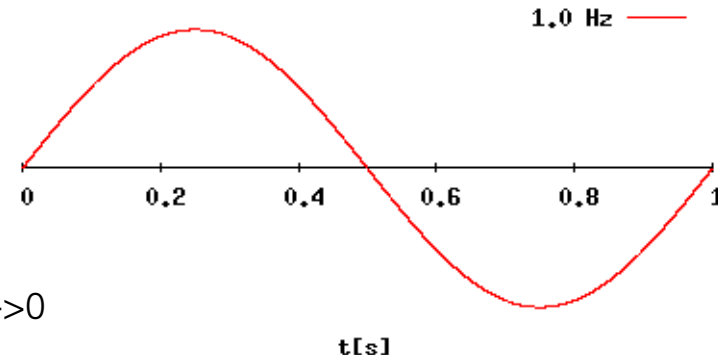


GigaBit Transmission by VPX Dimensions and Values

Frequency [Hz] = cycles per second

MegaHz = MHz 1 Million cycles per second = 10^6 Hz

GigaHz = GHz 1000 Million cycles / second = 10^9 Hz



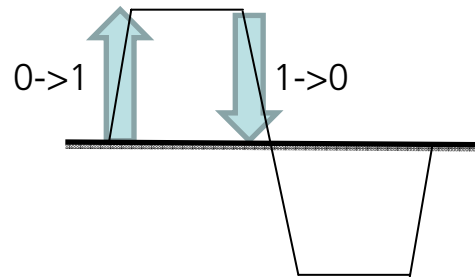
Digital Data Information

one bit is defined as change from

0 -> 1 or from 1 -> 0

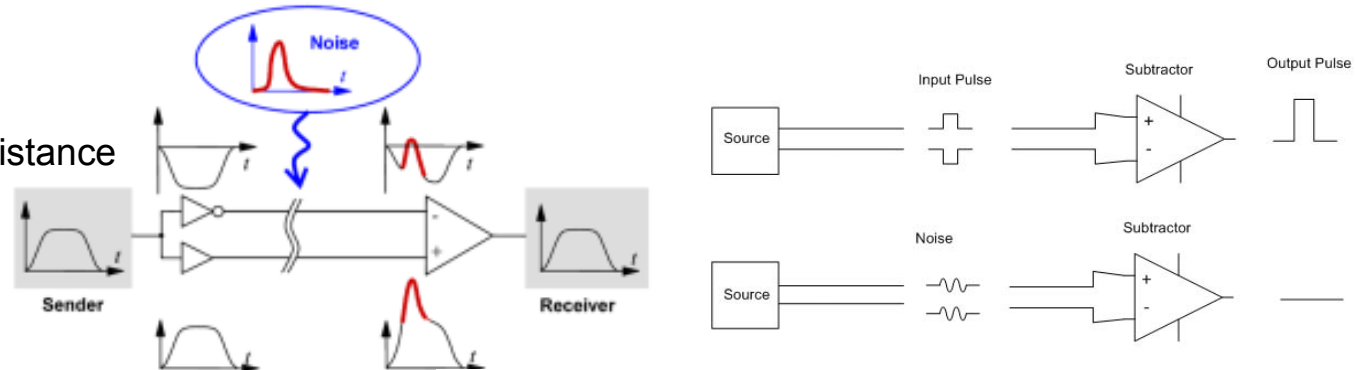
one bit can be rising OR falling flake

1 Hz can transmit 2 bit (in theory)



Differential Pair

the technique improves resistance to electromagnetic noise



Full-Duplex [FDX]

allows communication in both directions

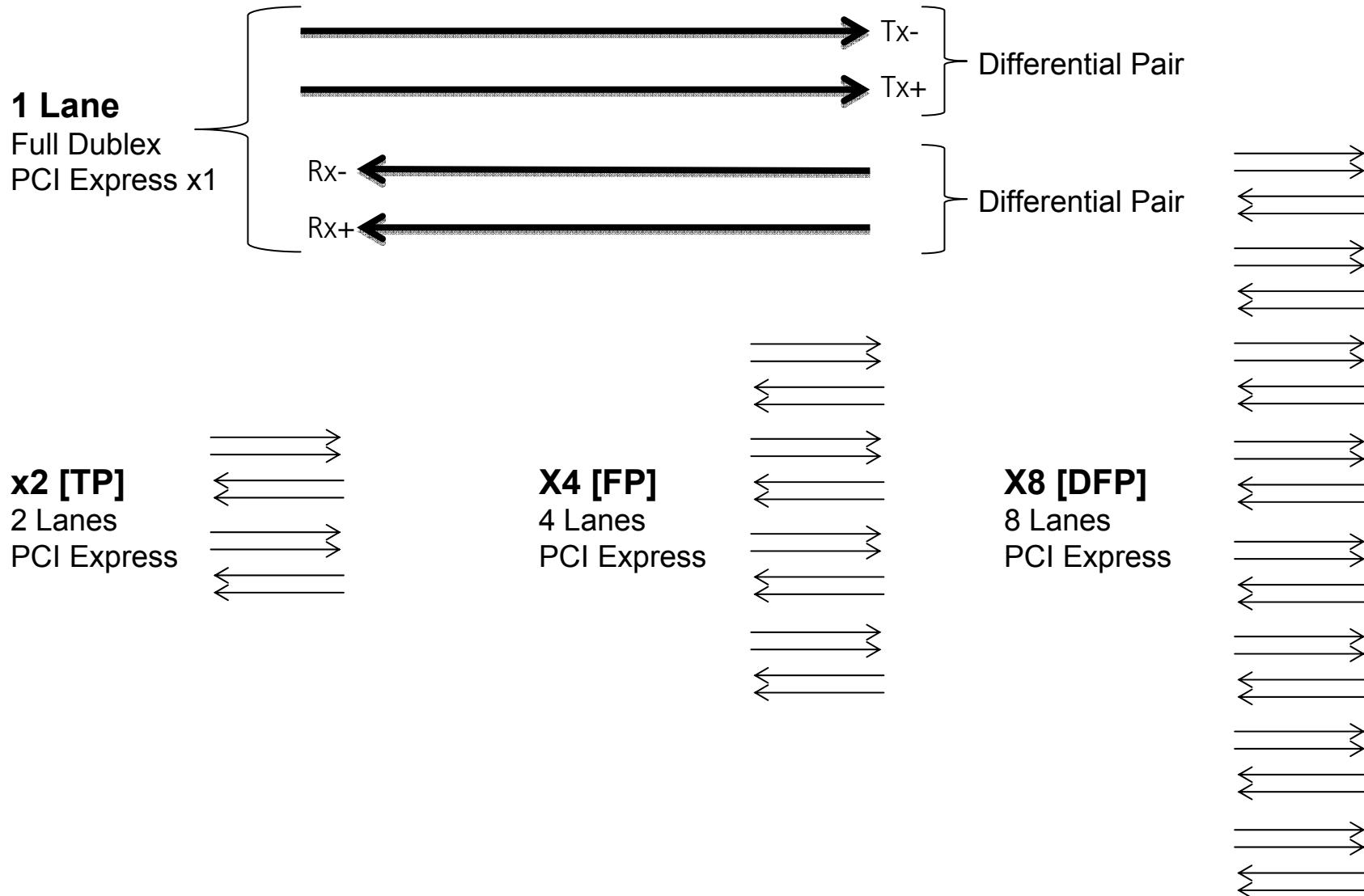
Simultaneously

One line is for **Tx** = Transmit Data

One line is for **Rx** = Receive Data



GigaBit Transmission by VPX PCI Express Lanes



GigaBit Transmission by VPX Data Rate PCI Express

Data Rate PCI Express Burstrate without Protokoll-Overhead				
	PCIe 1.0/1.1	PCIe 2.0/2.1	PCIe 3.0	PCIe 4.0
Frequency	1,25 GHz	2,5 GHz	4,0 GHz	?,? GHz
Transfers/s (each Lane each direction)	2,5 GT/s	5,0 GT/s	8,0 GT/s	16,0 GT/s
Lanes				
x1	250 MB/s	500 MB/s	985 MB/s	? MB/s
x2	500 MB/s	1000 MB/s	1969 MB/s	? MB/s
x4	1000 MB/s	2000 MB/s	3938 MB/s	? MB/s
x8	2000 MB/s	4000 MB/s	7877 MB/s	? MB/s
x16	4000 MB/s	8000 MB/s	15754 MB/s	? MB/s
x32	8000 MB/s	16000 MB/s	31508 MB/s	? MB/s

Transfer Rate (MT, 10⁶ Transfers, GT 10⁹ Transfers) Depends on
NUMBER of parallel LANES, FREQUENCY, and OVERHEAD

IPMB Intelligent Platform Management Bus, defined by [VITA 46.11]

UTP (Ultra-Thin Pipe)	1 Lane, x1 PCIe , Serial RapidIO
TP (Thin Pipe)	2 Lane, 1000BASE-T
FP (Fat Pipe)	4 Lane, x4 PCIe , 4x Serial RapidIO, 10GBASE-KX4
DFP (Double Fat Pipe)	8 Lane, x8 PCIe
TFP (Triple Fat Pipe)	12 Lane, 12x Infiniband
QFP (Quad Fat Pipe)	16 Lane, x16 PCIe
OFFP (Octal Fat Pipe)	32 Lane, x32 PCIe

Control Plane A Plane that is dedicated to application software control traffic.

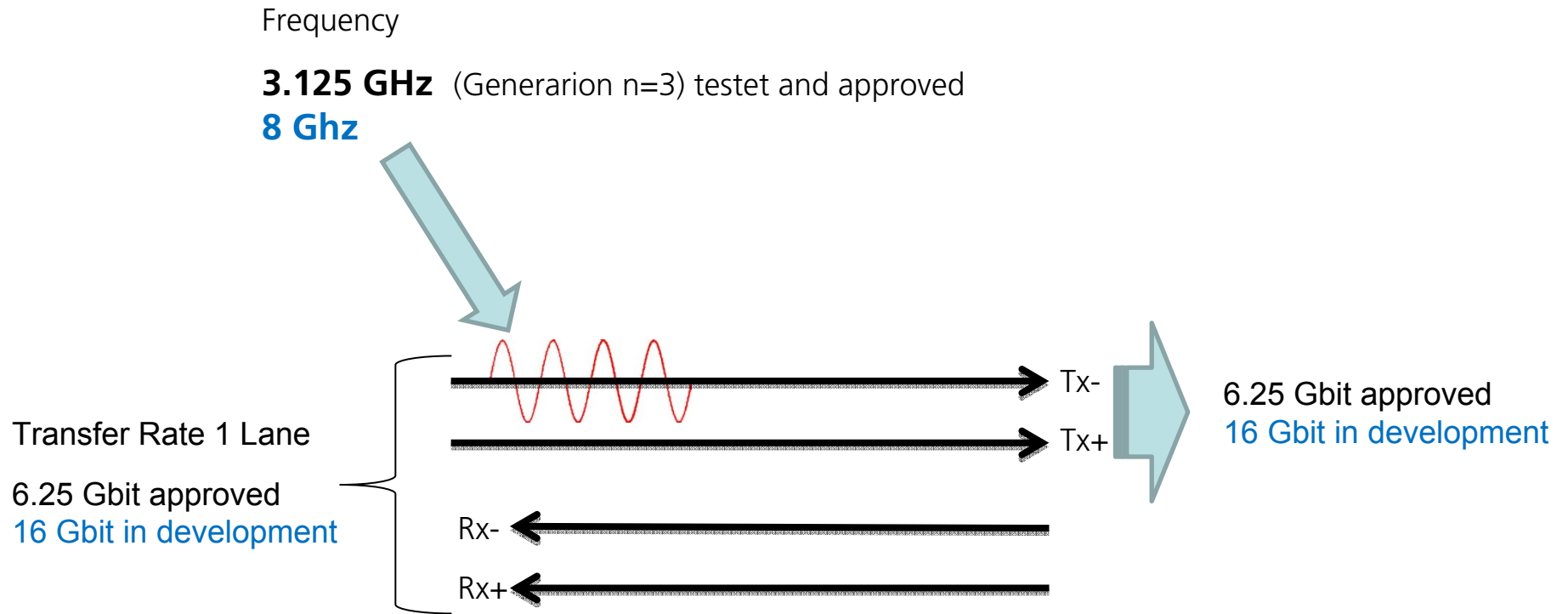
Data Plane A Plane that is used for application and external data traffic.

Expansion Plane controlling system element and a separate, but logically adjunct, system resource.

Management Plane A Plane that is dedicated to the supervision and management of hardware resources. Functional definitions for this Plane are provided in the specification.

Utility Plane A Plane that is dedicated to common system services and/or utilities.

GigaBit Transmission by VPX SPEED by Hartmann



Excmple

FP (Quad Fat Pipe) 4 Lanes **x4 PCIe**
25 Gbit
64 Gbit Transfer Rate in development

x16 PCIe
100 Gbit
256 Gbit Transfer Rate in development