ADAM-4570

2-PORT ETHERNET TO RS-232/422/485 DATA GATEWAY USER'S MANUAL

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Part No. 2000457000 1st Edition
Printed in Taiwan Nov 2000

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product returned without dated proof of purchase is not eligible for warranty service.

5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

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Chapter 1
Overview

1.1 Introduction

The ADAM-4570 is a lightening fast and cost effective data gateway between RS-232/422/485 and Ethernet interfaces. This unit immediately upgrades your existing device for integration into the Internet world. The ADAM-4570 provides two RS-232/422/485 serial ports easily individually configured for your needs. And the transmission speed of the ADAM-4570 is up to 230 Kbps, outstripping the competition to meet the demand for high-speed exchange. In addition, the user only needs the Windows utility to configure the ADAM-4570 without the need for any other software. Functionally transparent and efficient, The ADAM-4570 is specially designed for remotely controlling and monitoring devices via the Internet.

The ADAM-4570 links both your *human-machine interface* (HMI) software and the existing RS-232/422/485 system architecture with an Ethernet network. Because the cabling of industrial automation is expensive, requires heavy maintenance and occupies massive amounts of room space, the ADAM-4570 eliminates the amount of cabling. Using ADAM-4570, you can save cabling space, and software development cost. The ADAM-4570 also provides a high-performance RISC CPU and Real Time Operating System to reduce CPU load. This element makes the ADAM-4570 more stable and reliable during data transmission. Another benefit is the ADAM-4570 allows users to remotely download programs to a designated device via Ethernet. This reduces the need for on-site maintenance and diagnosis.

In addition, The ADAM-4570 comes with a Windows-based configuration and port-mapping utility. The configuration tool can auto-detect all ADAM-4570s on the local network. It also lets you adjust all settings easily. The port mapping utility helps you to set up 255 ports for one Windows NT™ or Windows 2000 platform. This helps users manage all ports for their needs.

1.2 Features

- Expand up to 255 serial ports for one Windows NT and Windows 2000 host
- Supports 10/100 Base-T Ethernet standard
- Supports high transmission speeds up to 230Kbps
- Supports 5 LED indicators: Easy to diagnostic
- Auto-searching Windows configuration utility: Easy setting and security protection
- Port-mapping utility: Easy to manage 255 ports and self-diagnostic
- Supports real-time Operating System
- Surge protection for RS-485 line and power supply
- Mounts on DIN rail, panel or piggyback easily

1.3 Specifications

- Protocol: TCP/IP, UDP
- Network Port: IEEE 802.3, IEEE 802.3u
- Interface:

  Network: 10/100 BASE-T standard

  Serial: RS-232, RS-422, RS-485
- Port: Two independent RS-232/422/485 ports
- Connector:

  Network: RJ-45

  Serial: RJ-45 (RJ-45 to DB-9 cable provided)
- Transmission speed: 300 bps to 230 Kbps
- Parity bit: odd, even, none, space, mark
- Data bit: 5, 6, 7, 8
- Stop bit: 1, 1.5, 2
- Signals: Full Modem control signals (Doesn't support RAS service)
- Diagnostic LEDs:

  Network: TX/RX, Link, Speed (10/100 Mbps), Power

  Serial: TX/RX, Status
- Utility Software:

  Auto-detecting configuration utility

  Easy-to-manage port mapping utility
- Driver Supported:

Windows NT 4.0 & Windows 2000 driver

- Power Requirements: unregulated 10 to 30 Vdc with surge protection
- Power Consumption**:** 4 watt
- Case**:** ABS with captive mounting hardware
- Placement**:**

  DIN-rail, panel mounting, piggyback stack
- Operating Temperature: 0 ~ 60° C
- Storage Temperature**:** -20 ~ 80° C
- Operating Humidity: 20 ~ 95% (non-condensing)
- Storage Humidity: 0 ~ 95% (non-condensing)

1.4 Package Checklist

- ADAM-4570
- ADAM-4570 User's Manual
- Windows Configuration utility disk
- Driver/Port Mapping utility disk
- Two RJ-45 to DB-9 serial cables
- One loopback DB-9 tester
- Five stickers
- NYLON DIN-rail Mounting Adapter
- SECC Panel Mounting Bracket

Chapter 2
Getting Started

In this chapter, you will be given an overview of the ADAM-4570 hardware installation procedures. As mentioned in the previous chapter, the ADAM-4570 comes ready for all network connections, including Ethernet, and RS-232/422/485 port connections.

We begin this chapter with a brief showing the installation procedure. You can take flow chart for reference.

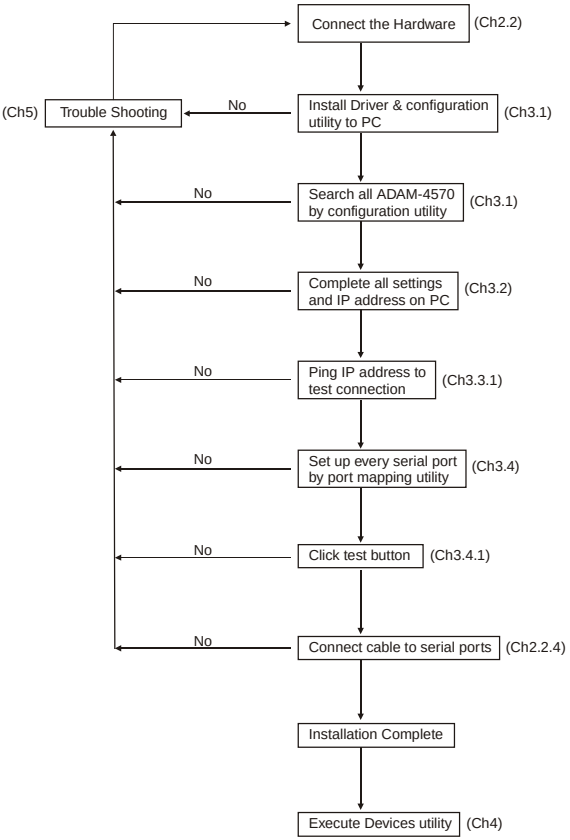


Figure2-1: Installation Flow Chart

2.1 Understanding the ADAM-4570

The ADAM-4570 is an advanced data gateway unit. It extends traditional COM ports of a PC with access over a TCP/IP network. Through networking, you can control and monitor remote serial devices either over a LAN or over the WAN.

Since the ADAM-4570 is connected through a TCPIP network, you will need to know some basic facts about networking in order to get the server hooked up correctly.

2.1.1 Network Architecture

Traditional serial port communication uses a COM port board that slides into one of the slots at the back of your PC. In this case, only the computer containing the board can access the serial port. With the ADAM-4570, you are now able to access the COM port from a distance through local area network. The ADAM-4570 can be integrated within the network architecture of any protocol. Note, all serial devices which are connected to the port must have the same protocol running and the same transmission speed. Connect devices running different protocols to different ports of the ADAM-4570.

The following illustration shows the network architecture as below:

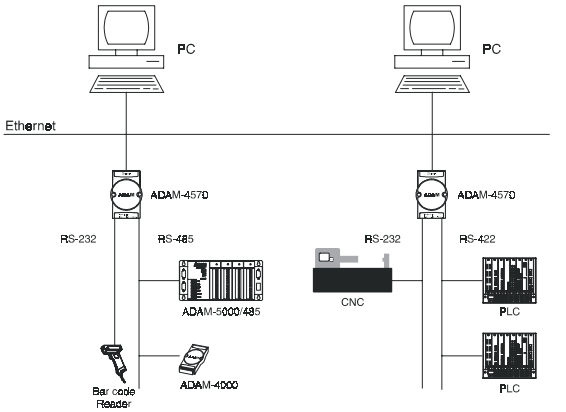


Figure 2-2: Network Architecture(1)

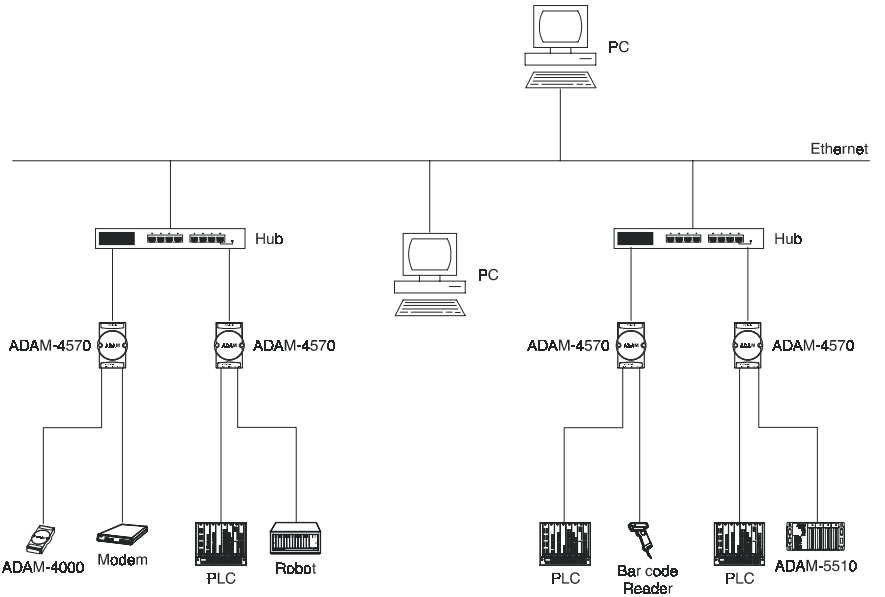


Figure 2-3: Network Architecture(2)

2.1.2 ADAM-4570 Top / Front / Rear View

There are five network status LEDs located on the top panel of ADAM-4570, each with its own specific function.

LED	Color	Status	Description
Status/Power	Red	ON	Heartbeat (1 time/sec)
		OFF	Not working
	Green	ON	Power ON
		OFF	Power OFF
Speed/Link	Red	ON	100 Mbps speed
		OFF	10 Mbps speed
	Green	ON	Valid network link
		OFF	Invalid network link
Tx/Rx (Ethernet)	Red	ON	Ethernet data being transmitted
		OFF	No data being transmitted
	Green	ON	Data being received
		OFF	No data being received
Tx/Rx (port1)	Red	ON	Serial port data being transmitted
		OFF	No data being received
	Green	ON	Data being received
		OFF	No data being received
Tx/Rx (port2)	Red	ON	Data being transmitted
		OFF	No data being transmitted
	Green	ON	Data being received
		OFF	No data being received

Table 2-1: LED Definition

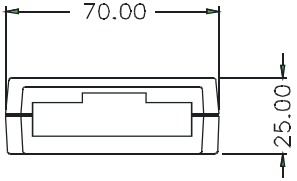


Figure 1-1 ADAM-4570—Top Panel

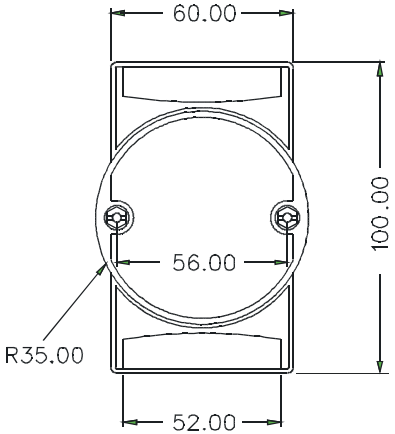


Figure 1-2. ADAM-4570—Front Panel

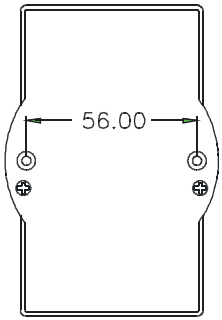


Figure 1-3. ADAM-4570—Back Panel

2.2 Connecting the Hardware

Next, we will explain how to find a proper location for your ADAM-4570, and then explain how to connect to the network, hook up the power cable, and connect to the ADAM-4570's serial port.

2.2.1 Choosing a Location

Due to its versatility and innovative design, the ADAM-4570 can be:

- fixed to a panel mount
- fixed to a DIN Rail.
- Piggyback Stack

Panel Mounting

The ADAM-4570 can be attached to a wall using the included metal brackets. Each bracket comes with four screws; first attach the brackets to the bottom of the ADAM-4570. Next, screw each bracket to a wall.

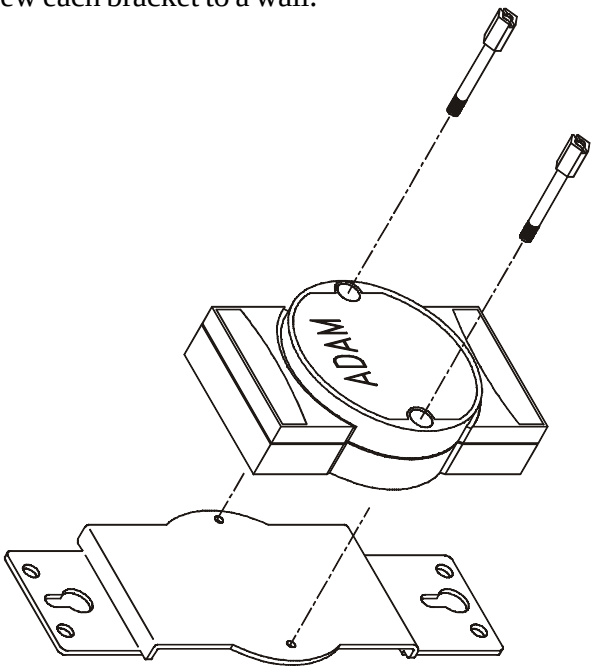


Figure 2-4. Panel Mounting

DIN Rail Mounting

You can mount the ADAM-4570 on a standard DIN Rail. First, using two screws, attach the metal plate to the DIN Rail bracket. Because the screw heads are beveled, the tops of the screws will be flush with the metal plate. Din Rail Mounting Brackets—Orientation of Metal Plates

You can now screw the metal plate with the DIN rail bracket assembly to the bottom of the server is a more convenient way. Next, use the remaining screws to put the metal plate on the bottom of the ADAM-4570.

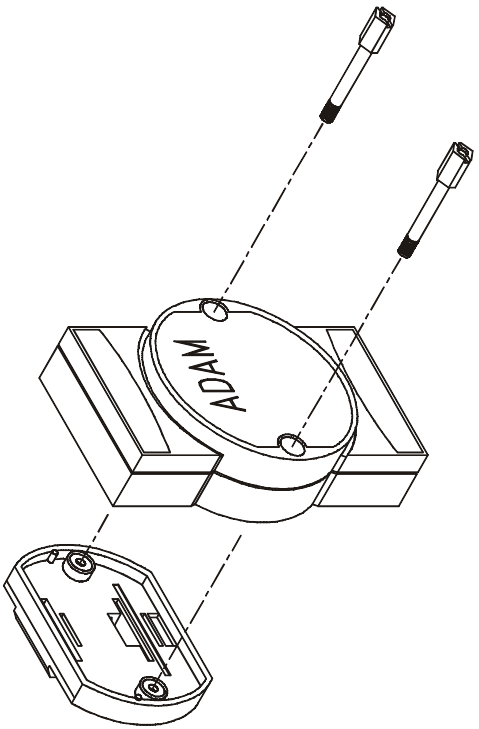


Figure 2-5: Din Rail Mounting

Piggyback Stack

ADAM-4570 can be stacked as seen in the figure below.

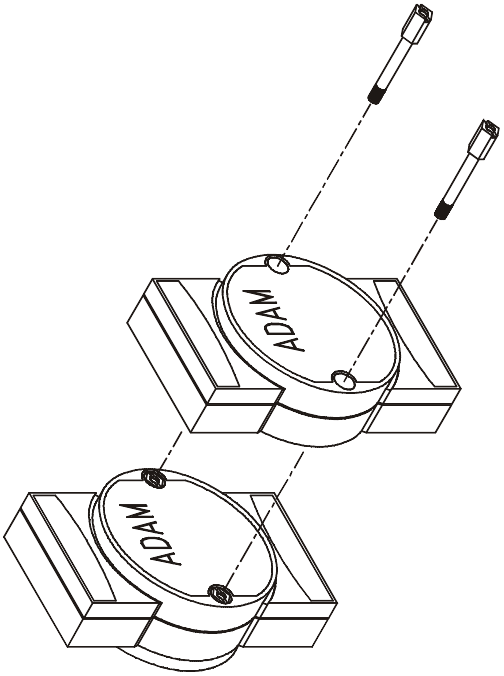


Figure2-6: Piggyback Stack

2.2.2 Network Connection

There are two ways to use the 10/100Base-T Ethernet connector located on the ADAM-4570 :

1. For Local Area Network (LAN) applications using the ADAM-4570, you will simply plug one end of your Ethernetcable into the 10/100Base-T connector, and the other end into the hub connected to your network.

2. When installing and configuring, you will find it convenient to hook the ADAM-4570 directly to your computer's Ethernet card. To do this you will need to use a "crossed-cable", such as the one supplied with your server.

Cabling requirements for the Ethernet side

Use an RJ-45 connector to connect the Ethernet port of the ADAM-4570 to the network hub. The cable for connection should be Category 3 (for 10Mbps data rate) or Category 5 (for 100 Mbps data rate) UTP/STP cable, which is compliant with EIA/TIA 586 specifications. Maximum length between the hub and any ADAM-4570 is up to 100 meters (ca. 300 ft).

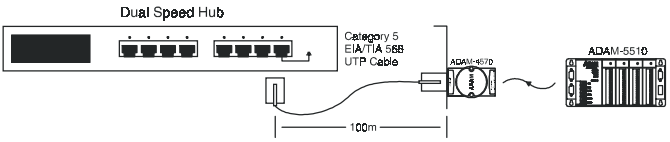


Figure 2-7: Connecting ADAM-4570 to the hub

2.2.3 Power Connection

You should take the following steps to connect ADAM-4570 power.

1.Connect the power cable to 2-pin connector

2.Connect power cable to power adapter

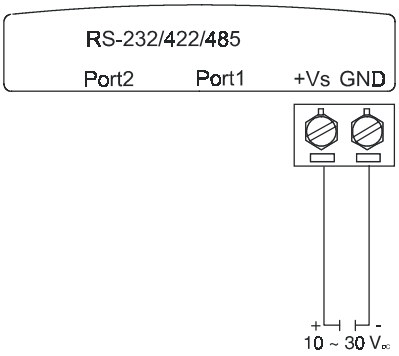


Figure 2-8: Power Connection

If the ADAM-4570 is working properly, the green power LED will light up , indicating that the ADAM-4570 is receiving power. Furthermore, the ADAM-4570 provides surge protection to protect it from being damaged by over-voltage, a 34V surge protection is added to the power end and an 18V surge protection is for the RS-422/485 end.

2.2.4 Serial Connection

The model of the ADAM-4570 that you purchased has two RJ-45 serial ports on the bottom of module. Depending on your serial device and serial interfaces, there are two options:

1. For an RS-232/422/485 port you may use a RJ-45 to DB-9 cable which we supply to connect your serial device to the ADAM-4570. Simply plug one end of the cable into the jack, and plug the other end into the serial port jack on your serial device.
2. Refer to the following table for details on serial cable RJ-45 to DB-9 pinouts.

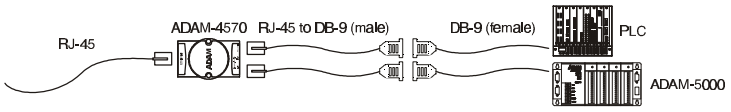
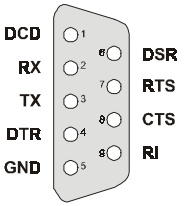


Figure 2-9: Serial Connection

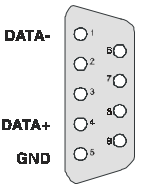
RJ-45

PIN Name	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI
RJ-45	1	2	3	4	5	6	7	8	9

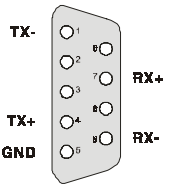
DB-9



RS-232



RS-485



RS-422

Chapter 3

Installation and Configuration

3.1 Driver and Utility Installation

In order to use a PC via an Ethernet network to control serial devices connected to the ADAM-4570, you must first have a host running Windows™NT4.0 or Windows 2000. This type of application also requires the host to have an Ethernet card and TCP/IP protocol installed. Following are the installation instructions to set up the ADAM-4570.

1. Insert the ADAM-4570 Driver/Port Mapping utility diskette into the floppy drive (e.g. A:\) on the host PC. Change the host computer's default drive from C: to A:

2. Use your Windows Explorer or the Windows Run command to execute the Setup program (the path for the Setup program on the diskette should be A:\setup.exe, if your default floppy drive is A:).

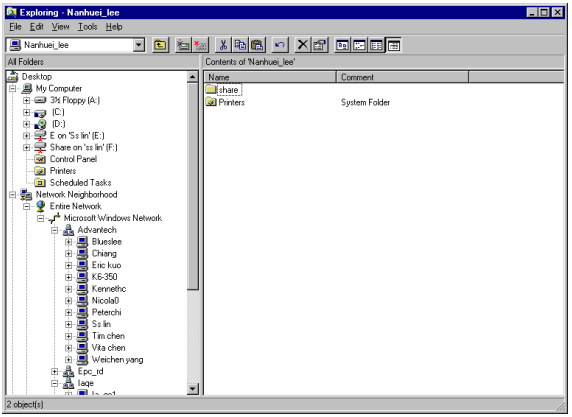


Figure3-1: Setup Configuration Utility

3. The Setup program will specify a default installation path, *C:\Program Files\Advantech\ADAM4570*. If a new

destination path is necessary, just click the *Browse* button to change to another path. After you have specified the installation path, click the *Next* button.

4. Insert the ADAM-4570 Configuration utility diskette into the floppy drive (e.g. A:\). Use the same way to execute the Setup program. The default path is

   C:\Program Files\Advantech\ADAM4570CFG.

5. After setup has copied all program files to your computer, click the *Finish* button to finish the installation.

6. The configuration utility will search for the ADAM-4570 devices on your local network.

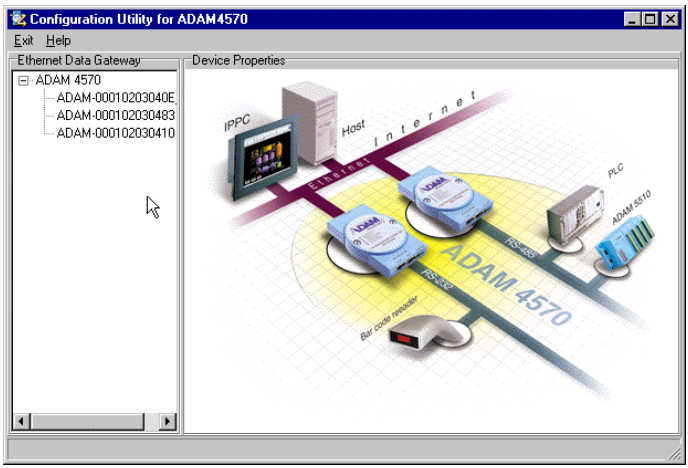
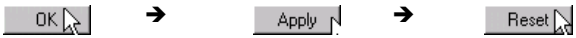


Figure 3-4: Configuration Utility

3.2 Configuring the ADAM-4570 — The Configuration Utility

The ADAM-4570 provides easy Windows configuration through Ethernet connection. This Windows utility searches all the ADM-4570 and devices on the network automatically and you can configure various parameters for TCP/IP configuration easily. For secure administration, it can also restrict the access rights for configuration to only one host PC to enhance network security. With this secure function enabled, other PCs will not have permission for configuration. The Windows utility consists of four functional categories: System, Network, Port, and Security which are presented on the toolbar of the configuration utility.

Note: When you have finished the configuration of these settings for each category, please follow the steps described below to make thse settings effective on the ADAM-4570.



3.2.1 System Configuration

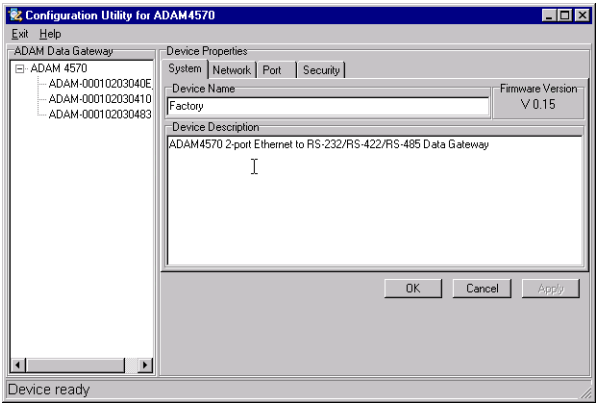


Figure 3-5: System Setting Window

Configuration utility can only search the ADAM-4570 devices on the local network segment and *cannot search beyond a router or gateway***.** Make sure that all the ADAM-4570 devices that you want to monitor must reside on the same local network segment with the host PC.

Ethernet Data Gateway

In this column, you will see all the found ADAM-4570 devices are listed when you use the configuration utility to auto-search ADAM-4570 devices. The specific number following each ADAM-4570 device is its MAC Address. The MAC Address is what helps the local system to identify and locate each Ethernet data gateway device. This MAC Address is already set before delivery from factory, hence no need for further configuration.

Device Name

Configuration utility provides a default name for device to distinguish a specific ADAM-4570 from other ADAM-4570. You can update the default device name based on your application. Names longer than 128 characters cannot be used. It is best to choose a name you can remember.

Device Description

This field is to record the function, application and other information for each ADAM-4570 device in more detail for easy management and maintenance. You are allowed to describe in your own words.

Firmware version

In this field, the configuration utility represents the firmware version of the ADAM-4570. You might need to refer to the

firmware version to determine functions available on the ADAM-4570 device. In case of problems that might concern the firmware version, please provide the firmware version number to our Customer Service.

Type

Each ADAM-4570 offers three serial interfaces, RS-232, RS-485 and RS-422. You can use any one of these serial interfaces according to your requirements.

3.2.2 Network Configuration

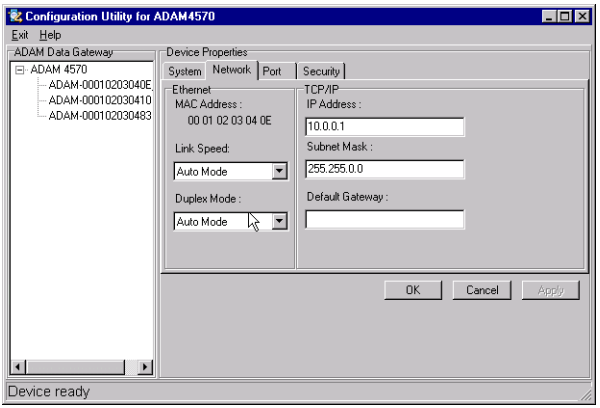


Figure 3-7: Network Configuration Window

MAC Address

This does not need configuration.

Link Speed

This function will show the current linking speed to be either 10Mbps or 100Mbps. However, the utility will auto-detect the current transmission speed on the network segment and set the transmission speed for the device accordingly without your

further efforts.

Duplex Mode

The utility will detect the current transmission mode (half-duplex or full-duplex) on the network segment, and set the transmission mode for the device accordingly without your further efforts.

IP address, Subnet Mask, Default Gateway

The IP address identifies your ADAM-4570 device on the global network. Each ADAM-4570 has same default IP address 10.0.0.1. Obtain a specific IP address from your network administrator and then configure each ADAM-4570 with the individual IP address.

Note: The ADAM-4570 does not support auto IP address configured by DHCP server.

3.2.3 Port Configuration

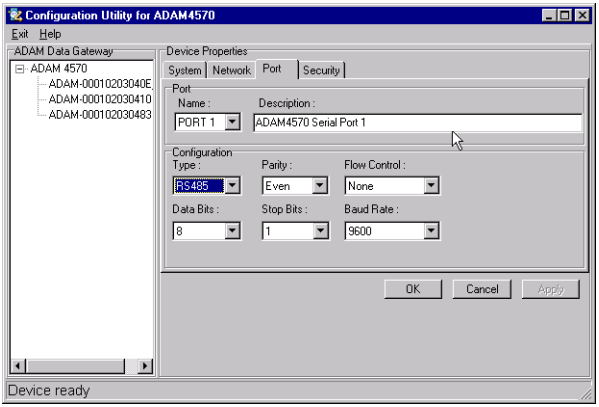


Figure 3-8: Port Configuration Window

Name

To specify which port on the ADAM-4570 is to be connected to the serial device.

Description

You can give more detailed description of the function of the port for easy management and maintenance. Descriptions longer than 128 characters cannot be used.

Type

Each ADAM-4570 offers three kinds of serial interfaces, RS-232, RS-485 and RS-422. You can use any of the three serial interfaces according to your requirements.

Parity

The ADAM-4570 provides five options: Even, Odd, None, Space, Mark.

Flow Control

The ADAM-4570 provides four options: None, Xon/Xoff, RTS/CTS, DTR/DSR.

Data Bits

The ADAM-4570 provides four options: 5, 6, 7 or 8.

Stop Bits

The ADAM-4570 provides three options: 1, 1.5 or 2.

Baud Rate

The ADAM-4570 supports baud rates from 300 to 230,000 bps.

3.2.4 Security Configuration

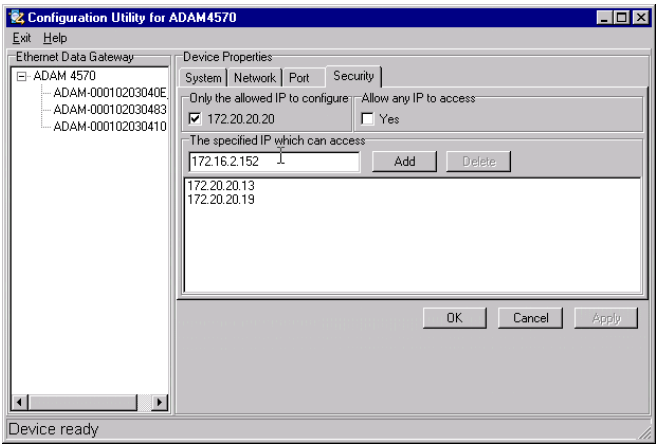


Figure 3-9: Security configuration

Only configure the authorized IP

This option is enabled in order to protect all configuration settings from being changed inadvertently.

Allow any IP to access

If this option is enabled, any PC can access data from this ADAM-4570.

The specified IP which can access

If you do not want many PCs to have the access right, you can limit at most 32 PCs to access data from this ADAM-4570.

3.3 Status Messages

The status message shown at the bottom of the utility window reflects the current status of ADAM-4570.

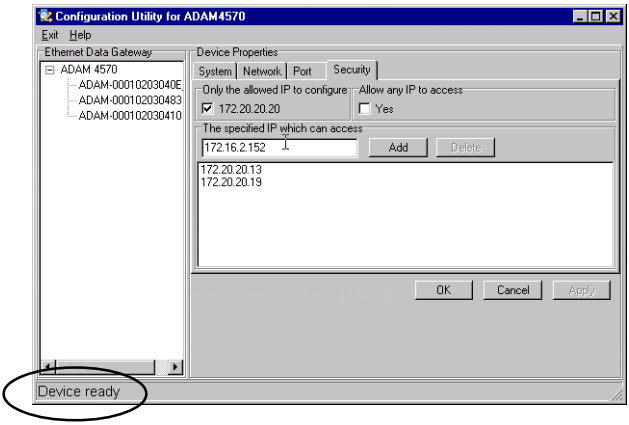


Figure 3-10: Status messages

"Read"

The configuration utility has found the ADAM-4570 and it is ready for use.

"Searching ADAM-4570"

The configuration utility is searching the ADAM-4570

"Querying DATA from ADAM-4570"

The configuration utility is getting data from the ADAM-4570.

"Device Ready"

The ADAM-4570 is ready to be configured and is now waiting for acknowledgement from the device.

"Lost Connection from the Device"

Due to device shut down or network failure, the configuration utility has lost connection after 5 seconds.

"Fail to apply this setting to the device"

Specific settings are not accepted by ADAM-4570.

"The device fails to respond"

The connected device does not respond.

"Fail to reset the device"

Fail to reset the ADAM-4570.

3.3.1 Connection Diagnostic

When you complete the configuration of your ADAM-4570s, you can follow the steps to check if the ADAM-4570 connects to network or not.

1. Execute the Microsoft DOS program.
2. Execute ***"PING"*** command and type your IP address of ADAM-4570. If ADAM-4570 connects to your network, it will display in the screen. If the ADAM-4570 cannot be pinged, you will need to ask someone at the remote site to

check and see if the power is on, and make sure that the connection is okay.

3.4 Port Mapping Utility

The purpose of the port mapping utility is to help you manage all ports which are in one Windows NT or Windows 2000 platform. The utility displays three types of ports: *Used ports*, *Unused ports* and *ADAM-4570 ports*. Please follow the steps.

1. Click the UNUSED PORTS item and select the port which you want to configure.

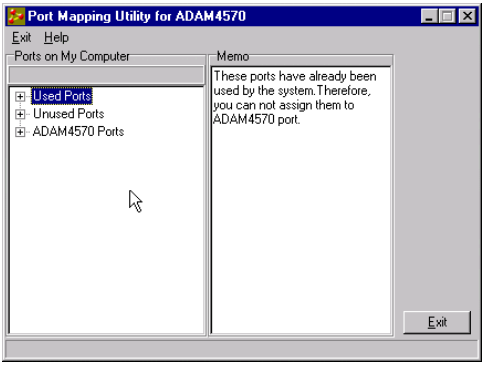


Figure 3-11: Unused ports

2. Click **ADD** button to assign the COMport to the specific ADAM-4570. Type IP address of the ADAM-4570 and select port1 or port2.

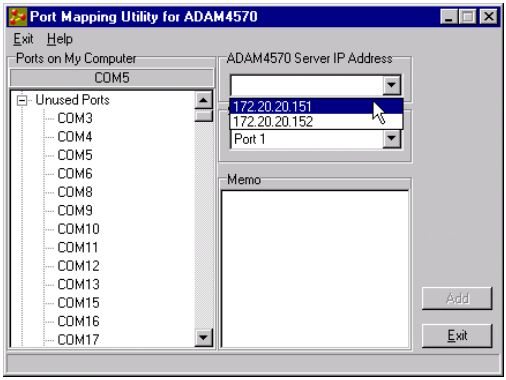


Figure 3-12: Assign COM port to ADAM-4570

Note: If you assigned different COMport to the same ADAM-4570's port. The dialog box will appear to remind you.

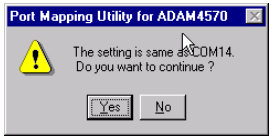


Figure 3-13: Warning window

3. The port has been added into ADAM-4570
4. If you want to remove the COMport, click **DELETE** to remove this.

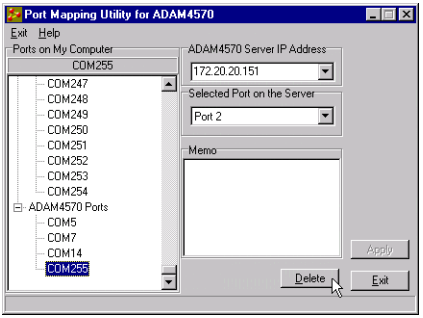


Figure 3-14: Delete the COM port

5. After you complete the configuration, click "Apply".

3.4.1 Self Test Function

The purpose of this test is to make sure the communication from host PC to ADAM -4570 is OK. If there is still an error, you can check the communication from the ADAM-4570 to the serial devices.

If the test is selected, an external test will be done to check that the connection signals for each port are working properly. For the test, you will need to connect each port to a loopback tester (provided in the package). Refer to the following chart for the specifications of this loopback tester. The loopback test only applies to RS-232 mode. The test is divided into two parts: Signal test and Communication Parameters test.

1. Click the Test button in the Port Mapping utility.

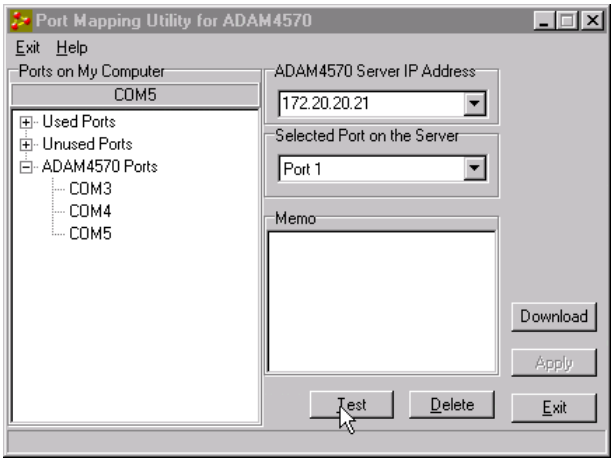


Figure 3-15: Test window

Signal Test

- **RTS →CTS:** Check the RTS and CTS signals between two ports.
- **DTR →RI:** Check the DTR and RI signal between two ports.
- **DTR →DSR:** Check the DTR and DSR signal between two ports.
- **DTR →DCD:** Check the DTR and DCD signal between two ports.

Communication Parameters Test

- Baud rate: From 50 bps to 230 Kbps
- Data bit: 5,6, 7, 8

- Stop bit: 1, 1.5, 2
- Parity: odd, even, none, space, mark

2. Click **OK** button to return to the port mapping window. All the ports in the ADAM-4570 are tested ok.

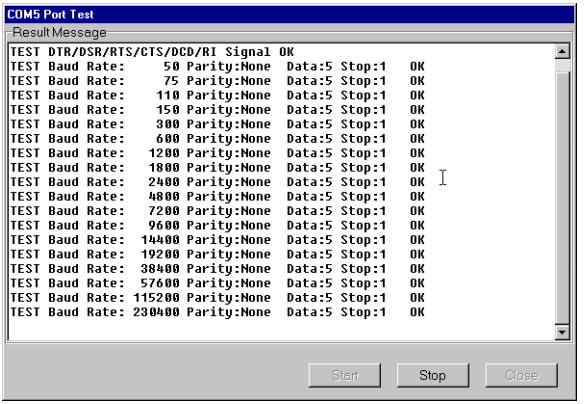


Figure 3-16: Loopback test

3.4.2 Upgrading ADAM-4570's Firmware Download

Advantech continually upgrades its firmware to keep pace with the ever-expanding world of computing. You can use the Download function located on Port Mapping utility to carry out the upgrade procedure. Please access Advantech's Web site at http://www.advantech.com to download the required computer file and then follow these instructions.

Click on the toolbar **Download** icon.

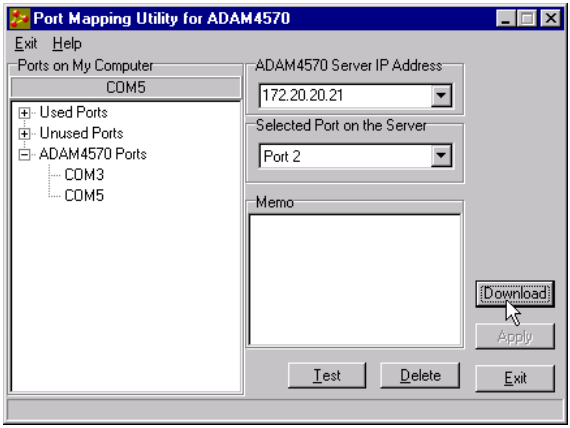


Figure 3-17: Download window

1. Locate and then select the filename of the firmware that you downloaded.

Figure 3-18: Select the file

2. After downloading firmware completely, click on the **Reboot** button. The ADAM-4570 will restart automati cally.

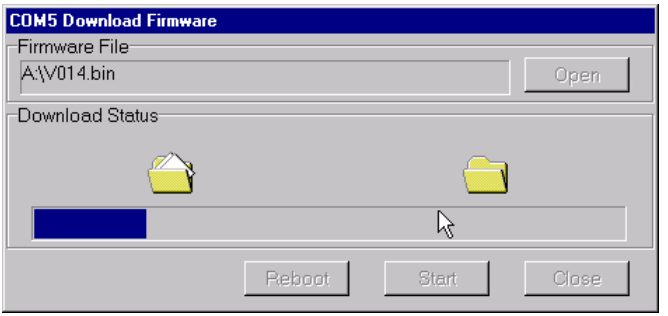


Figure 3-19: Download firmware

Note: After clicking ***Reboot*** button, configuration utility will not reboot ADAM-4570 untill no application program access this ADAM-4570.

Chapter 4
Troubleshooting

This chapter explains how to solve some of the most common problems you could encounter while using ADAM-4570. If you are still having problems after reading this chapter, contact your dealer, or e-mail Advantech for help.

"Configuration Utility can not find ADAM-4570"

1. Check POWER LED. If it is off, you have to check :

   - Make sure the ADAM-4570 power cable is plugged in, and the server is receiving power.
   - Check that the server's network connector is plugged in properly.
   - Make sure your computer is properly connected to the network.
   - The input voltage is between +10V and +30V

2. Check LINK LED. If it is off, you have to check:

   - Network Connection is OK
   - Make sure your network is 10/100 Mbps

3. Check Driver Installation. Make sure that your O.S. is Windows NT 4.0 (Serve Pack 3.0 or above) or Windows 2000.

4. If the above are completed, it means the ADAM-4570 is okay. Next, check to see if the ADAM-4570 and the host are on the same local area network.

"Configuration utility can find ADAM-4570 but cannot access ADAM-4570"

For security reasons, and to simplify operations, users can give the access right to specific PC. Only these PCs can get data from ADAM-4570. Thus, if while using the ADAM-4570, it is advised that you check to see if your PC is on the access right list.

"Cannot change the IP address or other server properties"

The network administrator is the only one allowed to modify the ADAM-4570's configuration. Keep in mind, even when multiple hosts share the same network, administrative access is still protected. If you need to change any configu ration settings, ask your network administrator for assis tance.

"The host PC can acess the ADAM-4570 at this local site but later moves the ADAM-4570 to a remote site that PC cannot access."

Due differing network interface connections, your IP address might have changed, and as a result, you are no longer on the ADAM-4570's Access Control list.

To resolve this issue:

1. Confirm your IP address with the ADAM-4570.
2. As the network administrator to set up the server configuration so that you are on the ADAM-4570's Access Control list.