Linux XFree−to−Xinside mini−HOWTO

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Linux XFree−to−Xinside mini−HOWTO

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How to convert an XFree86 modeline into an XInside/XiGraphics one

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1. Introduction

During the spring of 1996 I've seen a lot of posts in comp.os.linux.x asking how to convert video modes between XFree86 and one of its commercial alternatives: XInside (now named XiGraphics, note anyway that in this document I'll use the old product name, since I will mainly refer to that version)

I had evaluated before the product and had this evaluation version still floating on my hard disk: since I like problem solving, I've decided to give it a try and, after a couple of hours of fiddling and calculating, I came up with a supposedly informative article that was promptly posted.

The discussions about how to convert suddendly vanished and I received 1 (one) mail thanking me for the article so, since maybe somebody else could need this information in the future, I decided to transform that post in the mini−HOWTO you are reading.

Let me state something first: I do NOT work for XInside and I only had access to the evaluation 1.2 version for Linux. I know that nowadays (May 97) AccelX has reached revision 3.1, but I do think that the information included in this document, if not verbatim, is still applicable.

Due to the fact that this HOWTO has been written with the help of a pretty old Xinside version, it may well happen that some of the information contained here is not completely accurate: as you will read later, thanks to the birth of XFree 3.2, I haven't bought this commercial server, so if you have, and if you notice any incorrect information here please take the time to email me.

Notice anyway that fiddling with monitor timings can be hazardous and, for this reason, I absolutely make no guarantees. If it works for you , fine, if you blow up your computer I shall not be held responsible for it.

As you may have noticed from may name, I'm not a native speaker of English so you will probably find some errors here and there, I apologize for them and I ask you to please avoid flooding my mailbox with language−related flames. Thanks !

2. Why should I need it ?

I think that the Xinside policy of not giving you an utility to tweak your video modes (like xvidtune) and/or to import your existing XFree ones in the evaluation (and AFAIK commercial) version is incomprehensible. I've spent about three hours putting this together (hint: I've compared the VESA 1024x768@70Hz entry in the two formats (and I'm nearly an electronic engineer ;−)) while an Xinside programmer could have written a comparable article in a fraction of this time...

I haven't downloaded any evaluation version from 1.3 onwards and I really hope they have fixed this. Well, if they have, this mini−HOWTO could be considered useless but, alas, if you read it you will learn something more about how everything works...

3. Let's go

Let's suppose that you have your oh−so−tweaked XFree86 mode and you want to evaluate Xinside in the same conditions: follow the steps described below and you should be able to do it; we will use my default video mode as a real−life example and I will explain what you will have to do to convert it.

An Xfree86 entry looks like this:

```
Modeline "blahblah" DOTCLK  A B C D  a b c d
```

Every one of the A−D and a−d numbers has a meaning: if you want you can search for it in the 'The Hitchhiker's Guide to X386/XFree86 Video Timing' (/usr/lib/X11/doc/VideoModes.doc) but you don't need to know the theory behind all this to perform a succesful conversion...

My modeline in /usr/lib/X11/XF86Config is:

```
Modeline "1168x876" 105  1168 1256 1544 1640  876 877 891 900
                     |     |    |    |    |    |   |   |   |
                  DOT_CLK  A    B    C    D    a   b   c   d
```

In Xinside, you have to add an entry in the Xtimings file, which should be located in etc/ (from now on we suppose you are in the top Xaccel directory that should be something like /usr/X11/lib/X11/AcceleratedX)

```
!    Somewhere in the file, put here the name you want
```

```
[PREADJUSTED_TIMING]
    PreadjustedTimingName = "1168x876 @ 72Hz";

!
!     These four are obvious
!
    HorPixel          = 1168;         // pixels
    VerPixel          = 876;          // lines
    PixelWidthRatio   = 4;
    PixelHeightRatio  = 3;

!
!   hsync: DOT_CLK / D * 1000 [KHz]
!
!   hsync = 105 / 1640 * 1000 = 64.024 KHz
!
!   vsync: ( 1 / (( D / DOT_CLK ) * d) ) * 1,000,000 [Hz]
!
!   vsync: ( 1 / (( 1640 / 105 ) * 900) ) * 1,000,000
!           ( 1 / 14057.1428571 ) * 1,000,000 = 71.138 Hz
!

    HorFrequency      = 64.180;        // kHz
    VerFrequency      = 71.138;        // Hz

!   Obvious

    ScanType          = NONINTERLACED;

!
!   Put here the +/-hsync +/-vsync XFree86 options
!
    HorSyncPolarity   = POSITIVE;
    VerSyncPolarity   = POSITIVE;

!   Shouldn't change

    CharacterWidth    = 8;             // pixels

!   DOT_CLK here

    PixelClock        = 105.000;       // MHz
!
!
!   horizontal timings section: [usec]
!
    HorTotalTime  = D / DOT_CLK                  = 15.619;
    HorAddrTime   = A / DOT_CLK                  = 11.124;
    HorBlankStart = A / DOT_CLK                  = 11.124;
    HorBlankTime  = HorTotalTime - HorBlankStart =  4.495;
    HorSyncStart  = B / DOT_CLK                  = 11.962;
    HorSyncTime   = C / DOT_CLK - HorSyncStart   =  2.743;

 !
 !  vertical timings section:    [msec]
 !

    VerTotalTime  = ( HorTotalTime * d ) / 1000  = 14.057;
    VerAddrTime   = ( HorTotalTime * a ) / 1000  = 13.682;
    VerBlankStart = ( HorTotalTime * a ) / 1000  = 13.682;
    VerBlankTime  = VerTotalTime - VerBlankStart =  0.375;
```

```
    VerSyncStart  = ( HorTotalTime * b ) / 1000  = 13.698;
    VerSyncTime   = ( HorTotalTime * ( c - b ) ) / 1000
                                                 = 0.219

 ! Finished !
```

Now you have to put this newly created mode in the files shown below in the appropriate place.

4. Fixing up things

In the excerpts shown below the −> sign tells you what was modified: do NOT include it in your files!

Monitor entry (mine is monitors/mfreq/mfreq64.vda)

```
          [ESTABLISHED_TIMINGS]
              "640x480 @ 60Hz",
              "640x480 @ 72Hz",
              "640x480 @ 75Hz",
              "800x600 @ 56Hz",
              "800x600 @ 60Hz",
              "800x600 @ 72Hz",
              "800x600 @ 75Hz",
              "1024x768 Interlaced",
              "1024x768 @ 60Hz",
              "1024x768 @ 70Hz",
              "1024x768 @ 75Hz",
          "1152x900 Interlaced",
              "1152x900 @ 60Hz",
              "1152x900 @ 67Hz",
      ->      "1168x876 @ 72Hz",
              "1280x1024 Interlaced",
              "1280x1024 @ 60Hz",
          "1600x1200 Interlaced";
```

Board info file (mine is boards/s3/764−2.xqa , I wonder why they have nearly all the Hercules boards but not MINE: Terminator 64/Dram)

```
      [VISUAL]
          BitsPerPixel   = 8;
          MemoryModel    = Packed;
          ColorModel     = Indexed;
          BitsRGB        = 6;
          NumberOfColors = 256;

          [RESOLUTIONS]
          640x480,
          800x600,
          1024x768,
      ->  1168x876,
          1152x900,
          1280x1024

          [DESKTOPS]
          640x480,
          800x600,
          1024x768,
          1152x900,
```

```
->  1168x876,
    1280x1024,
    1600x1200
```

If the dot clock is low enough (NOT in this case for my board) you can put the entry even in the 16bpp and 32bpp sec− tions.

The /etc/Xaccel.ini will look something like this

```
--------------------------------------------------------------
    Board   = "s3/764-2.xqa";
    Monitor = "mfreq/mfreq64.vda";
    Depth   = 8;
->  Desktop = 1168x876;

    [RESOLUTIONS]
->      1168x876,
        1024x768;
```

The actual Xinside mode entry in etc/Xtimings

```
--------------------------------------------------------------
[PREADJUSTED_TIMING]
    PreadjustedTimingName = "1168x876 @ 72Hz";

    HorPixel          = 1168;          // pixels
    VerPixel          = 876;           // lines
    PixelWidthRatio   = 4;
    PixelHeightRatio  = 3;
    HorFrequency      = 64.024;        // kHz
    VerFrequency      = 71.138;        // Hz
    ScanType          = NONINTERLACED;
    HorSyncPolarity   = POSITIVE;
    VerSyncPolarity   = POSITIVE;
    CharacterWidth    = 8;             // pixels
    PixelClock        = 105.000;       // MHz
    HorTotalTime      = 15.619;        // (usec) =  205 chars
    HorAddrTime       = 11.124;        // (usec) =  146 chars
    HorBlankStart     = 11.124;        // (usec) =  146 chars
    HorBlankTime      =  4.495;        // (usec) =   59 chars
    HorSyncStart      = 11.962;        // (usec) =  157 chars
    HorSyncTime       =  2.743;        // (usec) =   36 chars
    VerTotalTime      = 14.057;        // (msec) =  900 lines
    VerAddrTime       = 13.682;        // (msec) =  876 lines
    VerBlankStart     = 13.682;        // (msec) =  876 lines
    VerBlankTime      =  0.375;        // (msec) =   24 lines
    VerSyncStart      = 13.698;        // (msec) =  877 lines
    VerSyncTime       =  0.219;        // (msec) =   14 lines
```

You can check your conversion by running the vgaset program with no parameters while running the Xinside server: it will output an XFree−like line and, if everything went OK, this line will be equal to the line you started from (except if b and c are equal, I haven't been able to reproduce this situation in Xinside: the best case was c=b+1).

---

5. The end...

That's all folks ! I hope this will be useful to you. I don't think I'll buy the XiGraphics server in the near future for one simple reason: the release of XFree86 3.2 solved all of the text speed problems I was having on my humble Trio 64 video board ;)

It seems anyway that the XiGraphics server supports a much wider array of chipsets and video boards than XFree, so it may well happen that the commercial 'alternative' is the only viable one for you. If this is the case, and you bought the XiGraphics server, I would really like to hear from you to know if the information presented here has been useful to you, or if you found it too complex or whatever.

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6. Automating the process

This small script automates most of the work. Be very careful with the ScanType and with the two Polarity lines: the script do not set them and, if you are too lazy to correct them, the risks of blowing up your monitor increase quite a lot.

Notice that I don't know if the 'Doublescan' flag has meaning in XInside: if you try to convert a low−res doublescan mode BE CAREFUL, you can easily kill your monitor since the refresh rate that you get is doubled (in fact my 400x300@72Hz became a 400x300@144Hz !).

```
#!/bin/sh
##########################################################################
# XF2XInside
#
# This script converts modelines from XF86Config format to XInside
# format as needed for the etc/Xtiming file.
#
# This is a quick hack, so don't expect much error checking (not to
# speak of anything like user friendlyness).
#
# If you call it without arguments it should tell you what to do.
#
#                                ( July 1996, hcz@tazlwurm.bb.bawue.de)
#
# Btw: New modes created as described in the HOWTO work, but don't
# show up in Xsetup's menu. Anybody who knows why?
#
##########################################################################
#------------------------------------------------ Here we go:
# Change this if your modeline file lives somewhere else:
XF=/usr/X11/lib/X11/XF86Config
if [ $# -ne 1 ] ; then
  echo "usage: ${0##*/} <mode>"
  echo " example: ${0##*/} 1024x764"
  echo -e " function: converts $XF modeline entry into\n Xinside Format (stdout)"
  exit 1
fi
egrep -i "^[\t ]*modeline.+\"$1\""  /usr/X11/lib/X11/XF86Config |
gawk '
NF < 11  { print "! invalid Modeline:\n! " $0 "\n!"; next }
{
  print "//", $0  ":"
  name = $2
  DOT_CLK = $3;
```

```
    A = $4;
    B = $5;
    C = $6;
    D = $7;
    a = $8;
    b = $9;
    c = $10;
    d = $11;
    VerFrequency =  1000000 / ((D / DOT_CLK) * d)
    print "[PREADJUSTED_TIMING]"
    printf "  PreadjustedTimingName = \"%dx%d @ %.0dHz\";\n", A, a, VerFrequency
    print "  HorPixel\t\t= " A ";"
    print "  VerPixel\t\t= " a ";"
    print "  PixelWidthRatio\t= 4;\n  PixelHeightRatio\t= 3;"
    print "  HorFrequency\t\t= " DOT_CLK / D * 1000 ";\t// kHz"
    print "  VerFrequency\t\t= " VerFrequency  ";\t// Hz"
    print "  ScanType\t\t= NONINTERLACED;\t\t// *CHECK*"
    print "  HorSyncPolarity\t= NEGATIVE;\t\t\t// *CHECK*"
    print "  VerSyncPolarity\t= NEGATIVE;\t\t\t// *CHECK*"
    print "  CharacterWidth\t= 8;"
    print "  PixelClock\t\t= " DOT_CLK ";"
    HorTotalTime = D / DOT_CLK
    print "  HorTotalTime\t\t= " HorTotalTime ";"
    print "  HorAddrTime \t\t= " A / DOT_CLK ";"
    print "  HorBlankStart\t\t= " A / DOT_CLK ";"
    print "  HorBlankTime\t\t= " D / DOT_CLK - A / DOT_CLK ";"
    print "  HorSyncStart\t\t= " B / DOT_CLK ";"
    print "  HorSyncTime\t\t= " C / DOT_CLK - B / DOT_CLK ";"
    VerTotalTime  = ( HorTotalTime * d ) / 1000
    print "  VerTotalTime\t\t= " VerTotalTime ";"
    print "  VerAddrTime\t\t= " ( HorTotalTime * a ) / 1000 ";"
    VerBlankStart = ( HorTotalTime * a ) / 1000
    print "  VerBlankStart\t\t= " VerBlankStart ";"
    print "  VerBlankTime\t\t= " VerTotalTime - VerBlankStart ";"
    print "  VerSyncStart\t\t= " ( HorTotalTime * b ) / 1000 ";"
    print "  VerSyncTime\t\t= " ( HorTotalTime * ( c - b ) ) / 1000
    print ""
  }'
```

7. Thanks to

- Heike Claudia Zimmerer hcz@tazlwurm.bb.bawue.de for pointing out a small inconsistency and for sending me a script that automates most of the work.
- Bartosz Maruszewski B.Maruszewski@zsmeie.torun.pl for translating this mini HOWTO in Polish and for pointing out a small typo.

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