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Project: **IEEE 802.3 – DTE Power over MDI Working Group**

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Title: **Draft proposed text for DTE Power section**

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Abstract: This contribution provides material for the DTE Power section.

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Patent Policy and Procedures The contributor is familiar with the IEEE 802.3 Patent Policy and Procedures Edition March 14, 1995, revised March 27, 1998 <http://ieee802.org/3/patent.html>

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## 1 DTE Power Via MDI

### 1.1 Overview

#### 1.1.1 Scope

Clause 0 describes the Remote Power function that allows a device connected to a CSMA/CD LAN to be powered via MDI from a remote power device. The following areas have been identified as potentially benefiting from power over MDI:

- IP telephony
- Web cameras
- Wireless access point
- Industrial automation
- Home automation
- Security Access Control and Monitoring Systems
- Point of Sale Terminals
- Lighting Control
- Gaming and Entertainment Equipment
- Building Management

Remote Power is supplied over the data pairs and/or the spare pairs of the link segment, from a power source to the power sink. A discovery mechanism provides a detection function, to recognize amongst the various 10-BASE-T, 100BASE-TX and 1000BASE-T compatible devices those who have been designed to be remotely powered, either for normal operation or for backup purposes.

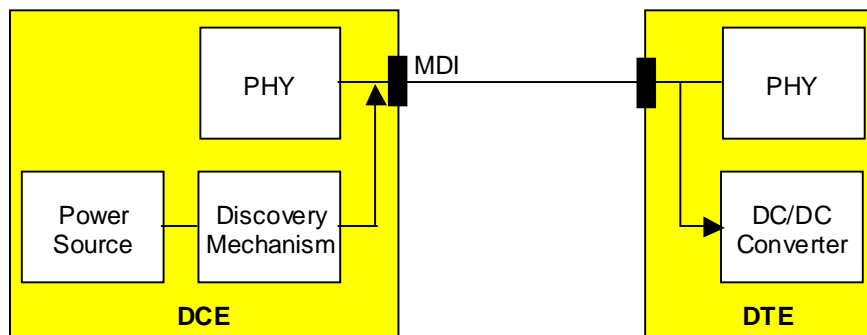


Figure 1-1. – High-level model

Power source and discovery mechanism might be implemented inside the DCE (hub, switch, etc.), but mid-span insertion is also possible and covered by this standard.

DTEs that are locally powered, and that do not make use of the remote power are normally not remotely powered. Specific use of remote power for maintenance operation of this kind of DTE are left open to the implementors.

DTEs that are locally powered, and that make use of the remote power are normally remotely powered.

The discovery mechanism is in charge of recognizing if the DTE needs to be remotely powered or not and to control power injection over MDI. The basic mechanism to achieve identification of the category of DTE is to make impedance measurements of the termination. Measurements are performed under direct and under alternative voltage test sequences.

The discovery mechanism remains active, to allow for a dynamic configuration of the installation: as an example, a DTE requiring remote power might be disconnected and replaced later on by another DTE that does not need remote power. These changes in the configuration need to be detected, and the power sending mechanism need to react accordingly.

To maintain interoperability with existing CSMA/CD devices, the function recognizes 10BASE-T, 100BASE-RX and 1000BASE-T compliant equipment. A device that does not show the right impedance will not be remotely powered, and link integrity is provided.

Intermediate devices may need to be powered via the MDI, and in turn pass power on to an end point. These intermediate devices will be required to facilitate the economic mass deployment of VoIP telephones. This is illustrated in figure 1.2

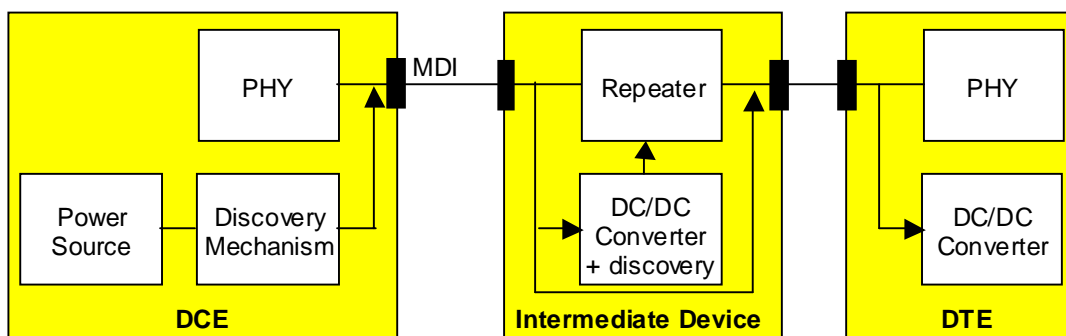


Figure 1-2. - Remote power of/through intermediate device

### 1.1.2 Application perspective/objectives

The Remote-Power function is designed to allow IEEE 802.3 compatible devices using an eight-pin modular connector to self-configure a segment for the provision of power over MDI.

The following are the objectives of Remote-Power:

- a) Economically provide power to 10BASE-T and 100BASE-TX devices, and consider powering 1000BASE-T
- b) Select one power distribution technique for world-wide use
- c) Must not cause damage and interoperate with compliant RJ-45 MDI Ethernet devices, including switch-to-switch connections (both supplying power), cross-over cables, common mode termination implementations, shorted conductors, pairs or loopback plug
- d) Must have a capability detection function that works with a powered and a unpowered device
- e) Add appropriate management objects for power capability and status
- f) Support current standard, 4-pair, horizontal cabling infrastructure for installed Cat 3 and Cat 5 cabling
- g) Must preserve the signal transmission and isolation characteristics of existing equipment and cabling
- h) Must do no harm to 1000BASE-T
- i) Must allow upgrade of a link from a non-powered to a powered solution by the use of external equipment (mid-span power insertion)

- j) Consider interaction with other RJ-45 interfaces: Token Ring, ATM, FDDI, TP-PMD, 1000BASE-T, ISDN, network test equipment, PBX
- k) Reasonable and cost-effective to implement
- l) Must consider intermediate devices that are powered via the MDI, and in turn pass power on to an end point
- m) Must be capable of operation in the absence of Network Management
- n) Must operate with DTEs that are already locally powered (backup or maintenance)
- o) Must operate properly when the DTE is electrically connected, powered up, reset, disconnected, replaced by either category (to be powered or not) of DTE
- p) Must not cause corruption of IEEE 802.3 Layer Management statistics
- q) Operates using a peer-to-peer master/slave mechanism
- r) Must not impact EMI/RFI emissions

### 1.1.3 Relationship to ISO/IEC 8802-3

The Remote-Power over MDI is provided at the Physical Layer of the OSI reference model

### 1.1.4 Compatibility considerations

The remote powering over MDI is designed to be compatible with 10BASE-T and 100BASE-TX UTP, and do not harm to 1000BASE-T, with no changes to the existing MAC client interface. It is backwards compatible and interoperable with 10BASE-T, 100BASE-TX and 1000BASE-T compliant devices. The proposed standard will conform to 802 Functional Requirements.

Implementation of the Remote Power over MDI is optional. For CSMA/CD compatible devices that use the eight-pin modular connector of ISO/IEC 8877:1992, if Remote Power is required, either for normal operation or for power backup operation, then the Remote Power over MDI shall be used in compliance with clause 0. If the implementor of a non-CSMA/CD eight-pin modular device wishes to assure that its operation does not conflict with CSMA/CD devices, then adherence to clause 0 is recommended.

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