intel®

Platform Components Group

Linux* Graphics Release Notes
Intel® 810 Chipset Family
Intel® 815 Chipset Family

Revision 1.0

DISCLAIMER

Revision History		
Rev	**Date**	**Comments**
0.9	03/15/00	Import from old format
1.0	06/19/00	Updated for 3.3.6 and 815

Table of Contents

1   Overview

1.1 Purpose and Scope

This document details how to best make use of the Graphics Components of the Intel® 810 and Intel® 815 Chipset Family with the Linux* Operating System. This document is intended for the experienced Linux user who is comfortable changing the inner workings of the operating system. Some software packages mentioned on this page may not be of production quality and should only be used by persons interested in the development versions. Intel recommends contacting a Linux distributor regarding support for your platform before attempting to install using the generic methods in this document. Linux distributions with Intel 810 and Intel 815 Chipset Family support should include only production quality software, and have seamless installation mechanisms.

This document was written using RedHat* 6.2 as a reference platform. Some details may not be valid on other distributions or versions.

WARNING: The installation of this software on Linux distributions may require modifications that will violate the support agreement of that distribution. This means that your Linux distribution may not support the software encompassed by these changes. If this is a concern please contact your distribution about offering support for your chipset, or contact a Linux support company about other support options.

1.2 <u>Overview</u>

The Graphical User Interface (GUI) under Linux is drawn by a user process know as the X server. Most Linux distributions use an open source X server known as XFree86, this document contains information for configuring XFree86 for the Intel® 810 and Intel® 815 Chipset Families. Currently there are two production versions of XFree86, 3.3.6 and 4.0. You will need to choose which version to install based upon the version included in your distribution. For further information about the XFree86 project visit the XFree86.org web site.

2   System Setup

When installing Linux on a new system, you should always check the supported hardware list included with the Linux distribution. New Linux distributions may include out of the box support for the chipset you are using. In that case, the installation instructions and software provided with the distribution should be used. The software and instructions described here are to be used as a reference for adding support for Intel® 810 and 815 chipsets to distributions that do not already support these chipsets, or for developers of Linux products.

When installing a Linux distribution on a new system there are a few things that should be known to help with the install. Distributions that are using XFree86 3.3.5 or earlier do not have built-in support for the Intel 810 or Intel 815 Chipset Families. The XFree86 'vga16' server should be installed if no option for your chipset is provided. Then, after the system has been loaded, the accelerated X server should be downloaded and installed per the instructions in this document. Also, make sure to read the Intel 810 and Intel 815 Chipset Family Linux system software userguide for help with non-graphics issues. When installing Linux, be sure to include the gcc compiler and the kernel sources. They are needed to compile the agpgart module. All other aspects of the install should proceed as expected.

3   XFree86 3.3.6

This section describes the installation and configuration of XFree86 3.3.6 for the Intel® 810 and Intel® 815 Chipset Families. These instructions require that the system already have XFree86 3.3.6 installed. See the references section below for XFree86 installation help.

3.1 <u>XFree86 3.3.6 Prerequisites</u>

- XFree86 3.3.6
- Kernel version 2.2.X or higher with sources
- glibc 2.1 or higher
- gcc

3.2 <u>XFree86 3.3.6 Features</u>

- X11R6 compatible
- Support for up to 1600x1200 resolutions
- Hardware cursor support
- Acceleration for 8,16 and 24 bit depths

3.3 <u>Kernel Setup</u>

This section details the kernel setup that is required to run the XFree86 X server on the Intel® 810 or Intel® 815 Chipset Families. Under most circumstances there will be no need to modify the existing kernel in the system. There is however, an additional kernel module that needs to be compiled and added to the existing kernel before the X server will be able to allocate the

necessary Video Memory. Follow the instructions below for obtaining and compiling the agpgart module.

Note: In order to properly configure the kernel module you will need the configured sources for your running kernel installed on the system at /usr/src/linux.

3.3.1   Download the agpgart kernel module

Download the agpgart kernel module from support.intel.com. This, when compiled and loaded, adds AGP support to the existing Linux* kernel. If the system already has an agpgart kernel module you should make a backup copy of that module and then replace it with the Intel specific one, as is described in this document. At present the agpgart kernel module available in kernels 2.3 and higher is not compatible with XFree86 3.3.6; therefore, you may need to replace agpgart with the one available from Intel's website.

The agpgart module source code comes packaged in the RPM format. Most Linux systems have the RPM tool available. If your system does not have this tool, visit www.rpm.org or your Linux distribution for information on obtaining it.

3.3.2   Compile and install the kernel module.

The kernel module must be compiled before it can be installed. This module will need to be recompiled and reinstalled if the kernel on the system is upgraded at a later date, so keep the source in a safe place.

```
cd /path_to_downloaded_rpm
rpm --recompile I810Gtt-0.2-4.src.rpm
```

The rpm command above will produce a few pages of output. Look for any errors in this output that may indicate a problem. This information may be useful if the verification steps below do indicate a problem.

The result of the above steps will be a kernel module named "agpgart.o". To verify that the installation has finished correctly, complete the following steps as the root user. If the module was not installed correctly revisit the steps above.

```
# Test to see if the module is installed in the correct location
ls -l /lib/modules/`uname -r`/misc/agpgart.o
# If a "No such file" error is produced, revisit the steps above.

# Attempt to load the kernel module
/sbin/modprobe agpgart
# Verify that the module has been correctly loaded.
cat /proc/modules | grep agpgart
# A line starting with "agpgart" should be produced.
```

If the "modprobe" command above returns "undefined symbol" errors, you do not have the configured kernel sources installed on your system. The configuration of the installed sources must be the same as the configuration of the running kernel to correctly compile this kernel module.

In order for the X server to make use of the kernel module it will need to have a device file created. The install process should do this automatically, but you should verify it is correct before continuing. The steps below detail how to create the device file by hand if an error occurred in the install process.

```
# Test to verify that the device file exists
ls –l /dev/agpgart
# If a "No such file" error is produced run this command as root
mknod –m 666 /dev/agpgart c 10 175

# Verify that the module can be autoloaded
cat /etc/conf.modules | grep agpgart

# If a line that starts with "alias" is produced your install
# is correct. If no output is produced run the following command
# as root.
echo "alias char-major-10-175 agpgart" >> /etc/conf.modules

# NOTE: A few Linux distributions use the file /etc/modules.conf
# instead of /etc/conf.modules. If /etc/modules.conf exists on
# your system use it in place of /etc/conf.modules in the above
# commands.
```

3.4 XFCom_i810 Server Installation

After a successful install of the required kernel module the system is ready to install the X server. This installation procedure requires that your system already have XFree86 3.3.6 installed, if your system does not have XFree86 3.3.6 contact your distribution for upgrade options, or follow the XFree86 links in the reference section of this document.

3.4.1   Verify your XFree86 version

To determine the version of XFree86 installed on the system use this command:

```
/bin/sh –c 'X –version 2>&1 |head –2'
```

If this version is lower than 3.3.6, the distribution is not supported and will need to be upgraded. Contact your distribution vendor for upgrade options.

3.4.2   Download XFCom_i810

Download the XFCom_i810 package in RPM format from the support.intel.com web site. This package will support both Intel® 810 and Intel® 815 Chipset Family-based systems.

3.4.3   Install the XFCom_i810 server

You will need to be the root user to do this.

```
cd /path_to_downloaded_rpm
rpm -Uvh XFCom_I810-1.2-3.i386.rpm
```

This RPM will install the XFCom_i810 binary onto your system in the /usr/X11R6/bin directory. It will then rename the existing XF86_SVGA binary to XF86_SVGA.SAVED and create a symbolic link between the XF86_SVGA name and the XFCom_i810 binary. In this way the system configuration will be simplified. If at any time you wish to restore the original XF86_SVGA binary simply remove the link and move XF86_SVGA.SAVED to XF86_SVGA.

3.4.4   Edit the XF86Config file

Setup your XF86Config file. Use your favorite text editor to edit the file /etc/X11/XF86Config. You will need to be root to do this. You may want to do a 'man XF86Config' on your Linux box first to understand this file.

Monitor Section

Each Mode that you would like to use must be defined in the XF86Config file under the "Monitor" section. They are defined in one of the two following formats.

Modeline "name" ...

or

Mode
...
EndMode

These should be set up according to the timings your monitor can support. Most distributions do this during the install process. If your distribution does not include all the modes you would like to use, check the reference section for information on creating these.

Device Section

Add the following device section to your XF86Config file. There should be other similar device sections already in the file. You can add this to the file without changing other device sections.

Section "Device"
        Identifier "i810"
EndSection

Screen Section

Add this screen section, you should remove any other "svga" screen sections that may be in this file. You can only have one "svga" section. Do not remove the vga16 screen section, as it would be useful if you should ever need to fall back to vga mode. You must edit the Monitor line to reflect the Monitor you have. You can get this from another "Screen" section in this file, or from the "Monitor" section of the XF86Config file. Be careful not to specify modes that your Monitor cannot support; you could damage the Monitor.

Section "Screen"
    Driver   "svga"
    Device   "i810"
    Monitor   "Your_Monitor_Here"
    Subsection "Display"
       Depth   8
       Modes   "640x480" "800x600" "1024x768" "1152x864" "1280x1024" "1600x1200"
       ViewPort   0 0
    EndSubsection
    Subsection "Display"
       Depth   16

```
        Modes     "640x480" "800x600" "1024x768" "1152x864" "1280x1024" "1600x1200"
        ViewPort   0 0
   EndSubsection
   Subsection "Display"
        Depth    24
        Modes     "640x480" "800x600" "1024x768" "1152x864" "1280x1024"
        ViewPort   0 0
   EndSubsection
EndSection
```

Note: Edit the "Modes" lines to have only the resolutions you want for each Color depth. In this configuration your desktop will be as large as the largest supported mode in the line. Your viewable area is the only thing that changes giving you a 'zoom' affect. If this is not what you want, make sure the largest mode on each line is the mode you plan on using for your desktop. The other modes can be available in case you need a low-resolution mode for a game or application. You can also remove an entire Subsection (Including the Subsection "Display" and "EndSubSection" lines) if you do not want to be able to use that color depth.

3.4.5   Set up the X server link

You will need to be the root user to do this. Since distributions set this up in differing manners, two methods have been included below. If neither of these work, you will need to contact your distribution to get more complete setup information.

Case 1: /etc/X11/X exists.

```
ls -l /etc/X11/X
# If this does not exist use case 2.
ln -sf /usr/X11R6/bin/XF86_SVGA /etc/X11/X
# Your system should be set up. Do not change the link in Case 2 even if it exists.
```

Case 2: /usr/X11R6/bin/X exists AND points to your current X server.

```
ls -l /usr/X11R6/bin/X
# If this does not exist and case 1 didn't exist, contact
# your distribution for assistance.
ln -sf /usr/X11R6/bin/XF86_SVGA /usr/X11R6/bin/X
```

3.4.6   Start the X server

If you are already running X you will need to exit and start again. If your system is set up to start X automatically then you will want to restart it by doing a "CTRL-ALT-Backspace". If X is not running you should start it with a command like this:

```
startx -- -bpp 16
```

The "-bpp 16" tells the server to start in 16 bit depth. You could also use 8 or 24 bit depth. "CTRL-ALT-KeyPadPlus" and "CTRL-ALT-KeyPadMinus" will rotate through the resolutions available at the current color depth. For additional documentation on XFree86 or the XF86Config file please visit the reference section.

3.5 Compiling XFree86 3.3.6 from Source

NOTE! This is for experienced Linux* users only. Provided below are only the details needed for patching and compiling the source; additional expertise is necessary to correctly install XFree86 on your system.

3.5.1   Download the source

First you will need to download the complete source for XFree86 3.3.6. Links are provided in the reference section of this document. You will need the following files, do not untar them, simply put them in a temp directory. (Note that this is 40+ MB of source)

- X336src-1.tgz
- X336src-2.tgz
- X336src-3.tgz

3.5.2   Download the patch

The modifications made to XFree86 3.3.6 are available from Intel in the form of a patch. You will need to download this patch from support.intel.com. You will need the file listed below.

- XFCom_i810-1.2.patch.tar.gz

3.5.3   Patch and build the source

Untar the patch into the same directory you placed the X336* files in and run the build-i81x.sh script.

```
cd  path to X336*
tar -zxpvf XFCom_i810-1.2.patch.tar.gz
./build-i810.sh
```

This will build the entire X tree by doing a 'make World'. You can find the correctly compiled XF86_SVGA server with the Intel® 810 and Intel® 815 Chipset Family support located in the directory XFree3.3.6/xc/programs/Xserver/. This is the same binary shipped as XFCom_i810 in the binary only distributions. Provided you already have XFree86 3.3.6 installed you should be able to use this binary by placing it in the correct location and setting up your links/XF86Config file as detailed above. If you do not have XFree86 3.3.6 installed you should see the reference section for help.

4   Reference

- XFree86 FAQ http://www.xfree86.org/FAQ
- XFree86 3.3.6 configuration http://www.xfree86.org/3.3.6/Config.html
- XFree86-HOWTO http://metalab.unc.edu/mdw/HOWTO/XFree86-HOWTO.html
- XFree86 3.3.6 Source ftp://ftp.xfree86.org/pub/XFree86/3.3.6/source/
- XFree86 4.0.x DRI site http://dri.sourceforge.net