

NXT Network Connection

Troubleshooting Guide

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1.0 Basic Principles of TCP/IP Network Communications

Before troubleshooting, it is necessary to understand the basic principles of TCP/IP network communications.

1.1 TCP/IP Communication Basics: IP Addresses and Subnetting

For proper communication between network devices, it is crucial that those devices are properly configured with IP addresses, subnet masks, and gateway addresses that match the network environment in which they are installed.

The IP Address is made up of four octets usually represented in dotted-decimal notation (i.e. 192.168.1.1). Each IP Address contains a Network ID and a Host ID. The Network ID identifies the network where the host or other network devices are located. The Host ID identifies the individual device on the network. The Subnet Mask is used to determine the Network ID and Host ID of an IP Address.

Using the above IP Address example of 192.168.1.1, if the Subnet mask is 255.255.255.0 (Class C), the Network ID would be 192.168.1 while the Host ID would be 1. This Host will be able to communicate to any other device on that network whose IP address is 192.168.1.1 – 254 (255 is reserved for network broadcasts). If the Subnet mask is 255.255.0.0 (Class B), the Network ID would be 192.168, and the Host ID would be 1.1. This Host will be able to communicate to any other device on that network whose IP address is 192.168.0.1 – 192.168.254.254.

Any communication to a device that is on another network (or outside of the Subnet mask) would be passed on to the Gateway, which will route the data to the appropriate Network and Host. If the Gateway does not have a route specified for the destination network, then the communication will fail.

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2.0 Introduction to *Doors NetXtreme*

Doors NetXtreme (*DoorsNXT*) is versatile in that it will work within a small LAN with a single PC running the Server, Database and Client or within a Global WAN encompassing dozens of clients controlling thousands of doors.

Doors NetXtreme operates in a networked client/server environment. There are four basic components to the *DoorsNXT* architecture: NXT controller hardware, *DoorsNXT* server, *DoorsNXT* database, and *DoorsNXT* client (referred throughout this document as the controller, server, database, and client).

NXT controller hardware may be comprised of a combination of 2-door and 4-door NXT controller hardware, NXT 4x4 modules, Reader Interface Modules (RIM), and card readers (MS, Wiegand, and NXT).

***DoorsNXT* Server** is the workhorse of *Doors NetXtreme*. It manages the communication between the clients and the NXT hardware.

***DoorsNXT* Database** is SQL compliant, client/server software providing access from multiple concurrent sites with no third-party royalty fees. The database is automatically installed on the same computer as the server.

***DoorsNXT* Client** provides an interface to configure the NXT hardware, operators, users, and access control functionality. The client is secured by an operator login. It communicates to the server over TCP/IP.

Configuration of *DoorsNXT* will require some general knowledge of TCP/IP Networking and will require specific knowledge of network details of the system to which *DoorsNXT* will be installed.

The following information must be known before attempting to install and configure *DoorsNXT*:

- The MAC address of the NXT hardware to be installed.
- The IP Addresses that will be assigned to the NXT controllers (each controller must have its own IP Address).
- The Subnet mask to be used for the LAN segment where the controllers will be installed.
- The Gateway address for the Subnet.

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3.0 Common Connection Issues

The following list contains some of the most common connection issues. Each individual issue is covered at greater length in the sections to follow.

3.1 Controller responds to an Autoconfig, but does not respond to the Assign IP Command (IP Assigned column shows NO)

- Improper Subnet Mask
- Improper IP Address
- Firewall is Blocking Communication

3.1.1 For WAN connections all of the above plus:

- Improper or Missing Gateway Address
- Router Not Routing Traffic
- VPN Tunnel Down

3.2 Controllers do not respond to Autoconfig

- Computer Has Multiple TCP/IP Connections
- Controller is Not in a Reset State
- Firewall is Blocking Communication
- Physical Hardware Problem

3.2.1 For WAN connections all of the above plus:

- DoorsNXT Proxy Not Installed or Not Running
- Router Not Routing Traffic
- VPN Tunnel Down

3.3 Controller Update or Controller Status fails

- Incomplete Autoconfig
- Controller Has Been Reset
- Incompatible Controller Firmware

3.4 *DoorsNXT* Client fails to connect to the *DoorsNXT* Server

- DoorsNXT Server Service Not Running
- Incorrect Client Login Settings
- Client License Not Available
- Firewall is Blocking Communication
- Client Software Not Properly Installed

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4.0 Common Causes

Verify that the *DoorsNXT* Server service is running. Open Task Manager and verify that the *DoorsNXTSvr.exe* process is running. If it is not running, then start the *DoorsNXT* Server service using the window control panel services applet.

4.1 *DoorsNXT* Proxy Not Installed or Not Running

The *DoorsNXT* Proxy must be installed on a computer within the targeted Subnet to allow the Autoconfiguration process to complete. If the *DoorsNXT* Proxy is installed, then verify that the proxy service is running by going to Control Panel > Performance and Maintenance > Administrative Tools. Open the Services control panel applet. Locate the *DoorsNXT* Proxy Service and verify the Status is "Started."

4.2 *DoorsNXT* Server Service Not Running

Verify that the *DoorsNXT* Server service is running by going to Control Panel > Performance and Maintenance > Administrative Tools. Open the Services control panel applet. Locate the *DoorsNXT* Server service and verify the Status is "Started."

4.3 Client Software Not Properly Installed

The *DoorsNXT* Client must be installed on the computer that will be running the client and cannot be run from a shared network location.

4.4 Incorrect Client Login Settings

The Server Name in the *DoorsNXT* Client Connection Settings tab must match the computer name or IP Address of the computer on which the *DoorsNXT* Server is installed. The Client Name should be MASTERCLIENT.

4.5 Client License Not Available

By default, the *DoorsNXT* Server will only communicate to one *DoorsNXT* Client at a time. Additional client licenses are required to connect more than one *DoorsNXT* Client to a *DoorsNXT* Server. See your Keri Dealer to purchase additional client licenses.

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4.6 Firewall is Blocking Communication

For the Microsoft Windows Firewall, make sure the *DoorsNXTSvr.exe* application is added as an exception.

1. From the Control Panel, open the Windows Security Center and then launch the Windows Firewall.



Figure 1: Windows Security Center

2. On the Exceptions tab, click on Add Program and then browse to where the *DoorsNXT* is installed and select the *DoorsNXTSvr.exe* application.

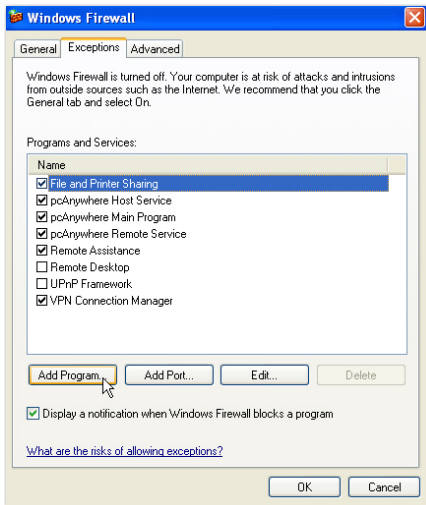


Figure 2: Windows Firewall Exceptions

3. For other software based firewalls, please refer to the software documentation on how to add an application to the exception list. For hardware-based firewalls, make sure that Ports TCP/10010, TCP/10020, TCP/10030, TCP/10040, UDP/11067, UDP/11068, UDP/11434, UDP/11435, TCP/3050, and TCP/3060 are allowed to pass through to the computer running *DoorsNXT* Server, Client, Proxy, and Controllers.

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4.7 Improper Subnet Mask

The Subnet Mask does not match the Network ID so that traffic designated for a gateway goes to the Local LAN or traffic with a destination on a local LAN is routed to a Gateway. The Subnet Mask is configured in the Setup System > Networking Properties page:

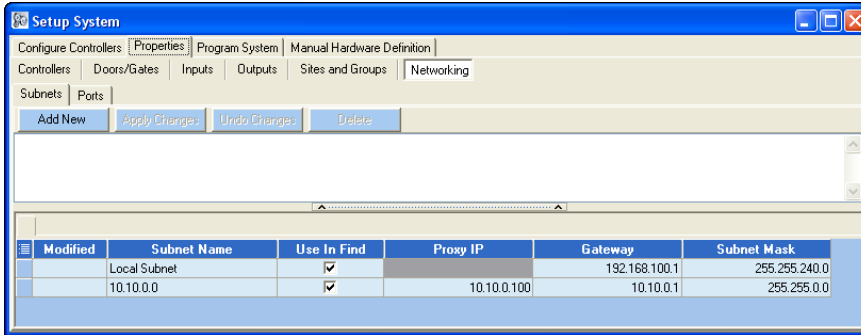


Figure 3: Setup System - Networking Properties

4.8 Router Not Routing Traffic

For communication to controllers on different networks or subnets, the Router/Gateway must have a route configured. If a route is configured in the Router, then verify that other devices on the two networks can communicate using the Ping utility. When using Autoconfig to configure controllers on different subnets, make sure the *DoorsNXT* Proxy service is running on a computer installed on the remote subnet and the IP address of that computer is set in the *DoorsNXT* Subnet property.

4.9 Computer Has Multiple TCP/IP Connections

If a computer has multiple Ethernet devices, *DoorsNXT* currently communicates through the primary device. For example, if a computer is connected to a LAN / NXT with a wired Ethernet cable and has its wireless network device enabled, the communication may route through the wireless network. Disable the wireless network adapter to resolve this.

4.10 Incomplete Autoconfig

An Autoconfig was performed and the controller was detected, however the IP Addresses were not yet assigned. Click on the Assign IP Address button or restart the Autoconfig process. Verify that the IP Address was assigned by checking the status in the IP Assigned column in the Autoconfig tab in Setup System.

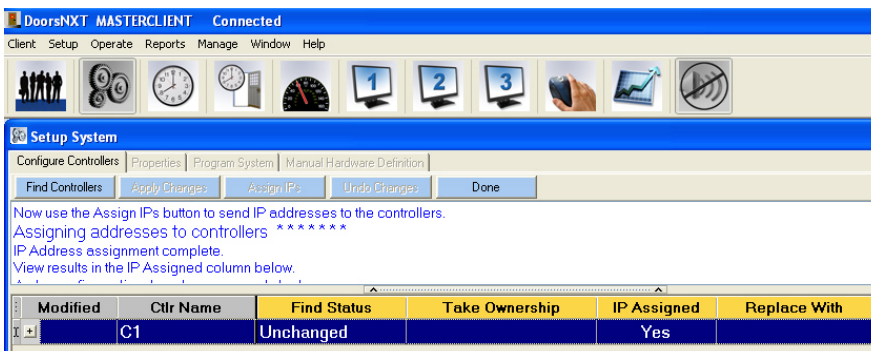


Figure 4: Find Controllers

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4.11 Improper IP Address

If the IP Address has not been assigned by the Autoconfig process or the IP Address assigned is not within the same network as the *DoorsNXT* Server, communication to the controller will fail.

4.12 Improper or Missing Gateway Address

A Gateway address must be specified for controllers that will be communicating to a *DoorsNXT* Server located outside its subnet. The *DoorsNXT* Proxy service must also be installed on a computer within that Subnet to allow the Autoconfiguration process to complete.

4.13 Controller is Not in a Reset State

A controller will only respond to an autoconfig if it is in a reset state or if the autoconfig request is from the *DoorsNXT* server that originally configured the controller. A controller can only be associated with a single *DoorsNXT* server.

4.14 Controller Has Been Reset

If a controller has been reset, the IP Address and other network data is reset and an Autoconfig is necessary to restore communications. Performing a controller update or controller status on a reset controller will fail. Performing an Autoconfig will identify the controller as a reset controller and then the Assign IP button will be enabled so that the controller can be reassigned its IP address.

4.15 Incompatible Controller Firmware

If *DoorsNXT* has been upgraded, it may be necessary to also upgrade the controllers' firmware to a newer version. Failure to do that may result in controller update and controller status failures.

4.16 Physical Hardware Problem

Check the physical network connections from the *DoorsNXT* to the NXT Controller. Look at the Link (D22) and Activity (D33) LEDs on the controller. The Link LED should be illuminated and the Activity LED will flicker when data is present. If the Link LED is not lit, check the patch cable or replace it with a known good cable. Verify the connection to the switch/hub/router. Check that there is a Link LED at the port.

4.17 VPN Tunnel Down

If the communication routes through a VPN, verify that the tunnel is operational. Use Ping or the VPN software to validate connection.

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5.0 Tools

The following tools can be useful when trying to troubleshoot and resolve connection issues. The purpose of these tools is to validate that a connection exists at the lowest network level.

5.1 System Reset / Default IP

After a system reset, the controller's IP address reverts to its default IP address of 169.254.1.1. This process should be used if you are unable to complete an autoconfig of a controller and need to validate that the controller is communicating and functioning properly.

In order to communicate to a reset controller, perform the following steps:

- Change or add an IP address of the computer to be within the 169.254.x.x subnet using a subnet mask of 255.255.0.0. Example 169.254.0.1.

NOTE: It may not be necessary to change the computer's IP address, as Windows will often perform an Auto IP and assign an IP address that is within the 169.254.x.x subnet range when it cannot get an address from a DHCP server.

- Using a cross over cable to isolate the controller from any other controllers or devices on the network, attempt to connect to the controller using Ping or Telnet.

NOTE: Some network adapters are autosensing and a standard patch cable can be used instead of a cross over cable.

5.2 Ping

Confirms basic connection route to another networked device. The Ping utility is a command line tool that will send a small packet to the designated device and expect a response from that device. To use Ping, open a command prompt (DOS prompt) by clicking on Start / Run and enter cmd in the Open: field and click on OK. A new window will appear with a command prompt: C:\>. The actual prompt may differ from computer to computer.

To run the Ping command, enter at the command prompt:

```
C:\>ping <ip address>
```

Where <ip address> is the IP Address or name of the target device. The ping is successful if a reply is received from the target device.

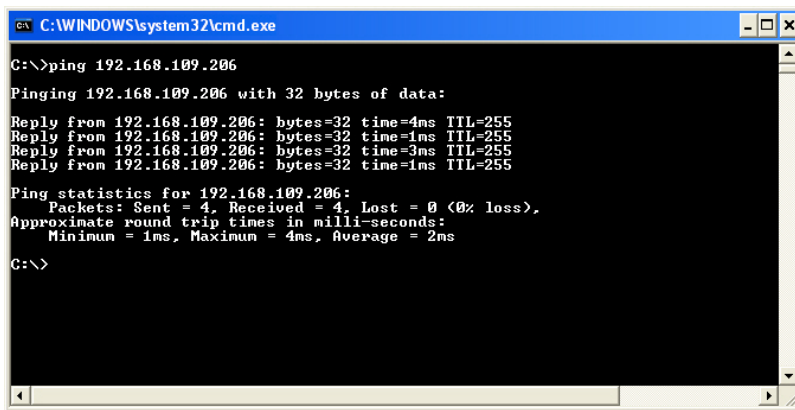


Figure 5: Successful Ping

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When a ping fails, it will show a Request timed out.

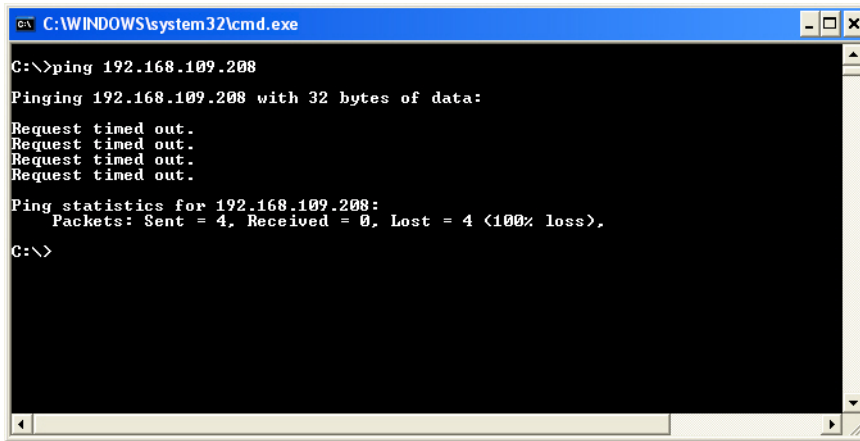


Figure 6: Failed Ping

5.3 Trace Route

The Trace Route utility displays the route path to a designated network device. If a ping fails, the Trace Route utility can be used to see at which point the packet failed. This tool is especially useful in troubleshooting connections that cross multiple routers.

5.4 Telnet

Telnet is a utility that provides a command line interface on a remote device. The NXT Controllers provide for some basic troubleshooting using the Telnet utility. Generally speaking, if you are able to successfully ping a controller, you will be able to use the controller's Telnet utility.

Telnet is useful to verify the controller's configuration and network settings, display connections the controller has to other devices or verifying a communication path to the *DoorsNXT* Server.

The Telnet utility is launched from a command prompt. Open a command window and at the command prompt, enter:

```
c:\>telnet <ip address> 2323
```

The telnet command will establish a connection with the designated IP Address at port 2323. When a connection is completed, the controller will display a command prompt similar to the one below:

```
Welcome to IPCOM SHELL. Type help for a list of commands.  
192.168.109.206#0>
```

Once the command prompt is displayed, the controller can execute a variety of commands. The command prompt consists of the controller's IP Address and the interface number that telnet is connected to. For the NXT controller, the interface number will always be zero.

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The following commands are used to gather information about the controller:

ifconfig

ifconfig displays the IP Address and Subnet settings. At the command line, enter: > ifconfig eth0 (eth0 is the Ethernet interface used in the NXT)

The command will return the following information:

```
eth0      Link type:6  HWaddr 00:14:34:00:00:01
          inet 224.0.0.1  mask 240.0.0.0  broadcast 0.0.0.0
          inet 192.168.109.206  mask 255.255.255.0  broadcast 192.168.109.255
          UP RUNNING SIMPLEX BROADCAST MULTICAST  mtu:1500 metric:1
```

The HWaddr is the MAC address for the controller and the second inet address and mask are the IP Address and Subnet Mask of the controller.

NOTE: *The ifconfig command can be used to change the IP Address and netmask, however changes made using the ifconfig command will not be permanent and should not be done.*

netstat

The netstat command displays the network connection ports that are in use and available on the controller. This information is useful to verify that the controller is connected to a DoorNXT server or ready for a connection. At the command prompt enter: netstat -a (the -a switch will provide the status of all connections). The command will return the following information:

```
INET sockets
Prot  Fd  Local Address      Foreign Address    State
TCP   5   0.0.0.0.2323      0.0.0.0.*         LISTEN
TCP   8   0.0.0.0.21       0.0.0.0.*         LISTEN
TCP   10  0.0.0.0.21484    0.0.0.0.*         LISTEN
TCP   12  0.0.0.0.21474    0.0.0.0.*         LISTEN
TCP   15  0.0.0.0.10020    0.0.0.0.*         LISTEN
TCP   16  0.0.0.0.10010    0.0.0.0.*         LISTEN
TCP   19  192.168.109.206.2323 192.168.100.108.3286 ESTABLISHED
TCP   21  127.0.0.1.49153   127.0.0.1.49152   ESTABLISHED
TCP   22  127.0.0.1.49152   127.0.0.1.49153   ESTABLISHED
UDP   6   127.0.0.1.20005   127.0.0.1.20004
UDP   9   127.0.0.1.20059   127.0.0.1.20058
UDP   13  0.0.0.0.11068    0.0.0.0.*
UDP   14  127.0.0.1.20073   127.0.0.1.20072
UDP   18  0.0.0.0.11434    0.0.0.0.*
```

route

Displays Gateway address. At the command prompt, enter the following command to display the Gateway address:
route get

The command will return the following information:

```
IPv4 default gateway: 192.168.100.1
```

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ping

The ping command confirms basic connection from the controller to other devices. Running the ping command from within the controller is useful to verify that the controller can communicate to other devices on the network. See the Ping command explanation above for instructions on how to the command.

tracert

tracert displays the route path from the controller to a designated network device. See the Trace Route command explanation above for instructions on how to use the command.

6.0 Contact Keri Systems

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