Report Modernization Utility for z/OS and OS/390

User's Guide and Reference

Version 1 Release 1

SC19-2726-00

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Note!

Before using this information and the product it supports, be sure to read the general information under "Notices" on page 65.

First Edition (March 2009)

This edition applies to Report Modernization Utility for z/OS Version 1 Release 1, Program Number 5697-P33 and to any subsequent releases until otherwise indicated in new editions. Make sure you are using the correct edition for the level of the product.

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About this manual

This manual describes how to use the Report Modernization Utility for z/OS licensed program.

In the rest of this document, the Report Modernization Utility for z/OS is referred to as ″RMU″.

Who should use this manual

This manual is for anyone who wants to convert standard mainframe reports to HTML or Character Separated Values (CSV) file format.

To use RMU properly, you need to be familiar with:

- Job Control (JCL)
- The RMU script language (RMU Script)
- COBOL compiling procedures

Structure of this manual

This manual consists of:

- Chapter 1, “Introducing RMU,” on page 1.

  Explains what RMU is and how it works.
- Chapter 2, “Working with RMU,” on page 3.

  An overview of the supplied JCL.
- Chapter 3, “Installation and RMU options,” on page 11.

  Describes RMU installation and customization.
- Chapter 4, “Working with RMU Script,” on page 17.

  Describes in detail how to work with the RMU Script language.
- Chapter 5, “RMU Script language instruction reference,” on page 33.

  Describes statements supported by RMU.
- Chapter 6, “Messages,” on page 59.

  Provides a list of:
  - COBOL compiler generated messages
  - RMU runtime error messages
  - RMU compiler generated messages

How to read syntax diagrams

The syntactical structure of commands described in this document is shown by means of syntax diagrams.

Figure 1 shows a sample syntax diagram that includes the various notations used to indicate such things as whether:

- An item is a keyword or a variable.
- An item is required or optional.
- A choice is available.
- A default applies if you do not specify a value.
- You can repeat an item.

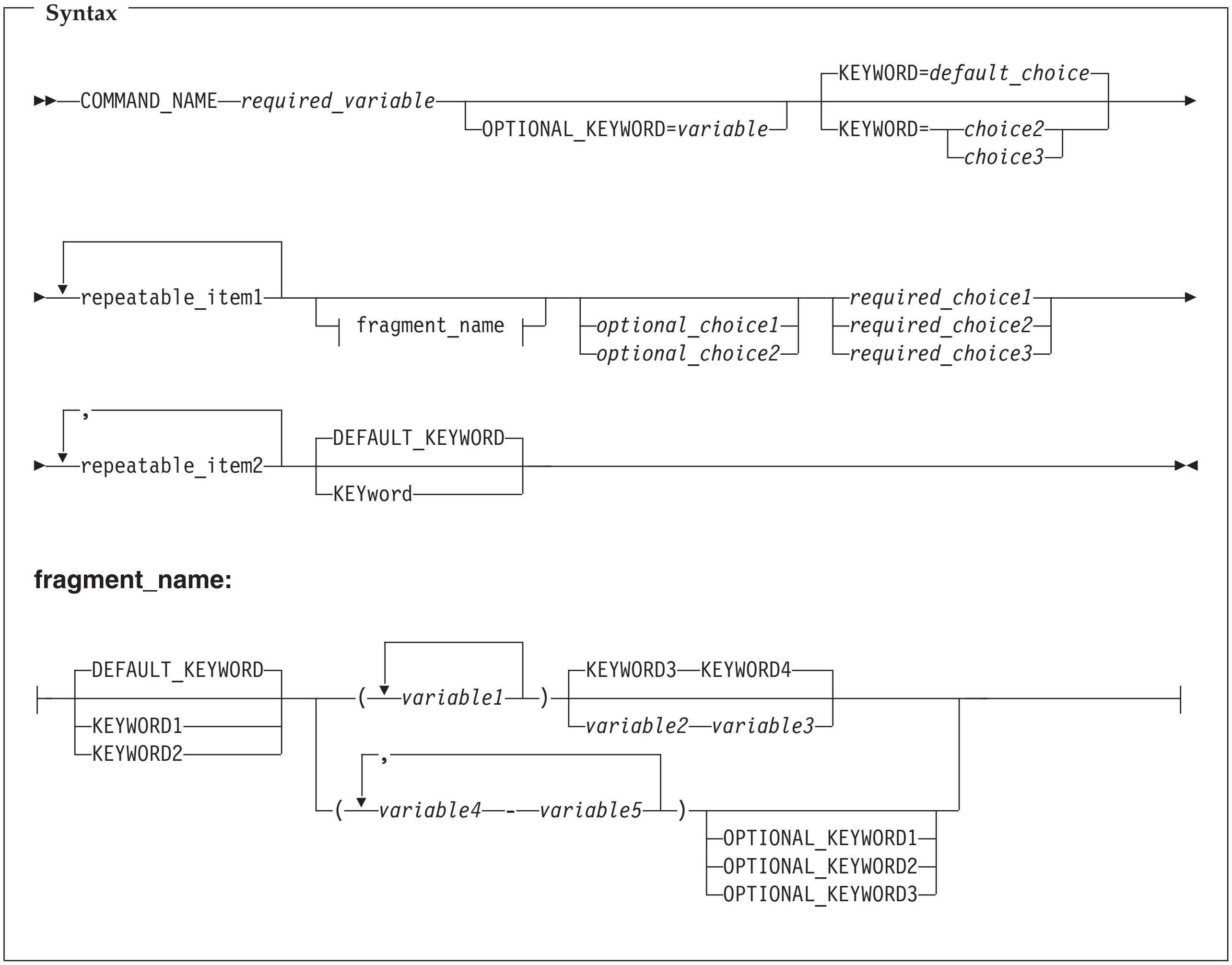


Figure 1. Sample syntax diagram

Here are some tips for reading and understanding syntax diagrams:

Order of reading

Read the syntax diagrams from left to right, from top to bottom, following the path of the line.

The ▶▶─── symbol indicates the beginning of a statement.

The ───▶ symbol indicates that a statement is continued on the next line.

The ▶─── symbol indicates that a statement is continued from the previous line.

The ───▶◀ symbol indicates the end of a statement.

Keywords

Keywords appear in uppercase letters.

```
▶▶──COMMAND_NAME──────────────────────────────────────────────▶◀
```

Sometimes you only need to type the first few letters of a keyword, The required part of the keyword appears in uppercase letters.

```
      ┌─DEFAULT_KEYWORD─┐
▶▶──┼─────────────────┼─────────────────────────────────────▶◀
      └─KEYword─────────┘
```

In this example, you could type ″KEY″, ″KEYW″, ″KEYWO″, ″KEYWOR″ or ″KEYWORD″.

The abbreviated or whole keyword you enter must be spelled exactly as shown.

Variables

Variables appear in lowercase letters. They represent user-supplied names or values.

```
▶▶──required_variable─────────────────────────────────────────▶◀
```

Required items

Required items appear on the horizontal line (the main path).

```
▶▶──COMMAND_NAME──required_variable───────────────────────────▶◀
```

Optional items

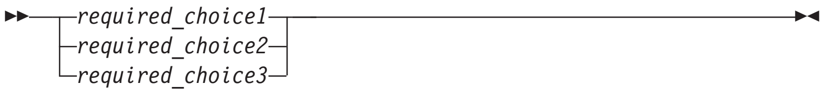
Optional items appear below the main path.

```
▶▶──┬──────────────────────────┬─────────────────────────────▶◀
      └─OPTIONAL_KEYWORD=variable─┘
```

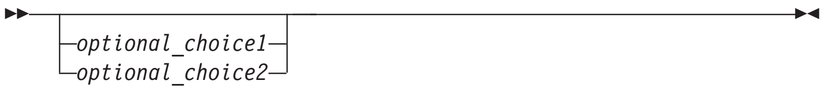
Choice of items

If you can choose from two or more items, they appear vertically, in a stack.

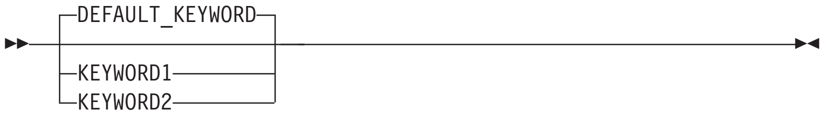
If you *must* choose one of the items, one item of the stack appears on the main path.



If choosing one of the items is optional, the entire stack appears below the main path.

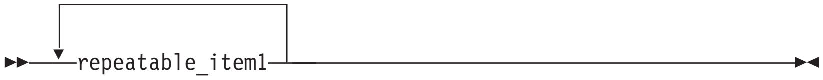


If a default value applies when you do not choose any of the items, the default value appears above the main path.

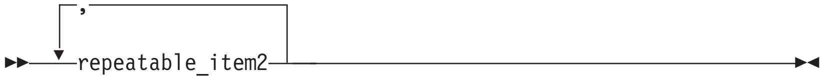


Repeatable items

An arrow returning to the left above the main line indicates an item that can be repeated.

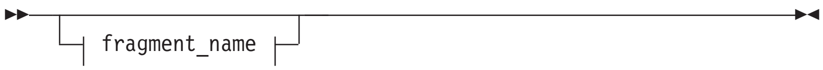


If you need to specify a separator character (such as a comma) between repeatable items, the line with the arrow returning to the left shows the separator character you must specify.



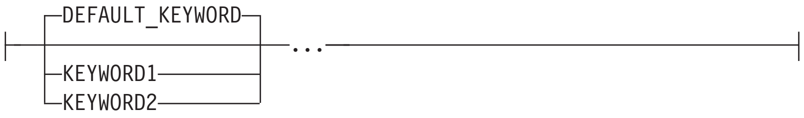
Fragments

Where it makes the syntax diagram easier to read, a section or *fragment* of the syntax is sometimes shown separately.



⋮

fragment_name:



Chapter 1. Introducing RMU

RMU is a stand-alone utility that converts mainframe printer files (reports) to HTML and CSV files. It runs exclusively on the z/OS® platform.

The purpose of RMU is to provide a comprehensive tool for converting mainframe reports to an HTML and CSV format which is understood by standard browsers and spreadsheet software such as IE and EXCEL, without the need to modify existing programs. Once the reports are converted, they can be published to z/OS or any other server, or downloaded to a PC platform for local access.

How does it work?

RMU executes on z/OS in background as a batch job. The input and output environment is controlled by means of JCL. RMU Script is available for massaging and decorating the input. The output is published directly to the z/OS server, or written to a file that can be routed or downloaded to any other server or client platform.

RMU features

The main features within RMU are:

- HTML and CSV documents can be produced from standard reports without changing the application programs.
- RMU Script is available for decorating HTML documents. The language can:
  - Decorate HTML text by means of fonts, CSS, colors, and so on. For example:
    - Negative amounts can be turned red.
    - The background can simulate 1403 green-striped printer paper.
  - Place objects such as pictures and special annotations at specific positions in the document.
  - Be used in interpretive mode or compiled and linked mode.
- Simple HTML documents can be produced (the use of RMU Script is optional).
- HTML documents, with a control breaks tree on the left side and the report body on the right side, can be produced (the use of RMU Script is required).
- HTML documents can be published to the z/OS server by pointing the JCL to the z/OS server.
- HTML documents can be created to a disk file and downloaded to any other platform.
- CSV files can be produced (the use of RMU Script is required).

Chapter 2. Working with RMU

This section provides an overview of the JCL supplied with RMU.

Running RMU

RMU can be run as a stand-alone batch utility in three ways:

Running RMU without RMU Script

This is the simplest form. The FZHRMU00 program is run without the SYSIN for RMU Script. The input report is read and an output HTML-format document is created without custom decorations. The background color and turf is supplied by the PARM= (’STYLE=&*css*,TURF= &*turf*’) options on the EXEC statement.

```
//RUNRMU  EXEC PGM=FZHRMU00,PARM=('STYLE=&css,TURF=&turf)')
```

Where:

&*css*	PDS member containing CSS in FJIDOC0 PDS. This is an optional parameter.	
&*turf*	The background color. Valid values are:	
	1403-paper	Simulate 1403 green-striped printer paper. This is the default.
	NO	Create plain solid background color.

Use the supplied FZHRMUJ0 or FZHRMUX0 job located in the &SYS1.SFZHJCLS library as a template for your own jobs.

Running RMU with compiled RMU Script

In this mode, the FZHRMU00 program is run by invoking a compiled RMU Script program. The name of the RMU Script program to use and the style CSS are supplied by the PARM= on the EXEC statement.

```
//RUNCOMP   EXEC PGM=FZHRMU00,PARM=('SCRIPT=&pgmname,STYLE=&css')
```

Where:

&*pgmname*	The name of the script program. This is a required parameter.
&*css*	The PDS member containing CSS in FJIDOC0 PDS. Style is used only if there is no style method coded in the RMU Script. This is an optional parameter.

The SYSIN for the Script source must not be coded in the JCL.

The &*pgmname*, RMU SCRIPT, must have been previously compiled and linked by means of the FZHRMU01 compiler.

Use the supplied FZHLINKJ job located in the &SYS1.SFZHJCLS library as a template to compile and link RMU Script programs.

Use the supplied FZHRMUJ1 or FZHRMUX1 job located in the &SYS1.SFZHJCLS library as a template to run the compiled RMU Script program.

Running RMU with RMU Script in ″link and go″ mode

In this mode, the FZHRMU00 program compiles and links RMU Script pointed to by the SYSIN and then runs it. SYSIN can be a flat file, a PDS or PDSE member, or an inline source. The background style can be supplied by the PARM= on the EXEC statement.

```
//RUNCOMP   EXEC PGM=FZHRMU00,PARM=(STYLE=&css)
```

Where:

&*css*	PDS member containing CSS in FJIDOC0 PDS. Style is used if there is no style method coded in the RMU Script. This is an optional parameter.

The SYSIN is required.

″PARM LINK (&NAME)″ must not be specified on the PARM statement in the RMU Script program.

Use the supplied FZHRMUJ2 or FZHRMUX2 job located in the &SYS1.SFZHJCLS library as a template to run as ″link and go″.

Distributing output documents

RMU can publish the output documents to the z/OS server (UNIX®), or to a regular z/OS flat variable-length file.

When documents are published to a regular z/OS variable-length file, the file must be downloaded to a PC (or another server) for access.

- **When you create simple HTML format**, download the output file as an ASCII text file with an extension of `.htm`. The downloaded file can be opened with IE or any other compatible browser.
- **When you create HTML1 format**, download the output as a binary file and run the FZHBPARS Java™ parser to build the required directories. See “Using the FZHBPARS parser utility” on page 8 for detailed steps.
- **When you create a CSV file**, download the output file as an ASCII text file with an extension of `.csv`. The downloaded file then can be imported into any spreadsheet software.

When documents are published to the z/OS server, the z/OS UNIX environment must be established and enabled. A root directory on the z/OS UNIX system must be established for each user. Coordinate access to the UNIX environment with your z/OS system administrator.

RMU determines where to send the output by checking for the existence of the name FJUNIX0 DD in the JCL. PATH= on the FJUNIX0 definition must point to the root directory showing where to write the documents.

If the name FJUNIX0 DD exists in the JCL, RMU assumes that the HTML documents are being sent to a z/OS UNIX System. If the name FJUNIX0 DD does not exist, RMU creates a flat file on z/OS.

Note: UNIX files are handled by the FZHUNIX1 RMU program. This program is dynamically loaded at end of job when combining the output. UNIX is case-sensitive. That is, commands, directory, and file names must by typed exactly as defined on the UNIX system.

When publishing to the z/OS server, RMU must comply with the code set (ASCII or EBCDIC) defined for each document type on the UNIX system. The code set is obtained from the UNIX file, httpd.conf.

Note: The layout of the UNIX file, httpd.conf, is beyond the scope of this document. Consult with your z/OS system administrator for the location of this file.

The httpd.conf file is pointed to by the FJCONFG DD name in the JCL. It can be a z/OS PDS member or a file in the UNIX directory.

If the FJCONFG DD name is not in the JCL, ASCII is assumed for HTML and CSV files, and binary code for gif files.

For a list of available job templates in the &SYS1.SFZHJCLS library, see “Summary of available jobs.”

For a list of files needed in the JCL, see “Summary of file DD Names.”

Summary of available jobs

These jobs are available:

RMU Script compiler job (FZHRMU01 program):

FZHLINKJ	Compile and link RMU Script program.

Jobs to use when the output documents are to be kept on z/OS for downloading to a PC (or other non-z/OS server):

FZHRMUJ0	Run RMU without the RMU Script program.
FZHRMUJ1	Run the compiled RMU Script program.
FZHRMUJ2	Run RMU Script as a ″link and go″ job.

Jobs to be used when output documents are to be distributed to the z/OS server (UNIX on z/OS):

FZHRMUX0	Run RMU without the RMU Script program.
FZHRMUX1	Run the compiled RMU Script program.
FZHRMUX2	Run RMU Script as a ″link and go″ job.

Summary of file DD Names

These files are required when running RMU without the RMU Script program:

Table 1. Files required when running RMU without the RMU Script

File	Required or optional
FJIRPT0	Required
FJORPT0	Required
FJIDOC0	Optional
SYSOUT	Required

These files are required when compiling RMU Script:

Table 2. Files required when when compiling RMU Script

File	Required or optional
COBLIST	Optional

Table 2. Files required when when compiling RMU Script (continued)

File	Required or optional
FJSVC99	Optional
LKEDMAP	Optional
RMULIST	Optional
RMUERR1	Optional
SYSLMOD	Required
SYSIN	Required

These files are required when running RMU with compiled RMU Script:

Table 3. Files required when running RMU with compiled RMU script

File	Required or optional
FJIRPT0	Required
FJORPT0	Required
FJIDOC0	Optional
FJSVC99	Optional
SYSOUT	Required

These files are required when running RMU in ″link and go″ mode:

Table 4. Files required when running RMU in ″link and go″ mode

File	Required or optional
COBLIST	Optional
FJIRPT0	Required
FJORPT0	Required
FJIDOC0	Optional
FJSVC99	Optional
LKEDMAP	Optional
RMULIST	Optional
RMUERR1	Optional
SYSOUT	Required
SYSIN	Required

These are additional files needed when publishing to z/OS UNIX:

Table 5. Additional files needed when publishing to z/OS UNIX

File	Required or optional
FJUNIX0	Required
FJDMAP0	Optional
STDERR	Optional
STDOUT	Optional
FJCONFG	Optional

File descriptions

COBLIST

Output COBOL compiler listing.

RECFM=FBA, LRECL=133.

This file is created when compiling RMU Script and the COBOL option is coded on the PARM in the RMU Script program. This is an optional file. The default is SYSOUT=*.

FJCONFG

Optional z/OS UNIX configuration file for determining the code set for file types. The file is used when publishing the document to the z/OS UNIX server. It can be a z/OS PDS member, or a file in the UNIX directory. If FJCONFG is not in the JCL, ASCII is assumed for HTML and CSV files, and binary code for gif files.

FJDMAP0

Output list of files published to the z/OS server (z/OS UNIX).

RECFM=VB, LRECL=4096

This is an optional file. The default is SYSOUT=*.

FJIDOC0

Input file where HTML templates and CSS files are located.

RECFM=VB, LRECL=4096

This is an optional file. The default is &SYS1.SFZHDOCS PDS. If you are creating custom CSS files, place the FJIDOC0 DD name in the JCL. Concatenate &SYS1.SFZHDOCS first, followed by your own data set names.

FJIRPT0

The input report (report to be converted).

This can be an FBA/VBA or an FB/VB file. Maximum LRECL=512 (including cc).

The first byte must be a valid ANSI print control character.

FJORPT0

The output report (HTML or CSV document).

RECFM=VB, LRECL=4096

When distributing to z/OS UNIX, this file is used as a work file. When creating a z/OS flat file, this file must be downloaded to a PC (or another server). The HTML1 format output must be parsed with the FZHBPARS parser utility. For details, see “Using the FZHBPARS parser utility” on page 8.

FJSVC99

This is an optional DD name for turning SVC99 messages ON or OFF. This is a dummy temporary file used to control RMU’s dynamic allocator messages. If supplied, it must be coded as follows:

```
//FJSVC99  DD DSN=&&FJSVC99(&svc99),DISP=NEW
```

Where:

&*svc99*

Can have one of the values: MSGOFF, MSGALL, or MSGTXT.

FJUNIX0
z/OS UNIX path (directory on z/OS UNIX showing where to publish the output). This is an HFS file. The maximum buffer length is 4096. The specified path must exist on z/OS UNIX with read and write permissions. When publishing to z/OS UNIX, RMU uses this path as the base directory into which all other created subdirectories and files are placed.

FJUNIX1
z/OS UNIX HFS file internally allocated by RMU. The files are dynamically allocated by RMU. Do not code this file in the JCL.

LKEDMAP
Link Edit map from the link step.

RECFM=FBA, LRECL=133

This file is created when compiling RMU Script and the LKED option is coded on the PARM in the RMU Script program. This is an optional file. The default is SYSOUT=*.

RMULIST
RMU Script compiler listing.

RECFM=FBA, LRECL=133

This file is produced by the RMU Script compiler. This is an optional file. The default is SYSOUT=*.

RMUERR1
RMU Script compiler errors.

RECFM=FBA, LRECL=133

This file is produced by the RMU Script compiler. This is an optional file. The default is SYSOUT=*.

STDERR
Standard z/OS UNIX error file. When publishing to z/OS UNIX, potential UNIX errors are written to this file. The default is STDERR in the home directory on z/OS UNIX.

STDOUT
Standard z/OS UNIX messages file. When publishing to z/OS UNIX, standard UNIX messages are written to this file. The default is STDOUT in the home directory on z/OS UNIX.

SYSIN
SYSIN of the RMU Script program.

RECFM=F, LRECL=80

This is an optional file. If present, the use of the RMU script compiler is assumed.

SYSOUT
Standard SYSOUT file for runtime messages required by every job.

Using the FZHBPARS parser utility

For the HTML1 option, RMU generates a binary format file that contains several HTML, gif, and CSS documents. The downloaded file must be parsed with the Java program, FZHBPARS, before it can be viewed with a browser.

To install the parser program FZHBPARS:

1. On your PC or a server, create a directory for the RMU documents.

   This is an example of a Windows® command line to create a directory called RMUDOCS:

   ```
   md rmudocs
   ```
2. Download from the mainframe (in binary format with no LF/CR) &SYS1.SFZHDOCS(fzhbpars) into the created directory:

   ```
   c:\rmudocs\fzhbpars.class
   ```

To view an HTML1 document on your PC or a server, perform these tasks:

1. Make sure that Java VM is installed and running.
2. Download the HTML1 document file from the mainframe (in binary format, no LF/CR) into a directory (assume the rmudocs directory).
3. Switch to the rmudocs directory:

   ```
   cd\rmudocs
   ```
4. Enter on the command line:

   ```
   java fzhbpars &src &dest
   ```

   Where:

&*src*	The downloaded HTML1 document file.
&*dest*	The target directory for the HTML1 documents.

   For example (assuming the file name htmlfil1.bin):

   ```
   java fzhbpars htmlfil1.bin  htmlfil1
   ```

At completion, all HTML documents are created in the c:\rmudocs\htmlfil1\r001 directory (drive c: assumed). To view from your default browser, click on the c:\rmudocs\htmlfil1\r001\index.htm file. Alternatively, you can open your browser and enter in the URL:

```
file:///C:/rmudocs/htmlfil1/r001/index.htm
```

When you click on index.htm, a selection tree on the left and the report body on the right side of the screen is displayed. When you click on FJORPT0.htm, the report body is displayed on the screen.

Chapter 3. Installation and RMU options

This section describes RMU installation and customization.

Installation

RMU is installed using SMP/E. Refer to the *Program Directory* (GI10-8807-00) for installation instructions.

RMU consists of these six libraries:

&SYS1.SFZHAMAC	Assembler (BAL) macros.
&SYS1.SFZHASRC	BAL programs source.
&SYS1.SFZHDOCS	HTML templates and CSS files.
&SYS1.SFZHJCLS	JCL library with test programs.
&SYS1.SFZHLOAD	Load library.
&SYS1.SFZHPROC	PROC Library.

At installation, perform the tasks as described in these sections:

- “RMU default options (FZHOPTAB) table.”
- “RMU default library locator table (FZHPROCS)” on page 13.
- “Setting up the z/OS server (UNIX) environment” on page 14.
- “System information” on page 15.

On completion, tailor and test these jobs located in the &SYS1.SFZHJCLS library:

FZHLINKJ	Compile and link the RMU Script program.
FZHRMUJ0	Run RMU without the Script program.
FZHRMUJ1	Run the compiled Script program.
FZHRMUJ2	Run RMU Script as a ″link and go″ job.
FZHDELCJ	Copy the test report with print control characters expanded.

If you are distributing HTML reports to the z/OS server (UNIX server on z/OS), tailor and test these jobs:

FZHRMUX0	Run RMU without the Script program.
FZHRMUX1	Run the compiled Script program.
FZHRMUX2	Run RMU Script as a ″link and go″ job.

Installation is successful if all jobs run to a normal end of job.

For instructions on how to use RMU for general users, see Chapter 2, “Working with RMU,” on page 3.

RMU default options (FZHOPTAB) table

The RMU default options are located in the FZHOPTAB table. The source code for the table is located in the &SYS1.SFZHASRC library.

Users in the United States can use the table as shipped on the product tape.

Users outside the United States should adjust the currency and the decimal character by means of the CURRENCY= and the DECIMAL= parameters respectively.

To assemble and link the table, use the FZHASMOJ job located in the &SYS1.SFZHJCLS library. You may need to tailor the job name and system libraries.

Figure 2 shows a copy of FZHOPTAB distributed with RMU:

```
FZHOPTAB FSMACRMU TYPE=E,        .E = GENERATE NUCLEUS                 X
               OPSYS=MVS,        .OPERATING SYSTEM MVS                 X
               COMPANY='FOUNDATION SOFTWARE INC.',                     X
               DISTNUM=RMU02139, .DISTRIBUTION ID FOR RMULIST          X
               RELEASE=V1R1.00,  .SOFTWARE RELEASE VERS,REL,MOD        X
               RELDATE=02/01/09, .SOFTWARE RELEASE  DATE               X
               RMULIST=YES,      .TRANSLATOR DEFAULT LIST OPTION       X
               COBLIST=YES,      .COBOL COMPILER DEFAULT LIST          X
               LKEDLST=YES,      .LINK STEP LIST OPTION                X
               DECIMAL=PERIOD,   .PERIOD/COMMA                         X
               CURRENCY=$,       .CURRENCY SYMBOL                      X
               CSVCHAR=',',      .DEFAULT CSV CHARACTER                X
               ERRLIMT=128,      .ERROR LIMIT COUNTER                  X
               TURF=1403-PAPER,  .TURF NO/1403-PAPER                   X
               LINESIZE=512,     .MAXIMUM REPORT LINE SIZE (INCL CC)   X
               PAGESIZE=66,      .MAXIMUM LINES PER PAGE (1 - 99)      X
               MAXSIZE=32767,    .MAX FIELD LENGTH ALLOWED VIA DEFINE  X
               FORMAT=HTML       .DEFAULT FORMAT HTML/HTML1/CSV
         END FZHOPTAB
```

Figure 2. Copy of FZHOPTAB distributed with RMU

Explanation:

TYPE=E Macro type. Do not change.

OPSYS=MVS Operating system. Do not change.

COMPANY='FOUNDATION SOFTWARE INC.'
Your company name up to 30 characters long.

RELEASE=V1R1.00
Software release. Do not change.

RELDATE=02/01/09
Software release date. Do not change

RMULIST=YES
Default RMU Script compiler LIST option:

YES	Print RMU Script listing.
NO	Do not print RMU Script listing.

COBLIST=YES
Default COBOL compiler LIST option:

YES	Print COBOL listing.

LKEDLST=YES
Default Link LIST option:

YES	Print Link listing.
NO	Do not print Link listing.

DECIMAL=PERIOD
Default character for decimal point:

PERIOD	Use period (.).
COMMA	Use comma (,).

CURRENCY=$	Default currency symbol. The currency symbol must be a single character acceptable by COBOL.
CSVCHAR=','	Default separator character for CSV files. You can change this to a character of your own choosing.
ERRLIMT=128	Error limit for the RMU Script compiler. The RMU Script compiler terminates after reaching the number of errors specified by this parameter.
TURF=1403-PAPER	Default background 1403-PAPER decorating option: **1403-PAPER** Generate HTML with stripes to simulate 1403 printer paper. **NO** Do not generate simulated 1403 printer paper.
LINESIZE=512	Maximum input reports line size (including print control character). This parameter is reserved for future use. Do not change.
PAGESIZE=66	Maximum input report lines per page. Do not change.
MAXSIZE=32767	Maximum RMU field size allowed. This size applies to the DEFINE statement in RMU Script. The maximum is 32,767. Do not change.
FORMAT=HTML	Default output format: **HTML** Produce a simple HTML report. **HTML1** Produce a HTML report with a selection tree on the left side by control break fields. RMU Script is required unless no control breaks are needed. **CSV** Produce a CSV file. Refer to the **CSVCHAR=** parameter for the default character to be used.

RMU default library locator table (FZHPROCS)

RMU is compiled with the FZHRMU01 program.

FZHRMU01:

- Is invoked directly from JCL when the RMU Script program is to be compiled and linked only.
- Is invoked indirectly from the FZHRMU00 program when performing ″link and go″.
- Invokes and performs these tasks as a single step:
  - Converts RMU Script source to z/OS COBOL by means of the FZHRMUS1 utility.
  - Compiles the generated COBOL by means of z/OS Enterprise COBOL.
  - Links the compiled program.

To activate the FZHRMU01 program, perform these steps:

1. Tailor FZH#PROC, located in &SYS1.SFZHJCLS. This proc is read by the FZHRMU01 program. It contains all the information and steps needed to simulate the single step process.

To tailor, follow the comments embedded in the proc. You will probably need to change these parameters: TWORK=, CWORK=, MODEL=, and COBLIB=. You may have to change other parameters, depending on your requirements.

Verify the entire proc for potential changes.

If you comment out a keyword, you must also comment out all references to it.

The SYSPRDD=&DDname option can be changed to redirect COBOL listings to a different DDname.

The default COBOL internal printer is set to FJSYSPR. This DD name is internally allocated and used by Migration Utility. Do not code it in the JCL.

While testing, you can change SVC99=MSGOFF in FZH#PROC to one of these options:

MSGOFF	Disable dynamic allocator tracing.
MSGON	Display JES messages.
MSGALL	Display input text and JES messages.
MSGSER	Display messages of a serious nature only.
MSGTXT	Display input text only.

Use these options to trace FZH#PROC and the dynamic allocation problems that might arise during testing. For production use, SVC99=MSGOFF is recommended to avoid excessive console messages.

Note: Messages can be controlled by placing this statement in the JCL:

```
//FJSVC99  DD DSN=&&FJSVC99(&SVC99),DISP=NEW
```

Where: &*SVC99* is one of the previously listed options.

2. Change the FZHPROCS table, located in &SYS1.SFZHASRC.

   You must change this program to point to the RMU libraries installed on your system. Change the PROCLIB0 constant to point to the PDS where FZH#PROC from step #1 is located. Change the PRODUCT0 constant to the high-level qualifier of the Migration Utility libraries.

   Assemble and link the FZHPROCS program using the FZHASMPJ job located in the &SYS1.SFZHJCLS library. This program must be linked into the RMU &SYS1.SFZHLOAD library.

   Note: FZHRMU01 loads FZHPROCS to locate the FZH#PROC member and to acquire a replacement for the &SYS1 symbol located in FZH#PROC. The information in FZHPROCS must always point to proper libraries. This means that if you rename or move your RMU libraries, you must also adjust the information in FZHPROCS accordingly.

Setting up the z/OS server (UNIX) environment

RMU can automatically publish the output documents to the z/OS server (UNIX) or to a regular z/OS variable-length flat file.

To publish to the z/OS server, the z/OS UNIX environment must be established and enabled. A root directory on the z/OS UNIX system must be established for each user. Coordinate access to UNIX environment with your z/OS system administrator.

RMU determines where to send the output by checking for the existence of the FJUNIX0 DD name in the JCL. The PATH= parameter on the FJUNIX0 definition points to the root directory showing where to write the documents.

If FJUNIX0 exists, RMU assumes that the HTML documents are being sent to the z/OS UNIX System. If FJUNIX0 does not exist, RMU creates a flat file on z/OS.

Note: UNIX files are handled by the FZHUNIX1 RMU program. This program is dynamically loaded at end of job when combining the output. UNIX is case-sensitive. That is, commands, directory, and file names must by typed exactly as defined on the UNIX system.

When publishing to the z/OS server, RMU must comply with the code set (ASCII or EBCDIC) defined for each document type on the UNIX system. The code set is obtained from the UNIX file, httpd.conf.

httpd.conf is pointed to by the FJCONFG DD name in the JCL. It can be a z/OS PDS member, or a file in the UNIX directory.

If FJCONFG is not in the JCL, ASCII is assumed for HTML and CSV files, and binary code for gif files.

These job examples located in &SYS1.SFZHJCLS can be used as templates to build custom jobs for publishing to z/OS UNIX:
FZHRMUX0
FZHRMUX1
FZHRMUX2

System information

These jobs and JCL are distributed in the &SYS1.SFZHJCLS library:

FZH#READ	RMU system information.
FZH#PROC	RMU Script compiler proc.
FZHASMOJ	JCL to assemble the RMU options table.
FZHASMPJ	JCL to assemble the RMU default proc location.
FZHDELCJ	Utility to expand the report print control characters.
FZHLINKJ	Job to compile and link RMU Script programs.
FZHRMUJ0	Job to run the FZHRMU00 utility (without Script program).
FZHRMUJ1	Job to run the FZHRMU00 utility with compiled script.
FZHRMUJ2	Job to run the FZHRMU00 utility with Script compile and ″link and go″.
FZHRMUX0	Job to run the FZHRMU00 utility (without Script program). Distributes to z/OS UNIX.
FZHRMUX1	Job to run the FZHRMU00 utility with compiled script. Distributes to z/OS UNIX.
FZHRMUX2	Job to run the FZHRMU00 utility with script compile, ″link and go″. Distributes to z/OS UNIX.
FZHTEST0	RMU Script example. Compile and link only.
FZHTEST1	RMU Script example. Compile, ″link and go″.
FZHTEST2	RMU Script example. Compile, ″link and go″.
FZHTEST3	RMU Script example. Compile, ″link and go″.
FZHTEST4	RMU Script example. Compile, ″link and go″.
FZHRPT00	Demo report file.

These procs are distributed in the &SYS1.SFZHPROC library:
Proc to compile and Link RMU Script.
Proc to compile, ″link and go″, z/OS UNIX output.
Proc to compile, ″link and go″, z/OS file output.
Proc to run compiled script, z/OS UNIX output.
Proc to run compiled script, z/OS file output.

These members are distributed in the &SYS1.SFZHDOCS library:

FZHBPARS	Java program for parsing HTML docs on PC platform.
FZHRMUL0	RMU logo gif file.
FZHMINUS	Minus sign symbol.
FZHPAGES	Page break symbol.
FZHPLUS0	Plus sign symbol.
FZHRARRW	Arrow symbol.
FZHSTOP0	Stop symbol.
FZHEBASE	HTML template.
FZHEBCSS	Base CSS templates.
FZHEINDX	JavaScript tree index.
FZHELOAD	JavaScript tree load.
FZHEPCSS	Tree CSS templates.

This BAL source is distributed in &SYS1.SFZHASRC:

FZHOPTAB	RMU options table.
FZHPROCS	RMU default proc locator.

This assembler macro is distributed in &SYS1.SFZHAMAC:

FSMACRMU	RMU Assembler macros needed for FZHOPTAB.

These modules are distributed in the &SYS1.SFZHLOAD library:

FZHATTCH	RMU internal use. Task attach module.
FZHCPYRT	RMU internal use. Copyright information.
FZHCSV00	CSV file I/O module.
FZHCVDAT	RMU internal use. Date retrieval module.
FZHDDCPY	RMU internal use. Dynamic allocator submodules.
FZHDELCC	Utility program to expand report print control characters.
FZHDYNCV	RMU internal use. EBCDIC/ASCII code conversion module.
FZHGJOB0	RMU internal use. Get job information.
FZHGOPT0	RMU internal use. Dynamic allocator submodules.
FZHGPRM0	RMU internal use. PARM retrieval from EXEC statement.
FZHGUSER	RMU internal use. Registration module.
FZHHTML0	RMU internal use. HTML formatter module.
FZHHTML1	RMU internal use. HTML1 formatter module.
FZHJCL00	RMU internal use. Installation JCL tailoring utility.
FZHJCL01	RMU internal use. Installation JCL tailoring utility.
FZHMVSC0	RMU internal use. Console I/O module.
FZHMVSC1	RMU internal use. Console I/O module.
FZHOPTAB	RMU options table. Prepared by the installer.
FZHPROCS	RMU default proc locator. Prepared by the installer.
FZHRMUB1	RMU internal use. COBOL skeleton.
FZHRMUSP	RMU internal use. I/O module for RMU listing.
FZHRMUS1	RMU internal use. RMU script compiler submodule.
FZHRMUS2	RMU internal use. RMU script compiler submodule.
FZHRMUS3	RMU internal use. RMU script compiler module.
FZHRMUW1	RMU internal use. COBOL and RMU reserved words.
FZHRMU00	RMU main utility for "link and go" or run without RMU script.
FZHRMU01	RMU Script compiler one step driver.
FZHSRC00	RMU developers tool.
FZHSTAE0	RMU compiler abend interrupt handler.
FZHSVC99	Dynamic Allocator program (SVC99 handler).
FZHTEST0	RMU compiled script test program.
FZHUNIX0	RMU internal use. Z/OS UNIX interface module.
FZHUNIX1	RMU internal use. Z/OS UNIX interface module.

Chapter 4. Working with RMU Script

This section describes in detail how to work with the RMU Script language

Basic concepts

RMU Script consists of RMU Script language statements (collectively a script program) that manipulate the input and formats the output document.

The script program is prepared with the ISPF editor in a PDS, as a regular text file. The program must be compiled with the RMU Script compiler and linked as a load module, or linked and executed (run as ″link and go″), depending on the JCL used.

The RMU Script compiler translates script statements to COBOL; therefore a z/OS COBOL or LE COBOL compiler is required.

An RMU Script program consists of 10 optional sections as shown here. You must supply at least one section to make it a valid program.

Environment section	The PARM statement with its options. If coded, PARM must be the first statement in the program.
Working Storage section	Defines the fields and variables used in the Activity section.
<style> section	Defines the Cascaded Style Sheets (color, fonts, and so on).
<object> section	Defines the images to be inserted in the output document.
<docs_top> section	Defines the images and text to be inserted at the top of output document.
<docs_end> section	Defines the images and text to be inserted at the bottom of output document.
<page_top> section	Defines the images and text to be inserted at the top of each page in the output document.
<page_end> section	Defines the images and text to be inserted at the bottom of each page in the output document.
Activity section	Contains the language statements that filter the input and construct the output documents.
Control section	Defines control breaks for HTML1 format documents.

I/O handling

Files cannot be defined in RMU Script. I/O is completely concealed from you. One input report and one output document are assumed.

RMU Script activity statements operate on the page buffer. RMU reads in one report page at the time. In this way, all lines on a single page can be accessed as a single resource. Each page contains up to 66 lines. The activity statements are executed from top to bottom as coded in the program.

The report page begins with Channel 1. That is, a "1" in the first position is Channel 1. If there are more than 66 lines on each page, the remaining lines are drained to the output document unchanged. The activity logic is not applied to the remaining lines.

Information on each line is accessed by explicitly coding the line number with substring notation. For example, LINE1 is line 1, LINE2 is line 2 ... LINE66 is line 66. This example evaluates line 1 starting in position 3 for 5 bytes:

```
IF LINE1 (3: 5) = 'abcde'
```

If the line number is not specified, then a subscript named IDX is used to subscript the lines. IDX is a reserved variable, but it can be assigned to a desired line number to be accessed.

Note: The input report must be a valid printer file with the print control character in position 1. RMU expands print control characters to compensate for the blank lines that would normally be seen on a printed report. Therefore, when referring to a specific line by number, the line number is as according to the expanded report.

These are recognized control characters:

1	Channel 1.
(blank)	Space 1.
0	Space 2.
-	Space 3.
+	Suppress space (for RMU, this is the same as space 1).

When coding a Script program, run the FZHDELCJ utility to expand the report control characters. This will help to identify the line numbers of interest. The FZHDELCJ JCL is located in the &SYS1.SFZHJCLS library.

Coding rules

These coding rules apply:

- RMU Script statements can be placed anywhere between columns 1 and 72. Only one statement is allowed on a line. Statements are followed by respective arguments.
- The arguments are separated by one or more spaces.
- Lines that begin with an asterisk (*) are treated as comments.
- Comments can be imbedded anywhere in the program.
- Alphanumeric constant values (literal) are enclosed in quotes. For example:
  `'abcd'`
- A hex literal is coded by placing an X before the hex constant. For example:
  `X'1234'`
- A hex literal must contain a combination of valid hex characters: 0–9, A–F.
- Numeric constant values are coded as numbers with a leading plus or minus sign and, if necessary, a decimal point. Numbers without a sign are treated as positive numbers. For example, -123.55 is a negative number.

Program example

The program shown in Figure 3 reads in the FZHRPT00 test report located in the &SYS1.SFZHJCLS library and produces an HTML1-format document with a control breaks tree on the left side and the report body on the right side of the screen.

The background of the output document simulates 1403 printer paper.

A page break image, fzhpages.gif, is inserted at the top of each page.

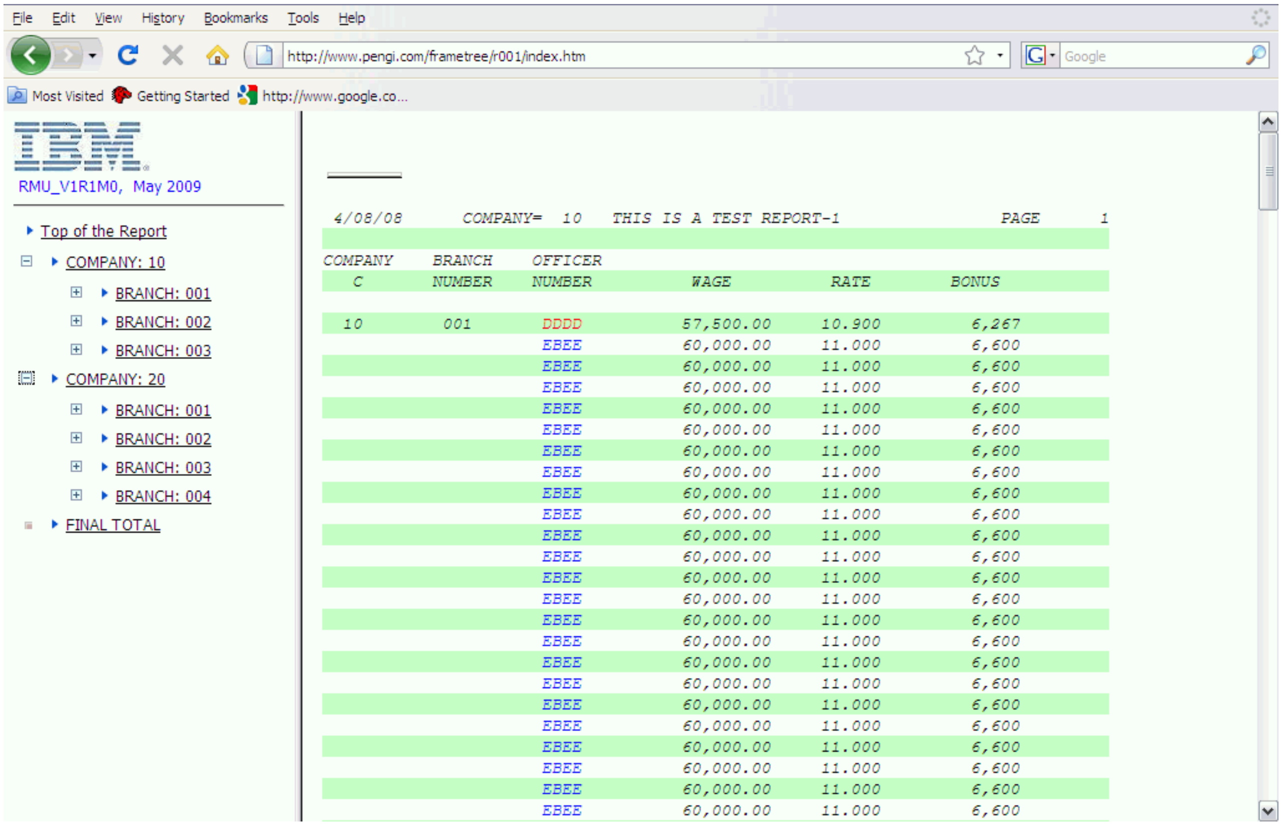
When LINE8-LINE55 contains ’DDDD’ in position 24 for 4, the value is made red (.em1). When LINE8-LINE55 contains ’EBEE’ in position 24 for 4, the value is made blue (.em2).

```
PARM LIST COBOL LKED FORMAT HTML1 TURF 1403-paper                        |Environment
                                                                         |Section
***********************************************************************
* This program converts a report to RMU HTML1 format.                 * |Comments
* Some decorating is inserted via styles and objects.                 *
*********************************************************************** |Working
DEFINE COMPANY W  2  A                                                   |Storage
DEFINE BRANCH  W  5  A                                                   |Section
DEFINE OFFICER W  4  A
<style>                                                                  |
  .em1 {color: red;}                                                     |Style
  .em2 {color: blue;}                                                    |Section
</style>                                                                 |
<page_top>                                                               |page_top
<IMAGE SRC="images/fzhpages.gif">                                        |Section
</page_top>                                                              |
                                                                         |
IF (LINE5 (2: 7) = 'COMPANY')                                            |
AND (LINE5 (13: 6) = 'BRANCH')                                           |
AND (LINE8 (4: 2) IS NUMERIC)                                            |Activity
    COMPANY = LINE8 (4: 2)                                               |
    BRANCH  = LINE8 (14: 3)                                              |
    OFFICER = LINE8 (24: 4)                                              |
    EVALUATE LINE8-LINE55 (24: 4)                                        |Section
       WHEN  'DDDD'                                                      |
           LINE (24: 4) = .em1                                           |
       WHEN  'EBEE'                                                      |
           LINE (24: 4) = .em2                                           |
    END-EVALUATE                                                         |
END-IF                                                                   |
CONTROL COMPANY BRANCH OFFICER                                           |Control
                                                                         |Section
```

Figure 3. Example of RMU script program to produce an HTML1 format document

Figure 4 on page 20 shows a screen print of the generated HTML1 document:

Program example



```
 4/08/08      COMPANY=  10   THIS IS A TEST REPORT-1                PAGE      1

COMPANY     BRANCH     OFFICER
   C        NUMBER     NUMBER              WAGE          RATE          BONUS

  10         001        DDDD          57,500.00        10.900          6,267
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
                        EBEE          60,000.00        11.000          6,600
```

Figure 4. Screen print of the generated HTML1 document

Creating CSV documents

When creating a CSV document, extraneous information such as page titles, field headings, and control break annotations must be removed from the input.

Additionally, you may want to remove float characters from the numeric fields and re-arrange the sign such that the spreadsheet program can intelligently format numeric cells.

Finally, you need to insert a special character between each field to delineate columns for import.

RMU provides methods and statements specifically designed to make these tasks simple.

- To create a CSV file, code `FORMAT CSV='&chr'` on the PARM statement where: &*chr* is the separator character to be placed between the fields.
- Use these RMU methods in the assign statement to format column values:

.ETEXT	For alphanumeric fields.
.ENUM1	For numeric and numeric edited fields.
- Use PAGE-COUNT and LINE-COUNT to determine the page properties.
- Use the BYPASS statement to remove a specific line or a range of lines.
- Use the IDX subscript to control a DO loop for a specific number of lines.

The line is selected for output if at least one method is applied, otherwise the line is bypassed.

Note: CSS (color, fonts, and so on) and images cannot be applied to a CSV file.

The RMU Script program shown in Figure 5 on page 22 creates a CSV file from the FZHRPT00 report located in &SYS1.SFZHJCLS. The source code is FZHTEST4 located in the &SYS1.SFZHJCLS library.

```
PARM LIST COBOL LKED FORMAT CSV=':' DECIMAL (PERIOD) CURRENCY($)
***********************************************************************
* This program converts test report to RMU CSV file format.          *
*                                                                     *
* The program demonstrates how to trim un-needed report lines and     *
* strings from a report. The output is a CSV file ready for import    *
* into a Spreadsheet.                                                 *
*                                                                     *
* The trimming is done via the .ETEXT and .ENUM1 RMU methods          *
***********************************************************************
IF (PAGE-COUNT > 1)
* REPORT TITLES ARE BYPASSED ON ALL BUT FIRST PAGE.
   BYPASS LINE1-LINE7
ELSE
* PRESERVE THE FIRST PAGE TITLE LINES FOR spreadsheet
   LINE1 (2: 80) = .ETEXT
   IDX = 1
   DO 6 TIMES
      IDX = (IDX + 1)
      LINE (02: 07) = .ETEXT
      LINE (13: 06) = .ETEXT
      LINE (23: 07) = .ETEXT
      LINE (34: 14) = .ETEXT
      LINE (52: 06) = .ETEXT
      LINE (62: 10) = .ETEXT
   END-DO
END-IF
IDX = 7
    * Line 8 to LINE-COUNT are detail lines on every page
DO WHILE (IDX < LINE-COUNT)
   IDX = (IDX + 1)
* get rid of Control break and FINAL lines
   IF (LINE (2: 5) = 'FINAL')
   OR (LINE (2: 6) = 'FILEIN')
   OR (LINE (24: 4) = SPACES)
      BYPASS LINE
   ELSE
* construct a row of character separated values
      LINE (02: 07) = .ETEXT
      LINE (13: 06) = .ETEXT
      LINE (23: 07) = .ETEXT
      LINE (34: 14) = .ENUM1
      LINE (52: 06) = .ENUM1
      LINE (62: 10) = .ENUM1
   END-IF
END-DO
```

Figure 5. Example of RMU script program to create a CSV file

Figure 6 on page 23 shows the first few records created by the program in Figure 5:

```
 4/08/08      COMPANY=  10   THIS IS A TEST REPORT-1                PAGE      1
        :        :         :                :        :            :
        :        :         :                :        :            :
        :        :         :                :        :            :
COMPANY : BRANCH : OFFICER :                :        :            :
   C    : NUMBER : NUMBER  :      WAGE      :  RATE  :    BONUS   :
        :        :         :                :        :            :
  10    :  001   :  DDDD   :      57500.00  : 10.900 :       6267 :
        :        :  EBEE   :      60000.00  : 11.000 :       6600 :
        :        :  EBEE   :      60000.00  : 11.000 :       6600 :
        :        :  EBEE   :      60000.00  : 11.000 :       6600 :
        :        :  EBEE   :      60000.00  : 11.000 :       6600 :
        :        :  EBEE   :      60000.00  : 11.000 :       6600 :
```

Figure 6. Records created by the example program shown

Creating simple HTML documents

A simple-HTML format document can be created without the use of RMU Script. To do this, use the FZHRMUJ0 JCL located in the &SYS1.SFZHJCLS library.

You can create a simple HTML document with special decorating if needed, such as special colors, fonts and images, as outlined in this section:

- Code `FORMAT HTML` on the PARM statement.
- Optionally, code <style>, <object>, <docs_top>, < docs_end>, <page_top> and <page_end> sections to define decorating. Use <style> and <object> methods to decorate text. You do so by assigning method names to line text in the Activity section.

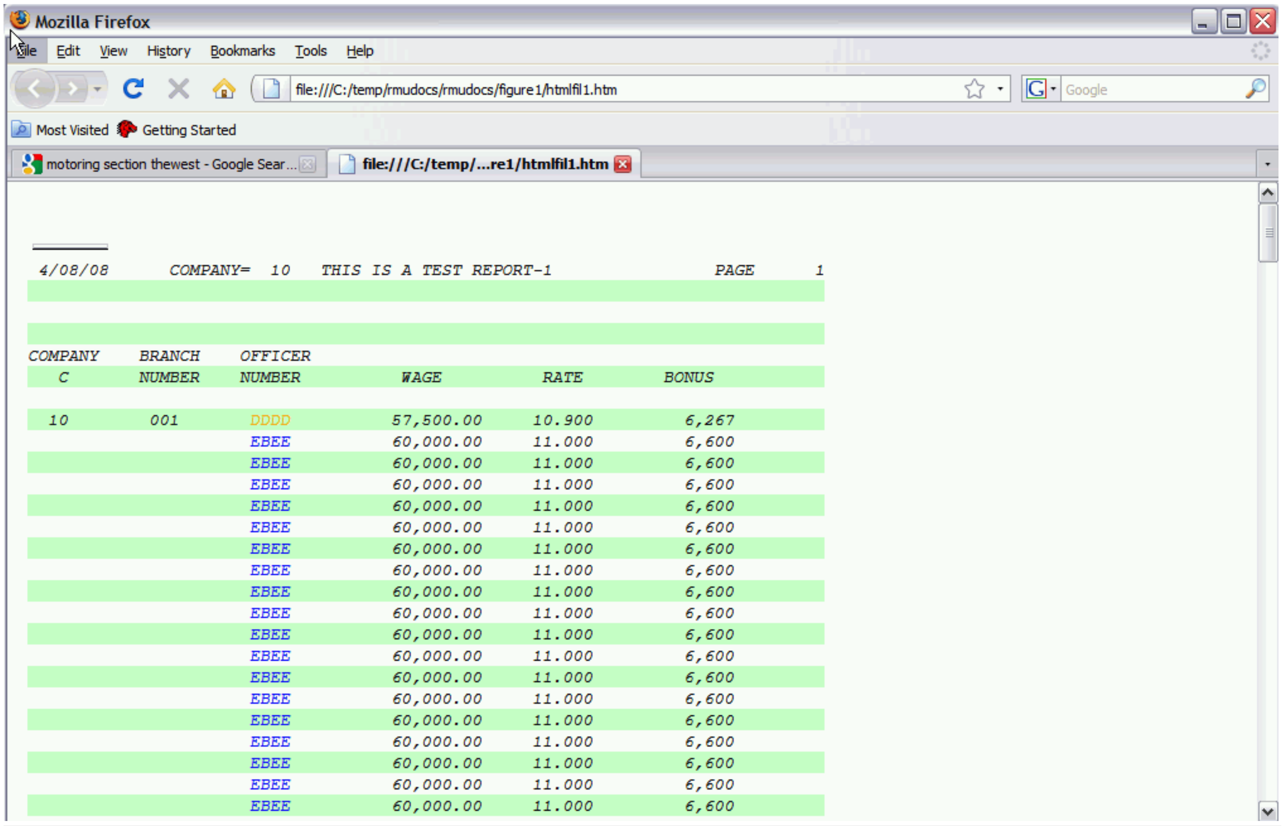
  Note: Images are not automatically included in the output document; therefore, if images are used, they must be available on the server where you place the document.
- Use PAGE-COUNT and LINE-COUNT to determine the page properties.
- Use the BYPASS statement to remove a specific line or a range of lines.
- Use the IDX subscript to control a DO loop for a specific number of lines.
- Use the EVALUATE statement to loop through a range of lines when a specific location on multiple lines is to be decorated with different methods.

The RMU Script program shown in Figure 7 creates a simple HTML document from the FZHRPT00 report located in the &SYS1.SFZHJCLS library. The source code is in FZHTEST1 located in the &SYS1.SFZHJCLS library.

```
PARM LIST COBOL LKED FORMAT HTML turf 1403-paper
************************************************************************
* This program converts test report to RMU HTML format.               *
* Some decorating is inserted via style and object methods.           *
************************************************************************
<style>
 .em1 {color: red; font-weight: normal;}
 .em2 {color: blue;}
 .em3 {color: orange;}
</style>
<page_top>
<IMAGE SRC="images/fzhpages.gif">
</page_top>
IDX = 1
IF (LINE5 (2: 7) = 'COMPANY')
AND (LINE5 (13: 6) = 'BRANCH')
AND (LINE8 (4: 2) IS NUMERIC)
    EVALUATE LINE8-LINE55 (24: 4)
       WHEN  'ZZZZ'
           LINE (1: 80) = .EM1
       WHEN  'EBEE'
           LINE (24: 4) = .EM2
       WHEN OTHER
           LINE (24: 4) = .EM3
    END-EVALUATE
END-IF
```

Figure 7. Example of RMU script program to create a simple HTML document

Figure 8 on page 25 shows a screen print of the generated HTML document:


Mozilla Firefox
File
Edit
View
History
Bookmarks
Tools
Help
file:///C:/temp/rmudocs/rmudocs/figure1/htmlfil1.htm
Google
Most Visited
Getting Started
motoring section thewest - Google Sear...
file:///C:/temp/...re1/htmlfil1.htm

```
 4/08/08      COMPANY=  10   THIS IS A TEST REPORT-1               PAGE      1


COMPANY    BRANCH   OFFICER
   C       NUMBER   NUMBER          WAGE         RATE        BONUS

  10        001      DDDD       57,500.00     10.900         6,267
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
                     EBEE       60,000.00     11.000         6,600
```

Figure 8. Screen print of the generated HTML1 document

Creating HTML1 documents with the control breaks selection tree

To create an HTML1-format document with special decorating such as special colors, fonts and images, create an RMU Script as outlined in this section:

- Code `FORMAT HTML1` on the PARM statement.
- Use the DEFINE statement to define working storage fields for control breaks and other needs.
- Optionally, code <style>, <object>, <docs_top>, <docs_end>, <page_top> and <page_end> sections to define decorating. Use <style> and <object> methods to decorate text. To do this, you assign method names to line text in the Activity section.

  Note: Images are automatically included in the output document if located in the FJIDOC0 library.
- Optionally use PAGE-COUNT and LINE-COUNT to determine the page properties.
- Optionally use the BYPASS statement to remove a specific line or a range of lines.
- Optionally use the IDX subscript to control a DO loop for a specific number of lines.
- Optionally use the EVALUATE statement to loop through a range of lines when a specific location on multiple lines is to be decorated with different methods.
- Use the CONTROL statement to declare control break fields. Note that this is a required statement.

Control break fields must be carefully populated from the supplied information in each page. You will probably have to test lines for certain values, such as field titles to make sure that the correct values are used. See Figure 9 on page 27.

The program shown in Figure 9 on page 27 reads in the FZHRPT00 test report located in the &SYS1.SFZHJCLS library and produces an HTML1 format document with a control breaks tree on the left side and the report body on the right side of the screen. The source code is in FZHTEST2 located in the &SYS1.SFZHJCLS library.

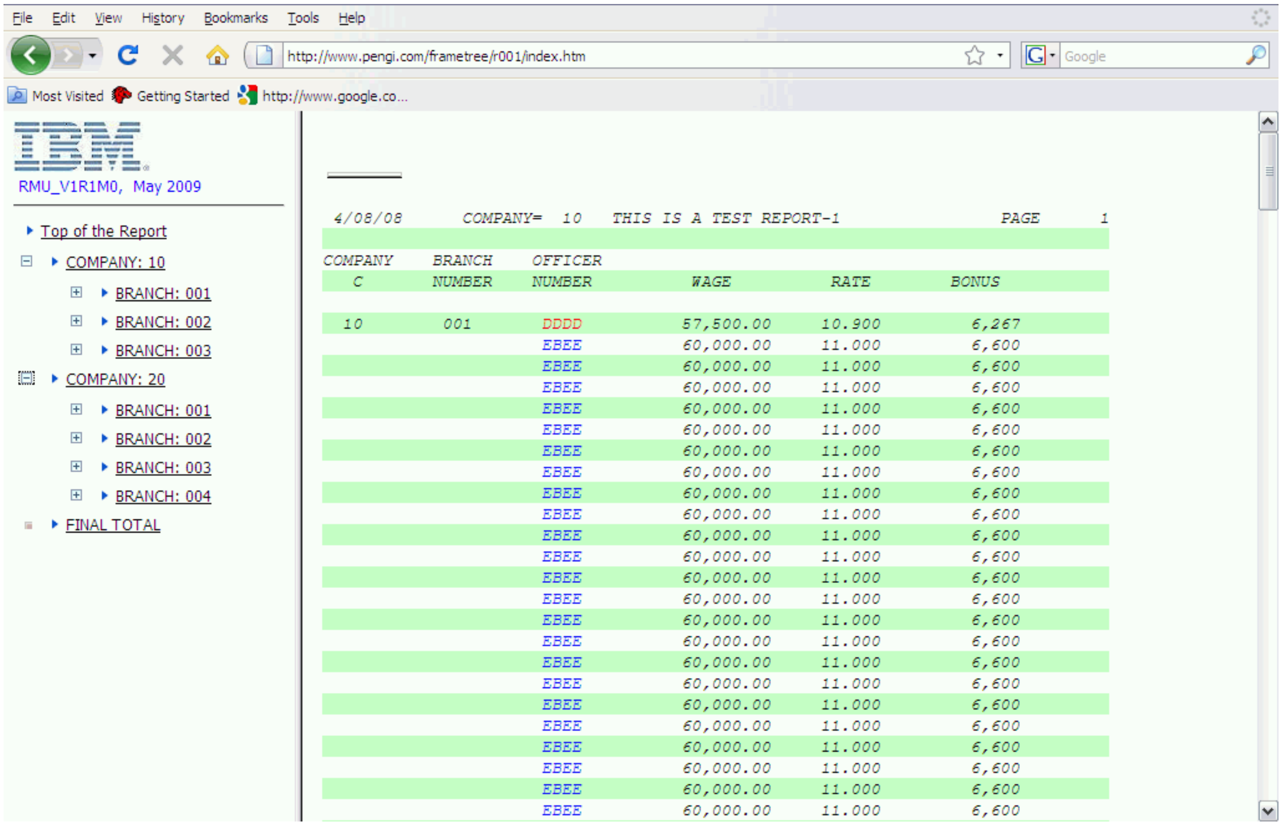
The background of the output document simulates 1403 printer paper. A page break image, fzhpages.gif, is inserted at the top of each page.

When LINE8-LINE55 contains ’DDDD’ in position 24 for 4, the value is made red (.em1). When LINE8-LINE55 contains ’EBEE’ in position 24 for 4, the value is made blue (.em2).

```
PARM LIST COBOL LKED FORMAT HTML1 TURF 1403-paper
************************************************************************
* This program converts a report to RMU HTML1 format.                  *
* Some decorating is inserted via styles and objects.                  *
************************************************************************
DEFINE COMPANY W  2  A
DEFINE BRANCH  W  5  A
DEFINE OFFICER W  4  A
<style>
  .em1 {color: red;}
  .em2 {color: blue;}
</style>
<page_top>
<IMAGE SRC="images/fzhpages.gif">
</page_top>
IF (LINE5 (2: 7) = 'COMPANY')
AND (LINE5 (13: 6) = 'BRANCH')
AND (LINE8 (4: 2) IS NUMERIC)
    COMPANY = LINE8 (4: 2)
    BRANCH  = LINE8 (14: 3)
    OFFICER = LINE8 (24: 4)
    EVALUATE LINE8-LINE55 (24: 4)
       WHEN  'DDDD'
           LINE (24: 4) = .em1
       WHEN  'EBEE'
           LINE (24: 4) = .em2
    END-EVALUATE
END-IF
CONTROL COMPANY BRANCH OFFICER
```

Figure 9. Example of RMU script program to produce an HTML1 format document

Figure 10 on page 28 shows a screen print of the generated HTML1 document:



```
 4/08/08      COMPANY=  10   THIS IS A TEST REPORT-1                    PAGE      1

COMPANY      BRANCH      OFFICER
   C         NUMBER      NUMBER          WAGE            RATE          BONUS

  10          001        DDDD         57,500.00        10.900         6,267
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
                         EBEE         60,000.00        11.000         6,600
```

Figure 10. Screen print of the generated HTML1 document

Decorating an HTML document

The output document can be decorated in three ways:

- **Images and special text can be created at the top of the document, the bottom of the document, the top of each page, and the bottom of each page.**

  File types recognized as images by RMU files are: JPG, TIF, PSD, PDD, BMP, PNG, and GIF.

  To do this, you code valid HTML between these tags:

  `<docs_top>  </docs_top>`
  This optional section defines the images and text to be inserted at the top of the document.

  `<docs_end>  </docs_end>`
  This optional section defines the images and text to be inserted at the bottom of the document.

  `<page_top>  </page_top>`
  This optional section defines the images and text to be inserted at the top of each page.

  `<page_end>  </page_end>`
  This optional section defines the images and text to be inserted at the bottom of each page.

  RMU uses <pre> and </pre> HTML tags to preserve the original document format, including spacing and blank lines. These tags tell HTML to leave the text pre-set as it is. Therefore when coding text, you can type the text without the special tags, or you can put the text between the </pre> and <pre> tags to resume standard default HTML formatting.

  This example shows both lines at the top of the document:

```
<docs_top>
  RMU generated document
  as of 11/15/2008
</docs_top>
```

  This example shows text as a single line at the top of the document:

```
<docs_top>
   </pre>
    RMU generated document
    as of 11/15/2008
   <pre>
</docs_top>
```

  Images included in the HTML text placed between the tags are automatically resolved by RMU if they exist in the FJIDOC0 library.

  For example, the code shown here causes the xyzimag1 and gif file to be included in the document from the FJIDOC0 file because of SRC=″images/xyzimag1.gif″:

```
<docs_top>
   <IMAGE SRC="images/xyzimag1.gif">
   RMU generated document as of 11/15/2008
</docs_top>
```

  RMU does not validate any information included between the tags. Errors are discovered when you browse the document.

  These images are available in the &SYS1.SFZHDOCS library:

FZHMINUS	Minus sign.
FZHPAGES	Page break line.
FZHPLUS0	Plus sign.
FZHRARRW	Arrow.

FZHRMUL0	RMU logo.
FZHSTOP0	Stop sign.

- **Special fonts and colors can be applied to line text conditionally.**

  The best way of doing this is to declare styles (CSS) in the <style> section and then assign the styles to the text in question on each line.

  You can choose to highlight special text. For example, title lines can be made a different color, negative amounts can be turned red, and so on.

  Changing the font size is not recommended as it may cause text alignment problems.

  Note: When declaring a style in the <style> section, the style parameters are not validated. Errors are discovered when you browse the document.

  In this example, the DDDD value on line 8 through line 55 starting in position 24 is made red and EBEE is made blue:

  ```
  <style>
    .em1 {color: red;}
    .em2 {color: blue;}
  </style>
  EVALUATE LINE8-LINE55 (24: 4)
     WHEN  'DDDD'
           LINE (24: 4) = .em1
     WHEN  'EBEE'
           LINE (24: 4) = .em2
  END-EVALUATE
  ```

  Likewise, the IF statement can be used to do the same.

- **Simulated 1403 printer paper background turf is the default.**

  The turf can be turned off by specifying `TURF NO` on the PARM statement at the top of the script program. The default background color will be as defined for the body in the FZHEBCSS member located in the &SYS1.SFZHDOCS library. You can override the default by adding your own body CSS in the <style> section.

  Example:

  ```
  PARM TURF NO
  <style>
       body {color: black; Background-color: white; font-size: &size%;}
  </style>
  ```

Debugging RMU Script programs

RMU generates COBOL programs that are compiled with standard IBM® COBOL, therefore any runtime problems that you experience are as for any other non-RMU COBOL programs.

Compile RMU Script with the PROCESS LIST,MAP COBOL options. A PROCESS statement can be placed before the PARM statement. Note that multiple PROCESS statements can be coded.

The RMU-generated COBOL contains statement sequence numbers in columns 1 to 6.

There are 3 types of sequence numbers:

#*nnnnn*	Statement is generated according to the *nnnnn* RMU script statement number.
#BASE	Statement is generated from the COBOL skeleton.

#EOF	Statement is generated after the last RMU Script statement is processed.

COBOL runtime problems fall into one of these categories:

- **File I/O errors**

  File problems such as wrong LRECL, or no DD in the JCL. RMU intercepts I/O errors and issues an appropriate message. Look at the console and SYSOUT messages for more information.
- **Environmental errors and ABENDs**

  Errors associated with such things as JCL issues, RACF®/security problems, and memory problems. Such problems are intercepted and logged by the operating system. In most instances, the job is canceled by the operating system with an appropriate message. Look at the console and SYSOUT messages for more information.
- **Program check interrupts**

  Processing problems such as an addressing exception, data exception, or specification exception.

To locate the RMU Script program statement in error:

1. If you have a COBOL debugger, use the debugger report to find the COBOL statement in error.
2. If you do not have a debugger:
   - In the Log or Dump file, find the hex offset of the PSW in your program as displayed by the Operating System.
   - Perform a find on the offset address in your COBOL compiler listing (expanded Assembler listing).
   - The COBOL source statement or line number can be found in the area before the offset.
   - Look at the COBOL listing identified by the line number in error.
3. The RMU Script statement number is in columns 1-6.
   - If #*nnnnn* is shown, this is the RMU Script statement in error.
   - If ’#EOF’ or ’#BASE’ is shown, look backward at statement numbers until you find a #*nnnnn* or a paragraph name (whichever you find first).
   - For a paragraph name, trace back to the perform statement to locate the routine that invoked it, then repeat the previous step.
4. Determine the cause of the program check interrupt from the located statement. If a protection exception occurred, check for bad subscripts. If a data exception occurred, check for non-numeric data in arithmetic operations.

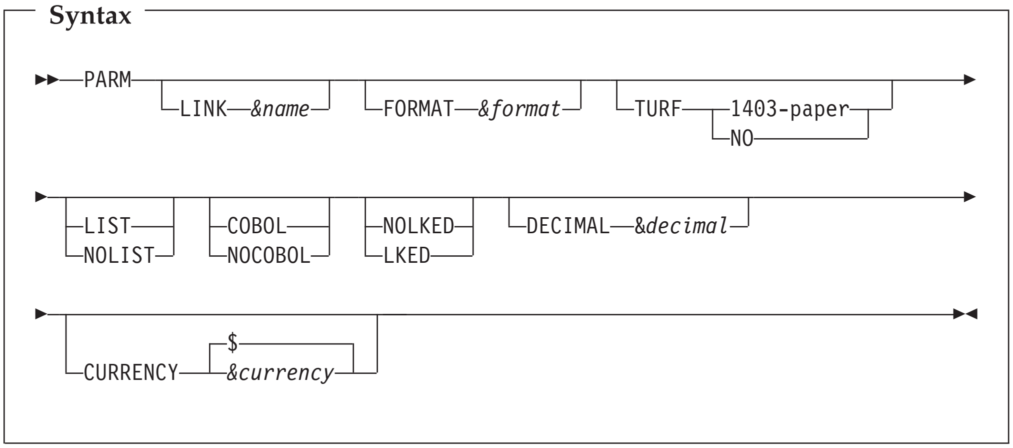
Chapter 5. RMU Script language instruction reference

This section lists program instructions, syntax, further explanation, and examples, for each instruction supported by RMU.

PARM statement

The PARM statement defines the RMU Script language compiler options. These options override the defaults in the FZHOPTAB options table.

Syntax



Note: Options are coded on the same line following the PARM keyword. If all options do not fit on a single line, multiple PARM lines can be coded as needed.

Parameters

&*name*	Program name 1 to 8 characters long. The name must be a valid COBOL program name. The default is NONAME.
&*format*	Type of output. Valid values are: **HTML0** Output is simple HTML format. **HTML1** Output is HTML format with a directory of control break fields on the left. **CSV='***&char***'** Output is a CSV file, where *&char* is the value separator character for CSV files.
1403-paper	Simulate green-striped 1403 printer paper background.
NO	Use gray background color.
&*decimal*	Decimal point character. Valid values are: **PERIOD** Use '.' for decimal point. **COMMA** Use ',' for decimal point.
&*currency*	Character to be used as currency symbol.

Examples

```
PARM LIST COBOL LKED FORMAT HTML1 TURF 1403-paper
PARM LINK FZHTEST0 LIST COBOL LKED FORMAT HTML1 TURF 1403-paper
```

DEFINE statement

The DEFINE statement defines the RMU Script program variables and field names to be used within the program.

Syntax

Syntax

```
►►──DEFINE──&field──W──&length──&type──┬────────────────┬──────────────►◄
                                       └─VALUE──&value──┘
```

Parameters

&field	Variable name 1 to 16 characters long. The name must begin with an alpha character. The name can be composed of letters, numbers, and a minus sign ('-').
	Example of valid names:
	`WS-BALANCE`
	`WS-AMOUNT`

&length	Field length in bytes. Maximum length for N fields is 18. Maximum length for P fields is 9. Maximum length for alpha fields is 32767.
&type	Field type. Valid values are: **N** Unsigned numeric display integer. **A** Alphanumeric. **B** Signed binary integer, 2- or 4-byte binary integer. **P** Signed packed decimal number.

&value	Initial value. An alpha value must be enclosed in quotes. a numeric value must not exceed the field length.
	These reserved values can be coded:
	`SPACES` or `SPACE`
	`ZEROS` or `ZEROES` or `ZERO`
	`LOW-VALUES` or `LOW-VALUE`
	`HIGH-VALUES` or `HIGH-VALUE`

Programming notes

RMU does not support decimal places at this time.

Examples of field definitions

```
DEFINE WX-WORK W  10 A
DEFINE WX-NUM  W  5  N
DEFINE WX-PACK W  5  P
DEFINE WX-BIN2 W  2  B
DEFINE WX-BIN4 W  4  B
DEFINE WS-WORK W  10 A VALUE 'ABCDEF'
DEFINE WS-NUM  W  5  N VALUE 12345
DEFINE WS-PACK W  5  P VALUE +123456789
DEFINE WS-BIN2 W  2  B VALUE 1234
DEFINE WS-BIN4 W  4  B VALUE 123456789
```

<object> and </object> tag

The <object> tag declares the beginning of object and image definitions to be inserted in the output document. The object section begins with the <object> tag and terminates with the </object> tag. One or more images can be declared between the tags.

```
<object>
    .im&mod {<IMAGE SRC="images/&image.gif">}
⋮
</object>
```

Parameters

&mod
: Image name modifier. The name is composed of .im*&mod*. For example, when *&mod* is "g1", the name is .img1. This name is referenced in the assign statement within the RMU Script program.

&image
: The image file name as found in the FJIDOC0 library. For example, fzhpages and fzhplus0 are gif files located in the &SYS1.SFZHDOCS default FJIDOC0 library. To declare these two gif files for use in an RMU Script program, use the code:

```
<object>
      .img1 {<IMAGE SRC="images/fzhpages.gif">}
      .img2 {<IMAGE SRC="images/fzhplus0.gif">}
</object>
```

Programming notes

When the output is directed to z/OS UNIX, images are copied from the &SYS1.SFZHDOCS file in binary format to the r001\images directory.

When the output is directed to the z/OS flat file for download to a PC or a server, images are included in the download document and parsed on the target PC or server with the FZHBPARS Java utility.

Images are assigned to a specific location in the document. Unresolved images are ignored.

Example:

```
LINE1 (10: 0) = .img1
```

Inserts img1 before position 10 on line 1.

<style> and </style> tag

The <style> tag declares the beginning of Cascaded Style Sheets (CSS) to be applied to the output text. The style section begins with the <style> tag and terminates with the </style> tag. One or more styles can be declared between the tags.

There are three distinct styles that can be declared:

- Style for document body.
- Colors for .turf1 and .turf2 alternated to simulate 1403 green-striped printer paper.
- Styles for highlighting and decorating text (element styles).

```
<style>
    body {color: &color; Background-color: &color; font-size: &size%;}
    .turf1 {Background-color: &color}
    .turf2 {Background-color: &color}
    .em&n {color: &color;}

⋮
</style>
```

Parameters

&color	A valid HTML color.
&size	Font size as an absolute size or percentage.
&n	Element name modifier.

Programming notes

All styles are optional.

Body and Element styles can include any combination of values acceptable to HTML. The content enclosed in { } is not validated by MU, therefore special care must be taken to make sure that the specified options are correct. Once defined, the body style is automatically applied to the document body.

.turf1 and .turf2 are special element styles for simulating 1403 printer paper. Color is the only acceptable option. These options are used automatically when the 1403-paper option is in effect. .turf1 and .turf2 colors are alternated to simulate 1403 printer paper.

.em*&n* styles are for decorating report text. Once defined, .em*&n* styles can be assigned to specific fields in the document. For example, negative amounts can be turned red and so on. One or more element styles can be defined.

Examples

```
<style>
    body {color: green; Background-color: light-gray; font-size: 100%;}
    .turf1 {Background-color: ccfff1}
    .turf2 {Background-color: 99fff1}
    .em1 {color: red;}
    .em2 {color: blue;}
</style>
```

<docs_top> and </docs_top> tag

The <docs_top> tag declares the beginning of the text and the images to be inserted at the top of the output document. The docs_top section begins with the <docs_top> tag and terminates with the </docs_top> tag.

You must code valid HTML strings between the tags. The content between the tags is placed at the top of the document without validation. Errors are not discovered until the document is browsed.

```
<docs_top>

⋮
</docs_top>
```

Parameters

None.

Programming notes

Images included in the HTML text placed between the tags are automatically resolved by RMU if they exist in FJIDOC0 library.

For example, the code shown here causes the xyzimag1 and xyzimag2 gif files to be included in the document from the FJIDOC0 file:

```
<docs_top>
   <IMAGE SRC="images/xyzimag1.gif">
   <IMAGE SRC="images/xyzimag2.gif">
</docs_top>
```

<docs_end> and </docs_end> tag

The <docs_end> tag declares the beginning of the text and images to be inserted at the bottom of the output document. The docs_end section begins with the <docs_end> tag and terminates with the </docs_end> tag.

You must code valid HTML strings between the tags. The content between the tags is placed at the bottom of the document without validation. Errors are not discovered until the document is browsed.

```
<docs_end>

⋮
</docs_end>
```

Parameters

None.

Programming notes

Images included in the HTML text placed between the tags are automatically resolved by RMU if they exist in FJIDOC0 library.

For example, the code shown here causes the xyzimag1 and xyzimag2 gif files to be included in the document from the FJIDOC0 file:

```
<docs_end>
   <IMAGE SRC="images/xyzimag1.gif">
   <IMAGE SRC="images/xyzimag2.gif">
</docs_end>
```

<page_top> and </page_top> tag

The <page_top> tag declares the beginning of the text and images to be inserted at the top of each page in the output document. The page_top section begins with the < page_top> tag and terminates with the </page_top> tag.

You must code valid HTML strings between the tags. The content between the tags is placed at the top of each page in the document without validation. Errors are not discovered until the document is browsed.

```
<page_top>

⋮
</page_top>
```

Parameters

None.

Programming notes

Images included in the HTML text placed between the tags are automatically resolved by RMU if they exist in FJIDOC0 library.

For example, the code shown here causes the xyzimag1 and xyzimag2 gif files to be included in the document from the FJIDOC0 file:

```
<page_top>
   <IMAGE SRC="images/xyzimag1.gif">
   <IMAGE SRC="images/xyzimag2.gif">
</page_top>
```

<page_end> and </page_end> tag

The <page_end> tag declares the beginning of the text and images to be inserted at the bottom of each page in the output document. The page_end section begins with the <page_end> tag and terminates with the </page_end> tag.

You must code valid HTML strings between the tags. The content between the tags is placed at the bottom of each page in the document without validation. Errors are not discovered until the document is browsed.

```
<page_end>

⋮
</page_end>
```

Parameters

None.

Programming notes

Images included in the HTML text placed between the tags are automatically resolved by RMU if they exist in FJIDOC0 library.

For example, the code shown here causes the xyzimag1 and xyzimag2 gif files to be included in the document from the FJIDOC0 file:

```
<page_end>
   <IMAGE SRC="images/xyzimag1.gif">
   <IMAGE SRC="images/xyzimag2.gif">
</page_end>
```

Assignment statement

The assignment statement assigns a value to a field. The value can be another field, a literal, a style, a method, an image, or an arithmetic expression.

There are four types of assignment statements:

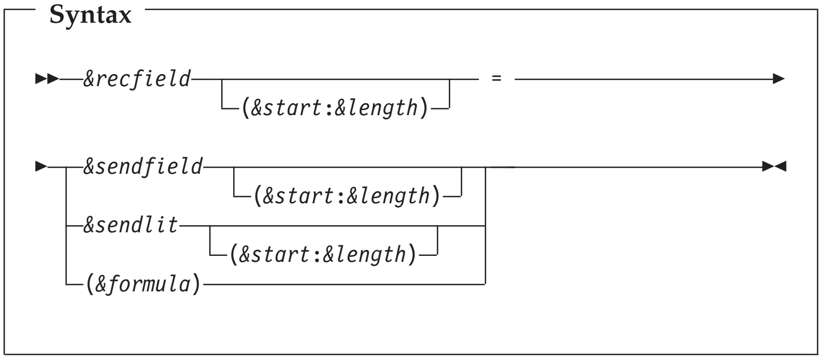
Normal assignment
Assigns field values and arithmetic outcomes to a field.

Style assignment to a line or a part of a line
Assigns fonts and colors (CSS) for decorating line text. The style to be inserted must be defined in the <style> section.

Method assignment to line text (columns) when creating CSV files
De-edits numeric values and prepares line text for spreadsheet use.

Object assignment to a line or line text
Inserts objects (images) in a specific position on the report line. The objects to be inserted must be defined in the <object> section.

Format 1 Assignment



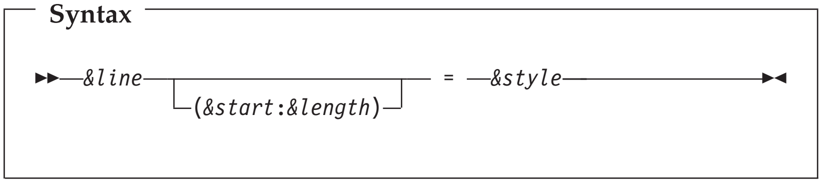
Parameters:

&recfield	Specifies the field name to which the value will be assigned.
&start	Starting position.
&length	Length to be moved.
equal sign (=)	Indicates assignment.
&sendfield	Sending field (field to be copied).
&sendlit	Sending value can be a literal. An alphanumeric literal must be enclosed in quotes.
&formula	Arithmetic expression. It can contain arithmetic operators (+, -, *, /). The outcome of the calculation is placed in the *&recfield*.

Examples:

```
WS-COMPANY = LINE5 (5: 4)
WS-COMPANY = '1234'
WS-COMPANY = '1234567890 (3:4)
WS-INTEGER = (WS-INTEGER + 1)
```

Format 2 Assignment



Parameters:

&line	Specifies the line to which the value will be assigned.
&start	Starting position.
&length	Text length *&style* applies to.
equal sign (=)	Indicates assignment.
&style	A style name as declared in the <style> section.

Example:

```
LINE10 (15:6) = .em1
```

Format 3 Assignment

Syntax

```
►►──&line──┬───────────────────┬── = ──┬─.ETEXT─┬──────────────►◄
           └─(&start:&length)──┘       └─.ENUM1─┘
```

Parameters:

&line	Specifies the line to which the value will be assigned.
equal sign (=)	Indicates assignment.
&start	Starting position.
&length	Text length *&style* applies to.
.ETEXT	Create plain text field.
.ENUM1	De-edit numeric field.

Examples:

```
LINE10 (15:6) = .ETEXT
LINE10 (15:6) = .ENUM1
```

Format 4 Assignment

Syntax

```
►►──&line──┬─────────────┬── = ──&image──────────────────────►◄
           └─(&start:0)──┘
```

Parameters:

&line	Specifies the line to which the value will be assigned.
equal sign (=)	Indicates assignment.
&start	Starting position. It can be: • An absolute number. • A numeric field. • The word ″BEFORE″ for placing the image before the line.

&image	An image name as declared in the <object> section.

Programming notes:

- An image can be inserted before a line or on a line before text. Use the (BEFORE: 0) substring notation to place the image before a line.
- Images placed on a line before text push the line text to the right and may cause column alignment problems.

Examples:

This example places .imag1 on line 10 before position 15:

```
LINE10 (15: 0) = .imag1
```

This example places .imag1 before line 5:

```
LINE5 (BEFORE: 0) = .imag1
```

BYPASS statement

The BYPASS statement tags specific lines or a range of lines for deletion. That is, the bypassed lines are excluded from the output document.

Syntax

```
►►──BYPASS──┬─LINE──────────────┬────────────────────────────────────►◄
            ├─&LINEn────────────┤
            └─&LINEn1─&LINEn2───┘
```

Parameters

LINE	The line number contained in the IDX subscript is bypassed.
&LINE*n*	Line number to bypass.
&LINE*n1*	Low line number of range of lines to bypass.
&LINE*n2*	High line number of range of lines to bypass.

Examples

This example bypasses line 2:

```
IDX = 2
BYPASS LINE
```

This example bypasses line 4:

```
BYPASS LINE4
```

This example bypasses line 1 through line 10:

```
BYPASS LINE1-LINE10
```

Programming notes

The BYPASS statement is convenient for stripping unneeded report lines from the output document, especially when creating CSV files. For example, running page titles and field headings are not needed in a spreadsheet. Report title lines and heading lines can be conditionally or unconditionally excluded from the output CSV file.

The use of BYPASS is not limited to CSV format files. It can also be used to bypass report lines when creating HTML and HTML1 format documents.

CALL statement

The CALL statement makes a call to a user-written program. The user-written program can be written in COBOL, BAL, or any other language that honors standard linkage conventions.

Syntax

Syntax

```
                              ┌─────────┐
                              ▼         │
►►──CALL──&program──USING────&field─────┴────────────────────────────►◄
```

Parameters

&program The program name. This can be:

- A hard-coded program name enclosed in quotes. In this case, it is a static call. That is, the program is included from the SYSLIB at link time.
- A field name that contains the program name. In this case, it is a dynamic call. The program must exist in the JOBLIB/STEPLIB at run time.

&field Field name as declared in the Library section.

Programming notes

`CALL` *`&program`* `USING` *`&field`* must be coded on a single line. Additional fields can be coded on the same line or subsequent lines.

CONTINUE statement

The CONTINUE statement is used in combination with the IF statement. It alters the processing logic to after the END-IF statement.

Syntax

Syntax

```
►►──CONTINUE─────────────────────────────────────────────────────────►◄
```

Parameters

None.

Examples

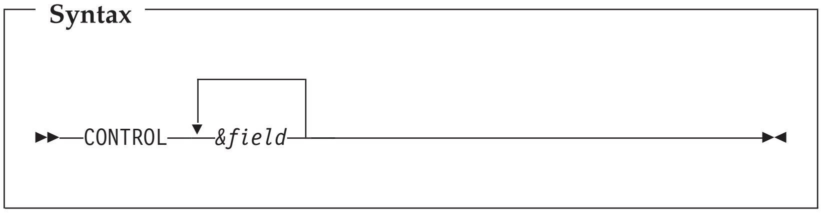
```
IF LINE1 (3: 4) = '1234'
   CONTINUE
ELSE
   processing statements
END-IF
```

CONTROL statement

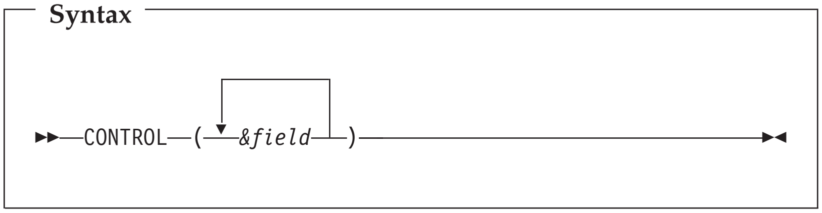
The CONTROL statement declares control break fields for an HTML1 format document. A selection tree is built on the left side of HTML1 format document in the hierarchy specified on the CONTROL statement.

There are two CONTROL statement formats:

Format 1 Use this format when all fields can be listed on a single line.



Format 2 Use this format when fields cannot be listed on a single line. The list begins with an open parenthesis and ends with a closed parenthesis. The list can span over multiple lines.



Parameters

&field	Field name as declared in the Library section.

Programming notes

Reports normally consist of title lines, field headings, detail lines, and control break totals. That is, reports follow a hierarchy as enforced in the programs that create them.

To create a selection tree such that you can navigate directly to a specific page where a new control starts, you must first define fields and variables to hold control break information.

Then, in the Activity section, the fields are populated by control field values from specific positions in the page lines. When populating fields, care must be taken to use the correct position and length where a control break value is printed. This is usually achieved by testing for a specific literal or data type in specific locations on one or more lines of each page.

Finally, control breaks are declared by the CONTROL statement. The first listed field is the highest break, followed by the subsequent fields as secondary breaks.

Examples

```
DEFINE COMPANY W  2  A
DEFINE BRANCH  W  5  A
DEFINE OFFICER W  4  A
IF (LINE5 (2: 7) = 'COMPANY')
AND (LINE5 (13: 6) = 'BRANCH')
AND (LINE8 (4: 2) IS NUMERIC)
    COMPANY = LINE8 (4: 2)
    BRANCH  = LINE8 (14: 3)
    OFFICER = LINE8 (24: 4)
END-IF
CONTROL COMPANY BRANCH OFFICER
```

DISPLAY statement

The DISPLAY statement prints fields, lines, or a literal to SYSOUT.

Syntax

Syntax

```
►►──DISPLAY──&field──┬────────────────────┬──────────────────────────────►◄
                     └─(&start:&length)───┘
```

Parameters

&field	Field name, literal, or line.
&start	Starting position.
&length	Text length.

Examples

```
DISPLAY 'COMPANY: ' COMPANY 'BRANCH: ' LINE1 (5: 4)
```

Programming notes

DISPLAY fields can be listed on multiple lines as needed. All packed decimal and binary fields are converted to numeric display format. The sign is not removed.

DO and END-DO statements

The DO and END-DO statements define the scope of repetitive program logic.

Syntax

Syntax

```
►►──DO──┬─┬─WHILE─┬──&condition──activity-statements──┬──END-DO──────────────►◄
        │ └─UNTIL─┘                                    │
        └─&count──TIMES────────────────────────────────┘
```

Parameters

WHILE	Evaluates the condition expression, *&condition*, at the top of a group of statements.
UNTIL	Evaluates the condition expression, *&condition*, at the bottom of a group of statements.
&condition	Specifies the condition expression for the continuous execution of the loop. See “IF, ELSE, and END-IF statements” on page 47 for the conditional expression syntax.
&count	The loop counter or limit. The maximum value is 2147483647. *&count* must be a numeric field or a positive number.
END-DO	Terminates the DO statement.

Programming notes

For DO WHILE, the truth value of the conditional expression, *&condition*, determines whether statements bound by the DO and END-DO pair are to be executed. When the conditional expression is true, the statements are executed. When the conditional expression is false, the processing continues with the next statement following the END-DO.

For DO UNTIL, the statements bound by the DO and END-DO pair are executed. The truth value of the conditional expression, *&condition* (evaluated at the end of the statements), determines whether statements bound by the DO and END-DO pair are to be executed again. When the conditional expression is true, the statements are executed again. When the conditional expression is false, the processing continues with the next statement following the END-DO.

For DO *&count* TIMES, the statements bound by the DO and END-DO pair are executed *&count* times unconditionally.

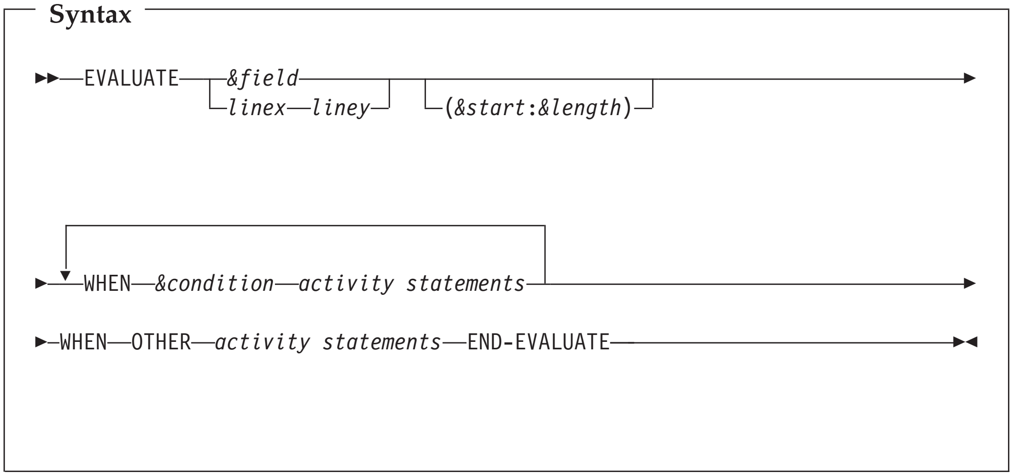
Examples

```
DEFINE WS-COUNT W B 2 VALUE ZERO
DO UNTIL (WS-COUNT = 6)
      WS-COUNT= (WS-COUNT + 1)
      DISPLAY 'LOOP COUNT OF 6'
END-DO
DO 6 TIMES
      DISPLAY 'LOOP COUNT OF 6'
END-DO
```

EVALUATE and END-EVALUATE statements

The EVALUATE statement provides an elegant way of testing for values.

Syntax


Syntax
EVALUATE
&field
linex—liney
(&start:&length)
WHEN—&condition—activity statements
WHEN—OTHER—activity statements—END-EVALUATE

Parameters

&field	The field name to be evaluated.
linex-liney	Range of lines to evaluate, where *linex* is the low line number and *liney* is the high line number. *linex* must be greater than zero and less or equal to *liney*. *liney* must be greater than zero and less or equal to LINE-COUNT.
&start	Starting position.
&length	Text length.
&condition	Value to be tested for. It must be a literal or a field with the same data type as *&field*.
OTHER	Must be the last statement after a series of tests. The statements following OTHER are executed only when all previous tests fail.
END-EVALUATE	Terminates the EVALUATE statement.

Programming notes

When a line range is specified, the reserved field IDX is initialized to *linex* and EVALUATE statements are processed in a loop incrementing IDX by 1 until all lines in the specified range are tested. Up to 8 nested EVALUATE statements are permitted.

Examples

```
EVALUATE LINE8-LINE55 (24: 4)
    WHEN 'DDDD'
          LINE (24: 4) = .EM1
    WHEN 'EBEE'
          LINE (24: 4) = .EM2
    WHEN OTHER
          LINE (24: 4) = .EM3
END-EVALUATE
```

IF, ELSE, and END-IF statements

The IF statement conditionally controls execution of the statements bound by the IF and END-IF statements.

Syntax

Syntax

```
►►──IF──(&expression)──statements_1──┬───────────────────────┬──END-IF──────────►◄
                                     └─ELSE──statements_2────┘
```

Parameters

&expression	Conditional expression. It can contain AND, OR, and arithmetic terms.
statements_1	The statements executed if *&expression* is evaluated to be true.
statements_2	The statements executed if *&expression* is evaluated to be false. If ELSE is not specified, then no statements are executed.
END-IF	Terminates the logic associated with the previous IF statement.

Programming notes

&expression must be enclosed in parentheses. Multiple expressions can be coded, each starting on a separate line and connected with an AND or an OR logical operator.

Examples

```
IF (LINE5 (2: 7) = 'COMPANY')
AND (LINE5 (13: 6) = 'BRANCH')
AND (LINE8 (4: 2) IS NUMERIC)
    COMPANY = LINE8 (4: 2)
    BRANCH  = LINE8 (14: 3)
    EVALUATE LINE8-LINE55 (24: 4)
       WHEN  'DDDD'
           LINE (24: 4) = .em1
       WHEN  'EBEE'
           LINE (24: 4) = .em2
    END-EVALUATE
END-IF
```

PERFORM statement

The PERFORM statement performs the specified procedure.

Syntax

Syntax

```
►►──PERFORM──&procname──────────────────────────────────────────────────►◄
```

Parameters

&procname	Procedure name 1 to 30 characters long. The name can consist of letters, numbers and hyphens. The procedure must be declared at the bottom of the program.

Programming notes

For additional information, see “PROC/END-PROC statement.”

PROC/END-PROC statement

The PROC and END-PROC statements are used to declare the beginning and the end of a procedure in the Activity section.

Syntax

Syntax

```
►►—&procname.—PROC—activity statements—END-PROC——————————————————————►◄
```

Parameters

&procname	Procedure name 1 to 30 characters long. The name can consist of letters, numbers and hyphens. The first character and the last character must be a letter or a number.

Programming notes

Procedures are declared at the bottom of the script program. One or more procedures can be coded.

Procedures are invoked by means of the PERFORM statement as needed.

Procedures should be used for repetitive logic to make the script program manageable.

RMU does not support the GOTO statement. Therefore procedures must be written in a straight top-to-bottom design.

Examples

```
PERFORM A0001-DECORATE

A0001-DECORATE. PROC
  IF (LINE5 (2: 7) = 'COMPANY')
  AND (LINE5 (13: 6) = 'BRANCH')
  AND (LINE8 (4: 2) IS NUMERIC)
      EVALUATE LINE8-LINE55 (24: 4)
         WHEN  'DDDD'
             LINE (24: 4) = .em1
         WHEN  'EBEE'
             LINE (24: 4) = .em2
      END-EVALUATE
  END-IF
END-PROC
```

PROCESS statement

The PROCESS statement controls COBOL compiler options.

Syntax

Syntax

```
              ┌──────────┐
              ▼          │
▶▶──PROCESS─────&option──┴──────────────────────────────────────▶◀
```

Parameters

&option	COBOL compiler PROCESS (CBL) option.

Programming notes

PROCESS statements are placed before the PARM statement at the top of the program. Options are separated by a comma (,). Options can be coded up to position 64, but multiple PROCESS statements can be coded as needed.

Options are not validated by RMU. Incorrect options will cause the COBOL compiler to fail.

Refer to the *IBM COBOL Reference* manual for valid options.

Examples

```
PROCESS LIST,OPTIMIZE
PROCESS OUTDD(SYSPRINT)
```

STOP statement

The STOP statement terminates the job.

Syntax

Syntax

```
▶▶──STOP──┬─────────┬───────────────────────────────────────────▶◀
          └─EXECUTE─┘
```

Programming notes

STOP terminates processing with RETURN-CODE set by the RMU Script logic.

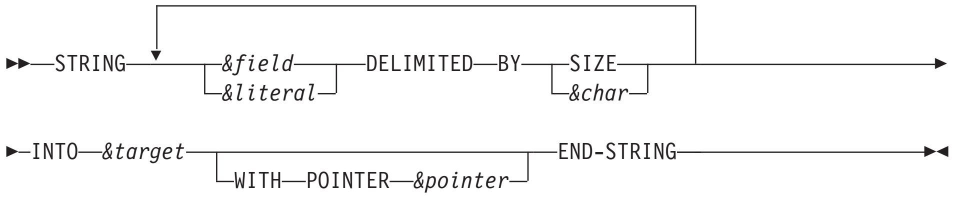
STOP EXECUTE terminates processing with RETURN-CODE set to 16, unless RETURN-CODE was set to a non-zero value before the STOP EXECUTE was issued.

STRING statement

The STRING statement concatenates the contents of fields and literal values into a target field.

Syntax

Syntax



Parameters

&field	Field name to string.
&literal	Literal to string. Must be enclosed in quotes.
&char	A literal enclosed in quotes or a valid field name. The field name, if coded, must be an alphanumeric or display numeric type. The value of *&field* or *&literal* is strung into *&target* up to the *&char* delimiter. If *&char* is not found, the entire content is strung.
&target	An alphanumeric field name into which the concatenated strings are placed. The field must be long enough to accommodate all sending strings.
&pointer	A numeric field indicating the starting position in *&target*. If used, this field must be initialized to the starting position before the STRING statement. At completion, this field contains the number of characters in the *&target* field placed by the STRING statement.

Programming notes

Multiple fields or literal values can be specified. *&pointer*, if used, is used as the starting position in the *&target*. For example, placing 5 in the pointer tells STRING statement to append values starting at position 5.

If the resulting string is longer than *&target*, the extraneous characters are ignored.

Examples

Assume that the following fields are defined:

```
DEFINE WSTRING W  50 A
DEFINE WCOUNT  W  4  B
DEFINE WVALUE1 W  10 A VALUE 'THIS PAYS '
DEFINE WVALUE2 W  15 A VALUE 'BILLS.'
```

Assume that LINE8 (4: 3) contains ’10 ’.

Case 1:

```
STRING WVALUE1      DELIMITED BY SIZE
      'UTILITY '    DELIMITED BY SIZE
       LINE8 (4: 3) DELIMITED BY ' '
      ' BILLS'      DELIMITED BY SIZE
  INTO WSTRING
END-STRING
```

At execution, WSTRING contains: ″THIS PAYS UTILITY 10 BILLS″.

Case 2:

```
WSTRING = 'PAYMENT INFORMATION:  '
WCOUNT = 22
STRING WVALUE1      DELIMITED BY SIZE
      'UTILITY '    DELIMITED BY SIZE
       LINE8 (4: 3) DELIMITED BY ' '
      ' BILLS'      DELIMITED BY SIZE
  INTO WSTRING WITH POINTER WCOUNT
END-STRING
```

At execution, WSTRING contains: ″PAYMENT INFORMATION: THIS PAYS UTILITY 10 BILLS″

System-defined fields

Fields available to programmers:

IDX	A 4-byte binary integer used as a subscript when LINE is coded in an argument without a substring. Also, IDX is used as a subscript in the EVALUATE statement when evaluating a range of lines for a value.
I	The same as IDX.
IDX2	A 4-byte binary integer used as a work subscript for the BYPASS statement when bypassing a range of lines. This field is for RMU internal use only.
I2	The same as IDX2.
LINE	General purpose name for accessing lines within a page. When coded, the IDX subscript must contain a valid line number within the page buffer.
LINE-COUNT	Contains the number of lines in the current page.
LINE1 thru **LINE66**	References specific lines within a page.
PAGE-COUNT	A 4-byte binary integer containing the current page being processed. This field should not be confused with the actual page number that may be shown on report titles.
RETURN-CODE	A 4-byte binary integer used as the job return code.
SYSDATE or **SYSDATE-E**	An 8-byte alpha field representing the current date as YY/MM/DD.
SYSDATE-9	A 6-byte numeric field representing the current date as YYMMDD.

SYSDATE-LONG or **SYSDATE-LONG-E**	A 10-byte alpha field representing the current date as CCYY/MM/DD.
SYSDATE-LONG-9	An 8-byte numeric field representing the current date as CCYYMMDD.
SYSTIME	An 8-byte alpha field representing the current time as HH.MM.SS.
SYSTIME-9	A 6-byte numeric field representing the current time as HHMMSS.

COBOL verbs, statements, and reserved fields

These words cannot be used as field names in RMU Script:

ABEND-MESSAGE
ABEND-REQUEST
ACCEPT
ACCESS
ACCUM
ACQUIRE
ADD
ADDRESS
ADVANCING
AFTER
ALL
ALLOWING
ALPHABET
ALPHABETIC-HIGHER
ALPHABETIC-LOWER
ALPHABETIC
ALPHANUMERIC-EDITED
ALPHANUMERIC
ALSO
ALTER
ALTERNATE
AND
ANY
APPLY
ARE
AREA-VALUE
AREA
AREAS
ARITHMETIC
ASCENDING
ASSIGN
AT
AUTHOR
AUTO-SKIP
AUTO
AUTOMATIC
B-AND
B-EXOR
B-LESS
B-NOT
B-OR
BACKGROUND-COLOR
BACKGROUND-COLOUR
BACKWARD
BASIS
BEEP
BEFORE
BEGINNING
BELL
BINARY
BIT
BITS
BLANK
BLINK
BLOCK
BOOLEAN
BOTTOM
BY
CALL
CANCEL
CBL
CD
CF
CH
CHAIN
CHAINING
CHANGED
CHARACTER
CHARACTERS
CH1
CH10
CH11
CH12
CH2
CH3
CH4
CH5
CH6

CH7
CH8
CH9
CLASS
CLOCK-UNITS
CLOSE
COBOL
CODE-SET
CODE
COL
COLLATING
COLOR
COLUMN
COM-REG
COMMA
COMMAND-LINE
COMMIT
COMMITMENT
COMMON
COMMUNICATION
COMP-X
COMP-0
COMP-1
COMP-2
COMP-3
COMP-4
COMP-5
COMP-6
COMP-7
COMP-8
COMP-9
COMP
COMPUTATIONAL-X
COMPUTATIONAL-0
COMPUTATIONAL-1
COMPUTATIONAL-2
COMPUTATIONAL-3
COMPUTATIONAL-4
COMPUTATIONAL-5
COMPUTATIONAL-6
COMPUTATIONAL-7
COMPUTATIONAL-8
COMPUTATIONAL-9
COMPUTATIONAL
COMPUTE
CON
CONFIGURATION
CONNECT
CONSOLE
CONTAINED
CONTAINS
CONTENT
CONTINUE
CONTROL-AREA
CONTROL
CONTROLS
CONVERTING
COPY
CORR
CORRESPONDING
COUNT
CREATE
CRT-UNDER
CRT
CTLFOOT
CURRENCY
CURRENT
CURSOR
CYCLE
DATA
DATE-COMPILED
DATE-WRITTEN
DATE
DAY-OF-WEEK
DAY
DB-ACCESS-CONTROL-KEY
DB-DATA-NAME
DB-EXCEPTION
DB-FORMAT-NAME
DB-RECORD-NAME
DB-SET-NAME
DB-STATUS
DB
DBCS
DE
DEBUG-CONTENTS
DEBUG-ITEM
DEBUG-LINE
DEBUG-NAME
DEBUG-SUB-1
DEBUG-SUB-2
DEBUG-SUB3
DEBUGGING
DECIMAL-POINT
DECLARATIVES
DEFAULT
DELETE
DELIMITED
DELIMITER
DEPENDING
DESCENDING
DESTINATION
DETAIL
DISABLE
DISCONNECT
DISK
DISPLAY-1
DISPLAY-2
DISPLAY-3
DISPLAY-4
DISPLAY-5
DISPLAY-6

COBOL verbs, statements, and reserved fields

DISPLAY-7
DISPLAY-8
DISPLAY-9
DISPLAY
DIVIDE
DIVISION
DOWN
DROP
DUPLICATE
DUPLICATES
DYNAMIC
EGCS
EGI
EJECT
ELSE
EMI
EMPTY-CHECK
EMPTY
ENABLE
END-ACCEPT
END-ADD
END-CALL
END-COMPUTE
END-DELETE
END-DISABLE
END-DIVIDE
END-ENABLE
END-EVALUATE
END-IF
END-MULTIPLY
END-OF-PAGE
END-PERFORM
END-READ
END-RECEIVE
END-RECORD
END-RETURN
END-REWRITE
END-SEARCH
END-SEND
END-START
END-STRING
END-SUBTRACT
END-TRANSCEIVE
END-UNSTRING
END-WRITE
END
ENDG
ENDING
ENTER
ENTRY
ENVIRONMENT
EOP
EQ
EQUAL
EQUALS
ERASE
ERROR
ESCAPE
ESI
EVALUATE
EVERY
EXACT
EXCEEDS
EXCEPTION
EXCESS-3
EXCLUSIVE
EXEC
EXECUTE
EXHIBIT
EXIT
EXTEND
EXTERNAL
EXTERNALLY-DESCRIBED-KEY
FALSE
FD
FETCH
FILE-CONTROL
FILE-ID
FILE
FILLER
FINAL
FIND
FINISH
FIRST
FIXED
FOOTING
FOR
FOREGROUND-COLOR
FOREGROUND-COLOUR
FORM
FORMAT
FREE
FROM
FULL
FUNCTION
GENERATE
GET
GIVING
GLOBAL
GO
GOBACK
GREATER
GROUP
HDR
HEADER
HIGH-VALUE
HIGH-VALUES
HIGHLIGHT
I-O-CONTROL
I-O
ID
IDENTIFICATION

IDW01
IDW02
IDW03
IDW04
IDW05
IDW06
IDW07
IDW08
IF
IN
INDEX-1
INDEX-2
INDEX-3
INDEX-4
INDEX-5
INDEX-6
INDEX-7
INDEX-8
INDEX-9
INDEX
INDEXED
INDIC
INDICATE
INDICATOR
INDICATORS
INITIAL
INITIALIZE
INITIATE
INPUT-OUTPUT
INPUT
INSERT
INSPECT
INSTALLATION
INTO
INVALID
IS
IW-FAKE-INDEX
IW-PENGI-PAGE
IW-RETURN-CODE
IW-WORK-INDEX
JAPANESE
JUST
JUSTIFIED
KANJI
KEEP
KEPT
KEY
KEYBOARD
LAST
LBEL
LD
LEADING
LEFT-JUSTIFY
LEFT
LENGTH-CHECK
LENGTH
LESS
LIKE
LIMIT
LIMITS
LINAGE-COUNTER
LINAGE
LINE-COUNTER
LINES
LINKAGE
LIT
LOCALLY
LOCK
LOW-VALUE
LOW-VALUES
MANUAL
MASK
MEMBER
MEMORY
MERGE
MESSAGE
MODE
MODIFIED
MODIFY
MODULES
MORE-LABELS
MOVE
MULTIPLE
MULTIPLY
NATIVE
NEGATIVE
NEXT
NO-ECHO
NO
NONE
NORMAL
NOT
NULL
NULLS
NUMBER
NUMERIC-EDITED
NUMERIC
OBJECT-COMPUTER
OBJECT
OBJECT
OCCURS
OF
OFF
OMITTED
ON
ONLY
OPEN
OPTIONAL
OR
ORDER
ORGANIZATION
OTHER

COBOL verbs, statements, and reserved fields

OUTPUT
OVERFLOW
OWNER
PACKED-DECIMAL
PADDING
PAGE-COUNTER
PAGE
PAGEFOOT
PALETTE
PARAGRAPH
PARM-LENGTH
PARM-REGISTER-9
PARM-REGISTER
PASSWORD
PENGI-CODES
PENGI-CODE0
PENGI-STATUS
PERFORM
PF
PH
PIC
PICTURE
PLUS
POINTER
POS
POSITION
POSITIVE
PRESENT
PREVIOUS
PRINT-SWITCH
PRINTER-1
PRINTER
PRINTING
PRIOR
PROCEDURE
PROCEDURES
PROCEED
PROCESS
PROCESSING
PROGRAM-DATE
PROGRAM-ID
PROGRAM-INFO-TABLE
PROGRAM-NAME
PROGRAM-OPSYS
PROGRAM-TIME
PROGRAM-TYPE
PROGRAM
PROMPT
PROTECTED
PURGE
QUEUE
QUOTE
QUOTES
RANDOM
RANGE
RC-ABEND00
RC-ABRCODE
RC-BOOLEAN
RC-CHKOVF0
RC-COBSTAT
RC-DATESWP
RC-HEXSTR0
RC-HEXSTR1
RC-REPCHR0
RC
RD
READ
READY
REALM
RECEIVE
RECONNECT
RECORD-NAME
RECORD
RECORDING
RECORDS
REDEFINES
REEL
REFERENCE
REFERENCES
RELATION
RELATIVE
RELEASE
RELOAD
REMAINDER
REMOVAL
RENAMES
REPEATED
REPLACE
REPLACING
REPORT
REPORTING
REPORTS
REQUIRED
RERUN
RESERVE
RESET
RETAINING
RETRIEVAL
RETURN
REVERSE-VIDEO
REVERSED
REWIND
REWRITE
RF
RH
RIGHT-JUSTIFY
RIGHT
ROLLBACK
ROLLING
ROUNDED
RUN
SAME

SCREEN
SD
SEARCH
SECTION
SECURE
SECURITY
SEGMENT-LIMIT
SEGMENT
SEL
SELECT
SEND
SENTENCE
SEPARATE
SEQUENCE
SEQUENTIAL
SERVICE
SESSION-ID
SET
SHARED
SHIFT-IN
SHIFT-OUT
SIGN
SIZE
SKIP1
SKIP2
SKIP3
SORT-CONTROL
SORT-CORE-SIZE
SORT-FILE-SIZE
SORT-MERGE
SORT-MESSAGE
SORT-MODE-SIZE
SORT-RETURN
SORT
SOURCE-COMPUTER
SOURCE
SPACE-FILL
SPACE
SPACES
SPECIAL-NAMES
STANDARD-1
STANDARD-2
STANDARD-3
STANDARD-4
STANDARD
START
STARTING
STATUS
STOP
STORE
STRING
STYLE
SUB-QUEUE-1
SUB-QUEUE-2
SUB-QUEUE-3
SUB-SCHEMA
SUBFILE
SUBPROGRAM
SUBTRACT
SUM
SUPPRESS
SWITCH-1
SWITCH-2
SWITCH-3
SWITCH-4
SWITCH-5
SWITCH-6
SWITCH-7
SWITCH-8
SWITCH
SYMBOLIC
SYNC
SYNCHRONIZED
TABLE
TALLY
TALLYING
TAPE
TENANT
TERMINAL
TERMINATE
TEST
TEXT
THAN
THEN
THROUGH
THRU
TIME
TIMEOUT
TIMES
TITLE
TO
TOP
TRACE
TRAILING-SIGN
TRAILING
TRANSACTION
TRANSCEIVE
TRUE
TYPE
UNDERLINE
UNEQUAL
UNIT
UNLOCK
UNSTRING
UNTIL
UP
UPDATE
UPON
USAGE-MODE
USAGE
USE
USER

COBOL verbs, statements, and reserved fields

USING
VAL
VALID
VALIDATE
VALUE
VALUES
VARCHAR
VARIABLE
VARYING
WAIT
WHEN-COMPILED
WHEN
WITH
WITHIN
WORDS
WORKING-STORAGE
WRITE-ONLY
WRITE
ZERO-FILL
ZERO
ZEROES
ZEROS

Chapter 6. Messages

There are three types of messages that you can encounter when using RMU:

COBOL compiler-generated messages

RMU converts Script programs to COBOL and then compiles the generated COBOL with a standard LE or z/OS COBOL compiler. COBOL ′I′ and ′W′ level errors are acceptable. ′E′ level errors are serious errors and should be reported to IBM for correction as they can be due to RMU compiler-generated statements.

These messages are generated by the COBOL compiler and are beyond the scope of this document.

RMU runtime error messages

Runtime messages are self-explanatory. File open errors are common due to improper or missing DD names.

For an explanation of runtime messages, refer to *z/OS MVS System Messages*.

RMU compiler-generated messages (listed in this chapter)

RMU compiler-generated messages consist of three parts: A 7-digit message number followed by a comma, a 2-digit condition code and the message text. A condition code of 00 is an advisory message. A condition code of 12 is an error.

RMU compiler-generated messages

RMU0-01,00 AUTO COPY OF IMAGES IGNORED.

Explanation: <object> section was declared for HTML format document. This is an MNOTE statement. MNOTE is informational only.

User response: The images declared (if any) in the section will not be automatically included in the document.

This means that all images used in the document must exist in the &home/images directory on the server where the document is downloaded.

RMU0-01,12 UNPAIRED PARENTHESES ON STATEMENT

Explanation: String was coded with unpaired parentheses.

User response: Code string inside a paired parentheses, example (string).

RMU0-01,12 UNPAIRED QUOTES ON TEXT STATEMENT

Explanation: A quoted string is missing end quote.

User response: Add the quote as needed.

RMU0-02,12 STATEMENTS ARE CODED BEYOND COL 71

Explanation: Text was found beyond column 71.

User response: Correct the problem.

RMU0-03,12 UNPAIRED END-IF/END-DO/ EVALUATE STATEMENT

Explanation: A scope terminator is missing. For IF statement, there is no matching END-IF. For DO statement there is no matching END-DO. For EVALUATE statement there is no matching END-EVALUATE.

User response: Add the required scope terminator.

RMU0-04,12 ″ELSE″ IS OUT OF SEQUENCE

Explanation: ELSE was placed on inappropriate line.

User response: Correct the problem.

RMU0-05,12 ″CONTINUE″ IS OUT OF SEQUENCE

Explanation: CONTINUE statement is out of sequence.

User response: Correct the problem.

RMU0-06,12 INCOMPLETE STATEMENT

Explanation: Statement requires more arguments.

User response: Complete the statement as required.

RMU0-07,12 LINE IS ILLEGAL (USE LINE1-LINE66)

Explanation: The variable name is not allowed. It conflicts with the reserved LINE*nn* names.

User response: Use the correct name.

RMU0-08,12 TARGET FIELD NAME EXCEEDS 16 CHRS

Explanation: The field name is longer than 16 characters.

User response: Reduce the field name down to 16 characters or less.

RMU0-09,12 UNDEFINED VARIABLE

Explanation: Variable is not defined and it is not a reserved field.

User response: Correct the problem.

RMU0-10,12 ILLEGAL NAME

Explanation: The name is illegal as coded.

User response: Refer to DEFINE statement for variable naming rules.

RMU0-11,12 ILLEGAL SUBSTRING EXPRESSION

Explanation: The substring is illegal as coded.

User response: Correct the erroneous substring.

RMU0-12,12 IF ARGUMENTS ARE REQUIRED

Explanation: IF statement is not followed by arguments.

User response: Complete the IF statement.

RMU0-13,12 ARGS NOT ENCLOSED IN PARENTHESES

Explanation: IF arguments are coded without parentheses.

User response: IF arguments must be enclosed in parentheses.

RMU0-14,12 SUB START+LENGTH EXCEEDS MAXIMUM

Explanation: The start position plus the length exceeds field capacity.

User response: Correct the substring values such that the sum of start position plus the length does not exceed the field length.

RMU0-15,12 DUPLICATE FIELD NAME

Explanation: The field name has been previously defined or it conflicts with a reserved field name.

User response: Use a different name.

RMU0-16,12 INVALID LENGTH OR EXCEEDS MAXIMUM

Explanation: The field length is invalid or it exceeds maximum allowed length.

User response: Correct the length as follows: Binary field can be 2 or 4 bytes Packed decimal field can be up to 9 bytes Display numeric field can be up 18 bytes. Alpha field can be up to 32,767 bytes.

RMU0-17,12 TYPE NOT A, N, B OR P

Explanation: Unknown field type.

User response: Code the correct type.

RMU0-18,12 STATEMENT CONTAINS EXTRA ARGUMENTS

Explanation: Extraneous arguments have been detected.

User response: Remove the extraneous arguments.

RMU0-19,12 VALUE IS ILLEGAL AS WRITTEN

Explanation: Field value cannot be resolved as written.

User response: Correct the syntax.

RMU0-20,12 VALUE EXCEEDS FIELD CAPACITY

Explanation: The specified value exceeds field capacity.

User response: Reduce the value to fit the field size.

RMU0-21,12 STATEMENT IS OUT OF SEQUENCE

Explanation: Statement is out of sequence.

User response: Put statements in the correct order according to RMU syntax rules.

RMU0-22,12 &EXPRESS ILLEGAL EXPRESSION

Explanation: Expression is illegal as written.

User response: Correct erroneous expression.

RMU0-23,12 EXCEEDS 2048 NESTED IF STATEMENTS

Explanation: The maximum number of nested IF statements has been exceeded.

User response: Reduce the number of IF statements. Simplify the tests.

RMU0-24,12 NAME IS INVALID OR EXCEEDS 16 CHRS

Explanation: The field name is longer than 16 characters.

User response: Reduce the field name down to 16 characters or less.

RMU0-25,12 &parm INVALID OPTION

Explanation: &parm is unknown option.

User response: Use the correct option.

RMU0-26,12 &var VARIABLE IS NOT NUMERIC TYPE

Explanation: Non-numeric variable used in substring.

User response: Use a numeric value or a numeric variable.

RMU0-27,12 INVALID ″DO″ STATEMENT SYNTAX

Explanation: The DO statement is illegal as written.

User response: Correct the statement according to DO statement rules.

RMU0-28,12 ″TIMES″ NOT FOUND

Explanation: Incomplete DO &nn statement.

User response: Correct the statement according to DO &nn TIMES rules.

RMU0-29,12 ″W″ IS MISSING IN DEFINE STATEMENT

Explanation: DEFINE is improper. ″W″ following the field name is required.

User response: Correct the erroneous statement.

RMU0-30,12 &var INCOMPATIBLE VARIABLE TYPE

Explanation: The &var type is not compatible with the IF argument type.

User response: Correct the erroneous argument.

RMU0-30,12 &var INCOMPATIBLE VARIABLE TYPE

Explanation: The &var type is not compatible with the WHEN argument type.

User response: Correct the erroneous argument.

RMU0-31,12 ″LINE″ CANNOT BE A TARGET FIELD

Explanation: LINE is improperly used as a target in ASSIGN statement.

User response: Correct the statement. LINE can be a target of an object or a style only. LINE content cannot be altered by RMU.

RMU0-32,12 LITERAL EXCEEDS 60 CHARACTERS

Explanation: Literal is too long.

User response: Reduce the literal size.

RMU0-33,12 INVALID ASSIGN STATEMENT SYNTAX

Explanation: Assign statement is not valid as written.

User response: Correct the statement to comply with the ASSIGN statement rules.

RMU0-34,12 SUBSTRING NOT VALID FOR P,B TYPE

Explanation: A substring was coded for a Packed decimal or a Binary field.

User response: Remove the substring.

RMU0-35,12 RECURSIVE USE OF ″&word″

Explanation: The &word section was previously declared.

User response: Remove the extraneous section.

RMU0-36,12 &word : ILLEGAL NUMBER/ ARGUMENT

Explanation: Argument is illegal as written.

User response: Write the correct argument.

RMU0-37,12 NAME EXCEEDS 8 CHARACTERS

Explanation: Style or Object name exceeds 8 characters.

User response: Reduce the name down to 8 characters. Note that period is included as part of the name.

RMU0-38,12 ARGUMENT IS OUT OF SEQUENCE

Explanation: The argument is out of sequence.

User response: Style and Object arguments are written in pairs as .&name {...}. Correct the erroneous arguments.

RMU0-39,12 OBJECT USE, SUBSTRING LENGTH NOT 0

Explanation: The length in substring is not zero.

User response: When an object is used as source in assign, the length in the target substring must be zero.

RMU0-40,12 &name DUPLICATE OBJECT NAME

Explanation: The &name was previously declared.

User response: Use a unique name.

RMU0-41,12 &name UNDEFINED OBJECT NAME

Explanation: The &name is undefined.

User response: Use a defined &name from the Style or Object section.

RMU0-42,12 ″TURF″ IS ILLEGAL IN THIS CONTEXT

Explanation: Illegal use of .turf1 or .turf2.

User response: Correct the erroneous statement.

RMU0-43,12 ZERO START IN SUBSTRING IS ILLEGAL

Explanation: Zero value was used as start position in target field of Assign statement.

User response: Correct the erroneous start value.

RMU0-44,12 SYNTAX UNSUPPORTED FOR CSV FORMAT

Explanation: An object or a style name was used as source in Assign statement for CSV document.

User response: CSV documents cannot be decorated with fonts and images. Remove the statement.

RMU0-45,12 </&tag> TAG IS MISSING

Explanation: No matching end tag was located for <&tag> section.

User response: Insert the correct </&tag> to complete the <&tag> section.

RMU0-46,12 LITERAL FOUND IN CALL PARAMETERS

Explanation: Alphanumeric (quoted) or numeric literal was detected in the call parameters. Literal is not allowed in the CALL parameters.

User response: Remove erroneous parameter. Define a field in the library section with appropriate value and use the field name in the parameter list.

RMU0-47,12 PROCESS STRING EXCEEDS 64 CHARS

Explanation: Parameters on the PROCESS statement span beyond column 64.

User response: Limit PROCESS statement to less than 65 characters. Code multiple PROCESS statements back to back to accommodate your options.

RMU0-42,12 ″TURF″ IS ILLEGAL IN THIS CONTEXT

Explanation: .turf is being assigned to a LINE text.

User response: .turf is a special style that can be declared on the PARM statement. When coded, the option is applied to the entire document. Remove/correct improper statement.

RMU0-43,12 ZERO START IN SUBSTRING IS ILLEGAL

Explanation: Zero was used for substring start position.

User response: Code the correct start position.

RMU0-44,12 SYNTAX UNSUPPORTED FOR CSV FORMAT

Explanation: A style or and object was coded in assign statement.

User response: Style and objects cannot be assigned to text in CSV files. Remove erroneous statements.

RMU0-45,12 </XXXX-XXX> TAG IS MISSING

Explanation: A matching end tag is not coded for the tag option in effect.

User response: Code the end tag in the appropriate place.

RMU0-46,12 LITERAL FOUND IN CALL PARAMETERS

Explanation: Literal was coded on CALL statement.

User response: Define a field in Library section with the needed value and use the field name instead.

RMU0-47,12 PROCESS STRING EXCEEDS 64 CHARS

Explanation: COBOL PROCESS exceeds 64 characters.

User response: Code options using multiple PROCESS statement back to back.

RMU0-48,12 EXCEEDS EIGHT(8) EVALUATE NESTS

Explanation: Maximum nested EVALUATE statements exceeded.

User response: Reduce the number of nested EVALUATE statements. If you need to code more than 8 nested EVALUATE statements, write a procedure and use PERFORM to invoke the procedure name.

RMU0-49,12 UNPAIRED END-EVALUATE STATEMENT

Explanation: END-EVALUATE was not coded.

User response: Add END-EVALUATE to appropriate place.

RMU0-50,12 DUPLICATE PROC NAME

Explanation: Procedure name was previously defined.

User response: Use a unique procedure name.

RMU0-51,12 ″&proc″ UNDEFINED PROC NAME

Explanation: The ″&proc″ procedure name is not defined.

User response: Correct the spelling of your proc name.

RMU0-52,12 INVALID PROC NAME

Explanation: Procedure name contains invalid characters.

User response: Correct the name. You can use letters, numbers and hyphens. The first character and the last character must be a letter or a number.

RMU0-53,12 END-PROC IS OUT OF SEQUENCE

Explanation: END-PROC was placed without the PROC statement before it, or END-PROC was placed in the middle of a statement that requires a scope terminator, i.e., IF/DO or EVALUATE.

User response: Correct the problem.

RMU0-54,12 PROC NAME EXCEEDS 30 CHARACTERS

Explanation: Procedure name is more than 30 characters long.

User response: Reduce the name to 30 characters or less.

RMU0-55,12 PROC PERFORM WOULD CAUSE A LOOP

Explanation: perform &procname was placed in a proc where &procname is the procedure name where PERFORM was placed.

User response: Correct &procname or remove PERFORM statement in error.

RMU0-56,12 END-PROC IS MISSING

Explanation: End of script program is reached with a proc without a matching END-PROC statement.

User response: Add END-PROC as required.

RMU0-57,12 ILLEGAL CHARACTER AFTER END-STRING

Explanation: The END-STRING statement is followed by extraneous characters.

User response: Remove the extraneous characters.

RMU0-58,12 ″DELIMITED″ OPTION IS MISSING

Explanation: Improper STRING statement syntax.

User response: Refer to STRING statement for the correct syntax in this manual.

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