SM750 Linux X.org driver specification
Version 1.1

1. Display Outputs

SM750 has 7 display layers supporting CRT and different kinds of digital TFT panels as outputs. The hardware is able to support dual display with simultaneous contents (SIMUL mode) and different contents. X.org driver can be configured to support one of the following output combinations according to system requirement.

1. Digital TFT (expansion) + CRT
2. Digital TFT (fixed resolution) + CRT
3. Digital TFT (fixed resolution) + Digital TFT (fixed resolution)
4. Dual CRT (CRT 1 + CRT 2)

The tables below summarize the display features for each output combination.

1. Digital TFT (expansion) + CRT

	TFT	**CRT**
Graphic layer	18/24/36 bit digital TFT with expansion feature to match different resolutions to different panel sizes	Analog DAC
Cursor layer	Software	Hardware
Video	Software	Overlay
Alpha layers	N/A	Support

2. Digital TFT (fixed resolution) + CRT

	TFT	**CRT**
Graphic layer	18/24/36 bit digital TFT with a fixed resolution equal to panel size	Analog DAC
Cursor layer	Hardware	Hardware
Video	Overlay	Software
Alpha layers	Support	N/A

3. Digital TFT (fixed resolution) + Digital TFT (fixed resolution)

	TFT 1	**TFT 2**
Graphic layer	18 bit TFT with a fixed resolution equal to panel size	18 bit TFT with a fixed resolution equal to panel size. Size of TFT 2 can be different from TFT 1.
Cursor layer	Hardware	Hardware
Video	Overlay	Software
Alpha layers	Support	N/A

4. Dual CRT

	CRT 1	**CRT 2**
Graphic layer	Analog DAC	Analog DAC
Cursor layer	Hardware	Hardware
Video	Overlay	Software
Alpha layers	Support	N/A

1.1 Display Output Behavior of Driver during Boot-Up

When system boot up, driver has to set itself into one of the above four output configurations. This can be done through configuration file.

Driver uses boot configuration file to get the following parameters:

1. Primary is CRT or TFT (18/24/36 bit)
2. If primary is TFT, then TFT size
3. Secondary is CRT or TFT (18 bit)
4. If secondary is TFT, then TFT size
5. Boot up in single or dual displays.
6. If dual display, SIMUL mode or different content
7. Resolution and color depth

Please refer to appendix 1 for detailed parameter format in boot configuration file.

Driver will set itself up to one of the display output configurations according to the parameter information. If there is no boot-up information, driver defaults to dual CRT output configuration in SIMUL mode.

2. Driver Features

Features	**Comments**	**Availability**
X.org versions	1.3.0 to 1.4.0	Latest driver (Note 1)
4:3 resolutions: 640x480 800x600 1024x768 1280x1024 1600x1200	With panel expansion, the highest resolution is limited by the panel size.	Latest driver (Note 1)
Wide screen resolutions: 1024x600 1280x720 1360x768 1440x960 1920x1080	With panel expansion, the highest resolution is limited by the panel size.	Latest driver (Note 1)
Color depth: 16, 32 BPP	32 BPP is not available in 1600x1200	Latest driver (Note 1)

	1920x1080	
Refresh rates (CRT output only): 60, 75, 85Hz	• 85 Hz is not available in 1600x1200 and 1920x1080. • Only 60Hz is available in all wide screen resolutions	Latest driver (Note 1)
Panel type	18/24 bit TFT 36 bit double pixel TFT	Latest driver (Note 1)
Panel expansion	SM750 can stretch the screen to fit the size of most TFT. The only limitation is that panel size cannot be smaller than the target resolution since there is no screen shrinking capability.	Latest driver (Note 1)
Primary graphics configuration	SM750 boots as primary adapter with video BIOS	Latest driver (Note 1)
Secondary graphics configuration	SM750 boots as secondary adapter without BIOS	Latest driver (Note 1)
2D acceleration	Screen BLT HOST BLT Monochrome font Line draw Rectangle fill	Latest driver (Note 1)
Hardware video	Overlay	Latest driver (Note 1)
Power management	ACPI suspend and resume	Latest driver (Note 1)
Dual displays	Support SIMUL mode and different contents for primary and secondary outputs from a single chip	Latest driver (Note 1)
Multiple adapters	Two or more SM750 chips in one system.	Latest driver (Note 1)
CSC video		End Dec, 2009
Rotation	• Desktop rotates in 90, 270 and 180 degrees. • Limitations: No dual display No hardware video	Feb, 2010

Note 1: Latest driver version is 2.3.0

3. OS Support

X.org driver supports the following variations of Linux.

	32 bit	**64 bit**
Red Hat Enterprise 5	Available	End Dec, 2009
Red Hat Enterprise 5.2	End Dec, 2009	Available

Fedora 7	Available	End Dec, 2009
Fedora 11	End Jan, 2010	End Dec, 2009
Suse Enterprise 10.1	Available	End Dec, 2009
Suse Enterprise 10.3	Mid Dec, 2009	End Dec, 2009
Ubuntu 8.xx	End Dec, 2009	End Dec, 2009

Appendix 1

Boot up configuration parameters.

```
Output configuration:

- "output"   "tft+crt"        tft + crt dual view
- "output"   "tft+tft"        tft +tft dual view
- "output"   "crt+crt"        crt + crt dual view
- "xlcd"     "1280"           horizontal expansion    (only valid when
                              "output" "tft+crt")
- "ylcd"     "1024"           vertical expansion     (the same as above)
- "pnltype"  "18bit"          select panel type,such as
                              "18bit"."24bit","36bit"

note:"crt+crt" is the default
      "24bit" is the default
      xlcd and ylcd is not valid when output is not "tft+crt"

e.g.
if you need "tft+crt" and expansion to 1280x1024 on tft (18bit tft)
add below options to xorg.conf (videocard0):

Option      "output"         "tft+crt"
Option      "xlcd"           "1280"
Option      "ylcd"           "1024"
Option      "pnltype"        "18bit"
```

Notes: these above options must be filled out in Section "Device"("Videocard0") in xorg.conf, otherwise it will make these options inactive

e.g

```
       Section       "Device"
       Identifier    "Videocard0"
       Driver        "siliconmotion"
```

```
#       Driver          "nvidia"
        VendorName      "Silicon Motion, Inc"
#       BoardName       "Voyager"
#       Option          "CSCVideo"      "TRUE"
        Option          "CSCVideo"      "False"
        Option          "output"        "crt+crt"
#       Option          "xlcd"          "1280"
#       Option          "ylcd"          "1024"
#       Option          "pnltype"       "24bit"
#       Option          "DPMS"
#       Option          "PCI_burst"     "TRUE"
#       Option          "Rotate"        "Randr"
#       Option          "Rotate"        "UD"
#       Option          "Rotate"        "CW"
#       Option          "NoAccel"       "TRUE"
        Option          "SWCursor"      "TRUE"
        BusID           "PCI:3:0:0"
        Screen          0
EndSection
```