SPMD Power Up Procedure

Chad Jones
August 26, 2020

Propose a power up scheme for SPMD

Objectives to satisfy:

- Specify optional plug-and-play power distribution over the mixing segment
- PSE shall only energize the mixing segment when at least one PD is connected
- Support addition and removal of a node or set of nodes to a continuously operating powered mixing segment

Objective 9

- Specify **OPTIONAL** plug-and-play power distribution over the mixing segment
- Implies support for PDs that don't require power
- Implies PDs that don't require power need to 'tolerate' PSE voltage

This is covered in 147.9.3:

The DTE shall withstand without damage the application of any voltages between 0 V dc and 60 V dc with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA–, in either polarity, under all operating conditions, for an indefinite period of time.

- This text will also need to be included in P802.3da

Objective 10

- PSE shall only energize the mixing segment when at least one PD is connected
- Implies a detection scheme.
- Heath Stewart proposed a simplified version of the method in clause 104 (https://www.ieee802.org/3/da/public/jul20/stewart_01_0720%20Classification.pdf)
- After detection, PSE applies power.
- PD still required to perform ‘negotiation’ (details to come)

Objective 11

- Support addition and removal of a node or set of nodes to a continuously operating powered mixing segment
- Implies that one can plug in a string of PDs
- Need method to allow multi-PD detection (stewart_01_0720)
- PDs would still need to perform negotiation

Negotiation

- This happens after a PSE has applied power to the initial PD, or after a PD is added to an already energized mixing segment (i.e. after power is applied at the PD PI)
- Negotiation is the method for the PD to request power from the PSE and for the PSE to grant or deny the request
- Need requirements for the PD for negotiation power draw and for the denied power state

Steps for Negotiation

- Power is applied at the PI (i.e. PD is connected to a mixing segment)
- PD powers up in a limited power mode
- PD uses LLDP to request power from PSE

  Two possible results:

  PSE replies ‘YES’: PD fully powers up

  PSE replies ‘NO’: PD moves to denied power state

Allowed Power

- Propose that P802.3da adopt 1W as power allowed to PD for negotiation
- Propose that P802.3da adopt 0.1W as the power allocated for the denied power state

Summary

- This text needs included in P802.3da: The DTE shall withstand without damage the application of any voltages between 0 V dc and 60 V dc with the source current limited to 2000 mA, applied across BI_DA+ and BI_DA−, in either polarity, under all operating conditions, for an indefinite period of time.
- PSE does not apply voltage to the PI until a PD is attached.
- PD is detected via the method in stewart_01_0720
- PSE applies voltage after detecting at least one PD

Summary pt 2

- PD is powered up
- PD power draw limited to 1W prior to completion of successful negotiation
- PD uses LLDP to request a power draw
- If PSE grants the requested power, PD moves to full power
- PD limits power draw to 0.1W if denied power by PSE (could call this power back off, while waiting to renegotiate)

In presentation observations

- Exit strategy – how do we sense that PDs have left and reclaim that allocated power
- PSE hands out back off time to denied PD.
- Time limit for negotiation and back off time between retries
- Use LLDP to also relax power budget
- A 1W or less PD never needs to negotiate? (how does PSE maintain power budget in this case)
- What is the power penalty of LLDP
- How much power to reserve for negotiation?
- Current noise spec


CISCO