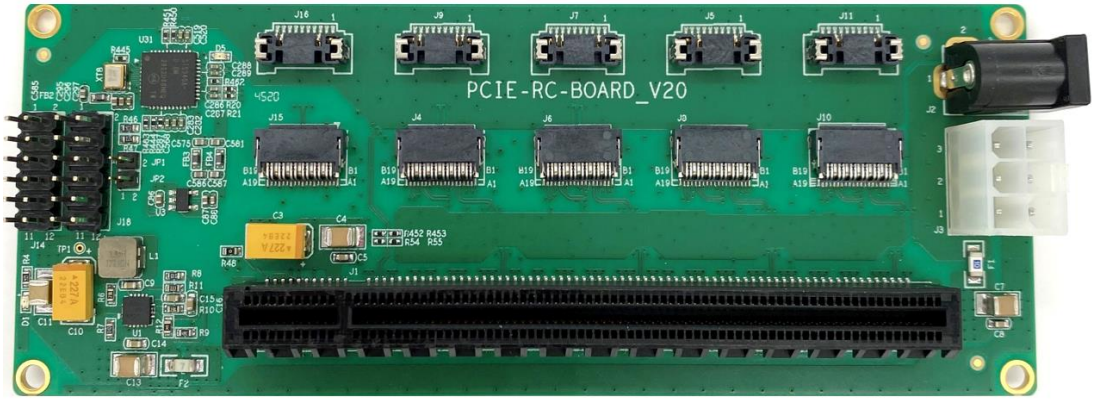
PCIEGEN5_RC_FIREFLY
EH2016002037
Reference Manual

December 2020 ver0.2



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Revision History

Date	Rev	Comment
Nov. 2020	v0.1	Initial version
Dec. 2020	v0.2	Upgrade to PCIE Gen5

Contents

IMPORTANT!

ESD:

The PCIEGEN5_RC_FIREFLY Card, as with all other electronic equipment, is sensitive to electrostatic discharge (ESD). When handling the transceiver card:

- Transport the card in an ESD bag
- Wear an anti-static wrist strap
- Make sure the work area is equipped with an ESD mat

Warning

Never hot-plug interface cards, daughter boards or cables. Always power down the HAPS® system when adding or removing a board, card, or cable to avoid damage to both the system and peripheral.

Overview

This document is the PCIEGEN5_RC_FIREFLY Reference Manual and describes the functions of the PCIEGEN5_RC_FIREFLY interface card.

The PCIEGEN5_RC_FIREFLY daughter board includes Gen5 PCIe x16 slot, the rate can reach 32 GT/s.

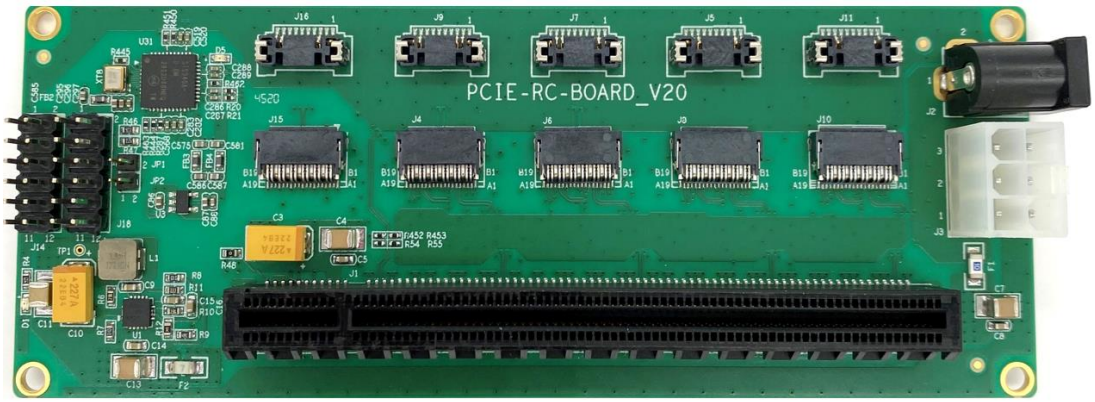

Figure 1: Top View of PCIEGEN5_RC_FIREFLY

Layout

PCIEGEN5_RC_FIREFLY daughter board consists of:

- 5 Firefly connector
- 1 PCIe x16 slot
- 2 12-Pin PMOD connector

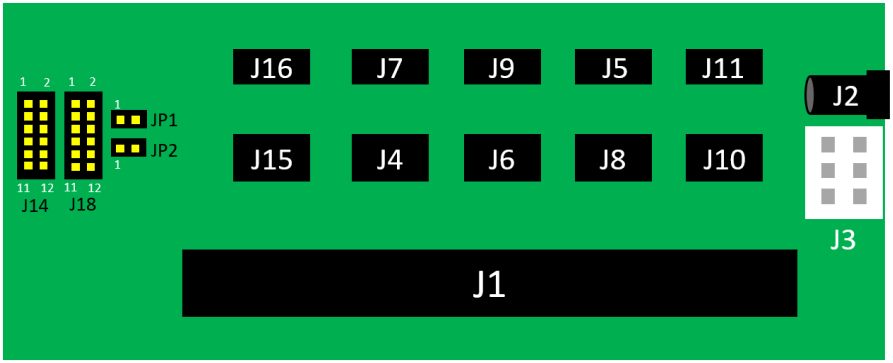

Figure 2: Top PCIEGEN5_RC_FIREFLY Card Layout

Block Diagram

Figure 3 shows the connectivity between the PCIEGEN5_RC_FIREFLY daughter board's headers and connectors.

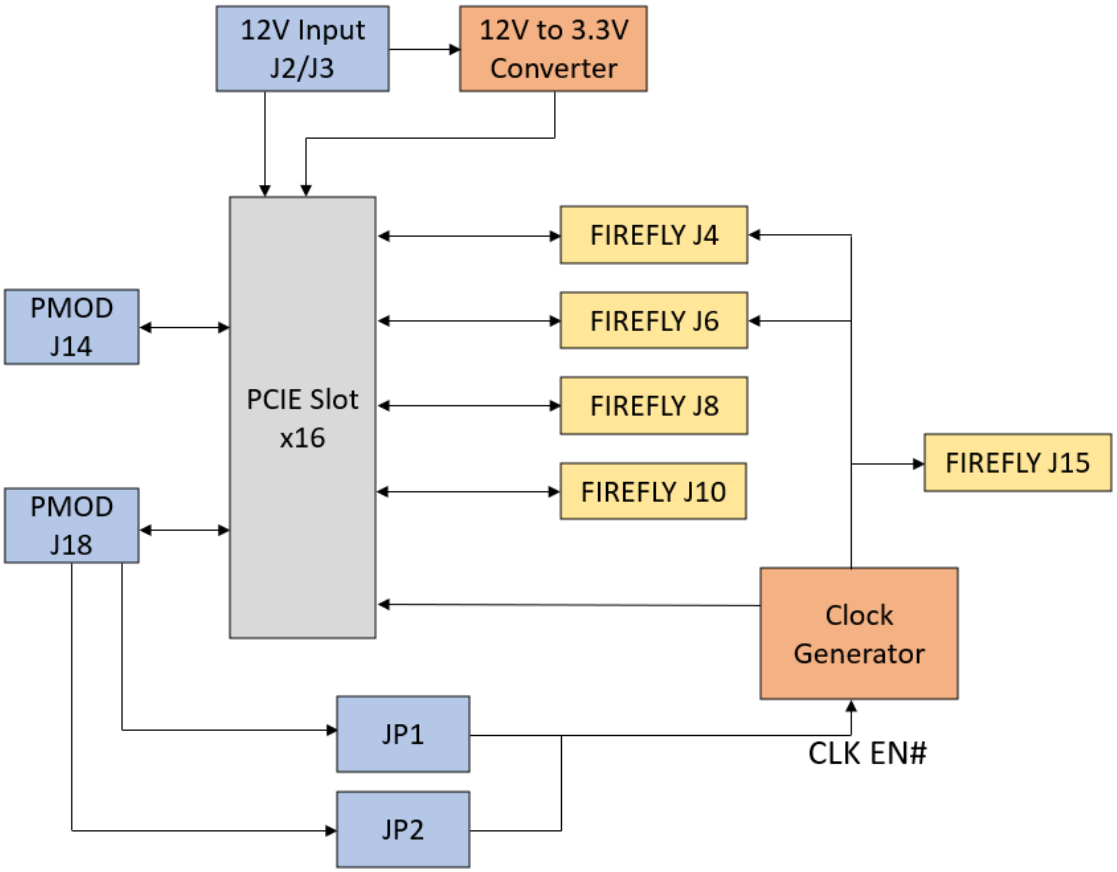

Figure 3: PCIEGEN5_RC_FIREFLY Architecture Block Diagram

LED

There are one LED on the PCIEGEN5_RC_FIREFLY.

LED	Function
D1	3.3V Power LED

Table 1: LED Table

Jumpers

Jumpers provide different configuration options dependent on your requirements.

Jumper	Function
JP1	Short to connect PCIE J1 PCIE_CLKREQ# to clock generator CLK_EN#.
JP2	Short to connect PMOD J14 CLKREQ# to clock generator CLK_EN#.

Table 2: Jumpers Table

Programmable Frequency Clocks

PCIEGEN5_RC_FIREFLY uses a Silicon Labs SI5340A-B-GM chip to generate arbitrary clock frequencies which are controlled by I2C, the default frequency is 100MHz.

The I2C hex addresses for accessing the SI5340 are set to: 0x74.

Trace Name	SI5340A-B-GM(U24)		Connected to
	Pin Name	Pin Number	
PLL_SDA	SDA	13	J14 Pin4
PLL_SCL	SCL	14	J14 Pin2
CLK_EN#	OE#	12	JP1/JP2(User select)
JC_CLK_P	OUT0	20	J15 Pin B12
JC_CLK_N	OUT0b	19	J15 Pin B11
SLOT_CLK_P	OUT1	25	J1 Pin A13
SLOT_CLK_N	OUT1b	24	J1 Pin A14
JA_CLK_P	OUT2	31	J4 Pin B12
JA_CLK_N	OUT2b	30	J4 Pin B11
JB_CLK_P	OUT3	36	J6 Pin B12
JB_CLK_N	OUT3b	35	J6 Pin B11

Table 3: SI5340 Table

FIREFLY Connector

FIREFLY Connector J4/J6/J8/J10/J15 to PCIe Slot

Connector J4		Connector J4	
Pin	Trace Name	Pin	Trace Name
A1	GND	B1	GND
A2	PER_N0	B2	PER_N1
A3	PER_P0	B3	PER_P1
A4	GND	B4	GND
A5	PER_N2	B5	PER_N3
A6	PER_P2	B6	PER_P3
A7	GND	B7	GND
A8		B8	
A9		B9	
A10	GND	B10	GND
A11		B11	JA_CLK_N
A12		B12	JA_CLK_P
A13	GND	B13	GND
A14	PET_P3	B14	PET_P2
A15	PET_N3	B15	PET_N2
A16	GND	B16	GND
A17	PET_P1	B17	PET_P0
A18	PET_N1	B18	PET_N0
A19	GND	B19	GND

Connector J6		Connector J6	
Pin	Trace Name	Pin	Trace Name
A1	GND	B1	GND
A2	PER_N4	B2	PER_N5
A3	PER_P4	B3	PER_P5
A4	GND	B4	GND
A5	PER_N6	B5	PER_N7
A6	PER_P6	B6	PER_P7
A7	GND	B7	GND
A8		B8	
A9		B9	
A10	GND	B10	GND
A11		B11	JB_CLK_N
A12		B12	JB_CLK_P
A13	GND	B13	GND
A14	PET_P7	B14	PET_P6
A15	PET_N7	B15	PET_N6
A16	GND	B16	GND
A17	PET_P5	B17	PET_P4
A18	PET_N5	B18	PET_N4
A19	GND	B19	GND

Connector J8		Connector J8	
Pin	Trace Name	Pin	Trace Name
A1	GND	B1	GND
A2	PER_N8	B2	PER_N9
A3	PER_P8	B3	PER_P9
A4	GND	B4	GND
A5	PER_N10	B5	PER_N11
A6	PER_P10	B6	PER_P11
A7	GND	B7	GND
A8		B8	
A9		B9	
A10	GND	B10	GND
A11		B11	
A12		B12	
A13	GND	B13	GND
A14	PET_P11	B14	PET_P10
A15	PET_N11	B15	PET_N10
A16	GND	B16	GND
A17	PET_P9	B17	PET_P8
A18	PET_N9	B18	PET_N8
A19	GND	B19	GND

Connector J10		Connector J10	
Pin	Trace Name	Pin	Trace Name
A1	GND	B1	GND
A2	PER_N12	B2	PER_N13
A3	PER_P12	B3	PER_P13
A4	GND	B4	GND
A5	PER_N14	B5	PER_N15
A6	PER_P14	B6	PER_P15
A7	GND	B7	GND
A8		B8	
A9		B9	
A10	GND	B10	GND
A11		B11	
A12		B12	
A13	GND	B13	GND
A14	PET_P15	B14	PET_P14
A15	PET_N15	B15	PET_N14
A16	GND	B16	GND
A17	PET_P13	B17	PET_P12
A18	PET_N13	B18	PET_N12
A19	GND	B19	GND

Connector J15		Connector J15	
Pin	Trace Name	Pin	Trace Name
A1	GND	B1	GND
A2		B2	
A3		B3	
A4	GND	B4	GND
A5		B5	
A6		B6	
A7	GND	B7	GND
A8		B8	
A9		B9	
A10	GND	B10	GND
A11		B11	JC_CLK_N
A12		B12	JC_CLK_P
A13	GND	B13	GND
A14		B14	
A15		B15	
A16	GND	B16	GND
A17		B17	
A18		B18	
A19	GND	B19	GND

PMOD Connector

Connector J14		Connector J14	
Trace Name	Pin	Pin	Trace Name
PCIE_WAKE#	1	2	PLL_SCL
PCIE_RESET#	3	4	PLL_SDA
PCIE_CLKREQ#	5	6	
CLKREQ#	7	8	
GND	9	10	GND
-	11	12	-

Connector J18		Connector J18	
Trace Name	Pin	Pin	Trace Name
SMCLK	1	1	TCK
SMDAT	2	2	TDI
-	3	3	TDO
TRST#	4	4	TMS
GND	5	5	GND
-	6	6	-