



Configuring Interfaces on the ML-Series Card

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 (POS) interface configuration is covered in [Chapter 6, “Configuring POS on the ML-Series Card.”](#) 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 5-1](#)
- [Basic Interface Configuration, page 5-3](#)
- [Basic Fast Ethernet and POS Interface Configuration, page 5-4](#)
- [Monitoring Operations on the Fast Ethernet Interfaces, page 5-6](#)

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, which 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, Fast Ethernet 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:

```
ML_Series# show interfaces fastethernet 0
FastEthernet0 is up, line protocol is up
  Hardware is epif_port, address is 000b.fcfa.339e (bia 000b.fcfa.339e)
  Description: 100 mbps full duplex q-in-q tunnel
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 18/255, rxload 200/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, 100BaseTX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, 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: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 75000 kilobits/sec
  30 second input rate 78525000 bits/sec, 144348 packets/sec
  30 second output rate 7363000 bits/sec, 13537 packets/sec
  4095063706 packets input, 3885007012 bytes
  Received 0 broadcasts (0 IP multicast)
  2 runts, 0 giants, 0 throttles
  4 input errors, 0 CRC, 0 frame, 1 overrun, 0 ignored
  0 watchdog, 0 multicast
  0 input packets with dribble condition detected
  1463732665 packets output, 749573412 bytes, 0 underruns
  131072 output errors, 131072 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 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 ML-100T-8 port IDs for the eight Fast Ethernet interfaces are Fast Ethernet 0 through 7. The ML-Series card features two POS ports. The ML-Series port IDs for the two POS interfaces are POS 0 and 1. You can use user-defined abbreviations such as f0 through f7 to configure the eight Fast 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. The key word *your-password* is the password set up by the user in the initial configuration of the ML-Series card.

```
ML_Series> enable
Password:<your-password>
ML_Series# configure terminal
ML_Series(config)#
```

- Step 2** Enter the **interface** command, followed by the interface type (for example, fastethernet or pos) and its interface port ID (see the [“Interface Port ID”](#) section on page 5-2).

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

```
ML_Series(config)# interface fastethernet number
```

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

The commands 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.

```
ML_Series# show interfaces fastethernet 0
FastEthernet0 is up, line protocol is up
  Hardware is epif_port, address is 000b.fcfa.339e (bia 000b.fcfa.339e)
  Description: 100 mbps full duplex q-in-q tunnel
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 18/255, rxload 200/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, 100BaseTX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, 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: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 75000 kilobits/sec
  30 second input rate 78525000 bits/sec, 144348 packets/sec
  30 second output rate 7363000 bits/sec, 13537 packets/sec
  4095063706 packets input, 3885007012 bytes
  Received 0 broadcasts (0 IP multicast)
  2 runs, 0 giants, 0 throttles
  4 input errors, 0 CRC, 0 frame, 1 overrun, 0 ignored
  0 watchdog, 0 multicast
  0 input packets with dribble condition detected
  1463732665 packets output, 749573412 bytes, 0 underruns
  131072 output errors, 131072 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 and POS Interface Configuration

ML-Series cards support Fast 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 or POS interface, perform the following procedure, beginning in global configuration mode:

	Command	Purpose
Step 1	ML-Series(config)# interface <i>type number</i>	Activates interface configuration mode to configure either the Fast Ethernet interface or the POS interface.
Step 2	ML-Series(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	ML-Series(config-if)# no shutdown	Enables the interface by preventing it from shutting down.
Step 4	ML-Series(config)# end	Returns to privileged EXEC mode.
Step 5	ML-Series# copy running-config startup-config	(Optional) Saves configuration changes to flash database.

Configuring the Fast Ethernet Interfaces

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

	Command	Purpose
Step 1	ML-Series(config)# interface fastethernet <i>number</i>	Activates interface configuration mode to configure the Fast Ethernet interface.
Step 2	ML-Series(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	ML-Series(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—the ML-Series card matches the speed and duplex mode of the partner node.

	Command	Purpose
Step 4	ML_Series(config-if)# [no] duplex {full half auto}	Sets full duplex, half duplex, or autonegotiate mode.
Step 5	ML_Series(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.
Step 6	ML_Series(config-if)# no shutdown	Enables the interface by preventing it from shutting down.
Step 7	ML_Series(config)# end	Returns to privileged EXEC mode.
Step 8	ML_Series# copy running-config startup-config	(Optional) Saves your configuration changes to the flash database.

Example 5-1 shows how to do the initial configuration of a Fast Ethernet interface with an IP address, autonegotiated speed, and autonegotiated duplex.

Example 5-1 Initial Configuration of a Fast Ethernet Interface

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

Configuring the POS Interfaces

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 6, “Configuring POS on the ML-Series Card.”](#)



Note

The initial state of the ONS 15310-CL ML-Series card POS port is inactive. A POS interface command of **no shutdown** is required to carry traffic on the SONET circuit.

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	ML_Series(config)# interface pos number	Activates interface configuration mode to configure the POS interface.
Step 2	ML_Series(config-if)# { ip address ip-address subnet-mask bridge-group bridge-group-number}	Sets the IP address and subnet mask. or Assigns a network interface to a bridge group.

	Command	Purpose
Step 3	ML_Series(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	ML_Series(config-if)# encapsulation type	Sets the encapsulation type. Valid values are: <ul style="list-style-type: none"> • hdlc—Cisco high-level data link control (HDLC) • lex—(Default) LAN extension, special encapsulation for use with Cisco ONS Ethernet line cards • ppp—Point-to-Point Protocol Note Under GFP-F framing, the ONS 15310-CL ML-Series card is restricted to LEX encapsulation.
Step 5	ML_Series(config-if)# no shutdown	Restarts the shutdown interface.
Step 6	ML_Series(config)# end	Returns to privileged EXEC mode.
Step 7	ML_Series# copy running-config startup-config	(Optional) Saves configuration changes to NVRAM.

Monitoring Operations on the Fast Ethernet Interfaces

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

[Example 5-2](#) shows the output from the **show interface** command, which displays the status of the interface including port speed and duplex operation.

Example 5-2 show interface Command Output

```
ML_Series# show interface fastethernet 0
FastEthernet0 is up, line protocol is up
  Hardware is epif_port, address is 000b.fcfa.339e (bia 000b.fcfa.339e)
  Description: 100 mbps full duplex q-in-q tunnel
  MTU 1500 bytes, BW 100000 Kbit, DLY 100 usec,
    reliability 255/255, txload 18/255, rxload 200/255
  Encapsulation ARPA, loopback not set
  Keepalive set (10 sec)
  Full-duplex, 100Mb/s, 100BaseTX
  ARP type: ARPA, ARP Timeout 04:00:00
  Last input 00:00:00, output 00:00:00, 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: weighted fair
  Output queue: 0/1000/64/0 (size/max total/threshold/drops)
    Conversations 0/0/256 (active/max active/max total)
    Reserved Conversations 0/0 (allocated/max allocated)
    Available Bandwidth 75000 kilobits/sec
  30 second input rate 78525000 bits/sec, 144348 packets/sec
  30 second output rate 7363000 bits/sec, 13537 packets/sec
    4095063706 packets input, 3885007012 bytes
    Received 0 broadcasts (0 IP multicast)
```

```

2 runts, 0 giants, 0 throttles
4 input errors, 0 CRC, 0 frame, 1 overrun, 0 ignored
0 watchdog, 0 multicast
0 input packets with dribble condition detected
1463732665 packets output, 749573412 bytes, 0 underruns
131072 output errors, 131072 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 5-3](#) shows the output from the **show controller** command, which shows statistics, including information about initialization block information and raw MAC counters.

Example 5-3 show controller Command Output

```

ML_Series# show controller fastethernet 0
IF Name: FastEthernet0
Port Status UP
Send Flow Control      : Disabled
Receive Flow Control  : Enabled

MAC registers
CMCR : 0x00000433 (Tx Enabled, Rx Enabled)
CMPR : 0x150B0A82 (Long Frame Enabled)
FCR  : 0x00008007

MII registers:

Control Register          (0x0): 0x100 (Auto negotiation disabled)
Status Register          (0x1): 0x780D (Link status Up)
PHY Identification Register 1 (0x2): 0x40
PHY Identification Register 2 (0x3): 0x61D4
Auto Neg. Advertisement Reg (0x4): 0x461 (Speed 10, 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): 0x0
100Base-X Aux Status Register(0x11): 0x0
100Base-X Rcv Error Counter (0x12): 0x0
100Base-X False Carr. Counter(0x13): 0x400
100Base-X Disconnect Counter (0x14): 0x200
Aux Control/Status Register (0x18): 0x31
Aux Status Summary Register (0x19): 0x5
Interrupt Register       (0x1A): 0xC000
10Base-T Aux Err & Gen Status(0x1C): 0x3021
Aux Mode Register        (0x1D): 0x0
Aux Multi-phy Register   (0x1E): 0x0

Counters :
MAC receive counters:
Bytes                749876721
pkt64                2394
pkts64to127         49002
pkts128to255        21291
pkts256to511        11308
pkts512to1023       40175
pkts1024to1518      24947
pkts1519to1530      54893
pkts_good_giants    11319
pkts_error_giants   0
pkts_good_runts     0
pkts_error_runts    5

```

```

pkts_ucast          26976
pkts_mcast          57281
pkts_bcast          0
align_errors        1
FCS_errors          5
Overruns            0

MAC Transmit Counters
Bytes               1657084026
pkts64              23344
pkts65to127         48188
pkts128to255        12358
pkts256to511        38550
pkts512to1023       24897
pkts1024to1518      11305
pkts1519to1530      62760
pkts_ucast          17250
pkts_mcast          23108
pkts_bcast          11
pkts_fcs_err        0
pkts_giants         0
pkts_underruns      0
pkts_one_collision  0
pkts_multiple_collisions 0
pkts_excessive_collision 0
Ucode drops         2053079661

```

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

Example 5-4 show run interface Command Output

```

daytona# show run interface fastethernet 1
Building configuration...

Current configuration : 222 bytes
!
interface FastEthernet1
 no ip address
 duplex full
 speed 10
 mode dot1q-tunnel
 l2protocol-tunnel cdp
 l2protocol-tunnel stp
 l2protocol-tunnel vtp
 no cdp enable
 bridge-group 2
 bridge-group 2 spanning-disabled
end

```