

# A DIY XFree86 1280x1024 Modeline for the IIYAMA AS4314UT TFT Monitor

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This document can be found at <http://www.comp.leeds.ac.uk/jj/linux/tftmodeline.html>

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## 1 The Modeline

IIYAMA AS4314UT TFT Monitor in full 1280x1024 resolution

**Modeline “1280x1024” 135 1280 1300 1612 1688 1024 1025 1028 1066**

## 2 Why DIY?

Simple - I couldn't get X to work in full resolution 1280x1024.

AND - Learning is fun :-)

First, I'm no X Xpert. None of the 1280x1024 modelines in the default Debian XF86config file worked. I scoured the WWW and gathered several more modelines to try, but no success. So then I looked for info on rolling your own.

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## 3 Some helpful references

- XFree86-Video-Timings-HOWTO at <http://www.tldp.org/HOWTO/XFree86-Video-Timings-HOWTO/>
  - or in /usr/doc/HOWTO Eric Raymond's howto do exactly this - but only if you have the most detailed monitor timing information. Few manufacturers give more than minimal timing details
  - Monitor Timings into Absolute Pixels by Peter H. Wendt at <http://members.aol.com/mcpage0/timecalc>.
  - Calculator for video timings, which is ok if you have ready to hand the sync pulse and front/back porch values at <http://www.hut.fi/Misc/Electronics/faq/vga2rgb/calc.html>
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## 4 Just what do the numbers in the modeline mean then?

Modeline "1280x1024" 135 1280 1300 1612 1688 1024 1025 1028 1066

- "1280x1024" - is simply a label describing the modeline and used to reference it
  - 135 - the dot frequency or Video Bandwidth in MegaHertz
  - 1280 - horizontal visible pixels on screen
  - 1300 - start of sync pulse
  - 1612 - end of sync pulse - I think
  - 1688 - total number of pixels in a full horizontal line
  - 1024 - vertical visible lines on screen
  - 1025 - start of vertical sync pulse (?)
  - 1028 - end of vertical sync pulse (?)
  - 1066 - total vertical lines in a frame
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## 5 What details did I have from the Monitor Manual?

- Horizontal Frequency 79.976kHz
  - Vertical Frequency, or Frame Rate, 75.025Hz
  - Dot Clock 135MHz
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## 6 How to calculate the modeline numbers needed?

- Dot Clock is easy, 135
- from that the time for one pixel is  $1/135\text{usec}$  or  $1000/135\text{nsec} = 7.4074\text{nsec}$
- Total pixels in a horizontal line - Hor freq is 79.976kHz so one line lasts  $1/79,976$  sec which is  $12503.75\text{nsec}$ .
- Divide that time by the time for each pixel  $12503.75/7.4074 = 1688$
- Or even easier.....

Dot Clock Freq/Horiz. Freq =  $135000000/79980=1688$

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- Total vertical lines in a frame - Vert freq is 75.025Hz so one complete frame lasts 1/75.025 secs which is 13.32889msec.
- One line lasts 12.50375usec so number of lines/frame is 13328.89/12.50375 = 1066
- Or even easier.....

Horiz Freq./Vertical Sync. Freq. = 79980/75.02=1066

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## 7 The modeline so far.....

Modeline "1280x1024" 135 1280 ... .. 1688 1024 ... .. 1066

What to do now. The references talk about "porch" and "synch pulse" times etc, which weren't too helpful as the incomplete manual didn't give any of these, or indeed anything else. We are now in the realms of guesswork.

One reference mentioned just adding 3 to the vertical screen lines then 2 to give the 2 remaining vertical lines, so I got.....

Modeline "1280x1024" 135 1280 ... .. 1688 1024 1027 1029 1066

And there was some talk of a "sync" pulse of 3.8usec, or 3800/7.4074=410 pixels. There were also warnings that some graphics cards need all horizontal pixel counts to be multiples of 8, and some talk of 32 or so pixels at each side of the sync pulse. So I fudged and came up with.....

Modeline "1280x1024" 135 1280 1312 1656 1688 1024 ... .. 1066

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## 8 But that's not the modeline I gave at the start!

Ok. I edited my XF86Config file with this prototype modeline, and fired up.....

Got a picture...

It was the right size...

But wasn't quite positioned correctly.....

So I fired up xvidtune....

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## 9 Fine Tune with xvidtune

Get pencil and paper and note the HSyncStart/End and the VSyncStart/End values, and any values you test. You will need to edit these into your modeline.

Leave the HTotal and VTotal alone, the values already calculated should be correct. Try the Left | Right and Up | Down buttons, these modify the start and stop positions of the Horizontal and Vertical sync pulses.

xvidtune seemed to vary values a few pixels at a time. If you cannot get it spot on, then resort to your favorite configuration tools - mine's 'vi' - and edit best guess interpolated values into your modeline, and restart X. This was iterated to get the best fit.

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