Viewing Status and Statistics

This chapter explains how to use ADU to view the client adapter's status and its transmit and receive statistics.

The following topics are covered in this chapter:

Overview of ADU Status and Statistics Tools

In addition to enabling you to configure your client adapter for use in various types of networks, ADU provides tools that enable you to assess the performance of the client adapter and other devices on the wireless network. These tools perform the following functions:

- Display your client adapter's current status and configured settings
- Display statistics pertaining to your client adapter's transmission and reception of data

Table 7-1 enables you to quickly find instructions for using ADU status and statistics tools.

Table 7-1 Status and Statistics Tool Instructions

Tool	Page Number
Status	7-4
Statistics	7-12

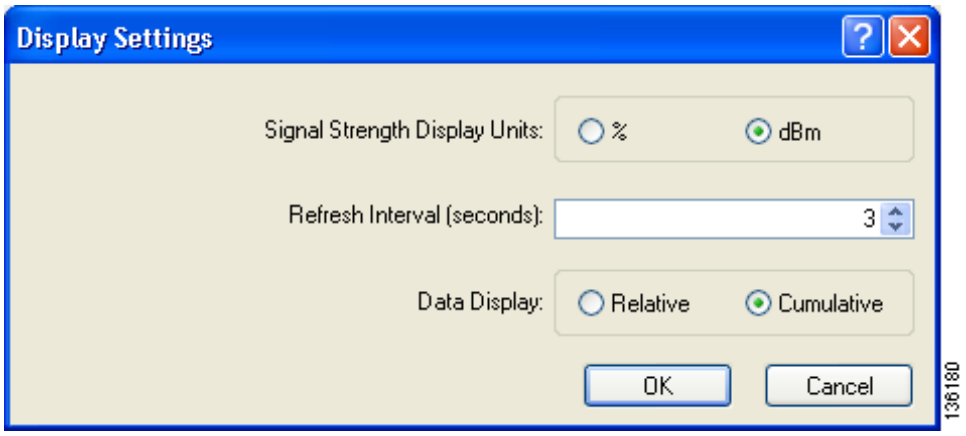
Setting Parameters that Affect ADU Status and Statistics Tools

Several parameters affect the operation of ADU status and statistics tools. Follow these steps to set these parameters.

Step 1 Open ADU.

Step 2 Choose **Display Settings** from the Options drop-down menu. The Display Settings window appears (see Figure 7-1).

Figure 7-1 Display Settings Window



Step 3 Table 7-2 lists and describes the parameters that affect the operation of ADU status and statistics tools. Follow the instructions in the table to change any parameters.

Table 7-2 Parameters Affecting ADU Status and Statistics Tools

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Signal Strength Display Units</td><td>Specifies the units used to display signal strength on the Advanced Status window and signal-to-noise ratio (SNR) on the Available Infrastructure and Ad Hoc Networks window.
Options: % or dBm
Default: dBm

<table><tr><th>Units</th><th>Description</th></tr><tr><td>%</td><td>Displays the signal strength and signal-to-noise ratio as a percentage.</td></tr><tr><td>dBm</td><td>Displays the signal strength in decibels with respect to milliwatts (dBm) and the signal-to-noise ratio in decibels (dB).</td></tr></table></td></tr>
<tr><td>Refresh Interval</td><td>Specifies how often the ADU status and statistics windows and the ASTU icon are updated.
Range: 1 to 5 seconds between updates (in 1-second increments)
Default: 3 seconds between updates</td></tr>
<tr><td>Data Display</td><td>Specifies whether the data that is displayed on the Diagnostics and Advanced Statistics windows continue to increment until the driver is reloaded or only until an update occurs (every 1 to 5 seconds).
Options: Relative or Cumulative
Default: Cumulative

<table><tr><th>Data Display</th><th>Description</th></tr><tr><td>Relative</td><td>Displays statistical data collected since the last update, as specified by the Refresh Interval (1 to 5 seconds).</td></tr><tr><td>Cumulative</td><td>Displays statistical data collected since the driver was loaded, upon card insertion or reboot.</td></tr></table></td></tr>
</table>

Step 4 Click **OK** to save your changes.

Viewing the Current Status of Your Client Adapter

ADU enables you to view the current status of your client adapter as well as many of the settings that have been configured for the adapter. To view your client adapter's status and settings, open ADU. The Current Status window appears (see Figure 7-2).

Figure 7-2 Current Status Window

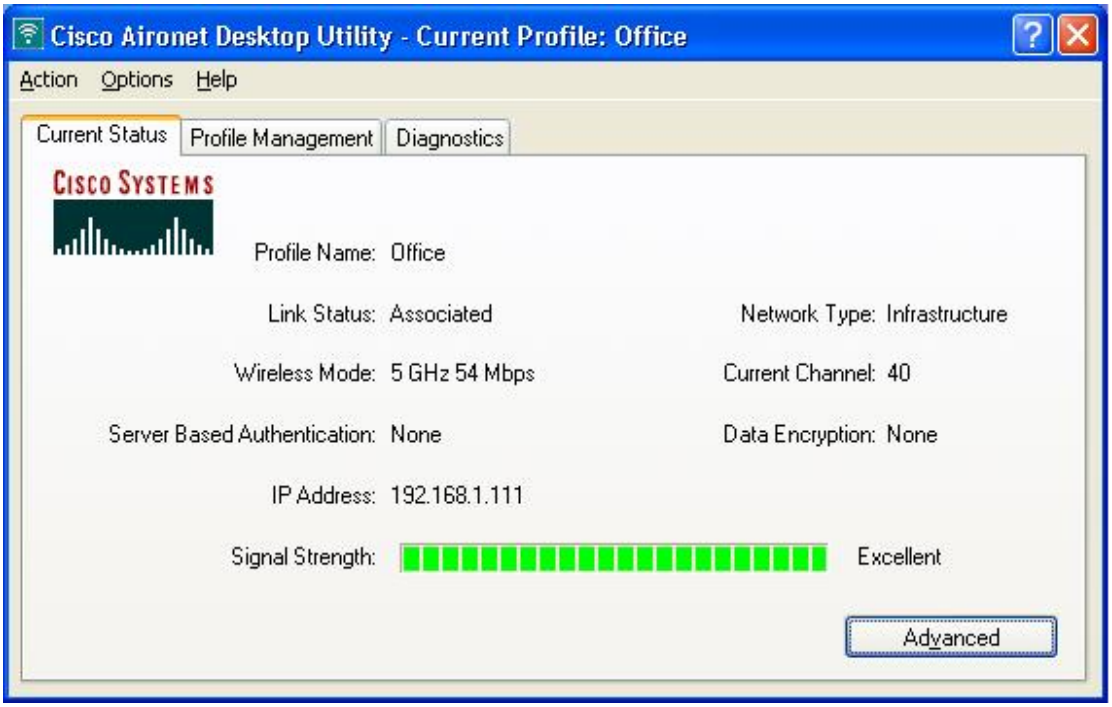


Table 7-3 interprets each element of the Current Status window.

Table 7-3 Basic Client Adapter Status

<table>
<tr><th>Status</th><th>Description</th></tr>
<tr><td>Profile Name</td><td>The network configuration (or profile) your client adapter is currently using.
Note Refer to Chapter 4 for information on creating, modifying, and selecting profiles.</td></tr>
<tr><td>Link Status</td><td>The operational mode of your client adapter.
Value: Not Associated, Associated, Authenticating, Authenticated, Authentication Failed, Authentication Failed Retrying
<table>
<tr><th>Link Status</th><th>Description</th></tr>
<tr><td>Not Associated</td><td>The client adapter has not established a connection to an access point (in infrastructure mode) or another client (in ad hoc mode).</td></tr>
<tr><td>Associated</td><td>The client adapter has established a connection to an access point (in infrastructure mode) or another client (in ad hoc mode).</td></tr>
<tr><td>Authenticating</td><td>The client adapter is associated to an access point, and the EAP authentication process has begun but not yet succeeded.</td></tr>
<tr><td>Authenticated</td><td>The client adapter is associated to an access point, and the user is EAP authenticated.</td></tr>
<tr><td>Authentication Failed</td><td>The client adapter is associated to an access point, but the user has failed to EAP authenticate.</td></tr>
<tr><td>Authentication Failed Retrying</td><td>The client adapter is associated to an access point, the user has failed to EAP authenticate, but another authentication attempt is being made.</td></tr>
</table></td></tr>
<tr><td>Wireless Mode</td><td>The frequency and rate at which your current wireless connection is capable of transmitting or receiving packets.
Value: 5 GHz 54 Mbps, 2.4 GHz 11 Mbps, or 2.4 GHz 54 Mbps
Note Refer to the Wireless Mode parameter in Table 5-3 for information on setting the wireless mode for your client adapter.</td></tr>
<tr><td>Network Type</td><td>The type of network in which your client adapter is being used.
Value: Infrastructure or Ad Hoc
Note Refer to the Network Type parameter in Table 5-3 for information on setting the network type.</td></tr>
</table>

Table 7-3 Basic Client Adapter Status (continued)

Status	Description
Server Based Authentication	The method by which authentication to a back-end server is being performed to establish secure connectivity. **Value:** None, LEAP, EAP-FAST, EAP-TLS, PEAP (EAP-GTC), PEAP (EAP-MSCHAP V2), or Host Based EAP **Note** Refer to the "Overview of Security Features" section on page 5-14 for details on these server-based authentication types.
IP Address	The IP address of your client adapter.
Current Channel	The channel that your client adapter is currently using for communications. This field displays *Scanning* while the client adapter searches for a channel. **Value:** Dependent on radio band and regulatory domain **Note** Refer to the Channel parameter in Table 5-3 for information on setting the channel for your client adapter. **Note** Refer to Appendix D for a list of channel identifiers, channel center frequencies, and regulatory domains for each channel.
Data Encryption	The data encryption type that was negotiated with the access point (in infrastructure mode) or another client (in ad hoc mode) upon association. **Value:** None, WEP, CKIP, TKIP, or AES **Note** Refer to the "Overview of Security Features" section on page 5-14 for details on these data encryption types.
Signal Strength	The signal strength for all received packets. The color of this parameter's progress bar provides a visual interpretation of signal strength. **Value:** Excellent (green), Good (green), Fair (yellow), Poor (red), or No Link

Click **Advanced** if you want to view more detailed status information for your client adapter. The Advanced Status window appears (see Figure 7-3).

Figure 7-3 Advanced Status Window

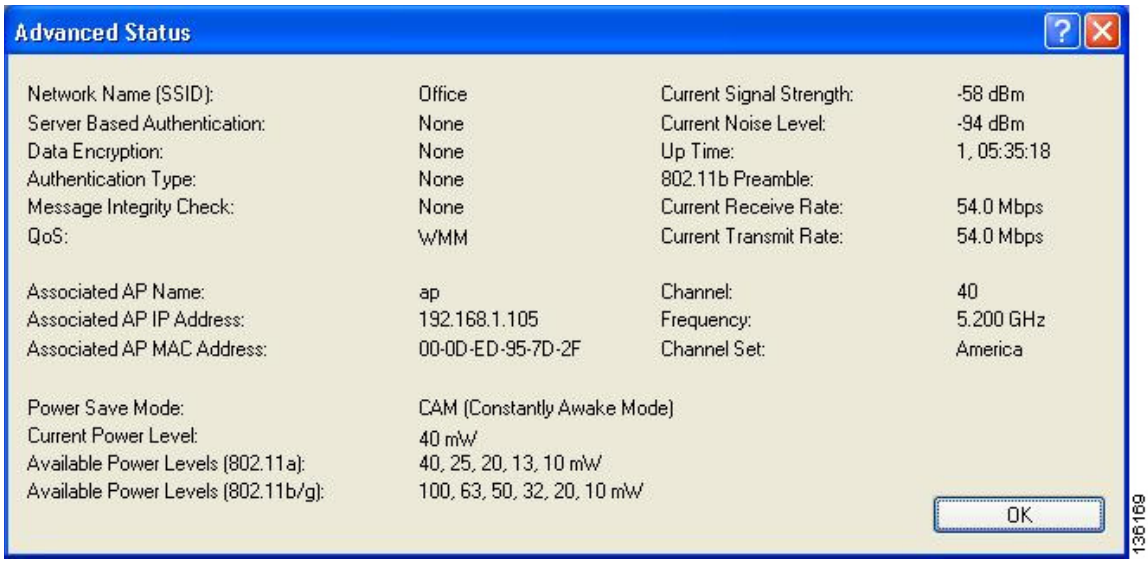


Table 7-4 interprets each element of the Advanced Status window.

Table 7-4 Advanced Client Adapter Status

Status	Description
Network Name (SSID)	The name of the network to which your client adapter is currently associated. **Note** Refer to the SSID1 parameter in Table 5-2 for information on setting the client adapter's SSID.
Server Based Authentication	The method by which authentication to a back-end server is being performed to establish secure connectivity. **Value:** None, LEAP, EAP-FAST, EAP-TLS, PEAP (EAP-GTC), PEAP (EAP-MSCHAP V2), or Host Based EAP Refer to the "Overview of Security Features" section on page 5-14 for details on these server-based authentication types.
Data Encryption	The data encryption type that was negotiated with the access point (in infrastructure mode) or another client (in ad hoc mode) upon association. **Value:** None, WEP, CKIP, TKIP, or AES **Note** Refer to the "Overview of Security Features" section on page 5-14 for details on these data encryption types.

Table 7-4 Advanced Client Adapter Status (continued)

Status	Description
Authentication Type	Specifies whether the client adapter must share the same WEP keys as the access point in order to authenticate or can authenticate to the access point regardless of its WEP settings. **Value:** Open or Shared **Note** An incorrect WEP key setting prevents connectivity to the network regardless of the 802.11 authentication type selected. **Note** Refer to the "Setting Advanced Parameters" section on page 5-6 for information on setting the 802.11 authentication mode.
Message Integrity Check	Indicates whether your client adapter is using message integrity check (MIC) to protect packets sent to and received from the access point. MIC prevents bit-flip attacks on encrypted packets. During a bit-flip attack, an intruder intercepts an encrypted message, alters it slightly, and retransmits it, and the receiver accepts the retransmitted message as legitimate. **Note** MIC is supported automatically by the client adapter's driver, but it must be enabled on the access point. **Value:** None, MMH, or Michael

Message Integrity Check	Description
None	MIC is disabled.
MMH	MIC is enabled and is being used with CKIP.
Michael	MIC is enabled and is being used with WPA and TKIP.

Table 7-4 Advanced Client Adapter Status (continued)

<table>
<tr><th>Status</th><th>Description</th></tr>
<tr><td>QoS</td><td>The type of quality of service that is currently being used by your client adapter. QoS on wireless LANs (WLAN) provides prioritization of traffic from the access point over the WLAN based on traffic classification.

Value: None or WMM

<table>
<tr><th>QoS</th><th>Description</th></tr>
<tr><td>None</td><td>WMM standard QoS is not enabled.</td></tr>
<tr><td>WMM</td><td>Wi-Fi Multimedia, a component of the IEEE 802.11e WLAN standard for QoS, is enabled. For this value to appear, QoS and WMM must be enabled on the access point to which the client adapter is associated.</td></tr>
</table>
Note WMM is supported automatically on the client adapter in the software included in Install Wizard 2.0 or later. However, you must enable the Windows QoS Packet Scheduler to ensure WMM support. Follow the instructions in the “Enabling Wi-Fi Multimedia” section on page 5-51 to enable the QoS Packet Scheduler.</td></tr>
<tr><td>Associated AP Name</td><td>The name of the access point to which your client adapter is associated. It is shown only if the client adapter is in infrastructure mode, the access point was configured with a name, and Aironet Extensions are enabled (on access points running Cisco IOS Release 12.2(4)JA or later).

Note This field shows up to 15 characters although the name of the access point may be longer.</td></tr>
<tr><td>Associated AP IP Address</td><td>The IP address of the access point to which your client adapter is associated. It is shown only if the client adapter is in infrastructure mode, the access point was configured with an IP address, and Aironet Extensions are enabled (on access points running Cisco IOS Release 12.2(4)JA or later).

Note If Aironet Extensions are disabled, the IP address of the associated access point is shown as 0.0.0.0.</td></tr>
<tr><td>Associated AP MAC Address</td><td>The MAC address of the access point to which your client adapter is associated. It is shown only if the client adapter is in infrastructure mode.

Note This field displays the MAC address of the access point’s Ethernet port (for access points that do not run Cisco IOS software) or the MAC address of the access point’s radio (for access points that run Cisco IOS software). The MAC address of the Ethernet port on access points that run Cisco IOS software is printed on a label on the back of the device.</td></tr>
</table>

Table 7-4 Advanced Client Adapter Status (continued)

Status	Description
Power Save Mode	The client adapter's current power consumption setting. **Value:** CAM (Constantly Awake Mode), Max PSP (Max Power Saving), or Fast PSP (Power Save Mode) **Note** Refer to the Power Save Mode parameter in Table 5-3 for information on setting the client adapter's power save mode.
Current Power Level	The power level at which your client adapter is currently transmitting. The maximum level is dependent upon the radio band used and your country's regulatory agency. **Value:** 10, 13, 20, 25, or 40 mW (802.11a band); 10, 20, 30, 50, 63, or 100 mW (802.11b/g band) **Note** Refer to the Transmit Power Level parameter in Table 5-3 for information on setting the client adapter's power level.
Available Power Levels	The power levels at which your client adapter is capable of transmitting. The maximum level is dependent upon the radio band used and your country's regulatory agency. **Value:** 10, 13, 20, 25, or 40 mW (802.11a band); 10, 20, 30, 50, 63, or 100 mW (802.11b/g band) **Note** Refer to the Transmit Power Level parameter in Table 5-3 for information on the client adapter's available power levels.
Current Signal Strength	The signal strength for all received packets. The higher the value, the stronger the signal. **Range:** 0 to 100% or 0 to –100 dBm
Current Signal Quality	The signal quality for all received packets. The higher the value, the clearer the signal. **Range:** 0 to 100% **Note** This field appears only if you selected signal strength to be displayed as a percentage. See the Signal Strength Display Units parameter in Table 7-2 for information.
Current Noise Level	The level of background radio frequency energy in the current radio band. The lower the value, the less background noise present. **Range:** 0 to –100 dBm **Note** This field appears only if you selected signal strength to be displayed in dBm. See the Signal Strength Display Units parameter in Table 7-2 for information.
Up Time	The amount of time (in hours:minutes:seconds) since the client adapter has been receiving power. If the adapter has been running for more than 24 hours, the time is displayed in days, hours:minutes:seconds.

Table 7-4 Advanced Client Adapter Status (continued)

Status	Description
802.11b Preamble	Indicates whether your client adapter is using only long radio headers or short and long radio headers. **Value:** Short & Long or Long Only **Note** This field contains a value only when the client adapter is operated in 2.4-GHz 11-Mbps or 2.4-GHz 54-Mbps mode. **Note** Refer to the 802.11b Preamble parameter in Table 5-3 for information on using radio headers.
Current Receive Rate	The rate at which your client adapter is currently receiving data packets. **Value:** 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps
Current Transmit Rate	The rate at which your client adapter is currently transmitting data packets. **Value:** 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54 Mbps
Channel	The channel that your client adapter is currently using for communications. This field displays *Scanning* while the client adapter searches for a channel. **Value:** Dependent on radio band and regulatory domain **Note** Refer to the Channel parameter in Table 5-3 for information on setting the channel for your client adapter. **Note** Refer to Appendix D for a list of channel identifiers, channel center frequencies, and regulatory domains for each channel.
Frequency	The radio frequency that your client adapter is currently using for communications. This field displays *Scanning* while the client adapter searches for a frequency. **Value:** Dependent on radio band and regulatory domain **Note** Refer to the Wireless Mode parameter in Table 5-3 for information on setting the frequency for your client adapter.
Channel Set	The regulatory domain for which your client adapter is currently configured. This value is not user selectable. **Value:** America, EMEA, Japan, or Rest of World **Note** Refer to Appendix D for a list of channel identifiers, channel center frequencies, and regulatory domains for each channel.

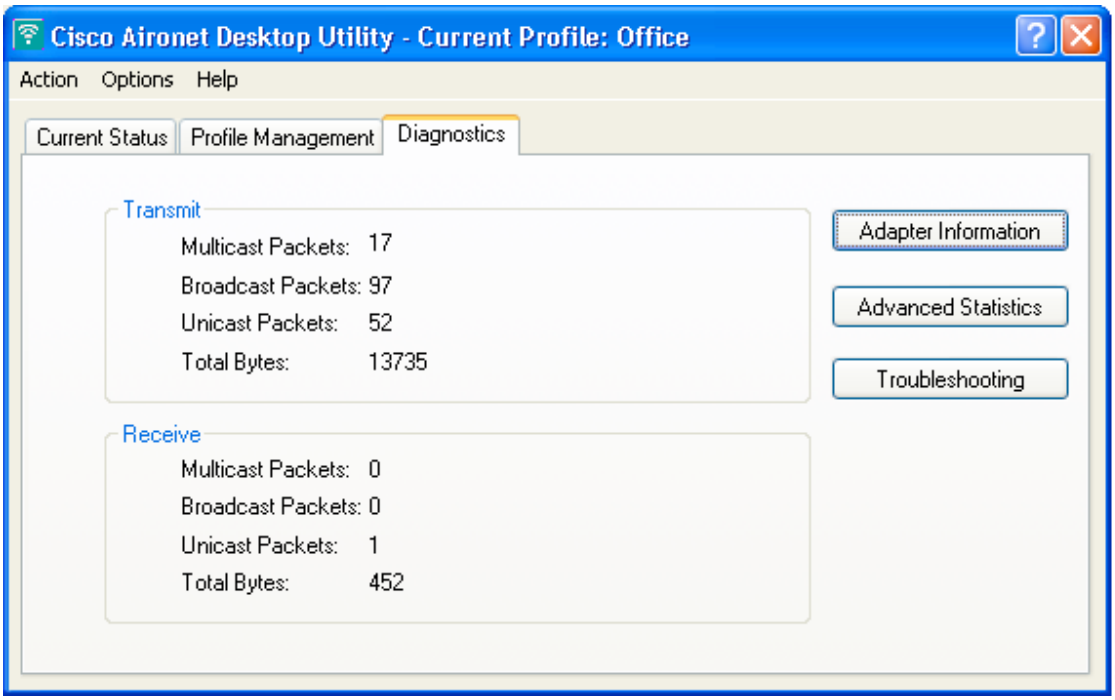
Click **OK** to close the Advanced Status window.

Viewing Statistics for Your Client Adapter

ADU enables you to view statistics that indicate how data is being received and transmitted by your client adapter.

To view your client adapter's statistics, open ADU and click the **Diagnostics** tab. The Cisco Aironet Desktop Utility (Diagnostics) window appears (see Figure 7-4).

Figure 7-4 Cisco Aironet Desktop Utility (Diagnostics) Window



This window displays basic transmit and receive statistics for your client adapter. The statistics are calculated on a relative or cumulative basis as specified by the Data Display parameter and are continually updated at the rate specified by the Refresh Interval parameter. Instructions for changing the Data Display and Refresh Interval settings are provided in Table 7-2.

Note The receive and transmit statistics are host statistics. That is, they show packets and errors received or sent by the Windows device.

Table 7-5 describes each statistic that is displayed for your client adapter.

Table 7-5 Basic Client Adapter Statistics

Statistic	Description
Transmit Statistics	
Multicast Packets	The number of multicast packets that were transmitted.
Broadcast Packets	The number of broadcast packets that were transmitted.
Unicast Packets	The number of unicast packets that were transmitted successfully.
Total Bytes	The number of bytes of data that were transmitted successfully.
Receive Statistics	
Multicast Packets	The number of multicast packets that were received.
Broadcast Packets	The number of broadcast packets that were received.
Unicast Packets	The number of unicast packets that were received successfully.
Total Bytes	The number of bytes of data that were received successfully.

Click **Advanced Statistics** if you want to view additional statistics for your client adapter. The Advanced Statistics window appears (see Figure 7-5).

Figure 7-5 Advanced Statistics Window

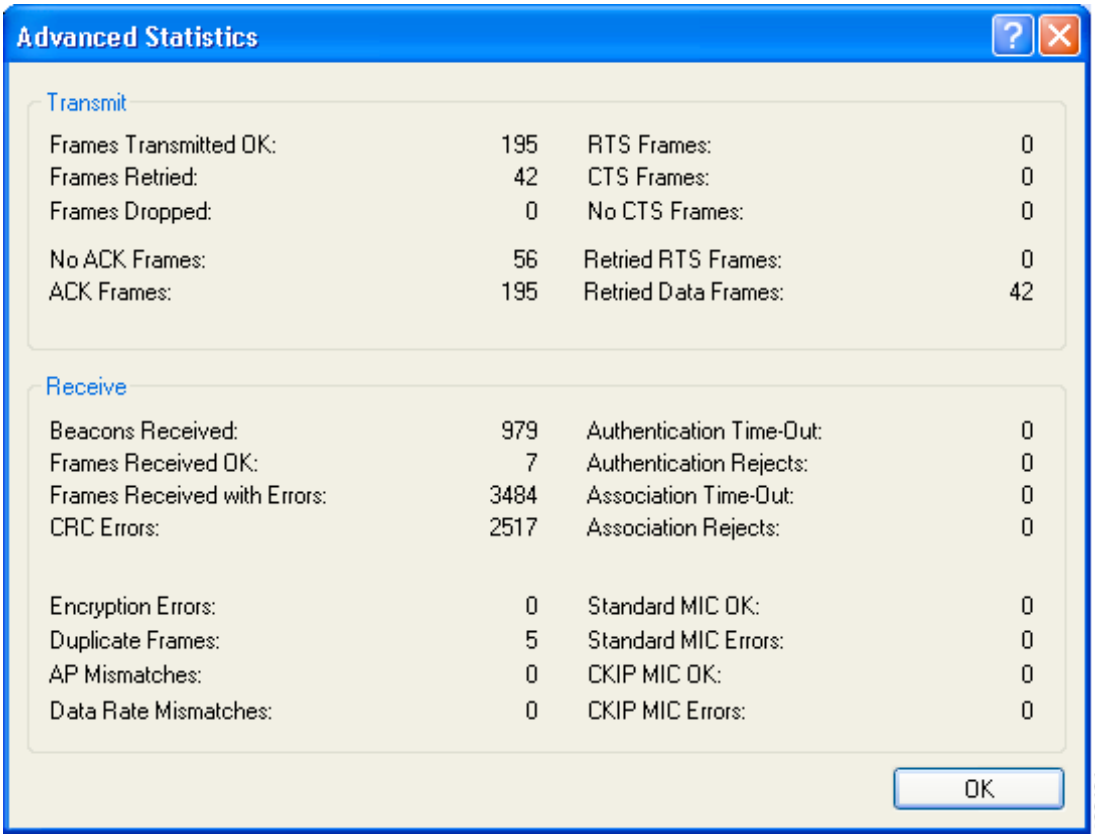


Table 7-6 interprets each element of the Advanced Statistics window.

Table 7-6 Advanced Client Adapter Statistics

Status	Description
Transmit Statistics	
Frames Transmitted OK	The number of frames that were transmitted successfully.
Frames Retried	The number of frames that were retried.
Frames Dropped	The number of frames that were dropped because of errors or collisions.
No ACK Frames	The number of transmitted frames that did not have their corresponding Ack frame received successfully.
ACK Frames	The number of transmitted frames that had their corresponding Ack frame received successfully.
RTS Frames	The number of request-to-send (RTS) transmissions that were attempted.
CTS Frames	The number of clear-to-send (CTS) frames that were received in response to a successfully transmitted RTS frame.
No CTS Frames	The number of request-to-send (RTS) transmissions that were unsuccessful. The access point sends CTS frames in response to the client's RTS frames. This field keeps track of each time the client does not receive a CTS back from the access point.
Retried RTS Frames	The number of request-to-send (RTS) frames that were retransmitted.
Retried Data Frames	The number of normal data frames that were retransmitted.
Receive Statistics	
Beacons Received	The number of beacon frames that were received successfully.
Frames Received OK	The number of all frames that were received successfully.
Frames Received with Errors	The number of frames that were received with an invalid checksum.
CRC Errors	The number of cyclic redundancy check (CRC) errors detected in the data portion of the frame.
Encryption Errors	The number of frames that were received with encryption errors.
Duplicate Frames	The number of duplicate frames that were received.
AP Mismatches	The number of times the client adapter tried to associate to an access point but was unable to because the access point was not the adapter's specified access point. **Note** Refer to the Access Point 1 through Access Point 4 parameters on page 5-13 for information on specifying access points.
Data Rate Mismatches	The number of times the client adapter tried to associate to an access point but was unable to because the adapter's data rate was not supported by the access point. **Note** Refer to the Wireless Mode parameter in Table 5-3 for information on supported data rates.

Table 7-6 Advanced Client Adapter Statistics (continued)

Status	Description
Authentication Time-Out	The number of times the client adapter tried to authenticate to an access point but was unable to because the access point did not respond fast enough (timed out).
Authentication Rejects	The number of times the client adapter tried to authenticate to an access point but was rejected.
Association Time-Out	The number of times the client adapter tried to associate to an access point but was unable to because the access point did not respond fast enough (timed out).
Association Rejects	The number of times the client adapter tried to associate to an access point but was rejected.
Standard MIC OK	The number of frames that were received with the correct message integrity check (MIC) value.
Standard MIC Errors	The number of frames that were discarded due to an incorrect message integrity check (MIC) value.
CKIP MIC OK	The number of frames that were received with the correct message integrity check (MIC) value when CKIP was being used. **Note** This field is displayed only if MIC is enabled on the access point.
CKIP MIC Errors	The number of frames that were discarded due to an incorrect message integrity check (MIC) value when CKIP was being used. **Note** This field is displayed only if MIC is enabled on the access point.

Click **OK** to close the Advanced Statistics window.