

ISP SOC XC7022

1080p@30fps
720p@60fps

2M
HDR
WDR

MIPI 2 TX

MIPI 2 RX

I2C slave host

I2C

PLL 6 27M

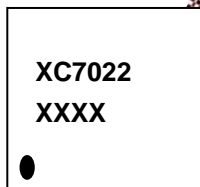
1.8V/2.8V/3.3V IO

-20 C~ 70 C

Sleep/Active

0.4mm pitch 5x5 QFN40

QFN5x5-40L



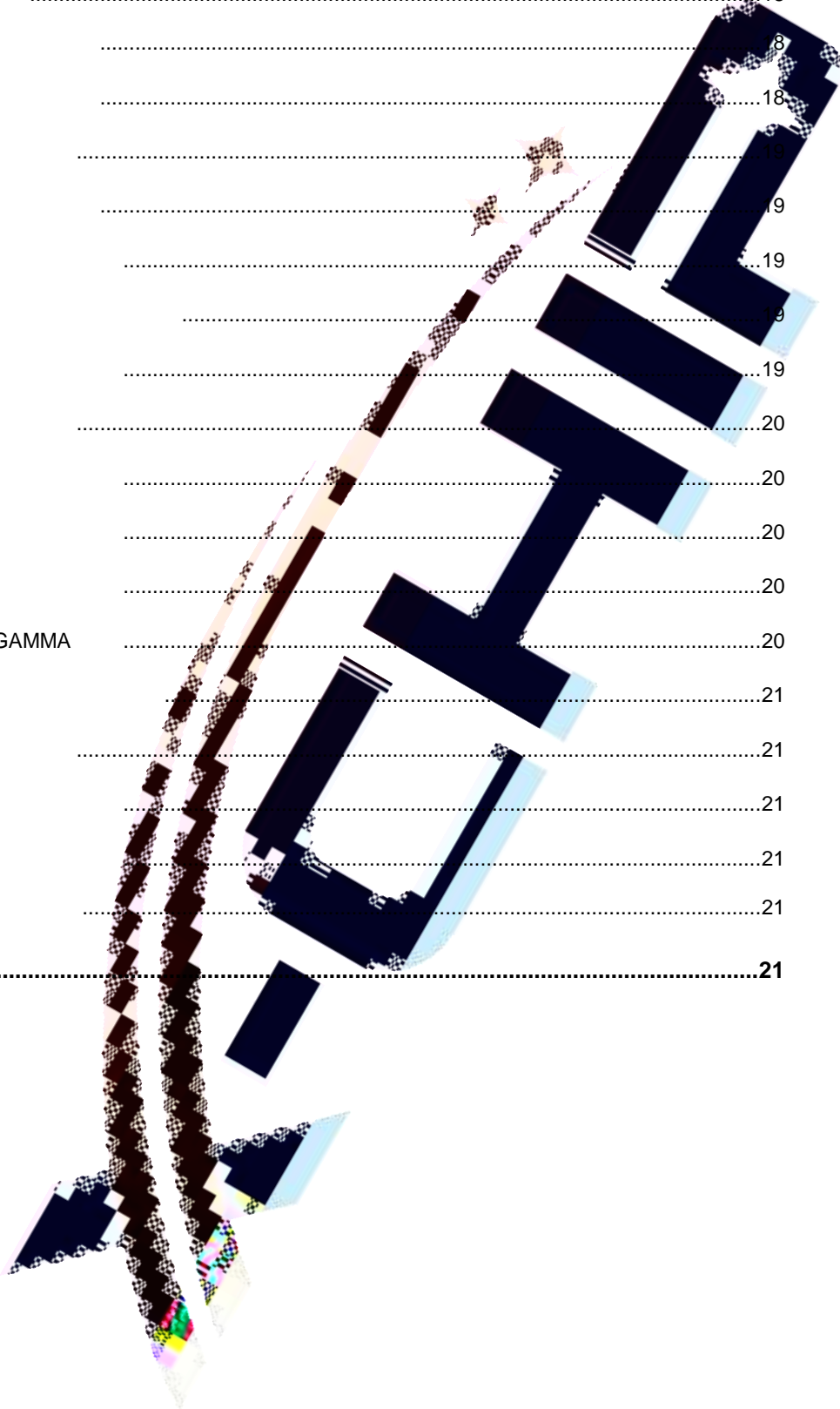
XC7022
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XC7022 32 RISC ISP SoC

1080P RAW

YUV MIPI Smart AE XC7022
8/10bit RAW YUV422 1080P@30fps 720@60fps

1.1

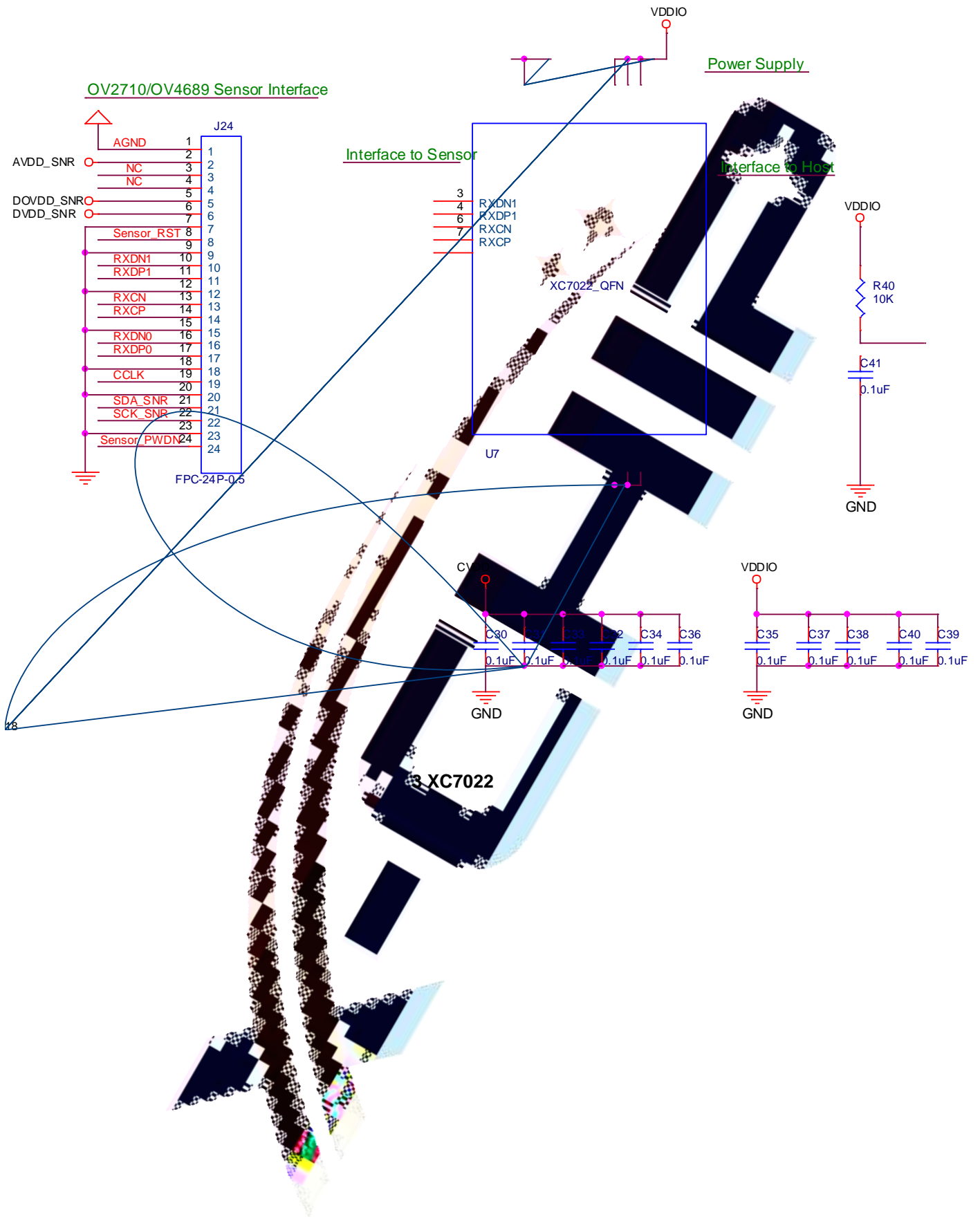
XC7022

1 XC7022

No.	signal Name	pad type(1)	description	
1	SCK2	I/OD	I2C Clock (Host)	Host
2	EVDDR_X	P	MIPI RX digital power Supply 1.2V	MIPI RX Power Domain (Sensor)
3	RXDN1	I DS	MIPI RX data lane 1 negative input	
4	RXDP1	I DS	MIPI RX data lane 1 positive input	
5	EGND	G	MIPI RX analog ground	
6	RXC_N	I DS	MIPI RX clock lane negative input	
7	RXCP	I DS	MIPI RX clock lane positive input	
8	PVDD33_RX	P	MIPI RX analog Power Supply 1.8V /2.8V/3.3V	
9	RXDN0	I DS	MIPI RX data lane 0 negative input	Sensor Power Domain
10	RXDP0	I DS	MIPI RX data lane 0 positive input	
11	CCLK		Sensor Referenced Clock	
12	SDA0	I/OD	I2C Data (Sensor)	
13	SCK0	I/OD	I2C Clock (Sensor)	
14	CVDD	P	Digital Core Power Supply 1.2V	
15	PADVDD1	P	I/O Group1 Power Supply 1.8V /2.8V/3.3V	
16	VSS	G	GROUND	
17	SPWDN	O	Sensor Power-Down Control 1: Power down mode 0: Normal mode	
18	SRESET	O	Sensor Reset Control	
19	CVDD	P	Digital Core Power Supply 1.2V	
20	VSS	G	GROUND	
21	AVDD33_TX	P	MIPI TX Analog Power Supply 1.8V /2.8V/3.3V	MIPI TX Power Domain (Host)
22	TXDP0	O DS	MIPI TX data lane 0 positive output	
23	TXDN0	O DS	MIPI TX data lane 0 negative output	
24	EGND	G	MIPI TX analog ground	

No.	signal Name	pad type(1)	description		
25	TXCP	O DS	MIPI TX clock lane positive output		
26	TXCN	O DS	MIPI TX clock lane negative output		
27	EVDDTX	P	MIPI TX digital power Supply 1.2V		
28	TXDP1	O DS	MIPI TX data lane 1 positive output		
29	TXDN1	O DS	MIPI TX data lane 1 negative output		
30	CVDD	P	Digital Core Power Supply 1.2V		Host Power Domain
31	VSS	G	GROUND		
32	PADVDD2	P	I/O Group2 Power Supply 1.8V /2.8V/3.3V		
33	RESETB	I	System Reset; (active low with internal pull-up resistor) 1: Normal mode 0: Reset mode		
34	VSS	G	GROUND		
35	VSS	G	GROUND		
36	VSS	G	GROUND		
37	XMCLK	I	PLL Master Reference Clock Input		
38	CVDD	P	Digital Core Power Supply 1.2V		
39	PADVDD2	P	I/O Group2 Power Supply 1.8V /2.8V/3.3V		
40	SDA2	I/OD	I2C Data (Host)		

(1) P = Power, G = Ground, I = Input, O = Output, IO = Input and Output Signal, D = Open drain, DS = Differential



2.1

2

PADVDD1	Sensor PAD	-0.5	TBD(3.6)	V
PADVDD2	Host PAD	-0.5	TBD	V
PVDD33_RX	MIPI RX PAD	-0.5	TBD	V
AVDD33_TX	MIPI TX PAD	-0.5	TBD	V
CVDD	Core	-0.5	TBD(2.0)	V
EVDDR_X	MIPI RX Core	-0.5	TBD	V
EVDDTX	MIPI TX Core	-0.5	TBD	V
Tstg		-55	+150	
Ta		-20	+70	

3

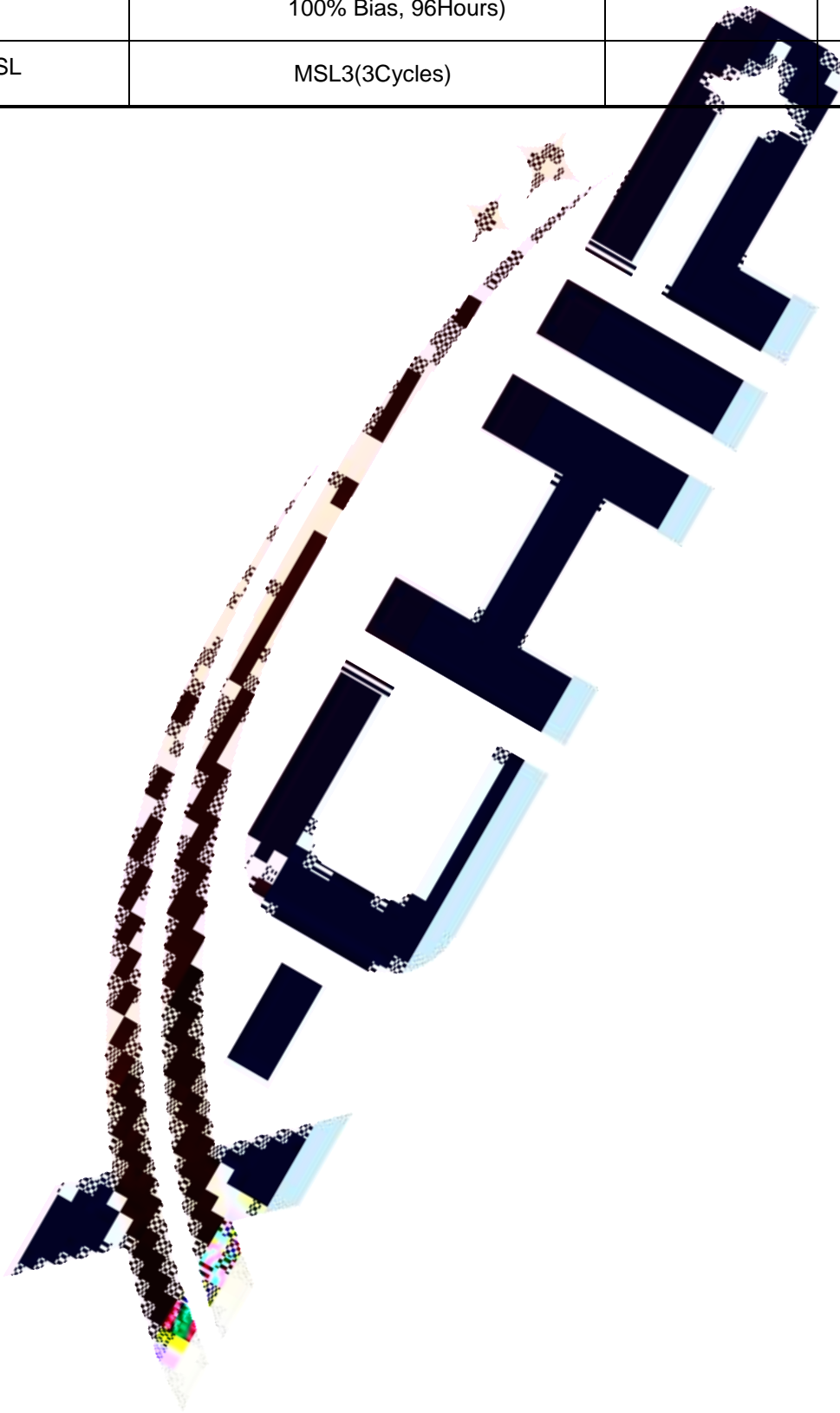
PADVDD1	Sensor PAD	2.52/2.97	2.8/3.3	3.08/3.6	V
PADVDD2	Host PAD	2.52/2.97	2.8/3.3	3.08/3.6	V
PVDD33_RX	MIPI RX PAD	2.52/2.97	2.8/3.3	3.08/3.6	V
AVDD33_TX	MIPI TX PAD	2.52/2.97	2.8/3.3	3.08/3.6	V
CVDD	Core	1.08	1.2	1.32	V
EVDDR_X	MIPI RX Core	1.08	1.2	1.32	V
EVDDTX	MIPI TX Core	1.08	1.2	1.32	V

2.2

4

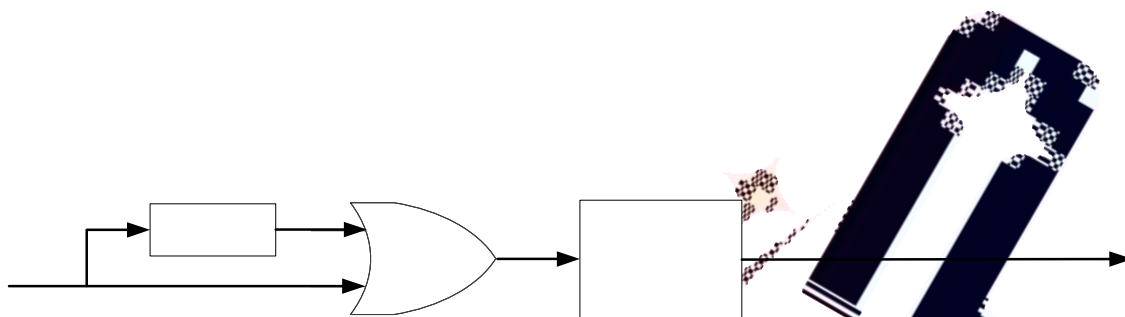


TCT	TC1000(-65 ~150 ,1000Cycles)		TBD
HAST	UHAST96(130 , 85%RH, 33.3 PSIA, 100% Bias, 96Hours)		TBD
MSL	MSL3(3Cycles)		TBD



3.1

3.1.1



XC7022

4

4

RESETB

1.2V

3.1.2

CPU
0x80500018

RST
bit

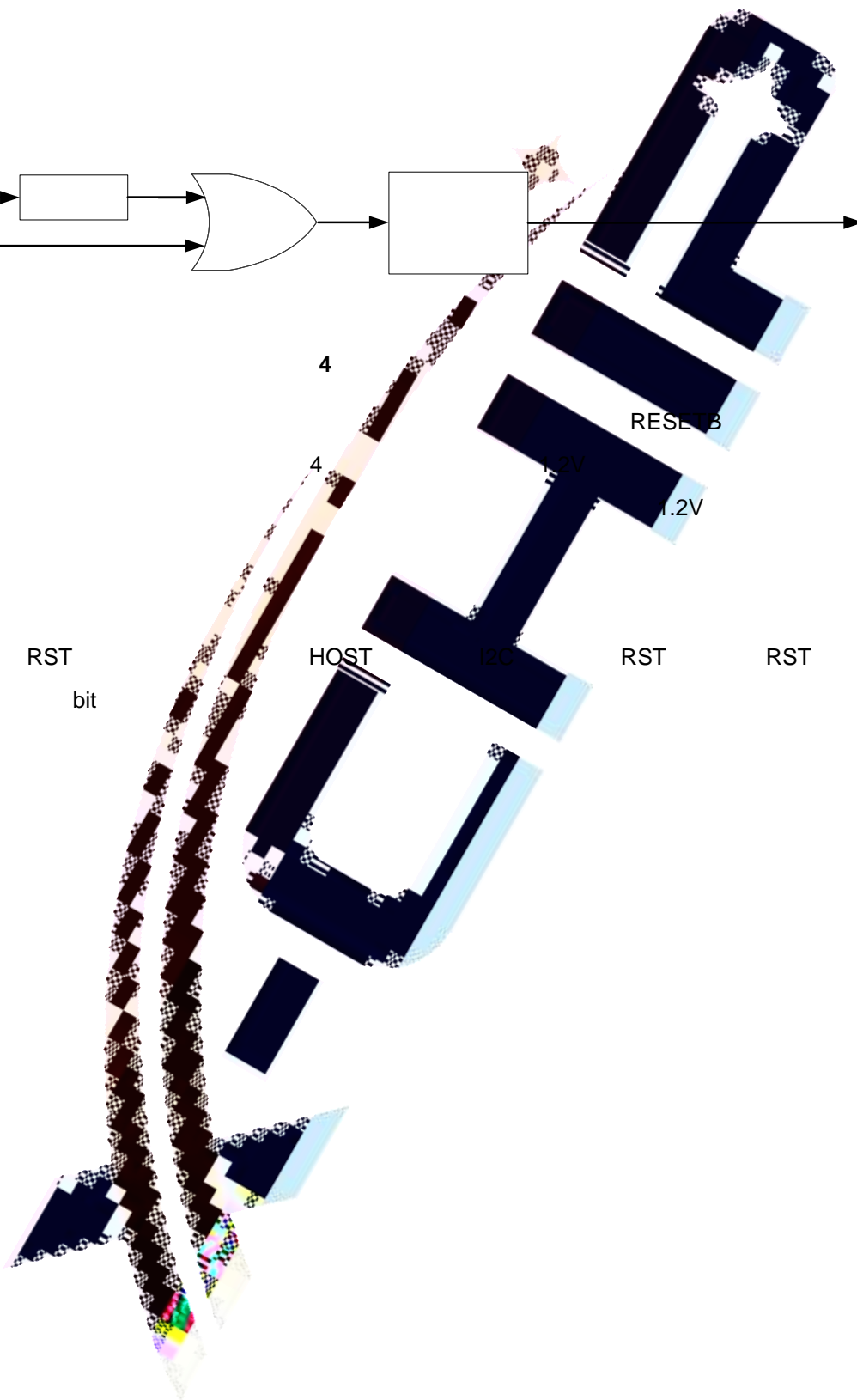
HOST

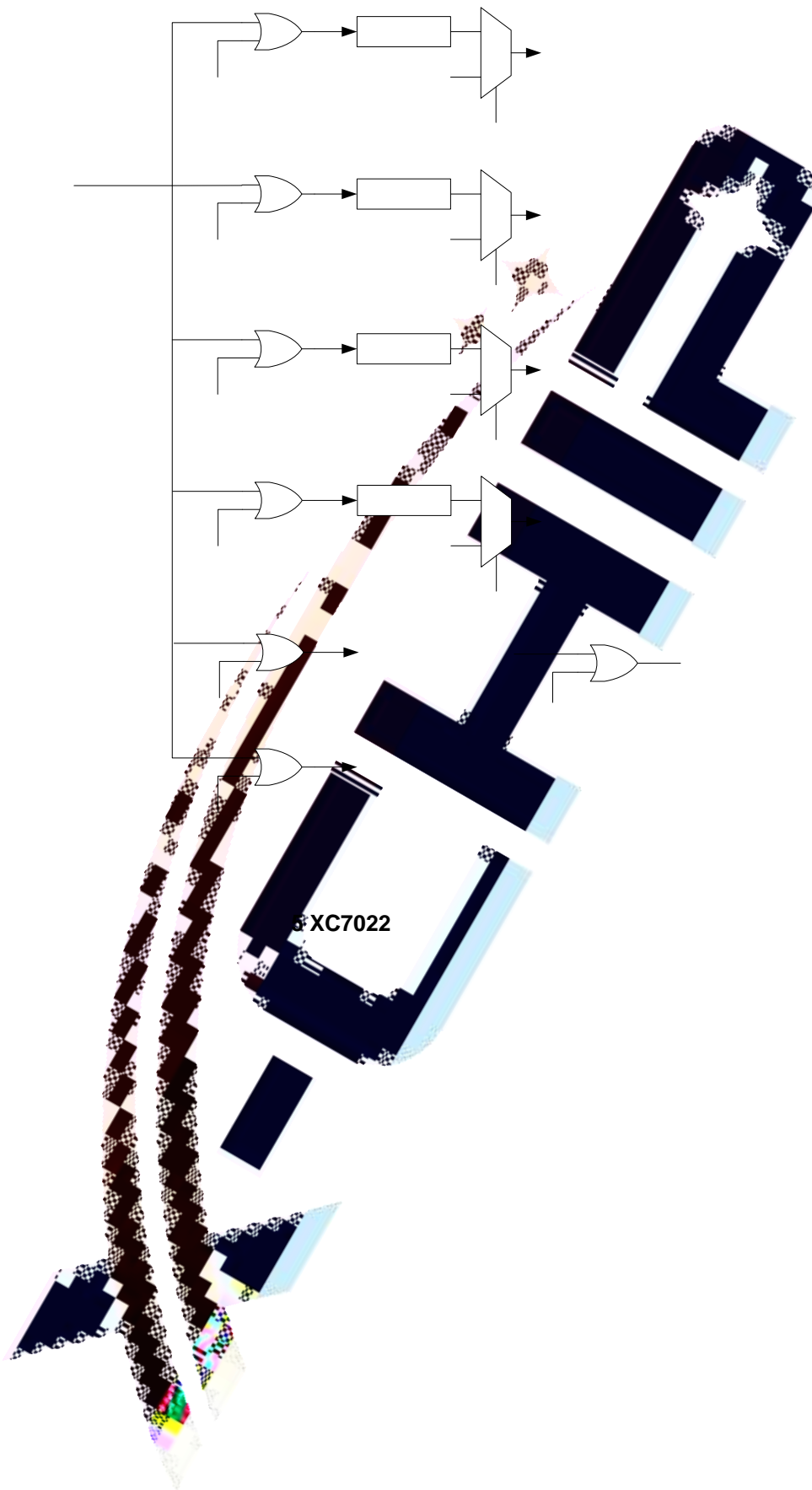
I2C

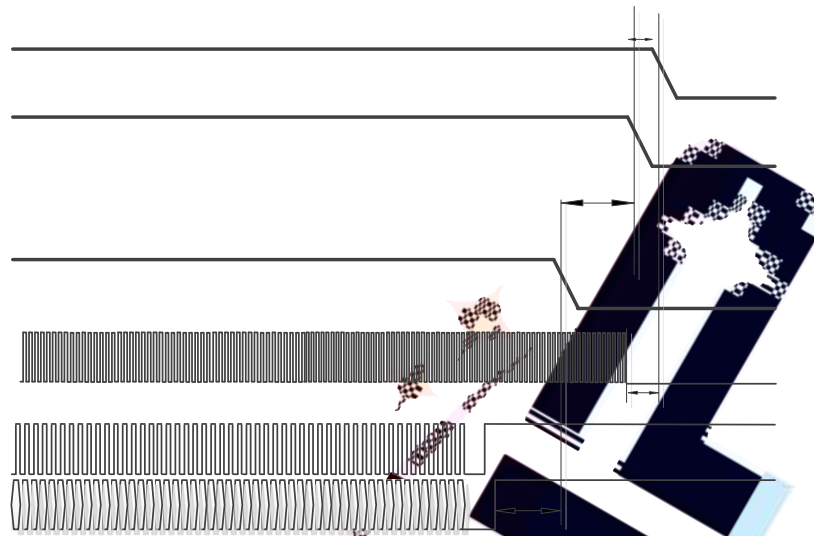
RST

RST

3.1.3 XC7022





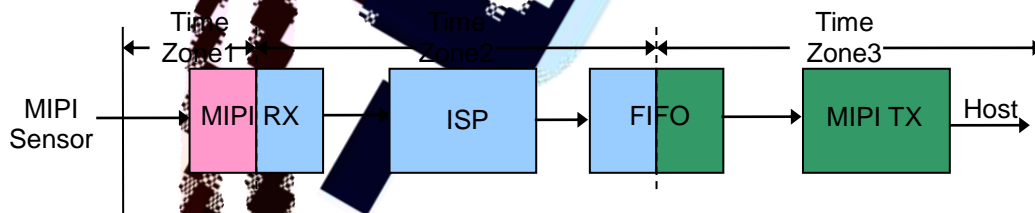


7 XC7022 sensor

下电过程：

- 1 Host XC7022 I2C
- 2 2.5ms RESETB
- 3 RESETB XMCLK
- 4 CVDD EVDD PA/VDD VDD33 AVDD33

3.5



8 XC7022

- 1 MIPI RX
- 2
- 3 MIPI TX

4.1 PLL

960MHz

MIPI TX PHY
120Mhz

MIPI TX PHY

4.2 MIPI TX PHY

MIPI TX PHY
(data lane)

(clock lane)

4.2.1

- 1
- 2
- 3

960M bps

120M

4.3 MIPI RX PHY

lane)
CMOS
(data lane)

MIPI RX

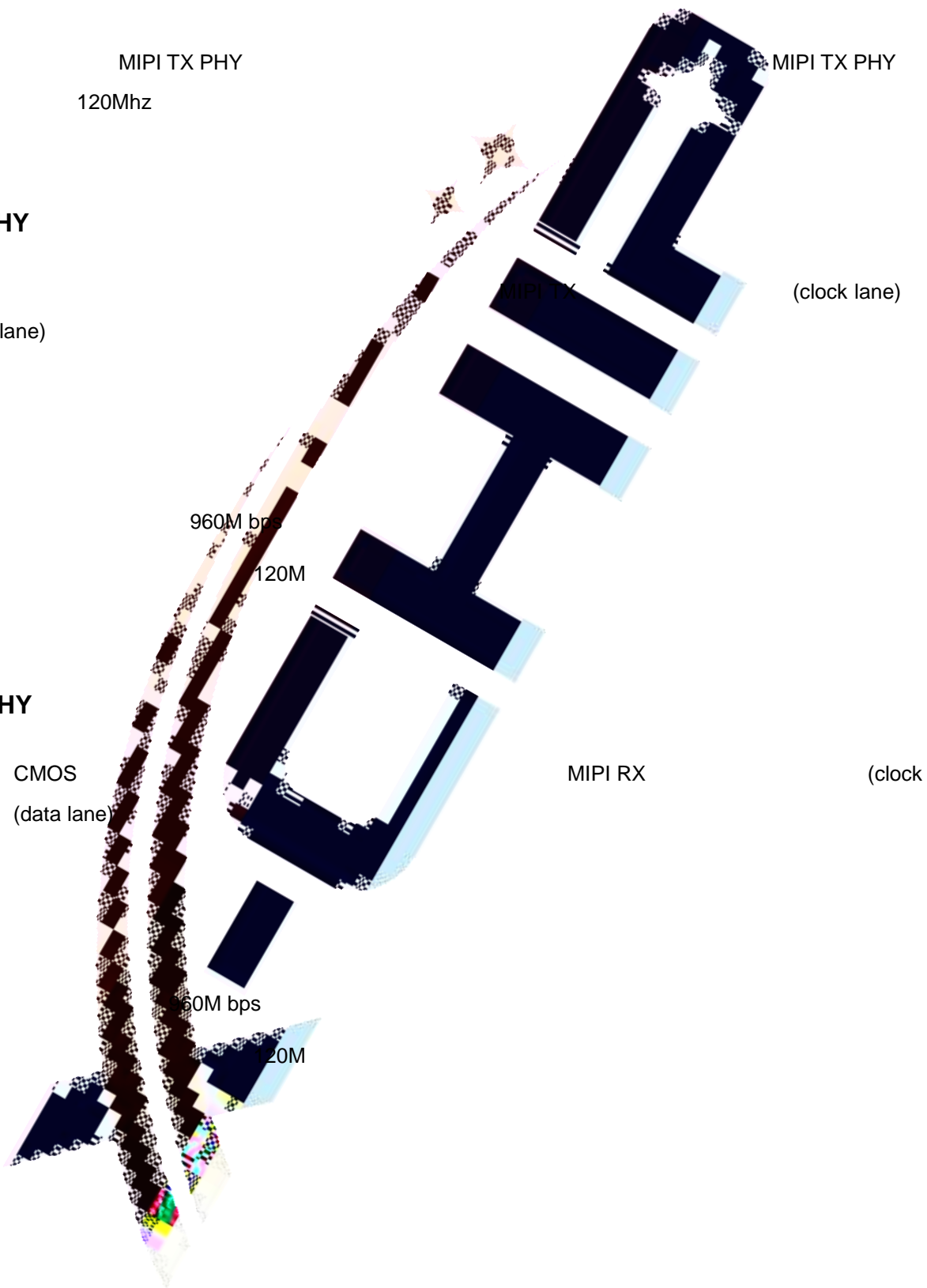
(clock

4.3.1

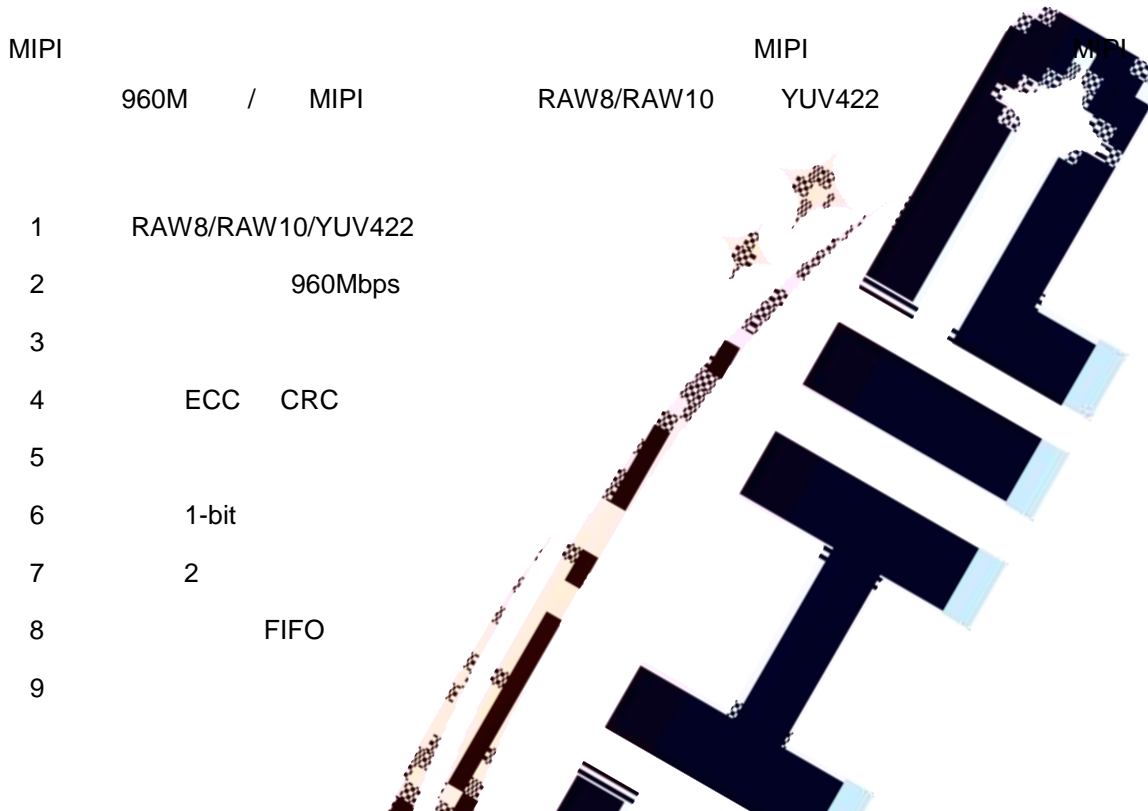
- 1
- 2
- 3

60M bps

20M



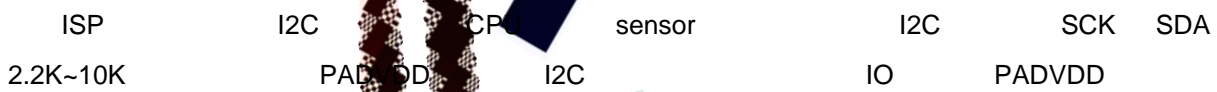
5.1 MIPI



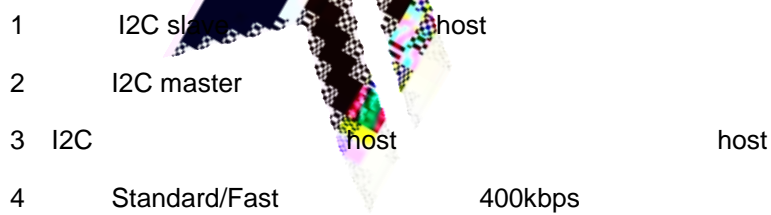
5.2 MIPI



5.3 I2C



5.3.1



- 7. Slave ACK
- 8. Master I2C 0x37 ACK
- 9. Slave ACK
- 10. Slave Data 8bit



5.4.3

Defective Pixel Correction DPC

5.4.4

Auto Exposure AE

Gain Control

XC7023

5.4.5

RAW

YUV

5.4.6

Balance AWB

Automatic White

5.4.7

XC7022

VCM

XC7022 25

5.4.8

RAW Bayer

RGB

RAW

RGB

RGB

5.4.9

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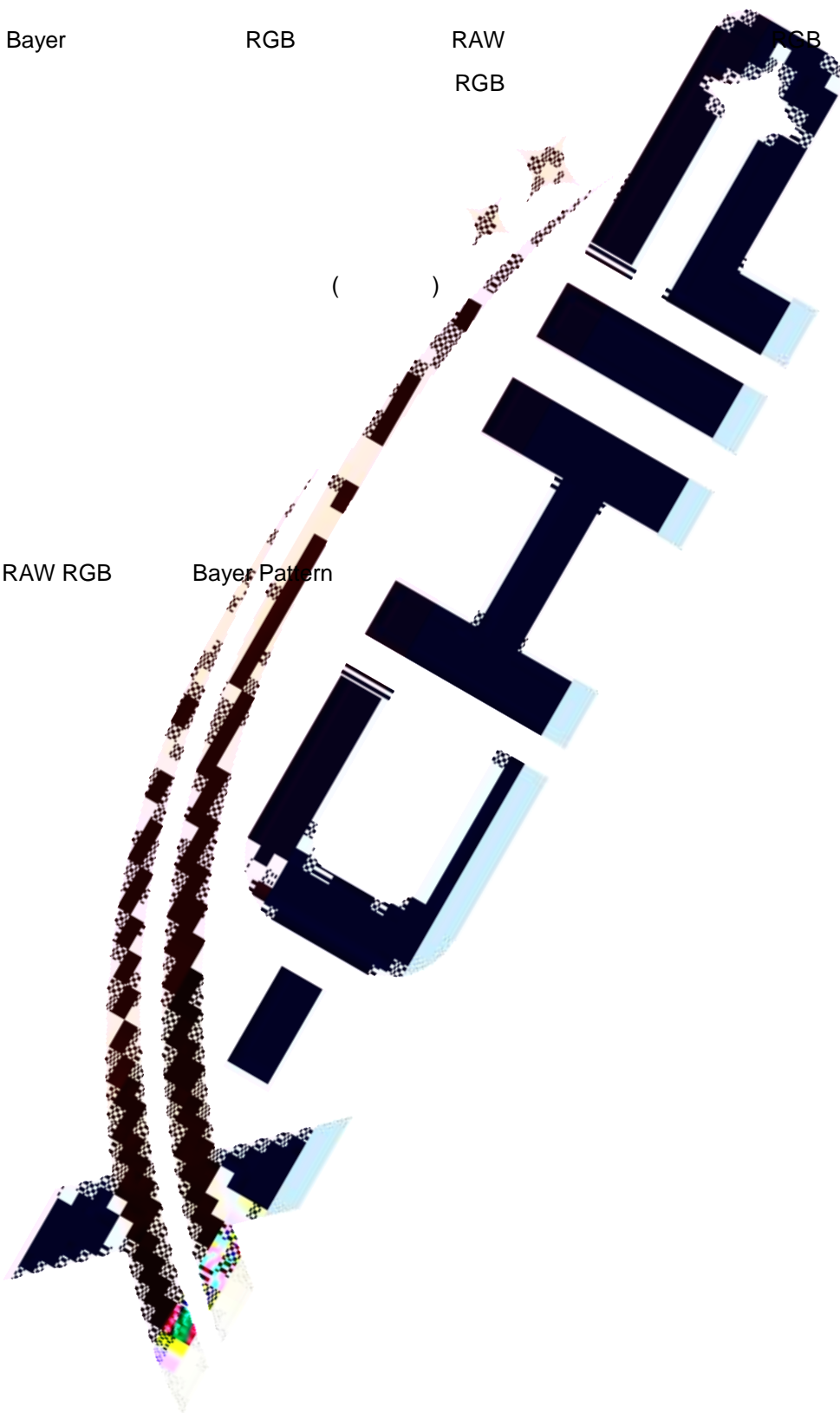
De-noise

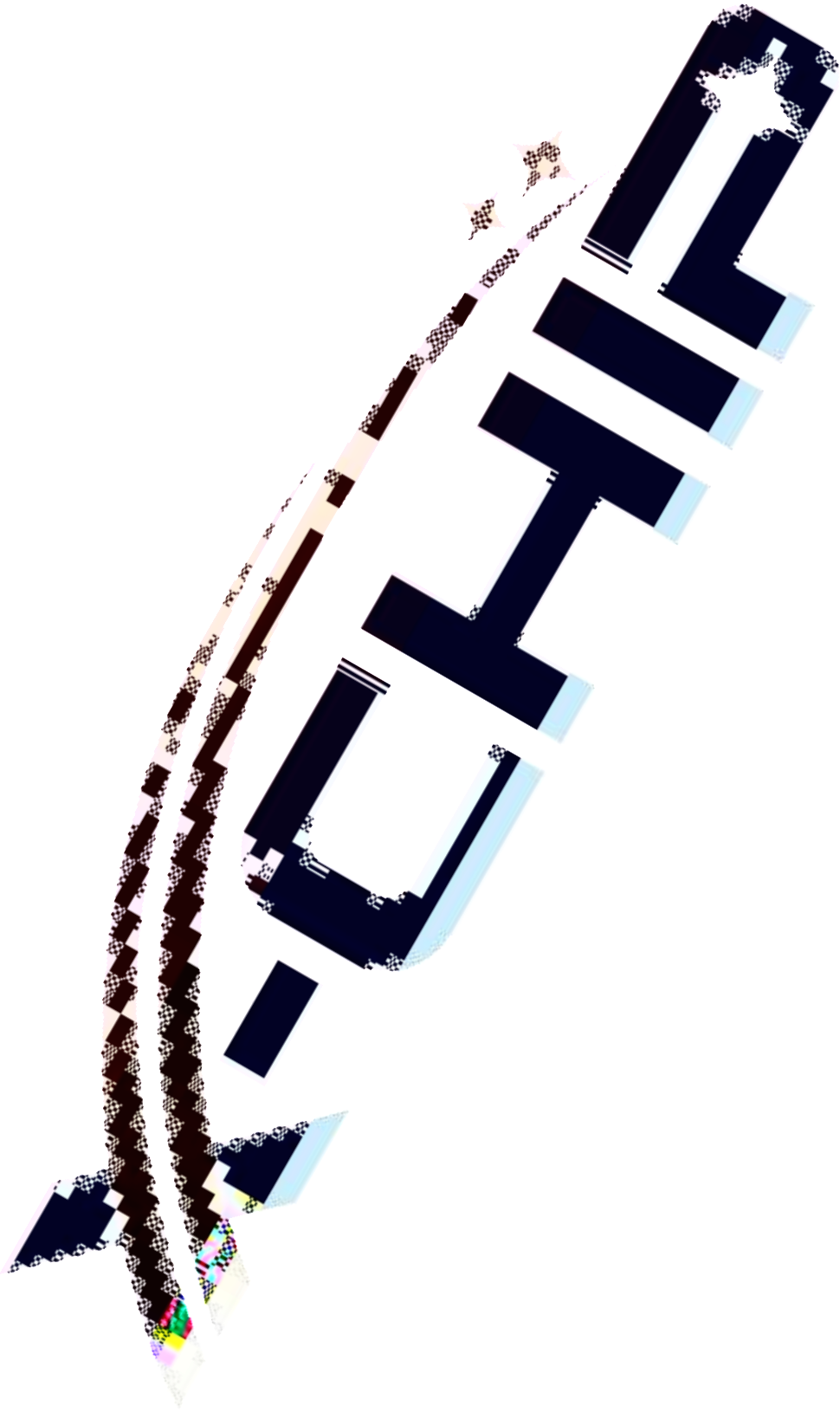
5.4.10

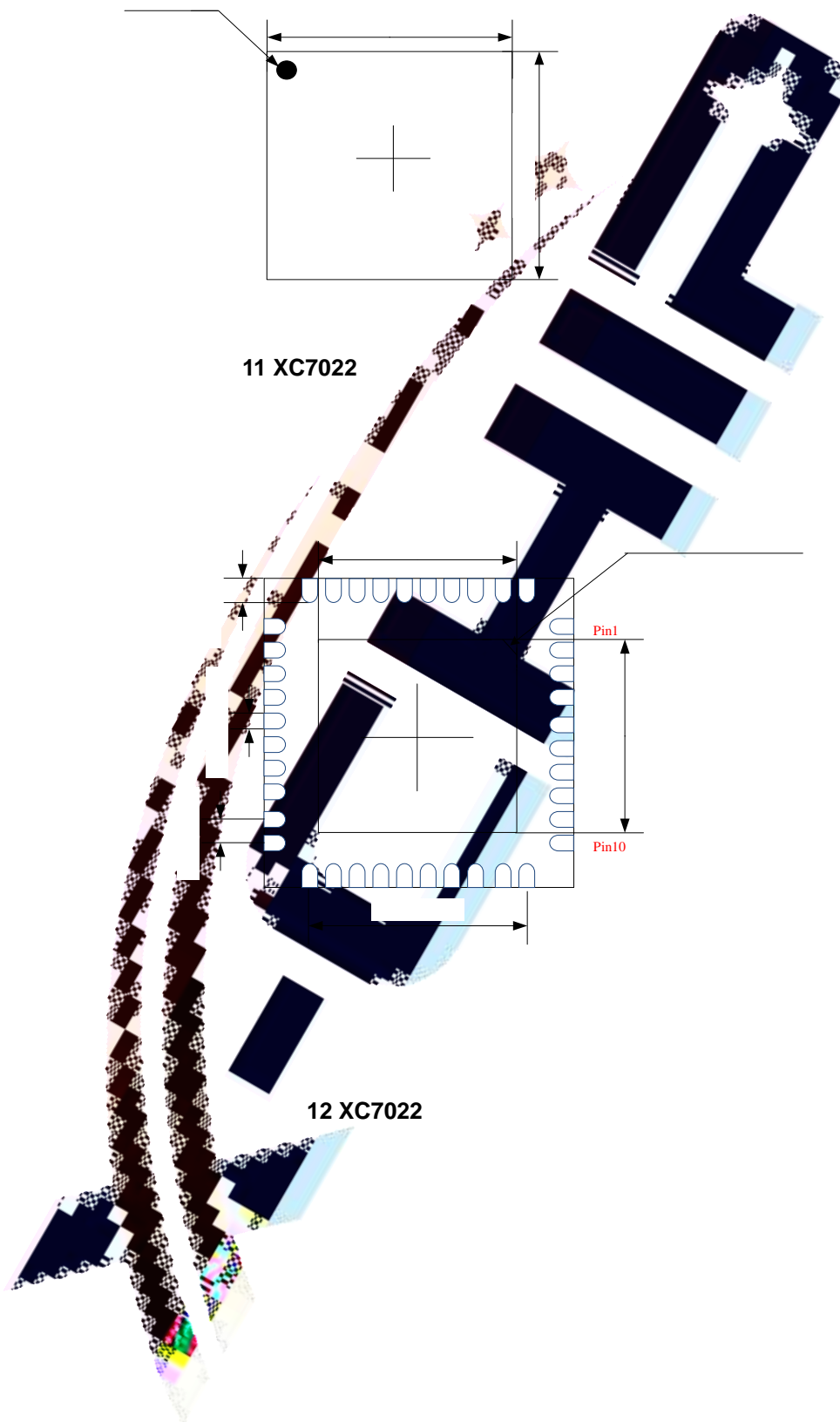
Sensor

RAW RGB

Bayer Pattern

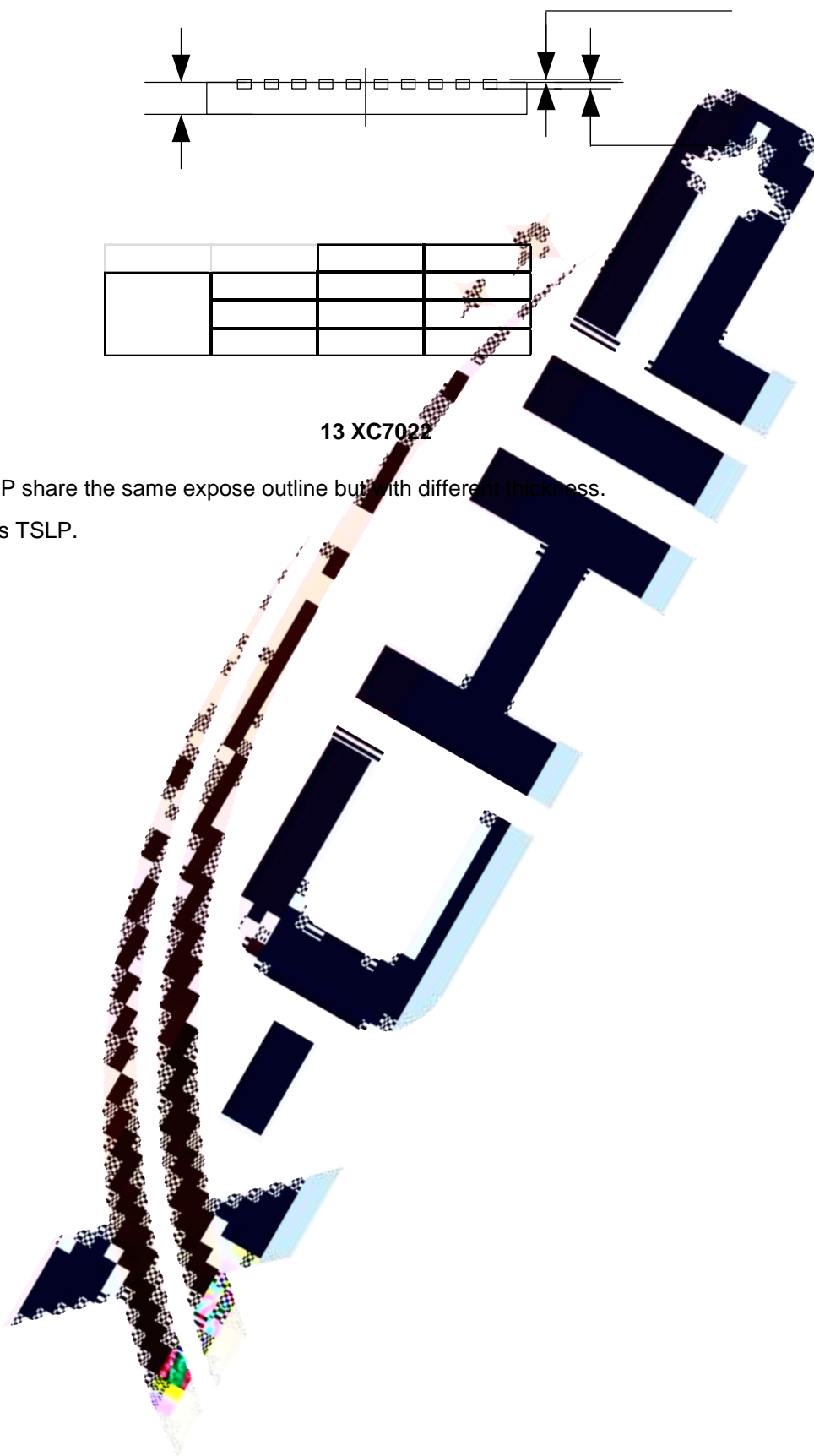






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12 XC7022



Note: TSLP and SLP share the same expose outline but with different thickness.

XC7022 uses TSLP.