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DTE Power via MDI: System Requirements

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November 5, 1999

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Strict Requirements

A solution for DTE Powering via DTE <u>must</u> satisfy the following conditions:

→ It will meet all applicable safety standards and regulations.

→ It will meet all of the requirements of existing 802.3 Ethernet LAN standards.

→ Its operation will not degrade in any way the performance of the Ethernet data transmission.

→ It will not damage, or be damaged by, or have its operation degraded, or be degraded by, any other RJ-45 or RJ-11 interconnected equipment to which it may be incidentally connected.

→ It will not cause any anomalous behavior or change the expected operation for any connected LAN equipment (e.g. link status LED indicators).

Desirable Requirements

A DTE Powering solution <u>should</u> satisfy the following conditions:

→ **It should be able to provide sufficient power to support a useful range of single IP terminal devices (e.g. IP telephones, wireless LAN base-stations, cameras, hubs, power controls, thermostats, etc.)**

→ **The powering topology should allow for the easy insertion of power at any point along the span.**

→ **The power source equipment should support a MIB for SNMP system management (including any backup power system).**

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Power Source Attributes

To satisfy the previous conditions the following LAN power source characteristics are proposed:

➔ **An isolated DC voltage source meeting all applicable worldwide regulatory safety requirements;**

➔ **Metallic power feed on Pins 4-5, one of the idle pairs of the 10/100 BASE-T LAN loop;**

➔ **Each loop power feed isolated to withstand ±2250 Volts DC or 1500 Volts AC for 60 sec. (IEC 60950:1991 "Hipot");**

➔ **The power source to each loop must be independently current limited to a level to be determined above the level of the maximum rated output.**

➔ **All protection circuitry for the loop power feed must recover automatically without any operator intervention once the fault has been removed.**

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Power Source Attributes (continued)

To satisfy the previous conditions the following LAN power source characteristics are proposed:

➔ **The loop supply must be "smart," using a discovery mechanism to insure that power is only provided to authorized terminal devices;**

➔ **The source must provide a maintenance capability to monitor and supply power only as long as the loop connection remains valid;**

➔ **The source must limit the power to any non-authenticated terminal loads to protect against damage;**

➔ **At the point of power insertion, appropriate terminations will be presented to the network side of the LAN connection.**

Terminal Power Attributes

Given the previous system attributes and requirements the power characteristics for the terminal are:

- ➔ A terminal, which is authorized for LAN powering, must support a unique discovery mechanism for its powering authentication;

- ➔ A target for the absolute maximum peak power consumption at the terminal of 15 Watts;

- ➔ A target of 10 Watts for the continuous nominal power load at the terminal;

- ➔ At the point of power extraction, appropriate terminations will be presented to the terminal side of the LAN connection;

- ➔ Under no circumstances will the terminal source current into the loop (i.e. back feed);

- ➔ The terminal port must meet the "Hipot" isolation requirements of IEC 60950:1991.

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Rationale

- ## Use of a non-signal pair for powering:

  → **Does not require any changes to the magnetics, and the potential for secondary effect problems;**

  → **Minimizes interference into the LAN transmission signals;**

  → **Allows for simple mid-span power insertion;**

- ## Use of a DC Voltage source:

  → **Builds on existing, mature power back-up system technology;**

  → **Minimizes noise and potential data transmission interference;**

  → **A DC source enables the use of integrated silicon control circuitry.**

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