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# AMD Geode™ GX and LX Processors Configuring Xorg.conf for Use With Custom Panels



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## 1.0 Scope

This document is intended to alert AMD Geode™ GX and LX processor users to the means by which configuration of custom panels is facilitated with an Xorg desktop.

This document is not meant to be all inclusive. It is intended to illustrate the basic framework for configuration as it relates to custom panels and to identify where more documentation exists.

## 2.0 Description

The technical detail of this document was provided entirely by the Xorg Xorg.conf documentation found at:

- <http://xorg.freedesktop.org/archive/X11R6.8.0/doc/xorg.conf.5.html>

### 2.1 Screen Section

The config file may have multiple **Screen** sections. There must be at least one, for the “screen” being used. A “screen” represents the binding of a graphics device (**Device** section) and a monitor (**Monitor** section). A **Screen** section is considered “active” if it is referenced by an active **ServerLayout** section or by the **-screen** command line option. If neither of those is present, the first **Screen** section found in the config file is considered the active one. **Screen** sections have the following format:

```
Section "Screen"
    Identifier   "Screen0"
    Device       "Geode"
    Monitor      "MyMonitor"
    entries
    ...
    SubSection  "Display"
        entries
        ...
    EndSubSection
    ...
EndSection
```

### 2.2 Monitor Section

The config file may have multiple **Monitor** sections. There should normally be at least one, for the monitor being used, but a default configuration will be created when one is not specified. **Monitor** sections have the following format:

#### Example A

```
Section "Monitor"
    Identifier   "Monitor0"
    VendorName   "Monitor Vendor"
    ModelName    "NEC FP2141SB"
    UseModes     "Cimarron"
    Option       "dpms"
EndSection
```

**Example (B)**

```

Section "Monitor"
    Identifier      "Monitor1"
    VendorName     "Generic Vendor"
    ModelName      "Generic Monitor"
    HorizSync      28-50
    VertRefresh    43-73
    Modeline       "800x600-60"    40.0000  800  840  976  1056  600  601  605  628
    Modeline       "800x600-72"    50.0000  800  856  976  1040  600  637  643  666
    Modeline       "640x480-60"    25.1749  640  656  744  800  480  490  492  525  -HSync -VSync
    Modeline       "640x480-72"    31.5000  640  664  704  832  480  489  492  520  -HSync -VSync
    Option         "dpms"
EndSection
Section "Monitor"
    Identifier      "name"
    entries
    ...
EndSection

```

In Example (A), the monitor is defined to use those modes defined in the Mode Section named "Cimarron". (Cimarron is the Hardware Abstraction Layer (HAL) for the AMD Geode LX processor and Durango is the HAL for the AMD Geode GX processor.)

In example (B), Modelines unique to Monitor1 are defined inline.

**Note:** The Cimarron modes are the standard modes that are defined with the base Xorg implementation as delivered.

**2.3 Modes Section**

The config file may have multiple **Modes** sections, or none. These sections provide a way of defining sets of video modes independently of the **Monitor** sections. **Monitor** sections may include the definitions provided in these sections by using the **UseModes** keyword (as shown in Monitor Section above) Example (A). **Modes** sections have the following format (the entire Cimarron mode table is provided as an example):

```

Section "Modes"
    Identifier      "Cimarron"
    Modeline       "320x240-60"    0.0000  320  354  384  400  240  249  253  260  -HSync -VSync
    Modeline       "640x400-70"    25.1749  640  656  752  800  400  412  414  449  -HSync +VSync
    Modeline       "640x480-60"    25.1749  640  656  744  800  480  490  492  525  -HSync -VSync
    Modeline       "640x480-70"    28.5599  640  664  728  816  480  482  485  500  +HSync +VSync
    Modeline       "640x480-72"    31.5000  640  664  704  832  480  489  492  520  -HSync -VSync
    Modeline       "640x480-75"    31.5000  640  656  720  840  480  481  484  500  -HSync -VSync
    Modeline       "640x480-85"    36.0000  640  696  752  832  480  481  484  509  -HSync -VSync
    Modeline       "640x480-90"    37.8889  640  672  736  832  480  481  484  506  +HSync +VSync
    Modeline       "640x480-100"   43.1629  640  680  744  848  480  481  484  509  +HSync +VSync
    Modeline       "640x480-60"    25.1749  640  656  744  800  480  490  492  525  -HSync -VSync
    Modeline       "800x600-56"    36.0000  800  824  896  1024  600  601  603  625  +HSync +VSync
    Modeline       "800x600-60"    40.0000  800  840  976  1056  600  601  605  628  +HSync +VSync
    Modeline       "800x600-70"    45.7199  800  840  920  1040  600  604  607  628  +HSync +VSync
    Modeline       "800x600-72"    49.5000  800  856  976  1040  600  637  643  666  +HSync +VSync
    Modeline       "800x600-75"    49.5000  800  816  896  1056  600  601  604  625  +HSync +VSync
    Modeline       "800x600-85"    56.2500  800  832  896  1048  600  601  604  631  +HSync +VSync
    Modeline       "800x600-90"    60.0649  800  840  928  1056  600  601  604  632  +HSync +VSync
    Modeline       "800x600-100"   68.1789  800  848  936  1072  600  601  604  636  +HSync +VSync
    Modeline       "800x600-60"    40.0000  800  840  968  1056  600  601  605  628  -HSync -VSync
    Modeline       "1024x768-60"    65.0000  1024  1048  1184  1344  768  771  777  806  -HSync -VSync
    Modeline       "1024x768-70"    75.0000  1024  1048  1184  1328  768  771  777  806  -HSync -VSync
    Modeline       "1024x768-72"    78.7500  1024  1080  1192  1360  768  772  775  804  +HSync +VSync
    Modeline       "1024x768-75"    78.7500  1024  1040  1136  1312  768  769  772  800  +HSync +VSync
    Modeline       "1024x768-85"    94.5000  1024  1072  1168  1376  768  769  772  808  +HSync +VSync
    Modeline       "1024x768-90"   100.1869  1024  1088  1200  1376  768  769  772  809  +HSync +VSync
    Modeline       "1024x768-100"  113.3099  1024  1096  1208  1392  768  769  772  814  +HSync +VSync
    Modeline       "1024x768-60"    65.0000  1024  1048  1184  1344  768  771  777  806  -HSync -VSync
    Modeline       "1152x864-60"    81.5999  1152  1216  1336  1520  864  865  868  895  +HSync +VSync
    Modeline       "1152x864-70"    97.5199  1152  1224  1344  1536  864  872  875  907  +HSync +VSync

```

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```

Modeline "1152x864-72" 101.4199 1152 1224 1352 1552 864 871 874 907 +HSync +VSync
Modeline "1152x864-75" 108.0000 1152 1216 1344 1600 864 865 868 900 +HSync +VSync
Modeline "1152x864-85" 119.6499 1152 1224 1352 1552 864 867 870 907 +HSync +VSync
Modeline "1152x864-90" 129.5999 1152 1232 1360 1568 864 873 876 918 +HSync +VSync
Modeline "1152x864-100" 144.0000 1152 1232 1360 1568 864 867 870 918 +HSync +VSync
Modeline "1152x864-60" 81.5999 1152 1216 1336 1520 864 865 868 895 -HSync -VSync
Modeline "1280x1024-60" 108.0000 1280 1328 1440 1688 1024 1025 1028 1066 +HSync +VSync
Modeline "1280x1024-70" 129.5999 1280 1368 1504 1728 1024 1030 1033 1071 +HSync +VSync
Modeline "1280x1024-72" 133.5000 1280 1368 1504 1728 1024 1031 1034 1073 +HSync +VSync
Modeline "1280x1024-75" 135.0000 1280 1296 1440 1688 1024 1025 1028 1066 +HSync +VSync
Modeline "1280x1024-85" 157.5000 1280 1344 1504 1728 1024 1025 1028 1072 +HSync +VSync
Modeline "1280x1024-90" 172.7999 1280 1376 1520 1760 1024 1036 1039 1090 +HSync +VSync
Modeline "1280x1024-100" 192.0000 1280 1376 1520 1760 1024 1030 1033 1090 +HSync +VSync
Modeline "1280x1024-60" 108.0000 1280 1328 1440 1688 1024 1025 1028 1066 -HSync -VSync
Modeline "1600x1200-60" 162.0000 1600 1664 1856 2160 1200 1201 1204 1250 +HSync +VSync
Modeline "1600x1200-70" 189.0000 1600 1664 1856 2160 1200 1201 1204 1250 +HSync +VSync
Modeline "1600x1200-72" 198.0000 1600 1712 1888 2176 1200 1213 1216 1263 +HSync +VSync
Modeline "1600x1200-75" 202.5000 1600 1664 1856 2160 1200 1201 1204 1250 +HSync +VSync
Modeline "1600x1200-85" 229.5000 1600 1664 1856 2160 1200 1201 1204 1250 +HSync +VSync
Modeline "1600x1200-90" 251.1819 1600 1728 1904 2208 1200 1201 1204 1264 +HSync +VSync
Modeline "1600x1200-100" 280.6399 1600 1728 1904 2208 1200 1201 1204 1271 +HSync +VSync
Modeline "1600x1200-60" 162.0000 1600 1664 1856 2160 1200 1201 1204 1250 -HSync -VSync
Modeline "1920x1440-60" 234.0000 1920 2048 2256 2600 1440 1441 1444 1500 +HSync +VSync
Modeline "1920x1440-70" 278.3999 1920 2072 2280 2640 1440 1448 1451 1506 +HSync +VSync
Modeline "1920x1440-72" 288.0000 1920 2072 2280 2640 1440 1444 1447 1515 +HSync +VSync
Modeline "1920x1440-75" 297.0000 1920 2064 2288 2640 1440 1441 1444 1500 +HSync +VSync
Modeline "1920x1440-85" 341.3489 1920 2072 2288 2656 1440 1441 1444 1512 +HSync +VSync
Modeline "tv-ntsc" 27.0000 720 737 800 858 480 488 496 526 +HSync +VSync
Modeline "pnl-ntsc" 25.1749 640 819 883 936 480 501 503 525 -HSync -VSync
Modeline "pnl-8x6_ntsc" 40.0000 800 935 999 1008 600 618 626 650 -HSync -VSync
Modeline "pnl-10x7_ntsc" 65.0000 1024 1168 1232 1248 768 795 797 825 -HSync -VSync
Modeline "tv-pal" 27.0000 720 740 804 864 576 582 590 626 +HSync +VSync
Modeline "pnl-pal" 25.1749 640 783 847 864 480 501 503 525 -HSync -VSync
Modeline "pnl-8x6_pal" 40.0000 800 935 999 1008 600 624 626 650 -HSync -VSync
Modeline "pnl-10x7_pal" 65.0000 1024 1168 1232 1248 768 795 797 825 -HSync -VSync
Modeline "tv-480p" 27.0000 720 736 808 858 480 481 483 525 +HSync +VSync
Modeline "pnl-480p" 27.0000 720 739 803 858 480 484 490 525 +HSync +VSync
Modeline "tv-720p" 74.2500 1280 1350 1430 1650 720 723 728 750 +HSync +VSync
Modeline "pnl-720p" 74.2500 1280 1351 1431 1650 720 724 729 750 +HSync +VSync
Modeline "tv-1080i" 74.2500 1920 1965 2053 2200 1080 1084 1100 1126 +HSync +VSync
EndSection

```

The **Identifier** entry specifies the unique name for this set of mode descriptions. The other entries permitted in **Modes** sections are the **Mode** and **ModeLine** entries that are described above in the **Monitor** section.

## 2.4 Modeline Section

**ModeLine** “*name*” *mode-description*

The *mode-description* is in four sections, the first three of which are mandatory.

- The first is the dot (pixel) clock. This is a single number specifying the pixel clock rate for the mode in MHz.
- The second section is a list of four numbers specifying the horizontal timings. These numbers are the *hdisp*, *hsyncstart*, *hsyncend*, and *htotal* values.
- The third section is a list of four numbers specifying the vertical timings. These numbers are the *vdisp*, *vsyncstart*, *vsyncend*, and *vtotal* values.
- The final section is a list of flags specifying other characteristics of the mode.
  - **Interlace** indicates that the mode is interlaced.
  - **DoubleScan** indicates a mode where each scanline is doubled.
  - **+HSync** and **-HSync** can be used to select the polarity of the HSync signal. **+VSync** and **-VSync** can be used to select the polarity of the VSync signal.
  - **Composite** can be used to specify composite sync on hardware where this is supported. Additionally, on some hardware, **+CSync** and **-CSync** may be used to select the composite sync polarity.
  - The **HSkew** and **VScan** options mentioned above in the **Modes** entry description can also be used here.

**Example (from the Cimarron Modes Section):**

```
Modeline "1024x768-75" 78.7500 1024 1040 1136 1312 768 769 772 800 +HSync +VSync
```

```
Name: 1024x768-75
Dot Clock: 78.7500
Hdisp: 1024
Hsyncstart: 1040
Hsyncend: 1136
HTotal: 1312
Vdisp: 768
Vsyncstart 769:
Vsyncend: 772
VTotal: 800
Hsync Polarity: Positive (+HSync)
Vsync Polarity: Positive (+VSync)
```

**Note:** The “Mode Section” is not documented here, but it could be used as well as the Modeline to define unique modes.

## 2.5 Devices Section

The config file may have multiple **Device** sections. There must be at least one, for the video card being used.

**Device** sections have the following format:

```
Section "Device"
    Identifier "Geode"
    Driver     "amd"
    Option    "HWcursor"
EndSection
```

**Note:** This section is not necessarily relevant to the topic (custom panel configuration), but it is a good opportunity to point out how the AMD driver is called out for use. The Screen Section identifies the “Geode” as the device and the AMD Geode device uses the “amd” driver. In the path `/usr/X11R6/lib/modules/drivers`, the implementation of the XAA acceleration API for X.org is represented in the form of the file `amd_drv.o`. It is called out for use by the “Driver” directive and value “amd”.

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### 3.0 Summary

It was shown how a user could define a set of custom modelines in the context of a Modes Section and subsequently use that in a Monitor Section which is then used in a Screen Section. Alternatively, the modelines could be defined inline in the monitor section.

Please make use of all available documentation, especially the X.org main page at:

- <http://xorg.freedesktop.org/archive/X11R6.8.0/doc/xorg.conf.5.html>

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