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Consideration on bt PSE MPS to work with bt PD

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Purpose

- Discuss and suggest PSE DC-MPS solution for BT spec.

Review of AF/AT PSE DC-MPS Requirement

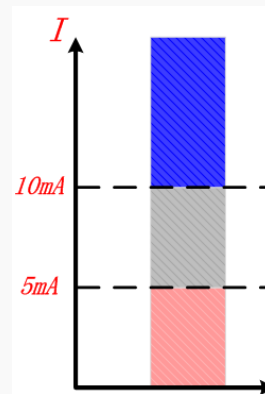
What's the PSE DC MPS component requirement?

1. According to 802.3 at 33.2.9.1.2:

- A PSE shall consider the DC MPS component to **be present if I_{port} is greater than or equal to I_{Hold} max** for a minimum of TMPS.
- A PSE shall consider the DC MPS component to **be absent if I_{port} is less than or equal to I_{Hold} min.**
- A PSE may consider the DC MPS component to **be either present or absent if I_{port} is in the range of I_{Hold} .**

2. According to 802.3 at Table 33-11:

Item	Parameter	Symbol	Unit	Min	Max	PSE Type	Additional information
17	DC MPS current	I_{Hold}	A	0.005	0.010	1, 2	See 33.2.9.1.2.



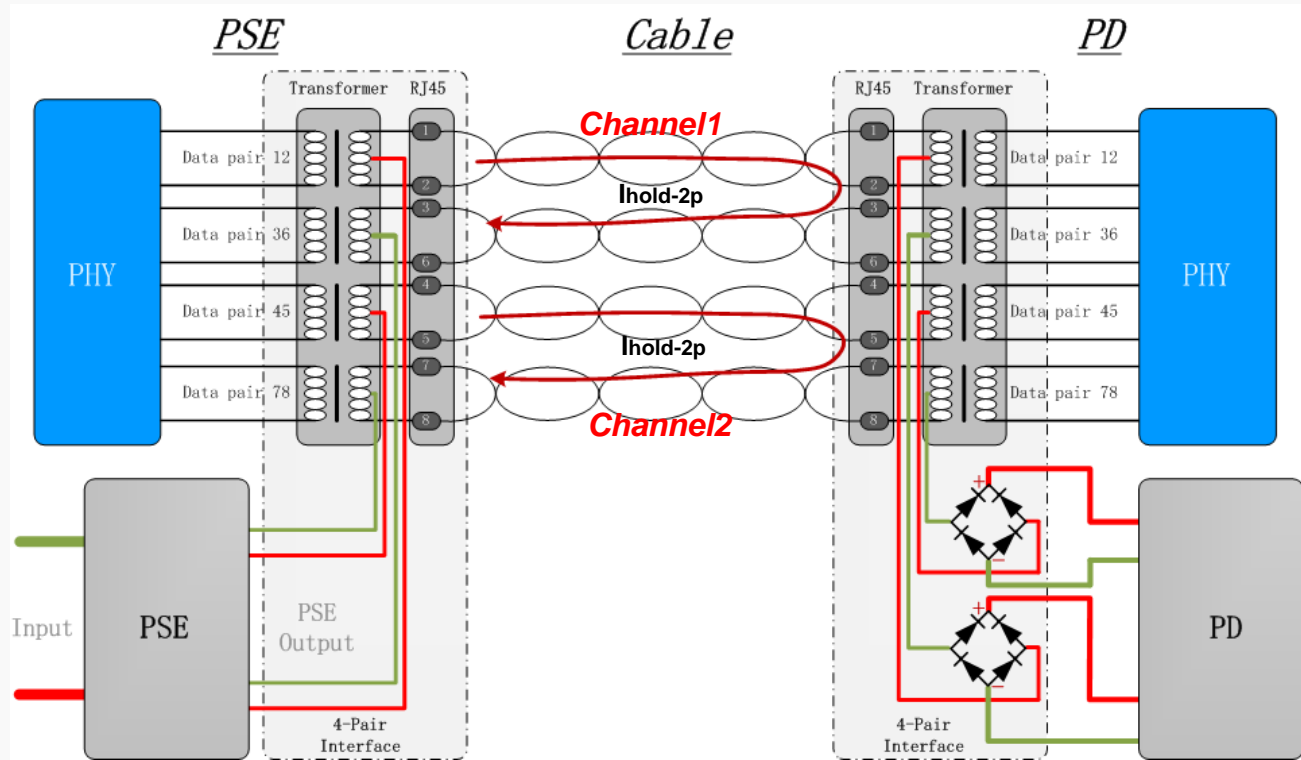
Keep Power

Remove or Keep Power

Remove Power

System architecture

Basic PoE configuration.




Solution A: Per pair-set MPS maintenance on PSE


If PSE follows AT DC-MPS $I_{hold\max}$ and $I_{hold\min}$ per pair-set, which means:

If $I_{port-2p}$ on **both** pair-sets $\geq I_{hold\max}$ in T_{MPS} ,
A PSE shall consider the PD to be present.

Note: Due to the unbalance effect, one channel $I_{port-2p}$ will exceed 10mA.



BT PSE	Keep Power	Remove or Keep Power	Remove Power
Channel1	$I_{port-2p} \geq 10\text{mA}$	All other situation	$I_{port-2p} \leq 5\text{mA}$
Channel2	$I_{port-2p} \geq 10\text{mA}$		$I_{port-2p} \leq 5\text{mA}$



If $I_{port-2p}$ on **both** pair-sets $\leq I_{hold\min}$ in T_{MPS} ,
A PSE shall consider the PD to be absent.

Note: Due to the unbalance effect, one channel $I_{port-2p}$ will exceed 5mA.

Solution B: Combined MPS maintenance on PSE

In order to **eliminate the increase of MPS current** caused by channel unbalance, PSE follows AT DC-MPS and provide a combined MPS maintenance on PSE PI, which means: $I_{port} = I_{port-2p1} + I_{port-2p2}$

If $I_{port} \geq 2 \times I_{hold\ max}$ in T_{MPS} ,
A PSE shall consider the PD to be present.

BT PSE	Keep Power	Remove or Keep Power	Remove Power
Channel1 + Channel2	$I_{port} \geq 20\text{mA}$	All other situation	$I_{port} \leq 10\text{mA}$

If $I_{port} \leq 2 \times I_{hold\ max}$ in T_{MPS} ,
A PSE shall consider the PD to be absent.

Note: **PSE should provide extra designs to synchronize current sampling on each pair-set and combine the two sampled $I_{port-2p}$ for MPS control.**

Solution C: One pair-set MPS maintenance on PSE

If PSE follows AT DC-MPS $I_{\text{hold}}^{\text{max}}$ and $I_{\text{hold}}^{\text{min}}$ on **one pair-set**, which means:

If $I_{\text{port-2p}}$ **on at least one pair-set** $\geq I_{\text{hold}}^{\text{max}}$ in T_{MPS} ,
A PSE shall consider the PD to be present.



BT PSE	Keep Power	Remove or Keep Power	Remove Power
Channel1 OR Channel2	$I_{\text{port-2p}} \geq 10\text{mA}$	All other situation	$I_{\text{port-2p}} \leq 5\text{mA}$



If $I_{\text{port-2p}}$ **on at least one pair-set** $\leq I_{\text{hold}}^{\text{max}}$ in T_{MPS} ,
A PSE shall consider the PD to be absent

Note: **Nothing is added in PSE but provide a lower standby power than solution A.**

Conclusion

In order to keep low standby power and make system design simple, we suggest the solution C as the BT DC-MPS, that is:

- A PSE shall consider the DC MPS component to be present, if $I_{\text{port-2p}}$ on at least one pair-set is greater than or equal to I_{holdmax} for a minimum of T_{MPS} .
- A PSE shall consider the DC MPS component to be absent if $I_{\text{port-2p}}$ on at least one pair-set is less than or equal to $I_{\text{Hold min}}$ for a minimum of T_{MPS} .

Thank you!