ADAM-4577

1 Port Universal Serial Device Gateway User's Manual

Copyright Notice

CE Notification

The ADAM-4577 has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the ADAM-4577 system from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

Jan 2002

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Your satisfaction is our number one concern. Here is a guide to Advantech's customer services. To ensure you get the full benefit of our services, please follow the instructions below carefully.

Technical Support

We want you to get the maximum performance from your products. So if you run into technical difficulties, we are here to help. For most frequently asked questions you can easily find answers in your product documentation. These answers are normally a lot more detailed than the ones we can give over the phone.

Please consult this manual first. If you still cannot find the answer, gather all the information or questions that apply to your problem and, with the product close at hand, call your dealer. Our dealers are well trained and ready to give you the support you need to get the most from your Advantech products. In fact, most problems reported are minor and are able to be easily solved over the phone.

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Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability as a consequence of such events under the terms of this Warranty.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product ever does prove defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered (e.g. type of PC, CPU speed, Advantech products used, other hardware and software used etc.). Note anything abnormal and list any on-screen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, you have to request an RMA number. When requesting an RMA (Return Material Authorization) number, please access ADVANTECH's RMA website: http://www.advantech.com.tw/rma. If the web sever is shut down, please contact our office directly. You should fill in the "Problem Repair Form",describing in detail the application environment, configuration, and problems encountered. Note that error descriptions such as "does not work" and "failure" are so general that we are then required to apply our internal standard repair process.
4. Carefully pack the defective product, a completely filled-out Repair and Replacement Order Card and a photocopy of dated proof of purchase (such as your sales receipt) in a shippable container. A

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-4577 is a peer-to-peer 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-4577 makes your serial devices behave just like networking devices. You can issue commands or transmit data from one serial device, which connected to ADAM-4577, to any devices that are connected to the Internet. This provides greater flexibility. There is no need to constrain the serial devices to be bundled with a host PC running on a different O.S. Besides, if you want your PLC or intelligent devices which is running specific application program to connect to any networking device dynamically, we provide several commands to let the device to control ADAM-4577. The ADAM-4577 provides three types of networking architecture: polling, event-handling, peer-to-peer. In addition, ADAM-4577 supports UDP protocol .It allows most 8 host Pc accessing data simultaneously via polling networking architecture. You can use it according to your application.

The ADAM-4577 features a lot of powerful functions such as: high speed data transfer, advanced security protection, auto-detection of all EDG series products, remote firmware download and more.Functionally transparent and efficient, the ADAM-4577 is specially designed for remotely controlling and monitoring devices via the Internet.

If you want to access the ADAM-4577, you must ascertain your application software supports Standard networking application programming interface (API) such as: WinSock Socket. The transmission speed of the ADAM-4577 is up to 230 Kbps, outperforming the competition to meet the demand for high-speed exchange. The ADAM-4577 also provides a high-performance RISC CPU and Real Time Operating System to reduce CPU load. This element makes the ADAM-4577 more stable and reliable during data transmission. Another benefit is the ADAM-4577 allows users to remotely download programs to a designated device via Ethernet. This reduces the need for on-site maintenance and diagnosis.

The ADAM-4577 comes with a Windows-based configuration and testing utility. The configuration utility can auto-detect all ADAM-4570/4571/4572/4579/EDG-4504s on the local network. It also lets you

adjust all settings easily. In addition,the utility provides a security option that protects all configuration settings from being changed inadvertently.The download & testing utility helps you to diagnose the communication condition between devices.

1.2 Features

- Support TCP/IP, UDP protocol
- Supports 10 Base-T Ethernet standard
- Support Standard networking API: WinSock, Socket
- Provides three networking architectures: polling, event-handling, peer-to-peer
- Supports high transmission speeds up to 230 Kbps
- Supports LED indicators: Easy to diagnostic
- Auto-searching Windows configuration utility: Easy setting and security protection
- Download & Testing utility: Easy to download firmware and self-diagnostic
- Easy to locate specific EDG series
- Surge protection for RS-485 line and power supply
- Mounts on DIN rail, panel or piggyback easily

1.3 Specifications

- Protocol: TCP/IP , UDP
- Standard networking API: WinSock, Socket
- Network type: polling, event-handling, peer-to-peer
- Network Port: IEEE 802.3
- Interface:
  Network: 10 BASE-T standard
  Serial: 3-wire RS-232, RS-422, RS-485
- Port: 1 independent RS-232/422/485 port
- Connector:

Network: RJ-45
Serial: DB-9

- 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
- Diagnostic LEDs:
  Network:
- Utility Software:
  Auto-detecting configuration utility
  Easy-to-diagnostic download & testing utility
- Power Requirements: unregulated 10 to 30 Vdc with surge protection
- Power Consumption: 1.5 Watt
- 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-4577
- CD for utility & manual
- One loopback DB-9 tester
- One crossed null modem connector
- Five stickers
- NYLON DIN-rail Mounting Adapter
- SECC Panel Mounting Bracket

Chapter 2

Getting Started

This chapter includes an overview of the ADAM-4577 hardware installation procedures. As mentioned in the previous chapter, the ADAM-4577 comes ready for all network connections, including Ethernet, and RS-232/422/485 port connections.

2.1 Understanding ADAM-4577

The ADAM-4577 is an advanced peer-to-peer data gateway unit. It extends traditional RS-232/422/485 interfaces to Ethernet network. Through networking, you can control and monitor remote serial devices either over a LAN or over the WAN.

Since the ADAM-4577 is connected through a TCP/IP 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 devices uses RS-232/422/485 interface to issue commands or transmits data to another one. By doing this, both of these two devices will be constrained by the length of wire. With the ADAM-4577, you are now able to communicate with each other via Internet. Even more, you can connect any networking device dynamically. ADAM-4577 provides 3 networking architectures: Polling, Event handling, Peer-to-peer. For details, you can refer to chapter 4.

The following illustration shows the network architecture as below:

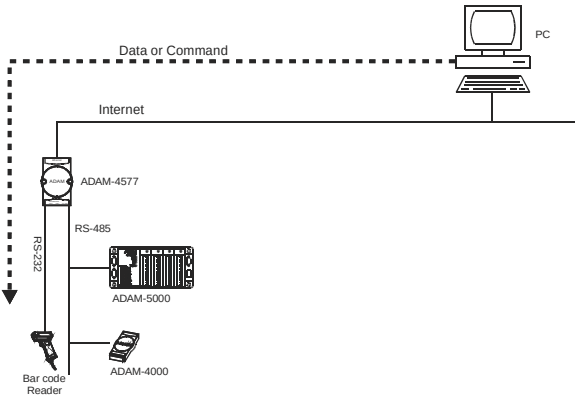


Figure 2-1 Network architecture:Polling

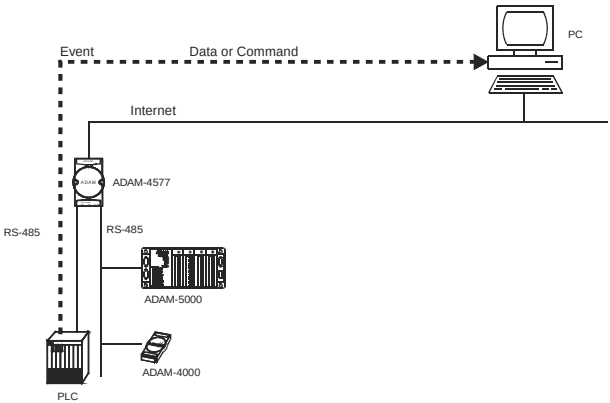


Figure 2-2 Network architecture:Event-handling

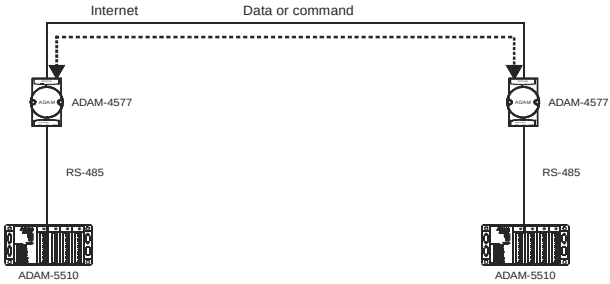


Figure 2-3 Network architecture:Peer-to-peer

2.1.2 Serial Architecture

The ADAM-4577 provides data modes to meet your needs.

The Data mode provides a certain amount of transparence and flexibility in transmitting data between two devices.

The data from the serial port of one ADAM-4577 can be automatically sent to the other networking device, without the need for an intermediate PC. Thus, serial devices will be no longer bundled with operation system and behave like network devices to send /receive data via Ethernet.

2.1.3 Top / Front / Rear View

There are three network status LEDs located on the top panel of ADAM-4577, each with its own specific function.

LED	Color	Status	Description
Status/Link	Red	Flash	Heartbeat (1 time/sec)
		ON	Locate
		OFF	Not working
	Green	ON	Valid network link
		OFF	Invalid network link
Tx/Rx (Ethernet)	Red	ON	No data being transmitted
		Flash	Ethernet data being transmitted
	Green	ON	No Data being received
		Flash	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

Table 2-1 ADAM-4577 LED Definition

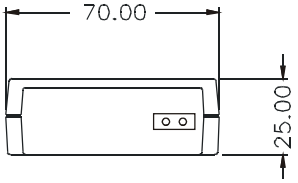


Figure 2-4 ADAM-4577—Top Panel

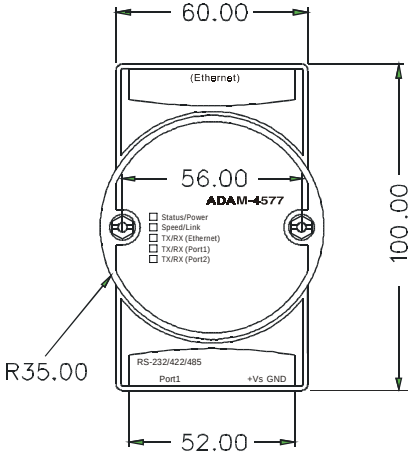


Figure 2-5 ADAM-4577—Front Panel

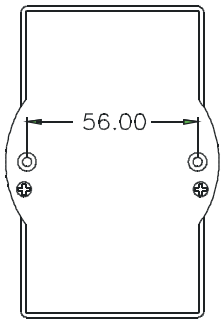
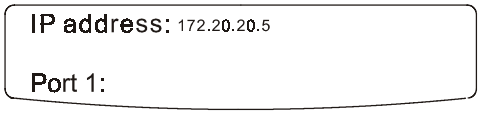


Figure 2-6 ADAM-4577—Back Panel

2.1.4 Stickers

If you forget the IP addresses of specific ADAM-4577 or which specific networking device you connect to, we have provided five stickers for you to note the IP addresses and place in a secure location. For example,

172.20.20.5: The IP address of specific ADAM-4577



2.2 Connecting the Hardware

Next, we will explain how to find a proper location for your EDG series and explain how to connect to the network, hook up the power cable, and connect to the ADAM-4577 serial port.

2.2.1 Choosing a Location

Due to its versatility and innovative design, the ADAM-4577 can be:

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

Panel Mounting

The ADAM-4577 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-4577. Next, screw each bracket to a wall.

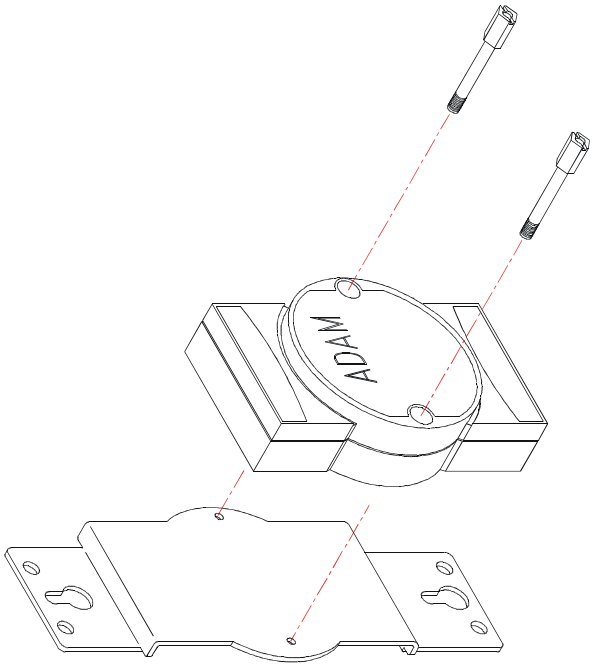


Figure 2-7 Panel Mounting

DIN Rail Mounting

You can mount the ADAM-4577 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-4577.

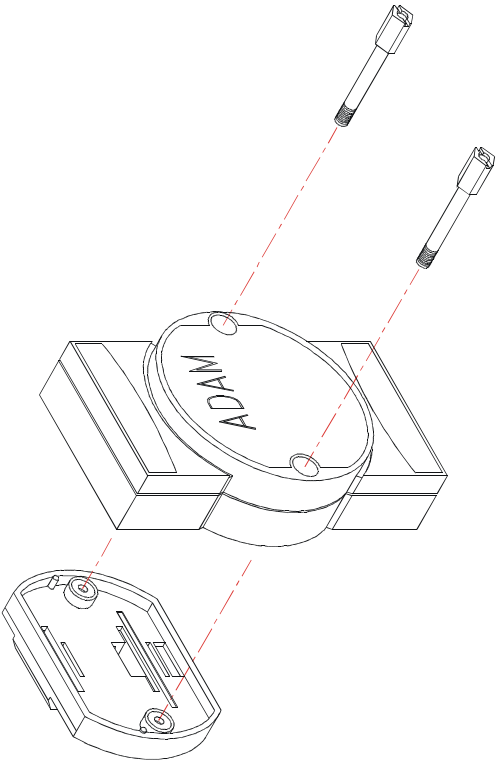


Figure 2-8 Din Rail Mounting

Piggyback Stack

ADAM-4577 can be stacked as seen in the figure below.

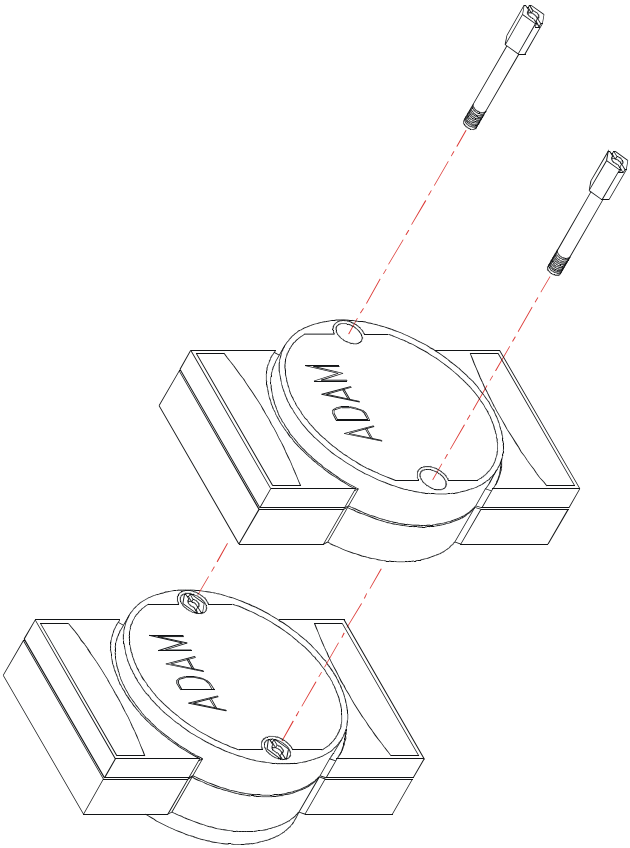


Figure2-9 Piggyback Stack

2.2.2 Network Connection

There are two ways to use the 10 Base-T Ethernet connector located on the ADAM-4577 :

1. For Local Area Network (LAN) applications using the ADAM-4577, you will simply plug one end of your Ethernetcable into the 10 Base-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-4577 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-4577 to the network hub. The cable for connection should be Category 3 (for 10Mbps data rate) UTP/STP cable, which is compliant with EIA/TIA 586 specifications. Maximum length between the hub and any ADAM-4577 is up to 100 meters (ca. 300 ft).

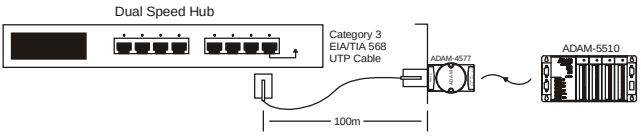


Figure 2-10 Connecting ADAM-4577 series to the hub

2.2.3 Power Connection

You should take the following steps to connect ADAM-4577 power.

1. Connect the power cable to 2-pin connector

2. Connect power cable to power adapter

If the ADAM-4577 is working properly, the green power LED will light

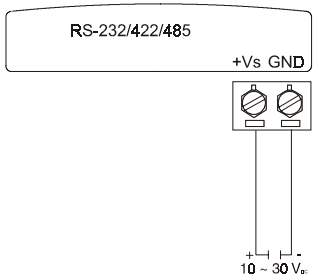


Figure 2-11 Power Connection for ADAM-4577

up , indicating that the ADAM-4577 is receiving power. Furthermore, the ADAM-4577 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

2.2.4.1 Connecting to Serial device

The model of the ADAM-4577 that you purchased has DB-9 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 DB-9 cable which we supply to connect your serial device to the ADAM-4577. 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 DB-9 pinouts.

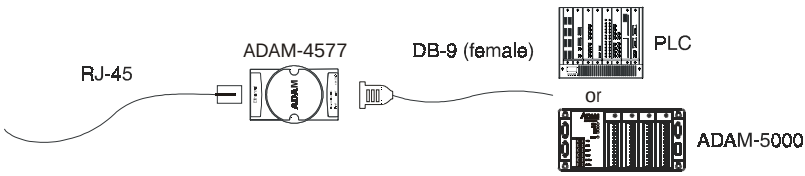
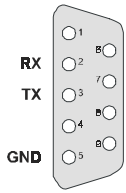
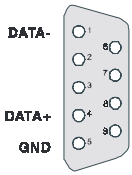


Figure 2-12 Serial Connection for ADAM-4577

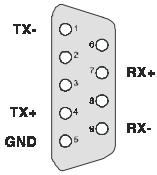
DB-9 (male)



RS-232



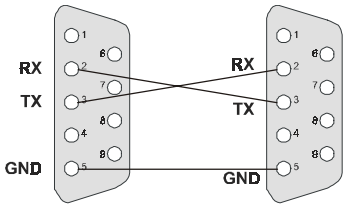
RS-485



RS-422

2.2.4.2 Connecting to PC

Sometimes, you want ADAM-4577 to connect to PC. You have to plug crossed null modem connector (female) that we provided to the cable. Refer to the following picture for details on the pinouts.



Chapter 3

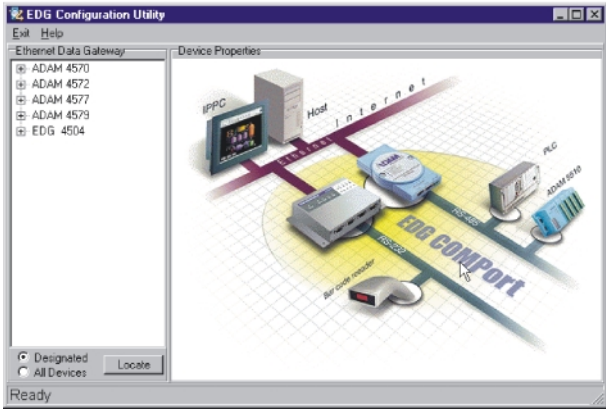
Installation and Configuration

3.1 Windows utility Installation

The ADAM-4577 provides two window-based utilities. One is configuration utility; the other is testing utility. You can configure ADAM-4577 in any operating system by using configuration utility via Ethernet . If you want to test the communication situation or download firmware remotely, you can use “testing utility”. The following are the installation instructions for setting up the ADAM-4577.

1. Insert the ADAM-4577 Download and Testing utility CD into the drive on the host PC. Change the host computer default drive from C: to D:
2. Use your Windows Explorer or the Windows Run command to execute the Setup program.
3. The Setup program will specify a default installation path, C:\Program Files\Advantech\EDG Serial\Download and Testing utility. 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-4577 Configuration utility diskette or CD into the drive (e.g. D:\). Use the same way to execute the Setup program. The default path is C:\Program Files\Advantech\EDG Serial\Configuration utility.
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-4570/4571/4572/4577/4579/EDG-4504 devices on your local network automatically.

Figure 3-1 Configuration Utility



3.2 Configuring the ADAM-4577

The ADAM-4577 provides easy Windows configuration through Ethernet connection. You can configure various parameters for TCP/IP or UDP 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 Settings 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-4577.*

3.2.1 Search for Specific ADAM-4577

If you want to locate specific ADAM-4577s, the configuration utility provides a “Locate” function to assist you. You can select all the ADAM-4570/4571/4572/4577/4577/EDG-4504 devices (see Figure 3-2) or just select one ADAM-4577 (see Figure 3-3). When you select a specific device, the LED that stands for “Status” will flash . When you select another device, the original “Status” LED will be red. Please follow these steps:

1. Select “All Devices” and click “Locate”

2. The “Status” LED of all devices will turn on

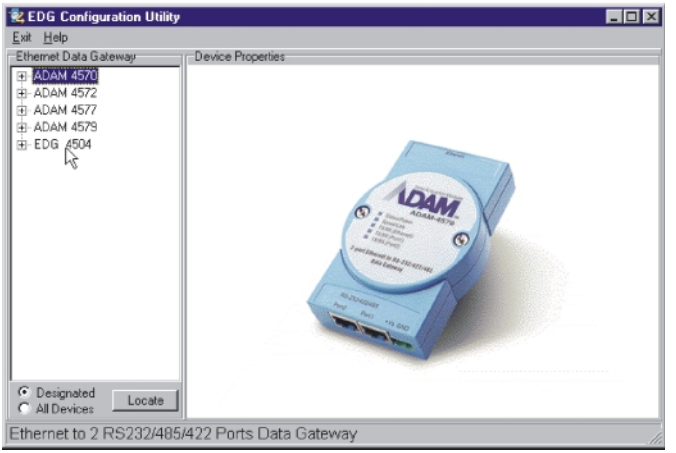


Figure 3-2 Locate all ADAM-4570/4572/4577/4577/EDG-4504

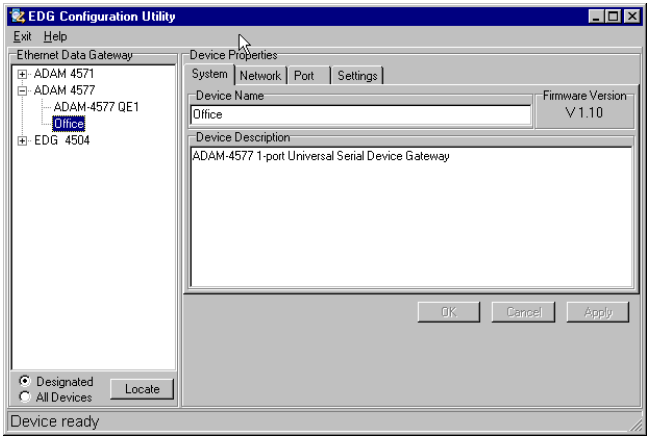


Figure 3-3 Locate specific ADAM-4577s

Configuration utility can only search the ADAM-4570/4571/4572/4577/4577/EDG-4504 devices on the local network segment and cannot search beyond a router or gateway. Make sure that all the ADAM-4570/4571/4572/4577/4577/EDG-4504 devices that you want to monitor must reside on the same 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

The configuration utility provides a default name for device to distinguish a specific ADAM-4577 from other ADAM-4577. 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-4577 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-4577. You might need to refer to the firmware version to determine functions available on the ADAM-4577 device. In case of problems that might concern the firmware version, please provide the firmware version number to our Customer Service. Besides, you can download upgraded ADAM-4577 firmware to meet your requirements.

3.2.2 Network Configuration

This section will show network configuration of ADAM-4577's configuration utility.

We will introduce their function and operation by item.

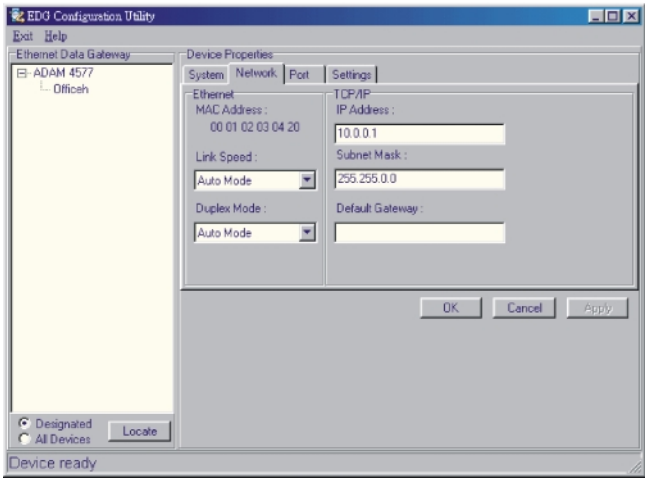


Figure 3-4 Network Configuration Window

Ethernet:

MAC Address

This does not need configuration.

Link Speed

This function will show the current linking speed to be 10Mbps.

TCP/IP:

IP address, Subnet Mask, Default Gateway

The IP address identifies your ADAM-4577 device on the global network. Each ADAM-4577 has same default IP address 10.0.0.1. Obtain a specific IP address from your network administrator and then configure each ADAM-4577 with the individual IP address.

Note: The ADAM-4577 does not support auto IP address configured by DHCP server.

3.2.3 Port Configuration

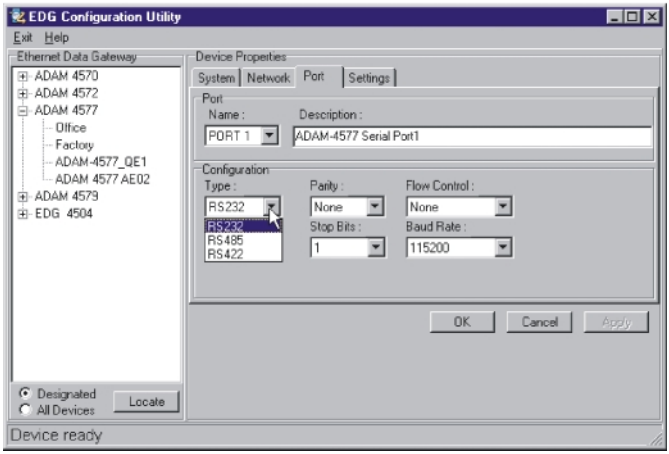


Figure 3-5 Port Configuration Window

Name

ADAM-4577 provide one port to connected to the serial device. The name default is port1, it goes without your further efforts

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-4577 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-4577 provides five options: Even, Odd, None, Space, Mark.

Flow Control

The ADAM-4577 provides one option: None

Data Bits

The ADAM-4577 provides four options: 5, 6, 7 or 8.

Stop Bits

The ADAM-4577 provides three options: 1, 1.5 or 2.

Baud Rate

The ADAM-4577 supports baud rates from 300 to 230,000 bps.

3.2.4 Setting Configuration

ADAM-4577 provides TCP/IP and UDP two protocol. In settings, you can choose either TCP mode (see Figure 3-6) or UDP mode(see Figure 3-7) according to your application. In this section, we will show setting configuration in either TCP or UDP mode. As to detailed networking architecture for TCP/UDP application, please refer to Chapter 4.

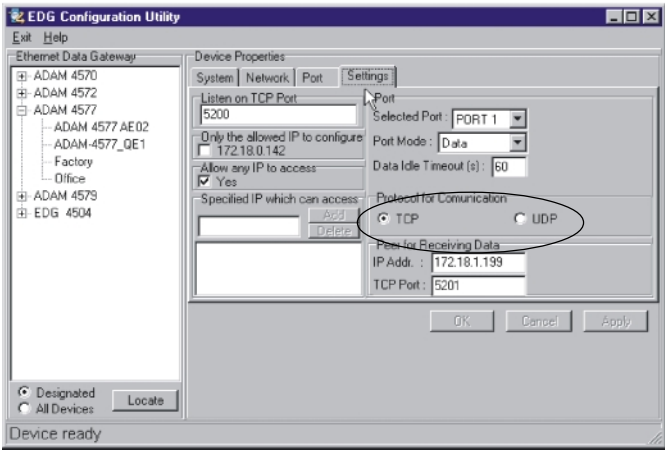


Figure 3-6 TCP Setting configuration

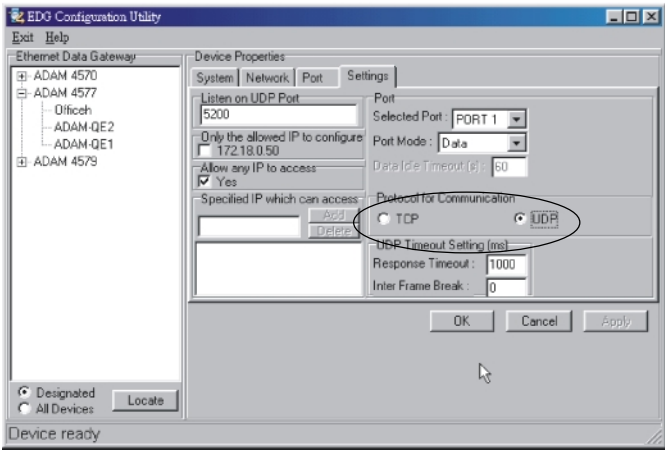
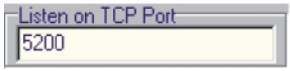


Figure 3-7 UDP Setting configuration

3.2.4.1 TCP(UDP) Port number



The TCP(UDP) port number represents the source port number , and the number is used to identify the channel for remote initiating connections. Range: 1024-65533.

If an unknown caller wants to connect to the system and asks for some services, they need to define the TCP(UDP) port to carry a long-term conversation.

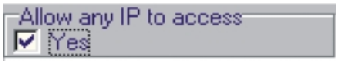
Each node on a TCP/IP network has an IP address, and each IP address can allow connections on one or more TCP port. The well known TCP port are those that have been defined; for example, port 23 is used for Telnet connections. There are also custom sockets that users and developers define for their specific needs. The default TCP (UDP) port of ADAM-4577 is 5200. The example initial 5200 is System Port, and 5201 is Data Port. But users can adjust them by one's preference or application.

Note1: Timing between serial signals (such as DSR, RTS, and DCD) is not preserved, and the state of such signals is not readable.

3.2.4.2 Only configure the authorized IP

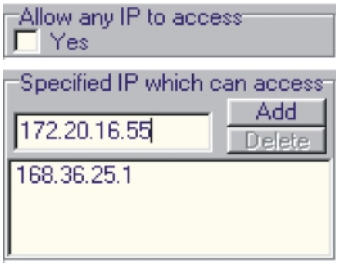
This option is enabled in order to protect all configuration settings from being changed inadvertently.

3.2.4.3 Allow any IP to access



If this option is enabled, any PC can access data from this ADAM-4577.

3.2.4.4 The specified IP which can access



If this option is disabled, only the specified PC can access data from this ADAM-4577. Due to the difference of TCP and UDP, we will discuss them individually.

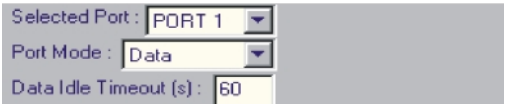
TCP Mode

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-4577. You can list most 32 authorized PCs to allow access data .

UDP Mode

You can also list most 32 authorized PCs to allow access data in UDP mode. However, Only 8 PCs can access data from ADAM-4577 simultaneously.

3.2.4.5 Port Mode



1. Selected Port

The default is Port1, DAM-4577 provide one port to connected to the serial device.

2. Port Mode

The default is Data Mode, The ADAM-4577 provide one mode: Data mode.

Serial devices that connect to the ADAM-4577 can transmit data to another networking device

3. Data Idle Timeout

It only appears in TCP mode, The default is 60 seconds. If you want to keep connection continuously, you can key-in "0".

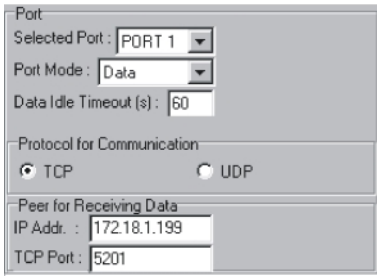
Data idle Time is the time period in which the device waits for data. If the ADAM-4577 does not receive data over an established idle time, the ADAM-4577 will disconnect temporarily. When the data comes to the ADAM-4577, it will reconnect automatically. Users do not need to reconnect.

3.2.4.6 Protocol for Communication

In this option, you can choose either TCP or UDP mode according to your application.

Due to your TCP or UDP mode choice, it will show different setting frame of configuration utility. We'll illustrate the setting base on TCP or UDP mode.

TCP Mode



Peer for Receiving Data

The option is the setting of another networking device which you want to connect , including IP address and TCP port. It applies to two network architectures: Peer-to-peer and Event-handling. It means that you needn't fill out any value in this option when you are in Polling network architecture.

1. **IP Addr**
   Key-in another IP address of networking device which you want to connect.

2. **TCP Port**
   Key-in another TCP port of networking device which you want to connect. If you want to connect to the port of another ADAM-4577, you have to note the following information.

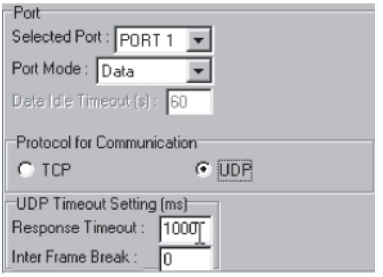
TCP port of ADAM-4577: &&&&
TCP port of ADAM-4577's port1: &&&& +1

For example:

TCP port of ADAM-4577 that you want to connect: 5220
TCP port of Port 1: 5220 +1=5221

If you want to connect to a PC or any system, you have to key-in the TCP port of that PC or system.

UDP Mode



UDP Timeout Setting (ms)

The UDP mode is only applied to Polling network architecture. When you choose UDP mode , Data Idle Timeout option is disable.

1. Response Timeout

It counts after ADAM-4577 transmits out the last data byte to the device, the period through the device process data and device transmits data back to ADAM-4577.

As the time is over, ADAM-4577 starts to return data to host PC. The default is 1000ms, that means ADAM-4577 won't return data back to host PC until one second passes

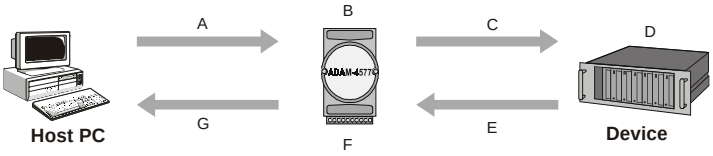


Figure 3-8 ADAM-4577 transmits data and response timeout diagram

A: Time for Host PC transmits the data to ADAM-4577

B: Time for ADAM-4577 processes the data

C: Time for ADAM-4577 transmits the data to Device

D: Time for Device processes the data

E: Time for Device transmits the data back to ADAM-4577

F: Time for ADAM-4577 processes the transmitted data

G: Time for ADAM-4577 transmits the data back to Host PC

Response timeout = D+E

Host PC total waiting time = A+B+C+D+E+F+G

2. Inter Frame Break

ADAM-4577 provides one smart way to reduce inefficient waiting time.Through Inter Frame Break,ADAM-4577 transmits data more fficiently.

Inter Frame Break is a good control machine, ADAM-4577 will distinguish whether it transmits back data to host PC by the function. As to set Inter Frame Break 30 ms, ADAM-4577 won't wait response timeout 1000ms over to transmit data As long as the idle time is longer than 30 ms, ADAM-4577 starts to transmit back data to host PC.

Without setting Inter Frame Break, If the device have transmitted out the data before response timeout is over,ADAM-4577 has to wait response timeout over to transmit back data to host PC.The transmission way is very inefficient.For solving the problem,you can set Inter Frame Break value.

ADAM-4577 will cause efficient network environment with Inter Frame Break function ADAM-4577 utility default is zero,it means the time of ADAM-4577 transmits data back to host PC only depends on Response Timeout.

As follows ,we will compare the data time from two case. One is we don't set any Inter Frame Break, another is setting Inter Frame Break. Through the comparison, you can see the effectiveness of setting Inter Frame Break.

Case1 :
Assume the transmitted data spends 600 ms

As Setting:
Response timeout = 1000 ms
Inter Frame Break = 0 ms

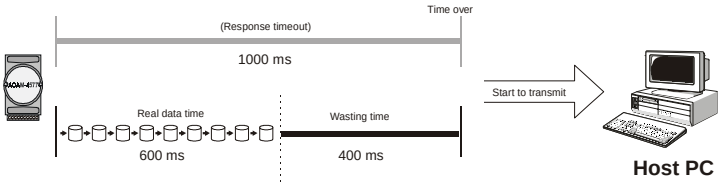


Figure 3-9 Case1 data time diagram

Case2 :

Assume the transmitted data spends 600 ms

As Setting:
Response timeout = 1000 ms
Inter Frame Break = 30 ms

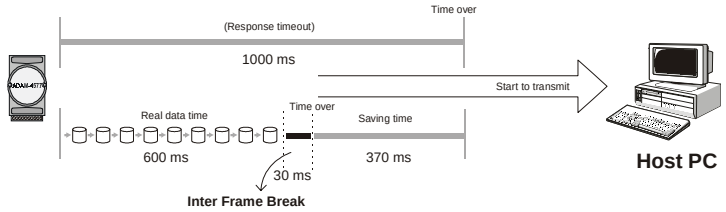


Figure 3-10 Case2 data time diagram

Comparing the difference of the two case, case 2 only wastes 30 ms but saves 370 ms comparing to case1. We see clearly that if we set Inter Frame Break, we could save waiting time. ADAM-4577 transmit data to Host PC at once as Inter Frame Break time is over.

3.3 Testing Utility

The purpose of testing utility is to help you diagnose the communication between devices and download firmware remotely.

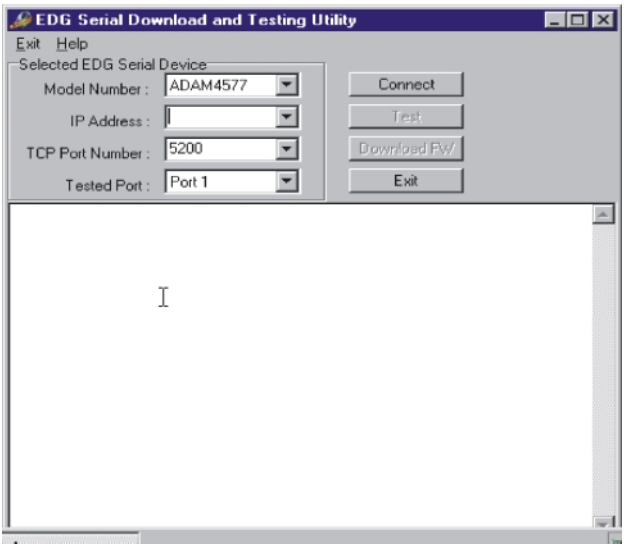
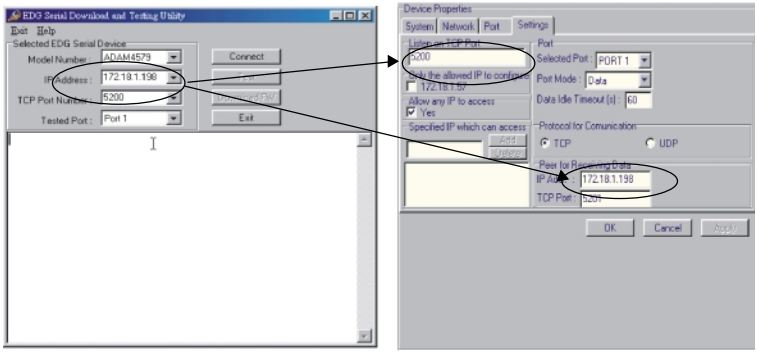


Figure 3-11 Testing utility

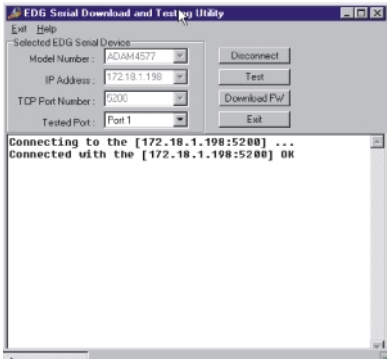
3.3.1 Self Test Function

The purpose of this test is to confirm the communication from host PC to the ADAM-4577. If there is still an error, you can check the communication from the ADAM-4577 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). The loopback test only applies to RS-232 mode.

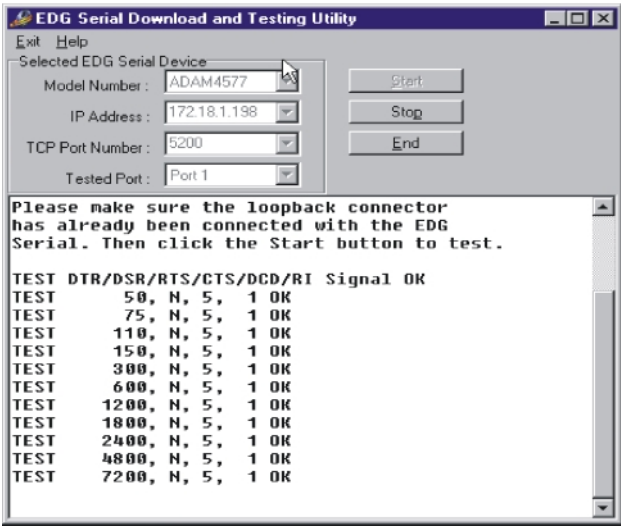
1. Key-in the IP address and TCP port of the device that you want to connect. Select which port you want connect.



2. Click “connect” button



3. If the connection is ok, click “Test” button



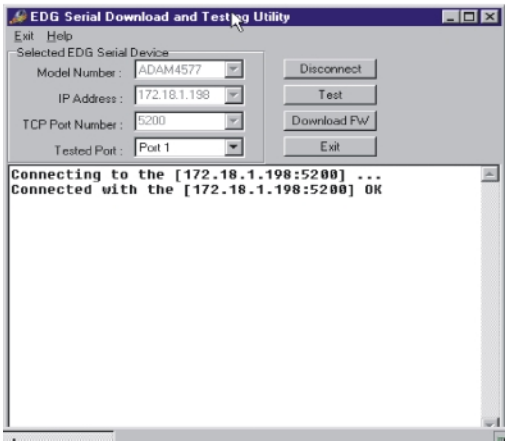
Communication Parameters Test

- 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

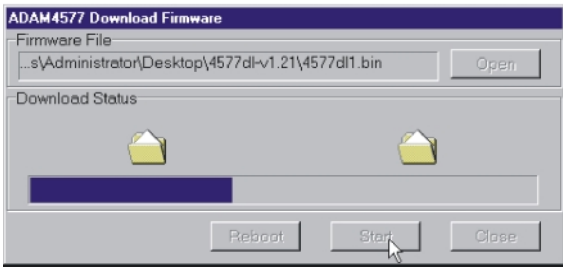
3.3.2 Upgrading ADAM-4577 (tm) s Firmware Download

Advantech continually upgrades its firmware to keep pace with the ever-expanding world of computing. You can use the Download function located on Testing 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.

1.Click "Download" button.



2.Locate and select the filename of the firmware that you downloaded.



3.3.3 UDP Testing Utility

The utility is for testing the status of ADAM-4577 UDP mode. By the utility, you can set Command Timeout to test the status of UDP network architecture.

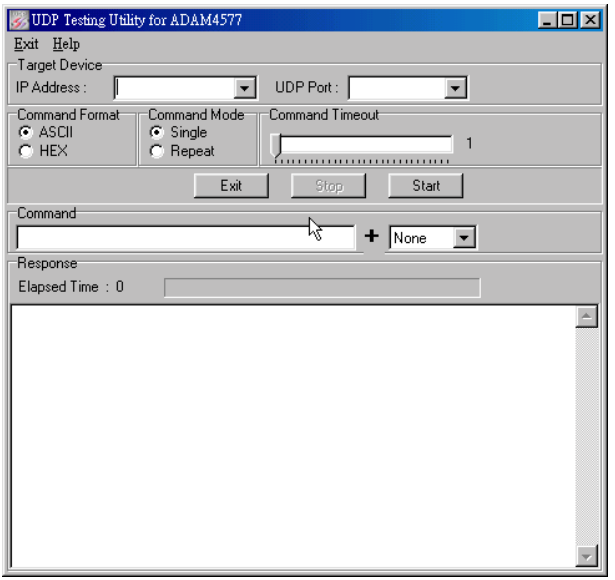
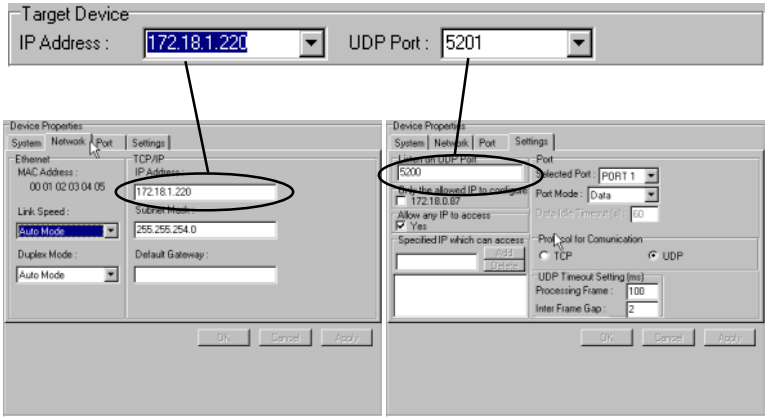


Figure 3-12 UDP Testing utility Windows

In this section, we will describe the function by item in the UDP Testing Utility.

Target Device & UDP Port

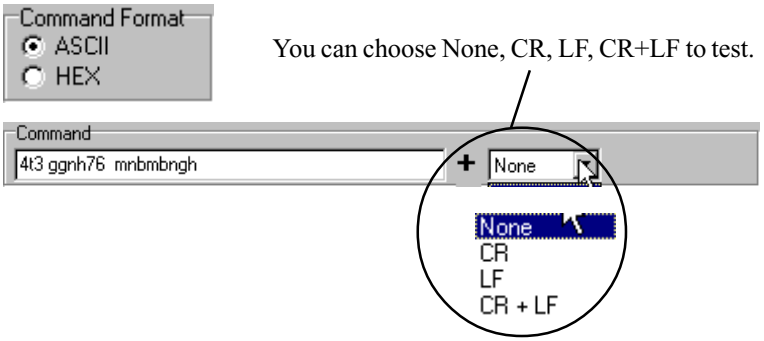


You can set Target Device IP Address according to Network IP Address in Configuration Utility. And UDP Port is depended on Setting Listen on UDP Port in Configuration Utility. “UDP Port” value is equal to “Listen on UDP Port” value plus one.

For Example: If your Listen on UDP Port is setting 5500, UDP Port in UDP Testing Utility must set 5501.

Command Format

This option have two choices, one is ASCII and another is HEX. This will decide Command blank what to display.



The command edit control can be inputted in ASCII code ast choose ASCII Command Forma, and the command edit control can be inputted in HEX format as choose HEX Coomand.

Command Mode

Single Mode means command is running only one time to test UDP Mode. Command is running repeatedly to test UDP Mode as you choose Repeat Mode.

Command Timeout

The Timeout is the Host PC waiting time from ADAM-4577, in this period Host PC doesn't receive any response from ADAM-4577, it will display "Timeout" as setting time is over.

For Example, if setting Command Timeout is 12 sec., Host Pc will wait ADAM-4577 response until 12 sec. is over. As 12 sec. is over, Host PC did not receive any response from ADAM-4577 , it will appear the following frame :

Send Command to the [IP Address : UDP Port] Timeout

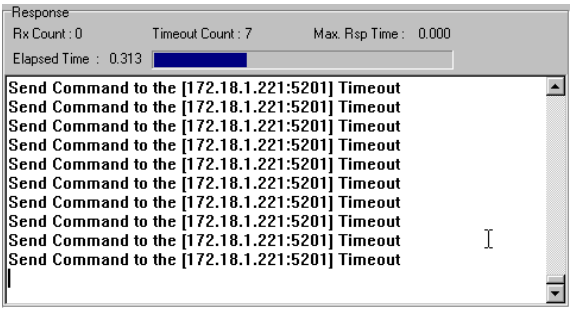


Figure 3-13 Timeout Frame

Following Frame is UDP Testing Utility is running test as UDP responses well.

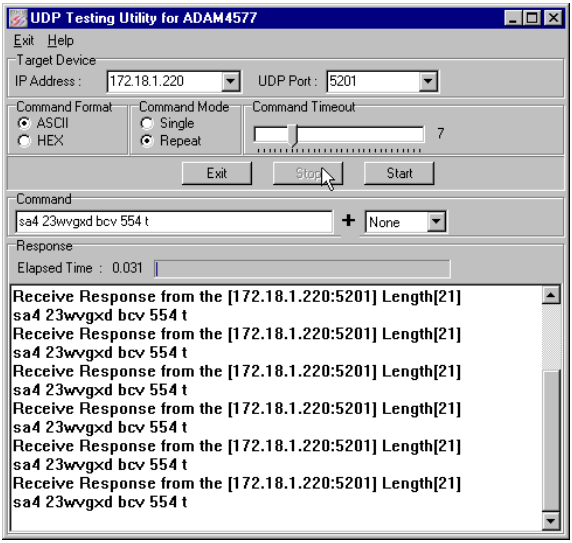


Figure 3-14 Command ASCII Testing Windows

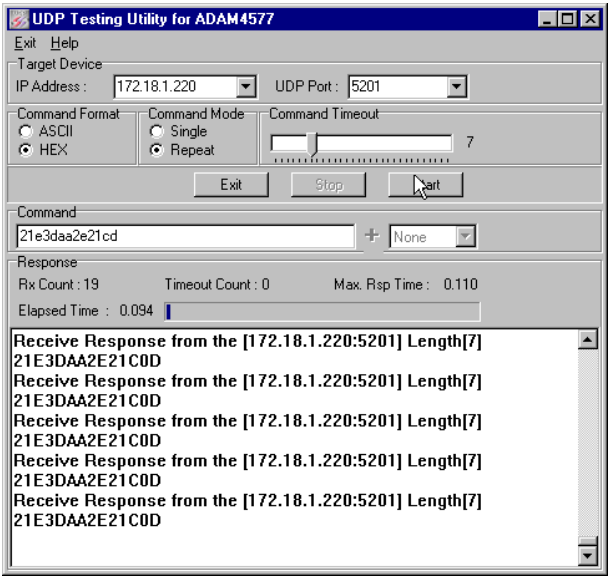
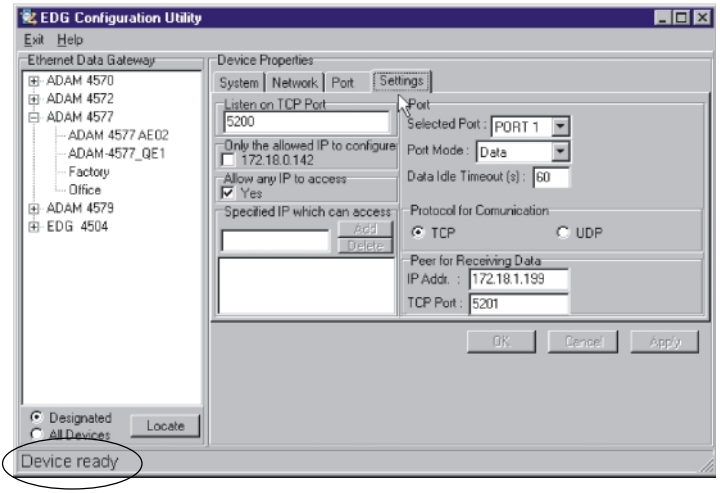


Figure 3-15 Command HEX Testing Windows

3.4 Status Messages



The status message shown at the bottom of the utility window reflects the current status of ADAM-4577.

"Read"
The configuration utility has found the ADAM-4577 and it is ready for use.

"Searching EDG Devices"
The configuration utility is searching the ADAM-4570/4571/4572/4577/4577/EDG-4504

"Querying DATA from EDG Devices"
The configuration utility is getting data from the ADAM-4570/4571/4572/4577/4577/EDG-4504.

"Device Ready"
The ADAM-4570/4571/4572/4577/4577/EDG-4504. is ready to be configured and is now waiting for acknowledgement from the device.

Chapter 4

Network Architecture and Example Code

ADAM-4577 is one port universal series device which supprots TCP/ UDP protocol. TCP mode applies to Polling, Event-handling, and Peer-to-peer network architecture. UDP mode only applies to Peer-to-peer. ADAM-4577 provides the flexible network environment , you can use it according to your application. As following, we will demonstrate the network architecture and example code base on TCP and UDP mode.

4.1 TCP Mode

4.1.1 Polling Network Architecture

If you want to use host PC to poll the serial devices which connect to ADAM-4577 via Ethernet, you can use polling network architecture.

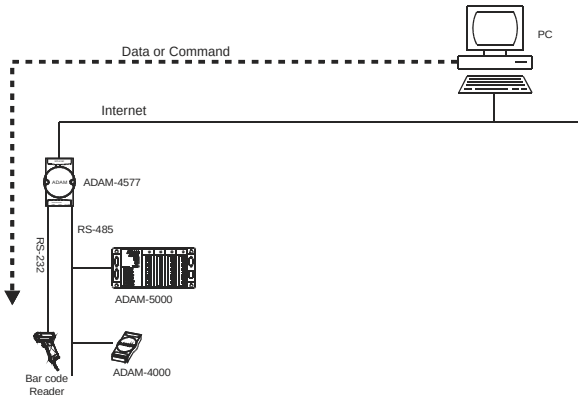


Figure 4-1 Network architecture-Polling

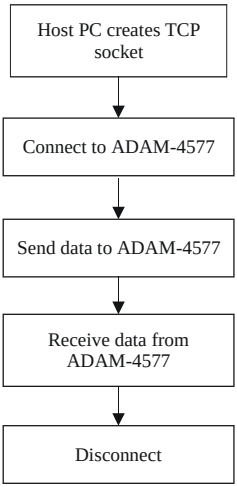


Figure 4-2 Flow chart-Polling network

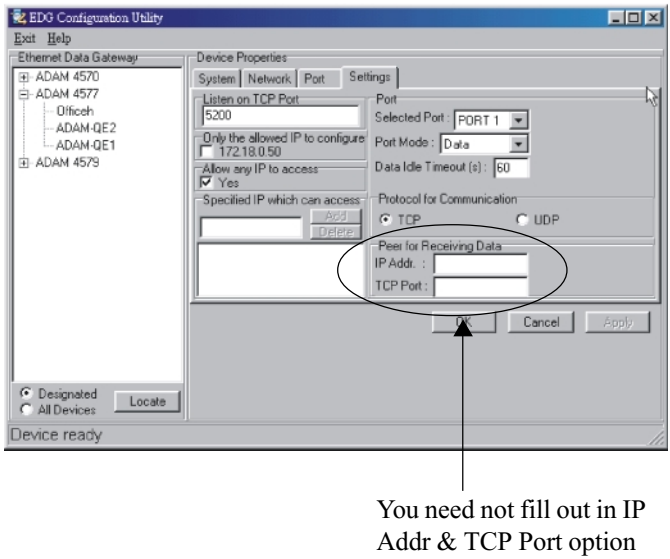


Figure 4-3 Polling Setting Windows

Example:

```
SOCKADDR_IN Dst4577Addr;
SOCKET Dst4577Sock;
char RxData[10];
memset(&Dst4577Addr, 0, sizeof(SOCKADDR_IN));
Dst4577Addr..sin_family = AF_INET;
Dst4577Addr..sin_addr.s_addr = inet_addr("10.0.0.1");
//Indicate the IP Address of ADAM-4577 that you want to connect.//
Dst4577Addr..sin_port = htons(5201);
// Indicate which port of ADAM-4577 you want to access//
// TCP port no. of Port1 = TCP port +1//
// TCP port no. of Port2 = TCP port +2//
Dst4577Sock = socket(AF_INET, SOCK_STREAM, 0));
// ADAM-4577 creates the TCP socket//
connect(Dst4577Sock, (sockaddr *)&Dst4577Addr,
sizeof(Dst4577Addr));
//Connect to the ADAM-4577//
send(Dst4577Sock, "0123456789", 10, 0);
//Send data "0123456789" to the port of ADAM-4577//
recv(Dst4577Sock, RxData, 10, 0);
//Receive the data from the port of ADAM-4577//
closesocket(Dst4577Sock);
//Disconnect from the ADAM-4577//
```

4.1.2 Event-handling Network Architecture

If an event occurs from serial devices connected to the ADAM-4577, the host PC can get the data via the Ethernet. You can use an event-handling network architecture.

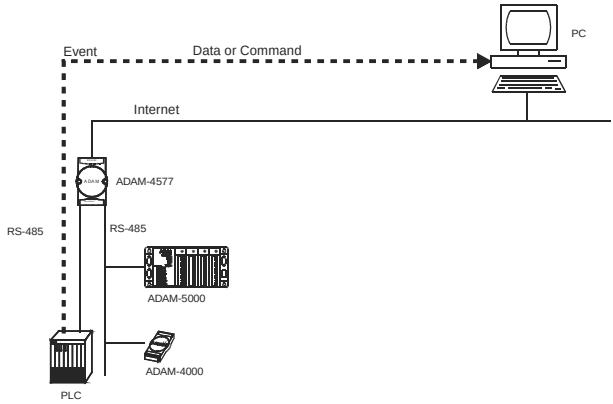


Figure 4-4 Network architecture-Event handling

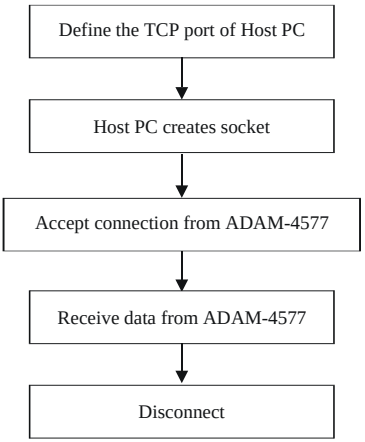


Figure 4-5 Flow chart-Event handling network

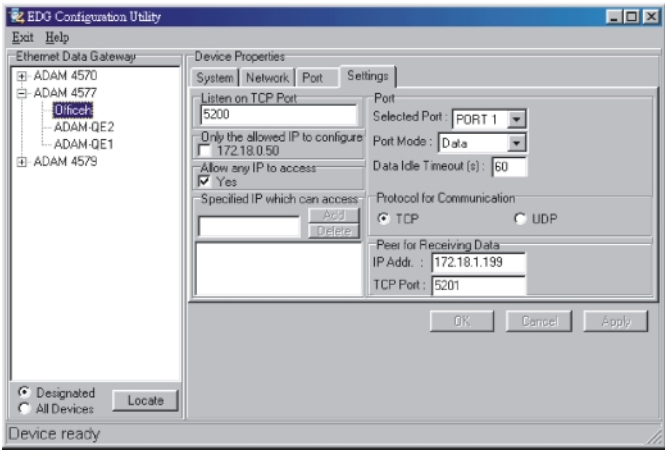
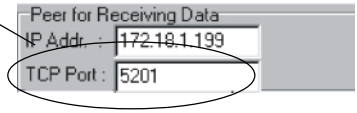


Figure 4-6 Event handling Setting Windows

Example:

```
SOCKADDR_IN HostAddr;
SOCKET HostSock;
SOCKADDR_IN ClntAddr;
SOCKET ClntSock;
int ClntAddrLen;
char RxData[256];
memset(&HostAddr, 0, sizeof(SOCKADDR_IN));
HostAddr..sin_family = AF_INET;
HostAddr..sin_addr.s_addr = INADDR_ANY;
HostAddr.sin_port = htons (5201);
```




```
//Define the TCP port of host PC. It's the same as the value that you
key-in it in the "Peer for Receiving Data" item of configuration
utility//
HostSock = socket(AF_INET, SOCK_STREAM, 0);
// Create the socket of TCP on the Host//
bind(HostSock,(sockaddr *)&HostAddr, sizeof(HostAddr));
listen(HostSock, 1);
ClntAddrLen=sizeof(ClntAddr);
ClntSock = accept(HostSock, (sockaddr *)&ClntAddr, &ClntAddrLen);
//The host PC accepts the connection request from the ADAM-4577//
recv(ClntSock, RxData, 256, 0);
//Receive the data from the port of ADAM-4577//
closesocket(ClntSock);
//Disconnect from the ADAM-4577//
```

4.1.3 Peer-to-peer Network Architecture

If you want to transmit data from one serial device to another serial device via the Ethernet, you can add ADAM-4577s at both sides and use peer-to-peer network architecture.

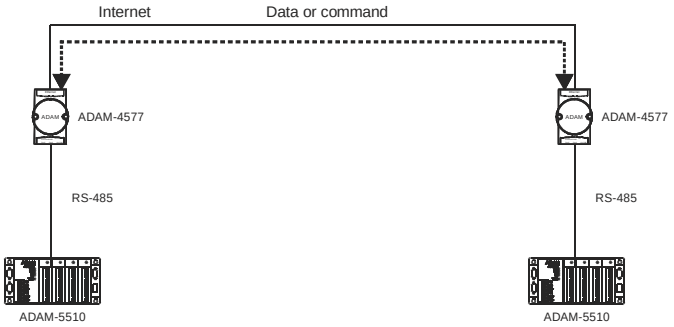


Figure 4-7 Network architecture- Peer-to-peer

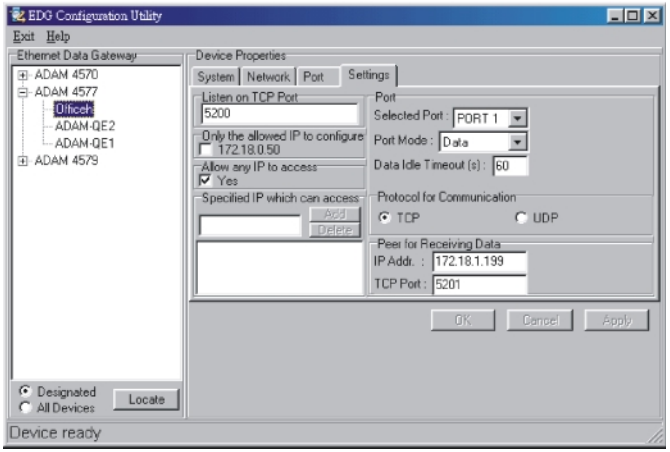


Figure 4-8 Peer-to-peer Setting Windows

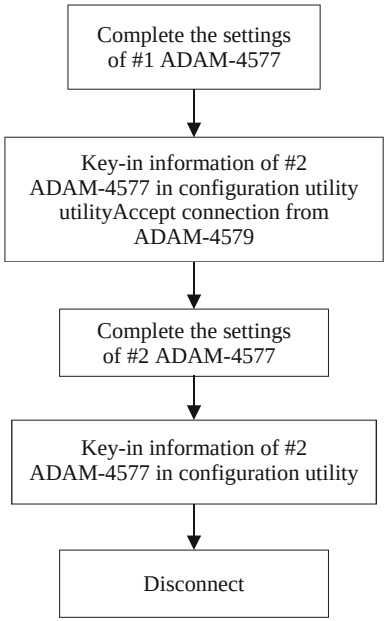


Figure 4-9 Flow chart- Peer-to-peer network

Example:

1. Complete the settings of #1 ADAM-4577

   #1 ADAM-4577

   Module name: Office

   IP address: 172.18.1.198

   TCP port: 5200

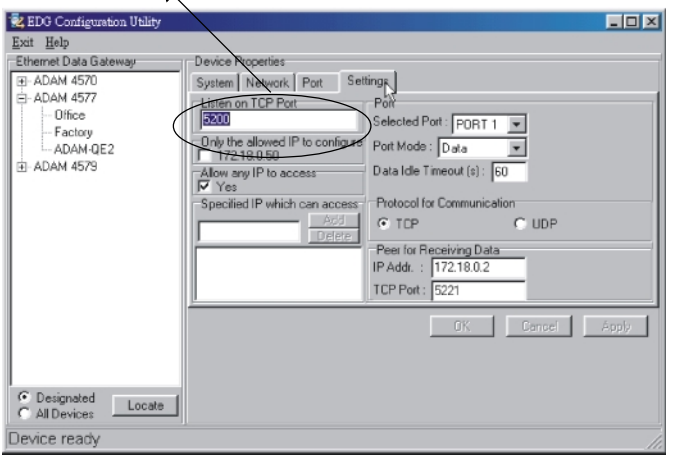


Figure 4-10 #1 ADAM-4577 configuration utility

2. Find out the IP address and TCP port of #2 ADAM-4577 that you want to connect.

   #2 ADAM-4577

   Module name: Factory

   IP address: 172.18.0.2

   TCP port: 5220

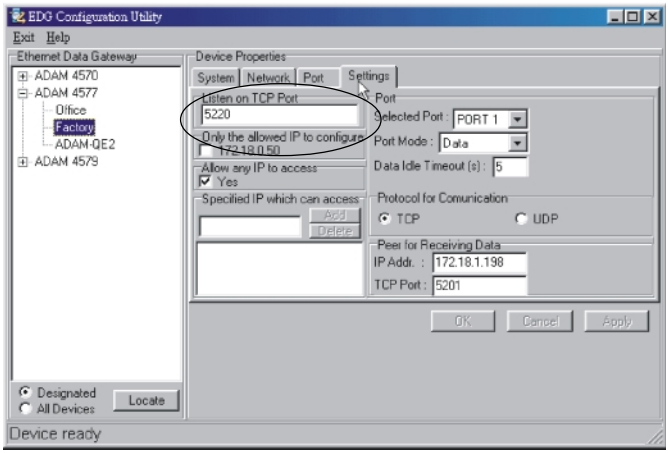


Figure 4-11 #2 ADAM-4577 configuration utility

3. Key-in the IP address & TCP port of #2 ADAM-4577 in #1 ADAM-4577 configuration utility.

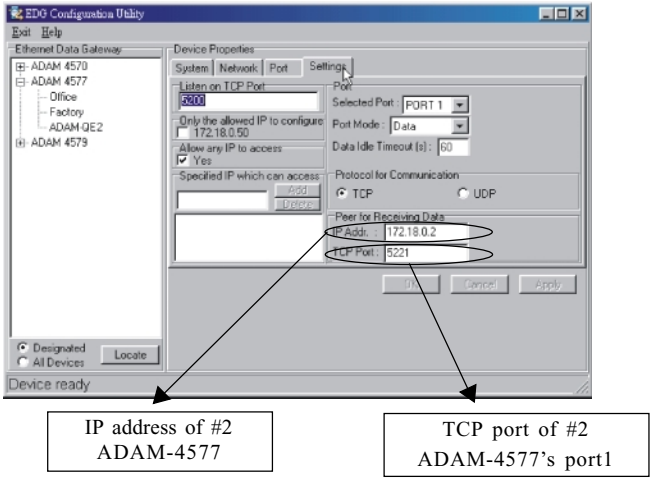


Figure 4-12 Key-in the information of #2 ADAM-4577

4. Follow the above procedure and complete the settings of #2 ADAM-4577 in the configuration utility.

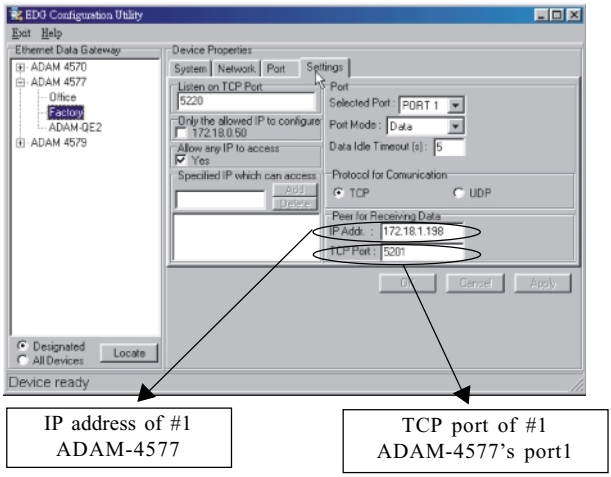


Figure 4-13 Key-in the information of #1 ADAM-4577

4.2 UDP Mode

4.2.1 Polling Network Architecture

In UDP Mode, If you want to use host PC to poll the serial devices, you can use polling network architecture.

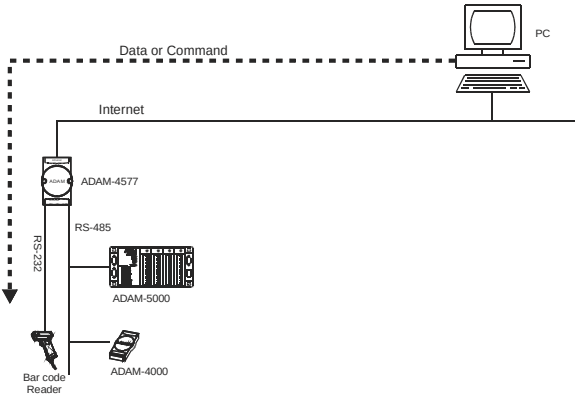


Figure 4-14 Network architecture-Polling

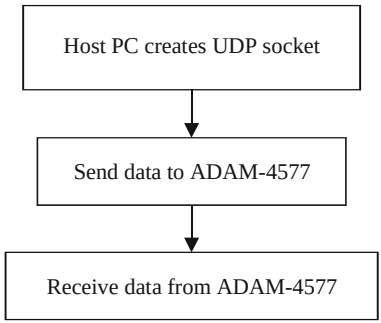


Figure 4-15 UDP Mode Flow chart-Polling network

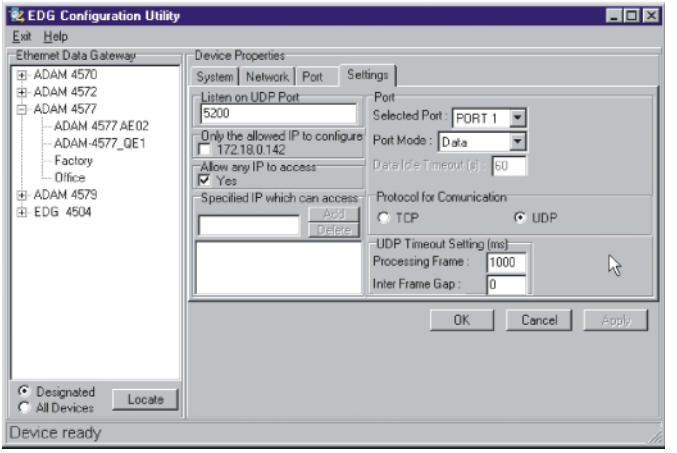


Figure 4-16 UDP Polling Setting Windows

Example:

```
WSADATA wsd;
SOCKADDR_IN Dst4577Addr;
SOCKADDR_IN RecvedAddr;
SOCKET Dst4577Sock;
int iRecvedAddrLen;
int i;
char RxData[10];
WSAStartup((MAKEWORD(1, 1)), &wsd);
memset(&Dst4577Addr, 0, sizeof(SOCKADDR_IN));
Dst4577Addr.sin_family = AF_INET;
Dst4577Addr.sin_addr.s_addr = inet_addr("172.18.1.74");
```

```
//|
//+--Indicate the IP Address of ADAM4577 which you want to access
Dst4577Addr.sin_port = htons(5201);
//|
//+-- The UDP port of the serial port on ADAM-4577
// Creat a UDP socket on the local PC
Dst4577Sock = socket(AF_INET, SOCK_DGRAM, 0);
sendto(Dst4577Sock, (char *)"0123456789", 10, 0, (sockaddr
*)&Dst4577Addr, sizeof(Dst4577Addr));
iRecvedAddrLen = sizeof(RecvedAddr);
recvfrom(Dst4577Sock, (char *)RxData, 10, 0, (sockaddr
*)&RecvedAddr, &iRecvedAddrLen);
for(i = 0; i < 10; ++i)
printf("%c ", RxData[i]);
printf("\n");
closesocket(Dst4577Sock);
return 0;
```