

App Note

Powerline Extension to EtherRain



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XE-102



XE-103

Ethernet Powerline Adapter



EtherRain™ 8

Powerline network extension adapters provide a means to extend an Ethernet connection to most any location where a power outlet exists. Today's Powerline network extension adapters are reliable and have more than enough capacity to provide a solid network extension for use with EtherRain.

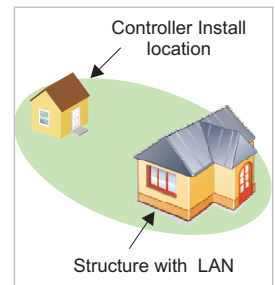
The most convenient install location for an EtherRain controller is typically at the location of an already existing sprinkler controller. Many natural install locations are not readily served by a network connection. However, because an existing sprinkler controller requires AC power for operation, a power outlet is most likely readily available. With an available power outlet, a Powerline network adapter can make easy work of providing an accessible network connection.

This note provides details on how to reliably extend a local Ethernet network to an EtherRain install location using commonly available and low cost Powerline network adapters.

Choosing an Adapter Set

Three generations of Powerline adapters are currently available. The first generation is rated at 14 Mbps. The second generation is rated at 85 Mbps and the latest generation has a maximum speed rating of about 200 Mbps. Any of these can be used, however for this application the first and second generation of adapters are preferred due mainly to their more proven records of reliability.

The Netgear model XE-103 is an 85 Mbps adapter that has proven reliability, is available at a low cost, and so is recommended for use in this application. The Netgear XE-102 has many of the same characteristics, is generally lower in cost, and is also recommended.



Issues with Powerline

Powerline adapters represent a convenient and effective method of extending a network connection to an EtherRain install location. However, there are some issues with their use. The adapters modulate a high frequency signal on to the power wires, and so their ability to communicate, and their effective communication distance depends on the level of spurious electrical noise already on the wire. The most common source of noise are high powered fluorescent lights. For most residential applications noise will not be an issue.

The next issue is the degree to which the chosen outlets are electrically connected. Both outlets will have power, however, if they are not on the same power phase there will be some degradation of signal and the connection distance will be limited. If one outlet combination doesn't work, it is possible to try different outlet combinations until two are found on the same power phase to provide a strong connection.

Step 1 Configure Adapter

Before using Powerline adapters it is important to verify that they have the same network name. If the adapters have different network names they will not communicate with each other. All Powerline adapters that have the same network name will become part of the same network and will share all traffic on the network. The adapters used for extending the network for EtherRain must share the same unique name. Also, in most cases, there is very little need to enable encryption for an EtherRain network extension.

Use the adapter configuration software to assign a unique shared network name to each adapter. Test the connectivity of two adapters by plugging them into outlets located within close proximity. The blue "Home Plug" LED will illuminate to confirm Powerline connectivity.

IMPORTANT: A Powerline extension for EtherRain requires two dedicated adapters. Both adapters must be given the same unique name. Do not assign more than two adapters to a network that is used for attaching EtherRain to the main LAN.

Step 2 Establish a Powerline Network

To establish the network extension, choose an outlet in close proximity to an open switch or router port on your existing network and plug an adapter directly into the wall socket. Next, locate a power outlet in close proximity to the intended EtherRain install location. When using Netgear XE-103 adapters, the blue "Home Plug" LED will illuminate within each unit when a connection is established between the adapters.

If after plugging in both adapters the blue Home Plug LED does not illuminate (confirm network names per step 1) then alternate outlets will have to be tested. If tests with alternate outlets do not result in illumination of the Home Plug LED the adapters cannot be used.



A 6 Plug Power Tap Adapter securely mounts both Power Transformer and XE-103

Step 3 Confirm Connectivity and Install

After Home Plug connectivity has been confirmed, mount the EtherRain controller and with EtherRain powered down, connect EtherRain to the adapter with a CAT5 patch cable. Connect the other adapter to an open switch port or router port. Power up the controller. You should see the yellow LED flicker on the controller to indicate it is receiving data.

When using Powerline adapters a 6 plug power tap such as the one shown above is convenient for securely mounting both the 24VAC sprinkler power transformer and the Powerline adapter usually with a few open outlets remaining. A powerstrip can be used with Powerline adapters, but avoid using the expensive strips that have noise filters as these will block out the network signals.