AGA Graphics Supplement

Your Amiga is built around the AGA (AA) custom chipset, which supersedes the earlier ECS and original chipsets in graphics capability.

The new graphics features of the AGA chipset and Release 3 software open up many new possibilities. Because of the numerous options involved, it can sometimes be difficult to find the optimum graphics configuration for the software and monitor you are using. This Supplement pulls all the information on using the AGA/Release 3 display modes together into one place, and adds further suggestions on how to determine monitor compatibility.

The following areas are covered:

- General AGA graphics features, and how they differ from previous Amigas
- Display modes and monitor drivers
- Mode Promotion
- Coercion
- Preferences editor location

General AGA Information

The main graphics features of AGA Amigas under Release 3 include:

- All colour display modes can display up to 256 colours from a palette of 16.8 million (up from a maximum of 64 colours from a 4096-colour palette on earlier Amigas).

- The new HAM-8 mode, available in any display resolution, can display over 256,000 colours at once, from the 16.8 million-colour palette (up from a maximum of 4096 colours using the earlier HAM mode).

- The Mode Promotion feature uses scan-doubling to turn the standard 15 kHz screens used by most Amiga applications to a stable, non-flickering VGA-quality display. Earlier Amigas required additional hardware to eliminate interlace flicker.

- Sprites, including the mouse pointers, can now be high-resolution, and can be up to four times larger.

- New monitor driver files allow the Amiga to use additional screen resolutions, and adapt to a wider variety of monitors.

- AGA retains virtually complete compatibility with software developed for ECS and earlier Amigas.

*Note   The A2024 high-resolution monochrome mode remains the same under Release 3, except that its horizontal resolution is a full 1024 pixels, and an A2024 screen larger than the display can now be defined and will autoscroll. The A2024 mode is not discussed further in this supplement.

Tips for Working with AGA

To get the most from your AGA Amiga, observe these
recommendations:

- **Use a multiscan monitor that can sync down to 15 kHz if
  possible.** A monitor that can display 15 kHz modes is required
  for initial setup of the Amiga.

- **To enable Mode Promotion, select the Mode Promotion
  gadget in the IControl Preferences editor.** Be sure the
  appropriate monitor driver (DblNTSC for NTSC Amigas, or
  DblPAL for PAL Amigas) is in the DEVS:Monitors drawer.

- **Place in DEVS:Monitors only the monitor drivers for the
  display modes you need.** This reduces clutter in the
  ScreenMode Preferences editor.

- **Mode Promotion should be turned off when doing video
  work.** Video devices require 15 kHz output.

- **In case of software compatibility problems, the Amiga
  Early Startup Control options may help.** If an application
  appears not to work on an AGA/Release 3 Amiga, try first
  booting the system with the Enhanced or Original custom chip
  set emulation available from the Display Options screen.

Monitor Types

The Amiga requires an analog RGB (colour) monitor. There are
three general types of analog RGB monitors that you might use
with your Amiga. The difference among them is in the horizontal
sync frequencies (also called the scan rates) they accept:

1. Video monitors, like the Commodore 1084 series, accept only the
   standard Amiga 15 kHz scan rate (NTSC and PAL display
   modes)

2. VGA-only monitors accept only the 31 kHz VGA scan rate (Dbl,
   Multiscan, and Productivity modes)

3. Multiscan (multiple horizontal sync frequency or "multi-sync")
    monitors, like the Commodore 1950 and 1960, accept a range of
    scan rates

Horizontal Scan Rate

To properly reproduce all the Amiga display modes that you are
likely to encounter, you should use an appropriate multiscan monitor.

•   Certain important Amiga screens, such as alerts and the Early
    Startup Control screen, always appear in one of the 15 kHz
    modes, as do many games and certain other applications. A
    VGA-only monitor cannot properly display these screens.

•   A 15 kHz-only monitor can display all system screens and
    virtually all Amiga applications, but cannot take advantage of
    Mode Promotion or offer the higher resolutions and enhanced
    displays that the AGA chipset offers.

Check the specifications for a multiscan monitor carefully, however,
as not all multiscan monitors accept 15 kHz input.

Vertical Scan Rate

Display modes also have a vertical scan rate (also called the refresh
rate) that must be supported by the monitor. Vertical scan rates for
display modes available under Release 3 vary from 48 to 73 Hz.

Appendix B in the *Amiga Workbench User's Guide* details the
resolutions of the modes offered by the different monitor drivers
included with Release 3, listed by monitor. The following tables
group the monitor types according to the three basic horizontal scan
rates that they require.

Video Monitors

Monitor Driver	Horizontal Scan Rate	Vertical Scan Rate
NTSC	15.72 kHz	60 Hz
PAL	15.60 kHz	50 Hz
Euro36	15.76 kHz	73 Hz

VGA Monitors

The standard VGA horizontal scan rate is 31.5 kHz. Most, but not all, VGA-only monitors can also display the 27 kHz promoted modes produced by the DblNTSC and DblPAL monitor drivers.

Note   If you are attempting to use a VGA monitor with the Dbl or Multiscan modes, and it does not display those modes correctly, activating the VGAOnly monitor driver may help. It modifies the scan rates slightly, at the cost of smooth horizontal scrolling. (There is no other reason to use VGAOnly.) The next tables show the normal scan rate followed by the rates as modified by VGAOnly.

Monitor Driver	Horizontal Scan Rates	Vertical Scan Rates
DblNTSC	27.66 kHz / 29.20 kHz	58 Hz / 59 Hz
DblPAL	27.50 kHz / 29.45 kHz	48 Hz / 50 Hz
Euro72	29.32 kHz / 31.43 kHz	69 Hz / 70 Hz
Multiscan	29.29 kHz / 31.44 kHz	58 Hz / 60 Hz

(If you activate or deactivate VGAOnly, you should delete the file ENVARC:Sys/overscan.prefs and reboot before editing your ScreenMode and Overscan preferences settings.)

Multiscan Monitors

A multiscan monitor can potentially display any of the above, plus the following:

Monitor Driver	Horizontal Scan Rates	Vertical Scan Rates
Super72	23.21 kHz / 24.62 kHz	71 Hz / 72 Hz

Choosing a Monitor

To determine whether a given monitor will work with your Amiga, you must compare the specifications of the monitor you are considering against the scan rates listed above. If the monitor accepts the scan rate of the monitor driver listed, the monitor should work with the display modes the monitor driver provides.

In practice, it is unusual to find a monitor that can display all of the Amiga's display modes. However, there is really no need to do so. Many modes have similar resolutions, and differ only in their scan rates. The large number of video modes with different scan rates allows you the flexibility to use any of various types of monitors that may be available to you.

Note   When changing between screens whose display modes do not have the same scan rates, such as DblNTSC and Super72 modes, a multiscan monitor must re-sync to the new scan rate. While the monitor adjusts itself, the image will jump, or the display may go blank briefly, depending on the monitor. This is normal.

Mode Promotion

Mode Promotion is a feature of AGA Amigas intended to give you the best possible display. When an application tries to open a normal NTSC or PAL (15 kHz) screen while Mode Promotion is enabled, the screen is promoted to a solid, non-flickering 27 kHz display.

A non-interlaced screen (200/256 pixel high) is scan-doubled, which fills in the blank scan lines; an interlaced screen (400/512 pixels high) is de-interlaced so that horizontal lines do not flicker. This is similar to the operation of the Commodore Display Enhancer circuitry in the Amiga 3000. By default, Mode Promotion is off.

Not all display modes can be promoted. Only standard NTSC and PAL screens are promoted. (Super-HighRes modes are promoted by changing them to autoscrolling Dbl HighRes screens.) Certain screens are not promoted if the program that opens the screen does not allow it. Video applications in particular may force a standard NTSC/PAL screen. Also, games and other applications that bypass the operating system are not promoted.

Note   The horizontal overscan available when using the DblNTSC and DblPAL monitors is slightly less than that of the equivalent non-promoted screen.

Enabling Mode Promotion

To enable promotion, make sure the Mode Promotion gadget in the IControl Preferences editor is checked, and that you select Use or Save to exit the editor. Also, the DblNTSC or DblPAL monitor driver must be in your DEVS:Monitors drawer and be activated. If you did not boot with a given monitor in DEVS:Monitors and want to activate it, double-click on its icon after dragging it into DEVS:Monitors.

Screen Centring and Overscan

The display modes produced by different monitor drivers may vary
in their size and centring on the monitor screen. You can control
this by first saving your preferred Workbench display settings in
the ScreenMode and Overscan Preferences editors, and then using
the monitor's horizontal and vertical size/centring controls for the
best display. If certain display modes produce screens on which
some part is not visible, a further adjustment of the monitor controls
should help.

Coercion

Coercion should not be confused with promotion. Coercion occurs
when the front screen is pulled down to reveal a screen behind it that
has a different scan rate. The monitor can display only one scan
rate at a time, that of the front screen. Therefore the rear screen is
"coerced," or shown in the display mode of the front screen. Depen-
ding on the two modes, coercion may involve a distortion of the rear
screen, such as an apparent shrinkage or expansion. This effect dis-
appears when the rear screen is brought to the front.

The IControl Preferences editor has two options related to coercion.
The Preserve Colours option has no function on AGA/Release 3
Amigas, because all display modes now share the same colour
capabilities.

Preferences Editors

On the Amiga disk set, Preferences editors are stored in the Prefs
drawer on the Extras disk. If you have a floppy-only system, you
must place the Extras disk in a drive and open the Prefs drawer on
that disk to get to the ScreenMode, Overscan, and other Prefs
editors. You will need to replace your boot disk in the drive when
you want to save your chosen display mode, overscan settings, and
other system options.