



PCI Express is the new serial bus addition to the PCI series of specifications.

PCI Express as a high-bandwidth, low pin count, serial, interconnect technology. PCI Express architecture provides a high performance I/O infrastructure for Desktop Platforms with transfer rates starting at 2.5 Giga transfers per second over a x1 PCI Express lane for Gigabit Ethernet, TV Tuners, 1394a/b controllers, and general purpose I/O. PCI Express architecture provides a high performance graphics infrastructure for Desktop Platforms doubling the capability of existing AGP8x designs with transfer rates of 4.0 Gigabytes per second over a x16 PCI Express lane for graphics controllers. ExpressCard utilizing PCI Express interface, developed by the PCMCIA group for mobile computers. PCI Express Advanced Power Management features help to extend platform battery life and to enable users to work anywhere, without an AC power source.

The broad adoption of PCI Express in the mobile, enterprise and communication segments enables convergence through the re-use of a common interconnect technology.

PCI-E is a serial bus which uses two low-voltage differential LVDS pairs, at 2.5Gb/s in each direction [one transmit, and one receive pair]. PCI Express supports 1x [2.5Gbps], 2x, 4x, 8x, 12x, 16x, and 32x bus widths [transmit / receive pairs].

The differential pins [Lanes] listed in the pin out table above are LVDS which stands for: Low Voltage Differential Signaling.

PCI-Express 1x Connector Pin-Out

Pin	Side B Connector		Side A Connector	
#	Name	Description	Name	Description

1	+12v	+12 volt power	PRSNT#1	Hot plug presence detect
2	+12v	+12 volt power	+12v	+12 volt power
3	RSVD	Reserved	+12v	+12 volt power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus clock	JTAG2	TCK
6	SMDAT	SMBus data	JTAG3	TDI
7	GND	Ground	JTAG4	TDO
8	+3.3v	+3.3 volt power	JTAG5	TMS
9	JTAG1	+TRST#	+3.3v	+3.3 volt power
10	3.3Vaux	3.3v volt power	+3.3v	+3.3 volt power
11	WAKE#	Link Reactivation	PWRGD	Power Good
Mechanical Key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference Clock
14	HSOp(0)	Transmitter Lane 0, Differential pair	REFCLK-	Differential pair
15	HSOn(0)	Differential pair	GND	Ground
16	GND	Ground	HSIp(0)	Receiver Lane 0, Differential pair
17	PRSNT#2	Hotplug detect	HSIn(0)	Differential pair
18	GND	Ground	GND	Ground

PCI-Express 4x Connector Pin-Out

Pin	Side B Connector		Side A Connector	
#	Name	Description	Name	Description

1	+12v	+12 volt power	PRSNT#1	Hot plug presence detect
2	+12v	+12 volt power	+12v	+12 volt power
3	RSVD	Reserved	+12v	+12 volt power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus clock	JTAG2	TCK
6	SMDAT	SMBus data	JTAG3	TDI
7	GND	Ground	JTAG4	TDO
8	+3.3v	+3.3 volt power	JTAG5	TMS
9	JTAG1	+TRST#	+3.3v	+3.3 volt power
10	3.3Vaux	3.3v volt power	+3.3v	+3.3 volt power
11	WAKE#	Link Reactivation	PWRGD	Power Good
Mechanical Key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference Clock Differential pair
14	HSOp(0)	Transmitter Lane 0, Differential pair	REFCLK-	
15	HSOn(0)		GND	Ground
16	GND	Ground	HSIp(0)	Receiver Lane 0, Differential pair
17	PRSNT#2	Hotplug detect	HSIn(0)	
18	GND	Ground	GND	Ground
19	HSOp(1)	Transmitter Lane 1, Differential pair	RSVD	Reserved
20	HSOn(1)		GND	Ground

21	GND	Ground	HSIp(1)	Receiver Lane 1, Differential pair
22	GND	Ground	HSIn(1)	
23	HSOp(2)	Transmitter Lane 2, Differential pair	GND	Ground
24	HSOn(2)		GND	
25	GND	Ground	HSIp(2)	Receiver Lane 2, Differential pair
26	GND	Ground	HSIn(2)	
27	HSOp(3)	Transmitter Lane 3, Differential pair	GND	Ground
28	HSOn(3)		GND	
29	GND	Ground	HSIp(3)	Receiver Lane 3, Differential pair
30	RSVD	Reserved	HSIn(3)	
31	PRSNT#2	Hot plug detect	GND	Ground
32	GND	Ground	RSVD	Reserved

PCI-Express 8x Connector Pin-Out

Pin #	Side B Connector		Side A Connector	
	Name	Description	Name	Description
1	+12v	+12 volt power	PRSNT#1	Hot plug presence detect
2	+12v	+12 volt power	+12v	+12 volt power
3	RSVD	Reserved	+12v	+12 volt power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus clock	JTAG2	TCK
6	SMDAT	SMBus data	JTAG3	TDI

7	GND	Ground	JTAG4	TDO
8	+3.3v	+3.3 volt power	JTAG5	TMS
9	JTAG1	+TRST#	+3.3v	+3.3 volt power
10	3.3Vaux	3.3v volt power	+3.3v	+3.3 volt power
11	WAKE#	Link Reactivation	PWRGD	Power Good
Mechanical Key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference Clock
14	HSOp(0)	Transmitter Lane 0, Differential pair	REFCLK-	Differential pair
15	HSOn(0)		GND	Ground
16	GND	Ground	HSIp(0)	Receiver Lane 0, Differential pair
17	PRSNT#2	Hotplug detect	HSIn(0)	
18	GND	Ground	GND	Ground
19	HSOp(1)	Transmitter Lane 1, Differential pair	RSVD	Reserved
20	HSOn(1)		GND	Ground
21	GND	Ground	HSIp(1)	Receiver Lane 1, Differential pair
22	GND	Ground	HSIn(1)	
23	HSOp(2)	Transmitter Lane 2, Differential pair	GND	Ground
24	HSOn(2)		GND	Ground
25	GND	Ground	HSIp(2)	Receiver Lane 2, Differential pair
26	GND	Ground	HSIn(2)	
27	HSOp(3)	Transmitter	GND	Ground

		Lane 3, Differential pair		
28	HSON(3)		GND	Ground
29	GND	Ground	HSIp(3)	Receiver Lane 3, Differential pair
30	RSVD	Reserved	HSIn(3)	
31	PRSNT#2	Hot plug detect	GND	Ground
32	GND	Ground	RSVD	Reserved
33	HSOp(4)	Transmitter Lane 4, Differential pair	RSVD	Reserved
34	HSON(4)		GND	Ground
35	GND	Ground	HSIp(4)	Receiver Lane 4, Differential pair
36	GND	Ground	HSIn(4)	
37	HSOp(5)	Transmitter Lane 5, Differential pair	GND	Ground
38	HSON(5)		GND	Ground
39	GND	Ground	HSIp(5)	Receiver Lane 5, Differential pair
40	GND	Ground	HSIn(5)	
41	HSOp(6)	Transmitter Lane 6, Differential pair	GND	Ground
42	HSON(6)		GND	Ground
43	GND	Ground	HSIp(6)	Receiver Lane 6, Differential pair
44	GND	Ground	HSIn(6)	
45	HSOp(7)	Transmitter Lane 7, Differential pair	GND	Ground
46	HSON(7)		GND	Ground
47	GND	Ground	HSIp(7)	Receiver Lane 7, Differential pair
48	PRSNT#2	Hot plug detect	HSIn(7)	

49	GND	Ground	GND	Ground
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PCI-Express 16x Connector Pin-Out

Pin #	Side B Connector		Side A Connector	
	Name	Description	Name	Description
1	+12v	+12 volt power	PRSNT#1	Hot plug presence detect
2	+12v	+12 volt power	+12v	+12 volt power
3	RSVD	Reserved	+12v	+12 volt power
4	GND	Ground	GND	Ground
5	SMCLK	SMBus clock	JTAG2	TCK
6	SMDAT	SMBus data	JTAG3	TDI
7	GND	Ground	JTAG4	TDO
8	+3.3v	+3.3 volt power	JTAG5	TMS
9	JTAG1	+TRST#	+3.3v	+3.3 volt power
10	3.3Vaux	3.3v volt power	+3.3v	+3.3 volt power
11	WAKE#	Link Reactivation	PWRGD	Power Good
Mechanical Key				
12	RSVD	Reserved	GND	Ground
13	GND	Ground	REFCLK+	Reference Clock
14	HSOp(0)	Transmitter Lane 0, Differential pair	REFCLK-	Differential pair
15	HSOn(0)	Differential pair	GND	Ground
16	GND	Ground	HSIp(0)	Receiver Lane 0, Differential pair
17	PRSNT#2	Hotplug detect	HSIn(0)	Differential pair

18	GND	Ground	GND	Ground
19	HSOp(1)	Transmitter Lane 1,	RSVD	Reserved
20	HSOn(1)	Differential pair	GND	Ground
21	GND	Ground	HSIp(1)	Receiver Lane 1,
22	GND	Ground	HSIn(1)	Differential pair
23	HSOp(2)	Transmitter Lane 2,	GND	Ground
24	HSOn(2)	Differential pair	GND	Ground
25	GND	Ground	HSIp(2)	Receiver Lane 2,
26	GND	Ground	HSIn(2)	Differential pair
27	HSOp(3)	Transmitter Lane 3,	GND	Ground
28	HSOn(3)	Differential pair	GND	Ground
29	GND	Ground	HSIp(3)	Receiver Lane 3,
30	RSVD	Reserved	HSIn(3)	Differential pair
31	PRSNT#2	Hot plug detect	GND	Ground
32	GND	Ground	RSVD	Reserved
33	HSOp(4)	Transmitter Lane 4,	RSVD	Reserved
34	HSOn(4)	Differential pair	GND	Ground
35	GND	Ground	HSIp(4)	Receiver Lane 4,
36	GND	Ground	HSIn(4)	Differential pair
37	HSOp(5)	Transmitter Lane 5,	GND	Ground
38	HSOn(5)	Differential pair	GND	Ground

39	GND	Ground	HSIp(5)	Receiver Lane 5, Differential pair
40	GND	Ground	HSIn(5)	
41	HSOp(6)	Transmitter Lane 6, Differential pair	GND	Ground
42	HSOn(6)		GND	Ground
43	GND	Ground	HSIp(6)	Receiver Lane 6, Differential pair
44	GND	Ground	HSIn(6)	
45	HSOp(7)	Transmitter Lane 7, Differential pair	GND	Ground
46	HSOn(7)		GND	Ground
47	GND	Ground	HSIp(7)	Receiver Lane 7, Differential pair
48	PRSNT#2	Hot plug detect	HSIn(7)	
49	GND	Ground	GND	Ground
50	HSOp(8)	Transmitter Lane 8, Differential pair	RSVD	Reserved
51	HSOn(8)		GND	Ground
52	GND	Ground	HSIp(8)	Receiver Lane 8, Differential pair
53	GND	Ground	HSIn(8)	
54	HSOp(9)	Transmitter Lane 9, Differential pair	GND	Ground
55	HSOn(9)		GND	Ground
56	GND	Ground	HSIp(9)	Receiver Lane 9, Differential pair
57	GND	Ground	HSIn(9)	
58	HSOp(10)	Transmitter Lane 10, Differential pair	GND	Ground
59	HSOn(10)		GND	Ground

60	GND	Ground	HSIp(10)	Receiver Lane 10, Differential pair
61	GND	Ground	HSIn(10)	
62	HSOp(11)	Transmitter Lane 11, Differential pair	GND	Ground
63	HSOn(11)		GND	Ground
64	GND	Ground	HSIp(11)	Receiver Lane 11, Differential pair
65	GND	Ground	HSIn(11)	
66	HSOp(12)	Transmitter Lane 12, Differential pair	GND	Ground
67	HSOn(12)		GND	Ground
68	GND	Ground	HSIp(12)	Receiver Lane 12, Differential pair
69	GND	Ground	HSIn(12)	
70	HSOp(13)	Transmitter Lane 13, Differential pair	GND	Ground
71	HSOn(13)		GND	Ground
72	GND	Ground	HSIp(13)	Receiver Lane 13, Differential pair
73	GND	Ground	HSIn(13)	
74	HSOp(14)	Transmitter Lane 14, Differential pair	GND	Ground
75	HSOn(14)		GND	Ground
76	GND	Ground	HSIp(14)	Receiver Lane 14, Differential pair
77	GND	Ground	HSIn(14)	
78	HSOp(15)	Transmitter Lane 15, Differential pair	GND	Ground
79	HSOn(15)		GND	Ground
80	GND	Ground	HSIp(15)	Receiver

81	PRSNT#2	Hot plug present detect	HSIn(15)	Lane 15, Differential pair
82	RSVD#2	Hot Plug Detect	GND	Ground

PRSNT#1 is connected to GND on motherboard.

Add on card needs to have PRSNT#1 connected to one of PRSNT#2 depending what type of connector is in use.

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