

ICD-OEM-Camera-Side Interfaces

2021-10-14

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 **CAUTION:** Alerts to a potential hazard that may result in personal injury, or an unsafe practice that causes damage to the equipment if not avoided

 **IMPORTANT:** Identifies crucial information that is important to setup and configuration procedures.

 *Used to emphasize points or reminds the user of something. Supplementary information that aids in the use or understanding of the equipment or subject that is not critical to system use.*

Revision History

Date	Description
2021-10-14	Added max load specification with FLIR Boson 640 and 320 to SLA-FPC-BOSON-E section. Noted features not available and 1500-FPC and SLA-3000-FPC compatibility.
2021-09-29	Updated obsolete Molex FFC ribbon cable part number.
2021-03-31	Added SLA-FPC-TAU camera interface board photo.
2021-02-08	Replaced Thermal Management with Operating Temperature section. Added placeholder for SLA-FPC-TAU board.
2019-12-05	Added SLA-FPC-BOSON connector descriptions table.
2019-11-12	Added SLA-FPC-DRS camera interface board photo.
2019-07-08	Added new link to ICD-3000-4000 Adapter Boards document.
2019-05-10	Updated SLA-FPC-BOSON board to SLA-FPC-BOSON-E REV C.
2018-09-19	Added VIOSEL information to table 1.
2018-06-19	Updated ICD to new format. Added SLA-FPC-BOSON board.



1 Overview

This document describes power requirements, thermal management, interface specifications, and connector pinouts for SLA-FFC and SLA-FPC camera interface boards. Camera interface boards can be connected to the appropriate OEM adapter board using a COTS FFC cable. Design files are also available for customers to build their own boards. Contact [Sales](#) for the latest boards available.

1.1 Available Adapter Boards

[SLA-FFC-TAU](#)

[SLA-FPC-TAU](#)

[SLA-FFC-DRS](#)

[SLA-FPC-DRS](#)


[SLA-FPC-BOSON-E](#)

[SLA-FFC-QUARK](#)

1.2 Additional Support Documentation

Additional Engineering Application Notes (EANs) can be found on the [Documentation](#) page of the SightLine Applications website.


The [Panel Plus User Guide](#) provides a complete overview of settings and dialog windows located in the Help menu of the Panel Plus application.

 The Interface Command and Control ([IDD](#)) describes the native communications protocol used by the SightLine Applications product line. The IDD is also available as a PDF download on the [Documentation](#) page under Software Support Documentation.


1.3 Hardware Compatibility

Standard Ethernet network or serial connection to the SightLine hardware.

1.4 Sightline Software Requirements

 **IMPORTANT:** The Panel Plus software version should match the firmware version running on the board. Firmware and Panel Plus software versions are available on the [Software Download](#) page.

2 Safe Device Handling

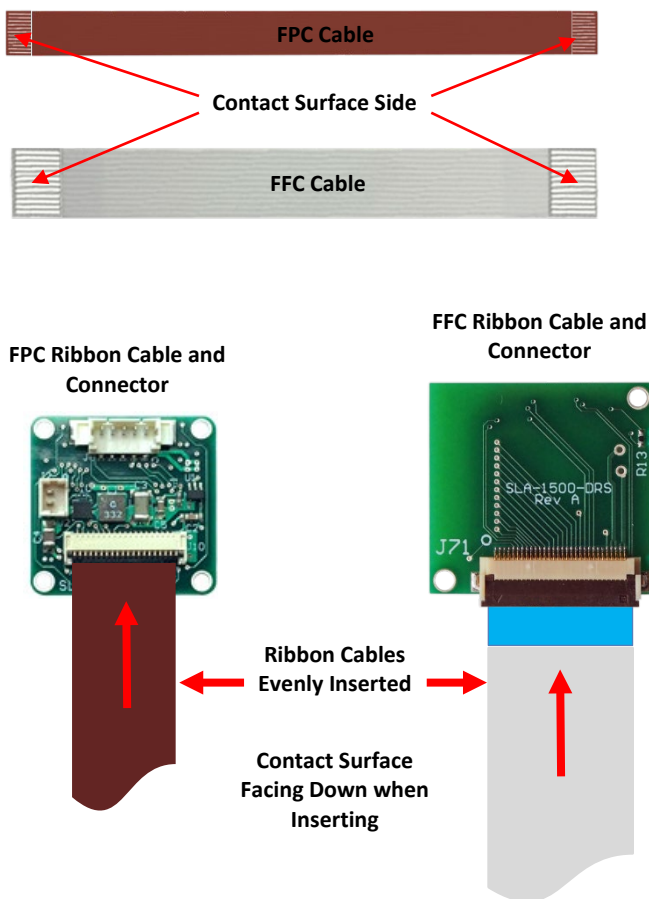
 **CAUTION:** To prevent damage to hardware boards, use a conductive wrist strap attached to a good earth ground. Before picking up an ESD sensitive electronic component, discharge built up static by touching a grounded bare metal surface or approved antistatic mat.



3 FFC-FPC Adapter Board Connections

Some adapter boards use the Molex FFC (Flexible Flat Cable) or an FPC (Flexible Printed Circuit) cable to connect to the camera. FFC and FPC connectors are a bottom contact design. The flip-lock is on top of the connector and the contact surface is on the bottom. This means that the metal surface of the cable must connect with the metal surface of the connector to have a proper interface. An incorrectly seated cable can cause a wide range of issues and unpredictable behavior.

There are two rows of contacts on the FPC cable and connector. Unlike the FFC connector the FPC connector is a low insertion force (LIF) design. Expect some considerable resistance pushing past the second row of contacts, especially with a new cable. Care should be taken to prevent the cable from over flexing.



Connection instructions:

1. Open the flip-lock on the connector. Use thumb or index finger. Do not use tools or excessive force.
2. Insert the ribbon cable (with the contact surface side down) straight into the connector (parallel to the PCB):

FFC: The FFC connector has a zero-insertion force (ZIF) design. No force is required for insertion.

FPC: Some pressure is required for a proper interface. Expect resistance at the second row of contacts before it stops.

3. Ensure that the FFC / FPC cable is fully inserted and parallel to the mounting surface. Close the flip-lock connector.

If the ribbon cable is moved at any time before the flip-lock is closed repeat the process starting at step 1.

Figure 1: FPC / FFC Cable Connections



4 Operating Temperature

The electrical components specified in the design of all adapter boards defined in this document are rated at an operating temperature range of -40°C to 85°C. Simple convective cooling of the adapter board is often sufficient in most cases, but integrators should analyze their thermal environment to ensure that it stays within the recommended component operating temperature range. OEM boards require conducted cooling to maintain proper operation. See the [ICD-1500-OEM](#), [ICD-3000-OEM](#), and [ICD-4000-OEM](#) for details.

5 Camera-Side Ribbon Connectors

ⓘ IMPORTANT: For specific camera connector pinout descriptions, refer to the camera manufacturer's instructions and design recommendations.

5.1 FFC Ribbon Connections

SLA-FFC boards are designed to work with Molex 15266-0325 0.50mm Pitch Premo-Flex™ FFC jumper, same side contacts (type A), 30 circuits, 0.152 mm cable length, 0.27 mm cable thickness, Tin (Sn) plating. This cable is compatible with the SLA-1500-FFC and SLA-3000-FFC adapter boards.

Longer and shorter cables have also been tested with positive results.

Table 1: FFC Ribbon Cables

SightLine Part Number	MFG Part Number	Description
SLA-CAB-FF06	Molex 15266-0325	CABLE FFC 30POS 0.50MM 6-inch

Table 2: FFC Main Camera Connector

Pin	Description	Pin	Description
1	Camera TX	2	Camera RX
3	NC	4	NC
5	Ground	6	Digital Data 13
7	Digital Data 12	8	Digital Data 11
9	Digital Data 10	10	Digital Data 9
11	Digital Data 8	12	Digital Data 7
13	Digital Data 6	14	Digital Data 5
15	Digital Data 4	16	Digital Data 3
17	Digital Data 2	18	Digital Data 1
19	Digital Data 0	20	Ground
21	Pixel Clock Out	22	Frame Valid
23	Line Valid	24	NC
25	NC	26	VIOSEL out (to OEM)*
27	+5V Camera power in	28	+5V Camera power in
29	Ground	30	Ground

* VIOSEL out must match the camera voltage level for Digital Data, Pixel Clock, Line Valid and Frame Valid signals. This is +3.3V level for most cameras. This is used by the 1500-OEM for level translation.



5.2 FPC Ribbon Connections

SLA-FPC boards are designed to work with Molex 15015-0439, Premo-Flex™ 39-position FPC cable 0.012-inch (0.30 mm) pitch, 4.000-inch (101.60 mm) length. This cable is compatible with the SLA-1500-FPC and SLA-3000-FPC adapter boards.

Table 3: FPC Ribbon Cables

SightLine Part Number	MFG Part Number	Description
SLA-CAB-FPC04	Molex 15015-0439	CABLE FPC 30POS 101.60 mm

Table 4: FPC Main Camera Connector

Pin	Signal	Pin	Signal	Pin	Signal
1	VINC_D12	14	VINC_D3	27	AIRBORNE_DET
2	VINC_D13	15	VINC_D4	28	PCLK_C
3	VINC_D14	16	VINC_D5	29	GND
4	ID1_GPO_C	17	VINC_D6	30	MCLK
5	VINC_D15	18	VINC_D7	31	Ground
6	NC	19	VINC_D8	32	P5V
7	I2C0_SDA	20	VINC_D9	33	P5V
8	I2C0_SCL	21	VINC_D10	34	VIOSEL_IN
9	VINC_D0	22	VINC_D11	35	P3P3V
10	VINC_D1	23	TRIG_TX	36	P3P3V
11	Ground	24	FLASH_RX	37	P5V
12	Ground	25	VINA_HSYNCC	38	Ground
13	VINC_D2	26	VINA_VSYNCC	39	ID0_GP1_c

5.3 KEL Cable Connections

The KEL ribbon cable length should be as short as possible to ensure video quality and reduce EMI susceptibility. SightLine provides a 10cm cable within camera interface kits. A KEL cable length greater than 15cm is not recommended. There are COTS sources for alternate length KEL cables to help with custom integrations.



6 SLA-FFC-TAU

Revision: A
Dimensions: 1.50 in x 1.50 in (38.10 mm x 38.10 mm)
Weight: 5 grams
Drawing: [SLA-FFC-TAU](#)
[SLA-FFC-TAU Exploded](#)
STEP File: [SLA-FFC-TAU STEP](#)
Rev History: Rev A: Initial production release.

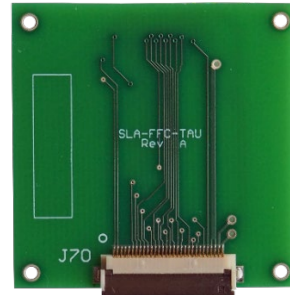


Figure 2: SLA-FFC-TAU Board

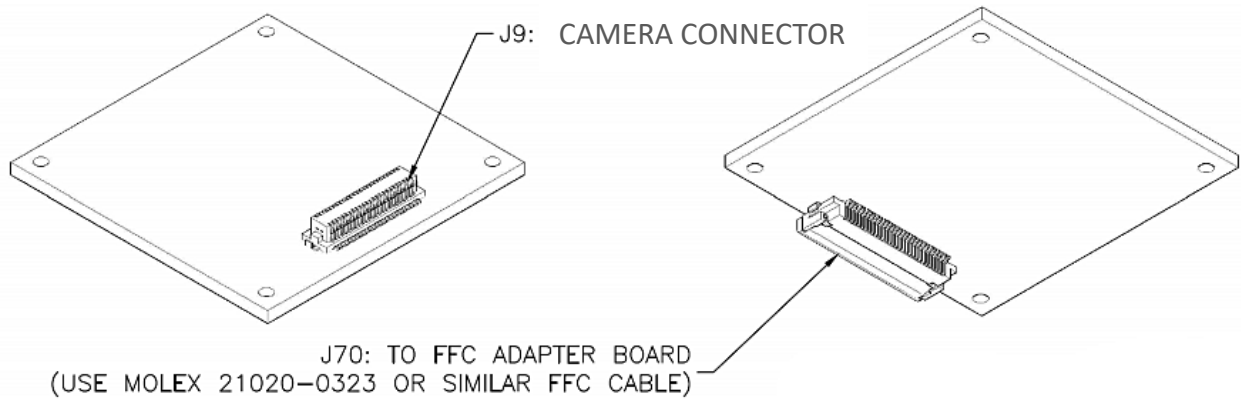


Figure 3: SLA-FFC-TAU Connector Callouts

Table 5: SLA-FFC-TAU Connector Summary

Label	MFG Part Number	Mates with:
J9	DF12B-50DS-0.5V(86)	FLIR TAU Camera
J70	FH12-30S-0.5SH(55)	FFC Cable (Molex 21020-0323)



7 SLA-FPC-TAU

Revision: A
Dimensions: 1.50 in x 1.50 in (38.10 mm x 38.10 mm)
Weight: 5 grams
Drawing: [SLA-FPC-TAU](#)
STEP File: [SLA-FPC-TAU STEP](#)
Rev History: Rev A: Initial production release.



Figure 4: SLA-FPC-TAU Board

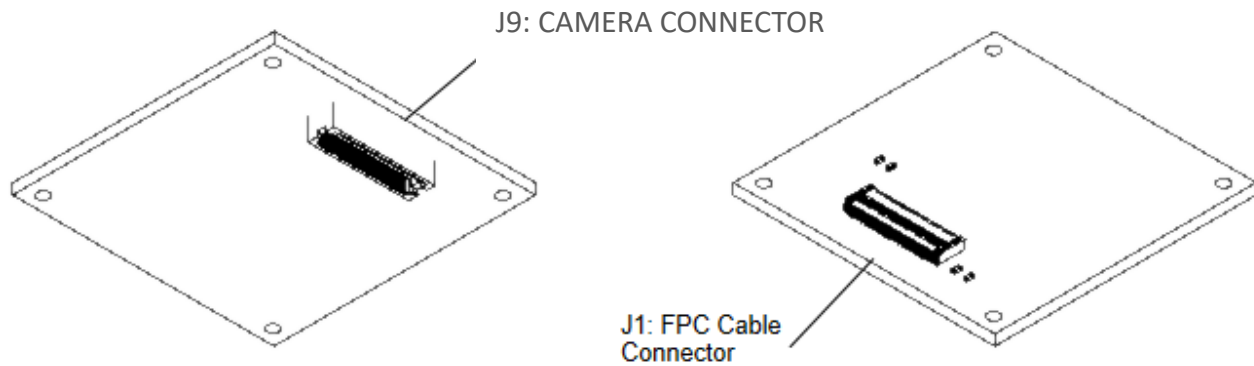


Figure 5: SLA-FPC-TAU Connector Callouts

Table 6: SLA-FPC-TAU Connector Summary

Label	MFG Part Number	Mates with:
J1	501912-3990	Molex 15015-0439, SLA-CAB-FPC04
J9	DF12B(5.0)-50DP-0.5V(86)	FLIR TAU Camera



8 SLA-FFC-DRS

The SLA-FFC-DRS board provides an interface to DRS Tamarisk cameras.

- Revision:** A
- Dimensions:** 0.99 in x 0.94 in (25.14 mm x 23.87 mm)
- Weight:** 2.5 grams
- Drawing:** [SLA-FFC-DRS](#)
[SLA-FFC-DRS Exploded](#)
- STEP File:** [SLA-FFC-DRS STEP](#)
- Rev History:** Rev A: Initial production release.

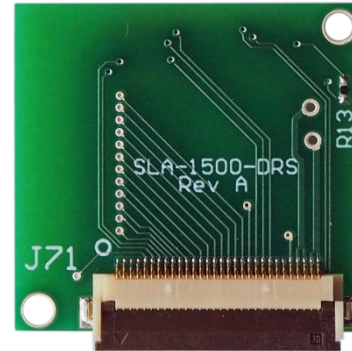


Figure 6: SLA-FFC-DRS Board

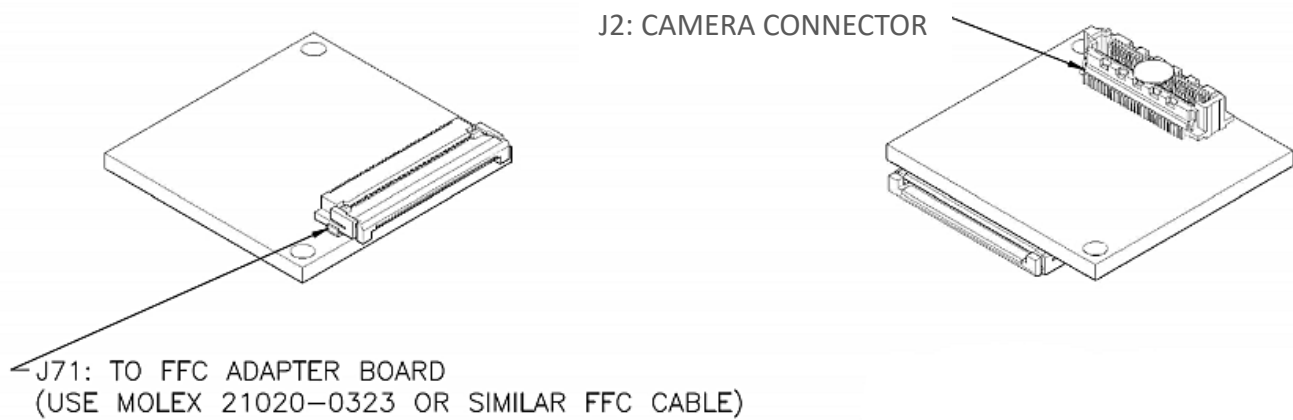


Figure 7: SLA-FFC-DRS Connector Callouts

Table 7: SLA-FFC-DRS Connector Summary

Label	MFG Part Number	Mates with:
J2	SS4-30-3.00-1-L-D-K-TR	DRS Tamarisk camera
J1	FH12-30S-0.5SH(55)	FFC Cable (Molex 21020-0323)



9 SLA-FPC-DRS

The SLA-FPC-DRS board provides an interface to DRS Tamarisk cameras.

Revision: A
Dimensions: 0.99 in x 0.94 in (25.14 mm x 23.87 mm)
Weight: 2.5 grams
Drawing:
STEP File: [SLA-FPC-DRS STEP](#)
Rev History: Rev A: Initial production release.

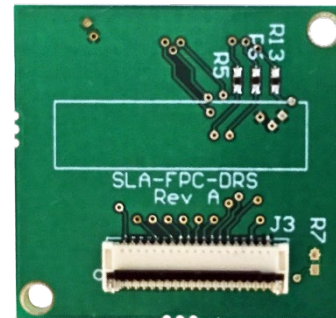


Figure 8: SLA-FPC-DRS Board

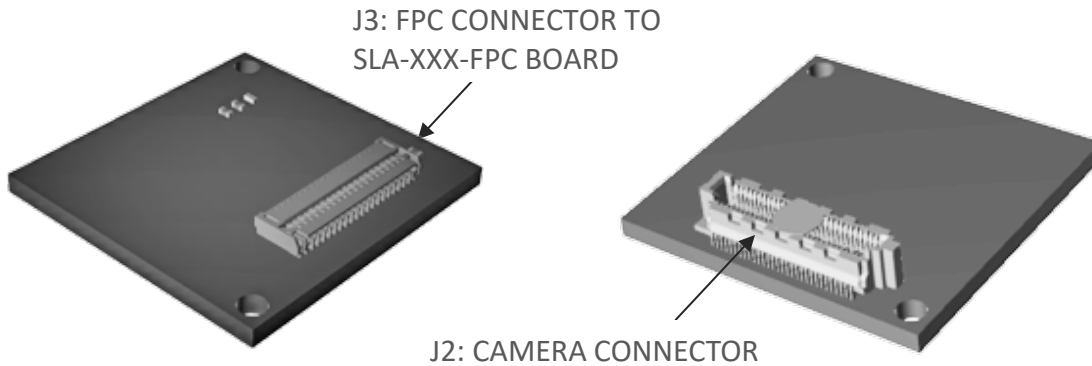


Figure 9: SLA-FPC-DRS Connector Callouts

Table 8: SLA-FPC-DRS Connector Summary

Label	MFG Part Number	Mates with:
J2	SS4-30-3.00-L-D-K-TR	DRS Tamarisk camera
J3	501912-3990	Molex 15015-0439, SLA-CAB-FPC04



10 SLA-FFC-QUARK

Revision: A
Dimensions: 0.87 in x 0.87 in (22.09 mm x 22.09 mm)
Weight: 2.3 grams
Drawing: [SLA-FFC-QUARK](#)
[SLA-FFC-QUARK Exploded](#)
STEP File: [SLA-FFC-QUARK STEP](#)
Rev History: Rev A: Initial production release.



Figure 10: SLA-FFC-QUARK Board

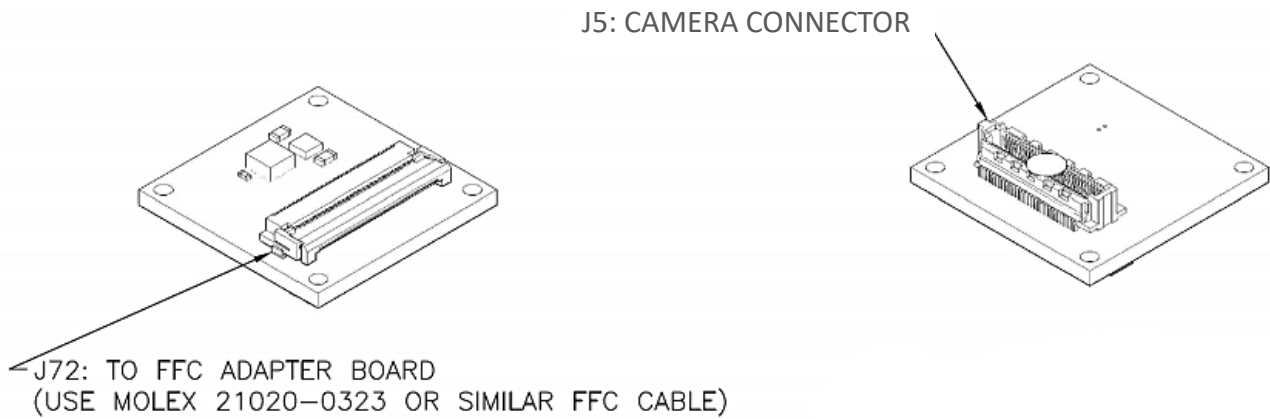


Figure 11: SLA-FFC-QUARK Connector Callouts

Table 9: SLA-FFC-QUARK Connector Summary

Label	MFG Part Number	Mates with:
J5	SS4-30-3.00-1-L-D-K-TR	FLIR Quark camera
J72	FH12-30S-0.5SH(55)	FFC Cable (Molex 21020-0323)



11 SLA-FPC-BOSON-E

This SLA-FPC-BOSON-E board can be used with the SLA-1500-FPC or SLA-3000-FPC board. See [ICD-1500-Adapter Boards](#) and [ICD-3000-4000 Adapter Boards](#) for connector details.

This camera adapter board is compatible with the FLIR Neutrino LC camera.

USB, camera reset, and external trigger features are not available on this board.

- Revision:** C
- Dimensions:** 0.83 in x 0.83 in (21.08 mm x 21.08 mm)
- Weight:** 2.3 grams
- Drawing:** [SLA-FPC-BOSON](#)
- STEP File:** [SLA-FPC-BOSON STEP](#)
- Rev History:**
 - B: Corrected routing.
 - B1: Corrected serial communications.
 - C: External power connector added for Boson 640 camera.



Figure 12: SLA-FPC-BOSON-E Board

For the FLIR Boson 320 camera, an adapter board is available without the external camera power connector, part number SLA-FPC-BOSON. In this configuration the camera power is supplied by the OEM board.

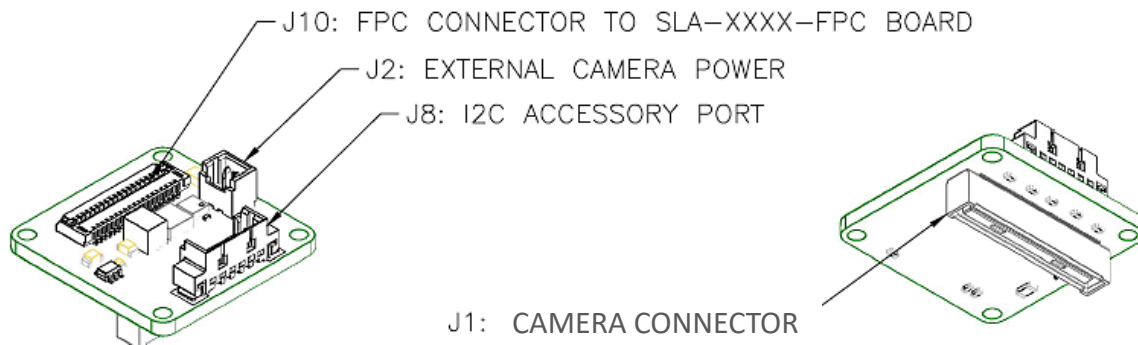


Figure 13: SLA-FPC-BOSON Connector Callouts

SLA-FPC-BOSON-E board can also be used to provide power and I²C access to a device if there is no camera connected, e.g., a lens, accelerometers, etc.

Table 10: SLA-FPC-BOSON Connector Summary

Label	MFG Part Number	Mates with:
J1	DF40HC-(4.0)-80DS-0.4V(51)	Camera
J2	53047-0210	SLA-CAB-0202 (Molex: 51021-0200)
J8	53398-0571	Molex 51021-0500 (housing) and 0500588000 (terminals)
J10	501912-3990	Molex 15015-0439 , SLA-CAB-FPC04

**SLTable 11: J2 Connector Description**

Connector	Description		
Connector J2: External Power	Pin	Signal	Description
	1	Vin 5-15V, 5W	Provides power to camera, local circuit, and other accessories (5W total). Does <u>not</u> provide power to SLA-XXXX-FPC or connected OEM. Max load: 50mA with the FLIR Boson 640 camera and 100mA with the FLIR Boson 320 camera.
	2	Ground	

Table 12: J8 Connector Description

Connector J8: I2C Accessory Port	Pin	Signal	Description
See the FPC Connector Descriptions table in the ICD-1500-Adapter Boards and ICD-3000-4000 Adapter Boards .	1	3.3V	3.3V Power Output
	2	GND	Ground
	3	NC	No Connect
	4	SDA	I2C SDA
	5	SCL	I2C SCL

I²C connections to OEM port numbers are a function of OEM and input slot.

Table 13: J1 Camera Connector

Pin	Signal	Description	Pin	Signal	Description
1	GROUND	Ground	2	3.3V TO CAM	3.3V Supply
3	GROUND	Ground	4	3.3V TO CAM	3.3V Supply
5	GROUND	Ground	6	3.3V TO CAM	3.3V Supply
7	GROUND	Ground	8	3.3V TO CAM	3.3V Supply
9	NC	Not Connected	10	GROUND	Ground
11	NC	Not Connected	12	NC	Not Connected
13	GROUND	Ground	14	NC	Not Connected
15	NC	Not Connected	16	NC	Not Connected
17	NC	Not Connected	18	NC	Not Connected
19	GROUND	Ground	20	GROUND	Ground
21	D14	Data 14	22	NC	Not Connected
23	NC	Not Connected	24	NC	Not Connected
25	D8	Data 8	26	NC	Not Connected
27	D4	Data 4	28	D5	Data 5
29	GROUND	Ground	30	GROUND	Ground
31	D7	Data 7	32	D6	Data 6
33	UART_APB_SIN	Serial Input to Camera	34	NC	Not Connected
35	NC	Not Connected	36	NC	Not Connected
37	NC	Not Connected	38	D15	Data 15
39	GROUND	Ground	40	GROUND	Ground
41	D13	Data 13	42	NC	Not Connected
43	UART_APB_SOUT	Serial Output from Camera	44	NC	Not Connected
45	D10	Data 10	46	D9	Data 9
47	D12	Data 12	48	D11	Data 11
49	GROUND	Ground	50	GROUND	Ground
51	D2	Data 2	52	NC	Not Connected
53	VSYNC	Vertical Sync	54	NC	Not Connected
55	PCLK	Pixel Clock	56	D3	Data 3



(J1 Camera Connector table continued)

57	NC	Not Connected	58	NC	Not Connected
59	GROUND	Ground	60	GROUND	Ground
61	NC	Not Connected	62	D1	Data 1
63	I2C0_SCL	Reserved for future use	64	NC	Not Connected
65	NC	Not Connected	66	NC	Not Connected
67	I2C0_SDA	Reserved for future use	68	NC	Not Connected
69	GROUND	Ground	70	GROUND	Ground
71	NC	Not Connected	72	NC	Not Connected
73	HSYNC	Horizontal Sync	74	NC	Not Connected
75	NC	Not Connected	76	NC	Not Connected
77	D0	Data 0	78	DATA_EN	Data Valid
79	GROUND	Ground	80	NC	Not Connected

ⓘ IMPORTANT: Not all camera signals are accessed on the SightLine board. For the FLIR Boson and Neutrino LC cameras, in addition to other signals, NO connections are provided for USB, camera reset, or external trigger.

Table 14: J10 FPC Connector to SLA-FPC-XXX Board

Pin	Signal	Description	Pin	Signal	Description
1	D12	Data 12	21	D10	Data 10
2	D13	Data 13	22	D11	Data 11
3	D14	Data 14	23	UART_APB_SIN	Serial Output from OEM
4	SLA_GPIO	GPIO from SightLine board, exposed for customer use on J8	24	UART_APB_SOUT	Serial Input to OEM
5	D15	Data 15	25	HSYNC	Horizontal Sync
6	NC	NC	26	VSYNC	Vertical Sync
7	I2C_SDA_SLA	I2C Port from OEM, exposed for customer use on J8	27	NC	Not Connected
8	I2C_SCL_SLA	I2C Port from OEM, exposed for customer use on J8	28	PCLK	Pixel Clock
9	D0	Data 0	29	GROUND	Ground
10	D10	Data 10	30	NC	Not Connected
11	GROUND	Ground	31	GROUND	Ground
12	GROUND	Ground	32	P5V	5V supply to board (Not used on SLA-FPC-BOSON-E)
13	D2	Data 2	33	P5V	5V supply to board (Not used on SLA-FPC-BOSON-E)
14	D3	Data 3	34	P1P8V_SENSE	IO Voltage Sense Connection
15	D4	Data 4	35	NC	Not Connected
16	D5	Data 5	36	NC	Not Connected
17	D6	Data 6	37	P5V	5V supply to board (Not used on SLA-FPC-BOSON-E)
18	D7	Data 7	38	GROUND	Ground
19	D8	Data 8	39	DATA_EN	Data Valid
20	D9	Data 9			

See the [SLA-1500-FPC Connector Descriptions table in the ICD-1500-Adapter-Boards](#) or the [SLA-3000-FPC Connector Descriptions table in the ICD-3000-Adapter-Boards](#) for FPC connector descriptions on the OEM side.



12 Questions and Additional Support

For questions and additional support, please contact [Support](#). Additional support documentation and Engineering Application Notes (EANs) can be found on the [Documentation](#) page of the SightLine Applications website.