Technical Note

V440 Logistics Solution for Multi Code Reading

V440-F Barcode Reader | An advanced solution meticulously crafted for logistics applications.

This document explains how to:

- Sample Application Solution
- System Architecture
- Application Requirements
- V440 Set-up and Configuration
- Traceability Toolbox
- Logistics Solution Simplified

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Logistics Solution for Multi Code Reading

1. Introduction:

The OMRON V440-F code reader offers an advanced solution meticulously crafted for logistics applications. Featuring flexible optics, high-performance algorithms for challenging symbols, and the remarkable ability to read up to 400 codes in a single view. This reader excels in wide area, long-distance barcode reading tasks.

2. Sample Application Solution:

In this Example we will show how to read the barcodes on 4 package labels at the same time. Each box has a 2D code label on it. All four codes will be read simultaneously and sent to PLC using Traceability toolbox function block.

3. System Architecture:

To solve this traceability application, we used the OMRON V440-F barcode reader and OMRON Sysmac NX102, communicating over Ethernet/IP using the traceability toolbox to make communication Easy. The V440-F Barcode Reader will be placed directly over top of the labeled boxes at approximately 1 meter, with a view of approx. 200 x 200 mm.

Model Number	Description	Qty
V440-FXXXY50M-NNX	V440-F, No Optics, 5 MP, Mono, No Light, X-Mode	1
SV-1214H	Lens 12mm	1
V430-W8-3M	M12 to Flying Leads Cable, Straight Power, IO	1
61-9000135-01	Y Cable, Reader/Power and Smart Light Power	1
98-000133-01	Industrial High-Flex GigE Ethernet Cable with RJ45	1
NER-011661100G	R-100, 100 mm RED Ring Light	1
S8VK-G12024	Single Phase Power supply- 24V Output	1
NX102-9020	PLC unit with Database Connectivity	1

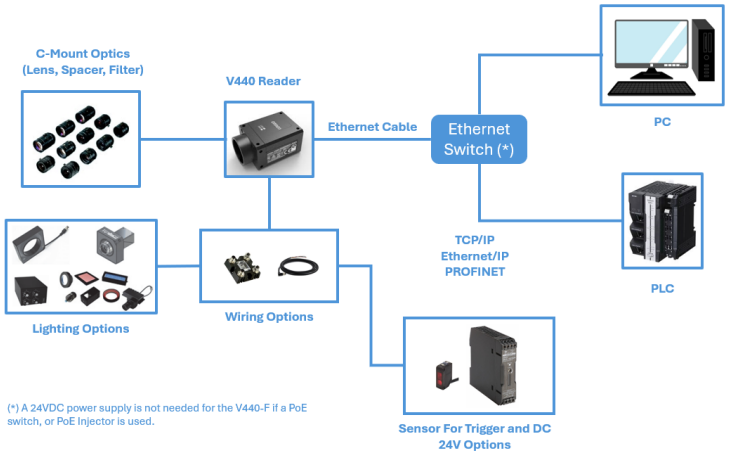


Fig1. System Architecture

4. Application Requirements:

4.1 System Power:

The OMRON V440-F offers flexibility in power options. Direct 24VDC can be supplied using the I/O cable. Alternatively, Power over Ethernet (PoE) is supported as well. A direct 24VDC flying lead power cable along with Y cable is used for this application to power both camera and light.

4.2 System Control and Communication:

The OMRON V440-F provides flexibility in communication protocols, whether it's a PC or PLC. Protocols include TCP/IP, Ethernet/IP, PROFINET, and RS232C. For this application we are using Ethernet I/P. In this application dedicated cable 98-000133-01 for communication is used.

4.3 Optics Selection:

The V440 features a C-mount for lens mounting, providing enhanced flexibility in optics selection to cover a wide range of applications with varying field of view or working distance requirements. A 12mm lens was used for this application.

4.4 Lighting:

NERLITE Smart Series ring lights are an excellent choice for ease of wiring.
A Nerite 100mm ring light was used for this setup.

4.5 Trigger Options:

The V440-F can be triggered either through a software command or a direct trigger.
A photoelectric sensor (Hardware trigger) is used in this application.

4.6 PC Requirement:

Weblink is a super intuitive browser-based software tool. Google chrome is used in the sample application.

5. V440 Setup and Configuration

5.1 Get Connected:

- Set your PC to a fixed IP address of 192.168.188.X IP address (e.g., 192.168.188.5).
- Open a web browser and enter the reader's default IP address (http://192.168.188.2) in the address bar. Note: If the IP address has been changed, use the Device Discovery Utility (DDU) to find the correct IP address (DDU link under Reference section).

The reader will connect to Weblink as shown below Fig.2

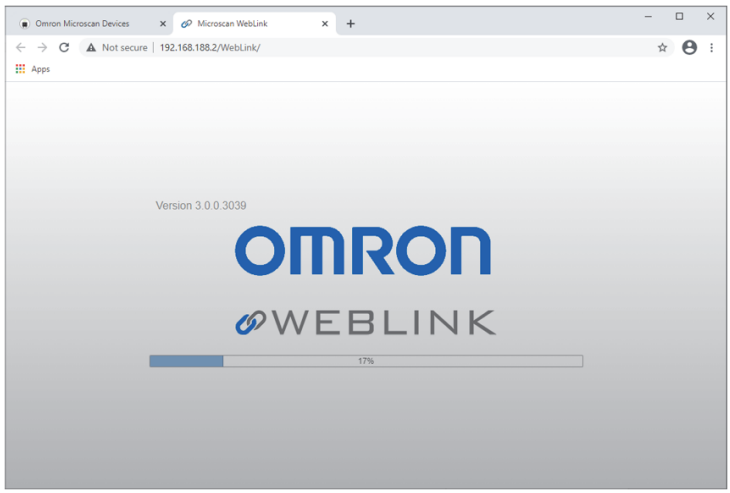


Fig2. WebLink Starting Page

5.2 Create Setup (Start View):

The Start view in WebLink displays details of the connected reader.

Let's Navigate to Assisted Setup for quick settings.

Fig3. WebLink Start View

1- Within the Assisted Setup wizard, choose the type of code you intend to read. Clicking on a specific code provides access to the symbology settings, allowing for the configuration of every code type supported by the reader and let's select the 2D code here.
2- Specify how many codes you need to read simultaneously. Input 4 for this application.
3- Select the Acquisition type (Continuous, Trigger, or Start/Stop). Let's select Trigger mode for this application.
4- Specify if you need to change the reader's name. Its Optional and its left blank.
5- Click on Create Setup to proceed.

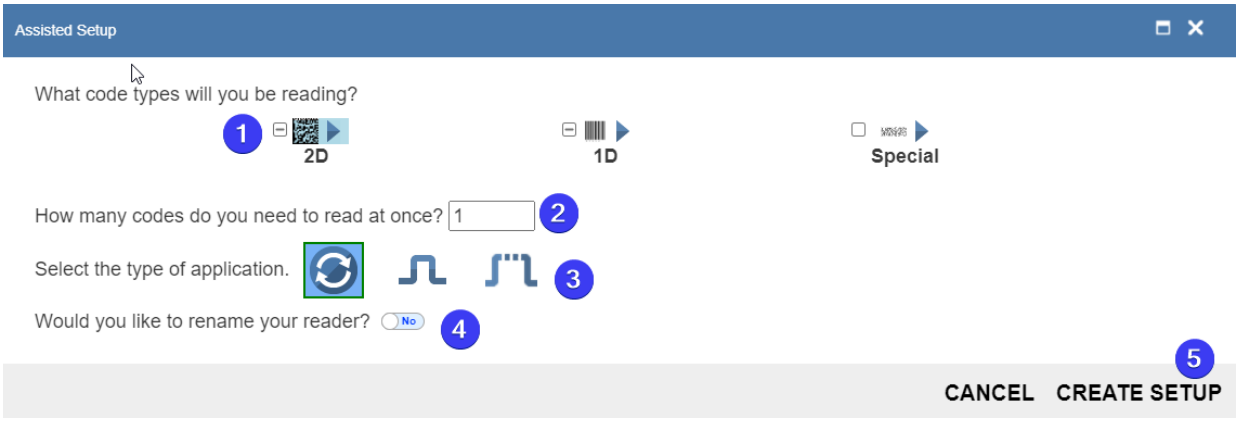


Fig4. WebLink Assisted Setup

5.3 Setup (Setup View):

The Setup view lets you configure all elements of the Read Cycle Sequence on the left side of the user interface, including Autocalibration, Cycle, Acquire, Matrix Mode, Decode, Match String, Format Output, Outputs, and Favorites.

Adjust Exposure and Gain settings using the Acquire section.

Fig6. WebLink Setup View "Acquire"

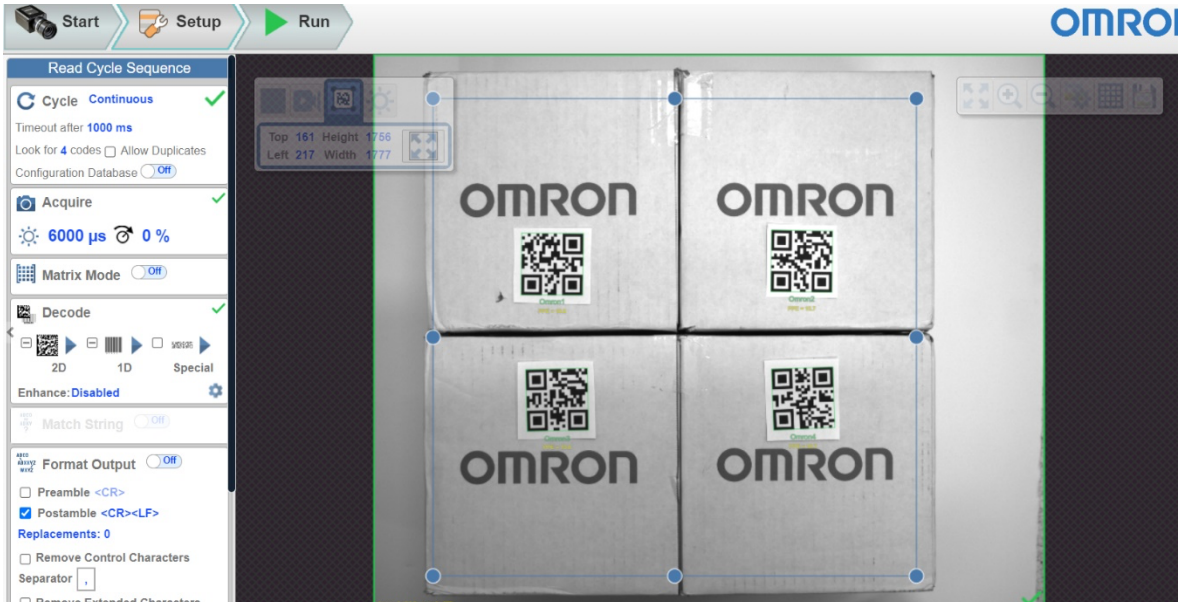


Fig7. WebLink Multiple Code Reading

5.4 Setup (Decode View):

Use the Decode area to select the code type, In this example we selected both 1D and 2D code symbology for our application

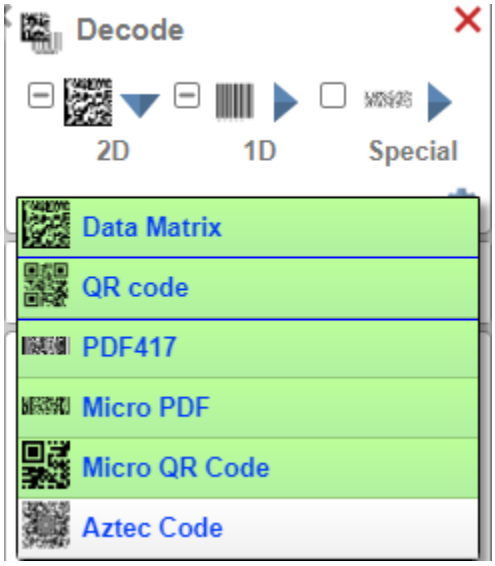


Fig8. WebLink Setup View "Decode"

5.5 Setup (Run View):

Ensure to save your changes to the reader by clicking on the Disk icon located on the top right of the screen.

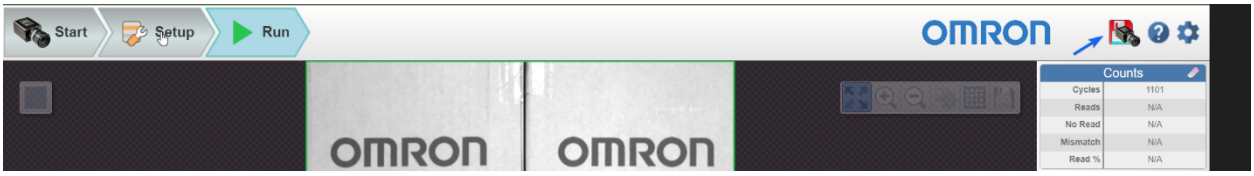


Fig9. WebLink Setup View Save Button

In the Run view, you can monitor the real-time progress of the 4-code reading process as it adheres to the parameters you have defined. The right panel of the Run view displays counts, data for Cycles, Reads, No Reads, Mismatches, and Read %.

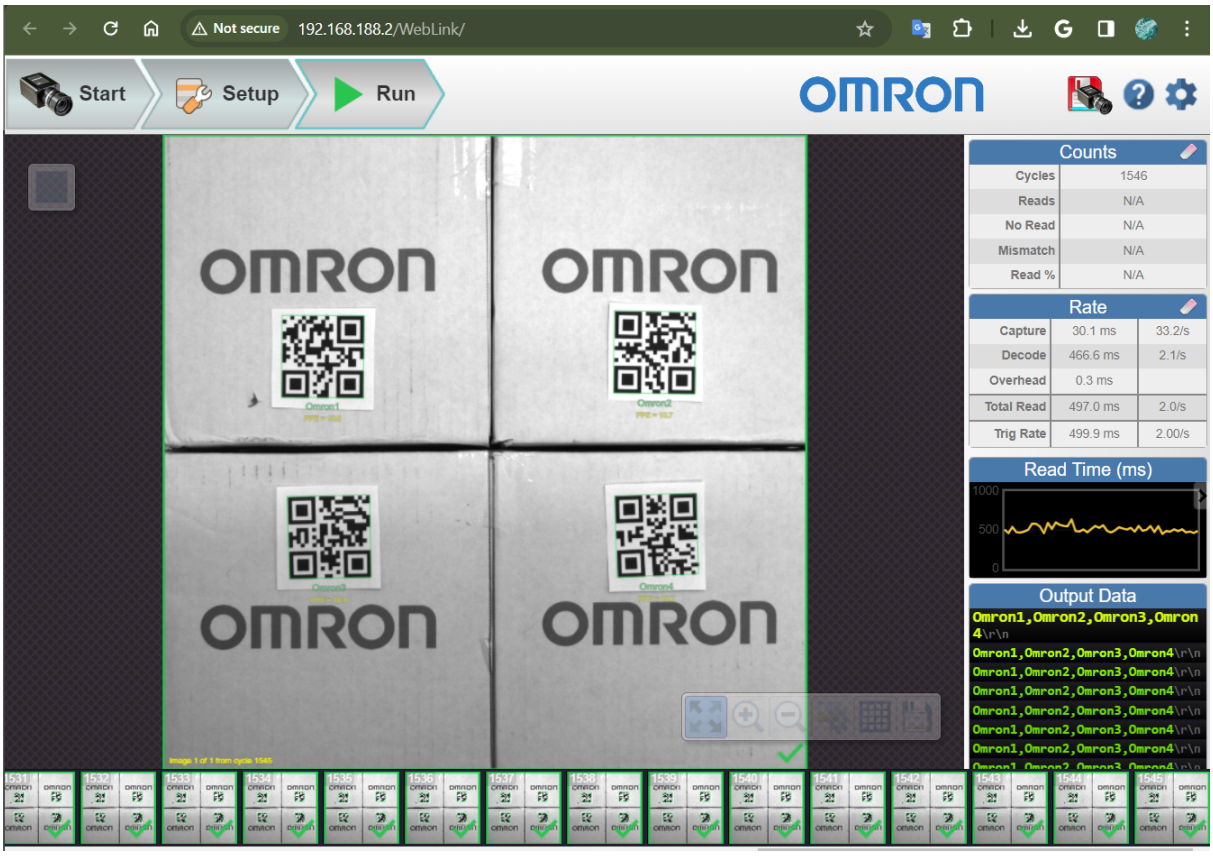
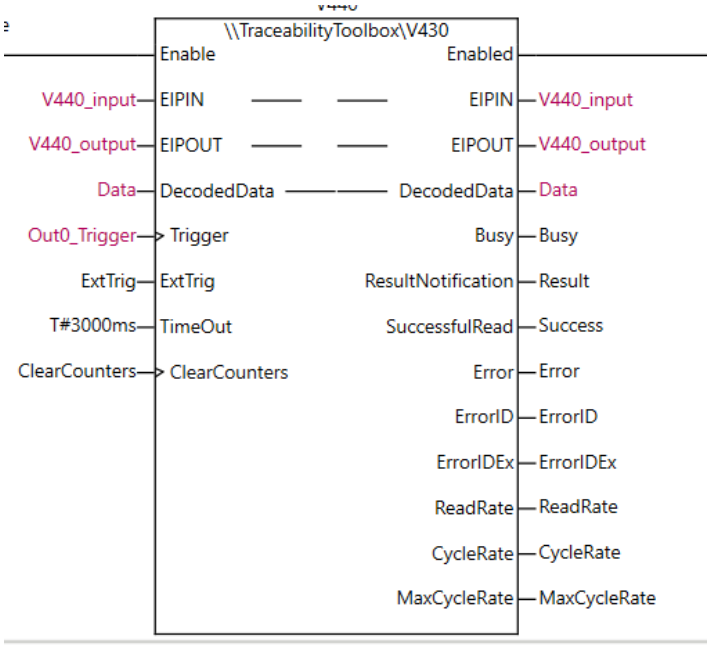


Fig10. Weblink Run View

6. Traceability toolbox

Utilize the Omron's Traceability Toolbox function block to collect all the information and control with ease. Omron's controllers take on a central role within the traceability systems, serving as a vital interface connecting devices on the manufacturing line to higher-level database systems. Omron controllers offer robust support for various data interface options, including SQL, MQTT, OPC-UA, and REST, ensuring seamless communication in the dynamic landscape of logistics.

Fig15. Traceability Toolbox Function in Sysmac Overview



The Traceability Toolbox Sysmac library complements this framework by providing essential data capture building blocks. These blocks facilitate the effortless creation of retrofit data collection systems using Omron data capture devices from Sysmac Studio.

Omron provides a library of functionality, such as the Traceability Toolbox, to assist in reducing development time during solution implementation.

Utilizing this library significantly reduces the time required for designing, testing, and commissioning a traceability system, contributing to increased efficiency in logistics operations.

7. Logistics Solution Simplified

The NX102 machine automation controller, paired with the V440 code reading products, simplifies data integration across diverse systems. This powerful combination enhances efficiency in data handling, proving to be a strategic asset for improved system performance in manufacturing environments. Its advanced features not only facilitate seamless data collection but also play a key role in optimizing operations for greater efficiency.

8. References

The V440 data sheet includes information on optics, lighting, cabling options, and part numbers:

https://assets.omron.com/m/45e22939d95d1a05/original/V440-F-Datasheet.pdf

The communication guide provides clear instructions for commissioning the V440 with the appropriate communication protocol:

https://assets.omron.com/m/16069dea48d414c1/original/V440-F-C-Mount-Communication-Manual.pdf

The V440 manual offers comprehensive technical details about the device:

https://assets.omron.com/m/3ce2bfb7fe395f54/original/V440-F-C-Mount-User-Manual.pdf

The Traceability Solution toolbox includes software function blocks and a manual:
https://automation.omron.com

https://assets.omron.eu/downloads/latest/software/en/traceability_solutions_toolbox_software_en.zip?v=4

Lens Selection Tool:

https://www.fa.omron.co.jp/product/tool/lens_selector/en/index.html

EDS Files:

https://assets.omron.com/m/e83b46861608a7f/original/V440-F-EDS-Files.zip

GDS Files:

https://assets.omron.com/m/393ebe40dfbc896a/original/V440-F-GSD-Files.zip

Omron Device Discovery Utility DDU Installer:

https://assets.omron.com/m/308229ecb8ad0e40/original/Omron_Microscan_DDU_Installer_3-0-0_3064.zip