DTE Power via MDI

Vafa Rakshani

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A DTE Power via MDI system should:

1. Prevent connection of power via MDI to any legacy system that is not capable of receiving power

2. Prevent any legacy system from falsely detecting link when connected to an un-powered DTE-Reducing Power (DTE-RP)

3. Limit power supplied to the DTE-RP in order to prevent fire/safety hazards

4. Allow normal Auto-Negotiation, parallel detection, and data transmission between any legacy system and any new DTE capable of supplying power

5. Detect a DTE-RP and supply power via MDI.
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This proposed DTE Power via MDI system must have:

1. DTE-RP Loopback Condition.
   - In the absence of power, the DTE-Required-Power (DTE-RP) has its receive pair (RD) effectively connected to its transmit (TD) through a low pass filter.
   - In the presence of power, the loopback condition is removed, allowing normal transmit and receive operation.

2. Low Pass Filter.
   - The loopback condition passes through a low pass filter in order to cutoff normal Ethernet signals. The filter prevents a legacy transceiver from linking to itself if connected to a DTE-RP.
3. DTE Detecting Station (DTE-DS) PHY with DTE-RP detection capability.

- The DTE-DS PHY detects the presence of the DTE-RP through the loopback condition.
- The DTE-DS PHY’s output, during the DTE-RP search, is lower frequency than normal Ethernet pulses, including Normal Link Pulses, and will therefore pass through the low pass filter.
- While in the DTE-RP search, the DTE-DS PHY is capable of detecting and linking to legacy transceivers.
- The DTE-DS PHY must not mistake a legacy device for a DTE-RP.
  - Power supplied via MDI to a legacy device may damage it.


- Once the DTE-RP is detected, the detecting station supplies power via the MDI to the DTE-RP.
- The power supply must have current limitation in order to prevent hazards in case of a cable short while the system is powered.
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DTE Power Supply, Relay, & Filter Connectivity
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DTE-RP’s Low Pass Filter

3 pole filter with cutoff frequency of 880kHz
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Bad Connection Example

Resistive Short in Cable Plant

Detecting Station

DTE Power Source

DTE Power Sink

Relay

Filter

DTE Requiring Power Station
DTE Power via MDI Detection Scheme

Detection Scheme for A Short across the Detecting Station RD & TD

The following scheme may produce a method to detect a short across the RD & TD of the Detecting Station:

1. Detect that the Detecting Station’s transmit is looped back to its receiver
   - indicates the presence of either a DTE-Prereq-Power or the short across RD & TD
2. Before supplying power via the MDI, Detecting Station transmits a 100ns pulse
3. If the pulse is received at the Detecting Station, there may be a short
   - The filter across a true DTE-Prereq-Power will sufficiently attenuate the 100ns pulse below the Detecting Station receiver’s sensitivity level
4. Repeat step 3 TBD more times
5. If every time the pulse is received at the Detecting Station, there’s a short
6. Therefore, the power via MDI is supplied only after determining that there are no shorts across the RD & TD