DTE Power via MDI Detection Scheme

Joint Proposal By:

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DTE Power via MDI Detection Scheme

Motivation

- To detect the need for power over the MDI in a remote DTE
- To prevent two detecting stations from simultaneously detecting each other when connected together
- Compatibility with legacy equipment in the detection scheme and the detection mechanism
- Some existing terminations may not handle power delivered via MDI
  - "Bob Smith" termination
  - Center tap connected to Ground
- Ability of a detecting station to determine if the connected DTE requires power enables selective distribution of power to only those DTE's which require power

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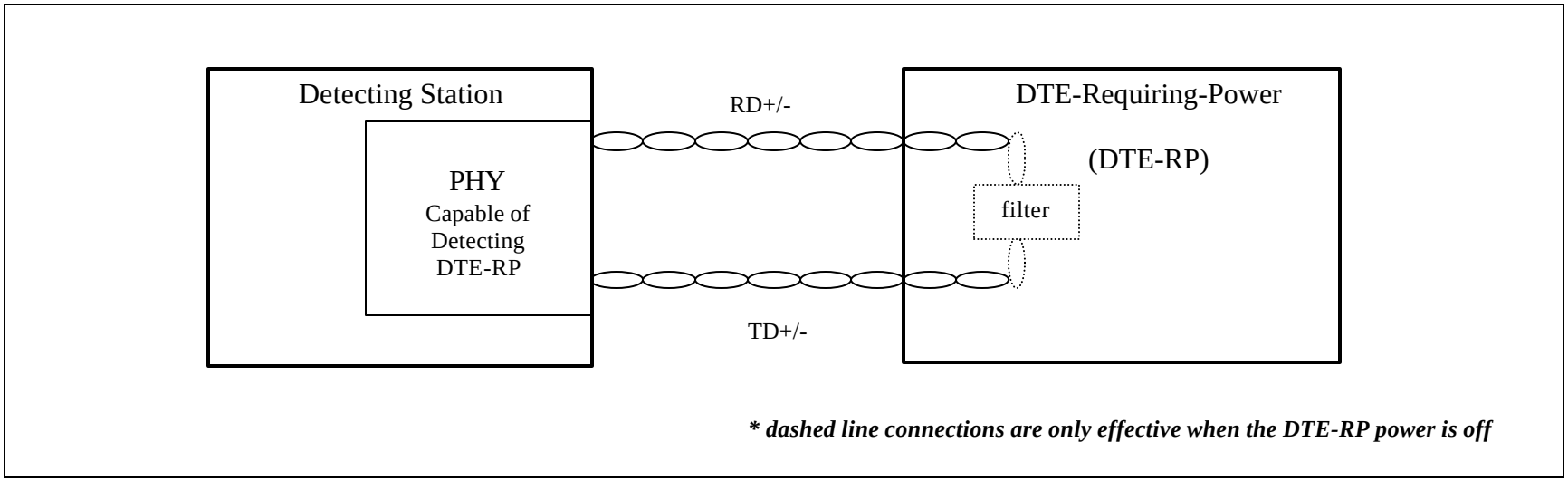
System Overview



- In absence of power, the DTE-Requiring-Power (DTE-RP) has its receive pair (RD) effectively connected to its transmit pair (TD) through a low pass filter (DTE-RP loopback condition)
- The detecting station detects the presence of the DTE-RP by transmitting a random code of sufficient uniqueness to prevent unintentional power-up when two detecting stations are connected
- Once the detecting station detects the presence of the DTE-RP, its system supplies power to the DTE-RP

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DTE-RP Detection and Power-via-MDI sequence

- The detecting station is set to a mode to search for a DTE-RP
- The DTE-RP's RD pair is effectively connected to the TD pair through a low pass filter
- The PHY of the detecting station transmits a random code of sufficient uniqueness
- The DTE-RP is detected through the PHY of the detecting station receiving its unique random code through the DTE-RP loopback
- Once the detecting station detects the presence of the DTE-RP, it supplies system power to the DTE-RP via an MDI connection
- The detecting station will then perform an Auto-Negotiation with the now-powered DTE-RP
- During the detection process, if the detecting station receives valid 10Base-T NLPs, 100Base-TX idles, or Auto-Negotiation FLP code-words, it will Auto-Negotiate normally

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Low Pass Filter

- To prevent a legacy link partner from saturating its port with valid packets when connected to a DTE-RP without power (DTE-RP loopback condition), the DTE-RP receive pair (RD) is effectively connected to its transmit pair (TD) through a low pass filter
- This low pass filter will cut-off the legacy link partner's valid data, avoiding network activity
- The random code signal used for DTE-RP detection must be of sufficiently low frequency content to pass through the filter, as well as two worst-case CAT-3 cables
- Once the DTE-RP power is applied, the DTE-RP loopback condition and low pass filter connection are removed and the RD and TD pairs operate normally

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Proposal Benefits

- Prevents supplying power to a legacy DTE not equipped to handle power through the MDI
- In case the far-end device is not a DTE-RP, the far-end unit's link detection will be unaffected by the DTE-RP detection mechanism
- The standard Auto-Negotiation process occurs in parallel to the DTE-RP detection process, enabling detection of non-DTE-RP devices while DTE-RP detection is enabled
- Randomization in the DTE-RP detection algorithm prevents two detection-enabled stations from simultaneously applying power
- DTE-RP detection scheme works over CAT-3, CAT-5, or better cabling

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