# The Hebrew HOWTO

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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* `<http://shekel.jct.ac.il/ rajwan/Hebrew.html>` or from *¡tt¿ftp://hobbes.jct.ac.il¡/tt¿* `<ftp://hobbes.jct.ac.il>`.

## Contents

# 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* `<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* `<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 - 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 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/* `<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* `<ftp://sunsite.unc.edu/pub/Linux/X11/fonts/>`, 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).
- 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.

#### 4.3.1 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.

#### 4.3.2 Netscape

Usaly you can use the hebrew fonts from 4.1, Install it 4.2, 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 4.2.

### 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
!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
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
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/bin: /usr/games:."
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
        xrdb -merge $sysresources
fi
if [ -f $sysmodmap ]; then
        xmodmap $sysmodmap
fi
if [ -f $resources ]; then
        xrdb -merge $resources
fi
if [ -f $xmodmap ]; then
        xmodmap $xmodmap
fi
#
# 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 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 complied 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 bu 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* `<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* `<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* `<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* `<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* `<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* `<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* `<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 4.2 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 avalible by the help of Danny ¡tt¿danny@cs.huji.ac.il¡/tt¿. 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 4.3.1! Danny's port (for SUN) can be obtained from: *ftp://ftp.huji.ac.il/pub/local/xhterm* `<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* `<ftp://plasma-gate.weizmann.ac.il/pub/software/linux>` Get it from there and you'll get 5 4.2: `[heb10x20.pcf, heb6x13.bdf, heb6x13.pcf, heb8x13.bdf, heb8x13.pcf]`

## 6.6 TeX–XeT - Hebrew Tex.

The bigest 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, pre-compiled for Linux. It can be obtained from *ftp://sunsite.unc.edu.gz/pub/Linux/apps/tex/ntex* `<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* `<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.

If you use PostScript, you should download soft fonts to the printer (you can always use the 4.1 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 compelete 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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```

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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 glyphes.

# 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* `<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* `<http://www.cs.technion.ac.il/ gil>`.
- Gavrie has some info about Hebrew on his ftp site: *ftp://kelim.jct.ac.il* `<ftp://kelim.jct.ac.il>`

## 9.2 Gopher

- A one word testing for Hebrew-gopher can be found on *gopher://shekel.jct.ac.il* `<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* `<ftp://noa.huji.ac.il/tex>`.
- Horizon site as 6.2 contains the main site of pine/pico Hebrew support - *ftp://horizon.huji.ac.il/pub* `<ftp://horizon.huji.ac.il/pub>`.
- Gili Granot's Hebrew archive page ftp site is at *ftp://ssl.cs.technion.ac.il/pub* `<ftp://ssl.cs.technion.ac.il/pub>`.