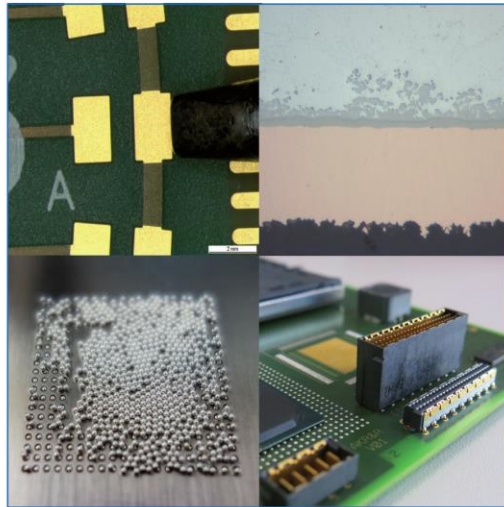


Leitfaden

Rework elektronischer Baugruppen

Qualifizierbare Prozesse für die Nacharbeit



Zentralverband Elektrotechnik- und Elektronikindustrie

Ergebnisse Reworkversuche

Teilnehmer:

Cassidian

H. Thomas Lauer

Zollner Elektronik AG

H. Groitl Christian (Rework)

H. Michael Zimmerer (Doku)

H. Stefan Penzenstadler (Rework)

Rohde und Schwarz

H. Cyrus (Rework QFN)

Arbeitsablauf

- Für FCI und ERNI Stecker aktuell keine Düsen

Bauteil xx/ auf Board Seriennummer

- 1. X-Ray Status Poren/ Voiding Overview im Initialzustand**
- 2. Durchführung des Rework Zevac Onyx29 mit Profilen**
- 3. Baustein abnehmen (Foto nach Abnahme), Focus auf verlorene Pads**
- 4. Restlotentfernung (automatisch, manuell geübt, manuell ungeübt)
exemplarisches Video jedes Arbeitsganges 1x je Bauteil**
- 5. Flussmittel applizieren – Bauteil auflöten- X-Ray Reworkzustand
Focus auf Voiding**

Variationen

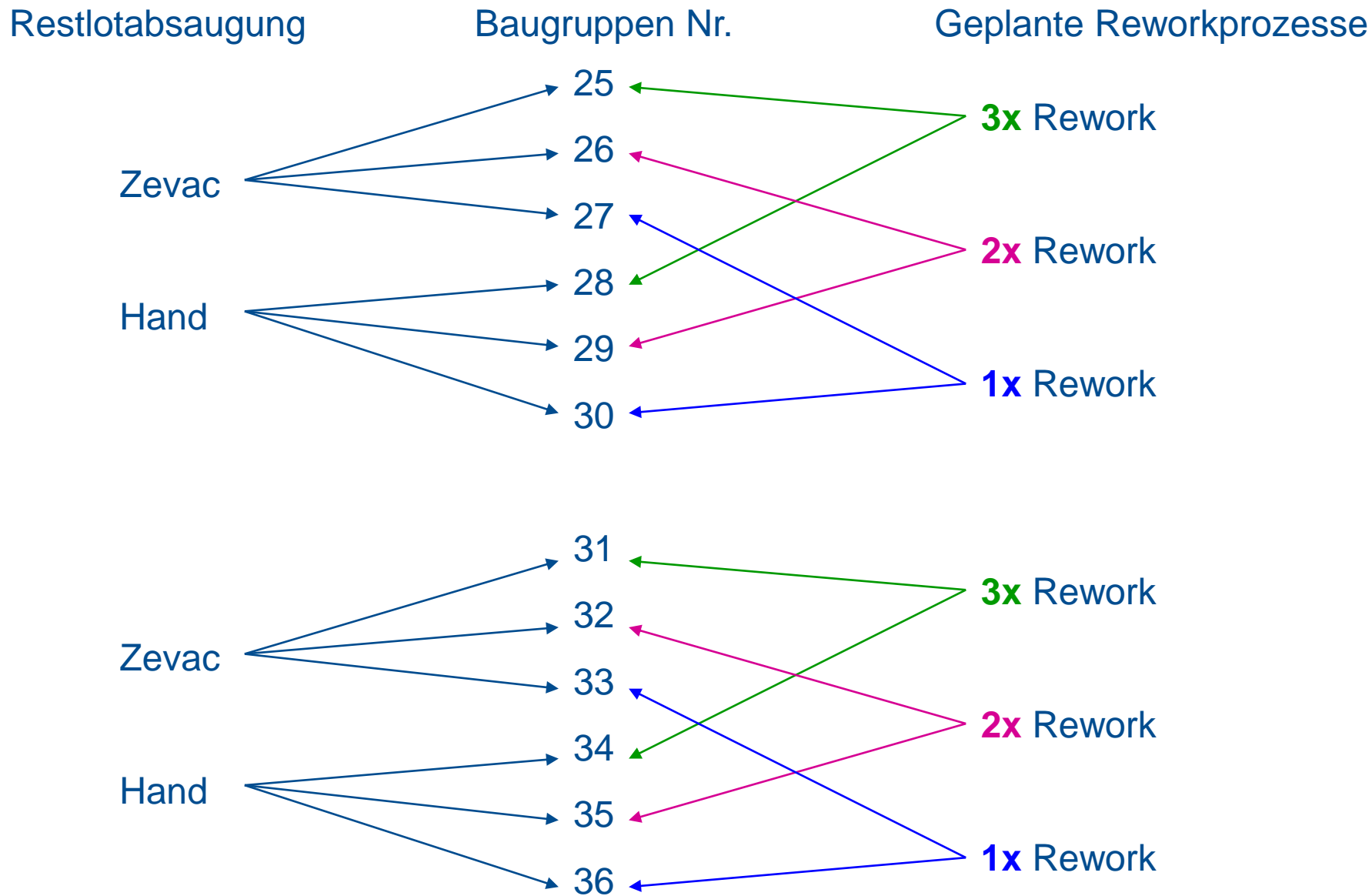
Zum Entlöten wird Flussmittel verwendet

- Thermischer Ausgleich
- Restlotdepot ist bei größeren Pitches nutzbar





































- Plugging Varianten beachten
- Rückstellmuster zur Variationsbeurteilung zurückhalten

Rework:













- 1. Baustein BGA 256 Daisy Chain Messung**
- 2. 3x Rework mit neuen Baustein**
- 3. später Reballing**



BGA256			CONN_FCI_743 90		
ZAL R-PBGA-N176 (mit Massefläche)			CONN_ERNI_1 14713		
ZAL R-PBGA-N176 (ohne Massefläche)			PN S-PQFP- G80		
PZP-S-PQFP-G100			RCE S-PQFP- G64		
PZ-S-PQFP-G100			TAC		
BGA Socket			BEAD PROBES		

Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	DC	X-Ray 1	Rework 2 (Absaugung)	DC	X-Ray 2	Rework 3 (Absaugung)	DC	X-Ray 3
25	Zevac - Rework		ja (Zevac)	ok		ja (Zevac)	ok		ja (Zevac)	ok	
26			ja (Zevac)	ok		ja (Zevac)	ok				
27			ja (Zevac)	ok							
28			ja (Hand)	ok		ja (Hand)	ok		ja (Hand)	ok	
29			ja (Hand)	ok		ja (Hand)	ok				
30			ja (Hand)	ok							
31			ja (Zevac)	ok		ja (Zevac)	ok		ja (Zevac)	ok	
32			ja (Zevac)	ok		ja (Zevac)	ok				
33			ja (Zevac)	ok							
34			ja (Hand)	ok		ja (Hand)	ok		ja (Hand)	ok	
35			ja (Hand)	ok		ja (Hand)	ok				
36			ja (Hand)	ok							



Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	Methode	X-Ray 1
25	Zevac - Rework		ja (Zevac)	mit Flussmittel	
26			ja (Zevac)	mit Flussmittel	
27			ja (Zevac)	mit Dip-Paste	
28			ja (Hand)	mit Flussmittel	
29			ja (Hand)	mit Dip-Paste	
30			ja (Hand)	mit Dip-Paste	



Versuchsplan ZAL R-PBGA-N176 (mit Massefläche)





































Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Zevac - Rework		ja (Zevac)		ja (Zevac)		ja (Zevac)	
26			ja (Zevac)		ja (Zevac)			
27			ja (Zevac)					
28			ja (Hand)		ja (Hand)		ja (Hand)	
29			ja (Hand)		ja (Hand)			
30			ja (Hand)					
31			ja (Zevac)		ja (Zevac)		ja (Zevac)	
32			ja (Zevac)		ja (Zevac)			
33			ja (Zevac)					
34			abgelötet					
35			abgelötet					
36			abgelötet					







































Versuchsplan ZAL R-PBGA-N176 (ohne Massefläche)

Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Zevac - Rework		ja (Zevac)		ja (Zevac)		ja (Zevac)	
26			ja (Zevac)		ja (Zevac)			
27			ja (Zevac)					
28			ja (Hand)		ja (Hand)		ja (Hand)	
29			ja (Hand)		ja (Hand)			
30			ja (Hand)					
31			ja (Zevac)		ja (Zevac)		ja (Zevac)	
32			ja (Zevac)		ja (Zevac)			
33			ja (Zevac)					
34			abgelötet					
35			abgelötet					
36			abgelötet					























Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Hand – Rework		ja (Hand)		ja (Hand)		ja (Hand)	
26			ja (Hand)		ja (Hand)			
27			ja (Hand)					
28			ja (Hand)		ja (Hand)		ja (Hand)	
29			ja (Hand)		ja (Hand)			
30			ja (Hand)					
31			ja (Hand)		ja (Hand)		ja (Hand)	
32			ja (Hand)		ja (Hand)			
33			ja (Hand)					
34			ja (Hand)		ja (Hand)		ja (Hand)	
35			ja (Hand)		ja (Hand)			
36			ja (Hand)					















Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Hand – Rework		ja (Hand)		ja (Hand)		ja (Hand)	
26			ja (Hand)		ja (Hand)			
27			ja (Hand)					
28			ja (Hand)		ja (Hand)		ja (Hand)	
29			ja (Hand)		ja (Hand)			
30			ja (Hand)					
31			ja (Hand)		ja (Hand)		ja (Hand)	
32			ja (Hand)		ja (Hand)			
33			ja (Hand)					
34			ja (Hand)		ja (Hand)		ja (Hand)	
35			ja (Hand)		ja (Hand)			
36			ja (Hand)					



Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Zevac – Rework		ja (Zevac)		ja (Zevac)		ja (Zevac)	
26			ja (Zevac)		ja (Zevac)			
27			ja (Zevac)					
28			ja (Hand)		ja (Zevac)		ja (Hand)	
29			ja (Hand)		ja (Zevac)			
30			ja (Hand)					
31			ja (Zevac)		ja (Zevac)		ja (Zevac)	
32			ja (Zevac)		ja (Zevac)			
33			ja (Zevac)					
34			ja (Hand)		ja (Zevac)		ja (Hand)	
35			ja (Hand)		ja (Zevac)			
36			ja (Hand)					





















Test-board	Ver-fahren	Rework 1 (Absaugung)	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Zevac – Rework	keine (Restlot)		keine (Restlot)		keine (Restlot)	
26		keine (Restlot)		keine (Restlot)			
27		keine (Restlot)					
28		keine (Restlot)		keine (Restlot)		keine (Restlot)	
29		keine (Restlot)		keine (Restlot)			
30		keine (Restlot)					
31		keine (Restlot)		keine (Restlot)		keine (Restlot)	
32		keine (Restlot)		keine (Restlot)			
33		keine (Restlot)					
34		keine (Restlot)		keine (Restlot)		keine (Restlot)	
35		keine (Restlot)		keine (Restlot)			
36		keine (Restlot)					



Test-board	Ver-fahren	Rework 1 (Absaugung)	Optisch	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Ablöten Zevac –	ja (Zevac)						
26		ja (Zevac)						
27		ja (Zevac)						
28	Rework Hand –	ja (Hand)			ja (Hand)		ja (Hand)	
29		ja (Hand)			ja (Hand)			
30		ja (Hand)						
31	Ablöten Zevac –	ja (Zevac)						
32		ja (Zevac)						
33		ja (Zevac)						
34	Rework Hand –	ja (Hand)			ja (Hand)		ja (Hand)	
35		ja (Hand)			ja (Hand)			
36		ja (Hand)						



Test-board	Ver-fahren	X-Ray	Rework 1 (Absaugung)	Optisch	X-Ray 1	Rework 2 (Absaugung)	X-Ray 2	Rework 3 (Absaugung)	X-Ray 3
25	Ablöten Zevac –		ja (Zevac)						
26			ja (Zevac)						
27			ja (Zevac)						
28	Rework Hand –		ja (Hand)			ja (Hand)		ja (Hand)	
29			ja (Hand)			ja (Hand)			
30			ja (Hand)						
31	Ablöten Zevac –		ja (Zevac)						
32			ja (Zevac)						
33			ja (Zevac)						
34	Rework Hand –		ja (Hand)			ja (Hand)		ja (Hand)	
35			ja (Hand)			ja (Hand)			
36			ja (Hand)						



Test-board	Ver-fahren	Leiterbahn-breite	Rework-zyklen	optische Inspektion
34	Hand – Rework	0,1	1	
		0,1	2	
		0,1	3	
		0,15	1	
		0,15	2	
		0,15	3	
		0,2	1	
		0,2	2	
		0,2	3	
		0,254	1	
		0,254	2	
		0,254	3	
		0,3	1	
		0,3	2	
		0,3	3	



Versuchsplan BEAD PROBES

Test-board	Ver-fahren	Leiterbahn-breite	Temp. Belastungen	optische Inspektion
34	Hand – Rework	0,1	1	i
		0,1	2	
		0,1	3	
		0,15	1	i
		0,15	2	
		0,15	3	
		0,2	1	i
		0,2	2	
		0,2	3	
		0,254	1	i
		0,254	2	
		0,254	3	
		0,3	1	i
		0,3	2	
		0,3	3	

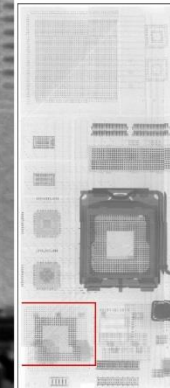
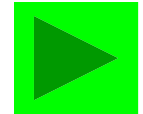
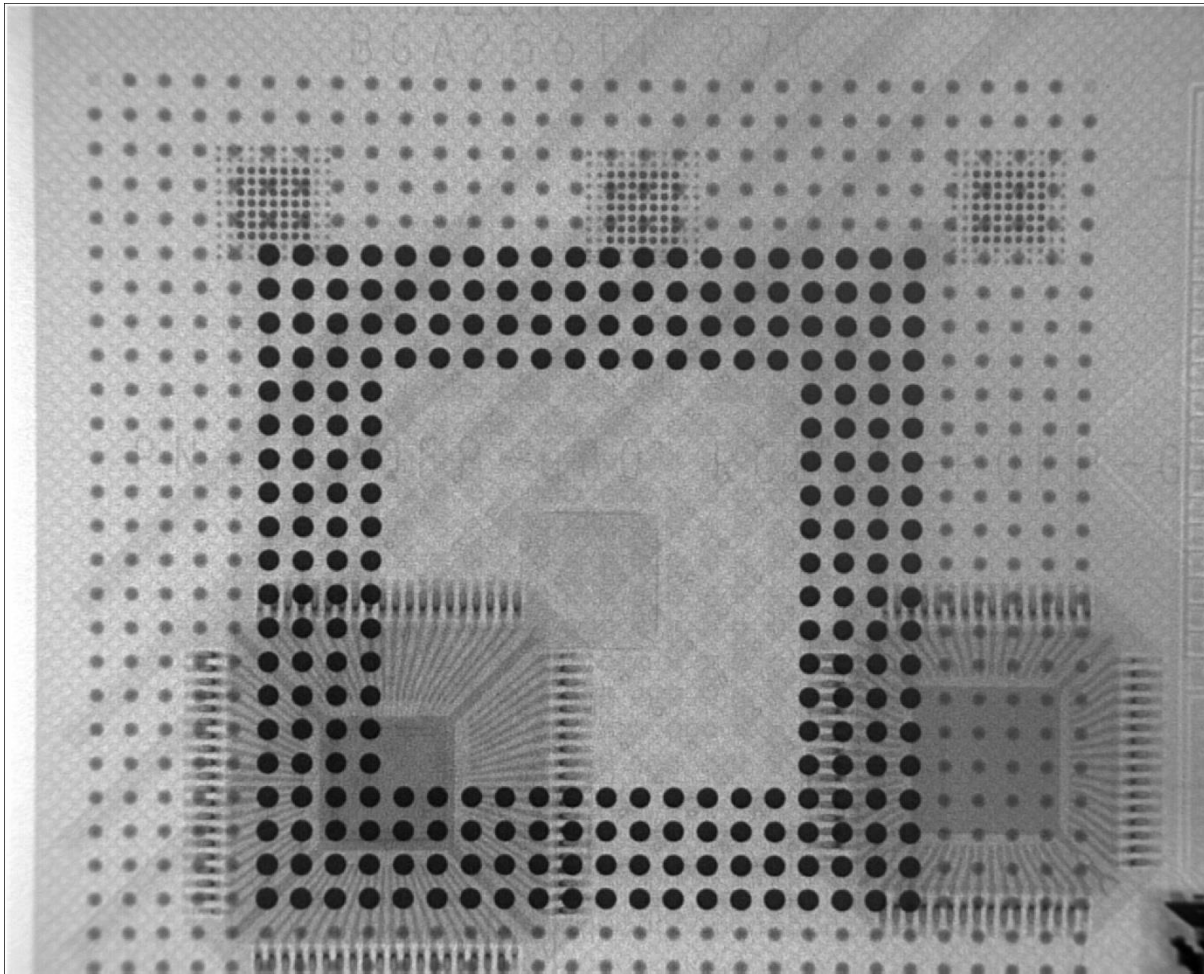
BEAD PROBES

0.1mm
0.15mm
0.2mm
0.254mm

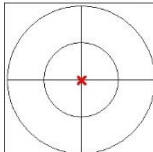


Baugruppe

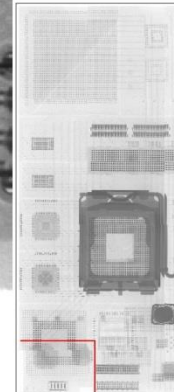
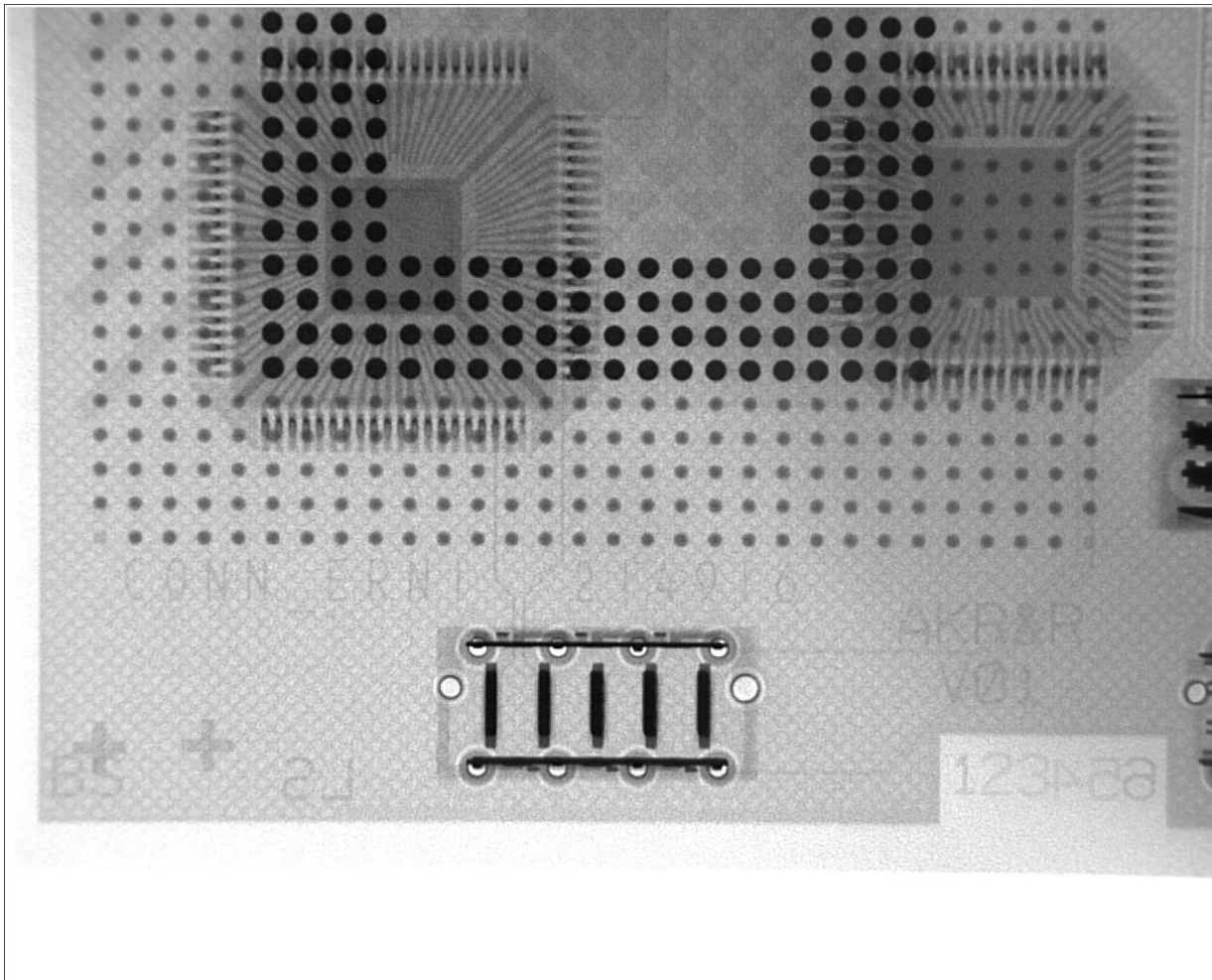
R+R 25 / Z



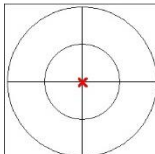
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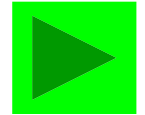
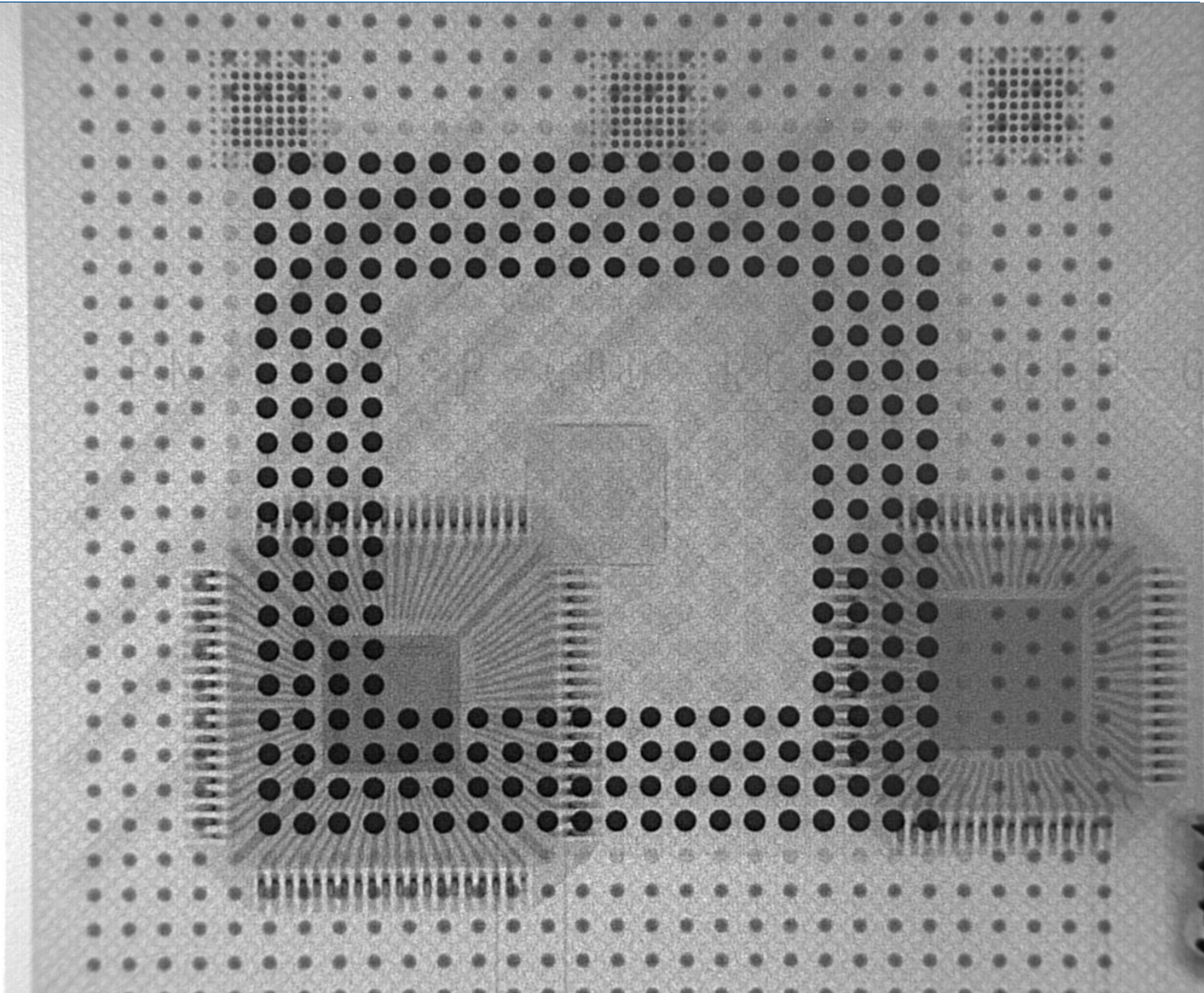
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Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

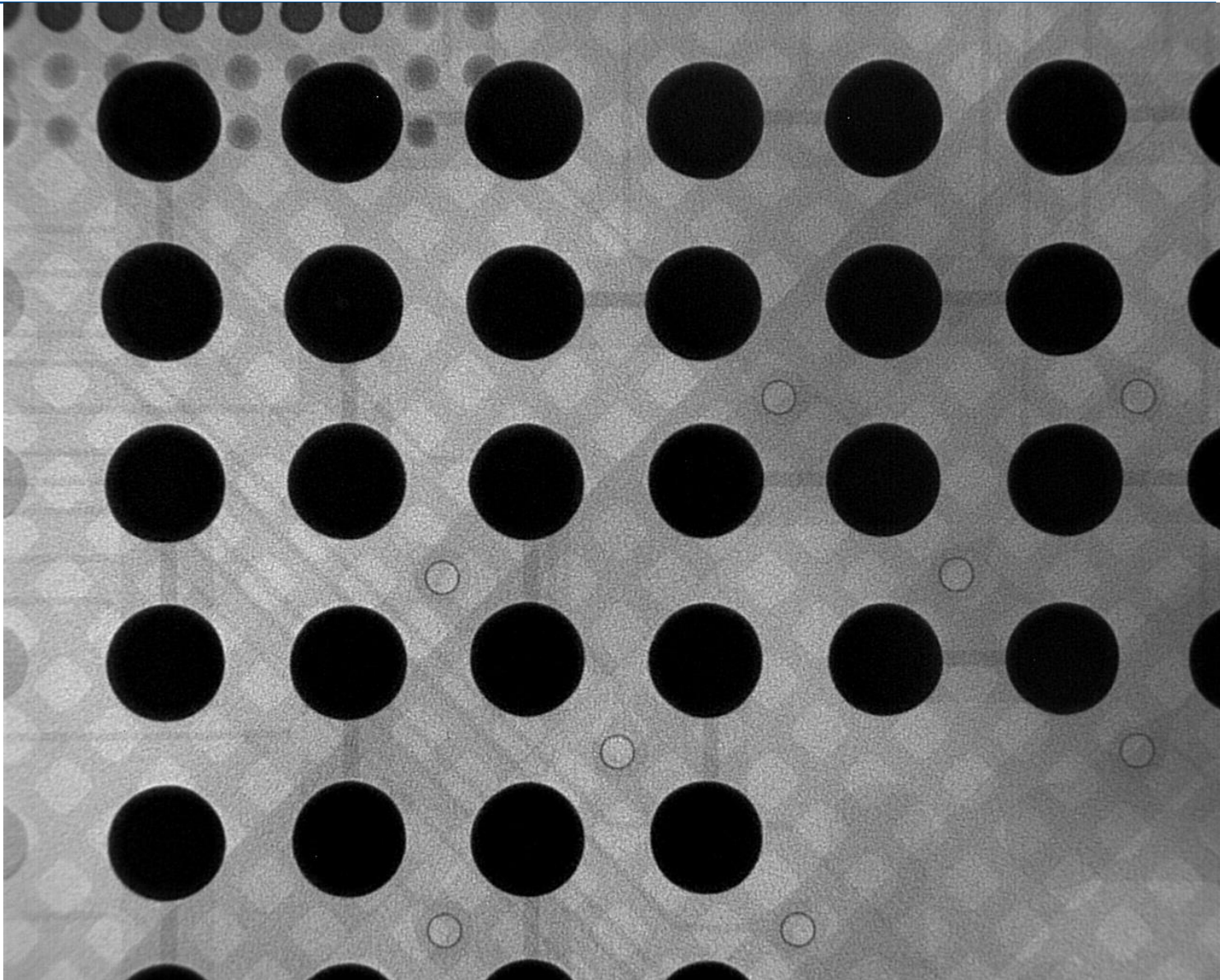


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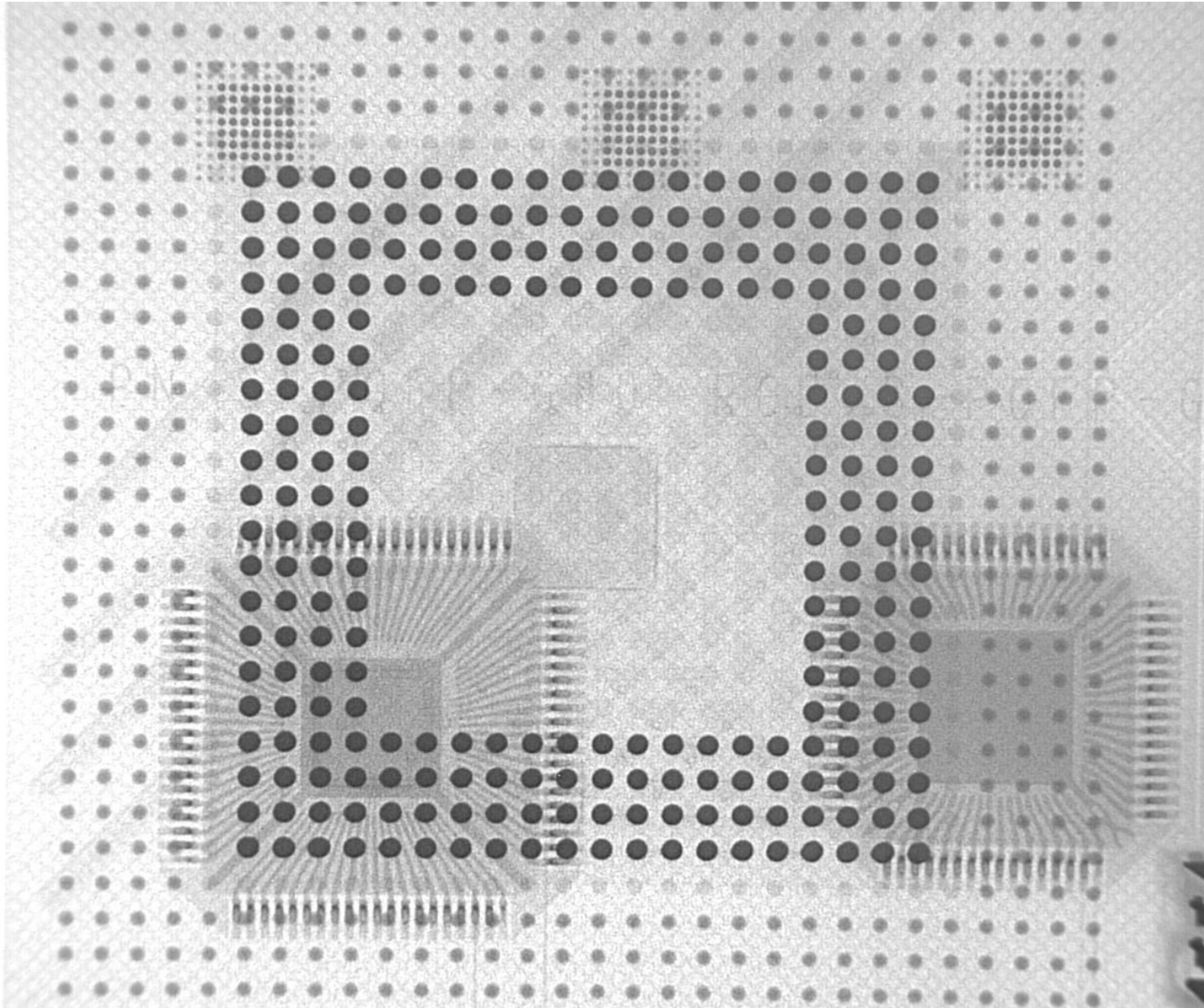


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Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

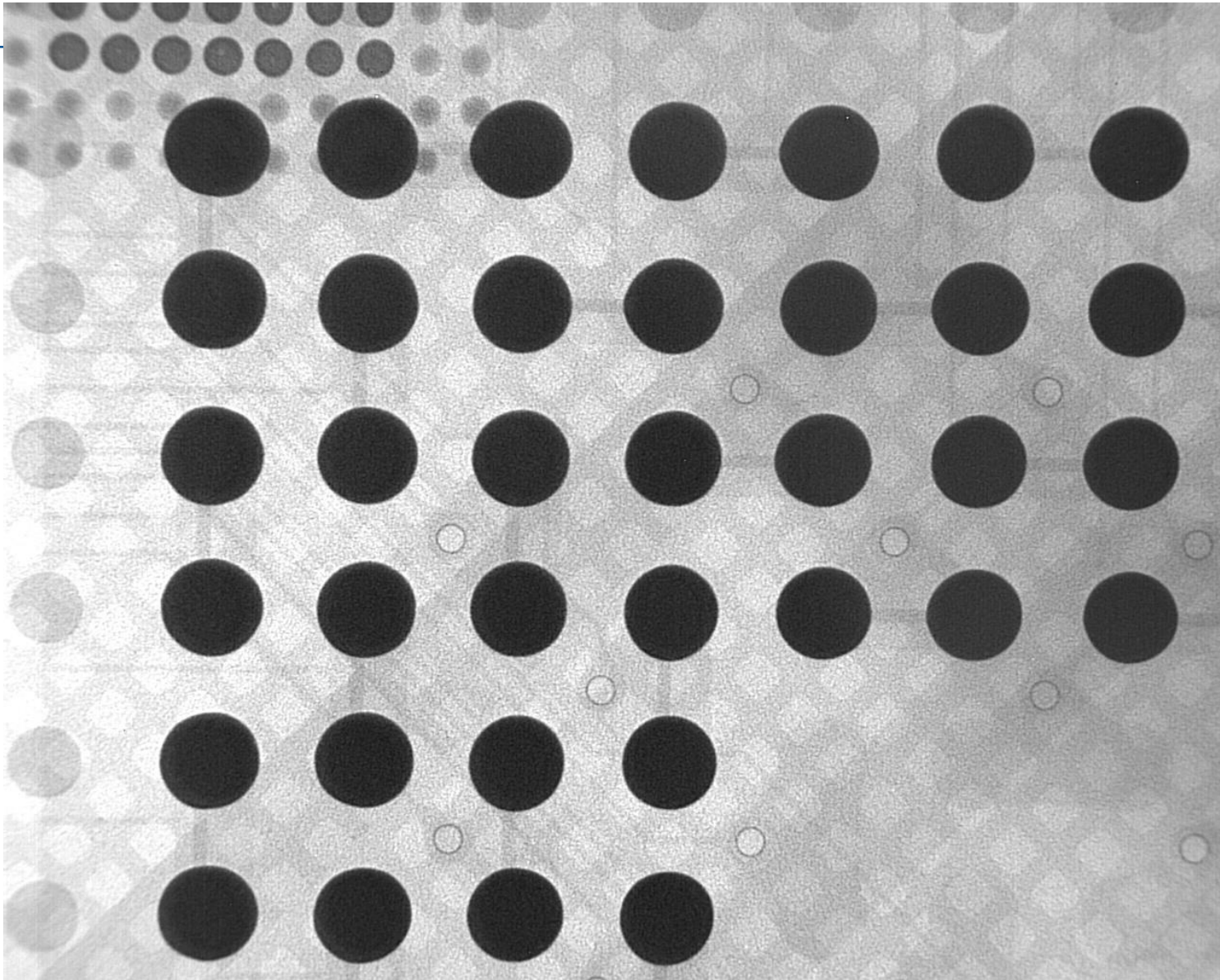




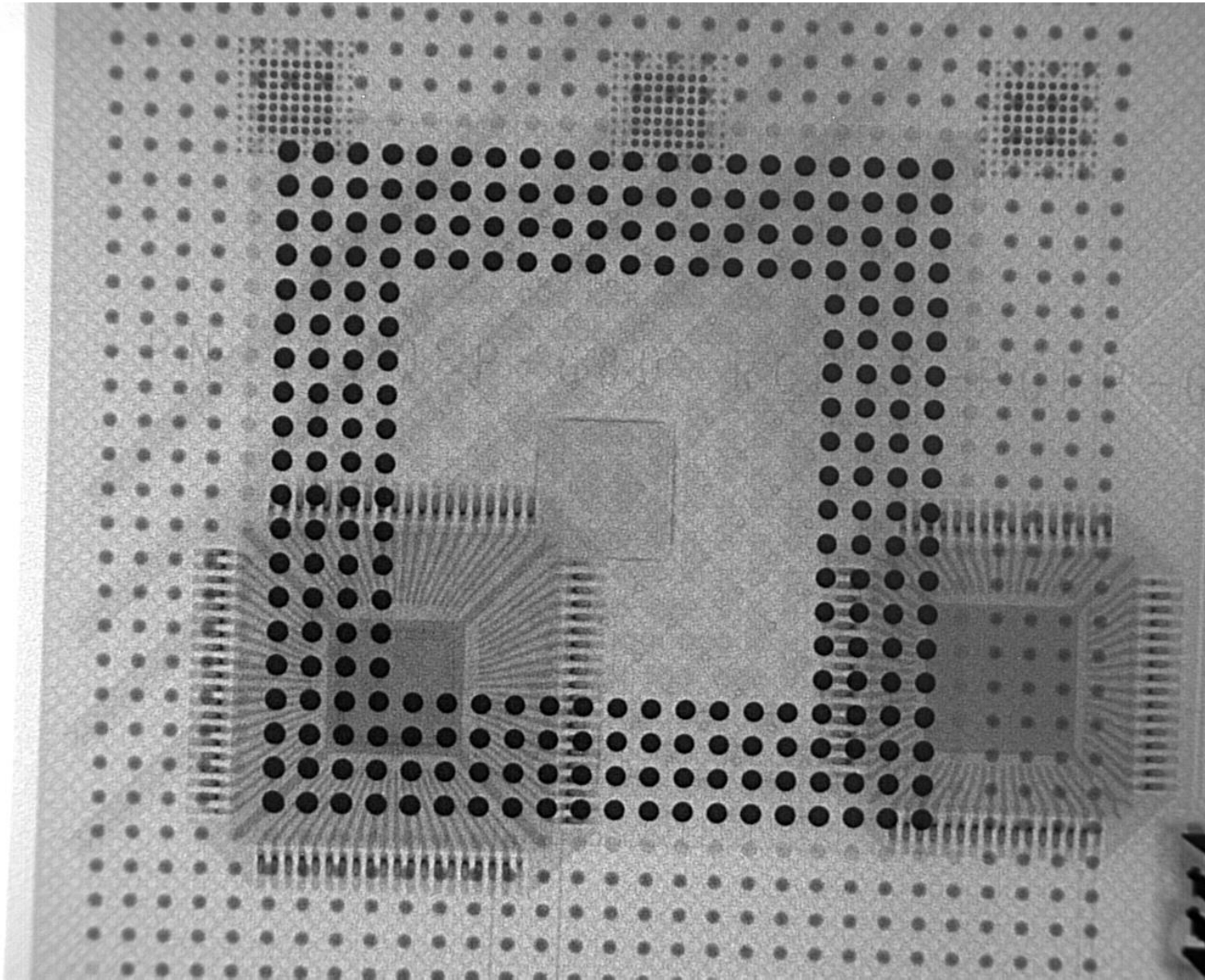
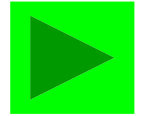
R+R 25 / Z – X-Ray nach Rework 2 – BGA 256



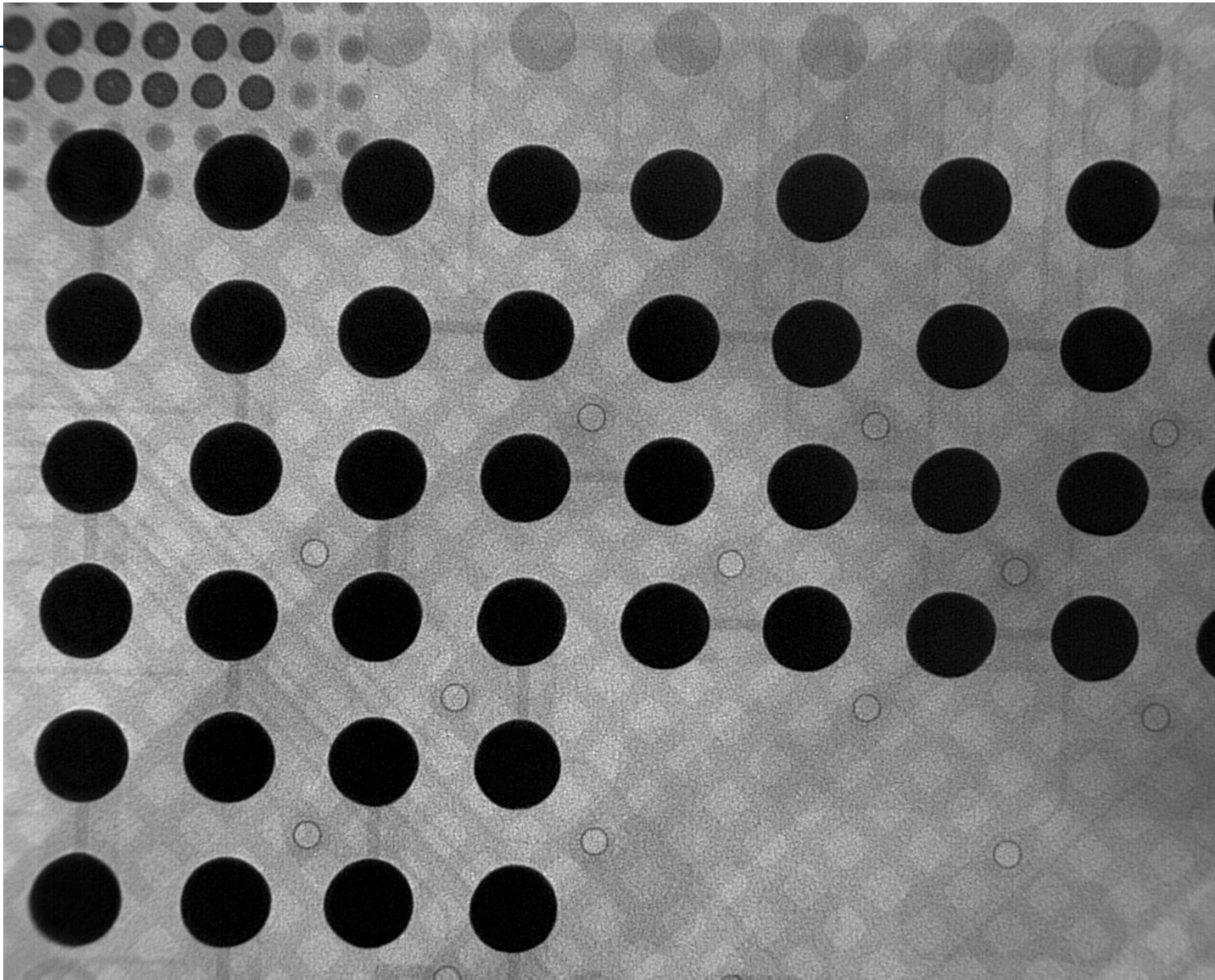
R+R 25 / Z – X-Ray nach Rework 2 / Detail – BGA 256



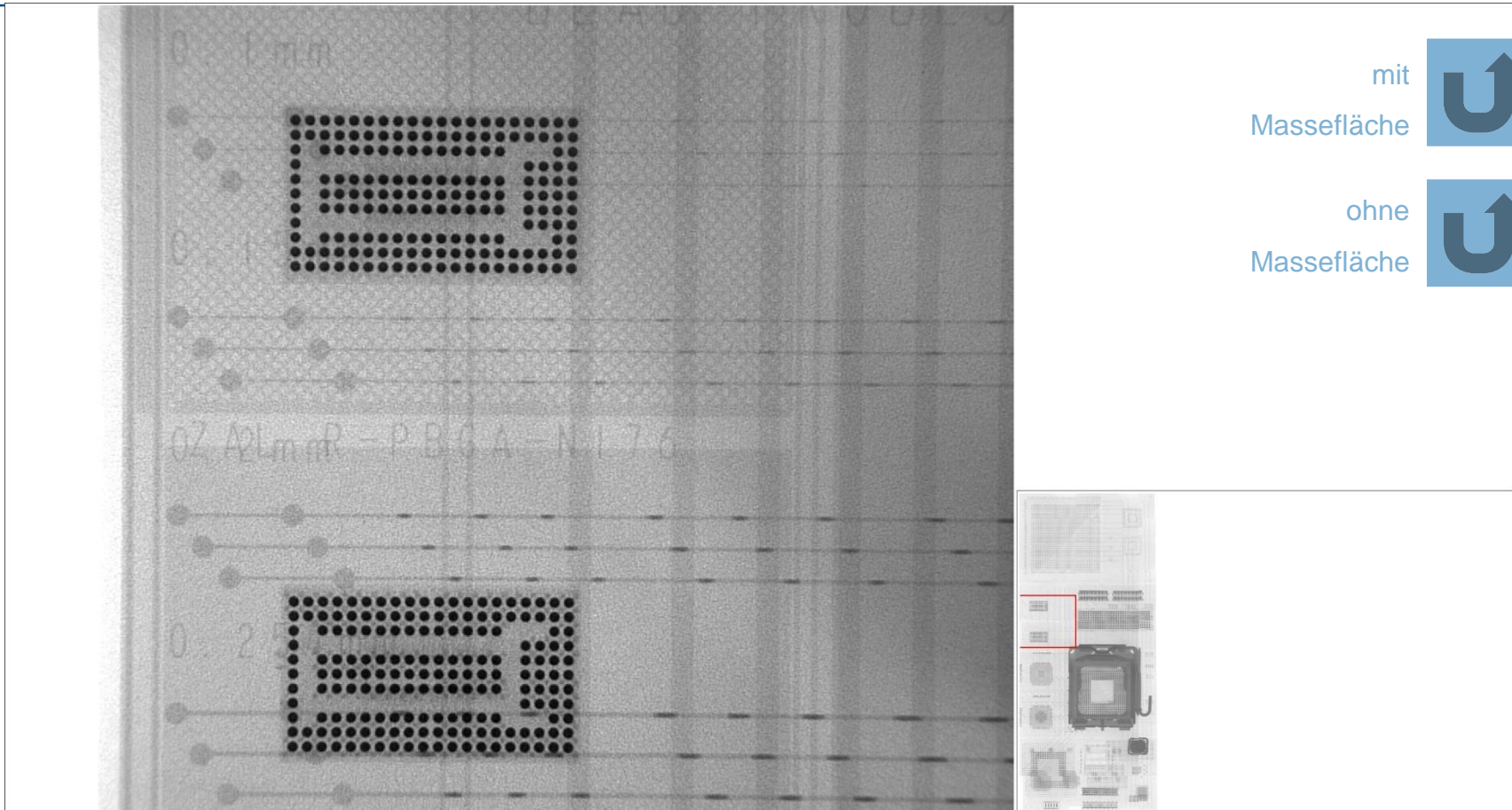
R+R 25 / Z – X-Ray nach Rework 3 – BGA 256



R+R 25 / Z – X-Ray nach Rework 3 / Detail – BGA 256



R+R 25 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



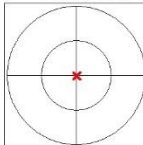
mit
Massefläche



ohne
Massefläche

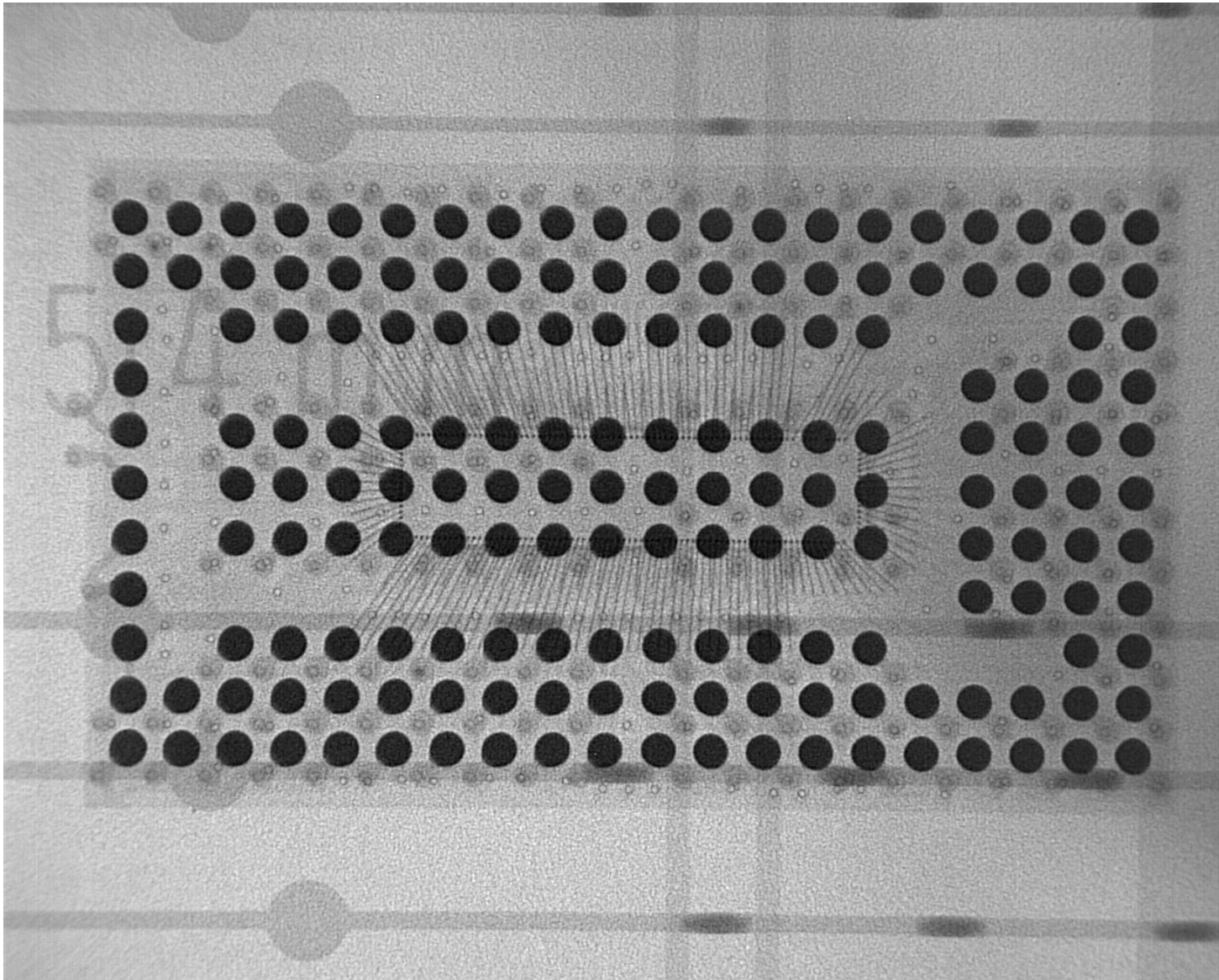


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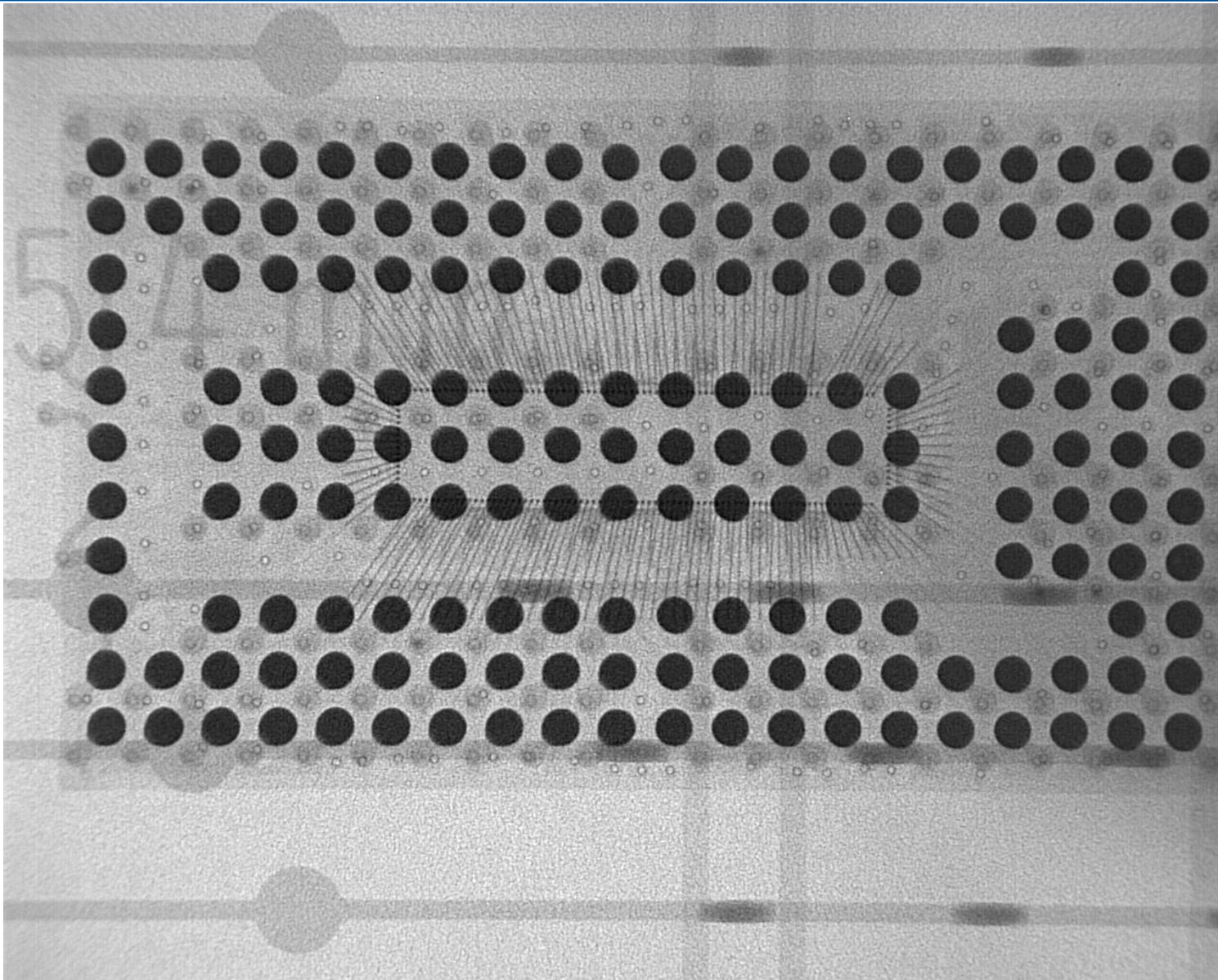


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Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

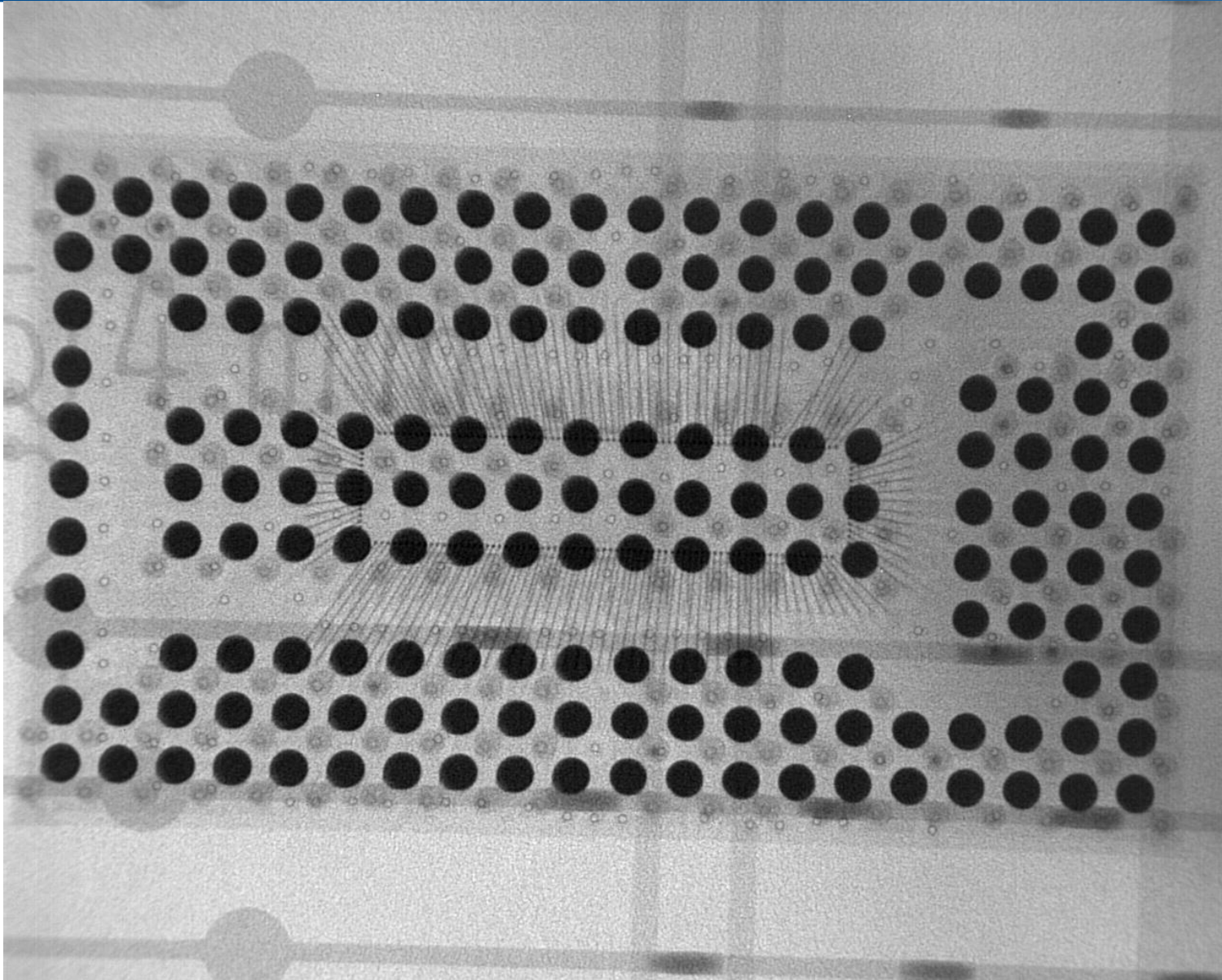
R+R 25 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



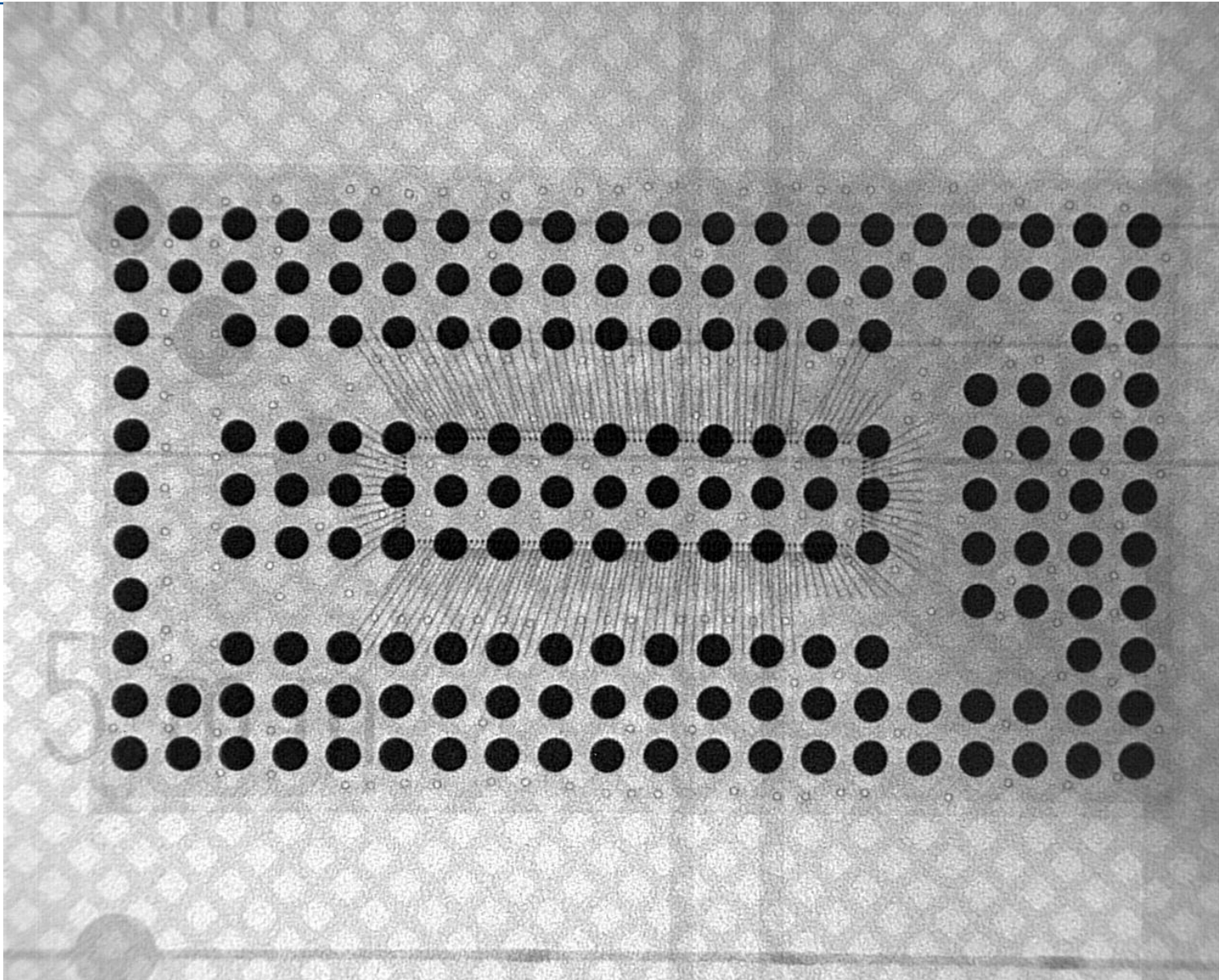
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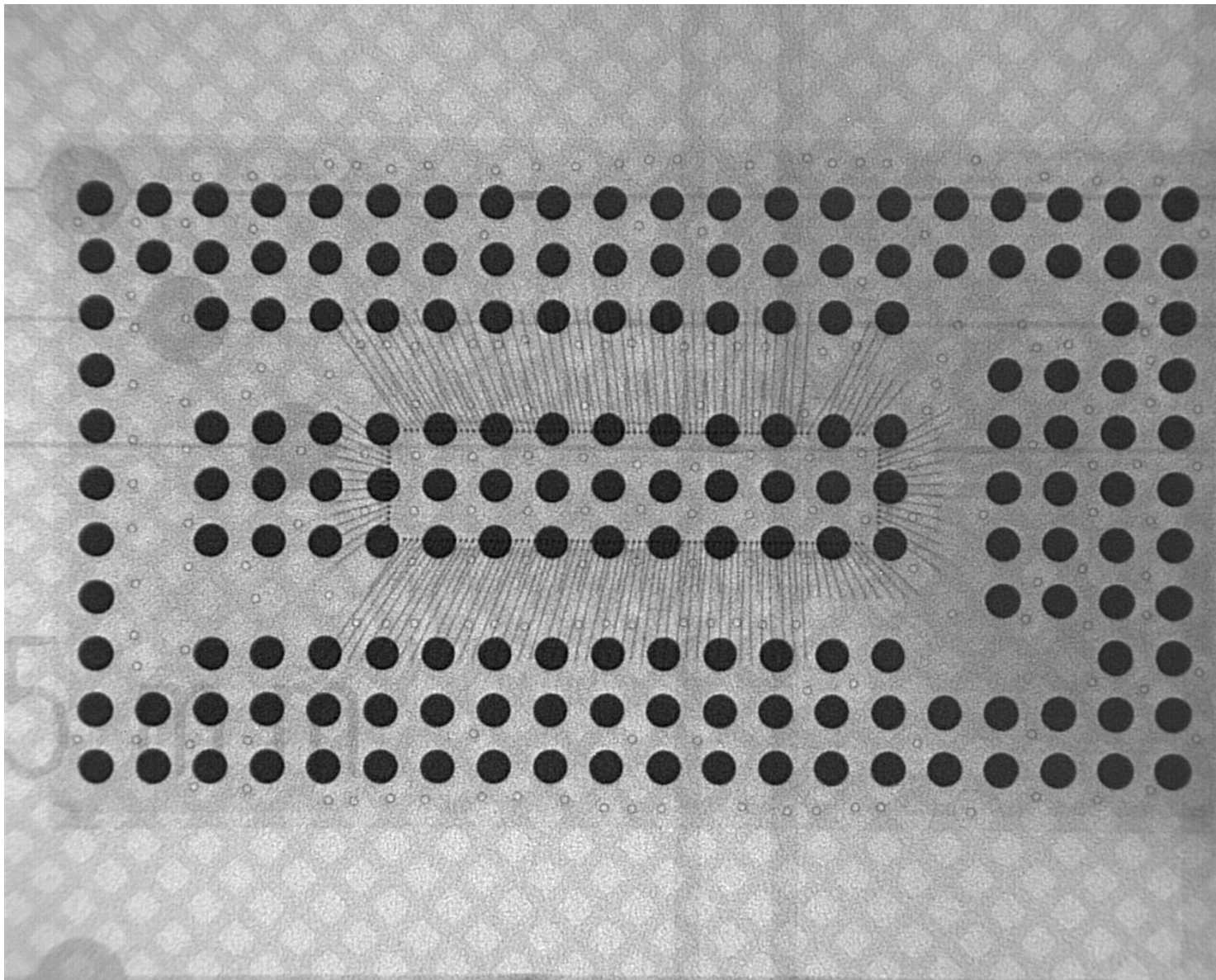
R+R 25 / Z – X-Ray nach Rework 3 – ZAL R-PBGA-N176 (mit Massefläche)



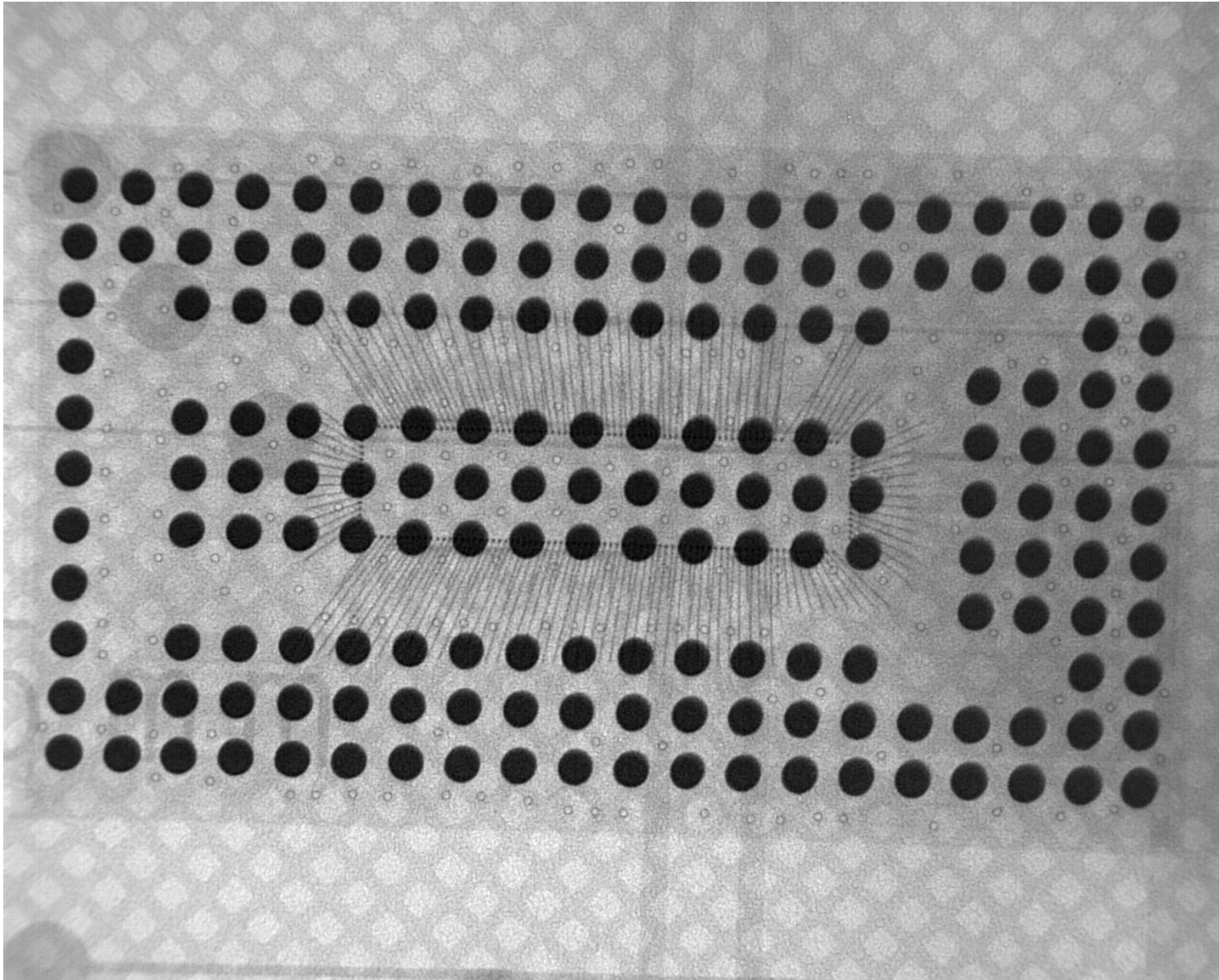
R+R 25 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



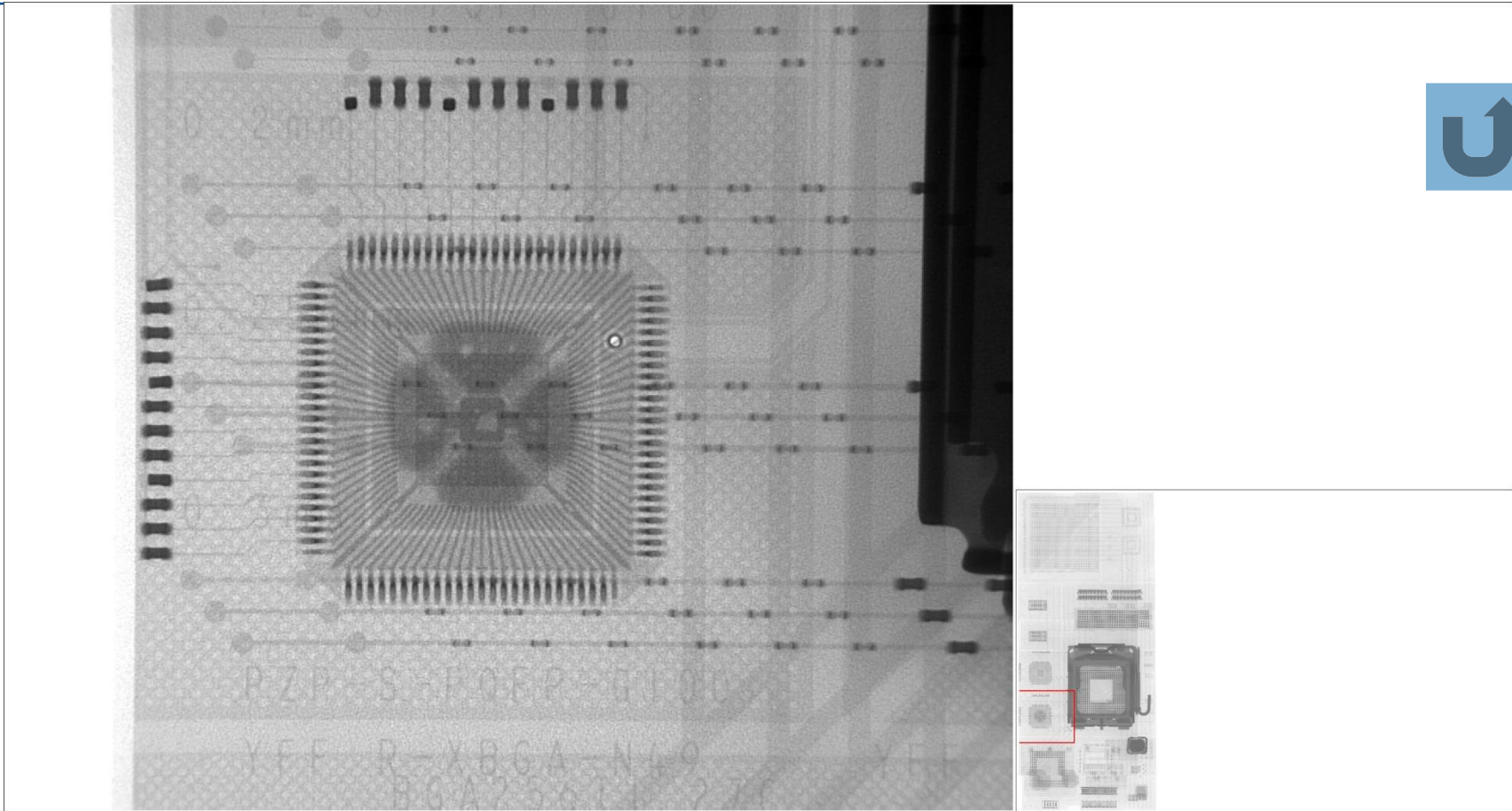
R+R 25 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)



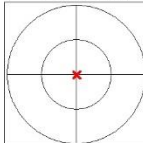
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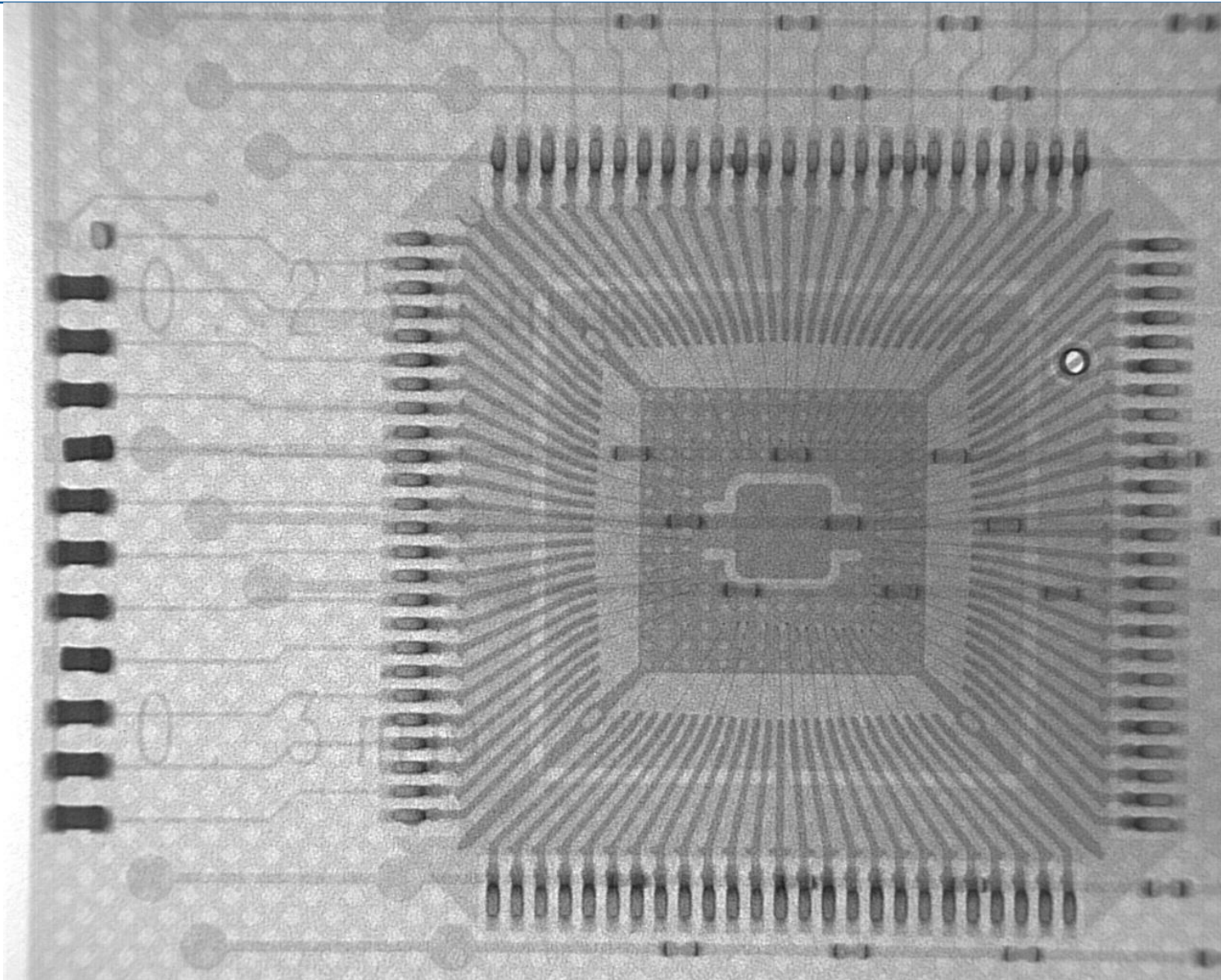
R+R 25 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

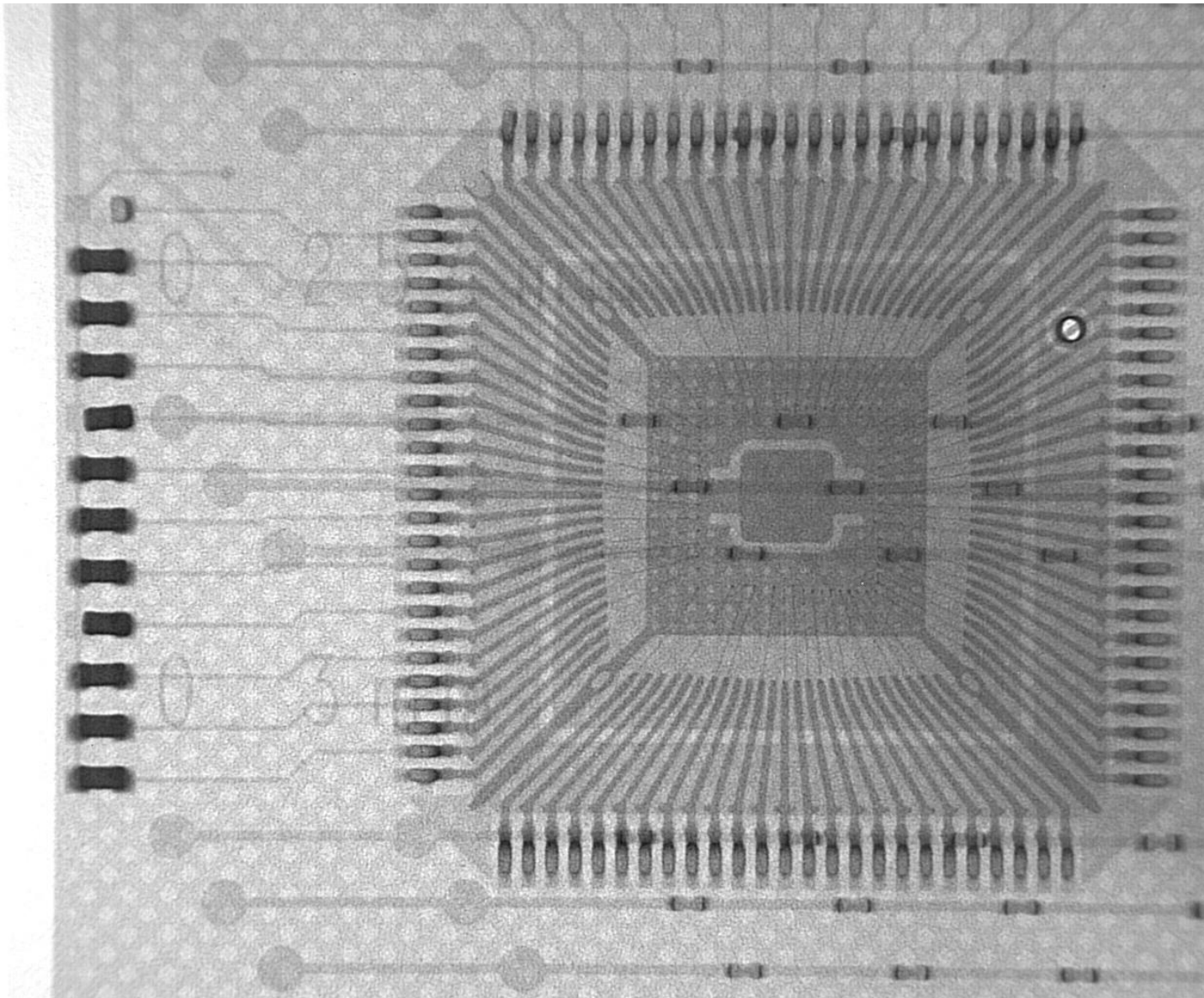


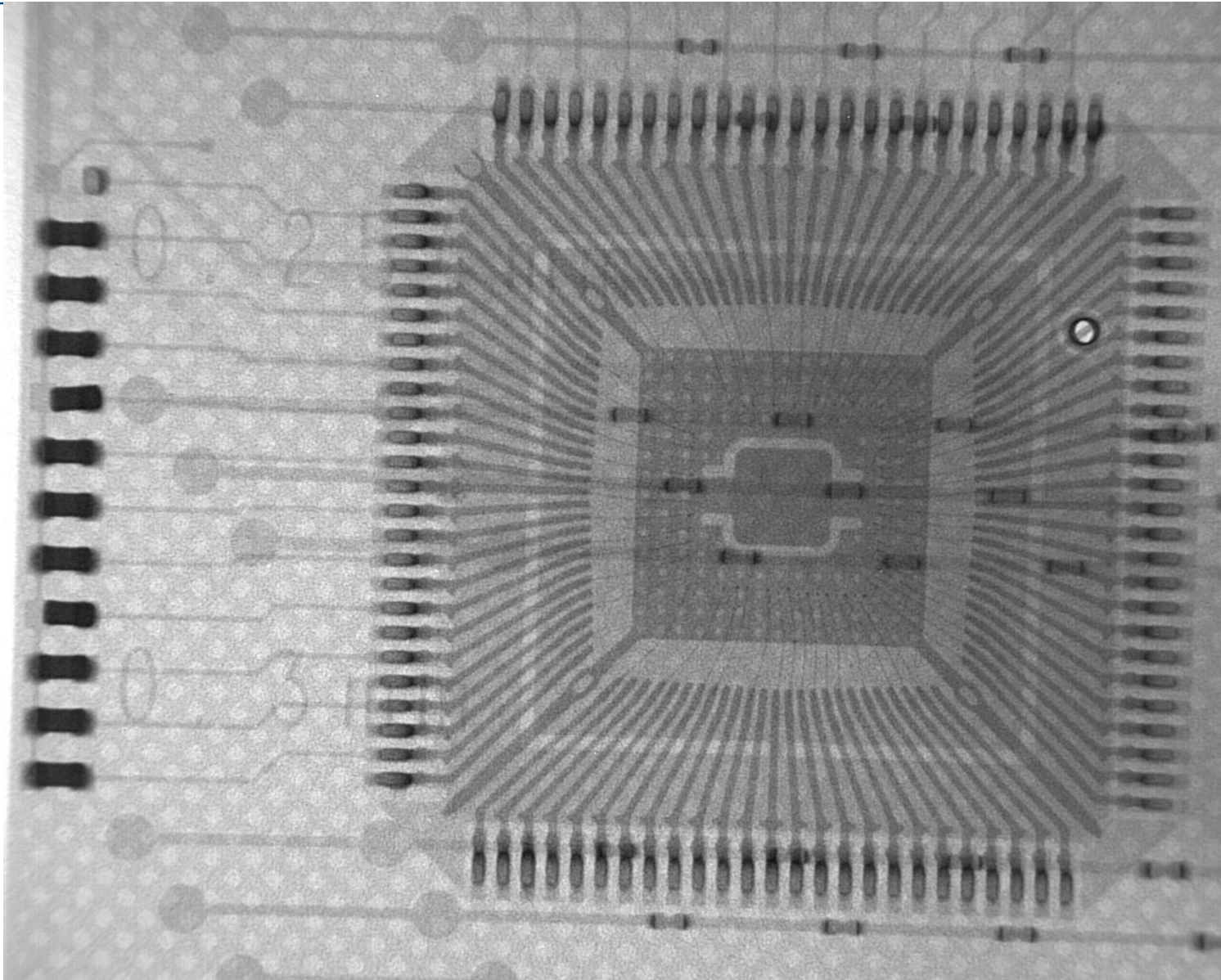
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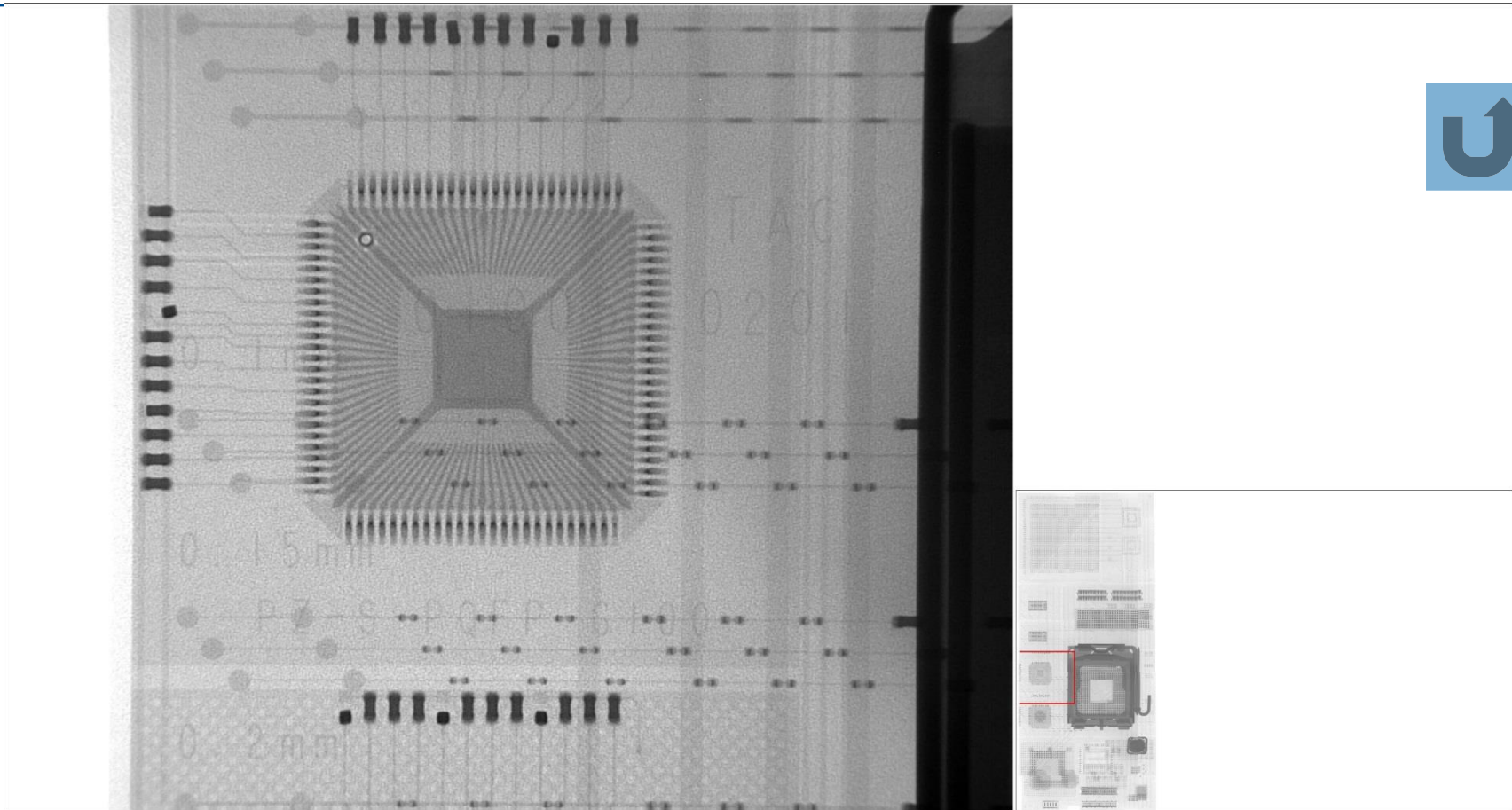
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Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames



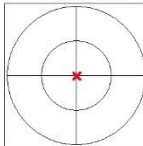




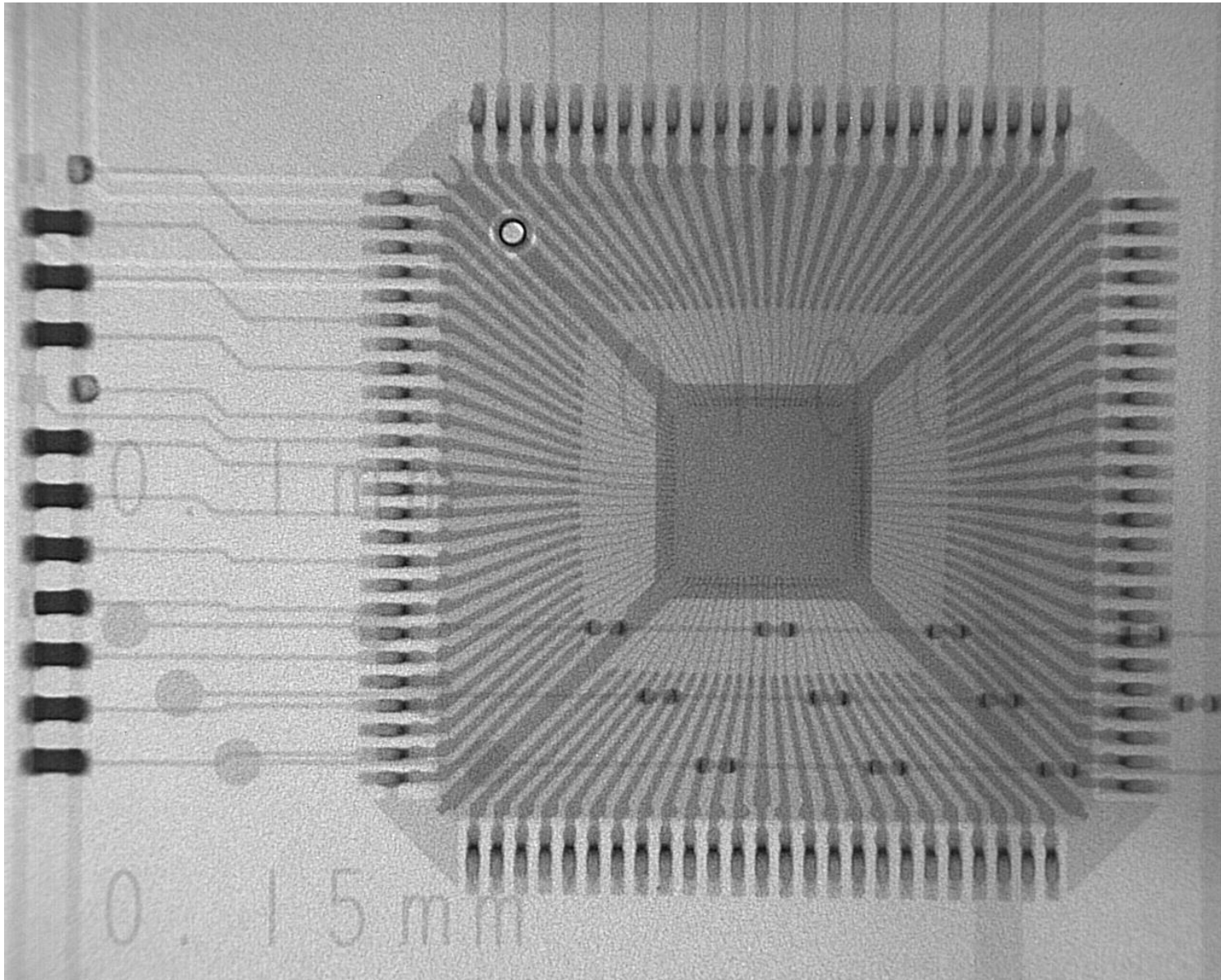
R+R 25 / Z – X-Ray vor Rework – PZ-S-PQFP-G100

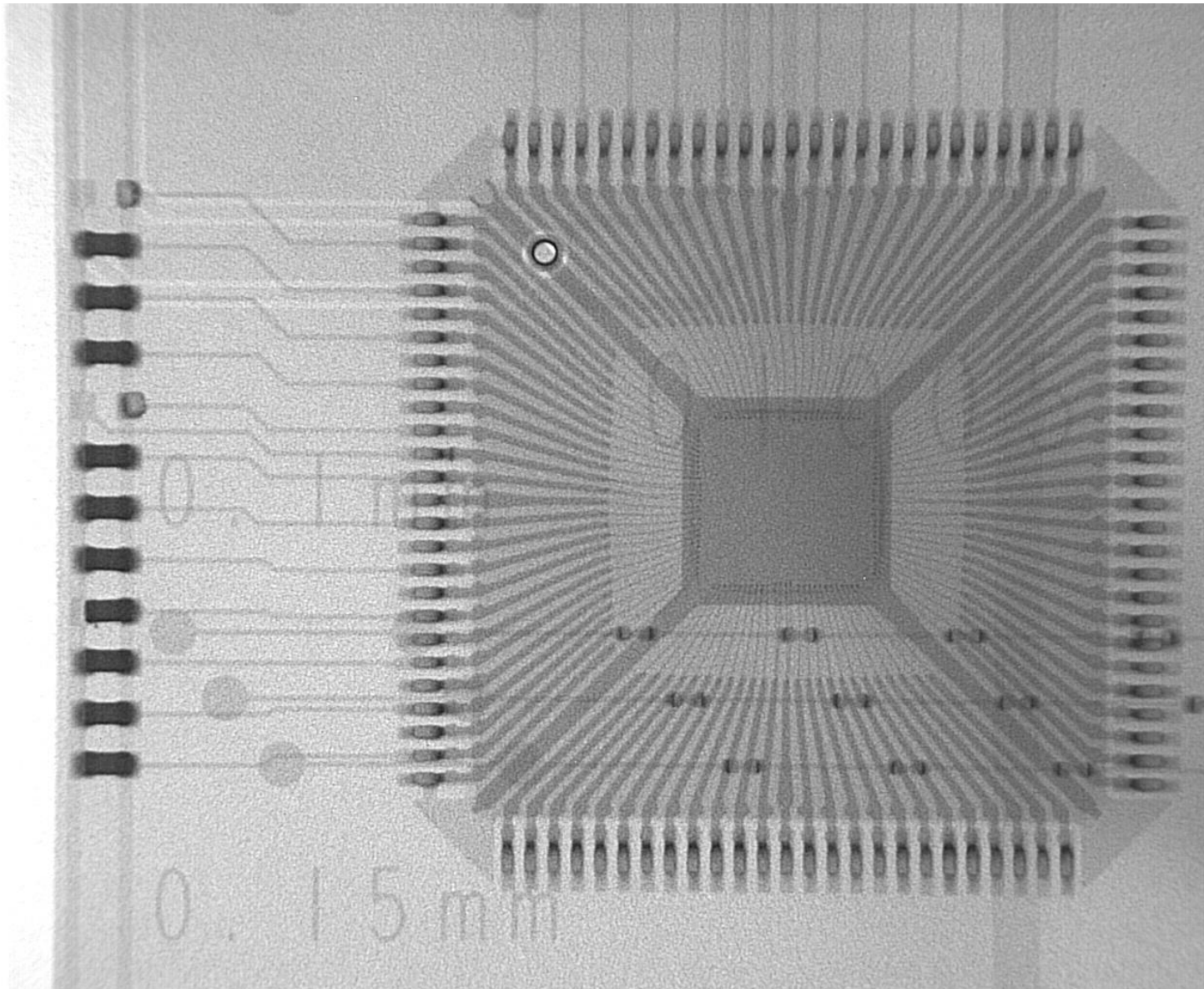


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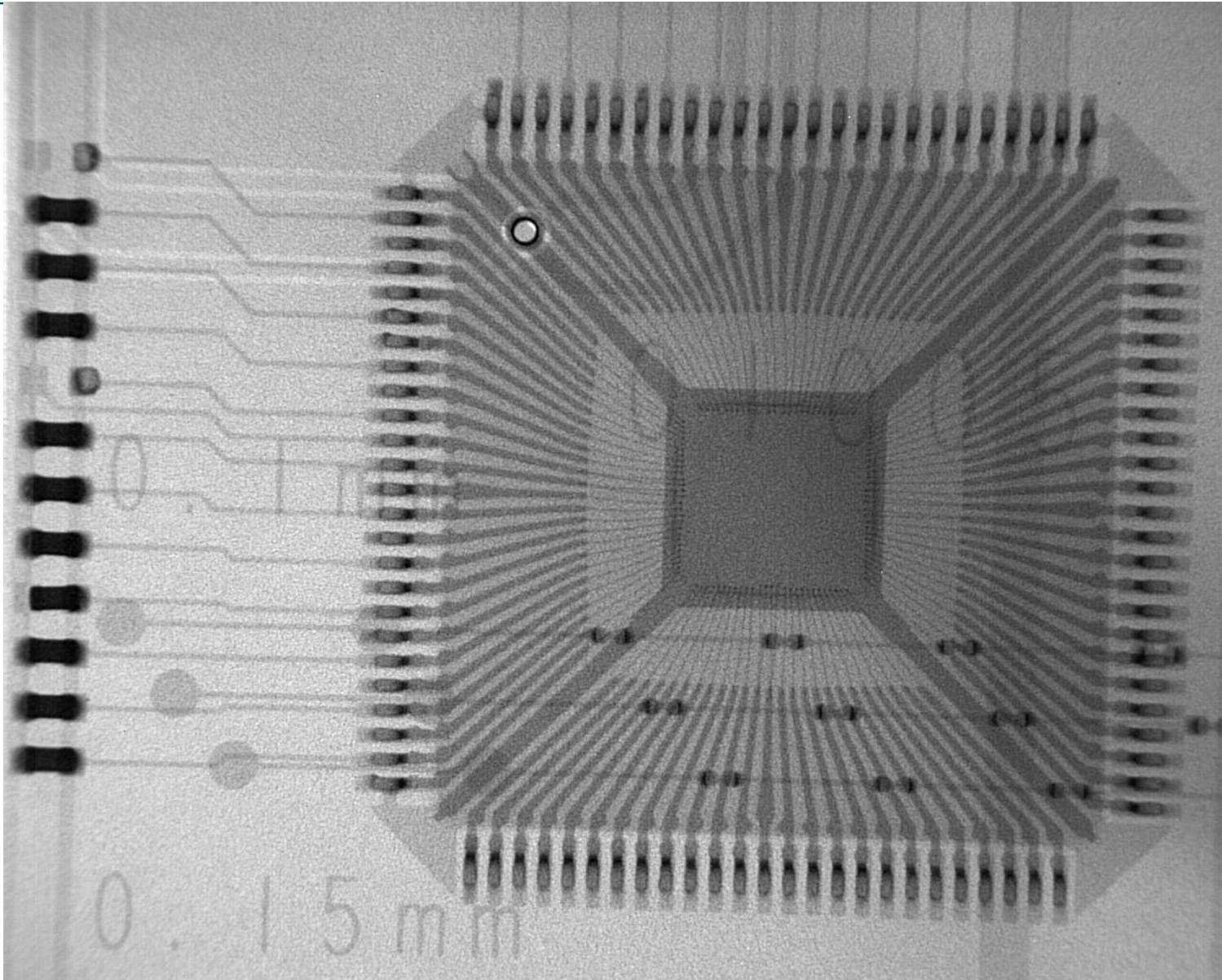


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames





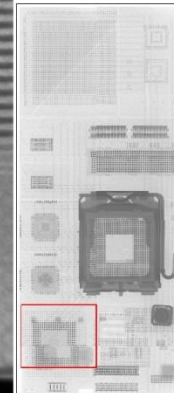
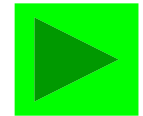
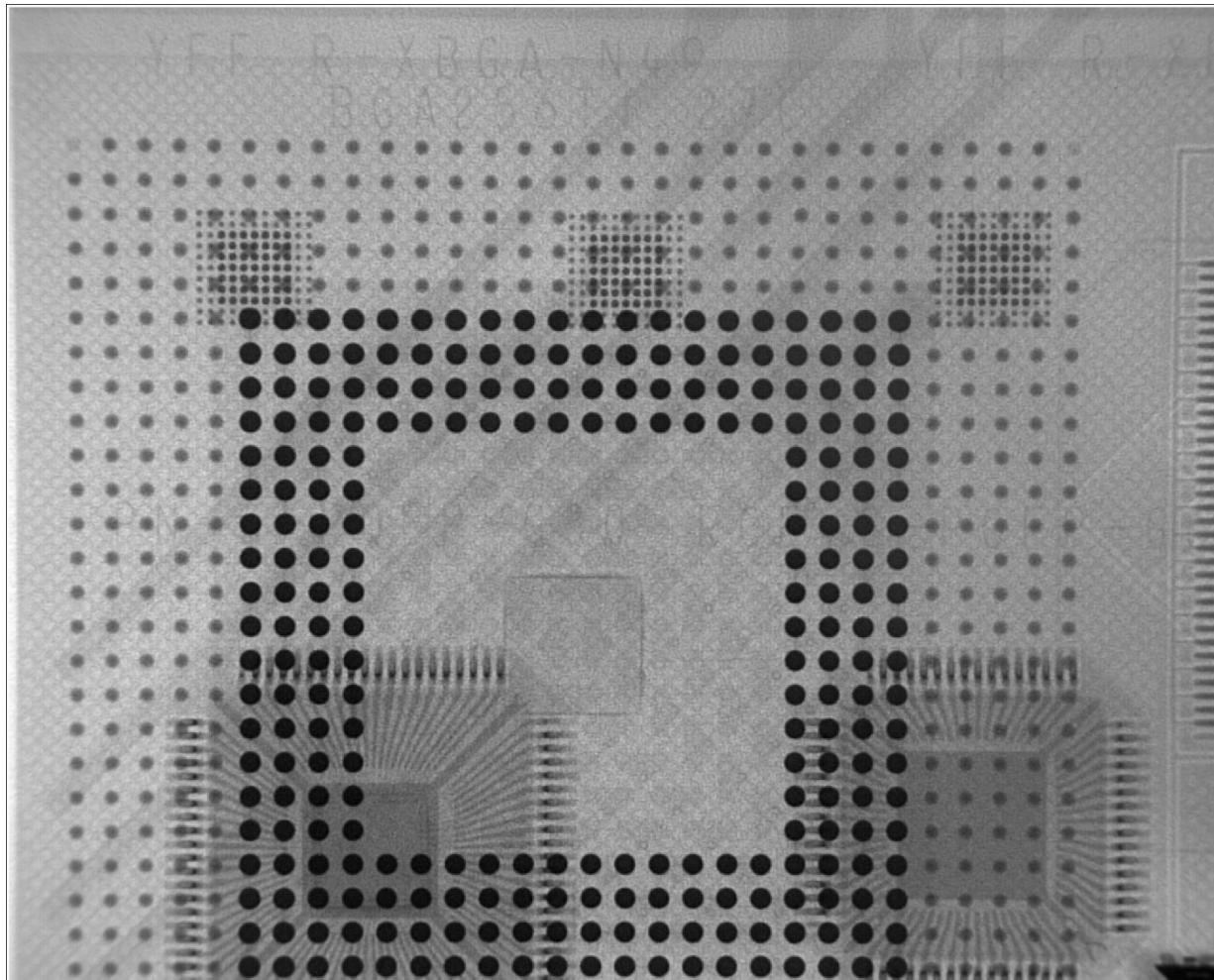
R+R 25 / Z – X-Ray nach Rework 3 – PZ-S-PQFP-G100



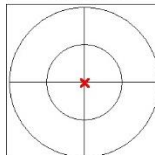
Baugruppe

R+R 26 / Z

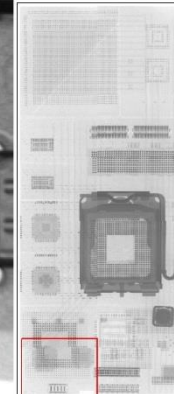
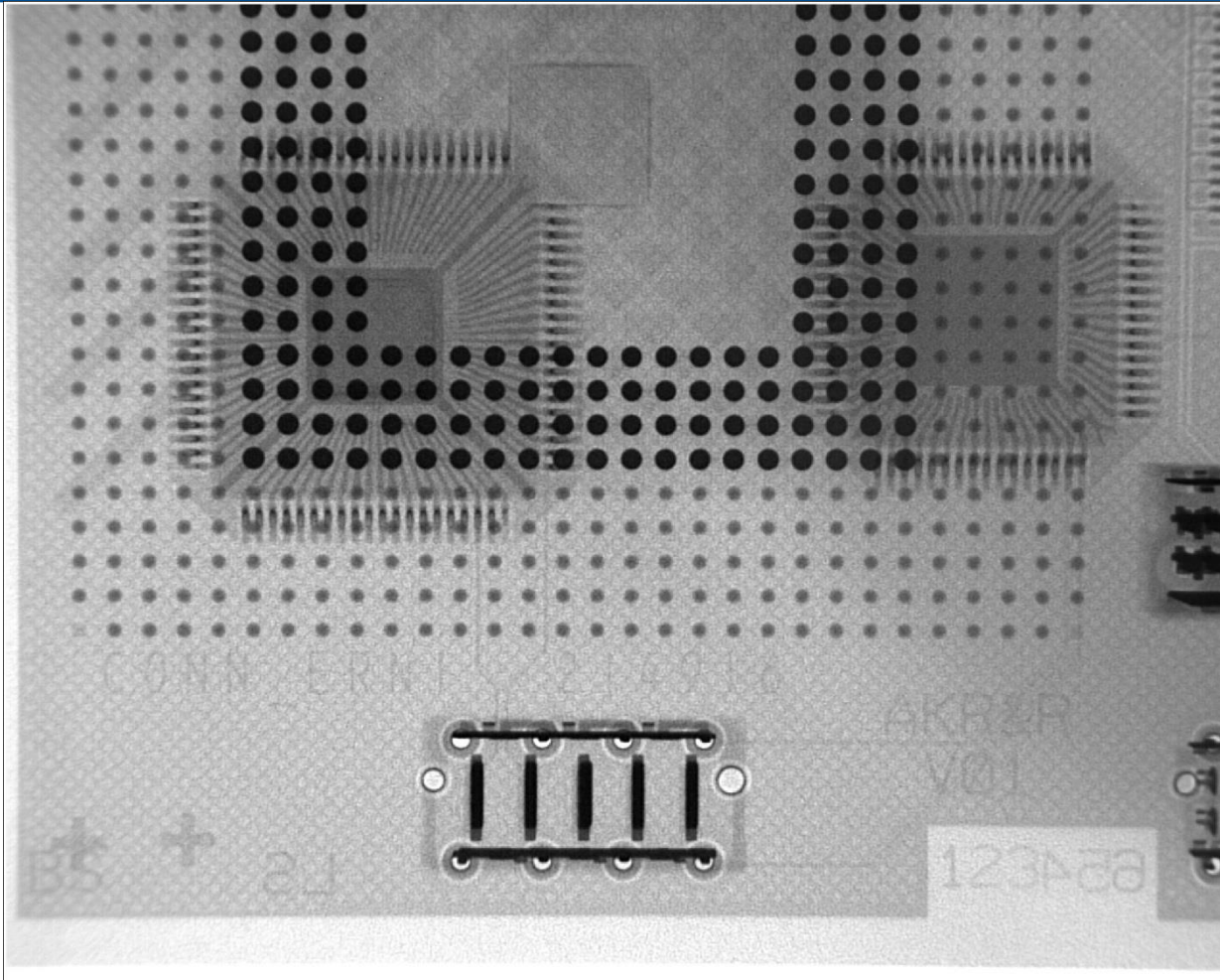
R+R 26 / Z – X-Ray vor Rework – BGA 256



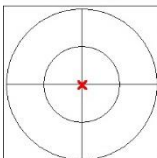
10.0mm



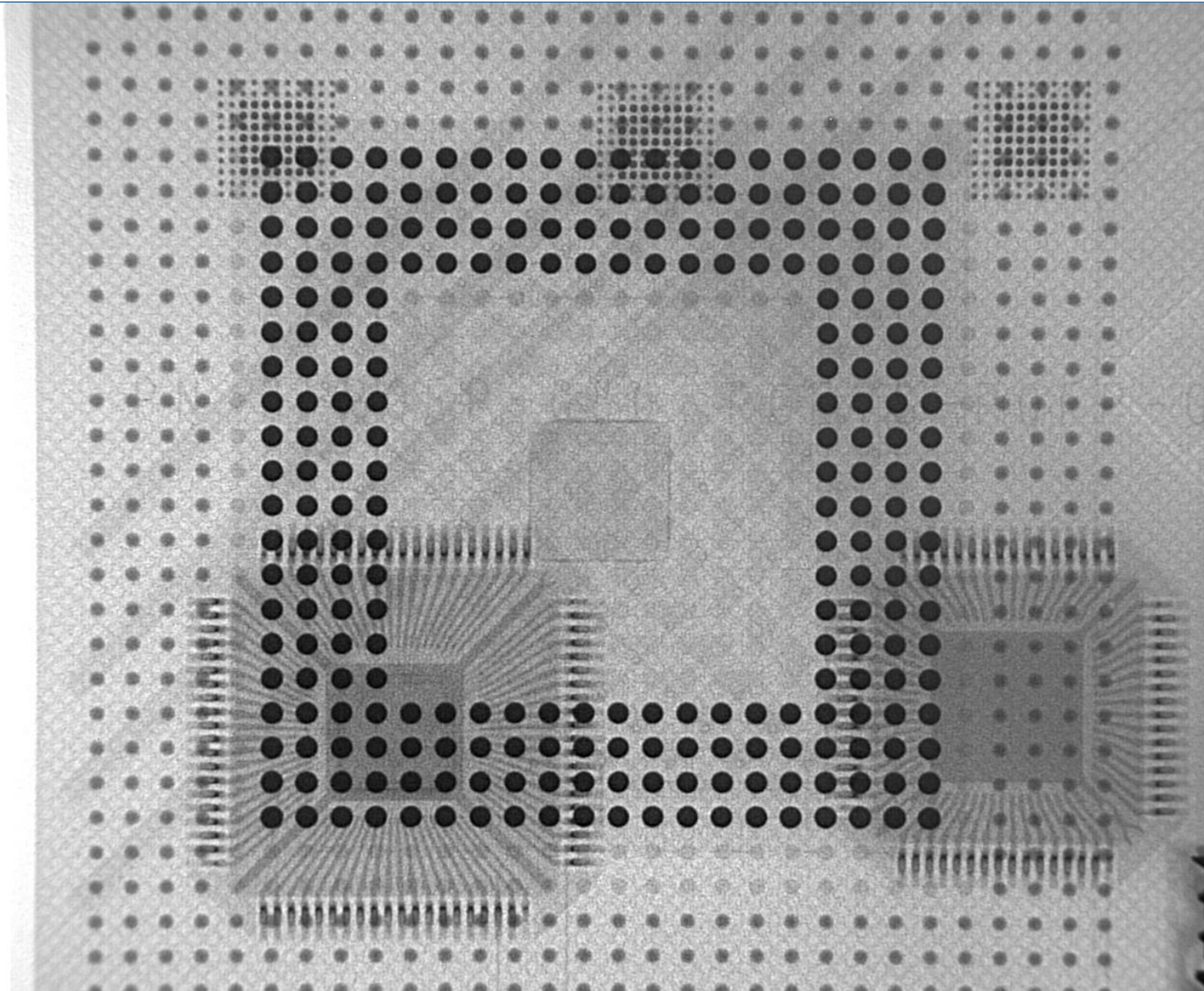
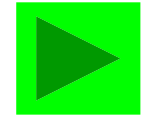
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

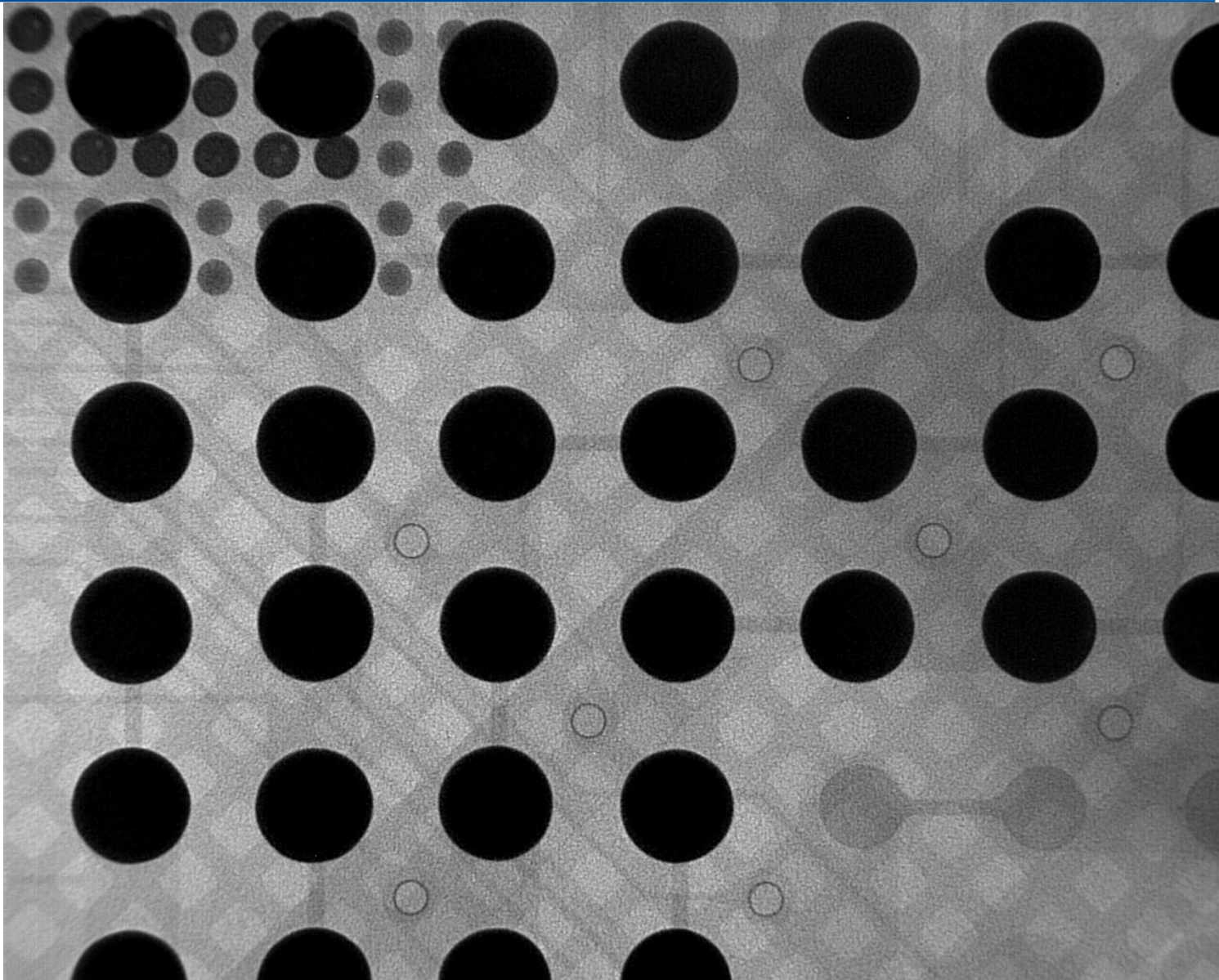


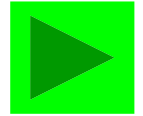
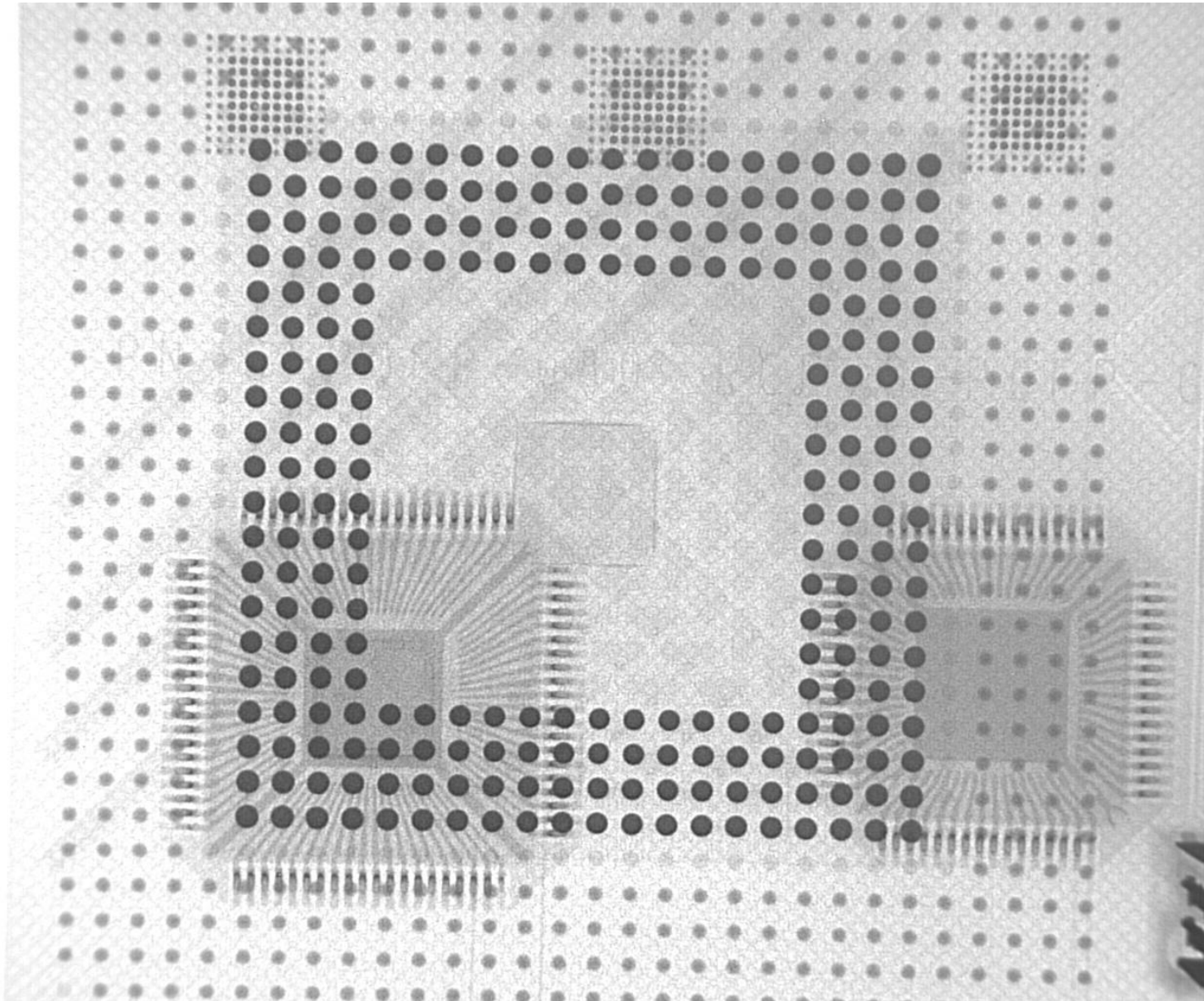
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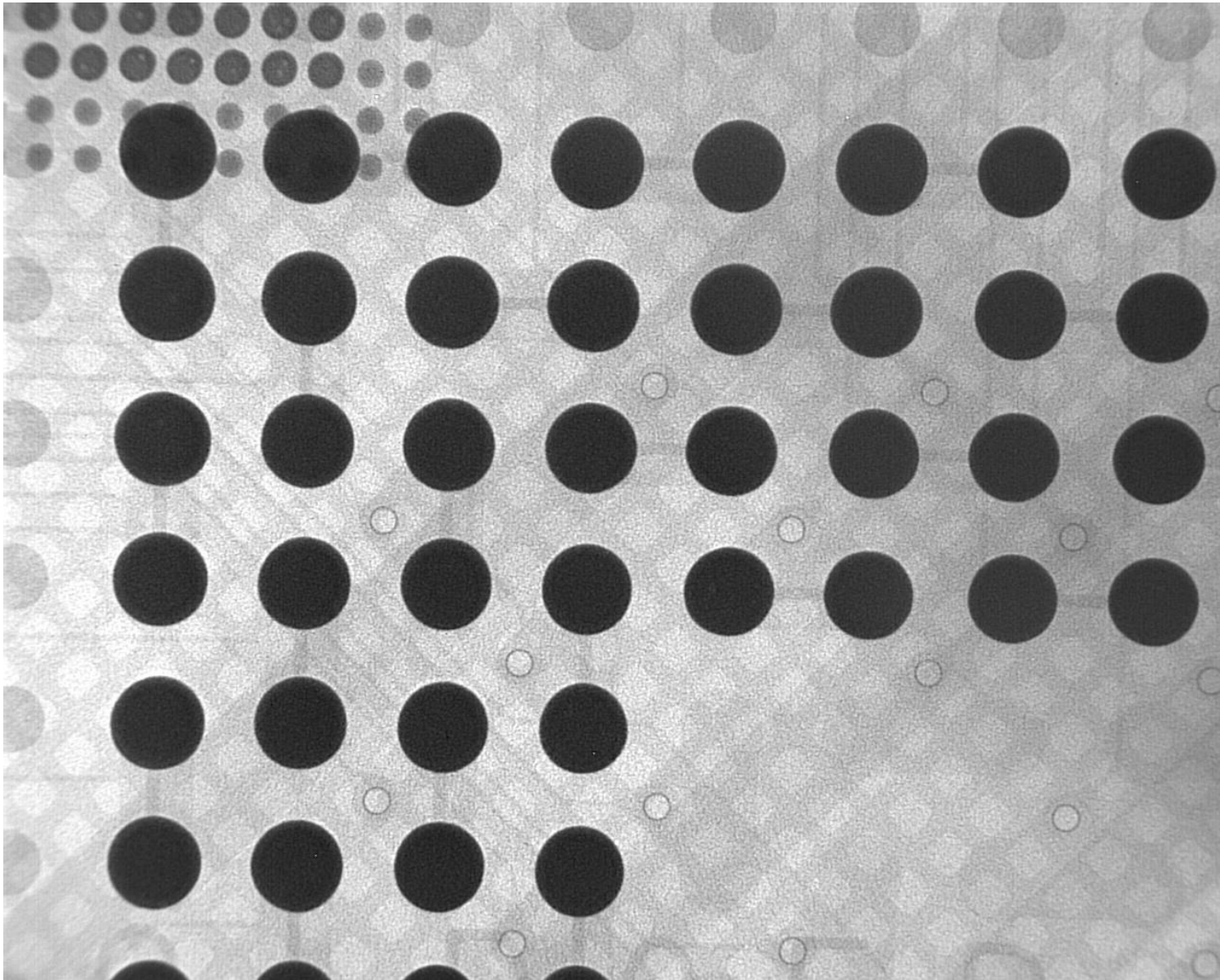


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

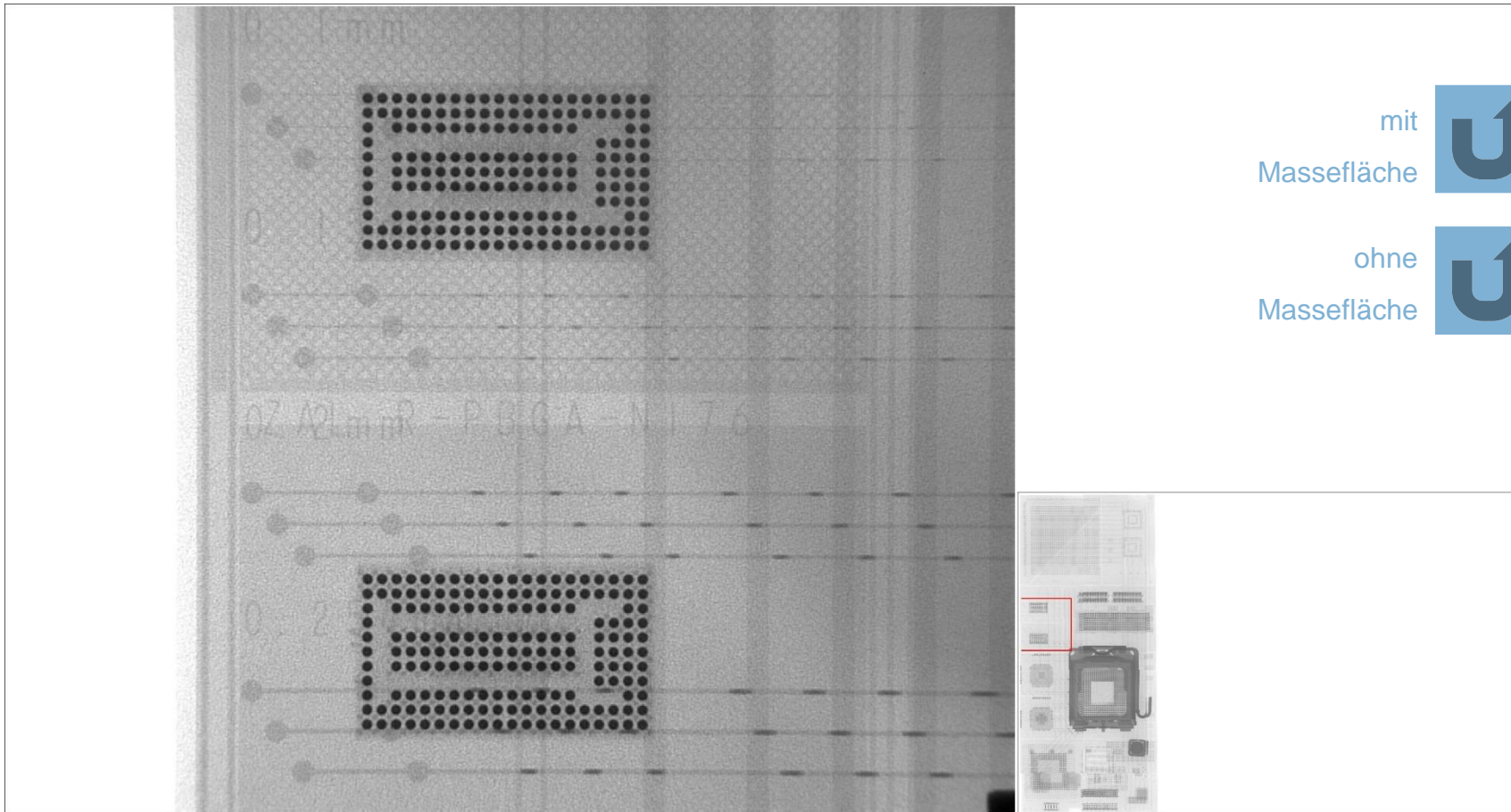








R+R 26 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



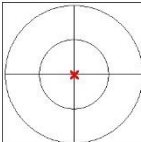
mit
Massefläche



ohne
Massefläche

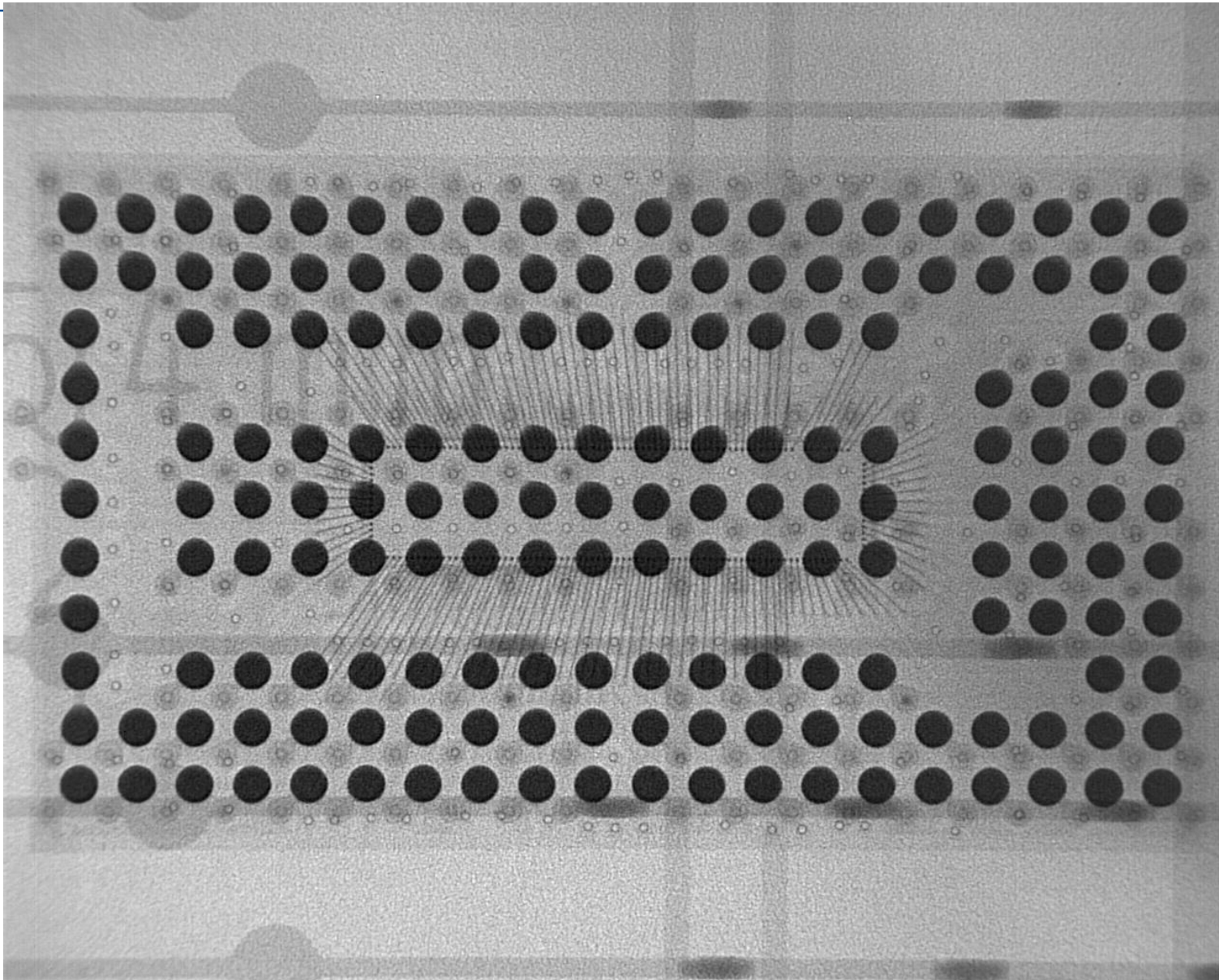


10.0mm

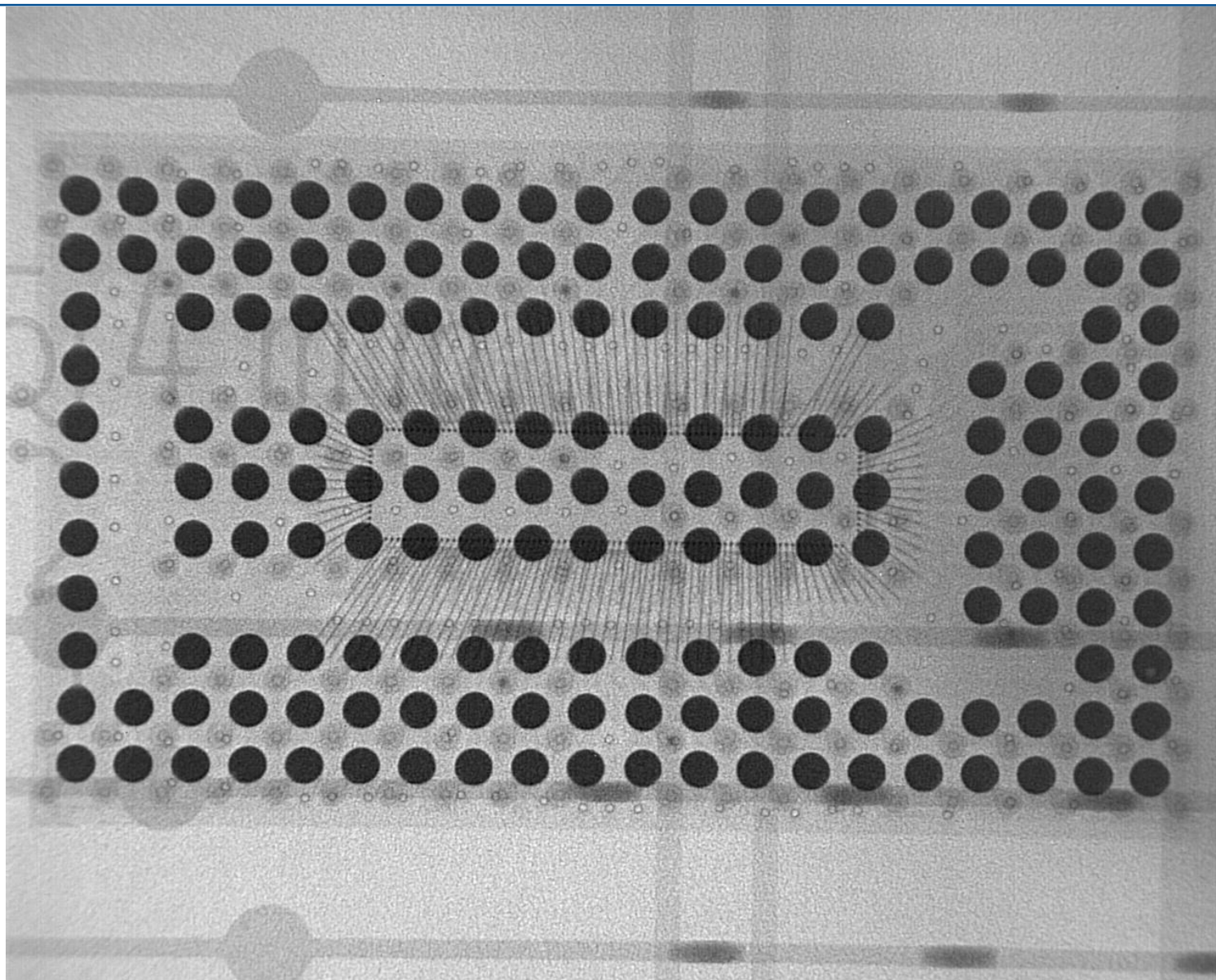


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

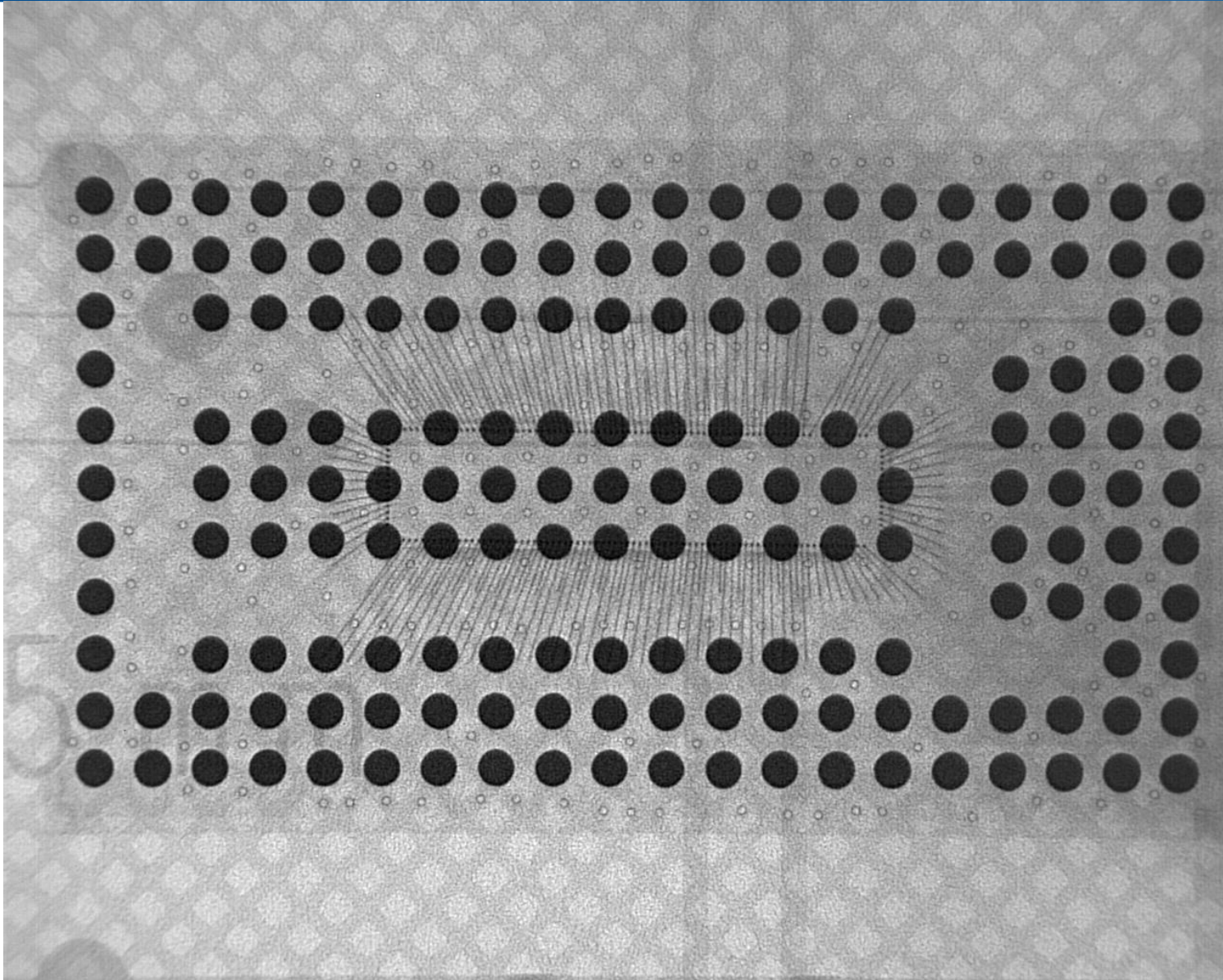
R+R 26 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



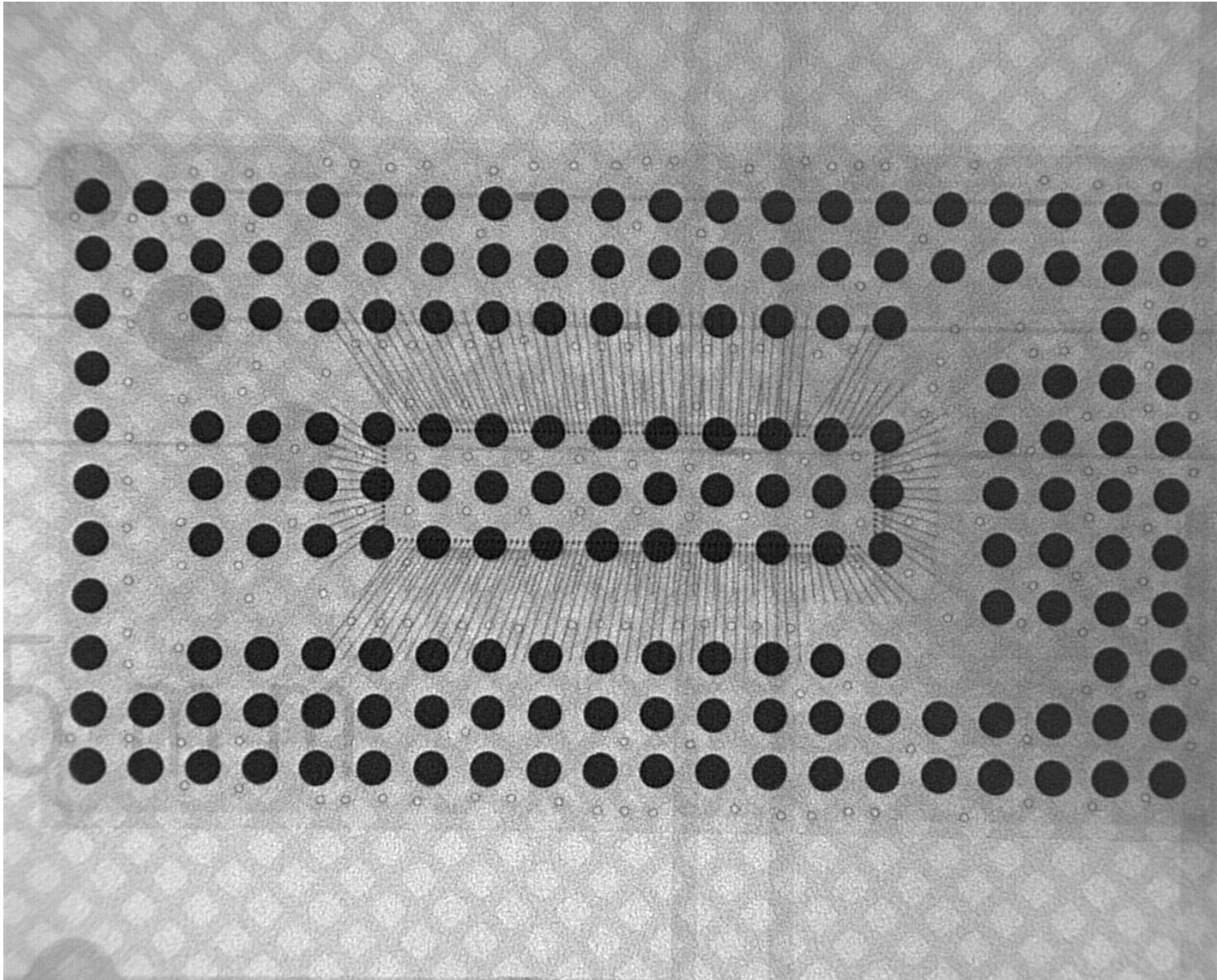
R+R 26 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (mit Massefläche)



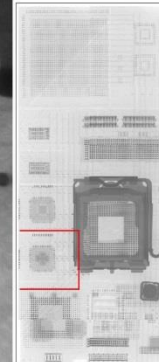
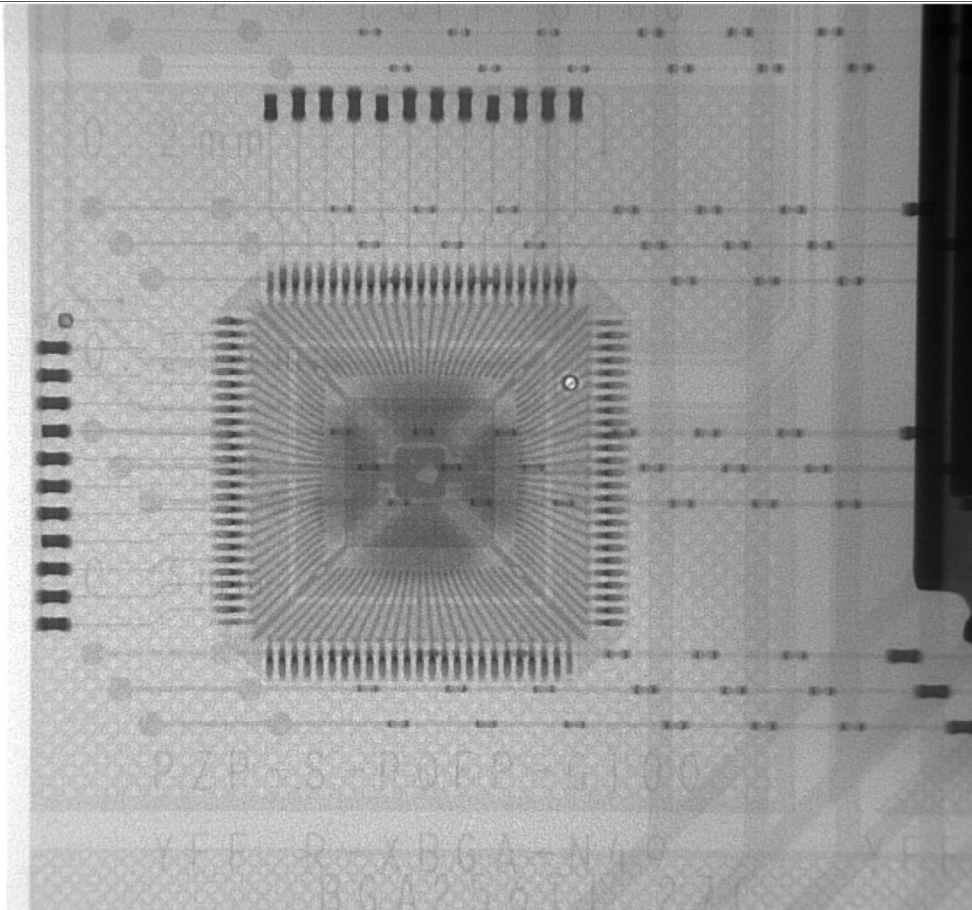
R+R 26 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



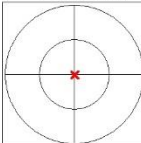
R+R 26 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)



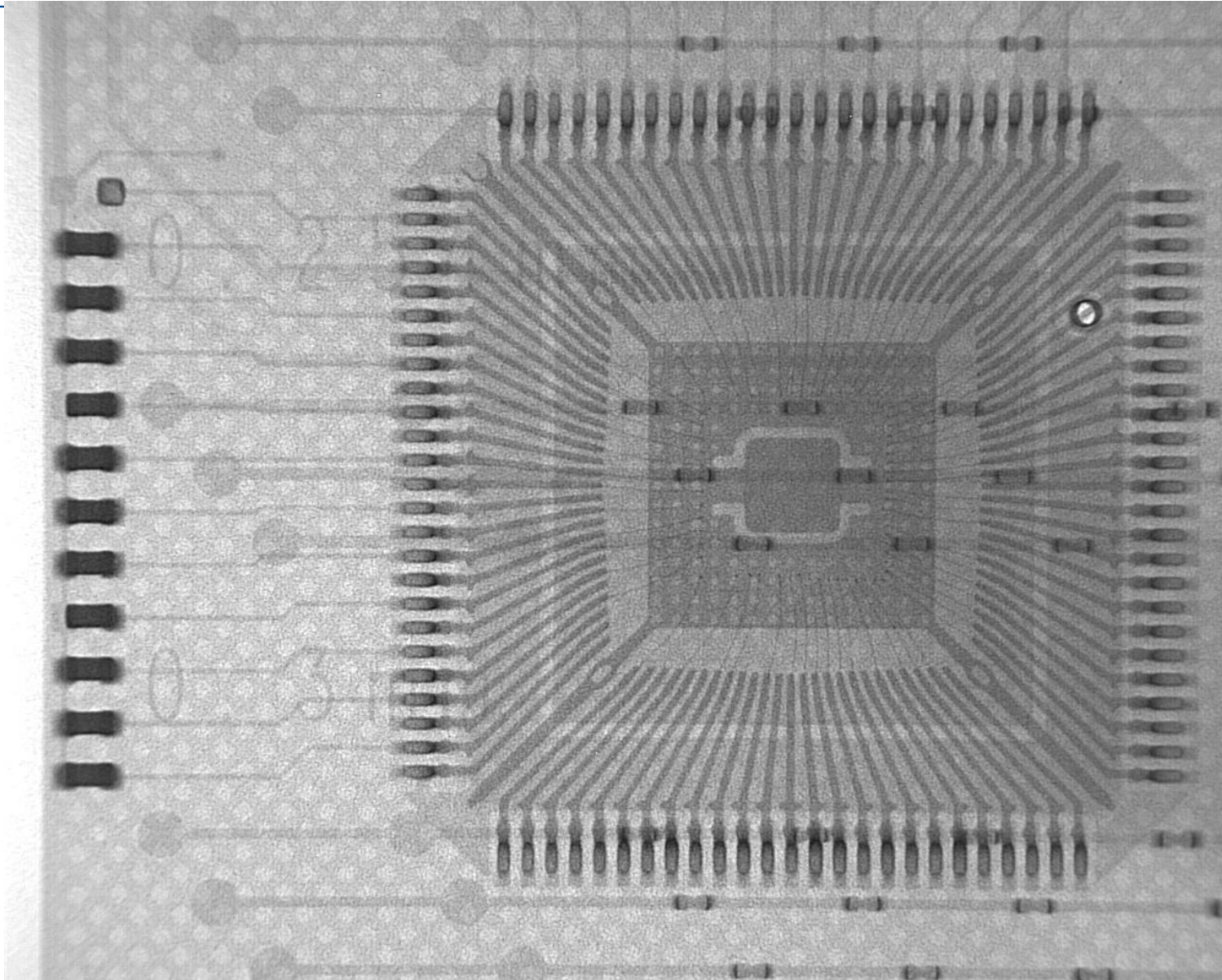
R+R 26 / Z – X-Ray vor Rework – PZP-S-PQFP-G100



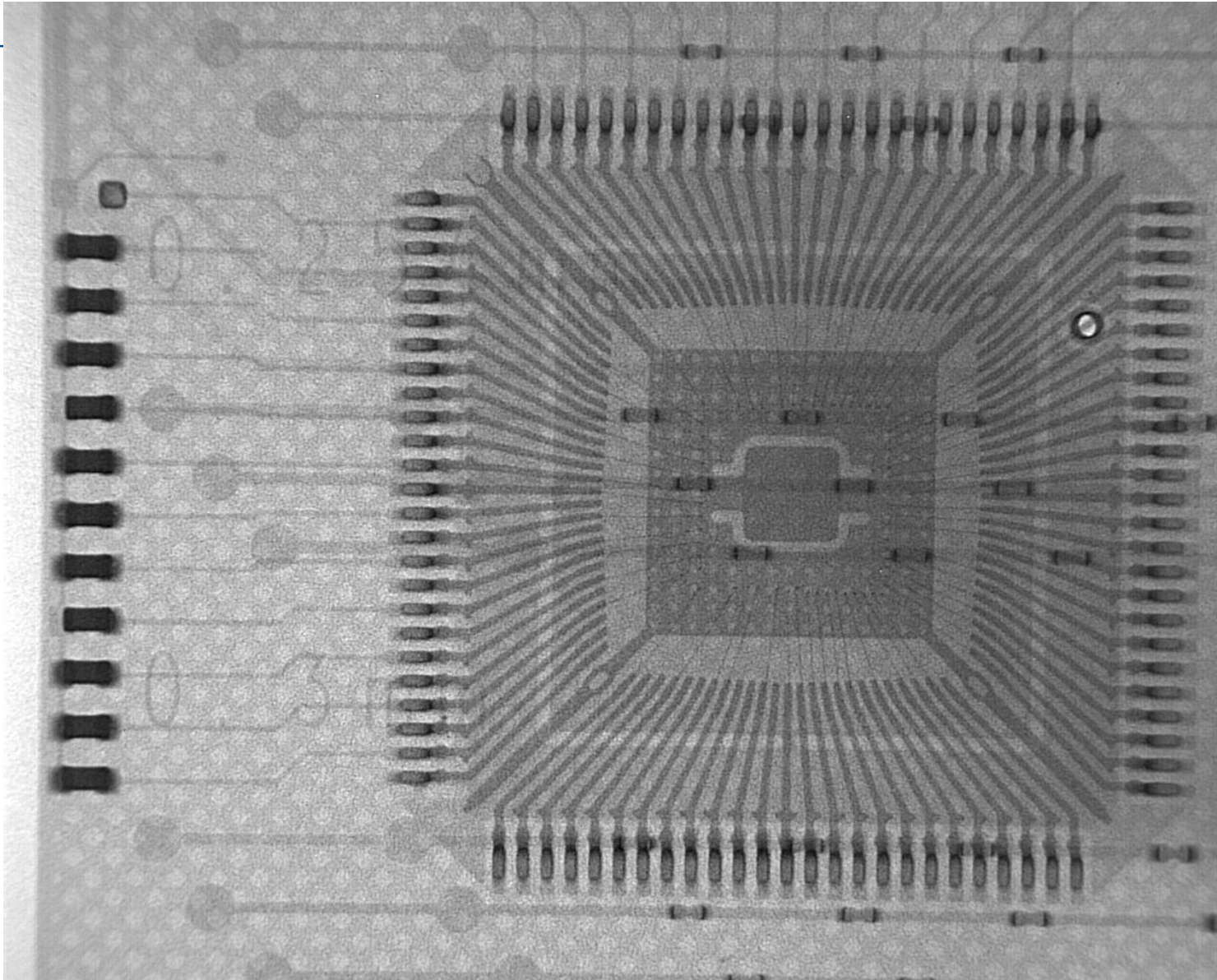
10.0mm

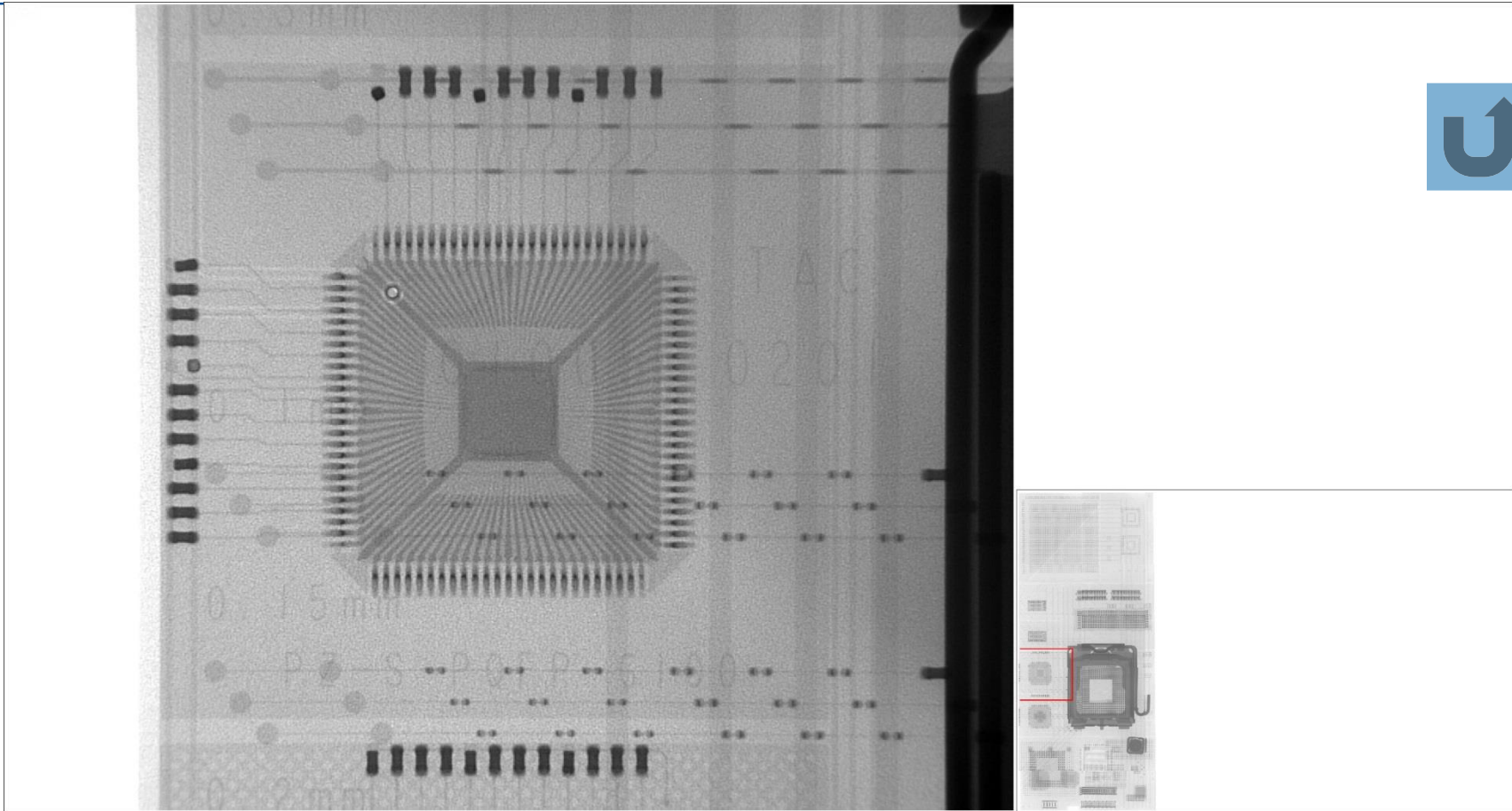


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

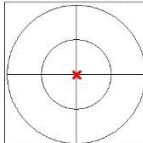


R+R 26 / Z – X-Ray nach Rework 2 – PZP-S-PQFP-G100

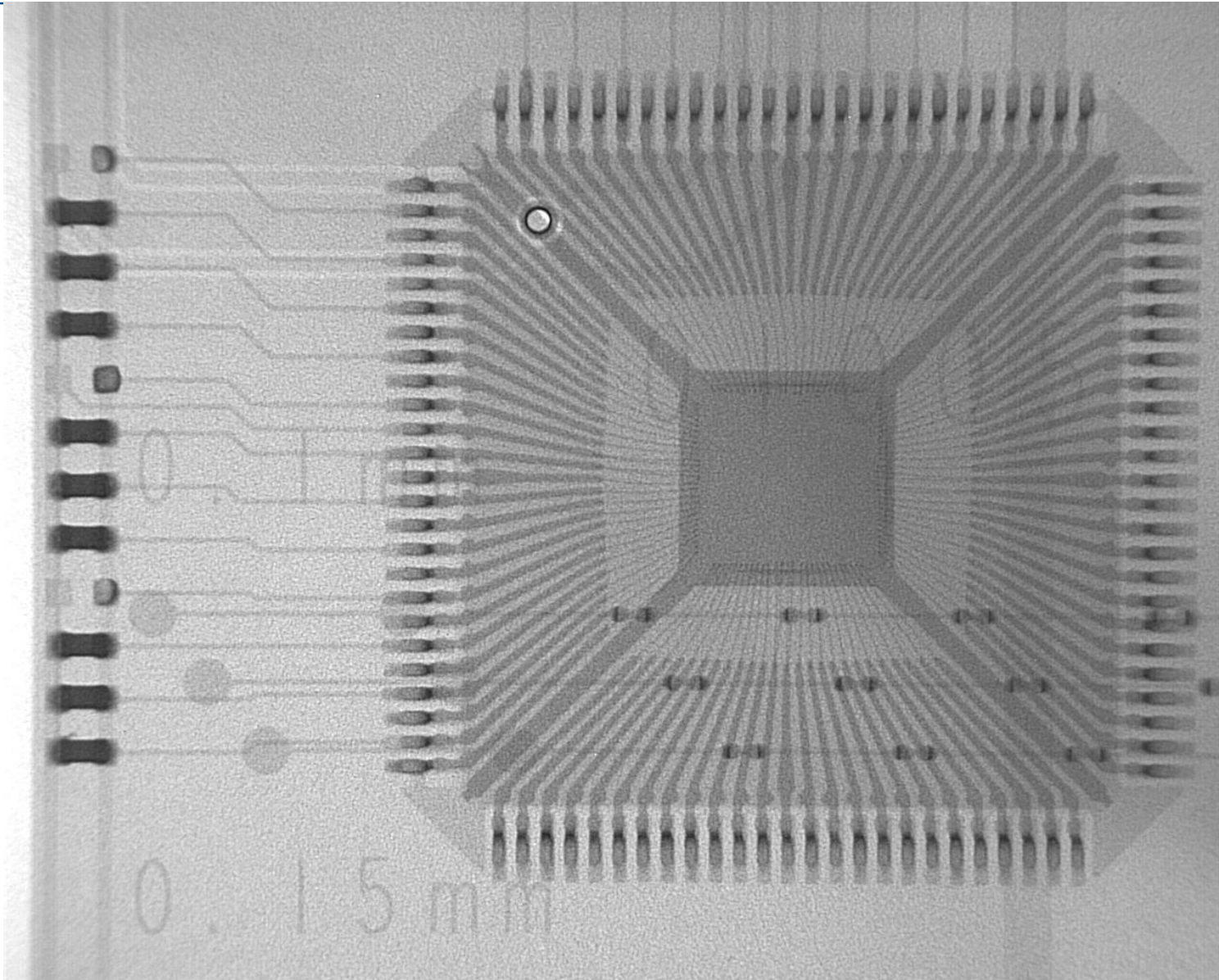




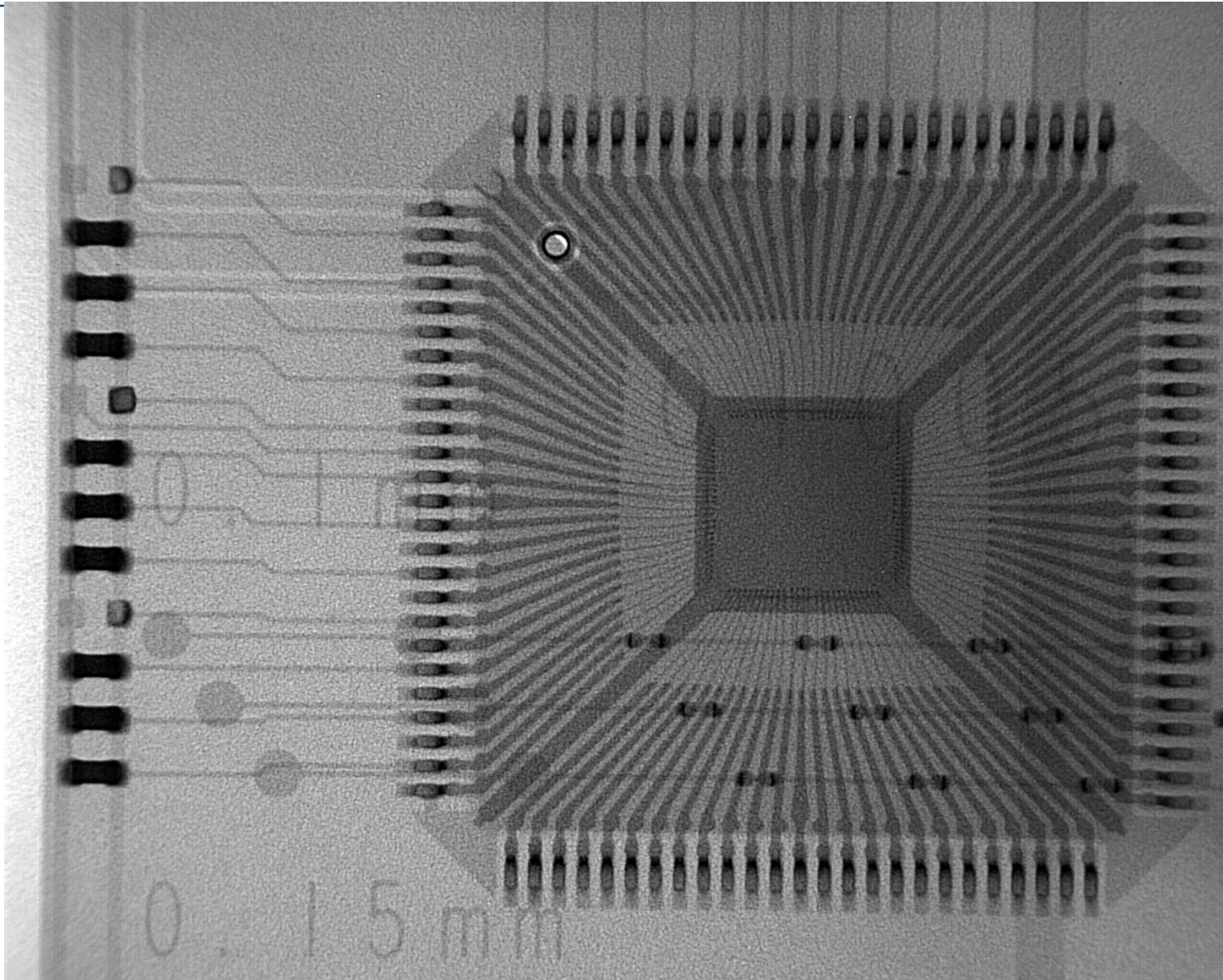
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames



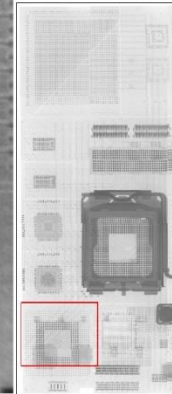
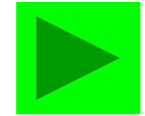
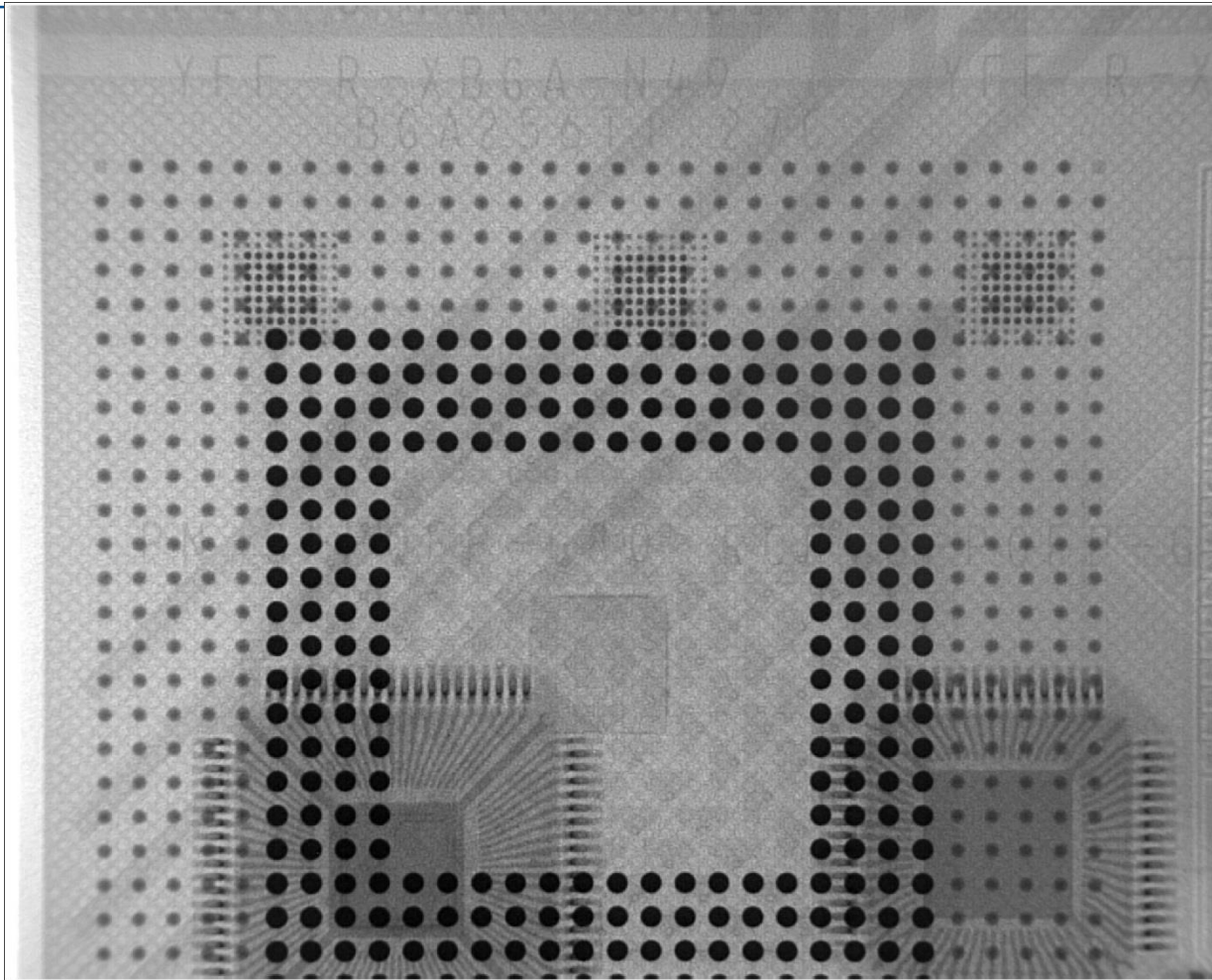
R+R 26 / Z – X-Ray nach Rework 2 – PZ-S-PQFP-G100



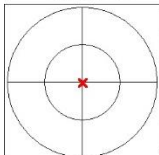
Baugruppe

R+R 27 / Z

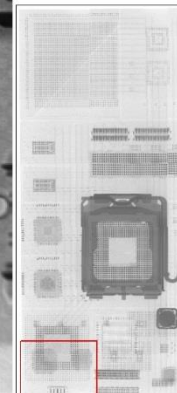
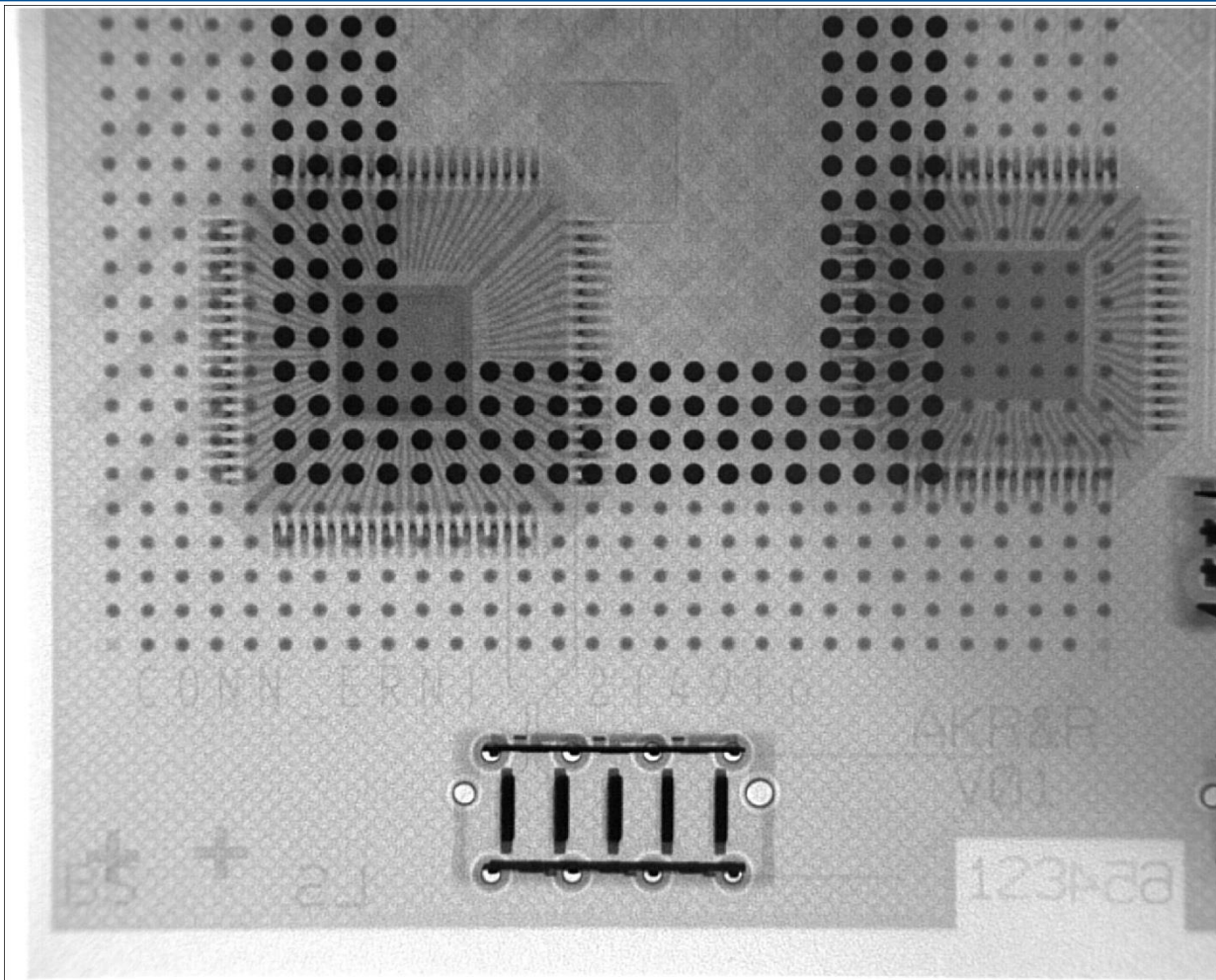
R+R 27 / Z – X-Ray vor Rework – BGA 256



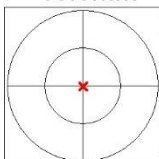
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

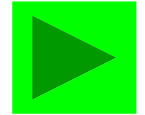
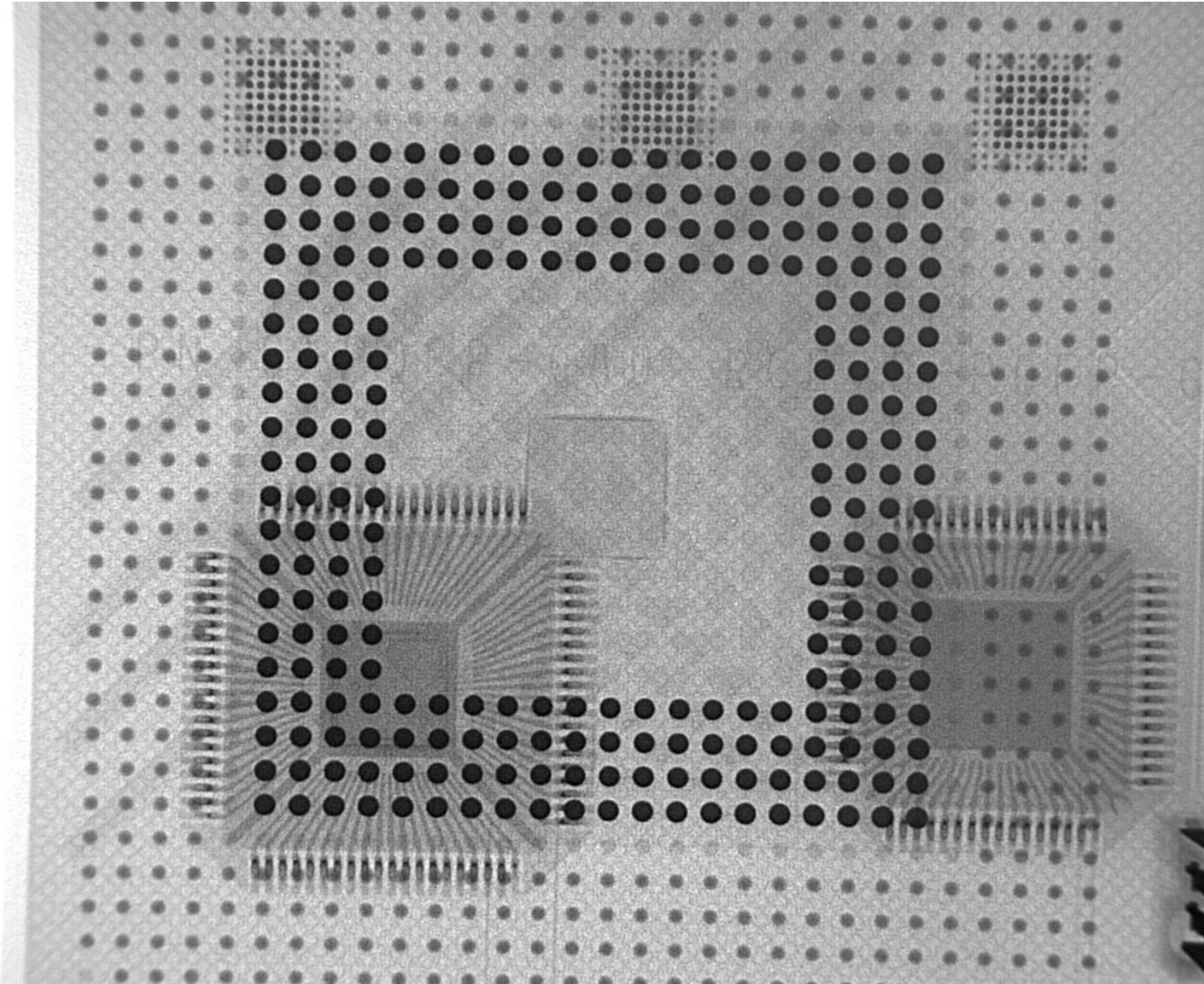


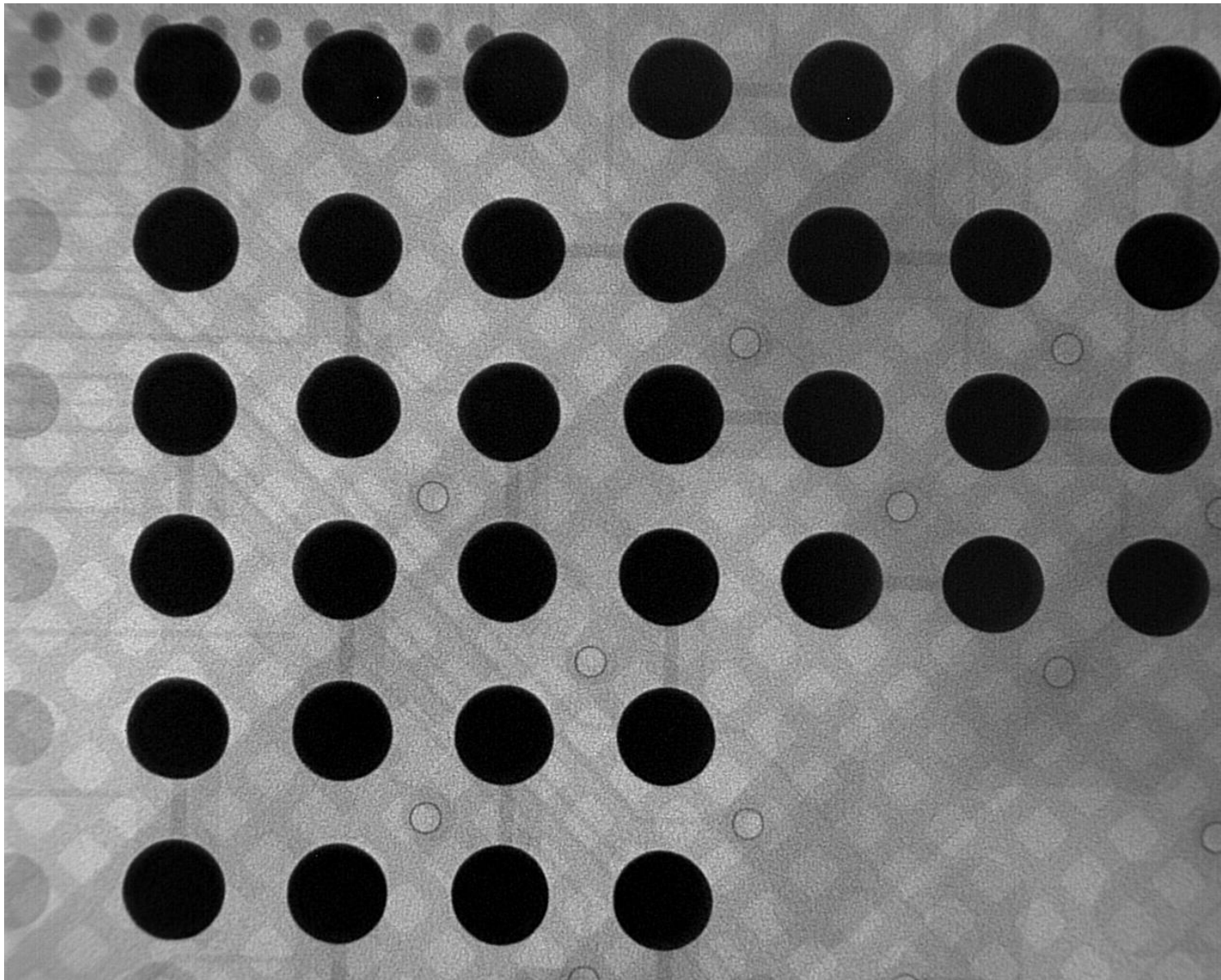
10.0mm



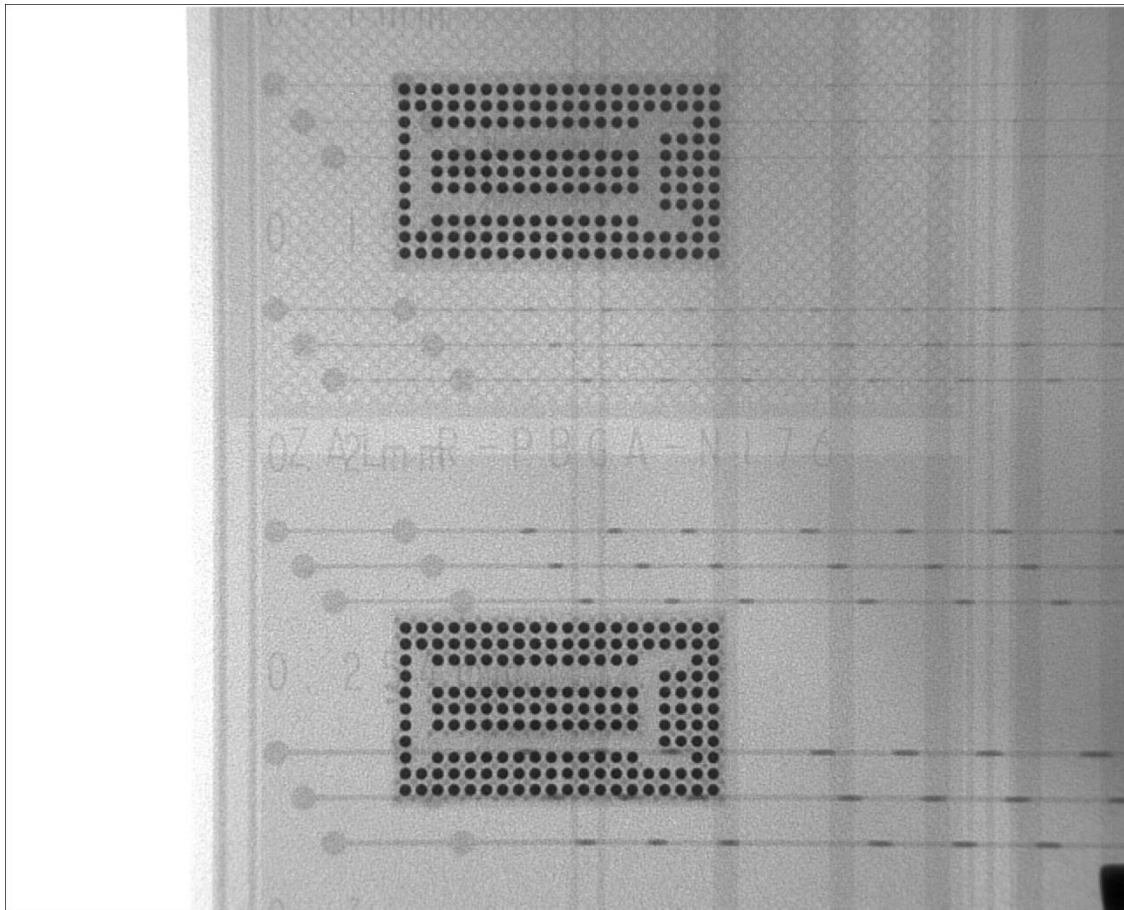
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

R+R 27 / Z – X-Ray nach Rework 1 – BGA 256





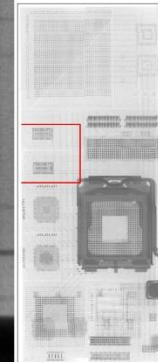
R+R 27 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



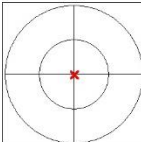
mit
Massefläche



ohne
Massefläche

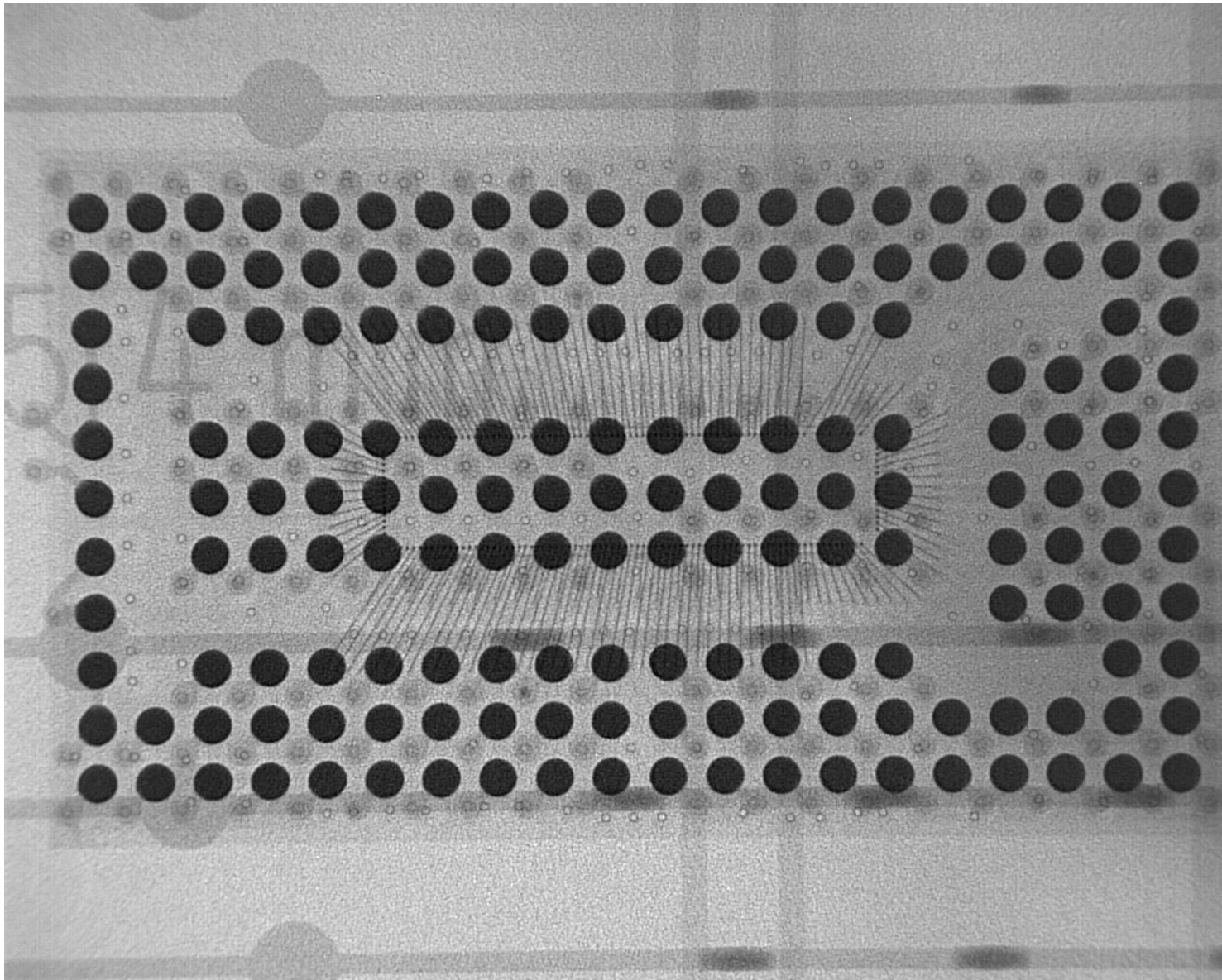


10.0mm

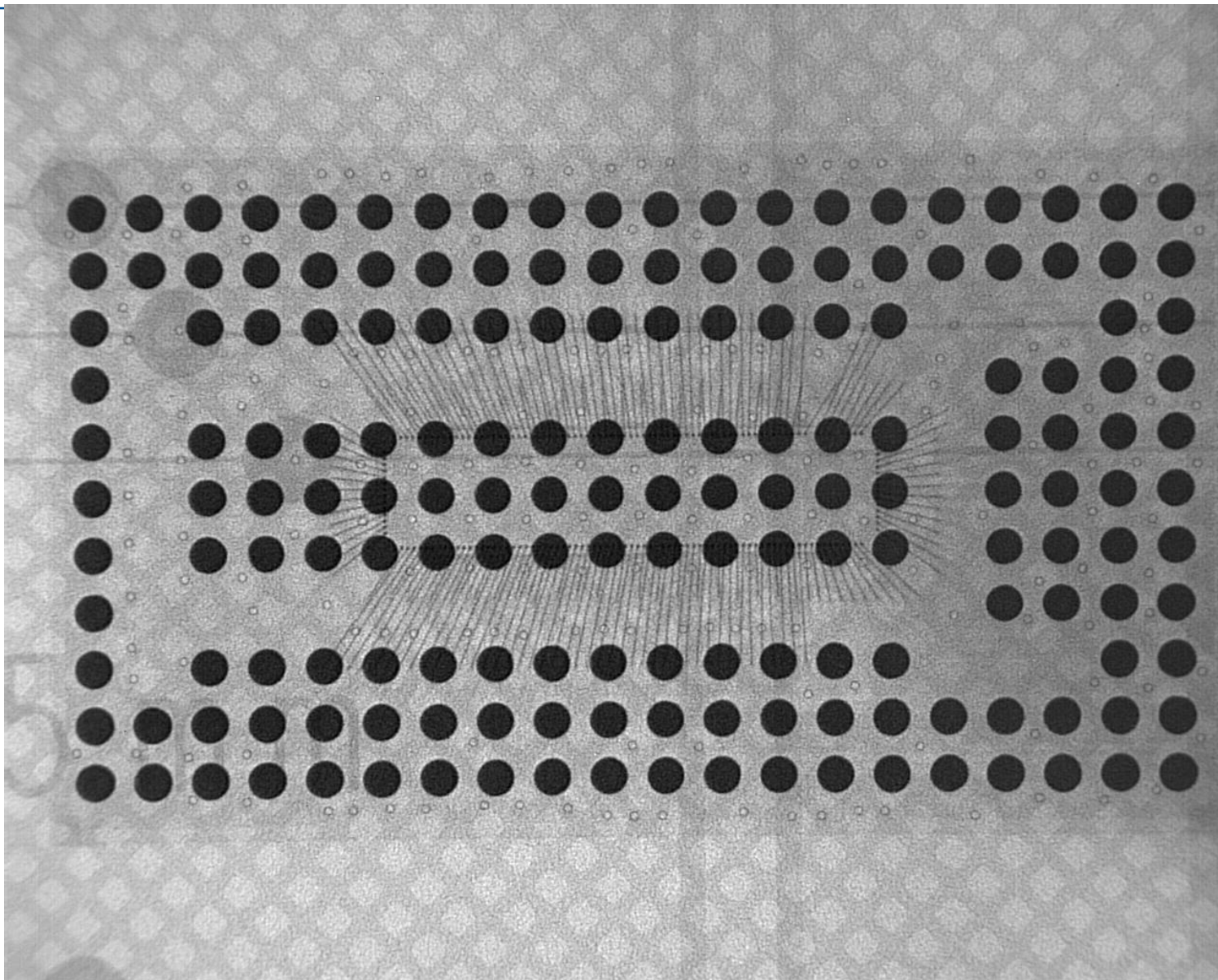


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

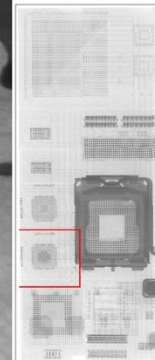
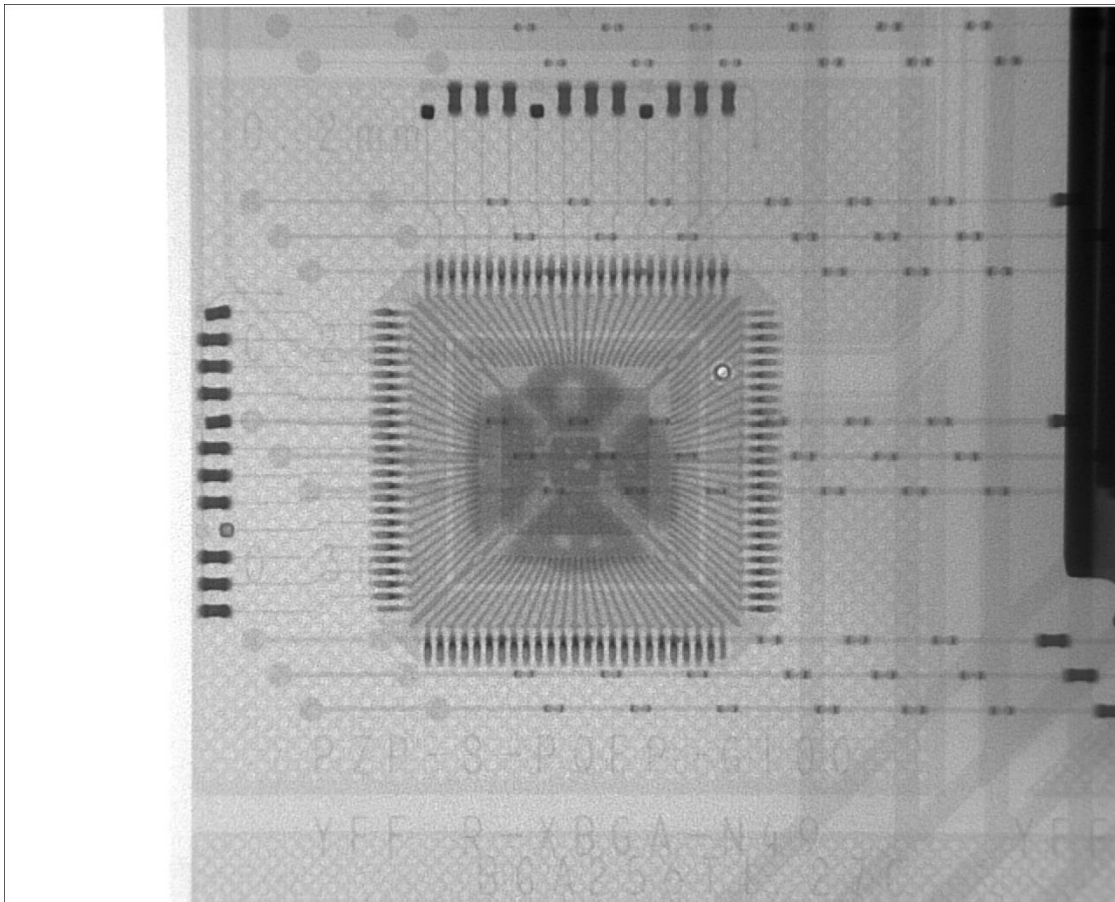
R+R 27 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



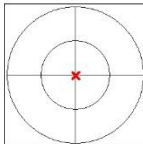
R+R 27 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



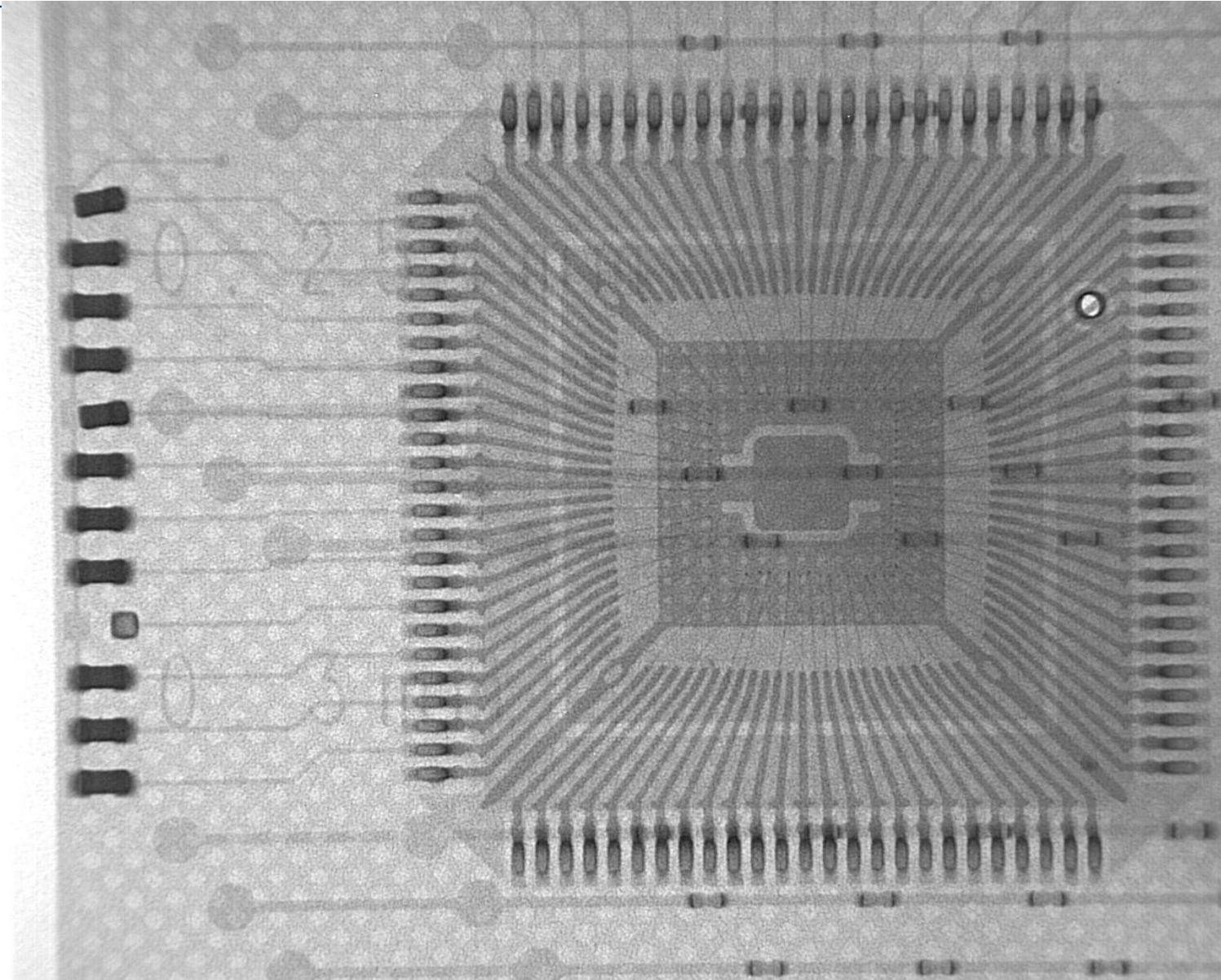
R+R 27 / Z – X-Ray vor Rework – PZP-S-PQFP-G100



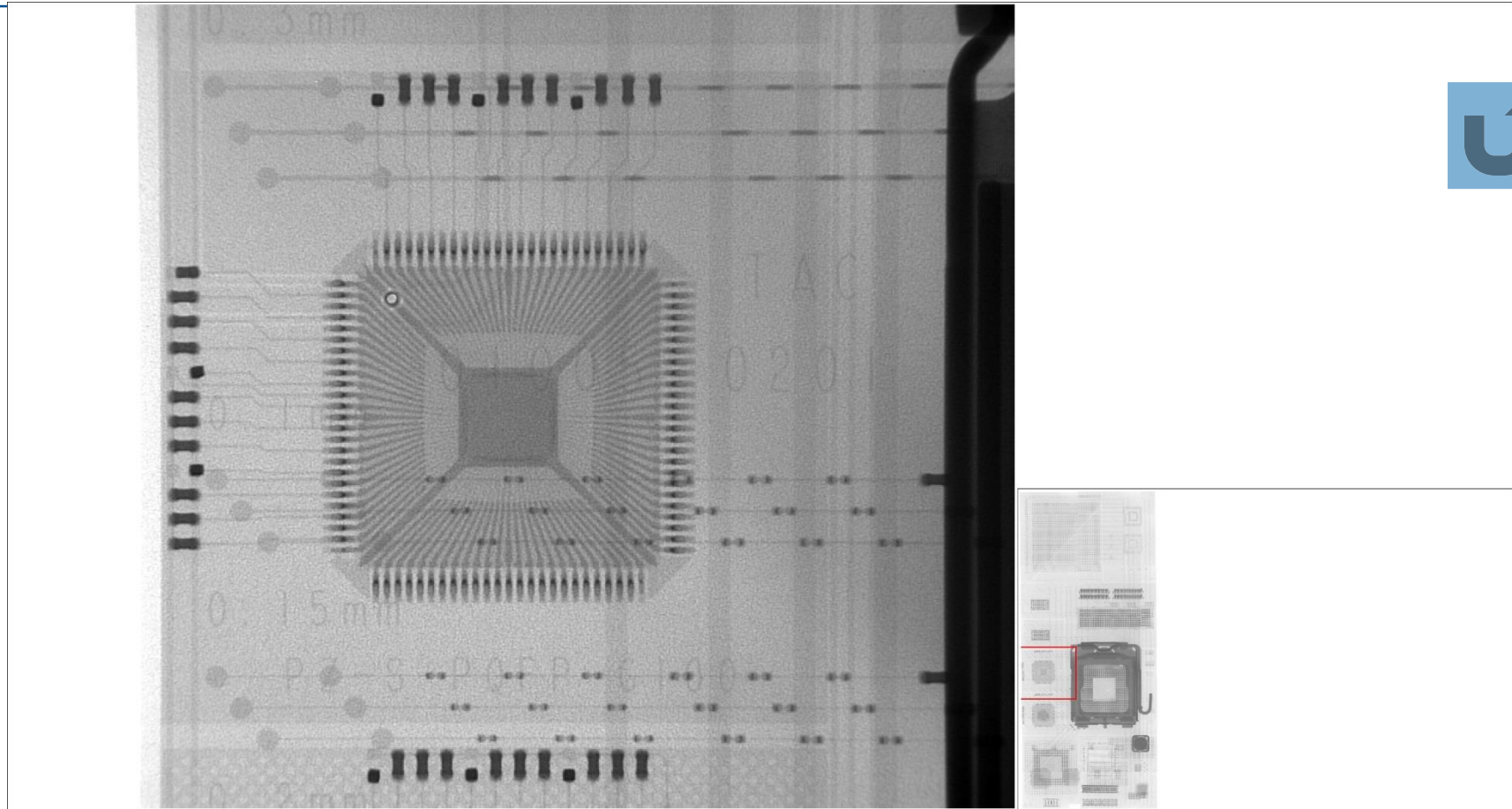
10.0mm



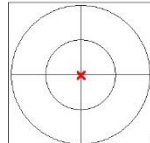
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames



R+R 27 / Z – X-Ray vor Rework – PZ-S-PQFP-G100

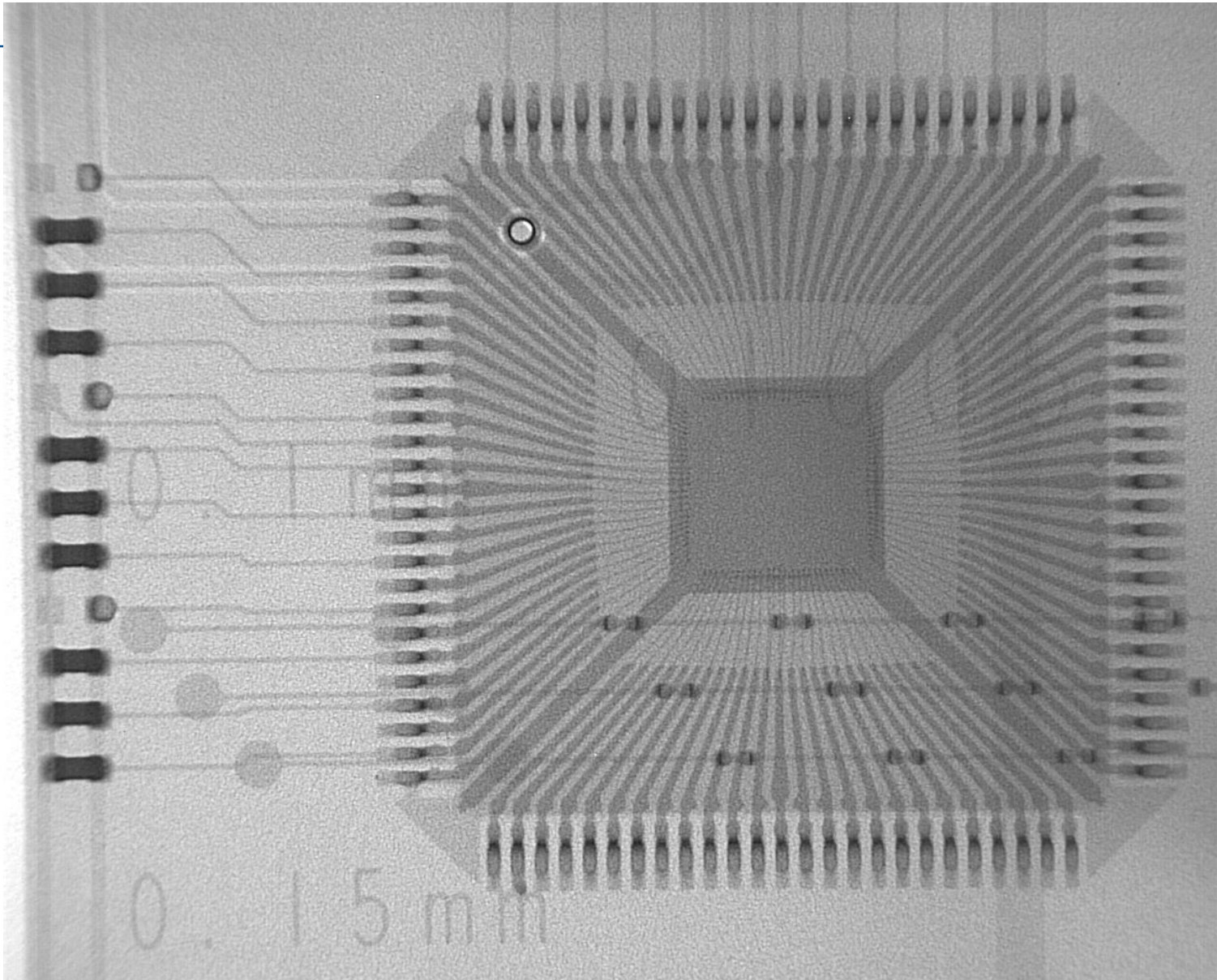


10.0mm



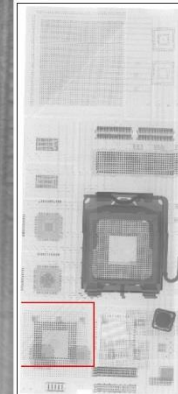
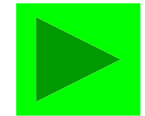
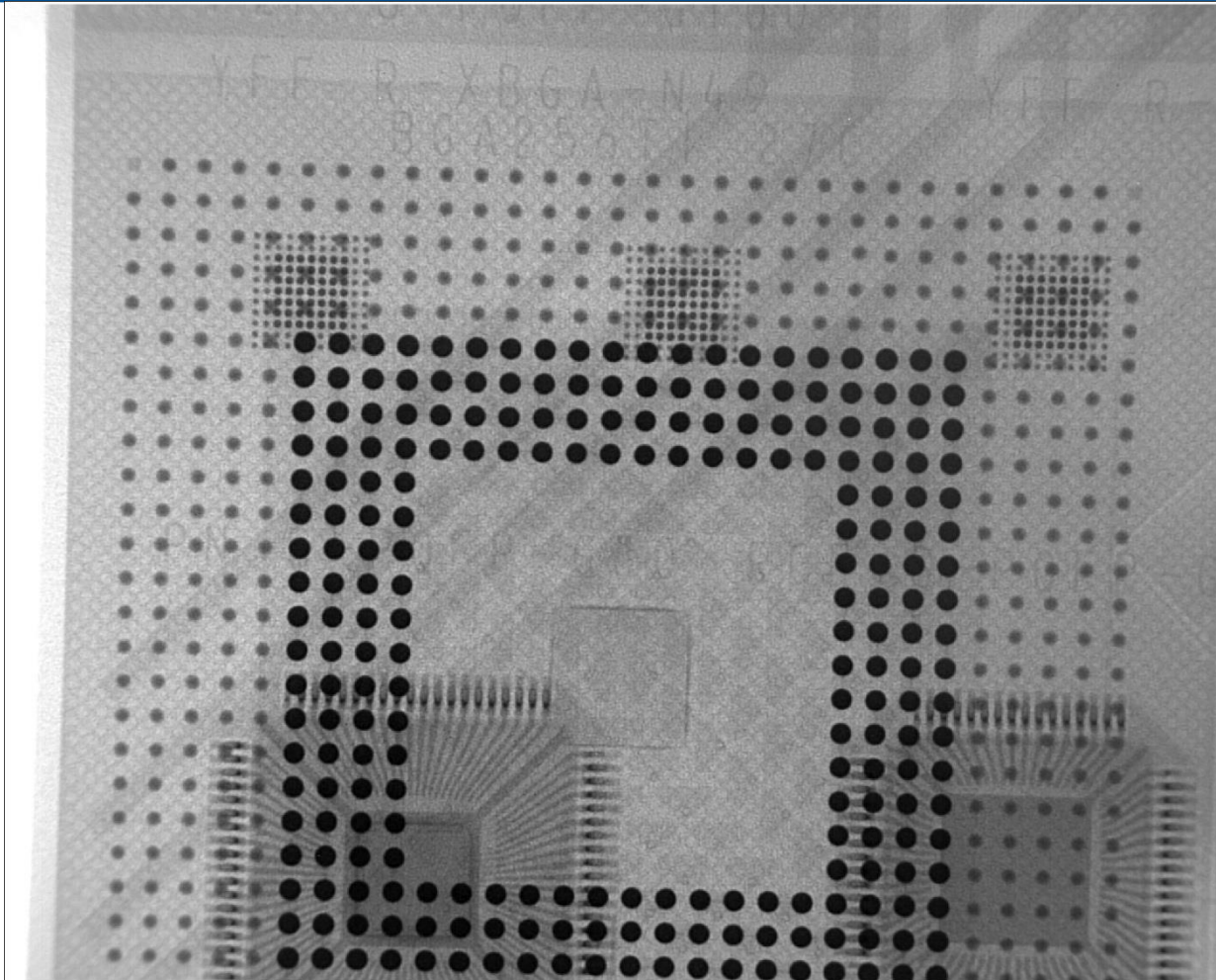
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

R+R 27 / Z – X-Ray nach Rework 1 – PZ-S-PQFP-G100

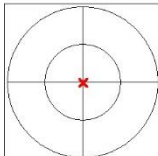


Baugruppe

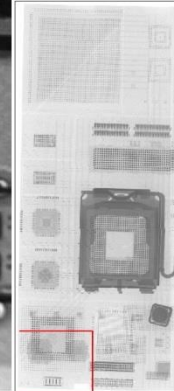
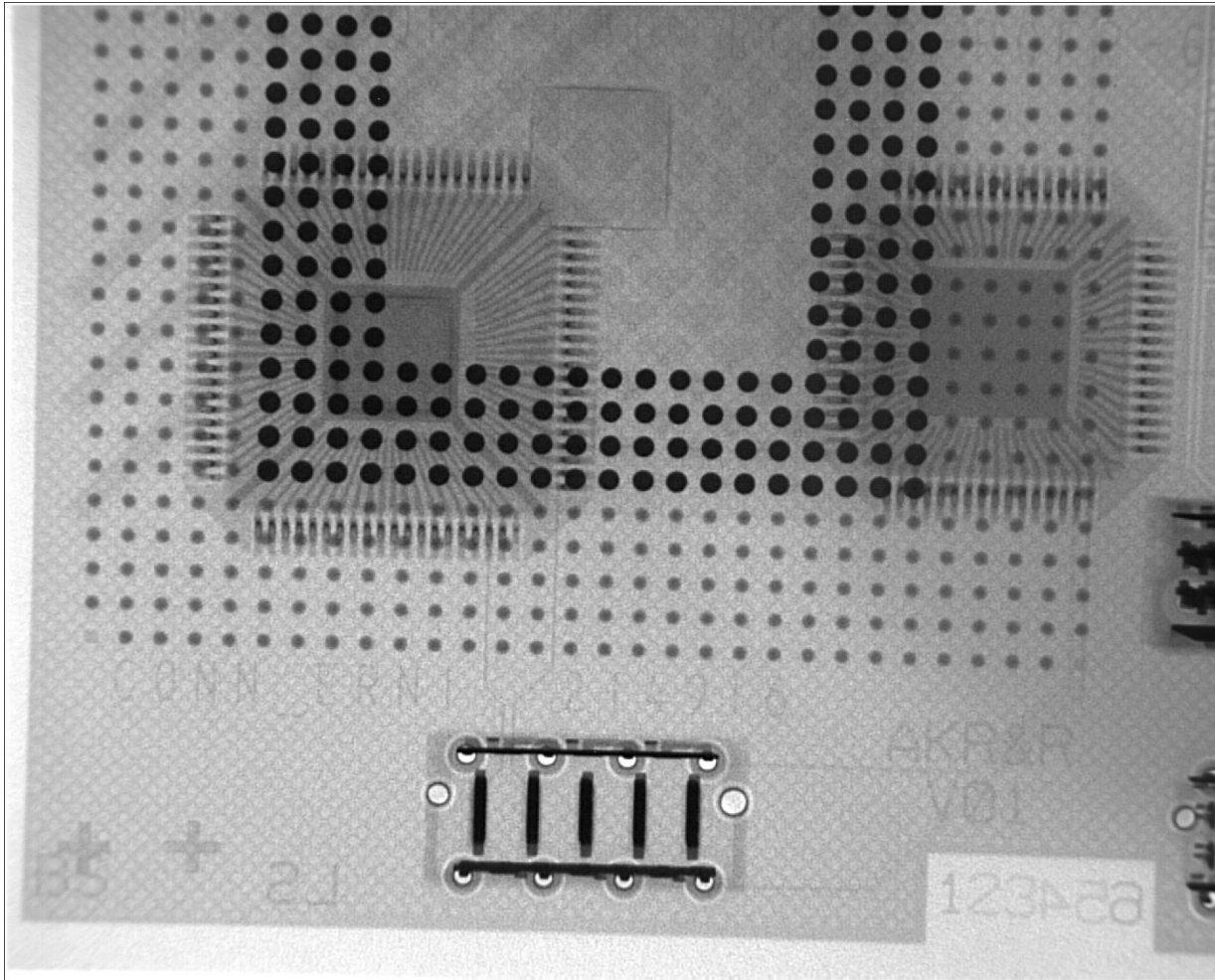
R+R 28 / Z



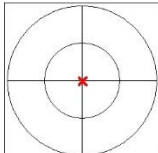
10.0mm



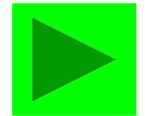
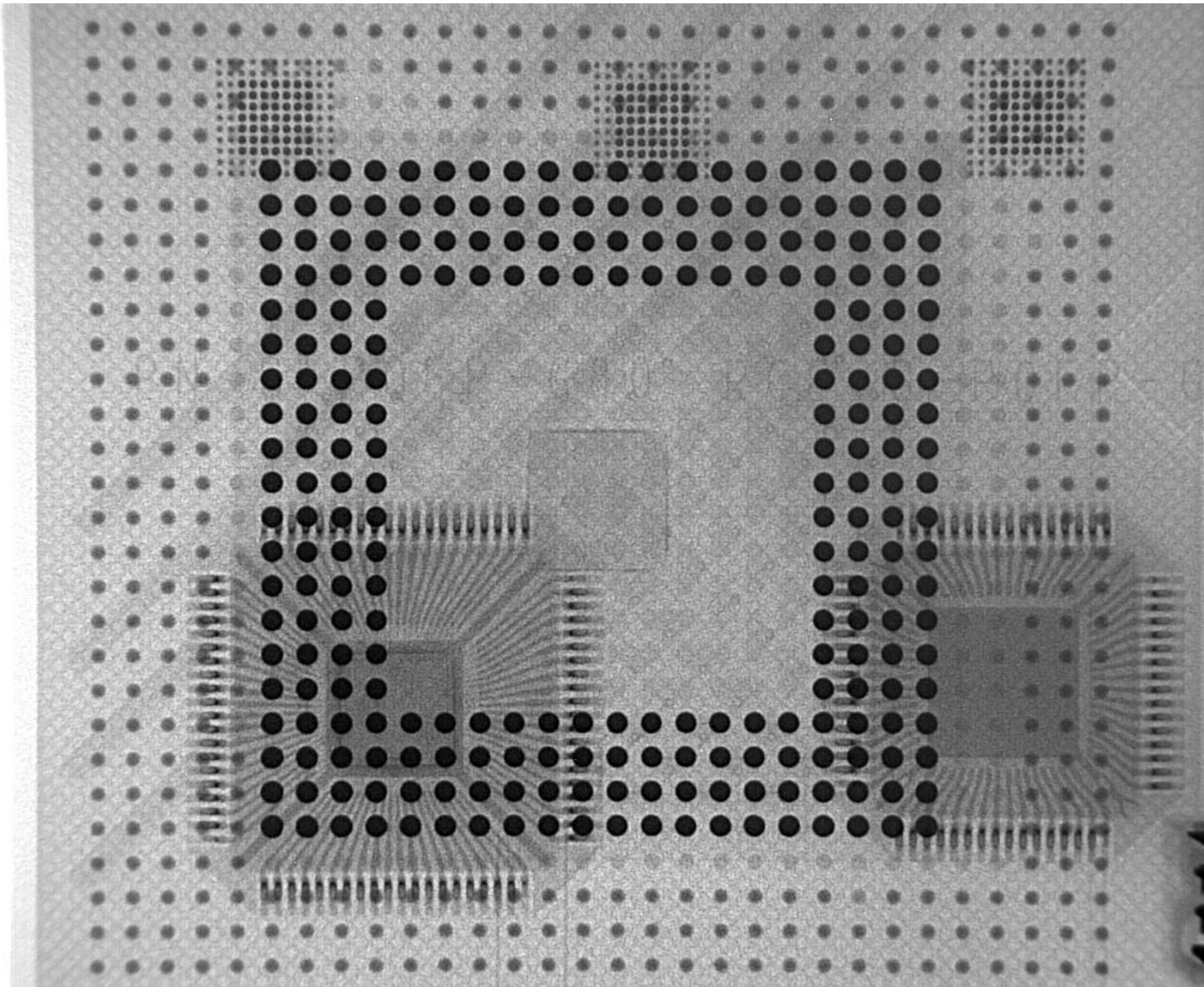
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

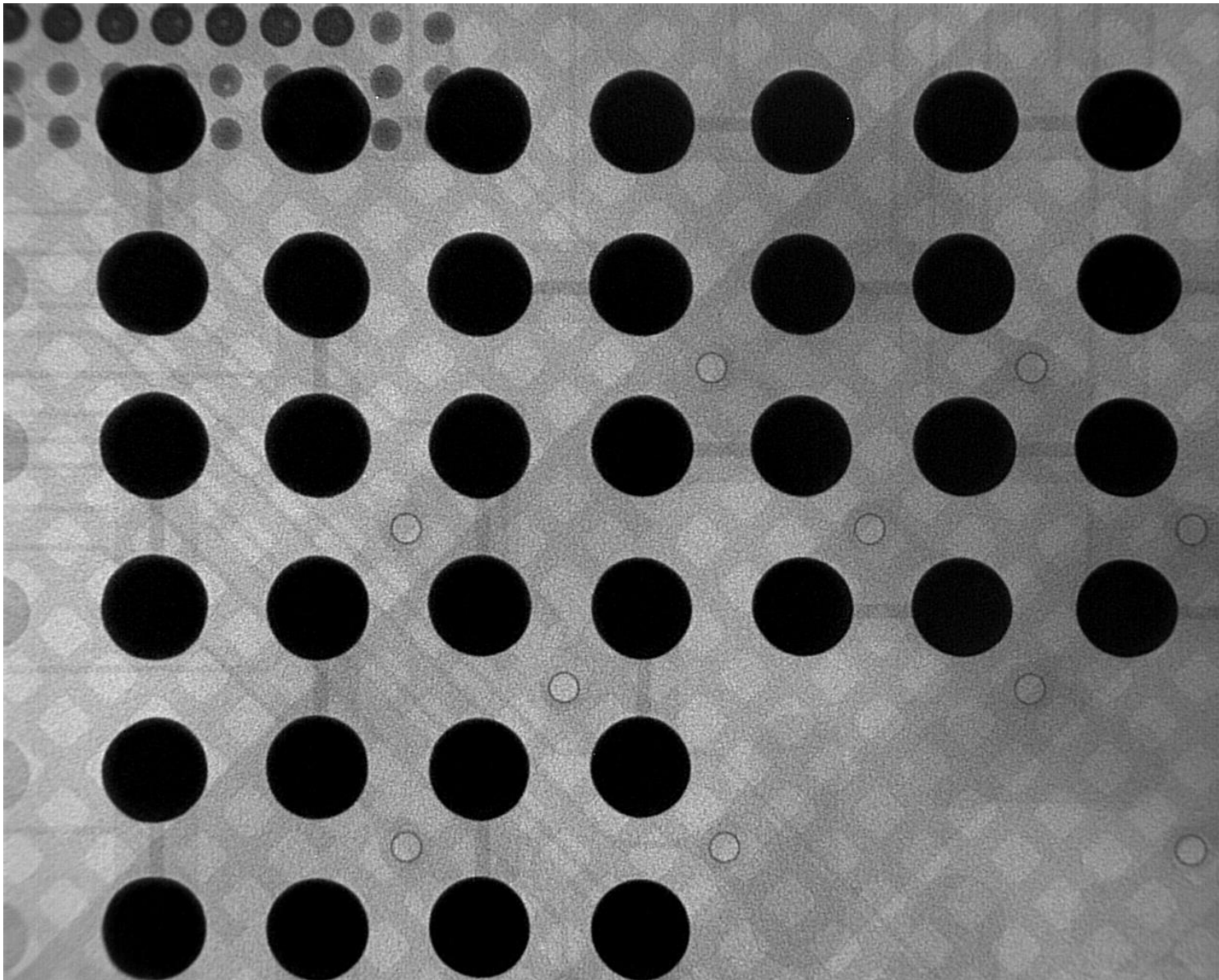


10.0mm

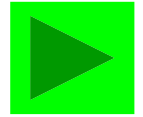
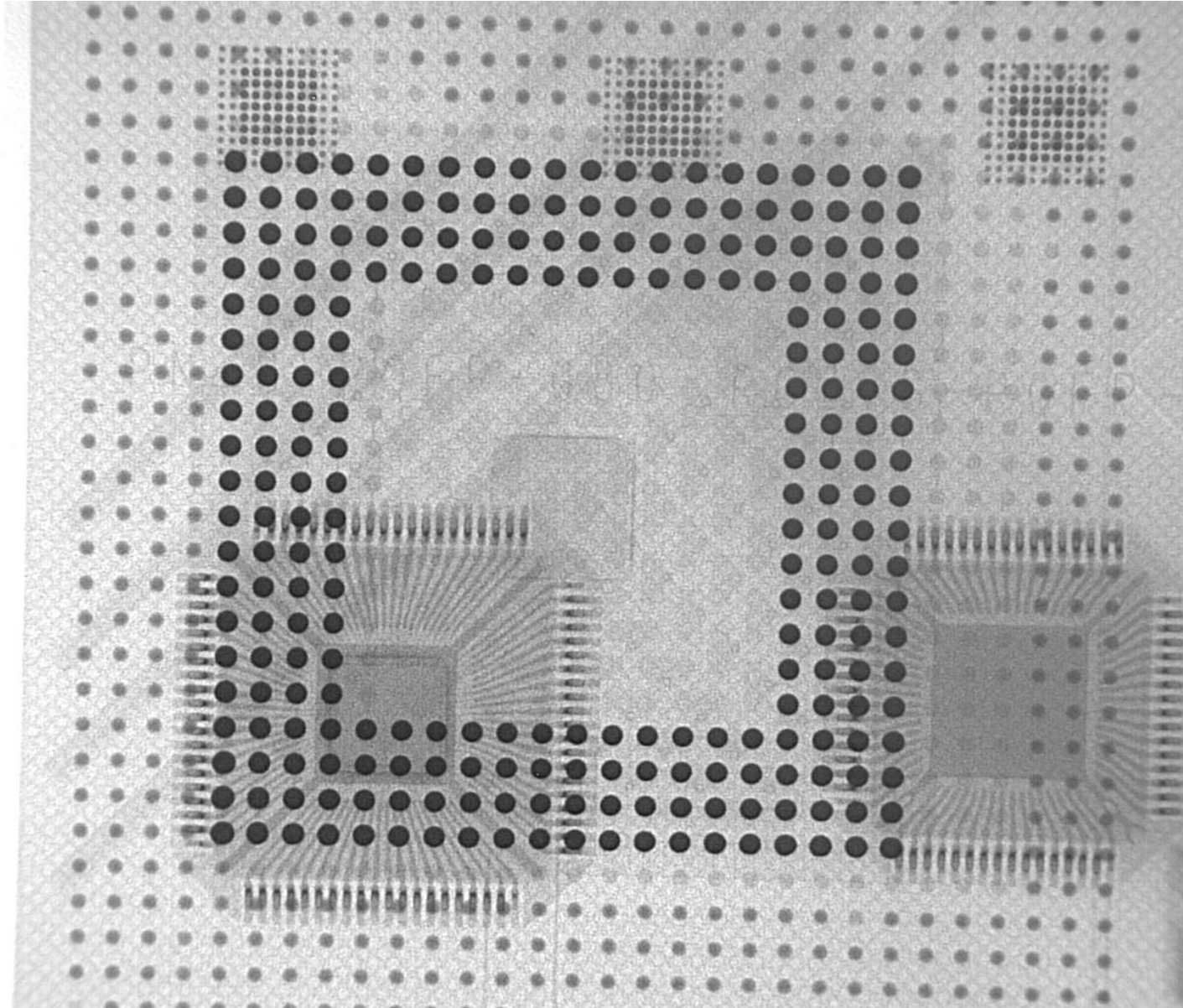


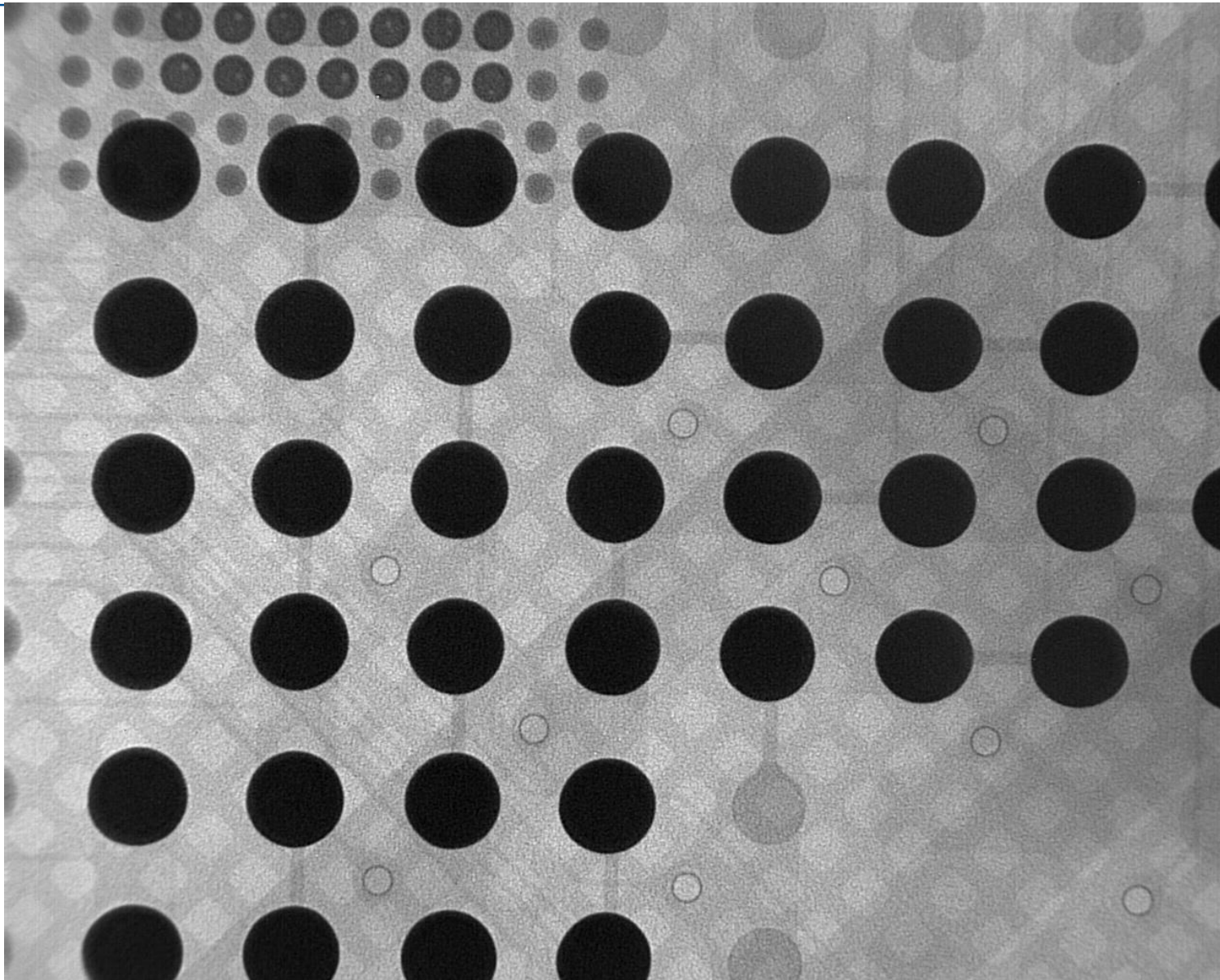
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

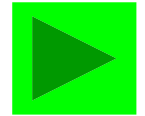
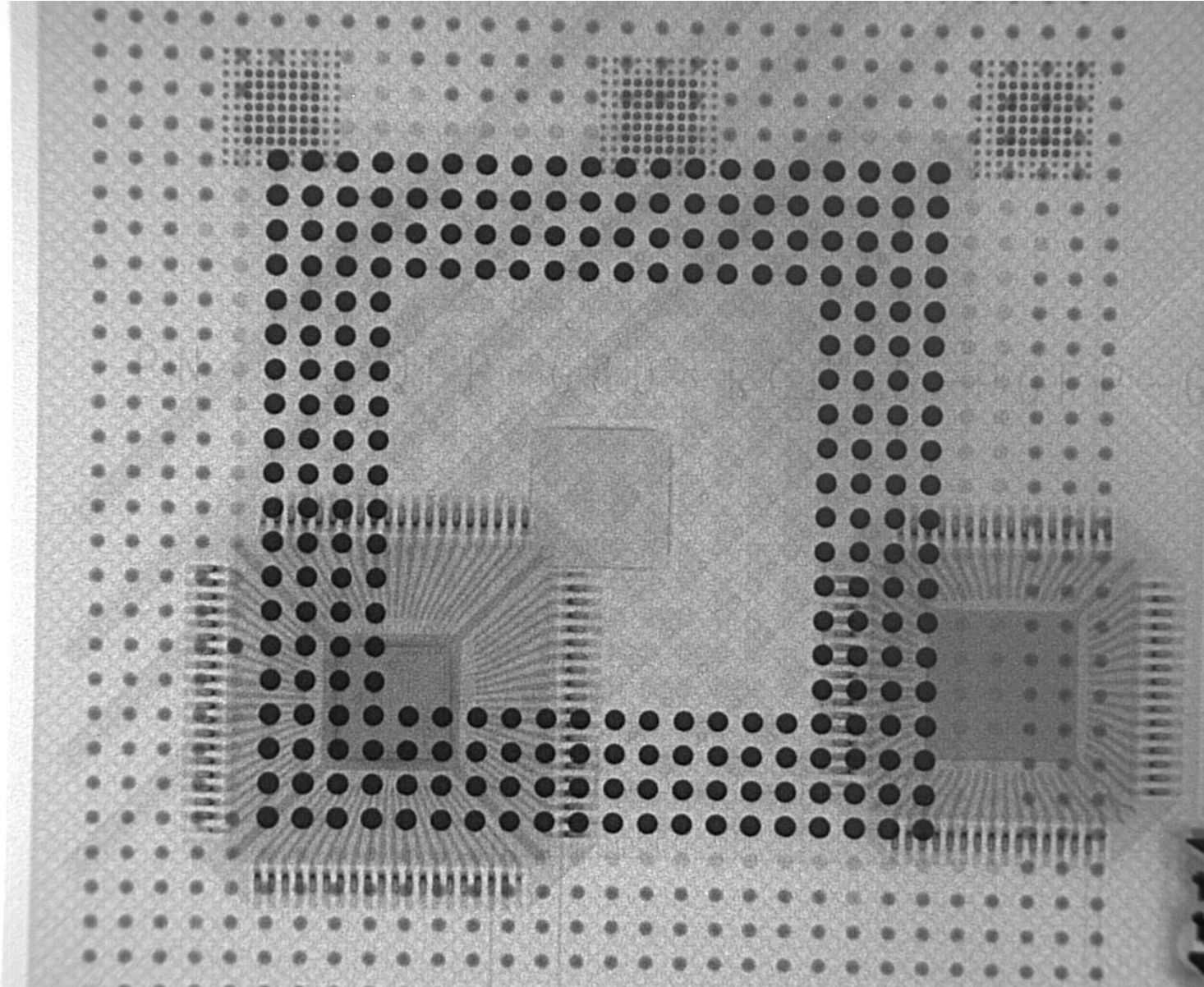


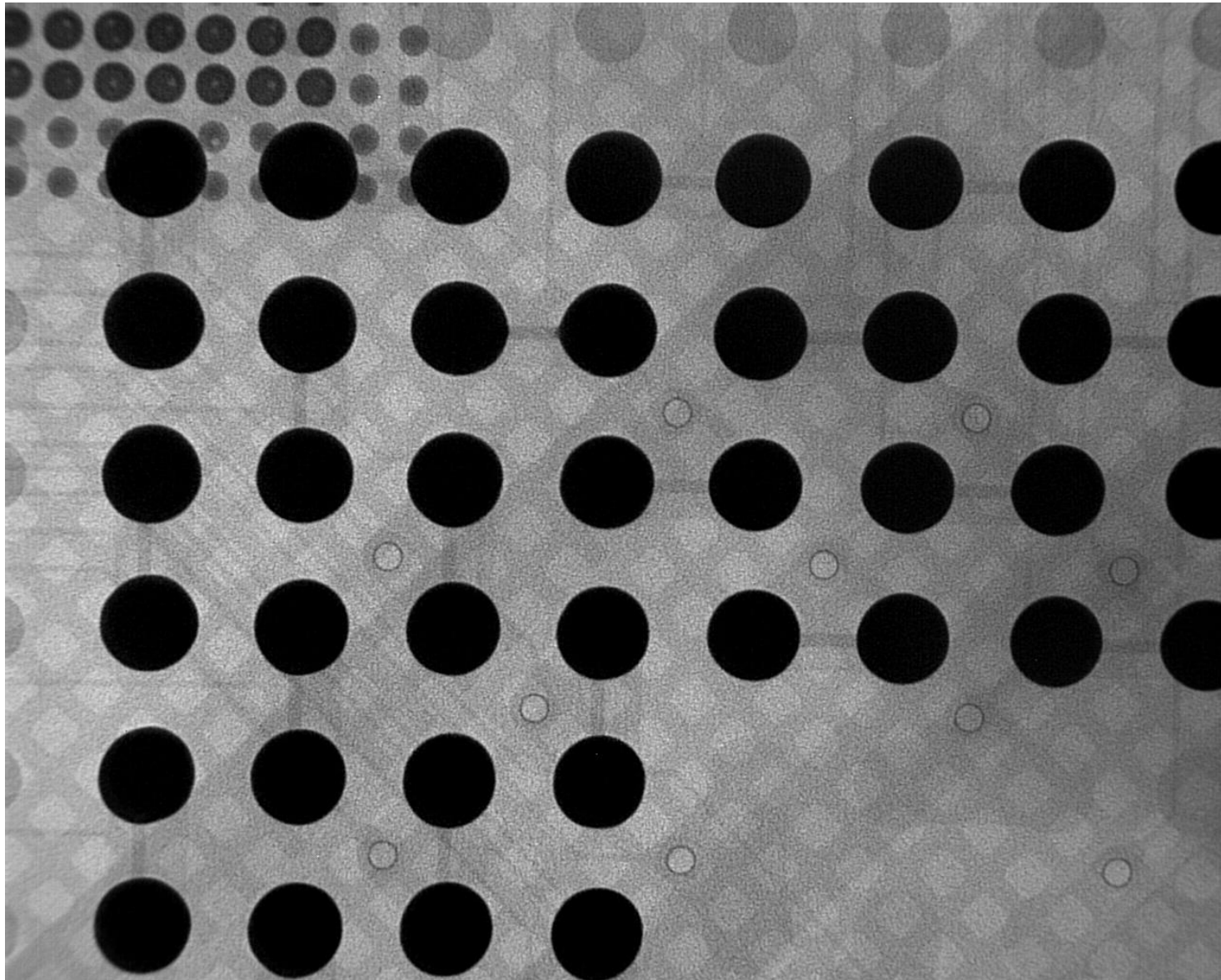


R+R 28 / Z – X-Ray nach Rework 2 – BGA 256

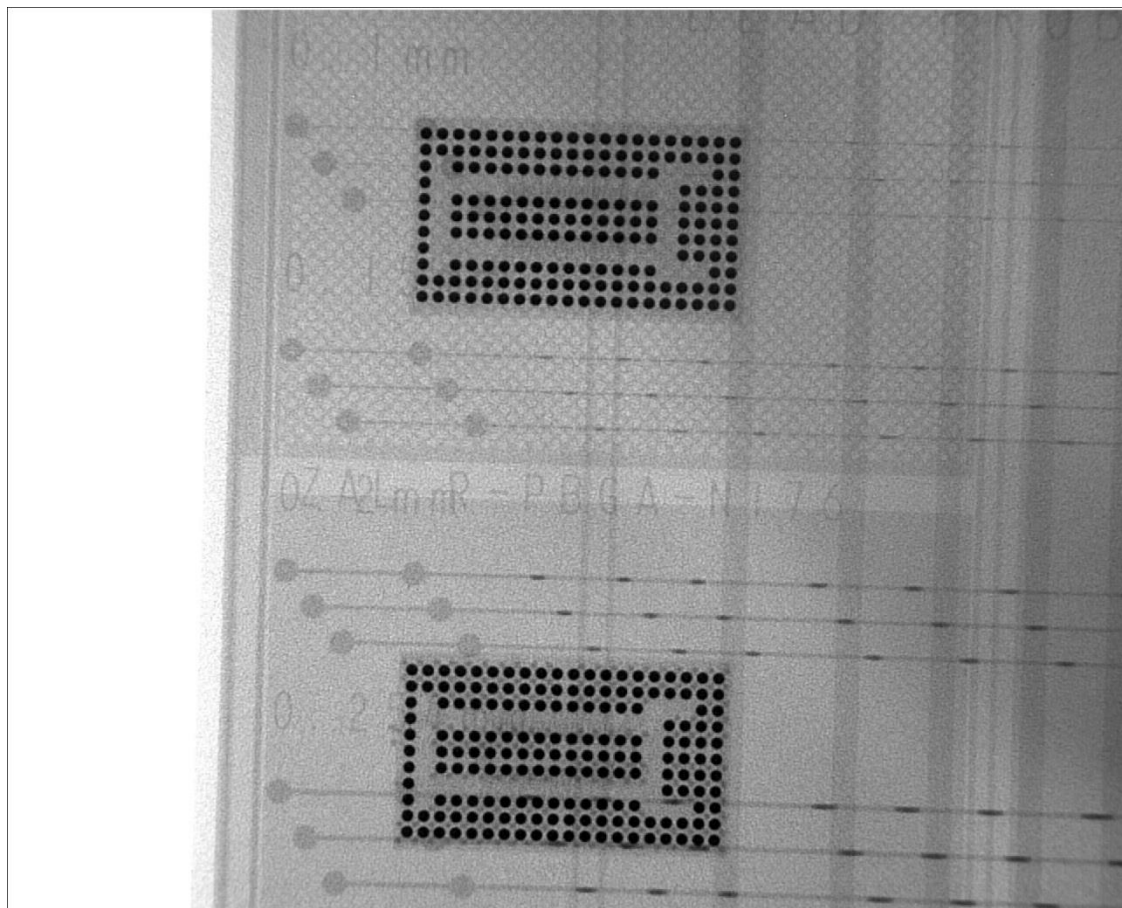








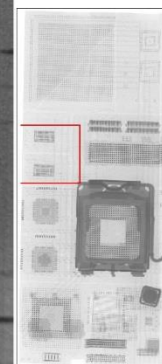
R+R 28 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



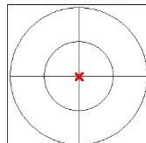
mit
Massefläche



ohne
Massefläche

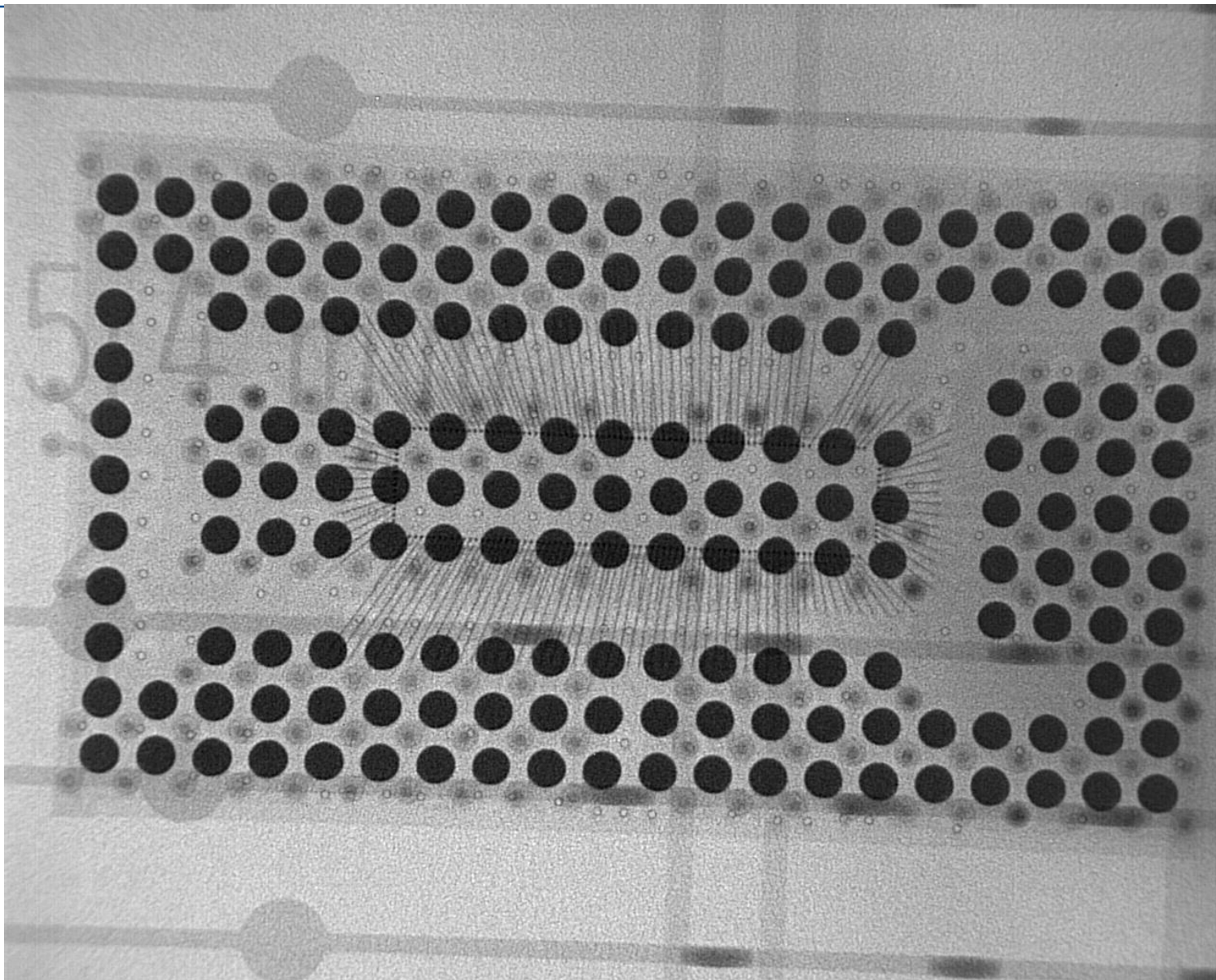


10.0mm

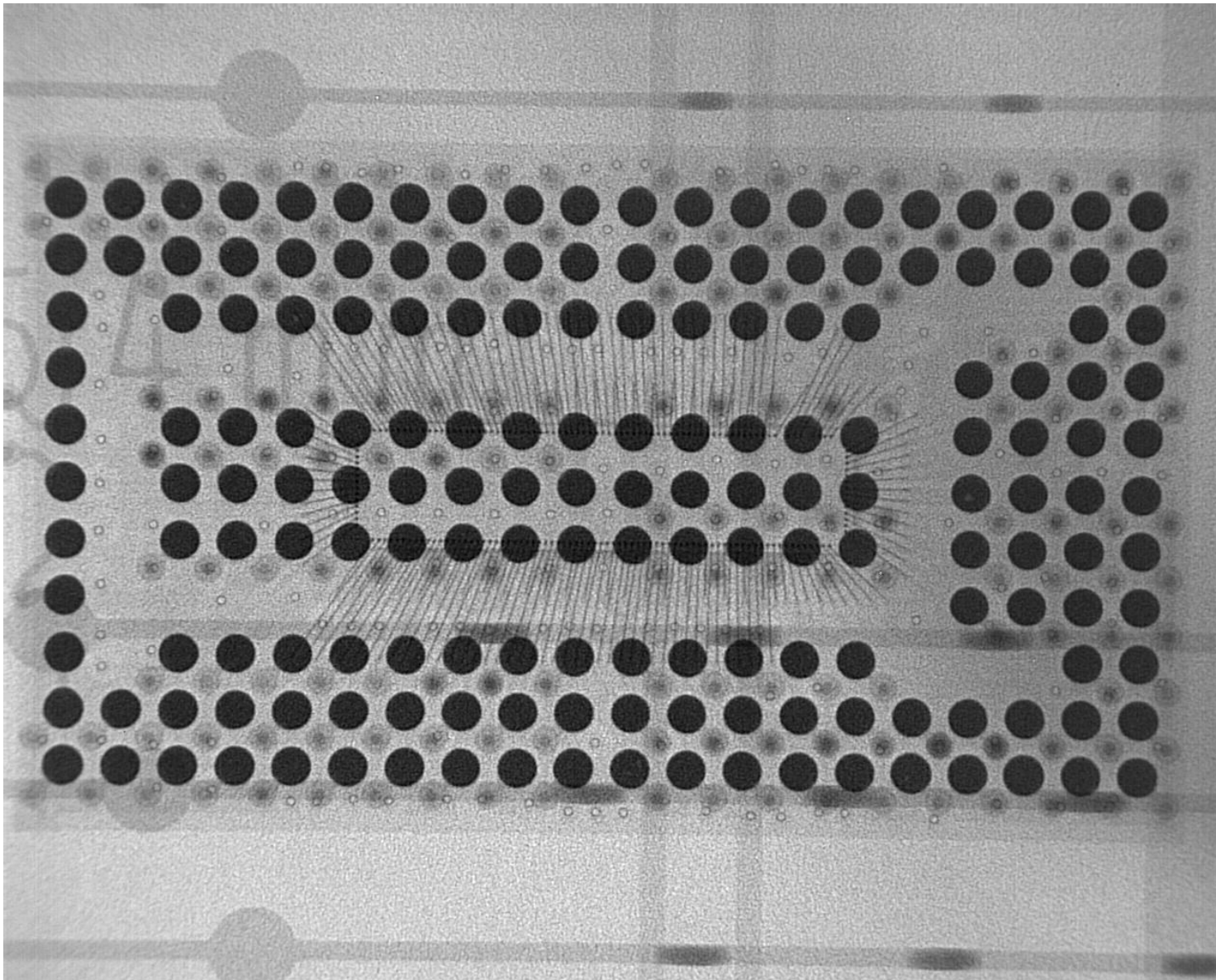


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

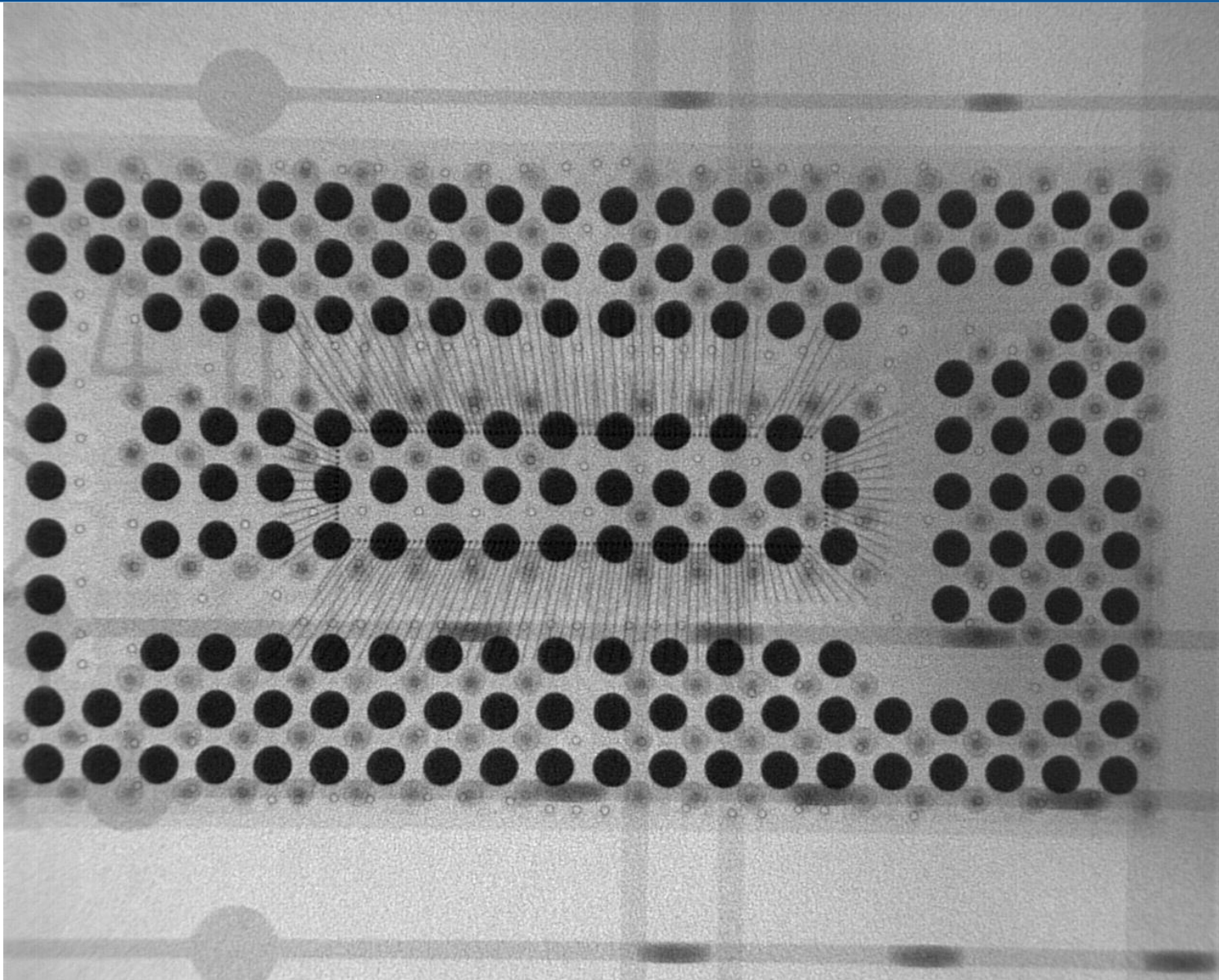
R+R 28 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



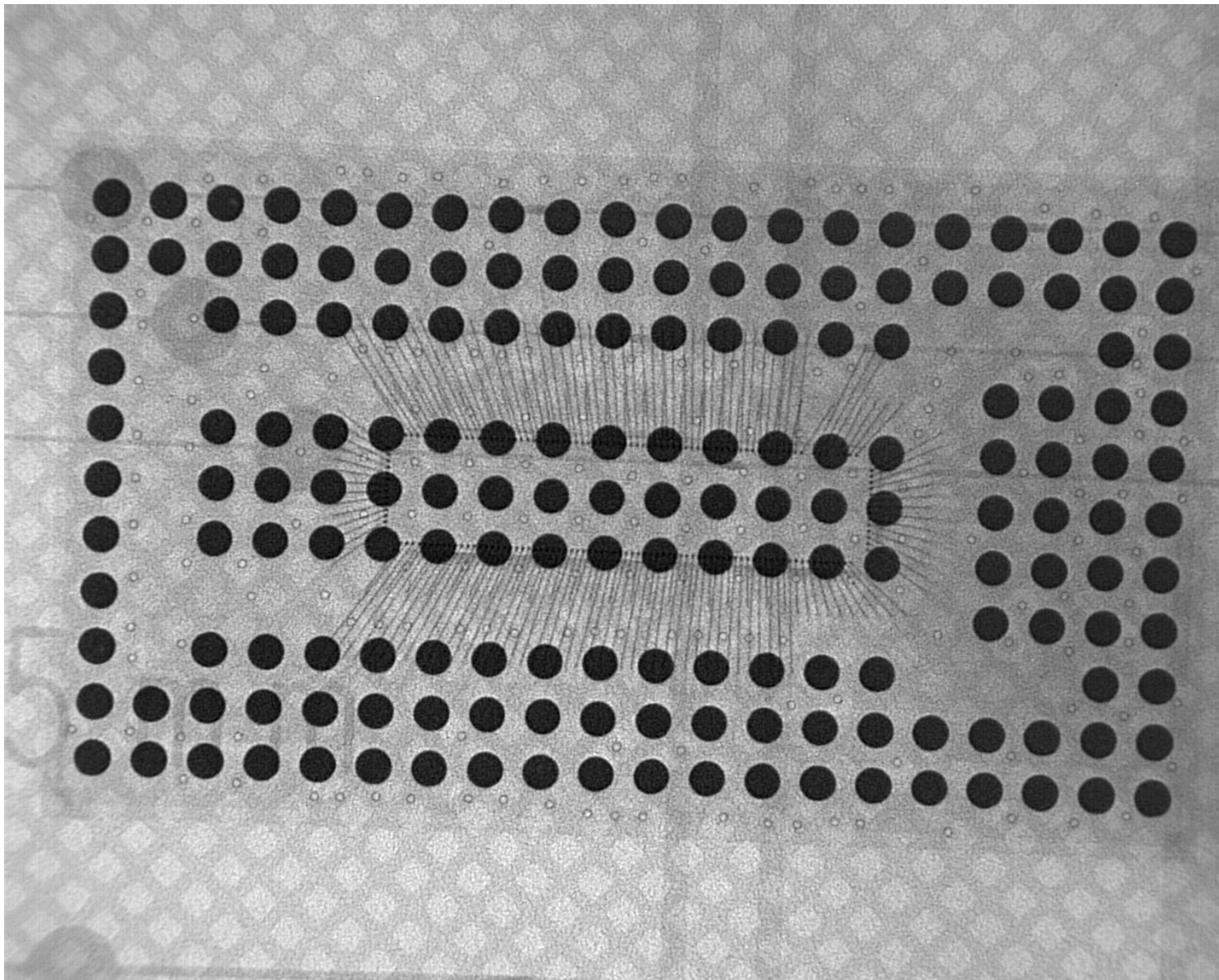
R+R 28 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (mit Massefläche)



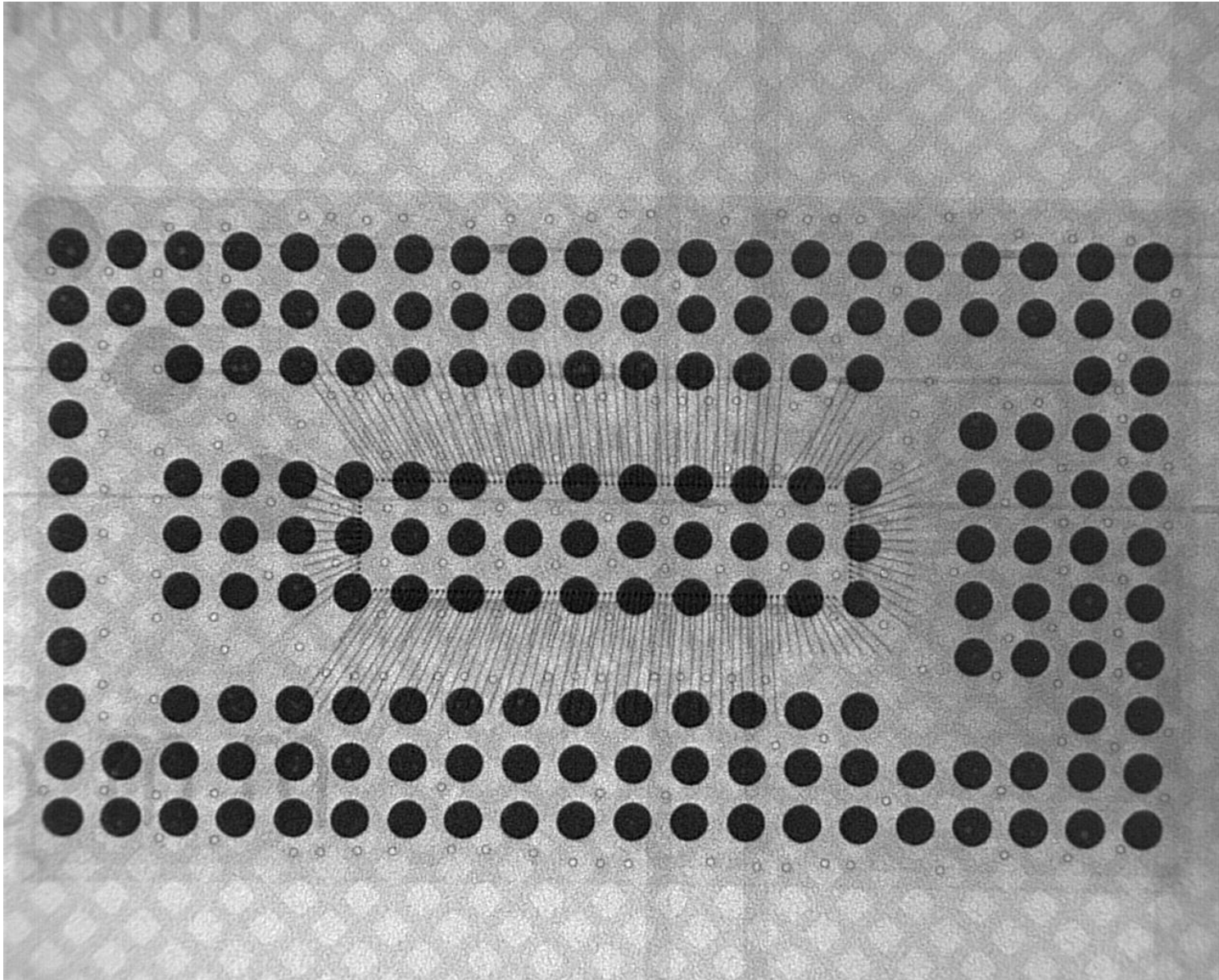
R+R 28 / Z – X-Ray nach Rework 3 – ZAL R-PBGA-N176 (mit Massefläche)



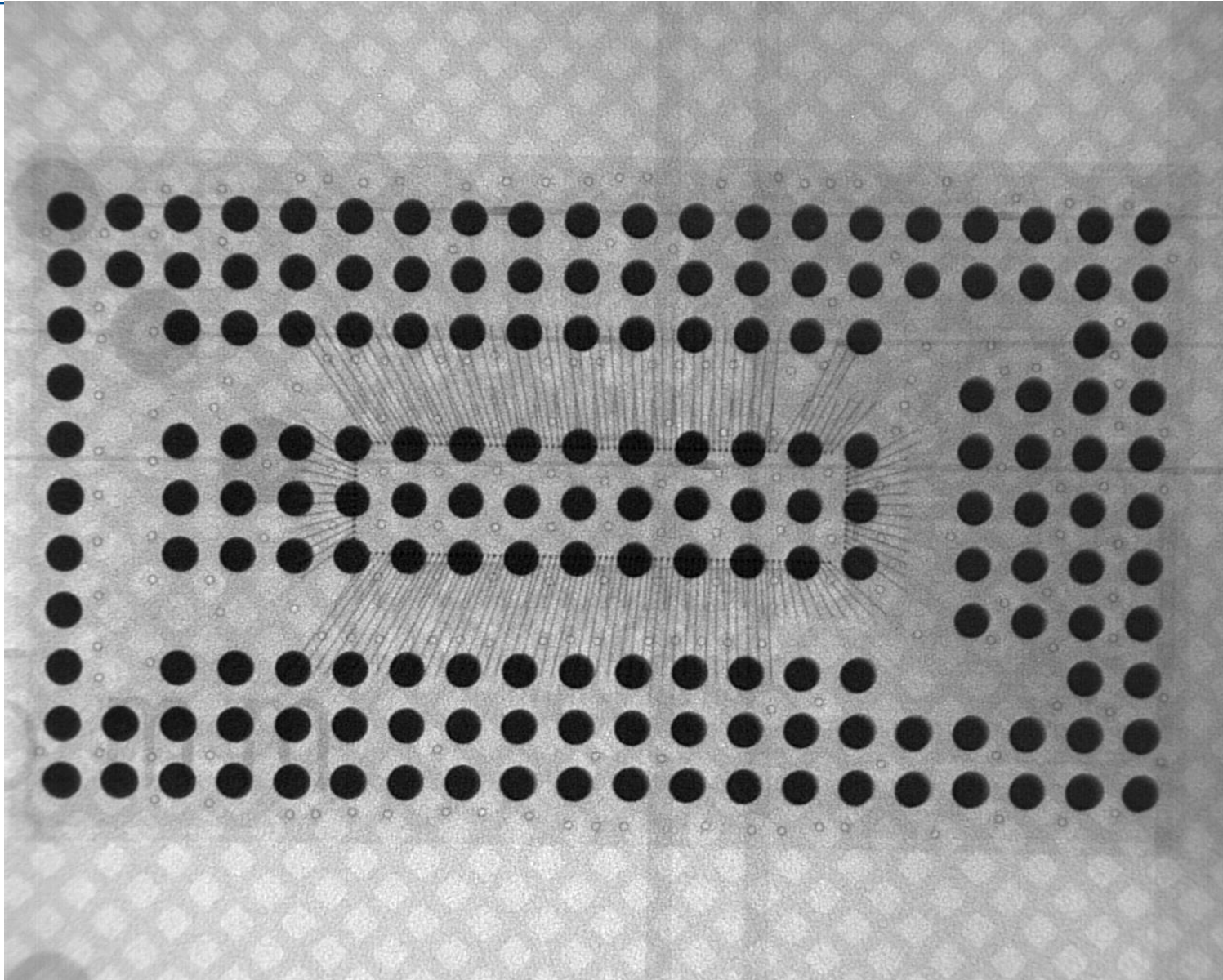
R+R 28 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)

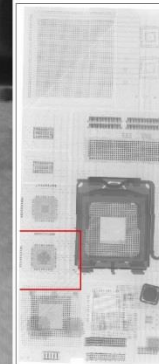
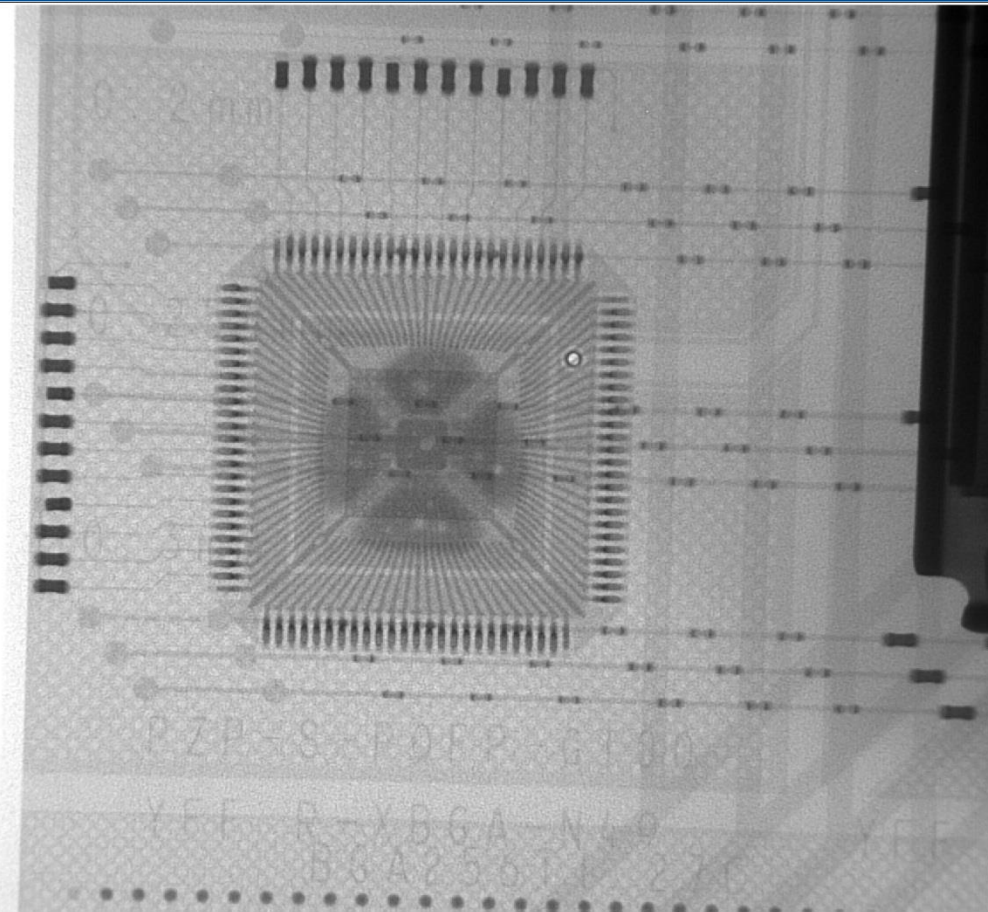


R+R 28 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)

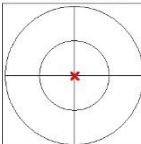


R+R 28 / Z – X-Ray nach Rework 3 – ZAL R-PBGA-N176 (ohne Massefläche)

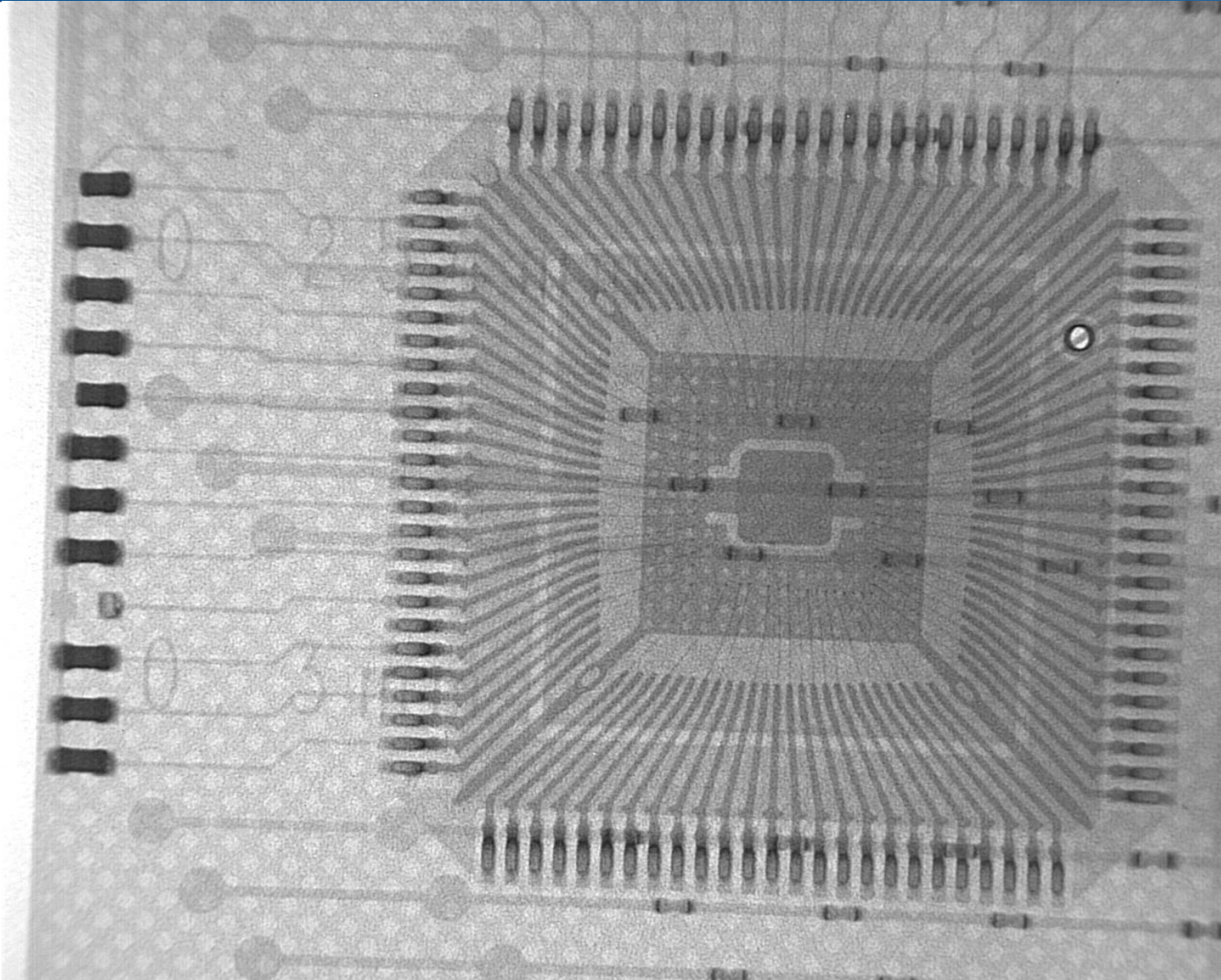


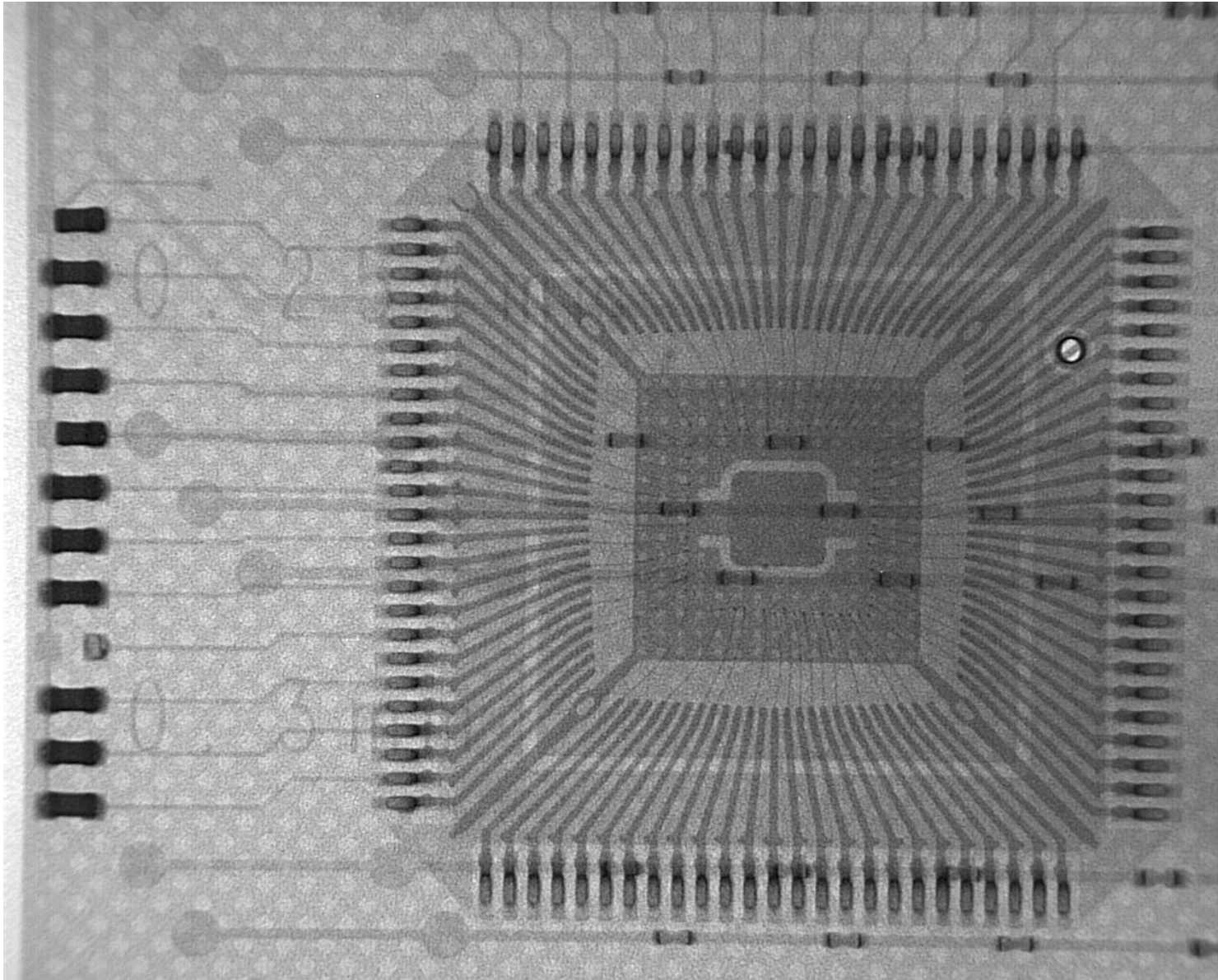


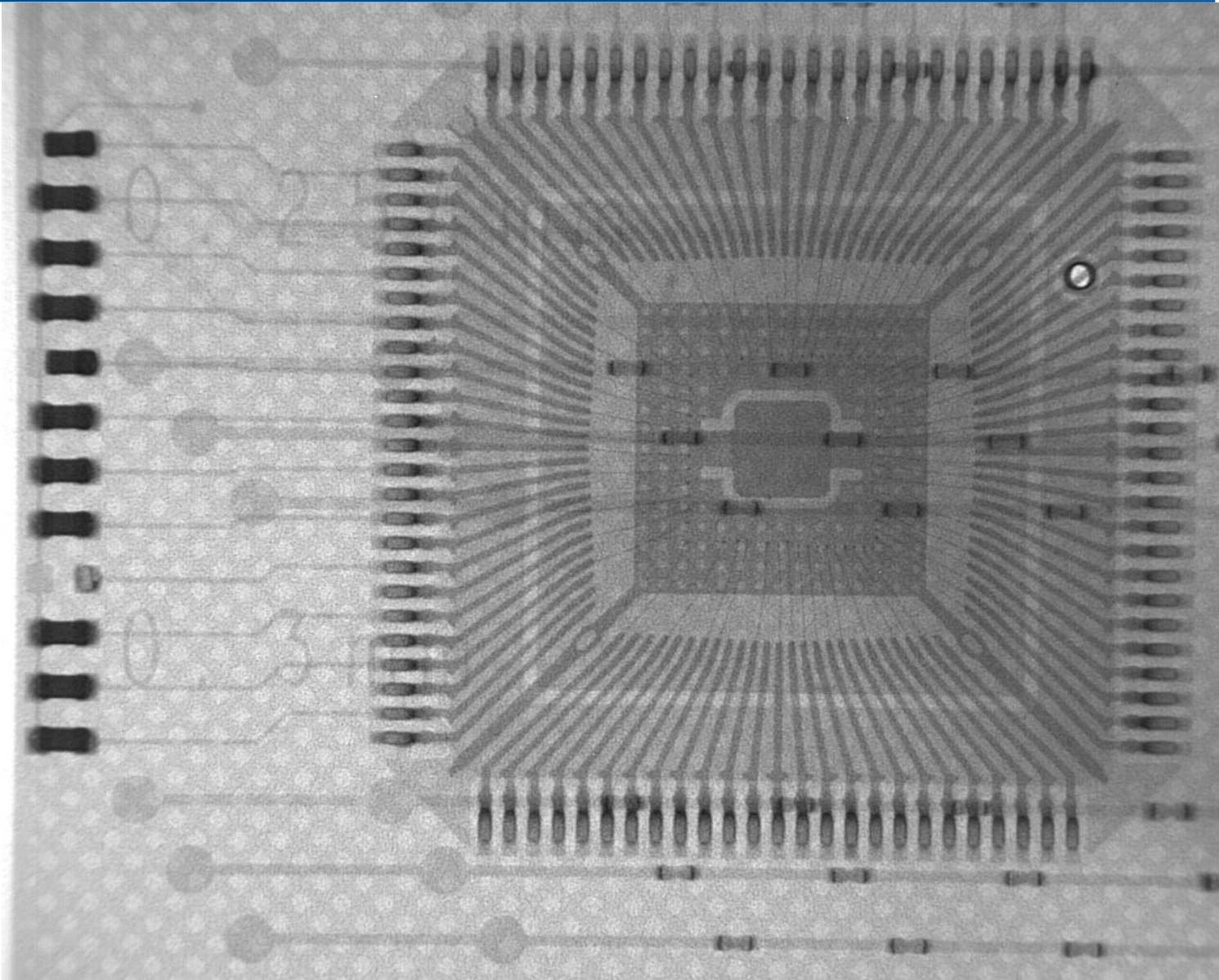
10.0mm



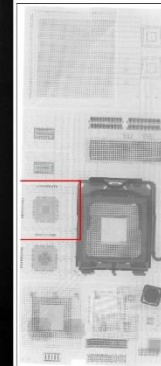
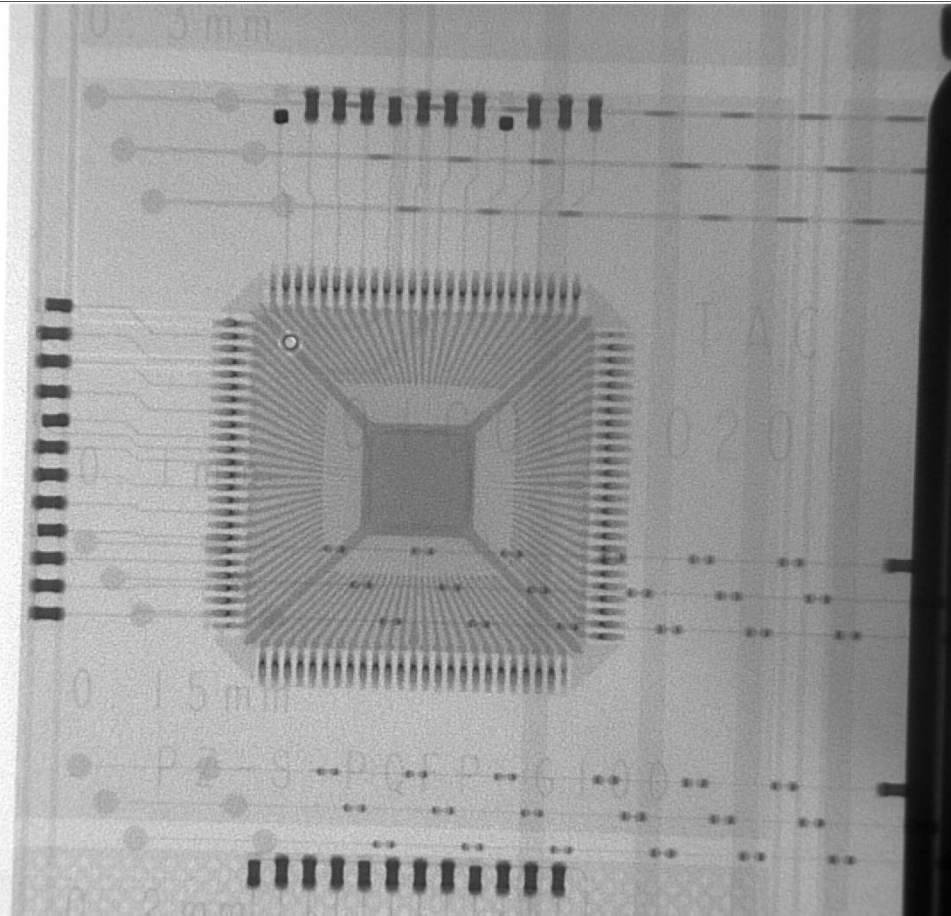
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames



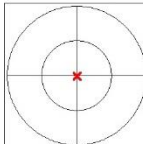




R+R 28 / Z – X-Ray vor Rework – PZ-S-PQFP-G100

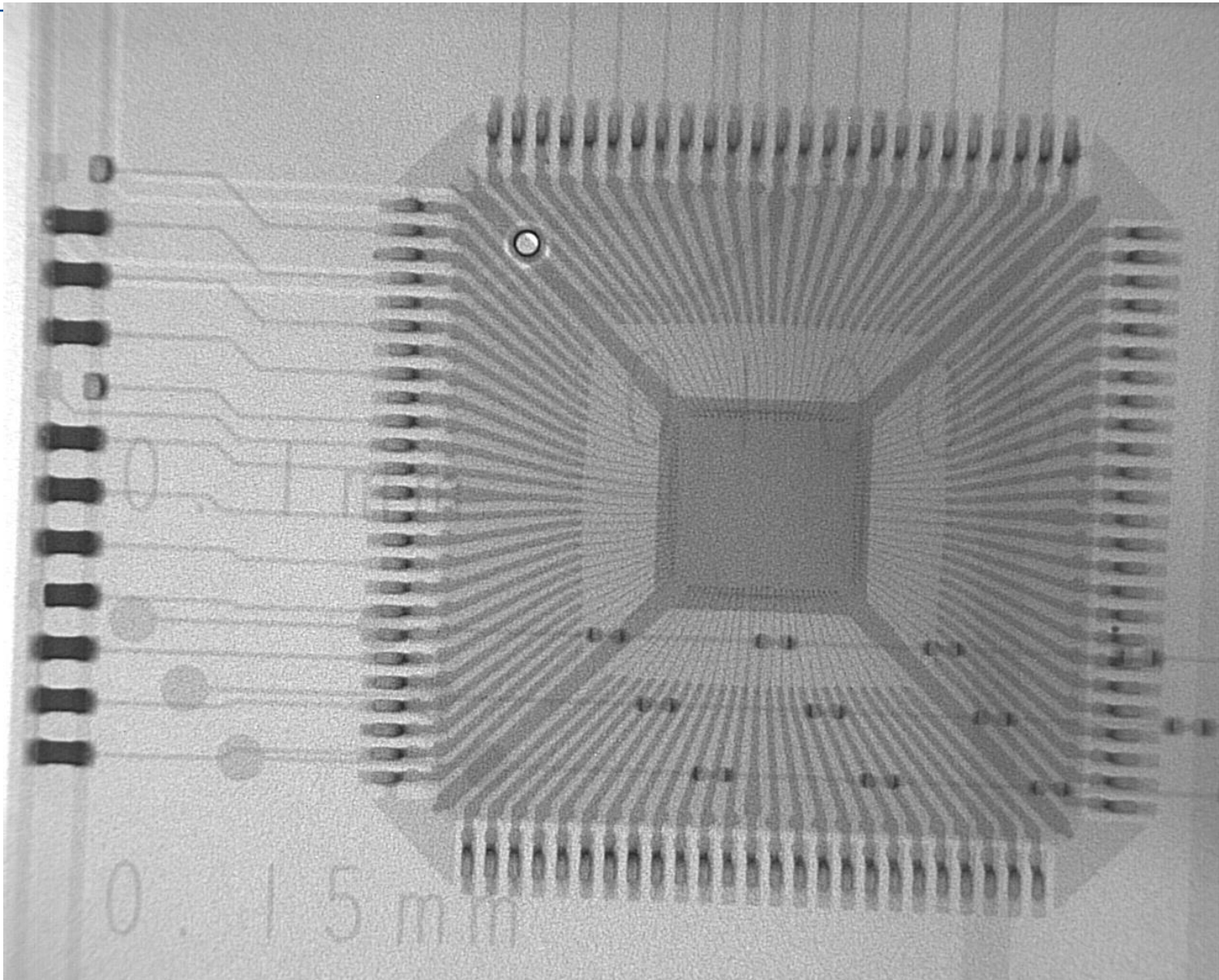


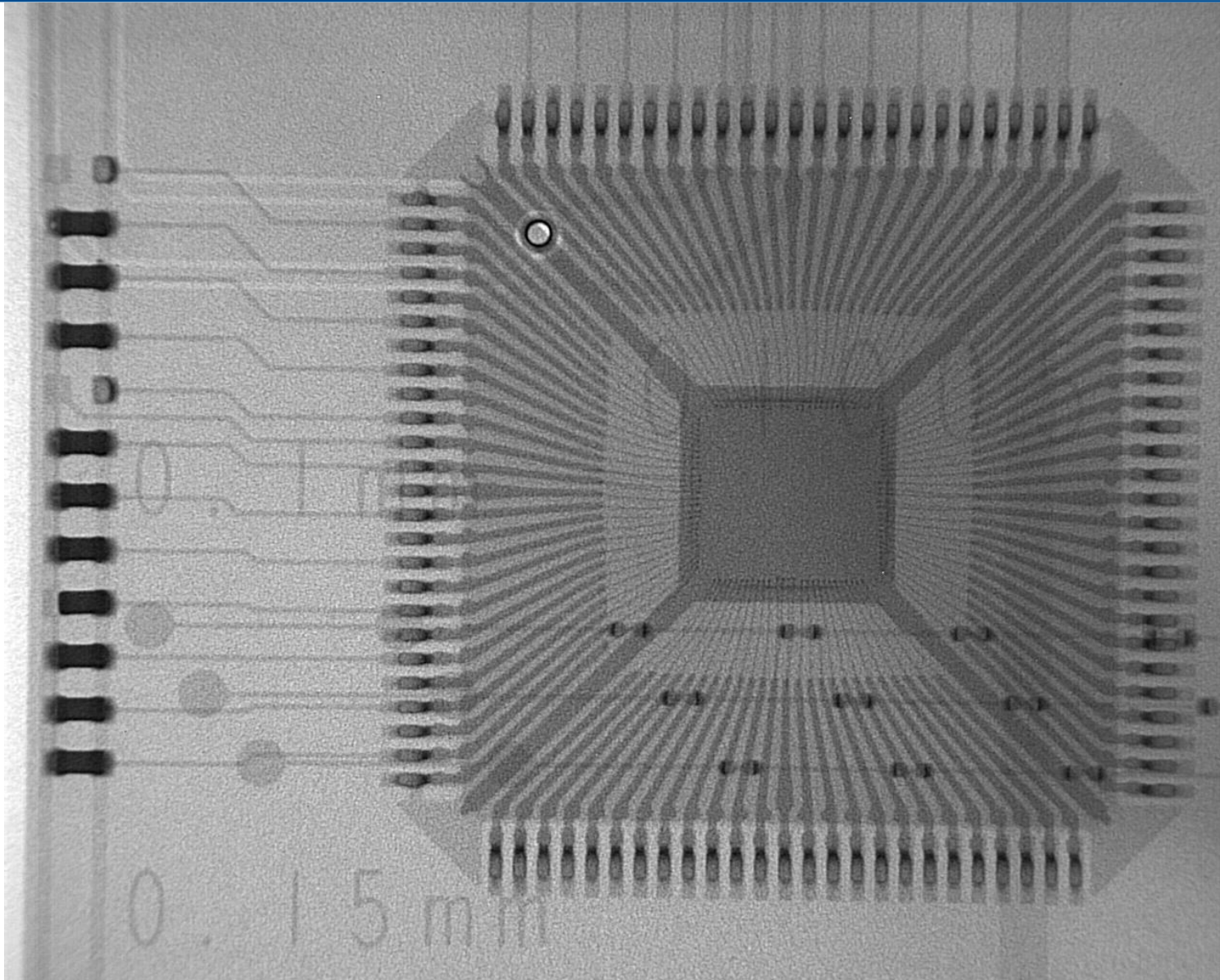
10.0mm

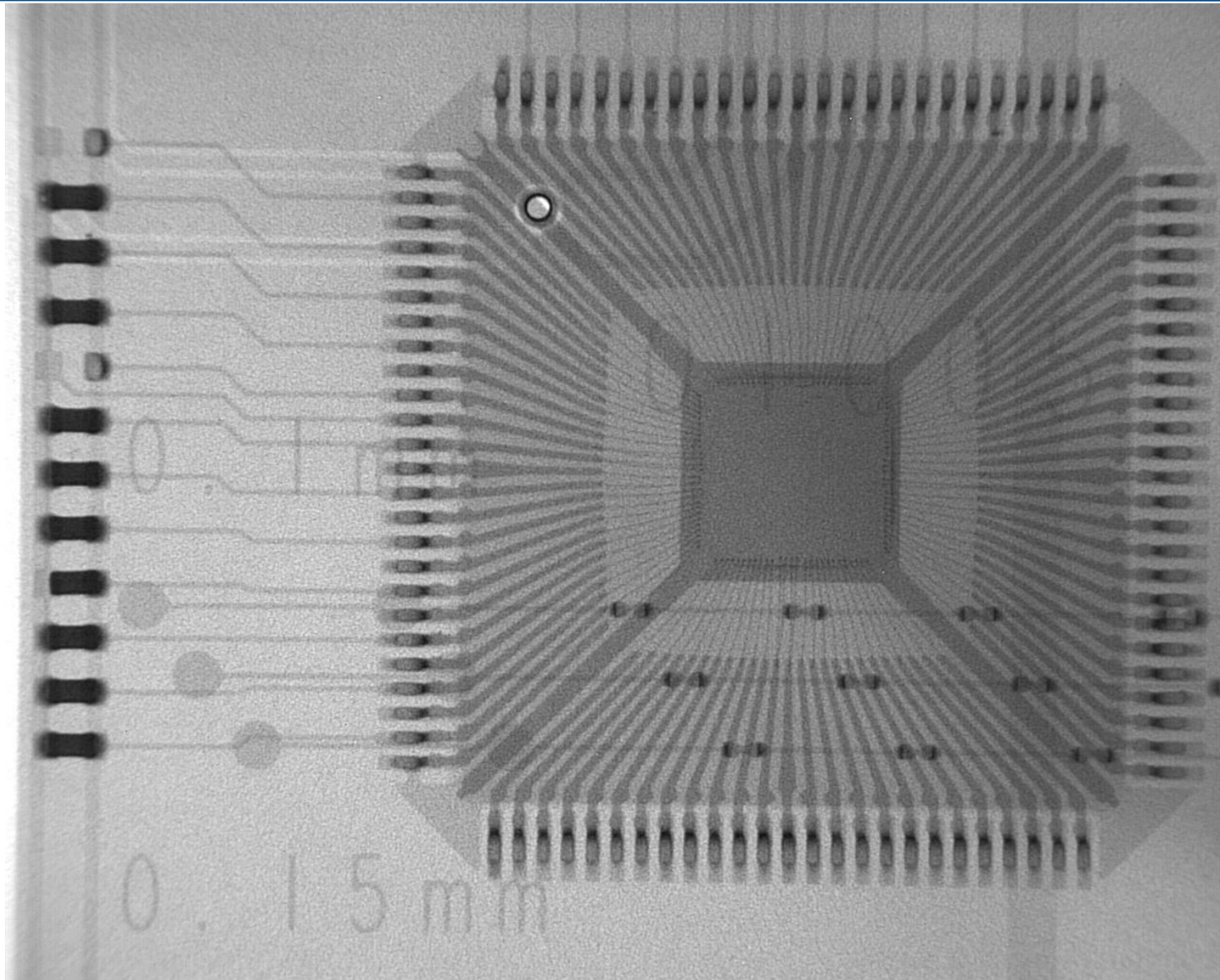


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 80
Akkumulierung: 64 Frames

R+R 28 / Z – X-Ray nach Rework 1 – PZ-S-PQFP-G100

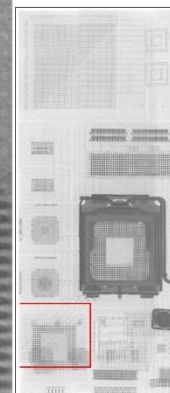
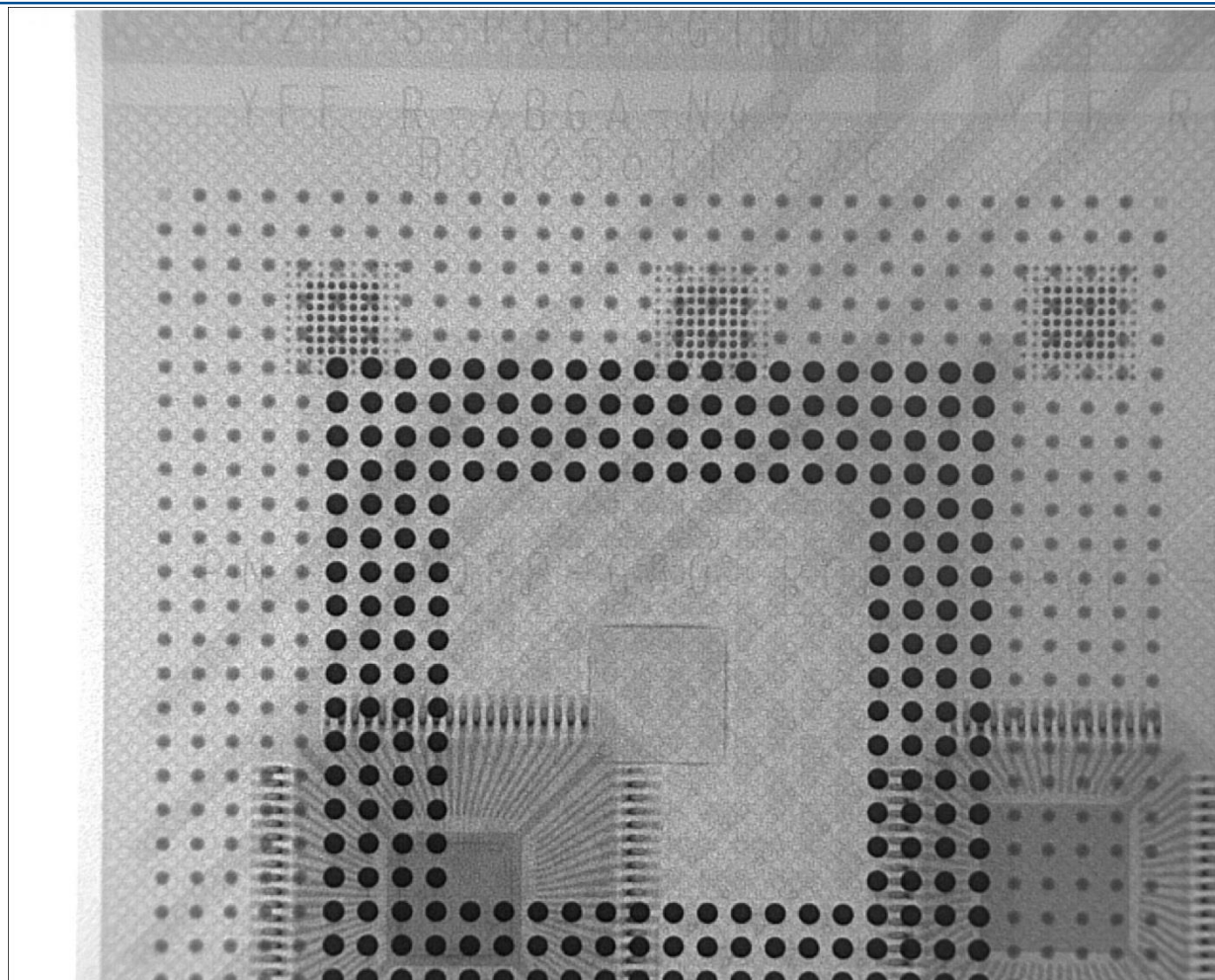




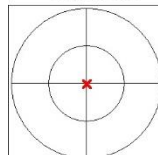


Baugruppe

R+R 29 / Z

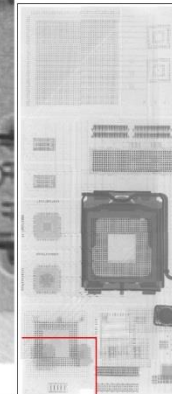
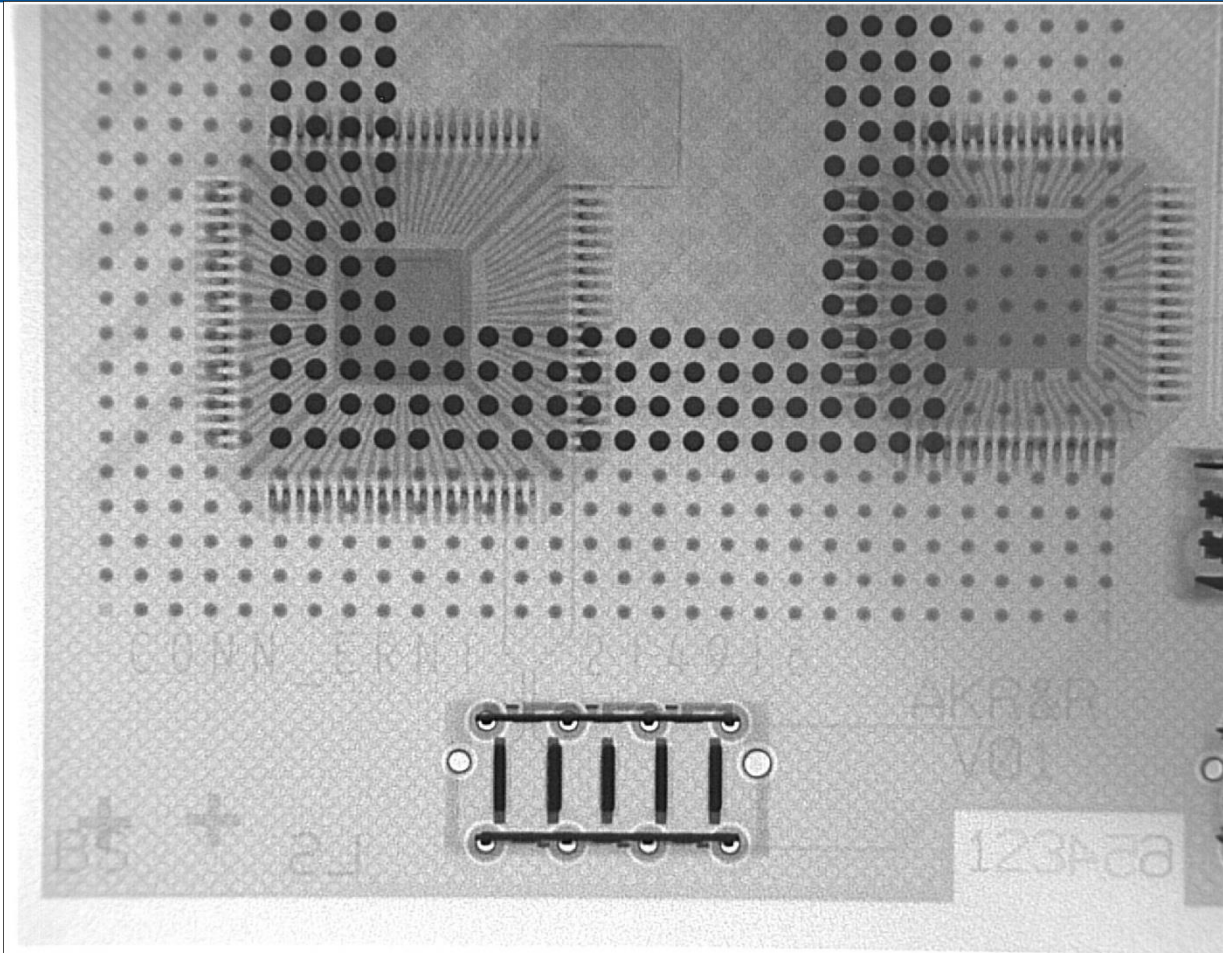


10.0mm

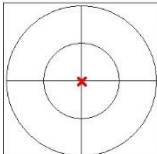


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

R+R 29 / Z – X-Ray vor Rework – BGA 256

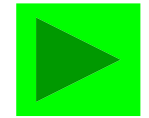
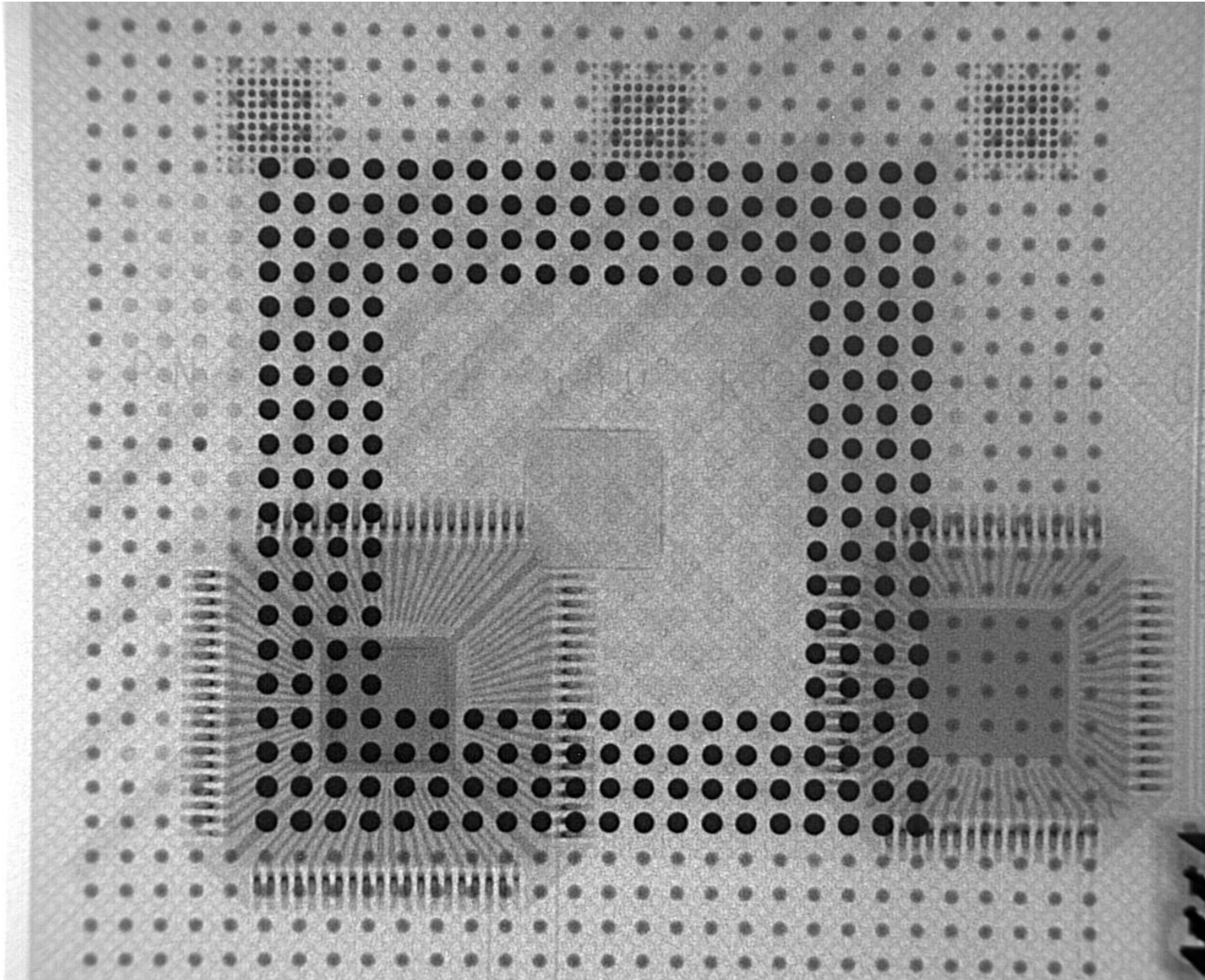


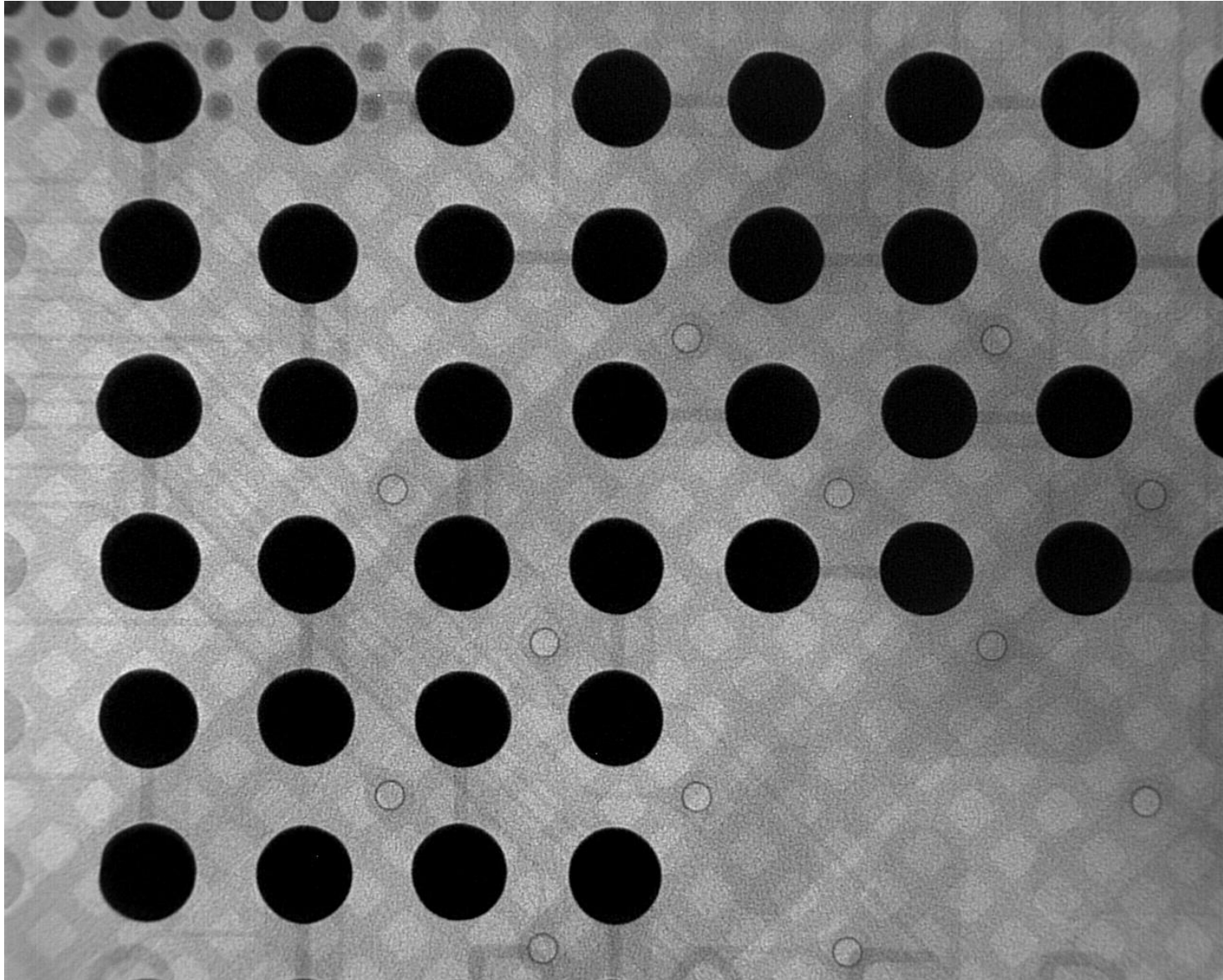
10.0mm

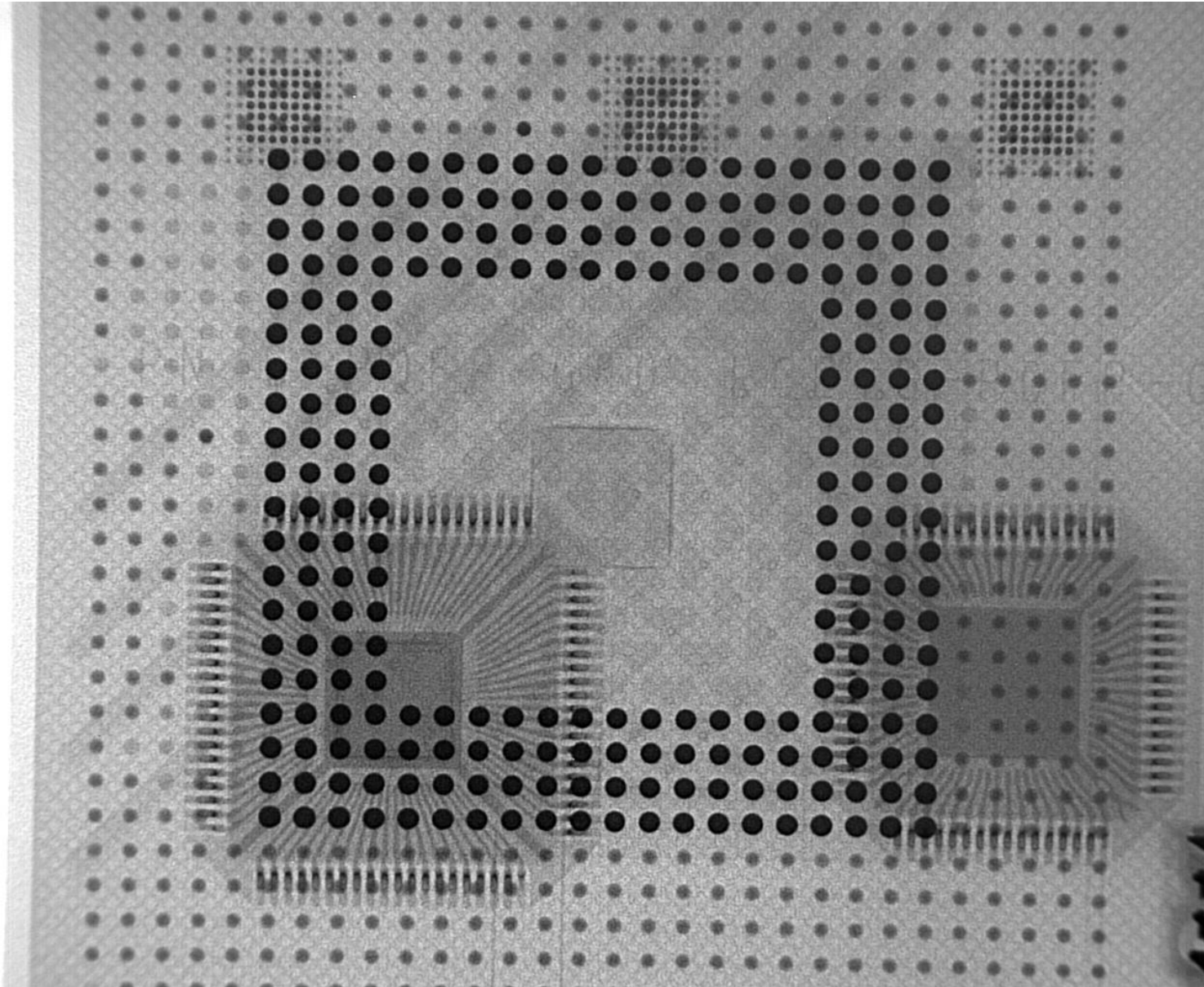


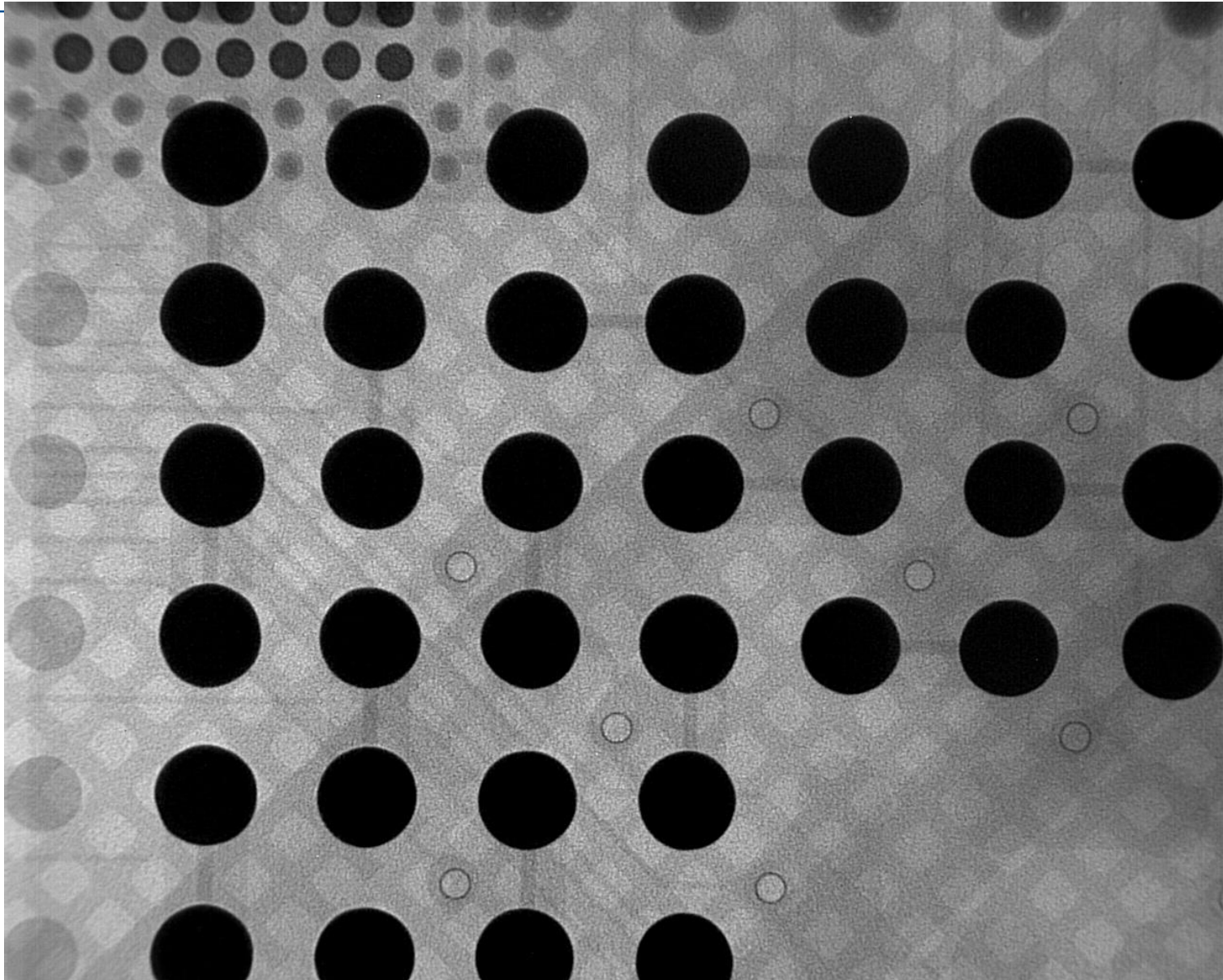
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

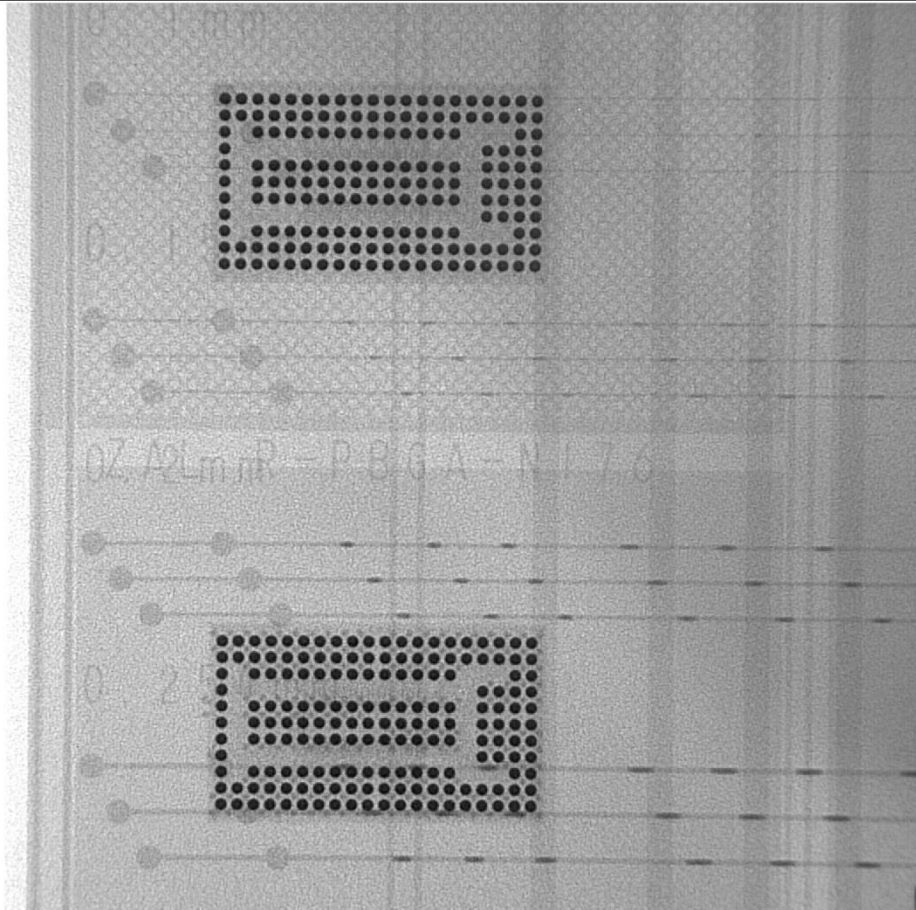
R+R 29 / Z – X-Ray nach Rework 1 – BGA 256







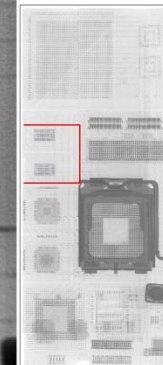




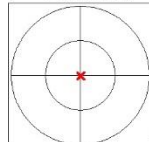
mit
Massefläche



ohne
Massefläche

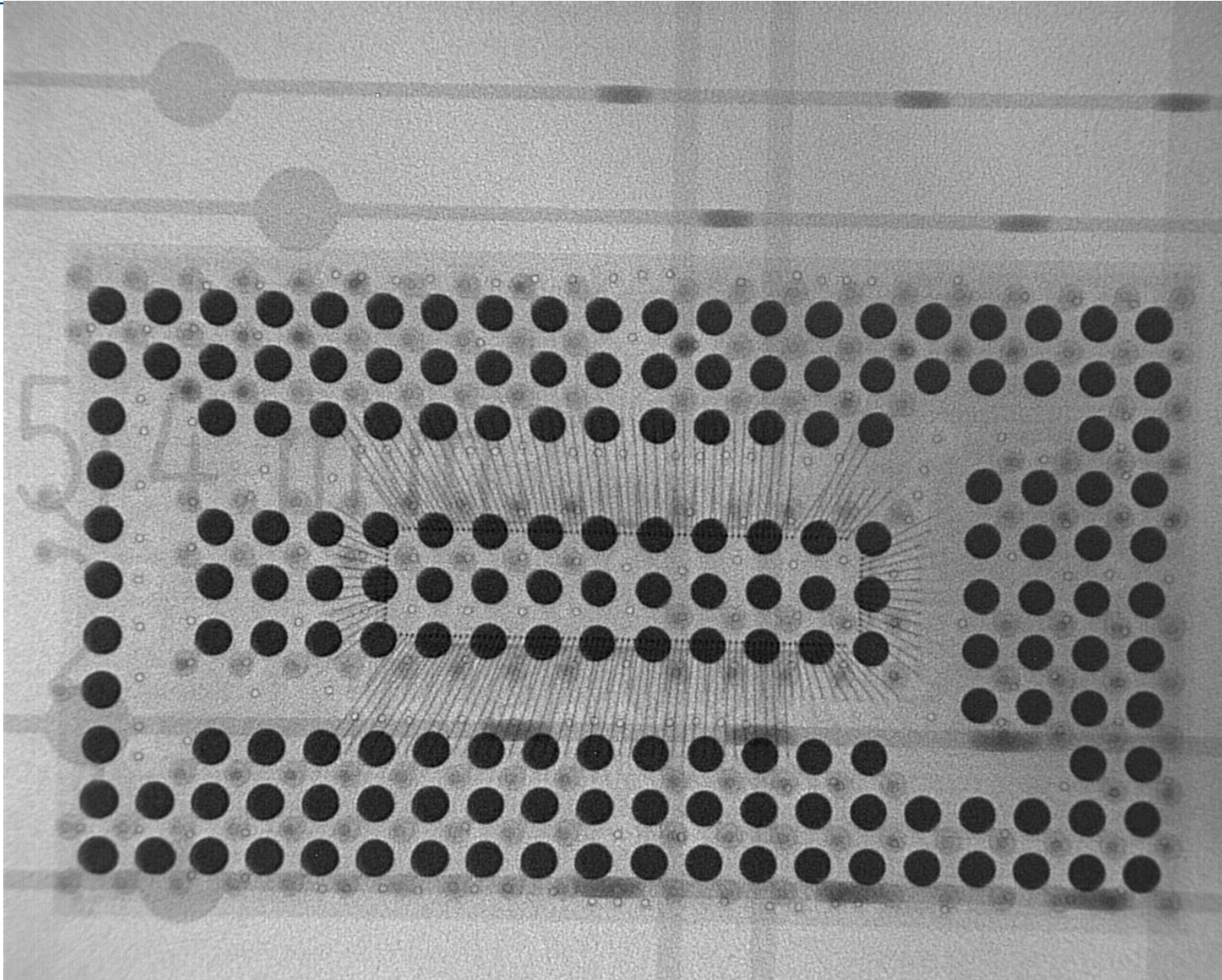


10.0mm

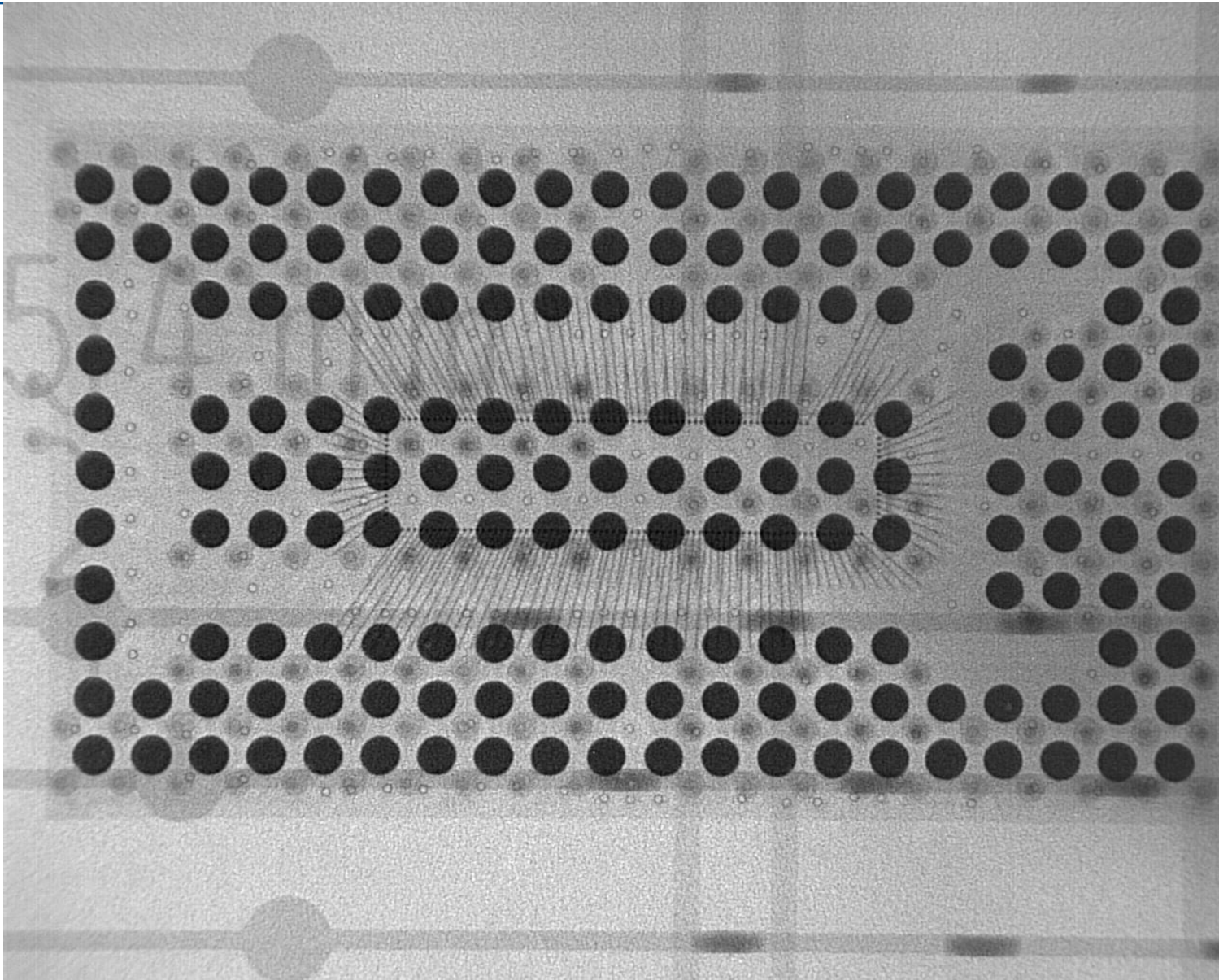


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

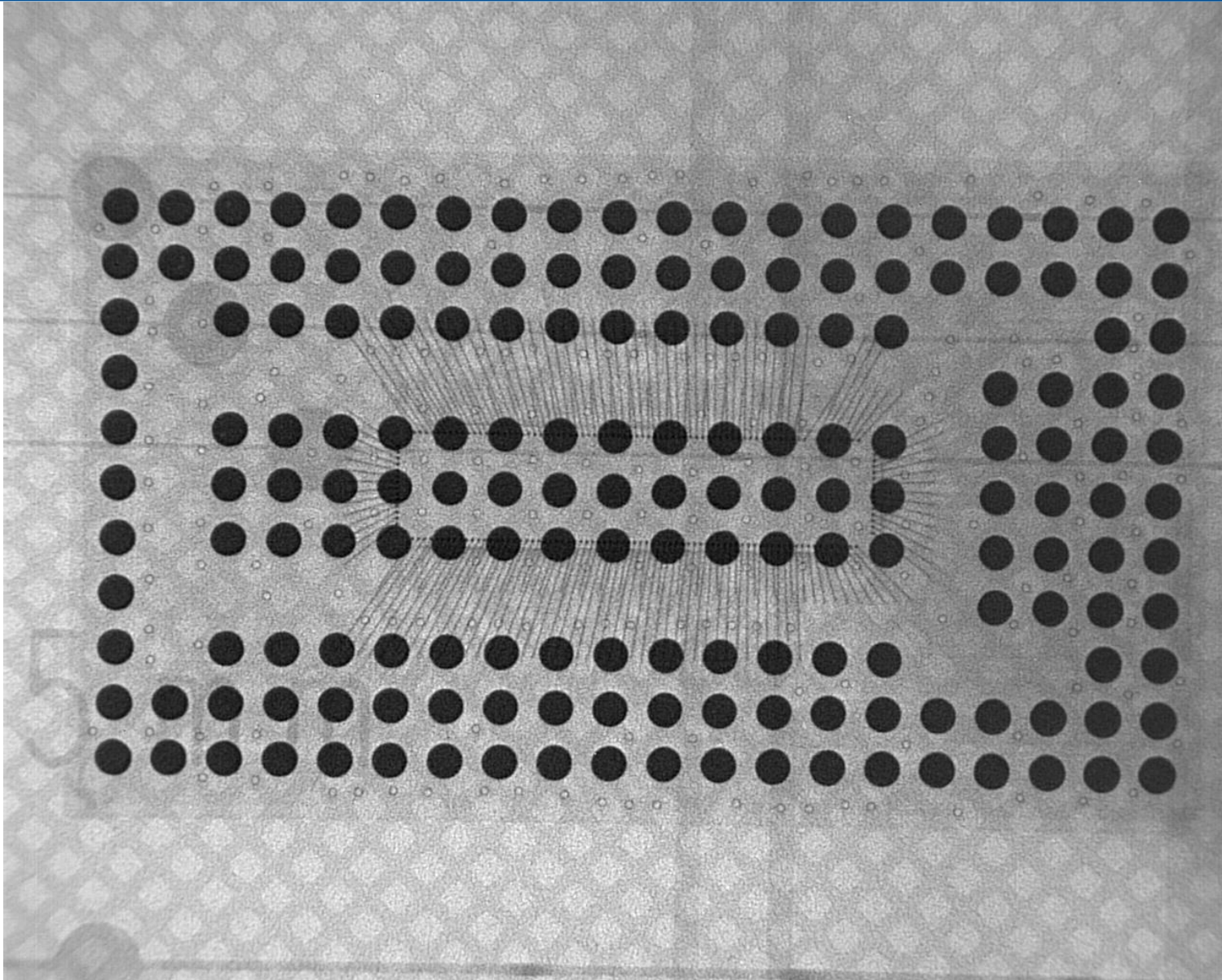
R+R 29 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



R+R 29 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (mit Massefläche)



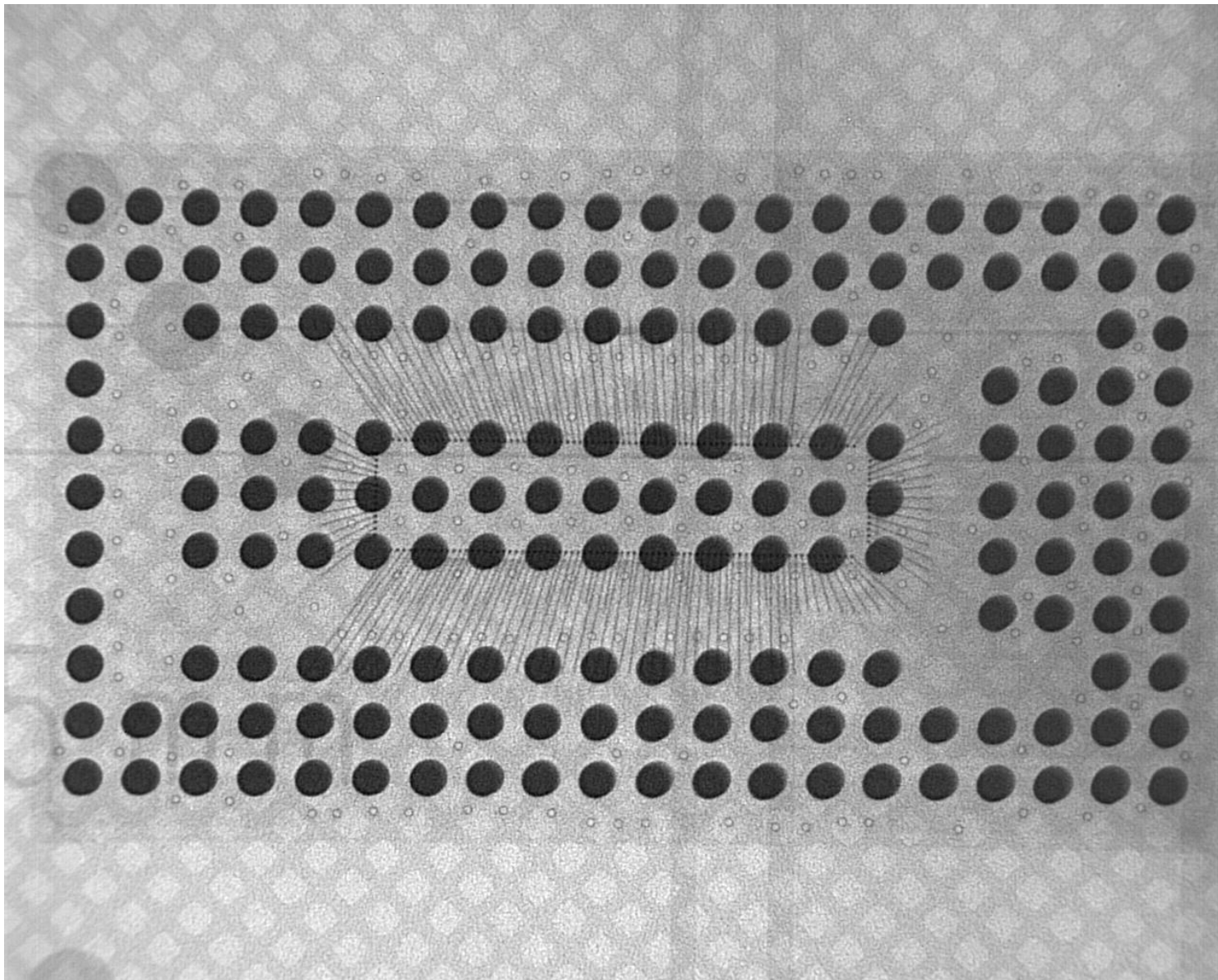
R+R 29 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)

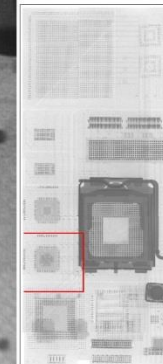
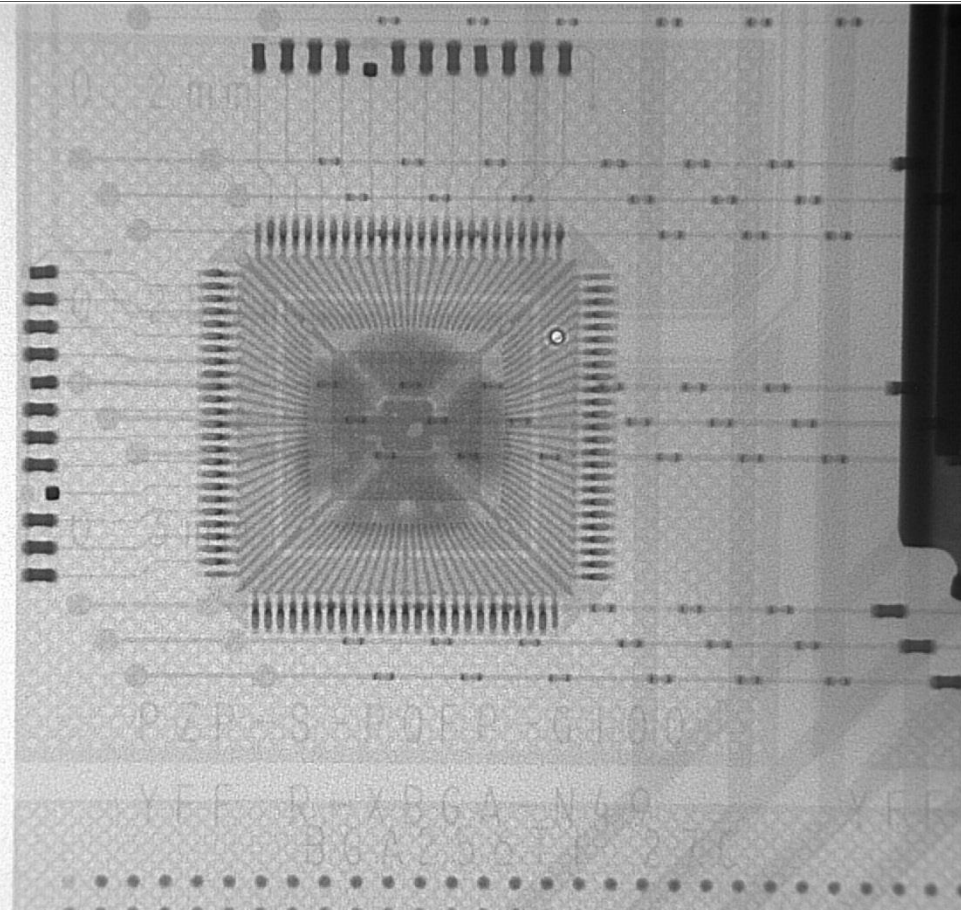


R+R 29 / Z – Padablöser bei Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)

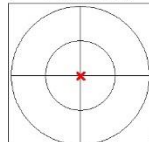


R+R 29 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)

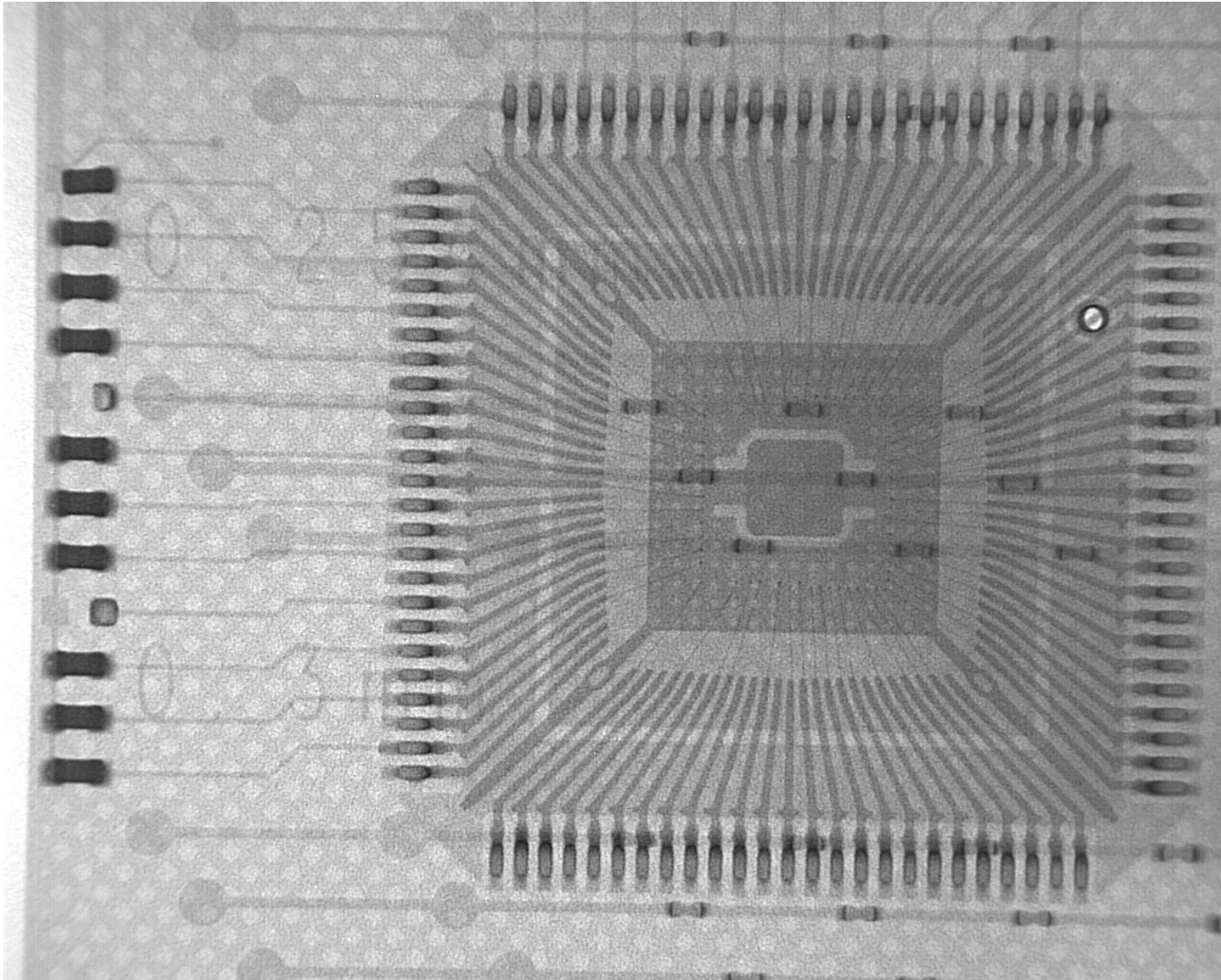


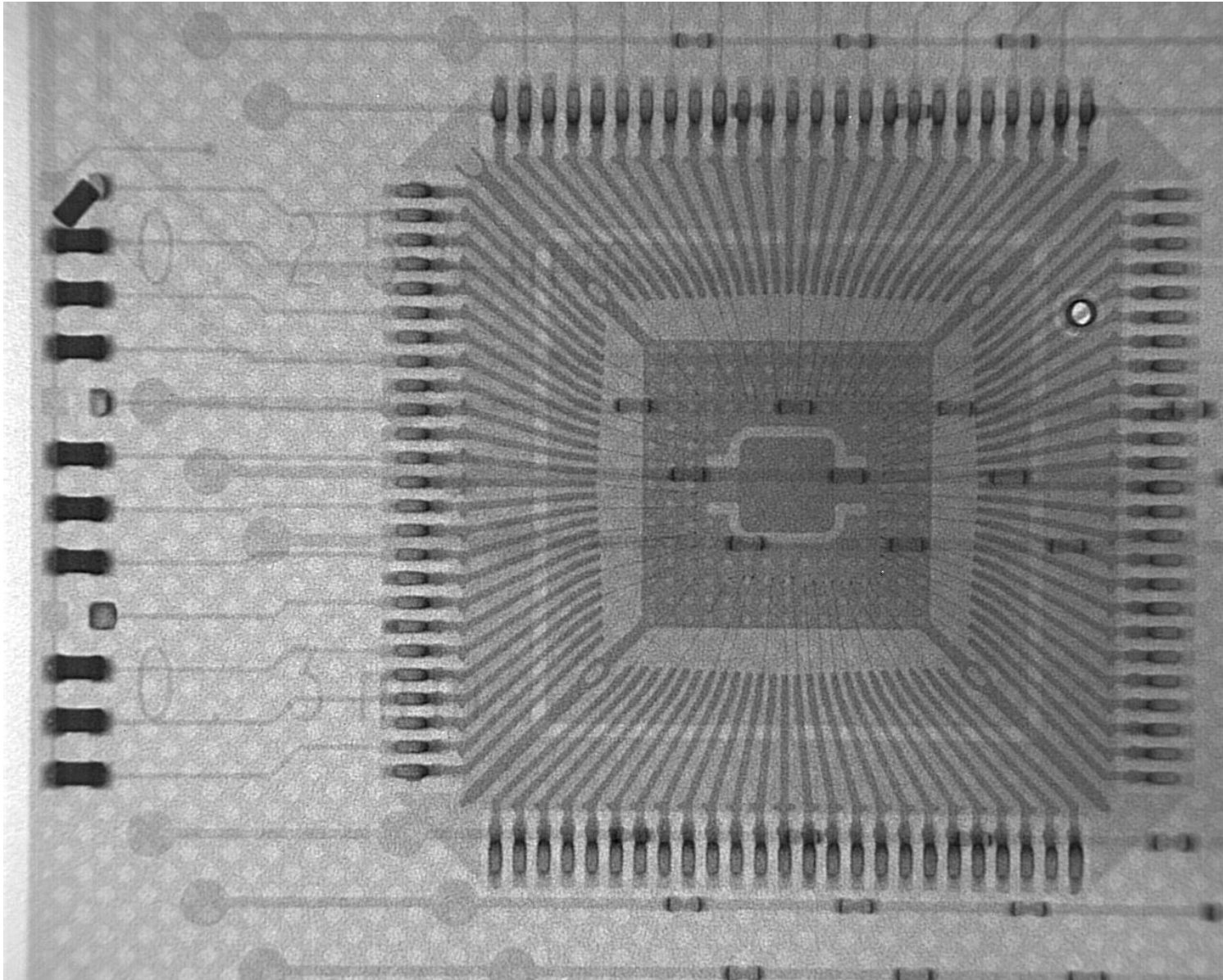


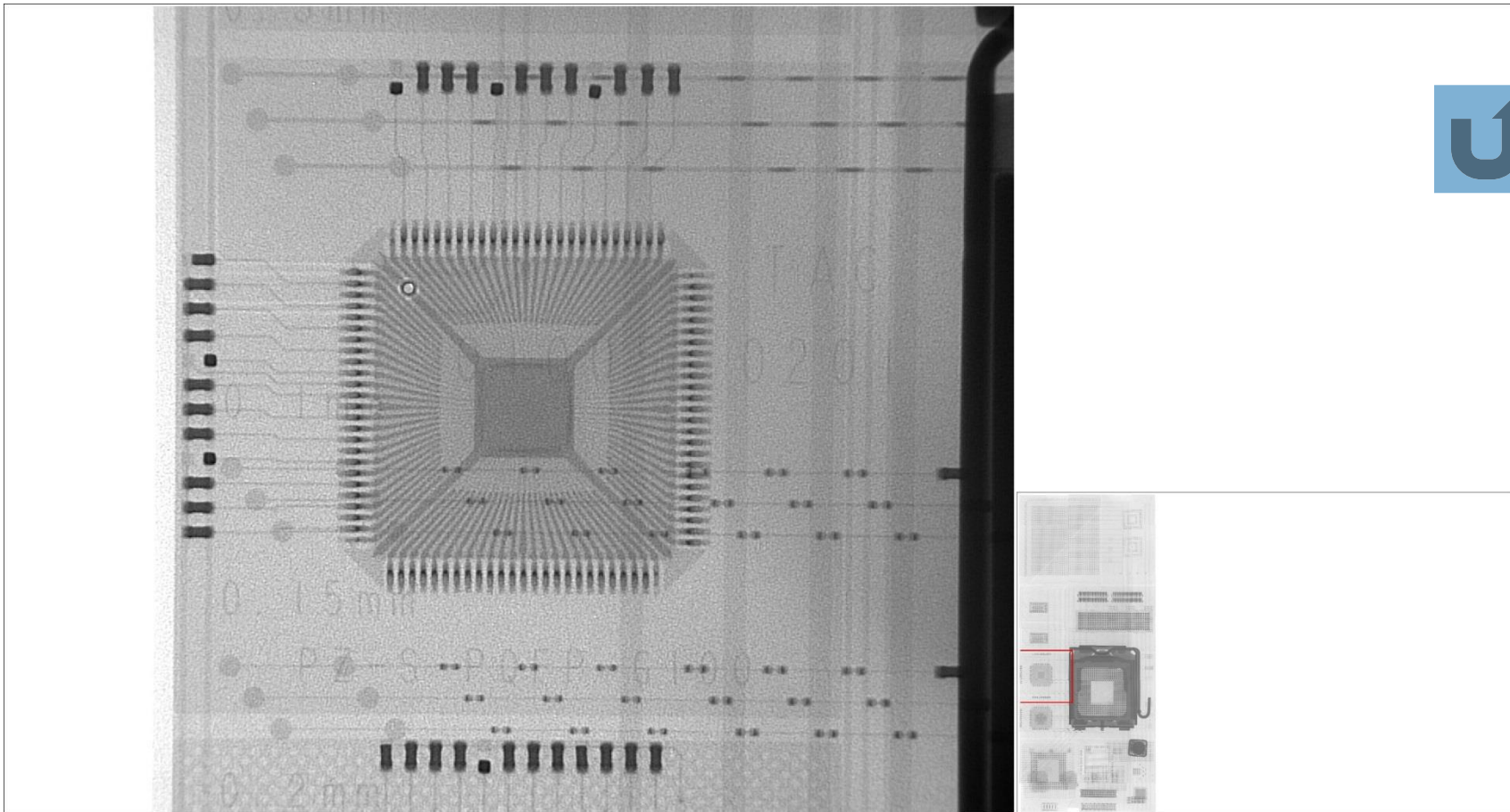
10.0mm



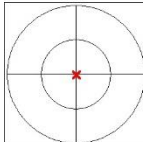
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



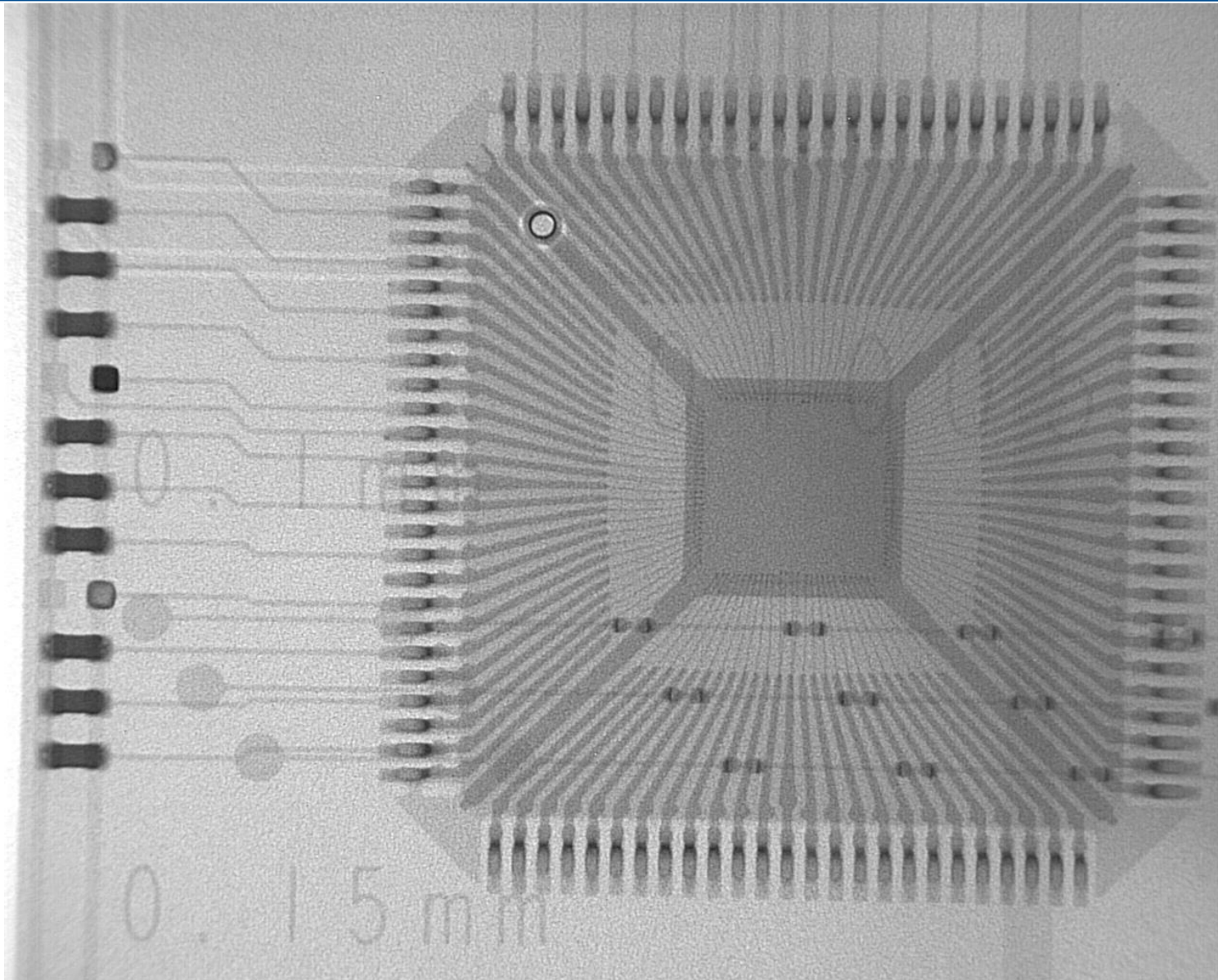


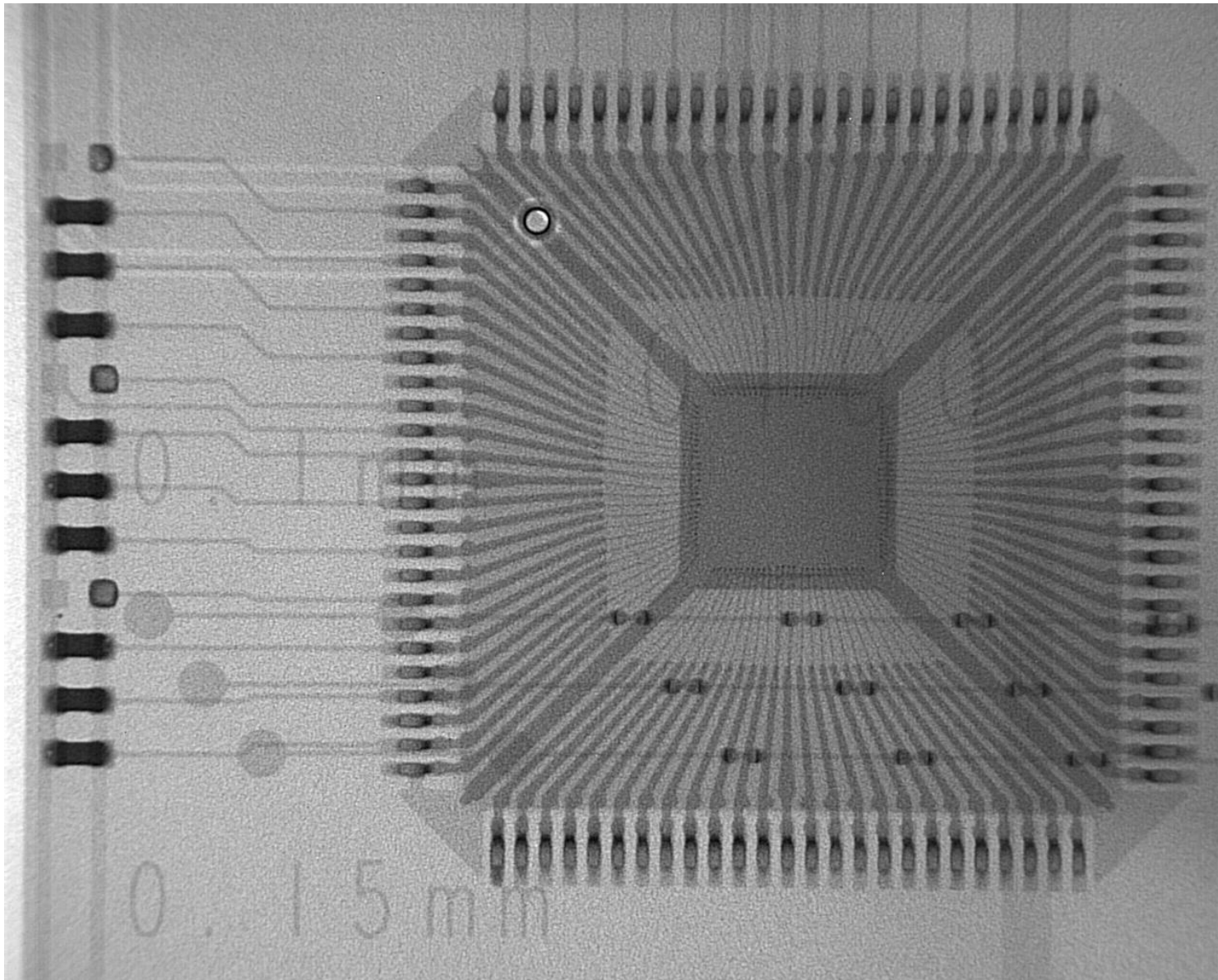


10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

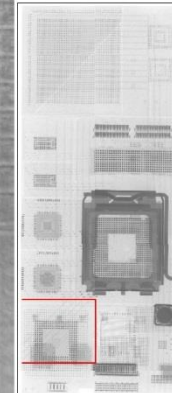
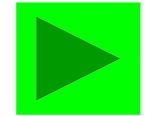
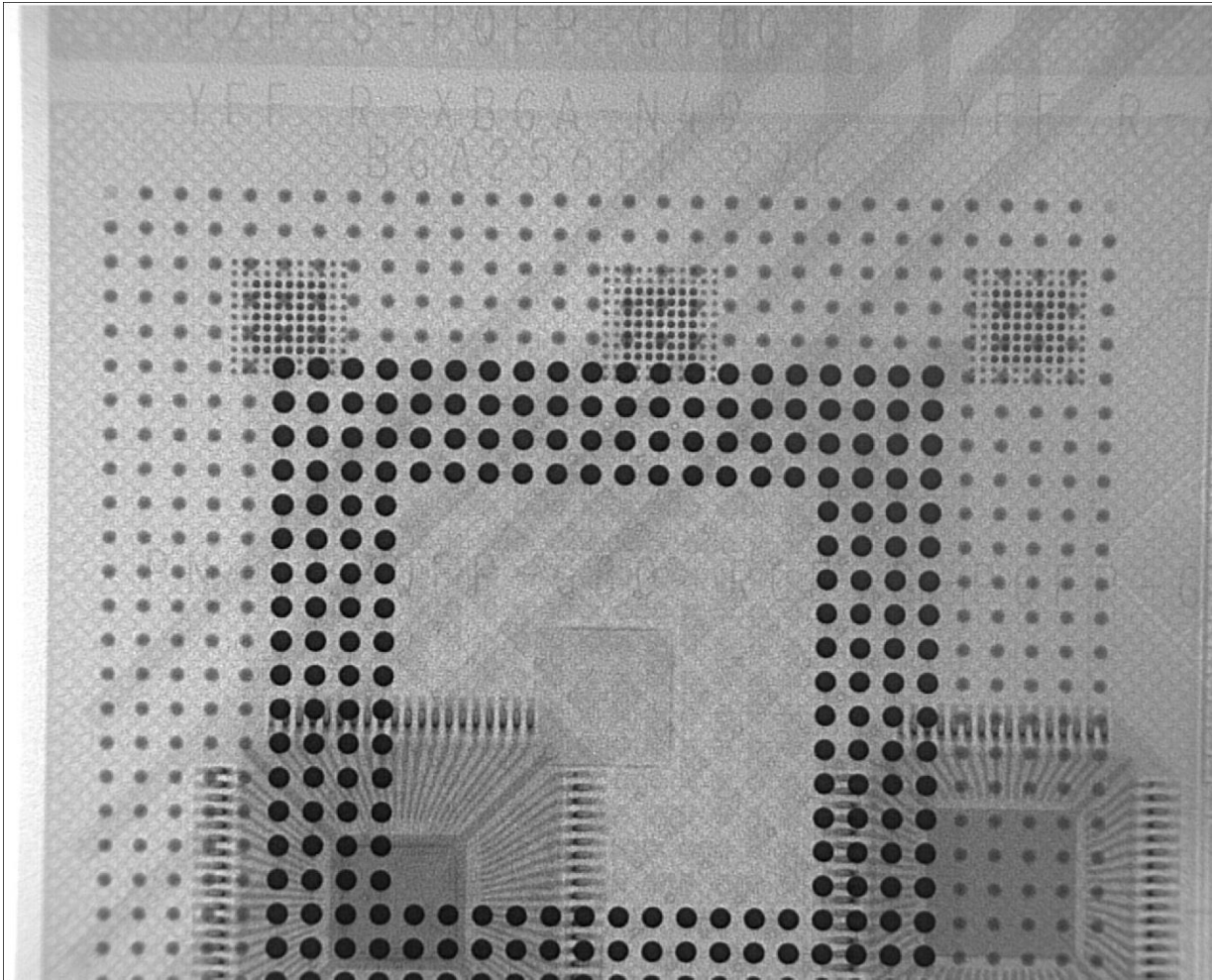




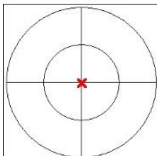
Baugruppe

R+R 30 / Z

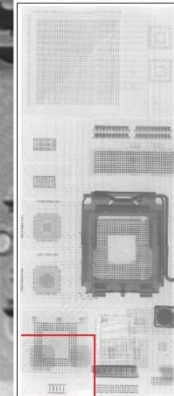
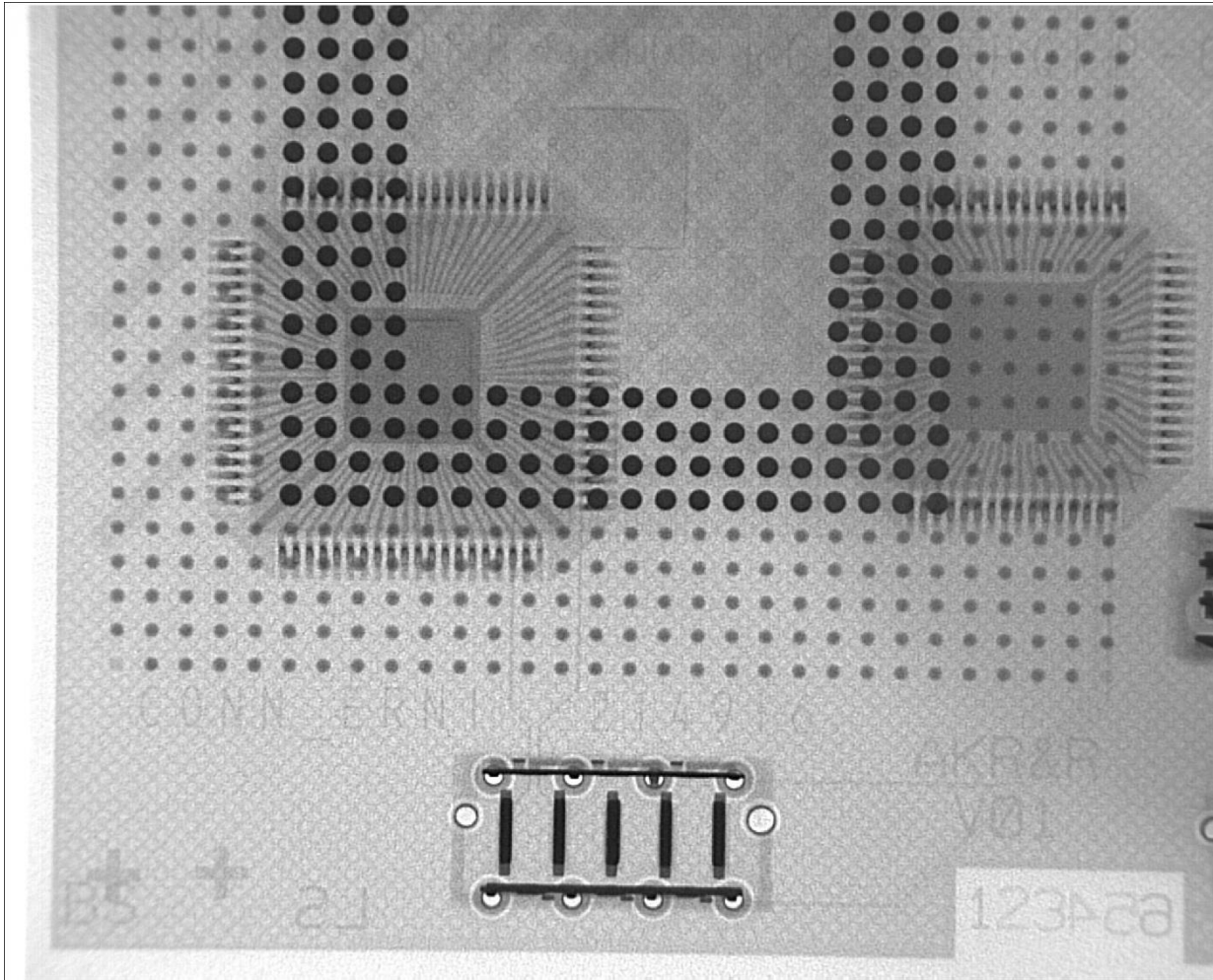
R+R 30 / Z – X-Ray vor Rework – BGA 256



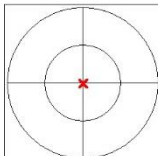
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

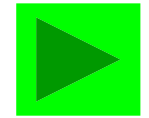
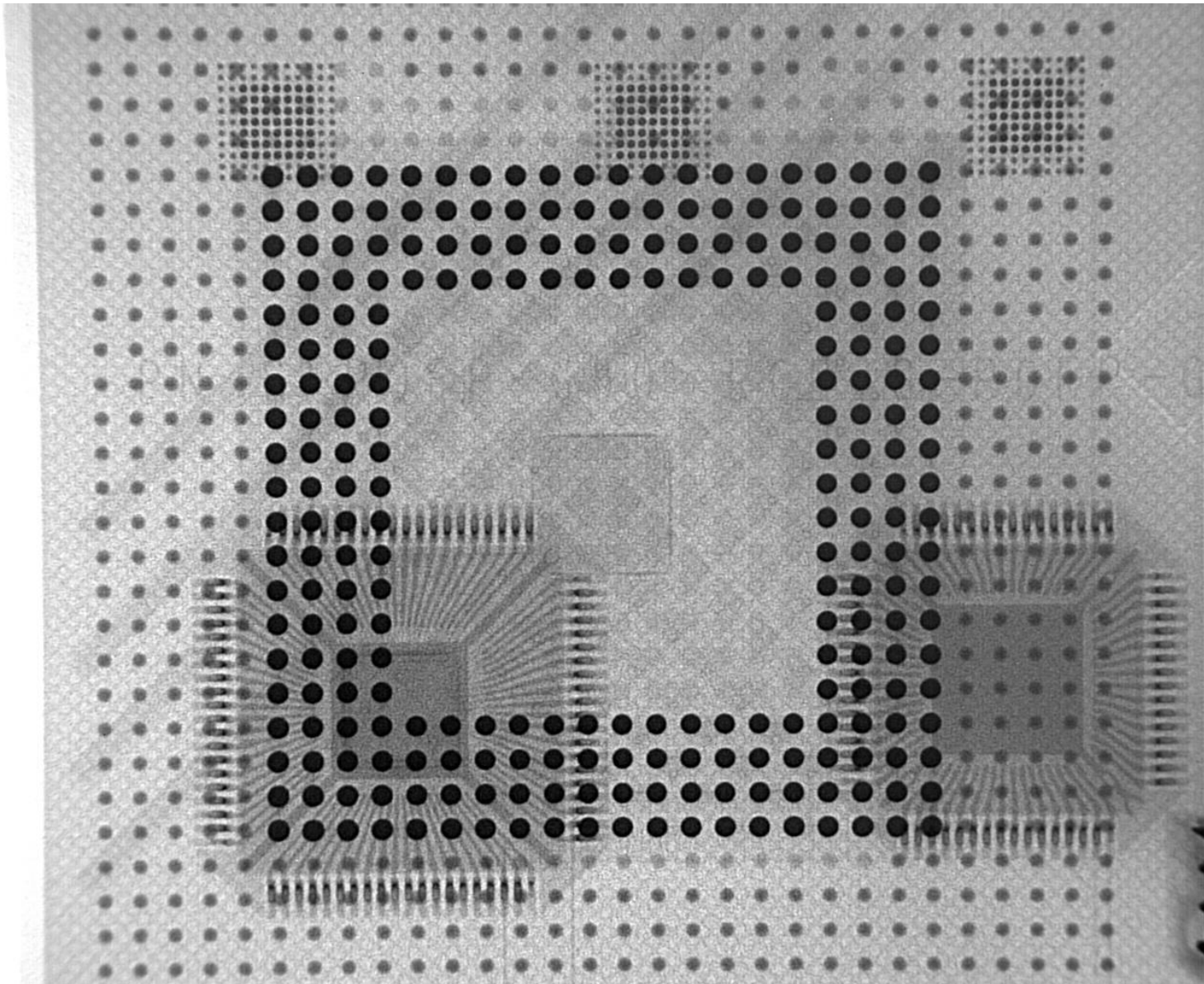


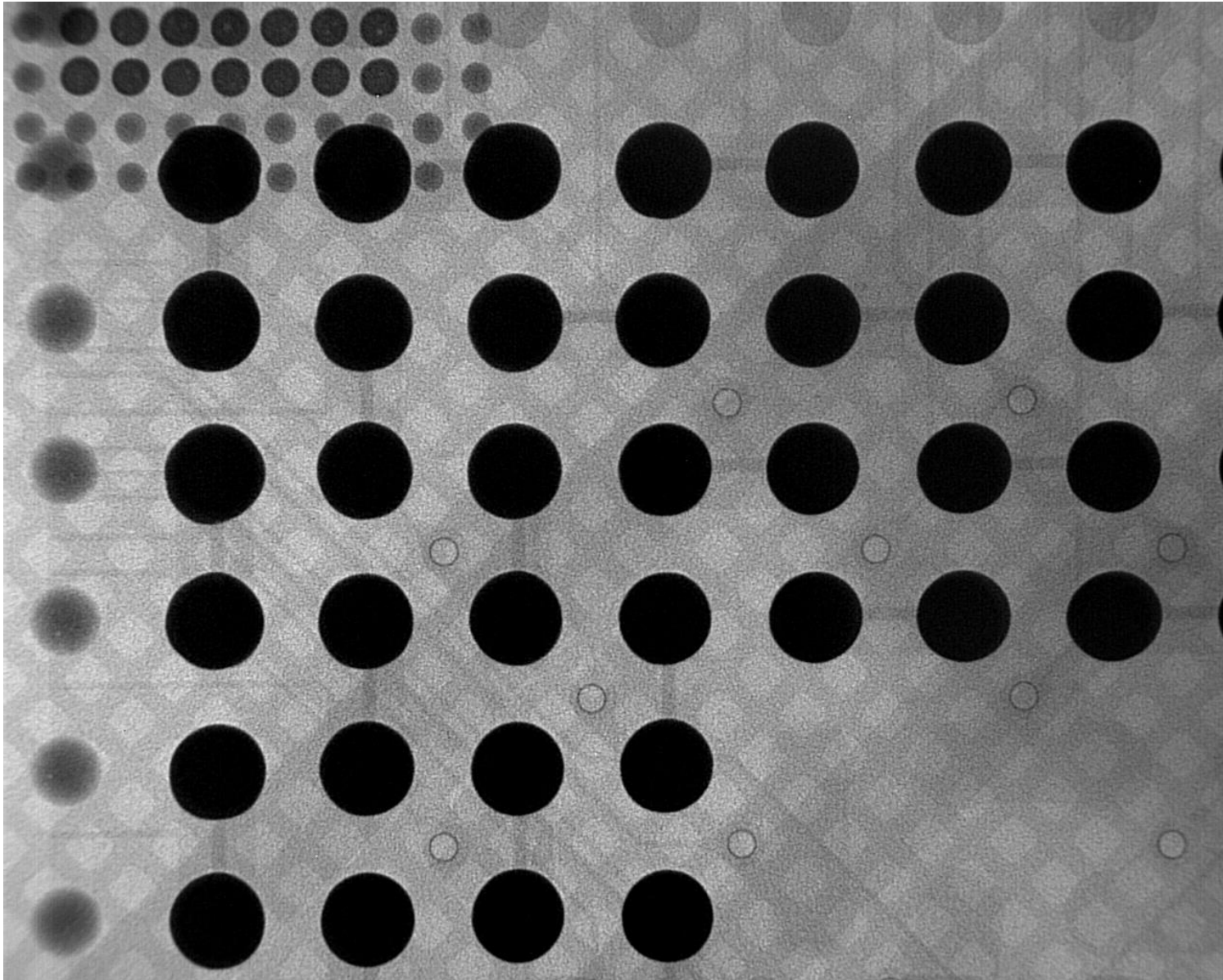
10.0mm



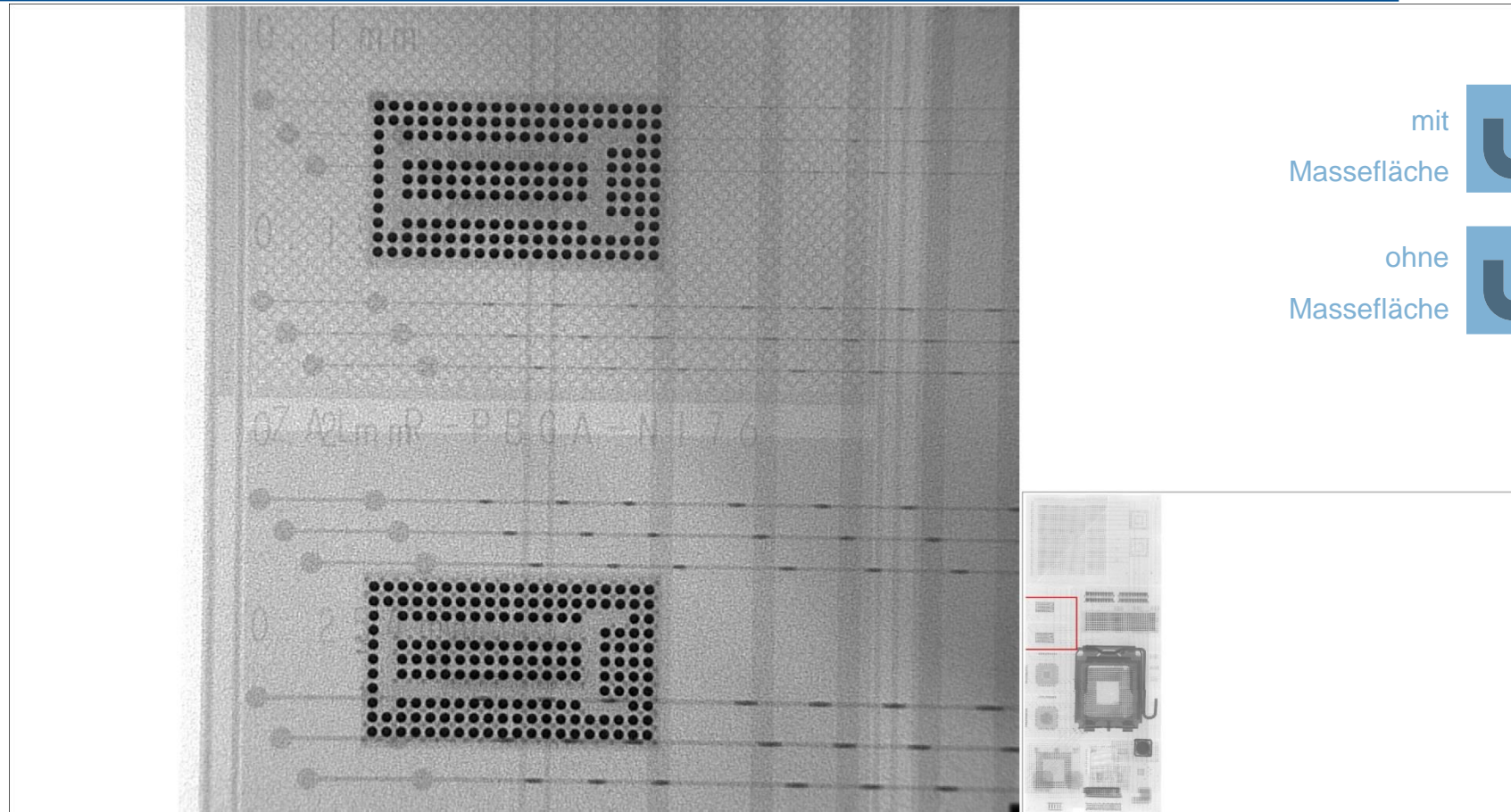
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

R+R 30 / Z – X-Ray nach Rework 1 – BGA 256





R+R 30 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



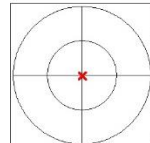
mit
Massefläche



ohne
Massefläche

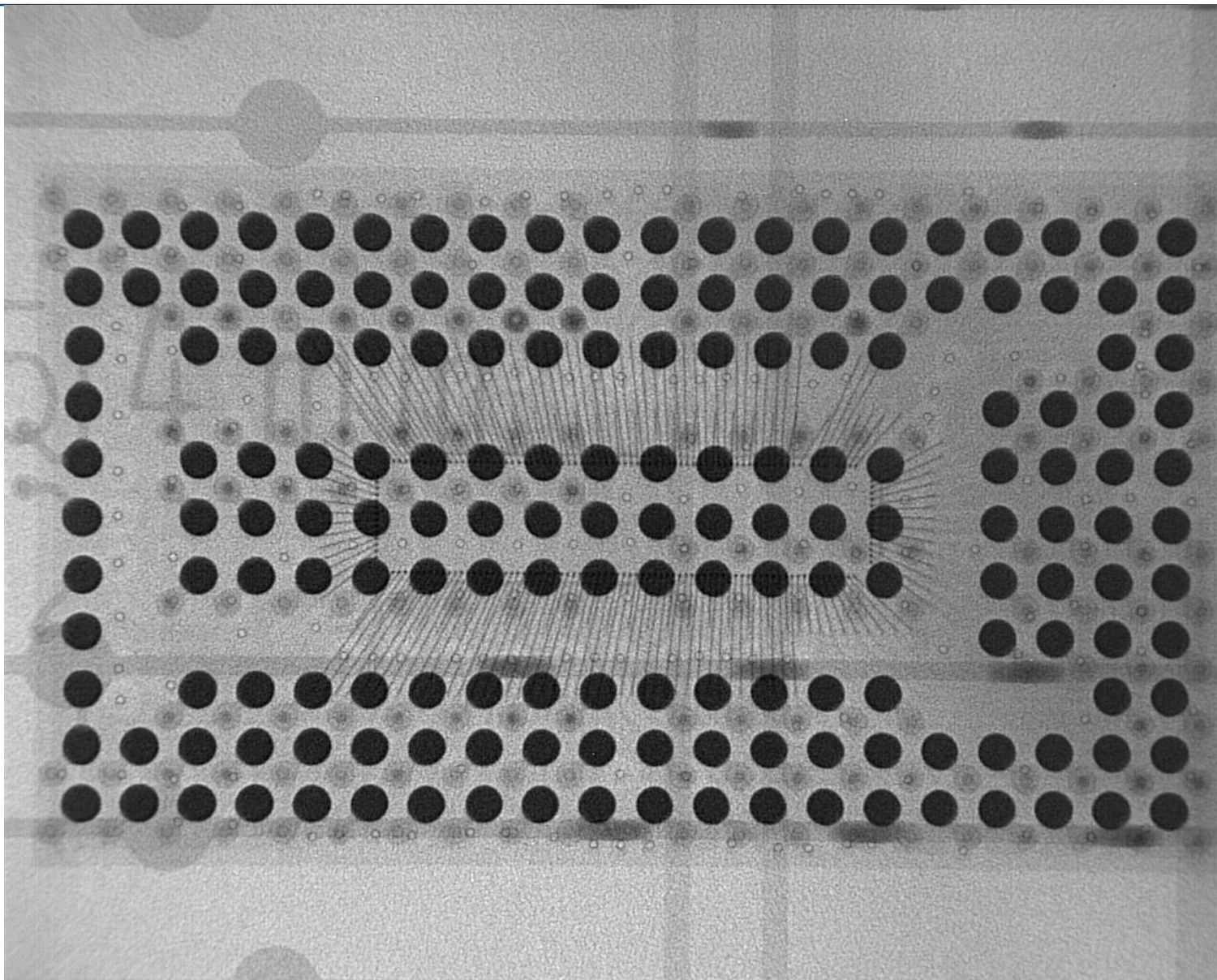


10.0mm

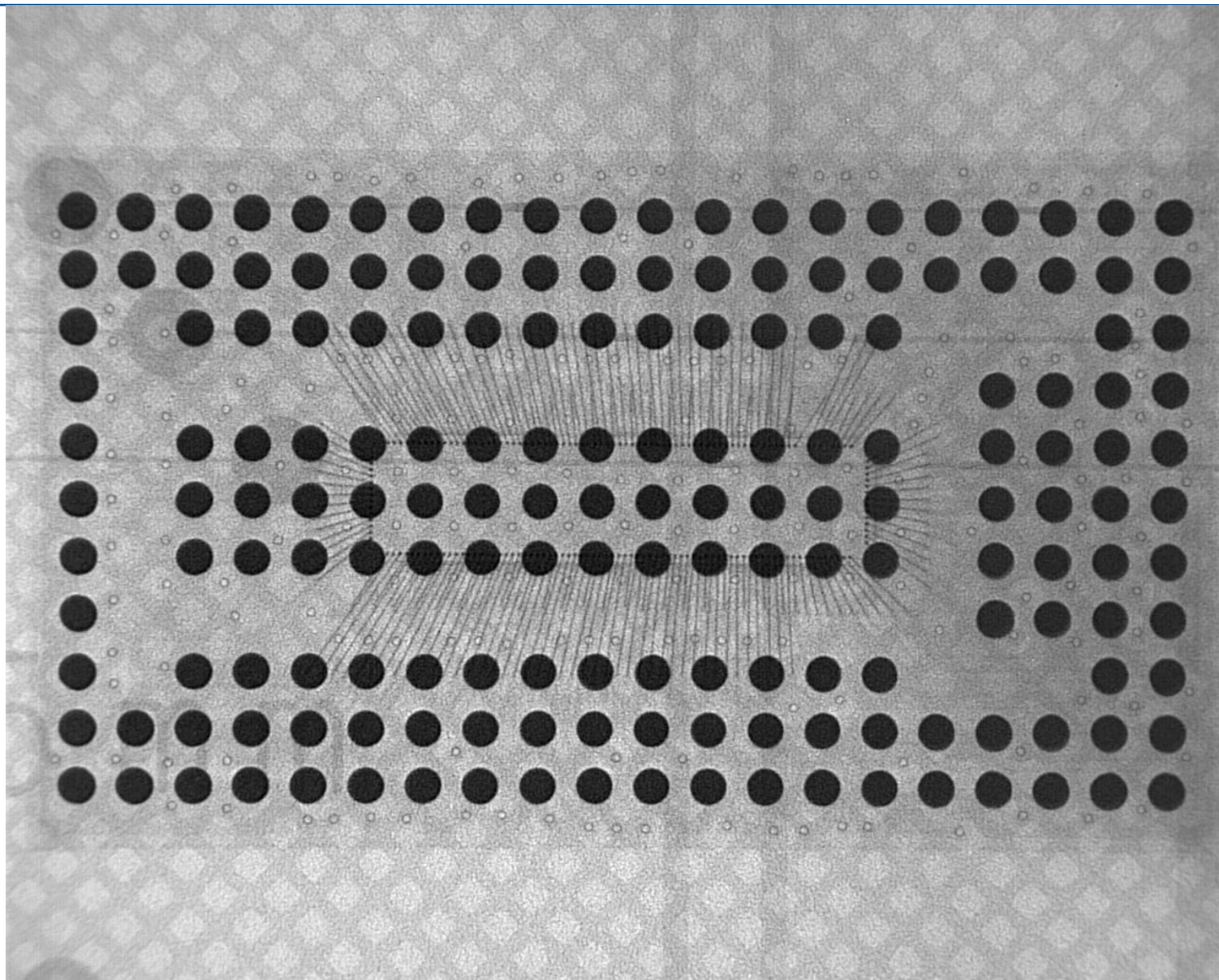


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

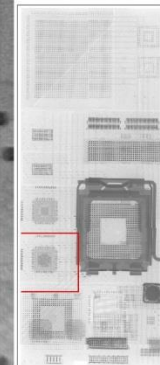
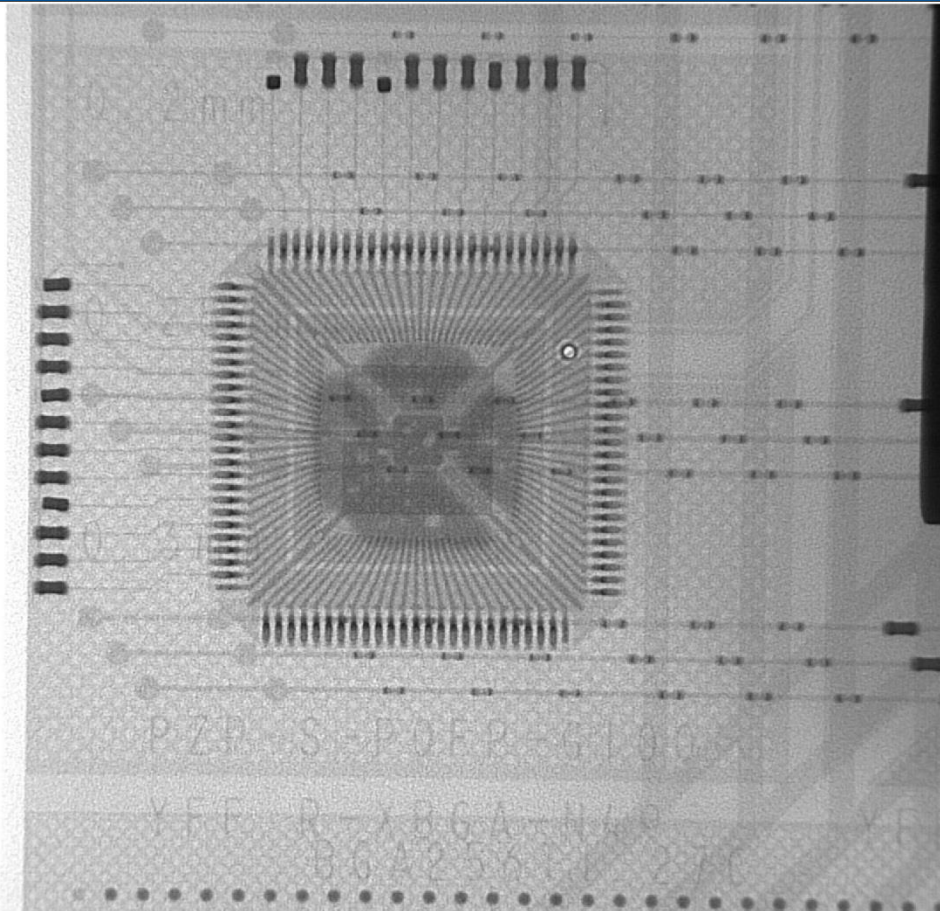
R+R 30 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



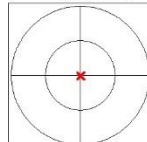
R+R 30 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



R+R 30 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

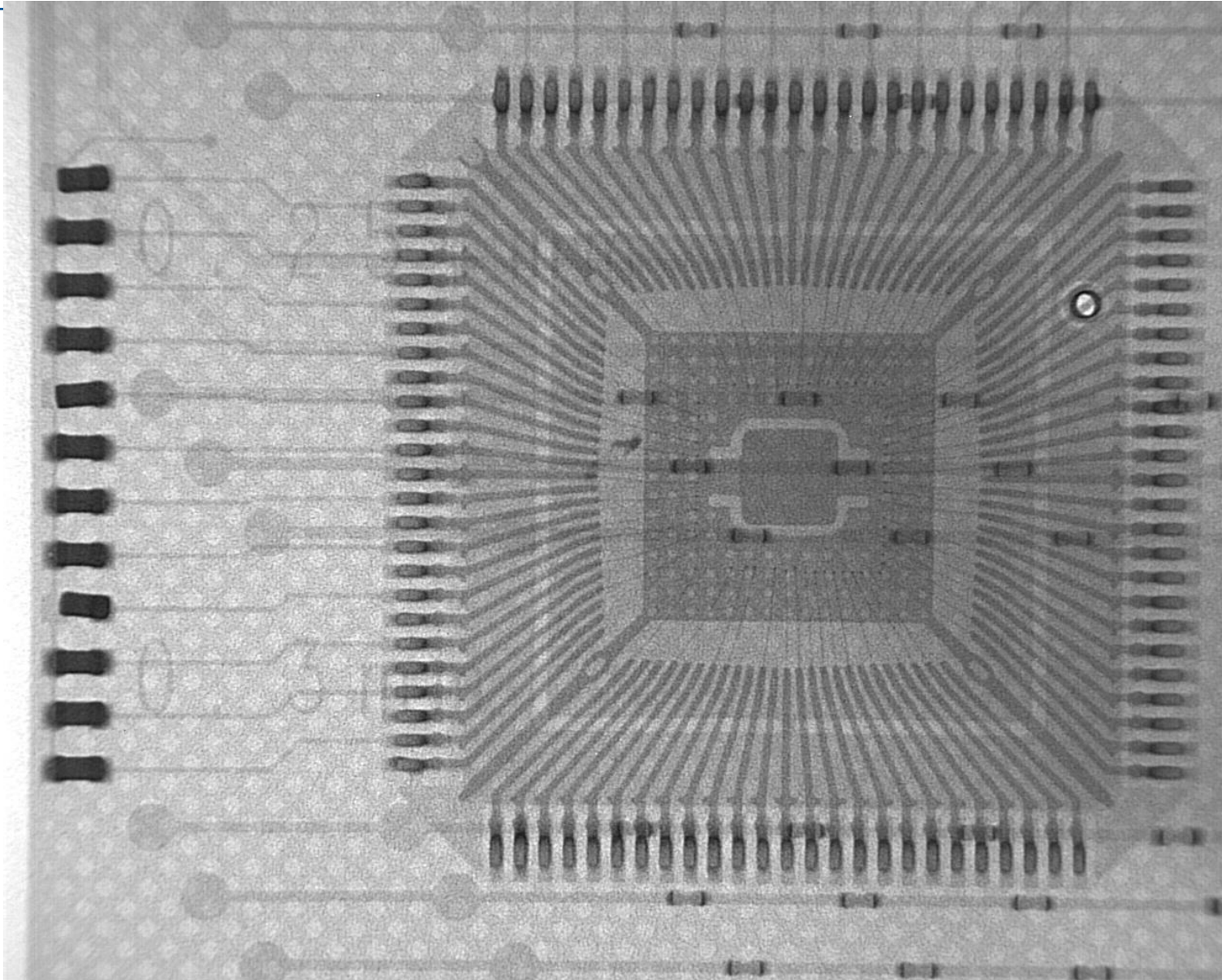


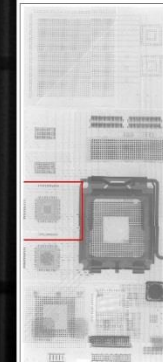
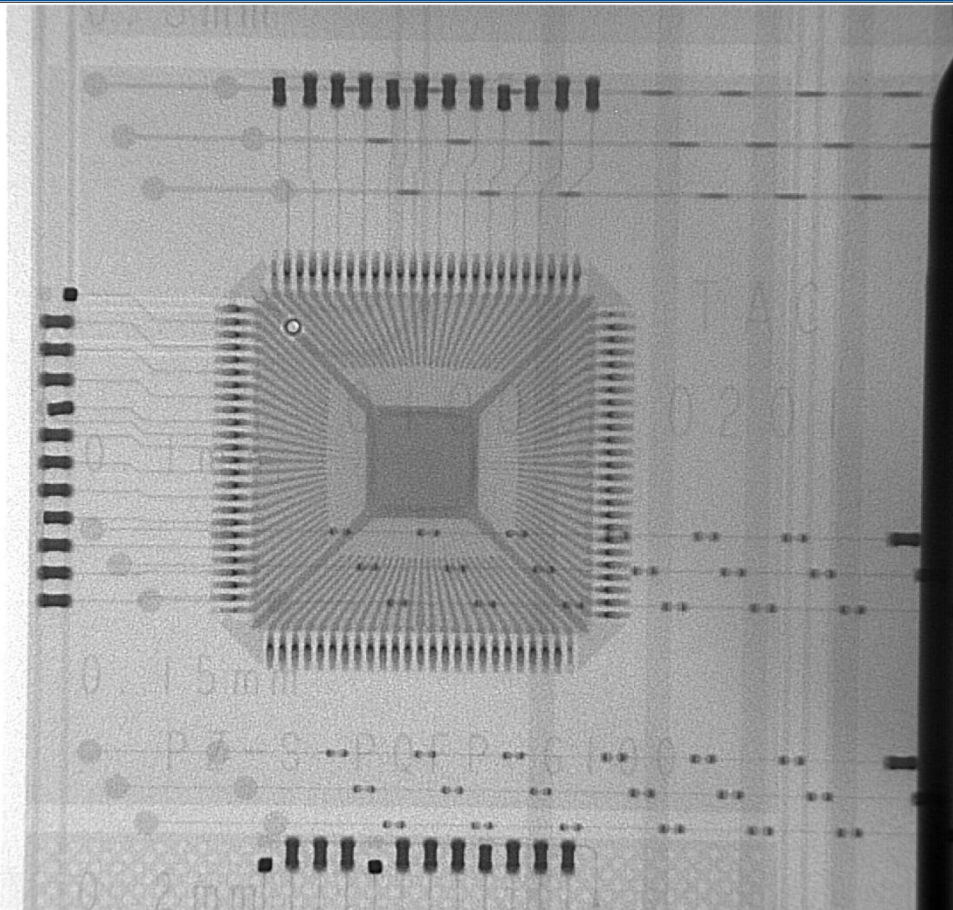
10.0mm



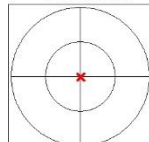
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

R+R 30 / Z – X-Ray nach Rework 1 – PZP-S-PQFP-G100

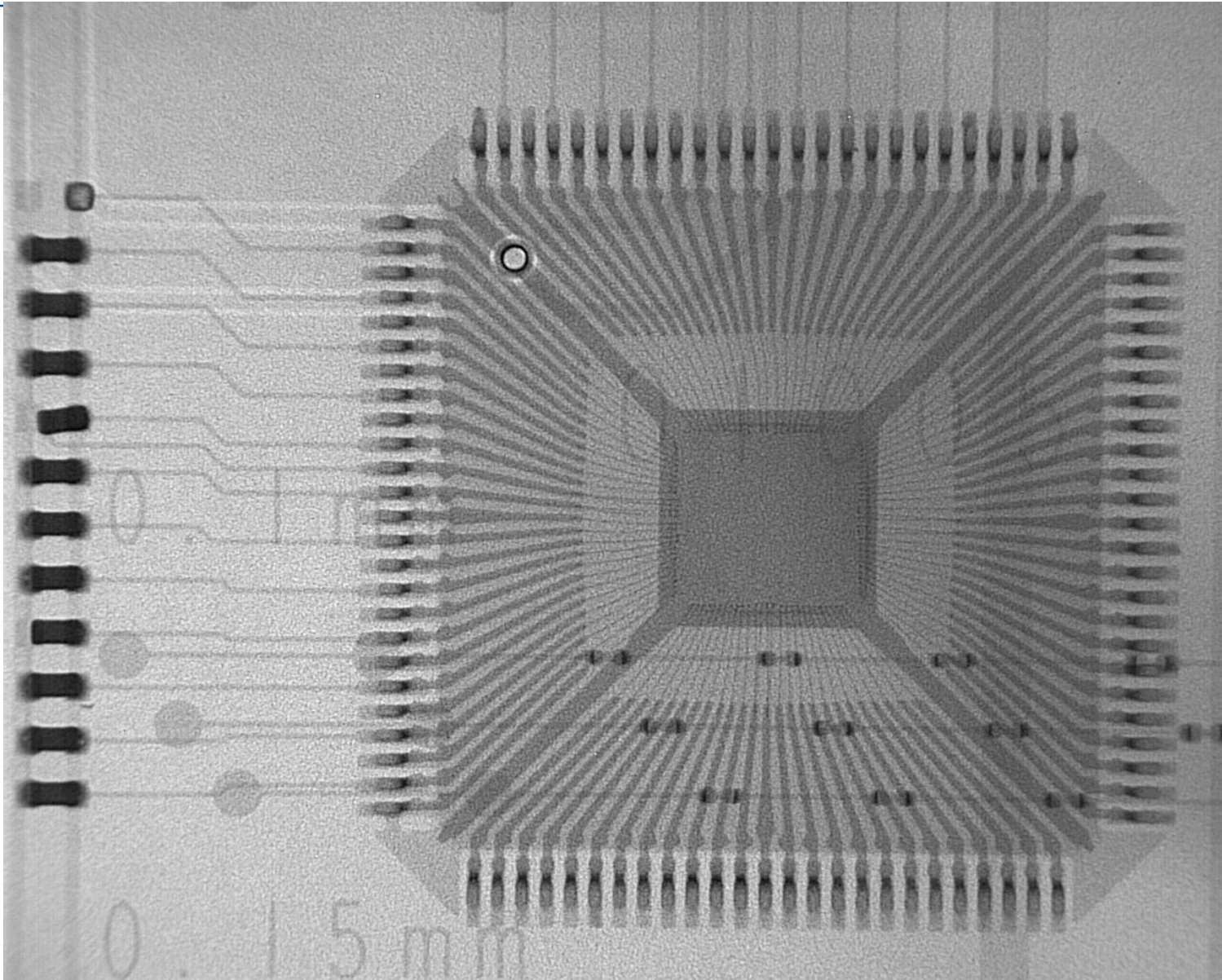




10.0mm

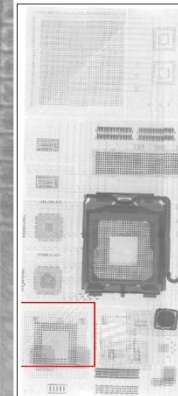
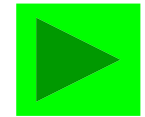
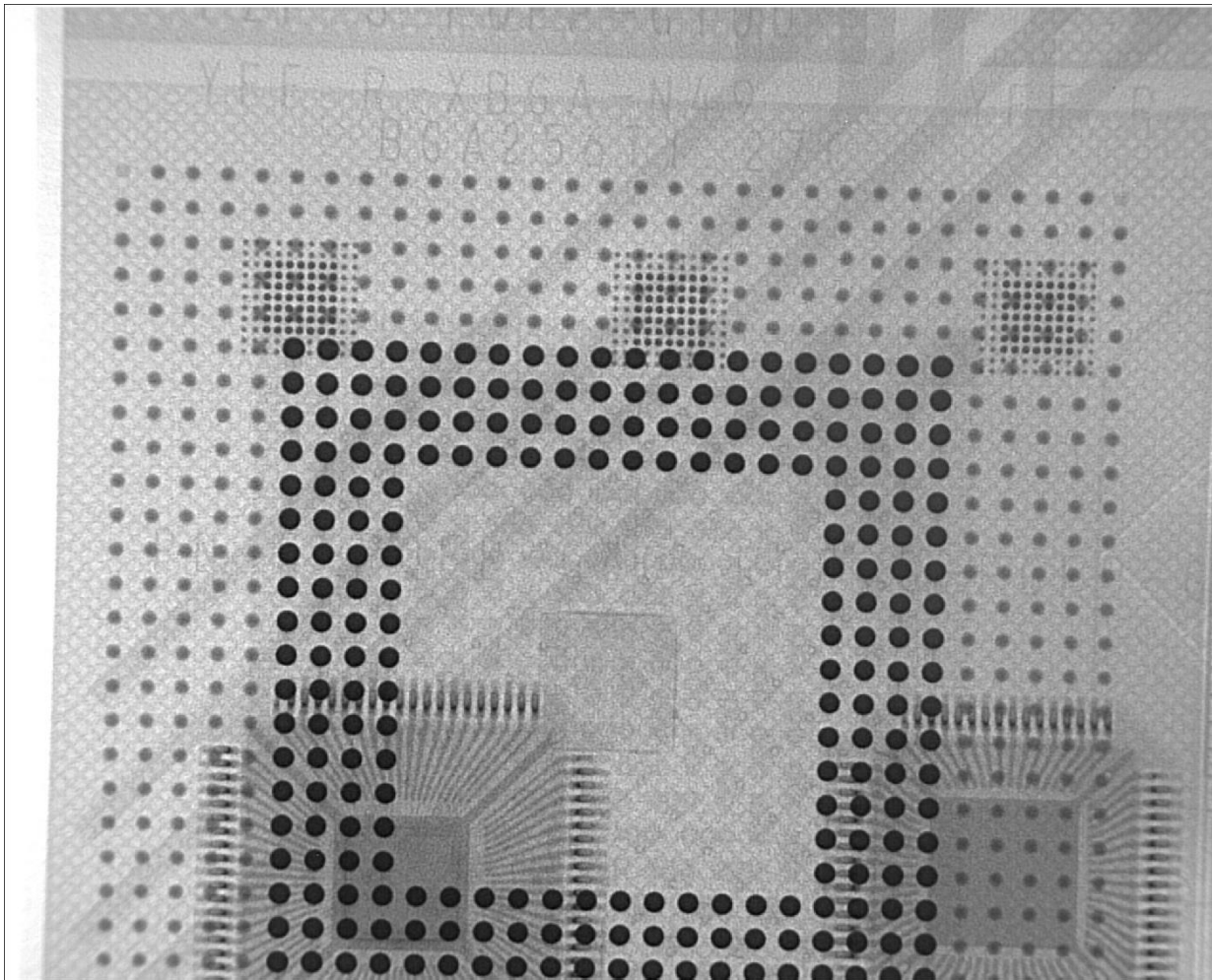


Röhren Spannung: 120 kV
Röhren Leistung: 2.21 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

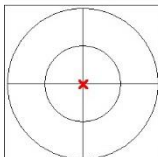


Baugruppe

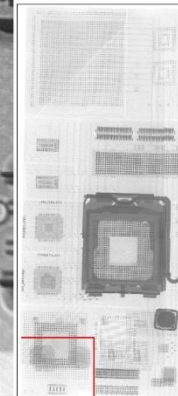
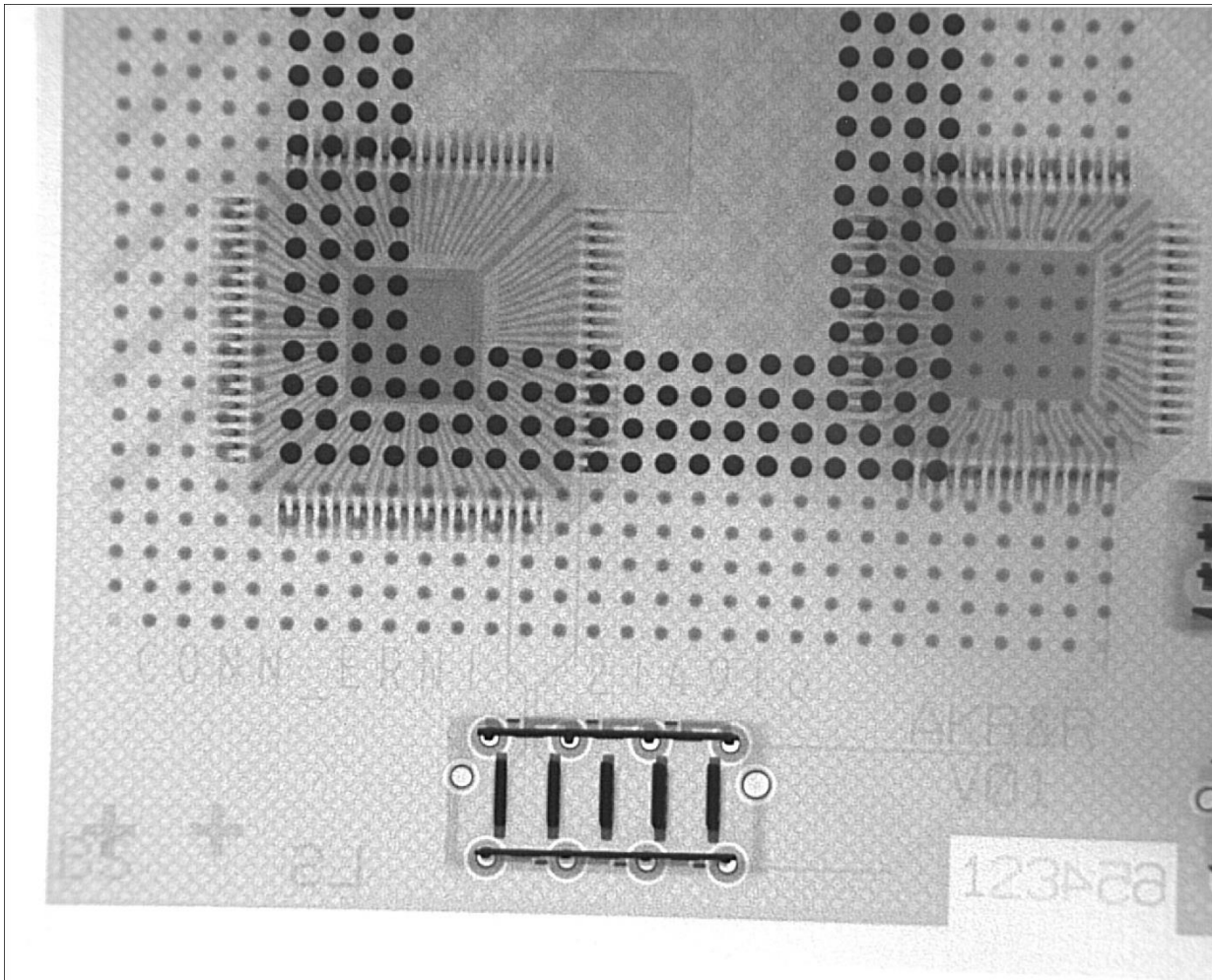
R+R 31 / Z



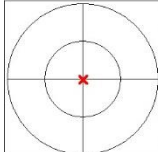
10.0mm



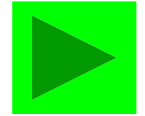
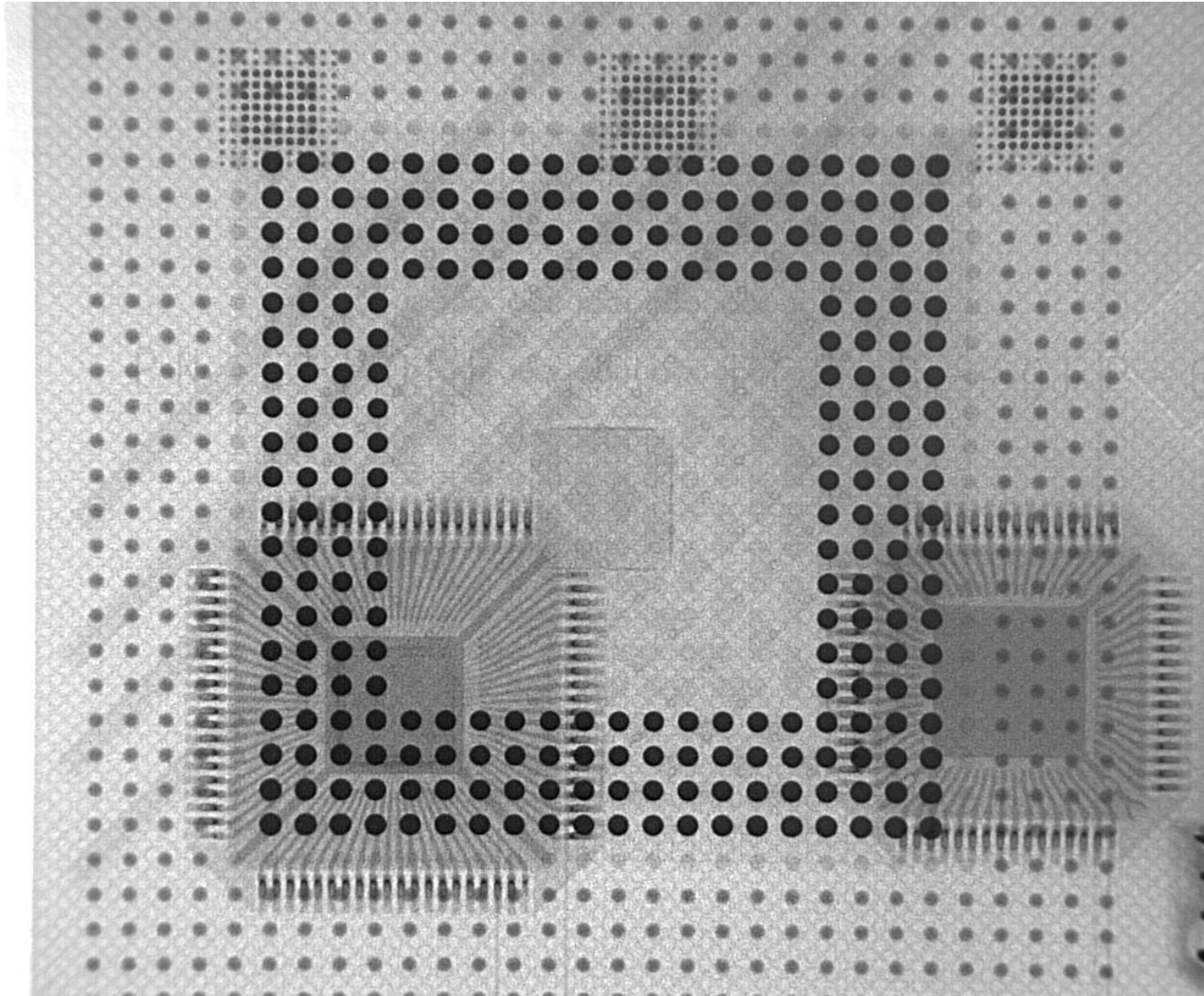
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

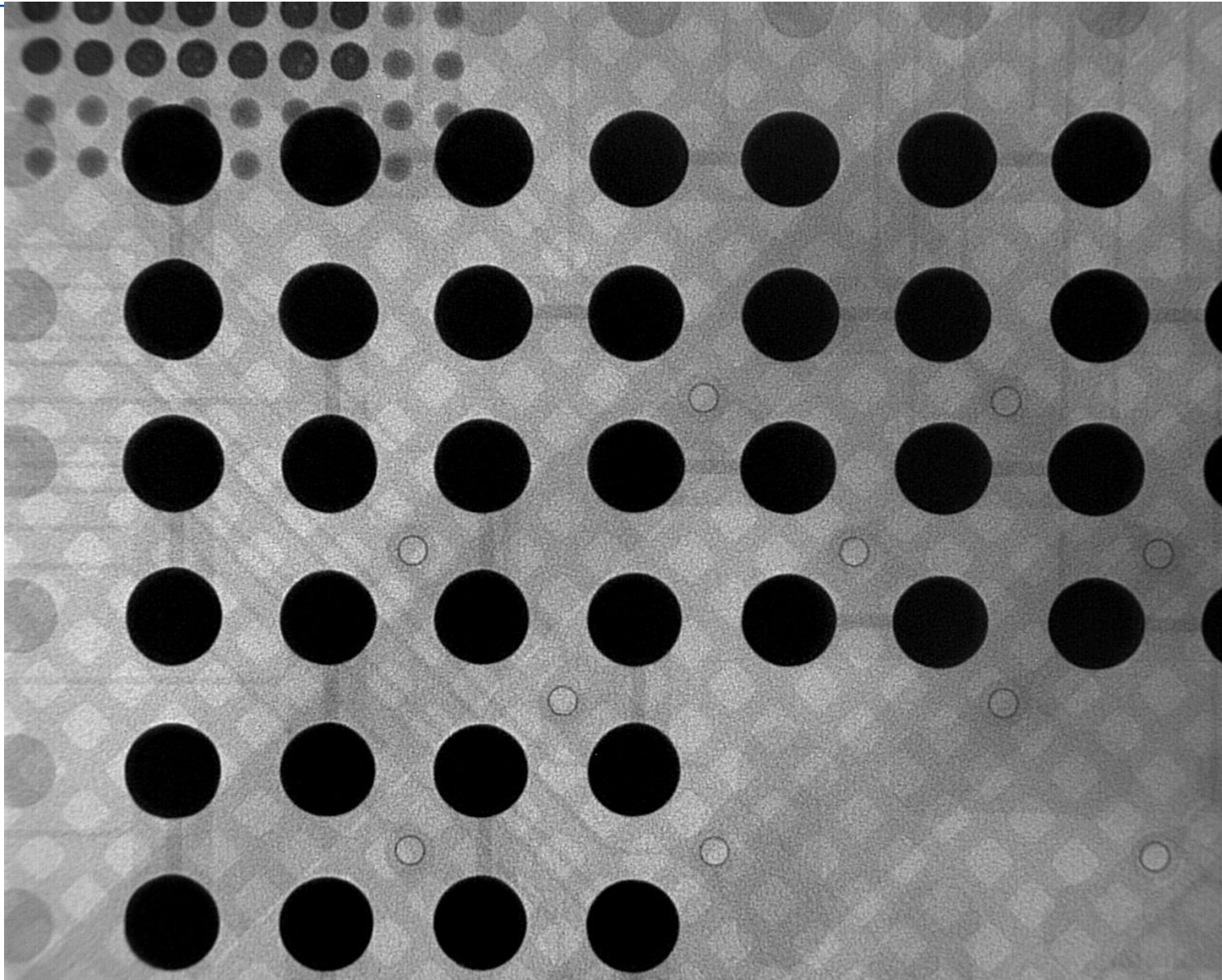


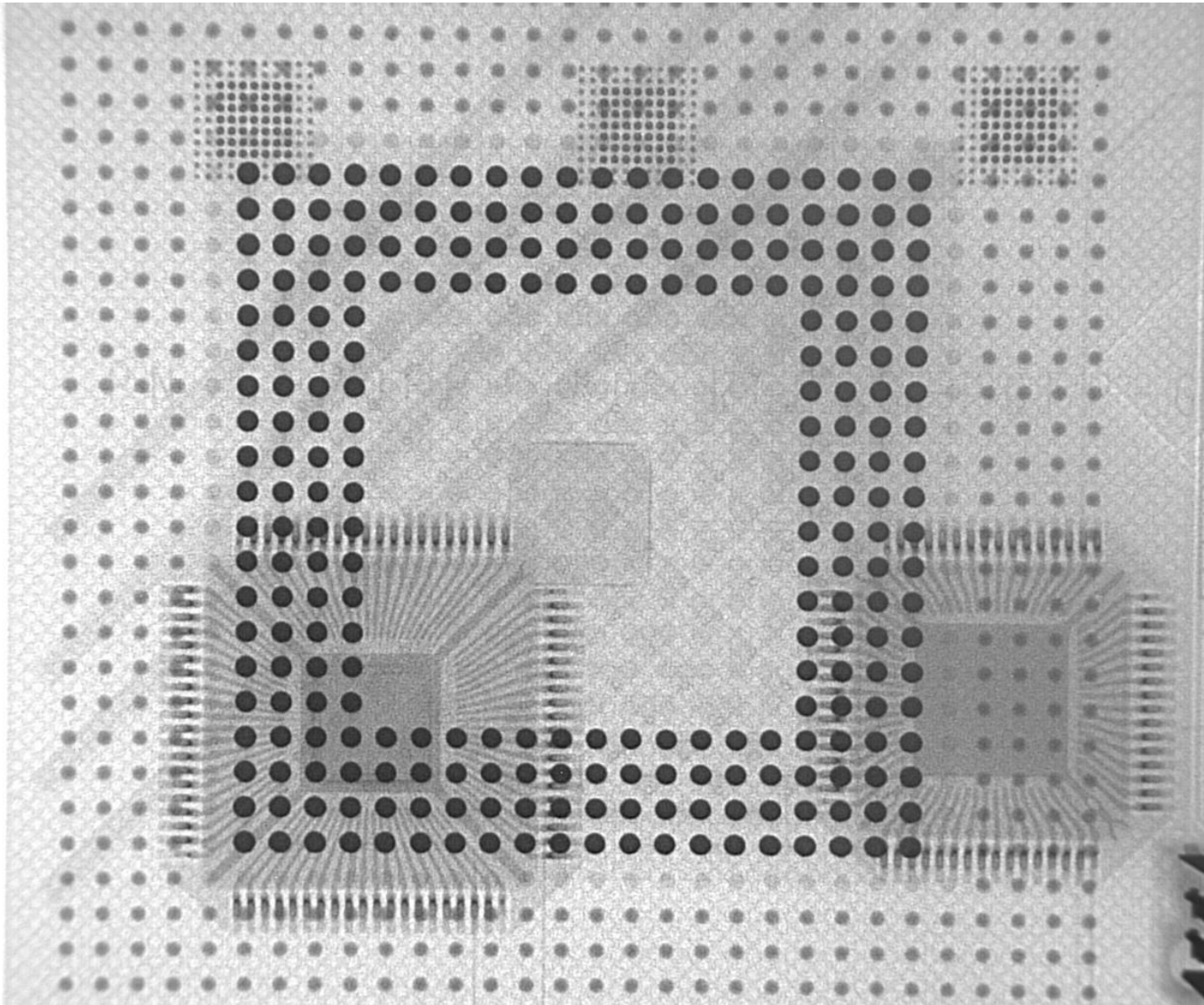
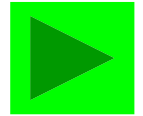
10.0mm

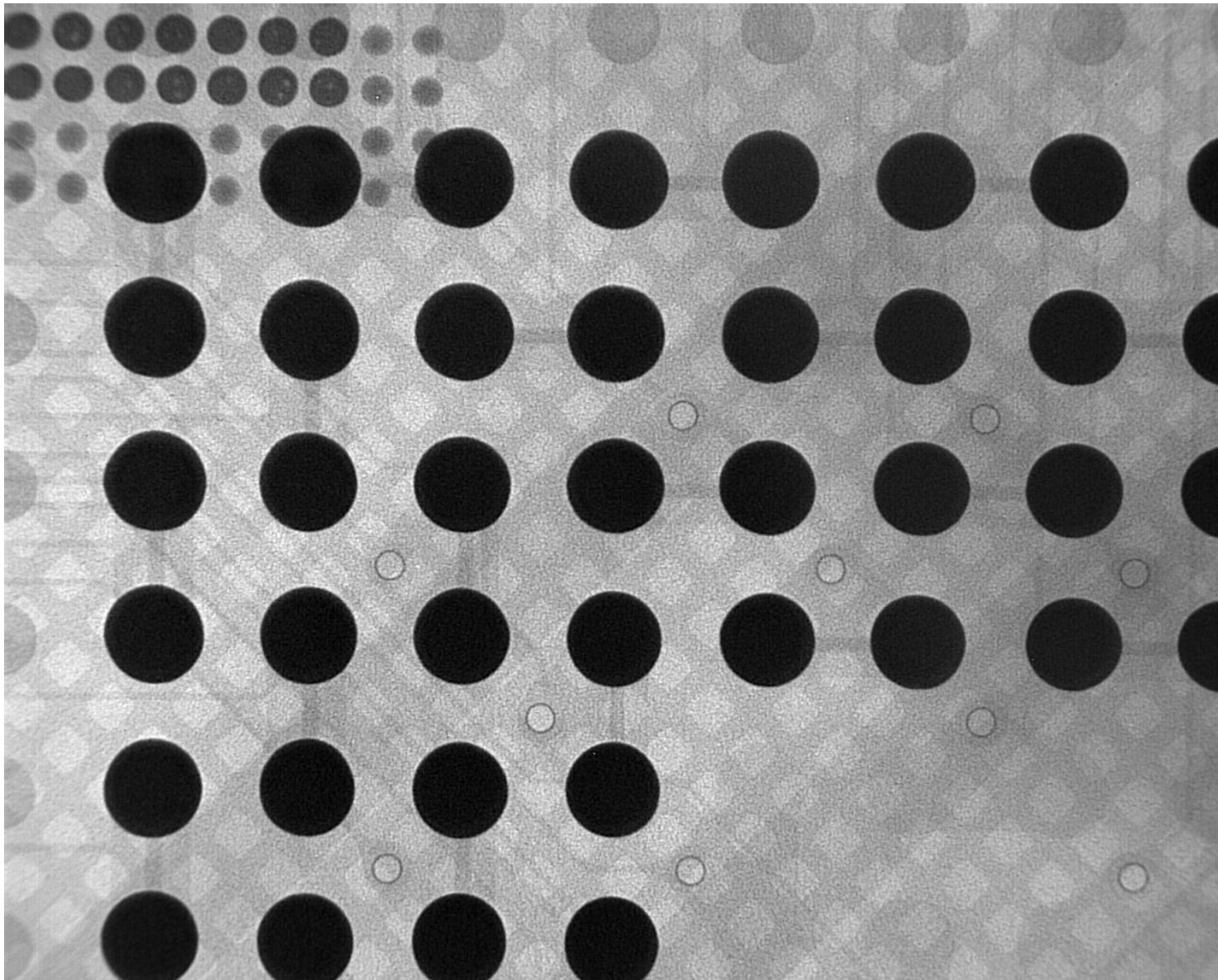


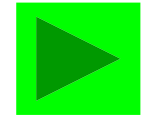
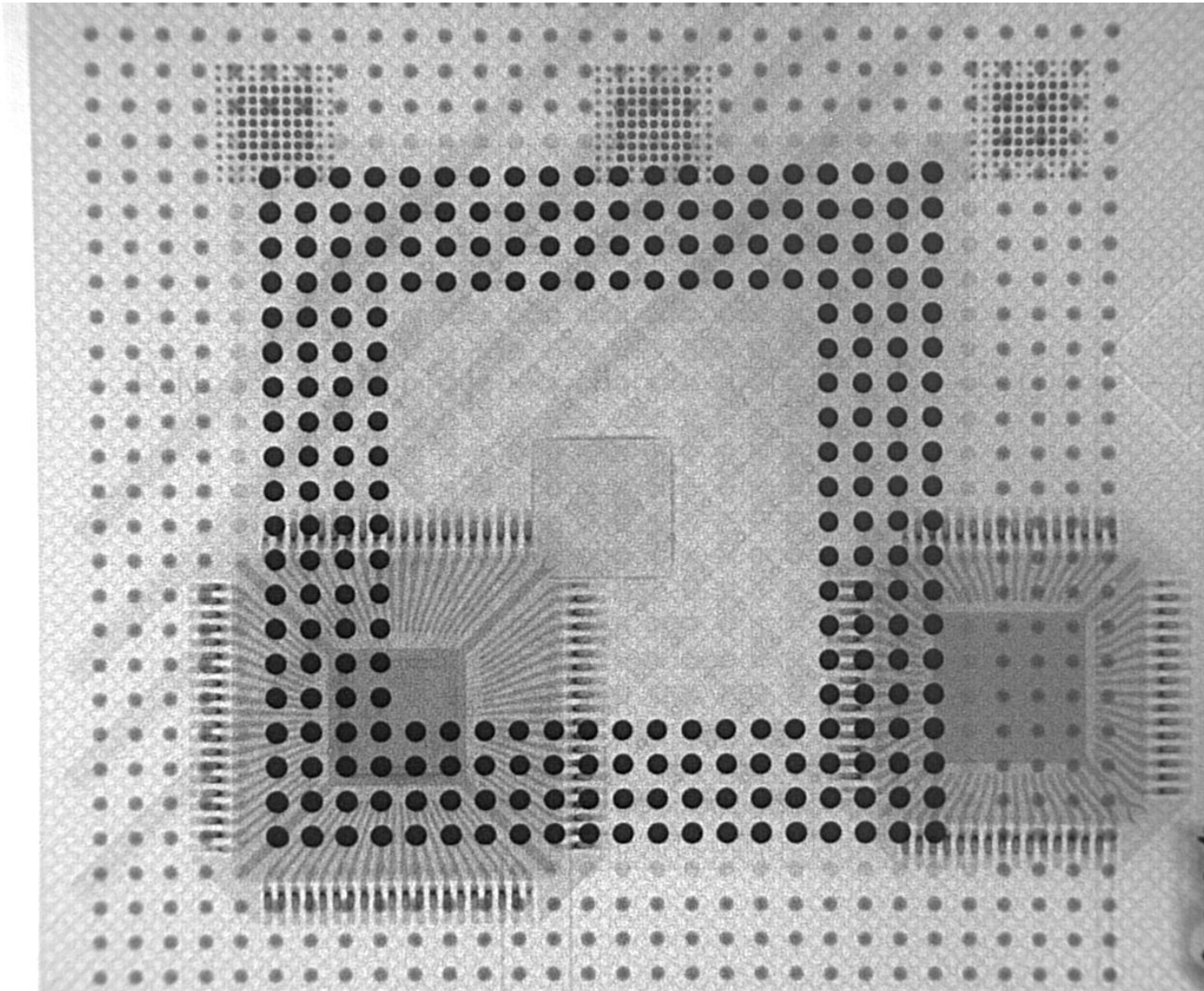
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

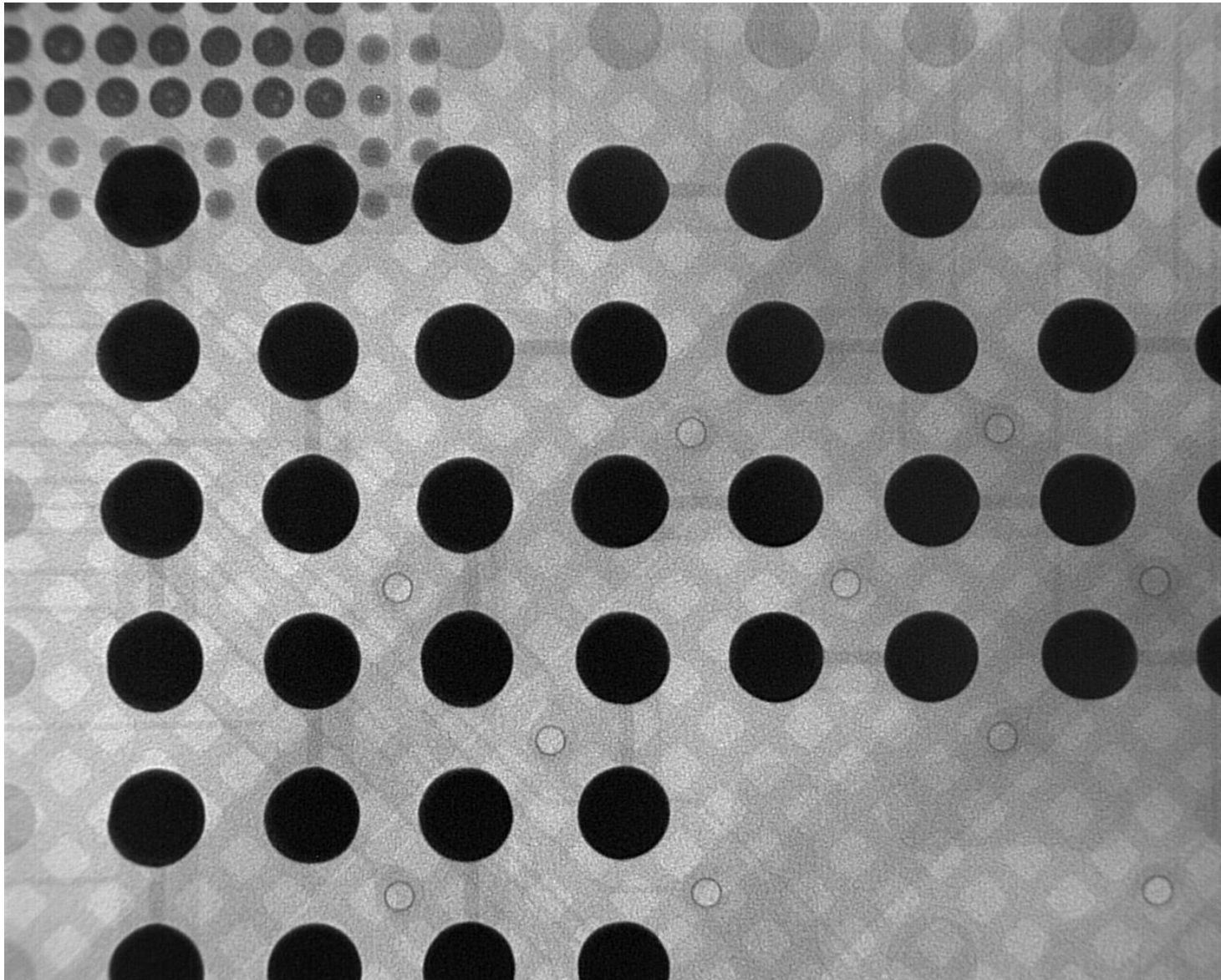




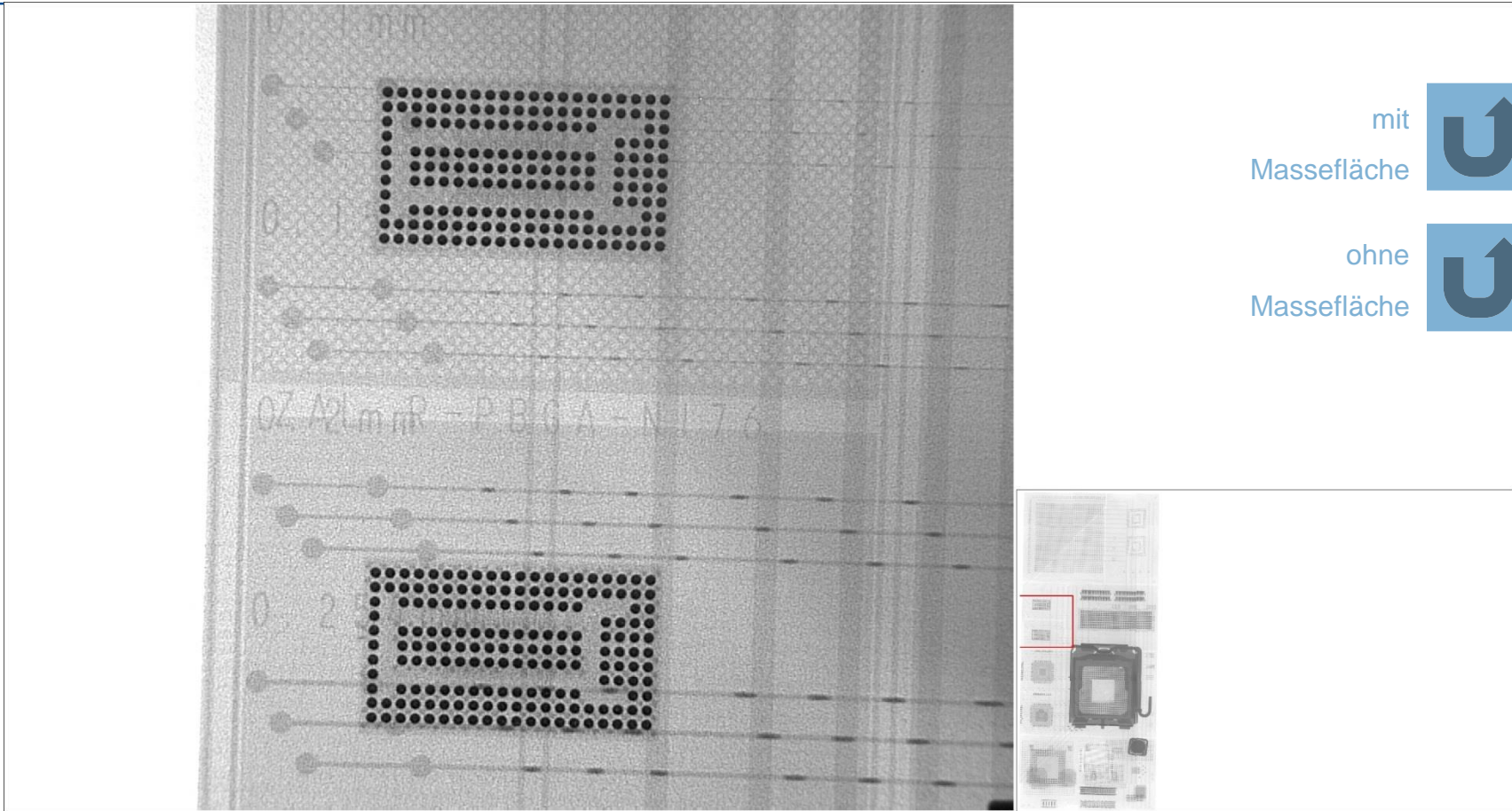








R+R 31 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



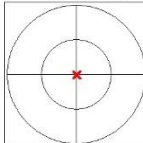
mit
Massefläche



ohne
Massefläche

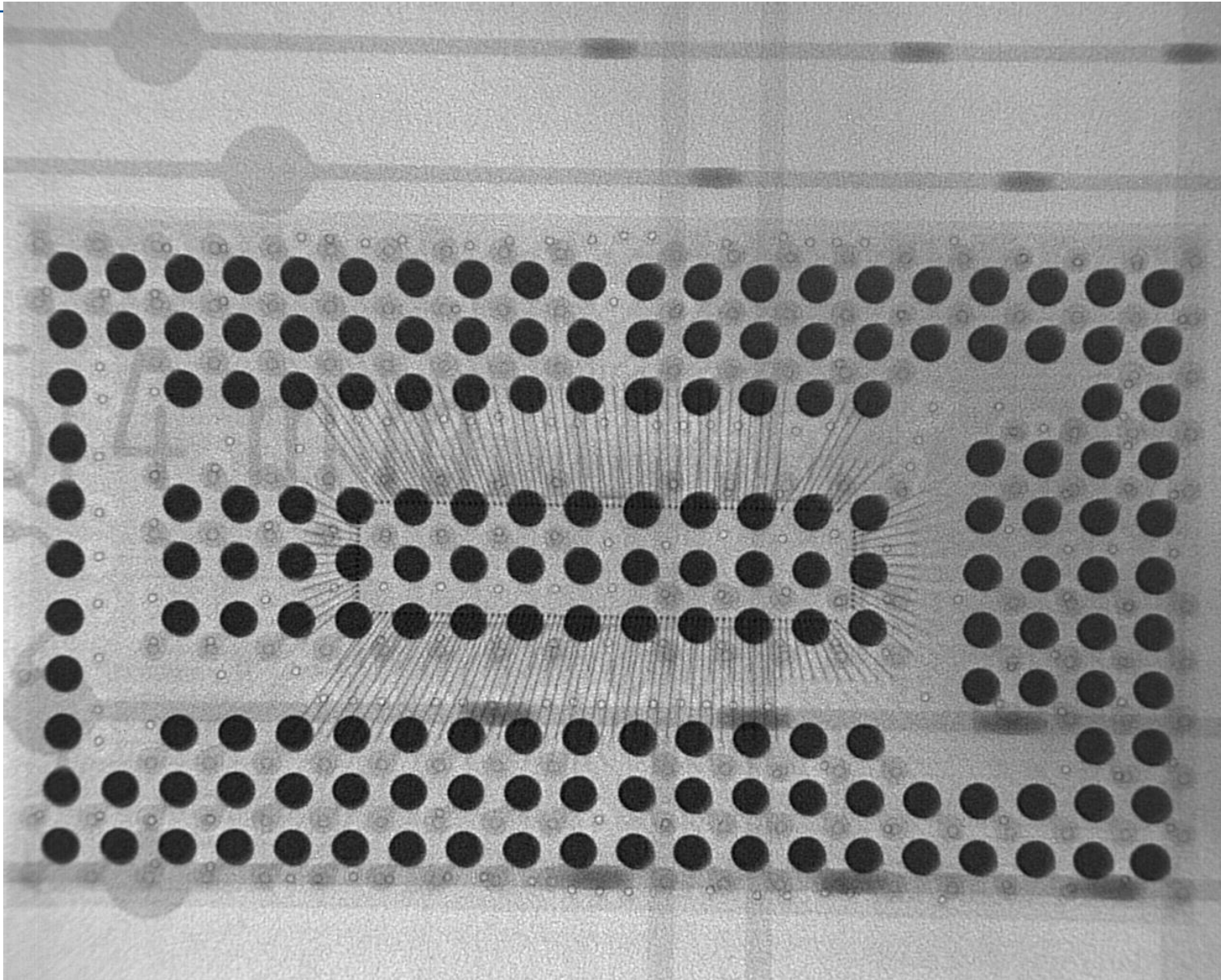


10.0mm

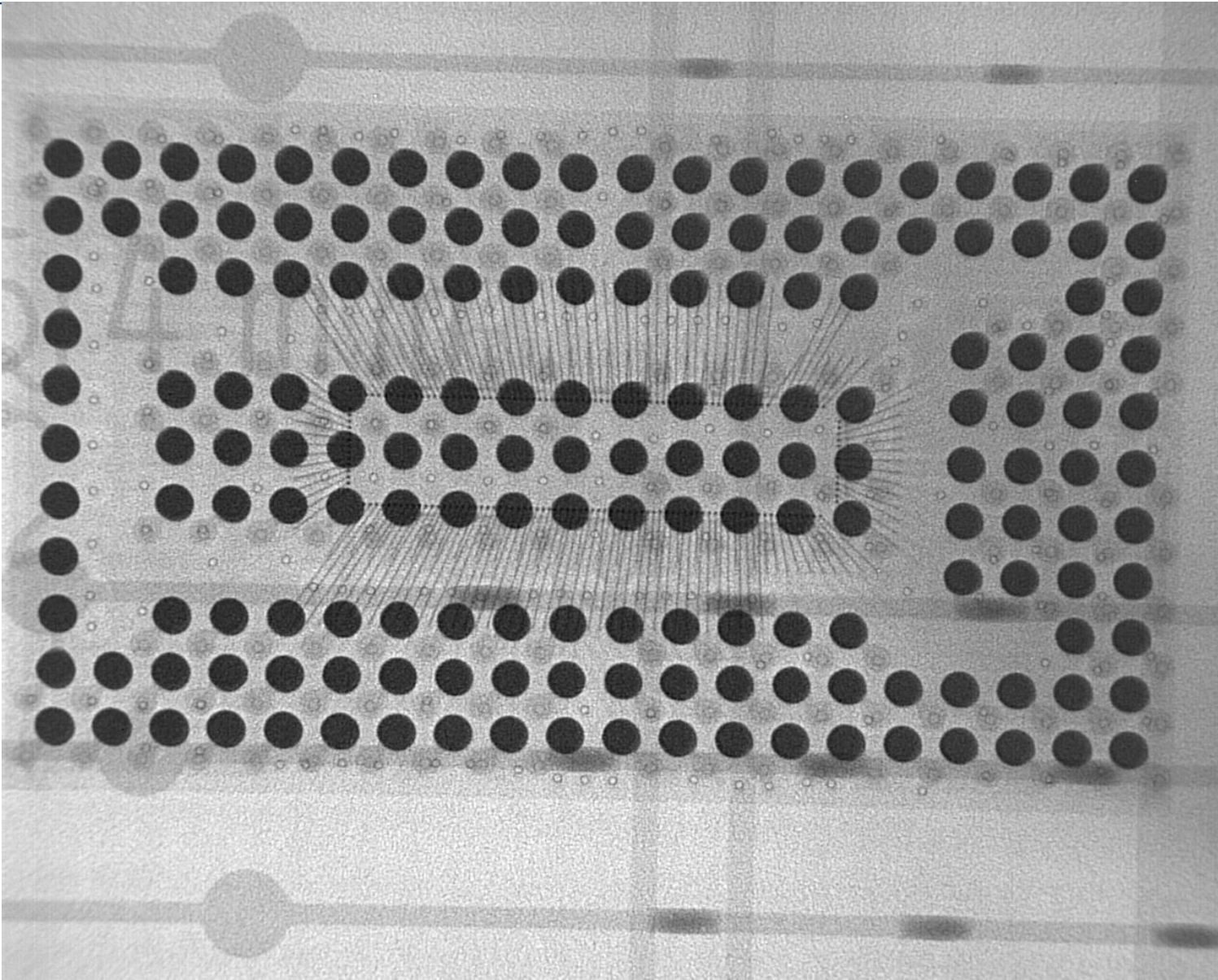


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

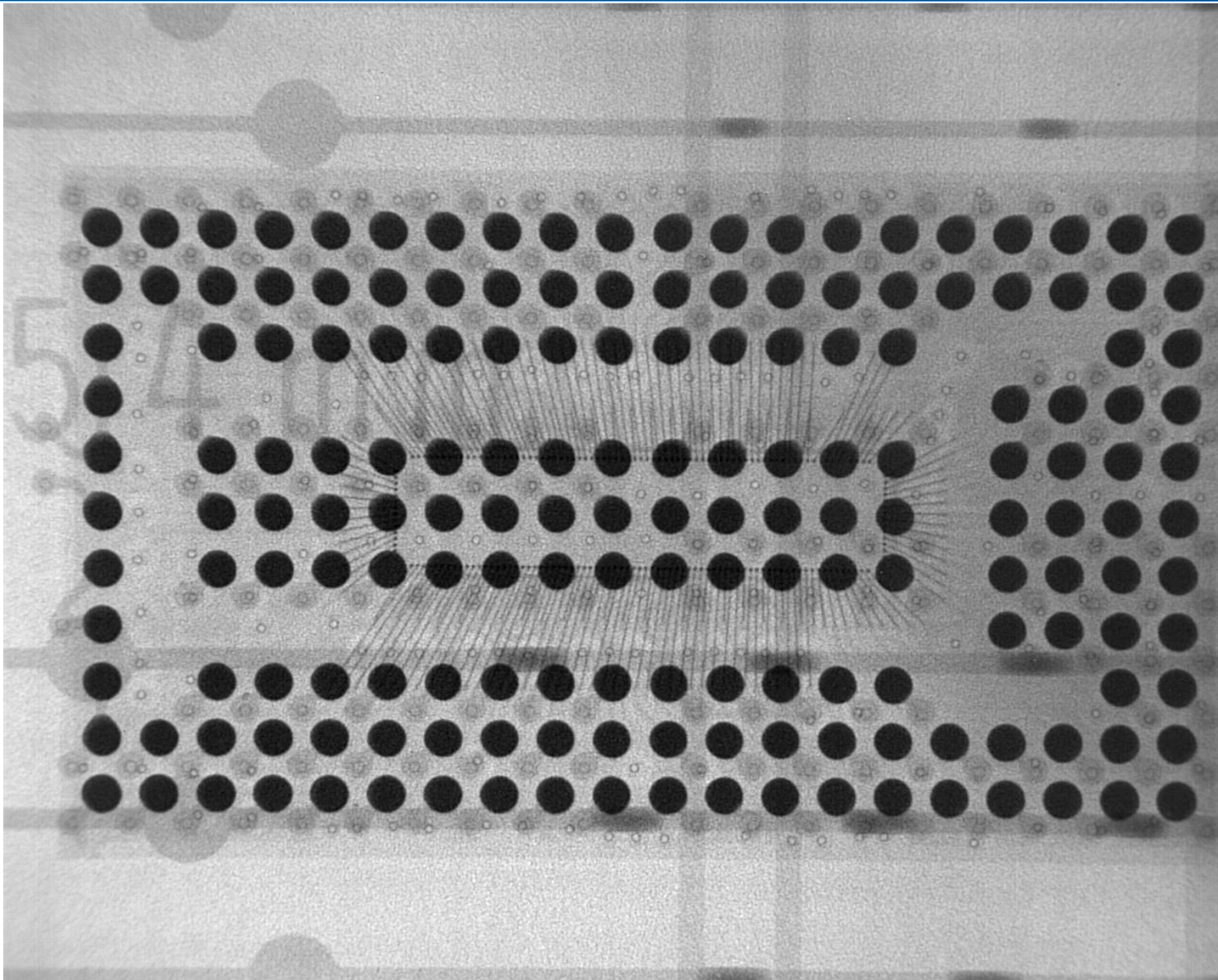
R+R 31 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



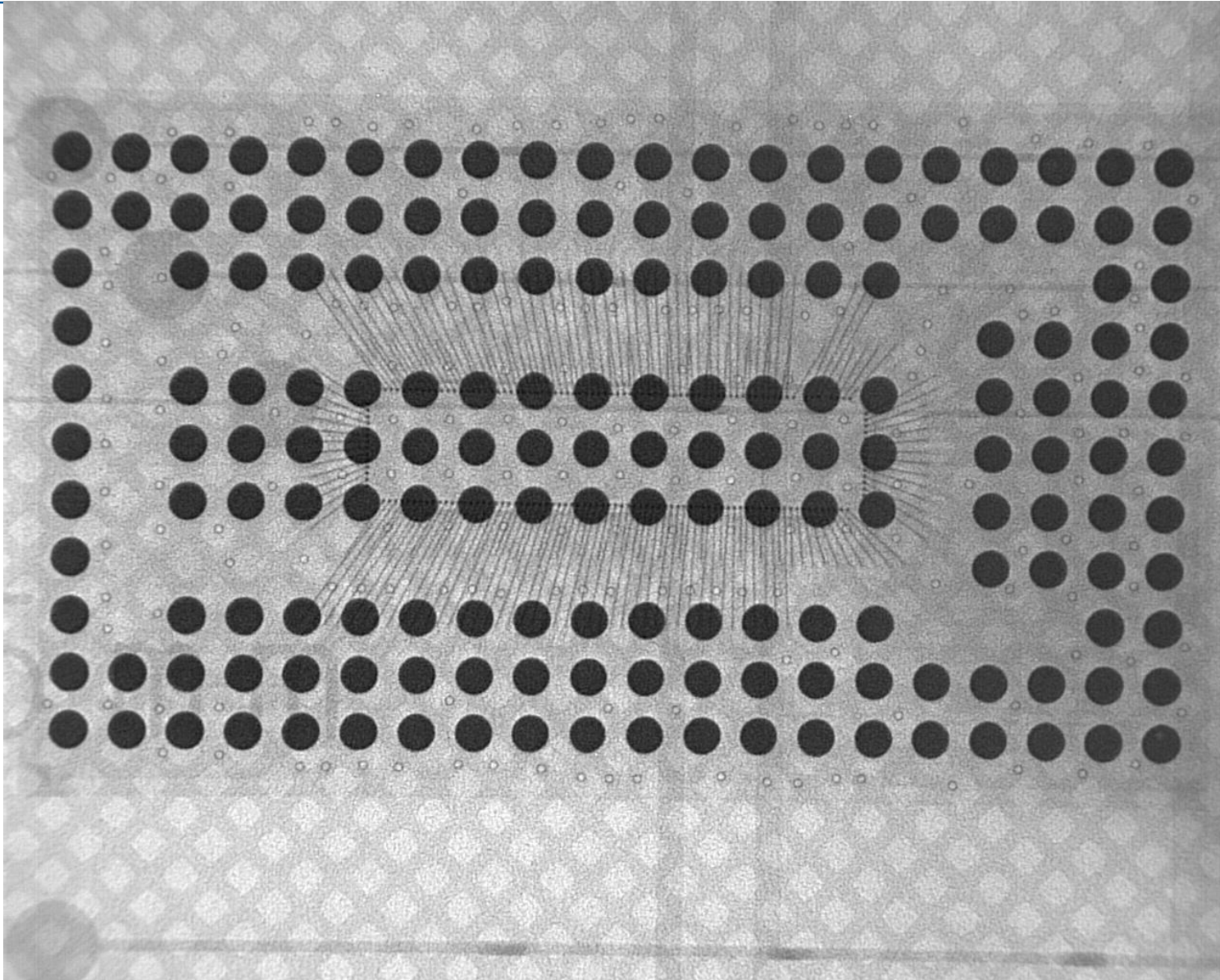
R+R 31 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (mit Massefläche)



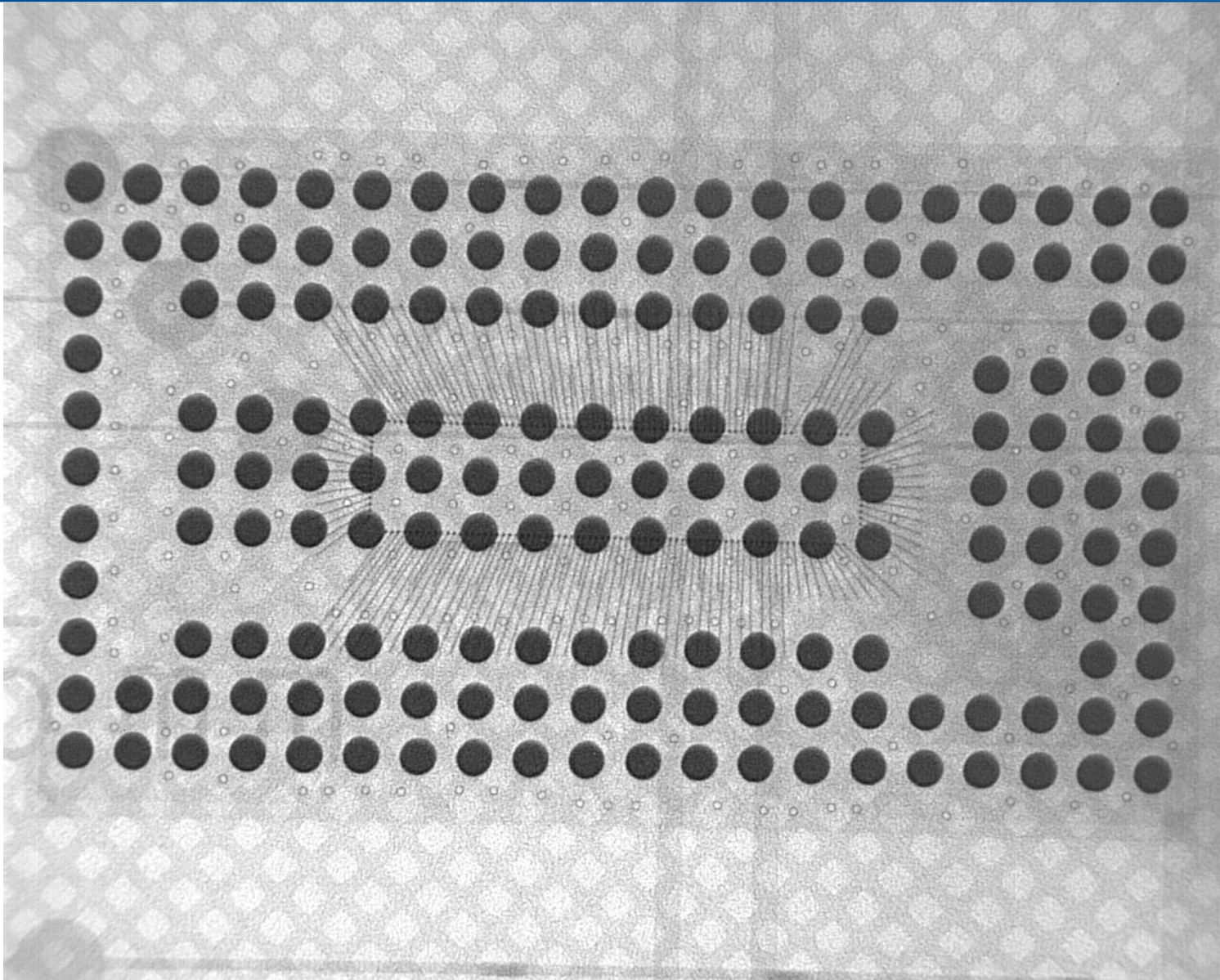
R+R 31 / Z – X-Ray nach Rework 3 – ZAL R-PBGA-N176 (mit Massefläche)



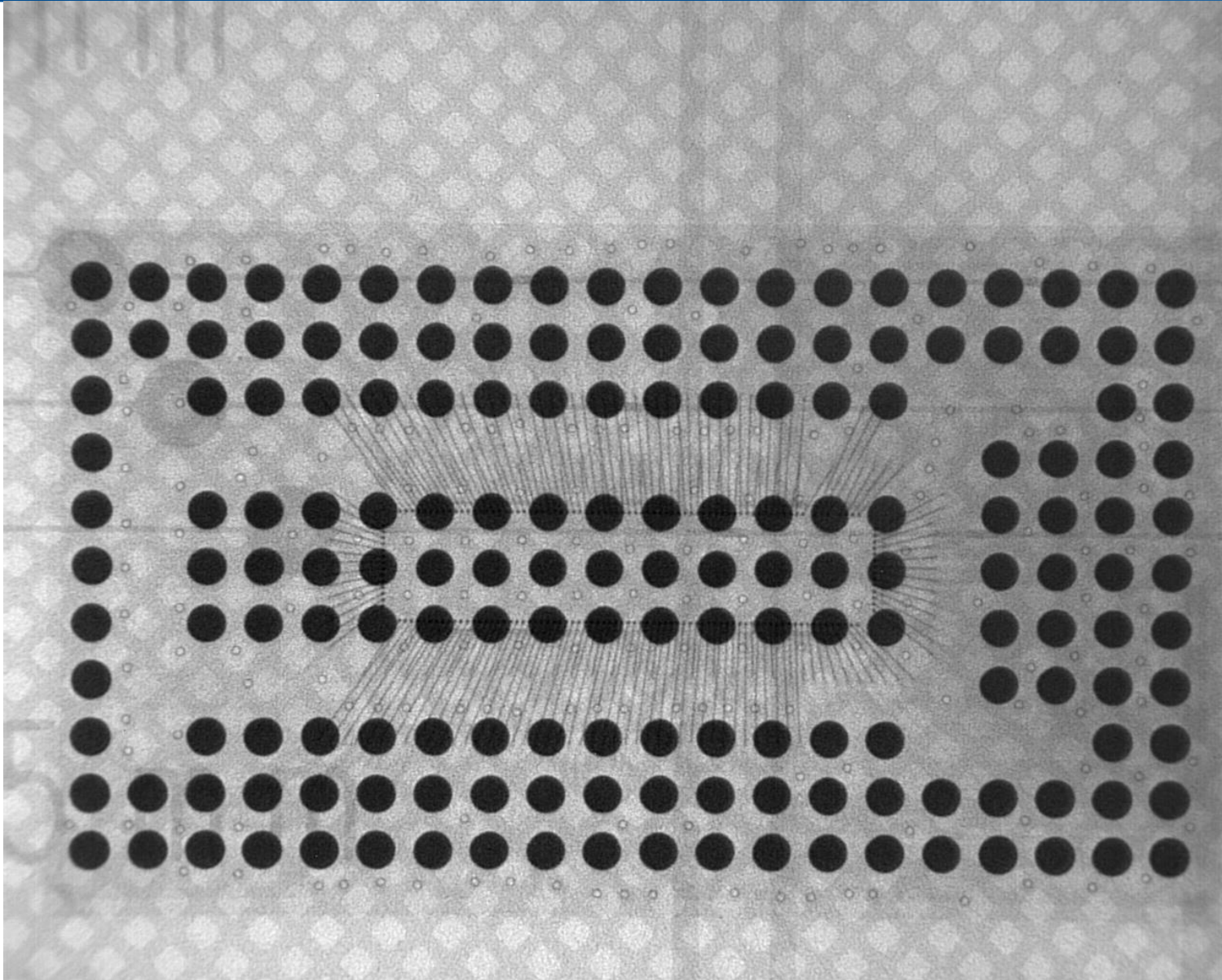
R+R 31 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)

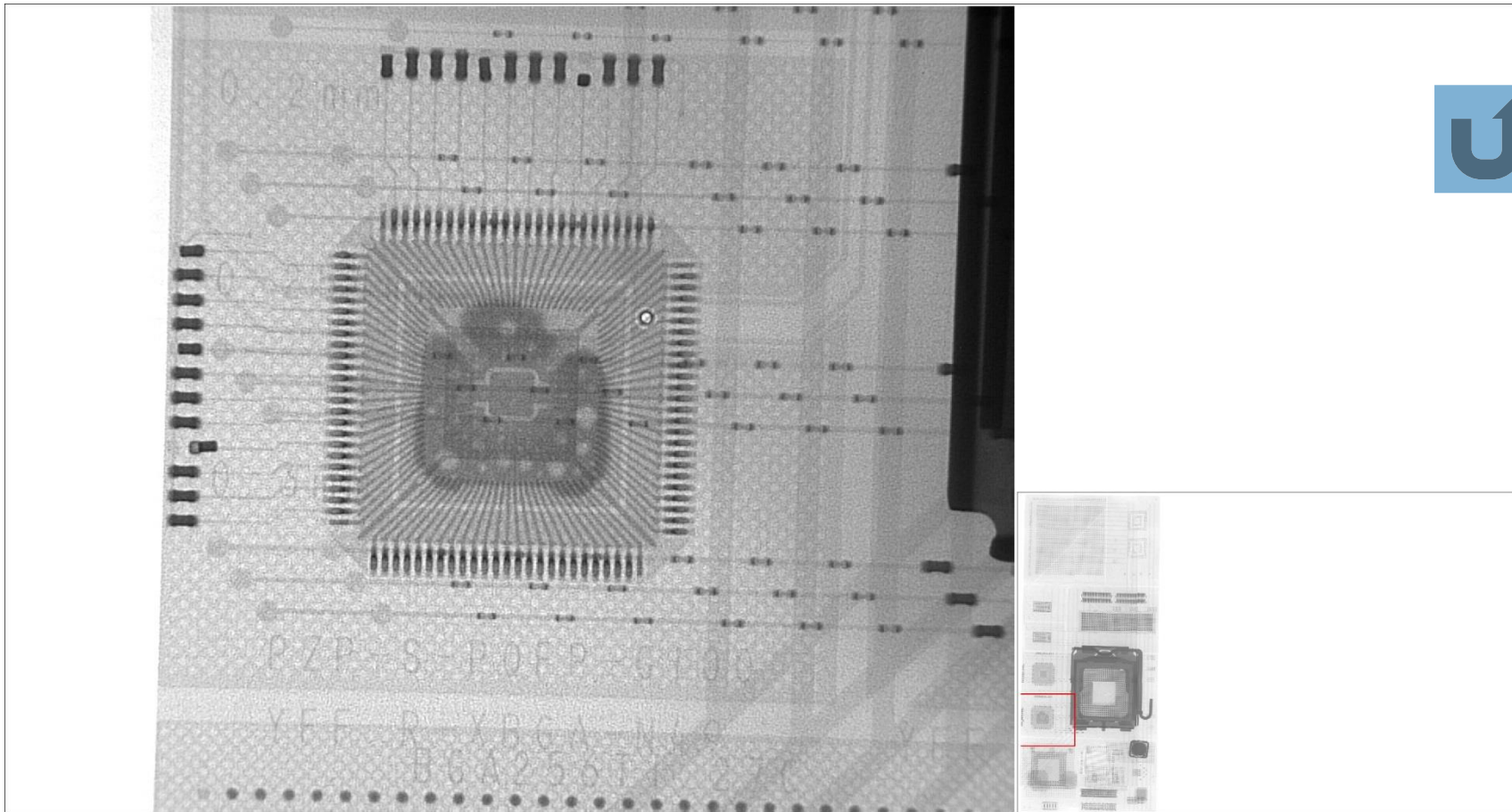


R+R 31 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)

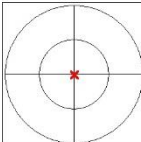


R+R 31 / Z – X-Ray nach Rework 3 – ZAL R-PBGA-N176 (ohne Massefläche)

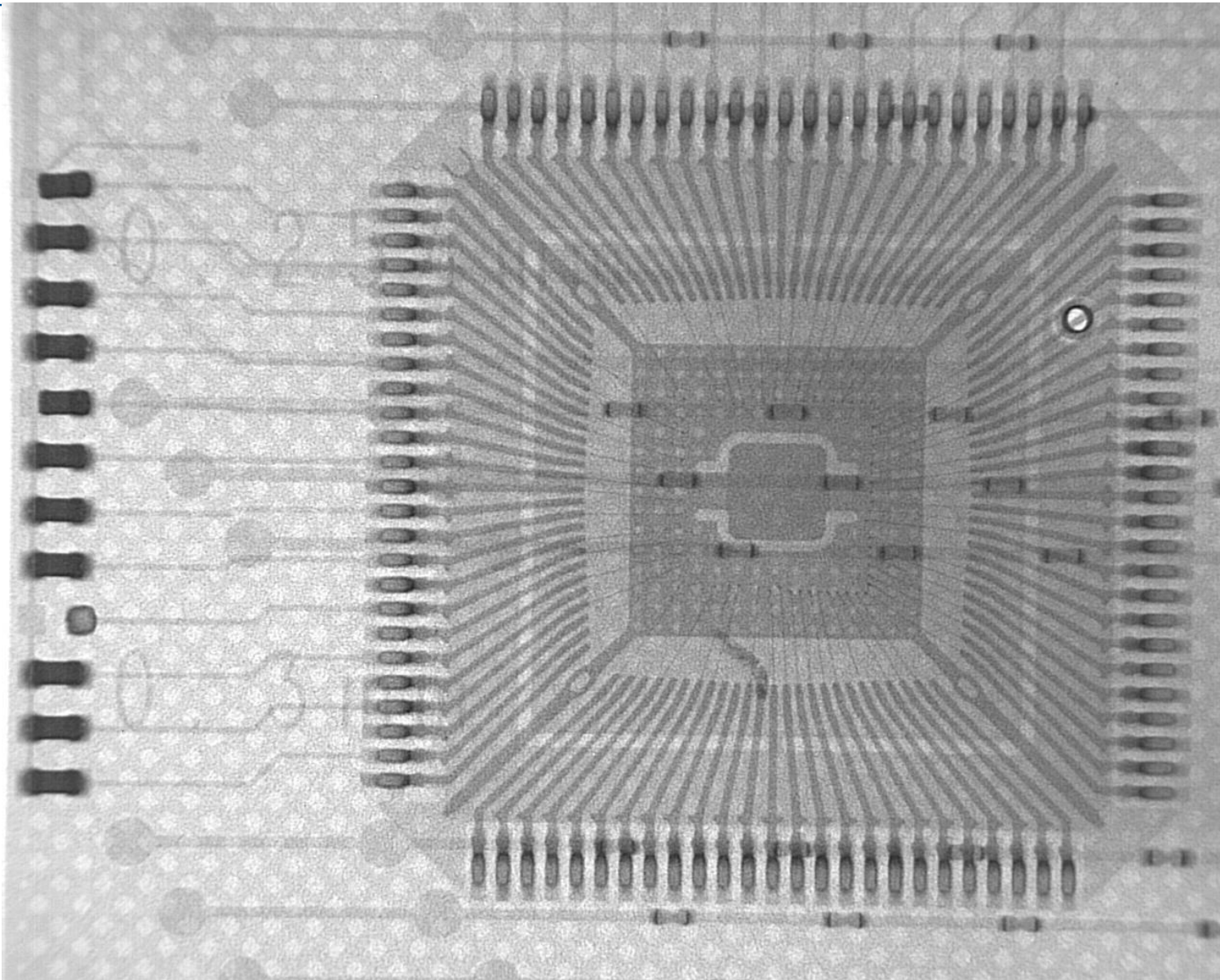


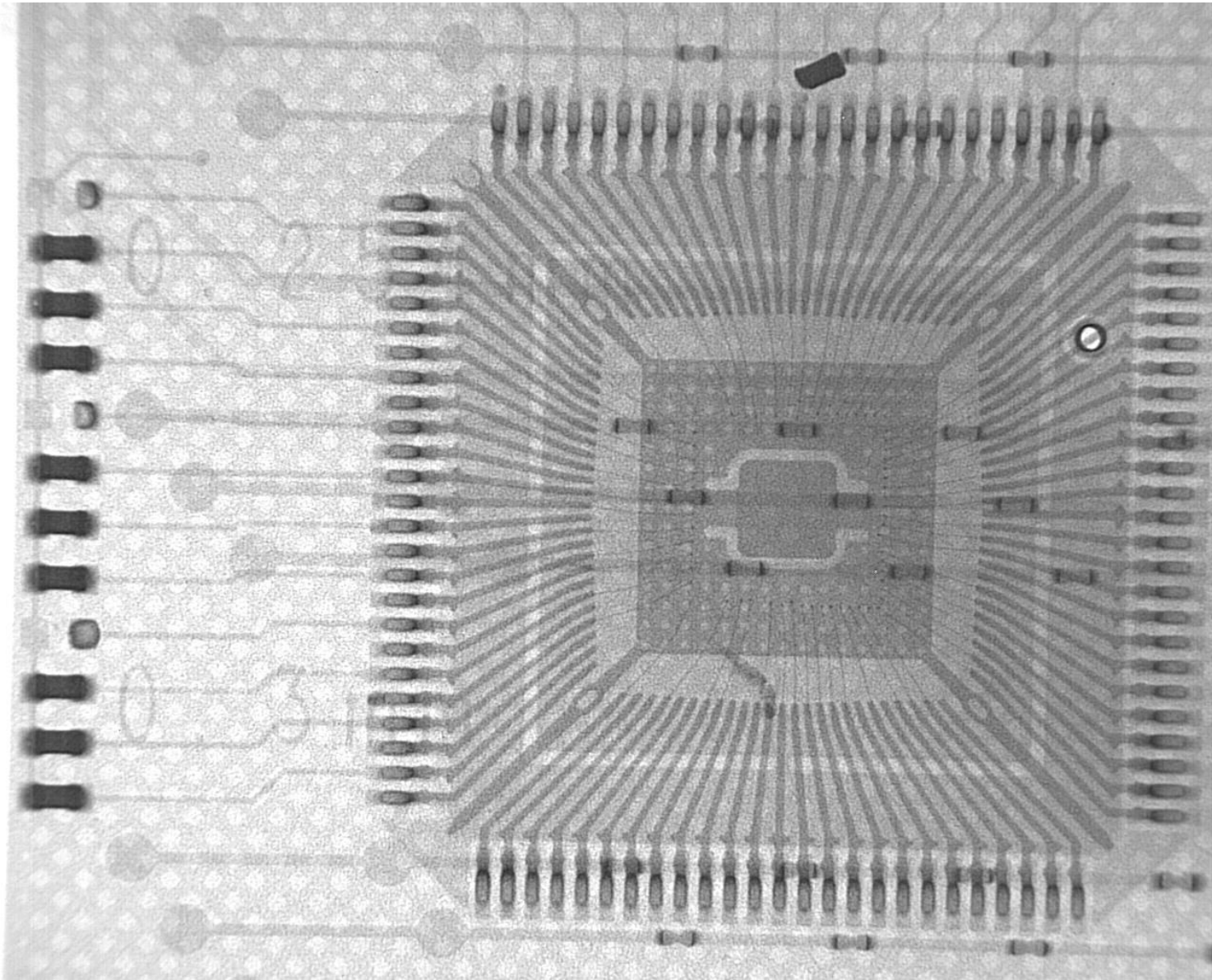


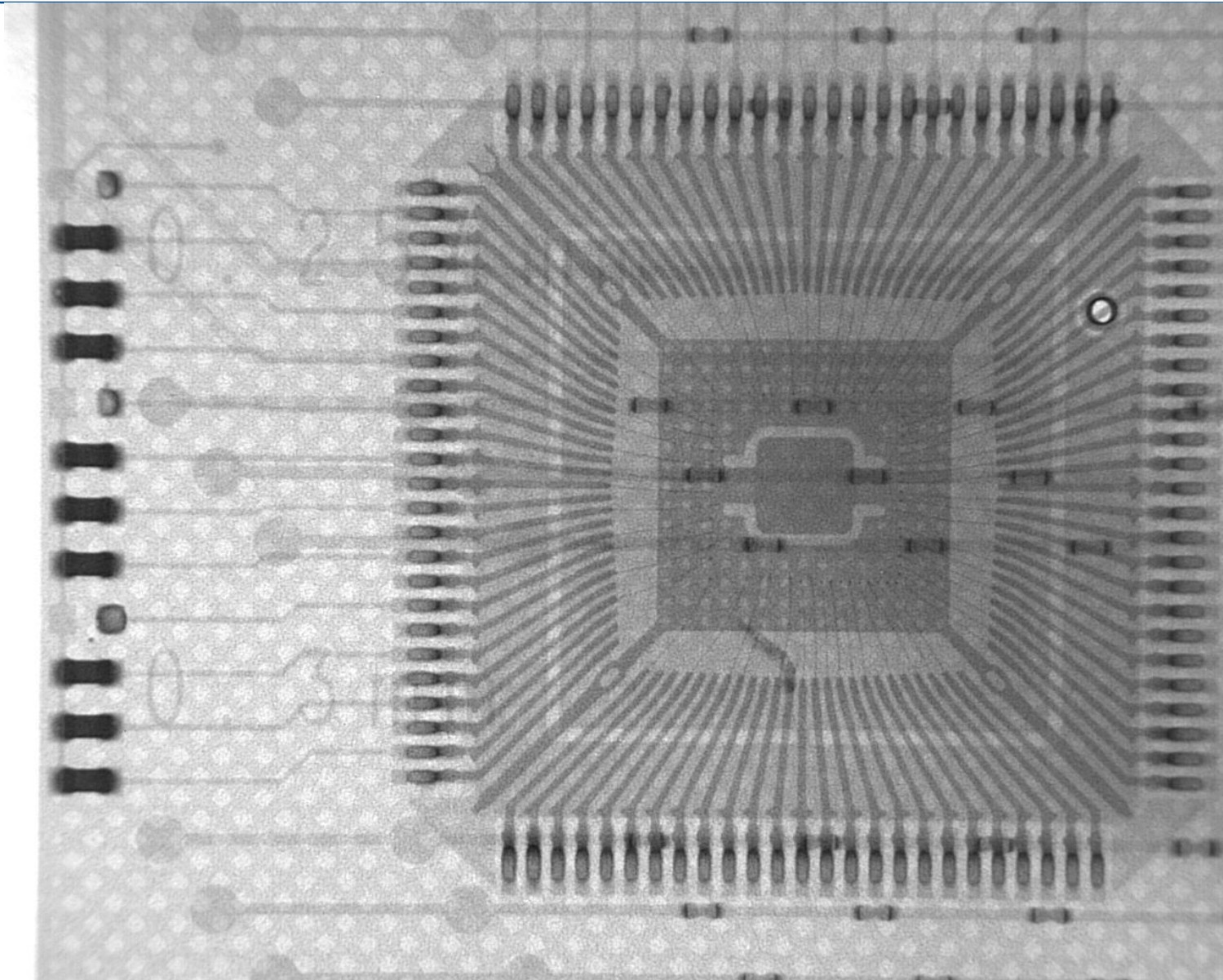
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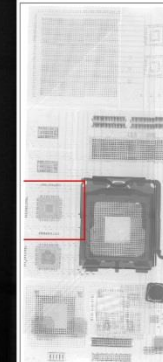
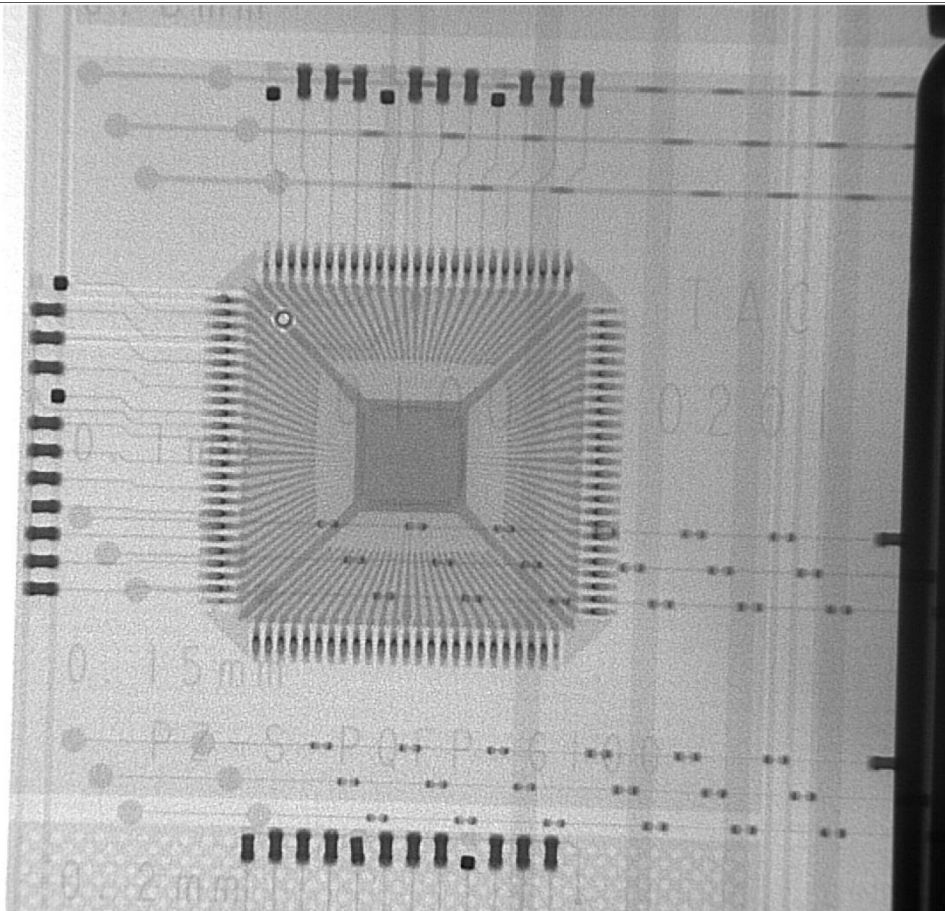


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

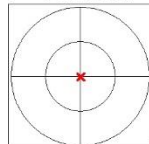




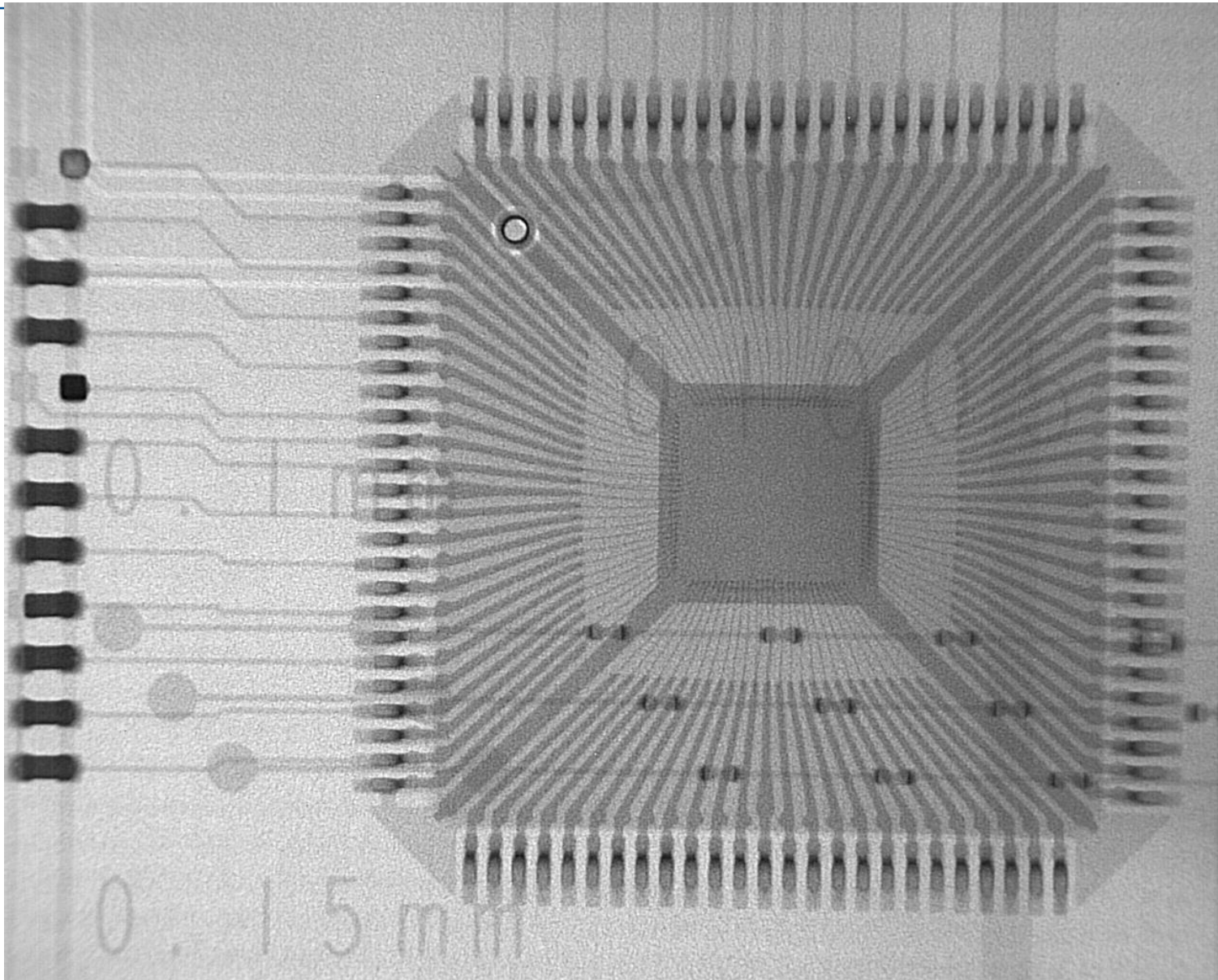


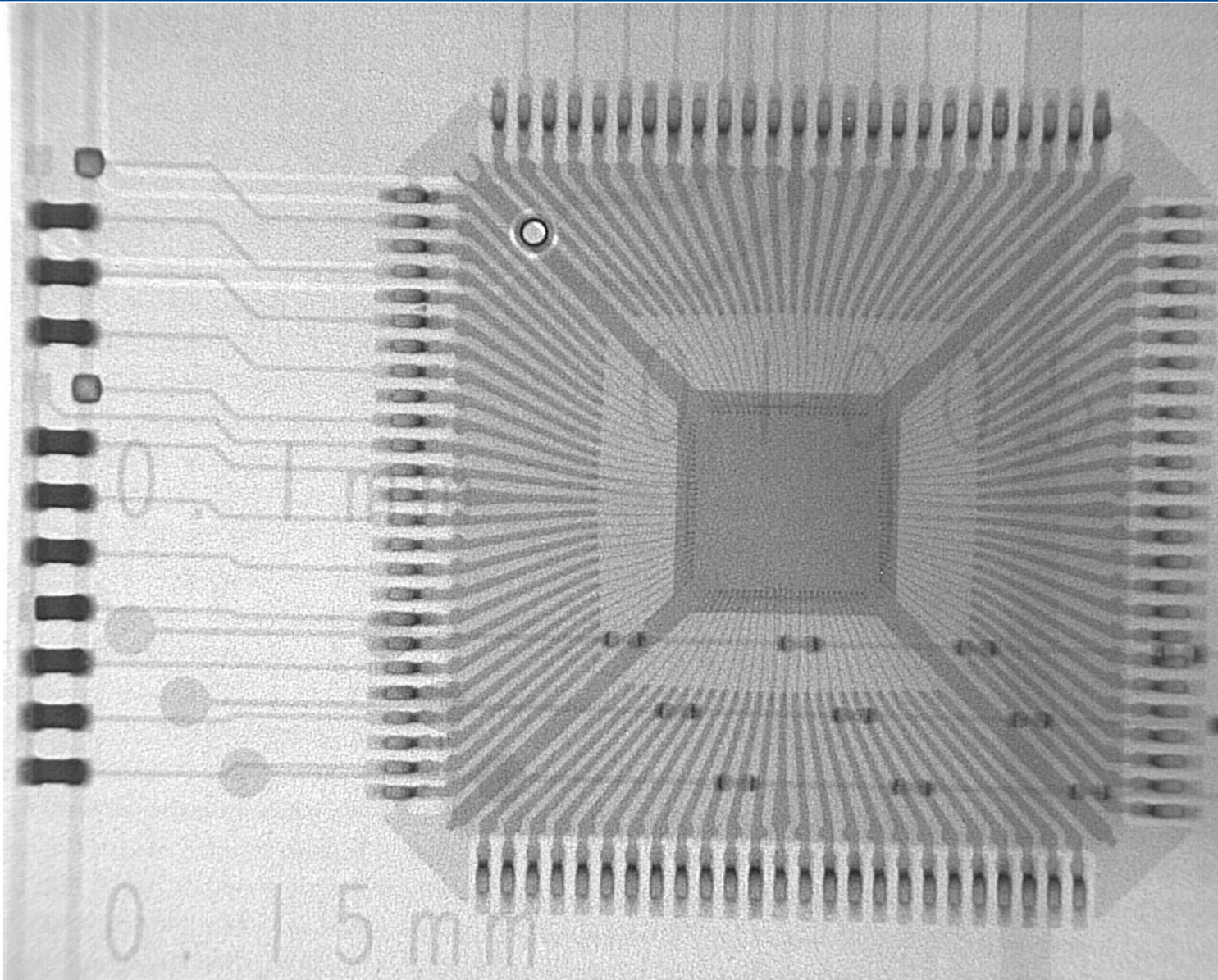


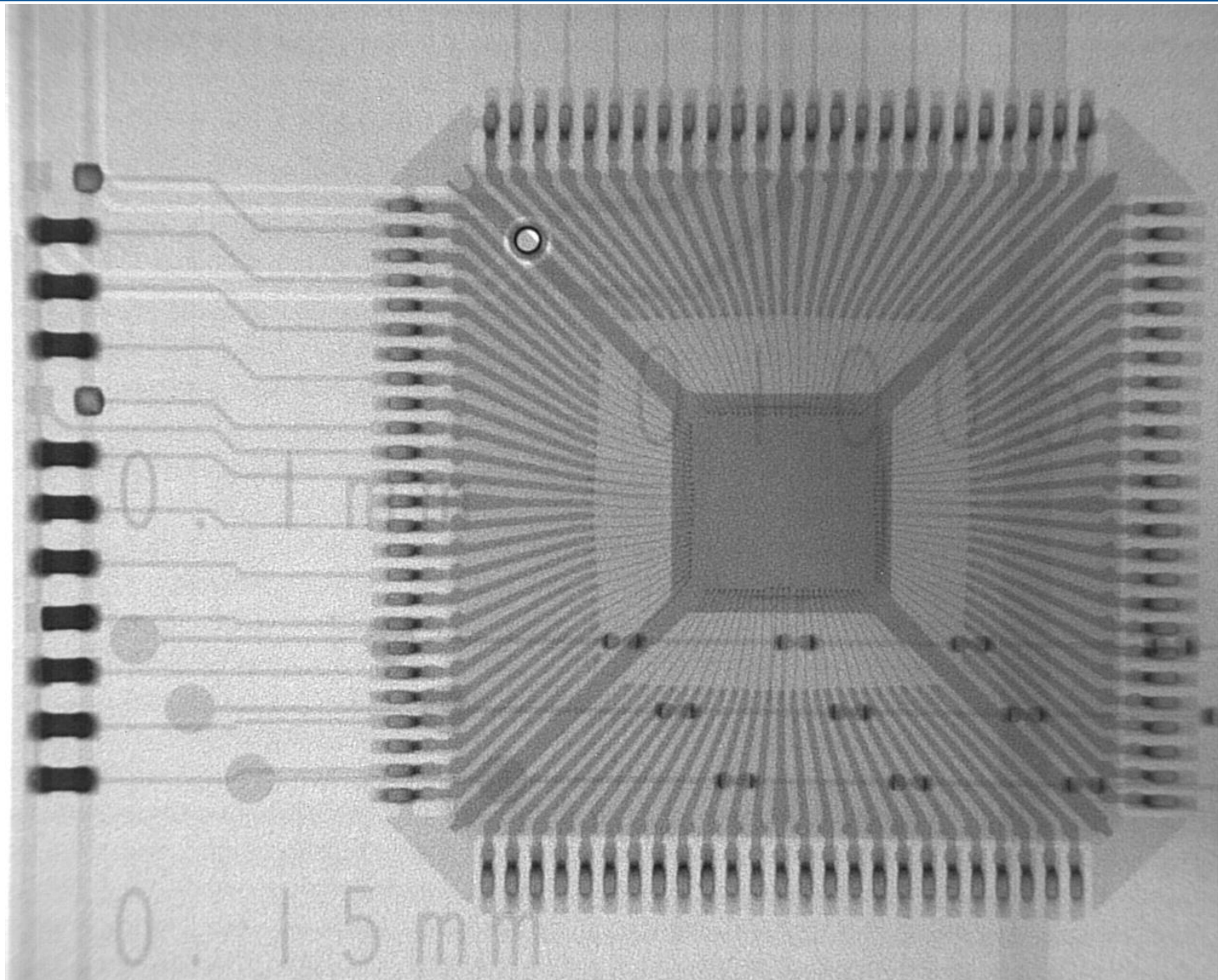
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Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

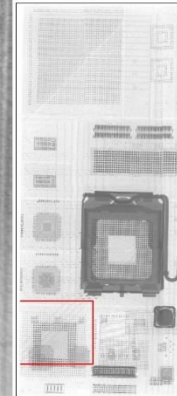
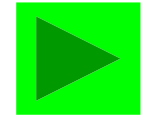
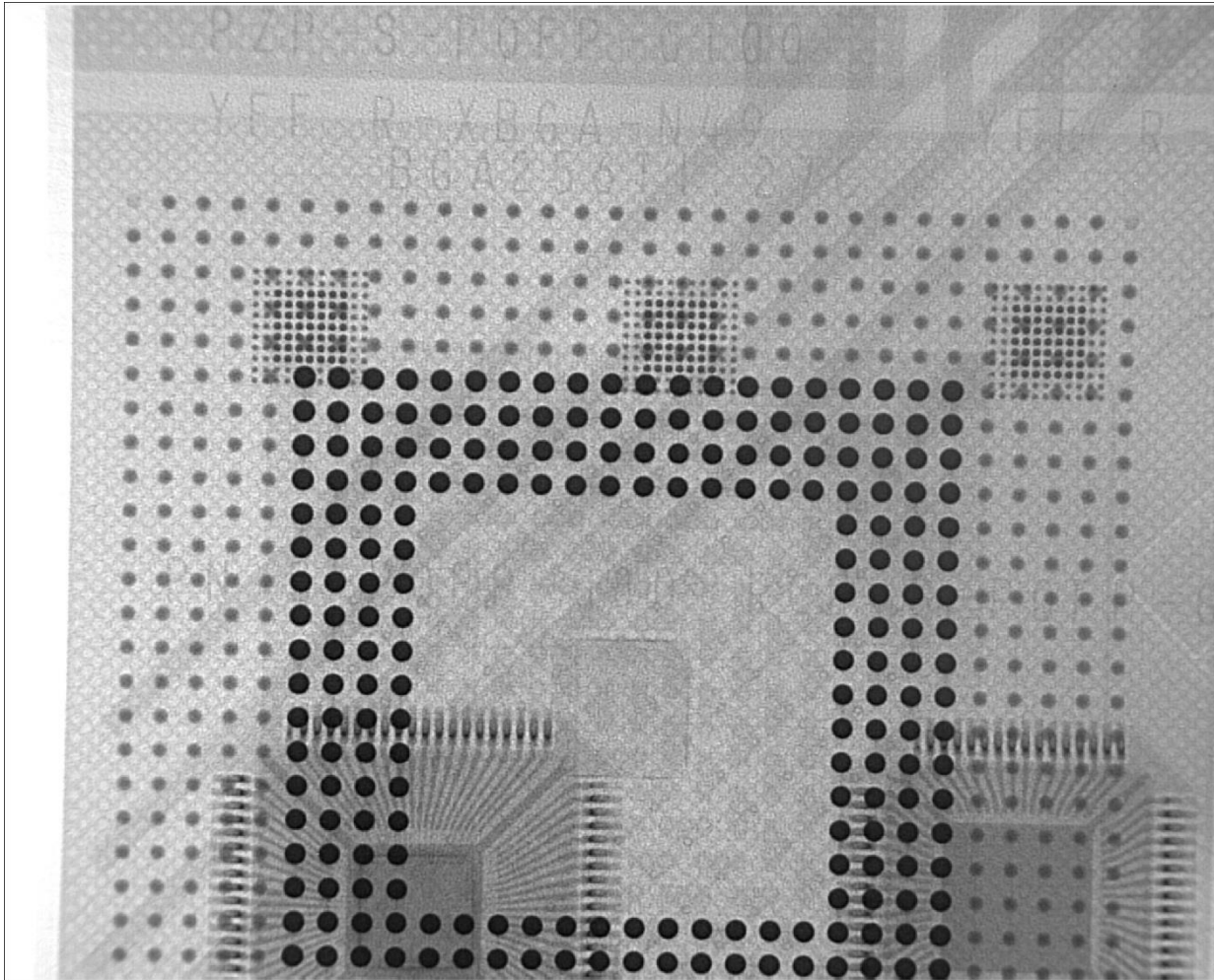




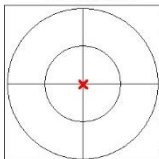


Baugruppe

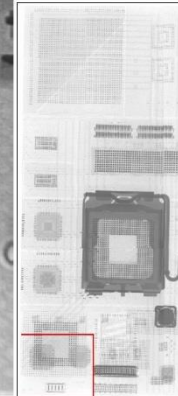
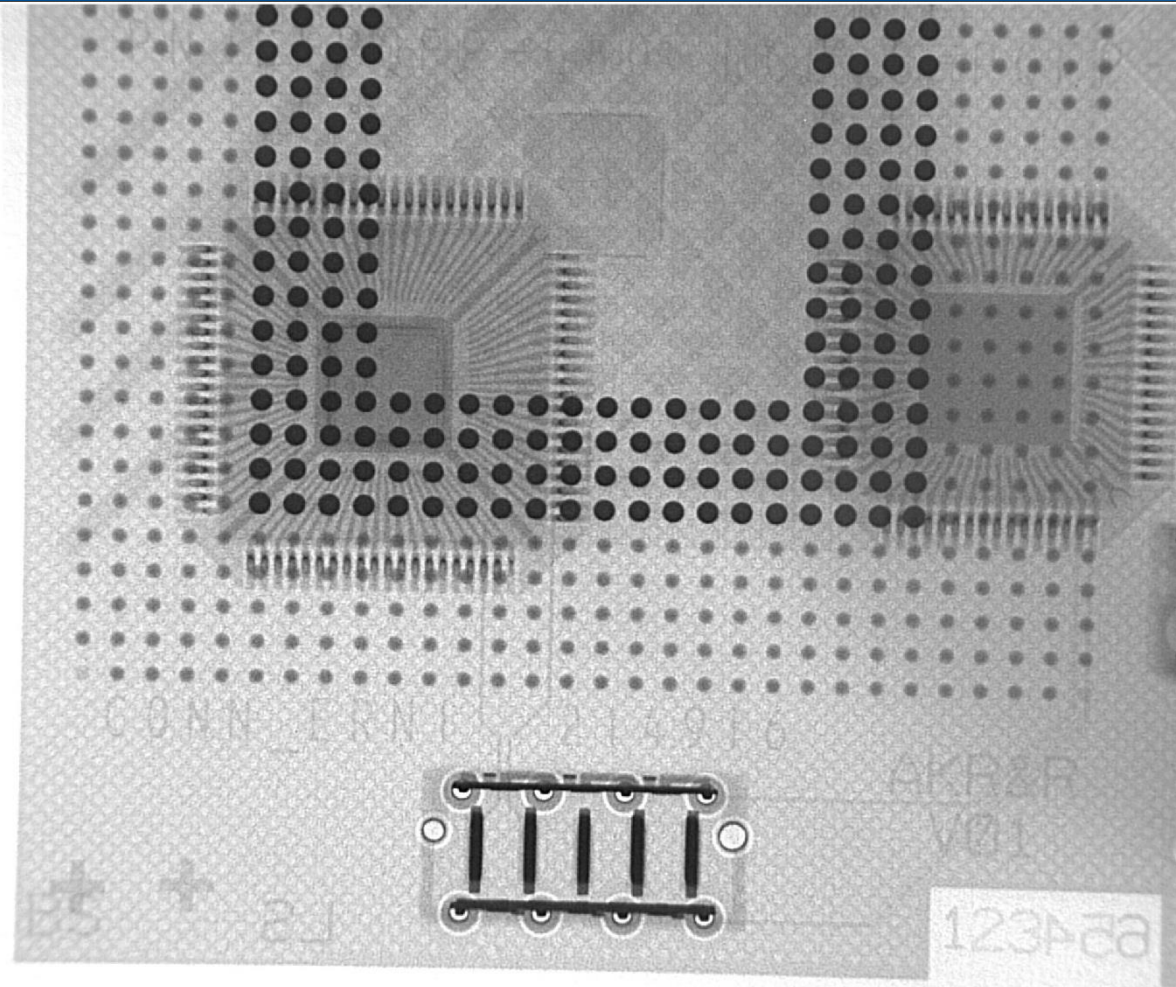
R+R 32 / Z



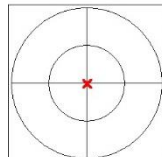
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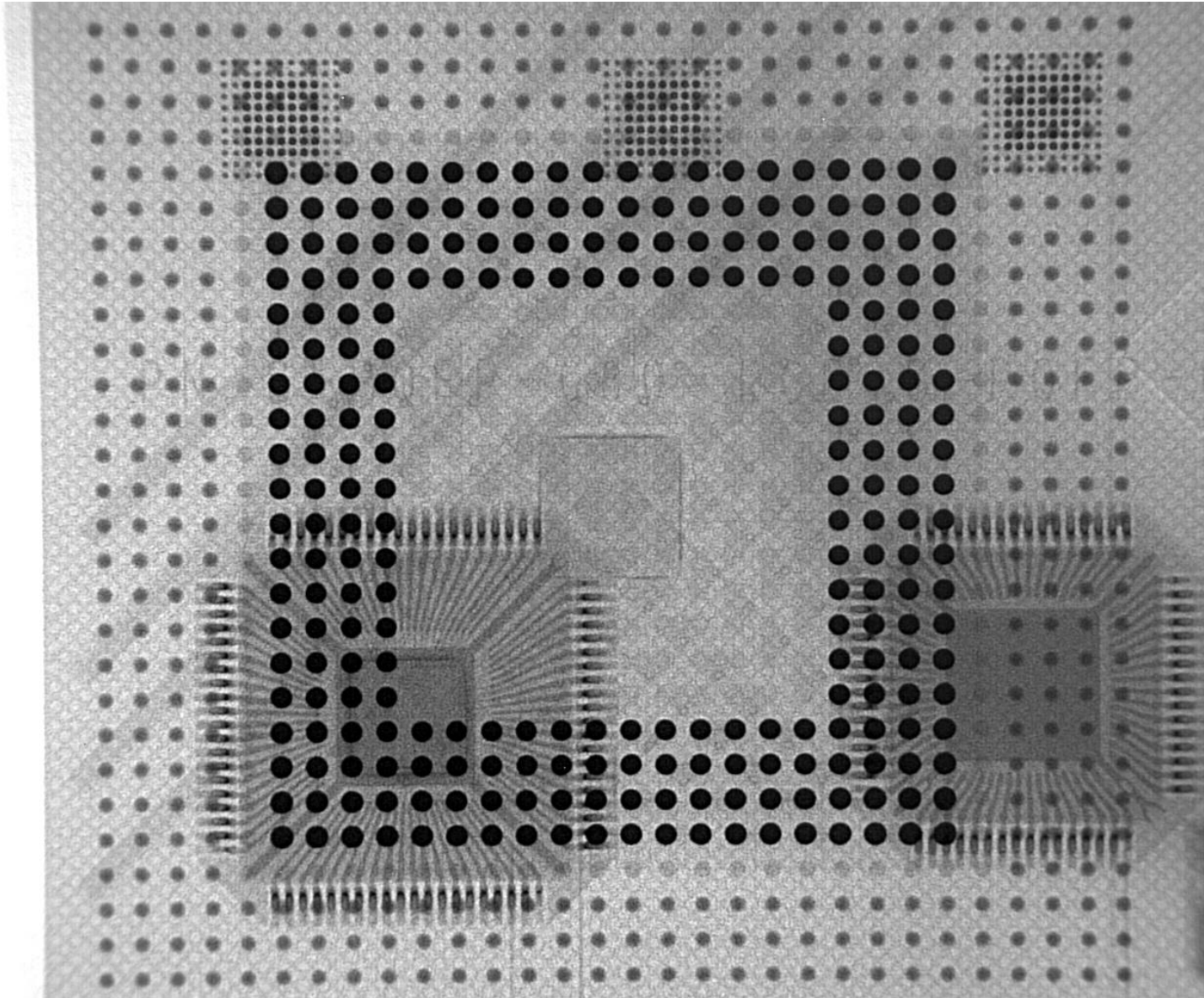
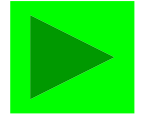
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

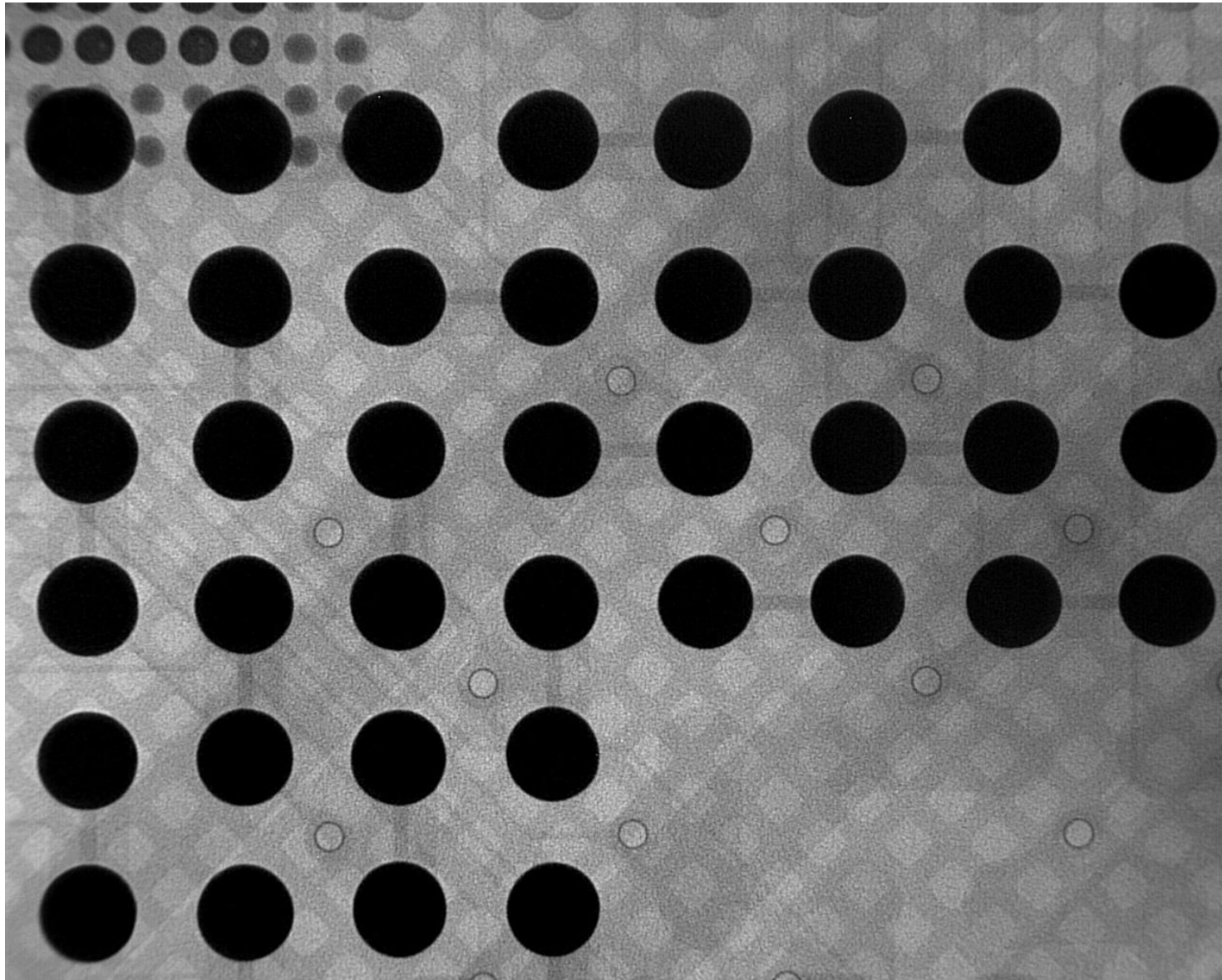


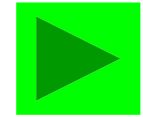
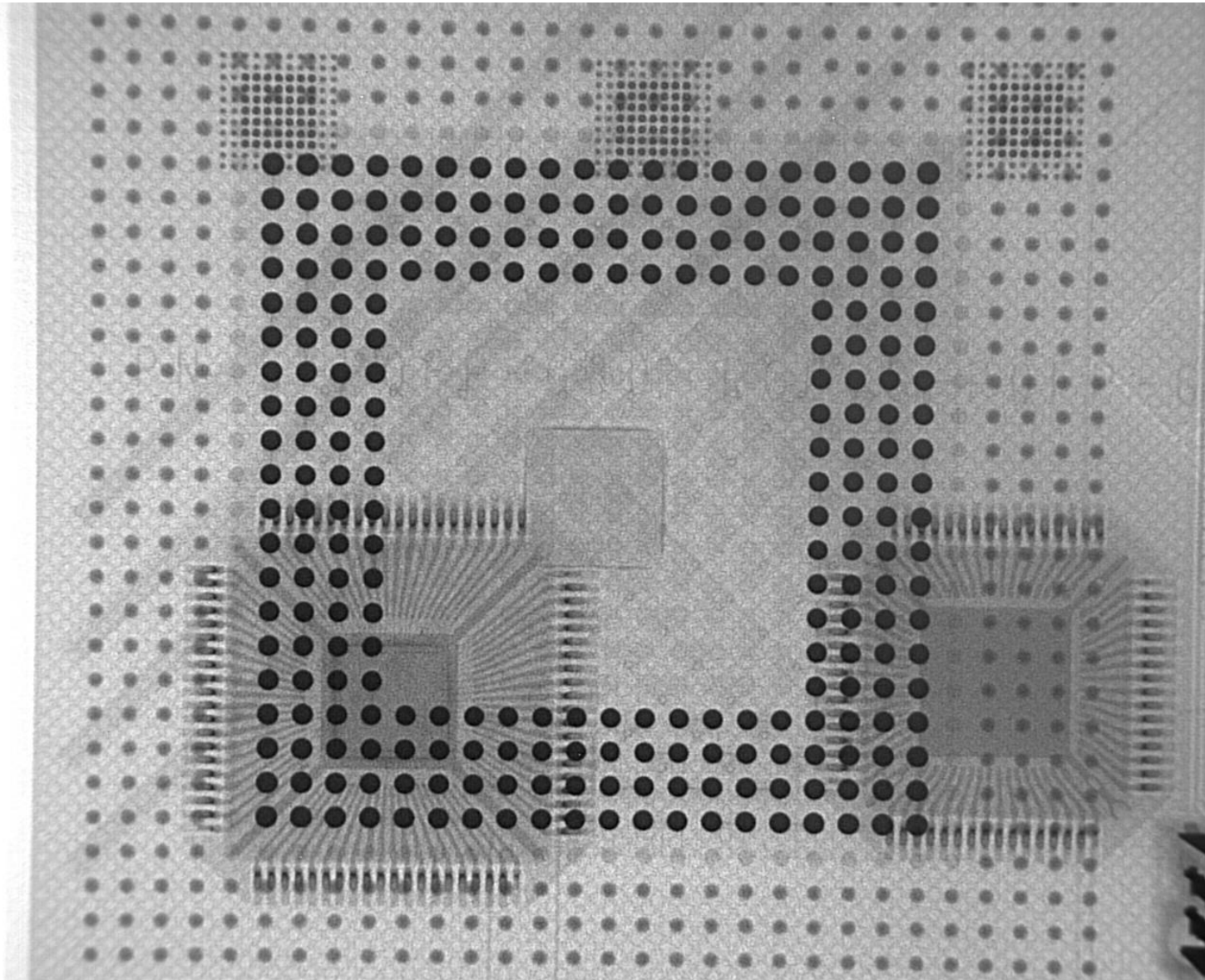
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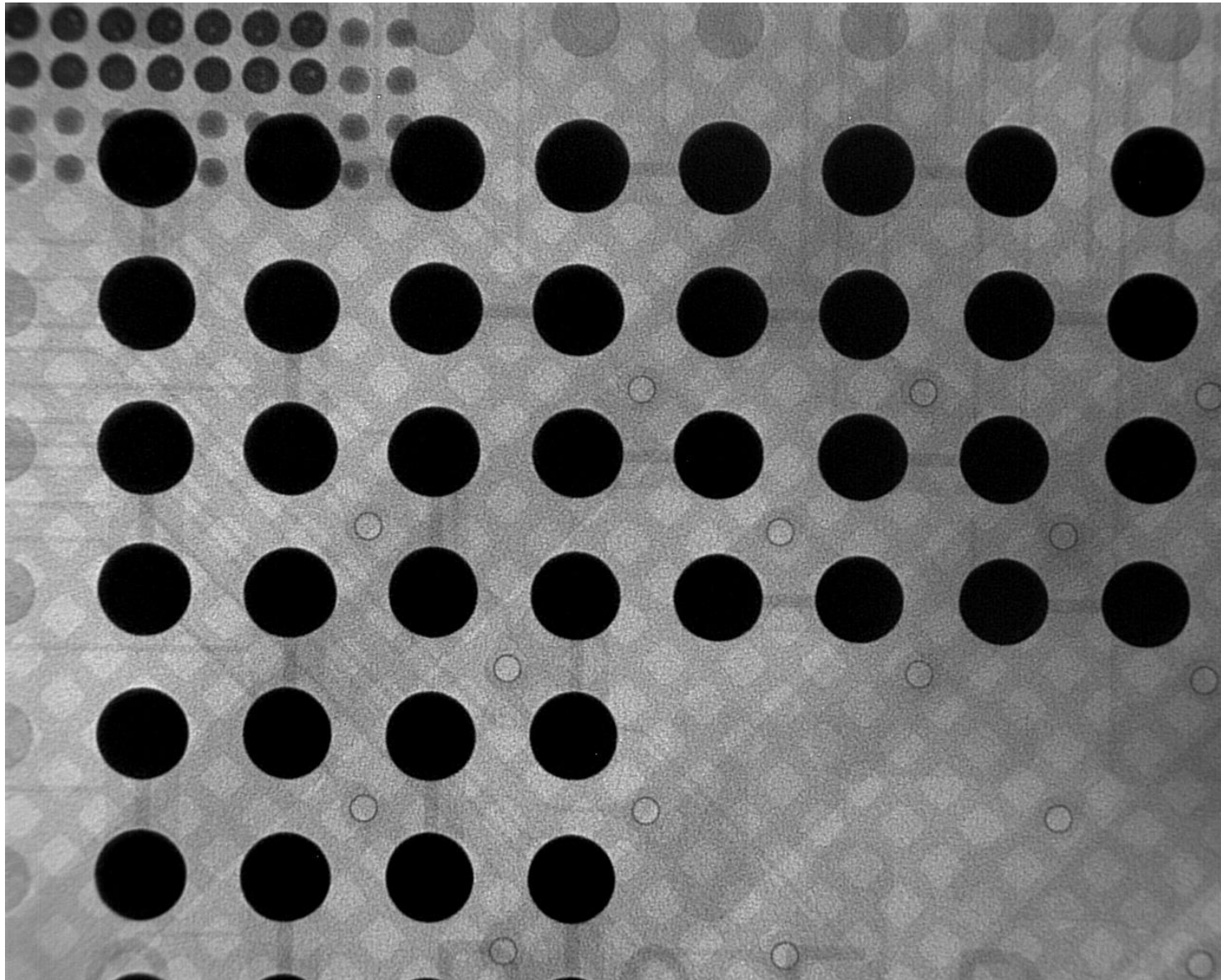


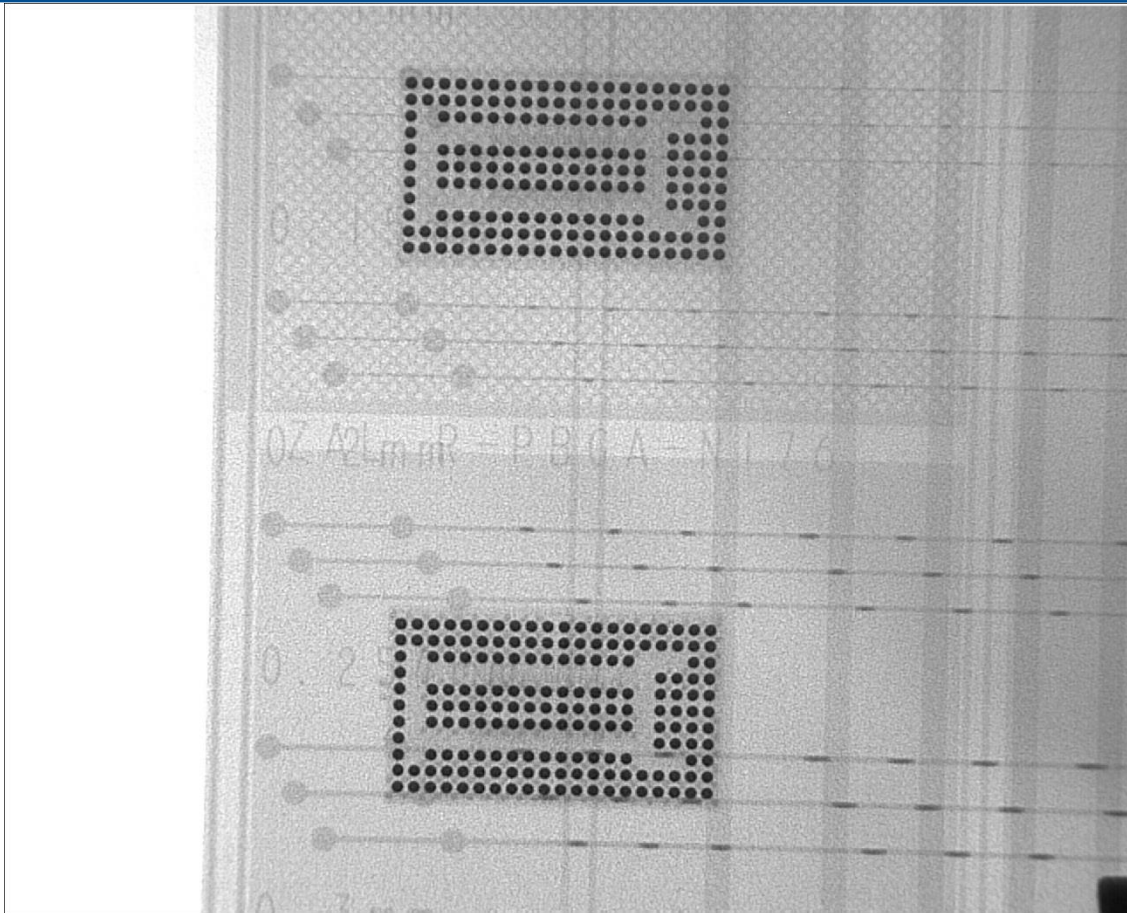
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames







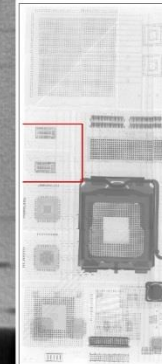




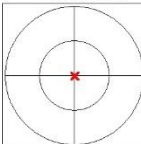
mit
Massefläche



ohne
Massefläche

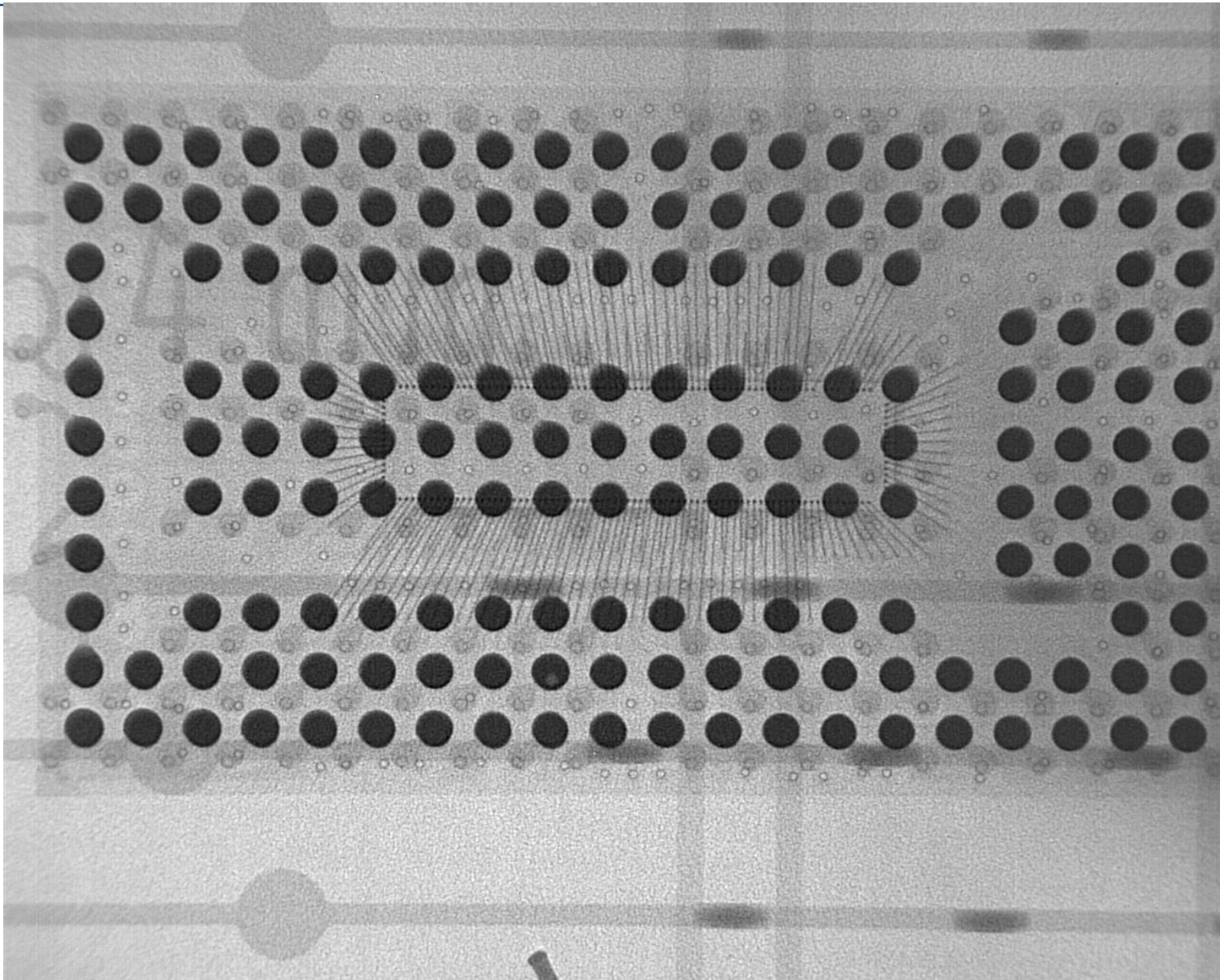


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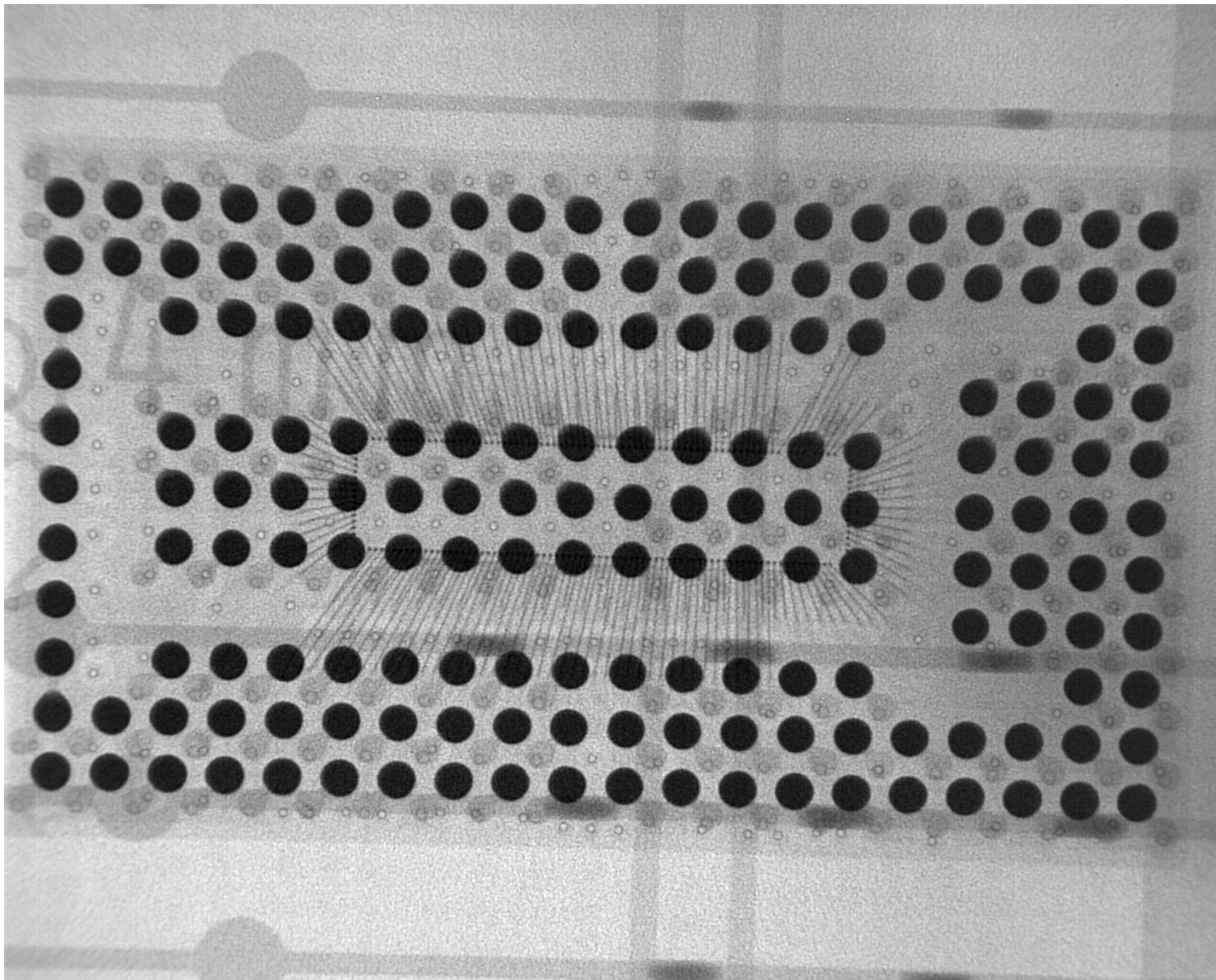


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

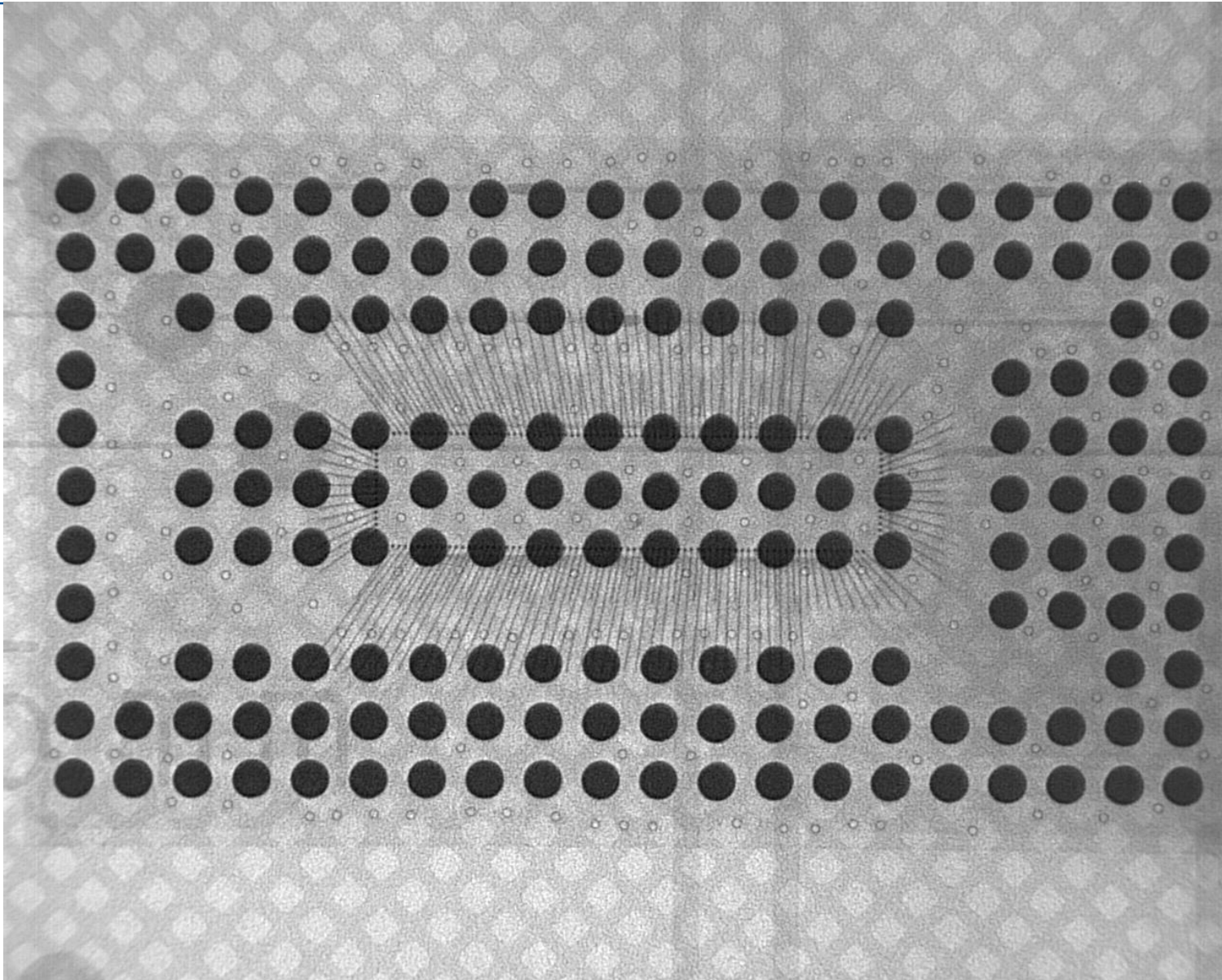
R+R 32 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



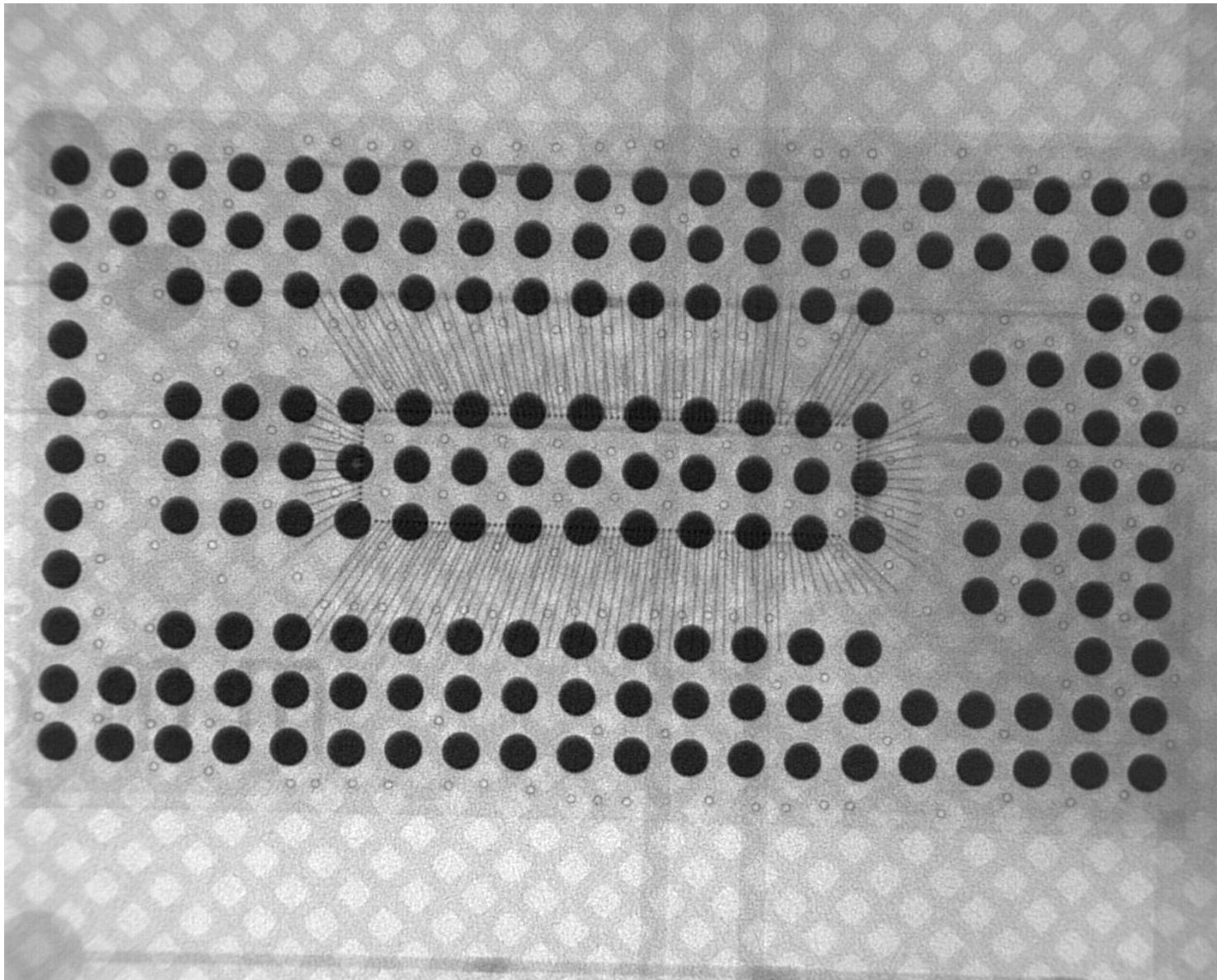
R+R 32 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (mit Massefläche)



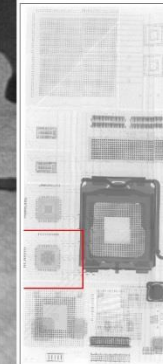
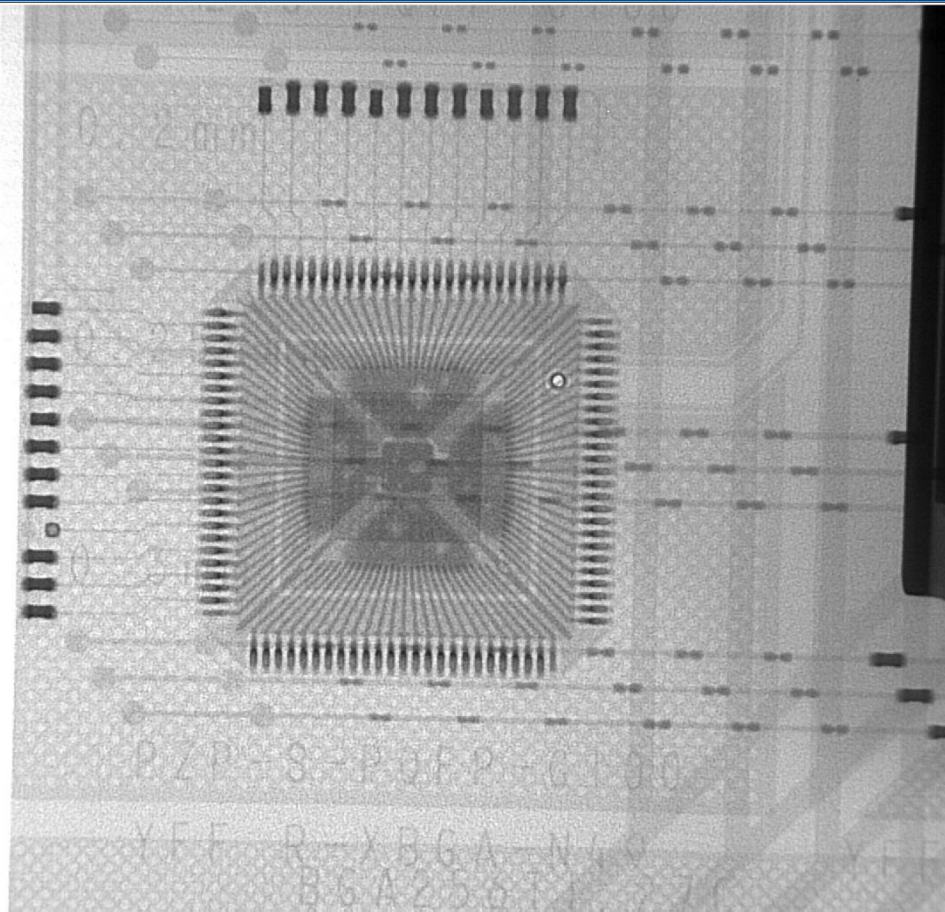
R+R 32 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



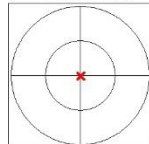
R+R 32 / Z – X-Ray nach Rework 2 – ZAL R-PBGA-N176 (ohne Massefläche)



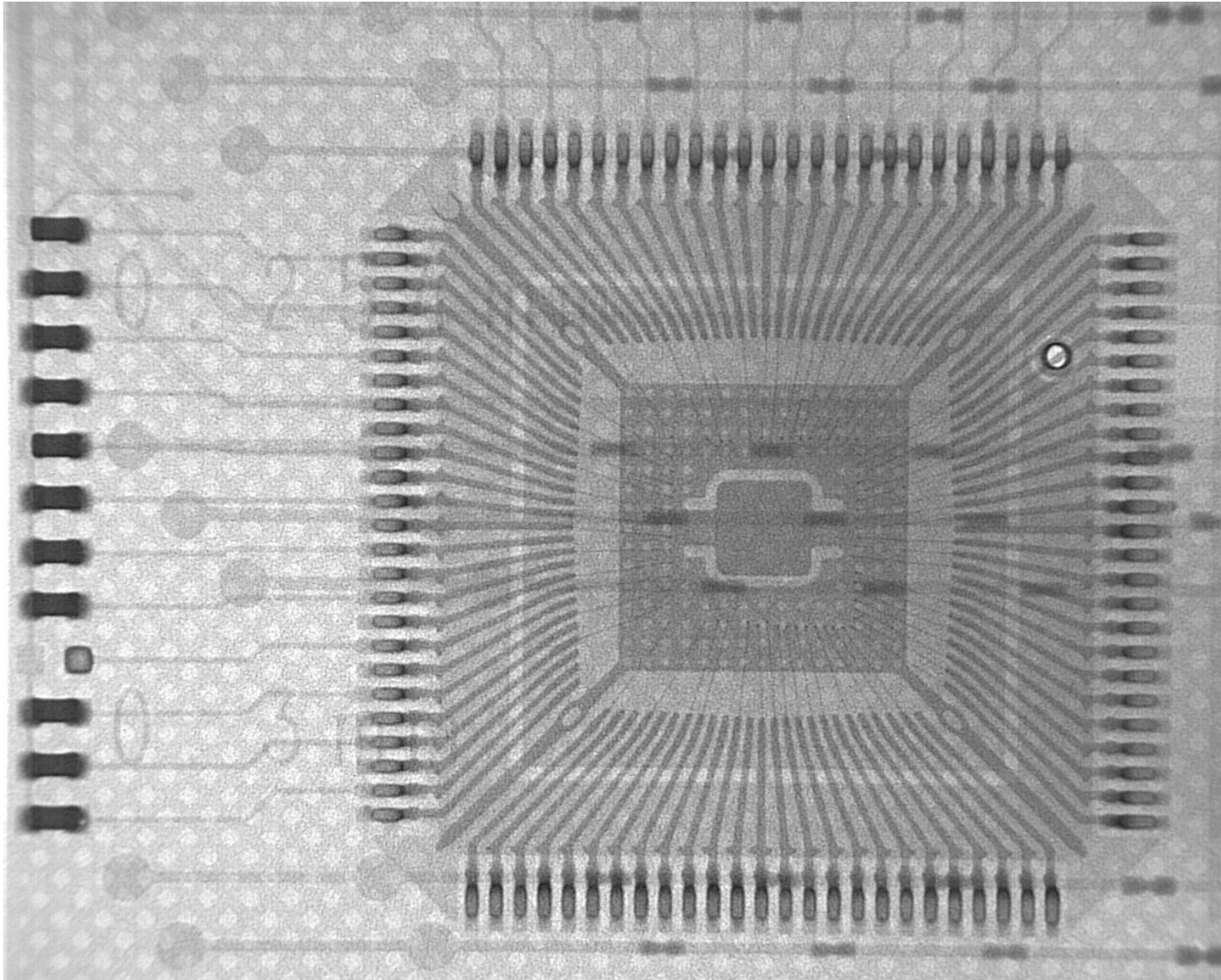
R+R 32 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

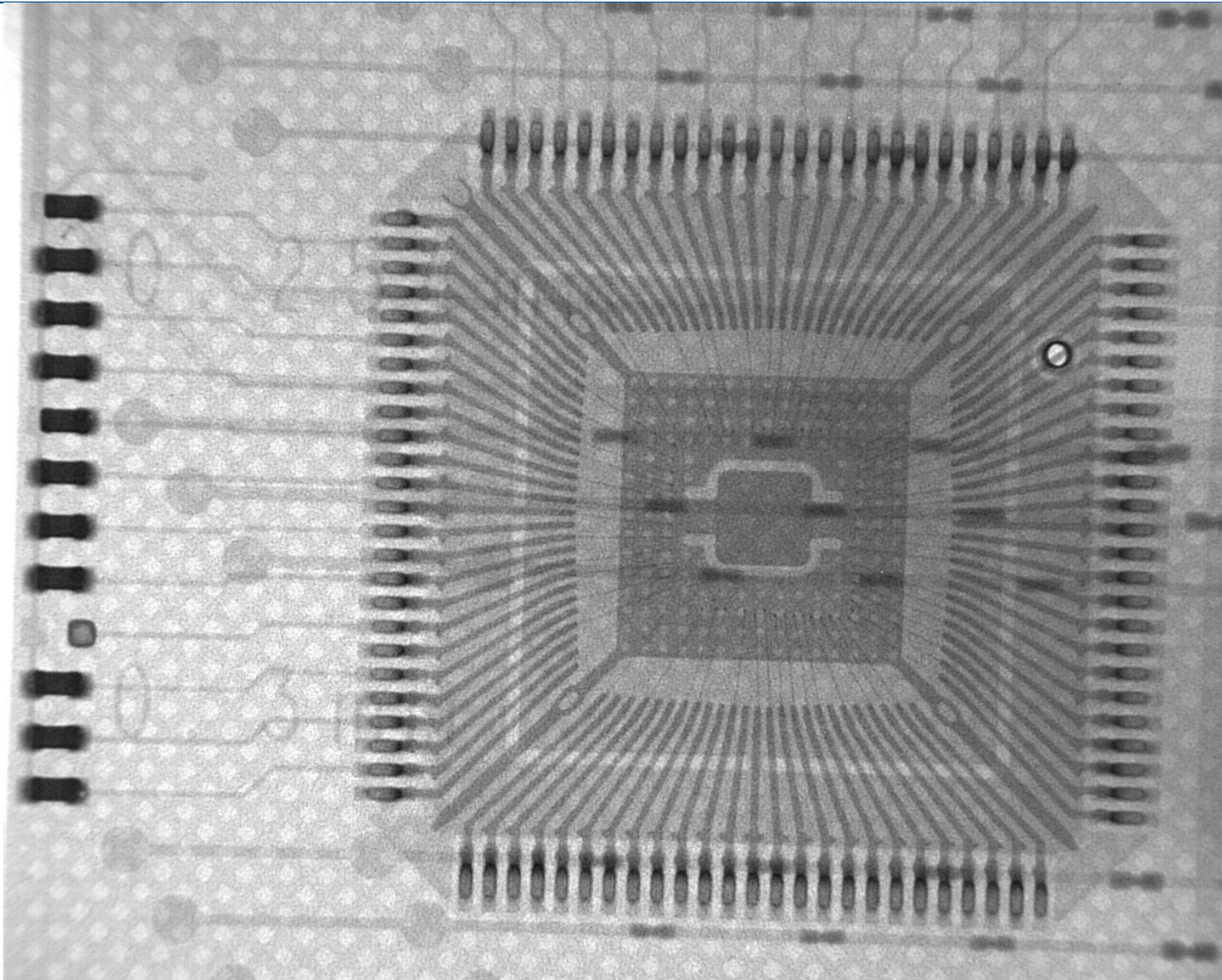


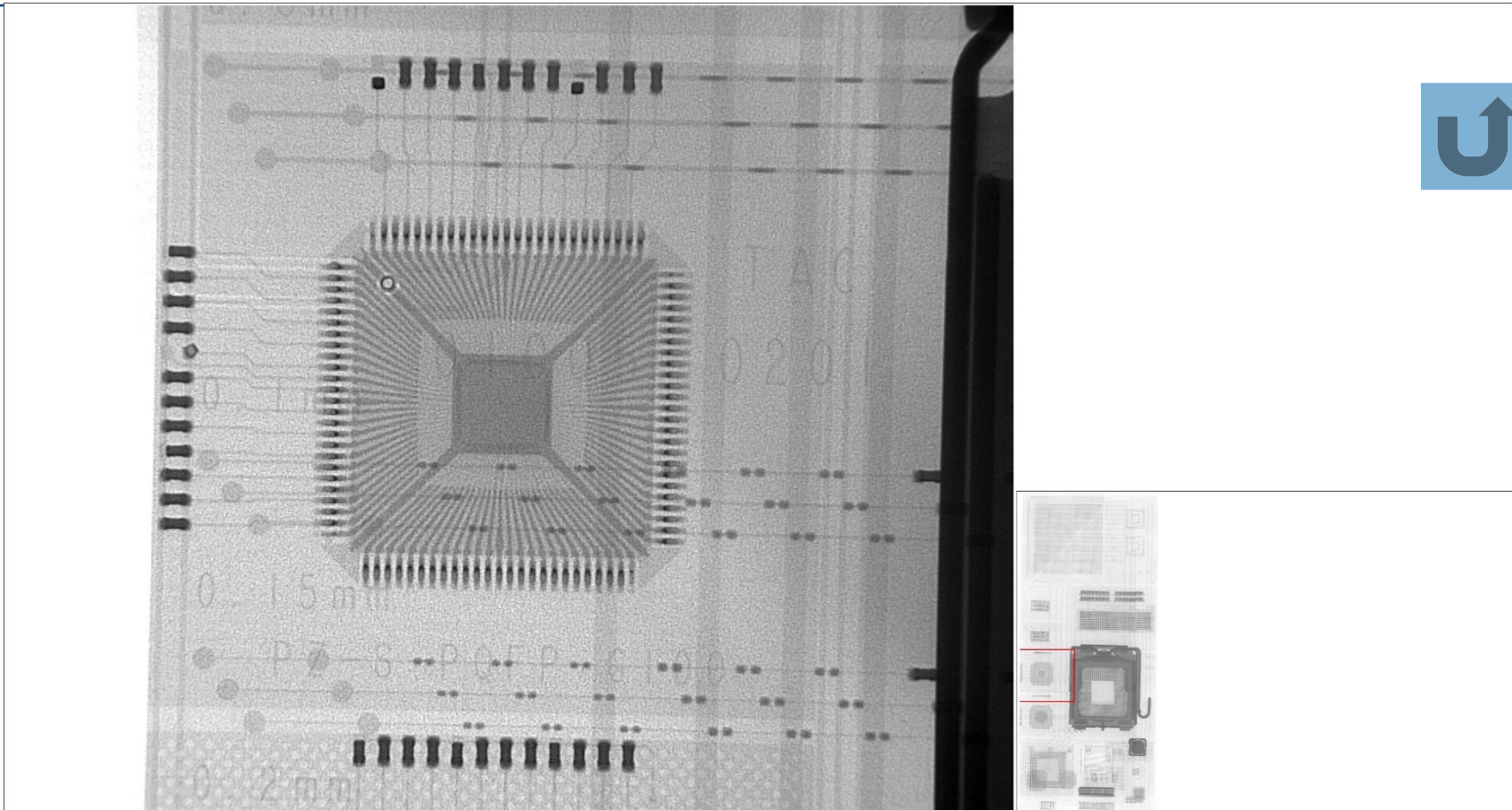
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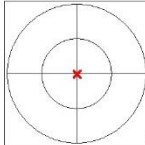
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



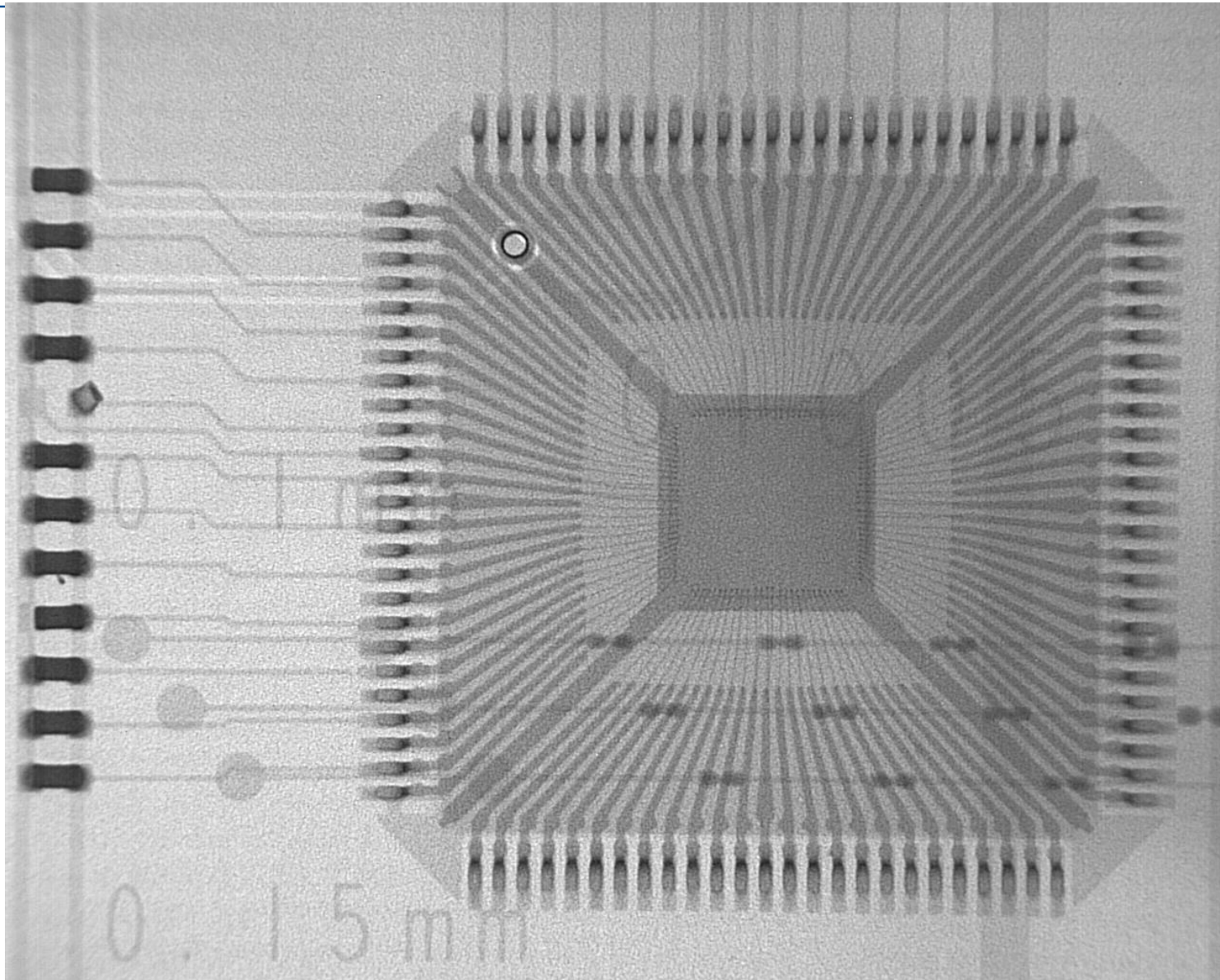


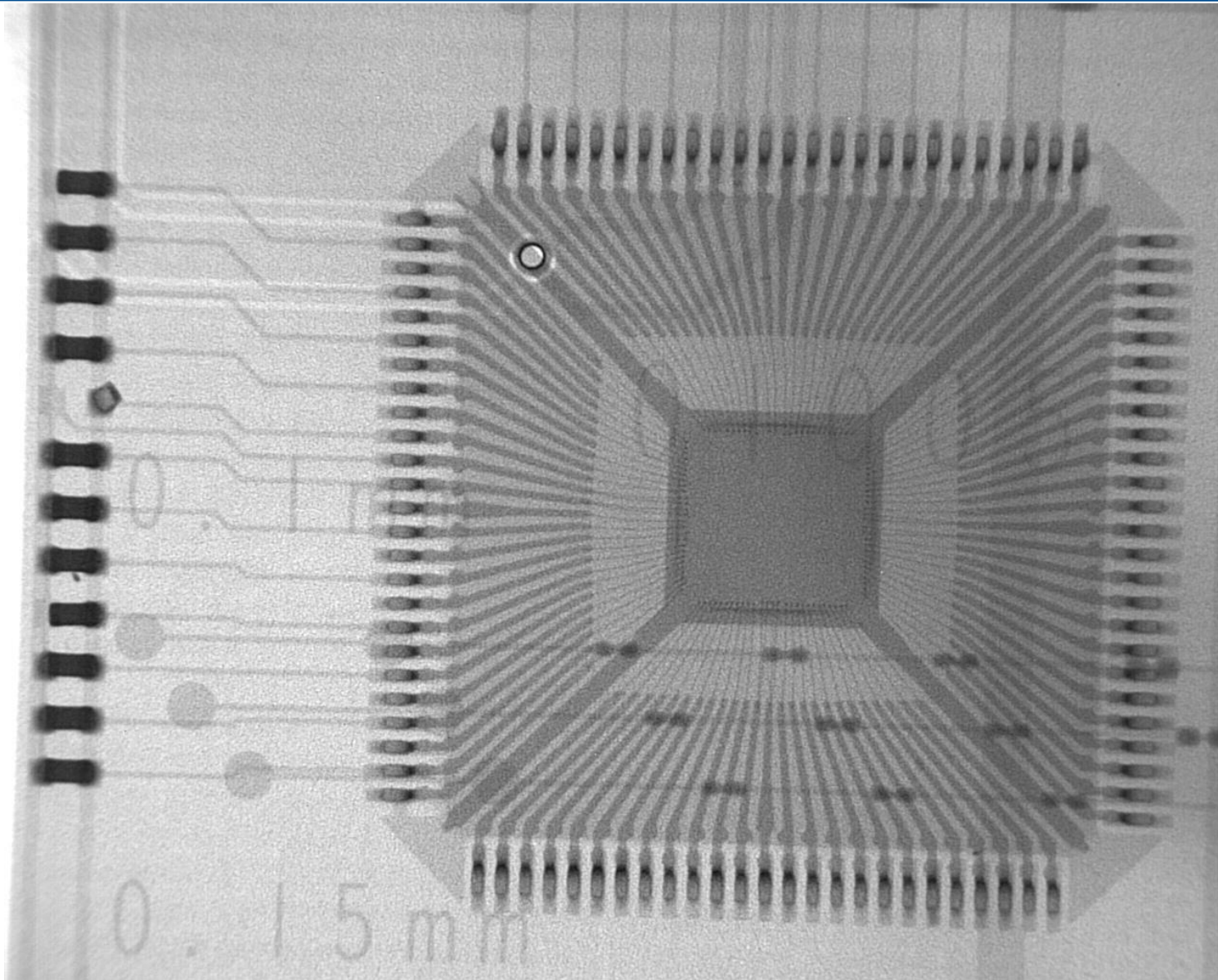


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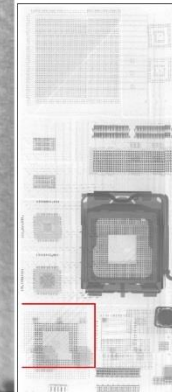
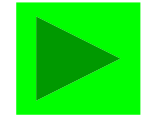
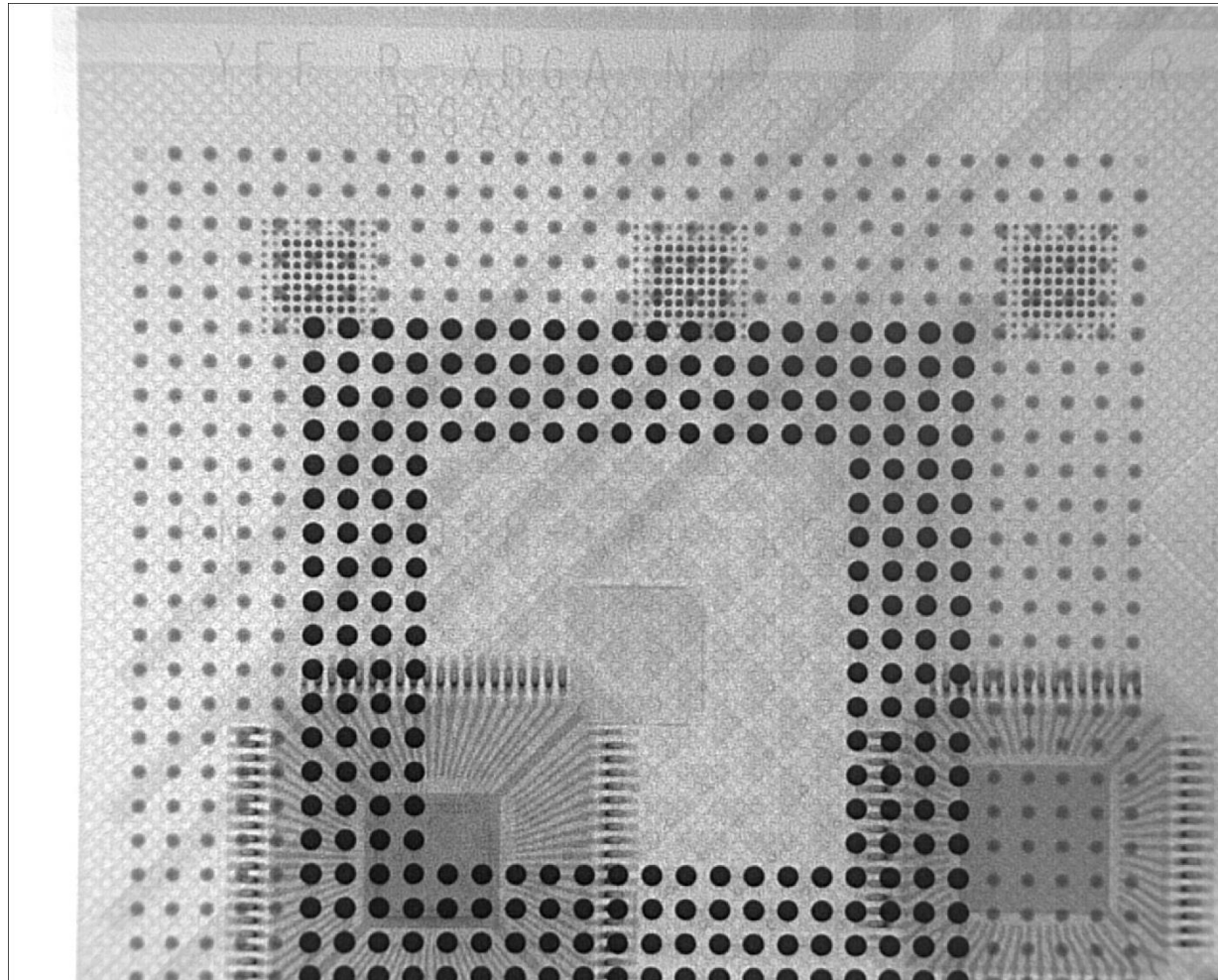
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



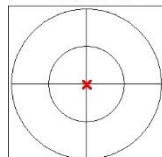


Baugruppe

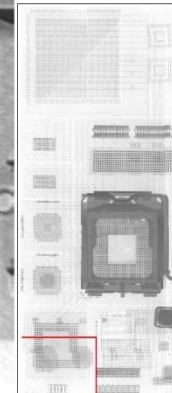
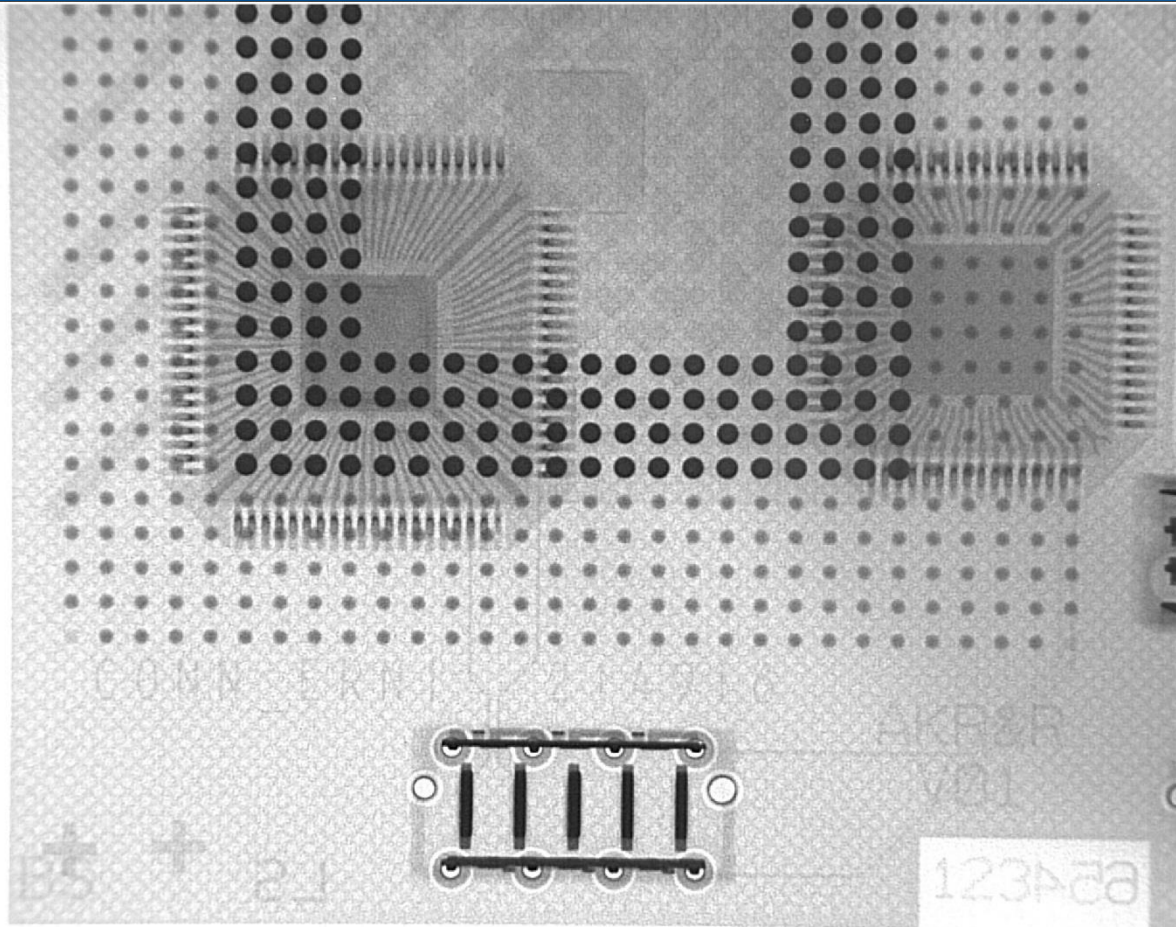
R+R 33 / Z



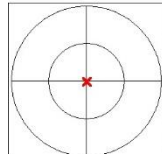
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Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



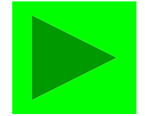
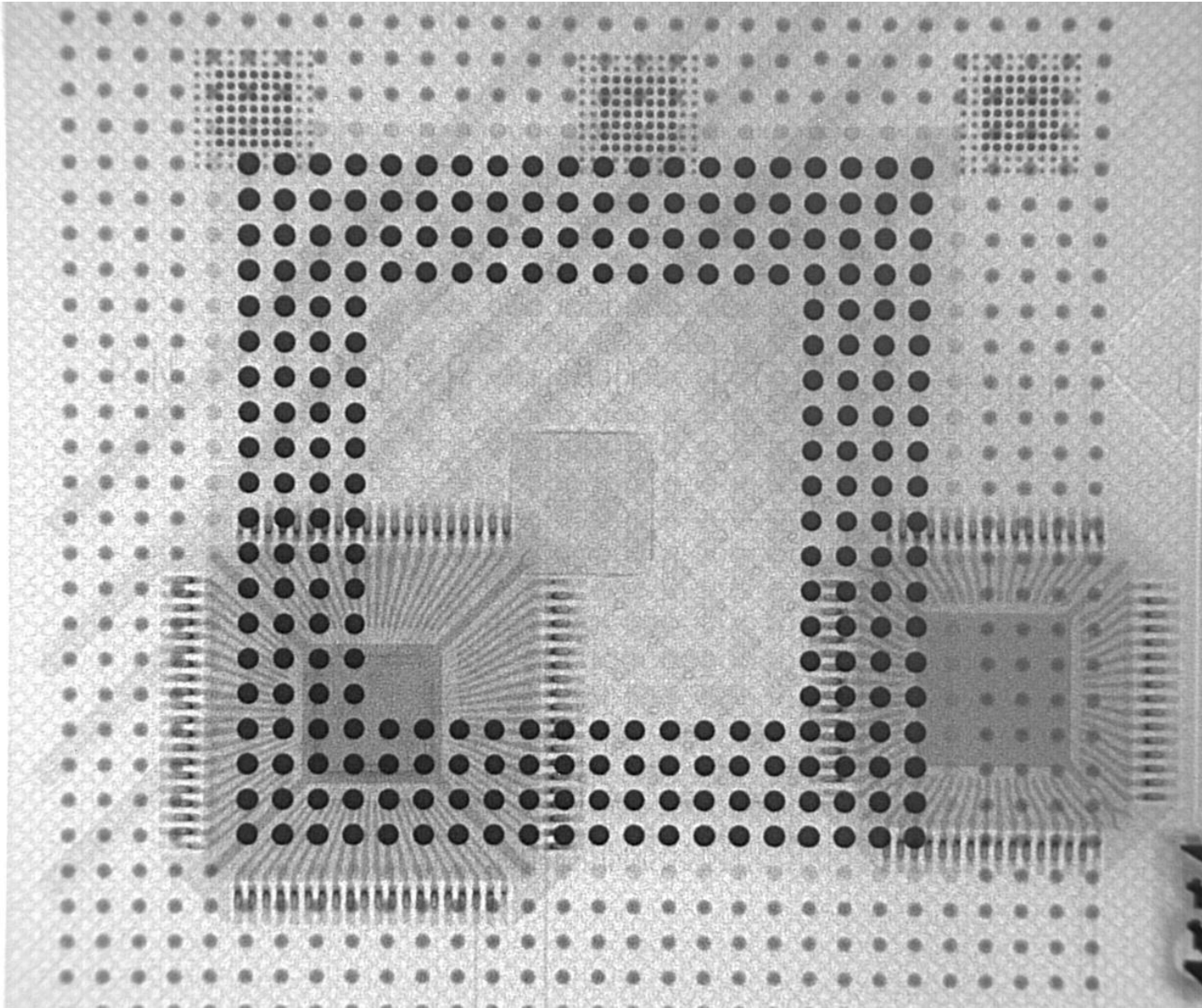
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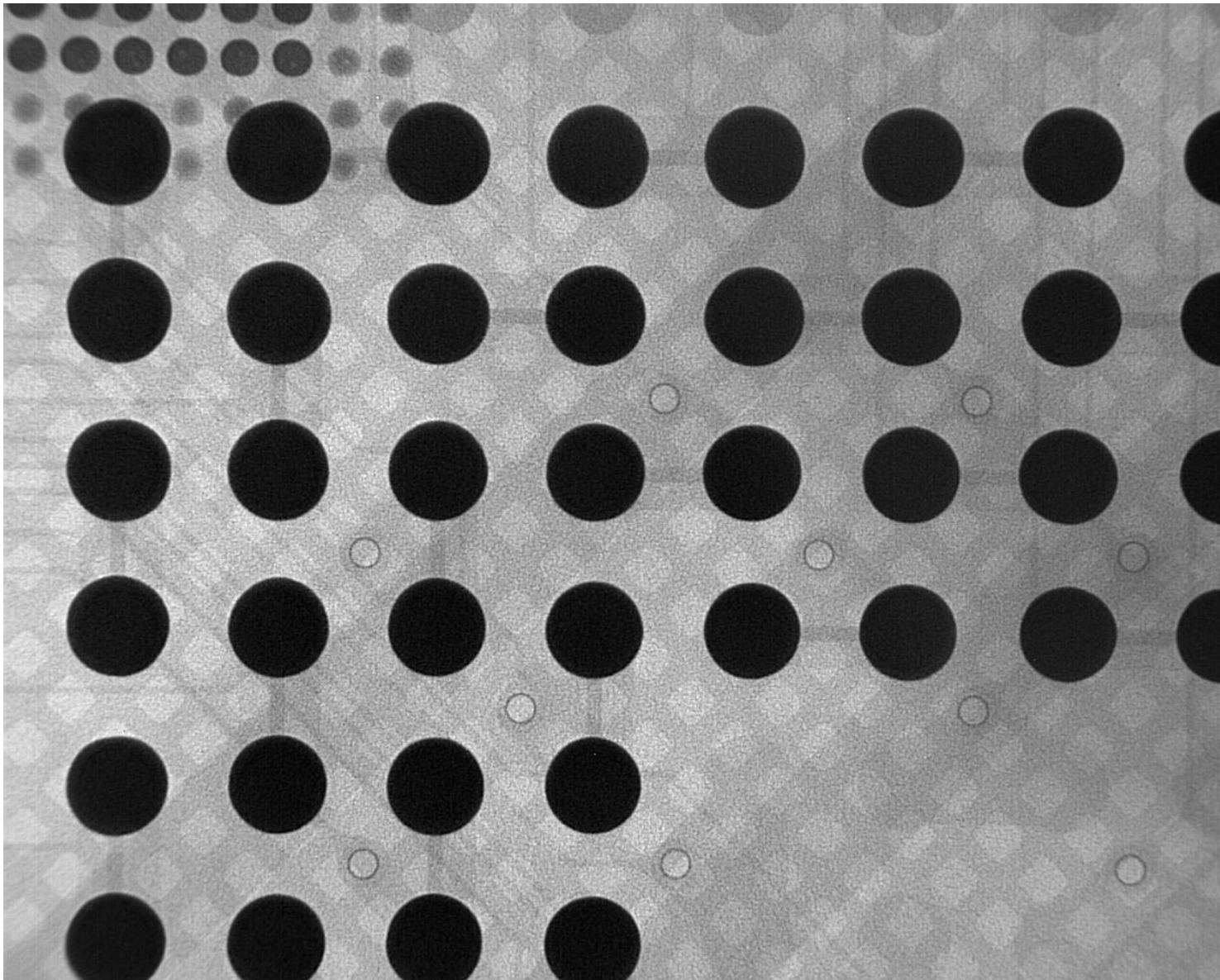


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

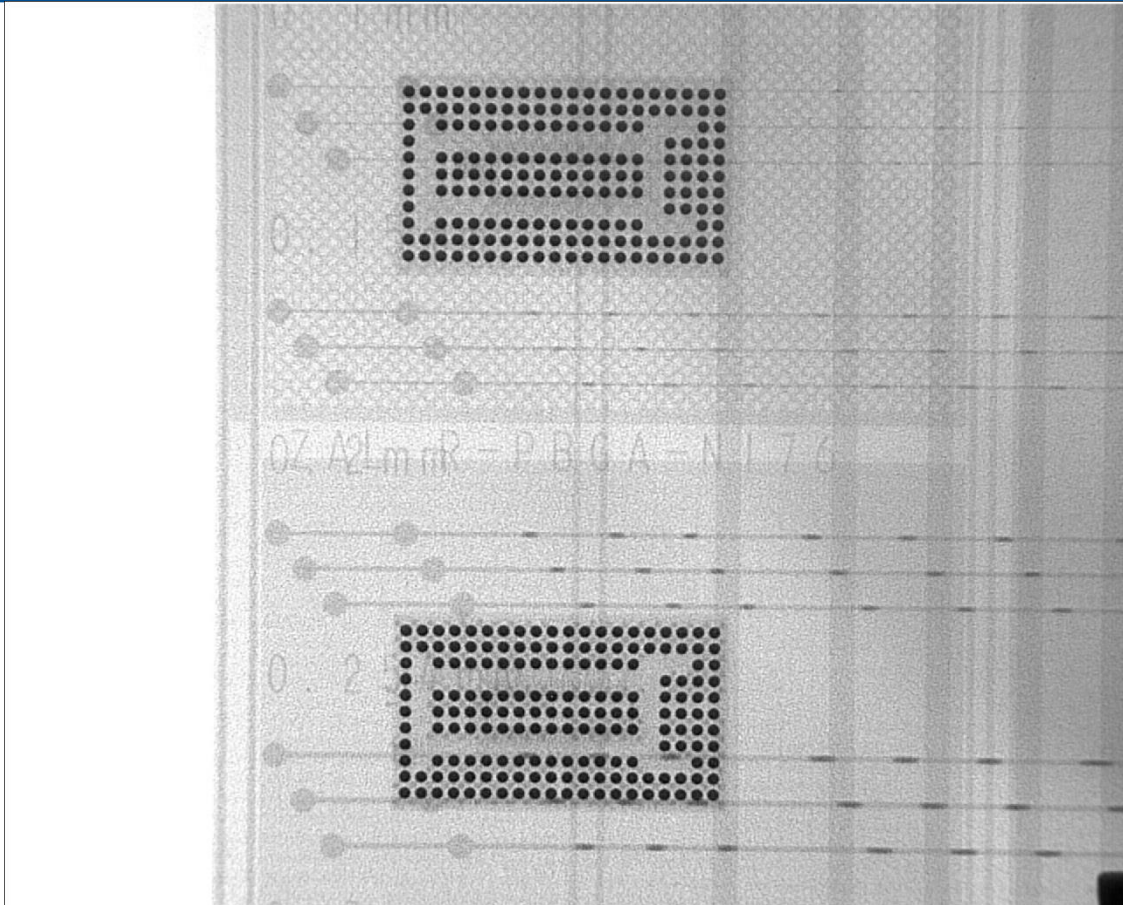
R+R 33 / Z – X-Ray nach Rework 1 – BGA

256





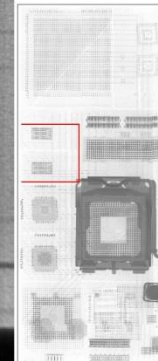
R+R 33 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



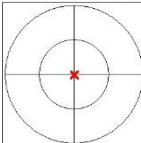
mit
Massefläche



ohne
Massefläche

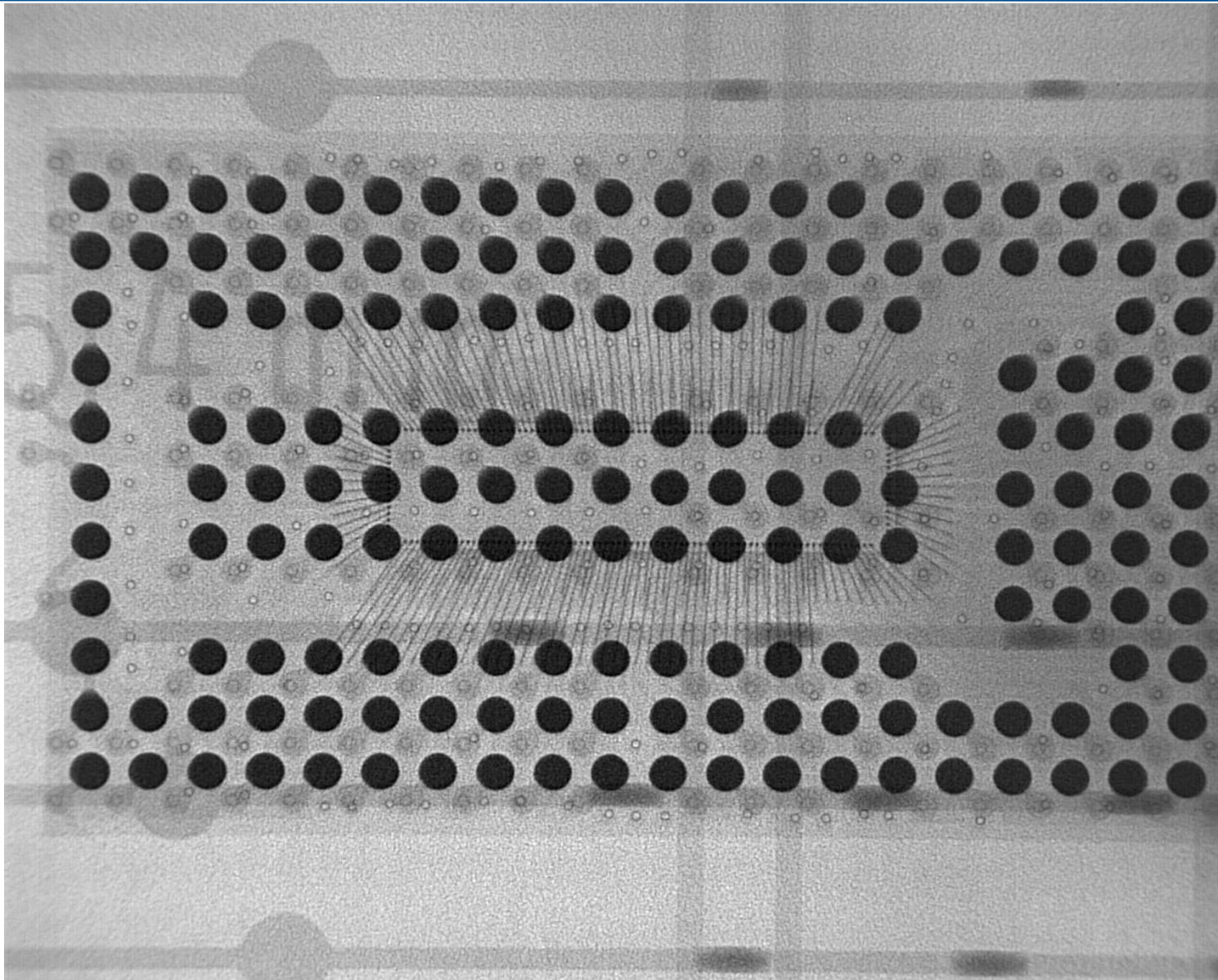


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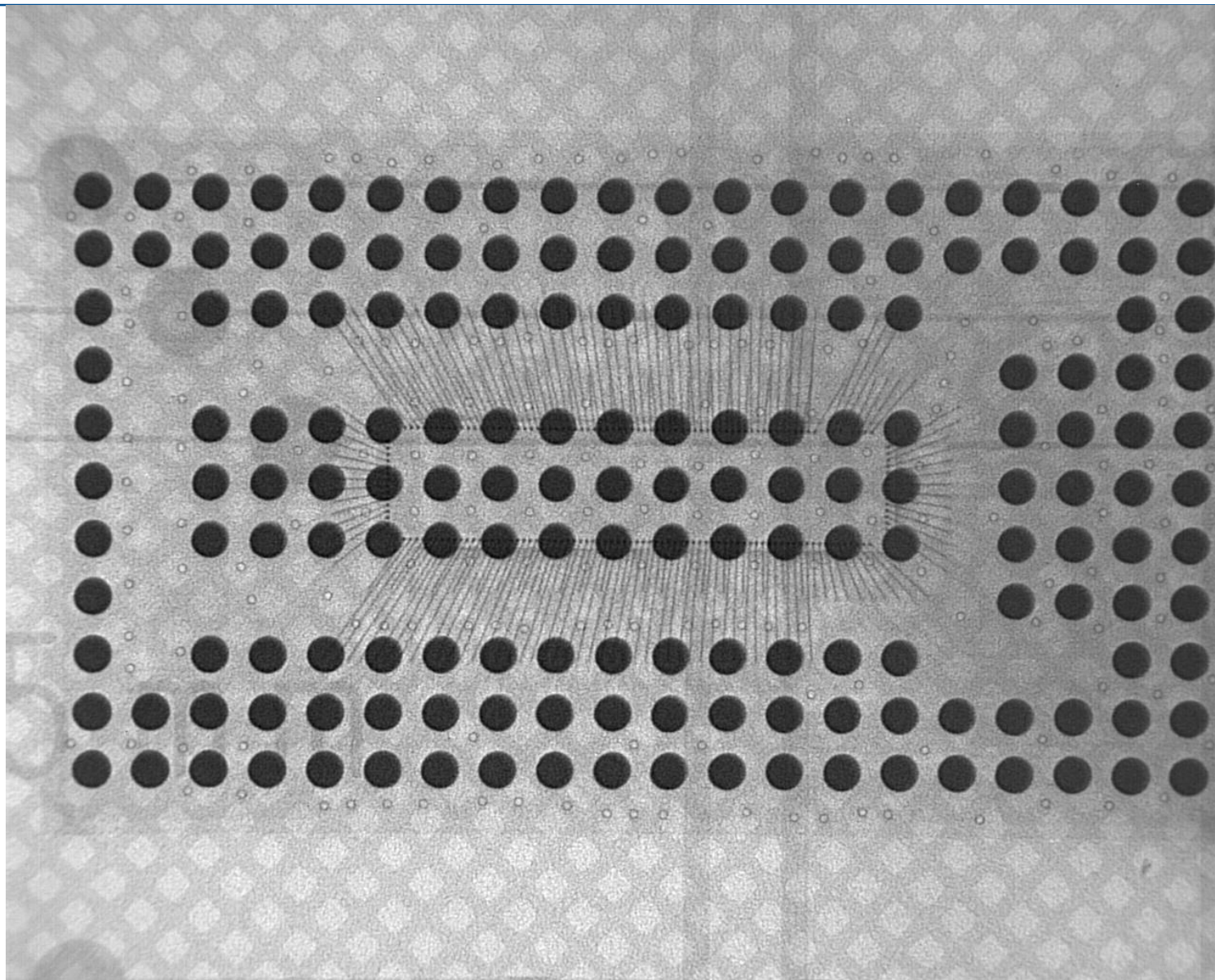


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

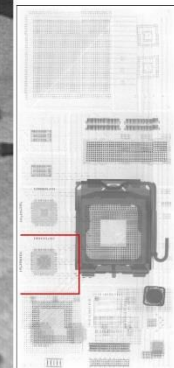
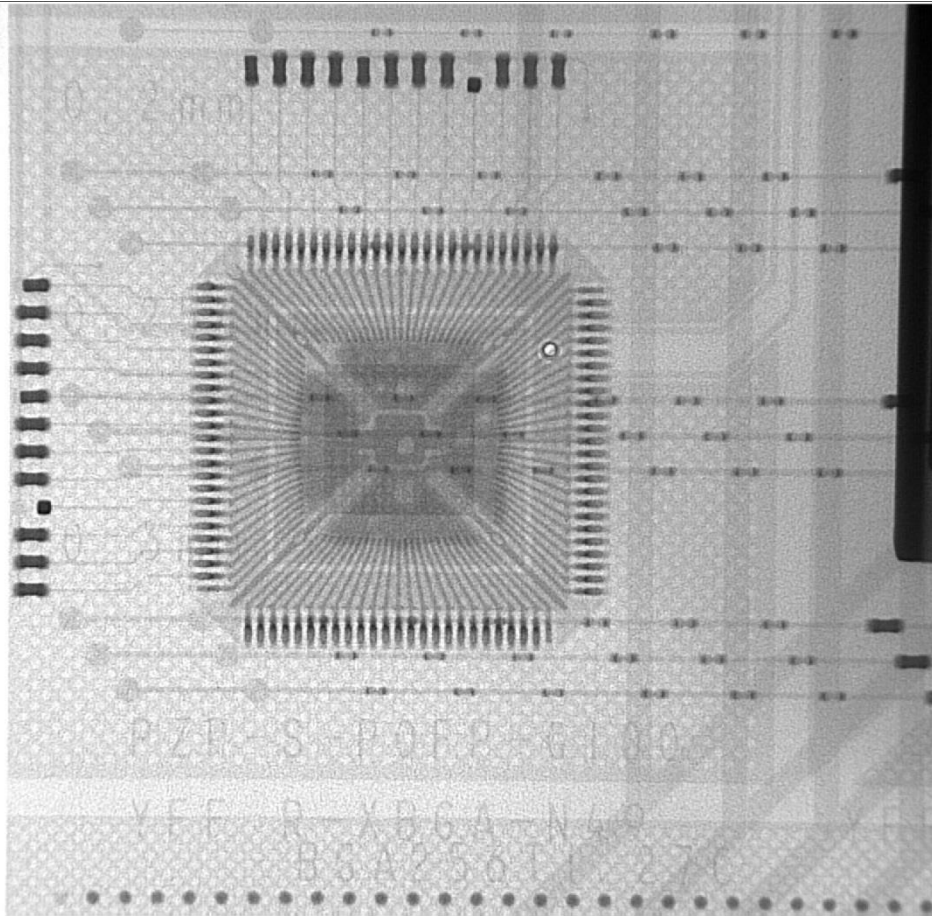
R+R 33 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (mit Massefläche)



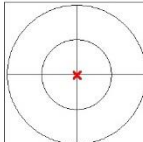
R+R 33 / Z – X-Ray nach Rework 1 – ZAL R-PBGA-N176 (ohne Massefläche)



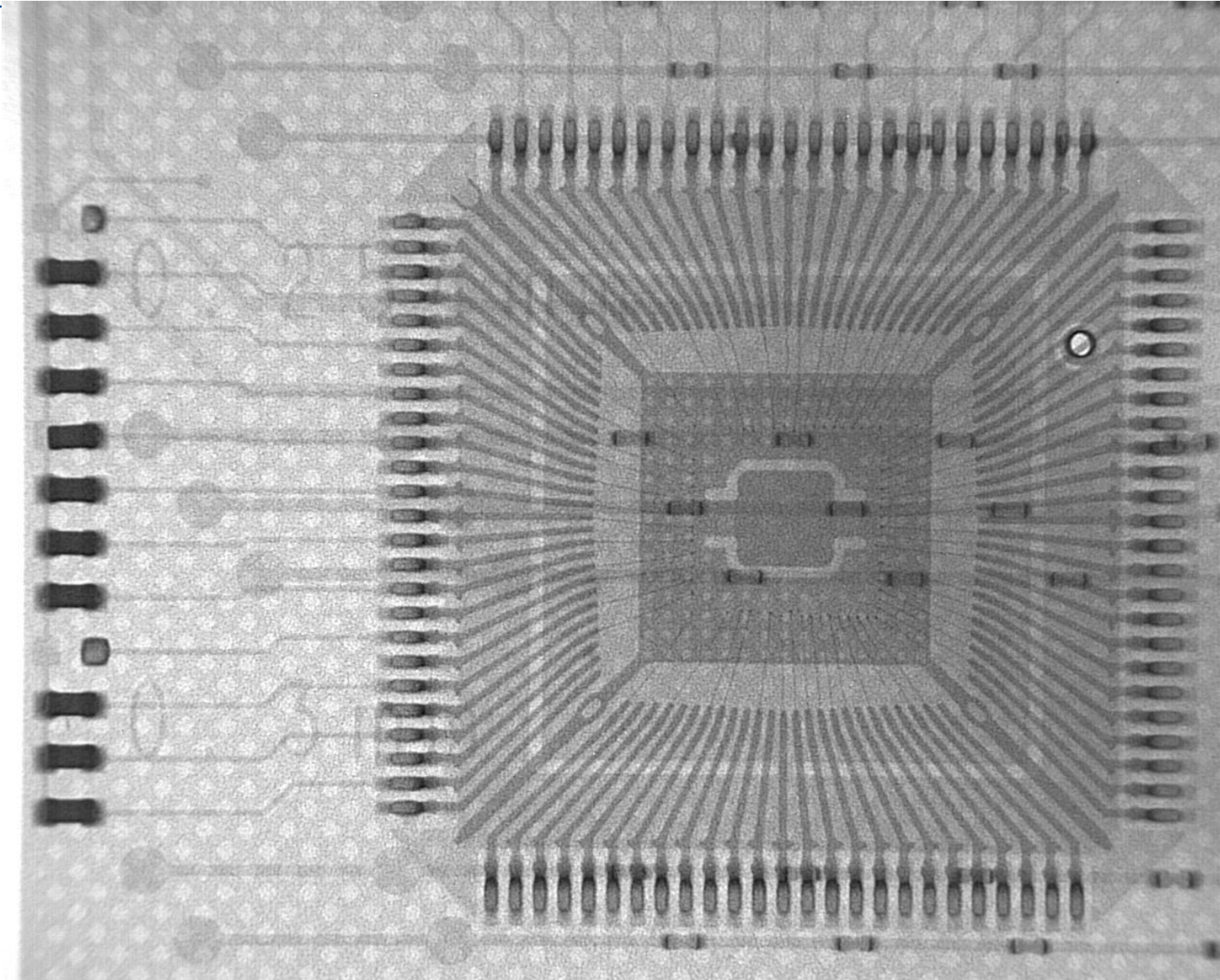
R+R 33 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

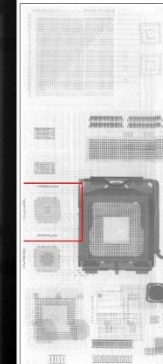
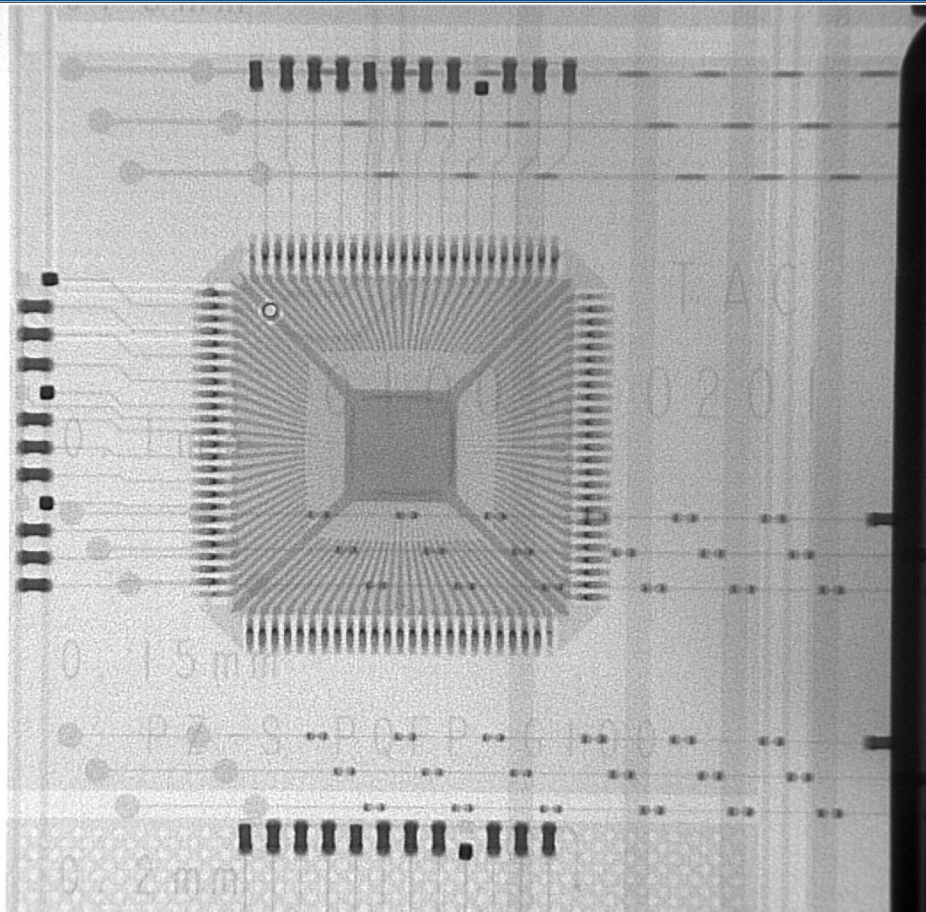


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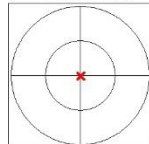


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



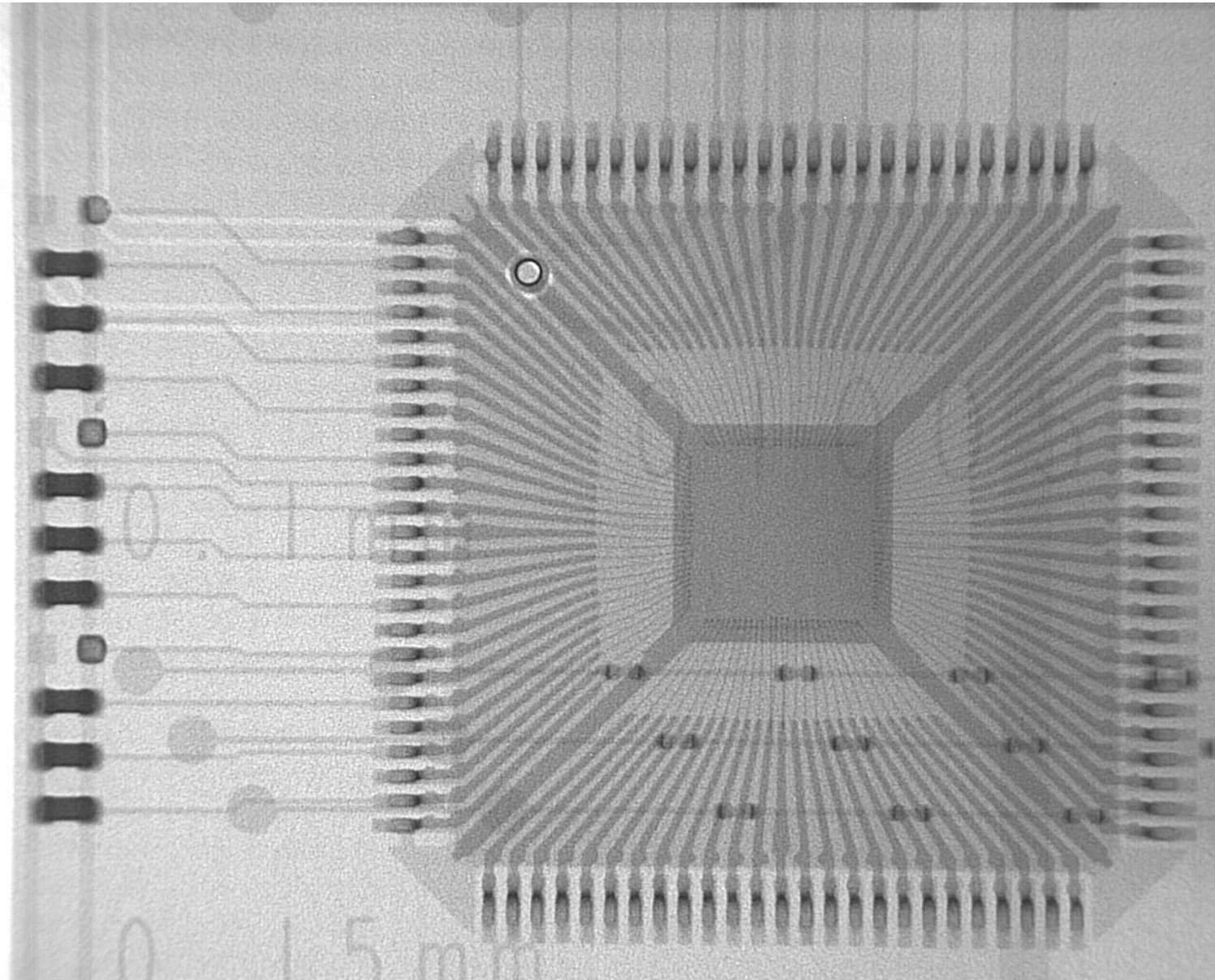


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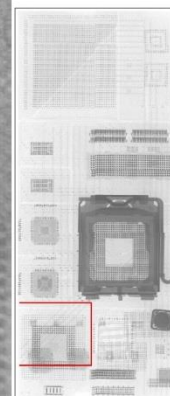
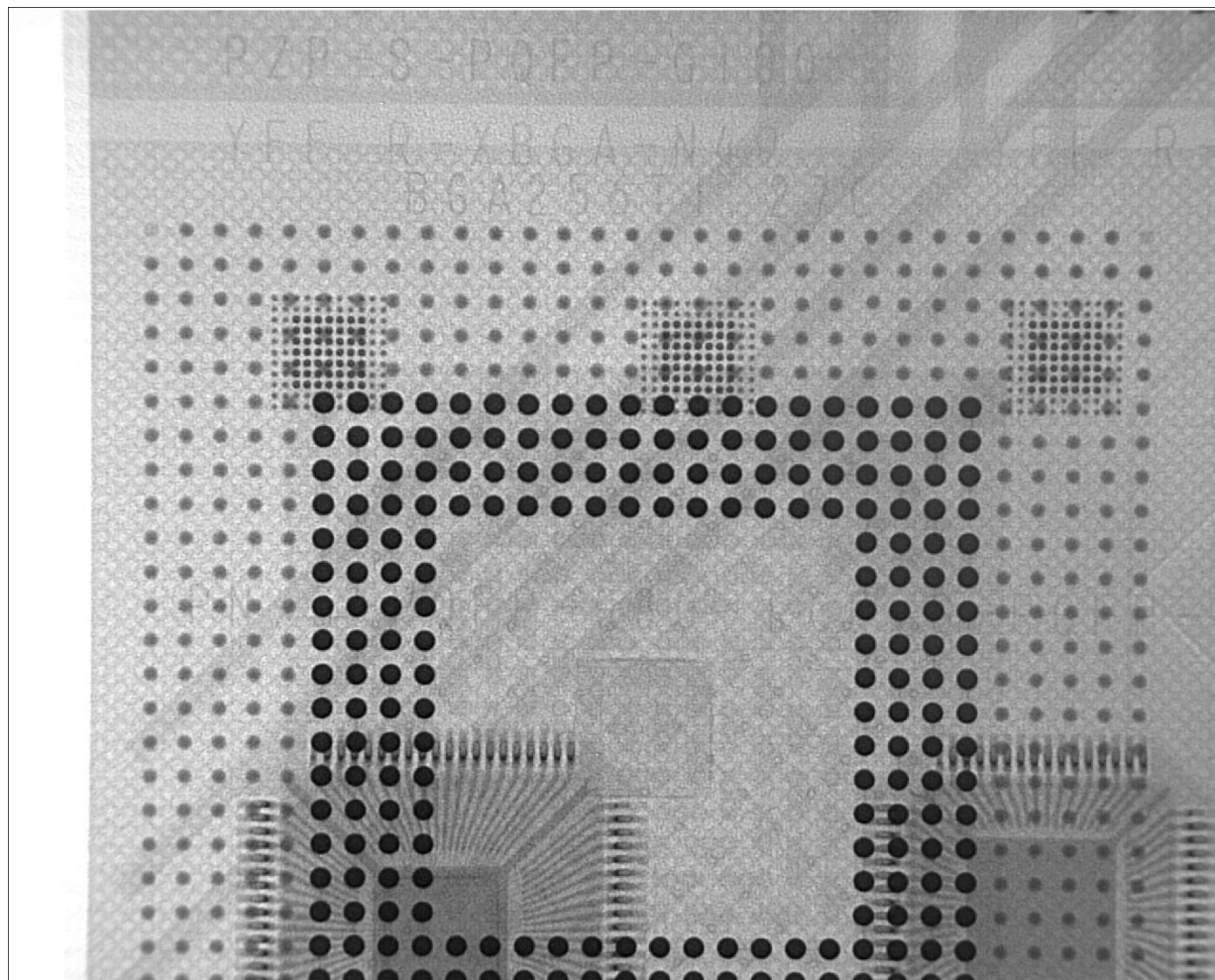
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

R+R 33 / Z – X-Ray nach Rework 1 – PZ-S-PQFP-G100

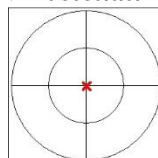


Baugruppe

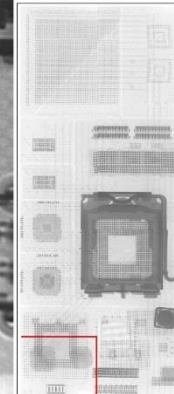
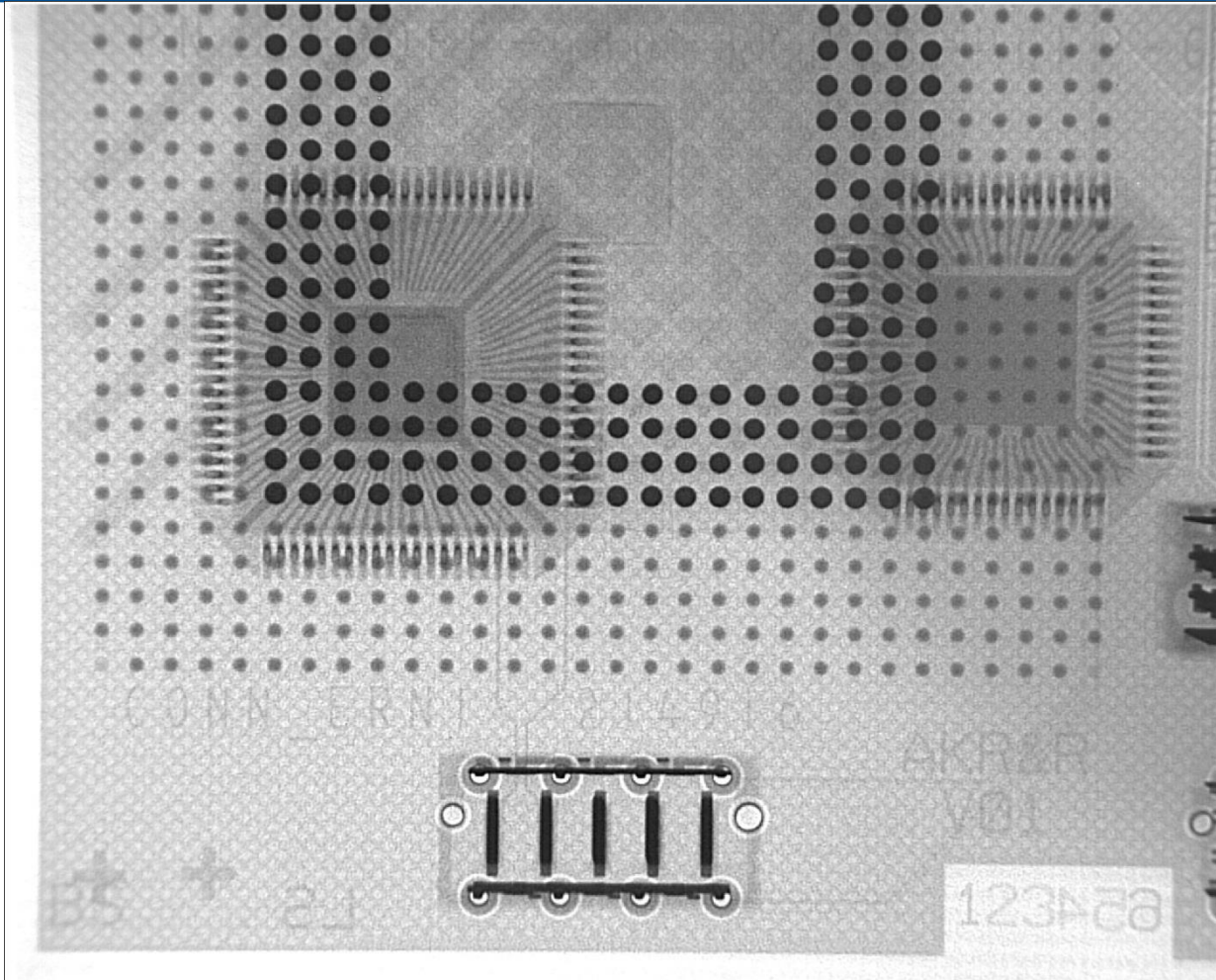
R+R 34 / Z



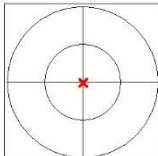
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



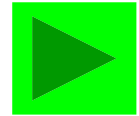
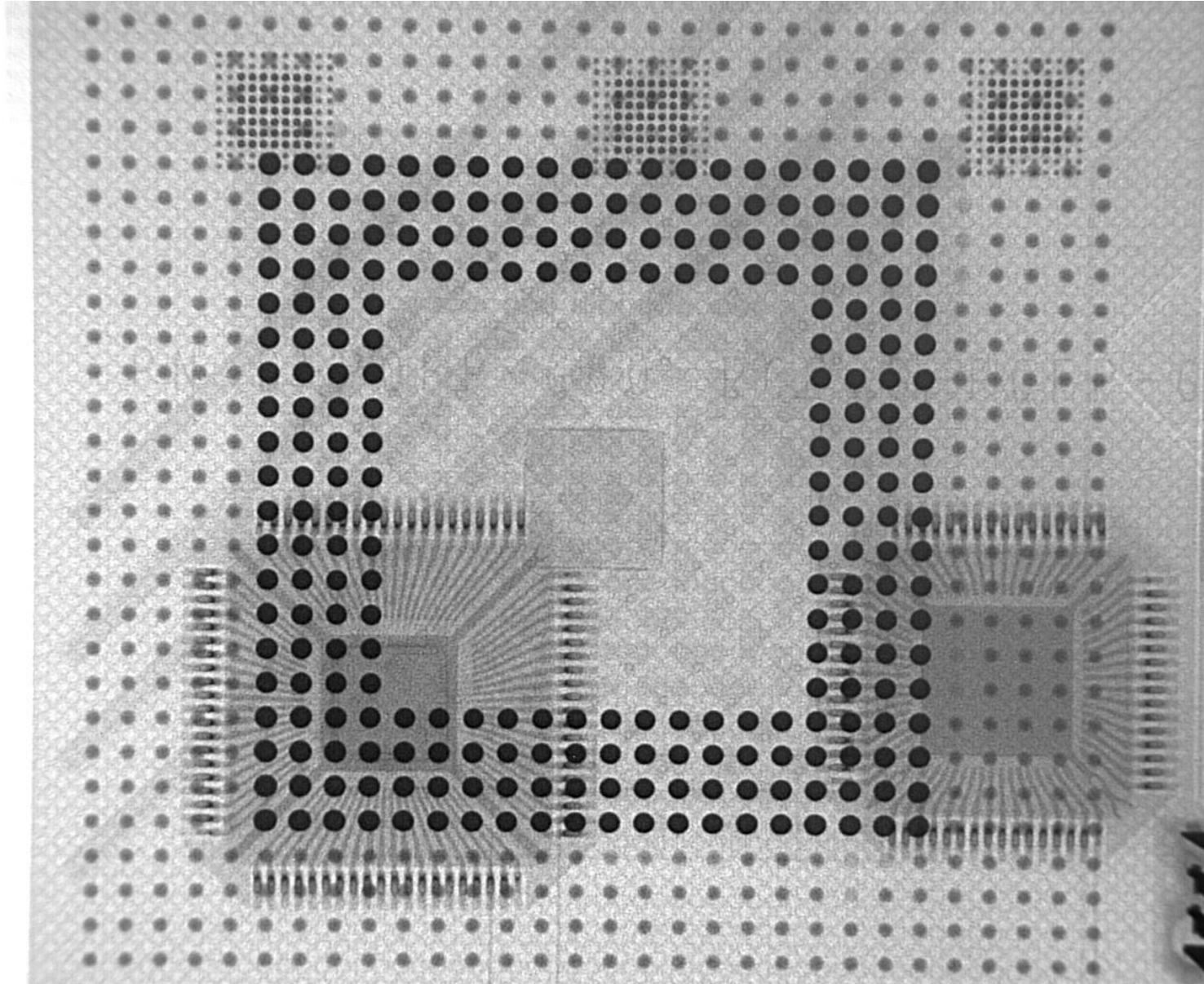
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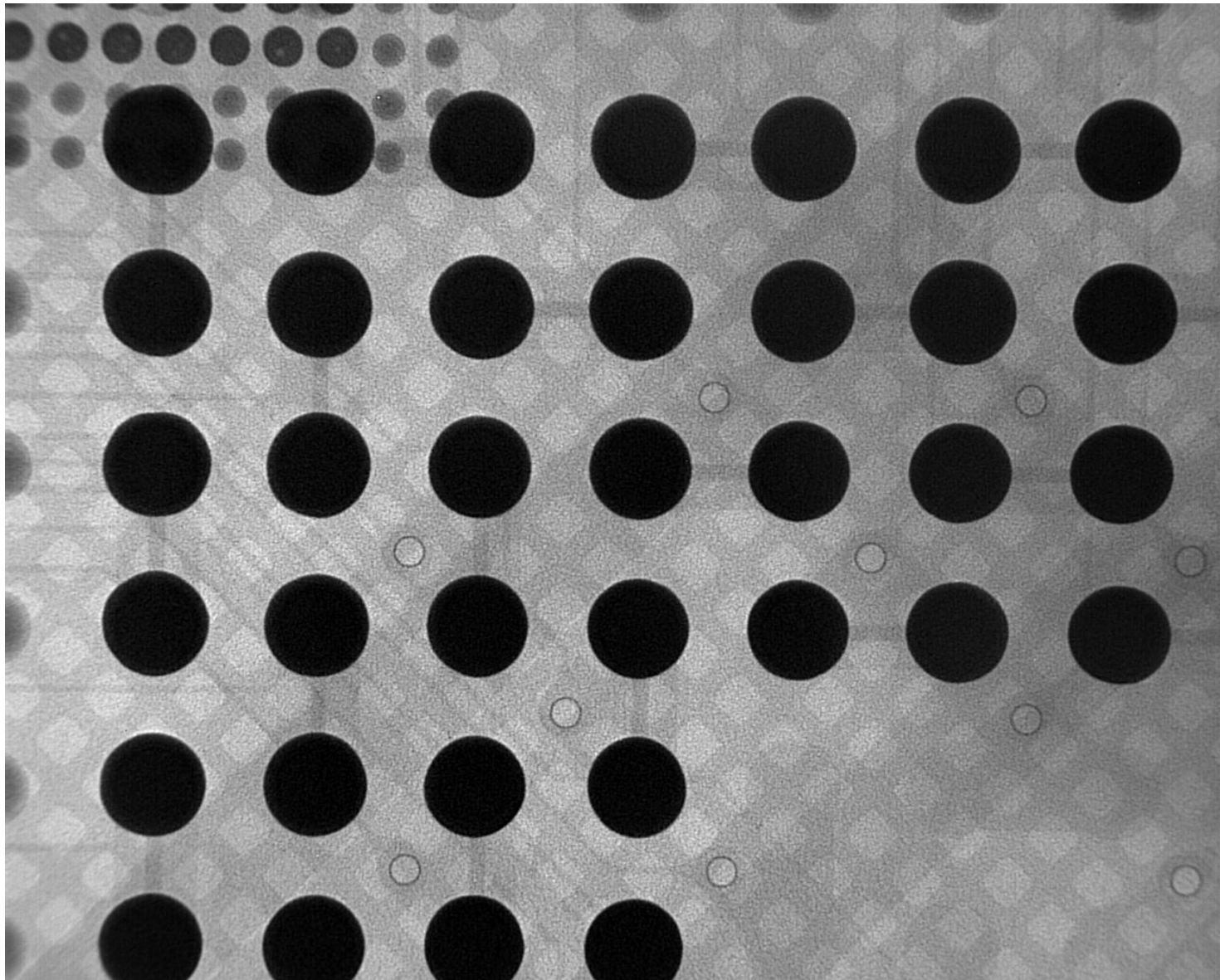


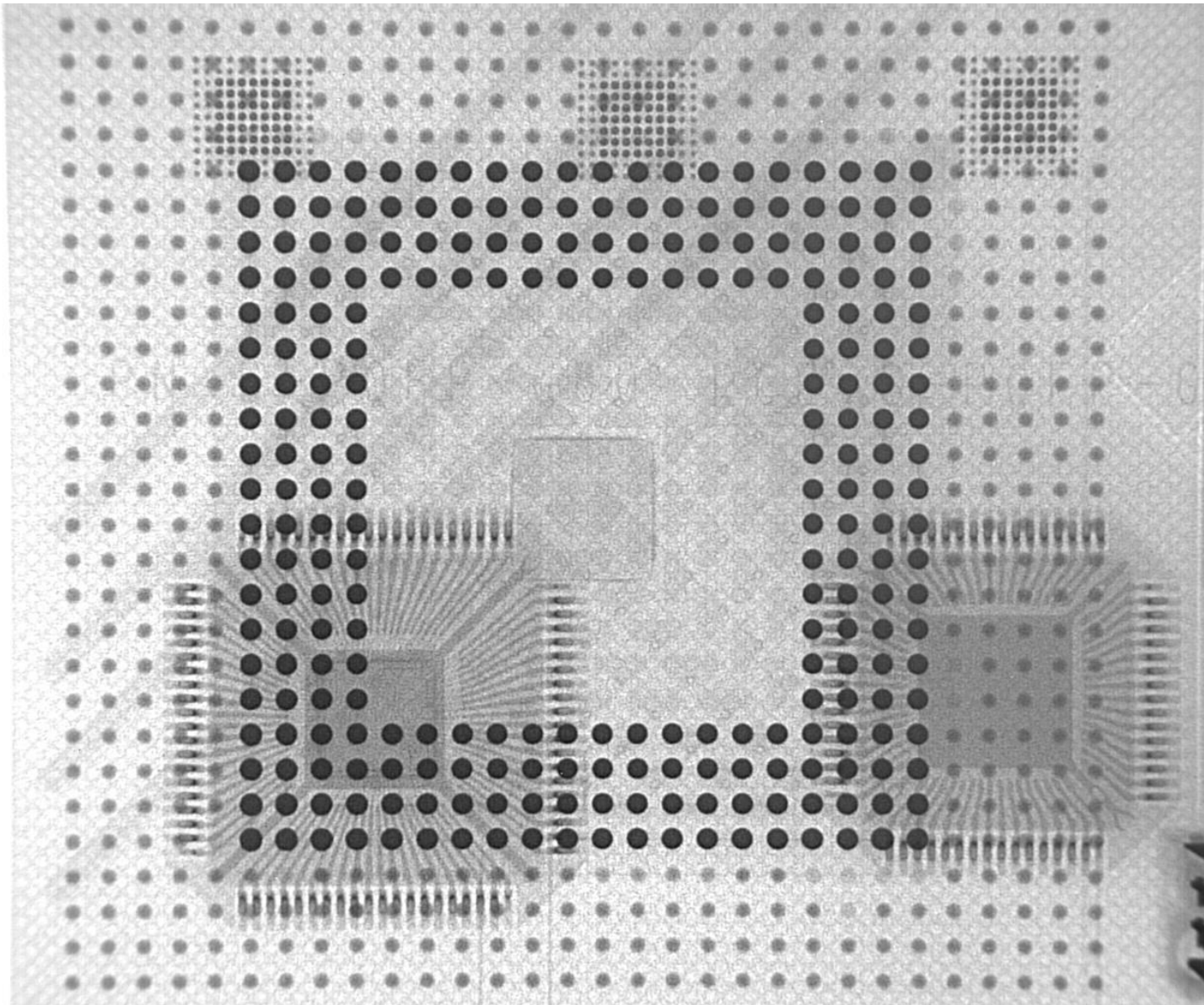
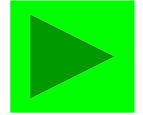
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

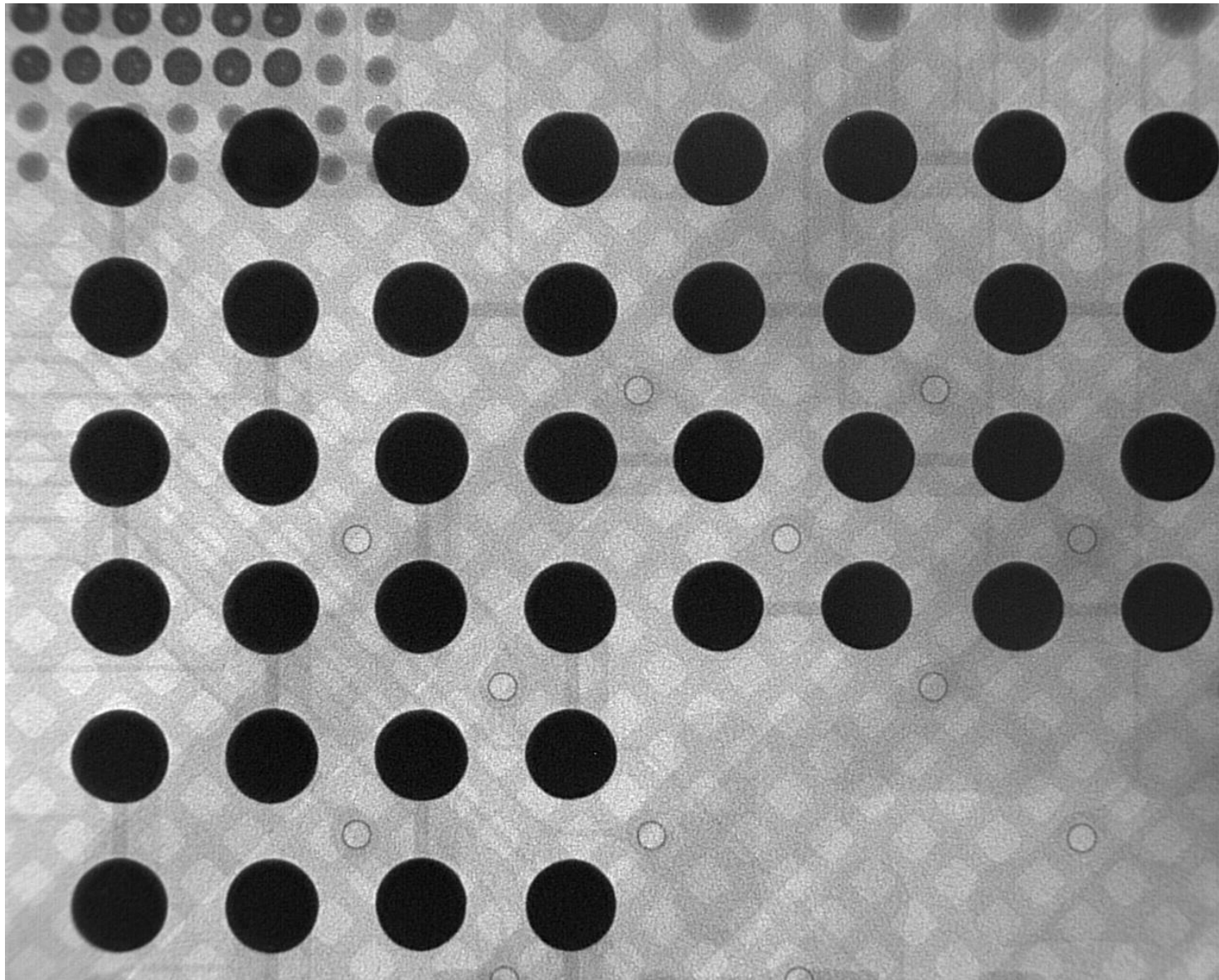
R+R 34 / Z – X-Ray nach Rework 1 – BGA

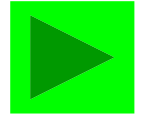
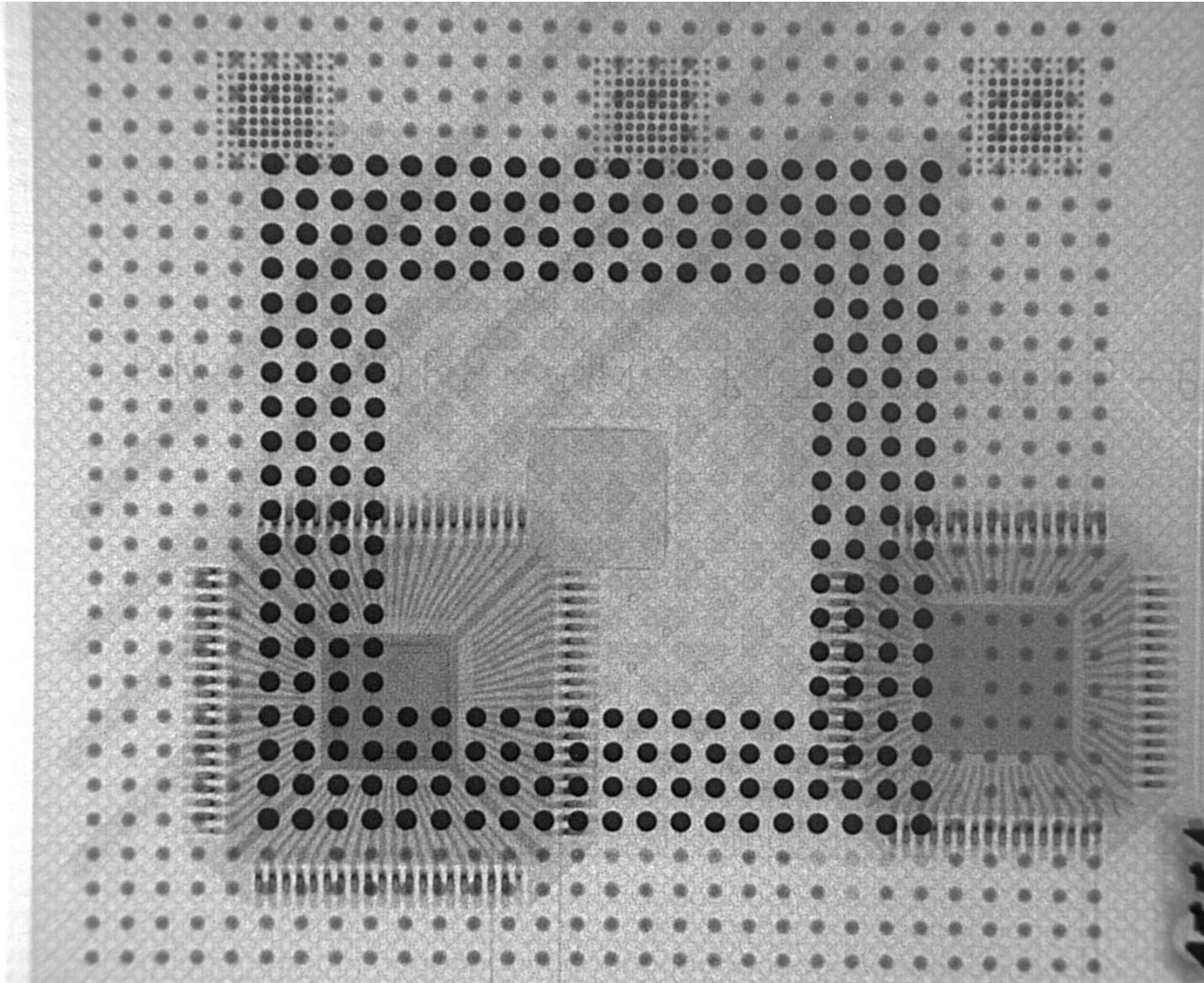
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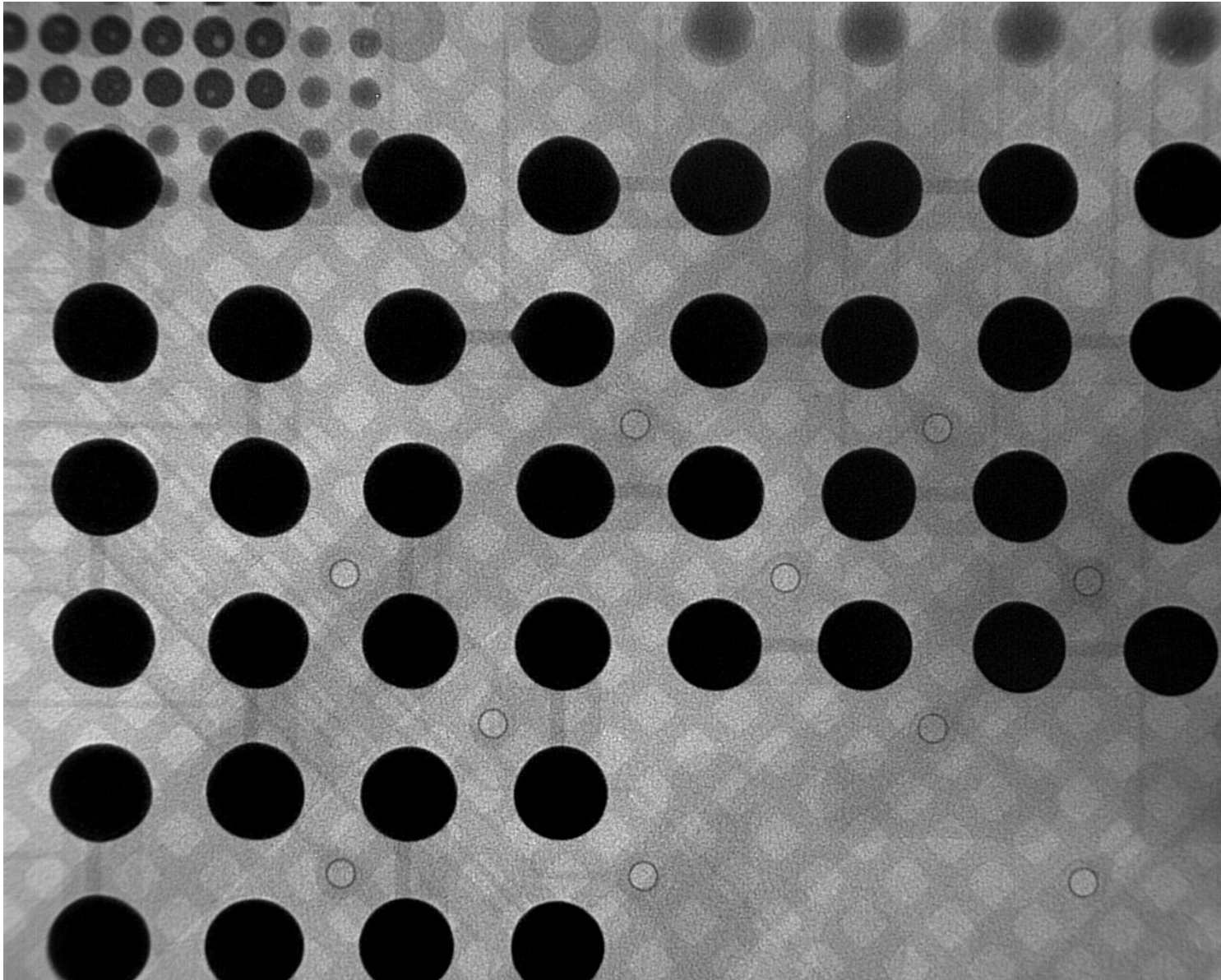




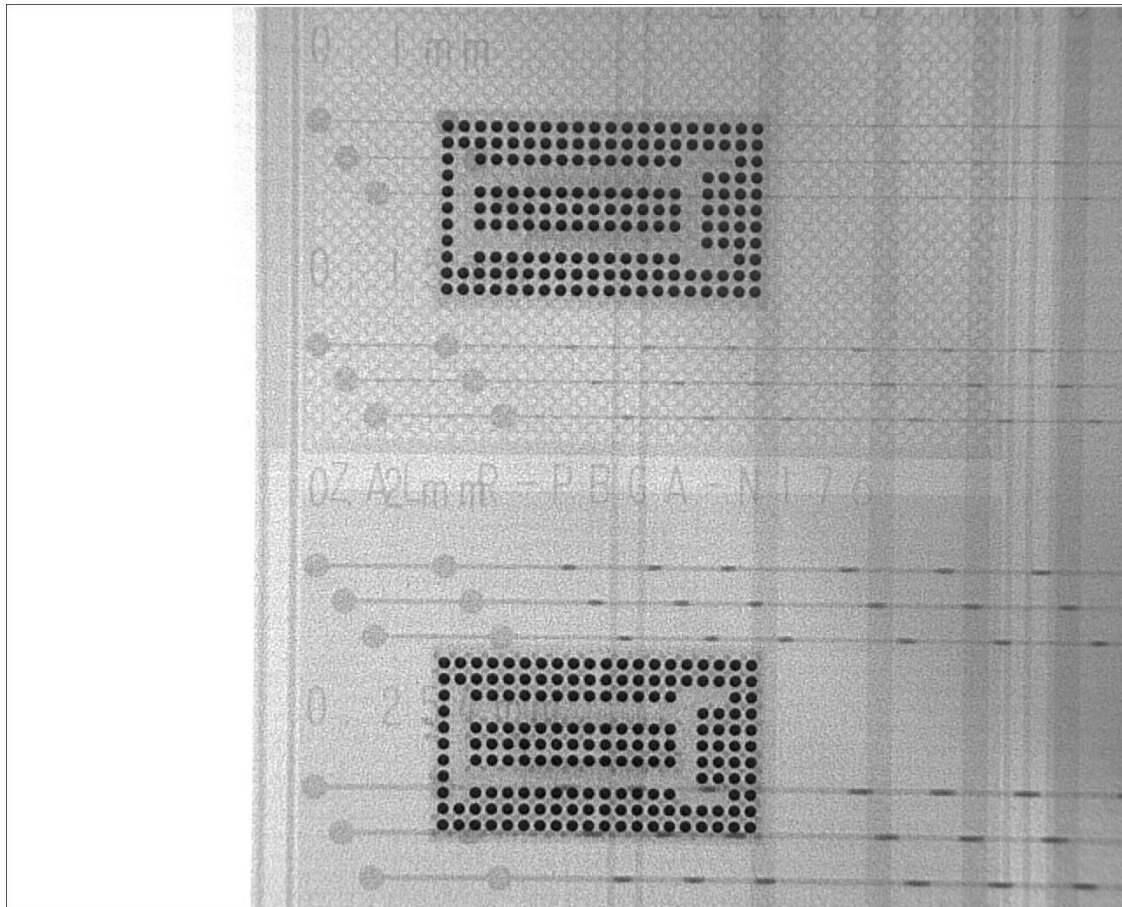








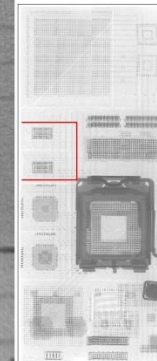
R+R 34 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



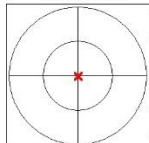
mit
Massefläche



ohne
Massefläche

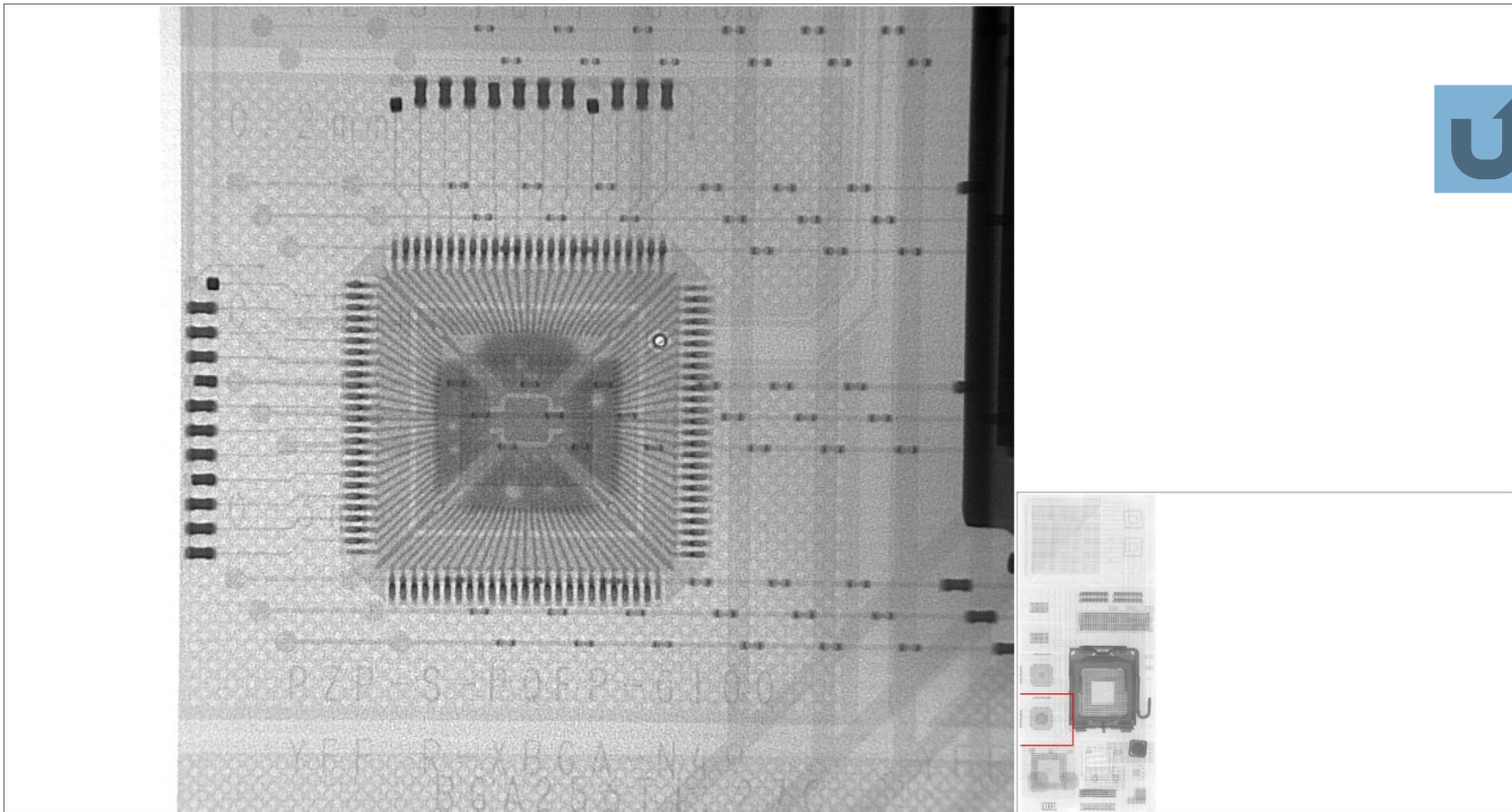


10.0mm

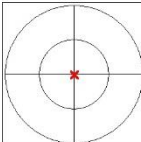


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

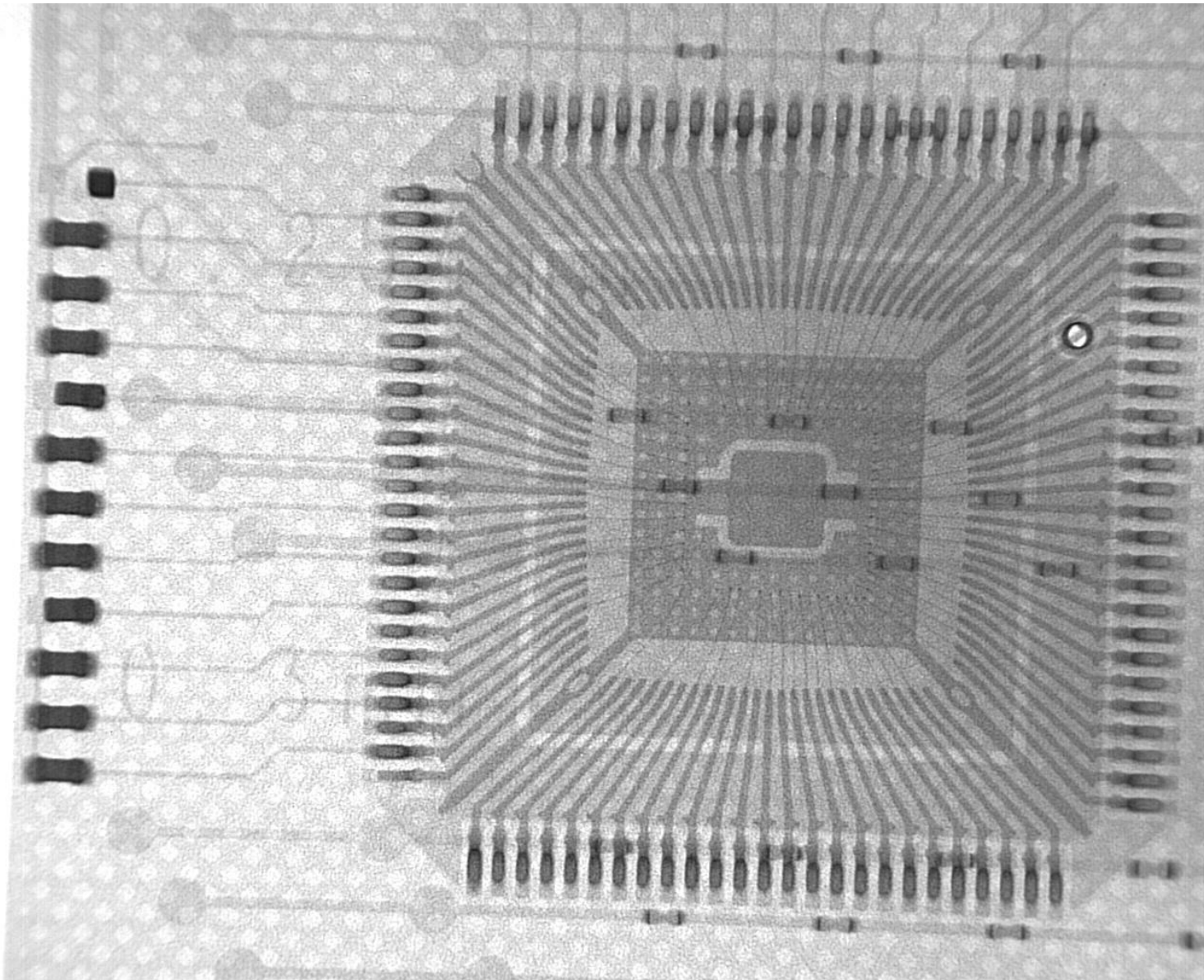
R+R 34 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

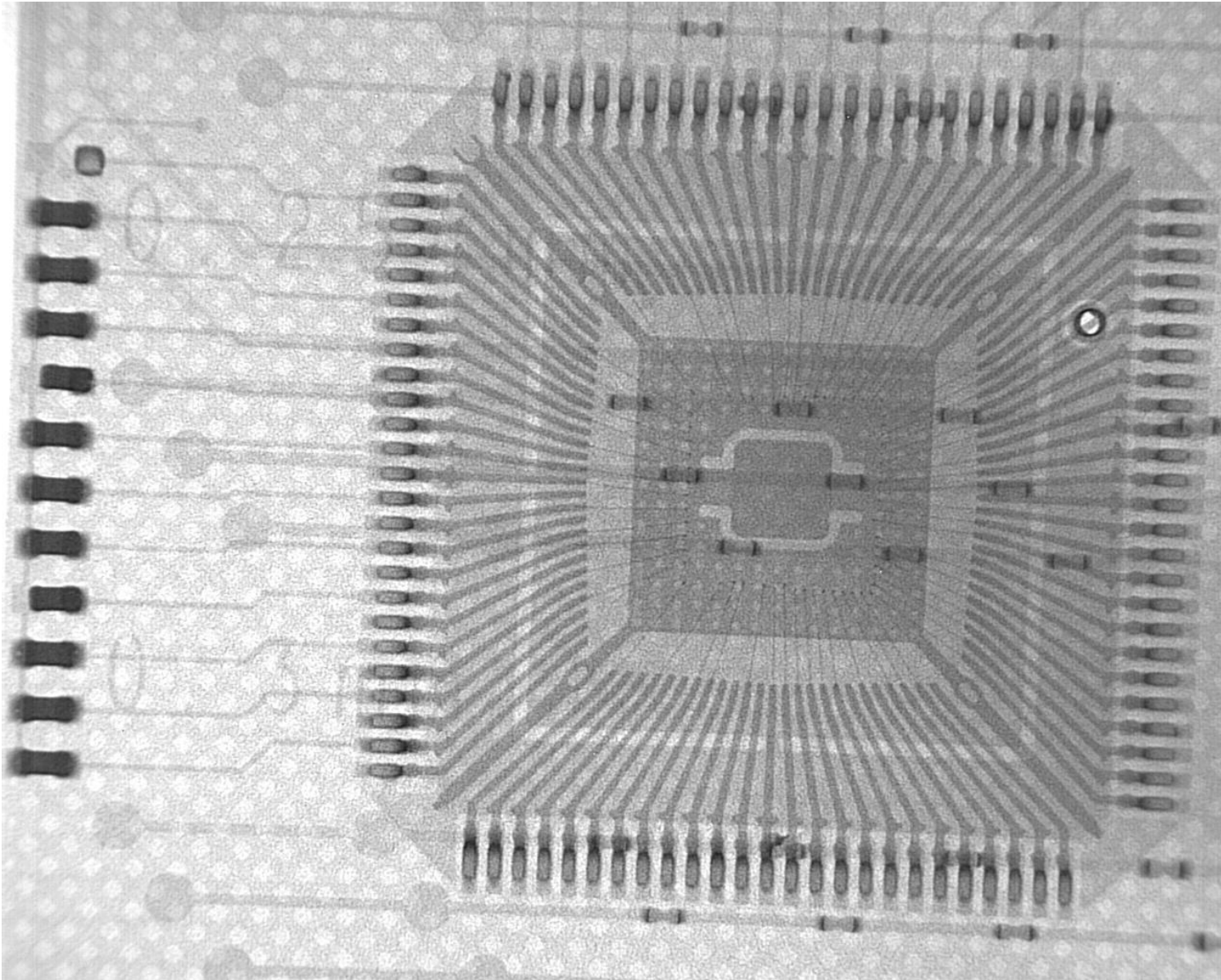


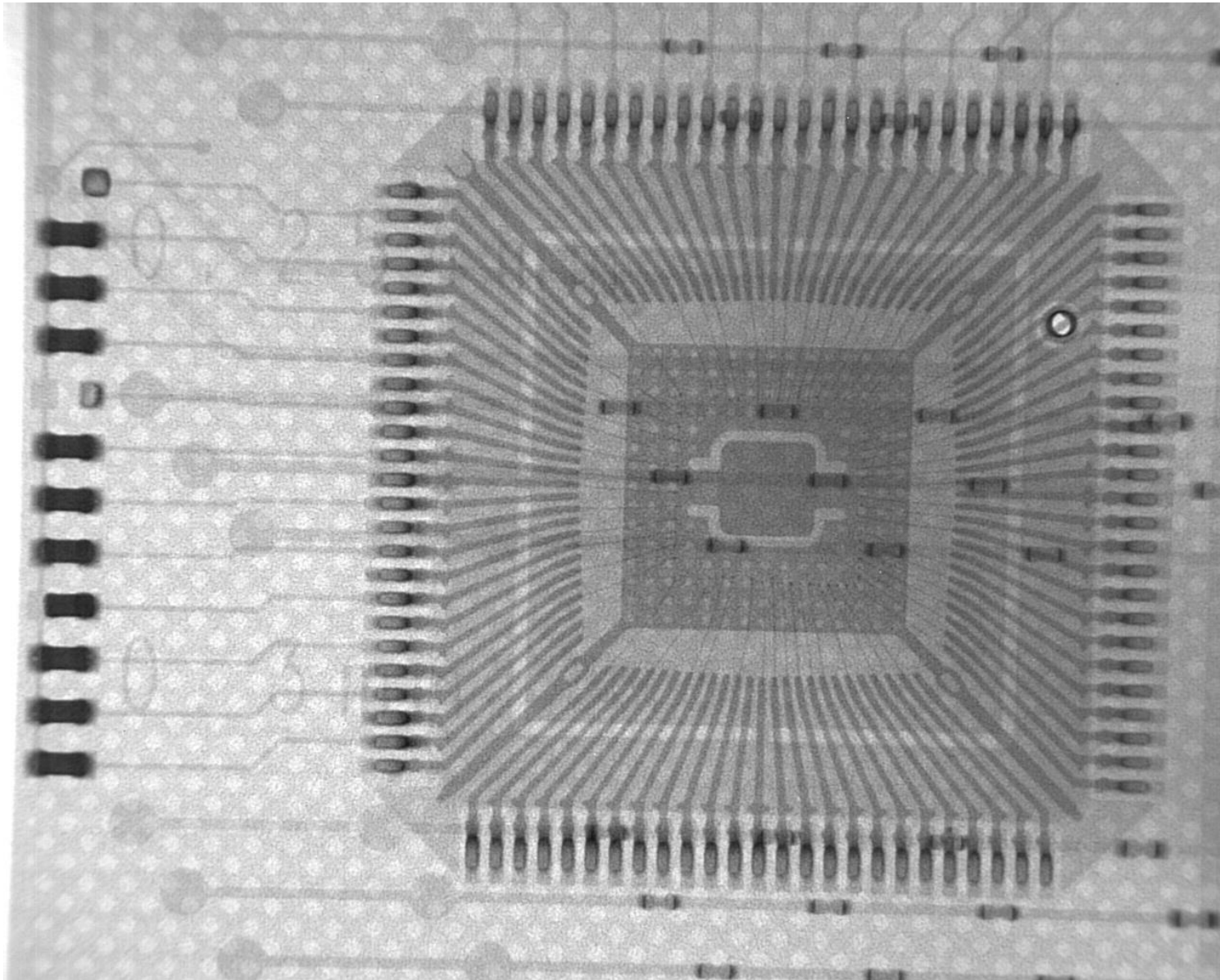
10.0mm

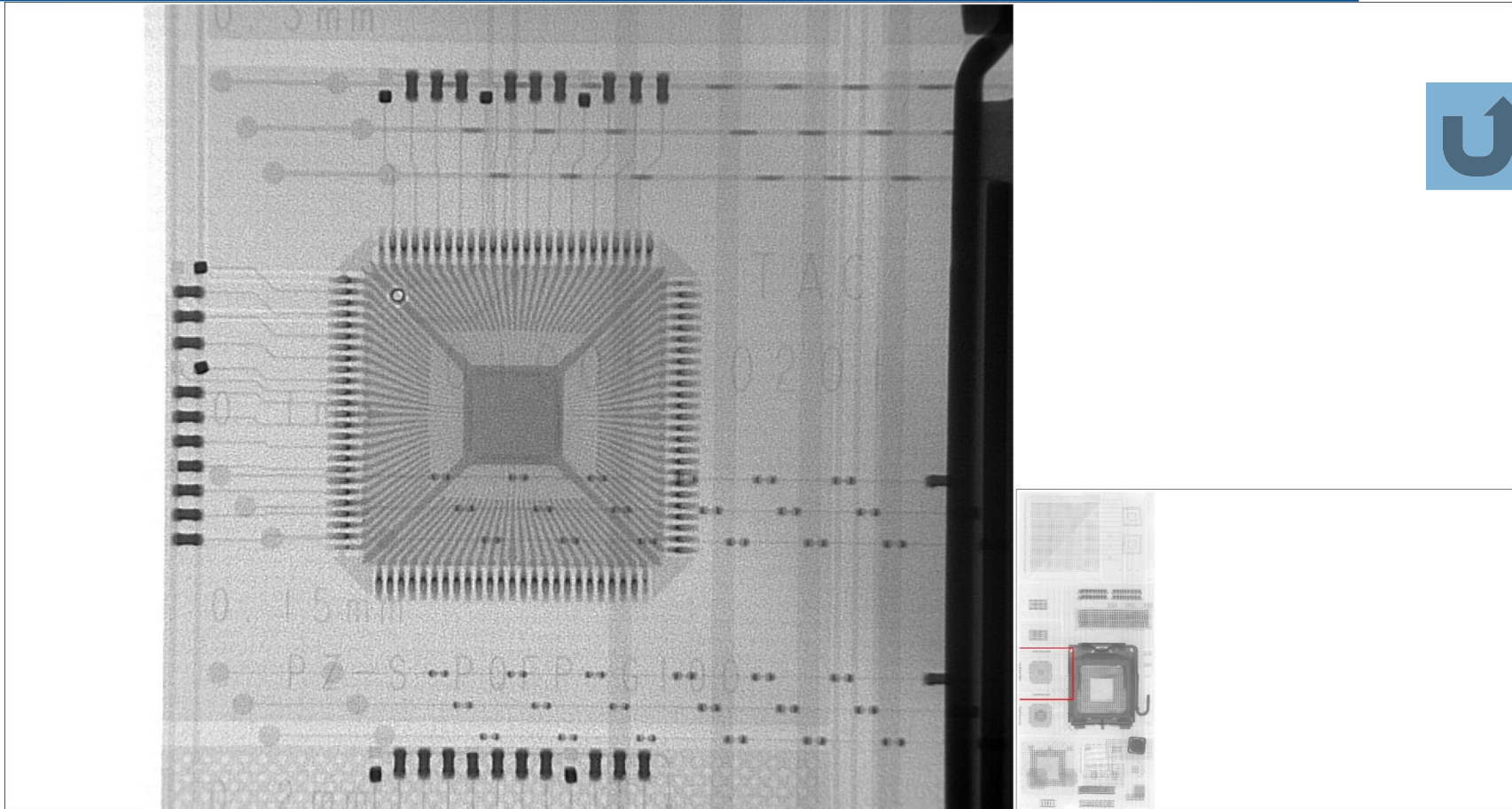


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

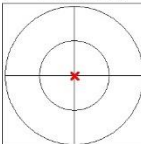




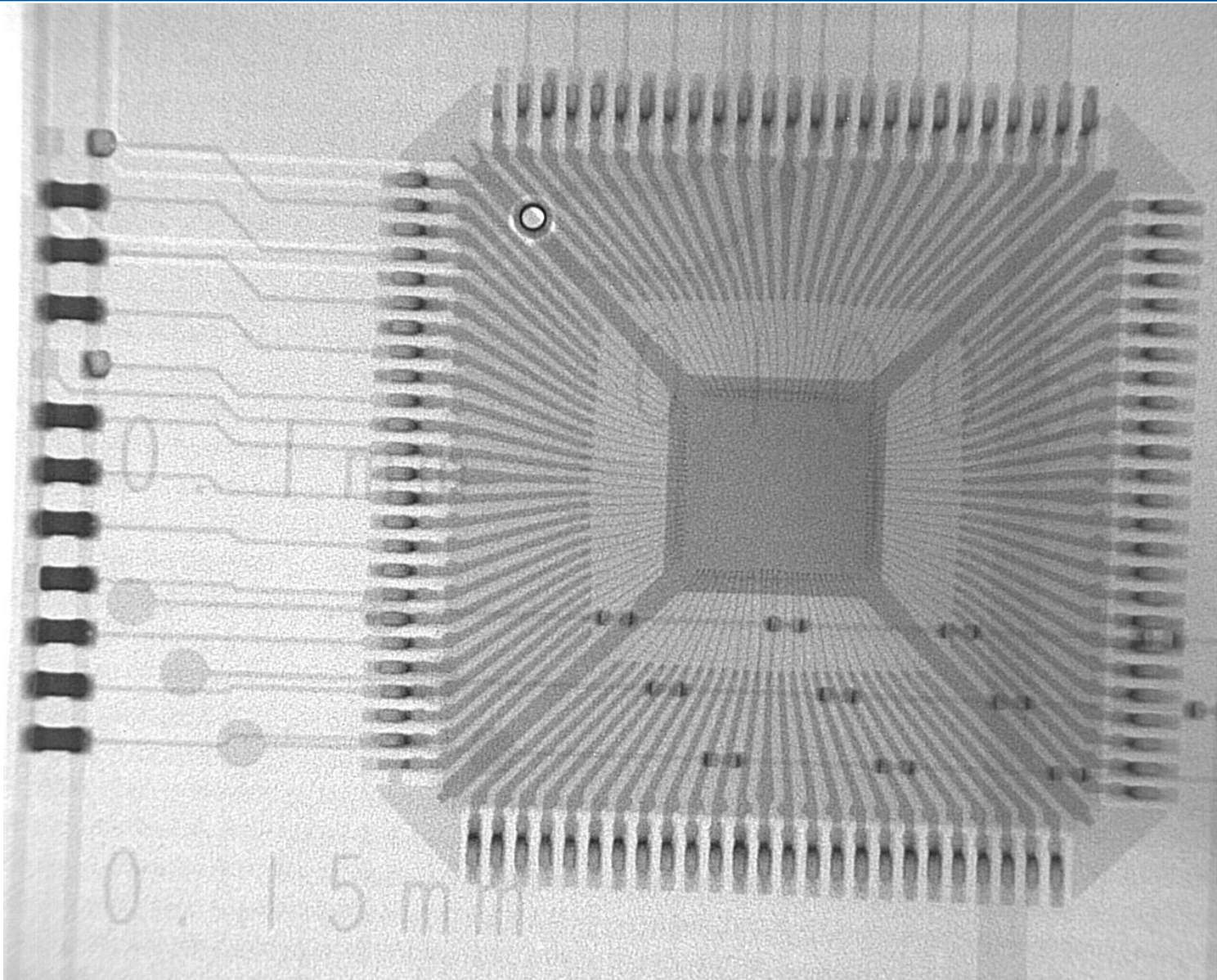


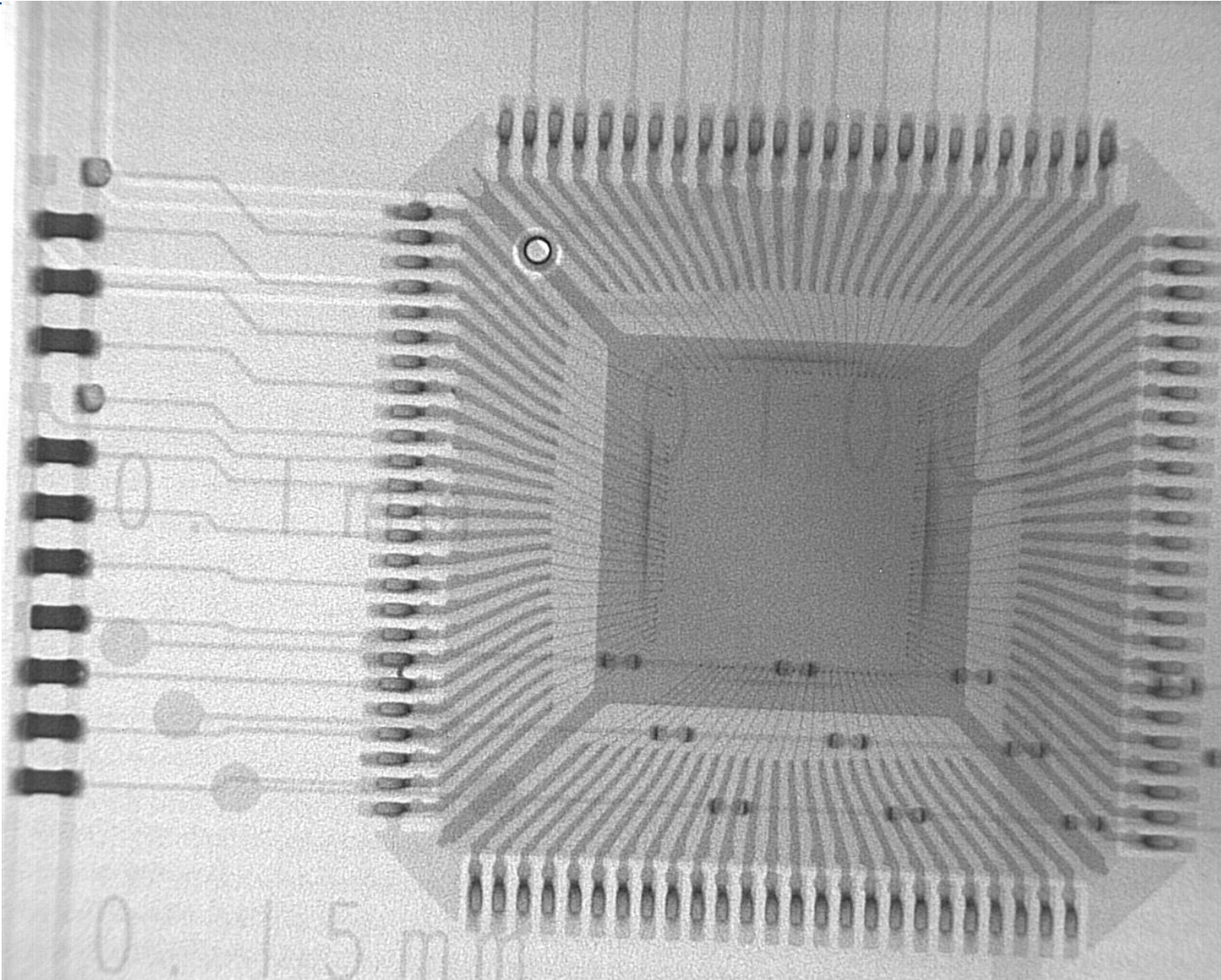


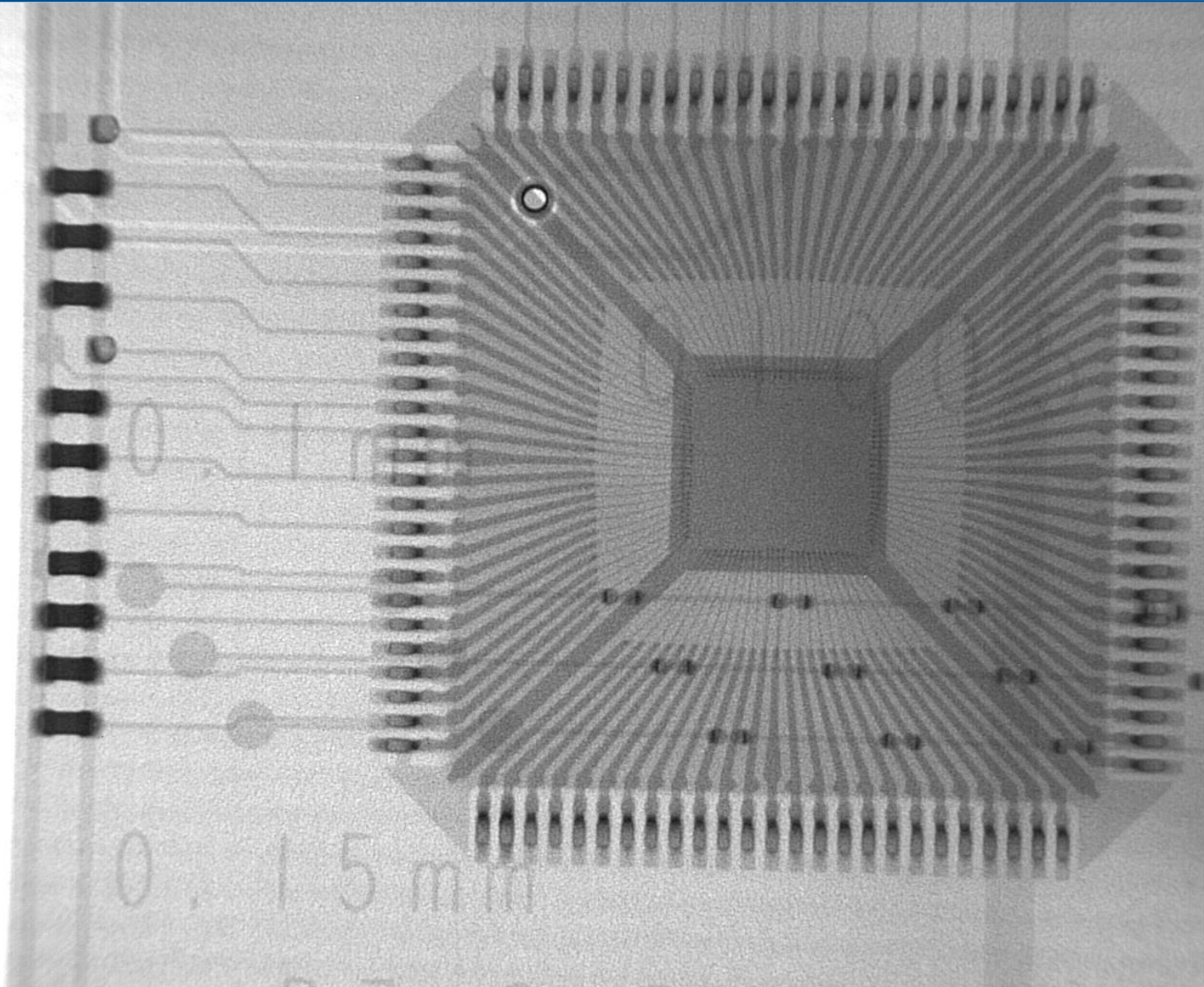
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



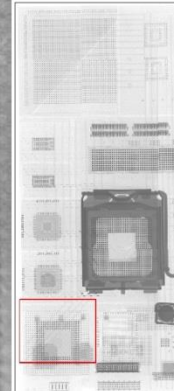
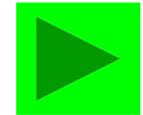
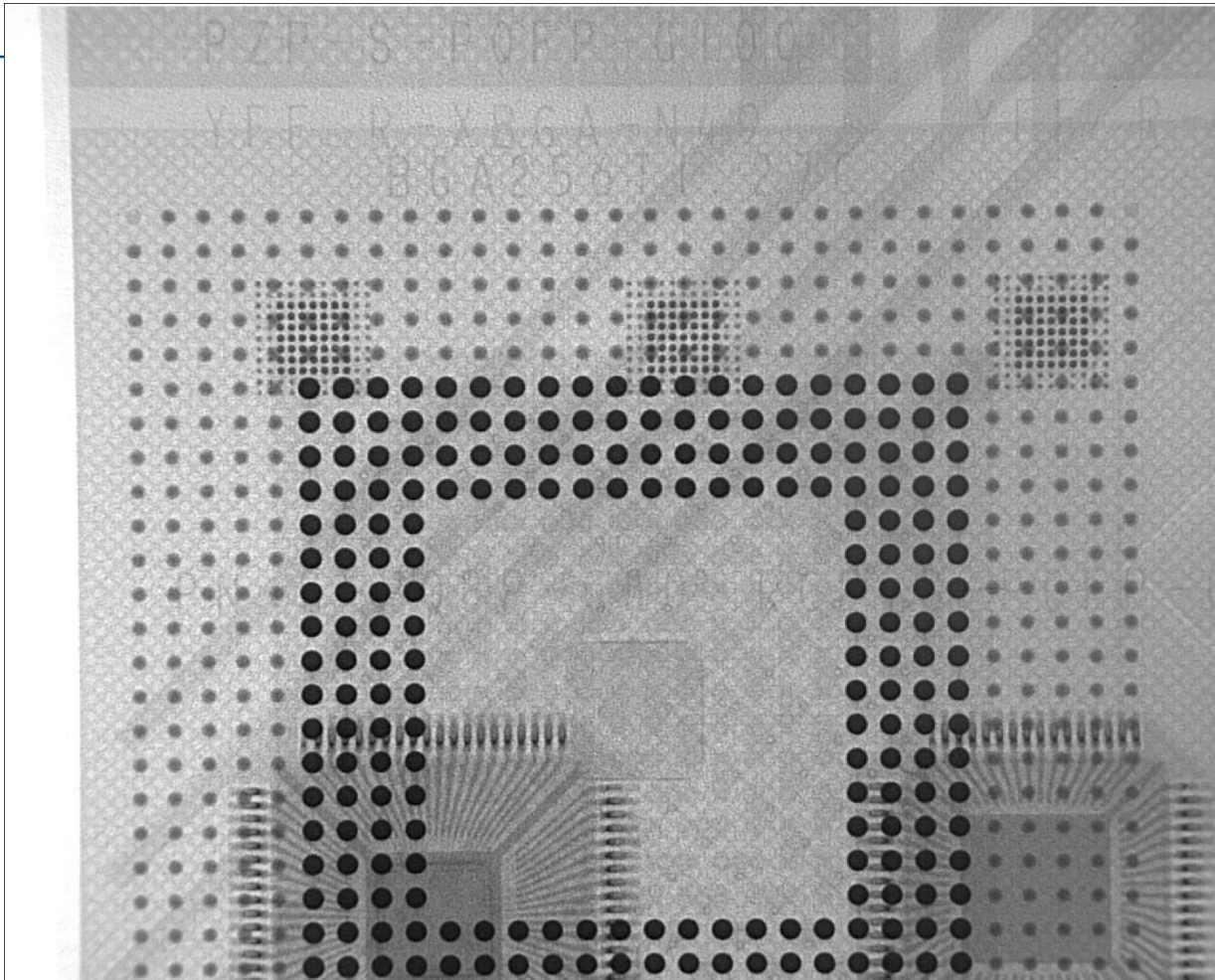




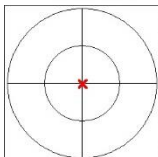
Baugruppe

R+R 35 / Z

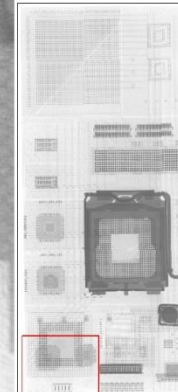
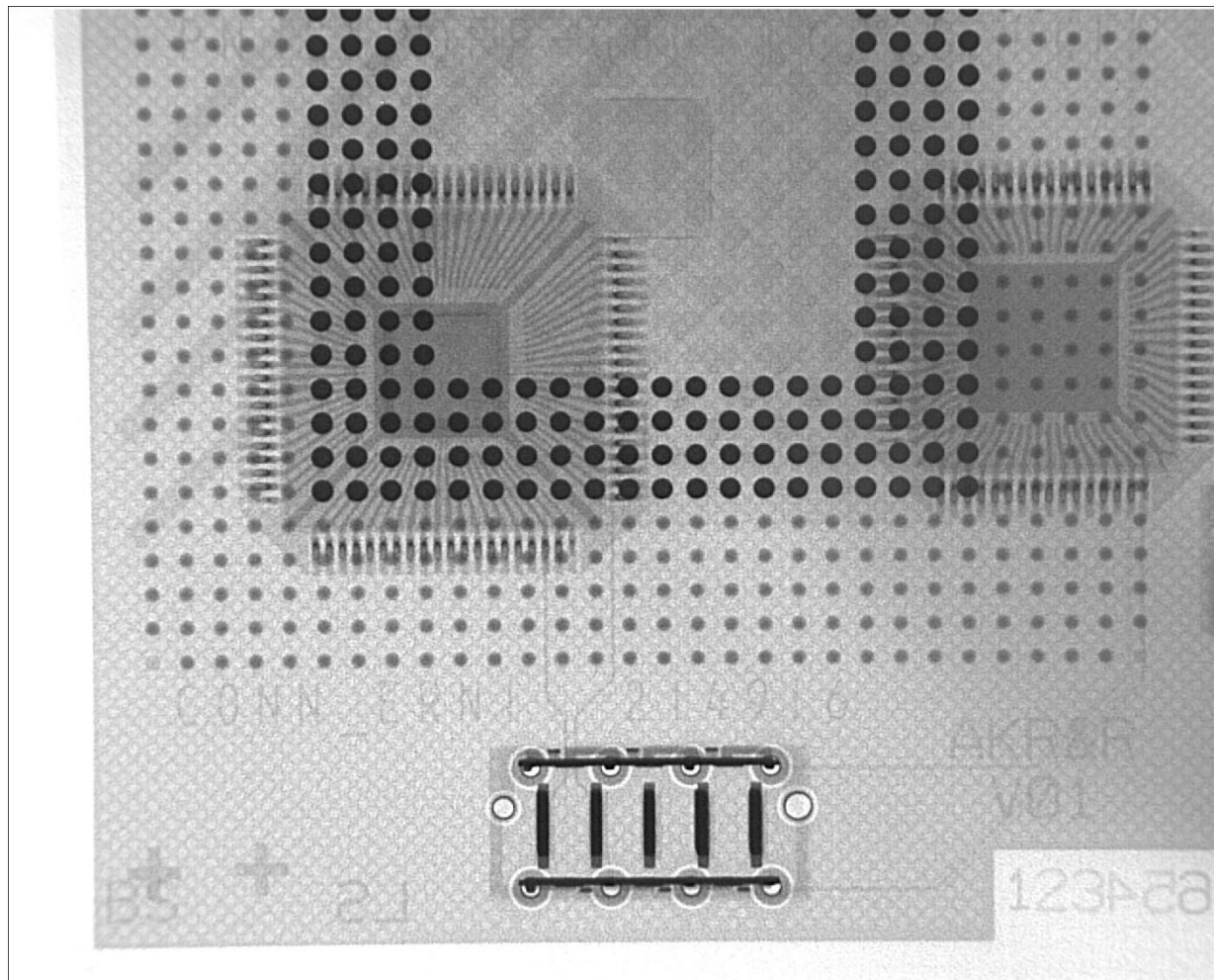
R+R 35 / Z – X-Ray vor Rework – BGA 256



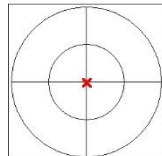
10.0mm



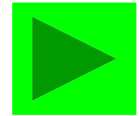
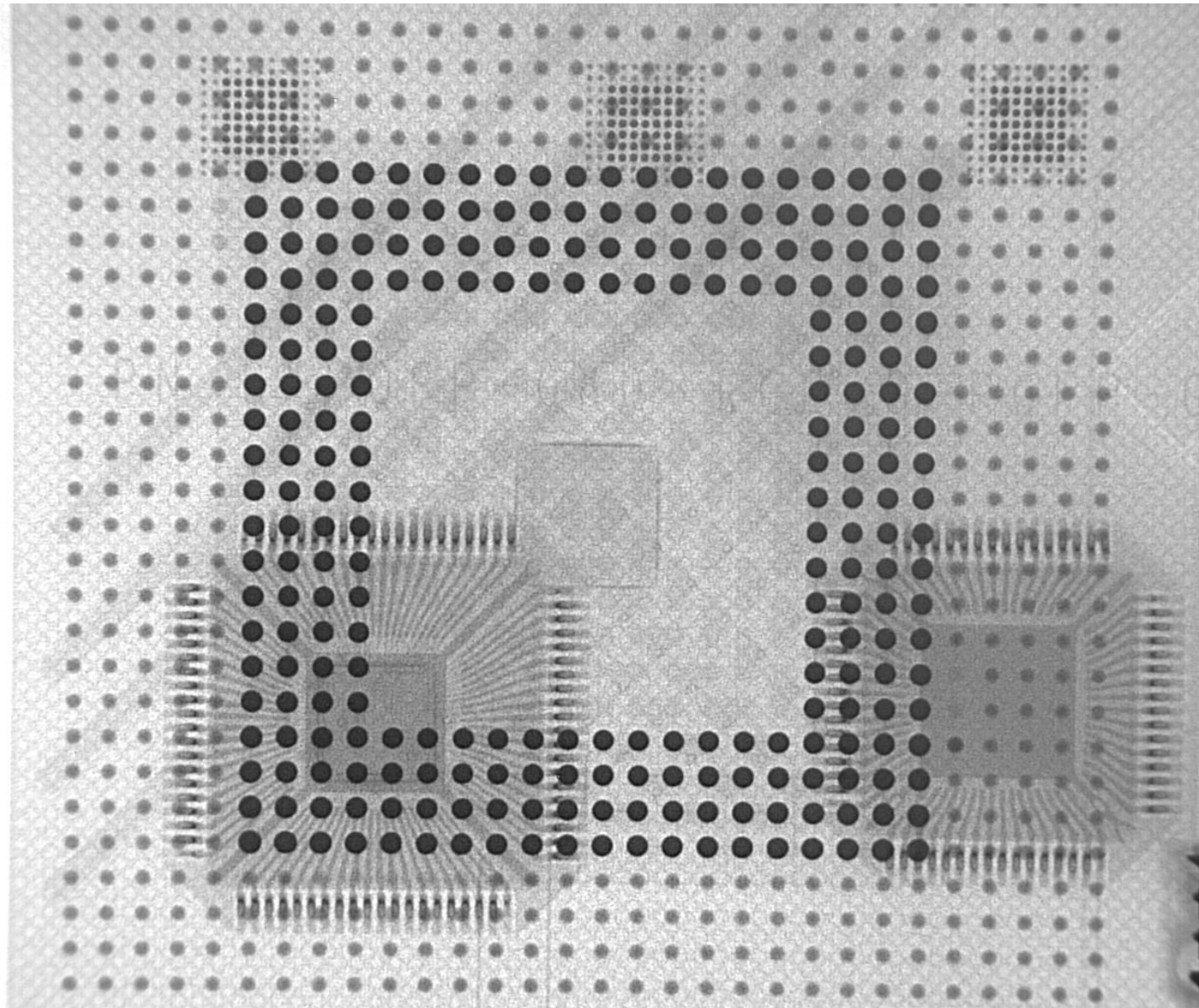
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

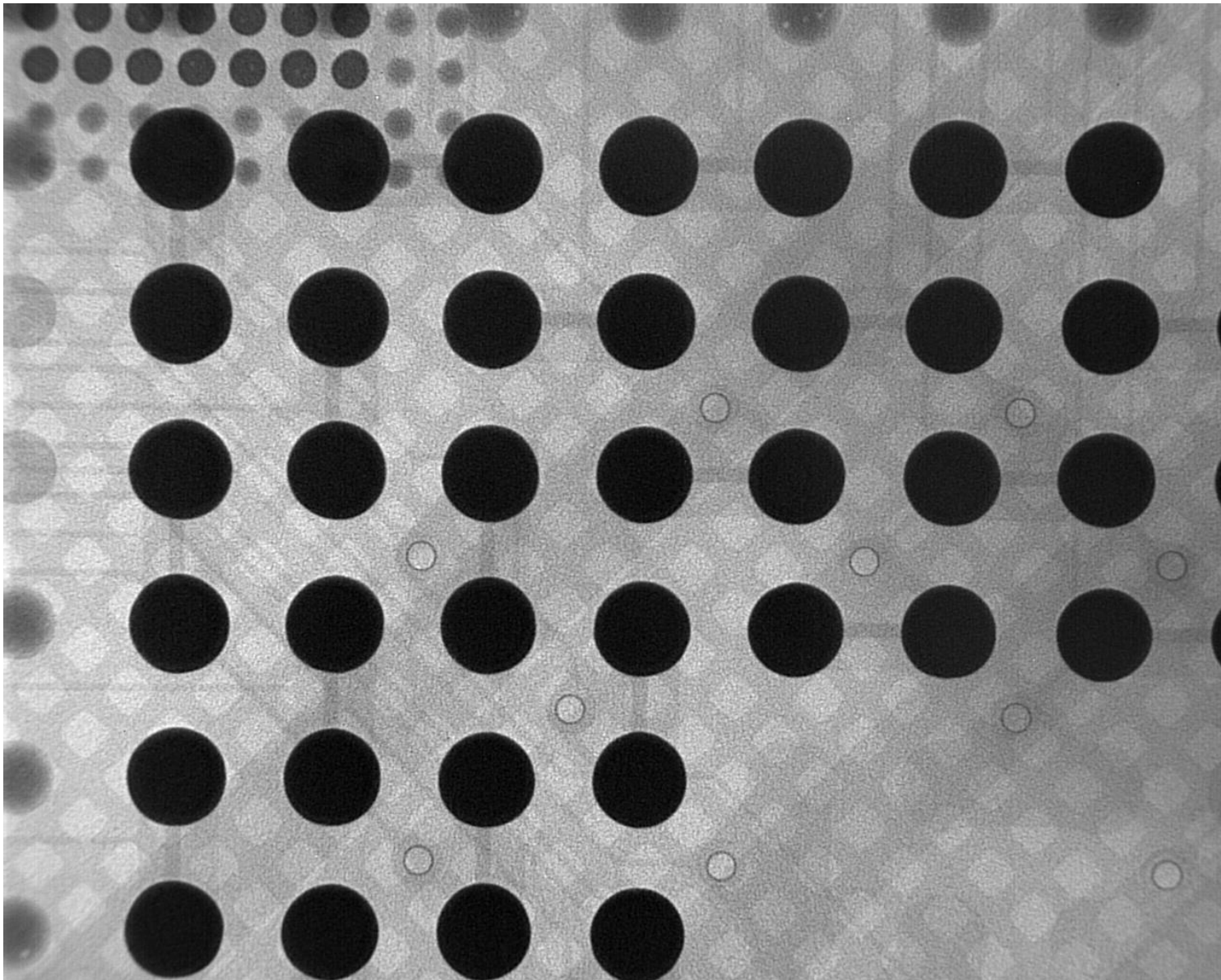


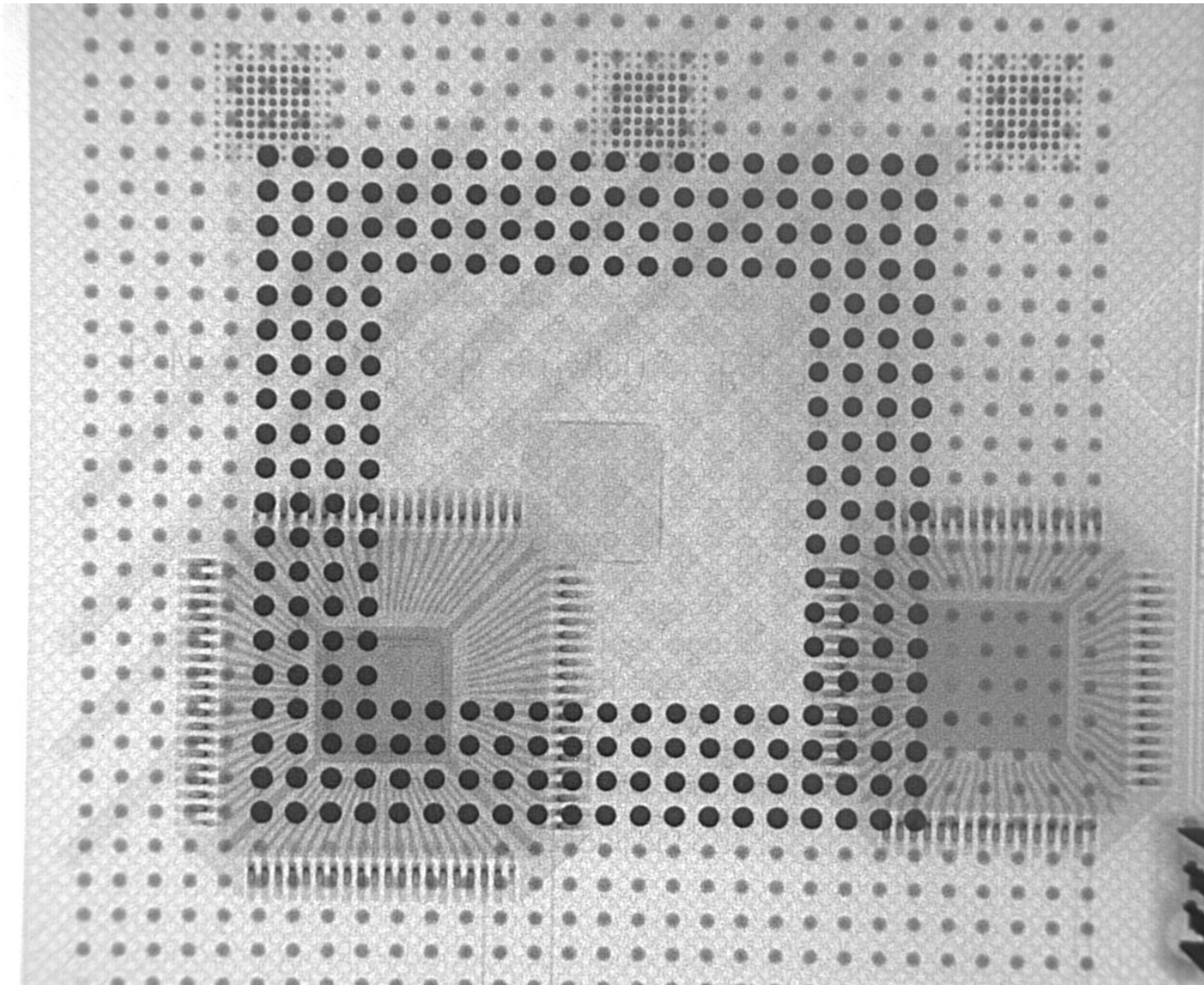
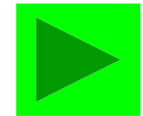
10.0mm

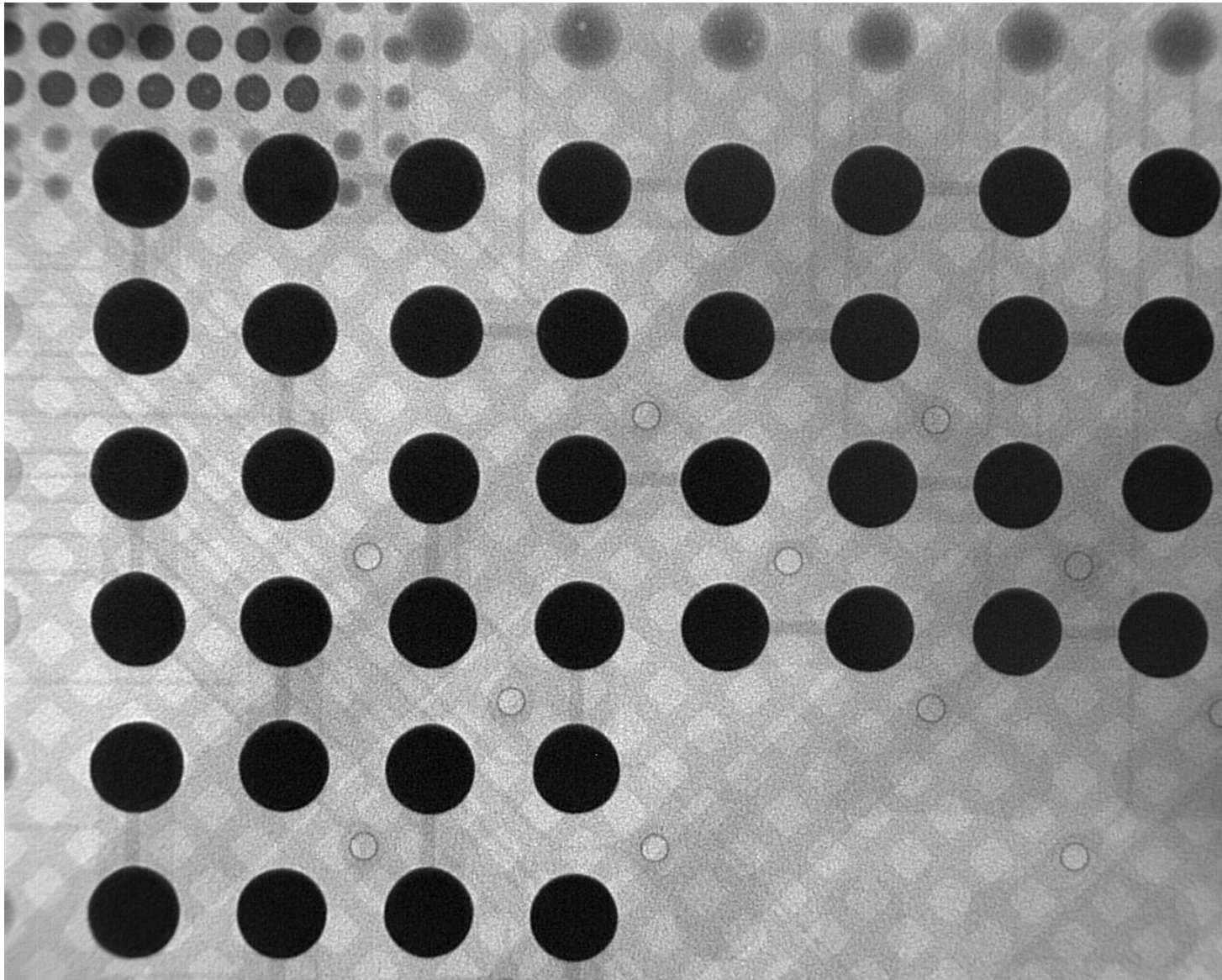


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

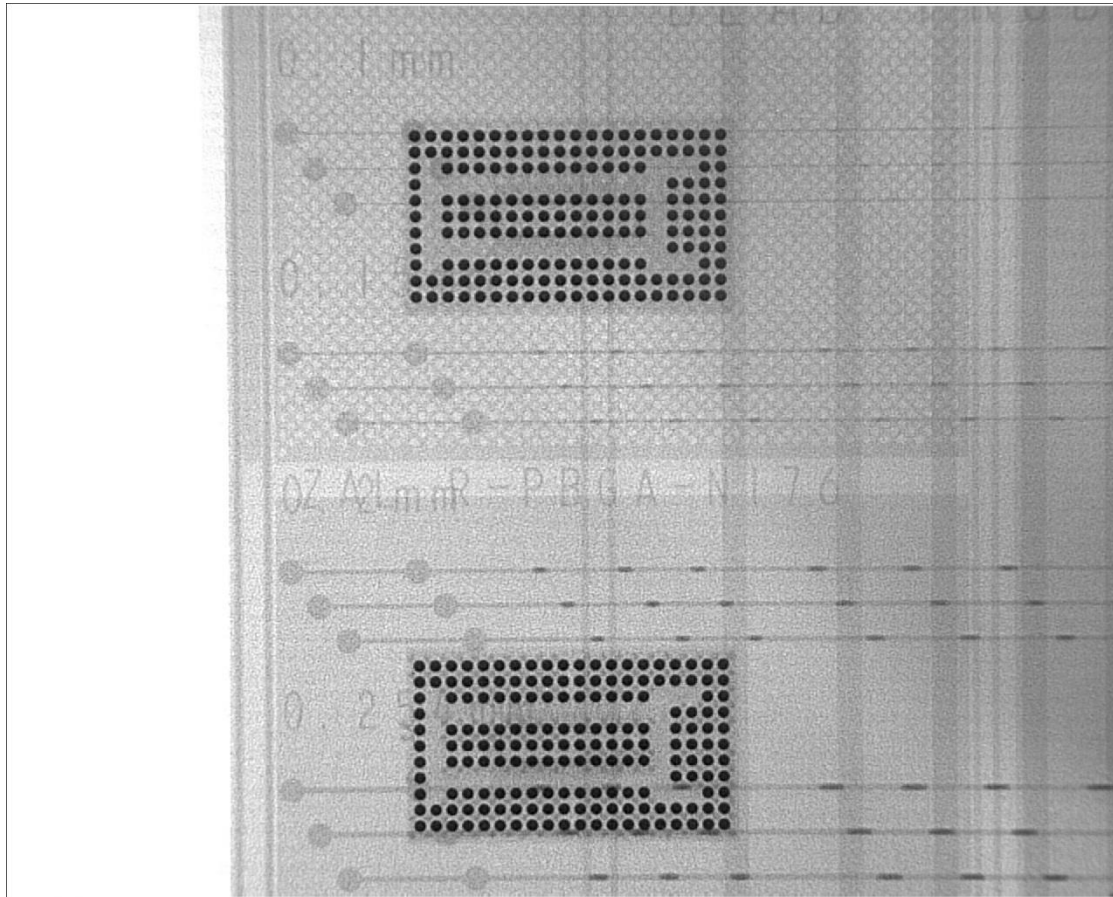








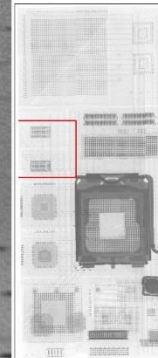
R+R 35 / Z – X-Ray vor Rework – ZAL R-PBGA-N176



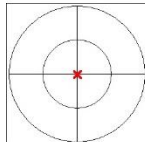
mit
Massefläche



ohne
Massefläche

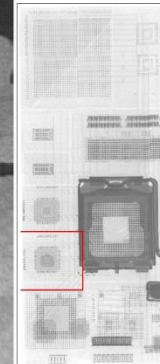
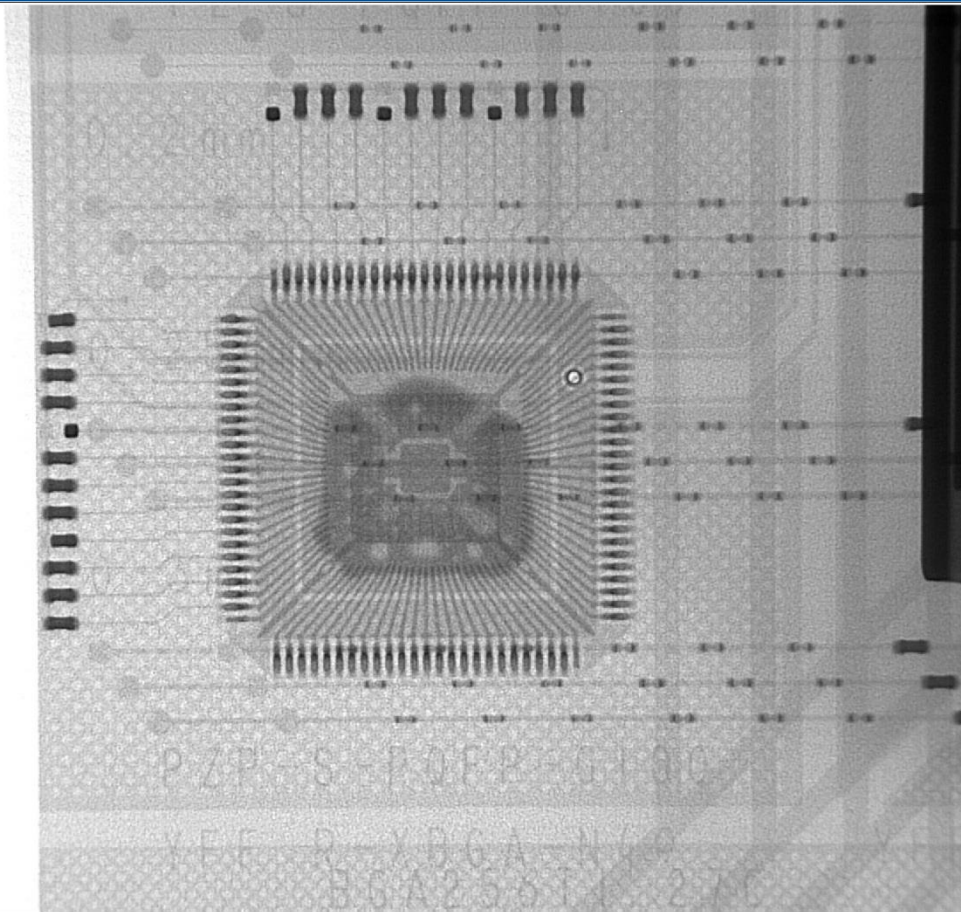


10.0mm

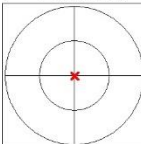


Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

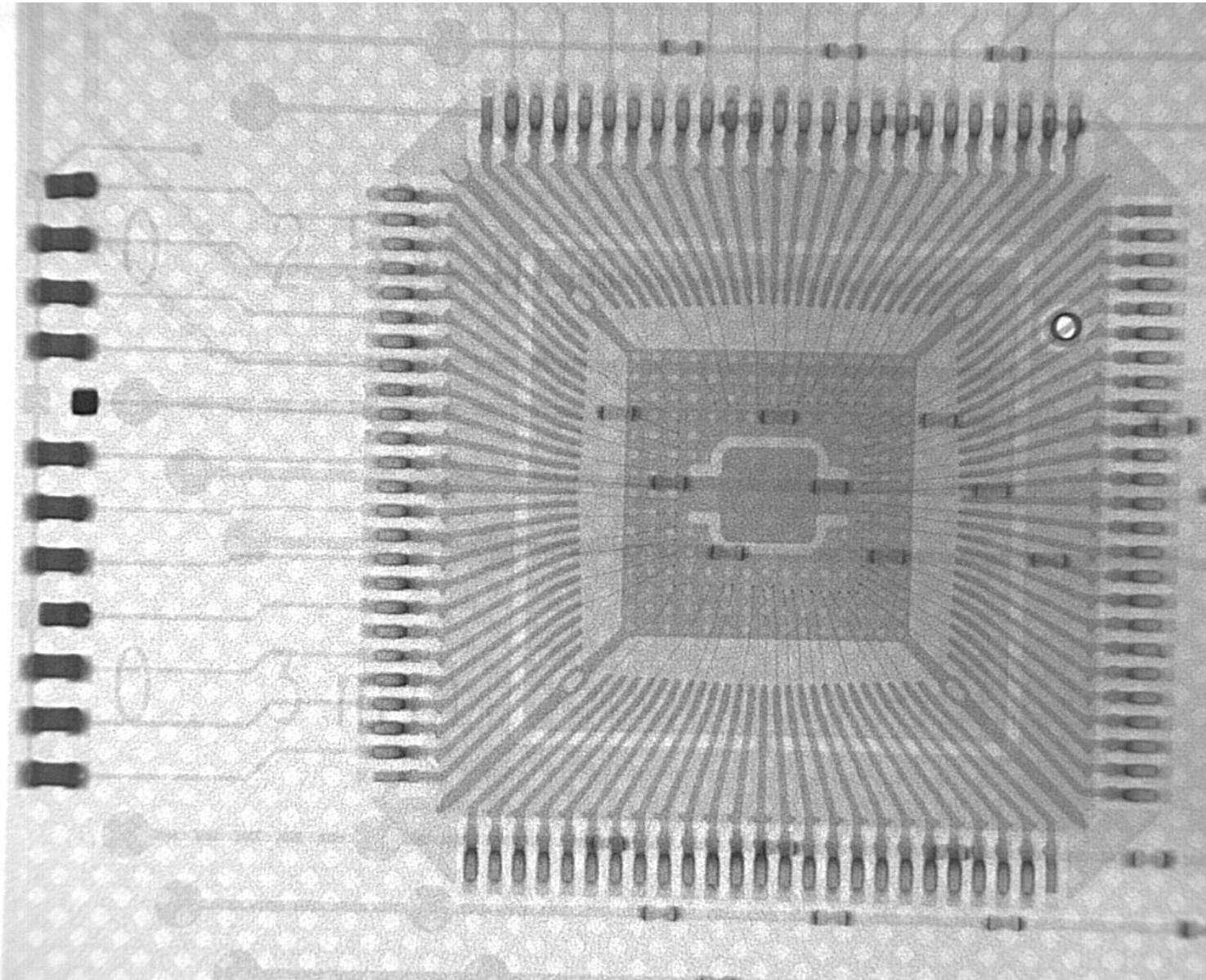
R+R 35 / Z – X-Ray vor Rework – PZP-S-PQFP-G100

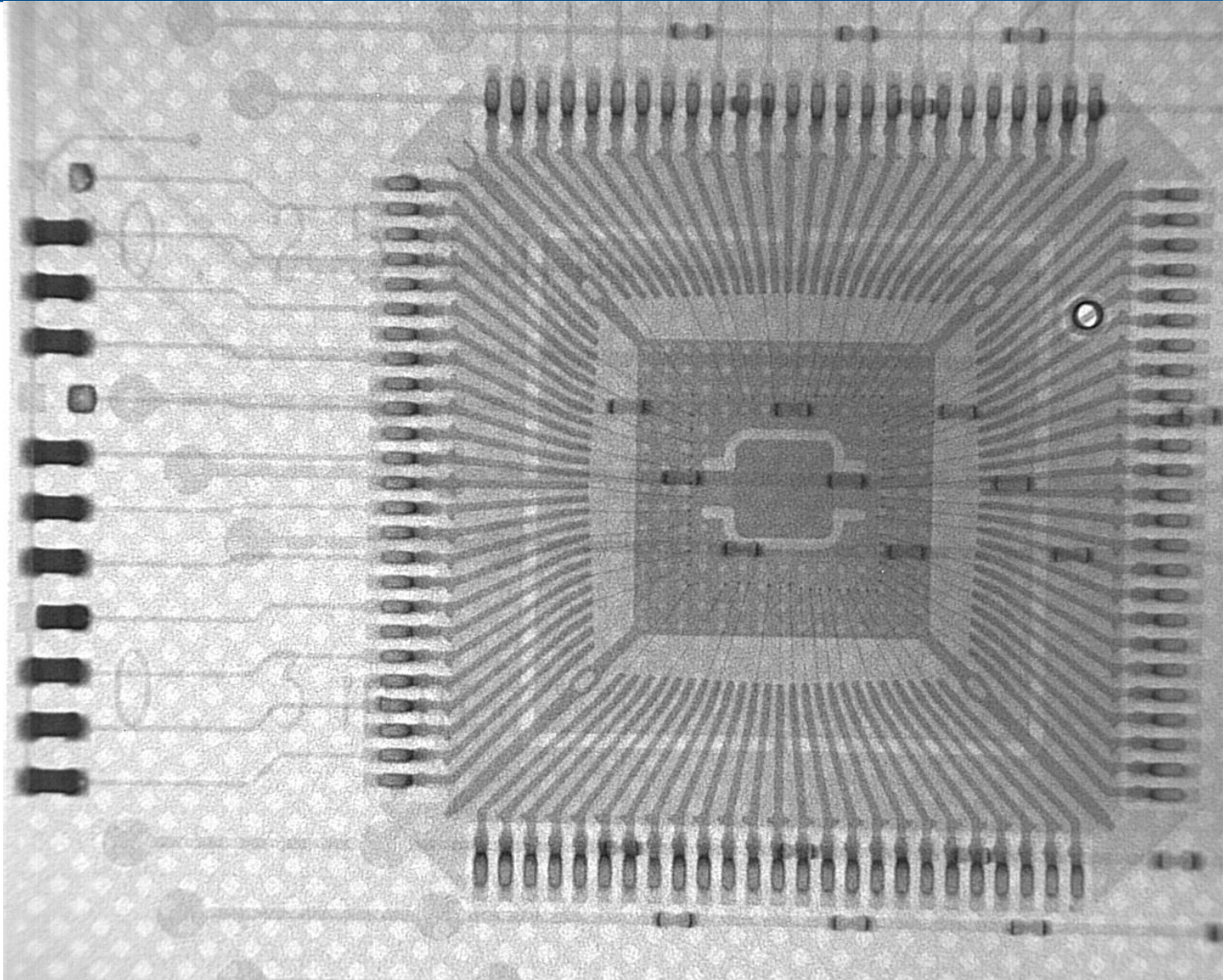


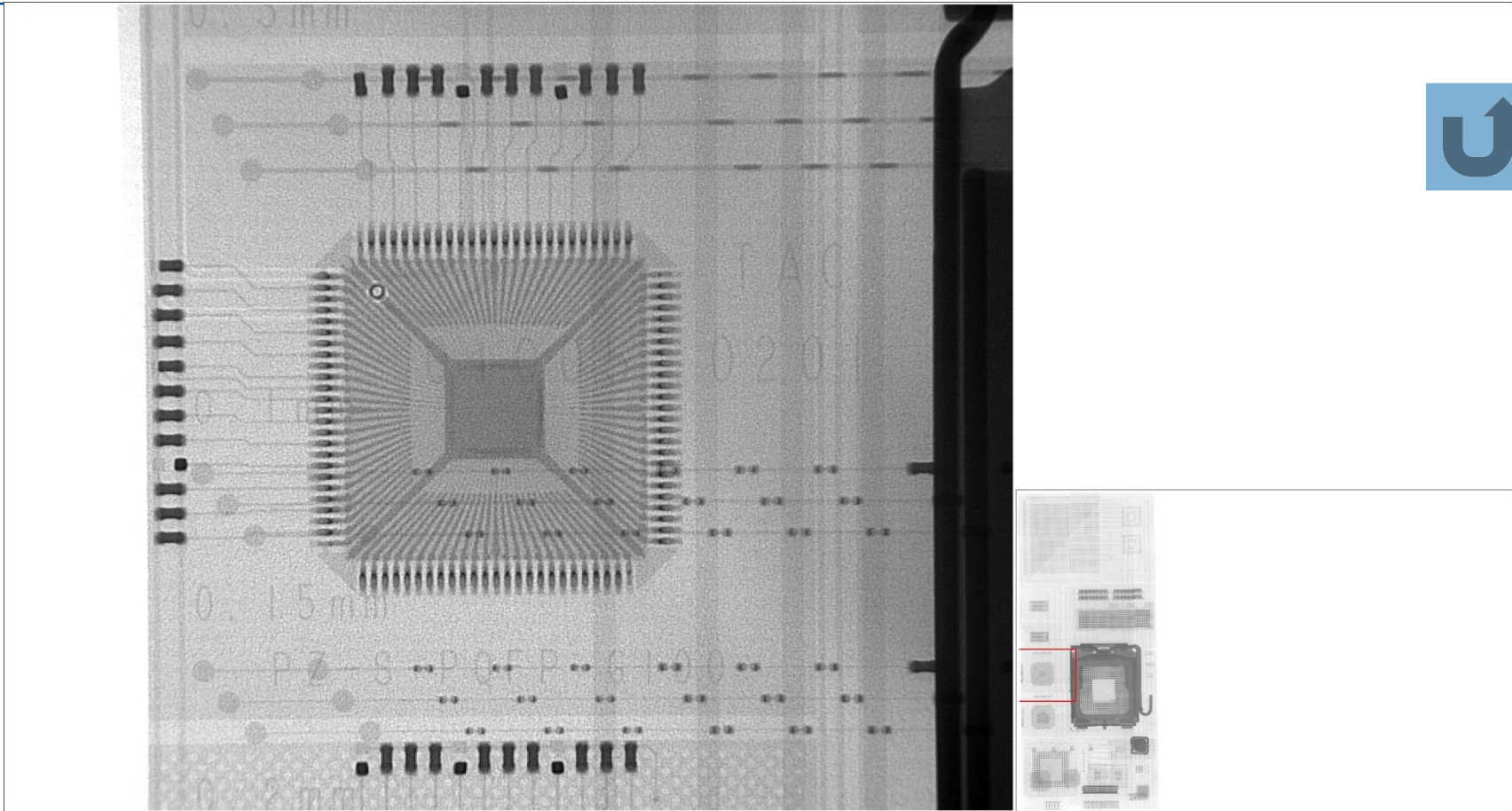
10.0mm



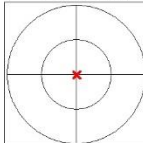
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



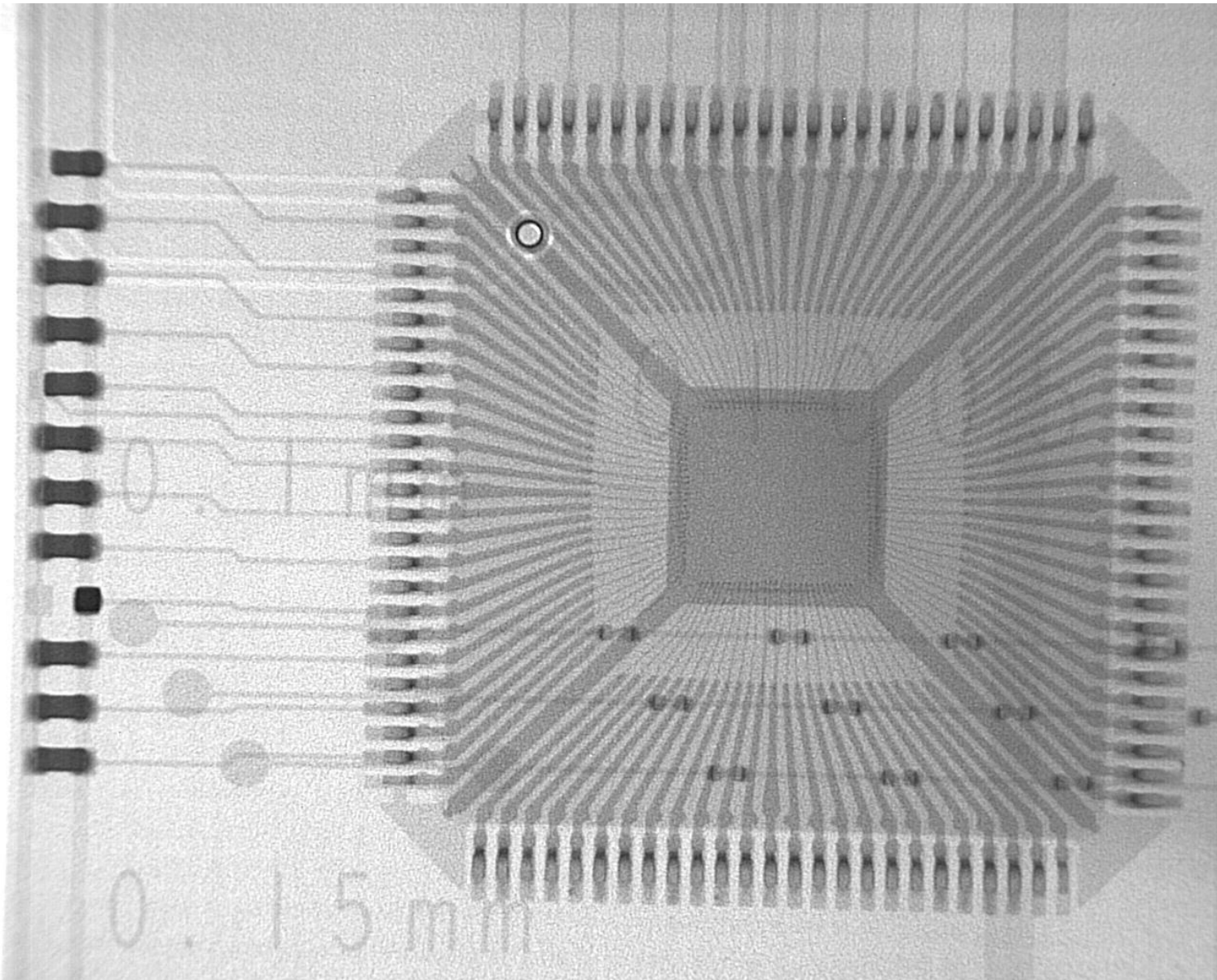


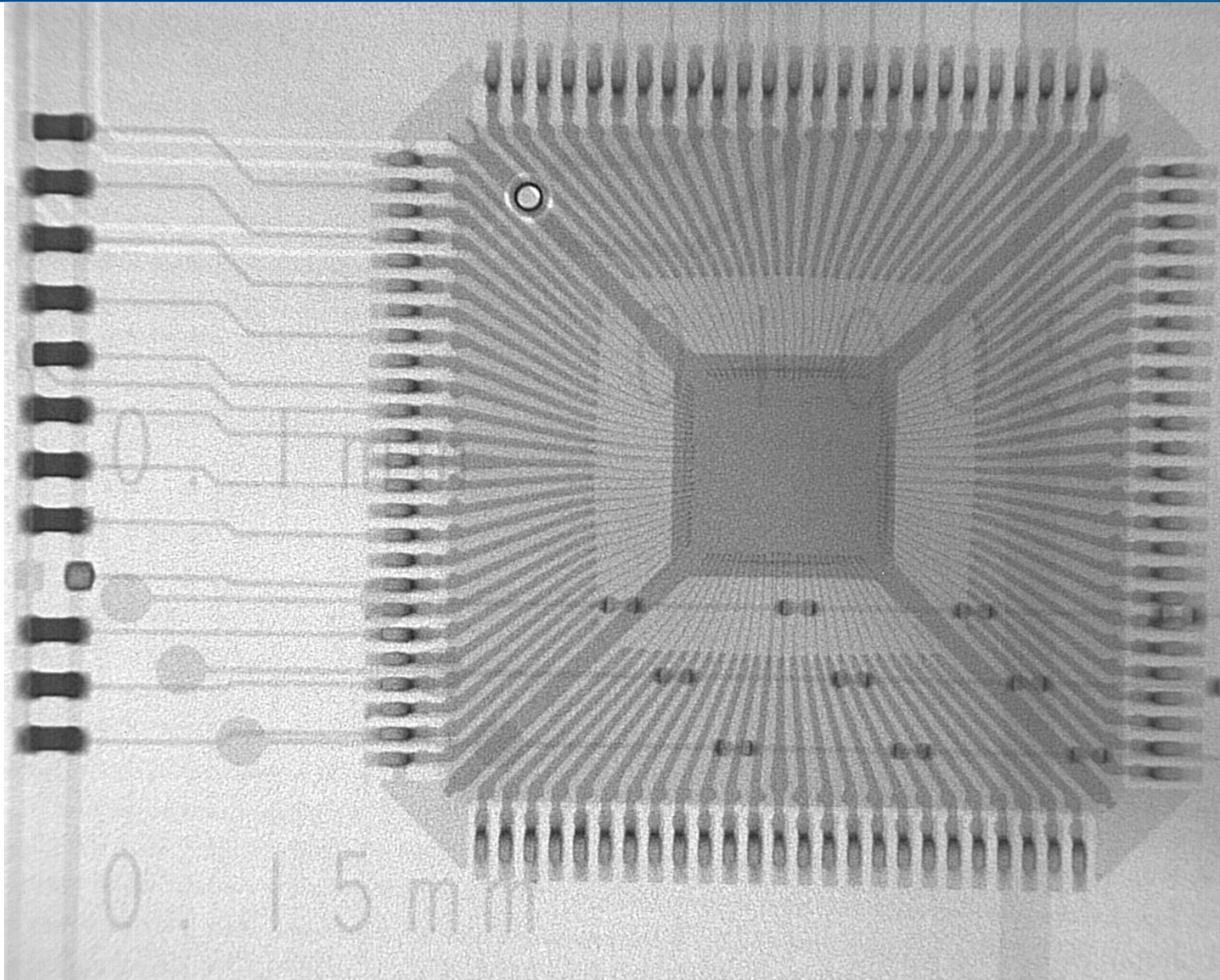


10.0mm



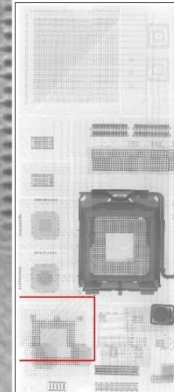
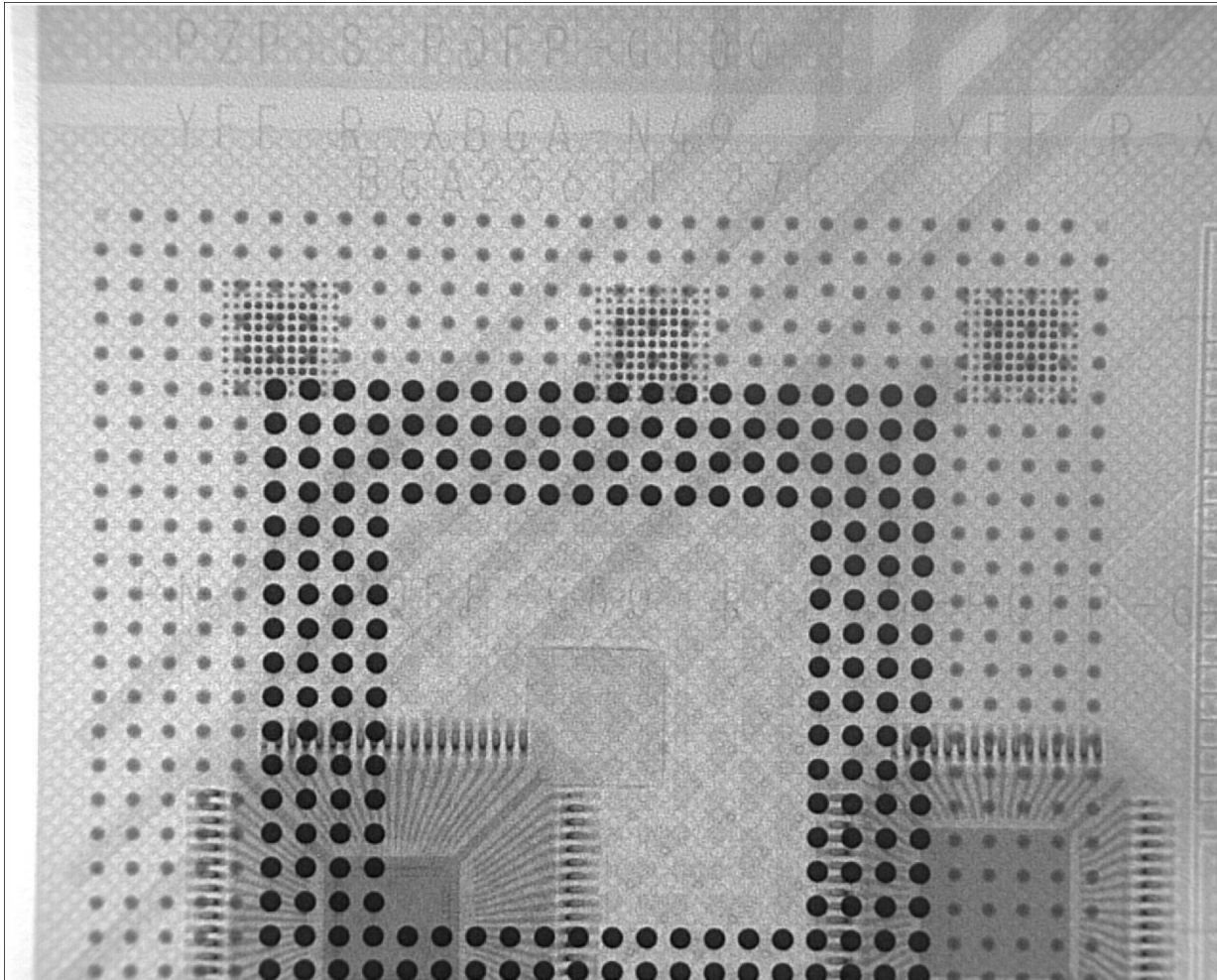
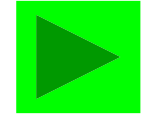
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



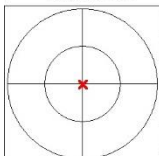


Baugruppe

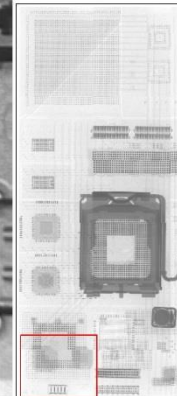
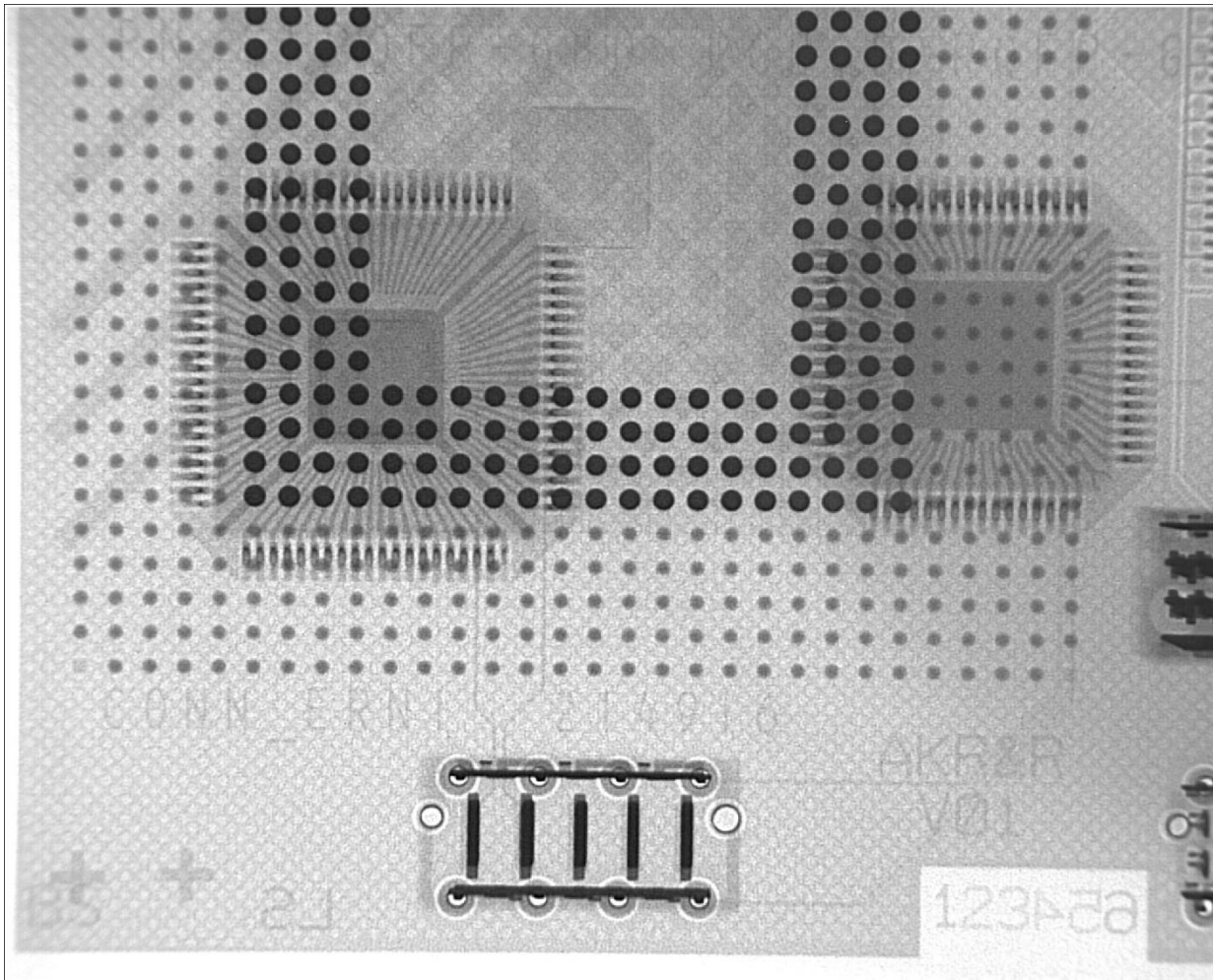
R+R 36 / Z



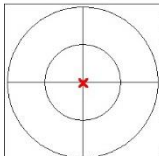
10.0mm



Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

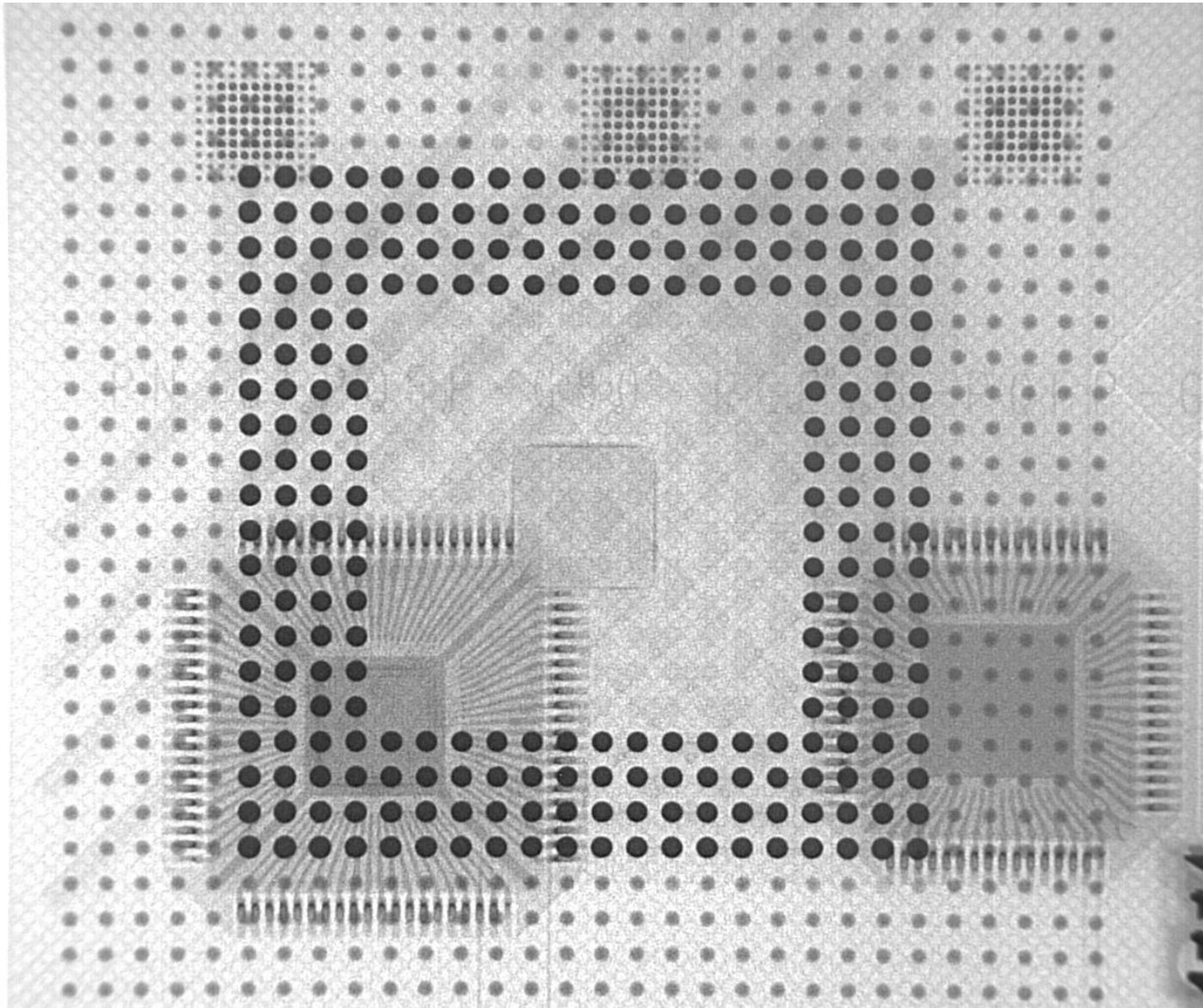
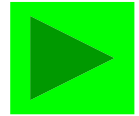


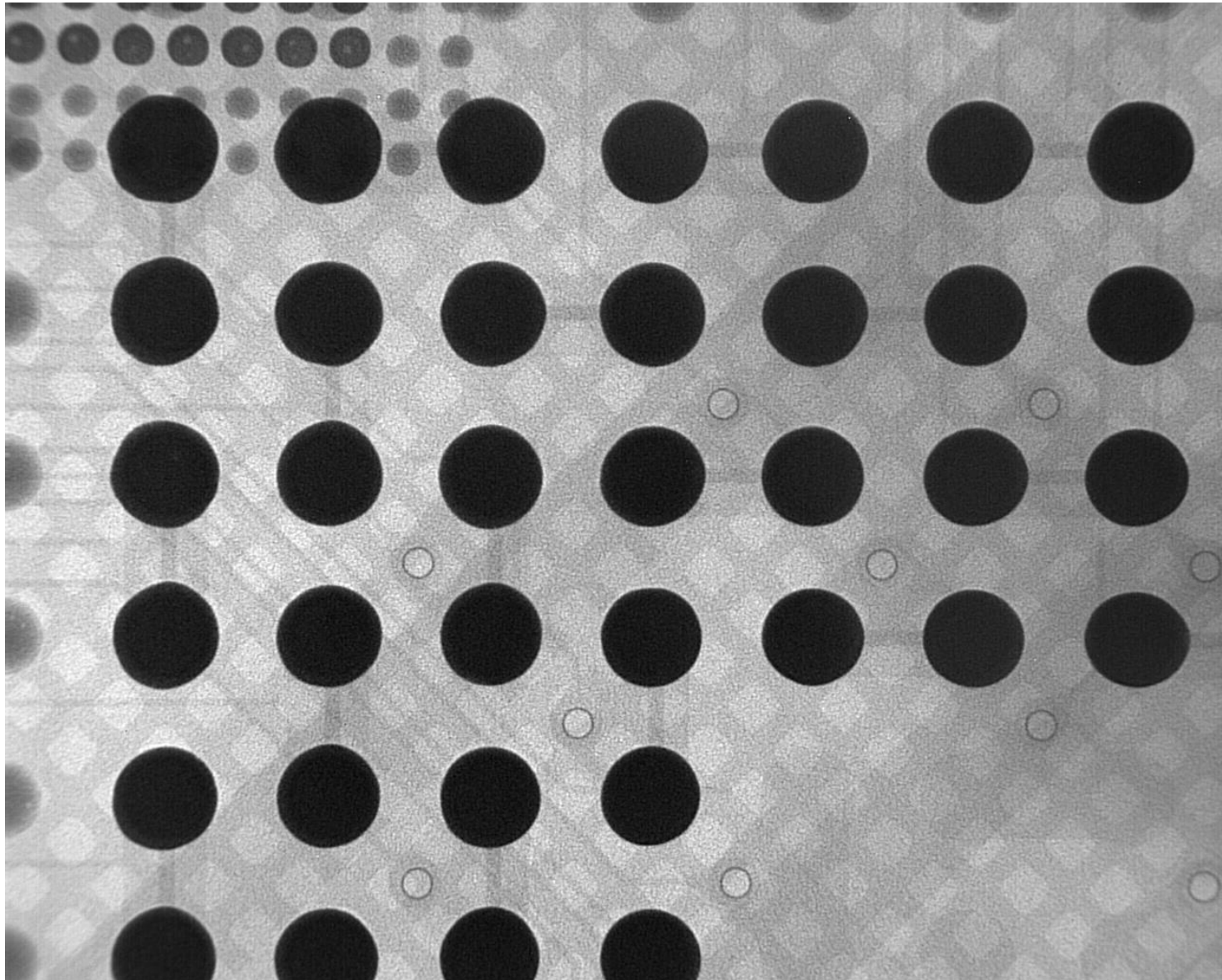
10.0mm

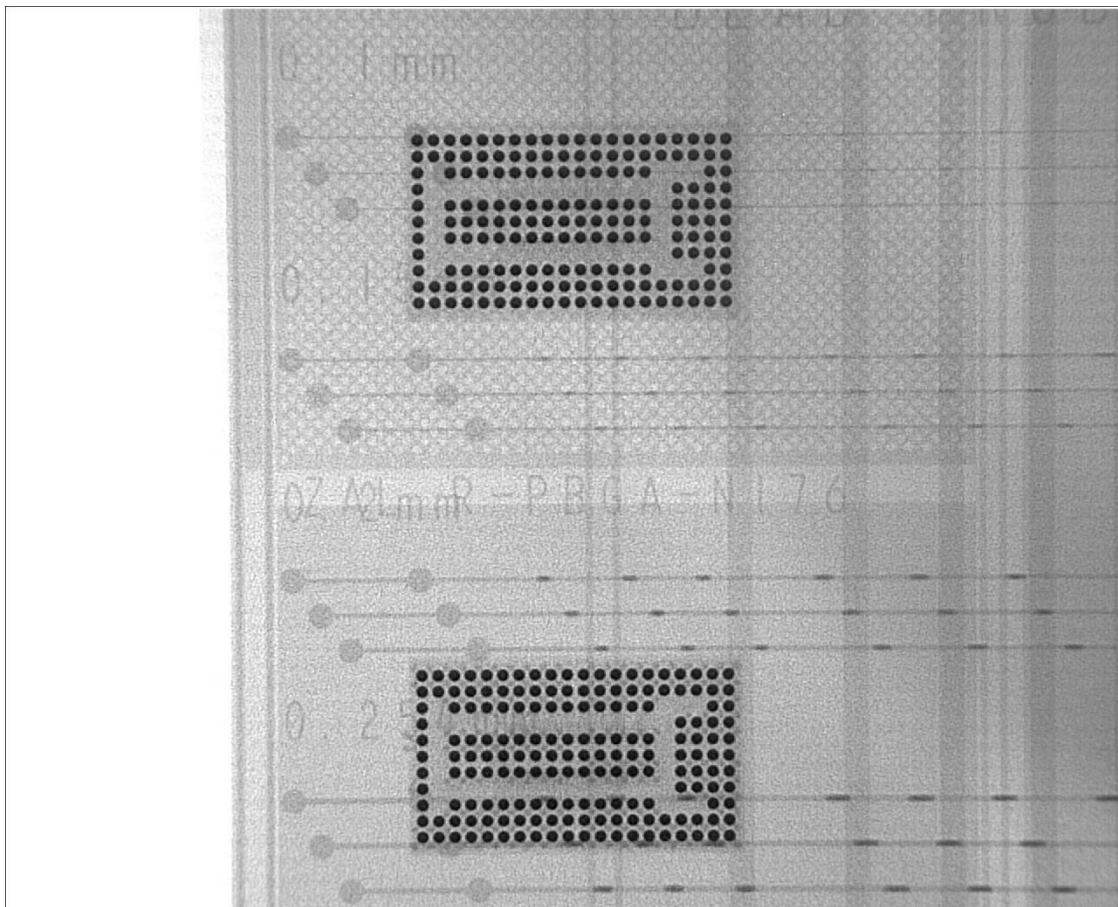


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

R+R 36 / Z – X-Ray nach Rework 1 – BGA 256



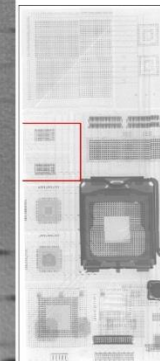




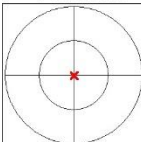
mit
Massefläche



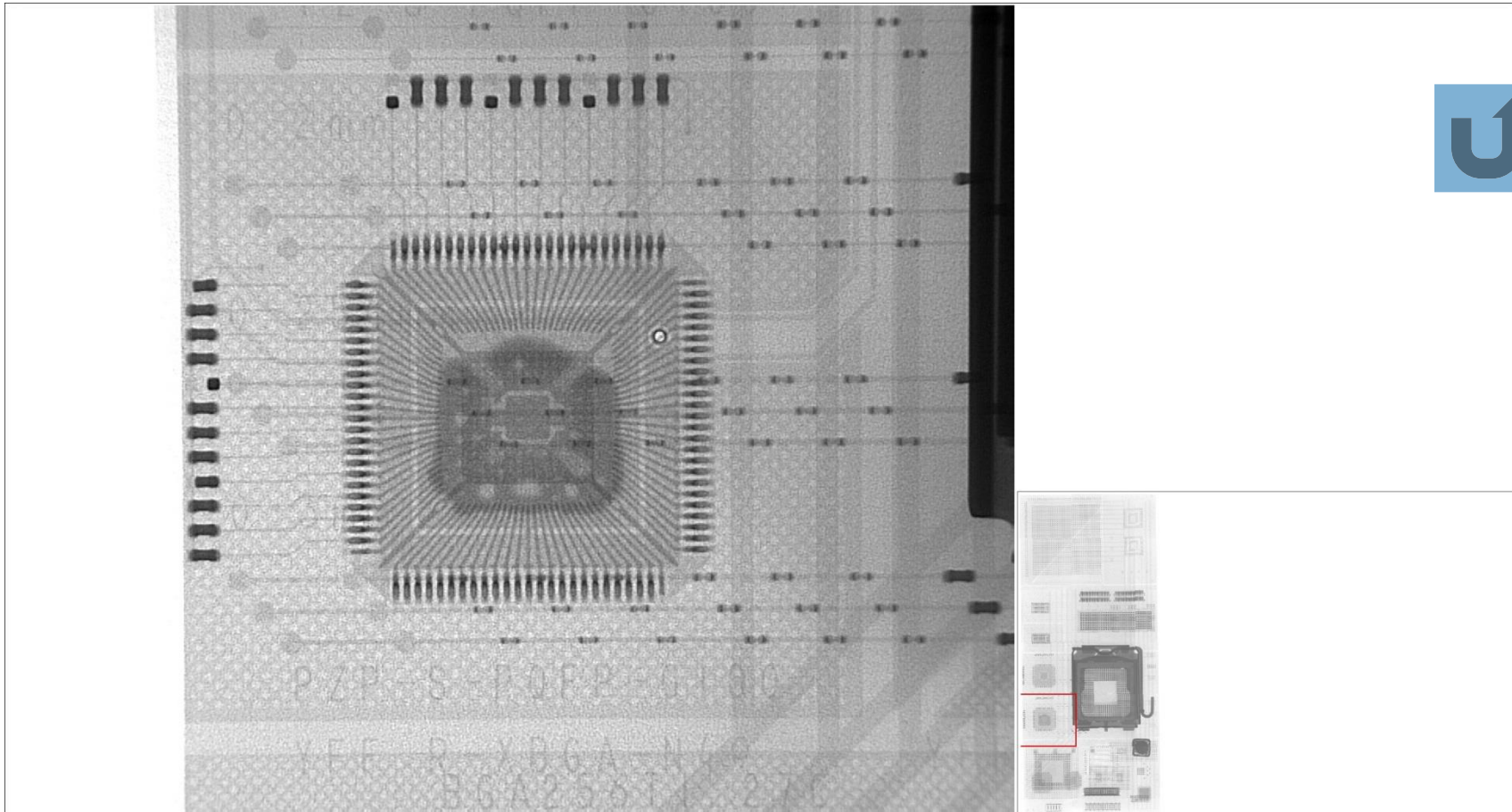
ohne
Massefläche



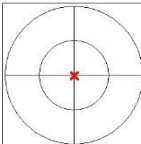
10.0mm



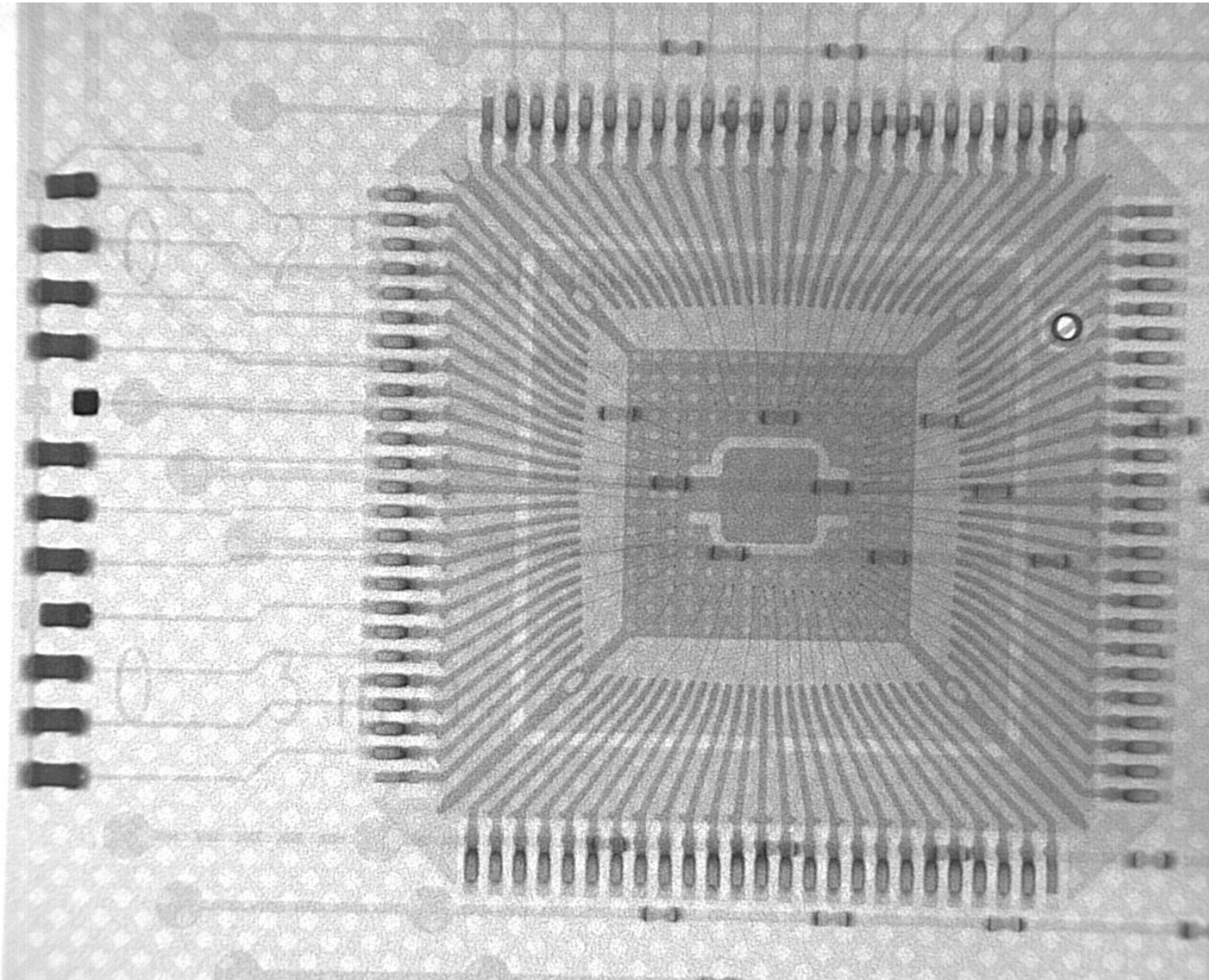
Röhren Spannung: 120 kV
Röhren Leistung: 2.19 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

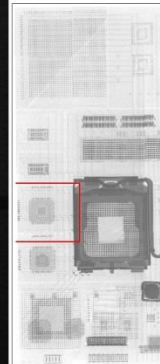
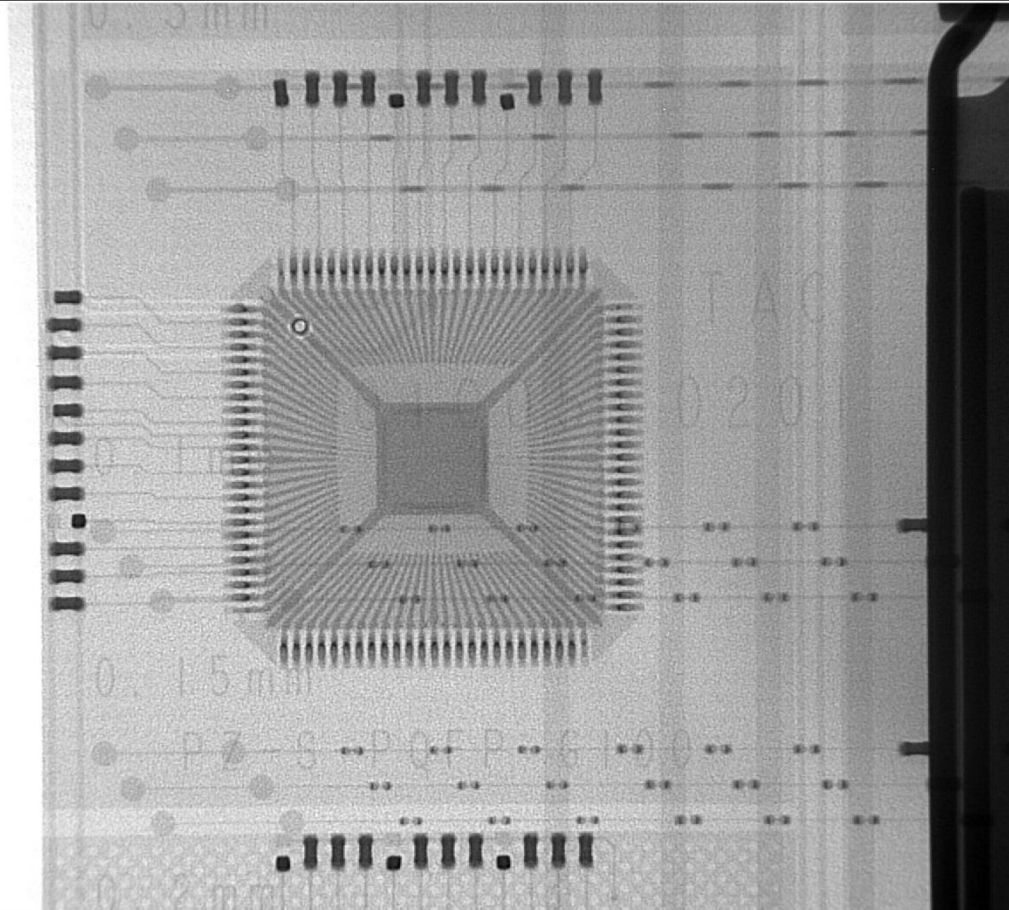


10.0mm

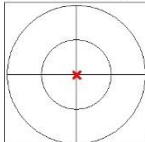


Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames

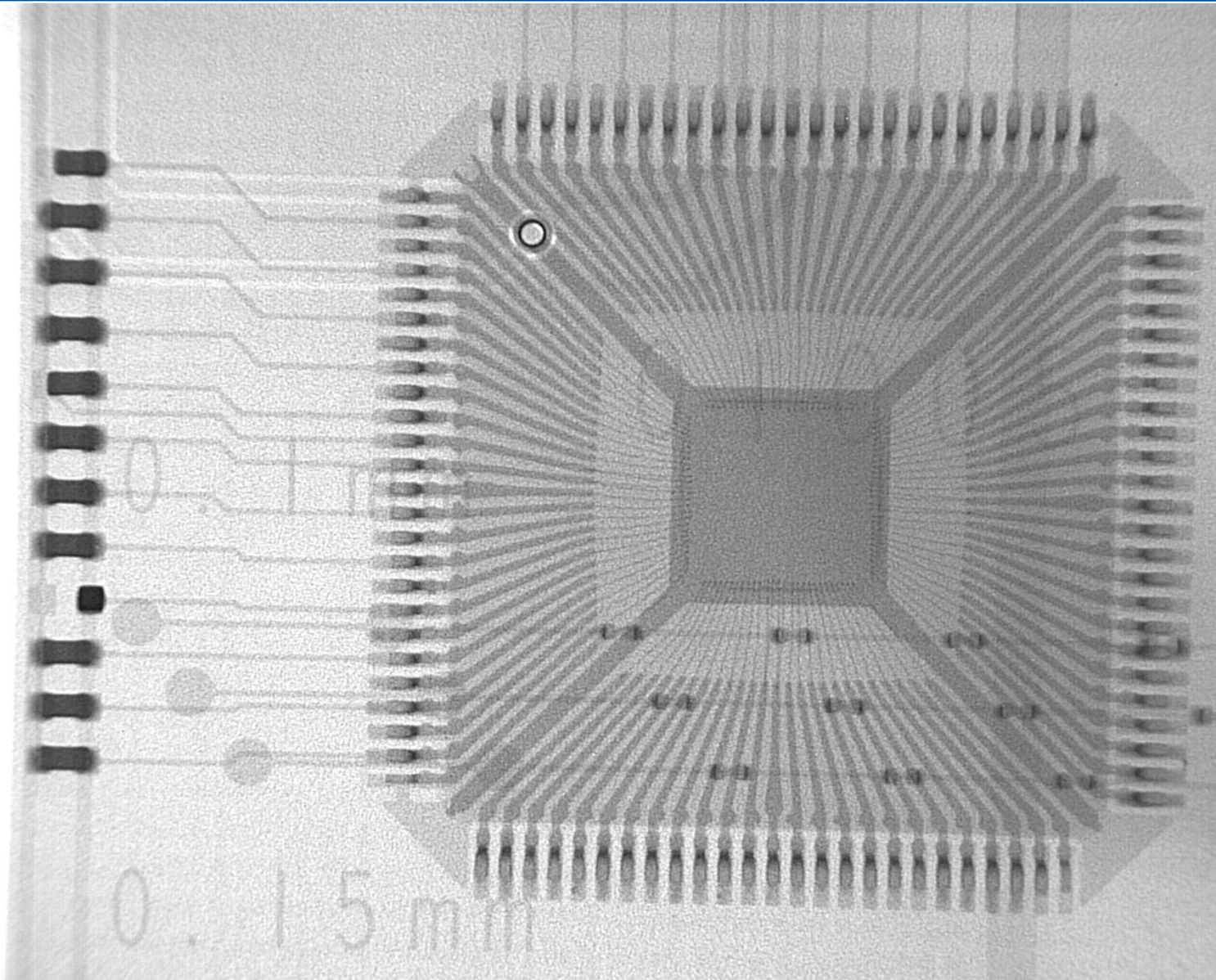




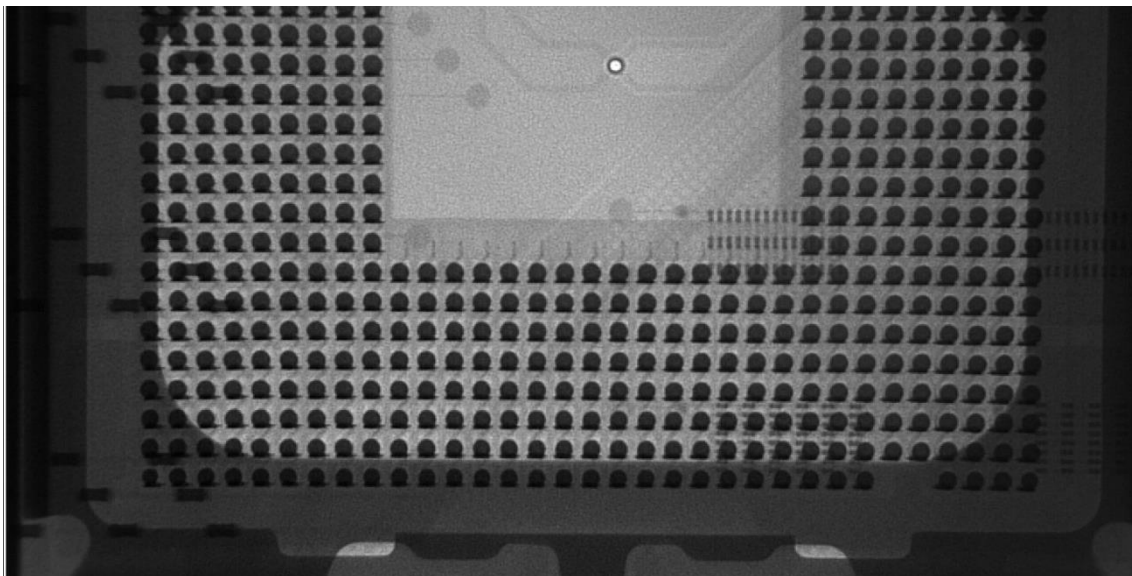
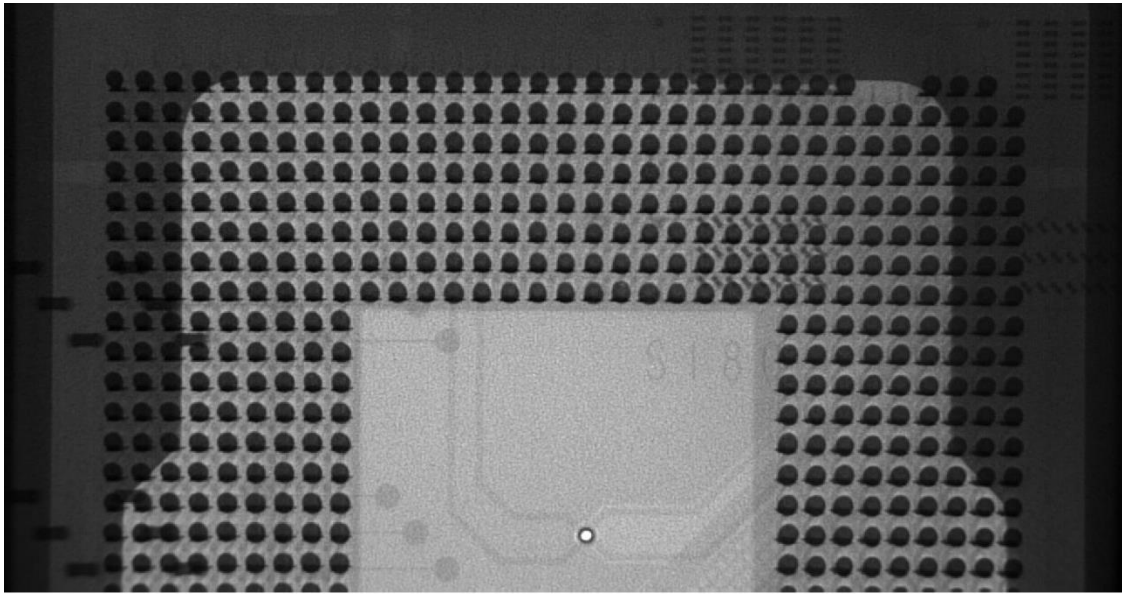
10.0mm



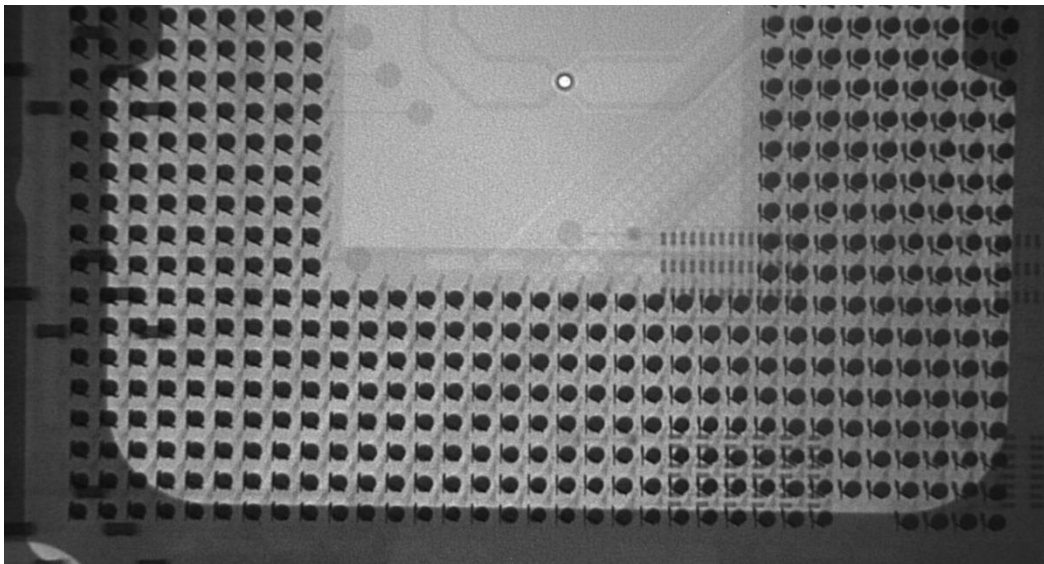
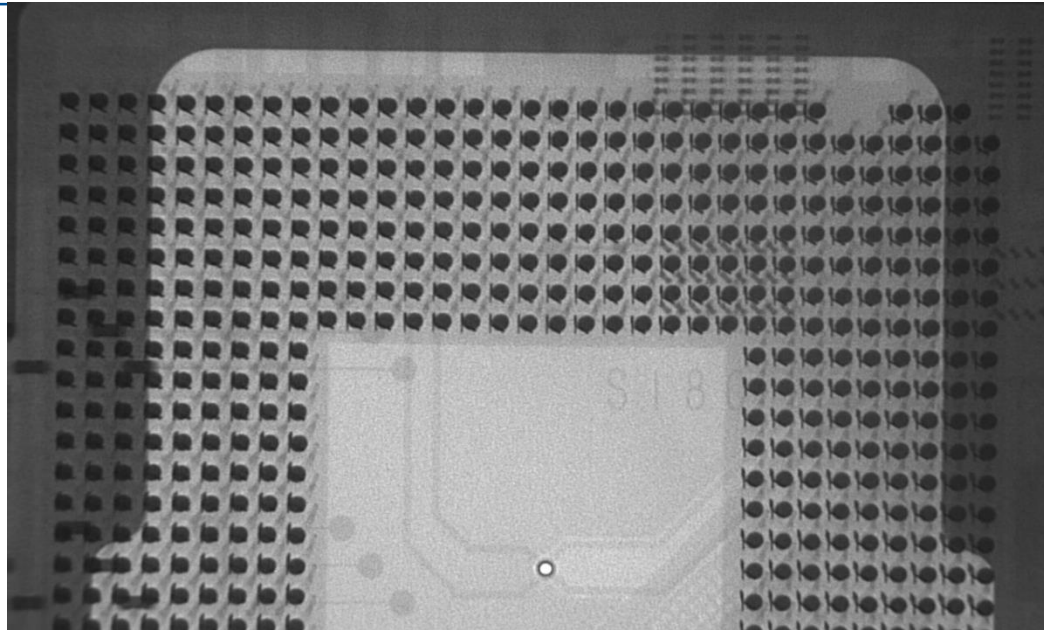
Röhren Spannung: 120 kV
Röhren Leistung: 2.20 W
Filter in Verwendung: Medium-High Mag
Filter Stärke: 100
Akkumulierung: 64 Frames



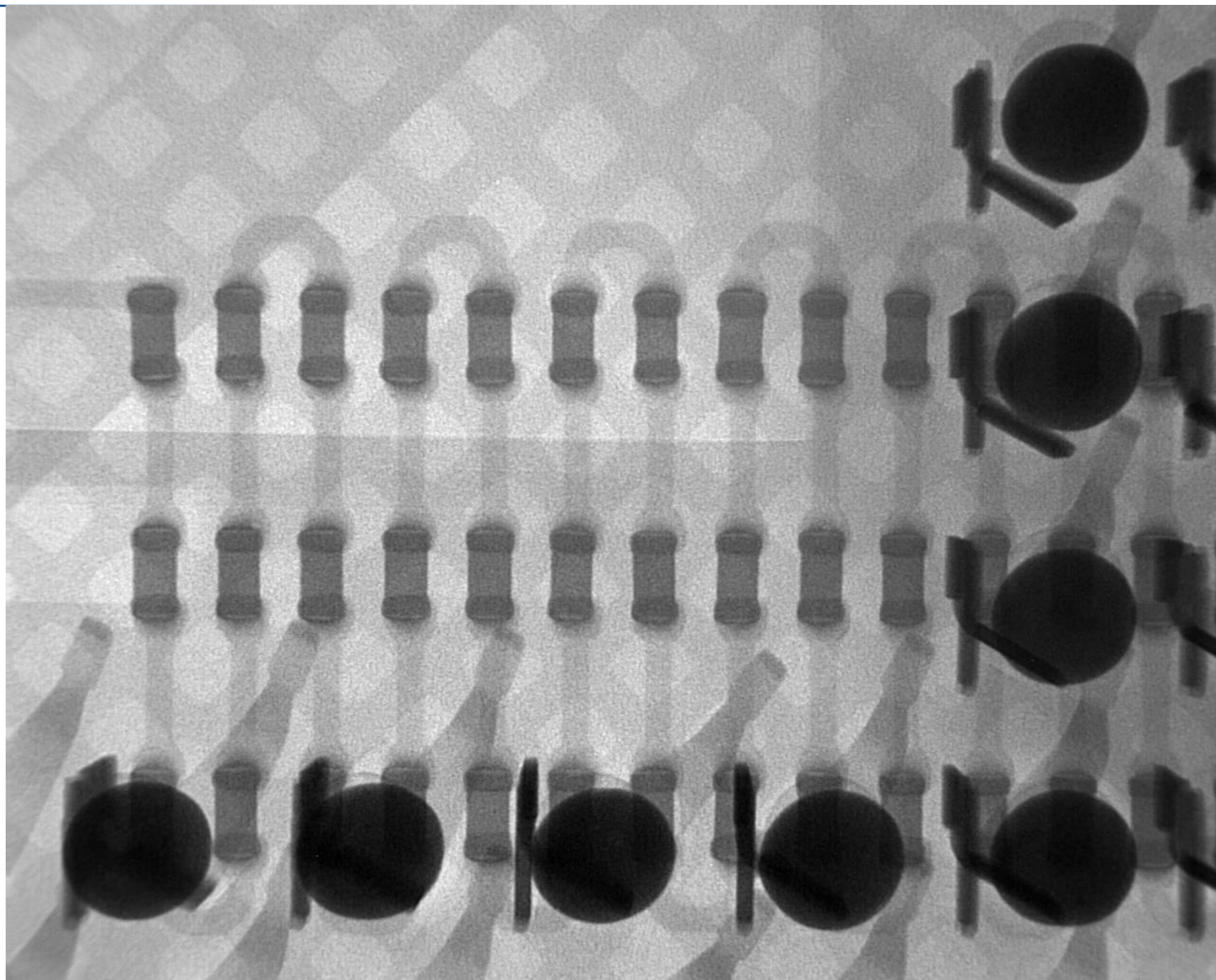
BGA Sockel

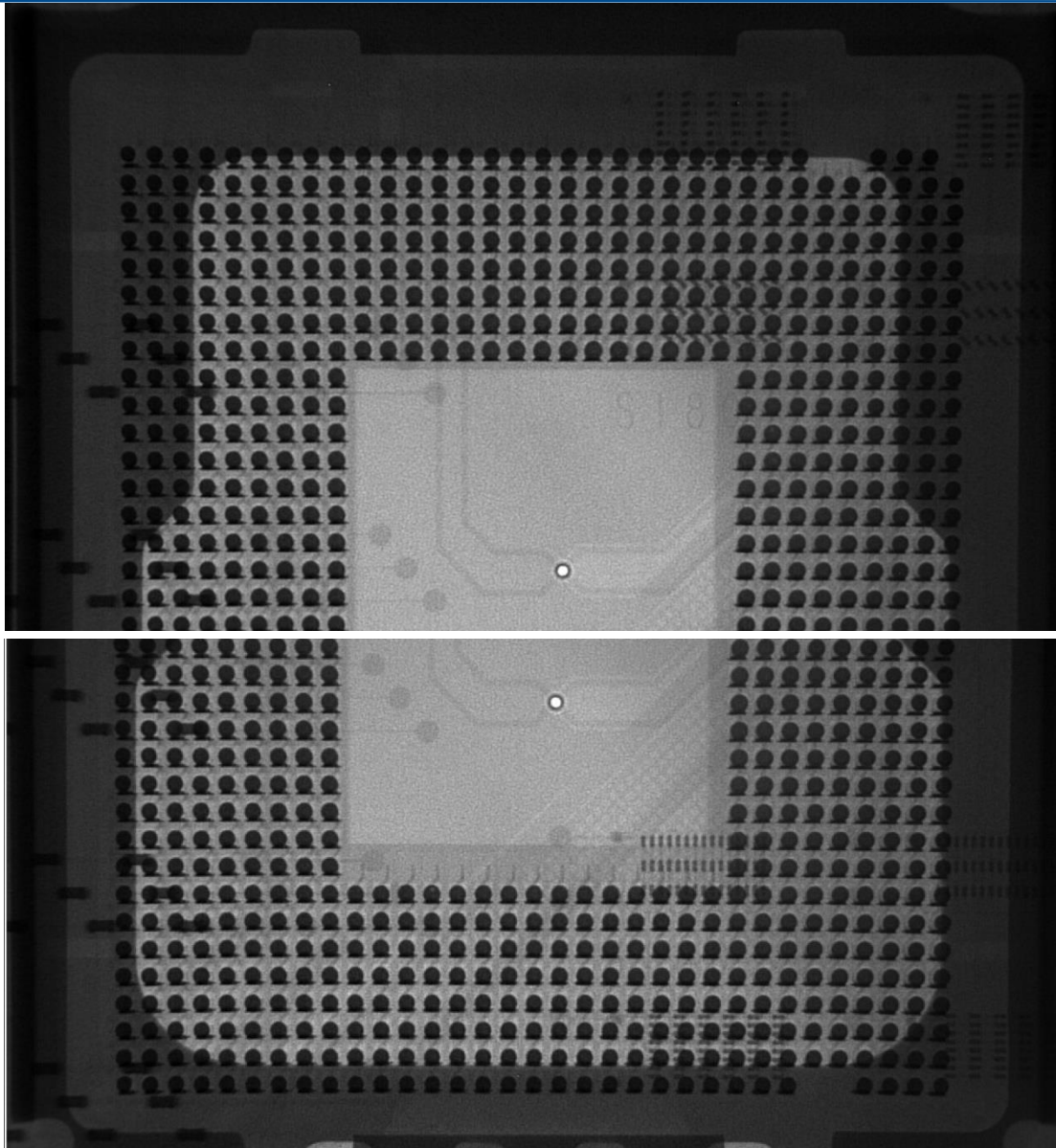


R+R 25 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel

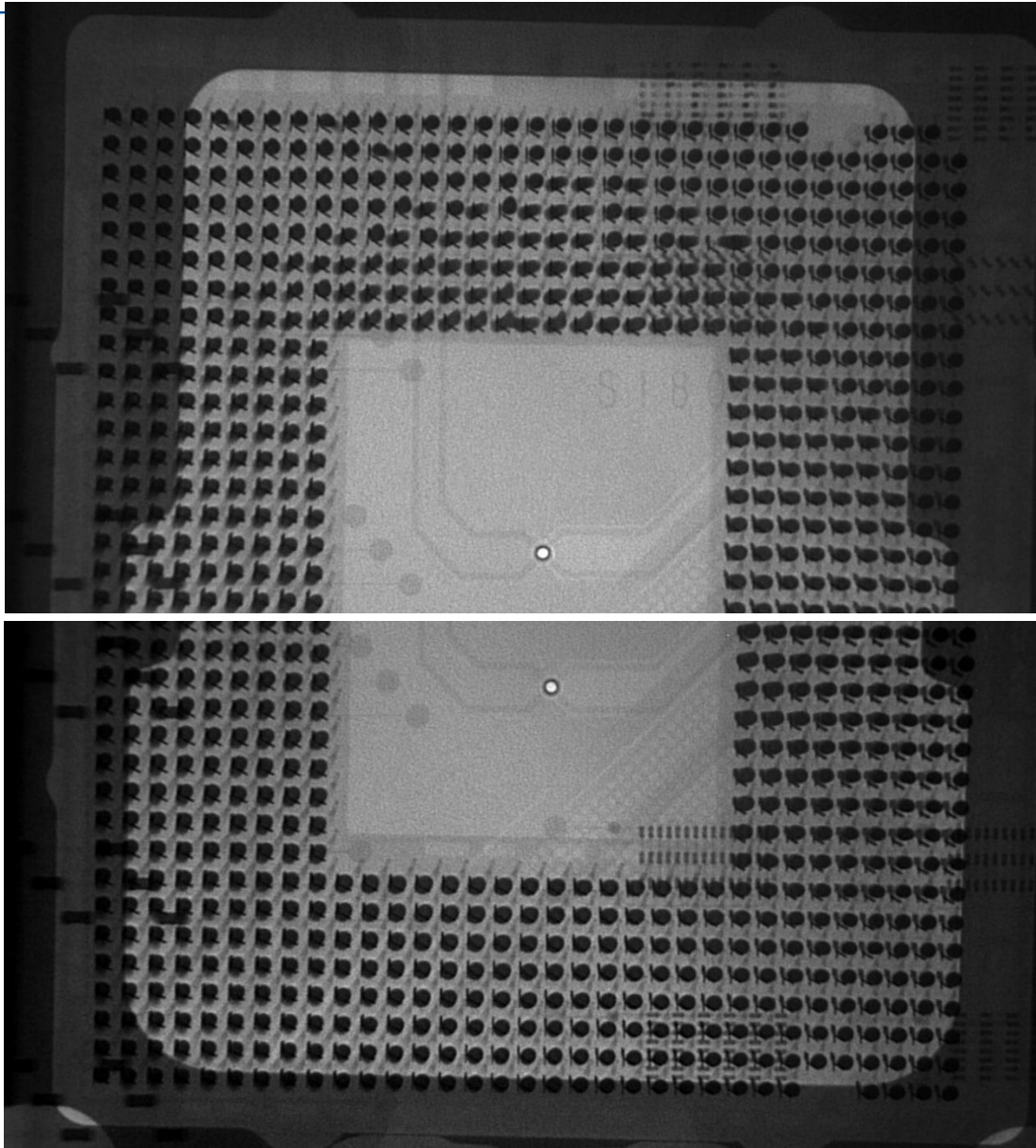


R+R 25 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel Detail

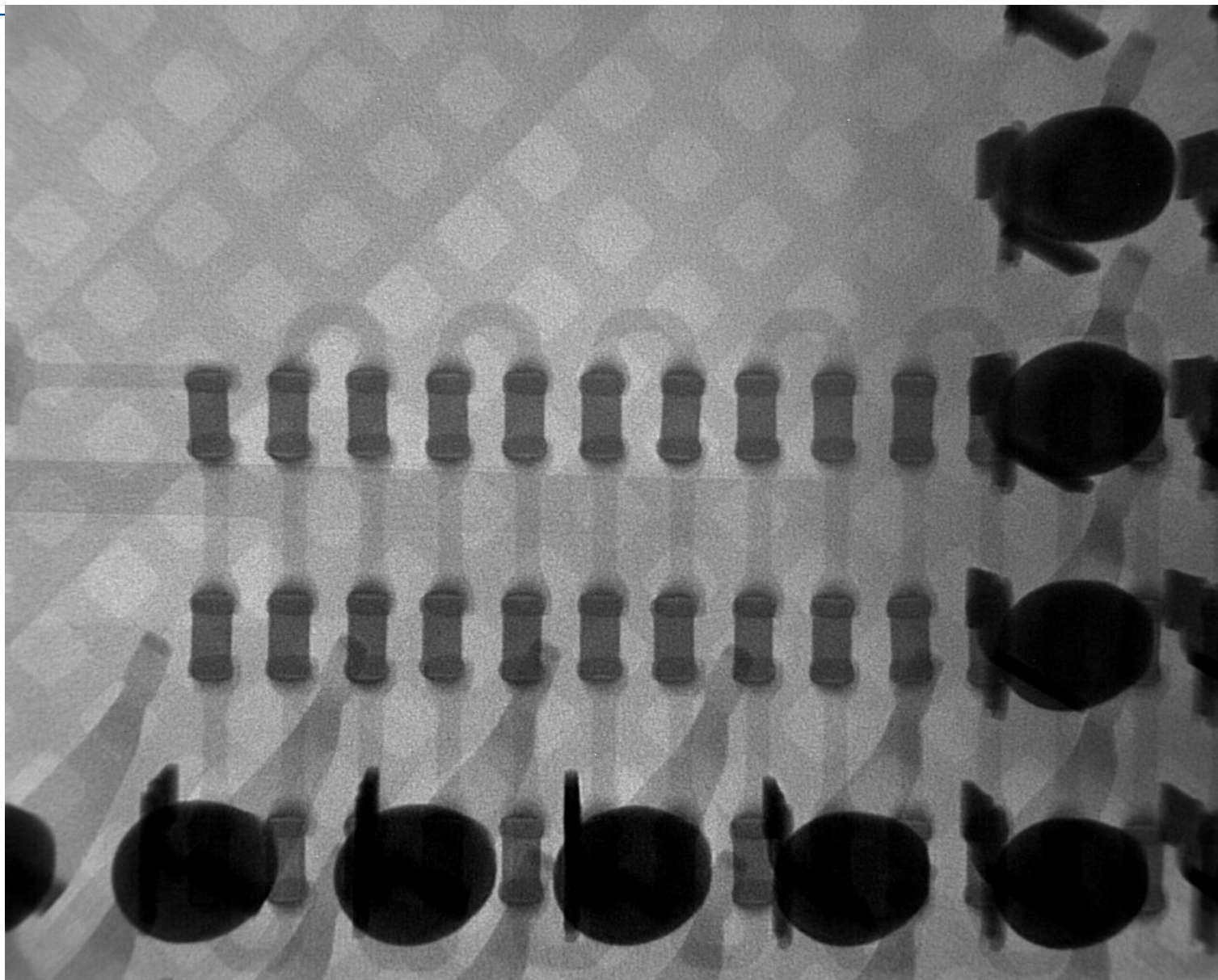




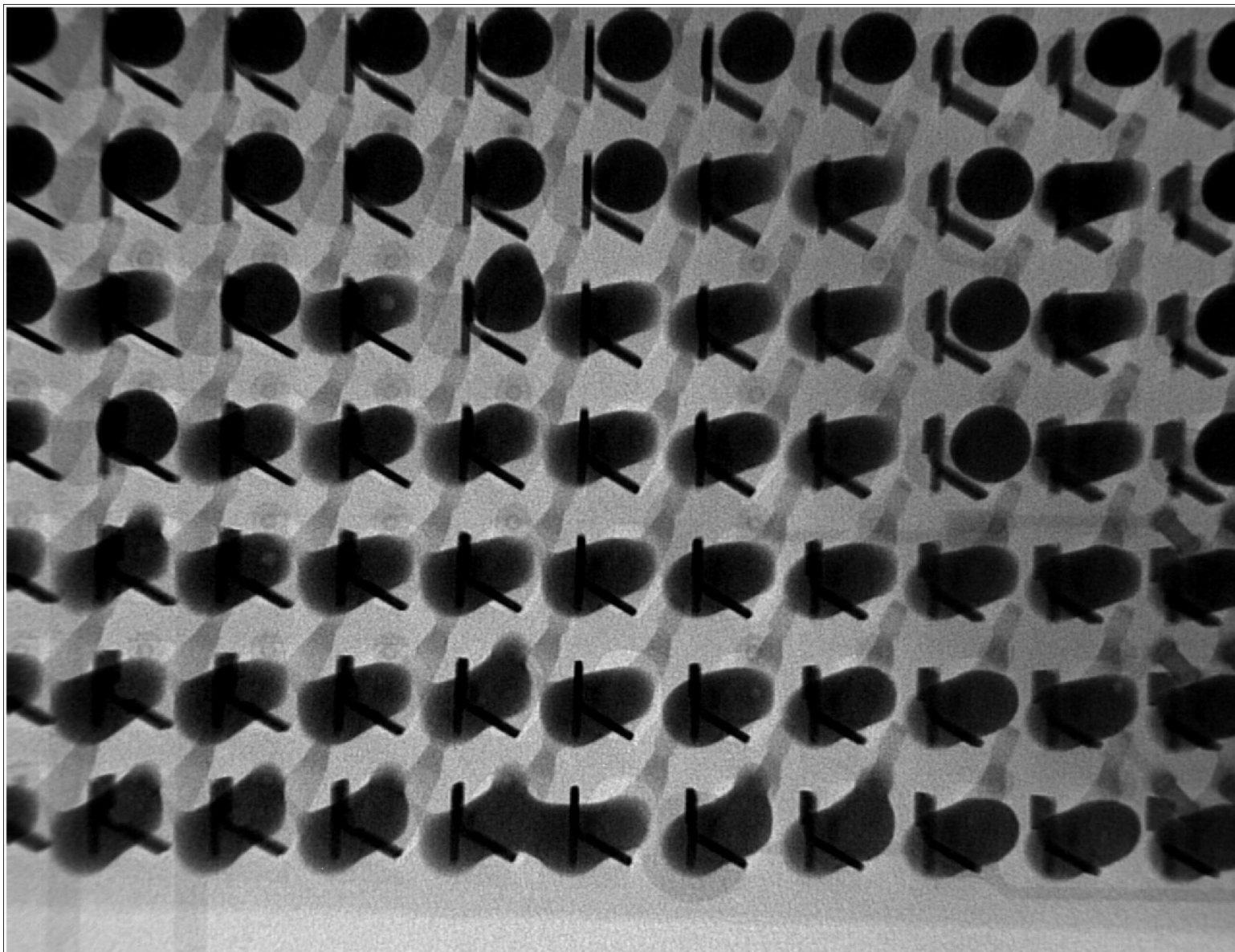
R+R 26 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel

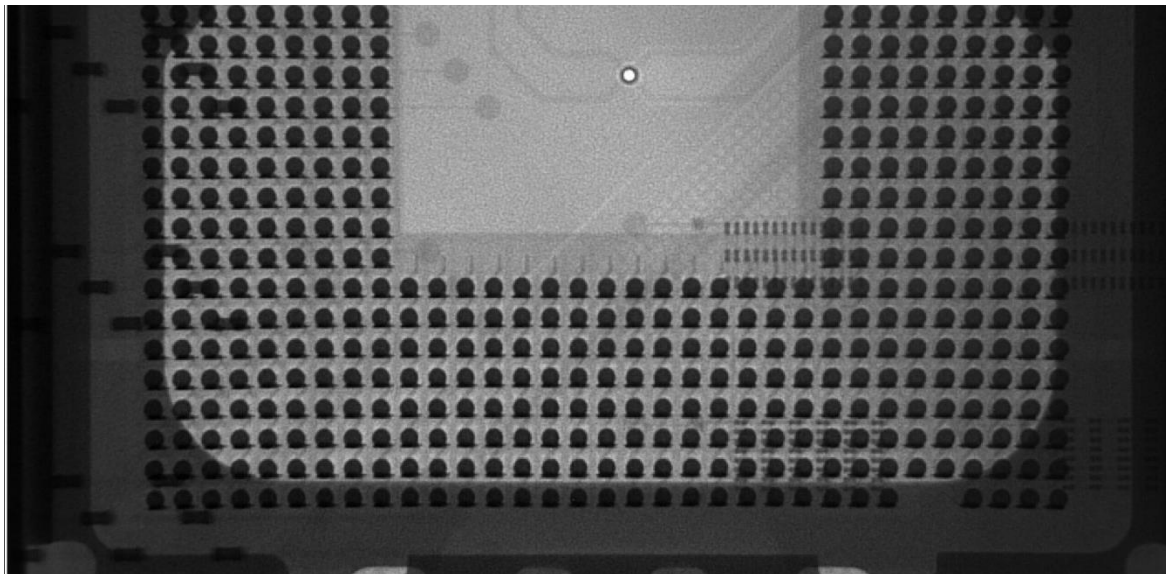
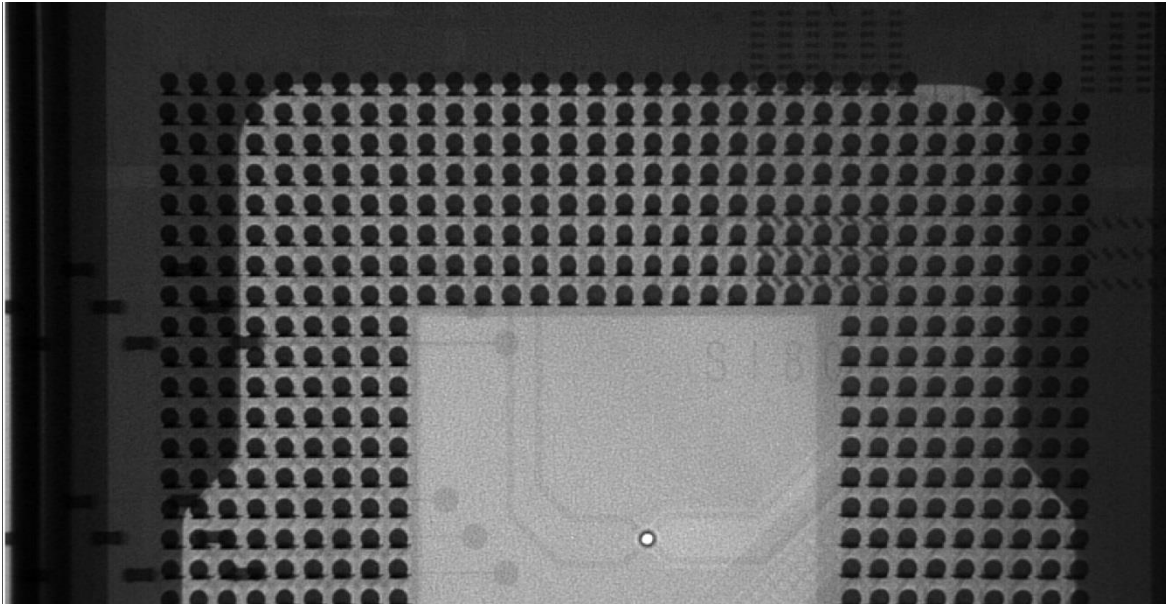


R+R 26 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel Detail

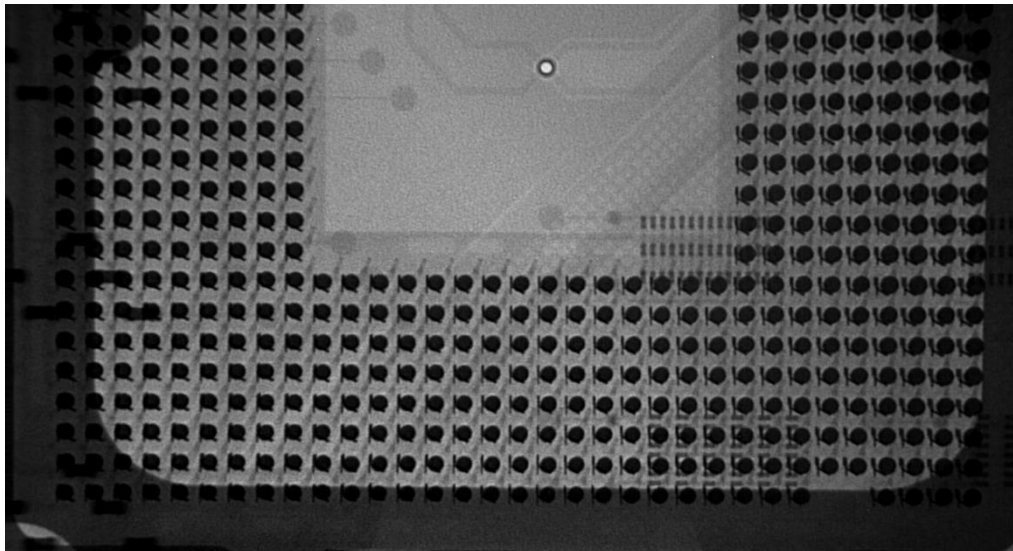
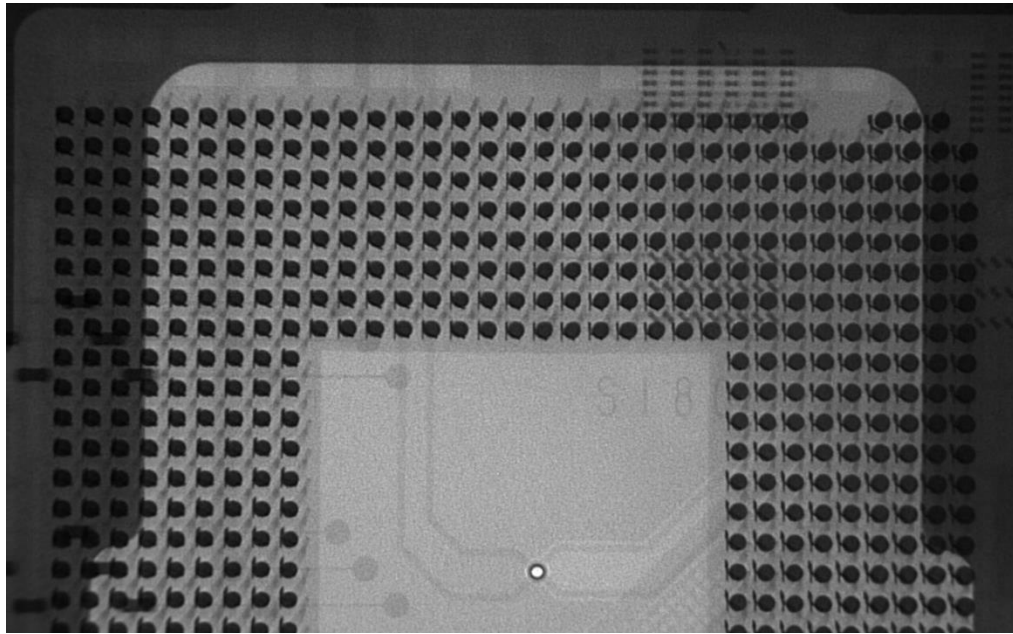


R+R 26 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel Detail

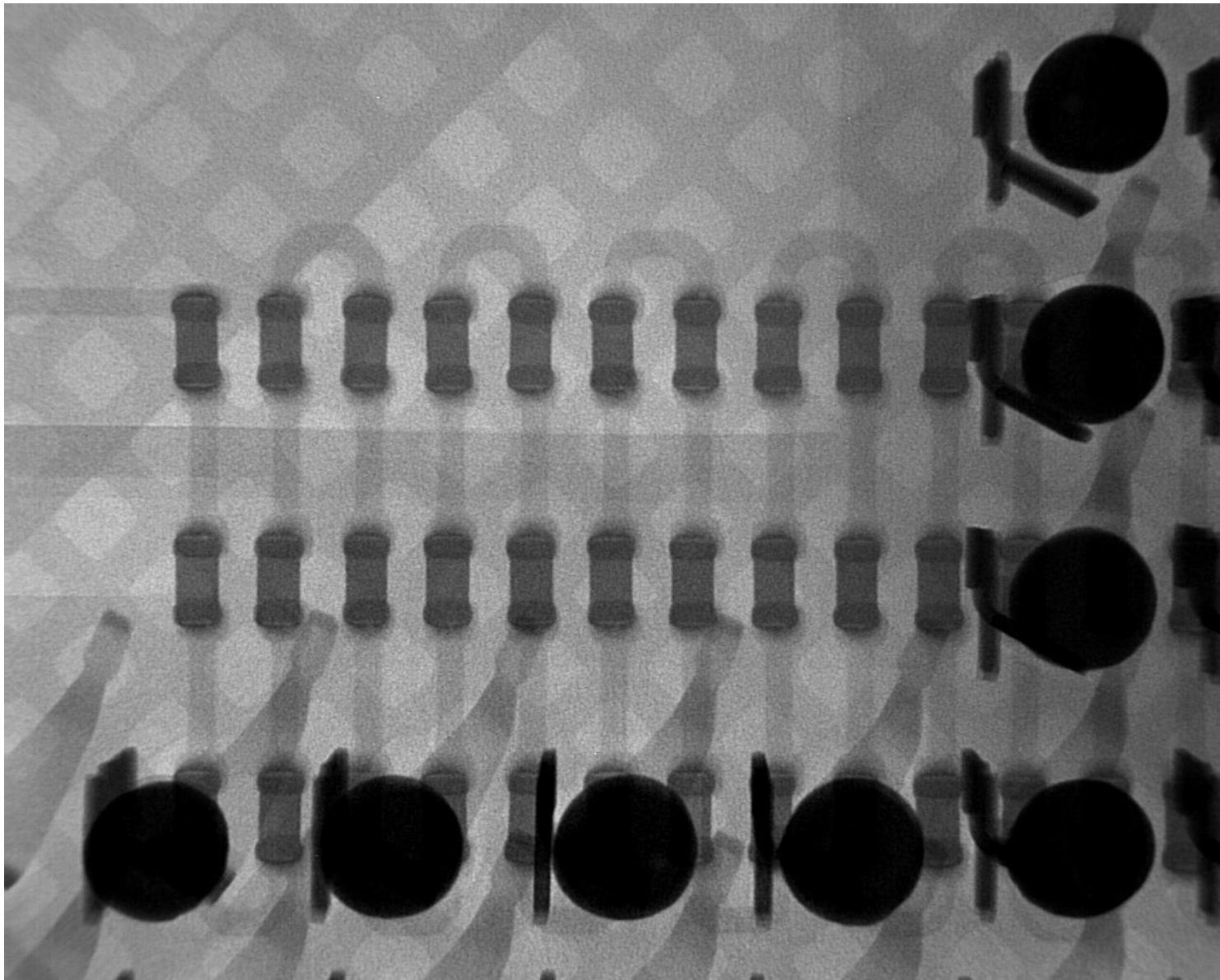




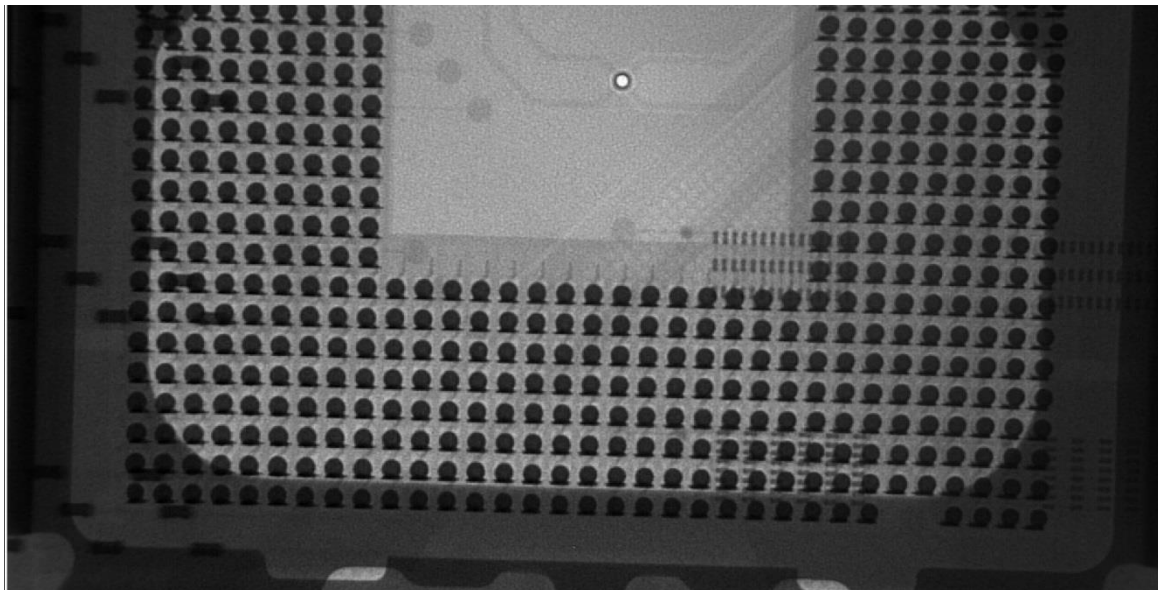
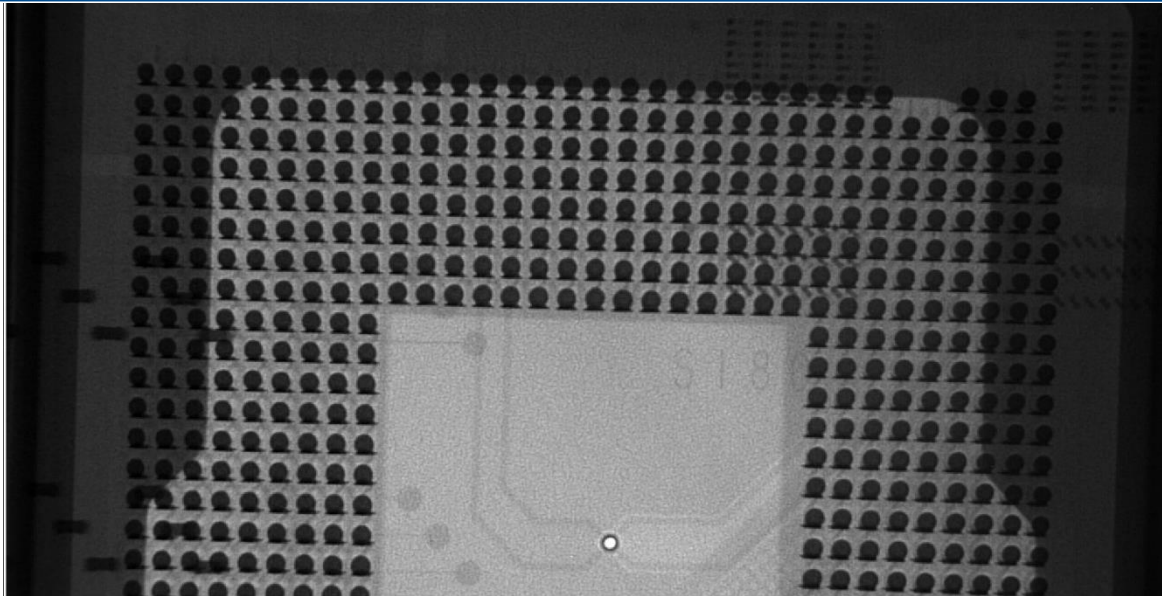
R+R 27 / Z – X-Ray nach Rework 1 mit Dip-Paste – Sockel



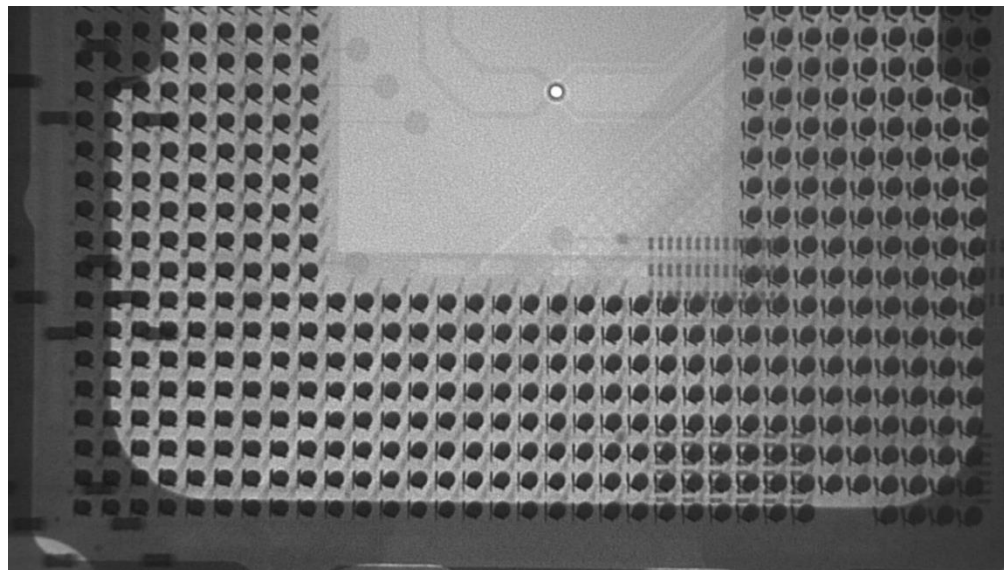
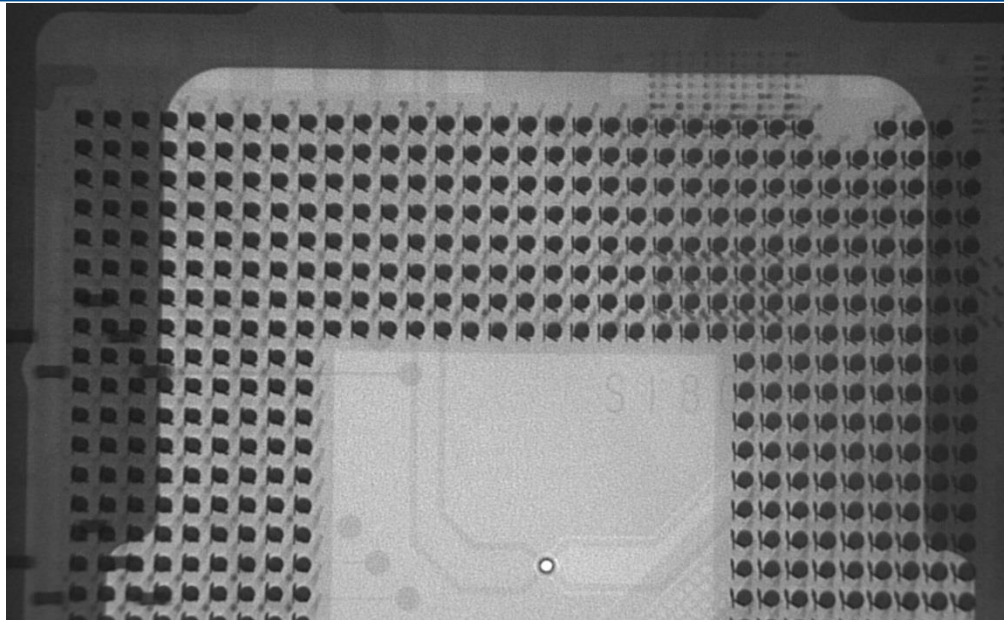
R+R 27 / Z – X-Ray nach Rework 1 mit Dip-Paste – Sockel Detail



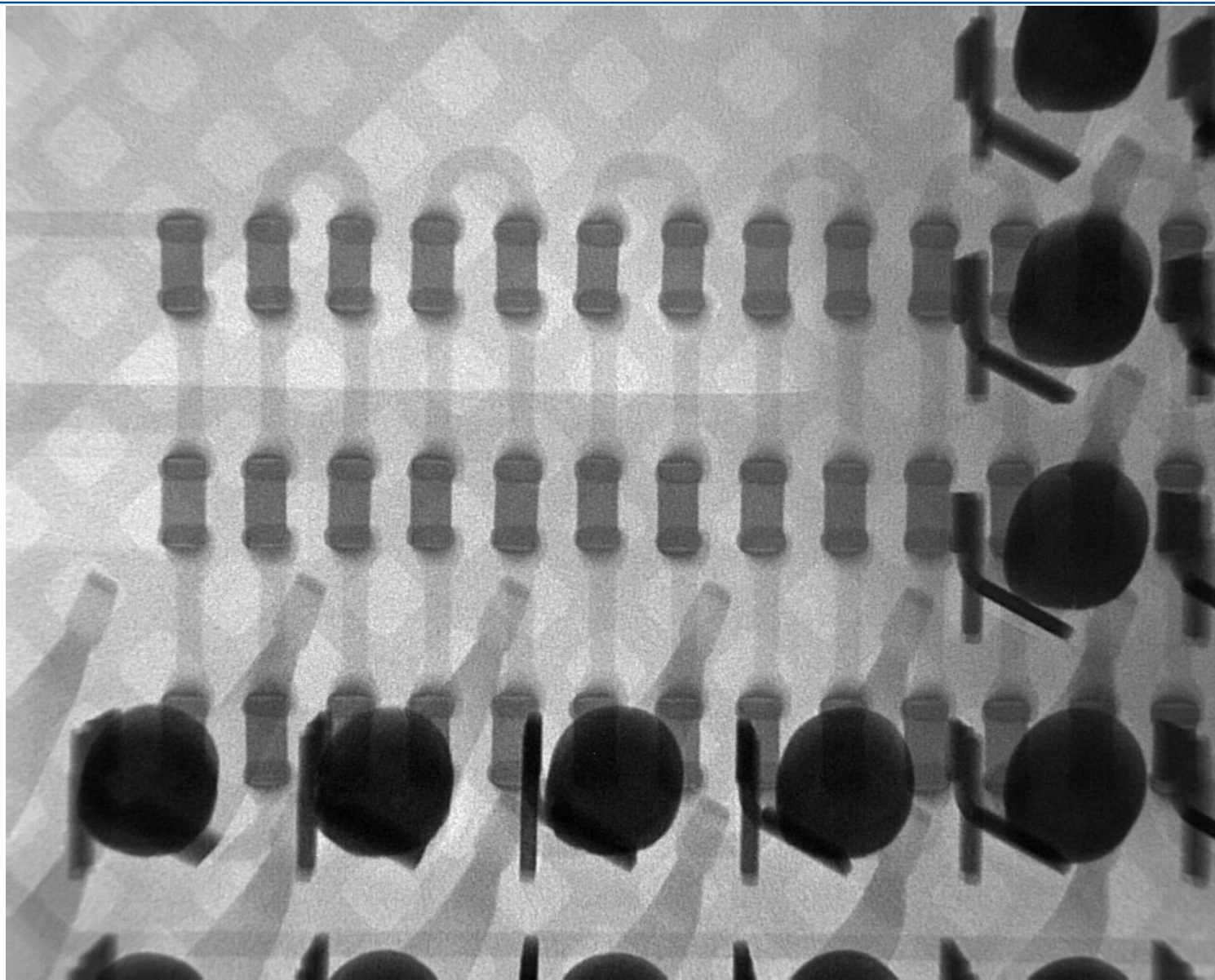
R+R 28 / Z – X-Ray vor Rework – Sockel



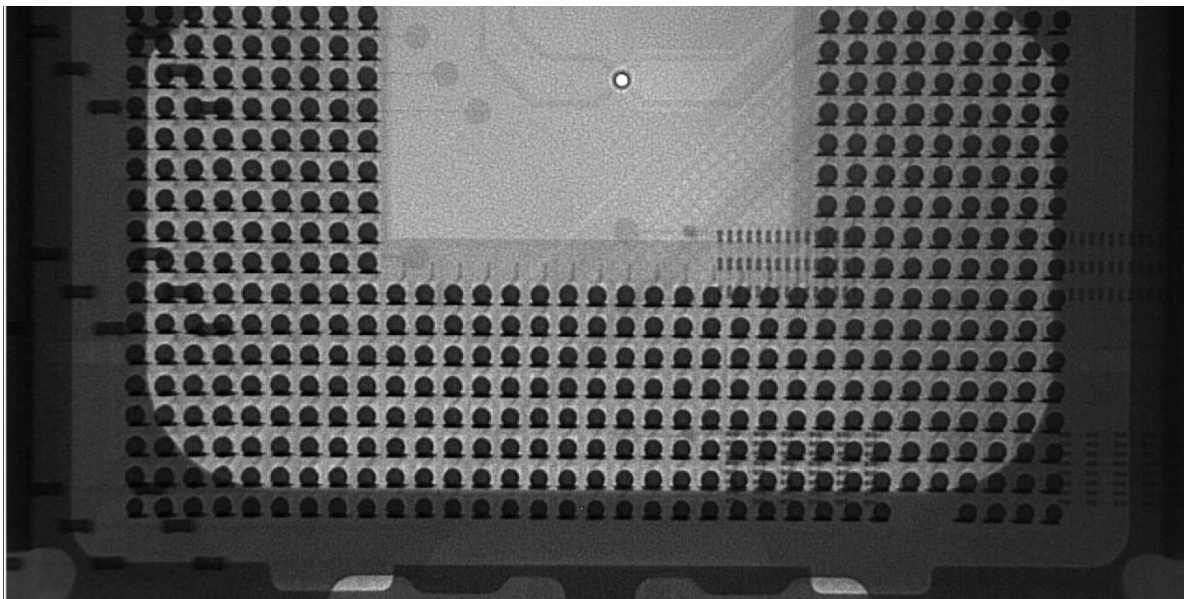
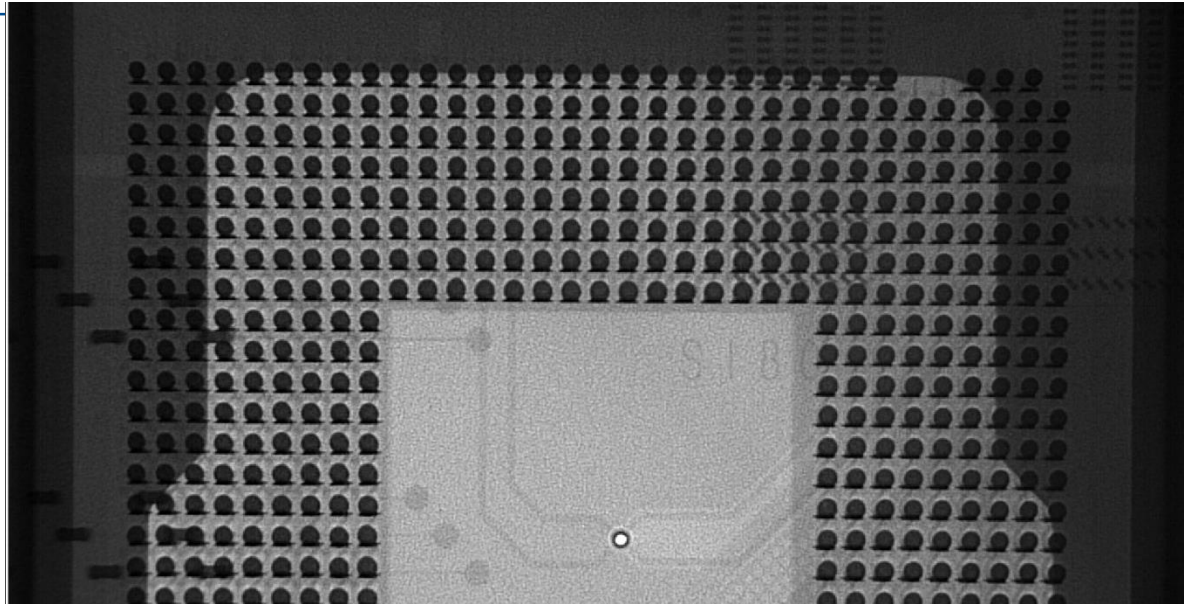
R+R 28 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel



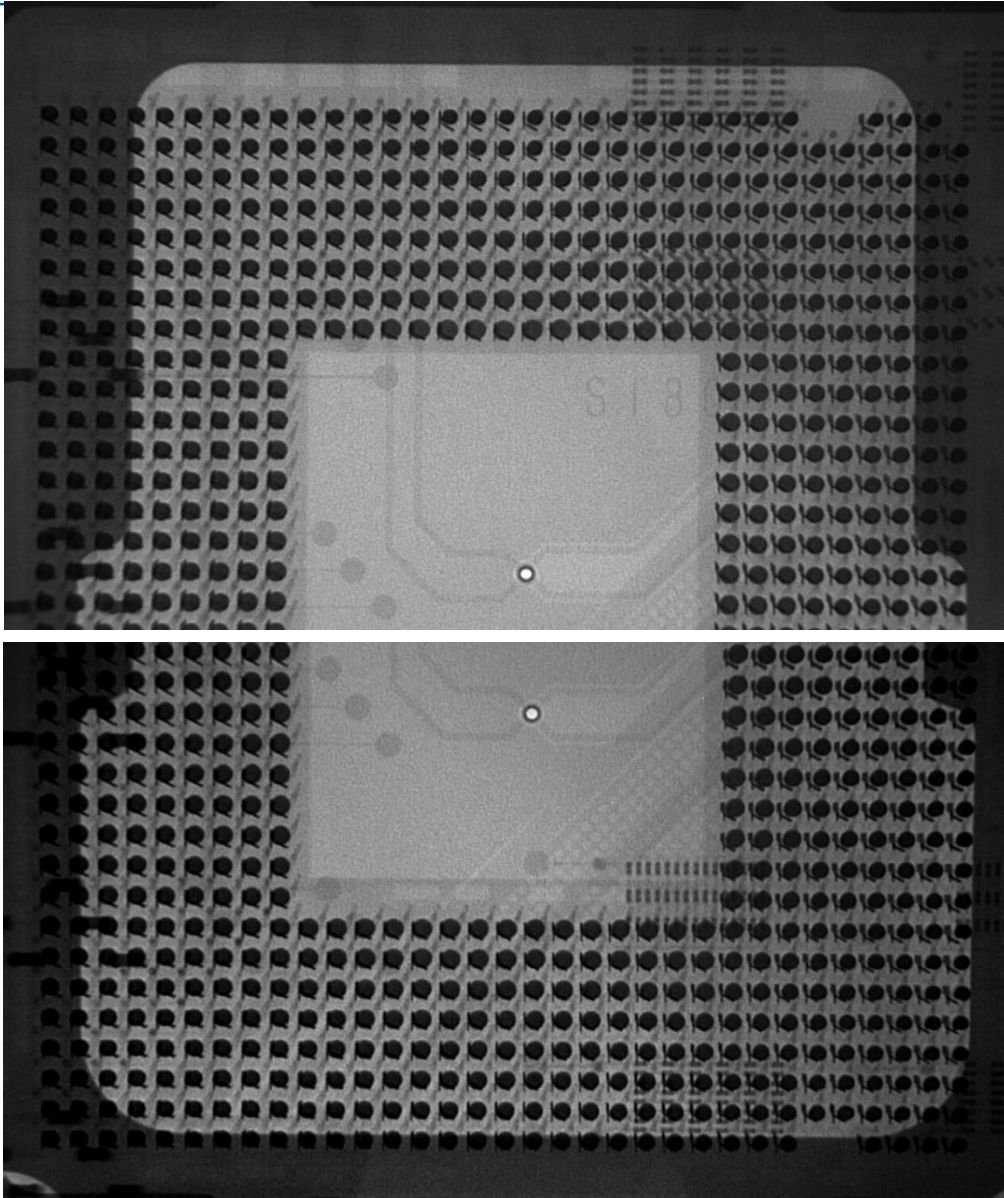
R+R 28 / Z – X-Ray nach Rework 1 mit Flussmittel – Sockel Detail



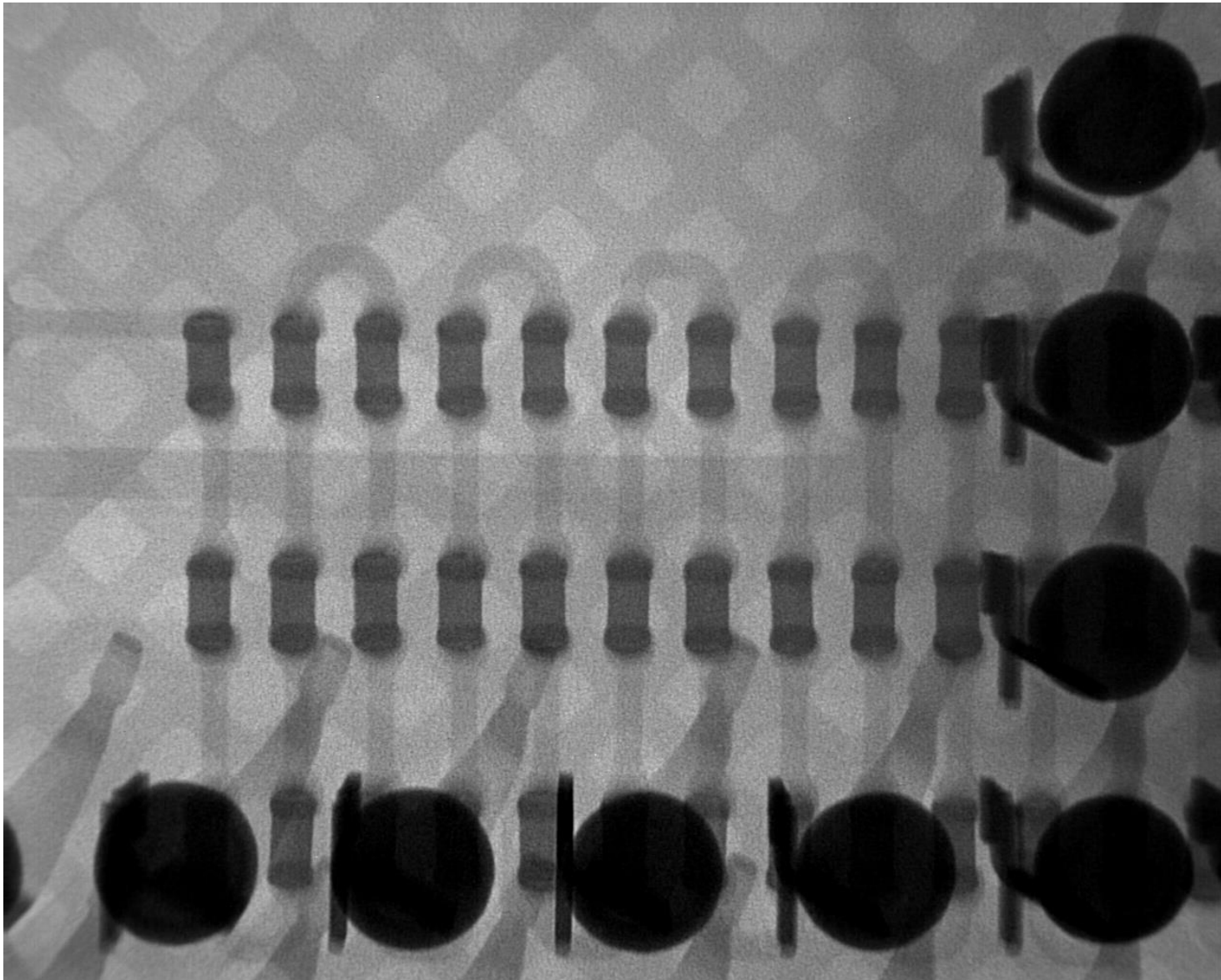
R+R 29 / Z – X-Ray vor Rework – Sockel

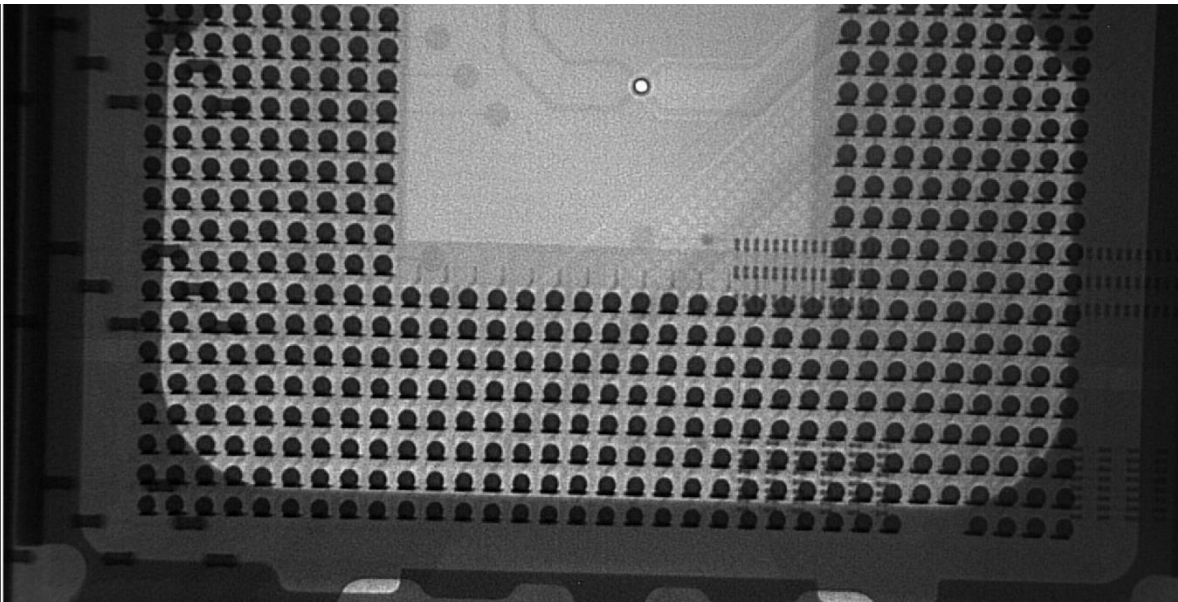
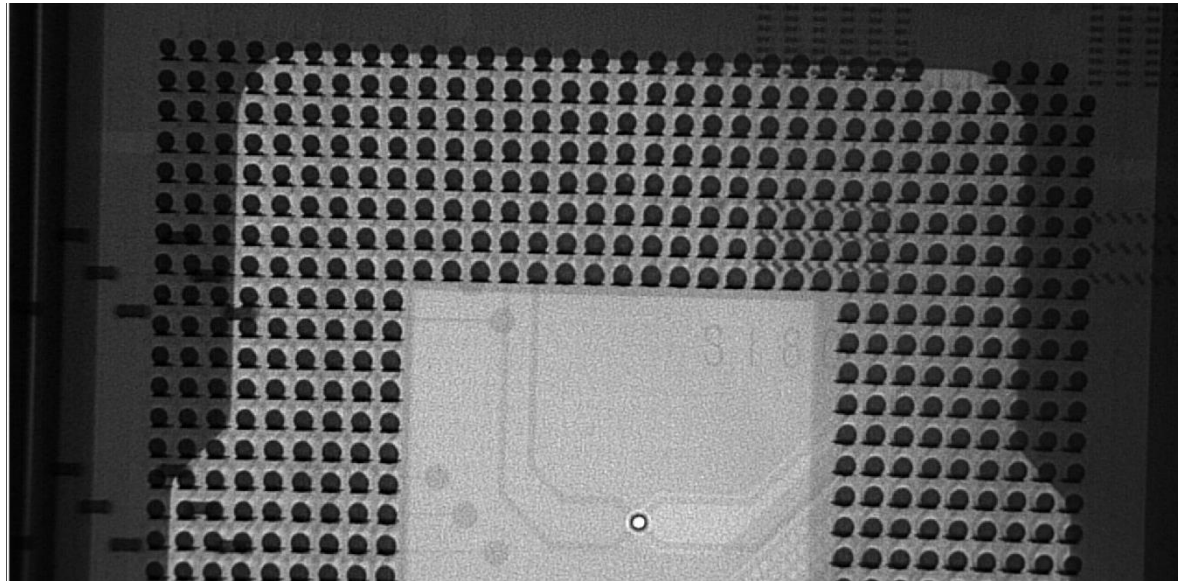


R+R 29 / Z – X-Ray nach Rework 1 mit Dip-Paste– Sockel

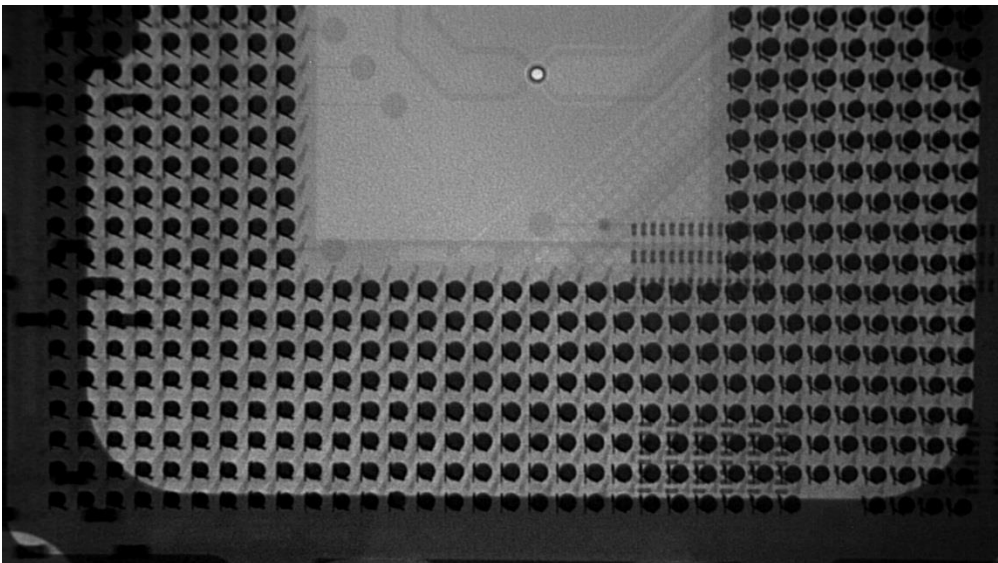
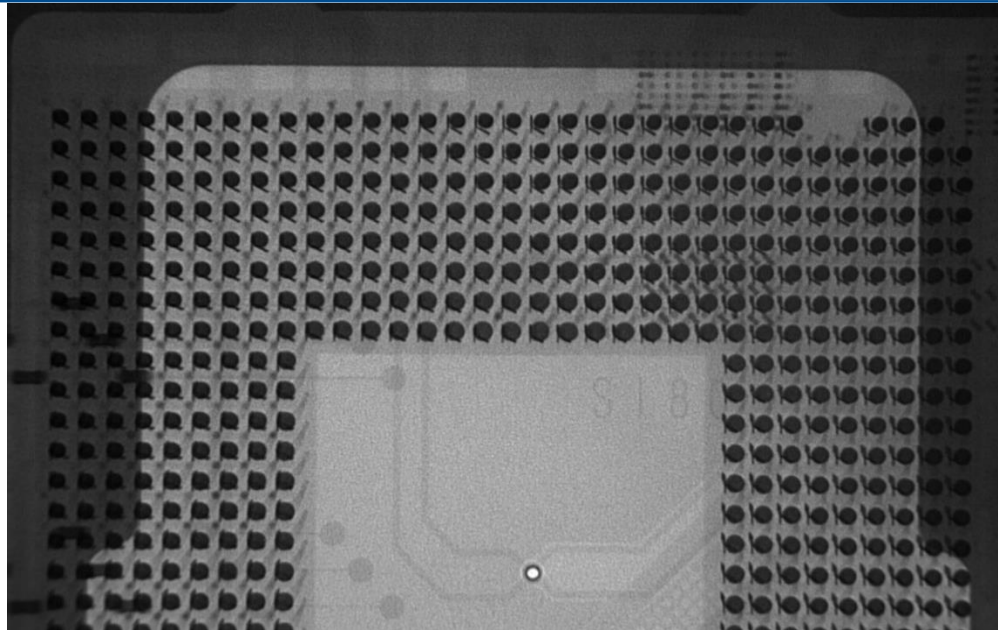


R+R 29 / Z – X-Ray nach Rework 1 mit Dip-Paste – Sockel Detail

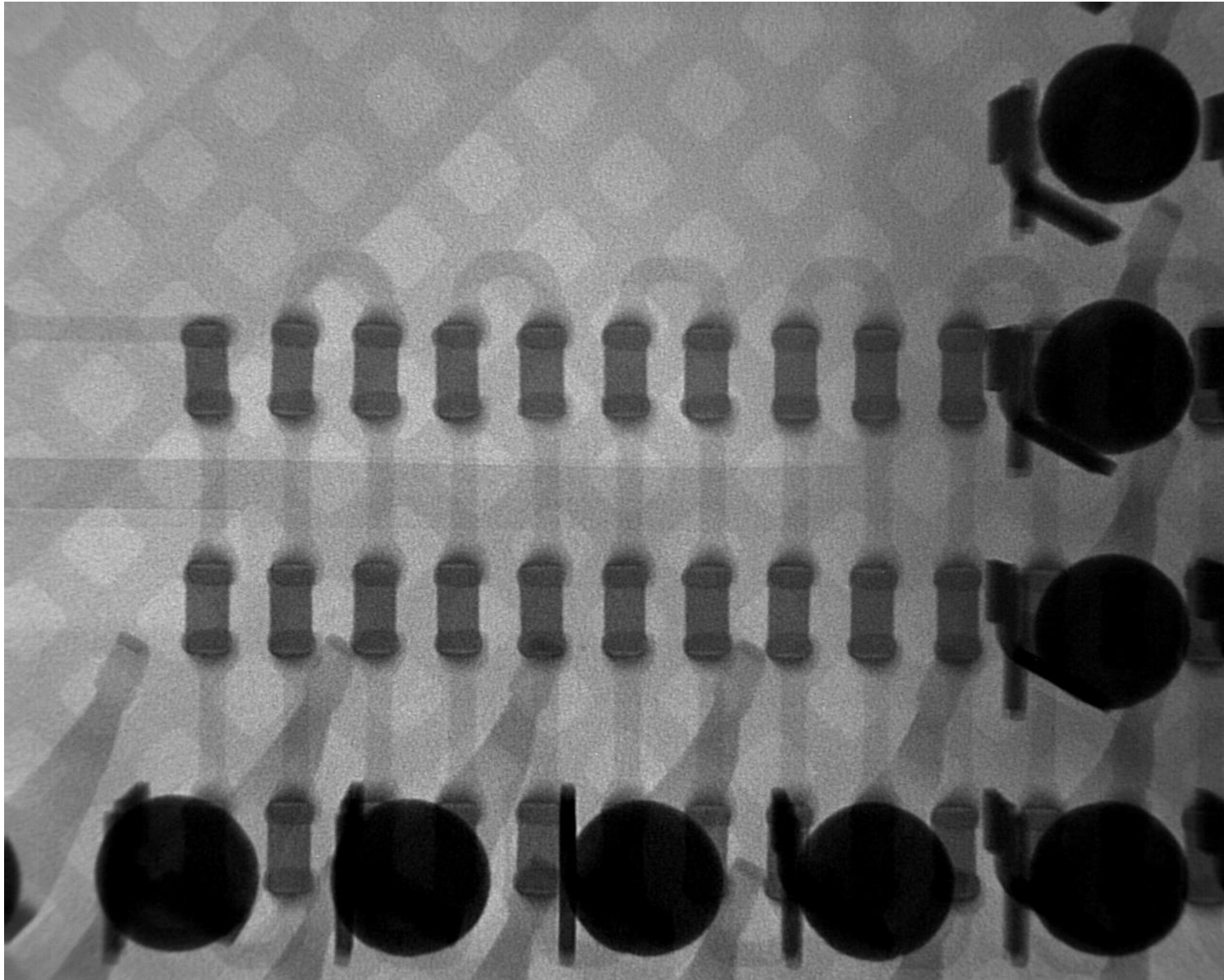




R+R 30 / Z – X-Ray nach Rework 1 mit Dip-Paste – Sockel



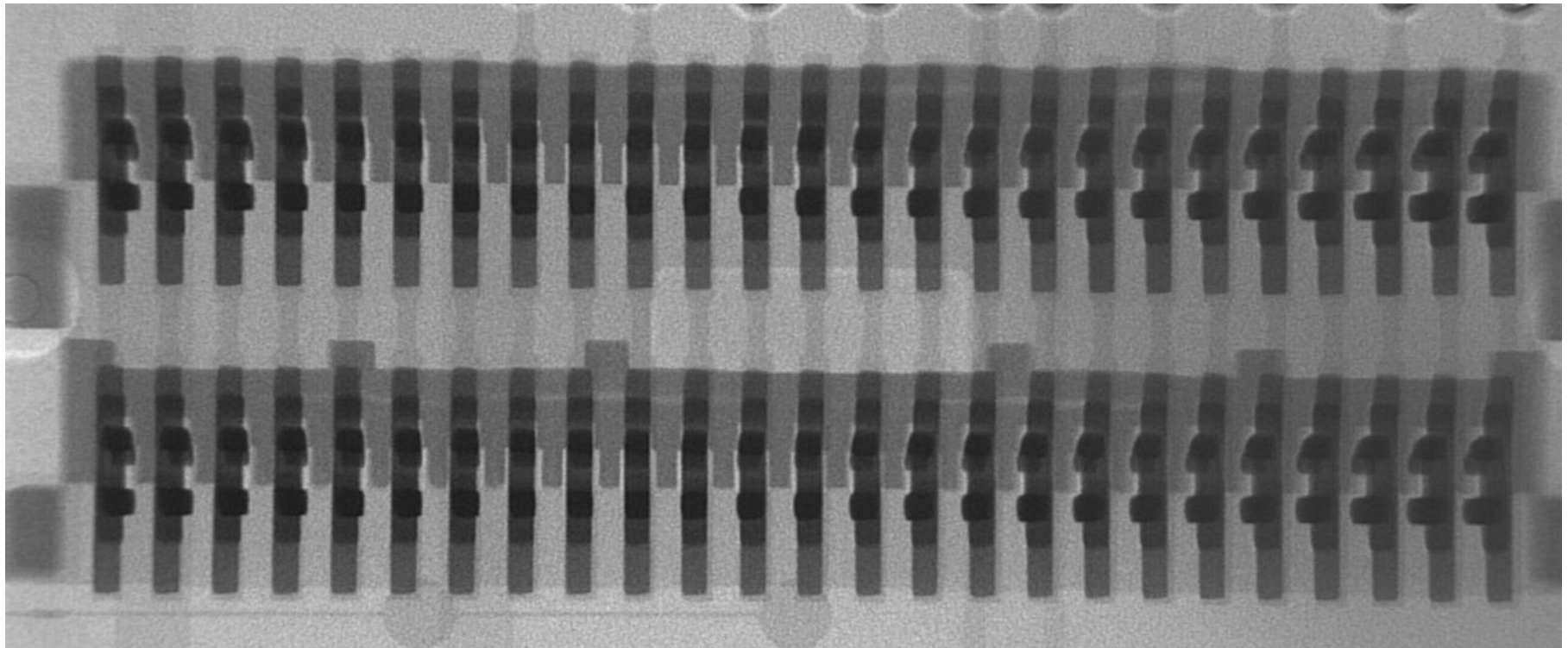
R+R 30 / Z – X-Ray nach Rework 1 mit Dip-Paste – Sockel Detail



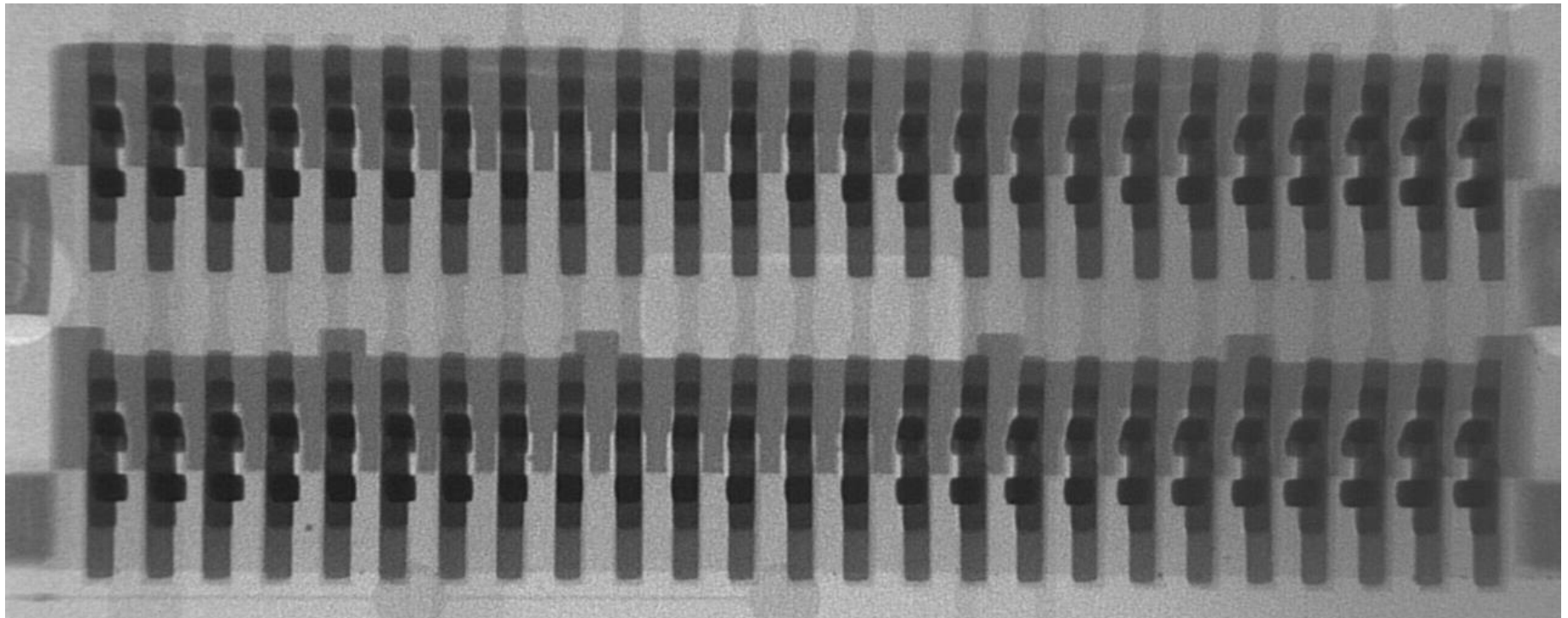
Stecker

CONN_ERNI_114713

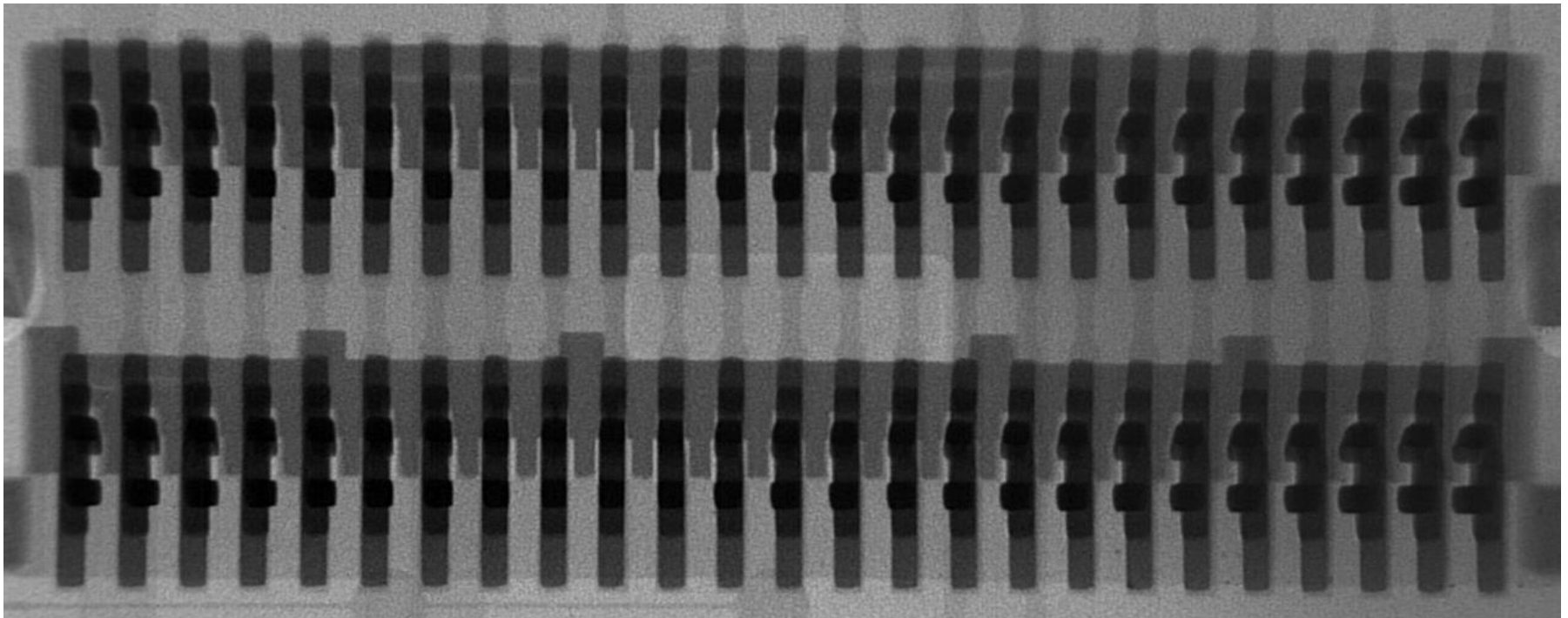
R+R 25 / Z – X-Ray nach Rework 3 – CONN_ERNI_114713



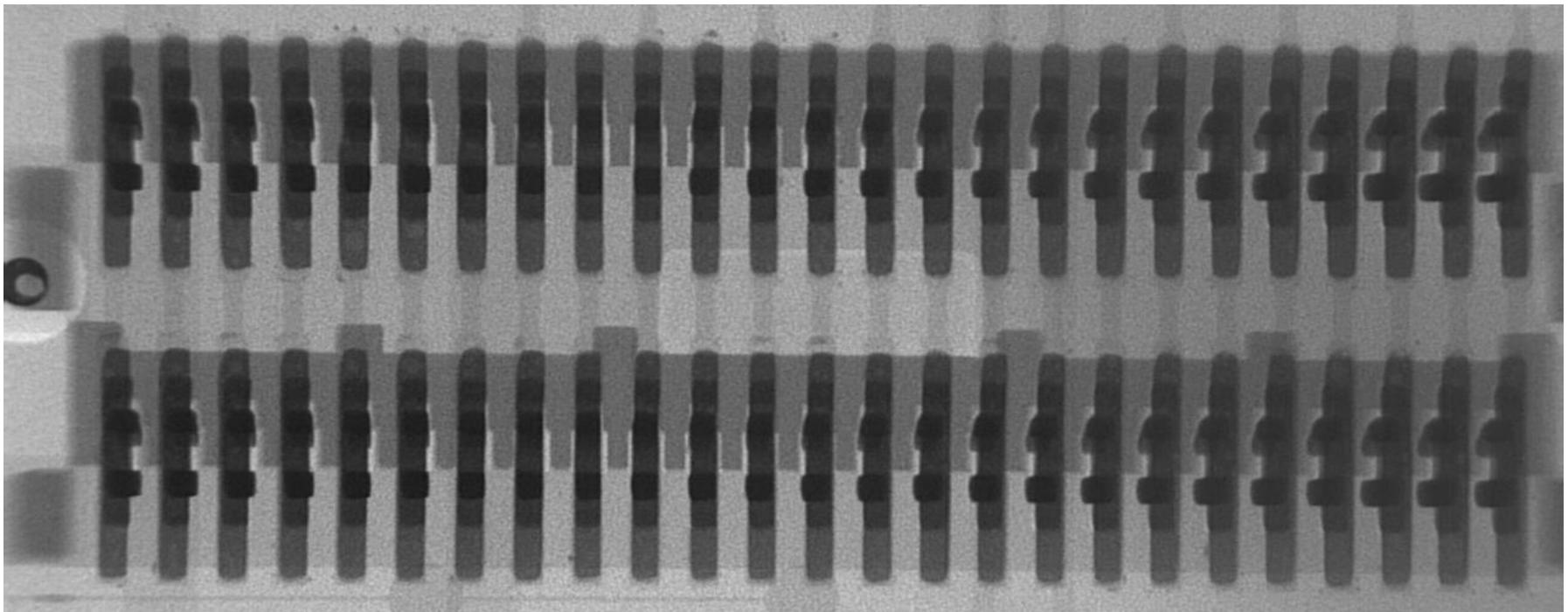
R+R 26 / Z – X-Ray nach Rework 2 – CONN_ERNI_114713



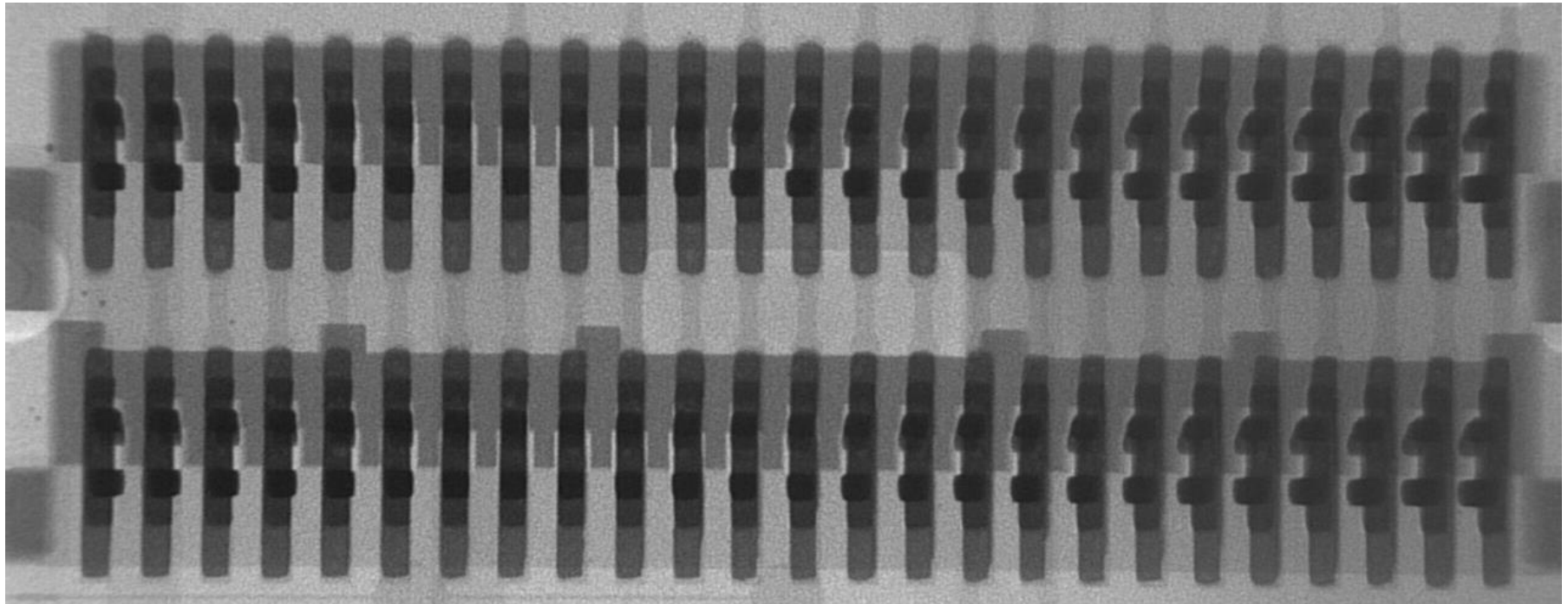
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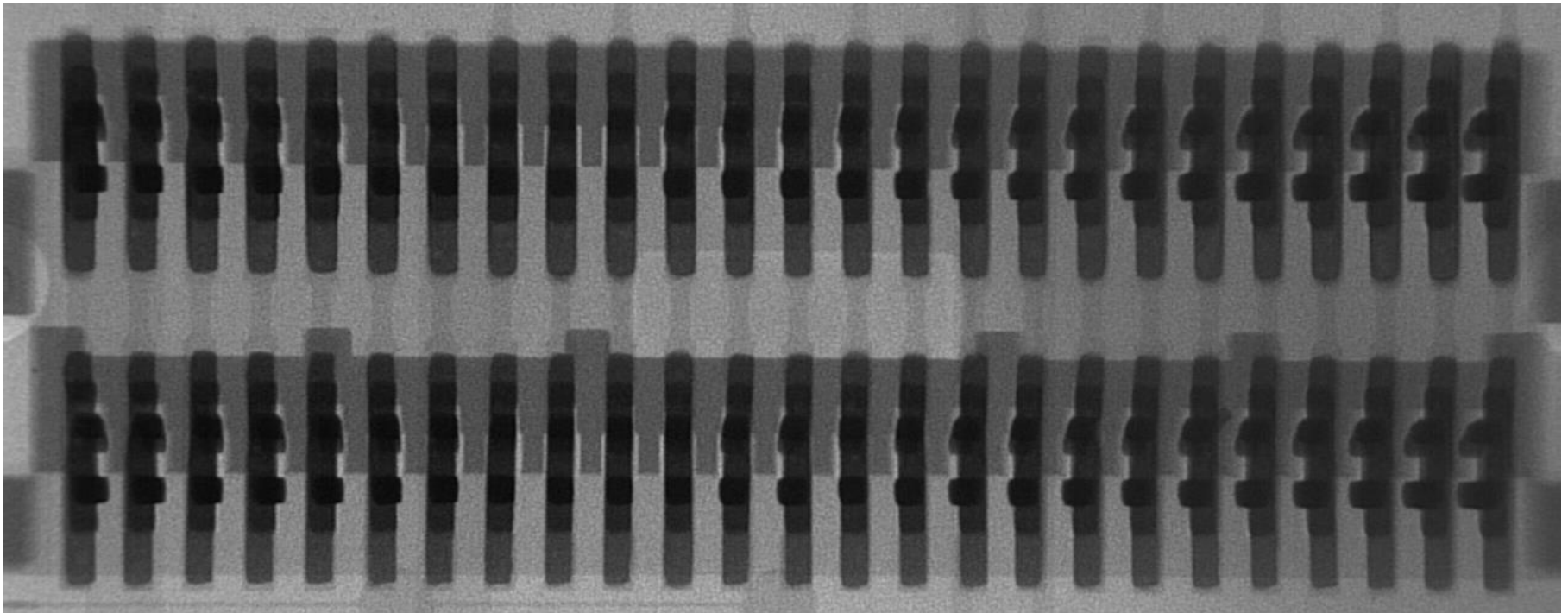
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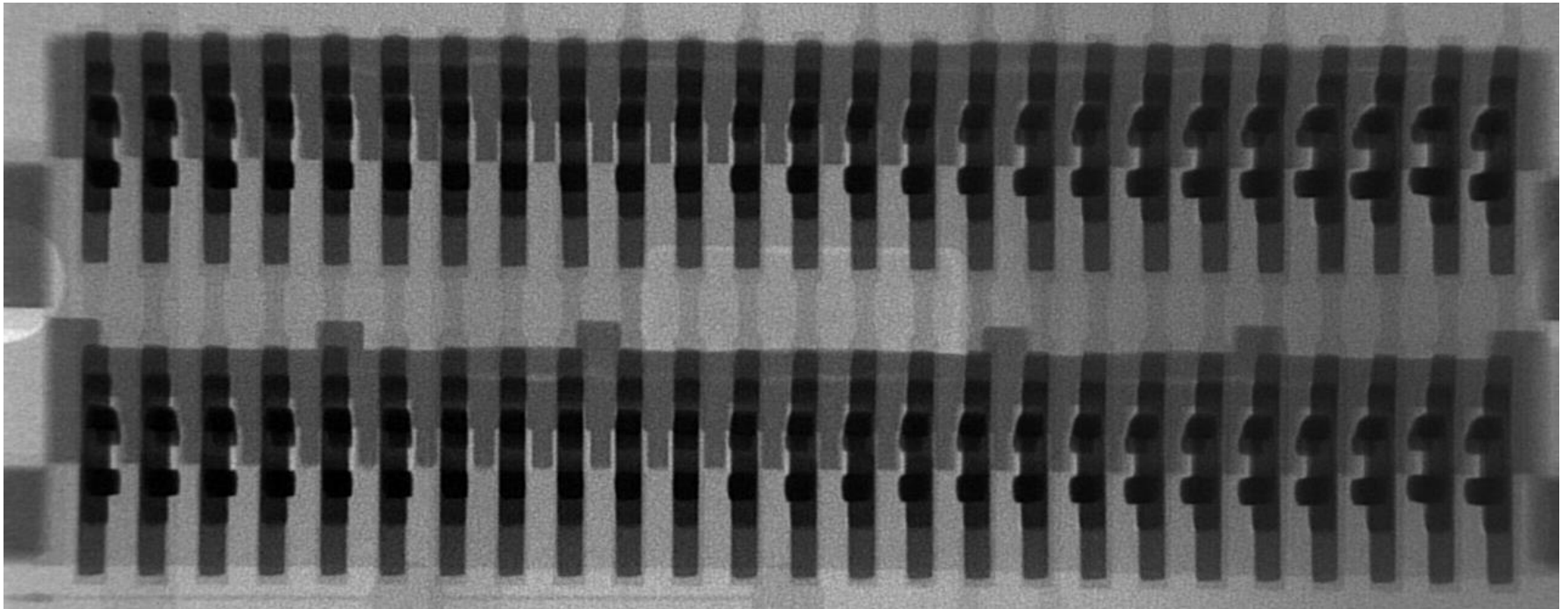
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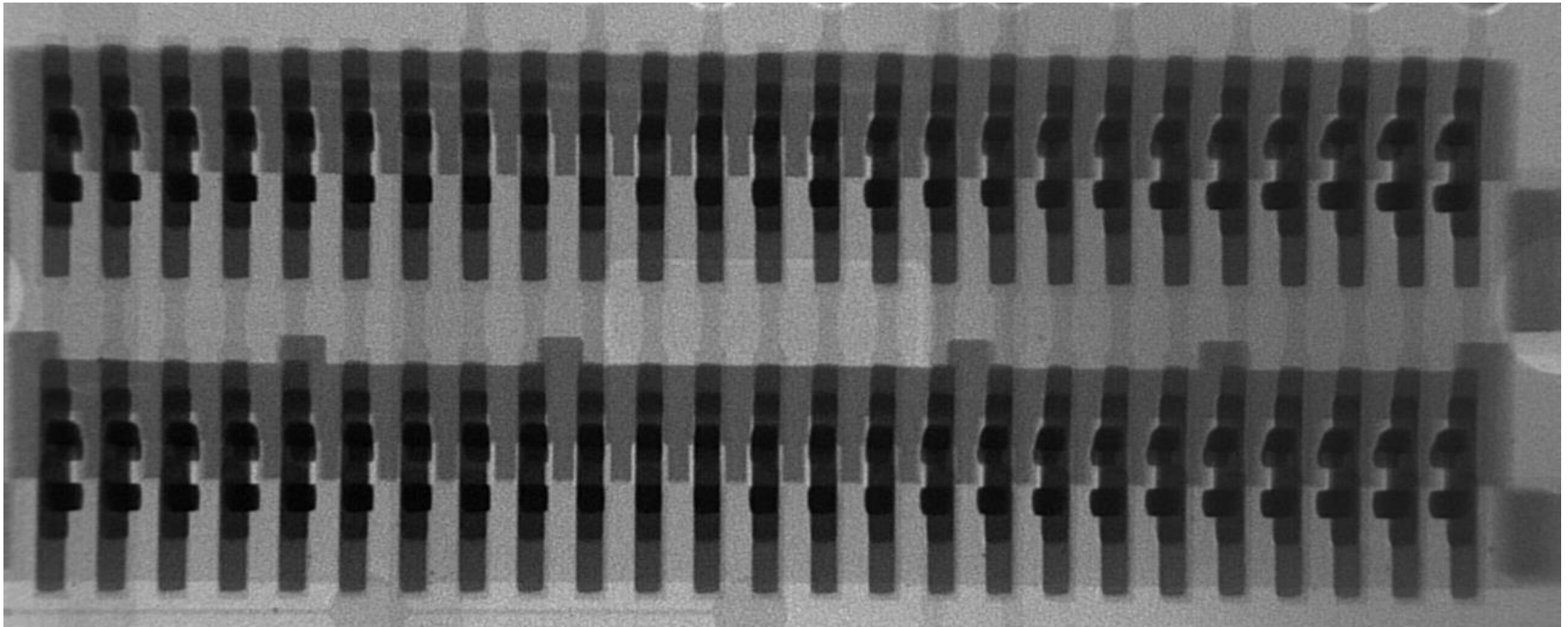
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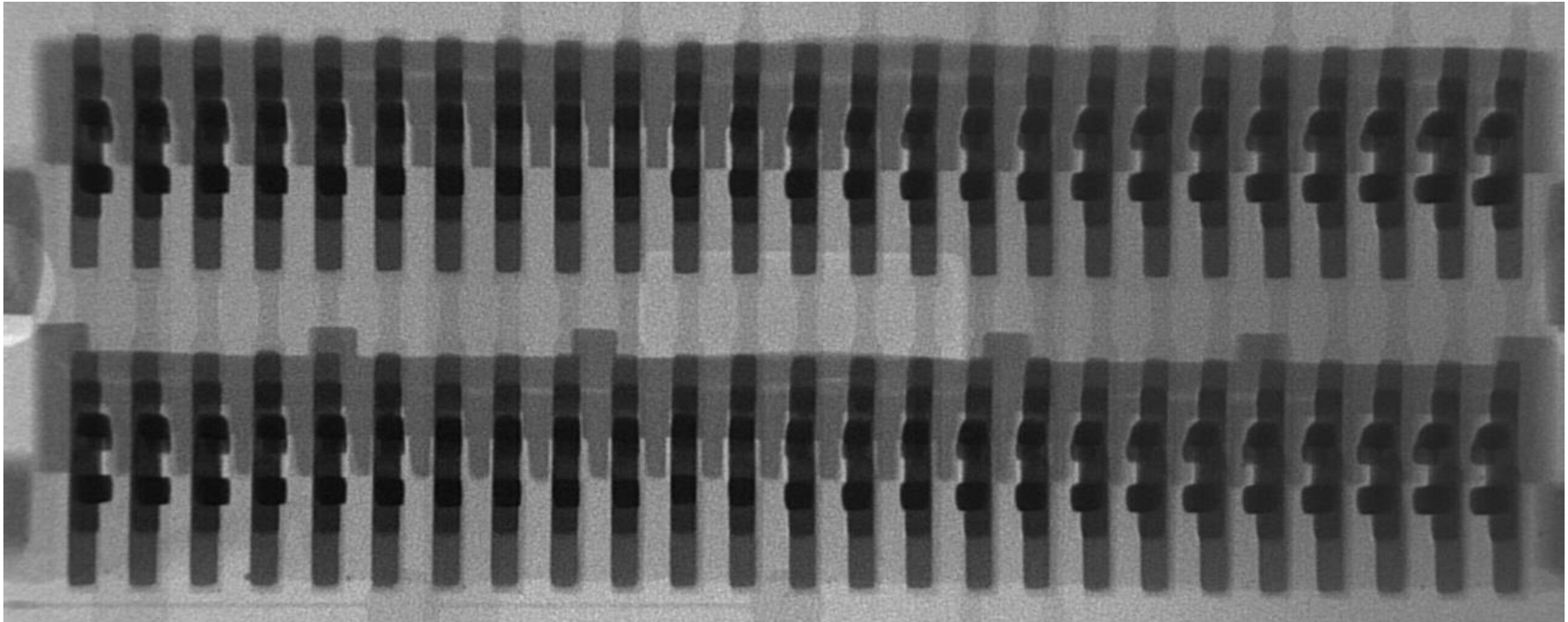
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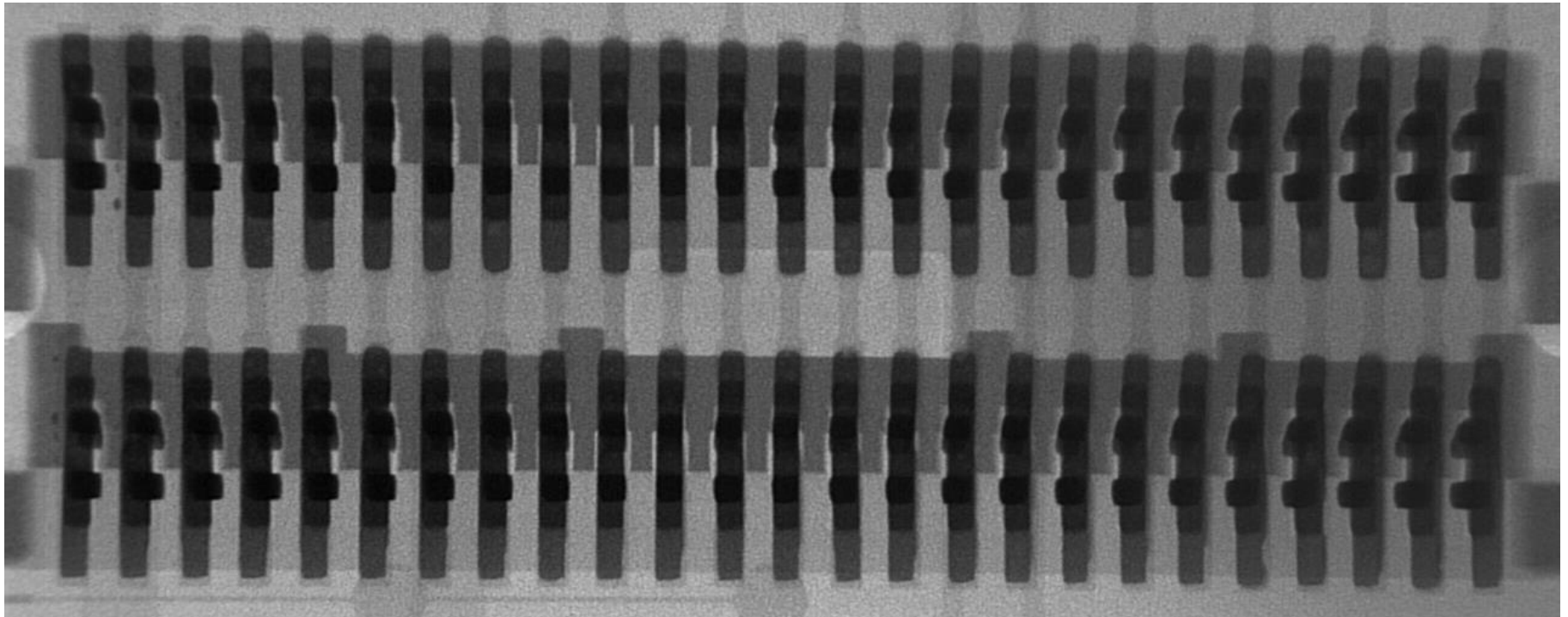
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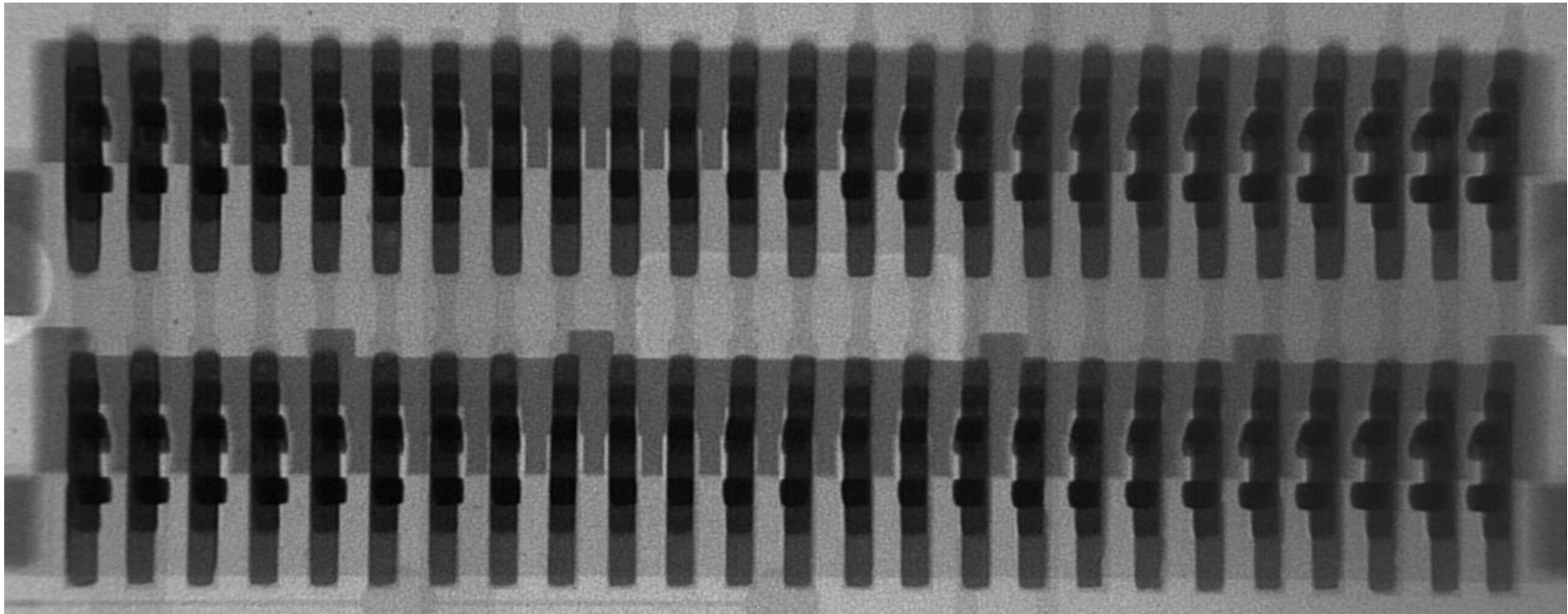
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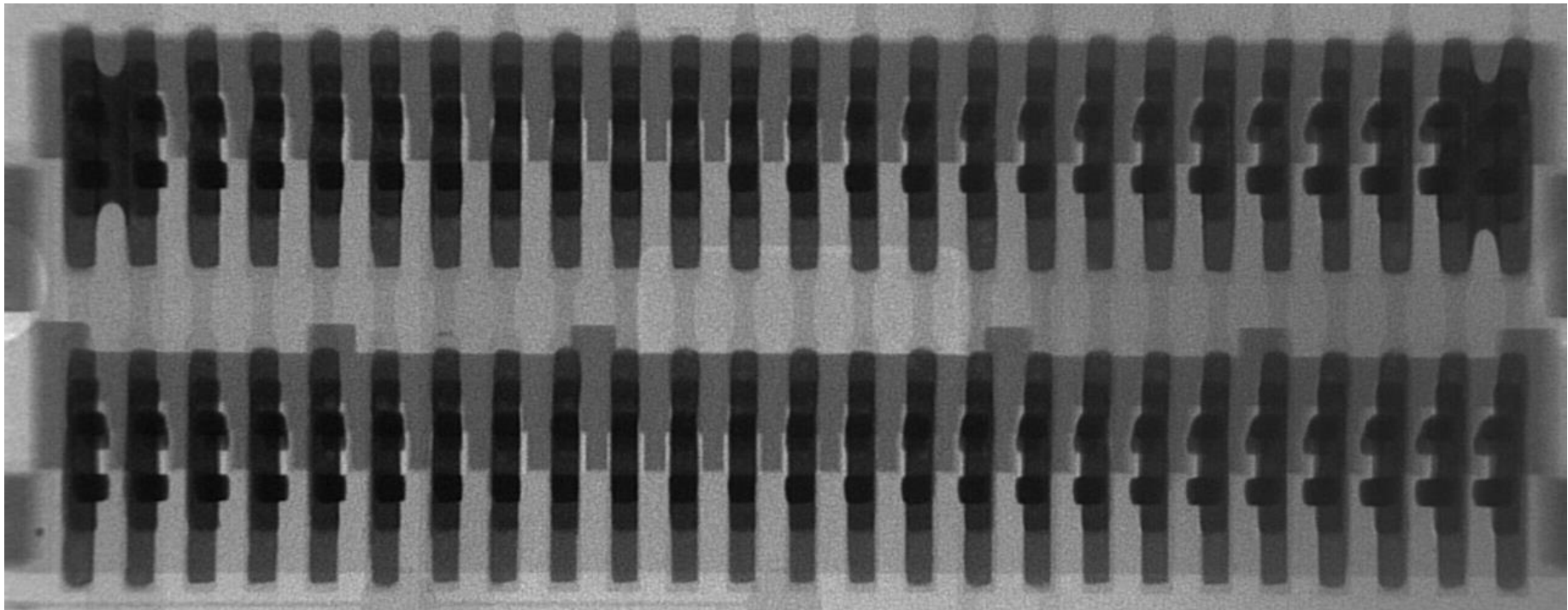
R+R 34 / Z – X-Ray nach Rework 3 – CONN_ERNI_114713



R+R 35 / Z – X-Ray nach Rework 2 – CONN_ERNI_114713



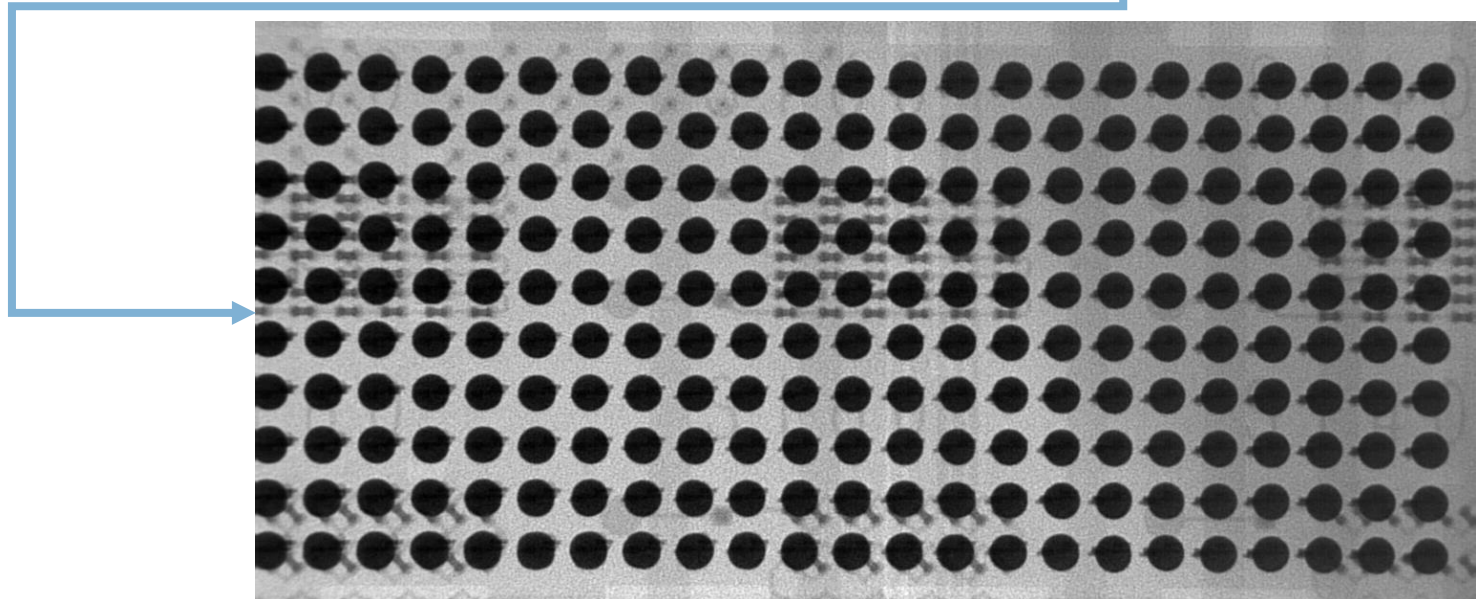
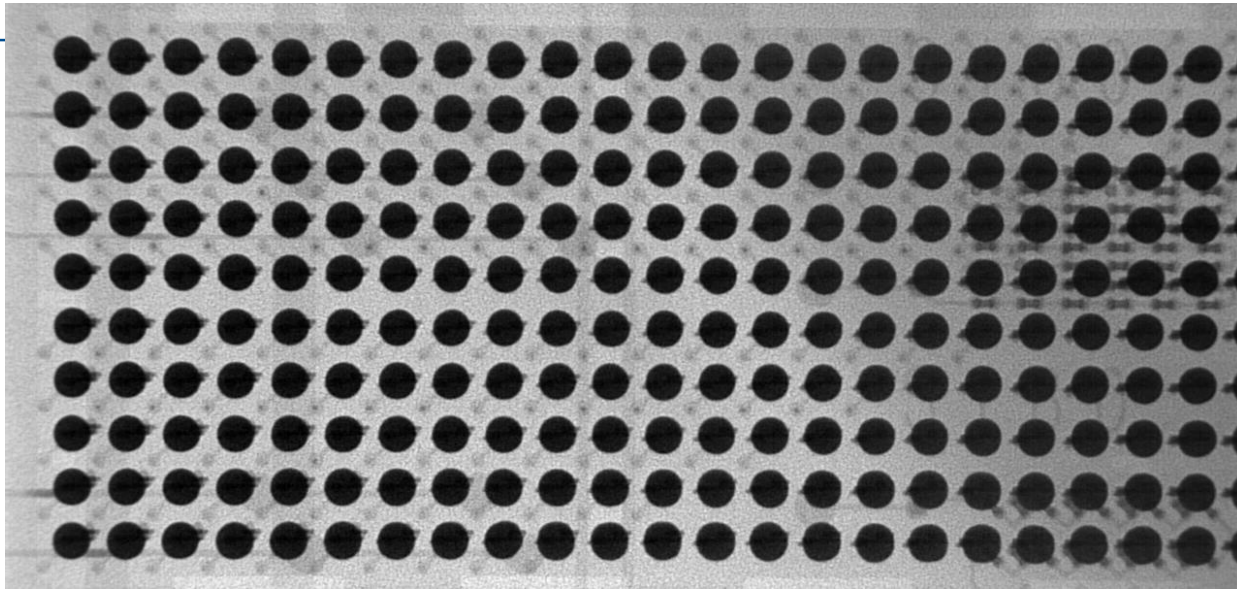
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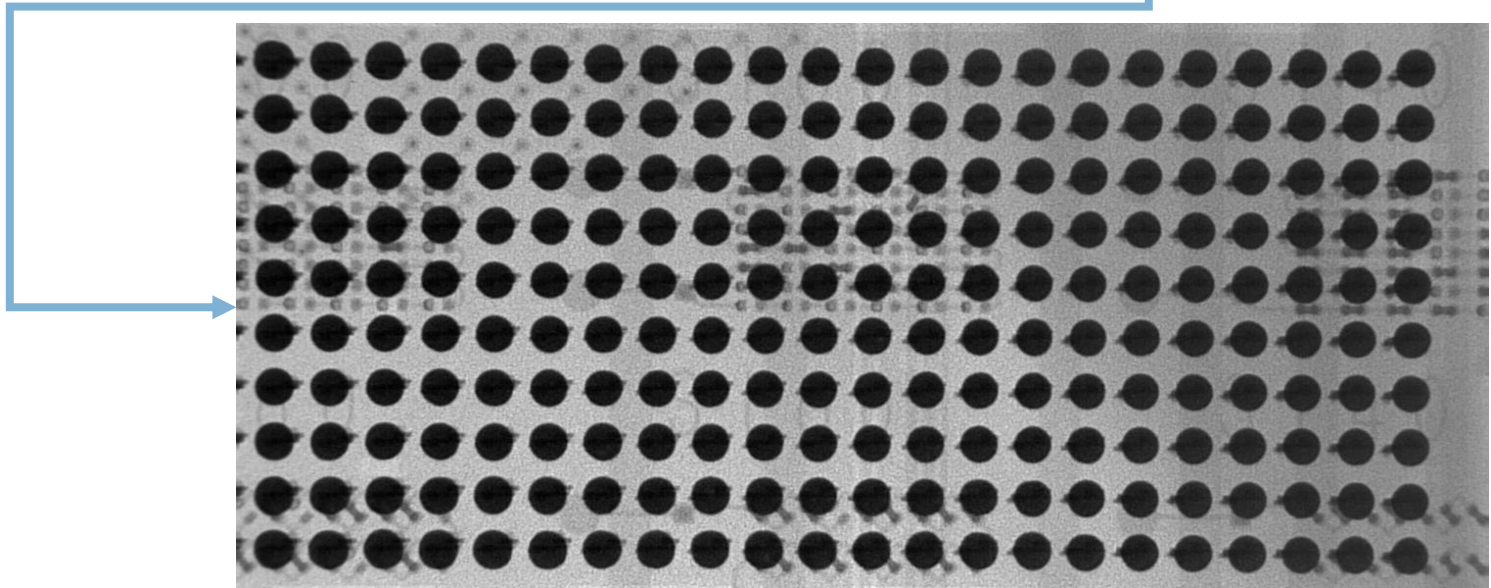
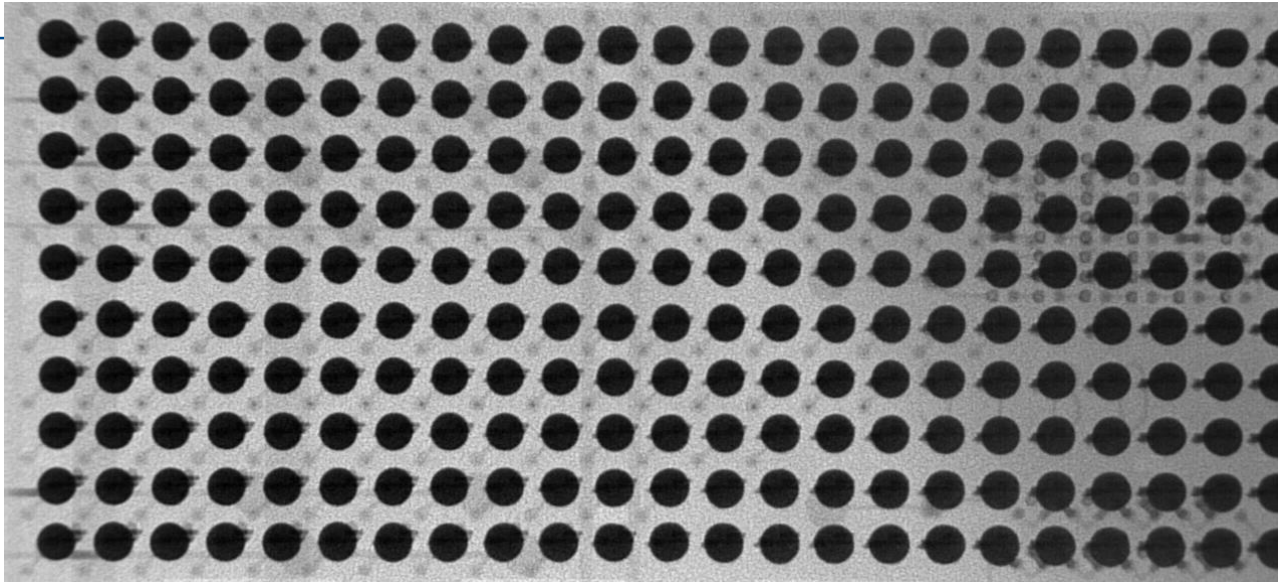
Stecker

CONN_FCI_74390

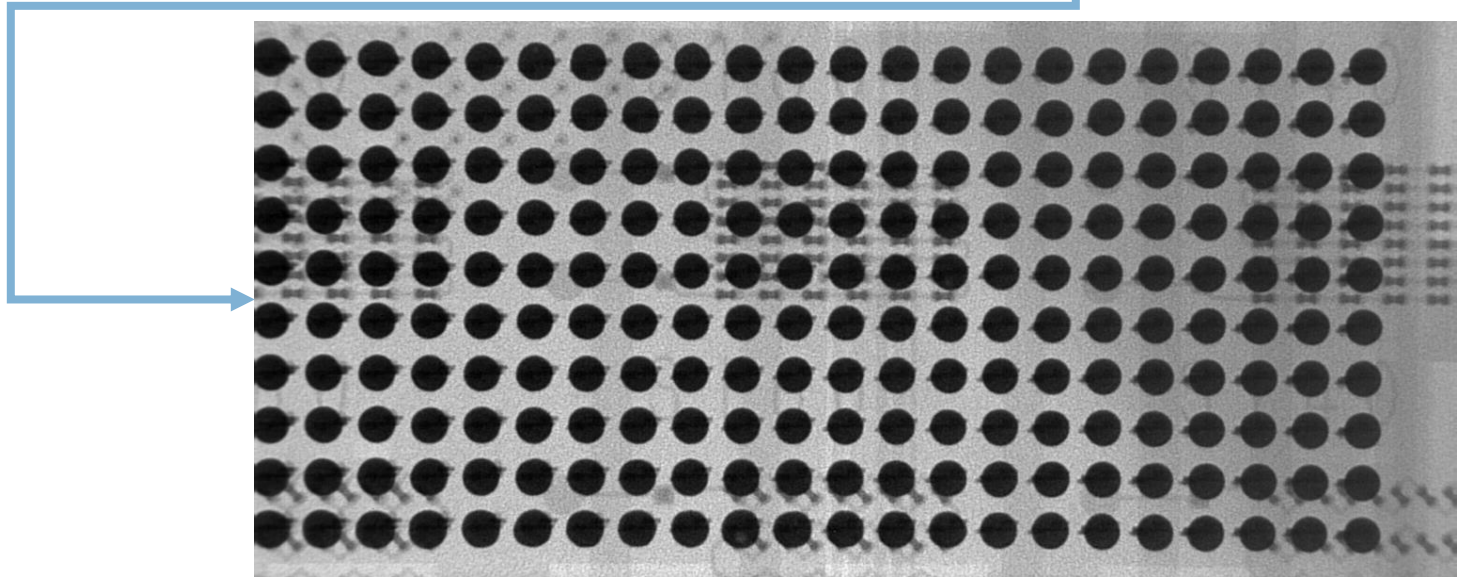
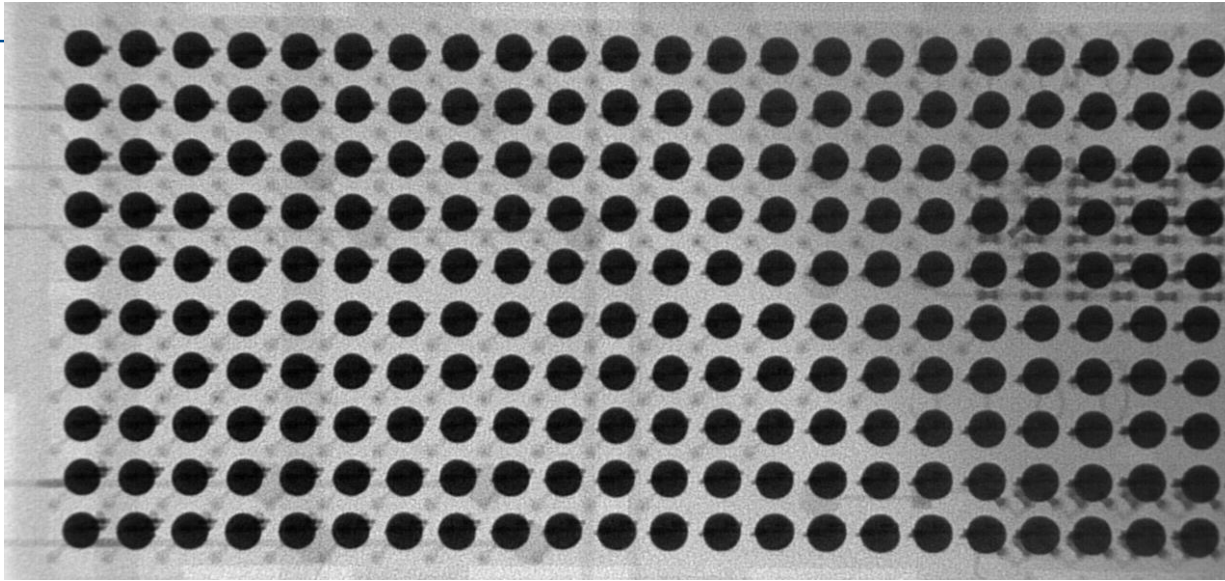
R+R 25 / Z – X-Ray nach Rework 1 – CONN_FCI_74390



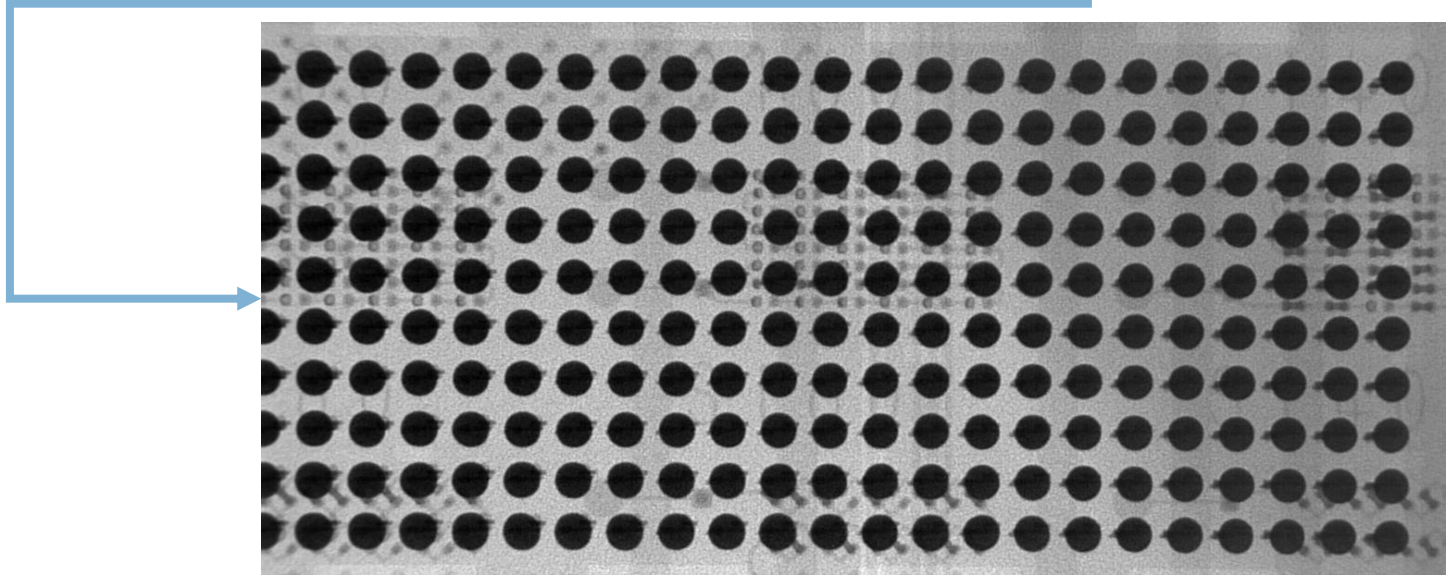
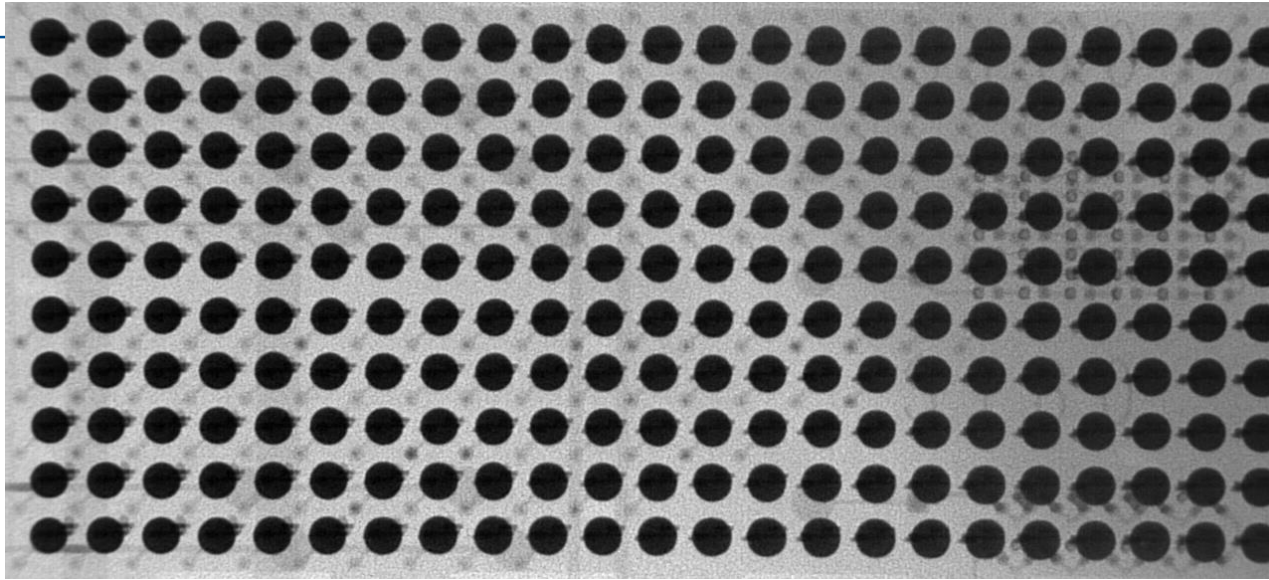
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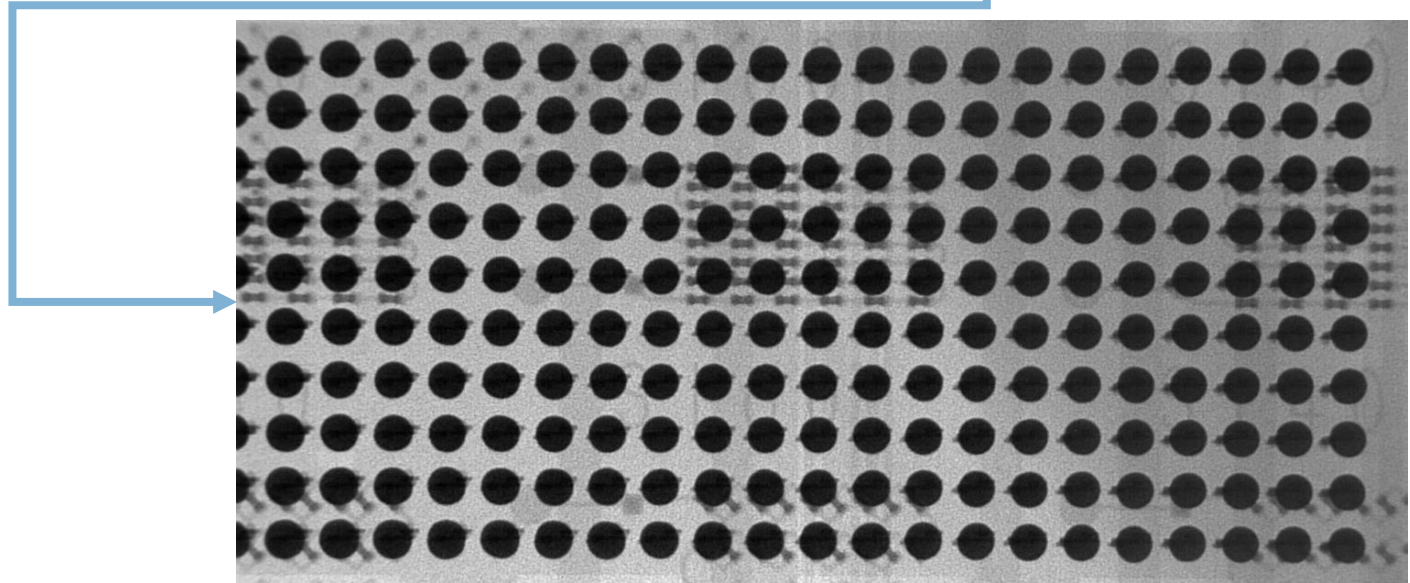
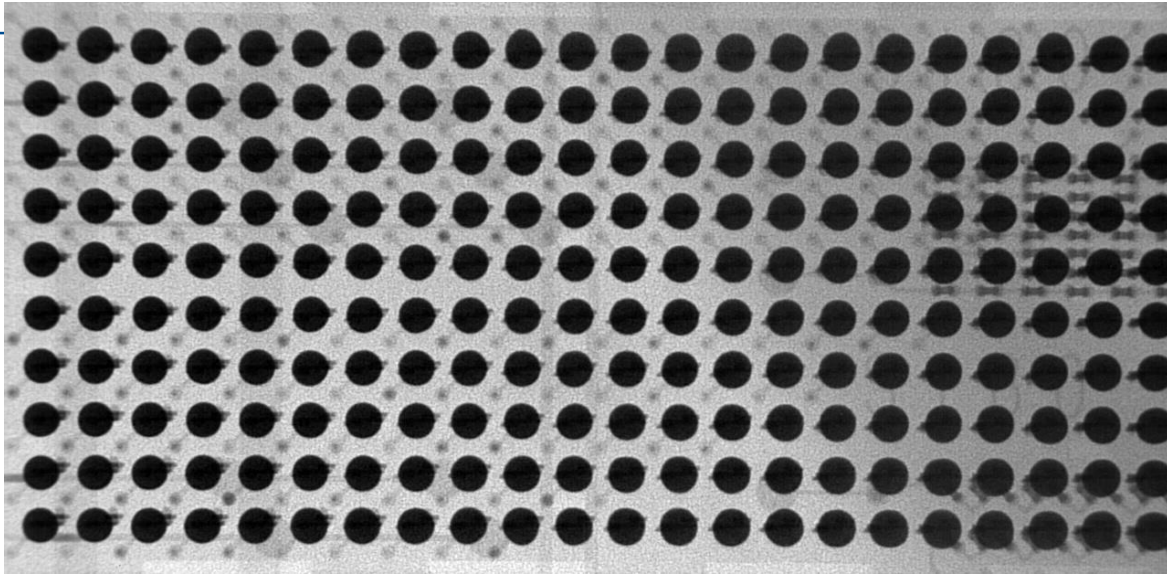
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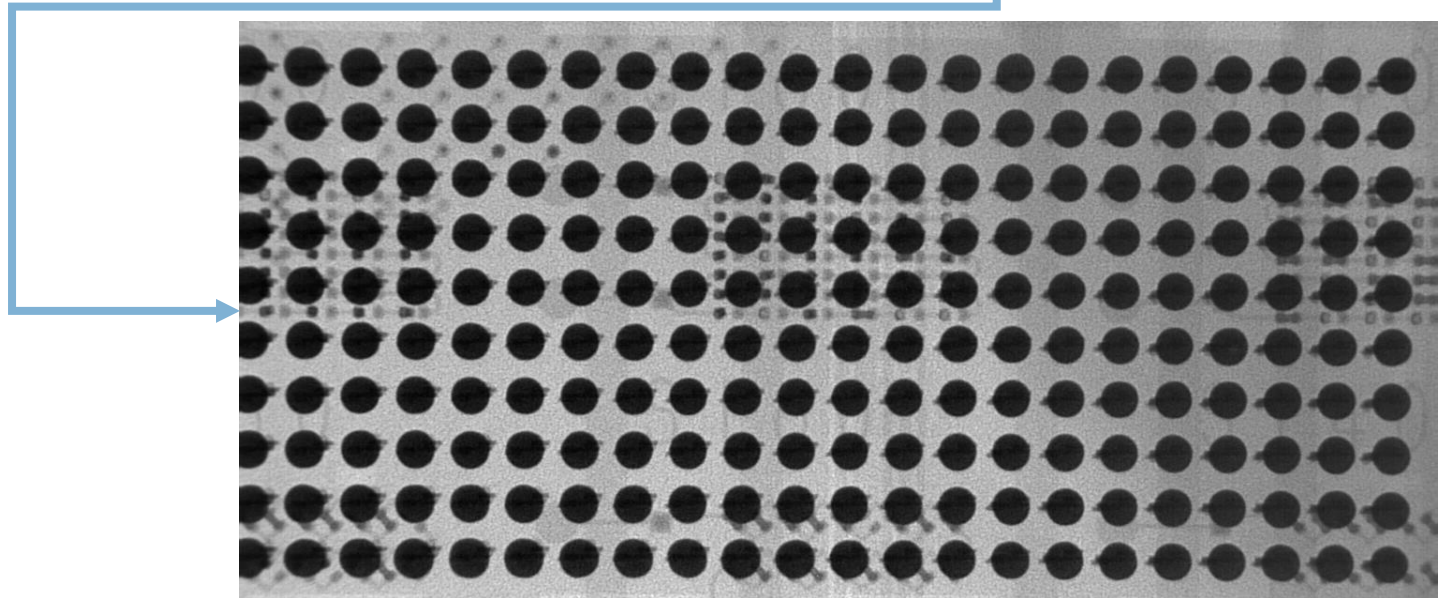
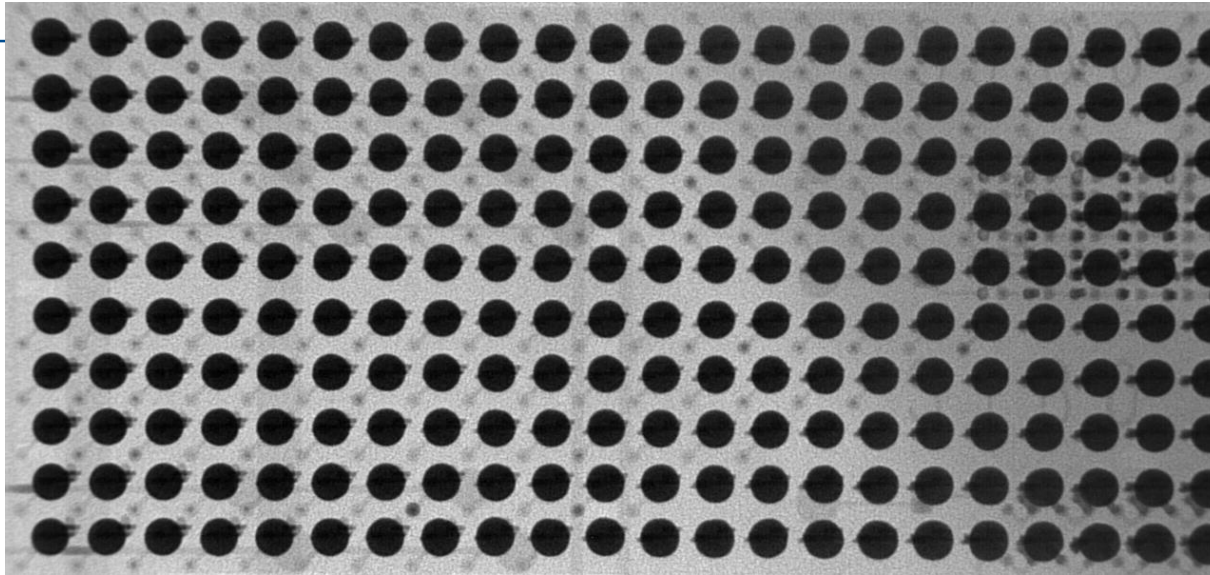
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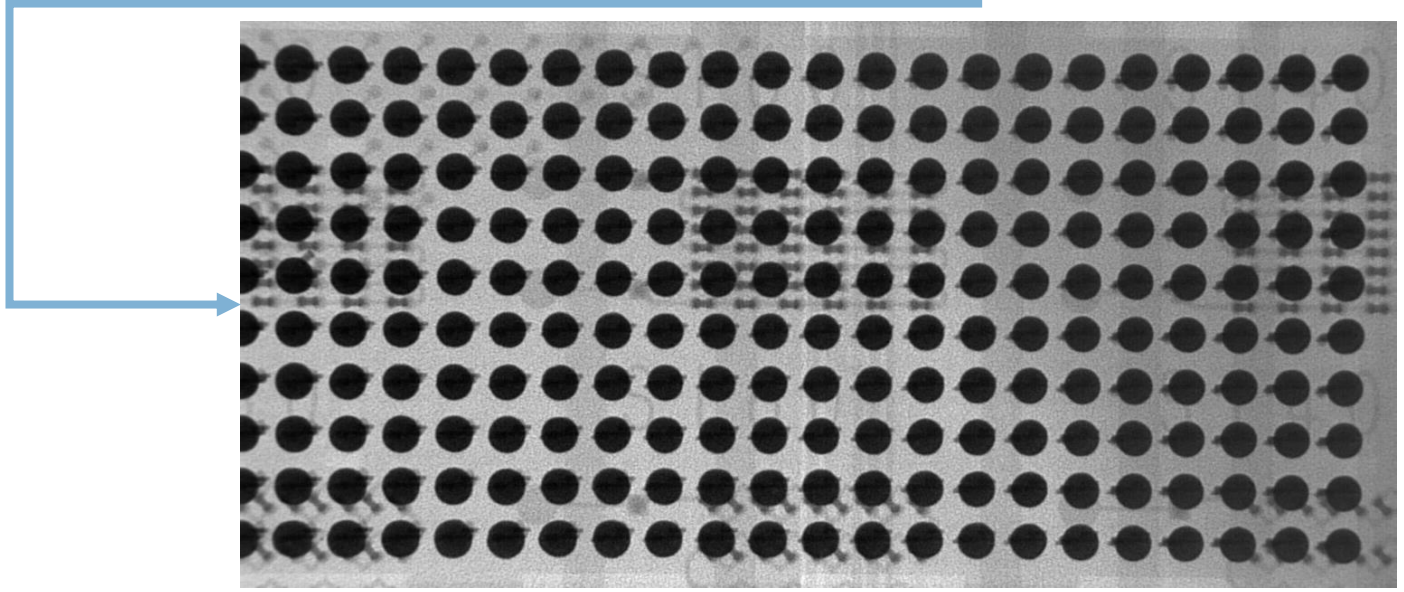
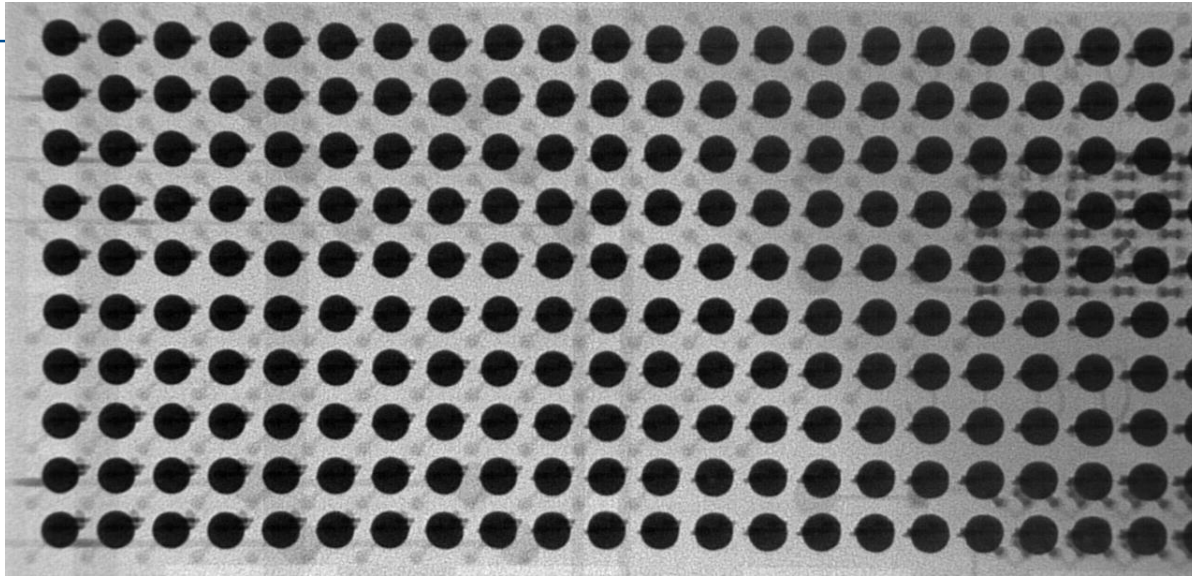
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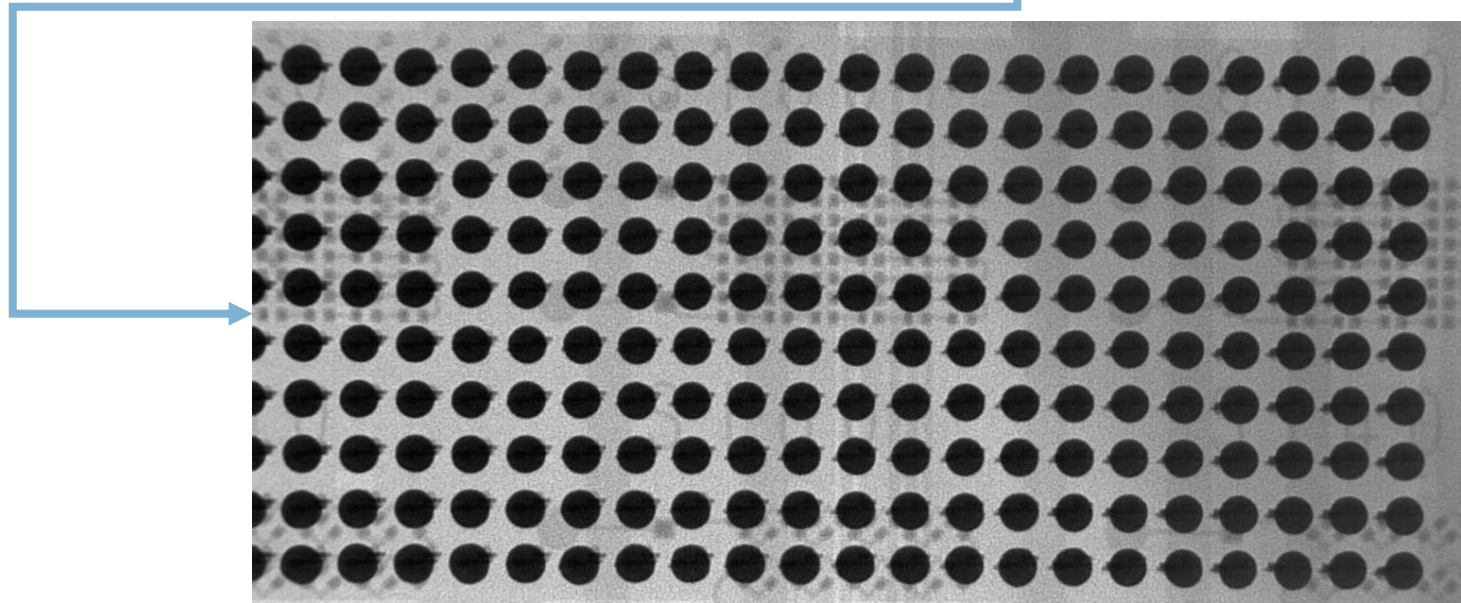
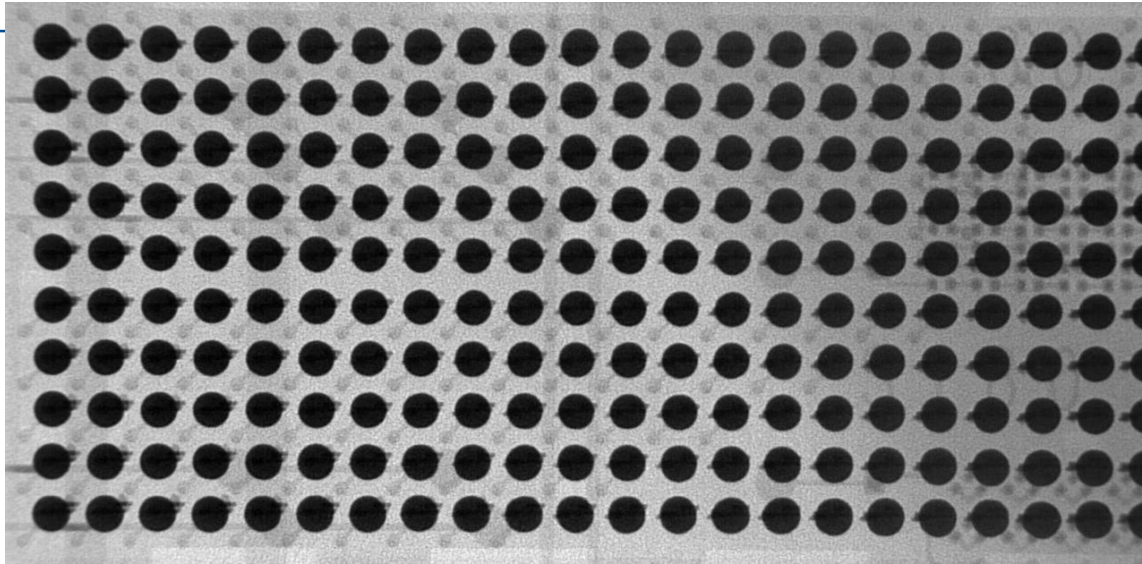
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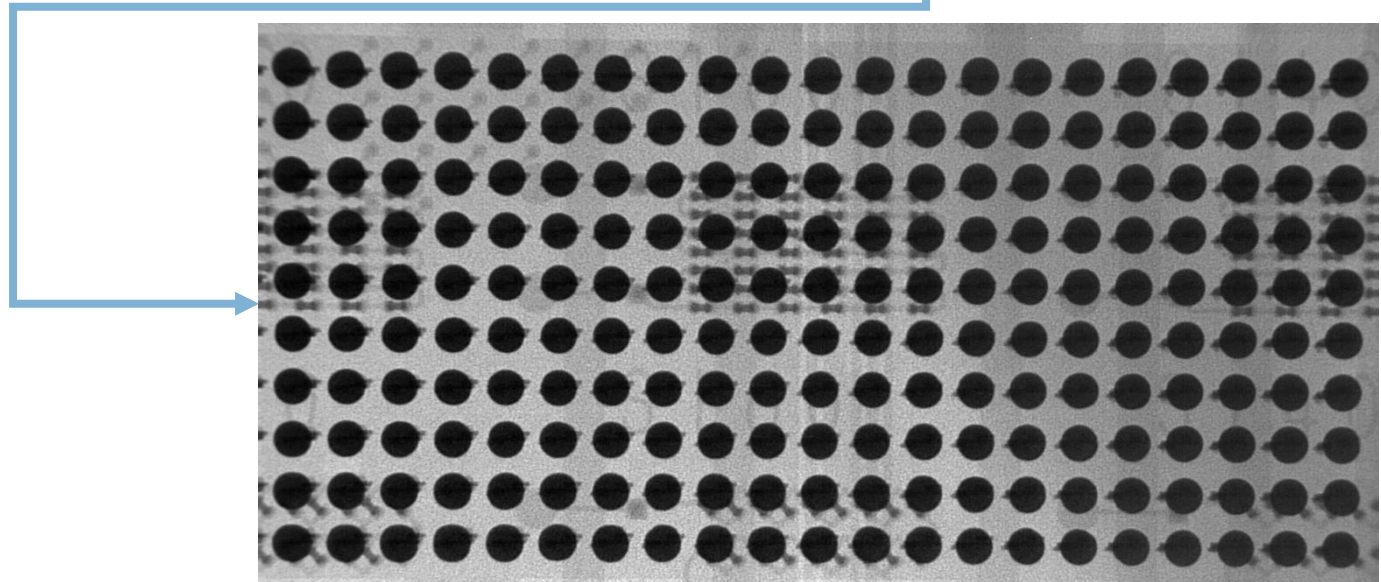
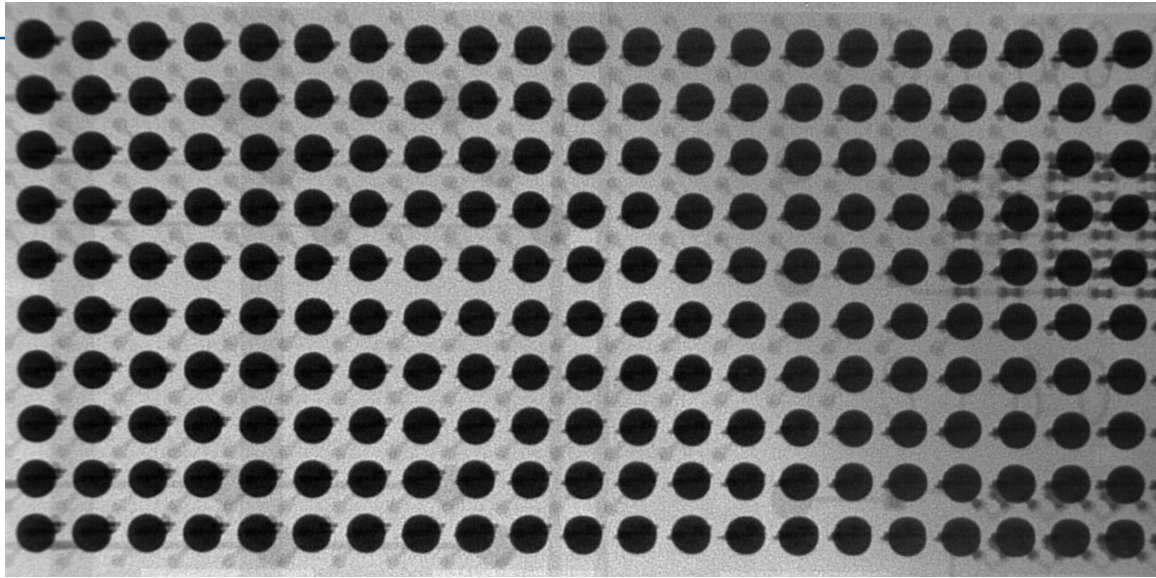
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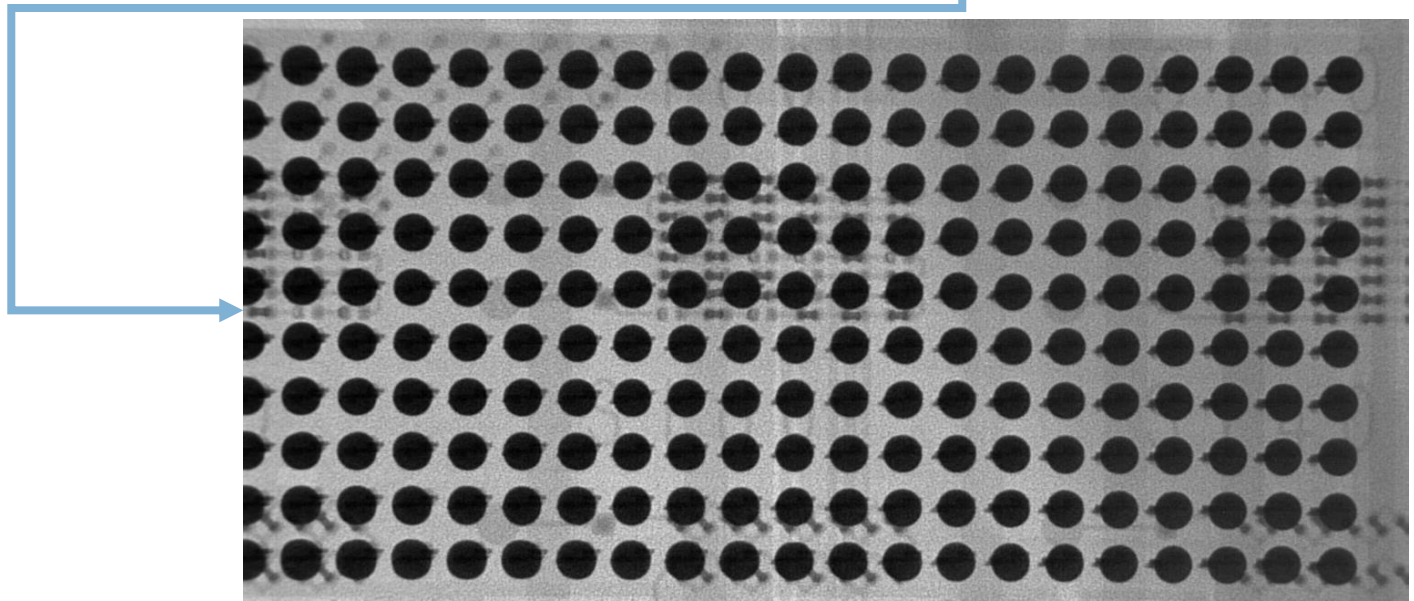
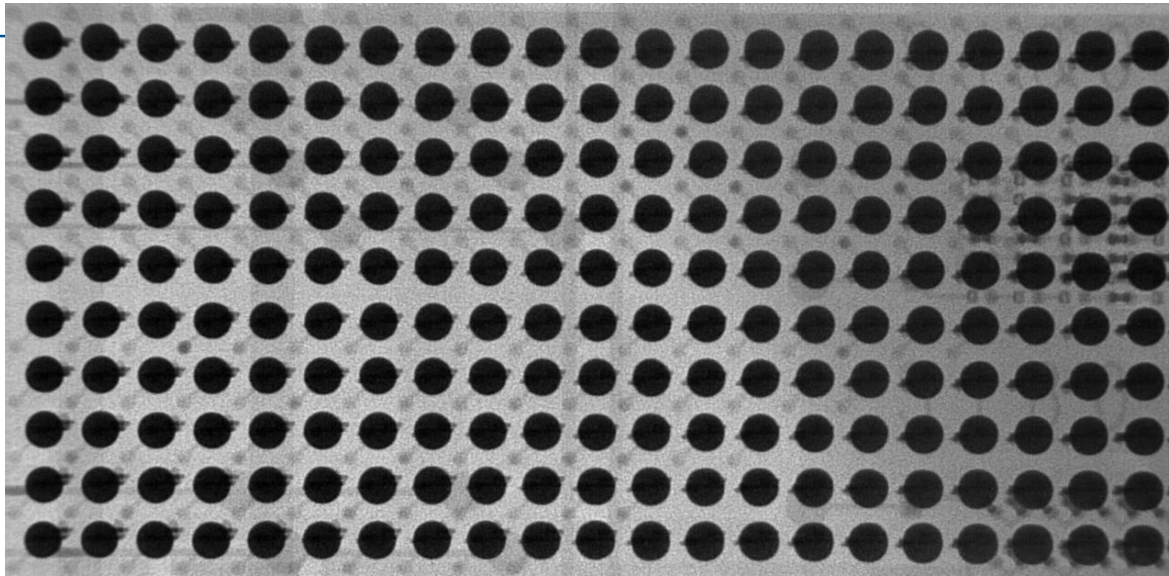
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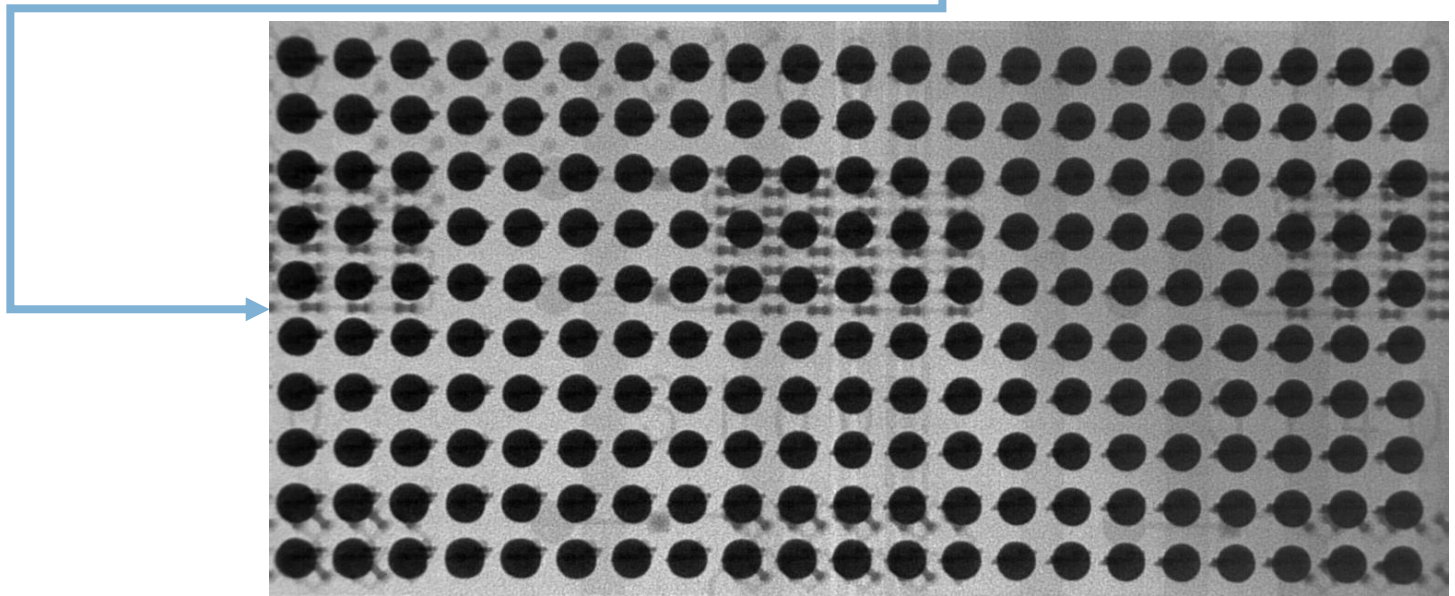
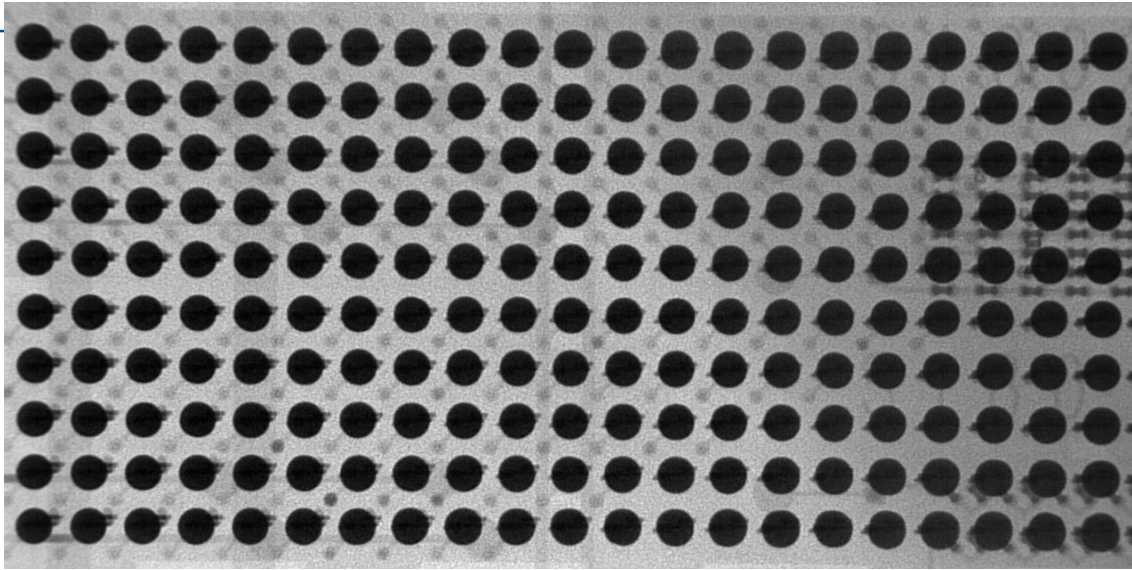
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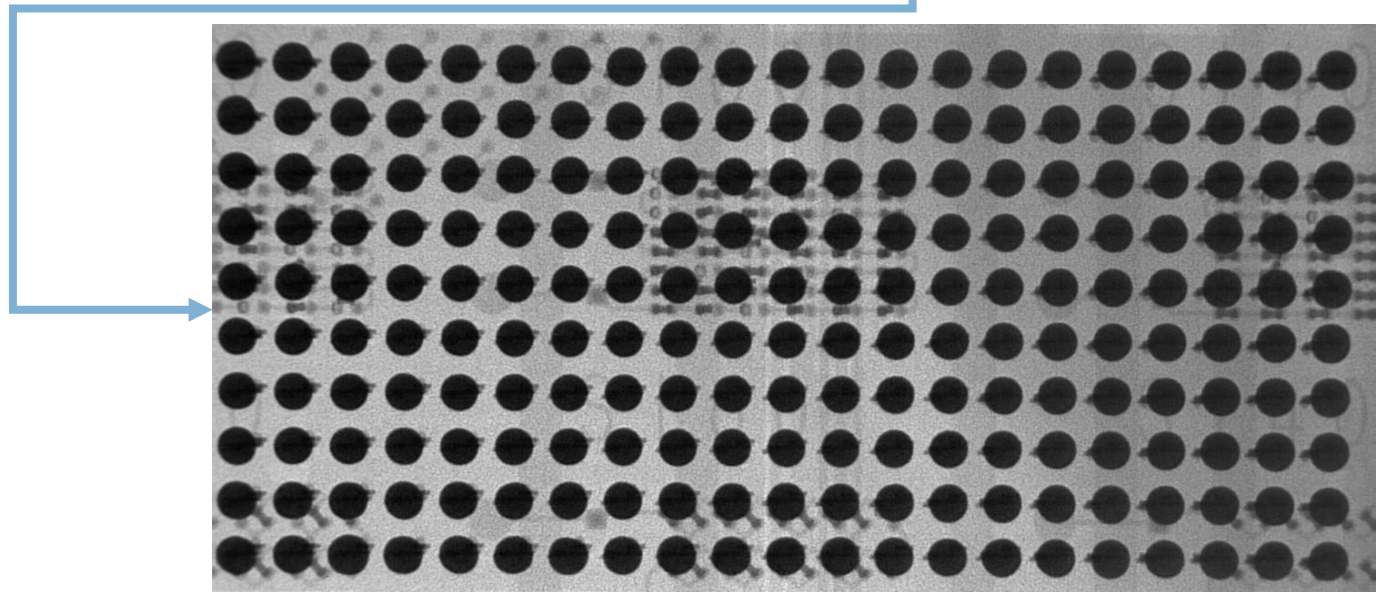
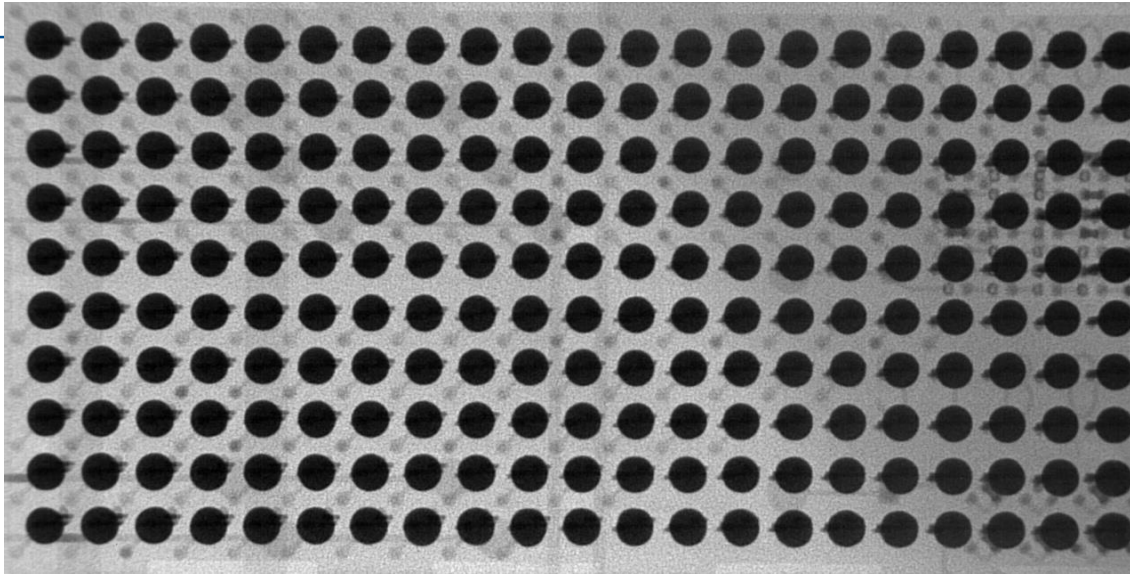
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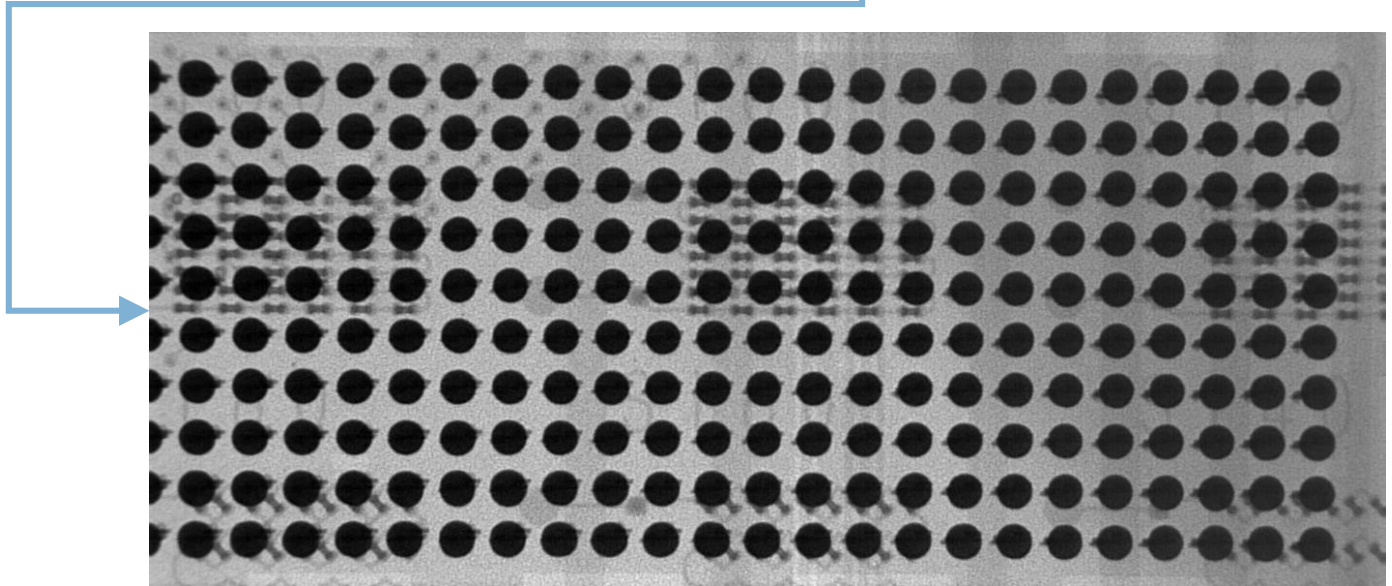
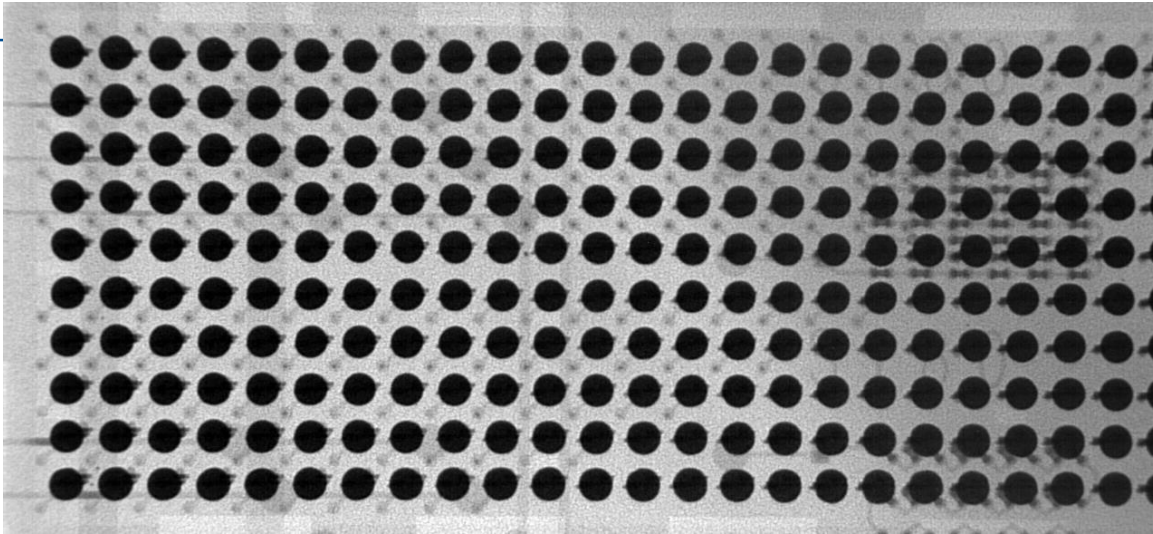
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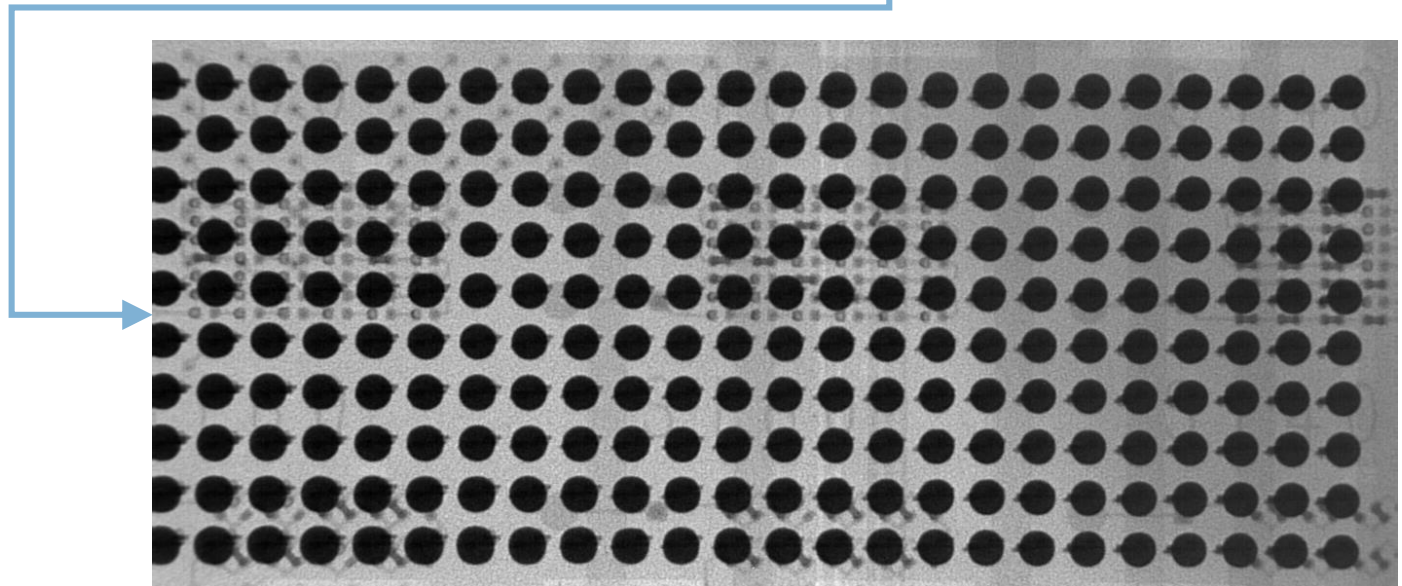
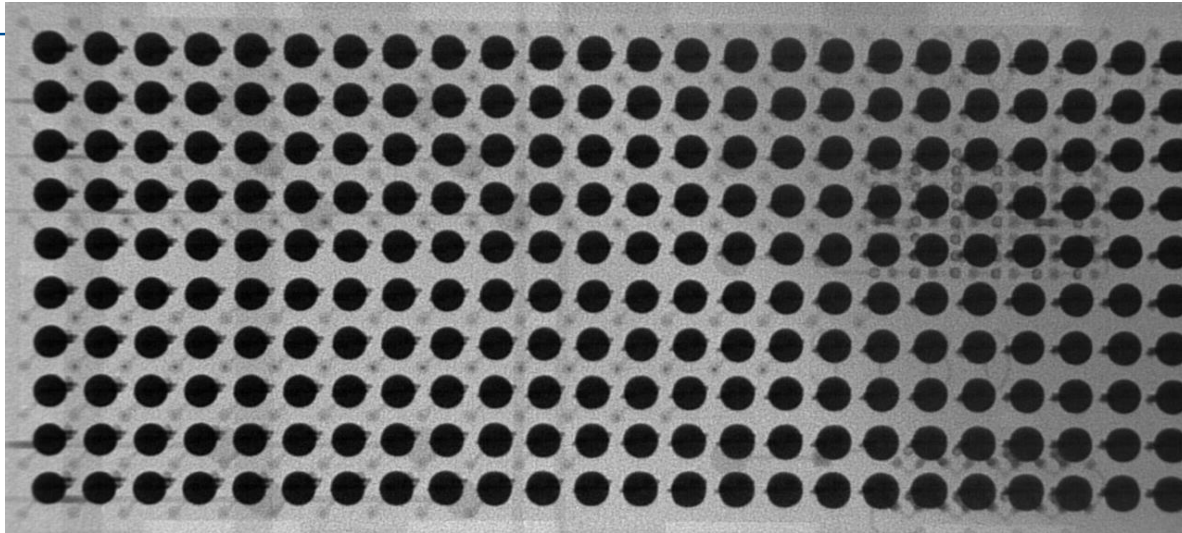
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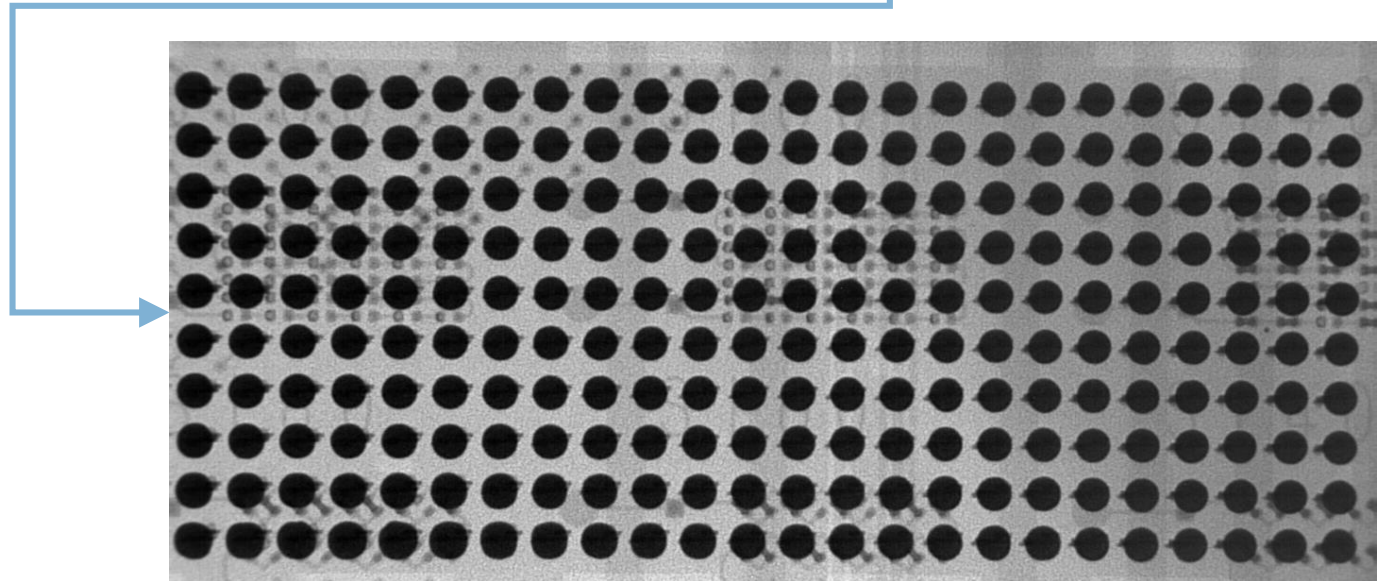
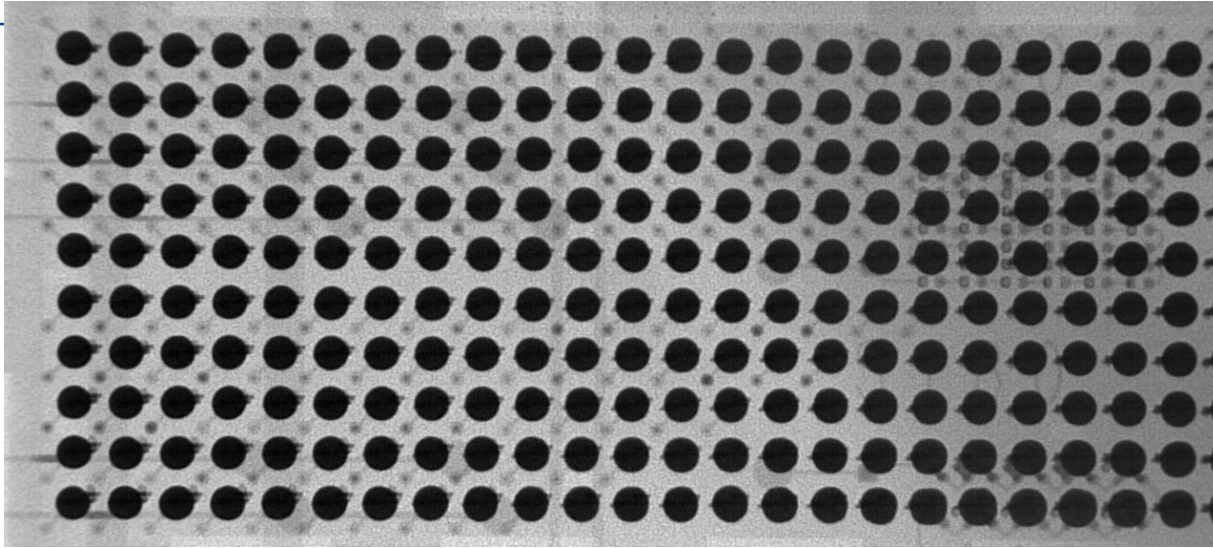
R+R 25 / Z – X-Ray nach Rework 3 – CONN_FCI_74390



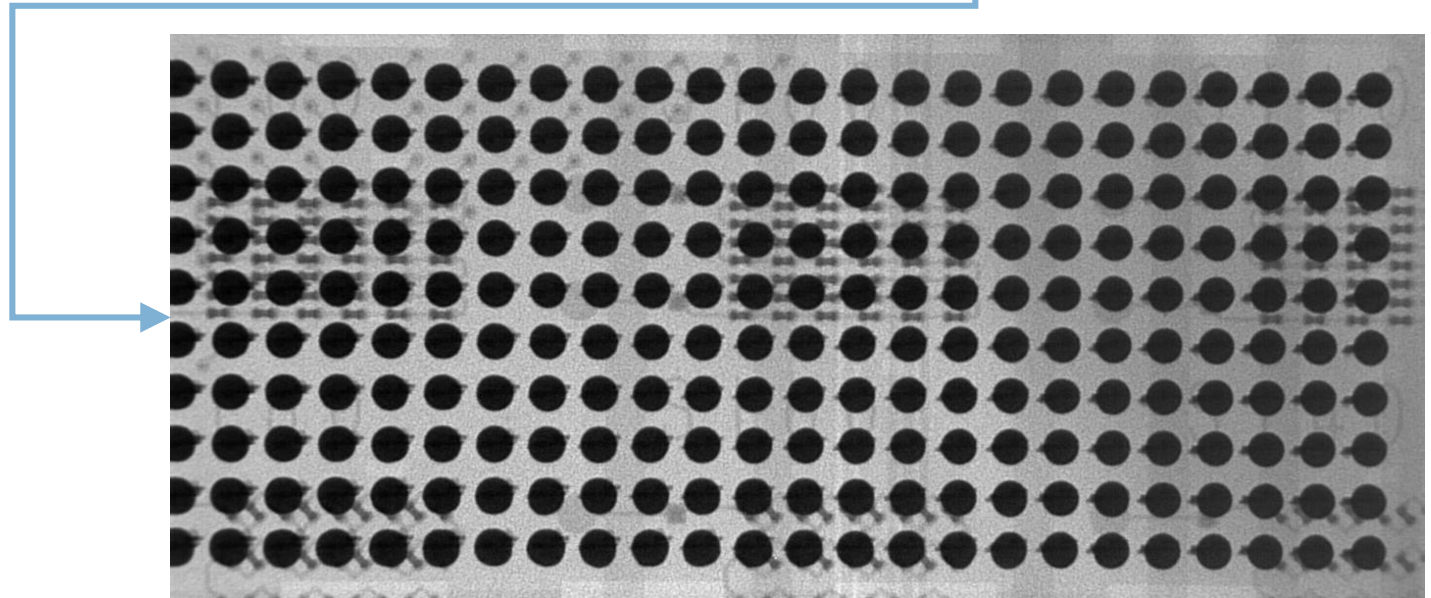
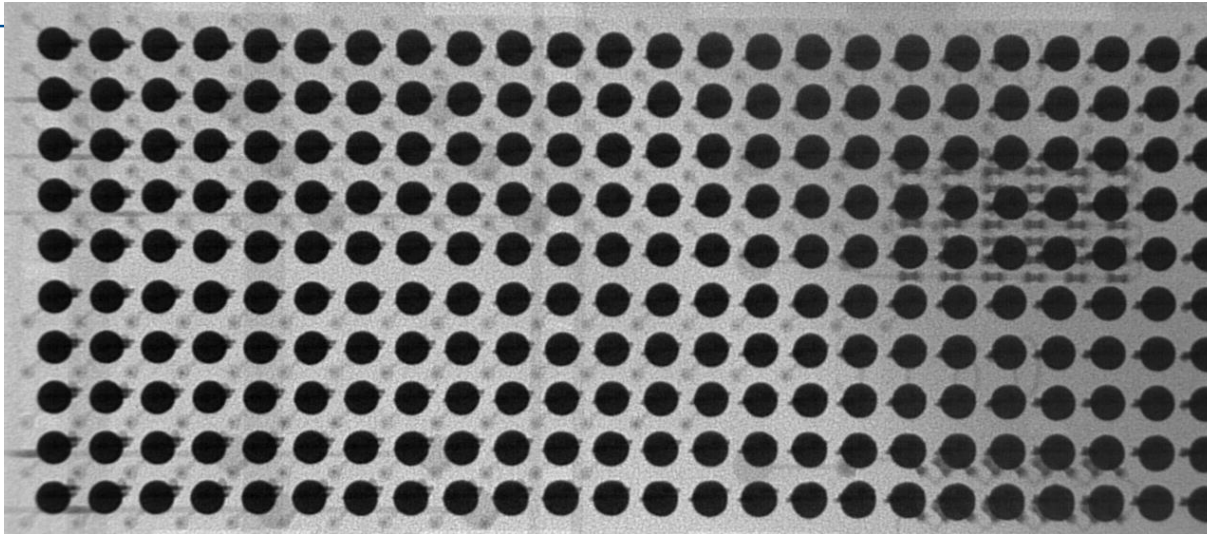
R+R 26 / Z – X-Ray nach Rework 2 – CONN_FCI_74390



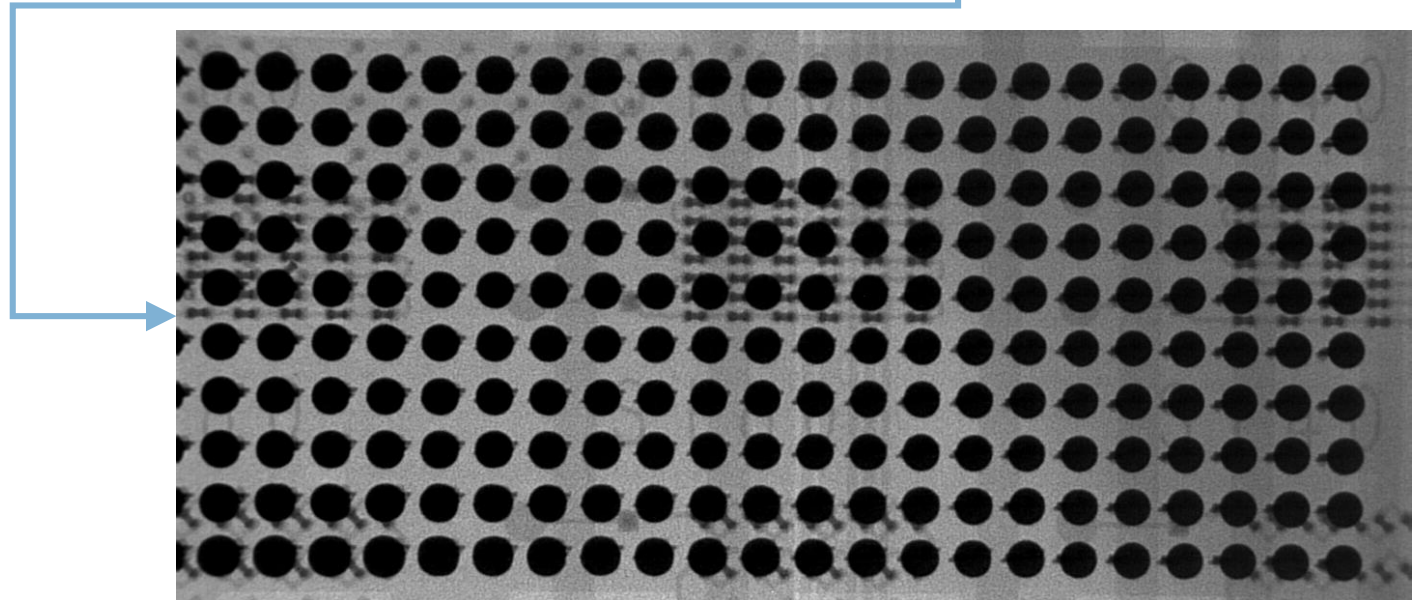
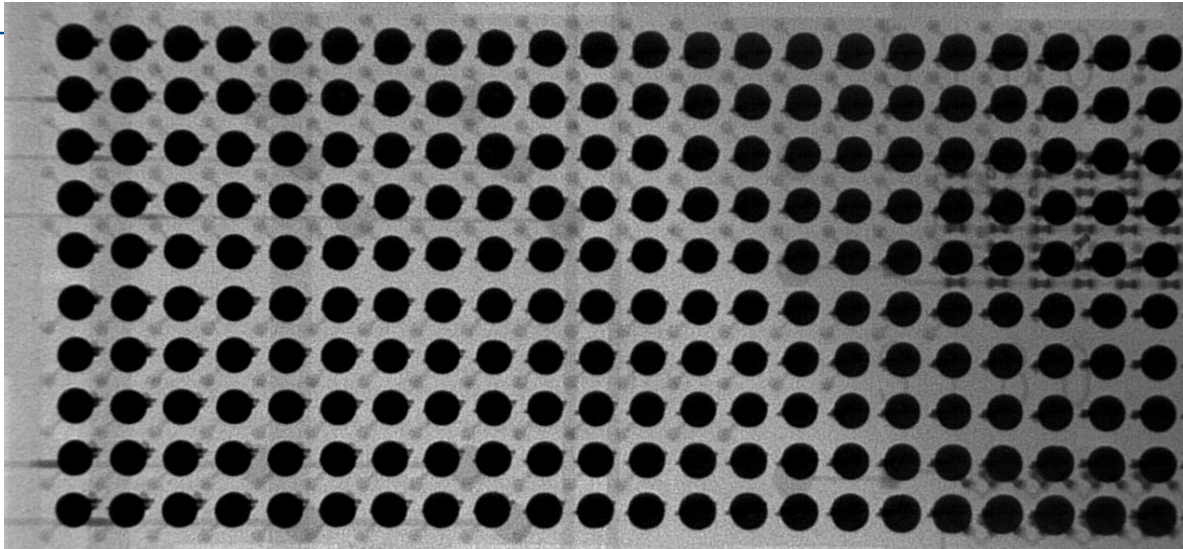
R+R 28 / Z – X-Ray nach Rework 3 – CONN_FCI_74390



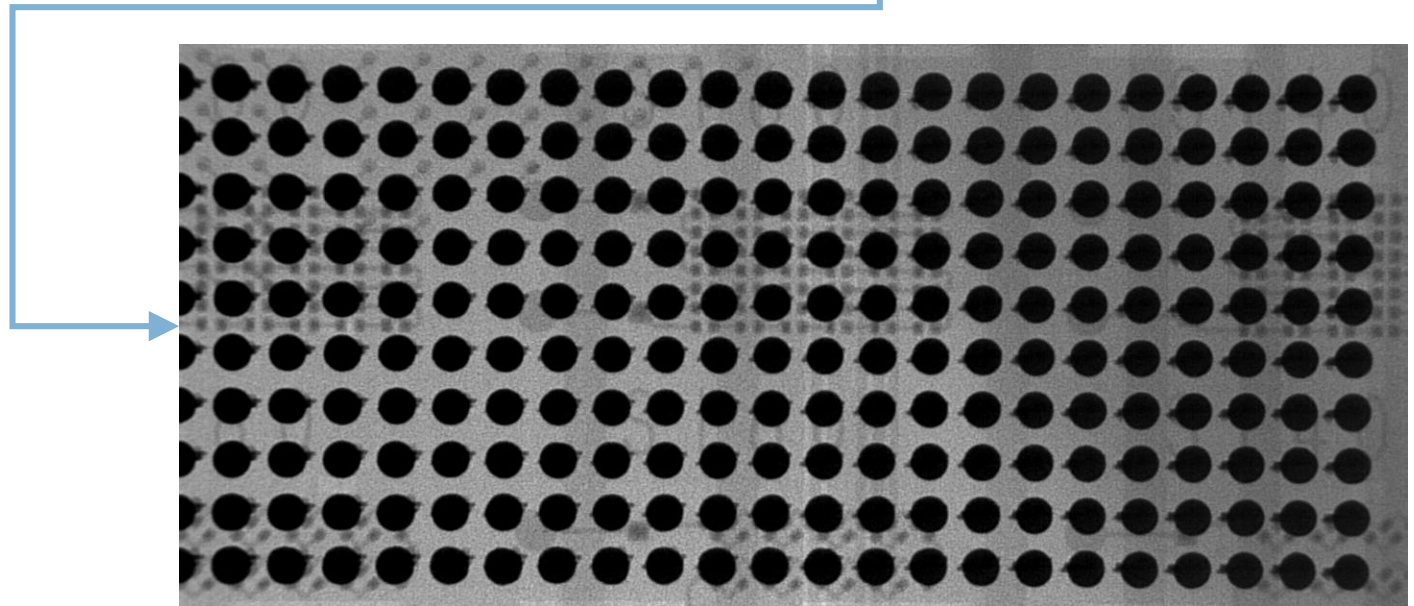
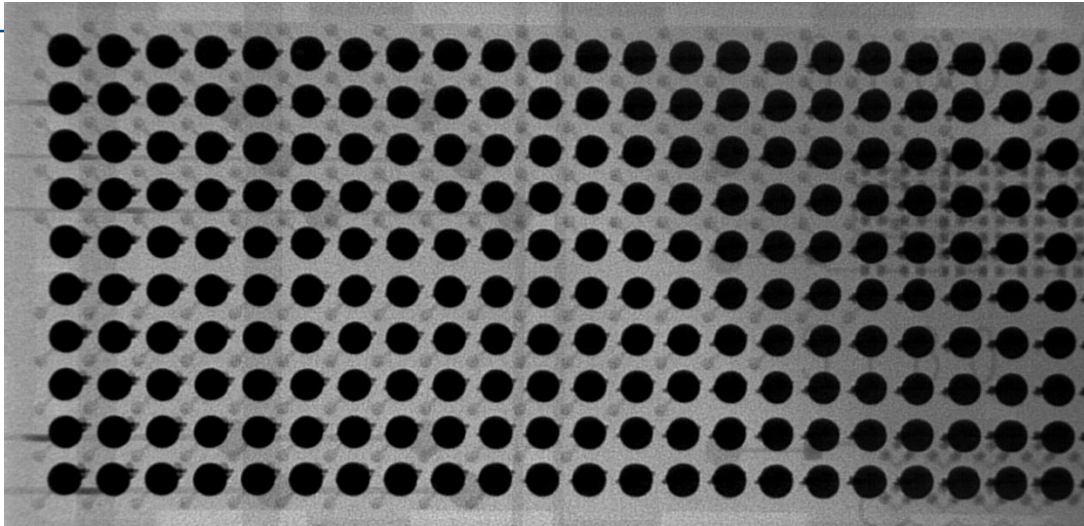
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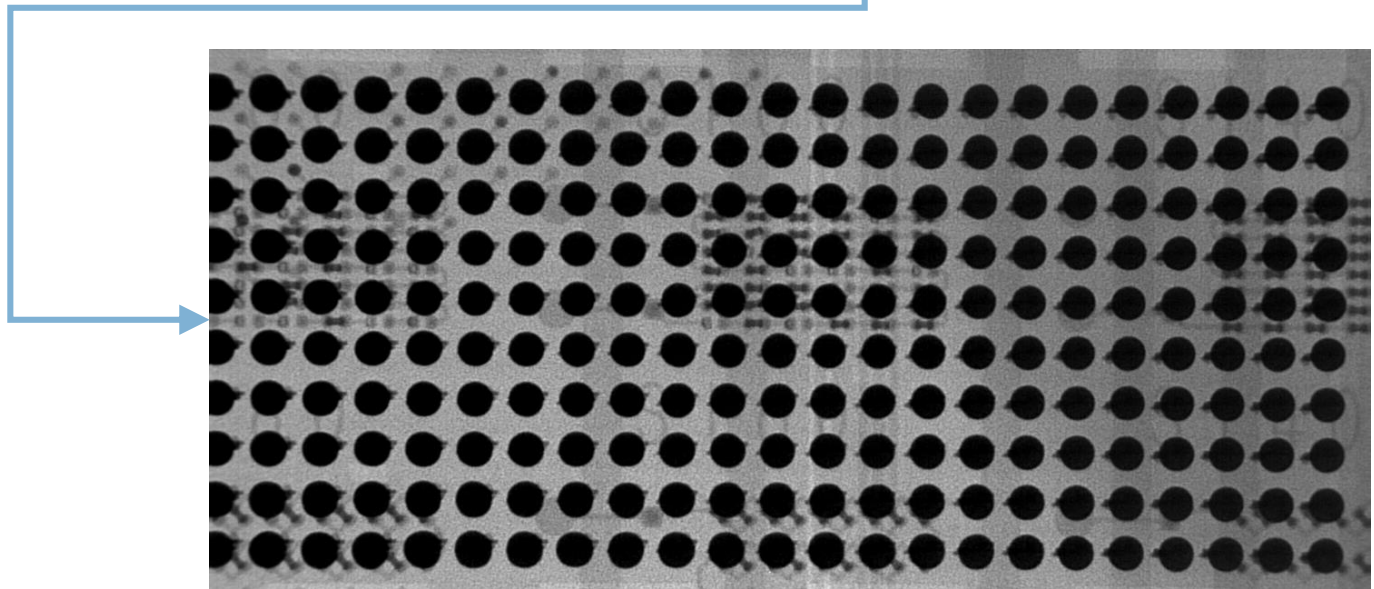
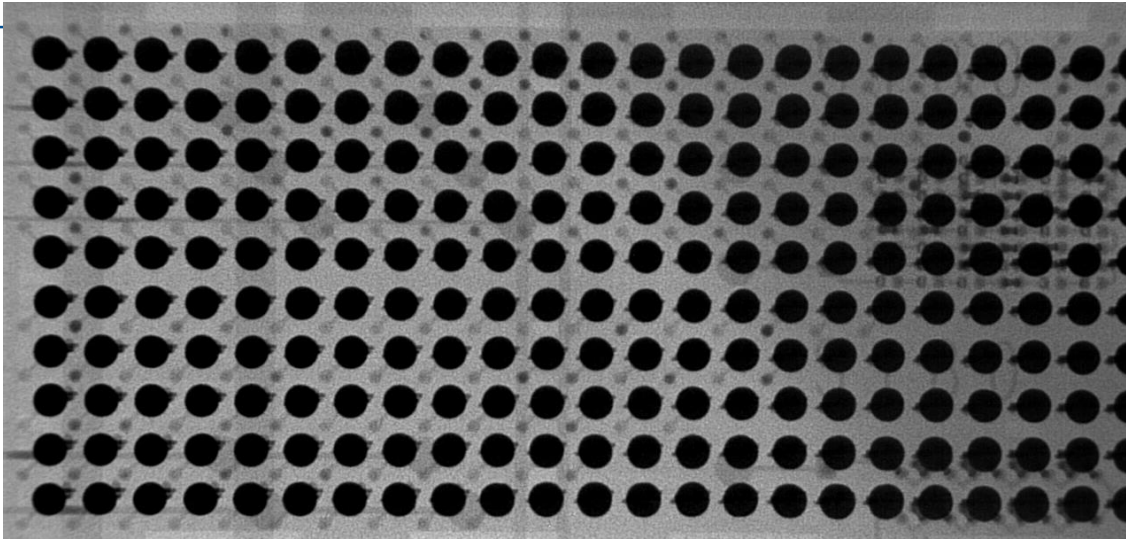
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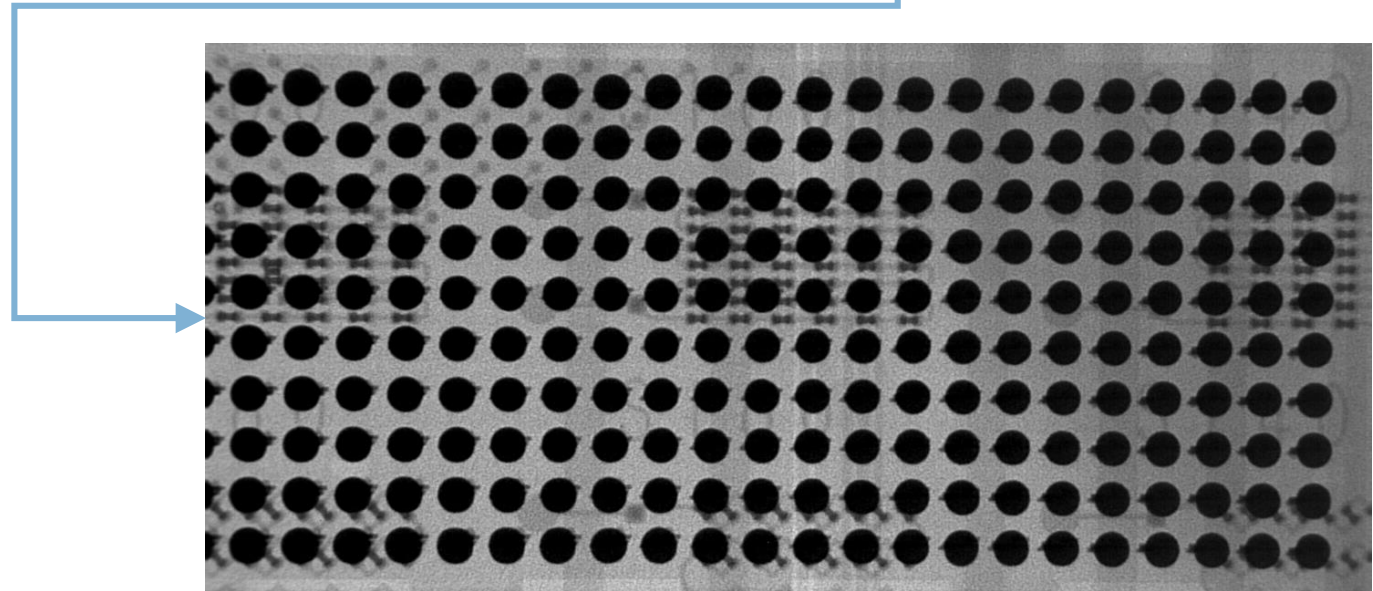
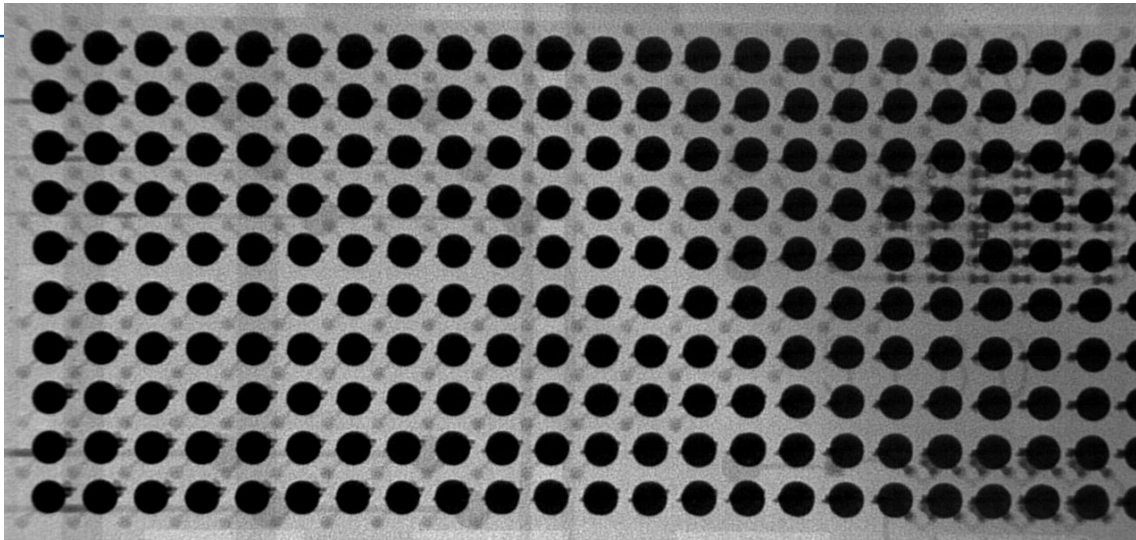
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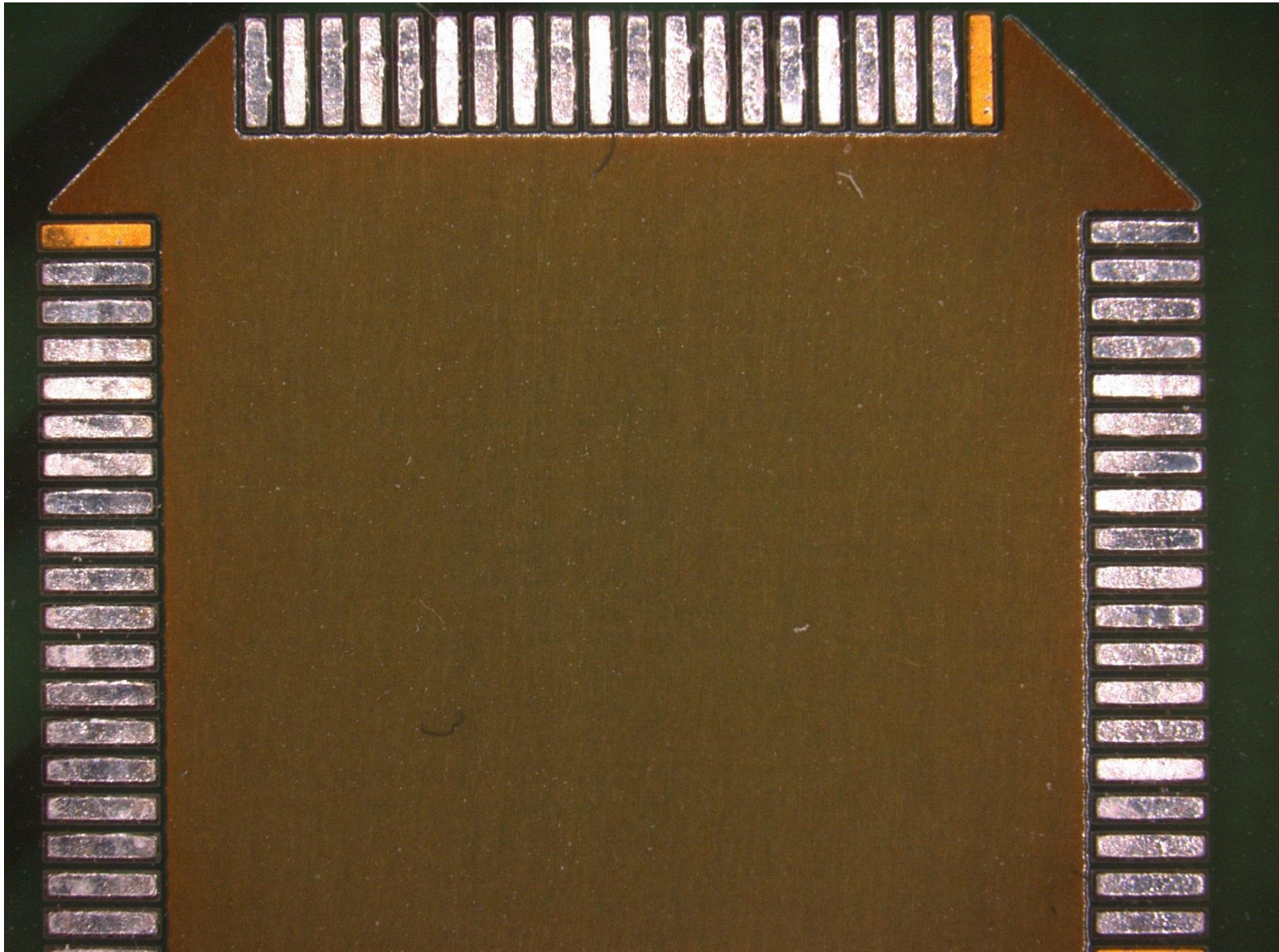
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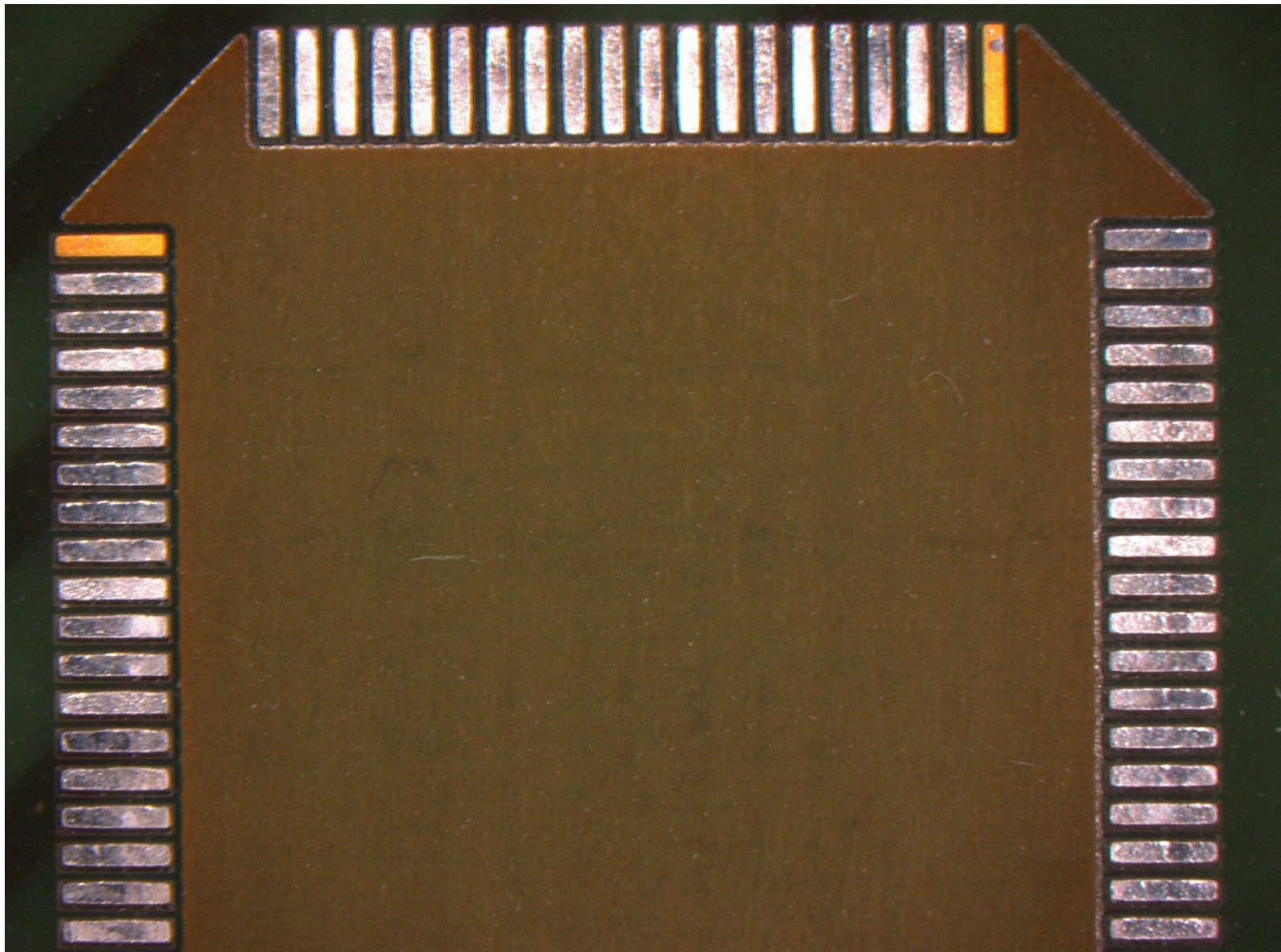


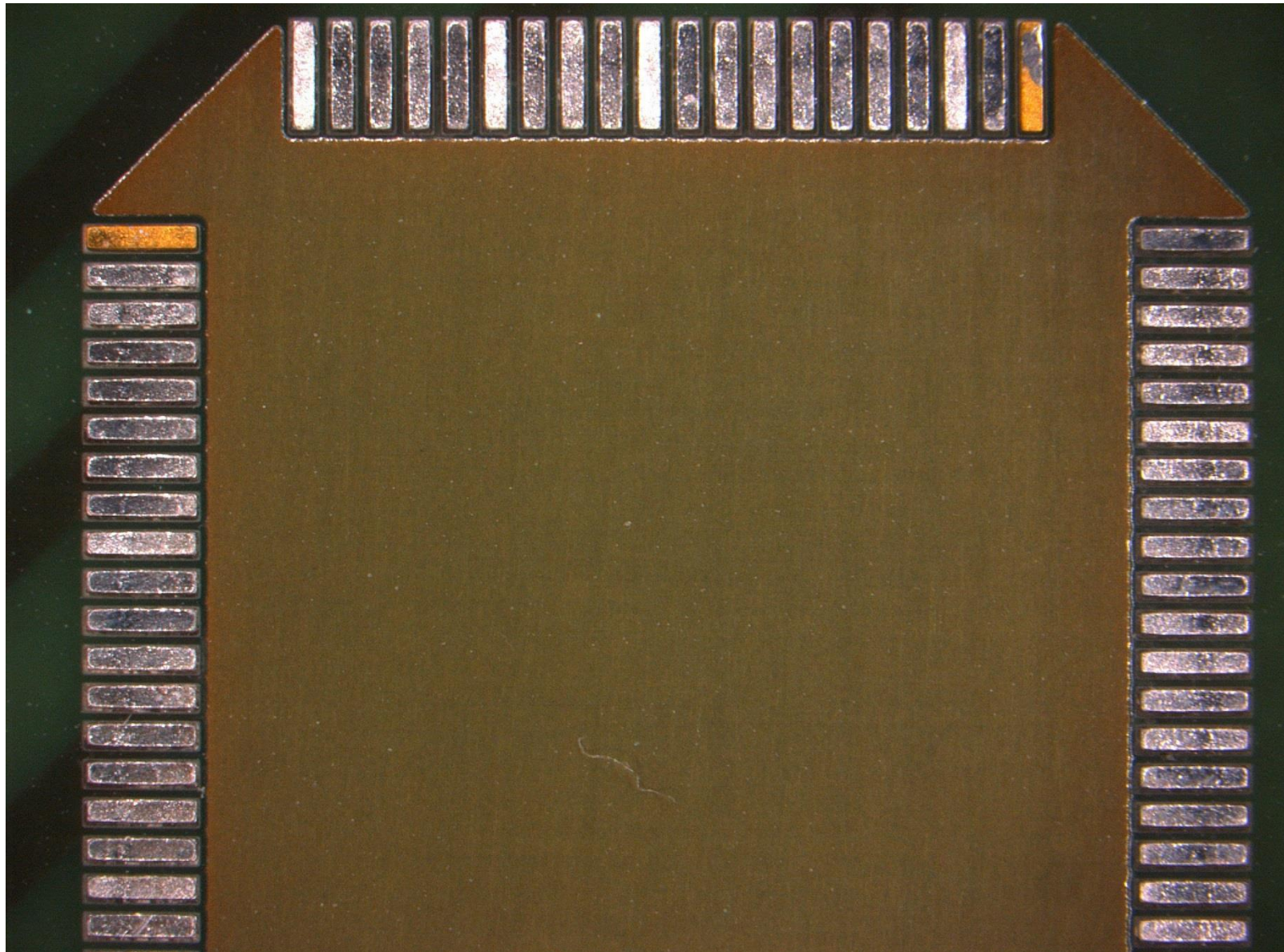
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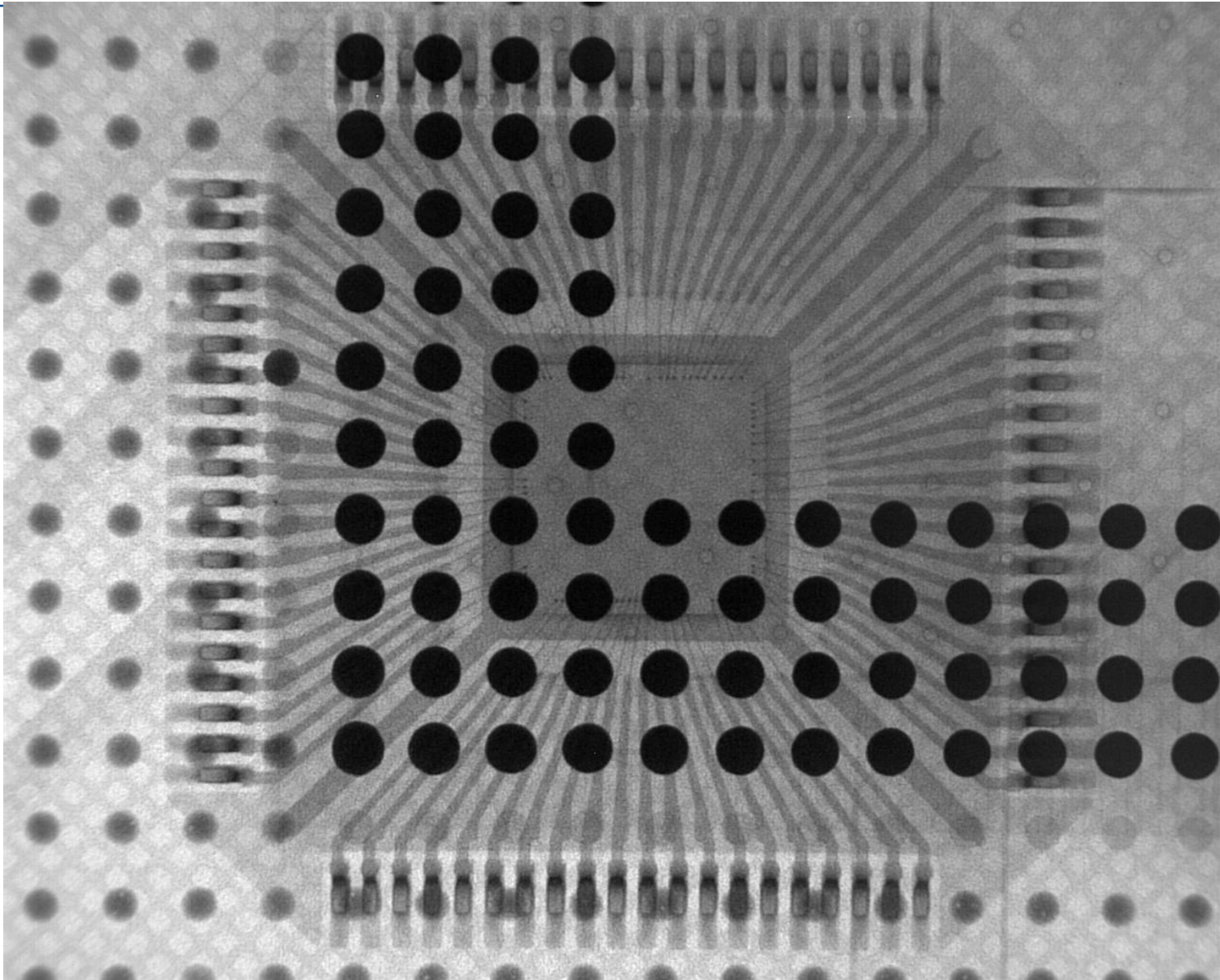


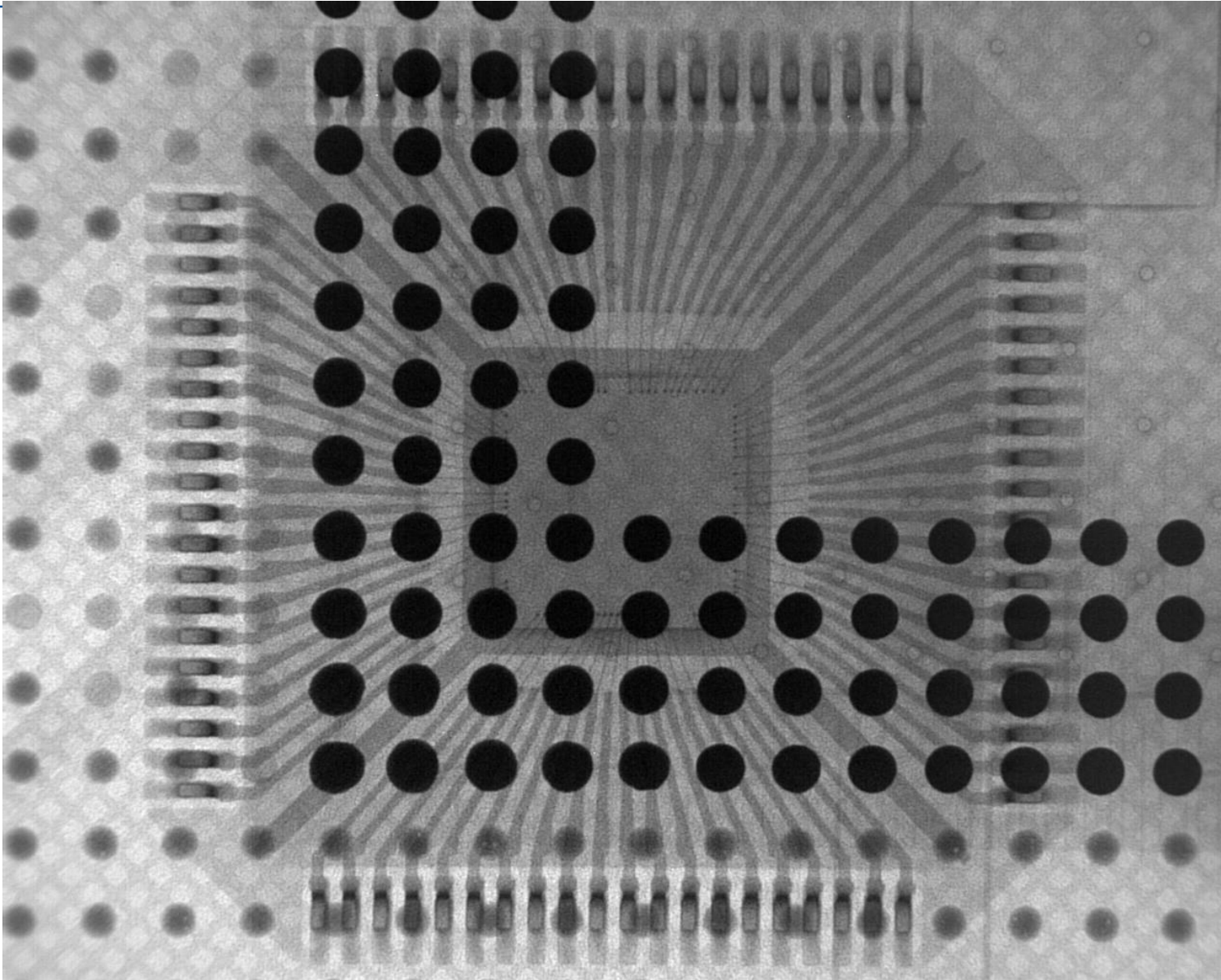
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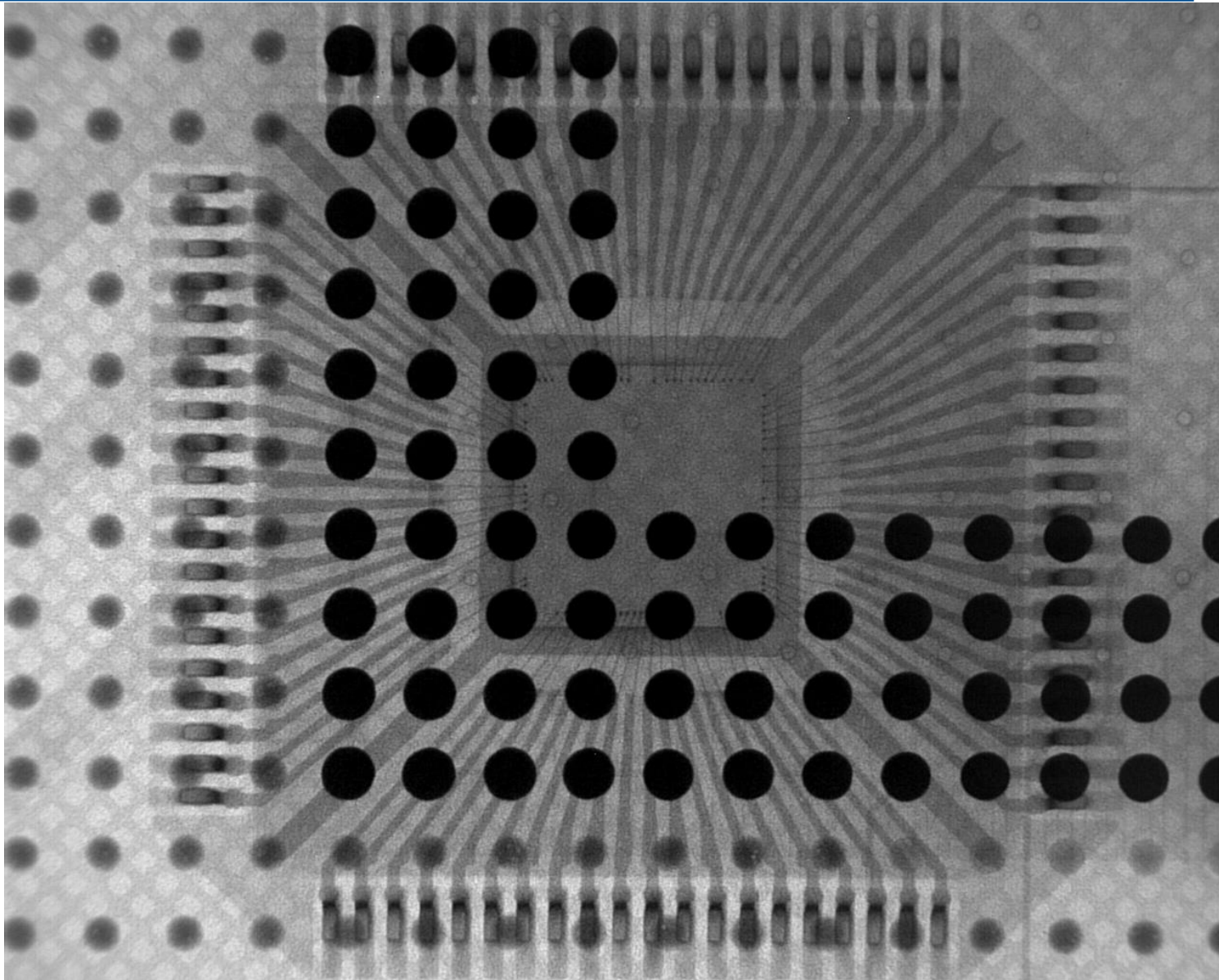


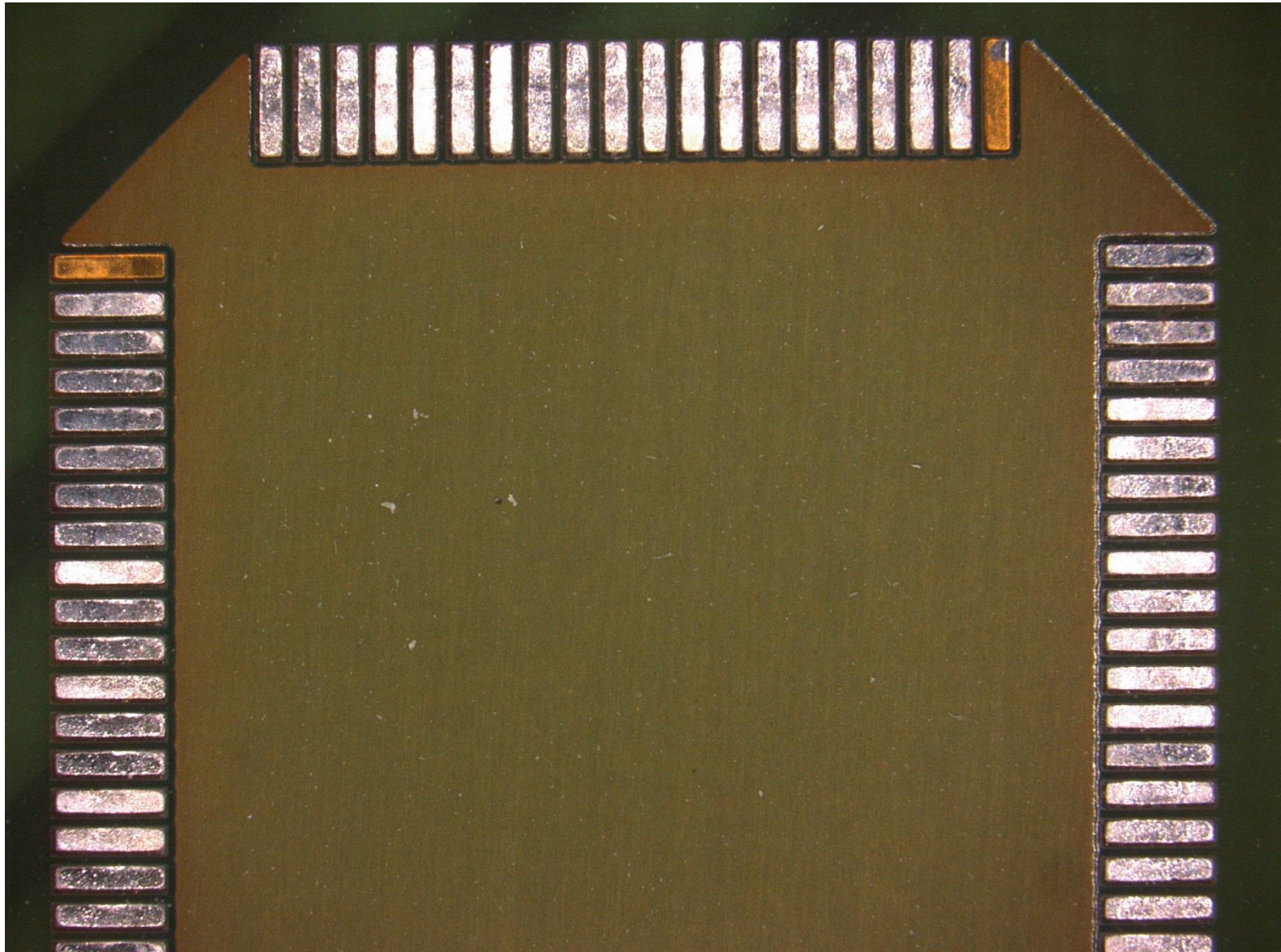


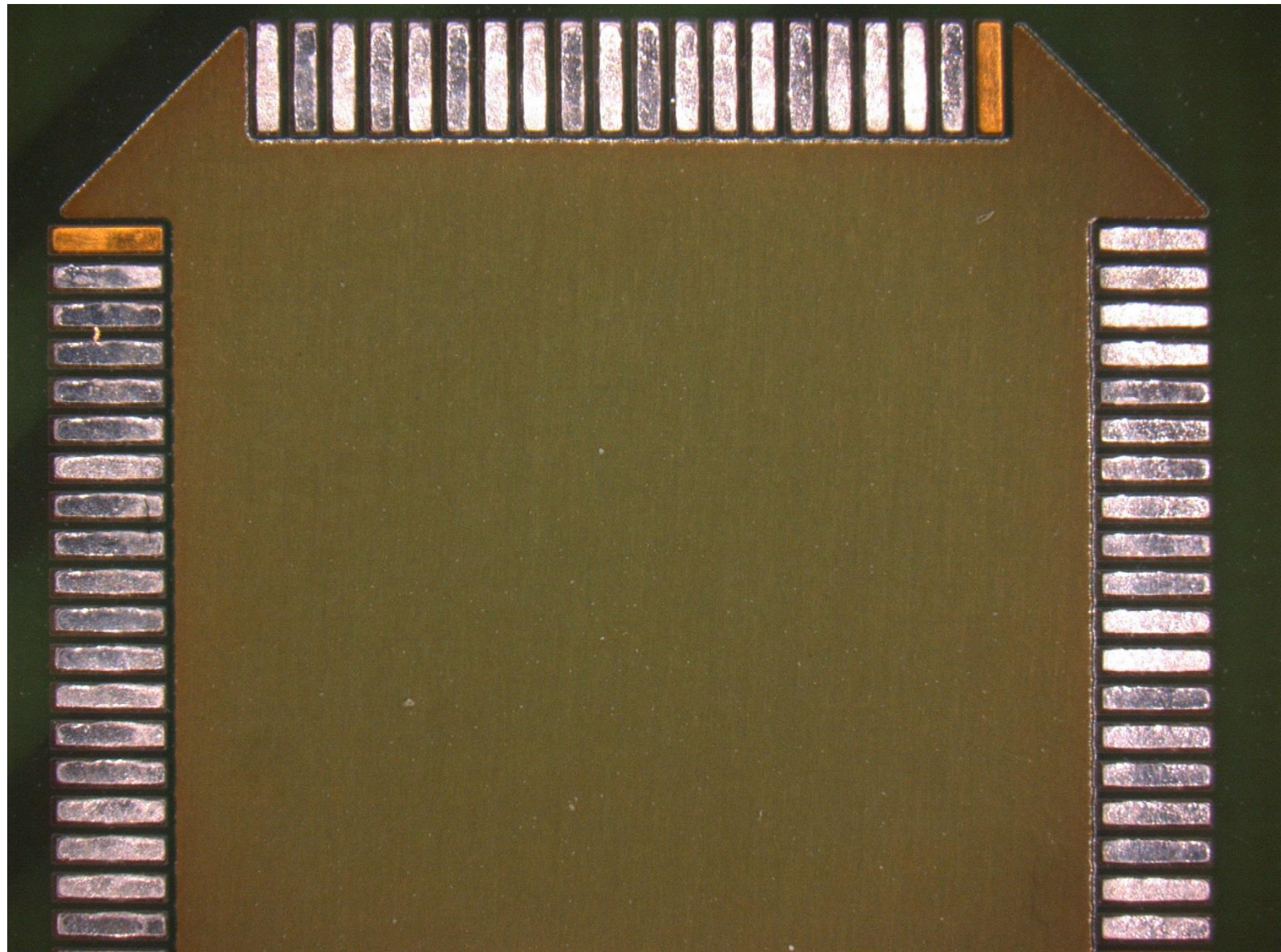


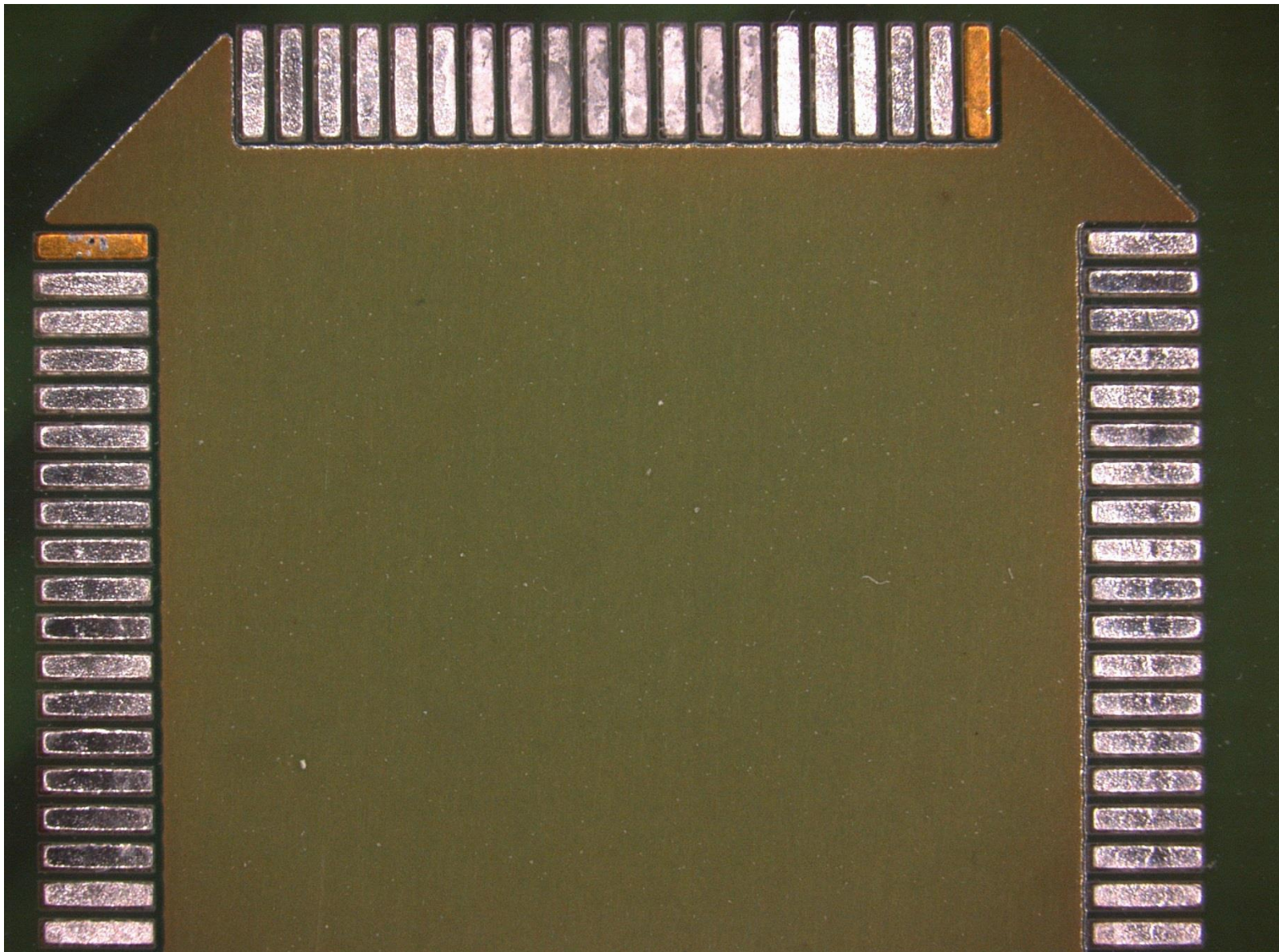


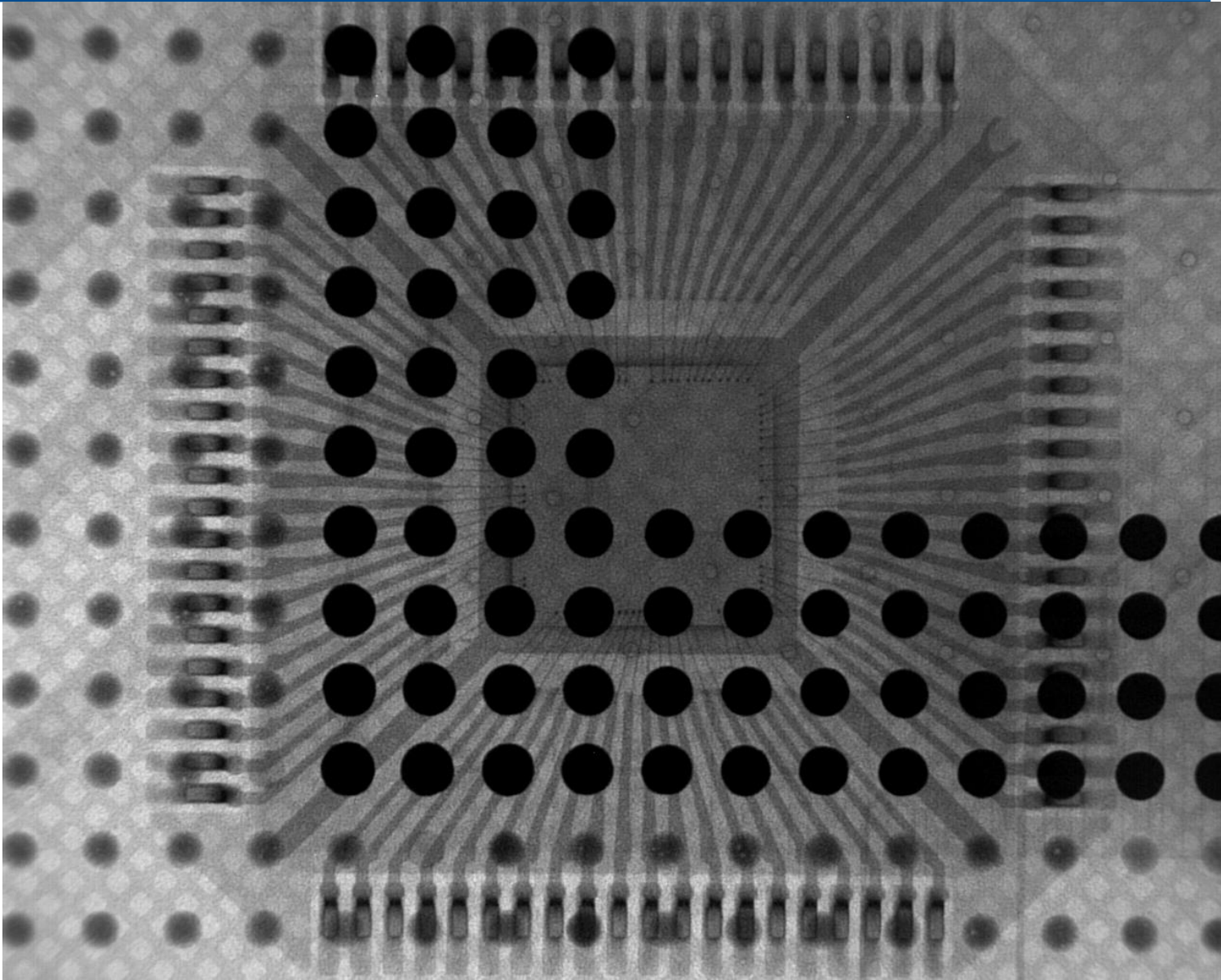


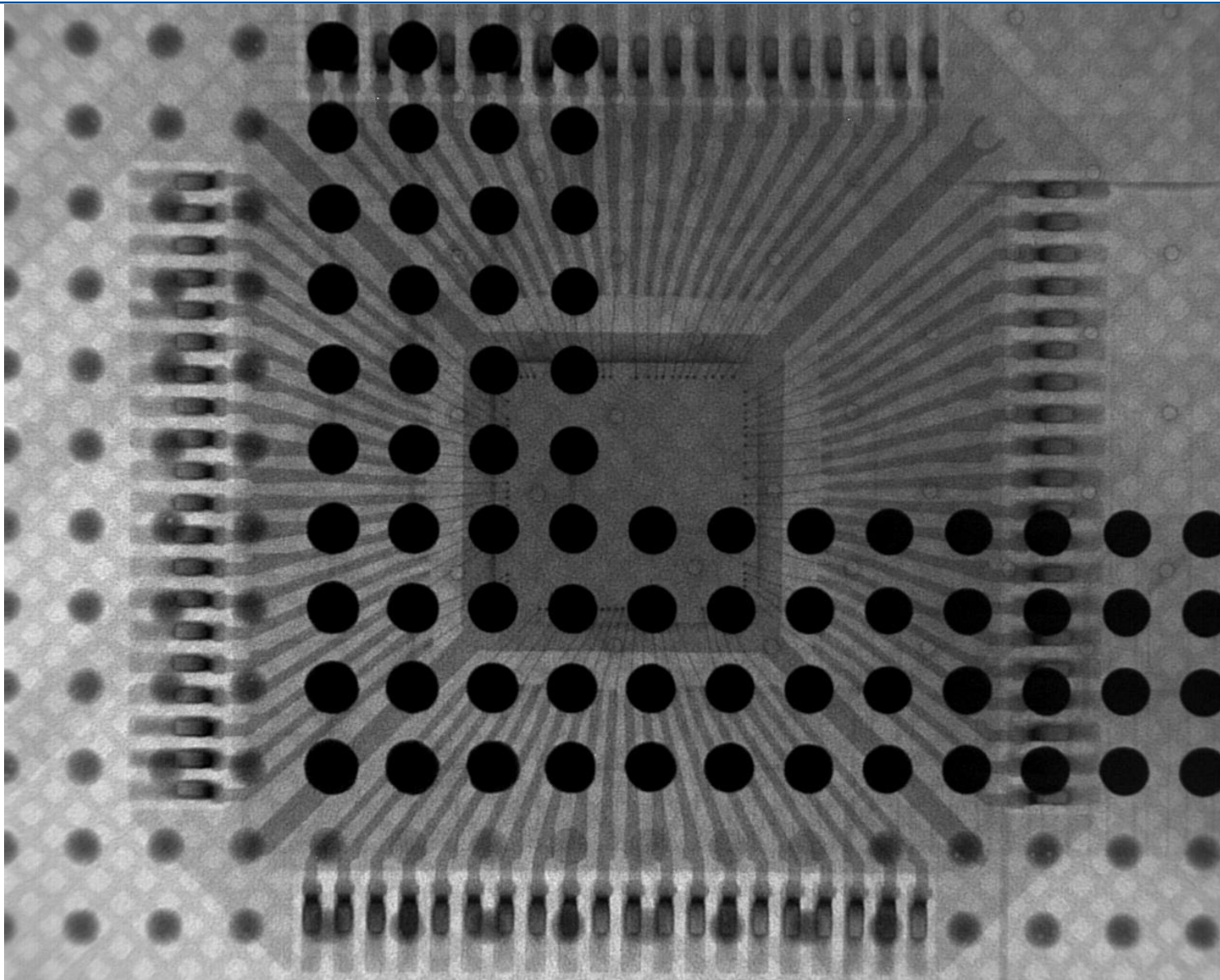


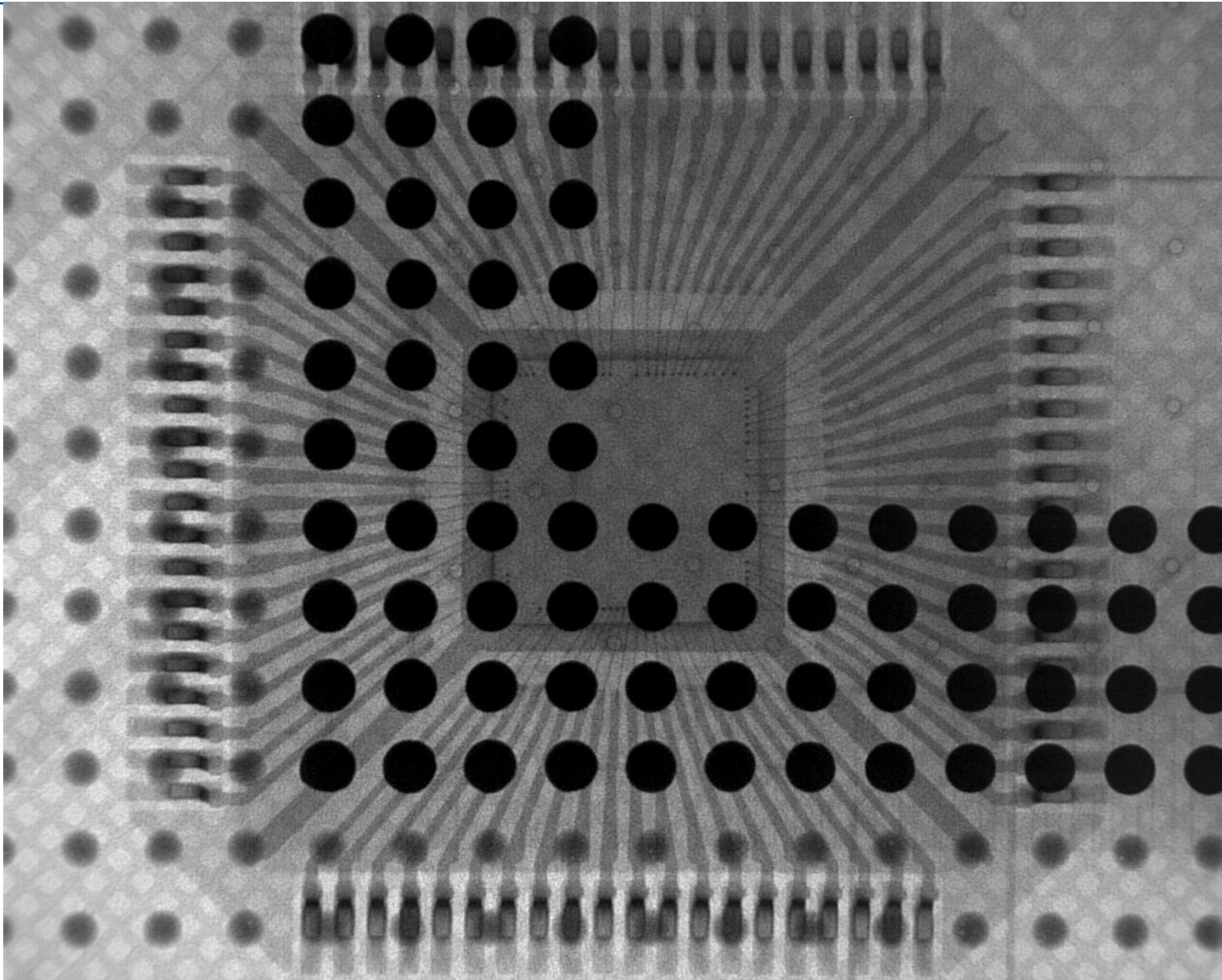




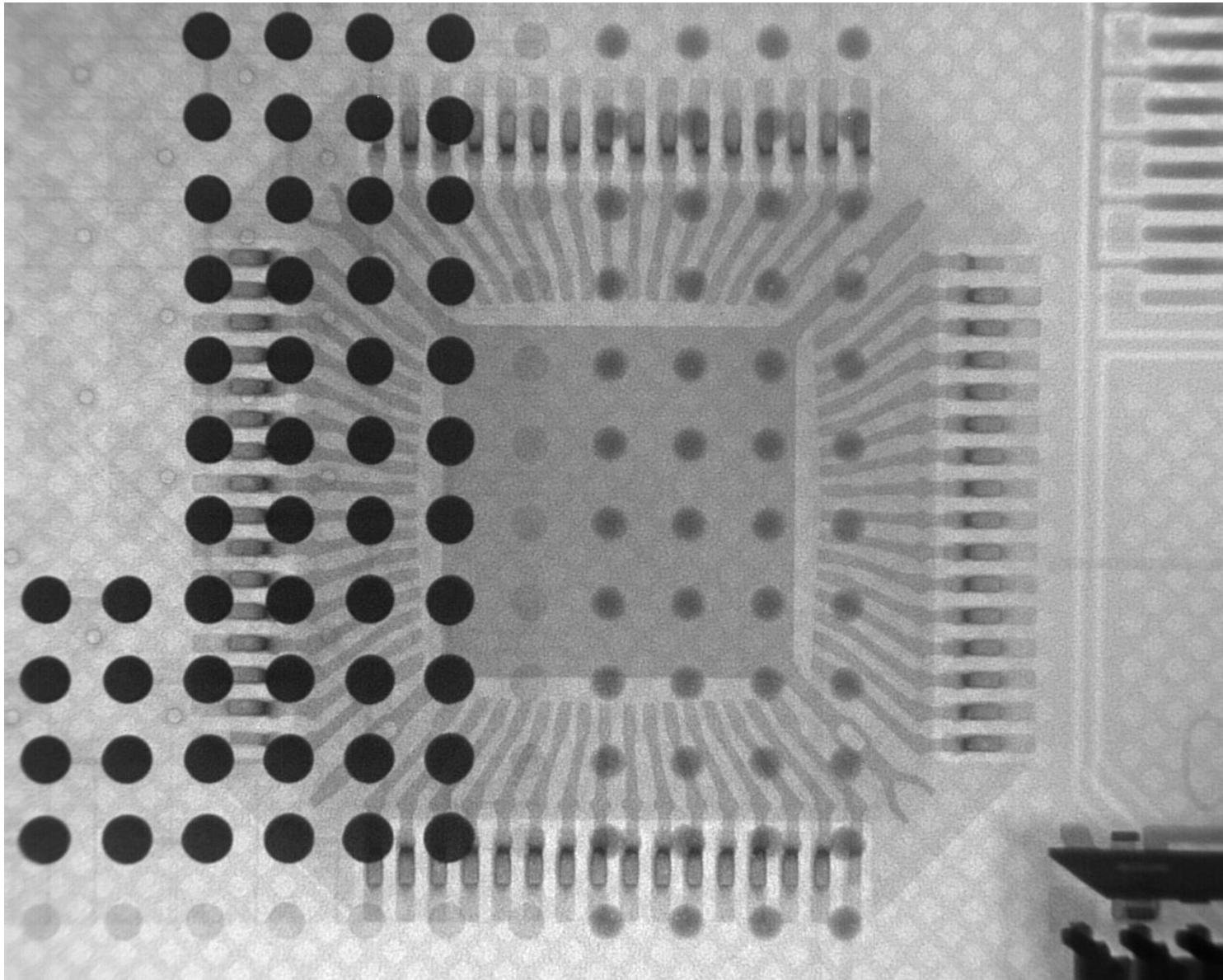


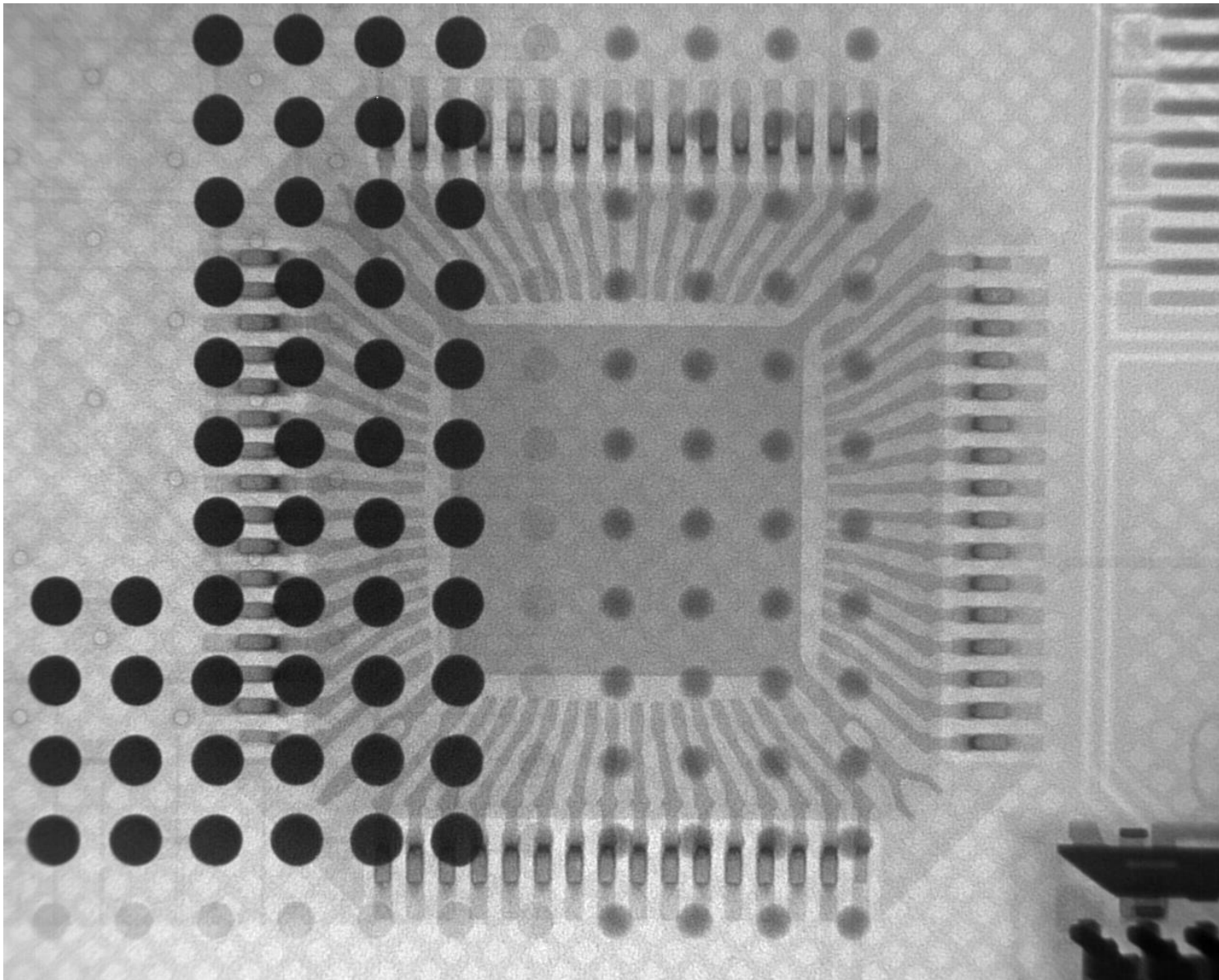


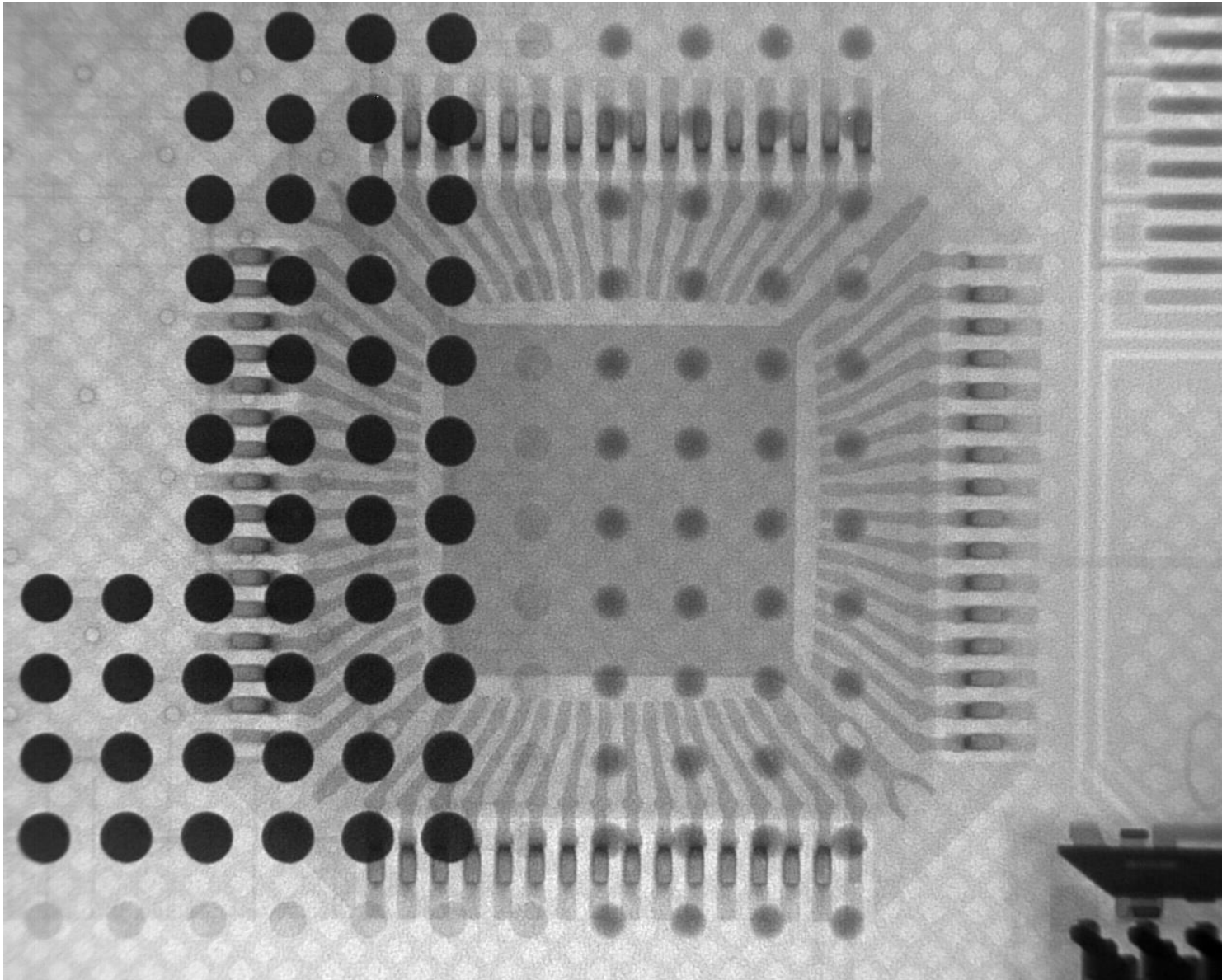


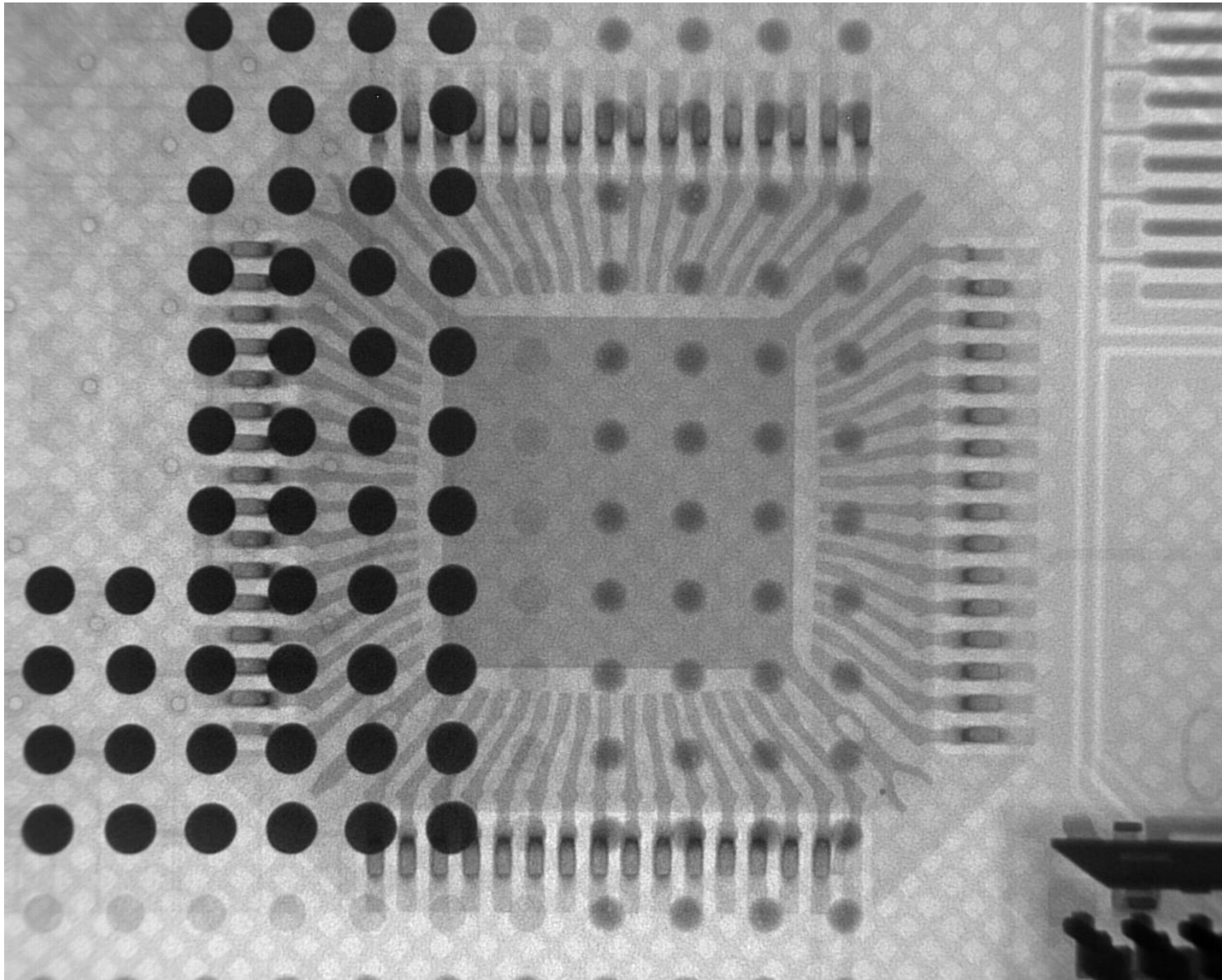


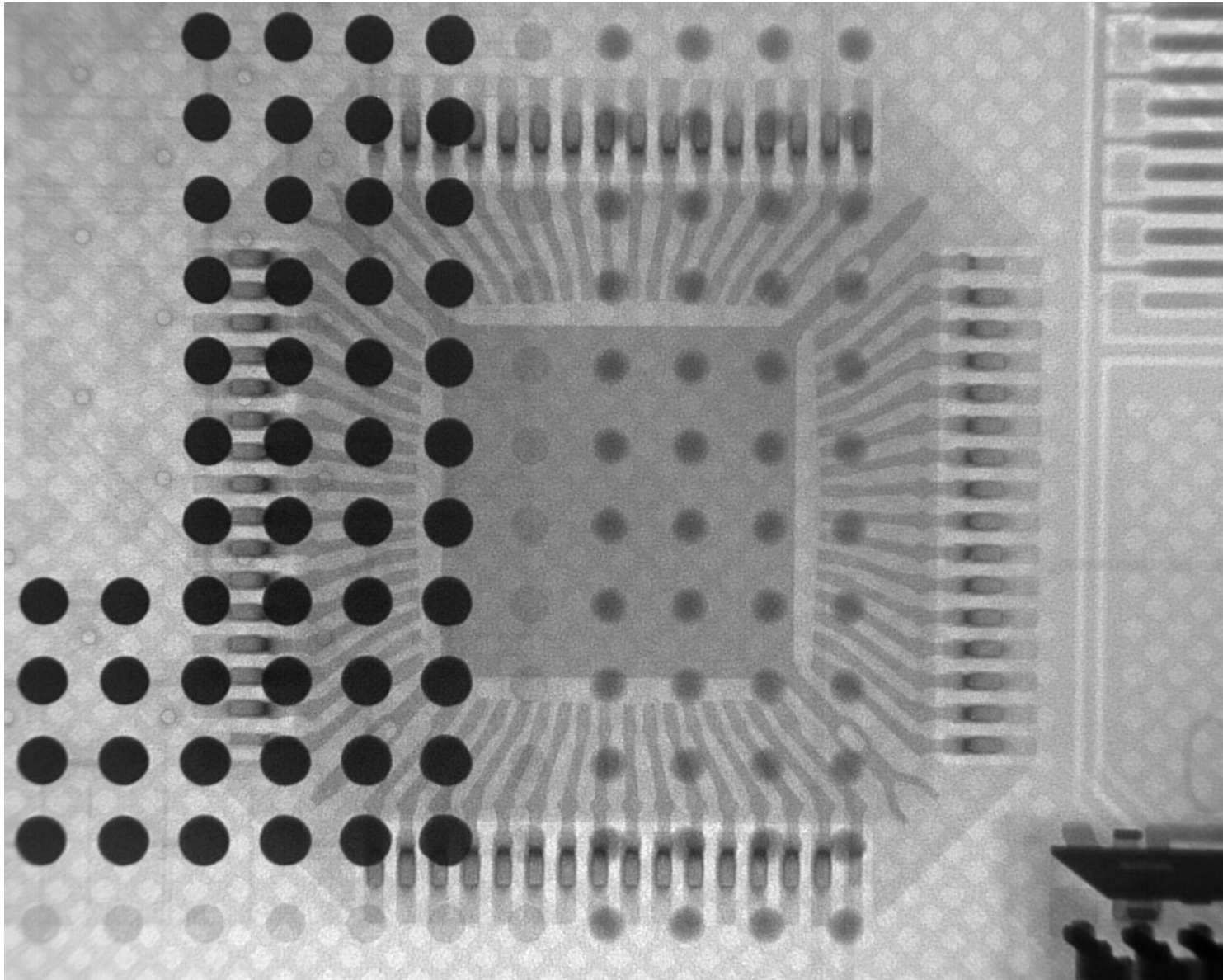
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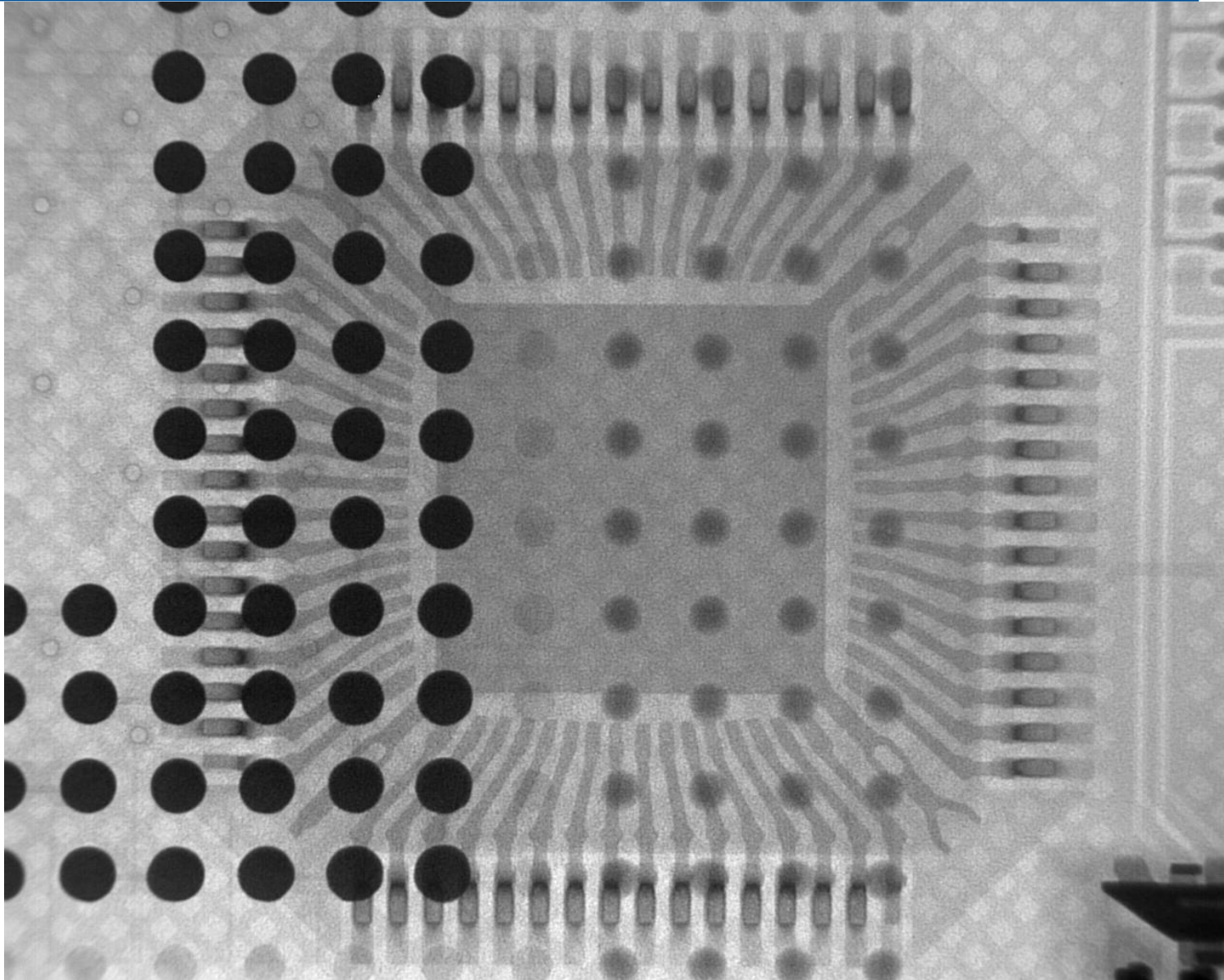


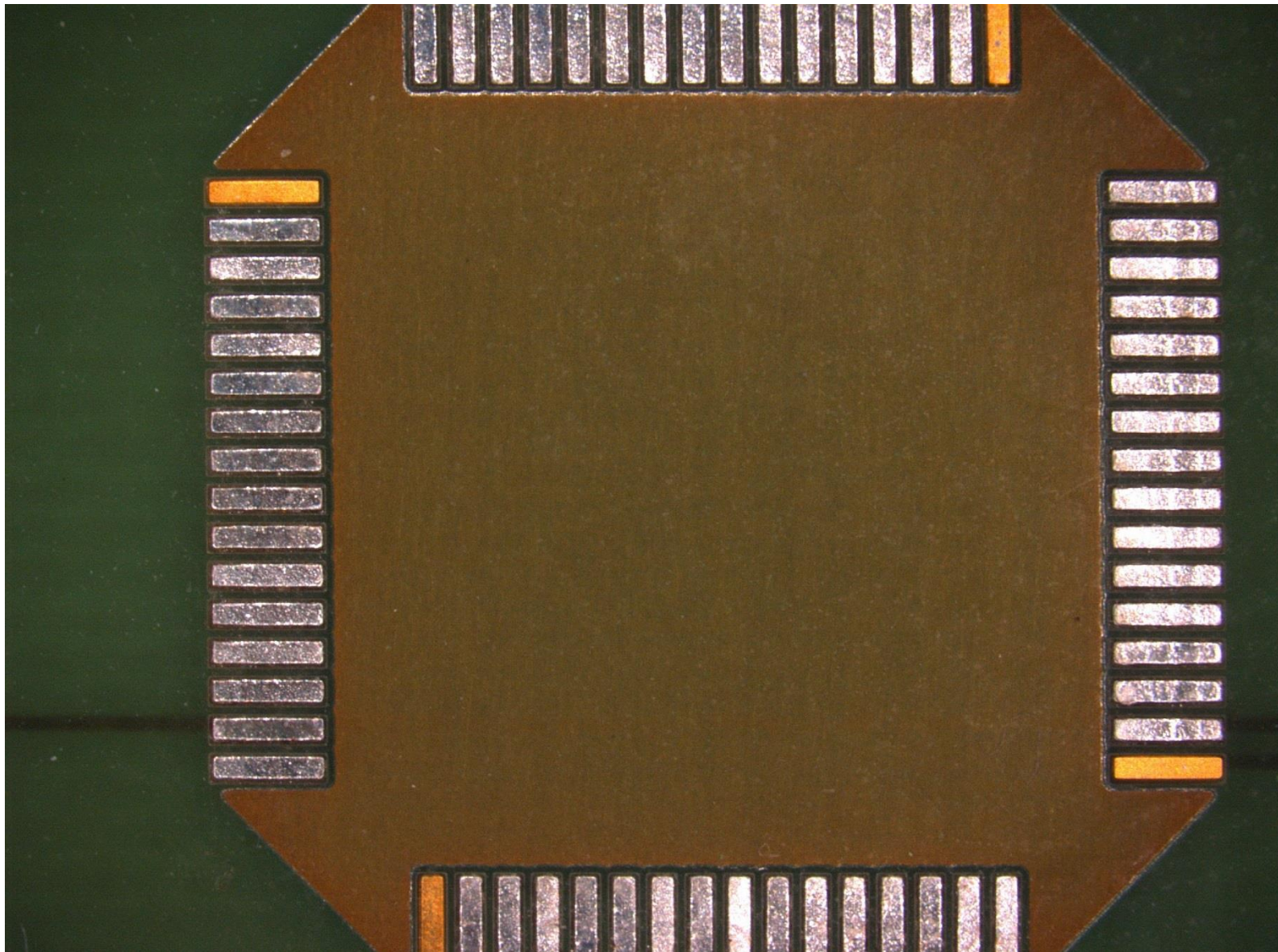




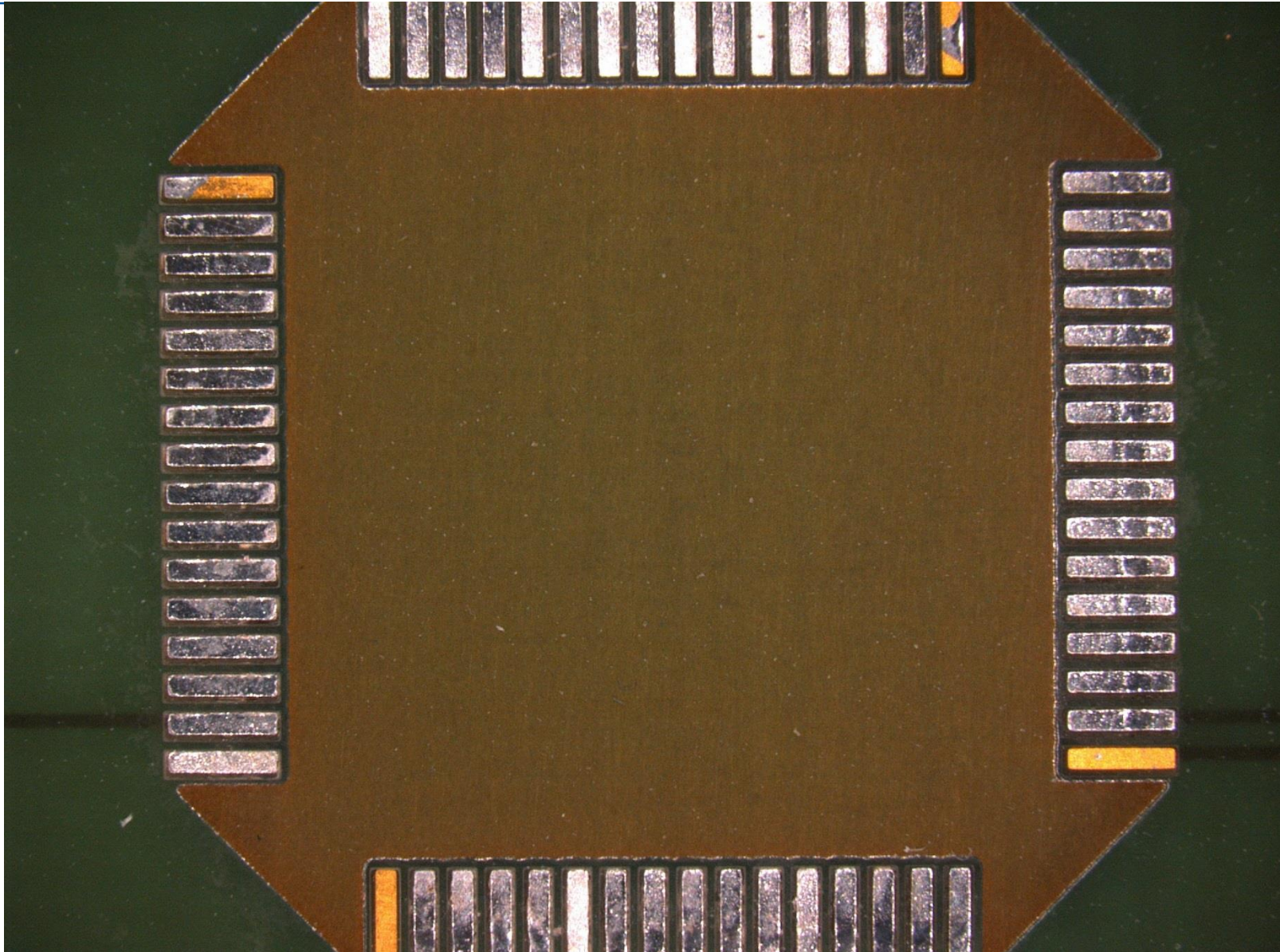


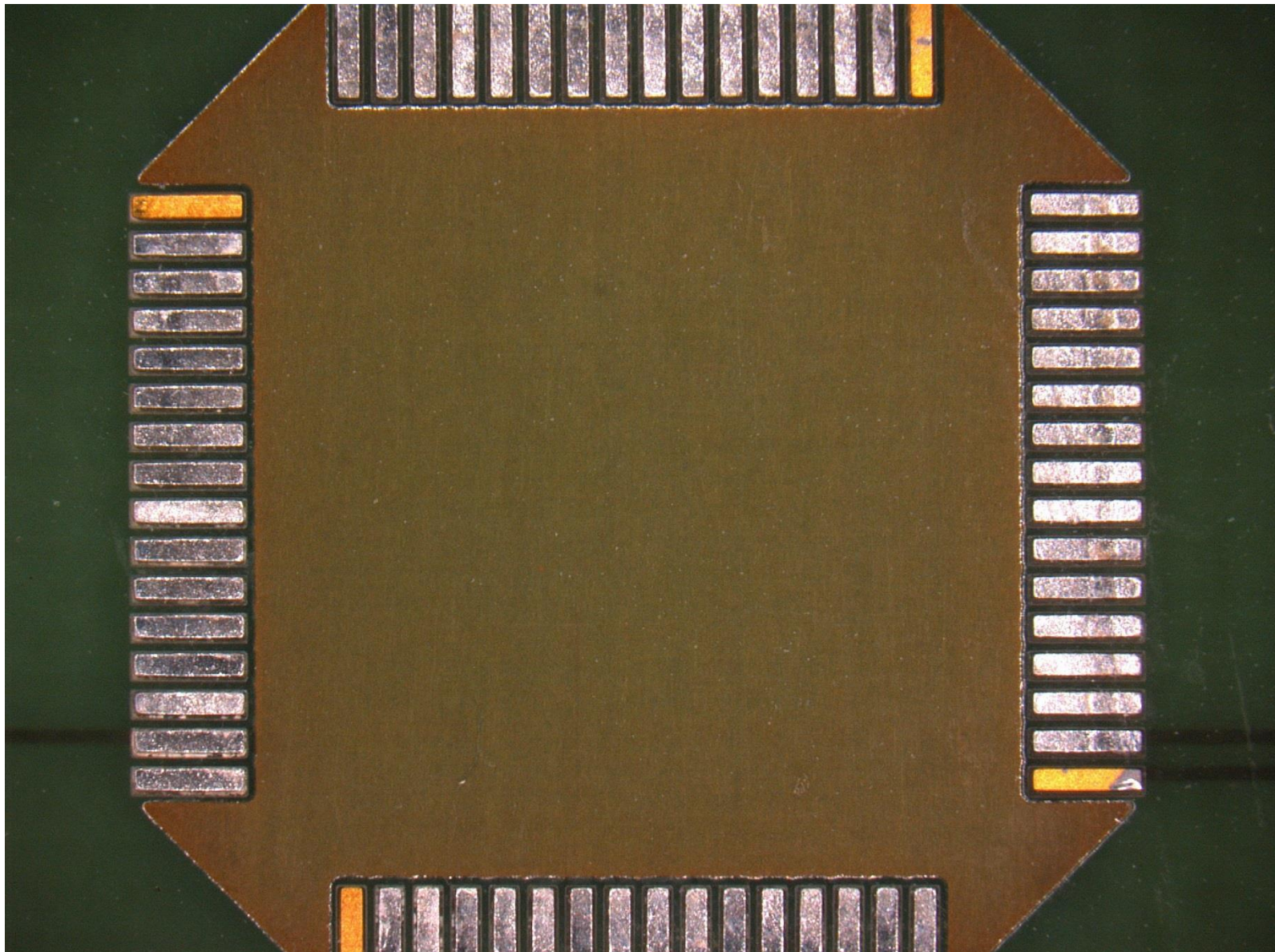


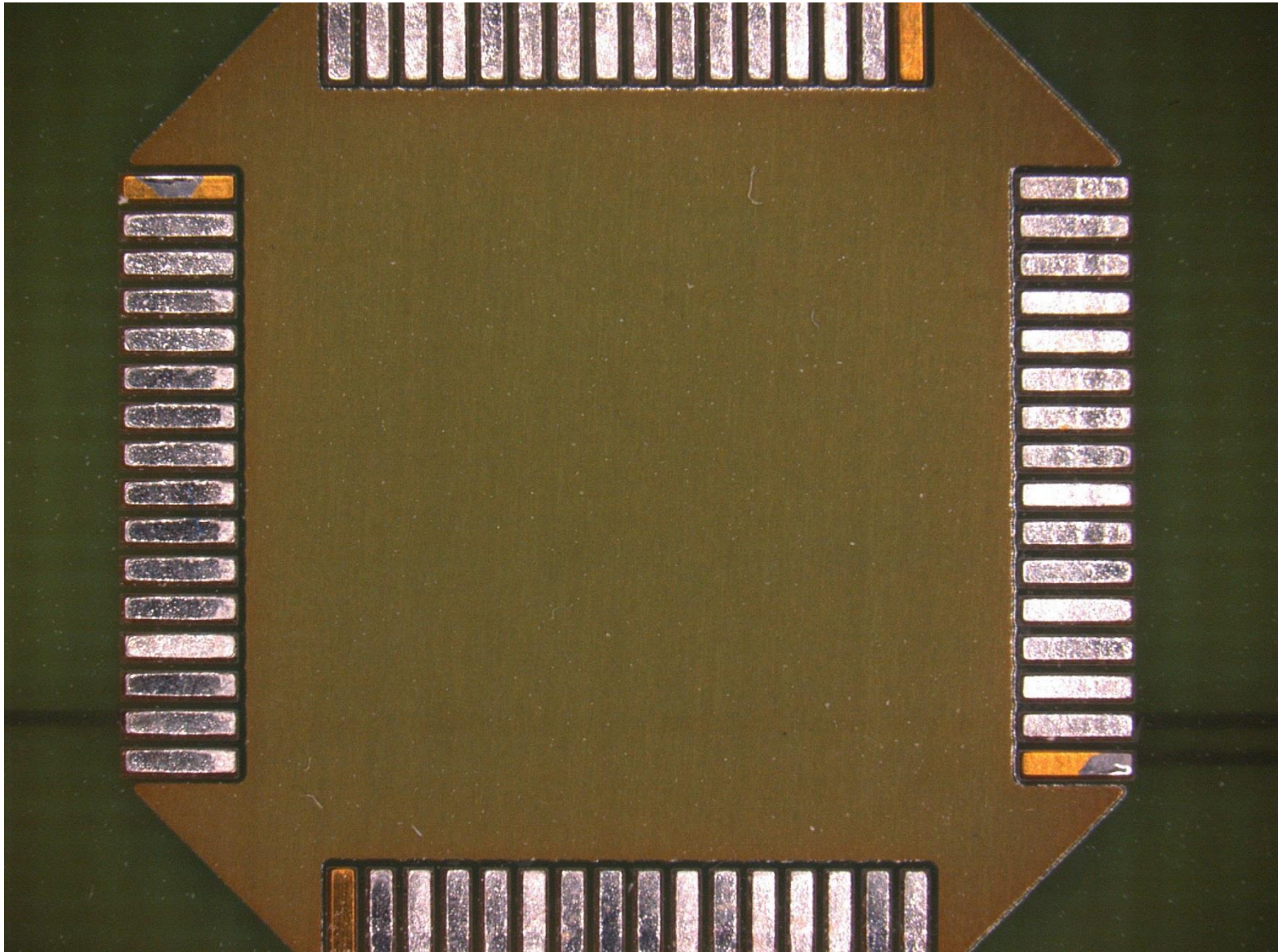


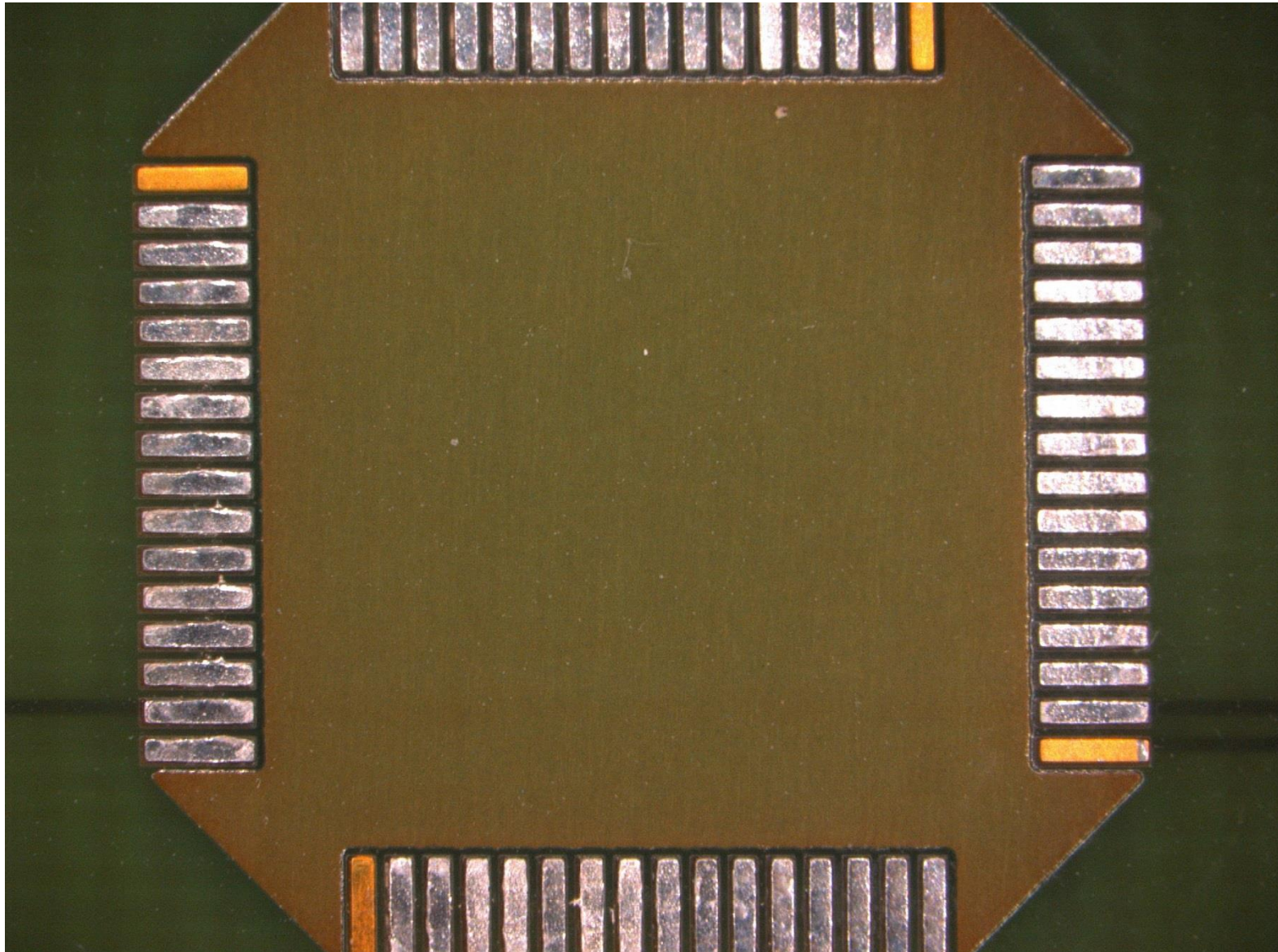


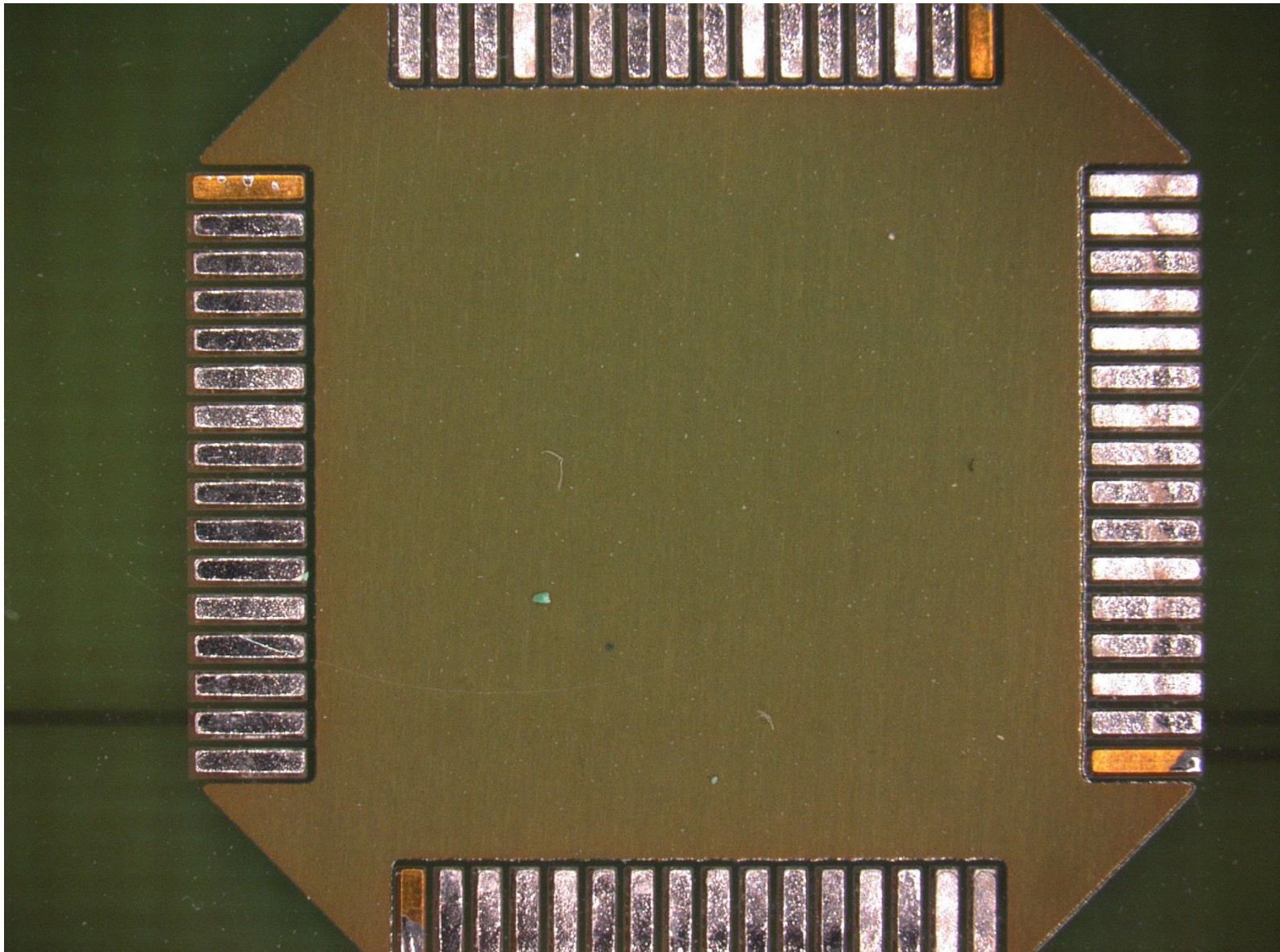
R+R 26 / Z – Optisch nach Absaugen – S-PQFP-G64

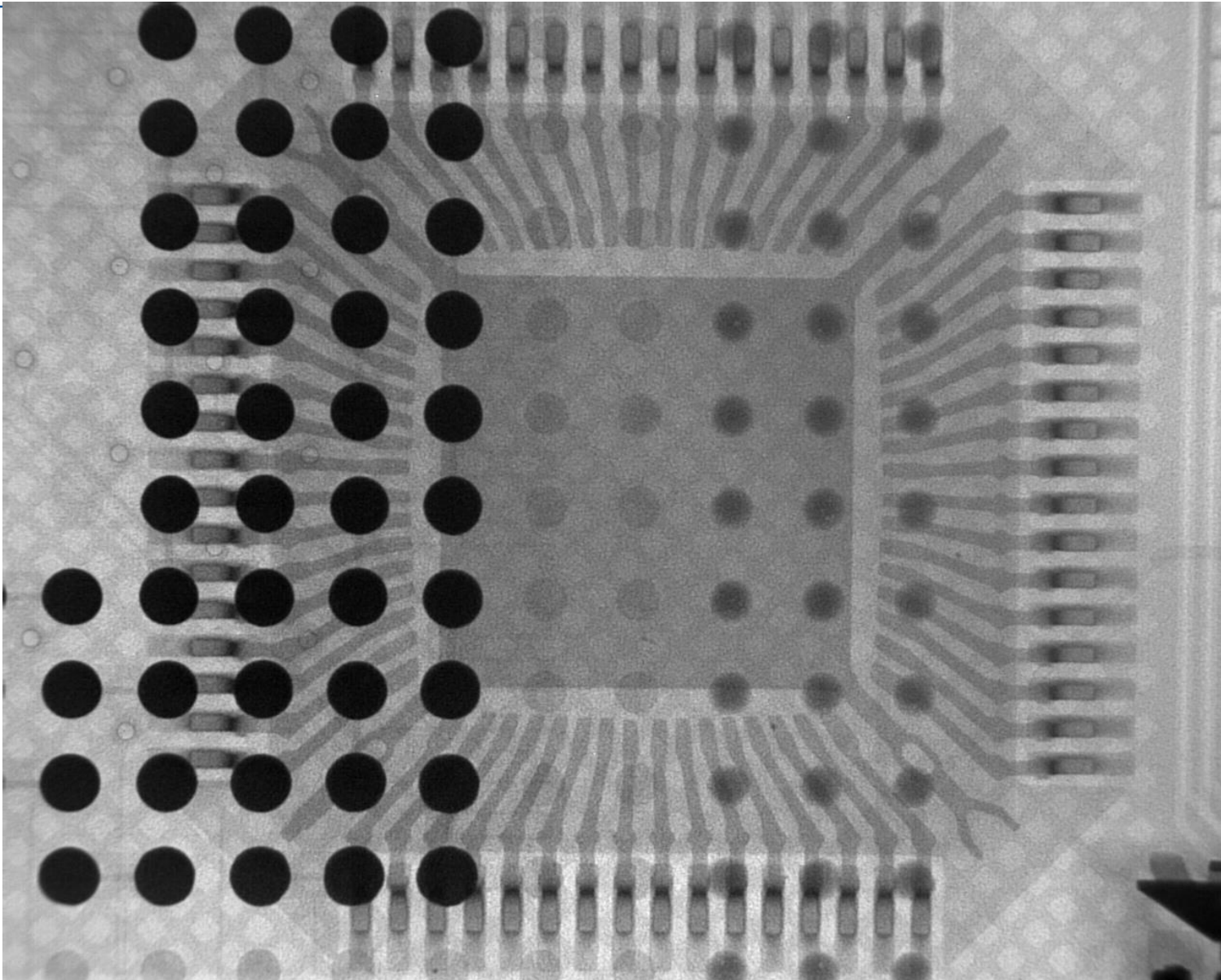


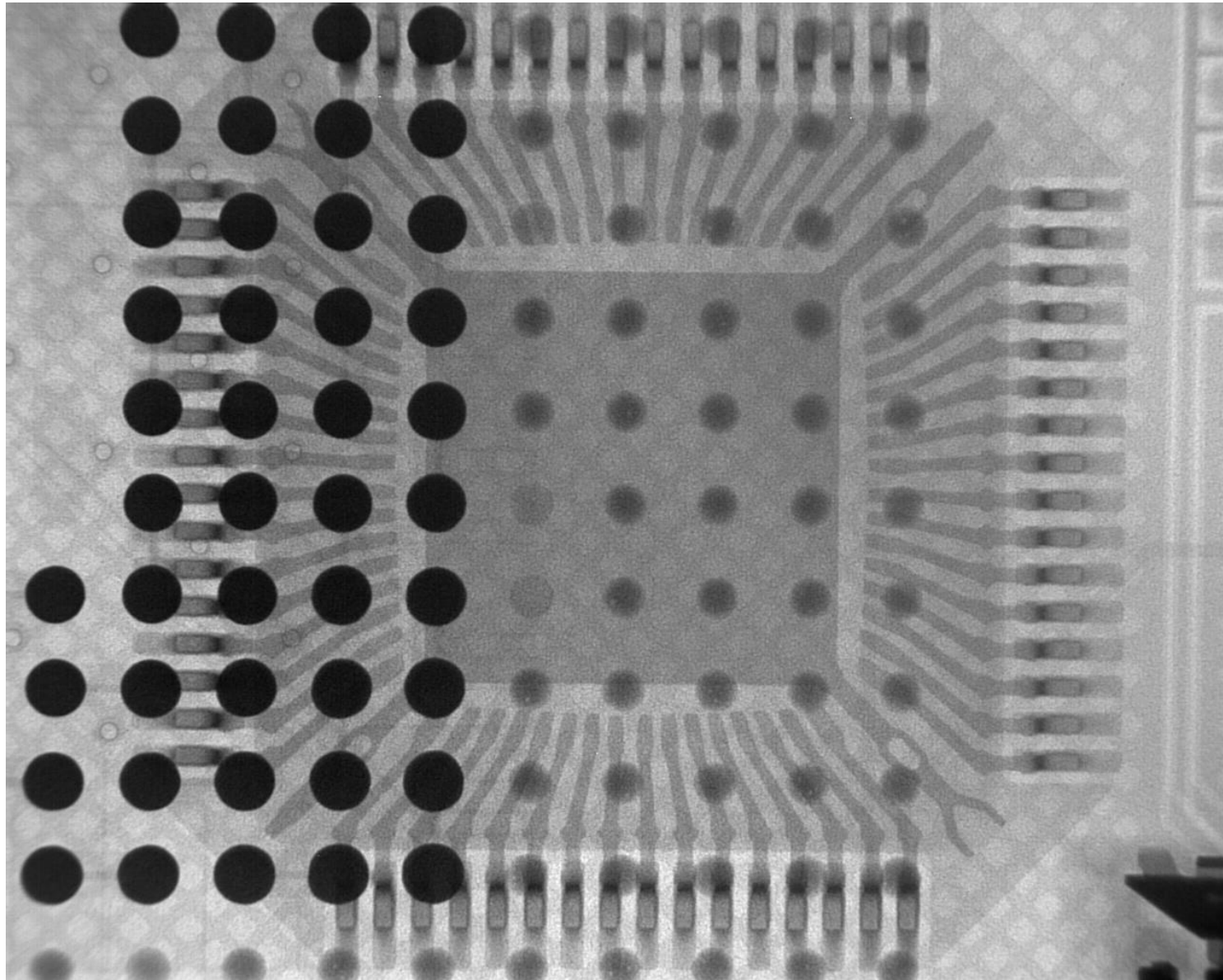


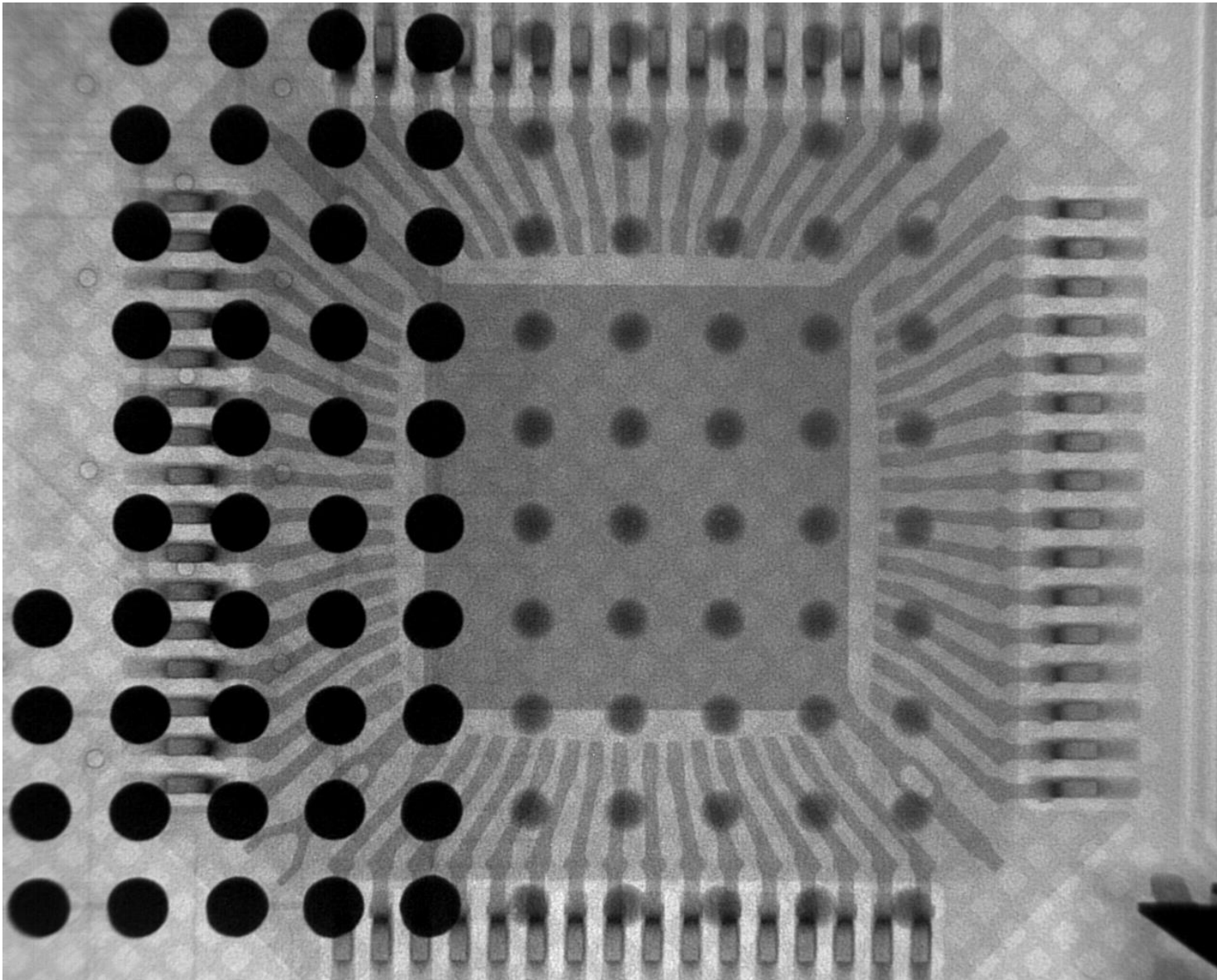


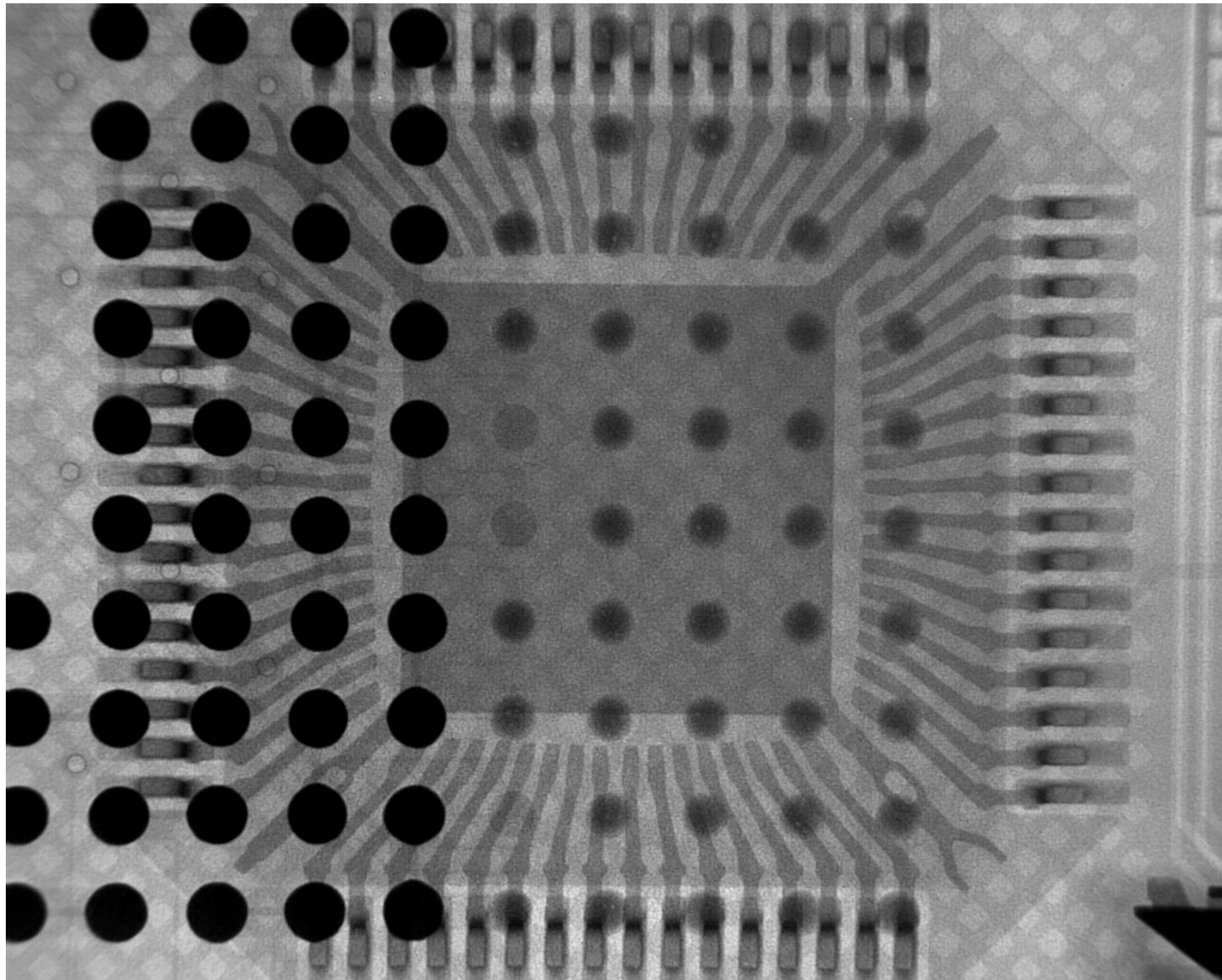




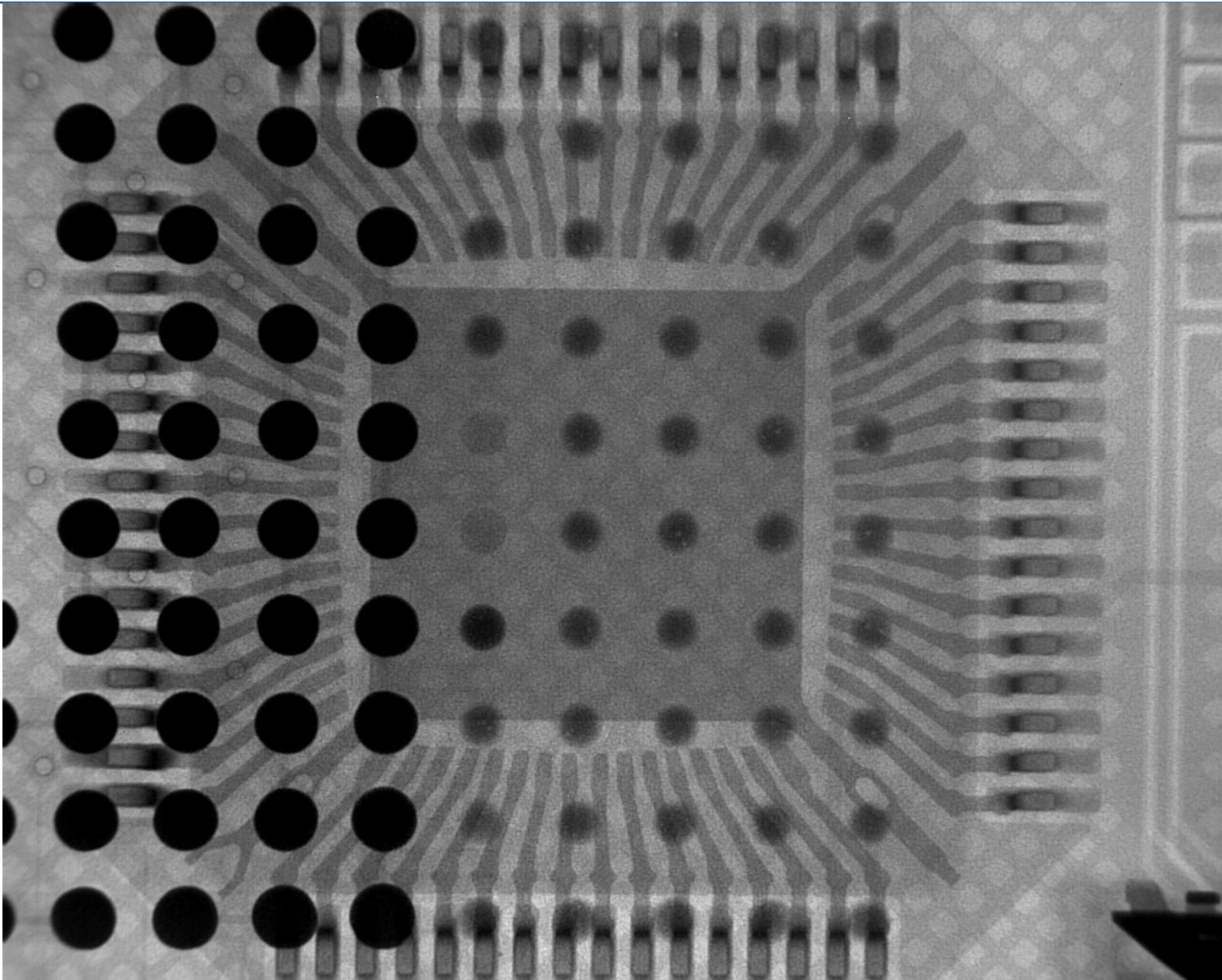


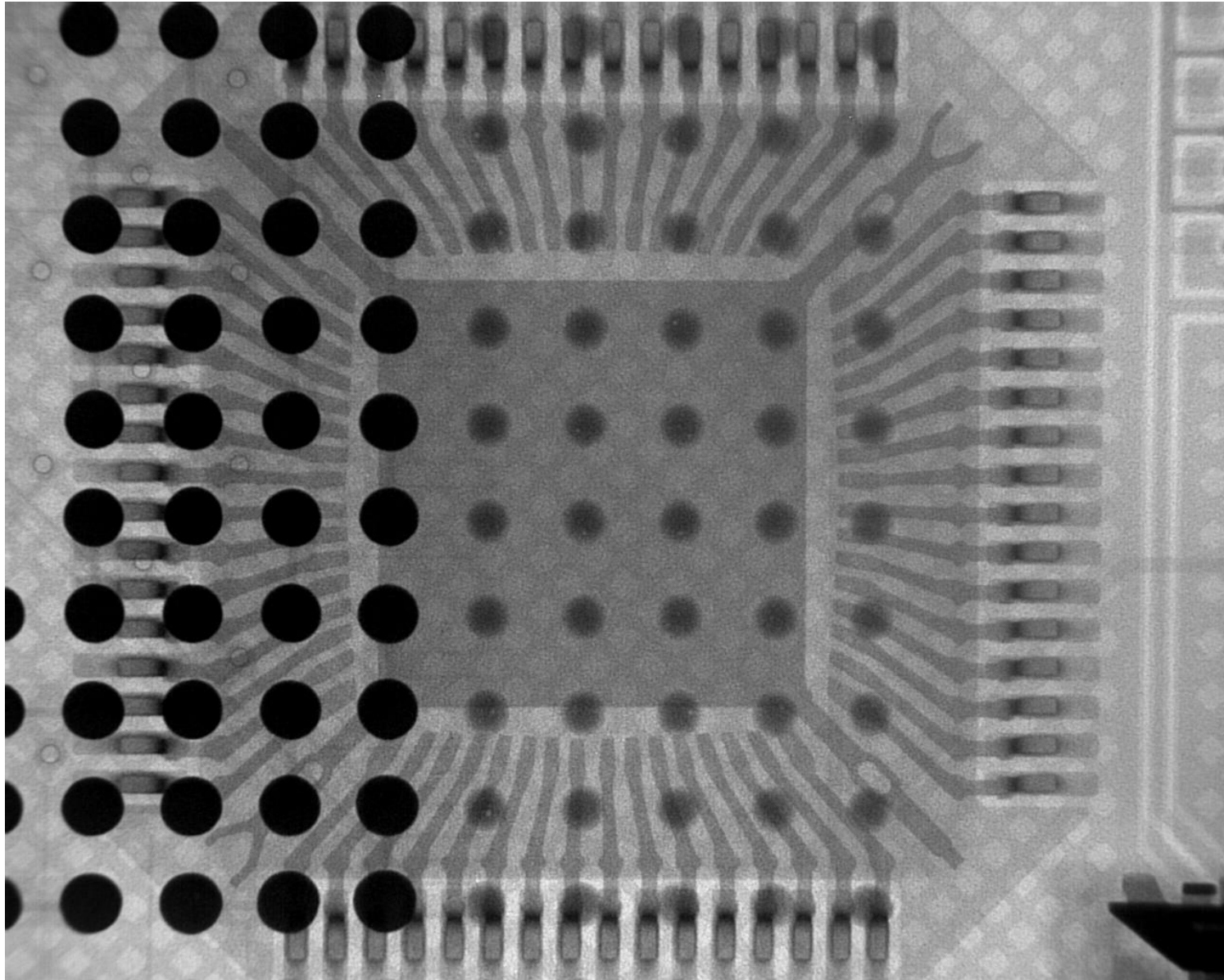






R+R 35 / Z – X-Ray nach Rework 2 – S-PQFP-G64





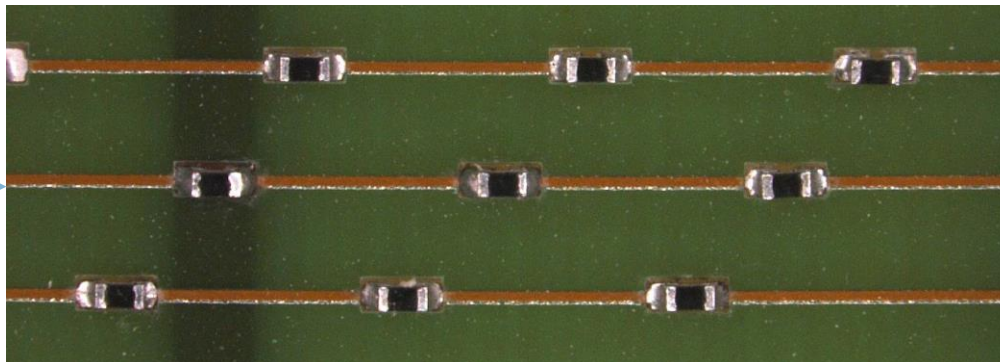
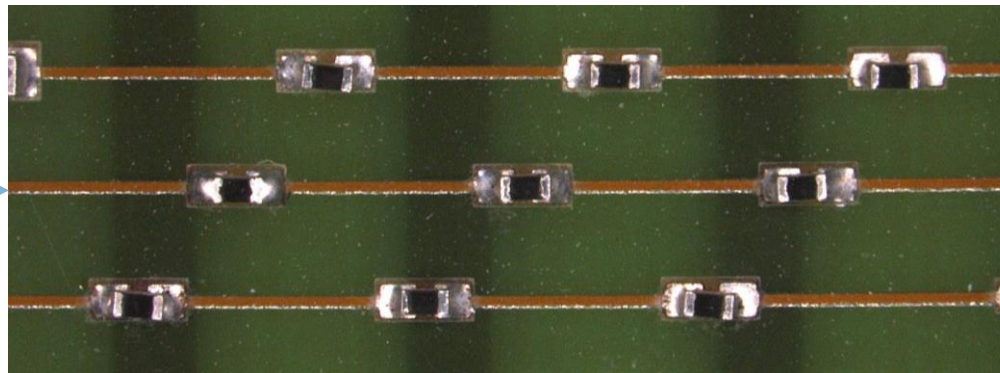
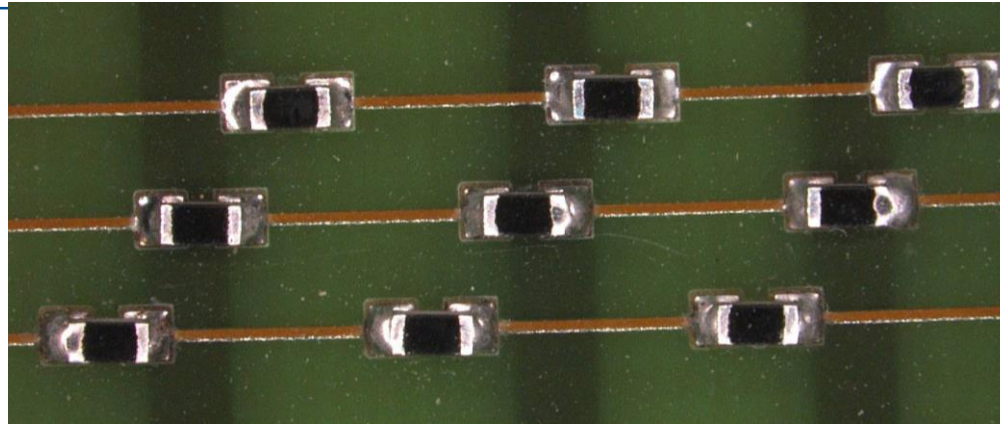
TAC

R+R 34 / Z – Optisch nach Rework 1/2/3 – TAC 0,1

Rework 1 →

Rework 2 →

Rework 3 →

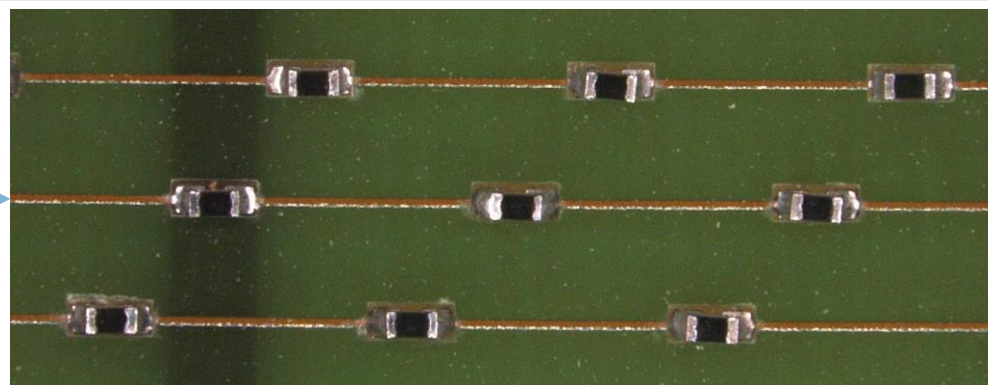
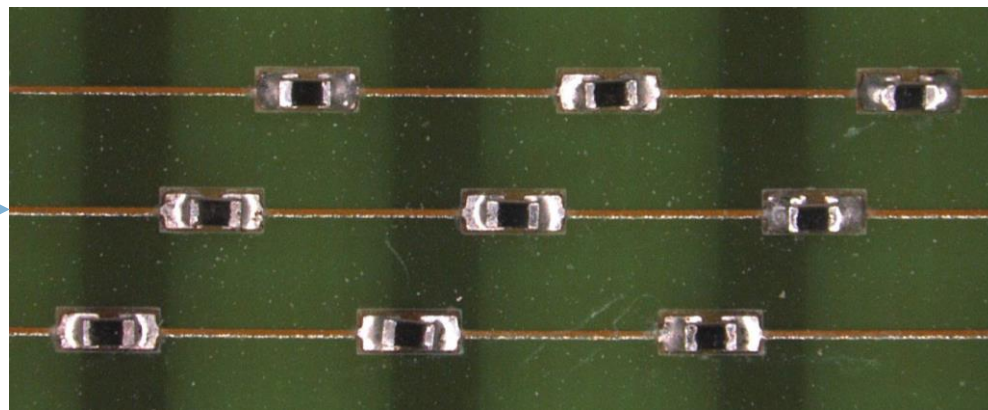
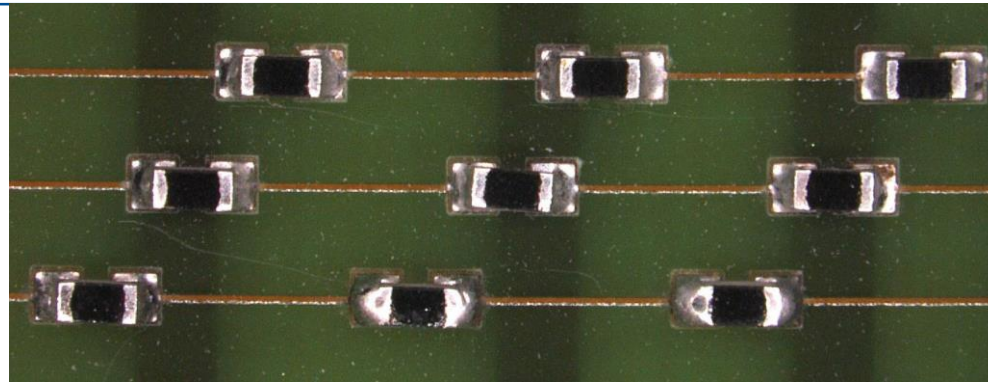


R+R 34 / Z – Optisch nach Rework 1/2/3 – TAC 0,15

Rework 1 →

Rework 2 →

Rework 3 ↘



R+R 34 / Z – Optisch nach Rework 1/2/3 – TAC 0,2

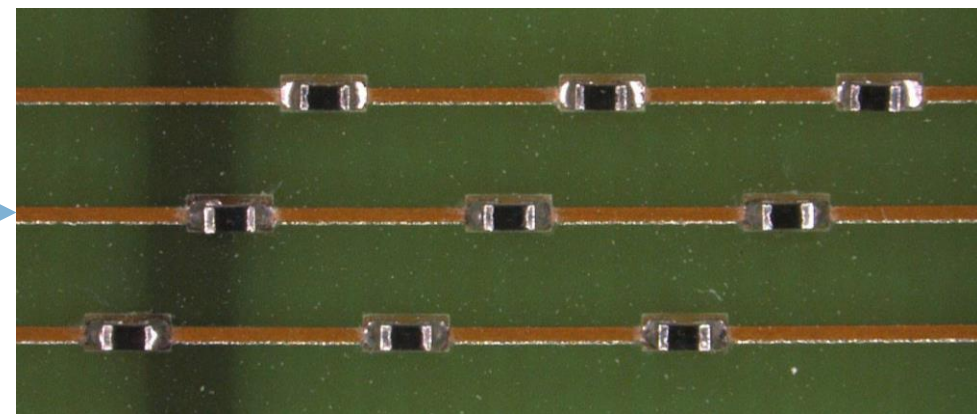
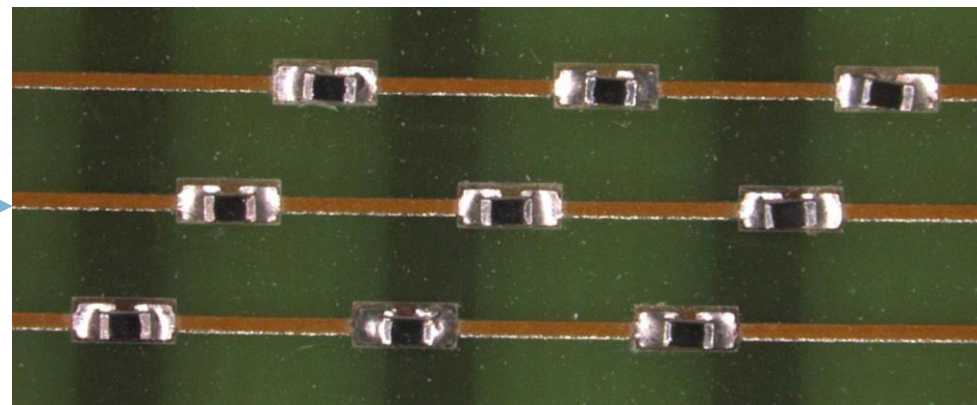
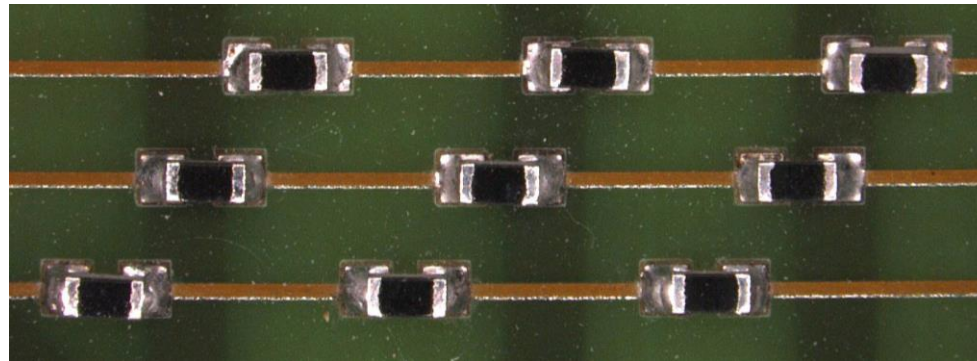
Rework 1



Rework 2

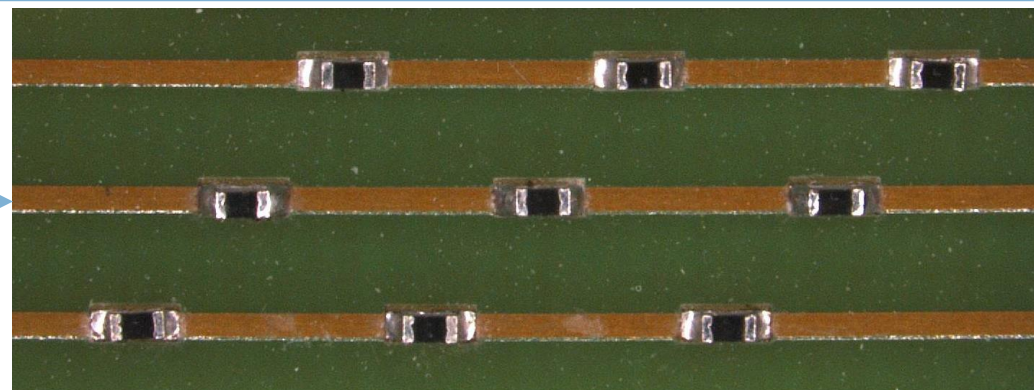
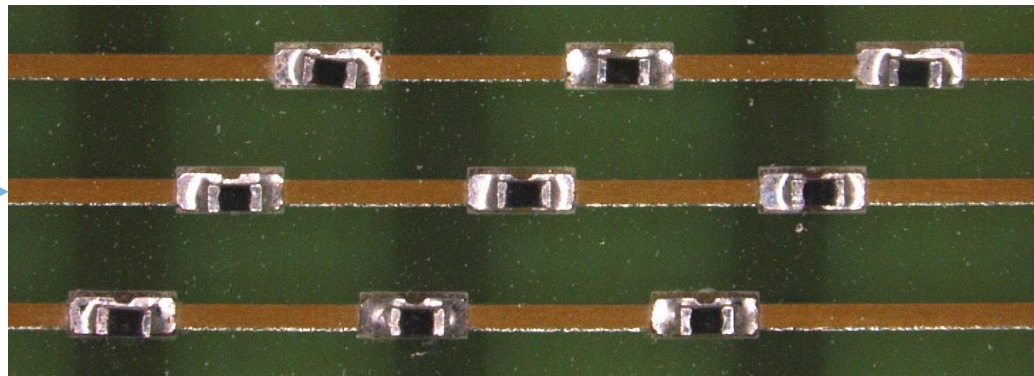
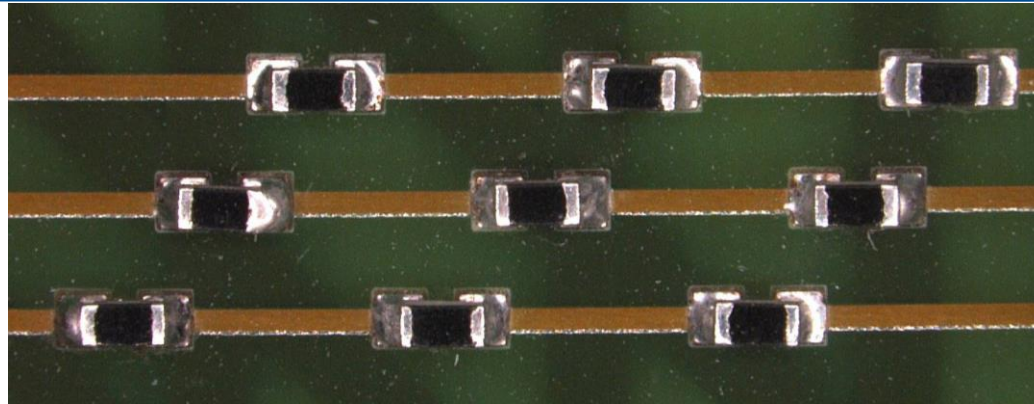


Rework 3



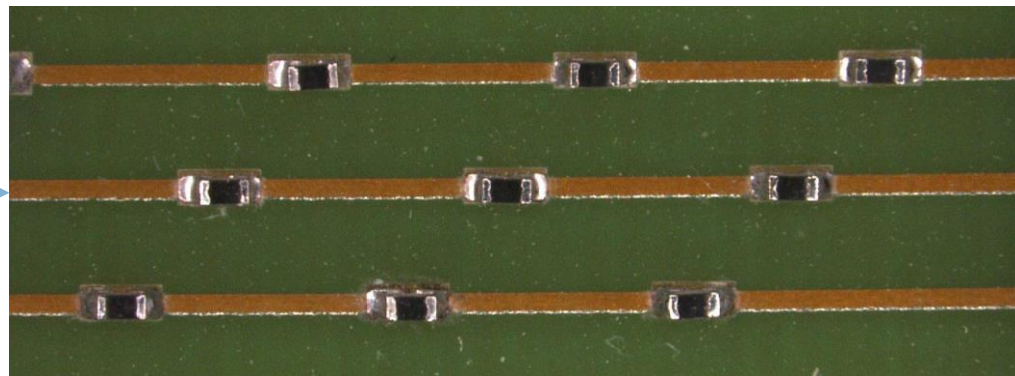
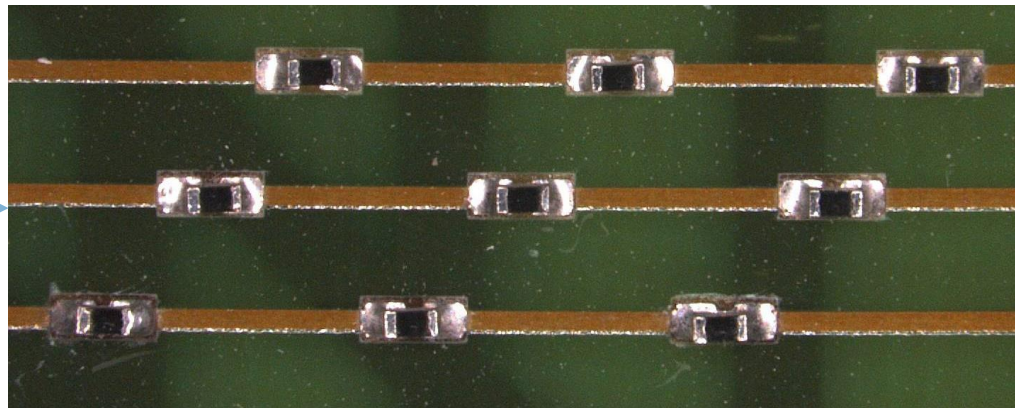
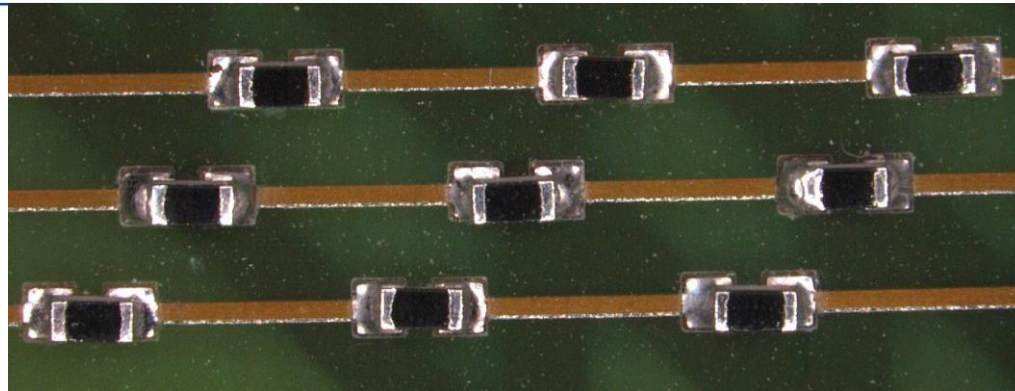
R+R 34 / Z – Optisch nach Rework 1/2/3 – TAC 0,254

Rework 1 →
Rework 2 →
Rework 3 ↘



R+R 34 / Z – Optisch nach Rework 1/2/3 – TAC 0,3

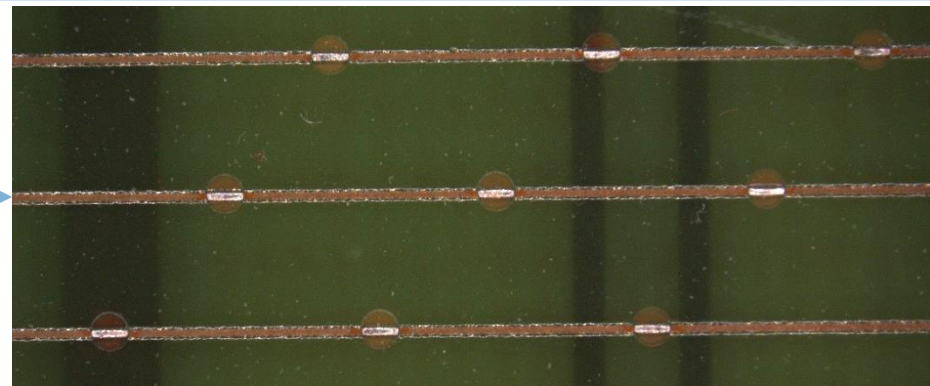
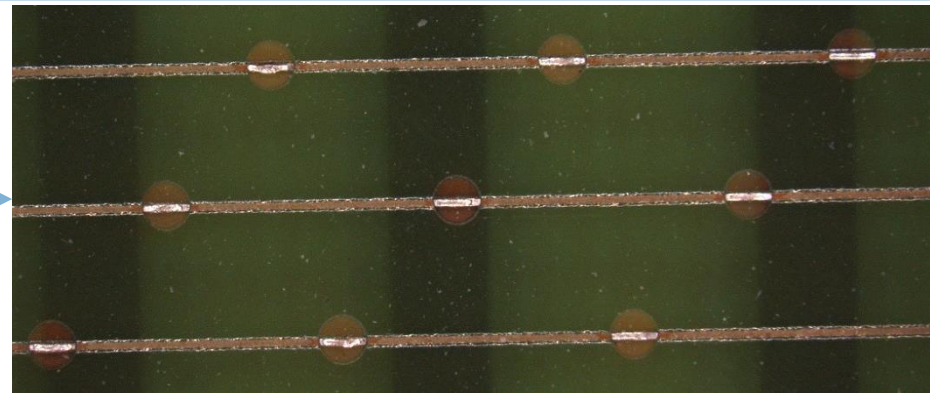
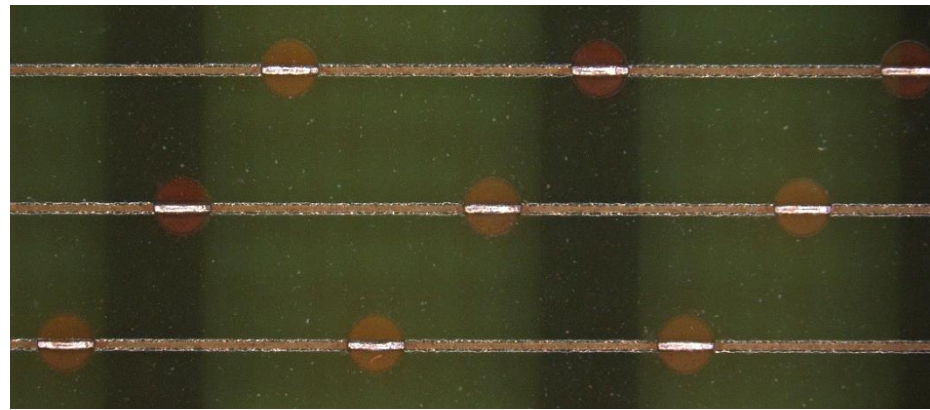
Rework 1 →
Rework 2 →
Rework 3 →



Bead Probes

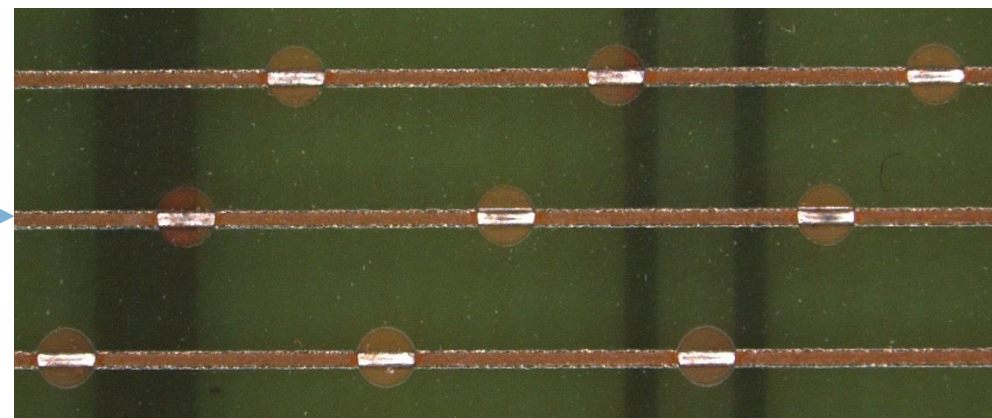
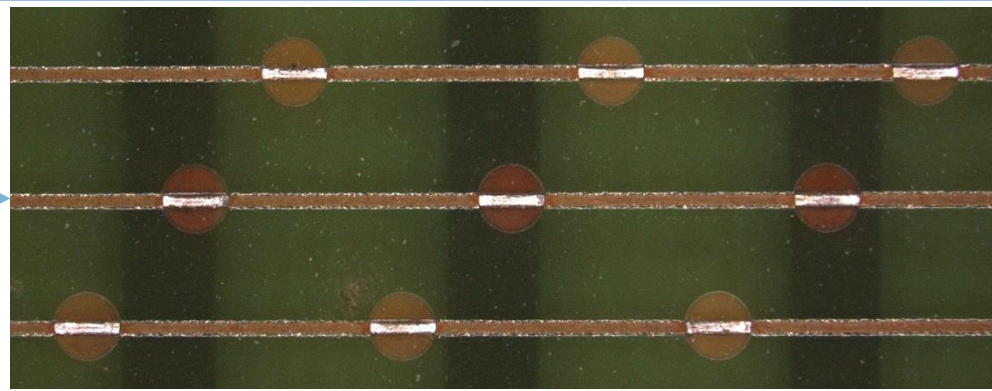
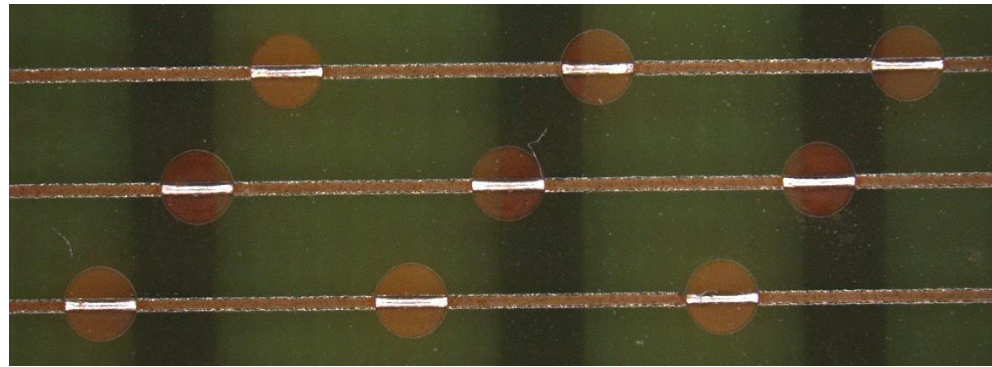
R+R 34 / Z – Optisch nach Rework 1/2/3 – Bead Probes 0,1

Rework 1 →
Rework 2 →
Rework 3 ↘

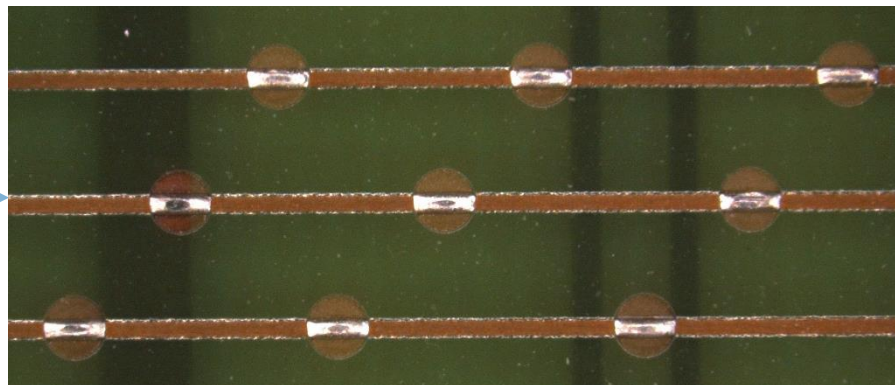
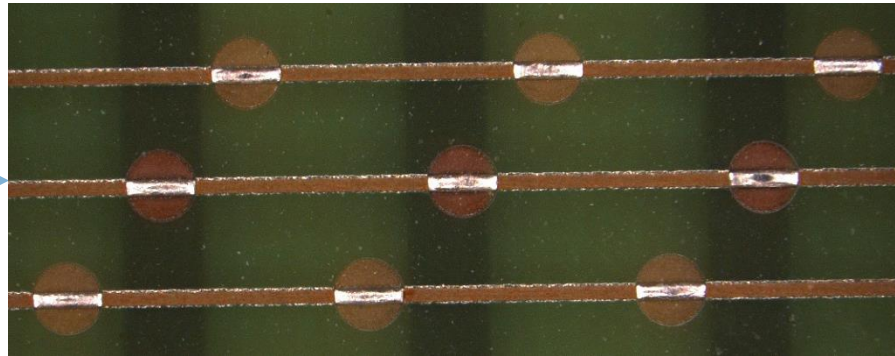
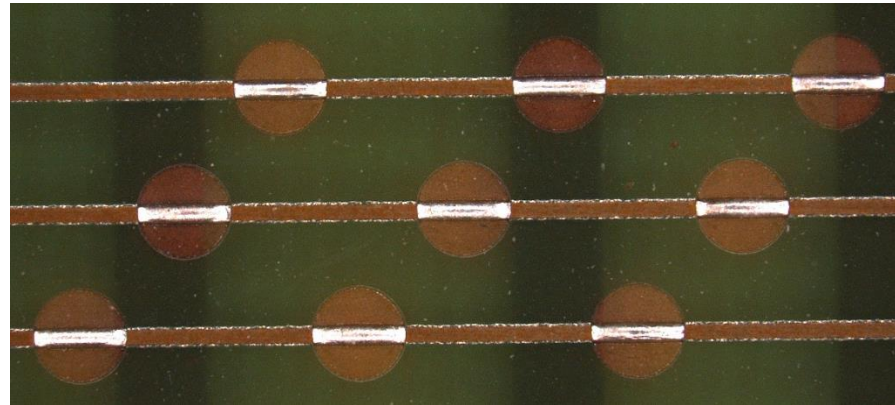


R+R 34 / Z – Optisch nach Rework 1/2/3 – Bead Probes 0,15

Rework 1 →
Rework 2 →
Rework 3 ↘



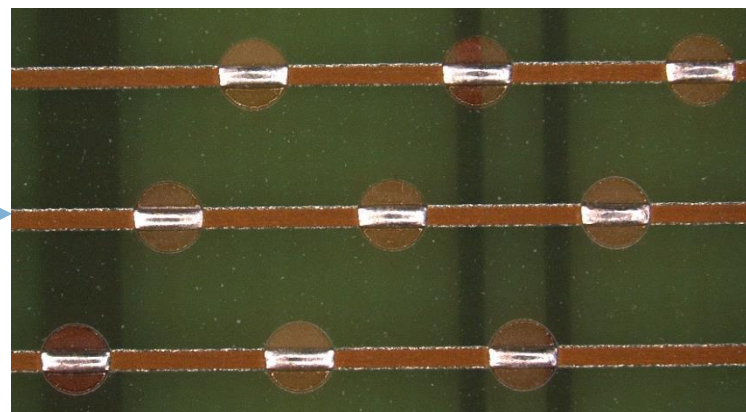
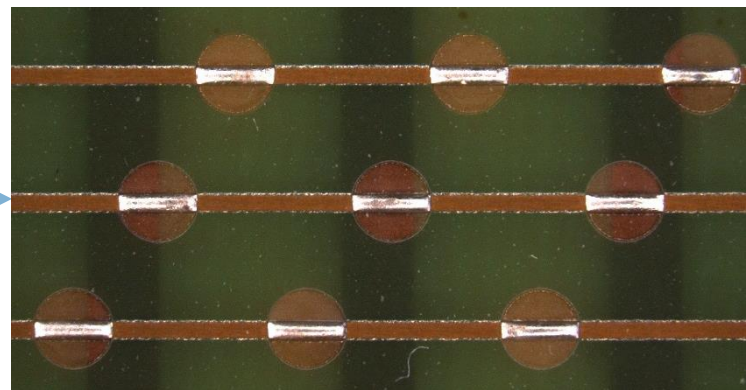
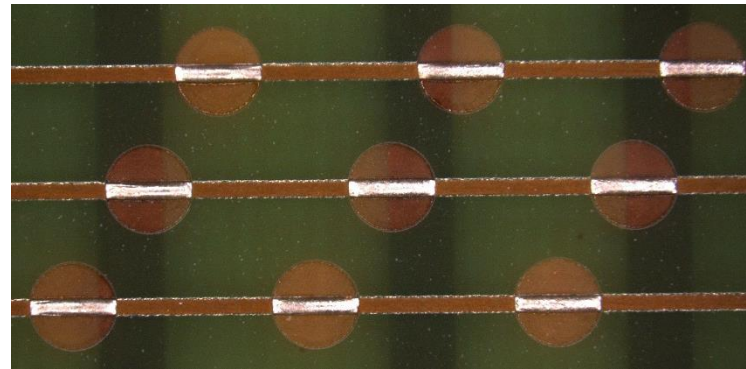
Rework 1 →
Rework 2 →
Rework 3 →



Rework 1 →

Rework 2 →

Rework 3 ↘



Rework 1 →

Rework 2 →

Rework 3 →

