

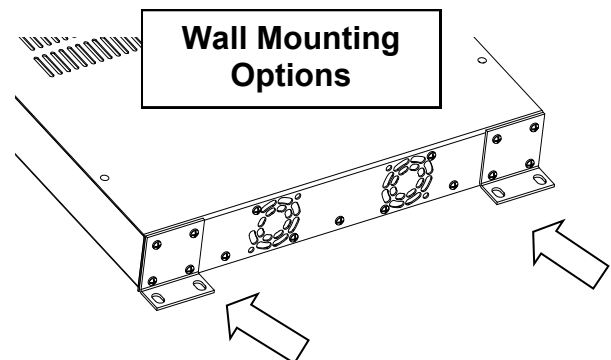
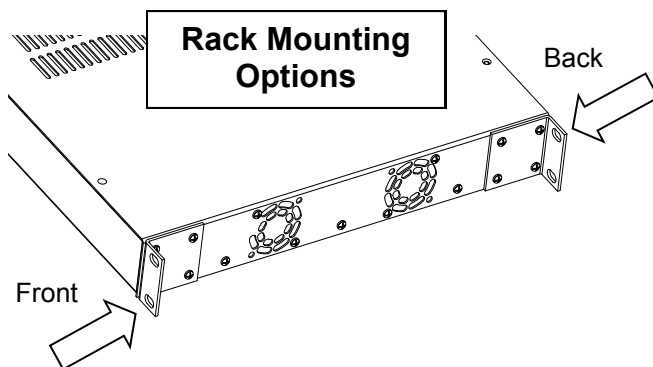


Reduce risk of fire or electrical shock. Do not expose this product to rain or moisture.

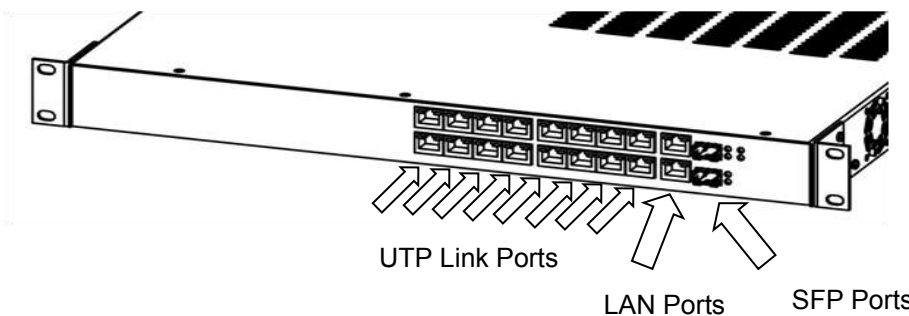
Note: This installation should be made by a qualified service person and conform with local codes.

Head-end Installation ER8500U and ER16500U

- 1) The ER8500U / ER16500U can be rack mounted, wall mounted or used as desk top unit. Use the included mounting ears in the front or back of the unit depending on your needs. The mounting ears can also be turned to the bottom of the unit for wall mounting if needed. When mounting the unit, be sure to follow these guide lines.
 - a. Operating Ambient - Do not install the unit in an assembly where the ambient temperature could exceed 52°C (125°F). NOTE: the ambient temperature in a closed or multi-unit rack assembly could greatly exceed the ambient temperature outside that assembly.
 - b. Air-Flow – Leave space on the sides of the unit for airflow into the cooling fans and some space on top of the unit for air to exit the unit. Adequate air flow is required for safe operation.
 - c. Mechanical Loading – The mounting ears were designed for two ears to support one unit. Other configurations, such as mounting other equipment directly on top of the unit or using only one mounting ear, could cause a hazardous condition due to uneven or excessive mechanical loading.
 - d. Circuit Loading - Do not connect the unit to an electrical supply if the wiring or over current protection of the supply could be overloaded when the ratings listed on the unit are considered.
 - e. Grounding (Earthing) - Reliable earth grounding of rack-mounted equipment should be maintained, use only 3 conductor equipment power cords. If the unit is plugged into a power strip or extension cord, that strip or cord should have a ground (third) pin on its plug.



- 2) Connect up the link ports of the unit. The link ports are designed for connection with standard Ethernet cables. The link ports are 10/100Mb speed and will run at the highest possible speed given the wire conditions and system settings. This system normally operates at 100Mb over cable up to 600 meters long, when connected to the correct Nitek transmitters. When connected directly to network devices, cables can be up to 100 meters. We refer to the cable between the Head-end and the transmitter as the Link cable. The speed of the connection is indicated on the link port of the unit. A transmitter or other network device must be connected at the other end of the Link cable for the connection speed to be indicated.



Patent Pending

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NITEK®

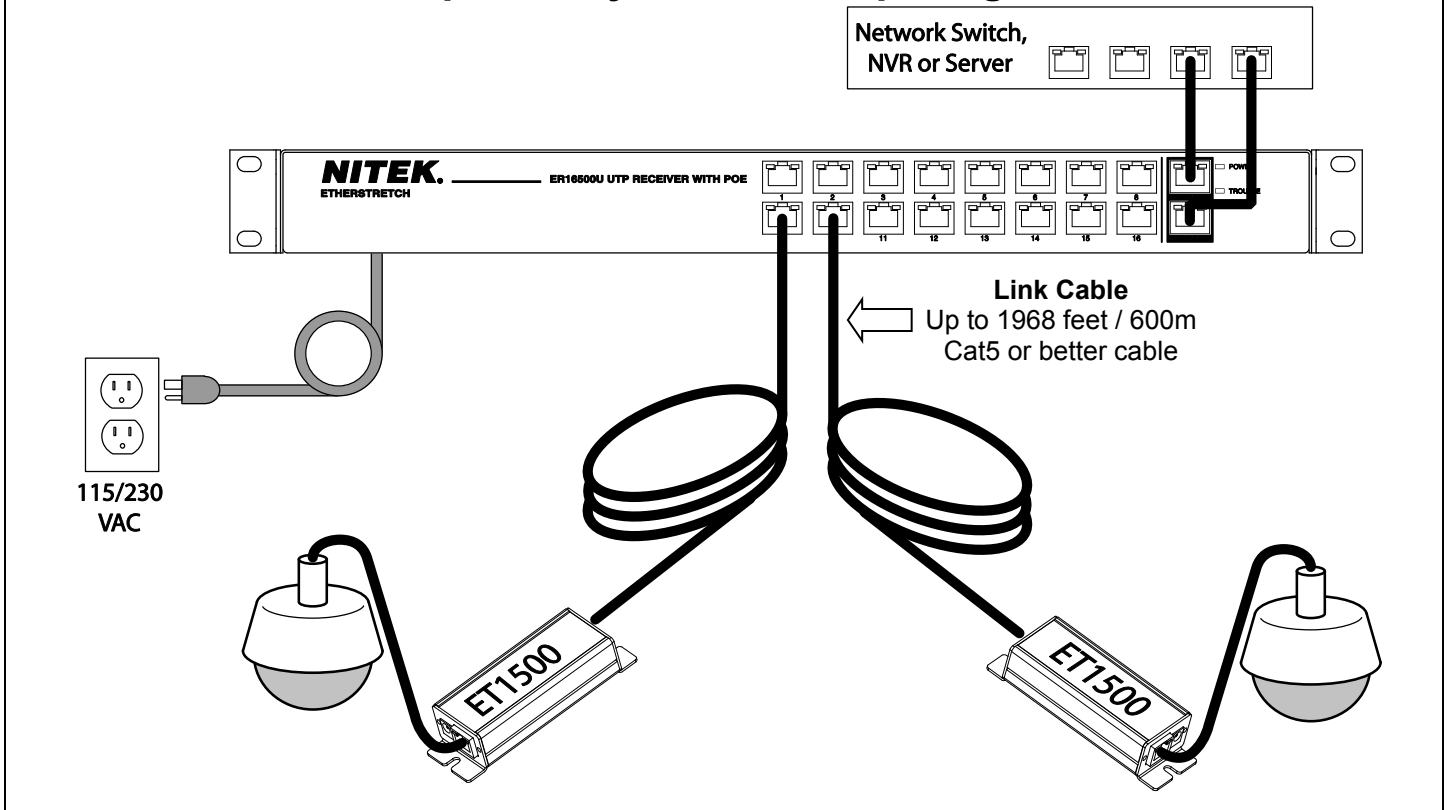
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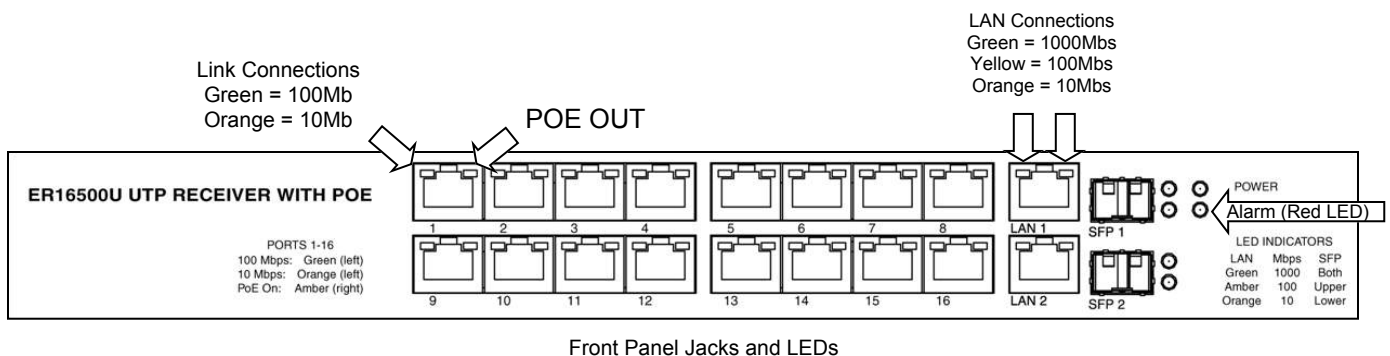
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Simplified System Hookup Diagram

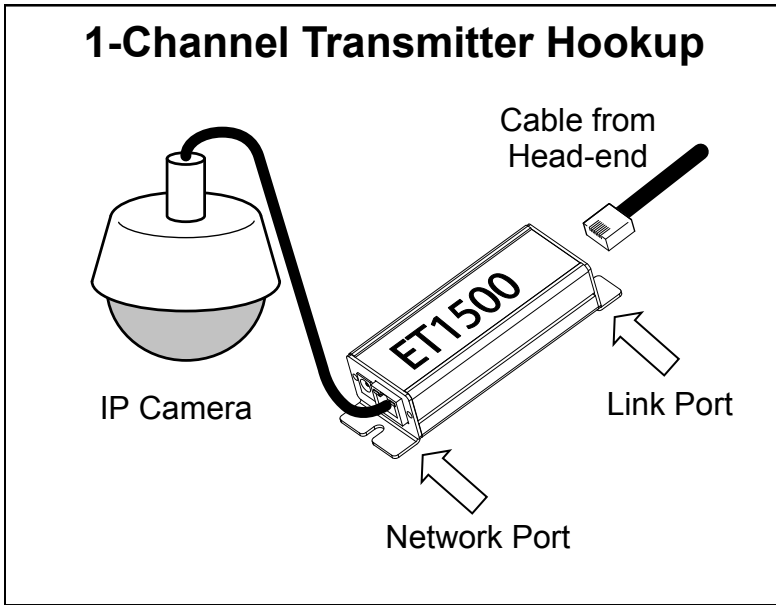


- 3) Connect a LAN port to the network switch. The LAN ports of the ER500 / ER16500 can communicate at up to 1Gbps each. The LAN port will automatically sense the connection speed of the network switch. For most applications, using a single LAN port will be the easiest and best solution. Also commonly done is using the additional LAN port to chain two or more units together. This will provide a way to bring 32 cameras or more into a single NIC of an NVR unit. There is an option to use both LAN jacks out the ER16500U into an additional switch for more throughput. While this is possible, the additional switch **MUST** be equipped with a 10Gigabit port or this will not work and the use of both LAN jacks into a single switch is not recommended. Additionally you must be aware that in some more complex network configurations loops can be created. Such conditions can cause data to cascade and then bring down a network. It is recommended to remove the second LAN jack cable if this occurs and see if the problem goes away. The LAN port is **NOT** POE capable, only the link ports can provide power to connected devices. The data speed and POE status for all connected ports is indicated on the port LEDs. Make sure your network switch can handle the expected data (i.e. do not use a 100Mb network switch if you expect 300Mbps of data).
- 4) A main power outlet should be installed near to the equipment and easily accessible. Connect main power to the ER500 / ER16500 using a proper IEC power cord. A power cord is supplied in the box with your ER500 / ER16500 unit. Disconnect main power before removing cover.
- 5) After completing the installation of the Head-end equipment, transmitter units must be installed at the camera/remote end for link cables longer than 100 meters. For shorter cables, plug the remote end of link cable directly into the Ethernet device. The device should power up in a few seconds, but may take much longer to establish a link.



Transmitter-end Installation ET1500U and ET4500U Units

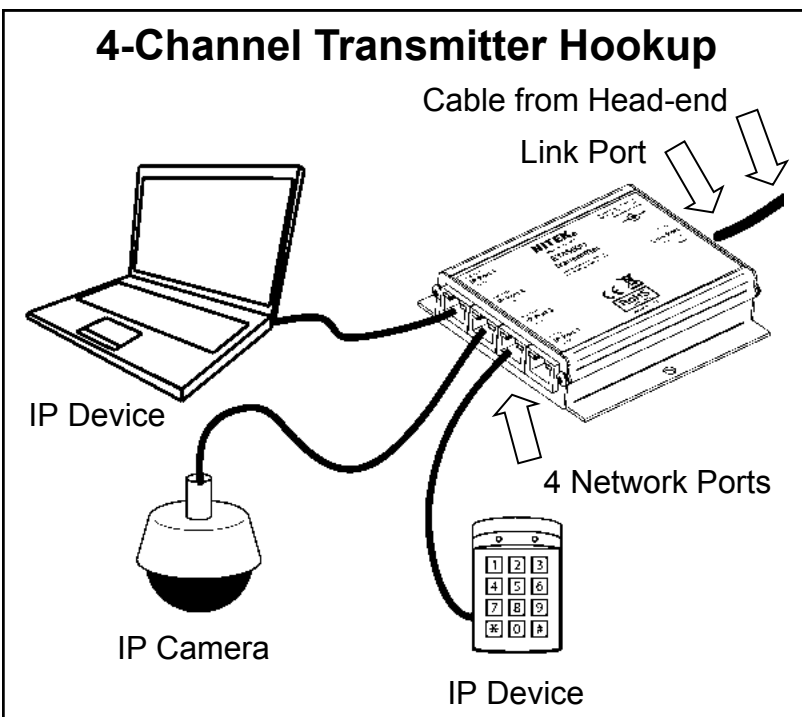
- 6) At the camera location securely mount the transmitter.
- 7) Connect the Ethernet device to the transmitter's "Network Port".
- 8) Find the Link cable from the head-end and make sure it is properly terminated. Connect the Link cable to the "Link Port" of the transmitter. If the head-end unit is powered up, it will sense the connection to the transmitter and turn on the power. This will be indicated by the POWER LED on the transmitter.
 - a. After several seconds, if the Ethernet device requires PoE power, the POE OUT LED on the transmitter will turn on. If the IP camera or other Ethernet device required power, it may take a few minutes to power up and link to the transmitter. The LINK STATUS or 10/100 LED on the "Network Port" should then turn on.
 - b. After about 15 to 30 seconds, the 10/100Mb LED on the "Link Port" will turn on to tell you that the system is connected. An Ethernet device does not need to be connected for the transmitter to communicate with the head-end.
 - c. When the "Link Port" and "Network Port" link LEDs are both lit, the Ethernet device should then be ready to operate. Continue installing the remaining transmitters as needed.



| ET1500U LED INDICATORS | | | | |
|------------------------|-------------|------------------|--------------------|----------|
| Port | LED | OFF | ON | FLASHING |
| Network Port | Power | No power | Power Good | |
| | Link Status | No Ethernet Link | Ethernet Link Good | |
| Link Port | PoE Out | No PoE Power Out | PoE Power Good | |
| | 10/100 | No Link | 100Mb | 10Mb |

| PoE Device Power 4 pair CAT5+ * | |
|------------------------------------|-------------------|
| Distance | Power at PoE Port |
| 328ft/100m | 27.4 watts |
| 656ft/200m | 27.4 watts |
| 984ft/300m | 25.0 watts |
| 1312ft/400m | 20.0 watts |
| 1640ft/500m | 18.0 watts |
| 1968ft/600m | 14.1 watts |

*Results with ER8500 Receiver and using 4 pair CAT5+ cable

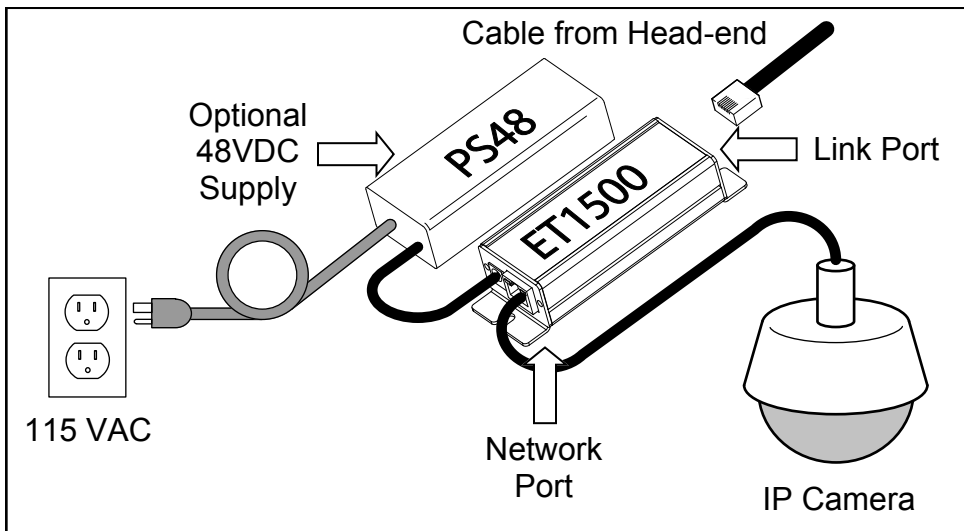


| ET4500U LED INDICATORS | | | | | |
|------------------------|---------|------------|--------------|--------|---------------|
| Port | LED | OFF | YELLOW | ORANGE | GREEN |
| Network Port | PoE OUT | No PoE Out | PoE Out Good | | |
| | 10/100 | No Link | | | Ethernet Link |
| Link Port | Power | No Power | Power Good | | |
| | 10/100 | No Link | | 10Mb | 100Mb |

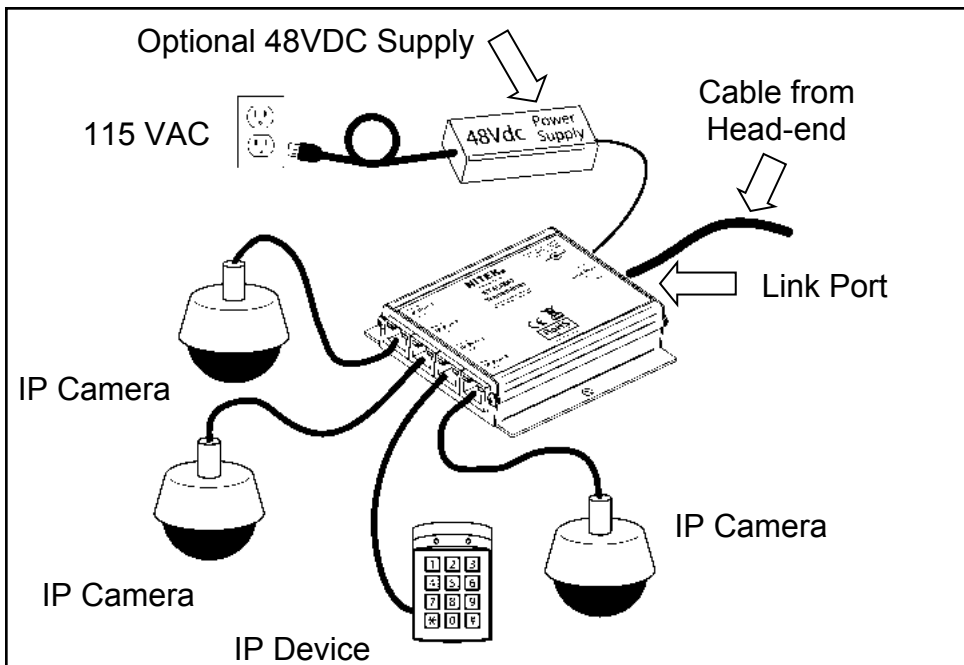
Optional Hookup for High Power PoE Devices ET1500U and ET4500U Units

- 9) In some cases the PoE device connected to the transmitter needs more power than can be supported over a long cable run. You can usually identify these cases by watching the POWER LED of the transmitter, located on the "Network Port". If the power light cycles ON for less than 1 second and then is off for 3 or 4 seconds when the PoE device is connected, but it turns ON and operates normally without a PoE device connected, this would indicate you are having a current limit problem.
- 10) You should first check the power requirements of the PoE device. Also check the length of the Link cable from head-end to transmitter. The POE POWER CHART on the previous page will indicate the maximum power available for your length of cable.
- 11) If the needed level of power is not available for the length of cable, alternate options are available. One method is to directly power the transmitter with a 48VDC power supply (Nitek #PS48) as shown below. When powered directly from a 48VDC supply the transmitter can deliver full 802.3AT power, regardless of the cable length, plus an additional length of up to 100 meters of network cable.
Note: A higher wattage DC supply than the PS48 may be required to power multiple cameras from the ET4500U.

48VDC Powered ET1500 Hookup



48VDC Powered ET4500U Hookup



Transmitter used as PoE Injector*

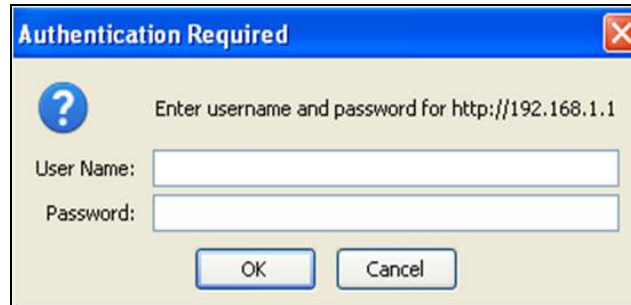
| Distance from Network Port | PoE Device Power Available |
|----------------------------|----------------------------|
| 33ft/10m | 33 watts |
| 328ft/100m | 26 watts |

*Results with 48VDC power to the Transmitter optional Power Port

BROWSER BASED GUI – LOGIN PAGE

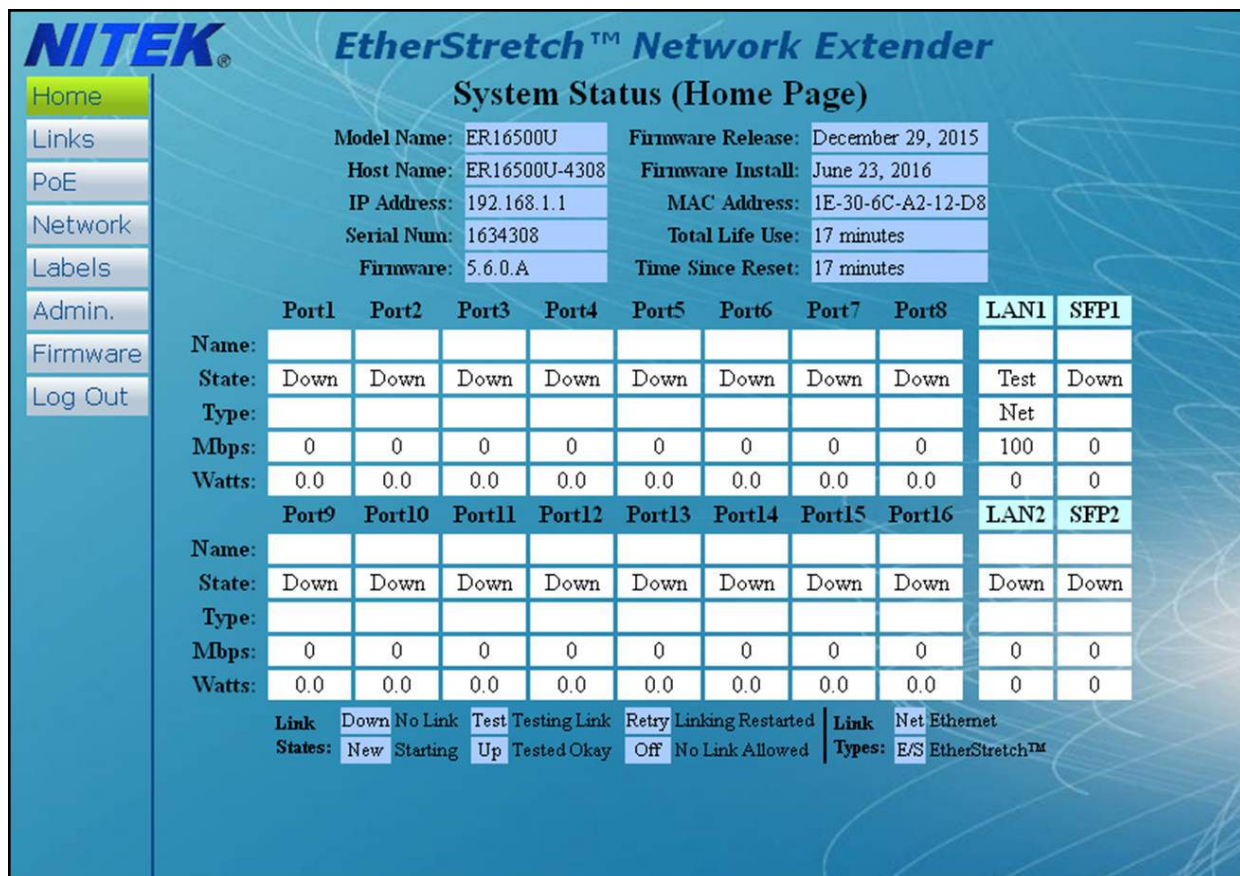
The ER8500U and ER16500U do not require a user setup or configuration in order to function when using a single unit. Multiple units do need to be configured to prevent IP address conflicts. The Graphical User Interface (GUI) allows access to additional features to provide for monitoring system and customizing the settings.

In order to access the GUI, connect an Ethernet port of a PC to any port of the ER8500/ER16500 unit. Go into the network setting for your PC and set its IP address to **192.168.1.100** and subnet mask to **255.255.255.0**. Enter “**http://**” and the default IP address of the ER unit, **192.168.1.1**, into your browser as “**http://192.168.1.1**”. The browser will display the login screen below. The default login User Name is “**admin**” with no password.



The image shows a standard Windows-style dialog box titled "Authentication Required". It contains a question mark icon and the text "Enter username and password for http://192.168.1.1". Below this are two input fields: "User Name:" and "Password:". At the bottom are "OK" and "Cancel" buttons.

After login you will come to the **HOME** screen shown below. The Home screen provides a look at some basic information about your unit. From here you can see basic information about the status of each port, firmware version, IP address, and MAC address, among other things. There are no settings or controls on this page.



The screenshot shows the NITEK EtherStretch Network Extender System Status (Home Page). The interface has a blue background and a sidebar on the left with navigation links: Home, Links, PoE, Network, Labels, Admin., Firmware, and Log Out. The main content area displays system information and port status.

System Status (Home Page)

| | | | |
|-------------|---------------|-------------------|-------------------|
| Model Name: | ER16500U | Firmware Release: | December 29, 2015 |
| Host Name: | ER16500U-4308 | Firmware Install: | June 23, 2016 |
| IP Address: | 192.168.1.1 | MAC Address: | 1E-30-6C-A2-12-D8 |
| Serial Num: | 1634308 | Total Life Use: | 17 minutes |
| Firmware: | 5.6.0.A | Time Since Reset: | 17 minutes |

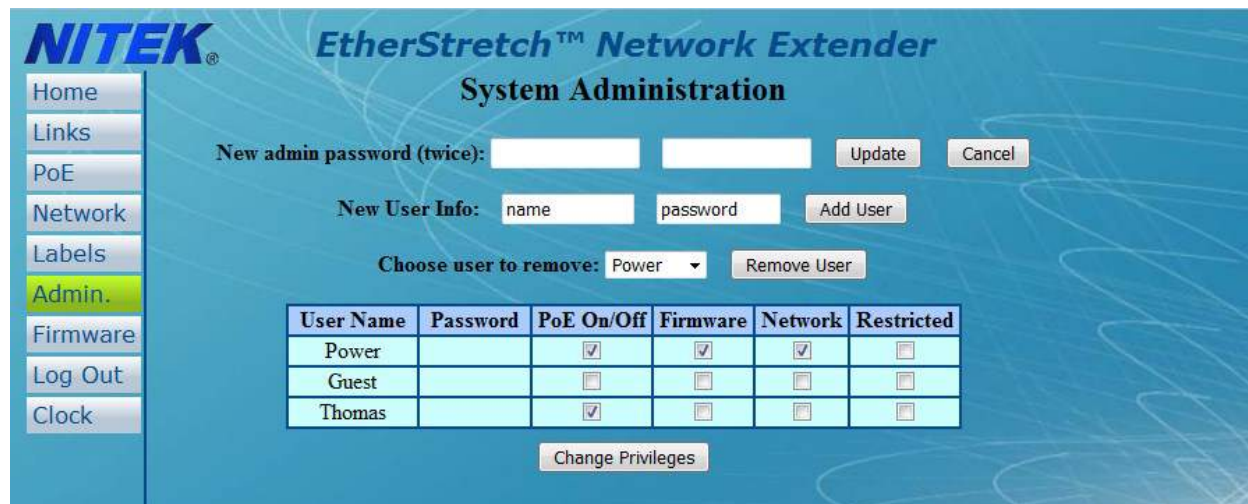
| | Port1 | Port2 | Port3 | Port4 | Port5 | Port6 | Port7 | Port8 | LAN1 | SFP1 |
|--------|-------|--------|--------|--------|--------|--------|--------|--------|------|------|
| Name: | | | | | | | | | | |
| State: | Down | Down | Down | Down | Down | Down | Down | Down | Test | Down |
| Type: | | | | | | | | | Net | |
| Mbps: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 100 | 0 |
| Watts: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 |
| | Port9 | Port10 | Port11 | Port12 | Port13 | Port14 | Port15 | Port16 | LAN2 | SFP2 |
| Name: | | | | | | | | | | |
| State: | Down | Down | Down | Down | Down | Down | Down | Down | Down | Down |
| Type: | | | | | | | | | | |
| Mbps: | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Watts: | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0 | 0 |

Link: Down No Link Test Testing Link Retry Linking Restarted | Link: Net Ethernet
 States: New Starting Up Tested Okay Off No Link Allowed | Types: E/S EtherStretch™

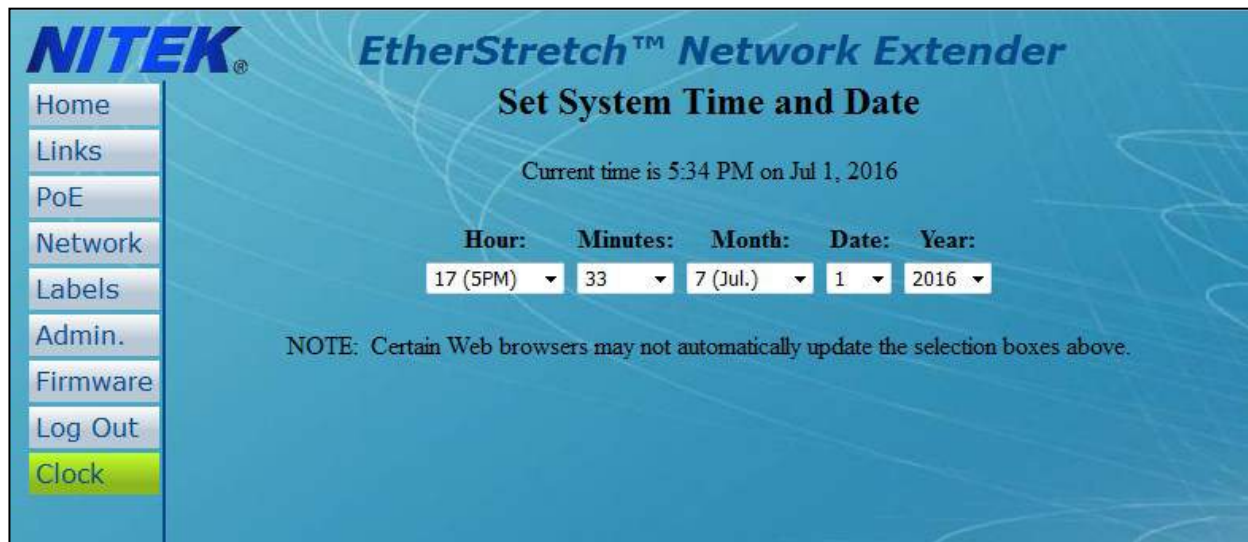
Next, move to the Administrator settings with the **ADMIN** button. Here you can setup passwords and users. Only the administrator can access this page. Begin by entering a new admin user password. The password can be up to 11 digits. It is case sensitive and may include special characters. Remember to record the admin password, as it is the only way to access the admin screen. After setting the new password you will be forced to login again using the new password. Return to the ADMIN screen and add users as needed.



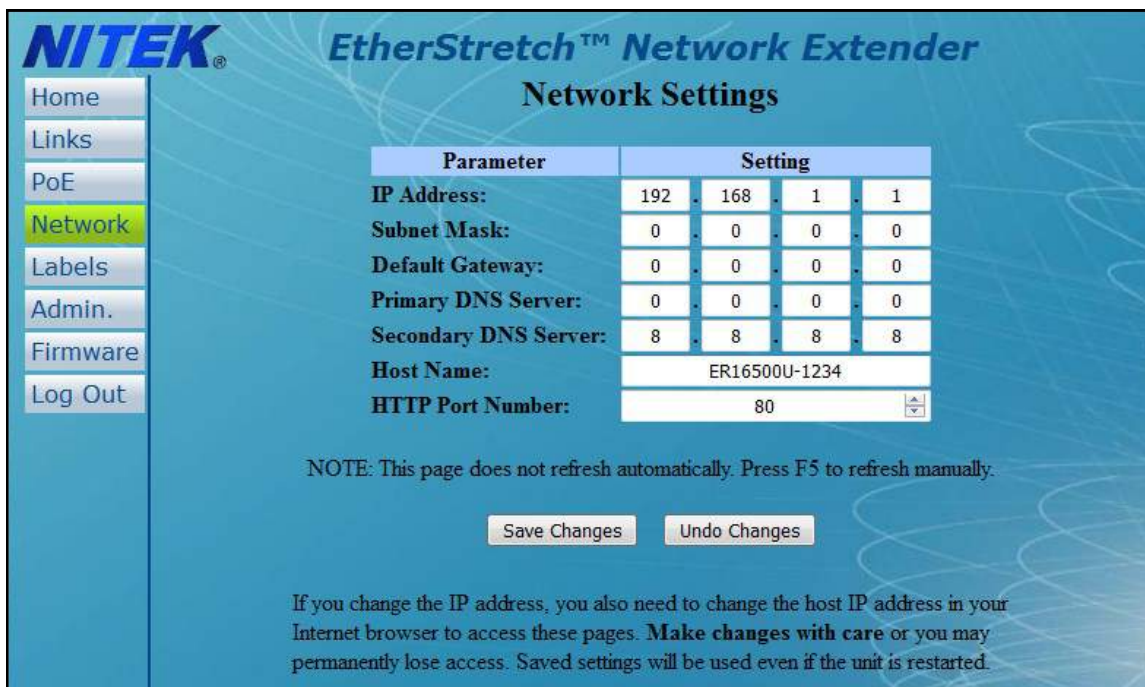
Additional users can be assigned. User names can be up to 9 characters and passwords can be up to 8 characters. For each user you may also select additional rights. "Restricted" will only allow this person to see the Home screen and the Log Out Screen. "POE On/Off" will allow a user to turn off power to individual transmitters and cameras and to make system settings adjustments. This user can cycle camera power, adjust link speeds, and reset the unit. "Firmware" will allow a user to upgrade the firmware and reset the unit. "Network" will allow a user to change network settings for a unit.



Also available only in the ADMIN screen is the CLOCK button. This can be used to set the current time internal to this unit only. Set the current time for the unit in this screen. There is a real time clock in the unit which is battery backed up. It is unlikely that the battery would need to be replaced under normal use, but if it did, the battery type is a standard CR1220. The battery must be replaced by a qualified service tech only.



Next would be setting up the network connection. Select the **Network** button. From the network page you can change the IP address of the unit and the subnet mask along with other settings. Remember, once you change the network address you will have to login to the unit again. If you have multiple units in one installation you will need a unique IP address and host name for each unit. They will operate with the same host name, but can cause confusion for a network administrator. The IP address allows you to access the web interface.



NITEK EtherStretch™ Network Extender

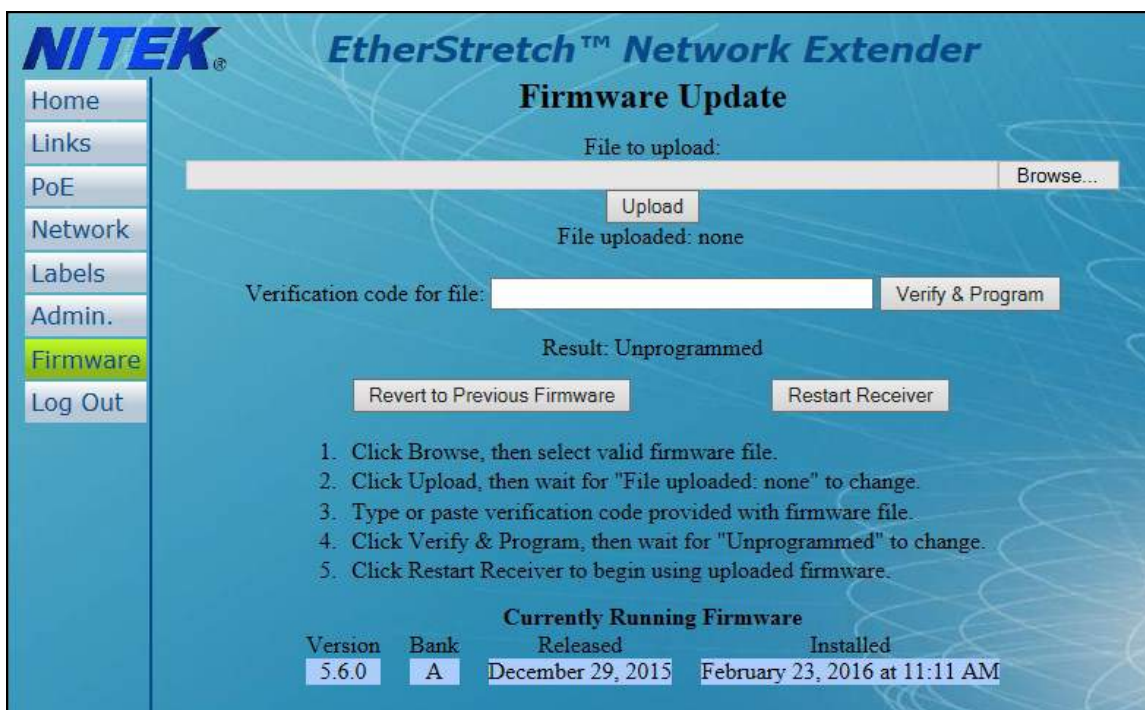
Network Settings

| Parameter | Setting | | | |
|-----------------------|---------------|-----|---|---|
| IP Address: | 192 | 168 | 1 | 1 |
| Subnet Mask: | 0 | 0 | 0 | 0 |
| Default Gateway: | 0 | 0 | 0 | 0 |
| Primary DNS Server: | 0 | 0 | 0 | 0 |
| Secondary DNS Server: | 8 | 8 | 8 | 8 |
| Host Name: | ER16500U-1234 | | | |
| HTTP Port Number: | 80 | | | |

NOTE: This page does not refresh automatically. Press F5 to refresh manually.

If you change the IP address, you also need to change the host IP address in your Internet browser to access these pages. **Make changes with care** or you may permanently lose access. Saved settings will be used even if the unit is restarted.

Units are shipped from the factory with the most up to date firmware. Firmware is from time to time updated to add features to the unit. These updates are mostly in the form of added features in this webpage interface. Firmware updates will be posted to the Nitek website at www.nitek.net and can be found under the support tab. In the home screen page you can see what firmware version is loaded in your unit and when it was loaded. To update the firmware, download the update to your PC. From the Firmware Update page, browse to the update file location on your PC and click the "Upload" button. Next, enter the verification code and select the "Verify and Program" button. When complete, Result will change to "Programmed". You will need to restart the unit in order the have the code take effect. Reverting to Previous Firmware will keep all user settings but will change to the previously installed firmware.



NITEK EtherStretch™ Network Extender

Firmware Update

File to upload:

File uploaded: none

Verification code for file:

Result: Unprogrammed

1. Click Browse, then select valid firmware file.
2. Click Upload, then wait for "File uploaded: none" to change.
3. Type or paste verification code provided with firmware file.
4. Click Verify & Program, then wait for "Unprogrammed" to change.
5. Click Restart Receiver to begin using uploaded firmware.

Currently Running Firmware

| Version | Bank | Released | Installed |
|---------|------|-------------------|-------------------------------|
| 5.6.0 | A | December 29, 2015 | February 23, 2016 at 11:11 AM |

The “Links” page is useful in seeing the connections between each of the ports and the connected device. From within this page you can see the link speed for all ports that are operating. The speed will be displayed below each port and in the row marked “Mbps”. The speed can be controlled for each of the link ports. It is selected in the “Speed” row. The ports normally operate at 100Mbps but can be changed if a connected device needs a lower speed or if the cable is degraded and causing errors at a higher speed. The speed of the LAN and SFP ports is determined by the connected device. They are normally 1000Mbps but if connected to a lower speed device, they will automatically match the speed of the connected device.

The “Mode” is normally set to automatic. In this mode the system is always checking for communication between connected devices. If there is no communication or a fault is determined the system will attempt to repair the connection. In rare situations some cameras may not be communicating with the server or may not yet be properly setup. This can lead to a false reading. In this rare case Mode may need to be set to DM (Discovery Mode) to allow for cameras to be configured. Once the cameras are properly configured, the setting can be returned to “Auto” (automatic). Mode can also be set to OFF, which will disable the operation of this port.

All ports allow standard Ethernet links on cables up to 100 meters. The PoE capable Link ports also allow EtherStretch™ links on cables up to 600 meters, when used with compatible EtherStretch™ transmitters. The “Link” row indicates whether links are EtherStretch™ (E/S) or Ethernet (Net). The “Type” row allows ports to be set to automatic (Auto) or only one of the two types. In the default setting of “Auto”, the port will attempt to establish an Ethernet link only if it fails to establish an EtherStretch™ link. Non-EtherStretch devices connected directly to the unit will link faster if the port is set to Ethernet. Ports set to EtherStretch™ will not stop attempting to establish an EtherStretch™ link.

Finally, State displays the status of the links. State can tell you if all of the IP devices and transmitters at the other ends of the link cables are up and working. If the state is “Down” then no transmitter or IP device is detected. This can be because there is no unit connected or because the cable was damaged or cut. Once a transmitter is detected, the state will become “New”. After several seconds, state will show “Test”. This means that a transmitter is connected and is in the process of startup. The transmitter in turn attempts to connect to an IP device. If there is no IP device or if the device is not working for some reason, the state will be “Test” or “Retry”. This shows that the system is attempting to get an IP device up and working. If all parts of the system are working properly the state will show “Up”. This tells you the communication is normal. If an IP device is connected directly without a transmitter, the state will change from “New” to “Up” after a link is established.

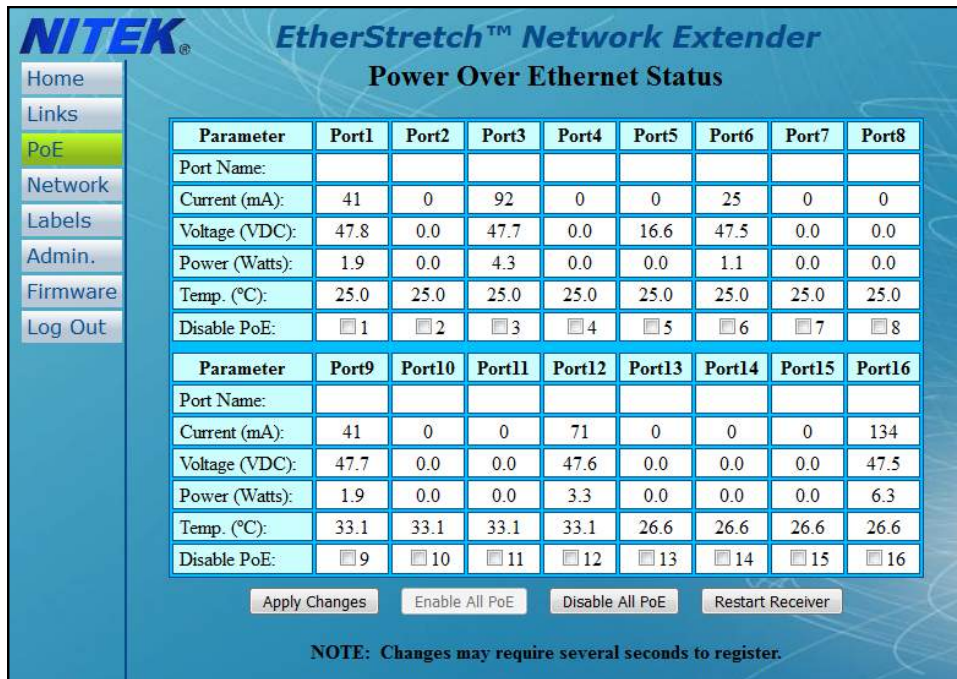
NITEK® EtherStretch™ Network Extender

Link Status

| | Port1 | Port2 | Port3 | Port4 | Port5 | Port6 | Port7 | Port8 | LAN1 | SFP1 |
|---------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Name: | cam1 | cam2 | cam3 | cam4 | cam5 | cam6 | cam7 | cam8 | NVR1 | Sw1 |
| Mbps: | 100 | 0 | 0 | 0 | 0 | 100 | 0 | 0 | 1000 | 0 |
| State: | Up | Down | Down | Down | Down | Up | Down | Down | Up | Down |
| Link: | Net | | | | | Net | | | Net | |
| Mode: | Auto ▾ | D.M. ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ |
| Speed: | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 1000 ▾ | 1000 ▾ |
| Type: | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Net ▾ | Net ▾ |
| | Port9 | Port10 | Port11 | Port12 | Port13 | Port14 | Port15 | Port16 | LAN2 | SFP2 |
| Name: | cam9 | N10 | cam11 | cam12 | cam13 | cam14 | cam15 | N16 | NVR2 | Sw2 |
| Mbps: | 100 | 0 | 0 | 100 | 0 | 0 | 0 | 100 | 100 | 0 |
| State: | Up | Down | Down | Up | Down | Down | Down | Up | Up | Down |
| Link: | E/S | | | E/S | | | | E/S | Net | |
| Mode: | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ |
| Speed: | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 100 ▾ | 1000 ▾ | 1000 ▾ |
| Type: | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Auto ▾ | Net ▾ | Net ▾ |

| Link States: | | | | Link Modes: | | Link Speeds (Mbps): | | | | Link Types: | |
|--------------|----------|-------|-----------|-------------|------------|---------------------|-----------------|-----|----------|-------------|---------------|
| New | Starting | Down | No Link | Auto | Link Check | 1000 | 10/100/1000 | 100 | 100 only | E/S | EtherStretch™ |
| Test | Testing | Retry | Restarted | D.M. | Discovery | Auto | 10 if 100 fails | 10 | 10 only | Net | Ethernet |
| Up | Tested | Off | Disabled | D.M. | Mode | Off | Disabled | 0 | Down | Auto | Net if no E/S |

Selecting the POE button will display power information about each port. You can see current, voltage and power consumed from each port. Additionally, you can disable POE power out any of the ports, which could bring the link down.



NITEK® EtherStretch™ Network Extender
Power Over Ethernet Status

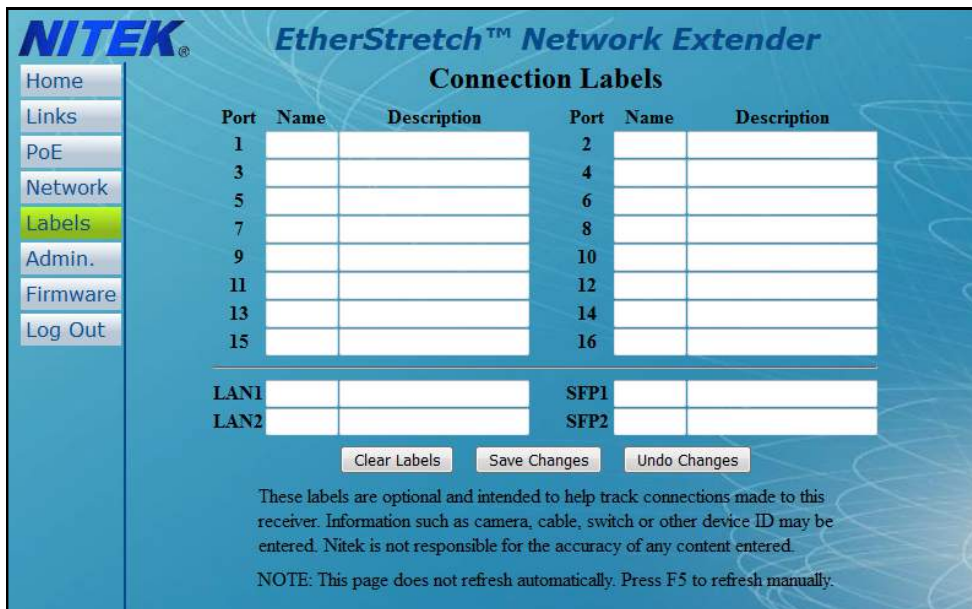
| Parameter | Port1 | Port2 | Port3 | Port4 | Port5 | Port6 | Port7 | Port8 |
|----------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| Port Name: | | | | | | | | |
| Current (mA): | 41 | 0 | 92 | 0 | 0 | 25 | 0 | 0 |
| Voltage (VDC): | 47.8 | 0.0 | 47.7 | 0.0 | 16.6 | 47.5 | 0.0 | 0.0 |
| Power (Watts): | 1.9 | 0.0 | 4.3 | 0.0 | 0.0 | 1.1 | 0.0 | 0.0 |
| Temp. (°C): | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 | 25.0 |
| Disable PoE: | <input type="checkbox"/> 1 | <input type="checkbox"/> 2 | <input type="checkbox"/> 3 | <input type="checkbox"/> 4 | <input type="checkbox"/> 5 | <input type="checkbox"/> 6 | <input type="checkbox"/> 7 | <input type="checkbox"/> 8 |

| Parameter | Port9 | Port10 | Port11 | Port12 | Port13 | Port14 | Port15 | Port16 |
|----------------|----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|-----------------------------|
| Port Name: | | | | | | | | |
| Current (mA): | 41 | 0 | 0 | 71 | 0 | 0 | 0 | 134 |
| Voltage (VDC): | 47.7 | 0.0 | 0.0 | 47.6 | 0.0 | 0.0 | 0.0 | 47.5 |
| Power (Watts): | 1.9 | 0.0 | 0.0 | 3.3 | 0.0 | 0.0 | 0.0 | 6.3 |
| Temp. (°C): | 33.1 | 33.1 | 33.1 | 33.1 | 26.6 | 26.6 | 26.6 | 26.6 |
| Disable PoE: | <input type="checkbox"/> 9 | <input type="checkbox"/> 10 | <input type="checkbox"/> 11 | <input type="checkbox"/> 12 | <input type="checkbox"/> 13 | <input type="checkbox"/> 14 | <input type="checkbox"/> 15 | <input type="checkbox"/> 16 |

Apply Changes Enable All PoE Disable All PoE Restart Receiver

NOTE: Changes may require several seconds to register.

The Labels button takes you to the screen where you can apply custom labels to the inputs. These labels will be displayed below the port number on several screens, include the Home and Links screens.



NITEK® EtherStretch™ Network Extender
Connection Labels

| Port | Name | Description | Port | Name | Description |
|------|------|-------------|------|------|-------------|
| 1 | | | 2 | | |
| 3 | | | 4 | | |
| 5 | | | 6 | | |
| 7 | | | 8 | | |
| 9 | | | 10 | | |
| 11 | | | 12 | | |
| 13 | | | 14 | | |
| 15 | | | 16 | | |

| | | | |
|------|--|------|--|
| LAN1 | | SFP1 | |
| LAN2 | | SFP2 | |

Clear Labels Save Changes Undo Changes

These labels are optional and intended to help track connections made to this receiver. Information such as camera, cable, switch or other device ID may be entered. Nitek is not responsible for the accuracy of any content entered.

NOTE: This page does not refresh automatically. Press F5 to refresh manually.

When finished with the web interface it is important to close your browser completely. Some browsers keep cookies and will not fully disconnect until the browser is closed.



NITEK® EtherStretch™ Network Extender
Login / Logout

You are currently logged in as: **admin**

You must log in as valid user to access any of these pages.

You must completely close your browser to log out from this session.

You must completely close then reopen your browser to log in as different user.