PD Power Interface Identification

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Purpose

To determine when Type 1 and 2 PDs may be powered using both power Alternatives simultaneously.

IEEE 802.3 Requirements

- 33.3.1 The PD shall be capable of accepting power on **either** of two sets of PI conductors.

  ...
  PDs that simultaneously require power from both Mode A and Mode B are specifically **not allowed by this standard**.

- PD State Diagram 33.3.3.3
   power_received   An indication from the circuitry that power is present on the **PD's PI**.

   FALSE: The input voltage does not meet the requirements of VPort_PD in Table 33–18.

   TRUE: The input voltage meets the requirements of VPort_PD.

IEEE 802.3 Requirements

- ## PICs, protocol implementation conformance

Item	Feature	Subclause	Value/Comment
PD1	Accept power	33.3.1	On either set of PI conductors

- ## Physical and DLL Classification only provides identification for existing PD types.

Table 79–3a—Power type/source/priority field

Bit	Function	Value/meaning
7:6	power type	7 6 1 1 = Type 1 PD 1 0 = Type 1 PSE 0 1 = Type 2 PD 0 0 = Type 2 PSE
5:4	power source	Where power type = PD 5 4 1 1 = PSE and local 1 0 = Reserved 0 1 = PSE 0 0 = Unknown Where power type = PSE 5 4 1 1 = Reserved 1 0 = Backup source 0 1 = Primary power source 0 0 = Unknown

Requirements Review

- A PD requiring power from both Alternatives is not permitted.

- A PD shall be capable of accepting power on either power Alternative.

- Classification is not required to report if a PD is capable of receiving power on both power Alternatives simultaneously.

Simplified PD State Diagram

- IEEE 802.3 provides defined behaviors for some stimuli.

Stimulus	Behavior
VPD < detection voltage	IDLE
VRESET < VPD < VDET_MAX	Do Detection
VPD within VCLASS	Do physical layer classification
Power On Threshold < VPD < VPD_MAX	PD power up steps
Receive POE TLV	Respond to TLV

Type 1 PDs are not required to support LLDP.

PD: Unknown Stimulus

- A stimuli without a required behavior results in undefined behavior.

Stimulus	Behavior
Power On threshold < VPD < VPD_MAX	Vendor one: PD power up steps for both alternatives
Power on both power Alternatives	Vendor two: PD power up steps for Alternative-A only
	Vendor three: PD draws 2x expected power.
	Vendor four: hardware anomaly

Interoperability issues exist because behavior is undefined.

Proprietary 4-Pair Solutions

- Proprietary 4-pair power solutions exist.
  - They meet IEEE requirements for existing Types.
    Ex. Type-2 PD draws up to 25 W in the power-on state.
  - They may do unexpected things when stimulated with 4-pair power. Ex. Draw more than 25 W.

- The IEEE should identify PDs capable of receiving power on both Alternatives simultaneously before powering both Alternatives simultaneously to avoid interoperability problems.

Conclusion

- IEEE 802.3-2012 does not define behavior for PDs when both Alternatives are powered simultaneously.

- PD behavior is determined by the PD vendor when it has not been defined by the IEEE.

- IEEE 802.3BT should provide a means to identify PDs capable of receiving power on both Alternatives simultaneously.

IEEE 802.3 Five Criteria

1. Broad Market Potential
2. **Compatibility with IEEE Std 802.3**
3. Distinct Identity
4. Technical Feasibility
5. Economic Feasibility

IEEE 802.3bt PAR

5.2.b. Scope of the project: The scope of this project is to augment the capabilities of the IEEE Std 802.3 standard with 4-pair power and associated power management information. The project will augment the methodology for the provision of power via balanced cabling to connected Data Terminal Equipment with 802.3 interfaces. Optional augmented power limit will be made available for certain structured cabling systems. Compatibility with existing equipment will be maintained.
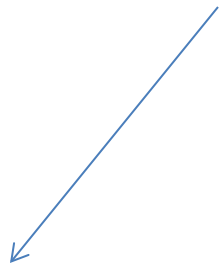
Compatibility with existing equipment will be maintained.

Straw Poll

IEEE 802.3BT should provide a means to identify a PD capable of receiving power simultaneously on both Alternatives.

Y: N: A:

Straw Poll

Add to 33.2.5:

The PSE shall only power both Alternatives simultaneously for PDs capable of accepting power on both Alternatives simultaneously.

Do you agree with the above statement for IEEE.3bt?

Y: N: A:

Seen Simply

Turning complexity into understanding.