Are diode bridges really needed?

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IEEE 802.3bt 4-Pair Power over Ethernet Task Force

Jan 31th,2014 Update

life.augmented

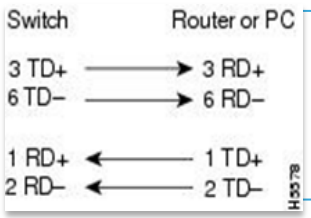
PSE specification

- ✓PSE output voltage polarity is defined by table 33-2
  - ✓Alt-A polarity depends on Cable type.
  - ✓Alt-B polarity is fixed

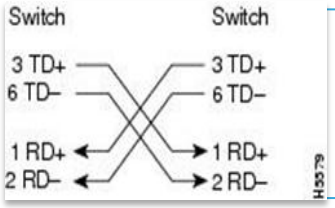
Table 33–2—PSE Pinout alternatives

Conductor	Alternative A (MDI-X)	Alternative A (MDI)	Alternative B (All)
1	Negative V_{PSE}	Positive V_{PSE}	
2	Negative V_{PSE}	Positive V_{PSE}	
3	Positive V_{PSE}	Negative V_{PSE}	
4			Positive V_{PSE}
5			Positive V_{PSE}
6	Positive V_{PSE}	Negative V_{PSE}	
7			Negative V_{PSE}
8			Negative V_{PSE}

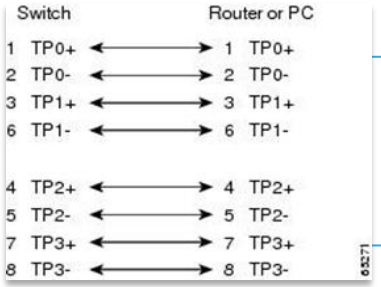
Cable specification



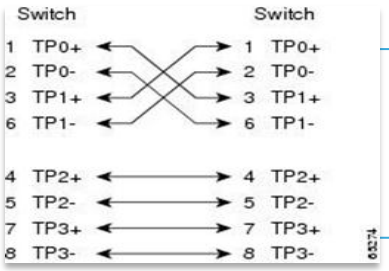
Two Twisted-Pair Straight-Through Cable (MDI) Schematic for 10/100 Ports



Two Twisted-Pair Crossover Cable (MDI-X) Schematic for 10/100 Ports



Four Twisted-Pair Straight-Through Cable (MDI) Schematic for 1000BASE-T Ports



Four Twisted-Pair Crossover Cable (MDI-X) Schematics for 1000BASE-T Ports

- Clause 33.2.3 text:
  - For the purposes of data transfer, the type of PSE data port is relevant to the far-end PD, and in some cases, to the cabling system between them
  - Therefore, Alternative A matches the positive voltage to the transmit pair of the PSE
  - PSEs that use automatically-configuring MDI/MDI-X (“Auto MDI-X”) ports may choose either polarity choice associated with Alternative A configurations

PD specification

- The PD is required to accept both polarities from both Mode A and Mode B: why?
  - Could MDI-X auto detect mode solve the issue?
  - Can the PSE be able to send positive voltage on conductors 1,2 regardless of cable type?
  - PSE voltage polarity on Alt-B is fixed (4-5 positive, 7,8 negative). Why PD Mode B has both polarities? MDI and MDI-X does not reverse 4-5 and 7-8 conductors

Table 33–13—PD pinout

Conductor	Mode A	Mode B
1	Positive V_{PD}, Negative V_{PD}	
2	Positive V_{P}, Negative V_{PD}	
3	Negative V_{PD}, Positive V_{PD}	
4		Positive V_{PD}, Negative V_{PD}
5		Positive V_{PD}, Negative V_{PD}
6	Negative V_{PD}, Positive V_{PD}	
7		Negative V_{PD}, Positive V_{PD}
8		Negative V_{PD}, Positive V_{PD}

Thanks!