

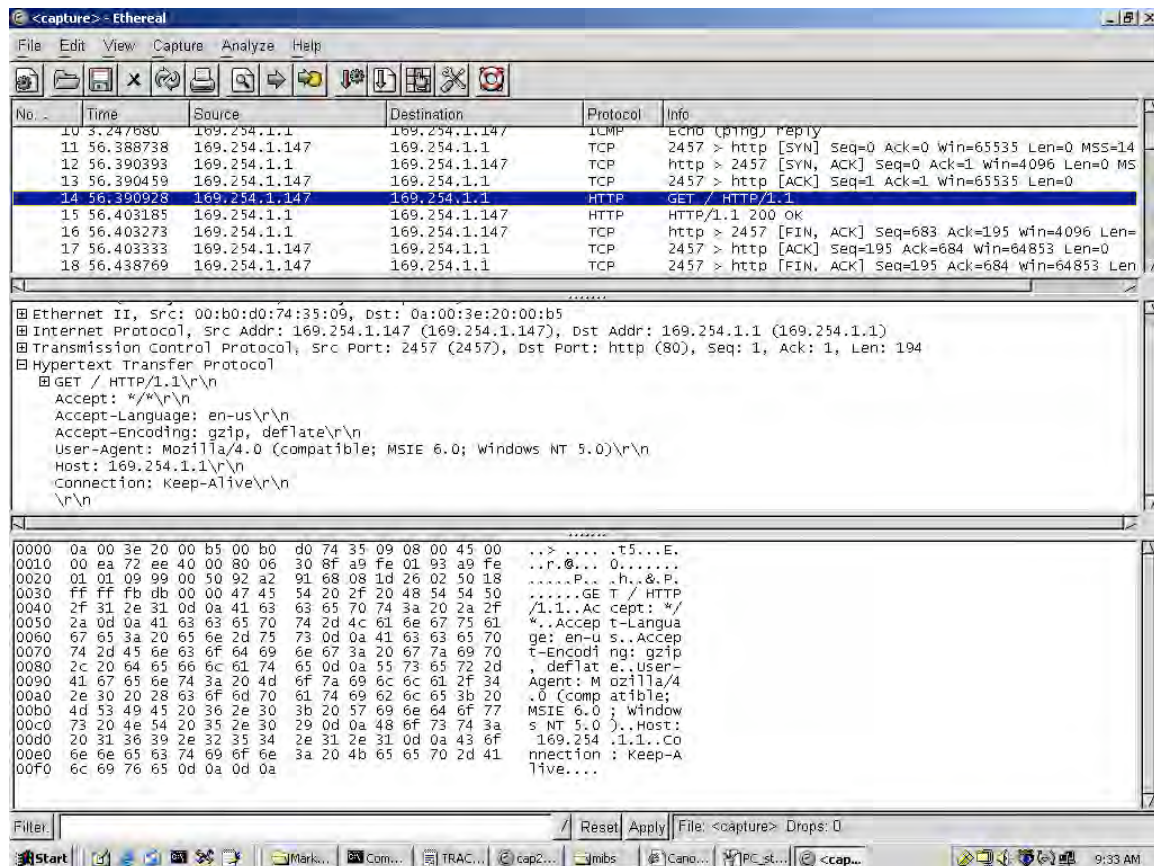


Figure 183: <capture> - Ethereal window, Packet 14 selected

In this second example, Packet 14 (protocol type HTTP) is selected in the top pane. The two lower panes provide further details about Packet 14.

32 TROUBLESHOOTING

32.1 GENERAL PLANNING FOR TROUBLESHOOTING

Effective troubleshooting depends in part on measures that you take before you experience trouble in your network. Canopy recommends the following measures for each site:

1. Identify troubleshooting tools that are available at your site (such as a protocol analyzer).
2. Identify commands and other sources that can capture baseline data for the site. These may include
 - **ping**
 - **tracert** or **tracert**
 - Link Capacity Test results
 - throughput data
 - Configuration tab captures
 - Status tab captures
 - session logs
3. Start a log for the site.
4. Include the following information in the log:
 - operating procedures
 - site-specific configuration records
 - network topology
 - software releases, boot versions, and FPGA firmware versions
 - types of hardware deployed
 - site-specific troubleshooting processes
 - escalation procedures
5. Capture baseline data into the log from the sources listed in Step 2.

32.2 GENERAL FAULT ISOLATION PROCESS

Effective troubleshooting also requires an effective fault isolation methodology that includes

- attempting to isolate the problem to the level of a system, subsystem, or link, such as
 - AP to SM
 - AP to CMM
 - AP to GPS
 - CMM to GPS
 - BHM to BHS
 - BHM to CMM
 - power
- researching Event Logs of the involved equipment. (See [Interpreting Messages in the Event Log](#) on Page 412.)

- answering the questions listed in the following section.
- reversing the last previous corrective attempt before proceeding to the next.
- performing only one corrective attempt at a time.

32.3 QUESTIONS TO HELP ISOLATE THE PROBLEM

When a problem occurs, attempt to answer the following questions:

1. What is the history of the problem?
 - Have we changed something recently?
 - Have we seen other symptoms before this?
2. How wide-spread is the symptom?
 - Is the problem on only a single SM? (If so, focus on that SM.)
 - Is the problem on multiple SMs? If so
 - is the problem on one AP in the cluster? (If so, focus on that AP)
 - is the problem on multiple, but not all, APs in the cluster? (If so, focus on those APs)
 - is the problem on all APs in the cluster? (If so, focus on the CMM and the GPS signal.)
3. Based on data in the Event Log (described in [Interpreting Messages in the Event Log](#) on Page 412)
 - does the problem correlate to External Hard Resets with no WatchDog timers? (If so, this indicates a loss of power. Correct your power problem.)
 - is intermittent connectivity indicated? (If so, verify your configuration, power level, jitter, cables and connections, and the speed duplex of both ends of the link).
 - does the problem correlate to loss-of-sync events?
4. Are connections made via *shielded* cables?
5. Does the GPS antenna have an *unobstructed* view of the entire horizon?

32.4 SECONDARY STEPS

After preliminary fault isolation through the above steps

1. check the Canopy knowledge base (<http://motorola.canopywireless.com/support/knowledge>) to find whether other network operators have encountered a similar problem.
2. proceed to any appropriate set of diagnostic steps. These are organized as follows:
 - [Module Has Lost or Does Not Establish Connectivity](#)
 - [NAT/DHCP-configured SM Has Lost or Does Not Establish Connectivity](#) on Page 468
 - [SM Does Not Register to an AP](#) on Page 470
 - [BHS Does Not Register to the BHM](#) on Page 471
 - [Module Has Lost or Does Not Gain Sync](#) on Page 472
 - [Module Does Not Establish Ethernet Connectivity](#) on Page 473
 - [Module Does Not Power Up](#) on Page 474
 - [Power Supply Does Not Produce Power](#) on Page 474

- [CMM2 Does Not Power Up](#) on Page 475
- [CMM2 Does Not Pass Proper GPS Sync to Connected Modules](#) on Page 475

32.5 PROCEDURES FOR TROUBLESHOOTING

32.5.1 Module Has Lost or Does Not Establish Connectivity

To troubleshoot a loss of connectivity, perform the following steps.

Procedure 48: Troubleshooting loss of connectivity

1. Isolate the end user/SM from peripheral equipment and variables such as routers, switches, and firewalls.
2. Set up the minimal amount of equipment.
3. On each end of the link
 - a. check the cables and connections.
 - b. verify that the cable/connection scheme—straight-through or crossover—is correct.
 - c. verify that the LED labeled LNK is green.
 - d. access the General Status tab in the Home page of the module.
 - e. verify that the SM is registered.
 - f. verify that RSSI is 700 or higher.
 - g. verify that jitter is reported as 9 or lower.
 - h. access the IP tab in the Configuration page of the module.
 - i. verify that IP addresses match and are in the same subnet.
4. On the SM end of the link
 - a. verify that the PC that is connected to the SM is correctly configured to obtain an IP address through DHCP.
 - b. execute `ipconfig`.
 - c. verify that the PC has an assigned IP address.
5. On each end of the link
 - a. access the General tab in the Configuration page of each module.
 - b. verify that the setting for **Link Speeds** (or negotiation) matches that of the other module.
 - c. access the Radio tab in the Configuration page of each module.
 - d. verify that the **Radio Frequency Carrier** setting is checked in the **Custom Radio Frequency Scan Selection List**.
 - e. verify that the **Color Code** setting matches that of the other module.
 - f. access the browser LAN settings (for example, at **Tools→Internet Options→Connections→LAN Settings** in Internet Explorer).
 - g. verify that none of the settings are selected.
 - h. access the Link Capacity Test tab in the Tools page of the module.
 - i. perform a link test. (See [Procedure 40: Performing a Link Capacity Test](#) on Page 435.)

- j. verify that the link test results show efficiency greater than 90% in both the uplink and downlink (except as described under [Comparing Efficiency in 1X Operation to Efficiency in 2X Operation](#) on Page 134).
 - k. execute `ping`.
 - l. verify that no packet loss was experienced.
 - m. verify that response times are not significantly greater than
 - 2.5 ms from BH to BH
 - 4 ms from AP to SM
 - 15 ms from SM to AP
 - n. replace any cables that you suspect may be causing the problem.
6. After connectivity has been re-established, reinstall network elements and variables that you removed in Step 1.

===== end of procedure =====

32.5.2 NAT/DHCP-configured SM Has Lost or Does Not Establish Connectivity

Before troubleshooting this problem, identify the NAT/DHCP configuration from the following list:

- NAT with DHCP Client and DHCP Server
- NAT with DHCP Client
- NAT with DHCP Server
- NAT without DHCP

To troubleshoot a loss of connectivity for an SM configured for NAT/DHCP, perform the following steps.

Procedure 49: Troubleshooting loss of connectivity for NAT/DHCP-configured SM

1. Isolate the end user/SM from peripheral equipment and variables such as routers, switches, and firewalls.
2. Set up the minimal amount of equipment.
3. On each end of the link
 - a. check the cables and connections.
 - b. verify that the cable/connection scheme—straight-through or crossover—is correct.
 - c. verify that the LED labeled LNK is green.
4. At the SM
 - a. access the NAT Table tab in the Logs web page.
NOTE: An example of this tab is shown in [Figure 184](#).

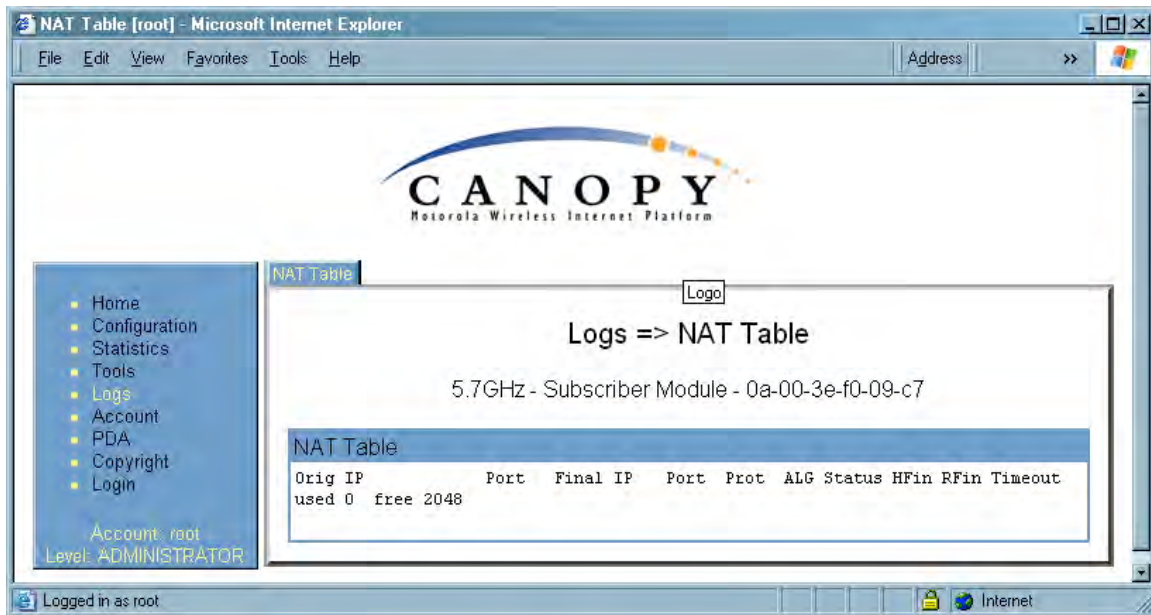


Figure 184: NAT Table tab of SM, example

- b. verify that the correct NAT translations are listed.
RESULT: NAT is eliminated as a possible cause if these translations are correct.
5. If this SM is configured for NAT with DHCP, then at the SM
 - a. execute **ipconfig**.
 - b. verify that the PC has an assigned IP address.
 - c. if the PC *does not* have an assigned IP address, then
 - enter **ipconfig /release "Adapter Name"**.
 - enter **ipconfig /renew "Adapter Name"**.
 - reboot the PC.
 - retreat to Step 5a.
 - d. if the PC has an assigned IP address, then
 - access the NAT DHCP Statistics tab in the Statistics web page of the SM.
NOTE: An example of this tab is shown in [Figure 185](#).

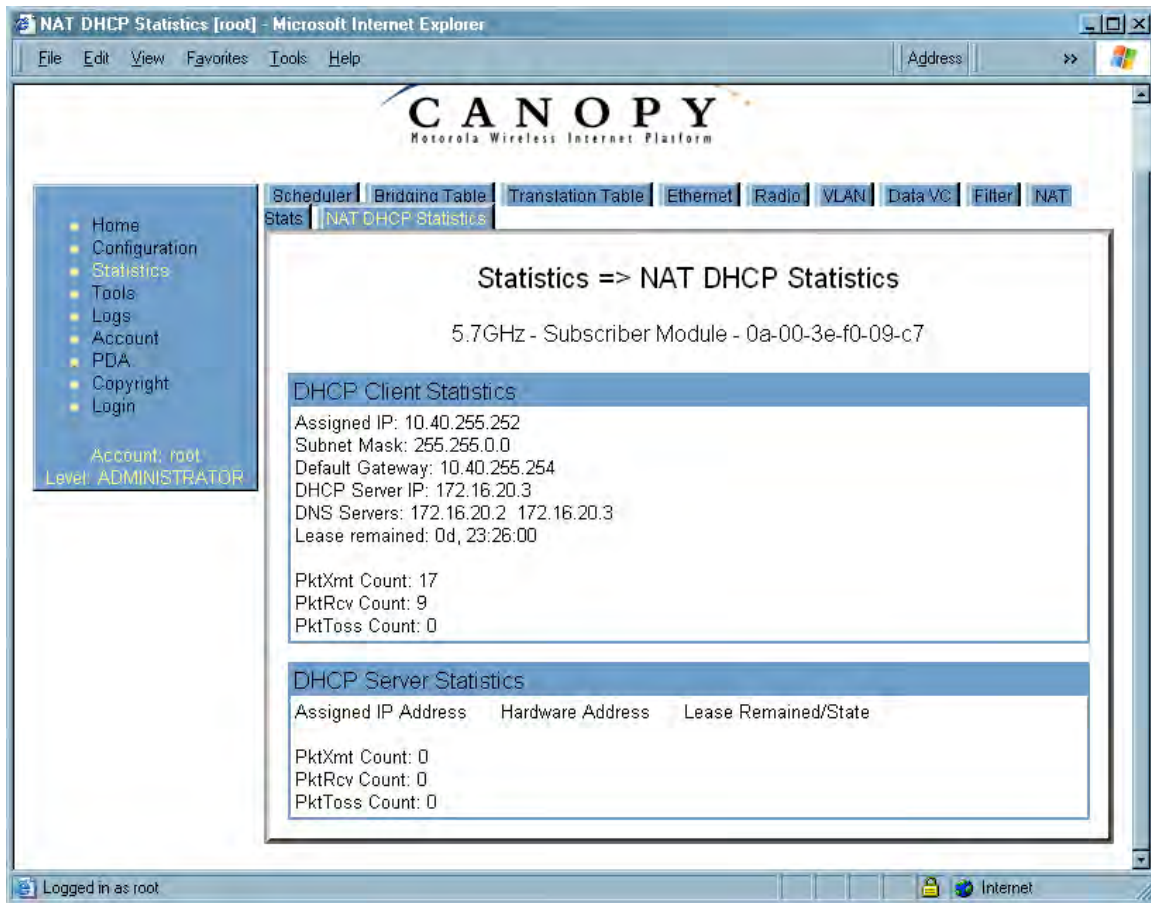


Figure 185: NAT DHCP Statistics tab of SM, example

- verify that DHCP is operating as configured.
6. After connectivity has been re-established, reinstall network elements and variables that you removed in Step 1.

===== end of procedure =====

32.5.3 SM Does Not Register to an AP

To troubleshoot an SM failing to register to an AP, perform the following steps.

Procedure 50: Troubleshooting SM failing to register to an AP

1. Access the Radio tab in the Configuration page of the SM.
2. Note the **Color Code** of the SM.
3. Access the Radio tab in the Configuration page of the AP.
4. Verify that the **Color Code** of the AP matches that of the SM.
5. Note the **Radio Frequency Carrier** of the AP.
6. Verify that the value of the **RF Frequency Carrier** of the AP is selected in the **Custom Radio Frequency Scan Selection List** parameter in the SM.

7. In the AP, verify that the **Max Range** parameter is set to a distance slightly greater than the distance between the AP and the furthest SM that must register to this AP.
8. Verify that a clear line of sight exists between the AP and the SM, and that no obstruction significantly penetrates the Fresnel zone of the attempted link. If these conditions are not established, then verify that the AP and SM are 900-MHz modules in close proximity to each other.
9. Access the General Status tab in the Home page of each module.
10. In the **Software Version** field, verify that both the AP and SM are of the same encryption scheme (AES or DES).
11. Remove the bottom cover of the SM to expose the LEDs.
12. Power cycle the SM.
RESULT: Approximately 25 seconds after the power cycle, the green LED labeled LNK should light to indicate that the link has been established. If the orange LED labeled SYN is lit instead, then the SM is in Alignment mode because the SM failed to establish the link.
13. In this latter case, and if the SM has encountered no customer-inflicted damage, then request an RMA for the SM.

===== end of procedure =====

32.5.4 BHS Does Not Register to the BHM

To troubleshoot an BHS failing to register to the BHM, perform the following steps.

Procedure 51: Troubleshooting BHS failing to register to a BHM

1. Access the Radio tab in the Configuration page of the BHS.
2. Note the **Color Code** of the BHS.
3. Access the Radio tab in the Configuration page of the BHM.
4. Verify that the **Color Code** of the BHM matches that of the BHS.
5. Note the **Radio Frequency Carrier** of the BHM.
6. Verify that the value of the **RF Frequency Carrier** of the BHM is selected in the **Custom Radio Frequency Scan Selection List** parameter on the Configuration page of the BHS.
7. Verify that a clear line of sight exists between the BHM and BHS, and that no obstruction significantly penetrates the Fresnel zone of the attempted link.
8. Access the General Status tab in the Home page of each module.
9. In the **Software Version** field, verify that both the BHM and BHS are of the same encryption scheme (AES or DES).
10. Also in the Software Version field, verify that both the BHM and BHS are of the same modulation rate from the factory (BH20 or BH10).
11. Remove the bottom cover of the BHS to expose the LEDs.

12. Power cycle the BHS.

RESULT: Approximately 25 seconds after the power cycle, the green LED labeled LNK should light to indicate that the link has been established. If the orange LED labeled SYN is lit instead, then the BHS is in Alignment mode because the BHS failed to establish the link. In this latter case, and if the BHS has encountered no customer-inflicted damage, then request an RMA for the BHS.

===== end of procedure =====

32.5.5 Module Has Lost or Does Not Gain Sync

To troubleshoot a loss of sync, perform the following steps.

Procedure 52: Troubleshooting loss of sync

1. Access the Event Log tab in the Home page of the SM.

NOTE: An example of this tab is shown in [Figure 186](#).

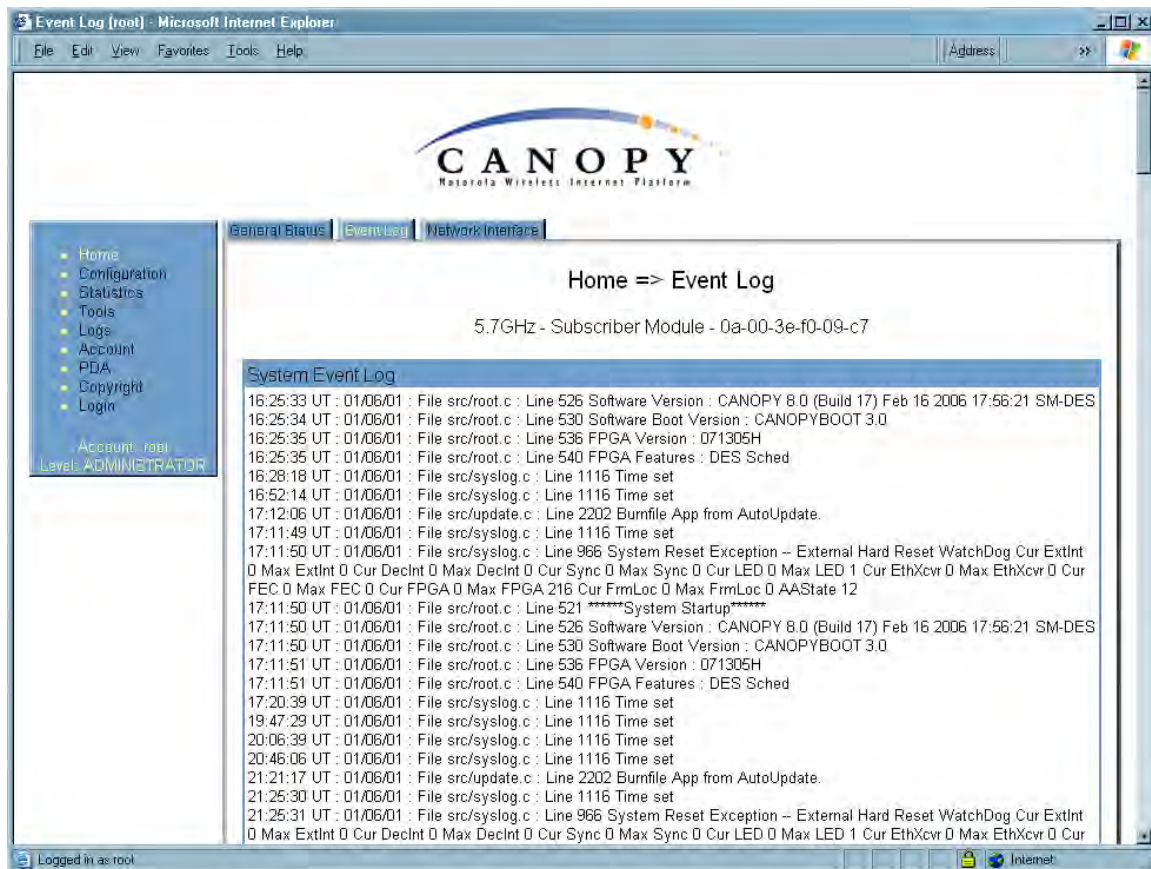


Figure 186: Event Log tab of SM, example

2. Check for messages with the following format:

RcvFrmNum =
ExpFrmNum =

(See [Table 67: Event Log messages for abnormal events](#) on Page 414.)

3. If these messages are present, check the Event Log tab of another SM that is registered to the same AP for messages of the same type.
4. If the Event Log of this second SM *does not* contain these messages, then the fault is isolated to the first SM.
5. If the Event Log page of this second SM contains these messages, access the GPS Status page of the AP.
6. If the **Satellites Tracked** field in the GPS Status page of the AP indicates fewer than 4 or the **Pulse Status** field does not indicate Generating Sync, check the GPS Status page of another AP in the same AP cluster for these indicators.
7. If these indicators are present in the second AP
 - a. verify that the GPS antenna still has an unobstructed view of the entire horizon.
 - b. visually inspect the cable and connections between the GPS antenna and the CMM.
 - c. if this cable is not shielded, replace the cable with shielded cable.
8. If these indicators *are not* present in the second AP
 - a. visually inspect the cable and connections between the CMM and the AP antenna.
 - b. if this cable is not shielded, replace the cable with shielded cable.

===== end of procedure =====

32.5.6 Module Does Not Establish Ethernet Connectivity

To troubleshoot a loss of Ethernet connectivity, perform the following steps.

Procedure 53: Troubleshooting loss of Ethernet connectivity

1. Verify that the connector crimps on the Ethernet cable are not loose.
2. Verify that the Ethernet cable is not damaged.
3. If the Ethernet cable connects the module to a network interface card (NIC), verify that the cable is pinned out as a straight-through cable.
4. If the Ethernet cable connects the module to a hub, switch, or router, verify that the cable is pinned out as a crossover cable.
5. Verify that the Ethernet port to which the cable connects the module is set to auto-negotiate speed.
6. Power cycle the module.
RESULT: Approximately 25 seconds after the power cycle, the green LED labeled LNK should light to indicate that the link has been established. If the orange LED labeled SYN is lit instead, then the module is in Alignment mode because the module failed to establish the link.
7. In this latter case, and if the module has encountered no customer-inflicted damage, then request an RMA for the module.

===== end of procedure =====

32.5.7 Module Does Not Power Up

To troubleshoot the failure of a module to power up, perform the following steps.

Procedure 54: Troubleshooting failure to power up

1. Verify that the connector crimps on the Ethernet cable are not loose.
2. Verify that the Ethernet cable is not damaged.
3. Verify that the cable is wired and pinned out according to the specifications provided under [Wiring Connectors](#) on Page 182.
4. Remove the cover of the module to expose the components on the printed wiring board.
5. Find the Ethernet transformer, which is labeled with either the name Halo or the name Pulse.
6. Verify that the Ethernet transformer does not show damage that would have been caused by improper cabling. (You can recognize damage as the top of the transformer being no longer smooth. The transformer in the following picture is damaged and is ineligible for an RMA.)



7. Connect the power supply to a known good Canopy module via a known good Ethernet cable.
8. Attempt to power up the known good module and
 - if the known good module fails to power up, request an RMA for the power supply.
 - if the known good module powers up, return to the module that does not power up.
9. Reconnect the power supply to the failing module.
10. Connect the power supply to a power source.
11. Verify that the red LED labeled PWR lights.
12. If this LED *does not* light, and the module has not been powered up since the last previous FPGA firmware upgrade was performed on the module, then request an RMA for the module.

===== end of procedure =====

32.5.8 Power Supply Does Not Produce Power

To troubleshoot the failure of a power supply to produce power, perform the following steps.

Procedure 55: Troubleshooting failure of power supply to produce power

1. Verify that the connector crimps on the Ethernet cable are not loose.
2. Verify that the Ethernet cable is not damaged.

3. Verify that the cable is wired and pinned out according to the specifications provided under [Wiring Connectors](#) on Page 182.
4. Connect the power supply to a known good Canopy module via a known good Ethernet cable.
5. Attempt to power up the known good module.
6. If the known good module fails to power up, request an RMA for the power supply.

===== end of procedure =====

32.5.9 CMM2 Does Not Power Up

To troubleshoot a malfunctioning CMM2, perform the following steps.

Procedure 56: Troubleshooting CMM2 that malfunctions

1. Verify that the 115-/230-V switch (in the lower right-hand corner of the CMM2) is in the correct position for the power source. (See [Figure 129](#) on Page 339.) Applying power when this switch is in the wrong position can damage the CMM2 and will render it ineligible for an RMA.
2. Verify that the electrical source to the CMM2 meets Canopy specifications. See [Table 20](#) on Page 75.
3. Verify that the electrical source is connected to the CMM2 at the proper connection point. (See [Figure 131](#) on Page 341.)
4. Verify that the fuse is operational.
5. Verify that the fuse is properly seated in the receptacle.
6. Attempt to power up the CMM2.
7. If the power indicator on the interconnect board of the CMM2 fails to light when power is applied to the CMM2, request an RMA for the CMM2.

===== end of procedure =====

32.5.10 CMM2 Does Not Pass Proper GPS Sync to Connected Modules

If the Event Log tabs in all connected modules contain `Loss of GPS Sync Pulse` messages, perform the following steps.

Procedure 57: Troubleshooting CMM2 not passing sync

1. Verify that the GPS antenna has an unobstructed view of the entire horizon.
2. Verify that the GPS coaxial cable meets specifications.
3. Verify that the GPS sync cable meets specifications for wiring and length.
4. If the web pages of connected modules indicate any of the following, then find and eliminate the source of noise that is being coupled into the GPS sync cable:
 - In the GPS Status page
 - anomalous number of **Satellites Tracked** (greater than 12, for example)
 - incorrect reported **Latitude** and/or **Longitude** of the antenna
 - In the Event Log page
 - garbled GPS messages
 - large number of `Acquired GPS Sync Pulse` messages

5. If these efforts fail to resolve the problem, then request an RMA for the CMM2.

===== end of procedure =====

32.5.11 Module Software Cannot be Upgraded

If your attempt to upgrade the software of a module fails, perform the following steps.

Procedure 58: Troubleshooting an unsuccessful software upgrade

1. Download the latest issue of the target release and the associated release notes.
2. Compare the files used in the failed attempt to the newly downloaded software.
3. Compare the procedure used in the failed attempt to the procedure in the newly downloaded release notes.
4. If these comparisons reveal a difference, retry the upgrade, this time with the newer file or newer procedure.
5. If, during attempts to upgrade the FPGA firmware, the following message is repeatable, then request an RMA for the module:

Error code 6, unrecognized device

===== end of procedure =====

32.5.12 Module Functions Properly, Except Web Interface Became Inaccessible

If a module continues to pass traffic, and the telnet and SNMP interfaces to the module continue to function, but the web interface to the module does not display, perform the following steps.

Procedure 59: Restoring the web interface to a module

1. Enter `telnet DottedIPAddress`.
RESULT: A telnet session to the module is invoked.
2. At the `Login` prompt, enter `root`.
3. At the `Password` prompt, enter `PasswordIfConfigured`.
4. At the `Telnet +>` prompt, enter `reset`.
RESULT: The web interface is accessible again, and this telnet connection is closed.

===== end of procedure =====

33 OBTAINING TECHNICAL SUPPORT

**NOTE:**

The contact information for Canopy Technical Support staff is included at the end of this section (on Page 481). However, in most cases, you should follow the procedure of this section before you contact them.

To get information or assistance as soon as possible for problems that you encounter, use the following sequence of actions:

1. Search this document, the user guides of products that are supported by dedicated documents, and the software release notes of supported releases
 - a. in the Table of Contents for the topic.
 - b. in the Adobe Reader⁹ search capability for keywords that apply.⁹
2. Visit <http://motorola.canopywireless.com/support/knowledge> to view the Canopy Knowledge Base.
3. Ask your Canopy products supplier to help.
4. View and analyze event logs, error messages, and debug messages to help isolate the problem.
5. Check release notes and verify that all of your Canopy equipment is on the correct software release.
6. Verify that the Canopy configuration files match the last known good (baseline) Canopy configuration files captured in the site log book.
7. Verify connectivity (physical cabling).
8. At the SM level, minimize your network configuration (remove home network devices to help isolate problem).
9. Perform the site verification checklist.
10. Use [Table 69](#) (two pages) as a job aid to collect basic site information for technical support to use.

⁹ Reader is a registered trademark of Adobe Systems, Incorporated.

Table 69: Basic site information for technical support

Call Log Number:	Company:	Location:
Problem Type:	Site Contact:	Site Phone:
Call Severity (Select One): 1- Urgent-Customer Svc Down 2- Serious- Customer Svc Impacted 3- Non-Critical/General Inquiry	Open Date:	Close Date:
Product Types Involved: (ID the product type) 2400 SM/AP/BHM/BHS 5200 ER /BHM/BHS 5200 SM/AP/BHM/BHS 5700 SM/AP/BHM/BHS 1008CK 300SS ACPS110	MAC Addresses:	IP Addresses:
Software Releases:	Boot Versions:	FPGA Versions:
Authentication ?: Yes/No Type:	Is the customer using shielded cables? Yes/No	Remote Access Method: IP Address:

- IP address:
 - Downlink/uplink ratio:
 - Max range:
 - Bridge entry timeout:
 - Number of subscribers:
 - Method of synchronization:
14. If you selected [Figure 35](#)
- a. Indicate how many APs are in each cluster.
 - b. Indicate how many AP clusters are deployed (and what types).
 - c. Indicate how many BH links are configured.
 - d. Include the IP addresses.
 - e. Indicate the frequency for each sector.
 - f. Indicate the type of synchronization.
 - g. Indicate how much separation exists between clusters and BHs.
 - h. Indicate the types of BH links (10-Mbps or 20-Mbps).
 - i. Distances of links.
 - j. Frequency used by each BH.
 - k. For each AP and BHM, collect the following additional information:
 - Sector number:
 - SW release:
 - Frequency:
 - Color code:
 - IP address:
 - Downlink/uplink ratio:
 - Max range:
 - Bridge entry timeout:
 - Number of subscribers:
 - Method of synchronization:
15. If you selected [Figure 36](#), collect the following additional information:
- Sector number:
 - SW release:
 - Frequency:
 - Color code:
 - IP address:
 - Downlink/uplink ratio:
 - Max range:
 - Bridge entry timeout:
 - Number of subscribers:
 - Method of synchronization:
16. Add any details that are not present in the generic diagram that you selected.
17. Save your diagram as file `Net_Diagram`.
18. Capture screens from the following web pages of affected modules:

- Home page Status tabs as files *SM/AP/BHM/BHS_StatusTabname.gif*
 - Configuration page tabs as files *SM/AP/BHM/BHS_ConfigTabname.gif*
 - Home page Event Log as file *SM/AP/BHM/BHS_Events.gif*
 - Tools page Link Capacity Test tab (with link test results) as file *SM/AP/BHM/BHS_LinkTST.gif*
 - Statistics page Radio tab as file *SM/AP/BHM/BHS_RFstats.gif*
19. For any affected SM or BHS, capture the Tools page AP Evaluation tab as file *SM/BHS_APEval.gif*.
20. For any affected SM that has NAT/DHCP enabled, capture screens from the following additional web pages:
- Configuration page NAT tab as file *SM_Natconfig.gif*
 - Configuration page NAT Port Mapping tab as file *SM_NatPortmap.gif*
 - Logs page NAT Table tab as file *SM_NatTable.gif*
 - Statistics page NAT Stats tab as file *SM_NatStats.gif*
 - Statistics page Translation Table tab as file *SM_ArpStats.gif*
 - Statistics page NAT DHCP Statistics tab as file *SM_DhcpStats.gif*
- Also capture the Windows IP Configuration screen as file *SM_WindowsIP.gif*.
21. Escalate the problem to Canopy systems Technical Support (or another technical support organization that has been designated for you) as follows:
- a. Start e-mail to technical-support@canopywireless.com. In this email
 - Describe the problem.
 - Describe the history of the problem.
 - List your attempts to solve the problem.
 - Attach the above files.
 - List the files that you are attaching.
 - b. Send the email.
 - c. Call 1 888 605 2552 (or +1 217 824 9742).

===== end of procedure =====

34 GETTING WARRANTY ASSISTANCE

For warranty assistance, contact your reseller or distributor for the process.

