

# DIGILINX™ Application Note

## DigiLinX and Internet Protocol (IP)

The  
IP-Based  
Distributed  
Entertainment  
Company.

Products Included:  
*DigiLinX*

### IP and DigiLinX Tutorial

*DigiLinX* communicates with control devices, amplifiers, audio sources and computers via Internet protocol. TCP/IP (or Internet Protocol) is a means of sending and receiving information on a computer network. A *DigiLinX* example would be taking a song from a CD player and sending TCP/IP to an amplifier. Of course this is an oversimplification of the process, IP is a much more complicated process, but how it applies to *DigiLinX* is not.

Let's start with a simple *DigiLinX* IP Network Diagram.

In the diagram, you have control devices (*TouchLinX™*), source devices (*MediaLinX™*), and output devices (*SpeakerLinX™*) all connected together. For these devices to communicate via TCP/IP each device must have a unique identifier or IP Address.

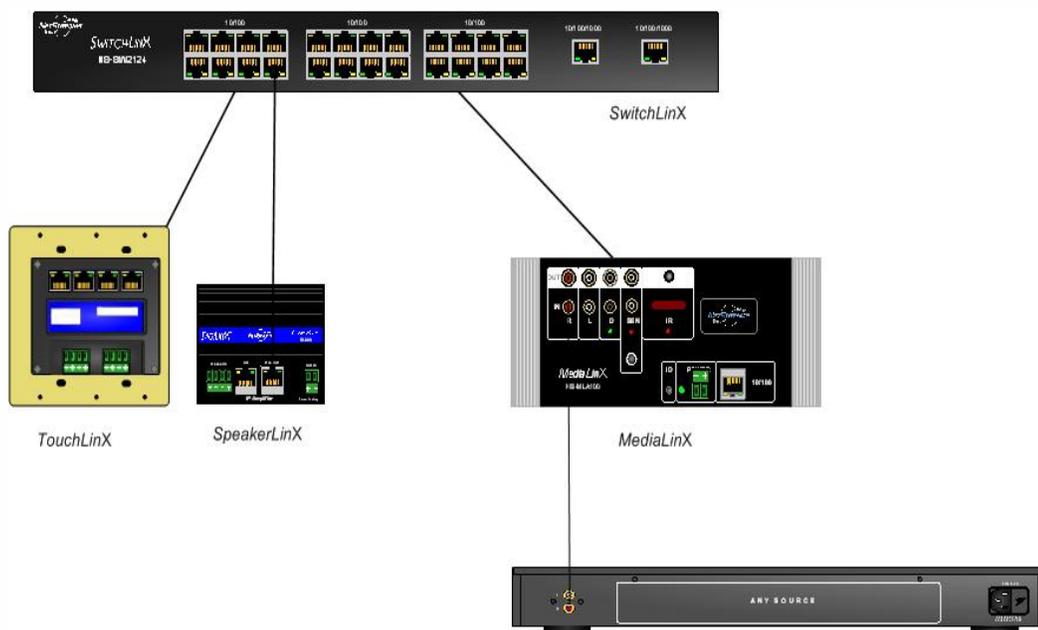


Figure 1 DigiLinX Network Diagram

### IP ADDRESS and the Subnet Mask

On a network all the devices must use the same IP address scheme so that they know where to send information. This scheme is determined by the subnet mask (i.e.



255.255.255.0) and the IP address (192.168.1.110). The IP address has four octets that can be divided into two sections that determine the network and the device. You can tell which octets in an address are the network identifiers by referring to the Subnet Mask. In the subnet you also have four octets containing either the number 255 or the number 0. This denotes which octet in the IP address is part of the network number. For example:

- If the IP address is 10.15.20.13 and the Subnet is 255.0.0.0 Then this devices is on the 10 network and it is device 15.20.13.
- If the IP address is 10.15.20.13 and the Subnet is 255.255.0.0 Then that device is on the 10.15 network and it is device 20.13.
- If the IP address is 10.15.20.13 and the Subnet is 255.255.255.0 Then that device is on the 10.15.20 network and it is device 13.
- If the IP address is 192.168.1.100 and the Subnet is 255.255.255.0 Then that device is on the 192.168.1 network and it is device 100.

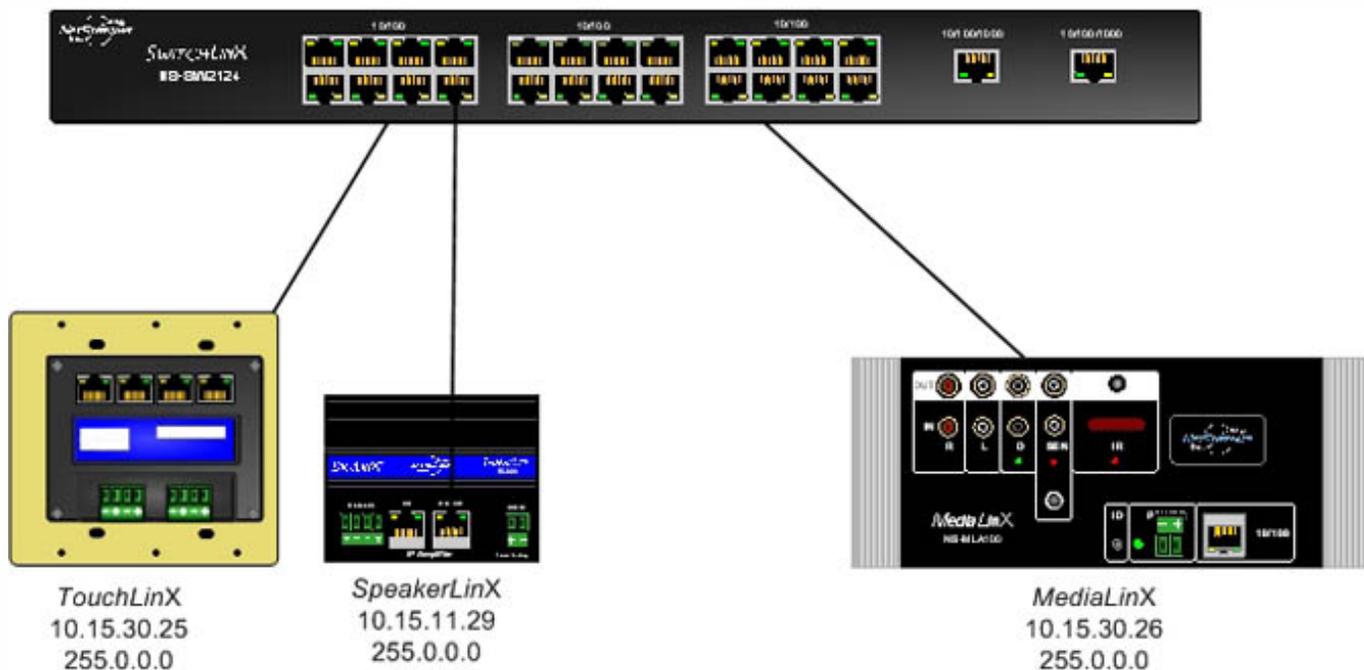
**For devices to communicate with each other they must all have the same network number but have unique device numbers.** On a *DigiLinX* network, devices have a subnet mask of 255.0.0.0 and an IP address of 10.x.x.x This means that all devices on a *DigiLinX* network must have an IP address starting with 10 and the remaining numbers must be unique. The table below shows two devices and whether they can communicate with each other.

DEVICE 1		DEVICE 2		Results
IP ADDRESS	Subnet Mask	IP ADDRESS	Subnet Mask	
10.15.1.110	255.0.0.0	10.16.5.25	255.0.0.0	Yes they can talk
10.15.1.110	255.255.0.0	10.16.5.25	255.255.0.0	No, the subnet makes the first 2 octets the network number and in this example the first two octets are not the same so they are part of
10.15.1.110	255.255.255.0	192.168.1.110	255.255.255.0	No, the network numbers are not the same. The subnet requires that the first three octets be the same. These are clearly not.

This brief explanation of TCP/IP is simplified for the purposes of explaining key networking concepts of *DigiLinX*. The next section of this document will explain a how a *DigiLinX* network is assembled.

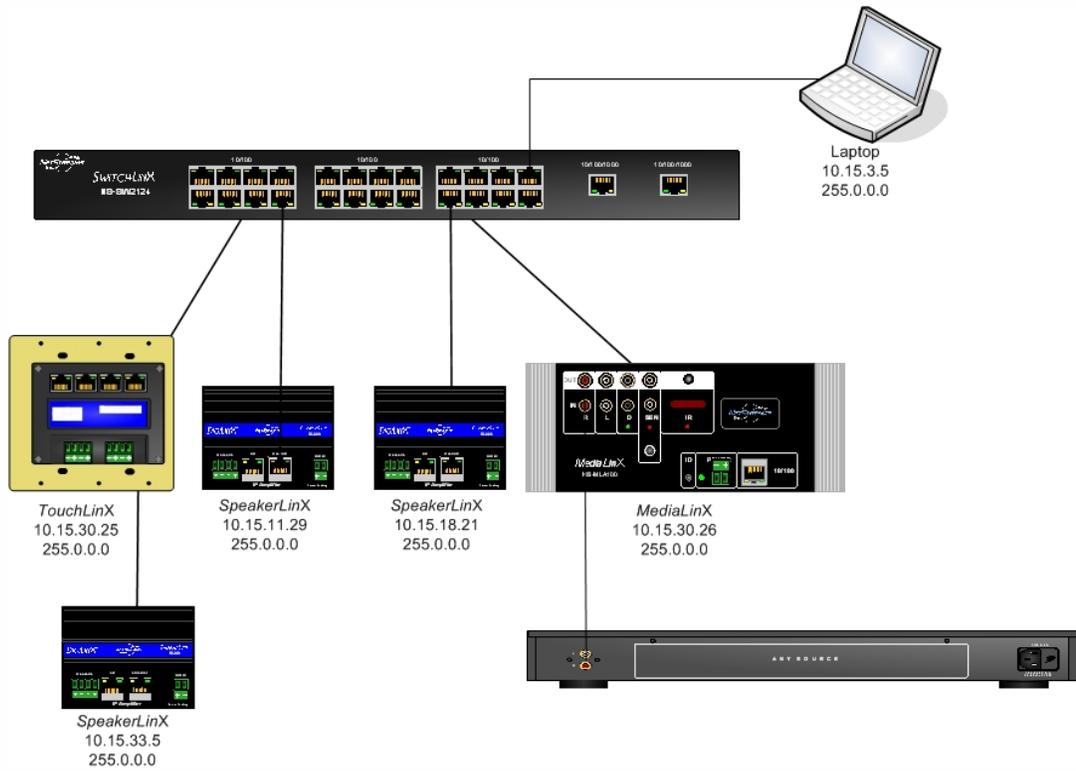
## ***Building a DigiLinX IP Network***

By default, *DigiLinX* automatically assigns IP addresses via a *NetStreams* AutoIP process (not to be confused with DHCP). This allows *DigiLinX* to function as a standalone system. Below is simple *DigiLinX* network with sample IP addresses:



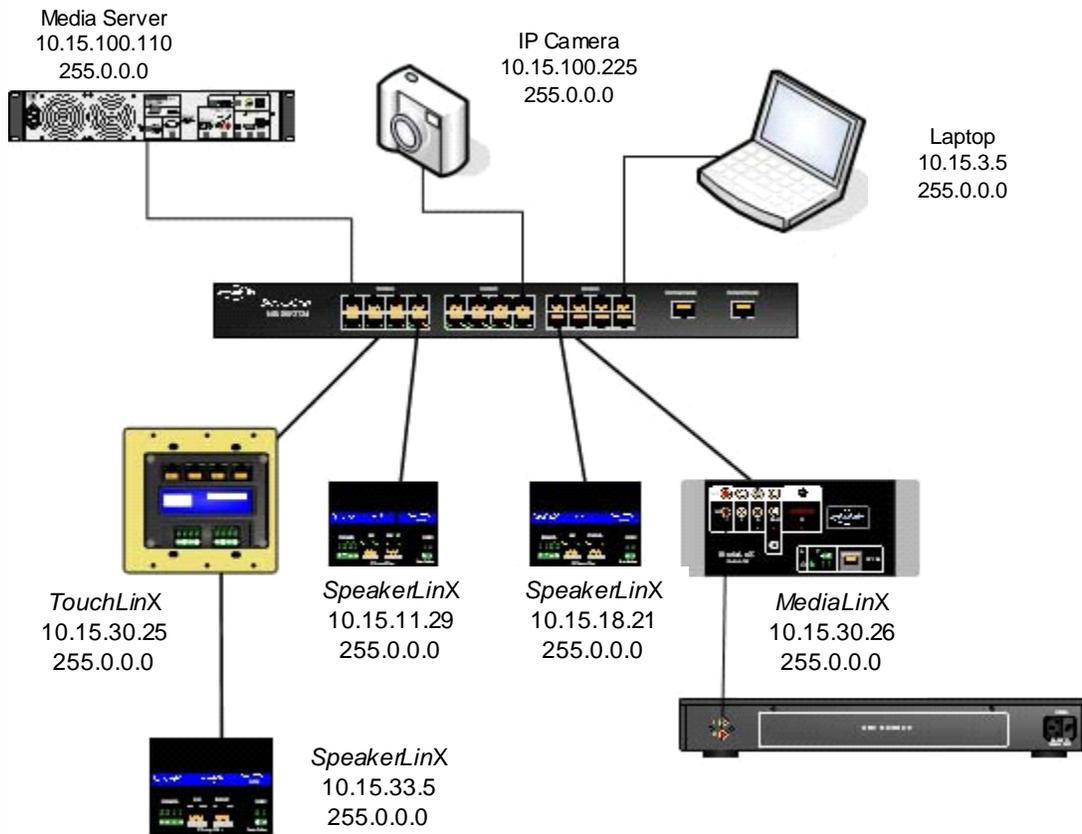
**Figure 2** Building a DigiLinX IP Network (1 of 6)

The IP addresses in the example all work in the same IP range (as defined by the subnet). Given these settings, this is a working *DigiLinX* system. However its not a practical one. There are no sources or speakers, and it only has one room. Here is a somewhat more realistic network diagram with IP addresses that are consistent with a default *DigiLinX* system. Notice that again they all work in the same IP Range and a PC (for configuring the system) also exists on the network. When *DigiLinX Dealer Setup* is started on a PC, it will go out and determine what IP address range to use, and this will automatically assign itself a valid IP address. You do not need to make an address change to your PC when you use the *DigiLinX Dealer Setup* program; however, you WILL need to assign a network card.



**Figure 3** Building a *DigiLinX* IP Network (2 of 6)

*DigiLinX* requires very little IP knowledge for a basic standalone set, but it becomes a little more interesting when non-*DigiLinX* devices are added. These devices lack the ability to configure valid IP address by themselves. It is necessary to create and assign addresses manually. Continuing with the previous example, a digital media server and an IP camera have been added. On the Media Server and on the IP Camera the IP address must be changed so that it uses a valid address that follows the correct IP address scheme.



**Figure 4** Building a *DigiLinX* IP Network (3 of 6)

All of these *DigiLinX* examples are based on using *DigiLinX* assigning IP using factory defaults. However, in many installations the customer would like to integrate *DigiLinX* into the home network. This level of integration requires the installer to change the default *DigiLinX* IP address scheme to one that matches the home network's IP address scheme. Look at the diagram below:

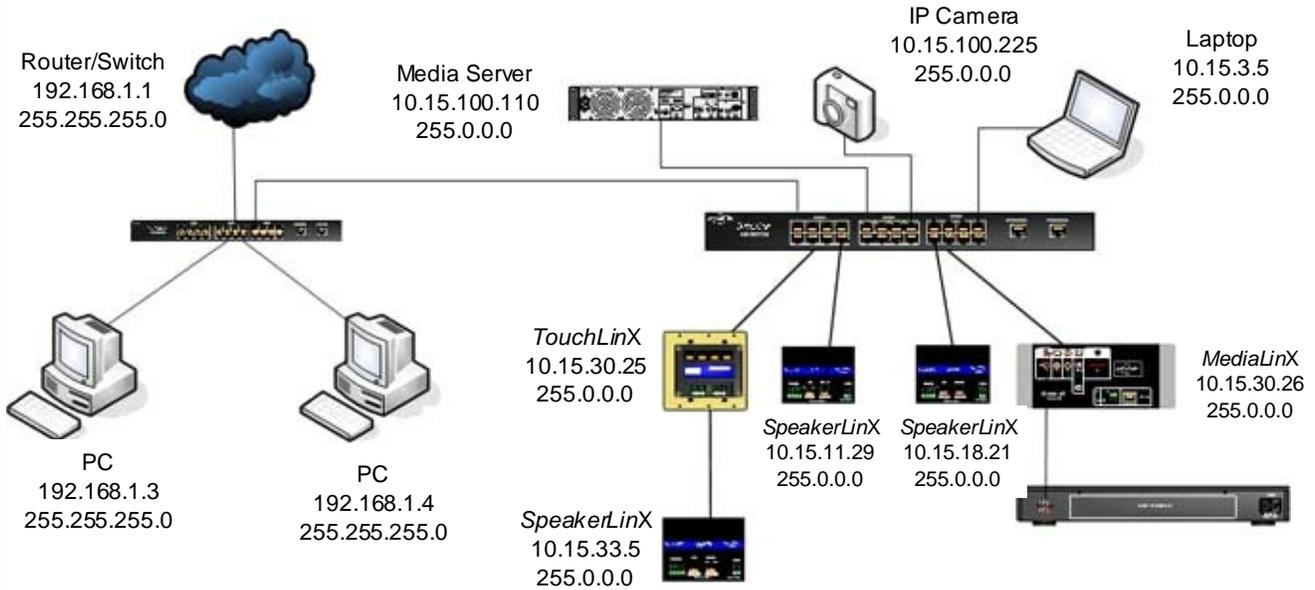


Figure 5 Building a DigiLinX IP Network (4 of 6)

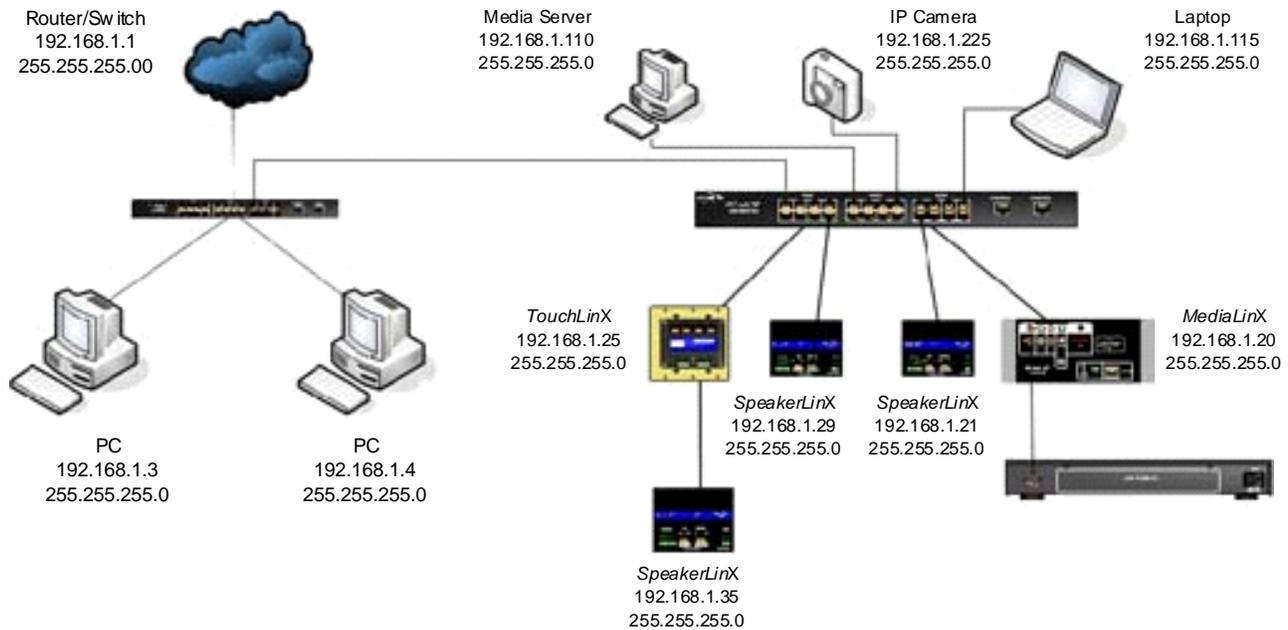
Notice that the address for the home network does not match the IP address scheme for the *DigiLinX* network. Left this way, the *DigiLinX* network would work independently of the Home network, but the home network would not be able to control the *DigiLinX* system.



Figure 6 Building a DigiLinX IP Network (5 of 6)

To fix this, change the IP range for *DigiLinX* so that it matches the home networks IP address range. In the above example, the home network has a subnet of 255.255.255.0. This means that all addresses on the home network must use the same numbers in the first three octets. In this case, all IP address must start with 192.168.1 and the final octet must be unique. To make *DigiLinX* work with this network all devices on the *DigiLinX* network must also start with 192.168.1 and the fourth octet must also be unique.

Some devices on the *DigiLinX* network may require access to the Internet like the digital media server. These devices require additional IP settings like the Gateway IP and DNS address on the digital media server. For more details on configuring *DigiLinX* to work on the home network refer to the Application Note titled: [DigiLinX Home PC Network Integration](#) (downloadable from the dealer section of our website, [www.netstreams.com](http://www.netstreams.com)).



**Figure 7** Building a *DigiLinX* IP Network (6 of 6)