Technical Bulletin:

Port forwarding

Provides information for using port forwarding with Burk products

BURK TECHNOLOGY

Overview

Port forwarding allows you to communicate with devices behind a router (or firewall) by instructing the router to forward traffic on certain ports to specific IP address on its LAN. This is often necessary when configuring equipment at remote transmitter locations to communicate with studio equipment, or to allow access from other locations.

This document provides the basic information necessary to configure port forwarding for use with Burk Technology products. Because routers and firewalls differ greatly in their capabilities and interfaces, this document cannot explain in detail how to configure your specific router.

For information on how to configure your router for port forwarding, see the documentation supplied with your router. Burk Technology does not recommend or support any specific models.

Definitions

Term	Definition
LAN	Local Area Network. A computer network comprising systems in a single location that do not require a router to communicate with each other.
WAN	Wide Area Network. A computer network that uses routers to link multiple networks together.
Port Number	A port number is used to identify the service requested by an IP connection. When a connection is established on a specific port, the device will provide the appropriate service to the connecting computer. Port numbers range from 0 to 65,535.
TCP	Transmission Control Protocol. TCP is used for reliable communications over an IP link.
UDP	User Datagram Protocol. UDP is typically used for streaming data where timeliness is more important than reliability*. *Burk Technology products that use UDP employ proprietary application-layer protocols that ensure delivery of critical data without delaying real-time communications.*
HTTP	Hypertext Transfer Protocol. This is the protocol used by web servers. HTTP typically uses TCP port 80.
Well-known Ports	Ports 0 – 1023 are considered to be "well-known" ports. These ports are reserved for common services, including HTTP, SMTP, telnet, etc. *When configuring ports on your equipment, avoid using well-known ports, except for appropriate services.*

TCP ports and UDP ports use the same range of numbers (0 – 65,535). However, these ports are typically defined (and forwarded) separately. Any given port number may be used for TCP and UDP simultaneously. Depending on your router's capabilities, a single port number may be forwarded to different IP addresses for TCP and UDP.

Ports and Configuration

The table below lists the Burk Technology products that this document applies to, along with what ports they require.

The ports listed are the default ports for each product. In most cases, you can change these port numbers.

For information on configuring network settings and changing port numbers, see the documentation supplied with your product.

System	Port		Description
ARC Plus	TCP	80	HTTP
	TCP	2000	Communications with AutoPilot®, AutoLoad, and the built-in Web Interface
	UDP	2000	Site-to-site communications with other ARC Plus units
	UDP	45000	Communications with Plus-X devices
PPM™ Assurance™	TCP	80	HTTP
	UDP	45100	Communications between the Monitor and Controller units
Plus-X (all models)	TCP	80	HTTP (Used primarily for configuration)
	UDP	45000	Communications with the ARC Plus
PlusConnect™ (all models)	TCP	23	Telnet. Used primarily for configuration. *Not available on all models.*
	UDP	45000	Communications with the ARC Plus
GSC/VRC Web Interface	TCP	80	HTTP
	TCP	4095	Communications with AutoPilot/Lynx and the built-in web page
ARC-16 Web Interface	TCP	80	HTTP
	TCP	4095	Communications with AutoPilot and the built-in web page
Watchband™	TCP	80	HTTP *Note that this is configured in Microsoft Internet Information Server.*
	TCP	3000	Communications with the Watchband java applet.
	UDP	3100	Streaming audio

Depending on how your router/firewall works, you may need to separately forward TCP and UDP ports. It is important to take note of this difference, as your equipment will not function as expected unless its TCP and UDP ports are correctly forwarded.

Example

Here is an example that shows how you would implement port forwarding for an ARC Plus with the IP address 192.168.0.101:

Router Port	Device IP Address	ARC Plus Port
TCP 80	192.168.0.101	TCP 80
TCP 2000	192.168.0.101	TCP 2000
UDP 2000	192.168.0.101	UDP 2000
UDP 45000	192.168.0.101	UDP 45000

Using Alternate Port Numbers

In most cases, you can use the same port on the router that you are using on the equipment. For example, you can forward TCP port 80 on the router to TCP port 80 on your device. Some routers will allow you to use different ports for each side. In other words, you may be able to route from TCP port 8080 on the router to TCP port 80 on your device. There may be security or compatibility reasons that affect which choice is more appropriate. Consult your network administrator if you are unsure.

Example

Here is an example that shows how you would forward TCP port 8080 to TCP port 80 for a device with the IP address 192.168.0.101:

Router Port	Device IP Address	Device Port
TCP 8080	192.168.0.101	TCP 80

Connecting to your Equipment from Outside the LAN

Once you have configured port forwarding, you will be able to connect to your equipment from outside the LAN. It is important to note that you will be connecting to the router's *outside* (WAN) address, not the equipment's actual IP address. For example, if the router's WAN address is 10.100.0.1 and the equipment's IP address is 192.168.0.101, you will be connecting to 10.100.0.1.

If you are using a different port number on the router than on the equipment, your connection must use the router's port number. For example, if you are forwarding from TCP port 81 on a router with the IP address 10.100.0.1 to TCP port 80 on a device with the IP address 192.168.0.101, you will connect to 10.100.0.1 on TCP port 81.

Port Forwarding with Multiple Devices

You may have more than one device on your LAN that need to use the same port number. For example, if you have two devices that both have built-in web servers, each device will need to use TCP port 80. **It is not possible for a router to forward one port to two different devices**. In this case, you need to use a different port number for one of the devices.

Example

If you have two devices that both require TCP port 80, and their IP addresses are 192.168.0.101 and 192.168.0.102, you would port forward as follows:

Router Port	Device IP Address	Device Port
TCP 80	192.168.0.101	TCP 80
TCP 81	192.168.0.102	TCP 80

If your router does not allow you to forward from TCP port 81 to TCP port 80, you will have to configure the device to use TCP port 81 instead, and then forward as follows:

Router Port	Device IP Address	Device Port
TCP 80	192.168.0.101	TCP 80
TCP 81	192.168.0.102	TCP 81

When to Change a Port Number

There are several situations that may require you to change the port number on a device from the default to an alternate. Some common situations are described below.

In all of these cases you may either forward from the alternate port on the router to the standard port on the device, or, if your router doesn't support this kind of forwarding, you may change the port number used on the device.

Changing the HTTP port for increased security

To decrease the chance that an unauthorized individual may discover and attempt to access the web page on your device, you may wish to use a non-standard port number for HTTP.

When using a non-standard port for web access, you will need to specify the port number in your browser. If your router's IP address is 10.100.0.1 and the HTTP port is 8080, you would use the following address in your browser: http://10.0.100.1:8080 (note that the colon separates the IP address and port).

Note: Entering the "http://" at the beginning of the address is necessary on some browsers when using a specific port number.

To browse to a specific page, enter a forward slash followed by the page name at the end of the address: http://10.0.100.1:8080/page.html.

It is important to note that this only decreases the chance of unauthorized access through obscurity. It is still vital to employ good security practices, including strong passwords, IP filtering, and VPNs.

Some ISPs may block certain ports

Some Internet service providers may prevent access to your equipment on certain ports (often port 80). You may wish to use alternate port numbers for your equipment if this is the case.

It is your responsibility to ensure that the use of your equipment over an IP connection provided by your ISP does not violate your terms of service.

Installing multiple devices on the LAN that require the same ports

As explained above, a router cannot forward the same port number to more than one device. If you have multiple devices that require the same port number, you will have to change some of the port numbers.

Changing the ARC Plus data port for compatibility with Cisco routers

Some Cisco routers may erroneously detect ARC Plus traffic on port 2000 as being an unrelated service (SCCP – Skinny Call Control Protocol), and behave in an unexpected manner. If you experience connectivity issues using the ARC Plus with a Cisco router, you can change the ARC Plus data port from 2000 to a different value.

For more information visit www.cisco.com. Cisco references port 2000 issues using the tracking numbers CSCdt14805 and CSCds72170.