

Re: MCU w/ integrated graphics LCD controller suggestions?

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- *From:* Bob <SkiBoyBob@xxxxxxxxxx>
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Ulf Samuelsson wrote:

"Bob" <SkiBoyBob@xxxxxxxxxx> skrev i meddelandet
news:5gsqn5F3ehrloU1@xxxxxxxxxxxxxxxxxxxxxxxxxxxx

Hi all,

I'm looking for a single chip solution that integrates an Epson-like (135x family, e.g.) LCD controller and some flash with a modest MCU.

The application needs at a minimum of
2 bits per pixel and
320 by 240 STN LCD control.

Similar code and font data on a 80186 consumes around 64k bytes so it needs at least that much flash built-in. The LCD RAM obviously needs to be at least 19.2k but the general purpose RAM could be tiny (1 or 2 kbytes). SPI slave hardware is also required. Pretty modest, no?

I'm not interested in an external bus and it can't be BGA. I'm wondering if such a beast exists or if I have to put down an epon and a micro w/ bus to do this job. Production quantities are in the 1k/year range so custom is out...
Suggestions?

You need a sync serial peripheral which can transfer a continous bitstream of data, preferably without user intervention and then you need to have a number of timers. The AT91SAM7S/X/A3 has the SSC (Synchronous Serial Controller) which is connected to a double buffered DMA capable of sending up to 64 kB/transfer. The SSC clock can be driven by an external clock signal, which you can generate by one of the timers. This reduces the number of interrupts to one per frame. With a 64 kB part, you can double buffer.

Note that you are only shifting out one bit at a time, so you may need external H/W to generate two bit, or you use the SAM7A3, which has 2 x SSCs but then you have to divide the memory into planes, each handling one bit. This only has 32 kB of SRAM, so you cannot have more than 2 bits per pixel.

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Other timers can be used to generate the other signals needed by the LCD.
Since $19200 * 8 > 65535$, you have to prescale the timers before you use them.

You are likely to be better off getting a CPU module with an AT91SAM9261 which supports QVGA with up to 16 bits per pixel in the internal memory, (It is in BGA, so you dont like the bare chip)

Thanks Ulf,

The LCD actually has 4 data bits. Doesn't the glue logic to run it from less than 4 SPI channels gets a little ugly? Also, I believe the gray scale is done with PWM so doing it manually would mean planes even for 2 bit/pixel :-(

OTOH, poking around the Atmel site I see the AT91SAM7SE256 (256k flash, 32kSRAM internal and a full 16 bit wide by 20+bit tall external bus) with an Epson S1D13706 (80k graphics ram) hanging on the side will do the job nicely for <\$20 total and keep me in TQFP-land. Who knows, I might find a use for the USB ;-)

Bob

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