YASKAWA
PARTNER SUPPORT
Shared Integration Experience

This document captures ideas, experiences, and informal recommendations from the Yaskawa Partner Support team. It is meant to augment – not supersede manuals or documentation from motoman.com. Please contact the Partner Support team at partnersupport@motoman.com for updates or clarification.

Understanding Network Hubs, Switches, and Routers

Introduction

Starting out, you may have connected a PC directly to your robot controller to perform some basic network function. If you need to expand and connect other devices, you may be faced with a choice: Do I get a network hub, a switch, or a router? What is the difference? What is a *managed* switch and why would I want one? This document provides a basic introduction to these networking terms to help you make an informed decision.

Network Hubs

This is the simplest and least costly solution for connecting multiple devices in a local area network. A network hub simply passes all the network traffic flowing in to all devices connected to the hub. It is like the old "party line" in a phone system. Everyone can hear what everyone else is saying. The hub does not look at any of that traffic or control where it goes. All connected devices share the network capacity. (One "busy" connection can slow down communications to other devices connected to the hub.) If you are just looking for basic connectivity at low cost – this is your choice.

Network Switches: Unmanaged and Managed

A network switch is more sophisticated than a hub. It looks at the traffic flowing into the hub and decides whether to pass it on to other devices attached to the switch. This sophistication will cost you a bit more, but performance is significantly better. One busy connection will not slow down every other connection to the switch. Each device can operate as if 100% of the link speed is available to it.

An *unmanaged* switch is one with no additional controls beyond what is described above. There is no configuration to do and no control over what flows through the switch. If you just want better performance than available with a hub, this is your choice. When deciding between a hub and an unmanaged switch – go for the switch. They are generally not much more expensive and provide better performance.

A *managed* switch adds control, complexity, and cost. Typically, it runs a web server where you log in to set up network controls for the switch. With these controls you can prioritize traffic, monitor performance, and implement security rules, like encryption, access control lists, and Virtual LANs (VLANs). If you are not sure whether to get a managed switch, you probably don't need one. Managed switches can be complex to set up and use. They are usually purchased to solve a specific problem with performance or security.

Network Routers

A network router is a different type of device. The whole job of a network router is to look at network traffic and decide how to get it to where it needs to go. Routers are used to connect multiple networks together rather than multiple devices.

You may have a router in your home to connect the devices on your local network to the Internet. The router decides what internet traffic can come into your home (creating a firewall to protect your LAN) and what needs to go out. These consumer devices often combine the router function with a switch to simplify connectivity.

Of the equipment discussed here, routers are the most sophisticated and powerful. You may need a trained network expert to help with configuration. A good rule of thumb: if there is already a router in the area, see if you can connect to it rather than purchase another one.