CHAPTER 6

Capturing and Decoding Packet Data

The Capture tab has features for setting up, controlling, and displaying packet capture data.

The overall procedure for working with capture settings is:

1. Use the Settings option to configure capture settings and filters. (See the "Configuring Capture Settings" section on page 6-2.)
2. Use the Custom Filters option to create and save specialized filters when capturing data. (See the "Setting Up Custom Capture Filters" section on page 6-16.)
3. After packets are captured, use the Decode option to decode and view captured packets. See:
   - The "Viewing Packet Decode Information" section on page 6-10.
   - The "Viewing Protocol Decode Information" section on page 6-12.
4. Use the Download option to save and download the capture buffer. (See the "Downloading Capture Buffer to a File" section on page 6-13.)

Configuring Capture Settings

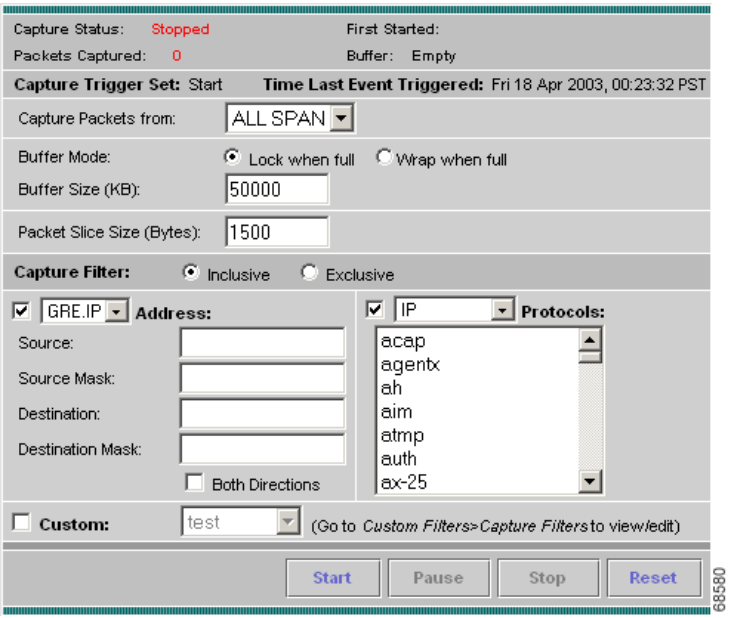
You must set up the capture settings and filters before starting the actual capture. After packets are captured, you can use decode filters to further narrow down the packets displayed in the Packet Decoder window.

Step 1 Click the Capture tab.

Step 2 Click **Settings**.

The Capture Settings Dialog Box (Figure 6-1) is displayed.

Figure 6-1 Capture Settings Dialog Box



In the top of the dialog box, there are four status indicators.

Status Indicator	Description
Capture Status	The current status of the capture: • Running—Packet capture is in progress. • Paused—Packet capture is paused. Captured packets remain in buffer, but no new packets are captured. • Stopped—Capture is stopped (by user) and capture buffer is cleared. • Locked—Capture is locked because the buffer is full. This is displayed only when Lock When Full is selected for the Buffer Mode.
Packets Captured	The number of packets captured and stored in the capture buffer. **Note** When the capture buffer is full and capture is in wrap-when-full mode, the number of packets captured may fluctuate as new packets arrive and old packets are discarded from the buffer.
First Started	Shows when the current capture started. You can pause and restart the capture as many times as necessary. If you stop the capture and start a new capture, this field shows the start time of the *new* capture.
Buffer	Current buffer state—Empty, Space Available, Full (Wrap), or Full (Locked).
Capture Trigger Set	Shows if a capture trigger was set.
Time Last Event Triggered	Time the last capture was started or stopped based on an alarm trigger.

Step 3 Enter information in the Capture Settings Dialog Box (Table 6-1) as appropriate.

Table 6-1 Capture Settings Dialog Box

Field	Description	Usage Notes
Capture Packets from	The data source from which to capture packets.	—
Buffer Mode	Determines what action to take when the capture buffer is full.	• Select **Lock when full** to stop the capture when the buffer is full. • Select **Wrap when full** to continue the capture when the buffer is full. The oldest packets are discarded as new packets arrive.
Buffer Size	The size of the capture buffer in KB.	Enter a number from 64 to 64,000. If system memory is low, the actual buffer size allocated might be less than the number specified here. After starting the capture, this field shows the actual buffer size allocated. **Note** The WS-SVC-NAM-1 device allows up to 96,000 KB, and the WS-SVC-NAM-2 device allows up to 128,000 KB.
Packet Slice Size	The slice size in bytes, used to limit the size of the captured packets. If the packet size is larger than the specified slice size, the packet is "sliced" before it is saved in the capture buffer. For example, if the packet is 1000 bytes and slice size is 200 bytes, only the first 200 bytes of the packet is stored in the capture buffer.	Enter a number from 12 to 1984. If you have a small buffer but want to capture as many packets as possible, use a small slice size.

Step 4 In the Capture Filter pane, select inclusive or exclusive filter mode. (Inclusive filters capture only packets that match the filter conditions; exclusive captures exclude those packets that match the filter conditions.)

Step 5 Select one of the following check boxes to enable the applicable filter types:

- **Address** to filter traffic based on a type of IP, IPIP4, IPv6, GRE.IP, or MAC address. (See the "Capturing Using an Address Filter" section on page 6-6.)
- **Protocol** to filter traffic based on specific protocols. (See the "Capturing Using a Protocol Filter" section on page 6-9.)
- **Custom** to use a customized filter. (See the "Capturing Using a Custom Filter" section on page 6-9.)

Note To create a custom capture filter, see the "Setting Up Custom Capture Filters" section on page 6-16.

Step 6 Do one of the following:

- To start the capture, click **Start**.
- To temporarily pause a running capture, click **Pause**.
- To stop a running capture and clear the capture buffer, click **Stop**.
- To discard and reset all of your selections and start over, click **Reset**.

Working with Alarm Capture Triggers

You can create two types of capture triggers from the Setup > Alarms section—start or stop. Only one capture trigger may be set at a time. For the capture triggers to work, you must set the capture buffer settings in advance. For more information on setting capture triggers, see the "Setting Alarm Thresholds" section on page 3-40.

For start capture triggers, the capture buffer should be in a paused state. If the buffer is stopped or running, a start capture trigger does not work. For optimal performance, we recommend that you set the buffer mode to Lock when full.

For stop capture triggers, the capture buffer should be running. If the buffer is paused or stopped, a stop trigger does not work. For optimal performance, we recommend that you set the buffer mode to Wrap when full.

Capturing Using an Address Filter

If you selected the **Address** check box, enter information in the Capture Settings Address Filter Dialog Box (Table 6-2) as appropriate.

Note When filtering on tunnel addresses such as IPIP4 or GRE.IP, the filters will match the addresses on the inner and outer IP header.

Table 6-2 Capture Settings Address Filter Dialog Box

Field	Description	Usage Notes
Address	Indicated what address to filter by.	• Select MAC to use the source/ destination MAC address of the packets. • Select IP to use the source/destination IP addresses of the packets. • Select IPIP4 for IP addresses including those tunneled over IP protocol 4. • Select GRE.IP for IP addresses including those tunneled over GRE. • Select IPv6 for addresses using IP version 6.
Both directions.	Indicates whether the filter is applied to traffic in both directions.	If the source is host A and the destination is host B, enabling both directions filters packets from A to B and B to A. If the source is host A and the destination is not specified, enabling both directions filters packets both to and from host A.

Table 6-2 Capture Settings Address Filter Dialog Box (continued)

Field	Description	Usage Notes
Source	Source address of the packets.	• For IP, IPIP4, and GRE.IP address, enter a valid IPv4 address in dotted-quad format *n.n.n.n,* where *n* is 0 to 255. • For IPv6 address, enter a valid IPv6 address in any allowed IPv6 address format. For example: – 1080::8:800:200C:417A – ::FFF:129.144.52.38 **Note** See RFC 2373 for valid text representations. • For MAC address, enter *hh hh hh hh hh hh*, where *hh* is a hexadecimal number from 0 to 9 or a to f.
Source Mask	The mask applied to the source address. • If a bit in the Source Mask is set to 1, the corresponding bit in the address is relevant. • If a bit in the Source Mask is set to 0, the corresponding bit in the address is ignored.	• For IP, IPIP4, and GRE.IP address, enter a valid IPv4 address in dotted-quad format *n.n.n.n,* where *n* is 0 to 255. The default (if blank) is 255.255.255.255. • For IPv6 address, enter a valid IPv6 address in any allowed IPv6 address format. The default mask (if blank) for IPv6 addresses is ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff **Note** See RFC 2373 for valid text representations. For MAC address, enter *hh hh hh hh hh hh,* where *hh* is a hexadecimal number from 0 to 9 or a to f. The default is ff ff ff ff ff ff.

Table 6-2 Capture Settings Address Filter Dialog Box (continued)

Field	Description	Usage Notes
Destination	Destination address of the packets.	• For IP, IPIP4, and GRE.IP address, enter a valid IPv4 address in dotted-quad format *n.n.n.n,* where *n* is 0 to 255. The default (if blank) is 255.255.255.255. • For IPv6 address, enter a valid IPv6 address in any allowed IPv6 address format. For example: – 1080::8:800:200C:417A – ::FFF:129.144.52.38 **Note** See RFC 2373 for valid text representations. For MAC address, enter *hh hh hh hh hh hh,* where *hh* is a hexadecimal number from 0 to 9 or a to f. The default is ff ff ff ff ff ff.
Dest. Mask	The mask applied to the destination address. • If a bit in the Dest. Mask is set to 1, the corresponding bit in the address is relevant. • If a bit in the Dest. Mask is set to 0, the corresponding bit in the address is ignored.	• For IP, IPIP4, and GRE.IP address, enter a valid IPv4 address in dotted-quad format *n.n.n.n,* where *n* is 0 to 255. The default (if blank) is 255.255.255.255. • For IPv6 address, enter a valid IPv6 address in any allowed IPv6 address format. The default mask (if blank) for IPv6 addresses is ffff:ffff:ffff:ffff:ffff:ffff:ffff:ffff **Note** See RFC 2373 for valid text representations. For MAC address, enter *hh hh hh hh hh hh,* where *hh* is a hexadecimal number from 0 to 9 or a to f. The default is ff ff ff ff ff ff.

Capturing Using a Protocol Filter

If you selected the **Protocol** check box, select one or more protocols to capture from the list.

Capturing Using a Custom Filter

Step 1 Select the **Custom** check box.

Note The Address Filter and Protocol Filter check boxes are disabled if you select the Custom Filter check box and vice versa.

Step 2 Select a custom capture filter from the list.

Note If the list is empty, see the "Creating Custom Capture Filters" section on page 6-17 for instructions on creating custom capture filters.

Step 3 (Optional.) To view or edit the selected custom capture filter, select **Custom Filters > Capture Filters**.

For example, to capture only HTTP and HTTPS packets in the 111.122 Class B network, do the following:

Step 1 Select the **Inclusive** check box.

Step 2 Select the **Address** check box.

Step 3 Select the IP button.

Step 4 Select the **Both Directions** check box.

Step 5 In the Source, enter `111.122.0.0`.

Step 6 In the Source Mask, enter `255.255.0.0`.

Step 7 Select the **Protocol** check box.

Step 8 Press **Shift-Click** to select HTTP and HTTPS from the list.

Viewing Packet Decode Information

After some packets have been captured in the buffer, you can use the Packet Decoder to view the packet contents.

Note If several people use the Packet Decoder simultaneously, they see the same capture buffer.

The Packet Decoder window has three parts:

- Packet browser pane (top of window).
- Protocol decode (See the "Viewing Protocol Decode Information" section on page 6-12).
- Packet hexadecimal dump.

Step 1 Click the Capture tab.

Step 2 Click **Decode**.

The Packet Decoder dialog box is displayed. Packet Browser (Table 6-3) describes the information displayed in the packet browser pane.

Table 6-3 Packet Browser

Field	Description
Pkt	Packet numbers, listed numerically in capture sequence. If the decode (display) filter is active, the packet numbers might not be consecutive.
Time	Time the packet was captured relative to the first packet displayed (not the first packet in the buffer). **Note** To see the absolute time, see the Detail window.
Size	Size of the packet, in bytes.
Source	Packet source, which might be displayed as hostname, IP, IPX, or MAC address. **Note** To turn hostname resolution on and off for IP addresses, click the Setup tab and change this setting under Preferences.
Destination	Packet destination, which might be displayed as hostname, IP, IPX, or MAC address.
Protocol	Top-level protocol of the packet.
Info	Brief text information about the packet contents.

Viewing Packets in the Packet Browser

Use the packet browser to browse the list of captured packets. You can:

- Filter by protocol, IP address, MAC address, text, and custom decode filter.
- Use the **Next**, **Previous**, and **Go To** buttons to load packets from the capture buffer.

Note The capture must be paused or stopped for you to use these features.

Filtering Packets Displayed in the Capture Decode Window

Step 1 Select one of the following filter types from the list:

- Protocol—To filter by protocol.
- IP Addr—To filter by IP address.
- MAC Addr—To filter by MAC address.
- Text—To filter by matching text in the packet summary.
- Custom—To use a custom decode filter.

Step 2 Specify the protocol name, IP address, MAC address, matching text, or custom decode filter.

Note Do not use hyphens (-) in the text filter.

Step 3 Click **Filter**.

Viewing Protocol Decode Information

Step 1 Highlight the packet number about which you want more information.

Detailed information about that packet is displayed in the Protocol Decode and hexadecimal dump panes at the bottom of the window.

Note If you highlight the details in the Protocol Decode pane, the corresponding bytes are highlighted in the hexadecimal dump pane below it.

Step 2 To review the information, use the scrolling bar in the lower panes.

Tip Protocols are color coded both in the Packet Browser and the Protocol Decode pane.

Click the protocol name in the Protocol Decode pane to collapse and expand protocol information.

To adjust the size of any of the panes, click and drag the pane frame up or down.

Downloading Capture Buffer to a File

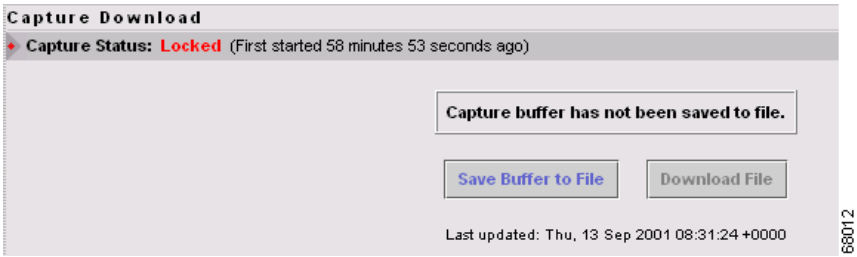
Use this option to download the capture buffer to a file in Sniffer format.

Step 1 Click the Capture tab.

Step 2 Click **Download**.

The Capture Download Window (Figure 6-2) is displayed.

Figure 6-2 Capture Download Window



The Capture Status line displays the status of the current capture.

A display area in the main window shows whether the capture buffer has already been saved to a file.

- If the capture buffer has not been saved, the following message is displayed:

```
Capture buffer has not been saved to file.
```

- If the capture buffer has been saved, a message similar to the following is displayed:

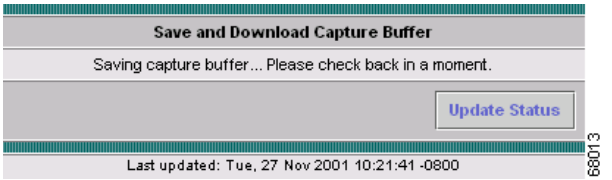
```
Capture buffer saved to file on Thu, 9 Aug 2001 00:00:00 +0000.
File Size: bytes Packets
Saved in File: 246085
Packets in Buffer Now: 69511
```

Step 3 Do one of the following:

Note You must save the capture buffer to a file before you can download it.

- To save the buffer to a file, click **Save Buffer to File**. The Capture Download Window—Saving Capture Buffer Window (Figure 6-3) is displayed:

Figure 6-3 Capture Download Window—Saving Capture Buffer Window



Tip To refresh the information after a few moments, click **Update Status**.

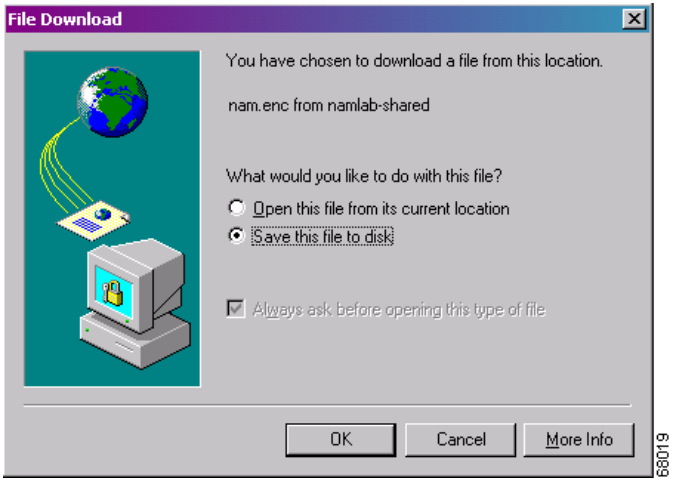
- To download the file to your desktop, click **Download File**, then go to Step 4.

The Capture Download Window shows the status after the capture buffer has been successfully saved.

Step 4 If you clicked **Download File**, the File Download Dialog Box (Figure 6-4) is displayed. Do one of the following:

- To open the file on your desktop, select **Open this file from its current location**.
- To save the file to your hard drive, select **Save this file to disk**, then enter a destination file location and name in the File Download Dialog Box (Figure 6-4).

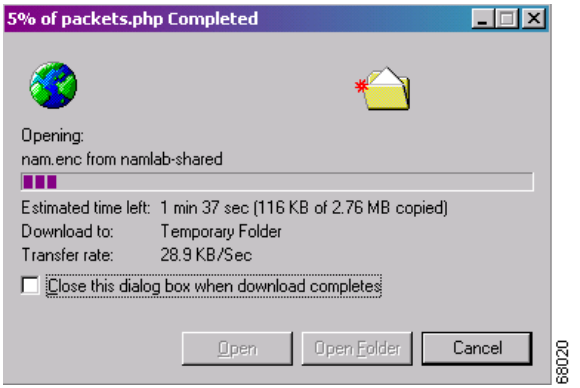
Figure 6-4 File Download Dialog Box



In both cases. the File Transfer Dialog Box (Figure 6-5) shows:

- The estimated amount of time before the file opens on your desktop or is written to your hard drive.
- The location to which the file is being transferred (a temporary folder to open on your desktop or the output filename you specified).
- The file transfer rate in KB/sec.

Figure 6-5 File Transfer Dialog Box



Setting Up Custom Capture Filters

You can use custom capture filters to create and save specialized filters to disregard everything except the information you are interested in when you capture data.

For more information about using custom filters when capturing data, see the "Capturing Using a Custom Filter" section on page 6-9.

See these topics for help setting up and managing custom capture filters:

- Creating Custom Capture Filters, page 6-17.
- Editing Custom Capture Filters, page 6-21.
- Deleting Custom Capture Filters, page 6-22.

Creating Custom Capture Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

The Custom Capture Filters dialog box is displayed.

Step 3 Click **Create**.

The Custom Capture Filter Dialog Box (Table 6-4) is displayed.

Step 4 Enter information in each of the fields as appropriate.

Table 6-4 Custom Capture Filter Dialog Box

Field	Description	Usage Notes
Filter Name	Name of the new filter.	Enter a name.
Description	Brief description of the filter.	Enter a description from 1 to 35 characters.
Protocol	The protocol to match with the packet.	Select the encapsulation from the drop-down list, then select the protocol.
Data	The data pattern to be matched with the packet. If the packet is too short and does not have enough data to match, the packet match fails.	• Enter `hh hh hh ...`, where `hh` are hexadecimal numbers from 0 to 9 or a to f. • Leave blank if not applicable.
Data Mask	The mask applied to the data matching. • If a bit in the Data Mask is set to 1, the corresponding bit in the packet is relevant in the matching algorithm. • If a bit in the Data Mask is set to 0, the corresponding bit in the packet is ignored. If you do not specify the Data Mask, or if it is shorter than the Data field, the Data Mask is padded with "1" bits up to the length of the Data field.	• Enter `hh hh hh ...`, where `hh` are hexadecimal numbers from 0 to 9 or a to f. • Leave blank if all data bits are relevant.

Table 6-4 Custom Capture Filter Dialog Box (continued)

Field	Description	Usage Notes
Data Not Mask	The mask applied to reverse data matching. • For those bits in the Data Not Mask that are set to 0 (or not specified), the relevant bits in the packet must match the corresponding bit in the Data field. • For those bits in the Data Not Mask that are set to 1, at least one relevant bit in the packet must be different than the corresponding bit in the Data field. If you do not specify the Data Not Mask, or if it is shorter than the Data field, the Data Not Mask is padded with "0" bits up to the length of the Data field.	• Enter *hh hh hh ...*, where *hh* are hexadecimal numbers from 0 to 9 or a to f. • Leave blank for no reverse data matching.
Offset	The offset (in bytes, from the Base) where packet data-matching begins. This offset applies to the Data, Data Mask, and Data Not Mask fields.	Enter a decimal number.
Base	The base from which the offset is calculated. • If you select absolute, the offset is calculated from the absolute beginning of the packet (the beginning of the Ethernet frame). You must account for an 802.1q header when calculating an offset for WS-SVC-NAM-1 and NAM-2 devices. • If you select protocol, the offset is calculated from the beginning of the protocol portion of the packet. If the packet does not contain the protocol, the packet fails this match.	Select absolute or a protocol.

Table 6-4 Custom Capture Filter Dialog Box (continued)

Field	Description	Usage Notes
Status	The status to match with the packet. For Ethernet packet captures, the status bits are: • Bit 0—Packet is longer than 1518 octets. • Bit 1—Packet is shorter than 64 octets. • Bit 2—CRC or alignment error. For example, an Ethernet fragment has a status value of 6 (bits 1 and 2 set).	• Enter a number from 0 to 65535. • Leave blank if not applicable.
Status Mask	The mask applied to the status matching. • If a Status Mask bit is set to 1, the corresponding bit in the packet status is relevant in the matching algorithm. • If a Status Mask bit is set to 0, the corresponding bit in the packet status is ignored. If you do not specify a Status Mask, or if it is shorter than the Status field, the Status Mask is padded with "1" bits up to the length of the Status field.	• Enter a number from 0 to 65535. • Leave blank if all status bits are relevant.

Table 6-4 Custom Capture Filter Dialog Box (continued)

Field	Description	Usage Notes
Status Not Mask	The mask applied to reverse status matching. • For those bits in the Status Not Mask that are set to 0 (or not specified), the relevant status bits of the packet must match the corresponding bit in the Status field. • For those bits in the Status Not Mask that are set to 1, at least one relevant bit of the status packet must be different than the corresponding bit in the Status field. If you do not specify a Status Not Mask, it is padded with "0" bits.	• Enter a number from 0 to 65535. • Leave blank for no reverse status matching.

Step 5 Do one of the following:

- To create the filter, click **Apply**.
- To cancel the changes, click **Reset**.

Tips for Creating Custom Capture Filter Expressions

- The TOS value is stored in byte 1 (the second byte) in the IP header. To match the IP packet with a TOS value of 16 (0x10), enter:

  Data—10
  Offset—1
  Base—IP

- The source address of an IP packet is stored in bytes 12 to 15 in the IP header. To match IP packets with a source address of 15.16.17.18, enter:

  Data—0f 10 11 12
  Offset—12
  Base—IP

- To match IP packets with a source address of 15.*.*.18 (where * is any number from 0 to 255), enter:

  Data—0f 00 00 12
  Data Mask—ff 00 00 ff
  Offset—12
  Base—IP

- To match IP packets with a source address of 15.16.17.18 and a destination address different than 15.16.17.19, enter:

  Data—f0 10 12 12 0f 10 11 13
  Data Mask—ff ff ff ff ff ff ff ff
  Data Not Mask—00 00 00 00 00 00 00 00
  Offset—12
  Base—IP

Editing Custom Capture Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

The Custom Capture Filters dialog box is displayed.

Step 3 Select the filter to edit, then click **Edit**.

The Custom Capture Filter dialog box (see Table 6-4 on page 6-17) is displayed.

Step 4 Enter information in each of the fields as appropriate.

Step 5 Do one of the following:

- To apply the changes, click **Apply**.
- To cancel the changes, click **Reset**.

Deleting Custom Capture Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

The Custom Capture Filters dialog box is displayed.

Step 3 Select the filter to delete, then click **Delete**.

Step 4 In the confirmation dialog box, do one of the following:

- To delete the filter, click **OK**.
- To cancel, click **Cancel**.

Setting Up Custom Decode Filters

Use custom decode filters to create and save customized filters to use in the Decode window to limit which packets are to be displayed.

See these topics for help setting up and managing custom decode filters:

- Creating Custom Decode Filters, page 6-22.
- Editing Custom Decode Filters, page 6-27.
- Deleting Custom Decode Filters, page 6-28.

Creating Custom Decode Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

Step 3 In the contents, click **Decode Filters**.

The Custom Decode Filters dialog box is displayed.

Step 4 Click **Create**.

The Custom Decode Filter Dialog Box (Table 6-5) is displayed.

Step 5 Enter information in each of the fields as appropriate.

Table 6-5 Custom Decode Filter Dialog Box

Field	Description	Usage Notes
Filter Name	The name of the capture filter.	Enter the name of the filter to be created.
Description	The description of the capture filter.	Enter a description of the filter.
Protocol	The protocol to match with the packet.	Select a protocol from the list. (Select **All** to match all packets regardless of protocol.)
Address (MAC or IP)	Indicates whether to filter by MAC or IP address.	• Select MAC to filter using the source/destination MAC address of the packets. • Select IP to filter using the source/destination addresses of the packets.
Both Directions	Indicates whether the filter is applied to traffic in both directions.	• If the source is host A and the destination is host B, enabling both directions filters packets from A to B and B to A. • If the source is host A and the destination is not specified, enabling both directions filters packets both to and from host A.

Table 6-5 Custom Decode Filter Dialog Box (continued)

Field	Description	Usage Notes
Source	Source address of the packets.	• For IP address, enter *n.n.n.n*, where *n* is 0 to 255 or *n.n.n.n/s* where *s* is the subnet mask (0 to 32). • For MAC address, enter *hh hh hh . . .*, where *hh* are hexadecimal numbers from 0 to 9 or a to f.
Destination	Destination address of the packets.	• For IP address, enter *n.n.n.n*, where *n* is 0 to 255 or *n.n.n.n/s* where *s* is the subnet mask (0 to 32). • For MAC address, enter *hh hh hh hh hh hh*, where *hh* are hexadecimal numbers from 0-9 or a-f.
Offset	The offset (in bytes) from the Base where packet data-matching begins.	Enter a decimal number.
Base	The base from which the offset is calculated. • If you select absolute, the offset is calculated from the absolute beginning of the packet (for example, the beginning of the Ethernet frame). • If you select protocol, the offset is calculated from the beginning of the protocol portion of the packet. If the packet does not contain the protocol, the packet fails this match.	Select **absolute** or a protocol.

Table 6-5 Custom Decode Filter Dialog Box (continued)

Field	Description	Usage Notes
Data Pattern	The data to be matched with the packet.	Enter `hh hh hh ...`, where `hh` are hexadecimal numbers from 0-9 or a-f. Leave blank if not applicable.
Filter Expression	An advanced feature to set up complex filter conditions. The simplest filter allows you to check for the existence of a protocol or field. For example, to see all packets that contain the IPX protocol, you can use the simple filter expression **ipx**.	See the "Tips for Creating Custom Decode Filter Expressions" section on page 6-25.

Step 6 Do one of the following:

- To create the filter, click **Apply**.
- To cancel the changes, click **Reset**.

Tips for Creating Custom Decode Filter Expressions

- You can construct custom decode filter expressions using the following logical and comparison operators:

and	Logical AND
or	Logical OR
xor	Logical XOR
not	Logical NOT
==	Equal
!=	Not equal
>	Greater than

<	Less than
>=	Greater than or equal to
<=	Less than or equal to

- You can also group subexpressions within parentheses.
- You can use the following fields in filter expressions:

Field	Filter By	Format
eth.addr eth.src eth.dst	MAC address	*hh:hh:hh:hh:hh:hh*, where h is a hexadecimal number from 0 to 9 or a to f.
ip.addr ip.src ip.dst	IP address	*n.n.n.n or n.n.n.n/s* , where n is a number from 0 to 255 and s is a 0-32 hostname that does not contain a hyphen.
tcp.port tcp.srcport tcp.dstport	TCP port number	A decimal number from 0 to 65535.
udp.port udp.srcport udp.dstport	UDP port number	A decimal number from 0 to 65535.
protocol	Protocol	Click the Protocol list in the Custom Decode Filter dialog box to see the list of protocols on which you can filter.
protocol [*offset*:*length*]	Protocol data pattern	*hh:hh:hh:hh...*, where hh is a hexadecimal number fro 0 to 9 or a to f. *offset* and *length* are decimal numbers. *offset* starts at 0 and is relative to the beginning of the *protocol* portion of the packet.
frame.pkt_len	Packet length	A decimal number that represents the packet length, not the truncated capture packet length.

Examples of Custom Decode Filter Expressions

- To match SNMP packets from 111.122.133.144, enter:

```
snmp and (ip.src == 111.122.133.144)
```

- To match IP packets from the 111.122 Class B network, enter:

```
ip.addr == 111.122.0.0/16
```

- To match TCP packets to and from port 80, enter:

```
tcp.port == 80
```

- The TOS value is stored in byte 1 (the second byte) in the IP header. To match the IP packet with the TOS value 16 (0x10), enter:

```
ip[1:1] == 10
```

- The TCP acknowledgement number is stored in bytes 8 through 11 in the TCP header. To match the TCP packet with acknowledgement number 12345678 (0xBC614E), enter:

```
tcp[8:4] == 00:BC:61:4E
```

Note You can use a filter expression with other fields in the Custom Decode Filter dialog box. In this case, the filter expression is ANDed with other conditions. Invalid or conflicting filter expressions result in no packet match.

Editing Custom Decode Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

Step 3 In the contents, click **Decode Filters**.

The Custom Decode Filters dialog box is displayed.

Step 4 Select the filter to edit, then click **Edit**.

Step 5 Change the information in each of the fields as appropriate.

Step 6 Do one of the following:

- To apply the changes, click **Apply**.
- To cancel the changes, click **Reset**.

Deleting Custom Decode Filters

Step 1 Click the Capture tab.

Step 2 Click **Custom Filters**.

Step 3 In the contents, click **Decode Filters**.

The Custom Decode Filters dialog box is displayed.

Step 4 Select the filter to delete, then click **Delete**.

Step 5 In the confirmation dialog box, do one of the following:

- To delete the filter, click **OK**.
- To cancel, click **Cancel**.