

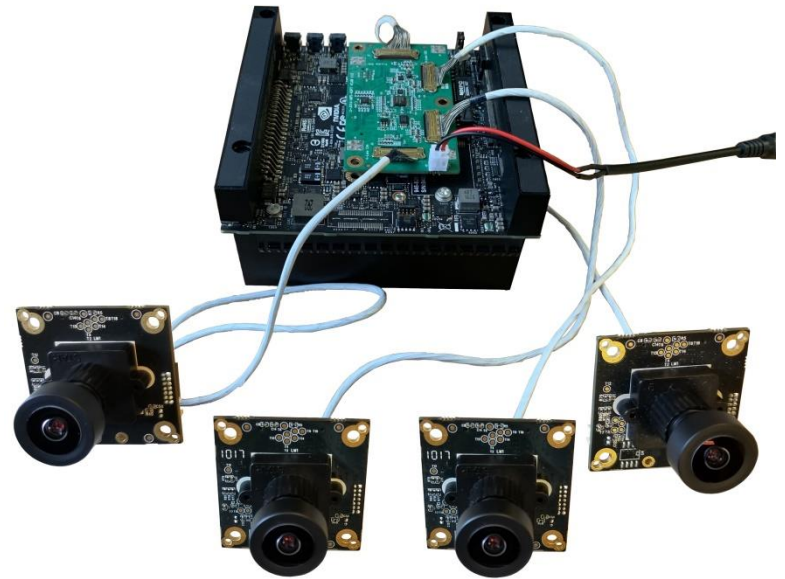


LEOPARD IMAGING INC

# LI-XAVIER-KIT-IMX577M12-X Data Sheet

## Key Features

- Compatible with Nvidia® Jetson AGX Xavier™ Developer Kit
- MIPI CSI-2 interface
- Support up to six cameras
- Two adapter board options
  - LI-JXAV-MIPI-ADPT-4CAM
  - LI-JXAV-MIPI-ADPT-6CAM-FP
- Sony Diagonal 7.857 mm (Type 1/2.3) CMOS Image Sensor IMX577
- Active pixels: 4056H x 3040V
- Color camera
- Length of the I-PEX cable: 300mm
- Support multiple length cables
- Connector Part#: 20525-030E-02C
- Provide customization services
- Part#:
  - (1 cam) [LI-XAVIER-KIT-IMX577M12](#)
  - (2 cam) [LI-XAVIER-KIT-IMX577M12-D](#)
  - (3 cam) [LI-XAVIER-KIT-IMX577M12-T](#)
  - (4 cam) [LI-XAVIER-KIT-IMX577M12-Q](#)
  - (6 cam) [LI-XAVIER-KIT-IMX577M12-H](#)



## Lens Spec

- Model: SYD1201A
- Focal length: 3.7 mm
- Aperture, F/#: 2.8 +/- 5%
- Built in 650nm IR cut filter
- FOV (D/H/V): 100° / 86° / 69°
- TV Distortion: -1.0 %
- M12 x P0.5

## Applications

- Industrial Applications
- Intelligent Transportation System (ITS) Cameras

## BOM

Nvidia AGX Xavier Developer Kit not included

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM or LI-JXAV-MIPI-ADPT-6CAM-FP	1
2	LI-IMX577-MIPI-M12	1, 2, 3, 4 or 6
3	FAW-1233-03 cable	1, 2, 3, 4 or 6



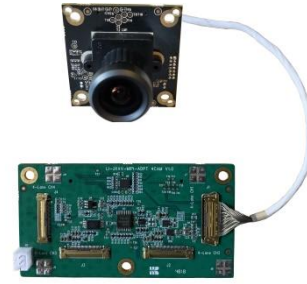
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 Website: www.leopardimaging.com

## LI-XAVIER-KIT-IMX577M12

### BOM

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX577-MIPI-M12	1
3	FAW-1233-03 cable	1



## LI-XAVIER-KIT-IMX577M12-D

### BOM

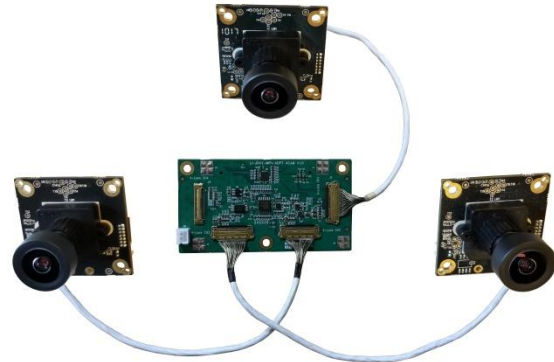
#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX577-MIPI-M12	2
3	FAW-1233-03 cable	2



## LI-XAVIER-KIT-IMX577M12-T

### BOM

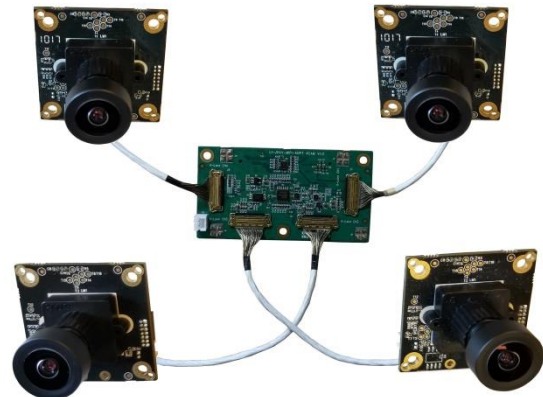
#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX577-MIPI-M12	3
3	FAW-1233-03 cable	3



## LI-XAVIER-KIT-IMX577M12-Q

### BOM

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-4CAM	1
2	LI-IMX577-MIPI-M12	4
3	FAW-1233-03 cable	4



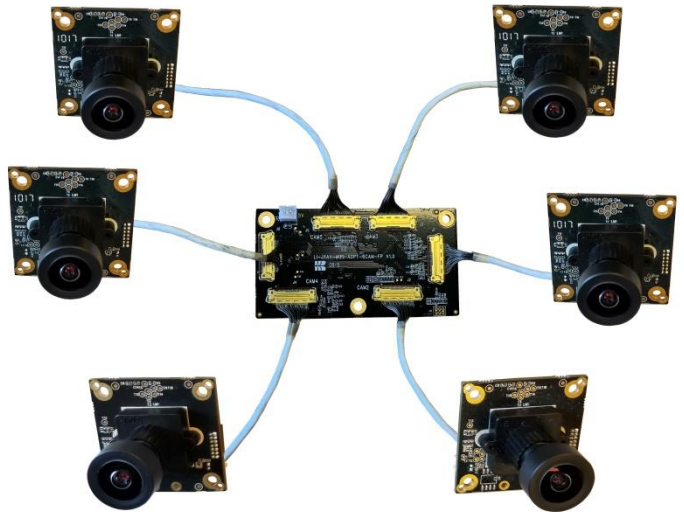
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## LI-XAVIER-KIT-IMX577M12-H

### BOM

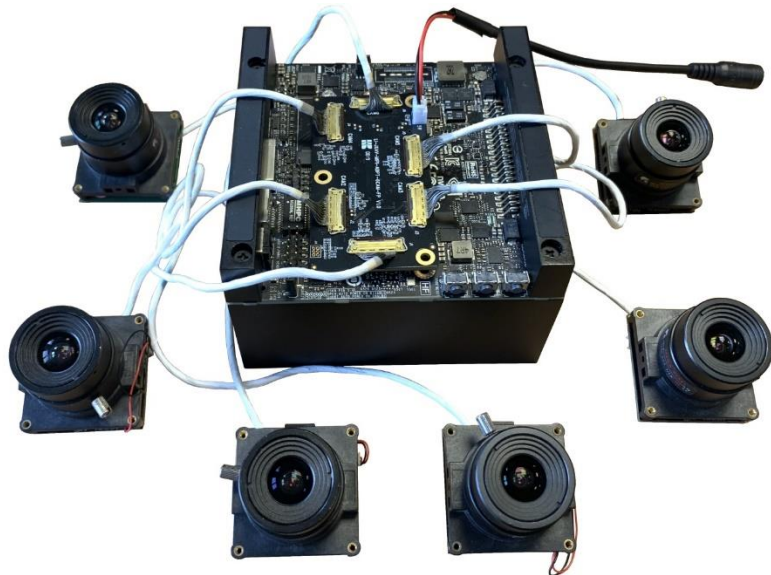
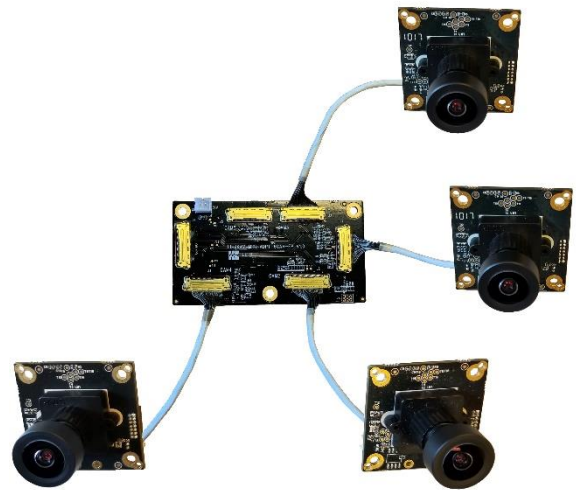
#	Items	QTY
1	LI-JXAV-MIPI-ADPT-6CAM-FP	1
2	LI-IMX577-MIPI-M12	6
3	FAW-1233-03 cable	6



## LI-XAVIER-KIT-IMX577M12-6CAM-Q

### BOM

#	Items	QTY
1	LI-JXAV-MIPI-ADPT-6CAM-FP	1
2	LI-IMX577-MIPI-M12	4
3	FAW-1233-03 cable	4

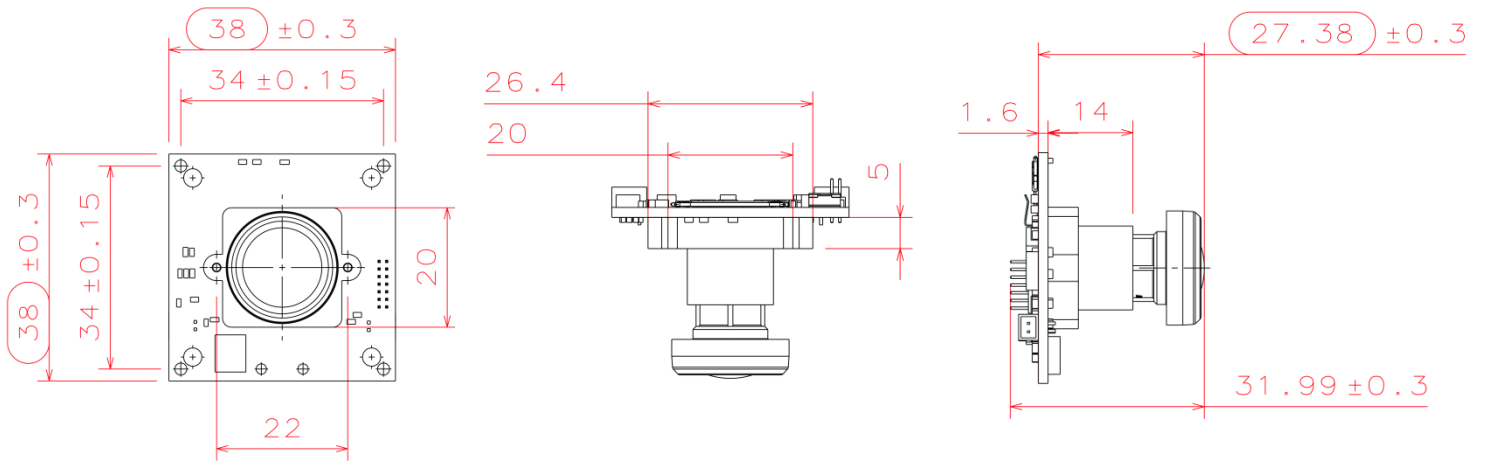


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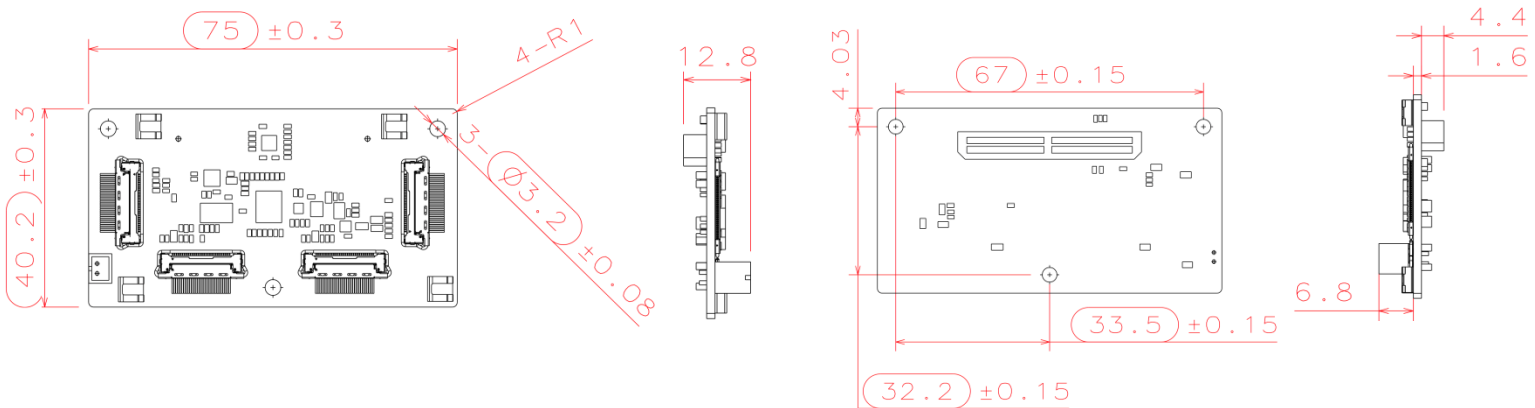
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# Dimensions

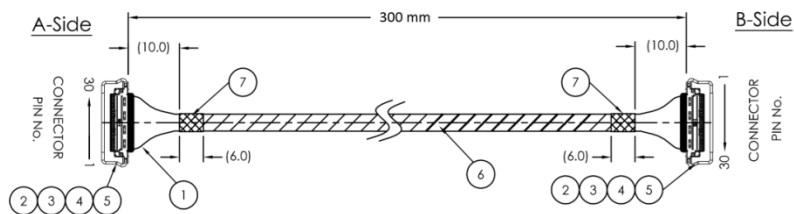
## LI-IMX577-MIPI-M12



## LI-JXAV-MIPI-ADPT-4CAM



## FAW-1233-03

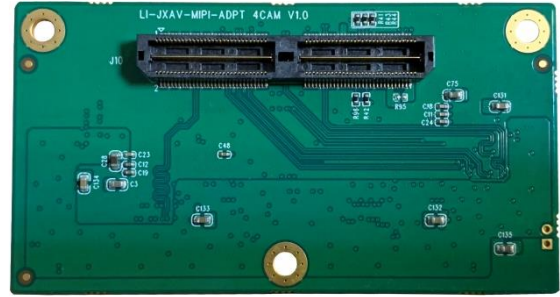


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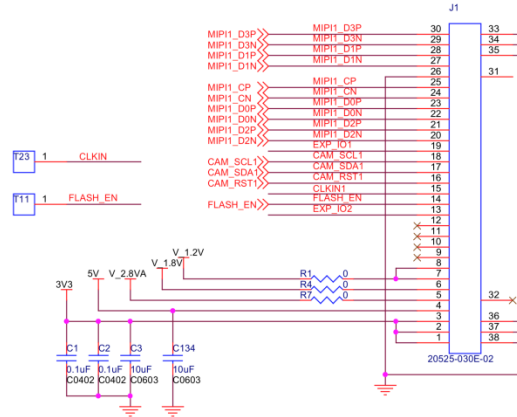
# LI-JXAV-MIPI-ADPT-4CAM



## Interfaces

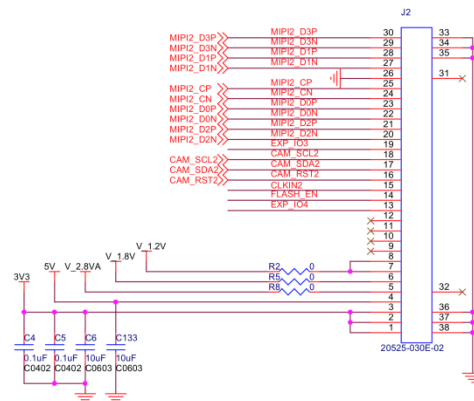
### Interface J1

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



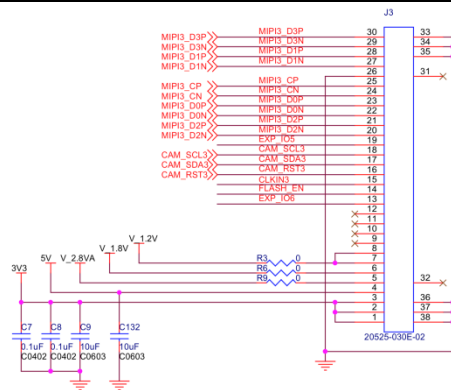
### Interface J2

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



### Interface J3

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)

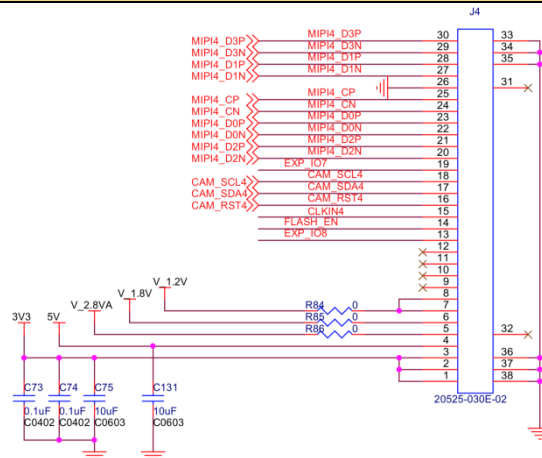


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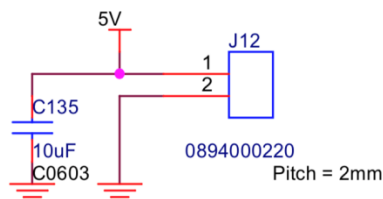
## Interface J4

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-03 (300mm)



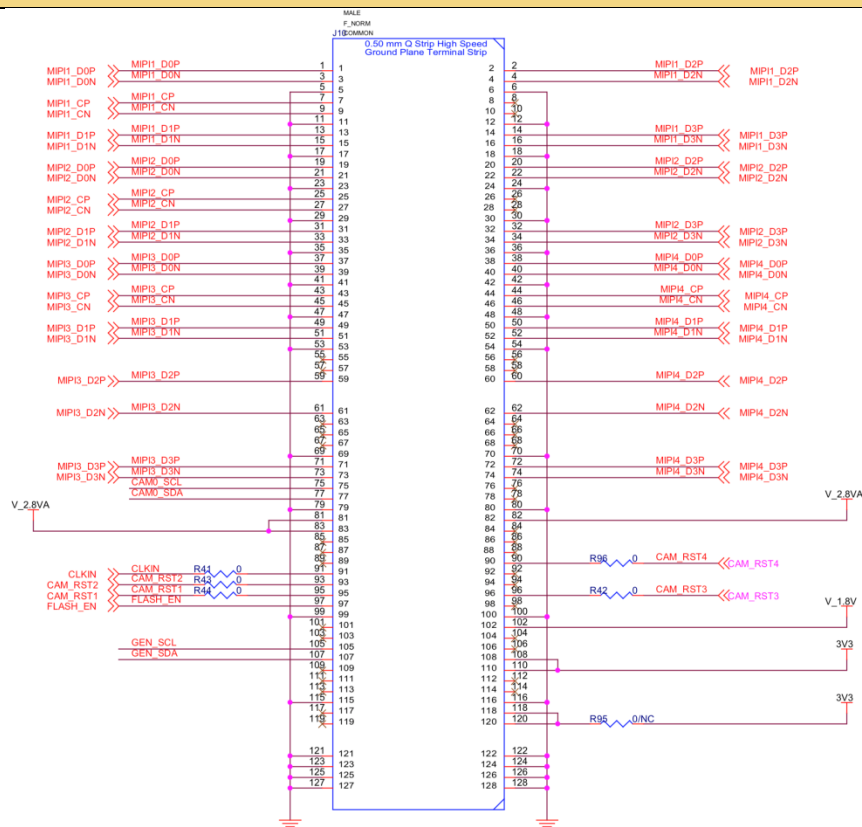
## Interface J5

- Part#: 0894000220
- Number of Positions: 2
- Pitch: 2mm



## Interface J10

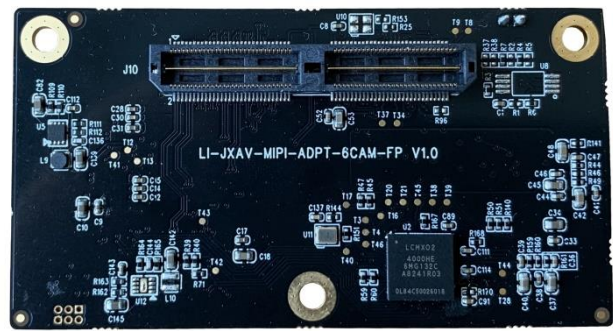
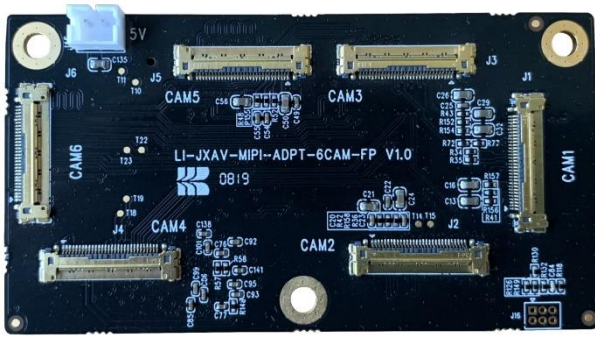
- Part#: QTH-060-01-L-D-A
- Number of Positions: 120
- Number of Rows: 2
- Pitch: 0.5 mm



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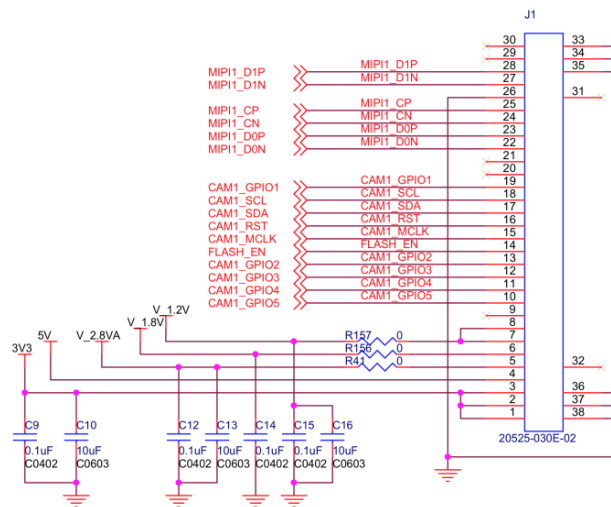
# LI-JXAV-MIPI-ADPT-6CAM-FP



## Interfaces

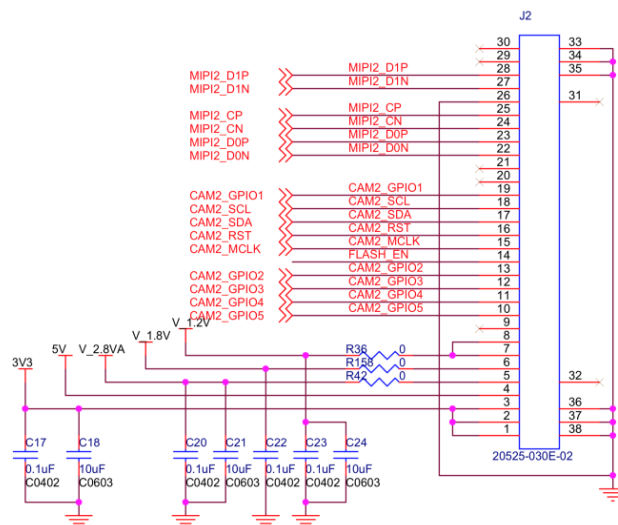
### Interface J1 (camera channel 1)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-xx



### Interface J2 (camera channel 2)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-xx

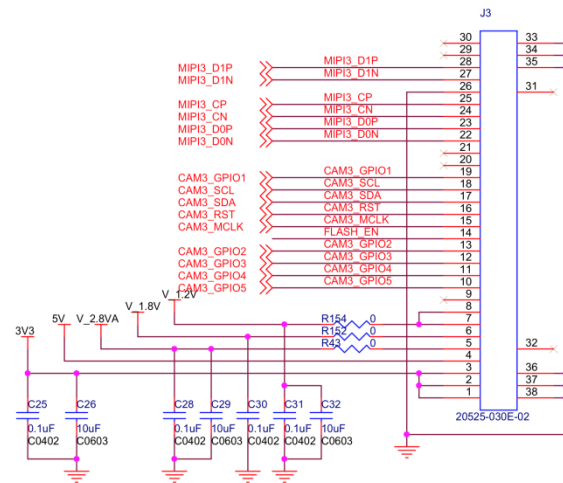


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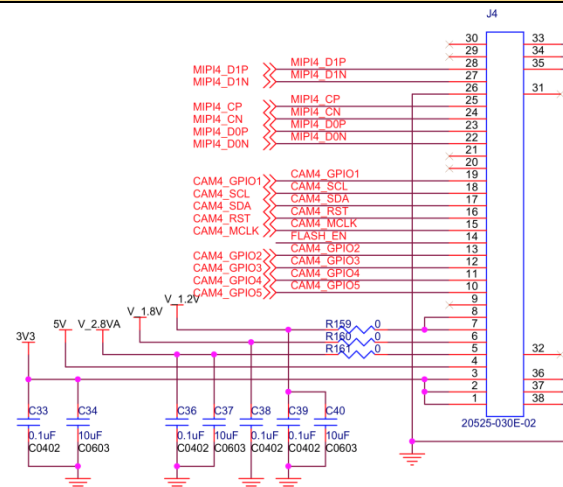
### Interface J3 (camera channel 3)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-xx



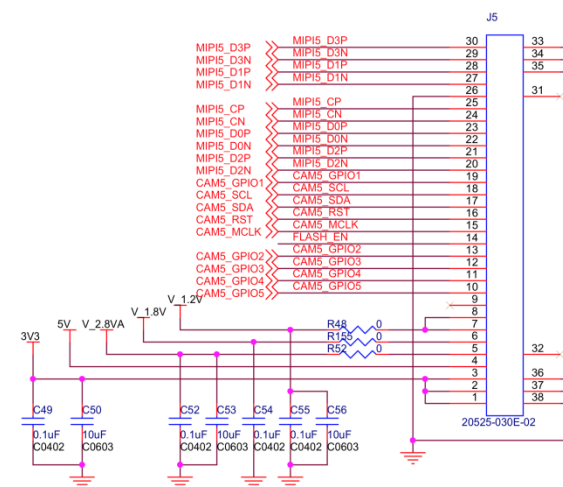
### Interface J4 (camera channel 4)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-xx



### Interface J5 (camera channel 5)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable: FAW-1233-xx



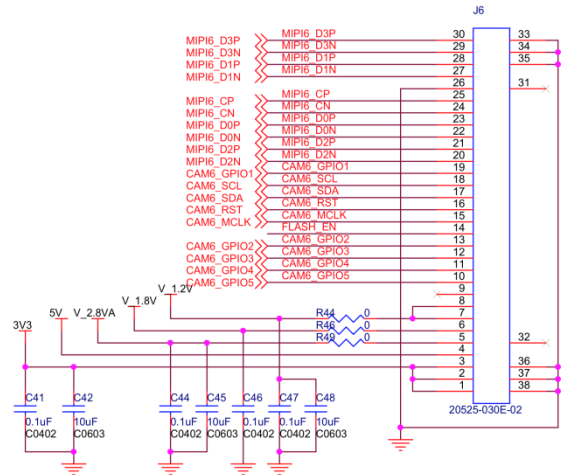
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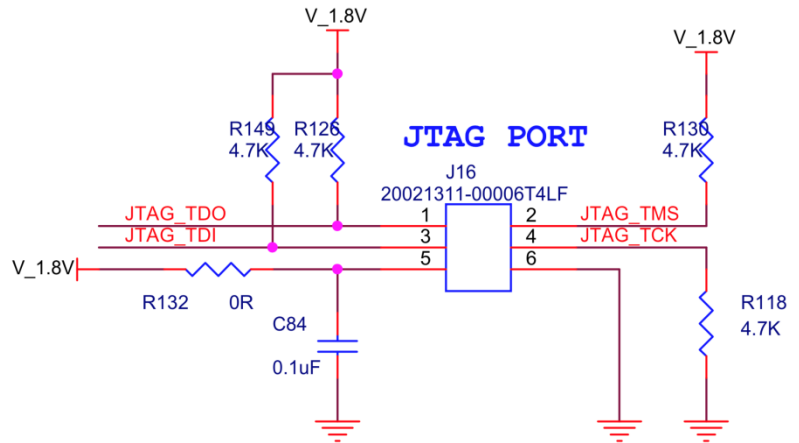
### Interface J6 (camera channel 6)

- Part#: 20525-030E-02C
- Number of Positions: 30
- Pitch: 0.4mm
- Mating I-PEX cable:  
FAW-1233-xx



### Interface J16 (FPGA programming interface)

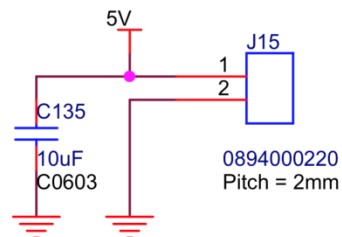
- Part#: 20021311-00006T4LF
- Number of Positions: 6
- Pitch: 0.050" (1.27mm)
- Number of Rows: 2



### Interface J15 (External power input interface)

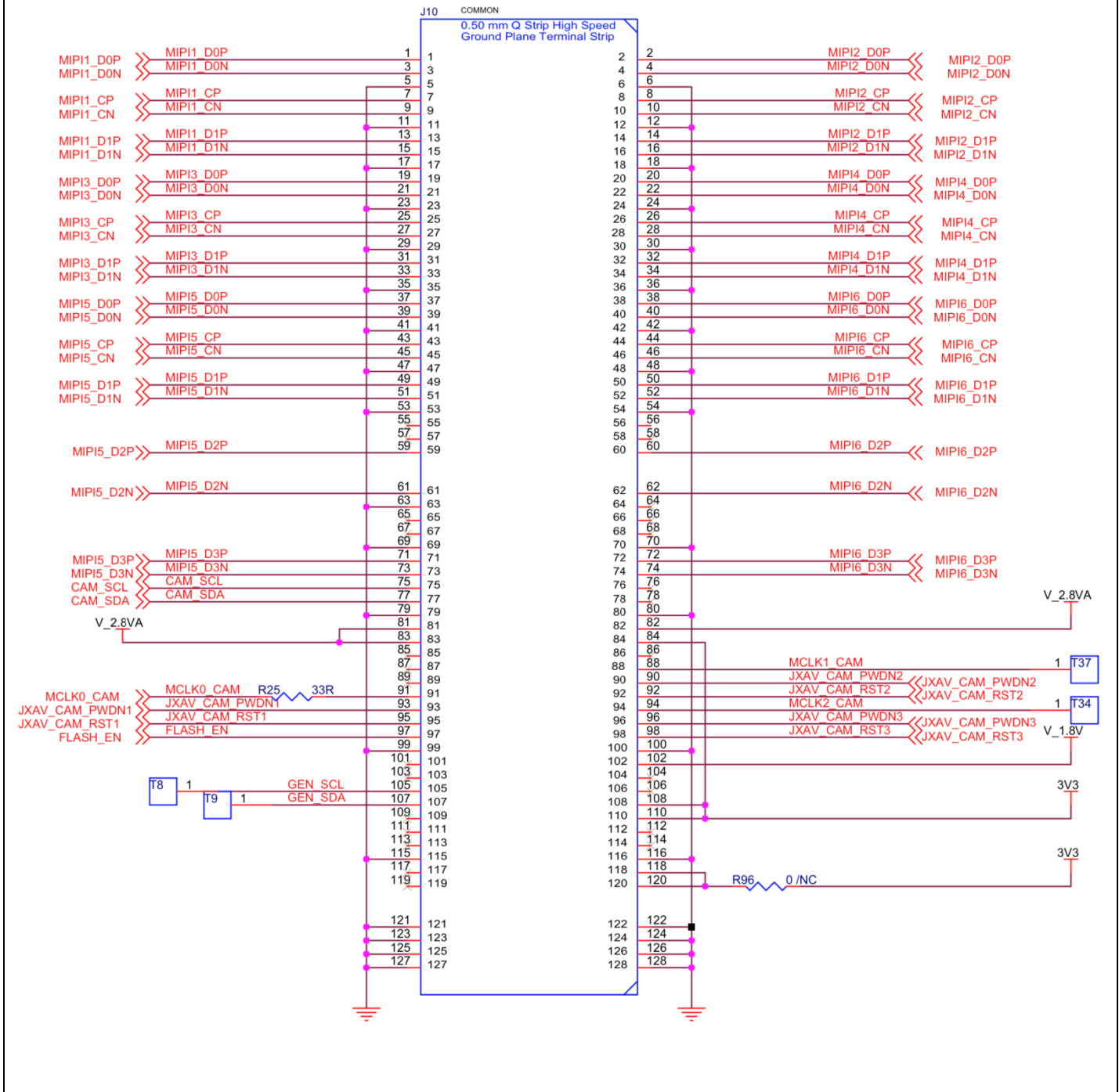
- Part#: 0894000220
- Number of Positions: 2
- Pitch: 2 mm

### External Input Power



## Interface J10 (To Xavier)

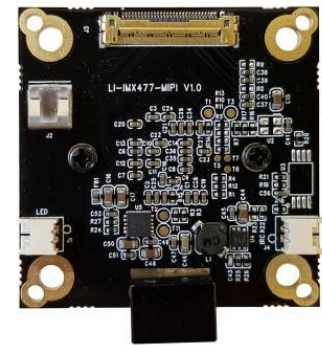
- Part#: QTH-060-01-L-D-A
- Number of Positions: 120
- Number of Rows: 2
- Pitch: 0.5 mm



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# LI-IMX577-MIPI-M12



Camera Spec	
Image Sensor	Sony Diagonal 7.857 mm (Type 1/2.3) CMOS Image Sensor IMX577
Optical format	1/2.3"
Number of active pixels	4056 (H) x 3040 (V)
Pixel size	1.55um (H) x 1.55um (V)
Color or Mono	Color
Interface	MIPI interface
Lens mount	M12
Weight	14 g
Interfaces	
<b>Interface J3:</b> <ul style="list-style-type: none"> <li>Part#: 20525-030E-02C</li> <li>Number of Positions: 30</li> <li>Pitch: 0.4mm</li> <li>Mating I-PEX cable: FAW-1233-03 (300mm)</li> </ul>	
<b>Interface J4:</b> <ul style="list-style-type: none"> <li>Part#: 1734829-2</li> <li>Number of Positions: 2</li> <li>Pitch: 1.25mm</li> </ul>	
<b>Interface J1:</b> <ul style="list-style-type: none"> <li>Part#: 1734829-2</li> <li>Number of Positions: 2</li> <li>Pitch: 1.25mm</li> </ul>	



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## Absolute Maximum Ratings

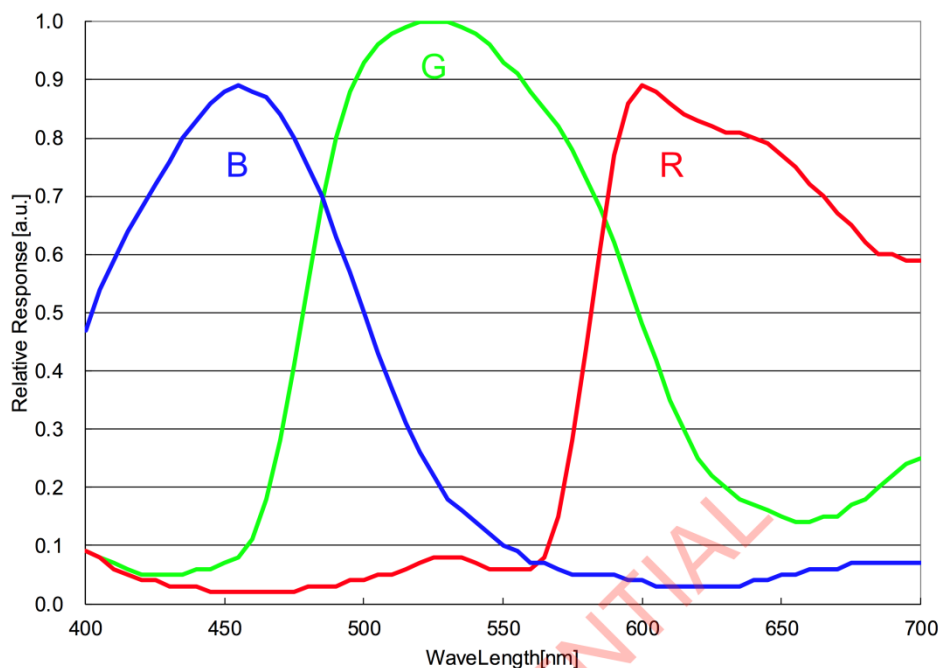
Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	V <sub>ANA</sub>	-0.3 to +3.3	V	refer to V <sub>SS</sub> level
Supply voltage (digital)	V <sub>DIG</sub>	-0.3 to +1.8	V	
Supply voltage (interface)	V <sub>IF</sub>	-0.3 to +3.3	V	
Input voltage (digital)	V <sub>I</sub>	-0.3 to +3.3	V	
Output voltage (digital)	V <sub>O</sub>	-0.3 to +3.3	V	
Guaranteed operating temperature	T <sub>OPR</sub>	-20 to +75	°C	
Guaranteed storage temperature	T <sub>STG</sub>	-30 to +80	°C	
Guaranteed performance temperature	T <sub>SPEC</sub>	-20 to +60	°C	

## Recommended Operating Conditions

Item	Symbol	Ratings	Unit	notes
Supply voltage (analog)	V <sub>ANA</sub> <sup>*1</sup>	2.8 ± 0.1	V	refer to V <sub>SS</sub> level
Supply voltage (digital)	V <sub>DIG</sub> <sup>*2</sup>	1.05 ± 0.1	V	
Supply voltage (interface)	V <sub>IF</sub> <sup>*3</sup>	1.8 ± 0.1	V	

- \*1 V<sub>ANA</sub>: V<sub>DDSUB</sub>, V<sub>DDHAN</sub>, V<sub>DDHCM1</sub> to 2, V<sub>DDHSN1</sub> to 4 (2.8 V power supply)  
 \*2 V<sub>DIG</sub>: V<sub>DDLSC1</sub> to 4, V<sub>DDLGN1</sub> to 2, V<sub>DDLPL1</sub> to 2, V<sub>DDLIF</sub> (1.05 V power supply)  
 \*3 V<sub>IF</sub>: V<sub>DDMIO1</sub> to 2, V<sub>DDMIF</sub> (1.8 V power supply)

## Spectral Sensitivity Characteristics



## DC Characteristics

Item	Pins	Symbol	Conditions	Min.	Typ.	Max.	Unit
Supply voltage	V <sub>DD</sub> SUB, V <sub>DD</sub> HCM1 to 2, V <sub>DD</sub> HSN1 to 4, V <sub>DD</sub> HAN	V <sub>ANA</sub>		2.7	2.8	2.9	V
	V <sub>DD</sub> LCN1 to 2, V <sub>DD</sub> LSC1 to 4, V <sub>DD</sub> LIF, V <sub>DD</sub> LPL1 to 2	V <sub>DIG</sub>		0.95	1.05	1.15	V
	V <sub>DD</sub> MIO1 to 2, V <sub>DD</sub> MIF	V <sub>IF</sub>		1.7	1.8	1.9	V
Digital input voltage	SDA,	V <sub>IH</sub>		0.7 V <sub>IF</sub>		2.9	V
	SCL	V <sub>IL</sub>		- 0.3		0.3 V <sub>IF</sub>	V
Digital input voltage	XCLR, INCK, GYINT,	V <sub>IH</sub>		0.65 V <sub>IF</sub>		V <sub>IF</sub> + 0.3	V
	SDI,SLASEL	V <sub>IL</sub>		- 0.3		0.35 V <sub>IF</sub>	V
Digital output voltage	SDA	V <sub>OH</sub>		V <sub>IF</sub> - 0.4			V
		V <sub>OL</sub>				0.4	V
Digital output voltage	GPO,SDO, SCSB, FSTROBE	V <sub>OH</sub>		V <sub>IF</sub> - 0.4			V
		V <sub>OL</sub>				0.4	V

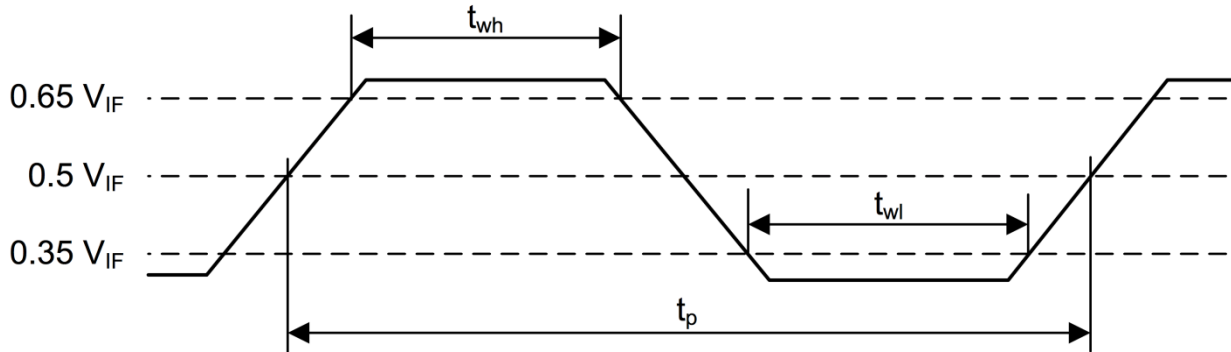




## AC Characteristics

### Master Clock Square Waveform Input Diagram

Input specifications are shown below when square-wave signal is input directly into the external pin INCK.

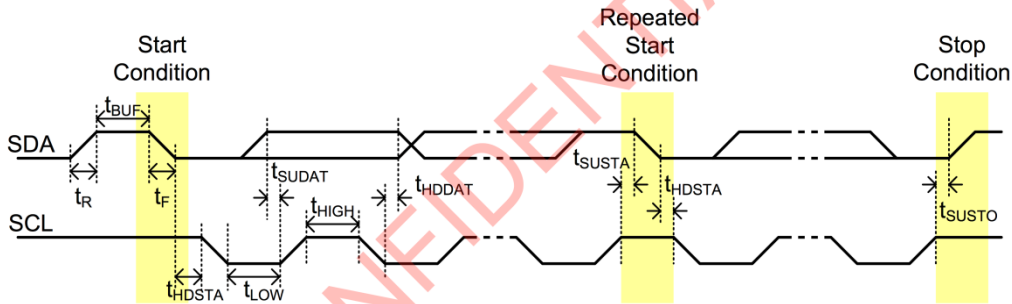


### Master Clock Square Waveform Input Characteristics

PARAMETER	Symbol	Min.	Typ.	Max.	Unit
INCK clock frequency	$f_{SCK}$	6		27	MHz
INCK clock period	$t_p$	37.0		166.7	ns
INCK low level width	$t_{wl}$	$0.4 t_p$		$0.6 t_p$	ns
INCK high level width	$t_{wh}$	$0.4 t_p$		$0.6 t_p$	ns
INCK jitter	$T_{jitter}$			600	ps



## 2-wire serial communication block characteristics



## 2-wire serial communication block specification

Parameter	Symbol	Conditions	Min. (Fast-mode Plus)	Max. (Fast-mode Plus)	Unit
Low level input voltage	$V_{IL}$		-0.5	0.3 $V_{IF}$	V
High level input voltage	$V_{IH}$		0.7 $V_{IF}$	2.9	V
Low level output voltage	$V_{OL1}$	$V_{IF} > 2$ V, Sink 3 mA	0	0.4	V
	$V_{OL2}$	$V_{IF} < 2$ V, Sink 3 mA	0	0.2 $V_{IF}$	V
Output fall time	$t_{of}$	Load 10 pF – 400 pF, 0.7 $V_{IF} \rightarrow$ 0.3 $V_{IF}$		250 (120)	ns
Input current	$I_I$	0.1 $V_{IF} \rightarrow$ 0.9 $V_{IF}$	-10	10	$\mu$ A
SDA I/O capacitance	$C_{I/O}$			10	pF
SCL Input capacitance	$C_I$			10	pF

## 2-wire serial communication block AC specification

Parameter	Symbol	Min. (Fast-mode Plus)	Max. (Fast-mode Plus)	Unit
SCL clock frequency	$f_{SCL}$	0	400 (1000)	kHz
Rise time (SDA and SCL)	$t_R$	—	300 (120)	ns
Fall time (SDA and SCL)	$t_F$	—	300 (120)	ns
Hold time (start condition)	$t_{HDSTA}$	0.6 (0.26)	—	$\mu$ s
Setup time (rep.-start condition)	$t_{SUSTA}$	0.6 (0.26)	—	$\mu$ s
Setup time (stop condition)	$t_{SUSTO}$	0.6 (0.26)	—	$\mu$ s
Data setup time	$t_{SUDAT}$	100 (50)	—	ns
Data hold time	$t_{HDDAT}$	0	—	$\mu$ s
Bus free time between Stop and Start condition	$t_{BUF}$	1.3 (0.5)	—	$\mu$ s
Low period of the SCL clock	$t_{LOW}$	1.3 (0.5)	—	$\mu$ s
High period of the SCL clock	$t_{HIGH}$	0.6 (0.26)	—	$\mu$ s

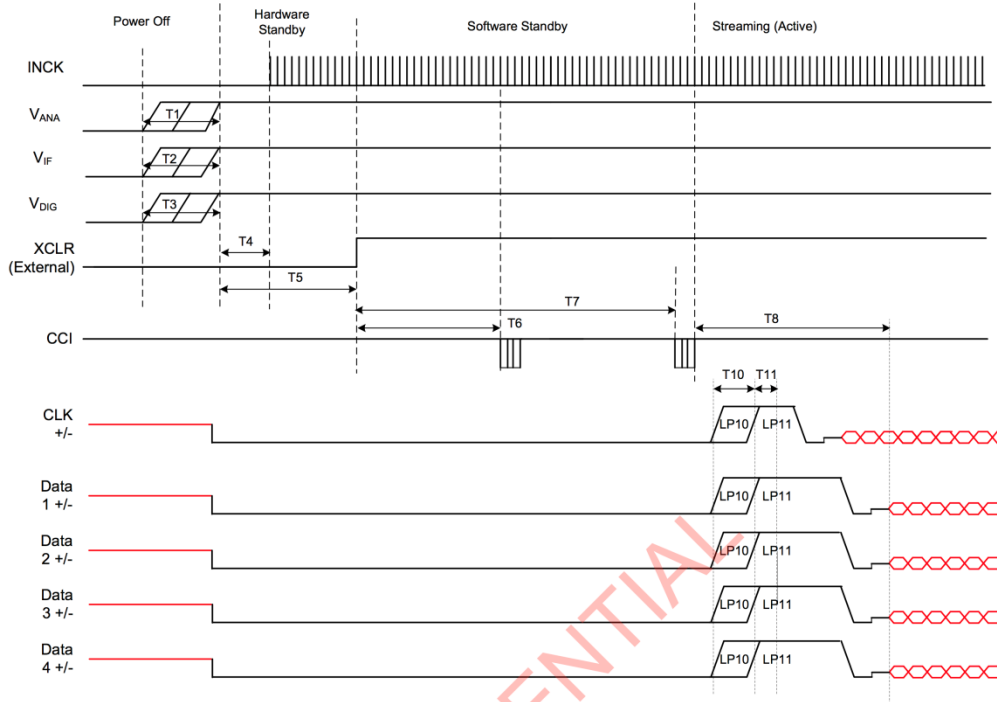
Note) Fast-mode Plus supports only available with INCK  $\geq$  8.0 MHz



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# Power-on Sequence



Item	Label	Min.	Max.	Unit	Comment
V <sub>ANA</sub> rising – V <sub>ANA</sub> ON	T1	V <sub>ANA</sub> and V <sub>IF</sub> and V <sub>DIG</sub> may rise in any order.		µs	Slew rate of V <sub>ANA</sub> , V <sub>IF</sub> and V <sub>DIG</sub> (0 % - 100 %): Max. 50 mV/µs
V <sub>IF</sub> rising – V <sub>IF</sub> ON	T2			µs	
V <sub>DIG</sub> rising – V <sub>DIG</sub> ON	T3			µs	
V <sub>ANA</sub> and V <sub>IF</sub> and V <sub>DIG</sub> rising - INCK start	T4	0		µs	Presence of INCK during Power off is acceptable
V <sub>ANA</sub> and V <sub>IF</sub> and V <sub>DIG</sub> rising - XCLR rising	T5	0		ms	After T1, T2 and T3
INCK start and XCLR rising till CCI Read version ID register wait time	T6	0.6		ms	
INCK start and XCLR rising till Send Streaming Command wait time (To complete reading all parameters from NVM)	T7	8		ms	
Start of first streaming from Sending Streaming Command.	T8		4.0 ms + The delay of the coarse integration time value		
D-PHY power up	T10	1	1.1	ms	
D-PHY init.	T11	100	110	µs	

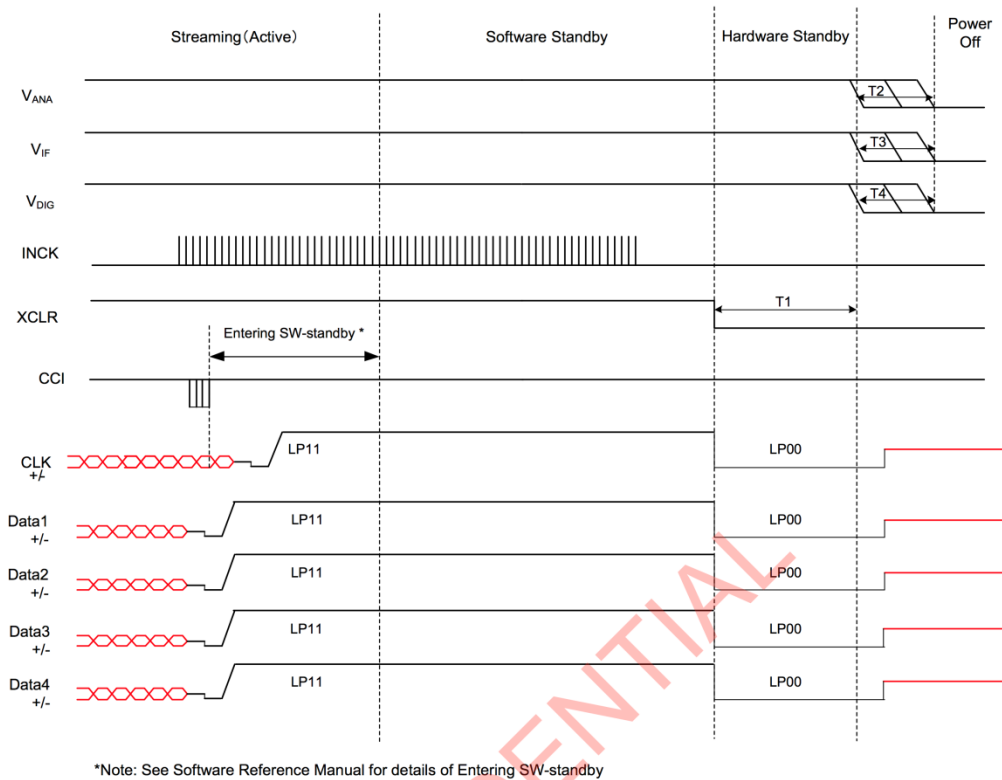
Note) XCLR needs to be Low until all power supplies complete power-on



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# Power-off Sequence



Item	Label	Min.	Max.	Unit	Comment
XCLR Neg-edge - V <sub>ANA</sub> (V <sub>IF</sub> or V <sub>DIG</sub> ) fall	T1	0		µs	Presence of INCK during Power Off is acceptable.
Sequence free of V <sub>ANA</sub> falling and V <sub>IF</sub> falling and V <sub>DIG</sub> falling	T2,T3,T4	V <sub>ANA</sub> and V <sub>IF</sub> and V <sub>DIG</sub> may fall in any order.		µs	



## Revision History

Revision	Description	Release Date
1.0	First Release	23. Mar. 2019
1.1	Add LI-JXAV-MIPI-ADPT-6CAM-FP board	25. Jun. 2019
1.2	Add LI-XAVIER-KIT-IMX577M12-6CAM-Q	21. May. 2019



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