

Terminal Descriptions

for OpenBSD AMD/Intel consoles

In this article I would like to describe the results of my work of tuning OpenBSD consoles for AMD/Intel PCs. These results are also applicable to computers with the same hardware architecture (amd64 or i386, see <http://www.openbsd.org/plat.html>): servers, workstations, notebooks, etc.

What you will learn...

- important facts about ASCII terminals
- how to tune OpenBSD AMD/Intel consoles for comfortable work with mail and Midnight Commander

What you should know...

- what is OpenBSD
- how to install OpenBSD operating system
- how to use OpenBSD packages and ports

I often worked on OpenBSD AMD/Intel PC consoles and really did not have good support of navigation and function keys of a typical PC keyboard. Also I had some problems with colors/attributes (maybe they

were videoadapter dependent). These issues exist long time and cause much inconveniences if you often work at console (not in a graphical environment!).

Listing 1. Cyrillic support for AMD/Intel consoles

```
# cat /etc/kbdtype
ru
# cat /etc/rc.local
...
if [ -x /usr/sbin/wsconscfg -a -x /usr/sbin/wsfontload ]; then
    /usr/sbin/wsfontload -h 16 /usr/share/misc/pcvtfonts/koi8-r-8x16

    for CONSOLE in 2 3 ; do
        /usr/sbin/wsconscfg -d -F ${CONSOLE}
        /usr/sbin/wsconscfg -t 80x25bf -e vt100 ${CONSOLE}
    done

    /sbin/wsconscctl -w keyboard.map+="keycode 184 = Mode_Lock" >/dev/null
fi
...
#
```

Listing 2. *Terminal descriptions patch for AMD/Intel consoles*

Apply this patch by doing:

```
cd /usr/src
patch -p0 <OpenBSD_PC_console.patch
```

And then rebuild and install the terminal description

databases:

```
cd share/termtypes
make obj
make cleandir
make depend
make
make install
```

After that you can use these emulations **for** AMD/Intel PC consoles:

- pcccon0-m
- pcccon0
- pcccon-m
- pcccon

Also you can replace default "vt220" to "pcon" in /etc/
ttyps
for "console" & "ttyC*" entries.

```
=====
--- ./share/termtypes/termtypes.master.orig      Mon
                Nov 29 23:55:07 2010
+++ ./share/termtypes/termtypes.master Sun Aug 14 18:33:
                19 2011
@@ -1649,6 +1649,55 @@
qansi-w|QNX ansi for windows,
    xvpa, use=qansi-m,

+#### OpenBSD consoles
+#
+# From: Alexei Malinin <Alexei.Malinin@mail.ru>; July,
+                2011.
+#
+# The following terminal descriptions for the AMD/
+                Intel PC console
+# were prepared based on information contained in the
+                OpenBSD-4.9
+# termtypes.master and wscons(4) & vga(4) manuals
+                (2010, November).
+#
+pccon+keys|OpenBSD PC keyboard keys,
+    kbs=^H, kcan=^C, kclr=^L, kcub1=^E[D, kud1=^E[B,
```

```

kcufl=\E[C,
+ kcuul=\E[A, kdchl=\E[3~, kend=\E[8~, kent=^M, kfl=\E[11~,
+ kfl0=\E[21~, kfl1=\E[23~, kfl2=\E[24~, kf2=\E[12~,
+ kf3=\E[13~, kf4=\E[14~, kf5=\E[15~, kf6=\E[17~, kf7=\E[18~,
+ kf8=\E[19~, kf9=\E[20~, khome=\E[7~, kichl=\E[2~,
+ knp=\E[6~, kpp=\E[5~, krfr=^R, kspd=^Z,
+pccon+acs0|simple ASCII pseudographics for OpenBSD PC
console,
+ acsc=+>\,<-\^.\v0#'+a[:f\h#j+k+l+m+n+o~p-q-r-s_
t+u+v+w+x!|!}#~o,
+pccon+acs|default ASCII pseudographics for OpenBSD PC
console,
+ acsc=++\,<,\,--..00'!aaffgghhiijjkkllmmnnoopppqrrssttuu
vwvwxxyyzz{|||}~~,
+pccon+colors|ANSI colors for OpenBSD PC console,
+ bce,
+ op=\E[m$<2>, setab=\E[4%p1%dm$<2>,
+ setaf=\E[3%p1%dm$<2>,
+pccon+base|base capabilities for OpenBSD PC console,
+ am, km, mc5i, npc, nxon, xenl, xon,
+ cols#80, it#8, lines#24,
+ bel=^G, clear=\E[H\E[2J$<50>, cr=^M,
+ cup=\E[%i%p1%d;%p2%dH$<5>, ed=\E[J$<50>, el=\E[K$<3>,
+ ell=\E[1K$<3>, enacs=\E(B\E)0, home=\E[H$<5>, ht=^I,
+ ind=^J, nel=^EE$<2>, rev=\E[7m$<2>, ri=\EM$<5>, rmacs=^O,
+ rmso=\E[m$<2>, rs2=\Ec$<50>,
+ sgr=\E[m$<2>?%p1%p3%|t\E[7m$<2>;?%p9%t\016e\017;;,
+ sgr0=\E[m$<2>\017, smacs=^N, smso=\E[7m$<2>,
+pccon0-m|OpenBSD PC console without colors & with
simple ASCII pseudographics,
+ use=pccon+base,
+ use=pccon+acs0,
+ use=pccon+keys,
+pccon0|OpenBSD PC console with simple ASCII pseudographics,
+ use=pccon0-m,
+ use=pccon+colors,
+pccon-m|OpenBSD PC console without colors,
+ use=pccon+base,
+ use=pccon+acs,
+ use=pccon+keys,
+pccon|OpenBSD PC console,
+ use=pccon-m,
+ use=pccon+colors,
+
#### NetBSD consoles
#
# pcvt termcap database entries (corresponding to release 3.31)

```

Note

Commands and options discussed in this article refer to the latest version of OpenBSD – 4.9.

Let us look at my typical work environment:

- an AMD/Intel PC with VGA display,
- PC keyboard (usually 104-key with cyrillic letters),
- `vt220` default console terminal type,
- cyrillic support for the 2 and 3 consoles (`Ctrl+Alt+F3` and `Ctrl+Alt+F4`), fragments for configuration files (in my `/etc` catalog) which differ from defaults are on Listing 1.

Note

Useful links about OpenBSD cyrillization:

- <http://www.obsd.ru/8/?q=node/1172>
- <http://www.openbsd.ru/docs/howto-cyrillic.html>
- <http://www.openbsd.org/faq/faq7.html>

The console environment described above is suitable for mail and Midnight Commander but not all navigation and function keys work as expected, some color/attribute issues are annoying.

Note

Midnight Commander (<http://www.midnight-commander.org/>) is a handy full-screen file manager but it is not in the base OpenBSD distribution. It can be installed from packages or ports (`ports/misc/mc`), see <http://www.openbsd.org/faq/faq15.html>.

Before delving into details of tuning the console let us recall how full-screen applications interact with ASCII (or alphanumeric) terminals. These applications typically use high-level screen management library. In turn this library uses a terminal descriptions database for performing high-level screen management functions (cursor movement, setting colors, etc). The most famous screen management library for ASCII terminals is `curses` which uses one of the two terminal descriptions databases: `termcap` or `terminfo`. These terminal description databases make `curses` terminal independent, and the terminal independence is the foundation of `curses`. `termcap` and `terminfo` are the mechanisms by which UNIX systems support hundreds of varieties of ASCII terminals without the need for special drivers for each terminal. Most of the capabilities in `termcap` and `terminfo` are identical except in name.

Listing 3. Tuning display resolutions for AMD/Intel consoles

```
...
if [ -x /usr/sbin/wsconscfg -a -x /usr/sbin/wsfontload ]; then
    /usr/sbin/wsfontload -h 8 /usr/share/misc/pcvtfonts/koi8-r-8x08
...

and

...
if [ -x /usr/sbin/wsconscfg -a -x /usr/sbin/wsfontload ]; then
    /usr/sbin/wsfontload -h 10 /usr/share/misc/pcvtfonts/koi8-r-8x10
...

and

...
if [ -x /usr/sbin/wsconscfg -a -x /usr/sbin/wsfontload ]; then
    /usr/sbin/wsfontload -h 16 /usr/share/misc/pcvtfonts/koi8-r-8x16
...

```

Note

Important OpenBSD manual pages about ASCII terminals:

- `ttys` (5) – terminal initialization information
- `wsconscfg` (8) – configure virtual terminals on a `wscons` display
- `wscons` (4) – console access
- `vga` (4) – VGA graphics driver for `wscons`
- `stty` (1) – set the options for a terminal device interface
- `tset` (1) – terminal initialization
- `tput` (1) – terminal capability interface
- `termcap` (5) – terminal capability database
- `terminfo` (5) – terminal capability database

So, the problem to be solved is that `vt220` terminal type is not well suited for the AMD/Intel PC console.

What could I do?.. In the OpenBSD terminal descriptions database (I used the text version of `termcap` – `/usr/share/misc/termcap`) I found descriptions for NetBSD, FreeBSD, Linux (and for many others operating systems) consoles but nothing suitable for the OpenBSD AMD/Intel PC console! So the only solution would be to prepare a complete and correct terminal description for this console... I read OpenBSD manual pages and many others information sources that might be relevant to ASCII terminals, `curses`, `vt100`, `vt220`, `xterm`, `ANSI`, etc...

Note

The best source of information I ever read is the book “termcap & terminfo” published by O’Reilly in 1988 (<http://oreilly.com/catalog/9780937175224/>).

At last I prepared several terminal descriptions for the AMD/Intel PC console. The patch against OpenBSD-4.9 sources is on Listing 2. Do not forget to read the comments at the beginning of the patch!

Note

This patch can be downloaded from here: http://am1225.narod.ru/software/OpenBSD_PC_console.patch.

Note

The OpenBSD FAQ describes how to build the operating system from sources: <http://www.openbsd.org/faq/faq5.html>.

After patching OpenBSD it will be possible to use several terminal types for AMD/Intel consoles:

- `pccon` is suitable for color display with 80x25 resolution,

- `pccon-m` is suitable for black and white display with 80x25 resolution,
- `pccon0` is suitable for color display with 80x40 and 80x50 resolutions,
- `pccon0-m` is suitable for black and white display with 80x40 and 80x50 resolutions.

There are no pseudographics for 80x40 and 80x50 display resolutions, so I prepared separate terminal descriptions `pccon0` and `pccon0-m` for these cases.

Note

To set up resolutions it is necessary to use the appropriate font:

- `/usr/share/misc/pcvtfonts/koi8-r-8x08` for 80x50 resolution,
- `/usr/share/misc/pcvtfonts/koi8-r-8x10` for 80x40 resolution,
- `/usr/share/misc/pcvtfonts/koi8-r-8x16` for 80x25 resolution.

The appropriate fragments of `/etc/rc.local` are on Listing 3.

Note

To eliminate some color/attribute issues I usually run Midnight Commander as follows:

```
# mc -c --colors errdhotnormal=black,lightgray:menuhotsel=
lightgray,black
```

That is all I have to tell about my work. Also I hope that the OpenBSD developers will find these terminal descriptions helpful and include them into the base OpenBSD distribution as the default configuration for the AMD/Intel console.

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