



Micro Focus Relativity Data Manager

Installation

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Revised 2018-06-11 for version 12.15

Contents

- Preface..... 1**
 - Introducing the Relativity Data Manager 1
 - Related Relativity Documentation 2
 - Using Online Help 3
 - Relativity Data Manager Help Files 3
 - Accessing the Relativity Data Manager Help Files 3
 - Using the Relativity Help files 4
 - Conventions Used in this Document 5
 - Technical Support..... 5
 - Support Guidelines 5
 - Test Cases 6
 - Contact information 6

- Chapter 1: Installation of Relativity Data Manager..... 9**
 - System Requirements 10
 - Installing the Relativity Data Manager 11
 - Electronic Product Delivery Installation 11
 - Installing CD-ROM Media 12
 - Installing from Self-Extracting Executable 13
 - Installing the Relativity Data Manager 13
 - Removing the Relativity Data Manager 14

- Chapter 2: Verification..... 17**
 - Starting the ODBC Data Source Administrator 17
 - Starting the ODBC Data Source Administrator on Windows 7 (32-bit) 17
 - Starting the ODBC Data Source Administrator on Windows 7 (64-bit) 17
 - Starting the ODBC Data Source Administrator on Windows 10 18
 - Creating a new Data Source using the ODBC Data Source Administrator 18
 - Accessing Relativity Data Sources from Microsoft SQL Server via OLE DB 27

- Appendix A: Indexed File Recovery Utility (recover1) for RM/COBOL 29**
 - Installing the Recovery Utility Program 29
 - Using the Recovery Utility Program 29
 - Recovery Command 30
 - Recovery Command Options 31
 - Recovery Process Description 33
 - Recovery Support Module Version Errors 34
 - Example 34
 - Recovery Program Error Messages 39

List of Figures

Figure 1: File Recovery Verification	35
Figure 2: Recover1 Summary	36
Figure 3: Recover1 Statistics.....	36
Figure 4: Recover1 Finished Successfully	37
Figure 5: Entering Key Information.....	38
Figure 6: Entering KIB Information	38

Preface

Introducing the Relativity Data Manager

The Relativity Data Manager is used in the single-tier configuration where the complete Relativity DBMS resides on a single Windows machine. This component implements the ODBC interface, the file to relational database transformations, and the application data file access routines. All the data files to be accessed must be accessible from the Windows machine, either because the files exist on disk drives attached to that machine or are accessible using the Windows network file system.

Relativity provides for a *true* relational database view of your COBOL application data. It also provides a Microsoft Windows Open Database Connectivity (ODBC)-compliant relational database engine that allows SQL-based access to your COBOL application data *without* moving, converting, replicating or re-engineering your legacy data files. With Relativity, you can choose virtually any modern Windows development tool to build applications for ad hoc reporting, decision support, and specialized data processing functions. Furthermore, using Relativity, you do not have to rewrite or migrate any of your working applications.

This manual, the *Relativity Data Manager Installation Guide*, which is part of the Relativity document set listed in [Related Relativity Documentation](#) (see page 2), describes how to install the Relativity Data Manager software component on a Windows-based workstation and verify that the installation was successful by configuring a data source. It also explains how to run the RM/COBOL Indexed File Recovery utility (**recover1**) to recover an RM/COBOL indexed file.

In addition, your Relativity package contains the document, *The Theory of Relativity, A Primer*, which defines specific terminology and provides a comprehensive overview of the Relativity software tools and their functions. Before you install this Relativity product, be sure to read this book, paying particular attention to the single-tier data source topic.

Related Relativity Documentation

In addition to the *Relativity Data Manager Installation Guide* and *The Theory of Relativity, A Primer*, the complete Relativity documentation set consists of the following items:

- **Relativity Client/Server Installation Guide.** A document (one for UNIX and one for Windows) that is intended for a System Administrator. It describes the following:
 - How to install the Relativity Data Server software component on a computer running either a UNIX or Windows operating system and verify that the installation was successful.
 - How to:
 - Install the Relativity Data Client software component on a secure Windows workstation (such as the workstation belonging to a Database Administrator) for the purpose of catalog development.
 - Install the Relativity Server Administrator utility program in order to define a server for the client and configure a server data source.
 - Verify communications between the client and the server.
 - How to install the Relativity Data Client software component on an end user's Windows workstation and verify that the installation was successful by configuring a client data source and associating it with a server data source.
 - How to run the RM/COBOL Indexed File Recovery utility (**recover1**) to recover an RM/COBOL indexed file.
- **Relativity Data Client for UNIX Installation Guide.** A document that describes how to install and verify the Relativity Data Client software component on a UNIX-based server or workstation. It also describes the utilities for creating client and server data sources.
- **Relativity Designer Installation Guide.** A document that describes how to install the Relativity Designer software component and verify that the installation was successful.
- **Relativity DBA Installation Guide.** A document that describes how to install the Relativity DBA (Database Administrator) software component on a Windows-based workstation and verify that the installation was successful.
- **Relativity Java Client User's Guide.** An HTML document, located in the JDBC directory of the Relativity Java Client Electronic Software Delivery download file and on the Relativity product CD, that describes the installation and verification of the Relativity Java Client as well as information about deploying it with Java applications and applets, and setting up data source connections. The Java Client is a Java Database Connectivity (JDBC) component that resides in a Java runtime environment (JRE).
- **Relativity Online Help.** An online HTML help documentation system that provides fast access to detailed information on Relativity features and options. The help system also contains step-by-step presentations on how to accomplish specific tasks with Relativity and an extensive glossary. A separate help file is provided for each of the various Relativity tools: the DBMS (Data Client and Data Manager), the Designer, the DBA, the Relativity Configuration Utility, and

the Server Administrator. For more details, see [Using Online Help](#) (described below).

- **Relativity README Files.** A set of online HTML documents that lists any changes to the Relativity documentation since its publication and contains new technical information that supplements the documentation.
- **RM-Install Program User's Reference.** A document that describes how to configure and control the installations of RM/COBOL products, including Relativity.

Using Online Help

The Relativity Data Manager comes with online assistance in the form of Windows HTML Help files. This section describes the help files available for the Relativity Data Manager as well as how to access and use these help file systems.

Relativity Data Manager Help Files

Two help files are available for the Relativity Data Manager:

- **Relativity Data Manager Help.** This help file describes how to use the Relativity Data Manager for all users, advanced users, and programmers, and it also includes information on the following:
 - Creating Relativity data sources.
 - Connecting to a Relativity data source.
 - The SQL grammar supported by Relativity.
 - The Error Messages produced by Relativity.
 - The Relativity stored procedures.
- **Relativity Admin Help.** This help file describes the configuration of Relativity using the Relativity Admin Control Panel applet. It contains information on the following:
 - Using the Relativity Admin Utility to set options that apply to all Relativity data sources.
 - Configuring Relativity to use RM/InfoExpress.

Accessing the Relativity Data Manager Help Files

Use any of the following methods to access the Relativity Data Manager Help file:

- **Start Menu.** From the Windows Start menu, navigate to the **RMCOBOL** programs folder and then to the **Relativity vx**, folder (where vx is the version number of the installed Relativity product), and then select **Data Manager Help**.
- **Data Source Setup.** In the Relativity Data Source Administrator, click the **Help** button.
- **Designer.** From the Help menu in the Relativity Designer main window, click **DBMS Help File**.

- **DBA.** From the Help menu in the Relativity DBA main window, click **DBMS Help File**.

Use any of the following methods to access the Relativity Configuration Utility Help file:

- **Relativity Admin.** In the Relativity Admin Utility, click the **Help** button.
- **Designer.** From the Help menu in the Relativity Designer main window, click **Relativity Configuration Help File**.
- **DBA.** From the Help menu in the Relativity DBA main window, click **Relativity Configuration Help File**.

Using the Relativity Help files

A Relativity help file consists of two panes: the navigation pane and the topic pane. The left side of the Help window (the navigational pane) contains the **Contents**, **Index**, **Search**, and **Favorites** tabs. The right side of the Help window (the topic pane) displays the currently selected Help topic. Across the top of the Help window is a group of buttons that help you navigate through the Help contents and perform other operations, such as printing a topic in the Help file.

- **To browse through topics grouped by subject:** Click the **Contents** tab. From here, you can go directly to more specific information and a list of all the Help topics by double-clicking any closed book icon. Then select the topic of interest from the expanded list and click the topic. The Help window for that topic appears in the topic pane.
- **To see a list of alphabetized index entries (or keywords):** Click the **Index** tab to find specific topics listed alphabetically (the online index is arranged just like a book index). Type an entry or the first few letters of the word you want to search for, or scroll through the list. Then select the topic and click the **Display** command button. The content of the Help topic opens in the Help window.
- **To search for words or phrases that may be contained in a Help topic:** Click the **Search** tab. Follow the instructions on your screen to complete this task.
- **To create a list of preferred Help topics:** Click the **Favorites** tab. Follow the instructions on your screen to complete this task. Note that, by default, the contents of this tab is empty until you select topics to populate it. The content of the Favorites tab is automatically saved between sessions.

You can exit Relativity online Help from the Help window by clicking the **Close** button on the title bar or double-clicking the **Control Menu** icon at the left end of the title bar.

Conventions Used in this Document

This document contains visual cues to help the reader identify important information.

Table Convention	Indicates
Initial Capitals	Menu names, command names, and dialog box windows, and form titles.
Bold	Menu, command, and button names. Other elements to be selected or typed to accomplish an action. Label on input media used during installation.
<i>Italic</i>	Reference to a topic in the current document or another Relativity document. Reference to another document. Emphasis.
<i>Bold Italic</i>	Variables.

Technical Support

Micro Focus is dedicated to helping you achieve the highest possible performance from the RM/COBOL family of products. The technical support staff is committed to providing prompt and professional service to you when you have problems or questions about your Micro Focus products.

Technical support services are subject to Micro Focus's prices, terms, and conditions in place at the time the service is requested.

While it is not possible to maintain and support specific releases of all software indefinitely, we offer priority support for the most current release of each product. For customers who elect not to upgrade to the most current release of the products, there is free support available on the Micro Focus Community Forum:

community.microfocus.com

Support Guidelines

When you need assistance, you can expedite your call by having the following information available for the technical support representative:

- Company name and contact information.
- Micro Focus product serial number (found in the Electronic Product Delivery email, or in the License Certificate).
- Micro Focus Relativity product version number.
- Operating system and version number.
- Type of files (RM/COBOL or Micro Focus COBOL) being used when the problem occurred.
- Hardware, related equipment, and terminal type.

- Exact message appearing on screen.
- Concise explanation of the problem and process involved when the problem occurred.

Test Cases

You may be asked for an example (test case) of the source that demonstrates the problem.

- The smaller the test case is, the faster we will be able to isolate the cause of the problem.
- Do not send full applications.
- Reduce the test case to the smallest possible combination of components required to reproduce the problem.
- If you have very large data files, write a small program to read in your current data files and to create new data files with as few records as necessary to reproduce the problem.
- Test the test case before sending it to us to ensure that you have included all the necessary components to run the test case.

When submitting your test case, please include the following items:

1. **README text file that explains the problems.** This file must include information regarding the hardware, operating system, and versions of all relevant software (including the operating system and all Micro Focus products). It must also include step-by-step instructions to reproduce the behavior.
2. **Program source files.** We require source for any program that is called during the course of the test case. Be sure to include any copy files necessary for recompilation.
3. **Data files required by the programs.** These files should be as small as possible to reproduce the problem described in the test case.

Contact information

Our Web site gives up-to-date details of contact numbers and addresses.

Additional technical information or advice is available from several sources.

The product support pages contain considerable additional information, including the WebSync service, where you can download fixes and documentation updates. To connect, enter <http://www.microfocus.com> in your browser to go to the Micro Focus home page.

If you are a Micro Focus SupportLine customer, please see your SupportLine Handbook for contact information. You can download it from our Web site or order it in printed form from your sales representative. Support from Micro Focus may be available only to customers who have maintenance agreements.

You may want to check these URLs in particular:

- <https://www.microfocus.com/products/relativity/> (trial software download and Micro Focus Community files)

- <https://www.microfocus.com/support-and-services/documentation/> (documentation updates and PDFs)

Chapter 1: Installation of Relativity Data Manager

This chapter lists the [system requirements](#) (see page 10) and provides the instructions on how to install the Relativity Data Manager software on a Windows-based workstation (see page 11).

This chapter also discusses the following topics:

How to	See page
Verify that the installation was successful by configuring a data source.	11
Remove the Relativity Data Manager software component.	14
Access Relativity data sources from Microsoft SQL Server via OLE DB.	27

System Requirements

Installation of the Relativity Data Manager software on a Windows-based workstation requires the following minimum software and hardware.

Component	Requirement
Computer	An IBM PC or compatible machine with a Pentium-class processor or higher.
Operating System	Windows XP, Windows 7, or higher.
Memory	64 MB is recommended.
Disk Space	A hard drive with at least 11 MB of free disk space.
Installation Media	Internet access and/or one CD-ROM drive.
Monitor	800 x 600 resolution is required. Higher resolution is recommended.
Internet Browser	A browser (for example, Mozilla Firefox or Microsoft Internet Explorer) capable of viewing HTML files, such as the README text or other documents that are available in this format.
Adobe Reader	This software, available free from Adobe.com , allows you to view (and print) the Portable Document Format (PDF) documents.

Installing the Relativity Data Manager

Note If you have a previous version of Relativity installed, you should remove it prior to installing a newer version. See [Removing the Relativity Data Manager](#) (on page 14).

The Relativity Data Manager can be installed on a Windows workstation using the following methods:

- [Electronic Product Delivery Installation](#) (as described below)
- [CD-ROM Installation](#) (see page 12)

You may also automate the installation program for the Relativity Data Manager, which allows the installation of the Data Manager to be incorporated with the installation of your application. For more information, navigate to www.microfocus.com/documentation/rm-cobol/ and refer to the “Relativity Data Manager Installation Details” section of the *RM-Install Program User's Reference* documentation.

To verify that the installation is successful, see [Chapter 2: Verification](#) (on page 17).

Note The instructions that follow refer to an installation components directory, which is the directory to which the deliverable file via electronic product delivery was downloaded and decompressed.

Electronic Product Delivery Installation

Note You must have an Internet connection and an Internet browser installed to proceed with this method of installation.

All Relativity orders generate an Electronic Product Delivery (EPD) email that contains links to download the product. It also contains a link to download the product's License Certificate (also called the license file) for the order, which will be necessary to install the product. Finally, there are instructions about how to decompress the download file and begin the installation. This section will elaborate on the process of downloading the order and preparing to install the product.

All Relativity EDP orders contain links to download the product as a CD-ROM image, in the form of a compressed .iso file, and to download a smaller installation, in the form of a self-extracting compressed file. And you can also elect to have a physical CD-ROM shipped to you. (You can also use a CD-ROM burner drive to create your own physical CD-ROM using the .iso file, if you do not wish to wait for it to be shipped.) The CD-ROM (both .iso and physical) contains installation files for all the supported platforms. The smaller self-extracting compressed file version contains the installation for only the platform purchased by the order.

(Although using the CD-ROM image is not common, this section will cover it, for sake of completeness.)

The process begins with the arrival of a [Micro Focus Electronic Product Delivery](#) email which was generated when your order was complete. There is a link in this email on which to click to browse to the Electronic Product Delivery website. Once you have clicked on that link, a login page will appear in your browser. Use this page to login with your Micro Focus account. There will be an individual Invoice line for each item in your order. Locate the invoice line for the *Relativity Data Manager*, and click on the + in the left hand column. The invoice line will expand, displaying three

tabs: **Software/Licenses**, **Documentation**, and **Legal Information**, with **Legal Information** selected. After you review the End User License Agreement in the Legal Information tab, click on the checkbox in Step 2 at the beginning of the email. (This is necessary to acknowledge the acceptance of the End User License Agreement. You will not be able to proceed until the checkbox has been checked.) Next, select the **Software/License** tab and click on the + to the left of the serial number. You will then be presented with the lines for downloading the complete CD-ROM image (ISO), for downloading a smaller self-extracting installation file, and for downloading the license key.

At a minimum, click on the “here” in “Please click here to download your license key” to obtain the License Certificate file. This will download the certificate file on your browser’s download directory with the name **liant-xx-nnnn-nnnnn-IDnnnnnn.lic**. Copy this file to a safe place in case you need to install the product again, and place it in an easily accessible location on the target machine.

The next two sections deal with downloading, decompressing, and installing the desired installation media.

Installing CD-ROM Media

If you elected to receive physical media, insert the media into the machine’s CD-ROM drive and close the drive. Windows will automatically detect the media’s presence and mount it. If the machine is configured for AutoPlay, the RM-Install program will begin running and start the installation. If the machine is not configured for AutoPlay, open a Windows Explorer window. In the left hand pane, under Computer, locate the entry for the CD-ROM drive (it should have the volume name RMRelativity12xx), and right-click on it. In the pop-up menu, select **RM Install**. Proceed to the **Installing the Relativity Data Manager** section below.

If you elected to download the compressed ISO file, it will be compressed using gzip and will need to be decompressed before installation, although the Chrome browser may decompress it automatically. (Click on the **Documentation** tab in your EDP order to obtain up to date details on this process. Use the “Installation Guide to Installing an ISO Image” instructions.) The downloaded file will have a name similar to **rmrelativity12xx.igz**.

Note: The following instructions assume that the gzip utility has been installed on the machine and is in your PATH. (If the following instructions are unclear to you, please use the Installing from Self-Extracting Executable option below.)

From the Start menu, open a Command Prompt window, change directory to the directory where the .igz was downloaded, and rename the file’s extension from .igz to iso.gz.

```
ren rmrelativity12xx.igz rmrelativity12xx.iso.gz
```

Then decompress the file with the command:

```
gunzip rmrelativity12.iso.gz
```

If this command results in an error, then the .igz file has already been decompressed by the browser, in which case, all that needs to be done is rename the file without the .gz extension.

```
ren rmrelativity12.iso.gz rmrelativity12.iso
```

An .iso file is useful for burning a CD with Relativity installation. Use the .iso image burning feature included with Windows 10 or later, or third-party CD-ROM Burning software, such as Nero (<http://www.nero.com>) or Roxio's Easy CD Creator (<http://www.roxio.com>), to create physical media.

On Windows 10 and later, to create physical media, open a file explorer window on the folder that contains the .iso image file, then right-click on the file and select **Burn Disk Image** from the menu and follow the directions. (Note that **Burn Disk Image** is not the same as burning a CD with the .iso file on it.)

After you create a CD, follow the instructions at the beginning of this section for how to start the installation.

Alternatively, on Windows 10, .iso files can also be mounted as a virtual CD. Simply open Windows Explorer, navigate to the directory containing the .iso file. Right click on the .iso file and select **Mount** from the pop-up menu. This may be done with Windows 7, but additional software will need to be installed first, such as Virtual CloneDrive.

After the .iso file has been mounted, follow the instructions at the beginning of this section for how to start the installation.

Installing from Self-Extracting Executable

The most common case is to use the .exe file download. When downloaded, the file will have a name similar to **rmrelativity12xx_dm_win_32.exe**. (Where 12xx is the version of Relativity.) If it is not there already, copy the .exe file to the target Windows machine. Then double click on the .exe to start the installation. The file will be decompressed into a temporary directory on the target machine, and the RM-Install program automatically started. Proceed to the **Installing the Relativity Data Manager** section below.

Installing the Relativity Data Manager

At this point in the installation:

- The License Certificate file has been downloaded from the EDP order and is available on the target machine.
- You have the CD-ROM (or .iso file) mounted and RM-Install is running, or you have executed the Self-Extracting Executable, it has extracted itself into a temporary directory, and RM-Install is running.

Next, follow the instructions below to install the Relativity Data Manager software.

1. Follow the instructions presented on the pages of RM-Install and press the **Next** or **Back** button to advance through the various pages.
2. On the **Software License Agreement** page, you must click “I accept the terms in the license agreement” in order to continue with the installation.
3. On the **License Certificates** page, the license certificate file for the product being installed is displayed. Do one of the following:
 - If the license certificate for the Relativity Data Manager software being installed is present in the list area, press the **Next** button.
 - If the license certificate for the Relativity Data Manager software being installed is *not* present in the list area:
 - a. Press the **Add** button.
 - b. In the **Select License Certificates** dialog box, navigate to the directory containing the License Certificate file for the Relativity Data Manager software being installed and select the filename for the license certificate. (This license file is downloaded from the EDP page for the order.)
 - c. Press the **Open** button and then press **Next**.
4. On the Installation Type page, do one of the following:
 - Select the **Standard Installation** option to install all the components of all the license certificates listed on the **License Certificates** page immediately, using their default settings. Press the **Install** button.
 - Select the **Custom Installation** option to select specific components (for those products with multiple components) of all the license certificates listed on the **License Certificates** page, and install them, changing their default installation settings, as necessary.

Follow the custom installation instructions presented on the remaining pages. On the **Ready to Begin Installations** page, press the **Install** button.

When the installation for the Relativity Data Manager program starts, follow the additional instructions presented by the installation program.
5. When either the standard or custom installation is complete, click the **Finished** button on the **Installation Status** page.

Removing the Relativity Data Manager

The Relativity Data Manager can be removed from the Windows workstation on which it was installed. This may be necessary if the Relativity Data Manager is to be moved to a different machine or if a new release of the Relativity Data Manager is to be installed on the same machine.

To remove the Relativity Data Manager:

1. Open the Windows Control Panel.
2. In the Control Panel, do one of the following:
 - On Windows XP, double-click **Add or Remove Programs**.
 - On Windows 7 or Server 2008, double-click **Programs and Features**.

3. In either the Add or Remove Programs window or the Programs and Features window, select **RM Relativity v12.xx Data Manager** from the list of currently installed programs and updates, where *xx* is the version number of the product to be removed.
4. Do one of the following to start the uninstall process:
 - On XP, click the **Remove** button.
 - On Windows 7 or Server 2008, click the **Uninstall** button.
5. In the message box, click **Yes** to proceed with the uninstall process.
6. The RM Relativity v12xx Data Manager dialog box is then displayed, detailing the progress of the uninstall.
When the uninstall is successfully completed, click **OK**.
7. Click **OK** to close either the Add or Remove Programs window or the Programs and Features window.
8. Close the Windows Control Panel.

Chapter 2: Verification

The verification procedure consists of the successful configuration of a Relativity data source. Before you configure the Relativity data source, you must first start the ODBC Data Source Administrator. The ODBC Data Source Administrator is accessible from the Windows Control Panel. The ODBC Data Source Administrator is used to create and maintain ODBC data sources.

Note A data source also can be configured from within the Relativity Designer. (See the Relativity Designer online help file for more information.)

Starting the ODBC Data Source Administrator

To configure a Relativity data source, the first step is to start the ODBC Data Source Administrator. Because the Relativity Data Manager is a 32-bit Driver, the 32-bit ODBC Data Source Administrator must be used. This is not straight-forward on a 64-bit version of Windows 7. The details for starting the ODBC Data Source Administrator is detailed for several environments below:

Starting the ODBC Data Source Administrator on Windows 7 (32-bit)

1. Open the Windows **Control Panel**.
2. In the Control Panel, double-click **Administrative Tools**.
3. On the Administrative Tools page, double-click **Data Sources (ODBC)**.

Starting the ODBC Data Source Administrator on Windows 7 (64-bit)

1. Open the Windows Explorer.
2. Navigate to C:\Windows\SysWOW64.
3. Open ODBCAD32.

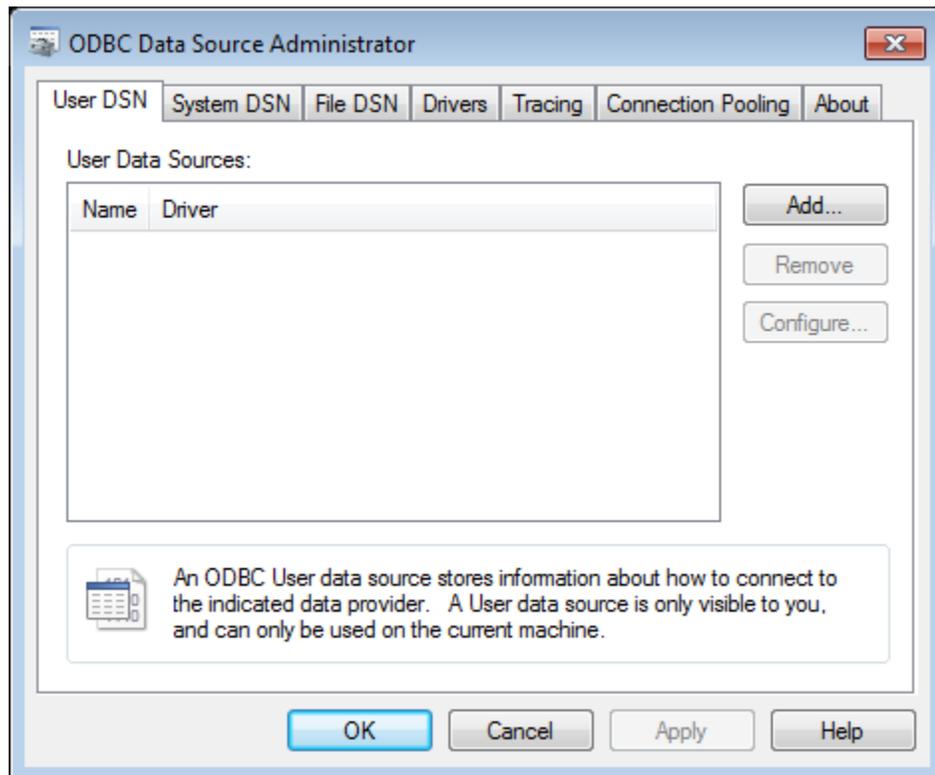
Note It is recommended that you create a short-cut from the desktop to the C:\Windows\SysWOW64\ODBCAD32.EXE in order to facilitate starting the ODBC Administrator.

Starting the ODBC Data Source Administrator on Windows 10

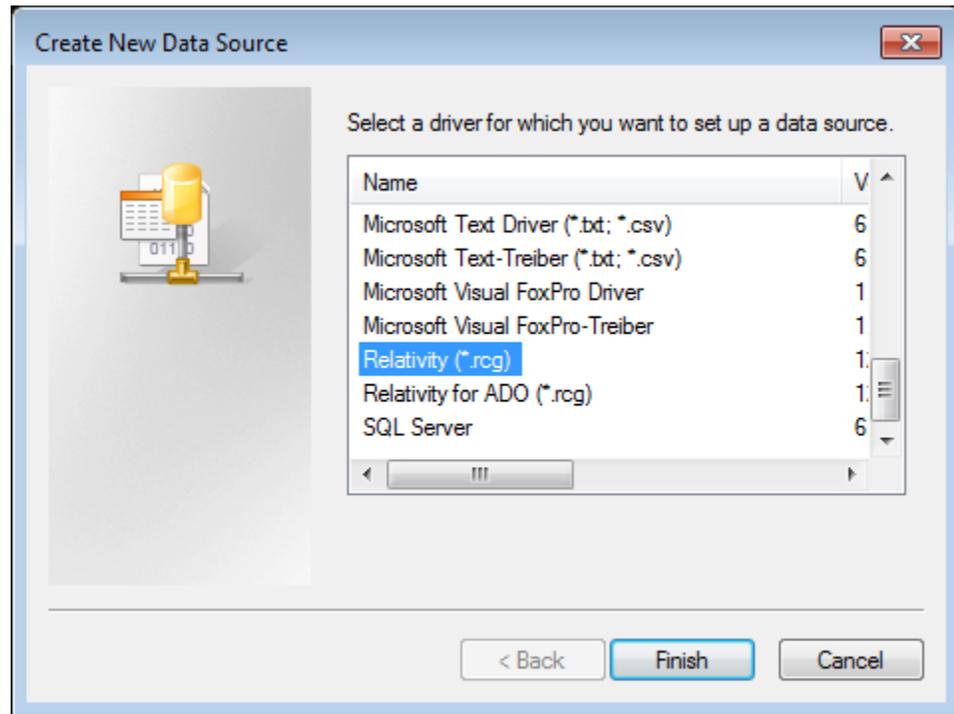
1. Click on the Windows Start icon.
2. Click on the Settings icon.
3. In the Settings window, in the **Find a setting** text box, type **ODBC**.
4. Below the **Find a setting** search box, two search results will be displayed. Click on **Set up ODBC data sources (32-bit)**.

Creating a new Data Source using the ODBC Data Source Administrator

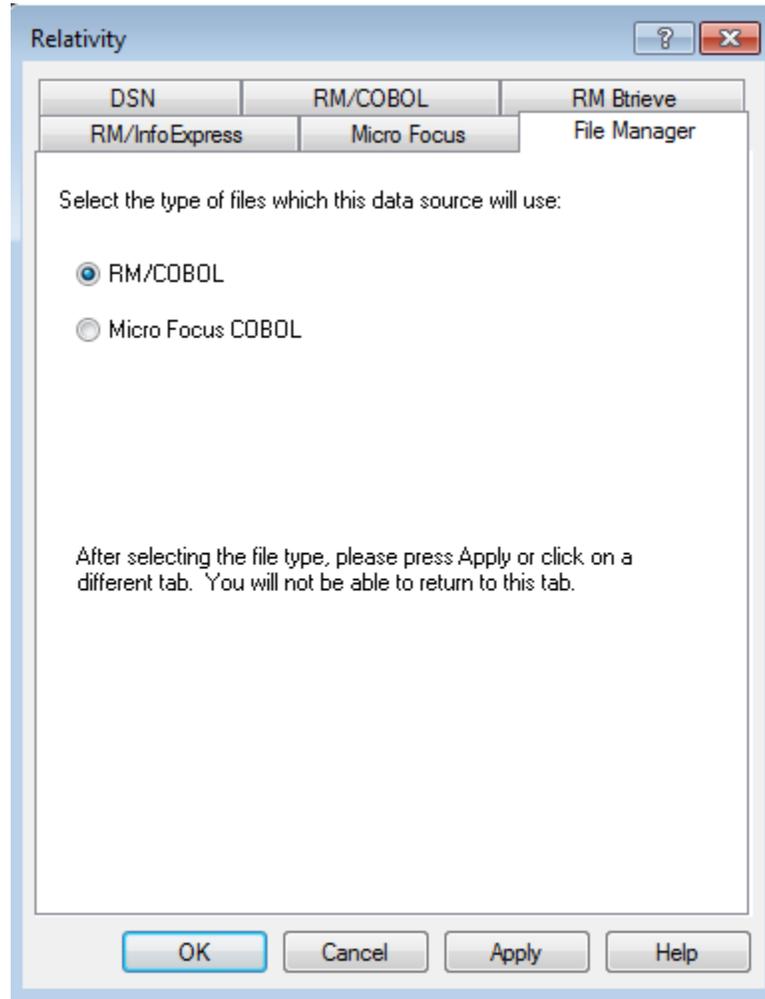
1. In the ODBC Data Source Administrator dialog box, select the **User DSN** tab and click **Add**.



2. In the Create New Data Source dialog box, double-click the driver named **Relativity (*.rcg)**.

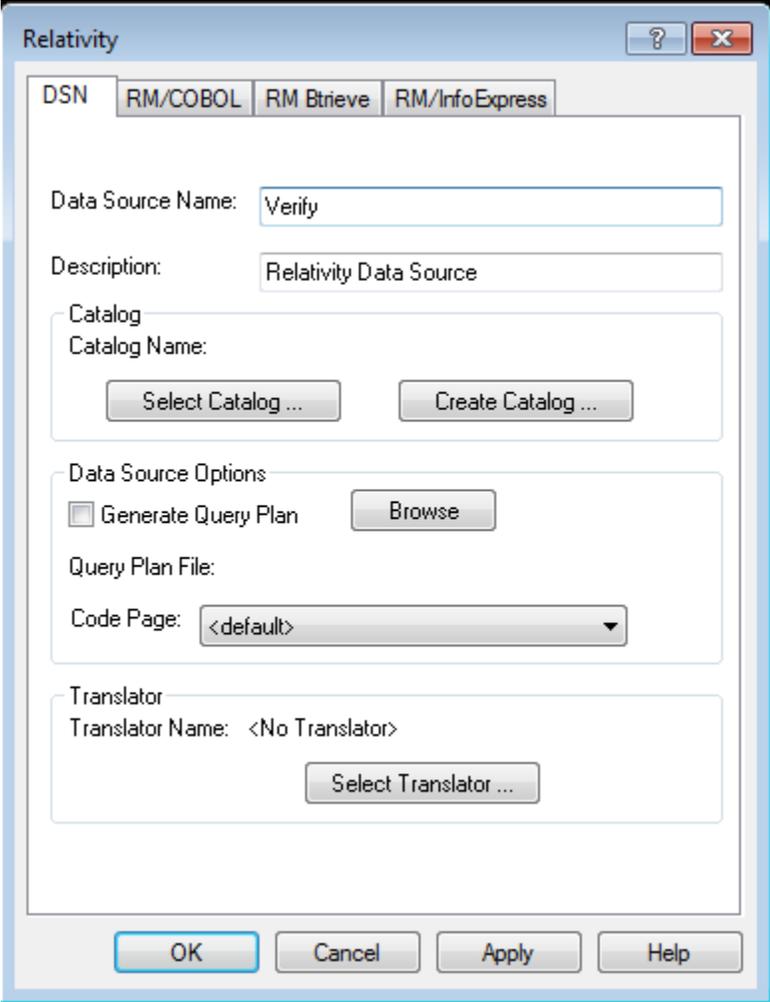


3. If support for both Micro Focus COBOL and RM/COBOL files is installed, in the File Manager tab of the Relativity dialog box, select the desired type of files, and then click the DSN tab.



4. Click the DSN tab of the Relativity dialog box and type **Verify** as the name of the data source in the Data Source Name box.

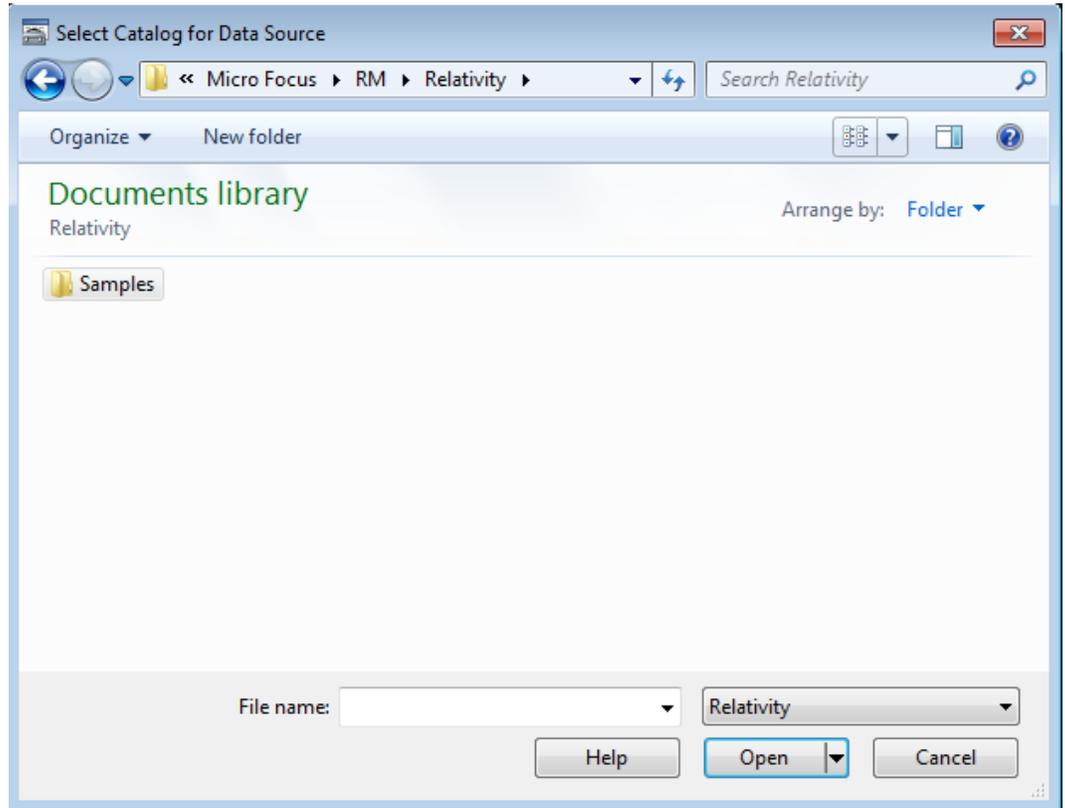
- Optionally, in the Description box, type a description of the data source.



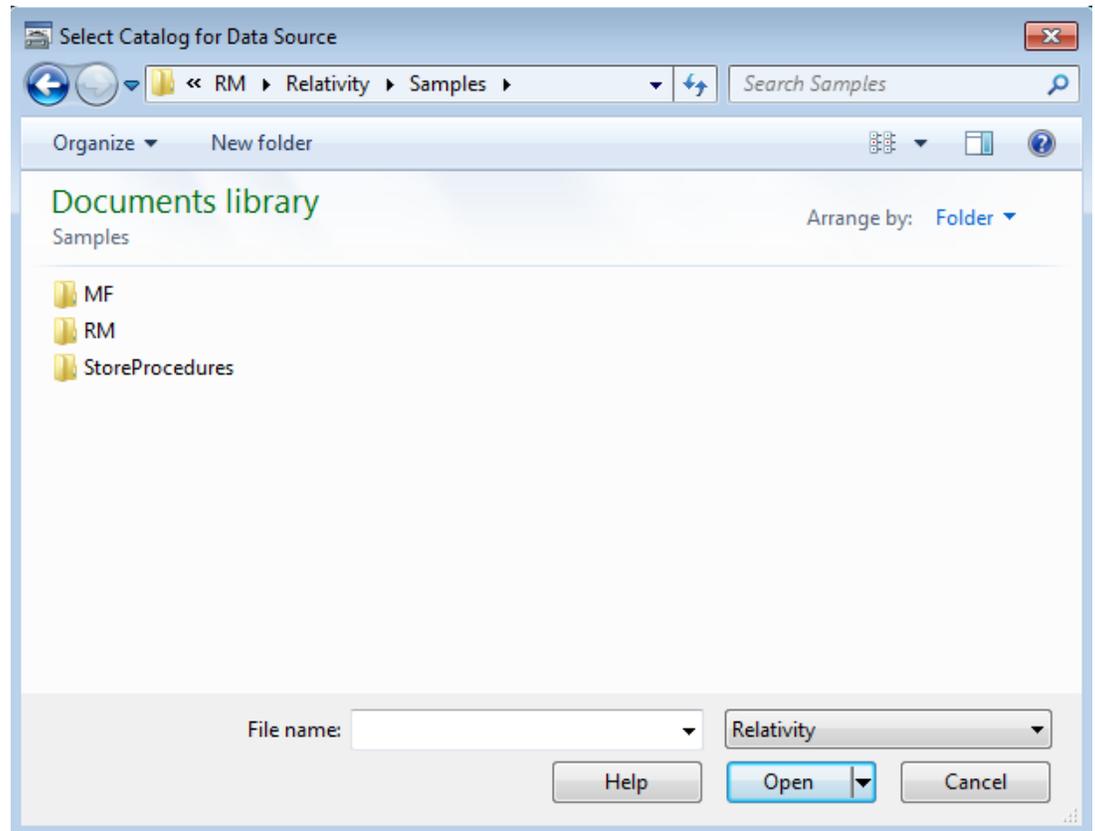
The screenshot shows the 'Relativity' dialog box with the 'DSN' tab selected. The 'RM/COBOL' sub-tab is active. The 'Data Source Name' field contains 'Verify' and the 'Description' field contains 'Relativity Data Source'. The 'Catalog' section has a 'Catalog Name' field and two buttons: 'Select Catalog ...' and 'Create Catalog ...'. The 'Data Source Options' section includes a 'Generate Query Plan' checkbox (unchecked), a 'Browse' button, a 'Query Plan File' field, and a 'Code Page' dropdown menu set to '<default>'. The 'Translator' section has a 'Translator Name' field set to '<No Translator>' and a 'Select Translator ...' button. At the bottom are 'OK', 'Cancel', 'Apply', and 'Help' buttons.

- Click **Select Catalog**. The Select Catalog for Data Source dialog box is displayed.

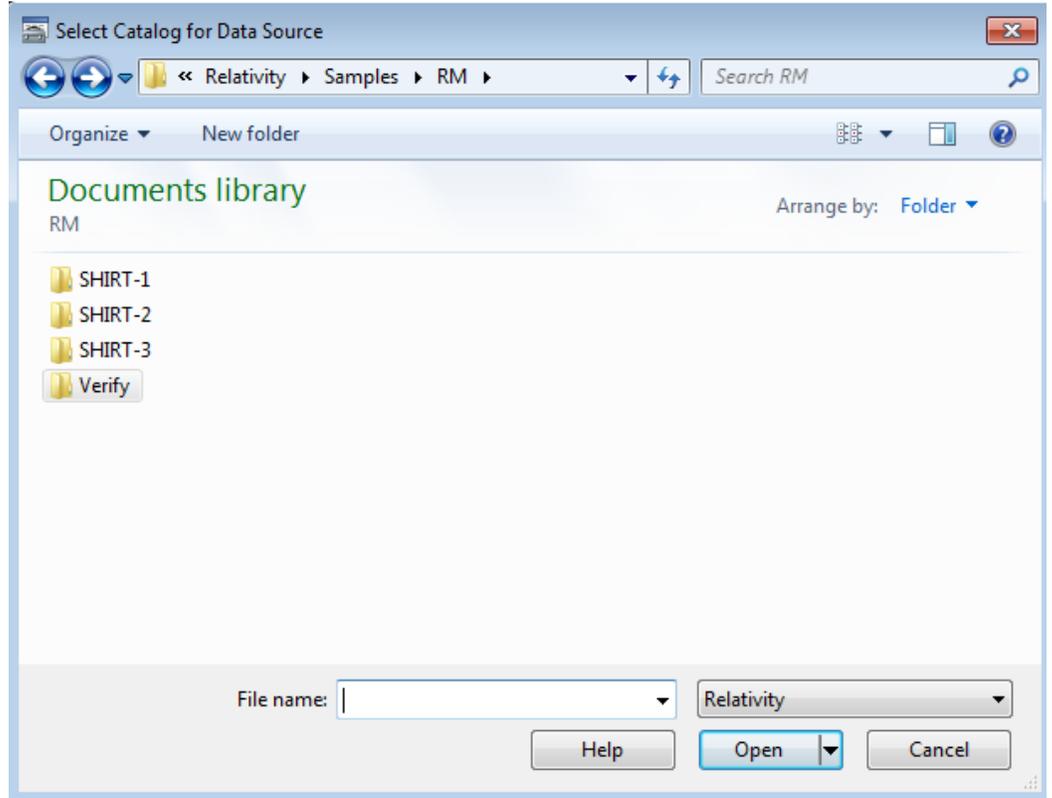
7. In the Select Catalog for Data Source window, navigate to the folder where Relativity was installed, **C:\Users\Public\Documents\Micro Focus\RM\Relativity**.



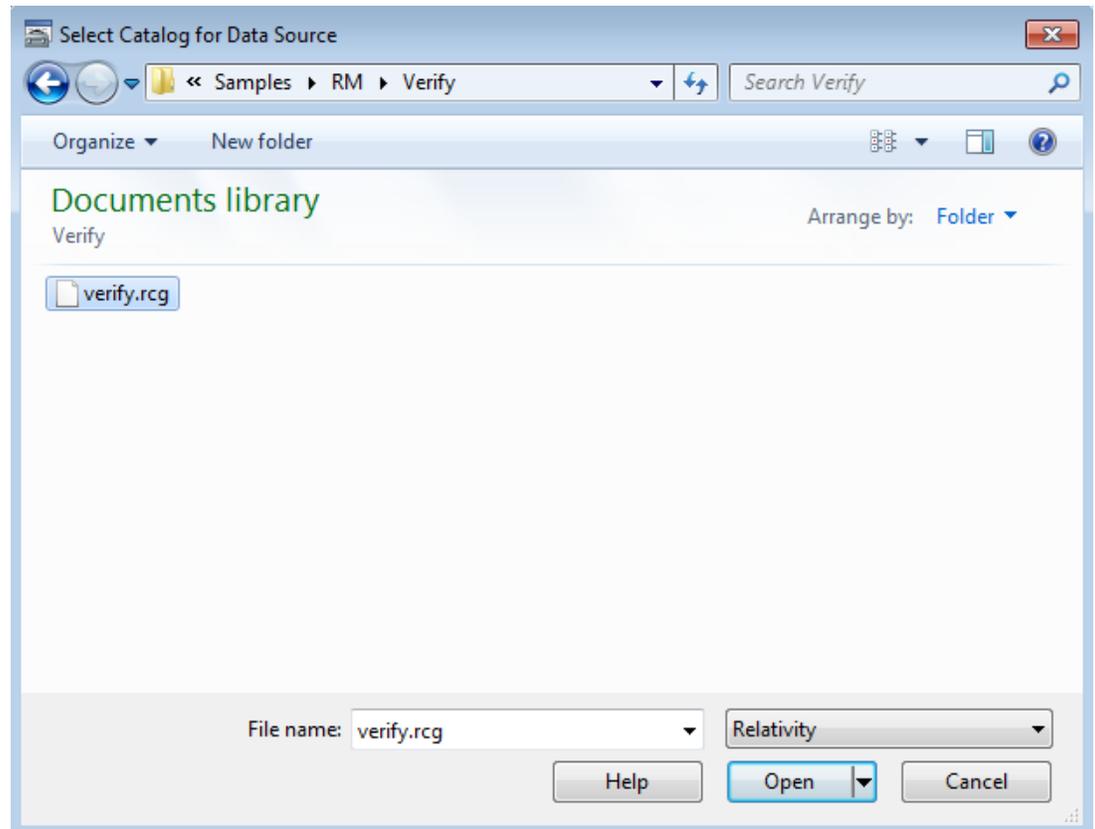
8. Double-click the **Samples** folder.



9. Double-click the appropriate folder. The RM/COBOL files are located in the folder named **Rm**. The Micro Focus COBOL files are located in the folder named **Mf**.

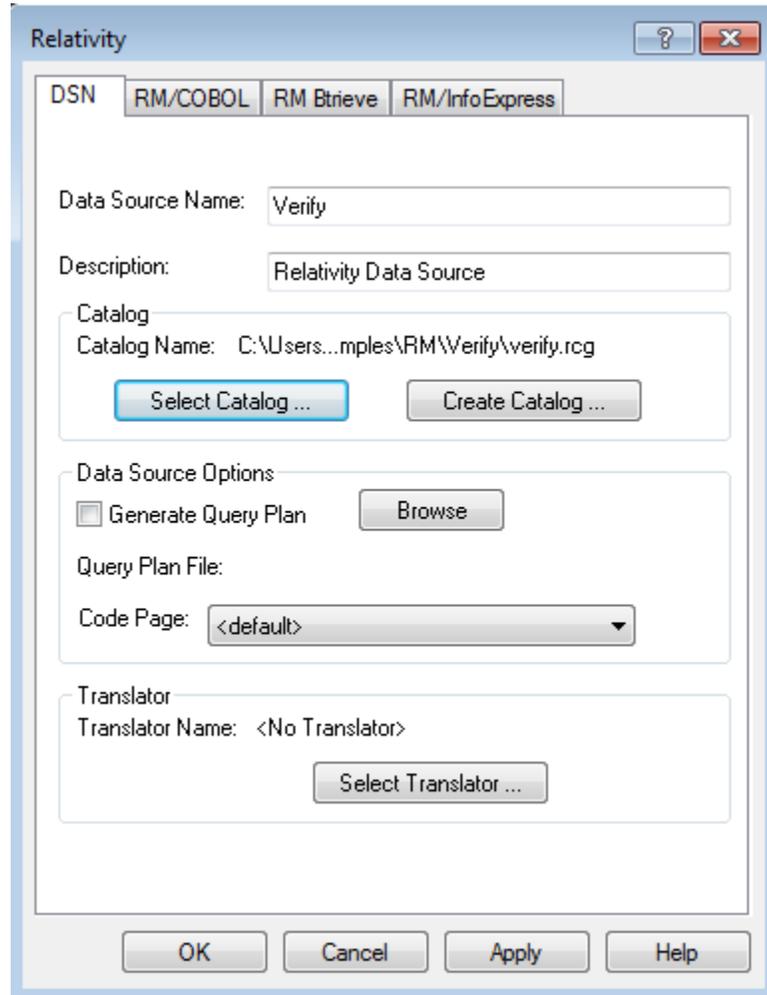


10. Double-click the **Verify** folder.



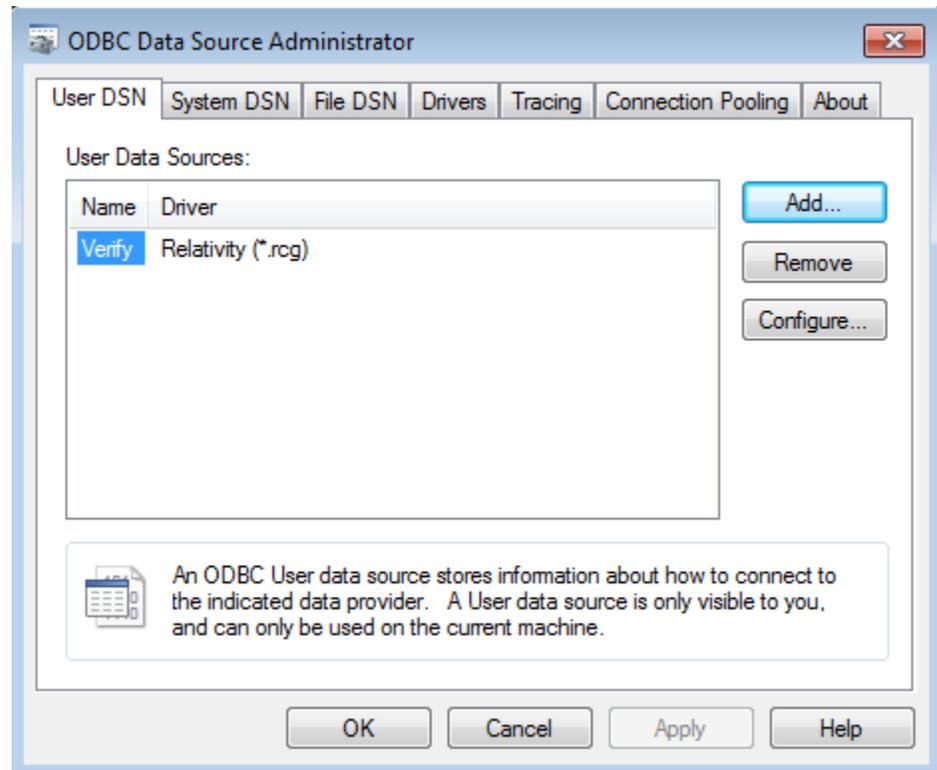
11. In the File Name box, type or select **Verify.rcg** for the catalog file.

12. Click **Open**. The Relativity dialog box is displayed. This action also accesses the Relativity Data Manager, which opens the catalog file and verifies that the catalog is valid.



13. Click **OK** to dismiss the Relativity dialog box. You have successfully created a new data source and associated it with an existing catalog.

The ODBC Data Source Administrator dialog box is displayed with Verify listed as a user data source in the User DSN tab.



14. Click **OK** to dismiss the ODBC Data Source Administrator dialog box.

In this verification procedure the data source refers, indirectly through the Relativity catalog, to the sample Relativity database named Verify. If you wish to further verify the installation, the Relativity Verify database can be accessed from any ODBC-enabled application. The Verify database contains a single table named BackOrder, which may be viewed with the ODBC-enabled application.

Note To see an example of accessing the Verify data source from an ODBC-enabled application, see either the Relativity DBA or Relativity Designer installation guides.

Accessing Relativity Data Sources from Microsoft SQL Server via OLE DB

It is possible to access Relativity data sources from Microsoft SQL Server via OLE DB (Microsoft's set of interfaces for data access). The following procedures describe how to access the Relativity sample database, Verify, using the Relativity Data Manager and the Microsoft OLE DB Provider for ODBC drivers.

1. On the Windows machine running SQL Server, create a Relativity Data Manager data source named **Verify** using the System DSN tab in the ODBC Data Source Administrator dialog box.
2. Using the SQL Server Enterprise Manager, navigate to the Console Root\Microsoft SQL Servers\SQL Server Group\YourServer'sName\Security\Linked Servers option.
3. Right-click on **Linked Servers** and select **New Linked Server**. The Linked Server Properties - New Linked Server dialog box opens.
4. In the Linked Server field, enter the name of the database that is to be used by your ADO application. For this example, use **TESTLINK**.
5. Select the **Other Data Source** option button.
6. From the Provider Name list box, select **Microsoft OLE DB Provider for ODBC Drivers**.
7. In the Data Source field, enter the name of the Relativity Data Manager data source created in Step 1 (Verify). (Alternatively, you can leave the Data Source field blank and place a connection string in the Provider String field.)
8. Click **OK**.
9. To query this table, you must provide a four-part table name having the following format:

LinkedServerName . Catalog . Owner . ActualTableName .

where,

LinkedServerName is the name specified in the Linked Server field in Step 4 (TESTLINK).

Catalog is the name of the Relativity Data Manager data source specified in Step 1 (Verify).

Note When accessing Relativity data sources from Microsoft SQL Server, it is not obvious that the Relativity Data Manager data source name is what is required in *Catalog*. However, if you return to the SQL Server Enterprise Manager, navigate to Linked Servers again, select the linked server name and under that, select Tables, a list of all the tables in the Relativity data source is displayed on the right. A column labeled *Catalog* is also displayed. This is the value that should be placed in the *Catalog* field of the four-part table name. Take note, however, that for Relativity Data Manager data sources, this value is the Data Base Qualifier, which is a value that Relativity automatically generates as a unique name for the data source. (Usually, this is similar to the data source name but with spaces replacing the underscores.) Again, check the *Catalog* column in the Linked Servers display to determine the value.

Owner is the user name to open the data source and can be left blank.

ActualTableName is the name of the table to be queried in the Relativity data source.

For example, to query the Backorder table in the sample database, Verify, use the following SELECT statement:

```
select * from TestLink.Verify..Backorder
```

Appendix A: Indexed File Recovery Utility (**recover1**) for RM/COBOL

RM/COBOL indexed files that have become corrupted can be recovered using the RM/COBOL Indexed File Recovery utility (**recover1**).

This appendix provides instructions for using the **recover1** utility when opening a Relativity RM/COBOL catalog or data file results in a 98, "File is Broken", error.

Installing the Recovery Utility Program

The RM/COBOL Recover1 Utility (**recover1**) utility program is generally installed with a Relativity Data Manager, a Relativity Data Server, or an RM/COBOL development system on the Windows machine.

However, if this is not the case, navigate to www.microfocus.com/documentation/rm-cobol/ and locate *RM-Install Program User's Reference* documentation. Refer to the "RM/COBOL Recover1 Utility Installation Details" section for information on how to install this utility using the license-driven install program on Windows.

Using the Recovery Utility Program

By default, the RM/COBOL Recover1 Utility (**recover1**) will be installed in the directory, **c:\Program Files (x86)\Micro Focus\RM\RMCOBOLvx** (where vx represents the version number). From a command window, change your Windows directory to be the directory into which **recover1** was installed and invoke the **recover1** command as described in the instructions that follow.

The **recover1** utility recovers data stored in an RM/COBOL indexed file. It is a standalone program; that is, it does not require use of the RM/COBOL Runtime Command (**runcobol**) to be executed.

Notes

- In order to recover data stored in a Btrieve file, use the Btrieve File Manager (either the Windows interactive version, **wbmanage.exe**, or the command line version, **butil.exe**). Refer to the appropriate Btrieve installation and operation manual for complete information about the utility.
- If the output window of the Windows version of the **recover1** program disappears upon successful completion and you want that window to remain visible, set the Persistent property to TRUE for the **recover1.exe** program.

Recovery Command

The Indexed File Recovery utility (**recover1**) is executed by issuing the following command:

```
recover1 indexed-file drop-file [options] ...
```

indexed-file is the filename of the indexed file to be recovered. The name is not resolved through any environment variables.

drop-file is the name of the file where **recover1** places any unrecoverable records found in the indexed file (as described in [Recovery Process Description](#) on page 33). If *drop-file* specifies an environment variable name, the environment variable value will be resolved before opening the dropped record file.

option is zero or more command line options as described in [Recovery Command Options](#) (on page 31). Options are specified with letters that must be preceded with a hyphen (-) or a slash (/). Option letters may be specified in uppercase or lowercase. Certain option letters allow an optional pathname as part of the option format. The presence or absence of the pathname is determined by whether or not the next non-white space character following the option letter is a hyphen or slash, whichever one was used preceding the option letter.

Note The option introducer character forward-slash is supported for Windows compatibility and should not be used on UNIX, where it can be confused with an absolute pathname; that is, a pathname that begins with a forward-slash. Nevertheless, either the hyphen or the forward-slash may be used to introduce option letters on Windows and UNIX. In the option formats given in this document, only the hyphen is shown, but the hyphen may be replaced with a forward-slash.

WARNING Because of several changes introduced in the RM/COBOL 7.5 runtime system, it is possible that an indexed file created by performing an OPEN OUTPUT in a COBOL program using the RM/COBOL 7.5 runtime system may have a different block size than a file you are attempting to recover. This may happen even though you specify the same file control entry and file description entry for the template file as when you initially created the file with an earlier version of RM/COBOL. Attempting to use this new file with a different block size as a template file may result in a loss of a large percentage of the recoverable records. You should verify that the block size of your template file is correct by using the Map Indexed File (**rmmapi**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) You can also avoid this problem by creating the template file with a version of RM/COBOL prior to 7.5 or

by using a backup copy of the undamaged file. Keywords MINIMUM-BLOCK-SIZE and ROUND-TO-NICE-BLOCK-SIZE of the RUN-INDEX-FILES configuration record may also be used to cause the runtime to create a file with a block size that matches releases prior to 7.5.

Recovery Command Options

Note These options may also be placed into the registry (on Windows) or the resource files (on UNIX). In the Windows registry, the Command Line Options property provides command line options for the Indexed File Recovery utility when "Recovery" is selected on the Select File tab of the RM/COBOL Properties dialog box. In UNIX resource files, the Options keyword provides command line options for the Indexed File Recovery utility in the global resource file, */etc/default/recover1rc*, and the local resource file, *~/.recover1rc*. For more information, see Chapter 2: *Installation and System Considerations for UNIX* and Chapter 3 *Installation and System Considerations for Windows*, in the *RM/COBOL User's Guide*.

The following Recovery Command options may be specified on the command line to modify the behavior of the Indexed File Recovery utility (**recover1**):

- **I Option.** The I option causes **recover1** to test only the file integrity and then stop. The file will not be modified in any way. Specifying the I option causes both the T and Z options to be ignored. If no problems are discovered, the exit code is set to 0. If a problem is discovered, the exit code is set to 1. The default is for **recover1** to do a complete recovery of the indexed file if the file is marked as needing recovery. See the Y and Z options for additional options that modify the behavior of the Indexed File Recovery utility.

Note The integrity scan is a quick test of the file and is not comprehensive. Some problems, such as records with invalid duplicate keys, will not be detected. Indexed files with no errors detected by the integrity scan may still receive "98" errors or other I/O errors.

- **K [*template-file*] Option.** The K option is used to indicate that the Key Information Block (KIB) should be assumed to be invalid and, optionally, to specify a template file (*template-file*) for recovering the KIB. If no *template-file* is specified, the user will be prompted either for a template file or for enough information to rebuild the KIB. If *template-file* is specified, it should be the name of a valid indexed file with the same format as the file being recovered. This file will be used as a template. The required KIB information is read from the KIB of the template file. The template file can be a backup copy of the file being recovered, if the backup occurred before the file was damaged, or, it can be a file created by performing an OPEN OUTPUT in a COBOL program with the proper file control entry and file description entry for the file being recovered. An OPEN OUTPUT must have been performed on the template file, but it need not contain any records. A template file must be specified if the KIB is corrupt and the file uses either an enumerated code set or an enumerated collating sequence. The default is to check the KIB for validity and, if it is found to be invalid, prompt for either a template file or information to rebuild the KIB. The name of the template file is not resolved through any environment variables.

WARNING A template file with the wrong block size can cause the loss of a large percentage of the recoverable records in your file. This can happen because of changes introduced in RM/COBOL 7.5 in the method used by the runtime system for calculating the block size. See the warning on page 30 for additional information.

- **L [*log-file*] Option.** The L option is used to write information about errors encountered while recovering the file to a log file (*log-file*). Only the first 100 errors will be logged. In addition to errors, a number of informational lines about the indexed file and its recovery are written to the log file, including information about sort memory (see the M option regarding sort memory). If *log-file* specifies an environment variable name, the environment variable value will be resolved before opening the log file; this allows the use of the name PRINTER to send the log information to the print device. If *log-file* is omitted in the L option, the default value of *log-file* is PRINTER. If the L option is not specified, the default is not to write a log file.
- **M [*MB-of-memory*] Option.** The M option is used to specify the number of megabytes of memory (*MB-of-memory*) to allocate to the sort algorithm used in phase 4, [build node blocks](#) (on page 33). *MB-of memory* is a number in the range 0 to 500. Allocating more memory generally results in faster execution of **recover1** and causes fewer node blocks to be built. If this option is not specified, a suitable number will be computed. When a log file is written (see the L option), a line is written into the log file to show the maximum effective sort-memory size.
Note Specifying a number for *MB-of-memory* that is too large for your system may result in very poor system performance.
- **Q Option.** The Q option causes **recover1** to perform its work without displaying information or asking the operator questions. If the file is marked as needing recovery, or has a non-zero Open For Modify Count, then it will be recovered. Otherwise, no action occurs. This behavior can be modified by using the Y option. The default is to display information and ask questions, which must be answered by the operator.
- **T Option.** The T option is used to indicate that unused space should be truncated and returned to the operating system. Specifying the T option will result in a minimal size indexed file, but may reduce performance if records are subsequently added to the indexed file. The default is not to truncate the file. When the file is not truncated, any empty blocks remain part of the file and are available for use in adding new records to the file.
Note Some versions of UNIX do not support the operating system call required to truncate a file.
- **Y Option.** The Y option causes **recover1** to assume that the operator wants to answer “y” to all possible questions and therefore not stop to wait for a response. Using the Y option will cause a file to be recovered even if it is not marked for recovery, including the case of when the Q option is also specified. The default is to wait for a response from the operator after a question is displayed.
- **Z Option.** The Z option is used to reset the Open For Modify Count to zero, without performing a full recovery. If the file is marked as needing recovery, the Z option is ignored. The default is to treat a non-zero Open For Modify Count as indicating that the file needs recovery.
Note Use the Z option with caution. Resetting the Open For Modify Count to zero without performing a full recovery may leave the file in a corrupted state.

Recovery Process Description

If the **recover1** program is successful, the exit code is set to 0. If the **recover1** program is canceled by the operator, the exit code is set to 2. Otherwise, the exit code is set to 1.

You may produce a list of the support modules loaded by the **recover1** program by defining the environment variable `RM_DYNAMIC_LIBRARY_TRACE`. The listing will indicate which Terminal Interface support module is used and whether the Automatic Configuration File module is present. This information is most helpful when attempting to diagnose a problem with support modules.

Note The information will be visible only if you enter the **recover1** command without any parameters. In this case, **recover1** will show the proper form for the command and the list of support modules.

The **recover1** program attempts to recover the indexed file in place; that is, the program rebuilds the internal file structure in the actual file being recovered. If necessary, the Key Information Block (KIB) is rebuilt and any corrupted data blocks are repaired. Corrupt data blocks may result in loss of some data records. Because of this feature, it is strongly recommended that you either backup the file or copy the indexed file to be recovered to some other directory or pathname as additional security. Any records that cannot be successfully reindexed into the file due to invalid duplicate key values, or invalid record sizes, are decompressed (if compression is selected for the file), converted to the native code set, and then written to *drop-file*. **recover1** should be able to handle most kinds of indexed file corruption problems, but some fatal errors may still cause the recovery to fail. Any fatal error is displayed and causes the program to terminate. Broken hardware should be suspected in many of these cases.

drop-file can be in fixed- or variable-length format; this is set by **recover1** based on whether *indexed-file* is fixed- or variable-length format. Records placed in *drop-file* were those undergoing change at the time of the system failure that required recovery or have invalid record sizes. Investigate any records appearing in *drop-file* and make the appropriate corrections to *indexed-file*.

The **recover1** program's processing consists of up to four separate phases, which are run in the following order:

1. **Integrity Scan.** If the Q option or Y option is specified, the Integrity Scan phase is disregarded unless it is forced to occur by the specification of the I option or L option. This phase reads the entire file in a forward direction checking for simple errors, and produces a summary report showing the state of the file and an estimate of the number of records **recover1** can recover. The indexed file is not modified during this phase.
2. **Repair Blocks.** The Repair Blocks phase, which is always run, reads and writes the file in a backward direction repairing corrupt data blocks, converting non-data blocks to empty blocks, and rebuilding some internal file structures.
3. **Move Data Blocks.** The Move Data Blocks phase is run only when the truncate file option (T) is specified. This phase reads and writes parts of the file moving high-numbered data blocks (near the end of the file) to lower-numbered available blocks to maximize the amount of space at the end of the file that can be truncated and returned to the operating system when **recover1** finishes.
4. **Build Node Blocks.** The Build Node Blocks phase, which is always run, reads data blocks and writes node blocks in the file in a forward direction rebuilding the entire node structure for each key of the file.

Notes

- After the Integrity Scan phase, if the Estimated Recoverable records value is zero or very low, and the number of corrupt data blocks is very close to the total number of data blocks found, the number of keys that allow duplicates may be incorrect, either because the KIB is corrupt or the user provided incorrect key information to **recover1**.
- After the Integrity Scan phase, if most of the blocks are invalid, the Disk Block Size or the Disk Block Increment may have been incorrectly specified or the KIB may be corrupt.
- During the Repair Blocks phase, a count of blocks that could be read but not written may be displayed. This count may indicate the presence of a hardware problem with your disk.

Recovery Support Module Version Errors

During initialization, the Indexed File Recovery utility (**recover1**) locates and loads various support modules, including the automatic configuration module, and, on UNIX, either the terminfo or the termcap Terminal Interface support module. Also, at initialization, the **recover1** utility verifies that each support module is the correct version for the utility. If a support module is not the correct version, the following message is displayed:

```
RM/COBOL:  module-name version mismatch, expected
           12.nn.nn, found n.nn.nn.
```

When the previous message is displayed, the **recover1** utility terminates with the following message:

```
Recover1:  Error invoking mismatched recover1
           and support module.
```

Example

An example run through the Indexed File Recovery utility is described below. The **recover1** session is started in this example by the following command:

```
recover1 master.inx dropout1
```

[Figure 1: File Recovery Verification](#) (see page 35) shows information about the file, **master.inx**.

Under the name of the file to be recovered, a description of the state of the file is displayed. Any of the following messages may appear:

- This file has not been marked as needing recovery!
- The Open For Modify Count for this file is not zero: *count*
- File has been marked as corrupted due to a previous error.

- KIB is corrupt. Using template file: *template-file*
- KIB is corrupt. Enter a template filename (press Enter for manual entry).

WARNING Because of several changes introduced in the RM/COBOL 7.5 runtime system, it is possible that an indexed file created by performing an OPEN OUTPUT in a COBOL program using the RM/COBOL 7.5 runtime system may have a different block size than a file you are attempting to recover. This may happen even though you specify the same file control entry and file description entry for the template file as when you initially created the file with an earlier version of RM/COBOL.

Attempting to use this new file with a different block size as a template file may result in a loss of a large percentage of the recoverable records. You should verify that the block size of your template file is correct by using the Map Indexed File (**rmmapi_nx**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) You can also avoid this problem by creating the template file with a version of RM/COBOL prior to 7.5 or by using a backup copy of the undamaged file. Keywords MINIMUM-BLOCK-SIZE and ROUND-TO-NICE-BLOCK-SIZE of the RUN-INDEX-FILES configuration record may also be used to cause the runtime to create a file with a block size that matches releases prior to 7.5.

If the KIB is corrupt, and a template filename is not entered, **recover1** will prompt the user for the required KIB information before continuing.

If more keys exist than can appear on this screen, as many as possible appear, after which you are asked if you want to see the remaining key descriptors. This continues until all keys are shown. You are then asked to verify that this is the file you want to recover. Entering N terminates the program. Entering Y continues the program.

Figure 1: File Recovery Verification

```

                                Indexed File Recovery Utility
                                Recover1 Version 12.nn

Index File: master.inx

This file has not been marked as needing recovery!

Disk Block Size:           1024      Minimum Record Length:    80
Disk Block Increment:     1024      Maximum Record Length:   80
Number of Index Blocks:   170       Number of Records:       150

  Key Position Size  Remarks
PRIME      1         8
  1         9         8
  2        17         8  duplicates allowed

Is this the file you wish to recover (y/n)?

```

[Figure 2: Recover1 Summary](#) shows a summary of the information that is gathered during the file integrity scan. You are then asked if you would like to proceed with the recovery process. Entering N terminates the program. Entering Y continues the program.

The “Average record length” is computed by adding the length of all the records in the file and dividing by the number of records. The “Average data size” is computed by adding the size that the record actually occupies in the file and dividing by the

number of records. This size allows you to determine how much your data can be compressed.

Figure 2: Recover1 Summary

```

Indexed File Recovery Utility
Recover1 Version 12.nn

Index File: master.inx
Drop File: dropout1

This file has not been marked as needing recovery!

Disk Block Size:      1024      Minimum Record Length:   80
Disk Block Increment: 1024      Maximum Record Length:   80
Number of Index Blocks: 170      Number of Records:       150
Phase: Integrity Scan           Estimated Recoverable:    150

Block Type | Total | Total | First | Last |
           | Found| Corrupt| Corrupt| Corrupt|
KIB       | 1    | 0     |       |       |
Data      | 102  | 0     |       |       |
Node      | 61   | 0     |       |       |
Empty     | 6    | 0     |       |       |
Invalid   | 0    | 0     |       |       |
Unreadable| 0    | 0     |       |       |

Average data size: 14, Average record length: 80

Do you wish to proceed with recovery (y/n)?
    
```

[Figure 3: Recover1 Statistics](#) shows the information that is displayed while **recover1** is rebuilding the node blocks for the prime key.

Figure 3: Recover1 Statistics

```

Indexed File Recovery Utility
Recover1 Version 12.nn

Index File: master.inx
Drop File: dropout1

This file has not been marked as needing recovery!

Disk Block Size:      1024      Minimum Record Length:   80
Disk Block Increment: 1024      Maximum Record Length:   80
Number of Index Blocks: 170      Number of Records:       150
Phase: Build Node Blocks           Estimated Recoverable:    150

Key being processed:                PRIME
Records recovered:                   100
Records written to drop file:
Block being processed:                13
Number of data blocks moved (for truncate): 5
    
```

[Figure 4: Recover1 Finished Successfully](#) shows the information that is displayed after **recover1** terminates successfully. The two lines regarding truncation are shown only when the T option is specified.

Figure 4: Recover1 Finished Successfully

```

Indexed File Recovery Utility
Recover1 Version 12.nn

Index File: master.inx
Drop File: dropped

This file has not been marked as needing recovery!

Disk Block Size:          1024      Minimum Record Length:  126
Disk Block Increment:    1024      Maximum Record Length:  126
Number of Index Blocks:  120      Number of Records:      100
Phase: Build Node Blocks          Estimated Recoverable:  100

Key being processed:          PRIME
Records recovered:            100
Records written to drop file:
Block being processed:        120
Truncate option specified - number of data blocks moved:  4
Truncate action successful - new Number of Index Blocks: 112

Recovery successful.

```

[Figure 5: Entering Key Information](#) shows that the KIB of the file has been corrupted and that key information must be entered for the file to be recovered. Key information can be obtained from the output of the Map Indexed File (**rmmapi****nx**) utility. (Note that the Map Indexed File utility is not included in Relativity; it is available in the RM/COBOL development or runtime system.) Underlined characters have been entered by the user.

The **recover1** session is started by the following command:

```
recover1 master.inx dropout1 -k
```

Note Entering incorrect information about how many keys, or which keys, can have duplicate values may cause unpredictable results.

Figure 5: Entering Key Information

```

Indexed File Recovery Utility
Recover1 Version 12.nn

Index File: master.inx

Last error was 98,38 at 9:29 on 03-21-2008

Are any of the keys in this file segmented (split) (y/n)? y
Key #: PRIME Segment #: 2 Starting Position? 10 Length? 5
      Another Segment (y/n)? n
      Total Key Length = 13 Duplicates Permitted (y/n)? n
Another Key (y/n)? n
    
```

[Figure 6: Entering KIB Information](#) shows an example of entering the remainder of the KIB information. Underlined characters have been entered by the user.

Figure 6: Entering KIB Information

```

Indexed File Recovery Utility
Recover1 Version 12.nn

Index File: master.inx

Last error was 98,38 at 9:29 on 03-21-2008

Minimum Record Length (in bytes)? 80
Maximum Record Length (in bytes)? 80
Disk Block Size (in bytes)? 1024
User Block Size (1=none/2=in bytes/3=in records)? 1
Data Compression (y/n)? y Space Character Value? 32
Zero Character Value? 48
Key Compression (y/n)? y Space Character Value? 32
File Version Number (0,2/3/4)? 4 Atomic I/O Enabled (y/n)? y
File Lock Limit (in GB)? 2
Disk Block Increment (in bytes)? 1024
Allocation Increment (in blocks)? 8
Force Write Data Blocks (y/n)? n Force Write Index Blocks (y/n)? n
Force to Disk (y/n)? n Force File Closed (y/n)? n
Code Set (1=none/2=ASCII/3=EBCDIC)? 1
Collating Sequence (1=none/2=ASCII/3=EBCDIC)? 1

Is this information correct (proceed with recovery) (y/n)? y
    
```

After the key and KIB information has been successfully entered, the recovery process proceeds the same as before, as illustrated in [Figure 1: File Recovery Verification](#) on page 35. If a template file had been specified on the command line or a template filename had been entered when prompted, the screens prompting for the key and KIB information would not have been displayed. A template file must be specified if the KIB is corrupt and the file uses either an enumerated code set or an enumerated collating sequence.

Recovery Program Error Messages

Error *status* initializing file manager

recover1 was unable to initialize the RM/COBOL file management system for the reason indicated by *status*. The usual cause for this error is that a buffer pool has been configured that is too large to be allocated.

Truncate option not supported

recover1 detected that the truncated function was not supported on the system when the user requested file truncation. Truncation of the file is not possible.

recovery terminating - no records recoverable!

recover1 detected corruption in the indexed file and no records could be recovered. In this case, **recover1** terminates at the end of the integrity scan to protect the user from erroneously deleting all the records from the file. This error may indicate that the block size, the block size increment, or the number of keys that allow duplicates has been incorrectly specified, or the KIB may be corrupt.

Error *status* on template file

recover1 detected an error in the KIB of the template file specified by the user. The user may enter another template file, may enter the KIB information manually, or may enter a Ctrl-C to terminate **recover 1**.

Cannot write near end of file - check "ulimit"

recover1 detected that blocks near the end of the file can be read but not written, but other blocks of the file may be both read and written. This error may indicate that the operating system file size limit (ulimit) may be smaller than the size of the file. Set the file size limit correctly or use an account with sufficient privileges and run **recover1** again.