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Understanding Embedded - Microcontroller, Microprocessor, FPGA Modules

Embedded - Microcontroller, Microprocessor, and FPGA Modules are fundamental components in modern electronic systems, offering a wide range of functionalities and capabilities. Microcontrollers are compact integrated circuits designed to execute specific control tasks within an embedded system. They typically include a processor, memory, and input/output peripherals on a single chip. Microprocessors, on the other hand, are more powerful processing units used in complex computing tasks, often requiring external memory and peripherals. FPGAs (Field Programmable Gate Arrays) are highly flexible devices that can be configured by the user to perform specific logic functions, making them invaluable in applications requiring customization and adaptability.

Applications of Embedded - Microcontroller,

Details	
Product Status	Active
Module/Board Type	MPU Core
Core Processor	DSTni-EX
Co-Processor	XPort AR
Speed	25MHz
Flash Size	512KB
RAM Size	256KB
Connector Type	RJ45
Size / Dimension	0.57" x 0.72" (14.5mm x 18.3mm)
Operating Temperature	-40°C ~ 85°C
Purchase URL	https://www.e-xfl.com/product-detail/maestro-wireless/xp1001000-05r

IP Address

Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit. The XPort is automatically assigned an IP address on DHCP-enabled networks, as it is DHCP-enabled by default.

Port Numbers

Every TCP connection and every UDP datagram is defined by a destination IP address and a port number. For example, a Telnet application commonly uses port number 23. A port number is similar to an extension on a phone system.

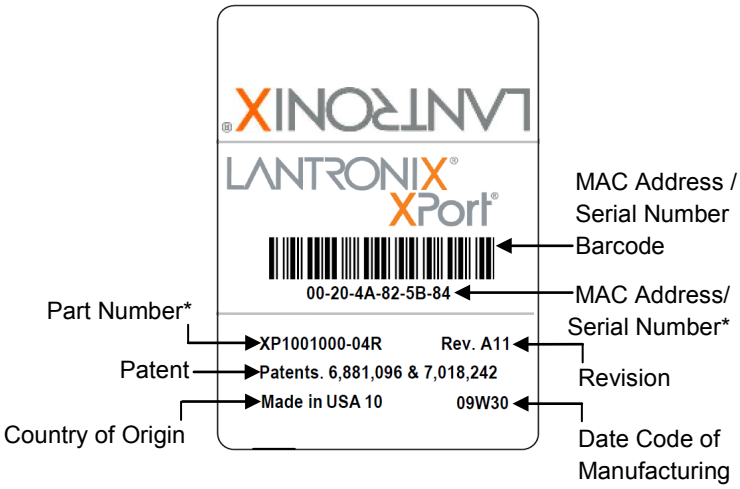
The unit's serial channel (port) can be associated with a specific TCP/UDP port number. Port number 9999 is reserved for access to the unit's Setup (configuration) Mode window. Ports 0-1024 are reserved as well. For more information on reserved port numbers, see to *Table 7-5. Reserved Port Numbers* on page *50*.

Product Information Label

The product information label on the unit contains the following information about the specific unit:

- Part Number
- Revision
- Manufacturing Date Code
- Country of Origin Manufacturing Location ID
- MAC Address/Serial Number Barcode
- MAC Address/Serial Number*

Figure 2-1. Product Label



Note: *The Part Number* and MAC Address/Serial Number* on the product label will vary according the unit model (XPort-03, XPort-04 or XPort-05).*

3. If prompted, enter the hardware address (on the product label) and click **Next**.
4. Select Assign a specific IP address and click Next.
5. Enter the **IP address**. The **Subnet mask** displays automatically based on the IP address; if desired, you may change it. On a local network, you can leave the **Default gateway** blank (all zeros). Click **Next**.
6. Click the **Assign** button and wait several seconds until a confirmation message displays. Click **Finish**.
7. Select the device from the main window list and select **Ping** from the **Tools** menu. The Ping Device dialog box shows the IP address of the selected unit.
8. From the **Tools** menu, click the **Ping** button. The results display in the Status window. Click the **Clear Status** button to clear the window so you can ping the device again.

Note: *If you do not receive "Reply" messages, make sure the unit is properly attached to the network and that the IP address assigned is valid for the particular network segment you are working with. If you are not sure, check with your systems administrator.*

9. Click the **Close** button to close the dialog box and return to the main window.

Accessing the XPort Module Using DeviceInstaller

1. Click **Start→All Programs→Lantronix→DeviceInstaller 4.4→DeviceInstaller**.
2. Click the **XPort** folder. The list of available Lantronix XPort devices displays.
3. Expand the list of XPort modules by clicking the **+** symbol next to the XPort icon. Select the XPort unit by clicking on its IP address to view its configuration.

Viewing the Current Configuration

DeviceInstaller provides a view of the unit's configuration.

To view the unit's current settings:

1. Follow the instructions above to locate the XPort module.
2. In the right pane, click the **Device Details** tab. The current XPort device configuration displays:

Name	Configurable field. A name that identifies the XPort module. Double-click the field, type in the value, and press Enter to complete. This name is not visible on other PCs or laptops using DeviceInstaller.

Ethernet Configuration

You must specify the speed and direction of data transmission.

To specify how data will be transmitted:

1. On the main menu, click **Network**.
2. Enter the following (as necessary):

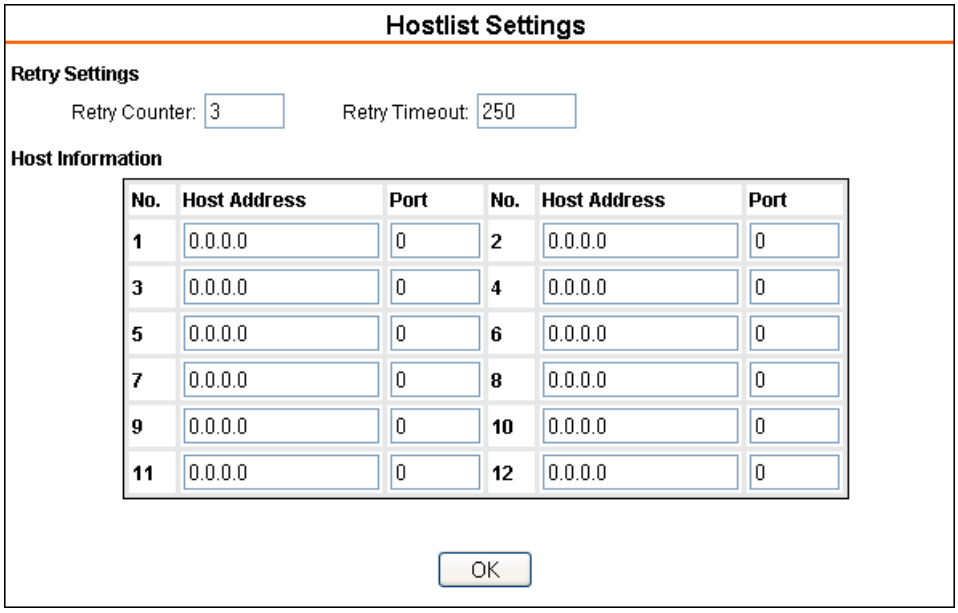
Auto Negotiate	With this option, the Ethernet port auto-negotiates the speed and duplex with the hardware endpoint to which it is connected. This is the default. If this option is not selected, the complete the fields that become available: ◆ **Speed:** The speed of data transmission. The default is 100 Mbps. ◆ **Duplex:** The direction of data transmission. The default is Full.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

To configure the XPort module's host list:

1. On the main menu, click **Hostlist**.

Figure 4-5. Hostlist Settings



2. Enter or modify the following fields:

Retry Settings

Retry Counter	Enter the value for the number of times the XPort device server should attempt to retry connecting to the host list.
Retry Timeout	Enter the duration (in milliseconds) the XPort unit should abandon attempting a connection to the host list.

Host Information

Host Address	Enter or modify the host's IP address.
Port	Enter the target port number.

3. When you are finished, click the **OK** button.
4. On the main menu, click **Apply Settings**.

Channel 1 Configuration

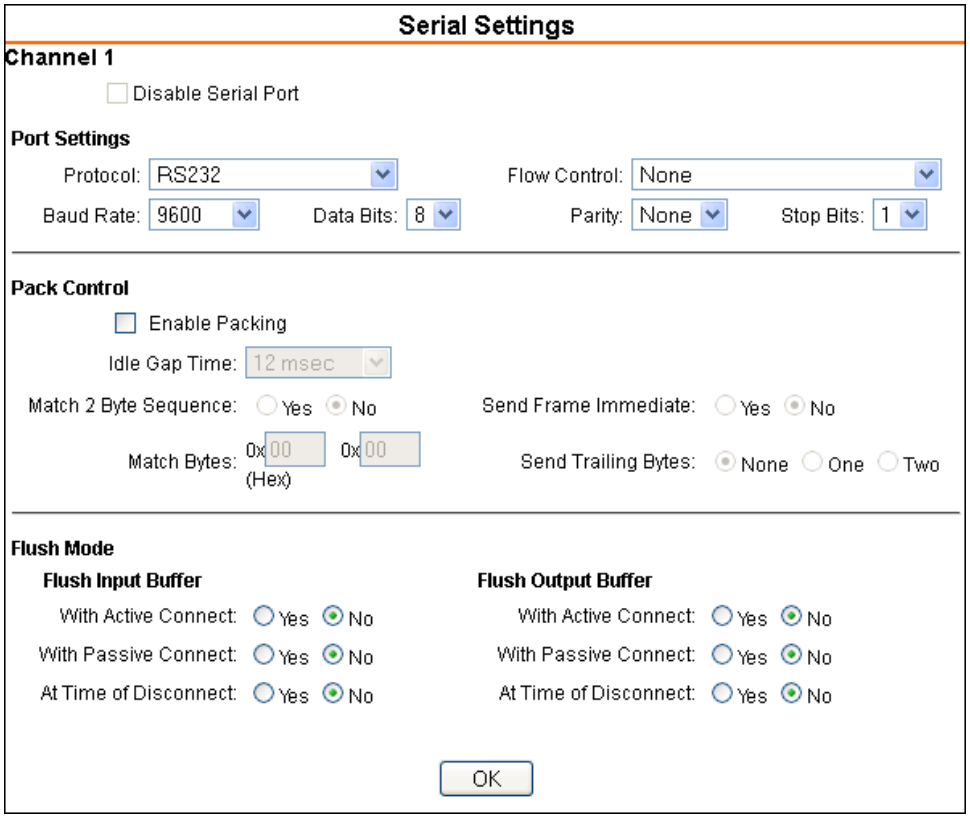
The Channel 1 configuration defines how the serial port responds to network and serial communication.

Serial Settings

To configure the channel's serial settings:

1. On the main menu, click **Serial Settings** (under **Channel 1**) to display the Serial Settings window.

Figure 4-6. Channel Serial Settings



2. In the available fields, enter the following information:

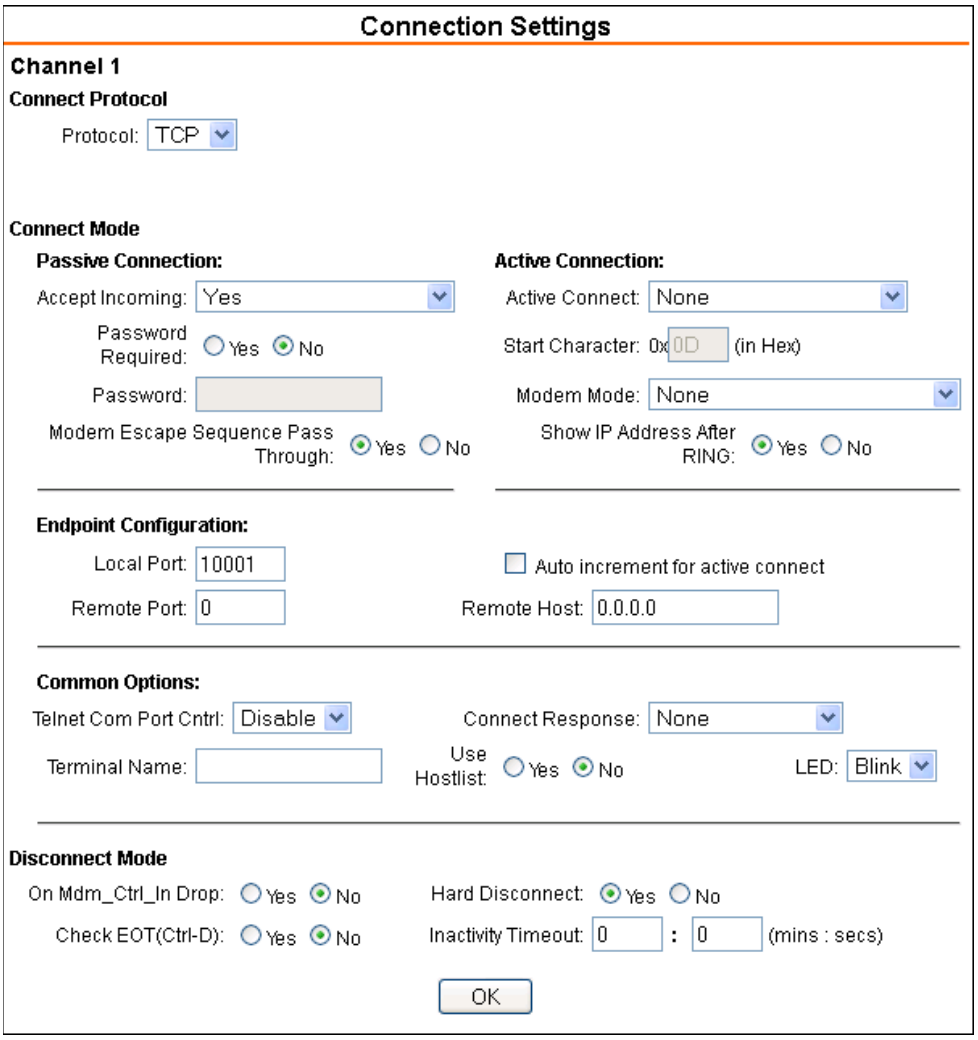
Channel 1

Disable Serial Port	Available on Channel 2 settings only. When selected, disables communication through the serial port.

Port Settings

Protocol	From the drop-down menu, select the protocol type for the selected channel.
Flow Control	Flow control manages data flow between devices in a network to ensure it is processed efficiently. Too much data arriving before a device is prepared to manage it causes lost or retransmitted data. None is the default.
Baud Rate	The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, 230400, 460800, or

Figure 4-7. TCP Connection Settings

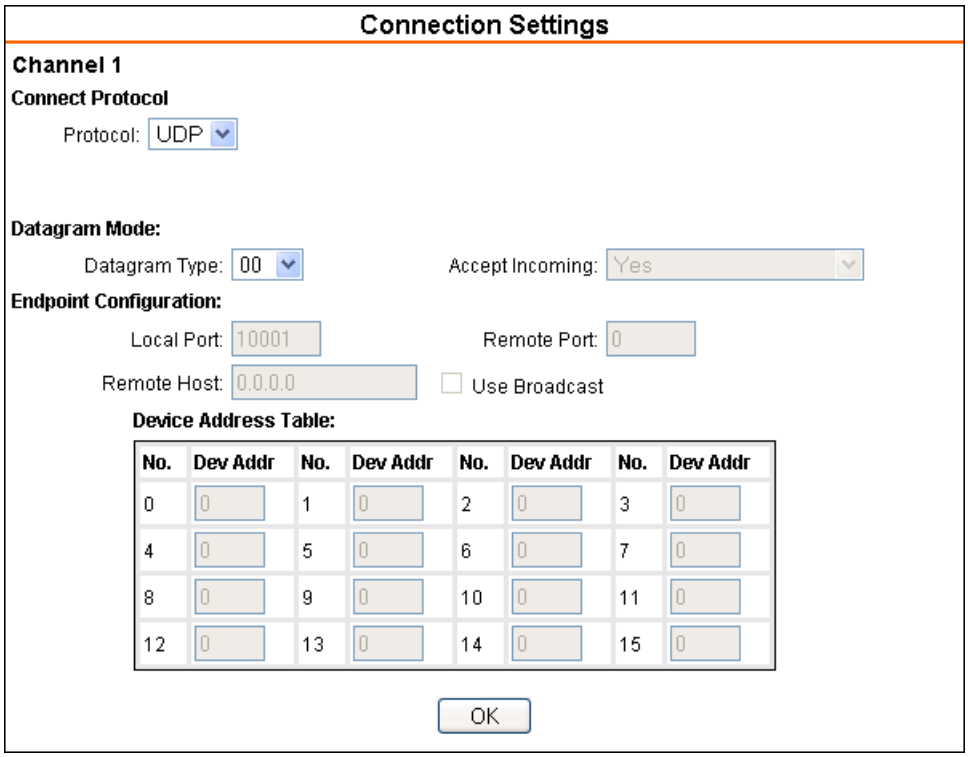


Connection Settings - UDP

To configure a channel's UDP settings:

1. On the main menu, click **Connection**. The Connection Settings window for the selected channel displays.
2. In the available fields, enter or modify the following information:

Figure 4-8. UDP Connection Settings



Connect Protocol

Protocol	Select **UDP** from the drop-down menu.

Datagram Mode

Datagram Type	Configures the remote IP or network broadcast address and the remote port. Enter **01** for directed or broadcast UDP. The default setting is **00**.
Accept Incoming	Select **Yes** to accept incoming UDP datagrams.

Endpoint Configuration

Local Port	Enter the local port number.
Remote Port	Enter the port number of the remote device.
Remote Host	Enter the IP address of the remote device.
Use Broadcast	Select to broadcast the UDP datagram. The default is not to

	messages. Spaces are not permitted.

Recipients

Recipient 1: Email Address	Enter the email address designated to receive email notifications.
Recipient 2: Email Address	Enter an additional email address designated to receive email notifications.

3. When you are finished, click the **OK** button.

4. On the main menu, click **Apply Settings**.

Trigger Configuration

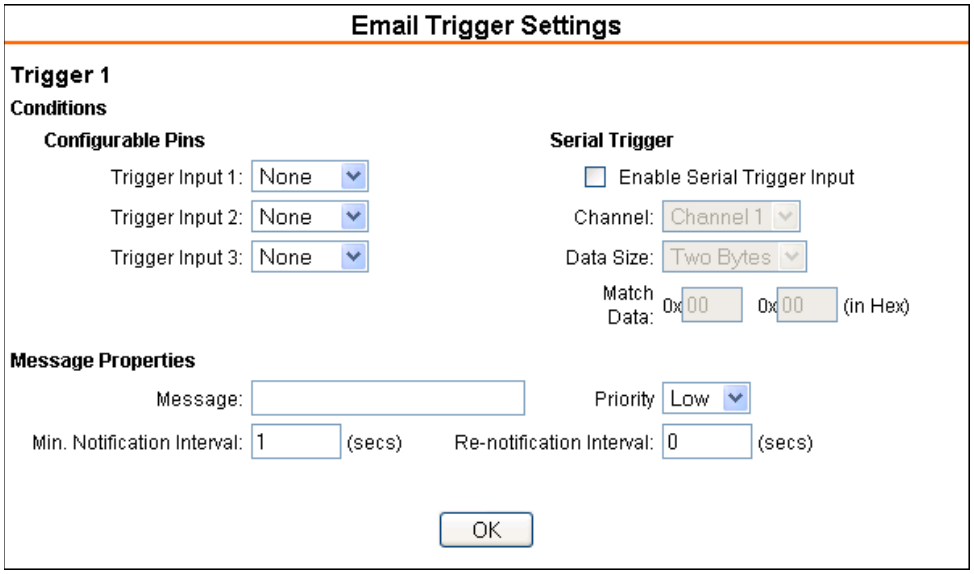
A trigger event occurs when the unit receives the specified trigger input resulting from a specified combination of conditions on the configurable pins.

Set the configurable pins to **Active**, **Inactive**, or **None**. The configurable pins are disabled if they are all set to **None**. If both the serial sequence and the configurable pins are disabled, the trigger is disabled.

To configure the XPort module's email trigger settings:

1. On the main menu, click **Trigger 1**, **Trigger 2**, or **Trigger 3** to configure the desired trigger settings. The **Email Trigger Settings** page opens.

Figure 4-10. Email Trigger Settings



2. Configure or modify the following fields:

Conditions

Configurable Pins	Select the condition from the drop-down menu for the

Serial Port Connection

To configure the unit through a serial connection:

1. Connect a console terminal or PC running a terminal emulation program to your unit's serial port.
2. Set the terminal emulator serial port settings to 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.

Note: *The XPort module always uses these serial port settings on boot-up.*

3. Reset the XPort unit by cycling the unit's power (turning the power off and back on). Immediately upon resetting the device, enter three lowercase **x** characters (**xxx**).

Note: *The easiest way to enter Setup Mode is to hold down the **x** key at the terminal (or emulation) while resetting the unit.* ***You must do this within three seconds of resetting the XPort module.***

At this point, the screen display is the same as when you use a Telnet connection. To continue, go to step 4, above, in the section *Telnet Connection*

Exiting Setup Mode

To exit setup mode:

You have two options:

- To save all changes and reboot the device, select option **9 Save and exit** from the Change Setup menu. All values are stored in nonvolatile memory.
- To exit the configuration mode without saving any changes or rebooting, select option **8 Exit without save** from the Change Setup menu.

6. Setup Mode: Server Configuration

This chapter explains how to configure the network settings.

Note: *Current values appear in parentheses.*

Server Configuration (Option 0)

The unit's basic network parameters display when you select **Server configuration** (option **0**). The **IP Address**, **Set Gateway IP Address**, and **Netmask** fields display the current values.

```
IP Address : (000) .(000) .(000) .(000)

Set Gateway IP Address (N) ?

Netmask: Number of Bits for Host Part (0=default) (0)

Set DNS Server IP addr  (N) ?

Change Telnet/Web Manager password (N) ?

Change DHCP device name (not set) ? (N) ?

Enable DHCP FQDN option :  (N) ?
```

IP Address

If DHCP is not used to assign IP addresses, enter the IP address manually. The IP address must be set to a unique value in the network. Enter each octet and press **Enter** between each section. The current value displays in parentheses.

```
IP Address : ( 0) ( 0) ( 0) ( 0) _
```

If DHCP is used, the third octet of the IP address sets the BootP/DHCP/AutoIP options. The following table shows the bits you can manually configure to force the XPort module to disable AutoIP, DHCP, or BootP. To disable an option, set the appropriate bit.

Table 6-1. BootP/DHCP/AutoIP options

Options	Bit
AutoIP	0
DHCP	1
BootP	2

For example, if the third octet is 0.0.5.0, the AutoIP and BootP options are disabled; only DHCP is enabled. (The value 5 results from adding the binary equivalents of 0 and 2.) This is the most common setting when using DHCP.

Set Gateway IP Address

The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the unit. The gateway address must be within the local network. The default is **N** (No), meaning the gateway address has not been set. To set the gateway address, type **Y** and enter the address.

```
Set Gateway IP Address (N) ? Y

Gateway IP addr ( 0) ( 0) ( 0) ( 0)_
```

Netmask: Number of Bits for Host Part

A netmask defines the number of bits taken from the IP address that are assigned for the host part.

```
Netmask: Number of Bits for Host Part (0=default) (0) _
```

Note: *Class A: 24 bits; Class B: 16 bits; Class C: 8 bits*

The unit prompts for the number of host bits to be entered, then calculates the netmask, which appears in standard decimal-dot notation (for example, 255.255.255.0) when the saved parameters display.

Table 6-2. Standard IP Network Netmasks

Network Class	Host Bits	Netmask
A	24	255.0.0.0
B	16	255.255.0.0
C	8	255.255.255.0

Set DNS Server IP Address

The DNS server allows the name of a remote machine to be resolved automatically. The default is **N** (No), indicating the DNS server address has not been set. To set the DNS server address, type **Y**. At the prompt, enter the DNS server address. If the device is DHCP enabled, the DHCP server provides the DNS server IP address, which will override this configured value.

Note: *This setting is applicable only in Manual Connection mode.*

```
Set DNS Server IP addr (N) ? _
```

Only use this automatic port increment feature to initiate a connection using TCP. Set the port to a non-zero value when the unit is in a passive mode or when using UDP instead of TCP.

Connect Mode

Connect Mode defines how the unit makes a connection, and how it reacts to incoming connections over the network.

```
ConnectMode (C0) ? _
```

Enter Connect Mode options in hexadecimal notation.

Note: *All bit positions in the table that are blank represent "don't care" bits, for that particular option, which can be set to either a 0 or 1 value.*

Table 7-6. Connect Mode Options

Connect Mode Option	7	6	5	4	3	2	1	0
a) Incoming Connection								
Never accept incoming	0	0	0					
Accept with active Modem Control In	0	1	0					
Always Accept	1	1	0					
b) Response								
Nothing (quiet)				0				
Character response (C=connect, D=disconnect, N=unreachable)				1				
c) Active Startup								
No active startup					0	0	0	0
With any character					0	0	0	1
With active Modem Control In					0	0	1	0
With a specific start character					0	0	1	1
Manual connection					0	1	0	0
Autostart					0	1	0	1
Hostlist	0	0	1	0				
d) Datagram Type								
Directed UDP					1	1	0	0
e) Modem Mode								
No Echo			0	0		1	1	

Connect Mode Option	7	6	5	4	3	2	1	0

5. For **Retrytimeout**, enter the number of milliseconds the unit should wait before failing an attempted connection. The time is stored as units of milliseconds in the range of **10-65535**. The default is **250**.

d) Datagram Type

Directed UDP	When selecting this option, you are prompted for the Datagram type. Enter 01 for directed or broadcast UDP. Datagrams of type 01 can be sent as a broadcast by enabling the **Send as Broadcast** option. The default is not to broadcast. When the UDP option is in effect, the unit never attempts to initiate a TCP connection because it uses UDP datagrams to send and receive data.

e) Modem Mode

In Modem (Emulation) Mode, the unit presents a modem interface to the attached serial device. It accepts AT-style modem commands and handles the modem signals correctly.

Normally, there is a modem connected to a local PC and a modem connected to a remote machine. A user must dial from the local PC to the remote machine, accumulating phone charges for each connection. Modem Mode allows you to replace modems with XPort modules, and to use an Ethernet connection instead of a phone call. By not having to change communications applications, you avoid potentially expensive phone calls.

To select Modem Mode, set the Connect Mode to **C6** (no echo), **D6** (echo with full verbose), **D7** (echo with numeric response), **CF** (modem responses only, numeric response), or **CE** (modem responses only, full verbose).

Note: *If the unit is in Modem Mode, and the serial port is idle, the unit can still accept network TCP connections to the serial port if Connect Mode is set to* **C6** *(no echo),* **D6** *(echo with full verbose),* **D7** *(echo with numeric response,* **CF** *(modem responses only, numeric response), or* **CE** *(modem responses only, full verbose).*

Without Echo	In Modem Mode, echo refers to the echo of all of the characters entered in command mode; it does *not mean* to echo data that is transferred. Quiet Mode (without echo) refers to the modem *not* sending an answer to the commands received (or displaying what was typed).