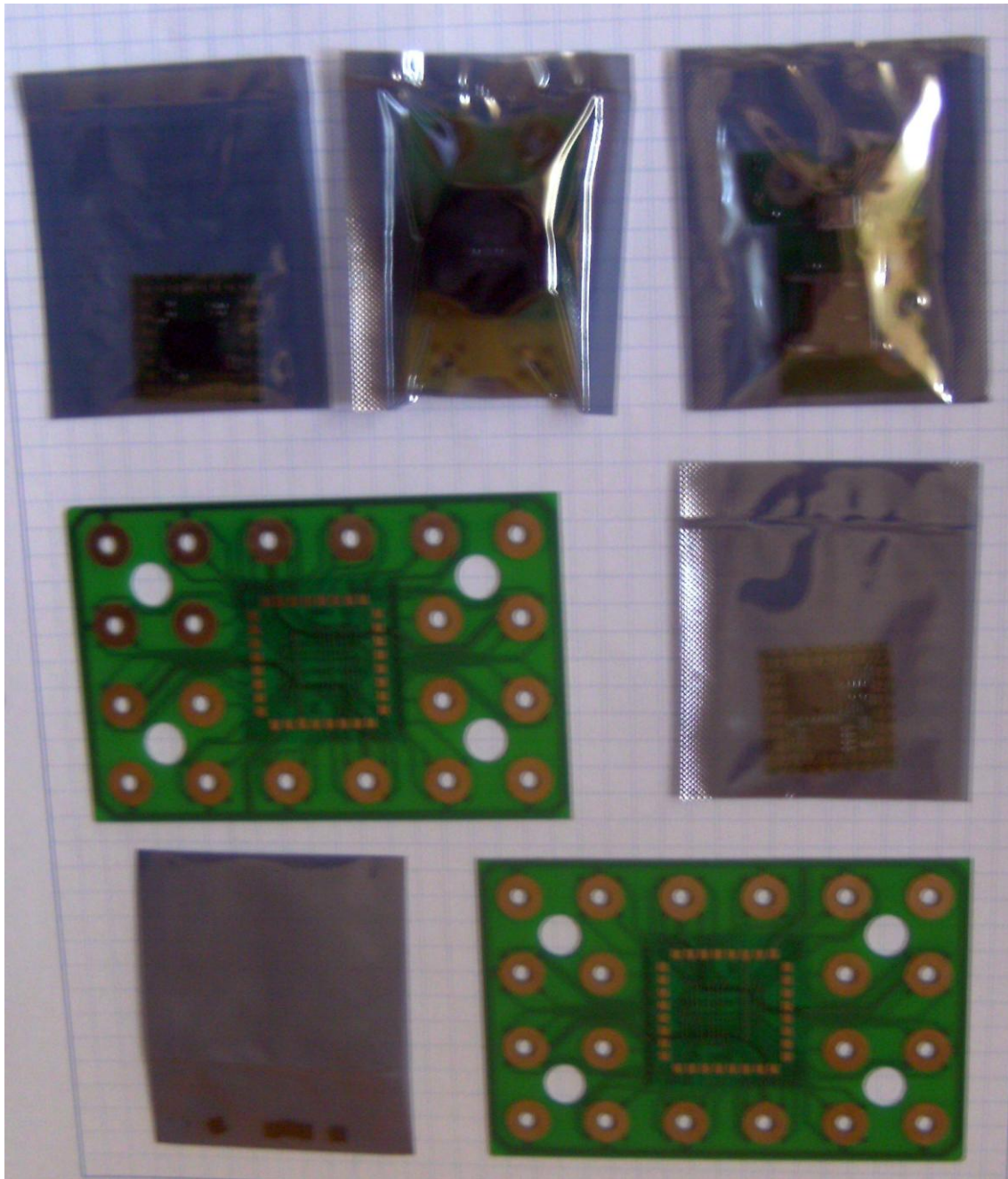


Antti-Brain

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Editorial

Busy as never before. One year anniversary issue is coming soon, un-believable how time flies!

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Cover Story

CRUVI™ baseboard are back from Taiwan. Also the new Actel STAMP rev B modules and some more Silicon Blue stamps for the lab testing. Actel stamps are ready for sales, Silicon Blue one actually also, I just need give GREEN to the fab in Taiwan to make a first production batch. Also on the picture CRUVI Speaker modules, SD Card Module, and USB Power Modules.

And what that small things in that other bag? Tiny?

And tiny they are ATtiny13A AVR's. For real cool tiny projects and products.

Oscillators

Problem as always ☺

Discera

Promises handheld MEMS oscillator programmer, there is link “buy now”, but it only displays a web page, please contact us, and email address.



DragonFly™ Programmer Kit. Haa-HAA, abracon is distributing Discera silicon. So abracon MEMS is actually Discera MEMS? Looks like. But abracon does not offer a programmer ☺ as they sell programmed oscillators only.

Ha, got the pricing for this ding, I think I am going to buy the Deluxe Starterkit ☺

Maxim Silicon Oscillators

Pin	DS1077/L	DS1086	DS1099	MAX7384	DS1091	DS1094L
1	OUT1	OUT	OUT1	VCC	OUT	OUT1
2	OUT0 ref	SPRD	OUT0	VL	VCC	OUT2
3	VCC	VCC	VCC	SPEED	GND	VCC
4	GND	GND	GND	RSTn	SEL1	GND
5	CTRL0	OE	OE0n	CLOCK	SEL0	OUT3
6	CTRL1	PDN	OE1n	GND	NC	OUT4
7	SDA	SDA	NC	ENABLE	NC	SDA
8	SCL	SCL	NC	NC	DR	SCL

Pin map table, oh how different, is there a reason? All have different placement. Aweful! ☹️ yiok.

Oh, wanted to write more about different silicon and MEMS oscillators, but, ok I leave the unfinished stuff still here.

FPGA FM Transmitter II

After having success with square wave (1-bit !) modulated FM transmitter I added small sample memory and tried it out, worked as well. Ok, I did maybe overmodulate but the sound was definitely not 1 bit any more. Cool Edit pro was used to convert some wave file to 8KHz 8Bit mono, and then to write the raw sample data out to file. Then I had to make again another COE converter that created COE file for coregen 32Kbyte ROM, that was then connected to the DDS.

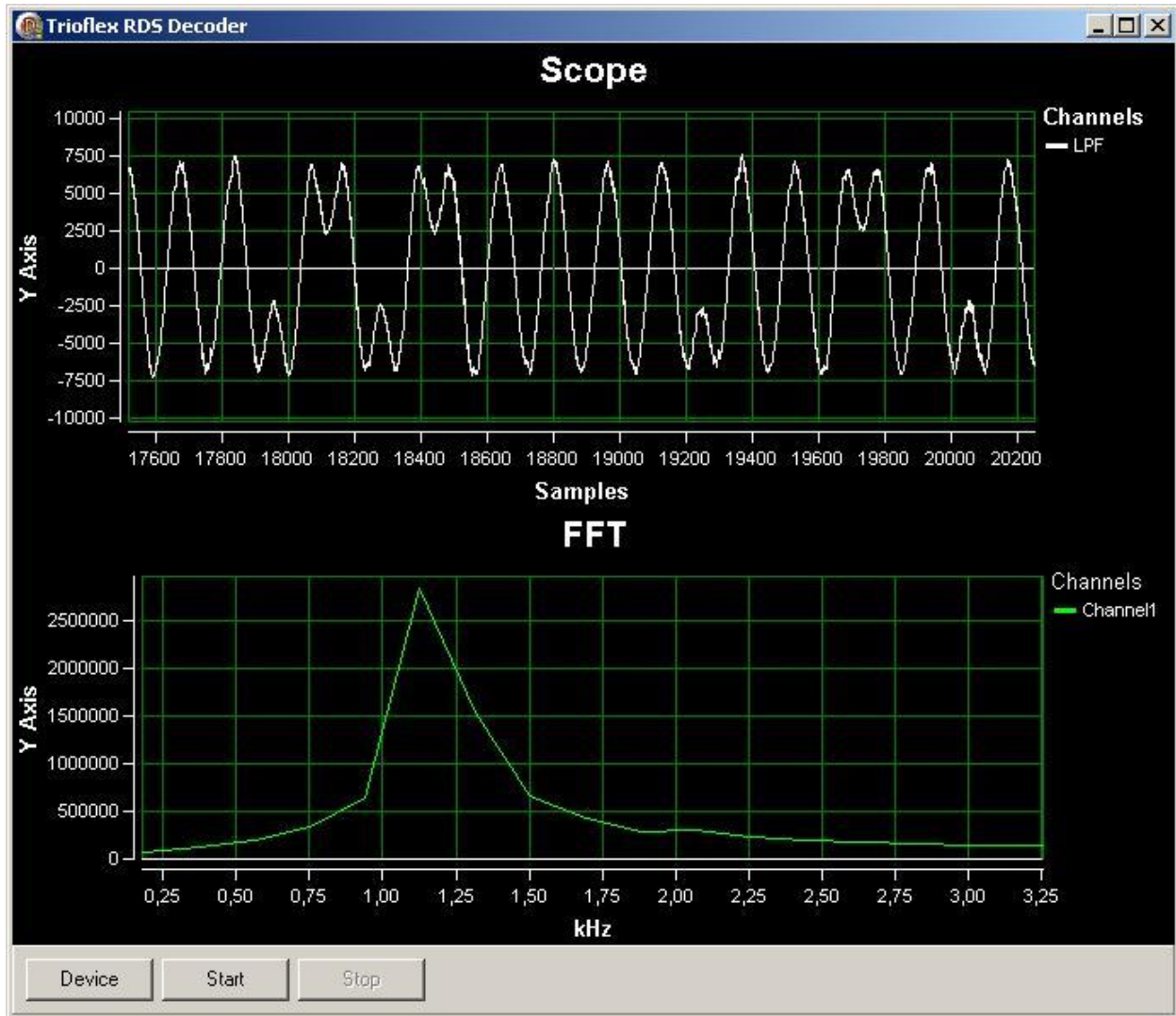
Would it be possible to have this "one-pin" transmitter to generate RDS also? Doing some search, finding lots of old abandoned projects, most PIC based. Most with no source code.

Ok, setting up some tools first, getting "Stereo Tool" installing, ok, trying out works. But RDS MPX output from PC Audio Card requires 192KHz sampling rate, wau my workstation has Realtek HD Audio on motherboard supporting this! I have never connected any audio devices to that desktop PC before. Ok, plugging my cheap Koenig FM transmitter gadget into the audio jack of the PC. Tuning my handy, and well, ok, after some troubleshooting, I see RDS text being received and displayed on the screen of the handy.

Ok, so I have validated RDS audio source.

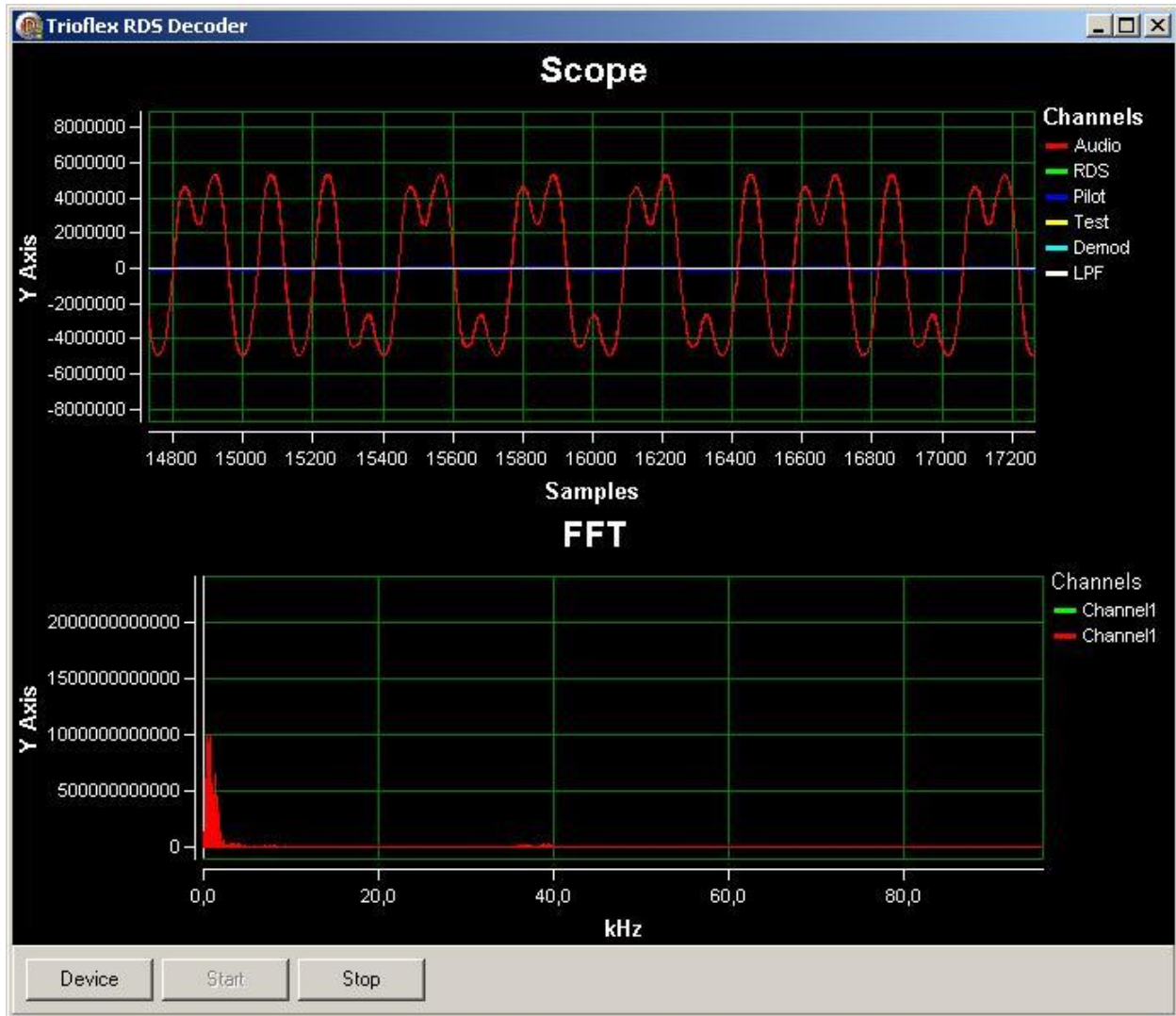


This is how this signal looks with the my quick and dirty signal analyzer, that I wrote within 14 minutes using SignalLab. Cool ! Ah, I forgot to mention, those 14 minutes where those I spend after first time ever installing SignalLab © And yes it is free, for non-commercial use. Really easy to get going. Ok, you need Delphi RAD tools to be able to use it. But the real good thing is that the generated application is one single win32 executable without the need to install any runtime or DLL's. The screenshot is showing Stereotool's audio output, signal is "routed" using Virtual Audio Cable (so there is no real cable required).



Another 34 minutes of programming time are spent. Added maybe 12 lines of code ☺ The input signal is the same as before, the upper display shows the RDS signal after decode, bottom is FFT of it, it does show the bit rate to be 1187.5 KHz.

Hm, so let's do it with FPGA now! Adding a CQPIC HDL code to my FM Transmitter project. Oh, I need MPLAB, ok download install, assemble go, ok got RDS encoder HEX file. Converting VHDL, adding to project. Adding another NCO to generate the required 14.592MHz for the PIC clock. Adding DsDAC HDL, wiring up. Connecting the DsDAC to the one pin D/A that goes to audio jack on the S3ASK board. Download. Oh, need go shopping for 3.5mm cable extension. Back!



And here we see PIC generating the RDS signal, it goes to analog (uses Delta Sigma DAC), by cable into the input of PC audio card. Looks good. Let's add the 57KHz subcarrier now!

Bummer... Realtek HD Audio on my PC seems to have fixed 48KHz filter on the input, no way to see the 57KHz signal. Ok, I reduce the clock for the PIC by 2, yes now I see the side bands around 28.5KHz around 2KHz both sides, so it assumedly actually working (as of output from S3ASK).

Now need real world testing..

(to be continued?)

Audio-DSP's

Pre-history – I think, yes I did try to make the DSP von glue logic chips, the schematic was published in QST, long time ago. So I had a bread-board and lots of wires. I never got it finished or working tough.

As of today, there are much better toys for DSP play. But are there? Ok, the big suspects first.

ADI, Sigma-DSP

Is it ADC or DSP? Well both, it started with ADC/DAC that had small DSP cores inside, then later also devices come out with no ADC/DAC but only the DSP (and audio digital ports).

So how do we eat them? With Sigma-Studio of course. It is free, no it isn't, it is bundled free with any evaluation board purchase, but the software itself cannot be downloaded for free, only a trial version is available on request. Requesting. Granted. Download/Install done!

Very nice GUI, all wires “bend” with nice round corners! So let's do some cool stuff. The best would be to open some example project first, right? Bummer..! There are no examples at all included, nothing. Ok, getting started guide, step by step, good have something, it says compile download ok, no errors. Now something more complicated, writing some own DSP algorithm.. Bummer! There is no way to add any own algorithms at all. All you can do is drag and drop and connect wires. And change parameters. Ok, then we need the hard way, look at assembly listing (SigmaStudio DOES assemble the DSP sources!), write own assembler, then it should be possible, right? Bummer! SigmaStudio Patches out all addresses and instruction mnemonic from all generated files. Datasheet? All Datasheets for SigmaDSP IC's refer to SigmaStudio as the tool for software development and programming, the instruction set of the DSP units is not described. Well, yes the GUI does generate pure downloadable binary code, and it IS possible to write a dis-assembler and assembler based on that, but it way too much trouble!

Simulation – while the quickstart guide has some charts showing the spectral response in simulation, trying it out failed, the response window was just empty. Well I don't have USB hardware but, eh simulator should simulate, right?

TI, PurePath™

Is TI better than ADI? There is DSP instruction set description for TAS3108, for other IC's it's not available. Programming? With PurePath Studio of course! This is free for AIC family, but getting it is not that simple as getting SigmaStudio trial. But doable, starting AIC PurePath Studio, wau – lots or projects are included, nice! So let's do some programming! There is even separate command line assembler! Well no description of the language, of course. And the examples? Well there is assembly listing generated, but all source mnemonic is replaced with *** encrypted ***, so also no programming possible. Just configuration with the GUI icons.

Well this was the free AIC PurePath Studio, the TAS3xxx Studio, is not free but should allow custom component creation, and hence development of new algorithms. But it does only support the TAS3xxx series Audio SoC's not the AIC Audio DSP's. There should be a possibility to obtain a trial of TAS3xxx studio, but I am still waiting for request approval.

Freescale, Symphony

And another studio, Symphony Studio! Ha, this is different from the others, while TI/ADI used .NET to create their studio IDE's, so Freescale's Studio is Eclipse based. Getting access to Symphony download was just registration, no asking and waiting for approval as it was with ADI/TI. Well here also a difference, while ADI/TI Studios did install and start out of the box, Symphony did not, asked for missing javaw.exe file! Ok, fixed, that, importing sample project, try compile, error during cleanup. Great! Just not working out of the box. Ok, there isn't much to see, it's just another Eclipse, with modified Zylind CDT plugin. GNU GCC is used as compiler, available is also simulator and GDB stub, OpenOCD is supported as well. So it is ready to use environment for own programming, nothing hidden, all tools and stuff available.

AKM

Eh, I only was about to write about the known candidates, but seems there are more players around. Well AKM has datasheets only, but there is no instruction set documentation and no links or hints how to get software tools. In one of the evaluation board documentation is visible "SASM80.EXE" so I assume some sort of assembler is available. But really no place to get it.

Alesis/Wavefront Semiconductor

Now Wavefront Semiconductor, a funny fab, it was I think started by some audiophiles, who designed own Audio IC's. Their AL3101 is really funny chip, packaged in SO-16 narrow body, it has a small Audio DSP executing 1024 instructions each audio frame, up to max sample rate of 48KHz. And there are datasheets, and free software, and there is open-source software including simulator!

But, it seems that the Alesis IC will not be available for much longer any more, all development seems to be abandoned in 2005 or so.

The super cool about the AL3101 is the fact that it does not need a clock! Yes, that right, it derives the DSP clock from the digital audio word clock using a PLL. There is no master clock needed externally.

Features in Table

Just small table of some features offered by Audio SoC/DSP IC's.

IC Type	Vendor	Package	ASRC		Digital In, Ch#	Digital Out, Ch#	ADC Bits	DAC Bits	MIPS	Sample Rate KHz
AL3101	Alesis	SO-16			4*2	4*2			50	48
DSP56721	Freescale	TQFP80	Y		Y	Y			2*200	192
AK7730A	AKM	TQFP48		SPI Boot	Y	Y	24	-		96
AK7770	AKM	TQFP80	Y	SPI Boot	Y	Y	24	24		48
ADAU445	ADI	TQFP100	Y	I2C Boot	24	24			2*172	192
ADAU1761	ADI	QFN32		I2C Boot	Y	Y	24	24	50	96
TAS3108	TI	TSOP38		I2C Boot + 8051MCU	Y	Y			135	192
TAS3204	TI	TQFP64		I2C Boot+ 8051MCU	Y	Y	24	24	135	48
AIC3254	TI	QFN32			Y	Y	24	24	2*135	192
	Renesas	TQFP48								
CS47048	Cirrus	TQFP100	Y		Y	Y	24	24	300	192
BS200	OnSemi	QFN52		SPI Boot	Y	Y	16	16	200	
BS300	OnSemi	WLCSP			Y	Y	16	16	240	

Just a few devices and some parameters included, taking as much different from each vendor as possible. AIC3254 claims 192KHz sample rates, but it seems the DAC can only do 192KHz in interpolation 2x mode, strange the EVM software tool allows 1x interpolation selection for DAC with stock program, well that runs below 192KHz.

I was looking at those Audio-Soc's from a little bit weird perspective, I wanted to checkout if any of them could be used to implement FM Stereo Encoder + RDS Encoder. I assume TAS3108 could do it, as it supports 192KHz, but it would need external DAC, all AudioDSP IC's with built in DAC do not support true 192KHz sampling rate (not on output), but for the 57KHz subcarrier generation 192KHz is required as minimum.

Oh, no there so many of them? Ok, many of the devices included are rather hard to get, but still surprising how many Audio-DSP makers there are around. Most devices included are processing "per frame" basis, so that all complete DSP program is executed once per Audio Frame.

Conclusion

Total mess around, vendors claim "full programming" but only configuration of fixed blocks is possible, or then information is not available at all about programming. Well it depends on the application, if the prepackaged components are sufficient then it nice and easy.

Ha, the "encrypted" is done by ADI/TI most likely because the algorithm providers who license their algorithms are enforcing it.

My Own Processor IV

Small, smaller, SOLD! Nanubas is born, super duper small processor programmable in kind of basic, first programs done and tested. The goal is to fit the "10" series of Actel chips, those are real tiny in terms of FPGA resources.

Also will be doing a derivate of AP32 Application Processor (AVR kinda compatible) for implementing FT245 Applications, well, the PCB for this is already in the fabrication.

More information in the next issues.

Motion I

Just staring it...

LinuxCNC

Problem one, need VERY special (patched?) version of Linux, and special PC as well, there are some tests about latency (if I read it right modern PC's may not be suitable?). What more bad news, it seems that LinuxCNC does support Mesanet motion controllers only in "HostMot2" mode but not in "SoftDMC" mode. But my friend needs to control Brushed servo motors and those are only supported by SoftDMC and not with HostMot2 solution. Connecting a Brushed DC Servo "Anti-phase PWM" gate drivers directly to LPT port would be beyond what I am ready to experiment.

Of course it should be possible to write driver for LinuxCNC that supports SoftDMC, or then write a converter that makes SoftDMC to look like HostMot2.

Mach3

Seems to be one of the very popular ones amongst the hobby people, closed source but allows custom plugin writing.

Organize my Life™

Moved to “city-house” so it more messy then before, well keeping software in place is still important, so sorting that out, but it goes slowly. Again and again people come with requests, and I know, I have done, that or that, but finding it form my backup archives would takes longer than rewriting from scratch. So there is a way to go with the life organization ☺

Shorts

Stories.

!@#%?! LPT Ports

I needed a LPT port, well my desktop PC has none, but well I do have a PCI LPT card. Should be easy. Open up case, add card, close case, power on! System hangs with report that the boot disk is not bootable. Oh, god, is the hard disk now damaged? I open up, remove the LPT card, power up, no, still not booting, checking HDD cables, all ok, but PC just want boot.

Power off (plug power cord), power on, press F2, blank screen, and tick, tick, ticking. Is my HDD making this noise? Covering up the motherboard buzzer, silence, ok, it's not HDD that ticking.

Taking a walk (or thinking about?), luckily problem is solved, BIOS somehow tried to boot from external 1TB usb-hdd before the internal HDD, hence the messages.

Card back to slot, but well not show as PCI device? Open up case, use another slot, not boot. Oh no, what now? Card out, back in, all ok, booting. Now all we need is driver right? Google search "netmos pci LPT driver" lots of hits, but what's this need pay 2.95\$ with PayPal? Looking at Moschip the vendor webpage for drivers, ah here they are, my card is listed too. Selecting proper OS, download, what's that, need register to get driver? OK, I do it, entering data, hey company name? Designation? EU? Ok filling in, but "**Type the characters you see in the picture above.**" but there is no picture!

!@#%! This cannot be true! I was aware LPT is PITA, but this is super annoying..!

All downloads either ask for money, membership or point to Moschip non-existing download locations.

DriverDetective ?? from **howtodrivers**, there is link: "download NetMos 9805 PCI Driver" but after entering captcha check symbols, there will be prompt to download **DriverDetective**? I do not want some detectives, I just need the driver, ok, let's try again Moschip site. Oh my god, now I see the captcha thing, but it tells me my email is already registered? Ok, let's ask for password recovery!

Message could not be sent.

Mailer Error: SMTP Error: Could not connect to SMTP host.

! how hard can it be? Just to install drivers for PCI LPT card. Trying different email, same error screen. No way, Moschip site is dead-unusable, but all other download locations for the driver point to non-existing files at Moschip site.

Wau, maybe lucky, one seller (asound) has link to local driver download for my card. But.. it ends up being 404 error!

Do not give up, do not give up, found from CNC table website (<http://romaxxcnc.com>) driver installed, LPT port visible in the system! But why it had to be so hard?

Ok, but hard work done, card installed, why did I bother? To connect Amontec Chameleon of course ☺
What other reason there would be to have and LPT card? And why one may need Chameleon? To configure it say as Lattice Cable, and use Lattice tools to configure FPGA's without the need to purchase Lattice USB Cable. Or to use with OpenOCD to program some cool micros over JTAG.

TI News

Delphino? It wasn't that long when it was Piccolo, now delphino? Nice names.

Hum, but there seems that TI has killing its own ARM products after purchasing Luminary, the TMS470 cannot be found any more using normal product search on TI's site.

References

- <http://www.trioflex.com>
- <http://www.cruvi.com>

Instead of adding the URL links at the end of each issue, I will be adding them to the TrioFlex online link collection, so they can be updated more frequently.