C H A P T E R 5

Out-of-Band Management

This chapter describes how to configure and manage your network with the management console. Table 5-1 shows the default settings for many parameters and the menus you use to set them.

Table 5-1   Default Settings and Their Management Console Menus

	Default Setting	Management Console Menu
Switching mode	FastForward	"System Configuration" in this chapter
Spanning-Tree Protocol	Enabled	"Spanning-Tree Configuration" in this chapter
Addressing security	Disabled	"Port Addressing" in this chapter
VLAN configuration	All ports belong to VLAN1	"VLAN Configuration" in this chapter
Port monitoring	Disabled	"Monitoring Configuration" in this chapter
Flooding unknown unicast packets	Enabled	"Port Addressing" in this chapter
Flooding unregistered multicast packets	Enabled	"Port Addressing" in this chapter
Full duplex for FastMate 1-port 100Base-T modules	Disabled	"Port Configuration" in this chapter
Assign IP address to Catalyst 2100	0.0.0.0	"IP Configuration" in this chapter
Define trap manager	0.0.0.0	"Network Management (SNMP) Configuration" in this chapter
Action upon address violation	Suspend	"System Configuration" in this chapter

Connecting Catalyst 2100 to a Terminal

When connected to a terminal or modem, Catalyst 2100 must be configured to the same baud rate and character format as the terminal or modem. Although the Match Baud Rate option (autobaud) matches the baud rate when Catalyst 2100 is answering an incoming call, Catalyst 2100 does not change from its configured rate when it is dialing out. Also, Catalyst 2100 only matches a rate lower than its configured rate. When it completes a call and disconnects, Catalyst 2100 always returns to the last configured baud rate.

The following are the default RS-232 characteristics for Catalyst 2100:

- 9600 baud

- Eight data bits

- One stop bit

- Parity: none

- XON/XOFF protocol

These characteristics can be changed using the procedure in the section "RS-232 Interface Configuration" in this chapter. If you are using SNMP, they can be changed with the MIB objects described in the section "RS-232 MIB (RFC1317)" in the "In-Band Management" chapter.

Using the Catalyst 2100 Management Console

The management console is a simple menu-driven system with the following characteristics:

- To select a menu, type the letter in square brackets that precedes or follows the selection. The selected menu is displayed immediately and there is no need to press **Return**.

- Pressing **Return** is required after entry of all parameters. When pressed at the beginning of a parameter entry, **Return** causes the attempt to be canceled and the menu redisplayed.

- Certain menus, such as the RS-232 Interface Configuration Menu, allow activation of the given parameters as a group.

- The values and statistics displayed are the current values in use by Catalyst 2100, except when parameters are activated as a group.

- The information you type is not case sensitive, except when entered as a descriptive string that preserves case.

- The **Backspace** key works as expected; it erases the character previously typed. When pressed at the beginning of a parameter entry, **Backspace** causes the entry to be cleared.

- Type **X** to return to the previous panel. Type an **X** at the Main Menu to exit the management console and return to the command prompt.

You can use the management console locally or with a modem. The Catalyst 2100 autobaud function can automatically match your modem settings. See the section "Connecting Catalyst 2100 to a Terminal" in this chapter for a description of this feature.

Logging on to Catalyst 2100

No password is required the first time you use the application.

Two user(s) now active on Management Console. The current number of users is displayed when the panel is displayed. There can be up to seven simultaneous Telnet sessions.

Figure 5-1   Management Console Logon Screen

```
--------------------------------------------------
Catalyst 2100 Management Console
Copyright (c) Cisco Systems, Inc.  1995
All rights reserved.
--------------------------------------------------



2 user(s) now active on Management Console.


Press any key to continue.
```
S3948

Main Menu

Select an option from the Main Menu by typing the letter next it. You do not need to press **Enter**.

Figure 5-2   Management Console Main Menu

```
     Catalyst 2100 - Main Menu

 [C] Console Password
 [S] System
 [N] Network Management
 [P] Port Configuration
 [A] Port Addressing
 [D] Port Statistics Detail
 [M] Monitoring
 [V] Virtual LAN
 [R] Multicast Registration
 [F] Firmware
 [I] RS-232 Interface
 [U] Usage Summaries
 [H] Help

 [X] Exit Management Console

Enter Selection:
```

S3949

Use the **H** key to display the online Help and to change the expertise level for online prompts. Type an **X** to return to the Logon Security Menu. The options of this menu are presented sequentially in the following sections.

Configuration Menus

The first 11 options on the Main Menu are for configuring Catalyst 2100.

Console Password

Display this panel by typing **C** on the Main Menu. Use it to change your password, set the number of password intrusions allowed, and define how long the management console remains silent after an intrusion.

Figure 5-3   Logon Password Menu

```
       Catalyst 2100 - Console Password

    --------------------Settings------------------
    [P] Password intrusion threshold               3 attempt(s)
    [S] Silent time upon intrusion detection       None

    --------------------Actions-------------------
    [M] Modify password

    [X] Exit to Main Menu

Enter Selection:
```

S3950

[P] Password intrusion threshold. Enter the number of failed password attempts allowed. After this number is reached, the management console becomes quiet for a user-defined amount of time before allowing the next logon. To change the threshold value, type the new setting next to the prompt and press **Return**.

[S] Silent time upon intrusion. Enter the number of minutes this management console is to wait before allowing logon after a password intrusion. You can specify from 0 to 65,500 minutes. Enter **0** for no silent time.

[M] Modify password. Enter a new password of four to eight characters. You can use any character found on the keyboard but case is not considered. You will have to enter your current password before you can change it. Enter the new password. Verify the password by typing it a second time and press **Return**.

System Configuration

Use the System Configuration Menu to define Catalyst 2100's system-wide parameters and to reset the system. See the "Concepts" chapter for more details on switching modes and address violations.

Display this menu by typing **S** on the Main Menu.

Figure 5-4   System Configuration Menu

```
     Catalyst 2100 - System Configuration

     System Revision:  1   Address Capacity:  1024
     System Last Reset:   Fri Jul 21 15:23:52 1995

     -------------------Settings------------------
     [N] Name of system                              Engineering
     [C] Contact name                                Tom Avery
     [L] Location                                    Building 1
     [D] Date/time                                   Fri Jul 21 15:32:40 1995
     [S] Switching mode                              FastForward
     [U] Use of store-and-forward for multicast      Disabled
     [A] Action upon address violation               Suspend
     [G] Generate alert on address violation         Enabled
     [M] Management Console inactivity timeout       None

     -------------------Actions-------------------
     [R] Reset system
     [F] Reset with factory defaults
     [X] Exit to Main Menu

 Enter Selection:
```

S3951

[N] **Name of system.** Enter a name for the system of up to 255 characters and press **Return**.

[C] **Contact name.** Use this option to enter the name of the person or organization responsible for managing the system. You can type up to 255 characters; press **Return** when finished.

[L] **Location.** The system location is an informal indication of where the Catalyst 2100 is located. You can type up to 255 characters. Type the location and press **Return**.

[D] Date/time. First change the date by typing new values at the prompt and pressing **Return**:

```
   Current date/time ===> Fri Sep 24 07:21:05 1995
 New date (mm-dd-yy) ===>
```

After you press **Return**, you will be prompted to enter a new time. Type the time in the given format and press **Return**:

```
   Current date/time ===> Fri Sep 24 07:21:05 1995
 New date (mm-dd-yy) ===> Sat Sep 25 09:35:23 1995
 New time (hh:mm:ss) ===>
```

[S] Switching Mode. Set the Catalyst 2100 switching mode to one of the three available options. Read the section "Switching Modes" in the "Concepts" chapter for a complete description of their characteristics. Type the appropriate number and press **Return**.

[U] Use of store-and-forward for multicast. The store-and-forward switching mode is always used for broadcast frames. Use this option to force store-and-forward mode for multicast frames. With this option set to disabled, multicast frames adhere to Catalyst 2100's configured switching mode. Press **Return** when finished.

[A] Action upon address violation. Use this option to define how Catalyst 2100 responds to address violations. Address violations occur when a secured port receives a source address statically assigned to another port, or when a secured port tries to learn an address that will exceed its maximum number of addresses. Type a values at the prompt and press **Return**:

   [S]uspend The port stops forwarding until a packet with a valid source address is received.

   [D]isable The port is disabled until its status is returned to enabled by an administrator. port is disabled until its status is returned to enabled by an administrator.

   [I]gnore The port status remains unchanged.

[G] Generate alert on address violation. Whether or not Catalyst 2100 changes the port status when an address violation occurs, it can also send an SNMP alert to a management station. Select this option to enable or disable this feature. Type **E** or **D** at the prompt and press **Return**.

> **Note** Traps are sent to the IP addresses defined for the trap manager with the SNMP Management menu.

[M] Management console inactivity time-out. Use this option to define the length of time the management console can remain idle before it times-out. After a time-out, you will need to re-enter the password to use the application. The time-out is in seconds; a time-out of 0 means the management console will never time-out. Enter a **0** or a number between 30 and 6500 and press **Return**.

[R] Reset system. Use this command to reset the Catalyst 2100. All configured system parameters and static addresses will be retained; all dynamic addresses will be removed. Enter **Y** or **N** and press **Return**.

[F] Reset with factory defaults. Use this option to reset the Catalyst 2100 and return it to its factory settings. All static and dynamic addresses are removed, as is the IP address and all other configurations. Type a **Y** or **N** and press **Return**.

Network Management

This menu leads to the menus for:

- IP Configuration

- SNMP Management

- Bridge and Spanning-Tree Protocol configuration.

Display this menu by typing **N** on the Main Menu.

Figure 5-5   Network Management Menu

```
        Catalyst 2100 - Network Management

     [I] IP Configuration
     [S] SNMP Management
     [B] Bridge - Spanning Tree

     [X] Exit to Main Menu

 Enter Selection:
```

S3952

[I] IP Configuration. Select this option to assign IP addresses, subnet masks and a default gateway.

[S] SNMP Management. This option displays the SNMP Management Menu you use to define SNMP parameters.

[B] Bridge–Spanning-Tree. This option displays the Bridge–Spanning-Tree Menu.

IP Configuration

Before Catalyst 2100 can be managed in-band, it must be configured with an IP address. Use this menu to assign an IP address or use the BOOTP to assign one. You can also use this menu to assign subnet masks and to define a default gateway for Catalyst 2100. When multiple VLANs are defined in the system, the IP Configuration Menu displays IP address and subnet mask settings for all defined VLANs. Examples of both situations are shown in Figure 5-6 and Figure 5-7.

Display this menu by typing **N** on the Main Menu and **I** on the IP Configuration Menu.

Figure 5-6   IP Configuration Menu without VLANs

```
        Catalyst 2100 - IP Configuration

     Ethernet Address:  00-C0-1D-80-05-E3

     -------------------Settings-----------------
     [I] IP address  VLAN 1                       192.9.200.218
     [S] Subnet mask VLAN 1                       255.255.255.0
     [G] Default gateway                          192.9.200.99

     [X] Exit to previous menu

  Enter Selection:
```

S3953

Figure 5-7   IP Configuration Menu with VLANs

```
        Catalyst 2100 - IP Configuration

     Ethernet Address:  00-C0-1D-80-05-E3

     -------------------Settings-----------------
     [I] IP address  VLAN 1                       192.9.200.218
                     VLAN 2                       192.9.202.77
                     VLAN 3                       0.0.0.0
                     VLAN 4                       0.0.0.0
     [S] Subnet mask VLAN 1                       255.255.255.0
                     VLAN 2                       255.255.255.0
                     VLAN 3                       0.0.0.0
                     VLAN 4                       0.0.0.0
     [G] Default gateway                          192.9.200.99

     [X] Exit to previous menu

  Enter Selection:
```

S3954

[I] IP Address. Select this option to assign Catalyst 2100 an IP address for SNMP management. The first time you assign an IP address, it takes effect immediately, and the internet protocol suite is activated and in-band management becomes available. If you

subsequently change the IP address, you must reset Catalyst 2100 before the new IP address takes effect. If VLAN1 does not contain all ports as member ports, the following prompt is issued:

```
Identify VLAN: [1-4]:
Select [1-4]
```

After selecting a VLAN, or if VLAN1 contains all ports as member ports, the next prompt is displayed. Type the IP address and press **Return**:

```
Enter administrative IP address in dotted quad format
(nnn.nnn.nnn.nnn):
Current setting ===>   0.  0.  0.  0

    New setting ===>
```

[S] Subnet mask. If IP subnetting is used, use this option to enter a subnet mask for the system or current VLAN. The new value takes effect after the next reset. If subnetting is not in use, the subnet mask is the same as the network mask. If VLAN1 does not contain all ports as member ports, you are prompted for the VLAN number and then the subnet mask. Type the IP address and press **Return**:

```
Enter IP subnet mask in dotted quad format (nnn.nnn.nnn.nnn):
Current setting ===>   0.  0.  0.  0

    New setting ===>
```

[G] Default gateway. Use this option to enter a default gateway address for SNMP management. Type the new gateway address at the prompt and press **Return**:

```
Type the address in dotted quad format (nnn.nnn.nnn.nnn):
Current setting ===>   0.  0.  0.  0

    New setting ===>
```

Network Management (SNMP) Configuration

SNMP management, based on the Catalyst 2100 Management Information Base, or MIB, allows you to define management stations authorized to set configuration parameters and receive certain traps. If you have set up virtual LANs, each VLAN, acting as a discrete bridge, contains its own bridge MIB information.

Up to four management stations can be defined to set MIB objects and up to three stations can receive traps. If no management station is explicitly defined, any SNMP station can perform sets if the correct WRITE community string accompanies the request. Once a WRITE manager IP address is defined, however, only explicitly defined management stations can issue set operations on the switch.

You can use this menu to enable two traps and assign the management stations to receive them. Once a management station has been assigned, Catalyst 2100 generates several other traps documented in the section "Trap Clients and Traps" in the "In-Band Management" chapter. Any station can set Catalyst 2100 MIB objects if no station address has been explicitly defined.

All objects in the Catalyst 2100 MIB are documented in the *Catalyst 2000 MIB Reference Manual*. A functional list of the supported MIB objects can be found in "Standard MIBs and MIB Extensions" in the "In-Band Management" chapter.

Use this menu to define:

- Which management stations can set Catalyst 2100 MIB objects
- The READ and WRITE community strings
- Which SNMP traps are enabled and which stations are to receive them
- The community strings that accompany traps sent by Catalyst 2100.

Display this menu by typing **N** on the Main Menu and **S** on the Network Management Menu.

Figure 5-8   Network Management (SNMP) Configuration Menu

```
    Catalyst 2100 - Network Management (SNMP) Configuration

    -------------------Settings------------------
    [R] READ  community string
    [W] WRITE community string
    [1] 1st WRITE manager IP address             0.0.0.0
    [2] 2nd WRITE manager IP address             0.0.0.0
    [3] 3rd WRITE manager IP address             0.0.0.0
    [4] 4th WRITE manager IP address             0.0.0.0

    [F] First  TRAP community string
    [A] First  TRAP manager IP address           192.9.200.228
    [S] Second TRAP community string
    [B] Second TRAP manager IP address           0.0.0.0
    [T] Third  TRAP community string
    [C] Third  TRAP manager IP address           0.0.0.0
    [U] Authentication trap generation           Enabled
    [L] LinkUp/LinkDown trap generation          Enabled

    -------------------Actions------------------
    [X] Exit to previous menu

Enter Selection:
```

S3955

[R] READ community string. Select this option to change the SNMP agent's Get community string. Catalyst 2100 will automatically attach a number to the string you enter to create a unique string for each of the four possible VLANs. For example, if you enter the string **FINANCE**, it becomes the READ community string for VLAN1, and **FINANCE2, FINANCE3,** and **FINANCE4,** become the READ community strings for VLAN2, VLAN3, and VLAN4, respectively. Enter a string of up to 32 characters and press **Return**.

[W] WRITE community string. Select this option to define a WRITE community string for Catalyst 2100. Catalyst 2100 will automatically attach a number to the string you enter to create a unique string for each of the four possible VLANs. The example for entering a READ community string applies equally here. Enter a string of up to 32 characters and press **Return**.

[1] 1st WRITE manager IP ADDRESS

[2] 2nd WRITE manager IP ADDRESS

[3] 3rd WRITE manager IP ADDRESS

[4] 4th WRITE manager IP ADDRESS

Select one of these options to define the IP address of a station authorized to issue WRITE statements to Catalyst 2100. To remove an entry, type **0.0.0.0.** Type the IP address at the following prompt and press **Return**:

```
Enter First Write Manager IP address in dotted quad format
(nnn.nnn.nnn.nnn):
Current setting ===>    0.  0.  0.  0

      New setting ===>
```

[F] First TRAP community string

[A] First manager IP address

[S] Second TRAP community string

[B] Second manager IP address

[T] Third TRAP community string

[C] Third TRAP manager IP address

A trap manager, also called a trap client, is a management workstation configured to receive and process traps. If a trap manager has not been defined, Catalyst 2100 does not send any traps. Use these options to define up to three trap managers and their accompanying community strings. See the section "Trap Clients and Traps" in the "In-Band Management" chapter for more information.

Type **F** and a trap manager community string of up to 32 characters and press **Return**.

Type **A** to define the IP address for the first trap manager. Type the IP address of the station and press **Return** at the next prompt:

```
Enter First Trap Manager IP address in dotted quad format nnn.nnn.nnn.nnn
Current setting ===>

      New setting ===>
```

Continue with further definitions as needed.

[U] Authentication trap generation. Select this option to enable or disable authentication traps that alert a management station of SNMP requests not accompanied by a valid community string. Even if this parameter is set, no trap can be generated if no trap manager addresses have been defined. Type **E** or **D** at the prompt and press **Return**.

[L] LinkUp/LinkDown trap generation. Catalyst 2100 generates the LinkDown trap whenever a port changes to a suspended or disabled state due to:

- Secure address violation (address mismatch or duplication)

- Network connection error (loss of linkbeat or jabber error)

- Management intervention

The LinkUp trap is generated whenever a port changes to enabled state due to:

- Presence of linkbeat

- Spanning-Tree Protocol

- Management intervention

Note   No more than one trap of each type is sent every five seconds per port. The last trap in the five-second interval is sent.

Select this option to enable or disable the LinkUp/LinkDown trap. Type an **E** or **D** at the prompt and press **Return**.

Once you have defined a management workstation to receive traps, Catalyst 2100 will generate the traps in the following list by default. These traps are described in more detail in the section "Trap Clients and Traps" in the "In-Band Management" chapter.

coldStart

warmStart

logonIntruder

switchDiagnostic

newRoot

TopologyChange

addressViolation

Spanning-Tree Configuration

Use this menu to display and configure the Spanning-Tree Protocol parameters defined for Catalyst 2100. The menu consists of an Information section that represents parameters controlled by Spanning-Tree Protocol operation as influenced by other bridges on the network, and a Settings section that defines Spanning-Tree Protocol parameters that are global to this bridge. There is also an Actions section that allows you to scroll through the virtual LANs that are each considered a separate bridge by Spanning-Tree Protocol. For more information, read the section "Spanning-Tree Protocol" in the "Concepts" chapter.

Display this menu by typing **N** on the Main Menu and **B** on the Network Management Menu. When you invoke this menu, the following prompt is displayed:

```
An 802.1d Bridge is associated with a VLAN. Identify VLAN [1-4],
to which Bridge configuration applies.

Select [1-4]:
```

Type a VLAN to display the menu shown in Figure 5-9. If no VLANs have been configured, all ports belong to VLAN1.

The use of this menu requires an understanding of the following terms, some of which are displayed on the menu:

Bridge ID A unique identifier assigned to this bridge. This hexadecimal number is comprised of a bridge priority and a unique MAC address. You can change the bridge priority from this menu.

Designated root The bridge ID of the bridge assumed to be the root by Spanning-Tree Protocol.

Root path cost The cost of the path from this bridge to the root bridge shown in **Designated root.** It equals the path cost parameters held for the **root port.** When this Catalyst 2100 is the root, the root path cost will be zero.

Root port The port on this bridge with the lowest cost path to the root bridge. It identifies the port through which the path to the root bridge is established. N/A is displayed when Spanning-Tree Protocol is disabled or when this bridge is the root bridge.

Max age The maximum time in seconds a bridge waits without receiving Spanning-Tree Protocol configuration messages before attempting a reconfiguration. This parameter takes effect when a bridge is operating as the root bridge. Bridges not acting as the root use the root bridge's Max Age parameter.

Hello time The current time interval in seconds between the transmission of Spanning-Tree Protocol configuration messages. All bridges send configuration messages during reconfiguration to elect the designated root bridge. Bridges not acting as a root bridge use the root bridge Hello time value. After the topology is stabilized, only designated bridges send configuration messages.

Forward delay The time interval in seconds spent waiting to change a port from its Spanning-Tree Protocol pre-forwarding state to a forwarding state. This is necessary because every bridge on the network should ensure no loop is formed before allowing the port to forward packets.

Number of TopChanges The number of bridge topology changes experienced by this bridge. A topology change occurs as ports on this bridge change from a non-forwarding state to forwarding. A topology change also occurs when a new root is selected.

Time since last TopChange The time measured in days (d), hours (h), minutes (m), and seconds (s), since the last topology change.

Figure 5-9   Bridge–Spanning-Tree Configuration

```
      Catalyst 2100 - VLAN 1 Spanning Tree Configuration
      Bridge ID: 8000 00-C0-1D-80-05-E3

      -------------------Information----------------
    Designated root 8000 00-C0-1D-80-05-D8
    Number of member ports   21   Root port                 F2
    Max age (sec)            20   Root path cost            10
    Forward Delay (sec)      15   Hello time (sec)           2
    Topology changes          2   Last TopChange   0d00h11m39s

      --------------------Settings-----------------
    [S] Spanning-Tree Algorithm and Protocol       Enabled
    [B] Bridge priority                            32768 (8000 hex)
    [M] Max age when operating as root             20 second(s)
    [H] Hello time when operating as root          2 second(s)
    [F] Forward delay when operating as root       15 second(s)
    [A] Address aging time                         300 second(s)
    [T] Strict state transition on suspended ports  Disabled

      -------------------Actions------------------
    [N] Next VLAN bridge         [G] Goto VLAN bridge
    [P] Previous VLAN bridge     [X] Exit to previous menu

 Enter Selection:
```
S3956

[S] Spanning-Tree Algorithm and Protocol. Select this option to enable or disable the Spanning-Tree Protocol, an industry standard way to ensure a loop-free configuration in the bridge topology. Redundant ports are kept in a standby (suspended) status and are automatically enabled when needed.

This parameter applies to all VLANs.

Type **E** or **D** at this prompt and press **Return**.

[B] Bridge priority. Select this option to force a bridge to be selected as the root bridge, or as a designated bridge. The bridge priority is a value used in determining the identity of the root bridge. The bridge with the lowest value has the highest priority and will be selected as the root. Type a value at the prompt and press **Return**:

```
Enter bridge priority value (0 to 65535)
Current setting ===>   32768 (8000 hex)

     New setting ===>
```

[M] Max age when operating as root. Use this option to define the time in seconds to be used as the max age interval when this Catalyst 2100 becomes the root bridge. After this period expires, other bridges will notice that the root has not sent a configuration message and a new root will be selected. The default value is twenty seconds. Type the new number at the prompt and press **Return**:

```
Enter Max Age value (6 to 40 seconds):
Current setting ===>   20 second(s)

     New setting ===>
```

[H] Hello time when operating as root. Select this option to define the hello time interval when this Catalyst 2100 becomes the root bridge. Valid values range from 1 to 10 seconds; the default is 2 seconds. Type the new value at the prompt and press **Return**:

```
Enter Hello time value (1 to 10 seconds):
Current setting ===>   2 second(s)

     New setting ===>
```

[F] Forward delay when operating as root. Select this option to define the time in seconds to be used as the forward delay interval when this Catalyst 2100 becomes the root bridge. Possible values are 4 to 30 seconds; the default value is 15 seconds.

> **Note**   Spanning-Tree Protocol also uses this value to accelerate address aging when the spanning tree is reconfigured. See the section "Spanning-Tree Protocol and Accelerated Address Aging" in the "Concepts" chapter for more information.

Type a number at the prompt and press **Return**:

```
Enter forward delay value (4 to 30 seconds):
Current setting ===>   15 second(s)

    New setting ===>
```

[A] Address aging time. Use this option to define the time-out, in seconds, after which an unused dynamic address is automatically removed. During a topology change, ports are aged more quickly by using the forward-delay parameter. When the topology stabilizes, this value again takes effect.

Possible values range from 10 to 1,000,000 seconds (about 11.5 days). The default is 300 seconds or 5 minutes. This value applies for all dynamic addresses in the Catalyst 2100 address table. Enter a value at the prompt and press **Return**:

```
Enter aging time (10 to 1000000 seconds):
Current setting ===>   300 second(s)

    New setting ===>
```

[T] Strict state transition on suspended ports. When Catalyst 2100 suspends a port for jabber or address violation, the default is to return the port to its previous state without the normal forward delay. Enable this parameter to enforce the forward delay as defined by 802.1d.

[N], [P] Next VLAN bridge, Previous VLAN bridge. Use these options to scroll through the virtual LANs on the Catalyst 2100.

[G] Goto VLAN bridge. Use this option to enter the number of the VLAN whose parameters you want to display. Type a number at prompt and press **Return**.

Monitoring Configuration

Catalyst 2100 allows you to route a copy of incoming and outgoing traffic arriving on a port to a monitor port for analysis and troubleshooting. Use this menu to do the following:

- Turn frame-capturing on and off

- Define those ports whose frames are to be captured

- Define the port the captured frames are to be sent to

Frame capturing cannot take place until all three of these parameters have been set.

Display this panel by typing **M** on the Main Menu.

Figure 5-10   Monitoring Configuration Menu

```
        Catalyst 2100 - Monitoring Configuration


      -------------------Settings------------------
      [C] Capturing frames to the monitor          Enabled
      [M] Monitor port assignment                  1
      Current capture list:  20-25


      -------------------Actions-------------------
      [A] Add ports to capture list
      [D] Delete ports from capture list

      [X] Exit to Main Menu

   Enter Selection:
```

[C] Capturing frames to the monitor. Select this option to enable-disable frame capturing. Type a letter at the prompt and press **Return**.

[M] Monitor port assignment. Use this option to define the port where captured frames are to be sent. Type a port number at the prompt and press **Return**.

[A] Add ports to capture list. Use this option to add ports to the capture list. Enter the numbers according to the example in the prompt and press **Return**.

[D] Delete ports from capture list. Use this option to delete port numbers from the capture list. Enter the numbers in the list you want to delete and press **Return**.

Virtual LAN Configuration

This menu displays the virtual LANs defined for this Catalyst 2100. You can use it to enable overlapping VLANs and display the VLAN Configuration Menu. See the section "Virtual LANs" in the "Concepts" chapter for more information and some sample configurations.

⚠ **Caution**   Spanning-Tree may not prevent network loops in overlapping VLANs.

Display this panel by typing **V** on the Main Menu.

Figure 5-11   Virtual LAN Menu

```
         Catalyst 2100 - Virtual LAN Configuration

    --------------------Settings------------------
    [O] Overlapping of VLANs permitted            Enabled

    VLAN  Name                      Member ports
    ----  ------------------------- ------------
      1                             1-19, F1
      2                             20-25, F2

    -------------------Actions------------------
    [C] Configure VLAN
    [X] Exit to Main Menu

 Enter Selection:
```
S3958

[O] Overlapping of VLANs permitted. Select this option to allow membership of a port in more than one VLAN. Type a letter at the prompt and press **Return**.

[C] Configure VLAN. This option displays the VLAN Configuration Menu shown in Figure 5-12.

VLAN Configuration

Use this menu to define up to four separate VLANs. As every port must belong to at least one VLAN, Catalyst 2100 is shipped with all ports belonging to VLAN1; all other VLANs are empty. For more details about the nature of Catalyst 2100 VLANs, see the section "Virtual LANs" in the "Concepts" chapter.

Display this menu by typing **V** on the Main Menu and then **C** on the VLAN Configuration Menu. Before the menu is displayed you are prompted for the VLAN number:

```
Identify VLAN: [1 - 4]:
Select [1 - 4]:
```

Type the number of the VLAN you want to display and press **Return**. Note that options **[A]** and **[D]** of this menu are displayed only if overlapping of ports is permitted.

Figure 5-12   VLAN Configuration Menu

```
             Catalyst 2100 - VLAN 1 Configuration

          Current member ports:  1-19, F1

      -------------------Settings-----------------
      [V] VLAN name

      -------------------Actions------------------
      [M] Move member ports from other VLANs
      [A] Add member ports
      [D] Delete member ports

      [N] Next VLAN                  [G] Goto VLAN
      [P] Previous VLAN              [X] Exit to previous Menu

 Enter Selection:
```

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Note Certain conventions are used when moving, adding, or deleting ports from VLANs. Use number 26 for port F1 and 27 for port F2; 1 to 25 are entered as 1 to 25. Separate port numbers by a comma or a space. You can also enter ranges of ports such as 5-10.

[V] VLAN name. Select this option to enter a VLAN name of up to 60 characters. Type the name and press **Return**.

[M] Move member ports from other VLANs. Select this option to add ports to this VLAN and remove them from their previous configurations. Catalyst 2100 is shipped with all ports belonging to VLAN1. Type the numbers according to the conventions and press **Return**:

```
Example: 1, 2, 3, 8-15, 26

Enter port numbers:
```

[A] Add member ports. Use this option to add a port to this VLAN. This feature does not remove the port from its previous VLAN membership. Use **M**, **Move,** to add a port and remove it from its previous VLAN. If overlapping membership is not enabled, you will be prompted to use the **Move** option. Type the numbers according to the conventions and press **Return**:

```
Example: 1, 2, 3, 8-15, 26

Enter port numbers:
```

[D] Delete member ports. Use this option to delete member ports from this VLAN. Note that if a port belongs to only one VLAN, it should be moved rather than deleted. If you try to delete the port from its VLAN, Catalyst 2100 will abort the deletion and issue an error message.

Type the numbers according to the conventions and press **Return**:

```
Example: 1, 2, 3, 8-15, 26

Enter port numbers:
```

[N] Next VLAN **[P] Previous** VLAN. Use these options to scroll through the available VLANs.

[G] Goto VLAN. Select this option to enter a VLAN to display. Type a number at the prompt and press **Return**:

Multicast Registration

By default, all multicast frames are forwarded to all ports in a VLAN. You can, however, register multicast frames so they are sent to only the ports you define. As these packets are then *not* forwarded to other ports, this reduces the amount of flooding performed by Catalyst 2100. It also opens up the possibility of using multicast packets for dedicated groupcast applications such as broadcast video. For more information on this feature, see the section "Flooding Controls" in the "Concepts" chapter.

Display this panel by typing **R** on the Main Menu. The first line of the menu, shown in Figure 5-13, displays the number of registered multicast addresses.
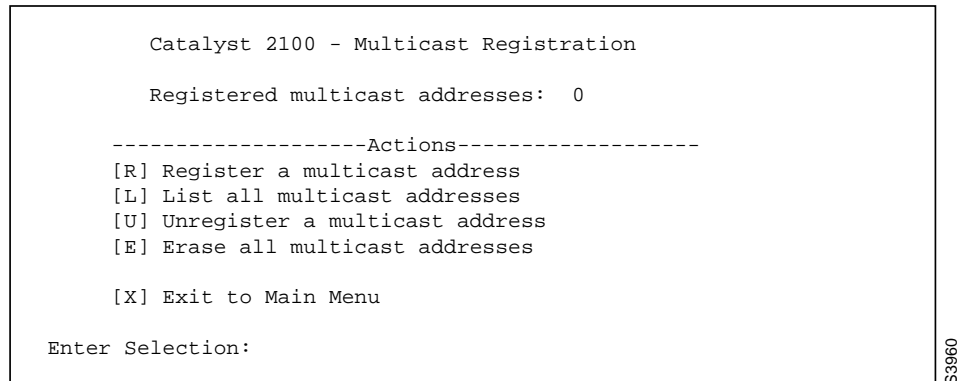
Figure 5-13   Multicast Registration Menu

```
        Catalyst 2100 – Multicast Registration

        Registered multicast addresses:  0

        -------------------Actions-------------------
    [R] Register a multicast address
    [L] List all multicast addresses
    [U] Unregister a multicast address
    [E] Erase all multicast addresses

    [X] Exit to Main Menu

Enter Selection:
```
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[R] Register a multicast address. Select this option to register a multicast address. You are prompted for both the address and the ports to which frames destined for this address are to be forwarded.

If you enter an invalid multicast address, the prompt will refresh itself so you can try again. Invalid addresses include non-multicast addresses, the broadcast address, and reserved multicast addresses such as those used for Spanning-Tree Protocol.

When you enter a valid address, the following prompt is displayed:

```
Enter the destination port numbers (separated by commas or spaces,)
e.g., 2,3,6,7,19,22

Default ports ===> All ports

    New ports ===>
```

Type the port numbers and press **Return**. Typing errors will cause the prompt to be refreshed.

[L] **List all registered multicast addresses.** Use this option to list all multicast addresses that exist in Catalyst 2100. Addresses are listed with the port or ports to which they are assigned. Addresses with an asterisk are subject to source port filtering. See the section "Forwarding, Filtering, and Flooding" in the "Concepts" chapter for more information on source port filtering.

[U] **Unregister a multicast address.** Select this option to delete registered multicast addresses. You cannot delete those multicast addresses that are not considered registered. Type the address at the prompt and press **Return**.

[E] **Erase all registered multicast addresses.** Select this option to remove all registered multicast addresses. Press **Y** at the prompt.

Port Configuration

Use this menu to display the status of a port, enter a port description, change the port's status, and define various Spanning-Tree Protocol parameters.

Display this menu by typing **P** on the Main Menu. The following prompt is displayed:

```
Identify port: 1 to 25,F1[A],F2[B]
Select [1 - 25, A, B]:
```

Type a port number to display and press **Return**. The menu shown in "Port Menu" in this chapter is displayed.

Figure 5-14   Port Menu

```
      Catalyst 2100 - Port F1 Configuration

      Built-in 100Base-TX
      802.1d STP State:  Forwarding    Forward Transitions:  1

      -------------------Settings------------------
     [D] Description/name of port
     [S] Status of port                              Enabled
     [F] Full duplex                                 Enabled
     [I] Port priority (Spanning Tree)               128 (80 hex)
     [C] Path cost (Spanning Tree)                   10

     -----------------Related Menus---------------
     [A] Port addressing          [V] View port statistics
     [N] Next port                [G] Goto port
     [P] Previous port            [X] Exit to Main Menu

 Enter Selection:
```

The following terms are used to describe the status of the port:

802.1d STP state The current Spanning-Tree Protocol state. This could be:

Blocking Port is not participating in the frame forwarding process and is not learning new addresses.

Listening The same as Blocking but Catalyst 2100 is actively trying to bring the port into the forwarding state.

Learning Port is not forwarding frames but is learning addresses. Catalyst 2100 is actively trying to bring the port into the forwarding state.

Forwarding Port is forwarding frames and learning addresses.

Disabled Port has been removed from operation. Administrative intervention is required to enable the port.

Forward Transitions The number of times the Spanning-Tree Protocol state for this port has changed from listening or learning to forwarding.

[D] **Description/Name of port.** Use this option to assign a name to the port. This could be **Engineering Segment** or any 60-character string. Type the port name at the prompt and press **Return**.

[S] **Status of port.** Use this option to enable a disabled port or disable a port in any operational state. Type **E** or **D** at the prompt and press **Return**.

The status indication shown on this panel will be one of the following:

Enabled Normal operation. Port can transmit and receive.

Disabled-mgmt Disabled by explicit management action

Suspended-linkbeat Suspended due to the absence of a linkbeat. This is usually due to the attached station being disconnected or powered-down.

Suspended-jabber Suspended because the attached station is jabbering

Suspended-violation Suspended due to address violation

Reset The port is currently in the reset state

Suspended-Spanning-Tree Protocol Spanning-Tree Protocol not forwarding

Disabled-self-test Disabled because port failed self-test

Disabled-violation Disabled due to address violation.

[T] **Type of connector.** Select this option to define the connector type for port 25. Type **S**, **R**, or **A** at the prompt and press **Return**:

```
Port connector type may be set to [S]elf-sensing, [R]J45, [A]UI
Current setting ===>   RJ45

    New setting ===>
```

[F] **Full duplex.** Select this option to enable or disable full-duplex transmission on 100-Mbps ports. Full duplex is simultaneous transmission in both directions yielding an aggregate bandwidth of 200 Mbps. Because both ends must be configured for full duplex, the port cannot be connected to a repeater. A likely scenario would be to connect a full-duplex port to a server with a 100Base-TX adapter, configured for full duplex. You could also connect it to another Catalyst 2100 or other 100Base-TX switch or router, configured for full-duplex operation. Type an **E** or a **D** at the prompt and press **Return**.

[I] Port priority. Use this option to define which port is to remain enabled by Spanning-Tree Protocol if two ports form a loop. Type a number from 1 to 255 and press **Return** at the prompt.

[C] Path cost. Use this option to define the Spanning-Tree Protocol path cost of the port. It is inversely proportional to the LAN speed of the network interface at the port. A high path cost means the port has low bandwidth and should not be used if possible.The default is 1000/LAN-speed-in-Mbps. The path cost of 100-Mbps ports is thus 10, and 10-Mbps ports is 100. Enter a value at the prompt and press **Return**. This option also affects which port is to remain enabled by Spanning-Tree Protocol if two Catalyst 2100 connections form a loop.

[A] Port addressing. Select this option to display the Port Addressing Menu.

[V] View port statistics. Select this option to display the Detailed Port Statistics Menu.

[N] Next port [P] Previous port. Use these options to scroll back and forth between ports, displaying each port's characteristics.

[G] Goto port. Select this option to display the prompt. Type one of the values and press **Return**.

Port Addressing

Use this menu to configure address security of a port and define static unicast and multicast addresses. Although multicast address registrations are configured elsewhere, you can use this menu to specify how a port filters and forwards unmatched unicast addresses and non-registered multicast addresses. For more information on these features, see the section "Flooding Controls" in the "Concepts" chapter.

Display this menu by typing **A** on the Main Menu and responding to the prompt with the port number.

Figure 5-15   Port Addressing Menu

```
      Catalyst 2100 - Port F1 Addressing

      Dynamic addresses:  8    Static addresses:  1

      -------------------Settings-----------------
      [T] Address table size                      Unrestricted
      [S] Addressing security                     Disabled
      [U] Flood unknown unicasts                  Enabled
      [M] Flood unregistered multicasts           Enabled

      -------------------Actions------------------
      [A] Add a static address
      [D] Define restricted static address
      [L] List addresses
      [E] Erase an address
      [R] Remove all addresses

      [C] Configure port          [V] View port statistics
      [N] Next port               [G] Goto port
      [P] Previous port           [X] Exit to Main Menu

Enter Selection:
```

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The top of the panel displays the current addressing situation:

Dynamic addresses The current number of unicast addresses that have been automatically learned on this port. If this is a secured port, the dynamic addresses field is set to 0.

Static addresses The current number of unicast addresses that have been assigned to this port.

[T] Address Table Size. Select this option to define the size of the address table for a secured port. Type a number between 1 and 132 and press **Return** at the prompt.

Note The size of the address table for an unsecure network port cannot be modified.

[S] Addressing security. Use this option to secure a port. Alerts may be generated when secured ports attempt to learn new addresses and its address table is full. The port may be disabled or suspended due to such address violations. See the section "Securing Ports" in the "Concepts" chapter for more information. Type an **E** or **D** at the prompt and press **Return**.

[U] Flood unknown unicasts. When a frame with an unrecognized unicast destination address is received on any port, the default action is to forward the packet to all enabled ports. Use this option to inhibit the forwarding of unknown unicasts to this port. Type **E** or **D** at the prompt and press **Return**.

[M] Flood unregistered multicasts. When a frame with an unregistered multicast destination address is received on any port, the default action is to forward the packet to all enabled ports. Use this option to inhibit the forwarding of unregistered multicast addresses to this port. Type **E** or **D** at the prompt and press **Return**.

[A] Add a static address. Use this option to add a static unicast address to the port's address table. If the address table is already full, an error message is generated. If there is room in the table, type **E** or **D** at the prompt and press **Return**.

Note   Only unicast addresses can be added. An attempt to add a multicast or broadcast address will not be added and will generate an error message.

[D] Define a restricted static address. Packets with static addresses are usually accepted from any source port. A restricted static address, which corresponds to source port filtering in 802.1d, is accompanied by a list of ports that are allowed to send frames to this address and port. Type a unicast or multicast address and press **Return**.

You are then prompted for the port numbers allowed to send to this address. Type the port numbers at the prompt and press **Return**. Catalyst 2100 checks the list of ports for typing errors and, if there are any, redisplays the prompt.

[L] List addresses. Select this option to list all dynamic and static addresses that belong to this port. Catalyst 2100 displays up to 15 addresses per screen; static addresses are listed first.

[E] Erase an address. Use this option to erase a dynamic or static address assigned to the current port. Type the address at the prompt and press **Return**.

[R] Remove all addresses. Select this option to remove all dynamic and static addresses currently associated with the port. Type **Y** or **N** at the confirmation prompt and press **Return**.

[C] Configure port. Select this option to display the Port Menu.

[V] View port statistics. Select this option to display the Detailed Port Statistics Menu.

[N] Next port [P] Previous port. Use these options to scroll back and forth between ports, displaying each port's characteristics.

[G] Goto port. Select this option to display the prompt:

```
Identify port: 1 to 25[1-25], F1[A], F2[B]:
Select [1 - 25, A, B]:
```

Type one of the values and press **Return** to display the port.

Port Statistics Report

This display-only menu shows frame transmit and receive statistics captured by Catalyst 2100. Statistics are displayed on a per-port basis. Press the **Spaceba**r to update the statistics.

Display the menu by typing **V** on the Port Menu or on the Port Addressing Menu.

Figure 5-16   Detailed Port Statistics Report

```
        Catalyst 2100 - Port F1 Statistics Report
     Receive Statistics                   Transmit Statistics

----------------------------------   ------------------------------------
Total good frames              505   Total frames                    1825
Total octets                 77951   Total octets                  135076
Broadcast/multicast frames     410   Broadcast/multicast frames      1466
Broadcast/multicast octets   64237   Broadcast/multicast octets    107796
Good frames forwarded          502   Deferrals                          0
Frames filtered                  3   Single collisions                  0
Runt frames                      0   Multiple collisions                0
No buffer discards               0   Excessive collisions               0
                                     Queue full discards                0
Errors:                              Errors:
  FCS errors                     0     Late collisions                  0
  Alignment errors               0     Excessive deferrals              0
  Giant frames                   0     Jabber errors                    0
  Address violations             0     Other transmit errors            0

Select [A] Port addressing, [C] Port configuration,
      [N] Next port, [P] Previous port, [G] Goto port,
      [R] Reset port statistics, or [X] Exit to Main Menu:
```

Performance or connectivity problems could be evident in the port statistics, particularly those under the heading **Errors.** For example, FCS and alignment errors could be the result of cabling problems such as the following:

• Exceeding the cabling-distance specifications

• Split pairs

• Defective patch-panel ports

- Wrong cable type

- Misconfigured full-duplex connection

For more information on responding to the errors found here, see the "Troubleshooting" chapter. The following definitions of the types of errors found on this panel are taken from RFC 1398:

FCS errors A count of frames received on a particular interface that are an integral number of octets in length but do not pass the Frame Check Sequence (FCS) test.

Alignment errors A count of frames received on a particular interface that are not an integral number octets in length and do not pass the FCS check.

Giant frames A count of frames received on a particular interface that exceeds the maximum permitted frame size.

Address violations Number of times a source address was seen on this port which duplicates a static address configured on another port, plus the number of times a source address was seen on this port that does not match any addresses secured for the port.

Late collisions The number of times that a collision is detected on a particular interface later than 512 bit-times into the transmission of a packet.

Excessive deferrals A count of frames for which transmission is deferred for an excessive period of time.

Jabber errors The number of times the jabber function was invoked because a frame received from this port exceeded a certain time duration.

[A] Port addressing. Display the Port Addressing Menu.

[C] Port configuration. Display the Port Menu.

[N] Next port [P] Previous port. Use these options to scroll back and forth between ports, displaying each port's characteristics.

[G] Goto port. Type a port number and press **Return** to display the port's statistics.

[R] Reset port statistics. Select this option if you want to clear this port's statistics, including those found here and in the Utilization Statistics and Exceptions Reports. Type **Y** at the following prompt and press **Return**:

```
This command clears the statistics of this port to zero.
Clear port statistics, [Y]es or [N]o?
```

Firmware Configuration

It may be required to upgrade Catalyst 2100's firmware in order to incorporate future corrections or enhancements. Upgrading Catalyst 2100 firmware is performed by downloading an upgrade file directly into FLASH memory. When new firmware is downloaded, Catalyst 2100 resets, and the new firmware begins executing immediately. To avoid writing over itself, Catalyst 2100 must be executing out of EPROM for the firmware to be upgraded.

Use this menu to display the firmware version currently in use by Catalyst 2100 and to perform firmware upgrades. You can also download diagnostic software for use by customer support.

Display this menu by typing **F** on the Main Menu.

Figure 5-17   Firmware Configuration Menu

```
      Catalyst 2100 - Firmware Configuration

   ----------------System Information------------
   EPROM:  256K bytes
   Factory installed firmware V2.35

   FLASH:  512K bytes
   V2.31: valid

   -------------------Settings-----------------
   [C] Current system firmware source            EPROM
   [S] Server:  IP address of TFTP server        0.0.0.0
   [F] Filename for firmware upgrades
   [A] Accept upgrade transfer from other hosts  Enabled

   -------------------Actions------------------
   [U] System XMODEM upgrade
   [T] System TFTP   upgrade
   [D] Download test subsystem (XMODEM)

   [X] Exit to Main Menu

Enter Selection:
```

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How you upgrade the firmware depends on your installation. There are three possibilities:

- With the XMODEM protocol Use an attached station and its supporting communications application to transfer the firmware via the XMODEM protocol. Catalyst 2100 checks to ensure that FLASH memory is available.

- From a TFTP server Before the upgrade can be performed, you must enter the name of the TFTP server and the name of the file containing the upgrade. The actual upgrade can be initiated through the management console or with any SNMP-compatible management station. As a result, the switch retrieves the upgrade file from the server via TFTP.

- From a TFTP client A TFTP client can *put* the firmware upgrade into the switch.

Upgrading Catalyst 2100 Firmware with a TFTP Server

1   Select option **S** and enter the IP address of the server where the upgrade file is located.

2   Select option **F** and enter the name of the firmware-upgrade file.

3   Make sure Catalyst 2100 can reach the TFTP server. Select option **T** to initiate the TFTP transfer; Catalyst 2100 contacts the server to get the upgrade file.

Upgrading Catalyst 2100 Firmware with a TFTP Client

1   On the TFTP client workstation, establish a TFTP session with the IP address assigned to the Catalyst 2100.

2   Ensure that the TFTP client is in binary transfer mode.

3   Type **put** and the name of the upgrade file.

4   Verify the upgrade is in progress by checking the System Information section of the Firmware Upgrade Menu. The status line should read: `in-progress`.

5   When the transfer is complete, Catalyst 2100 resets and begins using the new firmware.

Identifying the Source of Firmware

Under the heading System Information you can see the past and current state of the Catalyst 2100 firmware. The EPROM heading reflects the factory-installed firmware; the FLASH heading shows the version number of the most recent upgrade and when it was installed; the station address displays the station used for the upgrade. If a terminal was used, it will say `serial terminal`. Also displayed is the status of the most recent upgrade: `valid, in-progress,` or `invalid.`

[C] Current system firmware source. The source of the currently executing Catalyst 2100 firmware, EPROM or FLASH, is displayed at the top of the menu. Catalyst 2100 must be executing out of EPROM for the firmware to be upgraded. Type **E** or **F** at the prompt and then press **Return** to change the source. If you press **Return** without typing a letter, or after clearing an entry with **Backspace**, the setting is not changed and the previous menu is displayed.

[S] Server: IP address or TFTP server. Type the IP address of the TFTP server where a Catalyst 2100 upgrade file is located.

[F] Filename for firmware upgrades. Type the name of the firmware upgrade file to be downloaded and press **Return**. The file should be on a TFTP server.

[A] Accept upgrade transfer from other hosts. You have the option of accepting, or not, upgrades from TFTP clients on the network. Use this option to enable or disable this function and press **Return**.

[U] System XMODEM upgrade. Select this option to upgrade the firmware using a modem. If the firmware is currently running from EPROM, you will be prompted to confirm the upgrade. Type **Y** to begin the transfer or **N** to return to the Firmware Upgrade Menu. The next prompt is:

```
Please initiate XMODEM transfer.
Awaiting transfer . . . C
```

C is the first XMODEM/CR protocol request. Use the appropriate application-specific command to start the transfer. Upon successful completion of the transfer, Catalyst 2100 resets and the newly downloaded firmware begins to execute. The Logon Security Menu is displayed.

[T] System TFTP upgrade. Use this option to upgrade the firmware from a TFTP server. The address of the server and the name of the file must already be set. Depending on whether a valid firmware has been written to flash memory, the following message is displayed:

```
Do you wish to continue with the upgrade process, [Y]es or [N]o?
```

[D] Download test subsystem (XMODEM**).** This option is reserved for use by the Cisco Systems customer support group and is used to download diagnostic software.

RS-232 Interface Configuration

Use this menu to define the RS-232 port's physical characteristics—baud rate, stop bits and the like—and call-features such as the time delay between outgoing calls. Note that the changes that you make are not invoked until you press **G** to activate them. Press **C** to cancel the session and return to the previous settings.

Display this panel by typing **I** on the Main Menu.

Figure 5-18   RS-232 Port Configuration Menu

```
     Catalyst 2100 - RS-232 Interface Configuration

     ------------------Group Settings--------------
     [B] Baud rate                                  19200 baud
     [D] Data bits                                  8 bit(s)
     [S] Stop bits                                  1 bit(s)
     [P] Parity setting                             None


     -------------------Settings-----------------
     [M] Match remote baud rate (auto baud)         Enabled
     [A] Auto answer                                Enabled
     [N] Number for dial-out connection
     [T] Time delay between dial attempts           300
     [I] Initialization string for modem            E0V1M1


     -------------------Actions------------------
     [C] Cancel and restore previous group settings
     [G] Activate group settings

     [X] Exit to Main Menu

  Enter Selection:
```

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[B] Baud rate. Type the baud rate for the Catalyst 2100 RS-232 serial port and press **Return**.

[D] Data bits. Type the data bits value for the serial port and press **Return**. Valid values are 7 and 8.

[S] Stop bits. Type the stop-bits value for the serial port and press **Return**.

[P] Parity settings. Change the parity settings for the serial port and press **Return**.

[M] Match remote baud rate. Select this feature to enable the RS-232 port to automatically match the baud rate of an incoming call. Catalyst 2100 only matches a baud rate lower than its configured baud rate. After the call, Catalyst 2100 reverts back to its configured rate.

[A] Auto answer. Select this feature to enable the auto-answer feature. Type **E** or **D** at the prompt and press **Return**.

[N] Number for dial-out connection. Enter the phone number Catalyst 2100 is configured to use when dialing out. This number is dialed when Catalyst 2100 is configured to communicate with a remote terminal upon power-up or reset. If the dial-out is unsuccessful and auto-answer is enabled, Catalyst 2100 will cease dialing and await incoming calls.

Up to 48 characters can be entered. Use the **Backspace** followed by **Return** to delete the number. Using the format required by your modem, type the number at the prompt and press **Return**.

[T] Time delay between attempts. Type the amount of time in seconds between dial-out attempts and press **Return**. **0** disables retry.

[I] Initialization string for modem. Change the initialization string to match your modem requirements. Up to 48 characters can be entered. A single **Backspace** followed by **Return** deletes the current string and restores the default string E0V1M1 for Hayes-compatible modems.

Note   Do not specify an AT prefix or end-of-line suffix.

Type the new string at the prompt and press **Return**.

[C] Cancel and restore previous group settings. Select this option to undo any new values entered for the baud rate, data bits, stop bits and parity setting. Values are restored to those last saved.

[G] Activate group settings. This option activates the setting you have entered for baud rate, data bits, stops bits, and parity settings. After selecting this option, configure the attached terminal to match the new settings. Enter **Y** or **N** at the prompt.

Usage Summaries

Use this menu to display network statistics in the form of summary displays showing all ports. Press **U** on the Main Menu to display this menu. These statistics are read only; press the space bar to refresh them at any time.
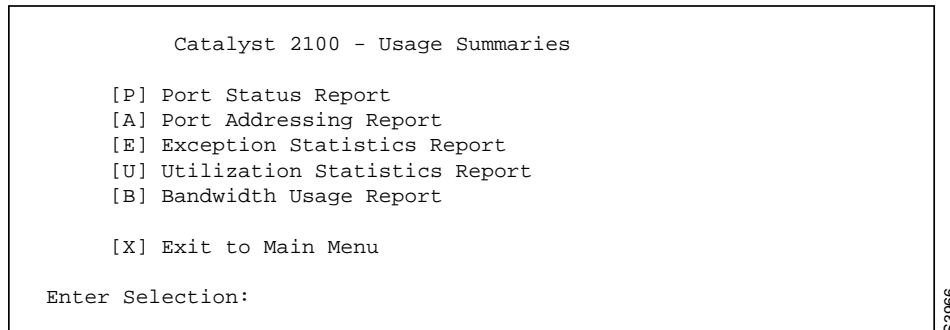
Figure 5-19   Usage Summary Menu

```
          Catalyst 2100 - Usage Summaries

      [P] Port Status Report
      [A] Port Addressing Report
      [E] Exception Statistics Report
      [U] Utilization Statistics Report
      [B] Bandwidth Usage Report

      [X] Exit to Main Menu

Enter Selection:
```

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Port Status Report

This panel summarizes the status of all ports as defined on the Ports Menu. Definitions of these terms are in the section "Port Configuration" in this chapter.

Display this panel by typing **U** on the Main Menu and **P** on the Usage Summary Menu.

Figure 5-20   **Port Status Report**

```
        Catalyst 2100 - Port Status Report

 1 : Enabled                     13: Suspended-no-linkbeat
 2 : Suspended-no-linkbeat       14: Suspended-no-linkbeat
 3 : Suspended-no-linkbeat       15: Enabled
 4 : Suspended-no-linkbeat       16: Suspended-no-linkbeat
 5 : Suspended-spanning tree     17: Enabled
 6 : Suspended-no-linkbeat       18: Suspended-no-linkbeat
 7 : Enabled                     19: Enabled
 8 : Enabled                     20: Suspended-no-linkbeat
 9 : Suspended-spanning tree     21: Suspended-no-linkbeat
10: Suspended-no-linkbeat        22: Suspended-no-linkbeat
11: Suspended-no-linkbeat        23: Suspended-no-linkbeat
12: Suspended-spanning tree      24: Enabled
                                 25: Enabled
 F1: Enabled
 F2: Enabled

Select [X] Exit to previous menu:
```

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Port Addressing Report

This panel displays the port's address mode, dynamic or static, and how many addresses have been assigned to the port.

Display this panel by typing **U** on the Main Menu and **A** on the Usage Summary Menu.

Figure 5-21   Port Addressing Report

```
       Catalyst 2100 - Port Addressing Report

Port               Addresses        Port              Addresses
------------------------------------ ------------------------------------
 1 :Static         00-00-00-00-00-01  13:Static        00-00-00-00-00-0D
 2 :Static         00-00-00-00-00-02  14:Static        00-00-00-00-00-0E
 3 :Static         00-00-00-00-00-03  15:Static        00-00-00-00-00-0F
 4 :Static         00-00-00-00-00-04  16:Static        00-00-00-00-00-10
 5 :Static         00-00-00-00-00-05  17:Static        00-00-00-00-00-11
 6 :Static         00-00-00-00-00-06  18:Static        00-00-00-00-00-12
 7 :Static         00-00-00-00-00-07  19:Static        00-00-00-00-00-13
 8 :Static         00-00-00-00-00-08  20:Static        00-00-00-00-00-14
 9 :Static         00-00-00-00-00-09  21:Static        00-00-00-00-00-15
10:Static          00-00-00-00-00-0A  22:Static        00-00-00-00-00-16
11:Static          00-00-00-00-00-0B  23:Static        00-00-00-00-00-17
12:Static          00-00-00-00-00-0C  24:Static        00-00-00-00-00-18
                                      25:Secured       Static 13  Max 13
F1:Dynamic 4       Static 1
F2:Dynamic 4       Static 1

Select [X] Exit to previous menu:
```

The two columns on this panel can have the following values:

Port Whether the port is enabled for dynamic learning or secured.

Addresses If it is a single station, this field contains its address; if it is not a single station, this field shows the number of static and dynamic addresses associated with the port.

Exception Statistics Report

The Exceptions Report Menu displays the number of receive errors, transmit errors, and security violations for each port.

Display this panel by typing **U** on the Main Menu and **E** on the Usage Summary Menu.

Figure 5-22   Exceptions Report Menu

```
    Catalyst 2100 - Exception Statistics Report (Frame counts)

        Receive   Transmit  Security          Receive   Transmit  Security
        Errors    Errors    Violations        Errors    Errors    Violations
       --------------------------------       --------------------------------
 1 :        0         0          0  13:           0         0          0
 2 :        0         0          0  14:           0         0          0
 3 :        0         0          0  15:           0         0          0
 4 :        0         0          0  16:           0         0          0
 5 :        0         0          0  17:           0         0          0
 6 :        0         0          0  18:           0         0          0
 7 :        0         0          0  19:           0         0          0
 8 :        0         0          0  20:           0         0          0
 9 :        0         0          0  21:           0         0          0
10:         0         0          0  22:           0         0          0
11:         0         0          0  23:           0         0          0
12:         0         0          0  24:           0         0          0
                                    25:           0         0          0
 F1:        0         0          0
 F2:        0         0          0

Select [R] Reset all statistics, or [X] Exit to previous menu:
```

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The figures displayed are actually totals of various kinds of errors:

Receive errors The combined number of giants, FCS, and alignment errors.

Transmit errors The combined number of excessive deferrals, late collisions, jabber errors and other transmit errors.

Security violations The combined number of secure address violations caused by address mismatches or duplications.

Utilization Statistics Report

This panel displays the frame-count statistics generated by Catalyst 2100.

Display this panel by typing **U** on the Main Menu and **U** on the Usage Summary Menu.

Figure 5-23   Utilization Statistics Reports

```
    Catalyst 2100 - Utilization Statistics Report (Frame counts)

        Receive    Forward   Transmit        Receive    Forward   Transmit
      -------------------------------      -------------------------------
 1 :     1134       1134     112309  13:        0          0          0
 2 :        0          0          0  14:        0          0          0
 3 :        0          0          0  15:       48         12     109552
 4 :        0          0          0  16:        0          0          0
 5 :   111191       1245         18  17:      234        234     109311
 6 :        0          0          0  18:        0          0          0
 7 :       39         39     109881  19:      234          0     109556
 8 :        0          0     109910  20:        0          0          0
 9 :   109901       1171         19  21:        0          0          0
10:        0          0          0  22:        0          0          0
11:        0          0          0  23:        0          0          0
12:   109900       1170         20  24:   108484     108484       1067
                                     25:        0          0     109560

 F1:      236        236        216
 F2:      216        216        236

Select [R] Reset all statistics, or [X] Exit to previous menu:
```

S3970

Column headings have the following meanings:

Receive The number of received good unicast frames, good multicast frames, and good broadcast frames.

Forward The number of good frames forwarded.

Transmit The combined number of transmitted unicast frames, multicast frames, and broadcast frames.

[R] Reset all statistics. Select this option to reset all statistics to 0. Type a letter at the confirmation prompt and press **Return**.

Bandwidth Usage Report

Use this menu to display the peak bandwidth of the network during a given period of time. Catalyst 2100 displays a list of the last 12 recordings of maximum bandwidth, in Mbps, according to a time interval you set. You can reset or clear the statistics at any time.

Display this panel by typing **U** on the Main Menu and **B** on the Usage Summary Menu.

Figure 5-24   Bandwidth Usage Report

```
       Catalyst 2100 - Bandwidth Usage Report
    -------------------Settings------------------
    Current bandwidth usage                    35 Mbps
    [T] Capture time interval                  24 hour(s)

    -----------Last 12 Capture Intervals----------
    Start Capture Time     Peak Time           Peak Mbps
 *  1. Fri Jul 21 00:00:00   Fri Jul 21 15:43:13   35
    2.
    3.
    4.
    5.
    6.
    7.
    8.
    9.
   10.
   11.
   12.
    -------------------Actions------------------
    [C] Clear table              [R] Reset current(*) entry
    [X] Exit to previous menu

Enter Selection:
```

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[T] Capture time interval. Use this option to define the time interval during which data is collected to calculate bandwidth usage.

[C] Clear table. Select this option to clear the bandwidth table. Respond to the confirmation prompt and press **Return**.

[R] Reset current entry. This option sets the current table entry to 0 and allows new information to be recorded. The current table entry is marked by an asterisk (*). Respond to the confirmation prompt and press **Return**.