

IDOS kernel manual

2025 by E. C. Masloch. Usage of the works is permitted provided that this instrument is retained with the works, so that any entity that uses the works is notified of this instrument.
DISCLAIMER: THE WORKS ARE WITHOUT WARRANTY.

This document has been compiled on 2025-03-12.

Contents

Section 1: Building the IDOS kernel	3
Section 2: Starting the IDOS kernel	4
Section 3: Installing boot sector loader using INSTSECT	5
Section 4: IDOS configuration	6
4.1 Query patch	6
4.2 ICFG block	6
4.3 Kernel command line	6
4.4 Configuration file	7
Section 5: Additional usage conditions	9
5.1 BriefLZ depacker usage conditions	9
5.2 LZ4 depacker usage conditions	9
5.3 Snappy depacker usage conditions	9
5.4 Exomizer depacker usage conditions	10
5.5 X compressor depacker usage conditions	10
5.6 Heatshrink depacker usage conditions	10
5.7 Lzd usage conditions	11
5.8 LZO depacker usage conditions	11
5.9 LZSA2 depacker usage conditions	11
5.10 aPLib depacker usage conditions	12
5.11 bzipack depacker usage conditions	12
Source Control Revision ID	14

Section 1: Building the IDOS kernel

To build only the kernel and sharer, the following tools are needed:

- bash shell
- GNU make, or compatible
- Netwide Assembler, a recent version needed (at least v2.15)
- dosemu2 to run DOS tools
- WarpLink linker (DOS tool, public domain)
- x2b2 tool (DOS tool, public domain)

The two DOS tools have to be found in the DOS path.

The following components are expected in sister directories to the repo:

- lmacros
- ldosboot
- scanptab
- kernwrap
- inicomp (if to use compression support), also needs one of the compression tools:
 - brieflz (blzpack)
 - lz4
 - snappy (snzip)
 - exomizer
 - x-compressor
 - heatshrink
 - lzip
 - lzop
 - lzs -- default choice, one of the fastest depackers
 - apultra
 - bzpack

Section 2: Starting the IDOS kernel

The IDOS current release build includes four different kernel files in the `bin/` subdirectory: `ldos.com`, `ldos.sys`, `ldospak.com`, and `ldospak.sys`. Any single one of these four files contains the complete kernel.

The `.com` files are called iniload variants, as they are wrapped in the IDOS `iniload.asm` (initial loader) stage. They are valid DOS MZ application executables and can be loaded as a number of different kernel formats.

The `.sys` files are called drload variants, from the stage named `drload.asm` (originally created for the IDOS flavour of the Enhanced DR-DOS kernel). They are only valid to be loaded as FreeDOS kernel (typically named `kernel.sys`) or as EDR-DOS kernel (typically named `drbio.sys`). The advantage is that they are smaller than the iniload variants.

The `ldos` files are uncompressed. The advantage is faster load time and being able to patch the kernel image.

The `ldospak` files are compressed. The advantage is, again, the smaller file size.

Section 3: Installing boot sector loader using INSTSECT

The recommended choice is to install a boot sector loader using the `instsect` application. This application is found both in `instsect.com` and in the COMLOADER multi-executable tool which is embedded in `ldos.com`, using the command program name `instsect`.

The default filename for `instsect`'s loaders is `ldos.com`. Note that the loaders use the IDOS load protocol. Trying to load `ldos.sys` or `ldospak.sys` using these loaders will fail with a check 'V'alue error (letter 'V' displayed at boot time).

The `instsect` online help can be accessed using the `/?` switch. Redirect to a file or to a tool like `'more'` to read all of it.

Section 4: IDOS configuration

There are four inputs to the IDOS configuration:

- IDOS iniload query patch site, modified using patchqry
- ICFG block, modified using patchpro and patchdeb
- IDOS kernel command line, can be passed using bootable lDebug to chainload IDOS
- Configuration file

4.1 Query patch

The query patch site determines whether the initial loader uses CHS or LBA access, and whether it queries the CHS geometry using int 13h function 08h. This is accessed using the patchqry tool.

The query patch site is not passed along to the IDOS kernel yet.

4.2 ICFG block

The ICFG block currently contains two configuration choices:

First, the incomp depack progress display choice. This allows to choose none, dots, percentage, bar, or bar with percentage. This is accessed using the patchpro tool.

Second, the debugger detection choice. This indicates conditions for detecting a resident debugger in order to avoid overwriting its int 1 and int 3 handlers. This is accessed using the patchdeb tool.

4.3 Kernel command line

The kernel command line is a text string of up to 255 bytes that can be passed to the kernel from the prior loader. Bootable lDebug allows to pass a command line when loading a kernel using the RxDOS.2, RxDOS.3, IDOS, FreeDOS, or EDR-DOS load protocols. (The latter two need to enable this using a CMDLINE=1 parameter.)

The commands of the command line are separated by semicolons. A semicolon immediately following another semicolon is parsed as an escaped semicolon. The following command names are recognised:

CONFIG

Highest priority configuration file override. This file is tried first. Default is empty.

ALTCONFIG

Second configuration file override. This file is tried second. Default is 'ldos.ini'.

OLDCONFIG

Third configuration file override. This file is tried last. Default is 'config.sys'.

PREPEND

Prepend the following line to the configuration file contents.

APPEND

Append the following line to the configuration file contents.

‘.’ (dot)

Command ignored, possibly used for future optional extensions.

4.4 Configuration file

If a configuration file is found, its length is checked. The length should not exceed 56 KiB. Then a buffer is allocated and the entire file is read. Too long file contents may be truncated. The command line PREPEND and APPEND lines are also stored in the buffer.

Aside all the usual MS-DOS v4 level configuration directives, some additional directives are supported:

DEVICEHIGH

Like DEVICE but attempt to load into the UMA

INSTALLHIGH

Like INSTALL but attempt to load into the UMA

INSTALLLAST, INSTALLLASTHIGH

Like INSTALL, INSTALLHIGH but after final DOSDATA and DOSCODE relocation

SHELLHIGH

Like SHELL but attempt to load into the UMA

COMPAT

List comma-separated compatibility options. The following options are recognised:

(NO)ALTAH

Control allocation of a compatible ALTAH (CON device driver look-ahead buffer) that should be found at the segmented address 70h:61Bh.

(NO)DOSDATAFIRST

Control relocation of DOSDATA segment first, before loading any device drivers. This means the segment will be allocated in the Low Memory Area.

(NO)DOSDATAEARLY

Control relocation of DOSDATA segment early, after any device driver. The segment is relocated after the first device driver load that provides DOS with a sufficiently large (ca 6 KiB) Upper Memory Block. If no such UMB is provided at all then the DOSDATA segment is eventually relocated into the Low Memory Area at the default end relocate time.

(NO)BOUNCEHMACHS

Control bouncing CHS disk accesses involving the HMA through the Low Memory Area (DOENTRY) disk sector buffer. This slows down the access but may be required if the access won't work in the HMA.

(NO)BOUNCEHMALBA

Control bouncing LBA disk accesses involving the HMA through the Low Memory Area (DOENTRY) disk sector buffer. This slows down the access but may be required if the access won't work in the HMA. (Appears to be needed for qemu.)

Section 5: Additional usage conditions

The kernel executables can be compressed with a choice of different compressors. The files then contain a decompression stub. Some of these stubs have their own usage conditions. The following stub usage conditions apply, if one of these stubs is used.

5.1 BriefLZ depacker usage conditions

BriefLZ - small fast Lempel-Ziv

8086 Assembly IDOS iniload payload BriefLZ depacker

Based on: BriefLZ C safe depacker

Copyright (c) 2002-2016 Joergen Ibsen

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

5.2 LZ4 depacker usage conditions

8086 Assembly IDOS iniload payload LZ4 depacker

by E. C. Masloch, 2018

Usage of the works is permitted provided that this instrument is retained with the works, so that any entity that uses the works is notified of this instrument.

DISCLAIMER: THE WORKS ARE WITHOUT WARRANTY.

5.3 Snappy depacker usage conditions

8086 Assembly IDOS iniload payload Snappy depacker

by E. C. Masloch, 2018

Usage of the works is permitted provided that this instrument is retained with the works, so that any entity that uses the works is notified of this instrument.

DISCLAIMER: THE WORKS ARE WITHOUT WARRANTY.

5.4 Exomizer depacker usage conditions

8086 Assembly IDOS iniload payload exomizer raw depacker

by E. C. Masloch, 2020

Copyright (c) 2005-2017 Magnus Lind.

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented * you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any distribution.

5.5 X compressor depacker usage conditions

MIT License

Copyright (c) 2020 David Barina

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

5.6 Heatshrink depacker usage conditions

8086 Assembly IDOS iniload payload heatshrink depacker

by E. C. Masloch, 2020

Usage of the works is permitted provided that this instrument is retained with the works, so that any entity that uses the works is notified of this instrument.

DISCLAIMER: THE WORKS ARE WITHOUT WARRANTY.

5.7 Lzd usage conditions

Lzd - Educational decompressor for the lzip format

Copyright (C) 2013-2019 Antonio Diaz Diaz.

This program is free software. Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

This program is distributed in the hope that it will be useful, but WITHOUT ANY WARRANTY; without even the implied warranty of MERCHANTABILITY or FITNESS FOR A PARTICULAR PURPOSE.

5.8 LZO depacker usage conditions

8086 Assembly IDOS iniload payload LZO depacker

by E. C. Masloch, 2020

Usage of the works is permitted provided that this instrument is retained with the works, so that any entity that uses the works is notified of this instrument.

DISCLAIMER: THE WORKS ARE WITHOUT WARRANTY.

5.9 LZSA2 depacker usage conditions

8086 Assembly IDOS iniload payload LZSA2 depacker

by E. C. Masloch, 2021

based on:

decompress_small.S - space-efficient decompressor implementation for 8088

Copyright (C) 2019 Emmanuel Marty

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

5.10 aPLib depacker usage conditions

8086 Assembly IDOS iniload payload aPLib depacker

by E. C. Masloch, 2021

based on:

aplib_8088_small.S - size-optimized aPLib decompressor for 8088 - 145 bytes

Copyright (C) 2019 Emmanuel Marty

This software is provided 'as-is', without any express or implied warranty. In no event will the authors be held liable for any damages arising from the use of this software.

Permission is granted to anyone to use this software for any purpose, including commercial applications, and to alter it and redistribute it freely, subject to the following restrictions:

1. The origin of this software must not be misrepresented; you must not claim that you wrote the original software. If you use this software in a product, an acknowledgment in the product documentation would be appreciated but is not required.
2. Altered source versions must be plainly marked as such, and must not be misrepresented as being the original software.
3. This notice may not be removed or altered from any source distribution.

5.11 bzipack depacker usage conditions

8086 Assembly IDOS iniload payload bzipack depacker

by E. C. Masloch, 2021

BSD 2-Clause License

Copyright (c) 2021, Milos Bazelides

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE COPYRIGHT HOLDERS AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE COPYRIGHT HOLDER OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

Source Control Revision ID

hg 6fcd065a4b71, from commit on at 2025-03-12 22:06:58 +0100

If this is in ecm's repository, you can find it at
<https://hg.pushbx.org/ecm/msdos4/rev/6fcd065a4b71>