The big question: Is 4-Pair PWR allowed under 802.3af?

Picking through the Standard and the definitions to find the answer

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Outline

- Scope
- Definitions
- Interpretation
 - PSE End
 - PD End
- Implementation scenario
 - Combinational result possibilities
- Conclusions & Wrap

Scope

- The scope of this discussion is only the existing IEEE Std 802.3 – 2005 and Std 802.3af within it.
- No material from P802.3at was considered
- 1000BASE-T was not considered

Definitions (by the book)

- 1.4.282 Power Interface (PI): The mechanical and electrical interface between the Power Sourcing Equipment (PSE) or Powered Device (PD) and the transmission medium. In an Endpoint PSE and in a PD the Power Interface is the MDI.
- 1.4.283 Power Sourcing Equipment (PSE): A DTE or midspan device that provides the power to a single link section. DTE powering is intended to provide a single 10BASE-T, 100BASE-TX, or 1000BASE-T device with a unified interface for both the data it requires and the power to process these data.
- **1.4.284 Powered Device (PD):** A device that is either drawing power or requesting power from a PSE.

Interpretation

- A "PSE" or a "PD" is not:
 - A networking system station
- A "PSE" or a "PD" is:
 - A power supply subsystem within a networking system station
- This view is consistent with:
 - Definitions in 1.4
 - Figure 33—4
- (So far, so good.)

Interpretation

- An "802.3af PSE" is (by specification):
 - Provisioning no more than 15.4 watts of power.
 - Providing that power via 2 and only 2 pair (at any one time, Ref: 33.2.2, para 3).
 - Exactly the device specified in cl. 33.2
 - (A system may have more than one PSE, Ref: 33.2.9, para. 3)
 - A 4 pair link may have two powered PSE's hooked to it at the same time, one sourcing Alt A and the other sourcing Alt B. (Ref: 33.2.3.1, para. 3)

Dual PSE Energizing End Station



Conclusion

- The configuration shown on the previous slide is perfectly valid under the standard.
- Only one PSE will ultimately turn on according to the provisions of 33.2.3.1
- So an PSE-end MDI with two PSEs, one Alt. A only and the other Alt. B only is allowed under the current 802.3 Std.

Next Question/Step

- Can we do the same sort of thing at the PD end?
- Perhaps. There are some requirements
- Clause 33.3.1 is where the req'ts live.

Each one of two PDs must have:

- Access somehow or other to both sets of pairs (No req't to actually be "connected" to both sets).
- A scenario allowed by the standard will follow

Imagine the following socket and a corresponding compliant PD module:



Dual PD Energized End Station



Table of Possibilities

# of PDs in 2 sockets	Alt. A Socket and its pluggable PD			Alt. B Socket and its pluggable PD				OUTPUT
0	Alt A PD	Not Present	DNA	Alt B PD	Not Present	DNA		No power
1	Alt A PD	Present	Not Energized	Alt B PD	Not Present	DNA		No power
	Alt A PD	Present	Energized	Alt B PD	Not Present	DNA		Single power
	Alt A PD	Not Present	DNA	Alt B PD	Present	Not Energized		No power
	Alt A PD	Not Present	DNA	Alt B PD	Present	Energized		Single power
2	Alt A PD	Present	Not Energized	Alt B PD	Present	Not Energized		No power
	Alt A PD	Present	Energized	Alt B PD	Present	Not Energized		Single power
	Alt A PD	Present	Not Energized	Alt B PD	Present	Energized		Single power
	Alt A PD	Present	Energized	Alt B PD	Present	Energized		Double power
Both sockets go to all 8 pins, Alt A socket has Alt. A as its primary connection. Alt B socket has Alt. B as its primary connection. Modules bear the isolation requirement,								

Conclusion:

 I believe that all of this is permitted and can be implemented in a manner that is fully conformant with IEEE Std 802.3af.

FEEDBACK ?

DISCUSSION?

Page 15

