,038

ComDataSet: . . SDRS1.V350.SYSCOM

-----

                Softek Replicator
                Version 3.5.0

Report Date and Time ; 02/05/2002 12:53:08.96

Communication DataSet : SDRS1.V350.SYSCOM
                Created   02/05/2003 08:24:09.19

-----

Detected I/O Error locations for volume SPMS84 for SMFID SDR1

No errors detected on this volume

-----

Detected Invalid Count locations for volume SPMS84 for SMFID SDR1

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 ==>>
  F1=Help      F2=Split      F3=Exit      F5=Rfind      F7=Back      F8=Forward
  F9=Swap      F12=Cancel

                Scroll ==>> CSR
```

## Option H - Softek Replicator Help and Message Detail Facility

This selection brings up a panel that will display detailed information for Softek Replicator messages, support information, an overview of the Softek Replicator TSO Monitor line commands available and a brief introduction to Softek Replicator and the process necessary to start a session. An example follows.

### Help Selection Panel

```
                Softek Replicator Help Selection

Help Selection:
_  1. Display Replicator Message Details
   2. Introduction of Replicator
   3. Support Information
   4. Monitor Line Commands

Command ===>
F1=Help    F2=Split  F3=Exit    F9=Swap    F12=Cancel
```

## Option H.1 - Display Replicator Message Details

This function contains all Softek Replicator messages within the system. These messages provide a more detailed explanation that what is displayed in the Softek Replicator TSO Monitor or in the output listing.

**NOTE** Messages are also available using program product BookManager Read, if BookManager Read is installed.

### Message Display Example

```

                                Message Display                                Row 1 to 13 of 13
Command ==>>                                Scroll ==>> CSR

Within the message text there may be special string variables
that will be replaced when the message is generated.

-----

Message Number:  1443

SDR1443S

Message Text:
The target volume failed authorization checking for the point-in-time
migration

Explanation:
At Softek Replicator initialization, READ access authority to the target
volume has not been granted by the installation's System Authorization
Facility.

System Action:
Softek Replicator terminates the migration session.

```

To search for a message, use the 4-digit value within the message. For example, message SDR1447W would be found by searching for 1447, as shown in the next example.

### 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

SDR1447W
Message Text:
The devices involved contain a different number of alternate cylinders.

Explanation:
At Replicator initialization, the source volume is being swapped to a device
that contains a different number of alternate cylinders.

User Response:
The execution of ICKDSF REFORMAT VTOC may be required after the
completion of the migration.  See the Replicator Installation and Reference
manual for more details.

System Action:
Replicator continues normally.

Command ==>
F1=Help      F2=Split    F3=Exit      F5=Rfind     F7=Back     F8=Forward
F9=Swap      F12=Cancel

                                Scroll ==> CSR
```

The last character in a Softek Replicator message indicates the severity of the message.

#### Softek Replicator Message Severity Table

Character	Return Code	Description
A		Action message – WTO/WTOR option selected; requires a response from the MVS console or the Softek Replicator TSO monitor.
I	0000	Informational message – all volume migrations/replications successful; no action required.
W	0004	Warning message – all volume migrations/replications successful; one or more warning messages was issued; an action may be required.
E	0008	Error message – a volume migration/replication 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 Replicator 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 Replicator

This selection provides a brief overview of Softek Replicator and how it works. It also provides a quick reference list of what is necessary to create, execute and monitor a session.

### Softek Replicator Introduction

```
Menu Utilities Compilers Help
-----
BROWSE      SDRS1.SDR350.SDRMLIB(INTRO)          Line 00000000 Col 001 080

                Softek Replicator

Replicator 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 SDRSLIB (which may be accessed
using Option 0 under the Replicator 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.

### Support Information

```

Menu Utilities Compilers Help
-----
BROWSE    SDRS1.SDR350.SDRMLIB(SUPPORT) - 01.00    Line 00000000 Col 001 080
***** Top of Data *****

                  Softek Replicator
                  Support Panel

                  Softek 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
Replicator Support Web Page:
www.softek.com/en/support/replicator/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 Replicator 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 Replicator TSO Monitor does not support the standard ISPF commands on most screen displays. This selection discusses the line commands that the Softek Replicator TSO Monitor does support and how they may be different from stand ISPF commands.

### Softek Replicator Monitor Line Commands

```
Menu  Utilities  Compilers  Help
-----
BROWSE   SDRS1.SDR350.SDRMLIB(MONITORC)           Line 00000000 Col 001 080
***** Top of Data *****
```

Softek Replicator Monitor Line Commands

Most screens presented by the Replicator monitor will not perform the normal ISPF commands. Detailed below is the line commands that the Replicator Monitor does support and the differences in their action.

Replicator Monitor functions that invoke the ISPF "browse" support all ISPF line commands normally.

Replicator Monitor functions that build panel display support the following commands as described.

**FIND**

Enter FIND followed by your search argument(s). Unlike ISPF, the Replicator 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 Replicator 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.

**SDRPPRT (P is the short command)**

Unlike ISPF, SDRPPRT will print all the lines contained in that panel to ISPF's print dataset. Each invocation of SDRPPRT starts on a new page.

Command ==>

F1=Help    F2=Split    F3=Exit    F5=Rfind    F7=Up    F8=Down    F9=Swap  
F10=Left   F11=Right   F12=Cancel

Scroll ==> CSR



## DASD Space Requirements

---

DASD Space Requirements

235



## DASD Space Requirements

The following table gives all space requirements (3390) for the Softek Replicator files.

### DASD Space Requirements

Data Set Name	DSORG	RECFM	LRECL	BLKSIZE	DIRBLKS	SPACE
HLQ.SDR350.ASDREXEC	PO	FB	80	6160	1	1 trk
HLQ.SDR350.ASDRLLIB	PO	U	0	6144	20	5 cyl
HLQ.SDR350.ASDRMLIB	PO	FB	80	6160	2	1 cyl
HLQ.SDR350.ASDRPLIB	PO	FB	80	6160	20	1 cyl
HLQ.SDR350.ASDRSLIB	PO	FB	80	6160	5	1 cyl
HLQ.SDR350.ASDRTLIB	PO	FB	80	6160	1	1 trk
HLQ.SDR350.SDREXEC	PO	FB	80	6160	1	2 trk
HLQ.SDR350.SDRLLIB	PO	U	0	6144	20	5 cyl
HLQ.SDR350.SDRMLIB	PO	FB	80	6160	2	1 cyl
HLQ.SDR350.SDRPLIB	PO	FB	80	6160	20	1 cyl
HLQ.SDR350.SDRSLIB	PO	FB	80	6160	5	1 cyl
HLQ.SDR350.SDRTLIB	PO	FB	80	6160	1	1 trk
HLQ.ML145060.BOOK	PS	FBS	4096	4096	0	10 cyl
HLQ.ML145060.PDF	PS	VB	260	6160	0	3 cyl
HLQ.ML145060.PDF.A4	PS	VB	260	6160	0	3 cyl
HLQ.ML145061.BOOK	PS	FBS	4096	4096	0	5 cyl
HLQ.ML145061.HTML	PS	VB	260	6160	0	2 cyl
HLQ.ML145061.PDF	PS	VB	260	6160	0	1 cyl

**DASD Space Requirements** *(Continued)*

Data Set Name	DSORG	RECFM	LRECL	BLKSIZE	DIRBLKS	SPACE
HLQ.ML145061.PDF.A4	PS	VB	260	6160	0	1 cyl



## Determining CPU Serial Number

---

Determining CPU Serial Number

239





## 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:

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)*.





## Authorization Return Codes

---

Authority Checking	243
Reading/Writing the Softek Replicator Security Record	244
Reading/Updating/Writing Softek Replicator - Express Feature Information	245
History File Recording	246



## Authority Checking

The following documents all possible return codes and their meaning from authority checking.

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 Replicator. Verify that CPU is authorized to run Softek Replicator.
28 (1C)	Failed authority checking.	Softek Replicator 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 Softek Global Support Center.
516 (204)	Error loading SDRPUKEY	Verify that correct library is pointed to.
520 (208)	Error locating CPU PCCA	Re-run job. Contact Softek Global Support Center.
524 (20C)	Error in caller identification	Verify input statements. Contact 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 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 Replicator version definition	Verify that the proper Softek Replicator version is specified.

Return Code	Description	Reason
556 (22C)	Program error	Verify input statements. Contact Softek Global Support Center.
4096 (1000)	No valid keys detected	Un-initialized keys data set. Run SYSOPTN batch job

### Reading/Writing the Softek Replicator Security Record

The following documents all possible return codes and their meaning from program for reading/writing the Softek Replicator security record.

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	SDRPKEYS load module has multiple text records or the format is invalid. Contact Softek Global Support Center.
208 (D0)	TTR conversion error	Verify that JCL is correct. Contact 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 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 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

Return Code	Description	Reason
228 (E4)	Bad Buffer address	Verify that JCL is correct. Contact Softek Global Support Center.
232 (E8)	Invalid Function code	Verify that JCL and input statements are correct. Contact Softek Global Support Center.

## Reading/Updating/Writing Softek Replicator - Express Feature Information

The following documents all possible return codes and their meaning from program for reading, updating or writing Softek Replicator - Express information.

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	SDRPKEYS 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.

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.

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 <i>Security</i> on page 24.
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.	SDRPLOGS 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	SDRPLOGS completed in error. Contact Softek Global Support Center.



<b>Return Code</b>	<b>Description</b>	<b>Reason</b>
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.





# Messages for Automated Operations

---

Messages for Automated Operations

251



# Messages for Automated Operations

The following messages are intended for use with automated operations packages.

## Messages for Automated Operations

Message Number	Text
SDR2411A	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.
SDR2412A	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.
SDR2413A	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.
SDR2414A	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.
SDR2415E	Migration is being terminated by request for volume <volser>.
Explanation	This volume migration is being terminated due to operator CANCEL reply to message SDR2411A, or via a request from the SDRF TSO monitor. Migration of this volume continues termination.
Action	None
SDR2416E	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 SDR2412A, or via a request from the SDRF TSO Monitor. Migration of this volume group continues termination.
Action	None

**Messages for Automated Operations** *(Continued)*

<b>Message Number</b>	<b>Text</b>
SDR2419I	Migration initialization process starting for volume <source-volser>.
Explanation	This volume migration is being initialized. Migration of this volume continues.
Action	None
SDR2420I	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
SDR2421I	Swap Migration process completed successfully for volume <source-volser>.
Explanation	This volume migration is being completed successfully.
Action	None
SDR2422I	Swap Migration has completed successfully for group <groupid>.
Explanation	This group of volume's migrations has completed successfully.
Action	None
SDR2423I	Swap Migration was not completed successfully volume <source-volser>.
Explanation	This volume migration was not completed successfully.
Action	Error messages issued; review output.
SDR2424I	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.
SDR2425I	Point In Time migration completed successfully volume <volser>.
Explanation	This volume migration is being completed successfully.
Action	None
SDR2426I	Point In Time migration complete successfully group <groupid>.
Explanation	This group of volume's migrations has completed successfully.
Action	None
SDR2427I	Point In Time migration was not successfully for volume <volser>.
Explanation	This volume migration was not completed successfully.
Action	Error messages issued; review output.

## Messages for Automated Operations *(Continued)*

Message Number	Text
SDR2428I	Point In Time migration was not successfully for group <groupid>.
Explanation	This group of volume's migration has not completed successfully due to errors.
Action	Review output.
SDR2579A	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.
SDR2580I	PPRC to non-PPRC confirmation received from console <consoleid>.
Explanation	This volume's migration confirmation was received from the console indicated.
Action	None
SDR2666E	Volume <source-volser> in group <groupid> has been terminated.
Explanation	During a 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.
SDR2802I	Volume activity is being resumed for volume <source-volser>.
Explanation	This Point-in-Time volume migration has completed synchronization and user I/O requests will be allowed to proceed.
Action	None
SDR2803I	Volume activity is being resumed for group <groupid>.
Explanation	This group Point-in-Time migration has completed synchronization and user I/O requests will be allowed to proceed on the volumes in the group.
Action	None







## Determining DASD Subsystem Serial Number

---

Determining DASD Subsystem Serial Number

257



## 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: Softek Replicator Batch Utilities-SDRPQDSK*. This batch program will provide the same information as the DEVSERV QDASD command.





# Configurable REXX Execs

---

Softek Replicator REXX Exec

261



# Softek Replicator REXX Exec

```
/* REXX */

/*****
/****
/**** Replicator REXX exec
/**** Softek Replicator
/**** Version 3.5.0
/****
/**** All user variables are defined****
/**** in this REXX
/****
/****
/*****

/* Get the user's high level qualifier */
parse upper arg hlq

if hlq = "" then
    hlq = "hlq.sdr350"

Upper hlq

/* Define the dataset and variables for LOAD LIBRARY */
address ISPEXEC "LIBDEF ISPLLIB DATASET ID('"hlq".SDRLLIB')"
megt b = "'hlq".SDRLLIB'"

/* Define the dataset where the security key resides. May be
defined to reside in the load library ('secty' definition below)
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".SECURITY' */
secty = "'hlq".SDRLLIB'"

/* Define the dataset and variables for MESSAGE LIBRARY */
address ISPEXEC "LIBDEF ISPLMLIB DATASET ID('"hlq".SDRMLIB')"
intro = "'hlq".SDRMLIB(INTRO)'"
suptf = "'hlq".SDRMLIB(SUPPORT)'"
moncmd = "'hlq".SDRMLIB(MONITORC)'"

/* Define the dataset PANEL LIBRARY */
address ISPEXEC "LIBDEF ISPLPLIB DATASET ID('"hlq".SDRPLIB'"

/* Define the dataset and variable for SKELETON LIBRARY */
address ISPEXEC "LIBDEF ISPLSLIB DATASET ID('"hlq".SDRSLIB'"
wrkfl = "'hlq".SDRSLIB'"

/* Define the dataset TABLE INPUT LIBRARY */
```

```
address ISPEXEC "LIBDEF ISPTLIB DATASET ID('hlq'.SDRTLIB)"

/* Start the main REXX and pass the user's parameters          */
address TSO "ALTLIB ACTIVATE APPLICATION(EXEC)",              */
"DATASET('hlq'.SDREXEC') UNCOND"
address ISPEXEC
"SELECT CMD(%SDRPMON "wrkfl"
                    "megtb"
                    "intro"
                    "suptf"
                    "moncmd"
                    "secty" ) NEWAPPL(SDR) PASSLIB"

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
```





## Session Examples

---

Loading Softek Replicator keys	265
Creating the Communications Data Set	268
Creating the History Log Data Set	269
Performing a Swap Migration	269
Executing a Point-In-Time Session	275
Executing Delayed OVA	279
Performing a SCAN ONLY	280
Setting Up a Migration Using TCP/IP	281



Comments have been removed in all examples.

## Loading Softek Replicator keys

SYSOPTN is located in SAMPLIB. The same member is contained in SDRSLIB for use within the Softek Replicator TSO Monitor. Either member may be used. For information regarding the different types of keys, please refer to *Preparing to execute Softek Replicator* on page 30. 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.

## Full Function Keys

The following example shows how to load Softek Replicator Full Function Base keys. If OVA or OVA and PPIT were purchased, the email will provide this information. The fields are filled in as an example and will not work in the customer's environment. Refer to *Maintenance Overview* on page 25 and *Softek Replicator System Defaults and Options* on page 48 for more information.

```
JOB CARD
//SYSOPTN EXEC PGM=SDRPLKEY, PARM='NEW'
//STEPLIB DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
*
TDMF VERSION 3
*
TDMF FULL FUNCTION BASE
KEY01=87F455AD7E98437C Description = Sample key
*
SYSCOM HISTORY DATASET NAME =
*
SITE NUMBER = 99999
*
CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SMF RECORD ID = 0
*
DISPLAY TIME AS = GMT
*
VOLUME PACING REQUIRED = NO
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = NO
*
WTO AUTO OPERATION MVS ROUTCDE = (2,4,6,11)
*
VOLUME SECURITY = NO
*
OVA REGISTRATION INTERVAL = 0
```

```

*
REVERSE PACING = NO
*
ACTIVE IN COPY = NO
*
AUTOMATIC ICKDSF = NO
*
UNIDENTIFIED SYSTEMS ACTION = WARN
*
ALLOW INVALID COUNT FIELDS = NO
*
MONITOR XRC SESSIONS = NO
//

```

## Express Keys

The Softek Replicator – Express Offering keys have a specific number of volume migrations/replications 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 25.

```

JOB CARD
//SYSOPTN EXEC PGM=SDRPLKEY, PARM='NEW'
//STEPLIB DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
*
TDMF VERSION 3
*
TDMF EXPRESS VOLUMES = 001024 EXPIRES = 05/15/2003
KEY01=87F455AD7E98437C Description = Sample key
*
SYSCOM HISTORY DATASET NAME =
*
SITE NUMBER = 99999
*
CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SMF RECORD ID = 0
*
DISPLAY TIME AS = LOCAL
*
VOLUME PACING REQUIRED = YES
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = (2,4,6,11)
*
WTO AUTO OPERATION MVS ROUTCDE = NO
*
VOLUME SECURITY = NO
*
OVA REGISTRATION INTERVAL = 0
*

```

```

REVERSE PACING = NO
*
ACTIVE IN COPY = NO
*
AUTOMATIC ICKDSF = NO
*
UNIDENTIFIED SYSTEMS ACTION = WARN
*
ALLOW INVALID COUNT FIELDS = NO
*
MONITOR XRC SESSIONS = NO
//

```

## Trial Express Keys

The Softek Replicator – Trial Express keys have a specific number of volume migrations/replications 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 25.

```

JOB CARD
//SYSOPTN EXEC PGM=SDRPLKEY, PARM='NEW'
//STEPLIB DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.TDM350.TDMLLIB, DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSIN DD *
*
TDMF VERSION 3
*
TRIAL EXPRESS VOLUMES = 000016 EXPIRES = 05/05/2003
KEY01=87F455AD7E98437C Description = Sample key
*
SYSCOM HISTORY DATASET NAME =
*
SITE NUMBER = 99999
*
CORPORATION = Any Corporation
*
SITE NAME = Location or Corporation Name
*
SMF RECORD ID = 0
*
DISPLAY TIME AS = LOCAL
*
VOLUME PACING REQUIRED = YES
*
STARTUP CONFIRM REQUIRED = NO
*
TERMINATE ALL VOLUMES IN GROUP ON ERROR = NO
*
WTO MESSAGES FOR AUTOMATED OPERATIONS REQUIRED = NO
*
WTO AUTO OPERATION MVS ROUTCDE = (2,4,6,11)
*

```

```

VOLUME SECURITY = NO
*
OVA REGISTRATION INTERVAL = 0
*
REVERSE PACING = NO
*
ACTIVE IN COPY = NO
*
AUTOMATIC ICKDSF = NO
*
UNIDENTIFIED SYSTEMS ACTION = WARN
*
ALLOW INVALID COUNT FIELDS = 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 SDRSLIB for use within the Softek Replicator 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.

---

### Formula for Determining Data Set Size

The size (number of cylinders required) is based upon the following formula:

$$CYLS = (2.5 * N) + K$$

Where:

$N$  = the number of participating systems

$K$  = the size of the source volumes involved. For example:

- 3390-3  $K = 10$
- 3390-9  $K = 15$

For example, there could be five 3390-3 and five 3390-9 volumes across 7 LPARs in the session. To determine the number of cylinders required, the formula would be calculated as follows:

1.  $CYLS = (2.5 * 7) + 15$  (Always use the largest device type in the session. In this case, the largest is 15).
2.  $CYLS = (17.5) + 15$
3.  $CYLS = 32$  (Round down when calculating size).

This procedure is discussed in *Post-Installation Tailoring*, Step 4 on page 28.

```

JOB CARD
//STEP1 EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=*
//SYSCOM DD DSN=HLQ.SDR350.SYSCOM, DISP=(NEW,CATLG,DELETE),

```

```
//          SPACE= (CYL, 32, , 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.

```
JOB CARD
//STEP1   EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=*
//SYSCOM  DD DSN=HLQ.SDR350.SYSCOM, DISP=(NEW, CATLG, DELETE) ,
//          SPACE= (CYL, 37, , CONTIG) , UNIT=SYSDA,
//          VOL=SER=COMVOLSER,
//          DCB= (LRECL=4096, BLKSIZE=4096, RECFM=F, 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 Replicator session. This data set is input to the SYSOPTN job deck, entry SYSCOM HISTORY DATASET NAME.

```
JOB CARD
//STEP1   EXEC PGM=IEFBR14
//SYSPRINT DD SYSOUT=*
//SYSCOM  DD DSN=HLQ.SDR350.LOG, DISP=(NEW, CATLG, DELETE) ,
//          SPACE= (CYL, (5, 1) ) , UNIT=SYSDA,
//          VOL=SER=COMVOLSER,
//          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 SDRSLIB for use within the Softek Replicator 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=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    Master (TDM1)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            CHECKTARGET
            CONCURRENT (04 ACTIVE)
            ICKDSF
            )
MIGRATE SRC000 TGT100 OPT (FAST)
MIGRATE SRC004 TGT104 OPT (FAST)
MIGRATE SRC008 TGT108 OPT (FAST)
MIGRATE SRC00C TGT10C OPT (FAST)
MIGRATE SRC001 TGT101 OPT (FAST)
MIGRATE SRC005 TGT105 OPT (FAST)
MIGRATE SRC009 TGT109 OPT (FAST)
MIGRATE SRC00D TGT10D OPT (FAST)
MIGRATE SRC002 TGT102 OPT (FAST)
MIGRATE SRC006 TGT106 OPT (FAST)
MIGRATE SRC00A TGT10A OPT (FAST)
MIGRATE SRC003 TGT103 OPT (FAST)
MIGRATE SRC007 TGT107 OPT (FAST)
MIGRATE SRC00B TGT10B OPT (FAST)
MIGRATE SRC00F TGT10F OPT (FAST)
MIGRATE SRC010 TGT110 OPT (FAST)
/*
//
```

In the example above, 16 volumes have been defined for swap migrations (MIGRATE statements) with the FastCopy option specified. The OPTIONS keyword has set the session defaults, which may override what was specified in the system defaults (SYSOPTN batch job). The following has been set: Local Time display, Pacing, no WTO/WTOR, no volume confirmation, the target volumes must have no data on them (only VTOC, VTOCIX and VVDS entries allowed), Active in Copy has been set on and the maximum number of volumes to be concurrently migrating is 4, and the Dynamic ICKDSF option has been set. Only those options desired need to be specified, all others may take the default.



## 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=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    Master (TDM1)
    AGENT (TDM2 TDM3 TDM4)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            CHECKTARGET
            CONCURRENT (04 ACTIVE)
            ICKDSF
            )
MIGRATE SRC000 TGT100 OPT (FAST)
MIGRATE SRC004 TGT104 OPT (FAST)
MIGRATE SRC008 TGT108 OPT (FAST)
MIGRATE SRC00C TGT10C OPT (FAST)
MIGRATE SRC001 TGT101 OPT (FAST)
MIGRATE SRC005 TGT105 OPT (FAST)
MIGRATE SRC009 TGT109 OPT (FAST)
MIGRATE SRC00D TGT10D OPT (FAST)
MIGRATE SRC002 TGT102 OPT (FAST)
MIGRATE SRC006 TGT106 OPT (FAST)
MIGRATE SRC00A TGT10A OPT (FAST)
MIGRATE SRC003 TGT103 OPT (FAST)
MIGRATE SRC007 TGT107 OPT (FAST)
MIGRATE SRC00B TGT10B OPT (FAST)
MIGRATE SRC00F TGT10F OPT (FAST)
MIGRATE SRC010 TGT110 OPT (FAST)
/*
//
```

The following JCL is what would be submitted for each of the participating systems: TDM2, TDM3 and TDM4.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=AGENT, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.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=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    Master (TDM1)
    AGENT (TDM2 TDM3 TDM4)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            CHECKTARGET
            CONCURRENT (04 ACTIVE)
            ICKDSF
            )
MIGRATE SRC500 HDF001 XX2300 OPT (FAST)
MIGRATE SRC504 HDF002 XX2304 OPT (FAST)
MIGRATE SRC508 HDF003 XX2308 OPT (FAST)
MIGRATE SRC50C HDF004 XX230C OPT (FAST)
MIGRATE SRC501 HDF005 XX2301 OPT (FAST)
MIGRATE SRC505 HDF006 XX2305 OPT (FAST)
MIGRATE SRC509 HDF007 XX2309 OPT (FAST)
MIGRATE SRC50D HDF008 XX230D OPT (FAST)
MIGRATE SRC502 HDF009 XX2302 OPT (FAST)
MIGRATE SRC506 HDF00A XX2306 OPT (FAST)
MIGRATE SRC50A HDF00B XX230A OPT (FAST)
MIGRATE SRC50E HDF00C XX230E OPT (FAST)
MIGRATE SRC503 HDF00D XX2303 OPT (FAST)
MIGRATE SRC507 HDF00E XX2307 OPT (FAST)
MIGRATE SRC50B HDF00F XX230F OPT (FAST)
MIGRATE SRC510 HDF010 XX2310 OPT (FAST)
or
MIGRATE SRC500 HDF001 RELABEL (XX2300) OPT (FAST)
/*
//
```

## 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 Replicator 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 Replicator 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=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    Master (TDM1)
    AGENT (TDM2)
    SYSCOM (TDMS1.SDR350.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 Replicator will issue a warning message (SDR2377W) and post a return code of 04 at session termination. If a different action is preferred, Softek Replicator 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 *Softek Replicator System Defaults and Options* on page 48 for more detail.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SYSCOM DD DSN=TDMS1.SDR350.SYSCOM, DISP=SHR
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    MASTER (TDM1)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            NOTERMGROUP
            CHECKTARGET
            CONCURRENT (04 ACTIVE)
            ICKDSF
            UNIDENT (I)
            )
*
MIGRATE SRC000 TGT100 OPT (FAST)
MIGRATE SRC004 TGT104 OPT (FAST)
MIGRATE SRC008 TGT108 OPT (FAST)
MIGRATE SRC00C TGT10C OPT (FAST)
MIGRATE SRC001 TGT101 OPT (FAST)
MIGRATE SRC005 TGT105 OPT (FAST)
MIGRATE SRC009 TGT109 OPT (FAST)
MIGRATE SRC00D TGT10D OPT (FAST)
/*
```

## Executing a Point-In-Time Session

The JCL (MASTER or AGENT) necessary to perform a Point-In-Time session is located in SAMPLIB. The same members are contained in SDRSLIB for use within the Softek Replicator TSO Monitor. Either member may be used.

Point-In-Time (PIT) sessions may be used to create an offline backup for later use with a Delayed OVA session and data center relocations or consolidations. Options such as OVA or Perpetual Point-In-Time may also be selected with PIT sessions.

Comments have been removed in the examples for brevity.

In the following example, 16 volumes are to participate in a PIT Replication session.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    MASTER (TDM1)
    AGENT (TDM2)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            CHECKTARGET
            CONCURRENT (04 ACTIVE)
            )
REPLICATE SRC000 TGT100 OPT (FAST)
REPLICATE SRC004 TGT104 OPT (FAST)
REPLICATE SRC008 TGT108 OPT (FAST)
REPLICATE SRC00C TGT10C OPT (FAST)
REPLICATE SRC001 TGT101 OPT (FAST)
REPLICATE SRC005 TGT105 OPT (FAST)
REPLICATE SRC009 TGT109 OPT (FAST)
REPLICATE SRC00D TGT10D OPT (FAST)
REPLICATE SRC002 TGT102 OPT (FAST)
REPLICATE SRC006 TGT106 OPT (FAST)
REPLICATE SRC00A TGT10A OPT (FAST)
REPLICATE SRC003 TGT103 OPT (FAST)
REPLICATE SRC007 TGT107 OPT (FAST)
REPLICATE SRC00B TGT10B OPT (FAST)
REPLICATE SRC00F TGT10F OPT (FAST)
REPLICATE SRC010 TGT110 OPT (FAST)
/*
//
```

In the preceding example, 16 volumes have been defined for replications (REPLICATE statements) with the FastCopy option specified. The OPTIONS keyword has set the session defaults, which may override what was specified in the system defaults (SYSOPTN batch job). The following has been set: Local Time display, Pacing, no WTO/WTOR, no volume

confirmation, the target volumes must have no data on them (only VTOC, VTOCIX and VVDS entries allowed), Active in Copy has been set on and the maximum number of volumes to be concurrently replicating is 4. Only those options desired need to be specified, all others may take the default.

The following example depicts a replication session with all volumes treated as a single group. Additionally, the prompt option has been selected as well as the auto-operations, Active in Copy, and FastCopy options.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
  MASTER (TDM1)
  AGENT (TDM2)
  SYSCOM (TDMS1.SDR350.SYSCOM)
  OPTIONS (TIME (LOCAL)
    PACING (NORMAL)
    AUTOOPS
    NOCONF
    NOTERMGROUP
    CHECKTARGET
    CONCURRENT (04 ACTIVE)
    SINGLE
  )
REPLICATE SRC000 TGT100 OPT (FAST PROMPT)
REPLICATE SRC004 TGT104 OPT (FAST PROMPT)
REPLICATE SRC008 TGT108 OPT (FAST PROMPT)
REPLICATE SRC00C TGT10C OPT (FAST PROMPT)
REPLICATE SRC001 TGT101 OPT (FAST PROMPT)
REPLICATE SRC005 TGT105 OPT (FAST PROMPT)
REPLICATE SRC009 TGT109 OPT (FAST PROMPT)
REPLICATE SRC00D TGT10D OPT (FAST PROMPT)
REPLICATE SRC002 TGT102 OPT (FAST PROMPT)
REPLICATE SRC006 TGT106 OPT (FAST PROMPT)
REPLICATE SRC00A TGT10A OPT (FAST PROMPT)
REPLICATE SRC003 TGT103 OPT (FAST PROMPT)
REPLICATE SRC007 TGT107 OPT (FAST PROMPT)
REPLICATE SRC00B TGT10B OPT (FAST PROMPT)
REPLICATE SRC00F TGT10F OPT (FAST PROMPT)
REPLICATE SRC010 TGT110 OPT (FAST PROMPT)
/*
//
```

When using the auto-ops option, certain Softek Replicator messages are routed to the MVS console for operator action or reply. When volumes are grouped, these messages will usually contain the group name rather than the volume serial number. It is recommended that the user supply a meaningful group name, especially if there are multiple Softek Replicator Master jobs active and issuing the same messages. For this particular example, the messages will contain the group name SINGLE.

All volumes within a group will synchronize at the same time and can be controlled as a group by the Softek Replicator TSO Monitor. As the name infers, the Single group option groups all the volumes within the same session. Multiple group names may be employed within the same session, but are mutually exclusive with the single group option. When a user supplied group name is employed for only one volume, it will be discarded.

In the next example these volumes will be replicated as a group again, but with a user-supplied group name.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    Master (TDM1)
    agent (TDM2)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
        PACING (NORMAL)
        AUTOOPS
        NOCONF
        NOTERMGROUP
        CHECKTARGET
        CONCURRENT (04 ACTIVE)
    )
GROUP GROUP001 OPT (FAST PROMPT)
REPLICATE SRC000 TGT100
REPLICATE SRC004 TGT104
REPLICATE SRC008 TGT108
REPLICATE SRC00C TGT10C
REPLICATE SRC001 TGT101
REPLICATE SRC005 TGT105
REPLICATE SRC009 TGT109
REPLICATE SRC00D TGT10D
REPLICATE SRC002 TGT102
REPLICATE SRC006 TGT106
REPLICATE SRC00A TGT10A
REPLICATE SRC003 TGT103
REPLICATE SRC007 TGT107
REPLICATE SRC00B TGT10B
REPLICATE SRC00F TGT10F
REPLICATE SRC010 TGT110
/*
//
```

The group name and options remain in force until a new GROUP statement is encountered.

## Replicate Session with OVA

In this example, the selected volumes will be participating in an OVA session once the replication session has completed the synchronization phase and has marked the volumes offline.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    MASTER (TDM1)
    AGENT (TDM2)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
            PACING (NORMAL)
            NOAUTOOPS
            NOCONF
            CHECKTARGET
            )
REPLICATE DBS435 XX7856 OPTIONS (PROMPT FAST OVA)
/*
//
```

In the following OVA sample, a full DFDSS volume copy has been selected. DBS435 is involved in a replication (it is also listed on the INCLUDE list, for clarity). The offline target pair of DBS435 (at sync time) will be input for the copy to XX1975. XX1975 is listed on the EXCLUDE list because it is the output in the OVA JCL (VOL2 DD statement). If the EXCLUDE statement is not used, the OVA job will assume that XX1975 is part of another replication session.

```
//IPGM EXEC PGM=SDRPIPGM, REGION=2047M
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//IPGMOUT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//IPGMIN DD *
    PROGRAM ADRDSSU name
    INCLUDE DBS435
    EXCLUDE XX1975
//SYSPRINT DD SYSOUT=*
//VOL1 DD DISP=SHR, UNIT=3390, VOL=SER=DBS435
//VOL2 DD DISP=SHR, UNIT=3390, VOL=SER=XX1975
//SYSUDUMP DD SYSOUT=Y
//SYSIN DD *
COPY FULL INDDNAME (VOL1) OUTDDNAME (VOL2)
/*
//
```



## PIT Session with PPIT

PPIT sessions may be used during a batch cycle to allow for multiple synchronization points for fallback purposes. Once the volumes have been synchronized, the target volumes are marked offline. Softek Replicator will continue to monitor updates to the source volumes so that at a later time, the target volume may be updated to a new synch time.

OVA has been selected in this example in order to take periodic backups to tape as well as having "hot" backup volumes available, if desired.

In this example, the selected volumes will be participating in a PPIT session once the replicate session has completed the synchronization phase and marked the volumes offline.

```
//STEP1 EXEC PGM=SDRPMAIN, PARM=MASTER, TIME=1440
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    MASTER (TDM1)
    AGENT (TDM2)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (TIME (LOCAL)
        PACING (NORMAL)
        NOAUTOOPS
        NOCONF
        CHECKTARGET
        SINGLE
    )
    REPLICATE DBS001 XX1001 OPTIONS (PROMPT FAST OVA PPIT)
    REPLICATE DBS078 XX1012 OPTIONS (PROMPT FAST OVA PPIT)
    REPLICATE DBS080 XX10F3 OPTIONS (PROMPT FAST OVA PPIT)
    REPLICATE DBS105 XX10C4 OPTIONS (PROMPT FAST OVA PPIT)
/*
//
```

## Executing Delayed OVA

The JCL for Delayed OVA (DOVA) is located in SAMPLIB. All that is required for this type of session is a Communications Data Set (COMMDS) which contains volumes that successfully completed a PIT session.

An example follows:

```
//STEP1 EXEC PGM=SDRPDOVA
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//
```

Once this session has initialized, a normal OVA batch job may be submitted. If an OVA batch job is not submitted within the standard 15-minute interval, the Delayed OVA job will terminate (normally).

## 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 Replicator copy task does not start and the target volume remains unchanged. If the WTO option is specified, automated operations messages (SDRxxxxA) 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.

## Using a //SDRPSCAN DD DUMMY Statement to Specify a SCAN

The SCAN parameter can be specified with a //SDRPSCAN DD DUMMY statement as shown in the following sample, *Sample SCANONLY JCL*.

When the SCAN parameter is specified as shown in the following example JCL, Softek Replicator simulates the INITIALIZATION and ACTIVATION phases. As a result of this simulation, the normal Softek Replicator messages are issued, as well as message SDR2722I, **Volume termination requested by "SCAN ONLY."**

### Sample SCANONLY JCL

```
JOB CARD
//STEP1 EXEC PGM=SDRPMAIN, PARM='MASTER, SCAN'
//STEPLIB DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SECCOM DD DISP=SHR, DSN=TDMS1.SDR350.SDRLLIB
//SYSCOM DD DISP=SHR, DSN=TDMS1.SDR350.SYSCOM
//SYSPRINT DD SYSOUT=*
//*SDRPSCAN DD DUMMY
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
    MASTER (TDM1)
    SYSCOM (TDMS1.SDR350.SYSCOM)
    OPTIONS (PROMPT PURGE COMPARE NOCHECKT FASTCOPY CONC (03 ACTIVE)
    )
GROUP TESTGRP OPT (NOPU NOCOMPARE)
MIGRATE TD239A TD239B
/*
//
```

# Setting Up a Migration Using TCP/IP

## REMOTE Master JCL

When performing TCP/IP migration to a remote system, a port number must be specified for the remote master system that is the target of a transparent migration using TCP/IP.



### CAUTION:

The port number specified in the remote master job must match the port number specified in the local master job.

### Remote Master JCL Example

```
JOBCARD
/*
/* +-----+
/* |
/* |   THIS MASTER JOB IS USED ON THE REMOTE SYSTEM OF A TCP/IP
/* |   CONNECTION.  THE PORT NUMBER SPECIFIED ON THE REMOTE MASTER,
/* |   MUST MATCH THE PORT NUMBER SPECIFIED ON THE LOCAL MASTER.
/* |   THE PORT NUMBER MUST BE IN THE RANGE OF 1-65534.  THE SYSCOM
/* |   USED FOR THE REMOTE MASTER MUST ALSO BE USED FOR ANY REMOTE
/* |   AGENT(S) .
/* |
/* +-----+
/*
//RMASTER EXEC PGM=SDRPMAIN,PARM='MASTER,PORT=8888'
//STEPLIB DD DSN=TDMS1.SDR350.SDRLLIB,DISP=SHR
//SECCOM DD DSN=TDMS1.SDR350.SDRLLIB,DISP=SHR
//SYSCOM DD DSN=TDMS1.REMOTE.SYSCOM,DISP=SHR
//SYSTCPD DD DSN=TDMS1.TCPPARMS(TCPDATA),DISP=SHR
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
//SYSIN DD *
SESSION SESSION1
MASTER(TDM2)
AGENT(DRM1)
SYSCOM(TDMS1.REMOTE.SYSCOM)
OPT(TIME(LOCAL)
CONFIRM
AUTOOPS
FASTCOPY
UNIDENT(W)
)
/*
//
```

## Guidelines for Creating Remote Master JCL

Keep in mind the following when creating remote master JCL for a TCP/IP migration:

- The `PORT=port` parameter on the EXEC statement indicates to Softek Replicator that this is a remote Replicator session.
- MIGRATE control statements cannot be used in the remote Master input stream; the migration volumes can be defined only on the local Replicator session.
- The agent system (in this example, DRM1) on the remote session does not perform normal agent functions (source volume updates monitoring and notification). In the case of a remote master job for a TCP/IP migration, the agent system only protects the target volume from unauthorized access and varies it offline at termination time.

## LOCAL Master JCL

When performing a TCP/IP migration, a LOCAL master job must be submitted that identifies a local master system as a sending system using TCP/IP.

### Local Master JCL Example

```

JOB CARD
/*
/* +-----+
/* |
/* |   THIS MASTER JOB IS USED ON THE LOCAL SYSTEM OF A TCP/IP
/* |   CONNECTION.  THE PORT NUMBER SPECIFIED ON THE LOCAL MASTER,
/* |   MUST MATCH THE PORT NUMBER SPECIFIED ON THE REMOTE MASTER.
/* |   THE PORT NUMBER MUST BE IN THE RANGE OF 1-65534.  THE SYSCOM
/* |   USED FOR THE LOCAL MASTER MUST ALSO BE USED FOR ANY LOCAL
/* |   AGENT(S) .
/* |
/* +-----+
/*
//LMASTER EXEC PGM=SDRPMAIN, PARM=MASTER
//STEPLIB DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SYSCOM DD DSN=TDMS1.LOCAL.SYSCOM, DISP=SHR
//SYSTCPD DD DSN=TDMS1.TCPPARMS(TCPDATA), DISP=SHR
//SYSPRINT DD SYSOUT=*
//DSFPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD *
SESSION SESSION1
MASTER(TDM1)
AGENT(BRO1)
  SYSCOM(TDMS1.LOCAL.SYSCOM)
  OPT(FAST UNIDENT(W)
    )
*
REMOTE TESTING ADDR(255.255.255.255) PORT(8888)
REPLICATE SCR000 TGT100
//

```

**CAUTION:**

The port number specified in the remote master job must match the port number specified in the IP statement of the local master job.

## Remote Agent JCL

In the remote agent JCL, the SYSCOM data set name must match the SYSCOM data set name in the remote master JCL.

### Remote Agent JCL Example

```

JOB CARD1
JOB CARD2
/*JOBPARM SYSAFF=DRM1
/* +-----+
/* |
/* |   THIS AGENT JOB IS USED ON THE REMOTE SYSTEM OF A TCP/IP
/* |   CONNECTION TO ENSURE DATA INTEGRITY FOR THE REMOTE VOLUME(S) .
/* |   THE SYSCOM USED FOR THE REMOTE MASTER MUST ALSO BE USED FOR
/* |   THE REMOTE AGENT(S) .
/* |
/* +-----+
/*
/*RAGENT EXEC PGM=SDRPMAIN, PARM=AGENT
/*STEPLIB DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
/*SECCOM DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
/*SYSCOM DD DSN=TDMS1.REMOTE.SYSCOM, DISP=SHR
/*SYSPRINT DD SYSOUT=*
/*SYSUDUMP DD SYSOUT=*
/*SYSSNAP DD SYSOUT=*
/*SYSIN DD DUMMY

```

## Local Agent JCL

In the local agent JCL, the SYSCOM data set name must match the SYSCOM data set name in the local master JCL.

### Local Agent JCL Example

```
JOB CARD
/*JOBPARM SYSAFF=BR01
/* * +-----+
/* * |
/* * |   THIS AGENT JOB IS USED ON THE LOCAL SYSTEM OF A TCP/IP
/* * |   CONNECTION TO ENSURE DATA INTEGRITY FOR THE LOCAL VOLUME(S) .
/* * |   THE SYSCOM USED FOR THE LOCAL MASTER MUST ALSO BE USED FOR
/* * |   THE LOCAL AGENT(S) .
/* * |
/* * +-----+
/* *
//LAGENT EXEC PGM=SDRPMAIN, PARM=AGENT
//STEPLIB DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SECCOM DD DSN=TDMS1.SDR350.SDRLLIB, DISP=SHR
//SYSCOM DD DSN=TDMS1.LOCAL.SYSCOM, DISP=SHR
//SYSPRINT DD SYSOUT=*
//SYSUDUMP DD SYSOUT=*
//SYSSNAP DD SYSOUT=*
//SYSIN DD DUMMY
```



## How to Read Syntax Diagrams

---

Reading Syntax Diagrams

287





## 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.

```
>>---+-TARget-+- (target_volume)----->
      +-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.

```
>-----+-----target_volume-----+-----+----->
      |                                     |
      |                                     +---duplex_target---+
      |                                     +---remote_target---+
      +---remote_target-----+
      |
      +-TARGET----- (-+-----+-----+-----+-----) -+
      +-TGT-----+
      |                                     |
      |                                     +-local_target---+
      |                                     +-remote_target---+
      |                                     +-duplex_target---+
```

- 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.

```
>-----+----->
      +-SINGLEgroup---+
```

- 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.

```

    +-NOPUrge--+
>-----+----->
    +-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

**NOTE** This glossary contains a list of terms used within this *Softek Replicator 3.5 Installation and Reference Guide* for z/OS (ML-145060).

## 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 destaging. 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 destaging 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 recovery, device migration, and workload migration.

**extended specify task abnormal exit (ESTAE)**

See *specify task abnormal exit (STAE)*.

## 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.

**point-in-time migration/replication**

A copy of a source volume onto a target volume that ends at a specific time.

## 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 volume 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.

**specify task abnormal exit (STAE)**

A macro-instruction that specifies a routine to receive control in the event of abnormal termination of the issuing task.

**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 volume pair that will contain a duplicate of the data on the source volume.

**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.



# Index

## Symbols

) 90

” 31

## A

ACDS 83

Activation 9

agent system

*build batch jobs* 195, 203

*CPU overhead* 70

*execution order* 52

*initiation* 5, 7, 8

*number of* 95

*quiesce request* 10, 68

*relationship* 30

*responsibilities* 6, 7

*sample job* 31, 160

*storage requirements* 21

*termination of* 53

*time intervals* 69

Application I/O performance 66

Audience iii

Audience for this Manual iii

authorization return codes

*authority checking* 243

*history file recording* 246

*Replicator security record* 244

*Replicator/Express feature information* 245

auto-operations 59, 97, 169

*interface* 59

*messages* 251

## B

Batch Utilities 129

*overview* 129

*SDRPBMON* 129

*auto-operations* 129

*command processing* 131

*control statement processing* 132

*messages* 135

*operational considerations* 130

*SDRPCFTP* 129, 135

*SDRPCLIP* 129, 136

*return codes* 136

*SDRPXTV* 129

*SDRPMON*

*messages* 135

*printed output* 135

*SDRPMUCB* 129, 137

*operation* 137

*SDRPQDSK* 129, 138

*printed output* 139

*user abends* 139

*SDRPSCAN* 129, 139

*abend codes* 140

*invalid count field*

*identification of* 139

*messages* 140

*operation* 140

*parameters* 139

*return codes* 140

*SDRPVTOC* 129, 143

*messages* 145

*printed output* 144

*return codes* 146

Batch utilities (see Replicator Batch Utilities)

BCDS 83

Build Data Migration Jobs (see Replicator Monitor Feature)

## C

CA Products (see Computer Associates Products)

cache fast write 82, 92, 94

CFTP (see SDRPCFTP)

channel command word 87, 289

channel extenders

*spacing with* 62

channel utilization 68, 69

class names 82

CLIP (see SDRPCLIP)

COMMDS (see Communication Data Set)

Communication Data Set 5, 6, 22, 52, 174, 185

*allocation* 17, 85, 94

*hardware reserve* 97

*history file* 24, 28, 187

*placement* 70

*purpose* 5

- compare option 21, 31
    - errors* 221
  - Computer Associates Products
    - BrightStor CA-ASTEX Performance* 79
    - Moving Multi-Image Manager Control Data Sets* 81
    - Unicenter CA-11 Job Management* 80
    - Unicenter CA-7 Job Management* 80
    - Unicenter CA-MIM Resource Sharing* 80
    - Unicenter CA-OPS/MVS Event Management and Automation* 79
    - Unicenter CA-Scheduler Job Management* 79
  - concurrent copy 85
  - Consistency Groups 85
  - control data sets
    - migration of* 83
  - couple data sets 96
  - CPU model 29, 239
  - CPU serial number 29, 239
    - determining* 239
- D**
- DASD Fast Write 69, 82
  - DASD space requirements 235
  - DASD subsystem serial number 255
    - determining* 257
  - data bases
    - point-in-time migrations* 67
  - Data Facility Products 83
  - data migration
    - definition and characteristics* 3
  - DCOLLECT 83
  - DD statements
    - SECCOM* 24
  - Delayed Offline Volume Access (DOVA)
    - purpose* 114
  - device recovery 53
  - device states
    - before and after a swap migration* 82
  - DFHSM 83
  - DFSMS
    - class names* 82
    - DCOLLECT* 83
    - DISNEW command* 83
    - extended functions* 85
    - QUIENew command* 83
    - volume status* 83
  - DFW 69
  - distribution media 15
  - duplexing functions
    - Dual Copy* 84
    - PPRC* 96
    - SDMS* 97
    - SRDF* 97
    - XRC* 84
  - dynamic devices 100, 101
  - Dynamic ICKDSF
    - how functions will affect a swap migration* 87
    - intent of* 87
  - dynamic pacing
    - I/O pacing* 179
    - real storage pacing* 179
  - dynamic suspend command 162
  - dynamic suspension 73
  - dynamic volume pacing
    - I/O* 60
    - pacing with channel extenders* 62
    - real storage pacing* 61
    - reverse pacing* 61
    - user-specified pacing values* 62
- E**
- EMC
    - Symmetrix Manager* 85
  - ENF 97
  - Enterprise Storage Server
    - considerations* 98, 100
    - support* 98, 100
  - esoteric names 82
  - Event Notification Facility 97
  - executing Softek Replicator 52
  - extended functions
    - concurrent copy* 85
    - data striping* 85
    - VSAM data compression* 85
  - Extended Remote Copy (XRC) support 103
- F**
- Fast Copy
    - required with TCP/IP* 123
  - file allocation managers
    - ProSMS* 85
    - SAMS Vantage* 85
  - files on product tape 15
  - FTP process
    - SDRPCFTP* 135



## G

Global Resource Serialization 52, 70  
groups  
    *number of, per session* 95  
GRS 70

## H

Hang Monitor 72  
HCD 86  
help messages (see Replicator Monitor Feature,  
    Help and Message Detail Facility)  
Host Software Component 86, 95  
HSC 86  
HSM 83

## I

I/O pacing 60  
I/O performance 67  
ICKDSF  
    REFVTOC 52, 67  
    *re-label* 67  
    *restrictions* 87  
IDCAMS  
    *cache fast write* 82  
    DASD Fast Write 82  
    LISTDATA *command* 92  
IMS Write Ahead Data Sets 90  
initialization  
    *system initialization* 7, 8, 96  
    *volume initialization* 9, 162  
installing Softek Replicator 22  
invalid count field 90  
    *correction of* 90  
    *display* 224  
    *identification of* 139  
IODF 86  
IPL volumes 90  
ISPF  
    *keylist* 30, 157  
    *profile data set members* 29, 157

## J

JES2  
    *checkpoint volumes* 91  
    *considerations* 91  
    *MASDEF statement* 91  
    *spool volumes* 91  
JES3

*checkpoint volumes* 91  
*considerations* 86, 91, 92  
*P/DAS support* 91  
*spool volumes* 91  
*XTYPE parameter* 92

## K

key types 31  
Keylist  
    *enable* 30  
keys  
    #SYSOPTN 24, 30, 48  
    *adding*  
        *express* 32  
        *license* 31, 190  
        *Replicator/Virtual* 31  
        *trial express* 32  
        *vendor* 31  
    *deleting*  
        *express* 32  
        *license* 31  
        *Replicator/Virtual* 31  
        *trial express* 32  
        *vendor* 31  
    *Replicator Monitor Feature* 24, 190  
    *Replicator/Virtual* 31

## L

LISTDATA information 92

## M

manuals  
    *accessing* 54  
master system  
    *activation phase* 9  
    *build batch jobs* 195  
    *copy task* 9  
    CPU overhead 70  
    *execution order* 52  
    I/O pacing 60  
    *initiation* 5, 8  
    *pacing option* 49  
    *placement of* 70  
    *quiesce phase* 10  
    *real storage pacing* 61  
    *redirect phase* 10  
    *refresh phase* 9  
    *relationship* 6, 31

- responsibilities* 6
  - resume phase* 11
  - sample job* 30, 31
  - session status* 162
  - SMF recording* 65
  - storage requirements* 21
  - synchronization goal* 68
  - synchronize phase* 10
  - termination of* 53
  - time intervals* 69
  - MCDS 83
  - messages (see Replicator Monitor Feature, Help and Message Detail Facility)
  - migration
    - definition and characteristics* 3
    - dynamic suspension* 73
    - master/agent system relationship* 6
    - suspend* 72
  - migration of
    - checkpoint volumes* 91
    - control data sets* 83
    - devices above the 16Mb line* 102
    - dynamic devices* 101
    - installation static devices* 101
    - IODF 86
    - IPL volumes* 90
    - JES3 system managed devices* 92
    - page data sets* 4, 95
    - PPRC volumes* 96
    - RAID and non-RAID devices* 93
    - SDMS volumes* 97
    - SRDF volumes* 97
    - static devices* 101
    - swap data sets* 4
    - sysplex couple data sets* 96
    - unlike device types* 93
    - VM formatted volumes* 94
    - VM volumes* 102
  - migration phases
    - activation* 9
    - copy volume* 9
    - quiesce* 10
    - redirect* 11
    - refresh* 9
    - resume* 11
    - synchronize* 10
    - system initialization* 7, 9
  - migration session
    - auto-operations* 59
    - canceling*
      - recovery of devices* 53
    - channel utilization* 69
    - group termination* 50
    - history file* 8, 48
    - pacing option* 49
    - rank contention* 71
    - return codes* 228
    - terminating* 53
    - volume confirmation* 49
  - migration types
    - point-in-time* 66
  - MIM 70
  - Model 204
    - considerations* 94
  - model number
    - CPU* 29, 239
  - Monitor Feature
    - execution* 30
  - MUCB (see SDRPMUCB)
  - Multi-Image Manager 70, 95
  - MVS
    - running under VM* 94
- ## O
- OCDS 83
  - Offline Volume Access 107
    - control statements* 112
    - de-registration* 111
    - exclusion list* 109
    - functions* 108
    - I/O redirection* 111
    - I/O Redirection Report* 111
    - inclusion list* 109
    - initialization* 110
    - JCL statements* 112
    - multi-volume data sets* 109
    - processing* 110
    - purpose* 108
    - registration* 110
    - Registration Report* 111
    - starting a session* 108
    - usage* 108, 109
    - using on different subsystems* 108
    - using the interface program* 112
  - operating system requirements 17
  - operating system support 6
  - options
    - auto-operations* 50, 59
    - compare* 21, 31
    - history file* 8, 24, 48
    - keys* 48
    - multiple group names* 66

- parm statement* 48
- prompt* 66, 68
- Replicator function* 48
- Replicator version* 48
- SMF recording* 49, 65
- synchronization time goal* 68
- system authorization facility* 8
- terminate group on error* 50
- time display* 49
- volume confirmation* 9, 49
- volume pacing* 49

OVA (see Offline Volume Access)

## P

P/DAS (see Peer to Peer Remote Copy/Dynamic Address Switching)

pacing with channel extenders 62

page data sets 4, 95

- common* 95
- local* 4, 95
- PLPA* 95

parallel sysplex

- considerations* 96

Peer to Peer Remote Copy Support

- migrating PPRC to a non-PPRC device* 97

Peer to Peer Remote Copy/Dynamic Address Switching

- JES3 support* 91

Peer-to-Peer Remote Copy Support 96

performance

- application impact* 68
- channel utilization* 68
- considerations* 71, 72
- customer on volume* 181
- Replicator Monitor Feature* 174, 176, 181
- storage subsystem* 72

performance statistics

- storage subsystem* 72

Perpetual Point-In-Time 117

- considerations* 118
- during an active* 117
- setting up for* 118

PIT (see Point-In-Time)

planning considerations 75

Point-In-Time

- data bases* 66
- replications* 66

post-installation tailoring 25

pre-installation considerations 15

preparing to execute Softek Replicator 30

product requirements 15

## Q

QDSK (see SDRPQDSK)

quiesce phase 10

## R

RAID subsystems

- rank contention* 71

RAMAC Virtual Array (See RVA Support)

read device characteristics 138

real storage pacing 61

real-time monitors 97

recovering Softek Replicator devices 53

recovery

- of devices after cancel* 53

Replicator /Exchange Monitor Feature

- support utilities*
  - invalid count field*
  - correction of* 90

Replicator /Virtual 31

Replicator Batch Utilities

- SDRPBMON* 73

Replicator Monitor Feature

- adding license keys* 190
- auto-operations* 59
- build data migration jobs* 195
  - agent system batch job* 203
  - build cmds communication data set* 205
  - master system batch jobs* 196
- change or submit migration jobs* 160
- current sessions*
  - display messages* 171
  - display Offline Volume Access (OVA)* 173
  - display performance data* 174
  - monitor progress* 161
  - user interaction and status* 162
    - continue group migration* 168
    - continue volume migration* 168
    - group confirmation* 169
    - group termination* 167
    - help panel* 164
    - suspend group migration* 168
    - suspend volume migration* 168
    - sync volume needed* 171
    - volume confirmation* 169
    - bypass PPRC checking* 166
    - volume termination* 167
- current/past sessions*

- display associated address spaces* 173
  - display performance data*
    - average device response time* 182
    - system information* 175
    - volume information* 176
    - volume pacing information* 178
  - deleting license keys* 190
  - display installation options and environment* 189
    - authorization return codes* 191
  - display/modify installation security environment* 190
  - display/modify user's TSO monitor options* 192
  - execution* 157
  - help and message detail facility* 226
    - display message detail* 227
    - introduction* 229
    - introduction to Softek Replicator* 229
    - monitor line commands* 231
    - support information* 230
  - invalid count field*
    - display* 224
  - ISPF
    - keylist* 157
    - profile data set members* 157
  - master system batch job* 196
  - migration session*
    - return codes* 228
  - modify installation security environment*
    - adding/deleting license keys* 190
  - overview* 157
  - past sessions*
    - display communication data set history* 24, 187
      - navigation* 187
    - display details* 185
    - display summary* 183
  - session termination* 53
  - support utilities*
    - active session*
      - display/alter tracing bit settings* 210, 211
    - current session*
      - module version levels for COMMDS* 174
    - detected source volume i/o errors* 224
    - display memory* 208
    - invalid count field* 90
    - module version levels in defined load library* 213
    - past sessions*
      - module version levels for COMMDS* 174
    - previous session*
      - display trace table* 212
    - system change summary* 215
    - unit communication data set merged system messages* 223
    - unit communication data set navigator* 220
    - unit communication data set volume refresh bit map* 221
    - unit control block display* 215
    - view internal details for active migrations* 209
    - user interaction and status*
      - volume confirmation*
        - bypass PPRC checking* 97
  - Replicator/Express 32
  - resume phase 11
  - return codes
    - authorization* 243
  - reverse pacing 61
  - REXX execs
    - Replicator* 29, 262
    - requirements* 157
  - RMM 83
  - running Softek Replicator 52
  - RVA Support 101
- ## S
- SAF 8
  - sample jobs 30
  - SCAN (see SDRPSCAN)
  - SCAN parameter 280
  - Scanning the system 280
  - SDRPBMON
    - command processing* 131
    - printed output* 135
  - SDRPCLIP
    - return codes* 136
  - SDRPEXTV
    - abend codes* 147
    - program messages* 147
  - SDRPQDSK
    - messages* 139
    - user abends* 139
  - SDRPQDSK - User Abends 139
  - SDRPSCAN
    - abend codes* 140
    - return codes* 140
  - SDRPVTOC

- abend codes* 146
- SECCOM
  - DD statement* 24, 30, 31
- security 8
- serial number
  - CPU 29, 239
  - DASD subsystem 257
- session examples 263
- sessions
  - number of* 95
- shared versus non-shared devices 97
- Shared Virtual Array (See SVA Support)
- Shark support 98
  - FlashCopy support* 100
  - messaging* 98
  - swap from ESS to non-ESS* 98
- single group option 66
- SMF recording 49, 65
- SMP naming conventions 21
- SMP/E
  - installation* 23
  - installation without* 24
- SMS 83
- SMS (see DFSMS)
- sort programs 82
- source volume
  - DFSMS considerations* 83
  - dynamic suspend command* 72
  - dynamic suspension* 73
  - extended functions considerations* 85
  - IMS Write Ahead Data Set considerations* 90
  - invalid count field*
    - display* 224
  - JES3 considerations* 92
  - Model 204 considerations* 94
  - pacing* 59
  - performance* 69, 180
  - PPRC considerations* 96
  - requirements* 4, 30, 93, 95, 100
  - SDMS considerations* 97
  - smaller to larger device migration* 67
  - SRDF considerations* 97
  - status after migration* 66, 67, 68
  - Symmetrix Manager considerations* 85
  - system authorization facility requirements* 8, 25
- space requirements (see DASD space requirements)
- SRDF 84
- static devices 100
- storage requirements 6, 18
- StorageTek Virtual Array

- considerations* 101
- support utilities 207
  - active session*
    - display trace table* 210
    - display/alter tracing bit settings* 210
  - communication data set control blocks* 218
  - current session*
    - module version levels for COMMDS* 214
- SVA support 101
- swap data sets 4, 95
- synchronization goals 68
- SYSMOD naming conventions 21
- system authorization facility 8, 25
- system defaults 47
- system failure manager 96
- system initialization 8

## T

- tape, files on 15
- target device
  - status after migration* 66
- target volume
  - DFSMS considerations* 83
  - dynamic suspension* 73
  - extended functions considerations* 85
  - IMS Write Ahead Data Set considerations* 90
  - JES3 considerations* 92
  - Model 204 considerations* 94
  - performance* 69
  - PPRC considerations* 96, 97
  - Replicator ownership* 102
  - requirements* 4, 30, 93, 100
  - SDMS considerations* 97
  - smaller to larger device migration* 67
  - SRDF considerations* 97
  - status after migration* 66, 67
  - Symmetrix Manager considerations* 85
  - system authorization facility requirements* 8, 25
- TCP/IP
  - Fast Copy requirement* 123
- Technical Support 29
- terminate phase 11
- terminating Softek Replicator 53

## U

- UCB (see Unit Control Block(s))
- Unit Control Block(s)
  - above the 16MB line* 52

*below the 16-MB line* 52

*four-digit* 52

*JES3 considerations* 91

*LISTUCB command* 101

*status after migration* 66

*three-digit* 52

URLs for technical support and maintenance 27

user-specified pacing values 62

utilities (see Replicator Monitor Feature Support Utilities)

## V

Vendor 31

Virtual Machine

*considerations* 95

*previously used by* 103

*restrictions* 17

*volume tolerance* 102

*volumes* 103

VM (see Virtual Machine)

volume I/O redirection 11

volume pacing 59, 60, 62, 174

*#SYSOPTN* 49

*application performance* 67, 69

*channel extenders* 62

*I/O pacing* 60, 174, 178, 179

*real storage pacing* 61, 174, 178, 179

*reverse pacing* 61

*session default* 49

*specific pacing values* 62

*when pacing is not active* 62

Volume Table of Contents 102

volumes

*number of volumes per session* 95

VTOC (see Volume Table of Contents)

## W

WADS (see Write Ahead Data Set)

Write Ahead Data Set 90

## X

XRC (see Extended Remote Copy)

# Revision History

---

This revision history lists all revisions of this publication and their effective dates.

Revision Level	Change Summary
ML-145060-001 December 2003	General Availability release of this manual for Softek Replicator Version 3.5.0.











**Softek Offices**

**Worldwide Headquarters – USA**

1250 East Arques Avenue, M/S 317  
Sunnyvale, CA 94085  
Toll-free 1.877.887.4562  
Phone 408.746.7638  
Facsimile 408.737.5900  
Email USA cs@softek.com

**United Kingdom**

1 Meadow Gate Avenue,  
Farnborough Business Park  
Farnborough, Hampshire GU14 6FG  
Phone 44.1252.550440  
Facsimile 44.1252.550441  
Email Europe info@softek.com

**Canada**

Softek Software Technology, Ltd.  
Phone 450.686.2455  
Facsimile 450.686.0239

**Ireland**

Softek Software Technology Ireland, Ltd.  
Phone 353.1.813.6000  
Facsimile 353.1.813.6321

**France, Spain & Portugal**

Softek Software Technology SAS  
Phone 33.1.44.10.41.00  
Facsimile 33.1.44.10.41.08

**Italy**

Softek Software Technology, Filiale Italiana  
Phone 39.02.241.01405  
Facsimile 39.02.241.01408

**Germany, Austria, Switzerland**

Softek Software Technology, GmbH  
Phone 49.89.244417.0  
Facsimile 49.89.244417.111

**Belgium, Luxembourg**

Softek Software Technology  
Phone 32.2.712.77.72  
Facsimile 32.2.712.78.19

**The Netherlands**

Softek Software Technology  
Phone 31.346.244700  
Facsimile 31.346.244710

For more information, please visit us at [www.softek.com](http://www.softek.com)