



ChangeMan[®]ZMF

M+R Option Getting Started Guide

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Welcome to the ChangeMan ZMF M+R Option

The ChangeMan® ZMF M+R (Merge and Reconcile) Option enables you to consolidate multiple versions of source code, JCL, and other types of text.

- Before You Begin See the Readme for the latest updates and corrections for this manual.
- Objective The *M+R Option Getting Started Guide* describes how to use the M+R Option.
- Audience This book is intended for software change management administrators, application systems managers, software auditors, and technical staff who are planning and evaluating how to reconcile existing applications with newer versions of that software or how to merge and reconcile concurrent development of software components.
- Ultimately, this book is intended for programmers who will use the M+R Option to
- Identify and measure the impact of differences among multiple versions of a software program or library or product.
 - Reconcile the changes to create a consolidated version of that program or library or product.
- Navigating this book Change bars in the left margin identify substantive changes in this publication since the last time it was published.

Guide to ChangeMan ZMF Documentation

The following sections provide basic information about ChangeMan ZMF documentation.

ChangeMan ZMF Documentation Suite

The ChangeMan ZMF documentation set includes the following manuals in PDF format.

Manual	Description
<i>Administrator's Guide</i>	Describes ChangeMan ZMF features and functions with instructions for choosing options and configuring global and application administration parameters.
<i>ChangeMan ZMF Quick Reference</i>	Provides a summary of the commands you use to perform the major functions in the ChangeMan ZMF package life cycle.
<i>Customization Guide</i>	Provides information about ChangeMan ZMF skeletons, exits, and utility programs that will help you to customize the base product to fit your needs.
<i>Db2 Option Getting Started Guide</i>	Describes how to install and use the Db2 Option of ChangeMan ZMF to manage changes to Db2 components.

Manual	Description
<i>ERO Concepts</i>	Discusses the concepts of the ERO Option of ChangeMan ZMF for managing releases containing change packages.
<i>ERO Getting Started Guide</i>	Explains how to install and use the ERO Option of ChangeMan ZMF to manage releases containing change packages.
<i>IMS Option Getting Started Guide</i>	Provides instructions for implementing and using the IMS Option of ChangeMan ZMF to manage changes to IMS components.
<i>INFO Option Getting Started Guide</i>	Describes two methods by which ChangeMan ZMF can communicate with other applications: <ul style="list-style-type: none"> ■ Through a VSAM interface file. ■ Through the Tivoli Information Management for z/OS product from IBM.
<i>Installation Guide</i>	Provides step-by-step instructions for initial installation of ChangeMan ZMF. Assumes that no prior version is installed or that the installation will overlay the existing version.
<i>Java / zFS Getting Started Guide</i>	Provides information about using ZMF to manage application components stored in USS file systems, especially Java application components.
<i>Load Balancing Option Getting Started Guide</i>	Explains how to install and use the Load Balancing Option of ChangeMan ZMF to connect to a ZMF instance from another CPU or MVS image.
<i>M+R Getting Started Guide</i>	Explains how to install and use the M+R Option of ChangeMan ZMF to consolidate multiple versions of source code and other text components.
<i>M+R Quick Reference</i>	Provides a summary of M+R Option commands in a handy pamphlet format.
<i>Messages</i>	Explains messages issued by ChangeMan ZMF, SERNET, and System Software Manager (SSM) used for the Staging Versions feature of ZMF.
<i>Migration Guide</i>	Gives guidance for upgrading ChangeMan ZMF
<i>OFM Getting Started Guide</i>	Explains how to install and use the Online Forms Manager (OFM) option of ChangeMan ZMF.
<i>SER10TY User's Guide</i>	Gives instructions for applying licenses to enable ChangeMan ZMF and its selectable options.
<i>User's Guide</i>	Describes how to use ChangeMan ZMF features and functions to manage changes to application components.
<i>XML Services User's Guide</i>	Documents the most commonly used features of the XML Services application programming interface to ChangeMan ZMF.
<i>ZMF Web Services User's Guide</i>	Documents the Web Services application programming interface to ChangeMan ZMF.

Using the Manuals

Use Adobe® Reader® to view ChangeMan ZMF PDF files. Download the Reader for free at get.adobe.com/reader/.

This section highlights some of the main Reader features. For more detailed information, see the Adobe Reader online help system.

The PDF manuals include the following features:

- **Bookmarks.** All of the manuals contain predefined bookmarks that make it easy for you to quickly jump to a specific topic. By default, the bookmarks appear to the left of each online manual.
- **Links.** Cross-reference links within a manual enable you to jump to other sections within the manual with a single mouse click. These links appear in blue.
- **Comments.** All PDF documentation files that are delivered with ChangeMan ZMF have enabled commenting with Adobe Reader. Adobe Reader version 7 and higher has commenting features that enable you to post comments to and modify the contents of PDF documents. You access these features through the Comments item on the menu bar of the Adobe Reader.
- **Printing.** While viewing a manual, you can print the current page, a range of pages, or the entire manual.
- **Advanced search.** Starting with version 6, Adobe Reader includes an advanced search feature that enables you to search across multiple PDF files in a specified directory.

Searching the ChangeMan ZMF Documentation Suite

There is no cross-book index for the ChangeMan ZMF documentation suite. You can use the Advanced Search facility in Adobe Acrobat Reader to search the entire ZMF book set for information that you want. The following steps require Adobe Reader 6 or higher.

- 1 Download the ZMF All Documents Bundle ZIP file and the *ChangeMan ZMF Readme* to your workstation from the Micro Focus SupportLine website.
- 2 Unzip the PDF files in the ZMF All Documents Bundle into an empty folder. Add the *ChangeMan ZMF Readme* to the folder.
- 3 In Adobe Reader, select **Edit | Advanced Search** (or press **Shift+Ctrl+F**).
- 4 Select the **All PDF Documents in** option and use **Browse for Location** in the drop down menu to select the folder containing the ZMF documentation suite.
- 5 In the text box, enter the word or phrase that you want to find.
- 6 Optionally, select one or more of the additional search options, such as **Whole words only** and **Case-Sensitive**.
- 7 Click **Search**.
- 8 In the **Results**, expand a listed document to see all occurrences of the search argument in that PDF.
- 9 Click on any listed occurrence to open the PDF document to the found word or phrase.

Online Help

Online help is the primary source of information about ChangeMan ZMF. Online help is available as a tutorial, through Help screens, and in ISPF error messages.

Online Tutorial

ChangeMan ZMF includes an online tutorial that provides information about features and operations, from high-level descriptions of concepts to detailed descriptions of screen fields.

To view the tutorial table of contents, select option T from the Primary Option Menu, or jump to it from anywhere in ChangeMan ZMF by typing =T and pressing ENTER.

Press PF1 from anywhere in the Tutorial for a complete list of Tutorial navigation commands and PF keys.

Online Help Screens

If you have questions about how a ChangeMan ZMF screen works, you can view a help panel by pressing PF1 from anywhere on the screen.

Online Error Messages

If you make an invalid entry on a ChangeMan ZMF screen, or if you make an invalid request for a function, a short error message is displayed in the upper right corner of the screen. Press PF1 to display a longer error message that provides details about the error condition.

Remember that the long message does not display automatically. Request the long message by pressing PF1.

Typographical Conventions

The following typographical conventions are used in the online manuals and online help. These typographical conventions are used to assist you when using the documentation; they are not meant to contradict or change any standard use of typographical conventions in the various product components or the host operating system.

Convention	Explanation
<i>italics</i>	Introduces new terms that you may not be familiar with and occasionally indicates emphasis.
bold	Emphasizes important information and field names.
UPPERCASE	Indicates keys or key combinations that you can use. For example, press the ENTER key.
monospace	Indicates syntax examples, values that you specify, or results that you receive.
<i>monospaced italics</i>	Indicates names that are placeholders for values you specify; for example, <i>filename</i> .
vertical rule	Separates menus and their associated commands. For example, select File Copy means to select Copy from the File menu. Also, indicates mutually exclusive choices in a command syntax line.

Chapter 1

What Is ChangeMan M+R?

The M+R Option eases the task of consolidating multiple versions of source code, JCL, documentation, and other types of text with record lengths of up to 240 characters. It bridges site-modified software products and their new releases, and assists both system administrators and application programmers in many of their change management responsibilities.

The specialized context viewing of up to eight merged versions and the rich version editing features make M+R much more powerful than the standard three-way merging tools that merely show whether a particular code line is found in one, two, or three versions.

In M+R, you have four source code reconciliation tools (Reconcile, Consolidate, Synchronize, and JCL Compare) that recognize different kinds of changes in multiple library versions and helps you reconcile changes into an error-free updated consolidated version.

M+R generates and maintains an elaborate database of the source code differences. It takes up to eight versions of an original text and displays their combined relationships using a design that makes the consolidation quick, accurate, and easy.

The merged versions are available to you in the form of specific easy-to-manipulate views so that you can quickly understand and reconcile conflicting differences in the versions.

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Views of Merged Versions

Each view of the merged versions illustrates specific changes within a context, highlights the reconciliation problems, and helps you solve them. For example:

- Which parts of the base code have been changed and by which derivative?
The M+R primary command "**eXclude BAse**" creates a view that contains only those base records that have been changed. It points out, graphically and in color, which derivative has made what kind of changes.
- Which parts of the base code have been changed by a particular derivative?
The M+R primary command "**View ID**" creates a view that highlights only the changes made by the derivative with that ID.
- Which parts of the base code have been changed by a combination of two or more derivatives?
The M+R pair of primary commands "**eXclude ID**" and "**Reset ID**" generate views containing only the changes made by the derivatives which are *not* excluded.
- How does the consolidation look at this stage?
M+R automatically applies the single (made by one derivative only) changes to the base code, and then presents the current state of the consolidated file in response to a primary command "**View REmaining**".
- Which lines of base code are changed by more than one derivative?
Such records are in conflict and are the prime target of reconciliation. The M+R primary command "**View COnflicts**" provides a view where you can delete, move, or otherwise manipulate the code to resolve the conflicts.

When Can M+R Help?

M+R helps you consolidate multiple versions of applications, fixes, enhancements, and libraries, as the following scenarios illustrate.

Working with Multiple Fixes and Enhancements

There are occasions where two or more programmers check out the same source module and simultaneously modify the code. For instance, when one programmer checks out a module to make a long-term change, the module fails in production. An emergency fix is created to patch the code. If the fix is not integrated with the long-term change, then that change regresses the emergency fix and the error is repeated.

With M+R, concurrent developments can be merged to avoid the risk of version regression.

Working with Multiple Libraries

Imagine that you have created a customized version of an application and now you receive the next release of the application. You probably want to upgrade to use the

newer release. However, if some components are highly customized and/or many components have been tailored to your environment, you probably do not want to rewrite all the customized pieces of the previous version. With M+R, you can merge and reconcile multiple libraries of member versions.

M+R measures the *complexity* of the reconciliation so that a systems project manager can properly allocate the work among programmers who are consolidating up to eight versions of application code libraries. The project manager can then observe the progress of the consolidation effort online or print out status reports.

Working with Versions of Source and Copybook Libraries

During the application life cycle, source and copy code evolve in an asynchronous way. Suppose you have the task to merge the Year 2000 compliance changes with the maintenance changes in the source and copybook libraries. Instead of working separately to consolidate the two sets (source and copy code) of version libraries, it will be much easier and faster to have the source and copybook changes merged in one place, and reconciled right there. M+R offers this kind of tool for "synchronizing" the source and copy code in most programming languages. After specifying up to eight versions of source code libraries and the corresponding versions of copy/include code libraries, M+R expands the source with the copybooks, compares and merges the differences. You can edit the source and copybook code lines and export the reconciled code to corresponding source and copybook export libraries for compilation.

Working with JCL Code

You might have had troubles in judging the effect of slight changes in JCL code over the resulting JCL that will be executed. M+R can help you with its unique Equivalent JCL Comparison tool. M+R accepts up to eight versions of jobdeck libraries and expands the (nested) JCL procedures and include code, then substitutes the symbols, compares the equivalent JCL code, and displays the differences highlighted graphically and in colors. Using the M+R Version Browser, you can easily trace how a change in a symbolic value is propagated through the executable JCL code.

Merging Staging Versions

The staging versions facility of ChangeMan ZMF saves multiple versions of a package component that a developer creates in a series of edit-in-stage sessions. If you license the M+R Option, it is invoked automatically to let you merge 2-8 of those saved versions to create a new version that you can then stage into your package.

What Does M+R Include?

M+R has the necessary features for merging concurrent developments and reconciling the conflicting changes, such as

- Project management
- Library support

- Comparison utility
 - Batch compare, merge, and export
 - Version Browser
 - Version Editor
 - Reconciliation Auditor

Project Management

A large consolidation project like a Year 2000 compliance or Vendor Code reconciliation project usually involves a team of programmers and covers versions of several libraries such as source code and copybooks. To control the reconciliation process, the team leader can set up project-wide profile options and shared working and version data sets. Then the team leader can assign different tasks to the team members and monitor the progress online as well as through status reports.

Library Support

ChangeMan M+R supports any combination of sequential (SEQ) and PDS files, CA Panvalet and CA Librarian libraries, and ChangeMan ZMF applications and packages.

Comparison Utility

M+R uses Comparex[®], *The Intelligent Comparison Utility*, as the underlying technology to compare versions.

Batch Compare, Merge, and Export

When consolidating entire libraries, the task of comparing member version, parsing and expanding copybooks and JCL procedures, doing the symbolic substitution, and merging the differences becomes very time and resource consuming. M+R can perform it in batch and present you with the merged versions for browsing and editing. Moreover, M+R can export some members in batch. For example, if a member exists in only one version library, or if all its versions are equal, there is no need for reconciliation—such a member can be auto-exported, thus reducing your workload.

Version Browser

The M+R Version Browser includes features to help you investigate and understand the differences between the versions.

Different views or *contexts* for browsing and editing the differences are generated with single commands.

By coloring and graphically marking the lines, M+R lets you see whether a base record has been deleted, replaced, or cut and by which derivative. You can also view the replacing, pasted, and inserted code lines, including the derivative they originated from.

Version Editor

When reconciling different versions with M+R, you can use primary and edit line commands that have the look and feel of ISPF/PDF Edit commands.

These commands include the following:

- Cut and Paste or Copy and Paste from one context to another.
- Delete and Undelete.
- Copy and Move.
- Insert, Repeat, and Overtyping.
- Exclude and Reset.
- Find and Repeat Find ((R)Find).
- Change and Repeat Change ((R)Change).
- Locate next base code line and locate a base code line by its relative number.
- Show moved block of records.

Reconciliation Auditor

M+R offers many options that support a comprehensive reconciliation auditing. These options follow.

- **Batch Version Difference Report**

When up to 8 versions of a library are merged in batch mode, the user can request a detailed Merge report for each member illustrating the differences between the versions. Each block of changes is surrounded by two blocks of common code lines in a fade-in/fade-out fashion. These reports mark the starting point of the library consolidation.

- **Insertion of Team/Individual Banners**

The history of the reconciliation of each member can be recorded at a team, user, member, and line level. The project manager can create a project banner file formatted as comments and include it as one of the derivatives. Each team member can create an individual banner file and include it as an additional derivative. The banner is a sequential data set or a member of a library. Although these banners are invisible to the user, M+R will include them, on export, on the top of each consolidated member to record its reconciliation history.

- **Insertion of Reconciliation Statistics**

Reconciliation statistics concerning member attributes can be exported as comments. Such attributes include:

- Member name.
- Number of code lines in each member version.
- Number of conflicts and single changes.
- User ID of the programmer who has merged the member versions.

This analysis table records the reconciliation history at a user level and member level.

- **Insertion of Line Signature**

For reconciliation auditing, M+R can trace the origin of each code line in the exported consolidated version. In the line sequence number area (positions 73 to 80), a line signature appears, formatted to include the IDs of all versions that have the same line in that place. The base records that are common across all versions have their original sequence numbers as line signatures.

- **Intelligent Line Renumbering**

Another way of tracing the reconciliation effort is the renumbering that M+R performs on export, at the user's request. M+R supports both standard and COBOL sequence numbers, and follows the ISPF sequence numbering rules. The code lines from the base version are numbered with their original sequence numbers. The code lines from the derivative versions and the user-inserted and overtyped code lines have numbers that are between the numbers of the two surrounding base code lines. When such numbers are exhausted (due to too many inserts), the entire consolidated version is renumbered on export.

How Does M+R Work?

Scenario: Vendor Code Reconciliation

Suppose you are a systems manager, and your site runs Release N of a vendor product. You have applied fixes and modified the vendor product to customize it for your users. When the vendor announces the next release, (N+1), your users want it installed immediately. You are now faced with a version migration filled with these complications:

- If you install release N+1 as is, your own custom modifications are regressed.
- Some of the vendor's fixes duplicate your own changes, so not everything you have done must be reapplied.
- It took you many months to evolve modifications for release N, and neither you nor your users want to wait that long for the next release customization.
- The upgrade job looks long, painful, and error-prone—particularly if the vendor has renumbered the source code lines. You need a fast, intelligent method to blend the vendor's upgrades and your custom modifications into a working product.

Solution: M+R

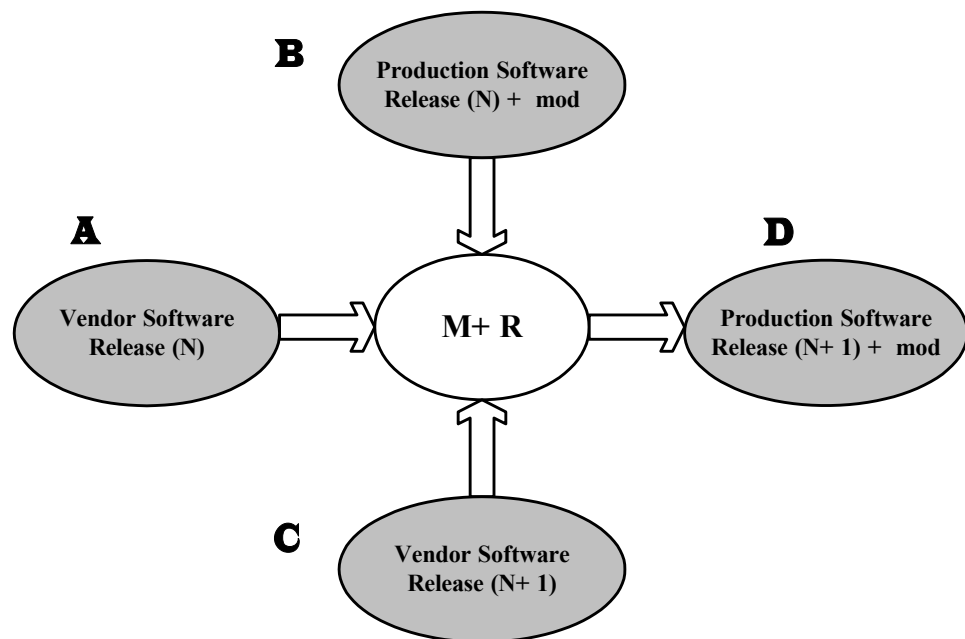
M+R can handle this problem. First, you have to identify the source files (the base version and derivatives) to M+R.

- The base is the Release N of the vendor product.
- One derivative is the current production library that contains your customizations.
- The other derivative is the Release (N+1).

Then, you run M+R, which performs the following steps:

- Compiles member lists of the base/derivative libraries and matches same-named members in version sets.
- Loads the chosen base members and the derivatives' members into storage.

- Compares the base version with each of the derivatives, records the differences, then compares and combines them.
- Stores the base version and the differences in the M+R work-in-suspense file.
- Identifies conflicts and single changes.
- Calculates the degree of complexity of the reconciliation effort, and stores the relevant statistics.
- Displays a full view of the merged versions, formatted graphically and in color, for reconciliation.
- The following figure illustrates schematically how M+R reconciles different releases of software.



The following table shows the steps that you must take in order to merge and reconcile.

Steps	M+R Function	Meaning
1	M+R compares Version A to Version B	This comparison identifies the changes and modifications added to the vendor code release by your company.
2	M+R compares Version A to Version C	This comparison identifies vendor's changes between Release N and Release N+1.
3	M+R merges and combines the differences with Version A	By presenting the combined versions for browsing and editing, you can see the differences between all the versions.

Steps	M+R Function	Meaning
4	Reconcile the changes	Now, you reconcile the changes to create a conflict-free consolidated version that includes Vendor Software Release (N+1) and your company's modifications.
5	M+R extracts the reconciled code and creates Version D	Version D is the new production software containing the new (N+1) vendor release plus all the needed customization minus those user modifications (fixes) that have already been addressed in the (N+1) release.

Chapter 2

Installing M+R

This chapter provides instructions for installing ChangeMan ZMF M+R Option components and enabling the option.

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Applying an M+R License

If you license M+R at the same time that you license ChangeMan ZMF, the license for the option is applied when you apply the license for the base product. You do not have to take further action to enable M+R.

If you license M+R after you apply licenses for ChangeMan ZMF and other selectable options, use the SER10TY™ License Manager to add a license for the option. See the *SER10TY User Guide* for instructions on how to apply a license. The load modules, JCL, and other components that you need to run SER10TY are included in the SERCOMC libraries in the ChangeMan ZMF installer.

After you have applied a license, shut down the SERNET™ started task where ChangeMan ZMF runs and restart the task.

Then, follow these steps to verify that M+R is activated.

- 1 Connect to ChangeMan ZMF through ISPF.
- 2 Verify that the **Primary Option Menu** includes option **C M+R**:

```

CMN@PRIM          ChangeMan(R) ZMF Primary Option Menu  SYS(7)
Option ==> _____

0 Settings        User parameters
1 Build           Create, update and review package data
2 Freeze          Freeze or unfreeze a package
3 Promote         Promote or demote a package
4 Approve         Approve or reject a package
5 List            Display (to process) package list
6 Reports         Generate ChangeMan ZMF batch reports
7 Release         Extended Release Management
A Admin           Perform administrative functions
B Backout         Back out a package in production
C M+R            Merge+Reconcile
D Delete          Delete or undelete a package
L Log             Browse the activity log
M Monitor         Monitor internal scheduler or packages in limbo
N Notify          Browse the Global Notification File
O OFMlist         Online Forms package list
Q Query           Query packages, components and relationships
R Revert          Revert a package to DEV status
T Tutorial        Display information about ChangeMan ZMF
X Exit            Exit ChangeMan ZMF

```

If option **C, M+R** is listed, the license activation is successful.

Installing M+R Components

M+R components are included in the CMNZMF libraries in the ChangeMan ZMF installer.

Execute these steps to install M+R components.

- 1** Allocate a permanent WALKTHRU PDS library with these characteristics:

Primary space allocation	80 Blocks
Secondary space allocation	100 Blocks
Directory Blocks	10
Record Format	VB
Logical Record Length	4096
Block Size	4100

- 2** Copy these members from the vendor CMNZMF SAMPLES library to the WALKTHRU library:

- WALKBAS
- WALKDV1
- WALKDV2

- 3** Allocate a permanent sequential PROJECTS data set with these characteristics:

Primary space allocation	20 Blocks
Secondary space allocation	400 Blocks
Record Format	FB
Logical Record Length	80
Block Size	6000

- 4** Grant the following data set access to all potential users of M+R:

- a** READ/WRITE authority to the PROJECTS file.
- b** READ authority to the vendor WALK THRU library.

- 5** Copy panel SEROJECT from the vendor CMNZMF PANELS library to your custom ChangeMan ZMF panel library. Edit the)INIT section of the panel to assign values to these variables:

Variable	Value
&CDFPROJ	DSN of the PROJECTS data set allocated previously.
&CDFSAMPL	DSN of the WALKTHRU library allocated previously.

Variable	Value
&CDFUNIT	Generic unit for allocating user work data sets. Variable CDFUNIT is preset to SYSDA. Note: User work data sets are cataloged data sets that hold intermediate or final results from the M+R reconcile process. Work user data sets include the WIS (Work In Suspense) file, the PRINT file, and the EXPORT file. M+R can automatically allocate these files for each user.
&CDFDSNQ	High level qualifier(s) for user work data set names. The maximum length is 24 characters. Use literal strings and/or system variables like &ZPREFIX or &ZUSER. M+R automatically inserts &ZUSER as a mid-level DSN qualifier unless variable CDFDSNQ is set to &ZUSER. CDFDSNQ is preset to CDFUSER, which is the logon ID of the user.

Save your changes to panel SEROJECT.

- Copy panel SER@PRIM from the vendor CMNZMF PANELS library to your custom panels library. Edit the)INIT section of the panel to assign a value to variable &CDFTIME:

Variable	Value
&CDFTIME	Set to YES to check for a TIME parameter in the JOB card in generated batch jobs. Set to NO to suppress this check.

Save your changes to panel SER@PRIM.

- Stop and start the SERNET started task running ChangeMan ZMF.

Updating the ACF2 TSO Command Limiting Table

If you use CA ACF2® for your security system, and if you use the ACF2 TSO Command Limiting feature to restrict execution access to TSO commands, add M+R program CDF\$ISPF to the ACF2 Command Limiting Table.

This is the format for the table entries:

```
TSOtable CSECT *      REGIONAL ACF2 TABLE
TSOCST ,             TSO RESTRICTED COMMANDS LIST
$TSOCMD CLS          CLEAR SCREEN
$TSOCMD CDF$ISPF     M+R ISPF DRIVER
$TSOCEND ,           INDICATE END OF LIST
END
```

If you use the ACF2 Command Limiting Feature and do not make the table entries above, and you attempt to use the M+R Option, the following message results:

```
IKJ56500I COMMAND CDF$ISPF NOT FOUND
```



CAUTION! Do not add CDF\$ISPF to the TSO Command Table IKJTSONn in SYS1.PARMLIB. If you do and you attempt to use M+R, your session will freeze and this message is displayed:

```
ISPS118L SERVICE NOT INVOKED. A VALID ISPF ENVIRONMENT DOES NOT EXIST.
```

Installation Notes

This section contains additional information about installing M+R.

ISPF Profile Library Allocation

When you first use the ChangeMan ZMF M+R Option, it creates member CDFPROF in your ISPF profile library (ISPPROF). This member is saved each time you exit M+R, retaining your settings for use in your next M+R session.

ISPF profile libraries for users of ChangeMan ZMF and M+R must be allocated with sufficient primary, secondary, and directory space for ZMF and M+R to create profiles and to save them at the end of each session. This applies to all ISPF applications that run with ISPF NEWAPPL(XXXX).

Chapter 3

Using M+R

Before using M+R, you must invoke it and complete the following tasks:

- Select one of the four M+R tools.
- Set up your profile (see [Chapter 4, "Setting Your Profile" on page 35](#)) on the *Profile* panel(s).
- Define your base and derivative files (see [Chapter 5, "Defining Versions" on page 47](#)) on the *Version* panel(s).

This chapter gives a brief description of the *Merge+Reconcile* primary menu, the online Tutorial, and suggestions on how to select an appropriate M+R tool and how to choose base vs. derivative versions.

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Invoking the Merge+Reconcile Primary Menu

To invoke the M+R Option of ChangeMan ZMF, connect to an instance of ChangeMan ZMF to see the *Primary Option Menu*.

```

CMN@PRIM          ChangeMan(R) ZMF Primary Option Menu  SYS(7)
Option ==>>> _____

0  Settings          User parameters
1  Build             Create, update and review package data
2  Freeze            Freeze or unfreeze a package
3  Promote           Promote or demote a package
4  Approve           Approve or reject a package
5  List              Display (to process) package list
6  Reports           Generate ChangeMan ZMF batch reports
7  Release           Extended Release Management
A  Admin             Perform administrative functions
B  Backout           Back out a package in production
C  M+R              Merge+Reconcile
D  Delete            Delete or undelete a package
L  Log               Browse the activity log
M  Monitor           Monitor internal scheduler or packages in limbo
N  Notify            Browse the Global Notification File
O  OFMlist           Online Forms package list
Q  Query             Query packages, components and relationships
R  Revert            Revert a package to DEV status
T  Tutorial          Display information about ChangeMan ZMF
X  Exit              Exit ChangeMan ZMF

```

On the *Primary Option Menu*, choose option **C M+R** to display the *Merge+Reconcile* primary menu.

```

SER@PRIM          Merge+Reconcile
Option ==>>> _____

M  Reconcile         Up to 8 versions of a member or sequential data set
L  Consolidate        Up to 8 versions of a library - PDS, panvalet, librarian
S  Synchronize        Up to 8 versions of source and copy/include libraries
J  Compare            Up to 8 versions of a jcl lib after symbol substitution
C  Changes            From prior releases of merge+reconcile (m+r)
W  Walk through       The version reconciliation process with m+r
T  Tutorial
X  Exit

```

The following table describes the menu options (which includes access to the four M+R tools) on the *Merge+Reconcile* primary menu.

Menu Option	Description
M	Invokes the <i>Member Reconciliation Menu</i> , which allows you to reconcile up to eight versions of a program, copybook, JCL procedure, or other source type. The versions may be members of libraries or sequential data sets.
L	Invokes the <i>Library Consolidation Menu</i> . This option offers additional features for consolidating up to eight versions of a source library.

Menu Option	Description
S	Invokes the <i>Source/Copy Libraries Synchronization Menu</i> . This option supports concurrent merge and reconciliation of source and copy code (up to eight versions of program libraries and eight copybook libraries).
J	Invokes the <i>Equivalent JCL Comparison Menu</i> . This option is a unique JCL comparison tool that helps in tracing how changes to separate pieces of JCL code affect the equivalent JCL resulting from procedure expansion and symbol substitution.
C	Displays a panel that explains the new features of M+R and changes from the prior release of M+R (formerly known as Merge+Reconcile, Concurrent Development Facility, and CDF).
W	Invokes the interactive guided tour (walk-through) that combines tutorial text with reconciliation actions.
T	Invokes the online M+R Tutorial.
X	Exits your M+R session and returns you to the <i>ChangeMan Primary Option Menu</i> .

Online M+R Tutorial

To display online information about M+R from the *Merge+Reconcile* primary menu, select option **T**. The *Tutorial Table of Content* panel, shown below, appears.

SERPRTOC	Tutorial Table Of Content	Tutorial
Topic ==>		
<p>Concurrent development results in creating multiple versions of programs, copybooks, JCL procedures, and other application source code. Merge+Reconcile provides vital assistance in consolidating those versions.</p> <p>This tutorial displays on-line information about M+R features. The table of contents listed below contains a list of major topics.</p> <p>I - Information - Concurrent development concept and terminology P - Profile - M+R profile options and data sets V - Versions - Data sets that M+R compares, merges, and displays D - Display - How M+R displays version differences in color and graphics R - Reconcile - How M+R helps in reconciling the version differences B - Batch - Compare, merge, and export in batch mode M - Management - Create and manage team-oriented and individual projects</p>		

All *Tutorial* and *Help* panels are scrollable. This means that when you select a topic or issue the Help command, generally by use of a program function key [PF1], you are presented with a lengthy panel of text that you can scroll through at your leisure. There are no arbitrary breaks in panel content. Split- screen boundaries are automatically respected such that the last visible line at the bottom of one screen is presented at the top after you page down, using the [Enter] key. Conversely, you page up by pressing [PF10].

The top and bottom of each *Help* panel is clearly marked. The IBM-CUA standard of a plus (+) sign signifying page down capability and a minus (-) sign indicating page up capability (in the upper right-hand corner) is supported.

```
SER00PRM ----- M+R Primary Menu -----TUTORIAL
                                          More:   +
TOP  TOP  TOP  Panel scrolls; Press ENTER or RIGHT to page down TOP  TOP  TOP
```

The Merge+Reconcile from SERENA Software Inc. provides **four** source code **reconciliation tools** selectable through options **M**, **L**, **S**, and **J**, as well as an interactive tutorial (option **W**).

Option M allows a novice or infrequent M+R user to reconcile up to eight versions of a program, copybook, JCL procedure, or other source type. The versions may be **members** of libraries or sequential datasets.

Option L offers additional features needed for consolidating up to eight versions of a source **library** - PDS, PANvalet, and LIBrarian. Main features include the Consolidation Workplace, Batch Execution, and Reconciliation Project Management.

Option S supports **concurrent merge** and **reconciliation** of source and copy code - up to 8 versions of program libraries and 8 copybook libraries. It detects the invocation of copybooks in the source code and merges them into the source versions for concurrent comparison, merging, reconciliation and export.

M+R Interactive Guided Tour

M+R recognizes a new user and automatically *escorts* them through the reconciliation process, mixing tutorial text with hands-on work. The user can apply a variety of primary and line commands for version browsing and editing, prompted by the tutorial text, or at will.

This interactive tutorial is also accessible through option **W** on the *Merge+Reconcile* primary menu.

Using M+R Effectively

M+R provides a wealth of powerful facilities to aid your reconciliation efforts. Choosing these facilities carefully before starting a reconciliation project can simplify the task. This section outlines some of these facilities and attempts to help you make good choices.

Choosing the Right M+R Tool

M+R provides four tools that help you cope with the software version expansion. Although they share many features, these tools differ in respect to the scale of the task of version merging and reconciling that they are designed for. When using M+R you will choose one of these tools from the primary menu. The purpose of this section is to help you choose the proper tool for your particular reconciliation task.

Member Reconciliation Tool

Sometimes you might have to deal with *several* versions of *one* program. The proper tool to use in this case would be the *Member Reconciliation* tool (option **M** on the *Merge+Reconcile* primary menu). The steps needed to reconcile the versions of one program are explicitly stated as consecutive options on this tool's menu panel.

Library Consolidation Tool

In massive consolidation efforts like Y2K-compliance projects or Vendor Code reconciliation you are forced to deal with versions of an *entire library* containing *hundreds* of programs. The proper tool to aid you when doing such consolidation projects would be the *Library Consolidation* tool (option **L** on the *Merge+Reconcile* primary menu).

Source/Copy Synchronization Tool

Sometimes the reconciliation task is more complicated and includes not only source code library versions but also copybook library versions. Of course, both sets of libraries can be consolidated separately using the Library Consolidation tool, but it's possible the changes in the source code and those in the copy/include code will be out-of-sync and several iterations of using M+R and the compiler will be needed. The *Source/Copy Synchronization* tool (option **S** on the *Merge+Reconcile* primary menu) is designed to cope with such a situation. It automatically detects the copybook inclusion in the source code, imports it, merges the versions, and allows the consolidated programs and copybooks to be extracted into designated export libraries.

Equivalent JCL Comparison Tool

JCL code differs significantly from the other computer languages because of its heavy use of symbolic variables whose value is substituted by following a complex set of rules. The result of that symbol substitution is the code that is actually executed—the equivalent JCL. Therefore, it is difficult tracking how changes in the separate JCL code pieces—jobdecks, JCL procedures, included blocks of statements, SET statements—will affect the equivalent JCL. The *Equivalent JCL Comparison* tool (option **J** on the *Merge+Reconcile* primary menu) is designed to help understand the differences in the versions of JCL code. It takes up to eight versions of jobdeck library and generates the equivalent JCL before comparing them. The JCL statements changed by the symbol substitution are displayed twice, with *before* and *after* content so that the differences can be fully understood. The *Equivalent JCL Comparison* tool is used for analysis—it is not to be used for actual reconciliation. Instead, when you have analyzed the JCL with this tool, use the *Library Consolidation* tool for the actual reconciliation.

Shared Facilities and Features

M+R provides several facilities that are common to these tools:

- A **Consolidation Workplace** panel that presents the libraries as a table whose rows are the same named members in the library versions. Each set of member versions on that panel can be processed by line commands towards full reconciliation of the differences. This facility is available in the *Library Consolidation*, *Source/Copy Synchronization*, and *Equivalent JCL Comparison* tools.
- A **Batch facility** to compare, merge, and selectively export member versions. Batch mode can speed up the online reconciliation and reduces the consumption of

mainframe resources. This facility is available in the *Library Consolidation*, *Source/Copy Synchronization*, and *Equivalent JCL Comparison* tools.

- A **Project Management facility** that supports individual and team-oriented project profiles, assigning tasks to team members, and monitoring the project progress. This facility is available in the *Library Consolidation* and *Source/Copy Synchronization* tools.

All these tools have other common features, such as the ability to handle up to **eight versions**, numerous profile settings, presenting the differences **graphically** and **in color**, etc.

Choosing Base And Derivative Versions

For any reconciliation task with M+R, you must choose a base version of a program or library and multiple *derivative* versions. This may be obvious for your particular reconciliation task. If not, the following is a list of thoughts that might help:

- Use the *oldest* version as a base for all reconciliation tasks and create the newer derivative versions.
- Use the *shortest* version as the base—the software always tend to grow in complexity, respectively in volume.
- For Vendor Code reconciliation projects, use the vanilla library before the customization effort has started, that is, the previous release of the vendor software, as the base library. The derivatives are the libraries created as a result of the concurrent development—the customized version and the next release.

Chapter 4

Setting Your Profile

The *Profile* panels gather basic information regarding the destination of the reconciliation effort, the work files, and compare, display, export, and other options. For first-time users, the profile data sets are automatically allocated and their profile options have default values.

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Setting the Colors	39
Setting the Editing Options	41
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Overview

Your M+R Profile contains information about how you want to compare and merge the versions of one program, or library, or source/copybook libraries, or JCL code libraries.

Before M+R can consolidate multiple versions, you must specify the M+R working data sets. This means that you must define the following files to M+R:

- Work in suspense (WIS) file - holds data from reconciliation efforts in progress.
- Print file - holds the last report generated through the printing options.
- Export file - holds the final consolidated version.
- Copybook export file - holds the consolidated versions of the copybooks.

When you specify work-in-suspense, print, and export data sets that are not cataloged, they will be automatically allocated.

The profile options are grouped into six categories which contain choices you have for fine tuning the merge and reconcile process. These categories are

- Compare.
- Colors.
- Editing.
- Export.
- Data sets.
- Merged data filtering.

Invoking the Profile Panel (Option 0)

To establish your work profile, you must access the *Profile* panel from one of the four tools' respective menus.

From the *Member Reconciliation* menu, *Library Consolidation* menu, *Source and Copy Libraries Synchronization* menu, or *Equivalent JCL Comparison* menu, type **0** (PROFILE) and press [Enter]. The *Profile* panel, shown below, appears.

SERPROFL	Profile
Option ==>	
0 Restore	Back out all changes to the profile options and data sets
1 Compare	Specify version comparison options
2 Colors	Specify coloring scheme for versions codelines
3 Editing	Select merged versions editing options
4 Export	Select export options for the consolidated version
5 Data Sets	Specify Work In Suspense, print and export data set names
6 Filtering	Auto-delete certain merged code lines upon business rules
T Tutorial	Information about setting up M+R reconciliation profile
X Exit	

Setting the Compare Options

The *Compare Options* panel allows you to specify a comparison configuration. To display the *Compare Options* panel, from the *Profile* panel, select option **1** (COMPARE). The *Compare Options* panel, shown below, appears.

```

SERCPXOP                               Compare Options
Command ==>> _____

Text type . . . . . _____ (Language name or dot for M+R to determine)
Column range from . . _____ (Compare from this column)
Column range to . . . _____ to that column instead of language defaults)
Ignore records
with characters . . . _____ (Up to 8 characters that mark a comment line)
at position . . . . . _____ (Starting column position of above)
Comparison res . . . DEFAULT (Low or default or high or super resolution)

Enter "/" to select option
_ Ignore differences in text case
_ Block differences between versions
_ Determine and display moved records

```

The following table describes the information that you can type in the fields of the *Compare Options* panel.

Field	Description
Text type	The language of the code that you plan to consolidate. To enable a comparison algorithm that dynamically determines the code type it compares, you can use a period (.) as the wildcard character. You can override this field with a specific language from a list. (See next page for definitions of valid TEXT Types.) To suppress the default of ignoring columnar indentation, you can prefix the chosen language with a dollar (\$) sign (outside U.S.A and Canada it is the national currency symbol). For example, enter "COBOL" (to ignore blanks) or "\$COBOL" (to compare all characters).
Column range from	The first column from which you wish to begin the comparison of a record.
Column range to	The last column to which you wish to end the comparison.
Ignore records with characters	Allows you to exclude certain records from the comparison between the versions; for example, comment records.
at position	The column where the string, that you specified in the Ignore Records with Characters field, begins.

Field	Description
Comparison res	The Comparison res setting gives you a choice to “prime” the comparison engine. Occasionally, the language default resolution fails to produce a concise picture of what has been changed in the versions. This may be caused by adding a block of code that is similar to the preceding or following block of code; the default resolution in this case prevents the comparison engine from looking ahead far enough. In other cases, a lower-than-the-default resolution produces better results. You can improve the comprehension of the version differences by selecting an appropriate resolution: L (low), D (default), H (high), or S (super high). Note: When comparing ISPF skeleton and panel components, a Comparison Resolution of Low is forced to obtain best results, regardless of the setting in this field.
Ignore differences in text case	Yes or No to ignore the difference in the text case, that is, the case sensitivity of the comparison.
Block differences between versions	Select to display the differences between versions, in blocks vs. overlaid.
Determine and display moved records	Select to determine and display records moved to different places in the versions.

The following table defines the TEXT Types. Use this table to enter the TEXT Type field as illustrated in the *Compare Options* panel. For each TEXT Type, the comparison range and ignored characters are specified. “EOR” means end-of-record.

TEXT Type	Meaning	Comparison Range (position)	Ignore (unless type prefixed with \$)
ALC	Assembler Language Coding	1 through 72	Blanks
BAL	Basic Assembler Language	1 through 72	Blanks
C	C	1 through 72	Blanks
CLIST	CLIST (variable length records)	9 through EOR	Blanks
COBOL	COBOL	7 through 72	Blanks, Commas
FORTRAN	FORTRAN	2 through 72	Blanks
JCL	Job Control Language	1 through 72	Blanks
NATURAL	ADABAS Natural	Entire record	Blanks
PANEL	ISPF Panel	Entire record	
PASCAL	Pascal	1 through 72	Blanks
PL/I, PLI	PLI forms	2 through 72	Blanks
PL/1, PL1	PLI forms	2 through 72	Blanks

TEXT Type	Meaning	Comparison Range (position)	Ignore (unless type prefixed with \$)
REPORT	Report	Entire record	
REXX	REXX	Entire record	Blanks
RPG	RPG	2 through 66	Blanks
SCRIPT	SCRIPT/VS GML	Entire record	

Setting the Colors

The *Colors* panel allows you to set colors and highlights to distinguish changes. You can set any combination of seven colors and two highlights (normal and reverse) to separate the 10 line types and the 10 different points of origin.

To access the *Colors* panel, type **2** (COLORS) from the *Profile* panel. The *Colors* panel (SERCOLOR), shown below, appears.

```

SERCOLOR                               Colors
Option ==> _____

0 Set          No colors
1 Set          Selected colors and highlights for change types
2 Set          Selected colors and highlights for change origin
3 Reset       To default colors and highlights

Change type      Color      Hilite      Change origin    Color      Hilite
Common base . . . . . W . . . . . N      Base . . . . . W . . . . . N
Deleted base < . . . . Y . . . . . N      1st derivative . . . . Y . . . . . N
Replacement <> . . . . P . . . . . N      2nd derivative . . . . P . . . . . N
Inserted > . . . . . G . . . . . N      3rd derivative . . . . G . . . . . N
Placeholder . . . . . R . . . . . N      4th derivative . . . . B . . . . . N
User deleted /* . . . . Y . . . . . R      5th derivative . . . . Y . . . . . R
User overtyped >< . . . . P . . . . . R      6th derivative . . . . P . . . . . R
User inserted > . . . . . T . . . . . N      7th derivative . . . . G . . . . . R
User pasted >> . . . . . B . . . . . N      User inserted . . . . T . . . . . N
User cut << . . . . . B . . . . . R      Placeholder . . . . . R . . . . . N

Color: Blue; Green; Pink; Red; Turq; White Yellow. Hilite: Normal or Reverse
To set a default value, blank out the input field.

```

The *Colors* panel allows you to choose different colors and highlights for

- Various types of changes such as replacement, deletions, insertions, etc.
- Different origin of changes such as the base and derivatives code lines, and your inserted and overtyped lines.

If you want to return to the default value, blank out the *Color/Hilite* pair of one or more fields. Option **3** resets all fields to their default values.

Choosing option **0** disables the line coloring on the *Reconcile* panel.

Use option **1** to set distinct colors/highlights for the various line types. This setting will facilitate conflict resolution where two or more derivatives have changed the same block of base code.

Select option **2** to set different colors/highlights for the versions. It will help you investigate changes, as their origin will be clearly marked in colors. This setting is also helpful when auditing code changes.

You can change the coloring scheme at any time. The last setting is carried over to your next M+R session.

If you want to see the effect of your color choices (or the default), press [Enter] and the *Reconcile Palette* will be displayed.

The sample versions are in COBOL. The upper part shows the current color scheme for different code line types. The lower part shows the colors assigned depending on the origin of the code line itself or its change.

The **origin of the lines** is self-explanatory—a code line belongs to the base version, or to one of the seven derivatives, or to the user who can overwrite, paste and insert code lines during the reconciliation. The *origin of the change* for a base code line is one of the derivatives; thus, the derivative color is used for a deleted or replaced base code line.

The **line types** are an M+R concept that needs to be explained. Below, an example of the upper half of the *Reconcile Palette* is reproduced, and the lines are numbered on the left to facilitate the explanation.

(1)	000035	003500	IF	OPEN-REQUEST	PERFORM DO-THE-OPEN
(2)	< A	003600	ELSE IF	READ-REQUEST	PERFORM DO-THE-READ
(3)	<> B	003600	ELSE IF	UPDATE-REQUEST	PERFORM DO-THE-UPDATE
(4)	> C	003610	ELSE IF	EXTRACT-REQUEST	PERFORM DO-THE-EXTRACT
(5)	---	---	---	---	2 Lines DELETED
(6)	/*0039	003900	ELSE IF	CLOSE-REQUEST	PERFORM DO-THE-CLOSE
(7)	>< +	004000	ELSE	DISPLAY 'YOUR I/O REQUEST IS INVALID'	
(8)	> +	004010		MOVE 12 TO RETURN-CODE	
(9)	>>0051	005100	DO-THE-READ.		
(10)	<<0052	005200	READ ONLY-FILE NEXT,AT	END MOVE 8 TO RETURN-CODE	

A short explanation for each line follows:

- This is a common (unchanged) base record with a relative number 35 as shown in the command area.
- The next (36th) base record is missing in version A; that is, it is deleted. This fact is depicted with the less-than (<) symbol.
- The same 36th base record is replaced in version B by new text. The replacement symbol (<>) conveys a *not equal* meaning.
- Version C has an inserted code line after the 36th base record. Accordingly, the insertion symbol is the greater-than (>) symbol.
- This line holds the place of two base records that have been deleted by the user during the reconciliation and therefore are excluded from view.
- The 39th base record has also been deleted by the user but here it is included in view, possibly through a First or Last command. The *commented-out* (/*) symbol is used to present this action. The Undelete command can be issued to reverse the commented-out status.

- 7 The user has overtyped the 40th base record. The over typing (><) symbol also conveys a *not equal* meaning but differs from the replacement (<>) symbol.
- 8 The user has inserted a code line represented by the greater-than (>) symbol.
- 9 The user has pasted the 51st base record here. The symbol (>>) is supposed to convey a *landed-from-somewhere* meaning.
- 10 The 52nd base record has been cut by the user. The symbol (<<) accentuates the *gone elsewhere* finale of a cut or moved record. However, the Undelete command can be issued to “resurrect” cut code lines.

Setting the Editing Options

To access the *Version Editing Options* panel, select option **3** (EDITING) from the *Profile* panel. The *Version Editing Options* panel, shown below, appears.

```

SEREDTOP                               Version Editing Options
Command ===> _____

Enter "/" to select option
_ Include prefix (Display analysis statistics & banner)
_ Data filtering (Filter data from merged versions)
_ Fade in/out   (Surround changes with common lines)
_ Upper case   (Convert user input to upper case)

```

The following table describes the information that you can enter on the *Version Editing Options* panel.

Field	Description
Include prefix	YES or No to display statistics about the reconciliation. The Include Prefix option suppresses or enables the display of the statistics regarding the complexity of the new reconciliation effort. It also prevents or enables display of team or individual banners (if any) that follow the analysis table.
Data filtering	The Data Filtering option controls the deletion of records of specified type. If it is switched from YES to NO, all requests for filtering certain records from the Merged versions are nullified. While it stays NO, the workflow of the creation and updating of M+R projects does not include the <i>Merged Data Filters</i> panel for user input. If it is switched from NO to YES and while it is YES, the workflow of the creation and updating of M+R projects include the <i>Merged Data Filters</i> panel for user input.

Field	Description
Fade in/out	The Fade In/Out option allows the changes to be displayed within a context. If you want to browse the differences between the Base and one (or more) derivative versions, you can issue a View ID primary command that displays all the Base records and the changes made to them in the derivative(s). You can then issue an eXclude Base command to concentrate the view on the changes but now they will be displayed without any context. However, if Fade In/Out is set to YES, each change will be displayed with common (unchanged) records surrounding it—these records provide the context for that change. The Fade In/Out option takes effect when the eXclude Base command is issued.
Upper case	The Upper Case option ensures an auto-conversion of the user input to UPPER CASE as certain languages and/or compilers can process only upper case text. By default, all the editing during the reconciliation is done in a case-sensitive manner, that is, without changes.

Setting the Export Options

To access the *Export Options* panel, select option **4** (EXPORT) from the *Profile* panel. The *Export Options* panel, shown below, appears.

```

SEREXPOP                               Export Options
Command ==>>> _____

Enter "/" to select option
  / Autooverride      (Single changes override base records)
  / Export conflicts  (Export with unresolved conflicts)
  _ Export prefix     (Incl analysis statistics as comments)
  _ Renumber         (Renumber consolidated version lines)
  _ Line signature    (Mark origin in consolidated version)

```

The following table describes the information that you must enter in the fields of the *Export Options* panel.

Field	Description
Autooverride	The default for Autooverride is selected by default. This eliminates the need to manually delete base lines that are already deleted or replaced in one of the derivatives. If you want to have total control over which code lines will be included in the consolidated final versions, set the Autooverride option to off.
Export conflicts	Export Conflicts is set on by default. If you want to prevent incidental export action when there are still some unresolved conflicts, set this option to NO.
Export prefix	By selecting, you elect to prefix the Analysis table to the exported data. The default is off. The advantage of prefixing is that a record of the statistics, conflicts, and consolidation effort, stays with the member. The disadvantage is that, although the Analysis records are formatted as comments in <i>most</i> programming languages, the compiler might flag them and you would have to edit them manually.

Field	Description
Renumber	Renumber provides a choice to trace the changes incorporated in the consolidated version on export. M+R supports both standard and COBOL sequence numbers, and follows the ISPF sequence numbering rules. The code lines from the base version are numbered over their original sequence numbers. The code lines from the derivative versions and the user inserted and replaced code lines have numbers that are between the numbers of the two surrounding base code lines. When such numbers are not available (as from too many inserts), the entire consolidated version is renumbered on export.
Line signature	Line signature is an alternative to the Renumber option that provides detailed tracing of the origin of each code line of the exported consolidated version. In the line sequence number area (positions 73 to 80), a line signature is formatted that includes the IDs of all of the versions that have that line in that place. Common across all versions, the base records have their original sequence numbers as line signatures.

Setting the Profile Data Sets

To access the *Profile Data Sets* panel, select option **5** (DATA SETS) from the *Profile* panel. The *Profile Data Sets* panel, shown below, appears.

```

SERDSNML                               Profile Data Sets
Command ===> _____

WIS dsname . . . . . USER015.WIS.DATASET_____
Print dsname . . . . . USER015.WIS.PRINT_____
Export dsname . . . . . USER015.WIS.EXPORT_____
Export DSORG . . . . . PDS_____ (PDS, SEQ, PAN, LIB, or blank)
Export member mask . . . . . _____ (Mask to rename Base members on export)
LIB module name . . . . . LIB_____ (LIBrarian update module name: LIBR, LIBRARY)

```

The following table description the fields on the *Profile Data Sets* panel.

Field	Description
WIS dsname	<p>The Work In Suspense data set name is the holding place for suspended efforts.</p> <p>If you are using the Member Reconciliation tool to reconcile the versions of only one program, the WIS file has to be a SEQuential data set. The consolidation of multiple libraries needs a PDS as Work In Suspense so that you can save and resume the work on any set of member versions as desired.</p> <p>M+R auto-allocates a SEQuential WIS file for a new M+R user for use in the Member Reconciliation tool.</p> <p>If you enter a DSNAMES for a file that is not cataloged, M+R auto-allocates it, as follows:</p> <ul style="list-style-type: none"> ■ As SEQ if you are using the Member Reconciliation tool. ■ As PDS otherwise.
Print dsname	<p>The name of the file where you want to route print requests. For the Member Reconciliation tool, the actual report format is option dependent; for example, the WIS format differs from the format of the exported file. After selecting a printing option (5P, 6P, 7P), you can browse and/or route the file to a local printer as desired.</p> <p>If you issue a Print line command on the <i>Consolidation Workplace</i> panel, the last view of the selected member (merged versions) will be printed.</p> <p>M+R auto-allocates a Print file for a new M+R user.</p> <p>If you enter a DSNAMES for a file that is not cataloged, M+R auto-allocates it as a SEQuential data set.</p>
Export dsname	<p>Enter the target data set name for the consolidation effort. It can be a SEQuential file or PDS, PANvalet, or LIBrarian library. Although no restrictions on DCB characteristics exist for PDS and SEQ, the characteristics should be similar to those of the Base version. If you intend to export to a ChangeMan ZMF package, use a PDS or SEQ data set for an export file.</p> <p>M+R auto-allocates a PDS Export file for a new M+R user.</p> <p>If you enter a DSNAMES for a file that is not cataloged, M+R auto-allocates it as a PDS or SEQuential data set depending on the field Export DSORG, but the default is PDS (see below).</p> <p>For PAN and LIB libraries, the Export DSORG must reflect that organization.</p>
Export DSORG	<p>Enter the data set organization for the Export DSNAMES (see the previous entry).</p> <p>For PDS or SEQ, entry is required only if the Export file is not already cataloged, or you want the new file to be SEQ. If entered for an existing data set, it must accurately reflect the organization - PDS or SEQ. You should use this type of data set if you plan to export to a ChangeMan ZMF package; that is, to Staging libraries.</p> <p>For PAN or LIB, an accurate entry is always required; otherwise, the output file cannot be opened.</p>
Export member mask	<p>Identifies a member name mask that will be applied to the name of each exported member.</p>
LIB module name	<p>Enter a program name, up to eight characters in length, for the module that updates a LIBrarian master file (only applies to LIB shops that plan to export consolidated versions to a LIBrarian master file). Common names are LIBR and LIBRARY.</p>



NOTE The Source/Copy Libraries Synchronization tool allows a second Export library to be defined on the *Profile Data Sets* panel for export of the consolidated copybooks.

The following two fields are added in this panel:

Copybook Export DSN ===> USER83.CDF.USER83.EXPCPY_____

Copybook Export DSORG ===> PDS_____ (PDS, SEQ, PAN, LIB, or blank)



NOTE The equivalent JCL Comparison tool does not include an export feature; thus, its *Profile Data Sets* panel does not contain any export-related fields.

Data Filtering

To select the *Merged Data Filters* panel, select option **6** (FILTERING) from the *Profile* panel. The *Merged Data Filters* panel (SERCLEAN), shown below, appears.

```
SERCLEAN ----- Merged Data Filters -----
Enter > or < or <> in TYPE and           Enter a string in MATCHING TEXT and
one or more derivative ID in MARKING      optionally a column position

   TYPE MARKING                         MATCHING TEXT      POSITION
   >  BC_____                        * Notes_____     7
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
   _____                          _____           _____
```

The Data Filtering of the merged base and derivative versions is implemented as a logical deletion of certain records so that they will not be exported. The following are two ways to filter out unwanted records:

- By specifying the record type and origin; for example, all records inserted by derivatives B and C are depicted as >BC; to logically delete such records, enter > in the TYPE field and BC in the MARKING field (use the *Merged Data Filters* panel above as an example).
- By specifying a part of the content of the record (a string) at a certain position or anywhere within the record; for example, to delete all records that contain the string *Notes starting at position 7, enter *Notes in the MATCHING TEXT field and 7 in the POSITION field.

The data filtering is automatically done as part of the compare and merge of the versions. The logically deleted records are marked with /* on the first display of the *Reconcile*

panel. If you like to examine the results of the data filtering, you can issue eXclude REmaining (X #) primary command. Conversely, you can issue View REmaining (V #) command to see all filtered out records disappear just as they would on export. Should you want to selectively reverse the result of data filtering, you can use the Undelete line command.

Up to 16 data filters of each category can be entered on the *Merged Data Filters* panel. The "Or" between a type/origin filter and a matching text filter means that if a record matches either of them it will be logically deleted. This way, you can specify up to 32 independent criteria for filtering out unwanted records from the merged versions.

The search for the text at a certain (or any) position is not case sensitive. The text can contain several words separated with blanks. If the text is enclosed within a pair of apostrophes or quotation marks, the search for that string becomes case sensitive. To search for a text anywhere on a record, leave the POSITION field blank.

The primary command RESet blanks out all merged data filters.

The Data Filtering can be used for many purposes. For example, the type/origin filters can logically delete an entire derivative, say X, by specifying the following merged data filters: <>X and > X, and setting the profile export option AutoOverride to No to avoid any deletions made in X. By using text/at position requests, many blocks of comment records can be dropped on export if unwanted.

More sophisticated applications of Merged Data Filtering may be, for example, propagations of software changes down the corporate hierarchy. Usually, the changes in the business rules come from the HQ while the branches make some local changes. In order to propagate the business rules' changes into a customized local software, the following consolidation process can be devised:

- Define the local code as the base, the current version of the central code as a derivative, say B, and the new version of the central code as another derivative, say C.
- All the differences between the derivatives and the base need to be filtered out except for those that originate from the new version C as they represent the changes in the business rules.
- Thus, specify the Merged Data Filters >BC, <>BC, >B, and <>B, then set the profile export option AutoOverride to No to neutralize derivative deletions like <BC, <B, and <C.
- After execution and export, use the auto-consolidated version as a derivative and the local code as the base to reconcile the business rules' changes with the local customizations.

Chapter 5

Defining Versions

This chapter describes how to define versions for reconciliation.

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Defining a Base and Derivatives (Option 1)

To compare, merge, and display up to eight versions for reconciliation, you must define the data set names that M+R will use to compare, merge, and display. The *Versions* panel allows you to accomplish this task.

Invoking the Versions Panel

From the *Member Reconciliation Library, Consolidation, Source and Copy Libraries Synchronization, or Equivalent JCL Comparison* menu, select menu option **1** (VERSIONS) to access the *Versions* panel.

On the *Versions* panel, you can enter up to eight version data sets. At least one—the base—is required. The other fields on the panel are explained in the following sections.

SERCDFCM		Versions			
Command ==>> _____					
	CMN Export package: _____	Libtype: _____	Export member: <u>TESTEXPT</u>		
Base:	<u>JPRESTO.COBOL</u>		<u>TEST001</u>	<u>PDS</u>	<u>-003</u> -
		Last Member: _____			
	or CMN appl/pkg: _____	Libtype: _____			
Drv1:	<u>JPRESTO.COBOL</u>		<u>TEST002</u>	<u>PDS</u>	<u>-002</u> A
	or CMN appl/pkg: _____	Libtype: _____			
Drv2:	_____		_____	_____	_____
	or CMN appl/pkg: _____	Libtype: _____			
...					
Drv7:	_____		_____	_____	_____
	or CMN appl/pkg: _____	Libtype: _____			

The *Versions* panel allows you to specify up to eight versions through either

- A full Data Set Name (DSN) and data set organization (TYPE).
- A ChangeMan ZMF application name (CMN Appl/Pkg) and library type (LibType).
- A ChangeMan ZMF package ID (CMN Appl/Pkg) and library type (LibType).
- Any combination of the above.

M+R validates version existence and your TSO/ISPF access authority to them. In case of application/package definition, M+R resolves the mnemonics to the corresponding baseline/staging DSNs and validates your ChangeMan ZMF authority.

The *Versions* panel also allows you to specify a package ID as a final export destination. M+R exports first to your profile export file, and then to the export package via the ChangeMan ZMF staging procedure for that library type.

If reconciliation is for a single member or for sequential data sets, you can enter an **Export member** name to specify the name of the member created in the export data set.

If the final export destination is a ChangeMan package, this name is also used as the component name in the package.



NOTE This field is automatically set to the component name if you are merging ZMF staging versions (SSV).

A base/derivative library can be a PDS, PANvalet, or LIBrarian, as well as the baseline of a CMN application or a package. For instance, in the *Versions* panel, the base is entered as the baseline for library type SRC of application ABC; the first derivative is the package 13 of that application; the second derivative is a PANvalet library, and so forth.

Member Field

Member List Filters

If the first version—the base—is a *library* (PDS, PAN, or LIB type), you can leave the Member field blank or enter a pattern or a range, to work on a number of members. If other versions—the derivatives—are also libraries, you can proceed with multiple libraries' consolidation.

All Members

An *empty* Member field means that *all members* of the base version library will be included in the *Consolidated Workplace* for reconciling efforts.

Member Name Pattern

A *pattern* (like ABC*) entered in Member field will select only members whose name begins with that pattern.

Member Name Range

You can specify a *range* of members to be selected for reconciliation by entering the *first member name* (or pattern) in the Member field of the base and the *last member name* (or pattern) in the Last Member field.

Member Name Masks

Another way to select member versions for reconciliation is through *masking* the names so that slightly, but uniformly, different names can be aligned together. Using masks is critical for sites that keep all the member versions in one library by applying some naming convention. For example, consequent versions of a member may be ABC1, ABC2, and ABC3.

You can align such versions through *suffix masks* like *1, *2, and *3, entered in the Member fields of the Base, Drv1, and Drv2 version libraries.

Another example may be version names like AB1C, AB2C, and AB3C. You can specify *position masks* ??1*, ??2*, and ??3*, to align such members in version sets.

Yet another example may be version names like XABC, YABC, and ZABC; that is, the names of the subsequent version start with a different letter (or string). The *prefix masks* X*, Y*, and Z* will align such members in version sets.

M+R supports any reasonable combination of these types of masks, including all three of them; combining the above examples, the masks should look like X?1*1, Y?2*2, and Z?3*3, to align members XB1C1, YB2C2, and ZB3C3.

One Member/File

If the base is of SEQ type or you enter a full member name, only the versions of that program can be reconciled. You will have to specify a new set of versions for another reconciliation.

Type Field

The TYPE field refers to the data set organization of the base/derivatives. If it is *PDS* or *SEQ*, no entry is required. However, you must enter *exactly* "PAN" or "LIB" if that is the type for that particular version.

- **PAN** refers to a CA Panvalet library (and members).
- **LIB** refers to a CA Librarian library (and members).

NICKNAME Field

Nicknames are used for visual references in the *Analysis* and *Reconcile* panels. Use, for example, names like BASE, CUSTOM, NEW#RELS, FIX312. If no nickname is entered, M+R generates one with the format "SOURCE#" plus the respective ID. When you edit the merged versions, a new "version" is created. The generated nickname for editing actions is RECONCIL and the ID is the plus (+) sign.

ID Field

You have to assign an *ID* to each derivative. The ID is used to mark the origin of the changes coming from that derivative. Use letters A to Z for that purpose.

Reconciliation Auditing

If you are dealing with less than eight versions, you can use the free derivative data set fields to specify one or two banner files.

- The project manager can create a *project banner file*, formatted as comments, and include it as one of the derivatives.
- Each team member can create their *individual banner file* and include it as an additional derivative.

The banner is a sequential data set or a member of a library. Although not visible to the user, M+R will include the banners on the top of each consolidated member when you export.

This way, when the export library is inspected, the reconciliation history of each member can be observed.

Data Set Access Considerations

To reconcile component versions residing in ChangeMan ZMF baseline libraries and/or packages, and stage the consolidated versions to ChangeMan ZMF packages, there are some issues of access privileges and authority that must be sorted out while you are setting up the M+R environment.

- 1 Obtain READ/WRITE access to all your M+R profile data sets:
 - The work in suspense (WIS) PDS or SEQuential data set.
 - The print SEQuential data set.
 - The export PDS or SEQuential data set, in case you will be exporting to a staging library; the export data set may be a PANvalet or LIBrarian data set if you do not intend to export to a staging library.

For details, see "Setting Your Profile" on page 3-1.

- 2 Obtain READ access to the data sets that you specify as versions in the *Versions* panel (see "Defining Versions" on page 4-1). For baseline and package libraries, you need READ access to the application they belong to.
- 3 You should have ChangeMan ZMF WRITE (UPDATE) authority over the staging library that you specify as an CMN export package in the *Versions* panel. In this case, the *last* requirement is that the SERNET started task has READ access to your profile export data set. M+R first exports to that data set and then issues an RPC to stage it from the export data set to the staging library.

When you submit a Batch Execution job, the SERNET **started task** should have READ/WRITE access to

- The work in suspense (WIS) PDS data set
- The print SEQuential data set

and READ access to the base and derivative libraries if they are not application baseline or package libraries. In short, the SERNET started task treats the version libraries as development (or personal) libraries.

Should your batch job abend due to access violation, you can manually submit it. The M+R generated jobdeck is member @CDFJOB in your WIS library.

Chapter 6

Reconciling a Member/File

The *Member Reconciliation* tool allows you to reconcile up to eight versions of a program, copybook, JCL procedure, or other type of text component by providing a sequential file or the full member name of the base version.

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Invoking the Member Reconciliation Menu

To access the Member Reconciliation tool from the *Merge+Reconcile* primary menu, select option **M**. The *Member Reconciliation* menu, shown below, appears.

```

SER@MAIN                               Member Reconciliation Menu
Option ==>> _____

0 Profile           Update user profile settings
1 Versions          Specify base and derivative data sets and member names
2 Execute           Execute (compare and merge) the specified versions of a file
3 Save              Save the current reconciliation as "work in suspense" (wis)
4 Load              Load prior "work in suspense" for edit now
5 Edit              Resume editing the current reconciliation or just loaded wis
5P Print            Print the last view (snapshot) of the reconciliation
6 Export            Export a successful reconciliation effort to a file
6P Exp print        Print a successful reconciliation effort
7 Analysis          Analyze the progress and complexity of the reconciliation
7P Anl print        Print analysis of the reconciliation progress and complexity
X Exit

```

- [Chapter 4, "Setting Your Profile" on page 35](#) discusses menu option **0** (PROFILE).
- [Chapter 5, "Defining Versions" on page 47](#) discusses menu option **1** (VERSIONS).
- The following table describes the other menu options on the Member Reconciliation menu.

Numeric Key	Menu Option	Function
2	Execute	M+R compares and merges the versions, then displays them for you to browse and edit; that is, to reconcile.
3	Save	This option is rarely used. M+R automatically saves the edits when you exit from the <i>Reconcile</i> panel.
4	Load	If you want to continue a reconciliation effort started previously, choose this option. M+R will load and verify your work.
5	Edit	After a LOAD or an exit from the <i>Reconcile</i> panel, you can return to your current reconciliation work by choosing this option.
5P	Print	Produces a copy of the last view of the reconciliation file with all the information about the type and origin of changes that you see on the <i>Reconcile</i> panel. You can direct the formatted file to a printer.
6	Export	When you decide that you have completed your reconciliation, choose this option. M+R extracts and writes the consolidated member to the export file that you have specified in your profile.
6P	Exp print	Produces a printout of what is going to be extracted at this point in time should you choose option 6 (EXPORT).

Numeric Key	Menu Option	Function
7	Analysis	At any time, you can invoke this option to follow the progress of your reconciliation: what is the current Degree of Complexity, how many conflicts you have resolved, how many are left, etc.
7P	Anl print	Produces a printout of the Analysis information that you would see by choosing option 7 (ANALYSIS).

Comparing and Merging Versions (Option 2)

To compare and merge versions, from the *Member Reconciliation* menu, select option **2** (EXECUTE). The base and derivative data set names are those that were previously specified on the *Versions* panel.

Since the base version is a single file or member, the *Execute In Progress* panel appears briefly, and M+R performs these actions behind this panel:

- Loads the chosen base member and the derivatives (one by one) into storage.
- Compares the base with each of the derivatives and records the differences.
- Stores the base and the differences in the M+R merged versions file.
- Identifies and combines the same changes in different versions and marks the conflicting and singular changes.
- Calculates the Degree of Complexity of the reconciliation effort and inserts this information (as a comment) at the top of the merged versions file.
- Displays a full view of the merged versions file for reconciliation.

The *Execute in Progress* panel is followed by the *Reconcile panel*, as shown below.

- If the Include Prefix field on the *Version Editing Options* panel is NO, then the first line containing the timestamp and the base version DSNNAME is followed by the merged versions code lines.

- If the Include Prefix field on the *Version Editing Options* panel is YES, then an analysis table of the reconciliation like the following appears after that first line.

```

CDFPANEL ----- RECONCILE ----- ROW 1 TO 20 OF 97
B:DRV1 C:DRV2
***** TOP OF DATA *****
000000 *****/* 2001/04/05 17:03:43 somnode.CMNZMF.SAMPLES
Records in Exported File:
-----
DEGREE OF COMPLEXITY: 4 MEDIUM
-----
RECORDS | CONFLICTS | SINGLE CHANGES |
-----|-----|-----|
NICKNAMES | PREV CURR DIFF | PREV CURR DIFF |
-----|-----|-----|
ORIGINAL 60 | 1 0% | 3 0% |
-----|-----|-----|
DRV1 63 | 5 0% | 2 0% |
-----|-----|-----|
DRV2 66 | 7 0% | 1 0% |
-----|-----|-----|
RECONCIL | 0 0% | 0 0% |
-----|-----|-----|
TOTAL: | 13 0% | 6 0% |
-----
Reconciliation Scope:
    
```

The panel above displays an initial analysis of the merged versions. It shows that the Degree of Reconciliation Complexity is 4, or Medium, on a scale of 1 through 10. It also indicates the following:

- One record in base was changed by more than one derivative. A total of 12 records of DRV1 and DRV2 are in conflict; that is, they represent competing changes to 1 record in base.
- The current release of base has 60 lines of code, 3 of which were changed independently by 2 records in DRV1 and by 1 record in DRV2. These are single changes.

For details about the analysis table, see "[Analyzing Changes \(Option 7\)](#)" on page 58.

The Degree of Complexity is followed by the Reconciliation Scope, similar to the following panel.

```

CDFPANEL ----- RECONCILE ----- ROW 21 TO 41 OF 97
B:WALKTR#1 C:WALKTR#2
NICKNAME MEMBER LAST MODIFIED USER ID DATA SET NAME
-----|-----|-----|-----|-----|
ORIGINAL COBOLBAS 2000/10/29 17:48 CDF410B somnode.CMNZMF.SAMPLES
WALKTR#1 COBOLDV1 2000/10/29 17:40 CDF410B somnode.CMNZMF.SAMPLES
WALKTR#2 COBOLDV2 2000/10/29 17:40 CDF410B somnode.CMNZMF.SAMPLES
RECONCIL 2001/04/05 11:41 USER83 Current Work
-----|-----|-----|-----|-----|
000001 000100 IDENTIFICATION DIVISION.
000002 000200 PROGRAM-ID. COBOL01.
000003 000300 ENVIRONMENT DIVISION.
    
```

Saving the WIS File (Option 3)

The following indicates the ways you may save your reconciliation work.

- 1** You can save the work from the *Reconcile* panel through the *SAVE* primary command, and then continue to edit. If you decide to discard your latest edits, issue the *CANCEL* primary command and select option **4** (*LOAD*) from the *Member Reconciliation* panel to load last saved WIS file.
- 2** Whenever you exit normally from the *Reconcile* panel, your just-completed reconciliation is saved as a WIS file.
- 3** Select option **3** (*SAVE*) from the *Member Reconciliation* menu to save your current work in a WIS file. You might use this option when the other two fail and you have to compress (outside M+R) the WIS file first.

In any case, you will receive an acknowledgment that your WIS file has been saved.

Loading the WIS File (Option 4)

To resume an interrupted reconciliation of a specified set of versions, you need to load, then edit, the WIS file. To load it, select option **4** (*LOAD*) from the *Member Reconciliation* menu.

You will receive an acknowledgment that your WIS file has been loaded and is ready to edit. Next, to continue the reconciliation effort, select option **5** (*EDIT*) from the *Member Reconciliation* menu.

If the previously reconciled member has not been exported or saved, M+R issues a warning message and ignores your Load request. On a repeated Load request, the WIS file is loaded but the previous reconciliation work is lost.

Alternatively, you can first export the previous work, then select option **4** (*LOAD*) from the *Member Reconciliation* menu. See message "[SER059I "WIS" Will Be Overlaid](#)" on page [151](#) for more information.

Editing the WIS File (Option 5)

After loading a previously saved WIS file or after a normal exit from the *Reconcile* panel, choose option **5** (*EDIT*) from the *Member Reconciliation* menu. You will see the *Reconcile* panel and you can then continue your work.

Printing the WIS File (Option 5P)

You might want to print a WIS file when, for example, the complexity of reconciliation is High; that is, when the changes in the derivatives overlap.

To print a WIS file, select **5P** (*PRINT*) from the *Member Reconciliation* menu. The printout is a snapshot of the current view displayed on the top left side of the *Reconcile* panel.

You will receive an acknowledgment that your WIS file has been printed; that is, the current view has been formatted for printing in your personal Print data set specified in the *Profile Data Sets* panel.

Exporting the Consolidated Version (Option 6)

The ultimate goal of the reconciliation is to produce a consolidated version from the base and its derivatives. To export a consolidated version, select option **6** (EXPORT) from the *Member Reconciliation* menu. You will receive an acknowledgment that your consolidated version has been exported.

When your reconciliation has not resolved all the *conflicts*, M+R will ignore your initial attempt to export it, and will issue a warning message. Your second attempt to export your reconciliation will succeed, but the consolidated version will have some unresolved conflicts. However, if your profile setting for "Export Conflicts" is NO, you won't be able to export with unresolved conflicts.

Warning: In case of profile setting AutoOverride=YES, be aware that when you export the consolidated version, all base records that have been changed (replaced or deleted) in *one* derivative will be substituted with these changes. The same rule applies when a base record is changed in the *same way in all* derivatives. In other words, all *single* changes to base records will be incorporated in the consolidated version.

The scenario described in the above **warning** happens automatically. To prevent an AutoOverride of certain lines, do the following:

- To export base records replaced by derivative records, **delete** the derivative records; replaced base records are marked like '< 0456' while the replacing derivative records are marked like '<>_B__'.
- To export base record deleted in one or all the derivatives, **repeat** the base records; deleted base records are marked like '< _B__'.

Before exporting, you can browse the consolidated version by issuing the **View REM**aining primary command.

Printing the Consolidated Version (Option 6P)

To print the current consolidated version (that is, the exported file), select option **6P** (EXP PRINT) from the *Member Reconciliation* menu. You will receive an acknowledgment that your consolidated version has been printed.

Warning: In case of profile setting AutoOverride=YES, be aware that when you print the consolidated version, all base records that have been changed (replaced or deleted) in *one* derivative, or have been changed in *the same way in all* derivatives, will be substituted with these changes. In other words, all *single* changes to base records will be incorporated in the consolidated version printout.

Analyzing Changes (Option 7)

At any time during the reconciliation, you can select **7** (ANALYSIS) from the *Member Reconciliation* menu to track the progress of the reconciliation (as measured in decreasing

the Degree of Complexity, respectively the number of conflicts). The *Analysis* panel, shown below, appears.

```

----- ANALYSIS ----- ROW 1 TO 21 OF 25
COMMAND ==>                SCROLL == CSR
-----
DEGREE OF COMPLEXITY:  4 MEDIUM
-----
      RECORDS | CONFLICTS | SINGLE CHANGES | DELETED BY YOU | REMAINING CODE
-----|-----|-----|-----|-----
NICKNAMES   | PREV CURR DIFF | PREV CURR DIFF | PREV CURR DIFF | PREV CURR DIFF
-----|-----|-----|-----|-----
BASE        60 |  1  0 -99% |  4  2 -50% |  0  3 +99% | 60  57 - 5%
-----|-----|-----|-----|-----
DRV1        63 |  5  0 -99% |  1  1  0% |  0  5 +99% |  6  1 -83%
-----|-----|-----|-----|-----
DRV2        66 |  7  0 -99% |  1  8 +99% |  0  0  0% |  8  8  0%
-----|-----|-----|-----|-----
RECONCIL    |  0  0  0% |  0  0  0% |  0  0  0% |  0  0  0%
-----|-----|-----|-----|-----
      TOTAL: | 13  0 -99% |  6 11 +83% |  0  8 +99% |
-----
                    Reconciliation Scope:
NICKNAME  MEMBER  LAST MODIFIED USER ID      DATA SET NAME
-----
. . .

```



NOTE The "0" entry for TOTAL CURR CONFLICTS indicates that the reconciliation was successful.

The terms used on the *Analysis* panel are explained in the following table.

Field	Description
DEGREE OF COMPLEXITY	Measuring the amount of effort required for the reconciliation, on a scale from 1 (low) to 10 (high). If all versions are equal, the complexity is zero (none).
NICKNAMES	Displays either the user-supplied or default names for the base and derivatives.
RECORDS	Displays the number of records in the base and corresponding derivative.
CONFLICTS	Displays the number of records in conflict; that is, the number of base records changed in more than one other derivative.
SINGLE CHANGES	Displays the number of base records changed in only one derivative.
DELETED BY YOU	Displays the number of records deleted during the reconciliation. (This is <i>not</i> the number of base records deleted in the derivative.)
REMAINING CODE	Generally, displays the number of records that have "survived" thus far and are targeted for the consolidated version. For base and derivatives, displays the number of changes not deleted thus far, excluding the overridden base records. For the nickname RECONCIL (and with a plus (+) sign as an ID), displays the number of inserted records.

Field	Description
TOTAL	Displays the total Conflicts, Single Changes, and Deleted records.
Subcolumns	PREVIOUS - Displays the number of records that are in conflict, single changes, deleted, and/or remaining during the previous execution of option 7 (ANALYSIS).
	CURRENT - Displays the number of records that are currently in conflict, simple changes, deleted, and/or remaining. Through deletions/insertions during the reconciliation, these numbers vary.
	DIFFERENCE - Displays the current versus previous, illustrating the progress of the reconciliation. The difference sign (+) or (-) indicates the direction of the reconciliation: the plus (+) sign means that the current number of conflicts is <i>greater</i> than the previous one, whereas the minus (-) sign means otherwise. The <i>number of conflicts</i> should decrease with reconciliation, causing a negative (-nn%) difference. However, when the number of conflicts decreases, the <i>number of deleted</i> records in some of the derivatives increases at the expense of those solved conflicts, resulting in a positive (+nn%) difference.

Printing the Analysis Report (Option 7P)

To print an analysis report, select option **7P** (ANL PRINT) from the *Member Reconciliation* menu. You will receive an acknowledgment that your analysis report has been printed.



NOTE As opposite to option **7** (ANALYSIS), this option does not update the PREVIOUS count of single changes, deleted records, records in conflict, and remaining code.

Chapter 7

Consolidating a Library

If you have specified a base which is a library (PDS, PAN, LIB type), and left the Member field blank or entered a pattern, range, or masks, the *Consolidation Workplace* panel provides you with status information and a place to work from, instead of going through the Member Reconciliation options. If some or all derivatives are also libraries, you will be able to perform a consolidation of multiple libraries.

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Invoking the Library Consolidation Menu

To invoke the Library Consolidation tool from the *Merge+Reconcile* primary menu, select option **L**. The *Library Consolidation* menu, shown below, appears.

```
SER@TEAM                               Library Consolidation Menu
Option ==>> _____

0 Profile           Update user profile settings
1 Versions          Specify base and derivative library data set names
3 Workplace         Display consolidation workplace listing version members
4 Batch job         Batch execution (compare and merge) of version libraries
5 Project           Create or select a consolidation project
X Exit
```

- Chapter 4, "Setting Your Profile" on page 35 discusses menu option **0** (PROFILE).
- Chapter 5, "Defining Versions" on page 47 discusses menu option **1** (VERSIONS).
- This chapter describes menu option **3** (WORKPLACE).
- Menu option **4** (BATCH JOB) is detailed in Chapter 11, "Executing and Exporting in Batch" on page 85.
- Menu option **5** (PROJECT) is detailed in Chapter 10, "Managing M+R Projects" on page 77.

Workplace (Option 3)

The *Consolidation Workplace* panel displays in response to option **3** (WORKPLACE).

```
----- CONSOLIDATION WORKPLACE ----- ROW 1 TO 14 OF 14
COMMAND ==>>                               SCROLL ==>> CSR
      Project: CDFTEAM/USER37
DIFFERENCE BASE MEMBER ACTION COMPL  CUSTOM    NEW_RELS  ENHANCE   LAST_FIX
@===b... _ APLQAAA                APLQAAA  APLQAAA  APLQAAA  SEQ
@$=$b... _ APLQMBLE             APLQMBLE APLQMBLE APLQMBLE SEQ
@$. $b... _ APLQONLY            APLQONLY                APLQONLY  SEQ
@. $ .b... _ APLQP                APLQP                APLQXYZ  SEQ
..@=b... _                      APLQXYZ  APLQXYZ  APLQXYZ  SEQ
@$$$b... _ APL00000             APL00000 APL00000 APL00000 SEQ
@==$b... _ APL01000             APL01000 APL01000 APL01000 SEQ
@==$b... _ APL02000             APL02000 APL02000 APL02000 SEQ
.@=$b... _                      APL03000 APL03000 APL03000 SEQ
..@$b... _                      APL04000 APL04000 APL04000 SEQ
...@b... _                      APL05000 APL05000 APL05000 SEQ
@$$$b... _ APL06000             APL06000 APL06000 APL06000 SEQ
@.= $b... _ APL07000             APL07000 APL07000 APL07000 SEQ
@$..b... _ APL08000             APL08000                APL08000  SEQ
***** BOTTOM OF DATA *****
```

In the member list displayed above, the third and fourth lines remain constant on each scrolled page. They remind you about the library being used as a base version and the column headings. When an Active Project is in force, the project name and owner's user ID are displayed on the third line, instead of the base library.

Consider this panel a table whose columns are the derivative version libraries. If you scroll to the right you will see the fifth to seventh derivatives as well as the LANGUAGE column (source code). The BASE MEMBER column refers to the base library. The nicknames specified in the *Versions* panel are used as column headers for the corresponding derivative libraries.

The rows contain same-named members in the base and derivatives.



NOTE You *can* process ten-character PANvalet member names. If you have used *masks* to filter and match member names, each row will contain differently-named members, like COBOLBAS, COBOLDV1, and COBOLDV2 for the suffix masks *BAS, *DV1, and *DV2.

Each cell of the table represents a version of that particular member in that specific base/derivative. An empty cell indicates that such-named member is not found.

The rows are ordered by their first filled cell so that the table can be browsed through scrolling and the Locate command just like in ISPF/PDF.

DIFFERENCE Column

The DIFFERENCE column depicts the differences and similarities between the versions. It is built in *two* stages from *two* separate sources.

- **Before** the compare and merge, as a result of the **Instant Impact Analysis** performed on the ISPF statistics of the member versions.
- **After** the execution of the compare and merge, as a result of a **direct comparison** of the derivatives with the base code.



NOTE This means that the derivative is considered different if either the ISPF statistics or the content are different from the base.

The following table describes the meaning of the characters:

Character	Description
\$	Indicates that the derivative is different from the base.
=	Indicates that the derivative is equal to the base.
@	Indicates the base version.
.	Signifies that the member is missing in the corresponding version library.
b	Indicates that the file is a banner. Banners are not compared, but only merged on the top of the consolidated version.

ACTION Column

The ACTION column contains the last action performed on the base/derivative sets of members.

- Blank for not yet executed member versions.
- *Execute - for compared and merged member versions.

- *Reconcl - for fully or partially reconciled member versions.
- **Export - for exported consolidated member versions.

COMPLexity Column

The COMPL column (Degree of Complexity) indicates the corresponding levels of differences (low, middle, and high) between the versions. M+R calculates the degree of complexity after the execution. An initial value of None means that all versions are equal; thus, no reconciliation is needed. You can immediately export such member sets and start reconciling different versions. Be aware that, when all versions are equal, the actions against such member sets are marked as =Execute, =Reconcl, and ==Export, respectively.

Reconciliation Commands

You can use the member versions table as a consolidation workplace to reconcile, analyze, and export sets (that is, rows) of base/derivative versions. In front of each set, you can enter one of the following line commands:

- **S** for Select: if this member set has already been executed, its WIS file is automatically loaded and the *Reconcile* panel is displayed so that you can continue your reconciliation. If this is a new execution, the base is compared with the derivatives and the *Reconcile* panel is displayed for you to start reconciling.
- **F** for Force: use it instead of Select when a member set has already been executed but you have just changed some profile settings. For instance, if you change to a higher comparison resolution or specify a language type, and you want a re-execution, you should use the Force line command.
- **A** for Analysis: can be issued against an executed or exported member set and displays the *Analysis* panel that shows the progress in the reconciliation (e.g., the number of conflicts resolved and how many still remain unresolved).
- **P** for Print: can be issued against the just-reconciled member set and results in a snapshot of the current reconciliation effort depending on the last view on your *Reconcile* panel. The report is routed to the Print DSNAM data set specified in your profile. You can browse the snapshot or direct it to a local printer.
- **E** for Export: can be issued against the just-reconciled member set and results in formatting the reconciliation and writing it into the export data set. The status of that member will be updated to **Export.

When M+R is used for Vendor Code reconciliation, newer versions of a software product may contain members absent in the older version (used as a base). In such a case, the first derivative which contains this member is used as a "base" in the execution.

For example, in the following panel, on [page 65](#), member APLQXYZ is not present in the base and first derivative; thus, its version in the second derivative is treated as the base version to be compared with the version in the third derivatives and the sequential file of the fourth derivative.

Banner Files

If a derivative is specified as a sequential data set, it is included in all sets; in this case, it will be marked with SEQ under its column in all rows and as 'b' for *banner* in the DIFFERENCE column.

The important difference between such a banner file and the library derivatives is that the banner is not compared with the base version; instead it is only merged at the top of the consolidated version.

The same rule applies to a derivative that is a specific member of a library; the specified member name will be present in all rows under that derivative column and as 'b' for *banner* in the DIFFERENCE column.

Select from Consolidation Workplace

When you select a new (not executed) member from the *Consolidation Workplace* panel, an *Execute in Progress* panel is displayed. If the previously reconciled member has not been exported or saved, a warning message is issued and the selection is ignored. With repeated **Select** commands, the selected member is executed or loaded from the WIS PDS but the previous reconciliation is lost. Alternatively, you can save or export the previous work, and then select a new member; see message "[SER059I "WIS" Will Be Overlaid](#)" on [page 151](#) for further details.

After you successfully complete your edits on the *Reconcile* panel, press the END command to return the *Consolidation Workplace*.



NOTE The literal *Reconcl is placed in the ACTION column for the member that you have just reconciled. The Degree of Complexity is placed in the COMPL column.

```

----- CONSOLIDATION WORKPLACE ----- ROW 1 TO 14 OF 14
COMMAND ==>                               SCROLL ==> CSR
      Project: CDFTEAM/USER37
DIFFERENCE BASE MEMBER ACTION COMPL  CUSTOM    NEW_RELS  ENHANCE  LAST_FIX
@==b... _ APLQAAA                APLQAAA  APLQAAA  APLQAAA  SEQ
@$$=b... _ APLQMBLE *Reconcl High APLQMBLE APLQMBLE APLQMBLE  SEQ
@.$ .b... _ APLQONLY                APLQONLY                APLQONLY  SEQ
@.$ .b... _ APLQP                    APLQP                    APLQP     SEQ
..@=b... _                          APLQXYZ  APLQXYZ  APLQXYZ  SEQ
@$$$b... _ APL00000                APL00000 APL00000 APL00000  SEQ
@==$b... _ APL01000                APL01000 APL01000 APL01000  SEQ
@==$b... _ APL02000                APL02000 APL02000 APL02000  SEQ
. @=$b... _                          APL03000 APL03000 APL03000  SEQ
..@$b... _                          APL04000 APL04000 APL04000  SEQ
...@b... _                          APL05000 APL05000 APL05000  SEQ
@$$$b... _ APL06000                APL06000 APL06000 APL06000  SEQ
@.= $b... _ APL07000                APL07000 APL07000 APL07000  SEQ
@$. .b... _ APL08000                APL08000 APL08000 APL08000  SEQ
***** BOTTOM OF DATA *****

```

Force Execution from Consolidation Workplace

If you have changed some of the comparison profile settings and want a re-execution, do the following:

- From the *Consolidation Workplace* panel (using the above panel), force a re-execution of an executed or exported member by entering **F** or **f** in front of it.



NOTE The *Execute In Progress* panel will be presented for a brief moment, then you can start the reconciliation anew. If the previously reconciled member has *not* been exported or saved, *no warning* message is issued—M+R simply goes ahead and force-executes the member set.

Export from Consolidation Workplace

You can export the just-completed reconciliation from the *Consolidation Workplace* by entering **E** or **e** in front of it.

Assuming that APLQMBLE has just been exported, the *Consolidation Workplace* is refreshed with a message and a new literal ****Export** under the ACTION column header for that member. (See member APLQMBLE below).

```

----- CONSOLIDATION WORKPLACE ----- ROW 1 TO 14 OF 14
COMMAND ==>                               SCROLL ==> CSR
      Project: CDFTEAM/USER37
DIFFERENCE BASE MEMBER ACTION COMPL  CUSTOM      NEW_RELS  ENHANCE  LAST_FIX
@==b... _ APLQAAA                APLQAAA    APLQAAA  APLQAAA  SEQ
@$=b... _ APLQMBLE  **Export None  APLQMBLE  APLQMBLE  APLQMBLE  SEQ
@$. $b... _ APLQONLY                APLQONLY                APLQONLY  SEQ
@. $. b... _ APLQP                                APLQP                SEQ
..@=b... _                                APLQXYZ  APLQXYZ  SEQ
@$ $b... _ APL00000                APL00000  APL00000  APL00000  SEQ
@== $b... _ APL01000                APL01000  APL01000  APL01000  SEQ
@== $b... _ APL02000                APL02000  APL02000  APL02000  SEQ
. @=b... _                                APL03000  APL03000  APL03000  SEQ
.. @ $b... _                                APL04000  APL04000  APL04000  SEQ
... @b... _                                APL05000  APL05000  SEQ
@$ $ $b... _ APL06000                APL06000  APL06000  APL06000  SEQ
@. = $b... _ APL07000                APL07000  APL07000  APL07000  SEQ
@$. . b... _ APL08000                APL08000                SEQ
***** BOTTOM OF DATA *****

```

If you attempt to export a member other than the one you just reconciled, an appropriate message is issued and your attempt is ignored. (See messages ["SER093A Nothing to Export"](#) on page 157 and ["SER094A Wrong Member to Export"](#) on page 157 for more information.)

Analyze from Consolidation Workplace

You can invoke the Analysis function for any executed member (that is, marked ***Execute**, ***Reconcl**, or ****Export** in the ACTION column) by entering **A** or **a** in front of it.

If an attempt is made to analyze a not executed member, an appropriate message is issued. (See message ["SER095I Wrong Member to Analyze"](#) on page 157 for details.)

Print from *Consolidation Workplace*

You can invoke the **P**rint function for this just-reconciled member to format a snapshot of the current reconciliation effort depending on the last view on the *Reconcile* panel.

The last view is always displayed on the top left side of the *Reconcile* panel title.

For example, to get a snapshot of the current consolidated version (i.e., the exported file), you should issue the **V**iew **R**Emaining primary command on the *Reconcile* panel and press the END command to get back to the *Consolidation Workplace*; then, you can issue the Print command for that member by entering **P** or **p** in front of it.

If an attempt is made to print a member other than the just-reconciled one, an appropriate message will be issued. (See message "[SER098I Nothing to Print](#)" on page 158 and "[SER099A Wrong Member to Print](#)" on page 158 for details.)

Batch Job (Option 4)

Option **4** (BATCH JOB) on the *Library Consolidation* menu allows you to invoke the *Batch Execution* panel in order to generate a jobdeck and submit a batch job to compare and merge source version library members, and export source member versions. This option is discussed in [Chapter 11, "Executing and Exporting in Batch"](#) on page 85.

Project (Option 5)

Option **5** (PROJECT) on the *Library Consolidation* menu allows you to provide management functions for individual and team-oriented consolidation projects. This option is discussed in [Chapter 10, "Managing M+R Projects"](#) on page 77.

Chapter 8

Synchronizing Source and Copy Libraries

The Source/Copy Synchronization tool (accessed from the *Source/Copy Synchronization* menu) supports concurrent reconciliation of up to eight versions of a source library and up to eight version of a copybook library. This tool detects the invocation of copybooks in the source code and merges them into the source versions for concurrent comparison, merging, reconciliation, and export.

Invoking the Source/Copy Libraries Synchronization Menu	70
Defining Copy/Include Base and Derivatives (Option 2)	70
Reconciling and Exporting Copybooks	71
Workplace (Option 3)	72
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Project (Option 5)	72

Invoking the Source/Copy Libraries Synchronization Menu

To invoke the Source/Copy Libraries Synchronization tool from the *Merge+Reconcile* primary menu, select option **S**. The *Source/Copy Libraries Synchronization* menu, shown below, appears.

```
SER@SYNC ----- Source/Copy Libraries Synchronization Menu -----  
Option ==>  
  
  0 - PROFILE   - Update User Profile Settings  
  
  1 - SOURCE    - Specify Source Base and Derivative Library Names  
  
  2 - COPY/INCL - Specify Copy/Include Base and Derivative Library Names  
  
  3 - WORKPLACE - Display Synchronization Workplace listing version members  
  
  4 - BATCH JOB - Batch execution (compare and merge) of version libraries  
  
  5 - PROJECT   - Create or Select a Synchronization Project  
  
  X - EXIT  
  
Press HELP KEY for tutorial assistance; Enter END to return to primary menu.
```

[Chapter 4, "Setting Your Profile" on page 35](#) discusses menu option **0** (PROFILE).

[Chapter 5, "Defining Versions" on page 47](#) explains menu option **1** (VERSIONS).

[Chapter 7, "Consolidating a Library" on page 61](#) discusses menu option **3** (WORKPLACE).

This chapter describes menu options **2** (COPY/INCL) and **3** (WORKPLACE).

[Chapter 10, "Managing M+R Projects" on page 77](#) describes menu option **5** (PROJECT).

[Chapter 11, "Executing and Exporting in Batch" on page 85](#) describes menu option **4** (BATCH JOB).

Defining Copy/Include Base and Derivatives (Option 2)

The *Copy/Include Versions* panel allows you to define the data set names of up to eight versions that correspond to the source version libraries.

To invoke the *Copy/Include Versions* panel, select option **2** (COPYING). The *Copy/Include Versions* panel, shown below, appears. If you have specified three source code version

libraries, the *Copy/Include Versions* panel appears after you have specified the corresponding copy libraries.

```
SERCPYCM----- COPY/INCLUDE VERSIONS -----
Command ==>

CMN Export Package: ABC 14          LibType: CPY
Base: somnode.ABC.BASE0.CPY        TYPE  NICKNAME  ID
PDS   BASE_SRC  -
or CMN Appl/Pkg: ABC              LibType: CPY
Drv1: somnode.ABC.#000013.CPY      PDS   CUSTOM   Y
or CMN Appl/Pkg:ABC 13            LibType: CPY
Drv2: ABC.VENDOR.RELEASE.V3R2M1   PAN   NEW_RELS V
or CMN Appl/Pkg:                  LibType:
Drv3:                               LibType:
or CMN Appl/Pkg:                  LibType:
Drv4:                               LibType:
or CMN Appl/Pkg:                  LibType:
Drv5:                               LibType:
or CMN Appl/Pkg:                  LibType:
Drv6:                               LibType:
or CMN Appl/Pkg:                  LibType:
Drv7:                               LibType:
or CMN Appl/Pkg:                  LibType:
Press ENTER to validate and stay; END to register and exit; CANCEL to exit.
```

The following table describes the fields on the *Copy/Include Versions* panel.

Field	Description
Base	The data set name of the base (original) version of the copybook library.
Drv <i>n</i> :	The data set names of the <i>n</i> th version of the copybook library.
Type	PAN (CA Panvalet), LIB (CA Librarian), or leave blank (if PDS or SEQ) to indicate the data set organization of the versions.
NICKNAME	The Copy/Include version libraries take the nicknames of the corresponding source version libraries.
ID	A letter that identifies each derivative.

Reconciling and Exporting Copybooks

The reconciliation of the differences in a copybook versions is done in the same way as the source code reconciliation.

The export of the consolidated source version is requested as with the Library Consolidation tool, that is, by typing an **e** in the line command in front of the just-reconciled member on the *Consolidation Workplace* panel.

Expanded copybooks are not exported as parts of the consolidated source. The export of a consolidated copybook version is requested through a primary command **EXPORT** on the *Reconcile* panel and a pair of **Copy** and **Move** block commands that encompass the consolidated copy/include code. The **EXP** command has the member name of the

copybook as an argument. Several copybooks can be exported during a reconciliation session through issuing a separate EXP command for each copybooks.

Before exporting a copybook, you must issue the **View REMaining** command (**v #**) so that only the reconciled code lines of the copybook are exported.

Workplace (Option 3)

Option **3** on the *Source/Copy Libraries Synchronization* menu allows you to display the *Consolidation Workplace* panel, which was created by merging member lists of up eight source code libraries.

When you select a member version set (a row of the table displayed on the *Consolidation Workplace* panel), M+R does the following:

- Determines the source code language.
- Parses the source code versions for the proper keywords that signify the inclusion of outside code into the source (like COPY in COBOL, INCLUDE in SQL, ++INCLUDE for CA Panvalet source libraries, -INC for CA Librarian libraries, etc.).
- Copies the parsed copybooks from the corresponding Copy/Include Libraries; that is, expands the base source code with the copybooks from the base copy/include library, expands the first derivative source code with the copybooks from the first derivative copy/include library, etc.
- Parses and copies nested copybook up to seven levels.
- Marks the copied code with C in front of each code lines.
- Compares the expanded versions.
- Merges the versions and marks the origin of the source code differences with the IDs of the source code libraries, and the copy code differences with the IDs of the copy/include libraries.

Batch Job (Option 4)

The Batch Job Option, option **4** on the *Source/Copy Libraries Synchronization* menu, allows you to invoke the *Batch Execution* panel in order to generate and submit a batch job to compare and merge source version library members, and export source member versions. This option is discussed in [Chapter 11, "Executing and Exporting in Batch" on page 85](#).

Project (Option 5)

The Project Option, option **5** on the *Source/Copy Libraries Synchronization* menu, allows you to provide management functions for individual and team-oriented synchronization projects. The option is discussed in [Chapter 10, "Managing M+R Projects" on page 77](#).

Chapter 9

Comparing Equivalent JCL

The M+R Equivalent JCL Comparison tool compares multiple versions of jobdeck libraries, merges the differences, and allows you to browse the comparison results.

The M+R Equivalent JCL Comparison tool supports PDS, CA Panvalet, and CA Librarian JCL jobdeck libraries, as well as the ChangeMan ZMF baseline and staging libraries.



NOTE JCL procedure libraries must be PDS.

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Workplace (Option 3)	75
Batch Job (Option 4)	76

Invoking the Equivalent JCL Comparison Menu

To access the Equivalent JCL Comparison tool from the *Merge+Reconcile* primary menu, select option **J**. The *Equivalent JCL Comparison* menu, shown below, appears.

```
SER@BJCL ----- Equivalent JCL Comparison Menu -----  
  
 0 - PROFILE   - Update User Profile Settings  
  
 1 - VERSIONS  - Specify JCL Jobdeck Library Data Set Names  
  
 2 - PROCLIB   - Specify Job Entry JCL Procedure Default Library Names  
  
 3 - WORKPLACE - Display JCL Jobdeck Workplace listing version members  
  
 4 - BATCH JOB - Batch execution (compare and merge) of version libraries  
  
 X - EXIT
```

[Chapter 4, "Setting Your Profile" on page 35](#), discusses menu options **0** (PROFILE).

[Chapter 5, "Defining Versions" on page 47](#), discusses menu option **1** (VERSIONS).

[Chapter 6, "Reconciling a Member/File" on page 53](#), describes menu option **3** (WORKPLACE).

Defining JCL Procedure Libraries (Option 2)

The *PROCLIBS panel* allows you to define the names of JCL procedures libraries which are the JES 2/3 installation default PROCLIB data sets.

To invoke the *PROCLIBS* panel, select option **2**. The *PROCLIBS* panel, shown below, appears.

```

SERPROCL ----- PROCLIBS -----
Job Entry System Installation JCL Procedure Libraries

DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____
DSNAME: _____

Press ENTER to validate and stay; END to register and exit; CANCEL to exit.

```

In the DSNAME field, type the name of the JCL procedure library in exactly the same order as they are defined in the JES2/3.

To expand the jobdecks, M+R searches for JCL procedures and include text in the following order:

- The private PROCLIB specified in the JCL LIB statement of the jobdeck.
- The JES 2/3 installation default PROCLIBs.
- The SYS1.PROCLIB data set.

Workplace (Option 3)

The Workplace Option, option **3** on the *Equivalent JCL Comparison* menu, allows you to display the *Consolidation Workplace* panel, which was created by merging member lists of up eight libraries.

When you select a jobdeck member versions set (a row of the table displayed on the *Consolidation Workplace* panel), M+R

- Parses the jobdecks for JCL procedures calls and ignores any in-stream procedures.
- Copies the procedures and include code from the proper PROCLIBs.
- Parses and copies nested JCL procedures and include code up to seven levels.
- Substitutes the symbolic variables with proper values, taking into account the jobdeck overrides, JCL procedure default values, and the SET statements.
- Marks each line containing symbolic variables with XX and follows it with the same line after the substitution.

- Compares the resulting version of Equivalent JCL.
- Merges the versions and displays them for browsing.

You can use all of the primary and line commands to browse and edit the merged versions (see [Chapter 12, "Using the Version Browser" on page 93](#) and [Chapter 13, "Using the Version Editor" on page 97](#)). If you edit the merged version, your changes will be saved in the WIS file across your M+R sessions. However, you could not export the Equivalent JCL. If you want to do some real reconciliation of JCL code, split the screen and use the Library Consolidation tool.

Batch Job (Option 4)

On the *Equivalent JCL Comparison* menu, select option **4** (BATCH) to invoke the *Batch Execution* panel in order to generate and submit a batch job to compare and merge JCL version library members. The *Batch Execution* panel, shown below, appears.

```

SERABBAT ----- BATCH EXECUTION -----
Command ==>>

Enter "/" to select options

    Execute Options
    _ Execute all members
    / Skip Executed members
    _ Skip executed but Equal members
    _ Do not execute Single members
    _ Produce Merge Report for Executed members

Job Statements
====> //USER83F JOB (X170,374),           <=== CHANGE ACCORDINGLY_____
====> // MSGCLASS=9,NOTIFY=USER83,TIME=1  <=== CHANGE ACCORDINGLY_____
====> /*JOBPARM S=ESA5                    <=== CHANGE ACCORDINGLY_____
====> /**

```

For details about the Execute Options, see [Chapter 11, "Executing and Exporting in Batch" on page 85](#).

Chapter 10

Managing M+R Projects

You can create your own individual or team-oriented consolidation projects. Each M+R project has a name, short description, and owner (the TSO user ID of the creator of the project). Also, each M+R project captures unique profile option settings, working data sets (WIS, export, print), and versions data sets.

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Invoking the Projects Panel

From the *Library Consolidation* menu or the *Source/Copy Libraries Synchronization* menu, select option **5 (PROJECT)**. The *Projects* panel, shown below, appears.

```

CDFPANEL-----PROJECTS ----- ROW 1 TO 8 OF 8
COMMAND  ==>
PROJECT  TYPE OWNER   PROJECT DESCRIPTION / TASK ASSIGNMENT
_ TESTEAM3 team USER37 COBOL Copybooks
_ TESTEAM3 team USER02 PL/I Source - 3 team members
_ TESTEAM5 team USER37 COBOL Source
_ NEWTEAM1 team USER15 Big Y2K project
_ TEAMWORK team USER37 Team-oriented project for M+R 6.1.0 Beta
_ CROUPTEM team USER12 Groupware project for CMN 6.1.7 Beta
_ NEWPROJ      USER37 Upgrade to next release
_ WISPDS2      USER37 Using wispds2 as work-in-suspense
***** BOTTOM OF DATA *****

```

You are presented with a *list of projects* relevant to you. This list will include all your individual and team-oriented projects as well as all team-oriented projects in which you participate.

As shown in the panel above, the M+R user USER37 owns three team-oriented projects (TESTEAM3, TESTEAM5, and TEAMWORK), and two individual projects (NEWPROJ and WISPDS2). Also, user USER37 participates in three team-oriented projects (TESTEAM3, NEWTEAM1, and CROUPTEM).

Individual Projects

You can create, update, load, delete, and purge an individual project.

To create a project, at the command line, type **create** and the new project name. For example, to create a new project named `project1`, type **create project1**. The *New Project* panel, shown below, appears.

```

SERCRPRJ ----- NEW PROJECT -----
Project Name      ==> PROJECT1 (Up to 8 chars Name of the project as entered)
Team Project      ==> NO_____ (Yes or No this is a Team project)
Project Owner     ==> USER83  (Your TSO Logon ID)
Project
Description       ==> _____ (Up to 44 chars Description of this project)
Complexity Limit ==> 50_____ (Threshold for the ratio of number of Conflicts
                               to the Total number of changed Base code lines
                               above which the Complexity is considered High )

```

The Complexity Limit has no particular significance for individual projects and is explained in the team-oriented project section.

When you create a project, an entry is made in your *M+R project data set*: a sequential fixed length record data set which M+R auto-allocates for you with DSNAME formatted as

"HLQ.CDF.userID", where HLQ is the High Level Qualifier(s) specified during the M+R installation. When you delete a project, the entry is removed. However, if you purge a project, the WIS and PRINT data sets associated with that project also are deleted.

Project Create and Update Workflow

After the *New Project* panel, M+R displays a sequence of panels for setting project profile options and data sets, and specifying the version data sets. This panel workflow is predetermined so that when you execute **END** or **CAN**cel at a panel, the next panel displays until you create a new project or update an old project.

The **END** command accepts your input on the panel, and **CAN**cel restores the previous entries. If you want to change some of the settings, issue the **UPDATE** command.

Team-Oriented Projects

You can create a team-oriented project in the same way you create an individual project. Set the Team Project option to YES. You can update, load, delete, and purge a team-oriented project if you are its owner. Otherwise, you can only select it to load the reconciliation task assigned to you by the team leader—that is, the owner of that project.

The *Complexity Limit* setting is important when a big M+R project will be divided between team members by the Degree of Complexity determined by M+R for each version set. The Complexity Limit is used to separate Middle and High Complexity version sets that will be assigned to programmers with corresponding qualifications. In short, the Complexity Limit allows you to determine how many conflicting changes in the versions will render a high degree of reconciliation complexity.

Low complexity (1 to 3) indicates no conflicts. The changes in the derivatives do not overlap or, if overlap, all the changes are the same.

To distinguish between Middle (4 to 6) and High (7 to 10) complexity, a threshold must be set. It is the ratio of the number of conflicts to the total number of changed lines of the base version. The default is 50 percent. If that ratio is below the threshold, the complexity is Middle; otherwise, it is High.

However, if there are conflicts involving more than two versions, the complexity is considered High, even when the ratio is below the threshold.

When you create a project, an entry is made in a *shared M+R project data set*: a sequential fixed length record data set which is allocated as a part of the M+R installation

procedure. If this data set is not available, you will be presented with the following panel that explains how to remedy the situation.

```
SEROJECT----- M+R PROJECTS REPOSITORY -----
Command ==>
```

This panel displays only because the Merge+Reconcile installation has not been completed successfully.

Press ENTER and ask your System Programmer to edit this SEROJECT panel. You won't be able to use the project management facility - Option 5 PROJECT and Option W Walk through M+R of the Primary Menu.

A SEQUENTIAL data set needs to be allocated with Record format FB, Record length 80, Block size 6000, 1st extent 20 blocks, Secondary blocks 400.

All M+R users should have read/write access to this data set that will contain information about the profiles of all team-oriented M+R Projects. The fully qualified name of this data set needs to be set in the)INIT section of this panel, as well as the fully qualified name of the M+R Samples data set.

```
M+R Projects DSNAME ==>
```

```
M+R Samples DSNAME ==>
```

Each M+R project needs two profile data sets: one as an intermediate storage ("Work In Suspense" or WIS) and one for writing different M+R reports. The preferred Unit Name and High Level Qualifiers for their allocation need to be set in the)INIT section. Defaults are SYSDA and User logon ID, respectively.

```
WIS / Print Unit Name ==>
```

```
High Level Qualifiers ==>
```

Project Task Assignment

The purpose of creating team-oriented projects is the ability to *assign blocks of version members* to other user's user IDs. A big reconciliation can be divided on the following *selectors*:

- Member name patterns.
- Member name ranges.
- Member name masks.
- Degree of Complexity.
- Source code language.
- Specified members.

When a team member selects a project, all the profile options and working data sets are automatically set and the *Consolidation Workplace* panel lists only the relevant to him or her members.

When the team leader (project owner) selects a project, their *Consolidation Workplace* lists all the members and their status, including their current Degree of Complexity, which indicates the progress of the reconciliation work for each member.

Project Management

In front of a **project** listed on the *Projects* panel, you can enter one of the following line commands:

- **S** for SELECT: to load this project settings of profile options, working data sets, and version libraries. If you are not the owner of the selected project, your task (assignment) will also be set so that your *Consolidation Workplace* will display only those member versions that are relevant to you. The selected project becomes the current active project.
- **F** for FULL: to display in full detail this team-oriented project—that is, to display all of the assignments to all the team members. You must be the owner of this project to get such information. The individual assignments are marked 'task' in the TYPE column. The team member TSO Logon ID and task appear in the TASK ASSIGNMENT column.
- **U** for UPDATE: to update this project's settings. If you have chosen a team-oriented project, you can update an assignment or add new tasks. To update a selected project, it must be active.
- **D** for DELETE: to delete this project.
- **P** for PURGE: to delete this project and the associated WIS file and print data sets.
- In front of a listed **task**, you can enter one of the following line commands.
- **S** for SELECT: to load this task (assignment) and establish the profile options, working data sets, and version libraries of the project containing the task. The project becomes the current active project.
- **U** for UPDATE: to update this task or add new tasks. If an assignment is based on the selector "Specific Members," you can add new library members to it (use Delete to delete up to three library members on a task line). For all other selector types (complexity, language, pattern, range, masks), you can replace a previous task assigned to a specific user ID with a new assignment provided you do not change this user ID. If you enter a new user ID, a new task assignment will be added. To update a selected project, it must belong to an active project.
- **D** for DELETE: to delete this task. If an assignment is based on the selector "Specific Members", you can delete the selected task line containing up to three library members without affecting other such lines (if any).
- **P** for PURGE: to delete this task. If an assignment is based on the selector "Specific Members", the entire task (member list) is deleted.

The following panel is an example of a *M+R Projects* panel, when a user issues the **Full** command. The owner's user ID is USER15 who has just executed the **Full** command on

the NEWTEAM1 team-oriented project line. Several team members are shown with their task assignments.

```

CDFPANEL ----- PROJECTS ----- ROW 4 TO 23 OF 26
COMMAND ==> SCROLL ==> CSR
PROJECT TYPE OWNER PROJECT DESCRIPTION / TASK ASSIGNMENT
_ NEWTEAM1 team USER15 Big Y2K project
_ NEWTEAM1 task USER15 USER00 CMLX HIGH
_ NEWTEAM1 task USER15 USER01 CMLX MIDDLE
_ NEWTEAM1 task USER15 USER02 CMLX LOW
_ NEWTEAM1 task USER15 USER04 LANG COBOL
_ NEWTEAM1 task USER15 USER05 PATT ABC*
_ NEWTEAM1 task USER15 USER06 RANGE AAA RRR
_ NEWTEAM1 task USER15 USER07 MEMBR B1 B2 B3
_ NEWTEAM1 task USER15 USER07 MEMBR B4
_ NEWTEAM1 task USER15 USER07 MEMBR BA BB BC
_ NEWTEAM1 task USER15 USER07 MEMBR BD BE BF
_ NEWTEAM1 task USER15 USER07 MEMBR B0
_ NEWTEAM1 task USER15 USER07 MEMBR BA BB BC
_ NEWTEAM1 task USER15 USER07 MEMBR BD BE BF
_ NEWTEAM1 task USER15 USER07 MEMBR B0
_ NEWTEAM1 task USER15 USER07 MEMBR Z0 Z1 Z2
_ NEWTEAM1 task USER15 USER07 MEMBR Z3 Z4
_ NEWTEAM1 task USER15 USER99 CMLX HIGH
_ TEAMWORK team USER37 Team-oriented project for CDF M+R 6.1.0 Beta
_ CROUPTEM team USER12 Groupware project for CMN 6.1.7 Beta

```

Task Assignment

You can distribute the reconciliation efforts of a M+R project among the team members by assigning different tasks to their TSO user IDs.

When you create a new team-oriented project or update an existing one, the *Project Assignments* panel appears.

```

SERASIGN----- PROJECT ASSIGNMENTS -----
Command ==>

Assign to ID      ==> (TSO User ID of CDF Project team member)
Degree of Complexity ==> (Complexity: High, Middle, Low, None)
OR
Source Code Language ==> (COBOL,PLI,BAL,JCL,FORTRAN,C,NATURAL,RPG)
OR
Member Name Pattern ==> (Library member name pattern)
OR
Member Name Range  ==> (Library member name range - First member)
                   ==> (Last member)
OR
Specific Members   ==> (Specific member) or (Base Members Mask)
OR
Member Name Masks  ==> (Specific member) or (1st Derivative Mask)
                   ==> (Specific member) or (2nd Derivative Mask)
                   ==> (Specific member) or (3rd Derivative Mask)
                   ==> (Specific member) or (4th Derivative Mask)
                   ==> (Specific member) or (5th Derivative Mask)
                   ==> (Specific member) or (6th Derivative Mask)
                   ==> (Specific member) or (7th Derivative Mask)
                   ==> (Specific member)

Press ENTER to register and stay; END to register and exit; CANCEL to exit.

```

You can choose to split the work on the basis of one of the following *selectors*:

Field	Explanation
DEGREE OF COMPLEXITY	High, Middle, Low, and None
Source Code Language	BAL, C, CLIST, COBOL, FORTRAN, JCL, NATURAL, PANEL, PASCAL, PLI, REPORT, REXX, RPG, SCRIPT
Member Name Pattern	Like ABC*
Member Name Range	Like SCNBAL SCNREXX
Member Name Masks	For each of the version libraries, like *1, *2, *3
Specific Members	Up to nine specific members may be entered at once, then new set of up to nine members, etc.

Mixing the selectors when assigning tasks leads to having different team members share some components that will appear on their *Consolidation Workplace* panels, respectively interfering with each other's work. The *Projects* panel on [page 82](#) shows an example of such bad practice. Consider the task of the team member USER06—a range from AAA to RRR, and the task of USER07—a list of components some of which (e.g., BA through BF) are within the component name range assigned to USER06. Both of them might work on the same component, save it in the same WIS, export it to the same data set.

M+R prevents you from accidentally assigning two tasks to the same user IDs (team member) *in a row*. As a result, if you assign a task, High Complexity for example, to a team member, and immediately, decide to change it to Middle Complexity, M+R will signal out a duplicate assignment. However, M+R does not exercise total control on the assignments.

For example, you can assign several tasks to a team member by mixing them with assignments to other team members. M+R will ignore the second and subsequent assignments when that team member **Selects** the project. You, as an owner of that project, will have all these assignment displayed in response to the **Full** line command. In order to activate the second task, you have to **Delete** the first assignment.

The *Project Assignments* panel allows you to enter task assignments, provided they are not duplicate as explained above. When you finish with your series of assignments, press END to return to the *Library Consolidation* menu or *Source/Copy Libraries Synchronization* menu. If you type "CANCEL" on the command line, previously entered assignments will not be saved. To avoid this situation, blank out all assignment fields on the panel and press END.

Chapter 11

Executing and Exporting in Batch

When you have to consolidate two or more (up to eight) version libraries, the following resource-intensive tasks can be performed in the batch mode.

- Comparing same-named members.
- Merging the results and saving them in WIS files.
- Exporting certain members.

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Invoking the Batch Execution Panel

From the *Library Consolidation*, *Source/Copy Synchronization*, or *Equivalent JCL Comparison* menus, select option **4** (BATCH JOB) to display the *Batch Execution* panel. The *Batch Execution* panel, shown below, appears.

```

SERBATCH ----- BATCH EXECUTION -----
Enter "/" to select options
  _ Status Report for all members - no Execute/Export actions

Execute Options                                Export Options
  _ Skip all members                            _ Export members with equal
  _ Execute all members                        _ last modification timestamp
  _ Skip executed and Exported members        _ Export Reconciled members with
  _ Skip executed and Reconciled members     _ Degree of Complexity None
  / Skip Executed members                    _ Export executed Equal members
  _ Skip executed but Equal members          _ Export Single members
  _ Do not execute Single members            _ Export just Executed members
  _ Produce Merge Report for Executed members

Job Statements
====> //USER83F JOB (X170,374),                <=== CHANGE ACCORDINGLY_____
====> // MSGCLASS=9,NOTIFY=USER83,TIME=1      <=== CHANGE ACCORDINGLY_____
====> /*JOBPARM S=ESA5                        <=== CHANGE ACCORDINGLY_____

Press ENTER to submit; Enter END Command to terminate JOB submission.

```

You can choose any number of Execution and/or Export options, as well as opt for producing a Reconciliation Status reports only.

Execute Options

With any of the Execute options, you can request that a detailed **MERGE** Report is produced for each member to show the differences between the versions. Each block of changes is surrounded by two blocks of common code lines in a fade-in/fade-out fashion. The **MERGE** report is written to your PRINT data set specified on the *Profile Data Sets* panel.

You can filter the version members you want to be compared and merged by entering a forward slash (/) symbol on the option fields.

- The first option, *Skip all members*, is used to report on the current status of the consolidation. It only produces detailed and summary reports. The report formats are explained below. Another way to produce only a Status Report is to select that option only which is above the Execute and Export options.
- The second option, *Execute all members*, is self-explanatory. Note, though, that previous executions and your reconciliations of the same libraries will be lost. To prevent such a loss, you can select a combination of the remaining 5 options:
 - The *Skip executed and Exported members* option keeps the exported version members intact (that is, those that you consider completed).
 - The *Skip executed and Reconciled members* option keeps the reconciled version members intact (including those already exported).

- The *Skip Executed members* option is useful when you have started the consolidation of several members online and then decided to execute the rest in batch mode.
- The *Skip executed but Equal members* option speeds up the re-execution by ignoring members that are the same in all version libraries. A re-execution may be required because of changes in the comparison parameters—like TEXT Type and/or Comparison resolution.
- The *Do not execute Single members* option speeds up the execution by ignoring the members that reside in only one version library (i.e., there are no other versions of them). The downside of this option is that you have to manually copy them from the corresponding version libraries to the export library, if you do not select also the Export Single members option.

Export Options

You can *filter* the members you want to be exported in batch by entering a forward slash (/) symbol on the option fields.

- The first option, *Export members with equal last modification timestamp*, saves a lot of time for comparing and merging essentially equal versions; you can export them in batch while other members are executed.
- The second option, *Export Reconciled members with Degree of Complexity None*, allows you to export in batch those member versions that have been completely reconciled; that is, all the conflicts have been resolved and single changes validated.
- The third option, *Export executed Equal members*, combines the execution of member versions with their export should they be found to be equal.
- The fourth option, *Export Single members*, also saves resources by bypassing the execution and directly exporting the members found in only one of the version libraries. Choosing this option automatically selects the corresponding *Do not execute Single members* execution option.
- The fifth option, *Export just Executed members*, works with the profile export option "Export with Conflicts." If this option is set to YES, then every executed member in the batch job run will be exported regardless of whether or not there are unresolved conflicts. If this option is set to NO, only just executed members with zero or low Complexity of Reconciliation will be exported, that is, members without conflicts.

Job Statements

You have to tailor the default job statements provided by M+R to comply with the requirements in your shop. You need to do this once only.

Should the batch jobabend due to space problems, increase the REGION value.

By default, M+R requires that the TIME parameter is included in the batch execution jobdeck. To disable this requirement, M+R has to be installed with &CDFTIME set to NO in the)INIT section of the *SEROJECT* panel.

STEPLIB

You have to let M+R know the fully qualified name of its load library so that the STEPLIB statement is properly set in the generated JCL.

M+R expects to find its load library name from a specific DDNAME, depending on the way M+R is installed in your site:

- CDFLLIB DD for M+R as a stand alone product.
- CMNLLIB DD for M+R as an option of ChangeMan ZMF.
- CPXLLIB DD for M+R as an option of Comparex.

In case such a DDNAME is not defined but your ISPF is 4.1 or higher, M+R will call the QLIBDEF service to find the current LINKLISTed load libraries list and use it in the STEPLIB statement.

If your ISPF is 3.x or earlier, M+R will try to find the load libraries list of the ISPLLIB DDNAME for the task and use it in the STEPLIB statement.

If the above fails, M+R writes the formatted JCL in your WIS library as a @@CDFJOB member and informs you that you can submit the job after filling in the load library name in STEPLIB statement.

Batch Execution Report

The Batch Execution Report is written to CDFPRINT DDNAME of the job, and the compared and merged versions are saved in the WIS DSNAME defined in your profile at the time of the batch job submission.

Thus, if you want to use M+R while the batch job is running, you have to update your profile providing a different WIS data set.

Also, if you intend to print snapshots or analysis and have requested a **MERGE** Report, you should provide a new print file.

The Batch Execution Report contains four parts:

- User Request.
- Member Sets Execution Messages.
- Version Impact Analysis.
- Batch Execution Summary.

Each report part is illustrated and explained below.

User Request

The Batch Execution Report starts with the **Job Name** and the **TSO Logon ID** of the user who has submitted the job.

The **Comparison Options** in effect during the batch *compare and merge* include

- Language (TEXT Type) and the *ignore cosmetic differences* option.

- Comparison Resolution: low, default, high, or super high.
- The AutoOverride option.

The **Execution Options** refer to the user's choices about

- Which member to execute: all or those whose names match a pattern, masks or member name range.
- Which members to export.

The User Request portion of the Batch report is shown below.

```

Merge+Reconcile (MVS-6.1.0)
2010/10/17          M+R  BATCH CONSOLIDATION REPORT

START 13:57:07          JOB NAME USER83  USER ID CUSER83

COMPARISON OPTIONS:    TEXT TYPE AUTO DETERMINED IGNORE BLANKS
                       RESOLUTION HIGH
                       SINGLE CHANGES DO NOT OVERRIDE BASE RECORDS

EXECUTION OPTIONS:     ALL MEMBERS
                       SKIP EXECUTED

WIS DSNAME somnode.CDF.WISPD5
EXPORT DSN somnode.CDF.EXPPDS
BASE DSN somnode.CDF.VANILLA
DERV #1 somnode.CDF.VERSONE
DERV #2 somnode.CDF.VERSTWO
DERV #3 somnode.CDF.VERS3EE

```

- **WIS DSNAME** refers to the WIS PDS where the executed member sets will be saved for access through M+R online sessions. This library already may have some members executed online or by a previous job. If the Execution option is *SKIP EXECUTED*, as in the example above, those members will not be re-executed in this run.
- **EXPORT DSN** is the export PDS which already may have some members exported. If the Execution option is *SKIP EXPORTED*, those members will not be re-executed in this run.
- **BASE DSN** and **DERV #n** specify the version libraries which will be compared and merged in this run.

Execution Messages

This is a log of all completion and exception messages generated during the execution of each same-name member set. For more details about the messages, see [Appendix A, "Messages and Codes" on page 139](#).

```

MEMBER SET EXECUTION MESSAGES

<14:18:29> SER036I - "Work In Suspense" saved for future session: $TEST
<14:18:29> SER036I - "Work In Suspense" saved for future session: ABC
<14:18:29> SER036I - "Work In Suspense" saved for future session: ASMBLBAS
<14:18:30> SER036I - "Work In Suspense" saved for future session: CMNZAPR
<14:18:31> SER036I - "Work In Suspense" saved for future session: COBOLBAS
<14:18:31> SER046A - Member does not contain any records EMPTY CDFUSER.CDF.VANILLA

```

Version Impact Analysis

This report is formatted as the *Consolidation Workplace* panel.

At the end of this report, a *Legend of the Header Abbreviations and Version Difference Symbols* is provided to assist you in reviewing the *Version Impact Analysis*. For each same-name member set, you can easily determine which versions are different and which are equal to the base code, as well as how difficult it would be to reconcile the versions. Let's analyze, member by member, the following panel:

VERSION IMPACT ANALYSIS							
DIFFERENCE	BASE MEMBER	ACTION	COMPL	DERV #1	DERV #2	DERV #3	LANGUAGE
@===	\$TEST	=Execute	None	\$TEST	\$TEST	\$TEST	PL1
.\$.		*Execute	Low	ABC	ABC		JCL
@\$\$\$	ASMBLBAS	*Execute	High	ASMBLBAS	ASMBLBAS	ASMBLBAS	BAL
@==.	CMNZAPR	=Execute	None	CMNZAPR	CMNZAPR		COBOL
@\$\$=	COBOLBAS	*Execute	Mid	COBOLBAS	COBOLBAS	COBOLBAS	COBOL

LEGEND - Header Abbreviations and Versions Symbols

DIFFERENCE - graphical summary of versions differences

- "@" - denotes the version used as a Base
- "." - denotes a missing version of a member
- "=" - denotes a version equal to the Base version
- "\$" - denotes a version different from the Base
- "b" - denotes a banner appended to consolidated version
- " " - denotes a missing versions library

ACTION - last action against the set of member versions

- *Execute - versions have been compared and merged
- *Reconcl - versions have been reconciled: Work In Suspense
- **Export - versions have been consolidated and exported
- "=" instead of "*" denotes equal versions

- **Member \$TEST** - From the Difference Impact summary @=== and the Degree of Complexity **COMPL = None**, all versions are present and equal. M+R has determined that the language is PL/I.
- **Member ABC** - From the Difference Impact summary .\$\$. and the Degree of Complexity **COMPL = Low**, there are two versions of that member in the first and second derivative, and they differ slightly (low complexity). Note that the first derivative version assumes the role of a base because there is no member ABC in the base library. It is JCL.
- **Member ASMBLBAS** - From the Difference Impact summary @\$\$\$ and the Degree of Complexity **COMPL = High**, all versions are present and significantly different (high complexity). They are written in IBM Assembler (BAL).
- **Member CMNZAPR** - From the Difference Impact summary @==. and the Degree of Complexity **COMPL = None**, there is no version of that member in the third derivative library and no difference between the present COBOL programs.
- **Member COBOLBAS** - From the Difference Impact summary @\$\$= and the Degree of Complexity **COMPL = Mid**, all versions are present, the base and the third derivative versions are equal, and there are some differences between the COBOL base and the first and second derivatives so that their reconciliation will be of medium complexity.

Batch Execution Summary

The last part of the Batch Execution Report provides a summary, shown below, of the *Version Impact Analysis* performed by this run. The summary contains rich information about the differences between the member versions in the base and derivatives libraries and the complexity of their reconciliation.

M+R BATCH EXECUTION SUMMARY					
	R E C O N C I L I A T I O N				NUMBER OF SETS
	-----ZERO	-----LOW	---MEDIUM	-----HIGH	
EXECUTED	2	1	1	1	5
RECONCILED	0	0	0	0	0
EXPORTED	0	0	0	0	0
NOT EXECUTED					1
STOP 14:18:35	COND CODE	4			

The sets of member versions are divided according to their degree of reconciliation complexity (**None, Low, Medium, or High**) and their current reconciliation status (**Executed, Reconciled, Exported, or Not Executed**).

In the preceding panel, 5 member sets have been compared and merged, of which 2 have zero complexity (that is, all versions are equal) and the rest have some Degree of Complexity. All 5 member sets have been *executed* during this run—see the 5 SER036I message lines in the **"Member Sets Execution Messages."** If there are executed member sets in the WIS library prior to this run, their status is included in the summary.

If there are *reconciled/exported* member sets in the WIS/export libraries prior to this run, their status is reported on the second and third line of the summary.



NOTE A Reconciled member set is one that already has been edited by the user but is not exported yet.

The not executed member set is the one that has an empty member—see the message SER046A line in the **"Member Sets Execution Messages."**

The Batch Execution job returns the following condition codes.

- **0** - successful completion
- **4** - member I/O error - e.g., an empty member
- **8** - data set I/O error (versions or WIS library)
- **16** - severe error

Chapter 12

Using the Version Browser

The central task in consolidating a base file and all its derivatives is reconciling two types of changes:

- *Single change* - A single change is when a base record is changed in only one derivative, or it is changed in all derivatives in the same way.
- *Conflict* - A conflict is when a base record is changed in different ways in more than one derivative, putting the derivative changes and the base record in conflict.

You reconcile by analyzing and editing the differences between the base and derivative(s) in the Version Browser. To ease your work, the M+R Version Browser generates various views of the changes.

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Viewing Changes in Context

A successful reconciliation of both conflicting and single changes depends on your ability to move rapidly from one view of the change to another. This functionality enables you to investigate any combination of derivatives—from conflicts to single changes to remaining records. For this purpose, M+R supports simple query commands to extract the different views. Each view provides a different context for consolidation so that you can choose the context that best helps you perform your task.

Viewing a particular derivative in M+R reveals the changes it has made to the base; that is, you observe those changes *in context*. With the M+R context-sensitive Version Browser, you browse the text of a derivative together with those base records that it has changed or deleted. In other words, you browse a derivative in the context of its changes to the base version. All other derivatives are *excluded* from this type of view, but you can selectively *include* them with primary and line commands.

Browser Primary Commands and Arguments

The M+R Version Browser provides you with three primary commands that are entered on the Command line of the panel:

- VIEW or V
- EXCLUDE or X
- RESET or R

You type one of six arguments with each primary command to create fifteen unique views for version browsing and editing.

This table shows describes the six arguments for version browser primary commands.



NOTE There are two short forms for each argument:

- First two letters
- Symbol

Argument	Specifics
ALL *	Every base, derivative, and user inserted record, including those deleted by you. ALL can be represented by an asterisk (*).
CONflict \$	Base and derivative record sets that are in conflict; a user must decide how to resolve the differences through editing. CONFLICT can also be represented by a dollar (\$) sign (outside U.S.A. and Canada it is the national currency symbol).
REmaining #	Base and derivative record sets that have not been deleted during conflict resolution, as well as base records that have not been overridden by changes made by only one derivative. REMAINING can also be represented by the pound (#) sign.
BAse @	Records of the base file. BASE can also be represented by the "at" (@) sign.

Argument	Specifics
letter	Derivative records from the specified ID, a single alphabetic character "A" to "Z".
USer +	Changes that you have made so far.

This table describes the view or context that results from each version browser primary command when it is combined with each of the six arguments.

COMMAND	Argument	Function	Examples
VIEW V	ALI(V *)	Displays all records, including deleted base/derivative records.	VIEW ALL, V *
	BAsE (V @)	Displays all base records that are not deleted.	v base, v @
	letter (V letter)	Displays derivative records only; displays all non-deleted records of a derivative with that ID; note that the next View command(s) will add the changes made by the second and following derivative(s) to those already displayed.	v A
	USer (V +)	Displays user changes only.	v +
	COnflicts (V \$)	Displays base/derivative records in conflict; that is, the base records changed by more than one derivative and the changes.	v confl, v \$
	REmaining (V #)	Displays the consolidated version (the remaining code that has not been deleted and base records that have not been overridden).	V remain, V #

COMMAND	Argument	Function	Examples
EXCLUDE X	ALI(X *)	eXclude from view all records; excludes everything so that you can use the RESET command to view either the base or one or more derivatives.	EXCL ALL X *
	BAsE(X @)	eXclude base records only.	x base, x @
	letter (X id)	eXclude derivative records only.	x A
	USer(X +)	eXclude user changes only.	x +
	COnclicts(X \$)	Display base records changed by one derivative only; excludes the conflicts and displays base records changed by one derivative only and those changes. Note that such base records will be overridden by their single changes in the consolidated version if AUTOOVERRIDE=YES in the user profile.	X co, X \$
	Remaining (X #)	Display all deleted and overridden records; excludes the remaining code and displays the deleted base/derivative records and the overridden base records so that you can check whether or not it is acceptable to drop that code from the consolidated version.	X re, X #
RESET R	ALI(R *)	Equivalent to "VIEW ALL".	RES ALL, R *
	BAsE(R @)	Restore previously eXcluded base records.	res base, r @
	letter (R letter)	Restore previously eXcluded derivative records.	r A
	USer (R +)	Restore previously eXcluded user changes.	r +
	COnclicts(R \$)	Equivalent to "VIEW CONFLICT".	r confl, r \$
	REmaining(R #)	Equivalent to "VIEW REMAINING".	R remain, R #

The **R**eset and **eX**clude commands mirror each other because you can reset whatever you have excluded from a context, and you can exclude whatever you have included (i.e., reset), within a context.

By default, a context starts from the statistics record (with zero sequence number). The command *Begin nnnnnn* sets the start of the context to the base record with a relative sequence number of *nnnnnn*. When there are no changes of interest before that base record, cutting off the beginning of a context can speed up and simplify the display.

Chapter 13

Using the Version Editor

After establishing a context using the M+R Version Browser primary commands, you can start editing with the M+R Version Editor using primary and edit line commands that are similar to ISPF/PDF Edit commands.

The M+R Version Editor supports most of the familiar ISPF/PDF Edit commands and provides additional ones capable of executing across contexts. This chapter describes the primary and edit line commands to edit merged versions and code lines.

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Primary Edit Commands

M+R includes an assortment of primary commands to help you edit the versions during reconciliation.

Overview

You can use the primary edit commands to do the following tasks:

- **LOCATE** a base record by its relative line number within the current context, or locate the next base record if many inserts exist (instead of paging).
- **FIND** a string within the current context (or within all undeleted records when issued with the argument ALL). **FIND** is case sensitive when the string is enclosed with a pair of quotation marks or apostrophes. The position of the searched string can be specified.
- **CHANGE** a string to another string within the current context (or within all undeleted records when issued with the argument ALL). **CHANGE** is case sensitive when the searched string is enclosed with a pair of quotation marks or apostrophes. The position of the searched string can be specified.
- **CUT** and **PASTE**: **CUT** a record block, delimited by a **C**opy or **M**ove command, from one context, and **PASTE** that block **A**fter or **B**efore a particular record within the same or different context.
- **EXPORT** a record block, delimited by **C**opy or **M**ove command, as a copybook into the designated export data set.
- **RESET** (without argument) a line command conflict or a pending block command.
- **END** the current reconciliation session and save its results.
- **CANCEL** the current reconciliation session without saving its results.
- **SAVE** the intermediate results of the current reconciliation, and continue to reconcile.

Edit Within and Across Contexts

Whereas ISPF/PDF or workstation editors restricts you to a single file, M+R enables you to edit multiple merged files, simultaneously and on the same panel. This is important because you must use more than one file (up to 8 versions) during the reconciliation effort.

M+R supports a simple query language to extract different views of the merged versions. Each view provides a different context for consolidation. Editing in context is important for your reconciliation effort because it provides the following benefits:

- Mirrors the current practice of comparing the base with each of the derivatives. The resultant listings are an ideal context for analysis, and for editing changes during the reconciliation.
- Helps you determine the change type (add-on or structural, conflicting or complementary), so that you can better plan your reconciliation strategy.
- Helps you choose the best structure for the final consolidation version. The structure might be derivative- or base-centered, or something new, as dictated by the amount and sources of the changes (single or conflict).

- Simplifies the editing process, especially when you plan to move or copy a block of changes highlighted in one context to another context.

Context generation is a one-command operation, and each command has one parameter.

You can use the **CUT** and **PASTE** commands in tandem to move or copy records across contexts. For example, to resolve a conflict, you might need to move a block of records after a specific record of derivative Z. You would start the operation from the View Conflicts context with block **MOVE** and **CUT** commands, switch to View Z, then complete the operation with the **FIND** and **PASTE** commands.

M+R enables you to reconcile version records with lengths up to **240** bytes.

Although consolidating base and derivatives records is the primary application of M+R Version Editor, you can also use its selective cross-session undo features to edit a **single** file.

Primary Command Summary

The following table illustrates the format, function, and examples of primary commands.

COMMAND	Argument	Function	Examples
BEGIN B	nnnnnn	Reorients the top of the display to a specific line; the specified line number is displayed at the top of the data. The BEGIN command can also "shorten" a specific context so that it starts from the relative line number (supplied as an argument) of a base record.	BEGIN 15 Begin 99 b 37
CANCEL CAN		Cancels the current reconciliation session. When the Auto-Save profile option is set to "YES", the results are <i>not</i> saved in the WIS file.	CANCEL can
CHANGE C	string_1 string_2	Change string_1 to string_2 only in records within the current context—optionally, at a specified position for string_1. Repeated change, (R)CHANGE, can be executed by alternatively using [PF5/17] and [PF6/18] function keys. (Quotation (") marks or apostrophes (') can be used for a string containing blanks, or respectively, apostrophe(s) or quotation mark(s); or to signify case sensitivity for string_1.)	c x y c ""p"" `q r' c `i"" `j k" c 12 app acc

COMMAND	Argument	Function	Examples
CHANGE C	ALL string_1 string_2	Change string_1 to string_2 in all undeleted base/derivative/user Inserted records—optionally, at a specified position for string_1. (Quotation (") marks or apostrophes (') can be used for a string containing blanks, or respectively, apostrophe(s) or quotation mark(s); or to signify case sensitivity for string_1.)	c all x y 22 c x y all c all ""p"" `q r' c ""i"" `j k" all
CUT		Extract a block of records, as defined by Copy or Move line command, to paste it to another place or context.	CUT cut
END PF03/PF15 PF04/PF16 =n		Use for a normal termination of the current reconciliation session. When the Auto-Save profile option is set to "YES", the results are saved in the WIS file.	END PF03/PF15 PF04/PF16
EXPORT EXP	copybook name	Extract a block of records, as defined by Copy or Move line command, and write it as a copybook into the designated export data set.	EXP cpyone export mycopy
FIND F	string_1	Find string_1 only in records within the current context—optionally, at a specified position for string_1. Repeated find, (R)FIND, can be executed with the [PF5/ 17] function key. (Quotation (") marks or apostrophes (') can be used for a string containing blanks, or respectively, apostrophe(s) or quotation mark(s); or to signify case sensitivity for string_1.)	f x f `q r" f ""p"" f ""i"" f app 12
FIND F	ALL string_1	Find string_1 in all undeleted base/derivative/User Inserted records—optionally, at a specified position for string_1. (Quotation (") marks or apostrophes (') can be used for a string containing blanks, or respectively, apostrophe(s) or quotation mark(s); or to signify case sensitivity for string_1.)	f all x f `q r" all f all ""p"" f ""i"" all f 12 all app
LOCATE L	nnnnnn	Position to a particular base line number temporarily. Scrolling can proceed after this location has been set.	LOCATE 5 Locate 32 l 37
LOCATE L	-	Position to the next base record. Useful when numerous derivative records have been inserted after a particular base record.	LOCATE l

COMMAND	Argument	Function	Examples
PASTE PAS	-	Insert a block of records previously CUT from another place or context. The insertion point is determined by an After or Before line command.	PAS pas
RESET RES	-	Reset any command conflict, pending, error, and so forth.	RESET reset RES res
SAVE SAV	-	Save the current reconciliation effort and continue to reconcile. Subsequent CANcel command and then LOAD will restore the reconciliation as it was when the last SAVE command was issued.	SAVE sav

Edit Line Commands

M+R offers an assortment of line commands to help you edit the merged versions during reconciliation.

You can enter the line commands in the six character prefix area of each displayed code line. You can enter a line command and its argument at any place in the line command area just like an ISPF/PDF Edit.

The line command area is a number, when the line represents a base record; when the line represents a derivative record, M+R uses special symbols. The following is an example of line command area.

```

000015 LINE 15 OF CODE from Base
< 0016 LINE 16 OF CODE from Base replaced in derivative "A"
<>A__ Line of code from derivative "A" differs from Base line 16 above
> _B_ Line of code from derivative "B" considered added after Base line 16 above
< __H_ LINE 17 OF CODE from Base considered deleted in derivative "H"
<<0018 LINE 18 OF CODE from Base cut by the user
> __+ Line of code inserted by the user
><__+ LINE 19 OF CODE from Base overtyped by the user
>>__+ Line of code pasted by the user
/*0020 LINE 20 OF CODE from Base deleted by the user

    if "<>" derivative line differs from Base
    if "> " derivative line considered added as compared to Base
    if "< " Base line considered deleted/replaced compared to derivative

    if "><" base or derivative line overtyped by the user
    if "> " line inserted by the user
    if "/*" base or derivative line deleted by the user
    if "<<" base or derivative line cut by the user or derivative
    if ">>" base or derivative line pasted by the user or derivative

```

Line Command Format

The first character must be alphabetic, whereas the second character must be one of the following:

- Blank - defaults to "1".
- The same alphabetic character (block command).
- Numeric (up to 5 digits numeric argument).
- Asterisk - meaning "all".

Line Command Summary

The following table illustrates the format, function, and examples of line commands.

COMMAND	Function	Example
A	Destination command for the Copy/Move/Paste commands. The line(s) is copied or moved After the line with this destination command.	A a
B	Destination command for the Copy/Move/Paste commands. The line(s) is copied/moved Before the line with this destination command.	B b
C	Copy one or more lines before or after a line. "C" is followed by a blank or a numeric and requires either "A", "B" or a Cut command. "C" and "C1" are functionally the same.	C c82
CC	Copy block command requiring a paired "CC" and "A", "B", or the Cut command.	Cc cc
D	Delete one or more lines. "D" is followed by a blank or a numeric. "D" and "D1" are functionally the same.	D d83
DD	Delete block command requiring a paired "DD".	Dd dd
F	Show First one or more lines that have been eXcluded or Deleted previously. "F" is followed by a blank, a single numeric, or an asterisk (*) for all. "F" and "F1" are functionally the same.	F f8y f* (show them all)
I	Insert one or more blank lines at this position. "I" is followed by a blank or a numeric. "I" and "I1" are functionally the same.	I i12
L	Show Last one or more lines that have been eXcluded or Deleted previously. "L" is followed by a blank or a numeric, or an asterisk (*) for all. "L" and "L1" are functionally the same.	L l12 l* (show them all)
M	Move one or more lines before or after a line. "M" is followed by a blank or a numeric and requires either "A", "B", or the Cut command. "M" and "M1" are functionally the same.	M m21
MM	Move block command requiring a paired "MM" and "A" or "B" or the Cut command.	Mm mm

COMMAND	Function	Example
R	Repeat one or more lines. "R" is followed by a blank or numeric. "R" and "R1" are functionally the same.	R r15
RR	Repeat block command requiring a paired "RR" command. Repeat a block of lines and "open" it for editing.	Rr rr
S	Show only moved around callable code, such as COBOL paragraphs. The base records are cut, while the derivative records are pasted.	
U	Undelete one or more lines at this position; allowed only on a deleted but displayed (that is, commented-out) line. "U" is followed by a blank, asterisk, or a numeric."U" and "U1" are functionally the same.	U u11
UU	Undelete block command requiring a paired UU; allowed only on a deleted but displayed (that is, commented-out) line.	Uu uu
X	eXclude one or more lines. "X" is followed by a blank or a numeric. "X" and "X1" are functionally the same.	X x123
XX	eXclude block command requiring a paired "XX".	Xx xx

Editing Considerations

The **Delete** command of M+R does not actually delete base and derivative records; instead, it flags them as deleted. This allows you to reverse any deletions if necessary. Deleted records are represented by a place holder—a "nnnnnn Lines DELETED" line on the display. The **First/Last** command on such a line includes those records in view (marked as *commented out* with (/*) or cut out with (<<)). You can restore the marked records into the remaining code with the **Undelete** command, while the **eXclude** or **Delete** commands fold them back into a place holder line.

The **Move** line command follows the **Delete** convention as it is a "composite" command: **Move** is equivalent to a **Copy** followed by a **Delete**.

When you overwrite a base or derivative code line, the same **Delete** convention is in force: Overwrite is equivalent to a **Repeat** followed by a **Delete**. However, if you overwrite a user-inserted, pasted, or overtyped record, the previous text is lost. M+R supports logical undeletion of the base and derivatives records, not of the user changes.

To reach a particular location in the code where a pending command will act, you can complement a pending block **Move/Copy** command with a **Find** or **Locate** command.

You can use the **Locate** command to find a specific base record or the next one. The latter is useful when many records have been inserted after a base record. By entering "**L**", you can avoid paging through the inserted records.

Repeated **Find** and **Change** are supported through [PF5/17] and [PF6/18], respectively.

Multiple line commands can be entered on one screen and executed simultaneously just like in ISPF/PDF Edit.

Chapter 14

Sample Sessions

The delivered ChangeMan ZMF libraries contains sample members for your use. For the benefit of other users, you should not change the samples; that is, you should not specify the samples library as your export library. You might want to copy the members ASMBL* and COBOL* from the distributed *somnode.CMNZMF.SAMPLES* library to your own custom samples library so that you can experiment with changes of your own.

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Complex Sample Session	115

Simple Sample Session

In this example, a base member called **COBOLBAS** has two derivatives called **COBOLDV1** and **COBOLDV2**.

Here are the tasks associated with this session:

- "Establishing Your Profile" on page 106.
- "Defining the Base and Derivatives to M+R" on page 106.
- "Running M+R" on page 108
- "Investigating the Changes" on page 112
- "Issuing Line Commands with M+R" on page 112
- "Exporting the Consolidated Version" on page 113
- "Verifying Your Work" on page 114

Establishing Your Profile

From the *Member Reconciliation* menu, select **0** (PROFILE), and then **1** (COMPARE OPTIONS). Ensure that TEXT Type is either a period (wildcard character) or COBOL. Press [PF3] END and select option **3** (EDITING). Set the Include Prefix option to YES. Press [PF3] END and select **5** (DATA SETS).

```

SERDSNML ----- PROFILE DATA SETS -----
WIS DSNAME      ==> CDFUSER.CDF.WIS_____
Print DSNAME    ==> CDFUSER.CDF.PRINT_____
Export DSNAME   ==> CDFUSER.CDF.EXPORT_____
Export DSORG    ==> PDS_____ (PDS, SEQ, PAN, LIB, or blank)
Export Member Mask ==> _____ (Mask to rename Base members on export)
LIB Module Name ==> LIBR_____ (LIBrarian update module name: LIBR, LIBRARY)

Press ENTER to validate and stay; END to register and exit; CANCEL to exit.

```

Fill in the profile data sets as suggested using your TSO user ID instead of *CDFUSER*.

Defining the Base and Derivatives to M+R

After establishing your user profile, you need to define the base and derivatives to M+R.

From the *Member Reconciliation* menu, select **1** (VERSIONS). When the *Versions* panel appears, specify the data set names, members, nicknames, and IDs, but leave *Type* blank.

```

SERCDFCM ----- VERSIONS -----
Command ==>>

CMN Export Package:      LibType:
Base: somnode.CMNZMF.SAMPLES      --MEMBER-  TYPE  NICKNAME  ID
                                cobolbas
                                Last Member:
  or CMN Appl/Pkg:      LibType:
Drv1: somnode.CMNZMF.SAMPLES      coboldv1      drv1      b
  or CMN Appl/Pkg:      LibType:
Drv2: somnode.CMNZMF.SAMPLES      coboldv2      drv2      c
  or CMN Appl/Pkg:      LibType:
Drv3:
  or CMN Appl/Pkg:      LibType:
Drv4:
  or CMN Appl/Pkg:      LibType:
Drv5:
  or CMN Appl/Pkg:      LibType:
Drv6:
  or CMN Appl/Pkg:      LibType:
Drv7:
  or CMN Appl/Pkg:      LibType:

Press ENTER to validate and stay; END to register and exit; CANCEL to exit.

```

Press [Enter] to register the specifications. All the field entries will be raised to upper case. Through registration, you also discover that Type is a PDS for the base and the two derivatives. Press [PF3] END to return to the *Member Reconciliation* menu.

Running M+R

At this point, you have specified the base and derivatives. Now select **2** (EXECUTE) from the *Member Reconciliation* menu. As M+R executes, the *In Progress* screen appears first, and is then followed by the *Reconcile* panel, shown below.

```
View All ----- RECONCILE ----- ROW 1 TO 20 OF 97
COMMAND ==>
B:DRV1 C:DRV2
***** TOP OF DATA *****
000000 *****/* 2000/12/04 17:03:43 somnode.CMNZMF.SAMPLES
Records in Exported File:
-----
| DEGREE OF COMPLEXITY: 4 MEDIUM
|-----
| RECORDS | CONFLICTS | SINGLE CHANGES |
|-----|-----|-----|
| NICKNAMES | PREV CURR DIFF | PREV CURR DIFF |
|-----|-----|-----|
| ORIGINAL 60 | 1 0% | 3 0% |
|-----|-----|-----|
| DRV1 63 | 5 0% | 2 0% |
|-----|-----|-----|
| DRV2 66 | 7 0% | 1 0% |
|-----|-----|-----|
| RECONCIL | 0 0% | 0 0% |
|-----|-----|-----|
| TOTAL: | 13 0% | 6 0% |
|-----|-----|-----|
Reconciliation Scope:
```

The panel displays an initial analysis of the reconcile work ahead. Complexity of the work is rated 4 Medium on a scale 1 through 10. It also tells us the following:

- The current release of base has 60 lines of code, 3 of which were changed by 2 records in DRV1 and by 1 record in DRV2. These are single changes.
- One record in base was changed by more than one derivative. A total of 12 records of DRV1 and DRV2 are in conflict; that is, they represent competing changes to 1 record in base.

Scroll down [PF8] to see the next page of the *Reconcile* panel.

```

View All ----- RECONCILE ----- ROW 21 TO 41 OF 97
COMMAND ==>                               SCROLL ==> CSR
B:DRV1      C:DRV2
  NICKNAME  MEMBER      LAST MODIFIED   USER ID        DATA SET NAME
-----
  BASE      COBOLBAS    2000/11/21 15:52 SERENA         somnode.CMNZMF.SAMPLES
  DRV1      COBOLDV1    2000/11/21 15:52 SERENA         somnode.CMNZMF.SAMPLES
  DRV2      COBOLDV2    2000/11/21 15:52 SERENA         somnode.CMNZMF.SAMPLES
  RECONCIL          2000/12/04 17:03 CDFUSER       Current Work
-----
000001 000100 IDENTIFICATION DIVISION.
000002 000200 PROGRAM-ID.          COBOL01.
000003 000300 ENVIRONMENT DIVISION.
000004 000400 INPUT-OUTPUT SECTION.
000005 000500 FILE-CONTROL.
000006 000600     SELECT ONLY-FILE,
000007 000700     ASSIGN VSAMFILE,
000008 000800     ORGANIZATION IS INDEXED,
000009 000900     ACCESS DYNAMIC,
000010 001000     RECORD KEY IS ONLY-KEY,
000011 001100     FILE STATUS IS ONLY-FILE-STAT.
000012 001200 DATA DIVISION.
000013 001300 FILE SECTION.
000014 001400 FD  ONLY-FILE.

```

In this panel, the line following the command line (B:DRV1 C:DRV2) relates the derivatives' IDs with their nicknames. The "Reconciliation Scope" section associates the nicknames with the data set names.

- -: BASE - somnode.CMNZMF.SAMPLES(COBOLBAS)
- B: DRV1 - somnode.CMNZMF.SAMPLES(COBOLDV1)
- C: DRV2 - somnode.CMNZMF.SAMPLES(COBOLDV2)

Furthermore, the artificial data set name "Current Work" for the nickname "RECONCIL" reflects your consolidation effort. Scroll down [PF8] to see the next page of the *Reconcile* panel.

```

View All ----- RECONCILE ----- ROW 42 TO 62 OF 97
COMMAND ==>>                               SCROLL ==>> CSR
  B:DRV1      C:DRV2
000015 001500 01 ONLY-REC.
000016 001600      02 ONLY-KEY.
000017 001700      03 ONLY-ACCOUNT    PIC X(10).
000018 001800      03 ONLY-TYPE      PIC XX.
000019 001900      03 ONLY-DSN      PIC X(44) OCCURS 2.
000020 002000      03 ONLY-MEMBER   PIC X(10) OCCURS 2.
< 0021 002100      02 ONLY-REST-OF-REC PIC X(100).
<>BC__ 002100      02 ONLY-REST-OF-REC.
> BC__ 002200      05 ONLY-DISP      PIC XXX.
> BC__ 002300      05 ONLY-UNIT     PIC X(8).
> BC__ 002400      05 ONLY-VOL     PIC X(6).
> B__  002500      05 FILLER      PIC X(83).
> _C__ 002500      05 ONLY-SMS-GROUP PIC X(8).
> _C__ 002600      05 ONLY-DESCRIPT PIC X(70).
> _C__ 002700      05 FILLER      PIC X(5).
000022 002200 WORKING-STORAGE SECTION.
000023 002300 77 ONLY-FILE-STAT    PIC XX.
000024 002400 01 SWITCHES.
000025 002500      02 END-OF-ONLY-FILE-SW PIC X.
000026 002600      88 END-OF-ONLY-FILE VALUE 'Y'.
000027 002700 LINKAGE SECTION.

```

This panel illustrates the conflicts between the derivatives. Line 21 of the base has undergone different changes in the two derivatives.

Recall that the symbols (>, <, <>) are M+R visual clues of what changes have been made. The composite "<>BC" (greater than and less than in B and in C) means that the base line 21 is considered different in derivative B (DRV1) and derivative C (DRV2). ">BC" (greater than in B and in C) means that the same line has been added in both derivatives B and C. ">B" (greater than in B) means that the line has been added in derivative B, when compared to the base. This representation also applies to derivative C (DRV2).

Scroll down [PF8] to see the next page of the *Reconcile* panel

```

View All ----- RECONCILE ----- ROW 63 TO 83 OF 97
COMMAND ==>>>                                SCROLL ==>> CSR
  B:DRV1      C:DRV2
000028 002800 01  LS-FUNCTION      PIC X(8).
000029 002900      88  OPEN-REQUEST      VALUE 'OPEN'.
000030 003000      88  READSEQ-REQUEST    VALUE 'READSEQ'.
000031 003100      88  CLOSE-REQUEST     VALUE 'CLOSE'.
000032 003200 01  LS-ONLY-REC PIC X(220).
000033 003300  EJECT
000034 003400  PROCEDURE DIVISION USING LS-FUNCTION, LS-ONLY-REC.
000035 003500  MAIN-LINE.
000036 003600      IF      OPEN-REQUEST      PERFORM DO-THE-OPEN
000037 003700      ELSE IF READSEQ-REQUEST    PERFORM DO-THE-SEQ-READ
< B___ 003800      ELSE IF UPDATE-REQUEST     PERFORM DO-THE-UPDATE
000039 003900      ELSE IF CLOSE-REQUEST     PERFORM DO-THE-CLOSE
000040 004000      ELSE  DISPLAY 'INVALID I/O FUNCTION REQUESTED'
000041 004100              MOVE 12 TO RETURN-CODE.
000042 004200      GOBACK.
000043 004300  DO-THE-OPEN.
000044 004400      OPEN I-O ONLY-FILE.
000045 004500      IF ONLY-FILE-STAT = '00'
000046 004600              MOVE 0 TO RETURN-CODE
<>B___ 004900              MOVE ZERO TO RETURN-CODE
000047 004700      ELSE

```

Observe the composite "**<B**" (less than in B). It means that this line has been deleted on derivative B when compared to the base. Also note that a line from derivative B has changed (replaced) the 46th base record. Scroll down [PF8] to see the next page of the *Reconcile* panel.

```

View All ----- RECONCILE ----- ROW 84 TO 97 OF 97
COMMAND ==>>>                                SCROLL ==>> CSR
  B:DRV1      C:DRV2
000048 004800      EXHIBIT NAMED ONLY-FILE-STAT
000049 004900      DISPLAY 'OPEN FAILED'
<>_C_ 005500      DISPLAY 'COBOL01 - OPEN FAILED'
000050 005000      MOVE 8 TO RETURN-CODE.
000051 005100  DO-THE-SEQ-READ.
000052 005200      READ ONLY-FILE NEXT, AT END MOVE 8 TO RETURN-CODE.
000053 005300      IF ONLY-FILE-STAT = '00'
000054 005400              MOVE ONLY-REC TO LS-ONLY-REC
000055 005500              MOVE 'N' TO END-OF-ONLY-FILE-SW
000056 005600      ELSE
000057 005700              MOVE 'Y' TO END-OF-ONLY-FILE-SW
000058 005800              MOVE 8 TO RETURN-CODE.
000059 005900  DO-THE-CLOSE.
000060 006000      CLOSE ONLY-FILE.
***** BOTTOM OF DATA *****

```

This panel indicates that a line from derivative C has replaced the 49th base record.

Investigating the Changes

Recall that the **VIEW Conflict (V \$)** primary command enables you to display the conflict. If you issue **V \$** at this point, only the conflicting base/derivative lines will be displayed. This result is shown below.

```
View All ----- RECONCILE ----- ROW 1 TO 20 OF 57
COMMAND ==>
      SCROLL ==> CSR
B:DRV1   C:DRV2
***** TOP OF DATA *****
----- 21 Lines NOT Displayed
< 0021 002100   02 ONLY-REST-OF-REC   PIC X(100).
<>BC_ 002100   02 ONLY-REST-OF-REC.
> BC_  002200   05 ONLY-DISP       PIC XXX.
> BC_  002300   05 ONLY-UNIT      PIC X(8).
> BC_  002400   05 ONLY-VOL      PIC X(6).
> B_   002500   05 FILLER        PIC X(83).
> _C_ 002500   05 ONLY-SMS-GROUP  PIC X(8).
> _C_ 002600   05 ONLY-DESCRIPT  PIC X(70).
> _C_ 002700   05 FILLER        PIC X(5).
----- 41 Lines NOT Displayed
```

Issuing Line Commands with M+R

For this scenario, we want to retain the code from derivative C, rather than from derivative B. To do this, we must delete line 21 from the base and the line "FILLER PIC X(83)" of derivative B. These results are shown below.

```
View All ----- RECONCILE ----- ROW 1 TO 20 OF 57
COMMAND ==>
      SCROLL ==> CSR
B:DRV1   C:DRV2
***** TOP OF DATA *****
----- 21 Lines NOT Displayed
d 0021 002100   02 ONLY-REST-OF-REC   PIC X(100).
<>BC_ 002100   02 ONLY-REST-OF-REC.
> BC_  002200   05 ONLY-DISP       PIC XXX.
> BC_  002300   05 ONLY-UNIT      PIC X(8).
> BC_  002400   05 ONLY-VOL      PIC X(6).
d B_   002500   05 FILLER        PIC X(83).
> _C_ 002500   05 ONLY-SMS-GROUP  PIC X(8).
> _C_ 002600   05 ONLY-DESCRIPT  PIC X(70).
> _C_ 002700   05 FILLER        PIC X(5).
----- 41 Lines NOT Displayed
```


To delete the two lines, press [Enter]. The lines are deleted. These results are shown below.

```

View All ----- RECONCILE ----- ROW 1 TO 20 OF 57
COMMAND ==>>>                               SCROLL ==>> CSR
B:DRV1      C:DRV2
***** TOP OF DATA *****
----- 1      Lines DELETED
----- 21     Lines NOT Displayed
<>BC__ 002100      02  ONLY-REST-OF-REC.
> BC__ 002200      05  ONLY-DISP          PIC XXX.
> BC__ 002300      05  ONLY-UNIT          PIC X(8).
> BC__ 002400      05  ONLY-VOL           PIC X(6).
----- 1      Lines DELETED
> _C__ 002500      05  ONLY-SMS-GROUP     PIC X(8).
> _C__ 002600      05  ONLY-DESCRIPT     PIC X(70).
> _C__ 002700      05  FILLER             PIC X(5).
----- 41     Lines NOT Displayed

```

Enter the [PF3] END command to return to the *Member Reconciliation* menu.

Exporting the Consolidated Version

To export the consolidated version, select **6** (EXPORT) from the *Member Reconciliation* menu. M+R acknowledges that your consolidation effort was exported to the target file that you have specified.

Press the [PF3] END command twice (or **X** command), to exit M+R and return to the *M+R Invocation* panel.

Verifying Your Work

To verify the reconciliation you have just finished, you can use a comparison utility to compare the base and consolidated version. You will obtain a difference report which should look like the following:

```

001600      02 ONLY-KEY.
           001700      03 ONLY-ACCOUNT    PIC X(10).
           001800      03 ONLY-TYPE      PIC XX.
           001900      03 ONLY-DSN      PIC X(44) OCCURS 2.
           002000      03 ONLY-MEMBER    PIC X(10) OCCURS 2.
+++++++
D      002100      02 ONLY-REST-OF-REC    PIC X(100).
-----
I      002100      02 ONLY-REST-OF-REC.
I      002200      05 ONLY-DISP          PIC XXX.
I      002300      05 ONLY-UNIT          PIC X(8).
I      002400      05 ONLY-VOL          PIC X(6).
I      002500      05 ONLY-SMS-GROUP     PIC X(8).
I      002600      05 ONLY-DESCRIPT     PIC X(70).
I      002700      05 FILLER            PIC X(5).
+++++++
           002200 WORKING-STORAGE SECTION.
           002300 77 ONLY-FILE-STAT      PIC XX.
           002400 01 SWITCHES.
           002500 02 END-OF-ONLY-FILE-SW PIC X.
           002600      88 END-OF-ONLY-FILE VALUE 'Y'.

. . .
           003300 EJECT
           003400 PROCEDURE DIVISION USING LS-FUNCTION, LS-ONLY-REC.
           003500 MAIN-LINE.
           003600      IF      OPEN-REQUEST          PERFORM DO-THE-OPEN
           003700      ELSE IF READSEQ-REQUEST      PERFORM DO-THE-SEQ-READ
+++++++
D      003800      ELSE IF UPDATE-REQUEST          PERFORM DO-THE-UPDATE
+++++++
           003900      ELSE IF CLOSE-REQUEST          PERFORM DO-THE-CLOSE
           004000      ELSE DISPLAY 'INVALID I/O FUNCTION REQUESTED'
           004100              MOVE 12 TO RETURN-CODE.
           004200      GOBACK.
           004300 DO-THE-OPEN.
           004400      OPEN I-O ONLY-FILE.
           004500      IF ONLY-FILE-STAT = '00'
+++++++
D      004600              MOVE 0 TO RETURN-CODE
-----
I      004900              MOVE ZERO TO RETURN-CODE
+++++++
           004700      ELSE
           004800              EXHIBIT NAMED ONLY-FILE-STAT
+++++++
D      004900              DISPLAY 'OPEN FAILED'
-----
I      005500              DISPLAY 'COBOL01 - OPEN FAILED'
+++++++
           005000              MOVE 8 TO RETURN-CODE.
           005100 DO-THE-SEQ-READ.
           005200      READ ONLY-FILE NEXT, AT END MOVE 8 TO RETURN-CODE.
           005300      IF ONLY-FILE-STAT = '00'
           005400              MOVE ONLY-REC TO LS-ONLY-REC

```

You have now completed the simple session. If you followed the tutorial, your results should match those illustrated in the difference report above.

Here is a question to assess your knowledge of M+R:

You performed only two line deletions, but the difference report reveals four single line deletions, a block insertion, and two single line insertions. Why is that?

Here is the answer:

Single changes like replacing and deleting base records are auto-applied, if not explicitly deleted, if your profile setting is **AUTOOVERRIDE=YES**.

The following session will help you master the commands introduced in the first scenario even if you are not quite comfortable with the IBM Assembler language.

Complex Sample Session

For this session, the base member is called **ASMBLBAS** and the three derivatives are:

- ASMBLDV1
- ASMBLDV2
- ASMBLDV3

We assume that all four members exist in *somnode.CMNZMF.SAMPLES*.

Here are the tasks associated with this session:

- ["Establishing Your Profile" on page 116](#)
- ["Defining the Base and Derivatives to M+R" on page 117](#)
- ["Running M+R" on page 118](#)
- ["Reconciling Conflicts" on page 124](#)
- ["Managing Single Changes" on page 132](#)
- ["Conducting an Ongoing Analysis of the Reconciliation Effort" on page 135](#)
- ["Exporting the Consolidated Version" on page 135](#)
- ["Compiling the Consolidated Version" on page 136](#)
- ["Resuming the Reconciliation Effort" on page 136](#)
- ["Resolving the Third Conflict" on page 137](#)
- ["Wrapping Up the Reconciliation Effort" on page 138](#)

The Scenario

Summary: Vendor software has been modified before being deployed into production, and you want to incorporate a new release of the vendor software while maintaining the in-house customization.

In detail:

- A couple of years ago, the *Accounts Receivable* Department of A.B.C. Company required a daily transaction report. The Trivial Software Company offered a package, PROGNAM, that reads an input file and produces that kind of report.
- The *Information Services* Department of A.B.C. Company bought PROGNAM and modified the report's default format.
- The *Accounts Payable* Department wanted to use the package. Understandably, it had different requirements for the report format, so a modified version called PGMACPAY was also installed.
- The Accounts Payable users were not as accurate as their colleagues in preparing the input file to run the daily transaction report. When PGMACPAY crashed, the support programmer decided to include code to test whether the input file had been opened successfully. If not, the new code would terminate the program with a non-zero return code and display a message to the operator console.
- The Trivial Software Company has just announced a new release of its PROGNAM package that is reentrant and accepts a start parameter. It has also announced that the support of the previous release will soon end.
- The A.B.C. Company has decided to upgrade to the new release, because it now ensures that both departments use only one copy of the package. A programmer has been assigned to install the new release while keeping all the customizations intact.

The following discussion shows you how that programmer can use M+R to accomplish the code reconciliation.

Establishing Your Profile

You need to select **0** (PROFILE) from the *Member Reconciliation* menu, then **1** (COMPARE options). Ensure that TEXT Type is either a period (wildcard character) or BAL. Press [PF3] END and select **3** (EDITING). Set the Include Prefix to YES. Press [PF3] END and select **5** (DATA SETS), then fill in the profile data sets as suggested below using your TSO user ID instead of CDFUSER.

```

SERDSNML ----- PROFILE DATA SETS -----
WIS DSNAME      ===> CDFUSER.CDF.WIS_____
Print DSNAME    ===> CDFUSER.CDF.PRINT_____
Export DSNAME   ===> CDFUSER.CDF.EXPORT_____
Export DSORG    ===> PDS_____ (PDS, SEQ, PAN, LIB, or blank)
Export Member Mask ===> _____ (Mask to rename Base members on export)
LIB Module Name ===> LIBR_____ (LIBrarian update module name: LIBR, LIBRARY)

Press ENTER to validate and stay; END to register and exit; CANCEL to exit.

```

Enter [PF3] END to return to the *Member Reconciliation* menu.

Defining the Base and Derivatives to M+R

From the Member Reconciliation menu, select **1** (VERSIONS). The *Versions* panel displays. Fill in the data set names, members, nicknames, and IDs. You may leave the *Type* blank.

```

SERCDFCM ----- VERSIONS -----
Command ==>

      CMN Export Package: _____ LibType: ____
Base: somnode.CMNZMF.SAMPLES_____ -MEMBER--- TYPE NICKNAME ID
      asmlbas__ __ original -
      or CMN Appl/Pkg: _____ LibType: ____
      Last Member: _____
Drv1: somnode.CMNZMF.SAMPLES_____ asmldv1__ __ receivbl r
      or CMN Appl/Pkg: _____ LibType: ____
Drv2: somnode.CMNZMF.SAMPLES_____ asmldv2__ __ payable_ p
      or CMN Appl/Pkg: _____ LibType: ____
Drv3: somnode.CMNZMF.SAMPLES_____ asmldv3__ __ new_rels n
      or CMN Appl/Pkg: _____ LibType: ____
Drv4: _____
      or CMN Appl/Pkg: _____ LibType: ____
Drv5: _____
      or CMN Appl/Pkg: _____ LibType: ____
Drv6: _____
      or CMN Appl/Pkg: _____ LibType: ____
Drv7: _____
      or CMN Appl/Pkg: _____ LibType: ____

Press ENTER to validate and stay; END to register and exit; CANCEL to exit.

```

Press [PF3] END to register the specifications and return to the *Member Reconciliation* menu.

Running M+R

From the *Member Reconciliation* menu, select **2** (EXECUTE). As M+R executes, the *In Progress* panel displays, followed then by the *Reconcile* panel, shown below.

```
View All ----- RECONCILE ----- ROW 1 TO 20 OF 213
COMMAND ==>                                SCROLL ==> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/* 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
Records in Exported File:
-----
| DEGREE OF COMPLEXITY: 9 HIGH
|-----
| RECORDS | CONFLICTS | SINGLE CHANGES |
|-----|-----|-----|
| NICKNAMES | PREV CURR DIFF | PREV CURR DIFF |
|-----|-----|-----|
| ORIGINAL 68 | 3 0% | 30 0% |
|-----|-----|-----|
| RECEIVBL 70 | 3 0% | 0 0% |
|-----|-----|-----|
| PAYABLE 85 | 13 0% | 9 0% |
|-----|-----|-----|
| NEW_RELS 131 | 9 0% | 81 0% |
|-----|-----|-----|
| RECONCIL | 0 0% | 0 0% |
|-----|-----|-----|
| TOTAL: | 28 0% | 120 0% |
```

With this panel, M+R has initially analyzed the complexity of the reconciliation work ahead. It has classified the complexity as 9 HIGH on a scale from 1 to 10. The analysis table also indicates the following:

- The current release of PROGRAM (nicknamed *original*) has 68 lines of code, 30 of which were changed by 81 records in the new release nicknamed *new_rels* and by 9 records in the *payable* derivative. These changes, however, do not overlap; that is, they are single changes. The derivative nicknamed *receivbl* made no single changes.
- Three records of *original* were changed by more than one derivative. A total of 25 records of *receivbl*, *payable*, and *new_rels* are in conflict; that is, they are competing changes to the same 3 records in original. Because *payable* contributes 13 records in conflict (roughly half of the total number of conflicting records), it will probably be the most difficult to reconcile.
- Almost half of the original records, 33 out of 68, have been changed.

This explains why the reconciliation is rated complex.



NOTE Although these initial analysis records appear only once, you can export/print them as part of the consolidated versions: 6 (EXPORT) and 6P (PRINT). You can prevent their display by setting the Include Prefix to NO—see 3 (EDITING options) on the Profile panel.

Scroll down [PF8] to see the next page of the *Reconcile* panel.

```

View All ----- RECONCILE ----- ROW 21 TO 41 OF 213
COMMAND ==>>                                SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
|-----|
                Reconciliation Scope:
NICKNAME  MEMBER      LAST MODIFIED   USER ID      DATA SET NAME
-----
ORIGINAL  ASMBLBAS    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
RECEIVBL  ASMBLDV1    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
PAYABLE   ASMBLDV2    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
NEW_RELS  ASMBLDV3    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
RECONCIL  2000/12/04 17:12 CDFUSER     Current Work
-----
< 0001  PROGRAM CSECT
<>_P_  PGMACPAY CSECT
000002      STM  R14,R12,12(R13)    save caller's registers
000003      LR   R12,R15             get program address
< 0004      USING PROGRAM,R12      addressability
<>_P_      USING PGMACPAY,R12      addressability
000005      B    AROUND             go around label
< 0006      DC   CL8'PROGRAM'       program name
<>_P_      DC   CL8'PGMACPAY'       program name
000007      DC   CL8'&SYSDATE'     date assembled
000008      DC   CL6'&SYSTIME'     time assembled

```

The line following the command line (R:RECEIVBL P:PAYABLE N:NEW_RELS) relates the derivatives' IDs (R, P and N) with their nicknames. The "Reconciliation Scope" section of the analysis table associates the nicknames with the data set names.

- -: ORIGINAL - *somnode.CMNZMF.SAMPLES*(ASMBLBAS)
- R: RECEIVBL - *somnode.CMNZMF.SAMPLES*(ASMBLDV1)
- P: PAYABLE - *somnode.CMNZMF.SAMPLES*(ASMBLDV2)
- N: NEW_RELS - *somnode.CMNZMF.SAMPLES*(ASMBLDV3)

In the line command area above, the composition <>_P_ is an M+R visual clue of the change that has been made. It implies that these base records have been replaced in *payable*; that is, are different from the base records above them. The base records themselves are marked with a "<" (less than sign) to show that they are missing in the derivative P.

Investigating the Versions

From the *Reconcile* panel, you can issue M+R primary commands to evaluate the versions and their relationships with each other:

- Use the M+R VIEW and EXCLUDE commands to generate different views from the M+R database.
- Use the M+R command pair EXCLUDE/RESET for the base and any derivative while within any of the contexts.

A short recap of the M+R Version Browser main contexts (views) follows:

- **V \$** - displays the conflicts: i.e., base records changed differently by more than one derivative and those changes.

- **X \$** - excludes the conflicts and displays base records changed by one derivative only and those changes.



NOTE If the profile setting is AUTOOVERRIDE=YES, these base records will be overridden by their single changes in the consolidated version.

- **V #** - displays the consolidated version at that moment in time—the so-called *remaining* code (i.e., the not deleted, not overridden and not overtyped records).
- **X #** - excludes the remaining code and displays the deleted base/derivative records and the overridden base records so that you can check whether or not it is OK to leave that code aside from the consolidated version; note the *cut and pasted* base/derivative records are **not** included in that view as they are not actually deleted but just moved around.
- **V *** - displays all records, including the deleted and overtyped base/derivative records.
- **X *** - excludes everything so that you can use **RESET** command to view either the base or one or more derivatives; note that the same effect can be achieved by one of the next two commands.
- **V @** - displays all base records that are not deleted or overtyped.
- **V letter** - displays all not deleted/overtyped records of a derivative with that letter as an ID; note that the next **V** command(s) will add the changes made by the second and subsequent derivatives to those already displayed.

While in any of the above main contexts, the base and/or one or more derivatives can be excluded/included through the commands **X @**, **R @**, **X letter**, and **R letter**.

V P (View Payable derivative)

On the *Reconcile* panel, let's enter **VIEW P**, **view p**, or **V P** (view payable) to see changes to the original base from the second derivative. (Recall that P is the derivative ID of payable.) The *Reconcile* panel, shown below, appears.

```

View Id P ----- RECONCILE ----- ROW 1 TO 20 OF 121
COMMAND ==>                                SCROLL ==> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/* 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
< 0001  PROGRAMNAME CSECT
<>_P_  PGMACPAY CSECT
000002      STM  R14,R12,12(R13)      save caller's registers
000003      LR   R12,R15              get program address
< 0004      USING PROGRAMNAME,R12    addressability
<>_P_      USING PGMACPAY,R12        addressability
000005      B    AROUND              go around label
< 0006      DC   CL8'PROGRAMNAME'    program name
<>_P_      DC   CL8'PGMACPAY'        program name
000007      DC   CL8'&SYSDATE'       date assembled
000008      DC   CL6'&SYSTIME'       time assembled
000009  COPYRITE DC   C' COPYRIGHT (C) '
000010      DC   C' TRIVIAL SOFTWARE CO. '
000011  AROUND  EQU   *
000012      SPACE 1
- - - - - 1 Lines NOT Displayed
000013 *      Chain Save Areas
- - - - - 1 Lines NOT Displayed
000014      ST   R13,SAVEAREA+4      save caller's save area

```

The NOT Displayed lines indicate that other derivatives have changed the base code in this code fragment.

Fn/Ln (Include First/Last)

You can browse the second derivative, as well as include *in view* some of the excluded lines by using the M+R line commands **First** and **Last**. For example, to include the first

excluded lines *in view*, enter the command First (**F**) on the line that says "1 Lines NOT Displayed" after the Base record "000012". The *Reconcile* panel, shown below, appears.

```

View Id P ----- RECONCILE ----- ROW 1 TO 20 OF 121
COMMAND ==>>                                SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/ * 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
< 0001  PROGRAMNAME CSECT
<> _P_  PGMACPAY CSECT
000002          STM  R14,R12,12(R13)      save caller's registers
000003          LR   R12,R15              get program address
< 0004          USING PROGRAMNAME,R12    addressability
<> _P_  USING PGMACPAY,R12              addressability
000005          B    AROUND              go around label
< 0006          DC   CL8'PROGRAMNAME'    program name
<> _P_  DC   CL8'PGMACPAY'              program name
000007          DC   CL8'&SYSDATE'      date assembled
000008          DC   CL6'&SYSTIME'      time assembled
000009  COPYRIGHT DC   C' COPYRIGHT (C)'
000010          DC   C' TRIVIAL SOFTWARE CO. '
000011  AROUND  EQU   *
< 0012          SPACE 1
<> _N_  L    R5,0(,R1)                save passed parameter
000013 *      Chain Save Areas
----- 1 Lines NOT Displayed
000014          ST   R13,SAVEAREA+4      save caller's save area

```

To include the last excluded lines *in view*, enter the command Last (**L**) on the "1 Lines NOT Displayed" line after Base record "000013". The *Reconcile* panel, shown below, appears.

```

View Id P ----- RECONCILE ----- ROW 1 TO 20 OF 121
COMMAND ==>>                                SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/ * 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
< 0001  PROGRAMNAME CSECT
<> _P_  PGMACPAY CSECT
000002          STM  R14,R12,12(R13)      save caller's registers
000003          LR   R12,R15              get program address
< 0004          USING PROGRAMNAME,R12    addressability
<> _P_  USING PGMACPAY,R12              addressability
000005          B    AROUND              go around label
< 0006          DC   CL8'PROGRAMNAME'    program name
<> _P_  DC   CL8'PGMACPAY'              program name
000007          DC   CL8'&SYSDATE'      date assembled
000008          DC   CL6'&SYSTIME'      time assembled
000009  COPYRIGHT DC   C' COPYRIGHT (C)'
000010          DC   C' TRIVIAL SOFTWARE CO. '
000011  AROUND  EQU   *
< 0012          SPACE 1
<> _N_  L    R5,0(,R1)                save passed parameter
< 0013 *      Chain Save Areas
<> _N_  SPACE 1
000014          ST   R13,SAVEAREA+4      save caller's save area

```

X @ (Exclude Base)

To display only the changes, use the **X @** command. The *Reconcile* panel, shown below, appears.

```

View Id P Base eXcluded----- RECONCILE ----- ROW 1 TO 20 OF 40
COMMAND ==>>                                SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
- - - - - 1 Lines NOT Displayed
< 0001  PROGRAMNAME CSECT
<> _P_  PGMACPAY CSECT
- - - - - 2 Lines NOT Displayed
< 0004          USING PROGRAM,R12      addressability
<> _P_          USING PGMACPAY,R12     addressability
- - - - - 1 Lines NOT Displayed
< 0006          DC   CL8'PROGRAM'      program name
<> _P_          DC   CL8'PGMACPAY'     program name
- - - - - 19 Lines NOT Displayed
000019          OPEN  (INFILE,INPUT,PRINTER,OUTPUT)
- - - - - 1 Lines NOT Displayed
> _P_          LA   R1,INFILE          get address of input DCB
> _P_          USING IHADCB,R1        addressability
> _P_          TM   DCBOFLGS,X'10'    ? successful open
> _P_          BZ   OPENERR           no...open failure
> _P_          LA   R1,PRINTER        get address of output DCB
> _P_          TM   DCBOFLGS,X'10'    ? successful open
> _P_          BZ   OPENERR           no...open failure
> _P_          PUT  PRINTER,RPRTITLE  write report title

```

You can enter **View R** or **V R** (View *receivbl*) to see the changes that the first derivative made to the original base, or enter **VIEW N** or **V N** (View *new_rels*) to see the changes made by the new release.

R N (Reset New_rels derivative)

To display previously excluded derivative records, enter the **Reset** command. For example, if you issued **R N** (Reset *new_rels*) on the previous screen, you would display

the changes made by both *payable* and *new_rels* derivatives. The *Reconcile* panel, shown below, appears.

```

View Id P N Base eXcluded----- RECONCILE ----- ROW 1 TO 20 OF 162
COMMAND ==>> SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
- - - - - 1 Lines NOT Displayed
< 0001 PROGRAM CSECT
<>_P_ PGMACPAY CSECT
- - - - - 2 Lines NOT Displayed
< 0004 USING PROGRAM,R12 addressability
<>_P_ USING PGMACPAY,R12 addressability
- - - - - 1 Lines NOT Displayed
< 0006 DC CL8'PROGRAM' program name
<>_P_ DC CL8'PGMACPAY' program name
< 0012 SPACE 1
<>_N_ L R5,0(,R1) save passed parameter
<0013 * Chain Save Areas
<>_N_ SPACE 1
< 0014 ST R13,SAVEAREA+4 save caller's save area
<>_N_ * Getmain pgm dynamic area
< 0015 LA R2,SAVEAREA get address of program save area
<>_N_ LA R2,DYNAREND-PGMDSCT size of pgm dynamic area
< 0016 ST R2,8(R13) save it in caller's save area
<>_N_ LA R2,1024(,R2) bump for rounding

```

As this panel illustrates, use of the **eXclude/Reset** command pair with a derivative ID argument provides decremental/incremental handling of the version view. Each command acts on its argument only; it does not override a previously issued **eXclude/Reset** command.

Reconciling Conflicts

You can reconcile any text in PDS, SEQ, PAN, or LIB format. To resolve a conflict, you need to see how multiple derivatives have changed a particular base record.

V \$ (Viewing the Conflicts)

To view the conflicts together, enter **V conflicts**, **V CO**, or **V \$** from the current *Reconcile* panel. The *Reconcile* panel, shown below, appears (although here it is a combination of two screens).

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 20 OF 32
COMMAND ==>                               SCROLL ==> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 29 Lines NOT Displayed
< 00019      OPEN  (INFILE,INPUT,PRINTER,OUTPUT)
> R__      PUT   PRINTER,COMPANY      write Company name
> _P__     LA    R1,INFILE              get address of input DCB
> _P__     USING IHADCB,R1            addressability
> _P__     TM    DCBOFLGS,X'10'        ? successful open
> _P__     BZ    OPENERR                no...open failure
> _P__     LA    R1,PRINTER            get address of output DCB
> _P__     TM    DCBOFLGS,X'10'        ? successful open
> _P__     BZ    OPENERR                no...open failure
> _P__     PUT   PRINTER,RPRTITLE      write report title
<> _N__    LR    R0,R2                 R0 needs the size
----- 106 Lines NOT Displayed
< 0053 HEADLINE DC   CL133'1 * * * RECORD LISTING * * * '
<>R__ COMPANY DC   CL133'1 * * * A.B.C. COMPANY * * * '
> R__ HEADLINE DC   CL133'1 * * ACCOUNTS RECEIVABLE * * '
<> _P__ RPRTITLE DC  CL133'1 * * * * ABC COMPANY * * * * '
> _P__ HEADLINE DC  CL133'1 * * * ACCOUNTS PAYABLE * * * '
<> _N__ HEADLINE DS  CL133              "1 * * * RECORD LISTING * * * "
----- 17 Lines NOT Displayed
000065      EODAD=ENDDATA
> _P__ *      Data Control Block Dummy Section (IHADCB)
> _P__      PRINT ON,NOGEN
> _P__      DCBD DEVD=DA,DSORG=PS
> _N__ *      Data Constants
> _N__ ZERO   DC   P'0'                packed zero
> _N__ ONE    DC   P'1'                packed one
> _N__ P50    DC   P'50'               packed fifty
> _N__ SPACES DC   CL80' '             eighty blanks
> _N__ HEADER DC   CL133'1 * * * RECORD LISTING * * * '
> _N__ ENDER  DC   CL133'1 * * * END OF REPORT * * * '
----- 4 Lines NOT Displayed

```

What does this panel reveal?

- 1 The lines under base record "000019" indicate that this line has been changed by all three derivatives as follows:

Derivative R - *receivbl* has added a line of code that prints the A.B.C. Company name on the report.

Derivative P - *payable* has added a block of code that checks for the successful opening of the input/output files. It also adds a single line that prints the report title.

Derivative N - this base record has been replaced with an instruction that looks "out of context" here—a sure sign that the *new_rels* derivative structurally differs from the base code.

- 2 The lines under Base record "000053" indicate that it has been changed by all three derivatives as follows:

Derivative R - *receivbl* has changed the page heading to "A.B.C. COMPANY" and added its own heading "ACCOUNTS RECEIVABLE".

Derivative P - *payable* has changed the page heading to "A.B.C. COMPANY" and added its own page heading "ACCOUNTS PAYABLE".

Derivative N - this base record is not a character constant at all—it is a variable name; this confirms the assumption of structural differences between the base and *new_rels*.

- 3 The lines under base record "000065" indicate that it has been changed by two derivatives as follows:

Derivative P - *payable* has added a DSECT (dummy section) that checks for the successful opening of the input/output files.

Derivative N - *new_rels* has added a block of data constants, including the page heading and the end-of-report lines (visible if you page down).

Now that you are familiar with the changes made by each derivative, you can begin the reconciliation work, but first, some planning.

Planning the Reconciliation Work

Here is a summary of the conflicts and how you can resolve them:

All changes to base record "000019" made by *payable* (marked **P**) will be used in the consolidated version. Before they can be used, however, they must be moved after the OPEN statements of *new_rels* (marked **N**). Then, the base record and code line added by R must be deleted.

The changes to the original page heading (base record "000053") from the customizations in both *receivbl* and *payable* should stay. Furthermore, code is required to pick up the proper page heading depending on the value of the start parameter.

The last conflict "000065" looks acceptable; both derivatives add data areas that should remain in the consolidated version. In this scenario, the last conflict will not be resolved because the changes do not appear to be mutually exclusive.

Now that you have summarized the conflicts, you can start resolving them by performing the following:

- Moving (**C**ut and **P**aste) the conflicting blocks of code to their proper place in the new consolidated version.
- Editing conflicting lines of code to incorporate the changes into a workable program.

You can handle conflicts through a combination of edit line commands such as Delete, Undelete, Insert, Repeat, Copy, and Move.

Resolving the First Conflict

Resolving the first conflict on the panel below consists of two actions:

- Block delete the base record "000019" and the **PUT** statement from *receivbl*.
- Move (**C**ut and **P**aste) the remaining lines of *payable* after the OPEN statements of *new_rels* for data sets PRINTER and INFILE.

Before you issue the **C**ut command, your screen should look like the following:

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 20 OF 31
COMMAND ==> cut                               SCROLL ==> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 2 Lines DELETED
----- 29 Lines NOT Displayed
mm_P__      LA    R1,INFILE          get address of input DCB
> _P__      USING IHADCB,R1          addressability
> _P__      TM    DCBOFLGS,X'10'     ? successful open
> _P__      BZ    OPENERR            no...open failure
> _P__      LA    R1,PRINTER         get address of output DCB
> _P__      TM    DCBOFLGS,X'10'     ? successful open
> _P__      BZ    OPENERR            no...open failure
mm_P__      PUT  PRINTER,RPRTITLE    write report title
<> _N__     LR    R0,R2              R0 needs the size
----- 106 Lines NOT Displayed
< 0053 HEADLINE DC    CL133'1 * * * RECORD LISTING * * *'
<>R__ COMPANY DC    CL133'1 * * * A.B.C. COMPANY * * *'
> R__ HEADLINE DC    CL133'1 * * ACCOUNTS RECEIVABLE * * *'
<> _P__ RPRTITLE DC    CL133'1 * * * * ABC COMPANY * * * *'
> _P__ HEADLINE DC    CL133'1 * * * ACCOUNTS PAYABLE * * *'
<> _N__ HEADLINE DS    CL133              "1 * * * RECORD LISTING * * *"
----- 17 Lines NOT Displayed
000065          EODAD=ENDDATA

```

Press [Enter] and issue the **V N** (View new_rels) primary command to switch to the *new_rels* view. On the resulting panel, issue the **find infile** command. The first occurrences of INFILE are on the just-deleted base line marked with (/*), that is commented out. Issue a Repeat FIND (PF5/17) to find the opening of the INFILE data set within the *new_rels* code and place the After line command on the following line:

```
> _N_ OPEN MF=[E,(1)]          execute form of OPEN
```

Then place the cursor on the command line using the "Home" key, and issue the **PAS**te command. After issuing this command, your screen will look like the panel below. The

pasted records are marked with the (>>) symbol to emphasize their type as not simply inserted but copied or moved from some other place.

```

View Id N ----- RECONCILE ----- ROW 68 TO 88 OF 175
COMMAND ==>>                                SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
> __N_ *
> __N_      MVC  DCBINPUT,INFILE      get model DCB for input file
> __N_      LA   R1,DCBINPUT          its address in pgm dynamic area
> __N_      ST   R1,FULLWORD          stash it
> __N_      OI   FULLWORD,X'8F'       indicate output
> __N_      LA   R1,FULLWORD          address DCB list
> __N_      OPEN MF=(E,(1))          execute form of OPEN
>>__+      LA   R1,INFILE             get address of input DCB
>>__+      USING IHADCB,R1           addressability
>>__+      TM   DCBOFLGS,X'10'       ? successful open
>>__+      BZ   OPENERR               no...open failure
>>__+      LA   R1,PRINTER            get address of output DCB
>>__+      TM   DCBOFLGS,X'10'       ? successful open
>>__+      BZ   OPENERR               no...open failure
>>__+      PUT  PRINTER,RPRTITLE      write report title
> __N_      PUT  DCBPRINT,HEADLINE    write page header
000021      SPACE 1
000022 *      Main Line Processing
000023 MAINLINE EQU *
< 0024      GET  INFILE,INAREA        read a record
<>__N_      GET  DCBINPUT,INAREA      read a record

```

You are now ready to resolve the second conflict.

Resolving the Second Conflict

Before proceeding to resolve the second conflict, verify that the first conflict has been resolved. To do this, issue the **V conflicts**, **V CO**, or **V \$** primary command from the

current *Reconcile* panel and press [Enter]. The *Reconcile* panel, shown below, appears. You should not see a conflict at the base record "000019".

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 21 OF 21
COMMAND ==>>                               SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 10 Lines DELETED
----- 144 Lines NOT Displayed
< 0053 HEADLINE DC CL133'1 * * * RECORD LISTING * * * '
<>R__ COMPANY DC CL133'1 * * * A.B.C. COMPANY * * * '
> R__ HEADLINE DC CL133'1 * * ACCOUNTS RECEIVABLE * * '
<>_P_ RPRTITLE DC CL133'1 * * * * ABC COMPANY * * * '
> _P_ HEADLINE DC CL133'1 * * * ACCOUNTS PAYABLE * * * '
<>_N_ HEADLINE DS CL133 "1 * * * RECORD LISTING * * * "
----- 17 Lines NOT Displayed
000065 EODAD=ENDDATA
> _P_ * Data Control Block Dummy Section (IHADCB)
> _P_ PRINT ON,NOGEN
> _P_ DCBD DEVD=DA,DSORG=PS
> _N_ * Data Constants
> _N_ ZERO DC P'0' packed zero
> _N_ ONE DC P'1' packed one
> _N_ P50 DC P'50' packed fifty
> _N_ SPACES DC CL80' ' eighty blanks
> _N_ HEADER DC CL133'1 * * * RECORD LISTING * * * '
> _N_ ENDER DC CL133'1 * * * END OF REPORT * * * '

```

Resolving the second conflict consists of two actions:

- Block delete the base record "000053' and the COMPANY statement from *receivbl*.
- Rename the page header constants to HEADLIN1 and HEADLIN2 by overtyping, and enter the block **Move** command against those lines. The destination command can be **Before** placed on the line below containing the ZERO constant.

Your screen should now appear like the panel below.

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 19 OF 19
COMMAND ==>> SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 12 Lines DELETED
----- 144 Lines NOT Displayed
mmR_ HEADLIN1 DC CL133'1 * * ACCOUNTS RECEIVABLE * *'
<>_P_ RPRTITLE DC CL133'1 * * * * ABC COMPANY * * * *'
mm_P_ HEADLIN2 DC CL133'1 * * * ACCOUNTS PAYABLE * * *'
<>_N_ HEADLINE DS CL133 "1 * * * RECORD LISTING * * *"
----- 17 Lines NOT Displayed
000065 EODAD=ENDDATA
>_P_ * Data Control Block Dummy Section (IHADCB)
>_P_ PRINT ON,NOGEN
>_P_ DCBD DEVD=DA,DSORG=PS
>_N_ * Data Constants
b_N_ ZERO DC P'0' packed zero
>_N_ ONE DC P'1' packed one
>_N_ P50 DC P'50' packed fifty
>_N_ SPACES DC CL80' ' eighty blanks
>_N_ HEADER DC CL133'1 * * * RECORD LISTING * * *'
>_N_ ENDER DC CL133'1 * * * END OF REPORT * * *'
----- 4 Lines NOT Displayed
***** BOTTOM OF DATA *****

```

Press [Enter] to execute the overtyped changes and the block **Move** command. The *Reconcile* panel, shown below, appears.

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 19 OF 19
COMMAND ==>> SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 15 Lines DELETED
----- 144 Lines NOT Displayed
<>_N_ HEADLINE DS CL133 "1 * * * RECORD LISTING * * *"
----- 17 Lines NOT Displayed
000065 EODAD=ENDDATA
>_P_ * Data Control Block Dummy Section (IHADCB)
>_P_ PRINT ON,NOGEN
>_P_ DCBD DEVD=DA,DSORG=PS
>_N_ * Data Constants
>_+ HEADLIN1 DC CL133'1 * * ACCOUNTS RECEIVABLE * *'
>>_+ RPRTITLE DC CL133'1 * * * * ABC COMPANY * * * *'
>_+ HEADLIN2 DC CL133'1 * * * ACCOUNTS PAYABLE * * *'
>_N_ ZERO DC P'0' packed zero
>_N_ ONE DC P'1' packed one
>_N_ P50 DC P'50' packed fifty
>_N_ SPACES DC CL80' ' eighty blanks
>_N_ HEADER DC CL133'1 * * * RECORD LISTING * * *'
>_N_ ENDER DC CL133'1 * * * END OF REPORT * * *'
----- 4 Lines NOT Displayed
***** BOTTOM OF DATA *****

```

Notice the different marking of the three lines you just moved: the middle one is marked with (>>) that was pasted, while the other two are shown as user inserted, marked with (- >). Considering the origin of the moved lines—the middle one is an **unchanged** line from payable which has been cut and pasted. The other two are **edited** lines from *receivbl* and *payable*; in other words, they “originate” from the user. Incidentally, the

derivative lines are commented out; that is, they are deleted by the user (i.e., **overtyp** = **repeat + delete**).

Moving overtyped lines to a new place makes them inserted lines. However, if you first overtype the two HEADLINE lines, press [Enter], and then block-move the three lines; all of them will be marked as user moved, that is with >>__+.

Although you have resolved the conflicts, you still need to provide the code for the page heading; the following describes how:

- Issue the **V N** primary command to switch to the *new_rels* view.
- On the resultant panel, issue **find headline** then a FIND/RFIND ([PF5/17]) to find it within the *new_rels* code.
- In front of the previous line, insert 12 lines and fill them (as shown in the panel below).
- After the same found line, insert the label HEAD003.

```
View Id N ----- RECONCILE ----- ROW 55 TO 75 OF 182
COMMAND ==>> SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
> __N_ MVC DATA+80(36),SPACES clean up to line end
> __+ * Determine Report Type
> __+ LH R1,0(,R5) get start parameter
> __+ CH R1,H4 ? Acc Receivable Dept
> __+ BNE HEAD0010 no...check next
> __+ MVC HEADLINE,HEADLIN1 yes..set its header
> __+ B HEAD0030 cont
> __+ HEAD0010 EQU *
> __+ CH R1,H8 ? Acc Payable Dept
> __+ BNE HEAD0020 no...set default header
> __+ MVC HEADLINE,HEADLIN2 yes..set its header
> __+ B HEAD0030 cont
> __+ HEAD0020 EQU *
> __N_ MVC HEADLINE(133),HEADER initialize page header
' ' ' ' HEAD0030 EQU *
> __N_ MVC ENDLINE(133),ENDER initialize end-of-report line
> __N_ ZAP RECNUM,ZERO initialize record counter
> __N_ ZAP LINECT,ZERO initialize line counter
> __N_ SPACE 1
> __N_ * Open Files
> __N_ MVC DCBPRINT,PRINTER get model DCB for output file
```

Because you have written the page heading initialization code using two constants, H4 and H8, you need to define them. The appropriate place for this code is the third conflict, because that is the context where the changes that are different between *receivbl* and *payable* are displayed. Here is what you need to do:

- Issue **V \$** to display the records in conflict, then press [Enter].
- On the resulting panel, specify the line command r2 at the constant ONE.

Define the new constants, as shown below.

```

View Conflicts ----- RECONCILE ----- ROW 1 TO 17 OF 17
COMMAND ==>> SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
----- 15 Lines DELETED
----- 175 Lines NOT Displayed
000065          EODAD=ENDDATA
> _P_ *        Data Control Block Dummy Section (IHACB)
> _P_          PRINT ON,NOGEN
> _P_          DCBD DEVD=DA,DSORG=PS
> _N_ *        Data Constants
----- 3 Lines NOT Displayed
> _N_ ZERO    DC   P'0'          packed zero
> _N_ ONE     DC   P'1'          packed one
> ___+ H4     DC   H'4'          halfword four
> ___+ H8     DC   H'8'          halfword eight
> _N_ P50     DC   P'50'         packed fifty
> _N_ SPACES  DC   CL80' '       eighty blanks
> _N_ HEADER  DC   CL133'1 * * * RECORD LISTING * * * '
> _N_ ENDER   DC   CL133'1 * * * END OF REPORT * * * '
----- 4 Lines NOT Displayed
***** BOTTOM OF DATA *****

```



NOTE The three constants we have moved (in this section of the program) are excluded from view because editing base/derivatives lines makes them user-inserted code lines. By definition, such lines do not create conflicts, so they are not displayed on the new panel.

The second conflict is now resolved. Because we decided to ignore the third conflict for now, you can focus on the single changes.

Managing Single Changes

Once you have resolved the conflicts, you need to incorporate the single changes. Be aware that single changes are *not* always simple changes. Provided your profile setting is AUTOOVERRIDE=YES, you should consider the following:

Each base record that has been changed (replaced or erased) in only one derivative, or has been changed in the same way in all derivatives, will be substituted with these changes during the export of the consolidated version.

To export base records replaced in only one derivative, you must explicitly delete those replacements with the **Dn** line command or the **DD** block command, or set in your profile AUTOOVERRIDE=NO. The same rule applies when all derivatives replace a base record with the same code line.

To export base records erased in only one derivative, you must explicitly repeat those base records with the **Rn** line command or the **RR** block command, or set AUTOOVERRIDE to NO. The same rule applies when all derivatives erase a base record.

When records are added after a base record in only one derivative or all derivatives, they do not “drop” the corresponding base record from the consolidated version.



NOTE The reference “all derivatives” above means “all derivatives that replace or erase” a particular base record, not all derivatives specified in the Versions panel.

If more than one derivative ID appears after a base record, the changes are in conflict, rather than single changes; thus no override is performed by M+R.

To check the impact of single changes, enter the **V # (View RE**maining) primary command.

The *Reconcile* panel, shown below, appears.

```
View Remaining code lines ----- RECONCILE ----- ROW 1 TO 20 OF 199
COMMAND ==>>                                     SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/* 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
----- 1 Lines NOT Displayed
<>_P_ PGMACPAY CSECT
000002     STM  R14,R12,12(R13)      save caller's registers
000003     LR   R12,R15              get program address
----- 1 Lines NOT Displayed
<>_P_     USING PGMACPAY,R12        addressability
000005     B    AROUND              go around label
----- 1 Lines NOT Displayed
<>_P_     DC    CL8'PGMACPAY'        program name
000007     DC    CL8'&SYSDATE'      date assembled
000008     DC    CL6'&SYSTIME'     time assembled
000009 COPYRITE DC    C' COPYRIGHT (C)'
000010     DC    C' TRIVIAL SOFTWARE CO. '
000011 AROUND EQU    *
----- 1 Lines NOT Displayed
<>_N_     L    R5,0(,R1)           save passed parameter
----- 1 Lines NOT Displayed
<>_N_     SPACE 1
----- 1 Lines NOT Displayed
```

To understand this panel, you should compare it with the panel on [page 121](#). Notice that this one does not display the base lines 000001, 000004, and 000006 (visible on the previous panel) because they are overridden by *payable* if your profile setting is AUTOOVERRIDE=YES, as suggested for this tutorial.

In *payable*, the name of the program has been changed to PGMACPAY. If the resulting single changes (those flagged by '< >_P_') are not explicitly deleted, the program will be called PGMACPAY, not PROGNAME, which is the original name.

To delete the three (payable) lines, enter **d** on each line with composition '< > _P__' and press [Enter]. Then issue the primary command **V #** (View **R**emaining) The *Reconcile* panel, shown below, appears.

```

View Remaining code lines ----- RECONCILE ----- ROW 1 TO 20 OF 199
COMMAND ==>>                                     SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
***** TOP OF DATA *****
000000 *****/* 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
000001 PROGRAM CSECT
-----
000002      STM  R14,R12,12(R13)      save caller's registers
000003      LR   R12,R15              get program address
000004      USING PROGRAM,R12        addressability
-----
000005      B    AROUND              go around label
000006      DC   CL8'PROGRAM'        program name
-----
000007      DC   CL8'&SYSDATE'       date assembled
000008      DC   CL6'&SYSTIME'      time assembled
000009 COPYRITE DC   C' COPYRIGHT (C)'
000010      DC   C' TRIVIAL SOFTWARE CO. '
000011 AROUND EQU *
-----
<>_N_      L    R5,0(,R1)          save passed parameter
-----
<>_N_      SPACE 1
-----

```

Issue **find pgmacpay**. On the resulting screen, the cursor is placed at PGMACPAY on the last line.

```

View Remaining code lines ----- RECONCILE ----- ROW 198 TO 199 OF 199
COMMAND ==>>                                     SCROLL ==>> CSR
R:RECEIVBL P:PAYABLE N:NEW_RELS
-----
<>_P__      END  PGMACPAY          end of program
***** BOTTOM OF DATA *****

```

To delete the last change in *payable* (the END statement), enter **d** on that line and press [Enter]. Then, enter [PF3] END to return to the *Member Reconciliation* menu.

Another way of investigating single changes is to investigate the “dropped” code lines. You can use the **eXclude Remaining (X #)** primary command to look at the base records that will be substituted with single changes, as well as the base/derivative records you have deleted thus far. You would observe that *payable* overrides all base lines of code with PROGRAM. To prevent this, you would issue the **V P (View payable)** primary command, then delete all lines of code containing PGMACPAY. These steps have been discussed previously.

Conducting an Ongoing Analysis of the Reconciliation Effort

Before exporting the consolidated version, you might want to select **7** (ANALYSIS) from the *Member Reconciliation* menu to invoke an ongoing analysis of the reconciliation. The *Analysis* panel, shown below, appears (although here it is a combination of two screens).

```

----- ANALYSIS ----- ROW 1 TO 21 OF 28
COMMAND ==>>          SCROLL ==>> CSR
-----
DEGREE OF COMPLEXITY:  9  HIGH
-----

```

NICKNAMES	RECORDS		CONFLICTS			SINGLE CHANGES			DELETED BY YOU		REMAINING CODE	
	PREV	CURR	DIFF	PREV	CURR	DIFF	PREV	CURR	DIFF	PREV	CURR	DIFF
ORIGINAL	68	3	1 -66%	30	30	0%	0	2 +99%	68	66	- 2%	
RECEIVBL	70	3	0 -99%	0	0	0%	0	3 +99%	3	0	-99%	
PAYABLE	85	13	3 -76%	9	5	-44%	0	14 +99%	22	8	-63%	
NEW_RELS	131	9	7 -22%	81	83	+ 2%	0	0 0%	93	93	0%	
RECONCIL		0	0 0%	0	26	+99%	0	0 0%	0	26	+99%	
TOTAL:		28	11 -60%	120	144	+20%	0	19 +99%				

```

-----
Reconciliation Scope:
NICKNAME  MEMBER      LAST MODIFIED   USER ID      DATA SET NAME
-----
ORIGINAL  ASMLBAS    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
RECEIVBL  ASMLDV1    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
PAYABLE   ASMLDV2    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
NEW_RELS  ASMLDV3    2000/11/21 15:52 SERENA      somnode.CMNZMF.SAMPLES
RECONCIL  ASMLDV3    2000/12/04 17:12 CDFUSER     Current Work
-----
***** BOTTOM OF DATA *****

```

When you finish viewing the *Analysis* panel, enter [PF3] END and return to the *Member Reconciliation* menu.

Exporting the Consolidated Version

After viewing an analysis of the reconciliation work, you might want to produce a consolidated version from the base and its derivatives. To do so, select **6** (EXPORT) from the *Member Reconciliation* menu and press [Enter]. You will receive an acknowledgment that your consolidated version (located in CDFUSER.CDF.EXPRTLIB(ASMLBAS)) has been exported.

Now, issue the **X** M+R (eXit M+R) primary command, and compile the consolidated version with your compiler.

Compiling the Consolidated Version

When you compile the consolidated version, the process should reveal some errors, as shown in the following examples.

```
DIAGNOSTIC CROSS REFERENCE AND ASSEMBLER SUMMARY
THE FOLLOWING STATEMENTS WERE FLAGGED
000079 000080 000083 000085 000088 000090 000093 000095 000096 000097
10 STATEMENTS FLAGGED IN THIS ASSEMBLY      8 WAS HIGHEST SEVERITY CODE
```

The following displays the lines of code that are in error.

```
ASSEMBLER DONE
400000      79      MVC DATA(80),SPACES      clean receiving data area
IEV034 *** ERROR *** ADDRESSABILITY ERROR
410000      80      MVC DATA+80(36),SPACES      clean up to line end
IEV034 *** ERROR *** ADDRESSABILITY ERROR
                        83      CH R1,H4
IEV034 *** ERROR *** ADDRESSABILITY ERROR
                        85      MVC HEADLINE,HEADLIN1
IEV034 *** ERROR *** ADDRESSABILITY ERROR
                        88      CH R1,H8
IEV034 *** ERROR *** ADDRESSABILITY ERROR
                        90      MVC HEADLINE,HEADLIN2
IEV034 *** ERROR *** ADDRESSABILITY ERROR
420000      93      MVC HEADLINE(133),HEADER      initialize page header
IEV034 *** ERROR *** ADDRESSABILITY ERROR
430000      95      MVC ENDLINE(133),ENDER      initialize end-of-report
IEV034 *** ERROR *** ADDRESSABILITY ERROR
440000      96      ZAP RECNUM,ZERO      initialize record counter
IEV034 *** ERROR *** ADDRESSABILITY ERROR
450000      97      ZAP LINCT,ZERO      initialize line counter
IEV034 *** ERROR *** ADDRESSABILITY ERROR
10 STATEMENTS FLAGGED IN THIS ASSEMBLY      8 WAS HIGHEST SEVERITY CODE
```

The compile errors reveal that the program constants were defined improperly. It looks like you'll need to investigate the data area for an unresolved conflict.

Resuming the Reconciliation Effort

To resume an interrupted reconciliation, first you need to load, then edit, the WIS file. To load this file, select **4** (LOAD) from the *Member Reconciliation* menu. You will receive an acknowledgment that your WIS file has been loaded.

To edit the file, select **5** (EDIT) from the *Member Reconciliation* menu. The *Reconcile* panel displays.

Resolving the Third Conflict

On the *Reconcile* panel, page to the bottom of the data (using primary command MAX and then pressing [PF8]). On the *Reconcile* panel, shown below, move the Dummy Section IHADCB after the label ENDER.

```
View All ----- RECONCILE ----- ROW 191 TO 210 OF 210
COMMAND ==>
R:RECEIVBL P:PAYABLE N:NEW_RELS
000065 EODAD=ENDDATA
mm_P_ * Data Control Block Dummy Section (IHADCB)
> _P_ PRINT ON,NOGEN
mm_P_ DCBD DEVD=DA,DSORG=PS
> _N_ * Data Constants
> ___+ HEADLIN1 DC CL133'1 * * ACCOUNTS RECEIVABLE * * '
>> ___+ RPRTITLE DC CL133'1 * * * * ABC COMPANY * * * * '
> ___+ HEADLIN2 DC CL133'1 * * * ACCOUNTS PAYABLE * * * '
> _N_ ZERO DC P'0' packed zero
> _N_ ONE DC P'1' packed one
> ___+ ONE DC P'1' packed one
> ___+ ONE DC P'1' packed one
> _N_ P50 DC P'50' packed fifty
> _N_ SPACES DC CL80' ' eighty blanks
> _N_ HEADER DC CL133'1 * * * RECORD LISTING * * * '
a _N_ ENDER DC CL133'1 * * * END OF REPORT * * * '
000066 * Register Equates
000067 YREGS
000068 END PROGNAME end of program
/*_P_ END PGMACPAY end of program
***** BOTTOM OF DATA *****
```

When you press [Enter], the Reconcile panel, shown below, appears.

```
View All ----- RECONCILE ----- ROW 191 TO 211 OF 211
COMMAND ==>
R:RECEIVBL P:PAYABLE N:NEW_RELS
000065 EODAD=ENDDATA
----- 3 Lines DELETED
> _N_ * Data Constants
> ___+ HEADLIN1 DC CL133'1 * * ACCOUNTS RECEIVABLE * * '
>> ___+ RPRTITLE DC CL133'1 * * * * ABC COMPANY * * * * '
> ___+ HEADLIN2 DC CL133'1 * * * ACCOUNTS PAYABLE * * * '
> _N_ ZERO DC P'0' packed zero
> _N_ ONE DC P'1' packed one
> ___+ ONE DC P'1' packed one
> ___+ ONE DC P'1' packed one
> _N_ P50 DC P'50' packed fifty
> _N_ SPACES DC CL80' ' eighty blanks
> _N_ HEADER DC CL133'1 * * * RECORD LISTING * * * '
> _N_ ENDER DC CL133'1 * * * END OF REPORT * * * '
>> ___+ * Data Control Block Dummy Section (IHADCB)
>> ___+ PRINT ON,NOGEN
>> ___+ DCBD DEVD=DA,DSORG=PS
000066 * Register Equates
000067 YREGS
000068 END PROGNAME end of program
/*_P_ END PGMACPAY end of program
```

You have now resolved the third conflict. Enter [PF3] END and return to the *Member Reconciliation* menu.

Wrapping Up the Reconciliation Effort

Before exporting the consolidated version, you might want to change your user profile, so that the reconciliation analysis results are appended as comments to the consolidated version. Here is how to do this:

- From the *Member Reconciliation* menu, select **0** (PROFILE), then **4** (EXPORT options).
- Set **EXPORT PREFIX=YES**.
- Export the consolidated version as described in "Exporting the Consolidated Version (Option 6)" on page 58.
- Exit M+R.
- Browse (using **ISPF 1**) the updated member ASMBLBAS in CDFUSER.CDF.EXPORT.

The beginning of the consolidated version is displayed in the figure below.

```

000001 *****/* 2000/12/04 17:12:21 somnode.CMNZMF.SAMPLES
000002 * * /* Records in Exported File: 220 */
000003 * * /* |----- */
000004 * * /* |DEGREE OF COMPLEXITY: 9 HIGH */
000005 * * /* |----- */
000006 * * /* | RECORDS | CONFLICTS | SINGLE CHANGES */
000007 * * /* |-----|-----|----- */
000008 * * /* |NICKNAMES | PREV CURR DIFF | PREV CURR DIFF */
000009 * * /* |-----|-----|----- */
000010 * * /* |ORIGINAL 68 | 3 0% | 30 0% */
000011 * * /* |-----|-----|----- */
000012 * * /* |RECEIVBL 70 | 3 0% | 0 0% */
000013 * * /* |-----|-----|----- */
000014 * * /* |PAYABLE 85 | 13 0% | 9 0% */
000015 * * /* |-----|-----|----- */
000016 * * /* |NEW_RELS 131 | 9 0% | 81 0% */
000017 * * /* |-----|-----|----- */
000018 * * /* |RECONCIL | 0 0% | 0 0% */
000019 * * /* |-----|-----|----- */
000020 * * /* | TOTAL: | 28 0% | 120 0% */
000021 * * /* |-----|-----|----- */
000022 * * /* Reconciliation Scope: */
000023 * * /* NICKNAME MEMBER LAST MODIFIED USER ID DATA S */
000024 * * /* ----- */
000025 * * /* ORIGINAL ASMBLBAS 2000/11/21 15:52 SERENA somnode.CMN */
000026 * * /* RECEIVBL ASMBLDV1 2000/11/21 15:52 SERENA somnode.CMN */
000027 * * /* PAYABLE ASMBLDV2 2000/11/21 15:52 SERENA somnode.CMN */
000028 * * /* NEW_RELS ASMBLDV3 2000/11/21 15:52 SERENA somnode.CMN */
000029 * * /* RECONCIL 2000/12/04 17:12 CDFUSER Current Wor */
000030 * * /* ----- */
000031 PROGRAM CSECT
000032 STM R14,R12,12(R13) save caller's registers
000033 LR R12,R15 get program address
000034 USING PROGRAM,R12 addressability
000035 B AROUND go around label
000036 DC CL8'PROGRAM' program name
000037 DC CL8'&SYSDATE' date assembled
000038 DC CL6'&SYSTIME' time assembled
000039 COPYRITE DC C' COPYRIGHT (C) '

```

When you compile the updated member ASMBLBAS, it should be error-free. You can now put the consolidated version into production.

Messages and Codes

M+R is an application under TSO/ISPF. As such, messages typically appear in short form in the upper right corner of the screen and in long form only if Help [PF1] is entered.

This appendix lists messages from M+R. The messages in series *SERnnnA* may require an action to rectify the situation evoking the message. Other messages, in series *SERnnnI*, are informational and require no action.

Messages are listed numerically by short message, followed by the long message, then an explanation, and finally, the required action (where needed).

SER001A M+R NOT LICENSED!

M+R not licensed for your use; contact local help desk.

M+R is a separately licensed product. The software, as installed, has detected that M+R has not been licensed and refuses to continue.

Action: If you get the message above and wish to investigate M+R further, contact your marketing representative.

SER002A M+R LICENSE HAS EXPIRED!

M+R license has expired; contact local help desk.

M+R is a separately licensed product. The software, as installed, has detected that M+R license has expired.

Action: If you get the message above and wish to continue to use M+R, contact your marketing representative.

SER003A Invalid Option

Enter one of the listed options.

A menu has been presented and the only acceptable response is one of the listed options.

Action: Enter one of the listed options or exit.

SER004A Invalid TEXT Type

Valid TEXT: BAL C COBOL FORTRAN JCL NATURAL PANEL PLI REXX RPG.

You have attempted to update your personal profile with a TEXT Type that has been misspelled. The long message above is a common subset of the entire list.

Action: Spell the TEXT Type correctly or enter a period (.) as a wildcard so that M+R can dynamically determine the columns to compare. Whatever is chosen can also be prefixed with a dollar (\$) sign to suppress ignoring of spaces in the comparison.

SER005A Must Be SEQ

Print File must be SEQuentially organized.

You have attempted to update your personal profile for **P**rint with a Data Set Name for **P**rint that is not SEQuential (DSORG=PS).

Action: Change the data set name and M+R will automatically allocate it with proper attributes.

SER006A MODULE(S) NOT LOADED!

At least one module not loaded; unable to proceed.

At initialization, M+R attempts to load modules required for its work. If it is unsuccessful, M+R terminates.

Action: Verify that your TSO logon procedure points to the M+R load library.

SER007A Must Be PDS or SEQ

Work-in-suspense file must be partitioned or SEQ Data Set.

You have attempted to update your personal profile with a Data Set Name for your WIS file that is neither PDS nor SEQuential.

Action: Change the data set name and M+R will automatically allocate it with proper attributes.

SER008I Changed Versions

At least one version: XXXX; number of same versions: ZZZZ.

You have changed the base or derivative data sets or both. XXXX can be any combination of the words "added," "moved," and "dropped" which describe your changes. ZZZZ is the number of same versions, although not necessarily in the previous order.

SER009I Profile Updated

Profile updated as entered for this and future sessions.

Action: The personal profile has been updated permanently. It applies for the rest of this session and future sessions until updated (in place) again. No action is required.

SER010A I/O Error

Input/Output error detected; unable to proceed.

A file Input or Output error has been detected. The more common symptom is specifically described under message SER037A below. This is the catch-all message for other errors.

One of the files specified under Profile Data Sets or VERSIONS has experienced an input error of undetermined origin. One of the possible reasons is the specification of PAN or LIB for a file that indeed is neither CA Panvalet nor CA Librarian, but that generally precipitates SER019A OPEN failure.

Action: Split the screen and inspect the file with option 3.2 of ISPF. If it appears normal, attempt to browse (ISPF Option **1**) the file.

SER011A DSNNAME Missing

Base DSNNAME missing or derivative DSNs not continuous; please enter.

An attempt has been made to specify data set names with an empty slot or these are not data sets. The minimum specification is a base. Derivatives 1 - 7 (Drv1 to Drv7) must be contiguous, i.e., no gaps. The cursor is placed at the perceived gap data set name.

Action: Respecify the versions such that there are no gaps or supply at least a base data set.

SER012A Allocation Failure

Data set not cataloged or under exclusive control; CANCEL or change.

An attempt has been made to specify data set name that could not be allocated to the session. The cursor is placed at the offending data set name.

Action: Probable user error in spelling the data set name or the data set is being exclusively allocated to another task. For example, an M+R batch job may be running that writes to the **P**rint and/or WIS data set.

Also remember that TSO ID and/or user prefix are *not* assumed. Full specification is always required in M+R.

SER013A TYPE Invalid

TYPE must be PDS, SEQ, PAN, LIB, or blank.

An attempt has been made to specify a TYPE and was misspelled. The cursor is placed at the offending TYPE. Valid literals and their meanings are:

- PDS - Partitioned Data Set, (DSORG=PO) includes PDSE
- SEQ - Sequential, DSORG=PS
- PAN - CA Panvalet
- LIB - CA Librarian

Action: If PAN or LIB, specify accordingly. Otherwise, we recommend leave it blank for M+R to determine.

SER014A MEMBER Invalid

MEMBER must be alphanumeric starting with alpha, @, #, or \$.

An attempt has been made to specify a MEMBER that is considered invalid. It must follow the rules for a PDS member name with the exception that it can be nine or ten characters long only if the version data set is PAN. The cursor is placed at the offending MEMBER.

Action: Specify correctly. Specify a pattern (ABC*) or leave it blank to get a member list.

SER015A MEMBER Invalid

MEMBER name can be longer than 8 chars only if PANvalet.

An attempt has been made to specify a MEMBER that is longer than eight characters and TYPE was not specified as PAN. The cursor is placed at the offending MEMBER.

Action: Respecify MEMBER name with a maximum of eight alphanumeric characters.

SER016A Pattern, Base Only

A member pattern is applicable only to the base data set.

An attempt has been made to specify a pattern for MEMBER of a derivative. This facility is only applicable to the base. The cursor is placed at the offending MEMBER.

Action: Blank out the offending MEMBER name.

SER017A MEMBER Must Be Blank

MEMBER name must be blank for SEQuential data sets.

An attempt has been made to specify a MEMBER and the data set was specified as SEQ or dynamically discovered to be DSORG=PS. The cursor is placed at the offending MEMBER.

Action: Blank out the offending MEMBER name.

SER018A TYPE Inconsistent

TYPE inconsistent with data set organization.

An attempt has been made to specify a TYPE that is inconsistent with what was dynamically discovered; for example, TYPE=PDS was specified and the data set is not a PDS; TYPE was specified as SEQ, PAN, or LIB, and the data set is really a PDS. The cursor is placed at the offending TYPE.

Action: Correct the offending TYPE.

SER019A OPEN Failure

Unable to OPEN the specified data set.

An attempt has been made to OPEN a data set and it failed. Probable cause is an error in the specification for PAN or LIB. The cursor is placed at the offending DSNAME.

Action: Split the screen and inspect the file with option 3.2 of ISPF.

SER020A Invalid DSORG

Data set organization (DSORG) unacceptable, e.g., VSAM.

A data set was allocated as specified but was discovered to have an organization (DSORG) that cannot be handled, such as VSAM. The cursor is placed at the offending DSNAME.

Action: Respecify the offending DSNAME.

SER021A Invalid RECFM

Record Format (RECFM) unacceptable, e.g., Undefined.

A data set was allocated as specified but was discovered to have a record format (RECFM) that cannot be handled, such as Undefined, which implies a load library. The cursor is placed at the offending DSNAME.

Action: Respecify the offending DSNAME.

SER022A Member Not Found

XXXX member not found in ZZZZ.

An attempt has been made to specify a MEMBER name that could not be found. The cursor is placed at the offending MEMBER.

XXXX is the member name; ZZZZ is either "base" or "derivative."

Action: Specify correctly. Specify a pattern (ABC*) for base MEMBER or leave it blank to get a member list.

SER023A Nothing to Execute

Versions not set; no work-in-suspense; nothing to edit.

An attempt has been made to EXECUTE (option **2**), EDIT (option **5**), EXPORT (option **6**), or for an ANALYSIS (option **7**) on the *Member Reconciliation* menu and there was nothing in place yet to process in this session.

Action: Set the VERSIONS (option **1**), or LOAD a prior WIS.

SER024A No Members

No members match the specified criteria (pattern, range, or mask).

An attempt has been made to EXECUTE (option **2**) on the *Member Reconciliation* menu or to invoke the *Consolidation Workplace* panel (option **3**) on the other tool menus, and it was determined that the specified base library had no members that matched the MEMBER pattern, range, or mask. Also, the library may be empty.

Action: If the library is empty, pick another library or determine the reason for it being empty. If a pattern was used, make it less restrictive—instead of ABC*, use A*. If a range (first/last member name or pattern) was used, check the directory and make it more inclusive.

SER025A Bad Pattern

Member pattern (*) must fit within first 8 characters.

An attempt has been made to specify a pattern for MEMBER that is considered invalid. The cursor is placed at the offending MEMBER.

Action: The pattern delimiter (*) must exist within the first eight characters and be followed by all blanks. This is true even if the library is PANvalet.

SER026A Invalid ID

ID field must be an alphabetic character "A" to "Z".

An attempt has been made to specify an ID that is considered invalid. Only alphabetic characters in the range "A" to "Z" are allowed. The cursor is placed at the offending ID.

Action: Specify a unique character for ID of this derivative, thus avoiding any confusion when the *Reconcile* panel is presented.

SER027A Duplicate ID

ID field must be unique—reenter ID.

An attempt has been made to specify an ID that is not unique, i.e., the same character already has been used as an ID for another derivative. The cursor is placed at the offending ID.

Action: Specify a unique character for ID of this derivative, thus avoiding any confusion when the *Reconcile* panel is presented.

SER028A Inconsistent DSORG

Data set organization (DSORG) inconsistent with findings.

A data set for export was allocated as specified but was discovered to have an organization (DSORG) inconsistent with what was specified: PDS for SEQ, PAN for PDS. The cursor is placed at the Export DSORG.

Action: Respecify the offending DSORG or Export DSNAME.

SER029I Versions Accepted

Data set names specified as versions have been accepted.

Action: This message acknowledges that you have passed all validations and allocations for the specifications. No action is required.

SER030I Print Complete

Printed report formatted in file "Print DSNAME".

This message acknowledges that you made an attempt to PRINT (option **5P**), EXP PRINT (option **6P**), or ANL PRINT (option **7P**), on the *Member Reconciliation* menu, or to Print on the *Consolidation Workplace* panel, and it was successful. No action is required.

Optionally, you can browse (ISPF option **1**) the Print DSNAME as specified on *Profile Data Sets* panel. You may also route the file to a local printer outside of M+R.

SER031A Execution Required

Consolidation (option 2, EXECUTE) required first.

An attempt has been made to SAVE a WIS (option **3**) on the *Member Reconciliation* menu but there was nothing in place yet to save in this session.

Action: Either set the VERSIONS and EXECUTE, or LOAD a prior WIS.

SER032A "WIS" Empty

"Work In Suspense" empty or member not found.

An attempt has been made to LOAD a prior WIS (option **4**) on *Member Reconciliation* menu but the file was found to be empty or the selected member was not found in the WIS library.

Action: Set the VERSIONS (option **1**) and EXECUTE (option **2**) something to populate the WIS file before attempting to LOAD again.

SER033I "WIS" Loaded

"Work In Suspense" from prior session loaded; ready to edit.

This message acknowledges that you have attempted, on the *Member Reconciliation* menu, to LOAD (option **3**) a WIS from a prior session and were successful. No action is required.

SER034I Must Be SEQ

"Work In Suspense" must be SEQuential file for Member Reconciliation.

An attempt has been made to validate the profile settings (option **0**) on the *Member Reconciliation* menu, but the specified WIS data set is not a sequential file. If you enter a new DSNAME, M+R will allocate it for you.

SER035I Export Complete

Consolidation effort successfully exported to external file.

This message acknowledges that you have attempted to EXPORT (option **6**) on the *Member Reconciliation* menu or, on the *Consolidation Workplace* panel, to issue an **E**xport line command and were successful. No action is required.

SER036I "WIS" Saved

"Work In Suspense" saved for future session.

This message acknowledges that you have ENDED the reconciliation on the *Reconcile* panel or attempted to SAVE (option **3**) a consolidation effort on the *Member Reconciliation* menu, and were successful. No action is required.

SER037A Abend Sx37

Target file full; compress/reallocate before proceeding.

An attempt to write to an output file failed because of an x37 abend: B37, D37, E37. The cursor is positioned to the file involved.

Action: Split the screen and inspect the file with option 3.2 of ISPF. If the file is a PDS, a library compress will probably be sufficient unless all directory blocks are consumed.

If the file is SEQuential, you have to reallocate it with larger dimensions and try again.

SER038A "WIS" Data Invalid

"Work In Suspense" has invalid data; considered unusable due to ZZ.

An attempt has been made to LOAD a prior WIS (option **4**) on the *Member Reconciliation* menu, but the data was found to be invalid and LOAD failed with a reason code ZZ, as follows:

40 - WIS perceived as empty

41 - Lengths of the statistics record out-of-sync

42 - No Base/Delta record found

- 43 - Lengths of a Base record out-of-sync
- 44 - No Delta record found
- 45 - Lengths of an Analysis record out-of-sync
- 46 - Delta Table missing
- 47 - Lengths of a Delta record out-of-sync
- 48 - No Delta Table entry found
- 49 - No End-of-Delta-Table found
- 4A - More than 8 Delta Table entries found
- 4B - WIS file continues after End-of-Delta-Table
- 4C - Previous Delta Deck 1st record lost
- 4D - Base record search out-of-sync
- 4E - Base record search abruptly ended
- 4F - Base record search unsuccessfully ended
- F0 - Delta Deck last record lost while switch to a new set of decks
- F1 - Delta Deck last record lost while switch to a new deck

Action: Set the VERSIONS (option **1**) and EXECUTE (option **2**) something to populate the WIS file before attempting to LOAD again.

If this message persists, write down the reason code and contact your local help desk.

SER039I Analysis Complete

Analysis of consolidation effort completed.

This message acknowledges that you have attempted to perform ANALYSIS (option **7**) on the *Member Reconciliation* menu, or to issue **Analysis** line command on the *Consolidation Workplace* panel and were successful. No action is required.

SER040I Request Cancel'd

Your request has been CANCEL'd as directed.

This message acknowledges that you have entered CANCEL (or abbreviated CAN) on the command line to exit immediately. No action is required.

SER041A Export Error

Output error of undetermined origin at export time.

An attempt has been made to export a consolidation effort and an output error has been uncovered.

Action: Most likely PAN (CA Panvalet) or LIB (CA Librarian) has been selected as the data set organization for the export file. Try to access the file outside M+R and rectify any adverse conditions.

SER042A Invalid Command

Use "S" Select, "F" Force, "P" Print, "E" Export, or "A" Analysis.

An attempt has been made to issue a line command from the *Consolidation Workplace* panel which is illegal.

Action: Enter "S" to execute or load a member from WIS, or "F" to force the execution of a member, or "P" to print the last view of a just-edited member, or "E" to export a just-reconciled member, or "A" to analyze an executed or exported member.

SER043A Unresolved Conflicts

Export with Unresolved Conflicts NOT allowed - Profile Setting.

An attempt has been made to export a consolidation effort with unresolved conflicts while the profile setting "Export Conflicts" is NO.

Action: Either resolved the conflicts and try to export or change the profile setting of "Export Conflicts" to YES.

SER044A Member Range Invalid

Last Member name in range NOT greater than Starting Base MEMBER.

An attempt has been made to validate the input on *Versions* panel (option 1). The required range of member names is invalid due to last member name being greater than the first member name.

Action: Either swap the first/last member names or enter a valid range.

SER045I Must Be PDS RECFM = VB

"Work In Suspense" must be PDS, RECFM = VB, LRECL > 273.

This message warns you that the WIS data set specified on the *Profile Data Sets* panel must be PDS with proper DCB parameters. If you enter a new DSNAME, M+R will allocate it for you.

SER046A Empty File

Member or sequential file does not contain any records.

The base file is considered empty. The cursor is positioned to the base DSNAME or member.

Action: Respecify the base DSNAME if SEQuential or select a different member if PDS, PAN, or LIB type.

SER047A SERBUILD Return Code 08

SERBUILD processing failed with reason code ZZ.

The SERBUILD program has encountered a non-recoverable condition and cannot complete the processing due to a hexadecimal reason ZZ as follows:

06 - Data record length error

- 07 - Bottom-Of-Data missing
- 08 - Conflict Setting - lower limit greater than upper limit
- 09 - End-Of-DB missing while retrieving base records
- 0F - Unknown Function
- 10 - End-Of-DB missing while freeing trapped base records
- 20 - Merge out-of-sync
- 21 - Base record not found while processing CPX directive
- 22 - Delta Hex ID not found in NUMTABLE
- 23 - User Delta Hex ID not found in DELTABLE
- 24 - No address of base file in storage
- 25 - No Entry Point Address of ISPLINK
- 26 - No Entry Point Address of SERBSAM
- 27 - No Entry Point Address of Comparex
- 28 - No Entry Point Address of M+RPANEL
- 29 - Not EXECUTE/LOAD on First Call
- 2A - PCA address/indicator conflict on Next Call
- 2B - DB address invalid on Next Call
- 2C - DB address/indicator conflict on Next Call
- 2D - Delta Table address/indicator conflict on Next Call
- 2E - DYNPANEL Area address/indicator conflict on Next Call
- 2F - Response Area address/indicator conflict on Next Call
- 30 - DB missing on SAVE Call
- 31 - WIS file in storage address NOT cleared
- 39 - End-Of-DB missing while saving Base records
- 3A - End-Of-DB missing while saving Delta records
- 50 - DB missing on EDIT Call
- 5D - ISPF variables definition failure
- 60 - DB missing on EXPORT Call
- 69 - End-Of-DB missing
- 70 - DB missing on ANALYSIS Call
- 71 - Banner desk restructuring miss
- 74 - Invalid request to M+RPANEL

77 - Delta Hex ID invalid
78 - No Delta record found for stats record
79 - User Delta ID not found
7A - Zero divider
7B - First User Delta record not blank
7C - First User Delta record not found
7D - No Delta record found for appending
7E - Unknown Analysis Request
7F - Analysis deck missing
96 - JCL scan End-Of-DB missing
97 - JCL substitution End-Of-DB missing
98 - JCL substitution PROC statement out-of-cinch
99 - JCL scan/substitute/CPY scan redundant deck
9A - JCL scan out-of-sync
9B - JCL expand out-of-sync
9D - CPY scan End-of-DB missing
A0 - DB missing on PRINTRCN Call
B0 - DB missing on PRINT Call
C0 - DB missing on PRINTANL Call
F2 - No address of "WIS" file in storage

Action: Write down the SERBUILD hexadecimal reason code ZZ and contact your local help desk.

SER048A SERBSAM Return Non-Zero

File in Storage Handling failed with return code ZZ.

The SERBSAM program which handles Files in Storage has completed with a non- zero return code ZZ.

Action: Write down the SERBSAM return code ZZ and contact your local help desk.

SER049A COMPARE Return > 4

Comparison of base to derivative failed with return code ZZ.

The text comparison of the base to one of the derivatives has failed with a return code ZZ greater than 4.

Action: Write down the return code ZZ and contact your local help desk.

SER050A Appl/Package Invalid

ChangeMan ZMF application or change package invalid; format xxxx999999.

The ChangeMan ZMF application or change package specified is invalid. Format is as follows: xxxx999999, where xxxx is the four character application mnemonic and 999999 is the package number.

Action: Verify that the ChangeMan ZMF application mnemonic and the package number are in the correct format, and respecify.

SER051A Appl/Package Not Found

ChangeMan ZMF application or change package not found.

The application or change package specified does not exist for this ChangeMan ZMF instance.

Action: Verify the existence of the application or change package under this ChangeMan ZMF instance.

SER052A Export CMN Package

ChangeMan ZMF package required for export; application insufficient.

The M+R/ChangeMan ZMF interface requires a change package number to export the consolidation effort to a ChangeMan ZMF Staging library.

Action: Specify the ChangeMan ZMF package number and corresponding library type to be used as the target of the export of the consolidation effort.

SER053A Export CMN Status

ChangeMan ZMF change package for export must be in "DEV" status.

The M+R/ChangeMan ZMF interface requires a change package in "development" status to export the consolidation file to the staging library.

Action: Specify a change package which is in development status or revert the package to development status.

SER054I Export CMN Package Complete

Consolidation effort successfully exported to ChangeMan ZMF package.

This message acknowledges that you have attempted to EXPORT (option **6**) on the *Member Reconciliation* menu, or to issue an **Export** line command on the *Consolidation Workplace* panel, for a consolidation effort to a ChangeMan ZMF change package and were successful. No action is required.

SER055A LibType Not Found

ChangeMan ZMF library type not found in specified application.

The specified library type is not valid under this ChangeMan ZMF application.

Action: Verify that this library type is valid for this application using the ChangeMan ZMF Local Administration function.

SER056A LibType Required

ChangeMan ZMF library type is required.

The library type is required if a ChangeMan ZMF application/package has been specified.

Action: Enter the appropriate ChangeMan ZMF library type to be processed.

SER057A Cannot Export to Package

Profile Export data set is not PDS or SEQ; update your profile.

The DSORG of the Export DSNAME data set is not PDS or SEQ. As M+R first exports to that data set and then from it to a ChangeMan ZMF package, it needs to be either PDS or SEQ.

Action: If you want to export to a ChangeMan ZMF package, change the Export DSNAME to a data set with DSORG either PDS or SEQ on the *Profile Data Sets* panel.

SER058I Unresolved Conflicts

Either Edit to solve or try again to export with records in conflicts.

The user has attempted to export a reconciliation when unresolved conflicts exist.

Action: You may ignore this warning by repeating the export request, or return to the *Reconcile* panel to resolve the conflicts and then try to export.

SER059I "WIS" Will Be Overlaid

Current work not Saved or Exported; it will be lost on Execute/Load.

The user has attempted to execute a new reconciliation or load a previously saved WIS file when the current reconciliation is neither **S**aved nor **E**xported; this way, it will be lost.

Information: You may ignore this warning by repeating the eXecute/Load request, or you may first **S**ave/**E**xport your current work.

SER060A Invalid Command

Follow primary command with space and an argument up to 8 char long.

You have entered what appears to be a "Locate" (abbreviated L) or "Create" (C) command without an argument.

Action: Reenter the command with a legal argument, such as a name.

SER061A MOVE/COPY Is Pending

Enter "M", "C", "MM", or "CC" line command, or PASTe, or RESeT.

You have entered a destination command ("A" or "B") and the source move/copy or PASTe command is pending.

Action: Enter "M", "C", "MM", or "CC" line commands, or PASTe command, or the RESeT primary command without any argument.

SER062A Command Conflict

Enter "M", "C", "MM", or "CC" line command, or PASTe, or RESet.

You have entered a destination move/copy command ("A" or "B") and then something other than source move/copy command(s) or PASTe.

Action: Blank out and enter, or override with, "M", "C", "MM", or "CC" source command(s), or enter PASTe command, or the RESet primary command without any argument.

SER063A Command RESet

This syntax was invalid; please reenter the command.

You have entered an invalid combination of commands which causes the system to internally reset itself.

Action: Reenter a valid combination of commands.

SER064A Invalid Argument

Enter numeric or space for a line command argument or RESet.

You have entered a line command argument which is neither a numeric nor a space.

Action: Set the line command argument to either numeric or space (the default argument of "1" will be supplied).

SER065A MOVE/COPY Destination

Enter "A" or "B" line command, or CUT, or RESet.

You have entered a move/copy source command(s) ("M", "C", "MM", or "CC") and the destination command is pending.

Action: Enter an "A" or "B" destination command, or CUT, or the RESet primary command without any argument.

SER066A Command Conflict

Enter "A" or "B" line command, or CUT, or RESet.

You have entered move/copy source command(s) ("M", "C", "MM", or "CC") followed by input other than a move/copy destination command.

Action: Blank out and enter, or override with, an "A" or "B" line command, or enter CUT or the RESet primary command without any argument.

SER067A bb Pending

Enter bb and "A" or "B" line commands, or CUT, or RESet.

You have entered one block move/copy command ("MM" or "CC"); the corresponding block command and the destination command are pending.

Action: Complete the initiated block move/copy command and enter a destination command or CUT command. Otherwise, enter the RESet primary command without any argument.

SER068A Command Conflict

Enter "MM" or "CC" and "A" or "B" line commands, or CUT, or RESet.

You have entered a block move/copy command ("MM" or "CC"), then something other than the corresponding block command or a destination command.

Action: Blank out or override, then complete the initiated block move/copy command, or enter a destination command or CUT command. Otherwise, enter the RESet primary command without any argument.

SER069A RESet - Cmd Conflict

Command processing interrupted; enter RESet to continue.

You have entered an invalid combination of commands which causes the system to request a user-initiated reset.

Action: Enter the RESet primary command without any argument, then resume your editing.

SER070A Command Not Recognized

Enter Insert, Delete, Repeat, eXclude, Undelete, Show, Move, or Copy.

You have entered an invalid line command.

Action: Enter one of the listed commands.

SER071A Interface VRM Not Proper

Proper Version of PAN/LIB interface required; regen.

An old version of the interface module has been used. The access to PANvalet and LIBrarian master files is performed by the module which must have previously been generated at install time.

Action: Regenerate the version.

SER072I "WIS" Saved

Current consolidation effort has been saved in the "Work In Suspense".

The user has issued the SAVE primary command from the *Reconcile* panel or END [PF3] to exit that panel.

Action: None is required. You may cancel any reconciliation made after this point, then load the WIS file to reverse the reconciliation to its state prior to that message.

SER073I bb Pending

Block command bb is pending.

You have entered a valid block command which has not yet been bounded by the other half. *bb* is filled in appropriately with DD, UU, RR, or XX. This message will appear until you bound the block command.

Action: Complete the pending command or enter the RESet primary command without any argument.

SER074A Command Conflict

Block command *bb* is pending; complete it or enter RESet.

You have entered a line command while block command *bb* is still pending.

Action: Complete the pending command or enter the RESet primary command without any argument.

SER075A Invalid Command

Enter "F" or "L", plus a numeric, blank, or * on excluded lines.

You have entered an inappropriate command on a line containing "NOT Displayed" marker.

Action: Enter first or last line command with an argument, if desired.

SER076A Invalid Command

"Locate" or "Create" (project) with an up to 8 chars argument is allowed.

M+R does not recognize the primary command as entered.

Action: Enter "L" ("Locate") and an argument on the *Consolidation Workplace* panel, or ignore. Enter "L" ("Locate") or "C" ("Create") and an argument on the *Projects* panel, or ignore.

SER077A Invalid Command

Follow "Locate" or "Begin" with a numeric value from 0 to 999999.

You have entered a non-numeric after a "Locate" or "Begin" command.

Action: Follow it with a numeric only, e.g., Locate 37, Begin 1987.

SER078A Invalid Command

Enter "F" or "L", plus a numeric, blank, or * on deleted lines.

You have entered an inappropriate command on a line containing a "DELETED" marker.

Action: Enter First or Last command with an argument, if desired.

SER079I Nowhere to Scroll

Nothing on the RIGHT of the display.

Nothing on the LEFT of the display.

You have entered one of the "LEFT" or "RIGHT" scrolling commands. All the content of the records in that direction is entirely displayed.

SER080A Seq no. Higher than Base

BEGIN/LOCATE Seq. no. higher than the highest Sequence Number of Base.

You have entered the "Begin" or "Locate" command with a sequence number which is higher than the highest sequence number of the base.

Action: Repeat the command with lower sequence number.

SER081A Source ID Invalid

Requested ID of Source derivative does NOT exist—see Header.

You have entered an M+R primary command with an ID for a source code derivative that does not exist.

Action: Check IDs displayed in the header (the third line) on the *Reconcile* panel and repeat the command. If there are two IDs per a nickname, the first one is the ID of the source code version and the second is the ID of the copy/include code version.

SER082I Derivative NOT Excluded

Nothing to Reset—this Derivative has NOT been eXcluded.

You have entered the RESet command with an ID of a derivative which has not been eXcluded.

SER083A Invalid Cmd Parameter

Parm ALL (*) is valid for First and Last line commands only.

You have entered the parameter ALL (*) for a line command **I**nsert, **D**elete, **U**ndelete, **R**epeat, **S**how, **M**ove, or **C**opy.

Action: Repeat the command with blank or number as a parameter.

SER084A Command Conflict

Line command is pending; complete it or enter RESet.

You have entered a **F**irst/**L**ast line command on a "Line(s) NOT Displayed" or "Line(s) DELETED" line while another line command is pending.

Action: Blank out the **F**irst/**L**ast command and complete the previously initiated pending command or enter RESet.

SER085A F/L Invalid on This Line

First/Last Cmd valid only on "NOT Displayed" and "DELETED" line.

You have entered the **F**irst or **L**ast line command somewhere other than on "Line(s) NOT Displayed" or "Line(s) DELETED" lines.

Action: Repeat the command on a proper line.

SER086A "U" Invalid on This Line

Undelete command valid only on deleted ("/") or cut ("<<") lines.

You have entered the **Undelete** line command somewhere other than on previously deleted records shown as "commented out" (/*) or cut (<<) lines.

Action: Repeat the command on a previously deleted or cut record.

SER087I BROWSE Only

BROWSE Only—ONLY Scrolling allowed.

You have entered an M+R primary command while browsing the Reconciliation *Analysis* panel. Only scrolling is allowed.

SER088A Command Conflict

"@" is within the range of "\$\$"command; enter RESet command.

You have entered a destination command "@" ("A" or "B") which is within the copied/moved block defined by the command "\$\$" ("C", "M", "CC", or "MM").

Action: Enter the RESet primary command without any argument.

SER089A Invalid Command

"O"verlay currently NOT supported; enter RESet command.

You have entered a destination command "O" (overlay) which is not supported in this release.

Action: Enter the RESet primary command without any argument.

SER090I Batch Not Allowed

Submitting a batch job is disabled on your installation.

You have selected option **4** (BATCH), which was disabled during the installation of M+R.

SER091A Severe Error

End the session; contact local Help desk.

Action: No user correction possible. Try to recreate and document the situation before reporting to your local Help desk.

SER092A PQUERY Service Error

ISPF PQUERY Service error; contact local Help desk.

An error was detected on return from an ISPF PQUERY service call.

Action: No user correction possible. Enter END primary command. Then continue through the option **5** (EDIT) on the *Member Reconciliation* menu or **Select** on the *Consolidation Workplace* panel.

SER093A Nothing to Export

No member has been selected for execution—nothing to Export.

The user has issued the **Export** line command against a member in the *Consolidation Workplace* when no member has ever been executed in this M+R session.

Action: The export request is ignored as no reconciliation work exists. You should **Select** a member for execution or loading from WIS before trying to export.

SER094A Wrong Member to Export

Choose the previously executed member for Export.

The user has issued the **Export** line command against a member in the *Consolidation Workplace*, which either has never been executed or is not the last one executed.

Action: Issue the **Export** line command against the just-reconciled member.

SER095I Wrong Member to Analyze

Choose a previously executed/exported member for Analysis.

The user has issued the **Analyze** line command against the member in the *Consolidation Workplace* that has never been executed.

Action: Issue the **Analyze** line command against a member with a status of `'*Execute'`, `'*Reconcl'`, or `'**Export'`, that is, a previously executed member.

SER096A "WIS" Incompatible

Used for another set of versions; Cancel/Change in Profile or ignore.

You have changed the base and derivative data sets.

Action: You can **CAN**cel the *Versions* panel and change the WIS file on the *Profile Data Sets* panel. Then you can return to the *Versions* panel to specify the set of versions to be associated with the new WIS.

Conversely, you can ignore this message and have the new set of versions associated with the old WIS file. When you exit from M+R and start a new M+R session, this WIS will be used as an information source. However, it is recommended that a set of version libraries is associated with one set of WIS and export files which are not used with another set of versions.

SER097A Export PDS Incompatible

Used for another set of versions; Cancel/Change in Profile or ignore.

You have changed the export PDS data set while your WIS file also is PDS. M+R will not use this export library as an information source when displaying the *Consolidation Workplace* panel.

Action: You can **CAN**cel the *Versions* panel and restore the proper export file on the *Profile Data Sets* panel. Then you can return to the *Versions* panel to specify the corresponding set of versions associated with that export PDS.

Conversely, you can ignore this message and have the old set of versions associated with the new export file. When you exit from M+R and start a new M+R session, this export file will be used as an information source.

However, it is recommended that a set of version libraries is associated with one set of WIS and export files which are not used with another set of versions.

SER098I Nothing to Print

No member has been selected for execution—nothing to Print.

The user has issued **P**rint line command against a member in the *Consolidation Workplace* when no member has ever been executed in this M+R session.

Action: The print request is ignored as there is no reconciliation to print. You should either **S**elect a member for execution or load from a previously saved WIS.

SER099A Wrong Member to Print

Choose the previously executed Member for Print of last view.

The user has issued **P**rint line command against a member in the *Consolidation Workplace* which either has never been executed or is not the last one executed.

Action: Issued **P**rint line command against the just-reconciled member.

SER101A Invalid Command

XXXX is an invalid primary command; enter HELP for commands.

You have entered an invalid primary command repeated in place of XXXX.

Action: Review HELP for list of valid primary commands.

SER102A Command Conflict

Unable to execute; report to local help desk; enter RESet command.

You have entered an invalid combination of commands which causes the system to prompt you to reset this series of commands and start anew.

Action: Enter the **RESet** primary command without any argument.

SER103I Only 2560 Lines Executed

Only 2560 lines have been moved/copied—stack limit.

The range of a **M**ove/**C**opy/**R**epeat command has exceeded the stack limit of 2560 records. Only the first 2560 records have been moved/copied. You may re-issue the command for the rest of the records.

SER104I Already Exported

Selected member already exported and will be overlaid on second try.

You have selected a member that had been previously exported. A second attempt to export that member will overlay the previous export.

SER105A Invalid Command

Follow "Find" with a string possibly within quotes.

The argument of a Find command has not been entered.

Action: Enter **F**ind command and a string argument. If the string contains blanks, enclose it with a pair of quotation marks (") or apostrophes ('). If the string contains ("), enclose it with ('), and vice versa.

NOTE The search for a string enclosed with a pair of quotation marks or apostrophes is **case sensitive**.

SER106A Invalid Command

Closing quote of "Find" string missing; please re-enter.

The argument of a **F**ind command has the beginning quotation mark (") or apostrophe(') but the corresponding closing one is missing.

Action: Re-issue the command with the corresponding closing quotation mark or apostrophe.

NOTE The search for a string enclosed with a pair of quotation marks or apostrophes is **case sensitive**.

SER107A Bottom of Data

Chars NOT found; press (R)FIND key to continue from Top of Data.

The bottom of the data has been reached without finding next occurrence of the **F**ind command argument.

Action: Press (R)FIND key to continue the search from the top of the data.

SER108I No Such Chars

Requested char string NOT found.

The entire data has been searched without finding any occurrence of the **F**ind command argument.

If this message appears in response of a Find ALL command, its argument string has not been found in any of the not deleted base/derivative/user-inserted records regardless of whether they are included or excluded into/from the current view.

Otherwise, in case of "Find" without the "ALL" argument, its argument string has not been found in the current view data. You may want to issue the **F**ind command again, with the "ALL" argument.

SER109I Nothing to Find

(R)FIND Argument has NOT been provided yet.

The R(FIND) key has been pressed without previous **F**ind command. Issue a **F**ind command or ignore.

SER110I Change Error

Change aborted due to both strings being equal.

A Change ALL command has been issued with two equal arguments which renders it senseless. The "Change" command is not executed.

SER111A Invalid Command

Follow "Change" with two strings possibly within quotes.

A Change command has been issued with none or only one string argument.

Action: Re-issue the Change command with two string arguments and, if needed, an "ALL" argument, and/or (if needed) with a numeric position for the searched (first) string.

SER112A Invalid Command

Closing quote of "Change" string missing; please re-enter.

An argument of a Change command has the beginning quotation mark (") or apostrophe(') but the corresponding closing one is missing.

Action: Re-issue the command with the corresponding closing quotation mark or apostrophe.

NOTE The search for a string enclosed with a pair of quotation marks or apostrophes is **case sensitive**.

SER113I Nothing to Change

(R)CHANGE Arguments have NOT been provided yet.

The R(CHANGE) key has been pressed without previously pressing the R(FIND) key. Press the (R)FIND key, then the (R)CHANGE key, or ignore.

SER114I Change Error

Change aborted due to Max Record Length overflow.

A Change command has been issued which tries to replace a string with one of bigger size causing the Max Record Length to be exceeded. The Change command is not executed.

SER115I NNNNNN Records Changed

ALL NNNNNN records changed.

A Change ALL command has completed successfully. *NNNNNN* is the total number of records which have been changed. If a record has contained more than one occurrence of the first string argument of the Change ALL command, all such occurrences have been changed, but the record is counted once only in the *NNNNNN* total.

SER116I Change Error

NNNNNN records changed; Max Length overflow for nnnnnn records.

A Change ALL command was completed successfully. *NNNNNN* is the total number of records which have been changed. *nnnnnn* is the total number of records which have not

been changed due to exceeding the Max Record Length. If a record has contained more than one occurrence of the first string argument of the Change ALL command, all such occurrences have been changed, but the record is counted once only in the *NNNNNN* total.

SER117I Change Error

Max Record Length overflow for ALL *nnnnnn* records.

A Change ALL command was completed unsuccessfully. *nnnnnn* is the total number of records which have not been changed due to exceeding the Max Record Length. For all *nnnnnn* records which contain the first string argument of the Change ALL command, the required change would have exceeded the Max Record Length.

SER118I Change Error

Change argument NOT found in any record.

A Change ALL command has completed unsuccessfully. No records containing the first string argument of the Change ALL command have been found.

SER119A Put String in Quotes

Put quotes (") around the string of characters to be displayed.

At least two numbers specified as arguments of a **F**ind or **C**hange command—one of them should be the position while the other the search string.

Action: Re-issue the command with quotation marks (") or apostrophes (') around the search string leaving the other number to be the requested position.

SER120I Nothing to Paste

No CUT has been taken during this Reconcile session to Paste.

A PASTe command was completed unsuccessfully due to lack of source to paste. No CUT command has been issued during the current Reconcile session. Whenever you issue END or CANCEL commands and return to the *Member Reconciliation* menu or *Consolidation Workplace* panel, the content of the last CUT command (if any) is lost. Multiple PASTe commands can be issued after a single CUT command. Each CUT command overrides the content of a previous such command.

SER121I Base Already Included

Base records are displayed for the current context (view).

A Reset BAsE command has been entered for the current context without a previous command eXclude BAsE for that context (view).

Base records for the current context (view) are displayed, nothing to reset.

SER122I Base Already Excluded

Base records are NOT displayed for the current context (view).

Either an eXclude BAsE command has been entered for the current context after a previous command eXclude BAsE had already been issued for that context (view), or the

current context does not contain base records (e.g., View CONflicts or eXclude CONflicts). In either case, base records for the current context (view) are NOT displayed; that is, there is nothing to exclude.

SER123I File ID Already Included

Derivative records are displayed for the current context (view).

A REset derivative ID command has been entered for the current context without a previous eXclude command (for this ID) in that context (view). This means that derivative records for the current context (view) are displayed anyway; there is nothing to reset.

SER124I File ID Already Excluded

Derivative records are NOT displayed for the current context (view).

Either an eXclude derivative ID command has been entered for the current context after a previous eXclude command for this ID has been issued in that context (view), *or* the current context does not contain these records (e.g., eXclude ALL). This means that derivative records for the current context (view) are *not* displayed; that is, there is nothing to eXclude.

SER125A Invalid Position

Specified position exceeds current maximum record length.

The number specified as a required position of the search string is greater than the current maximum record length, that is, the longest record in the base derivatives.

Action: Re-issue the command with a proper position request. Note that the minimum record length on the *Reconcile* panel is 80 character and the maximum is 240 character.

SER130A Invalid Package Level

Package level must be simple or participating.

Displays when a user tries to perform a function on a change package that does not match the package level, such as trying to freeze a super/complex package or trying to update remote site information for a super/complex package.

Action: Specify a simple or participating package ID.

SER131A No Staging Library

No Staging libraries found for that package; use another package.

Displays when no Staging libraries are allocated for the requested package. Either they were never allocated, or they were deleted.

Action: Specify a package ID with existing staging library.

SER132A No Staging Library

Staging libraries aged for that package; use another package.

Displays when the staging libraries have aged.

Action: Specify a package ID with existing staging libraries.

SER133A Staging Library Deferred

Check out or stage that component to allocate it.

Displays when a user tries to process a library type that was deferred during package creation. A deferred Staging Library Type can only be allocated when a component of that type is checked out or staged.

Action: Checkout or stage a component for that staging library.

SER134A Library Type Disallowed

Compare/Merge of like LOD library type is disallowed.

Displays when a user tries to compare and merge a change package library that is a load module type (LOD), and it is not allowed. See the "Comparing Staging Libraries to Baseline/Promotion" chapter in the *ChangeMan ZMF User Guide*.

Action: Specify a proper library type for that package ID.

SER135A Internal Reader Error

Unable to use internal reader; submit member @@CDFJOB of your WIS.

Severe error has occurred while submitting a batch job. The job deck is properly formatted and written to your WIS data set as member @@CDFJOB.

Action: Split the screen, invoke ISPF/PDF Edit, select @@CDFJOB in the current WIS PDS, and submit the job.

SER136A No JOB Statement

First card must contain JOB statement; rectify and press [Enter] to submit.

SER137I JobNameId

Batch Job to compare and merge version libraries has been submitted.

Standard message providing the job name and ID when a batch job is submitted successfully.

SER138I Cannot Run in Batch

Unable to execute in batch mode; "Work In Suspense" must be PDS, RECFM = VB, LRECL > 273.

The WIS in the profile is a SEquential data set while the Batch Execution is possible only if it is a PDS with proper DCB parameters. If you enter a new DSNAME, M+R will allocate it for you.

SER139A Load Lib DSName Unknown

Fill in STEPLIB DD statement and submit member @@CDFJOB of your WIS.

M+R expects to find its load library name from a specific DDNAME depending on the way M+R is installed in your site:

- CDFLLIB for M+R as a stand alone product.
- CMNLLIB for M+R as an option of ChangeMan ZMF.
- CPXLLIB for M+R as an option of Comparex.

In case such a DDNAME is not defined but your ISPF is 4.1 or higher, M+R will call the QLIBDEF service to find the current LinkListed load libraries list and use it in the STEPLIB statement.

If your ISPF is 3.x or earlier, M+R will try to find the load libraries list of the ISPLLIB DDNAME for the task and use it in the STEPLIB statement.

If the above fails, M+R writes the formatted job deck in your WIS library as a @@CDFJOB member.

Action: Split the screen, invoke ISPF/PDF Edit, select @@CDFJOB in the current WIS PDS, add the name of the M+R load library in the STEPLIB statement, and submit the job.

SER140A Invalid Export Mask

Export member name mask is invalid; format with "?", "*", "-".

The mask to format the member name of the consolidated version on export is considered invalid. Valid symbols are:

- Question (?) mark - denotes any one alphanumeric character at this position.
- Asterisk (*) - denotes zero, one, or more alphanumeric characters.
- Minus (-) sign - denotes replacement of one or more characters with the following string.

Enter valid export name mask. For example, if you want to add a *suffix* '2' to each exported member name, the mask would be "*2". If you want to *replace* the first character with 'K', the mask would be "-K*".

SER141A Invalid Export Name

Invalid member name Length after applying the Export name Mask.

The mask to format the member name of the consolidated version on export is such that, when applied to the exported member name, makes the name too long—more than eight character (ten character for PANvalet library).

Action: Check whether you have missed the *replacement* symbol "-". For example, if you have defined the mask "*311", M+R will add three digits after each member name on export. However, the mask "*-311" will replace the last three characters with the three digits.

SER142A "WIS" Incompatible

The WIS belongs to another M+R tool; use a compatible WIS DSNAME.

The WIS data set entered on the *Profile Data Sets* panel or through an M+R project has been used to store unfinished work in another M+R tool.

Action: Change the WIS DSNAME to one used within the current tool.

SER143I Not Member/SEQ Versions

Member Reconciliation requires member or SEQ versions, not library.

The base version that you have entered on the *Versions* panel (option **1**) of the Member Reconciliation tool is a library and you have *not* specified a member name.

The alternative message is SER144I below.

Action: Specify a member name, or use the Library Consolidation tool.

SER144I Not Library Versions

This M+R Tool requires library versions, not member or SEQ.

The base version that you have entered on the *Versions* panel (option **1**) is *not* a library—it's either a specific member or a sequential file.

The alternative message is SER143I above.

Action: Specify a member name pattern, or range, or masks, or use the Member Reconciliation tool.

SER145A Incomplete Installation

Ask System Programmer to provide M+R Projects Data Set as per manual.

The team-oriented Projects and Samples data sets need to be made known to M+R by manually editing the *SEROJECT* panel in the M+R PANELS library.

If these data sets are not allocated with the required parameters, or cannot be opened and read, or the samples data set does not contain the WALKBAS, WALKDV1, and WALKDAV2 members, this message is issued and some functions are not available.

Action: Ask the system programmer of your site to perform the actions advised in the installation guide:

In the)INIT section of the *SEROJECT* panel, enter:

- &CDFPROJ = somnode.CDF.PROJECTS
- &CDFSAMPL = somnode.CDF.SAMPLES

The DSName *somnode.CDF.PROJECTS* and *somnode.CDF.SAMPLES* are examples only.

The M+R Projects data set has to be **allocated** as a SEquential file, with:

- Record Format **FB**
- Logical Record Length **80**
- Block Size **6000**
- First extension **20** blocks
- Secondary extension **400**

All M+R users should be granted READ/WRITE authority to the Projects data set *somnode.CDF.PROJECTS*.

All M+R users should be granted READ authority to the Samples data set, *somnode.CDF.SAMPLES*.

SER146I No Projects Found

No individual project; not in any team-oriented project.

The user has not created any individual project nor he or she is a team member of any of the team-oriented project in the M+R project data set.

SER147I Project Purged

Successful Purge of the selected project, "Work In Suspense", Print data sets.

The project that you have selected for purging has been removed from the M+R project data set. Moreover, the WIS and Print data sets associated with that project have been deleted. Also see SER151.

SER148I Project Loaded

Successful Load of the selected project "Name/OwnerID".

The project *NAME/OwnerID* that you have selected has been loaded. The profile settings, working data sets, and version data sets have been set accordingly.

SER149I Project Created

Successful Create of the new project "Name/YourID".

Your new project *Name/YourID* has been created. The updated profile settings and working data sets specified on the *Profile* panels, as well as the version data sets specified on the *Versions* panel and *Copy Versions* panel, have been included in that project.

SER150I Not Authorized

Invalid request against a project; user not authorized.

The action requested can be performed only against a project that you had created. For example, you cannot request project details, delete, or purge a project that is owned by somebody else.

SER151I Project Deleted

Successful deletion of the selected project.

The project that you have selected for deletion has been removed from the M+R project data set. However, the WIS and Print data sets associated with that project have *not* been deleted. Also see SER147.

SER152A Not Unique Name/Owner

New project name and your logon ID must be an unique combination.

The project that you are trying to create has no unique ID formatted from the project name and your TSO logon ID.

Action: Change the project name and try again. You can check the list of M+R projects of both the Library Consolidation and Source/Copy Synchronization tools to pick up a unique name. If a project with the same name exists but you are not its owner, you could use that name as desired.

SER153A Invalid Line Command

"S" to load, "F" for details, "U" to update, "D" to delete, "P" to purge.

You have entered an invalid line command.

Action: Enter one of the listed commands.

SER154I Project Updated

Successful update of the selected project.

The **Update** line command can be issued against a project or task. Depending on that, there are two results from an **Update**:

- The project you have selected has been updated. The updated profile settings and working data sets specified on the *Profile* panels, as well as the version data sets specified on the *Versions* panel and *Copy Versions* panel, have been included in that project.
- The task you have selected has been replaced. If the Member List selector has been used for the selected task, the new members have been added to the task.

SER155A Invalid Complexity

Enter High, Middle, Low, or None for Degree of Complexity.

You have misspelled an assignment of the *Degree of Complexity selector*. The long message above is the full set of valid values.

Action: Enter the first letter: H, M, L, or N.

SER156A Invalid Pattern or Mask

Pattern must be alphanumeric ending with "*"; mask also may have "?".

You have attempted to specify a *pattern* or *masks* as a *selector* for an assignment that contains invalid characters.

Action: Specify a valid pattern like "ABC*" to select all members whose name starts with the string 'ABC'. You can also use:

- *Suffix masks* like *1, *2, and *3.
Or *position masks* ??1*, ??2*, and ??3*.
Or *prefix masks* X*, Y*, and Z*.
Or any reasonable combination of these types of masks, including all three of them; combining the above examples, the masks should look like X?1*1, Y?2*2, and Z?3*3.

SER157A Duplicate Assignment

Another task already assigned to team member; use Update to change.

You have attempted to assign a task to a team member who already have another task assigned.

Action: If you want to assign the new task, issue Full details command against the project and then issue **Update** against the previously assigned task. Now it will be replaced with the new task. Note that if the *task selector* is Member List, you can delete some members as desired before adding new members through the **Update** command.

SER158I Task Assignment Complete

Successful assignment of the specified task to a team member.

This message acknowledges that the specified task has been assigned to the designated team member (logon ID). You can continue with new assignments to other team members or END to return to the *Projects* panel.

SER159I Non Team-Oriented Project

Selected project is NOT team-oriented; no details.

You have attempted to issue a Full details command against an individual project. Only team-oriented projects may have task assignments that are displayed in response to the Full details command.

SER160I Already in Full View

Selected team-oriented project already displayed in full.

You have attempted to issue Full details command against a team-oriented project that has already been displayed in full detail.

SER161A Invalid Line Command

Use "U" to update, "D" to delete, and "P" to purge.

You have attempted to issue a **Select** or Full details command against a task (assignment). Only projects may be selected. Only team-oriented projects may have task assignments that are displayed in response to the Full details command.

SER162I Team Task Deleted

Successful deletion of Team Member Task of the selected project.

The task that you have selected for deletion has been removed from the M+R project data set.

SER163I No Purge: Active Project

Selected project is now Active, its "Work In Suspense" in use; cannot be Purged.

The project that you have selected for purge is the *currently active* project. Therefore, the *work in suspense* (WIS) and Print data sets associated with that project can NOT be deleted. You might try to delete that project as desired.

SER164A Invalid Project

Selected project information is corrupted; delete/recreate.

You have selected a project whose information entry in the M+R project data set is corrupted, possibly due to direct editing of that data set.

Action: Delete the project from the *Projects* panel and create it anew.

SER165A Cannot Load Project

Unable to load selected project; "Work In Suspense" is not PDS.

You have selected a project whose WIS data set is *not* PDS, maybe due to direct editing of the M+R project data set.

Action: Delete the project from the *Projects* panel and create it anew with a PDS as a WIS data set.

SER166A Invalid Project Data Set

Individual Projects data set cannot be allocated.

Your M+R project's data set has been deleted and hasn't been allocated due to system reasons.

Action: Exit M+R and invoke it again.

SER167A Cannot Update Project

Cannot update not active project; first load, then update project.

You have attempted to update a project that is not the current active project.

Action: Load the project, then update it.

SER168I Invalid Mask Format

All masks must be of same length and type—prefix, suffix, position.

You have specified masks that have different length (for example, *1 and *123) or masks of different type (for example, a prefix mask, ab*, and a suffix mask, *ab). Use masks of one of the following types:

- Suffix masks like *1, *2, and *3
- Or position masks ??1*, ??2*, and ??3*
- Or prefix masks X*, Y*, and Z*
- Or any reasonable combination of these types of masks, including all three of them; combining the above examples, the masks should look like X?1*1, Y?2*2, and Z?3*3.

SER169I Last Project Loaded

Active Project in force; Successful load of "Name/OwnerID".

The project *NAME/OwnerID* was the last project you have used in the previous M+R session. It has been loaded on the invocation of the Library Consolidation or Source/Copy

Synchronization tool. The profile settings, working data sets, and version data sets have been set accordingly.

SER170I Member @@CDFSET Not Found

Attempt to load @@CDFSET member of work-in-suspense failed.

The local repository of the project information—member @@CDFSET in the current *work in suspense* data set—has NOT been found. The profile settings, working data sets, and version data sets have not been updated. You may want to recreate this project.

SER171I Member @@CDFSET Corrupted

Member @@CDFSET of work-in-suspense considered corrupted.

The local repository of the project information—member @@CDFSET in the current *work in suspense* data set—is corrupted, possibly due to direct editing. The profile settings, working data sets, and version data sets have not been updated. You may want to recreate this project.

SER172A Invalid Show Request

Place Show line command on the first cut/pasted line of moved block.

You have entered the **Show** line command at some code line other than the first cut/pasted line of a “moved around” block of records.

Action: Re-enter the command on the first cut (<<) base record or pasted (>>) derivative record of a moved block of records.

SER173I Cannot Run in Batch

Unable to execute in batch mode; Export data set must be a library.

The Export data set in the profile is SEQuential while export options have been selected on the *Batch Execution* panel. You can specify an existing library for export or enter a new export DSNAME on the *Profile Data Sets* panel for M+R to auto-allocate it as a PDS.

SER190A Define Compare Range

Complete Compare Range or blank it out.

You have entered only the FROM or TO column number when specifying a range of positions in the version records for comparison.

Action: Enter the missing column number at the cursor.

SER191A Define Column Position

Complete Ignore Records request by defining Column Position.

You have entered only the character string of the “Ignore Records with characters at position” request.

Action: Enter the missing column number.

SER192A Define Text to Ignore

Complete Ignore Records request by defining up to eight char text.

You have entered only the position of the character string of the "Ignore Records with characters at position" request.

Action: Enter the missing character string.

SER193I Filtering Not Available

Merged Data Filtering not available in Reconciliation, Browse tools.

You have selected option **6** (FILTERING) on the *Profile* panel when using the Member Reconciliation tool or the Equivalent JCL Comparison tool (also known as Browser).

Action: For Merged Data Filtering, use the Library Consolidation tool or the Source/Copy Synchronization tool.

SER194A Filtering Request Failed

Merged Data Filtering Request cannot be set due to memory failure.

You have entered a Merged Data Filtering request that cannot be accepted due to not enough memory.

Action: Exit M+R, then try again.

SER195I Profile Options Restored

Profile Options and Data Set names restored to their previous values.

You have selected option **0** (RESTORE) on the *Profile* panel and the action has been successful.

SER196A Export Not Available

Export not available in Equivalent JCL Comparison tool.

You have selected option **4** (EXPORT) on the *Profile* panel when using the Equivalent JCL Comparison tool that does not support export, that is, can be used only as a Browser. Even if you can edit the merged equivalent JCL code, you cannot export the edits outside M+R.

SER197A No Members

No members match the task selector; ask team leader to execute.

As a member of a team-oriented project team, you have selected the project from the *Project* panel, then tried to invoke option **3** (WORKPLACE) but not even one of the member versions assigned to you through a name pattern, range, masks, or list can be found.

Action: Report to your team leader (project owner) to verify your assignment.

SER198A Source/Copy Out of Synch

The number of Copy versions must be equal to that of Source versions.

On the *Copy Version* panel, you have entered copybook library versions that are more or less than the source library versions entered on the *Version* panel. M+R associates source and copybook libraries' versions following the order of their entry on the panels.

Action: Add or remove missing redundant copybook library versions. If they are really less than the source library versions, fill in with the base copybook versions. Conversely, if the source library versions are really less than the copybook ones, enter the base source library on the *Versions* panel.

SER199A Column Range Mismatch

The from column must be less than the to column.

You have entered a value in the FROM field that is less than the value in the TO field of the column range.

Action: Reconsider the range and correct one or the other or both FROM/TO column numbers.

SER200 Invalid Current View

Issue "View Remaining" (V #), then EXPort a copybook member.

You have entered the EXPort primary command when the current view, displayed on the top left corner of the *Reconcile* panel, is not "View Remaining", that is, those code lines that will be exported are not displayed.

Action: Issue **V RE** or **V #**, and then the EXPort command.

SER201 Invalid Command

Follow EXPort with space and up to ten characters member name.

You have entered no argument or not a member name argument of the primary command EXPort.

Action: Follow EXPort with a valid member name up to eight character long. If the Copy Export Data Set is PANvalet, it can be up to ten character long.

SER202A Invalid Command

Export is supported only in the Source/Copy Synchronization tool.

You have entered the EXPort primary command when using some other than the Source/Copy Synchronization tool.

Action: Select Source/Copy Synchronization tool, if desired.

Appendix B

Complexity Calculation Formulas

The Degree of Complexity calculation might be of interest to you. This appendix explains how to derive it.

Because changes are of two types (*single* and *in conflict*), reconciliation complexity depends on the following two factors:

- the number of *single* changes
- the number of *conflicts*.

The *conflicts* themselves are of two types:

- involving only two derivatives
- involving more than two derivatives

Also, the *single* changes are of two types:

- simple - deletions and insertions
- combined - replacements = deletions + insertions

The following table contains the main variable that determine the Degree of Reconciliation Complexity.

Variable	Description
R	The current number of replaced Base code line
C'	The number of Base code lines still in conflict
C''	The number of conflicts C' that involve more than two derivatives
S	The number of base code lines changed in only one derivative or in the same way in all derivatives affecting a base code line
C	The initial number of base code lines in conflict
N	The total number of base code lines

The Degree of Complexity is determined as follows:

NONE	= 0	when $R = C' = C'' = S = 0$
LOW	= Low	when $C' = C'' = 0$ and $S \geq R > 0$
	= low	when $R = C' = C'' = 0$ and $S > 0$
MIDDLE	= Low + Mid	when $C' > 0$ and $C'' = 0$ and $C' / (S + C) < \text{threshold}$ (default 50%)
HIGH	= Low + Mid + High	when $C'' > 0$ and/or $C' / (S + C) \geq \text{threshold}$ (default 50%)

where the intermediate variables Low, low, Mid, and High are calculated as follows:

Intermediate Values	How Calculated
Low: $0 < R / S \leq 1$	= 1, 2, 3 when $\leq 1/3, 2/3, 3/3$
low: $0 < S / N \leq 1$	= 1, 2, 3 when $\leq 1/3, 2/3, 3/3$
Mid: $0 \leq C' / (S + C) \leq 1$	IF $0 < C' / (S + C) < \text{threshold (default 50\%)}$ = 1, 2, 3 when $\leq 1/3, 2/3, 3/3$ of threshold ELSE = 4, 5, 6 when $\leq 1/3, 2/3, 3/3$ of (100 - threshold)
High: $0 \leq C'' / C \leq 1$	= 1, 2, 3 when $\leq 1/3, 2/3, 3/3$

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