

Application Note 2100-1 / 12/12/2002

Replacing serial cables with Ethernet by using ESERV-10 2.0 device servers

Scope of the document

- Replacing serial cable connections between devices or between devices and PC with Ethernet
- Applies to ESERV-10 versions from:
 - 2.0.9 - software (SW)
 - 2.1.0 - hardware (HW)

Implementation options

- Use COM port redirector program on PC that simulates serial port to applications but uses TCP/IP network (Ethernet) communication instead of COM port. This is an useful option if you have a serial based control application and don't want to modify that
- Use two or more ESERV-10 device servers
- Modify your PC application to use TCP/IP sockets instead of COM ports.

1	COM PORT REDIRECTOR.....	2
1.1	<i>Setting up the COM port redirector environment.....</i>	2
2	POINT-TO-POINT NETWORK USING TWO OR MORE ESERV-10'S	5
3	MULTIPOINT NETWORK USING TWO OR MORE ESERV-10'S.....	7
4	DIRECT SOCKET COMMUNICATION FROM APPLICATIONS.....	9

1 COM PORT REDIRECTOR

The COM port redirector or Virtual COM port program is a PC application software that simulates serial/COM port to application but uses TCP/IP (Ethernet) network communication instead of serial port. With that program you can virtually bind COM ports to IP addresses of ESERV-10.

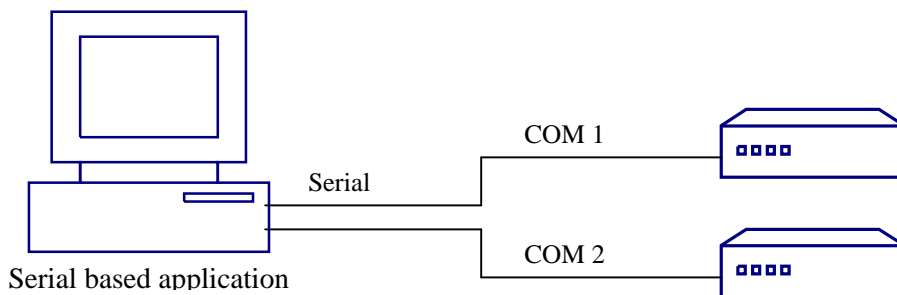


Figure 1-1. Common situation of RS-232 connected devices.

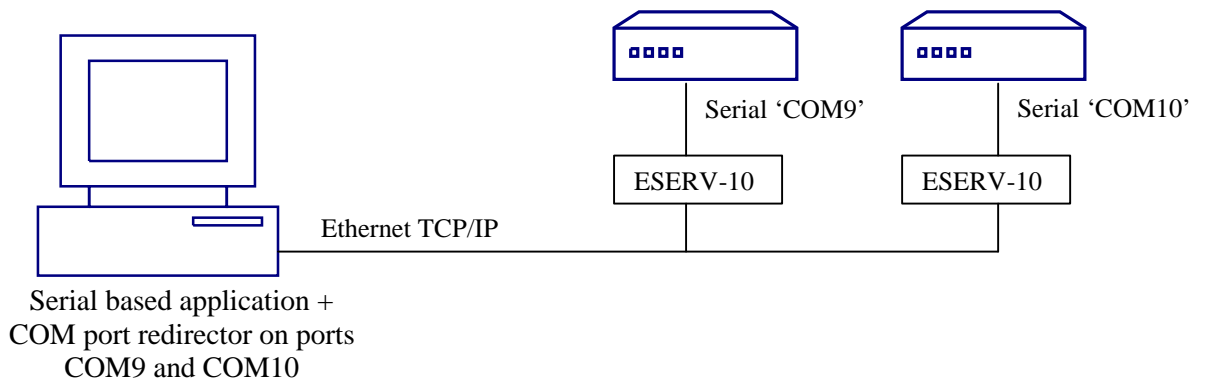


Figure 1-2. Situation after replacing serial cables by two ESERV-10 device servers and COM Port redirector program.

1.1 Setting up the COM port redirector environment

Firstly you need to get and configure unique IP address to every ESERV-10 device servers, set the communication protocol to be **TCP** and communication mode to **autosocket server**. The serial port settings of ESERV-10 must match your serial device's parameters (bps, data bits, stop bits, handshaking). Use serial configuration, Telnet configuration or Viola Configurator program as described in "ESERV-10 User's Manual" for these settings. The following pictures presents Telnet configuration screen of our example device assigned with IP address 172.16.8.29 (you need to use IP address of your own network).

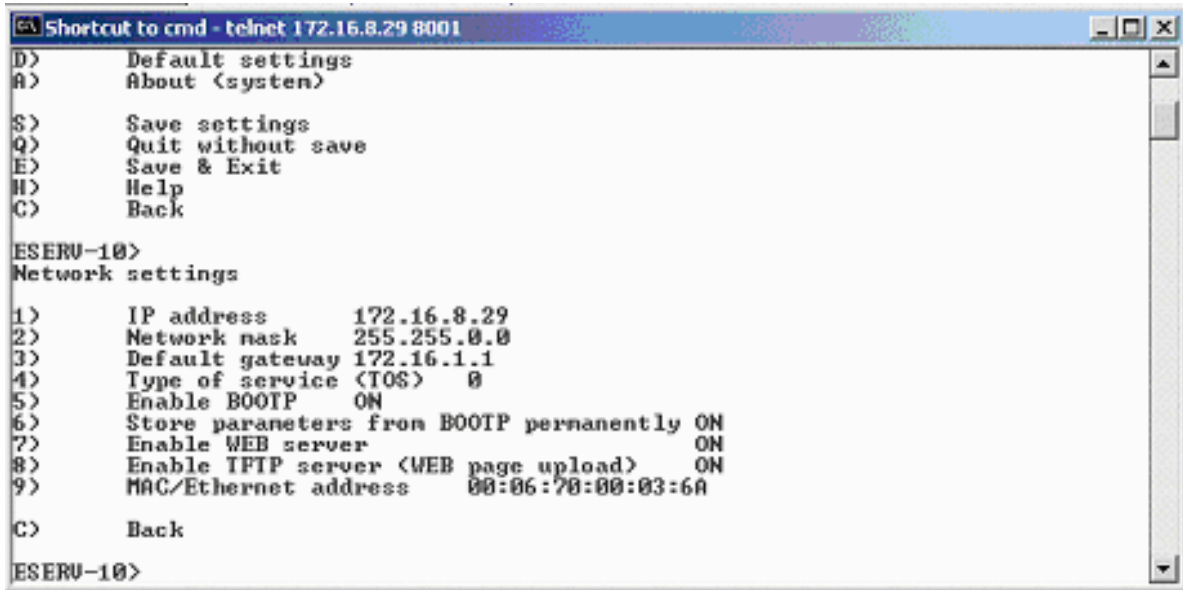


Figure 1-3. Network settings of example ESERV-10 for COM port redirector environment.

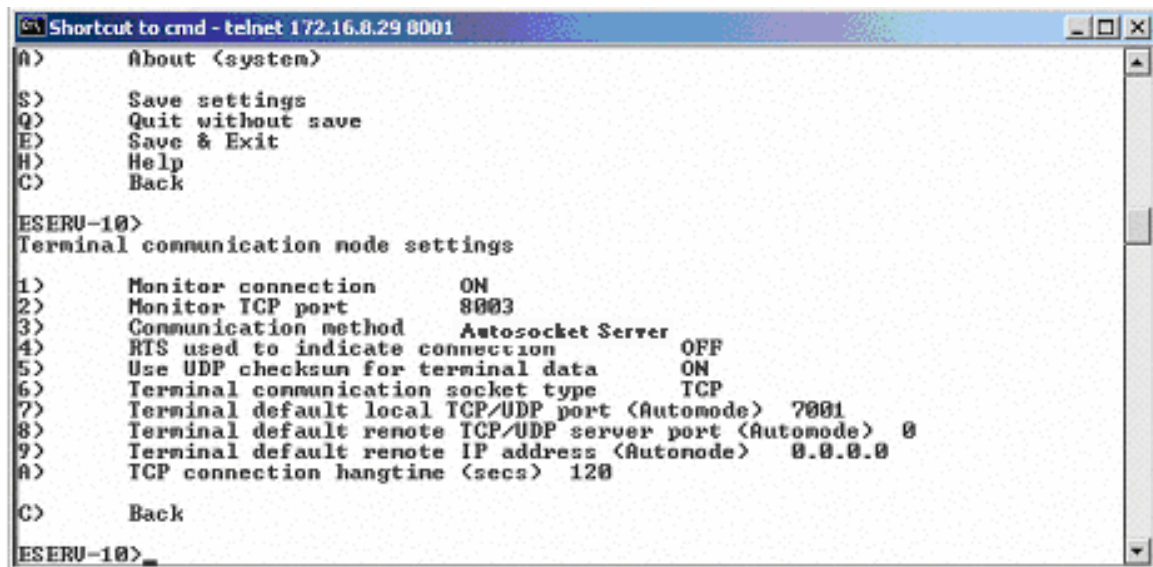


Figure 1-4. Terminal communication mode settings of example ESERV-10 for COM port redirector environment.

Then you need to have the COM port redirector program installed on your PC. Viola Systems Ltd. supports Serial/IP program from Tactical Software which can be downloaded from http://www.tacticalsoftware.com/evaluate_other.asp?product=8 for 30 day evaluation.

After the program is installed you can select the virtual COM ports that actually uses Ethernet and TCP/IP to transfer data. On the following picture ports 9 and 10 are selected (you need to select as many COM ports as you have ESERV-10's).

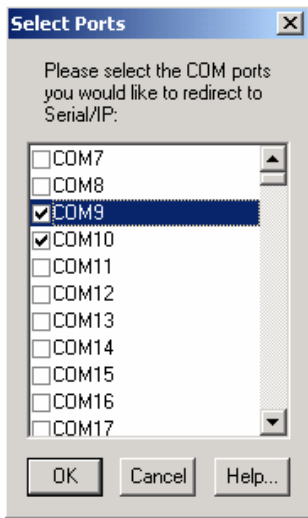


Figure 1-5. Selecting virtual COM ports COM9 and COM10 to be redirected to TCP/IP.

The next step is to tell the program to which IP address and TCP port each COM port is redirected. Our example configuration uses COM9 to access ESERV-10 on IP address 172.16.8.29 and TCP port 7001.

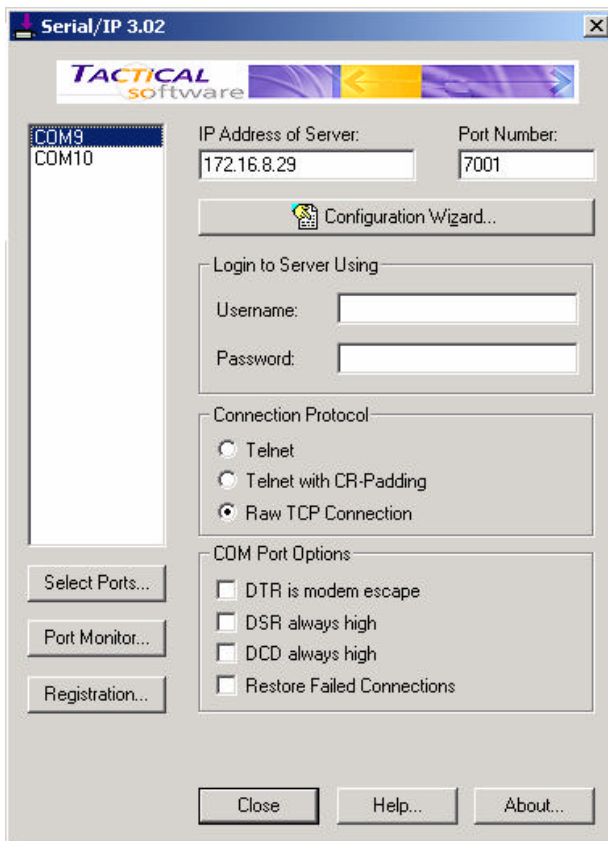


Figure 1-6. Configuring virtual serial port COM9 to use IP address and port of our example ESERV-10.

After these steps the COM port redirector environment is ready for use. Finalize the implementation by configuring your serial application to use these new virtual COM ports instead of the ‘real’ COM ports (e.g. if you have used COM1 and COM2 before you need to change these to COM9 and COM10 on our example).

One way to test the functionality of virtual COM ports is to use e.g. HyperTerminal to get console access to ESERV-10 over virtual serial port.

2 POINT-TO-POINT NETWORK USING TWO OR MORE ESERV-10’S

If it’s not possible to use COM port redirector software (e.g. when connecting two devices together) then two or more ESERV-10’s can be used instead.

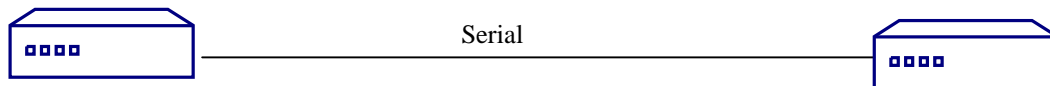


Figure 2-1. Two devices connected together with serial cable.

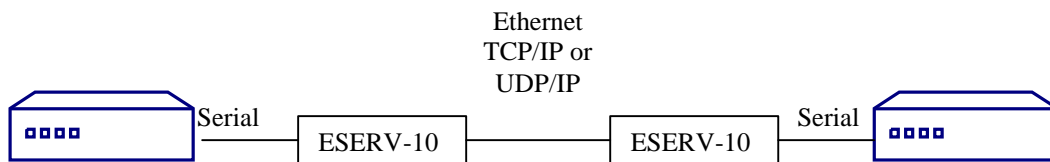


Figure 2-2. Serial cable replaced with Ethernet local area network by using two ESERV-10 device servers.

For using this principle you need to assign unique IP address to both ESERV-10 device servers, set the communication protocol to be **TCP or UDP (UDP being preferred)** and communication mode to **autosocket server-client**. The serial port settings of ESERV-10 must match your serial device’s parameters (bps, data bits, stop bits, handshaking). Both ESERV-10’s must know the IP address and TCP/UDP port of each other’s as default client IP and port. Use serial configuration, Telnet configuration or Viola Configurator program as described in “ESERV-10 User’s Manual” for these settings. The following pictures presents Telnet configuration screen of our example devices assigned with IP address 172.16.8.29 and 172.16.8.30 communicating by using UDP and ports 7001 (you need to use IP addresses of your own network).

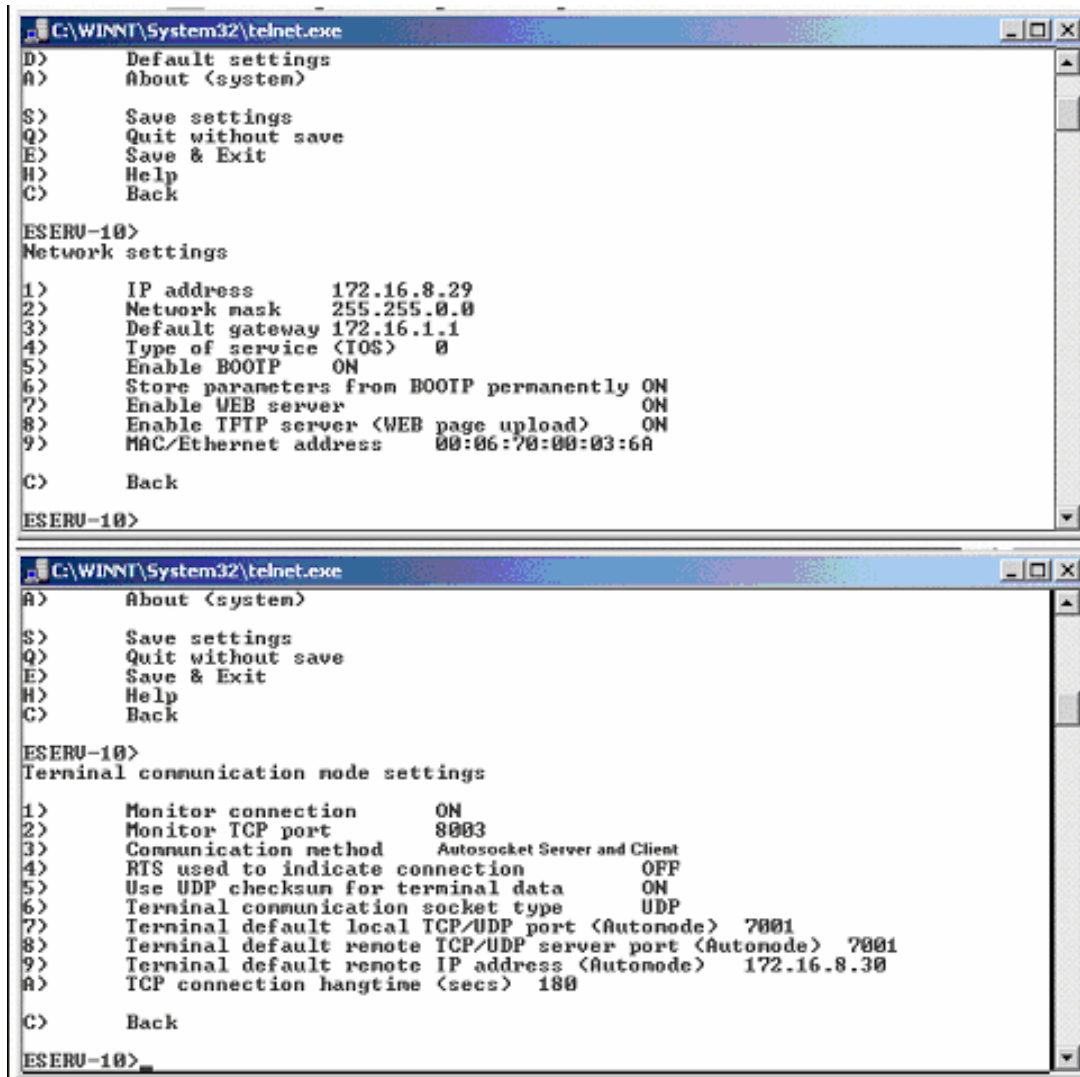


Figure 2-3. Network and Terminal communication mode settings of our example ESERV-10 device servers with IP address 172.16.8.29.

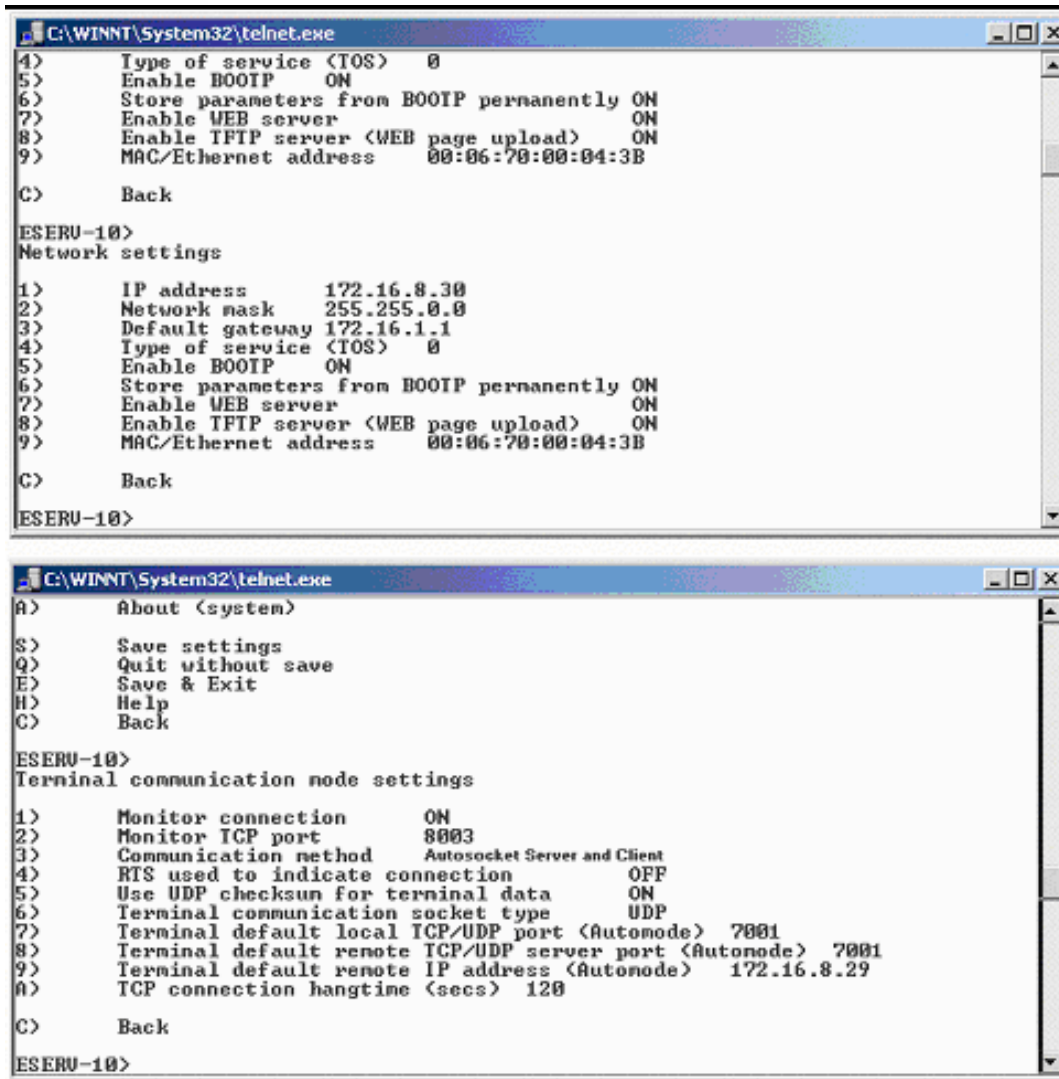


Figure 2-4. Network and Terminal communication mode settings of our example ESERV-10 device servers with IP address 172.16.8.30.

3 MULTIPOINT NETWORK USING TWO OR MORE ESERV-10'S

Multipoint serial environment that uses its own protocol level addressing (e.g. RS-485 based shared media networks) can also be Ethernet enabled by using two or more ESERV-10 device servers in broadcast IP addressing mode with UDP communication.

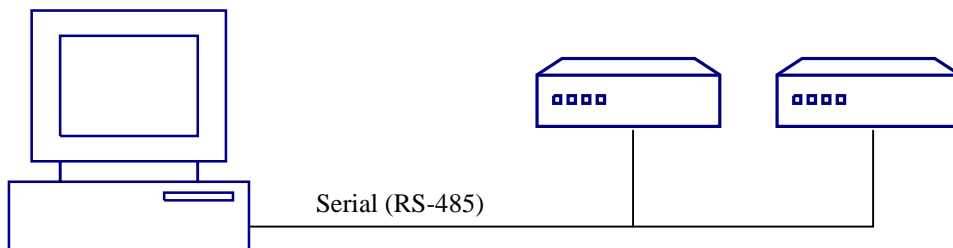


Figure 3-1. Multipoint RS-485 serial network.

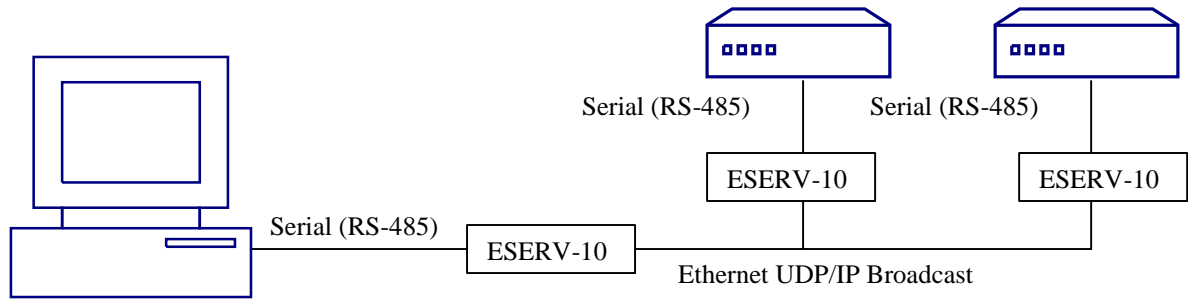


Figure 3-2. Multipoint RS-485 serial network replaced with Ethernet by using ESERV-10 device servers on UDP/IP broadcast mode.

For using this principle you need to assign unique IP address to every ESERV-10 device servers, set the communication protocol to be **UDP** and communication mode to **autosocket server-client**. Also the serial port settings of ESERV are needed to be configured to match your serial device's parameters (bps, data bits, stop bits, handshaking). Every ESERV must use the IP broadcast address **255.255.255.255** and same UDP port (e.g. 7001) as default client IP and port. Use serial configuration, Telnet configuration or Viola Configurator program as described in "ESERV-10 User's Manual" for these settings. The following pictures presents Telnet configuration screen of our example device assigned with IP address 172.16.8.29 communicating by using UDP and ports 7001 (you need to use IP addresses of your own network). Every other ESERVs are configured with same parameters except it's own unique IP address.

```

C:\WINNT\System32\telnet.exe
D> Default settings
A> About <system>

S> Save settings
Q> Quit without save
E> Save & Exit
H> Help
C> Back

ESERV-10>
Network settings
1> IP address 172.16.8.29
2> Network mask 255.255.0.0
3> Default gateway 172.16.1.1
4> Type of service <TOS> 0
5> Enable BOOTP ON
6> Store parameters from BOOTP permanently ON
7> Enable WEB server ON
8> Enable TFTP server <WEB page upload> ON
9> MAC/Ethernet address 00:06:70:00:03:6A

C> Back
ESERV-10>_

C:\WINNT\System32\telnet.exe
7> Terminal default local TCP/UDP port <Autonode> 7001
8> Terminal default remote TCP/UDP server port <Autonode> 7001
9> Terminal default remote IP address <Autonode> 255.255.255.255
A> TCP connection hangtime <secs> 180

C> Back
ESERV-10>
Enter ICP terminal socket hangtime <secs>:
Terminal communication node settings
1> Monitor connection ON
2> Monitor ICP port 8003
3> Communication method Aut socket Server and Client
4> RTS used to indicate connection OFF
5> Use UDP checksum for terminal data ON
6> Terminal communication socket type UDP
7> Terminal default local TCP/UDP port <Autonode> 7001
8> Terminal default remote TCP/UDP server port <Autonode> 7001
9> Terminal default remote IP address <Autonode> 255.255.255.255
A> TCP connection hangtime <secs> 120

C> Back
ESERV-10>

```

Figure 3-3. Network and Terminal communication mode settings for UDP/IP broadcast communication of our example ESERV-10 with IP address 172.16.8.29.

4 DIRECT SOCKET COMMUNICATION FROM APPLICATIONS

TCP/IP or UDP/IP sockets are very well supported by different operating systems and development tools like Microsoft Visual Basic®, Microsoft Visual C++ and Java. The ESERV software CD contains code examples of using sockets from MS VB and Java.