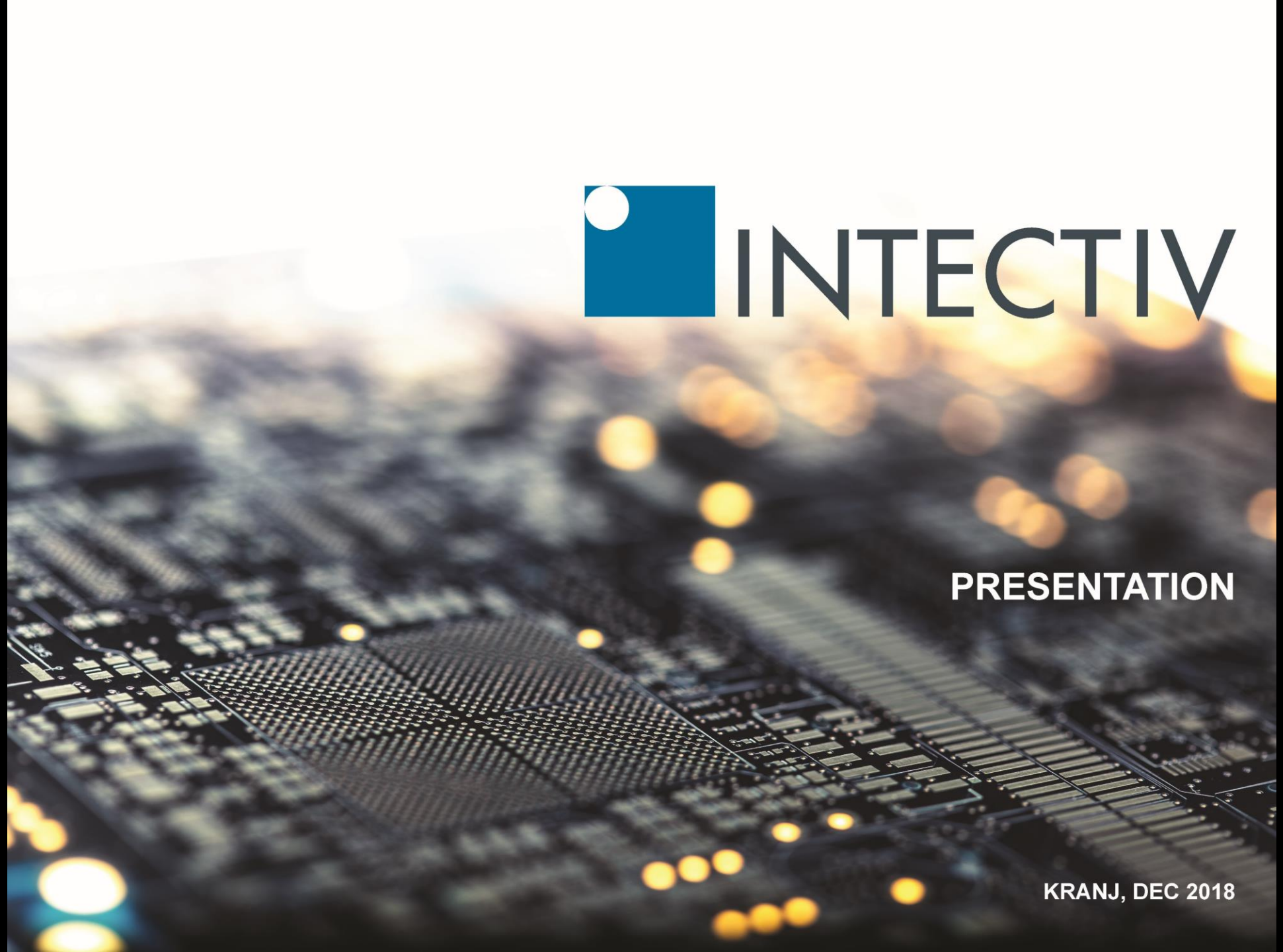

INTECTIV
PRESENTATION
KRANJ, DEC 2018

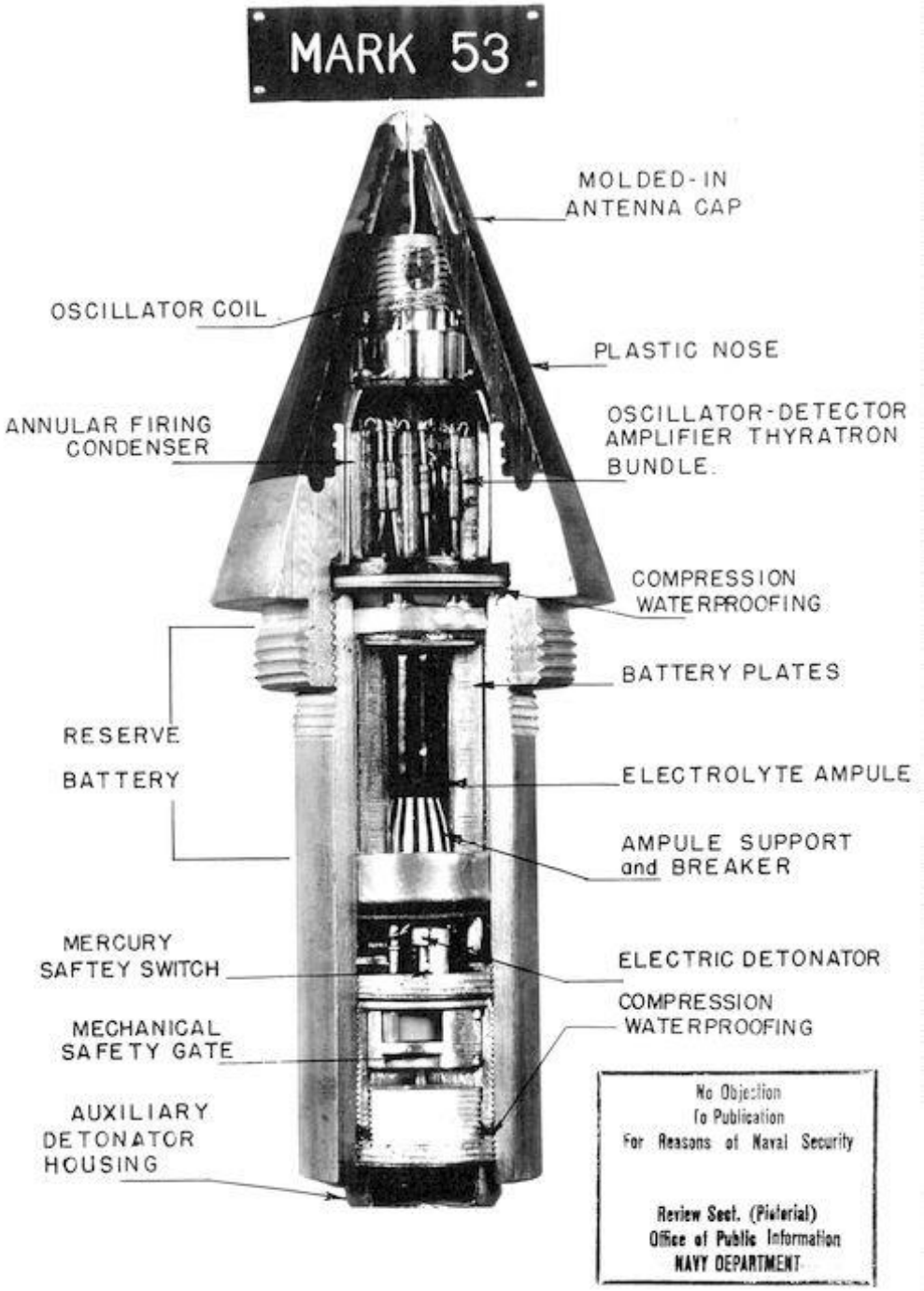
Zgodovina tehnologije tiskanih vezij

1948

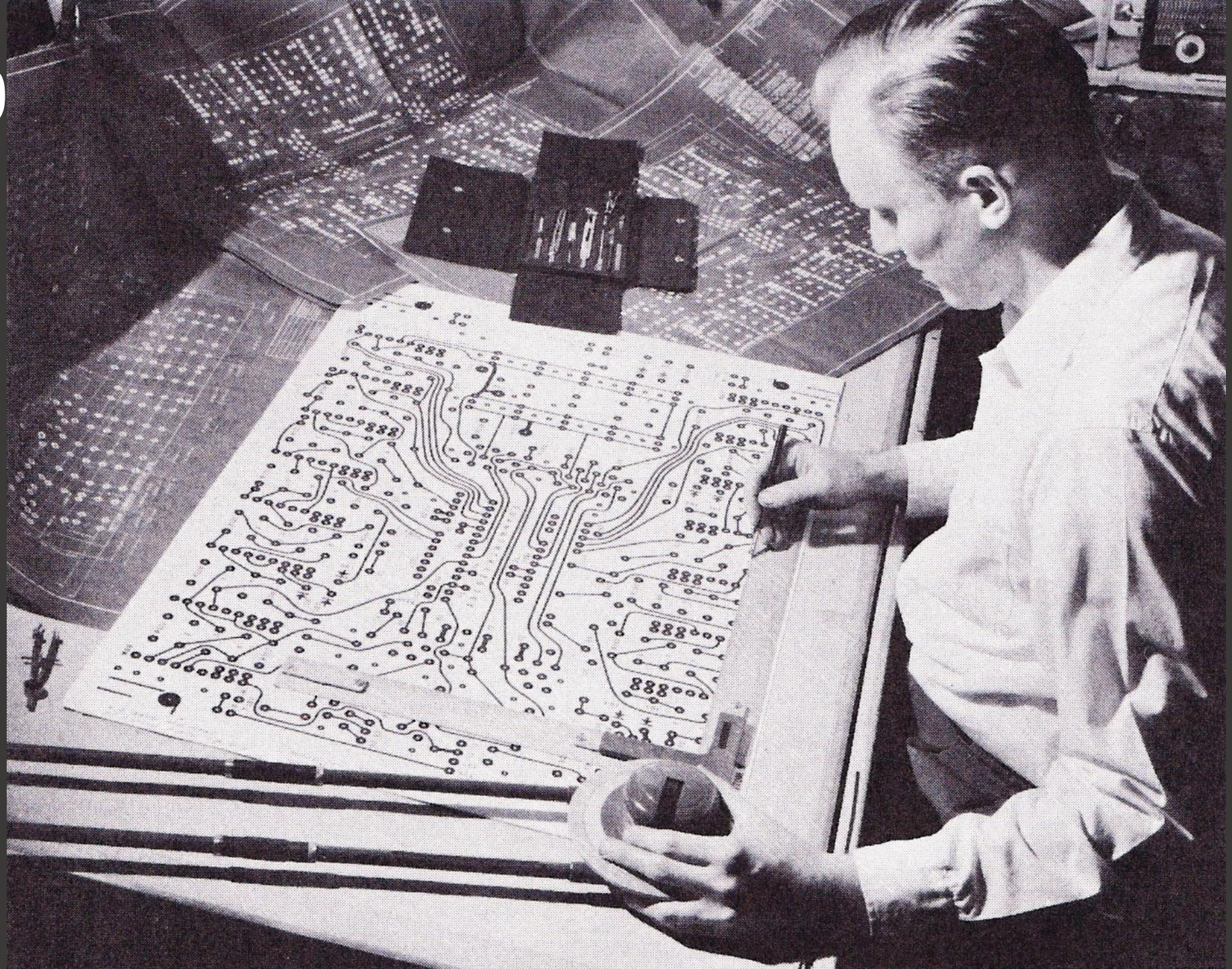
1948

1948

1948


MARK 53
MOLDED-IN ANTENNA CAP
OSCILLATOR COIL
PLASTIC NOSE
ANNULAR FIRING CONDENSER
OSCILLATOR-DETECTOR AMPLIFIER THYRATRON BUNDLE
COMPRESSION WATERPROOFING
BATTERY PLATES
RESERVE BATTERY
ELECTROLYTE AMPULE
AMPULE SUPPORT and BREAKER
MERCURY SAFTEY SWITCH
ELECTRIC DETONATOR
COMPRESSION WATERPROOFING
MECHANICAL SAFETY GATE
AUXILIARY DETONATOR HOUSING
No Objection To Publication For Reasons of Naval Security
Review Sect. (Pictorial) Office of Public Information NAVY DEPARTMENT

1960



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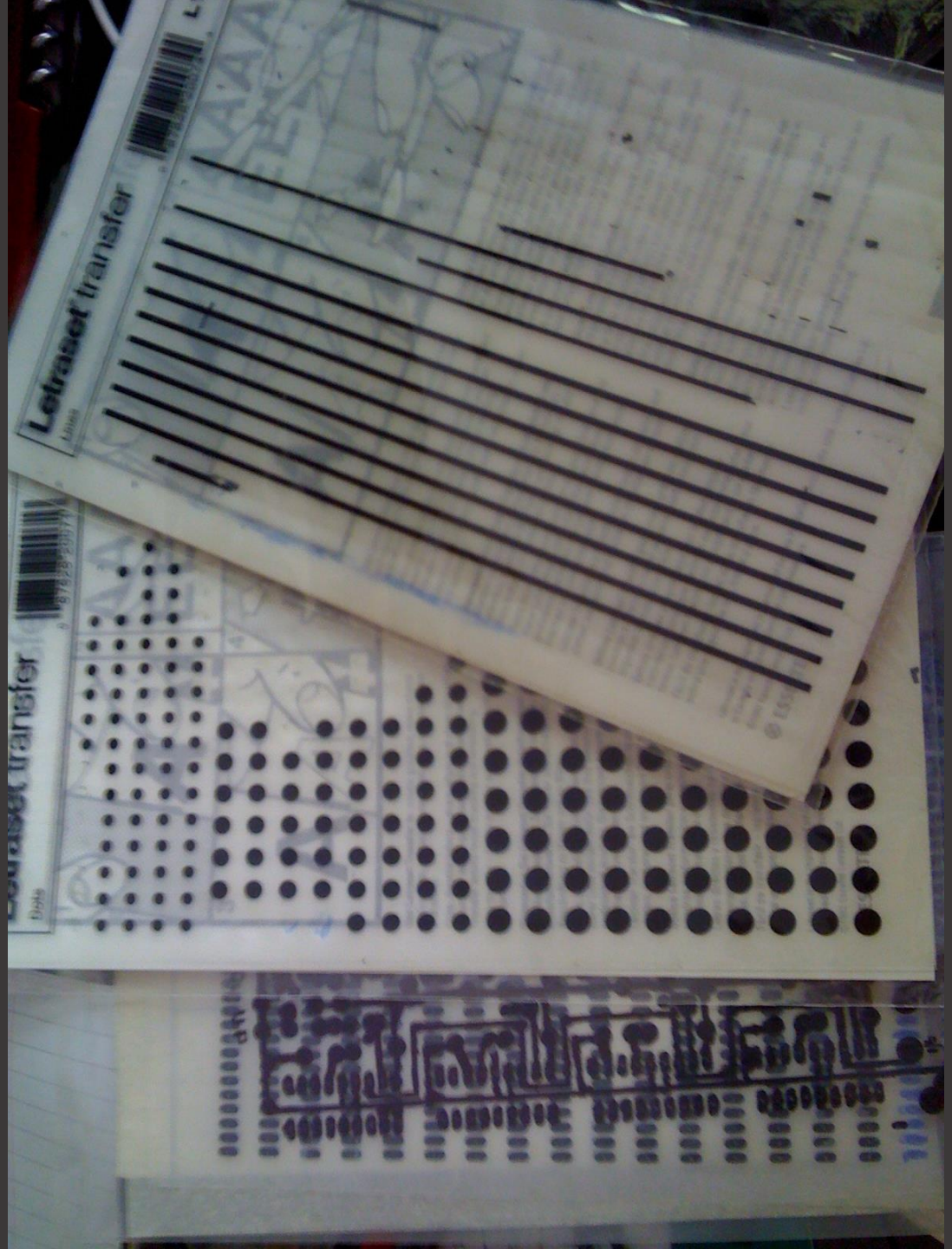

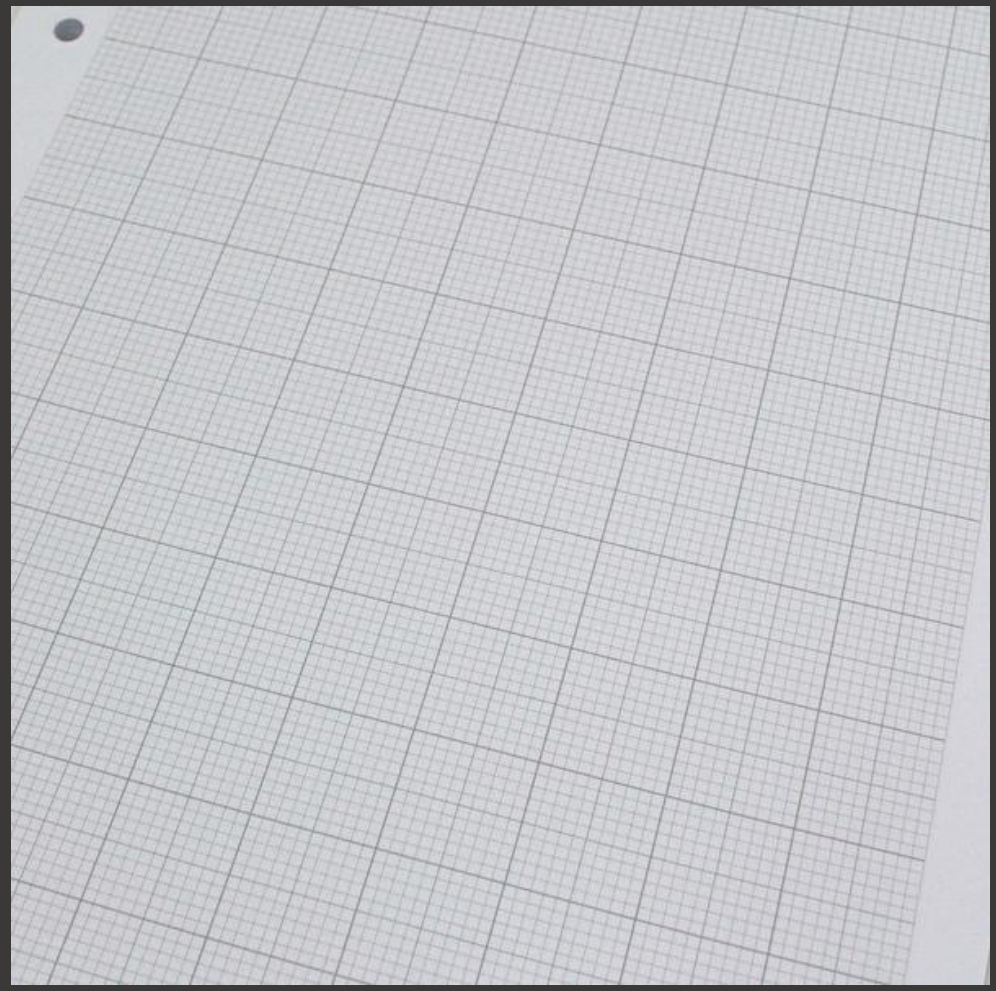

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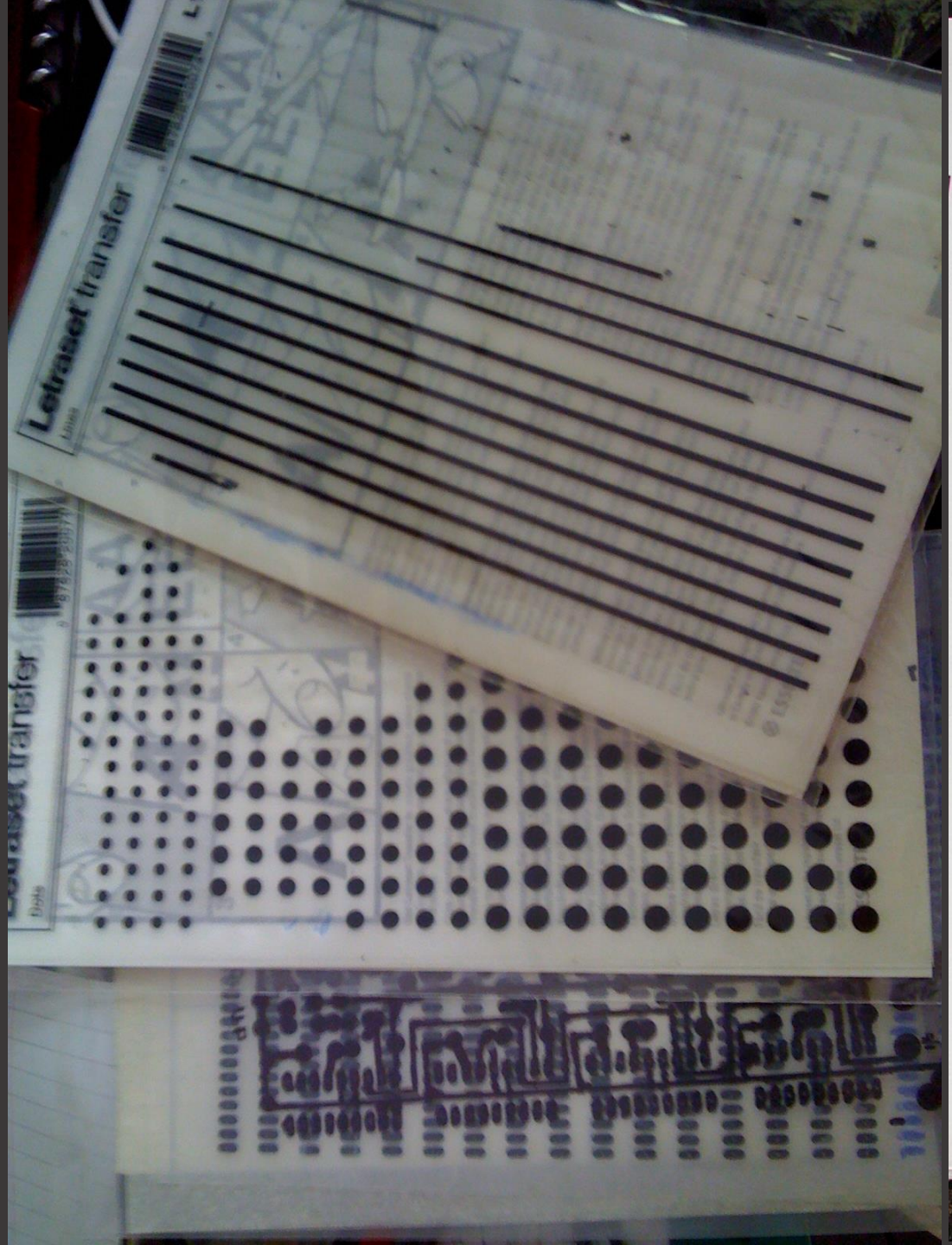

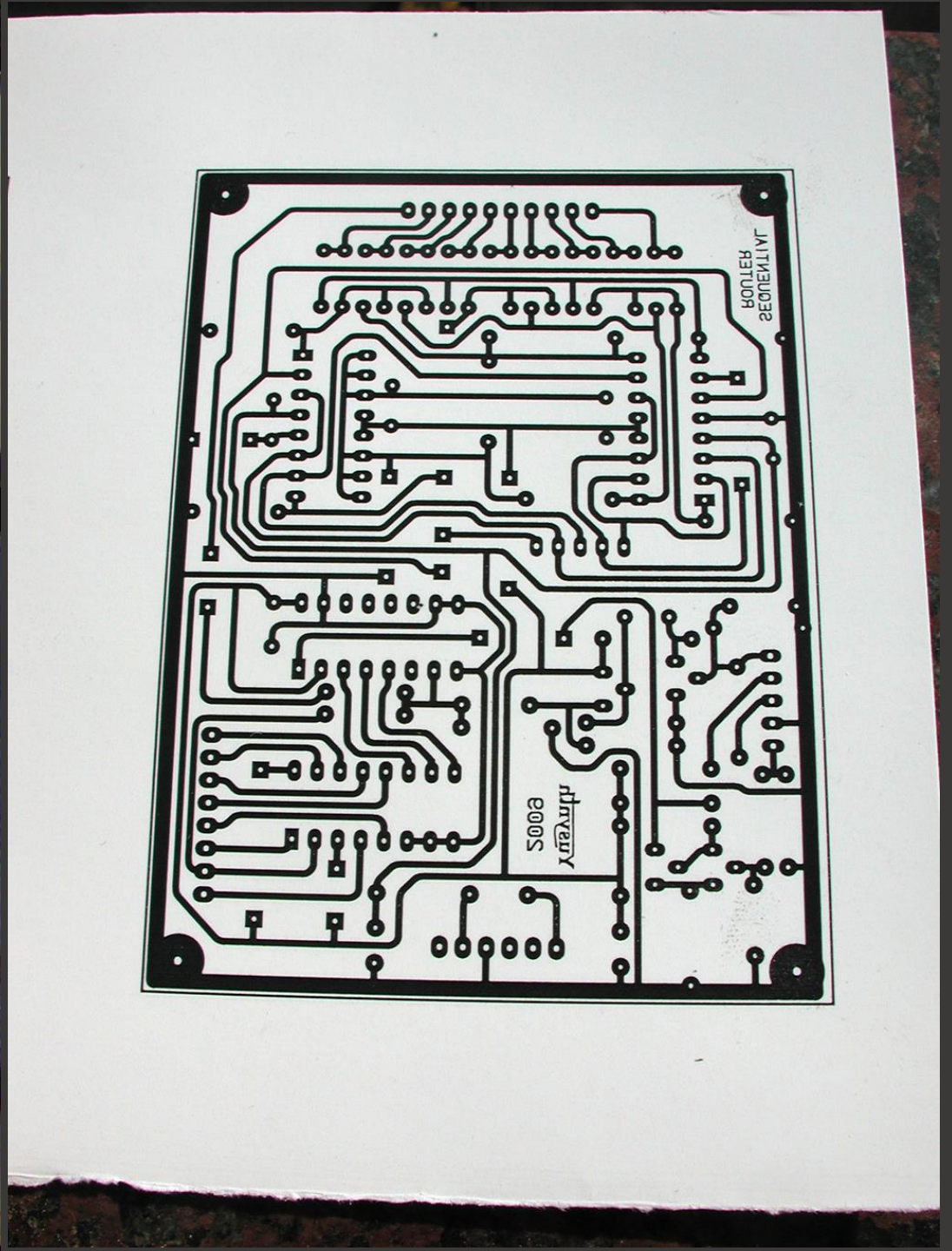

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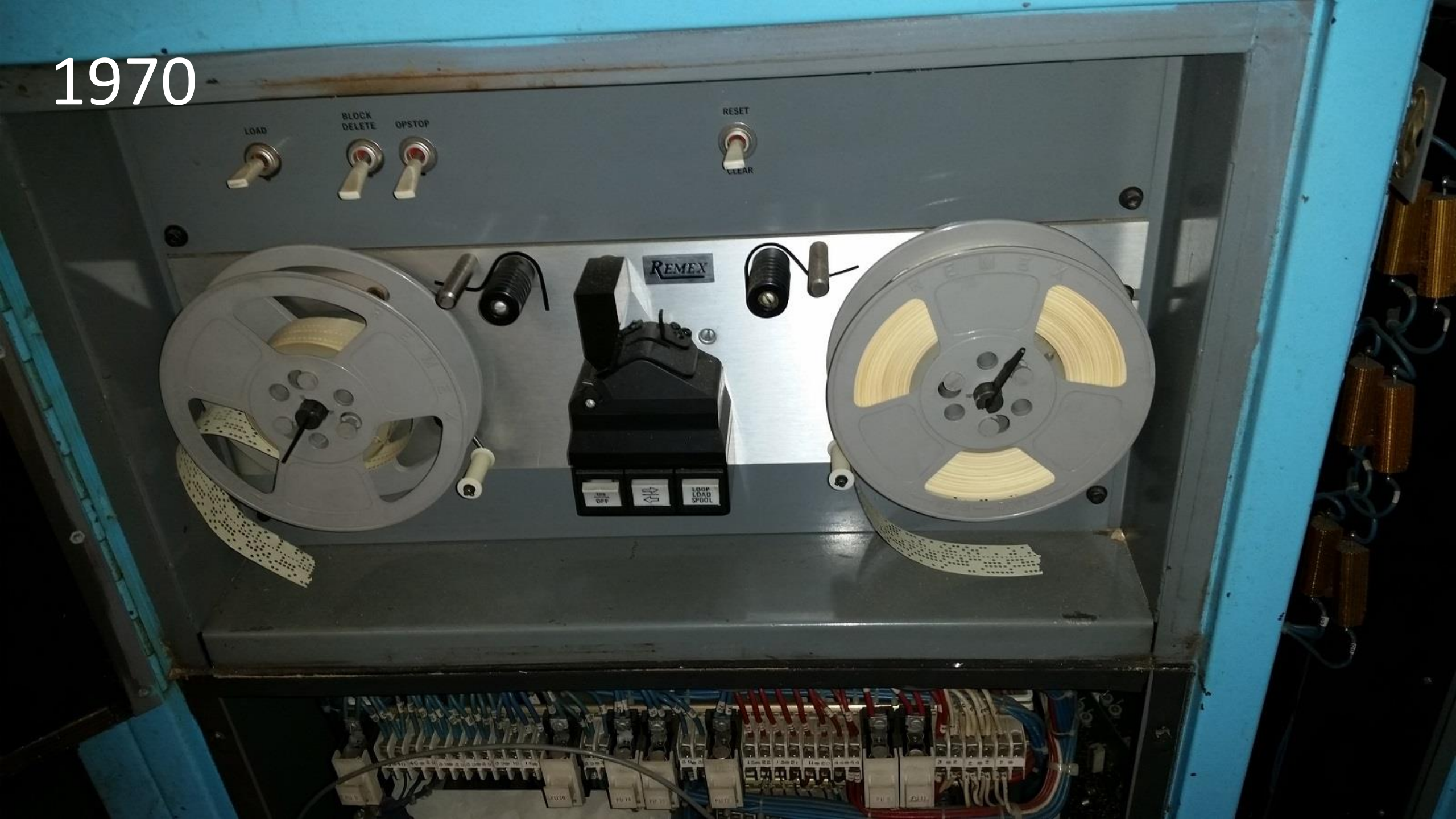
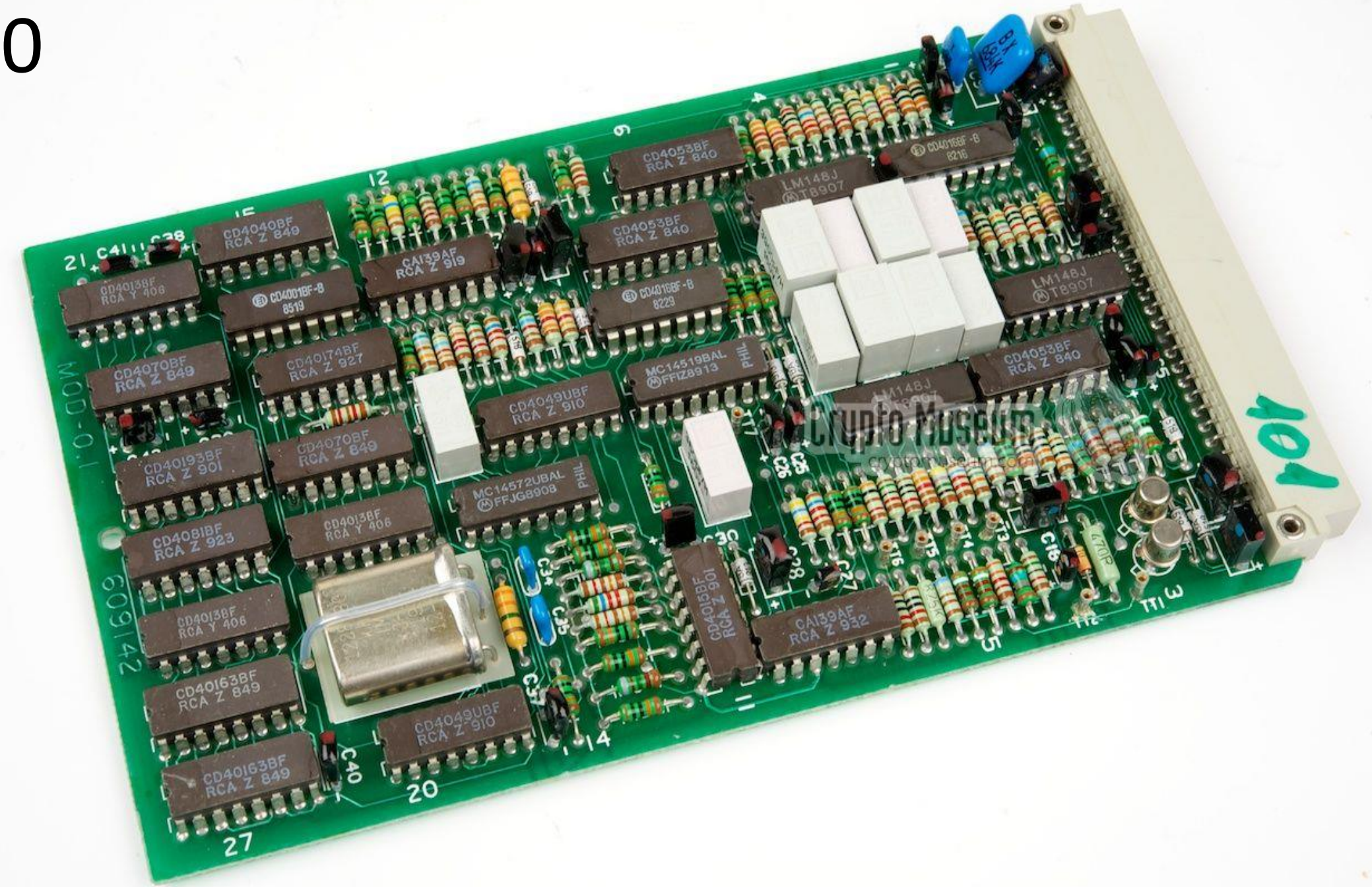


LOOP
LOAD
SPOOL

1980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LM148J MT8907
CD4013BF RCA Y 406
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CD4049UBF RCA Z 910
MC14519BAL FFIZ8913 PHIL
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CD4013BF RCA Y 406
CD4016BF RCA Z 849
CD4049UBF RCA Z 910
CD4015BF RCA Z 901
CAI39AF RCA Z 932
CD4016BF RCA Z 849
MOD-01 609142
Crypto Museum
101

1990

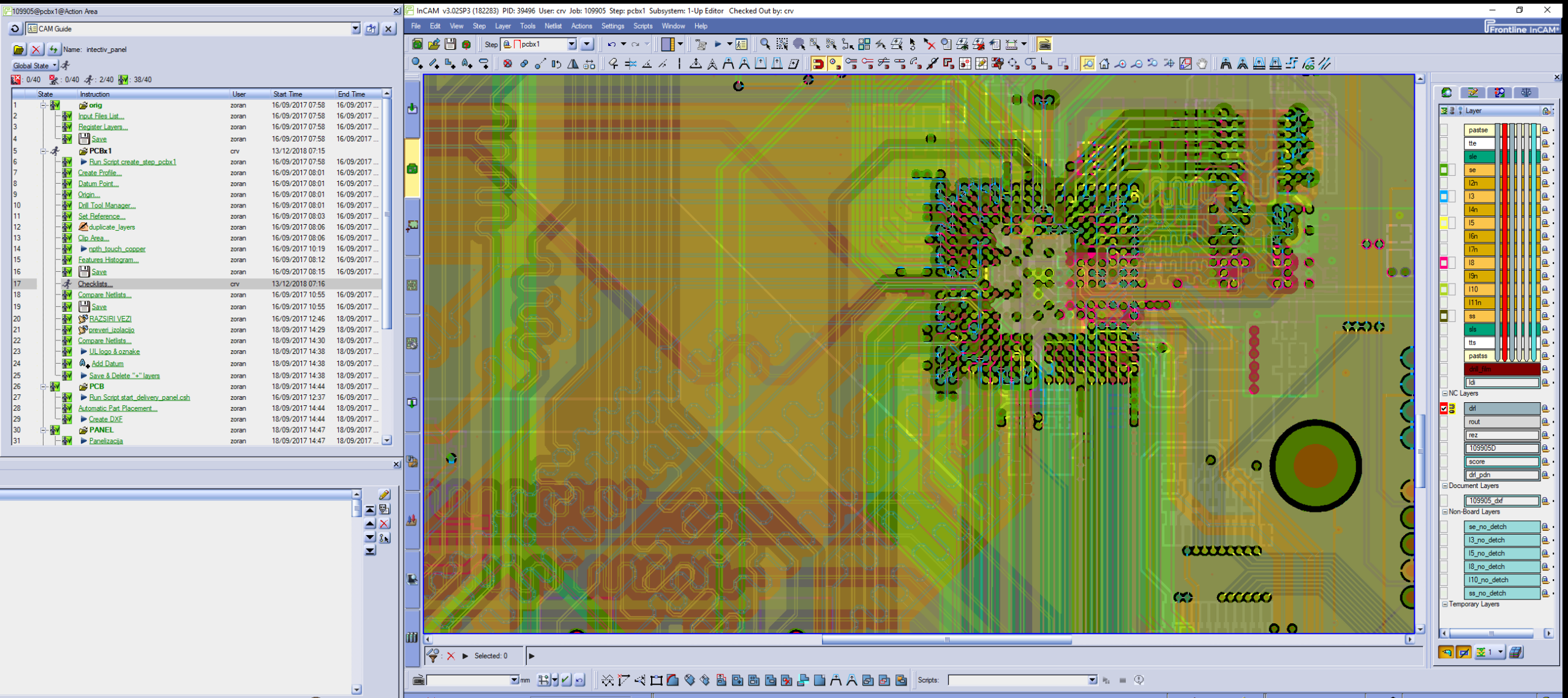

CAM350®


CAM350
Release 9
Version 9.5

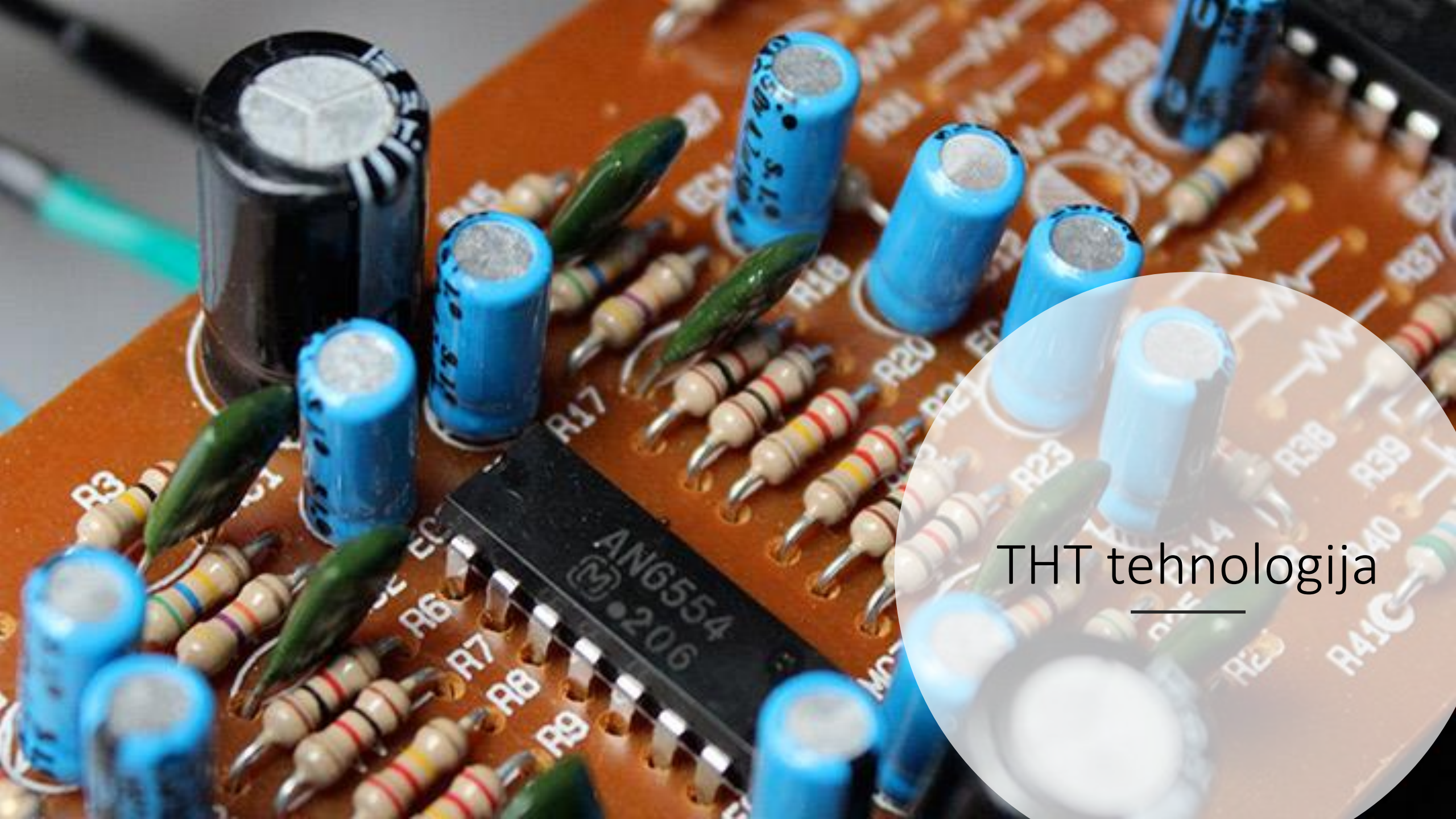

CAM350
Release 8.5


CAM350
Release 8.0

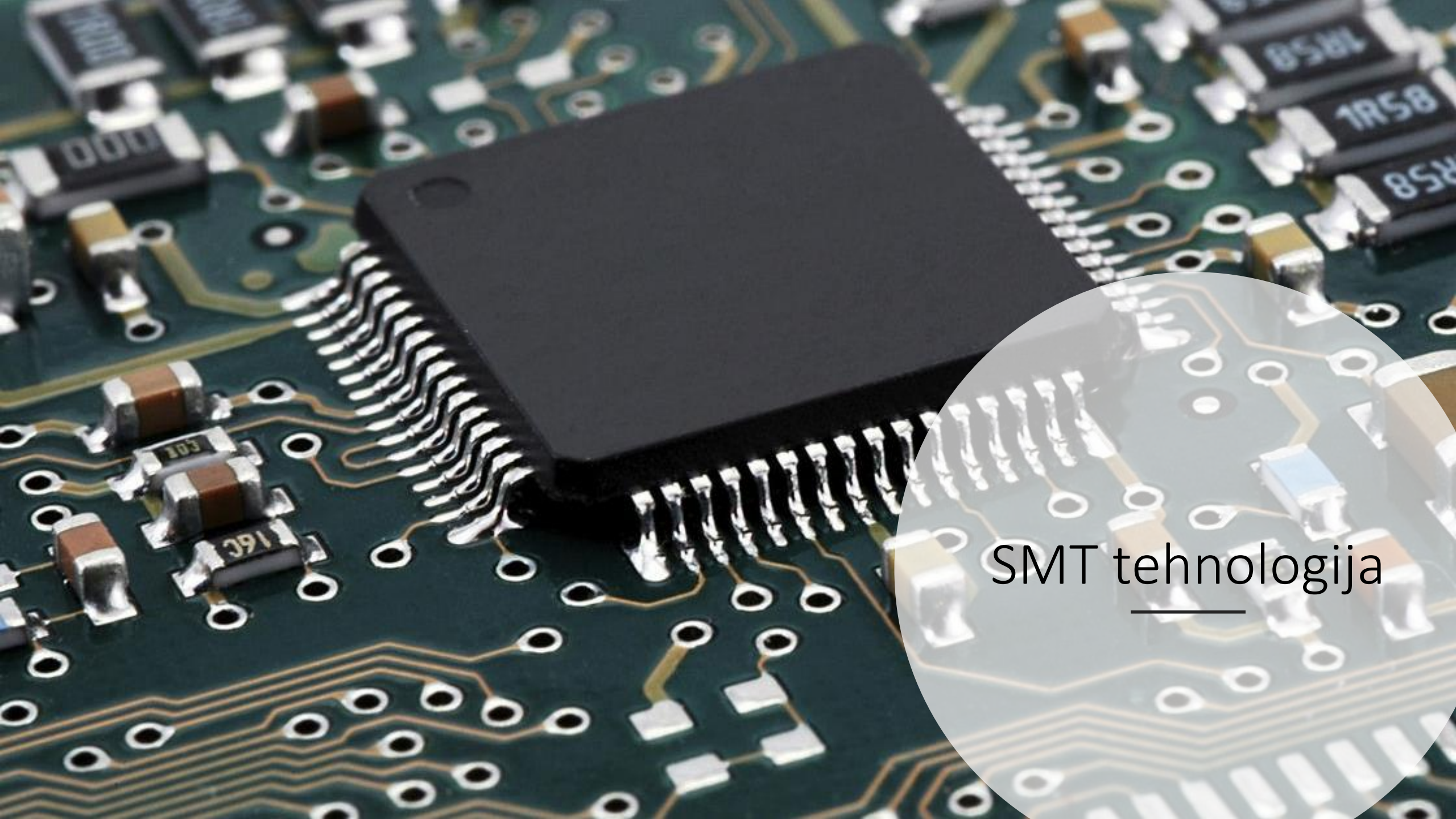
2015: Frontline InCAM



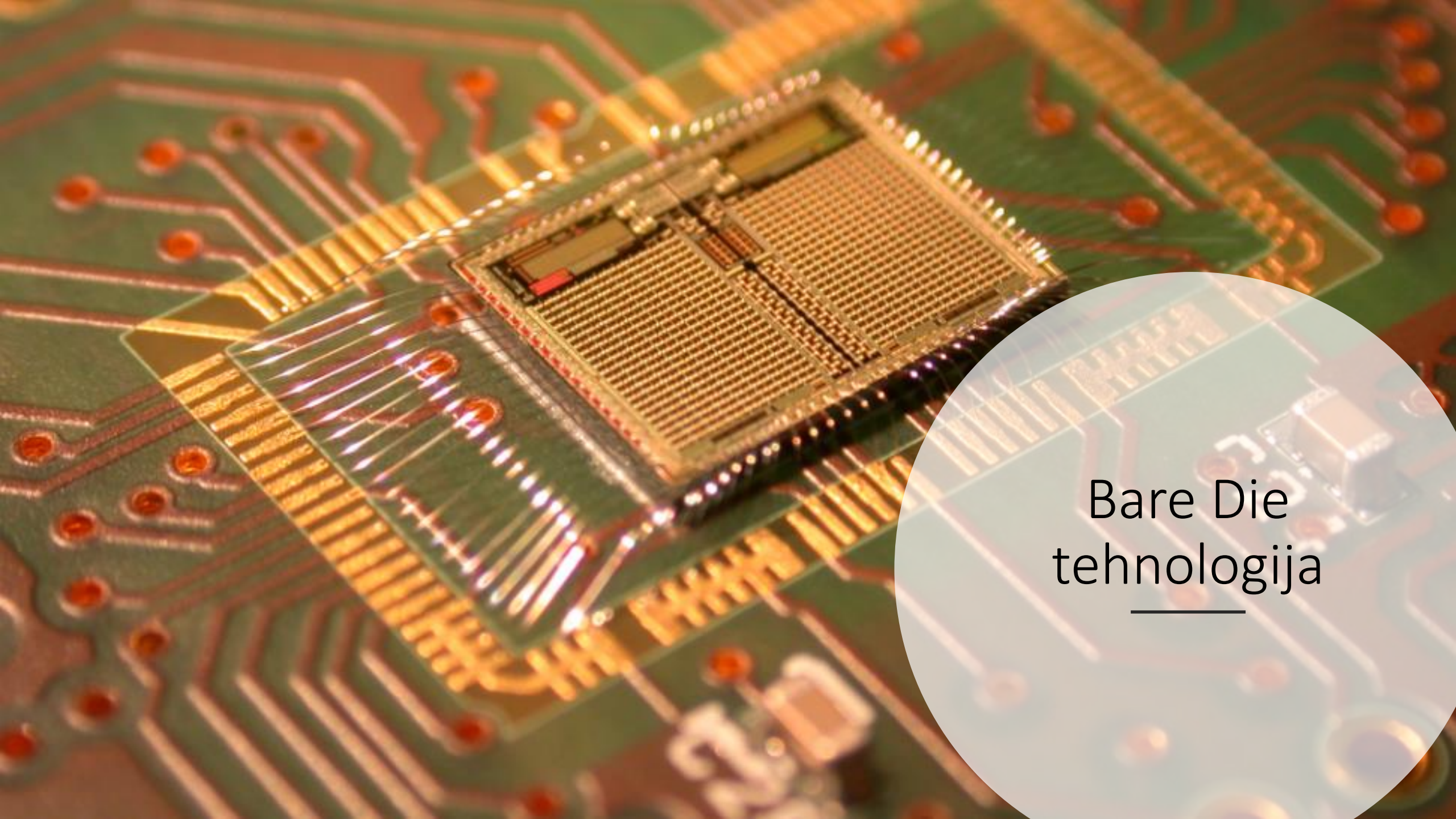
Razvoj tehnologije montaže elektronskih komponent



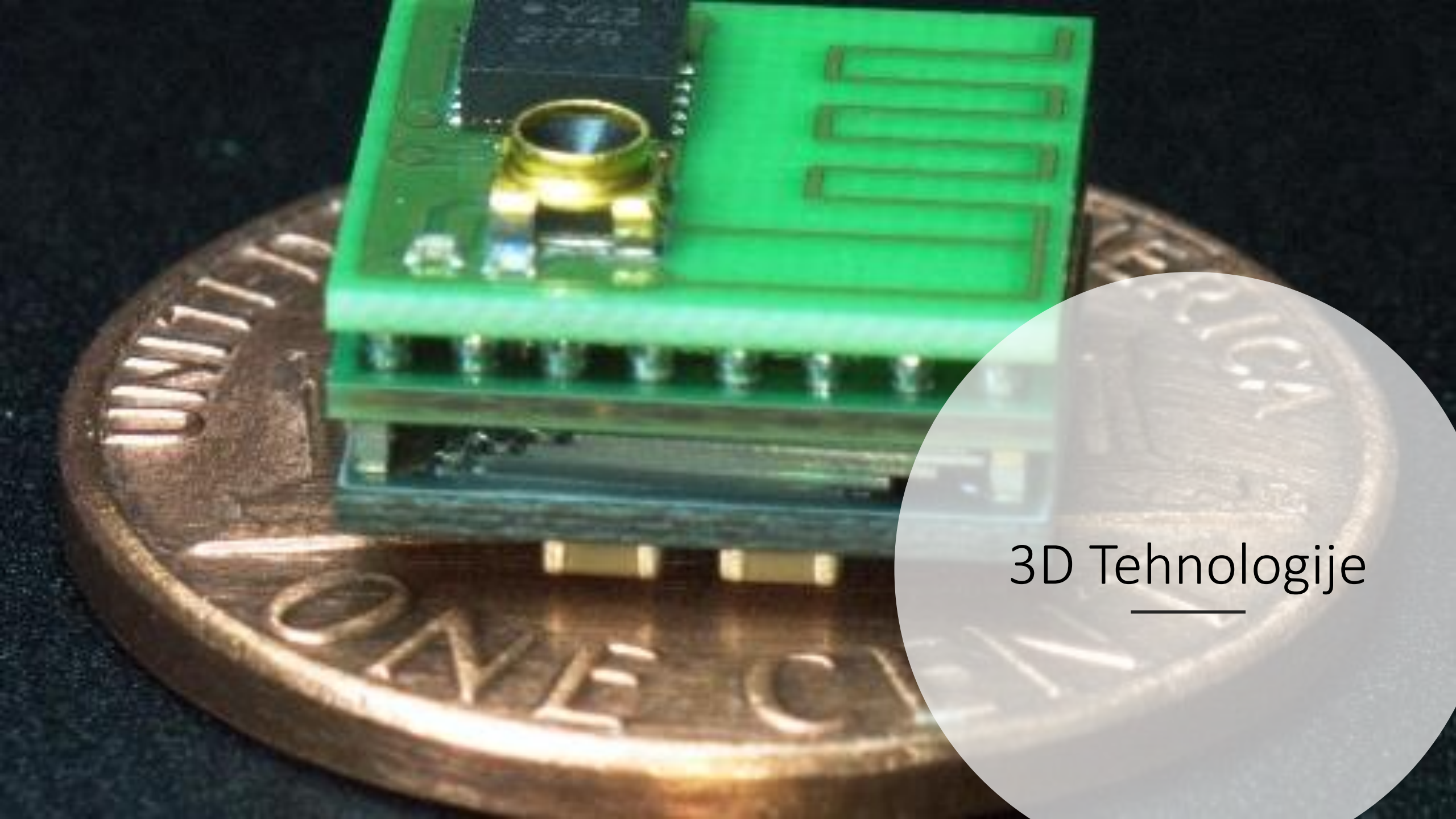
THT tehnologija



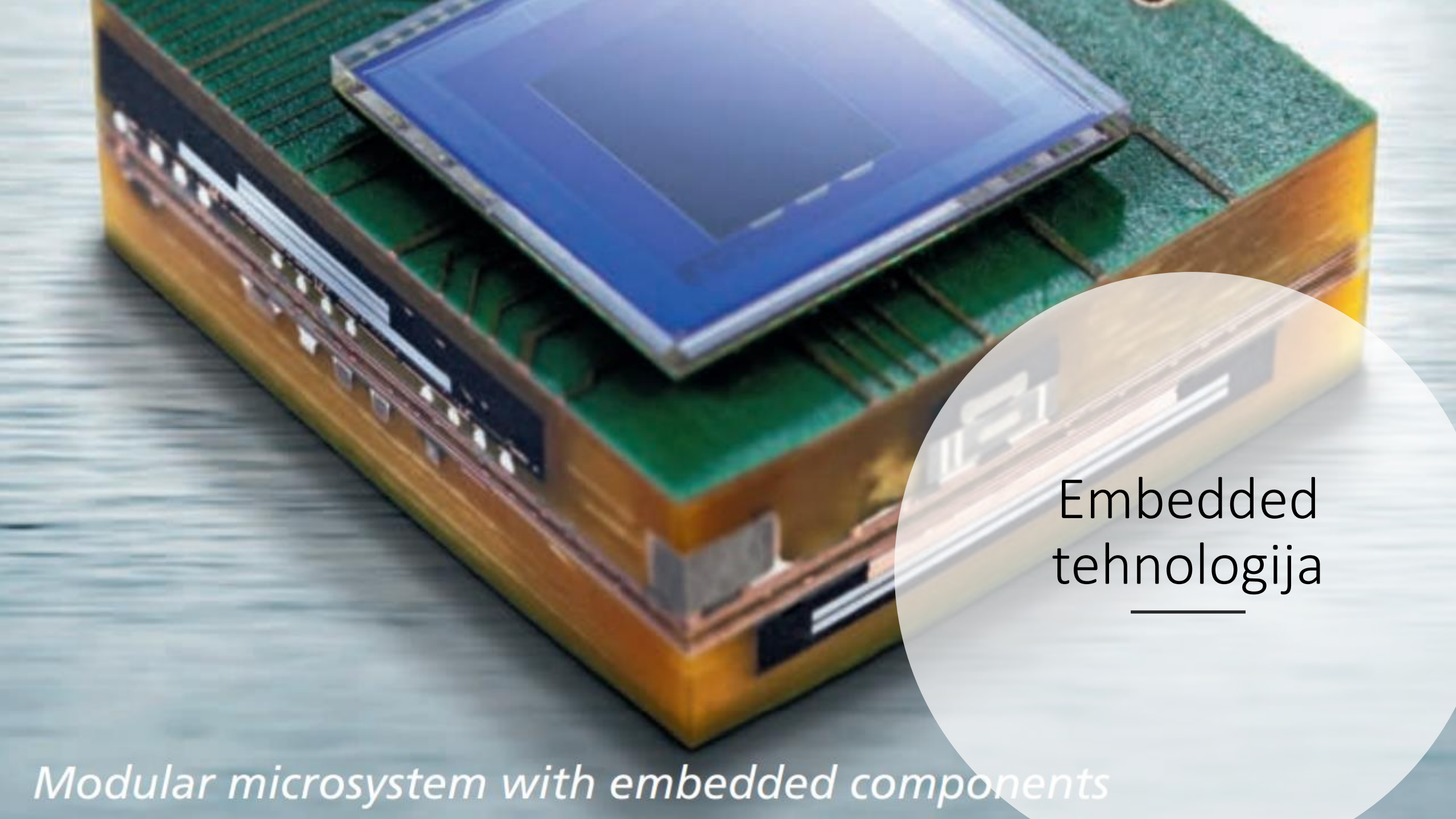
SMT tehnologija



Bare Die tehnologija

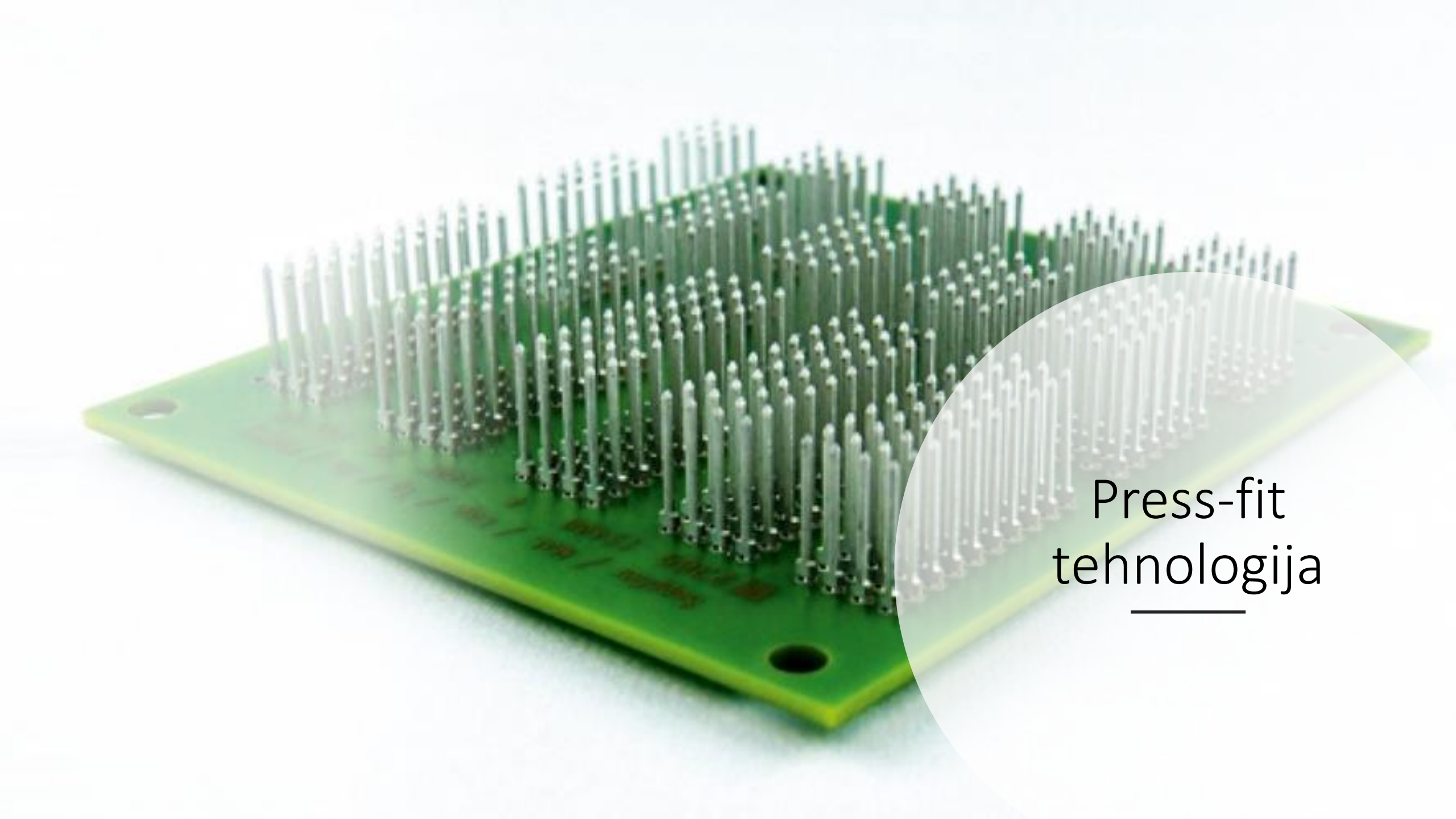


3D Tehnologije

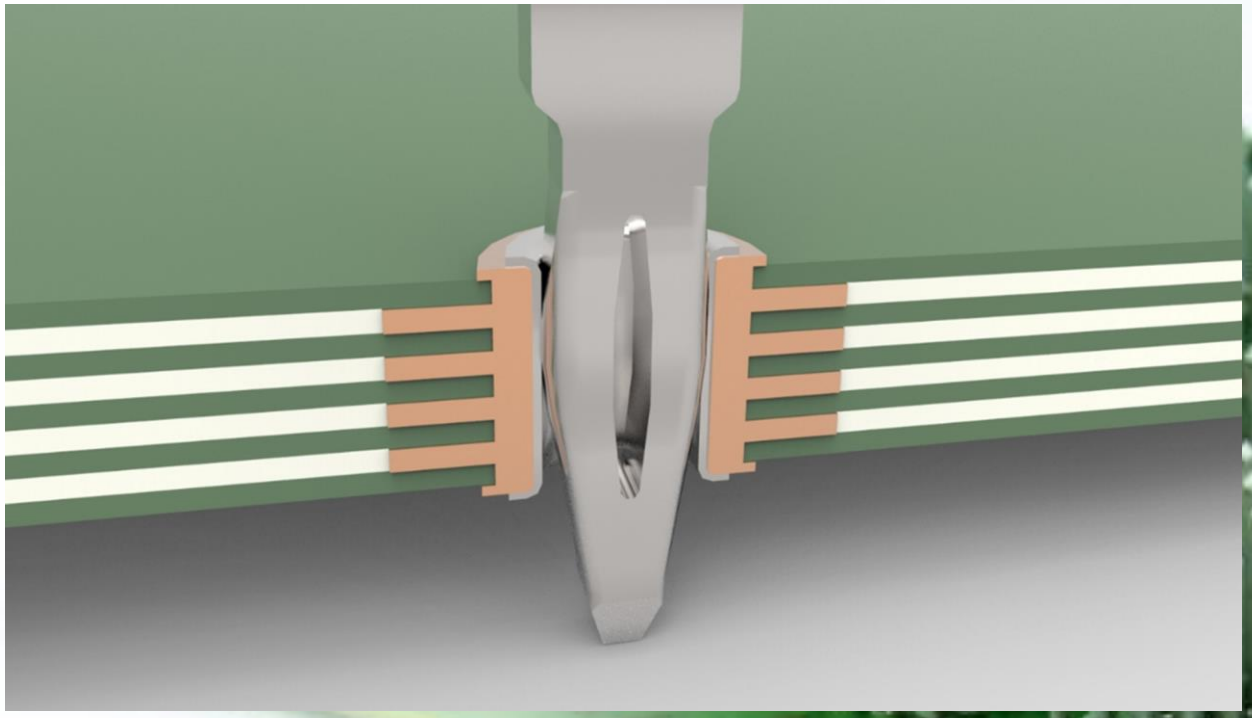


Embedded tehnologija

Modular microsystem with embedded components



Press-fit tehnologija



Press-fit tehnologija

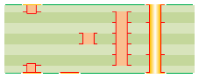
HDI SBU

High Desity Interconnection Sequential Build Up

ML8 HDI SBU struktura

(2x stiskanje)

ML8 HDI SBU



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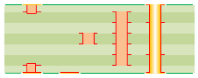

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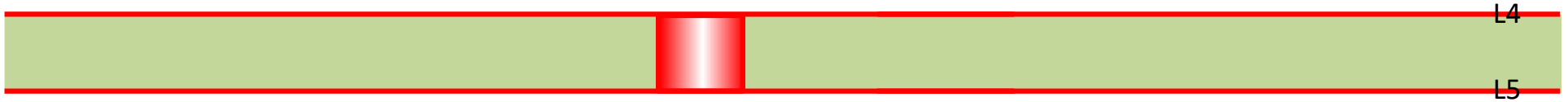

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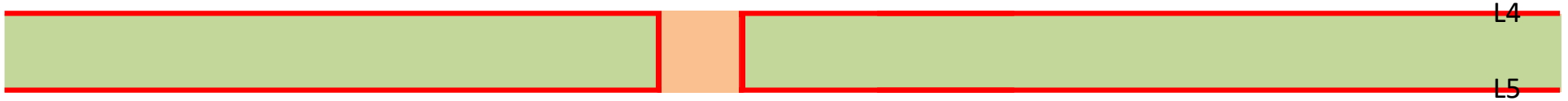

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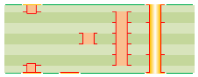

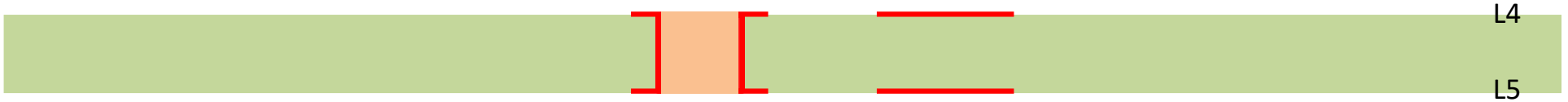

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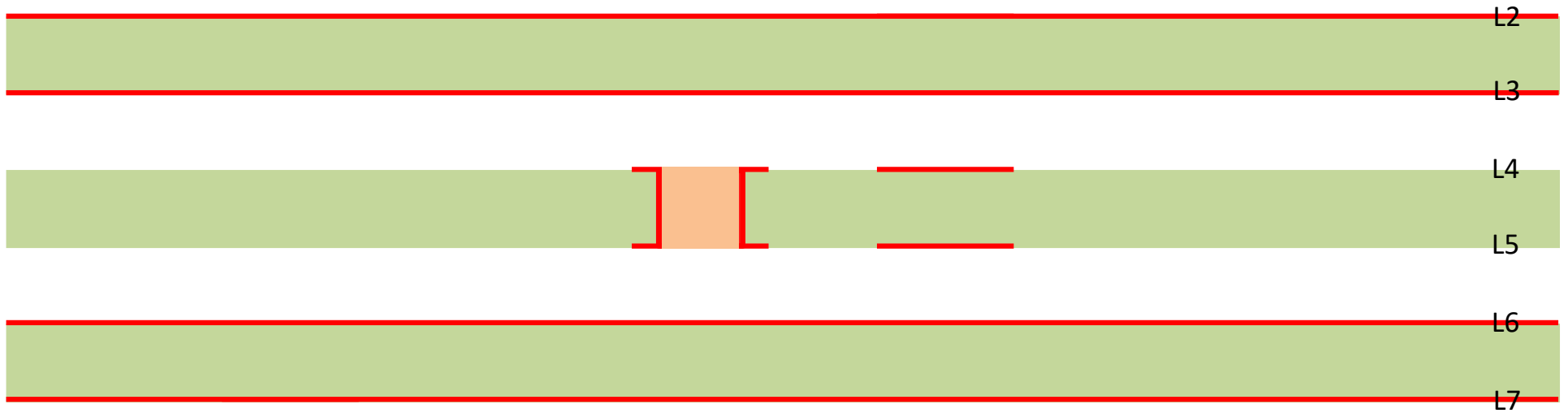

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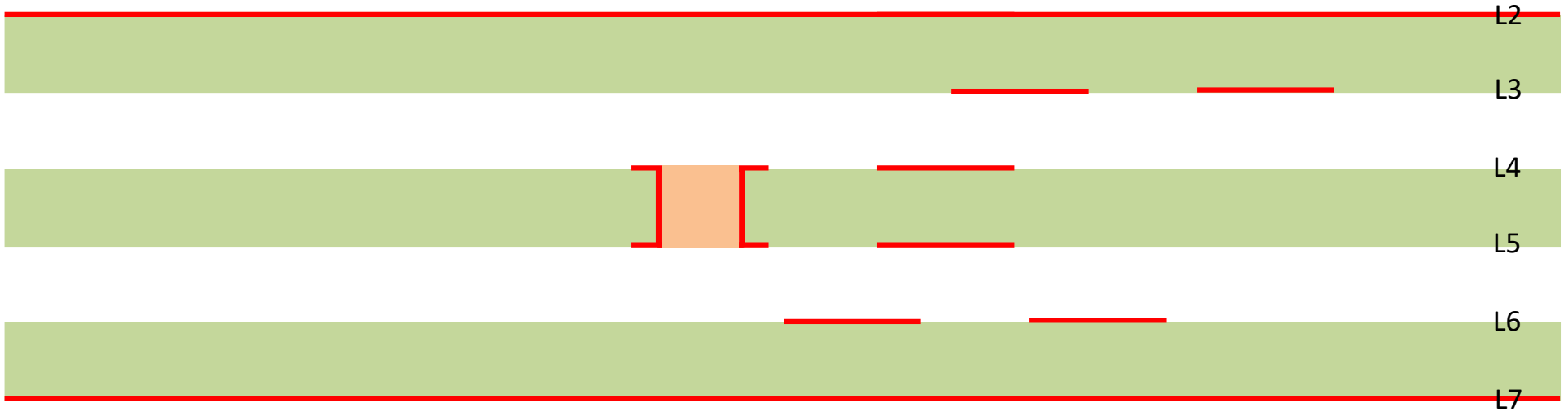

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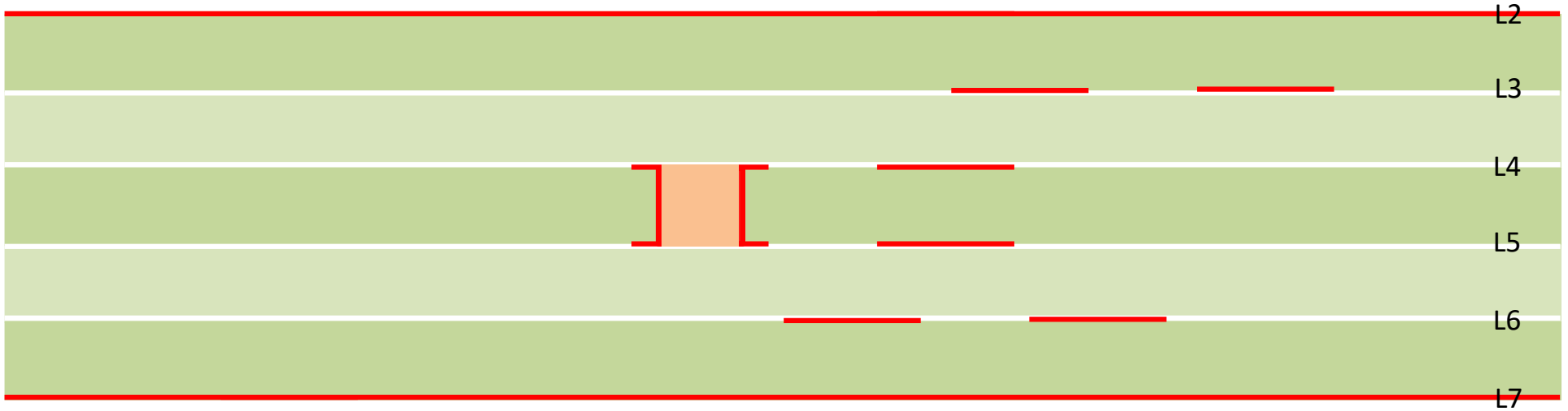

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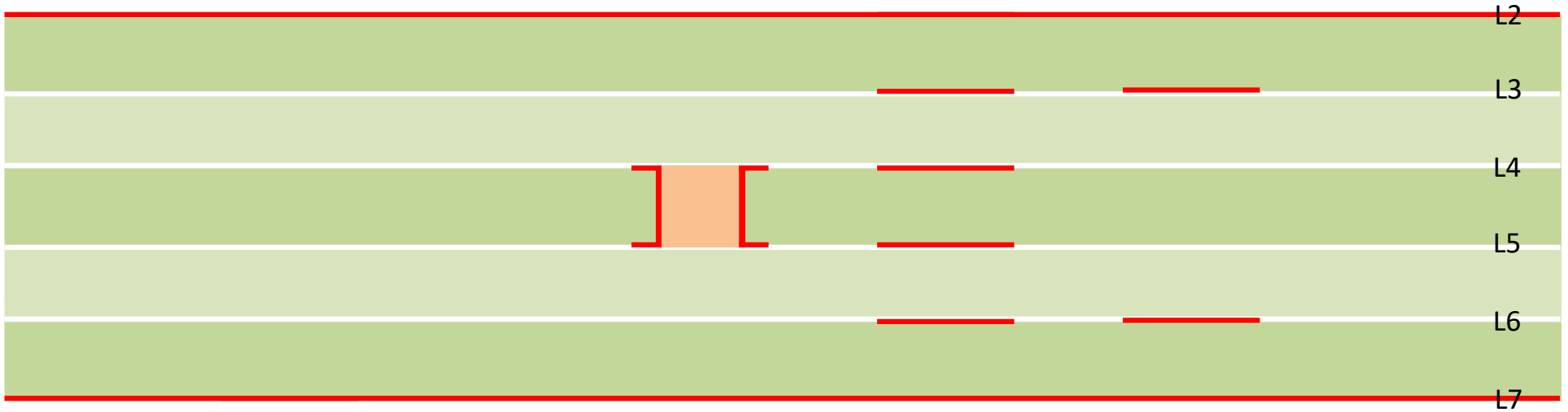

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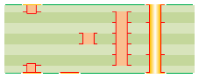

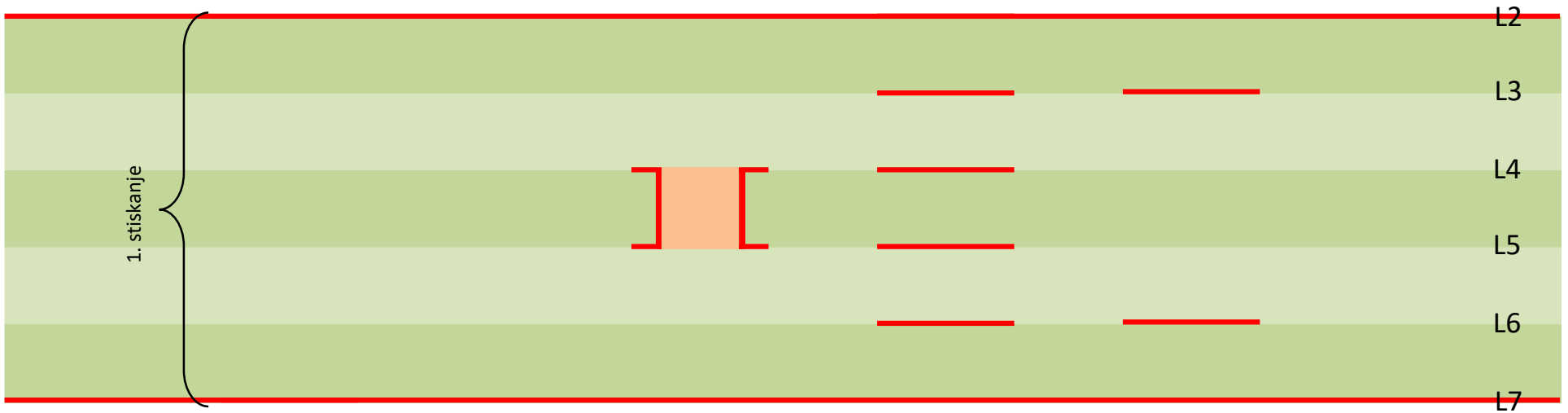

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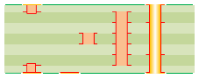

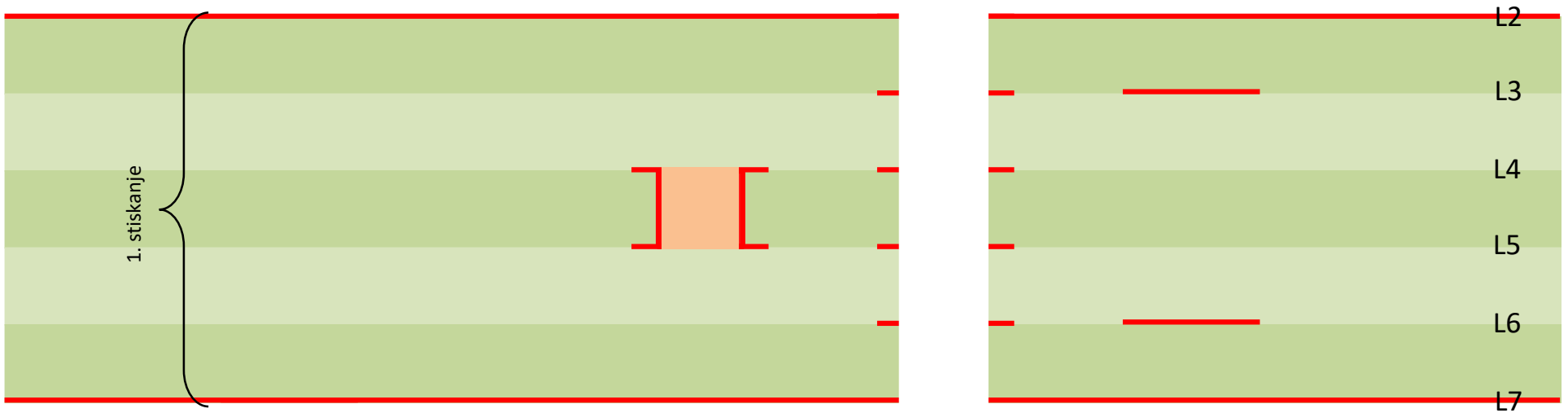

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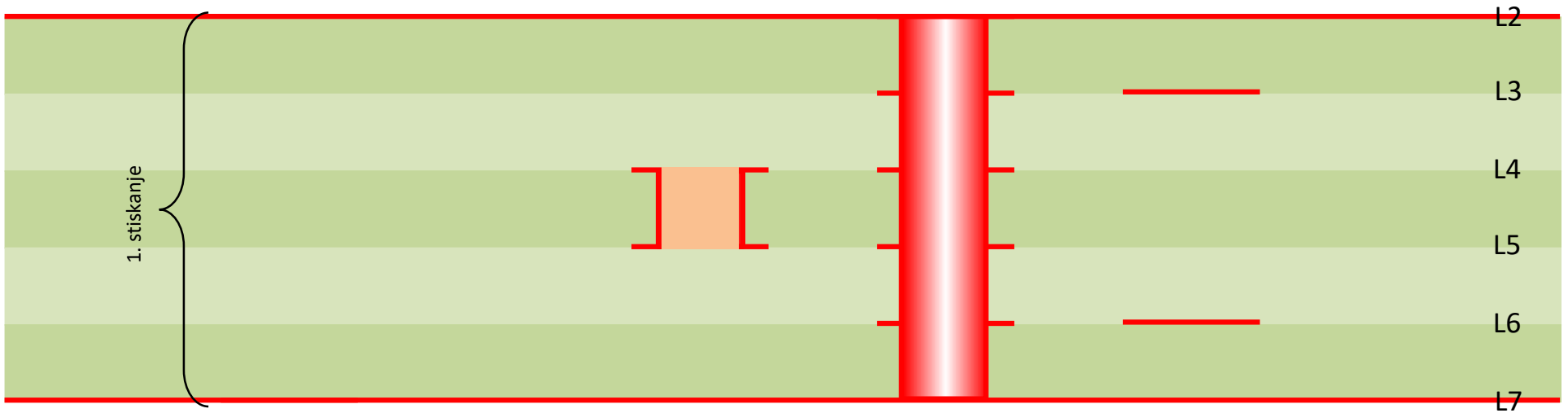

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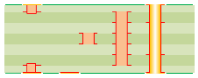

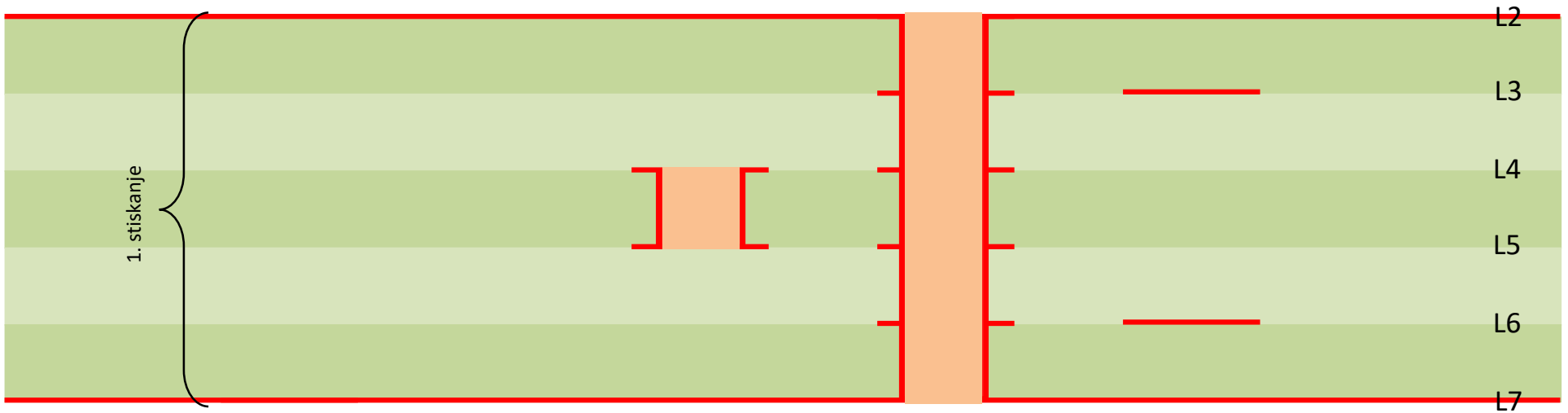

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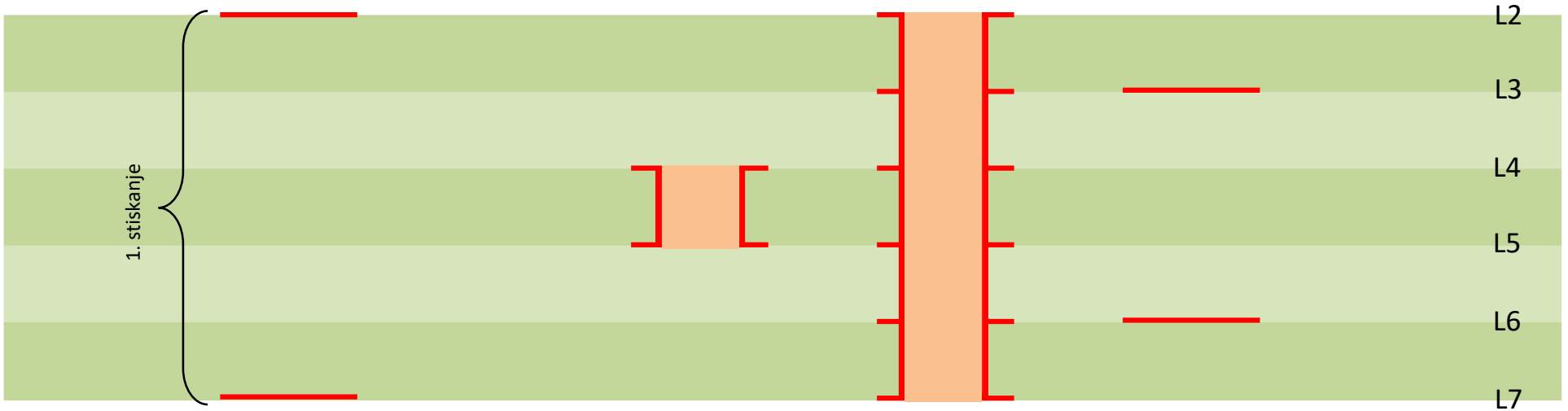

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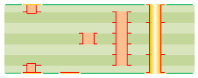

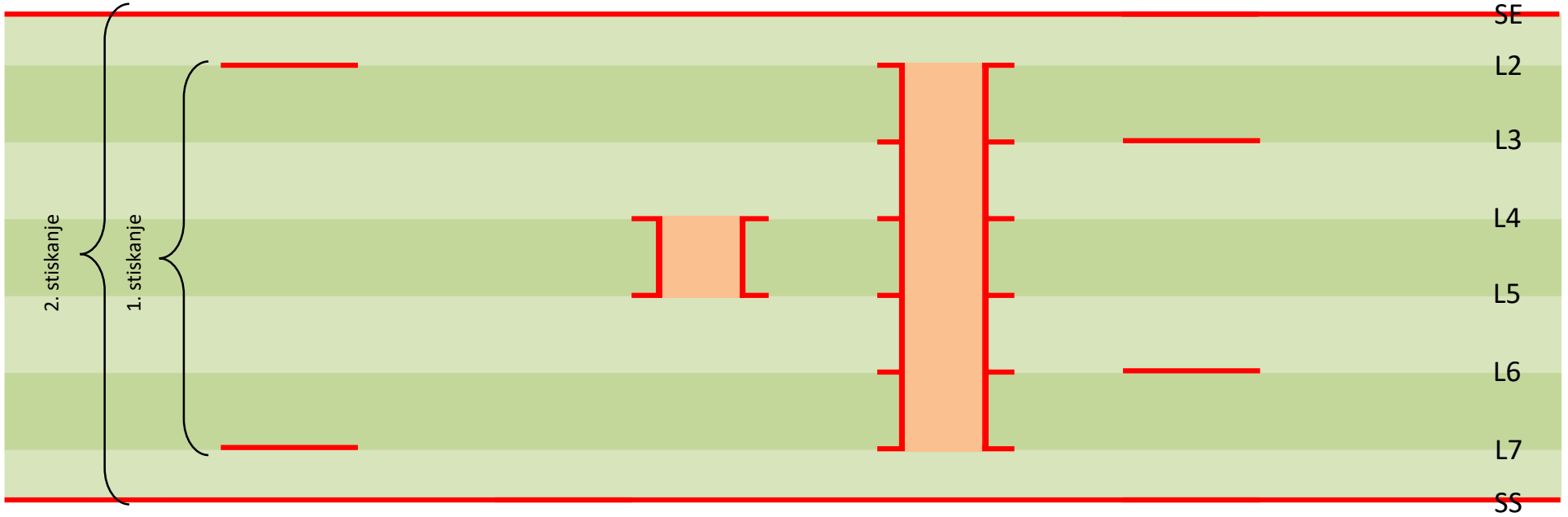

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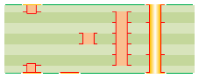

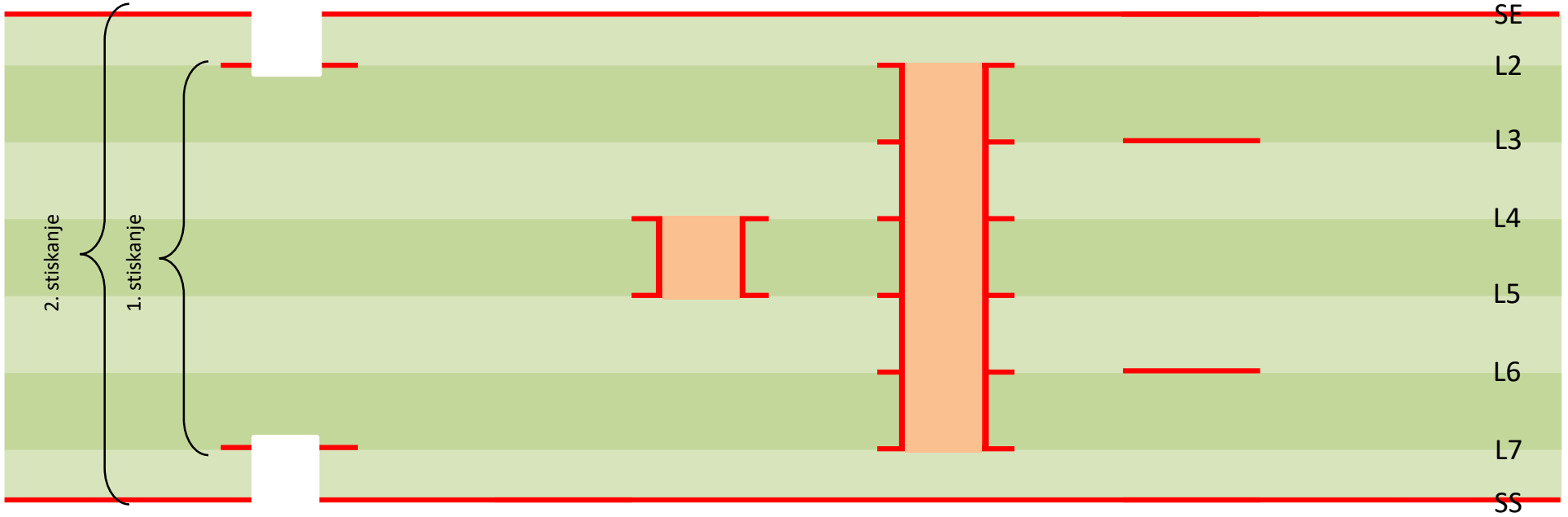

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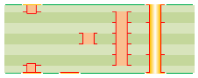

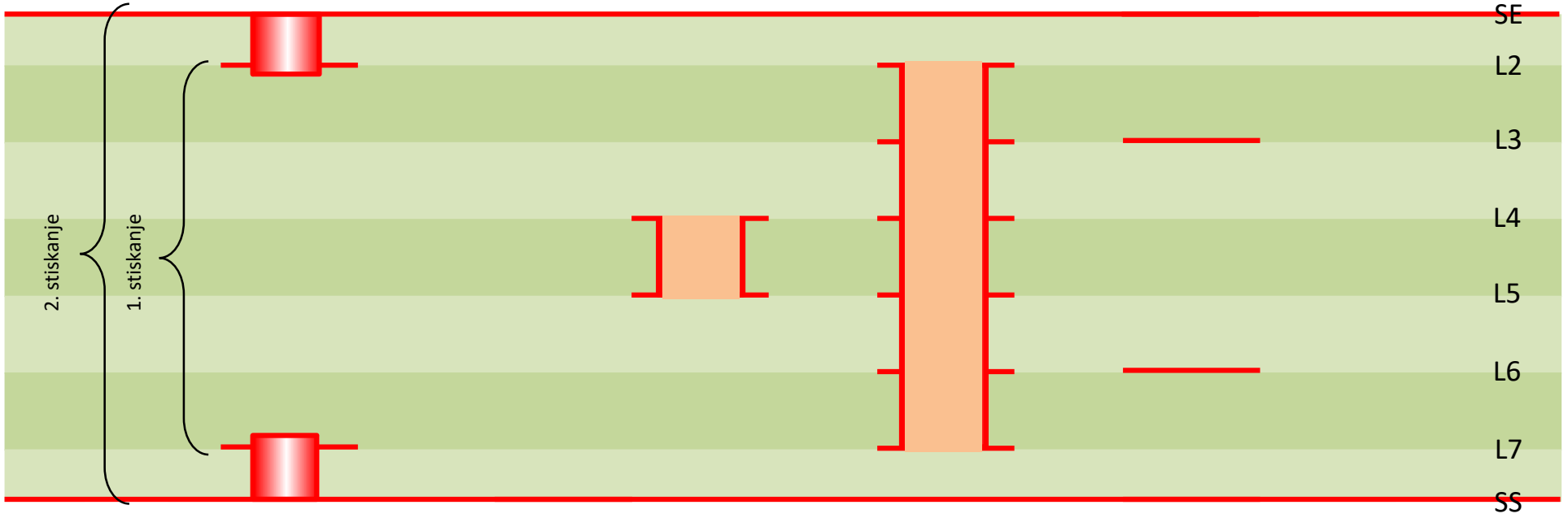

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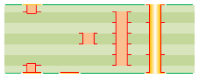

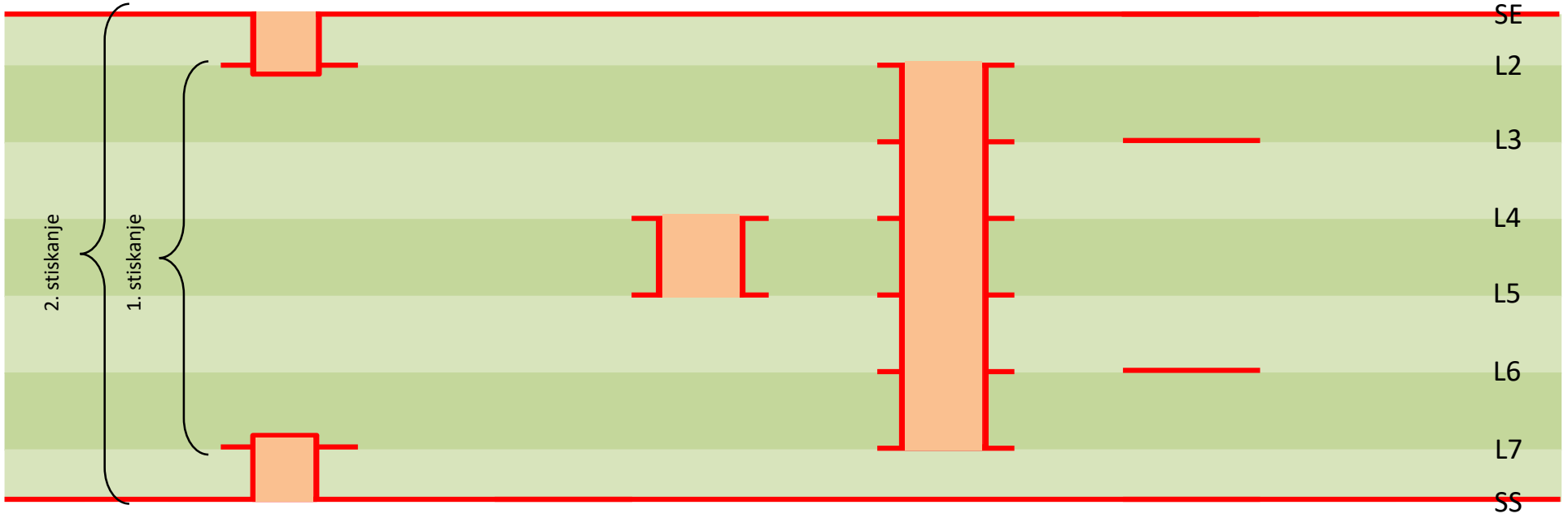

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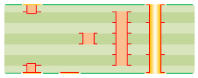

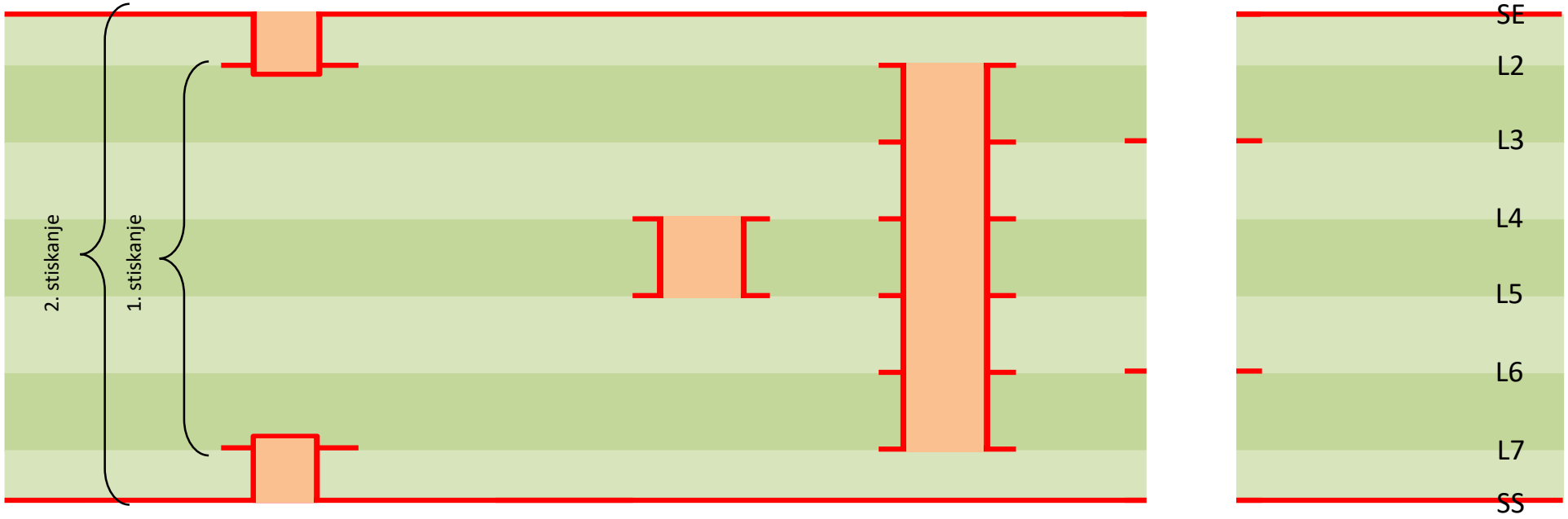

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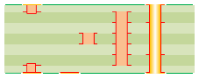

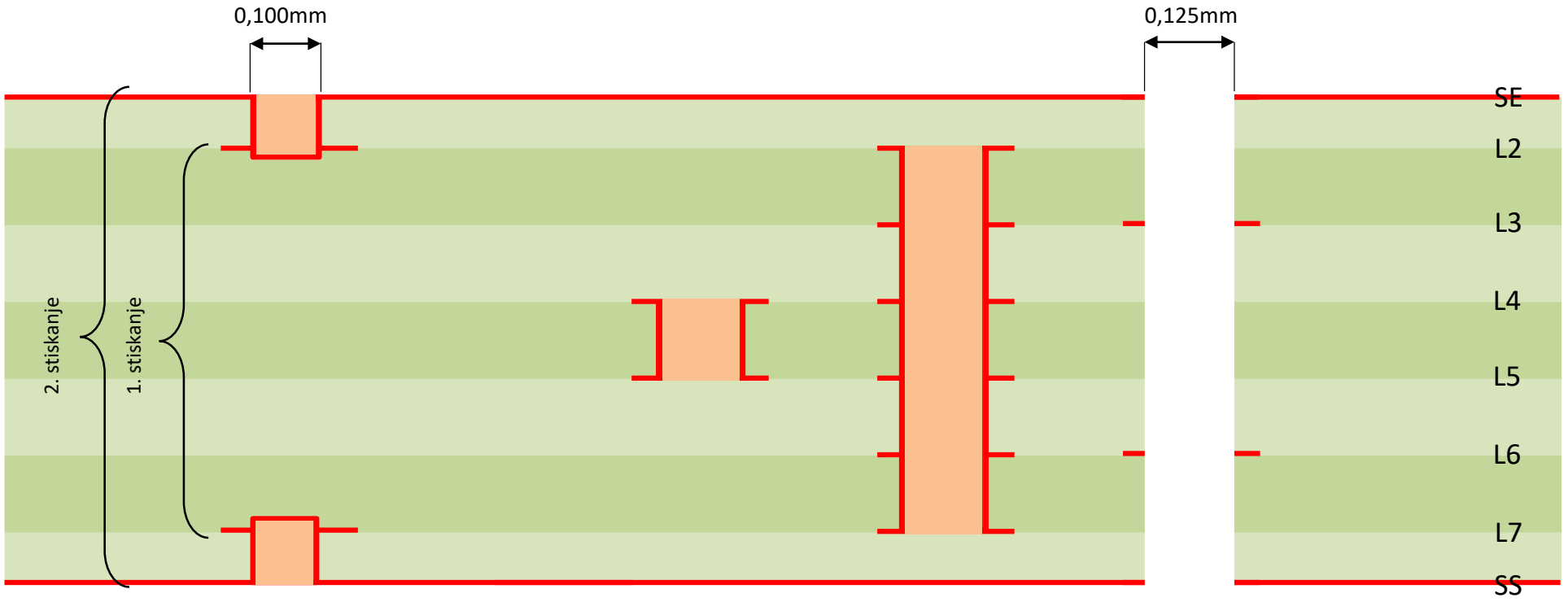

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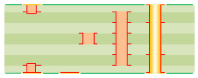

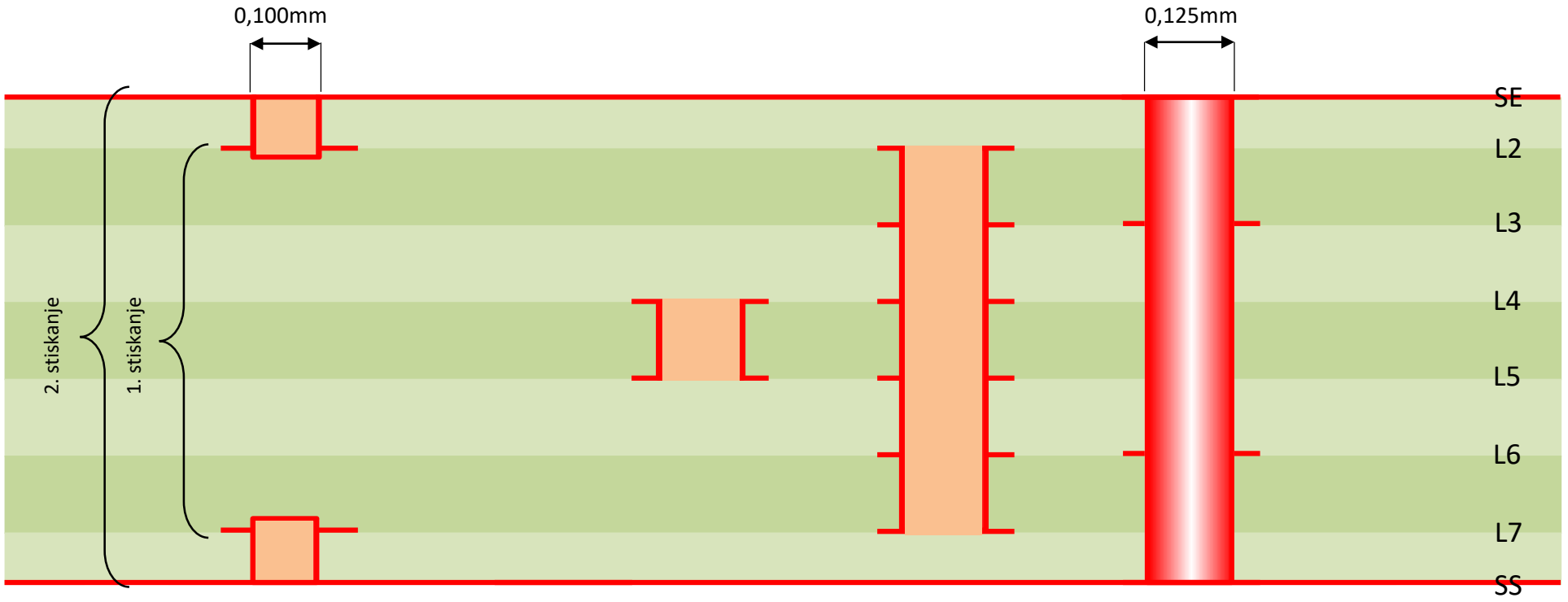

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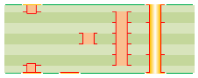

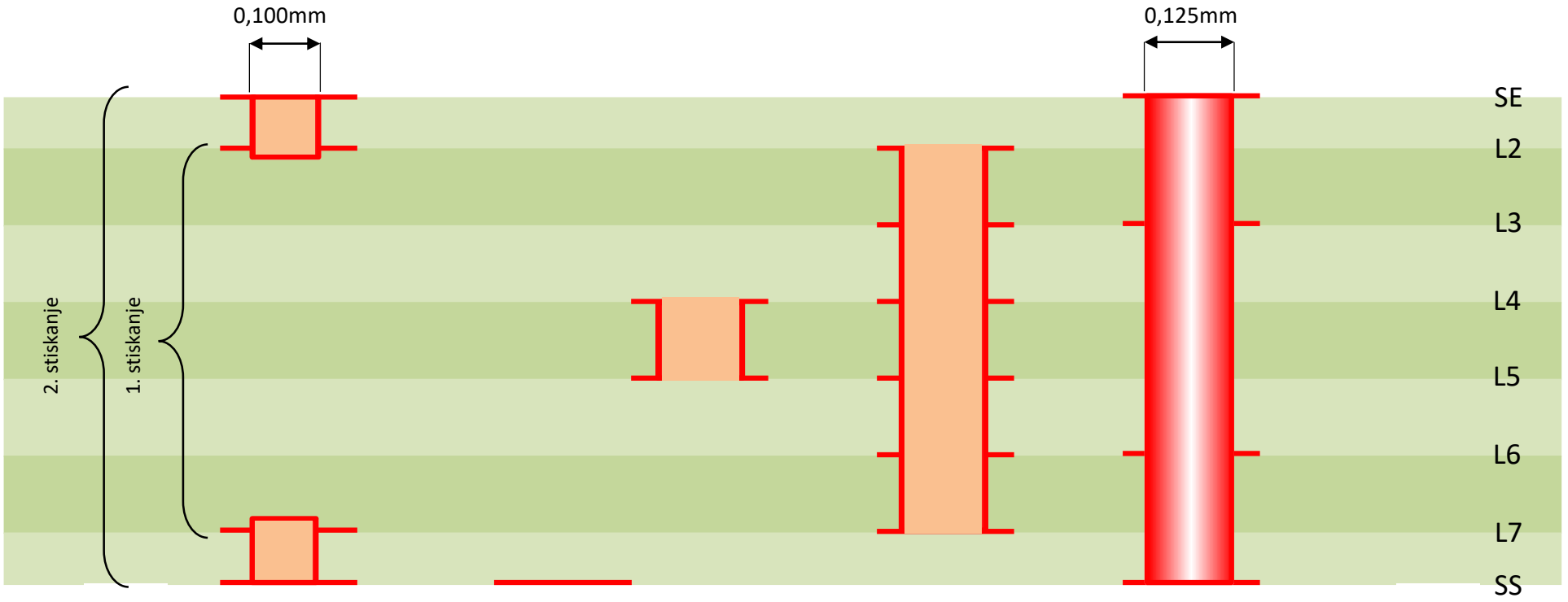

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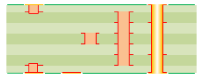

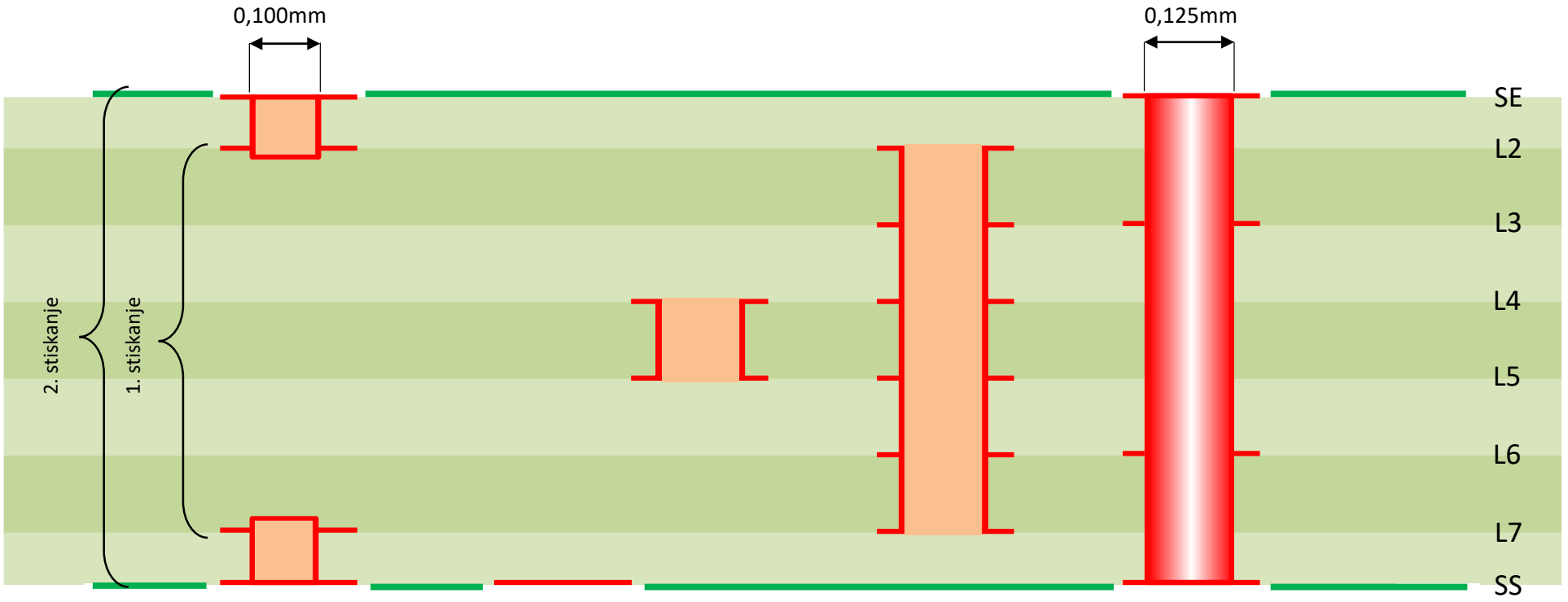

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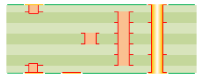

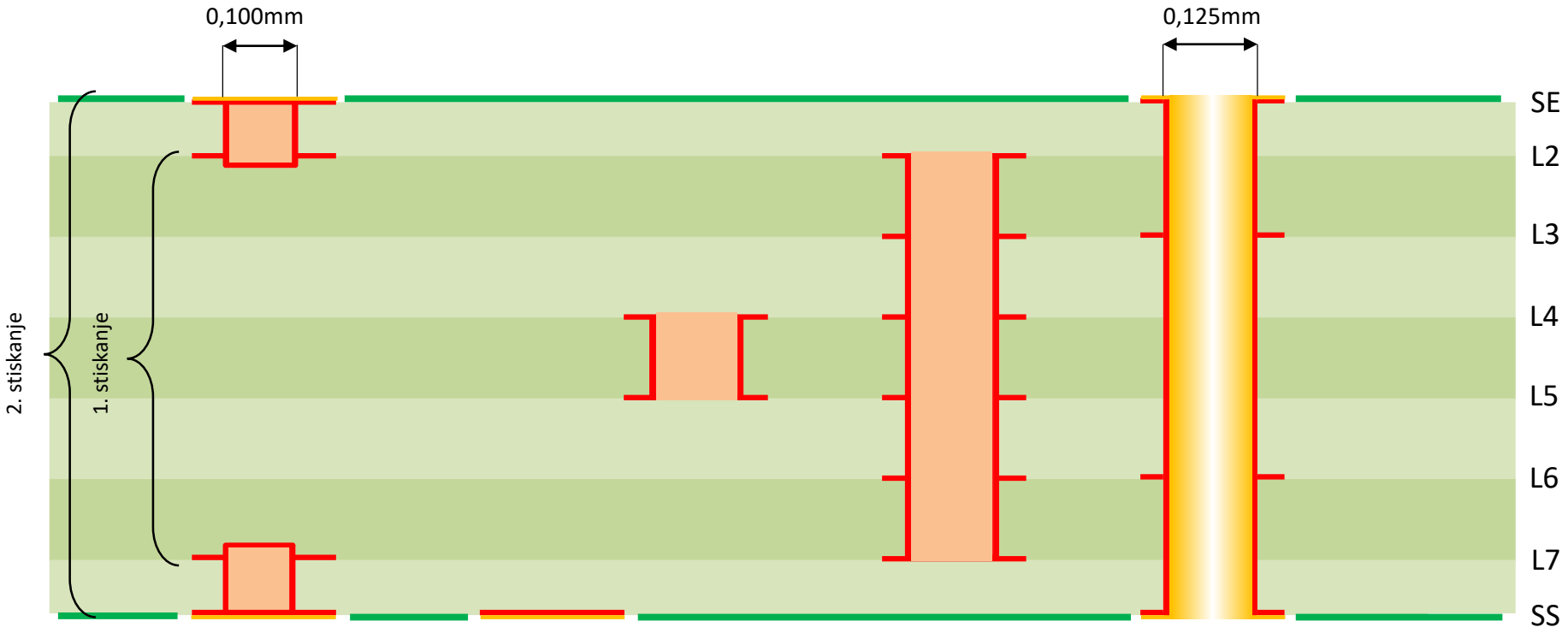

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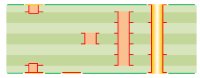
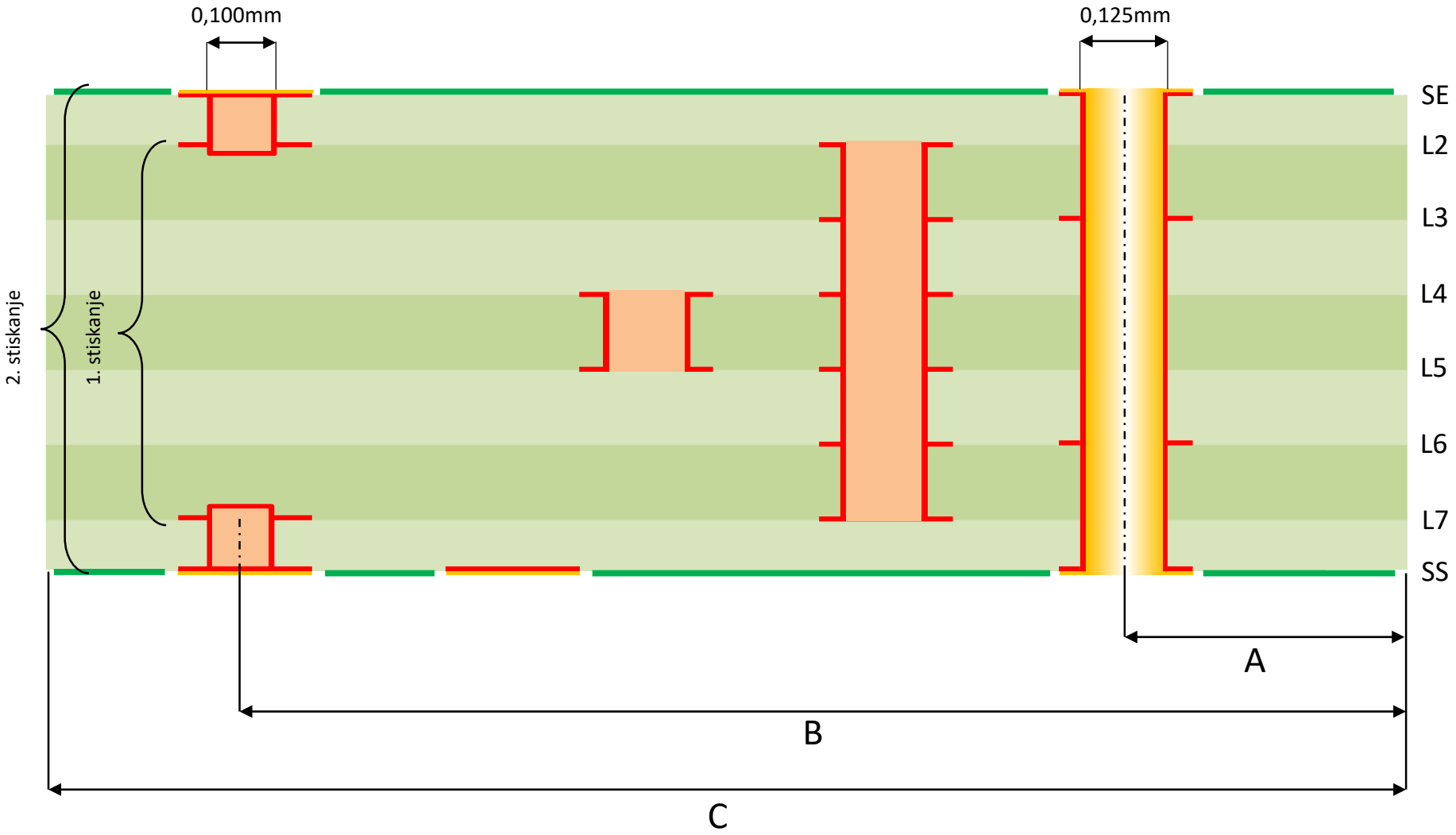
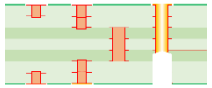


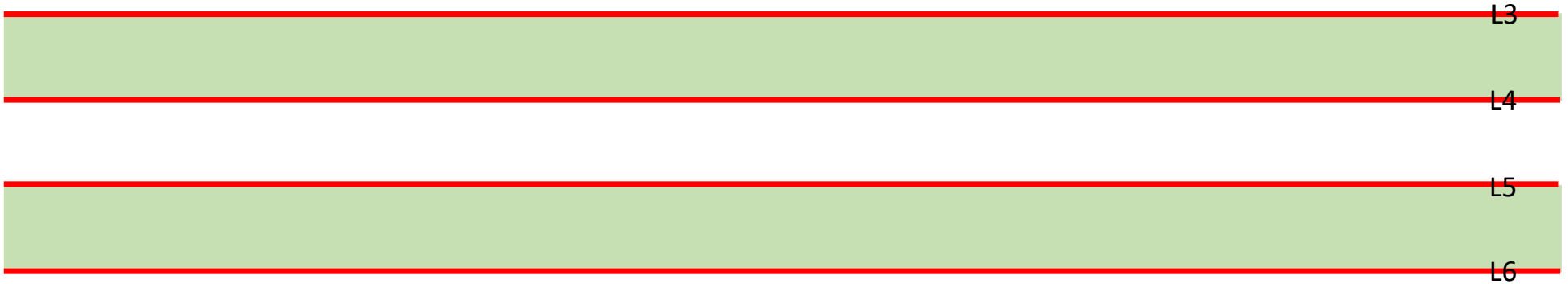

0,100mm
0,125mm
SE
L2
L3
L4
L5
L6
L7
SS
2. stiskanje
1. stiskanje
A
B
C

ML8 HDI SBU struktura

(3x stiskanje)

ML8 HDI SBU





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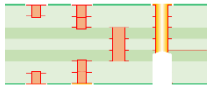

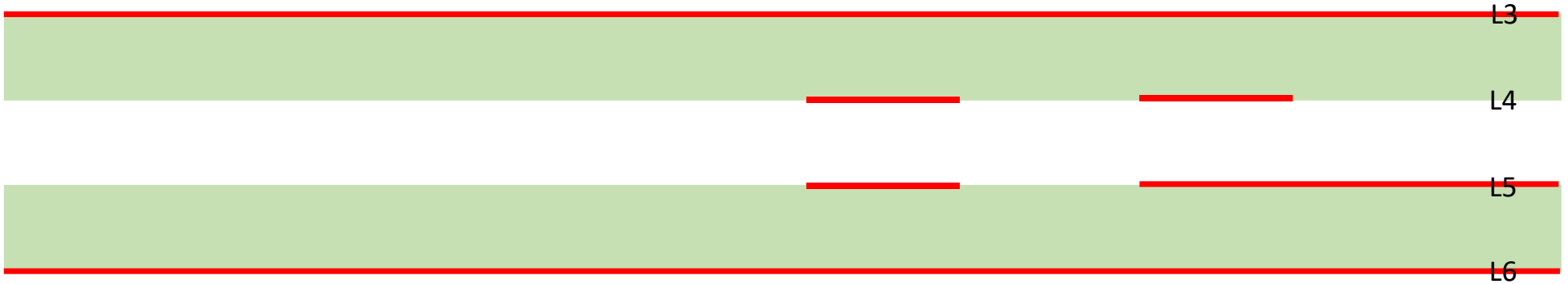

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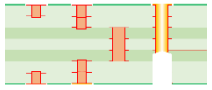

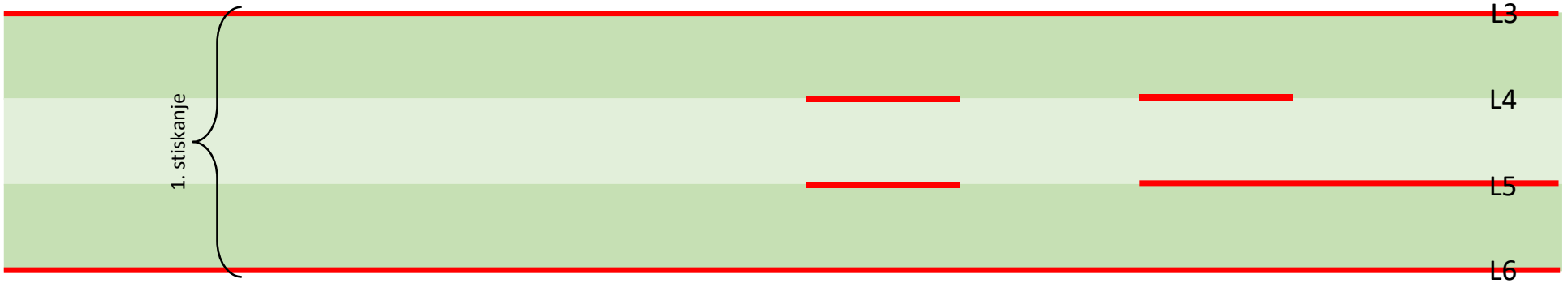

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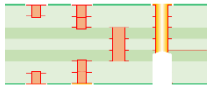

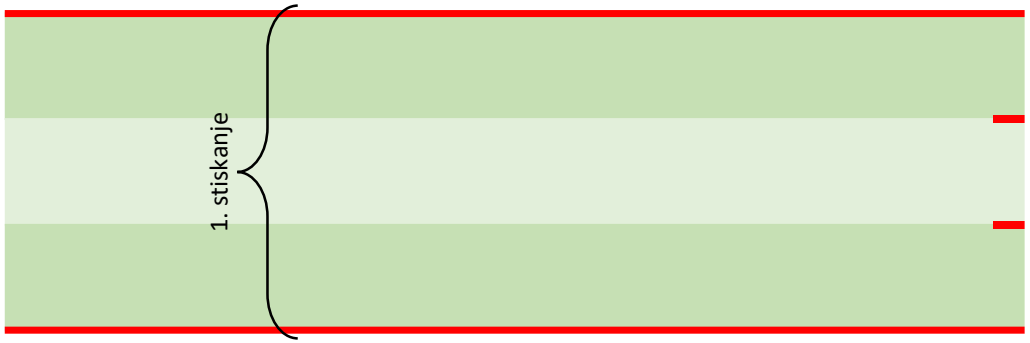

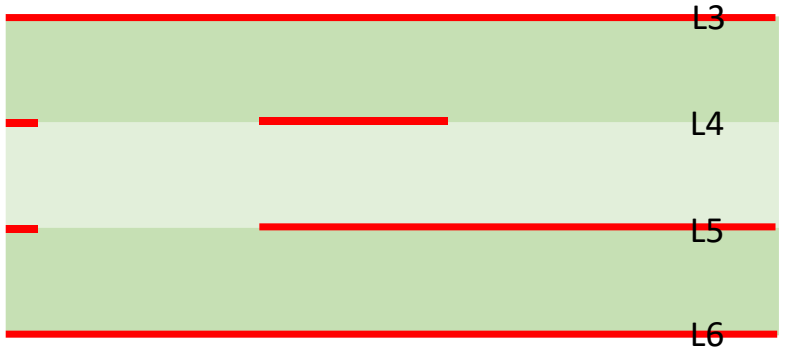

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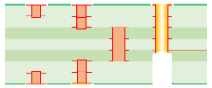

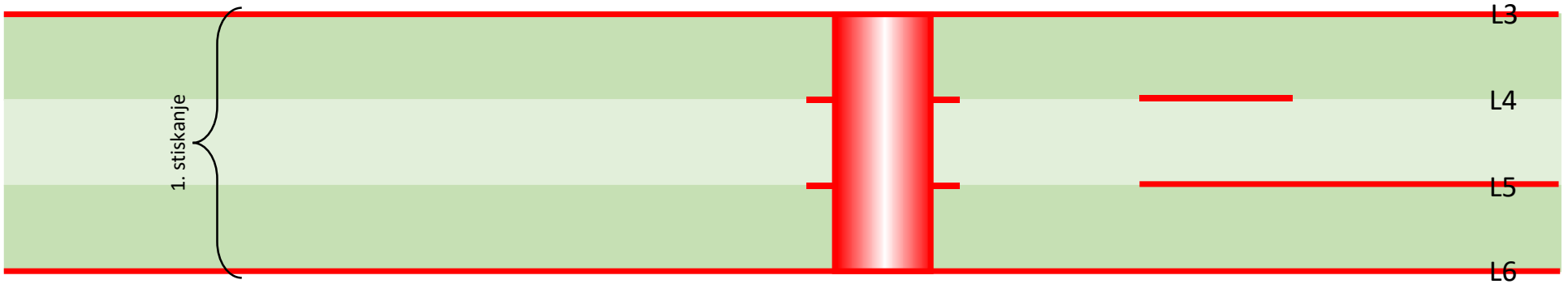

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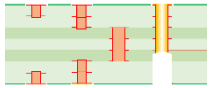

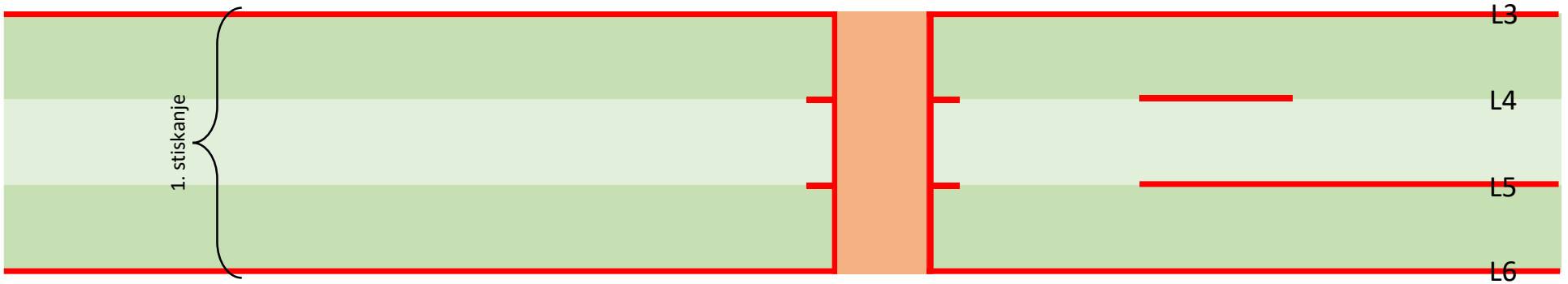

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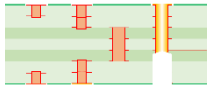

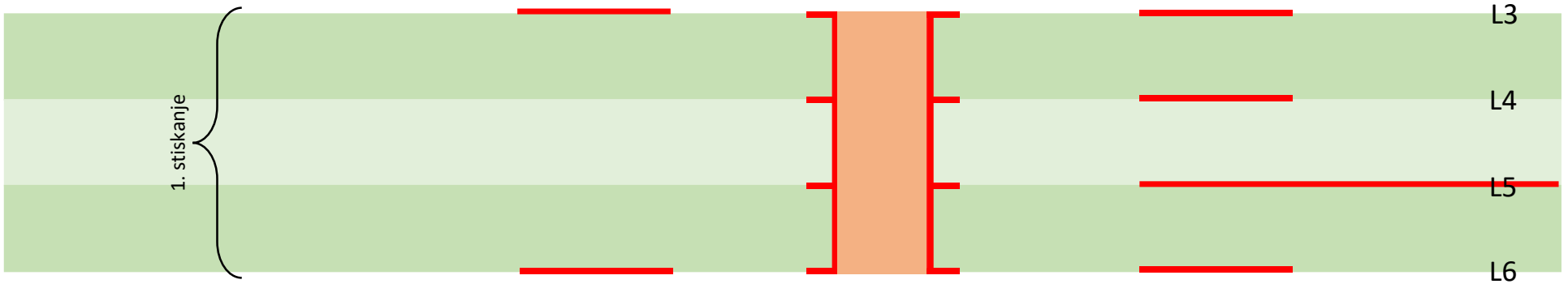

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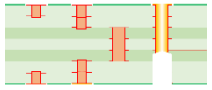

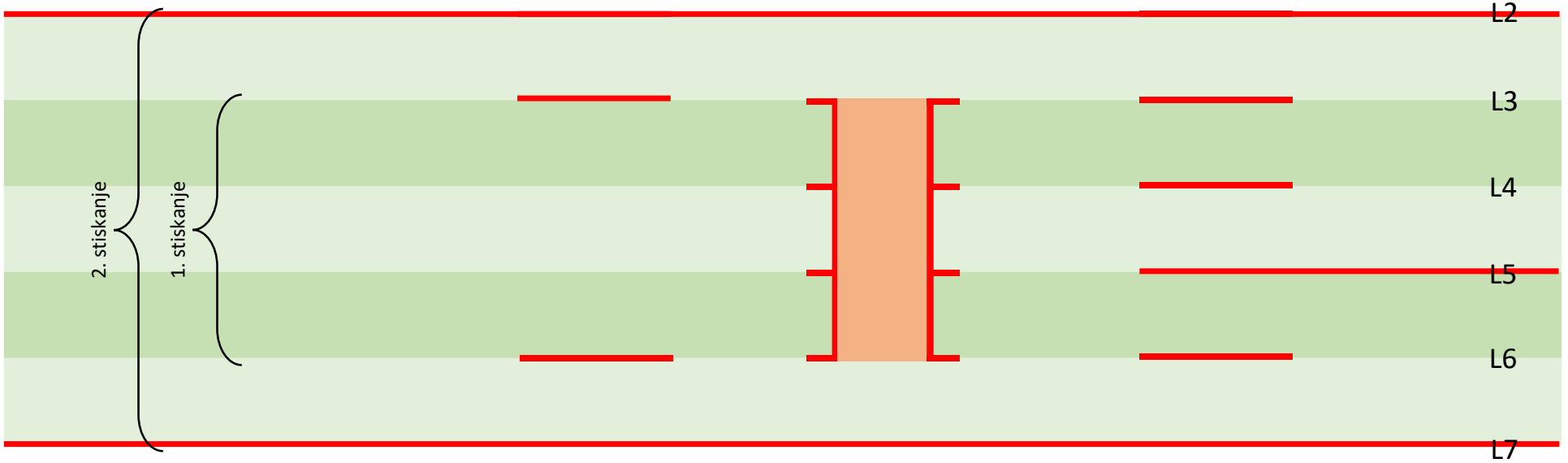

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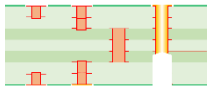

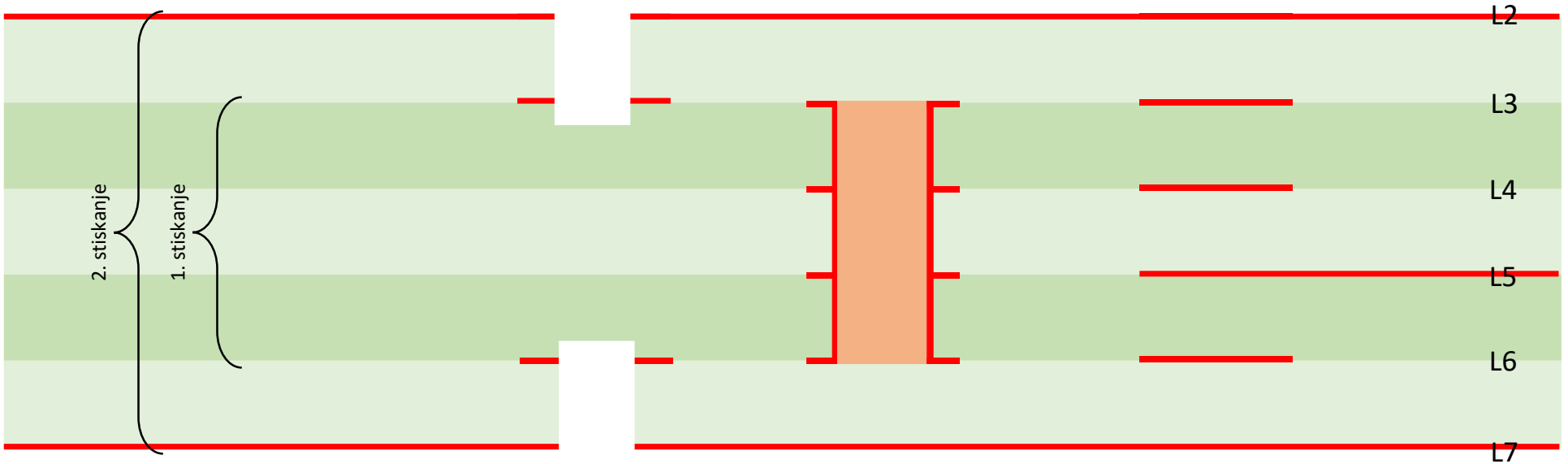

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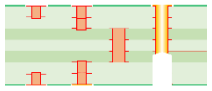

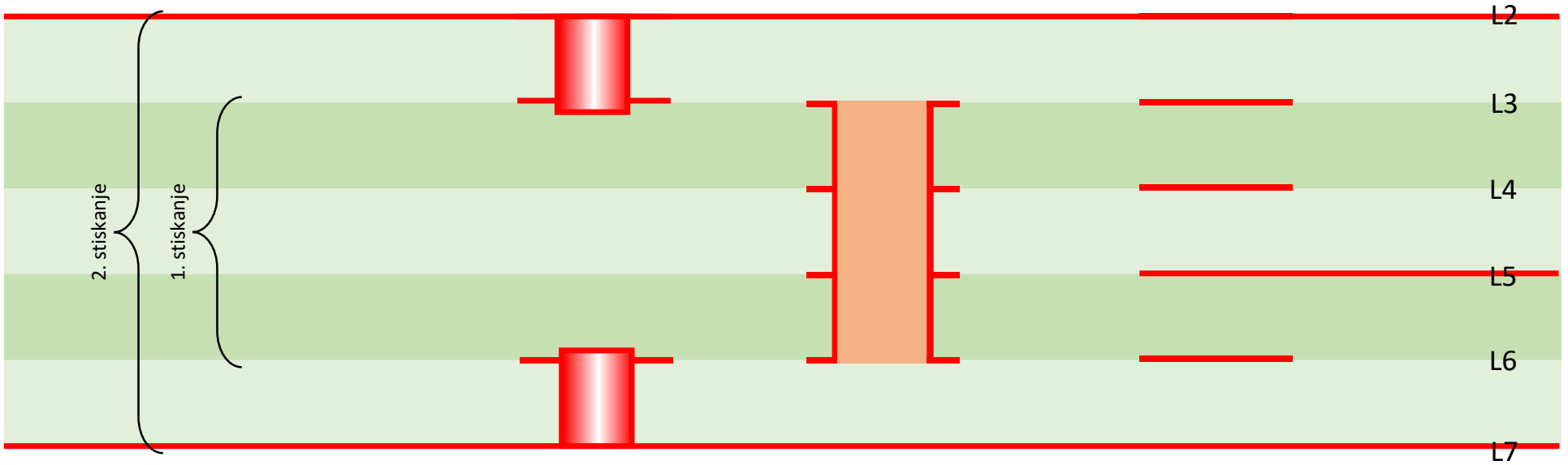

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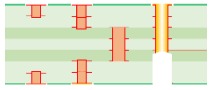

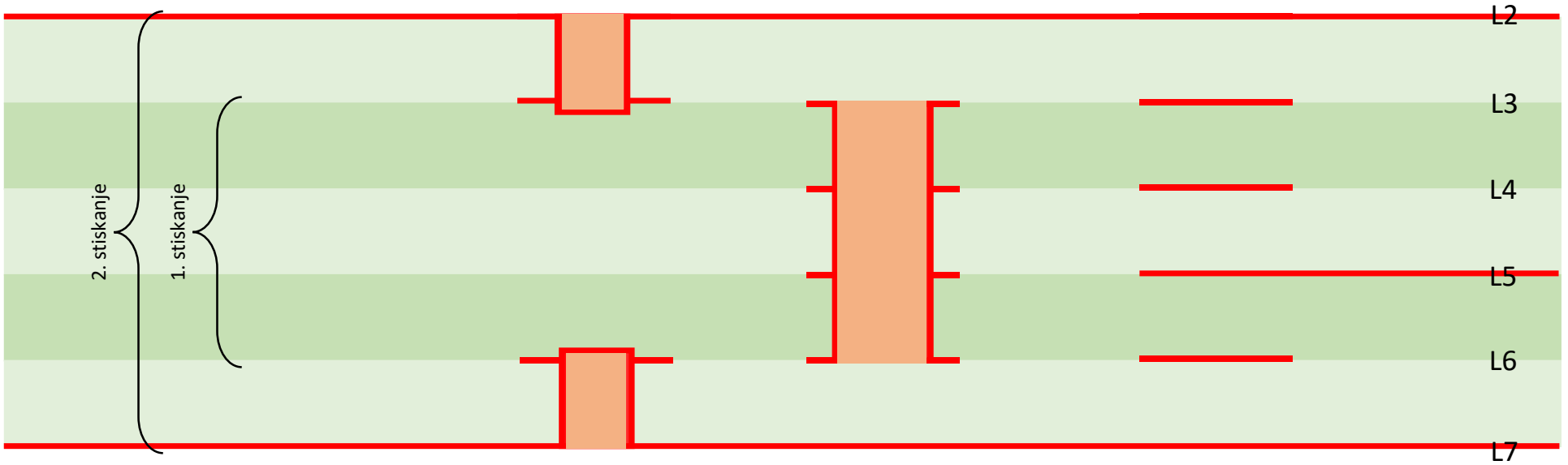

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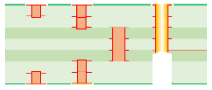

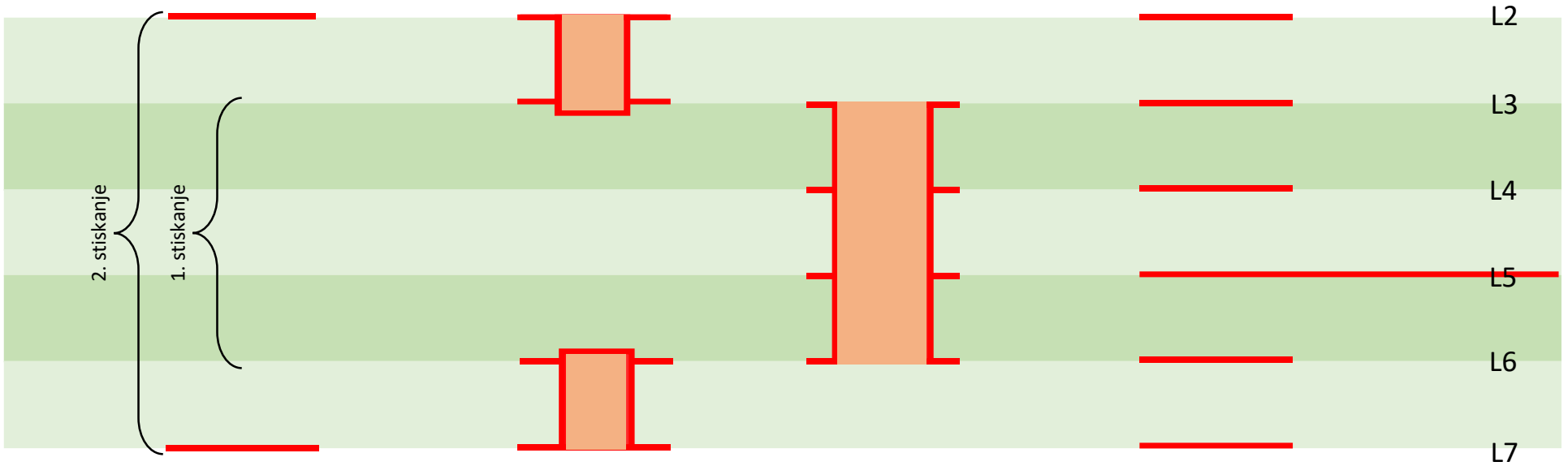

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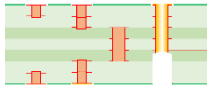

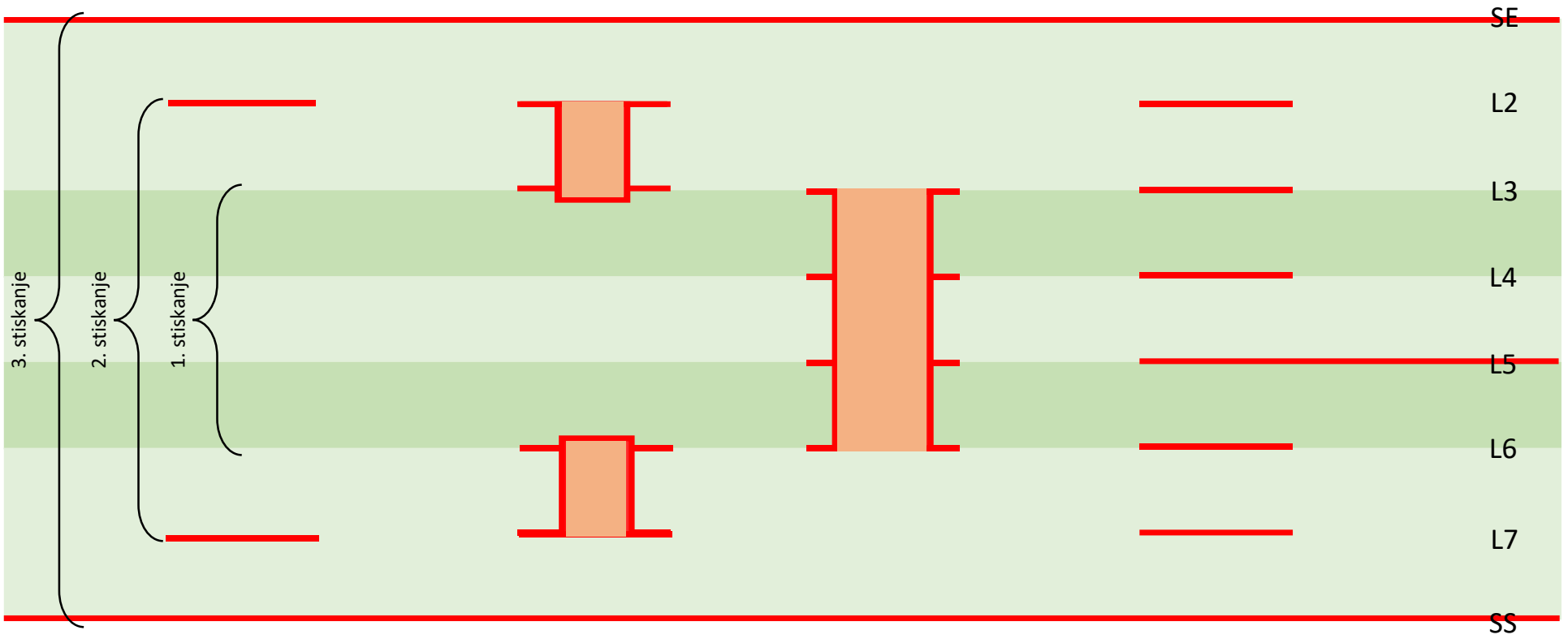

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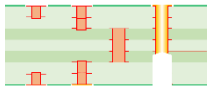

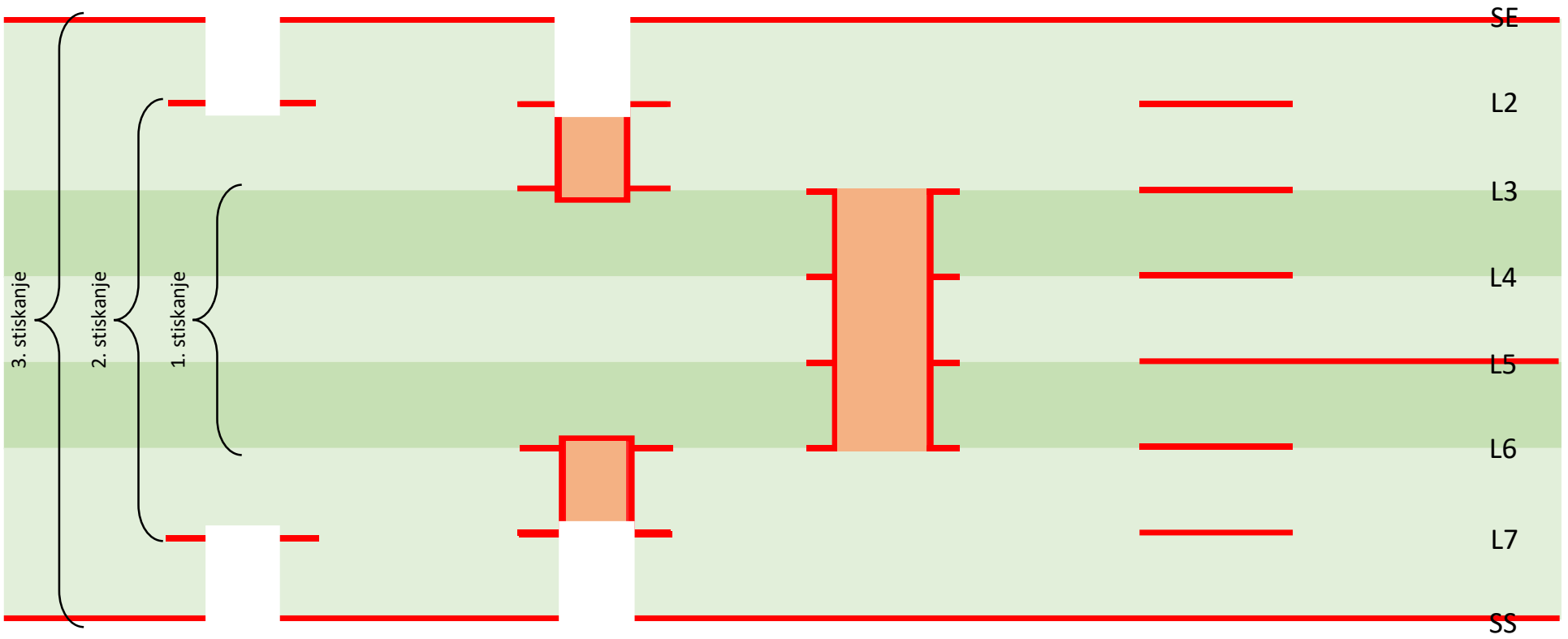

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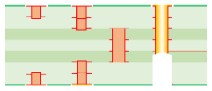

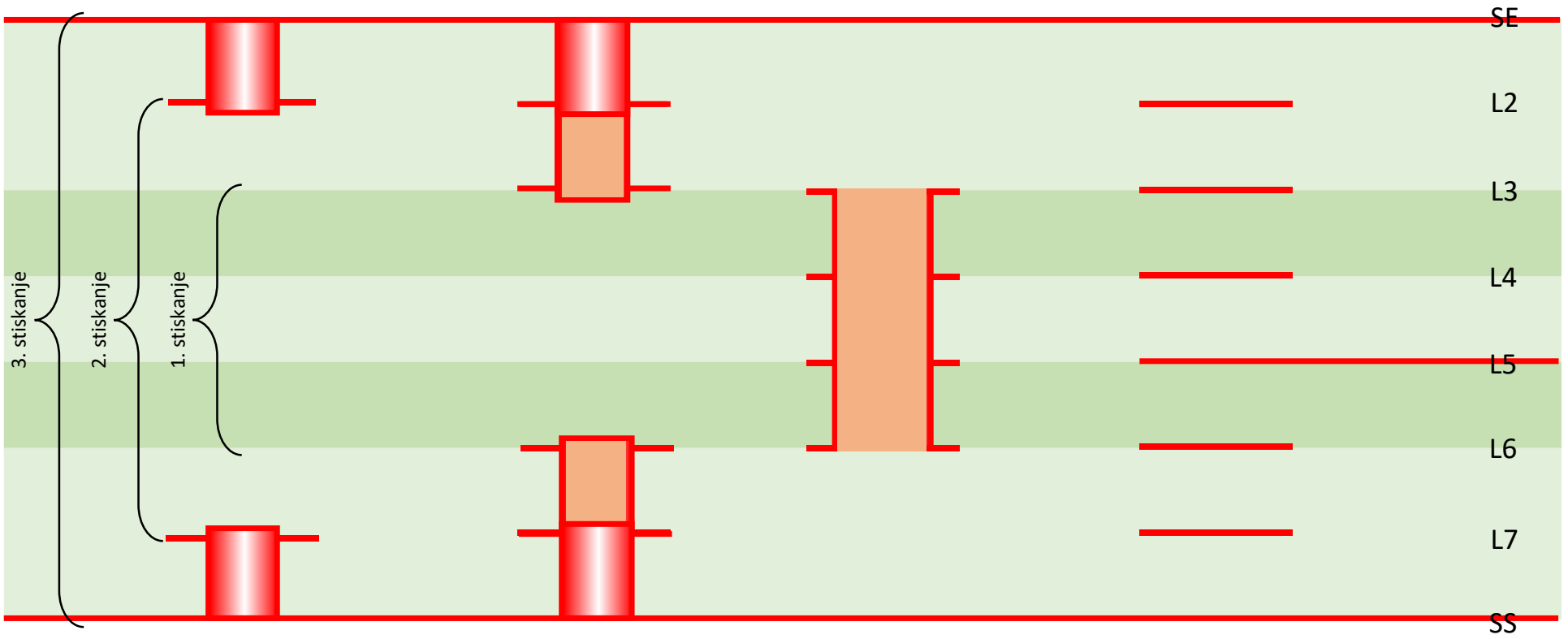

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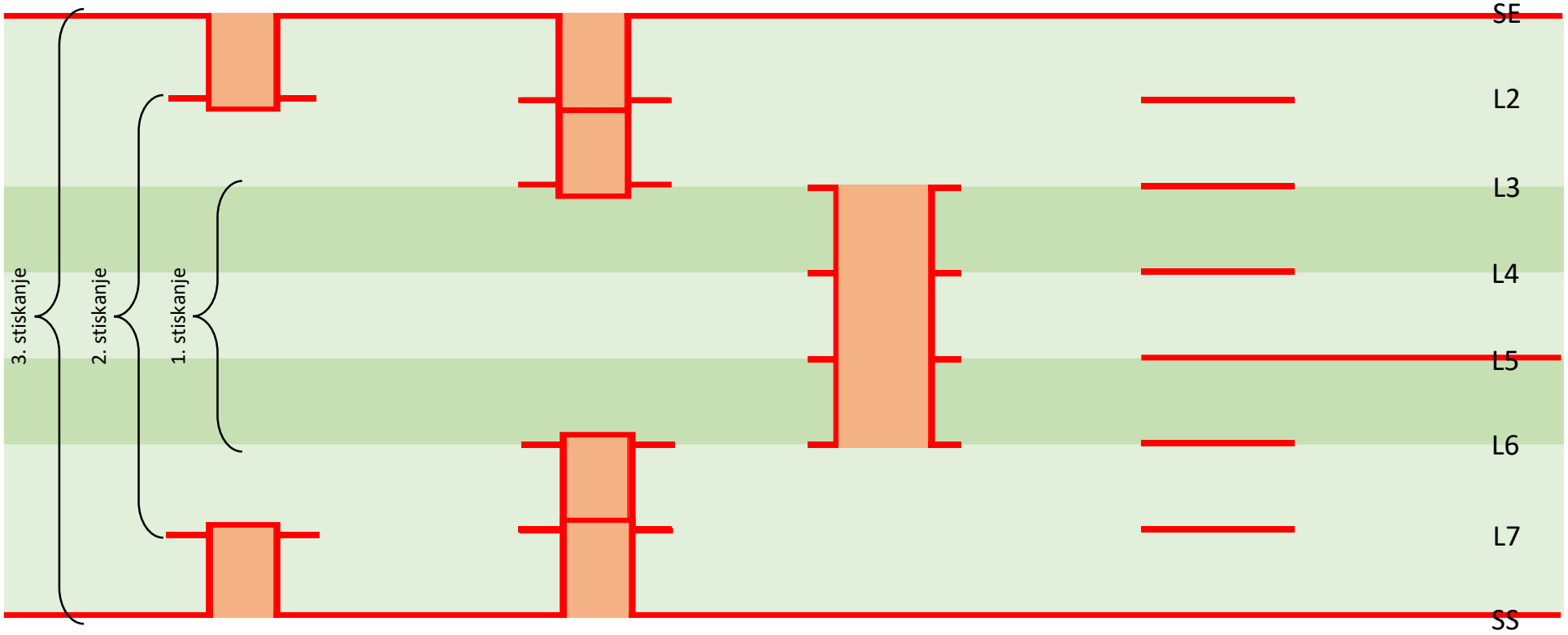

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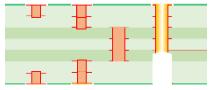

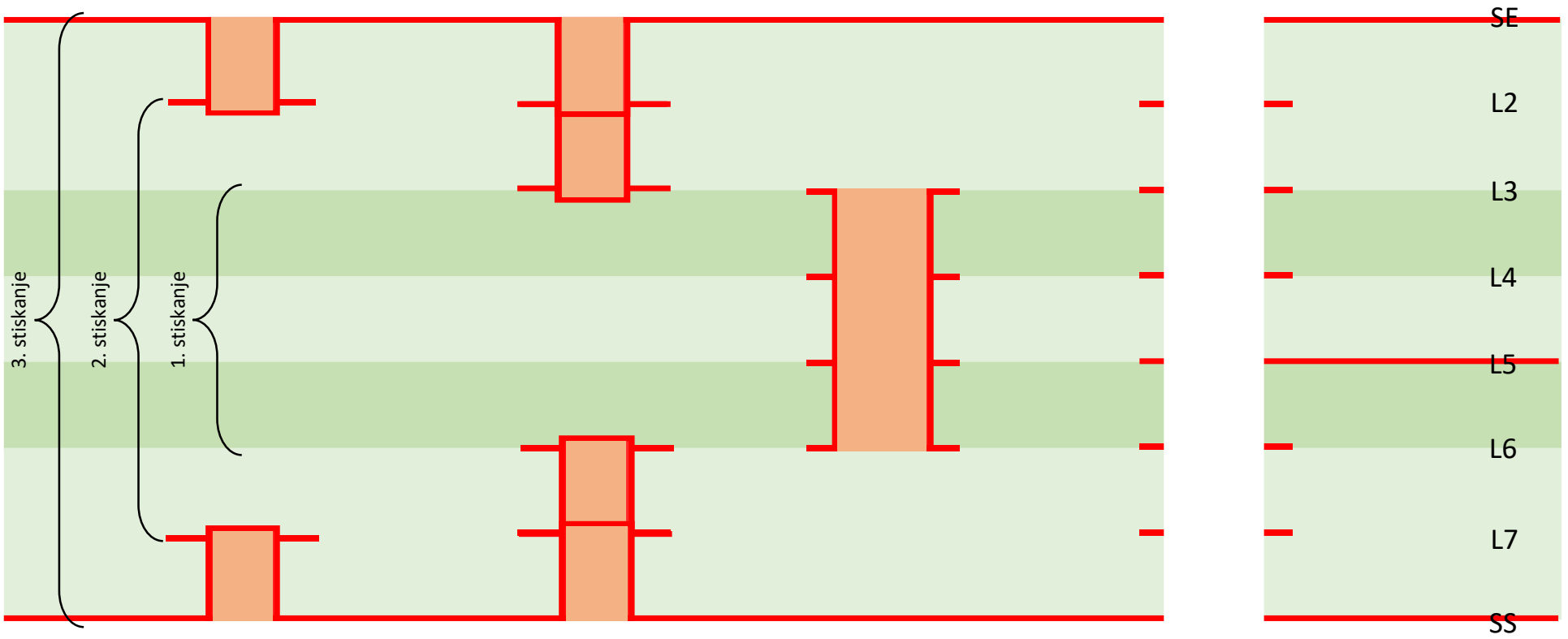

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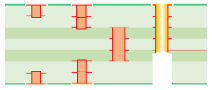

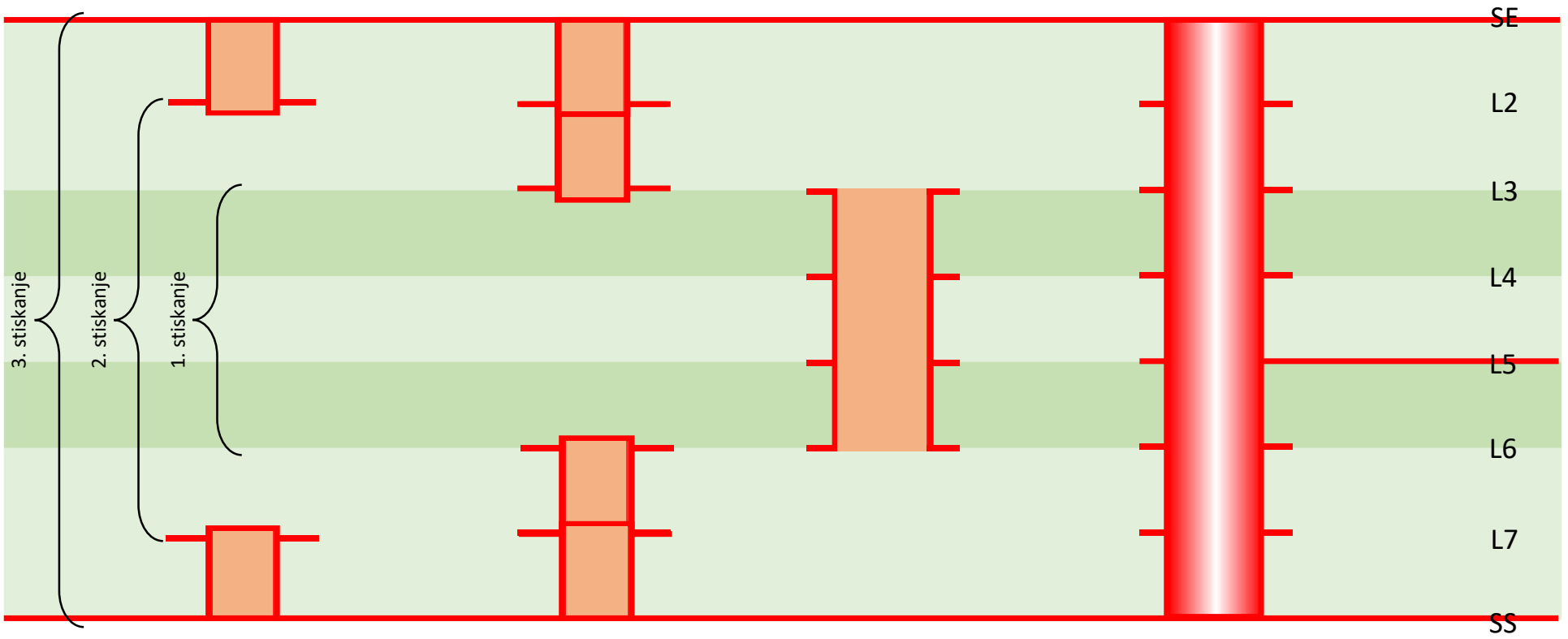

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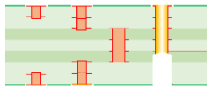

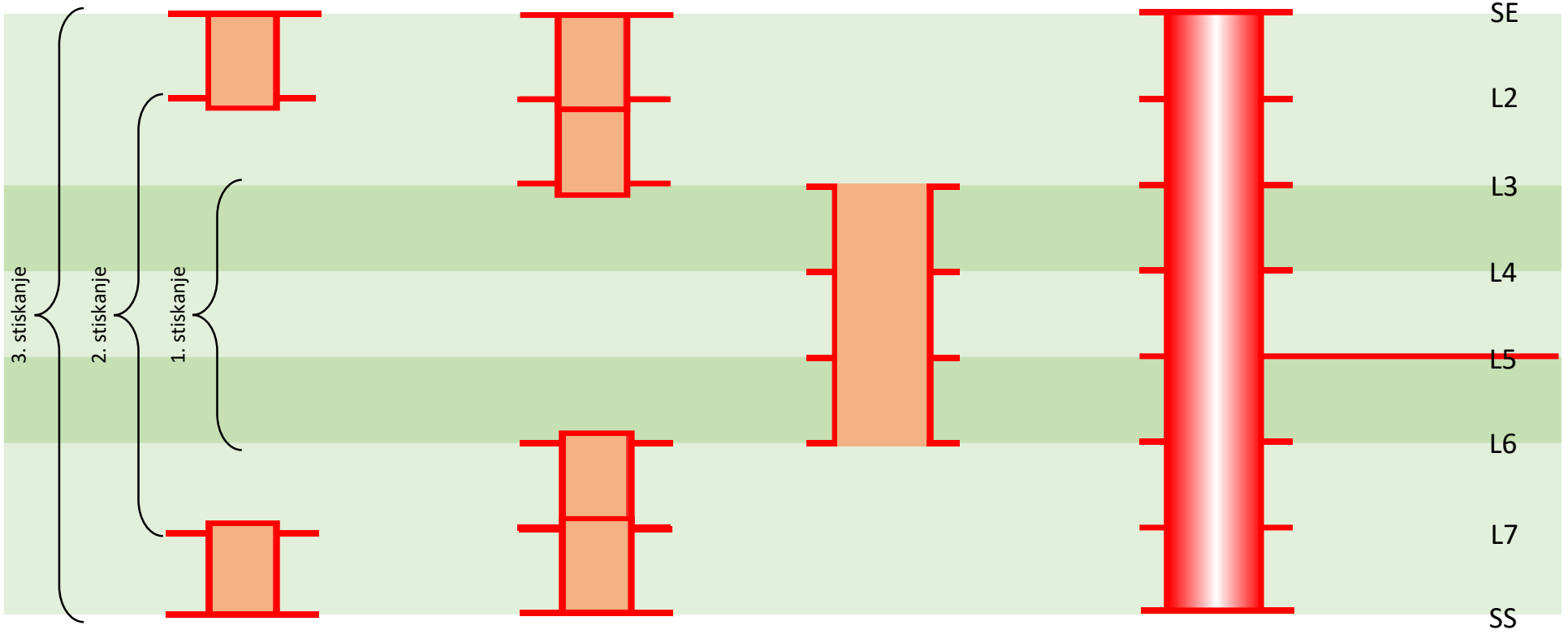

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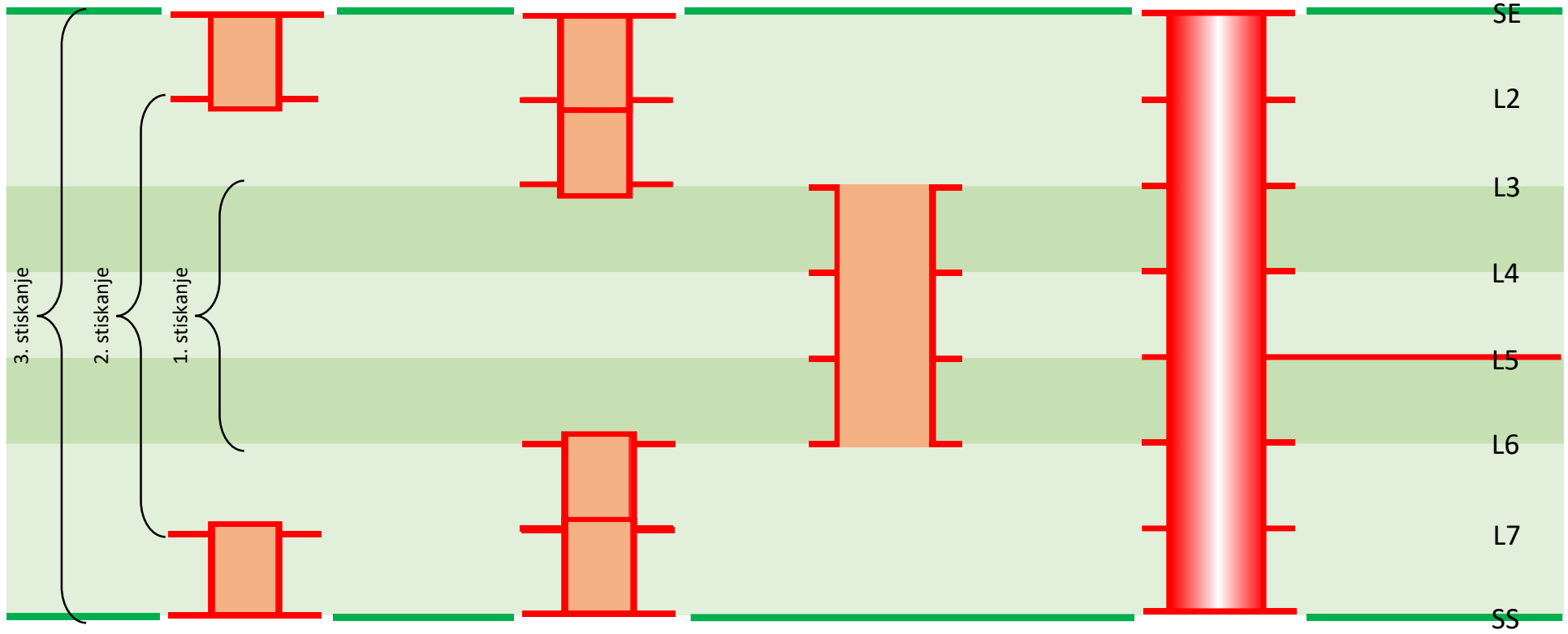

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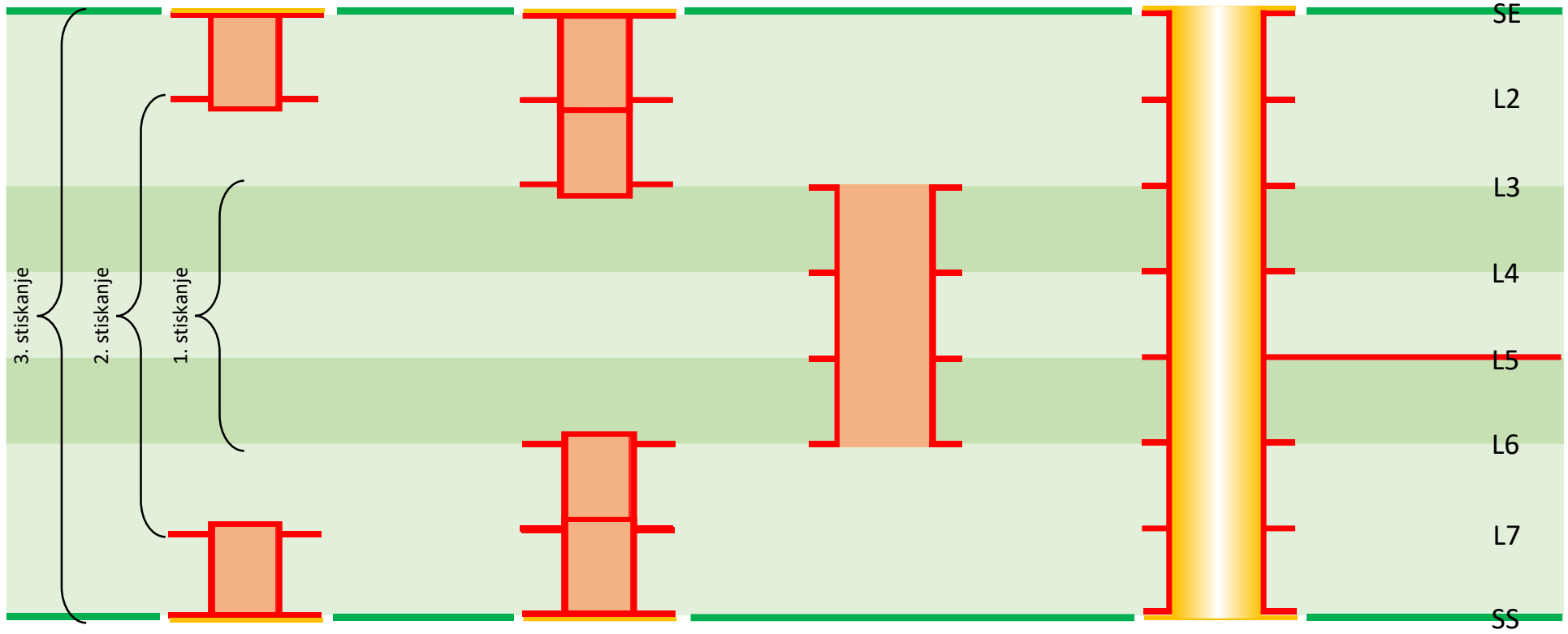

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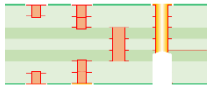

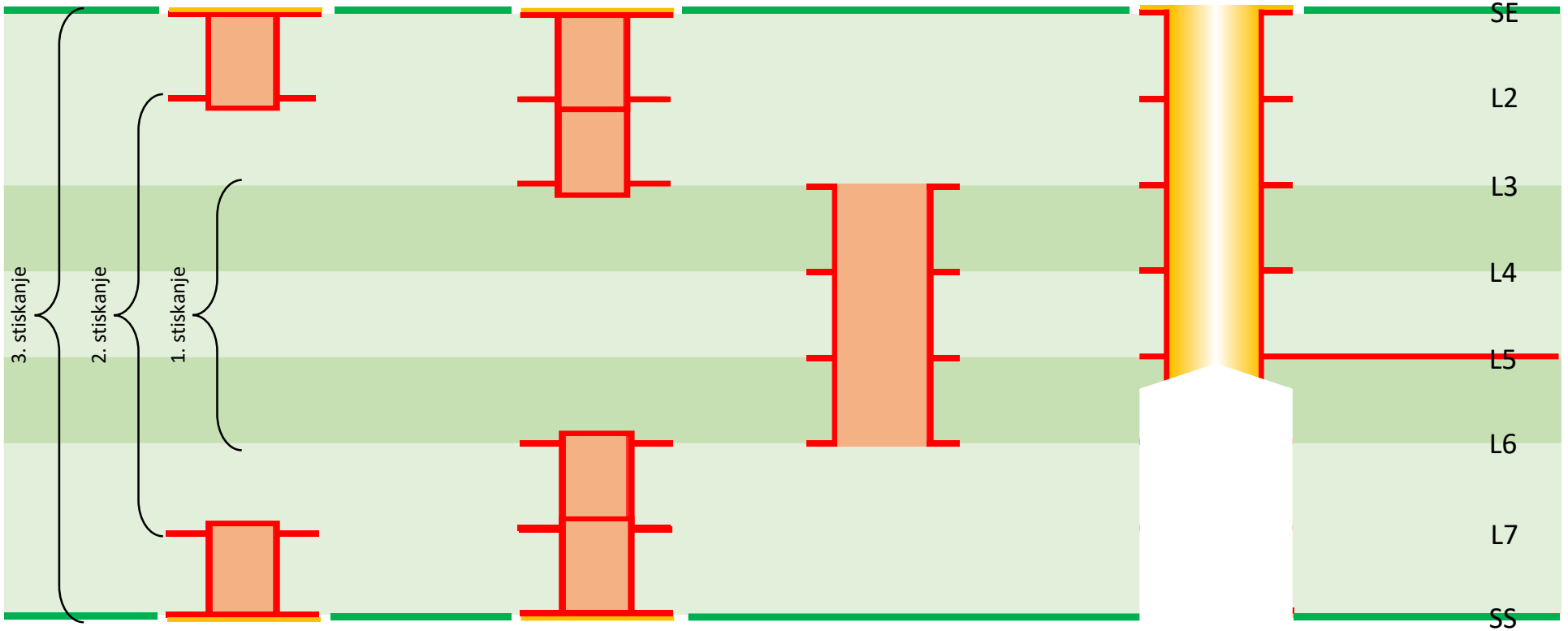

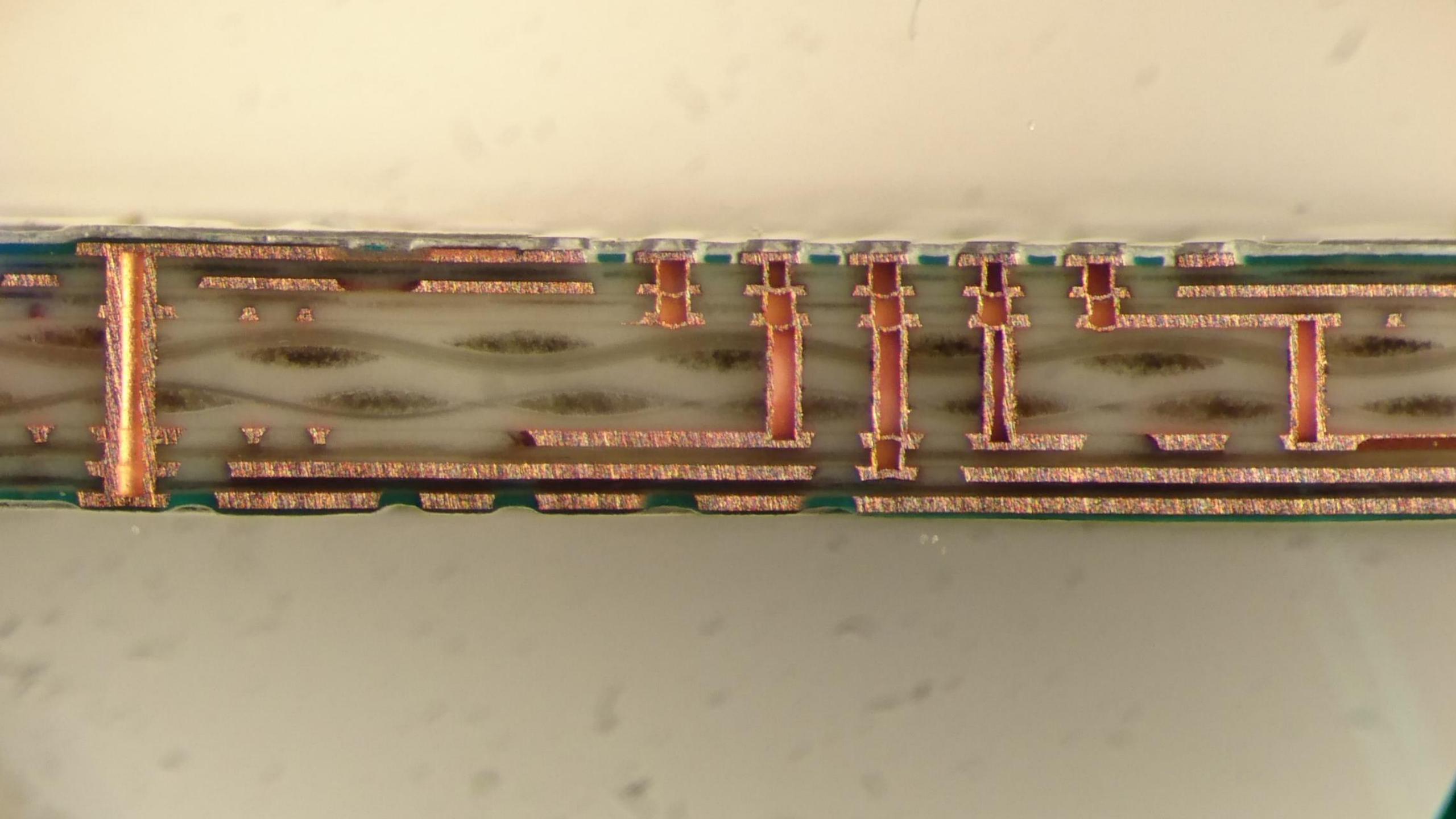

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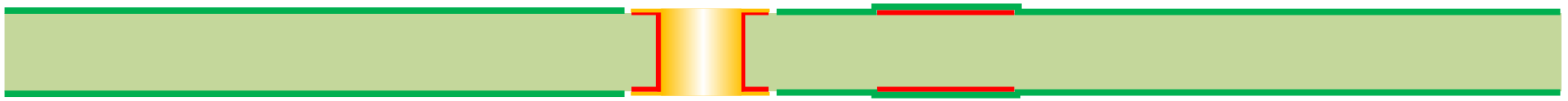

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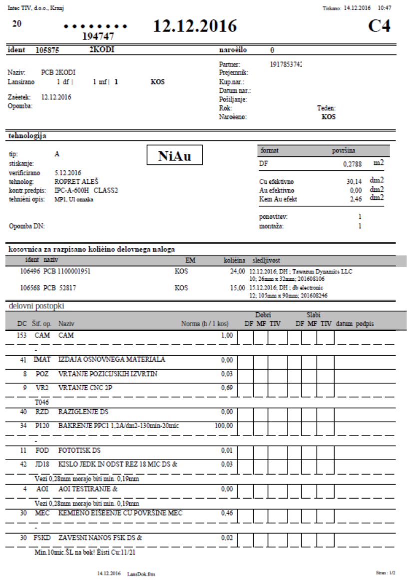


Intec TIV, d.o.o., Kranj — Tiskano: 14.12.2016 10:47

20 ••••••••• 194747 **12.12.2016** **C4**

ident 105875 2KODI **naroèilo 0**

Naziv:	PCB 2KODI	Partner:	191785374
Lansirano	1 df | 1 mf | 1 KOS	Prejemnik:	
Zaèetek:	12.12.2016	Kup.nar.:	
Opomba:		Datum nar.:	
		Pošiljanje:	
		Rok:	Teden:
		Naroèeno:	KOS

tehnologija

NiAu

tip:	A
stiskanje:	
verificirano	5.12.2016
tehnolog:	ROPRET ALEŠ
kontr.predpis:	IPC-A-600H CLASS2
tehnièni opis:	MP1, Ul oznaka
Opomba DN:	

format	površina	
DF	0,2788	m2
Cu efektivno	30,14	dm2
Au efektivno	0,00	dm2
Kem Au efekt	2,46	dm2
ponovitev:	1	
montaža:	1	

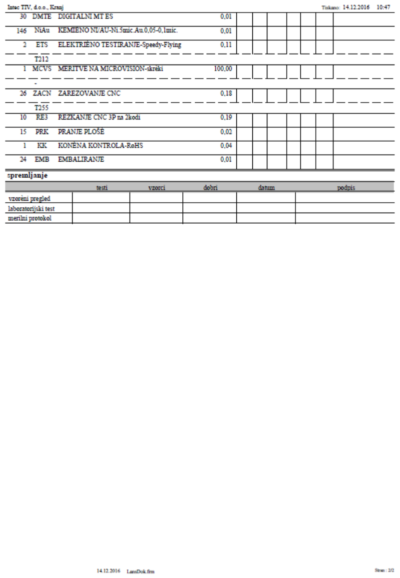
kosovnica za razpisano kolièino delovnega naloga

ident	naziv	EM	kolièina	sledljivost
106496	PCB 1100001951	KOS	24,00	12.12.2016; DH ; Tawazun Dynamics LLC 10; 26mm x 32mm; 201608106
106568	PCB 52817	KOS	15,00	15.12.2016; DH ; db electronic 12; 105mm x 90mm; 201608246

delovni postopki

DC	Šif. op.	Naziv	Norma (h / 1 kos)	Dobri DF	Dobri MF	Dobri TIV	Slabi DF	Slabi MF	Slabi TIV	datum	podpis
153	CAM	CAM	1,00								
	-										
41	IMAT	IZDAJA OSNOVNEGA MATERIALA	0,00								
8	POZ	VRTANJE POZICIJSKIH IZVRTIN	0,03								
9	VR2	VRTANJE CNC 2P	0,69								
	T046										
40	RZD	RAZIGLENJE DS	0,00								
34	P120	BAKRENJE PPC1 1,2A/dm2-130min-20mic	100,00								
	-										
11	FOD	FOTOTISK DS	0,01								
42	JD18	KISLO JEDK IN ODST REZ 18 MIC DS &	0,03								
	Vezi 0,28mm morajo biti min. 0,19mm										
4	AOI	AOI TESTIRANJE &	0,00								
	Vezi 0,28mm morajo biti min. 0,19mm										
30	MEC	KEMIÈNO ÈIŠÈENJE CU POVRŠINE MEC	0,46								
	-										
30	FSKD	ZAVESNI NANOS FSK DS &	0,02								
	Min.10mic.ŠL na bok! Èisti Cu:11/21										

14.12.2016 LansDok.frm — Stran : 1/2



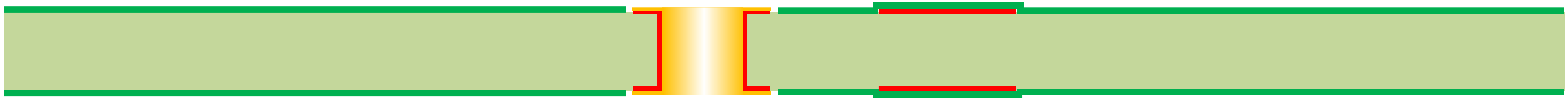
Intec TIV, d.o.o., Kranj — Tiskano: 14.12.2016 10:47

DC	Šif. op.	Naziv	Norma (h / 1 kos)							
30	DMTE	DIGITALNI MT ES	0,01							
146	NiAu	KEMIÈNO NI/AU-Ni.5mic.Au.0,05-0,1mic.	0,01							
2	ETS	ELEKTRIÈNO TESTIRANJE-Speedy-Flying	0,11							
	T212									
1	MCVS	MERITVE NA MICROVISION-skrèki	100,00							
	-									
26	ZACN	ZAREZOVANJE CNC	0,18							
	T255									
10	RE3	REZKANJE CNC 3P na 2kodi	0,19							
15	PRK	PRANJE PLOŠÈ	0,02							
1	KK	KONÈNA KONTROLA-RoHS	0,04							
24	EMB	EMBALIRANJE	0,01							

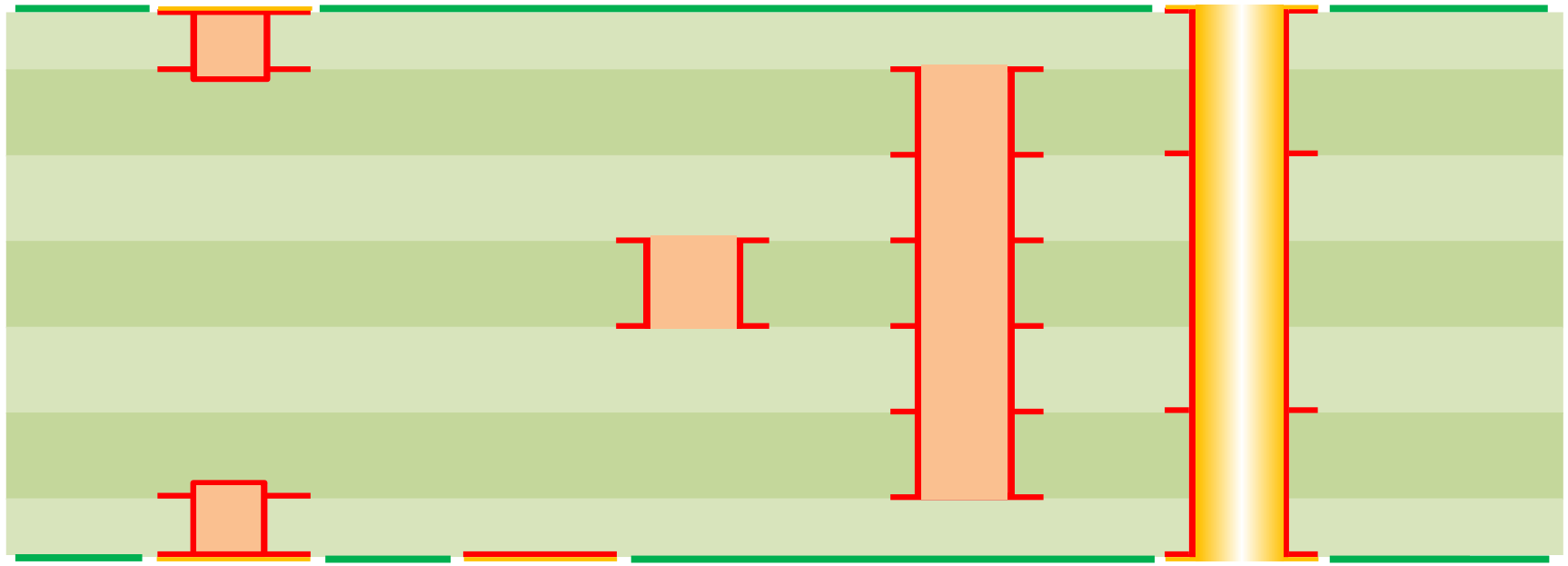
spremljanje

	testi	vzorci	dobri	datum	podpis
vzorèni pregled					
laboratorijski test					
merilni protokol					

14.12.2016 LansDok.frm — Stran : 2/2



ML8 HDI SBU



Intec TIV, d.o.o., Kranj Tiskano: 14.12.2016 10:45

IMP

20 •••••••• 194765 **12.12.2016 DH 1700 C9**

ident 106556 F0018W13266 **naroèilo 201608228**

F0018W12266

Naziv: PCB F0018W13266
Lansirano 22 df | 44 mf | 88 KOS
Zaèetek: 12.12.2016
Opomba: #p-7# 4017091-1

Partner: 5390 PCB Connect OY
Prejemnik: 5390 PCB Connect OY
Kup nar.: 4017091-1
Datum nar.: 2.12.2016
Pošiljanje: DH 1700 950352127 PCB CONNECT O
Rok: 12.12.2016 Teden: 50
Naroèeno: 40 KOS

tehnologija

NiAu

tip: A
stiskanje: 8E2
verificirano 5.12.2016
tehnolog: ÈIBEJ MARKO
kontr predpis: IPC-A-600H,KLASS 2+F001,W5206REV1.2
tehnièni opis: MP2 IMPEDANÈNI PROTOKOL, COC izdelati po zahtevah: F001,W5206REV1.2, po toèki 5

Opomba DN:

format	površina	
DF	0,1394	m2
Cu efektivno	13,21	dm2
Au efektivno	0,00	dm2
Kem Au efekt	0,53	dm2
ponovitev:	2	
montaža:	2	

kosovnica za razpisano kolièino delovnega naloga

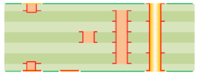
ident	naziv	EM	kolièina	sledljivost
12012	COPPERFOIL 18 UM /ROLL	M2	40,57	
88588	PREPREG 1080-R1551W-R/C63%-K460	KOS	66,00	
97059	PREPREG 2116-R1551W-R/C50%-K460	KOS	22,00	

delovni postopki

DC	Šif. op.	Naziv	Norma (h / 1 kos)
153	CAM	CAM	88,00
		-	
41	IMAT	IZDAJA OSNOVNEGA MATERIALA &	0,00
		- 305mmx457mm	
140	KN	KONDICIONIRANJE	4,89
		-	
8	POZ	VRTANJE POZICIJSKIH IZVRTIN	2,25
		-	
9	VRTI	VRTANJE CNC TEHNOL. IZVRTIN 2P &	5,28
		106556G.drl	
11	FOV	FOTOTISK DS-VP- AM 140 &	1,25
		-Vzemi PDN A (L4,L5)	
42	JD18	KISLO JEDK IN ODST REZ 18 MIC DS &	2,64
		Jedka obvezno nadrejena oseba! Kontroliraj impedanène vezi 0,130mm morajo biti noga 0,1mm in glava 0,085mm ! Najprej izdelaj 1DF in ga daj na microvision!	
4	AOIV	AOI TESTIRANJE - VP &	0,26
		Kontroliraj impedanène vezi na L4 0,13mm morajo biti noga 0,1mm in glava 0,085mm ! Meritve zabeleži na priloženi formular! obvezno se podpiši! Varjenje ni dovoljeno!	

DC	Šif. op.	Naziv	Norma (h / 1 kos)
45	OKS	OKSIDACIJA CU POVRŠINE	440,00
		-	
25	STI	STISKANJE PLOŠE d=0,6+/-0,05mm 18mic.&	40,04
		prepreg+Cu:305mmx457mm! Roèno naredi izpraznitev na prepregu za štift!!!! Sestava: 1x1080,1x2116 x 2 Parametri za R-1551W Obvezno loèilna folija! Pazi na èistoèo!	
27	OBR	OBREZ NA GROBO	0,41
9	XRCZ	X-RAY-POZICIONIRANJE-zunanje- PAZI &	8,80
		POZOR! Vzemi program 4slPRVI.cps Vsaka plošèa mora imeti na VL izpisan svoj SCALE FAKTOR!!	
20	ŽIG	ŽIGOSANJE &	12,17
		Na plošèo žigosaj poleg PDNja tudi zaporedno številko SCALE faktorja!!!!	
10	REG	REZKANJE CNC NA GROBO 4P &	4,93
		106556A.rez	
40	RZD	RAZIGLENJE DS	0,22
		T050	
43	JATA	AMONIJAKALNO JEDKANJE 4m/min.zmanjšani pritiski	1.460,80
9	VR0	VRTANJE CNC testni etalon-106556DA.drl &	121,53
9	VR	VRTANJE CNC 1P id106556A.drl &	14,67
		POSEBNI PARAMETRI!	
40	RZD	RAZIGLENJE DS	0,22
151	KÈL	KEMIÈNO ÈIŠÈENJE LUKENJ	0,02
34	P110	BAKRENJE PPC1 0,5A/dm2-120min-10mic	8.800,00
		-	
11	FOV	FOTOTISK DS-VP-POZOR! AM150 &	1,25
		Vzemi PDN B (L3N,L6N) Zlaminiraj obvezno do roba!	
31	SNC8	BAKRENJE IN SN PPC2 0,8A/dm2-180min-25mic&	8.800,00
		- -Površina Cu: 201406,00 mm2 Skrajšaj èas na 160min.! Min. 20mic. bakra v izvrtinah!	
32	ODRD	ODSTRANJEVANJE REZISTA DS	0,56
		T120	
43	JA10	AMONIJAKALNO JEDKANJE 10 MIC DS &	14,61
		Jedka obvezno nadrejena oseba!Kontroliraj impedanène vezi 0,095mm morajo biti noga 0,07mm in glava 0,06mm ! Najprej izdelaj 1DF in ga daj na AOI!	
33	ODSN	ODSTRANJEVANJE Sn	5,27
		T180	
4	AOIV	AOI TESTIRANJE - VP &	0,26
		Kontroliraj impedanène vezi na L3 0,095mm morajo biti noga 0,07mm in glava 0,06mm ! Meritve zabeleži na priloženi formular! obvezno se podpiši! Varjenje ni dovoljeno!	
17	SKO	TISKANJE SK. V SKOZNIKE	2,55
		-	
2	ETS	ELEKTRIÈNO TESTIRANJE-Speedy-Flying &	9,78
		Vzemi program 106556_3-6.ipc	
45	OKS	OKSIDACIJA CU POVRŠINE	440,00
		T150	

DC	Šif. op.	Naziv	Norma (h / 1 kos)
25	STI	STISKANJE PLOŠE d=0,75mm+/-0,05mm 18mic. &	40,04
		prepreg+Cu:305mmx457mm! Roèno naredi izpraznitev na prepregu za štift!!!! Sestava: 1x1080 x 2 Parametri za R-1551W Obvezno loèilna folija!	
27	OBR	OBREZ NA GROBO	0,41
		T241	
9	XRCV	X-RAY-POZICIONIRANJE VP-PAZI &	880,00
		Vzemi program: 6slDRUGI.cps POZOR! Vsaka plošèa mora imeti na VL izpisan svoj SCALE FAKTOR!! Dodaj novo nalepko in jo dobro oznaèi, da se bo vedelo, da je za zunanje plasti L2 in L7!!!	
20	ŽIG	ŽIGOSANJE &	12,17
		Na plošèo žigosaj poleg PDN-ja tudi zaporedno številko SCALE faktorja!!!!	
10	REG	REZKANJE CNC NA GROBO 4P-106556C.rez	4,93
40	RZD	RAZIGLENJE DS	0,22
		T050	
43	JATA	AMONIJAKALNO JEDKANJE 4m/min.zmanjšani pritiski	1.460,80
9	VR0	VRTANJE CNC testni etalon-106556DC.drl &	121,53
		Lestvica desno spodaj!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! Ustreznost globine kontroliraj z mikrosekcijo!!!!	
9	VR1	VRTANJE CNC 1P-id106556C.drl &	121,53
		Lestvica desno spodaj!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! POSEBNI PARAMETRI	
9	VR0	VRTANJE CNC testni etalon-106556DCB.drl &	121,53
		Lestvica levo spodaj!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! !Testni etalon-BLIND izvrtine! Ustreznost globine kontroliraj z mikrosekcijo!!!!	
9	VR1	VRTANJE CNC 1P-slepe izvrtine-ID106556CB.drl&	121,53
		Pazi! lestvica levo spodaj! Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! !!!!!!! POSEBNI PARAMETRI	
46	H210	KEMIÈNO ÈIŠÈENJE CU POVRŠINE H-2106 &	41,12
		Kontrola ostankov Cu v BLIND izvrtinah! Kontrola z mikroskopom! Obvezno poklièi nadrejeno osebo!	
40	RZD	RAZIGLENJE DS	0,22
151	KÈL	KEMIÈNO ÈIŠÈENJE LUKENJ	0,02
34	P110	BAKRENJE PPC1 0,5A/dm2-120min-10mic &	8.800,00
		-Pomnoži površino x 1,5mm! Min. 13mic. bakra v slepih izvrtinah 0,125mm! POZOR! Dvostranski BLINDI!	
10	REG	REZKANJE CNC NA GROBO 1P-id106556DC.rez&	4,93
		-Porezkaj samo eno plošèo, ki jo prinesejo u bakrenja! Rokuj pazljivo! Uporabi izvrtino z vrtalne risbe!! Preveri!	
1	MIK	MIKROSEKCIJA POZOR &	88,00
		-Naredi se mikrosekcija in preveri, èe je v izvrtinah min. 13mic. bakra! Plošèe daj naprej šele, ko dosežeš to vrednost!! Poklièi tehnologa!	
156	PONP	POLNJENJE NEP. PASTE V SKOZNIKE &	88,00
		ITC	
1	OÈ	VMESNI OÈNI PREGLED &	1,22
		-Kontrola plugginga!	
40	BRP	BRUŠENJE PLANETNO DS	22,00
		-	
11	FOD	FOTOTISK DS AM150 &	1,25
		Vzemi PDN C (L2N,L7N) Zlaminiraj obvezno do roba!	



DC	Šif. op.	Naziv	Norma (h / 1 kos)
31	SN20	BAKRENJE IN SN PPC2 1,1A/dm2-115min-20mic&	8.800,00
		-Površina:210297,00 mm2 POZOR! Daj samo 5mic. bakra!!! Obvezno poklièi g. Zabavnika! NE DELAJ BREZ NAVODIL NADREJENE OSEBE!!	
32	ODRD	ODSTRANJEVANJE REZISTA DS	0,56
		T120	
43	JA10	AMONIJAKALNO JEDKANJE 10 MIC DS &	14,61
		Jedka nadrejena oseba! Blind izvrtine!! Vezi 0,120mm morajo biti min. 0,065mm	
33	ODSN	ODSTRANJEVANJE Sn	5,27
		T180	
4	AOIV	AOI TESTIRANJE - VP &	0,26
		Vezi 0,120mm morajo biti min. 0,065mm	
2	ETS	ELEKTRIÈNO TESTIRANJE-Speedy-Flying &	9,78
		Vzemi program 106556_2-7.ipc	
45	OKS	OKSIDACIJA CU POVRŠINE	440,00
		T150	
25	STI	STISKANJE PLOŠE d=0,9+/-0,05mm18mic &	40,04
		Prepreg: 280mmx410mm Sestava: 1x1080 x 2 Parametri za R-1551W Obvezno loèilna folija	
27	OBR	OBREZ NA GROBO	0,41
		T241	
9	XRCZ	X-RAY-POZICIONIRANJE-zunanje POZOR &	8,80
		Vzemi program: 8slTRETJI.cps!!! POZOR! Vsaka plošèa mora imeti na VL izpisan svoj SCALE FAKTOR!! Dodaj novo nalepko in jo dobro oznaèi, da se bo vedelo, da je za zunanje plasti SE in SS!!!	
20	ŽIG	ŽIGOSANJE &	12,17
		Na plošèo žigosaj poleg PDN-ja tudi zaporedno številko SCALE faktorja!!!!	
10	REG	REZKANJE CNC NA GROBO 1P &	4,93
		Vzemi prg.id106556G.rez Najprej preveri ustreznost na podlogo!	
40	RZD	RAZIGLENJE DS	0,22
		T050	
43	JATA	AMONIJAKALNO JEDKANJE 4m/min.zmanjšani pritiski	1.460,80
9	VR0	VRTANJE CNC testni etalon id106556DV.drl &	121,53
		Lestvica desno spodaj!!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! !!Testni etalon-BLIND izvrtine! Ustreznost globine kontroliraj z mikrosekcijo!!!! (Globina med SE,L2)	
9	VR1	VRTANJE CNC 1P-id106556V.drl &	121,53
		Lestvica desno spodaj!!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke! !! POSEBNI PARAMETRI	
9	VR0	VRTANJE CNC testni etalon-id106556DVB.drl&	121,53
		Lestvica levo spodaj!Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke!Testni etalon-BLIND izvrtine! Ustreznost globine kontroliraj z mikrosekcijo!!!! (Globina med L7 in SS)	
9	VR1	VRTANJE CNC 1Pid 106556VB.drl &	121,53
		Pazi! lestvica levo spodaj! Brez fenolnih prekrivnih plošè! Izvrtine 0,125mm! Obvezno zamenjaj taèke!!!!!!! POSEBNI PARAMETRI	
46	H210	KEMIÈNO ÈIŠÈENJE CU POVRŠINE H-2106 &	41,12
		Kontrola ostankov Cu v BLIND izvrtinah! Kontrola z mikroskopom! Obvezno poklièi nadrejeno osebo!	
40	RZD	RAZIGLENJE DS	0,22
151	KÈL	KEMIÈNO ÈIŠÈENJE LUKENJ	0,02

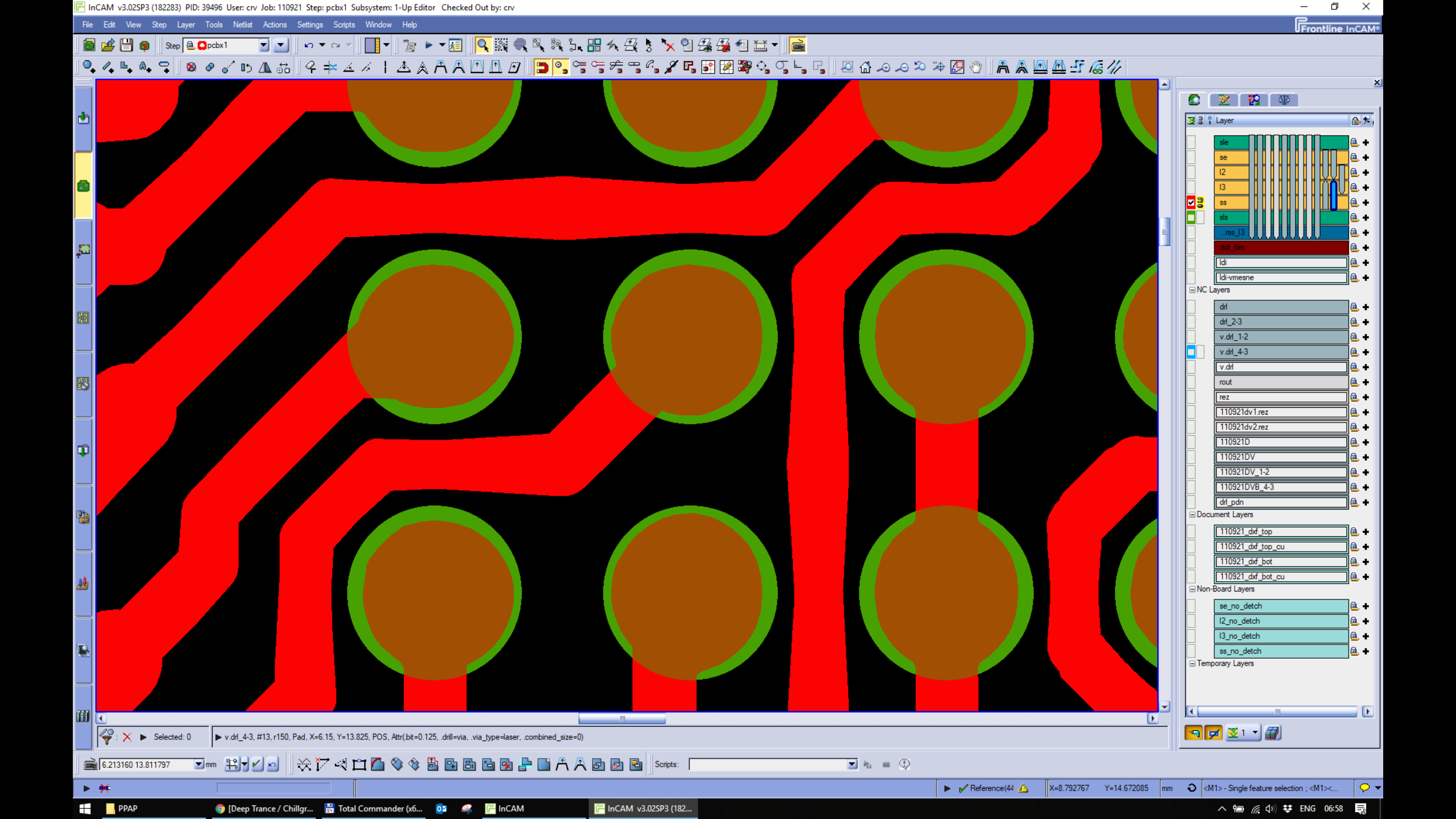
DC	Šif. op.	Naziv	Norma (h / 1 kos)
34	P110	BAKRENJE PPC1 0,5A/dm2-115min-10mic &	8.800,00
		POZOR! Pomnoži površino x 1,5 ! POZOR! Skupaj mora biti v izvrtinah min. 13mic. bakra!! Kontroliraj!	
10	REG	REZKANJE CNC NA GROBO 1P-id106556DV.rez &	4,93
		-Porezkaj samo eno plošèo, ki jo prinesejo z bakrenja! Rokuj pazljivo!	
1	MIK	MIKROSEKCIJA POZOR &	88,00
		-Naredi se mikrosekcija in preveri, èe je min. 13mic.bakra v izvrtinah! Plošèe daj naprej šele ko dobiš to vrednost!	
156	PONP	POLNJENJE NEP. PASTE V SKOZNIKE	88,00
		T390	
40	BRP	BRUŠENJE PLANETNO DS	22,00
		-	
1	OÈ	VMESNI OÈNI PREGLED &	1,22
		- kontrola plugginga	
9	VR0	VRTANJE CNC testni etalon-id106556D.drl &	121,53
		Uporabi drugo izvrtino na 5MM! Daj odštevanje! (uporabi plošèo, kjer testni etalonu še niso bili uporabljeni! Uporabi scale factor!	
9	VR1	VRTANJE CNC 1P-id106556.drl &	121,53
		Uporabi drugo izvrtino na 5MM! ! Uporabi scale factor! POSEBNI PARAMETRI!	
40	RZD	RAZIGLENJE DS	0,22
		T050	
151	KÈL	KEMIÈNO ÈIŠÈENJE LUKENJ	0,02
34	P1 5	BAKRENJE PPC1 0,5A/dm2-120min-5mic Pef.x0,8	8.800,00
		-	
11	FOD	FOTOTISK DS- AM150	1,25
		T080	
31	SNC8	BAKRENJE IN SN PPC2 0,8A/dm2-180min-25mic&	8.800,00
		-POZOR! Skupaj mora biti v izvrtinah vsaj 20mic. bakra! Kontroliraj! Pri prvem bakrenju, je bil uporabljen polovièen cikel!!-5 mic. bakra!! NE DELAJ BREZ NAVODIL NADREJENE OSEBE!!	
32	ODRD	ODSTRANJEVANJE REZISTA DS	0,56
		T120	
43	JA10	AMONIJAKALNO JEDKANJE 10 MIC DS &	14,61
		Kontroliraj impedanène vezi 0,135mm morajo biti noga 0,09mm in glava 0,080mm ! Najprej izdelaj 1DF in ga daj na AOI!	
33	ODSN	ODSTRANJEVANJE Sn	5,27
		T180	
4	AOI	AOI TESTIRANJE &	0,26
		Jedka obvezno nadrejena oseba!Kontroliraj impedanène vezi 0,135mm morajo biti noga 0,09mm in glava 0,08mm ! Meritve zabeleži na priloženi formular! obvezno se podpiši! -Vezi 0,12mm morajo biti min. 0,065mm Varjenje ni dovoljeno!	
30	MEC	KEMIÈNO ÈIŠÈENJE CU POVRŠINE MEC	40,48
		-	
30	FSKD	ZAVESNI NANOS FSK DS &	2,03
		-Min. 10mic. SL na bok! Èisti Cu:11/21 MDI!	
146	NiAu	KEMIÈNO NI/AU- Ni.5mic.Au.0,05-0,1mic.	0,88
		-	
155	IMP	KONTROLA IMPEDANC	0,88
		-	

DC	Šif. op.	Naziv	Norma (h / 1 kos)
2	ETS	ELEKTRIÈNO TESTIRANJE-Speedy-Flying &	9,78
		POZOR: Povezave: Glej drl file!	
1	MCVK	MERITVE NA MICROVISION-kontrola	88,00
		-	
10	RE2	REZKANJE CNC 2P na 2kos	24,46
		-	
15	PRK	PRANJE PLOŠE	2,13
1	KK	KONÈNA KONTROLA-RoHS POZOR! &	3,81
		krivost zvitost 0,75%! Pošlji tudi dva oznaèena IMPEDANÈNA etalona!!!	
24	EMB	EMBALIRANJE POZOR! POZOR! POZOR!! &	0,49
		Pakiranje obvezno po predpisu: F001,W5206REV1.2, po toèki 3 in 4 !	

spremljanje

	testi	vzorci	dobri	datum	podpis
vzorèni pregled					
laboratorijski test					
merilni protokol					

PCB Design priporočila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Frontline InCAM
Step pcbx1
Layer
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se
l2
l3
ss
sls
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drill_film
ldi
ldi-vmesne
NC Layers
drl
drl_2-3
v.drl_1-2
v.drl_4-3
v.drl
rout
rez
110921dv1.rez
110921dv2.rez
110921D
110921DV
110921DV_1-2
110921DVB_4-3
drl_pdn
Document Layers
110921_dxf_top
110921_dxf_top_cu
110921_dxf_bot
110921_dxf_bot_cu
Non-Board Layers
se_no_detch
l2_no_detch
l3_no_detch
ss_no_detch
Temporary Layers
Selected: 0
v.drl_4-3, #13, r150, Pad, X=6.15, Y=13.825, POS, Attr(bit=0.125, .drill=via, .via_type=laser, .combined_size=0)
6.213160 13.811797 mm
Scripts:
Reference(44
X=8.792767 Y=14.672085 mm
<M1> - Single feature selection ; <M1><...
PPAP
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Total Commander (x6...
InCAM
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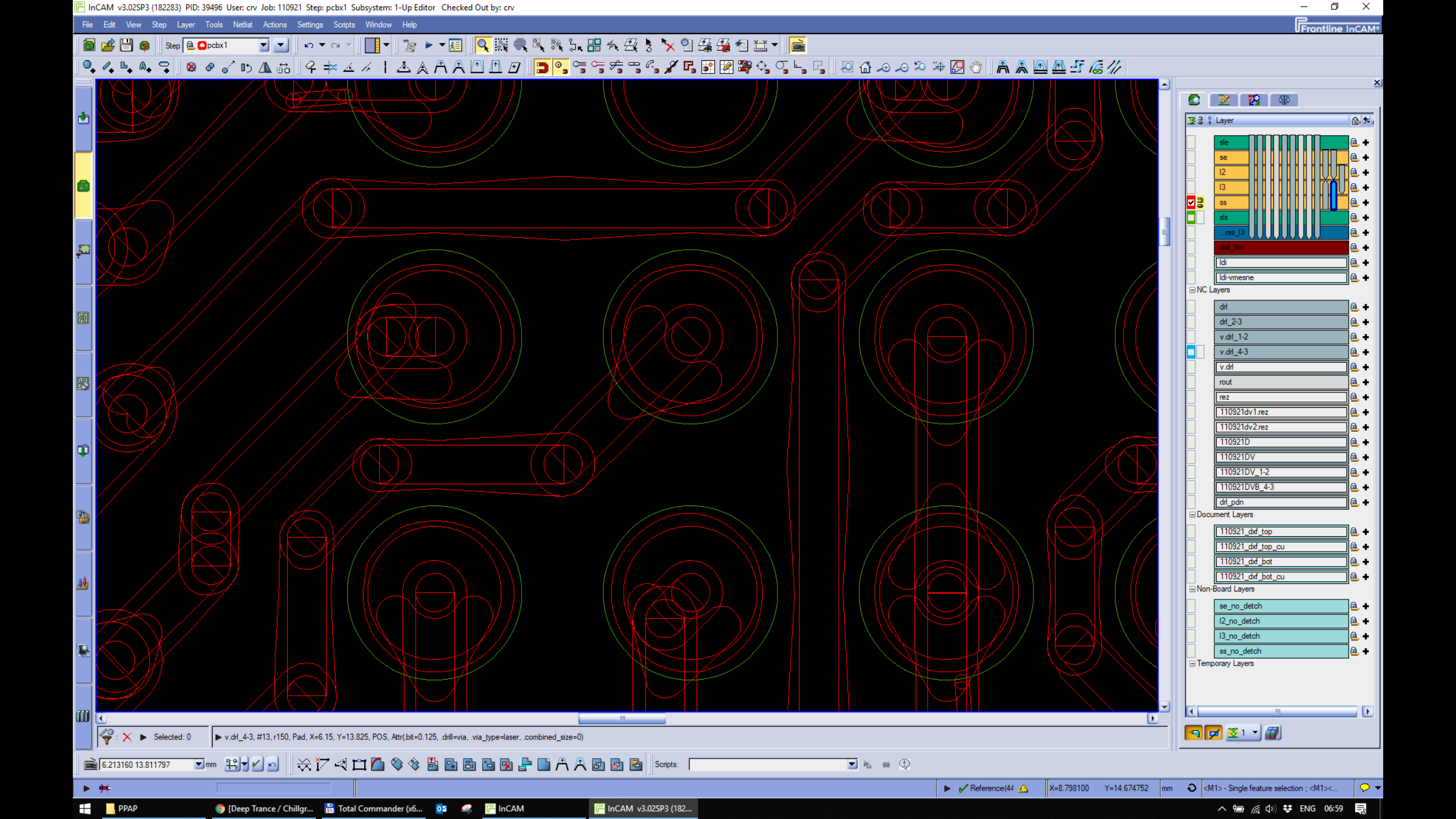
InCAM v3.02SP3 (182283) PID: 39496 User: crv Job: 110921 Step: pcbx1 Subsystem: 1-Up Editor Checked Out by: crv
File Edit View Step Layer Tools Netlist Actions Settings Scripts Window Help
Frontline InCAM
Step pcbx1
Layer
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l3
ss
sls
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drill_film
ldi
ldi-vmesne
NC Layers
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drl_2-3
v.drl_1-2
v.drl_4-3
v.drl
rout
rez
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110921dv2.rez
110921D
110921DV
110921DV_1-2
110921DVB_4-3
drl_pdn
Document Layers
110921_dxf_top
110921_dxf_top_cu
110921_dxf_bot
110921_dxf_bot_cu
Non-Board Layers
se_no_detch
l2_no_detch
l3_no_detch
ss_no_detch
Temporary Layers
Selected: 0
v.drl_4-3, #13, r150, Pad, X=6.15, Y=13.825, POS, Attr(.bit=0.125, .drill=via, .via_type=laser, .combined_size=0)
6.213160 13.811797
mm
Scripts:
Reference(44
X=8.798100
Y=14.674752
mm
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Total Commander (x6...
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ENG
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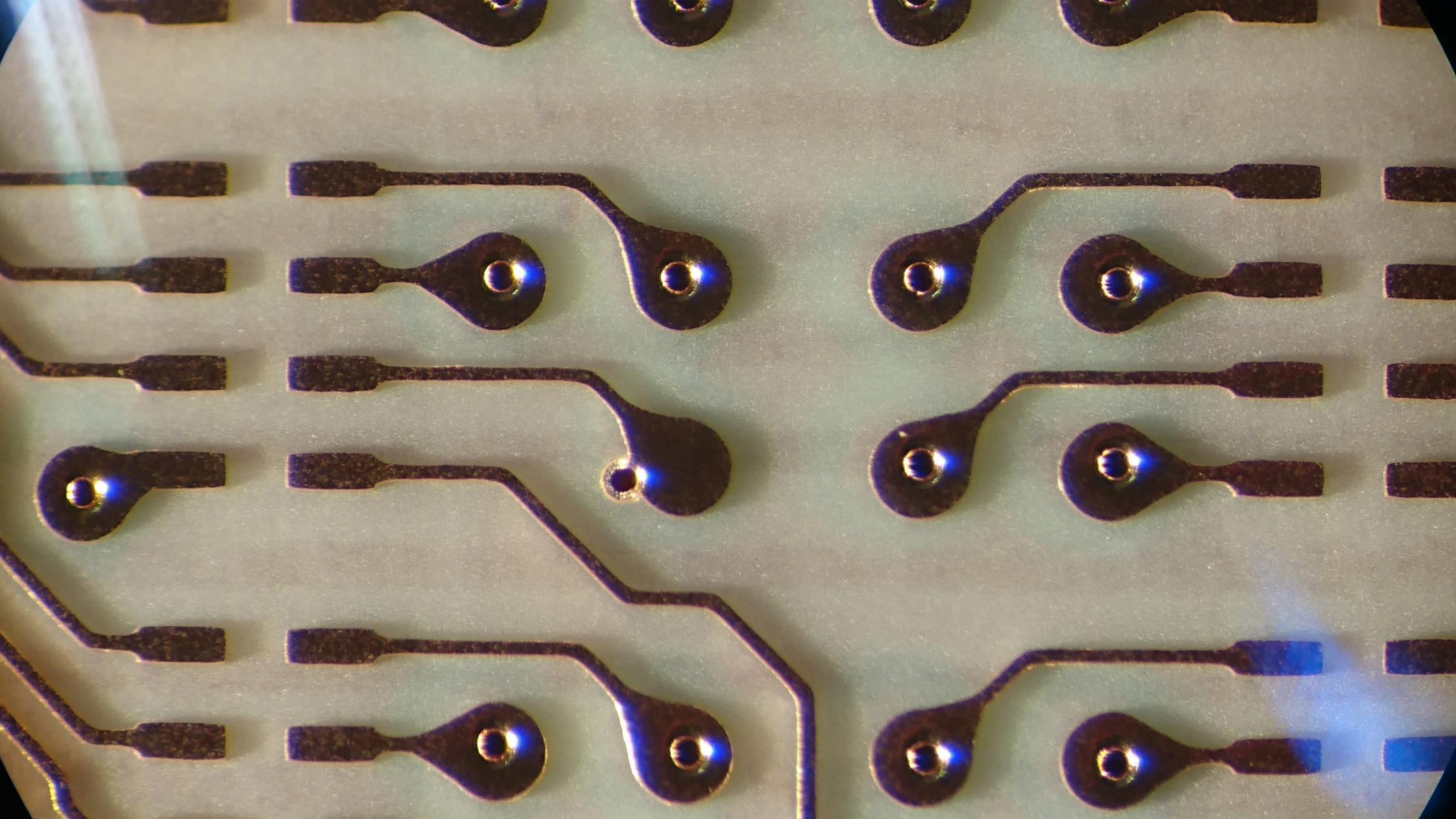


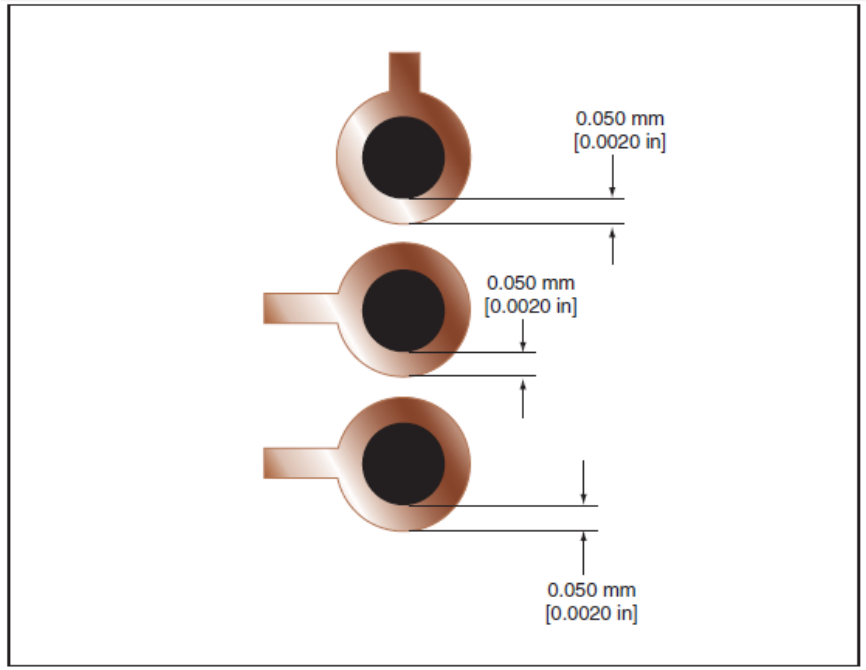


Figure 2103b

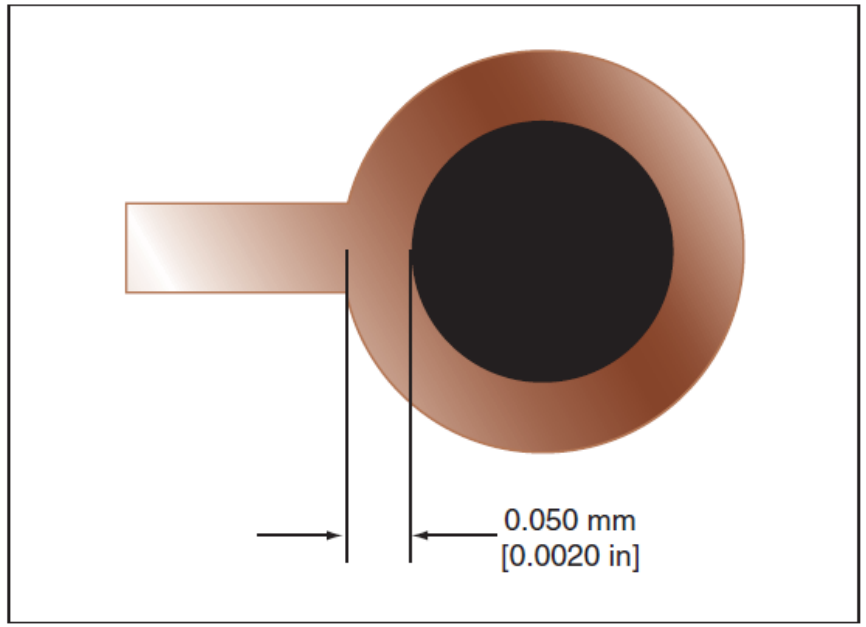


Figure 2103c

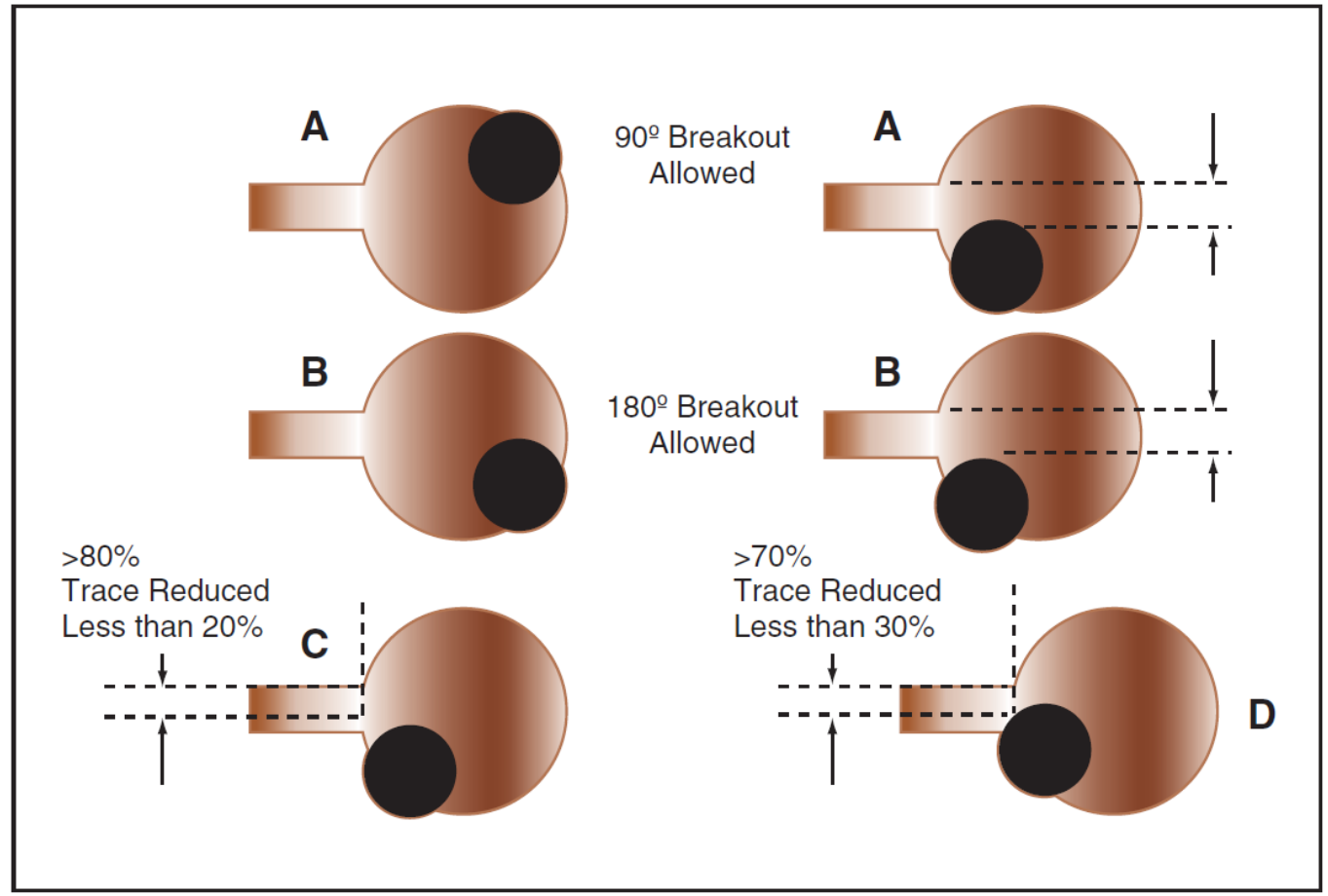
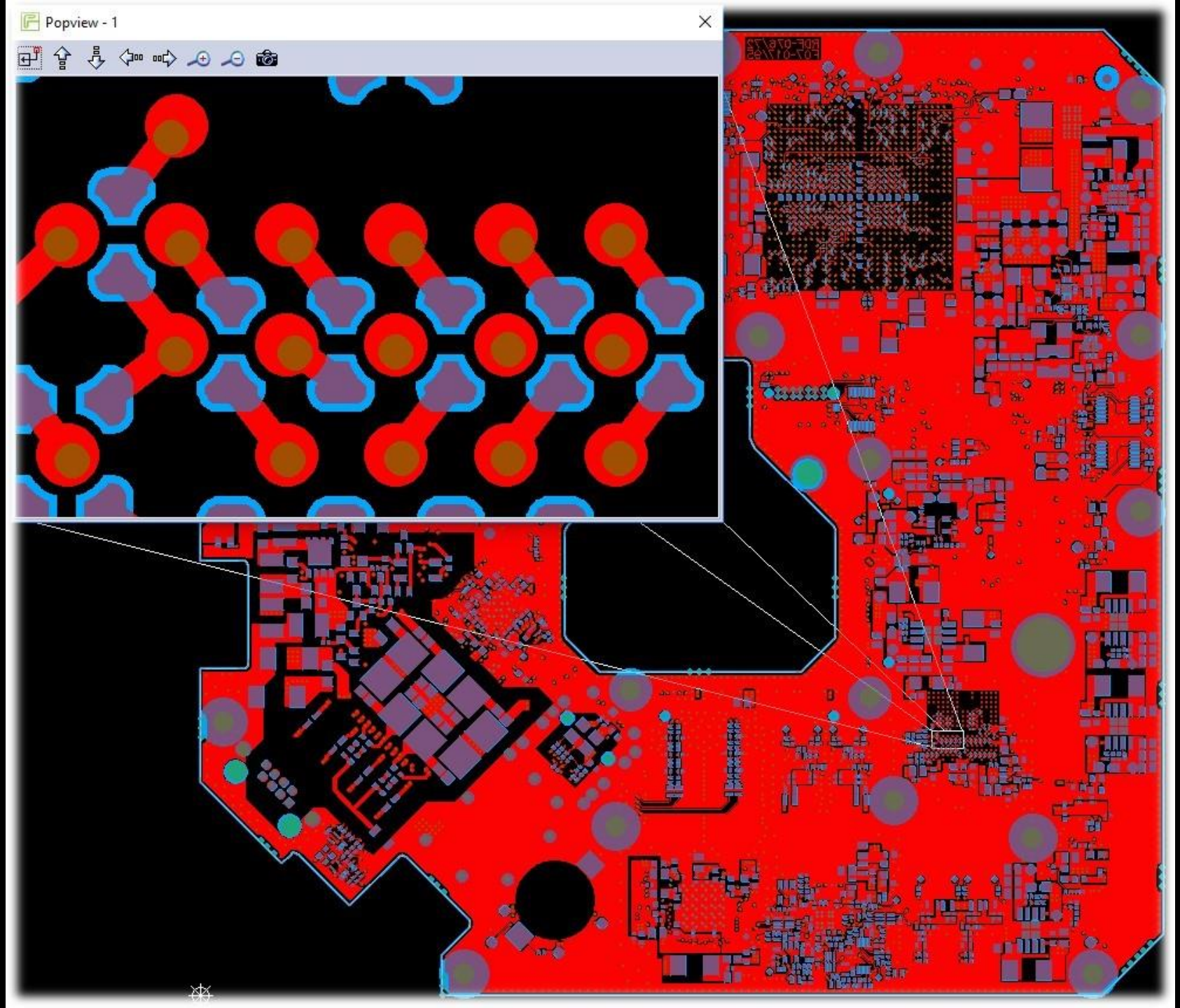
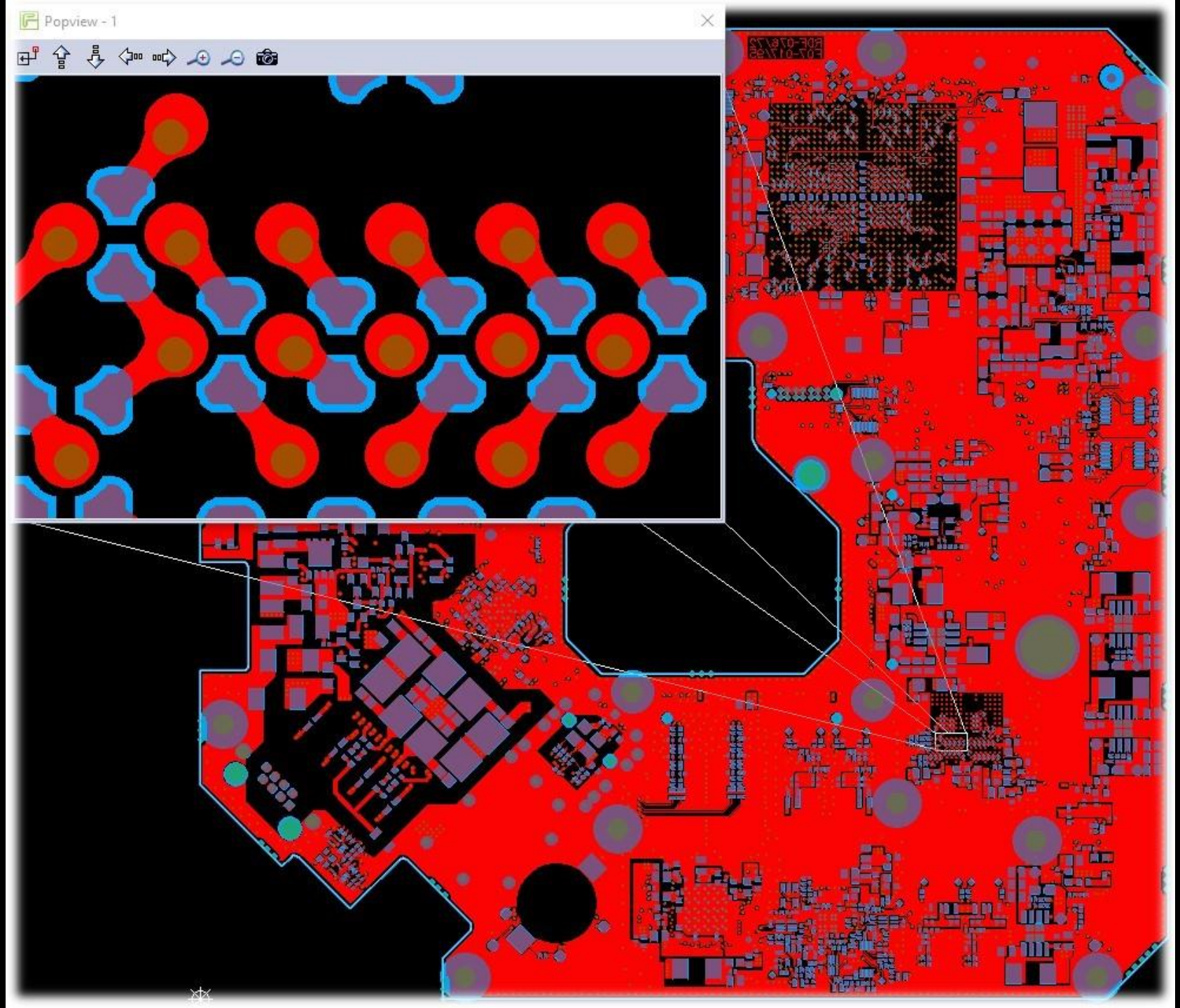
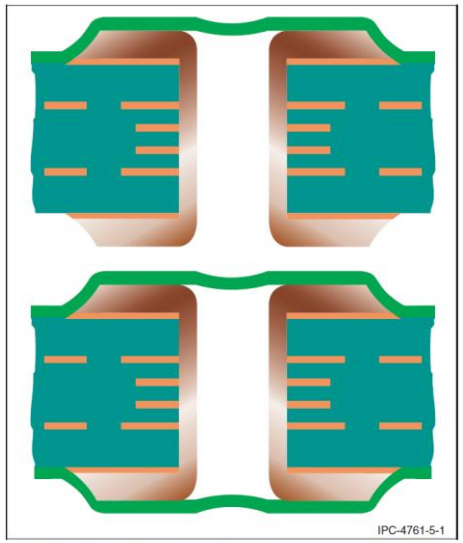


Figure 2103d

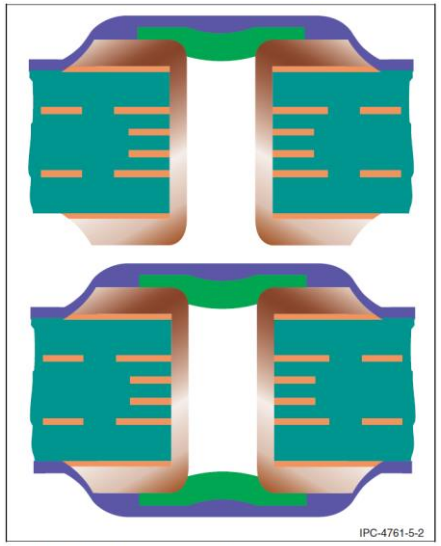

Popview - 1


Popview - 1

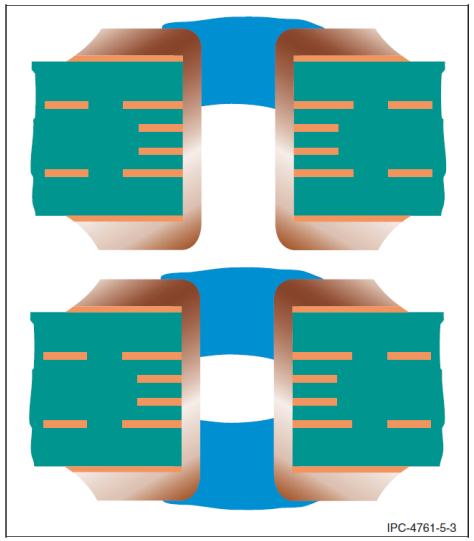
Tipi zaščite skoznikov po standardu IPC-4761



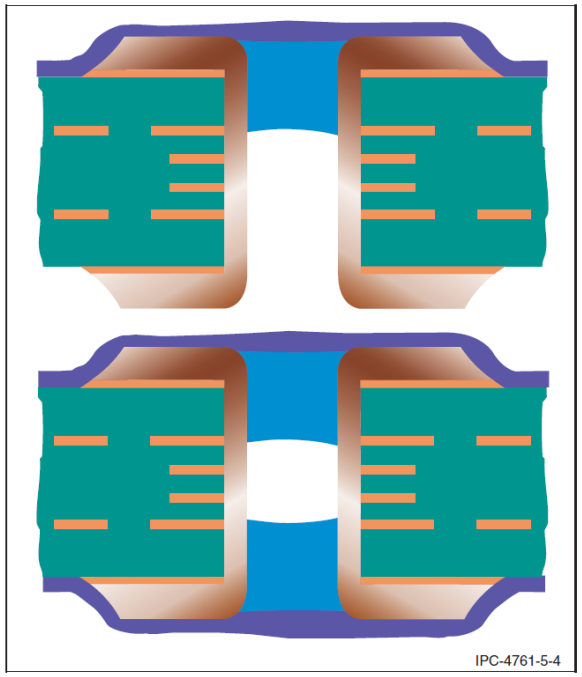
Single Sided Tented Not Recommended
Figure 5-1 Examples of Type I Tented Vias



Single Sided Tented and Covered Not Recommended
Figure 5-2 Examples of Type II Tented and Covered Vias



Single Sided Plugged Not Recommended
Figure 5-3 Examples of Type III Plugged Vias



Single Sided Plugged and Covered Not Recommended
Figure 5-4 Examples of Type IV Plugged and Covered Vias

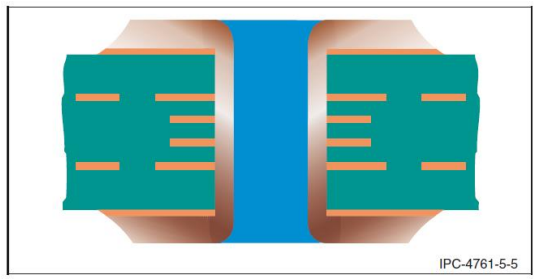


Figure 5-5 Example of Type V Filled Via

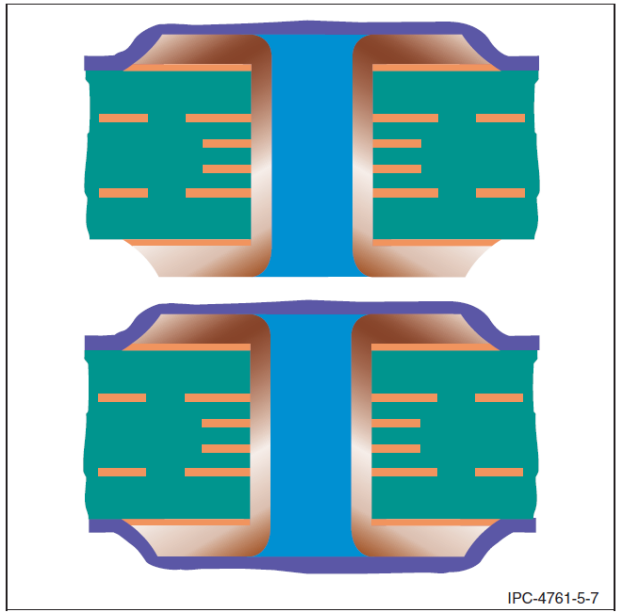


Figure 5-7 Examples of Type VI Filled and Covered Vias, Liquid Film Cover

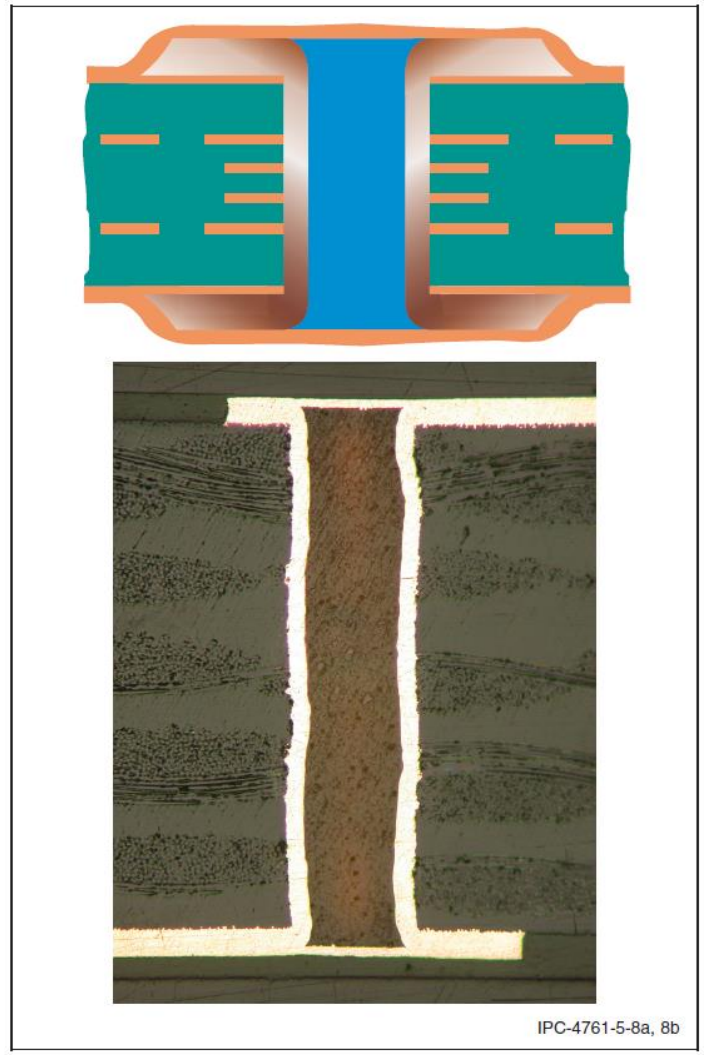
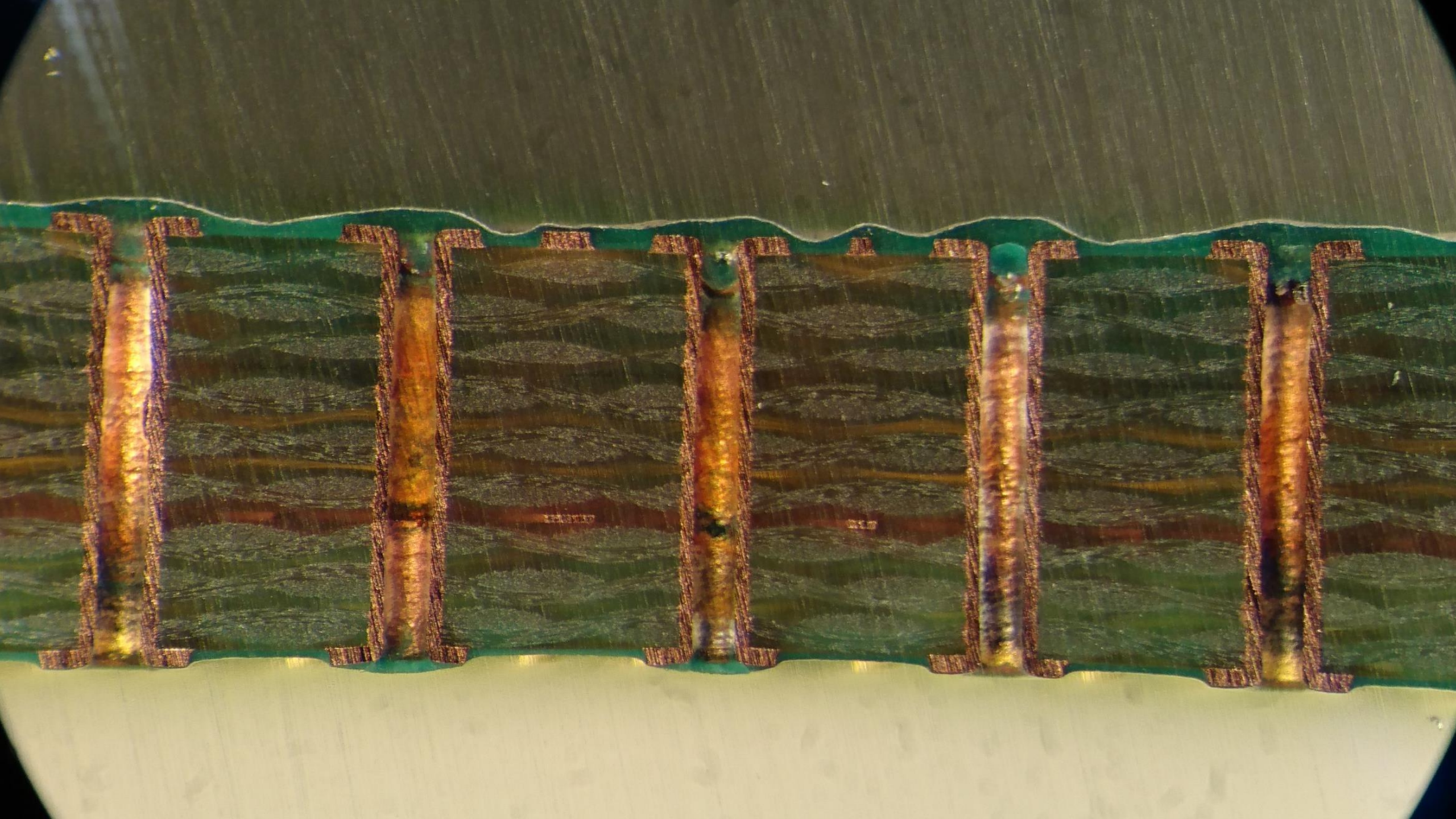


Figure 5-8 Examples of Type VII Filled and Capped Via



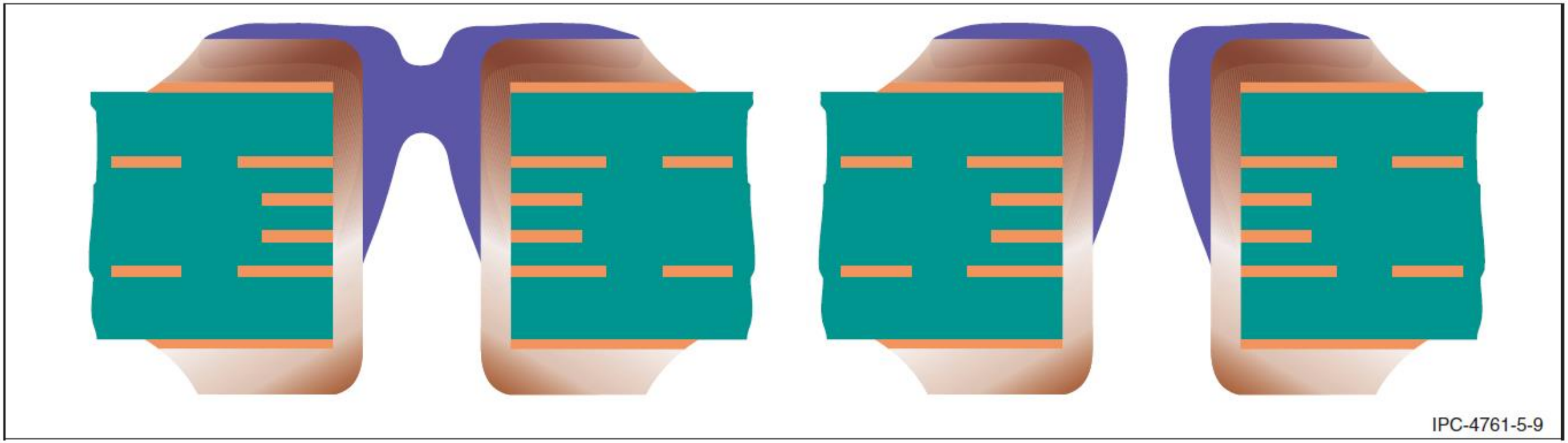
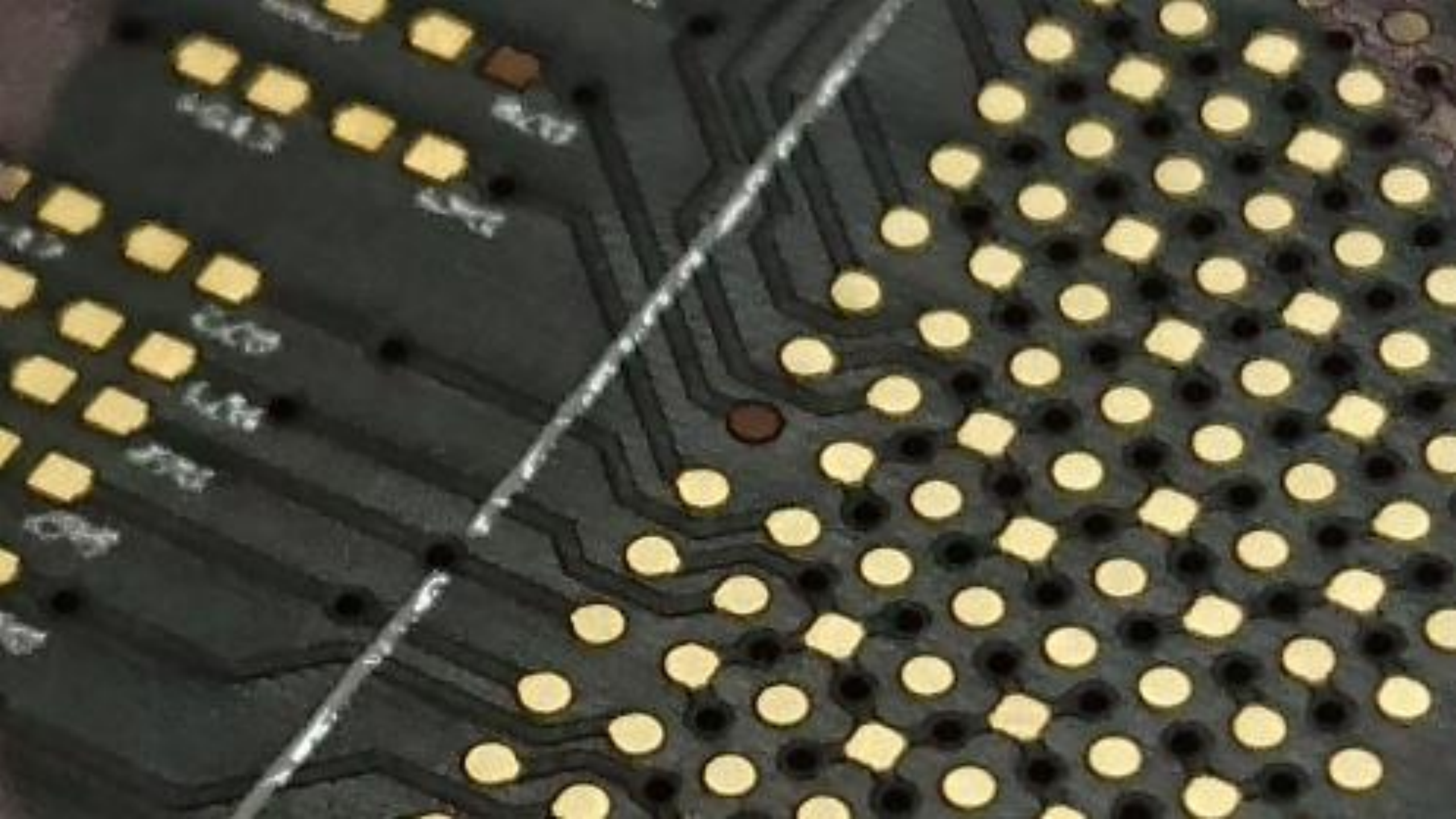
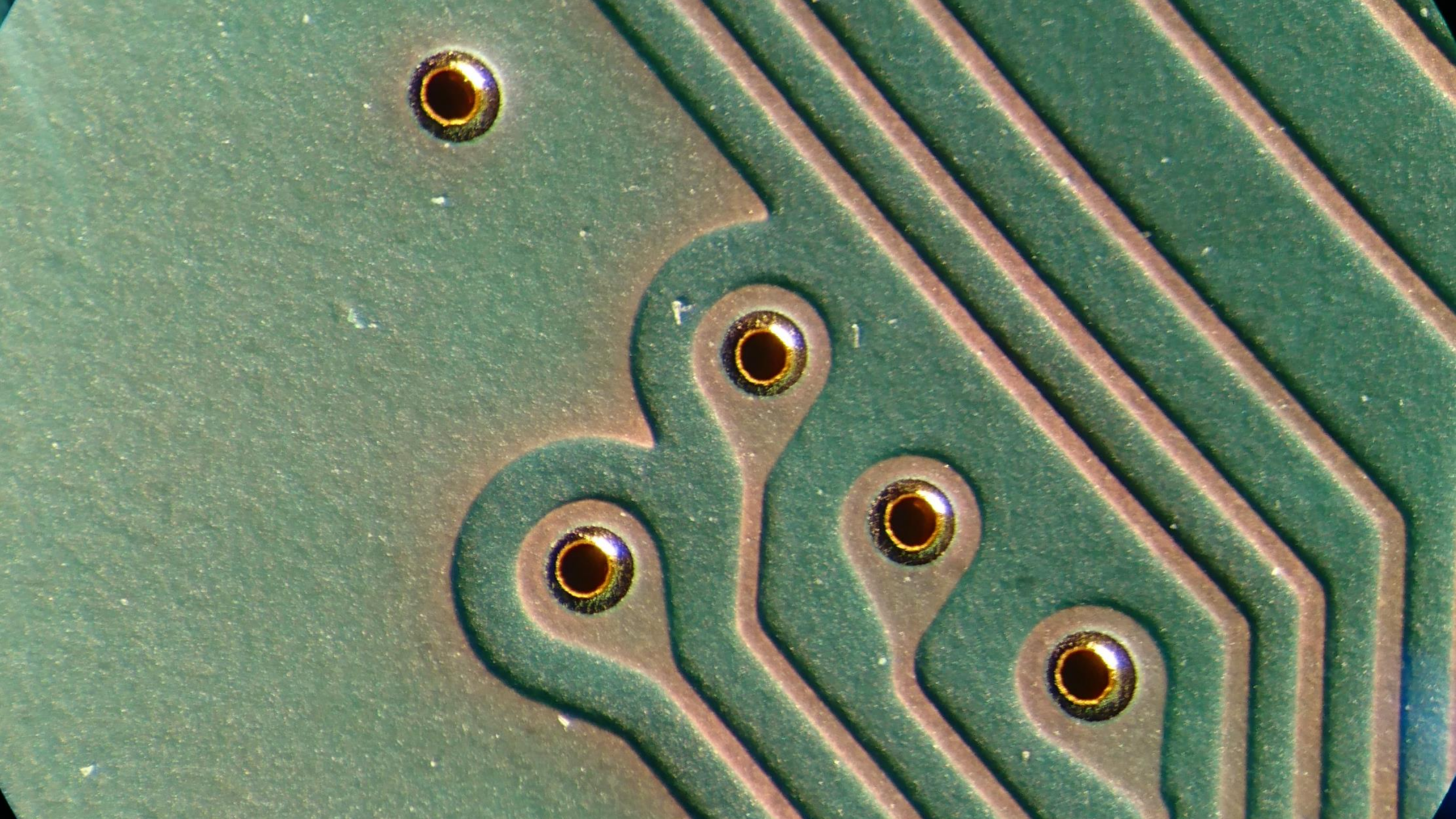
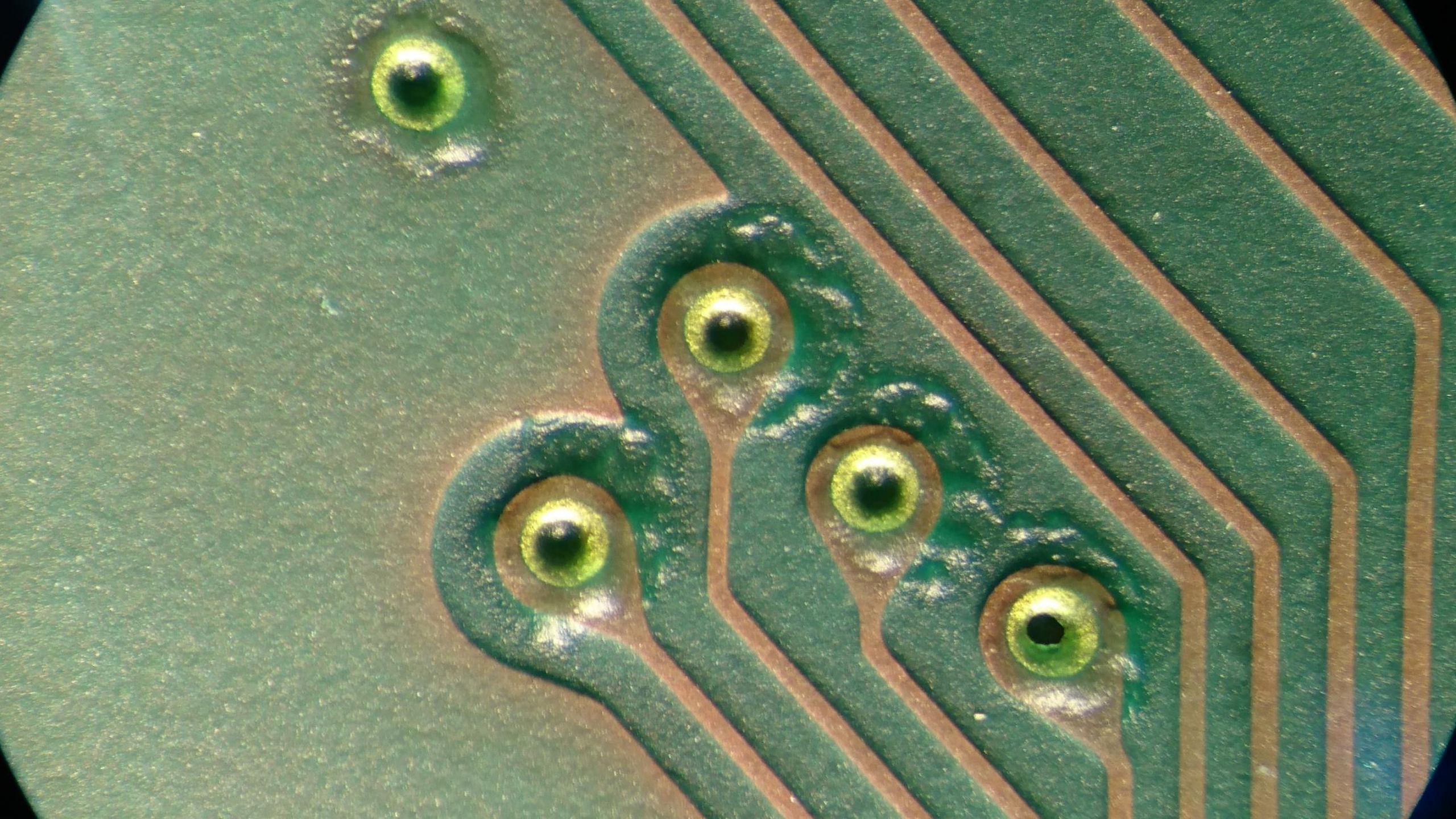


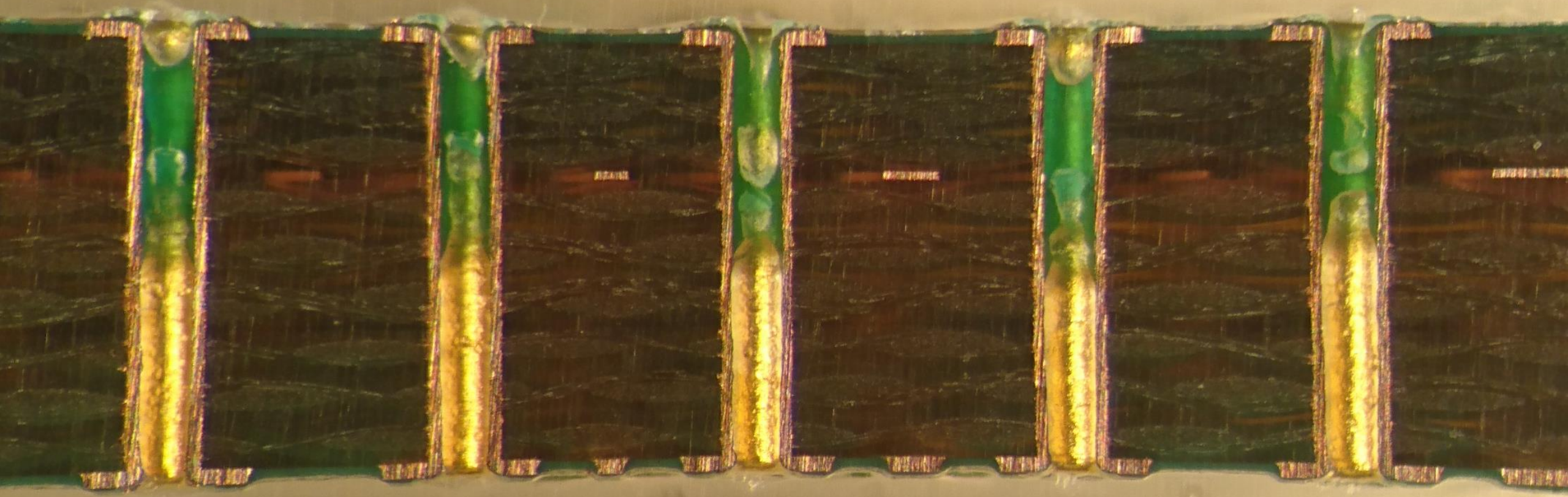
Figure 5-9 Examples of Partially Filled Vias

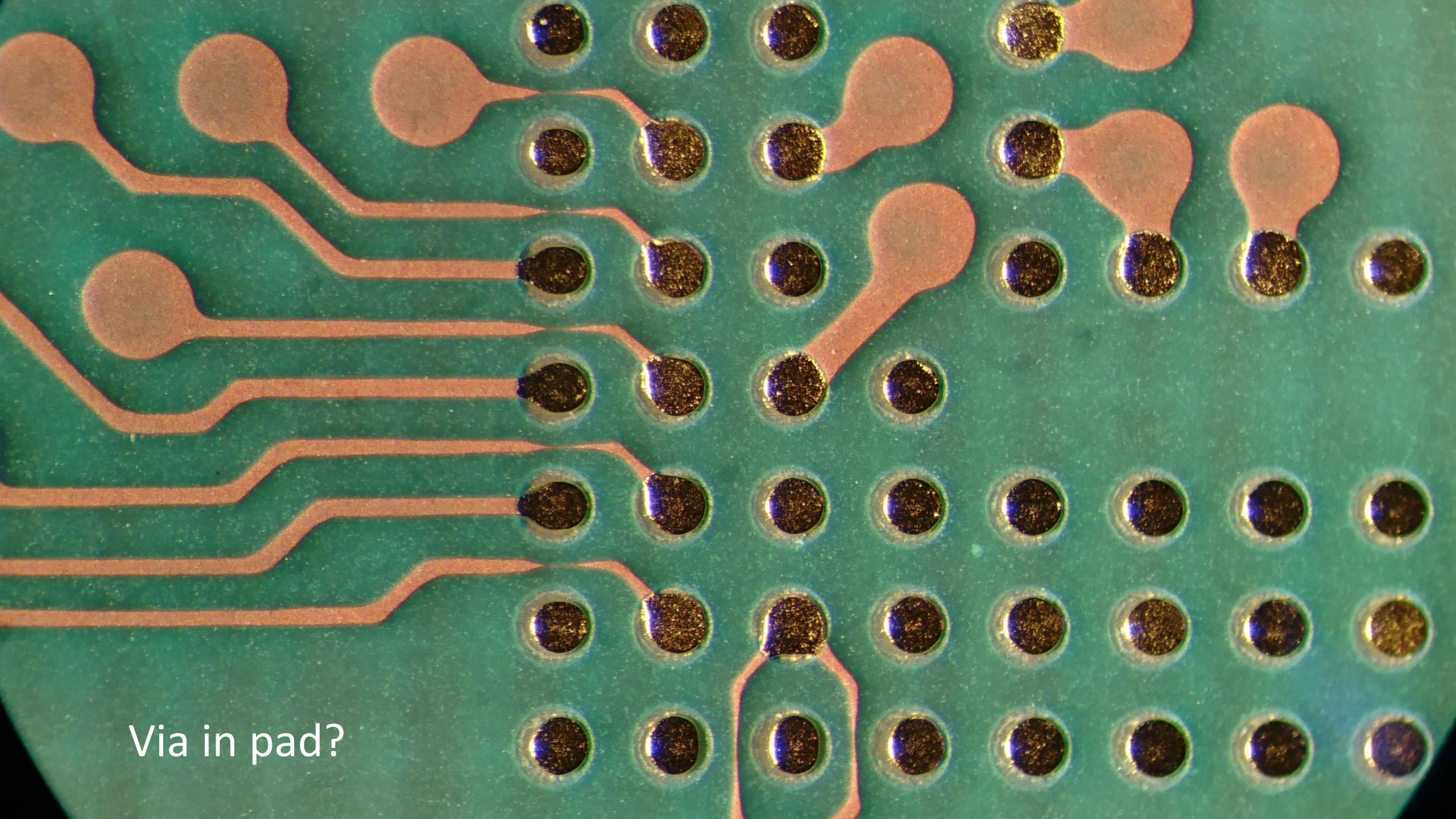




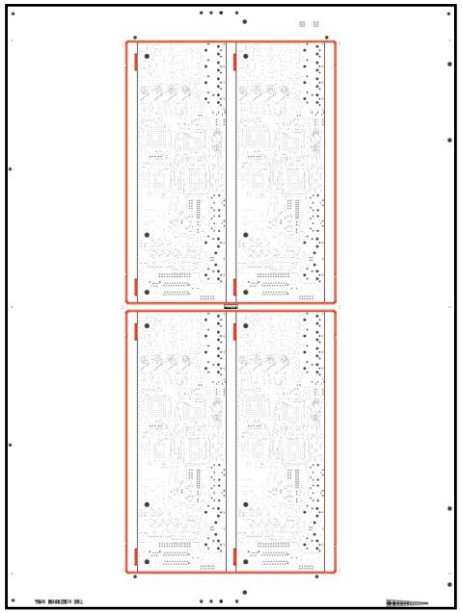


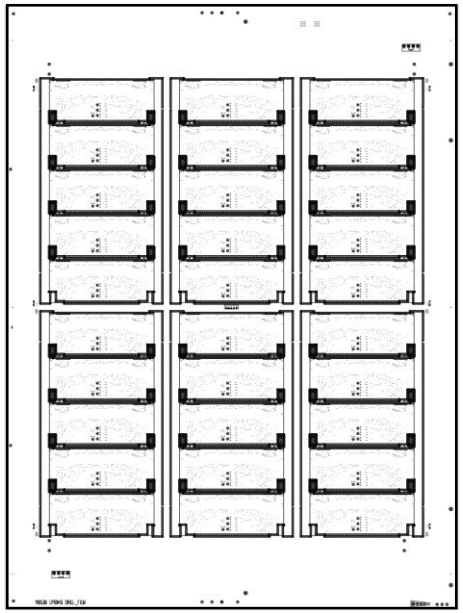
Odkriti skozniki na spajkalni kritini -> ENIG -> zaščita skoznikov IPC-4761 – Type IIIa

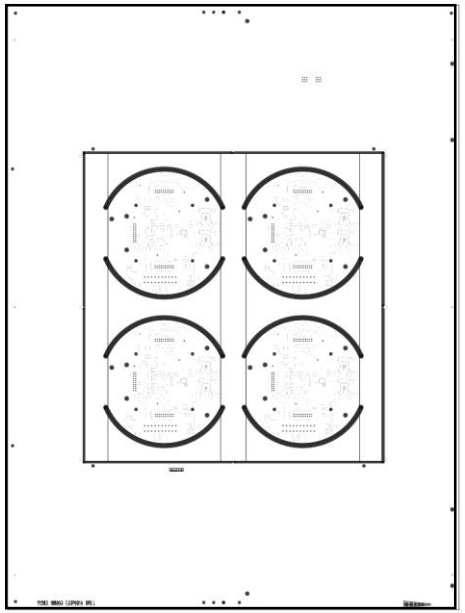


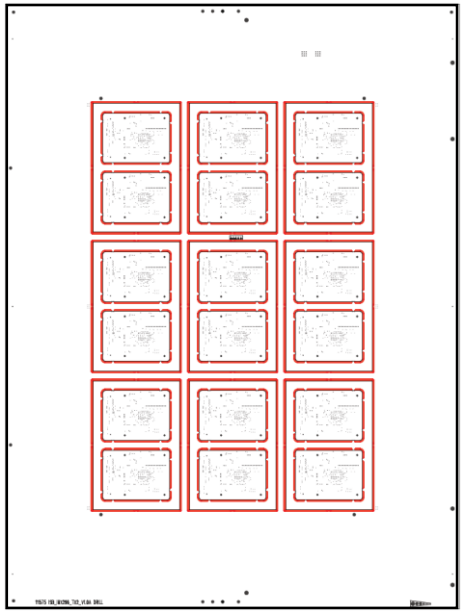

Via in pad?

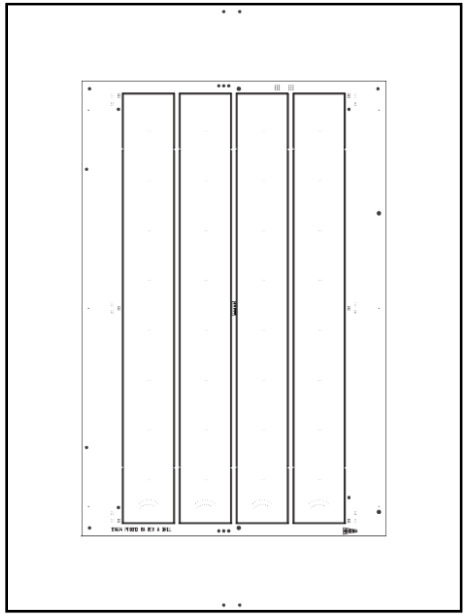
Montaža na delovni format

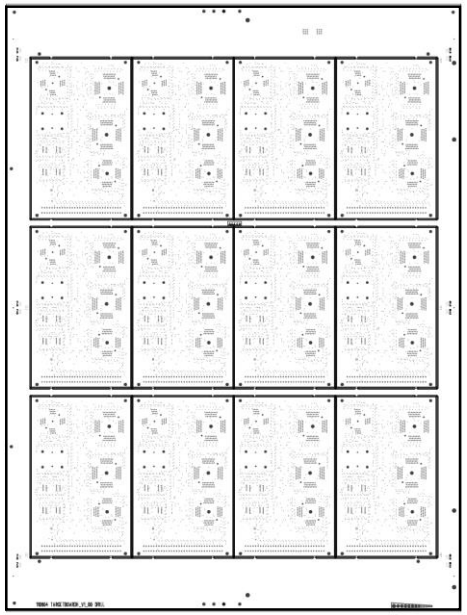






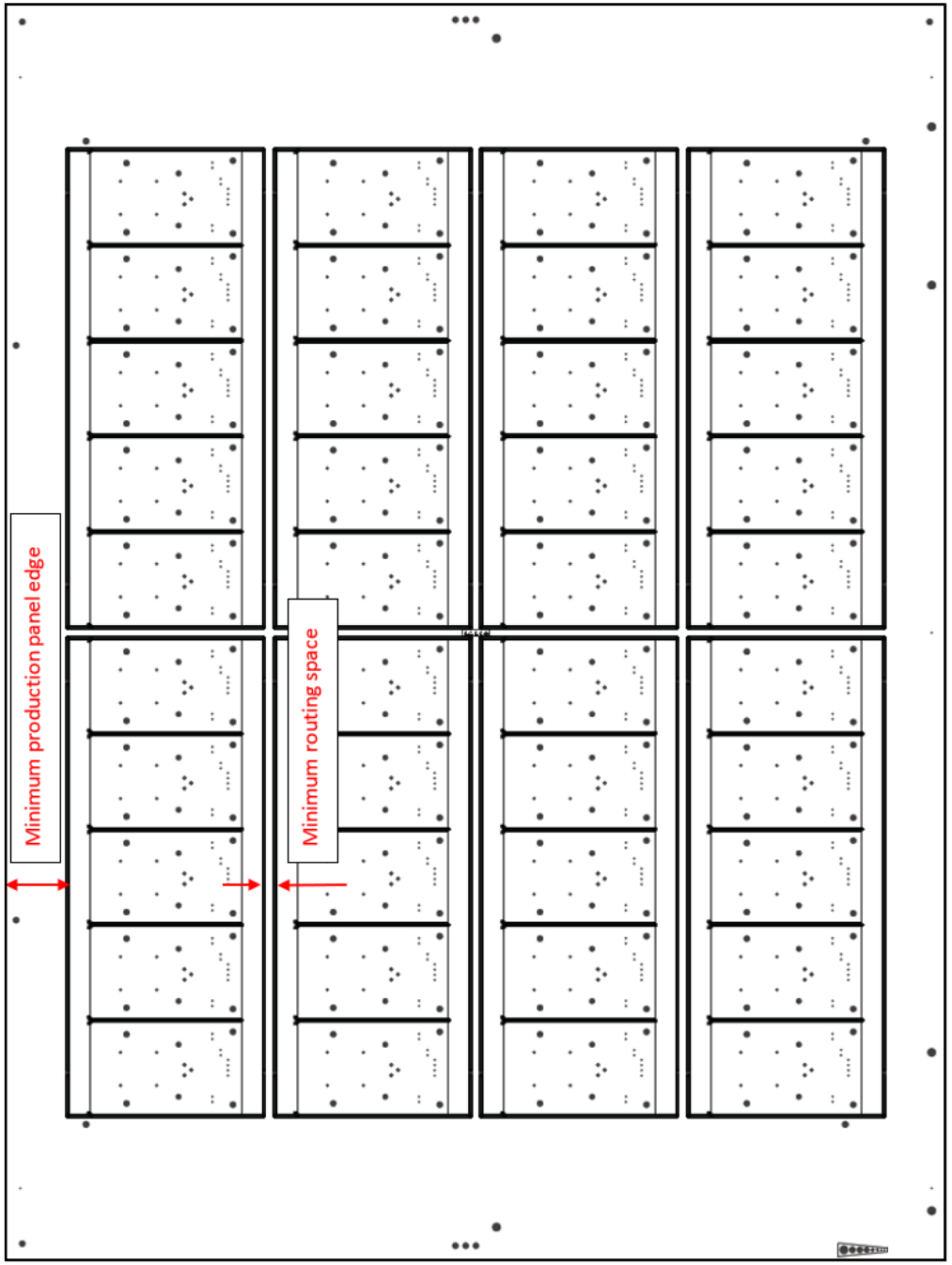






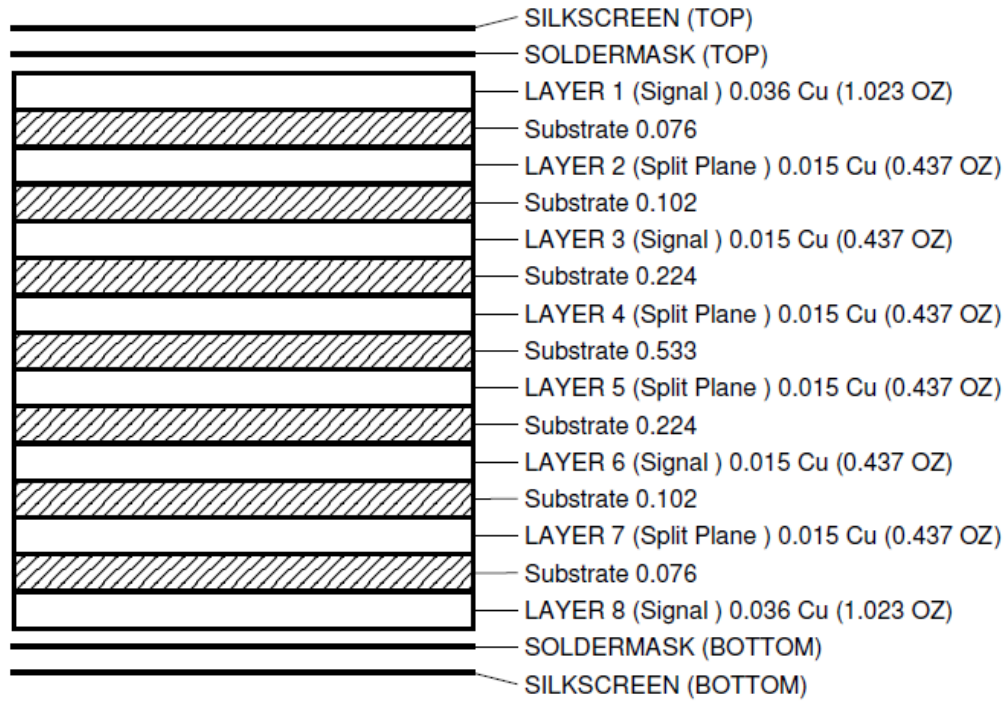
Uporabna površina delovnega formata

Production panel size	Type of PCB	Min. Production panel edge
457mm x 610mm	One-sided	12mm
	Double-sided	12mm-15mm, depending on the complexity
	Multi-layer ML4	15mm-20mm, depending on the complexity
	Multi-layer ML6 and more	25mm
305mm x 457mm	One-sided	12mm
	Double-sided	12mm-15mm, depending on the complexity
535mm x 610mm	One-sided	12mm
	Double-sided	12mm-15mm, depending on the complexity
280mm x 410mm	Multi-layer ML4	15mm-20mm, depending on the complexity
	Multi-layer ML6 and more	20mm



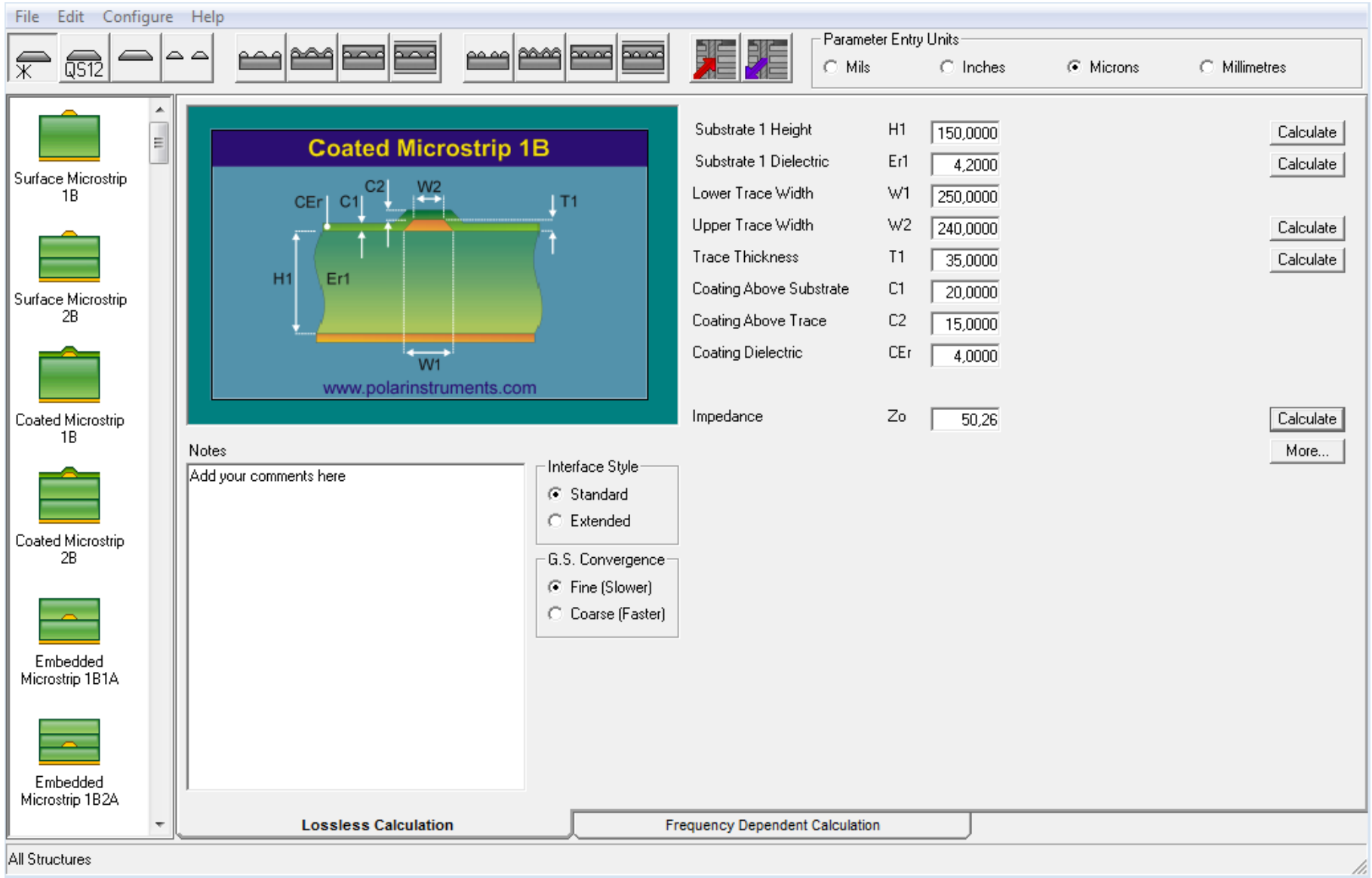
Kontrolirane impedance

LAYER STACK-UP

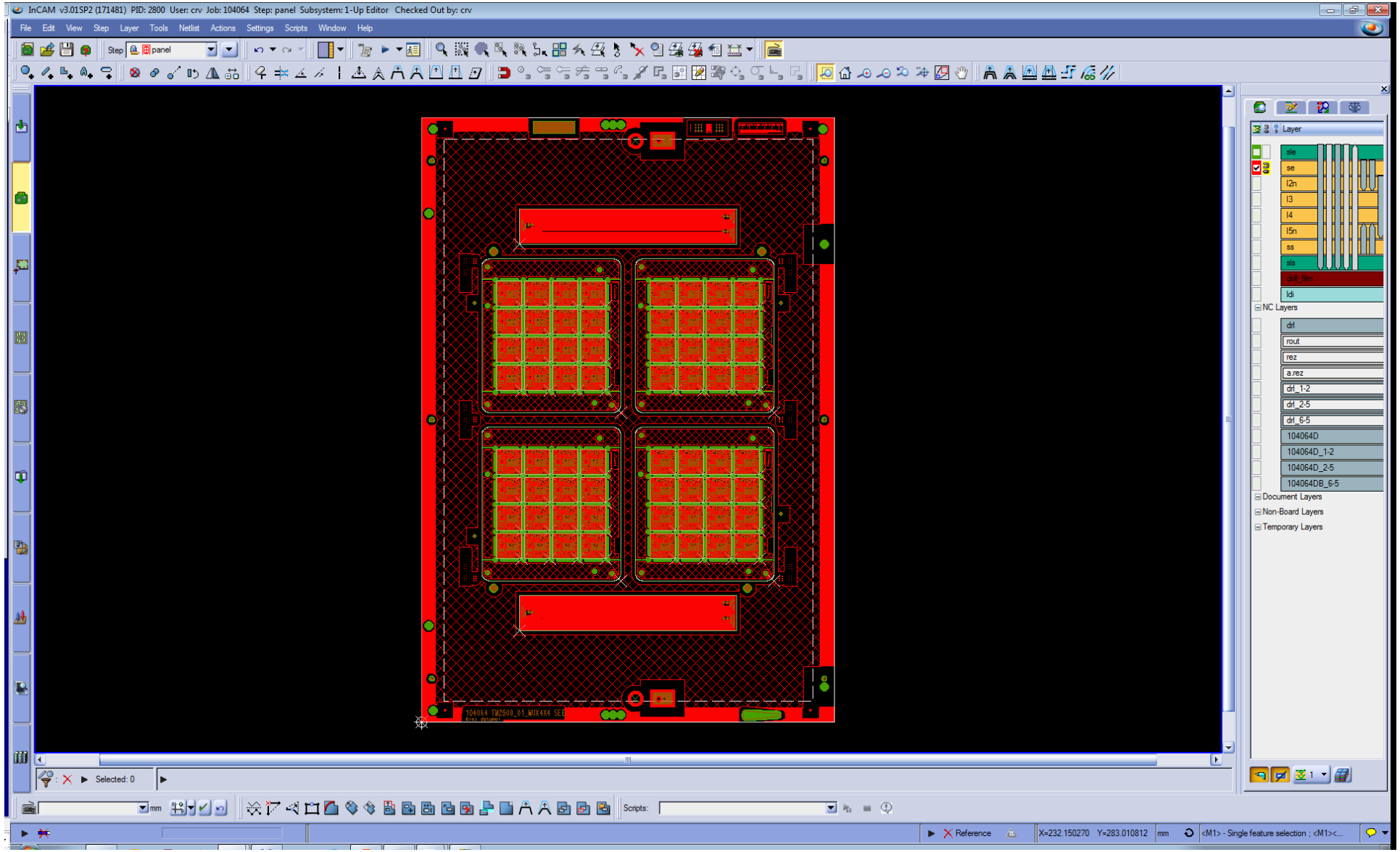


IMPEDANCES			
ALL UNITS ARE IN MILLIMETERS			
LAYER	SINGLE-ENDED	DIFFERENTIAL (WIDTH/GAP)	
	50 OHM +/-10%	90 OHM +/-10%	100 OHM +/-10%
L1	0.1269	0.1267/0.2032	0.1016/0.254
L2			
L3	0.1268		0.1016/0.1397
L4			
L5			
L6	0.1268	0.1266/0.1266	0.1016/0.1397
L7			
L8	0.1269		

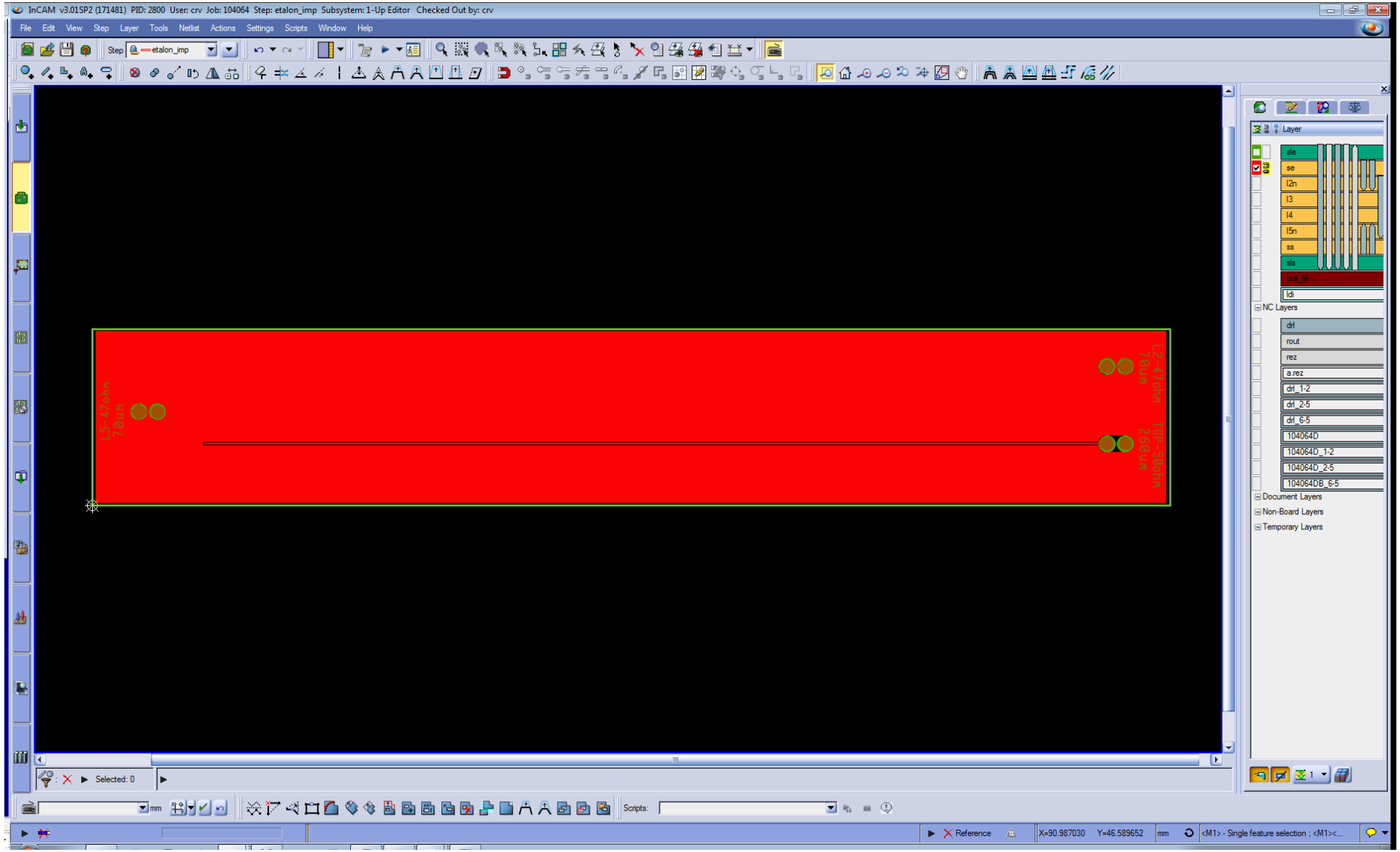
Kontrolirane impedance



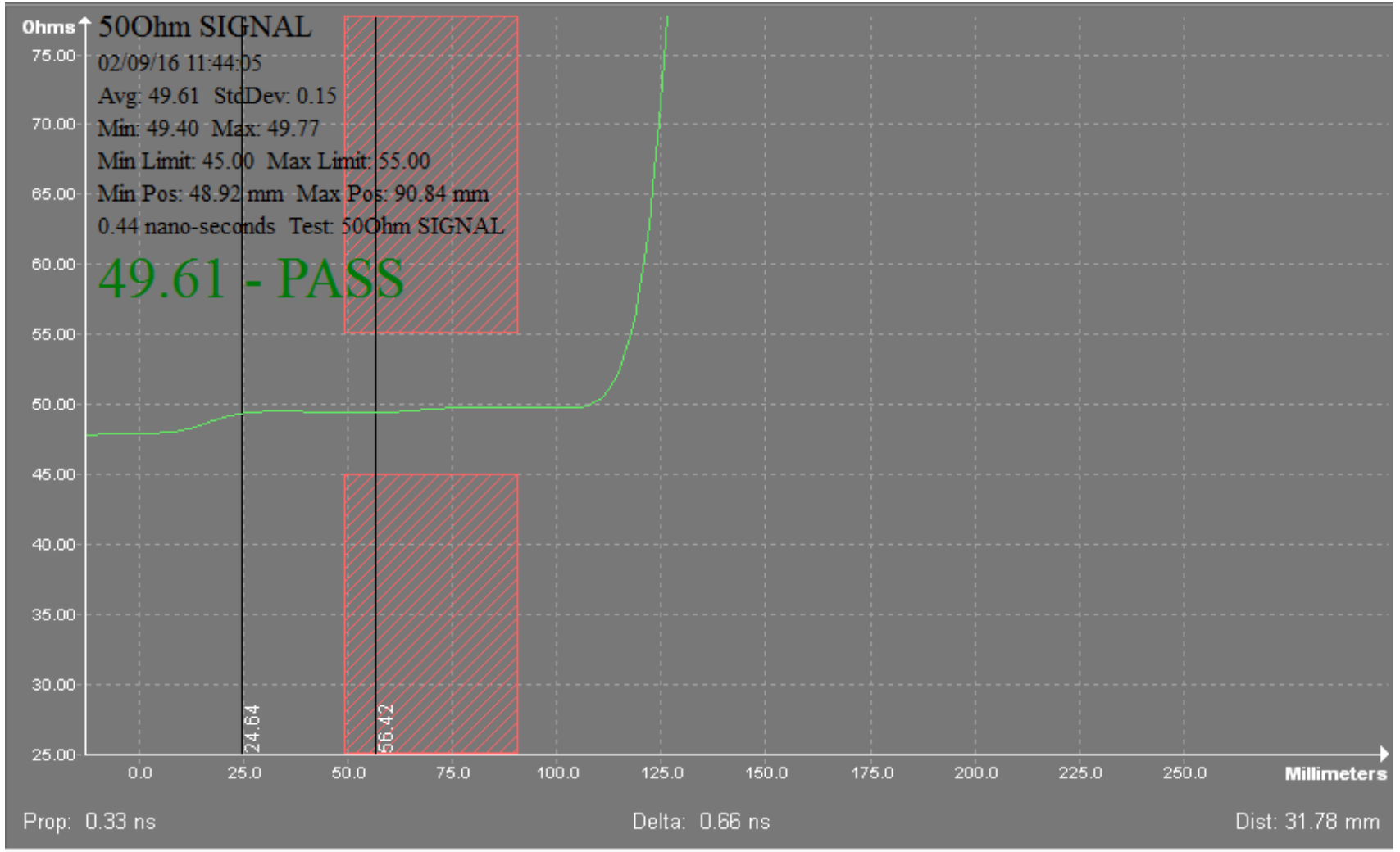
Kontrolirane impedance



Kontrolirane impedance



Kontrolirane impedance



Name	Result	Avg	S/N	Job #	LYR	Time/Date	Min Z	Max Z	Std Dev	Oper
50Ohm SIGNAL	Pass	49.61	1	103045	L3	02/09/16 11:44:04	49.40	49.77	0.15	ZORAN
50Ohm SIGNAL	Pass	50.62	2	103045	L3	02/09/16 11:44:30	50.07	50.75	0.20	ZORAN

Razvojni in raziskovalni projekti

PROJEKT: Lasersko vrtanje

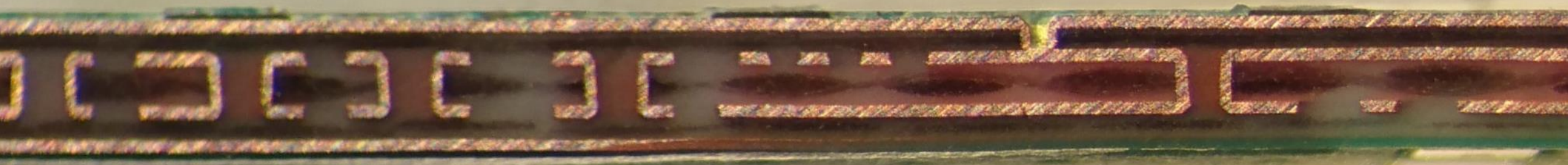
Id 113312 Kupčeva oznaka: ATTEP 3123

HDI plošča, z lasersko vrtanimi slepimi izvrtinami 0,1mm in pokopanimi izvrtinami.

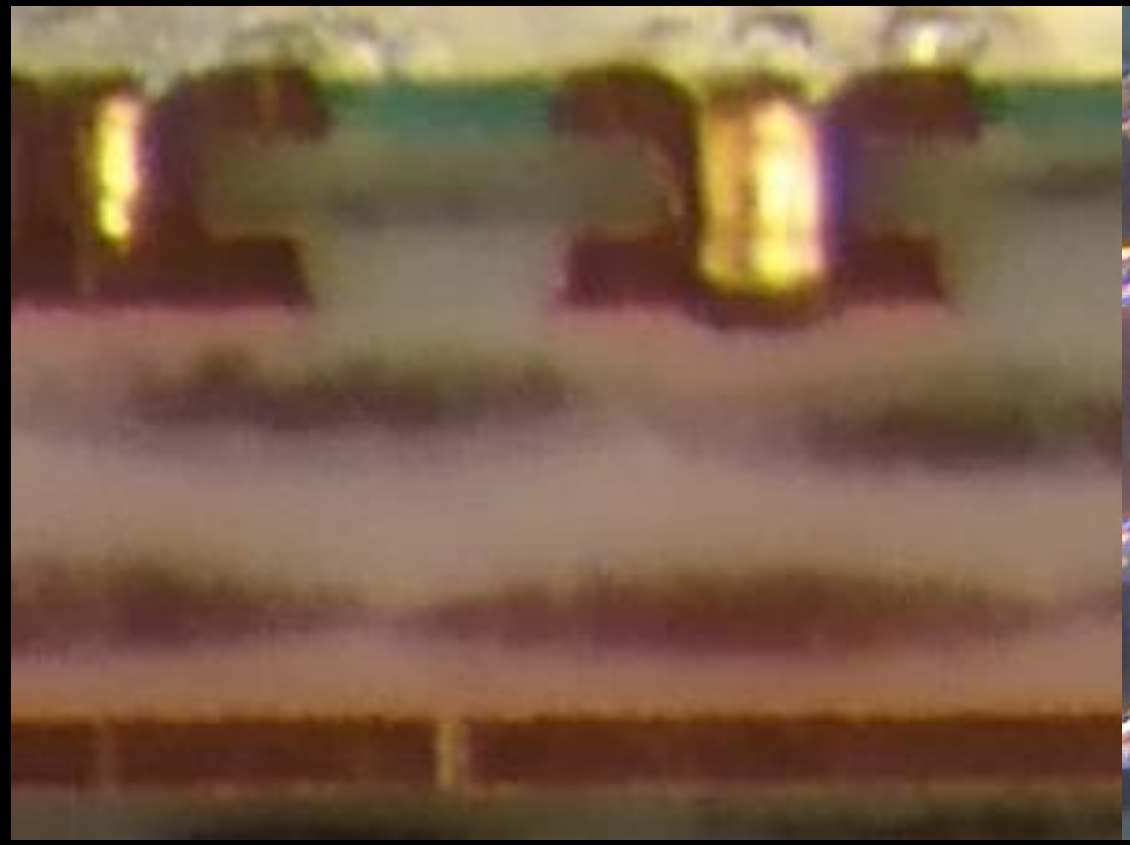
Osnovni material: Panasonic R-1755M

ML struktura:

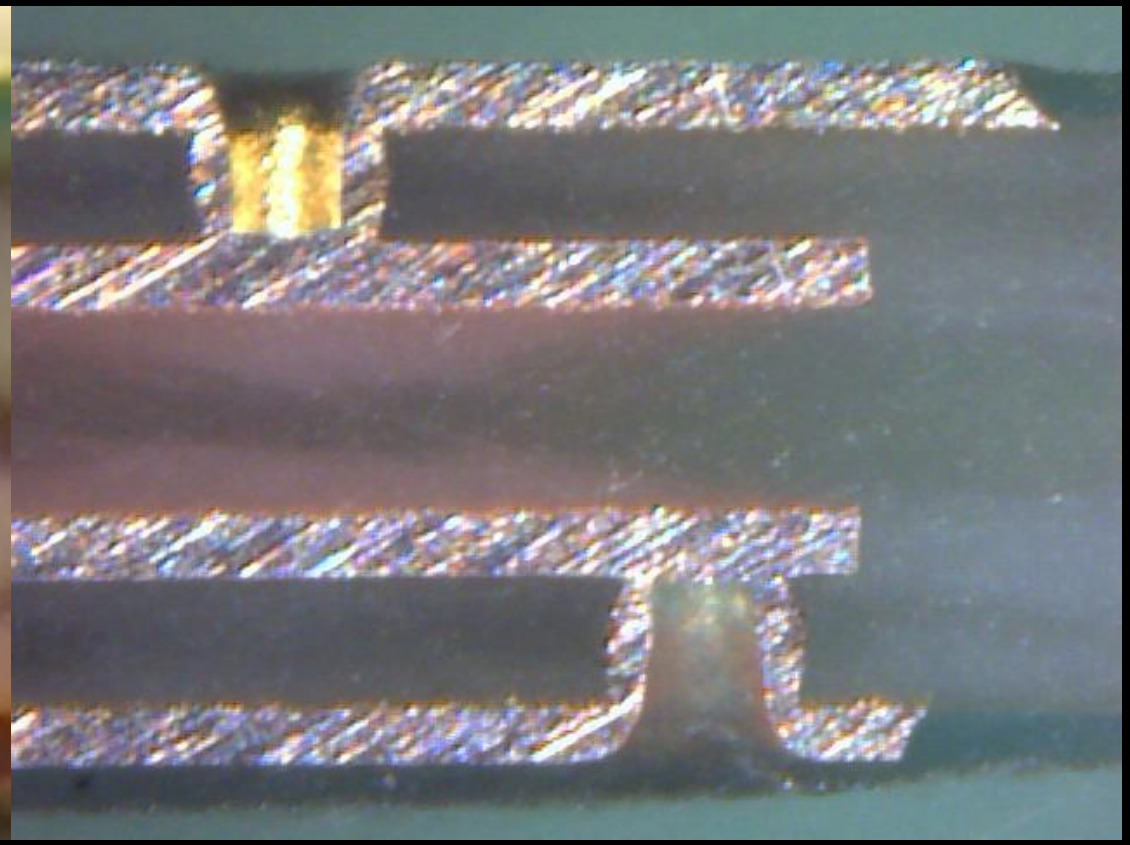
35mic.
Prepreg 1080 …… 0,074mm
35mic.
Core 0,1mm
35mic.
Prepreg 1080 ……. 0,074mm
35mic.
Končna debelina ploščice d= 0,4mm+/-0,1mm



Mehansko vrtanje



Lasersko vrtanje

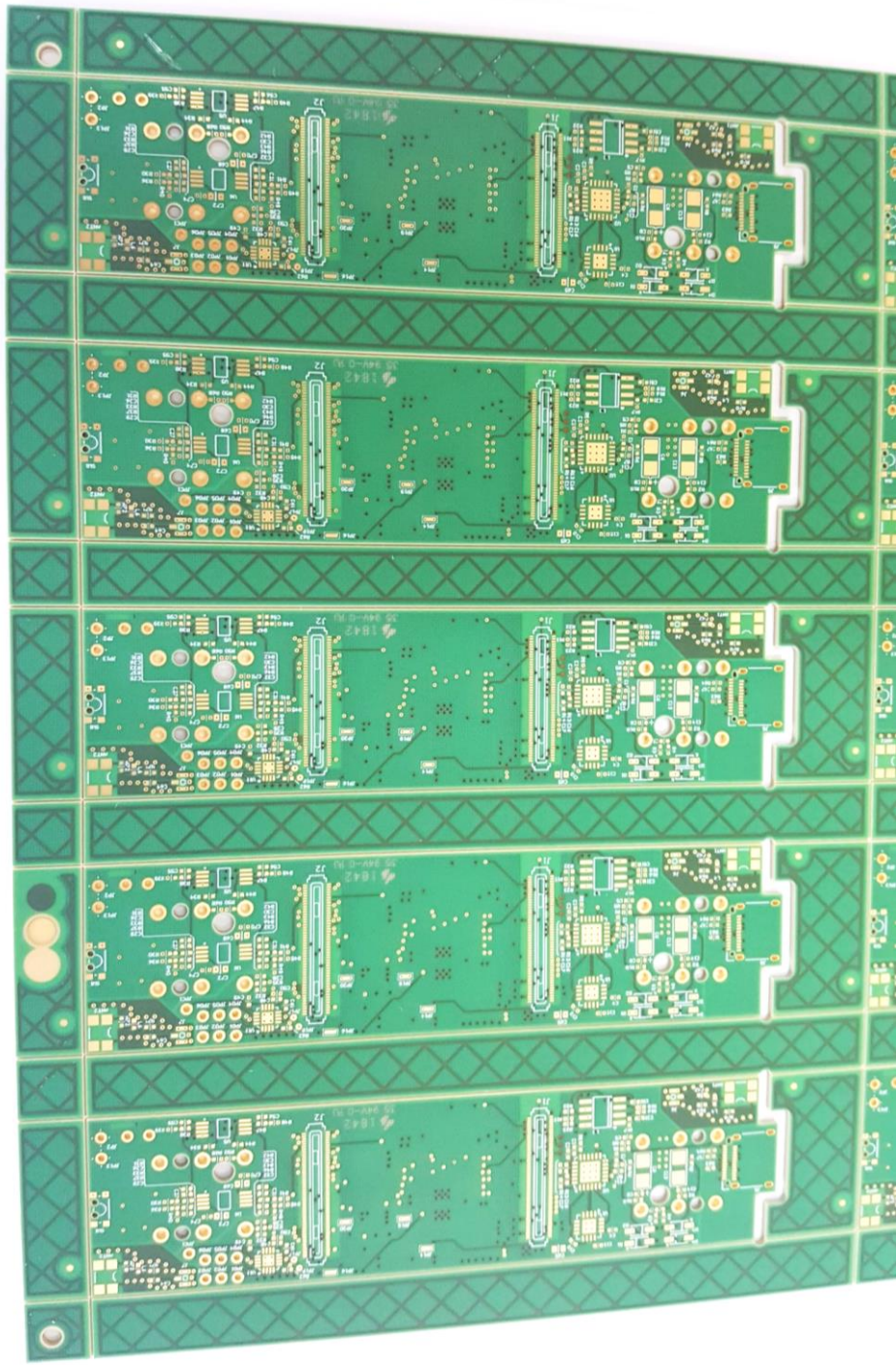


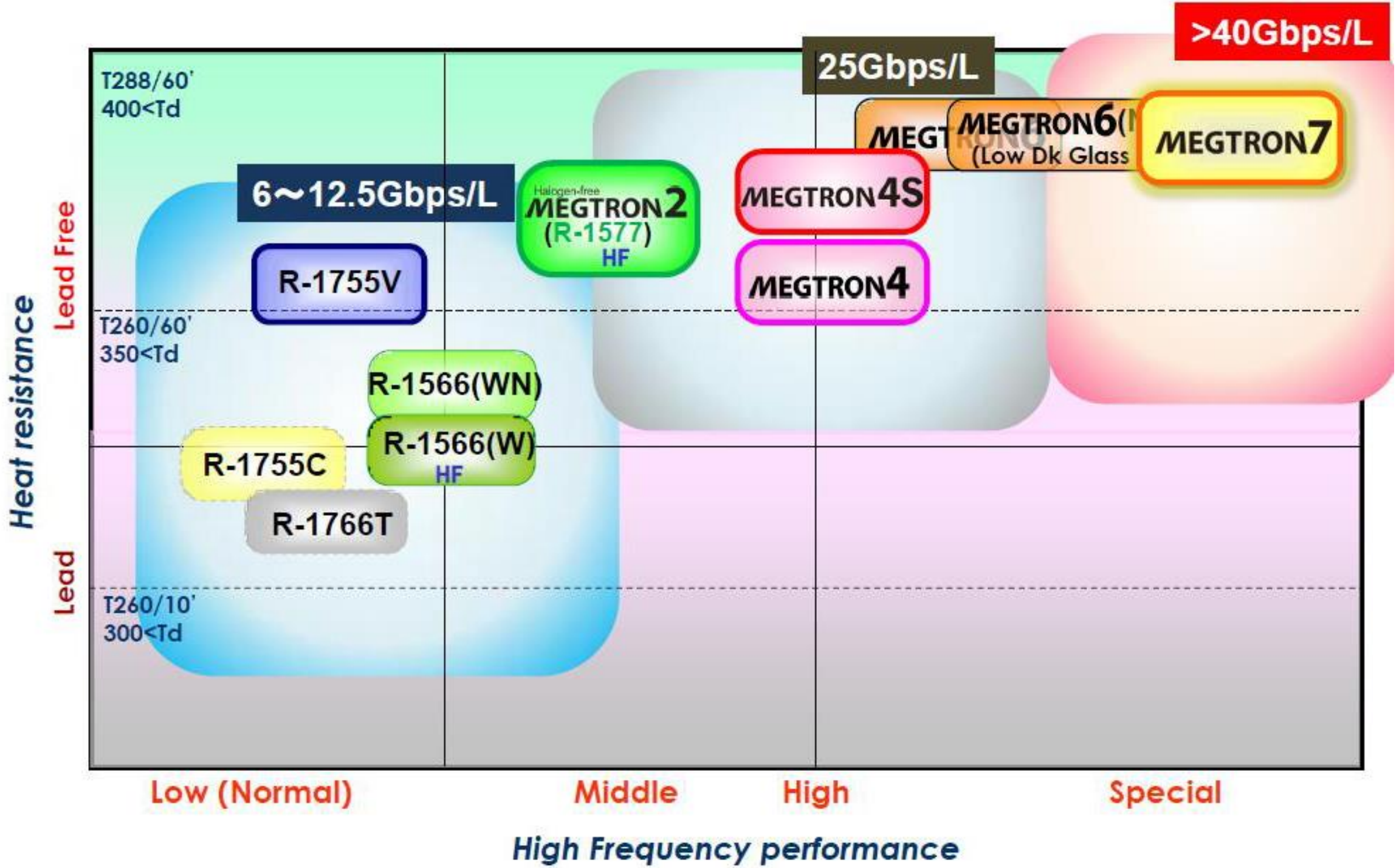
PROJEKT: Osnovni material MEG-6

Id 114504 Kupčeva oznaka: 56654

ML struktura:

35mic. Cu
R5670K Prepreg 2116 …….. 0,125mm nom.
35mic.
R5775K Core 0,2mm
35mic.
R5670K Prepreg 2116 …….. 0,125mm nom.
R5670K Prepreg 2116 …….. 0,125mm nom.
35mic.
R5775K Core 0,2mm
35mic.
R5670K Prepreg 2116 …….. 0,125mm nom.
R5670K Prepreg 2116 …….. 0,125mm nom.
35mic.
R5775K Core 0,2mm
35mic.
R5670K Prepreg 2116 …….. 0,125mm nom.
35mic.




>40Gbps/L
25Gbps/L
T288/60'
400<Td
6~12.5Gbps/L
Halogen-free
MEGTRON2
(R-1577)
HF
MEGTRON6(
(Low Dk Glass
MEGTRON7
MEGTRON4S
MEGTRON4
R-1755V
T260/60'
350<Td
R-1566(WN)
R-1566(W)
HF
R-1755C
R-1766T
T260/10'
300<Td
Heat resistance
Lead Free
Lead
Low (Normal)
Middle
High
Special
High Frequency performance

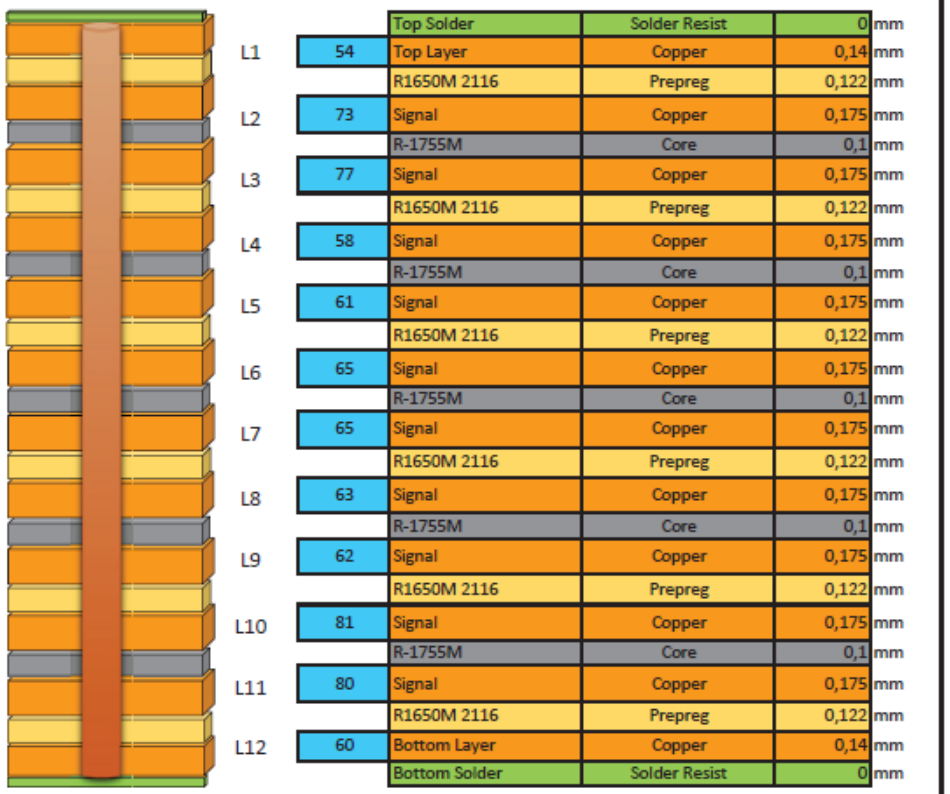
MEGTRON 6 - Line Up für QTA Artikel vom Lager Enns/ Österreich

Material	Dicke nominal mm	mil	Aufbau	Harzgehalt %	Suffix	Format Kette 1100 x1255mm RTF 18/18µm	RTF 35/35	Format Kette 950 x1255mm RTF 18/18µm	RTF 35/35	Lagermenge Tafeln	Artikelnummer
Laminat - R5775K	0,075	2,60	1x1078	63	-	X				10	HW00800053
	0,100	3,90	1x3313	54	-	X	X			50	HW01000156
	0,100	3,90	2x1035	65	-			X		100	HW01000177
	0,130	5,00	1x2116	54	-	X	X			10	HW01300042
	0,200	7,80	2x3313	54	-	X				10	HW02000141
	0,250	9,60	2x2116	54	-	X	X			20	HW02500055
	0,300	11,50	3x3313	54	-	X				30	HW03000044
	0,740	28.0*	4x7628	42	-	X	X			10	HW07400004
	1,490	58,00	8x7628	42	-	X	X			10	HW14900002

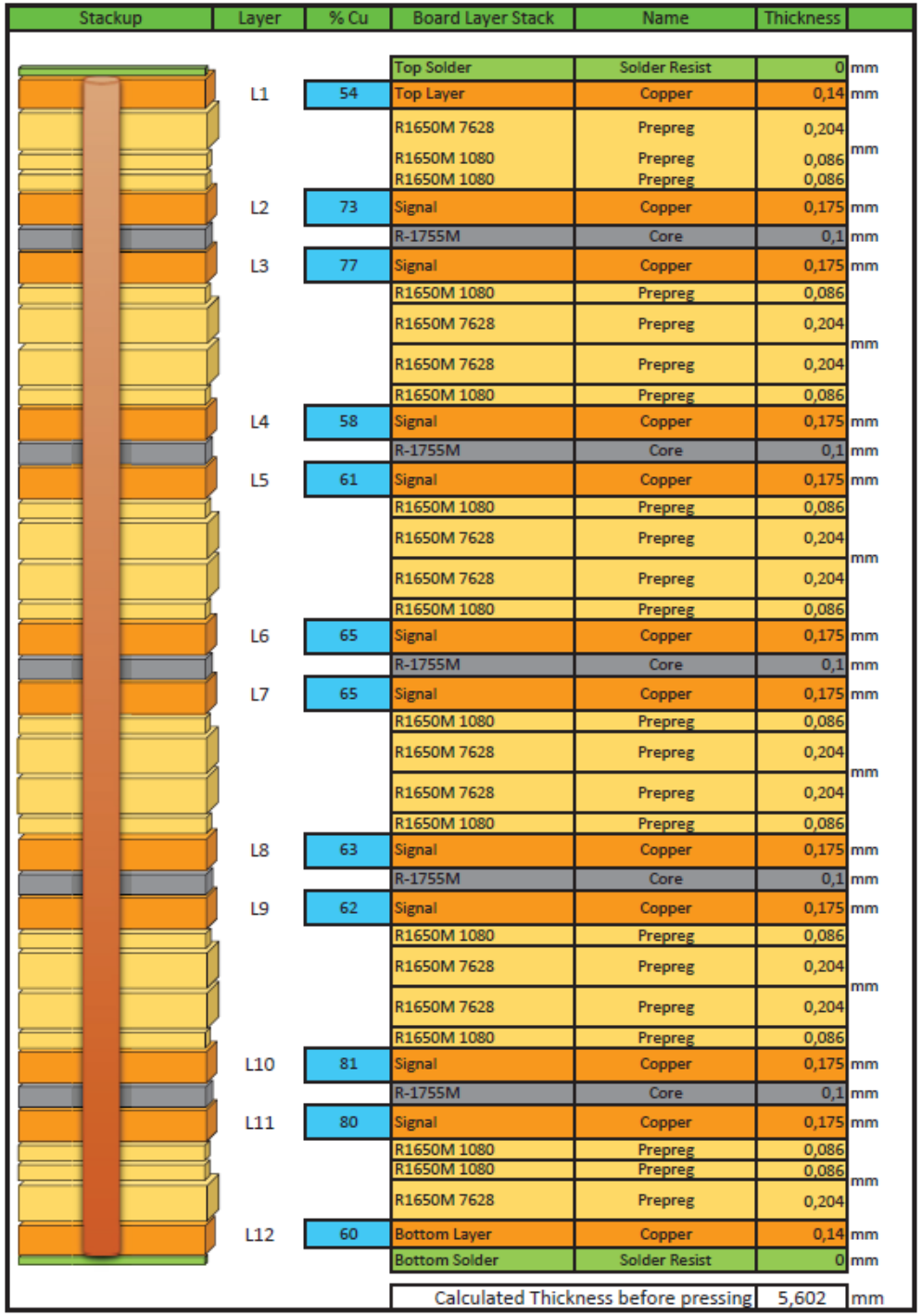
Material	Dicke nominal µm	Gewebe	Harzgehalt %	Suffix	Rollenbreite 1285mm	Rollenbreite	Lagermenge Laufmeter	
Prepreg - R5670K	49	1027	75	KD	X		200	HW10270077
	60	1035	70	KD	X		100	HW10350064
	68	1035	73	KF	X		100	HW10350047
	74	1035	75	KG	X		100	HW10350048
	89	1078	68	KF	X		100	HW10780037
	104	1078	72	KG	X		100	HW10780055
	98	3313	54	KC	X		100	HW33130025
	106	3313	57	KD	X		100	HW33130085
	125	2116	54	KG	X		100	HW21160366

PROJEKT: TRAFO 20kV

Id 114715 Kupčeva oznaka: WORK_SDU



Stackup	Layer	% Cu	Board Layer Stack	Name	Thickness	
			Top Solder	Solder Resist	0	mm
	L1	54	Top Layer	Copper	0,14	mm
			R1650M 2116	Prepreg	0,122	mm
	L2	73	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L3	77	Signal	Copper	0,175	mm
			R1650M 2116	Prepreg	0,122	mm
	L4	58	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L5	61	Signal	Copper	0,175	mm
			R1650M 2116	Prepreg	0,122	mm
	L6	65	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L7	65	Signal	Copper	0,175	mm
			R1650M 2116	Prepreg	0,122	mm
	L8	63	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L9	62	Signal	Copper	0,175	mm
			R1650M 2116	Prepreg	0,122	mm
	L10	81	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L11	80	Signal	Copper	0,175	mm
			R1650M 2116	Prepreg	0,122	mm
	L12	60	Bottom Layer	Copper	0,14	mm
			Bottom Solder	Solder Resist	0	mm
			Calculated Thickness before pressing		3,262	mm



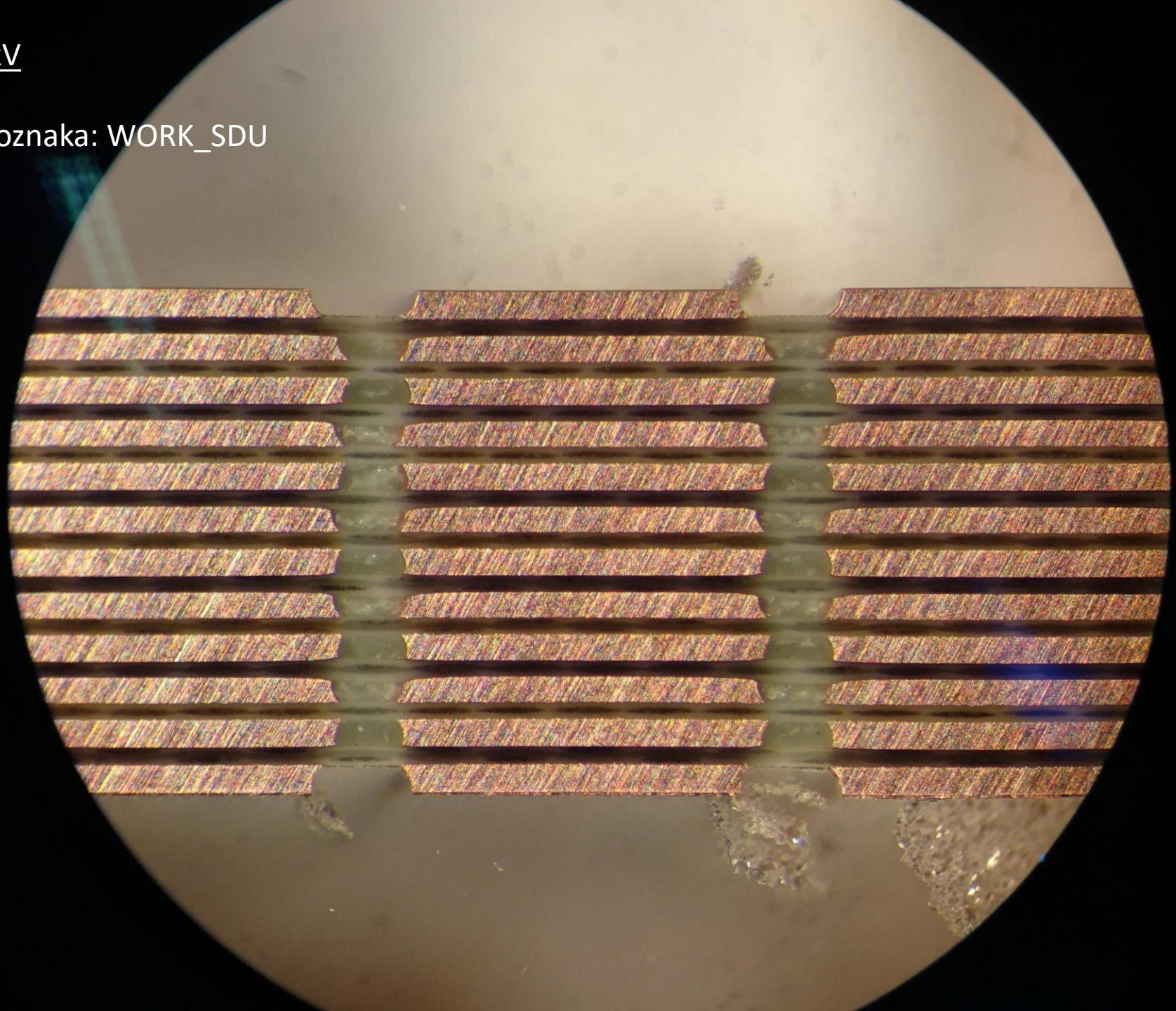
Stackup	Layer	% Cu	Board Layer Stack	Name	Thickness	
			Top Solder	Solder Resist	0	mm
	L1	54	Top Layer	Copper	0,14	mm
			R1650M 7628	Prepreg	0,204	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 1080	Prepreg	0,086	
	L2	73	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L3	77	Signal	Copper	0,175	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 7628	Prepreg	0,204	mm
			R1650M 7628	Prepreg	0,204	
			R1650M 1080	Prepreg	0,086	
	L4	58	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L5	61	Signal	Copper	0,175	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 7628	Prepreg	0,204	mm
			R1650M 7628	Prepreg	0,204	
			R1650M 1080	Prepreg	0,086	
	L6	65	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L7	65	Signal	Copper	0,175	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 7628	Prepreg	0,204	mm
			R1650M 7628	Prepreg	0,204	
			R1650M 1080	Prepreg	0,086	
	L8	63	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L9	62	Signal	Copper	0,175	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 7628	Prepreg	0,204	mm
			R1650M 7628	Prepreg	0,204	
			R1650M 1080	Prepreg	0,086	
	L10	81	Signal	Copper	0,175	mm
			R-1755M	Core	0,1	mm
	L11	80	Signal	Copper	0,175	mm
			R1650M 1080	Prepreg	0,086	
			R1650M 1080	Prepreg	0,086	
			R1650M 7628	Prepreg	0,204	mm
	L12	60	Bottom Layer	Copper	0,14	mm
			Bottom Solder	Solder Resist	0	mm
			Calculated Thickness before pressing		5,602	mm

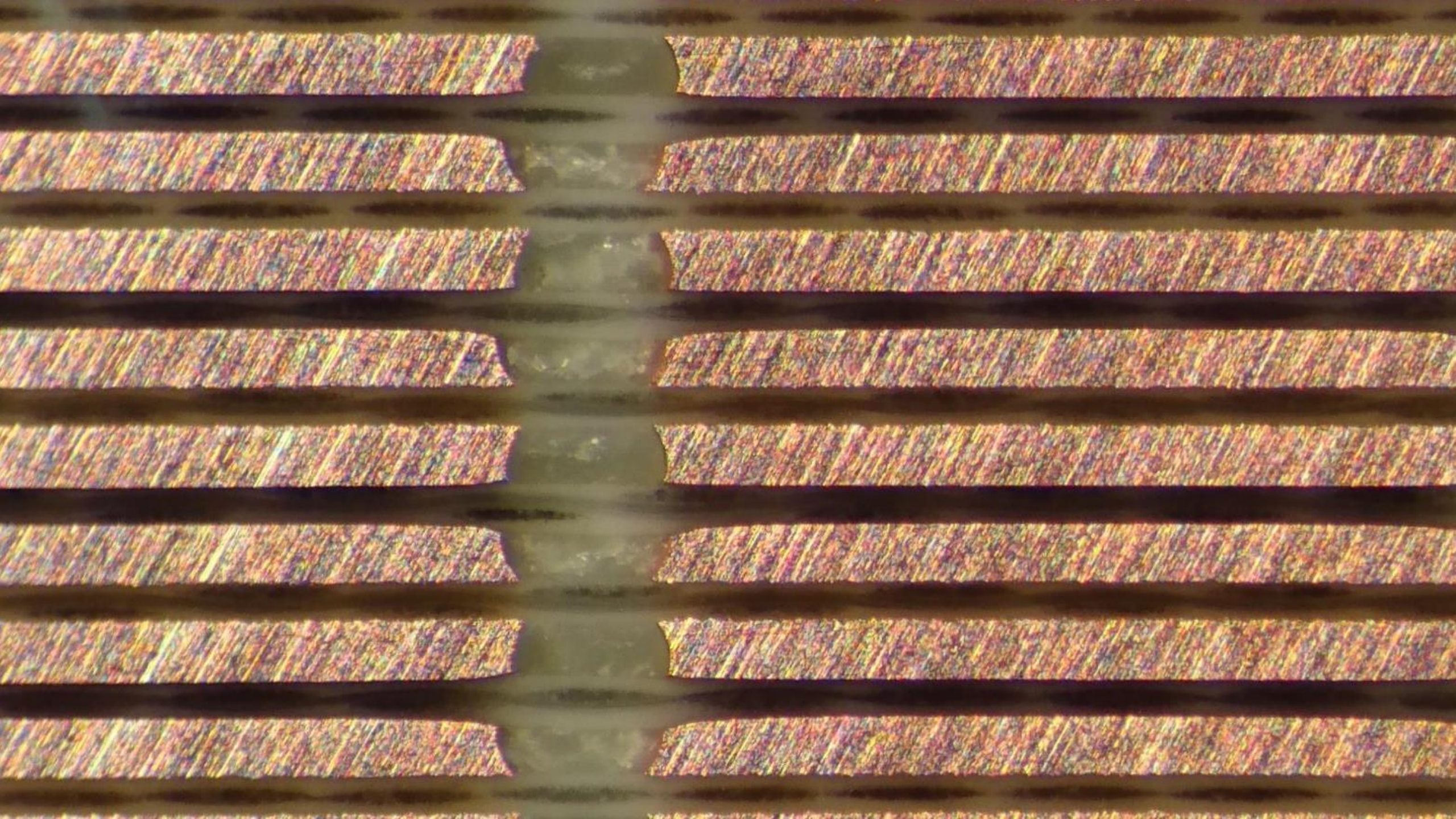
PROJEKT: TRAFO 20kV

Id 114715 Kupčeva oznaka: WORK_SDU

PROJEKT: TRAFO 20kV

Id 114715 Kupčeva oznaka: WORK_SDU





Contactless Energy Transfer

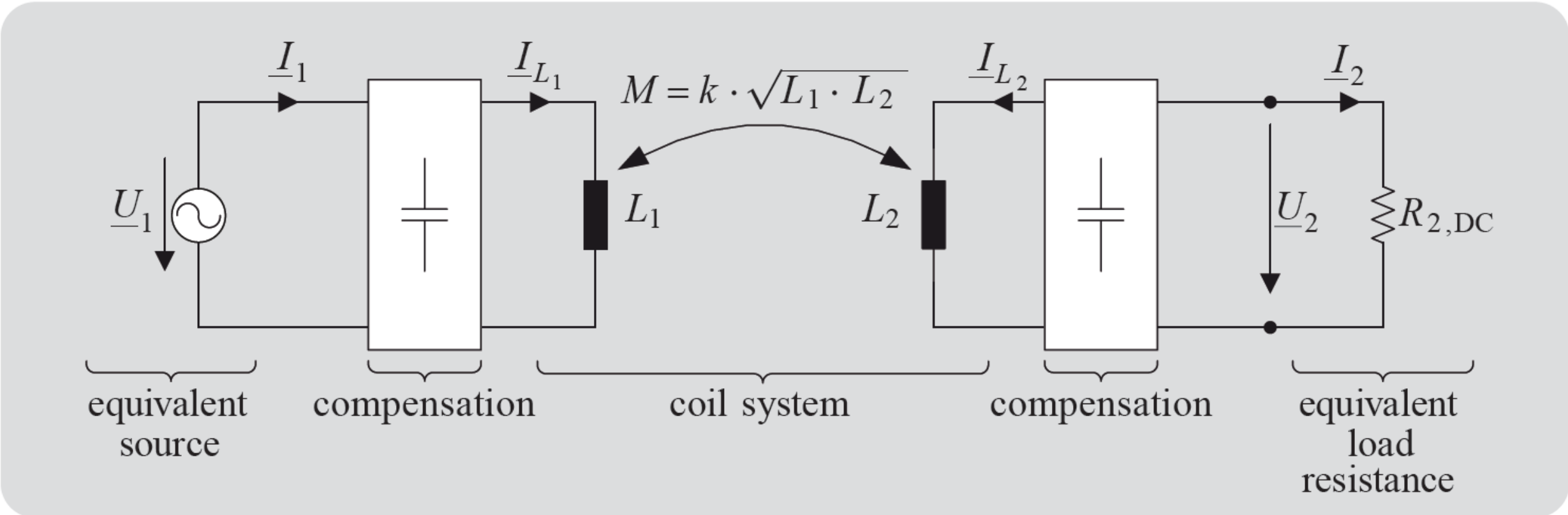


Figure 1: Overview of an inductive CET system with reactive power compensation and coil system

Geometry

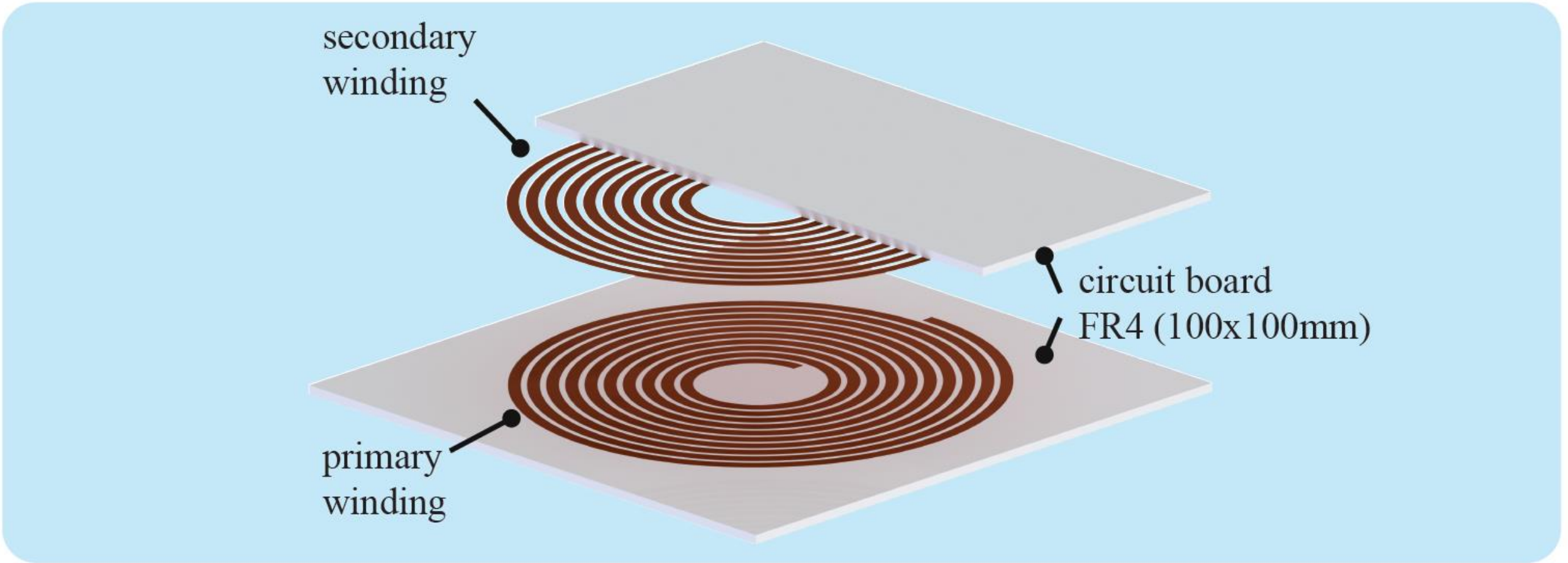
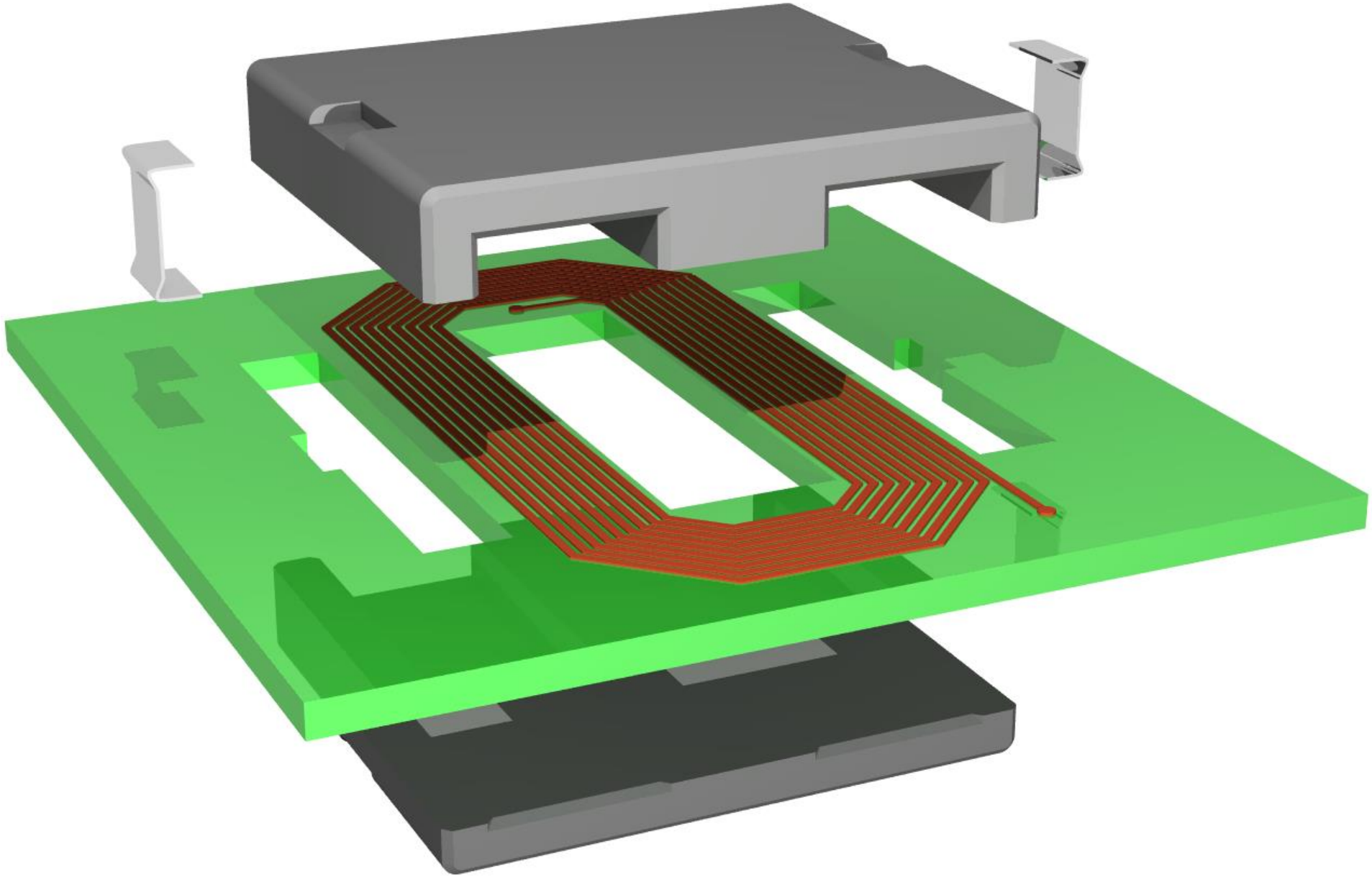


Figure 2: 3D model of the coil system with 10 copper windings on a FR4 PCB board. For improved visibility, only one copper layer of the coil is shown.



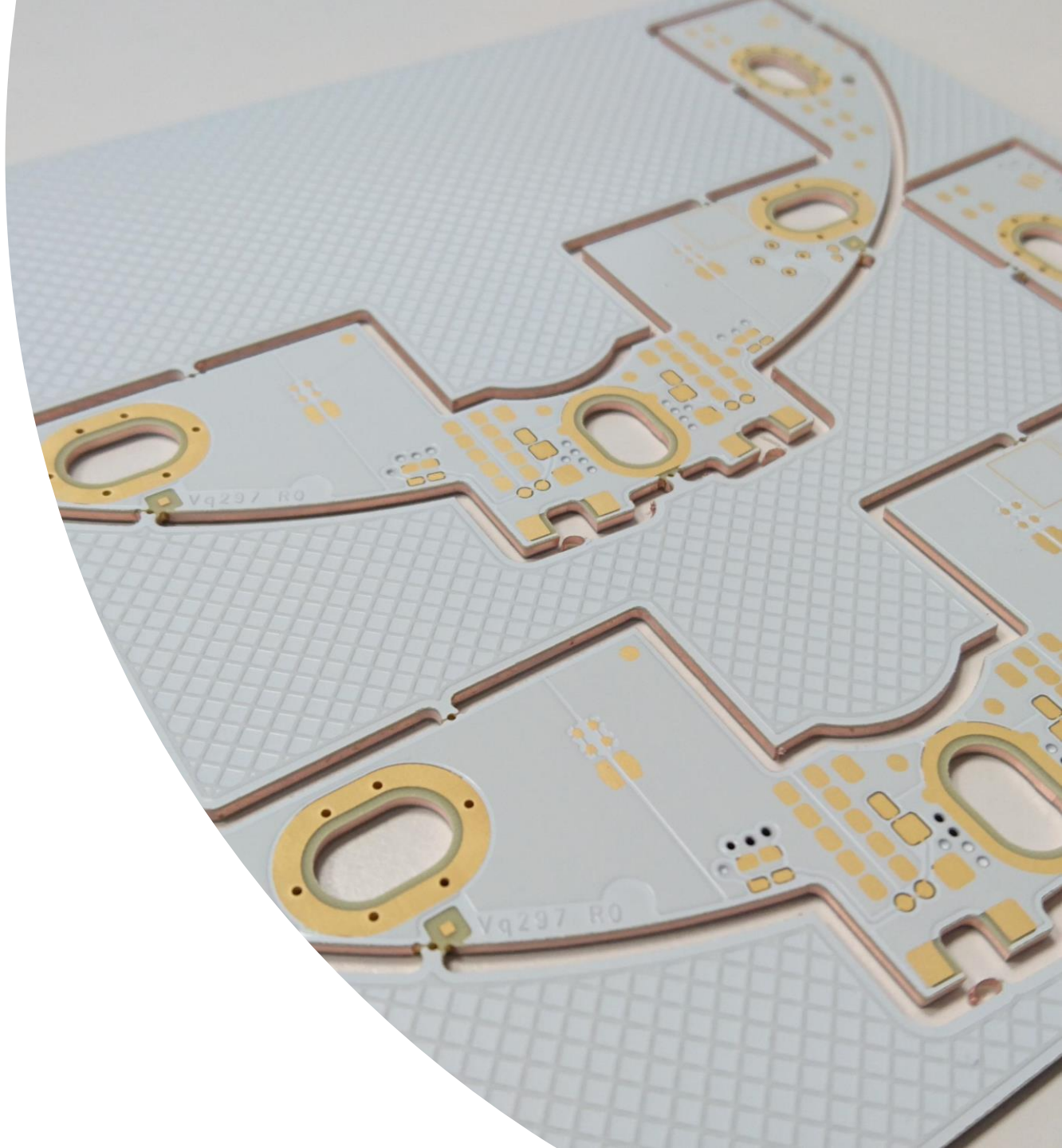
PROJEKT: plošča s kovinsko sredico in izoliranimi izvrtinami

Id 113440 Kupčeva oznaka: Master V297 Cu core

Kovinska sredica: bakrov substrat debeline 1,0mm
Toplotna prevodnost: 4,1W/m.K

Struktura kompozita:

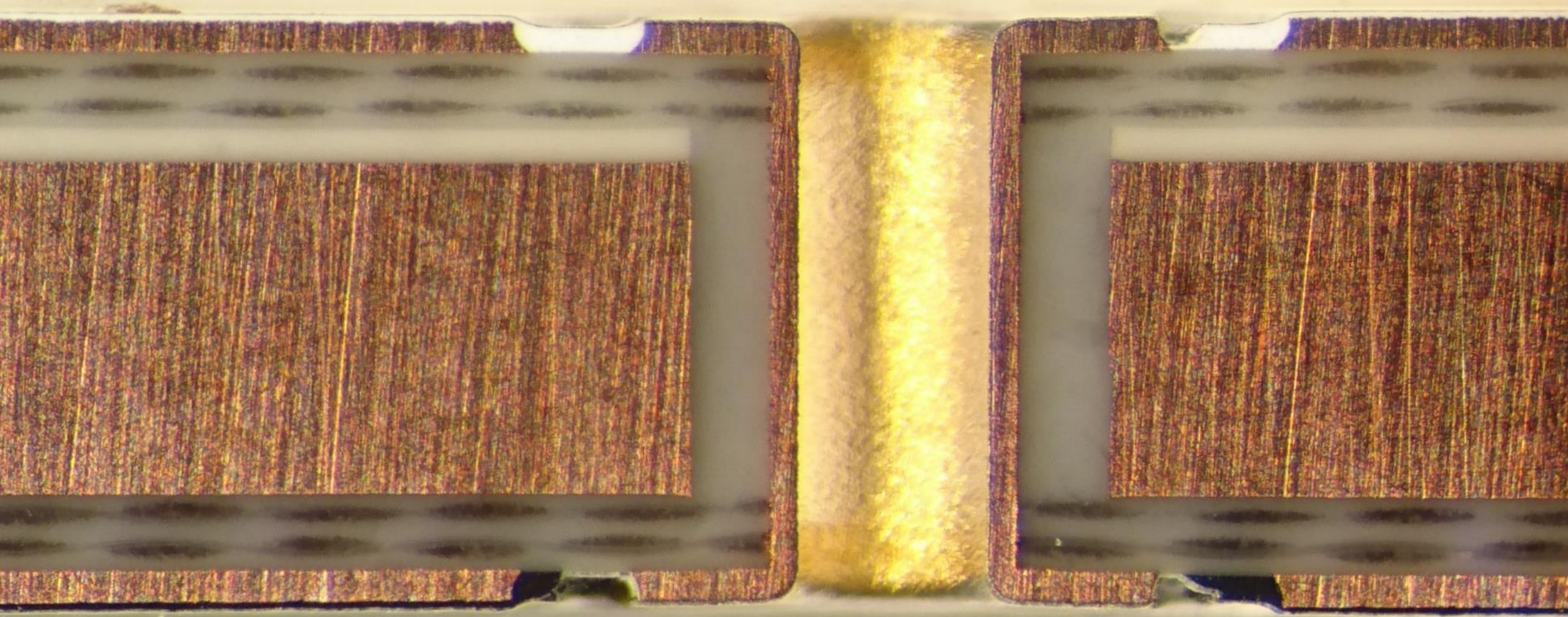
35mic.baker
Prepreg 2116 ……. 0,122mm
Prepreg 2116 ……. 0,122mm
Bakrov substrat Bergquist d= 1,0mm
Prepreg 2116 ……. 0,122mm
Prepreg 2116 ……. 0,122mm
35mic.baker
Končna debelina plošče 1,6mm



PROJEKT: plošča s kovinsko sredico in izoliranimi izvrtinami

Id 113440 Kupčeva oznaka: Master V297 Cu core

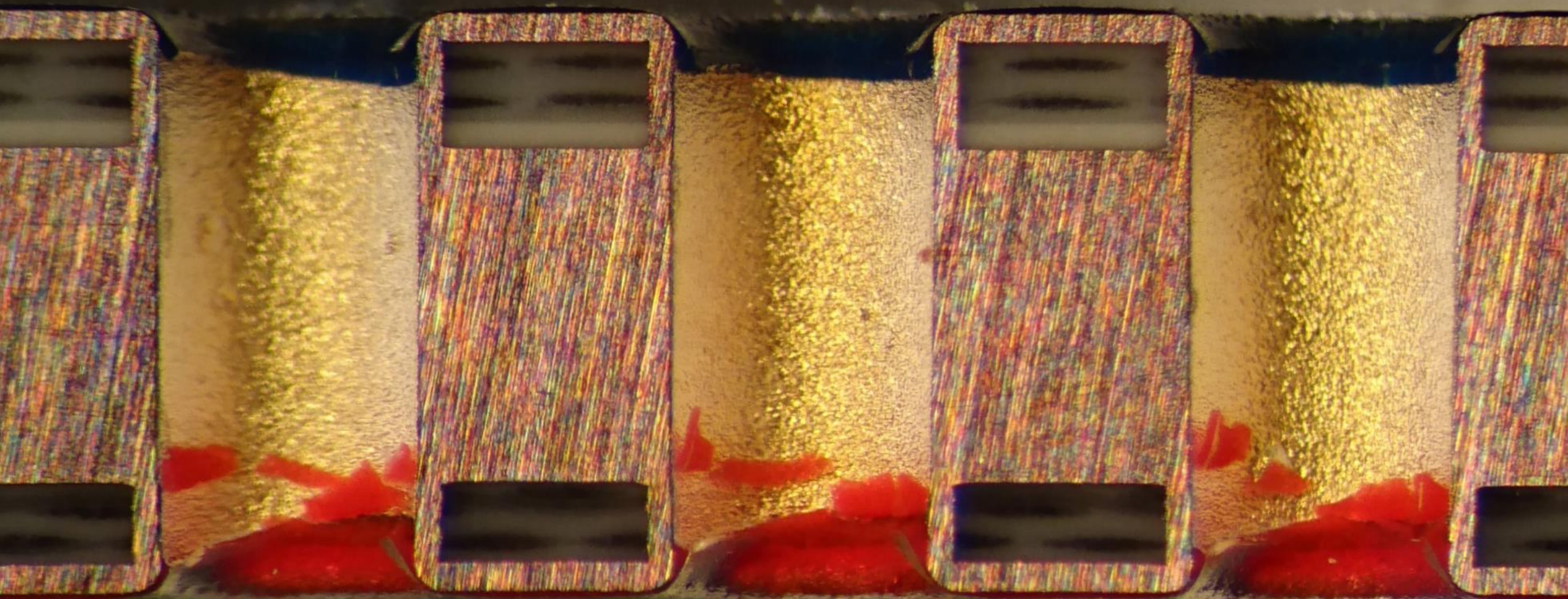
Izolirane izvrtine



PROJEKT: plošča s kovinsko sredico in izoliranimi izvrtinami

Termalne izvrtine

Id 113440 Kupčeva oznaka: Master V297 Cu core



PROJEKT: FLEX PI 25mic

Id 113826 Kupčeva oznaka: 614752 A19HP2

Polyimid: KREMPEL AKAFLEX 25mic
Štoplak: Tayo - flex – oranžen
Površinska zaščita: ENIG

Embedded feritno jedro

Feritno jedro

R 6.30 × 3.80 × 2.50 **B64290P0037**

■ Parylene coating

R 6.30 × 3.80 × 2.50 (mm)
R 0.248 × 0.150 × 0.098 (inch)

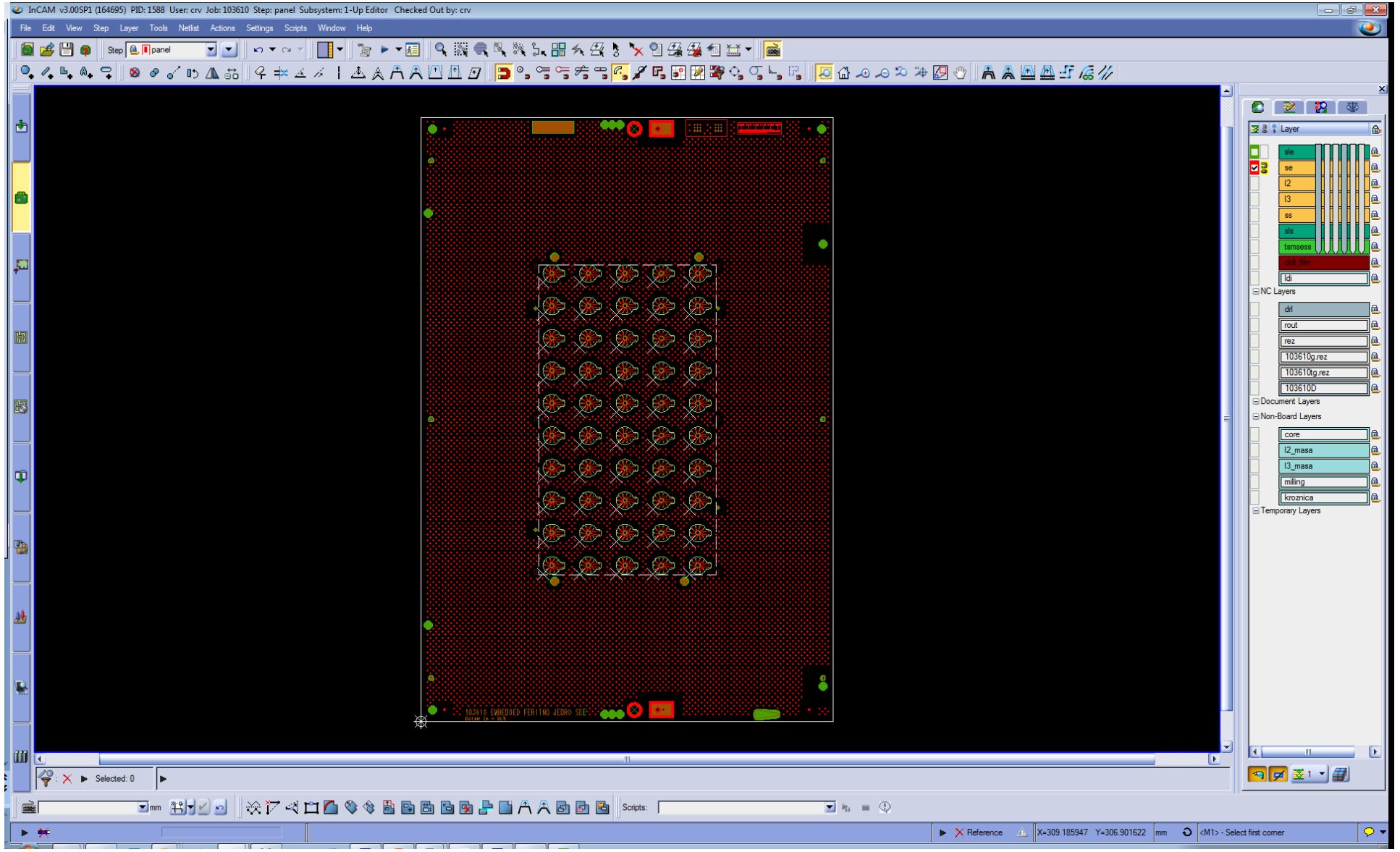
Dimensions

d_a (mm)	d_i (mm)	Height (mm)	d_a (inch)	d_i (inch)	Height (inch)	
6.30 ±0.15	3.80 ±0.12	2.50 ±0.12	0.248 ±0.006	0.150 ±0.005	0.098 ±0.005	uncoated[1)]
Coating thickness 0.017 mm						coated

Characteristics and ordering codes

Material	A_L value nH	μ_i (approx.)	Ordering code	Magnetic characteristics				Approx. weight g
				$\Sigma l/A$ mm^{-1}	l_e mm	A_e mm^2	V_e mm^3	
K1	20 ±25%	80	B64290P0037X001	4.97	15.21	3.06	46.5	0.2
N87	560 ±25%	2200	B64290P0037X087					
N30	1090 ±25%	4300	B64290P0037X830					
T65	1160 ±30%	4600	B64290P0037X065					
T38	2530 ±30%	10000	B64290P0037X038					
T46	3600 ±30%	14000	B64290P0037X046					

Testna matrika v delovnem formatu



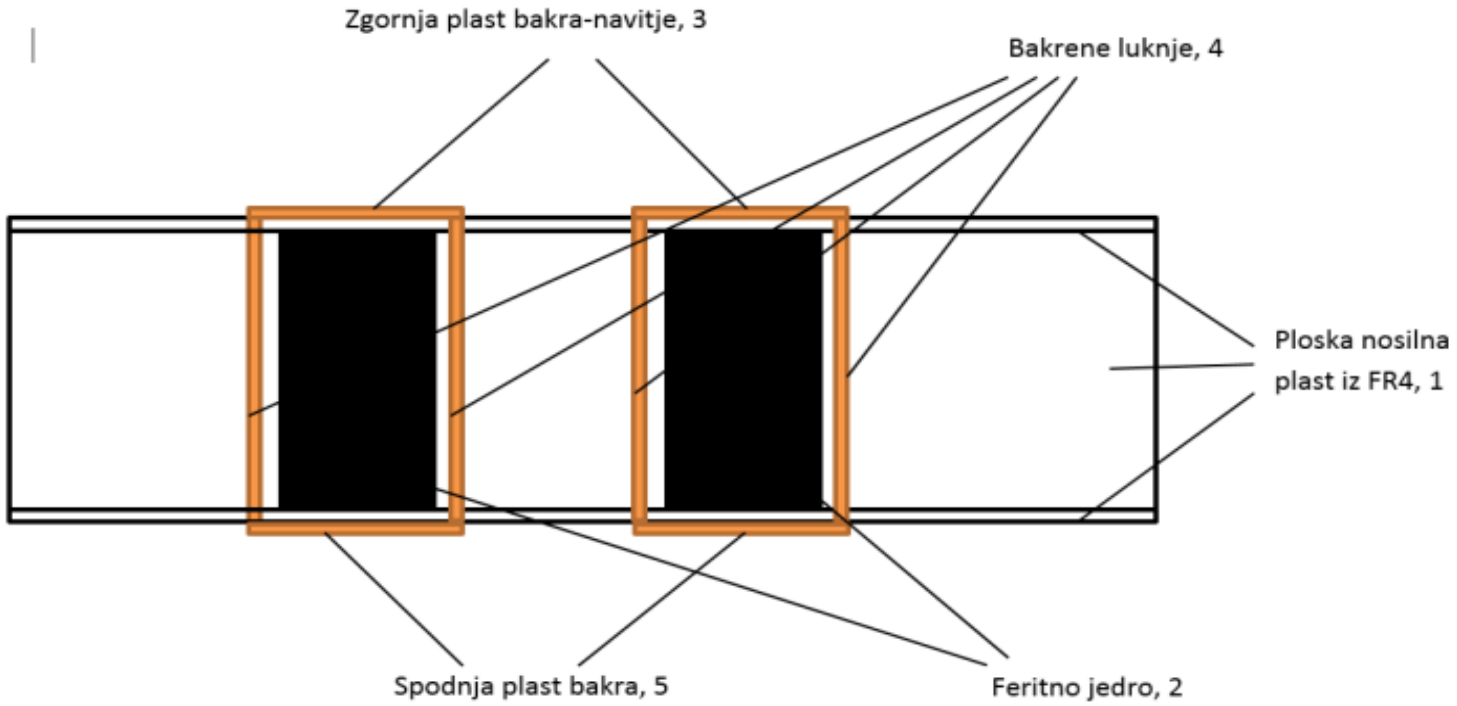
Štiri vrste preprega

Zaporedna Št.	Material	Odstotek epoksi smole
1	Tkanina 106	75
2	Tkanina 1080	64
3	Tkanina 2116	54
4	Tkanina 7628	47

Vložek za stiskanje

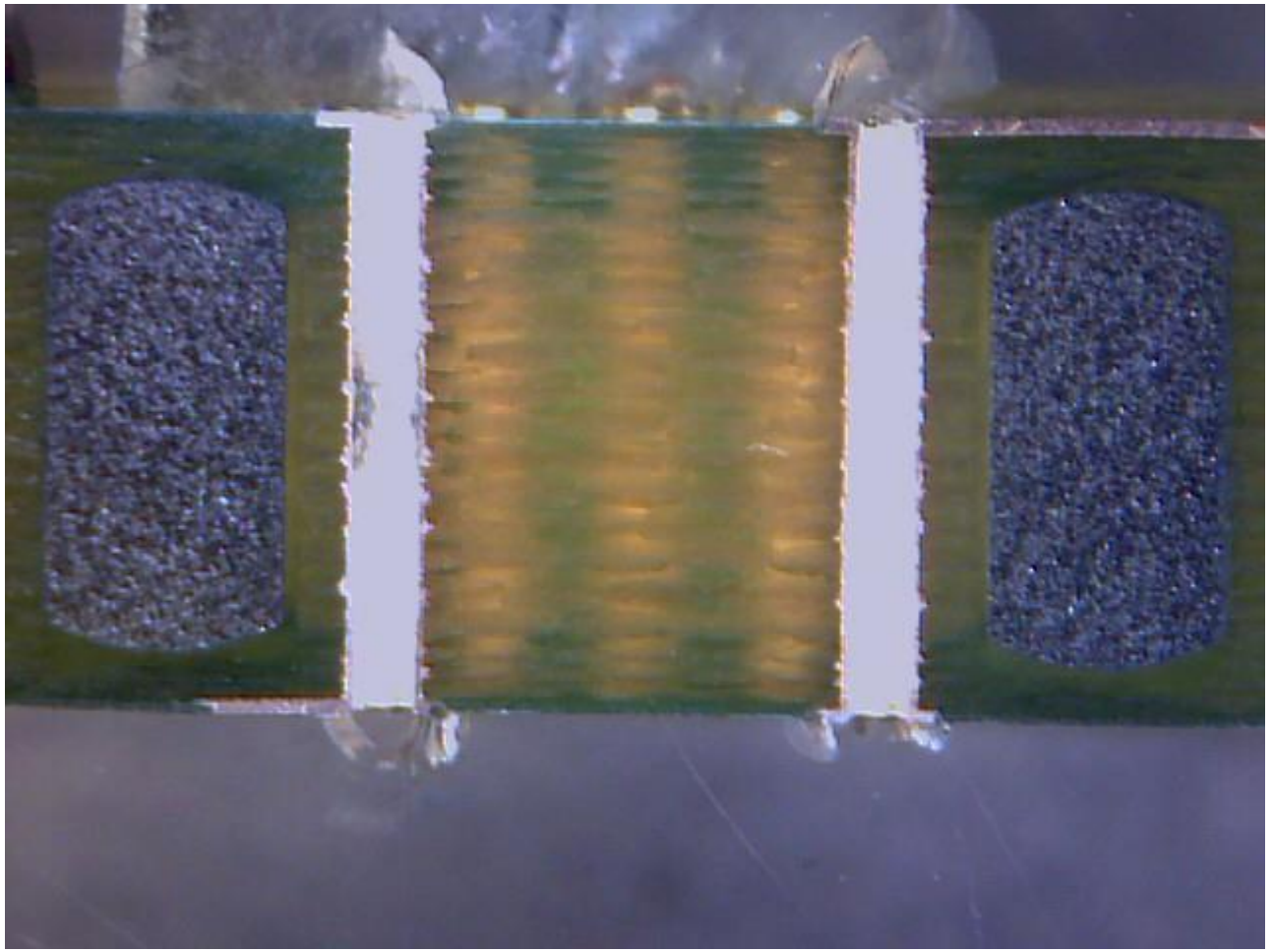
Stiskalnica

Shematični prikaz prereza magnetne komponente

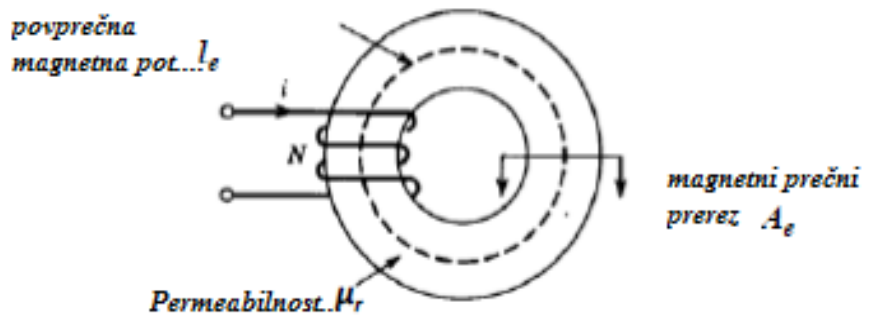


Embedded magnetna komponenta

Mikrosekcija embedded magnetne komponente

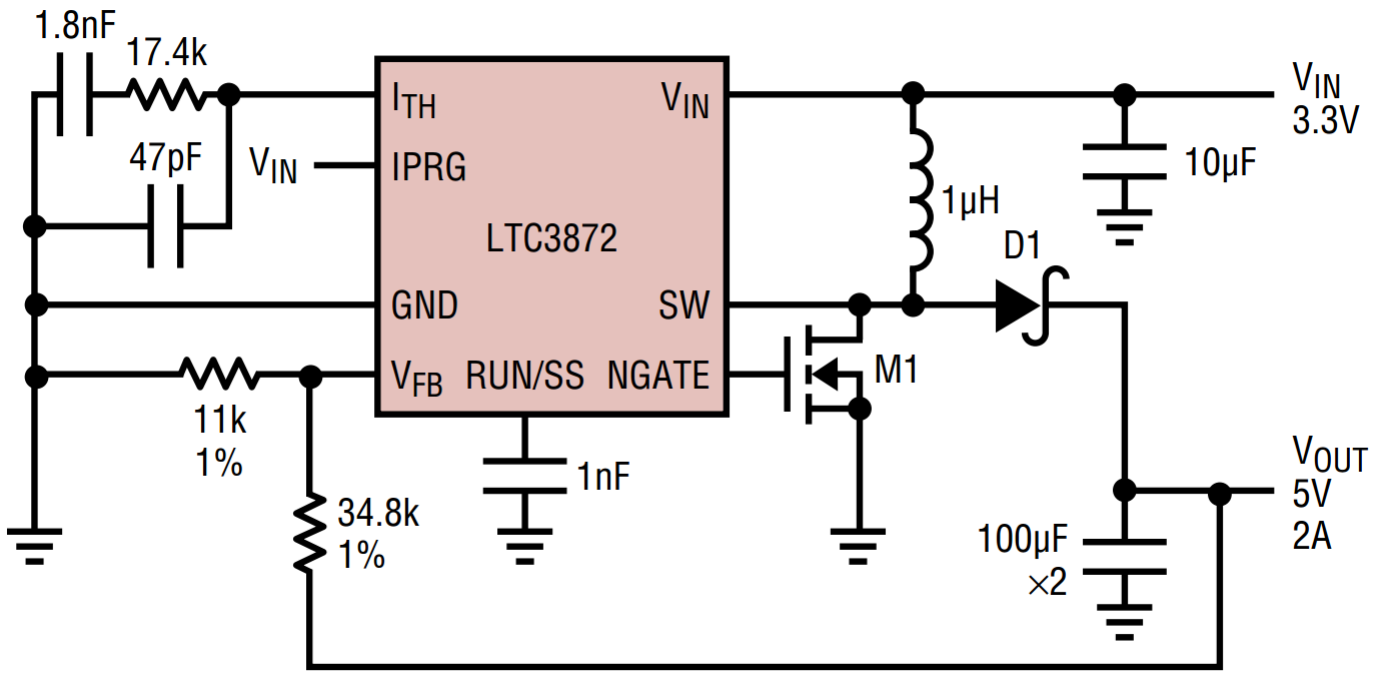


Izračun induktivnosti



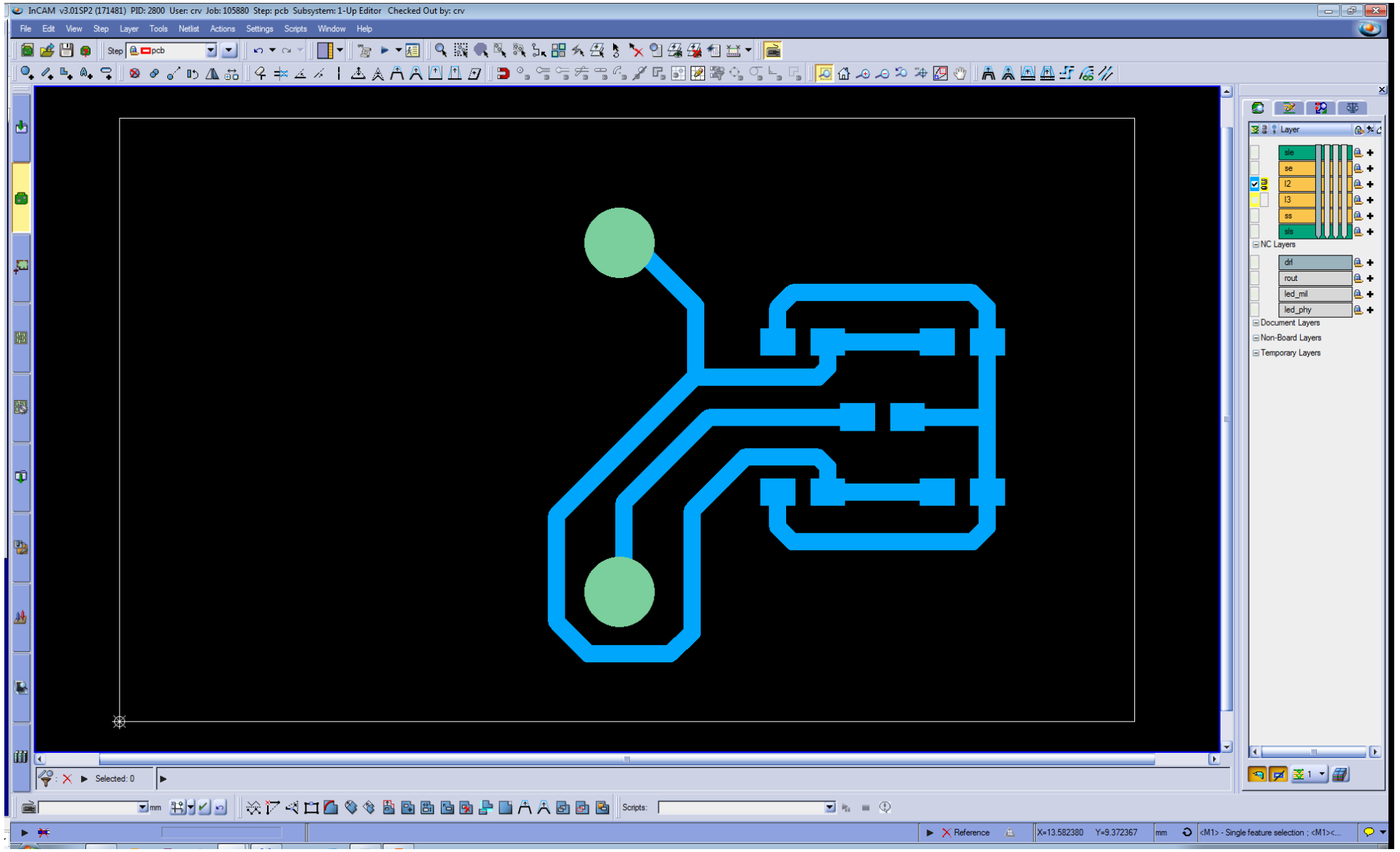
$$L = \mu_0 \mu_r N^2 \frac{A_e}{l_e}$$

Shema preklopnega DC/DC pretvornika

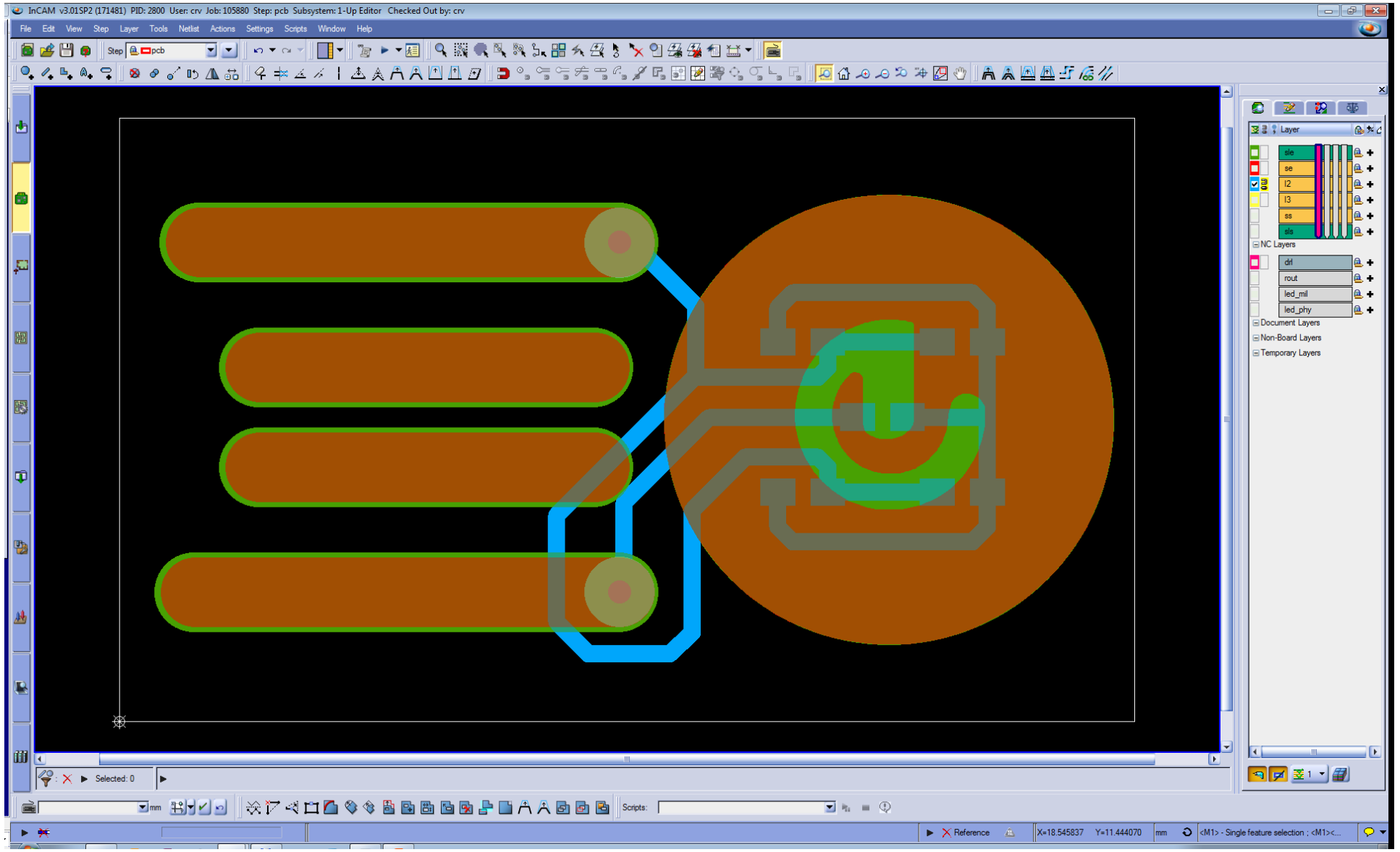


Embedded LED USB

Embedded LED USB



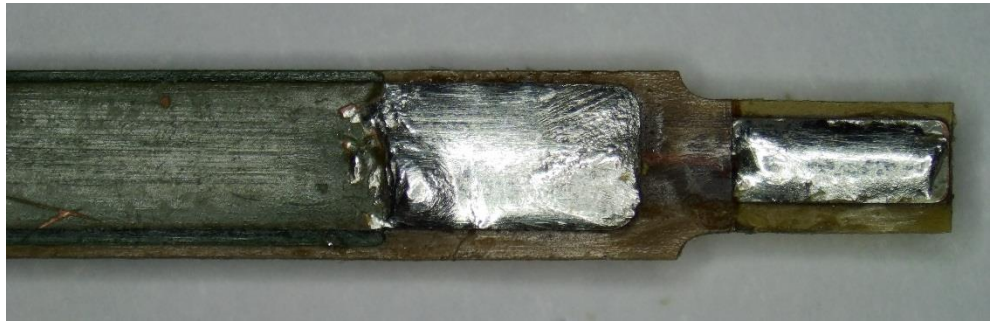
Embedded LED USB



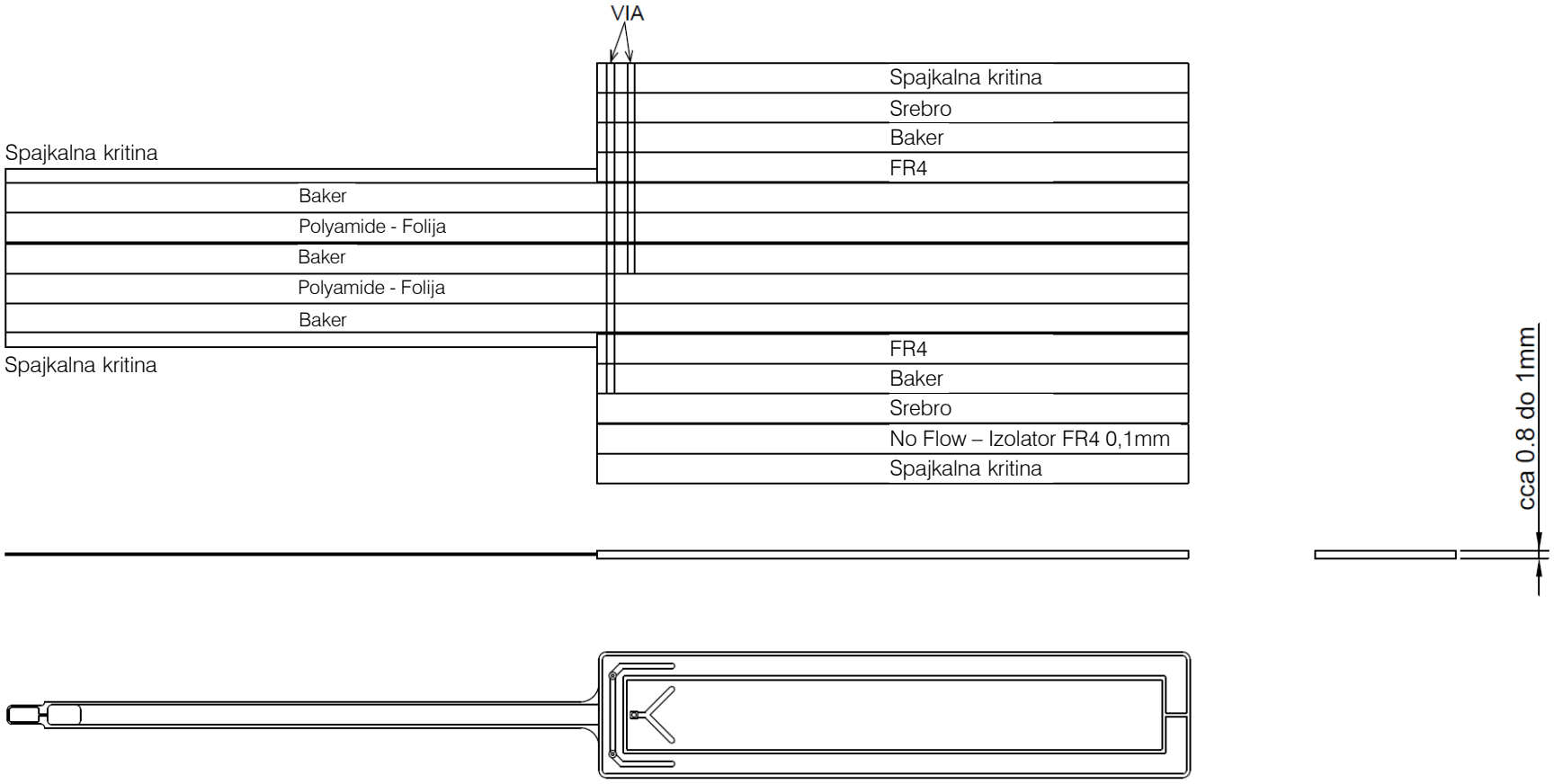
Embedded LED USB

Nova generacija kapacitivnega senzorja

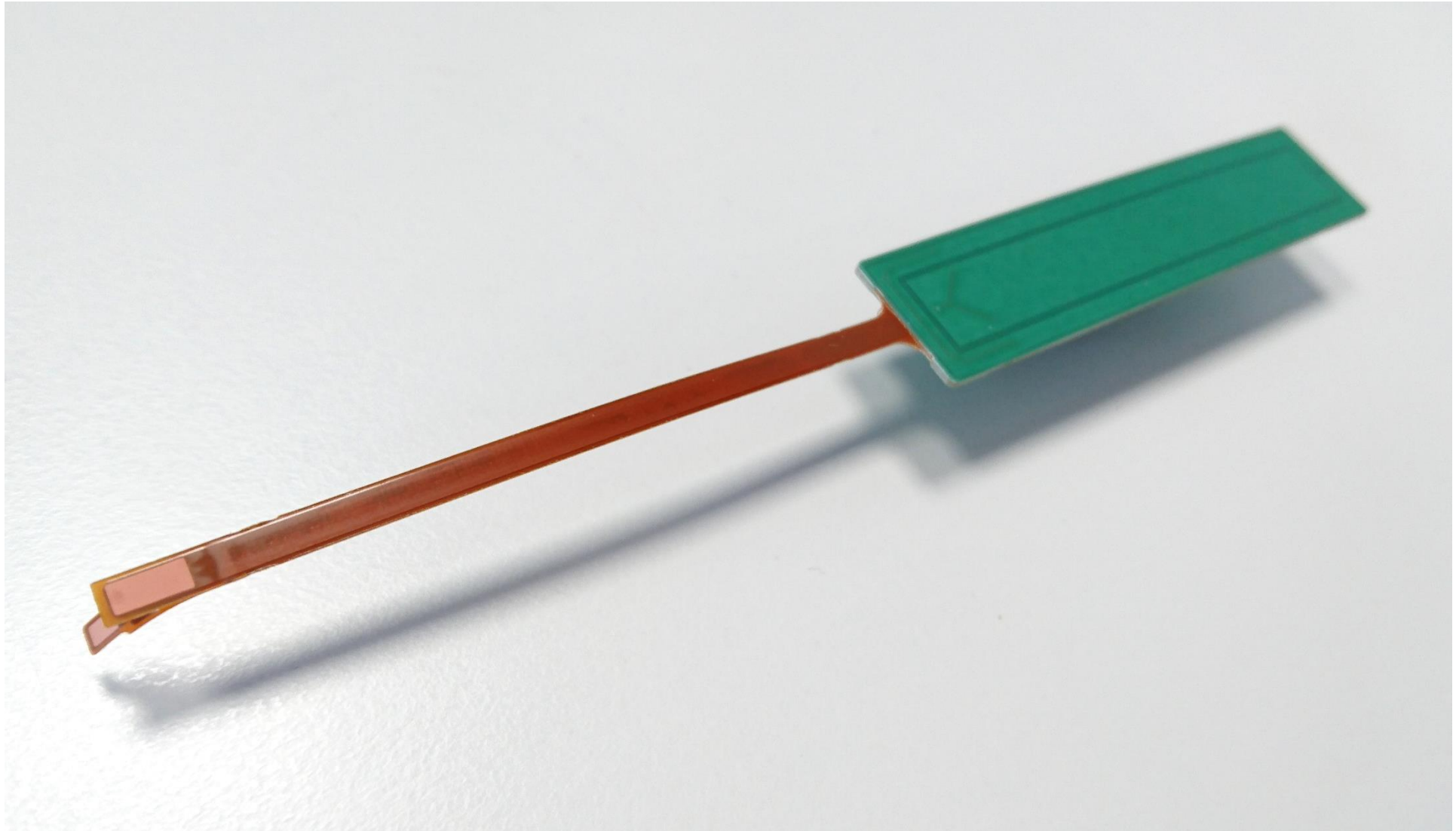
Naročnikov funkcionalen prototip



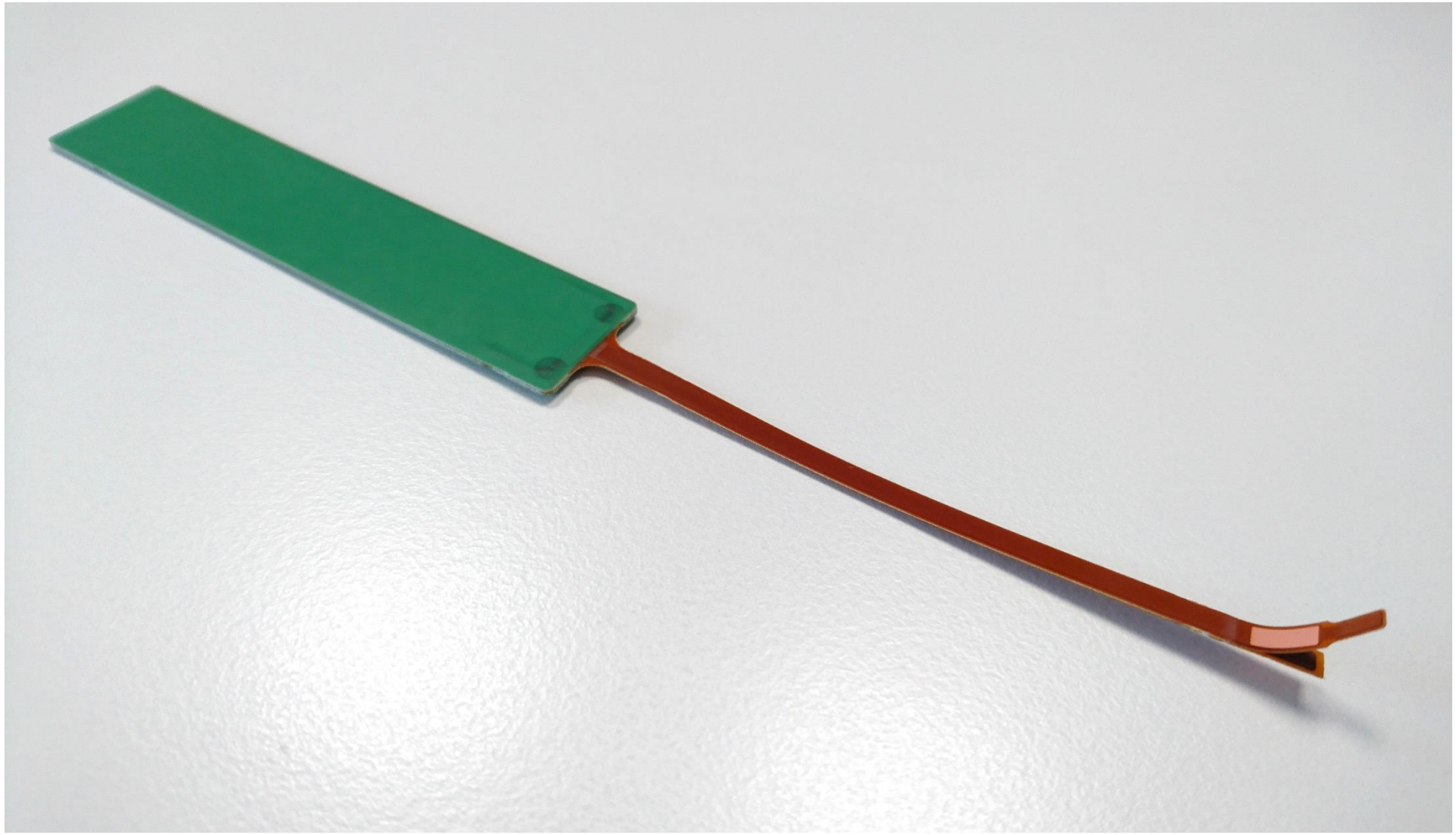
Struktura PTIV – Novi Senzor

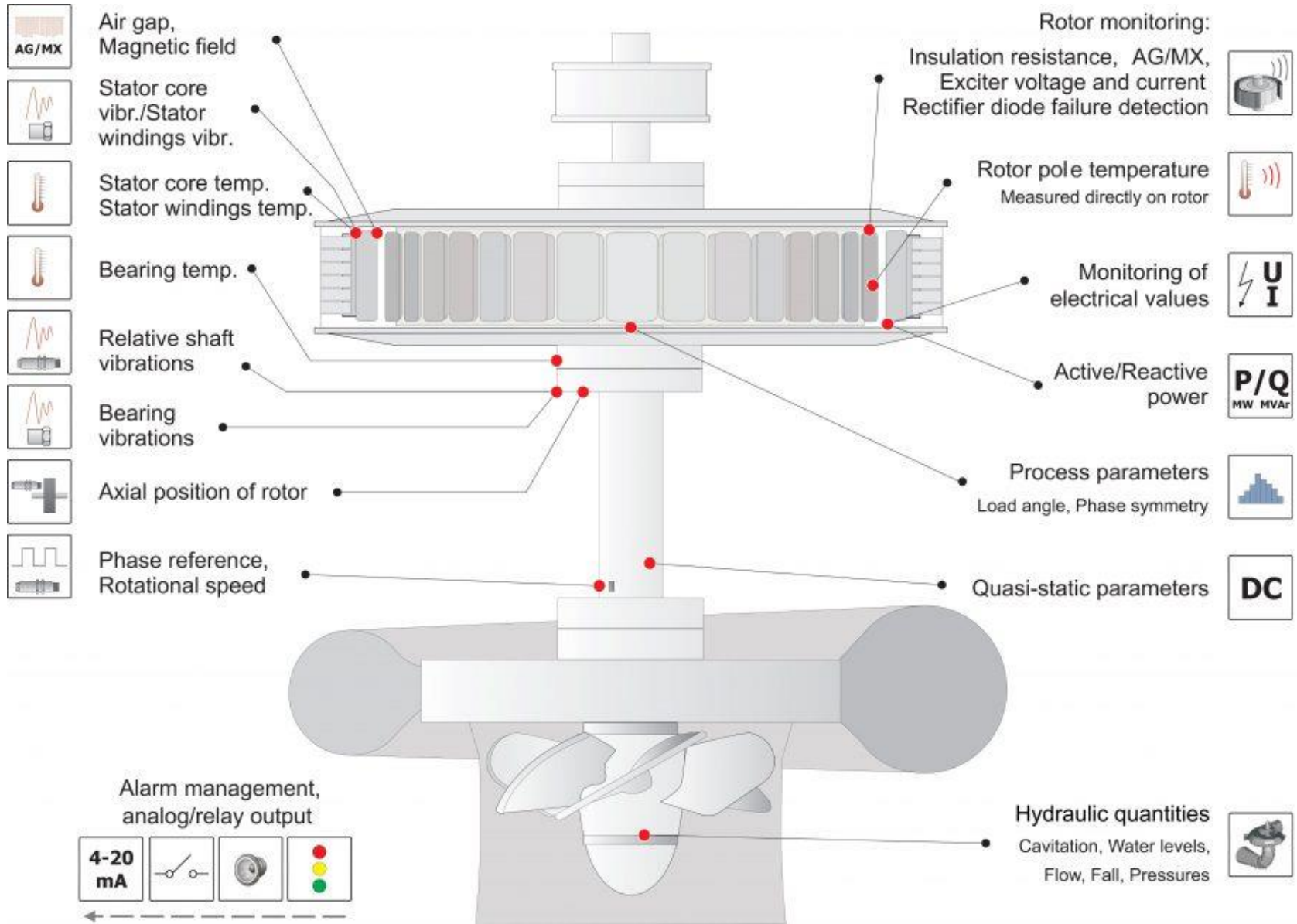


V Intectiv izdelana plošča tiskanega vezja – Kapacitivni senzor



V Intectiv izdelana plošča tiskanega vezja – Kapacitivni senzor




AG/MX
Air gap,
Magnetic field
Stator core
vibr./Stator
windings vibr.
Stator core temp.
Stator windings temp.
Bearing temp.
Relative shaft
vibrations
Bearing
vibrations
Axial position of rotor
Phase reference,
Rotational speed
Rotor monitoring:
Insulation resistance, AG/MX,
Exciter voltage and current
Rectifier diode failure detection
Rotor pole temperature
Measured directly on rotor
Monitoring of
electrical values
U
I
Active/Reactive
power
P/Q
MW MVAr
Process parameters
Load angle, Phase symmetry
Quasi-static parameters
DC
Hydraulic quantities
Cavitation, Water levels,
Flow, Fall, Pressures
Alarm management,
analog/relay output
4-20
mA