



**VigorPlug 200Av**  
**200M Powerline Ethernet Adapter**  
**User's Guide**

**Version: 1.0**

**Date: 2007/12/24**

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## Safety Instructions and Approval

### Safety Instructions

- The following pre-cautions should be taken when using this product:
- This product is intended for connection to the AC power line.
- The following pre-cautions should be taken when using this product:
- Please read all instructions before installing and operating this product.
- Please follow all warnings and instructions marked on the product.
- Do not operate this product near water.
- This product should never be placed near or over radiator, or heat register.
- This product relies on a building's electrical installation for short-circuit (over current) protection.
- Ensure that a fuse or circuit breaker is used on the phase conductors (all current-carrying conductors).
- Do not allow anything to rest on the product interconnect cords.
- Do not locate this product where people may walk on the cords.
- The power cord should be plugged directly into a specification AC wall outlet.
- Only a qualified technician should service this product. Opening or removing covers may result in exposure to dangerous voltage points or other risk.
- Unplug this product from the wall outlet and refer the product to qualified service personnel for the following conditions:
  - When the interconnect cords are damaged or frayed.
  - If liquid has been spilled onto the product.
  - If the product has been exposed to rain or water.
  - If the product does not operate normally when the operating instructions have followed.
  - If the product exhibits a distinct change in performance.

### Warranty

We warrant to the original end user (purchaser) that the router will be free from any defects in workmanship or materials for a period of two (2) years from the date of purchase from the dealer. Please keep your purchase receipt in a safe place as it serves as proof of date of purchase. During the warranty period, and upon proof of purchase, should the product have indications of failure due to faulty workmanship and/or materials, we will, at our discretion, repair or replace the defective products or components, without charge for either parts or labor, to whatever extent we deem necessary to restore the product to proper operating condition. Any replacement will consist of a new or re-manufactured functionally equivalent product of equal value, and will be offered solely at our discretion. This warranty will not apply if the product is modified, misused, tampered with, damaged by an act of God, or subjected to abnormal working conditions. The warranty does not cover the bundled or licensed software of other vendors. Defects which do not significantly affect the usability of the product will not be covered by the warranty. We reserve the right to revise the manual and online documentation and to make changes from time to time in the contents hereof without obligation to notify any person of such revision or changes.

### Be a Registered Owner

Web registration is preferred. You can register your Vigor router via <http://www.draytek.com>.

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# 1. Powerline Networking Introduction

## 1.1 Benefits

- Ranges up to 200 meters
- No need new wires for Home networking
- High-speed Internet and DVD-quality video streaming
- Easy to install

## 1.2 Features

- Coexist with Powerline 85M or 14M
- Orthogonal Frequency Division Multiplexing for high data reliability in noisy media conditions
- Integrated Enhanced Quality of Service(QoS) features: Eight levels of prioritized random access, contention free access, and segment bursting
- Up to 200Mbps data rate on Powerline
- Provide 128-bit AES Link Encryption with key management for secure Powerline communications
- LEDs indicate status

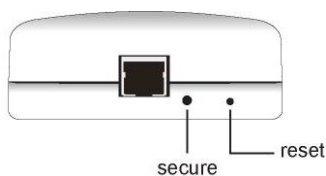
## 1.3 System Requirements

- Ethernet device
- AC power outlet
- Windows system for encryption setup

## 1.4 Package Contents

- 200M Powerline Ethernet Adapter unit
- VigorPlug 200AV Utility CD
- Quick Start Guide
- Category 5 cable

## 1.5 Panel Description



LED	Description
ACT	Means powerline networking activity
LAN	Means Ethernet link activity
PWR	Means power ready.

Connector	Description
Ethernet	Where you will connect 10/100M Ethernet network devices, such as PCs, printer servers, and anything else you want to put on your networks.
Secure	Please make sure press this button > 10 sec till all LEDs re-flash for each device to generate a random network password first. When each device gets the new random network password, please press one device's secure button < 3 sec first and then press another device secure button < 3 sec. Both devices will auto group. It will be easy to secure your home powerline network. All the operations must be completed within 2 minutes, otherwise time out will be occurred.
Reset	Reset the device to factory default. Please remove the Ethernet cable from RJ-45 connector before you press the button. Please press the button < 3 sec, the device will reset automatically.

## 2. Installation & Application

### 2.1 Hardware Installation

Follow the steps below to install your device.

1. Simply plug into a power outlet and do not use a power strip or UPS with the wall mount device.



2. Use a twisted-pair cable with RJ-45 plugs at both ends, and plug into Ethernet device and Ethernet of VigorPlug 200 AV.

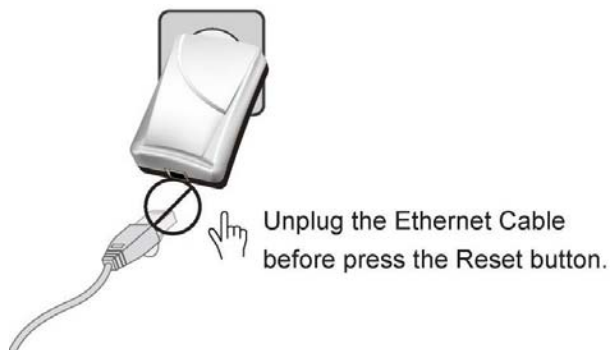


3. Before install VigorPlug 200 AV Utility, please make sure your windows system already installed the Microsoft .NET Framework 1.1 or later version.

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**Note:** Be sure unplug the Ethernet cable before press the Reset button to avoid damage to your device.

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## 2.2 Software Installation

The Powerline Device can automatically detect other Powerline Adapters which plug in the same power circuit. You don't need to use this Powerline utility except you want to encrypt all the Powerline devices as the same group or you cannot access into the other computers.

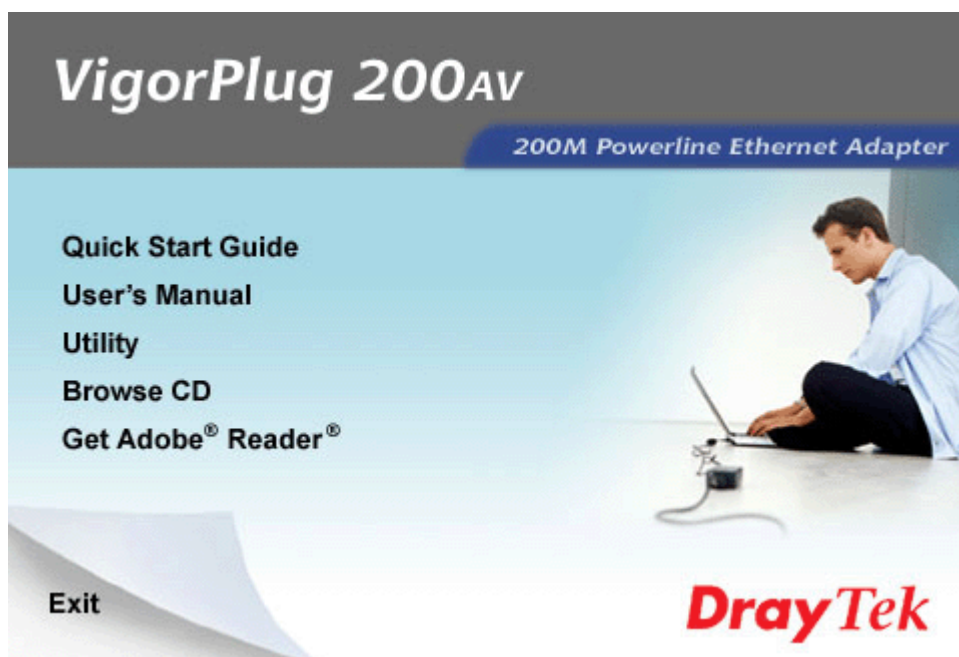
The VigorPlug 200AV Manager for Windows OS enables the user to find Powerline Ethernet devices on the Powerline network, measures data rate performance, ensures privacy, performs diagnostics and secures Powerline networks.

### Installation of the Utility

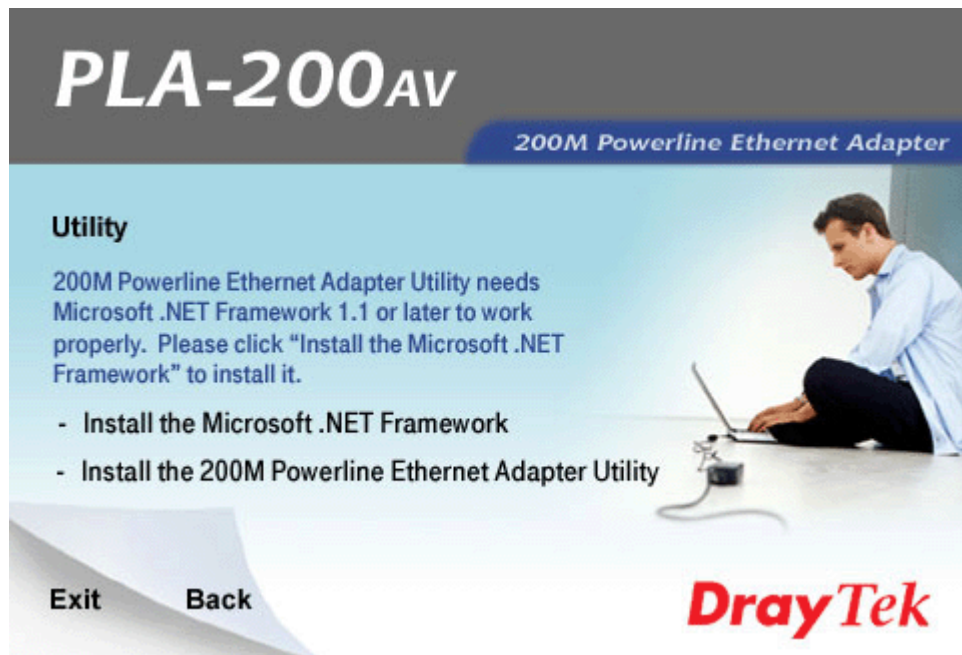
Please verify that no other Powerline Management utility is installed before installing this software. If other utilities are installed, please uninstall them and restart before installing this software. This utility only supports Windows 2000, 2003, XP and Vista.

1. Insert the VigorPlug 200AV CD-ROM into the computer's CD-ROM drive.

The Setup utility shall run automatically. Alternatively this can also be done manually by double clicking the setup.exe file on the CD. The CD will launch an installation utility similar to the one shown below:

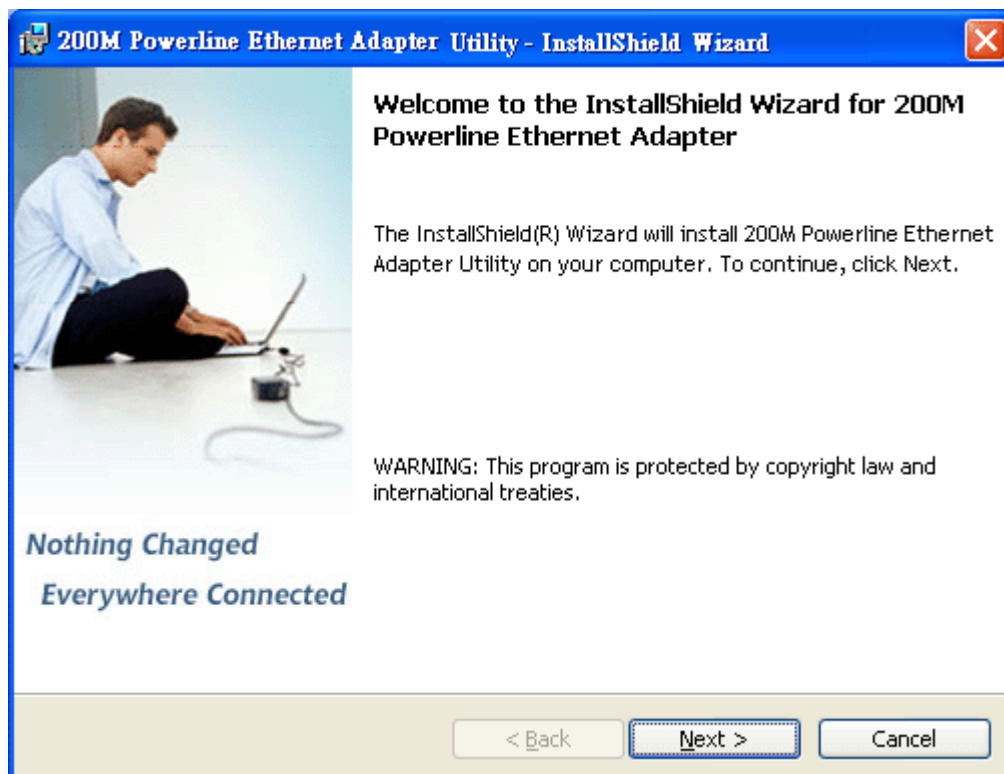


2. Click the **Utility** to enter the Utility installation page.



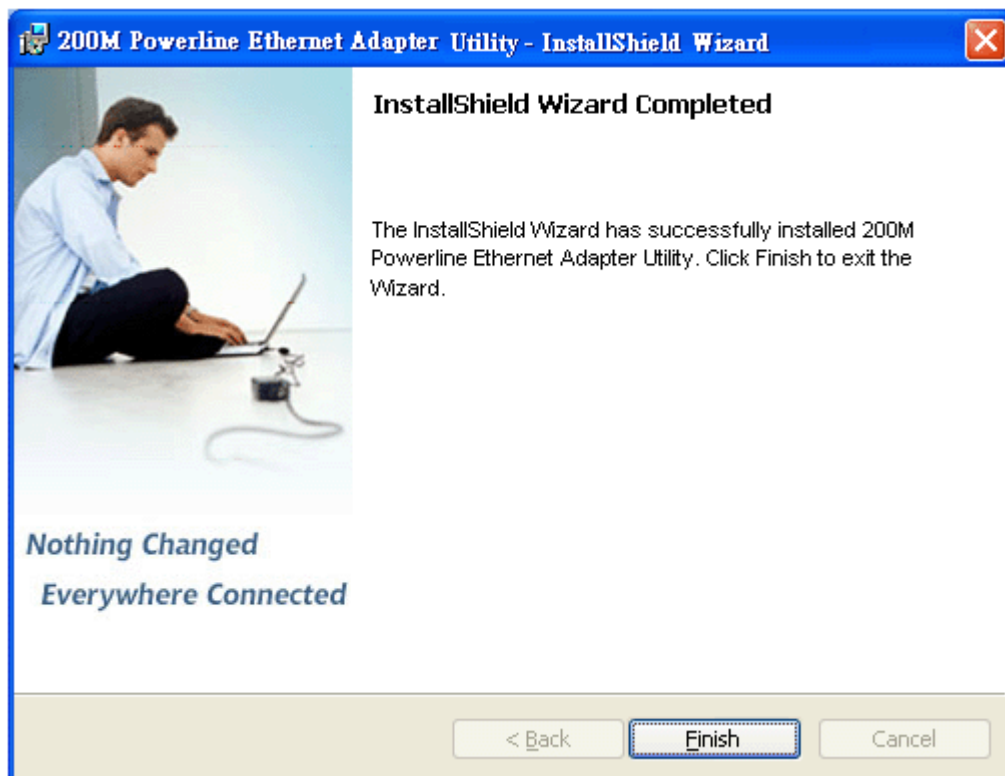
Please make sure if your windows OS doesn't install the .NET Framework, please install it first. Otherwise, the Powerline utility will not work properly.

3. Next, install the Powerline Utility directly. A setup wizard will be popped up as below, please click the **Next** button to continue. Then, follow the *onscreen instructions* to finish the installation.





4. When the installation has completed, please click **Finish** to exit.

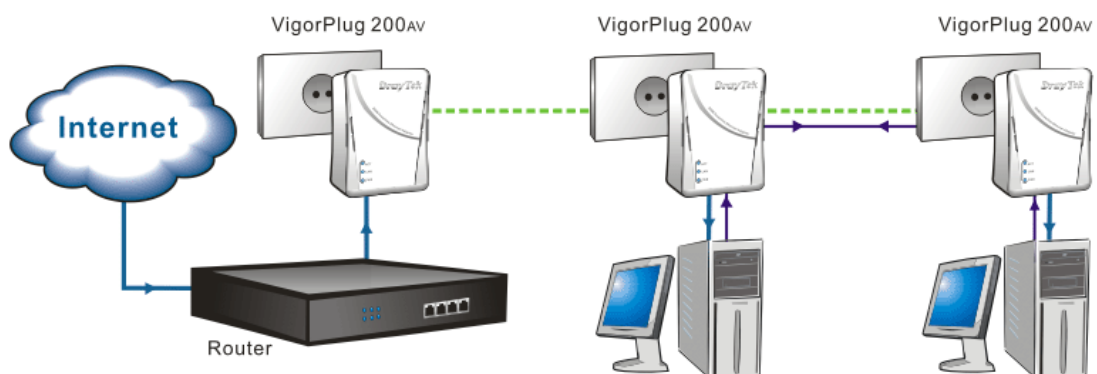


5. Now, the installation has been completed. Please go the next chapter for using the utility.

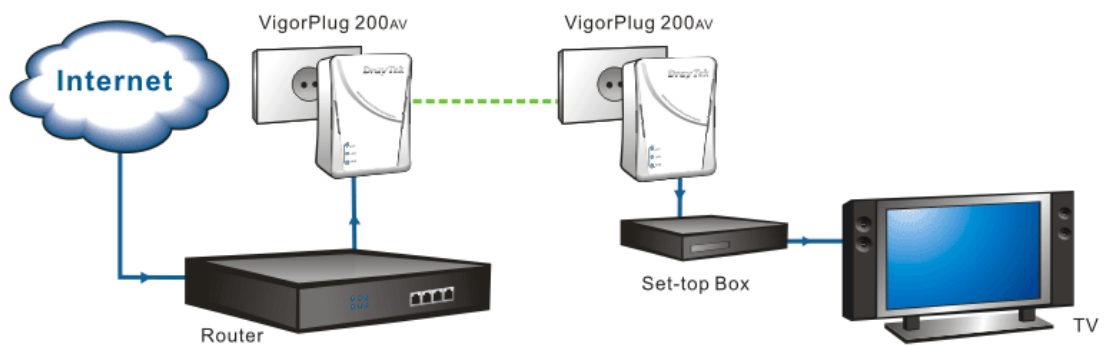
## 2.3 Applications for VigorPlug

Here provides some applications with VigorPlug 200Av.

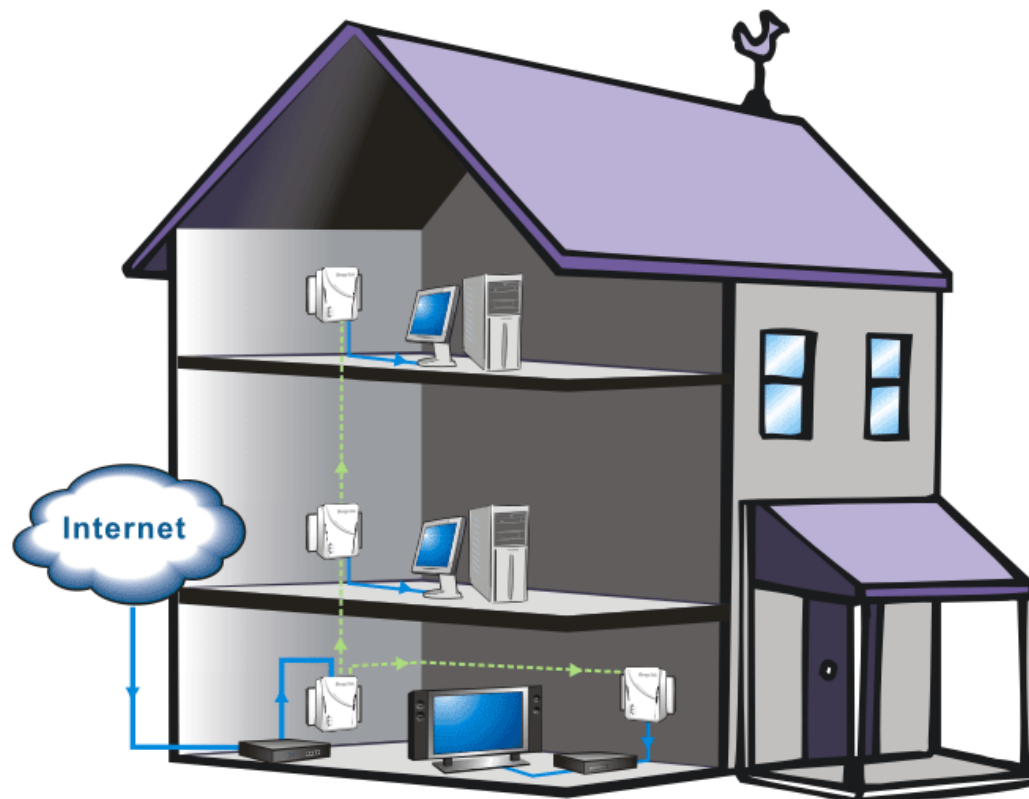
Below shows network application through VigorPlug 200Av:



### IPTV Application through VigorPlug 200AV:



### Internet ADSL and Home Networking through VigorPlug 200AV:



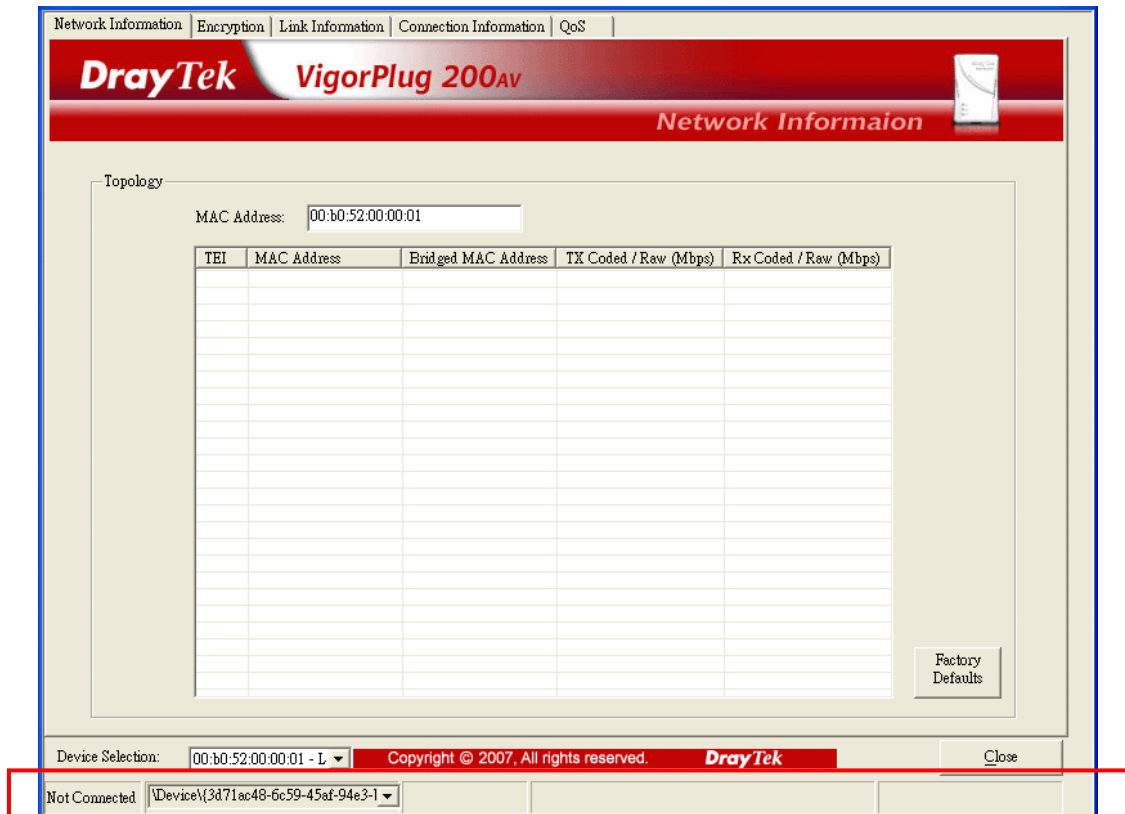
This page is left blank.

### 3. Configuring the Adapter

Please open the Powerline adapter utility by clicking **200M Powerline Ethernet Adapter Utility>>VigorPlug 200AV Manager**.



The **200M Powerline Ethernet Adapter** utility will appear.



The status bar, along the bottom of each window, contains five fields that provide important network information.

**The first field** Contains the status of the Device Manager in respect to connection to a Powerline device. ‘*Connected*’ indicates a local device has been identified. ‘*Not connected*’ indicates no device has been found.

**The second field** The read only drop down box of the second field lists the available network adapters found on the system. Use the drop down box to select the appropriate adapter for connection to the local Powerline device.

**The third field** Lists the MAC Address of the connected node.

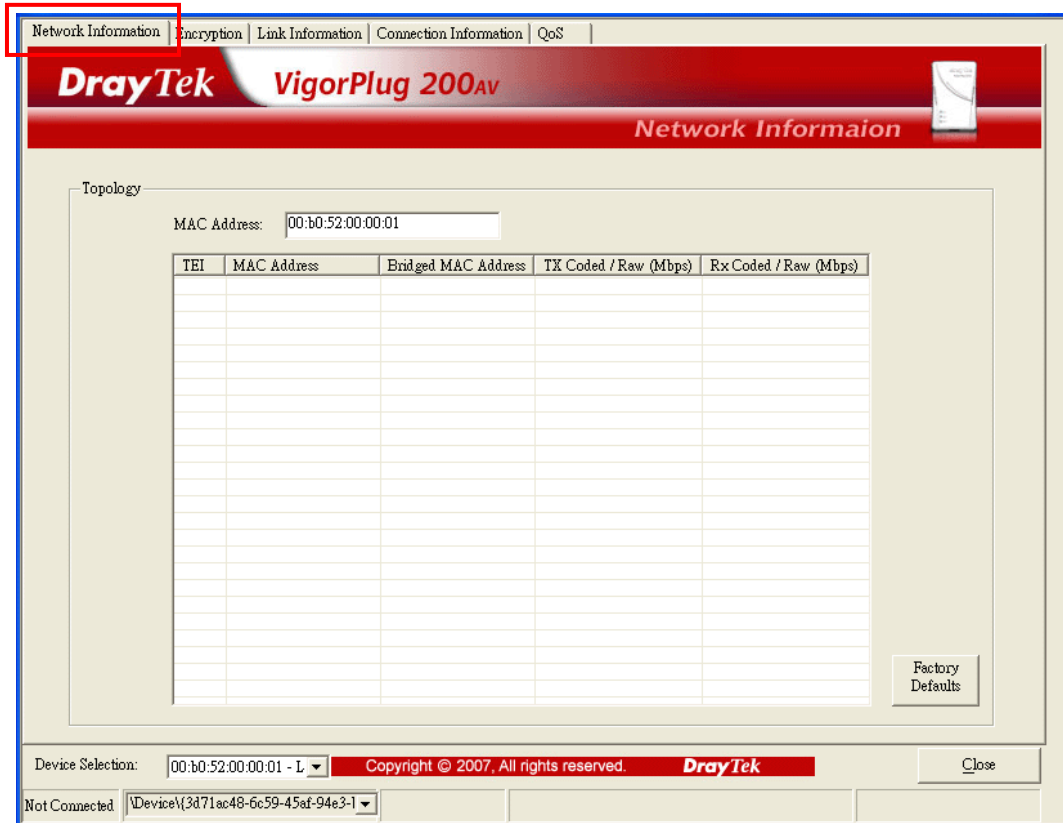
**The fourth field** Lists the firmware version of the locally connected node.

**The fifth field** Serves as a status indicator for the various download functions of the Device Manager, displaying a progress bar and messages pertaining to the various stages of operation.

### 3.1 Network Information Tab

This window is an operation analysis window that reveals network information.

The ‘Topology’ field shows the TEI, MAC Address, Bridged MAC Address, transmit (Tx) coded/raw, and receive (Rx) Coded and Raw rates for all nodes on the network (other than the local STA).



<b>TEI</b>	Display Terminal Equipment Identifier.
<b>MAC Address</b>	Display the MAC address of the device.
<b>Bridged MAC Address</b>	Display the MAC address of the other side.
<b>TX Coded/Raw (Mbps)</b>	Display the Transmit throughput.
<b>Rx Coded/Raw (Mbps)</b>	Display the Receive throughput.
<b>Factory Defaults</b>	Reset the settings to the factory default.

## 3.2 Encryption Tab

This Encryption window is used to set or change the network password on a remote device identified by its DAK password.

Network Information | **Encryption** | Link Information | Connection Information | QoS

**DrayTek VigorPlug 200AV** Encryption

Network Key to be Set

Network Password:

Remote Device Access Key

☐ Set Encryption for Remote Device

DAK Password:

Set

Push Button

Action:

Simulate Button Push

PIB Controls

☐ Member of AVLN

Simple Connect Timeout:  Seconds

Device Selection: 00:b0:52:00:00:01 - L Copyright © 2007. All rights reserved. DrayTek Close

Not Connected Device\{3d71ac48-6c59-45af-94e3-1}

### Network Key to Set

**Network Password** - It is used for the remote user trying to connect with VigorPlug 200AV. Default is “HomePlugAV” but not shown here. The user can change the Password through this page. Same password can group together in the same Powerline circuit.

### Remote Device Access Key

**Set Encryption for Remote Device** - Check this box for setting the Network Password for the remote device.

**DAK Password** - It means Device Access Key. Each device has its own password number located in the rear of the device. If you want to control VigorPlug 200AV in remote side through this page, you can enter the DAK password to this column.

### Set

Save the settings. If the DAK password field is left blank, clicking the **Set** button will only set local device with the entered password in Network Password column.

### Push Button

You can find the **Secure** button on the device to reach the purpose of encrypting for your data. However, you can do the same thing in this page. There are three actions provided here for you to choose.

**Action** - Provides a choice of three actions. **Simple Connect** allows you to use the default password to link. **NMK (Network Management Key) Randomize** can auto generate

a key for VigorPlug at random. And **AVLN (HomePlug AV Logical Network) Status** will show how many members in AVLN.

**Simulate Button Push** – Execute the action that you selected above. It's will depend the Action you choose, only NMK will auto generate a random key. The AVLN will show the members in the AVLN.

**PIB Controls** - Additionally, two configuration parameters are exposed in the PIB Controls sub-group box. **Member of AVLN** allows you to join such VigorPlug to the network. **Simple Connect Timeout** allows you to set the timeout for the second VigorPlug device to join the same network. The remote user must press **Secure** on the device within the specific time for linking.

### 3.3 Link Information Tab

This page provides you connection results for the device.

The screenshot displays the 'Link Information' tab in the DrayTek VigorPlug 200AV web interface. The interface is divided into several sections: 'Link Characteristics' with 'Source Address' and 'Destination Address' fields; 'Ethernet Controls' with 'Source Speed', 'Destination Speed', 'Source Duplex', and 'Destination Duplex' fields, and a 'Retrieve' button; 'Statistics' with fields for 'Avg. Pre-FEC Bit Error Rate', 'Avg. Bits/Carrier', 'Avg. SNR/Carrier', 'Avg. Source PB CRC Error Rate', 'Avg. Attenuation/Carrier', 'Avg. Dest PB CRC Error Rate', and 'Avg. Output Power/Carrier'; and 'Controls' with 'Clear Error Statistics' and 'Retrieve Statistics' buttons. The bottom of the interface features a 'Device Selection' dropdown menu, a 'Copyright © 2007, All rights reserved. DrayTek' notice, and a 'Close' button.

#### Link Characteristics

**Source Address** – It will be displayed automatically according to the device selected in the Device Selection box on the lower left of the tab

**Destination Address** – It will be selected from the drop down list. The list is the remote devices which connect to the local device.

#### Ethernet Control

Such control will be activated once the Retrieve button is pressed and indicates the physical settings of both ends of the

link.

**Source Speed** – Display the speed (10M or 100M) of VigorPlug connected to local PC.

**Destination Speed** - Display the speed (10M or 100M) of VigorPlug selected (by IP address) in Link Characteristics field.

**Source Duplex** – Display the duplex (Half / Full) of VigorPlug connected to local PC.

**Destination Duplex** – Display the duplex (Half / Full) of VigorPlug selected (by IP address) in Link Characteristics field.

**Retrieve** – Press this button to get the information from both sides.

## **Controls**

The members of the Statistics group are activated or cleared based on clicking the radio button in the Controls group and pressing of the Execute button. The lower status window provides feedback regarding the processing of the activity.

**Clear Error Statistics** – Clear all the error rates.

**Retrieve Statistics** – Recalculate the rates.

**Execute** – Click this button to activate the above selection.

## **Statistics**

Such information is useful for troubleshooting. It is not necessary for the user to change it.



### 3.4 Connection Information Tab

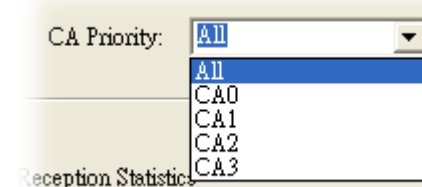
The Connection Information window is used to acquire statistics for both transmit and receive operations in the local or remote network.

#### Connection

**CSMA** – It means CSMA/CA (Carrier Sense Multiple Access / Collision Avoidance). It is not necessary for the user to change it.

**DA** – It means Destination Address. The drop-down menu may be used to select ALL devices or specific device which link to the same HomePlug AV Logical Network in the network.

**CA Priority** – Channel Access (CA) priority can be defined using the second drop-down menu. Such utility allows only certain valid combinations can be selected by the user.



The following table describes the combinations.

#### Transmission Statistics

The 'Transmission and Reception Statistics' groups return operational data regarding MPDU's (MAC Protocol Data Unit) and packet data unit handling. Results shown in these

fields provide valuable connection quality information.

**MPDUs Ack'd** - Display the number of the packets sent out successfully.

**MPDUs Collided** - Display the number of the packets which have been blocked by other devices but finally sent out successfully

**MPDUs Failed** –Display the number of the packets sent out failed.

### **Reception Statistics**

**MPDUs Rcvd** - Display the number of the packets received successfully.

**MPDUs Failed** – Display the number of the packets received failed.

### **Enable Statistics**

It is used to acquire the operational data. The value shown by the utility is a cumulative total of the packet data that was collected starting from pressing either the **Enable Statistics** button or the **Clear Statistics** button

Click this button to enable the statistics

### **Clear Statistics**

It is used to clear the fields of data. Click this button to clear all the statistics information on this window.

### 3.5 QoS Tab

QoS requirements are different for various data types such as streaming video or music, voice and raw data. To provide higher QoS for streaming data, priority levels can be set using tags at the beginning of data frames. Virtual Local Area Network (VLAN) 802.11p priority tags on Ethernet frames are used to specify 8 (0 – 7) levels of ‘user priority’. VigorPlug allows 4 levels of Channel Access Priority (CAP (0 – 3)). Therefore, the 8 levels of VLAN Ethernet tags must be mapped to the 4 levels of CAP priority, where **CAP 3 is the highest priority** and CAP 0 is the lowest. CAP 3 priority might be used for voice and network management frames, CAP 2 is used for streaming video and music while CAP 1 and CAP 0 are used for data. Mapping VLAN tags or TOS bits to CAP levels is easily done using the VLAN Priority Mapping function on the QoS tab window.

[illegible]**Dest MAC Address**

The QoS tab includes two list views to provide simple channel access priority (CAP) classification for individual MAC addresses and IP Ports. There is a collective limit of eight across both lists.

Please type MAC address of destination device manually. No delimiters, colons, or dashes are allowed in the MAC address format.

CAP

After typing the MAC address, choose CAP (CAP0 to CAP3) for that one by using the drop-down list.

### Dest IP Port

Please type the port for the destination device manually.

## Priority Mapping

It contains both VLAN and TOS Bit mapping capability. When selected, packets matching the VLAN or TOS Bit priority will be assigned the Powerline contention priority (Channel Access Priority, CAP) as set in the corresponding

dropdown box. If a packet has both VLAN and TOS in it, VLAN will override TOS.

Assign Priority Using – Check VLAN Tag or TOS Bits based on the network card you use.

**0-7** – There are seven groups can be set. The highest priority is 7 and the lowest priority is 0. Each group can be set with different CAP.

**Priority TTL** – It determines the life span (Time to live) of each packet in the buffer of the AV device that will be sent over the powerline subsequently. This value can be varied from 10 msec to 65000 msec which can be mapped to different levels of Channel access priority traffic. The default values are shown below:

CA0 traffic: 2000 msec (used for TCP data traffic)

CA1 traffic: 2000 msec (used for TCP data traffic)

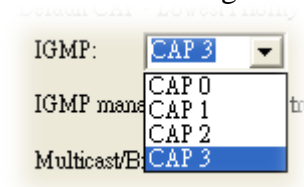
CA2 traffic: 300 msec (used for UDP video/music traffic)

CA3 traffic: 300 msec (used for VoIP traffic)

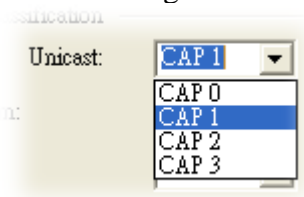
## Default CAP

It allows for default priority mapping of packets that do not have a VLAN or TOS bit (or if these are disabled). Settings are available for Unicast (directed to a host).

**IGMP** - Sets the channel access priority for IGMP frames - these are the group management frames, not the stream data. The default setting is CAP3.



**Unicast** - Sets the default channel access priority for unicast frames not matching any other classification or mapping. The default setting is CAP1.



**IGMP managed Multicast Stream** - Sets the default channel access priority for stream data belonging to a snooped IGMP multicast group.

**Multicast/Broadcast** – Sets the default CAP for multicast frames not in a snooped group and for broadcast frames.

## IGMP

It includes controls to **disable** the query timeouts. Checking the 'Override Defaults' box will enable the other boxes as choices.

**Override defaults** – Check this box to override the default settings.

**Disable Query Timeouts From**–Check this box to disable the query timeout for all groups or specific group.

**Save**

Click this button to save all the changes in this window.

## 4. Trouble Shooting

### 1. Why my utility can not work properly after finish install steps?

Ans: Please follow the steps to check the problem.

- Check the Control panel for Microsoft .NET Framework install status, if you don't install this, please install it.
- Reinstall the utility again, you can remove it and reinstall the utility again.

### 2. What kind of windows OS can install the Powerline utility?

Ans: Now the Powerline utility only supports Windows 2000, 2003, XP and Vista.

### 3. Why the throughput of Powerline 200M bridge is bad?

Ans: Please follow the steps to check the problem.

- Due to the master/slave structure, you need to avoid plugging two Powerline bridge in the same time, so you had better plug the Powerline to the power outlet sequence.
- Please unplug the Powerline bridge and plug again, please remember plug them in sequence.
- Check the Powerline utility and check the throughput again.

### 4. Why the Powerine 200M device can not work stable?

Ans: In some cases, it would be better for the user to set 100MBaseTx half duplex for NB/PC NIC's connection type while connecting to such device. It can ensure the best performance and keep the stability.

If the device still cannot work correctly after trying many efforts, please contact your dealer for further help right away. For any questions, please feel free to send e-mail to [support@draytek.com](mailto:support@draytek.com).