

# NC-485 Network Converter

## Application Note

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### 1.0 Purpose of this Document

This document discusses how to setup, configure, and use the LAN-520 LAN Port<sup>1</sup> and NC-485 Network Converter to provide LAN/WAN Ethernet connectivity between a PXL-500/PXL-510 Master controller and one or more PXL Slave controllers.

This document discusses how to setup, configure, and use the LAN-520 LAN Port with the NC-485 Network Converter to provide LAN/WAN Ethernet connectivity between two or more PXL RS-485 network segments. The following topics are covered:

- Overview
- LAN-520 with NC-485 Network Converter Setup
- Using the LAN-520 with Multiple PXL Networks
- Basic Ethernet Troubleshooting

### 2.0 Overview

The LAN-520, when used in conjunction with a NC-485, provides companies the ability to utilize their existing LAN/WAN for RS-485 communication between a Master PXL and multiple Slave PXLs. Since LAN/WAN networks can be global, using the LAN-520 with a NC-485 provides the ability to have Slave PXLs located throughout the world managed from one central location.

***NOTE: If all network segments are not located within the same time zone, the time zone where the Doors software is located will be used. For example, a site has network segments located in both the Mountain and Pacific time zones with the Doors software on a computer in the Pacific time zone. If an Auto Unlock/Lock is set on a controller in the Mountain time zone for 9 am, the controller will not auto unlock/lock until 9 am Pacific time (the location of the Doors software), which would then be 10 am Mountain.***

The LAN-520 supports two communication channels. Channel 1 is used for RS-232 communication and Channel 2 is used for RS-485 communication. The RS-232 communication is identical to that of a LAN-505. The LAN-520 replaces the LAN-505 for serial over Ethernet communication. In order to provide RS-485 communication over Ethernet, the LAN-520 must be connected to the NC-485 Network Converter.

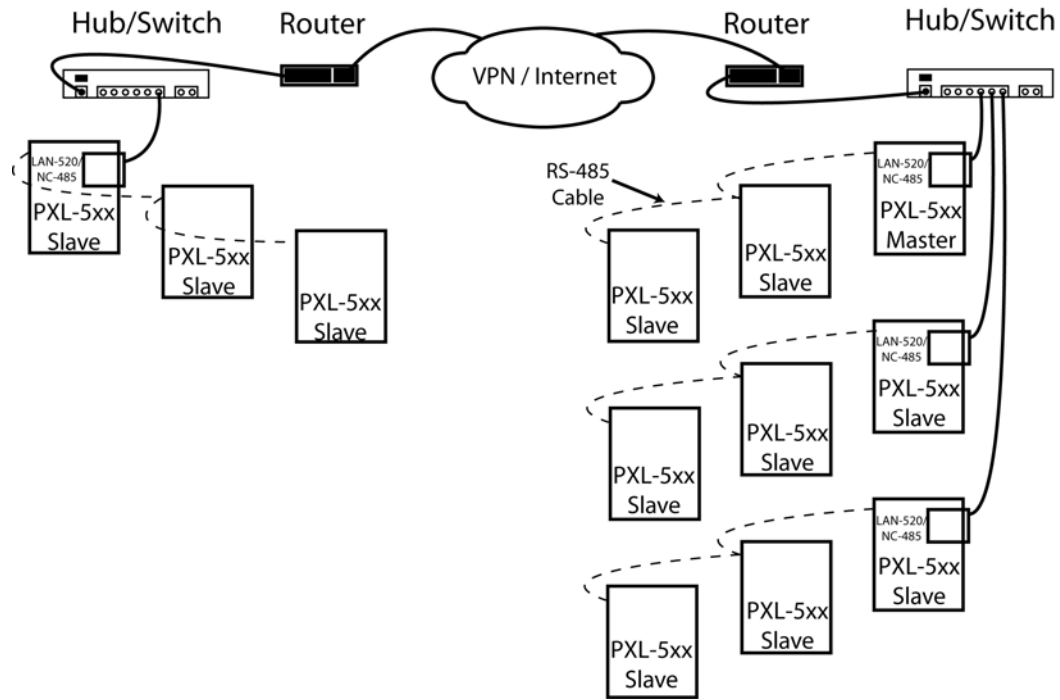
The drawing below shows a conceptual PXL network. Each PXL network segment contains one LAN-520 connected to a NC-485. The network segment containing the master must have the LAN-520/NC-485 connected to the PXL Master. Only one LAN-520/NC-485 combo can be installed on a network segment. A maximum of 48 network segments can be connected to a PXL Master. It is also possible to connect a PXL network outside of the Local LAN by utilizing a VPN or WAN.

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1. The LAN-520 may be used with a PXL-500/PXL-510 only.

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**Figure 1: Single Site with Multiple Network Segments**

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### 3.0 Setup

#### 3.1 NC-485

1. J102 on the NC-485 plugs into the TB-13 LAN connector on the PXL.

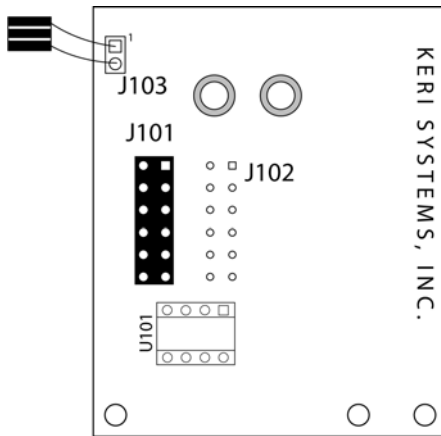


Figure 2: The NC-485 Network Converter

2. The 2-conductor lead (J103) connects to the JP-9 connector located at the top right corner of the PXL.
3. Pin 1 of J103 on the NC-485 connects to Pin 1 of JP-9 on the PXL (see Figure 3).

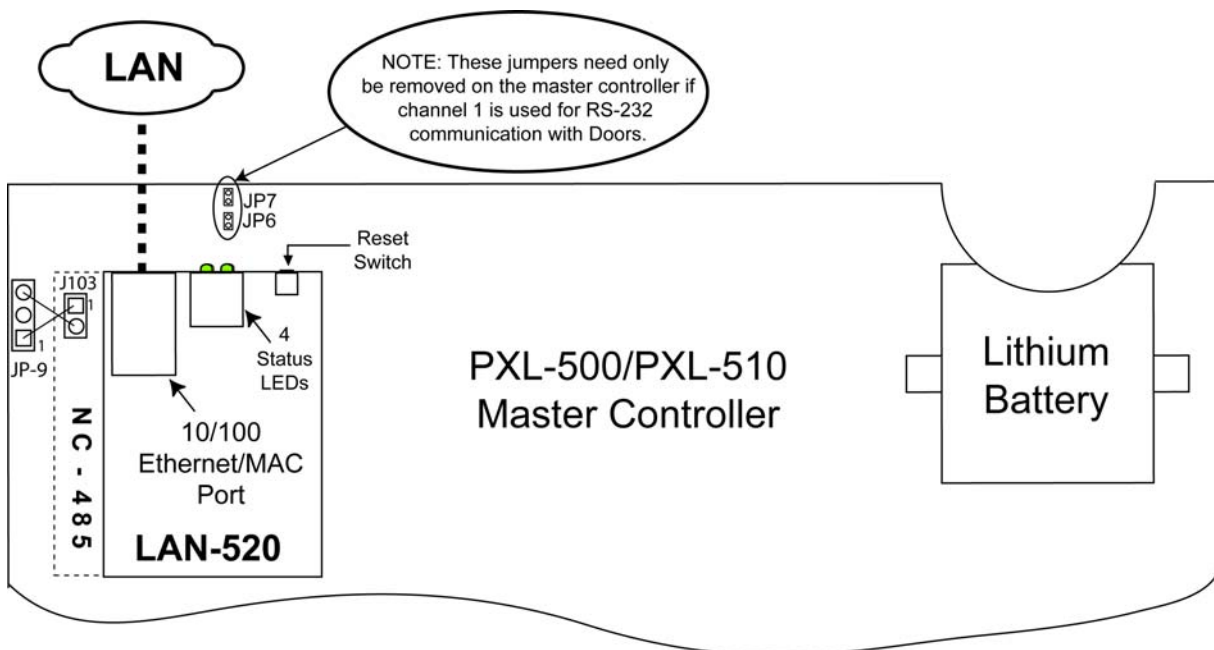


Figure 3: Installation of the LAN-520 with NC-485 Network Converter

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### 3.2 LAN-520

The LAN-520 plugs into J101 on the NC-485<sup>1</sup> (see Figure 2 on page 3). The LAN-520 can be configured in one of two modes: Master mode or Slave mode. The LAN-520 connected to the PXL Master must be configured in Master mode. Only one LAN-520 Master can exist in a PXL network. All other LAN-520 units within a PXL network must be configured in Slave mode.

This document assumes that Channel 1 of the LAN-520 Master has been configured with an IP address. Refer to the [LAN-520 Ethernet Communication Application Note \(P/N 01958-001\)](#) for basic setup and configuration. Note the Channel 1 IP address of the LAN-520 Master. For each LAN-520/NC-485 Slave, assign the Remote IP address in the Channel 2 configuration as the LAN-520 Master Channel 1 IP Address.

The default Channel 1 configuration settings for the LAN-520 should be sufficient for the LAN-520 Master.

To use the LAN-520 in a WAN environment, the following rules must be met:

- Network Routers must be configured to connect the LAN subnets.
- Ports 9999, 10001, and 10002 must be allowed to pass through the router.
- The Gateway IP address must be configured for the LAN-520 Master and any LAN-520 slave outside of the Master's subnet. Use option 0 Server in the Telnet connection to configure the Gateway.
- No more than 12 IP addresses can be entered into the LAN-520 Master Hostlist.

*NOTE: Configuration of Routers must be handled by knowledgeable IT personnel.*

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1. Later versions of the NC-485 have the LAN-520 plug into J102 on the NC-485.

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### 3.2.1 Channel 2 Configuration Settings

#### 3.2.1.1 Master Mode Configuration

There are a few critical parameters to set via Telnet, all other parameters should be left at their default values.

There are two ways to open Telnet, through the Lantronix DeviceInstaller window or by opening a DOS box.

- From the DeviceInstaller page, locate and double-click on the IP address of the LAN-520. Select the Telnet tab and then click on the  button.
- Open a DOS box and open a Telnet connection to Port 9999 on the LAN-520.

At the DOS prompt type the following to make the Port 9999 Telnet connection to the LAN-520:

```
- c:\>telnet <LAN-520 IP address> 9999 <Enter>
```

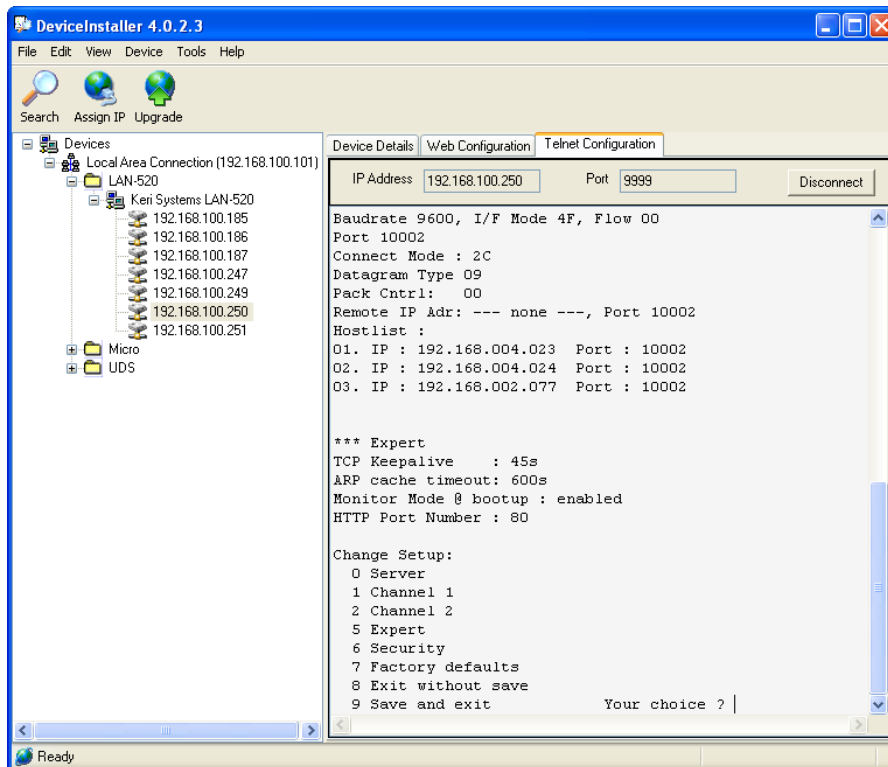
For example:

```
- c:\>telnet 192.168.100.250 9999 <Enter>
```

1. As soon as the Telnet sign-on screen appears, press <Enter> to go into the LAN-520 Setup mode. There is a two to three second window in which you must press <Enter> before the Telnet session automatically closes. If the Telnet session closes before you enter Setup mode (if nothing happens when you press <Enter>), simply click the  box again to establish a connection to Telnet.
2. Once Telnet connects with the LAN-520 all current configuration information is displayed and the cursor is placed at the “Your choice” field (see Figure 4 on page 6).

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**Figure 4: Telnet Configuration Main Window**

3. Press 2 <Enter> to enter the Channel 2 Configuration values. The second configuration parameter is displayed.
4. If a configuration value needs to be changed, type the new value and the original value is overwritten. Every time <Enter> is pressed, the displayed configuration value is accepted and the next parameter is displayed.
5. Press <Enter> until the I/F Mode parameter is displayed. This value must be **4F** for proper communication between LAN-520s over RS-485. If this value is not **4F**, type **4F** to overwrite the original value.
6. Press <Enter> until the Port parameter is displayed. This value must be **10002** for proper communication between *Doors* and the LAN-520. If this value is not **10002**, type **10002** to overwrite the original value.

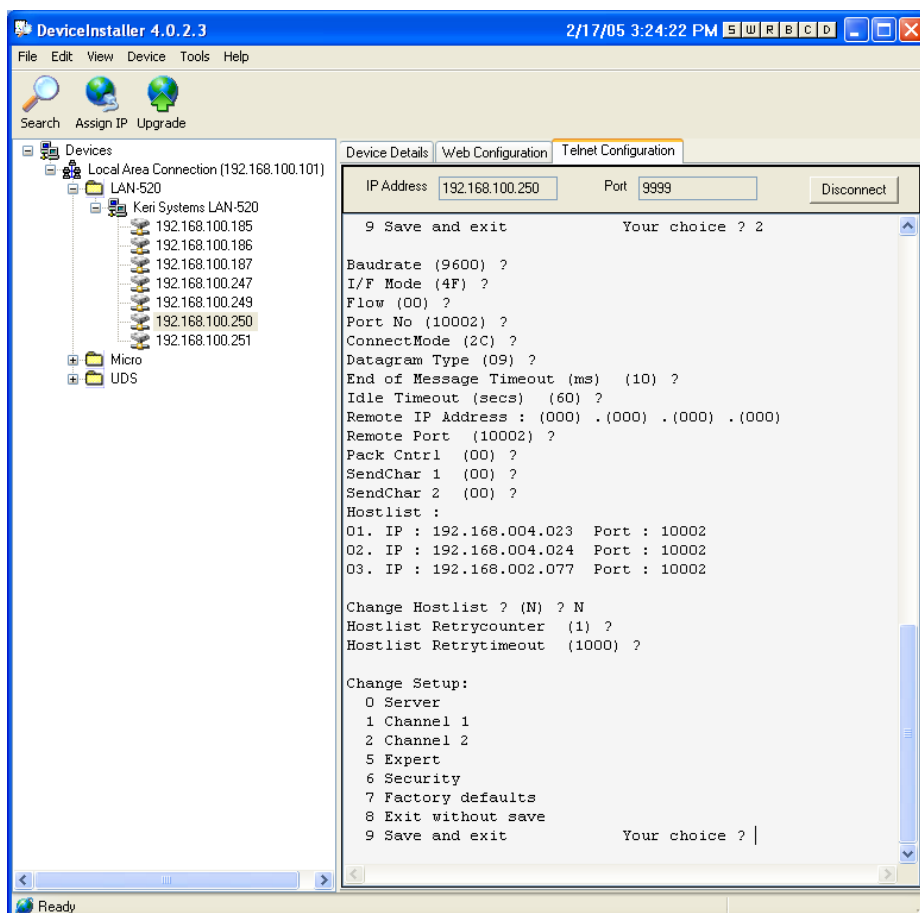
*NOTE: This value should not be changed unless multiple PXL networks are on the same LAN Subnet (see “Using Multiple PXL Networks on the Same LAN Subnet” on page 10) or instructed to do so by either Keri Systems or Lantronix Technical Support Staff.*

7. Press <Enter> until the Connect Mode parameter is displayed. The default for this value is **0C**. If all LAN-520 units are within the local subnet, leave the default as is. If one or more LAN-520s are located outside the local subnet, this value must be overwritten to **2C** for Master controllers to enable use of Hostlist.
8. Press <Enter> until the Remote IP Address parameter is displayed. Setting the remote IP address will designate this unit as a slave. Leave it at the default (0.0.0.0).
9. Press <Enter> until the Hostlist parameter is displayed. The Hostlist parameter is only displayed if the Connect Mode has been set to 2C. This option may be configured for up to 12 remote slave IP addresses on different LAN subnets. Setting this parameter will designate this unit as a master.

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10. Press Y <Enter> to add or change the IP addresses and Port numbers of the slave units. Enter the IP address and Port number for each slave unit. The Port number should be set to **10002**.
11. Once all the IP addresses and Port numbers have been entered, enter an IP address of 0.0.0.0 to exit and press N when the “Change Hostlist? (N)” option is displayed (see Figure 5).
12. Press <Enter> until the Change Setup menu appears.



**Figure 5: Correct Channel 2 Configuration Parameters - Master Unit**

13. Press 9 <Enter> to save the assigned Channel 2 configuration parameters. A “Connection to host lost” message appears. Click the box to clear the connection lost message, then close the Telnet window and close the DOS box. The Channel 2 configuration parameters are now entered into the LAN-520’s configuration table.

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### 3.2.1.2 Slave Mode Configuration

There are a few critical parameters to set via Telnet, all other parameters should be left at their default values.

There are two ways to open Telnet, through the Lantronix DeviceInstaller window or by opening a DOS box.

- From the DeviceInstaller page, locate and double-click on the IP address of the LAN-520. Select the Telnet tab and then click on the  button.
- Open a DOS box and open a Telnet connection to Port 9999 on the LAN-520.

At the DOS prompt type the following to make the Port 9999 Telnet connection to the LAN-520:

```
- c:\>telnet <LAN-520 IP address> 9999 <Enter>
```

For example:

```
- c:\>telnet 192.168.100.250 9999 <Enter>
```

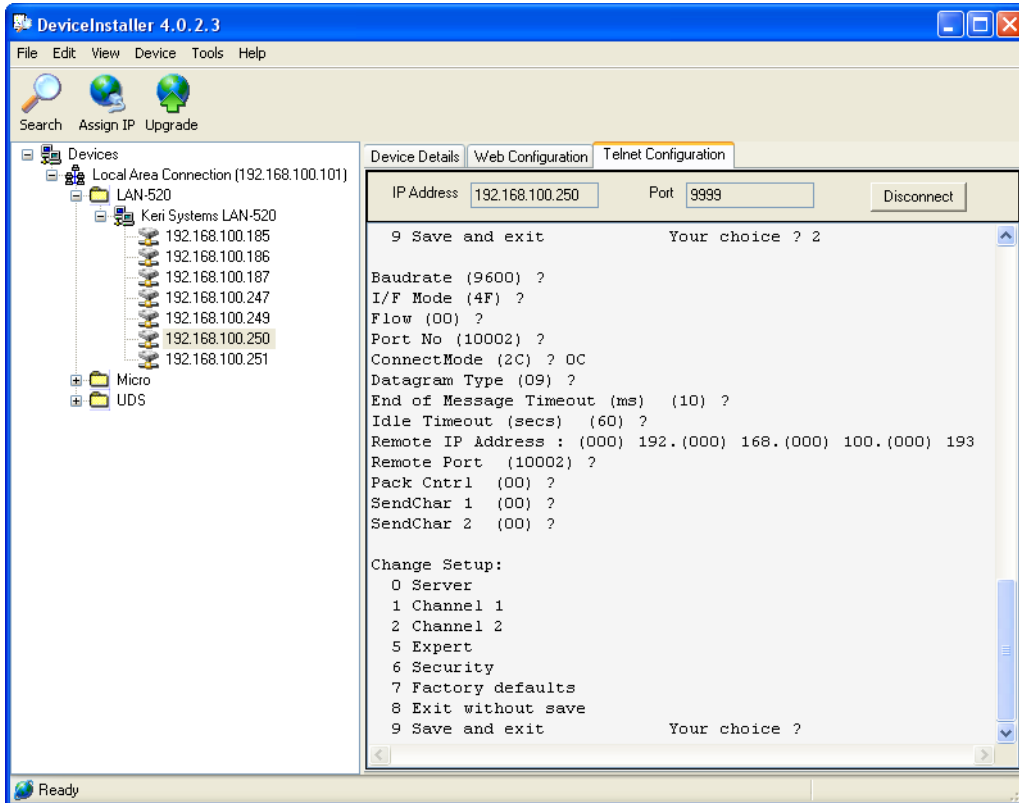
1. As soon as the Telnet sign-on screen appears, press <Enter> to go into the LAN-520 Setup mode. There is a two to three second window in which you must press <Enter> before the Telnet session automatically closes. If the Telnet session closes before you enter Setup mode (if nothing happens when you press <Enter>), simply click the  box again to establish a connection to Telnet.
2. Once Telnet connects with the LAN-520 all current configuration information is displayed and the cursor is placed at the “Your choice” field (see Figure 4 on page 6).
3. Press 2 <Enter> to enter the Channel 2 Configuration values. The second configuration parameter is displayed.
4. If a configuration value needs to be changed, type the new value and the original value is overwritten. Every time <Enter> is pressed, the displayed configuration value is accepted and the next parameter is displayed.
5. Press <Enter> until the I/F Mode parameter is displayed. This value must be **4F** for proper communication between LAN-520s over RS-485. If this value is not **4F**, type **4F** to overwrite the original value.
6. Press <Enter> until the Connect Mode parameter is displayed. This value must be **0C** for slave units. If this value is not set correctly, overwrite it with the correct value stated above.
7. Press <Enter> until the Remote IP Address parameter is displayed. This value must be set to the IP address of the LAN-520 Master. Setting the remote IP address will designate this unit as a slave. The slave will only respond to messages from the designated Master IP address.
8. Press <Enter> until the Remote Port parameter is displayed. This value must be **10002** for proper communication between *Doors* and the LAN-520. If this value is not **10002**, type **10002** to overwrite the original value.

*NOTE: The Port number should not be changed from 10002 unless multiple PXL networks are on the same LAN Subnet (see “Using Multiple PXL Networks on the Same LAN Subnet” on page 10) or instructed to do so by either Keri Systems or Lantronix Technical Support Staff.*

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9. Press <Enter> until the Change Setup menu appears (see Figure 6).



**Figure 6: Correct Channel 2 Configuration Parameters - Slave Unit**

10. Press 9 <Enter> to save the assigned Channel 2 configuration parameters. A “Parameters stored...” message appears and the connection is closed. You may now close the Telnet window. The Channel 2 configuration parameters are now entered into the LAN-520’s configuration table.

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### 3.3 Using Multiple PXL Networks on the Same LAN Subnet

If two or more PXL Networks using RS-485 over Ethernet exist on the same local subnet, it is recommended that each LAN-520 Master have a different Channel 2 port number.

For each PXL Network, change the Channel 2 Port setting on the LAN-520 Master and Slaves to a unique number. It is recommended that the port number be incremented by one digit for each network. The first network's LAN-520 Master Channel 2 Port is set to 10002, next Port is 10003, etc. Next, change each of the Channel 2 Remote IP Address for the LAN-520 Slaves to correspond to their LAN-520 Master's Port number (see Figure 7).

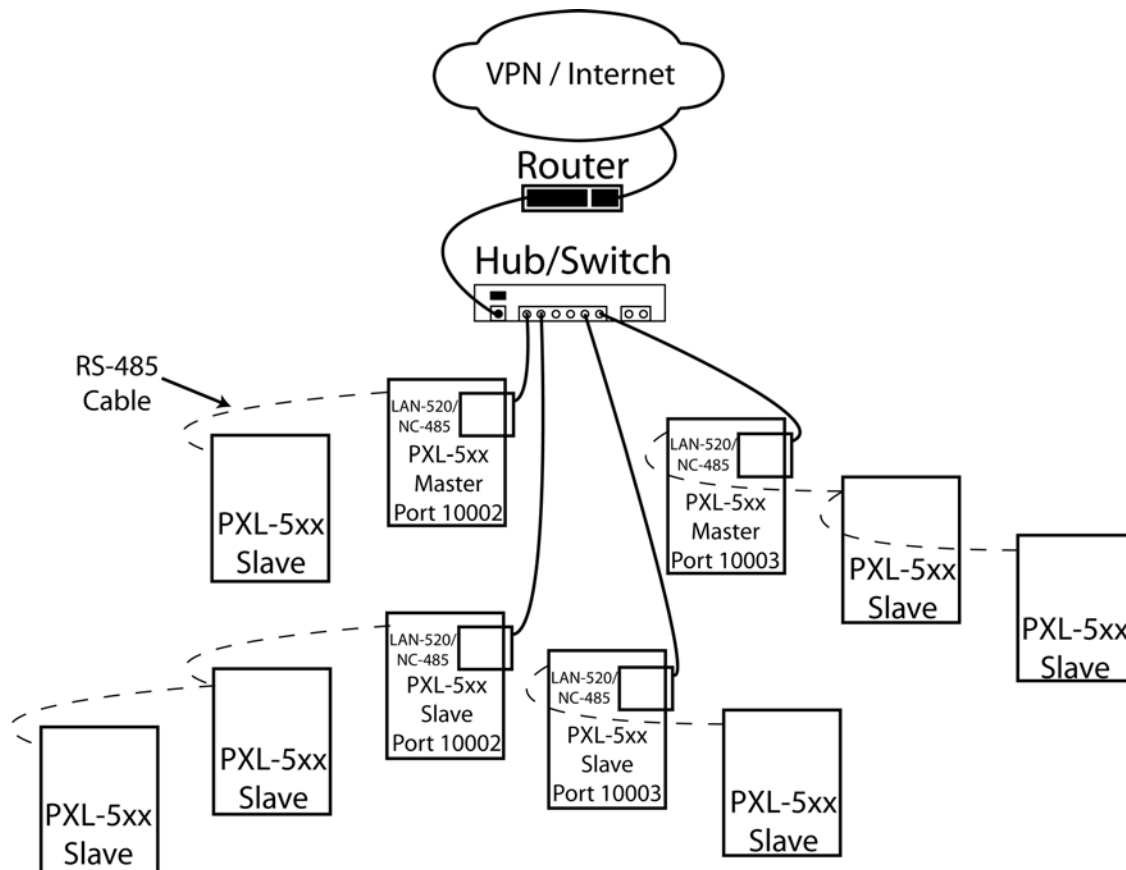


Figure 7: Multiple PXL Networks on the Same LAN Subnet

### 4.0 Ethernet Troubleshooting Guide

This section provides some basic troubleshooting information should you have trouble connecting to a LAN-520.

*NOTE: This section assumes you have a working knowledge of computer networks. For the troubleshooting process, you should consult with the system or network administrator.*

#### 4.1 Verify the LAN-520 Settings

1. Verify the Channel 1 settings as described in the LAN-520 Ethernet Communication Application Note (01958-001).
2. Verify the Channel 2 settings as described in “Channel 2 Configuration Settings” on page 5.

#### 4.2 Verify the LAN-520 is Online

1. Ping the IP address of the LAN-520. If the ping fails, that means a communication connection cannot be made. Possible reasons are:
  - There is no power to the LAN-520 unit.
  - The IP address was not programmed properly.
  - Another device on the network has that same IP address.
  - The IP address is unreachable to that segment of the network.

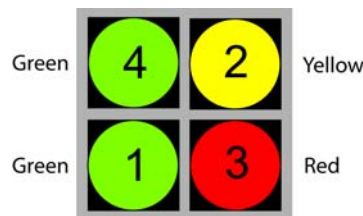
Contact the system or network administrator to resolve these issues.

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### 4.3 Troubleshooting the LAN-520 with NC-485

This troubleshooting section deals with possible problems using the LAN-520 with the NC-485. If the solutions offered here do not work, be sure to also consult the LAN-520 Application Note (P/N 01958-001) or the PXL-500/PXL-510 Quick Start Guide (P/N 01918-001).



**Figure 8: LAN-520 LED**

Cable Connection Status	Master Mode	Slave Mode
LAN Cable Connected	<ul style="list-style-type: none"> <li>LED 1, 2, 4 Solid</li> <li>LED 1 Blinking when Doors is connected</li> </ul>	<ul style="list-style-type: none"> <li>LED 1, 4 Solid</li> <li>LED 2 Blinking</li> </ul>
LAN Cable Not Connected	<ul style="list-style-type: none"> <li>LED 1 Solid</li> <li>LED 2 Solid</li> <li>LED 4 Off</li> </ul>	<ul style="list-style-type: none"> <li>LED 1, 2, 4 Solid<sup>a</sup></li> </ul>
NC-485 Cable Connected	<ul style="list-style-type: none"> <li>LED 1, 2, 4 Solid</li> <li>LED 2 Blinking</li> </ul>	<ul style="list-style-type: none"> <li>LED 1, 4 Solid</li> <li>LED 2 Blinking</li> </ul>
NC-485 Cable Not Connected		

a. If the Master LAN-520 LAN connection is the problem, then all LAN-520 slaves will have LEDs 1, 2, and 4 solid. If a Slave LAN-520 LAN connection is the problem, then only that LAN-520 will have LEDs 1, 2, and 4 solid.

Problem	Possible Reason	Possible Solution
Unable to communicate LAN-520 over Ethernet using either Ping or Telnet.	<ul style="list-style-type: none"> <li>The IP address is not reachable from the Master LAN-520 to the Slave LAN-520.</li> <li>The LAN-520 is not properly linked to the LAN. The Network link LED (Green #4) is not lit.</li> </ul>	<ul style="list-style-type: none"> <li>IP address, routing, or subnet mask may be incorrect. Consult Network Administrator.</li> <li>Check connection at Switch, Hub, or Patch Panel.</li> <li>Replace CAT5 Patch Cable.</li> </ul>

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Problem	Possible Reason	Possible Solution
Master PXL is unable to communicate to a single Slave PXL connected via Ethernet.	<ul style="list-style-type: none"><li>• The J103 lead on the Slave's NC-485 is reversed.</li><li>• Remote IP address or Port number does not match the LAN-520 Master Port number.</li><li>• IP Address is not reachable from the Master LAN-520 to the Slave LAN-520.</li><li>• If communicating to a unit outside the network subnet, the Gateway IP Address is not set in the LAN-520 Master or Slave.</li></ul>	<ul style="list-style-type: none"><li>• Verify Pin 1 on the J103 connector lead is connected to Pin 1 on JP-9 on the PXL.</li><li>• Verify the IP Address and Port number of the LAN-520 Master matches the Remote IP address and Port number on the slaves. The default Port number for Channel 2 is 10002.</li><li>• IP Address, routing, or subnet mask may be incorrect. Consult Network Administrator.</li><li>• Enter the Gateway IP Address in the Server Properties of the LAN-520 (may be Master or Slave).</li></ul>
Master PXL is unable to communicate to any Slave PXL.	<ul style="list-style-type: none"><li>• J103 lead on the Master's NC-485 reversed.</li><li>• The Remote IP Address or Port number does not match the LAN-520 Master Port number.</li><li>• IP Address is not reachable.</li></ul>	<ul style="list-style-type: none"><li>• Verify Pin 1 on the J102 connector lead is connected to Pin 1 on JP-9 on the PXL.</li><li>• Verify the IP Address and Port number of the LAN-520 Master matches the Remote IP address and Port number on the slaves. The default Port number for Channel 2 is 10002.</li><li>• IP Address, routing, or subnet mask may be incorrect. Consult Network Administrator.</li></ul>
Communication errors are received in Doors during an Update Net, Collect Events, or Event Monitoring.	<ul style="list-style-type: none"><li>• High latency or low bandwidth is causing the PXL Master to time out waiting on a response from the PXL Slave.</li></ul>	<ul style="list-style-type: none"><li>• Ping time should be under 300ms for optimal communication. If not, consult Network Administrator.</li></ul>

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Problem	Possible Reason	Possible Solution
LAN-520 not listed in the Device Installer Program	<ul style="list-style-type: none"> <li>Using Device Installer older than version 4.0.2</li> <li>Using version 4.0.2 of the Device Installer Software not obtained from the Doors v4.40 Installation CD.</li> <li>IP address not reachable.</li> </ul>	<ul style="list-style-type: none"> <li>Upgrade to the latest version of the Device Installer, which can be obtained from the Doors v4.40 or greater Installation CD.</li> <li>Keri System's installation of the Device Installer has a modified version of the Lantronix device list. Update the list by modifying the ProductInfobase.txt file in the Lantronix\DeviceInstaller\ folder to add the following line: "KR", "Keri Systems LAN-520".</li> <li>IP Address, routing, or subnet mask may be incorrect. Consult Network Administrator.</li> </ul>

## 5.0 Contact Keri Systems

If you are an End User, please contact your Keri Dealer.

If you are a Keri Dealer, please contact Keri at:

Keri USA	Keri UK, Ireland, Europe
2305 Bering Drive San Jose, CA 95131	Unit 17 Park Farm Industrial Estate Ermine Street Buntingford Herts SG9 9AZ UK
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Fax: (408) 577-1792	Fax: + 44 (0) 1763 274 106
Web: www.kerisys.com	Web: www.kerisystems.co.uk
E-mail: sales@kerisys.com techsupport@kerisys.com	E-mail: sales@kerisystems.co.uk tech-support@kerisystems.co.uk

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