DTE Power via MDI

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11-8-99

DTE Power via MDI

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-Requiring 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-Requiring-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.**

4. Power Supply with Current Limitation.

- **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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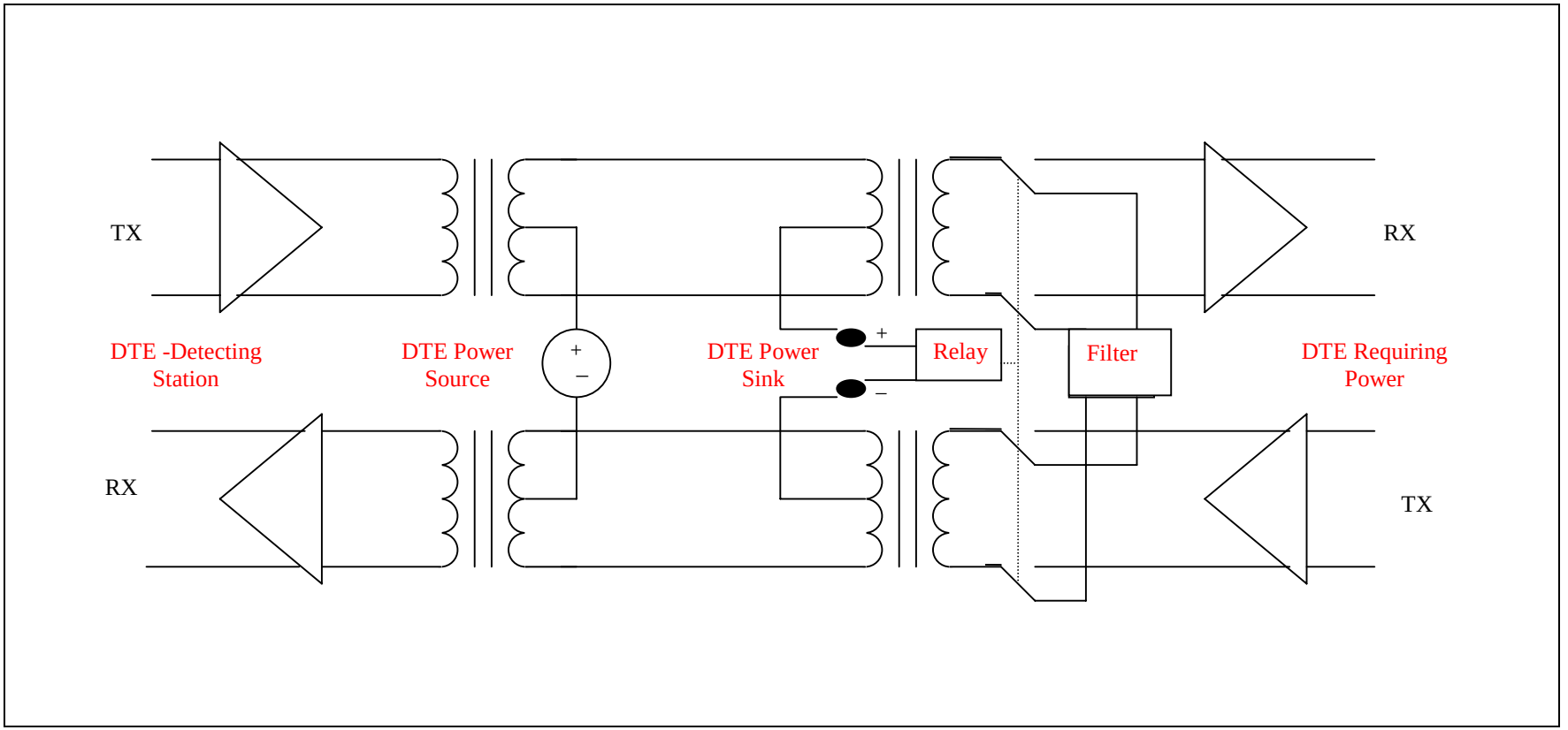
DTE Power Supply, Relay, & Filter Connectivity



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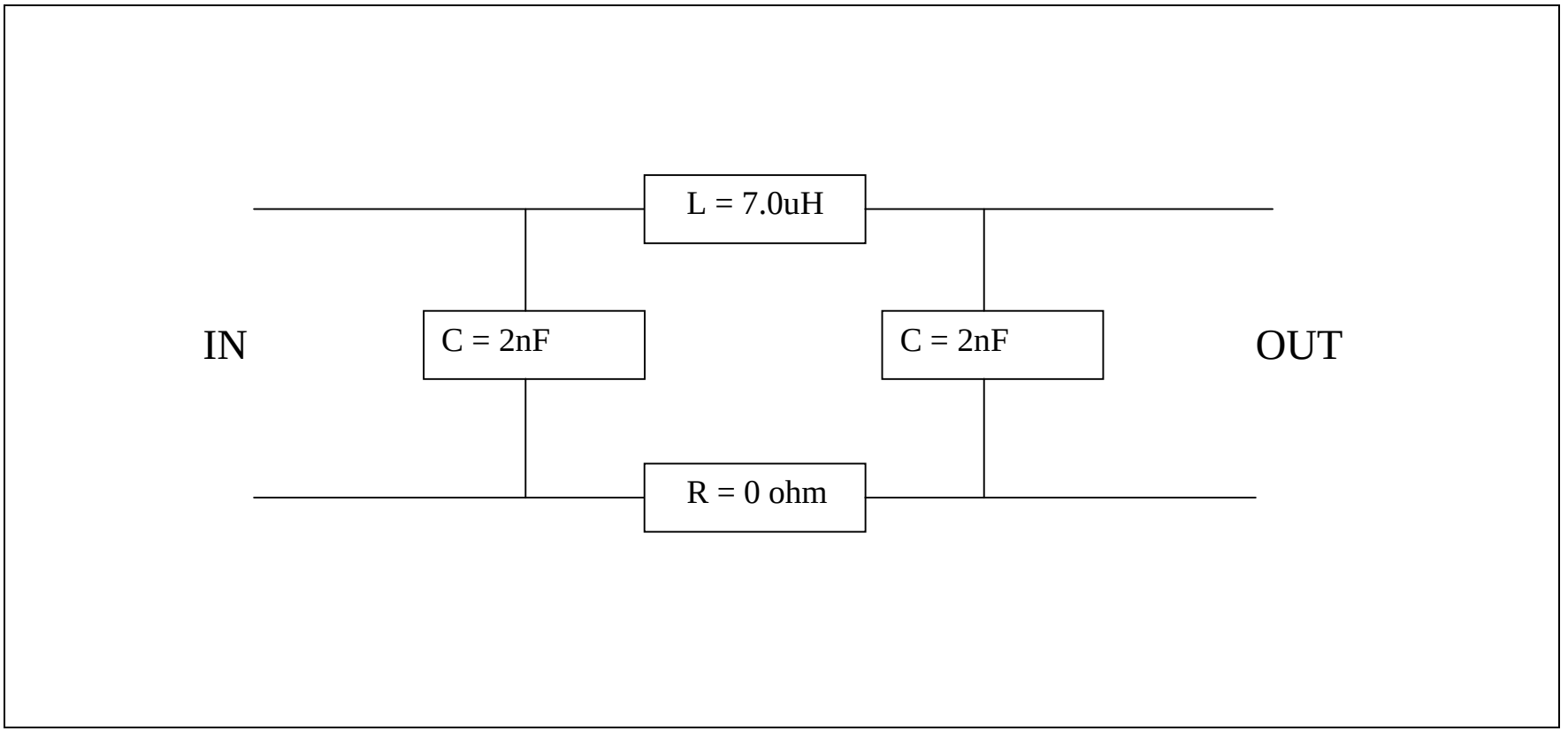
DTE-RP's Low Pass Filter



3 pole filter with cutoff frequency of 880kHz

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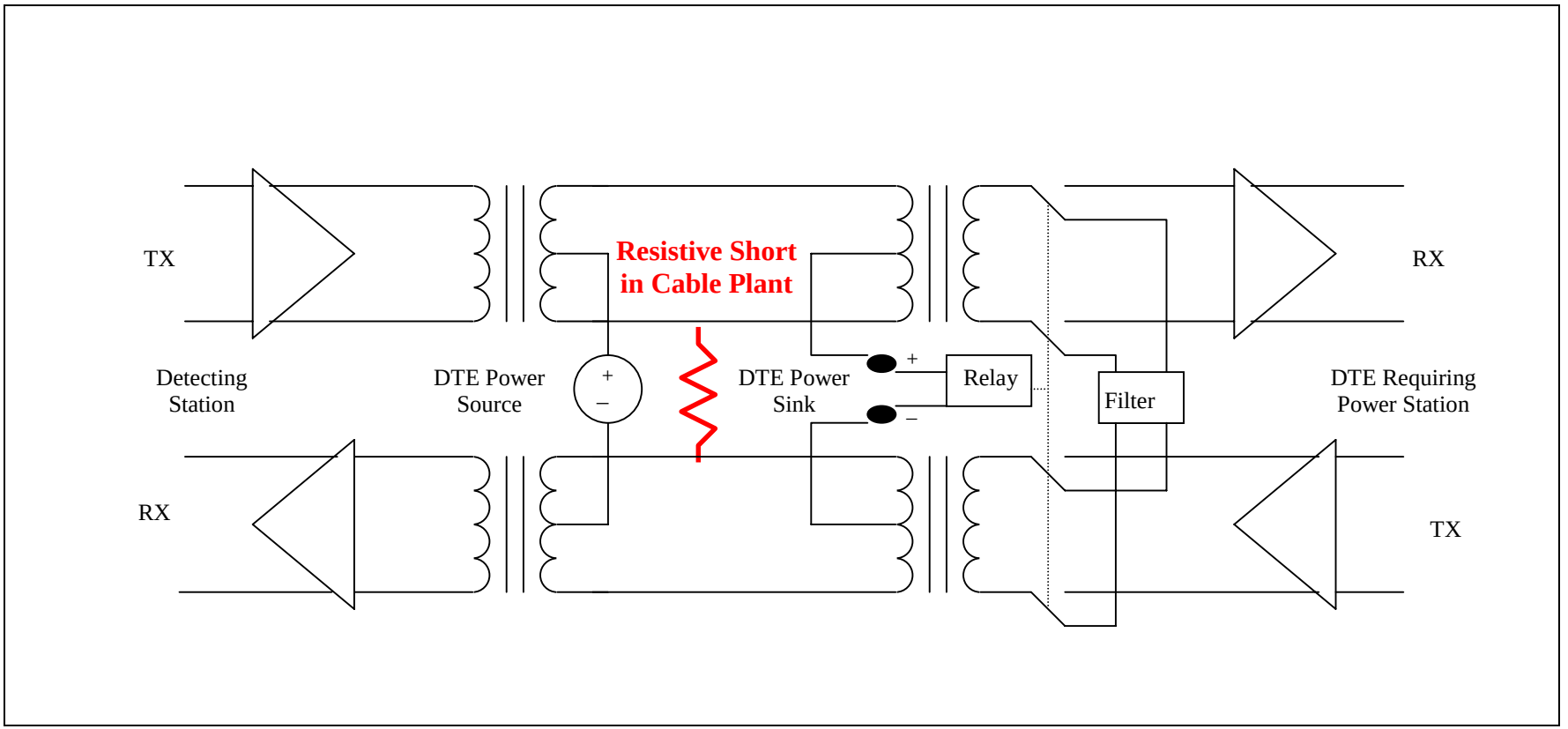
Bad Connection Example



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-Requiring-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-Requiring-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