Introduction

This application note covers the basics of placing a Pharos installation onto the Internet so that it may be accessed remotely. Please contact support@pharoscontrols.com if you would like our assistance engineering your specific project needs. Networks and connections to the Internet can be setup in many different ways. This document is only a basic guide covering one scenario.

Terms

Pharos Designer: Designer is the Pharos software that allows you to program an installation as well as upload your programming to the Pharos devices connected via USB or a Network.
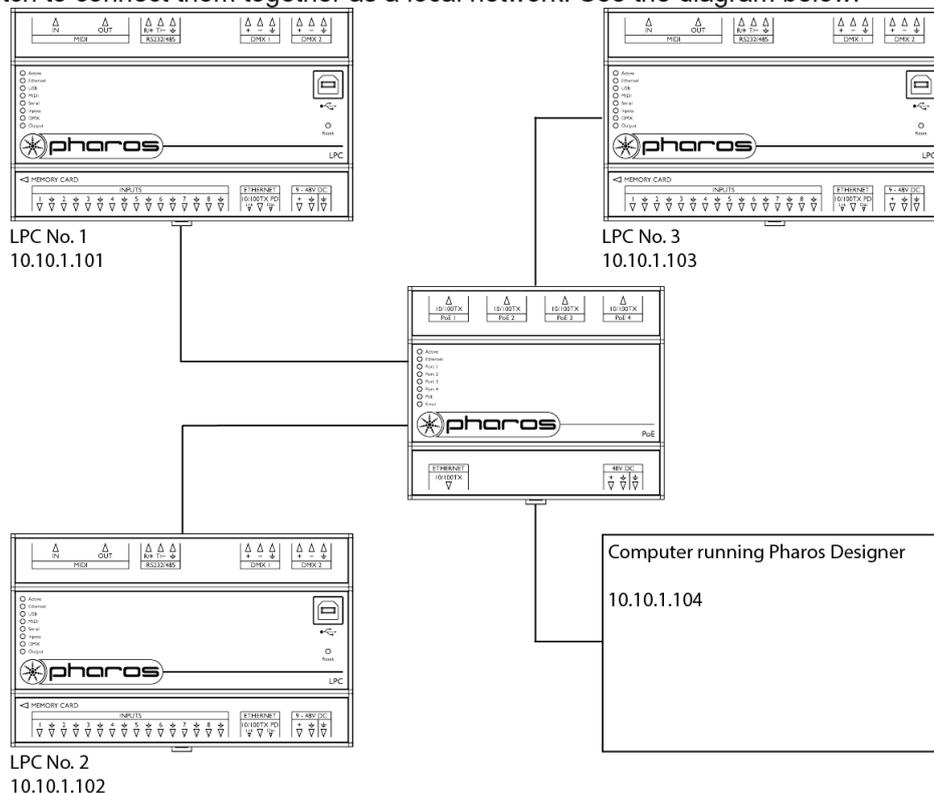
Local Network: This is the Ethernet network that connects all of the Pharos hardware, computers and lighting fixtures that does not also connect directly to the Internet or another network.

IP Address: An IP address is the numerical address that a computer uses to communicate on a Network. Only devices with similar IP addresses can speak to each other. Therefore if a local network uses a 10.10.1.xxx IP scheme, for example, but a computer with an IP Address of 192.168.1.100, that computer will not be able to talk to anything else. This is a typical problem when a local Pharos Network needs to connect to the Internet. Both networks will inherently have different IP address schemes.

Router: A network router is a devices that allows two networks to connect to each other. A router can be used to connect two local networks or connect a local network to the Internet. The router helps to manage the fact that the two networks most often will have different IP address numbering schemes.

Pharos Lighting System Example

In the example for this document we will be using a Pharos system that is comprised of three (3) LPCs and one (1) POE Ethernet switch to connect them together as a local network. See the diagram below:

LPC No. 1
10.10.1.101

LPC No. 3
10.10.1.103

Computer running Pharos Designer

10.10.1.104

LPC No. 2
10.10.1.102

Project Scenarios

There are two scenarios that dictate how to proceed allowing remote access to an installation.
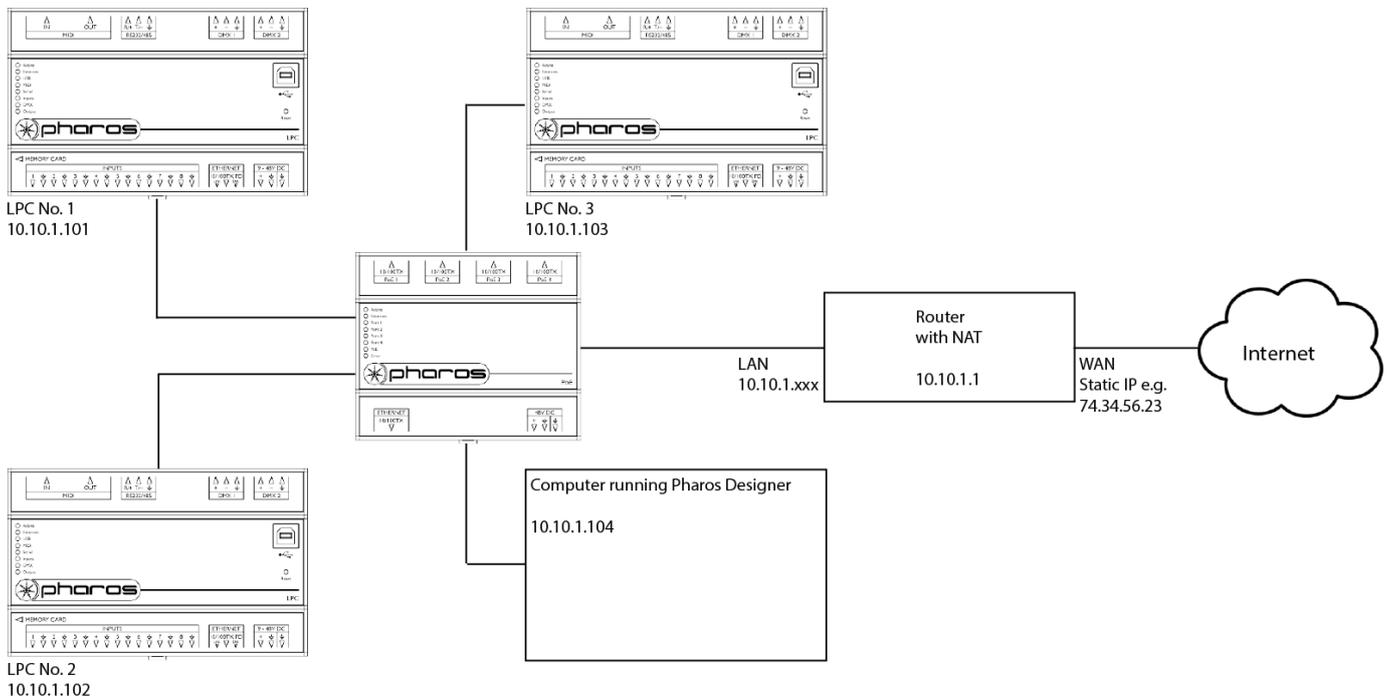
1. The Pharos system is installed in a building utilizing someone else's network. Perhaps a corporate network. In this case you will first need to make contact with the administrators of the network to learn how they wish to make the connection to the Internet. Pharos support is willing to help with any details they may need, but it will be that network's professionals who will design the connection.
2. The Pharos system is a stand alone network where a dedicated high speed (broadband) connection will be provided for the sole purpose of remote access. This is the scenario we will outline in this document.

Connecting a Pharos system to the Internet

4 Step Process

1. Order, or have the owner order, a high speed Internet connection with a static IP address
2. Choose a router with the features required to suit your needs (port forwarding and/or VPN capabilities)
3. Configure the router and LPC controllers if necessary
4. Connect everything together

1. Ordering a high speed connection that uses a static IP address allows for remote access methods to always know what the address of the installation is. Internet service providers who offer dynamic connections often rotate through IP addresses. Without knowing the location of the project on the Internet you will not be able to gain access.
2. Most Internet service providers today will supply you with at least a modem to make the wiring connection from their service and provide the project with a Ethernet connection. Be sure to ask if this device also contains a built in router. You may be able to use this router if it has the features you need like port forwarding or even VPN capabilities.
3. Whether you use the ISP's router or provide your own, you will need to access its setup menu and choose how a remote access request from the Internet will be handled and allowed to pass through the router's firewall and to the correct LPC controller. More of this setup later.
4. The riser below shows our example system now connected via a router to the Internet.

LPC No. 1
10.10.1.101

LPC No. 3
10.10.1.103

LPC No. 2
10.10.1.102

Router
with NAT

10.10.1.1

LAN
10.10.1.xxx

WAN
Static IP e.g.
74.34.56.23

Internet

Computer running Pharos Designer

10.10.1.104

pharoscontrols.com

Setting up the Router

There are two ways to setup the router to allow remote access traffic to pass through it. The first is called **port forwarding** and the second is called **VPN**. We will discuss both. Take another look at the riser above. Notice the local network is connected to the LAN of the router. LAN stands for "Local Area Network". The word local being important as this is the smaller Pharos network that we wish to connect to the larger Internet network. WAN stands for Wide Area Network, the Internet.

Setting up a VPN (Virtual Private Network)

Using a VPN is the best way to access a remote Pharos installation. The VPN is a secure "tunnel" through the Internet that allows only people and computers with the right security credentials to access the installation. Routers with a VPN feature are usually easy to configure by following the manufacturer's instructions. Once you do this and choose the name and password credentials, any computer can "start" a VPN with the router. Once started, Designer running on the remote computer can access all Pharos controllers on the LAN and upload new programming. Once the remote computer turns off the special VPN "tunnel", the connection to the remote units is severed.

Port Forwarding

When you access a Pharos Controller's web interface you typically type http://10.10.1.101. This is a standard request for a web site using the HTTP "port". A port is like a specific conduit for data over a network and the Internet. Pharos always listens for this HTTP request on port 80. This is a universal default. If you choose a router without a VPN you can instruct the router to forward all HTTP (web interface) requests on the WAN to the appropriate LPC in the LAN. Typing http://74.34.56.23 will ask the router for a webpage that it does not have. But if the router were told to forward this request to 10.10.1.101, the remote computer would indeed gain access to LPC1 Unit #1's Web Interface. This scenario works for one LPC on the LAN. Some additional ports have to be used to deal with multiple LPCs. Here's the example of ports to setup on the LPCs and forward scheme to setup on the router.

Remote Computer Request	Router Port Forwarding	LPC with a Custom Port
http://74.34.56.23:9001	9001 goes to 10.10.1.101 port 9001	LPC1 Unit#1 set to Port 9001
http://74.34.56.23:9002	9002 goes to 10.10.1.102 port 9002	LPC1 Unit#2 set to Port 9002
http://74.34.56.23:9003	9003 goes to 10.10.1.103 port 9003	LPC1 Unit#3 set to Port 9003

This method is a lot less secure than VPN, as anyone on the Internet can gain access to see each LPC's web interface if they guess the correct port numbers and IP addresses. This is unlikely but not impossible. We therefore suggest all Pharos controllers have their passwords set.

Connecting Designer to a Remote Controller over the Internet

Within Designer, it is possible to connect to a controller either locally to the computer or at a remote IP Address.
This can be achieved using the Find… option within the Network view of Designer.
Typing in the IP Address and port that are used to reach the controller's web interface into this tool will allow Designer to search for the controller at that IP Address and Port. If a controller responds, it will be added to the Network view and can be uploaded to as if it was on the same local network as the computer.
If you are using port forwarding, or firewalls, you will need to forward both Port 80 (for the web interface) and Port 38008 (for uploading to the controller).

As always, Pharos support is always available to help guide you through setup of remote access. Just ask!

pharoscontrols.com