Are diode bridges really needed?

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Background

- ✓Goal of this task force is to make the highest power available for the final PoE users

- ✓ The power dissipated on diode bridges can reach about:

$$4*(0.75V*0.6A + 0.3Ohm*0.6A^2) = 2.2W \text{ @ } 50W \text{ output}$$

- ✓Diodes are the main responsible for the current unbalance in 4 pairs systems, limiting the available power at PD interface of more than 2W

- ✓More sophisticated solutions, like active bridges, are an option in high power applications, especially in the 4Pair applications. They imply additional complexity and anyway the losses are still there:

$$4*(0.3Ohm*0.6A^2) = 0.4W$$

Diode bridge reasons

- Diode bridges were specified in previous PoE standards for blind compatibility with existing infrastructures:
  - Crossover cables
  - Installation done by non–IT people

- Now the situation is different:
  - High power systems are typically for professional usage
  - Installation will be managed by educated personnel

Why do not think about diode bridges removal ?

- Now try to answer to this simple question :
- Can we remove the diode bridges from our system ?
- The answer will be : yes!
- So why do not seriously think about building a standard which is not strictly requiring diode bridges?
- What do we need? To specify a single PSE output voltage polarity! (Table 33-2)
- Why not to get rid of Alternative A MDI-X? Do we still need it?

Advantages

- Less losses = More power at the PD
- More balanced pairs = More power at the PD
- Less components on the BOM = less complexity (savings!)
- Less components = higher reliability (what is not there won’t get busted!)

PD systems are still protected

- Protection against reverse polarity can be done with TVS + polyswitch
- The same TVS that limits surges due to line transients can be used to protect the converter input stage from reverse voltage applied to its input.
- During detection PSE limits the current to 5mA (short circuit current)
  - In case of reverse polarity a red led can be possibly turned on
- Backfeed voltage can be avoided just adding a single switch (or a diode that will be shorted after power on)

Questions? - Comments

Thanks!