CN2100 Async Server User's Manual

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CN2100 Async Server User's Manual

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About This Guide

This section discusses the audience, objectives and organization of the CN2100 Async Server User's Manual.

Document Objective and Usage

This manual guides you through the preparation, installation, configuration and troubleshooting of MOXA Async Server on Windows NT.

Audience

This publication is designed for persons who need to install Moxa Async Server, including users maintaining NT system with serial applications, software programmers designing programs for data communication, administrators maintaining Async Server for multi-users. For programmers, this publication is to be used along with the Moxa PComm manual.

Note: If you are multiport serial board user, and want to use same functions on Async Serve, please read Chapter 1, 2 and 3 for installation. If you are advanced users and like to enjoy more benefits from Async Server, please read Chapter 1, 2 and 4. If you like to customize Async Server for special functions such as WAN connection and backup routing, read Chapter 1, 2, and 5. If you need shared server installed on your network, read Chapter 4.

Document Organization

The major sections of this publication are as follows:

Chapter 1, "Introduction", general introduction about the CN2100 application types, including the time to use what kind of operation mode offered by Moxa and its features, specifications.

Chapter 2, "Installation", describes how hardware to be installed and the initial setup.

Chapter 3, "Configuration", describes how to configure the CN2100 and the detailed description for the relevant tool.

Chapter 4, "Terminal Mode", depicts the terminal operation mode and its facilities:

telnet, rlogin and the description of detailed settings.

Chapter 5, "Integrated SLIP and PPP Operations", describes the SLIP and PPP

operations and the description of detailed settings.

Chapter 6, "Integrated Dynamic Operations", states the Triple Dynamic operation modeand the description of detailed settings.

Chapter 7, "Async Server Proprietary Protocol", explains how to write the program to control the async ports from a network host and the description of detailed settings.

Chapter 8, "Networked Printers", provides information on how to setup networked printers and the description of detailed settings.

Chapter 9, "Reverse Telnet ", describes how to use the Reverse Telnet function and the description of detailed settings.

Chapter 10, "Transparent RAW Data Transmission ", illustrates how transparent RAW data transmission work and its configurations.

Chapter 11, "Administrative Utilities ", narrates the useful administrative tools and the detailed description.

Appendix A, "Troubleshooting", lists the common error condition and its reason as well as the possible solutions.

Appendix B, "Pin Assignment and Cable Wiring", provides the port pin assignment and cables wiring.

Appendix C, "TCP/IP and Internet Network", simple introduction to TCP/IP and networks.

Appendix D, "Domain Name Service ", describes the Domain Name Service.

Appendix E, "SNMP MIB Definitions", lists of the supported SNMP groups.

Appendix F, "Moxa Fixed TTY Program" advises users what moxatty means and where to get it and its manual.

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1 Introduction

1.1 Overview

The CN2100 Async Server is a TCP/IP communication server which supports 16 or 8 async ports (RS-232) and one parallel printer port (Centronics). It connects terminals, modems, printers and any other asynchronous serial devices to host computers on local area networks. The CN2100 Async Server complies with the Ethernet or the IEEE 802.3 specifications using standard Ethernet 10Base2 (ThinNet) or 10BaseT(twisted pair) as the physical medium.

With the CN2100 Async Server, you can attach virtually any serial devices and one parallel printer to the networks. The CN2100 supports and manages these devices, and provides many applications for connecting users and resources on the network. The following detailed application architecture for your reference will make you more realize the part CN2100 is playing in your needs.

Remote Dial-in and Multi-Point Routing

Before we talk about what “Remote Dial-in” is, we recommend you to see the Figure 1-1 to confirm whether the architecture is what you need. If so, Moxa CN2100 Async Server provides remote dial-in access for not only those ISPs who make people easy to use Internet resources via dial-in at home, but also all small remote offices need this kind of solution to process the data in home office.

When you are sure this application is fit for your need, you also have to know how PPP, SLIP, or Terminal works. Those protocols make “Remote Dial-in” function of Moxa CN2100 Async Server work. Please refer to **Chapter 5** for PPP / SLIP, and **Chapter 6** for Terminal settings.

Moxa CN2100 Async Server also provides static routing if you are considering to setup an async router and the data is routed from LAN to LAN. The detailed description and settings is also in **Chapter 5.**

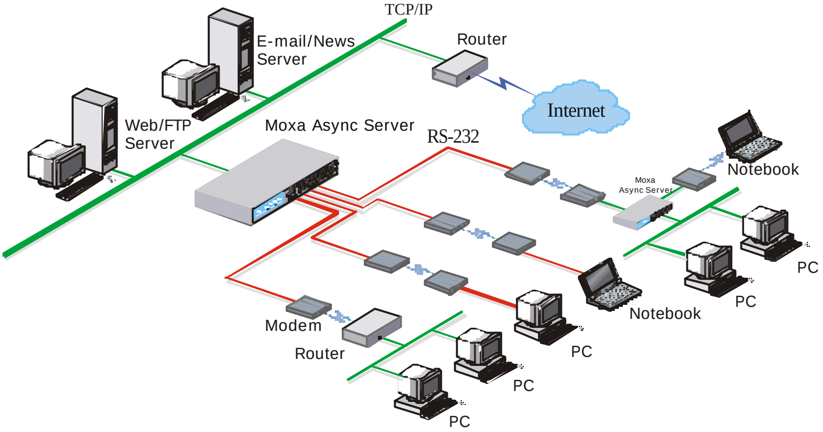


Figure 1-1

Terminal Access

If you are main-frame-based computing, you must use many terminals to access the data in central system like Figure 1-2. Of course cashiers in Point-Of-Sale system, terminals in stock exchange offices or travel agencies, to ATM machines in banking system can use the reliable solution provided by Moxa CN2100 Async Server. In this kind of application, Telnet protocol is necessary to be offered. Since the architecture is what you want, we recommend you to refer to **Chapter 4** for **t**he relevant settings and detailed description of "**Terminal operation mode**". You do need it.

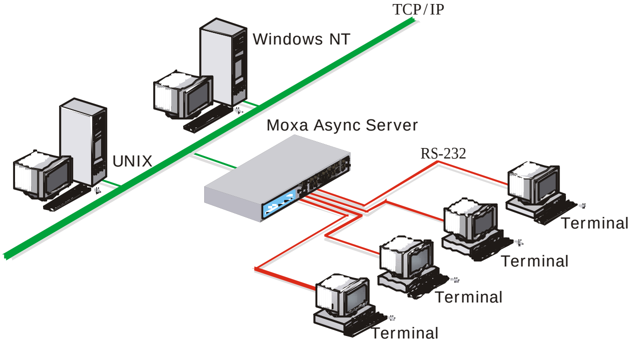


Figure 1-2

Reverse Telnet

You must be wondering how come Moxa CN2100 Async Server offers such a function “Reverse Telnet”, and what “Reverse Telnet” is. Now we call “Reverse Telnet” by “Rtelnet” by short and show you how it works briefly. “Rtelnet” protocol provides TCP/IP network hosts or workstations with access to RS-232 devices connected to a terminal server. And Moxa CN2100 Async Server is the one. That will help network administrators an alternative to manage other servers or routers with console ports or the equipment with asynchronous interfaces but without network controllers attached to Moxa CN2100 Async Server easily through LAN. The Figure 1-3 is the simple prototype diagram. If you happened to be this kind of user, you’ d better refer to **Chapter 9** for the relevant settings and detailed description of “**Reverse Telnet operation mode**”. That’ s really a convenient way.

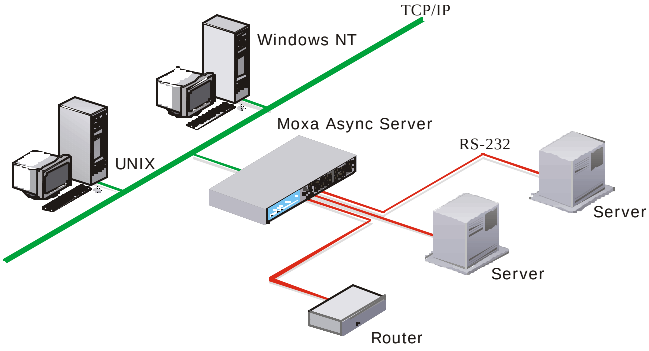


Figure 1-3

Async Device Control over TCP/IP

Most telecommuters or industrial control have to deal with serial communication data over TCP/IP networking for the trends of network. To program for data access over serial transmission maybe easy, but to program serial data transmission over TCP/IP maybe not.

To reduce the complexity of programming over TCP/IP, Moxa CN2100 Async Server provides ASPP protocol on various network hosts. With ASPP protocol, hosts can control devices attached to the Moxa CN2100 Async Server anywhere on the network as if they are connected directly. Figure 1-4 shows you the connection with different platform. In case you are the same as the one we talked about, please refer to **Chapter 7** for the relevant settings, usage and its detailed description of “**ASPP operation mode**”. You will know the easy function calls Moxa offered and the simple example program.

In addition to ASPP, Moxa offers another method, RAW operation, for those who would like to implement the program over TCP/IP individually, too. You can also see the application diagram, Figure 1-4, and refer to Chapter 10 for the relevant settings, usage and its detailed description of "RAW operation mode" if you need this function.

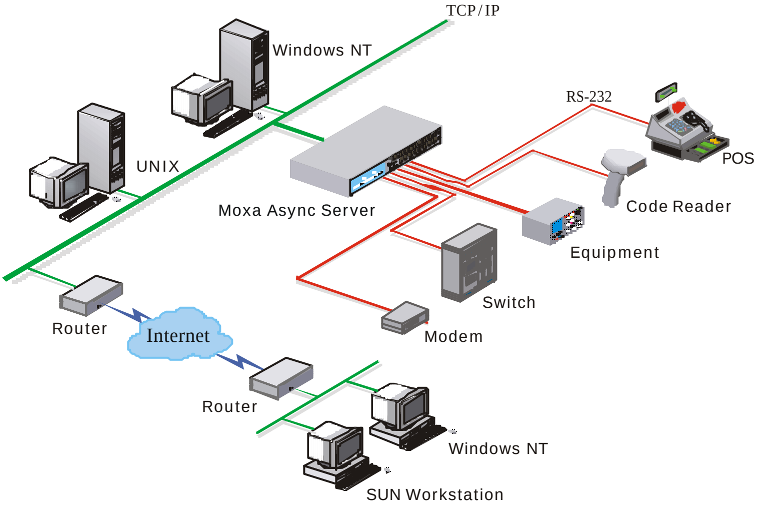


Figure 1-4

Moreover, for the booming Windows NT users, Moxa offers the **Windows NT COM port driver** that makes you control Moxa CN2100 Async Server' s async ports as Windows NT' s standard COM ports. Of course you can run application software like modem pooling, fax pooling, data acquisition, thin-client and RAS to control those serial devices attached to Moxa CN2100 Async Server from any Windows NT hosts on the network. Please find the URL http://www.moxa.com.tw/support/download/download.php3 and http://www.moxa.com.tw/support/documentation/documentation.php3 to get the software Windows NT COM port driver, and its manual.

UNIX Fixed TTY application is also supported for serial access in UNIX systems to interoperate with existing third party application software. Please refer to **Appendix F** for the detailed descriptions. The Figure 1-4 may inspire you to knowing your architecture better.

1.2 Checklist

Upon unpacking the CN2100 Async Server, you should find the following items included in your package:

- CN2100 Async Server
- AC power cord
- Software diskette(It' s a UNIX tar format disk with some useful utilities we' ve ever talked about in the previous section.)
- This User' s Manual
- RJ45 to female DB25 RS-232 cable (CN20030)
- RJ45 to male DB25 RS-232 cable (CN20040)
- Rackmount kit (2 brackets, 8 screws)

1.3 System Description

The CN2100 is equipped with a powerful 32-bit RISC-based microprocessor (i960CA) and an RISC-based Ethernet controller. Its ROM contains firmware for performing basic selftest and loading operated system program.

The operated system program, which is originally stored in the 512KB nonvolatile Flash ROM, can be upgraded via software. This makes upgrade task much easier because no hardware ROM chips need to be replaced. The configuration parameters are also kept in the Flash ROM as well.

One important part of the operated system program is the CONSOLE utility. You can access the windows-like CONSOLE utility from console ports or any network host to configure and administrate the CN2100.

1.4 Features

The following is a summary of the features of CN2100:

Hardware

- 32-bit CPU Processor
- 1MB RAM
- Easy firmware upgrade via 512K Flash ROM
- TI550C UART
- Auto-sensing Ethernet BNC 10Base2 and UTP RJ45 10BaseT connector
- 8 or 16 RJ45 RS-232 async ports with baud rate up to 921.6K bps
- DTR, DSR, DCD, RTS, CTS, TXD, RXD, and GND port signals

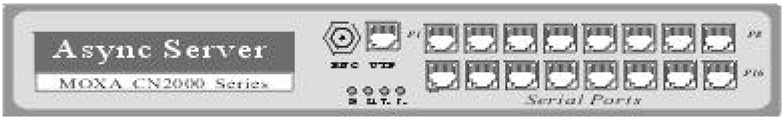
- One RS-232 console port and one centronic Parallel port
- Surge protection by Moxa A60 Surge protector (Optional)
- Internal Auto-sensing 90~260V, 47~63Hz, 60W Power

Software

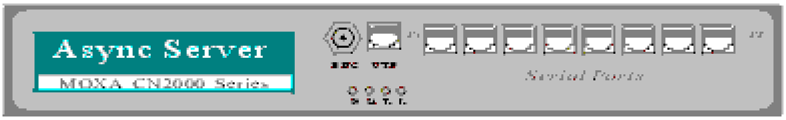
- Friendly window-like administrative CONSOLE utility
- Password protection and extensive user accounting
- RAW function for transparent data transmission
- Reverse Telnet function
- ASCII/Binary terminal modes with four/one Telnet and Rlogin sessions
- Dynamic auto-recognition of Terminal, SLIPD or PPPD
- Point to point Protocol (PPP)
- Serial Line Internet Protocols (SLIP and CSLIP)
- Remote serial or parallel (RLP) printing
- Async Server Proprietary Protocol (ASPP) for hosts to control the serial devices connected to CN2100.
- SNMP Agent for network management.
- Domain Name Service (DNS).
- Protocols: TCP/IP, ARP, UDP, ICMP, RCP, and Static Routing
- Security protocols: RADIUS, PAP/CHAP, Dial-Back, and Server password.

1.5 Outlook

Front Panel-Figure 1-1 shows the front panel of the 16-port CN2100(CN2116);
Figure 1-2 shows the front panel of the 8-por CN2100(CN2108);



Figure



Figure

The CN2100 provides 16 or 8 RJ-45 async ports. Please refer to the Appendix B for pin assignment and cable wiring. You may order Moxa if you need extra cables.

Table 1-1 describes the indicators on the front panel.

LED	Color	Description
S0	Red	On when the AC power is on and CN2100 is ready
S1	Yellow	Used for special function, for example, CN2100 would be fleshing when Windows NT real COM port driver was driven normally and you' d like to locate CN2100. Otherwise, it would be on when system abnormalizes
Tx	Red	Blinking when data being transmitted to the Ethernet interface
Rx	Red	Blinking when data being received from the Ethernet interface

Figure 1-3 shows the rear panel of the CN2100.Async Ports

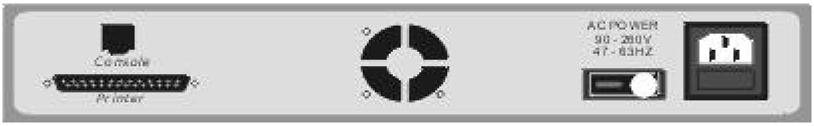


Figure 1-3

Console Port

The RJ-45 console port provides access to the CN2100 CONSOLE utility. Please refer to Appendix B for pin assignment and cable wiring.

Network Interface

The CN2100 has the ability of auto-sensing two network interface ports connecting to LAN:

- 10Base2 Ethernet port with a BNC connector
- 10BaseT Ethernet port with a RJ45 connector

Note: only one interface can be used at a time.

Printer Port

The CN2100 supports one parallel Centronics printer port with 25-pin female connector.

Power Switch

The power switch allows you to disconnect AC power without disconnecting power cord.

Power Selector

The CN2100 automatically selects the operational voltage range. It supports 90 to 260V, 47-63Hz AC power.

2 Installation

There are several steps to follow before getting the CN2100 to work. The instructions suppose that you have had a minimal TCP/IP network already.

2.1Attaching to the network

To connect to a 10Base2 Ethernet, you need to attach a BNC T-connector from the Ethernet cable to the CN2100. If CN2100 is on the termination point of the Ethernet cable, you need a terminator on the T-connector also.

To connect a 10BaseT Ethernet, insert the RJ45 network plug into the RJ45 connector on the CN2100.

After connecting the hardware to your network and your subnet is also in 192.168.127.xxx, you can directly use telnet program to CN2100's IP address for console utility working like described in **Chapter 3**. The default value of Async Server IP is 192.168.127.254. If your subnet is different from 192.168.127.xxx, you may add routing in your computer or follow the procedures described in the next section to attach a console terminal.

Note:

1.If 10Base2 is used, the 10BaseT connection must be removed. CN2100 supports auto-sensing network connector. When both kind of network connectors are attached at the time of power on , the console program by telnet doesn't work. You have to remove the unused connection, turn off and on your CN2100 power switch, then the console program by telnet can work properly.

2.You may add one routing, like "route add 192.168.127.254" in Windows 95/98/NT system's DOS mode, then use ping command, "ping 192.168.127.254" to confirm if this routing work or not. If you *successfully add this routing in your host, you can directly telnet the CN2100’ s IP address*

2.2 Attaching console terminal

Another way to make console utility work is attaching a terminal (vt52 or vt100/ansi) or a PC running terminal emulation to the RJ45 console port located on rear panel using the shipped RJ45 to female DB25 RS-232 cable (refer to Appendix B for its cable wiring). You need this terminal to make necessary configuration if you can’ t easily access the console utility via Ethernet.

Note: The terminal has to be set as 19200bps, 8 bits, no parity and 1 stop bit.

2.3 Power-up

All we talk about in the previous sections will be done successfully after you install the power cord and switch the power on. The CN2100 now runs its ROM-resident diagnose. The indicator lights are off in this stage, except for the power indicator S0.

2.4 Running the system program

The CN2100 will then automatically download the operated system program from the Flash ROM and run it.

3 Configuration

Configuring the CN2100 involves setting parameters to define the unit’s necessary operating and administrative attributes. These attributes included:

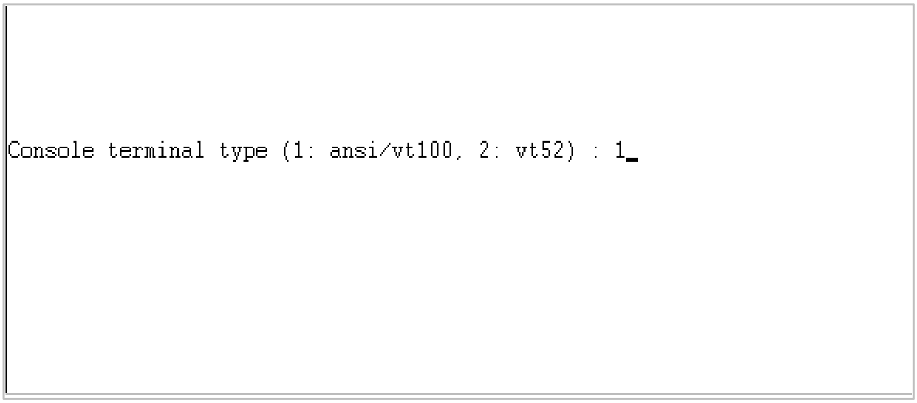
- □ Defining IP address for the CN2100
- □ Selecting the network interface, 10Base2 or 10Base T
- □ Setting up security / password
- □ Defining the IP address reference table for the preferred hosts
- □ Setting up the PPP/SLIP routing table
- □ Editing the hello message for terminal users
- □ Defining the operation mode of each async port
- □ Customizing the CN2100 environment

To do the configuration, you must access to the CONSOLE utility in any one of the following ways:

From a **terminal** with (Speed 19200, Parity None, Data bit 8, Stop bit 1) connected to the console port at the rear panel ;

From a **network host**, Telnet the CN2100’ s IP address (the default value is 192.168.127.254) if your subnet ‘s IP is in the 192.168.127.x. Otherwise you have to add a routing to your host. Please note the procedure for routing added is different in each platform.

Note:You may add one routing, like “route add 192.168.127.254” in Windows 95/98/NT system’ s DOS mode, then use ping command, “ping 192.168.127.254” to confirm if this routing work or not. If you successfully add this routing in your host, you can directly telnet the CN2100’ s IP address.



```
Console terminal type (1: ansi/vt100, 2: vt52) : 1_
```

Figure 3-1

Note: Only one CONSOLE session can be activated at a time. The first prompt by telnet /console port will be showing as the figure above.

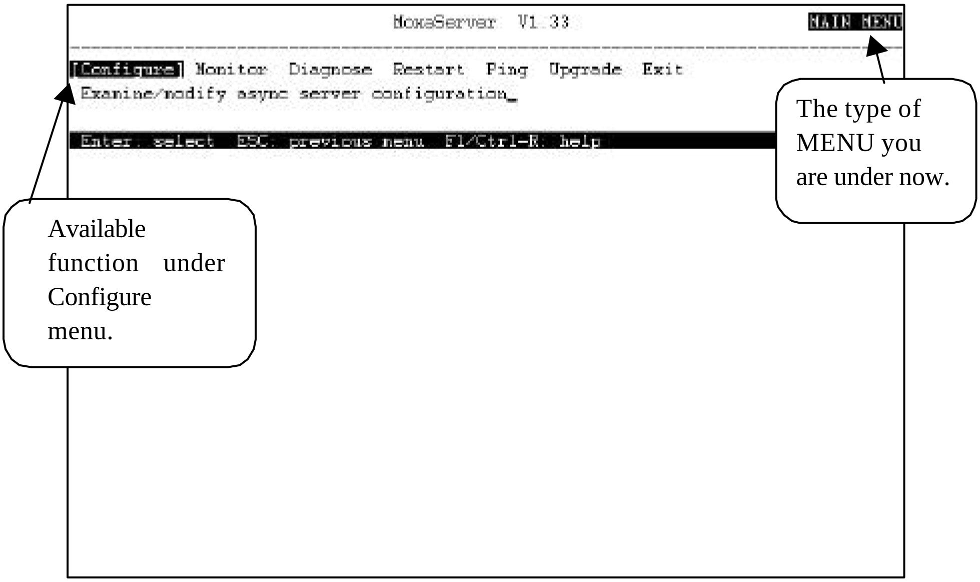
It is important that the terminal or PC running terminal emulation (HyperTerminal of Windows 95/98/NT, PC-PLUS, Telix, etc.) must be one of the types listed above; otherwise the cursor movement and display might not work as expected. Enter the console password and then select the terminal type if required. You can find HyperTerminal application at [Start] | [Programs] | [Accessories] | [Communications] | [Hyperterminal] | [HyperTerminal] in Windows 95/98 or at [Start] | [Programs] | [Accessories] | [Hyperterminal] | [HyperTerminal] in Windows NT. When you use HyperTerminal, please remember to set the port Speed at 19200, Parity None, Data bit 8, and Stop

bit 1.

3.1 Window-like CONSOLE

The CN2100 provides a window-like CONSOLE utility. The utility is designed in such a way to provide easier and friendly human interface for configuration and administration. A handy on-line help is accessible almost anywhere during the configuration procedure. You can always hit F1 or Ctrl-R to bring the help message.

To give user an idea about the window-like utility, the figures 3-2, 3-3 show a typical menu, You can use arrow key or initial letter of each function to choose the desired function. For example, you will see the firmware version of Moxa CN2100, V1.xx, at the top of the menu first of all. Then you can move cursor to other function in figure 3-3 by press ”H” for “Host”, “L” for “Line”, for example, or locate cursor at [Server] position and hit “Enter” to configure server information.

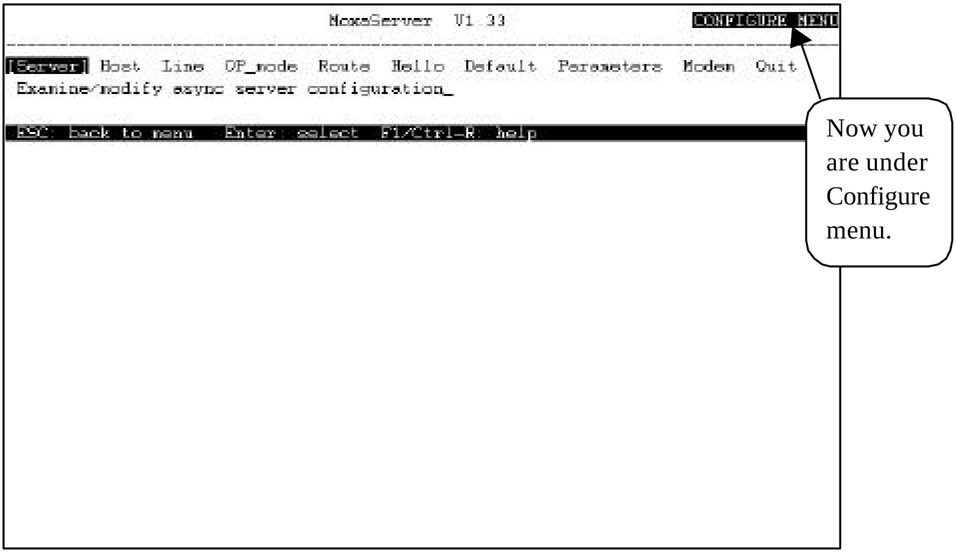


```
                              MoxaServer  V1.33                     MAIN MENU
---------------------------------------------------------------------------------
[Configure] Monitor  Diagnose  Restart  Ping  Upgrade  Exit
 Examine/modify async server configuration_

 Enter: select  ESC: previous menu  F1/Ctrl-R: help
```

The type of MENU you are under now.

Available function under Configure menu.

Figure 3-2



```
                              MoxaServer  V1.33                CONFIGURE MENU
---------------------------------------------------------------------------------
[Server] Host  Line  OP_mode  Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify async server configuration_

 ESC: back to menu   Enter: select  F1/Ctrl-R: help
```

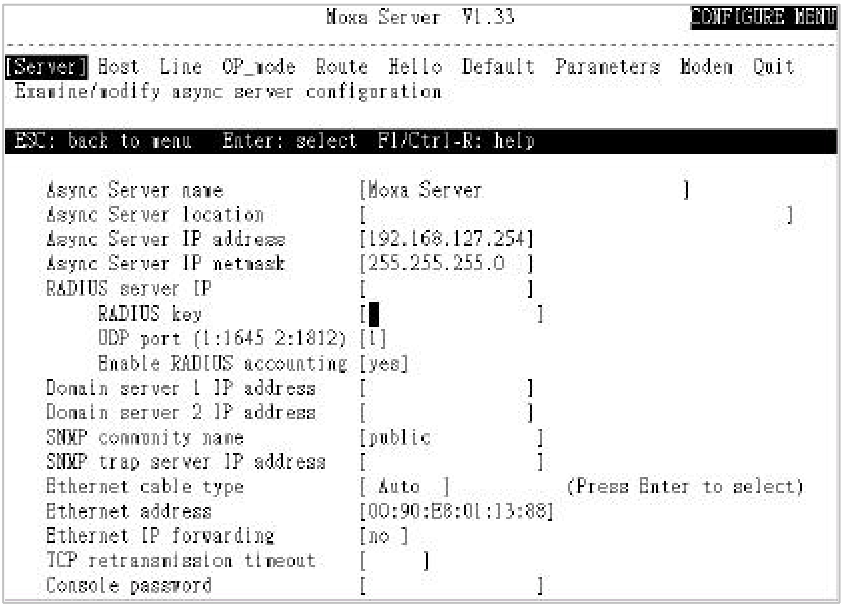
Now you are under Configure menu.

Figure 3-3

After the configuration is completed, please make sure to save it first. Then restart the CN2100 to take effect the configuration. Otherwise all your modifications will be lost when CN2100’ s switch is turned off. Of course you can immediately restart your system after modifying the parameters for a temporary test.

3.2 Server

After hitting <Enter> key to select the [Server] function, you may start configuring the CN2100 server information like below.



```
                        Moxa Server  V1.33                CONFIGURE MENU
-------------------------------------------------------------------------
[Server] Host  Line  OP_mode  Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify async server configuration

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

   Async Server name           [Moxa Server                    ]
   Async Server location       [                                        ]
   Async Server IP address     [192.168.127.254]
   Async Server IP netmask     [255.255.255.0  ]
   RADIUS server IP            [               ]
        RADIUS key             [                ]
        UDP port (1:1645 2:1812) [1]
        Enable RADIUS accounting [yes]
   Domain server 1 IP address  [               ]
   Domain server 2 IP address  [               ]
   SNMP community name         [public          ]
   SNMP trap server IP address [                ]
   Ethernet cable type         [ Auto  ]          (Press Enter to select)
   Ethernet address            [00:90:E8:01:13:88]
   Ethernet IP forwarding      [no ]
   TCP retransmission timeout  [     ]
   Console password            [                ]
```

Figure 3-4

The following message is the detailed description for each element under [Server].

Async Server name -This field contains the name of this Async Server. The Async Server identifies itself by this name when SNMP station or UNIX host requests. The name should be an ASCII string with length no more than 30 characters. Blank is allowed.

Async Server location-This field contains the location of this Async Server. The Async Server will report this location to SNMP station by request. The name should be an ASCII string with length no more than 40 characters. Blank is allowed.

Async Server IP address-This field MUST contain a unique Internet Protocol (IP) address in the network. The IP address appears in a dotted notation as ddd.ddd.ddd.ddd. Each 'ddd' is a decimal number. The default value is 192.168.127.254.

Async Server IP netmask-This field contains the server ethernet IP network mask pattern. 'Blank' means the network mask depends on IP address classes. For example, if the IP address is 192.168.127.254, belonging to class C (Please refer to Appendix C), the network mask is ought to set as 255.255.255.0. More detail information, please ask your network administrator of help.

RADIUS server IP-RADIUS is for short of Remote Authentication Dial-In User Service, used for authentication of remote dial-in users in any ISPs (Internet Service Providers). If you don’ t have a RADIUS server on your network, you can skip this field. Since the Async Server is a diskless device, it is hard for the Async Server to hold all the important authentication data such as RADIUS information. To solve this problem, users can specify a network host that has hard disk as the RADIUS server. With MOXA-supplied software, the RADIUS server can cooperate with the Async Server to do the authentication check and to record the user's activity.

This field contains the IP address of the RADIUS server. If you are setting up a network host as the RADIUS server, then this field must be filled. MOXA provides the necessary software, at the enclosed software diskette, to function the security and accounting task on UNIX-based platform. Please also refer to the \radius.2.2\read.me file after uncompressed this radius.2.2.tar.z for more information.

Note: The RADIUS server and Async Server SHOULD be able to communicate with each other, for example, they ping successfully on each other.

RADIUS key- RADIUS key is a shared key for RADIUS protocol. If you get a RADIUS server, you would have to create a password here.

UDP port (1:1645 2:1812)-There are two choices for port numbers for RADIUS UDP port number. The early deployment of RADIUS was done using the erroneously chosen port number 1645, which later conflicts with the RFC standard. The officially assigned port number for RADIUS is 1812. That means the UDP port number for the newer RADIUS server software is 1812. But we recommend that 1645 is the first choice. Many companies in industry still adopt 1645 as UDP port number in RADIUS server. You can check UDP port number in your RADIUS server software while making the choice. Moreover, the UDP port number of Moxa RADIUS Server utility is fixed at 1645.

Enable RADIUS accounting -This field will set as “yes” as default. If your RADIUS Server didn’t offer this kind of function, please set it as “No”.

Domain server IP address-This field specifies the IP address of the Domain Name Server. If you use domain name, like “www.moxa.com.tw” in any kind of application, we strongly recommend you to specify your Domain Name Server IP on your LAN here.

SNMP community name -The SNMP community name is a way to guarantee minimal security for SNMP communication. Only the SNMP stations with the same community name can access to the SNMP agents like Async Server. Enter the community name with no more than 16 ASCII characters. The default name is 'public'.

SNMP trap server IP address-This field specifies the IP address of the SNMP trap server. The Async Server will report to the SNMP trap server each time when it restarts the unit. You may skip this if no SNMP is needed

Ethernet cable type -The interface is set as “Auto” as default. Because CN2100 will auto-sense your ethernet cable type when you turn it on. If you are certain about your connection, please select the specific one to save system starting time.

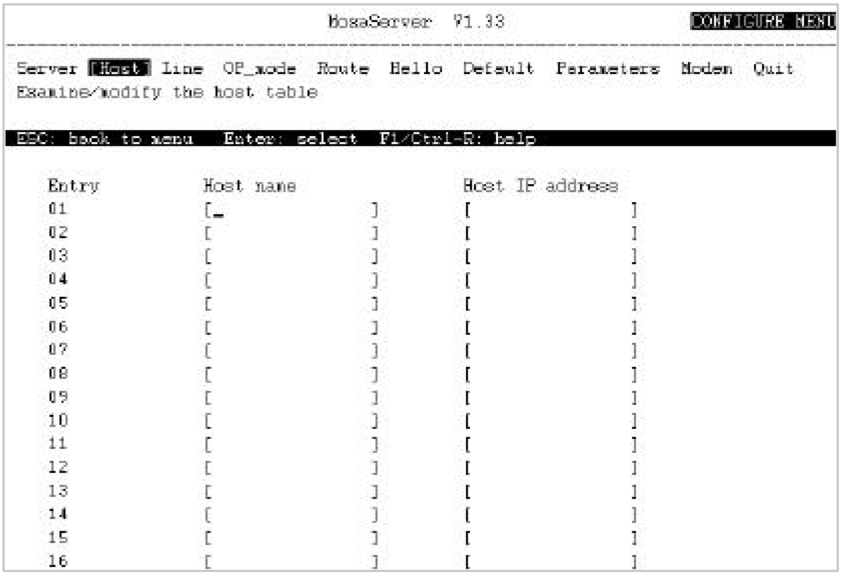
Ethernet address-This field contains the hardware Ethernet address. Modification of this field is not allowed.

Console password- You may or may not specify the password for the CONSOLE utility. If you specified the password, you would need to enter the password before getting into the CONSOLE utility. The console password is strongly recommended to highly keep in mind or write down in your note. If you accidentally lose it, you can only contact Moxa Technical Support for help.

Note: Save your console password in a safe place as soon as you set the password.

3.3 Host

The host table is designed for editing the frequently referred host names and their corresponding IP addresses. The advantage is that you can easily refer to a host by its name instead of the cumbersome IP address. The host table can hold up to 16 [Host name]-[Host IP address] entries as seen in the Figure 3-5.



```
                              MoxaServer  V1.33                CONFIGURE MENU
------------------------------------------------------------------------------
 Server [Host] Line  OP_mode  Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the host table

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

    Entry          Host name                Host IP address
    01             [_              ]        [               ]
    02             [               ]        [               ]
    03             [               ]        [               ]
    04             [               ]        [               ]
    05             [               ]        [               ]
    06             [               ]        [               ]
    07             [               ]        [               ]
    08             [               ]        [               ]
    09             [               ]        [               ]
    10             [               ]        [               ]
    11             [               ]        [               ]
    12             [               ]        [               ]
    13             [               ]        [               ]
    14             [               ]        [               ]
    15             [               ]        [               ]
    16             [               ]        [               ]
```

Figure 3-5

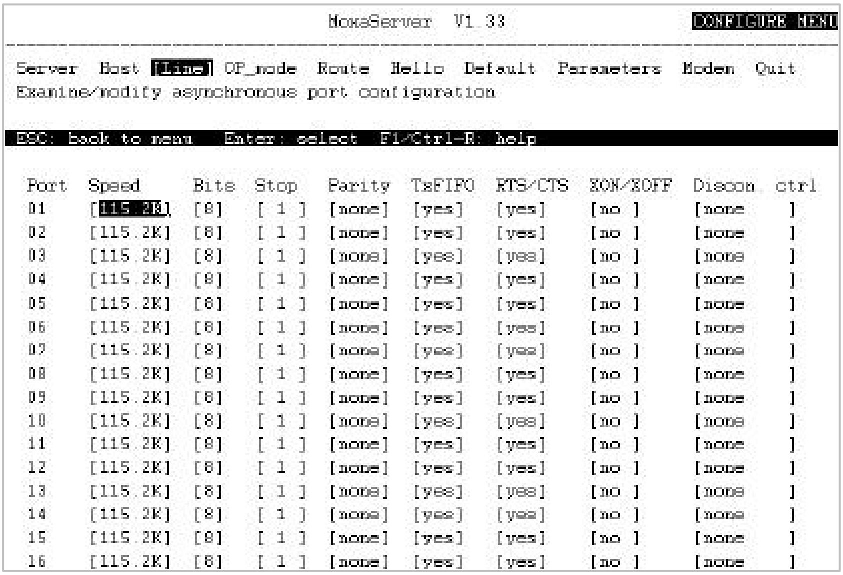
The following message is the detail description for each element under [Host].

Host name -This field contains the memorizable name of a host.

Host IP address-This field specifies the IP address of the host.

3.4 Line

The Figure 3-6 is about each async **Line's** configuration such as baud rate, parity and flow control condition.



```
                         MoxaServer  V1.33                  CONFIGURE MENU
----------------------------------------------------------------------------
 Server  Host  [Line]  OP_mode  Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify asynchronous port configuration

 ESC: back to menu   Enter: select   F1/Ctrl-R: help

  Port  Speed     Bits  Stop   Parity  TxFIFO  RTS/CTS  XON/XOFF  Discon  ctrl
  01    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  02    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  03    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  04    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  05    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  06    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  07    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  08    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  09    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  10    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  11    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  12    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  13    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  14    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  15    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
  16    [115.2K]  [8]   [ 1 ]  [none]  [yes]   [yes]    [no ]     [none     ]
```

Figure 3-6

The following message is the detailed description for each element under [Line].

Speed-Specify the baud rate of the async line. Press Enter to list the available speeds (50-921.6K) and make a choice.

Bits-Specify the data bits of the async line. Press Enter to list the available data bits (5-8) and make a choice.

Stop-Specify the stop bits of the async line. Press Enter to list the available stop bits (1, 1.5, 2) and make a choice.

Parity-Specify the parity of the async line. Press Enter to list the available parity type (none, odd, even) and make a choice.

TxFIFO -Enable the FIFO of async line. Default is yes. You can change it as‘ No’ upon your request.

RTS/CTS-Specify if you wish to apply hardware flow control over the async line. If 'yes', then the RTS and CTS control signals must be included in the cable wiring. The other end, e.g. terminal, should enable RTS/CTS flow control as well. RTS/CTS flow control is always recommended in order to prevent possible data loss.

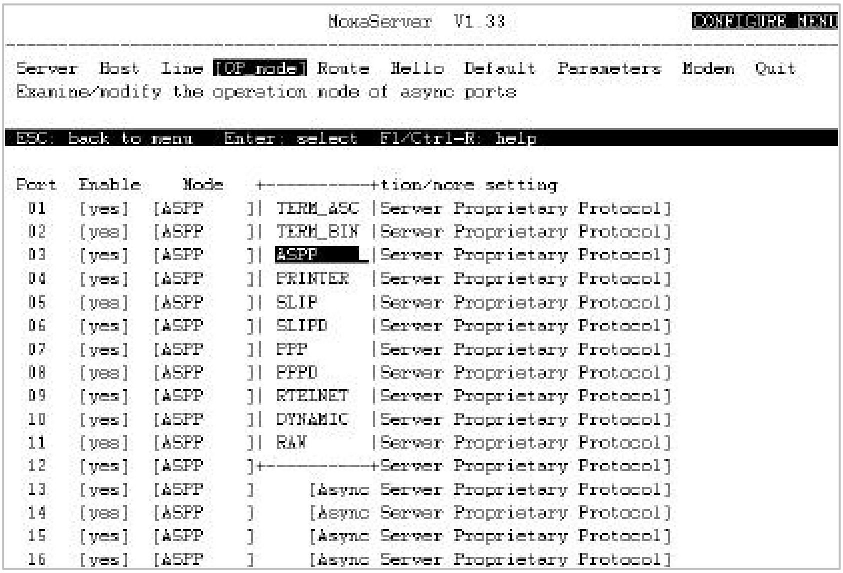
XON/XOFF-Specify if you wish to apply software flow control over the async line. If 'yes', then the other end, terminal for example, should also enable XON/XOFF flow control.

Note: If the async line is configured as a PPP, SLIP or TERM_BIN mode, then the XON/XOFF flow control must be set to 'no'. Otherwise the XON or XOFF control code may interfere the communication.

Discon.Ctrl-Specify the line disconnection condition. If 'DCD-off' selected, the line will be automatically disconnected when DCD signal goes off.

3.5 OP_mode

Figure 3-7 shows you port operation modes that CN2100 offered. For the detailed settings in different operation modes, you may see Chapter 4 to Chapter 10 for your reference. Be aware that all ports on CN2100 can be set to different OP_mode.

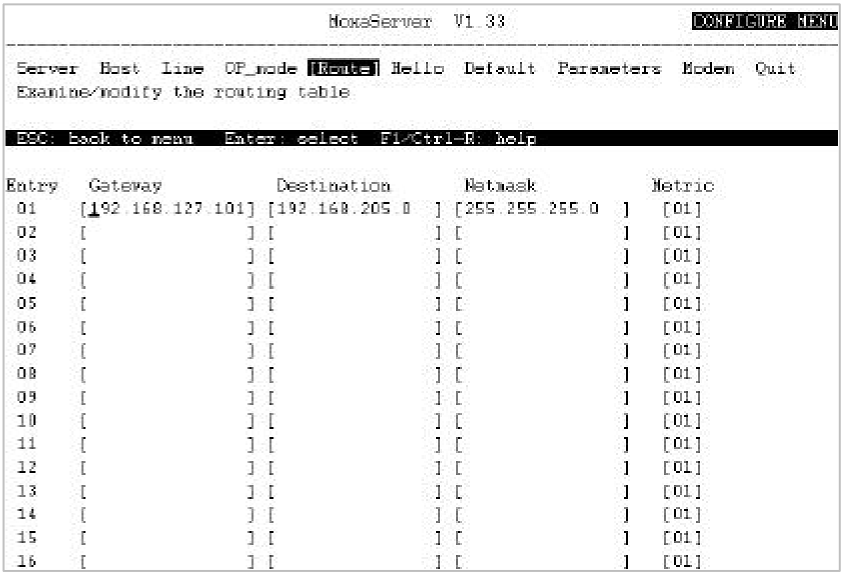


```
                              MoxaServer  V1.33                 CONFIGURE MENU
------------------------------------------------------------------------------
 Server  Host  Line [OP_mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

 Port  Enable    Mode     +----------+tion/more setting
  01   [yes]  [ASPP     ]| TERM_ASC |Server Proprietary Protocol]
  02   [yes]  [ASPP     ]| TERM_BIN |Server Proprietary Protocol]
  03   [yes]  [ASPP     ]| ASPP     |Server Proprietary Protocol]
  04   [yes]  [ASPP     ]| PRINTER  |Server Proprietary Protocol]
  05   [yes]  [ASPP     ]| SLIP     |Server Proprietary Protocol]
  06   [yes]  [ASPP     ]| SLIPD    |Server Proprietary Protocol]
  07   [yes]  [ASPP     ]| PPP      |Server Proprietary Protocol]
  08   [yes]  [ASPP     ]| PPPD     |Server Proprietary Protocol]
  09   [yes]  [ASPP     ]| RTELNET  |Server Proprietary Protocol]
  10   [yes]  [ASPP     ]| DYNAMIC  |Server Proprietary Protocol]
  11   [yes]  [ASPP     ]| RAW      |Server Proprietary Protocol]
  12   [yes]  [ASPP     ]+----------+Server Proprietary Protocol]
  13   [yes]  [ASPP     ]      [Async Server Proprietary Protocol]
  14   [yes]  [ASPP     ]      [Async Server Proprietary Protocol]
  15   [yes]  [ASPP     ]      [Async Server Proprietary Protocol]
  16   [yes]  [ASPP     ]      [Async Server Proprietary Protocol]
```

Figure 3-7

3.6 Route

Figure 3-8 shows the routing table CN2100 supported.



```
                              MoxaServer  V1.33             CONFIGURE MENU
--------------------------------------------------------------------------------
 Server  Host  Line  OP_mode [Route] Hello  Default  Parameters  Modem  Quit
 Examine/modify the routing table

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

Entry   Gateway           Destination       Netmask           Metric
 01    [192.168.127.101] [192.168.205.0   ] [255.255.255.0   ]  [01]
 02    [               ] [                ] [                ]  [01]
 03    [               ] [                ] [                ]  [01]
 04    [               ] [                ] [                ]  [01]
 05    [               ] [                ] [                ]  [01]
 06    [               ] [                ] [                ]  [01]
 07    [               ] [                ] [                ]  [01]
 08    [               ] [                ] [                ]  [01]
 09    [               ] [                ] [                ]  [01]
 10    [               ] [                ] [                ]  [01]
 11    [               ] [                ] [                ]  [01]
 12    [               ] [                ] [                ]  [01]
 13    [               ] [                ] [                ]  [01]
 14    [               ] [                ] [                ]  [01]
 15    [               ] [                ] [                ]  [01]
 16    [               ] [                ] [                ]  [01]
```

Figure 3-8

The following message is the detailed description for each element under [Route].

Gateway-This field specifies the gateway IP address or the interface source IP address which data packets should be sent to.

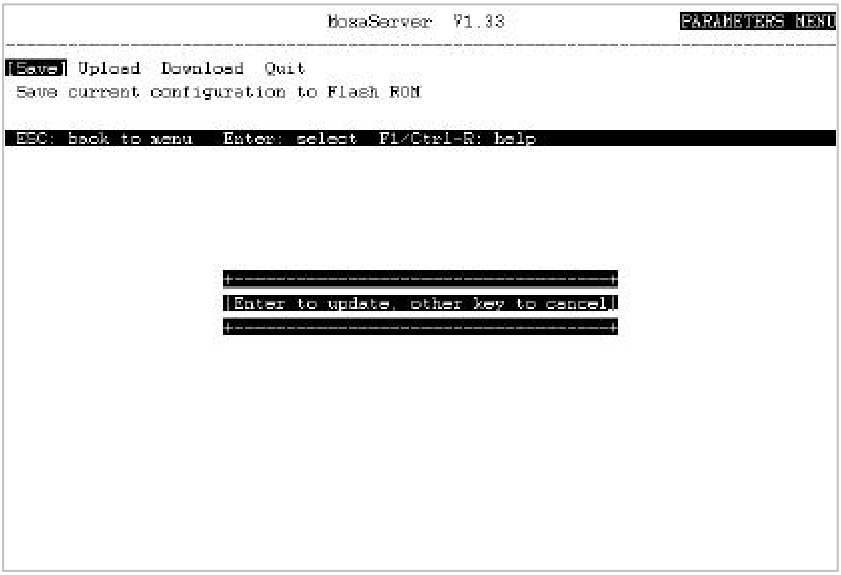
Destination-This field specifies the IP address of a host or network for which the route is going to.

Netmask-This field specifies the mask pattern of the destination network.

Metric-This field indicates the number of hops from source to the destination.

3.7 Parameters

All configurations that are modified must be save in [Parameters]. Otherwise you will lose the settings you' ve ever made once CN2100 is off. Now enter the parameters menu to save your configurations like Figure 3-9.



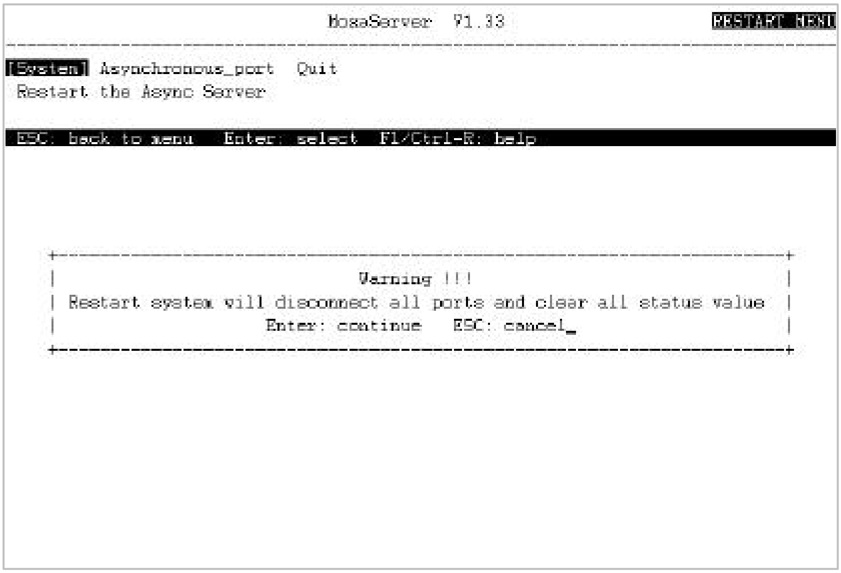
```
                          MoxaServer  V1.33               PARAMETERS MENU
--------------------------------------------------------------------------------
[Save] Upload  Download  Quit
 Save current configuration to Flash ROM

 ESC: back to menu   Enter: select  F1/Ctrl-R: help




                    +------------------------------------+
                    |Enter to update, other key to cancel|
                    +------------------------------------+
```

Figure 3-9

CN2100 also offers the way to save your configurations to a file in a disk by **[Upload]**. You may also retrieve the settings from a file by selecting **[Download]** to CN2100. For detailed description, please see **Chapter 11.5** for your reference.

3.8 Restart

If you finish all settings in the previous sections, you have to restart your system to make configurations take effect! Since restarting system will disconnect current communications, system will show you the warning message to confirm your decision.



```
                              MoxaServer  V1.33                  RESTART MENU
-----------------------------------------------------------------------------
[System] Asynchronous_port  Quit
 Restart the Async Server

 ESC: back to menu   Enter: select  F1/Ctrl-R: help



    +---------------------------------------------------------------------+
    |                              Warning !!!                            |
    | Restart system will disconnect all ports and clear all status value |
    |                      Enter: continue   ESC: cancel_                 |
    +---------------------------------------------------------------------+
```

Figure 3-10

So far you' ve finished the basic settings of CN2100.

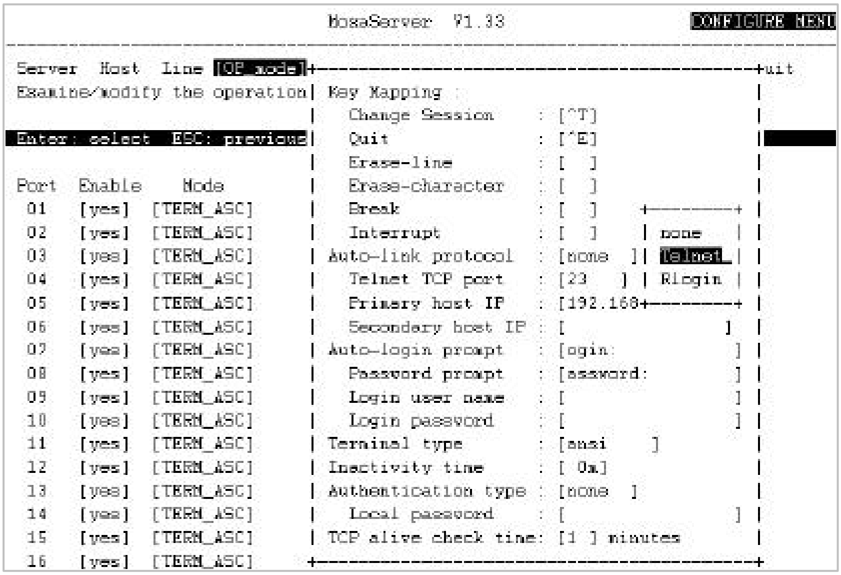
4
Terminal Mode Operations

Users can hook up terminals to the CN2100 aysnc ports then login to any TCP/IP host in the network via telnet or rlogin protocol. In this case, the CN2100 acts as a terminal server. This chapter describes the terminal modes that CN2100 supports: ASCII terminal mode and Binary terminal mode.

4.1 ASCII terminal mode

For all charters control, you may select ASCII terminal mode. Each async port with ASCII terminal mode (TERM_ASCII) supports four independent terminal sessions. You can switch among these sessions by pressing the pre-defined hot key. If the [Configure][Hello] is enabled, the greeting message will be displayed automatically each time your terminal connects to the CN2100.

The following figure and description shows the detailed settings of “TERM_ASCII”.



```
                              MoxaServer  V1.33                  CONFIGURE MENU
-------------------------------------------------------------------------------
Server  Host  Line [OP_mode]+------------------------------------------+uit
Examine/modify the operation| Key Mapping :                            |
                            |   Change Session    : [^T]               |
Enter: select  ESC: previous|   Quit              : [^E]               |
                            |   Erase-line        : [  ]               |
Port  Enable    Mode        |   Erase-character   : [  ]               |
 01   [yes]  [TERM_ASC]     |   Break             : [  ]    +--------+ |
 02   [yes]  [TERM_ASC]     |   Interrupt         : [  ]    | none   | |
 03   [yes]  [TERM_ASC]     | Auto-link protocol  : [none  ]| Telnet | |
 04   [yes]  [TERM_ASC]     |   Telnet TCP port   : [23   ] | Rlogin | |
 05   [yes]  [TERM_ASC]     |   Primary host IP   : [192.168+--------+ |
 06   [yes]  [TERM_ASC]     |   Secondary host IP : [               ]  |
 07   [yes]  [TERM_ASC]     | Auto-login prompt   : [ogin:           ] |
 08   [yes]  [TERM_ASC]     |   Password prompt   : [assword:        ] |
 09   [yes]  [TERM_ASC]     |   Login user name   : [                ] |
 10   [yes]  [TERM_ASC]     |   Login password    : [                ] |
 11   [yes]  [TERM_ASC]     | Terminal type       : [ansi    ]         |
 12   [yes]  [TERM_ASC]     | Inactivity time     : [ 0m]              |
 13   [yes]  [TERM_ASC]     | Authentication type : [none  ]           |
 14   [yes]  [TERM_ASC]     |   Local password    : [                ] |
 15   [yes]  [TERM_ASC]     | TCP alive check time: [1 ] minutes       |
 16   [yes]  [TERM_ASC]     +------------------------------------------+
```

Figure 4-1

The following message is the detailed description of each element for [TERM_ASC].

Session-Each terminal connected to a port with ASCII terminal mode will virtually have 4 sessions. This field defines the hot-key to switch to the next session in sequence. The default hot-key is a composite key of Ctrl (^) and‘ T’ character.

Quit-This field defines the Quit key used to disconnect the link between the current terminal session & the remote host. The default key is a composite key of Ctrl (^) and‘ E’ character.

Erase-line-This field defines the erase-line key. When this key is typed, a telnet 'EL' command will be sent to the remote host. There is no default erase-line key.

Erase-character-This field defines the erase-character key. When this key is typed, a telnet 'EC' command will be sent to the remote host. There is no default erase-character key.

Break-This field defines the break key. If this key is typed, the telnet BREAK signal will be sent to the remote host. There is no default break key.

Interrupt-This interrupt key is used to interrupt the remote process within a connection. It attempts to cause an immediate termination of the current process like Ctrl-C does on a local terminal.

Auto-link protocol-This field specifies the type to connect to a host automatically. Press Enter to choose Telnet or Rlogin protocol. If set to 'none', then users have to choose the protocol themselves when making a connection

Telnet TCP Port- This field specifies the TCP port which will be used to attach to a network host. Default TCP port number is 23.

Primary host IP-This field, if specified, designates a 'permanent' host to which the terminal will always be connected. Enter the host's IP address, the host's name defined in the [Host] table, or the host's name defined in domain name server.

Secondary host IP-This field, if specified, designates a secondary host to be connected when the terminal fails to connect the primary host. Enter the host's IP address or the host's name defined in domain name server.

Auto-login prompt-This field designates the keyword for checking the login prompt before send out the user name while the auto-login function is activated ,If you erase this prompt to blank, the auto-login function is disabled.

Password prompt-This field designates the keyword for checking the password prompt before send out password. If you erase this prompt to blank, the auto-password login function is disabled.

Login user name-This field designates the user name sent to connected host for auto-login. If this field is a blank, the auto-login function is disabled.

Login password-This field designates the password sent to the connected host. If this field is a blank, the password has to be hit when connected to host.

Terminal type-The terminal type is sent to the remote host after the user logs into network host successfully. This is available as the TERM environment variable.

Inactivity time -The terminal session will be disconnected after 'Time-out' minutes of inactivity. Press Enter to list the available time-out time. 0m means no time-out restriction.

Authentication type-The Async Server offers three types of security check when a user make a connection to it before go to network hosts:

'none' - No security check. Every user can freely access to the Async Server via this port.

'local' - Security check based on this port's local password specified at next field, "Local password". User must supply the correct password of the port before he can access to the Async Server.

'server' - Security check based on the security data base maintained on the RADIUS server described on [Configure][Server] menu. When a user wish to access to the Async Server via this port, he is requested to supply user name and password; the Async Server will then check with the RADIUS server to validate the supplied user name and password. To accomplish this, the 'RADIUS server IP' address on [Configure][Server] menu must be correctly specified. Also, running a security software on the RADIUS server is necessary.

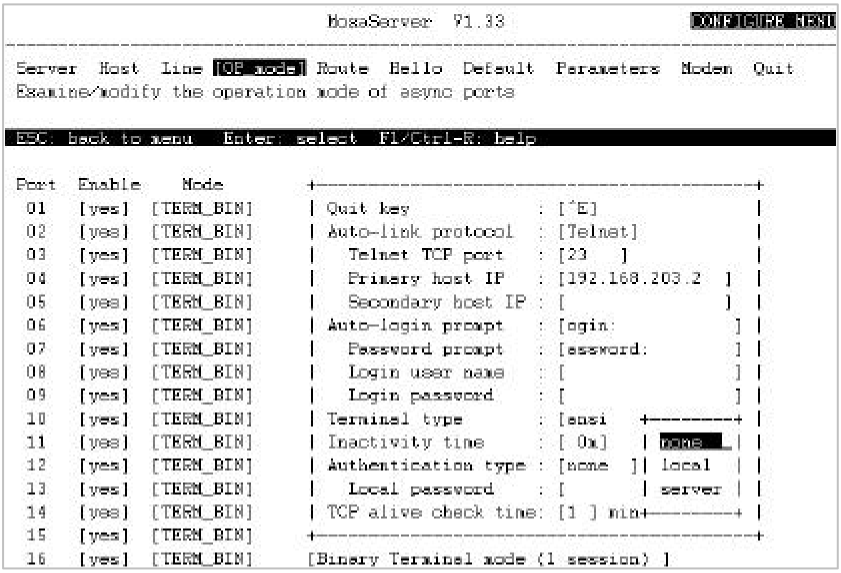
Local password-The access password of this port. This password is only valid when the 'Authentication type' is set to 'local'. Enter the ASCII text password with size up to 16 bytes.

TCP alive check time -Specify the time slice for checking whether TCP connection still established. 1-99 minutes can be set. If there is no response from the connected host in the time you specified, CN2100 will reset this port. The original connection will be disconnected.

4.2 Binary terminal mode

The reason for naming Binary terminal mode is because the port operation will keep transparent transmission of data from 0x00 to 0xFF. That is, the port will not interface any single byte coming in and out, and no data for control key will be ruled out except Quit key. This mode is suitable for those applications that need protocol transmission. For example, file transfer with XMODEM or ZMODEM, etc. Thus, the mode supports only one terminal session.

If the **[Configure][Hello]** is enabled, the greeting message will be displayed automatically each time your terminal connects to the CN2100. The following figure and description shows the detailed settings of “TERM_BIN”.



```
                              MoxaServer  V1.33                CONFIGURE MENU
--------------------------------------------------------------------------------
 Server  Host  Line [OP_mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

 Port  Enable    Mode          +----------------------------------------+
  01   [yes]  [TERM_BIN]       | Quit key             : [^E]            |
  02   [yes]  [TERM_BIN]       | Auto-link protocol   : [Telnet]        |
  03   [yes]  [TERM_BIN]       |   Telnet TCP port    : [23   ]         |
  04   [yes]  [TERM_BIN]       |   Primary host IP    : [192.168.203.2  ] |
  05   [yes]  [TERM_BIN]       |   Secondary host IP  : [               ] |
  06   [yes]  [TERM_BIN]       | Auto-login prompt    : [ogin:           ] |
  07   [yes]  [TERM_BIN]       |   Password prompt    : [assword:        ] |
  08   [yes]  [TERM_BIN]       |   Login user name    : [                ] |
  09   [yes]  [TERM_BIN]       |   Login password     : [                ] |
  10   [yes]  [TERM_BIN]       | Terminal type        : [ansi   +--------+ |
  11   [yes]  [TERM_BIN]       | Inactivity time      : [ 0m]   | none   | |
  12   [yes]  [TERM_BIN]       | Authentication type  : [none  ]| local  | |
  13   [yes]  [TERM_BIN]       |   Local password     : [       | server | |
  14   [yes]  [TERM_BIN]       | TCP alive check time: [1 ] min+--------+ |
  15   [yes]  [TERM_BIN]       +----------------------------------------+
  16   [yes]  [TERM_BIN]       [Binary Terminal mode (1 session) ]
```

Figure 4-2

The following message is the detail description of each element for [TERM_BIN].

Quit key-This field defines the Quit key used to disconnect the link between current terminal session and remote host. The default key is a composite key of Ctrl (^) and E character.

Auto-link protocol-This field specifies the type to connect to a host automatically. Press Enter to choose Telnet or Rlogin protocol. If set to 'none', then users have to choose the protocol themselves when making a connection.

Telnet TCP Port- This field specifies the TCP port which will be used to attach to a network host. The default TCP port number is 23.

Primary host IP-This field, if specified, designates a 'permanent' host to which the terminal will always be connected. Enter the host's IP address, the host's name defined in the [Host] table, or the host's name defined in domain name server.

Secondary host IP-This field, if specified, designates a secondary host to be connected when the terminal fails to connect the primary host. Enter the host's IP address or the host's name defined in domain name server.

Auto-login prompt-This field designates the keyword for checking the login prompt before send out the user name while the auto-login function is activated If you erase this prompt to blank, the auto-login function is disabled.

Password prompt-This field designates the keyword for checking the password prompt before send out password. If you erase this prompt to blank, the auto-password login function is disabled.

Login user name-This field designates the user name sent to connected host for auto-login. If this field is a blank, the auto-login function is disabled.

Login password-This field designates the password sent to the connected host. If this field is a blank, the password has to be hit when connected to host.

Terminal type-The terminal type is sent to the remote host after the user logs into network host successfully. This is available as the TERM environment variable.

Inactivity time -The terminal session will be disconnected after 'Time-out' minutes of inactivity. Press Enter to list the available time-out time. 0m means no time-out restriction.

Authentication type-The Async Server offers three types of security check when a user make a connection to it before go to network hosts:

'none' - No security check. Every user can freely access to the Async Server via this port.

'local' - Security check based on this port's local password specified at next field, "Local password". User must supply the correct password of the port before he can access to the Async Server.

'server' - Security check based on the security data base maintained on the RADIUS server described on [Configure][Server] menu. When a user wish to access to the Async Server via this port, he is requested to supply user name and password; the Async Server will then check with the RADIUS server to validate the supplied user name and password. To accomplish this, the 'RADIUS server IP' address on [Configure][Server] menu must be correctly specified. Also, running a security software on the RADIUS server is necessary.

Local password-The access password of this port. This password is only valid when the 'Authentication type' is set to 'local'. Enter the ASCII text password with size up to 16 bytes.

TCP alive check time -Specify the time slice for checking whether TCP connection still established. 1-99 minutes can be set. If there is no response from the connected host in the time you specified, CN2100 will reset this port. The original connection will be disconnected.

5
PPP and SLIP Operations

This chapter describes the CN2100's implementation for transmitting data over serial point-to-point links, Point-to-Point Protocol (PPP) and Serial Line Internet Protocol (SLIP).

In case your application happened to be the same as Figure 1-1 for **Remote Dial-in** or **Multi-Point Routing,** like what we talked in **Chapter 1**, PPP and SLIP are the right operation modes you have to specify on those async ports in Moxa CN2100 Async Server.

5.1 Point-to-Point Protocol (PPP)

PPP, the most popular protocols used in today's Internet connection, enables you to send datagrams across a serial line or telephone data circuits. PPP's features lists as below:

- □ Built-in error detection of transmission data.
- □ Dynamic connects and disconnects service to reduce phone line costs during inactive time.
- □ Security check (Password Authentication Protocol, PAP)

Connecting two networks via a PPP link

Using the PPP link, you can connect a host to the network without requiring special hardware, or multiplex data between two distant networks. The following information shows a way of routing traffic from any node on network 132.147.10.0 to any node on network 132.147.160.0 via PPP link constructed in Figure 5-1. To realize this, the routing table of each network node ought to look like:

Host 1

Gateway	Destination	Netmask	Metric
132.147.160.10	132.147.10.0	255.255.255.0	2

CN2100

Gateway	Destination	Netmask	Metric
132.147.5.2	132.147.10.0	255.255.255.0	2

Note: You must enter the routing entry into the CN2100 [Route] section in [Configure] menu manually.

Host 2

Gateway	Destination	Netmask	Metric
132.147.10.8	132.147.160.0	255.255.255.0	2

Host 3

Gateway	Destination	Netmask	Metric
132.147.5.1	132.147.5.2	255.255.255.255	1
132.147.5.2	132.147.160.0	255.255.255.0	2

At [Configure] | [OP_mode], the PPP mode means a leased line connection; while the PPPD (PPP Daemon) mode stands for dial in / dial out active connection link. The following figure shows detailed settings for PPP. Note that PPP and PPPD have the same settings. Furthermore, specified **Source IP address** in [Configure] | [OP_mode] | [Description/more setting] can be used as CN2100' s gateway to Destination 132.147.10.0 via PPP link in this example.

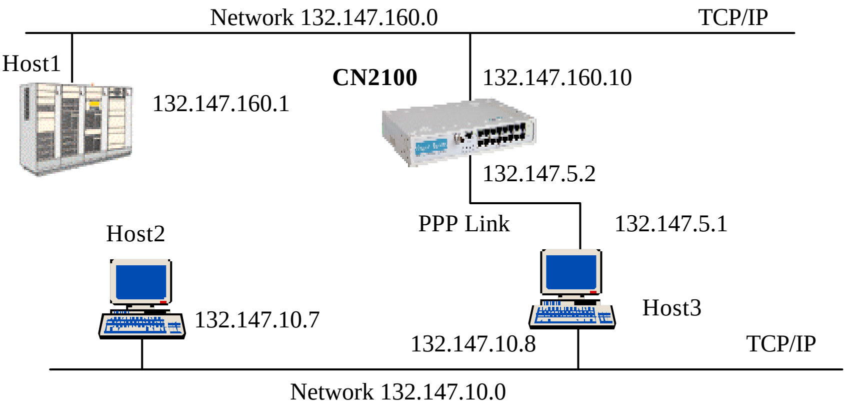
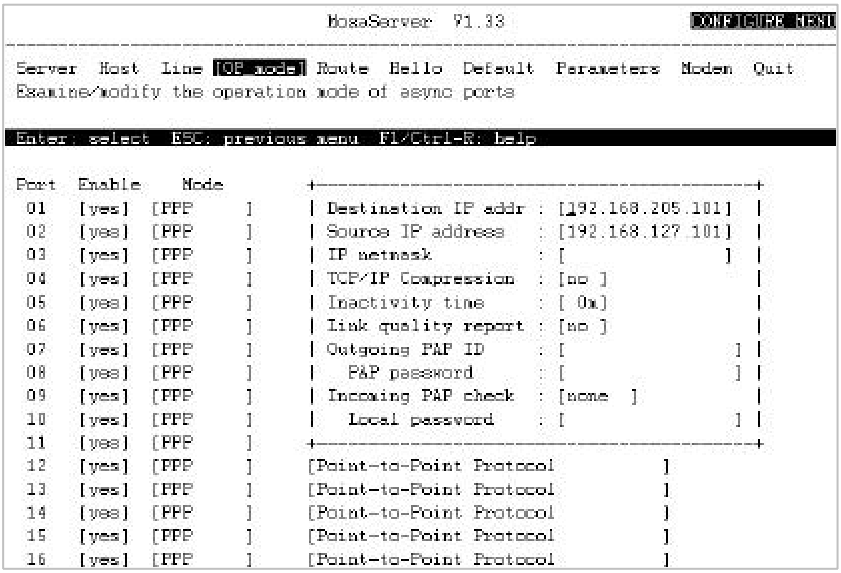


Figure 5-1

The detailed settings of PPP, please see Figure 5-2.



```
                              MoxaServer  V1.33                CONFIGURE MENU
--------------------------------------------------------------------------------
 Server  Host  Line [OP mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 Enter: select  ESC: previous menu  F1/Ctrl-R: help

 Port  Enable    Mode          +------------------------------------------+
  01   [yes]  [PPP      ]      | Destination IP addr : [192.168.205.101]  |
  02   [yes]  [PPP      ]      | Source IP address   : [192.168.127.101]  |
  03   [yes]  [PPP      ]      | IP netmask          : [               ]  |
  04   [yes]  [PPP      ]      | TCP/IP Compression  : [no ]              |
  05   [yes]  [PPP      ]      | Inactivity time     : [ 0m]              |
  06   [yes]  [PPP      ]      | Link quality report : [no ]              |
  07   [yes]  [PPP      ]      | Outgoing PAP ID     : [                ] |
  08   [yes]  [PPP      ]      |   PAP password      : [                ] |
  09   [yes]  [PPP      ]      | Incoming PAP check  : [none  ]           |
  10   [yes]  [PPP      ]      |   Local password    : [                ] |
  11   [yes]  [PPP      ]      +------------------------------------------+
  12   [yes]  [PPP      ]      [Point-to-Point Protocol          ]
  13   [yes]  [PPP      ]      [Point-to-Point Protocol          ]
  14   [yes]  [PPP      ]      [Point-to-Point Protocol          ]
  15   [yes]  [PPP      ]      [Point-to-Point Protocol          ]
  16   [yes]  [PPP      ]      [Point-to-Point Protocol          ]
```

Figure 5-2

The following message is the detail description of each element for [PPP].

Destination IP addr-'Blank' or '0.0.0.0' means the IP is assigned by remote site. If other IP specified, the remote site must use the IP address.

Source IP address-You must specify the IP address of the local site in this field. 'Blank' means the source IP address is the server's IP address.

IP netmask-This field contain the PPP Destination IP network mask pattern. 'Blank' means the network mask is 255.255.255.255, and Dial-in users are recommended to left this field blank.

TCP/IP Compression-If this field is set to 'yes', then the Van Jacobson Compressed TCP/IP Protocol is negotiated. Otherwise normal PPP is applied.

Inactivity time -The PPP link will be disconnected after specified minutes of inactivity. Press Enter to list the available time-out time. 0m means no time-out restriction.

Link quality report-Configure the setting of negotiation of Link Quality Monitoring protocol (RFC 1333). It is usually used for the administrator to figure out the current status of link quality. You may use the relevant application to collect it. ‘ yes’ is to negotiate.

Outgoing PAP ID-If this and next fields are specified, the Password Authentication Protocol will be used. The Async Server will send this PAP ID to the remote site for validation when the remote site requests.

PAP password-The Async Server will send this PAP password to the remote site for validation when the remote site requests.

Incoming PAP check-The Async Server offers three types of security check when an user would like to make a PPP connection to it:

'none' - No security check. Every user can freely access to the Async Server via this port.

'local' - Security check based on this port's local password specified at next field, "Local password". User must supply the correct password of the port before he can access to the Async Server.

'server' - Security check based on the security data base maintained on the RADIUS server described on [Configure][Server] menu. When a user wish to access to the Async Server via this port, he is requested to supply user name and password; the Async Server will then check with the RADIUS server to validate the supplied user name and password. To accomplish this, the 'RADIUS server IP' address on [Configure][Server] menu must be correctly specified. Also, running a security software on the RADIUS server is necessary.

Local password-The access password of this port. This password is only valid when the 'Authentication type' is set to 'local'. Enter the ASCII text password with size up to 16 bytes.

Note:

1. PPP-The PPP mode settings is basically the same as PPP mode except it only supports dial-in line.

2. If an async port is set to PPP/PPPD mode, the line configuration on [Configure][Line] menu should be set to 8 data-bits, no-parity, 1 stop-bit.

5.2 Serial Line Internet Protocol (SLIP)

The CN2100 supports Serial Line Internet Protocol (SLIP) which makes you send TCP/IP packets through a serial line or telephone data circuits. A SLIP link is a point-to point connection between two hosts. Using the SLIP link, you can connect a host to the network without requiring special hardware, or multiplex data between two distant networks. The CN2100 also supports Compressed SLIP (CSLIP).

The following lists the options for setting up a SLIP link:

- You can attach a host to a CN2100 async port. Using the SLIP as the network interface, the host becomes a node on the network.
- You can use SLIP to connect two separate networks, routing data from one network to the other over the SLIP link.

For best performance, you' d better set the line speed to as high as possible when using a SLIP link for retrieving files from a host.

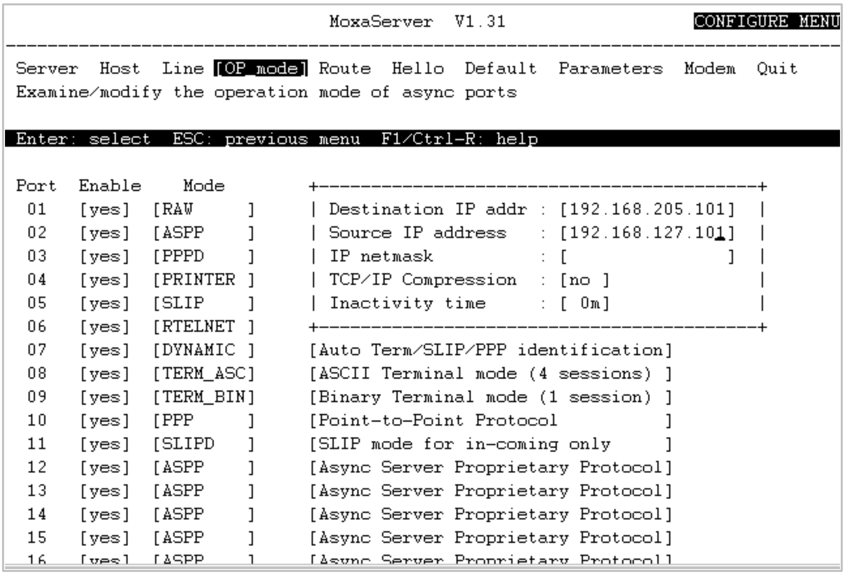
Compressed SLIP

The Compressed SLIP compresses the TCP/IP headers of SLIP protocol from 40 bytes to as few as three bytes and hence the name. This technique improves the overall throughput because of smaller packets.

SLIP Configuration

When setting up the CN2100 SLIP link, some rules must be followed:

- Since the SLIP is an 8-bit protocol, the async port should be set as 8 data bits, 1 stop bit and no parity. The XON/XOFF control must be disabled as well.
- For leased line (if the async port' s (OP_mode) is set to SLIP), you must specify IP addresses of both ends of the SLIP link.
- For dial in line (if the async port' s (OP-mode) is set to SLIPD), the local site' s IP address must be specified while the remote site' s may be UN-specified. If the remote site' s IP is not assigned, the CN2100 will auto-learn the remote IP addr. Figure 5-3 shows the detailed settings for SLIP. SLIP and SLIPD have the same settings.



```
                              MoxaServer  V1.31                  CONFIGURE MENU
--------------------------------------------------------------------------------
 Server  Host  Line [OP mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 Enter: select  ESC: previous menu  F1/Ctrl-R: help

 Port  Enable    Mode        +-------------------------------------------+
  01   [yes]  [RAW     ]     | Destination IP addr : [192.168.205.101]  |
  02   [yes]  [ASPP    ]     | Source IP address   : [192.168.127.101]  |
  03   [yes]  [PPPD    ]     | IP netmask          : [               ]  |
  04   [yes]  [PRINTER ]     | TCP/IP Compression  : [no ]              |
  05   [yes]  [SLIP    ]     | Inactivity time     : [ 0m]              |
  06   [yes]  [RTELNET ]     +-------------------------------------------+
  07   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
  08   [yes]  [TERM_ASC]     [ASCII Terminal mode (4 sessions) ]
  09   [yes]  [TERM_BIN]     [Binary Terminal mode (1 session) ]
  10   [yes]  [PPP     ]     [Point-to-Point Protocol          ]
  11   [yes]  [SLIPD   ]     [SLIP mode for in-coming only     ]
  12   [yes]  [ASPP    ]     [Async Server Proprietary Protocol]
  13   [yes]  [ASPP    ]     [Async Server Proprietary Protocol]
  14   [yes]  [ASPP    ]     [Async Server Proprietary Protocol]
  15   [yes]  [ASPP    ]     [Async Server Proprietary Protocol]
  16   [yes]  [ASPP    ]     [Async Server Proprietary Protocol]
```

Figure 5-3

The following message is the detailed description of each element for [SLIP].

Destination IP addr-'Blank' or '0.0.0.0' means the IP is assigned by remote site. If other IP specified, the remote site must use the IP address.

Source IP address-You must specify the IP address of the local site in this field. 'Blank' means the source IP address is the server's IP address.

IP netmask -This field contains the SLIP Destination IP network mask pattern. 'Blank' means the network mask is 255.255.255.255, and Dial-in users are recommended to left this field blank..

TCP/IP Compression-If this field is set to 'yes', then the Compressed Serial Line Internet Protocol (CSLIP) is used. Otherwise normal SLIP is applied.

Inactivity time -The DTR output will be dropped off after specified minutes of inactivity. Press Enter to list the available time-out time. 0m means no time-out restriction.

Note:
1. SLIPD-The SLIPD mode is basically the same as SLIP except it only supports dial-in line.
2. If an async port is set to SLIP/SLIPD mode, the line configuration on [Configure][Line] menu should be set to 8 data-bits, no-parity, 1 stop-bit.

Connecting a Single Host with a SLIP link

The connected host with a SLIP link appears as a node on the network. Specify a unique IP address to that host. See Figure 5-4 and the following descriptions.

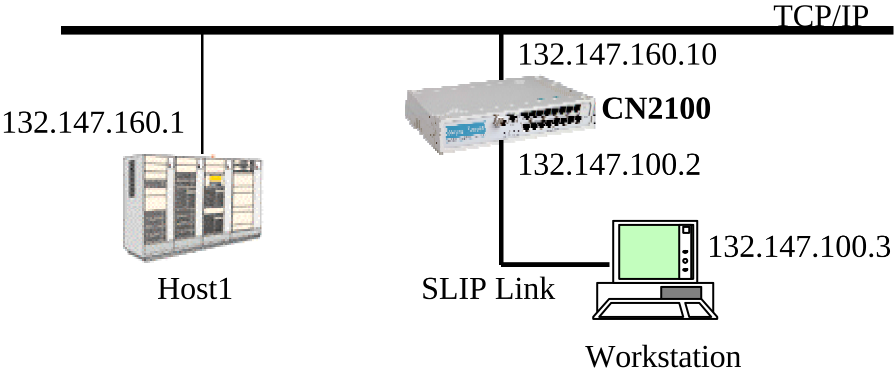


Figure 5-4

The routing table of each network node could look like:

Host 1

Gateway	Destination	Netmask	Metric
132.147.160.10	132.147.100.3	255.255.255.255	2

Workstation

Gateway	Destination	Netmask	Metric
132.147.100.3	132.147.100.2	255.255.255.255	1
132.147.100.2	132.147.160.0	255.255.255.0	2

CN2100

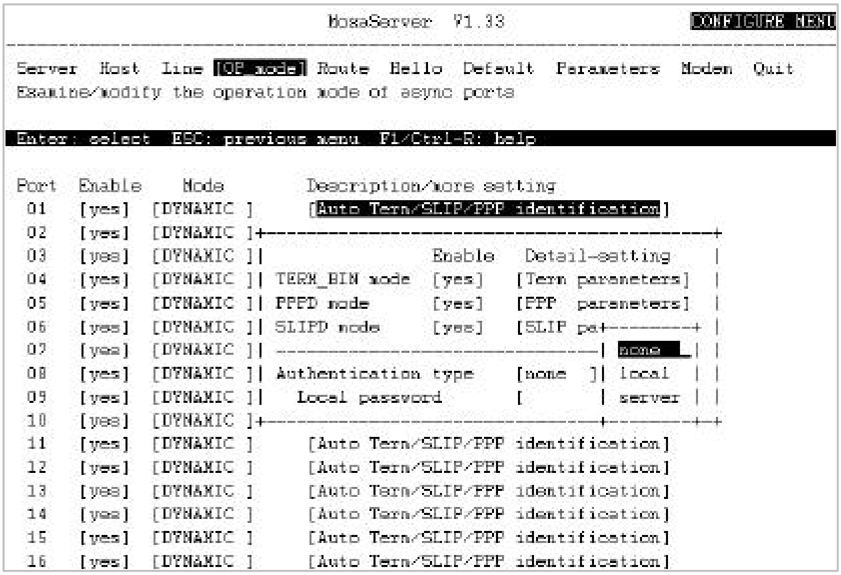
The below routing table is automatically generated by CN2100 when you finish the settings in [Configure] | [OP_mode] |[SLIP] / [Description/more setting] like Figure 5-3.

Gateway	Destination	Netmask	Metric
132.147.100.2	132.147.100.3	255.255.255.255	1

6
Integrated Dynamic Operations

This chapter shows you how to process terminal, PPP, SLIP, the three functions at a time. That' s an easy way by setting up OP_mode as a three in one [dynamic]. Dynamic function not only integrated the three functions, but also automatically detected the connection belonging to which kind of mode.

Taking a look at the following figure. You just enable each function included in [Dynamic], all the detailed settings is the same as we described previously. Please note that the authentication type must be specified upon your request when you use PPPD or TERM_BIN. Of course you can enable only one of those functions, then it will not offer the other service.



```
                              MoxaServer   V1.33                  CONFIGURE MENU
--------------------------------------------------------------------------------
Server  Host  Line [OP_mode] Route  Hello  Default  Parameters   Modem  Quit
Examine/modify the operation mode of async ports

Enter: select  ESC: previous menu  F1/Ctrl-R: help

Port  Enable    Mode        Description/more setting
 01   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 02   [yes]  [DYNAMIC ]+--------------------------------------------+
 03   [yes]  [DYNAMIC ]|                Enable   Detail-setting     |
 04   [yes]  [DYNAMIC ]| TERM_BIN mode  [yes]   [Term parameters]   |
 05   [yes]  [DYNAMIC ]| PPPD mode      [yes]   [PPP  parameters]   |
 06   [yes]  [DYNAMIC ]| SLIPD mode     [yes]   [SLIP pa+---------+ |
 07   [yes]  [DYNAMIC ]| -------------------------------| none    | |
 08   [yes]  [DYNAMIC ]| Authentication type    [none  ]| local   | |
 09   [yes]  [DYNAMIC ]|   Local password       [       | server  | |
 10   [yes]  [DYNAMIC ]+--------------------------------+---------+-+
 11   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 12   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 13   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 14   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 15   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
 16   [yes]  [DYNAMIC ]     [Auto Term/SLIP/PPP identification]
```

Figure 6-1

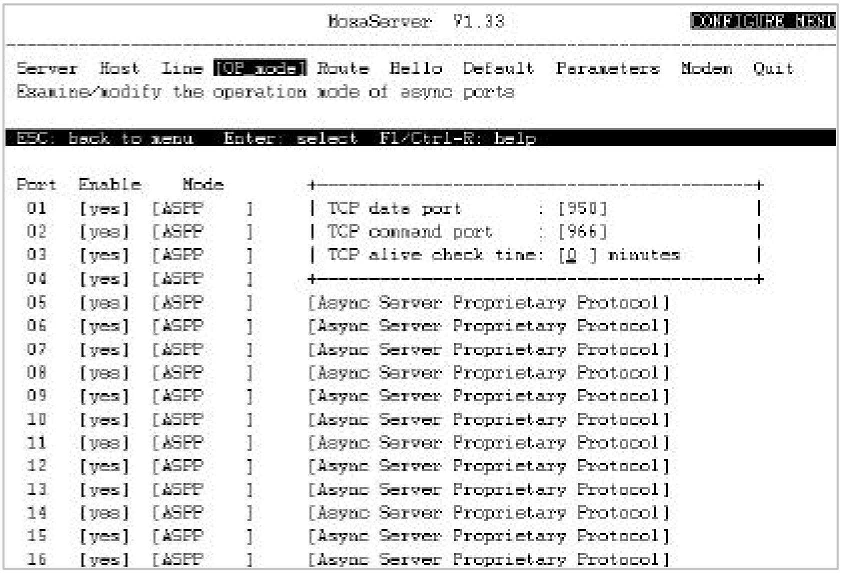
When you finished the settings, remember to save in [parameters], then restart your system to take effect.

7

Async Server Proprietary Protocol

The CN2100 Async Server supports a Proprietary Protocol (ASPP) that allows application based on this protocol to control the devices connected to the CN2100. The device could be a bar code reader, a POS terminal, data acquisition equipment, a modem or any other serial device. To ease the ASPP implementation, a command set and its associated subroutines on UNIX/Windows platform are provided.

To use the function, the desired async ports must be set as ASPP mode on [Configure] [OP_mode] menu as the figure below.



```
                           MoxaServer  V1.33              CONFIGURE MENU
--------------------------------------------------------------------------------
 Server  Host  Line [OP_mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

 Port  Enable    Mode          +----------------------------------------+
  01   [yes]  [ASPP    ]       | TCP data port       : [950]            |
  02   [yes]  [ASPP    ]       | TCP command port    : [966]            |
  03   [yes]  [ASPP    ]       | TCP alive check time: [0 ] minutes     |
  04   [yes]  [ASPP    ]       +----------------------------------------+
  05   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  06   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  07   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  08   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  09   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  10   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  11   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  12   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  13   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  14   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  15   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
  16   [yes]  [ASPP    ]       [Async Server Proprietary Protocol]
```

Figure 7-1

7.1 Basic Concepts

Each physical ASPP port is divided into two logical ports: one is called command port, the other is called data port. Via command port, user can issue commands across the network to set the line' s configuration such as baud rate, data bits, flow control condition, etc. Via data port, user can retrieve data through the async line.

There is a unique TCP port number associated with each of the ASPP command and data port. The TCP port number is defined as follows:

Physical port no.	Command TCP port number	Data TCP port number
01	950	966
02	951	967
03	952	968
04	953	969
05	954	970
06	955	971
07	956	972
08	957	973
09	958	974
10	959	975
11	960	976
12	961	977
13	926	978
14	963	979
15	964	980
16	965	981

7.2 Programming the ASPP port

In the cnclosed CN2100 Software Diskette (UNIX tar format), you can find the example program illustrating how to control the ASPP port successfully. There are several basic subroutines included in \aspp\as.h after uncompressed ASPP.tar.z. Since CN2100 belongs to CN2000 series, the programming utilities implemented with CN2000 as below also fit for CN2100 users.

****

```
Useful subroutines to control 'ASPP' port
1. sio_copen(ipaddr, p)
   Open command port.
2. sio_dopen(ipaddr, p)
   Open data port.
3. sio_reset(fd_cmd)
   Reset a port.
4. sio_ioctl(fd_cmd, baud, mode)
    Set port baud, parity, etc.
5. sio_flowctrl(fd_cmd, CTSmode, RTSmode, TxXon,
    RxXon)Set hardware and/or software flow control.
6. sio_lctrl(fd_cmd, DTRon, RTSon)
    Line control.
7. sio_flush(fd_cmd, mode)
    Flush input/output buffer.
8. sio_lstatus(fd_cmd)
    Check line status.
9. sio_iqueue(fd_cmd)
    Check how many data in input buffer.
10.sio_oqueue(fd_cmd)
    Check how many data still in output buffer.
```

****

In general, to be able to control the devices attached to the ASPP port, you will have to do the following procedures:

- □ Create a socket for command port and connect to it.
- □ Set the port configuration, e.g. baud, via command port.
- □ Create a socket for data port and connect to it.
- □ Transfer data via data port.

Here is a piece of a Program Example that demonstrates how to control and ASPP port and will continuously send '1234567890' string out from CN2100 RS-232 port, whose port Mode should be set as 'ASPP', and read back any incoming data until program interrupted.

Setting: The target port will be configured as: no parity, 8 data bits, 1 stop bit, with software(XON/XOFF) flow control, but no hardware(RTS/CTS). 1st port and 9600bps is default, however you may change it in command line.
The target port Mode should be set as 'ASPP' via [Configure] [OP_mode] from Async Server CONSOLE utility.

```
Syntax: # ./as AsyncServerName [port(1) [Baud(9600)]]


For example:
# ./as  cn2100 1 19200
```

Then the program will send '1234567890' to port 1 on Async Server at 19200 bps baud and read back any data on it.

Environment: This program is originally developed under SCO UNIX. Your environment may be different, if so, the included file name and other variable may need to be modified to suit your environment.

```
#include    <stdio.h>
#include    <fcntl.h>
#include    <sys/errno.h>

#include    <sys/socket.h>
#include    <netinet/in.h>
#include    <netdb.h>
#include    <arpa/telnet.h>

#include    "as.h"

int    fd_cmd, fd_data;

main(argc, argv)
int argc;
char *argv[];
{
     int              fd, port, i, baud;
     unsigned long         ipaddr;
     struct hostent   *name;
     struct sockaddr_in    des;
     unsigned char         buf[100];
     port = 1;   /* target port = 1st port on cn2000  */
     if(argc==1) {
       printf("\nNo Async Server name specified.\n");
       printf("\nSyntax: # ./as  AsyncServer
     [port(1)[Baud(9600)]]\n");
       printf("For example: # ./as   cn2000 1 9600\n\n");
       exit(0);
     }
     memset(&des,0,sizeof(des));
     printf("Hook up a terminal to the first port to test.\n");
     name = gethostbyname(argv[1]);
     if(!name) {
```

```
  printf("\n%s must appear in '/etc/hosts'.\n",argv[1]);
  printf("Please add cn2000  IP addr and name into
          /etc/hosts.\n");
  exit(0);
}
strncpy((char *)&des.sin_addr, name->h_addr, name->h_length);
printf("CN2000 IP addr = 0x%X(%s) \n",des.sin_addr.s_addr,
  inet_ntoa(des.sin_addr.s_addr) );
if (argc > 2)
  port = atoi(argv[2]);
if(argc > 3){
  baud = atoi(argv[3]);
  switch(baud){
    case 300:    baud = D_IOCTL_B300;
            break;
    case 600:    baud = D_IOCTL_B600;
            break;
    case 1200:   baud = D_IOCTL_B1200;
            break;
    case 2400:   baud = D_IOCTL_B2400;
            break;
    case 4800:   baud = D_IOCTL_B4800;
            break;
    case 9600:   baud = D_IOCTL_B9600;
            break;
    case 19200:  baud = D_IOCTL_B19200;
            break;
    case 38400:  baud = D_IOCTL_B38400;
            break;
    case 57600:  baud = D_IOCTL_B57600;
            break;
    case 115200: baud = D_IOCTL_B115200;
            break;
```

```
     case 230400: baud = D_IOCTL_B230400;
            break;
     case 460800: baud = D_IOCTL_B460800;
            break;
     default :
            printf("invalide baud rate %d \n",baud);
            exit(0);
  }
}
else
  baud = D_IOCTL_B9600;
if (argc > 3)
printf("\nport %d : %s,n,8,1,no RTS/CTS flow control.\n\n",
       port,argv[3]);
else
printf("\nport %d : 9600,n,8,1,no RTS/CTS flow
       control.\n\n",port);
printf("Press any key to continue...\n"); i=getchar();
if((fd_cmd=sio_copen(des.sin_addr.s_addr,port))==FAIL){
printf("\nCommand port %d open fail.(port Mode may
       wrong)\n",port);
printf("\nRe-examine the port Mode from cn2000 CONSOLE.\n");
    exit(0);
}
else
printf("Command port %2d opened OK.(cmd=%d)\n",port,fd_cmd);

if( sio_reset(fd_cmd)==FAIL) {
printf("Port reset error.\n");
  exit(0);
} else
printf("Port reset OK.\n");
```

```
if( sio_ioctl(fd_cmd,baud,D_IOCTL_BIT8
    +D_IOCTL_STOP1 + D_IOCTL_NONE)==FAIL) {
printf("Port ioctl error.\n");
  exit(0);
} else
printf("Port ioctl OK. \n");
if( sio_flowctrl(fd_cmd, D_FCTRL_CTS_NO, D_FCTRL_RTS_NO,
     D_FCTRL_TXXON_YES, D_FCTRL_RXXON_YES)==FAIL) {
printf("Port flow control error.\n");
  exit(0);
} else
       printf("Port flow control OK.\n");
if( sio_flush(fd_cmd, D_FLUSH_ALLBUFFER)==FAIL) {
       printf("Port flush error.\n");
  exit(0);
} else
       printf("Port flush OK.\n");
i = sio_lstatus( fd_cmd );
if (i == FAIL) {
  printf("Port lstatus error!\n");
  exit(0);
}
printf("\n");
if(i & 1)
  printf("DSR ON ");
if(i & 2)
  printf("CTS ON ");
if(i & 4)
  printf("DCD ON ");
if(!(i & 7))
  printf("LINE OFF ");
printf("\n");
```

```
         if((fd_data = sio_dopen(des.sin_addr.s_addr,port))==FAIL){
             printf("\nData port %d open fail.(port Mode may
         wrong)\n",port);
             printf("\nRe-examine the port Mode from cn2000
         CONSOLE.\n");
             exit(0);
         }
         else
              printf("Data port %2d opened
         OK.(data=%d)\n",port,fd_data);


         if (write(fd_data, "1234567890", 10) != 10) {
           printf("write data [1234567890] fail!\n");
           exit(0);
         } else
           printf("write data [1234567890] ok.\n");
         printf("Waiting data from port %d of %s .....\n",port,argv[1]);
         i = read(fd_data, buf, 100);
         if (i > 0) {
           buf[i] = 0;
           printf("Read: [%s]\n", buf);
         } else
           printf("read return %d !!!\n",i);
         close(fd_data);
         close(fd_cmd);
    }
*******************END************************
```

Note 1: Socket programming knowledge is necessary in writing TCP/IP application.
Note 2: In the above example, if sio_ioctl() were not present, then the settings associated with port 1 in (Configure)(Line) menu will be used.
Note 3: You can uncompress the \aspp\as. files in diskette into your hard disk, and make the example program to control ASPP port by doing the following command.*

You may use the following ‘ make’ command to have makefile ‘ as.mak’ offered after you uncompress the aspp.tar.Z work. When you do it as following, it will automatically compile and link for you.

#make –fas.mak

8

Networked Printers

The CN2100 Async Server has the ability to support networked printers. It can connect up to 16 serial printers and one parallel Centronics printer simultaneously. This section explains how this can work.

8.1 Serial Printers

When a serial printer is directly attached to a host, the printer spooler output data to a device driver, which in turn writes the data to the printer via RS-232 cable.

To be able to do network printing, we must redirect the data into our own utility, which will send the data across the network. The provided utility on UNIX platform is asprint.

The following figure illustrates a simple network printing with three serial printers attached to the CN2100 and one UNIX host.

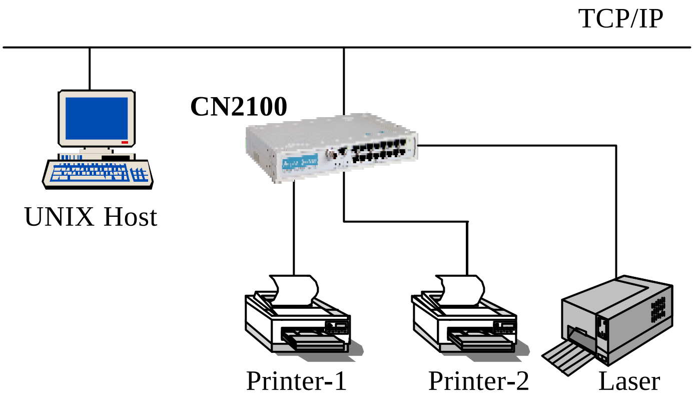


Figure 8-1

In the figure above, the CN2100 acts as a printer server that accepts print job from the UNIX host. The following figure and instructions will show the user how to configure CN2100 and the host machine to allow host machine to access the remote printer.

Setting up the CN2100

To allow network printing the CN2100 should be configured as follows.

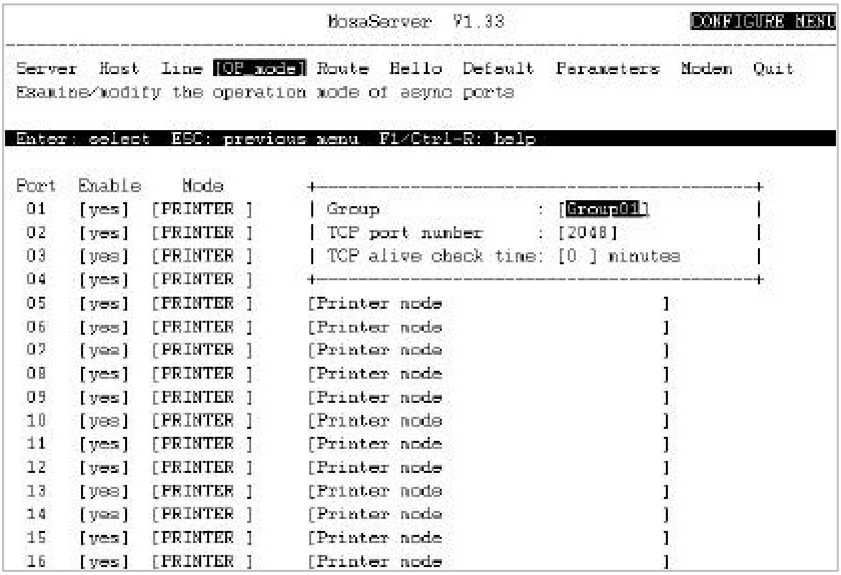
Attach a printer to apart on the CN2100 (e.g. port 1).

Enter into CONSOLE utility form console port or remote host.

Go to [Configure][Line] menu and edit port 1 to read as follows, (assumes printer running at 9600 baud using software flow control.)

Port	Speed	Bits	Stop	Parity	RTS/CTS	SON/SOFFDiscon.	Ctrl
15	[9600]	[8]	[1]	[none]	[no]	[yes]	[none]

Got to [Configure][OP_mode] menu and edit port 1 as the figure below



```
                        MoxaServer  V1.33                 CONFIGURE MENU
----------------------------------------------------------------------------
 Server  Host  Line [OP_mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 Enter: select  ESC: previous menu  F1/Ctrl-R: help

 Port  Enable    Mode        +-----------------------------------------+
  01   [yes]  [PRINTER ]     | Group              : [Group01]          |
  02   [yes]  [PRINTER ]     | TCP port number    : [2048]             |
  03   [yes]  [PRINTER ]     | TCP alive check time: [0 ] minutes      |
  04   [yes]  [PRINTER ]     +-----------------------------------------+
  05   [yes]  [PRINTER ]     [Printer mode                    ]
  06   [yes]  [PRINTER ]     [Printer mode                    ]
  07   [yes]  [PRINTER ]     [Printer mode                    ]
  08   [yes]  [PRINTER ]     [Printer mode                    ]
  09   [yes]  [PRINTER ]     [Printer mode                    ]
  10   [yes]  [PRINTER ]     [Printer mode                    ]
  11   [yes]  [PRINTER ]     [Printer mode                    ]
  12   [yes]  [PRINTER ]     [Printer mode                    ]
  13   [yes]  [PRINTER ]     [Printer mode                    ]
  14   [yes]  [PRINTER ]     [Printer mode                    ]
  15   [yes]  [PRINTER ]     [Printer mode                    ]
  16   [yes]  [PRINTER ]     [Printer mode                    ]
```

Figure 8-2

The following message is the detail description of each element for [PRINTER].

Group: Specify the Group of this port, you can set it from Group01 to Group16.

TCP port number: It's depend on the GROUP you set.

Group01 = 2048

Group02 = 2049

.

.

.

Group16 = 2063

To add another printer repeats the above procedures using another physical port. The printer group could be any one out of the 16 groups. If there are more than one printer belongs to the same group and port 1 is busy in printing, CN2100 will transfer the connecting/printing request to port 2 or 3. So users can print his report immediately if one of port 1,2,3 is idle..

After accomplishing the above steps, restart the CN2100 by way of [Restart] [System] from CONSOLE main menu. The CN2100 will now be listening on TCP port number 2048 (‘ Group1’) for incoming connection, Any data received on that connection will be redirected to the printer connected to port 1.

Setting up the host machine

To allow the host machine to send print job to the CN2100, the printer utility, asprint, must be used. The asprint utility consists of two files, asprint.c and asprint.mak, which are able to be found in the \printer directory after uncompressed the tar format software diskette and the printer.tar.Z. Note that you may need to tailor the source file as the source is originally developed under SCO UNIX, SOLARIS, or LINUX. The setting is different. For example, SCO UNIX will need to link a library called libnls.a, in Solaries this library call libnsl.a, while in Venix its name is libnsl_s.a.

Under SCO UNIX :

```
1.#tar /dev/fd0 ./              /* Uncompress all program to disk
     */

2.#tar xvf printer.tar.Z        /* Uncompress printer.tar.Z
     to ./printer */

3.#make -f sco_unix.mak         /* compile/link   */

4.#mknod /dev/iop1 p       /* make printer node */

5.#chown lp /dev/iop1      /* set it to printer */

6.#chmod 600 /dev/iop1     /* set it rw to me only */

7.#/usr/lib/lpadmin -pLaser1 -v/dev/iop1  /* set printer name */

8.#/asprint /dev/iop1 'CN2X00 IP address" 2048 &    /* execute
  asprint for Group 01 */

9.#/usr/lib/accept Laser1       /* accept printer Laser1 */

10.#enable Laser1          /* enable printer Laser1 */

11.#lp -dLaser1 file_name       /* print file to Laser1  */
```

Under SOLARIS X86 :

```
1.#/etc/init.d/volmgt stop /* Set free the occupied Floppy
disk */

2.#tar /dev/fd0 ./              /* Uncompress all program to
disk   */

3.#tar xvf printer.tar.Z        /* Uncompress printer.tar.Z
to ./printer */

4.#make -f sola_x86.mak         /* compile / link */

5. #mknod /dev/iop1 p      /* make printer node */

6. #chown lp /dev/iop1     /* set it to printer */

7. #chmod 600 /dev/iop1         /* set it rw to me only */

8. #lpadmin -pLaser1 -v/dev/iop1/* set printer name */

9. #./asprint /dev/iop1 'CN2X00 IP address" 2048 &  /*
execute asprint for Group 01 */

10. #accept Laser1              /* accept printer Laser1 */

11. #enable Laser1              /* enable printer Laser1 */

14. #lp -dLaser1 file_name /* print file to Laser1  */
```

Under LINUX :

```
1. #tar /dev/fd0 ./        /* Uncompress all program to disk
*/

2. #tar xvf printer.tar.Z       /* Uncompress printer.tar.Z
to ./printer */

3. #make -f asprint.mak         /* compile/link   */

4. #mknod /dev/iop1 p      /* make printer node */

5. #chown lp /dev/iop1     /* set it to printer */

6. #chmod 600 /dev/iop1         /* set it rw to me only */

7. #lpd -pLaser1 -v/dev/iop1    /* set printer name */

8. #add one line to /etc/printcap file

  Laser1:lp=/dev/iop1,sd=/usr/spool/Laser1

9. #mkdir /usr/spool/Laser1     /* make spool directory */

10. #./asprint /dev/iop1 'CN2X00 IP address" 2048 & /*
execute asprint for Group 01 */

11. #lpr -PLaser1 file_name/* print file to Laser1  */
```

Note: There are detailed descriptions for the steps above.

Create a named pipe to channel the data by command:

```
#mknod /dev/iop1 p
```

You have to create a unique pipe name for each printer group. Since there may be up to 16 groups(TCP port number form 2048 to 2063), you will need to create 16 named pipes at most. For example: iop1, iop2 and iop3, etc.

Change the pipe owner to 1p and access permission to 600 or rw-----.

```
#chown 1p /dev/iop
#chmod 600 /dev’iop 1
```

Redirect the printer spooler to write to this named pipe. We assume the printer name is Laser1.

```
#/usr/lib/lpadmin –pLaser1 –v/dev/iop1
```

This may be different on some systems. If so, the system manual should be consulted.

Start up the asprint utility to read from the name pipe and write to the CN2100’s port to which the printer is connected.

```
#./asprint /dev/iop1 CN2100 2048 &
```

In this command, asprint is running as a daenom.

‘/dev/iop1’ is the device name that spooler is writing to.

‘CN2100’ is the host name of the CN2100 as defined in /etc/hosts or its IP address.

‘2048’ is the TCP port number(Group01) of the printer ports on the CN2100.

Make Laser 1 to accept print request and enable it.

```
#/usr/lib/accept laser1
#/enable laser1
```

This may be different on your systems. If so, the system manual should be consulted.

You should now be able to send the print job to the CN2100 by using command similar to the following,

```
    #lp -dLaser1 My_Print_File
```

7. To set up another printer with different group (in other words different TCP port number), repeat the above steps with different printer name, different named pipe and associated TCP port number. For the rest of the same group printers, it is not necessary to go through these steps again. Because all prints in the same group will be treated as a hunt group. See next section.

Hunt groups

A hunt group consists of a group of similar printers which all accessed from a single spooler. The data will be printed on the first free printer of the group.

Taking Figure 8-1 as an example, if printer Printer-1 and Printer-2 are identical and arranged in the same group, the [Configure][Line] menu would be set up as described previously, however in the [Configure][OP_mode] menu each would be set to listen on the same TCP port number, e.g. Group1 (TCP port number 2048). Once there is a printer request made to this group, the CN2100 will select a first free printer and dump to it.

Parallel Printer

The CN2100 Supports Remote Line Printing (RLP) capability which allow UNIX system machines on a network to send print jobs to the parallel printer connected on the CN2100. The UNIX systems must be either a BSD system (or its derivatives) or any other system that supports RLP.

Refer to your UNIX Administrator's manual for how to install the RLP on the host. For more info, please refer to FAQ on www.moxa.com.tw. The CN2100 parallel printer port is always ready for service once you have correctly hooked the printer.

If your host machine does not support RLP, an alternative is providing. Set up the parallel printer on the host machine similar to the way to set up serial printer but with TCP port number = 2080.

9 Reverse Telnet

The CN2100 Async Server provides reverse telnet ability on any or all of its physical ports. This chapter explains how to set up the CN2100 to do so.

Reverse Telnet gives the network user the ability to connect to a machine that is not connected to Ethernet network.

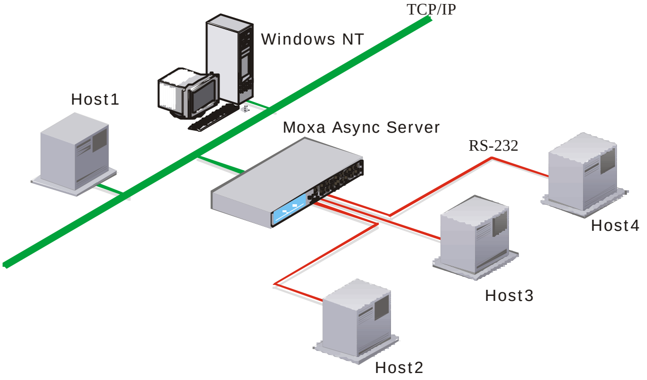
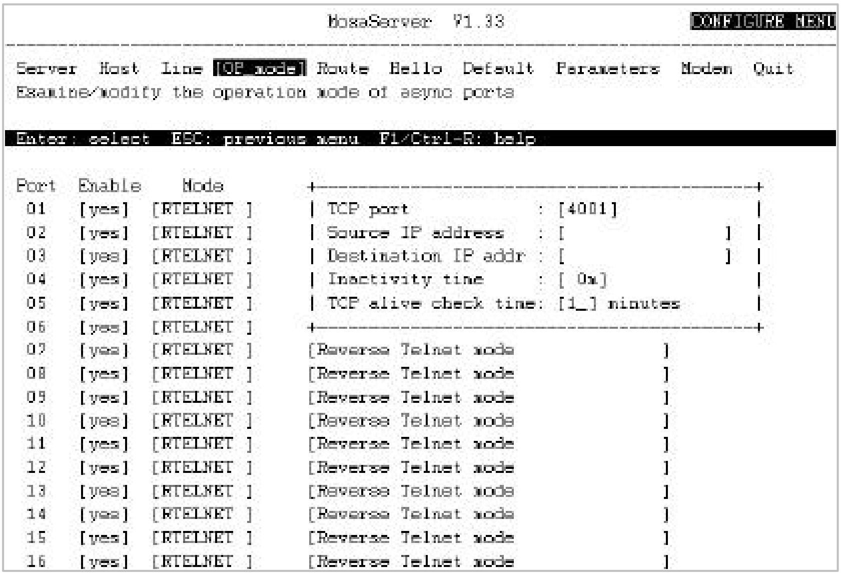


Figure 9-1

In the figure above, there is a host machine (Host1) and the CN2100 attached to the Ethernet network. Two other host machines (Host2 & Host3) are connected via serial lines to ports on the CN2100. How can Host1 access Host2 and Host3 which are not on the LAN but attached to Moxa CN2100 Async Server? That' s the main function of Reverse Telnet that follows TELNET protocol. Now we will give you more detailed description about how it works.

As defined under TCP/IP protocol, TCP incorporate abstract objects called ‘ ports’ that identify the ultimate destination within a machine. Each port is assigned an integer used to identify it. The port number assignments are local to a given machine and unique within that machine, the ultimate destination for TCP traffic is uniquely specified by giving both a destination host Internet address as well as a TCP port number on that host. For example, the Reserved TCP port number for TELNET program is 23. When you use TELNET program to connect a LAN host, it must look like ‘ ***telnet host_IP_address***’ . Because TCP port number 23 is reserved for TELNET, you don’ t have to enter it behind host’ s IP address like ‘ ***telnet host_IP_address 23***’ . Moxa offers Reverse Telnet function to make you use TELNET program to connect devices attached to Moxa Async Server like you connect a LAN host if you setup each port’ s OP_mode to Rtelnet. You just use TELNET program to connect CN2100’ s IP address with TCP port number you set for this port, so that you can do it in the same way like ‘ ***telnet CN2100_ IP_address TCP port number***’ . If you’ d like to give the device or host an individual IP and specific TCP port number at each async port, you may also assign it in OP_mode settings. The Figure 9-1 shows the detailed settings for RTelnet.

The Figure 9-1 shows the settings for RTelnet.



```
                              MoxaServer  V1.33                 CONFIGURE MENU
------------------------------------------------------------------------------
 Server  Host  Line [OP mode] Route  Hello  Default  Parameters  Modem  Quit
 Examine/modify the operation mode of async ports

 Enter: select  ESC: previous menu  F1/Ctrl-R: help

 Port  Enable   Mode         +-----------------------------------------+
  01   [yes]  [RTELNET ]     | TCP port            : [4001]           |
  02   [yes]  [RTELNET ]     | Source IP address   : [              ] |
  03   [yes]  [RTELNET ]     | Destination IP addr : [              ] |
  04   [yes]  [RTELNET ]     | Inactivity time     : [ 0m]            |
  05   [yes]  [RTELNET ]     | TCP alive check time: [1_] minutes     |
  06   [yes]  [RTELNET ]     +-----------------------------------------+
  07   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  08   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  09   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  10   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  11   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  12   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  13   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  14   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  15   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
  16   [yes]  [RTELNET ]     [Reverse Telnet mode              ]
```

Figure 9-2

TCP port - Moxa map each async port of CN2100 to a TCP port. Escaping from the collision of system proprietary TCP port, you may set port number as 4001 for port1, 4002 for port2 just like the default value. Or you may modify it for our requirement.

Source IP Address -This is the specified IP of this port. Many applications need such a setting to reach device' s fixed IP and use the basic telnet TCP port 23. When it is left blank, CN2100 will specified its own IP for it, meantime, you also have to modify your TCP port number to prevent from TCP port collision.

Destination IP Address - This is assigned as a host IP on the LAN. If you fill an IP address in it, that means only the specified IP host can access to the port. If not, all hosts on the network can access this port.

Inactive Time: This setting made automatic disconnection take effect after no data transfer between two ends during the period you defined in this item. You can press [Enter] to select a time limit from a scroll bar. That also means no disconnection will be made if you set it as "0m" item.

TCP alive check: Define whether MOXA CN2100 automatically detect TCP connection still existed or not. When it was set "0", Moxa CN2100 will not detect the TCP connection existed or failed. The numeric can be modified from 1 to 99, and the unit is minute. Please pay attention to the number you set is the time slice you would like Moxa CN2100 reset the port when Moxa CN2100 detects TCP connection doesn't exist any more.

Back to figure 9-1, to allow Host1 user to access to Host2 or Host3, the serial ports of the CN2100 must be set as RTELNET mode (refer to the figure above), then choose the port which links to the target machine. From the Host1 to make a connection to Host2 (or Host3), type

```
# telnet CN2100's IP address   TCP port number
```

For example,

```
#telnet 192.168.127.254 4006
```

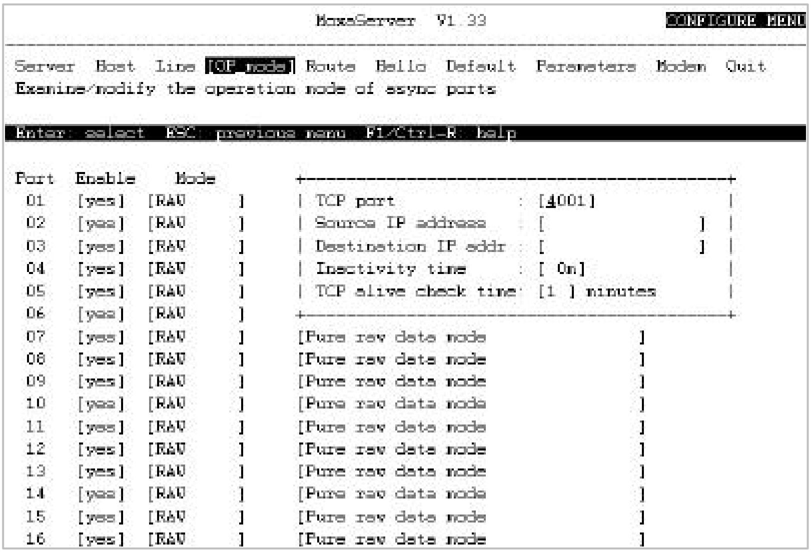
will connect you to the host, which is attached on CN2100 port 6. The TCP port number for each reverse telnet port is 4001 for port 1, 4002 for port 2, and so on as default. You can change it upon your request. Please note that there is the only host can access this device/equipment which is attached to this port if you specify a host IP at the item [Destination IP addr].

It is also possible for a user on a terminal connected to the CN2100 to connect to these hosts in exactly the same way.

10
Transparent RAW Data Transmission

The CN2100 Async Server provides transparent RAW data operation on any or all of its physical ports. This chapter explains how to set up the CN2100 to do so.

RAW data operation gives the network user the ability to send/receive transparent data via Ethernet network. The following figure is in [Configure][OP_mode][Description/more setting]. The setting up method is the same as Rtelnet mode. Destination IP addr also limits the connected host, and TCP port number can be modified upon your request.



```
                                MoxaServer  V1.33                 CONFIGURE MENU
------------------------------------------------------------------------------
Server  Host  Line [OP_mode] Route  Hello  Default  Parameters  Modem  Quit
Examine/modify the operation mode of async ports

Enter: select  ESC: previous menu  F1/Ctrl-R: help

Port  Enable    Mode           +------------------------------------------+
 01   [yes]  [RAW      ]       | TCP port            : [4001]              |
 02   [yes]  [RAW      ]       | Source IP address   : [                ]  |
 03   [yes]  [RAW      ]       | Destination IP addr : [                ]  |
 04   [yes]  [RAW      ]       | Inactivity time     : [ 0m]               |
 05   [yes]  [RAW      ]       | TCP alive check time: [1 ] minutes        |
 06   [yes]  [RAW      ]       +------------------------------------------+
 07   [yes]  [RAW      ]       [Pure raw data mode                ]
 08   [yes]  [RAW      ]       [Pure raw data mode                ]
 09   [yes]  [RAW      ]       [Pure raw data mode                ]
 10   [yes]  [RAW      ]       [Pure raw data mode                ]
 11   [yes]  [RAW      ]       [Pure raw data mode                ]
 12   [yes]  [RAW      ]       [Pure raw data mode                ]
 13   [yes]  [RAW      ]       [Pure raw data mode                ]
 14   [yes]  [RAW      ]       [Pure raw data mode                ]
 15   [yes]  [RAW      ]       [Pure raw data mode                ]
 16   [yes]  [RAW      ]       [Pure raw data mode                ]
```

Figure 10-1

The detailed description for each element in RAW mode please refer to [RTelnet].

RAW operation mode is usually used in the same architecture as RTelnet, or ASPP. But there is a definite difference, with protocol or not, between them. For more detailed information, please refer to Chapter 7. 9.

RAW operation is also used for Moxa Fixed TTY program. Please see Appendix F for your reference.

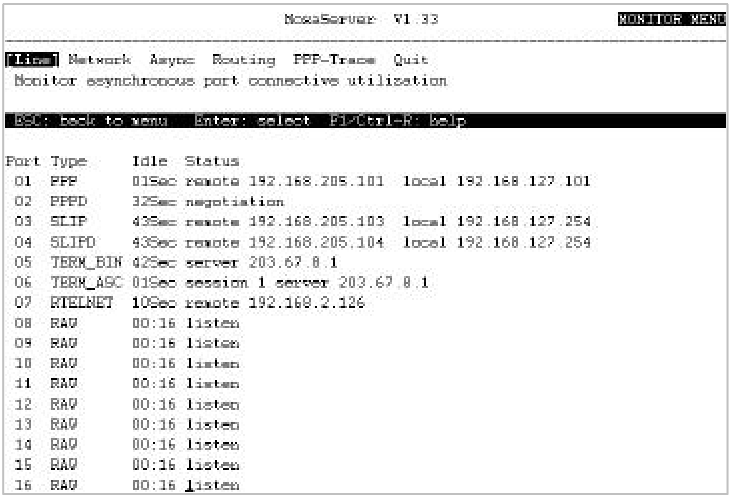
11
Administrative Utilities

This chapter describes the various administrative functions provided by the CN2100.

11.1 The Monitor function

From the main menu [Monitor] item, you can monitor the async lines usage and the status of the Ethernet interface.

Choosing [Monitor][Line] like the following figure to let you know the usage of each async line.



```
                                NoxaServer  V1.33               MONITOR MENU
----------------------------------------------------------------------------
[Line] Network  Async  Routing  PPP-Trace  Quit
 Monitor asynchronous port connective utilization

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

Port Type     Idle  Status
 01  PPP      01Sec remote 192.168.205.101  local 192.168.127.101
 02  PPPD     32Sec negotiation
 03  SLIP     43Sec remote 192.168.205.103  local 192.168.127.254
 04  SLIPD    43Sec remote 192.168.205.104  local 192.168.127.254
 05  TERM_BIN 42Sec server 203.67.8.1
 06  TERM_ASC 01Sec session 1 server 203.67.8.1
 07  RTELNET  10Sec remote 192.168.2.126
 08  RAW      00:16 listen
 09  RAW      00:16 listen
 10  RAW      00:16 listen
 11  RAW      00:16 listen
 12  RAW      00:16 listen
 13  RAW      00:16 listen
 14  RAW      00:16 listen
 15  RAW      00:16 listen
 16  RAW      00:16 listen
```

Figure 11-1

The following message is the detail description of each element for [Monitor][Line].

Type - the operation mode and the utilization of each of the async ports.

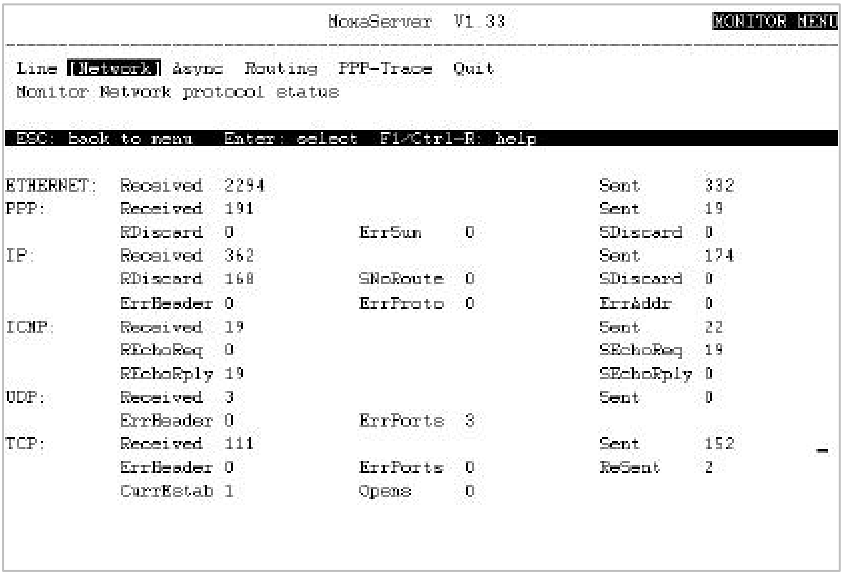
Idle - the idle time after you connect to Async Server.

Status - The IP address of those hosts that have connection to the port will also be displayed in the column, or it will show the waiting condition.

In the above example, port 3 is used as a PPPD port. The remote IP shows you that the connection has been built. Port 6 is using RTelnet for letting the host without network interface attached to the network while port 2 is using Async Server proprietary Protocol for programming. Now the program is not running. Port 5 is used as a SLIP port.

Choosing [Monitor][Network] let you know the state of the Ethernet activity.

Figure 11-2



```
                                MoxaServer  V1.33                     MONITOR MENU
----------------------------------------------------------------------------------
 Line [Network] Async  Routing  PPP-Trace  Quit
 Monitor Network protocol status

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

ETHERNET:  Received  2294                               Sent      332
PPP:       Received  191                                Sent      19
           RDiscard  0          ErrSum    0             SDiscard  0
IP:        Received  362                                Sent      174
           RDiscard  168        SNoRoute  0             SDiscard  0
           ErrHeader 0          ErrProto  0             ErrAddr   0
ICMP:      Received  19                                 Sent      22
           REchoReq  0                                  SEchoReq  19
           REchoRply 19                                 SEchoRply 0
UDP:       Received  3                                  Sent      0
           ErrHeader 0          ErrPorts  3
TCP:       Received  111                                Sent      152
           ErrHeader 0          ErrPorts  0             ReSent    2
           CurrEstab 1          Opens     0
```

[Monitor][Network] Shows you the statistical value of various protocols, ie PPP, IP, ICMP, UDP, TCP such as the number of total bad TCP checksum, the number of total IP datagrams received, etc.

◆ *The Ethernet statistics*

- □ **Received**: The total packets of input datagrams received from Ethernet.
- □ **Sent**: The total packets of output datagrams delivered to Ethernet.

◆ *The PPP statistics*

- □ **Received**: The packets of PPP datagrams received from PPP serial lines.

RDiscard: The packets of input PPP datagrams for those who maybe or maybe not encounter some problems but somehow were discarded (for lack of buffer space).

- □ **ErrSum**: The packets for checksum error.
- □ **Sent**: The packets of PPP datagrams delivered to PPP serial lines.
- □ **SDiscard**: The packets of output PPP datagrams for those who maybe or maybe not encounter some problems but somehow were discarded (bad ethernet connection).

The IP statistics

- □ **Received**: The packets of input IP datagrams received from interfaces.
- □ **RDiscard**: The packets of input IP datagrams for those who maybe or maybe not encounter some problems but somehow were discarded (for lack of buffer space)
- □ **ErrHeader**: The packets of input datagrams discarded due to errors in IP headers, including bad checksum, version number mismatch, time-to-live exceeded, etc.
- □ **SNoRoute**: The packets of input IP datagrams for those who can't find the correct route.
- □ **ErrProto**: The packets of locally addressed datagrams received successfully but discarded for not matching one of TCP, UDP, ICMP protocols offered by CN2100.
- □ **Sent**: The packets of output IP datagrams, which local IP user-protocols (including ICMP), supplied to IP in requests for transmission.
- □ **SDiscard**: The packets of output IP datagrams for those who maybe or maybe not encounter some problems but somehow were discarded (e.g. fragment flag was set not properly).
- □ **ErrAddr**: The packets of input datagrams discarded because the IP address in their IP header's destination field was not a valid address to be received at this entity.

The ICMP statistics

- □ **Received**: The total packets of ICMP messages, which the entity received.
- □ **Sent**: The total packets of ICMP messages which the entity attempted to send.
- □ **REchoReq**: The receiving packets from remote side made by ping
- □ **REchoRply**: The receiving packets responding from remote side made by ping
- □ **SEchoReq**: The receiving packets from local side made by ping
- □ **SEchoRply**: The receiving packets responding from local side made by ping.

The UDP statistics

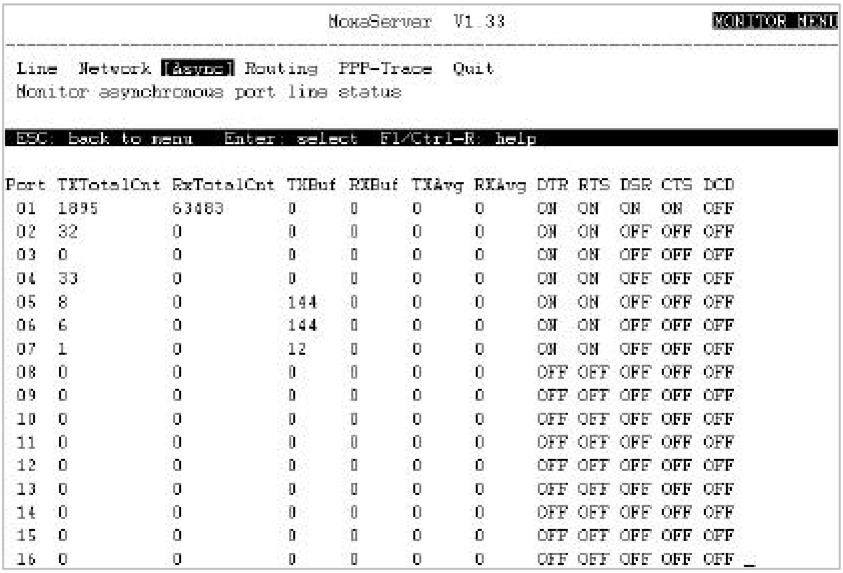
- □ **Received**: The packets of UDP datagrams delivered to UDP users.
- □ **ErrPorts**: The packets of received UDP datagrams for which there was no application at the destination ports.
- □ **ErrHeader**: The packets of received UDP datagrams that would not be delivered for reasons rather than the lack of an application at the destination port.
- □ **Sent**: The packets of UDP datagrams sent form this entity.

The TCP statistics

- **Received**: The total packets of segments received, including those receive in error.
- **ErrHeader**: The packets of segments received in error (e.g., band TCP checksums).
- **CurrEstab**: The counter of TCP connections for which the current state is either ESTABLISHED or CLOSE-WAIT.
- **Errorport**: The packets of received TCP datagrams for which there was no application at the destination ports.
- **Opens**: The packets of TCP connections have made a direct transition including all state (e.g. t SYNC-sent, CLOSED, SYNC-RCBD, LISTEN, SYNC_RCVD).
- **Sent**: The total packets of segements sent, including those on current connections.
- **ReSent**: The packets of segments retransmitted. That is, the number of TCP segments transmitted containing one or more previously transmitted octets.

Choosing [Monitor][Async] let you know the state of the async ports' flow.

If you have great amout of data want to transmit through PPP/PPPD you can use 2 or 3 or 4 …or 16 PPP/PPPD line for data TX/RX. For instance, we can use port 3 as PPP/PPPD to speed up data TX/RX. The following message is the description of each column under Async status. It will show you all asynchronous ports' current status.



```
                                MoxaServer  V1.33                   MONITOR MENU
--------------------------------------------------------------------------------
 Line  Network [Async] Routing  PPP-Trace  Quit
 Monitor asynchronous port line status

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

Port TXTotalCnt RxTotalCnt TXBuf RXBuf TXAvg RXAvg DTR RTS DSR CTS DCD
 01  1895       63483      0     0     0     0     ON  ON  ON  ON  OFF
 02  32         0          0     0     0     0     ON  ON  OFF OFF OFF
 03  0          0          0     0     0     0     ON  ON  OFF OFF OFF
 04  33         0          0     0     0     0     ON  ON  OFF OFF OFF
 05  8          0          144   0     0     0     ON  ON  OFF OFF OFF
 06  6          0          144   0     0     0     ON  ON  OFF OFF OFF
 07  1          0          12    0     0     0     ON  ON  OFF OFF OFF
 08  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 09  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 10  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 11  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 12  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 13  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 14  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 15  0          0          0     0     0     0     OFF OFF OFF OFF OFF
 16  0          0          0     0     0     0     OFF OFF OFF OFF OFF _
```

Figure 11-3

The following message is the detail description of each column for [Monitor][Async].

TXTotalCnt shows total transmited characters.

RXTotalCnt shows total received characters.

TXBuf shows the queued data bytes in the transmit raw buffer.

RXBuf shows the received data bytes in the receiving raw buffer.

TXAvg shows the current approx characters per second transmit rate.

RXAvg shows the current approx characters per second receiving rate.

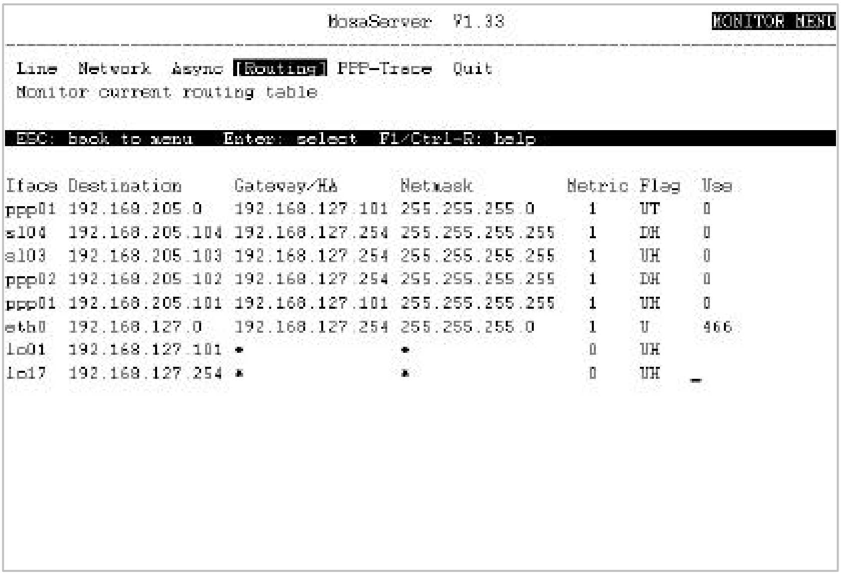
DTR shows the currect DTR status.

RTS shows the currect RTS status.

CTS shows the currect CTS status.

DCD shows the currect DCD status.

Choosing [Monitor][Routing] let you know the current active routing table of CN2100.



```
                         MoxaServer  V1.33                 MONITOR MENU
---------------------------------------------------------------------------
 Line  Network  Async [Routing] PPP-Trace  Quit
 Monitor current routing table

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

Iface Destination     Gateway/HA      Netmask         Metric Flag  Use
ppp01 192.168.205.0   192.168.127.101 255.255.255.0     1    UT    0
sl04  192.168.205.104 192.168.127.254 255.255.255.255   1    DH    0
sl03  192.168.205.103 192.168.127.254 255.255.255.255   1    UH    0
ppp02 192.168.205.102 192.168.127.254 255.255.255.255   1    DH    0
ppp01 192.168.205.101 192.168.127.101 255.255.255.255   1    UH    0
eth0  192.168.127.0   192.168.127.254 255.255.255.0     1    U     466
lo01  192.168.127.101 *               *                 0    UH
lo17  192.168.127.254 *               *                 0    UH   _
```

Figure 11-4

The following message is the description of each column for routing table.

Iface name of the physical network interface.

Destination network or machine to which the route allows you to connect.

Gateway address of the gateway you configued for this route. If you are directly connected, this is a local address. Otherwise, it is the address of the machine through which packets must be routed.

Netmask network mask pattern of this interface.

Metric the number of hops to the destination.

Flags state of the route. Valid states are:

U up

D down

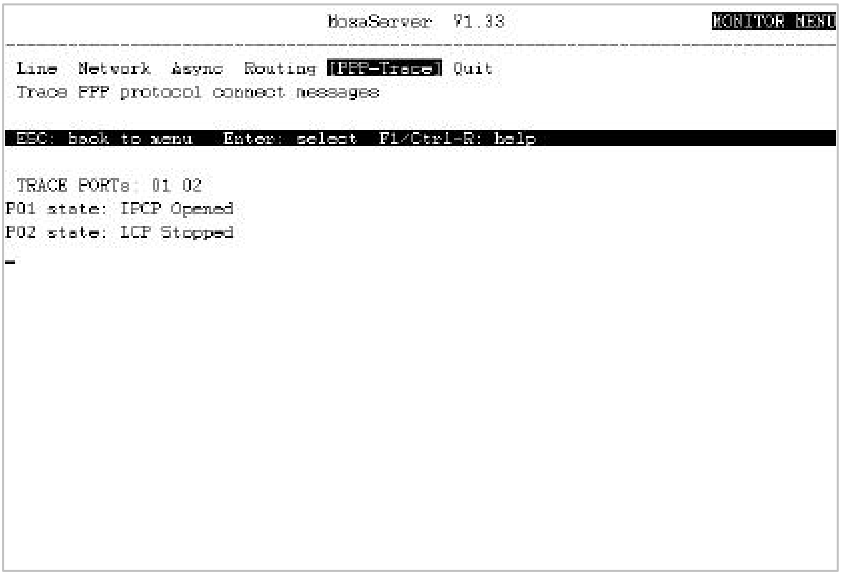
G a route to a gateway

H a route to a host

T setting in route table

Use currect number of packets sent using this route.

Choosing [Monitor][PPP-Trace] let you know the current active PPP situation.



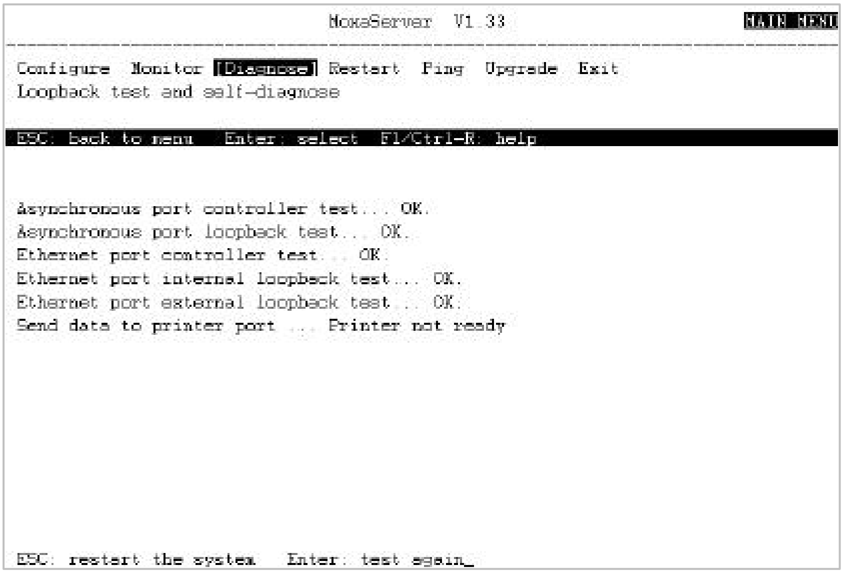
```
                                MoxaServer  V1.33                    MONITOR MENU
--------------------------------------------------------------------------------
 Line  Network  Async  Routing [PPP-Trace] Quit
 Trace PPP protocol connect messages

 ESC: back to menu   Enter: select  F1/Ctrl-R: help

 TRACE PORTs: 01 02
P01 state: IPCP Opened
P02 state: LCP Stopped
_
```

Figure 11-5

PPP-Trace this will show you the current selected PPP/PPPD ports connecting transmit / receive PPP protocol messages and PPP state.

11.2 The Diagnose function

Selecting [Diagnose] allow you to test async ports, Ethernet controller and printer port. This diagnosis includes 1) async ports controller internal loopbak test, 2) Ethernet controller, internal and external loopback test and 3) printer port test. The following figure is for example.



```
                              MoxaServer  V1.33                    MAIN MENU
--------------------------------------------------------------------------------
 Configure  Monitor [Diagnose] Restart  Ping  Upgrade  Exit
 Loopback test and self-diagnose

 ESC: back to menu   Enter: select  F1/Ctrl-R: help


 Asynchronous port controller test... OK.
 Asynchronous port loopback test... OK.
 Ethernet port controller test... OK.
 Ethernet port internal loopback test... OK.
 Ethernet port external loopback test... OK.
 Send data to printer port ... Printer not ready









 ESC: restart the system   Enter: test again_
```

Figure11-6

If the Ethernet controller or internal loopback test fails, it means the Ethernet controller hardware malfunctioned. Should the external test fail, chances are that the Ethernet cable or terminator is not properly installed. If so, make sure the Ethernet cable and terminators are well installed. Another possibility is when you attach the CN2100 to a large network with busy traffic. This could also influence the test result.

11.3 The Restart function

In some situations, the CN2100 may need to be restarted. For example, if any setting in [Configure][OP_mode] was changed, restarting the CN2100 to make the new parameters effect is necessary. Please refer to the Figure 3-10 for the detail. If you select to restart your system, it will show the warning message.

Two options are available:

- Restart the whole system.

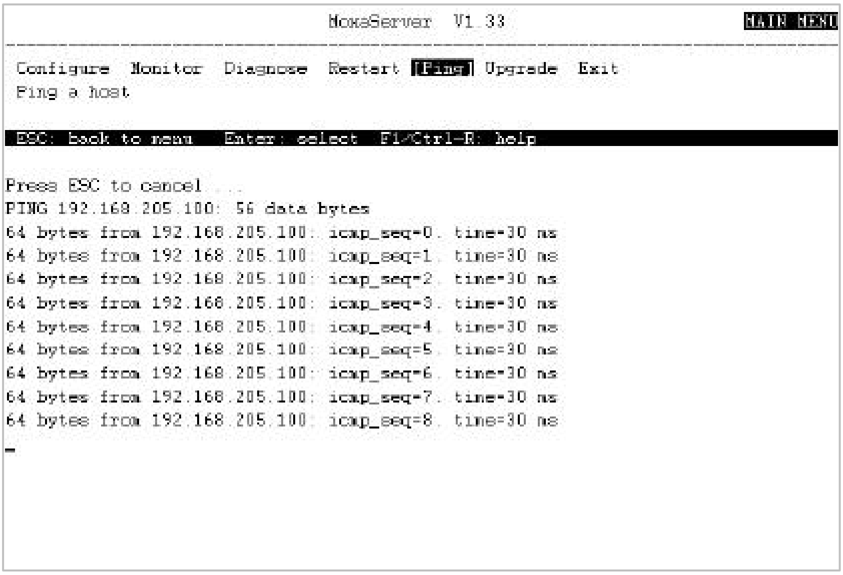
This should be done when configuration in [Configure][OP_mode] is changed or in the unlikely event of system fault.

- Restart only the selected async ports.

The CN2100 will disconnect the link between async ports and remote host and then flush the TxD/RxD buffers.

11.4 The Ping function

This function is useful when testing the network hardware connectivity. it is also used to testify if a network host is alive or not. The following figure is showing the normal situation.

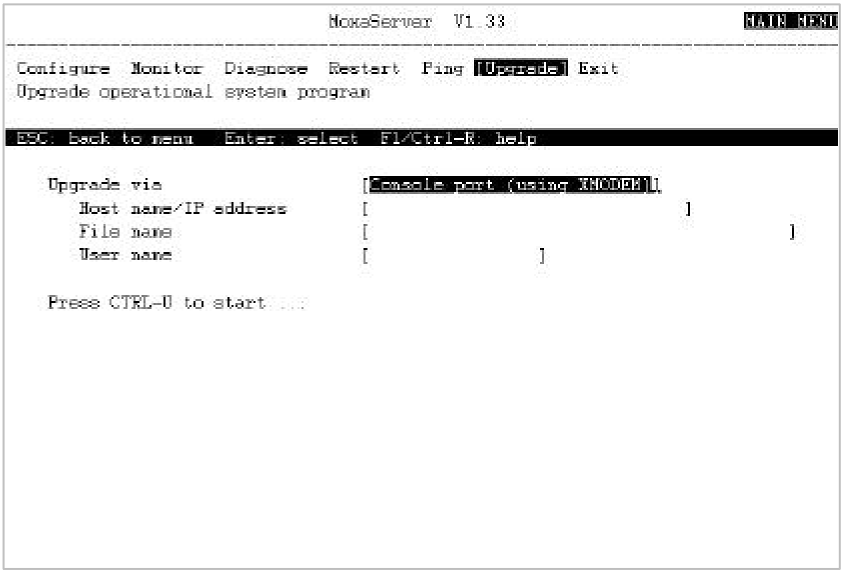


```
Press ESC to cancel ...
PING 192.168.205.100: 56 data bytes
64 bytes from 192.168.205.100: icmp_seq=0. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=1. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=2. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=3. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=4. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=5. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=6. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=7. time=30 ms
64 bytes from 192.168.205.100: icmp_seq=8. time=30 ms
_
```

Figure 11-7

11.5 The Upgrade function

The operated system program to the CN2100 is originally kept in the non-volatile Flash ROM. It can be upgraded from a CONSOLE Terminal (using XMODEM protocol) or from a remote host (using rcp protocol).



```
                              MoxaServer  V1.33                   MAIN MENU
---------------------------------------------------------------------------
Configure  Monitor  Diagnose  Restart  Ping [Upgrade] Exit
Upgrade operational system program

ESC: back to menu   Enter: select  F1/Ctrl-R: help

   Upgrade via                  [Console port (using XMODEM)]
      Host name/IP address      [                          ]
      File name                 [                                  ]
      User name                 [               ]

   Press CTRL-U to start ...
```

Figure 11-8

The figure above shows you how to upgrade via console port by using Telix terminal emulation. When you start to upgrade it, you have to send the file via Telix. The following is the detailed description.

Upgrade via XMODEM.

1. Power on CN2100.
2. APC connects console port with COM1 (or COM2).
3. Execute Terminal emulation program (Ex: telix.exe ....)
4. Then set up COM1 (COM2) to 19200 N_8_1.
5. You should see the configuration menu. Choose {Upgrade}
6. In [Upgrade via] field, choose [Console port (using XMODEM)]
7. Press CTRL-U to start CN2100 download program.
8. Press Alt-S to send file to CN2100 (under Telix).
9. Select [XMODEM]

10. Key in CN2100 firmware file name. (Ex:cn2100.rom)
11. You can see the file sending fromyour PC to firmware. When it is finished, you can see the upgrade status in your monitor.

Upgrade via RCP

1. Login your UNIX host. (Example: “root”)
2. Copy CN2100 firmware (cn2100.rom) into the current directory.
3. In this directory, create a file named. (.rhosts)

Notes. If you had defined the CN2100 domain name in your (/etc/hosts) file, put the domain name of CN2100 in (.rhosts). Otherwise you just put CN2100 IP address in it.

4. Telnet CN2100’ s IP address
5. You can see the configuration menu in your screen, choose {*Upgrade*}
6. In [*Upgrade via*] choose [*Network host (using RCP)*].
7. In [*Host name/IP address*] key in your UNIX HOST IP address.
8. In [*File name*] field, key in your CN2100 firmware file name in UNIX HOST.
9. In [*User name*] field, key in your user name used for login to UNIX HOST. (Example: “root”).
10. Press CTRL-U to start CN2100 download-program.
11. When it is finished, you can see the upgrade status in your screen.

A

Appendix ATroubleshooting

Console terminal problem

Q: No message displayed on console terminal.

Ans.:

- Check if terminal is set to 19200 bps, 8 data bits, no parity, 1 stop bit.
- Check if RS-232 cable is well wired. The console needs CTS/DCD signals to trigger. Refer to RS-232 Cable Wiring on Appendix section.
- Press ESC to try. The console may be blocked in waiting for an event.

Q: Garbage character displayed on console terminal.

Ans.:

- Check if terminal is set to 19200 bps, 8 data bits, no parity, 1 stop bit.
- Check if terminal type setting is correct. The console only accepts ansi/vt100 or vt52.
- Press Ctrl-L to refresh the display.

Terminal port problem

Q: When connecting a terminal to a TERM port, it prompts 'Port xx not enabled.'

Ans.:

- This port is disabled. Change the ' Enable' field in [Configure][OP _mode] menu to ' yes' . Then choose [Restart][System] to restart the CN2100.

Q: No message displayed on terminal attached to TERM port.

Ans.:

- Press Enter key several times to try.
- Check if terminal is set to correct baud, data bits, parity, and stop bit.
- Check if RS-232 cable is well wired. If the port utilized the RTS/CTS hardware flow control, then RTS, CTS pins should be included. Cable with only pin 2, 3 and 7 is not allowed in this cased. Refer to RS-232 cable Wiring on Appendix section.
- The terminal may be unlocked by Ctrl-S key if software flow control is used. Press Ctrl-Q to relieve it.

Q: No greeting hello message displayed on terminal.

Ans.:

- Check if you have enabled the [Configure][Hello] menu and
- Check if the line is set to detect DCD-off in [Configure][Line] menu. That is, the [Discon. Ctrl] must be set to DCD-off in order to send hello message on nest terminal connection has been made.

ASPP port problem

Q: The application utilizing the ASPP subroutines could not make connection to the CN2100.

Ans.:

- Check if the specified TCP port number is correctly fallen in the range from 950 to 981 inclusively.
- Check if the target port' s mode is set to ASPP. The connection would fail if the port mode were set to the mode other than ASPP.

Networked printer problem

Q: No printouts to the printers.

Ans.:

- Check if the asprint daemon is still running. If no, run it.
- Check if the CN2100 name and TCP port number given to asprint is OK.
- If asprint is running then kill it and restart it.
- Check your printer is H/W flow control (RTS/CTS) or S/W flow control (Xon/Xoff).
- Check if the cable pin out is the same as CN20030 mentioned in Appendix section.

Q: Corrupt data printing.

Ans.:

- Check the PRINTER port settings such as baud, parity, on [Configure][Line] menu are the same with printer's.

Q: Losing characters when printing.

Ans.:

- Please apply hardware handshaking pins (RTS/CTS) to the cable connecting the CN2100's PRINTER port and printer.

SLIP/PPP connection problem

Q: Cannot make SLIP connection to remote host.

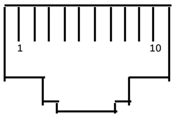
Ans.:

- Check if the baud rate, on [Configure][Line] menu, of the CN2100 SLIP port is the same with remote host.
- Check if the data bits= 8, parity=none, stop bit =1 .
- Check if the XON/XOFF flow control is disabled.
- Check if RS-232 cable is well wired. If the port utilized the RTS.CTS hardware flow control, then RTS, CTS pin should be included. Cable with only pin 2, 3 and 7 is not allowed in this cased.
- Make sure there is no getty or any other process is using the SLIP port on remotes host.

B

Appendix B Pin Assignment and Cable Wiring

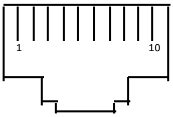
◆ *Pin Assignment of Console port*



RJ45 female connector

Pin	Signales
1	-
2	DSR
3	RTS
4	-
5	TxD
6	RxD
7	GND
8	CTS
9	DTR
10	-

◆ *Pin Assignment of Serial ports*



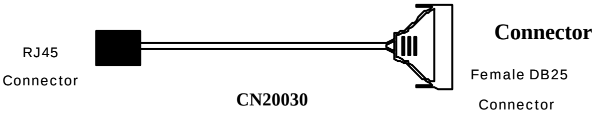
RJ45 female connector

Pin	Signales
1	DCD
2	DSR
3	RTS
4	-
5	TxD
6	RxD
7	GND
8	CTS
9	DTR
10	-

◆ *Cable Wiring of CN20030*

The cable is used to connect to a DTE device, e.g. terminal or PC.

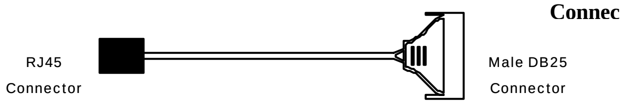
RJ45 Connector
DB25 Connector



6 RxD	←	2 RxD	
5 TxD	→	3 TxD	
8 CTS	←	4 CTS	
3 RTS	→	5 RTS	→ This end for terminal
9 DTR	→	6 DTR	
7 GND	——	7 GND	
1 DCD	←	8 DCD	
2 DSR	←	20 DSR	

◆ *Cable Wiring of CN20040*

The cable is used to connect to a DCE device, e.g. modem.



CN20040

RJ45

DB25 Connector

5 TxD	→	2 TxD	
6 RxD	←	3 RxD	
3 RTS	→	4 RTS	
8 CTS	←	5 CTS	→This end for modem
2 DSR	←	6 DSR	
7 GND	→	7 GND	
1 DCD	←	8 DCD	
9 DTR	—	20 DTR	

C

Appendix C T CP/IP and Internet Network

TCP/IP provides a means of letting computers to communicate with each other reliably, which normally operates over an Ethernet. Terminals cannot be connected directly to an Ethernet network, and instead must be attached directly to a host computer or an async server like the CN2100.

You can consider the CN2100 as a simple host computer that is dedicated to allowing terminal or other aysnc devices to be attached.

Network addresses

All machines in an Ethernet network need a pair of addressees so that all of them have a unique identification. These addresses are refereed to as Ethernet and IP addresses. The Ethernet address consists of 12 hex-digit number used to uniquely identify the machine within the whole Ethernet world. This number is set up by the manufacturer and would typically look like:

00:34:30:34:00:1D

The IP address should be also unique in a network. The IP address is not necessary world-wide unique, but you just be careful to make sure that all machines connected to the same Ethernet have different IP address is 32-bit number, appeared in a dotted notation and should look like this:

132.147.160.10

The IP address can be further broken down into two parts-a network id addresses and a host id address. There are three classes of networks and one reserved class of network, which can be represented by the 32-bit IP address. These three classes are referred to as classes A, B and C addresses. Looking at the first part can identify the class of network, an in the following example, of an IP address: (Suppose the general IP address format: a. b. c. d)

Class A

Net. Host. Host. Host

a. b. c. d.

a=0-127

Class B

Net. Net. Host. Host

a. b. c. d.

a=128-191

Class C

Net. Net. Net. Host

a. b. c. d.

a=192-223

D

Appendix D Domain Name Service

The easiest way to set up a network is to have a list of host names and addresses in a file, /etc/hosts, on each host machine. The problem with this approach is that each machine has it’s own copy of the file. If anything changes, such as adding a new host, then all of the hosts files on all of the machines must be changed. On a large network this could be very time consuming.

By applying a name server, this problem will be solved. Because a single host on the network has all of the address information and any other host can request this information form the name server.

As regards to how to set up a name revere on a host, please refer to relative host manuals.

E

Appendix E SNMP MIB Definitions

The CN2100 has a built-in Simple Network Management Protocol agent software. It supports cold/warm start trap and RFC 1213 MIB-II, The following lists the standard MIB-II group as well as the variables implemented in the CN2100.

Supported SNMP variables

System MIB	Interfaces MIB	IP MIB	ICMP MIB
sysDescr	itNumber	ipForwarding	icmpInMsgs
sysObjectID	ifIndex	ipDefaultTTL	icmpInErrors
sysUpTime	ifDescr	ipInreceives	icmpInDestUnreachs
sysContact	ifType	ipInHdrErrors	icmpInTimeExcds
sysName	ifMtu	ipInAddrErrors	icmpInParmProbs
sysLocation	ifSpeed	ipForwDatagrams	icmpInSrcQuenchs
sysServices	ifPhysAddress	ipInUnknownProtos	icmpInRedirects
	ifAdminStatus	ipInDiscards	icmpInEchos
	ifOperStatus	ipInDelivers	icmpInEchoReps
	ifLastChange	ipOutRequests	icmpInTimestamps
	ifInOctets	ipOutDiscards	icmpTimestampReps
	ifInUcastPkts	ipOutNoRoutes	icmpInAddrMasks
	ifInNUcastPkts	ipReasmTimeout	icmpOutMsgs
	ifInDiscards	ipReasmReqds	icmpOutErrors
	ifInErrors	ipReasmOKs	icmpOutDestUnreachs
	ifInUnknownProtos	ipReasmFails	icmpOutTimeExcds
	ifOutOctets	ipFragOKs	icmpOutParmProbs
	ifOutUcastPkts	ipFragFails	icmpOutSrcQuenchs

	ifOutNUcastPkts	ipFragCreates	icmpOutRedirects
	ifOutDiscards	ipAdEntAddr	icmpOutEchos
	ifOutErrors	ipAdEntIfIndex	icmpOutEchoReps
	ifOutQLen	ipAdEntNetMask	icmpOutTimestamps
	ifSpecific	ipAdEntBcastAddr	icmpOutTimestampReps
		ipAdEntReasmMaxSize	icmpOutAddrMasks
			icmpOutAddrMaskReps

IP MIB	TCP MIB	SNMP MIB
ipNetToMediaIfIndex	tcpRtoAlgorithm	snmpInPkts
ipNetToMediaPhysAddress	tcpRtoMin	snmpOutPkts
ipNetToMediaNetAddress	tcpRtoMax	snmpInBadVersions
ipNetToMediaType	tcpMaxConn	snmpInBadCommunityNames
ipRoutingDiscards	tcpActiveOpens	snmpInASNParseErrs
	tcpPassiveOpens	snmpInTooBigs
Address Translation MIB	tcpAttempFails	snmpInNoSuchNames
atIfIndex	tcpEstabResets	snmpInBadValues
atPhysAddress	tcpCurrEstab	snmpInReadOnlys
atNetAddress	tcpInSegs	snmpInGenErrs
	tcpOutSegs	snmpInTotalReqVars
UDP MIB	tcpRetransSegs	snmpInTotalSetVars
udpInDatagrams	tcpConnState	snmpInGetRequests
udpNoPorts	tcpConnLocalAddress	snmpInGetNexts
udpInErrors	tcpConnLocalPort	snmpInSetRequests
udpOutDatagrams	tcpConnRemAddress	snmpInGetResponses
udpLocalAddress	tcpConnRemPort	snmpInTraps
udpLocalPort	tcpInErrs	snmpOutTooBigs
	tcpOutRsts	snmpOutNoSuchNames
		snmpOutBadValues
		snmpOutGenErrs
		snmpOutGetRequests
		snmpOutGetNexts
		snmpOutSetRequests
		snmpOutGetResponses
		snmpOutTraps
		snmpEnableAuthenTraps

F

Appendix F M oxa Fixed TTY program

When a terminal logs in a UNIX host from terminal server, it is assigned a different pseudo tty every time. Processes running by different terminals are difficult to distinguish and therefore increase the complexity for management. To simplify management and enhance application-based security, Moxa Cn2100 provides fixed pseudo tty program.

MOXATTY, a fixed pseudo tty with a pairs of devices, master and slave, enables UNIX applications to use serial ports on Moxa CN2100 via TCP/IP network ass local serial ports. In other words, MOXATTY allows you to redirect UNIX tty devices to serial ports on Moxa CN2100.

Compared to random pseudo tty in terminal or other applications, MOXATTY makes you easy to pre-define and redirect fixed pseudo tty to ports on Moxa CN2100. Moxa fixed tty program makes Moxa CN2100 perfect for UNIX security-critical terminal access and transparent printer applications.

If you need this program for your application, you can get it at the URL http://www.moxa.com.tw/support/download/download.php3. And its manual is at URL http://www.moxa.com.tw/support/documentation/documentation.php3.