

# **ecm's webbed site**

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## Section 1: News

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2026-04-17 Apr Fri

IntList now listed on this page

2026-03-28 Mar Sat

WarpLink now listed on this page

2026-02-16 Feb Mon

IDebug release 10

2025-10-21 Oct Tue

**Access to the hg.pushbx.org hgweb server is now password-protected.** This has become a necessity due to unruly bot activity. Enter `anonymous` as the username and any nonempty string as the password. Alternatively, download a snapshot (< 100 MiB per file) of the hg repos from the `backups.hg` directory. (They are transient, but usually the one for the last elapsed day will be available.)

2025-09-14 Sep Sun

Added SRDISK and DEVLOAD sections to this page

2025-06-26 Jun Thu

Added LZEXE (section on this page, current release build, documentation, and repo)

2025-02-16 Feb Sun

Rebranded IMS-DOS as IDOS

2024-12-21 Dec Sat

IDebug release 9

2024-03-08 Mar Fri

IDebug release 8

2024-02-16 Feb Fri

IDebug release 7

2023-08-26 Aug Sat

IDebug release 6

2023-08-20 Aug Sun

Added Enhanced DR-DOS section and current release builds, as well as a repo.

Added WarpLink current release build and repo, ported to NASM + WarpLink toolchain.

2023-03-08 Mar Wed

lDebug release 5

2022-12-23 Dec Fri

booting now allows to cut out boot loader parts from a given file, as well as fragmenting files preloaded into the image

2022-08-06 Aug Sat

Added ICDebug build to the current releases that are created automatically. The new conditionally debuggable build option has also been covered by a blog post.

2022-07-20 Jul Wed

Added Eric Auer's Terminal and the Insight debugger to the current releases that are created automatically.

2022-07-12 Jul Tue

Updated the NASM revision that's used for building current releases. Now line numbers of included files are correct in listings as well as in the assembler's messages.

2022-07-10 Jul Sun

lDebug symbolic branch merged into default branch, made a build option that is default off. (As announced on the blog.)

2022-04-24 Apr Sun

The new pushbx blog is officially online

2022-03-08 Mar Tue

lDebug release 4

2021-11-04 Nov Thu

lDebug current release of DDebug added

2021-11-02 Nov Tue

Other builds added (FreeDOS kernel and its SHARE for now)

2021-11-01 Nov Mon

KEEPHOOK got a fix to a bug that made for a few broken releases

2021-10-30 Oct Sat

RENUMBER added

AMITSRS listed  
2021-10-26 Oct Tue  
FDAPM added  
2021-10-24 Oct Sun  
TSRs changed to use Update IISP Header function as now provided by IDebug's AMIS interface  
IDebug current release file added  
2021-10-19 Oct Tue  
SHUFHOOK first release added  
2021-10-13 Oct Wed  
RxANSI listed  
IClock listed  
SEEKEXT listed  
TSR example listed  
TSR current releases added  
2021-10-12 Oct Tue  
KEEPHOOK first release added  
2021-08-15 Aug Sun  
IDebug release 3  
2021-05-17 May Mon  
Moved from ulukai.org to pushbx.org domain  
2021-05-05 May Wed  
IDebug release 2  
2021-04-07 Apr Wed  
The IDebug manual had a News chapter added  
2021-02-18 Feb Thu  
What is "pushbx"?  
2021-02-15 Feb Mon  
IDebug release 1

## Section 2: Projects

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### 2.1 IDebug debugger

IDebug is a 86-DOS debugger based on the MS-DOS Debug clone FreeDOS Debug. It features DPMI client support for 32-bit and 16-bit segments, a 686-level assembler and disassembler, an expression evaluator, an InDOS and a bootloaded mode, script file reading, serial port I/O, permanent breakpoints, conditional tracing, buffered tracing, auto-repetition of some commands, and a number of extensions. There is also a symbolic debugging branch being developed.

The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/ldebug/> and proper releases are available at <https://pushbx.org/ecm/download/ldebug/>. A current release is available at <https://pushbx.org/ecm/download/ldebug.zip> and a current release of the debuggable debugger is available at <https://pushbx.org/ecm/download/lddebug.zip> (You only need this one if you want to debug the debugger itself.) Further, a current release of the conditionally debuggable debugger is available at <https://pushbx.org/ecm/download/lcdebug.zip> (This one can switch debuggable mode off and on.)

### 2.2 TracList - Trace debugging output in listing files

A companion application to IDebug, connecting to the debugger's serial I/O. It traces execution through NASM format listing files. Written in perl. The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/tracetest/>

### 2.3 IntList - Interrupt list viewer

A terminal viewer application for browsing the interrupt list. May work with earlier releases of Ralf Brown's Interrupt List but primarily targets the newer community project known as The List. Written in perl. The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/intlist/>

### 2.4 RxDOS 7.2x kernel

RxDOS is an alternative DOS kernel. It is not yet ready for general use. (I am not working on RxDOS any longer.) Unlike the FreeDOS kernel, its source is entirely in assembly language. (As of RxDOS 7.20N the source has been ported from MASM to NASM.) Unlike MS-DOS and PC-DOS versions past v4.01 it is (copylefted) free software. It aims to support extended features such as FAT32, LFNs, and LBA. It already supports UMBs (for DOSDATA, DOSCODE) and the HMA (for DOSCODE). Support for additional extensions is planned, such as FAT+, cluster sizes exceeding 32 KiB, sector sizes up to 8 KiB, and moving many DOS data structures into the UMA and HMA. The repo is hosted at <https://hg.pushbx.org/ecm/rxdos-7.2x/>

## 2.5 Enhanced DR-DOS kernel and shell

Enhanced DR-DOS is the effort of The DR-DOS/OpenDOS Enhancement Project to update the kernel and shell of the 1997 Caldera OpenDOS 7.01 source release. The original, restrictive OpenDOS license has been superseded by the 2022-07-07 license agreement by DRDOS, Inc. which allows to use, distribute, and modify 'CP/M and its derivatives'. (I consider DR-DOS a derivative of CP/M. As it happens, the copyright notices of DR-DOS stretch back to 1976.)

I based my own revisions on the last, 2011 release of EDR-DOS, mainly modifying parts of the kernel. The kernel of my EDR-DOS repo (IDOS flavour) now builds with a toolchain consisting of only NASM, WarpLink, x2b2, convlist.pl, and some tools (now all FLOSS with sources) shipping with the repo. Compressing the IDOS flavour kernel will make use of additional compression tools that correspond to the inicompress compression methods. Building the shell requires OpenWatcom and JWasm as well.

The EDR-DOS kernel, alike RxDOS and unlike FreeDOS, is written entirely in x86 assembly language. (The command.com shell utilises the C language in parts.) It fully supports FAT32 file systems and LBA int 13h disk access. Further, it supports FAT+ for file sizes up to 256 GiB minus 1 Byte on local FAT FS file systems. Consequently, a new function 7142h and an extension to the SFT entry layout are added to handle file seek offsets in terms of 64-bit offsets. Some LFN functions known from MSWindows 4 and doslfn are also supported in order to report FAT+ extended file sizes, though they only operate on SFNs. EDR-DOS introduced the file system choice of using 256 sectors per cluster, for 128 KiB per cluster at the normal sector size, now also supported by the FreeDOS kernel. Furthermore, the DR-DOS kernel is a highly compatible 8086 DOS beyond what is offered by FreeDOS.

The repo is hosted at <https://hg.pushbx.org/ecm/edrDOS/> and a current release is available at <https://pushbx.org/ecm/download/edrDOS.zip> The original files released by The DR-DOS/OpenDOS Enhancement Project can be found in the edrDOS subdirectory at <https://pushbx.org/ecm/download/edrDOS/>

## 2.6 IDOS kernel

IDOS is a new DOS kernel based on the 2024-04-25 release of MS-DOS v4 as free software under the MIT license. Like the IDOS flavours of the EDR-DOS and RxDOS kernels, the MS-DOS based IDOS kernel is implemented entirely in NASM assembly language.

The IDOS kernel supports LBA access, including for booting. It also supports relocating the DOSCODE segment and many data structures into the HMA or UMA, if they are available to DOS using the XMS interfaces. The DEVICEHIGH=, INSTALLHIGH=, and SHELLHIGH= directives are supported in Idos.ini as known from FreeDOS's fdconfig.sys. The kernel is LFN-aware (as in the DOSLFN USEOLDDOS define need not be enabled). Cluster sizes of 128 or 256 sectors are supported (where 256 sectors is an EDR-DOS extension).

The included shell is not updated as much as it isn't my focus. It doesn't support LFNs nor the LH command.

FAT32 and FAT+ support are not planned currently, as they would require many changes to the kernel interfaces, as well as layouts of the SFTs, DPBs, and UPBs.

The kernel and sharer now can be built with an entirely FLOSS toolchain consisting of bash, GNU make, NASM, dosemu2 (requires a DOS), WarpLink, x2b2, convlist.pl, fixupp, and

round. Other applications in the repo still require the original nmake, MASM, LINK, and MS C compiler that ship with the repo as free but closed-source software.

The repo is currently still hosted at <https://hg.pushbx.org/ecm/msdos4> (containing the entire IMS-DOS history back to 2024 April) whereas the current release is available in <https://pushbx.org/ecm/download/ldos.zip>

## 2.7 IDOS boot loaders

Advanced boot loading stages used by kernels or other bootloaded programs. The repos are hosted at <https://hg.pushbx.org/ecm/ldosboot/> and <https://hg.pushbx.org/ecm/ldosmbr/>

A file documenting the IDOS boot load protocols is available online here.

## 2.8 WarpLink 8086 OMF linker

WarpLink is an OMF linker implemented in 8086 assembly language. It was developed from 1989 to 1993 and released into the Public Domain in 1999. I started to work on it in 2023.

I ported the linker to assemble with NASM and be linked by itself. I fixed it so it supports DWORD and 4KIB section alignment, and improved its detection of disk full conditions. I also added three new features:

wlemitalign

Enabled using the `/XE` switch. Sections with names starting with `wlemitalign` will emit their alignment even if they are fully `nobits`.

wlcalc

Enabled using the `/XC` switch. Global labels of the form `wlcalc_SIZE_OPERATION_OPERAND` can be used to apply post-link calculations to the output binary.

wllist

Enabled using the `/XL` switch. A number of global labels can be used to generate a patch list. A temporary object file is generated during linking, which refers to the list items so as to build the patch list.

The repo is hosted at <https://hg.pushbx.org/ecm/warplink/> and it contains a readme for the ecm extensions. A current release is available at <https://pushbx.org/ecm/download/warplink.zip> (You may want to rename its `wl.exe` to `warplink.exe` to use it to link projects such as itself, the IDOS kernel, or lDebug.)

## 2.9 LZEXE executable packer

A fork of the 1990 executable packer by Fabrice Bellard. Adapted after the 2025 May free software release of source texts that approximately correspond to v0.91, under the MIT license. This base release was obtained from the LZEXE webpage.

The repo is hosted at <https://hg.pushbx.org/ecm/lzexe/> and a current release is available at <https://pushbx.org/ecm/download/lzexe.zip>

The manual (text, PDF) is available online.

## 2.10 SRDISK - reSizeable RAM Disk

Fork of the 2005-06-11 free software (GNU GPL any version) release of SRDISK, extracted from the FreeDOS servers. The fork has ported everything to build with NASM, WarpLink, x2b2, convlist.pl, objdump, and gcc-ia16 (C compiler, GAS, linker). Several bugs were fixed, new /X options added, and the file `srdisk.exe` contains both the format utility and all the device drivers, defaulting to load the embedded `srdxms.sys` device driver. Further, the resident drivers are discovered using the AMIS interrupt 2Dh now, rather than the traditional multiplex interrupt 2Fh.

The repo is hosted at <https://hg.pushbx.org/ecm/srdisk/> and a current release is available at <https://pushbx.org/ecm/download/srdisk.zip>

## 2.11 DEVLOAD - Load device drivers from command line

Fork of the last release (2011-08-05) of Eric Auer's DEVLOAD. Fixes some bugs. Allows to load IDebug as a device driver where previously it failed to pass along the device's maximum allocation size correctly when it is above 64 KiB. Also adds three checks for a valid device driver executable, which can be overridden using the /F switch.

The repo is hosted at <https://hg.pushbx.org/ecm/devload/> and a current release is available at <https://pushbx.org/ecm/download/devload.zip>

## 2.12 86 Mode NASM macro collection

A macro collection featuring parts such as defaultable defines for conditional assembly, stack frame calculation, anonymous @@ labels, safer sectioning directives, and assisted flag bit accesses. The repo is hosted at <https://hg.pushbx.org/ecm/lmacros/>

## 2.13 NASM 2.05 based x86 Instruction Reference

An assembly language reference covering all general instructions up to a 686-level instruction set. Includes encoding schemes and some general English-language descriptions. It is available online here (text, PDF). The repo is hosted at <https://hg.pushbx.org/ecm/insref/>

## 2.14 ACEGALS - Assembly Comments Explained: Guide for Advanced Learning and Style

A reference guide for our assembly comments and formatting styles. It is available online here (text, PDF). The repo is hosted at <https://hg.pushbx.org/ecm/acegals/>

## 2.15 Boot image FAT FS formatting script

A NASM script that allows formatting an image file with FAT12, FAT16, or FAT32. The filesystem can be preloaded with files. Both diskette or harddisk images can be created. Optionally an MBR and a dosemu image header can be wrapped around the image. For FAT32 a backup boot sector copy and an FSINFO sector can be initialised. Sector sizes between 32 Bytes and 8 KiB are supported. Likewise cluster sizes between 1 to 256 sectors. (Minimum cluster size is 32 Bytes, maximum is 2 MiB.) The repo is hosted at <https://hg.pushbx.org/ecm/bootimg/>

## 2.16 Original MS-DOS Debug fork, MSDebug

MSDebug is a fork based on the Debug sources included in the 2018 free software release of MS-

DOS v2. Several features of the later MS-DOS Debug versions were recreated. It also contains some new bugfixes. Further, the source has been ported to assemble with NASM, and link with WarpLink and x2b2. Unlike IDebug the memory footprint is smaller, and more similar to the original MS-DOS Debug. Also unlike IDebug, the MSDebug project aims to be very compatible to the original.

Big FreeDOS and IDOS feature extensions like the 686 assembler/disassembler, 386 register variables, expression evaluator, autorepeat, bootloadable and device driver mode, InDOS mode, and running Extensions for IDebug will not be ported to MSDebug.

The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/msdebug/> and current releases are available at <https://pushbx.org/ecm/download/msdebug.zip>

## **2.17 Terminate and Stay Resident (TSR) programs**

The current releases are created automatically from the repos and are updated daily. Old files of the current releases are found at <https://pushbx.org/ecm/download/old/>

There is a manual (text, PDF) available online that lists the common switches supported by most of these TSR programs.

### **2.17.1 KEEPHOOK utility**

A TSR which aids the uninstalling of other TSRs. The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/keephook/> and a current release is available at <https://pushbx.org/ecm/download/keephook.zip>

### **2.17.2 RxANSI - ANSI and LESS sequence parser**

RxANSI is a TSR to take over interrupt 29h and parse ANSI and LESS sequences. It only affects output - it does not do any input. The repo is hosted at <https://hg.pushbx.org/ecm/rxansi/> and some releases are available at <https://pushbx.org/ecm/download/> and a current release is available at <https://pushbx.org/ecm/download/rxansi.zip>

### **2.17.3 IClock - Clock display TSR**

IClock is a TSR that continuously displays a clock in the upper right-side corner of the screen by writing to the text mode video buffer. It can be customised using build time options. The repo is hosted at <https://hg.pushbx.org/ecm/lclock/> and a current release is available at <https://pushbx.org/ecm/download/lclock.zip>

### **2.17.4 SEEKEXT - Seek service extension**

This TSR extends DOS with an interrupt 21h handler. It hooks the services 21.42 (short seek), 21.7142 (long seek), as well as 21.71A6 (file info). The short seek hook is to provide sensible results from positive or negative 32-bit seek offsets for file handles that implement long seek (21.7142). The long seek and file info hooks are to redirect calls to the special int 2F.1142, 2F.11C2, or 2F.11A6 redirector interfaces, which are used by recent dosemu2 to provide 64-bit seeking and file info on its redirected file systems. The repo is hosted at <https://hg.pushbx.org/ecm/seekext/> and a current release is available at <https://pushbx.org/ecm/download/seekext.zip>

## 2.17.5 FDAPM - A tool for APM power management and energy saving

The power savings utility for FreeDOS, originally by Eric Auer. Extended to use IISP headers, an AMIS multiplexer, and to provide the UNLOAD command, with the advanced deinstallation method. The repo is hosted at <https://hg.pushbx.org/ecm/fdapm/> and a current release is available at <https://pushbx.org/ecm/download/fdapm.zip>

## 2.17.6 TSR example

This project is an example of a TSR. It was originally based on RxANSI, and was in turn the base for IClock, SEEKEXT, and KEEPHOOK. It implements an AMIS multiplexer and features optimal installation and the advanced deinstallation method. The repo is hosted at <https://hg.pushbx.org/ecm/tsr/> (No releases are going to be provided because this is useful only for developers.)

## 2.17.7 Tools to work with TSR programs

### 2.17.7.1 SHUFHOOK utility

This tool allows to re-order interrupt handlers. The manual (text, PDF) is available online. The repo is hosted at <https://hg.pushbx.org/ecm/shufhook/> and a current release is available at <https://pushbx.org/ecm/download/shufhook.zip>

### 2.17.7.2 RENUMBER

This tool allows to change the AMIS multiplex numbers of resident multiplexers. The repo is hosted at <https://hg.pushbx.org/ecm/renumber/> and a current release is available at <https://pushbx.org/ecm/download/renumber.zip>

### 2.17.7.3 AMITSRS - List resident AMIS multiplexers

This tool lists AMIS multiplexers that are resident. It is based on the tool of the same name that was released to the Public Domain by Ralf Brown in 1992. The verbose mode has been extended to list the multiplex number and interrupt list of each resident multiplexer. It has also been updated to compile with the ia16 gcc and libi86. The repo is hosted at <https://hg.pushbx.org/ecm/amitsrs/> and a current release is available at <https://pushbx.org/ecm/download/amitsrs.zip>

The AMITSRS tool has been ported to run as an Extension for IDebug (ELD) that can be loaded from the debugger's command line. It has been extended a little to allow specifying different keywords on the ELD's command line. This update wasn't backported to the original tool, which treats any arguments as indicating "VERBOSE" output.

## 2.18 Other builds

The current release scripts got updated to build a few projects that are kept in git repos. These are <https://pushbx.org/ecm/download/fdkernel.zip> (from repo at <https://github.com/fdos/kernel.git>) and <https://pushbx.org/ecm/download/fdshare.zip> (from repo at <https://github.com/fdos/share.git>) and <https://pushbx.org/ecm/download/freecom.zip> (from repo at <https://github.com/fdos/freecom.git>) (While these contain some contributions by me, I do not host current repos of them anywhere.)

Note: fdkernel builds after the 2021-11-23 release and before the 2022-04-06 release did not build correctly.

## Section 3: Links

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ecm's files

<https://pushbx.org/ecm/>

ecm's hgweb

<https://hg.pushbx.org/ecm/> (**now password-protected**, enter user anonymous and any non-empty password)

ecm's github

<https://github.com/ecm-pushbx/>

ecm's stackoverflow

<https://stackoverflow.com/users/738287/ecm?tab=profile>

ecm's NASM bug reports

[https://bugzilla.nasm.us/buglist.cgi?f1=reporter&list\\_id=1912&o1=equals&order=changeddate%20DESC](https://bugzilla.nasm.us/buglist.cgi?f1=reporter&list_id=1912&o1=equals&order=changeddate%20DESC)

ecm's twitter

<https://twitter.com/pushbx/>

BTTR Software

<https://www.bttr-software.de/>

DOS ain't dead

<https://www.bttr-software.de/forum/>

### **3.1 The pushbx blog**

Longer form comments or explanations can now go to the pushbx blog which runs on a dokuwiki instance on this server. It is expected that content that would be shared privately prior to this may land on there. That may include descriptions that do not fit into commit messages or are written later on with more hindsight. As of 2022 April this was experimental and may be used more or less frequently. As of 2024 October I regularly post to the blog, usually once a week. Comments are generally enabled on individual blog pages. Posting a comment requires signing up for a gratis account with the dokuwiki that runs the blog. All comments are screened manually.

## Section 4: What is "pushbx"?

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The username 'pushbx' originates in Eric Auer's callver (public domain). A line there reads the instruction 'push bx' but has a comment that *also* reads 'push bx'. The reason? There's a line further down which has the instruction 'pop ax' with the comment 'but pop ax'. This hints at the fact that, to a beginner, it is unusual to push then pop with two different registers as the source and destination. I've been using pushbx as a username ever since at the latest 2012 March. **NEW:** The little used twitter account indicates that I have used the username pushbx as early as 2009-11-27 in the first tweet.

## **Source format of this page**

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This page has been created using the libre Halibut documentation preparation system.

## Source Control Revision ID

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hg a6fdc21c3948, from commit on at 2026-04-17 15:41:41 +0200

If this is in ecm's repository, you can find it at  
<https://hg.pushbx.org/ecm/webecm/rev/a6fdc21c3948>