

Nordson EFD Networking Guide

For Ethernet-Capable Devices

Introduction

Nordson EFD offers several Ethernet-capable products. Ethernet communication allows great flexibility and configurability for managing these products, but also creates a complexity that makes it impossible to provide a succinct, thorough network installation process. Rather than attempting to explain all the possible ways to configure a network, this document introduces the terminology required to understand basic setups and provides some basic and advanced setup examples.

Terminology

Term	Definition
IPv4 (Internet Protocol Version 4)	Defines how messages can be sent between devices and configures the settings for the next three terms in this list: IP Address, Gateway, and Subnet Mask.
IP Address	An address to deliver messages to, similar to a mailing address or an email address. To receive a message, a device must have a unique IP address and the sender must know that unique IP address. IPv4 addresses take the form of x.x.x.x, where each x is called an octet and is a number from 0 to 255, inclusive. NOTE: An IP address is most commonly referred to only as “address.” In this guide, every use of the term “address” is synonymous with “IP address.”
Gateway	IPv4 was designed to allow devices that have a direct connection (those in the same subnet) to communicate directly, while devices that are separated by more connections must send their messages to an intermediate gateway to be forwarded on. The gateway address (usually called only “gateway”) is the address of the gateway to which devices that are not on the same subnet must send their messages so that they can be forwarded.
Subnet Mask	The sender/source device (“sender”) has an address, the receiver/destination device (“receiver”) has an address, and the gateway has an address. To determine if the sender and receiver are in the same subnet, their addresses are compared against the subnet mask, which looks like an IP address. This comparison is done in binary, or base 2, in which the only digits are zeros and ones. The subnet mask specifies which digits must match for the sender and receiver addresses to be in the same subnet. If the addresses are not in the same subnet, then the sender sends its messages to the gateway to be forwarded to the receiver. EXAMPLE: A subnet mask of 255.255.255.0 in binary has all ones digits for the first three octets and all zeros for the last octet. This mask means that the first three octets of the sender and receiver addresses must match for the addresses to be in the same subnet. If they match, they are in the same subnet and can communicate directly. NOTE: The gateway (as configured on the sending device) must be in the same subnet as the sender.
DHCP (Dynamic Host Control Protocol)	The method used by a DHCP server to automatically assign IP, gateway, and subnet mask addresses.
Dynamic IP Address	An IP address that was assigned in an automatic way, e.g., via DHCP or Automatic Private IP Addressing (APIPA).
Static IP Address	An IP address that was assigned manually and will not change unless manually reconfigured. This often implies that the gateway and subnet mask addresses are also manually configured.
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Terminology (continued)

Term	Definition
TCP (Transmission Control Protocol)	Allows for reliable communication by defining how messages are checked and re-sent if necessary. This protocol is like an envelope that has the following elements written on the outside: (1) a message number, (2) a short description of its content, and (3) a request for acknowledgment. When this envelope is received by a device, the receiving device returns an acknowledgment message if the communication was successful. TCP devices use these envelopes to send messages and acknowledgments back and forth until they are sure messages have been successfully communicated. TCP also uses ports to define different communication channels so that devices can have multiple conversations occurring at the same time without mixing the messages.
Port	A port is simply a number between 1 and 65,535. TCP specifies that each communication connection must have a source port and a destination port. When users talk about ports, they usually specify only the destination port of the first message. For example, “FTP operates on port 21” means that the first message of a TCP connection for FTP (File Transfer Protocol) has a destination port of 21.
Switch (also called Ethernet switch)	A hardware device that accepts multiple physical Ethernet connections and allows messages to pass through the connections. A switch does not have an address because messages only pass through it.
Hub (also called Ethernet hub)	A hub is just like a switch, but less efficient for large networks. The terms “switch” and “hub” are sometimes used interchangeably.
Server	A physical device, or a program on a device, that provides a “service” to clients.
Client	A physical device, or a program on a device, that connects to a server, makes requests of the service provided, and then disconnects from the server.
Service	A general term that includes anything that a server can do for a client when the client makes requests.

Technical Requirements

For devices to communicate with Nordson EFD products, they must be configured correctly. The technical requirements for each device differ slightly. For example, the UltimusPlus™-NX dispenser uses port 9080 for FTP, but the 7197PCP-DIN controller does not support FTP. Some products support DHCP while others require a static IP address. For the protocols supported and all specific technical requirements for each Ethernet-capable Nordson EFD product, refer to the product manual.

Setup Examples

Basic Setup: Using the Same Subnet and Static IP Addresses

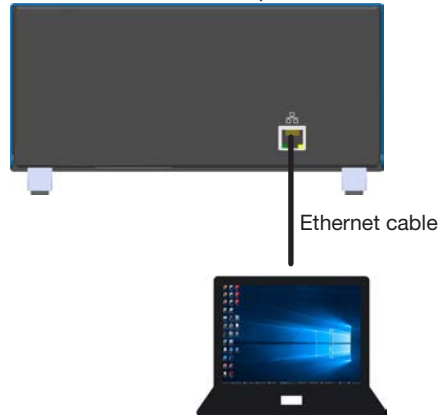
The simplest setup requires only a single Ethernet cable connected directly between the Nordson EFD device and a computer. Both devices can be configured with static IP addresses such that they are on the same subnet.

For example:

- A Nordson EFD Ethernet-capable device is configured with an IP address of **192.168.10.40** and a subnet mask of 255.255.255.0
- A computer is configured with an IP address of **192.168.10.10** and a subnet mask of 255.255.255.0.

These two addresses are on the same **subnet**, so once configured they will be able to communicate.

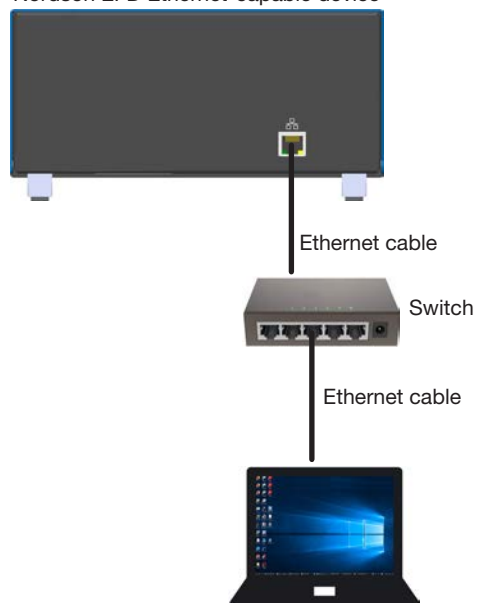
Nordson EFD Ethernet-capable device



Ethernet-capable device connected to a laptop

The same configurations can be used if you add a switch or hub:

Nordson EFD Ethernet-capable device

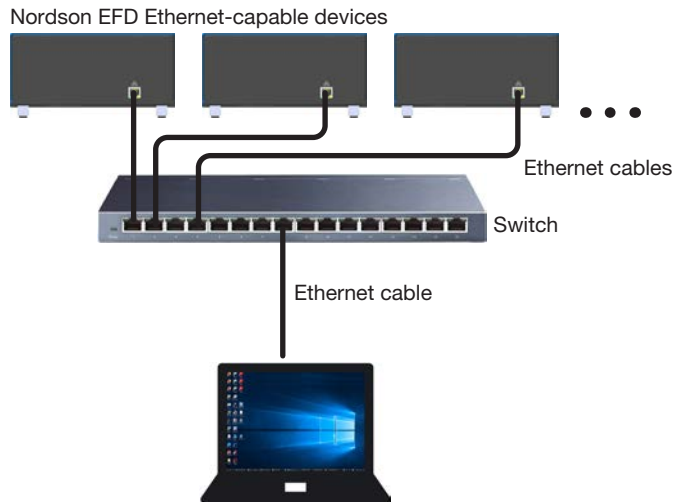


Ethernet-capable device connected to a laptop through a switch

Setup Examples (continued)

Basic Setup: Using the Same Subnet and Static IP Addresses (continued)

With a switch, you can also add multiple devices. For example, ten Nordson EFD Ethernet-capable devices could be connected and configured with IP addresses 192.168.10.40 through 192.168.10.49:



Multiple Ethernet-capable devices connected to a laptop through a 12-port switch

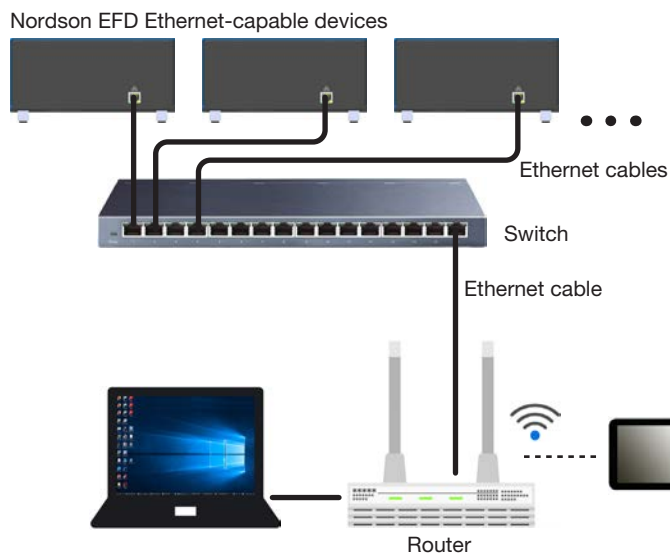
Setup Examples (continued)

Advanced Setup: Using a Router

Using a router allows for DHCP or multiple subnets with fire-walled access control. One possible setup is a single subnet that has (1) some Nordson EFD devices for which addresses were assigned statically and (2) some clients (such as a tablet) for which addresses were assigned automatically.

For example, the ten dispensers shown previously could be configured in the same way, and the router could be configured to assign addresses via DHCP in the range 192.168.10.128 to 192.168.10.254. This would ensure that no dynamically assigned addresses will overlap with any statically assigned addresses. In this setup, any client connecting to the network with a DHCP-enabled device would be able to communicate with the dispensers.

With a switch and a router, multiple devices can communicate with the dispensers, including clients for which an IP address was assigned via DHCP:



Multiple Ethernet-capable devices connected to a laptop through a 12-port switch



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