Troubleshooting INSTEON networks with HouseLinc

There is a very powerful tool in the latest version of HouseLinc that lets users run signal diagnostic tests on their INSTEON networks to determine the signal reliability to a given device.

As users add more and more devices, the network signal reliability becomes important to track and actively manage to get the best performance out of your home automation devices.

By following these steps you will be able to:

- Establish a baseline signaling test for your INSTEON network
- Troubleshoot areas of the network that show less than 99% reliability.
- Increase the reliability of the INSTEON network

Items needed:

- HouseLinc Home Automation Software (http://www.insteon.com/houselinc.html)
- Plug-In Dual-Band INSTEON Device(s) (Access Points and/or LampLinc Dual-Band)
- FilterLinc(s)

NOTE: Signaling diagnostics should be run when the network is quite; the best times are usually at night when devices are not being activated by users.

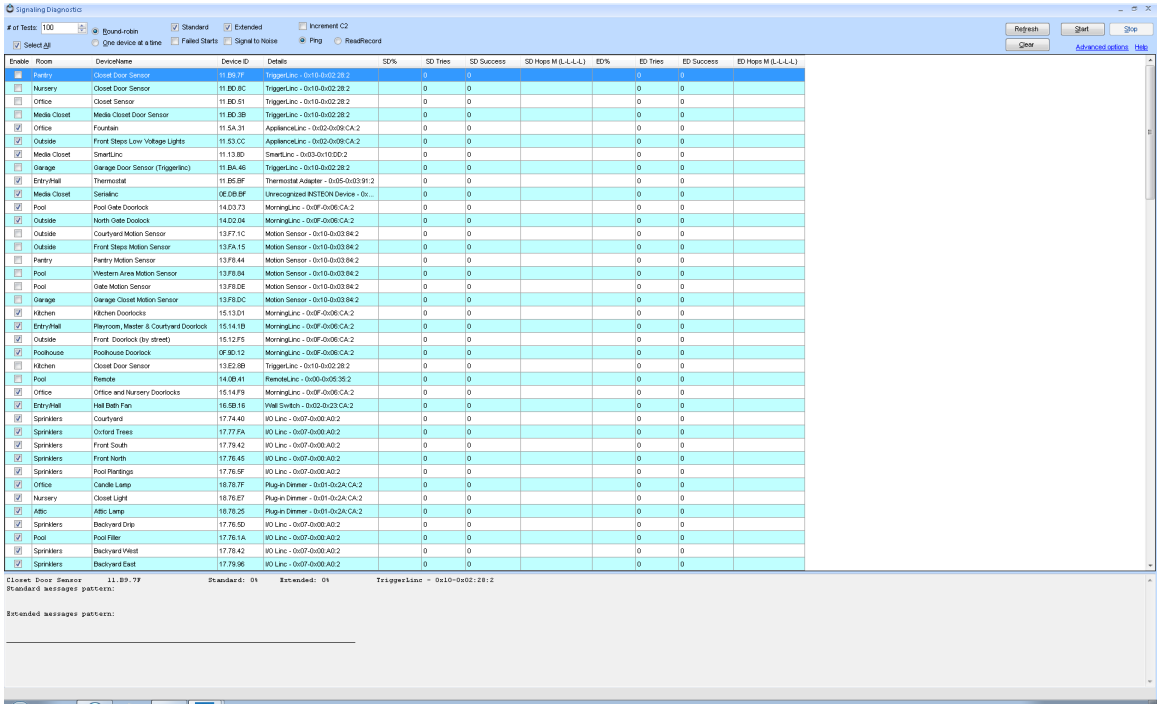
Establishing a baseline

Each home is different from the next; therefore each Home Automation installation is different.

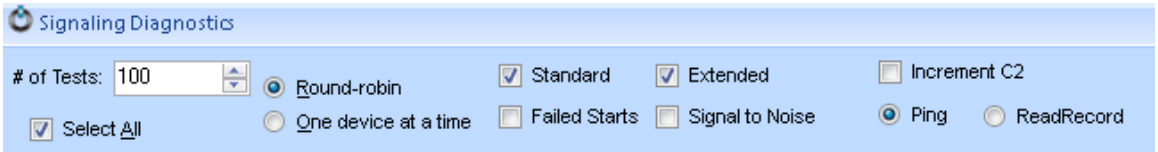
A baseline of the signaling (ability to communicate to devices) on the INSTEON network needs to be established before we can identify areas that will require attention.

Follow the steps below for HouseLinc to run the Signal Diagnostic test.

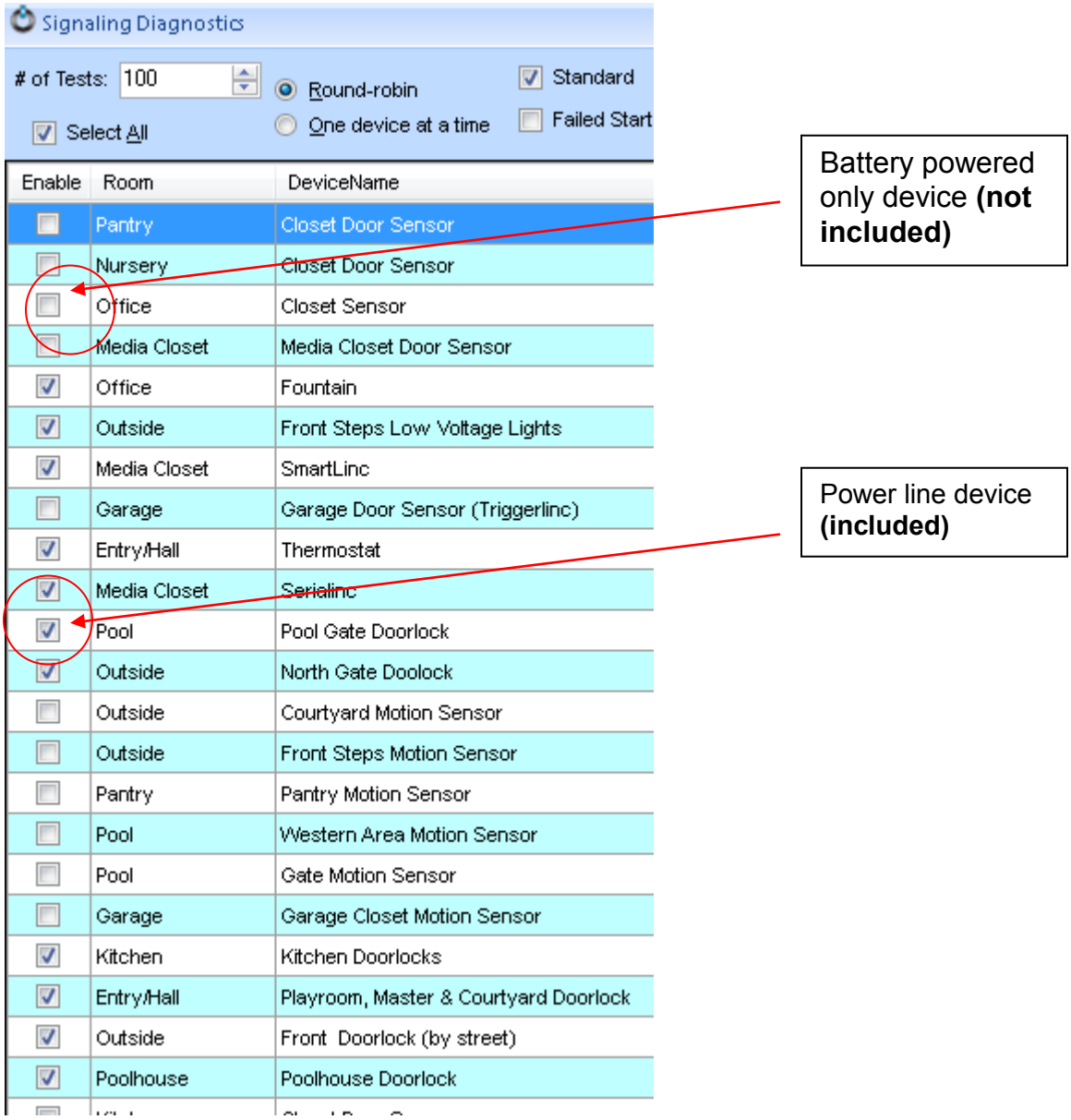
1>From the dropdown menu; Click Tools->Advanced->Signaling Diagnostics.
(this will list all the devices that are currently in HouseLinc)



2>The settings for our test are already configured by the software as default.

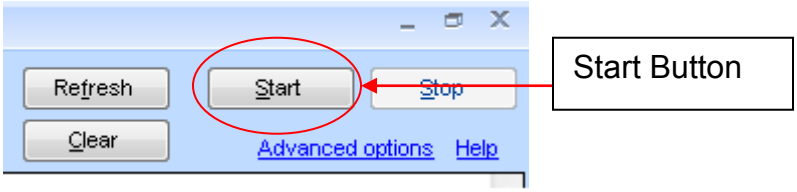


Additionally the software automatically deselected the devices that are battery powered only. Since this signal test will take some time the battery powered devices power down to save battery life. They will not be included in these results.



Enable	Room	DeviceName
☐	Pantry	Closet Door Sensor
☐	Nursery	Closet Door Sensor
☐	Office	Closet Sensor
☐	Media Closet	Media Closet Door Sensor
☑	Office	Fountain
☑	Outside	Front Steps Low Voltage Lights
☑	Media Closet	SmartLinc
☐	Garage	Garage Door Sensor (Triggerlinc)
☑	Entry/Hall	Thermostat
☑	Media Closet	Serialinc
☑	Pool	Pool Gate Doorlock
☑	Outside	North Gate Doolock
☐	Outside	Courtyard Motion Sensor
☐	Outside	Front Steps Motion Sensor
☐	Pantry	Pantry Motion Sensor
☐	Pool	Western Area Motion Sensor
☐	Pool	Gate Motion Sensor
☐	Garage	Garage Closet Motion Sensor
☑	Kitchen	Kitchen Doorlocks
☑	Entry/Hall	Playroom, Master & Courtyard Doorlock
☑	Outside	Front Doorlock (by street)
☑	Poolhouse	Poolhouse Doorlock

3>After opening the Signaling Diagnostic page, Click the Start button on the right.
(this will start the Signaling Test to your INSTEON network)



4>As HouseLinc proceeds to test your network you will notice a few things

Details	SD%	SD Tries	SD Success	SD Hops M {L-L-L-L}	ED%	ED Tries	ED Success	ED Hops M {L-L-L-L}
TriggerLinc - 0x10-0x02:28:2		0	0			0	0	
TriggerLinc - 0x10-0x02:28:2		0	0			0	0	
TriggerLinc - 0x10-0x02:28:2		0	0			0	0	
TriggerLinc - 0x10-0x02:28:2		0	0			0	0	
ApplianceLinc - 0x02-0x09:CA:2	**100**	1	1	0-0-0-0 1-0-...	**100**	1	1	0-0-0-0 1-0-...
ApplianceLinc - 0x02-0x09:CA:2	**100**	1	1	0-0-0-0 1-0-...	**100**	1	1	0-0-0-0 1-0-...
SmartLinc - 0x03-0x10:DD:2	**100**	1	1	1-0-0-0 0-0-...	**100**	1	1	1-0-0-0 0-0-...
TriggerLinc - 0x10-0x02:28:2		0	0			0	0	
Thermostat Adapter - 0x05-0x03:91:2	**100**	1	1	0-0-0-0 1-0-...	**100**	1	1	1-0-0-0 0-0-...
Unrecognized INSTEON Device - 0x...	**100**	1	1	1-0-0-0 0-0-...	**100**	1	1	1-0-0-0 0-0-...
MorningLinc - 0x0F-0x06:CA:2	**100**	1	1	0-0-0-0 1-0-...	**100**	1	1	0-0-0-0 1-0-...

Details = Shows the type of Device being tested and hardware versions of that device

SD% = Standard Message percentage = SD Tries / SD Success
SD Tries = Number of attempts to send a Standard Message
SD Success = Number of Standard Messages that have been received
SD Hops = statistical representation of distance away from the PowerLinc Modem

***ED%** = Extended Message percentage = ED Tries / ED Success
***ED Tries** = Number of attempts to send a Extended Message
***ED Success** = Number of Extended Messages that have been received
***ED Hops** = statistical representation of distance away from the PowerLinc Modem

NOTE: *Depending on the number of devices in your Home Automation network this test may take up to a few hours. We recommend that Signaling tests be run when the network is quietest (usually at night)*

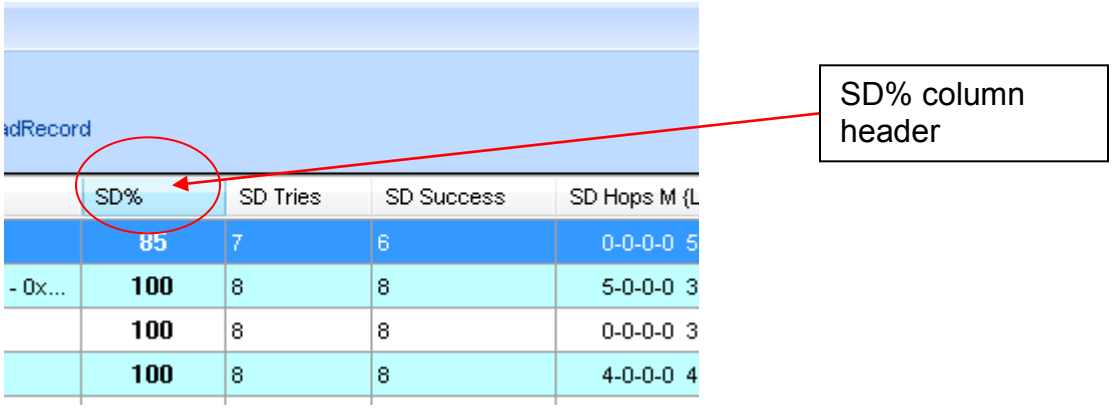
<u>The test is completed when the number of SD Tries is equal to # of Tests. In the case of this test that value is 100.</u>

**Extended Messages are supported in devices that have a hardware revision number of 4.0 and higher.*

Troubleshooting the INSTEON Network

For purposes of this test we are concerned with the devices that have the lowest percentages for SD%. To easily determine which ones those are we need to resort the table by SD% to show the devices that have the lowest percentage at the top of the window. *(see below)*

7>Click on the SD% column header until the grid resorts with the lowest percentage devices at the top.



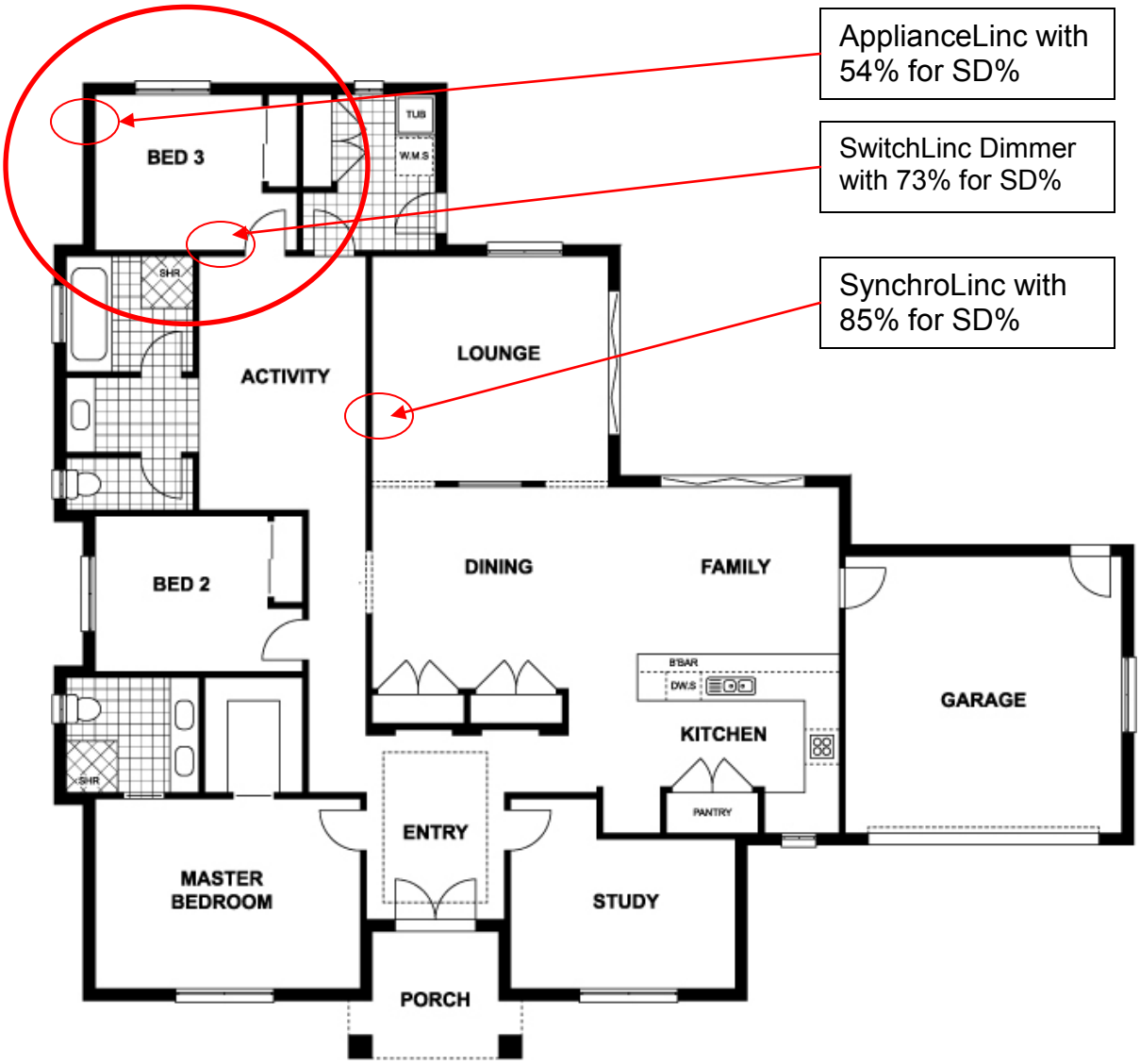
At this point differences from network to network are considered and the steps below should address most of the issues.

For the devices that show values less than 99% for SD% we will need to do some analysis to determine a course of action.

1>Are the items physically connected to your Home Automation network?

- Devices may have been removed from your network and/or replaced.
- Ensure that if the device should be active (plugged in) it is.
- If the device is not physically on the network and it should NOT be, then disregard the results (as they are correct).

2>Are the devices that have low SD% values able to be grouped by room?



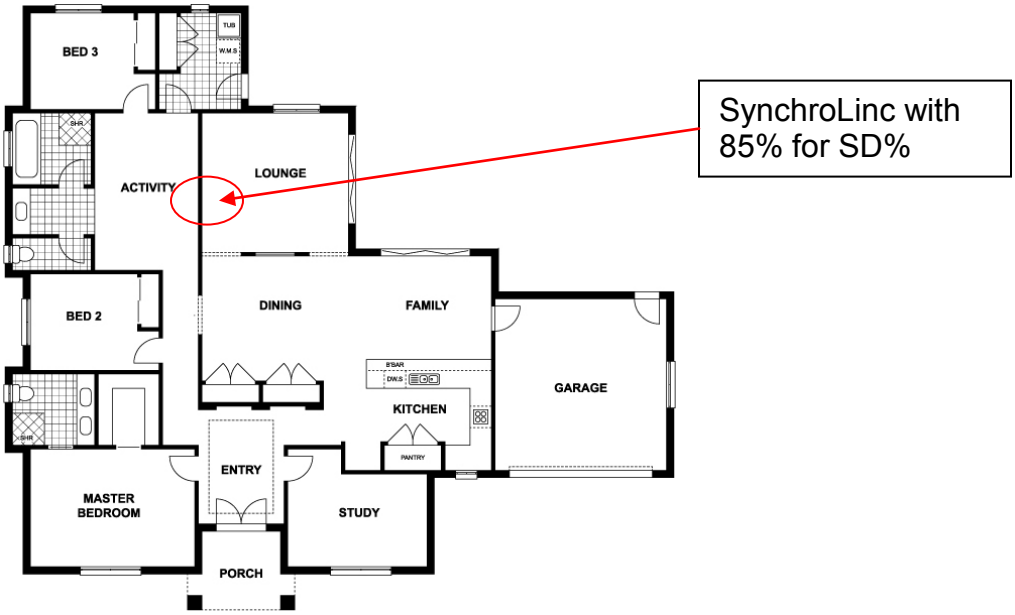
In this floor plan there are devices that are in BED 3 and LOUNGE that have a low SD%. This helps to identify the locations in the network where signaling is lower; thus focusing our efforts.

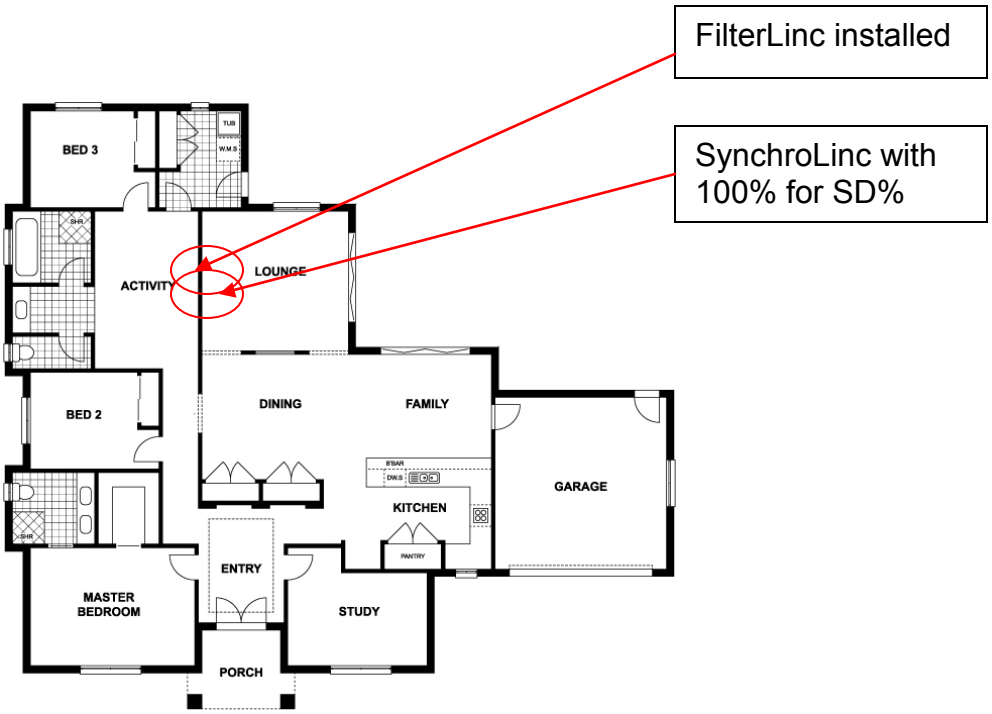
Within a given location there could be a couple of variables.
a> Are there devices in the room or in adjacent rooms that may be feeding back noise onto the power line? Additional power-line noise on the network will affect network performance.

In our example; there happens to be a media center that we suspect may be adding additional power-line noise to the network, in the Lounge. In this case we would place a FilterLinc on devices that we suspect are causing noise on the power line.

To test if adding the FilterLinc solved the issue we will have to run a Signaling Diagnostic to those devices.

Comparing the results from our baseline test v. this new test; we can determine if adding the FilterLinc showed an improvement in the signaling to those/that device.





With this testing we've established that there was some additional noise being placed on the power line and by adding a FilterLinc we've increased the signaling reliability to the device.

There will be cases where adding a FilterLinc to equipment will not address the lower signaling percentage for devices. In that case additional troubleshooting will be required.

b> Is the device mobile?

If the device can be unplugged and moved to a location where you can replace a high SD% device with a lower one, do so. When moved, run a Signaling Diagnostic test to that specific device in its new location.

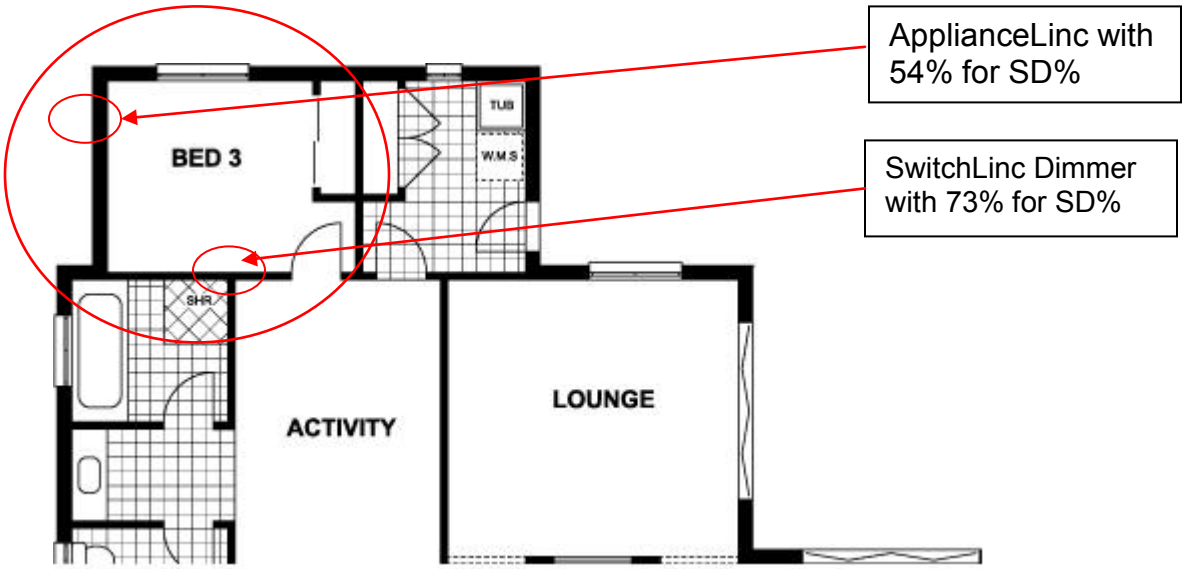
- If the previously low SD% device now reports a higher percentage for SD% (99% or better) then we can surmise that the device is working properly and focus our efforts on the environment.

- If the previously low SD% device is still reporting a low percentage for SD% in a location where there was already established good signaling to; then the device is suspect and should be replaced.

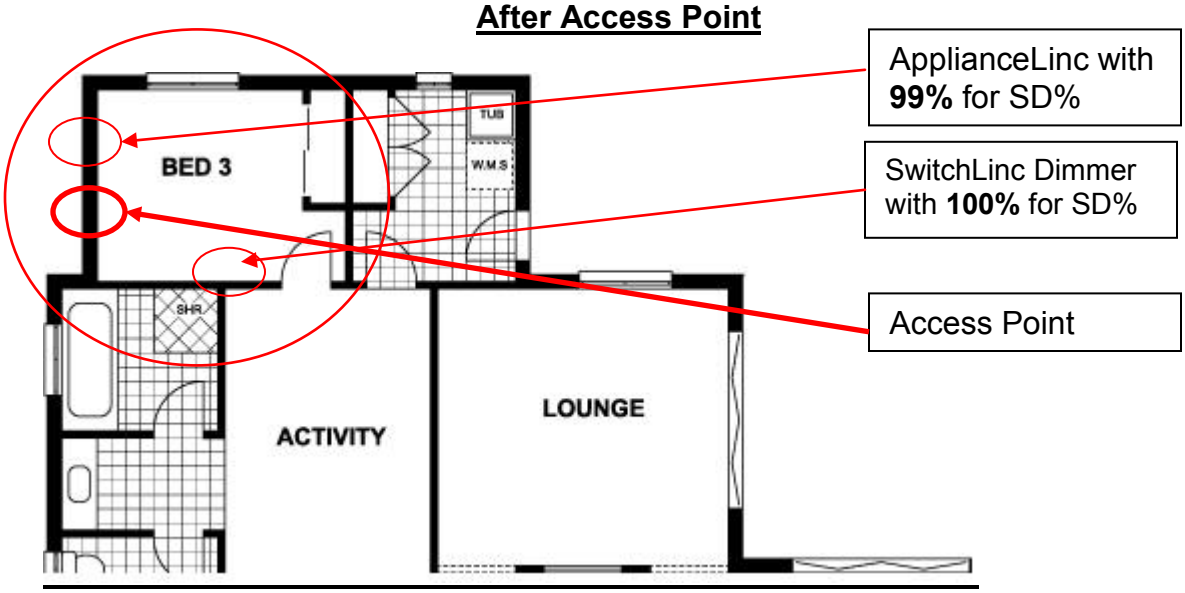
c> Does adding a Dual-Band Device help with the signaling to the lower SD% device and or room?

Add a Dual Band device to the room to help the signal get to the lower SD% devices and re-run a Signaling Diagnostic test to those devices to see if the addition of a Dual Band device helped with the signaling.

Before Access Point



After Access Point



If adding a dual-band device did not help signaling to the devices in the room, there are additional troubleshooting steps to be taken.

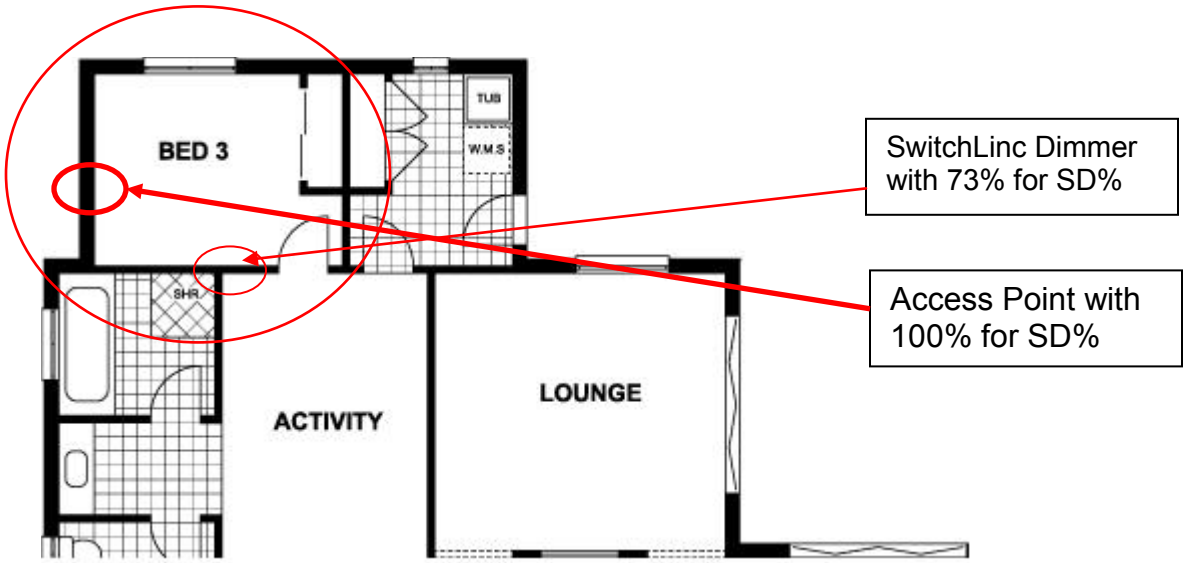
d> What is the SD% to the Access Point added to help with the signaling?

HouseLinc does not manage Access Points as there is no linking needed to the device. However HouseLinc does let the user add Access Points in the software so users can run Signaling Diagnostics to that device.

1. Add an Access Point to the HouseLinc software. (see steps in the HouseLinc manual for adding a device)

2. Run a Signaling Diagnostic test to the recently added Access Point and the device with the low SD%.

This is a useful tool when the device you are troubleshooting is not mobile (e.g. SwitchLinc Dimmer).



This would indicate that there may be some device specific issue with the SwitchLinc Dimmer and/or the load it is controlling.

e> Is the load connected to a wired-in controller be adding additional noise onto the network?

With the Signal Diagnostic tool you can test to see if the percentage of reliability to that specific switch is different when the switch is ON or OFF.

3. Turn the switch OFF (its load is in the OFF state).

4. Run a quick Signal Diagnostic test to that specific switch (20 tests) and note the SD % value

5. Turn the switch ON (its load is in the ON state).

6. Re-Run the Signal Diagnostic test from step 2 (20 tests) and note the SD % value.

7. Compare the 2 values. If the difference between the 2 values is greater than 5% then there may be an issue where the load connected to the switch is creating noise on the INSTEON network.

Smarthome offers a variety of in-line filters that help with the filtering of connected loads. One example is the Leviton Noise Block (6287). Follow the installation instructions that are included with the filter.

8. With the filter installed, restart the steps listed above to determine if there is still a difference between ON and OFF states.

- If the difference between the SD % when ON and when OFF is less than 5% the added in-line filter has helped with the amount of noise being introduced by the connected load.

- If the difference between the SD % when ON and when OFF is still greater than 5%, then the switch itself is suspect and my need replacing.

Using the Signaling Diagnostic tool in HouseLinc will help identify areas in your Home Automation Network where communication can be improved and thus improving your overall INSTEON reliability.

For additional help with troubleshooting please visit our support site for contact options http://www.insteon.net/contact.html