TIE – A Great Start for Your Career
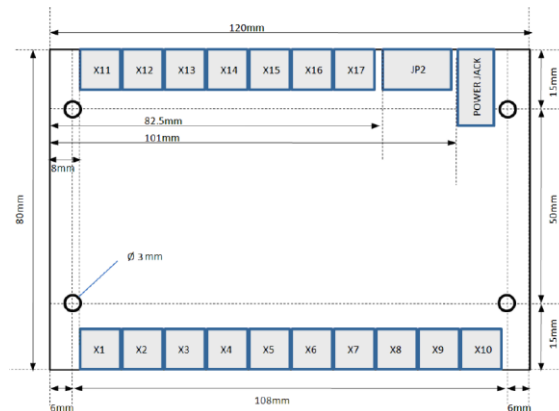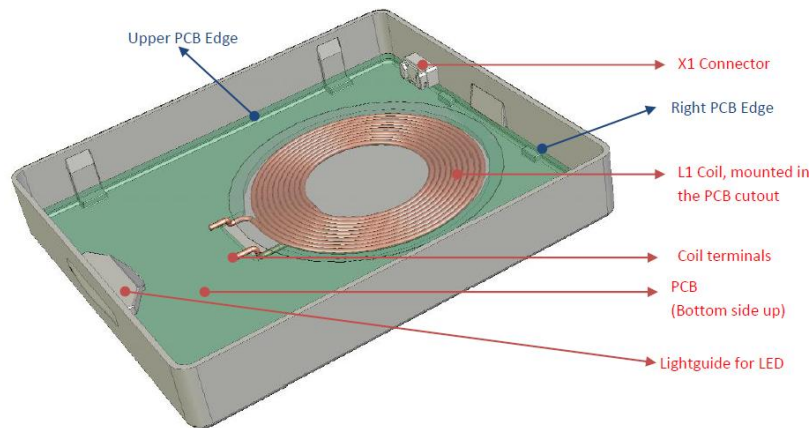Teodor Luchian, TIE 2015 Winner

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› Advices for TIE 2016+ participants

    › Months/weeks before the contest

    › Days before the contest

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› How did I won TIE 2015

› Q & A

Advices for TIE 2016+ participants

Months/weeks before the contest

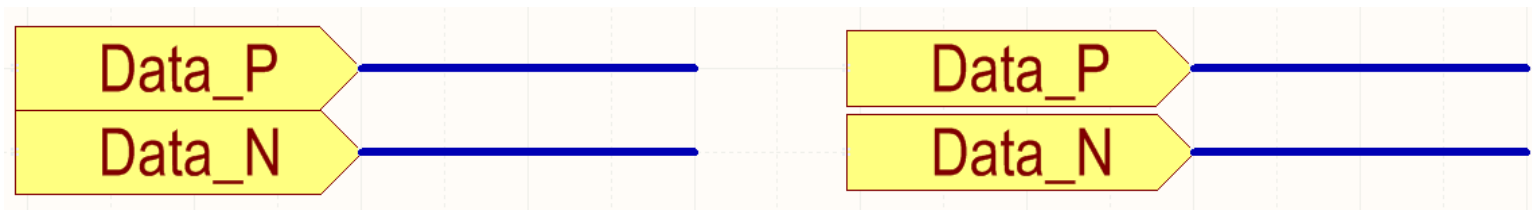› Get used to TIE requirements by solving subjects from the previous years

› Get used with the CAD tool and do not change it right before the contest

Advices for TIE 2016+ participants

Months/weeks before the contest

› Modify your tool settings so there will be no overlaps in the schematic

› Make your own library with as much as possible components

› Try to optimize every action

Advices for TIE 2016+ participants
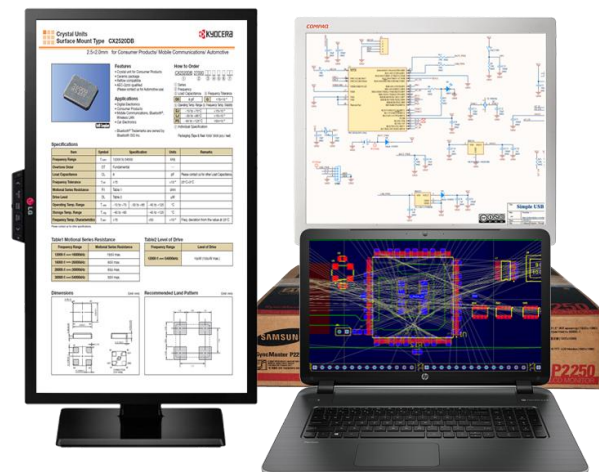
Days before contest

› Get some rest, sleep well

› Try to maintain your organism clean

› Buy water, juice, chocolate and some dry food for the contest day

› Buy pens, pencils, highlighters and any other tool that you think may help you during contest

Advices for TIE 2016+ participants

Days before contest

› Organize your setup

› Check if you have everything you need

Advices for TIE 2016+ participants

Morning before contest

› Be careful with what you eat/drink

› Calm down

› Go to the bathroom

› Go to your desk 10 minutes before the start

Advices for TIE 2016+ participants

During contest

› Take a short look at the subject (2-3 minutes)

› Read carefully the subject and focus on the important points

› Check carefully the datasheets

› Check the schematic

› Take a short look at the pcb drawing

› Read again the main points of the subject

Advices for TIE 2016+ participants

During contest

› Use highlighters to underline the main points of the subject

› Save your work every minute

› Do not panic and do not waste your time

› Use shortcuts

› Create the components

› Create the schematic, assign the right footprints and create the BOM

› Create the pcb and import the components

› Check the stack-up and the pcb rules

› Recheck the footprints (sch and pcb)

Advices for TIE 2016+ participants

During contest

› Place and lock the components components that are indicated in the subject

› Group components in functional groups

› Place global/local fiducials

› Route the data lines

› Route the power nets

› Complete the routing

› Do a final check

› Generate the fabrication files

Advices for TIE 2016+ participants

After contest

› Relax

› Eat something

› Don't be nervous when the reviewers are coming to your desk

How did I won TIE 2015
The first 30 minutes

› Short look on the subject to get a general idea

› Read again the subject, more carefully

› Short look on the schematic (general idea, reference designators, footprints)

› Short look on the datasheets (footprints, recommended layout)

› "How many components do I have to create?"

› "How many footprints do I have to create?"

How did I won TIE 2015
Footprints to create

Crt. No.	Part	Value	Package	Description
1	C1, C2, C6, C12, C13, C24-C27	100nF	0603	CAPACITOR
2	C3, C4, C5, C7, C8, C10, C16, C18	10uF	1206	CAPACITOR
3	C9, C19	150pF	0805	CAPACITOR
4	C11, C17	2uF	see cap_pol datasheet	POLARIZED CAPACITOR
5	C14, C15, C22, C23	22pF	0805	CAPACITOR
6	C20, C21	18pF	0805	CAPACITOR
7	D1	1N5819	DO35	DIODE
8	D2	GF1	DO214BA	DIODE
9	IC8	ENC28J60-SO	SO28	Microchip 10Mbit Et
10	IC1	PIC24F32KA304	TQFP44	microcontroller
11	IC2	MC34063	DIP-8	DC/DC converter
12	IC3	REG1117	SOT223	800mA and 1A LDO
13	J1	POWER	see POWER_JACK_PTH datasheet	Power Jack
14	JP1	M20-9990245	see M20-9990245 datasheet	PIN HEADER
15	L1	1mH	0603	SMD Multilayer Inductor
16	L2, L3, L4, L5	10uH	0603	SMD Multilayer Inductor
17	L6, L8	330uH	see BS11 datasheet	INDUCTOR
18	L7, L9	200uH	0603	SMD Multilayer Inductor

Crt. No.	Part	Value	Package	Description
19	IC9	PC817	DIP-4	SHARP OPTO COUPLER
20	Y1	40MHz	see CX2520DBxxxxxD0GEJ datasheet	CRYSTAL
21	Y2	80MHz	see CX2520DBxxxxxD0GEJ datasheet	CRYSTAL
22	Y3	25MHz	see CX2520DBxxxxxD0GEJ datasheet	CRYSTAL
23	R1	5K	1206	RESISTOR
24	R2, R6	200	1206	RESISTOR
25	R3	0R33	1206	RESISTOR
26	R4	16K	1206	RESISTOR
27	R5, R12, R13, R14, R40	10K	1206	RESISTOR
28	R7, R8, R9, R10	49R9	1206	RESISTOR
29	R11	2K	1206	RESISTOR
30	R15, R16, R17, R19, R21, R23, R27, R29, R31, R33, R35, R37	150	1206	RESISTOR
31	R39	1K	1206	RESISTOR
32	JP2	CJCBA8HF1Y0	see CJCBA8HF1Y0 datasheet	RJ45 connector
33	IC4 ... IC7	MAX6675	SO8	Thermocouple circuit
34	X1 ... X17	W237-102	see W237-102 datasheet	WAGO SCREW CLAMP

Continental

How did I won TIE 2015
The first 30 minutes

› Short look on the PCB drawing, stack-up and monting holes

› Check if there are any specifications regarding components placement

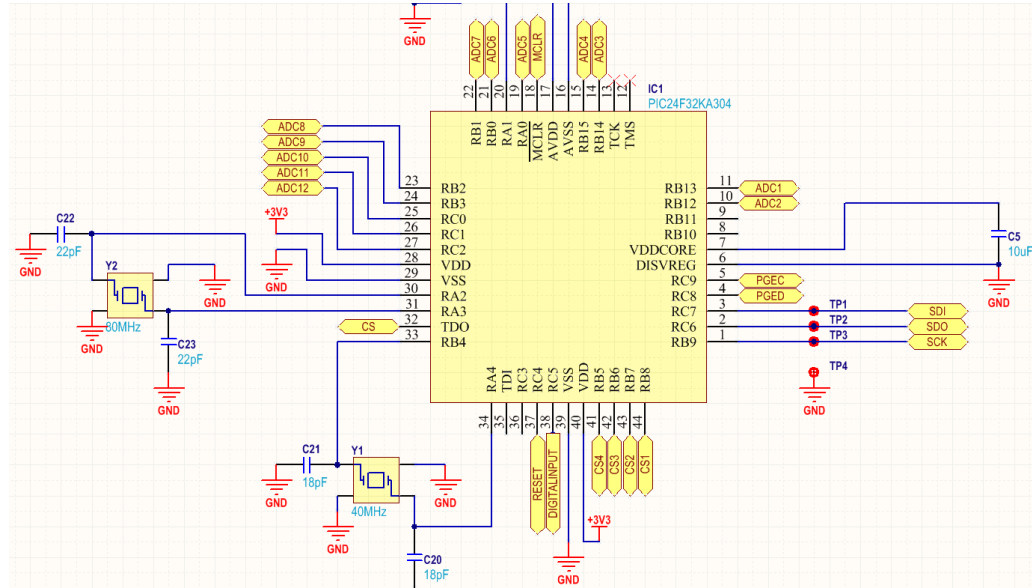› Read again the main points of the subject and imagine highlighting those points

Continental

How did I won TIE 2015

The actual contest

› Highlight the main point of the subject

› Check the footprints and start creating the missing ones

› Create the missing components

› Create the schematic

    › Try to follow a logical path

    › Look for easy solutions

› Generate BOM
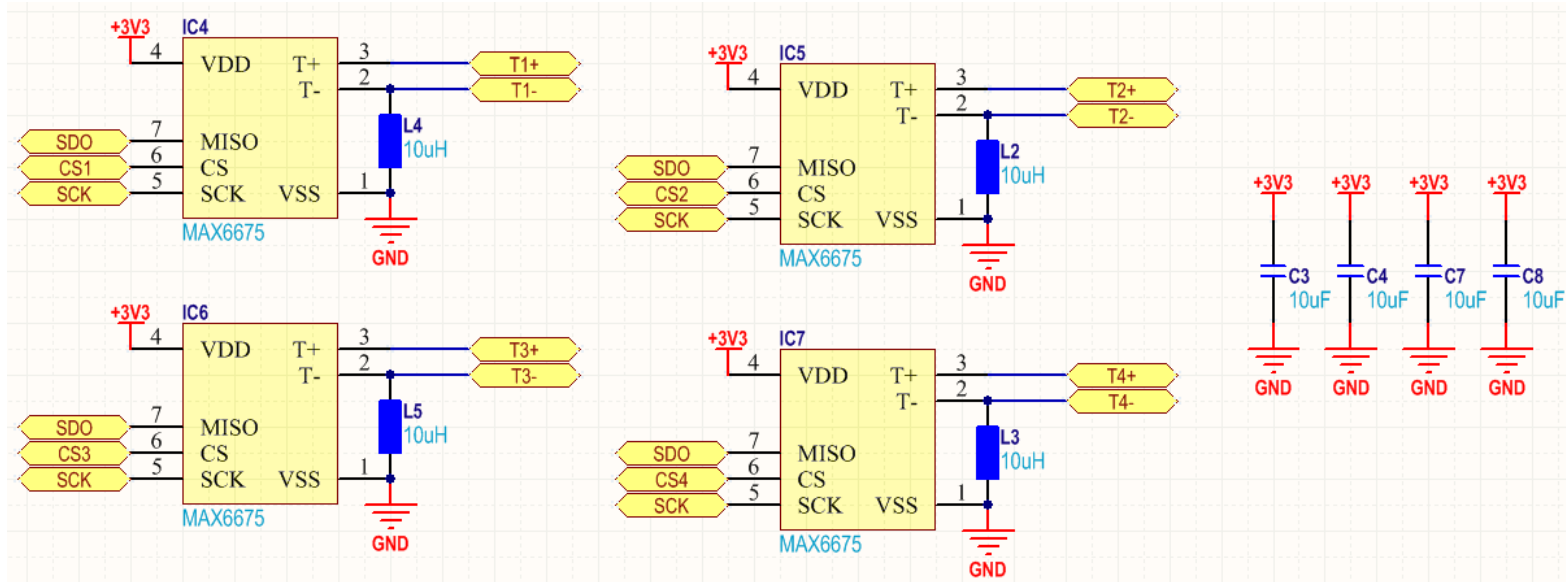
How did I won TIE 2015

Easy copy/paste

How did I won TIE 2015
The actual contest

› Create the PCB outline

› Place the mounting holes

› Define the stack-up

› Define the rules

› Place and lock the specified components in the right place

› Check the footprints

Ⓒntinental

How did I won TIE 2015

The actual contest

› Sort the components in functional groups

› Place all the components on the PCB

› Route as much as you can

   › Data lines -> Power lines -> Anything else

› Do a final check

› Generate the fabrication files

How did I won TIE 2015
Problem found during final check

PCB-012	Crystal routing rules:
	• Do not route traces and vias under crystals;
	• Traces between crystal and corresponding load capacitors must be as short as possible (max. 2.5 mm);
	• A local ground plane must be provided for each crystal circuitry.
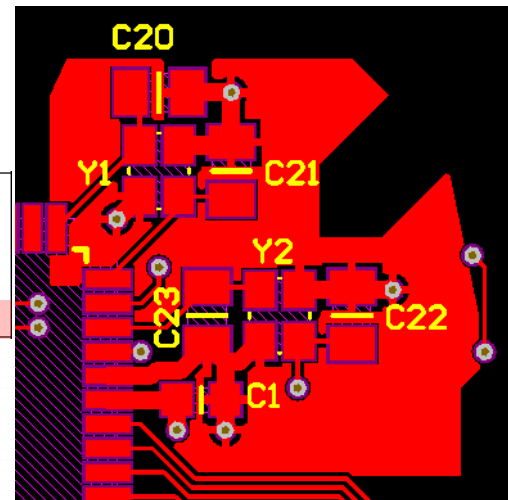
How did I won TIE 2015

Final result

Continental⅋
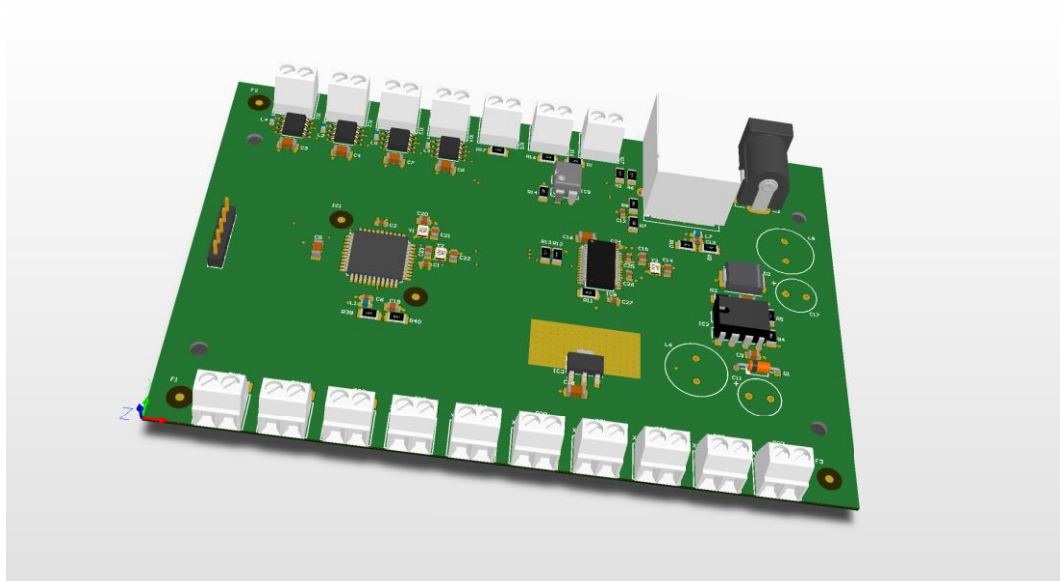
Thank you for your attention!
Questions?