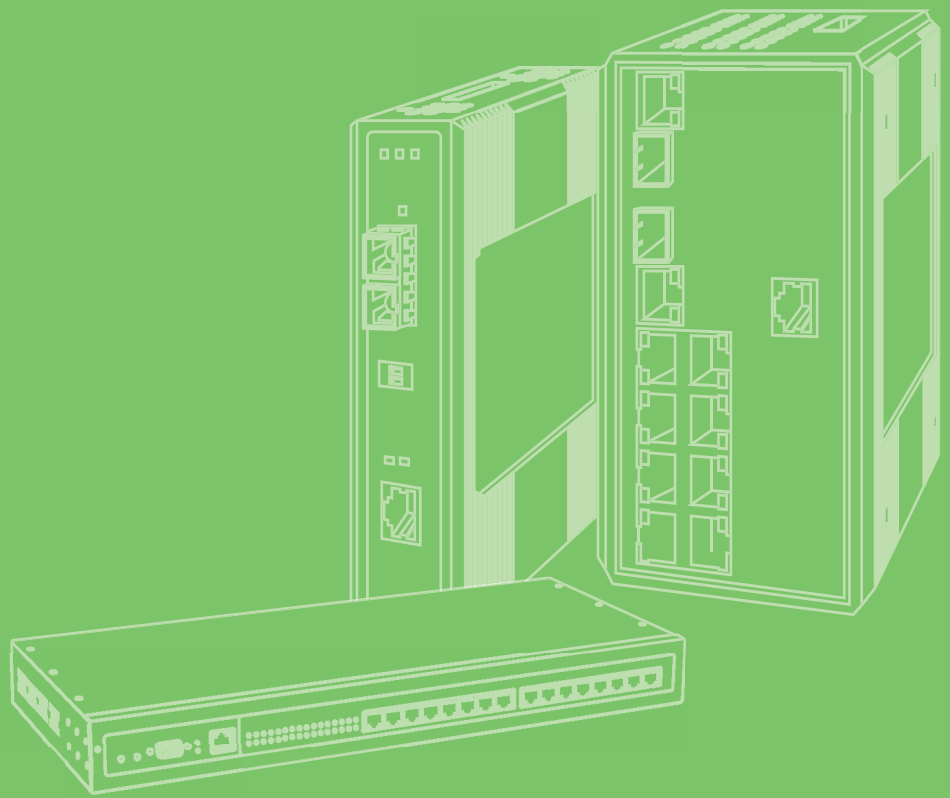


User Manual



EKI-1321/1322

1/2-port RS-232/422/485 to GPRS
IP Gateway

ADVANTECH

eAutomation

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Product Warranty (5 years)

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 persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

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 is 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. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen 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, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date 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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Declaration of Conformity

CE

This product 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 product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

Consult the dealer or an experienced radio/TV technician for help.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
 - Product name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.

6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
 - The power cord or plug is damaged.
 - Liquid has penetrated into the equipment.
 - The equipment has been exposed to moisture.
 - The equipment does not work well, or you cannot get it to work according to the user's manual.
 - The equipment has been dropped and damaged.
 - The equipment has obvious signs of breakage.
15. **DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -40° C (-40° F) OR ABOVE 75°C (167° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.**
16. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**
17. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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Chapter 1

Overview

1.1 Introduction

Advantech's EKI-1300 series of Industrial Device Servers are a robust, feature-rich, and cost effective way to network-enable equipment in an industrial automation environment. The EKI-1321/1322 provides one or two serial ports, cellular GPRS interface to connect any RS-232/422/485 devices to Cellular WAN. These wireless serial device servers provide serial-to-wireless network connectivity as an alternative to wired Ethernet connectivity and enable virtually any serial device or equipment to be remotely accessed, controlled, monitored, or shared on an cellular wireless network.

By encapsulating serial data and transporting it over Ethernet, the EKI-1321/1322 allows virtual serial links over Ethernet and IP (TCP/IP, UDP/IP networks. After Advantech Serial Device Server Configuration Utility installation, standard serial operation calls are transparently redirected to the serial device servers, guaranteeing compatibility with legacy serial devices and enabling backward compatibility with existing software. EKI-1321/1322 also supports serial tunneling, allowing two native serial devices to communicate over a network without any hosts and programming.

As a result, you can extend limited distance, point-to-point, direct serial connections within the plant, throughout the factory, the facility, the office building, or across the global enterprise.

The EKI-1321/1322 provides an impressive list of features and functions enabling multiple industrial devices to be connected, controlled, configured, managed, and updated over a network. With serial ports and cellular GSM/GPRS/EDGE, the EKI-1321/1322 can easily connects multiple serial devices to the internet.

The transmission speed of the EKI-1321/1322 is up to 921.6 Kbps totally outstripping the competition to meet the demand for high-speed exchange. Functionally transparent and efficient, the EKI-1321/1322 is especially designed for remotely controlling and monitoring devices via the Internet.

Type of supported devices:

- Human Machine Interface (HMI)
- Programmable Controller (PLC)
- Flow meters
- Temperature / pressure monitoring equipment
- Gas leak detection device
- Scales
- Power monitoring equipment
- Data Acquisition Modules

EKI-1321/1322 provides various TCP/UDP operations: COM port redirection (Virtual COM port), TCP server/ client and UDP mode, RFC2217 and SMS Tunnel mode. Serial devices can be connected by means of multi-access modes.

1.2 Features

- Expand up 255 serial ports for one Windows 2000/XP/Vista (x86) host
- Link any serial device to a cellular network
- Supports high transmission speed up to 921.6 kbps
- Supports LED indicators: easy to diagnose
- Supports various operation modes: VCOM, RVCOM, TCP Server/Client, UDP Server/Client, RFC2217 and SMS Tunnel
- Supports multi-access: allows a max. of 5 hosts to access one serial port
- A max of 4 hosts can be accessed in TCP client and command response mode
- Mounts on DIN-rail, or panel
- 15 KV ESD protection for all signals
- 2KV isolation protection for all serial signals (EKI-1321 only)

1.3 Specifications

Cellular Interface

- Standard Compliance: GSM/GPRS Quad Band 850/900 and 1800/1900MHz
- Antenna Connector: Reverse SMA
- GPRS Standard:
 - GPRS Multi-slot: Class 10
 - GPRS Terminal Device: Class B
 - GPRS Coding Schemes: CS1 to CS4

LAN Interface

- Ethernet: 10/100 Mbps auto sensing
- No. of Ports: 1
- Port Connector: RJ45
- Protection: Built-in 1.5 KV magnetic isolation

Serial Interface

- Interface: RS-232/422/485, software selectable
- No. of Ports:
 - EKI-1321:1 w/ isolation
 - EKI-1322: 2
- Port Connector: DB9 male
- Baud Rate: 50 bps to 921.6 kbps, any baud rate setting
- Parity: None, Even, Odd, Space, Mark
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Flow control: RTS/CTS, DTR/DSR, XON/XOFF, None
- Signals:
 - RS-232: TxD, RxD, CTS, RTS, DTR, DSR, DCD, RI, GND
 - RS-422: TxD+, TxD-, RxD+, RxD-, GND
 - RS-485: Data+, Data-, GND
- Protection: 15 KV ESD for all signals

Software

- Utility: Advantech Serial Device Server Configuration Utility
- Driver support: 32-bit/64-bit Windows 2000/XP/Vista/7, Windows Server 2003/2008, Windows CE 5.0, and Linux
- Operation Mode:
 - COM port redirection (Virtual COM)
 - RVCOM (Reversed Virtual COM)
 - TCP/UDP server (polling) mode
 - TCP/UDP client (event handling) mode
 - RFC2217 mode
 - SMS Tunnel
 - IP Gateway with VPN
- Configuration: Web interface, Windows utility
- Protocol: ICMP, TCP/IP, UDP, DHCP Client, Telnet, DNS, SNMP, HTTP, HTTPS, NTP, Sntp, ARP, SSL
- Router/Firewall: NAT, port forwarding

General

- LED indicators:
 - System: Power, Status
 - GSM/GPRS: Signal Strength, GPRS Ready
 - LAN: Link/Active, 10/100M
 - Serial: Tx, Rx
 - Others: SD
 - EKI-1321 Others: Relay, DI

Power

- Power input: 12 to 48 V_{DC} x 2
- Power connector: Terminal block
- Power Consumption:
 - EKI-1321: 8W
 - EKI-1322: 8.5W

Environmental

- Operation Temperature: -30 ~ 65°C (-22 ~ 149°F)
- Storage Temperature: -40 ~ 75°C (-40 ~ 167°F)
- Operating Humidity: 5 to 95% RH

Regulatory Approvals

- EMC: CE, FCC Part 15 Subpart B (Class A)

1.4 Package Check List

- EKI-1321/1322 GPRS serial device server
- 1 x RS-232 loopback DB9 tester
- Panel mounting bracket
- CD-ROM for utility and manual
- EMI Dia. 10.8mm/L82mm 5 Band GPRS Antenna

Optional Accessory

- OPT1-DB9-AE D-sub 9 (female) to terminal block connector (for EKI-1000 series RS-422/485 use)

Chapter 2

Getting Started

2.1 Understanding EKI-1321/1322

The EKI-1321/1322 is network-based, serial device server for connecting RS-232/422/485 devices, such as CNCs, PLCs, scales, and scanners, directly to a TCP/IP network. Once connected through EKI-1321/1322, serial device will be able to send and receive data through cellular ISP network like any other network device. It extends traditional COM ports of a PC with access over a TCP/IP network. Through networking, you can control monitor remote serial devices either over a LAN or over the WAN. Since the EKI-1321/1322 is connected through a TCP/IP network, you might need to know some basic facts about networking in order to get the server hooked up correctly.

2.1.1 Product Description

The EKI-1321/1322 is designed to network-enable any RS-232/422/485 serial devices and provides industry-grade hardware and easy-to-use software to make connecting serial devices to an Ethernet network a surprisingly simple process. These units immediately upgrade your existing serial devices for integration into the Internet world. The EKI-1321/1322 features a lot of powerful functions such as: high speed data transfer, access-control, auto-detection of all EKI series products, remote connection from different network domain, remote firmware download, and more.

After the simple installation steps to attach your network and serial device to the appropriate connectors on the serial device servers and driver installation, you will be able to communicate with the serial devices via its own application software and with the EKI serial device server. COM port redirector, TCP server mode, TCP client mode, UDP server mode, UDP client mode, RFC2217, SMS Tunnel and IP Gateway mode are all different schemes to make a serial connection across using one or more Serial device server.

EKI-1321/1322 has GSM/GPRS transceiver in addition to its serial and Ethernet port. Each serial port is connected to the serial communication port of a device. The GSM/GPRS transceiver connects to another device through ISP cellular network.

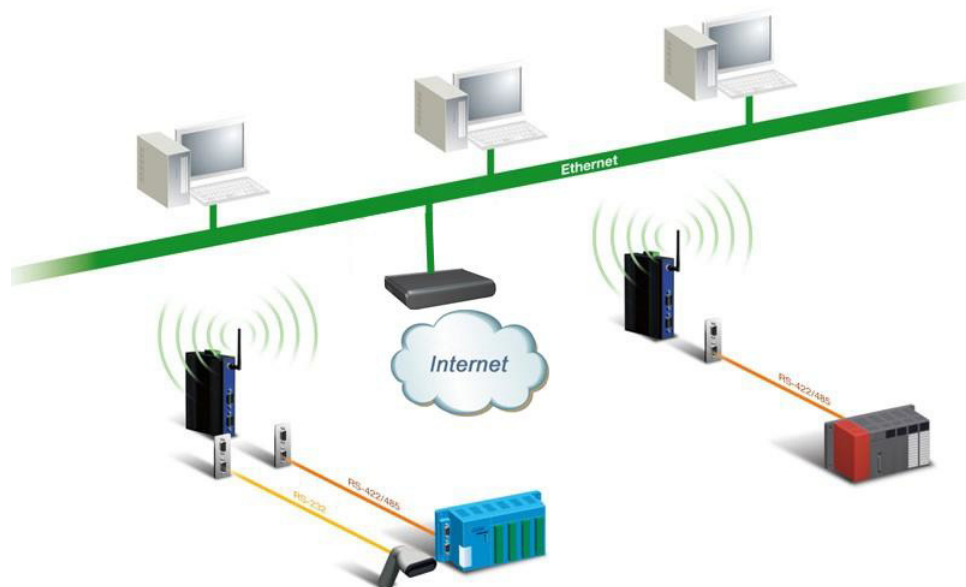


Figure 2.1 Cellular Network Connection

2.1.2 COM Port Redirector (Virtual COM Port)

Advantech Serial Device Server Configuration Utility is a serial COM port redirector that creates virtual COM ports and provides access to serial device connected to Advantech serial device server. You can configure the serial device server and enable the Virtual COM port using one integrated utility. Advantech Serial Device Server Configuration Utility allows you to configure Microsoft applications to communicate with network enabled serial device servers as easily as if they were physically installed in or directly connected on the PC.

The Advantech redirector can create up to 255 virtual COM ports. Application on the host can open virtual COM port to access the serial device servers at the same time. The redirector will handle each active virtual COM port as a separate TCP connection to Advantech serial device servers.

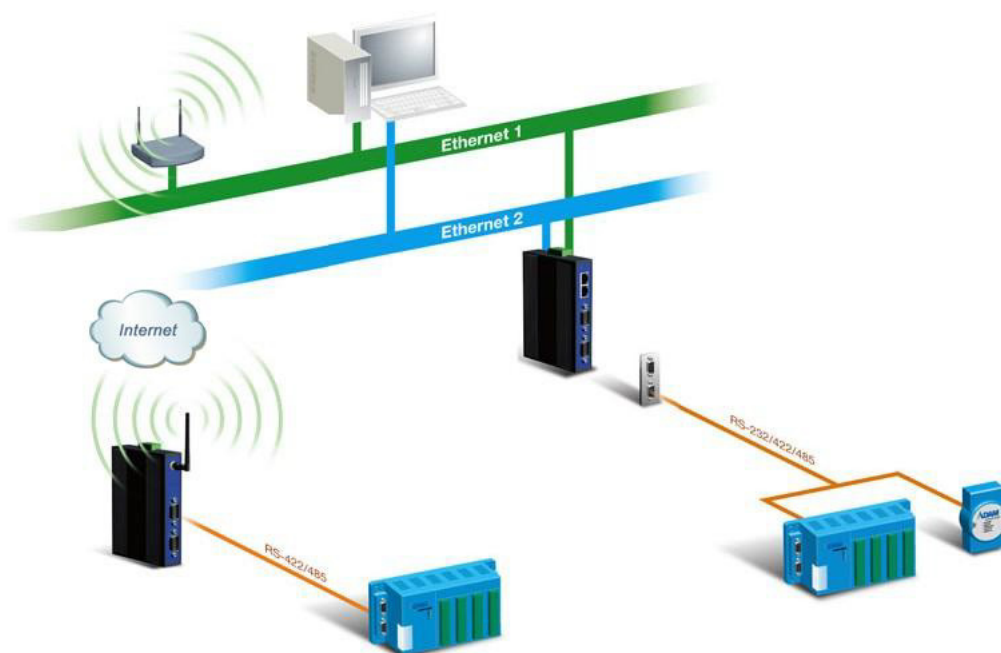


Figure 2.2 COM Port Redirector

2.1.2.1 Normal Mode

The Advantech redirector connects the Advantech serial device servers while an application opens the COM port and disconnects from the Advantech serial device servers when the application closes the COM port. The redirector uses TCP network connections to the Advantech serial device server to gain access to the connected serial devices.

2.1.2.2 Multi-Access Mode (Shared COM port mode)

Most of serial devices are connected directly and physically to the PC serial ports via a cable. The operation system, ex. Windows XP, provides the COM ports that user's application can access, and control the serial device through the serial cable. This means that the serial device can be connected to one host and only one application on this host can handle input, output and control operation on this device.

If you want to run more than one applications to use a serial device, you can employ EKI serial device servers that provide a virtual COM port for a host or multi-hosts on an Ethernet network. EKI serial device server is located between hosts and serial devices. Each serial port on the EKI serial device server can allow max. of five host connections through cellular WAN. There are two major operation modes for Multi-Access Mode. First one is **broadcast mode**; EKI serial device server handles a command from one application and replies the data from the serial port to all applications that are connecting this serial port. Another is **polling mode**; EKI serial device server handles the command from one application and reply to this application only. Query from other applications must be queued and wait for current process completing.

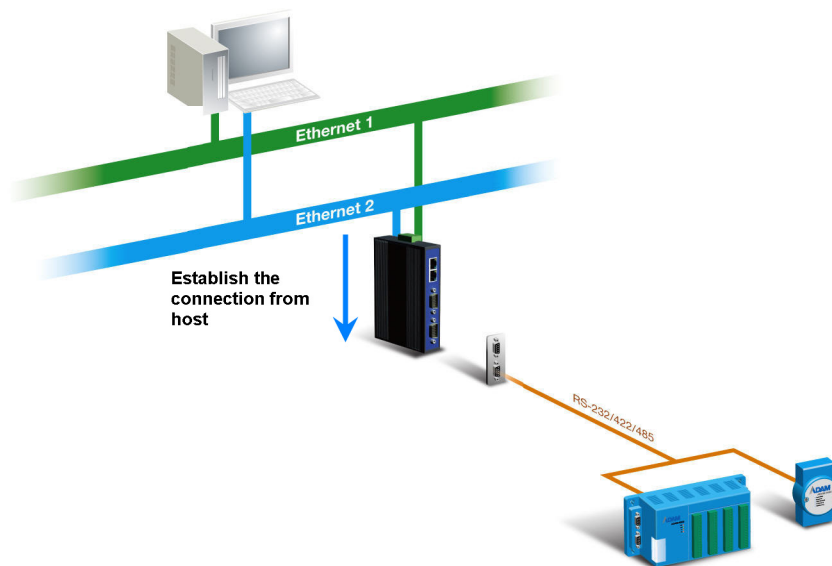


Figure 2.3 Multi-Access Mode

By using a serial device server to share serial device, you eliminate the separate serial lines and serial devices that can be attached to individual hosts. Collecting the data from these serial devices become more easily and more effectively.

2.1.2.3 Reversed Virtual COM Port Mode (RVCOM)

Sometimes, the EKI serial device server has a dynamic IP address, or even a private IP address. The host PC can't connect to the device directly. With the RVCOM function, the EKI serial device server can connect to a specific PC when booting up. That can help the end devices easily cross the Ethernet barrier.

When the application opens, the RVCOM port and the connection between host and device is not yet established, the open COM port action still will return success. And the write action will always be successful and the read action will not trigger or just no data. The situation is similar to the COM port that doesn't connect to any serial device.

After the EKI serial device server is established, the Ethernet connection, the behavior is similar to VCOM mode.

2.1.3 TCP Server Mode

In TCP server mode, you might initiate the TCP connection from host to EKI serial device server. This operation mode support max. five simultaneous connections for each serial port on EKI serial device server from one host or several hosts, however multi-hosts collect the data from one serial port at the same time

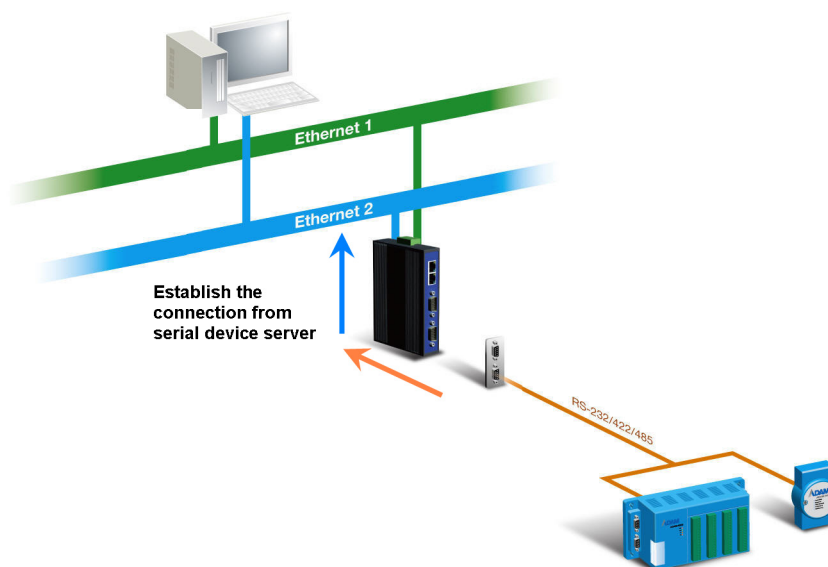


Figure 2.4 TCP Server Mode

2.1.4 TCP Client Mode

In TCP Client mode, the TCP connection will be established from EKI serial device server. This operation mode supports maximum four simultaneous connections for each serial port on EKI-1321/1322 to one host or several hosts. You should configure the IP address and TCP port number of the network hosts which the EKI serial device server connect to using Advantech Serial Device Server Configuration Utility. After configuration, when EKI serial device server receives the data from serial port, the device server will employ the connection to hosts which are configured.

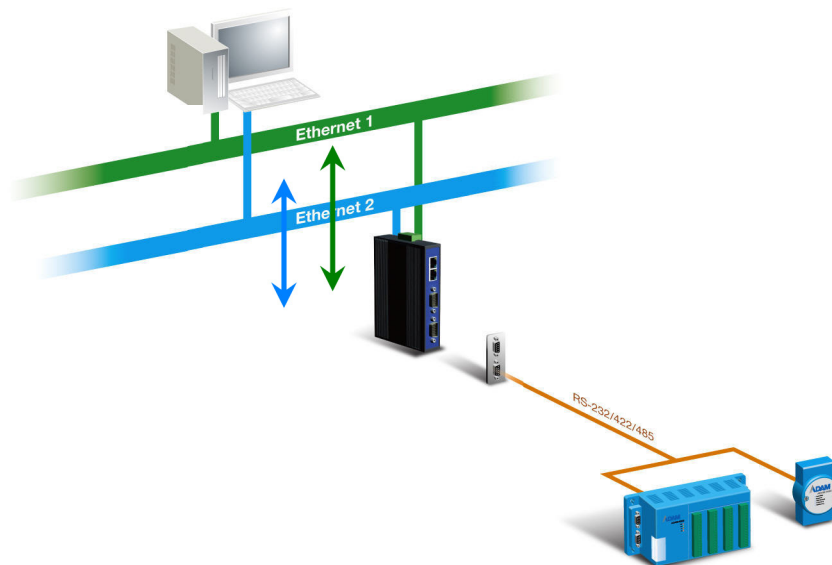


Figure 2.5 TCP Client Mode

2.1.5 SMS Tunneling Mode

Two native serial devices can communicate over an Ethernet network without any intermediate host PC and software programming. SMS Tunneling is very simple to use. You can use Advantech Serial Device Server Configuration Utility to configure SMS Tunnel Mode can be used to update the message on a remote display panel, place refill orders for vending machines, maintain remote rental equipment, or even help create an SMS alarm by directly transforming text, binary, or unicode data from a legacy device to short messages.

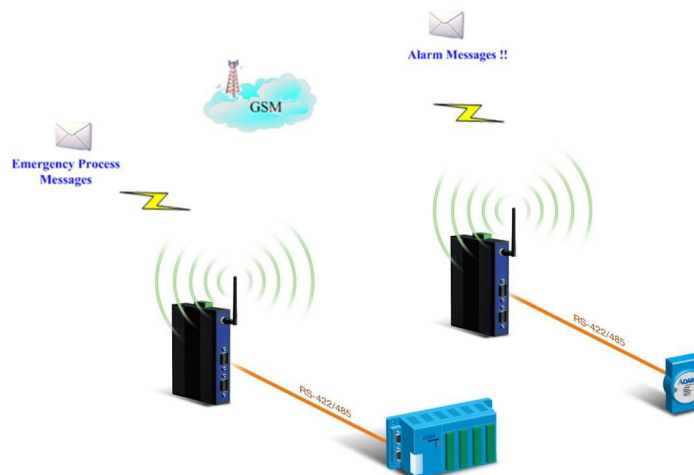


Figure 2.6 SMS Tunneling Mode

2.1.6 UDP Server/Client Mode

UDP is used primarily for broadcasting messages over a network. In the UDP server mode, EKI-1321/1322 access max. of 8 hosts' UDP message. In the UDP client mode, EKI serial device servers transmit UDP message to max. of 4 hosts simultaneously.

2.1.7 RFC2217 Mode

RFC2217 mode is similar to virtual COM mode in that a driver is used to establish a transparent connection between a host computer and a serial device by mapping the serial port on EKI-1321/1322 device to a local COM port on host computer. RFC2217 defines general COM port control options based on the Telnet protocol. Third party drivers supporting RFC-2217 are widely available on the Internet and can be used to implement virtual COM mapping to the serial port of your device.

2.2 Hardware

In this section, we will give you an overview of EKI-1321/1322 hardware and installation.

2.2.1 LED Indicators

There are LEDs display the power status, network status, and serial communication status located on the front panel of EKI-1321 and EKI-1322, each of them has its own specific meaning as below.

Table 2.1: EKI-1321/1322 LED Indicators

LED Name	LED Color	LED Description
PWR1 Signal Strength 3	Green Steady On	Power 1 is on
	Orange Steady On	RSSI is better than -51 dBm
	Off	Power 1 is off and RSSI signal strength is poor than -51 dBm
PWR2 Signal Strength 2	Green Steady On	Power 2 is on
	Orange Steady On	RSSI is better than -109 ~ -51 dBm
	Off	Power 2 is off and RSSI signal strength is poorer than -109 dbm
GPRS Ready Signal Strength 1	Green Steady On	GPRS network is ready
	Orange Steady On	RSSI is poorer than -109 dBm
	Off	GPRS network can't be used
Status	Orange Steady On	Detect signal strength and try to dial-up ISP network
	Green Steady On	Already dial-up and get a IP Address from ISP provider (GPRS connection is ready)
Link/SD	Green Blinking	Ethernet port is transmitting or receiving data
	Orange Steady On	SD Card is inserted
10/100M	Green Steady On	Ethernet has the good link for 100Mbps
	Off	Ethernet has link to 10Mbps or no link
P1 Tx/Rx	Green Blinking	Serial port is transmitting data
	Orange Blinking	Serial port is receiving data
	Off	No data is transmitted or received through the serial port
P2 Tx/Rx	Green Blinking	Serial port is transmitting data
	Orange Blinking	Serial port is receiving data
	Off	No data is transmitted or received through the serial port

2.2.2 Dimensions (Units: mm)

2.2.2.1 EKI-1321 and EKI-1322

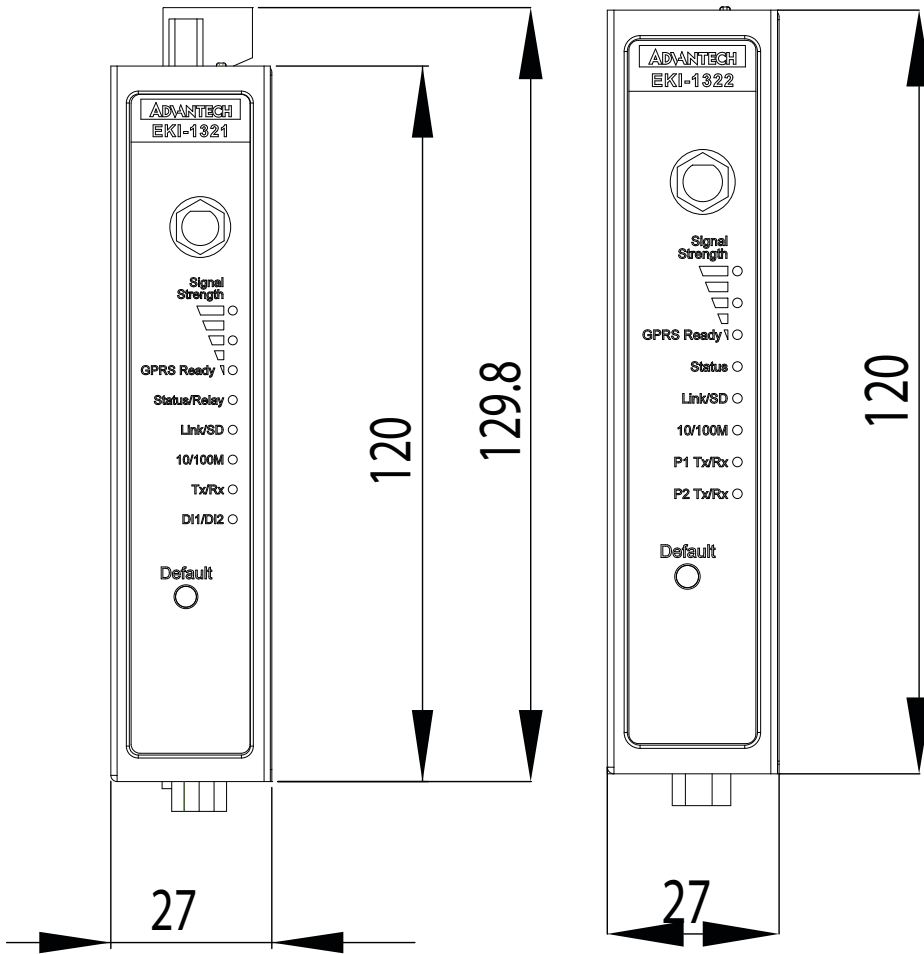


Figure 2.7 Front View of EKI-1321/1322

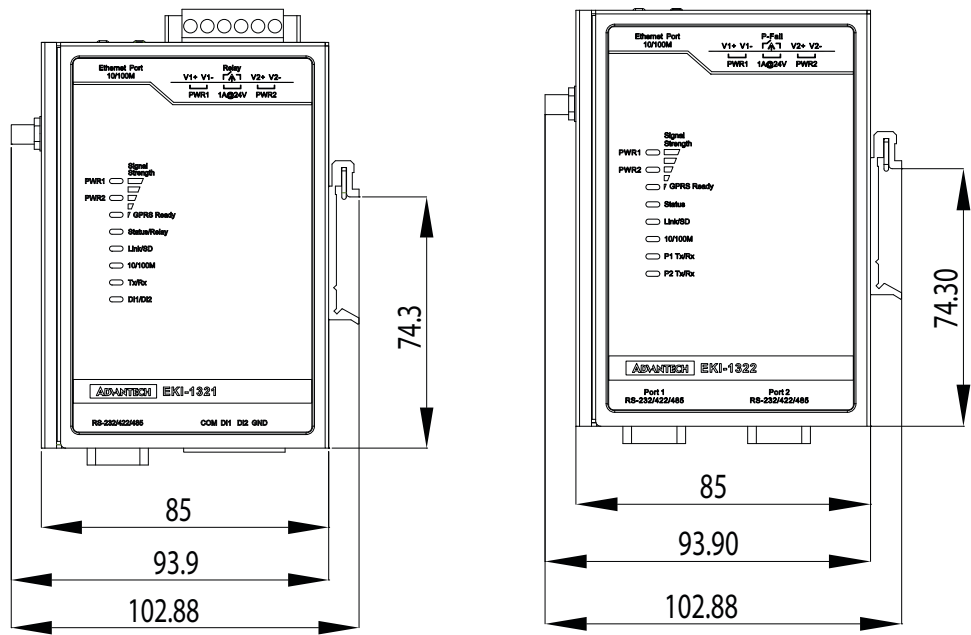


Figure 2.8 Side View of EKI-1321/1322

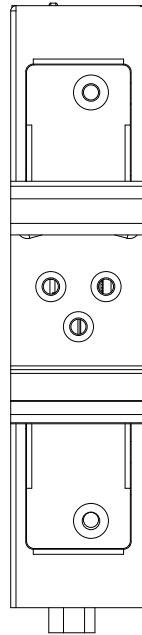


Figure 2.9 Back View of EKI-1321/1322

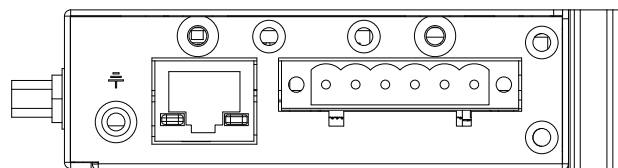
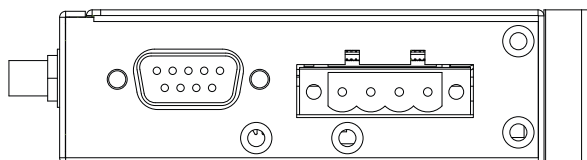
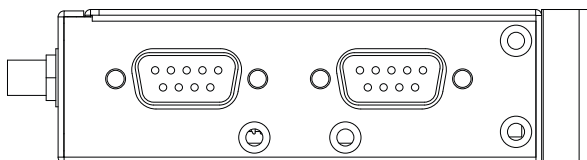


Figure 2.10 Top View of EKI-1321/1322



EKI-1321



EKI-1322

Figure 2.11 Bottom View EKI-1321/1322

2.3 Connecting Hardware

Next, we will explain how to find a proper location for your EKI-1321/1322, and then explain how to connect to the network, hook up the power cable, and connect to the EKI-1321/1322 serial port.

2.3.1 Choosing the Location

Due to its versatility and innovative design, EKI serial device server can be:

- Fixed to a panel/wall mount
- Fixed to a DIN-rail.

2.3.2 Wall/Panel Mounting

The EKI-1321/1322 can be attached to a wall or a panel using the included metal brackets. Each bracket comes with two screws; and then you can install the device firmly via the components, please see the figure as below.

2.3.2.1 Wall Mounting

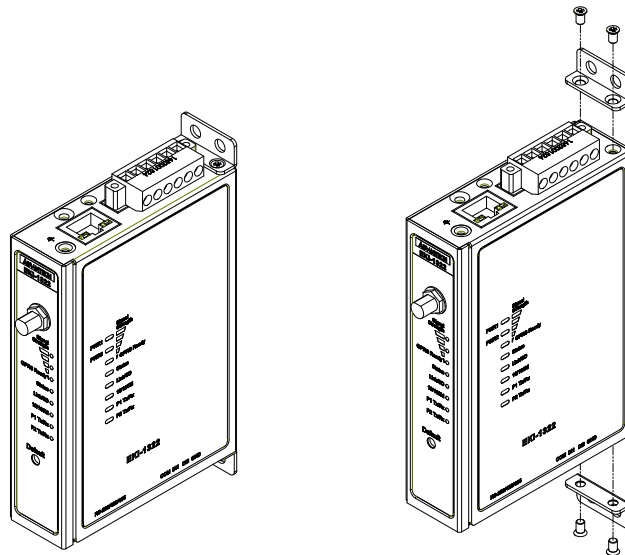


Figure 2.12 Attach the Wall Mounting Bracket

2.3.2.2 Panel Mounting

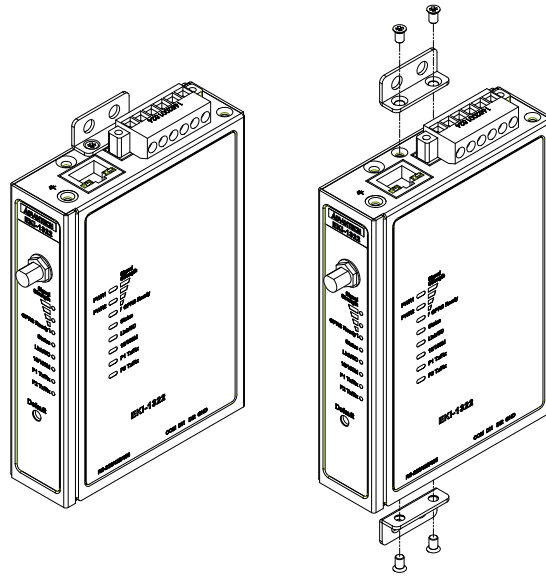


Figure 2.13 Attach the Panel Mounting Bracket

2.3.3 DIN-rail Mounting

You can mount the EKI-1321/1322 on a standard DIN rail. The DIN-rail kit is screwed on the serial device server when out of factory. If the DIN-rail kit is not screwed on the serial device server, use the three screws to attach the DIN-rail kit on the serial device server first.

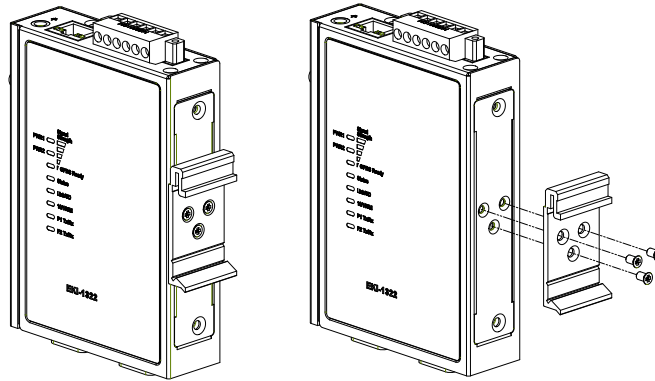


Figure 2.14 Attach to DIN-rail

2.3.4 GPRS Connection

EKI-1321 and EKI-1322 operate in the cellular GSM/GPRS environment, which access the Internet or intranet through GSM/GPRS network. Use the Ethernet interface to connect to device first. Then you can configure the setting of WAN configuration and you can build up the connection between the GSM/GPRS network and the EKI-1321 and EKI-1322

You can check the signal access strength with the GSM/GPRS signal strength LED indicators. Adjust the antenna of the EKI serial device server to optimize communication quality.

2.3.5 Power Connection

The EKI-1321/1322 supports dual 12 to 48V_{DC} power inputs.

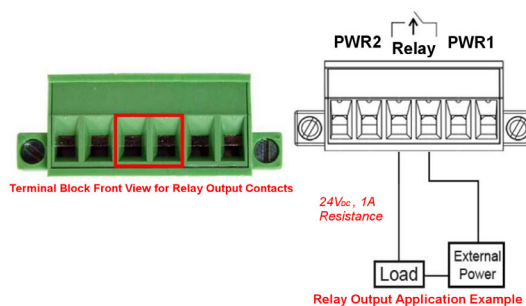


Figure 2.15 EKI-1321 Power Connector

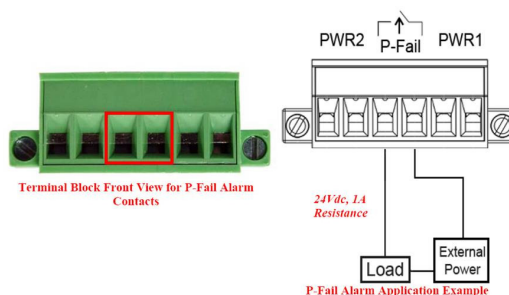


Figure 2.16 EKI-1322 Power Connector

You can connect an alarm indicator, buzzer or other signaling equipment through the relay output.

2.3.6 Serial Connection

EKI-1321/1322 provides one or two ports DB9 (male) connectors. RS-232/422/485 pin assignments as below:

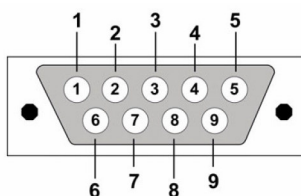


Table 2.2: EKI-1321/1322 Serial Pin Assignments

Pin	1	2	3	4	5	6	7	8	9
RS-232	DCD	RX	TX	DTR	GND	DSR	RTS	CTS	RI
RS-422	TX-	-	-	TX+	GND	-	RX+	-	RX-
RS-485	DATA-	-	-	DATA+	GND	-	-	-	-

2.4 Serial Device Server Configuration Utility

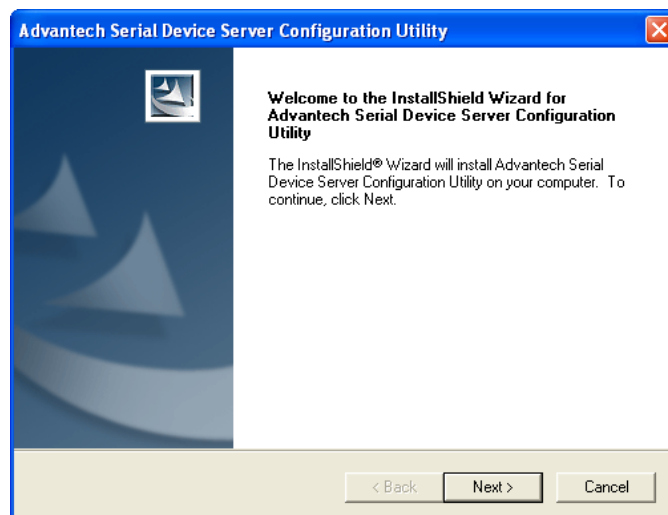
Advantech Serial Device Server Configuration Utility integrates device server management and virtual COM port mapping utility. After installation, this utility not only configures the EKI-1321/1322, but also connects and configures the ADAM series and EDG series device servers. Virtual COM port configuration and management was also integrated in this utility. The best improvement, you don't restart the host computer while you setup new virtual COM ports. When you map the virtual COM port, the COM port will enable immediately and show in Windows Device Manager.

In order to use a PC and an Ethernet network to control serial devices connected to the EKI-1321/1322, you must first have a host running Windows 2000/XP/Vista/7. This type of application also requires the host to have an Ethernet card and the TCP/IP protocol installed. The following are the installation instructions to set up the Serial Device Server Configuration Utility:

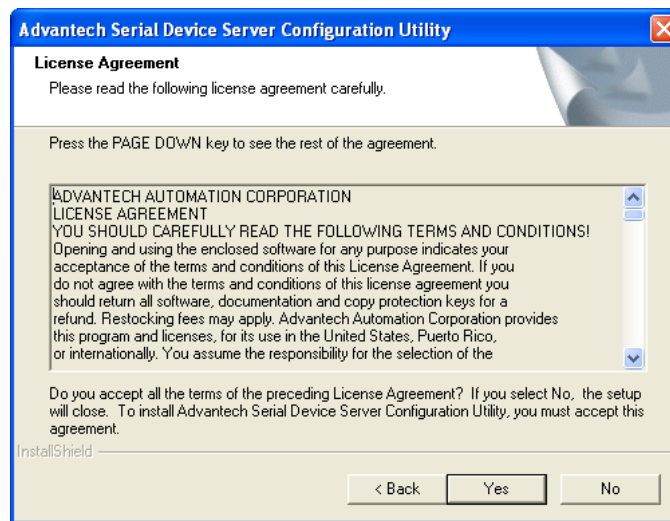
Note! Ensure Microsoft .NET Framework 2.0 has been installed on the host PC.



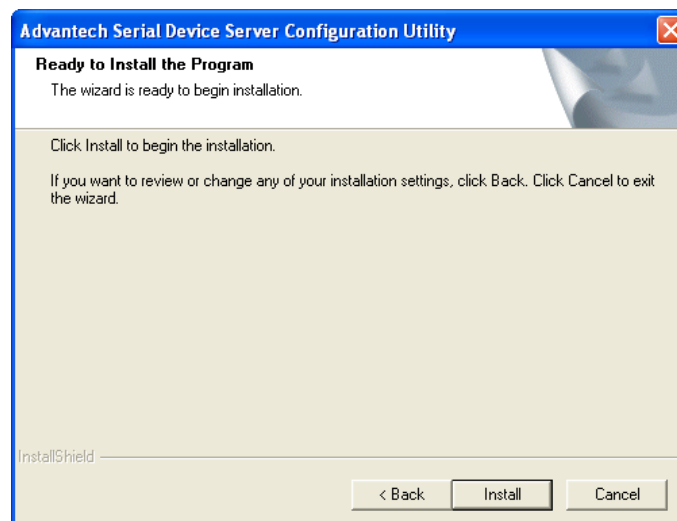
1. Insert the Advantech IEDG CD-ROM into the CD-ROM drive (e.g. D:\) on the host PC.
2. Use Windows Explorer or the Windows Run command to execute the Configuration Utility setup program. If your CD-ROM is D:\, the path for the setup program will be: D:\ Utility&Driver\Serial Device Server Configuration Utility\Serial_Device_Server_Configuration_UTILITY_[Version]_Release_[ReleaseDate].exe
3. Upon executing the setup program, the welcome dialogue window will be pop-up. Press the "Next" button to continue the process.



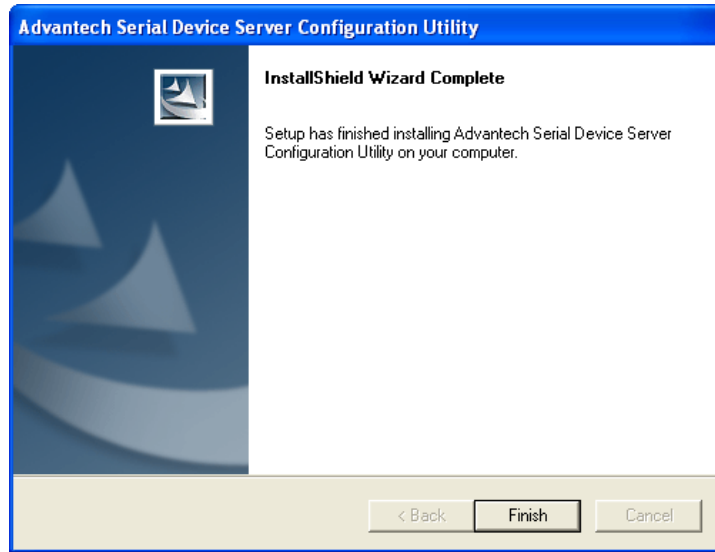
- Carefully read the Software License Agreement, and press “Yes” to continue the process.



- The setup program will specify a default installation path: C:\Program Files\Advantech eAutomation\Serial Device Server Configuration Utility\, press “Install” button to continue the process.



6. After setup program has copied all program files to your computer, press “Finish” button for completing the installation process.



Chapter 3

Utility Configuration

3.1 Configuration Utility Overview

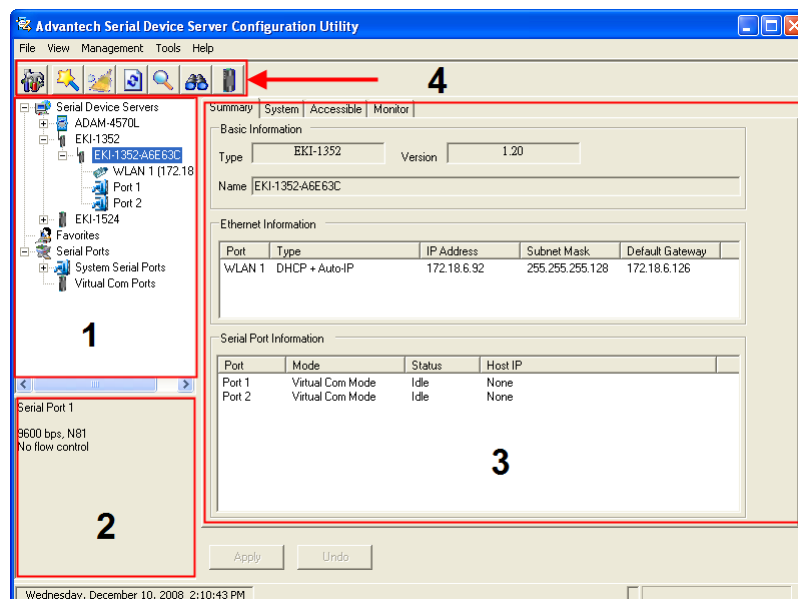
EKI-1321/1322 provides an easy-to-use configuration utility to configure your serial device server through an Ethernet connection. For secure administration, it can also restrict the access rights for configuration to only one host PC to enhance network security. With this secure function enabled, other PCs will not have permission for configuration. After the installation program on the Advantech IEDG Series Driver Utility CD-ROM is finished, the serial device servers will be ready for use and configure.

Advantech Serial Device Server Configuration Utility is an excellent device server management tool. You can connect and configure the local and remote Advantech serial device servers easily. Using this utility, you can:

- Configure the network settings (you can set the IP address, Gateway address, and Subnet mask)
- View and set the serial port parameters (configure operating mode, baud rate, serial port settings and operating mode settings) through web configuration utility.
- Perform administrative functions (export and import the serial device server setting, manage access IP, a descriptive name, upgrade firmware) through web configuration utility

There are four major areas in this new serial device server configuration utility.

1. **Device Server List Area:**
All devices will be searched and listed in this area. You can arrange different favorite group and virtual COM ports.
2. **Device Server Information Area:**
Click on the serial device server or move cursor to the serial device server, the related information will be shown on this area.
3. **Configuration Area:**
Click on the item on the Device Server List Area, the configuration page will display on the area.
4. **Quick Tool Area:**
Useful management functions shortcut.



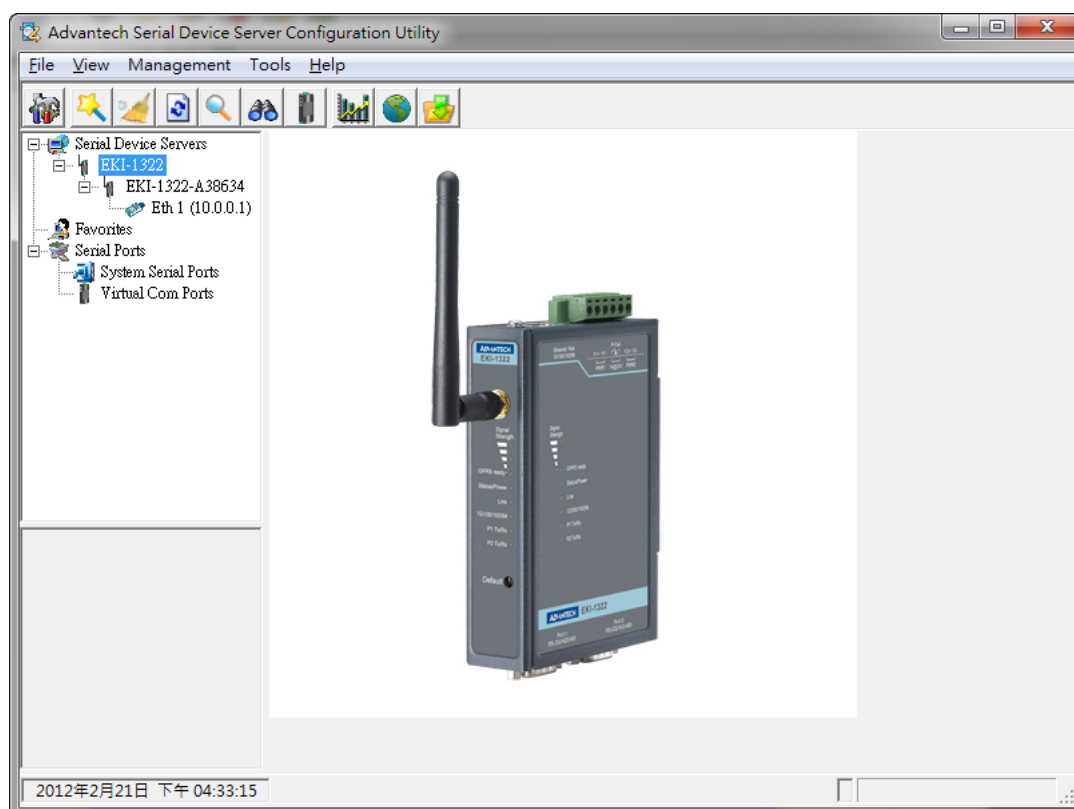
3.2 Discovering Serial Device Servers

3.2.1 Auto Searching

Advantech Serial Device Server Configuration Utility will automatically search all the EKI, ADAM and EDG series device servers on the network and show them on the Device Server List Area of the utility. The utility provides an auto-search function to show your device(s) by simply executing the configuration utility program from the Start Menu as follows: **Start Menu --> All Program --> Advantech eAutomation --> Serial Device Server Configuration Utility**



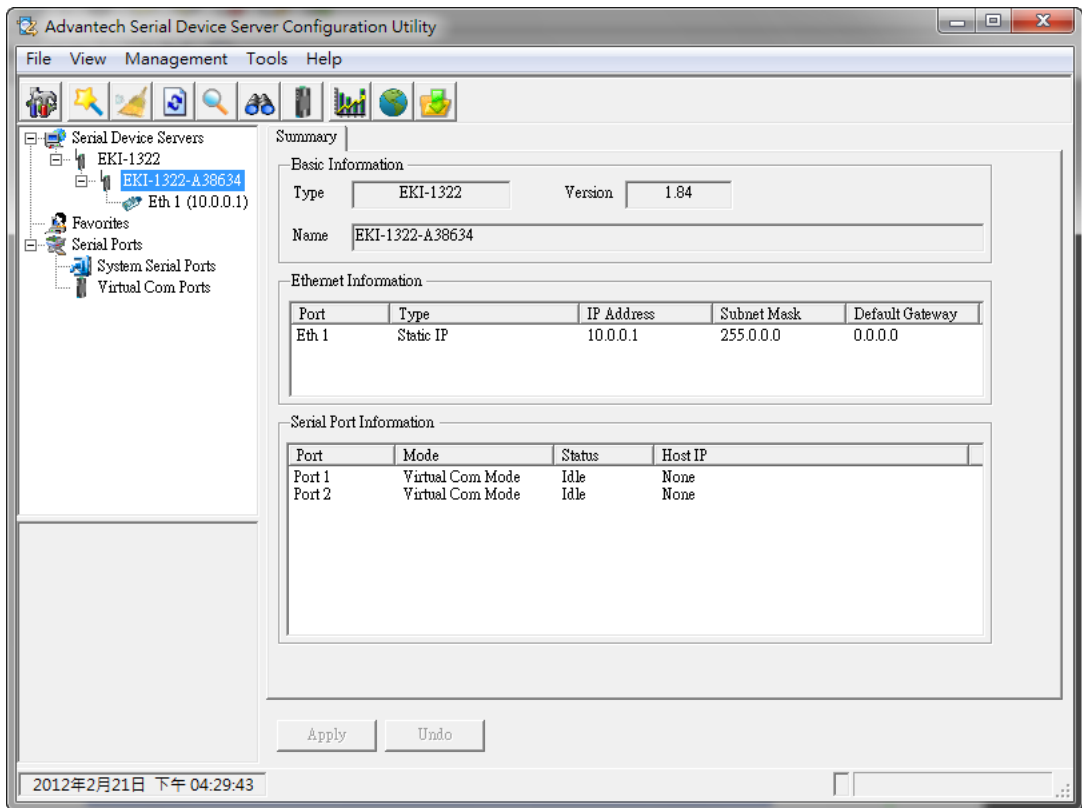
From here all device on the same network domain will be searched and display on Device Server List Area. You can click on the device name to show the features of the specific device. Click on the "+" before the model name, and the utility will expand the tree structure to show the individual device name. Click on the "-" before the model name, and the utility will collapse the tree structure.



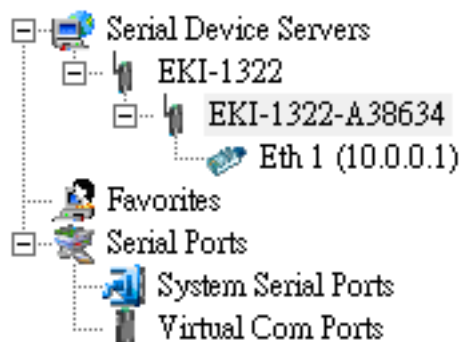
For Example, EKI-1322 in this figure is shown "EKI-1322-A38634" after expanding the tree structure.

Note When you run the Configuration Utility for the first time, the default device name is "MAC ID". In this case, the device name "EKI-1322-A38634" means the device "MAC ID" is "00 D0 C9 A3 86 34". You can change the default device name in System Tab of Device Properties.

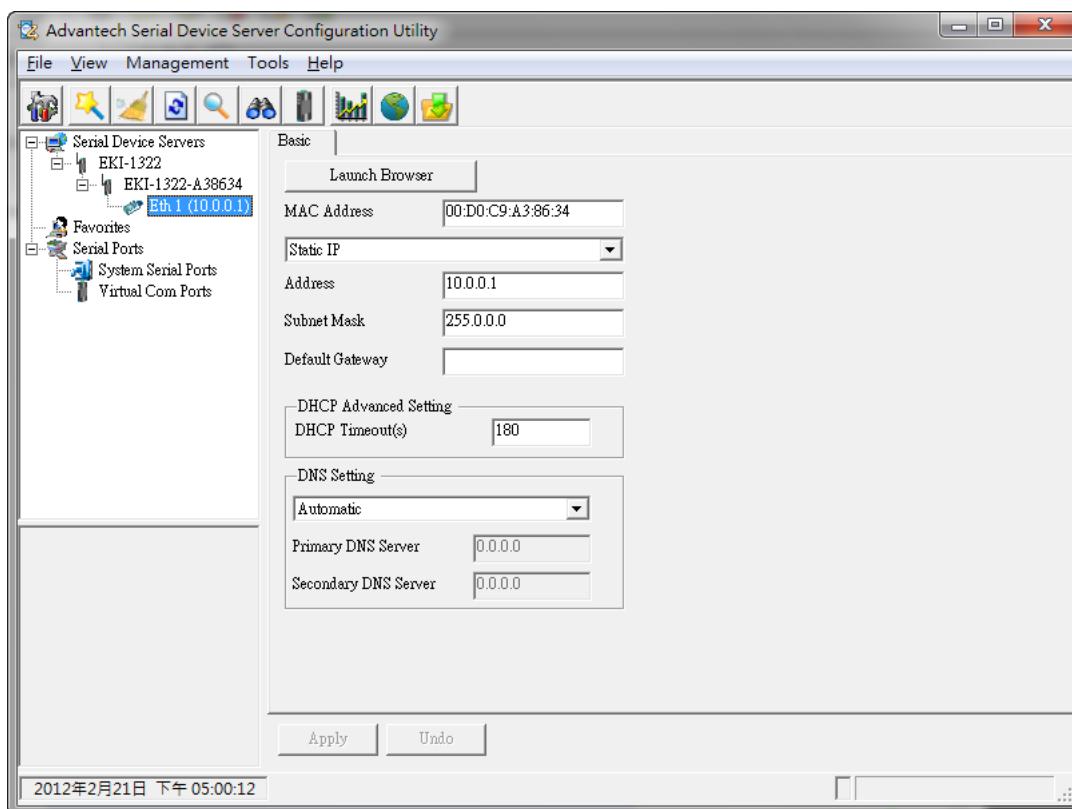
Select the device in this sub-tree. The first tab on the “Configuration Area” shows the summary of “Basic Information” included device Type, version, and name, “Ethernet Information”, and “Serial Port Information”. In the serial port information frame, it displays the operation mode, status and connected host IP.




Click on the “+” before the device name, and the utility will expand the interfaces on this device server.




Click on each item, you will enter the configuration page to change the setting. The configuration will be introduced on following sections.



3.2.2 Clear Device List and Search Again

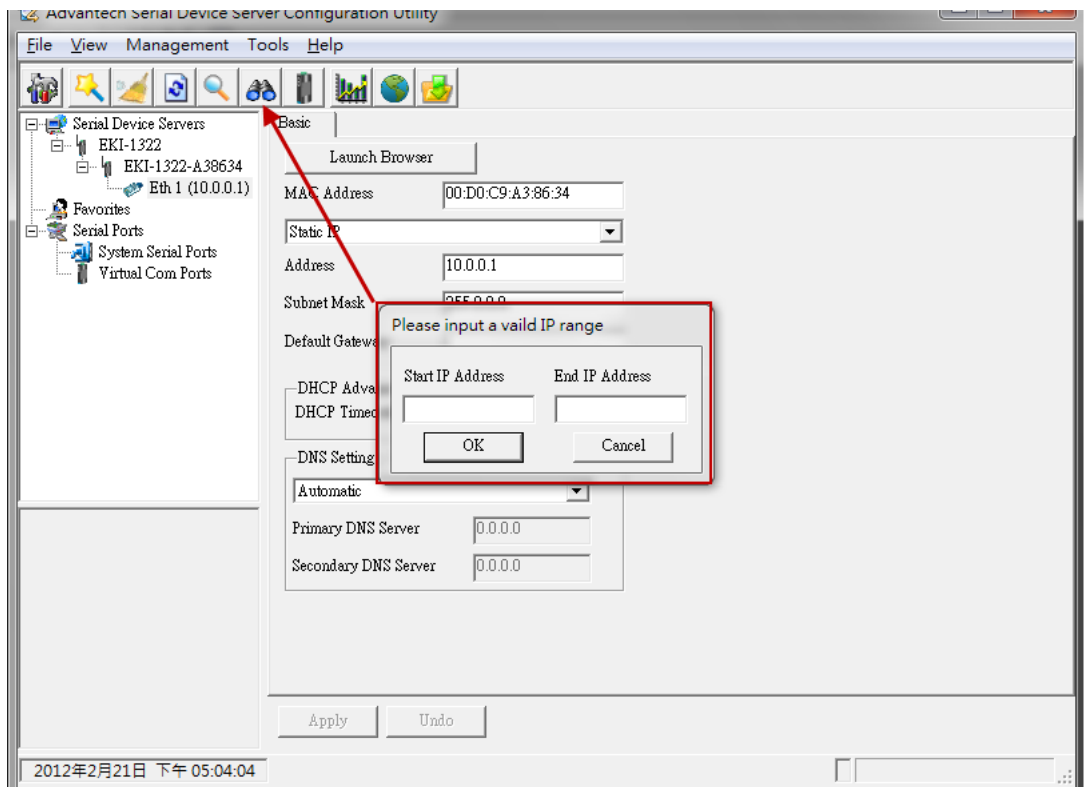
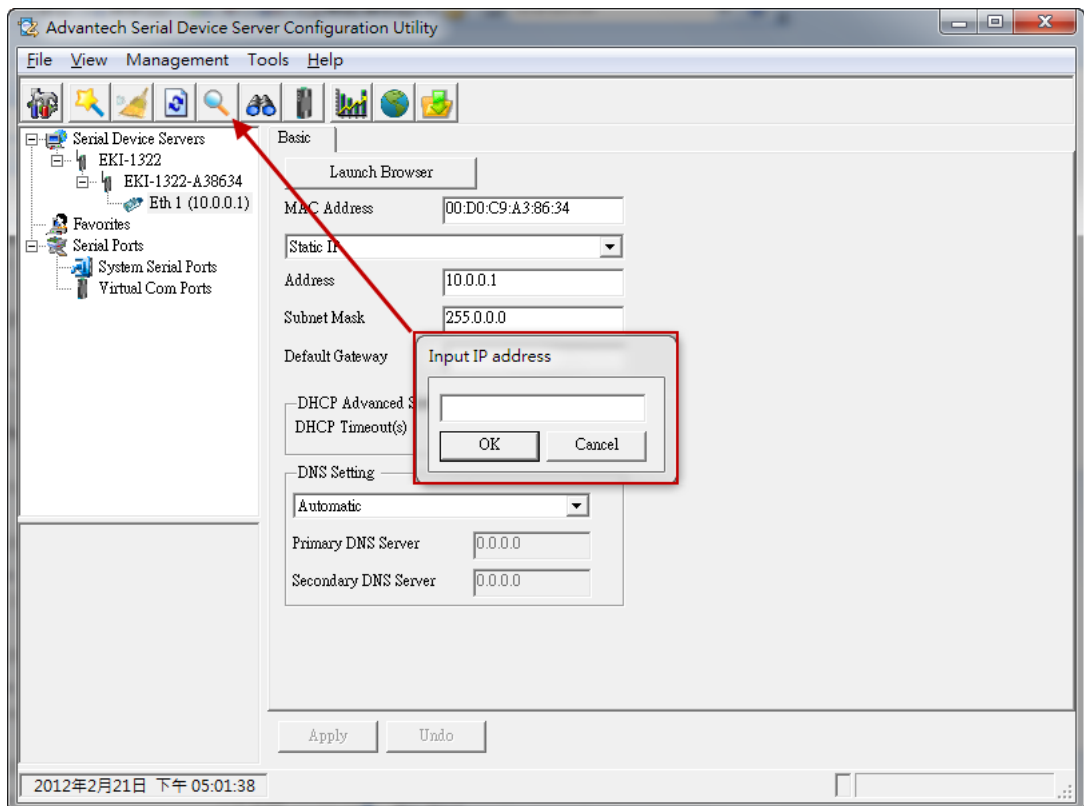
You can click the  button on the “Quick Tool Area”; utility will clear all list device servers in the Device Server List Area and re-search again. Don’t use this function frequently. The warning message will be pop-up when you double click this button.



You can click the  button on the “Quick Tool Area”; utility will search serial device server on local LAN.

3.2.3 Manual Appending

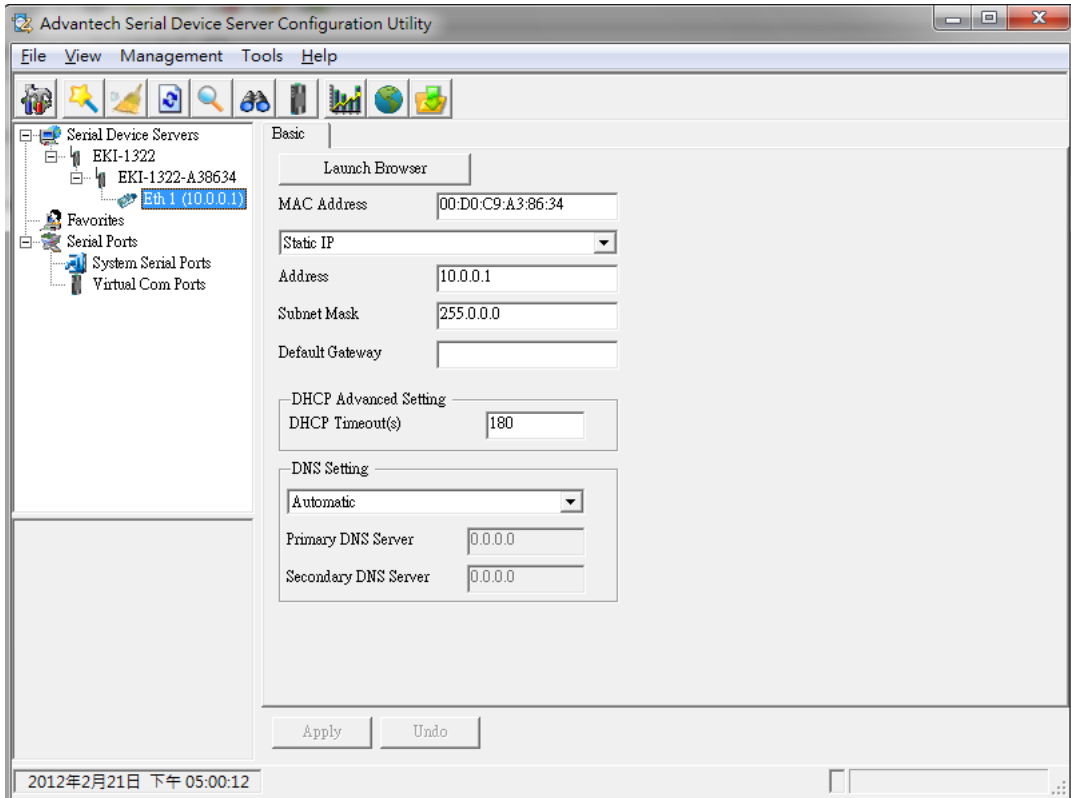
Using “Add IP address to Favorite” or “Search a Range of IP addresses” function, you are able to add one device or group of devices to “Favorites”. These devices can locate on local network domain or other network domain.



3.3 Network Settings

This section explains how to configure the EKI-1321/1322 series network using this utility so that it can communicate over a network with serial devices.

Click on the “+” before the model name (e.g. EKI-1322), and the utility will expand the tree structure to show the individual device name. And click on the “+” before the device name, and the utility will expand the interfaces on this device server. Select the Ethernet interface.



MAC address:

The MAC address is for the local system to identify and locate each serial device servers. This MAC address is already set before delivery from factory, hence no need for further configuration.

IP address, Subnet Mask, Default Gateway:

You can choose from four possible IP Configuration modes --- Static IP, DHCP + Auto-IP, BOOTP + Auto-IP, and DHCP + BOOTP + Auto-IP..

The screenshot shows a network configuration window with the following fields and options:

- Launch Browser** (button)
- MAC Address**: 00:D0:C9:A3:85:17
- IP Configuration Mode** (dropdown menu):
 - Static IP (selected)
 - DHCP + Auto-IP
 - Bootp + Auto-IP
 - DHCP + Bootp + Auto-IP
- Default Gateway**: (empty text box)
- DHCP Advanced Setting** (group box):
 - DHCP Timeout(s)**: 10
- DNS Setting** (group box):
 - DNS Mode** (dropdown menu): Automatic
 - Primary DNS Server**: 0.0.0.0
 - Secondary DNS Server**: 0.0.0.0

Static IP

User defined IP address, Subnet Mask, and Default Gateway.

DHCP + Auto-IP

DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS.

BOOTP + Auto-IP

BOOTP Server assigned IP address.

DHCP + BOOTP + Auto-IP

DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS, or BOOTP Server assigned IP address. (If the DHCP Server does not respond)

DNS Setting

In order to use DNS feature, you need to set the IP address of the DNS server to be able to access the host with the domain name. The EKI-152X series serial device server provides Primary DNS Server and Secondary DNS Server configuration items to set the IP address of the DNS server. Secondary DNS Server is included for use when Primary DNS server is unavailable.

DHCP Advanced Setting

When you enabling DHCP protocol to get IP address, it will be waited DHCP server to give IP within DHCP timeout. The default value is 180 seconds.

Note! *When you have finished the configuration of these settings for each category, please press the “Apply” button in order to make these settings effective on the Serial Device Server. (Will reboot your Serial Device Server immediately)*



Chapter 4

Setting COM
Redirector

4.1 Setting COM Redirector (Virtual COM port)

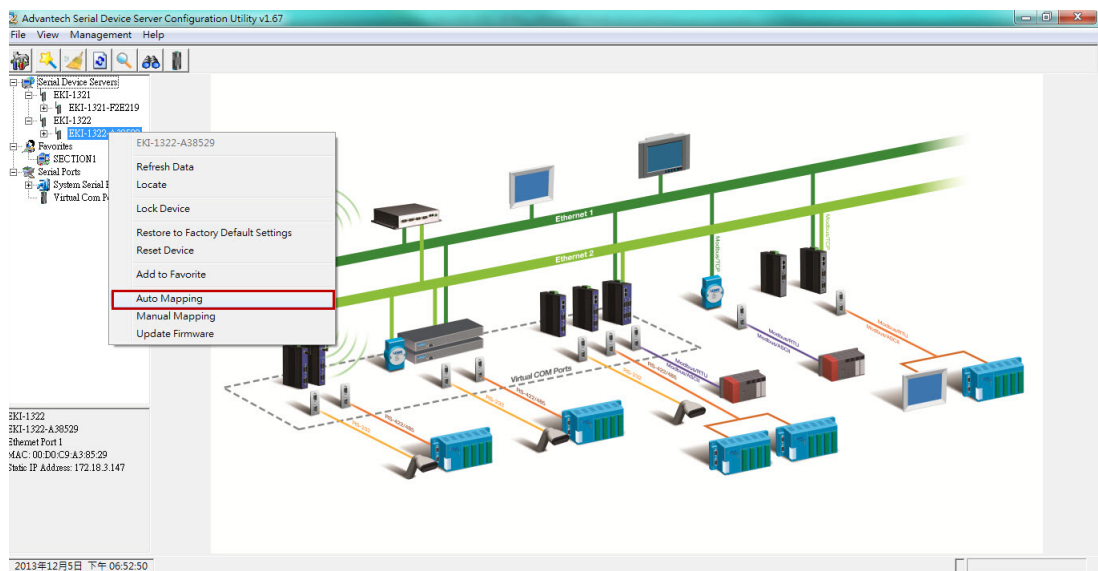
Advantech COM port mapping software is a serial COM port redirector that creates virtual COM ports and provides access to serial devices connected to Advantech serial device servers. Your serial device applications can communicate with serial devices connected to Advantech serial device servers without software changes.

Since the virtual COM ports work like standard Windows COM ports, your application software sees no difference between a local serial device and one connected to a Advantech serial device server.

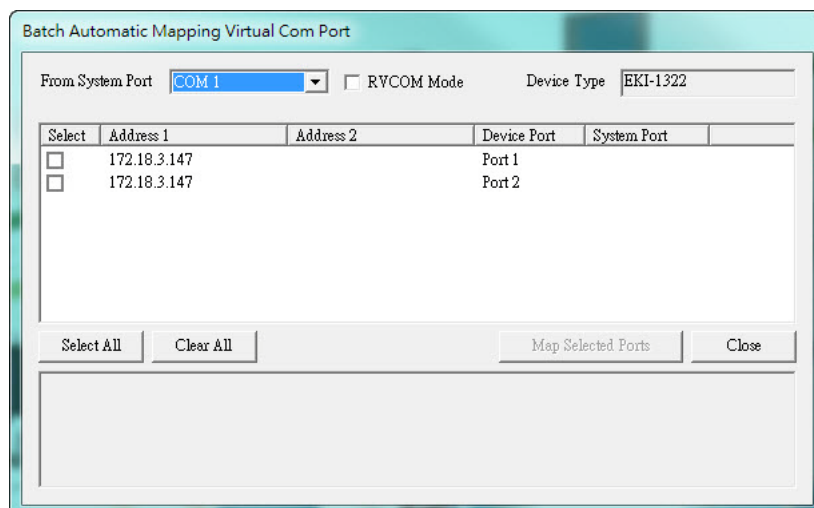
COM redirector utility and Virtual COM port Management utility are integrated into one utility with same GUI. Advantech Serial Device Server Configuration Utility can create all Virtual COM ports using “Auto Mapping” function. You can map the Virtual COM port by yourself.

4.1.1 Auto Mapping

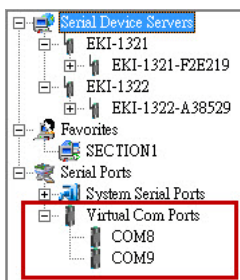
Right click the serial device name on the sub-tree of Device Server List area and select the “Auto Mapping” function.



The serial ports that can be assigned to virtual COM will be shown in this window. Select the serial ports you wish to map or click the <Select All> button and press <Map Selected Ports> button. The selected serial ports will be mapped to virtual COM ports in sequential order..

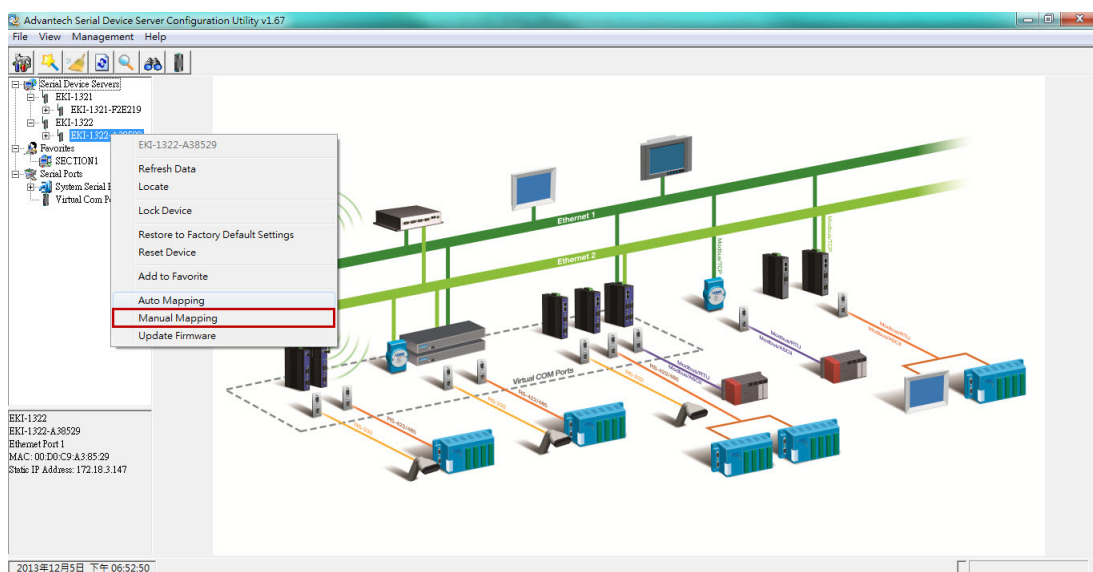


The COM ports in the “Virtual Com Ports” listing are now available for use by Windows applications.



4.1.2 Manual Mapping

Right click the serial device name on the sub-tree of Device Server List area and select the “Manual Mapping” function.



ADAM series, EDG series, and EKI wireless series have only one IP address. Select the serial port on the device server and the host COM that you want to set. Press <Map it> to establish the virtual COM port on the host.

Manual Mapping Virtual Com Port

Device Type: **EKI-1322**

Device

Address 1: 172.18.3.147

Address 2:

Serial Port: Port 1

Host

COM Port: COM 1

Auto Reconnect RVCOM Mode

4.1.2.1 Auto Reconnect Property

Sometimes, the connection between Advantech serial device server and HOST is interrupted by network traffic or powered-off by accident. In such a situation, the host has to reconnect to Advantech serial device server. The function "Auto Reconnect" is for this purpose, if the Advantech serial server loses the connection to its host, the COM redirector will try to re-establish the connection while the host's AP access the virtual COM port. The COM redirector DOES NOT re-establish the connection automatically. When the connection is working again, the host's commands will be automatically received by the Advantech serial device server again. Reconfiguration is not necessary, so this function enhances the reliability of the system.


If the function is disabled, the connection cannot be re-established again unless the COM redirector or host is restarted.

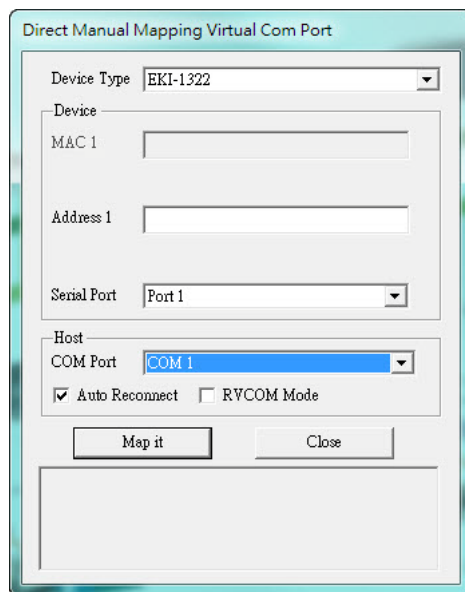
EKI series has two Ethernet ports. You can select two Ethernet port to establish two Ethernet connections with one virtual COM port. It means that COM redirector will use one connection with the COM port on device server to communicate. If this connection failed, COM redirector will establish another Ethernet connection to communicate with device. The switch time will be 3 seconds ~ 5 seconds depending on the network traffic and host status.

4.1.2.2 RVCOM Mode

When enabling this option with setting EKI device in the same operation mode, the device will connect to specific host when device is ready. Before the device ready, user still can use the mapped RVCOM port as usual, the com port but without cable connected.

4.1.3 Manual Direct Mapping Virtual COM Port

Click the  button on the Quick Toolbar, you can add a target by selecting the Device Type and inputting the IP address without physically connecting the serial device server to the network.

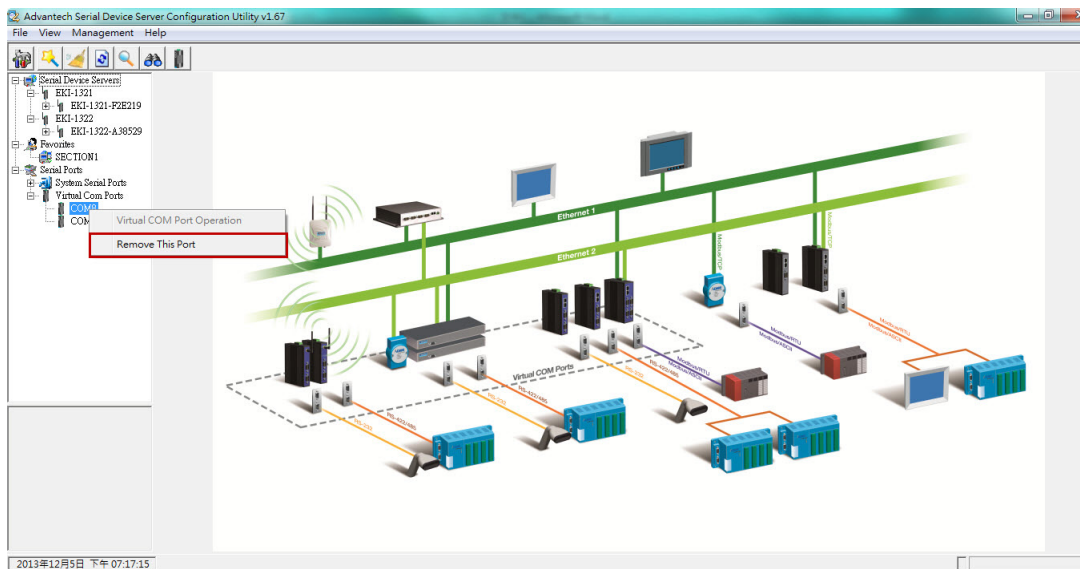


4.1.4 Remove the Virtual COM Port

If you want to remove the virtual COM port, you can remove them one by one or group remove ports.

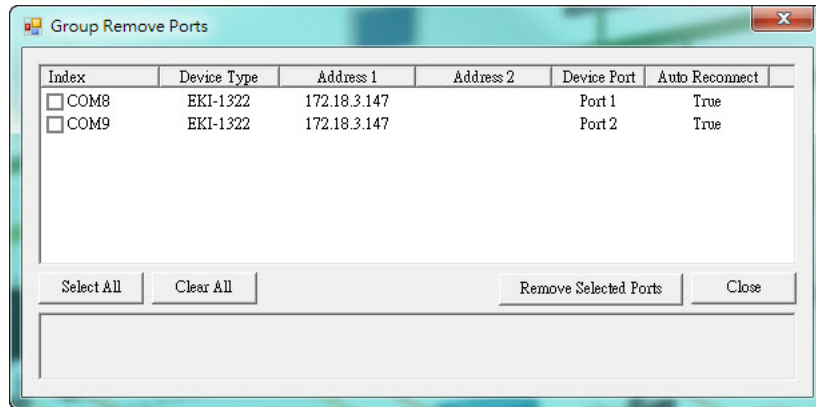
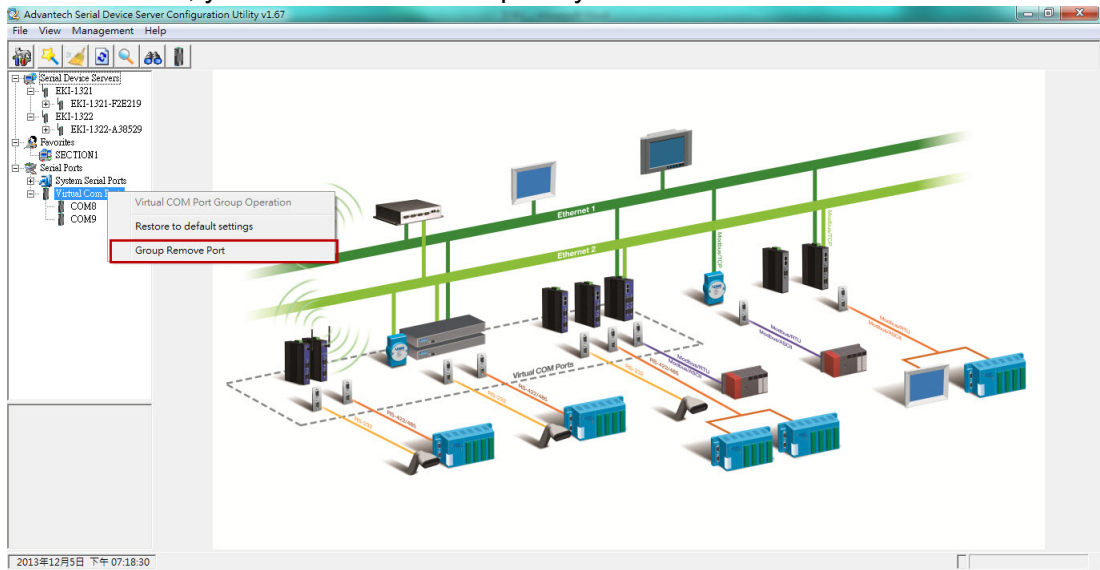
4.1.4.1 Individually Remove

Right click on COM port you have mapped and select "Remove This Port".



4.1.4.2 Group Remove Port

Right click on Virtual Com Ports on Device Server List Area and select “Group Remove Port”, you can choose which ports you want to remove.



Chapter 5

Web Configuration

5.1 Overview

EKI-1321/1322 serial device server can be configured through a web interface. By using a standard web browser, the same procedure as with the Windows configuration utility can be used. In the browser's address field, enter the IP Address of your EKI-1321/1322 serial device server. The default IP setting is 10.0.0.1, but you should use the IP which you have previously assigned for this device. Once the IP is entered, you will be presented with the following windows.

Note! *Before using the web-based configuration, make sure your host PC Ethernet network IP domain is as same as the serial device server, or it can establish the TCP connection with the serial device server.*

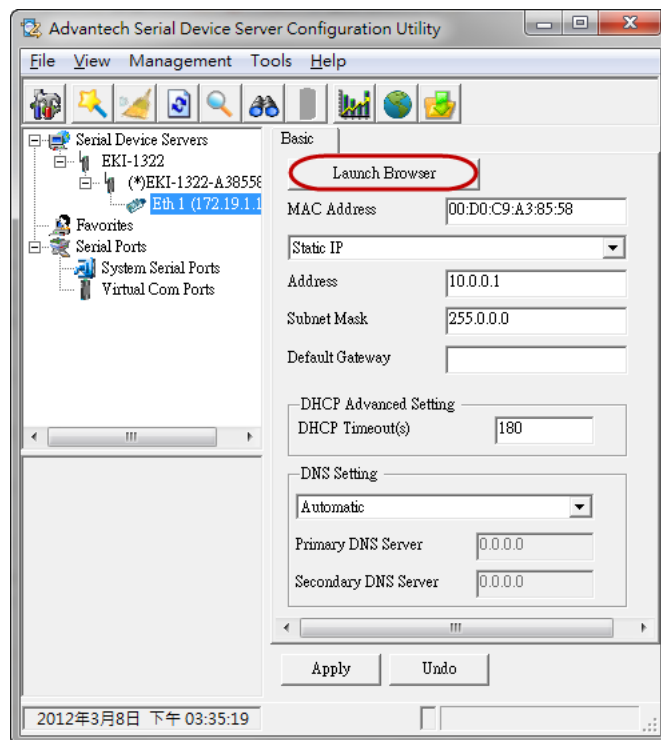


Note! *It is recommended that you use Microsoft Internet Explorer 7.0 or greater.*



5.2 Accessing the Web Page

By configuration utility

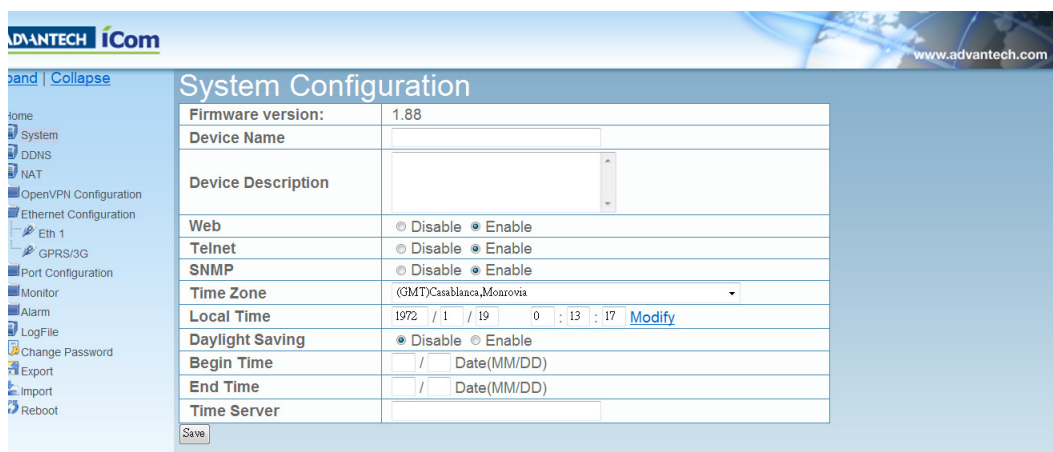


By Browser



5.3 System Configuration

You can change the Device Name/Device Description, time and time zone and enable/disable the configuration methods on this page. The configuration methods include Web, Telnet and SNMP.



5.4 DDNS Configuration

When the EKI-132x receives IP address from DHCP server, remote servers will be unable to access it using a fixed IP address. With DDNS, a remote server can access the EKI-132x using its domain name of its IP address.

Currently, the EKI-132x supports DNS service as provided by DynDNS. For detailed information, please visit <https://www.dyndns.com>

DDNS Provider (default=www.DynDns.org): Currently, www.dyndns.org is the only option available for Server address.

Username: This is the user name used for update authentication.

Password: This is the password used for update authentication.

DDNS Alias: In this field, use the name that you created on www.dyndns.com. The EKI-1321/1322 will update the DynDNS server with this host name.

5.5 NAT Configuration

This technique can allow an external user to reach a port on a private IP address (inside a LAN) from the outside via a NAT-enabled IP gateway (NAT original is disable). You configure the NAT setting in this web page directly.

Default Gateway (default=Disable): This function allows remote users to access the Host or FTP services via a public IP address, and automatically redirects them to local servers in the LAN.

If the function is disabled, the connection can not be re-established again unless the COM redirector or host is restarted.

Virtual TCP Server Configuration

LocalPort: is the port being used by the application on the host within your local network.

IP Address: Enter the IP address of the host on your local network that you want to link the incoming service to.

Port: The public port is the port seen from the Internet side. Public ports cannot be set to ports used by OP modes (950, 966, 4001, ...).

Firewall Rules Configuration: This function allows you to configure firewall feature filters out unrecognized packets to protect your LAN network when computers networked with the EKI-132x are hidden from public view. If you wish, you can make some of the LAN computers accessible from the Internet by enabling NAT. Depending on the requested service, the EKI-32x redirects the external service request to the appropriate server within the LAN network.

5.6 OpenVPN Configuration

To provide the secure communication links when accessing a private network from the public Internet . With the help of VPN, cellular devices acting as a VPN client can initiate a connection with a VPN server.

OpenVPN TUN Configuration	
OpenVPN status	Disable
Protocol	UDP
Cipher	BF-CBC(default)
Certification Mode	CRT/Key Pair
ServerIP	
ServerPort	0
UserName	
Password	
Current Status	
IP 1	Currently unavailable
<input type="button" value="Save"/>	

OpenVPN Configuration: configure the VPN server information and import the CA/ CERT/KEY file in this web page.

OpenVPN Status: Enable or disable the VPN tunnel function.

Protocol: UDP or TCP protocol.

Cipher: setup the cipher mode for VPN tunnel.

Certification Mode: Select the type of certification mode for VPN tunnel policy to be used.

Server IP: Enter the IP address or hostname of the remote VPN server endpoint.

Server Port: Enter port number of the remote VPN server endpoint.

User Name: This is the user name used for update authentication with remote VPN server endpoint.

Password: This is the password used for update authentication with remote VPN server endpoint.

5.7 Ethernet Configuration

5.7.1 Eth1 Configuration

Eth1 page is where you assign the EKI-132x IP address, netmask, Gateway and other parameters for the Ethernet interface.

Option	Description
Static IP	User defined IP address, Subnet Mask, and Default Gateway.
DHCP/Auto-IP	DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS.
BOOTP/Auto-IP	BOOTP Server assigned IP address.
DHCP/BOOTP/Auto-IP	DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS, or BOOTP Server assigned IP address. (If the DHCP Server does not respond)
MAC Address	6 bytes MAC address

Mode (default=Static): You can choose from four possible IP configuration modes.

Option	Description
Static IP	User defined IP address, Subnet Mask, and Default Gateway.
DHCP/Auto-IP	DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS.
BOOTP/Auto-IP	BOOTP Server assigned IP address.
DHCP/BOOTP/Auto-IP	DHCP Server assigned IP address, Subnet Mask, Default Gateway, and DNS, or BOOTP Server assigned IP address. (If the DHCP Server does not respond)
MAC Address	6 bytes MAC address

IP Address (default=10.0.0.1): Enter the IP address that will be assigned to your EKI-132x. All ports on the EKI-132x will share this IP address. An IP address is a number assigned to a network device (such as a computer) as a permanent address on the network. Computers use the IP address to identify and talk to each other over the network. Choose a proper IP address that is unique and valid for your network environment.

Subnet mask (default=255.0.0.0): Enter the subnet mask. A subnet mask represents all of the network hosts at one geographic location, in one building, or on the same local area network. When a packet is sent out over the network, the KI-132x will use the subnet mask to check whether the desired TCP/IP host specified in the packet is on the local network segment. If the address is on the same network segment as the EKI-132x, a connection is established directly from the EKI-132x. Otherwise, the connection is established through the given default gateway.

Default Gateway(default=255.255.255.255): Enter the IP address of the gateway if applicable. A gateway is a network computer that acts as an entrance to another network. Usually, the computers that control traffic within the network or at the local Internet service provider are gateway nodes. The EKI-132x needs to know the IP address of the default gateway computer in order to communicate with the hosts outside the local network environment. For correct gateway IP address information, consult the network administrator.

DNS Settings: In order to use the DNS feature, you need to set the IP address of the DNS server to be able to access the host with the domain name. The EKI-152X series serial device server provides Primary DNS Server and Secondary DNS Server configuration items to set the IP address of the DNS server. Secondary DNS Server is included for use when Primary DNS server is unavailable.

DNS server 1: This is an optional field. If your network has access to a DNS server, you may enter the DNS server's IP address in this field. This allows the EKI-132x to use domain names instead of IP addresses to access hosts.

DNS server 2: This is an optional field. The IP address of another DNS server may be entered in this field for times when DNS server 1 is unavailable.

DHCP Timeout: When you enabling DHCP protocol to get IP address, it will be waited DHCP server to give IP within DHCP timeout. The default value is 180 seconds.

5.7.2 GPRS Configuration

GPRS/3G Configuration: From the left navigation panel, click **Ethernet Configuration ' GPRS/3G** to configure the GSM/GPRS/SMS Settings. The various configuration items are described below

GPRS Configuration	
Operation Mode	Networking
SIM1 Configure	
SIM1	Enable
authorisation 1	no auth
user name 1	
password 1	
PIN number1	
APN1	internet
phone number1	*99***1#
Ping Interval 1	0
Ping Target 1	
SIM2 Configure	
SIM2	Disable
authorisation 2	no auth
user name 2	
password 2	
PIN number2	
APN2	
phone number2	*99***1#
Ping Interval 2	0
Ping Target 2	
Current Status	
IP 1	115.81.141.152

Operation Mode: The EKI-132x supports 2 types of operation modes. You may choose from Networking and SMS. The configuration of Network operation mode is described as follow. The configuration of SMS operation mode will be introduced in Chapter 4.8.6.

SIM1/2: Enable/Disable SIM Card 1 or SIM Card 2

Authorization: Select authentication type PAP, CHAP or No Auth

User Name: Enter User Name for your mobile connection

Password: Enter Password for your mobile connection

PIN Number: The pin number of SIM card. The default code is set by the Service Provider. Note that a cell phone must be used to change the PIN. (Warning: if the entered PIN will be wrong, the SIM card will be locked)

APN: Before using the GPRS/UMTS/HSDPA also need APN (Access Point Name) must be added as a modem initialization command.

Phone Number: Use this field to configure the number used to dial out.

Ping Interval: This field is the time interval of the periodically ping function. It can use this field to keep the connection without lost.

5.8 Port Configuration

There are Basic, Operation Mode, and Advanced Settings in the serial port configuration. There are various operation modes that are suitable for different application.

The screenshot shows the ICom web configuration interface. The left sidebar contains a navigation menu with options like Home, System, DDNS, NAT, OpenVPN Configuration, Ethernet Configuration, Port Configuration (highlighted with a red box), Monitor, Alarm, LogFile, Change Password, Export, Import, and Reboot. The main content area is titled "Port 1 configuration" and has three tabs: Basic, Operation, and Advanced. The Basic tab is active, showing a table of configuration parameters:

Basic	Operation	Advanced
Type		RS232
Baud Rate		9600
Parity		None
Data Bits		8
Stop Bits		1
Flow Control		None

Below the table is a "Save" button.

5.8.1 Setting Serial Port Parameters

Type: The EKI-1321/1322 offers three kinds of serial protocols, RS-232, RS-422 and RS-485. You can use any of these three serial protocols according to your requirements.

Port 1 configuration		
Basic	Operation	Advanced
Type	RS232	
Baud Rate	RS232	
Parity	RS422	
	RS485	
Data Bits	8	
Stop Bits	1	
Flow Control	None	
Save		

Baud Rate: The EKI-1321/1322 supports baud rates from 50 to 921.6Kbps. You can use the pull-down list to choose a standard baud rate or directly input any specific baud rate you want.

Port 1 configuration		
Basic	Operation	Advanced
Type	RS232	
Baud Rate	9600	
Parity		
Data Bits	8	
Stop Bits	1	
Flow Control	None	
Save		

Parity: The EKI-1321/1322 provides five options: None, Odd, Even, Space, and Mark.

Port 1 configuration		
Basic	Operation	Advanced
Type	RS232	
Baud Rate	9600	
Parity	None	
Data Bits	None	
	Odd	
Stop Bits	Even	
	Mark	
Flow Control	Space	
Save		

Data Bits: The EKI-1321/1322 provides four options: 5, 6, 7 and 8.


Port 1 configuration	
Basic	Advanced
Type	RS232
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	7
Flow Control	None
Save	

Stop Bits: The EKI-1321/1322 provides three options: 1, and 2.

Port 1 configuration	
Basic	Advanced
Type	RS232
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	1
Save	

Flow Control: The EKI-1321/1322 provides four options: None, XOn/XOff, RTS/CTS, and DTR/DSR.

Port 1 configuration	
Basic	Advanced
Type	RS232
Baud Rate	9600
Parity	None
Data Bits	8
Stop Bits	1
Flow Control	None
Save	

Note!  When you have finished the configuration of these settings for each category, please press the “Save” button in order to make these settings effective on all serial device servers. (Will restart your serial device server immediately)

5.8.2 Setting Virtual COM Operating Mode Parameters

The Advantech serial device servers extend traditional COM ports of a PC to Ethernet access. Through Ethernet networking, users can control and monitor remote serial devices and equipment over LAN or WAN. Advantech serial device servers come with a COM port redirector (Virtual COM driver) that transmits all serial signals intact. This means that your existing COM-based software can be preserved, without modifying to fulfill the needs. The Virtual COM mode allows user to continue using RS-232/422/485 serial communications software that was written for pure serial communication applications.

EKI-1321/1322 comes with COM port redirector (virtual COM driver) that works with Windows 2000/XP/Vista/7 systems. The driver establishes a transparent connection between host and serial device by mapping the IP of Advantech serial device server serial port to a local COM port on the host computer.

Port 1 configuration		
Basic	Operation	Advanced
Mode	Virtual COM Mode	
Host Idle Timeout(s)	60	
Response Timeout(ms)	0	
Frame Break(ms)	0	
Pack conditions (Pack sent immediately when reach 1024 Bytes)		
<input type="checkbox"/> By size	[] Bytes(1 ~ 1024 Bytes)	
<input type="checkbox"/> By interval	[] ms(1 ~ 60000 ms)	
<input type="checkbox"/> By end-character	Char Format	HEX
	Char Value	[]
RVCOM Extra Options		
RVcom Number	0	
Port Data Buffering		
Media	NONE	
When Data Full	Stop	
Maximum Buffer Size	0 (Max: 1024, Unit: MiB)	
Save		

Host Idle Timeout (10~255 seconds): The "Host Idle Timeout" setting monitors the connection between the host and the device. If the "Host Idle Timeout" setting time is reached, the device server will release the resources allocated to the port mapping. This prevents a stalled host from affecting the connected device.

Note! The default value of "Host Idle Timeout" is 60 seconds.




Response Timeout: For normal mode, you need to disable this field. For round-robin mode, you need to enable this field. The detailed configuration is described in following chapter.

EKI-1321/1322 provides Multi-access function through cellular WAN. Allow the maximum of five connections to open one serial port simultaneously. In the mode, all connections have to use the same serial setting. If one serial setting of these connections is different from others, the data communication may operate incorrectly.

There are two kinds of Multi-access function. One is Normal mode; another is Round-Robin mode.

Normal mode: Disabling "Response Timeout" parameter, EKI-1321/1322 will operate in "normal mode". When multiple hosts open the serial port simultaneously, the EKI-1321/1322 only offers control ability to the first connected host but also provides data communication function for others. Each serial port supports up to five simultaneous connections, so multiple hosts can transmit/receive data to/from the same serial port simultaneously. Every host can transmit data to the same serial port, and EKI-1321/1322 will also transmit data to every host. But, while multiple hosts transmit data to the same serial port at almost same time (there still have the order of arrival), the received data from serial device (this should be required by the first order of arrival) will be transmitted to the connected hosts simultaneously. This causes hosts receive incorrect data except the host who has the first order of arrival.

Note!  *This operating mode is suitable for the one major host send the command and others hosts just listen the data from serial port. If two of connected hosts send the command at the same time, it is possible that EKI serial device server will not handle the command and will response the incorrect data.*

Round-Robin mode: Enabling "Response Timeout" parameter, the EKI-1321/1322 will operate in "Round-Robin mode". Each serial port supports up to five simultaneous connections, so multiple hosts can transmit/receive data to/from the same serial port simultaneously. Every host can transmit data to the same serial port simultaneously, but EKI serial device server will process the data communication in order. EKI-1321/1322 will process the first host's request and reply the response to the first host. If EKI serial device server receives nothing from serial port after a period of time set by user in "Response Timeout" block, the device server will reply the acknowledgment to the host and then process the next host's request. The cycle time will be increased when you increase either the number of the connected hosts or the value of "Response Timeout".

Frame Break is a very import parameter for Round Robin mode. This parameter is a smart way to reduce inefficient waiting time and EKI-1321/1322 can transmit data more efficiently. Disabling the Frame Break function, EKI-1321/1322 will wait for data until "Response Timeout" setting time is reached. During this period, the commands from hosts will be queued and EKI-1321/1322 just processes this command. Enabling "Frame Break", if the serial port idle is longer than the "Frame Break" period, EKI-1321/1322 will assume the communication is completed and continue the next host's query. This is an efficient way to reduce the waiting time and improve the performance.

Pack Condition: There are 3 types of pack condition by length, time or specific character. “By size”: the system will collect the data with fixed size and send out according to your setting. “By interval”: the system will collect the data in fixed interval and send out. “By end-character”: the system will send out the package when it find the coming of specific character.

RVcom Number: 0 means disable RVcom function. There can have maximum of 5 peers. After EKI-132x get ready, it will connect to the specific targets automatically.

Port Data Buffering: EKI-132x series provide the function of data buffering to avoid the data lost.

Media: There are three types. None is no data buffering. RAM is to buffer the data in RAM storage. SD Card is to buffer the data in SD card if you plug-in the SD card in EKI-132x series devices.

When Data Full: When buffering space is full, you can select to “STOP” or “OVERWRITE” the buffering data.

MAX buffering size: The storage size will be used for data buffering.

5.8.3 Setting TCP/UDP Server/Client Operating Mode Parameters

EKI-1321/1322 provides various operating modes. Selecting the “USDG Data Mode” as below to change the mode of the port to TCP server/client or UDP mode. Before setting the TCP server mode, you have to check the serial port setting in advance.

Port 1 configuration	
Basic	Operation
Mode	USDG Data Mode
Protocol	TCP
Data Idle Timeout(s)	60
Data Listen Port	5300
Command Listen Port	5400
Response Timeout(ms)	0
Frame Break(ms)	0
TCP Mode Extra Options	
Auto Connect To Peer IP	<input type="checkbox"/>
Port Data Buffering	
Media	NONE
When Data Full	Stop
Maximum Buffer Size	0 (Max: 1024, Unit: MiB)
Pack conditions (Packet sent immediately when reach 1024 Bytes)	
<input checked="" type="checkbox"/> By size	<input type="text"/> Bytes(1 ~ 1024 Bytes)
<input checked="" type="checkbox"/> By interval	<input type="text"/> ms(1 ~ 60000 ms)
<input checked="" type="checkbox"/> By end-character	Char Format: HEX Char Value: <input type="text"/>
<input checked="" type="checkbox"/> By character-timeout	
Peer for Receiving Data	
Peer Number	0
<input type="button" value="Save"/>	

Protocol: TCP or UDP mode

Data Idle Timeout (10~255 seconds): The “Data Idle Timeout” setting monitors the connection between the host and the device. If the “Data Idle Timeout” setting time is reached, the device server will release the resources allocated to the port mapping. This prevents a stalled host from affecting the connected device.

Data Listen Port: 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 allows connections on one or more TCP port. The well known TCP ports 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. Each port has its own data listen port to accept connected request of other network device. So, the data listen port can't be set the same value. You can transmit/receive data to/from device via the data listen port.

Command Listen Port: Each port has its own command listen port to accept connected requests of other network devices, thus the command listen port can't be set the same value. You can use 'AT command' to change the port setting via the command listen port. The Command Listen Port must be different from the Data Listen port.

Response Timeout: Please refer to the description in chapter 4.8.2

Frame Break: Please refer to the description in chapter 4.8.2

Auto connect Peer IP: EKI-1321/1322 will connect to TCP/IP which are set at Peers page automatically after boot up.

Pack Condition: There are 3 types of pack condition by length, time or specific character. "By size": the system will collect the data with fixed size and send out according to your setting. "By interval": the system will collect the data in fixed interval and send out. "By end-character": the system will send out the package when it find the coming of specific character.

Port Data Buffering: EKI-132x series provide the function of data buffering to avoid the data lost.

Media: There are three types. **None** is no data buffering. **RAM** is to buffer the data in RAM storage. SD Card is to buffer the data in **SD card** if you plug-in the SD card in EKI-132x series devices.

When Data Full: When buffering space is full, you can select to "STOP" or "OVERWRITE" the buffering data.

MAX Buffering Size: The storage size will be used for data buffering.

Peers for Receiving Data (max. 16 sets): You can set maximum 16 Ethernet devices which you want to connect. You need to fill out the IP address and Port number of Ethernet devices you want to connect. You also need to fill out the local port, you can choose your prefer local TCP port or key in zero "0" to let EKI-1321/1322 decide itself.

5.8.4 Setting Control Operating Mode Parameters

In controlling mode, the EKI device presents a modem interface to the attached serial device: it accepts AT-style modem commands to connect/disconnect to other networking device. If you want serial device running application program to connect/disconnect to different devices dynamically, you can use controlling mode.

The “Control mode” provides three kinds of modem AT-style commands. The serial devices can use these commands to control the EKI device to connect/disconnect to remote networking device. Thus, intelligent serial devices such as standalone PLC will send/receive data to/from devices one by one via Ethernet.

Port 1 configuration		
Basic	Operation	Advanced
Mode	USDG Control Mode ▾	
Protocol	TCP	
Data Idle Timeout(s)	<input type="text" value="60"/>	
Data Listen Port	<input type="text" value="5300"/>	
Command Listen Port	<input type="text" value="5400"/>	
Hangup Character	<input type="text" value="+"/>	
Guard Time(ms)	<input type="text" value="1000"/>	
<input type="button" value="Save"/>		

Please refer to the TCP/UDP server operating mode to setup the Data Listen Port, Command Listen Port, and Data Idle Timeout.

■ Hangup Character

The default character is “+”. After you have connected to another serial device via EKI device, you may need to disconnect. Then you can use the command “+++” to disconnect. To do this leaves your keyboard idle (don't press any keys) for at least several seconds, then press “+” three times. You can set “Guard Time” to define the idle time. Be sure that you have to press “+” over the idle time.

■ Guard Time

The default value is 1000 ms.

Example: <Guard Time>+++<Guard Time>

Control Mode is designed for use with legacy operating systems, such as MS-DOS, that do not support TCP/IP Ethernet. By connecting one of EKI's serial ports to the MS-DOS computer's serial port, it is possible to use legacy software originally designed to transmit data via modem, but now transmit the data over the Ethernet.

■ Dial-in (Use TCP connect to serial port of EKI)

EKI listens for a TCP/IP connection request from the remote host. when a TCP connection is coming, there will have prompt string "RING" shows on serial port site. After the system prompting the "RING" string, user can use "ATA" command to accept the connection or just ignore it. After accepted the connection, EKI will enter data mode.

■ Dial-out (From serial port connect to specific TCP host target)

User can use the AT Command “ATD <IP>#<TCP port>” to connect to a specific TCP target host from serial port. when the TCP connection is accepted by the remote host, EKI will show “CONNECT” string to serial port and enter data mode.

- **Disconnect from serial port**
When EKI is in data mode, user can type the hangup character triple times, such as “+++”. EKI will shut down the TCP connection and back to command mode, and shows “NO CARRIER” to indicate the connection has been shut down.
- **Disconnect from remote TCP connection**
When EKI shows “NO CARRIER” on serial port, it means the TCP connection has been shut down. EKI will back to command mode automatically.

Note! *The “+++” command cannot be divided. The “+” character can be changed in Hang-up Character, and the guard time, which prefixes and suffixes the “+++” in order to protect the raw data, can be changed in Guard Time (ms). See picture.*



AT Commands

EKI supports the following common AT commands used with a typical modem:

AT command	Description
ATA	Answer
ATD	Dial up the IP address#Port No.
ATE	ATE0=Echo OFF ATE1=Echo ON (default)
ATH	On-hook
ATZ	Reset and Recall user’s settings
AT&F	Restore factory’s Default settings

Example 1 (Local connect to remote)

```

AT↵
OK↵
↵
ATD192.168.1.100#5300↵
↵
CONNECT↵
↵
/// Data ...↵
NO CARRIER /// Remote disconnects or send “+++”↵

```

Example 2 (Remote connect to local)

```

AT
OK

RING

RING

RING
ATA /// Answer

CONNECT

/// Data ...

NO CARRIER /// Remote disconnect or Send “+++”

```

5.8.5 Setting RFC2217 Operating Mode parameters

RFC-2217 mode is similar to Real COM mode in that a driver is used to establish a transparent connection between a host computer and a serial device by mapping the serial port on the EKI-132x to a local COM port on the host computer. RFC2217 defines general COM port control options based on the Telnet protocol.

Port 1 configuration		
Basic	Operation	Advanced
Mode		RFC2217 Mode
Listen Port		5500
Host Idle Timeout(s)		1
Save		

Listen Port: This is the TCP port number assignment for the serial port on the EKI-132x. It is the port number that the serial port uses to listen to connections, and that other devices must use to contact the serial port. To avoid conflicts with well known TCP ports, the default is set to 5500.

Host Idle Timeout (seconds): The “Host Idle Timeout” setting monitors the connection between the host and the device. If the “Host Idle Timeout” setting time is reached, the device server will release the resources allocated to the port mapping. This prevents a stalled host from affecting the connected device.

5.8.6 SMS Operating Mode Parameters

Short Message Service (SMS) is a telecommunications protocol that allows sending "short" (160 characters or less) text messages. It is available on most digital mobile phones and some personal digital assistants with built-in wireless capability.

GSM technology offers the benefit of using SMS (short message service) as an easy way to communicate over the mobile network.

Port 1 configuration		
Basic	Operation	Advanced
Mode	SMS Mode ▾	
SMS Incoming		
Status	Disable ▾	
Cellular phone capacity	0 ▾	
SMS Sending		
Encode	Text ▾	
Cellular phone capacity	0 ▾	
Pack conditions (Packet sent immediately when reach maximum bytes)		
<input type="checkbox"/> By size	<input type="text"/> Bytes(1 ~ 160 Bytes)	
<input type="checkbox"/> By interval	<input type="text"/> ms(1 ~ 60000 ms)	
<input type="checkbox"/> By end-character	Char Format	HEX ▾
	Char Value	<input type="text"/>
SMS Encode maximum length Text: 160 bytes Binary: 140 bytes UCS2: 70 bytes		
<input type="button" value="Save"/>		

Status (in SMS Incoming): To allow forwarding incoming short message to EKI-132x serial ports as data.

Cellular Phone Capability (in SMS Incoming): Phone number should be specified.

Encode (in SMS Sending): EKI-132x support three types of encoding scheme - Text, Binary and Unicode.

Cellular Phone Capability (in SMS Sending): Phone number should be specified.

5.8.7 Advanced Setting

The EKI-1321/1322 serial device server provides the advanced settings for some special applications which need critical time requirements. In normal applications, these settings are recommended not to be set to avoid the unusual action happened.

Port 1 configuration		
Basic	Operation	Advanced
<input type="checkbox"/>	Enable Delay Time	0 (ms)
<input type="checkbox"/>	Ignore Purge	
<input type="checkbox"/>	Disable Character Timeout Detection	
<input type="checkbox"/>	Disable Multiple Connection	
<input type="checkbox"/>	Enable BufferData Size	0
<input type="checkbox"/>	PortTimeout	0 (ms)
<input type="checkbox"/>	RTL	32
<input type="checkbox"/>	TTL	0
<input type="checkbox"/>	FCL	4
<input type="checkbox"/>	FCH	96
<input type="checkbox"/>	Write to FIFO Size	128
USDG Advanced Options(Flow Control will overwrite these options)		
	RTS Control	On ▼
	DTR Control	On ▼
<input type="button" value="Save"/>		

Enable Delay Time (ms)

When you enable the delay time, the serial port will postpone the received data for the time interval you set, and then send the received data to the TCP/IP network.

Ignore Purge

Some application program will purge the serial port while it is the first time opens this serial port. You can ignore the purge command by enable this option.

Disable Character Timeout Detection

Enable this option will disable the serial port character timeout detection.

Disable Multiple Connection

Enable this option will disable the multi-access function, thus the only one TCP connection is allowed on this serial port.

Buffer Data Size

It determines the internal buffer size to queue data to become a packet.

Port Timeout

It determines the time period that received data from serial port will be postponed.

RTL (Receiver Trigger Level)

It determines how often or when the receiver interrupt will be triggered.

TTL (Transmitter Trigger Level)

It determines how often or when the transmitter will be triggered.

FCL (Flow Control Lower Trigger Level)

FCH (Flow Control Higher Trigger Level)

It determines when the transmission will be suspend or resume.

Write to FIFO size

It determines the maximum characters will be wrote into one interrupt.

RTS/DTR Control

You can configure what happen to the RTS and DTR signals when the cellular and Ethernet connection goes down.

Note! *These settings are just for some special application cases. We strongly recommend do not enable the advanced settings in normal usage.*



5.9 Monitor COM information

5.9.1 Setting information

Go to “**Setting**” page under Monitor Configuration to view the setting of current Port.

Port 1 Status		
Setting	Statistic	ConnectedIP
Operating Mode		Virtual COM Mode
Baud rate		9600
Data bits		8
Stop bits		1
Parity		None
RTS/CTS		OFF
XON/XOFF		OFF
DTR/DSR		OFF

5.9.2 Statistical information

Go to “**Statistic**” page under Monitor Configuration to view network statistics.

Port 1 Status		
Setting	Statistic	ConnectedIP
Tx Count		0
Rx Count		0
Total Tx Count		0
Total Rx Count		0
RTS		ON
CTS		OFF
DTR		ON
DSR		OFF
DCD		OFF

5.9.3 Connected IP information

Go to “**ConnectedIP**” page under Monitor Configuration to view the IP address of Host connected to EKI-1321/1322.

Port 1 Status		
Setting	Statistic	ConnectedIP
Connected IP		IP Address
IP 1		
IP 2		
IP 3		
IP 4		
IP 5		
IP 6		
IP 7		
IP 8		
IP 9		
IP 10		
IP 11		
IP 12		
IP 13		
IP 14		
IP 15		
IP 16		

5.10 Alert

On the Alert Settings page, you may configure how administrators are notified by certain system, network, configuration, power, and cellular connection events. Rely on the events, administrators can collect different options for automatic notification. **Mail** refers to send an e-mail to a specified mail address. **Trap** refers to send an SNMP Trap. **Agent** refers to send the SNMP agent setting. **SMS** refers to send a message to a specified phone number.

5.10.1 Setting

Alarm Setting	
Mail Server	
Mail Server	<input type="text"/>
From Email address	admin@advantech.com
Email address 1	<input type="text"/>
Email address 2	<input type="text"/>
Email address 3	<input type="text"/>
Email address 4	<input type="text"/>
SNMP Trap Server	
Trap Server	<input type="text"/>
Trap Version	<input checked="" type="radio"/> v1 <input type="radio"/> v2c
Trap Community	public
SNMP Agent Setting	
Read Community	<input type="text"/>
Write Community	<input type="text"/>
Contact	<input type="text"/>
Location	<input type="text"/>
SMS alert cellular phone	
Cellular phone 1	<input type="text"/>
Cellular phone 2	<input type="text"/>
Cellular phone 3	<input type="text"/>
Cellular phone 4	<input type="text"/>
Save	

Mail Alarm

The E-mail Alert settings determine how e-mail warnings are sent for system and serial port events. You may configure up to 4 e-mail addresses to receive automatic warnings.

Mail Server: This field is for your mail server's domain name or IP address.

From Mail Address: This is the e-mail address from which automatic e-mail warnings will be sent.

Email Address 1 to 4: This is the e-mail address or addresses to which the automatic e-mail warnings will be sent.

SNMP Alarm

The SNMP Alert settings determine how warnings are sent for system and serial port events through SNMP.

Trap Server: Use this field to indicate the IP address to use for receiving SNMP traps.

Trap Version (default = v1): Use this field to select the SNMP trap version.

Trap Community: Use this field to designate the SNMP trap community.

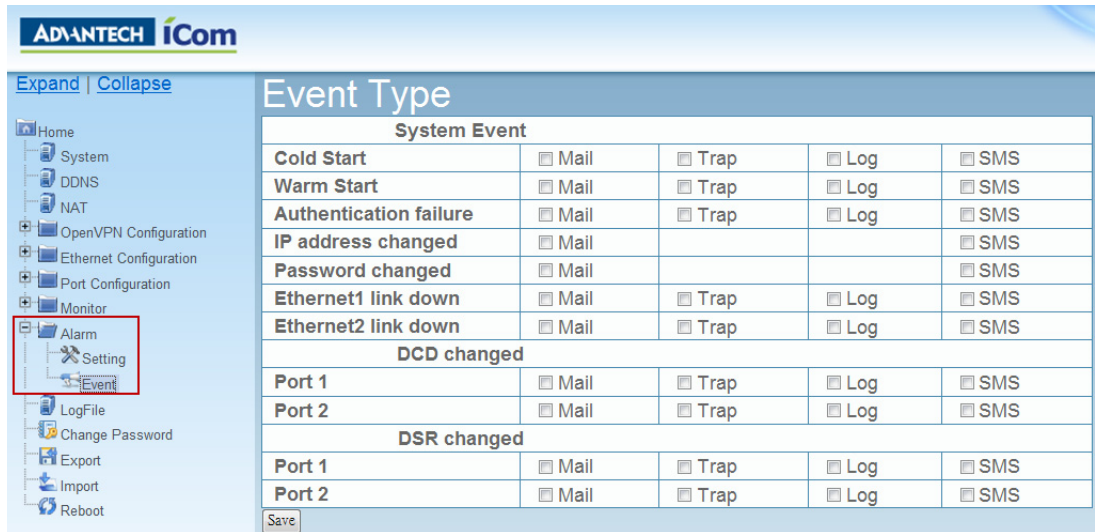
Read Community: Read community name of your agent.

Write community: Write community name of your agent.

Contact: identify the system contact of your agent.

Location: identify the system location of your agent.

5.10.2 Event

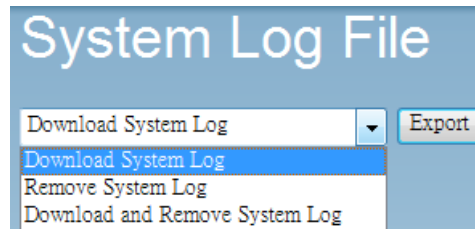


System Event				
Cold Start	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
Warm Start	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
Authentication failure	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
IP address changed	<input type="checkbox"/> Mail			<input type="checkbox"/> SMS
Password changed	<input type="checkbox"/> Mail			<input type="checkbox"/> SMS
Ethernet1 link down	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
Ethernet2 link down	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
DCD changed				
Port 1	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
Port 2	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
DSR changed				
Port 1	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS
Port 2	<input type="checkbox"/> Mail	<input type="checkbox"/> Trap	<input type="checkbox"/> Log	<input type="checkbox"/> SMS

In this page, you can configure what kind of events do you want to log or send out the mail/message through the four methods we provided. Currently, we provide system event included of cold start, warm start, authentication failure, IP address/Password change, serial DCD/DSR port change and Ethernet link down information. You can select 4 methods (Mail, SNMP, log file or SMS) to record or send the event messages.

5.11 LogFile

You can select how to handle the system log file. You can download the system log file to local disk or remove the system log file in EKI-132x devices. You also can download the system log file to local and remove it directly.



5.12 Change Password

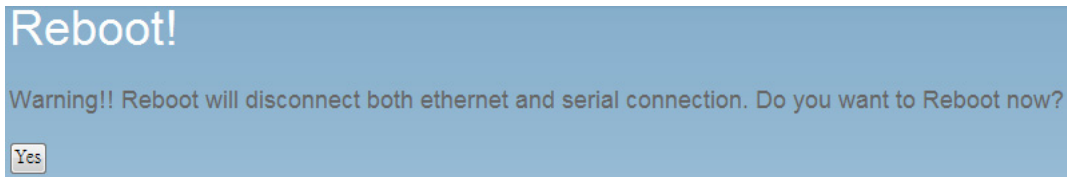
You can change the serial device server password on here.



New password	<input type="text"/>
New password again	<input type="text"/>
<input type="button" value="Save"/>	

5.13 Reboot

The configuration will take effect after clicking "Save" button. But all configurations will save to flash memory after this reboot step. Press the "Reboot" button and the system will give a reset response. It will take a few seconds to reconnect with the new values.



Appendix **A**

Troubleshooting

A.1 Successful GPRS Connection

The GPRS Dial-Up status is separated into two parts. Those information is shown by the **Status LED** and **GPRS Ready LED**.

Note! You can refer to Chapter 2.2.1 LED Indicators



Status LED is represented by

1. The Status LED is lit with an orange light. It means the device is detecting signal strength.
2. The Status LED is lit with a green light. It means the device tries to dial-up and ask for a IP address from the GPRS ISP network

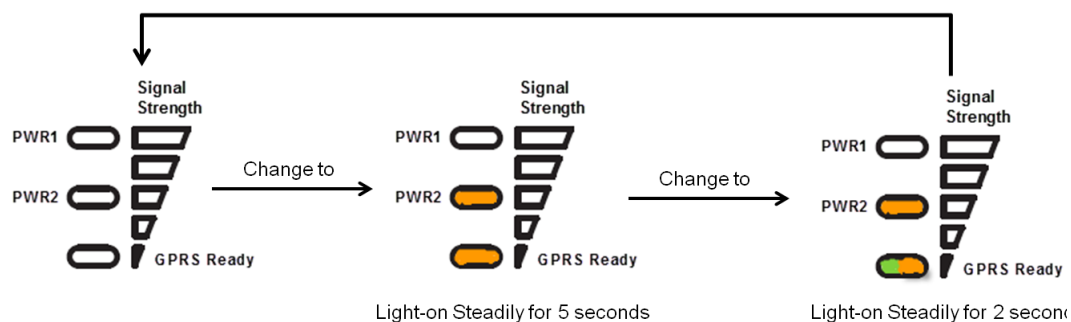
GPRS Ready LED is represented by

1. The GPRS Ready LED is lit with a steady orange light. It means the device already finished the authentication and the IP address had been received.

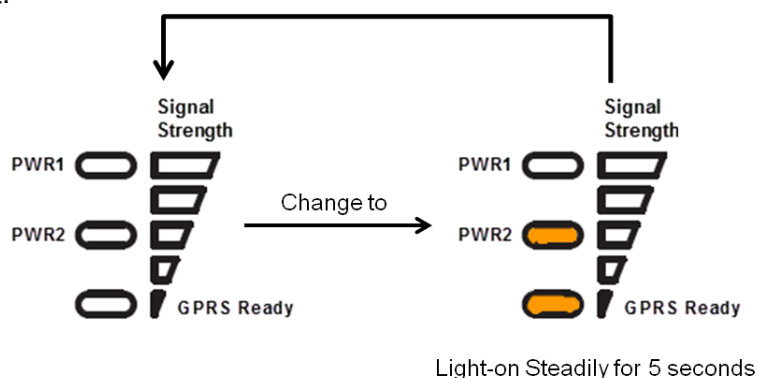
A.2 Failed GPRS Connection

If the GPRS connection in the device is failed, the light-up order of the LEDs and time interval between each state is very critical information to check the cause. There are two possible scenarios for failed GPRS connection.

1. If you meet the following scenario, the possible cause is the ping action can not reach to target. We suggest that you can check the content in Ping Target field of GPRS/3G configuration page. We suggest you can change the content to public server, such as www.google.com.



2. If you meet the following scenario, the possible cause is authentication failure. We suggest you can check the Authorisation, Username, Password, PIN Number, APN and Phone Number in the GPRS/3G configuration page again. If you are sure those fields you key-in are right, please contact your ISP provider to solve it.



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