Hi folks,
I've given Multicomp a native graphics screen with 640x240px including a fully programmable font-ROM. For more information see my builderpage 'muellerk' in the forum wiki.

cheers
Kurt

Great!!! You are pulling me to do a Cyclone IV version of "The Thing" soon ... :lol:

At this point I'll see if can be possible to leave the option to use a EP4CE15E22C8N or a EP4CE22E22C8N too...

UPDATE: the EP4C6 has 91 IO pins, the EP4C15 81, the EP4C22 79.... hmmm...

UPDATE2: the EP4CE10E22C8N has 91 IO pins too, so may be it is an easier upgrade...

Nice work Kurt.

I have been hoping someone will do a Multicomp terminal. An ECB+Multicomp graphics terminal would be even better.

Regards Phil

Hi just4fun,
if you really start a new board design, consider the following:
b/w graphic is a ok, that needs in 640x480px 38.4kB RAM the EP4CE10E22C8N has that block-RAM internally. But what I would prefer is 640x480px and 1 byte per pixel = 307200 Byte in a 2x2x2x2 (RxGxBxLumi) configuration. That leads to an external SRAM of 512kB. Together with 1MB SRAM we already have, we end up with a lot of pins. My second wish would be to interface to a RC2014 backplain. That are 40 pins+

cheers
Kurt

Subject: Re: Multicomp with native b/w graphic
Posted by kman on Wed, 20 Feb 2019 04:30:56 GMT
View Forum Message <> Reply to Message

Hi Phil,
yes, when I got my Multicomp up and running, it doesn’t last very long until I decided that a ASCII-Screen isn’t enough. Grant’s display solution is a little bit complicated. He squeezed a lot of functionality into his VHDL-code, but at the end I got it done.

cheers
Kurt

Subject: Re: Multicomp with native b/w graphic
Posted by JonB on Sun, 24 Feb 2019 08:43:07 GMT
View Forum Message <> Reply to Message

That font looks familiar... :)

You say on your page that you are looking for a polygon fill. More often referred to as "food fill" - there are several ways to do it. When I was at college many years ago, I had a programming competition with a friend to produce a flood fill on a Sinclair Spectrum. Mine used the stack and couldn't flood fill really complex shapes like the background to a screen of text. His used a circular buffer and worked better. It was also much faster, although it took him 3 times as long to write.

Unfortunately, the source code was lost but I do have the prototypes in Spectrum BASIC.

Subject: Re: Multicomp with native b/w graphic
Posted by b1ackmai1er on Sun, 24 Feb 2019 11:04:04 GMT
View Forum Message <> Reply to Message
Hi,
thank you for the hint. I will investigate that. I've found something in one of my old books (Franzis-Verlag, Juergen Plate, "Computer Graphic: ..."), a promising algorithm that can handle complex polygons to fill. That's what the paper says... When I've finished my ellipse challenge (the assembler code is written - incl. the needed 32-bit math, now I've to re-check and test the code).

At the moment I'm uncertain what to do next: go on with 'Flood-Fill' or splitt the RSX-Code into smaller pieces/files. The reason: I've several times accedently past/delete code when scrolling lines with the mouse wheel. On the other hand, I can do that later and go on...

Flood fill and polygon fill are different things. Polygon fill works from the geometry and basically flips between fill/nonfill at each line crossing of the polygon border, whilst a floodfill like that linked to starts at a point and fills the enclosed space. They produce different results.

The spectrum flood fill given is ok but the better ones checked bytes and did other clever things. Without that flood fill tends to be really really slow. The pattern capable one in the Illustrator and PAWS is a really good example to study with a disassembler.

Flood fill vs Polygon fill - true I hadnt thought of that distinction.

Hi,
never mind, I will try it. Otherwise I will stick to polygon fill. May be it's the better over all solution.
Subject: Re: Multicomp with native b/w graphic  
Posted by b1ackmai1er on Sun, 03 Mar 2019 10:21:36 GMT  
View Forum Message <> Reply to Message

Stumbled upon this arduino display library that may be useful as it has some bitmap polygon fill functions.

https://github.com/olikraus/u8g2/wiki/u8g2reference

Subject: Re: Multicomp with native b/w graphic  
Posted by kman on Tue, 05 Mar 2019 11:09:09 GMT  
View Forum Message <> Reply to Message

Thank you for the link. I've searched through the zip files and found a lot of interesting stuff...

Subject: Re: Multicomp with native b/w graphic  
Posted by kman on Thu, 14 Mar 2019 20:40:33 GMT  
View Forum Message <> Reply to Message

Hi all,
For those who own a multicomp-6809/6502 and wish to use my graphic-modification, I have incl. my last BASIC-Version of the graphic library I used to test the hardware attached for download. It has all line and text functions at the level when I started to code the CP/M3-RSX. It is pretty usable and fast when compiled with the CB80 BASIC-Compiler. The code is in plain ASCII

File Attachments
1) multicomp-cb80_xgraph_20181220.tar.gz, downloaded 327 times

Subject: Re: Multicomp with native b/w graphic  
Posted by b1ackmai1er on Thu, 14 Mar 2019 22:10:27 GMT  
View Forum Message <> Reply to Message

Nice work, thanks for sharing your code. BASIC must still be the best tool for quick small utilities :) Might try and use some routines to do some graphics on the VDU board I just completed .. would be 160x72 pixels lol.

Can you please upload CP/M file in .ARC and/or .LBR format in future (joke!).
If the hack is not longer then ~100 lines basic is ok. But the lack of const definitions, real subroutines with local param a.s.o. makes it a pain, when the programm complexity reaches a certain state.

I've search my computer and found the last sample of my "GRAFTST.bas" that can handle 160x120px semi block-graphic (aka 80x30 ASCII-screen). It only handles pixels, no text output. I think that is more suitable to your 160x72px graphic, because the special address and pixel calc. is considered. You have to adjust only the lines where the calc. is done...

File Attachments
1) GRAFTST-160x120px_Semi-2x4-Blockgraphic_20181029.zip, downloaded 328 times

Yes you are right. I never really got past ASM, BASIC and Turbo Pascal, little bit of Delphi. Can do basic stuff in C if forced to (arduino). I really liked Delphi but didn't get far with it.

Thanks for the code example.

Short info regarding the promised ref-manual:
I'm midway writing it. It's difficult enough to write one in ones own lanbuage, but doing it in a foreign language is to combat a real beast...but it's not hopeless ;-) I think it will be ready within the next weeks. At the moment I can say, the software is fairly bugfree, nothing horrible found until now. Same to the graphic hardware. Every try to get it to stumble fails - but never ask the developer wether his work is stable/good. He will always say YES ! ;-)
Love the Data 70 font.

Have to add on e to the ECB-VDU.

Regards Phil

---

Subject: Re: Multicomp with native b/w graphic
Posted by kman on Sun, 31 Mar 2019 00:41:07 GMT

Sorry, I'm a little bit late, but we have some sunny days here and garden work is calling... ;-)

Some interesting fonts can be found here
Click on the font picture to download.

A useful font-editor is here, I'm unsure, but it might be already mentioned elsewhere in the forum. Start it twice for copying between fonts.

---

Subject: Re: Multicomp with native b/w graphic
Posted by kman on Fri, 12 Apr 2019 10:20:42 GMT

Hi,
I've uploaded a new xgraph-archive, incl. the hopefully final version (for the moment) of the xgraph package together with the ref-manual on my builder-page. I've shifted all functions that are more low-level from xdraw.h etc. into xsys.h. I think these functions are more less often used, so it's better to have them out of the way. There is also a new demo, that shows the data of the Ellipse-Struct on the ASCII- and a FnRBoxEllipse sketch on the graphic-screen. If possible use a terminal-app on a PC and a 2nd monitor for the Multicomp-VGA output. This structure caused me some headache, because I've made a small but "hard to find" typo in a rightshift-subroutine that divided 2 WORD's by 2 at a unexpected place inside the struct (of cause only in one resolution mode). :'( This turned the graphic into a wood of lines, grrrr... The result of this bug-hunting is xdemo8. The output is more functional, don't expect a eye-candy..., there is some potential for improvements.

---

Subject: Re: Multicomp with native b/w graphic
Posted by b1ackmai1er on Sat, 11 May 2019 02:28:46 GMT

Had this Cyclone IV sitting in my shopping cart for a long time and looks to be in the Multicomp IV-B format.
Price has finally dropped if anyone else is interested.

Aliexpress

This ones a different format but looks like good value

As if I needed further distraction, doh!

Subject: Re: Multicomp with native b/w graphic
Posted by kman on Sat, 11 May 2019 07:47:59 GMT

Very interesting board (EP4CE15F23C8N), especially the FPGA size and the 2.54mm pinheader with its 108 user I/O’s, and the SDRAM. I’ve ordered one to test it. I’ve a small wish list for extending the 'old' Cyclone-IVb board by a interface to the RC2014 bus with a 'backplane' sitting on top of the FPGA-Board (for example), extra 512k VGA-RAM for full 640x480px graphics (may be with colour 2x2x2x2). There may be more..., so what about extending the 'old' Cyclone-IVb board ? Any thoughts about that ?

The Cyclone-IV board looks very similar to my blue spare one. The green board has a 50MHz oscillator instead of 25MHz as the blue one.

Subject: Re: Multicomp with native b/w graphic
Posted by b1ackmai1er on Mon, 07 Oct 2019 09:03:56 GMT

Hi Kurt,

How did you go with that Aliexpress board?

Regards Phil.

Subject: Re: Multicomp with native b/w graphic
Posted by kman on Mon, 07 Oct 2019 15:09:46 GMT

Hi Phil,,
do you have a sixth sense for new things ? At present I'm testing a new Multicomp prototype board (I call it "Multicomp_CycloneIV-E_July2019") with the EP4CE15 Core Board from AliExpress. It's already runing with the VHDL-Code I used for the CycloneIVc board. The PCB is a little bit larger (160*132mm^2) then the old one. See the attached foto and component placement plot from kiCAD. When the final test of the i82C55A PIO is successful I intend to give the PCB-Layout to Aisler PB for a new set of PCB's (the prototype board has some bugs). At the end the whole project has of 3 PCB's: 1xMulticomp, 1xSiss-Pi Adapter and 1x2nd i82c55a PIO-Board.
Important is only the Multicomp board ;-) , the other two PCB's are not mandatory if not needed.

A brief description of the new design is:

- 1 * the Cyclone IVc as the base design we already have
- 1 * stereo audio jack and a SN76489 sound chip with Delta-Sigma DAC (all in VHDL) - at present VHDL work in progress
- 1 * I2C Pin-Header with additional 2 * GPIO's, ment for connecting a SWISS-Pi Hat to this header. This allows using most of the analog-I/O of the board, incl. the on-board-clock - at present VHDL work in progress
- 1 * PS/2 Mouse connector. CP/M doesn't know anything about a mouse, but other OS'es do...
- 1 * i82C55A PIO, with a header for a 2nd one.
- 1 * 40 Pin GPIO-Connector as on a DE1 board for actually unknown extensions...
- 1 * good reachable reset switch at the PCB border :)  
- 1 * 32MB 6ns SDRAM on the core board

There are a two +12V DC-Power Input jacks on the board. My 8" monitor needs +12V and this way I can chain all devices to one power supply. The +5V connector on the EP4CE15 board can be used for low power experimental things.

Kurt

File Attachments
1) Booting CPM3_w_Z3plus.jpg, downloaded 350 times
2) CycloneIVJuly2019-brd-Placement.pdf, downloaded 330 times
3) CycloneIVJuly2019-brd-TOP-BOTTOM.pdf, downloaded 314 times
4) Multicomp_CycloneIVe_July2019.jpg, downloaded 356 times
5) CycloneIVJuly2019-brd-Schematic.pdf, downloaded 315 times

Subject: Re: Multicomp with native b/w graphic
Posted by b1ackmai1er on Mon, 07 Oct 2019 22:03:45 GMT
View Forum Message <> Reply to Message

Hi Kurt,

That looks great. I was playing with my Multicomp this weekend, which was what prompted me to ask. Installed your updated font.

Good to see a Multicomp update with through hole components.

Suggest adding space onboard 8 pin dip eeprom.

Adding a Pi Hat connector is a great idea!

Regards Phil.
Hi Phil.,
there are no free pins to connect a eeprom to the FPGA, but if someone really needs that, it's possible to use the one on the swiss-pi board (if used) or plug a small PCB with the eeprom into the pin-socket/ic-socket of serial-c (and unplug the MAX3232). There may be more solutions, but to re-open the layout is no good idea...

PS: I will try to add a 24LCxx type eeprom (DIP-8) to my swiss-pi adapter PCB.

cheers
Kurt