

The Hebrew HOWTO

Table of Contents

<u>The Hebrew HOWTO</u>	1
Maintained by Yair G. Rajwan, <tt>yair@hobbes.jct.ac.il</tt>.....	1
<u>1. Introduction</u>	1
1.1 Changes.....	1
1.2 Thanks.....	1
<u>2. Standards for representation of Hebrew characters</u>	2
2.1 ASCII.....	2
2.2 DOS Hebrew.....	2
2.3 ISO Hebrew.....	2
2.4 OLD PC Hebrew.....	2
2.5 Conversions.....	2
<u>3. Virtual Consoles (VCs)</u>	2
<u>4. X Windows setup - XFree86 3.1</u>	3
4.1 Hebrew fonts.....	3
4.2 Installing fonts.....	3
4.3 Making an X application to use Hebrew fonts.....	4
Xterm.....	4
Netscape.....	4
4.4 Mapping the keyboard.....	4
4.5 Integrating all the above, examples.....	7
<u>5. Shells setup</u>	8
5.1 bash.....	8
5.2 tcsh.....	8
<u>6. Applications</u>	8
6.1 Vim.....	8
6.2 Hebrew pine and pico.....	8
6.3 Some emacs Hebrew ports.....	8
6.4 Dosemu.....	9
6.5 XHTerm.....	9
6.6 TeX--XeT - Hebrew Tex.....	9
<u>7. Printer setup</u>	9
<u>8. Commercial products</u>	10
8.1 El-Mar software.....	10
<u>9. Hebrew around the Internet</u>	10
9.1 WWW.....	10
9.2 Gopher.....	11
9.3 Ftp.....	11

The Hebrew HOWTO

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v0.4, 12 September 1995

This 'Frequently Asked Questions' (FAQ) / HOWTO document describes how to configure your Linux machine to use Hebrew characters on X-Windows and Virtual Consoles. The most up-to-date version of the Hebrew-HOWTO may be obtained from [my Web page](#) or from [`<tt>ftp://hobbes.jct.ac.il</tt>`](ftp://hobbes.jct.ac.il).

1. Introduction

Any language setup, other than the original American English, has two issues:

1. Displaying the right characters (fonts) - for Hebrew it's ISO-8859-8 standard.
2. Mapping the keyboard.

There is much more to Hebrew than that (like right to left, geometry in X-Windows, etc), but this HOWTO (at least for the first draft) deals only with the basic issues.

More information can be found in the various "national" HOWTOs (German, Danish, etc.) and in the ISO 8859-1 HOWTO (<ftp://ftp.vlsivie.tuwien.ac.at/pub/8bit> FAQ-ISO-8859-1).

1.1 Changes.

- FIRST DRAFT to 0.2.

Most of this file is taken from the first draft by Vlad Moseanu.

- 0.2 to 0.3Beta.

Added excerpts from documents from the archive e-brew.zip from <ftp://ftp.jer1.co.il/pub/software/msdos/communication>, and some bug fixes with the help of JCT Linux-il group members.

- 0.3Beta to 0.4.

After the first release of the Hebrew-HOWTO to the Linux-il it contain all the E-mail send to me regarding spelling/grammer and Tex-Xet, Mule and Vim info.

1.2 Thanks

This HOWTO prepared by the help of all the group: Linux-il - 'The Israeli Linux users group' and especially by:

The Linux-il group (Linux-il@hagiga.jct.ac.il)

Vlad Moseanu (vlad@actcom.co.il)

Gili Granot (gil@csc.cs.technion.ac.il)

Harvey J. Stein (hjstein@math.huji.ac.il)

Dovie Adler (dadler@hobbes.jct.ac.il)

Gavrie Philipson (gavrie@shekel.jct.ac.il)

2. Standards for representation of Hebrew characters

2.1 ASCII

To make one thing clear, for once and forever: There is no such thing as 8-bit ASCII. ASCII is only 7 bits. Any 8-bit code is not ASCII, but that doesn't mean it's not standard. ISO-8859-8 is standard, but not ASCII. Thanks!

2.2 DOS Hebrew

The Hebrew encoding starts at 128d for Aleph. Therefore, encoding requires 8 bits. This is what you have on the Video card EPROM hardware fonts, all of the Hebrew DOS based editors use this table (Qtext, HED, etc.).

2.3 ISO Hebrew

The Hebrew encoding starts at 224 for Aleph. This is the Internet standard, international standard and basically the standard for Ms-Windows and for Macintoshes (Dagesh, etc...).

2.4 OLD PC Hebrew

This is 7-bit, and obsolete, as it occupies essentially the same ASCII range as English lowercase letters. So, it is best avoided. However, when ISO Hebrew gets its eighth bit stripped off by some ignorant Unix mail program (so you get a jumble of English letters for the Hebrew part of your message and the regular English, reversed or not, mixed in), you will get this, and will need to transform it to PC or ISO. If there was English mixed in with the Hebrew, this will be a sad situation, as you will either get Hebrew plus jumble, or English plus jumble...

2.5 Conversions

Here are some simple scripts to convert from each standard to the other:

```
DOS - ISO:      tr '\200-\232' '\340-\372' < {dos_file} > {iso_file}
ISO - DOS:      tr '\340-\372' '\200-\232' < {iso_file} > {dos_file}
OLD - DOS:      tr -z '\200-\232' < {old_Hebrew_file} > {dos_file}
```

NOTE: The numbers use by `tr` are in octal!

3. Virtual Consoles (VCs)

Every distribution of Slackware comes with `kbd`; the package is called `keytbls` under Slackware (a4 in 2.3.0 -

The Hebrew HOWTO

kbd 0.90). Joel Hoffman has contributed Hebrew fonts and keymaps from his original codepage.tar.Z file. Look under /usr/lib/kbd for iso08.* files. It follows ISO 8859-8 and the Hebrew keytables and maps.

Put the following lines in /etc/rc.d/rc.local:

```
-----
#!/bin/sh
#       Put any local setup commands in here
#
INITTY=/dev/tty[1-6]
PATH=/sbin:/etc:/bin:/usr/sbin:/usr/bin
#
#       kbd - Set the console font and keyboard
#       set numlock and set metabit mode on tty1 .. tty8
for tty in $INITTY
do
#       setleds -D +num < $tty > /dev/null
#       setmetamode metabit < $tty > /dev/null

done
#       Latin8(Hebrew) keyboard/console
setfont iso08.f16
mapscrn trivial
loadkeys Hebrew
#       enable mapping
for tty in $INITTY
do
#       echo -n -e "\\033(K" >$tty

done
-----
```

NOTE: If you are using X Windows be careful with "setleds", it may hang the X server.

The above setup works fine with the Hebrew version of pico (pine) and displays correctly ISO 8859-8 Hebrew (X Windows, MS Windows).

4. X Windows setup - XFree86 3.1

4.1 Hebrew fonts.

XFree86 3.1 comes with two Hebrew fonts: heb6x13, heb8x13. Additional Hebrew fonts can be found on the Net:

- The web Type1 fonts (Helvetica/David style (proportional) and Courier/Shalom Stick style (fixed space)) from the snunit-project archive at <ftp://snunit.huji.ac.il/pub/fonts/>, it's good for netscape Hebrew pages.
- Avner Lottem, (lottem@techunix.technion.ac.il) put some Hebrew-ISO 8859-8 fonts on archive at <ftp://sunsite.unc.edu/pub/Linux/X11/fonts/hebxfonts-0.1.tgz>, it has a font that's good for dosemu under X-Windows (read his README file).

4.2 Installing fonts

- Fonts exaptable: pcf (Portable Compiled Format), bdf (Bitmap Distribution Format), pfb (Type1 fonts).

The Hebrew HOWTO

- Move the fonts to some existing directory (/usr/lib/X11/fonts/misc) or create a new one (/usr/lib/X11/fonts/Hebrew). `compress` (to *.Z) the fonts to save space (NOT GZIP!!!).
- Run the `mkfontdir` to create/re-create the `fonts.dir` and edit `fonts.alias` (optional) to define new aliases.
- For Type1 fonts, `mkfontdir` does nothing. You have to add these fonts to `fonts.dir` manually.
- Make sure that the directory is in the X server path. Edit the `XF86Config` and add the appropriate path -- `FontPath "/usr/X11R6/lib/X11/fonts/..."`.

4.3 Making an X application to use Hebrew fonts.

In short you need to set the appropriate resource.

Xterm

Put the following line in the `$HOME/.Xresources`:

```
xterm*font: heb8x13
```

or simply start `xterm` with `xterm -fn heb8x13` The above font is way too small, so search for a better one ... See the comments/examples on starting X11.

Netscape

Usaly you can use the hebrew fonts from [snunit - webfonts](#). Install it [as described](#), and then put the next defaults in your local `.xdefaults` or in the `app-defaults/Netscape`.

```
-----
*documentFonts.latin1.variable.italic*slant:      r
*documentFonts.latin1.variable.boldItalic*slant:  r
*documentFonts.latin1.variable*family:            web
*documentFonts.latin1.fixed*family:               webmono
*documentFonts.latin1*registry:                   iso8859
*documentFonts.latin1*encoding:                   8
-----
```

In general you can put any fonts insted of the webfonts files as long as its supported by X11 [as described](#).

4.4 Mapping the keyboard.

For some reason the X server doesn't inherit the keymap from the previous paragraph, and anyway I would like to define ALT Left and ALT Right and Scroll Lock. When pressing ALT together with some key it will generate a Hebrew character, Scroll Lock will lock in Hebrew mode.

To do that we need to use `xmodmap`. Following is a `Xmodmap` which also corrects the bugs with the "Num Lock":

```
-----
! Hebrew key mapping for XFree86 (for US/Hebrew keyboards).
! By Vlad Moseanu
!
keysym Alt_L = Mode_switch
keysym Alt_R = Mode_switch
-----
```

The Hebrew HOWTO

```
!clear Mod1
clear Mod2
!add Mod1 = Alt_L
add Mod2 = Mode_switch
!
! Set the mapping for each key
!
keycode 8 =
keycode 9 = Escape
keycode 10 = 1 exclam
keycode 11 = 2 at
keycode 12 = 3 numbersign
keycode 13 = 4 dollar
keycode 14 = 5 percent
keycode 15 = 6 asciicircum
keycode 16 = 7 ampersand
keycode 17 = 8 asterisk
keycode 18 = 9 parenleft
keycode 19 = 0 parenright
keycode 20 = minus underscore
keycode 21 = equal plus
keycode 22 = Delete
keycode 23 = Tab
keycode 24 = q Q slash Q
keycode 25 = w W apostrophe W
keycode 26 = e E 0x00f7 E
keycode 27 = r R 0x00f8 R
keycode 28 = t T 0x00e0 T
keycode 29 = y Y 0x00e8 Y
keycode 30 = u U 0x00e5 U
keycode 31 = i I 0x00ef I
keycode 32 = o O 0x00ed O
keycode 33 = p P 0x00f4 P
keycode 34 = bracketleft braceleft
keycode 35 = bracketright braceright
keycode 36 = Return
keycode 37 = Control_L
keycode 38 = a A 0x00f9 A
keycode 39 = s S 0x00e3 S
keycode 40 = d D 0x00e2 D
keycode 41 = f F 0x00eb F
keycode 42 = g G 0x00f2 G
keycode 43 = h H 0x00e9 H
keycode 44 = j J 0x00e7 J
keycode 45 = k K 0x00ec K
keycode 46 = l L 0x00ea L
keycode 47 = semicolon colon 0x00f3 colon
keycode 48 = apostrophe quotedbl comma quotedbl
keycode 49 = grave asciitilde semicolon asciitilde
keycode 50 = Shift_L
keycode 51 = backslash bar
keycode 52 = z Z 0x00e6 Z
keycode 53 = x X 0x00f1 X
keycode 54 = c C 0x00e1 C
keycode 55 = v V 0x00e4 V
keycode 56 = b B 0x00f0 B
keycode 57 = n N 0x00ee N
keycode 58 = m M 0x00f6 M
keycode 59 = comma less 0x00fa less
keycode 60 = period greater 0x00f5 greater
keycode 61 = slash question period question
keycode 62 = Shift_R
```

The Hebrew HOWTO

```
keycode 63 = KP_Multiply
!keycode 64 = Alt_L Meta_L
keycode 65 = space
keycode 66 = Caps_Lock
keycode 67 = F1
keycode 68 = F2
keycode 69 = F3
keycode 70 = F4
keycode 71 = F5
keycode 72 = F6
keycode 73 = F7
keycode 74 = F8
keycode 75 = Escape
keycode 76 = F10
keycode 77 = Num_Lock
keycode 78 = Scroll_Lock
keycode 79 = KP_7
keycode 80 = KP_8
keycode 81 = KP_9
keycode 82 = KP_Subtract
keycode 83 = KP_4
keycode 84 = KP_5
keycode 85 = KP_6
keycode 86 = KP_Add
keycode 87 = KP_1
keycode 88 = KP_2
keycode 89 = KP_3
keycode 90 = KP_0
keycode 91 = KP_Decimal
keycode 92 = Sys_Req
keycode 93 =
keycode 94 =
keycode 95 = F11
keycode 96 = F12
keycode 97 = Home
keycode 98 = Up
keycode 99 = Prior
keycode 100 = Left
keycode 101 = Begin
keycode 102 = Right
keycode 103 = End
keycode 104 = Down
keycode 105 = Next
keycode 106 = Insert
keycode 107 = Delete
keycode 108 = KP_Enter
keycode 109 = Control_R
keycode 110 = Pause
keycode 111 = Print
keycode 112 = KP_Divide
!keycode 113 = Alt_R Meta_R
keycode 114 = Break
!
! This xmodmap file can be use to set the correct numerical keypad mapping
! when "ServerNumLock" is set in the XF86Config file. In this case the
! Xserver takes care of the Num Lock processing.
!
!
keycode 136 = KP_7
keycode 137 = KP_8
keycode 138 = KP_9
keycode 139 = KP_4
```


The Hebrew HOWTO

```
keycode 140 = KP_5
keycode 141 = KP_6
keycode 142 = KP_1
keycode 143 = KP_2
keycode 144 = KP_3
keycode 145 = KP_0
keycode 146 = KP_Decimal
keycode 147 = Home
keycode 148 = Up
keycode 149 = Prior
keycode 150 = Left
keycode 151 = Begin
keycode 152 = Right
keycode 153 = End
keycode 154 = Down
keycode 155 = Next
keycode 156 = Insert
keycode 157 = Delete
-----
```

To use the Xmodmap above define "Scroll-Lock Mode-Lock" in the XF86Config.

4.5 Integrating all the above, examples.

If you are using xdm a \$HOME/.xsession should look like the following:

```
-----
#!/bin/sh
# $XConsortium: Xsession,v 1.9 92/08/29 16:24:57 gildea Exp $
#
# General defs
#
export OPENWINHOME=/usr/openwin
export MANPATH=/usr/local/man:/usr/man/preformat:/usr/man:/usr/X11R6/man
#export HOSTNAME=`cat /etc/HOSTNAME`
export PATH="/bin: /usr/bin: /usr/X11/bin: /usr/X386/bin: /usr/TeX/bini: /usr/local/
LESS=-MM
if [ -z $XAPPLRESDIR ]; then
    XAPPLRESDIR=/usr/lib/X11/app-defaults:/usr/local/lib/X11/app-defaults
else
    XAPPLRESDIR=$XAPPLRESDIR:/usr/lib/X11/app-defaults
fi
export XAPPLRESDIR
#
sysresources=/usr/lib/X11/Xresources
sysmodmap=/usr/lib/X11/Xmodmap
resources=$HOME/.Xresources
xmodmap=$HOME/.Xmodmap
if [ -f $sysresources ]; then
    xrdp -merge $sysresources
fi
if [ -f $sysmodmap ]; then
    xmodmap $sysmodmap
fi
if [ -f $resources ]; then
    xrdp -merge $resources
fi
if [ -f $xmodmap ]; then
    xmodmap $xmodmap
fi
-----
```

The Hebrew HOWTO

```
#
# Start applications
#
# xterm -ls -sb &
xhost +                # look out !!!
exec fvwm
-----
```

If you prefer `startx` use the above as an example for `.xinitrc`.

5. Shells setup.

For more details read the [ISO 8859-1 HOWTO](#).

5.1 bash

Create a `$HOME/.inputrc` contain the following:

```
-----
set meta-flag On
set convert-meta Off
set output-meta On
-----
```

5.2 tcsh

Define the following in the `$HOME/.login` or `/etc/csh.login`: `setenv LANG iw_IL.ISO8859-8` (or `iw_IL`)
Actually because the binary version of `tcsh` is compiled without `nls` the `LANG` can be set to anything and it will still work (no need for `/usr/lib/nls...`). The `lang.` name also shows my Digital bias ...

6. Applications

6.1 Vim

- The Vim is a Vi IMproved editor with some enhanced commands and the hebrew support was made by Dov Grobgeld (HED developer).
- Another Vim patch announced by Avner Lottem, lottem@techunix.technion.ac.il and can be obtained from <ftp://sunsite.unc.edu/pub/Linux/apps/editors/vi/vim3.0-rlh0.1.tgz>.
- For more info, you can look at <http://www.cs.technion.ac.il/~gil/var.html>

6.2 Hebrew pine and pico

The pine and it's additional editor pico had been changed by Helen Zommer from CC-huji and has a bug-report mail: pineh-bug@horizon.cc.huji.ac.il. It can be down-loaded from <ftp://horizon.cc.huji.ac.il/pub>.

6.3 Some emacs Hebrew ports.

- Hebrew package by Joseph Friedman. It includes some Hebrew fonts in BDF format, patch for emacs 18.58 and an elisp package. It is fine, but nobody uses emacs 18.* anymore. It can be obtained from:

<ftp://archive.cis.ohio-state.edu/pub/gnu/emacs/elisp-archive/misc/Hebrew.tar.Z>.

- A very simple Hebrew package. Includes only right-to-left cursor movement support and right-to-left sorting. Works without any patches with FSF emacs 19. Can be obtained from <ftp://archive.cis.ohio-state.edu/pub/gnu/emacs/elisp-archive/misc/Hebrew.el.Z>.
- One of emacs branches - MULE (Multi Lingual Emacs) Supports a lot of languages including Hebrew. It compiles and runs under Linux with no problem. It is full Emacs, with Hebrew support and double-direction handling. It can be obtained from: <ftp://kelim.jct.ac.il/pub/Hebrew>

6.4 Dosemu

For a VC dosemu you can use your Hebrew from the Video card EPROM, and if you don't have it there are plenty of Hebrew dos fonts from EGA support to the VGA Hebrew support.

For X-Windows support you should download the file:

<ftp://sunsite.unc.edu/pub/Linux/X11/fonts/hebxfonts-0.1.tgz> it's contain some fonts include one called vgah.pcf that you should install it on your fonts directory as describe above the fonts are:

6.5 XHTerm

There is a main port of the regular X-Term program for use with a Hebrew fonts - XHTerm = xterm + Hebrew support. The port for a sun machine was made available by the help of Danny [<tt>danny@cs.huji.ac.il</tt>](mailto:danny@cs.huji.ac.il).

Evgeny has some patch for use this port under Linux. His version should come with a pre-compiled XHTerm for both X11R5 and X11R6. You should use xhterm with the option `-fn` and a Hebrew font as described!

Danny's port (for SUN) can be obtained from: <ftp://ftp.huji.ac.il/pub/local/xhterm> and the patched version of Evgeny Stambulchik is on: <ftp://plasma-gate.weizmann.ac.il/pub/software/linux> Get it from there and you'll get 5 fonts with it: [heb10x20.pcf, heb6x13.bdf, heb6x13.pcf, heb8x13.bdf, heb8x13.pcf]

6.6 TeX--XeT - Hebrew Tex.

The biggest problem with Tex with Hebrew is that the charecters should go backwards relative to Visual look (i.e. pico inserts the charecters from right to left), so the best thing is to get XHterm with a regular emacs and write the Hebrew left to right, backwards as well.

The newer NTeX distribution on sunsite (v1.5) includes everything, including TeX--XeT, precompiled for Linux. It can be obtained from <ftp://sunsite.unc.edu.gz/pub/Linux/apps/tex/ntex>. An older version of TeX--XeT can be obtained from <ftp://noa.huji.ac.il/tex>. This older version, however, has to be recompiled (not recommended).

These TeX distributions are fine if you use LaTeX2.09. If you want to use LaTeX2e (the current de facto standard) you have a problem. Alon Ziv (alonz@csa.cs.technion.ac.il) is currently working in support for LaTeX2e with Hebrew, using the Babel languages system. I don't know the current status of his work -- ask him!

7. Printer setup

Mainly there is not to say, if you have a regular ASCII line printer (who does, these days?) there is a good chance that there are Hebrew fonts in it on the EPROM chip.

The Hebrew HOWTO

If you use PostScript, you should download soft fonts to the printer (you can always use the earlier mentioned Web fonts for that. These fonts are also useable with Ghostscript).

If you have a PCL printer (LaserJet etc.), you can either use font cartridges or use Ghostscript.

8. Commercial products.

8.1 El-Mar software.

The Hebrew Support for X-Windows & Motif, is a product of El-Mar Software, which adds Hebrew functionality to many of the parts and layers of X-Windows and Motif, including Xlib, all of the widgets of Motif, hterm (Hebrew xterm), demos and simple useful applications (e.g. bi-lingual Motif-based editor), fonts (including scalable Type1), keyboard-manager in order to allow Hebrew and push-mode for non-Motif applications, etc.

Despite allowing many new features and variations for Motif widgets, the support doesn't have any modification to internal data-structures of Motif, so existing applications which were compiled and linked under non-Hebrew environment and libraries, can be relinked (without compilation!) and run with Hebrew (you can replace shared-libraries, so even the relink is not needed!)

By using another tool of us, Motif/Xplorer, you can take commercial applications (without their source) and translate them to Hebrew. This was the way of giving Hebrew support for Oracle Forms 4, Intellicorp's Kappa and OMW, CA-Unicenter, and many other leading UNIX tools sold in Israel. This product was purchased and adopted by most of the workstation vendors (9 of them, including the biggest: Sun, HP, SGI), and many other software houses. There are Makefiles for more than 30 platforms and operating systems.

We believe only in open software, so all the customers get the complete source code. We have good relations with the leading forces in this industry, including the technical staff of X-Consortium and the technical staff of COSE.

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P.S.: The announcement of the Arabic Support for X-Windows & Motif, is expected in January. English, Hebrew, and Arabic will be handled by 8 bits (!), including the full set of Arabic glyphs.

9. Hebrew around the Internet.

9.1 WWW

- Jerusalem 1 - has many program and FAQ files about Hebrew on Unix and other platforms <http://www.jer1.co.il>.
- Gili Granot's Hebrew archive page - sumerize of all Hebrew related issues around the Web (include all kind of files) <http://www.cs.technion.ac.il/~gil>.
- Gavrie has some info about Hebrew on his ftp site: <ftp://kelim.jct.ac.il>

9.2 Gopher

- A one word testing for Hebrew-gopher can be found on <gopher://shekel.jct.ac.il>

9.3 Ftp

- Some Tex-Xet programs and the main FTP site for Tex Hebrew support for PC and Unix is at <ftp://noa.huji.ac.il/tex>.
- Horizon site as [said already](#) contains the main site of pine/pico Hebrew support - <ftp://horizon.huji.ac.il/pub>.
- Gili Granot's Hebrew archive page ftp site is at <ftp://ssl.cs.technion.ac.il/pub>.