



Configuring Interfaces

This chapter describes basic interface configuration for the ML-Series card to help you get your ML-Series card up and running. Advanced packet-over-SONET/SDH (POS) interface configuration is covered in [Chapter 5, “Configuring POS.”](#) For more information about the Cisco IOS commands used in this chapter, refer to the *Cisco IOS Command Reference* publication.

This chapter contains the following major sections:

- [General Interface Guidelines, page 4-1](#)
- [Basic Interface Configuration, page 4-3](#)
- [Basic Fast Ethernet, Gigabit Ethernet, and POS Interface Configuration, page 4-4](#)
- [Monitoring Operations on the Fast Ethernet and Gigabit Ethernet Interfaces, page 4-8](#)



Note

Complete the initial configuration of your ML-Series card before proceeding with configuring interfaces.

General Interface Guidelines

The main function of the ML-Series card is to relay packets from one data link to another. Consequently, you must configure the characteristics of the interfaces that receive and send packets. Interface characteristics include, but are not limited to, IP address, address of the port, data encapsulation method, and media type.

Many features are enabled on a per-interface basis. Interface configuration mode contains commands that modify the interface operation (for example, of an Ethernet port). When you enter the **interface** command, you must specify the interface type and number.

The following general guidelines apply to all physical and virtual interface configuration processes:

- All interfaces have a name that is composed of an interface type (word) and a Port ID (number). For example, FastEthernet 2.
- Configure each interface with a bridge-group or IP address and IP subnet mask.
- VLANs are supported through the use of subinterfaces. The subinterface is a logical interface configured separately from the associated physical interface.
- Each physical interface, including the internal POS interfaces, has an assigned MAC address.

MAC Addresses

Every port or device that connects to an Ethernet network needs a MAC address. Other devices in the network use MAC addresses to locate specific ports in the network and to create and update routing tables and data structures.

To find MAC addresses for a device, use the **show interfaces** command, as follows:

```
Router# sh interfaces fastEthernet 0
FastEthernet0 is up, line protocol is up
  Hardware is epif_port, address is 0005.9a39.6634 (bia 0005.9a39.6634)
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 1/255, rxload 1/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, Auto Speed, 100BaseTX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:01, output 00:00:18, output hang never
  Last clearing of "show interface" counters never
  Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
  Queueing strategy: fifo
  Output queue :0/40 (size/max)
  5 minute input rate 0 bits/sec, 0 packets/sec
  5 minute output rate 0 bits/sec, 0 packets/sec
    11 packets input, 704 bytes
      Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
      0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
      0 watchdog, 11 multicast
    0 input packets with dribble condition detected
    3 packets output, 1056 bytes, 0 underruns
      0 output errors, 0 collisions, 0 interface resets
      0 babbles, 0 late collision, 0 deferred
      0 lost carrier, 0 no carrier
      0 output buffer failures, 0 output buffers swapped out
```

Interface Port ID

The interface port ID designates the physical location of the interface within the ML-Series card. It is the name that you use to identify the interface that you are configuring. The system software uses interface port IDs to control activity within the ML-Series card and to display status information. Interface port IDs are not used by other devices in the network; they are specific to the individual ML-Series card and its internal components and software.

The ML100T-12 port IDs for the twelve Fast Ethernet interfaces are Fast Ethernet 0 through 11. The ML100X-8 port IDs for the eight Fast Ethernet interfaces are Fast Ethernet 0 through 7. The ML1000-2 port IDs for the two Gigabit Ethernet interfaces are Gigabit Ethernet 0 and 1. Both ML-Series cards feature two POS ports, and the ML-Series card port IDs for the two POS interfaces are POS 0 and POS 1. You can use user-defined abbreviations such as f0 to configure the Fast Ethernet interfaces, gi0 or gi1 to configure the two Gigabit Ethernet interfaces, and POS0 and POS1 to configure the two POS ports.

You can use Cisco IOS **show** commands to display information about any or all the interfaces of the ML-Series card.

Basic Interface Configuration

The following general configuration instructions apply to all interfaces. Before you configure interfaces, develop a plan for a bridge or routed network.

To configure an interface, do the following:

- Step 1** Enter the **configure EXEC** command at the privileged EXEC prompt to enter global configuration mode.

```
Router> enable
Password:
Router# configure terminal
Router(config)#
```

- Step 2** Enter the **interface** command, followed by the interface type (for example, fastethernet, gigabitethernet, or pos), and its interface port ID (see the “[Interface Port ID](#)” section on page 4-2).

For example, to configure a Gigabit Ethernet port, enter this command:

```
Router(config)# interface gigabitethernet number
```

- Step 3** Follow each **interface** command with the interface configuration commands required for your particular interface.

The commands that you enter define the protocols and applications that will run on the interface. The ML-Series card collects and applies commands to the **interface** command until you enter another **interface** command or a command that is not an interface configuration command. You can also enter **end** to return to privileged EXEC mode.

- Step 4** Check the status of the configured interface by entering the EXEC **show interface** command.

```
Router# sh interface fastEthernet 0
FastEthernet0 is up, line protocol is up
Hardware is epif_port, address is 0005.9a39.6634 (bia 0005.9a39.6634)
MTU 1500 bytes, BW 100000 Bit, DLY 100 use,
    reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Full-duplex, Auto Speed, 100BaseTX
ARP type: ARPA, ARP Timeout 04:00:00
Last input 00:00:01, output 00:00:18, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue :0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
    11 packets input, 704 bytes
    Received 0 broadcasts, 0 runts, 0 giants, 0 throttles
    0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
    0 watchdog, 11 multicast
    0 input packets with dribble condition detected
    3 packets output, 1056 bytes, 0 underruns
    0 output errors, 0 collisions, 0 interface resets
    0 babbles, 0 late collision, 0 deferred
    0 lost carrier, 0 no carrier
    0 output buffer failures, 0 output buffers swapped out
```

Basic Fast Ethernet, Gigabit Ethernet, and POS Interface Configuration

ML-Series cards support Fast Ethernet, Gigabit Ethernet, and POS interfaces. This section provides some examples of configurations for all interface types.

To configure an IP address or bridge-group number on a Fast Ethernet, Gigabit Ethernet, or POS interface, perform the following procedure, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface <i>type number</i>	Activates interface configuration mode to configure either the Gigabit Ethernet interface, the Fast Ethernet interface, or the POS interface.
Step 2	Router(config-if)# { ip address <i>ip-address subnet-mask</i> bridge-group <i>bridge-group-number</i> }	Sets the IP address and IP subnet mask to be assigned to the interface. or Assigns a network interface to a bridge group.
Step 3	Router(config-if)# no shutdown	Enables the interface by preventing it from shutting down.
Step 4	Router(config)# end	Returns to privileged EXEC mode.
Step 5	Router# copy running-config startup-config	(Optional) Saves configuration changes to timing and control card (TCC2/TCC2P) flash database.

Configuring the Fast Ethernet Interfaces for the ML100T-12

To configure the IP address or bridge-group number, speed, duplex, and flow control on an ML100T-12 Fast Ethernet interface, perform the following procedure, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface fastethernet <i>number</i>	Activates interface configuration mode to configure the Fast Ethernet interface.
Step 2	Router(config-if)# { ip address <i>ip-address subnet-mask</i> bridge-group <i>bridge-group-number</i> }	Sets the IP address and IP subnet mask to be assigned to the interface. or Assigns a network interface to a bridge group.
Step 3	Router(config-if)# [no] speed { 10 100 auto }	Configures the transmission speed for 10 or 100 Mbps. If you set the speed or duplex for auto , you enable autonegotiation on the system. In this case, the ML-Series card matches the speed and duplex mode of the partner node.
Step 4	Router(config-if)# [no] duplex { full half auto }	Sets full duplex, half duplex, or autonegotiate mode.

	Command	Purpose
Step 5	Router(config-if)# flowcontrol send {on off desired}	(Optional) Sets the send flow control value for an interface. Flow control works only with port-level policing. ML-Series card Fast Ethernet port flow control is IEEE 802.3x compliant. Note Since Fast Ethernet ports support only symmetric flow control the flowcontrol send command controls both the receive and send flow control operations.
Step 6	Router(config-if)# no shutdown	Enables the interface by preventing it from shutting down.
Step 7	Router(config)# end	Returns to privileged EXEC mode.
Step 8	Router# copy running-config startup-config	(Optional) Saves your configuration changes to TCC2/TCC2P flash database.

Example 4-1 shows how to do the initial configuration of an ML100T-12 Fast Ethernet interface with an IP address and autonegotiation.

Example 4-1 Initial Configuration of a ML100T-12 Fast Ethernet Interface

```
Router(config)# interface fastethernet 1
Router(config-if)# ip address 10.1.2.4 255.0.0.0
Router(config-if)# negotiation auto
Router(config-if)# no shutdown
Router(config-if)# end
Router# copy running-config startup-config
```

Configuring the Fast Ethernet Interfaces for the ML100X-8

The ML100X-8 supports 100BASE-FX full-duplex data transmission. You cannot configure autonegotiation or speed on its Fast Ethernet interfaces. The card also features automatic medium-dependent interface crossover (Auto-MDIX) enabled by default. Auto-MDIX automatically detects the required cable connection type (straight-through or crossover) and configures the connection appropriately. To configure the IP address or bridge-group number, or flow control on a Fast Ethernet interface, perform the following procedure, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface fastethernet <i>number</i>	Activates interface configuration mode to configure the Fast Ethernet interface.
Step 2	Router(config-if)# { ip address <i>ip-address subnet-mask</i> bridge-group <i>bridge-group-number</i> }	Sets the IP address and IP subnet mask to be assigned to the interface. or Assigns a network interface to a bridge group.

	Command	Purpose
Step 3	Router(config-if)# flowcontrol send {on off desired}	(Optional) Sets the send flow control value for an interface. Flow control works only with port-level policing. ML-Series card Fast Ethernet port flow control is IEEE 802.3x compliant. Note Since Fast Ethernet ports support only symmetric flow control the flowcontrol send command controls both the receive and send flow control operations.
Step 4	Router(config-if)# no shutdown	Enables the interface by preventing it from shutting down.
Step 5	Router(config)# end	Returns to privileged EXEC mode.
Step 6	Router# copy running-config startup-config	(Optional) Saves your configuration changes to TCC2/TCC2P flash database.

Configuring the Gigabit Ethernet Interface for the ML1000-2

To configure IP address or bridge-group number, autonegotiation, and flow control on an ML1000-2 Gigabit Ethernet interface, perform the following procedure, beginning in global configuration mode:



Note

The default setting for the negotiation mode is **auto** for the Gigabit Ethernet and Fast Ethernet interfaces. The Gigabit Ethernet port always operates at 1000 Mbps in full-duplex mode.

	Command	Purpose
Step 1	Router# interface gigabitethernet <i>number</i>	Activates interface configuration mode to configure the Gigabit Ethernet interface.
Step 2	Router(config-if)# { ip address <i>ip-address</i> <i>subnet-mask</i> bridge-group <i>bridge-group-number</i> }	Sets the IP address and subnet mask. or Assigns a network interface to a bridge group.
Step 3	Router(config-if)# [no] negotiation auto	Sets negotiation mode to auto . The Gigabit Ethernet port attempts to negotiate the link with the partner port. If you want the port to force the link up no matter what the partner port setting is, set the Gigabit Ethernet interface to no negotiation auto .
Step 4	Router(config-if)# flowcontrol { send receive } {on off desired}	(Optional) Sets the send or receive flow control value for an interface. Flow control works only with port-level policing. ML-Series card Gigabit Ethernet port flow control is IEEE 802.3z compliant.
Step 5	Router(config-if)# no shutdown	Enables the interface by preventing it from shutting down.

	Command	Purpose
Step 6	Router(config)# end	Returns to privileged EXEC mode.
Step 7	Router# copy running-config startup-config	(Optional) Saves configuration changes to TCC2/TCC2P flash database.

Example 4-2 shows how to do an initial configuration of a Gigabit Ethernet interface with autonegotiation and an IP address.

Example 4-2 Initial Configuration of a Gigabit Ethernet Interface

```
Router(config)# interface gigabitethernet 0
Router(config-if)# ip address 10.1.2.3 255.0.0.0
Router(config-if)# negotiation auto
Router(config-if)# no shutdown
Router(config-if)# end
Router# copy running-config startup-config
```

Configuring the POS Interfaces (ML100T-12, ML100X-8 and ML1000-2)

Encapsulation changes on POS ports are allowed only when the interface is in a manual shutdown (ADMIN_DOWN). For advanced POS interface configuration, see Chapter 5, “Configuring POS.”

To configure the IP address, bridge group, or encapsulation for the POS interface, perform the following procedure, beginning in global configuration mode:

	Command	Purpose
Step 1	Router(config)# interface pos <i>number</i>	Activates interface configuration mode to configure the POS interface.
Step 2	Router(config-if)# { ip address <i>ip-address</i> <i>subnet-mask</i> bridge-group <i>bridge-group-number</i> }	Sets the IP address and subnet mask. or Assigns a network interface to a bridge group.
Step 3	Router(config-if)# shutdown	Manually shuts down the interface. Encapsulation changes on POS ports are allowed only when the interface is shut down (ADMIN_DOWN).
Step 4	Router(config-if)# encapsulation <i>type</i>	Sets the encapsulation type. Valid values are: <ul style="list-style-type: none"> hdlc—Cisco HDLC lex—(Default) LAN extension, special encapsulation for use with Cisco ONS Ethernet line cards ppp—Point-to-Point Protocol
Step 5	Router(config-if)# no shutdown	Restarts the shutdown interface.
Step 6	Router(config)# end	Returns to privileged EXEC mode.
Step 7	Router# copy running-config startup-config	(Optional) Saves configuration changes to NVRAM.

Monitoring Operations on the Fast Ethernet and Gigabit Ethernet Interfaces

To verify the settings after you have configured the interfaces, enter the **show interface** command. For additional information about monitoring the operations on POS interfaces, see the “[Configuring POS](#)” chapter.

[Example 4-3](#) shows the output from the **show interface** command, which displays the status of the interface including port speed and duplex operation.

Example 4-3 show interface Command Output

```
Router# show interface fastEthernet 0
FastEthernet1 is administratively down, line protocol is down
Hardware is epif_port, address is 000d.bd5c.4c85 (bia 000d.bd5c.4c85)
MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
reliability 255/255, txload 1/255, rxload 1/255
Encapsulation ARPA, loopback not set
Keepalive set (10 sec)
Auto-duplex, Auto Speed, 100BaseTX
ARP type: ARPA, ARP Timeout 04:00:00
Last input never, output never, output hang never
Last clearing of "show interface" counters never
Input queue: 0/75/0/0 (size/max/drops/flushes); Total output drops: 0
Queueing strategy: fifo
Output queue: 0/40 (size/max)
5 minute input rate 0 bits/sec, 0 packets/sec
5 minute output rate 0 bits/sec, 0 packets/sec
0 packets input, 0 bytes
Received 0 broadcasts (0 IP multicast)
0 runts, 0 giants, 0 throttles
0 input errors, 0 CRC, 0 frame, 0 overrun, 0 ignored
0 watchdog, 0 multicast
0 input packets with dribble condition detected
0 packets output, 0 bytes, 0 underruns
0 output errors, 0 collisions, 0 interface resets
0 babbles, 0 late collision, 0 deferred
0 lost carrier, 0 no carrier
0 output buffer failures, 0 output buffers swapped out
```

Enter the **show controller** command to display information about the Fast Ethernet controller chip.

[Example 4-4](#) shows the output from the **show controller** command, which shows statistics including initialization block information.

Example 4-4 show controller Command Output

```
Router# show controller fastEthernet 0
IF Name: FastEthernet0
Port Status DOWN
Send Flow Control      : Disabled
Receive Flow Control   : Enabled
MAC registers
CMCR : 0x0000042D (Tx Enabled, Rx Disabled)
CMPR : 0x150B0A80 (Long Frame Disabled)
FCR  : 0x0000A00B (Rx Pause detection Enabled)
MII registers:
Control Register      (0x0): 0x4000 (Auto negotiation disabled)
Status Register      (0x1): 0x7809 (Link status Down)
```



```
PHY Identification Register 1 (0x2): 0x40
PHY Identification Register 2 (0x3): 0x61D4
Auto Neg. Advertisement Reg (0x4): 0x1E1 (Speed 100, Duplex Full)
Auto Neg. Partner Ability Reg (0x5): 0x0 (Speed 10, Duplex Half)
Auto Neg. Expansion Register (0x6): 0x4
100Base-X Aux Control Reg (0x10): 0x2000
100Base-X Aux Status Register(0x11): 0x0
100Base-X Rcv Error Counter (0x12): 0x0
100Base-X False Carr. Counter(0x13): 0x0
```

Enter the **show run interface** [*type number*] command to display information about the configuration of the Fast Ethernet interface. The command is useful when there are multiple interfaces and you want to look at the configuration of a specific interface.

[Example 4-5](#) shows output from the **show run interface** [*type number*] command, which includes information about the IP address or lack of IP address and the state of the interface.

Example 4-5 *show run interface* Command Output

```
daytona# show run interface FastEthernet 1
Building configuration...

Current configuration : 56 bytes
!
interface FastEthernet1
no ip address
shutdown

end
```

