

## For Connecting a WaveBook, DaqBook, WBK40, or WBK41 to the Ethernet

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*The WBK25 Ethernet-to-Parallel Port Interface*

## Features

- Provides 10/100BaseT Ethernet connection for up to three WaveBook/512A, /516, /516A, DaqBook/2000A, DaqBook/2000X, WBK40, or WBK41 devices, in any combination
- High-speed performance guarantees continuous data transfer to the PC without data loss

The WBK25 is an Ethernet-to-parallel port interface, which provides high-speed Ethernet connectivity for WaveBook, DaqBook, WBK40, and WBK41 systems. Connection to the Ethernet is made via an Ethernet patch cable, which links the WBK25's 10/100BaseT Ethernet port to a PC's Ethernet jack or an Ethernet network hub.

The WBK25 includes three parallel ports, labeled as expansion ports 1 through 3. Each of these parallel ports can be attached to one of the designated acquisition devices via a parallel cable. The ports cannot be used for auxiliary devices such as printers and scanners.



**WBK25's three parallel ports are labeled as expansion ports 1 through 3. They are used to connect to WaveBook, DaqBook, WBK40, and WBK41 systems via parallel cables. The ports cannot be used for other parallel devices, such as printers and scanners.**

## Description

### Front Panel

The left side of the WBK25 front panel will include a **MAC (Media Access Control) Address Label**. The label displays the device serial number in both barcode and base 10 formats. The label also provides the Ethernet address (MAC Address) which is derived from the serial number in hexadecimal. If prompted to enter a serial number in software, use the base 10 number. After doing so, conversion to a hexadecimal number for use in addressing will be automatic.

**Note:** If your network administrator asks you for a MAC number or a MAC Address, provide him [or her] with the hexadecimal number that is located at the bottom of the label.

### Rear Panel

The WBK25 rear panel includes a power switch, DIN5 power in connector, Ethernet port, 5 LEDs (2 of which are on the Ethernet port), and three parallel ports. These items are described below, in order as they appear from left to right.



*WBK25, Rear Panel*

**POWER Switch:** A rocker-type switch with a “0” label for Power Off, and a “1” for Power On.

**DIN5 POWER IN:** +10 to +30 VDC, through a socket type DIN5 connector on the chassis. Power is typically supplied from a TR-40U power adapter.

**ETHERNET:** The 10/100BaseT Ethernet port can connect to the Ethernet port of the host PC, or to an Ethernet network. Either of two Ethernet patch cables may be used to make the connection. CA-242 is a 1.5-foot long cable. CA-242-7 is a 7-foot long cable. Note that the Ethernet connector has two built in LEDs (Tx and Rx) that indicate traffic flow. These are discussed with the three other Ethernet-related LEDs.



**To be CE compliant, the length of the Ethernet cable can not exceed 10m.**

**LEDs:** There are 5 ETHERNET Status LEDs. Two rectangular LEDs (Tx and Rx) are built into the frame of the Ethernet port. The other three LEDs, located just to the right of the Ethernet port, are round and are labeled L, T, and D for Link, BaseT, and Duplex, respectively.

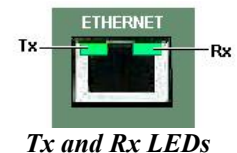
**Tx** – “ON” indicates traffic is being transmitted (see following figure).

**Rx** – “ON” indicates that the port is receiving traffic.

**L (Link)** “ON” indicates a link exists. “OFF” indicates no link.

**T (BaseT)** “ON” indicates 100BaseTx; “OFF” indicates 10BaseT.

**D (Duplex)** “ON” indicates full duplex, which allows simultaneous two-way data traffic. “OFF” indicates half-duplex, which only allows one-way data traffic at any given time.



*Tx and Rx LEDs*

**EXPANSION PORTS 1, 2, and 3:** The three parallel ports are used to expand the system with up to three additional devices. Each of these ports can be connected to the parallel port of a WaveBook/512A, /516, /516A, DaqBook/2000A, DaqBook/2000X, WBK40, or a WBK41 via a CA-35-2 (2-foot) or a CA-35-12 (1-foot) cable.

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## Operational Aspects

The WBK25 provides an interface for high-speed Ethernet connectivity. The module contains one 10/100BaseT Ethernet port for connection to a PC's Ethernet jack or to an Ethernet network hub. The WBK25 also includes three parallel ports, which are designated as "expansion ports." Each port can be attached to a to one device, such as a: WaveBook/512A, /516, /516A, DaqBook/2000A, DaqBook/2000X, WBK40, or a WBK41.



**WBK25's three parallel ports are labeled as expansion ports 1 through 3. They are used to connect to WaveBook, DaqBook, WBK40, and WBK41 systems via parallel cables. The ports cannot be used for other parallel devices, such as printers and scanners.**

Data transfer rates with the WBK25 depend on the network to which it is attached. If the WBK25 is used in a point-to-point configuration, where the WBK25 and the PC are the only devices on the network, then data transfers that exceed 2 Mbytes per second can be expected. The point-to-point scenario is recommended for WaveBook applications where data transfer speeds may be critical.

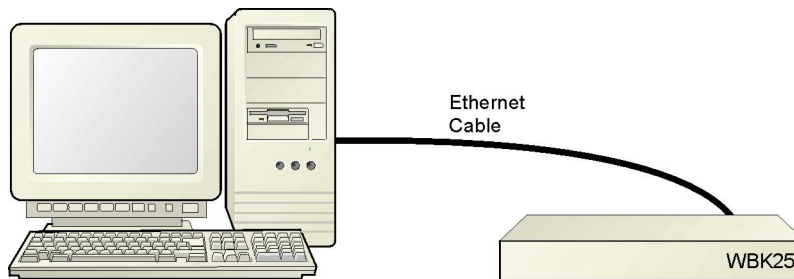
A single WaveBook, attached to a WBK25, can operate at its maximum 1 Msamples/s sampling rate while transferring data continuously to the PC. If the application requires that more than one WaveBook be attached to one WBK25, with each operating at its maximum 1 Mreading/s sampling rate, contact the factory for the latest information on data transfer rates. We will continue to improve the WBK25's data transfer rates as PCs and networks themselves increase in speed. Users will be able to perform the upgrades in the field.

If the WBK25 is used with DaqBook/2000A, DaqBook/2000X, and/or WBK40 series options, then up to three of these devices can be attached to one WBK25 and will be capable of simultaneously transferring data at their maximum sampling rate.

If the WBK25 is attached to a shared Ethernet network the data transfer rates will be dependent on the network traffic at the time. It is not possible to guarantee maximum data transfer rates in this mode. However, the WaveBook offers internal memory option cards (WBK30 series) for applications such as this, so that the acquired data can be locally stored in the event that the shared network traffic prohibits the WaveBook from transferring data at the same rate at which it was acquired.

**Note:** It is possible to attach multiple WBK25 units to a single PC that has more than one Ethernet port. It is also possible to attach several WBK25 units to a multi-port Ethernet hub. Performance under these conditions will be dependent on the PC's ability to handle multiple networks.

## Connecting a WBK25 to the Ethernet



Connecting a WBK25 to the Ethernet

### Introduction

The WBK25 connects directly to an Ethernet port on a PC or network hub via the unit's built-in 10/100BaseT Ethernet interface. An Ethernet patch cable CA-242 (1.5 foot) or CA-242-7 (7 foot) cable is used to make the connection.



Contact the factory or your service representative in regard to Ethernet connectivity if your operating system is other than Windows NT, Windows 2000, or Windows XP.

### CAUTION



Turn off power to the system devices and externally connected equipment before connecting cables. Electric shock or damage to equipment can result even under low-voltage conditions.



Take ESD precautions (packaging, proper handling, grounded wrist strap, etc.)



**Reference Note:** Adobe PDF versions of user manuals will automatically install onto your hard drive as a part of product support. The default location is in the **Programs** group, which can be accessed from the *Windows Desktop*. You can also access documents directly from the data acquisition CD via the <View PDFs> button located on the CD's opening screen.

### Minimum System Requirements

PC system with Pentium® Processor

Windows Operating System

RAM, as follows:

32 Mbytes of RAM for Windows 95/98/NT

64 Mbytes of RAM for Windows Me

64 Mbytes of RAM for Windows 2000

64 Mbytes of RAM for Windows XP

## STEP 1 – Install the Software

1. Remove previous version Daq drivers, if present. You can do this through Microsoft's *Add/Remove Programs* feature.
2. Place the Data Acquisition CD into the CD-ROM drive. Wait for PC to auto-run the CD. This may take a few moments, depending on your PC. If the CD does not auto-run, use the Desktop's *Start/Run/Browse* feature to locate and run the CD's **setup.exe** file.
3. After the intro-screen appears, follow the screen prompts.

## STEP 2 – Determine the type of Network Connection

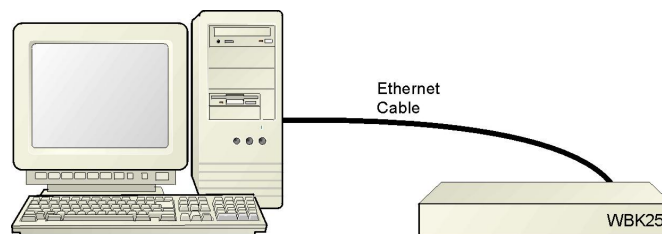
To properly connect a WBK25 you must determine the type of network that it will become part of. This is because the type of network used has a direct bearing on the IP address that will be assigned.

Briefly, the four network types are as follows:

- **Dedicated Network - with a direct cable connection from the PC to the device**
- **Dedicated Network - making use of a network hub or switch**
- **LAN with a DHCP Server**  
(Local Area Network with a Dynamic Host Configuration Protocol)
- **LAN with no DHCP Server**  
(Local Area Network with no Dynamic Host Configuration Protocol)

### ***Dedicated Network - with a direct cable connection from the PC to the device***

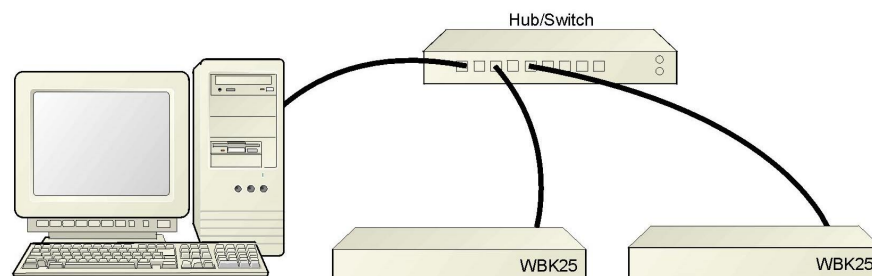
In this scenario the WBK25 is connected directly to an Ethernet jack on a host computer.



***Dedicated Network using a Direct Cable Connection***

### ***Dedicated Network - making use of a network hub or switch***

In this scenario the WBK25 is connected to the Ethernet through a network hub or switch. At least one computer is also connected to the hub.



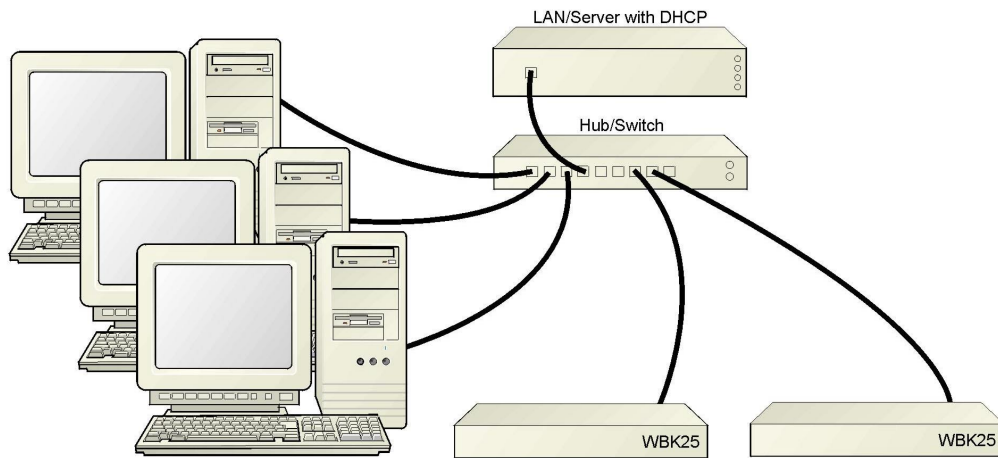
***Dedicated Network using a Hub/Switch***



Some network devices such as a *wireless access point* may act as a DHCP server. If this is the case, follow the instructions for the LAN with DHCP server. For detailed information consult the documentation that is specific to your network device.

**LAN with a DHCP Server** (Local Area Network with a Dynamic Host Configuration Protocol)

Many corporations use the LAN/Server with DHCP arrangement for their networks. In this type of setup several computers are typically connected to a network that makes use of a DHCP server. In addition, one or more WBK25 modules are connected to the network hub/switch.



*LAN with a DHCP Server*

**Notes:**

- Using the WBK25 on a typical LAN may affect the speed of the network and internet data transfer. Because of this we recommend adding a network card to the computer and using one of the two dedicated network configurations.
- Contact your network administrator before connecting a WBK25 to a corporate network.

**LAN with no DHCP Server** [Currently Not Supported]

(Local Area Network with no Dynamic Host Configuration Protocol)

This scenario looks the same as that shown in the previous illustration, except there is no Dynamic Host Configuration Protocol (DHCP). In this type of setup, one or more computers are connected to a network; and each computer has a static IP address. This configuration is currently not supported. We recommend adding a network card to the computer and using one of the two dedicated network configurations.

## STEP 3 – Connect the WBK25 to the Ethernet



### Reference Note:

For examples of system connections, including cable use, refer to the following documents, as applicable:

- For DaqBook/2000 Series systems refer to the section entitled *Examples of System Expansion* in the *DaqBook/2000 Series Installation Guide* (p/n 1103-0940) or the *DaqBook/2000 Series User's Manual* (p/n 1103-0901).
- For WaveBook systems refer to the *System Enhancement and Expansion* section of the *WaveBook User's Manual* (p/n 489-0901).

### What you will need to connect a WBK25 to the Ethernet:

- An available connection to the Ethernet. The connection can be either
  - an Ethernet jack on a computer or
  - an Ethernet jack on a hub that is connected to the Ethernet.
- An Ethernet patch cable, e.g., a CA-242 (1.5 foot cable) or a CA-242-7 (7-foot cable).

1. Connect the Ethernet cable to the Ethernet jack on the WBK25.
2. Connect the other end of the Ethernet cable to the Ethernet jack on the host computer or network hub.

## STEP 4 – Power-up the WBK25

### What you will need:

A power supply with a range of +10 VDC to +30 VDC.  
The power supply needs to have a male DIN5 connector.

**Note:** The switching-mode power supply that is commonly used with these systems has an input range of 100 VAC to 240 VAC at 50 Hz to 60 Hz. The power supply's output [to the device] is typically 15 VDC @ 2.7 amps via a DIN5 connector.

**Note:** Various AC adapter models support power grids of USA, Europe, Japan, and Asia.

### How to make the connection:

1. Place the WBK25's power switch in the "OFF" (0) position, if it is not already OFF.
2. Connect the DIN5 end of the adapter's cable to the power in connector on the WBK25.
3. Connect the adapter's plug to a standard AC outlet.
4. If your adapter has a power switch, position it to "ON."
5. Turn ON the WBK25 by placing the power switch to the "1" position.  
The power led will light up.



The power management and power requirements sections of the associated user's manual(s) should be reviewed prior to powering up a system.

- For DaqBook/2000 Series systems refer the *DaqBook/2000 Series User's Manual* (p/n 1103-0901).
- For WaveBook systems refer to the *WaveBook User's Manual* (p/n 489-0901).

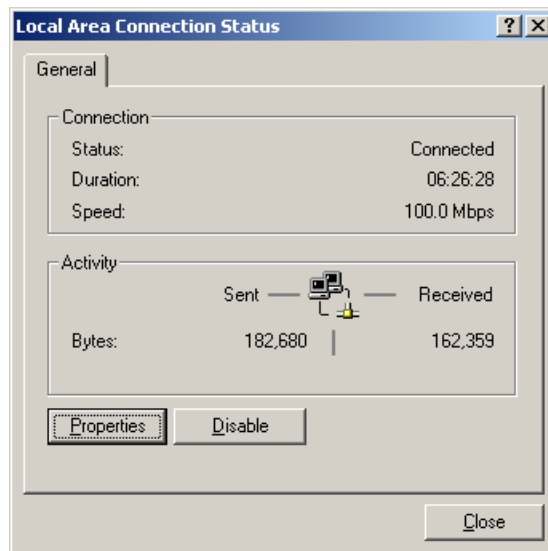
The PDF versions of these documents can be accessed from the data acquisition CD via the <View PDFs> button on the CD's opening screen.

## STEP 5 - Configure the Computer's Network Settings [Applies to "dedicated networks" only]



If using a LAN (Local Area Network), skip this section and continue with *Configure the System using the Daq\*Configuration Applet* (page 11).

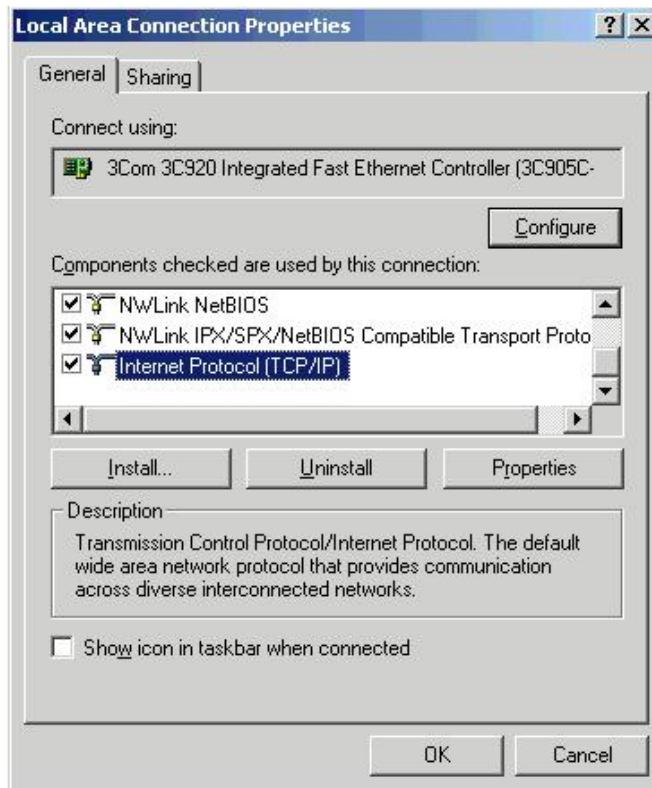
1. Open the Control Panel by navigating from the Windows Desktop as follows:  
**Start Menu ⇒ Settings ⇒ Control Panel.**
2. Double-click the "Network and Dial-up Connections" icon.
3. Double-click the "Network Connection" icon for the network that the WBK25 is connected to.



*Local Area Connection Status*

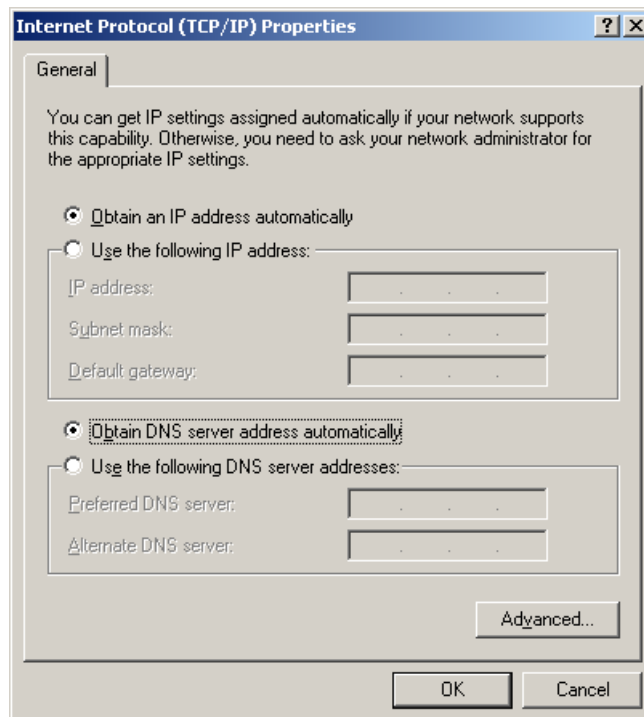
4. In the "Local Area Connection Status" box (previous figure), click on the <Properties> button. The "Local Area Connection Properties" box will appear (following figure).





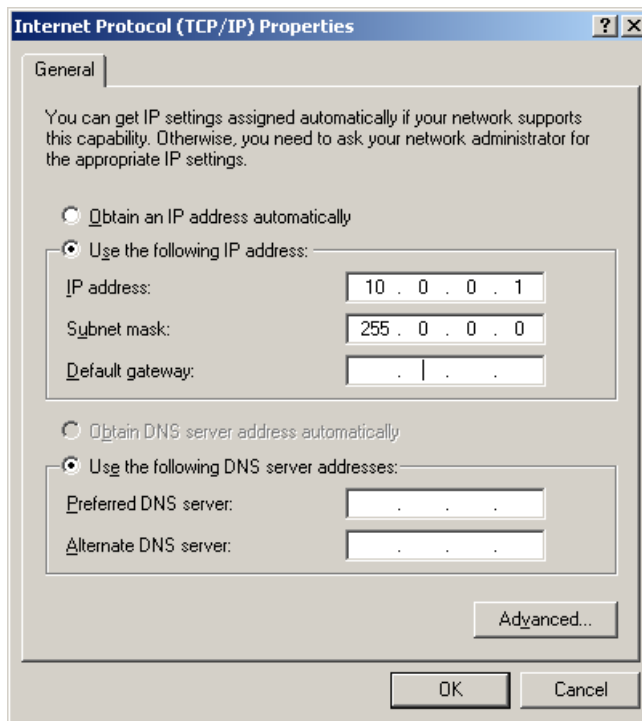
***Local Area Connection Properties***

5. Double-click the “Internet Protocol (TCP/IP)” component (previous figure). The “Internet Protocol (TCP/IP) Properties” box will appear (following figure).



***Internet Protocol (TCP/IP) Properties***

Configure the Computer's TCP/IP settings as follows.



*Internet Protocol (TCP/IP) Properties*

6. Select the “Use the following IP Address” radio button.
7. Set the IP address field to 10.0.0.x where x is some number from 1 to 255.  
**Make sure that each computer on the dedicated network has a unique IP address.**
8. Set the Subnet mask to 255.0.0.0. Note that the remaining fields can be left unchanged.

## STEP 6 - Configure the System using the Daq\* Configuration Applet

The *Daq\* Configuration* applet, designed for 32-bit Windows 95/98/Me/NT/2000/XP systems, is located in the Windows *Control Panel*. It allows you to add or remove a device and change configuration settings.

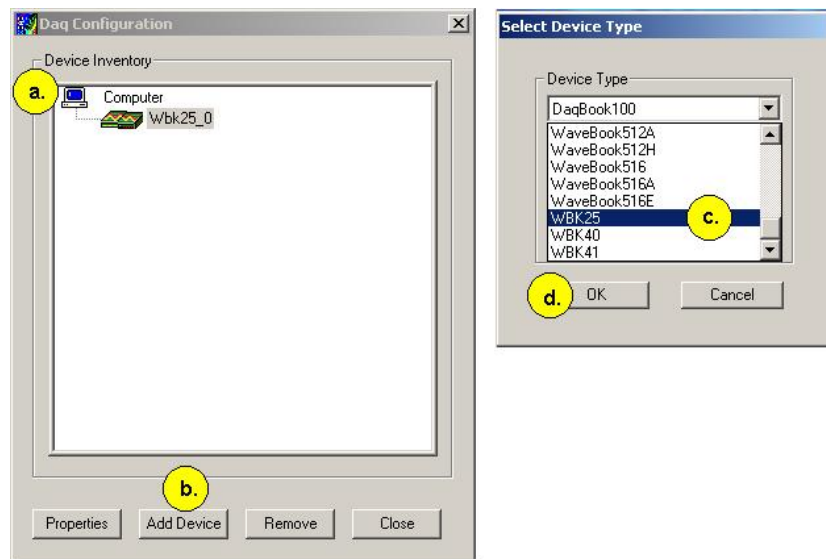
### 1. Open the Daq\* Configuration Applet.

- a. Open the Control Panel by navigating from the Windows' Desktop as follows:  
**Start Menu ⇒ Settings ⇒ Control Panel**
- b. From the Control Panel, double-click the *Daq\* Configuration* icon.

### 2. Add the WBK25 to the list of installed devices.

The first-level device is the device that will be connected directly to the Ethernet, via a host computer's Ethernet jack or a jack on a network hub. The WBK25 is a first-level device.

- a. Select the Computer image in the Device Inventory configuration tree (following figure).
- b. Click the <Add Device> button. The "Select Device Type" box will appear.
- c. Select the WBK25 from the list of devices, as applicable.
- d. Click the <OK> button. The "Properties" box will appear for the selected device.



*Using Daq\* Configuration Device Inventory & Select Device Type to Add a Device*

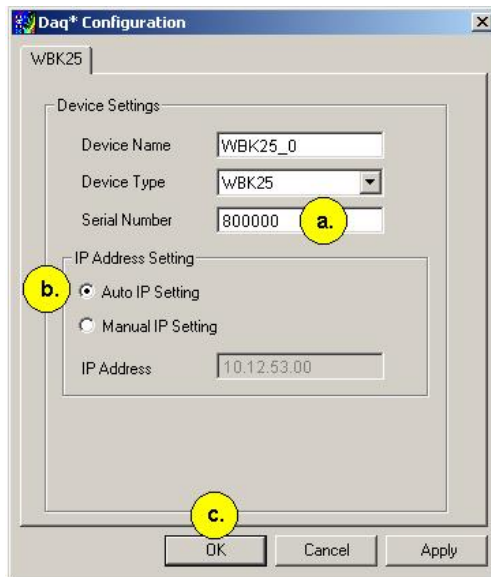
### 3. Set the properties of the WBK25.

In this step you will set the device properties according to one of the following two methods, depending on whether you have a “Dedicated Network” or a “LAN with DHCP Server Network.” Illustrations of the network types are provided on page 5.

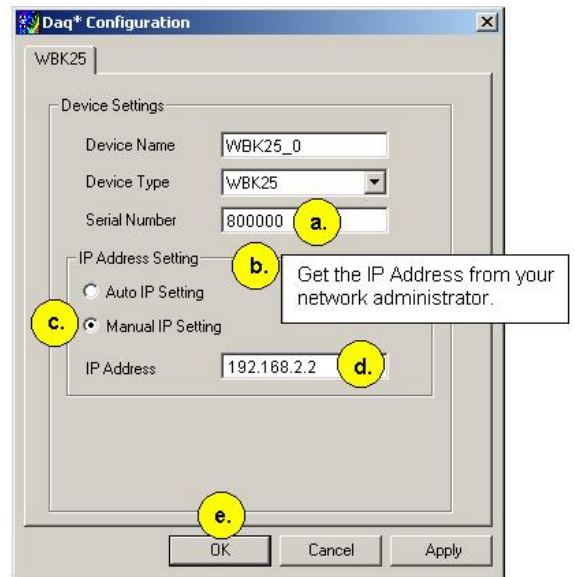
#### Users of Dedicated Networks, follow these 2 steps.

See following figure, left-hand image.

- In the “Properties” box, enter the serial number of the WBK25.
- Select the **Auto IP Setting** radio button. Note that the IP address of the WBK25 will automatically be calculated and displayed in the IP Address field.
- Click the <OK> button.



For DEDICATED Networks



For LAN with DHCP Server Networks

*Daq\* Configuration, Properties Dialog Boxes*

#### Users of LAN with DHCP Server Networks, follow these 4 steps.

See preceding figure, right-hand image.

- Enter the base 10 version of the serial number of the WBK25. The number is located on the MAC label. The label is located on the left edge of the front panel.
- Get the IP address of the WBK25 from your network administrator. The network administrator will need the unit powered-on and connected to the network. The administrator will also need the MAC address label’s hexadecimal number (the label’s bottom number).
- Select the **Manual IP Setting** radio button.
- In the IP Address field, enter the IP address obtained from your network administrator.
- Click the <OK> button.

This completes the procedure for connecting a WBK25 to the Ethernet. At this point you should refer to the more detailed user documentation that applies to the other devices that are included in your data acquisition system, e.g., WaveBooks, WBK options, DaqBooks, and DBK options. User manuals typically include pinouts, information on system explanation, data acquisition, and links to software and programming documents (in PDF format).

**Reference Notes:**

For additional device and system information:

- DaqBook/2000 Series users should refer to the *DaqBook/2000 Series User's Manual* (p/n 1103-0901) and the *DBK Options Manual* (p/n 457-0905).
- WaveBook and WBK option users should refer to both the *WaveBook User's Manual*, (p/n 489-0901) and the *WBK Options Manual* (p/n 489-0902).
- Programming information is contained in the *Programmer's Manual*, (p/n 1008-0901).

**Note:** You can access PDF documents directly from the opening screen of the data acquisition CD via the <**View PDFs**> button.

## Fuse Replacement

### CAUTION



Turn OFF the power to, and UNPLUG the WBK25 Ethernet Interface Module and all connected equipment. Electric shock or damage to equipment can result even under low-voltage conditions.



Take ESD precautions, to include using a grounded wrist strap.

Use care to avoid touching board surfaces and onboard components. Ensure boards do not come into contact with foreign elements such as oils, water, and industrial particulate.



You should only replace a fuse if your device shows no sign of damage. If your device appears damaged, such as evidenced by a “smoked” component, contact the factory as soon as possible.

If the replacement fuse blows contact the factory as this indicates a problem may exist with your WBK25 module.

Each WBK25 Ethernet Interface Module has one user-replaceable fuse designated as F201.

#### **F201 Input Power Fuse. 4.0 A, MINI ATO.**

This 4-amp fuse is located near the rear panel’s 5DIN POWER IN connector.

If this fuse has blown, the WBK25 module will not power up.

Factory Part Number: **FU-8-4**

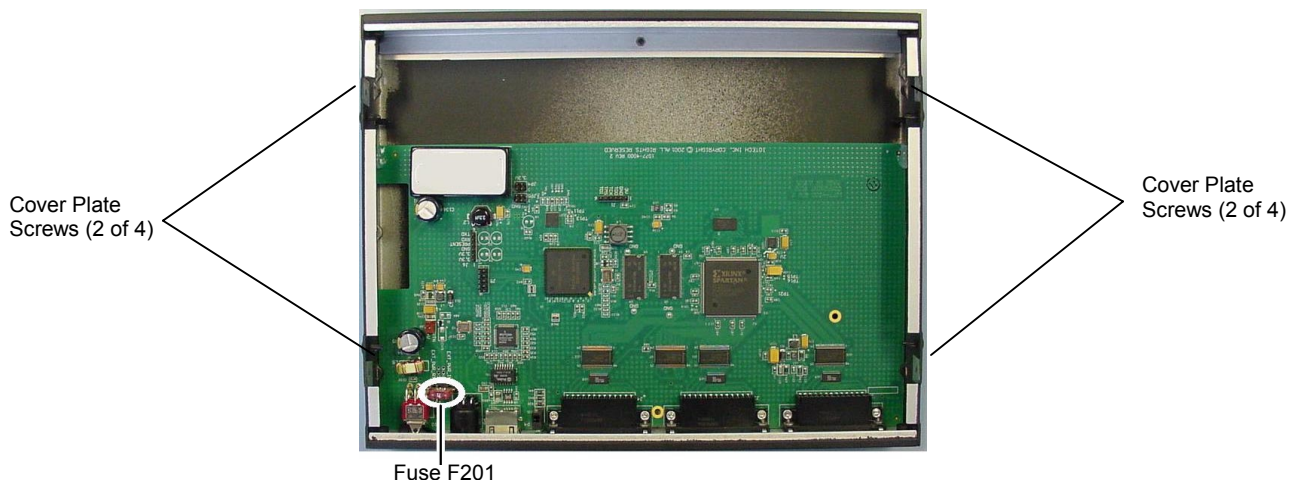
Littelfuse Part Number: **297-004**, Littelfuse Body Color Code: **Pink**

You will need the following:

- Phillips Screwdriver
- 3AG Fuse Puller, or needle-nose pliers\*
- Grounding wrist strap and associated anti-static pad
- Replacement fuse F201

\* Needle-nose pliers can be used to pull MINI ATO fuses; but should not be used to insert fuses.

1. If you have not already done so, turn OFF the power to, and UNPLUG the WBK25 module and all connected equipment. Remove all lines from the unit.
2. Using a Phillips screwdriver, remove the 4 cover plate screws and the cover plate (not shown).



*WBK25, Fuse and Cover Plate Screw Locations*

3. Locate fuse F201 near the Power In DIN 5 Connector (left edge of the rear panel, see figure).
4. While wearing a grounded wrist strap, remove and replace the bad fuse. Ensure that the new fuse is fully seated.
5. Replace the cover plate and secure it to the chassis with the 4 screws that were removed in step 2.
6. Return the WBK25 Ethernet Interface Module to normal service. Should any problems be noted consult the factory.

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## Specifications

### Environment

Operating: 0 to 50°C (32° to 122°F); 0 to 95% humidity, non-condensing  
 Storage: -20° to 70°C (-4° to 158°F)

**Power:** 0.75A @ 15V

**Fuse:** F201 Input Power Fuse. 4.0 A, MINI ATO. Factory Part Number: FU-8-4  
 Littelfuse Part Number: 297-004, Littelfuse Body Color Code: Pink

**Dimensions:** 285 mm W x 220 mm D x 35 mm H (11" x 8.5" x 1.375")

**Ethernet Interface:** 10/100BaseT

**Ethernet Connector:** RJ45

**Parallel Interface:** Three EPP (Enhanced Parallel Ports)

**Parallel Connectors:** DB25, female

### Accessories & Cables

|                                                | <b>Part No.</b> |
|------------------------------------------------|-----------------|
| Fastener-panel kit for WBK series              | 262-0801        |
| Fastener-panel kit for DBK series              | 232-0810        |
| Fastener-panel handle                          | HA-111          |
| DB25 male to DB25 female parallel cable, 2 ft. | CA-35-2         |
| DB25 male to DB25 female parallel cable, 1 ft. | CA-35-12        |
| Ethernet patch cable, 1.5 ft.                  | CA-242          |
| Ethernet patch cable, 7 ft.                    | CA-242-7        |

**Note:** WBK25 is supported in the 32-bit driver only.



Notes