Video Electronics Standards Association

# VESA®

## Safe Mode Timing Standard

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## VESA Safe Mode Timing Standard
## 640 and 720 Text Modes

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### Purpose

These safe mode 60Hz timings are intended as legacy fallback modes, primarily for flat-panel displays. Some flat-panel displays will not perform higher than 60Hz refresh rates. Therefore, if the graphics controller cannot establish a DDC connection and read EDID, the video controller should default to one of the modes in this document.

### Summary

It is not intended that these modes will be displayed perfectly centered or sized for all monitors. Though the timings themselves are independent parameters capable of such performance, it may be that the monitor itself does not require use of this mode as a pre-set timing. VESA safe mode timings are to be used as an industry standard 'fallback' (or boot) mode, thus the name safe mode timings. Included are both the graphics 640 and 720 text modes.

One thing to note about these modes is that the line rate can accommodate different character sets. Both modes have active lines between 400 and 480 lines, which can be accomplished by adding or removing front and back porch blank lines. The overall timing rates do not change, only some of the blanking lines are converted to active lines as mentioned.

As with other VESA DMTs, these timing parameters have the typical tolerance of 0.5% pixel clock.


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## Support for this Standard

Clarifications and application notes to support this standard may be written. To obtain the latest standard and any support documentation, contact VESA.

If you have a product that incorporates Safe Mode Timings you should ask the company that manufactured your product for assistance. If you are a manufacturer, VESA can assist you with any clarification you may require. All comments or reported errors should be submitted in writing to VESA using one of the following methods.

- Fax 408-957 9270, *direct this note to Technical Support at VESA*
- e-mail support@vesa.org
- mail to Technical Support
  VESA
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# VESA DIGITAL INTERFACE MONITOR SAFE MODE TIMING STANDARD

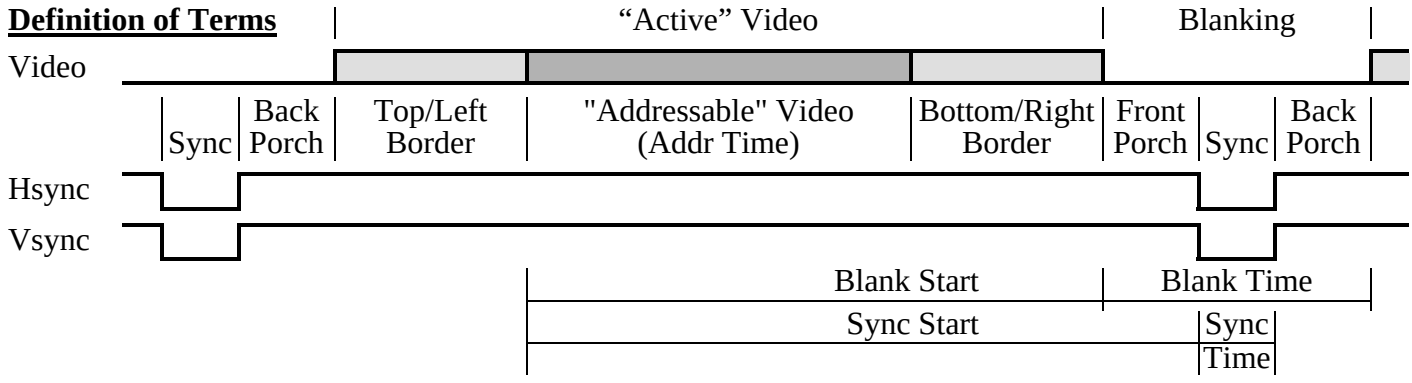
Resolution: 640 x 480 at 60Hz (non-interlaced) {480 scan lines can be varied to a value between 400-480 to allow different character cell blocks} This timing is mainly intended to be used with digital interface monitors. It can be used with analog displays.

Video Display Information Format (VDIF)
Pre-adjusted Timing Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Hor Pixels | = **640;** | // Pixels | | | | | | |
| Ver Pixels | = **480;** | // Lines | | | | | | |
| Hor Frequency | = 31.469; | // KHz | = | 31.8 | usec | / | | |
| Ver Frequency | = 59.940; | // Hz | = | 16.7 | msec | / | | |
| Pixel Clock | = **25.175;** | // MHz | = | 39.7 | nsec | | | |
| Character Width | = **8;** | // Pixels | = | 317.8 | nsec | | | |
| Scan Type | = **NONINTERLACED;** | | | | // H Phase | = | | |
| Hor Sync Polarity | = **NEGATIVE;** | // HBlank | = | 20.0% | of HTotal | | | |
| Ver Sync Polarity | = **NEGATIVE;** | // VBlank | = | 8.6% | of VTotal | | | |
| Hor Total Time | = 31.778; | // (usec) | = | 100 | chars | = | 800 | Pixels |
| Hor Addr Time | = 25.422; | // (usec) | = | 80 | chars | = | 640 | Pixels |
| Hor Blank Start | = 25.422; | // (usec) | = | 80 | chars | = | 640 | Pixels |
| Hor Blank Time | = 6.356; | // (usec) | = | 20 | chars | = | 160 | Pixels |
| Hor Sync Start | = 26.058; | // (usec) | = | 82 | chars | = | 656 | Pixels |
| // H Right Border | = 0.000; | // (usec) | = | **0** | chars | = | 0 | Pixels |
| // H Front Porch | = 0.636; | // (usec) | = | **2** | chars | = | 16 | Pixels |
| Hor Sync Time | = 3.813; | // (usec) | = | **12** | chars | = | 96 | Pixels |
| // H Back Porch | = 1.907; | // (usec) | = | **6** | chars | = | 48 | Pixels |
| // H Left Border | = 0.000; | // (usec) | = | **0** | chars | = | 0 | Pixels |
| Ver Total Time | = 16.683; | // (msec) | = | 525 | lines | multi line rate | | |
| Ver Addr Time * | = 15.253; | // (msec) | = | 480 | lines | 400 to 480 | | |
| Ver Blank Start * | = 15.253; | // (msec) | = | 480 | lines | VAddr | | |
| Ver Blank Time * | = 1.430; | // (msec) | = | 45 | lines | 525 - Vaddr | | |
| Ver Sync Start * | = 15.571; | // (msec) | = | 490 | lines | VAddr + VFP | | |
| // V Bottom Border | = 0.000; | // (msec) | = | **0** | lines | | | |
| // V Front Porch * | = 0.318; | // (msec) | = | **10** | lines | 10 + int((480-VAddr)/2) | | |
| Ver Sync Time | = 0.064; | // (msec) | = | **2** | lines | | | |
| // V Back Porch * | = 1.049; | // (msec) | = | **33** | lines | 33+int((481-VAdder)/2) | | |
| // V Top Border | = 0.000; | // (msec) | = | **0** | lines | | | |

*** These values change with vertical address change**

**Definition of Terms**





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# VESA DIGITAL INTERFACE MONITOR SAFE MODE TIMING STANDARD

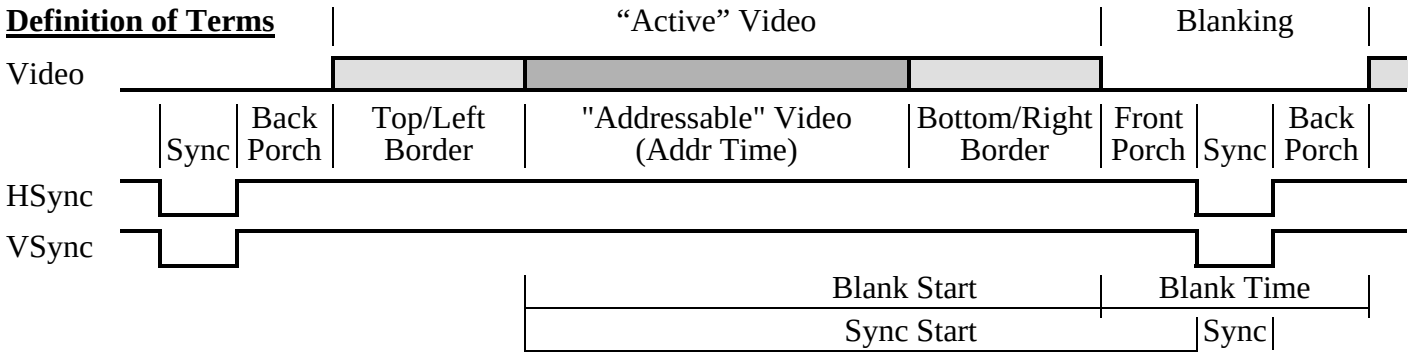
Resolution: 720 x 400 to 480 at 60Hz (non-interlaced) {480 scan lines can be varied to a value between 400-480 to allow different character cell blocks} This timing is intended for digital displays and can also be used for analog displays

Video Display Information Format (VDIF)

Pre-adjusted Timing Data

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Hor Pixels | = **720;** | // Pixels | | | | | | |
| Ver Pixels | = **480;** | // Lines | | | | | | |
| Hor Frequency | = 31.469; | // KHz | = | 31.8 | usec | / | line | |
| Ver Frequency | = 59.941; | // Hz | = | 16.7 | msec | / | frame | |
| Pixel Clock | = **28.322;** | // MHz | = | 35.3 | nsec | ± 0.5% | | |
| Character Width | = **9;** | // Pixels | = | 317.8 | nsec | | | |
| Scan Type | = **NONINTERLACED;** | | | // H Phase | = | 2.0 % | | |
| Hor Sync Polarity | = **NEGATIVE;** | // HBlank | = | 20.0% | of HTotal | | | |
| Ver Sync Polarity | = **NEGATIVE;** | // VBlank | = | 1.9% | of VTotal | | | |
| Hor Total Time | = 31.777; | // (usec) | = | 100 | chars | = | 900 | Pixels |
| Hor Addr Time | = 25.422; | // (usec) | = | 80 | chars | = | 720 | Pixels |
| Hor Blank Start | = 25.422; | // (usec) | = | 80 | chars | = | 720 | Pixels |
| Hor Blank Time | = 6.355; | // (usec) | = | 20 | chars | = | 180 | Pixels |
| Hor Sync Start | = 26.057; | // (usec) | = | 82 | chars | = | 738 | Pixels |
| // H Right Border | = 0.000; | // (usec) | = | **0** | chars | = | 0 | Pixels |
| // H Front Porch | = 0.636; | // (usec) | = | **2** | chars | = | 18 | Pixels |
| Hor Sync Time | = 3.813; | // (usec) | = | **12** | chars | = | 108 | Pixels |
| // H Back Porch | = 1.907; | // (usec) | = | **6** | chars | = | 54 | Pixels |
| // H Left Border | = 0.000; | // (usec) | = | **0** | chars | = | 0 | Pixels |
| Ver Total Time | = 16.683; | // (msec) | = | 525 | lines | | | |
| Ver Addr Time * | = 15.253; | // (msec) | = | 480 | lines | 400 to 480 lines | | |
| Ver Blank Start * | = 15.253; | // (msec) | = | 480 | lines | VAddr | | |
| Ver Blank Time * | = 0.318; | // (msec) | = | 45 | lines | 525- VAddr | | |
| Ver Sync Start * | = 15.571; | // (msec) | = | 490 | lines | V adder + VFP | | |
| // V Bottom Border | = 0.000; | // (msec) | = | **0** | lines | | | |
| // V Front Porch * | = 0.318; | // (msec) | = | 10 | lines | 10+int((480-VAddr)/2) | | |
| //Ver Sync Time | = 0.064; | // (msec) | = | **2** | lines | | | |
| // V Back Porch * | = 1.049; | // (msec) | = | **33** | lines | 33+int((481-VAddr)/2) | | |
| // V Top Border | = 0.000; | // (msec) | = | **0** | lines | | | |

*** These values change with vertical address change**





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**The companion spreadsheet for the SMT Standard can be downloaded from the VESA website.**

**Go to www.vesa.org and click on Public FTP. The file is listed under SMT.**

**Send an email to moderator@vesa.org if you have any problems accessing the file.**


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