
ooRexx

Documentation 5.2.0

Open Object Rexx

Release Notes

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1. About the 5.0.0 Release

Open Object Rexx Version 5.0.0 is based on the previous version of ooRexx™ (4.2.0). Version 5.0.0 has both enhancements and bug fixes.



IMPORTANT

If you have a version of IBM Object Rexx™ installed on your system, you must remove it before starting with the installation of this package. The two packages, Object Rexx and ooRexx can not be installed side-by-side.

Note that an upgrade type installation is not supported on any platform. If a previous version of ooRexx is installed, it should be completely uninstalled prior to installing 5.0.0. Failure to completely uninstall the previous version will produce unpredictable results.

On a Unix-like system use the appropriate package manager to uninstall the previous version. For instance, on Linux with a rpm install, you could use the command:

```
rpm -iv ooRexx
```

to uninstall ooRexx. On a Debian-based system you could use the **-r** or the **-P** option of **dpkg** to uninstall ooRexx:

```
dpkg -P ooRexx
```

On Windows, when the installation program is started, the installer will recognize that a previous version is installed. It will then present an option to uninstall the previous version before proceeding with the 5.0.0 install. Alternatively, you can completely uninstall the previous version prior to starting the 5.0.0 installation.



Warning

On Windows only. If a previous Windows install exists and is not the same addressing mode (32 or 64) as the version of ooRexx about to be installed, there are potential problems when the uninstaller is launched from the installer automatically. In this case it is **strongly** advised that the uninstallation program be run first to completely uninstall the current version of ooRexx, and then the new installer be run.

1.1. New in this Release

In General:

For the ooRexx 5.0.0 release, changes have been relatively well documented through the Tracker feature of the ooRexx project on SourceForge. The ticket number and the ticket title of each change is recorded in the CHANGES document. If more information is desired, look up the tracker item on SourceForge.

The Bug tracker is located at: [ooRexx Bug Tracker](https://sourceforge.net/p/ooorexx/bugs/)¹

The Requests For Enhancement tracker is located at: [ooRexx Feature Requests Tracker](https://sourceforge.net/p/ooorexx/feature-requests/)²

¹ <https://sourceforge.net/p/ooorexx/bugs/>

² <https://sourceforge.net/p/ooorexx/feature-requests/>

The Documentation Bugs tracker is located at: [ooRexx Documentation Bug Tracker](https://sourceforge.net/p/ooress/documentation/)³

To search for a single ticket number, in any of the trackers, enter **ticket_num: Number** in the search field of the tracker. For instance to search for ticket number 200, enter **ticket_num:200**

In Windows ooRexx Only:

The version of ooDialog distributed in ooRexx 5.0.0 is ooDialog 4.2.3.

2. Windows Requirements, Installation and Configuration

2.1. Hardware Requirements

- Approximately 52 MB free disk space is needed for a complete installation.
- 12 MB free disk space for the core interpreter.
- 25 MB free disk space for online documentation.
- 15 MB free disk space for all samples.
- 0.5 MB free disk space for the API headers and libraries.
- Any hardware capable of running the supported Windows operating systems is sufficient.

2.2. Software Requirements

On Windows, the ooRexx development team is committed to supporting all active versions of Windows. That is, versions of Windows that Microsoft has not declared end of life. For ooRexx version 5.0.0, the officially supported version of Windows are Windows Vista through Windows 10. The team will not *purposely* make changes to prevent ooRexx from running on versions of Windows that have reached end of life. However, the team is more interested in supporting newer versions of Windows than they are in supporting out of date operating systems. Versions of Windows that are no longer supported by Microsoft, are officially not supported by ooRexx.

The following lists the versions of Windows that ooRexx 5.0.0 has been consistently tested on by the development team:

- Windows 10

The following lists the version of Windows that the development team is committed to supporting. However, ooRexx 5.0.0 has not been well tested by the development team on these versions of Windows. Testing has been done by committed users of ooRexx.

- Windows Vista
- Windows 7
- Windows 8
- Windows 8.1

³ <https://sourceforge.net/p/ooress/documentation/>

2.3. Installation and Configuration Information

2.3.1. Windows Pre-Installation Notes

Open Object Rexx cannot coexist with IBM Object REXX. If IBM Object REXX is installed on the system you must first uninstall it.

If a previous version of ooRexx is installed, you *should* uninstall it. If two different versions of ooRexx are installed on the same system, the results are not predictable and the interpreter will *not* work correctly. You could install over the top of the existing installation, but that is not recommended and is not supported.

A previous version of ooRexx can be uninstalled ([Section 2.3.3, “Windows Uninstall Information”](#)) before starting the new installation. However, the uninstall does not have to be done as a separate step. When the installation program is started it will detect a previous version of ooRexx and offer to uninstall it at that time.



Warning

If a previous Windows install exists and is not the same addressing mode (32 or 64) as the version of ooRexx about to be installed, there are potential problems when the uninstaller is launched from the installer automatically. In this case it is **strongly** advised that the uninstallation program be run first to completely uninstall the current version of ooRexx, and then the new installer be run.

ooRexx should be installed by a user with administrator rights. On Vista and later this is a requirement. There are several installation steps that can only be performed with administrator rights. They are:

1. The subdirectory that ooRexx is installed into is added to the System PATH environment variable.
2. The environment variable REXX_HOME is set for all users.
3. The file type (ftype) **REXXScript** is defined for the interpreter executable and the file extension **.rex** is associated (assoc) with the **REXXScript** file type.
4. The file extension **.rex** is added to the System PATHEXT environment variable.



Note

On Vista when a user starts the installation program, the user is prompted for an administrator password to continue. It is not necessary to actually be logged in as administrator when the installation is started.

It is important that if ooRexx is installed by a user with administrator rights, that ooRexx is uninstalled by a user with administrator rights. Otherwise, the installation steps described above, including removal of rxapi as a service, will not be undone when ooRexx is uninstalled.

ooRexx is compiled both as 32-bit application and as a native 64-bit application. The native 64-bit application can not be installed on a 32-bit version of Windows. Either the 32-bit or the 64-bit

ooRexx can be installed on a 64-bit version of Windows. However, to take full advantage of both the operating system and ooRexx, the user should install the 64-bit version of ooRexx on a 64-bit version of Windows. The installation programs for the two types of ooRexx are clearly labelled: **ooRexx-5.0.0.windows.x86_32.exe** and **ooRexx-5.0.0.windows.x86_64.exe**.

2.3.2. Running the Installation Program on Windows

Before starting the installation, review the pre-installation ([Section 2.3.1, "Windows Pre-Installation Notes"](#)) notes if you have not already done so.

The ooRexx installation program is a typical Windows installation program. Download the installation program for your operating system. From Windows Explorer double-click the appropriate installation package: **ooRexx-5.0.0.windows.x86_32.exe** or **ooRexx-5.0.0.windows.x86_64.exe**. Follow the prompts in the installation dialog. Naturally, the program can also be run from a console window by typing the executable name at the command prompt.



Note

If a previous version of ooRexx is installed and the rxapi process is running, the user will be prompted to halt the process. The process *must* be halted to properly install the new version. If necessary, (because a Rexx program is running in the background and you are worried about possible data loss,) cancel the installation and take the appropriate steps to halt the process cleanly. If, on the other hand, you somehow trick the installation program to continue without halting the rxapi process, you will most likely end up with a corrupt installation of ooRexx.

Unattended installation. The Windows installation program can be run from the command line with no user input. This is done by using the **/S** option. Note that in this mode default values are used for all options other than the installation directory. This mode can be used to script automatic installs or multiple installs on different machines. From a script, or from the command line, enter the installation program name followed by the **/S** parameter, and the **/D** parameter if the default installation directory should be changed:

/S : Silent mode

This will install ooRexx without any user intervention using default values for all options.

/D : Default directory

The default installation directory, (C:\Program Files\ooRexx), can be changed using this switch.

This must be the last parameter used in the command line and must not contain any quotes, even if the path contains spaces. For example:

```
ooRexx-5.0.0.windows.x86_64.exe /S /D=C:\Program Files\Interpreters\ooRexx
```

2.3.3. Windows Uninstall Information

Select "Programs and Features" from the Control Panel, then select "Open Object Rexx" and select "Remove".

Alternatively, the ooRexx installation places a menu item in the program folder that can be used to uninstall. Select "Start->All Programs->Open Object Rexx->Uninstall ooRexx". This is functionally equivalent to using "Add Remove Programs".

2.4. Running Open Object Rexx as a Child Process of a Service on Windows

rxapi in its role as the memory manager for ooRexx can share out some resources among all the ooRexx processes to enable global functions, system exits, subcommand handlers, and global queues. If you start ooRexx from a service, two or more processes might run under different user accounts. Therefore it is required that the memory manager is not protected and can be accessed by every user. This means that ooRexx global data is system global and unsecured.

Note that starting ooRexx from a service is different than installing **rxapi** as a service.

If you want ooRexx to be started from a service, ooRexx must be installed as a common program or you must modify the system path manually to include the directory where ooRexx has been installed.

If you are writing a service that calls `RexxStart()`, ensure that the `SERVICE_INTERACTIVE_PROCESS` flag is set for your service. To prevent access violations, use a `NULL` security descriptor and assign it to your service process.

2.5. Open Object Rexx and Other Rexx Interpreters

If you have other Rexx interpreters installed, you may have to set the `PATH` manually because ooRexx and the other Rexx interpreters may both use the name "rex" for invoking the interpreter. Interpreter error messages that begin with "Rex:" indicate that another Rexx interpreter was called instead of ooRexx. You can verify which Rexx interpreter is running either by the form of the error messages, by running **rextry.rex** and executing `SAY VERSION`, or by invoking **rex -v**, which then should display information about the Rexx interpreter that is invoked. If no information is displayed, it is not ooRexx. If you don't want the other Rexx interpreter to be invoked, you should remove it from the `PATH`, delete it, or rename **rex.exe** in the installation directory to **orx.exe** and use **orx** to invoke the interpreter.

2.6. Exploring Open Object Rexx

Once you have installed the ooRexx files you can run Rexx scripts by issuing the command **rex** followed by the name of your Rexx script at the command prompt. In addition, if you installed ooRexx as recommended, a file type has been associated with the **.rex** extension which allows you to just type the name of your script, without the extension, to run it. For example, if your program was named **addressBook.rex**, the file association will allow you to execute the program as follows:

```
C:\work.ooRexx>addressBook
```

An execution of the program might look like this:

```
C:\work.ooRexx>addressBook
ooRexx Address Lookup, version 1.1.0
  Look up address for: gatch

Tom Gatch
3245 Westfield Dr
Mission Bay CA 92110

  Look up another address? [y/n] n
C:\work.ooRexx>
```

To interactively try Object Rexx statements, enter **rex rextry.rex** on the command line. Enter **exit** to end the program.

To help you explore programming in Open Object Rexx, the following generic sample programs are provided:

`ccreply.rex`

concurrent program using REPLY

`complex.rex`

complex number class

`drives.rex`

demonstrates the usage of Sys functions

`factor.rex`

factorial program

`greply.rex`

concurrent program using WAIT and NOWAIT

`guess.rex`

a guessing game

`ktguard.rex`

concurrent program using START and GUARD

`makestring.rex`

demonstrated the usage of the makestring method

`month.rex`

displays a calendar for the month of January

`philfork.rex`

program that demonstrates Open Object Rexx concurrency

`pipe.cls`

a library of pipeline classes

`properties.rex`

shows usage of the .Properties class and some Sys functions

`qdate.rex`

date query program

`qtime.rex`

time query program

`rexxcps.rex`

measures Rexx performance

`scclient.rex` `scserver.rex`

a client / server demonstration using the .Socket class from socket.cls

`semcls.cls`

semaphore class

`sfclient.rex` `sfserver.rex`

a client / server demonstration using the external rxsock library

`stack.rex`
program that uses a stack class

`usecomp.cls`
an implementation of a complex number class (see note below)

`usepipe.rex`
program that uses the pipeline implementation (see note below)



Note

To run these programs, you must either add the **samples** directory to the PATH or execute them directly from the **samples** directory.

To help you explore using the Windows **WinSystem.cls**, the following sample programs are provided:

`deskicon.rex`
AddDesktopIcon method of the WindowsProgramManager class

`desktop.rex`
uses the WindowsProgramManager class

`displayAnyMenu.rex`
Displays the menu hierarchy for a window that the user picks. The example uses a mixture of ooDialog and WinSystem.

`displayWindowTree.rex`
Allows the user to pick an open top-level window and then displays the window hierarchy for that window. The program uses both ooDialog and WinSystem classes.

`eventlog.rex`
uses the WindowsEventLog class

`getTheWindow.rex`
This example shows how to find a window without using the exact window title.

`menuCalc.rex`
Uses the MenuObject class to display the menu hierarchy of the Windows Calculator application. The menu hierarchy for both the Calculator's standard view and its scientific view are printed to the console.

`menuNotepad.rex`
Uses the MenuObject class to displays the hierarchy of the Notepad menu.

`quickCalc.rex`
Demonstrates how to control an application programmatically using the winsystem classes. Does some simple calculations using the Windows Calculator application. This program is similar to usewmgr.rex but more simple to better show what is going on.

`quickShowAllMenus.rex`
Uses the windowsSystem.frm package to print out a menu outline of every open window that has a menu.

registry.rex

uses the WindowsRegistry class

usewmgr.rex

program that uses the WindowsManager class

windowsSystem.frm

A collection of public routines and classes to help work with the winsystem.cls package. This is an example of how to extract common function into a package, and then use the package to help in writing similar programs. A number of the sample programs that use winsystem.cls make use of this framework.

writeWithNotepad.rex

Uses classes in winsystem.cls to automate the Windows Notepad application. This is a subset of the usewmgr.rex program designed to be a little easier to understand.

The directory **samples\ole** and its subdirectories contain a number of samples for the ooRexx OLE / ActiveX interface. The sample programs contain comments to help with learning to use the OLEObject class.

The **samples\oodialog** and its subdirectories contain a relatively large number of example programs that demonstrate the use of OODialog. A subset of these examples can be launched from the ooRexx Program folder in the Start Menu. "Start->All Programs->Open Object Rexx->ooRexx Samples->oodialog"

There are several examples provided to help with programming external function libraries using the ooRexx native API. These samples are located under the **samples\api** directory, along with two readme files:

- **sample\api\readme.txt**
- **sample\api\callrxnt**
- **sample\api\callrxwn**
- **sample\api\rexxexit**
- **sample\api\wpipe**
- **sample\api\wpipe\readme.txt**

Several of the API samples can be launched from the ooRexx Program folder in the Start Menu. "Start->All Programs->Open Object Rexx->ooRexx Samples->API"

3. Unix-Like (Linux, Darwin, etc.) Requirements, Installation and Configuration

3.1. Hardware Requirements

- 12 MB free disk space for the program
- 13.5 MB free disk space for online documentation
- IBM-compatible, Pentium or AMD processor, or higher, for an x86 32-bit or 64-bit platform.

3.2. Software Requirements

- **Linux**

- Linux ELF system (i386 or x86_64.) Linux kernel version 2.4.1 or higher, with support for System V IPC.

- **Solaris**

- Solaris V2.8 or higher.

3.3. Installation and Configuration Information

This new version of Open Object Rexx cannot coexist with a previous installed version of Open Object Rexx or IBM Object REXX on your system. If you have previously installed IBM Object Rexx or Open Object Rexx, you must first de-install that program.

3.3.1. Installation/Removal of the RPM Package



Note

The installation of Open Object Rexx requires that all steps be run with root authority.

To install the **rpm** package, use your rpm package manager. Refer to your package manager for further information. The package manager adds orexx to your local rpm-database. Select the appropriate package for your system. Although the 32-bit version of ooRexx can be installed on some 64-bit Linux distributions it is recommended that the 64-bit version of ooRexx be installed on all 64-bit Linux systems.

There may be several rpm packages available. Each package name will indicate the processor architecture (i386, x86_64, etc..) it is intended for, and the Linux distribution it was built on. In general, the Linux distribution the package was compiled on does not make a difference. The ooRexx rpm will install on any Linux system that supports rpms. However, sometimes, because of the libraries present on a system, the ooRexx rpm will not install. For instance, the Fedora Core 10 rpm may not install on a SuSE 9.3 system. Because of this, when resources are available, the ooRexx project will make available rpm packages built for older Linux distributions.

To install with the command line rpm package manager, a typical command line might be:

```
rpm -i ooRexx-5.0.0-0.centos7.x86_64.rpm
```

Open Object Rexx is installed in the directory **/usr/local**. Links are created in **/usr/lib** and **/usr/bin** for the ooRexx shared libraries and executables respectively. Additional links are created in **/usr/include** for the native API header files.

Use the rpm package manager to remove ooRexx from the system. The command line **rpm** can also be used to remove the package from the system. The command to enter is:

```
rpm -e ooRexx
```

3.3.2. Installation/Removal of the DEB Package



Note

The installation of Open Object Rexx requires that all steps be run with root authority.

Debian based Linux distributions (Ubuntu, Raspbian, etc.,) use the debian package manager. Use the following command to install a **.deb** package from the command line:

```
dpkg -i <packageFile>
```

For example:

```
dpkg -i ooRexx-5.0.0-0.ubuntu1604.x86_64.deb
```

Open Object Rexx is installed in the directory **/usr/local**.

The command **dpkg --purge** is used to remove ooRexx from the system. For example:

```
dpkg --purge ooRexx
```

Or, use the same package manager you used to install to remove ooRexx from a debian based system.

3.4. Configuration

There is nothing to configure for a Unix/Linux installation.

3.5. Open Object Rexx and Other Rexx Interpreters

If you have other Rexx interpreters installed, you may have to set the PATH manually because Open Object Rexx and the other Rexx interpreters may both use the name "rexx" for invoking the interpreter. Interpreter error messages that begin with "Rexx: " indicate that another Rexx interpreter was called instead of Open Object Rexx. You can verify which Rexx interpreter is running either by the form of the error messages, by running **rexxtry** and executing SAY VERSION, or by invoking **rexx -v**, which then should display information about the Rexx interpreter that is invoked. If no information is displayed, it is not Open Object Rexx. If you don't want the other Rexx interpreter to be invoked, you should remove it from the PATH, delete it, or rename the **rexx** binary in the **/usr/bin** directory to **orx** and use **orx** to invoke the interpreter.

3.6. Exploring Open Object Rexx for Unix/Linux

Once you have installed the Open Object Rexx files you can run Rexx scripts by issuing the command **rexx** followed by the name of your script at the command prompt. To interactively try Rexx statements, from a command prompt type **rexx rexxtry**. Enter **exit** to end the program.

To help you explore programming in Open Object Rexx, the following sample programs are provided in the **/usr/local/share/ooRexx**:

```
ccreply.rex
    concurrent program using REPLY
```

`complex.cls`
complex number class

`factor.rex`
factorial program

`greply.rex`
concurrent program using WAIT and NOWAIT

`guess.rex`
a guessing game

`ktguard.rex`
concurrent program using START and GUARD

`makestring.rex`
demonstrated the usage of the makestring method

`month.rex`
displays a calendar for the month of January

`pipe.cls`
a library of pipeline classes

`properties.rex`
shows usage of the .Properties class and some Sys functions

`qdate.rex`
date query program

`qtime.rex`
time query program

`rexxcps.rex`
measures Rexx clauses per second

`rexstry.rex`
interactively try out Rexx statements

`scclient.rex` `scserver.rex`
a client / server demonstration using the .Socket class from socket.cls

`semcls.cls`
implements a semaphore class on ooRexx

`sfclient.rex` `sfserver.rex`
a client / server demonstration using the external rxsock library

`stack.rex`
program that uses a stack class

`usecomp.rex`
program that uses the complex number class

`usepipe.rex`
program that uses the pipeline implementation

**Note**

To run these programs, you must either add the `/usr/local/share/ooRexx` directory to the PATH or execute them directly from the `/usr/local/share/ooRexx` directory.

4. The rxapi Daemon Process

Part of ooRexx is **rxapi**, a process that manages all data that can persist across interpreter invocations or is used for cross-process communications. The **rxapi** process manages the Rexx data queues, the macrospace, and all of the external function, subcommand handler and exit registrations.

Starting with ooRexx 5.0.0, **rxapi** no longer is a system-wide daemon process, but a process specific for each user and addressing mode. Both 32-bit and 64-bit versions of **rxapi** can run concurrently. The interpreter and **rxapi** communicate through the Unix socket interface or Windows named pipes.

The first time a user starts the interpreter, **rxapi** is started. Once started, the **rxapi** process will continue to run until the system is halted.

The first time the interpreter executes, and needs the function provided by **rxapi**, the interpreter will start the **rxapi** process, which, once started, will continue to run until the system is halted.

There is little or no point in stopping the **rxapi** process once it is started. **Be aware** that if you do stop the **rxapi** process, all queues, all registered subcommand handlers, system exits, and external functions, and the macrospace, disappear.

rxapi can be stopped by using an appropriate process killer for your platform. Typically the Task Manager or the **taskkill** command on Windows, and the **kill** command on a Unix-like system.

5. Known Limitations, Problems and Workarounds

- The global directory `.environment` is process local, not global to the system.

6. Documentation

All documentation is contained in PDF files and zipped HTML package files and is available online at SourceForge in the files section for documentation for the version of the interpreter in use. For the 5.0.0 release the documentation is at: [ooRexx 5.0.0 Documentation](https://sourceforge.net/projects/ooRexx/files/ooRexx-docs/)⁴

The following documents are available:

`rexxref.pdf`

This is the *Open Object Rexx: Reference*.

`rexxpg.pdf`

This is the *Open Object Rexx: Programmer Guide*.

`rexxapi.pdf`

This is the *Open Object Rexx: Application Programming Interfaces*.

⁴ <https://sourceforge.net/projects/ooRexx/files/ooRexx-docs/>

oodialog.pdf

This is the *ooRexx Documentation: ooDialog Reference 4.2.4*.

oodguide

This is the *ooRexx Documentation: ooDialog User Guide 4.2.3*.

rxsock.pdf

This is the *Open Object Rexx: TCP/IP Socket Library Functions Reference*.

rxftp.pdf

This is the *Open Object Rexx: FTP Class Library Reference*.

rxmath.pdf

This is the *Open Object Rexx: Mathematical Functions Reference*.

winextensions.pdf

This is the *Open Object Rexx: Windows Extensions Reference*.

unixextensions.pdf

This is the *Open Object Rexx: Unix Extensions Function Reference*.

readme.pdf

This document itself. The document is in PDF and HTML format.

A. Notices

Any reference to a non-open source product, program, or service is not intended to state or imply that only non-open source product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Rexx Language Association (RexxLA) intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-open source product, program, or service.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

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The railroad diagrams were generated with the help of "Railroad Diagram Generator" located at <https://github.com/GuntherRademacher/rr>. Special thanks to Gunther Rademacher for creating and maintaining this tool.



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