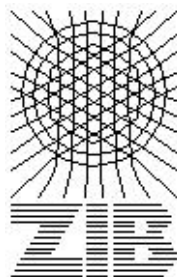


REDUCE

Installation Guide

for Personal Computers

Winfried Neun



Konrad-Zuse-Zentrum Berlin 1999

REDUCE Installation Guide

for Personal Computers

Version 3.7

by

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ZIB

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Federal Republic of Germany

April 1999

Abstract

This document describes operating procedures for installing REDUCE specific to personal computers running MS Windows 3.1, MS Windows NT, MS Windows 95 or MS Windows 98. A DOS version is currently NOT supported.

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1 Introduction

This guide describes the REDUCE version 3.7 distribution CD-ROM and procedures for installing, testing and maintaining REDUCE on a personal computer with an Intel¹ processor or Digital Equipment Alpha processor based computer with DOS² Version 3.3 or higher or any version of MS Windows. Please note: This version will **NOT** run on any 8086, 8088, 80186 or 80286 based machines no matter how much memory they have.

The following names are used for the operating systems in the REDUCE file tree and on the distribution disks:

operating system	system name	binary archive file
MS-DOS, PC-DOS:	dos386	dos386.zip
MS Windows 3.1	dos386	win31.zip
MS Windows NT (Intel):	win32	win32.zip
MS Windows 95/98:	win32	win32.zip
MS Windows NT (DEC Alpha):	alphant	alphant.zip

REDUCE is based on Standard LISP, and this version requires the availability of Portable Standard Lisp (PSL), version 4.2. The PSL files necessary to run REDUCE are included on the system CD-ROM. This is not however a complete PSL system and in particular does not include PSL sources. A complete PSL, if needed, is available separately from the Konrad-Zuse-Zentrum; contact:

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 D 14195 Berlin-Dahlem
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The distributed version of REDUCE takes its execution size from the command line. The minimum size of installed memory for executing REDUCE is 32 Megabytes, but for more advanced calculations more memory is necessary. The complete set of binaries requires approximately 14 million bytes of disk space for one of the Intel based operating systems. For the DEC Alpha binaries approximately 25 million bytes are needed. As usual, the REDUCE systems runs better the more physical memory is installed, up to 128 MBytes can be used on 32 bit systems.

Under all operating systems there is a small binary executable, the PSL loader, which loads the REDUCE kernel preserved in a binary file, called the “image” file with suffix .IMG.

The Intel architecture based versions of REDUCE use the 32 bit mode of this processor.

Under **MS DOS** REDUCE operates in protected mode using the 32 bit architecture, with uniform access to all memory; there is no 640K boundary during execution of REDUCE. This is possible because of the usage of the ERGO DOS Extender OS/386 (referred to as “DOS/ERGO”) or alternatively MS Windows. The license for 386 REDUCE includes a license for the use of OS/386, but only for this product unless you have a full ERGO license yourself. The loader PSL.EXE contains the OS/386 extender and supplies all operating system services. For MS Windows the loader PSLW.EXE is used which maps all operating system calls to MS Windows and organizes the Windows specific input and output. A license for MS Windows is not

¹Throughout this document “Intel processors” mean the 32 bit processors of the Intel x86 family, namely i386(SX and DX) (optionally with i387 coprocessor), i486 and Pentium or compatibles.

²MS, MS-DOS, Windows and Windows NT are registered trademarks of Microsoft Corporation, OS/386 is a product name reserved by ERGO Computing, Inc, OS/2 is a registered trademark of International Business Machines

included. The loaders PSLLE.EXE and PSLW.EXE use the same image file.

Under **Windows 95, Windows NT or Windows 98** REDUCE operates in the native modes of these systems. Both versions use an individual loader which loads an individual image file. Under Windows NT and Windows 95/98 the program BPSLW.EXE organizes at the same time the interactive window support which is very similar to that offered by the MS Windows version.

The load modules, sources and scripts are compatible among the Intel based systems - only the executables and image files are individual for the operating system and are kept in separate subdirectories.

On the DEC Alpha full the 64 bit mode is supported.

There are two levels of REDUCE available,

- professional version
- personal version

Compared to the professional version the following items are missing from the personal version:

- compiler
- rebuild scripts
- sources

This guide can be used for both versions. Differences are marked by notes (*prof*) for features which are available in the professional version only.

2 Description of the Distribution Disks

The material is distributed as a set of files on a CD-ROM. In order to make the installation process easy to handle, one REDUCE version is kept in one (compressed) file.

The CD-ROM contain files

win32.zip	REDUCE version for Windows NT, Windows 95 or 98
win31.zip	REDUCE version for Windows 3.1
dos386.zip	REDUCE version for DOS (will be completed later)
alphant.zip	REDUCE version for DEC Alpha Windows NT (will be completed later)
packages.zip	REDUCE sources of packages
doc	a folder which contains documents (not compressed) which can be read immediately with an appropriate browser without being copied onto disk. It can of course be useful to copy these files to disks in order to support users on a network.
other	a folder which contains software which may be useful for browsing documents or displaying graphics. This software is NOT part of REDUCE in any form. It is put on the CD-ROM in case the network connection of your system is not powerful enough to fetch large data files. Please consult the README file in this folder
. setup	containing setup.exe and scripts
disk1	unzip and some utilities

3 Installing REDUCE

3.1 Preparations

You have to select a directory name for the root of the REDUCE file tree. We recommend you either select a new directory, or empty in advance the directory for the REDUCE installation, as interferences of the new packages with any older code might cause failures. Do not use a directory with too long a path name: the directory path will be included in several command line parameters and with a long name you may run into problems with the limited DOS command line length. Also, it is not recommendable to include special characters in the REDUCE file tree name, even though the operating system might allow this. If the reduce directory itself is a subdirectory, you must create the upper part of the path before by hand if it does not yet exist.

3.2 Setting environment variable

REDUCE uses five environment variables at runtime, namely

REDUCE, MACHINE, LISP, GNUPLOT and HELPDIR

these have to be set to the following values

```
set REDUCE=<root of the REDUCE file tree>
set HELPDIR=%reduce%\help
set LISP=psl
set MACHINE=<win32, win31 or alphant>
set GNUPLOT=%reduce%\wutil\%MACHINE%
```

depending on the installed version of REDUCE. Using these variables allows you to keep several version of REDUCE in the same file tree.

Please add these settings to the file `c:\autoexec.bat` under Windows 3.1, 95 or 98 and use the *Settings > ControlPanel > System > Environment* mechanism under Windows NT.

If all or some of the settings are missing, there is a risk of malfunction of some components.

3.3 Automatic Installation using Setup

Following these installation steps is recommended.

If your CD-ROM drive supports the autorun feature, setup is started automatically after mounting the CD-ROM into the drive.

Under MS Windows 3.x , Windows 95/98 and Windows NT the installation material is prepared to be used by the MS Setup program.

In Windows 95/98 or NT, if the autorun feature is not supported, please

1. press the **Start** Button of the taskbar.
2. Select **Run...** from the menu.
3. Enter `DriveLetter:\Setup\Setup` as command for execution, e.g.
`d:\setup\setup`

If Windows 3.1 is not already started , perform the following step:

1. Insert CD-ROM in the drive
2. Select this drive as current drive (if Windows is not already started)

3. enter the command (if Windows is not already started)

```
cd setup
win setup
```

If Windows 3.1 is already started then

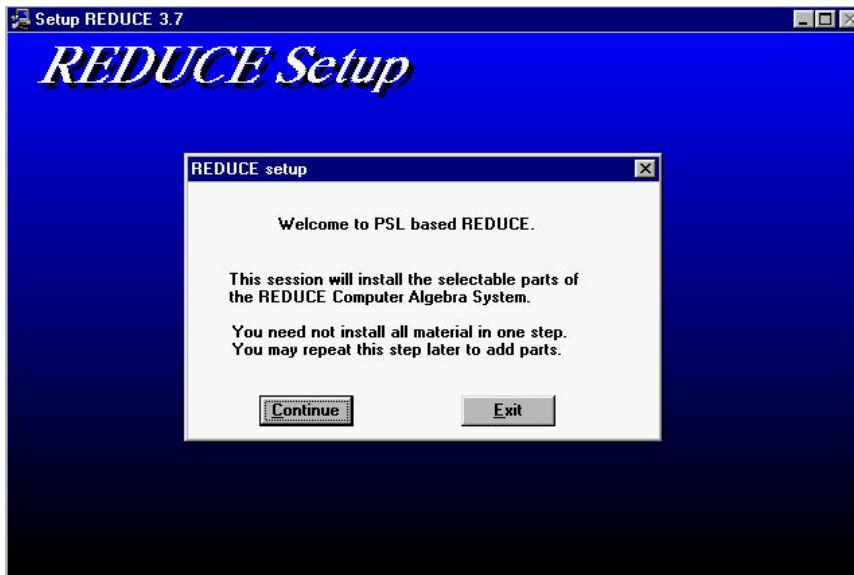
1. press the **F**ile Button of the Program Manager window.
2. Select **E**xecute from the pull-down menu.
3. Enter DriveLetter:\Setup\Setup as command for execution, e.g.

```
d:\setup\setup
```

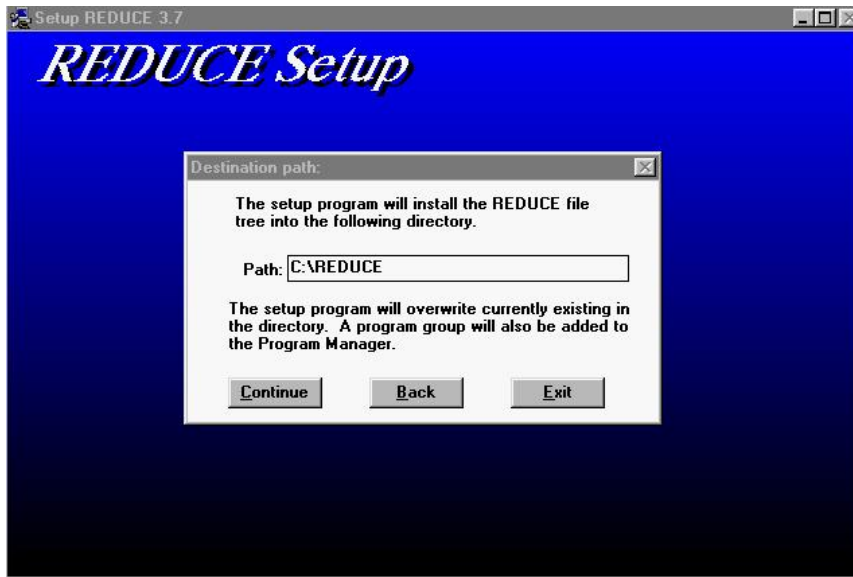
This will start the Setup Program which takes over control on the installation process and will offer a choice of options for the installation. At all stages of this installation it is possible to exit the ongoing process by pressing the Cancel or Exit button. It is also possible to install additional parts of the software or text files in a secondary installation step.

The installation steps are as follows:

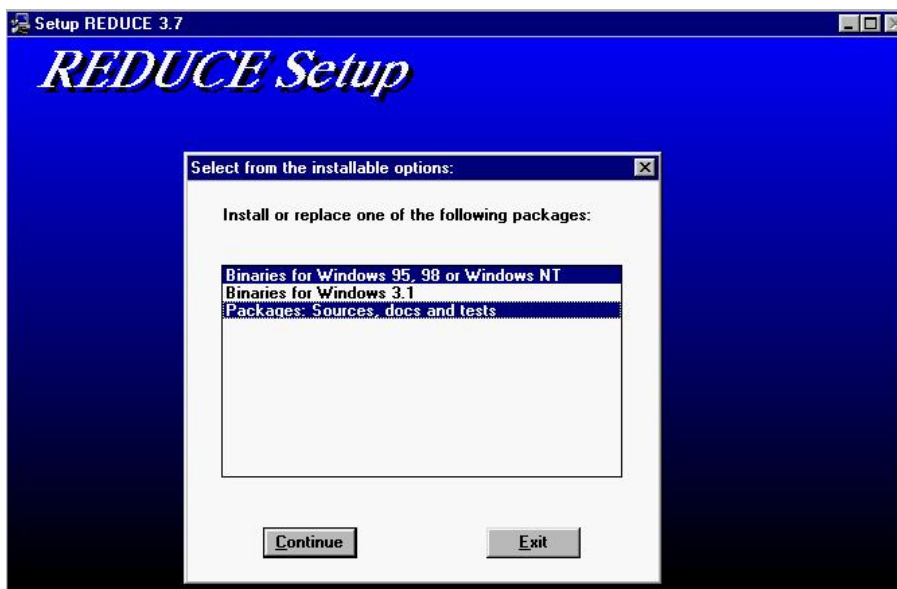
After Setup has been started (either automatically via autorun or manually), you will see this window:



1. Enter your choice of the REDUCE path, e. g. C:\REDUCE.



2. Select the parts of the software which you want to install. In order to produce a running system, one has to choose one of the binary version suited for the actual operating system.



3. After reading the CD-ROM files, the REDUCE files will be unpacked and put into the appropriate places in the REDUCE homedir tree.
4. As final step a group (called "REDUCE 3.7") of Windows icons is generated which allows the user to start REDUCE by double clicking the icon.
5. To test the installation double click the REDUCE icon. This will open a window where the message:

```
loading ....
REDUCE 3.7, 15-Apr-1999 ...
```

1:

appears followed by an input prompt. Enter `bye;` . This will end the first session.

The installation is now complete.

3.4 The shortcuts in the REDUCE group

The structure of the shortcuts in the automatically generated REDUCE group is as follows:

An example with Windows user interface:

```
Command Line:
%reduce%\iisp\psl\win32\psl\bpslw -f %reduce%\iisp\psl\win32\red\reduce.img -td 8000000
```

or an example for batch processing (reading from infile)

```
Command Line:
%reduce%\iisp\psl\win32\psl\bpsl -f %reduce%\iisp\psl\win32\red\reduce.img -td 8000000 -i infile -o outfile
```

If you want to modify existing or add new shortcuts, please use the *Settings > Taskbar > StartMenu > Advanced* mechanism as described in the Windows documentation.

The number following the `-td` parameter represents the total memory size in bytes as a decimal number. If your computer is equipped with large real memory, you may consider arranging for an icon with huge memory usage. The maximum for the `td` value is 128Mb on 32 bit systems.

BPSLW is equipped with several icons; you can select one of them by pushing the button

. After pushing the REDUCE icon appears in the group.

3.5 Mixing Operating Systems

On an Intel processor based machine you can install the binaries for DOS, Windows 3.1, Windows 95/98 and Windows NT in one file tree without problems. Simply run the installation script under each operating system separately with the same root. Please note that **.img** files which are produced during the installation are not compatible between Windows 95/98 and Windows NT. If you want to use both operation systems on the same machine or access the software from a server disk, please copy the specific image files and update the items in the REDUCE 3.7 folder in the taskbar.

However, please take into account that for DOS the file tree must reside in a FAT file system. You cannot execute DOS REDUCE under one of the 32 bit operating systems.

4 Printing Documents

The distributed documents can be found in the DOC folder in the REDUCE file tree or in printable form in the DOC folder on the CD-ROM.

The documents with suffix **.TXT** may be printed using standard DOS utilities. They are paginated and formatted with standard ASCII control characters. A maximum of sixty print lines per page are assumed. The left margin offset must be supplied by the user.

The documents with suffix **.TEX** need the \LaTeX program system for printing. You can find a \LaTeX implementation called MiKTeX in the **others** directory of the installation CD-ROM.

In order to browse files with a suffix .pdf you need ADOBE(R)'s Acrobat(R)³ reader. The version 4.0 of this software can be found in the `others` directory of the installation CD-ROM or directly from

<http://www.adobe.com>.

5 Testing REDUCE

To test the REDUCE installation enter:

```
REDUCE
in "$reduce/packages/alg/alg.tst";
```

or use the script

```
util\tstpckge alg
```

which generates a session log in the directory LOG. This requires about 1 second on a 133 MHz Pentium system under Windows 95.

Other programs for testing the REDUCE system assembly may also be found in the packages folders included in `%reduce%\packages`.

6 Running REDUCE Programs

Prototypical instructions for using the 386 implementation of REDUCE are available in the directory DOC as the file OPER.TEX. You should edit this to reflect your site-specific implementation. Site independent instructions for the use of REDUCE are given in the *REDUCE User's Manual*.

7 Utilities

In the subdirectory *util* there are several scripts available. They can all be executed with all supporting systems. Under DOS they will switch to Windows automatically if either the file `reduce/bin/psll.exe` is missing or if

```
set rbase=WIN
```

had been set before.

7.1 Tests

The script UTIL\TEST can be used to execute one of the tests in the XMPL subdirectory. Simply call e.g.

```
util\tstpckge int
```

for invoking the integrator test. A log is then written to the directory LOG, e.g. as `log/int.rlg`.

³Adobe and Acrobat are registered trademarks of Adobe Systems Incorporated.

7.2 Rebuilding REDUCE FASL Files^(prof)

Because of its organization into independently compilable packages and the packages into modules, the current REDUCE system is fairly easy to maintain. If any source updates are necessary, they can be incorporated into the appropriate files using a convenient editor. Once any system source file has been updated, it is necessary to rebuild (compile) the equivalent fast loading modules in order to utilize the changes. The `mkpckge` script can be used to update a packages fasl files belonging to a package. The parameter is the name of the package to be compiled; the path and the suffix `.red` is appended automatically.

Examples:

```
util\mkpckge int
util\mkpckge assist
```

7.3 Maintaining REDUCE

The `util` directory includes a number of scripts that are useful for the ongoing maintenance of REDUCE. Most of these are only of interest to the system maintainer, and several have been described earlier in this guide. However, for completeness, they are all described in this section. All are associated with a file with a `bat` extension and some have one with a `dat` extension. They are as follows:

buildpsl^(prof) This is used to rebuild the complete REDUCE fast-loading (fasl) file system from scratch. It first uses the script `dbuild` to build a version of REDUCE suitable for compiling all packages. After that, `mkpckge` is run for all packages defined in `upackage.bat`.

checkall^(prof) This can be used to check the logs generated by `testall` with the “exemplary” versions found in the packages folders. This uses a `perl` script to compare a log generated by `tstpckge` with the equivalent “exemplary” version found in the packages `rlg` file.

dbuild^(prof) This is used by `buildpsl` to build a version of REDUCE suitable for compiling all packages.

mkpckge^(prof) This creates a single fasl file from a package file. It is used in the form `mkpckge <package-name>` for files in the `packages` directory. The location of the packages in the file tree is defined in `packages\support\packages.red`.

mkreduce This creates the REDUCE executable from PSL and REDUCE fasl files. Under Windows NT or Windows 95 it is recommended to use the MKREDUCE icon from the REDUCE 3.7 group folder instead.

tstpckge This can be used to run one of the test files in the packages directory. `tstpckge <package>` will run a test file, `<package\package>.tst`. `tstpckge` generates a log file, `<package>.rlg`, in the `log` directory.

tstall This script runs all the tests contained in the `xmpl` directory, using the `tstpckge` script on each one. This script takes considerable time to complete (at least an hour on a 486 system, for example).

8 Patches for REDUCE

The REDUCE system is equipped with a mechanism for correcting bugs *in situ*. The basis for such corrections is the file `packages\support\patches.red`. It contains individual patches for the REDUCE core modules and for REDUCE packages. Its header contains the actual date of the file and gives information about the repaired bugs. A version of this file is delivered with all REDUCE disk sets, including Personal REDUCE. The installed binary includes the contents of this file in compiled form. The most recent version of the file `patches.red` can be obtained from the REDUCE **network library** in the directory `patches`. To install a new version on your system please perform the following steps:

- **professional REDUCE:**
 1. copy `patches.red` to the directory `packages\support`,
 2. run the script `util\mkpckge support`. This script compiles the patches file and builds a new binary.
- **personal REDUCE, with ftp access:**
 1. use anonymous ftp to fetch the file `patches.b` from the server `ftp.zib.de`. It is in `pub/reduce/patches/` or `pub/reduce/patches/alphant`. Use **binary** mode for the transfer.
 2. copy this file to the directory `lisp\ps1\%MACHINE%\red`.
 3. run the script `util\mkreduce` in order to build a new binary.
- **personal REDUCE, no ftp access:**
 1. copy `patches.red` to the directory `packages\support`,
 2. run the script `util\mkpatch`; this script translates the patch file into Standard LISP and builds a new binary.

When REDUCE is built with a non-compiled version of `patches` some programs may need more execution time; however, in most cases this effect is negligible.

The ftp server mentioned above contains other items that might be useful for your REDUCE installation. Please consult the `readme` file for actual information.

9 Obtaining recent information on REDUCE

Recent information about REDUCE and new or updated REDUCE packages can be obtained from a World Wide Web REDUCE server with URL `http://www.rrz.uni-koeln.de/REDUCE/`. In addition to general information about REDUCE, this server has pointers to the module library, the demonstration versions, examples of REDUCE programming.

For distribution of REDUCE news and for discussing REDUCE topics of general interest there is an electronic mail forum. Every user of REDUCE is invited to participate. To register for this forum, or for further information, please send email to `reduce@rand.org`.

10 Program Registration

After installing REDUCE, please fill out the accompanying registration form and send to:

Dr. Anthony C. Hearn
RAND
1700 Main Street
Santa Monica, CA 90407-2138
Telephone (310) 393-0411
Facsimile (310) 393-4818
Email: reduce@rand.org

This should be done so that you can be advised direct of any changes which are made to the system. Furthermore, the copyright statement on the REDUCE documents requires such registration as a requirement for their local distribution. The test time requested on the registration form is the time printed by the final call of `showtime` in the output from the test described in the section "Testing REDUCE".

11 Inquiries and Reporting of Errors

We would appreciate hearing about bugs you encounter or questions you may have regarding the assembly or the operation of the system. Suspected errors should be accompanied by the relevant output and a copy of the input source. Corrections for documented problems or other improvements to the system are also welcomed.

REDUCE 3.7 Registration Form

After installing REDUCE, please fill out this form and send to:

Anthony C. Hearn
RAND
1700 Main Street
P.O. Box 2138
Santa Monica CA 90407-2138 U.S.A.
Electronic Mail: reduce@rand.org

This should be done so that you can be advised of any changes made to the system. Furthermore, returning the registration form is a requirement for local reproduction of the REDUCE documentation.

Date: _____

Contact Person: _____

Organization: _____

Address: _____

Telephone: _____

Network Address: _____

(Indicate network: Internet, BITNET, EARN, UUCP, etc)

REDUCE Supplier: **Konrad-Zuse-Zentrum Berlin**

Computer Description:

Vendor: _____ Model: _____ Operating System: _____

Please indicate the test time as printed by the final call of `showtime` in the output from the test described in the section "Testing REDUCE" of the REDUCE Installation Guide.

Also give the memory size used (real or virtual) if known (called Region below), and the total amount of (real) memory available on the machine, if you know.

Time: _____ Region: _____ Machine Memory: _____

Please also write on the back of this form any comments you may have about the installation procedure, and system documentation and performance.

If you would like to be listed in a published registry of REDUCE system holders, please check here .