Subject: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Fri, 19 Oct 2018 13:08:28 GMT
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Hello,

I've had a search through the forum and while I can see discussions around this topic I can't see an exact answer.

As a background, I'm assembling a 65C816_ECB_SBC card which, for those unfamiliar, uses a couple of GAL16V8 and a GAL20V8. I ordered a couple of GAL16V8D chips before checking that I could compile the PLD files in WinCUPL. As I had a GAL16V8D I changed the 'device' definition in the PLD file from gal16v8a to gal16v8d. Of course, as I now know, WinCUPL is happy with the A variant but not the D variant.

I thought that I'd try my luck and using my TL866 programmer I told it that I had a Lattice GAL16V8D, was able to erase and 'blank check' the GAL. I was then able to program the chip using the JED file produced by WinCUPL.

My question is, can I use the JED file compiled for a GAL16V8A variant with a GAL16V8D variant? (What is actually the difference between the A, B, C and D variants?

WinCUPL only supports the GAL16V8A; are there any compilers that are available for the WinCUPL language that support the D variant chip?

I am going to download ispLEVER, which claims to support the GAL16V8D variant but then I am guessing that I'll need to translate the the PLD source file.

Thank you for reading this far through; I'm a newbie when it comes to GALs so please excuse my silly questions.

Simon

Incidentally, I have ordered a couple of GAL16V8A but these are significantly more expensive than GAL16V8D

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by Andrew B on Fri, 19 Oct 2018 14:32:49 GMT
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The fuse maps in the .JED file should be compatible. It's possible some new fuses were added in the 'D' parts, but the GALs I have encountered tend to be backwards-compatible with the fusemaps.

You can also write Lattice GAL maps to the Atmel ATF16V8 and 22V10 parts. Note that the Atmel parts use a different pin-twiddling algorithm to program the fuses even though the fuse map is compatible, so you programmer needs to support the ATF parts specifically as a separate part.

Programming the ATF22V10's has also been a challenge for some users, it seems that algorithm is not well-implemented by all of the cheap programmers.

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Fri, 19 Oct 2018 14:38:21 GMT
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Great - thanks. I've seen comments from other members who have manually compared the read fuse map against the JED file. I'll do the same.

I had some problems with erasing a GAL until I jiggled it around in the socket where upon it started working so I assume a bit of muck on a pin somewhere. The TL866 programmer appears to be a slightly temperamental device under Windows although there's an open-source Linux/Mac firmware available which I might try with a 'spare' programmer that I have.

Simon

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by jcoffman on Fri, 19 Oct 2018 20:11:16 GMT
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The free version of WinCUPL will produce JED files for Lattice GAL16V8, all A,B,C,D variants. The same JED file will program Atmel ATF16V8 (all suffix versions). In the Atmel series, I generally use the BQL variant (lowest power).

Atmel ATF22V10's will not program in the TL866. Apparently they use a different programming algorithm than the Lattice GAL22V10's.

I'm not sure about the 20V8 series; I've not used them.

--John

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by ale500 on Sat, 20 Oct 2018 05:49:36 GMT
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Where did you order the GALs from ?
Have you tried programming them with the TL866 yet ?
(My little experience: I bought some from aliexpress, as well as the TL866,
they do not seem to work. I have to burn them 4 times till they check).

I stopped worrying and made myself some nice adaptors for Xilinx's XC9572XL in tqfp64 package.
They work better as programming is more reliable, sadly no pin compatibility

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Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Sat, 20 Oct 2018 13:33:22 GMT
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Thank for the replies. The GALs did indeed come from AliExpress and the TL866 from eBay (so probably an AliExpress 'store' in a different name) and are, at least, labelled Lattice but I'm under few delusions about if that might be genuine! I'll try them in the board and if not then I'll try and read the fusemap and compare it by hand.

I've yet to try the 20V8. Fortunately (for me at the moment), none of the boards nor designs I've been looking at use the 22V10. It seems that people are having more success with the Genius G540 programmer with the 22V10 chips; is this correct?

An interesting point about the XC9572XL although I will struggle to solder a TQFP package. I've been thinking about using either XC9572XL or the ATF1508AS in an idea that I have but that would probably be in a PLCC package.

Finally, than you for all of your comments and advice - I appreciate it a complete newbie to the wonderful of GALs although some would say that they are 'so last millenium'!

Simon

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by Andrew B on Sat, 20 Oct 2018 14:28:15 GMT
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The Lattice GAL22V10s I think have been OK for most people to program, the Atmel ATF22V10s have been a bit of a pain. I bought a Wellon VP-598 that was supposed to support the ATF22V10, and it wouldn't program them (does program EEPROMs and ATF16V8s fine). I ended up building my own using the algorithm described here to complete my project.

The thing is with the GAL parts no longer being made, the ATF parts are the only parts you can buy new from Digikey, Mouser, etc instead of sketchy China sources.

There is also a simple parallel port GAL/ATF part programmer design - http://www.bhabbott.net.nz/atfblast.html

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by jcoffman on Sat, 20 Oct 2018 16:45:03 GMT
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Most of my GALs have come from 'funkward-tech' in China. All 16V8's program okay on the TL866. GAL22V10's program on the Genius G840 (16v8's & 20v8's as well).

--John

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Sun, 21 Oct 2018 15:57:47 GMT
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Hmm. Lots to think about.

For another RBC board, the VGA3, I have got some ATF16V8BQL-15PU so I'll need to look at one of the programmers that Andrew mentioned. Amusingly, I noticed that my current PC doesn't have a parallel port on it. Fortunately, its predecessor which is lurking in the garage does still! For the non-Atmel parts I'll press on with the TL866 as others have had success.

It's becomming clearer but of course I haven't got a board that I've assembled with the GALs on it up and running yet (still waiting for a couple of components) so...

Simon

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by linker3000 on Fri, 26 Oct 2018 21:03:13 GMT
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My experience with the TL866II is as follows:

Lattice 20V8x - No problems.
Lattice 22V10 - VERY flaky: 1 out of 20 so far with two batches of 10 from different suppliers.

I will try some Atmel chips and a Lattice 16V8 and report back.

I also have a TL866 (not Mk II), which I can fish out and try sometime soon - gotta find it first!

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Sun, 28 Oct 2018 17:28:59 GMT
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The summary of my experience so far is much the same; Lattic 16V8 seem fine as do Lattice 20V8. I haven't tried a 22V10 and I shan't bother with the ATF series chips and the TL866. Following Andrew's advice, I have orderd a PCB for the 'ATFBlast' which has, apparently, left China but I need to find an old PC that can run the software as it won't even startup on my Win 10 machine.

Thanks for all the feedback - it all helps me not waste my time (although my wife thinks that this all a waste of time...

Simon

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by linker3000 on Sun, 28 Oct 2018 18:06:14 GMT
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Hey folks,

I just popped over to the TL866/TL866-II manufacturer's site to see if I could contact them about GAL support - and looksee at the latest firmware released notes!! I'm off to download a copy and check out my Lattice 22V10s...I *might* have some ATF versions too. Watch this space, unless someone beats me to the punch!

http://autoelectric.cn/EN/TL866_main.html

TL866II Upgrade History:

Version: V8.07 Support:15401--2018.10.23

ADD: ATF16V8C ATF16V8CZ ATF16V8CEXT
ATF22V10C ATF22V10C(UES) ATF22V10CEXT
ATF22V10CQ ATF22V10CQ(UES)
ATF22V10CQZ ATF22V10CQZ(UES)
ATF22V10CZ ATF22V10CZ(UES)

Version: V8.05 Support:15360--2018.10.20

ADD: ATF20V8B ATF20V8BL ATF20V8BQ ATF20V8BQL
ATF22V10B ATF22V10BL ATF22V10BQ ATF22V10BQL
next step: will add more PLD chips.
FIXED: GAL22V10B M95320W M95128W

TL866 Upgrade History:

VERSION: V6.85 Support:14337--2018.10.19
ADD: ATF20V8B
FIXED: GAL22V10B M95320W M95128W

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by jcoffman on Sun, 28 Oct 2018 18:11:25 GMT
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I checked my TL866 s/w re: ATF22v10 -- none of my suffixes match the suffixes which the s/w says are programmable. Hence, in my experience, I have NEVER been able to program any Atmel 22V10 on the TL866.

Somewhere on-line I found an explanation of why the ATF22V10 programming algorithm is different from the Lattice GAL22V10 algorithm. It seems that the Atmel device requires a

transformation to be applied to the JED file bit map; a transformation which is akin to a 90 degree rotation. Atmel does not document this anomaly anywhere -- at least I have never found it on-line.

--John

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by linker3000 on Sun, 28 Oct 2018 21:16:19 GMT
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The results are in...

TL866-II, Latest firmware V8.07:

Lattice GAL22V10D-10LPH x5 + Lattice GAL22V10D-10LPN x5: 10/10 OK (Programmed and verified). I also pulled and copied a working Lattice 22V10 and the replacement is working fine on my Z80 board.

Lattice GAL20V8B-25LP: 3/3 OK. 2 complained about overcurrent or device error until I re-seated them.

Atmel ATF16V8B-15PU: 2/2 OK

I have some ATF22V10s already on order but they have not arrived yet.

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by jcoffman on Mon, 29 Oct 2018 04:28:42 GMT
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Unfortunately, many of us have older versions of the TL866; viz., TL866CS and TL866A, not the new one they are pushing, TL866II.

--John

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by linker3000 on Mon, 29 Oct 2018 06:56:10 GMT
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Appreciated - I'll check out my TL866A shortly.

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by frax on Tue, 30 Oct 2018 12:17:40 GMT
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Does the TL866II work with Linux?

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by simonj5 on Tue, 30 Oct 2018 12:38:45 GMT
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Googling 'TL866 open firmware' gives a couple of, allegedly, Linux compatible firmware various flavours of the TL866. I haven't tried any of them and, I have to say this, reflashing the firmware on a functioning programmer is entirely at your own risk ;-)

https://github.com/radiomanV/TL866
https://github.com/ProgHQ/open-tl866
https://github.com/vdudouyt/minipro
https://gitlab.com/DavidGriffith/minipro/

It's also not clear if any of this replacement firmware can cope with the ATF GALs.

Simon

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by lowen on Wed, 31 Oct 2018 03:42:22 GMT
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I've used the Linux minipro software to read and program EPROMs, EEPROMs, and flash chips with my TL866A (not a TL866II), but the GAL support I've not tried, and it isn't well tested. So I use a Win7 VM running in KVM on Linux to run that (at least the CentOS qemu-kvm-ev packages have working usb passthrough).

Subject: Re: GAL16V8, WinCUPL and TL866 Programmers
Posted by linker3000 on Thu, 01 Nov 2018 22:21:13 GMT
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As I understand it, the TL866/II's programming abilities comprise routines held in the programmer, and the software triggers the correct ones in the right sequence to make things happen (read, write, erase, verify, blank check.. etc) - so if the programmer is updated through a download of the manufacturer's software (new software has an 'update firmware' option), then the programmer now knows about any new devices.

This means that third party software authors don't need to work out the programming algorithms, however they still need to add the newly-supported devices to their app and code up what needs

to be triggered in the microcontroller inside the TL866/II - simpler tasks, but it still needs someone to get around to doing them.