

## Editing binary files in console and GUI on FreeBSD and Linux

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I've recently wanted to edit one binary file because there was compiled in the binary a text string with a word I didn't liked and therefore I wanted to delete. I know I can dig in the source of the proggy with **grep** and directly substitute my "unwatned text" there but I wanted to experiment, and see what kind of hex binary text editors are for Free OSes.

All those who lived the **DOS** OS computer era should certainly remember the DOS hex editors was very enjoyable. It was not rare case, where in this good old days, one could simply use the hex editor to "hack" the game and add extra player lives or modify some vital game parameter like put himself first in the top scores list. I even remember some DOS programs and games was possible to be cracked with a text editor ... Well it was times, now back to current situation as a Free Software user for the last 12 years it was interesting to see what is the DOS hexeditor like alternatives for FreeBSD and Linux and hence in this article I will present my findings:

A quick search in FreeBSD ports tree and Debian installable packages list, I've found a number of programs allowing one to edit in console and GUI binary files.

Here is a list of the hex editors I will in short review in this article:

- hexedit
- dhex
- chexedit
- hte
- hexer
- hexcurse
- ghex
- shed
- okteta
- bless
- lfhex

### 1. hexedit on Linux and BSD - basic hex editor

I've used *hexedit* already on Linux so I've used it some long time ago.

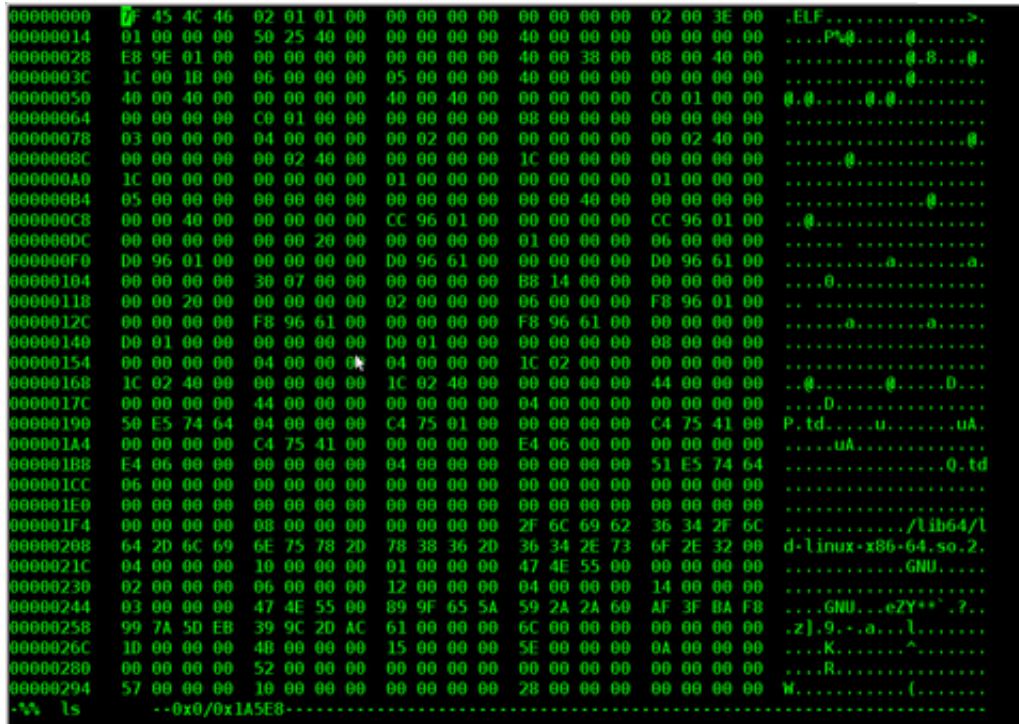
My previou experience in using **hexedit** is not too pinky, I found it difficult to use on *Redhat and Debian Linux* back in the day. *hexedit* is definitely not a choice of people who are not "initiated" with hex editing.

Anyways if you want to give it a try you can install it on FreeBSD with:

```
freebsd# cd /usr/ports/editors/hexedit
freebsd# make install clean
...
```

On Debian the hexedit, install package is named the same so installation is with apt:

```
debian:~# apt-get --yes install hexedit
```



## 2. Hex editing with chexedit

I've installed chexedit the usual way from ports:

```
freebsd# cd /usr/ports/editors/chexedit
```

```
freebsd# make install clean
```

...

*chexedit* is using the *ncurses* text console library, so the interface is very similar to **midnight commander (mc)** as you see from below's screenshot:

```

File: .bash_history      ASCII Offset: 0x00000000 / 0x0000205E (%00)
00000000 7C 73 20 20 61 6C 0A 75 6E 7A 69 70 20 79 6F 75  ls -al,unzip you
00000010 72 6C 73 20 77 6F 72 64 70 72 65 73 73 20 74 6F  rls-wordpress-to
00000020 20 74 77 69 74 74 65 72 2E 7A 69 70 0A 6C 73 0A  -twitter.zip,ls,
00000030 66 6F 72 20 69 20 69 6E 20 2A 2E 7A 69 70 3B 20  for i in *.zip;
00000040 64 6F 20 65 63 68 6F 20 24 69 3B 20 64 6F 6E 65  do echo $i; done
00000050 0A 66 6F 72 20 69 20 69 6E 20 2A 2E 7A 69 70 3B  .for i in *.zip;
00000060 20 64 6F 20 75 6E 7A 69 70 20 24 69 3B 20 64 6F  do unzip $i; do
00000070 6E 65 0A 66 6F 72 20 69 20 69 6E 20 2A 3B 20 64  ne,for i in *; d
00000080 6F 20 67 72 65 70 20 20 72 6C 69 20 27 70 6F 6D  o grep -rli 'pom
00000090 6F 72 69 65 60 6F 6E 61 73 74 65 72 79 2E 6F 72  oriesmonastery.or
000000A0 67 27 3B 20 64 6F 6E 65 0A 66 6F 72 20 69 20 69  g'; done,for i i
000000B0 6E 20 2A 3B 20 64 6F 20 67 72 65 70 20 20 72 6C  n *; do grep -rl
000000C0 69 20 27 70 6F 6D 6F 72 69 65 60 6F 6E 61 73 74  i 'pomoriesmonast
000000D0 65 72 79 2E 6F 72 67 27 20 24 69 3B 20 64 6F 6E  ery.org' $i; don
000000E0 65 0A 6C 65 73 73 20 31 33 30 36 37 35 34 37 35  e,less 130675475
000000F0 30 2E 32 30 31 37 32 2E 70 63 66 72 65 61 6B 2C  0.20172,pcfreak,
00000100 53 3D 37 31 34 3A 32 2C 0A 6C 65 73 73 20 31 33  S=714;2,less 13
00000110 30 36 37 35 35 38 32 38 2E 32 30 33 34 30 2E 70  06755828,20340,p
00000120 63 66 72 65 61 6B 2C 53 3D 37 39 38 3A 32 2C 0A  cfreak,S=798;2,.
00000130 63 64 20 2F 68 6F 6D 65 2F 68 69 70 6F 2F 69 6E  cd /home/hipo/in
00000140 66 6F 0A 6C 73 20 2A 67 6F 64 61 64 64 2A 0A 63  fo,ls 'godaddy'.c
00000150 61 74 20 67 6F 64 61 64 64 79 5F 6C 6F 67 69 6E  at godaddy_login
00000160 2E 74 78 74 20 0A 63 64 20 2F 76 61 72 2F 76 70  .txt ,cd /var/vp
00000170 6F 70 6D 61 69 6C 2F 64 6F 6D 61 69 6E 73 2F 0A  opmail/domains/.
00000180 6C 73 0A 63 64 20 70 6F 6D 6F 72 69 65 6D 6F 6E  ls,cd pomoriesmon
00000190 61 73 74 65 72 79 2E 6F 72 67 2F 0A 6C 73 0A 63  astery.org/.ls,c
000001A0 64 20 69 6E 66 6F 2F 0A 6C 73 0A 63 64 20 4D 61  d info/.ls,cd Ma
000001B0 69 6C 64 69 72 2F 6E 65 77 2F 0A 6C 73 0A 6D 63  ildir/new/.ls,wc
000001C0 0A 77 0A 70 73 20 61 78 75 0A 64 66 20 20 68 0A  .w.ps axu.df -h,
000001D0 77 0A 73 68 20 54 75 6E 69 6E 67 20 70 72 69 6D  w.sh Tuning-prim
000001E0 65 72 2E 73 68 20 0A 76 69 6D 20 54 75 6E 69 6E  er.sh .vim Tunin
000001F0 67 20 70 72 69 6D 65 72 2E 73 68 20 0A 63 68 6D  g-primer.sh .chm
00000200 6F 64 20 28 70 20 54 75 6E 69 6E 67 20 70 72 69  od +x Tuning-prim
  
```

Editing the binary compiled in string was an easy task with *chexedit* as most of the commands are clearly visible, anyways changing a certain text string contained within the binary file with some other is not easy with *chexedit* as you need to know the corresponding binary value representing each text string character.

I'm not a low level programmer, so I don't know the binary values of each keyboard character and hence my competence came to the point where I can substitute the text string I wanted with some unreadable characters by simply filling all my text string with **AA AA AA AA** values...

**chexedit** on Debian is packaged under a deb **ncurses-hexedit**. Hence to install it on Deb run:

```
debian:~# apt-get --yes install ncurses-hexedit
```

...

Further on the binary to run *chexedit* on binary contained within *ncurses-hexedit* is:

```
debian:~# hexeditor
```

### 3. Hex Editing on BSD and Linux with *hte*

Just after trying out **chexedit**, I've found about the existence of one even more sophisticated hexeditor console program available across both FreeBSD and Linux.

The program is called **hte** (sounds to me a bit like the Indian word for Elephant "Hatti" :))

**hte** is installable on Debian with cmd:

```
debian:~# apt-get install ht
```

On FreeBSD the port name is identical, so to install it I execed:

```
freebsd# cd /usr/ports/editors/hte  
freebsd# make install clean  
...
```

**hte** is started on Debian Linux (and presumably other Linux distros) with:

```
$ hte
```

On FreeBSD you need to run it with **ht** command:

```
freebsd# ht
```

You see how **hte** looks like in below screenshot:

```
File Edit Windows Help Local-Hex 20:58 25.04.2012
[x] /usr/bin/mc
00000000 7f 45 4c 46 02 01 01 00-00 00 00 00 00 00 00 00 00 ?ELF??
00000010 02 00 3e 00 01 00 00 00-c0 cb 41 00 00 00 00 00 00 ? > ? ??A
00000020 40 00 00 00 00 00 00 00-28 66 0c 00 00 00 00 00 00 @ (f?
00000030 00 00 00 00 40 00 38 00-08 00 40 00 1e 00 1d 00 00 @ 8 ? @ ? ?
00000040 06 00 00 00 05 00 00 00-40 00 00 00 00 00 00 00 ? ? @
00000050 40 00 40 00 00 00 00 00-40 00 40 00 00 00 00 00 @ @ @ @
00000060 c0 01 00 00 00 00 00 00-c0 01 00 00 00 00 00 00 ?? ??
00000070 08 00 00 00 00 00 00 00-03 00 00 00 04 00 00 00 ? ? ?
00000080 00 02 00 00 00 00 00 00-00 02 40 00 00 00 00 00 ? ? @
00000090 00 02 40 00 00 00 00 00-1c 00 00 00 00 00 00 00 ?@ ?
000000a0 1c 00 00 00 00 00 00 00-01 00 00 00 00 00 00 00 ? ?
000000b0 01 00 00 00 05 00 00 00-00 00 00 00 00 00 00 00 ? ?
000000c0 00 00 40 00 00 00 00 00-00 00 40 00 00 00 00 00 @ @
000000d0 a4 f8 0b 00 00 00 00 00-a4 f8 0b 00 00 00 00 00 ??? ???
000000e0 00 00 20 00 00 00 00 00-01 00 00 00 06 00 00 00 ? ?
000000f0 00 00 0c 00 00 00 00 00-00 00 6c 00 00 00 00 00 ? l
00000100 00 00 6c 00 00 00 00 00-1c 65 00 00 00 00 00 00 l ?e
00000110 50 58 03 00 00 00 00 00-00 00 20 00 00 00 00 00 PX?
00000120 02 00 00 00 06 00 00 00-38 17 0c 00 00 00 00 00 ? ? 8??
00000130 38 17 6c 00 00 00 00 00-38 17 6c 00 00 00 00 00 8?l 8?l
00000140 20 02 00 00 00 00 00 00-20 02 00 00 00 00 00 00 ? ?
00000150 08 00 00 00 00 00 00 00-04 00 00 00 04 00 00 00 ? ? ?
00000160 1c 02 00 00 00 00 00 00-1c 02 40 00 00 00 00 00 ?? ??@
00000170 1c 02 40 00 00 00 00 00-44 00 00 00 00 00 00 00 ??@ D
view 0b/0
1help 2save 3open 4edit 5goto 6mode 7search8resize9viewin0quit
```

*ht* has the look & feel like midnight commander and I found it easier to use than *chexedit* and *hexeditor*

#### 4. hexer VI like interface for Linux

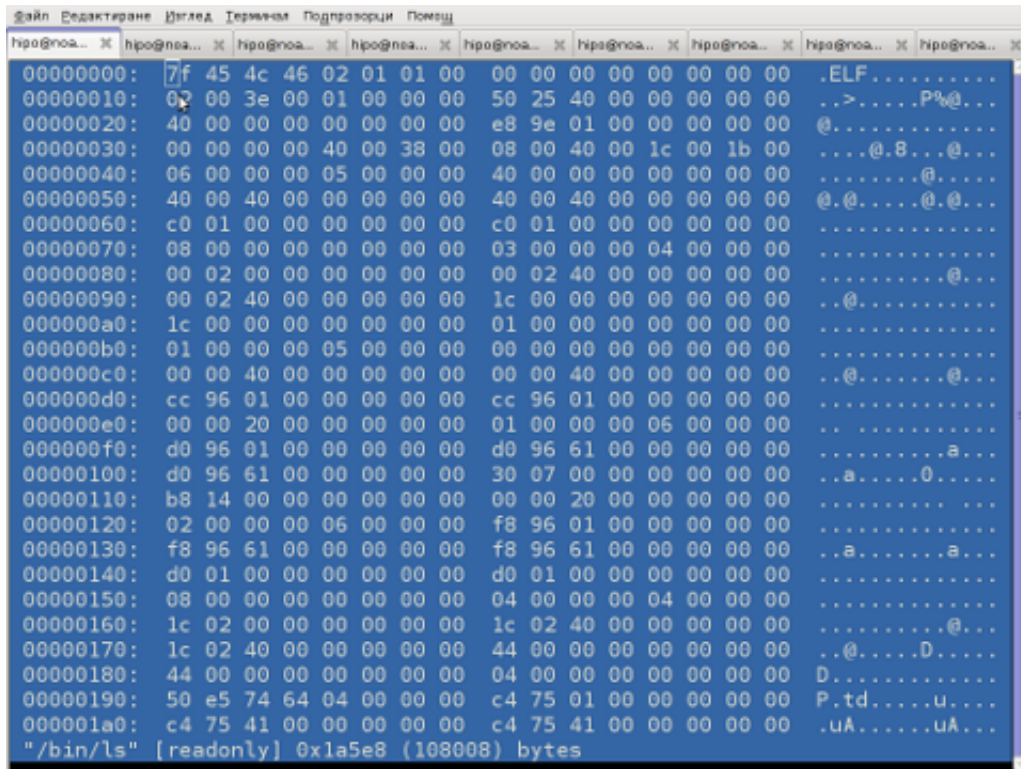
As I was looking through the available packages ready to install, I've tried **hexer**

```
debian:~# apt-get install --yes hexer
```

...

*hexer* does follow the same standard commands like VIM, e.g. *i* for insert, *a* for append etc.





It was interesting to find out *hexer* was written by a Bulgarian fellow **Petar Penchev** :)  
(Proud to be Bulgarian)

<http://people.freebsd.org/~roam/> - Petar Penchev has his own page on FreeBSD.org

As a vim user I really liked the idea, the only thing I didn't liked is *there is no easy way to just substitute a string within the binary with another string*.

### 5. *hexcurses* another ncurses library based hex editor

On Deb install and run via:

```
debian:~# apt-get --yes install hexcurses
debian:~# hexcurses /usr/bin/mc
```



*hexcurse* is also available on FreeBSD to install it use cmd:

```
freebsd# cd /usr/ports/editors/hexcurse
freebsd# make install clean
....
```

To access the editor functions press CTRL+the first letter of the word in the bottom menu, CTRL+H, CTRL+S etc.

Something I disliked about it is the program search is always in hex, so I cannot look for a text string within the binaries with it.

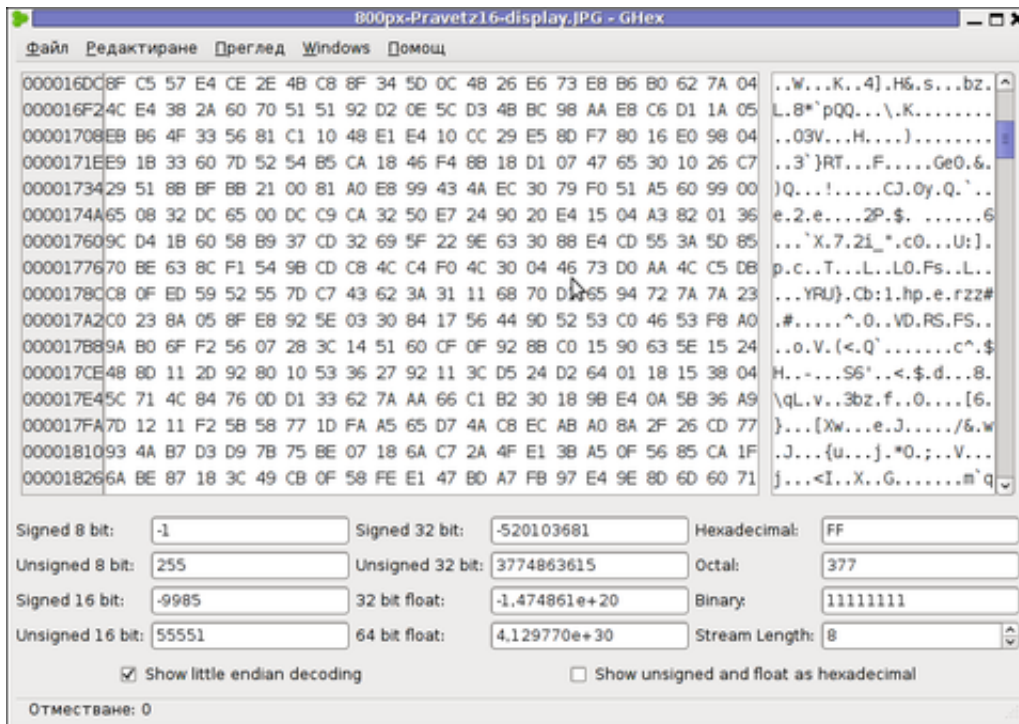
## 6. ghex - Editing binary files in graphical environment

If you're running a graphical environment, take a look at **ghex**. *ghex* is a gnome (graphical hex) editor. Installing *ghex* on Debian is with:

```
debian:~# apt-get --yes install ghex
....
```

To run *ghex* from terminal type:

```
debian:~# ghex2
```



To install ghex on FreeBSD (and I assume other BSDs), install via port:

```
freebsd# cd /usr/ports/editors/ghex
freebsd# make install clean
```

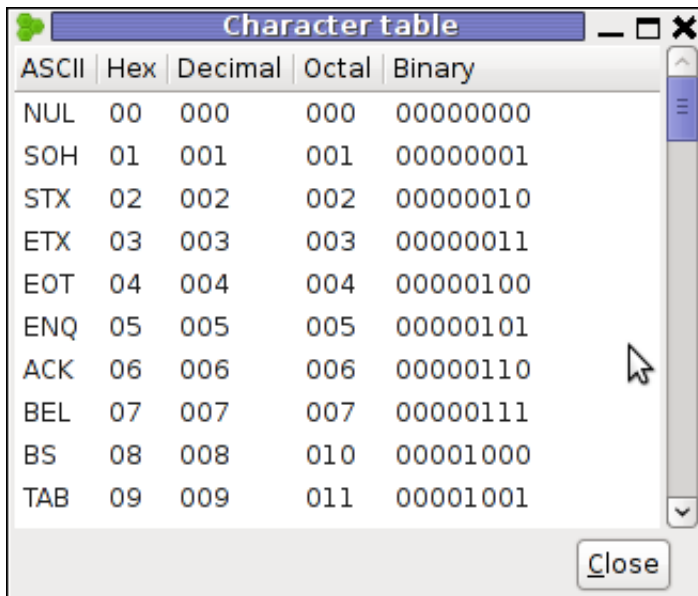
Gnome hex editor have plenty of tools, useful for developers to debug binary files.

Some nice tools one can find are under the the menus:

Windows -> Character Table

This will show a complete list of each keyboard sent character in *ASCII*, *Hex*, *Decimal*, *Octal* and *Binary*





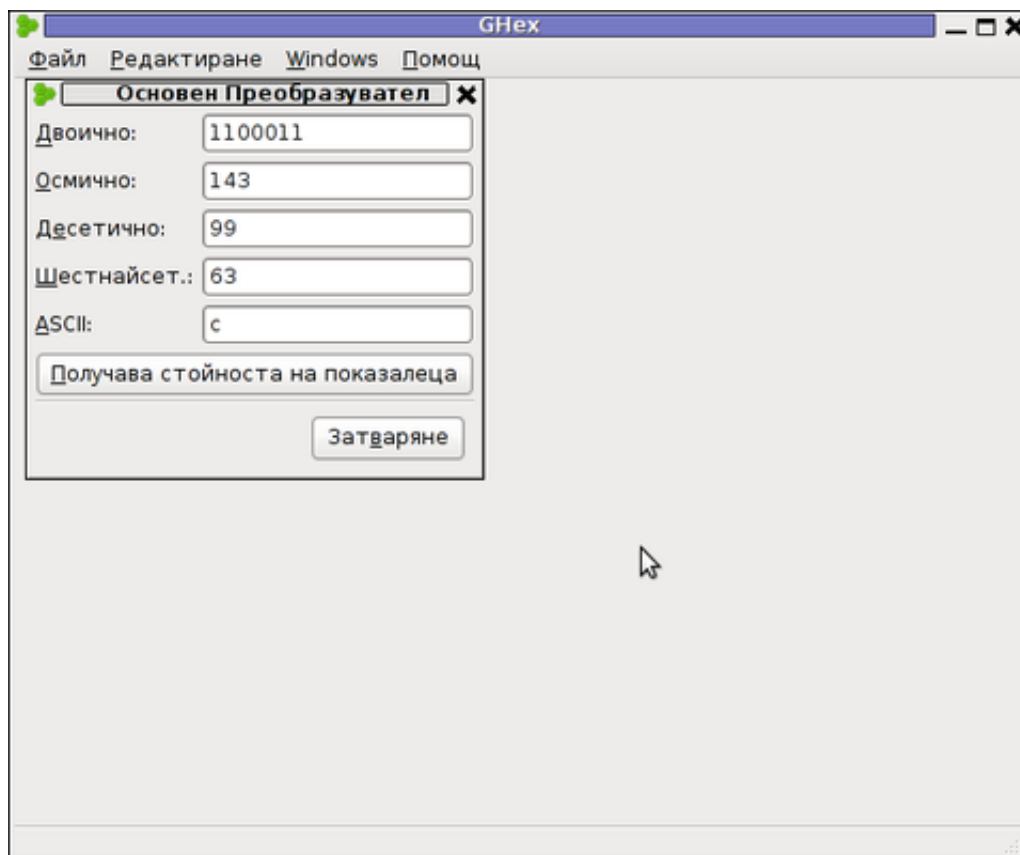
A screenshot of a 'Character table' window from the ghex application. The window has a title bar with a green icon and standard window controls. It contains a table with five columns: ASCII, Hex, Decimal, Octal, and Binary. The table lists characters from NUL to TAB. A mouse cursor is pointing at the row for 'ACK'.

ASCII	Hex	Decimal	Octal	Binary
NUL	00	000	000	00000000
SOH	01	001	001	00000001
STX	02	002	002	00000010
ETX	03	003	003	00000011
EOT	04	004	004	00000100
ENQ	05	005	005	00000101
ACK	06	006	006	00000110
BEL	07	007	007	00000111
BS	08	008	010	00001000
TAB	09	009	011	00001001

Close

Another useful embedded tool in *ghex* is:

Windows -> Type Conversion Dialog



Note that if you want to use the *Type Conversion Dialog tool* to find the representing binary values of a

text string you will have to type in the letters one by one and save the output within a text file and later you can go and use the same editor to edit the text string within the binary file you like.

I'm not a programmer but surely for programmers or people who want to learn some binary counting, this 2 ghex edmebbed tools are surely valuable.

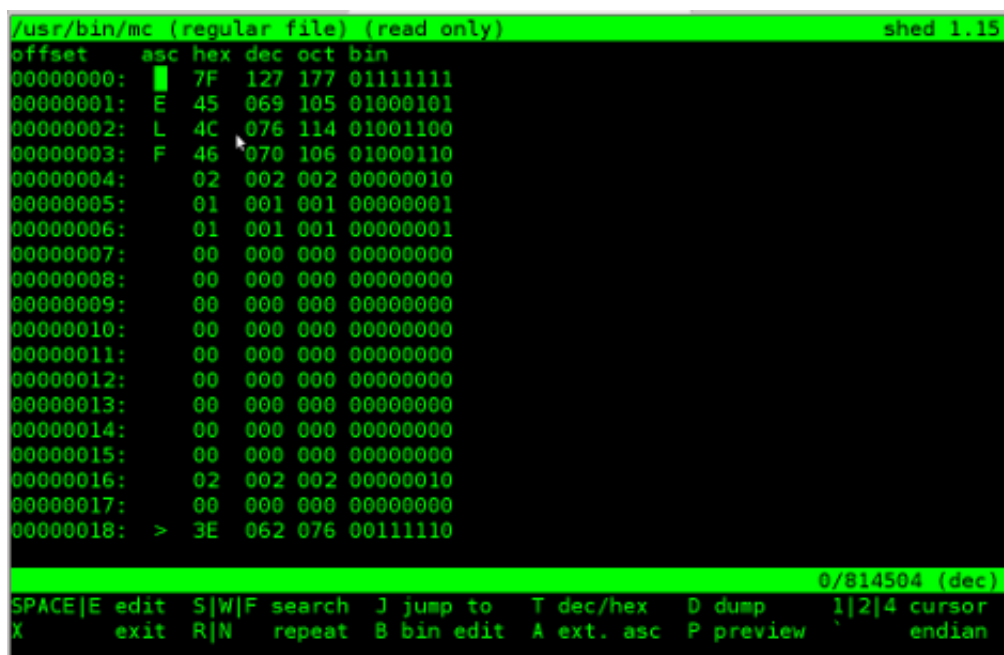
To conclude even though there are plenty of softwares for hex editing in Linux and BSD, none of them is not so easy to use as the old DOS hexdedit tool, maybe it will be a nice idea if someone actually rewrites the DOS tool and they package it for various free operating systems, I'm sure many people will find it helpful to have a 1:1 equivalent to the DOS tool.

### 7. Shed pico like interfaced hex editor

For people, who use **pico / nano** as a default text editor in Linux *shed* will probably be the editor of choice as it follows the command shortcuts of *pico*. On Deb based distros to install it run:

```
debian:~# apt-get install --yes shed
```

...



```
/usr/bin/mc (regular file) (read only) shed 1.15
offset  asc hex dec oct bin
00000000:  7F 127 177 01111111
00000001:  E 45 069 105 01000101
00000002:  L 4C 076 114 01001100
00000003:  F 46 070 106 01000110
00000004:  02 002 002 00000010
00000005:  01 001 001 00000001
00000006:  01 001 001 00000001
00000007:  00 000 000 00000000
00000008:  00 000 000 00000000
00000009:  00 000 000 00000000
00000010:  00 000 000 00000000
00000011:  00 000 000 00000000
00000012:  00 000 000 00000000
00000013:  00 000 000 00000000
00000014:  00 000 000 00000000
00000015:  00 000 000 00000000
00000016:  02 002 002 00000010
00000017:  00 000 000 00000000
00000018:  > 3E 062 076 00111110

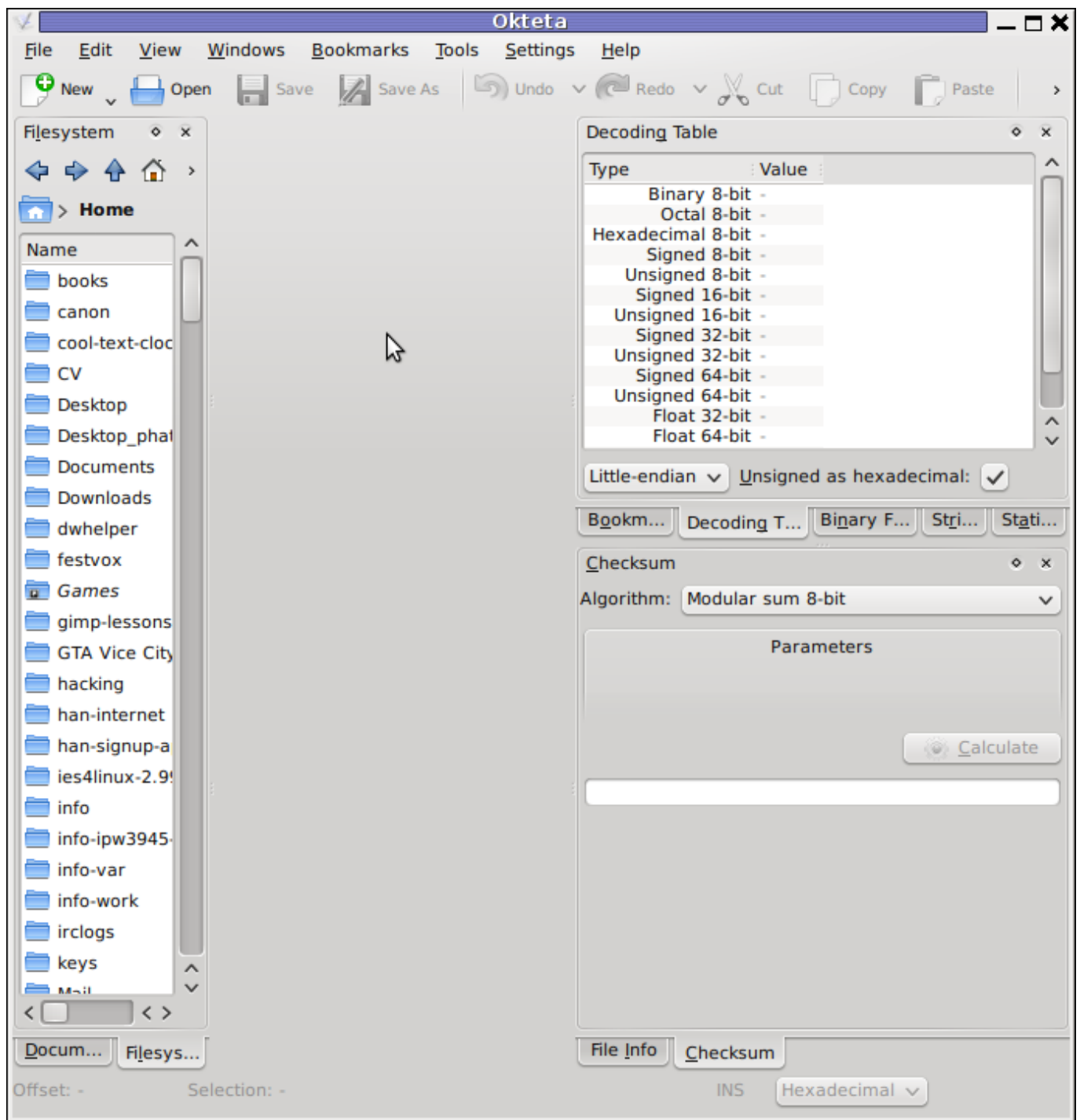
0/814504 (dec)
SPACE|E edit S|W|F search J jump to T dec/hex D dump 1|2|4 cursor
X      exit R|N  repeat B bin edit A ext. asc P preview `  endian
```

*Shed* has no BSD port as of time of writing.

### 8. Okteta a KDE GUI hex editor

For KDE users, I found a program called **okteta**. It is available for Deb based Linuxes as deb to install it:

```
debian:~# apt-get --yes install okteta
```



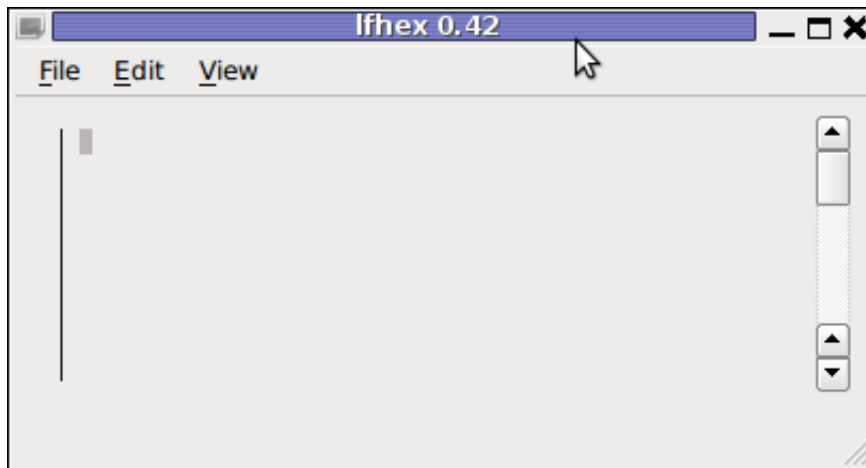
As of time of writing this article there is no **okteta** port for BSDs.

*Okteta* has plenty of functions and even has more of a functions than **ghexedit**. Something distinctive for it is it supports opening multiple files in tabs.

### 9. Ifhex a large file text editor

**Ifhex** is said to be a large (binary) file text editor, I have not tested it myself but just run it to see how it looks like. I don't have a need to edit large binary files too, but I guess there are people with such

requirements too :)



To install *lfhex* on Debian:

```
debian:~# apt-get install --yes lfhex
```

*lfhex* has also a FreeBSD port installable via:

```
freebsd# cd /usr/ports/editors/lfhex  
freebsd# make install clean
```

## 10. Bless a GUI tool for editing large hex (binary) files

Here is the description directly taken from the BSD port `/usr/ports/editors/bless`

Bless is a binary (hex) editor, a program that enables you to edit files as a sequence of bytes. It is written in C# and uses the Gtk# bindings for the GTK+ toolkit.

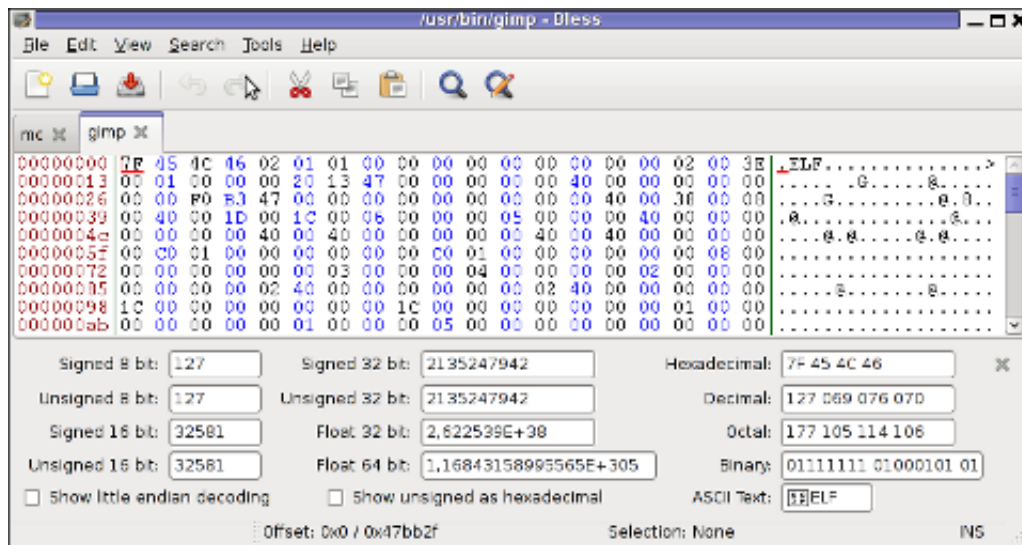
To install and use it on deb based Linuxes:

```
debian:~# apt-get install --yes bless  
....
```

On BSD installation is again from port:

```
freebsd# cd /usr/ports/editors/bless  
freebsd# make install clean  
....
```

Something that makes **bless**, maybe more desirable choice for GUI users than **ghex** is its availability of tabs. Opening multiple binaries in tabs will be useful only to few heavy debuggers.



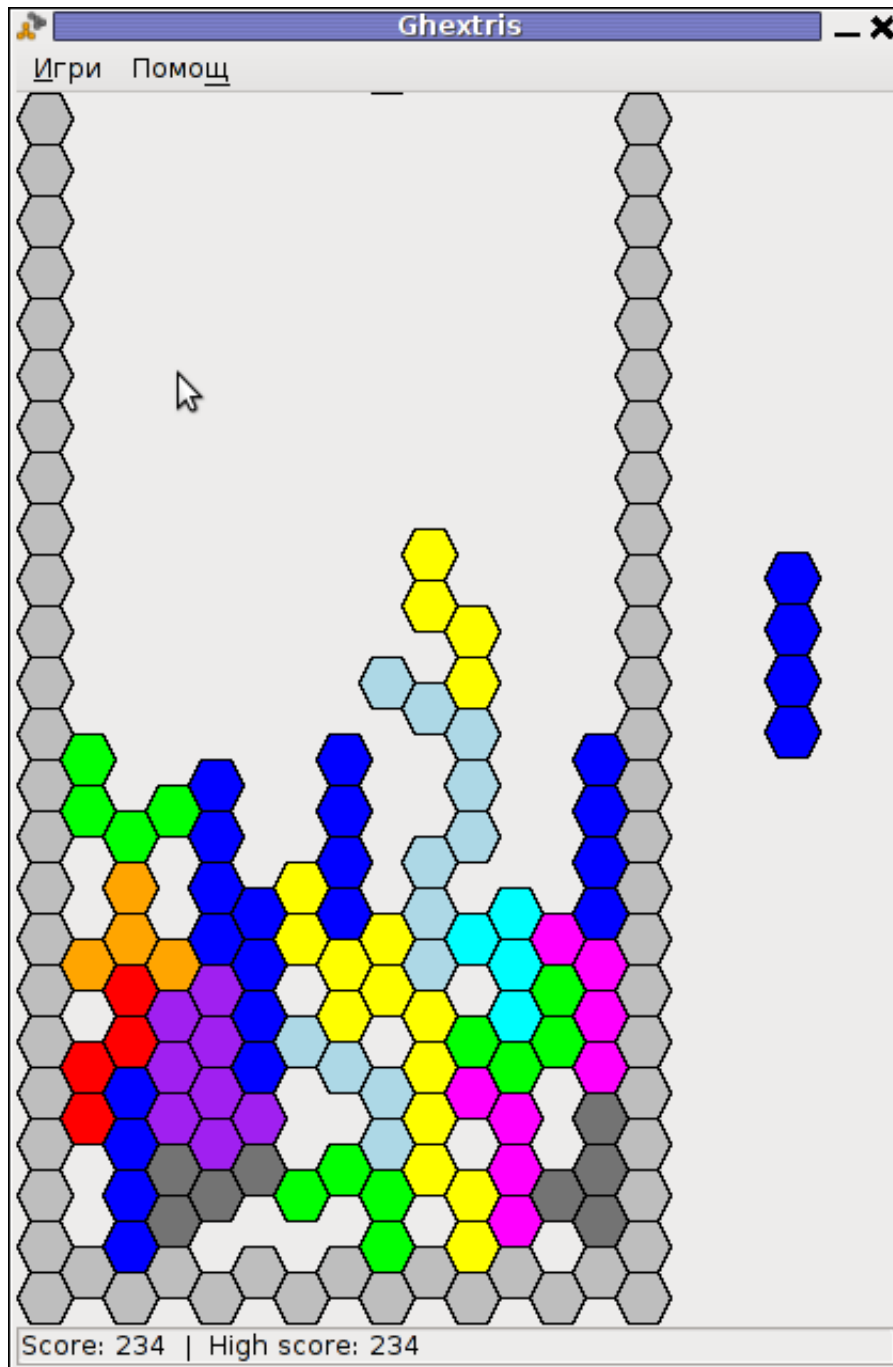
## 11. Ghextris - an ultra hard hacker tetris game :)

For absolute, hacker / (geeks), there is a tetris game called **ghextris**. The game is the hardest tetris game I ever played in my life. It requires more than regular IQ and a lot of practice if you want to become really good in this game.

To enjoy it:

```
debian:~# apt-get --yes install ghextris
```





Unfortunately there is no native port of ghextris for BSD (yet). Anyhow, it can be probably run using the Linux emulation or even compiled from source.

Well that's all I found for hexedit-ing, I'll be happy to hear if someone can give me some feedback on his favourite editor.