

DTE POWER DIFFERENTIAL NOISE AND COMMON-MODE VOLTAGE REQUIREMENT

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Introduction

- **To ensure that the PHY will operate a DTE power differential noise requirement should be included.**
- **In addition a Common-mode voltage requirement should also be included.**
- **Attached are the Noise and Common-mode voltage requirements for: 10BASE-T, 100BASE-TX, and 1000BASE-T.**
- **The differential noise or common-mode voltage when operating with DTE power should not exceed those requirements.**

Differential Noise

10BASE-T:

14.4.4.2 Crosstalk noise

The level of crosstalk noise on a simplex link segment depends on the level of the disturbing signal(s) and the crosstalk loss between the pair(s) carrying the signal(s) and the disturbed pair. With the maximum transmit level (14.3.1.2), the sinusoidal crosstalk loss (14.4.3.2), and multiple, random Manchester-encoded disturbers, the peak self-crosstalk noise levels as measured at the output of the following specified filter shall be less than or equal to 264mV. The filter is a 3-pole Butterworth low-pass with a 3dB cutoff at 15MHz (refer to B.4.2).

100BASE-TX:

25.4.6.3.1 External coupled noise

The differential noise coupled from external sources that is measured at the output of a filter connected to the output of the near end of a disturbed link segment shall not exceed 40 mV peak-to-peak. The filter for this measurement is a fifth order Butterworth filter with a 3 dB cutoff at 100 MHz.

1000BASE-T:

40.7.6 External coupled noise

The noise coupled from external sources that is measured at the output of a filter connected to the output of the near end of a disturbed duplex channel should not exceed 40 mV peak-to-peak. The filter for this measurement is a fifth order Butterworth filter with a 3 dB cutoff at 100MHz.

Common-mode Voltage

10BASE-T:

14.3.1.2.5 Common-mode output voltage

The magnitude of the total common-mode output voltage of the transmitter, E_{cm} , measured as shown in Figure 14-14, shall be less than 50mV peak.

NOTE - This specification is not intended to ensure compliance with regulations concerning RF emissions. The implementor should consider any applicable local, national, or international regulations. Driving unshielded twisted pairs with high-frequency, common-mode voltages may result in interference to other equipment.

100BASE-TX: No requirement.

1000BASE-T:

40.8.3.3 MDI common-mode output voltage

The magnitude of the total common-mode output voltage, E_{cm_out} , on any transmit circuit, when measured as shown in Figure 40-32, shall be less than 50 mV peak-to-peak when transmitting data.

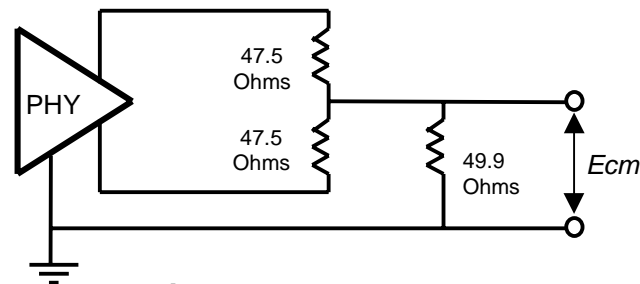


Figure 14-14 and 40-32

Conclusion

Recommend the following requirements:

Differential noise voltage: The differential noise coupled from a DTE power source shall not exceed 20 (TBD) mV peak-to-peak measured at the differential input of the MDI receiver port(s).

Common-mode voltage: With DTE power applied the magnitude of the total common-mode output AC voltage shall not exceed 50 mV peak when operating at 10Mbit/s and 50 mV peak-to-peak when operating at 100Mbit/s or greater measured at the MDI transmitter port(s). The magnitude of the common-mode AC voltage shall not exceed 50 mV peak-to-peak measured at all other ports.