
Subject: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 16:27:49 GMT
[View Forum Message](#) <> [Reply to Message](#)

It's interesting to me....

The Apple II came out in 1977 and can really be forgiven for not having hardware assisted screen scrolling, sprites, etc. The Atari 800 came out in 1979 and had lots of custom hardware (I think the first rev had 128 rather than 256 colors in the palette tho) for scrolling, sprites, etc. The C64 came out in 1982 and has sprites and (it seems from what I have recently read) hardware scrolling.

The Amiga came out with quite the custom hardware in 1985 and wowed us all. The Amiga combined a very fast CPU with this hardware and was a thing of beauty.

What I find odd is that the Apple IIgs came out in 1986 and did not have a fast CPU - a 2.8MHz 65C816 w/ a 1MHz bus and had screenmodes not unlike the Amiga and Atari ST, but lacked sprites, hardware scrolling etc. (The ST had no gfx acceleration either, but it at least had a fast CPU so the lack seems less grievous.) I got to thinking about this when I was looking at Shadow of the Beast on my newly setup C64 system...

http://www.blakespot.com/list/images/c64c_1.jpg

....and was amazed at what a 1MHz 6510-based system was doing. I am quite certain that the Apple IIgs could not have pulled that off. I wonder why it is that there was no acceleration in the GS? And I _am_ correct tha the C64 has hardware scrolling, yes?

Was just thinking about all this, reading the threads. It seems the Amstrad CPC had hardware scrolling as well. I guess the IIgs (and IIe / IIc really) were in the minority at their time of introduction.

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Hg\[1\]\[2\]](#) on Fri, 04 Feb 2005 17:08:11 GMT
[View Forum Message](#) <> [Reply to Message](#)

The C64 would have been even more beautiful had it possessed the Atari's 1.79Mhz CPU speed and colour palette.

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 19:17:23 GMT
[View Forum Message](#) <> [Reply to Message](#)

Yea, I can never really seem to reconcile that. The Atari had a far greater palette and a faster CPU, but the C64 is perhaps considered the better "graphics gaming machine." It seems the C64 can paint a 320x200 16-color screen. Could the Atari not do such a mode? It seems it might need to run at a lower res to get that many colors onscreen? Like the Apple II could do 280x192 in b&w pixels but 140x192 w/ color. (560x192 w/ double high res b&w pixels but 140x192 w/ 16-color double high res - similarly.)

Is the Atari the better game machine? There's a loaded question.

I think a lot of Free Fall's and Ozark's games were Atari first.

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [David Murray](#) on Fri, 04 Feb 2005 19:30:18 GMT
[View Forum Message](#) <> [Reply to Message](#)

Well, I just don't think the Apple II series was ever targeted or marketed as a game machine, just like the IBM PC. The Apple II had several advantages over the C64 that really boosted in for other applications. For example, lets face it, the disk access was much better. The speed was better, and the memory was better. The internal expandability was also better. But its graphics and sound sucked. I have played many games that were developed for both machines and was always blown away how much better the C64 version was. I actually own an Apple IIe but haven't fired it up in years. But I have copies of some of the same games.. Just what comes to mind are: Ms. Pac Man, Spy vs. Spy, and Ghostbusters. The C64 version of each of these are way better.

Not only that.. but honestly I prefer to use an Apple II on a black and white monitor. I'd rather not see the terrible color skew that you see on plain text. Since most anything I'd do with one would be a black & white type application anyway.

--DavidM

"Blake Patterson" <blakespot@gmail.com> wrote in
news:1107534469.719450.52490@g14g2000cwa.googlegroups.com:

> It's interesting to me....
>

> The Apple II came out in 1977 and can really be forgiven for not having
> hardware assisted screen scrolling, sprites, etc. The Atari 800 came
> out in 1979 and had lots of custom hardware (I think the first rev had
> 128 rather than 256 colors in the palette tho) for scrolling, sprites,
> etc. The C64 came out in 1982 and has sprites and (it seems from what
> I have recently read) hardware scrolling.
>

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 21:35:27 GMT
[View Forum Message](#) <> [Reply to Message](#)

The Apple II was the 8-bit machine that I primarily used back in the day. I have an Apple IIgs now to run the full lot of Apple II software. The color skew is not a problem with an RGB monitor tied to the IIgs.

On the IIgs, G = graphics, S = sound. It is curious to me that we did not see some hardware assistance in the animation department on that machine that was released in 1986. It had much better sound hardware than even the Amiga, but it was held back by only 64K of audio RAM.

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [de Selby](#) on Fri, 04 Feb 2005 21:41:34 GMT
[View Forum Message](#) <> [Reply to Message](#)

> On the IIgs, G = graphics, S = sound. It is curious to me that we did
> not see some hardware assistance in the animation department on that
> machine that was released in 1986. It had much better sound hardware
> than even the Amiga

....but you need expensive third party hardware to make use of it.

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 22:10:12 GMT
[View Forum Message](#) <> [Reply to Message](#)

No, you don't, actually.

The IIgs has a small internal speaker and a 1/8" headphone jack. The headphone jack outputs the IIgs' Ensoniq DOC's audio in mono only.

There is a connector inside the machine that breaks out the audio signals. Users wanting the sound in stereo would typically add a stereo card that sat in a slot to draw power and had a ribbon cable connecting to the sound connector to get at the stereo signal. The card amplified the signal and provided an 1/8" stereo headphone jack. Often the cards contained hardware that allowed sampling of audio to disk.

It is possible to build a stereo card and many users did so. Or you can make due with mono sound. You definitely did not need any hardware to hear the GS' 32-oscillator sound in full quality (if mono).

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Cameron Kaiser](#) on Fri, 04 Feb 2005 22:50:07 GMT
[View Forum Message](#) <> [Reply to Message](#)

This is more comp.sys.apple2 territory, but what the heck.

"Blake Patterson" <blakespot@gmail.com> writes:

> What I find odd is that the Apple IIgs came out in 1986 and did not
> have a fast CPU - a 2.8MHz 65C816 w/ a 1MHz bus and had screenmodes not
> unlike the Amiga and Atari ST, but lacked sprites, hardware scrolling
> etc. (The ST had no gfx acceleration either, but it at least had a
> fast CPU so the lack seems less grievous.) I got to thinking about
> this when I was looking at Shadow of the Beast on my newly setup C64
> system...
> http://www.blakespot.com/list/images/c64c_1.jpg
> ...and was amazed at what a 1MHz 6510-based system was doing. I am
> quite certain that the Apple IIgs could not have pulled that off. I
> wonder why it is that there was no acceleration in the GS? And I _am_
> correct tha the C64 has hardware scrolling, yes?

The C64 has hardware fine scrolling, although you have to do the heavy lifting for coarse scrolling.

The IIgs should not have been as crippled as it was (I'm a IIgs owner; I have a Woz converted to ROM 03 with 2MB of RAM, an AE SCSI card and drive, and GS/OS; I'll get a ZipChip one of these days). The reason was very simple: Apple didn't want to be in the Apple II line anymore, and didn't want people flocking to the IIgs when they should have been buying a Macintosh. As a result, the CPU speed was intentionally crippled.

Nevertheless, the Ilgs does have nice graphics and sound, and the 65816 in that unit is "good enough." It just could have been better, and the lousy part is that it was not better, on purpose.

--

Cameron Kaiser * ckaiser@floodgap.com * posting with a Commodore 128
personal page: <http://www.armory.com/%7Espectre/>

** Computer Workshops: games, productivity software and more for C64/128! **

** <http://www.armory.com/%7Espectre/cwi/> **

Subject: Re: Early machines and hardware scrolling, sprites, etc.

Posted by [Peter van Merkerk](#) on Fri, 04 Feb 2005 23:34:35 GMT

[View Forum Message](#) <> [Reply to Message](#)

Blake Patterson wrote:

> Yea, I can never really seem to reconcile that. The Atari had a far
> greater palette and a faster CPU, but the C64 is perhaps considered the
> better "graphics gaming machine." It seems the C64 can paint a 320x200
> 16-color screen.

It can, but there are restrictions though. You can have only two colors (out of palette of 16 colors) in every 8x8 pixel block. Suppose you want to paint a blue and a red line that cross each other on a black background (so in total 3 colors). Everything is fine with exception of the pixel block in which the lines cross. In that pixel block the red line has to be draw blue or the blue line has to be drawn red. This effect is known as color bleeding. The C64 is not unique in this respect; there are several other home computers, like the Sinclair Spectrum which have similar restrictions. There are undocumented tricks to improve the color resolution, but since these require very accurate timing and a lot of CPU time, they are rarely used except for demos. Because of the color restrictions in the 320x200 mode, many programs use the 160x200 mode, which can display 4 colors in every 4x8 pixel block.

> Could the Atari not do such a mode? It seems it
> might need to run at a lower res to get that many colors onscreen?
> Like the Apple II could do 280x192 in b&w pixels but 140x192 w/ color.
> (560x192 w/ double high res b&w pixels but 140x192 w/ 16-color double
> high res - similarly.)

Both the Atari and the C64 have only a limited amount of memory for display purposes. In both cases the video memory is insufficient to display 320x200 with 16 colors without restrictions. Atari deals with this by lowering the number of colors or lowering the resolution, the C64 deals with this by making some restrictions on the number of colors that can be displayed within a pixel block.

I'm not too familiar with the Atari, but I believe one can increase the total number of colors shown simultaneously on a screen by using display lists. But the number of possible colors on a single line would still be restricted to 4.

> Is the Atari the better game machine? There's a loaded question.

It is not just about numbers; for example the hardware sprites on the C64 are much more flexible than the player/missile graphics found on the Atari. From the hardware perspective I think the C64 is a better balanced machine. The relatively weak CPU is more than compensated by the video and audio chips. If it only would have had a faster disk drive and more colors...

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 23:41:14 GMT
[View Forum Message](#) <> [Reply to Message](#)

I, too, have a IIgs currently and enjoyed one during '87-'88. Current IIgs has:

- 500MB Focus IDE hardcard
- ZipGS accelerator
- 5.125MB RAM (SiriusRAM card)
- SoundMeister stereo card
- 2x 3.5", 1x 5.25" floppy
- ROM 03 mobo in a Woz case

I guess I am answering my own question here a bit, but I knew the GS was intentionally crippled at the CPU, but keeping a slowish CPU and adding some hardware accelerated gfx would still keep the computational power down, reducing the competition w/ Mac. Well, the GS does have FillMode. :-)

I don't think the GS could pull off Shadow of the Beast graphically, though. Not that much animation. I kept a close watch on my friend Arnold Kim (runs MacRumors.com now) who coded some GS demos in asm back in the late 80's - Nemesis Productions. What he showed me of the GS' outer limits falls short of SOTB on the C64.

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Blake Patterson](#) on Fri, 04 Feb 2005 23:45:14 GMT
[View Forum Message](#) <> [Reply to Message](#)

Yes Spectrum graphics make the limitation quite visible and obvious.
Much moreso than the C64. Are you sure the C64 is as limited as you describe? Looking at the gfx it seems not so while, again, it is obvious on the Spectrum.

Spectrum allows I think 2 colors/ 8x8 block if I am not mistaken.

So can the C64 scroll the entire screen w/ little CPU impact?

bp

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [White Flame \ \(aka Dav\[1\]](#) on Sat, 05 Feb 2005 03:37:30 GMT
[View Forum Message](#) <> [Reply to Message](#)

"Blake Patterson" <blakespot@gmail.com> wrote in message
news:1107560714.419887.214810@f14g2000cwb.googlegroups.com...
> Spectrum allows I think 2 colors/ 8x8 block if I am not mistaken.

Yep, same as c64's hires mode, but their bitmap layout is wonky in a different way, iirc.

> So can the C64 scroll the entire screen w/ little CPU impact?

The 64 has finescroll of 8 pixels in both x/y directions. To move more than that, redrawing the buffer is necessary, but since it's 8x8 char/tile based in most games' modes, that only takes 1000 bytes max to redraw, which is a whole lot faster than redrawing a bitmap.

There are also some tricks for freaking out the video chip so that it does scroll large distances, but some of them crash older machines or are limited to how much they can display, so they weren't used all that much in commercial games. Demos, on the other hand, use them all the time.

--

White Flame (aka David Holz)
<http://www.white-flame.com/>
(spamblock in effect)

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Peter van Merkerk](#) on Sat, 05 Feb 2005 10:18:21 GMT
[View Forum Message](#) <> [Reply to Message](#)

Blake Patterson wrote:

- > Yes Spectrum graphics make the limitation quite visible and obvious.
- > Much moreso than the C64. Are you sure the C64 is as limited as you
- > describe? Looking at the gfx it seems not so while, again, it is
- > obvious on the Spectrum.

Yes, but the advantage of the C64 is that it also has sprites which don't have the color bleeding problem.

On the spectrum the player graphics are part of the bitmap. If the player is moved the bitmap has to be redrawn, and if the player is between two 8x8 pixel blocks with different color attributes the color bleeding will become very appearant.

On the C64 player graphics are usually sprites which are completely independant of the underlying bitmap.

- > Spectrum allows I think 2 colors/ 8x8 block if I am not mistaken.

That is correct.

- > So can the C64 scroll the entire screen w/ little CPU impact?

The C64 can scroll the screen 8 pixels both vertically and horizontally. After that the image data has to be moved in memory. Since moving up to 10 kilobytes during the vertical retrace is more than a 6510 @ 1 MHz can handle, scrollers use character based screen modes which require much less bytes to be moved in memory.

--

Peter van Merkerk
peter.van.merkerk(at)dse.nl

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Anton Treuenfels](#) on Sun, 06 Feb 2005 04:38:50 GMT
[View Forum Message](#) <> [Reply to Message](#)

"Blake Patterson" <blakespot@gmail.com> wrote in message news:1107560474.922704.200390@f14g2000cwb.googlegroups.com...
> I guess I am answering my own question here a bit, but I knew the GS
> was intentionally crippled at the CPU, but keeping a slowish CPU and
> adding some hardware accelerated gfx would still keep the computational
> power down, reducing the competition w/ Mac. Well, the GS does have

> Fill Mode

I dunno - scanning through my copy of the "Apple IIgs Hardware Reference Guide" doesn't make it seem like Color Fill Mode is all that exciting. What's more interesting is that one of the new graphics modes is 320x200x16, where those 16 colors represent indexes into a 16-slot palette of 12-bit colors. So, any pixel on the screen can be one of sixteen colors selected from a potential 4096, with no restrictions on placement.

The analog RGB output as well as composite video is also nice.

But it also appears that the screen buffer location in this mode is fixed. There's no apparent way to do double-buffering, and that hurts animation quite a bit.

- Anton Treuenfels

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by anoned@netscape.net on Sun, 06 Feb 2005 14:11:31 GMT
[View Forum Message](#) <> [Reply to Message](#)

Blake Patterson wrote:

> It's interesting to me....

>

> The Apple II came out in 1977 and can really be forgiven for not having

> hardware assisted screen scrolling, sprites, etc. The Atari 800 came

> out in 1979 and had lots of custom hardware (I think the first rev had

> 128 rather than 256 colors in the palette tho) for scrolling, sprites,

> etc. The C64 came out in 1982 and has sprites and (it seems from what

> I have recently read) hardware scrolling.

<snip>

And the TI-99/4 came out in 1979, and had sprites (32 with foreground color only, automatic motion, limited to four on a line), 256x192 screen, no bitmap and no real hardware scrolling, only page flipping. The 99/4A came out about 1.5 years later and added bitmap, with its color bleeding problems. But with the memory usage of this mode you could not do page flipping.

Ben

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Payton Byrd](#) on Sun, 06 Feb 2005 15:23:45 GMT
[View Forum Message](#) <> [Reply to Message](#)

Peter van Merkerk wrote:

> Blake Patterson wrote:

>

>> Yes Spectrum graphics make the limitation quite visible and obvious.

>> Much moreso than the C64. Are you sure the C64 is as limited as you

>> describe? Looking at the gfx it seems not so while, again, it is

>> obvious on the Spectrum.

>

>

> Yes, but the advantage of the C64 is that it also has sprites which

> don't have the color bleeding problem.

Interesting. That means you could draw your bitmap in 320x200 and leave out the intersection blocks, and then use sprites to display the mixed colors over the missing blocks. Combine this with the hacks to get more sprites on the screen and you could have quite a complicated and color rich image. Add in the easy ability to animate sprites and well placed sprites over a well laid out background could accomplish some very nice 320x200 animations such as an erupting volcano or twinkling stars through a nebula or something.

--

Payton Byrd

Homepage - <http://www.paytonbyrd.com>

Blog - <http://blogs.ittoolbox.com/visualbasic/dotnet/>

Store - <http://stores.ebay.com/Collectible-Commodores-and-More>

Subject: Re: Early machines and hardware scrolling, sprites, etc.
Posted by [Peter van Merkerk](#) on Sun, 06 Feb 2005 16:51:01 GMT
[View Forum Message](#) <> [Reply to Message](#)

Payton Byrd wrote:

> Peter van Merkerk wrote:

>

>> Blake Patterson wrote:

>>

>>> Yes Spectrum graphics make the limitation quite visible and obvious.

>>> Much moreso than the C64. Are you sure the C64 is as limited as you

>>> describe? Looking at the gfx it seems not so while, again, it is

>>> obvious on the Spectrum.

>>

>> Yes, but the advantage of the C64 is that it also has sprites which
>> don't have the color bleeding problem.
>
> Interesting. That means you could draw your bitmap in 320x200 and leave
> out the intersection blocks, and then use sprites to display the mixed
> colors over the missing blocks.

You are not the first with that idea, check out the "SuperHires - SH"
part on this page:

<http://www.studiostyle.sk/dmagic/gallery/gfxmodes.htm>

--

Peter van Merkerk
peter.van.merkerk(at)dse.nl
