D-Link®

DWL-650
11Mbps Wireless LAN Card

User's Guide

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D-Link Systems, Inc. ("D-Link") provides this limited warranty for its product only to the person or entity who originally purchased the product from D-Link or its authorized reseller or distributor.

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Product Type	*Warranty Period*
Product (excluding power supplies and fans), if purchased and delivered in the fifty (50) United States, or the District of Columbia ("USA")	As long as the original purchaser still owns the product
Product purchased or delivered outside the USA	One (1) Year
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Spare parts and spare kits	Ninety (90) days

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Initial installation, installation and removal of the product for repair, and shipping costs;

Operational adjustments covered in the operating manual for the product, and normal maintenance;

Damage that occurs in shipment, due to act of God, failures due to power surge, and cosmetic damage; and

Any hardware, software, firmware or other products or services provided by anyone other than D-Link.

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Wichtige Sicherheitshinweise

1. Bitte lesen Sie sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den spätern Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Vervenden Sie keine Flüssig- oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Um eine Beschädigung des Gerätes zu vermeiden sollten Sie nur Zubehörteile verwenden, die vom Hersteller zugelassen sind.
5. Das Gerät is vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sichern Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen. Verwenden Sie nur sichere Standorte und beachten Sie die Aufstellhinweise des Herstellers.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor Überhitzung schützt. Sorgen Sie dafür, daß diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim Anschluß an das Stromnetz die Anschlußwerte.
9. Die Netzanschlußsteckdose muß aus Gründen der elektrischen Sicherheit einen Schutzleiterkontakt haben.
10. Verlegen Sie die Netzanschlußleitung so, daß niemand darüber fallen kann. Es sollete auch nichts auf der Leitung abgestellt werden.
11. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
12. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen.   Somit wird im Falle einer Überspannung eine Beschädigung vermieden.
13. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. Elektrischen Schlag auslösen.
14. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
15. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:

    a – Netzkabel oder Netzstecker sint beschädigt.

    b – Flüssigkeit ist in das Gerät eingedrungen.

    c – Das Gerät war Feuchtigkeit ausgesetzt.

    d – Wenn das Gerät nicht der Bedienungsanleitung ensprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.

    e – Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.

    f – Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.

16. Bei Reparaturen dürfen nur Orginalersatzteile bzw. den Orginalteilen entsprechende Teile verwendet werden. Der Einsatz von ungeeigneten Ersatzteilen kann eine weitere Beschädigung hervorrufen.
17. Wenden Sie sich mit allen Fragen die Service und Repartur betreffen an Ihren Servicepartner. Somit stellen Sie die Betriebssicherheit des Gerätes sicher.
18. Zum Netzanschluß dieses Gerätes ist eine geprüfte Leitung zu verwenden, Für einen Nennstrom bis 6A und einem Gerätegewicht gr ßer 3kg ist eine Leitung nicht leichter als H05VV-F, 3G, 0.75mm2 einzusetzen.

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Copyright Statement

1. Contents

2. Introduction

Thank you for purchasing your Wireless LAN, DWL-650 PC Card. This manual will assist you with the installation procedure.

The package you have received should contain the following items:

- DWL-650 PC Card
- User manua
- Quick installation guide
- Diskette containing Wireless LAN Management utility and drivers
  Note: if anything is missing, please contact your vendor

The diskette contains the drivers and the program **Gtutil** that is used for managing the DWL-650 Card and establishing the wireless connection with your Local Area Network.

3. Wireless LAN Basics

Wireless LAN (Local Area Networks) systems offer a great number of advantages over a traditional, wired system. Wireless LANs (WLANs) are more flexible, easier to setup and manage and often more cost effective than their wired equivalence.

Using radio frequency (RF) technology, WLANs transmit and receive data over the air, minimizing the need for wired connections. Thus, WLANs combine data connectivity with user mobility, and, through simplified configuration, enable movable LANs.

With wireless LANs, users can access shared information without looking for a place to plug in and network managers can set up or augment networks without installing or moving wires. Wireless LANs offer the following productivity, convenience and cost advantages over traditional wired networks:

- Mobility - Wireless LAN systems can provide LAN users with access to real-time information anywhere in their organization. This mobility supports productivity and service opportunities not possible with wired networks.

- Installation Speed and Simplicity - Installing a wireless LAN system can be fast and easy and can eliminate the need to pull cable through walls and ceilings.

- Installation Flexibility - Wireless technology allows the network to go where wires cannot go.

- Reduced Cost-of-Ownership - While the initial investment required for wireless LAN hardware might be higher than the cost of wired LAN hardware, overall installation expenses and life-cycle costs will be significantly lower. Long-term cost benefits are greatest in dynamic environments requiring frequent moves, adds, and changes.

- Scalability - Wireless LAN systems can be configured in a variety of topologies to meet the needs of specific applications and installations. Configurations are easily changed and range from peer-to-peer networks suitable for a small number of users to full infrastructure networks of thousands of users that allows roaming over a broad area.

4. Installation for Windows 95 (OSR2)/98

The following section will assist you to in installing wireless LAN Adapter successfully. You will first install software (driver) and then insert the DWL-650 wireless LAN card, and finally set the network properties to accommodate resource sharing and select the type of wireless network that you wish to install. The DWL-650 can easily be installed and used, without bothering to connect cables for keeping your computer to use network resources, as in case of wired LAN.

4.1. Installation Overview

Here are some steps you will perform in establishing your wireless network connection:

- Install the Acess Point at first. AP is needed in case of Infrastructure network mode.
- Install the software using the Installation Diskette.
- Install the Wireless LAN Card (DWL-650).
- Install the network protocol(s) required to communicate on your network. Most likely you will need the TCP/IP protocol.

4.2. Installation Procedure of DWL-650 PC Card

> Note: Do not insert the **PCMCIA** card until you are asked to do so, failure of which may result in unsuccessful installation of your **PCMCIA WLAN** card

Please follow the following steps one by one in order to install the **PCMCIA** card successfully.

1. Power on your computer and allow **Windows 95 (OSR2)/98** to load fully.

2. Be sure that there is no **PCMCIA** adapter inserted yet.

3. Insert the given Installation Diskette and then click on the A:\disk1\ setup.exe.

4. Accept the license agreement.

5. Give the path of the destination folder. To set the path of your choice click on **Browse** and then click **Next**.

6. It takes a few seconds for copying the utility files and then click on **Finish** to complete the installation.

7. Insert the DWL-650F card into PCMCIA slot , windows will then prompt the required driver

8. locate the driver path Ex. A:\ and install the driver

9. restart the PC and Click on the Control Panel and then on PC Card. Check whether it has PCMCIA card in one of the sockets or not. If you find Gemtek IEE802.11PC Card in one of the sockets, it means the card is detected properly.

10. Check for the **D-Link 11Mbps Wireless PCMCIA LAN Card** by right clicking on My Computer using the mouse. Select the Device manager and then Network Adapters. If you find the **Yellow (?)** sign on the adapter, it shows the installation is not successful. Select the adapter and click on **Remove**. Restart your computer after uninstalling the driver to make the changes effective. And refer to manual.

11. Right click on the **Network Neighborhood** using the mouse.

12. Select **Properties** from the pop up menu. The network box appears and you see three main tables: **Configuration**, **Identification**, and **Access Control**.

13. Click on the **Configuration** tab and then click on the **Add** button. Select Network Component Type box appears. Click on the **Protocol** the click the **Add** button.

14. Select Network Protocols box appears. From the list of manufactures, click on **Microsoft**. From the list of network protocols list, select **NetBEUI**, then click **OK**.

15. The **NetBEUI** protocol is now installed. After clicking on **OK** return back to Network Component Type box.

16. Repeat the step 15 and 16 to add IPX/SPX protocol.

17. Repeat the step 15 and 16 to add TCP/IP protocol.

18. Click on the **TCP/IP** option for setting the **IP** address for your computer. You can select either **Static** or **DHCP** setting. If you use the static IP setup then enter the **IP** value, **Subnet** masking , **DNS**, **Domain**/ **Workgroup** name, and **Gateway** Address values. After setting these parameter appropriately, click OK to return to Network Component Type and you can select the **File and Printer Sharing** options as well as the **Access** to your computer bu other users connected to that network by setting the computer sharing options. Click on **OK**.

19. Screen message **do want to restart your Computer** will pop up. Select **Yes**. It will shut down your computer and will restart.

Important: Restart your computer to make the changes effective before you reinstall the driver.

Proceed to chapter 5 for the explanation of the Configuration Utility.

5. Configuration Utility

D-Link PC Card Wireless LAN adapter uses his own management software. All functions controlled by user are provided by this application. Usually this application starts automatically, Use Start, Programs, D-Link Wireless LAN to start the Manager application.

A new icon - should appear in your Icon tray. If the icon is marked with a red "X", it means that D-Link NIC configuration is invalid or incomplete. Sometimes icon can be colored in red. This can happen when driver is in Pseudo BSS mode, and the radio channel, which is used for communication is defined incorrectly.

Figure 1 Icon tray with a new icon

Figure 2: Error Icon

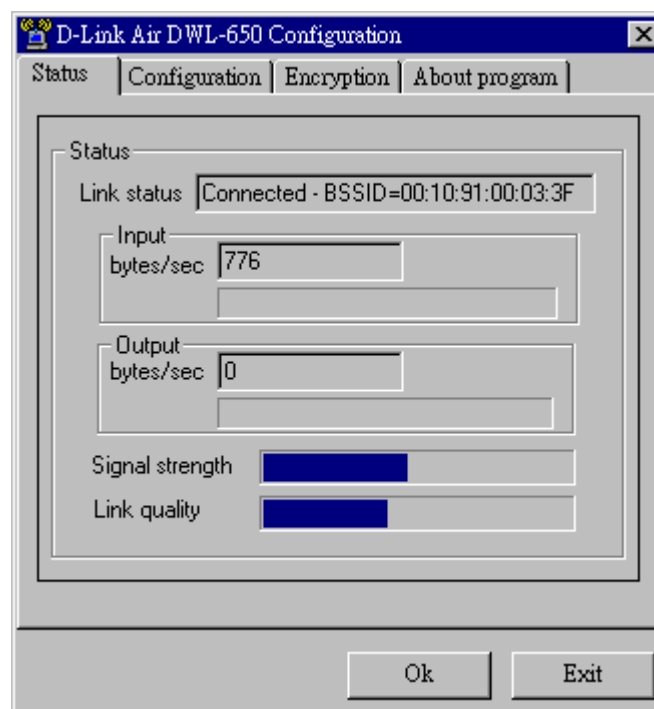Double clicking on that icon will show you the screen as shown below.

Figure 3 Management window with "Status" tab open

User can navigate through "sheets", by clicking or tapping them with a stylus. "OK" button will minimize window, and "Exit" (or X button) will close application. Here we explain the use and meanings of the various screen messages.

The first three fields show your wireless network card state.

Link status – indicates link accesibility. There are several values, that can be shown in this part of the window:

Connected - BSSID=… – normal flow of operation in Infrastructure mode. The PC is connected to access point. **BSSID** is shown in the form of hex digits. Networking is available.

No status… - the manager is retrieving information from the driver. If this text box value stays more than several seconds, it means that there are no access points or other workstations (if communicating in AdHoc mode), or that the D-Link NIC card is plugged out of PC.

Scanning for access point – driver scans wireless network searching for available access point in Infrastructure mode.

Disabled or disconnected - . If this text box value stays more than several seconds, it means that there are no access points or other workstations (if communicating in Pseudo BSS mode), or that the D-Link NIC card is plugged out of PC.

Undefined– means critical driver error. This error is usually caused by hardware misconfiguration (for example the card with similar chipset inserted in PC card bay, but not fully compatible with D-Link).

Input bytes/sec – shows the incoming (received) data speed, the progress bar below, means receiver load.

Output bytes/sec – shows the outgoing (sent) data speed, the progress bar below, shows transmitter load.

Signal strength : bar shows signal strength level. The higher blue bar is, the more powerful is radio signal received by D-Link PC card. This indicator helps to find the most comfortable antenna/workstation position for quality network operation.

Link quality: The measured signal level gives the overall Link Quality and Connection Status.

"CONFIGURATION" tab

You can change the configuration by clicking on the **Change Configuration.** When you click on the Change Configuration, you see the screen given below.
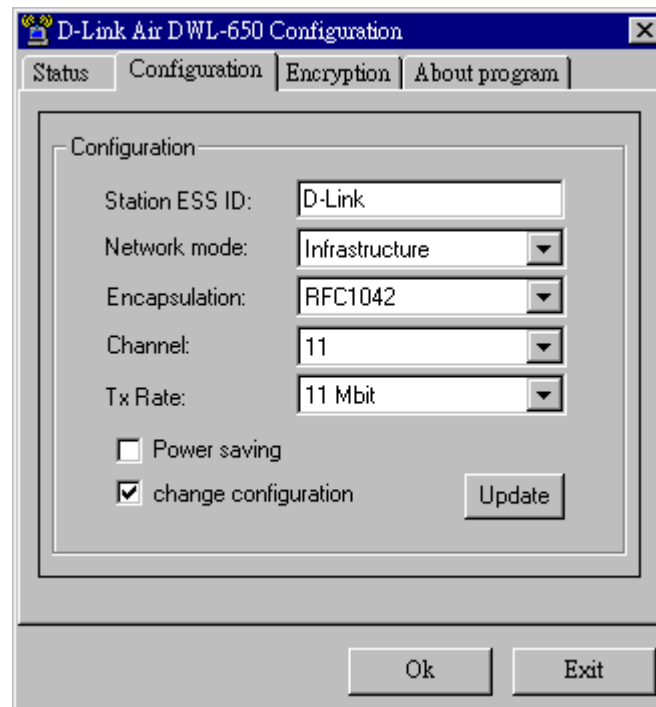

Figure 4 Management window with "CONFIGURATION" tab open

Five changeable fields in this field show desired D-Link NIC configuration.
The fields are following:

Station ESS ID Extended Service Set Identifier (Wireless Network Identifier) is the group name that will be shared by every member of your wireless network. You will only be able to connect with an **Access Point**, which has the same **ESS ID**.

Network mode shows one of these network modes:

- **Pseudo BSS** -this is the 802.11 peer-to-peer mode of operation. In **Ad Hoc** only one wireless "cell" is supported for each different **ESS ID**. All communication is done from Client to Client without the use of an **Access Point**.

- **Infrastructure** This mode of operation requires the presence of an 802.11 **Access Point**. All communication is done via the **Access Point**, which relays packets to other wireless Clients in the BSS (Basic Service Set) as well as to nodes on a wired network such as Ethernet.

Encapsulation shows one of two different network packet forming modes

- **None or Encapsulated** This setting takes the entire Ethernet frame, including the Ethernet Header, and puts it into an 802.11 frame. This setting is here for compatibility with some older 802.11 implementations and should not normally be used.
- **RFC1042** where the DIX Ethernet frames are converted using SNAP header based on RFC1042. This mode will also convert any RFC1042 SNAP header frames to DIX Ethernet frames before transmission to the Ethernet interface.
- **802.1h** where the DIX Ethernet frames are tunneled using a full selective translation table. This mode does not convert RFC1042 SNAP header frames to DIX Ethernet before transmission to the Ethernet interface

It is required to select encapsulation mode corresponding to the one your access point or other workstations use. If the encapsulation mode is incorrect, the PC will join to access point or will be seen by other workstations, but network operation will not work.

Channel – shows radio channel number used for networking. Only Access Points and Ad Hoc nodes can create a BSS therefore this parameters is not active if Mode is Infrastructure. Infrastructure Client nodes will always go the same channel as their AP. Please see the table for the requirements of different countries and the channel frequency.

TX Rate: The transmission rate at which the data packets are transmitted by the client or AP. You can set this to *Auto select I or 2Mbps, Fixed 1 Mbps, Fixed 2 Mbps, Fixed 5.5 Mbps, Fixed 11 or Full Auto (I to 11 Mbps).*

Important: **You must know the T*X* Rate that your AP can support. Failure to which may** *cause the undesired* **results.**

"ENCRYPTION" tab

Figure 5 Management window with "Encryption" tab open

You may desire an additional measure of security on your wireless network, which can be achieved by using WEP (Wired Equivalent Privacy) encryption. WEP encrypts each frame transmitted from the radio using one of the Keys entered from this panel.

 When an encrypted frame is received it will only be accepted if it decrypts correctly. This will only happen if the receiver has the WEP Key used by the transmitter.

This panel allows the entry of four keys, which can then be written to the driver and registry. Each key must consist of hex digits, it means that only digit 0-9 and letters A-F are valid entries. If entered incorrectly program will not write keys to a driver.

Write : This button updates the driver with the four keys displayed in Key field . The keys are also written to the registry for permanent storage.

Clear : This button clears all the bytes in the keys, useful when entering and you wish to start over.

Default Key : This pop-up field defines one of the four keys which will be used by the driver to encrypt frames it will be transmitting. This field does not affect decryption, as the driver can decrypt any frame that it receives which was encrypted with one of the four keys.

Enable : This checkbox enables or disables encryption operation. When it is checked, encryption is enabled, and when unchecked – encryption is disabled. The corresponding action is written to a driver immediately.
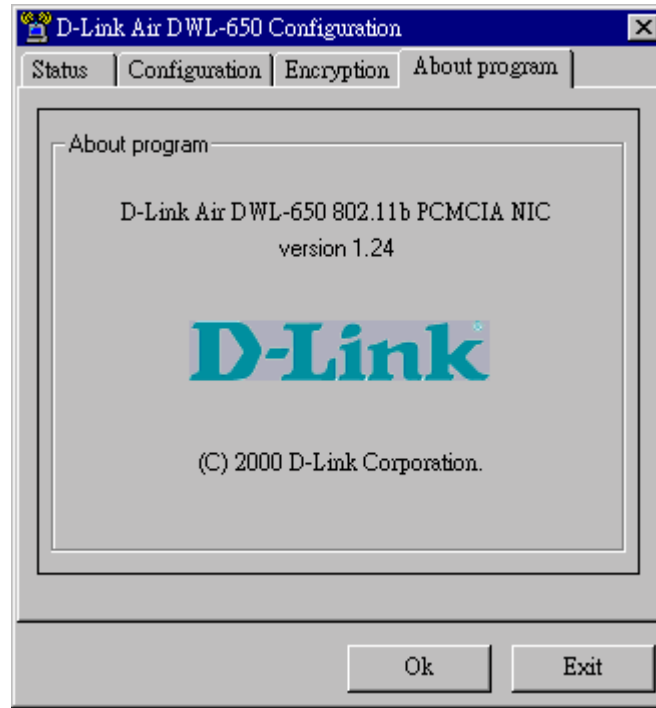
"ABOUT" tab

Figure 6 Management window with "ABOUT" tab open

About tab shows a software version. Users must use this version number when reporting their problems to tech support.

6. Troubleshooting

To make the installation of Wireless LAN Card more users friendly, we have suggested following the installation steps one by one as listed in the section 4 and section 5. Still you encounter some problems while installing the WLAN Card or you want to confirm whether your card is installed properly or not, we have listed the procedure for checking the various components after you have installed the card. In first part of **Troubleshooting,** we have suggested the users to check the various properties of the card to check the proper installation. In second section, we have listed the various problems that you may encounter during the installation and have also listed the possible solution. Check the first part to guess the probable reason of unsuccessful installation.

Procedure to Check the Various Properties of Card after Installation under Windows 95 (OSR2)/98:
Please check the followings if you encounter some problem while installing the PCMCIA card or your PCMCIA card is non-functional.

1. Click on the **Control Panel** and then on **PC Card.** Check whether it has **PCMCIA** card in one of the sockets or not. If you find **D-Link IEEE 802.11 PC CARDd** in one of the sockets, it means the card is detected properly. If you see the **Yellow** sign of Question-mark (?), the resources are conflicting.

2. Right click on **My Computer** and the select **Properties.** Select the **Device Manager** and click on the **Network Adapter.** You will find **D-Link IEEE 802.11 PC CARD** if it is installed successfully. If you see the **Yellow** sign the resources are conflicting. Click on PCMCIA Card and then on PCMCIA Card Service, you can see the status of PCMCIA card. If there are yellow sip either on adapter or PCMCIA card, please check the followings.
   i)   Check if your Notebook supports **3.3V** Card.
   ii)   Check if your Notebook has a free **IRQ.** If not, make an IRQ free by assigning
         the same IRQ to some devices, for example COM 1, COM 2 can be assigned same
         IRQ values.
   iii)   Check that you have inserted the right card and have installed the proper driver.

7. Technical specifications of DWL-650

Hardware compatibility

– IBM-compatible computer with a PC Card Type II

Driver support

NDIS 3.1

– Windows 95 OSR2

– Windows 98

– Windows NT 4 and higher

– Linux

– WinCE(x86,SH4,MIPS)

Standards supported

– IEEE 802.11 standard for Wireless LAN

– All major networking standards (including TCP/IP, IPX)

Environmental

Operating temperature (ambient):

– -10°C to 50°C (Operating),-20 to 70°C (Storing)

– *Max . Humidity:*95% Non-condensing

Power specifications

Operating voltage:

– +5 V ,+3.3V DC ±5%

– Nominal Temp Range: 17 dBm

– Extended Temp Range: 14 dBm min.

– Transmit Power, 2.7v to 3v: 14 dBm min.

Radio specifications

Range:

– per cell indoors approx. 35-100 meters or more

– per cell outdoors up to 100-300 meters

Frequency range:

– 2.4-2.4835 GHz, direct sequence spread spectrum

Number of Channels:

– Europe: 13 (3 non-overlapping)

– US: 11 (3 non-overlapping)

– France: 4 (1 non-overlapping)

– Japan: 14 (4 non-overlapping)

Antenna system:

- Internal patch antenna supporting diversity.

Mobility:

- Seamless roaming across cell boundaries with handover

Specific features

Supported bit rates:

- 11 Mbps

- 5.5 Mbps

- 1 Mbps

- 2 Mbps

Data encryption:

- 40 bit WEP Encryption

Utility Software:

- Management utility software

Physical Dimensions

- Extended type-II PC Card 110 x 54 x 6 mm