P1394 (Serial Bus)

Physical Layer for Cable Medium

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11/7/91
Physical Channel Features

* High Speed Serial (100 Mbits/sec, 200 Mbits/sec, etc.)
* Thin Flexible Cables and Small Connectors
* Simple Point to Point Connections
* Flexible Topology & Topology Mapping
* Supplies Power (18 watts up to 60 watts)
* Low Power Balanced Differential Twisted Pair Drivers
* No Clock Recovery (Data and Clock Transmitted Separately)
* Good Jitter Margins (Data and Clock ReSyncronized at each Node)
* No Coding of Data (NRZ Data and Clock Freq. is Half the Data Bit Rate)

* Variable speed
  Speed code associated with each packet.
  Link interface 2 bits @ 100Mbits/sec.
  4 bits @ 200 Mbits/sec etc.

* Allows for Isolation Barrier at either Cable or Link Interface.
Maximum of 6 cables between any two nodes

Branching Multi-Hop Interconnect

Maximum Round trip delay is 550ns.

Maximum # of Repeaters (and Cables) allowed between any two nodes is 6.
*All Isolation Barriers are optional.
Cable Interface Port

Packet Transmission TPA
idle out - arb out - clock out - idle out

Packet Reception on TPA
idle out - arb out - mode in - data in - idle out

Packet Transmission TPB
idle in - arb in - mode out - data out - idle in

Packet Reception on TPB
idle in - arb in - clock in - idle in
Cable Driver and Receiver

This transistor is on only if the Cable is connected to the port on the left.

This transistor is on only if the Cable is connected to the port on the right.

To other Ports

To other Ports
Cable Isolation Barrier
Physical Channel Specifications

* Differential Signal Level +/- 165mv (+/- 3ma)
* Rise and Fall Times 2.5ns
* Input Hysteresis +/- 100 mv
* Input Common Mode Range 2.2 to 4.6 volts
* Jitter Budget @ 100 Mbit/sec:
  
  Transmit Jitter: +/- .3 ns
  Cable: Reflections +/- .16 ns
    Intersymbol +/- .05ns
    Delay Difference +/- .12ns
  Cable with Isolation Barrier: Reflections +/- .25 ns
    Intersymbol +/- .5 ns
  Receiver Offset: +/- .35ns (Receiver 2u Channel Lengths)
  Flip Flop Setup Time: 1ns max. (1u Process) -> .3ns

  Jitter Budget Margin: Cable without Isolation Barrier - 2.9 ns (58% of budget)
    Cable with Isolation Barrier - 2.3ns (46% of budget)