

## Wifi Sensor Troubleshooting

### Overview

The Wifi Sensor Utility can be used to help troubleshoot sensors issues with connecting to a wireless network. The troubleshooting suggestions below assume you have the Wifi Sensor Utility or Point Sensor Utility installed on your computer and that you know how to use it.

When the programming cable is connected to the sensor, the sensor goes into "setup mode". The sensor continuously attempts to connect to the wireless network and will stay connected until the programming cable is disconnected or the sensor setup has changed. The sensor is in "sensor mode" when the programming cable is not connected and the sensor power switch is turned on. When in "sensor mode", the sensor remains in a low power state, when ready to transmit will turn on, connect, transmit a UDP packet and then go back to the low power state.

### Troubleshooting

#### Notes:

- 1) The sensor may not work reliably with signal strengths below about -63 dbm for 802.11b sensors and -75dbm for 802.11g sensors. If the signal strength is smaller than that the sensor may work marginally or not at all. Obviously the better the signal strength the better the chance that the sensor has at delivering a sensor packet.
- 2) The signal strength will vary from sample to sample. You should take multiple samples to determine the signal strength. Signal strength is available in the Status tab and the Available Networks window (press the "Find Networks" button in the Setup tab)
- 3) The red led on the main sensor board indicates that a transmit attempt has just started. The led on the radio module indicates that radio module is connected to the network. When in sensor mode the led will flash when a connection is made. When in setup mode (the programming cable is connected to the sensor) the led will remain on continuously when a connection is established. In setup mode the red led never comes on.
- 4) Some access points have a mode called Auto Channel mode where it will move between up to 11 channels. If the access point is using this feature the sensor may work properly in "setup mode" but could fail or work very marginally in "sensor mode". If the access point is using Auto Channel mode, make sure the sensor has "Auto Find" for the channel and the right channels have been selected for "Auto Find" channels. Note: 802.11b sensors can only Auto Find 3 channels; 802.11g sensors can use all channels in Auto Find channel mode.
- 5) Some access points will move between three channels (typically 1, 6 and 11). The Wifi sensor will work with these access points with the Channel AutoFind feature but the channels that are used must match the channels the sensor is configured for.
- 6) In sensor mode, it can take up to 5 seconds for the transmit cycle to complete. This is from when the service button is pressed to when the acknowledgement is received from the host.
- 7) If the connect time to the network is consistently long (over 5 seconds), the sensor may not be able to connect to the network. If you suspect the connect time to the network is long, 1) Use the "Test Connect Time" tool in the utility or 2) use a PC to connect to the network and then measure the connection that a PC takes to verify the connection time. If the network consistently takes longer than 5 seconds to connect to the network, you may need to make adjustments to the settings. Set the connect time window to a longer value (use the Connect Time tool to help determine this value) or change a connection component like channel AutoFind or DHCP. Extending the Connect Window may cause the battery to be exhausted more quickly. The battery meter may need to be de-rated.

### Cannot connect to the wireless network

- 1) Verify that the network exists.
- 2) Verify signal strength. Use the built in sensor signal strength meter. Use a signal strength meter like a PC running "Network Stumbler". Determine if adequate signal strength exists at that location.
- 3) Verify your network settings.

- 4) Make sure the network settings do not exclude 802.11b when using 802.11b sensors. Also make sure the router or Access Point will accept connections of 1 Mega baud. Some access points maybe set up to exclude certain WLAN data rates. You might have to change the WLAN data rate setting in the sensor.
- 5) *802.11b sensors only*: Turn off auto modes in the router or Access Point. The sensor does not support WPA2-PSK TKIP. There are some routers and Access Points where the sensor will connect if the network is set to WPA2-PSK AES and TKIP. Set the router to WPA2-PSK AES.
- 6) If the sensor was previously connected at one location, but will not connect at the new location, temporarily move the sensor to the previous location and verify operation. It is also possible that a setting at the sensor or on the network has changed.

### **Can connect to the network but cannot obtain a dynamic IP address**

- 1) Verify your network settings.
- 2) Verify that you are connected to the right network.
- 3) Use the "Ping from Sensor" function in the utility to ping an address that should be available from the network (verify that the address is ping-able).
- 4) Use the "Ping from PC" function in the utility to see if your PC can ping an address on that network (your PC must be connected to that network for this to work)
- 5) Use the "Ping from PC" function in the utility (if this PC is connected) and see if you can ping the sensor when it is in setup mode. Go to the Status tab to determine the sensor's IP address.
- 6) Use a static ip address temporarily and connect to the network. Determine if sensor packets are being received by the host.
- 7) Make sure the DHCP Server has not exhausted the number of assignable IP addresses.
- 8) Does the DHCP Server need to be configured to accept this type of device?
- 9) It is possible the DHCP Server is taking too long to respond to the request.

### **Can connect to the network but host is not receiving UDP packets**

- 1) Verify your network settings.
- 2) Verify that you are connected to the right network.
- 3) Verify that the Destination IP address is correct.
- 4) If using the broadcast address, verify that the network can support broadcasts. Most routers by default will not route broadcast traffic.
- 5) If the host will respond to ping requests, use the "Ping from Sensor" function in the utility to have the sensor ping the host. Use the "Ping from PC" feature if this PC is connected or a PC on the network and ping the host. Also try pinging the sensor when the sensor is in setup mode.
- 6) Is the host ready to receive the sensor packets? Is the host configured to listen for the UDP packets? Is the host software running? Is firewall software installed at the host that would prevent the UDP traffic? Anything on the network that would restrict packets from being routed (like MAC filtering)?
- 7) Use the "Contact Destination Host" function from the Tools tab.
- 8) If using a hostname for the destination address:
  - a. Make sure the DNS address is correct (whether set as static or obtained through the DHCP server).
  - b. Is the hostname being resolved in setup mode? (Use the Wifi Sensor, go to the Status tab and examine the Resolved Destination field.)

### **Can connect to the network and Contact Destination using the utility but host is not receiving UDP packets in sensor mode**

- 1) Verify your network settings.
- 2) Is the access point using Auto Channel mode and switching between channels? The access point may have switched to a different channel than is set up in the sensor.
- 3) Use the Connect Time tool in the utility to verify how long the sensor takes to connect to the network. If the network consistently takes longer than 5 seconds to connect to the network, you may need to make adjustments to the settings. Set the connect time window to a longer value (use the Connect Time tool to help determine this value) or change a connection component like channel AutoFind or DHCP. Extending the Connect Window may cause the battery to be exhausted more quickly. The battery meter may need to be de-rated.
- 4) Verify the signal strength where the sensor is located. Also check how the sensor is mounted and oriented at this location with respect to the access point. For example, the sensor is mounted at the back of a refrigerator but may work better being mounted near the top of the refrigerator.
- 5) Change batteries.

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## **Battery Meter indicates a lower battery life than expected**

- 1) Was the battery meter reset when the batteries were last changed?
- 2) The transmit period is too short.
- 3) Was the service button pressed a lot for this sensor?
- 4) Lots of alarms?
- 5) Lots of tries for the sensor?
- 6) Check network quality. Is the connect time for the sensor greater than 5 seconds? Use the "Test Connect Time" tool in the utility. Check the signal strength.

## **Wifi Sensor Utility cannot find the sensor**

- 1) Make sure the programming cable is plugged into the sensor.
- 2) Disconnect the programming cable, power the sensor off, power the sensor on, wait 5 seconds, connect programming cable and try again.
- 3) Does the red LED in the programming cable flash when doing an operation?
- 4) Disconnect the programming cable from sensor and connect again.
- 5) Disconnect the programming cable from sensor and then disconnect the cable from the PC. Wait 30 seconds. Plug cable back into PC and into sensor.
- 6) Reboot your computer.
- 7) Use an externally powered USB Hub. Your computer may not be supplying enough power through the USB port.

## **Wifi Sensor Network Compatibility Issues**

### **In Sensor Mode, Data Not Reaching Destination**

#### *DHCP Caching Enabled*

While in Configuration Mode, the sensor can connect (associate/authenticate) to the network and Contact Destination is successful but while in Sensor Mode the sensor data never reaches the destination. The UDP data packet from the sensor is not forwarded by the router.

The following routers have been confirmed to have this problem:

LinkSys	WRT610N
LinkSys	WRT310N V2
LinkSys	E1200 (3 sec. ave. connect time with no DHCP caching)
Belkin	F5D7234-4BC V1
NetGear	WNDR3400

Work Around:

- 1) Use Dynamic IP and have DHCP Caching turned off. If the IP address is static or the DHCP Caching is enabled, these routers will not forward the sensor's UDP data packet.
- 2) Re-image the firmware with firmware from such as Tomato.
- 3) Replace the router.

### **Sensor Data Not Reaching Destination When Using No Security for Authentication**

When the wireless router is set up for No Security for the Authentication method, the sensor can connect (associate/authenticate) to the network but Contact Destination is not successful (cannot reach host) and in sensor mode the sensor cannot successfully deliver the packet data.

The following routers have been confirmed to have this problem:

LinkSys	WRT610N
LinkSys	WRT310N V2
LinkSys	E1200

Work Around:

- 1) Use another Authentication method such as WPA2, WPA, or WEP128.

### **The Sensor Cannot Be Configured to Use an SSID with a Leading Zero (ex. "0TestNetwork")**

The sensor radio cannot be successfully configured to use an SSID with a leading zero. This issue applies to radio versions 2.18, 2.27, and 2.32.

Work Around:

- 1) Change the SSID on the wireless router or access point to an SSID that does not have a leading 0.
- 2) Request to upgrade the radio firmware to version 2.36 or greater.

### **Digi TransPort WR41 Wireless Router**

Wifi sensors would drop off. Typically all the wifi sensors would drop off. If a laptop wifi was connected full time, all the sensors would function properly.

Work Around:

- 1) Upgrade firmware for the WR41 to Version 5167.