OPEX®

CORTEX®

Cortex® User Manual

Product Version 1.2
Original Instructions

Revision A
June 2023

	Read, understand, and follow the information in the Perfect Pick® Operating Instructions before attempting to operate, service, or troubleshoot this equipment!
	Keep instructions for future use!

Contacting OPEX

1. For technical support:

Please have the model name and serial number of the product ready.

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1.1 Foreword

	Read, understand, and follow the information in the Perfect Pick® Operating Instructions before attempting to operate, service or troubleshoot this equipment! Keep these instructions for future use!

The Operating Instructions are in accordance with the Machinery Directive 2006/42/EC. It is an integral part of the machine.

Follow the instructions carefully to avoid damage.

The Operating Instructions are for individuals who have to operate, service or troubleshoot the system.

The Operating Instructions must be kept in a dry, protected, and easily accessible location near the machine.

The instructions have simplified, schematic diagram illustrations that show the basic functionality or structure of an assembly. These illustrations may not represent the latest design.

These instructions describe the basic components and functions that are necessary to understand how the system works.

1.2 Obtaining the Latest Revision

The Operating Instructions are not subject to any automatic revision service. Be sure to retain the latest electronic release for your reference. Download the latest release in PDF format at www.opexservice.com (authorized, registered users only).

1.3 Warranty Conditions

OPEX® links the warranty to the correct and careful observance of the information in the Operating Instructions.

OPEX assumes no responsibility for damage arising from:

- Failure to follow the instructions in this manual
- Use of insufficiently trained or qualified personnel
- Incorrect transport and storage of the machine
- Improper assembly, commission, operation and maintenance of the machine
- Operating the machine with defective safety devices or safety and protective devices that have not installed properly or are not working
- Unauthorized changes/modifications to the machine
- Unauthorized changes to the electrical control
- Unauthorized/improperly performed repairs

- Inadequate monitoring of machine parts that are subject to wear

- Use of non-original or non-approved spare parts

- Improper use of the machine

- Foreign bodies and force majeure that cause disasters

OPEX Corporation's "General Terms and Conditions of Sale and Delivery" apply. The customer can view these after contract conclusion. Warranty and liability claims for personal injury and damage to property are excluded if they are due to one or more causes listed above.

If the first buyer sells the machine to a second buyer, OPEX Corporation's responsibilities listed above expire.

If the first buyer sells the machine to a buyer in another country with a different language, they are responsible for handing over an accurately translated copy of the assembly instructions.

1.4 Purpose

The operation personnel can use the Operating Instructions to use the machine safely and consistently.

The Operating Instructions do not replace the operating personnel's experience and technical training. It is a management tool for better use of machine functions. The responsible person, following all the instructions in this document, can manage the machine with maximum efficiency throughout its lifetime.

1.5 Safety Message Conventions

1.5.1 General information

These instructions use safety message conventions to alert you about safety hazards associated with certain procedures and situations.

Machine and system-specific hazards can always occur in combination and mutual interactions with one another.

1.5.2 Structure

The Safety Messages are as follows:

> ⚠ **SIGNAL WORD**
>
> **Nature of the Hazard.**
>
> *Consequence(s) of interaction with the hazard.*
>
> ▶ Avoidance procedures.

1.5.3 Signal words

The following signal words are as follows:

⚠ DANGER

Indicates a hazardous situation that, if not avoided, results in death or serious injury. Use this signal word for the most extreme situations.

⚠ WARNING

Indicates a hazardous situation that, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation that, if not avoided, could result in minor or moderate injury.

NOTICE

Indicates information considered important, but not hazard-related (e.g. messages relating to property damage).

SAFETY INSTRUCTIONS

Indicate specific safety-related instructions or procedures.

1.5.4 Symbols and other graphics

The following symbols and graphics are as follows:

	This is the safety alert symbol. The purpose is to alert you to potential physical injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.
	This symbol signifies that you must read the instruction manual/booklet.
	This symbol provides important information on how to use the machine properly and gives application tips or useful information. Failure to follow these instructions results in malfunctions on the machine or in the surrounding area. These instructions can help to use all the machine's functions optimally.
	This symbol indicates hazardous voltage. It calls your attention to components or operations that could be dangerous to you and others. Read the message and follow the instructions carefully.
▶	Hazard avoidance procedures.
•	List.
1. **2.** **3.** ...	First-level instructions.
a. **b.** **c.** ...	Second-level instructions.

1.6 Target Audience

1.6.1 General safety information

> ⚠ **DANGER**
>
> **Insufficient qualification.**
>
> *Insufficient qualification and improper use can lead to significant personal injury and damage to property.*
>
> ▶ Only Qualified Persons can to operate the system.
>
> ▶ Adhere to the skill and qualification levels indicated throughout these instructions.

SAFETY INSTRUCTIONS

The employer is responsible for properly supervising and monitoring employees. If the employees do not have the necessary knowledge, then the employer must provide training. It is the employer's responsibility to ensure that the employees have read and understood the Operating Instructions.

1.6.2 Skills and qualifications

The skill and qualification levels are as follows:

Supervisor

The purchaser appoints a supervisor to be responsible for occupational safety on site.

Operator

A qualified person of at least 18 years who possesses extensive knowledge and training and has successfully demonstrated the ability and skills to operate or use a machine or equipment. The operator has received safety training to identify and avoid any hazards. The operator has received safety training to identify a machine, equipment, or area where servicing or maintenance is under LOTO procedure.

Purchaser

The purchaser is responsible for the following tasks:

- Proper and safe operation of the equipment
- Occupational health and safety
- Preventive maintenance schedule adherence
- Contacting OPEX for repair maintenance

Authorized personnel

Authorized personnel of the manufacturer or an authorized representative who performs a specific type of duty. Authorized personnel locks out and tags out machines or equipment in order to perform servicing or maintenance on them. Authorized personnel has technical training, knowledge, and experience to recognize and avoid possible hazards.

Mechanically qualified personnel

Mechanically qualified personnel (in jurisdictions where governmental authorization is required) has authorization to perform work on or around mechanical systems and components. Mechanically qualified personnel locks out and tags out machines or equipment in order to perform servicing or maintenance on their mechanical systems. Mechanically qualified personnel has technical training, knowledge, and experience to recognize and avoid possible hazards.

Electrically qualified personnel

Electrically qualified personnel (in jurisdictions where governmental authorization is required) has authorization to perform work on or around energized circuits or equipment. Electrically qualified personnel locks out and tags out machines or equipment in order to perform servicing or maintenance on their electrical systems. Electrically qualified personnel has technical training, knowledge, and experience to recognize and avoid possible hazards.

Super user

A super user has training in OPEX service activities and acts as a first responder. In addition to being able to operate the machine, the super user can perform the following tasks:

- Diagnose problems
- Resolve and clear jams
- Operate the scissor lift
- Remove iBOTs® from the aisle
- Re-insert totes
- Know when to escalate a problem

1.6.3 Qualification matrix

The target groups that can interact with the machine are in below.

> ⚠ **DANGER**
>
> **Inadequate qualification level.**
>
> *Disobeying qualification levels poses a risk of serious injury or death. It also poses a risk of machine damage and production failure.*
>
> ▶ Read and understand "Skills and qualifications" on page 7 before attempting to interact with this equipment.
>
> ▶ Adhere to the qualification level indicated in the qualification matrix.
>
> ▶ The purchaser is responsible for the qualifications of the personnel or contacting OPEX for service.

Table 1-1: Qualification Matrix

Person/Task	Operator	Super User	Electrically/Mechanically Qualified Personnel	Authorized Personnel
Packing/Transport				X
Installation				X
Commissioning				X
Operation	X	X		X
Troubleshooting				X
Fault Elimination				X
Working on iBOTs				X
Working on Power Enclosure				X

Table 1-1: Qualification Matrix

Person/Task	Operator	Super User	Electrically/Mechanically Qualified Personnel	Authorized Personnel
Inspection/Cleaning		X	X	X
Preventive Maintenance		X	X	X
Repair Maintenance				X
Decommissioning				X
Disassembly				X

1.7 Getting Started

Cortex® is a workflow process that includes a software application controlling the hardware, warehouse machinery, and an existing Warehouse Management System (WMS). The software application determines the warehouse machinery's automation and efficiency, and it interfaces between the warehouse machinery and the WMS. The client can use Cortex to:

- Identify the License Plate Number (LPN) on the container
- Determine the items stored in an aisle
- Direct inventory to aisles for storage
- Provide orderlines for an aisle to fulfill
- Generate product-specific tasks to suit business needs

1.7.1 Orderline API

Orderlines are fulfillment operations or inventory-verification operations for items. Orderlines can simplify operating an aisle into the following steps:

> 1. The customer's warehouse management software sends orderlines to Cortex (pick, put, cycle count).

> 2. Containers are sent to Cortex workstations where they are scanned and Cortex plans the work.

> 3. Cortex controls PerfectPick and guides the operator to complete the orderlines.

> 4. Cortex notifies the warehouse management software when orderlines are complete and routes the container back to the warehouse.

1.7.2 Cortex components

The Cortex suite contains:

- A database server
- An Aisle Controller (AC)
- A Workstation User Interface (WUI)
- An Order Creation Interface (OCI)

Cortex controls the Automated Workstation and other hardware for the aisle. Cortex also receives and sends information to the router and warehouse real-time controller (WRTC).

Note: *Cortex is compatible with many third-party components and site requirements. Images in this manual may not match your site setup.*

1.7.2.1 Software

Database

The Cortex database is the central repository of inventory and work action knowledge. The database receives orderline instructions from the WMS and finds fulfillment solutions, and also handles certain reporting and web services.

Workstation User Interface

The WUI visually guides operators through machine tasks, as well as exceptions, to complete workflows.

Order Creation Interface

The OCI is a high-level API that the client uses to create orderlines, receive orderline completion confirmations, and request and receive inventory snapshots.

1.7.2.2 Hardware

Automated workstation

Automated Workstations include:

- Sensors
- Motors
- Mechanical transfers
- A single entry conveyor
- A scanning solution

The workstation conveys totes and cartons from the warehouse conveyor for Cortex fulfillment actions.

Pick-To-Light modules

Operators can use PTL modules to identify which container on the workstation Cortex associates with the current action, display action quantity, and complete work actions by pressing a button. Cortex coordinates the color of the button with the WUI screen and cell projector lights.

Cell projector

Cell projectors shine a light into the tote to highlight the product cell where an action takes place. Cortex coordinates the color of the cell projector lights with the WUI screen and PTL button.

1.7.2.3 Other components

Router

The router handles aisle direction from a machine control level, along with container routing within the Automated Workstation and PTL modules.

Warehouse Real-Time Controller

The WRTC controls the Automated Workstation(s) at the machine level, and provides real-time sensor monitoring and motor control on an EtherCAT network.

1.8 Cortex System Operation

Cortex carries out tasks for either the following modes:

- Pick
- Replenish

Picking takes items from the system to fulfill external orders. Replenishing restocks inventory in the aisle.

Workstation User Interface operation

The user interacts with the Cortex WUI for conducting tasks and actions.

Aisle Controller operation

The WUI relies on the AC to operate. Keep the AC window open when using Cortex.

Fulfilling workflows for either mode updates the Cortex database upon completion.

2. Safety

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2.1 Safety Guidelines

This section provides safety guidelines to observe when working with this equipment.

The OPEX® Workstation adheres to the NFPA 79 electrical standard for industrial machinery, which provides safeguards to protect operators, equipment, facilities, and work-in-progress from fire and electrical hazards.

> ⚠️ **CAUTION**
>
> Follow these safety guidelines whenever installing, operating, servicing, or maintaining the equipment described in this manual.

Electrical safety

Always assume electrical wiring is hot any time the machine is plugged in. Failure to use caution may result in severe bodily injury or death from electric shock.

Use caution to avoid contact with exposed, non-insulated areas of any electrical devices or wiring.

Never handle or place a tool on the exposed terminals of any electrical device, such as a circuit breaker, a transformer, a switch, a relay, a terminal block, or a fuse block, without shutting off all power to that device.

Ensure that all electrical outlets and extension cords are equipped with a third earth grounding conductor-to-chassis ground.

Keep loose objects away from any exposed, moving parts of the machine

Foreign objects can jam the moving parts of the Perfect Pick® Integrated Work Station. Keep hands, hair, loose clothing, and jewelry away from the moving parts.

Proper tool usage

Keep loose tools and other objects away from any electrical and mechanical components of the machine. Use and maintain tools properly, according to manufacturer's instructions.

Do not attempt to clean the machine while it is running

Never use a cloth (or similar material) to clean moving parts, such as belts or rollers. This can result in damage to the machine or severe personal injury. If you need to clean a belt, a roller, a gate, or similar parts, hand-crank the part during cleaning or clean it while stationary.

Do not use flammable, high-pressure canned air to clean dust and debris from the machine

Keep away from children

This equipment is not suitable for use in locations where children are likely to be present.

Do not run the machine while a technician is repairing it

Avoid using Cortex® whenever Machine is Unavailable signs are displayed around the Main Control Panel (MCP).

⚠️ **WARNING**

Hazards due to not recognizing a locked and tagged out machine.

LOTO procedures protect workers from unexpected release of hazardous energy or startup of machinery and equipment during service or maintenance activities. Violating LOTO procedures can cause fatal workplace injuries or death.

▶ Observe the information in the 6.2 Lockout/Tagout (LOTO) Procedures in the Perfect Pick Operating Instructions, especially the safety instructions for LOTO procedures.

▶ Do not use Cortex when a technician has locked and tagged out the machine.

2.1.1 Arc Flash and Electrical Safety

The owner of this equipment is responsible for developing and maintaining safe work policies and practices to minimize employee exposure to arc flash and electrical shock hazards. These practices should be in accordance with applicable workplace safety codes and should include the following:

- Evaluation of the equipment for arc flash and electrical shock hazards
- Proper labeling of the equipment to alert employees to the hazards, arc-flash boundaries, and PPE requirements

For more information, refer to applicable electrical safety publications of the country or region where the equipment is operating.

USA customers: refer to publication *NFPA 70E, Standard for Electrical Safety in the Workplace*

Canada customers: refer to *CSA Z462-15, Workplace Electrical Safety*

EU customers: refer to British Standards *BS EN 50110-1:2013 Operation of electrical installations - General requirements*

2.2 Safety Labels

Cortex uses safety labels to alert you to certain safety hazards. These labels may appear in various languages or styles depending on the region or country where the machine is operating:

- Bilingual English/Spanish labels for US machines
- Bilingual English/French labels for Canadian machines
- Graphics-only labels for EU and various international machines (no text).

Although they appear different, the locations of these labels are identical.

Note: Only those labels found within the Cortex system will be described here. Please refer to the Perfect Pick Operator Manual for all Perfect Pick labels and their locations.

⚠ **DANGER**

Disregarding safety labels

Failure to follow the safety labels can result in health and safety hazards as well as damage to the machine.

▶ Follow safety precautions on all labels when operating the equipment.

2.2.1 Workstation labels

2.2.1.1 Arc Flash and Shock Hazard Warning label

Location: Front of Workstation Control Panel.

Purpose: Advises owner of machine to follow all arc flash and electrical safety requirements per applicable standards.This is a temporary label for only the employer to remove after completion of arc flash and electrical hazard assessment and labeling (see "Arc Flash and Electrical Safety" on page 9).

Table 2-1: Arc Flash and Shock Hazard Warning Label

Label location	Description
Front of Workstation Control Panel	US (8165700) CA (8165710) AU, EU, JP (8165730)

OPEX Corporation use only | Not for distribution

2.2.1.2 Ratings / Serial Number label

Location: Underneath power switch on Workstation Control Panel.

Purpose: Identifies product electrical ratings, machine serial number for U.S. & Canada; EU; Japan.

Figure 2-1: Ratings serial number label

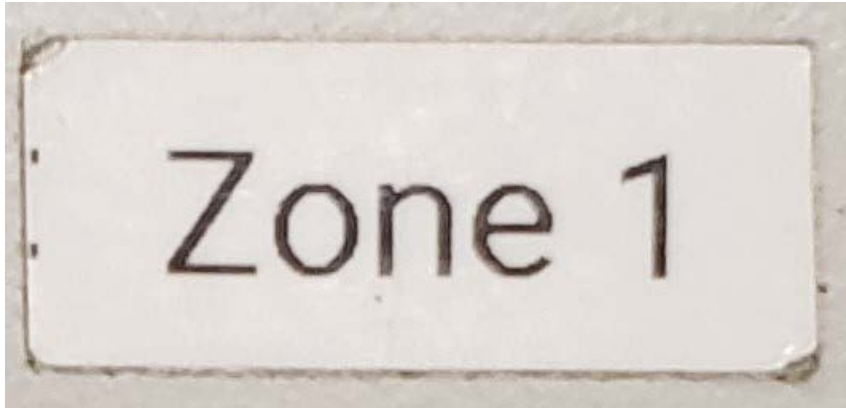# 2.2.1.3 Zone labels

Location: Front edge of the following:

- Scanning solution
- Staging conveyor
- Workstation; one at the end of the input conveyor, one at the beginning of the output conveyor

Purpose: Identifies each of the zone locations for containers/boxes.

Figure 2-2: Zone label

2.3 Emergency Stops

For operator safety, Cortex incorporates Emergency Stop (E-Stop) switches, as well as a pull cord to stop the machine in the event of an emergency. There is an E-Stop located on the OPEX scanning solution and one at the Operator Station. Details regarding the Perfect Pick E-Stop are in the Perfect Pick Operator Manual.

Pressing the E-Stop button on the scanning solution stops the conveyor system. You must disengage the E-Stop for Cortex to continue running. Once you have disengaged the E-Stop, you must press the reset button, and then the Start button on the main enclosure for the conveyor to start.

Note that the machine still remembers container positions during an E-Stop.

There is also a pull cord attached to the emergency stop, which runs from the E-stop button to zone button. Pulling the long, tensioned cable functions the same as pressing E-Stop button. Pressing any E-Stop button or pulling the E-Stop cable cuts power to the conveyors.

The exact placement of the body of this device depends on the site. Usually, it is mounted to the OPEX scanning solution. The pull-cord runs the length of the work station, just below the side of the conveyor area.

The pull-cord E-stop has two versions available supporting maximum lengths of 38 meters and 75 meters. Aside from the maximum length, the only difference is that the 75-meter version requires higher tension. This the operator can use the 75-meter version rather than a 38-meter version if accounting for the tension setting.

Familiarize yourself with the location of the Emergency Stop switch and pull-cord

The E-Stop switches and the E-stop pull-cord enable a quick stop of all motors in the machine, in the event of an emergency involving potential personnel injury. Pressing an E-Stop switch or pulling the E-stop pull-cord stops movement of the conveyor.

2.4 Light Tower

A light tower (Figure 2-3) is mounted on the workstation at the back corner furthest from the Perfect Pick. The color bands for the workstation light tower are in reverse order from the light tower on the Perfect Pick.
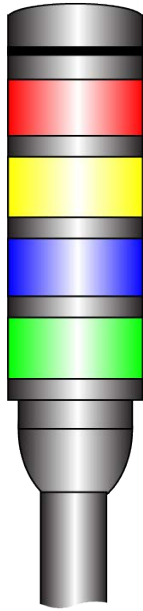
- Audible - beeps when starting

- Red – Interlock/E-Stop tripped

- Yellow – Flashes on start-up

- Blue – Jammed/maintenance required (see note)

- Green – Running/Normal Operation

Figure 2-3: Workstation light tower

Note: *From Maintenance mode, the machine restarts, which turns the solid green light on in addition to the flashing blue light. After determining that the machine is operating properly, the technician can turn off the flashing blue light by exiting out of Maintenance mode, leaving only the solid green light.*

2.5 Ergonomics

In any occupation that requires you to perform the same motion repeatedly during the course of your work, it is important to consider how you perform your task. Listed below are some guidelines to help you minimize the risk of physical discomfort and injury while operating the equipment.

> ### NOTICE
>
> Always observe the following guidelines when operating Cortex.

When at the pick station:

- Maintain an upright body posture.
- Occasionally change the angle of your posture for greater comfort.
- Avoid operating the machine for longer than a single 10-hour shift. If possible, stretch between breaks.

2. Hardware

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2.1 Overview

This chapter explains the hardware components of the machine that interact with Cortex®. This chapter also provides definitions of each part, along with proper operating techniques.

2.2 Pick-To-Light system

The PTL System is a shelf with lights and buttons along its front edge. A lit button indicates which box the pick is for; this button also dismisses the box. An LED number next to the button indicates the quantity to move.

After placing the item in the container, the user presses the button beside the light to indicate the container is ready, and then the system dismisses the box.

- If the operator needs to place more items into the container, the container remains on the workstation to wait for the additional items.

- If the last item is put into the container, the container is ready to go to the outgoing conveyor.

-

2.3 Other Components

2.3.1 Warehouse machine

OPEX designed Cortex to work with the Perfect Pick® machine. For more information about the components of a Perfect Pick Workstation, refer to a Perfect Pick manual.

2.3.2 Warehouse Real-Time Controller Computer

The Warehouse Real-Time Controller (WRTC) computer runs all conveyor systems for the workflow. This computer is usually the aisle's host computer.

2.3.3 Bin locator light - cell projector

This feature identifies a specific area within a tote from where it picks an item by shining a light in the cell.

When a tote has multiple cells, the cell projector shines a light into the specific cell to help the operator quickly locate where to pick or put an item.

The cell projector is mounted above the tote at the pick station.

Note: *This is an optional feature for Cortex installations.*

2.4 Digital Counting Scale

Operators can use a digital counting scale to compute the average number of pieces or items on the digital counting scale based on the total weight of items placed on it. The digital counting scale is useful for counting small objects such as:

- Screws
- Nuts
- Bolts
- Washers
- Ball-bearings

The digital counting scale interfaces with the Workstation User Interface (WUI) as part of the Cortex® Workstation. The digital counting scale can:

- Zero calibrate with a tare
- Save unit weights for a few items
- Update tare and item weights
- Weigh items up to 50 lb with a resolution of at least 0.001LB
- Allow for archive transactions and exporting data (preferably to CSV)

Note: The digital counting scale must have Ethernet capabilities to function as a server.

The digital counting scale (Figure 2-1) can configure profiles for workstation and extend databases to store items and their weights.

Figure 2-1: ZK840 Avery Weigh-Tronix digital counting scale

2.4.1 Capturing piece weight

- Ensure that the digital counting scale is calibrated for the item that the operator wants to measure. The operator can calibrate the digital counting scale with a fixed number of items in a tare. For example, 100 items in an enclosed bag.
- Have a larger calibration sample (100 pieces versus 5 pieces) to produce more accurate results.
- Set the digital counting scale to zero with the tare weight to accurately measure any additional items.
- The digital counting scale divides the total weight by the number of pieces entered to compute the average piece weight. To accurately divide the total weight, the items must have the same piece weight without any significant variations.

2.4.2 Digital counting scale connectivity and use

Cortex integrates with the WUI and the digital counting scale to allow automatic item counting for picks, replenishments, and cycle counts. This greatly reduces the time needed to count items with large or obscure quantities.

If the Cortex database has confirmed an item's piece weight:

- Cortex automatically sends the data to the digital counting scale and displays a check mark on the digital counting scale image on the WUI.
- The operator can place items on the digital counting scale for an accurate item count.

If the Cortex database has not confirmed an item's piece weight:

- Cortex displays a **?** icon over the digital counting scale image on the WUI.
- The operator performs a manual operation on the digital counting scale to set the piece weight.
- Cortex captures the piece weight for future use, and then the operator can use the digital counting scale for counting items.

2.4.3 Capturing unconfirmed piece weight

The WUI displays a scale icon and **Scale** button at the bottom right of any work tab if the digital counting scale is enabled. To perform a manual operation for capturing an unconfirmed piece weight, the operator can press the **Scale** button to open the **Scale - Capture** window and update or set the piece weight of the current item.

To capture an unconfirmed item's piece weight:

1. Open any tab in Cortex. The following image (Figure 2-2) displays when Cortex presents a tote for an item that does not have a piece weight in the database.

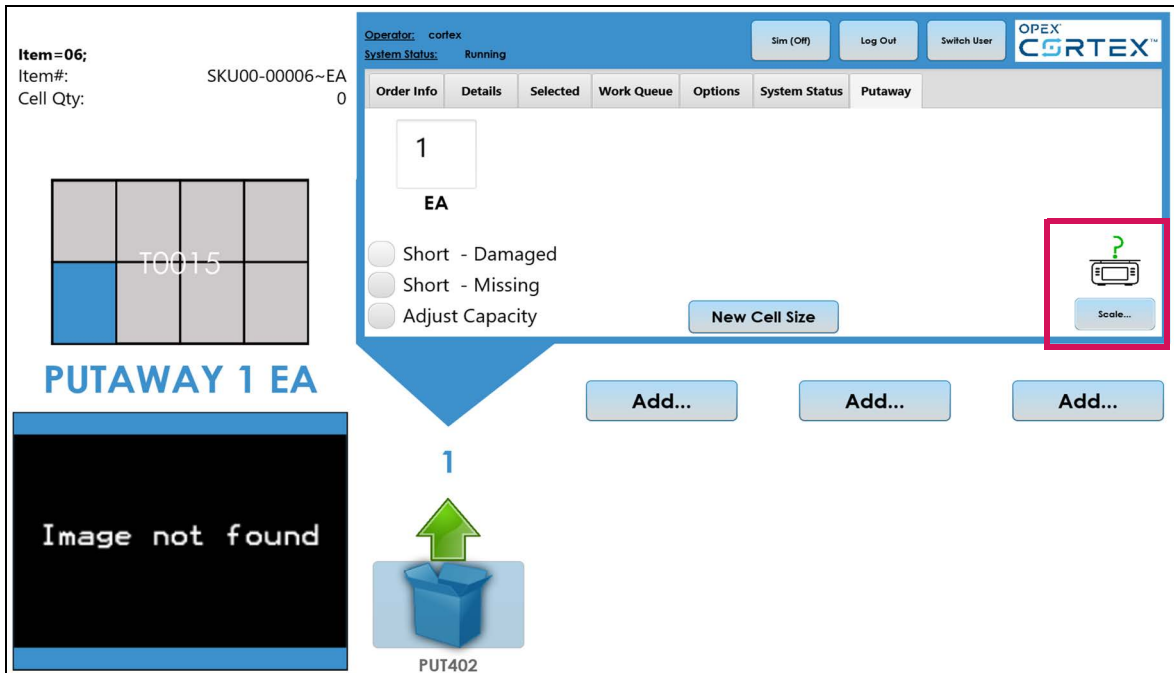*Figure 2-2: Cortex tab with scale icon and button*

2. Press the **Scale** button. The **Scale - Capture** window ([Figure 2-3](#)) opens.

Figure 2-3: Scale - Capture window

3. To confirm the piece weight of an item, press **Sample** on the digital counting scale.

4. After pressing **Sample**, add 5 of the items to measure on the digital counting scale.

5. After adding the items to the digital counting scale, press **Capture** on the **Scale - Capture** window ([Figure 2-4](#)).
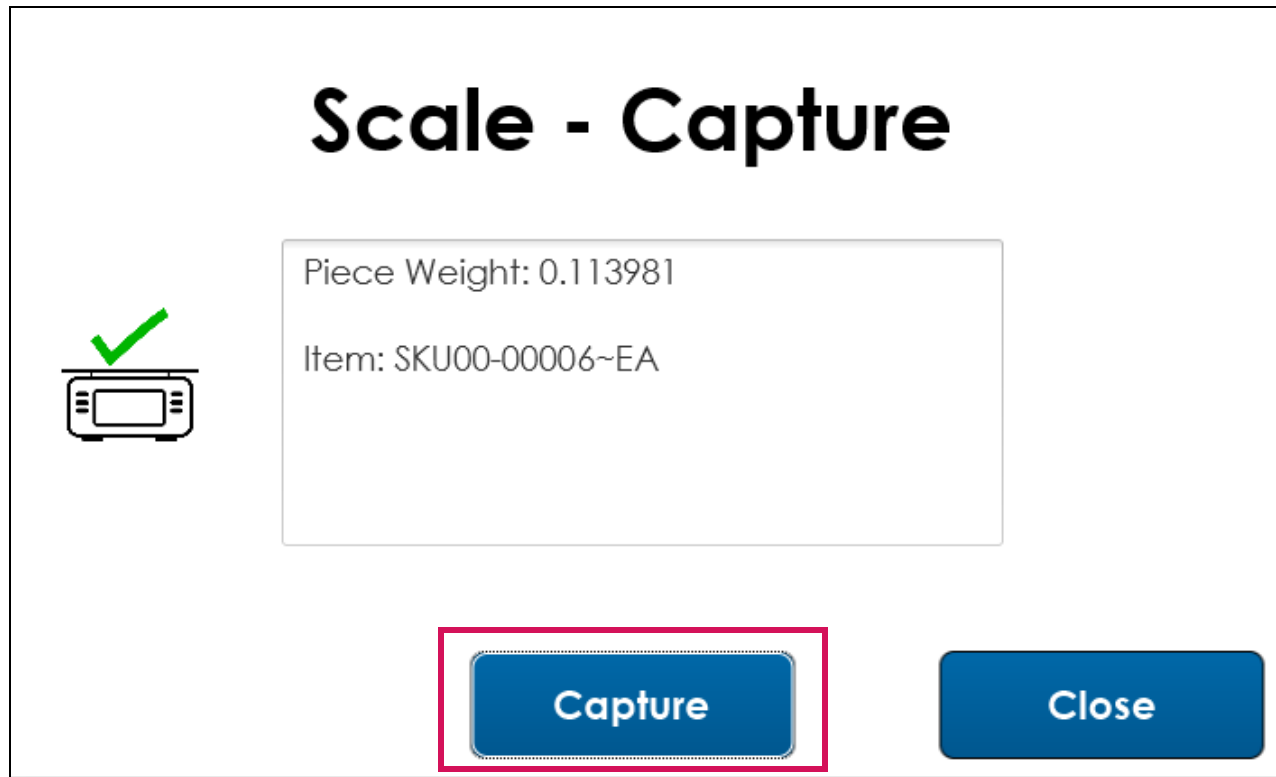
Figure 2-4: Capturing piece weight

6. To close the **Scale - Capture** window, press **Close**. The WUI work tab displays the check mark above the scale icon ([Figure 2-5](#)) to indicate the confirmed piece weight.
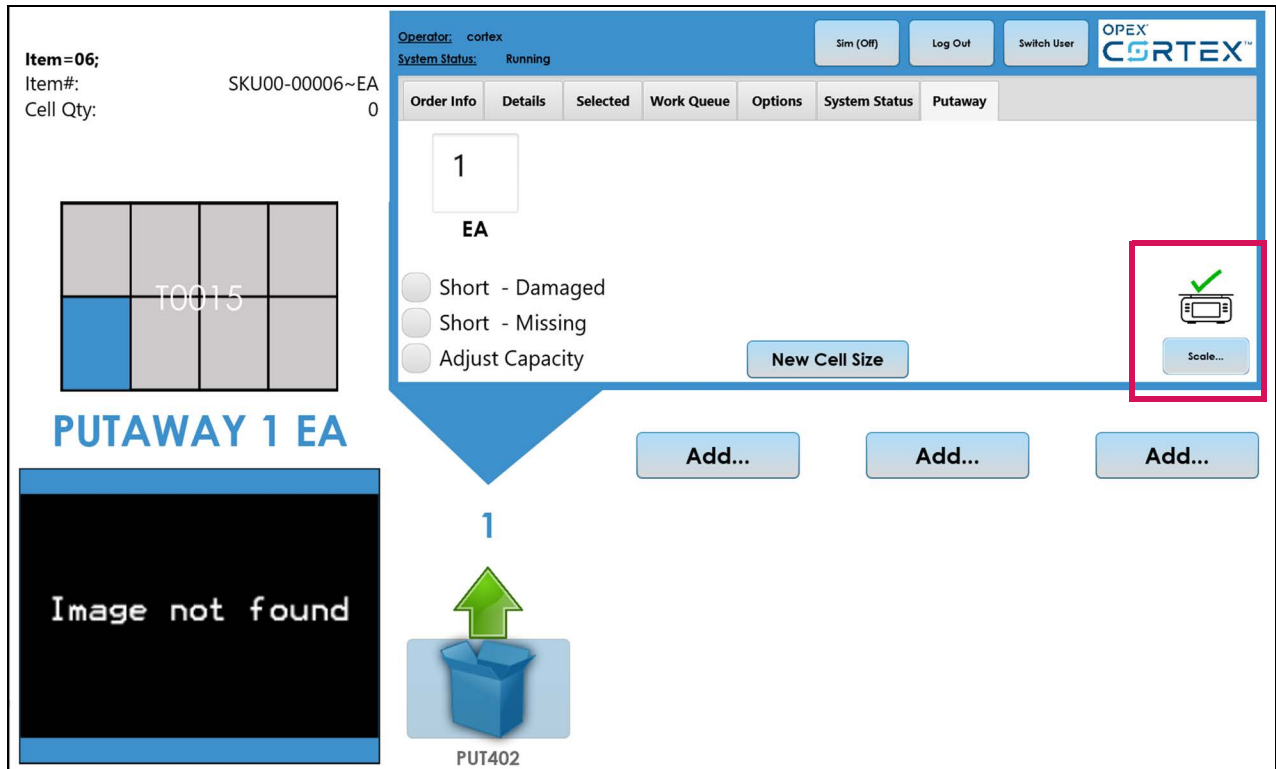
Figure 2-5: Scale icon check mark

Note: If there are digital counting scale connectivity issues, the WUI work tab displays a yellow exclamation point above the scale icon. Cortex also disables the Scale button. This does not affect the put-away process.
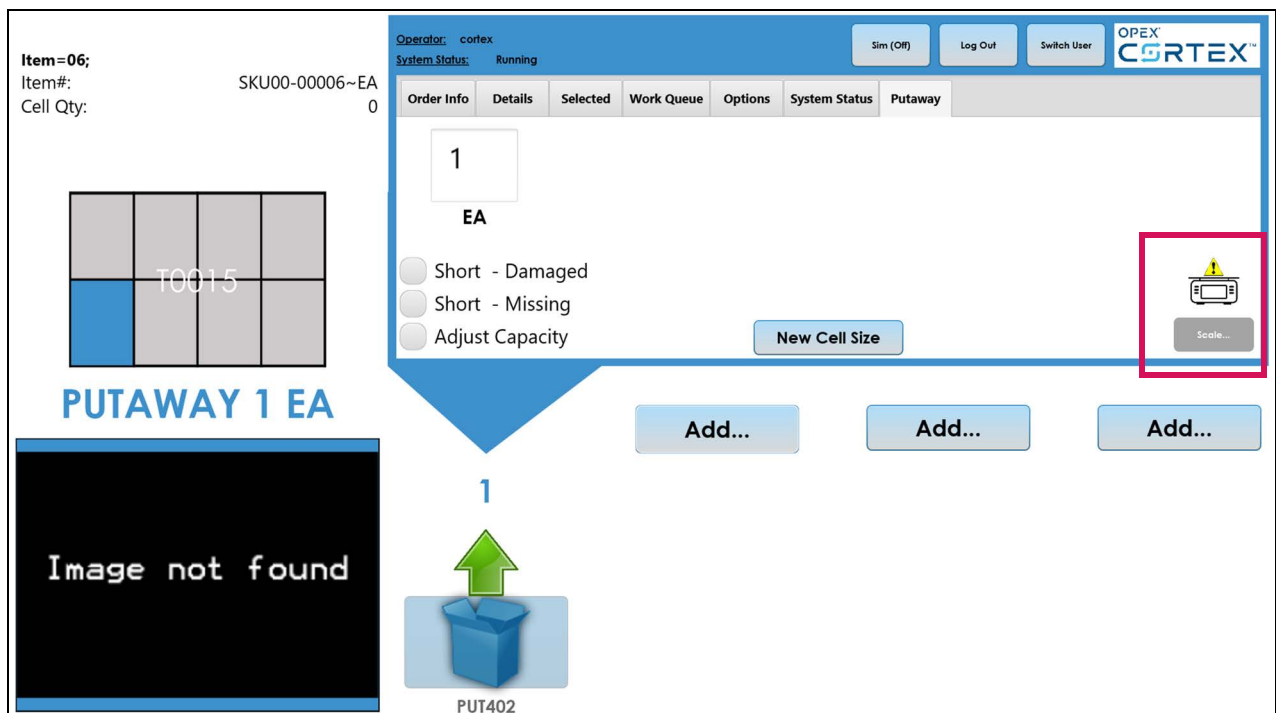
Figure 2-6: Scale icon yellow exclamation point

3. Software Operation

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3.1 System Startup

To operate Cortex®, log into the system.

3.1.1 Starting Cortex

1. Double-click Aisle-Stop and wait for the command to finish.
2. To start up the Workstation User Interface (WUI) and Aisle Controller (AC), double-tap Aisle Restart.

   Note: *To start up the WUI exclusively on systems with front and back stations, double-click the WUI-Restart command icon.*

3.1.2 Cortex login

1. Ensure that you have started the system and Cortex (see above).
2. Enter your **User Name** and **Password**, and then click **Login**.

Figure 3-1: Cortex login screen

3. From the Pick station, press the green **Start** button.

3.2 Other System Options

3.2.1 Logging out

The operator can use the logout function to abandon the active order state. After exiting Cortex, the presenting iBOT® drives away.

3.2.2 Switching users

A new user can use the Switch User function to continue working on the machine. Unlike logging out, the active order state remains, and the presenting iBOT remains in the workstation. The UI information also stays the same.

The user should only use this option when someone is available to switch with the current user.

NOTICE

Switching users.

iBOTs could jam if you do not switch users in a timely manner.

▶ Log in promptly while the presenting iBOT still has power.

3.3 Units of Measure

Note: *This feature is currently optional. Some features may still display on your computer.*

Cortex measures warehouse item quantities with Units of Measure (UOMs). OPEX recommends keeping each UOM in its own cell. However, if your workflows necessitate mixing UOMs of the same item, Cortex can support them.

If an item has mixed UOMs, Cortex tracks the inventory quantity in the Primary UOM—the smallest unit of measure provided for the site. Cortex converts the Primary UOM to other requested UOMs quantities. Units of measure are usually the same for a warehouse and a store. When a site has multiple UOMs stored together, the unit measure calculator is available to convert **Primary UOM** quantities to other requested UOMs.

The client provides the following for all item UOMs:

- UOM code
- Item dimensions
- Item weight
- Primary UOM for the stock keeping unit (SKU)
- Sales UOM
- Stock UOM

Orderlines must specify the quantity and UOM of a SKU. Cortex ensures that only partial UOM quantities exist by handling short picks and prompting the user to re-induct any partially picked UOM portion.

3.3.1 Sales unit of measure

Sales UOM is the minimum UOM at which the site sells an item. This value is often the **Primary UOM**.

Cortex only allows inventory adjustments in quantities of the Sales UOM. Orderlines requesting less than the Sales UOM fail and Cortex flags it.

3.3.2 Stock unit of measure

Stock UOM is the largest UOM for an item that the operator can put into a system. Cortex breaks down larger UOMs into the Stock UOM for put-away. Cortex can break down larger UOMs for case fulfillment from a different area.

3.4 Cortex Operations

3.4.1 Pick

Picking is the action of moving product from the machine to the container that Cortex indicates. The appearance of the Pick tab on the WUI (Figure 3-2) differs based on the operation mode.
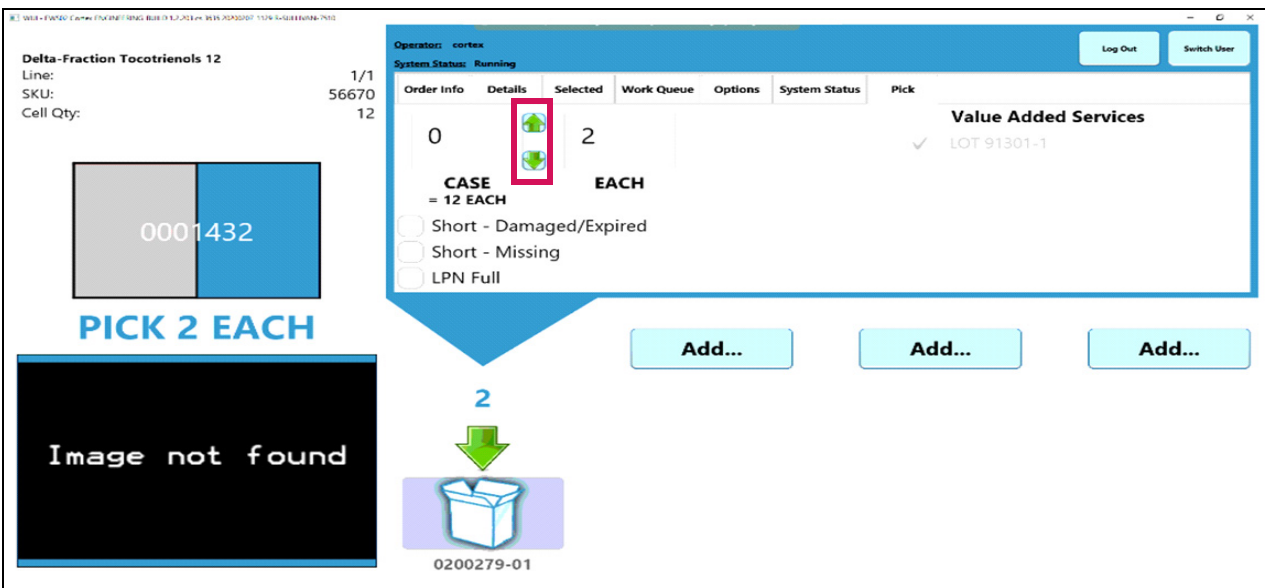


Figure 3-2: Cortex Pick tab

Pick contains quantities for cases and individual products. Adjust the quantity in Cortex with the green arrow buttons next to the UOM number fields, if needed.

Complete the pick by pressing the container on the screen or by pressing the corresponding PTL button on the workstation. The button is the same color as the container on the screen.

3.4.1.1 Pick procedure

Depending on your operation mode, the operator can start a pick in several different ways. After Cortex presents an iBOT, the WUI displays the order, and the tote highlights in the aisle as well as on-screen.
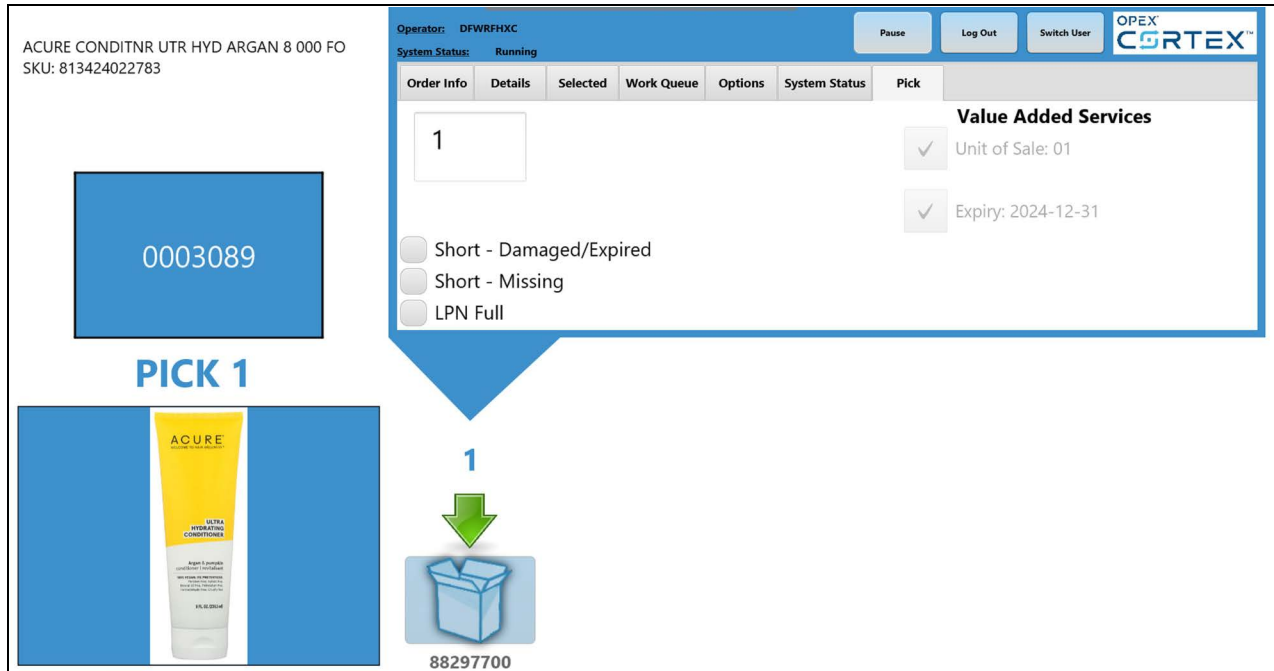
Figure 3-3: Workstation Pick screen

After the operator moves the product from the aisle to the container, select the container on the WUI or press the corresponding PTL button to bring forth the next container.

Repeat the procedure until Cortex presents and confirms the picked items for all items in an order.

Automatic mode

Cortex starts the Pick when the scanning solution scans the order. The operator can use a handheld scanner if the scanning solution does not scan the order. When the WUI displays the order (as seen in the figure above), Perfect Pick® presents the operator with a tote containing the items to pick. From the screen, Cortex highlights the cell with the desired items as well as in the aisle.

Table mode

Cortex starts the Pick when a handheld scanner scans the order. All other steps to completing a pick procedure occur after this step.

3.4.1.2 Pick exceptions

If the tote does not contain enough products to fulfill the pick or if the tote is already full, the operator can apply conditions to the workflow to notify the system.

Short - Missing or Damaged

If Cortex presents missing or damaged products, select either the Damaged or Missing exception and input the amount of present, undamaged product into the tote.

If Cortex picks Short - Damaged, a message shows the number of damaged items to remove from the order. The operator then removes and separates the items from other inventory at the pick station. When prompted, confirm that nothing is left in the cell.

LPN Full

If the container is already full, select the LPN Full option. The machine can then retrieve another carton to continue order fulfillment.

A dismissal prompt appears after the order is complete. If your site requires a printing step, indicate in the prompt whether to print out labels or other documents.

If it is not possible to split the order, dismiss the order and send the container's License Plate Number (LPN) to your site's designated rejection area.

*Note: When only one more item can fit in the container, the operator selects LPN Full and changes the EA quantity to 1 (*Figure 3-4*).*
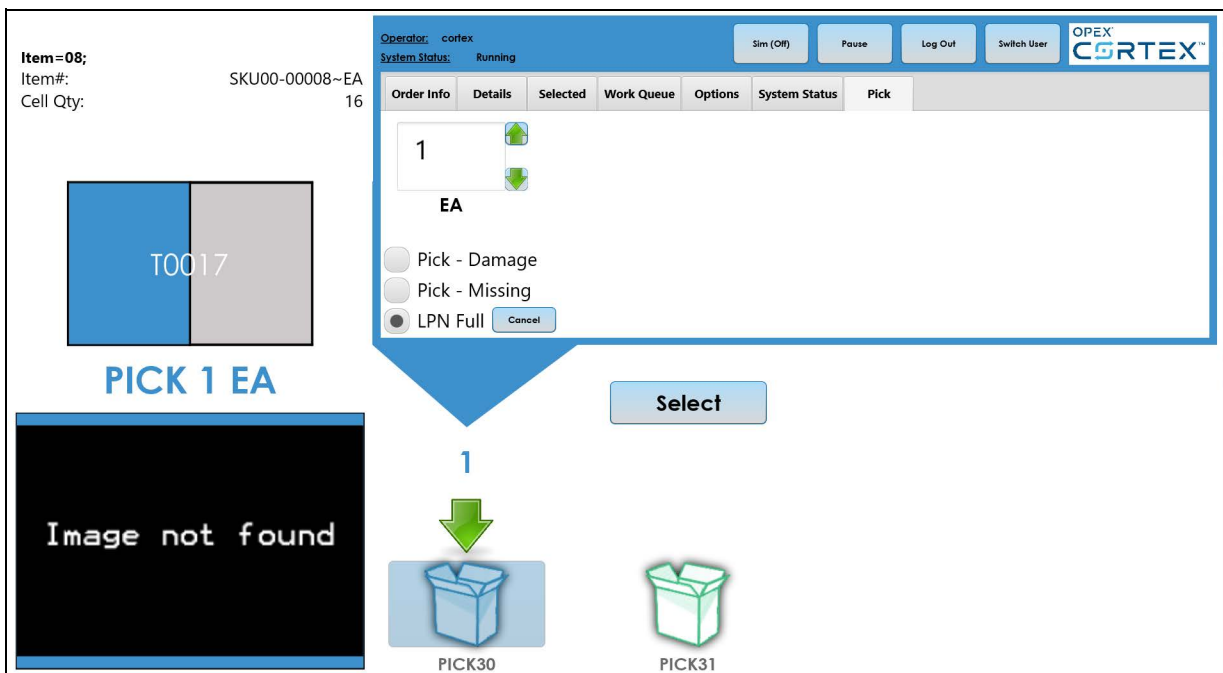
Figure 3-4: LPN Full example

Confirming the new License Plate Number

The operator can enter in any LPN in the **Adding Container at Location** dialog (Figure 3-5).
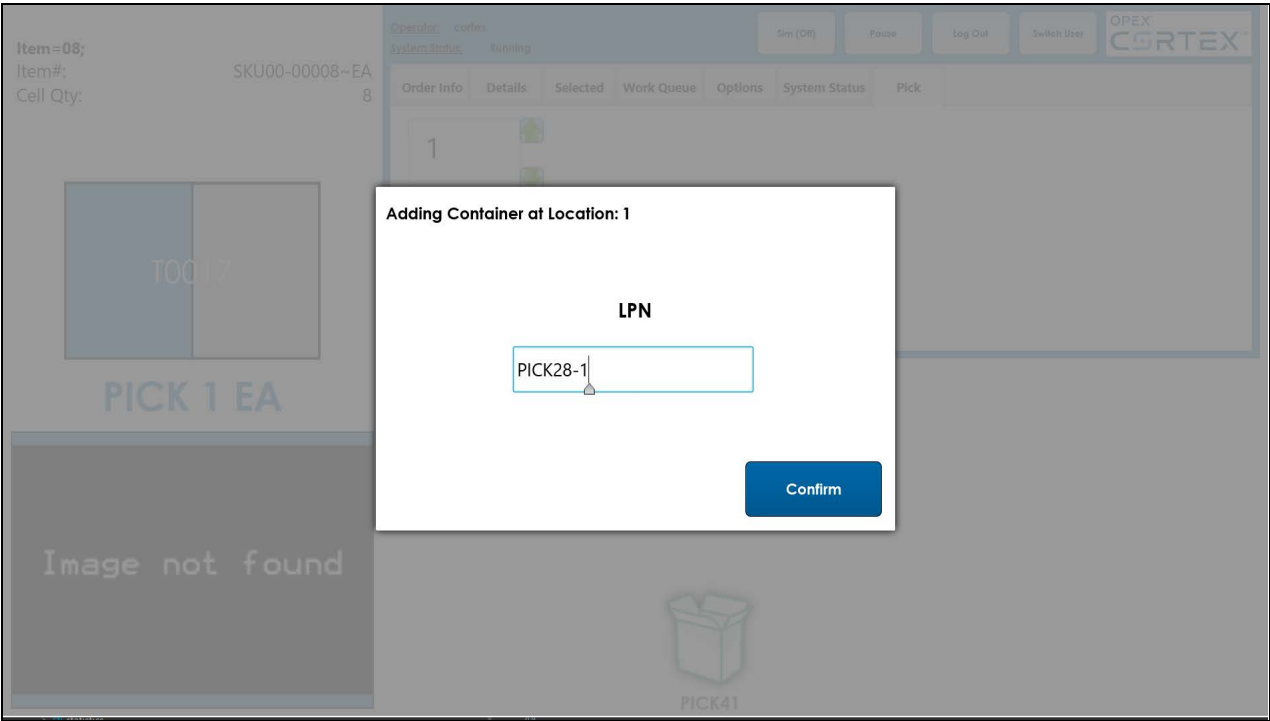
Figure 3-5: Adding Container at Location dialog

When the operator presses **Confirm**, the **Exception** view appears. The AC or Station Controller prevents any container routing in the position reserved for the new container. The exception view shows the location to place the new LPN in blue with directions at the top of the screen ().
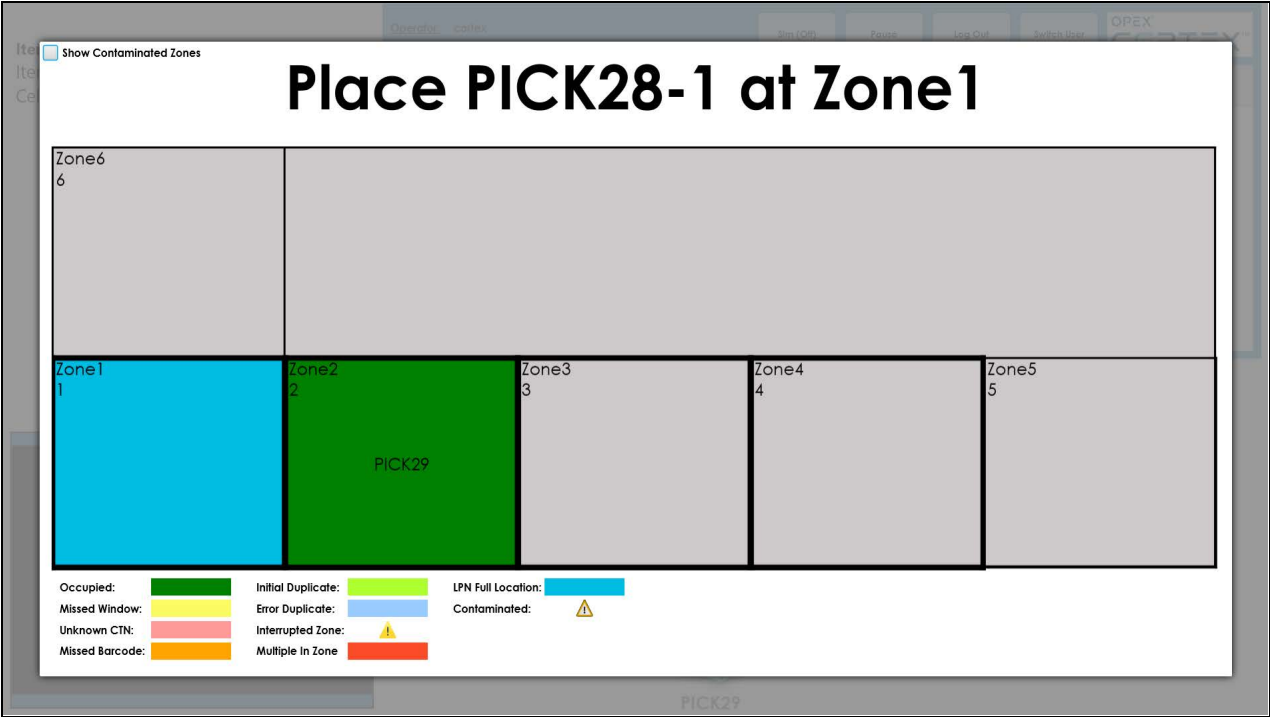

Figure 3-6: Place Zone window

After the operator places the container in the blue location with a blocked sensor, an unknown container indicator displays in that location. Cortex updates the directions at the top of the screen (Figure 3-7).
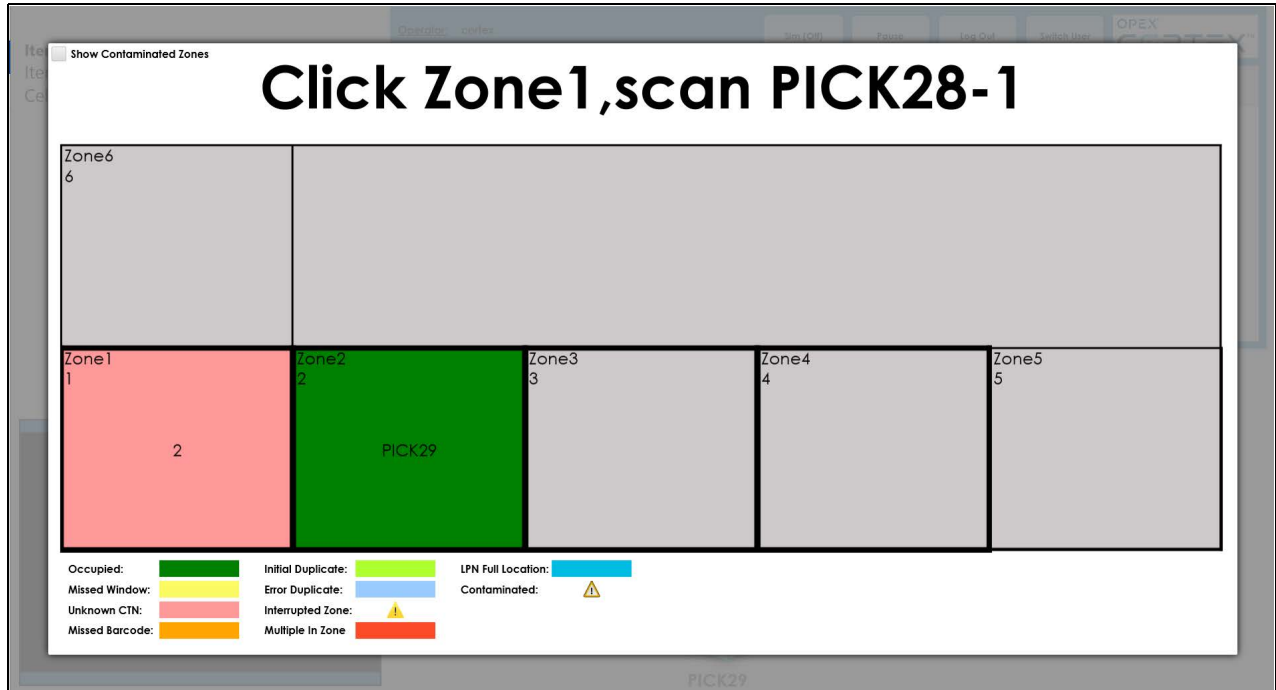
Figure 3-7: Click Zone window

After pressing the zone, the **UNKNOWN CONTAINER** dialog opens (Figure 3-8).
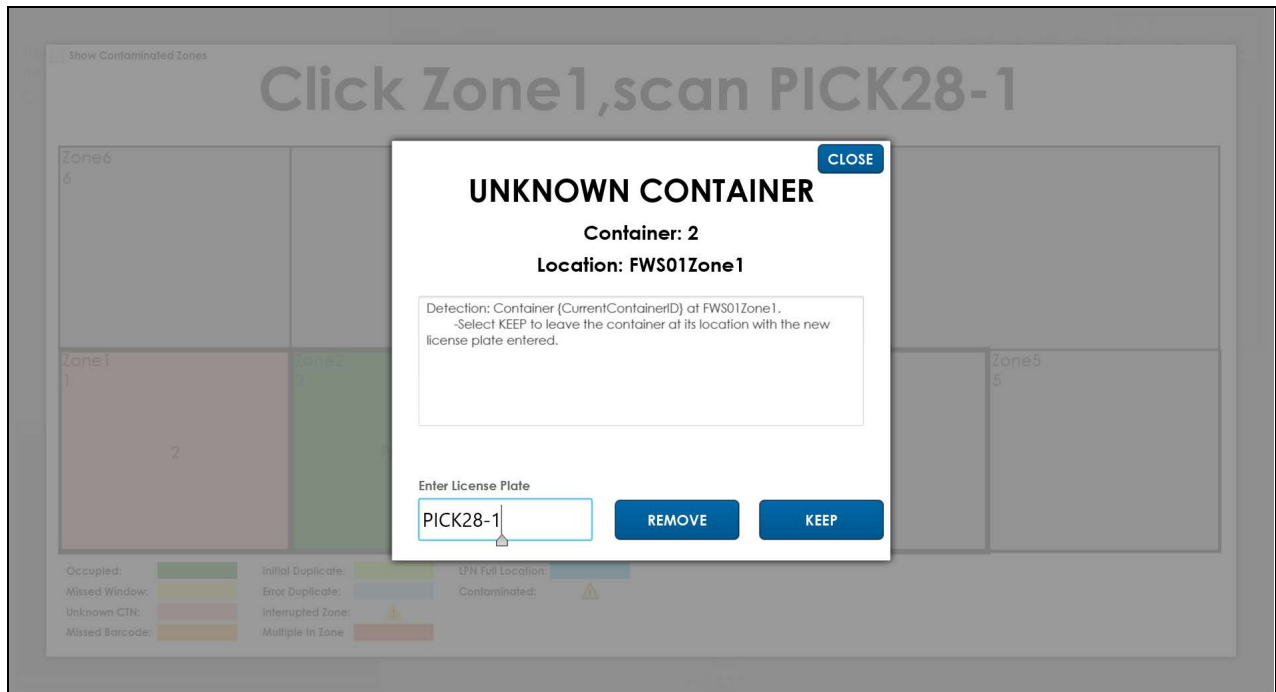
Figure 3-8: Unknown Container dialog

After the container is physically on the workstation, press **KEEP**.

Preventing bad input

When an operator places the container in the correct location but enters the wrong LPN, or when the operator places the new LPN in the wrong workstation location and attempts to add a different LPN to that location, the **KEEP** button becomes inactive (Figure 3-9 and Figure 3-10).
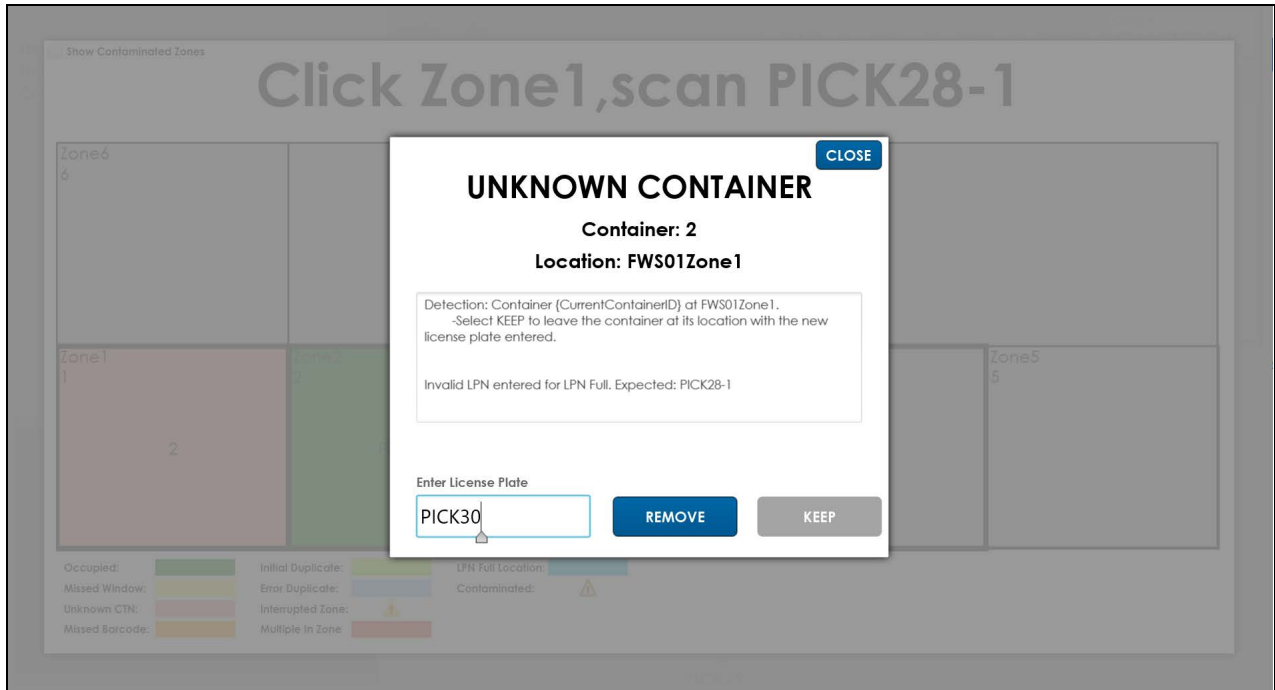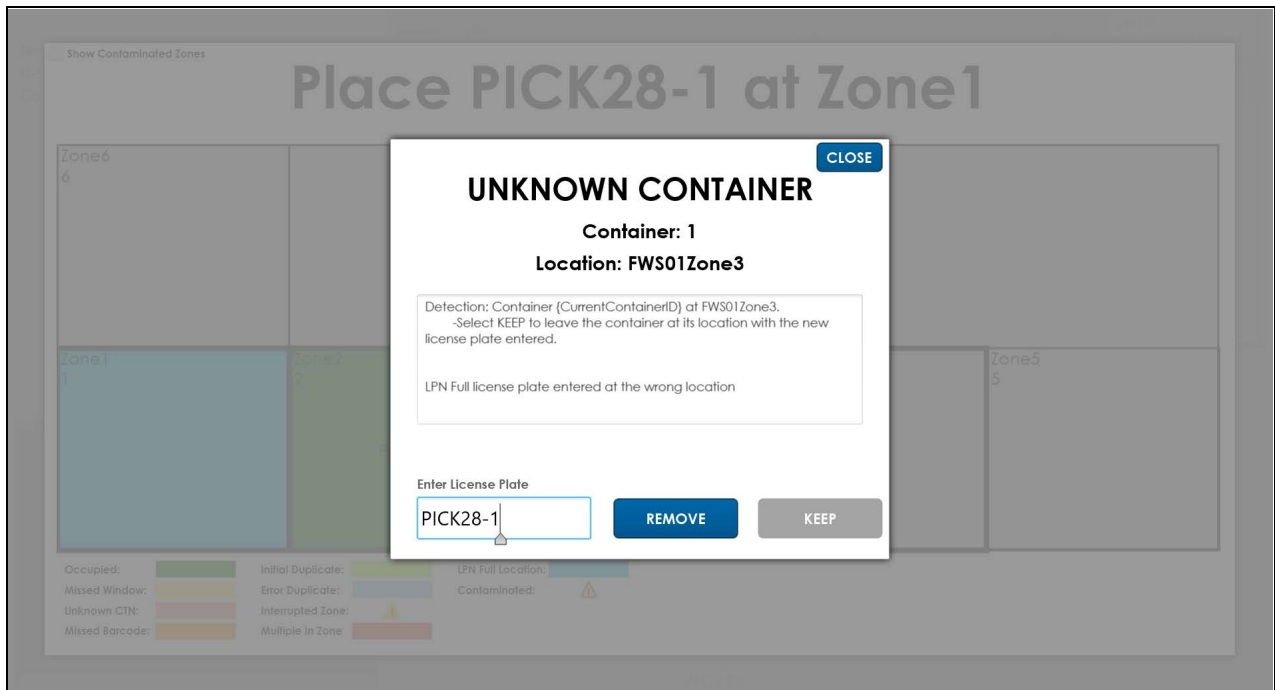

Figure 3-9: Unknown Container wrong LPN

Figure 3-10: Unknown Container wrong location

Completing the next License Plate Number

After an operator confirms that the next LPN for **LPN Full** is on the workstation, Cortex resumes operating as normal. Cortex moves the remaining work for the order to the new container. The following image (Figure 3-11) shows the remaining work to complete.
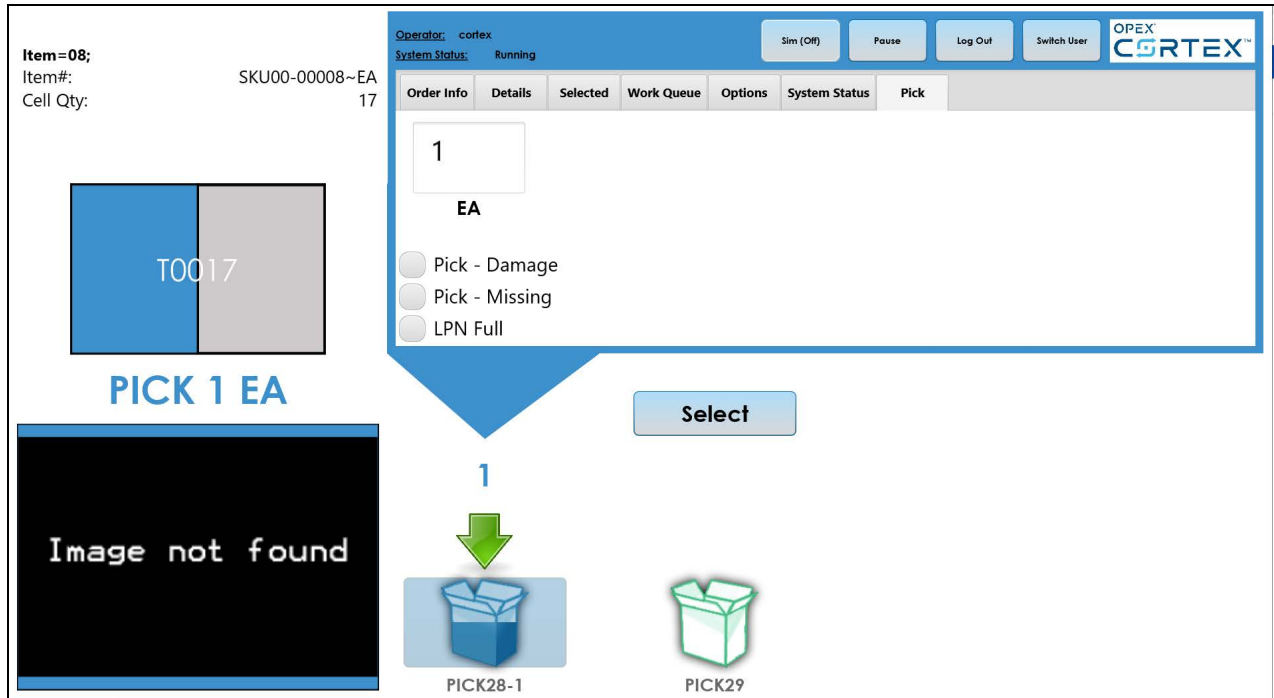
Figure 3-11: Completing the next LPN

Manual table mode

LPN Full functions similarly in manual table mode, with the exception of adding unknown containers or routing containers. The process of adding containers to a location remains the same. After the operator presses **Confirm**, the operator needs to place the new LPN container in the correct manual table mode location. The exception view only exists in auto mode. The following image shows the new LPN after the operator presses **Confirm** (Figure 3-12).
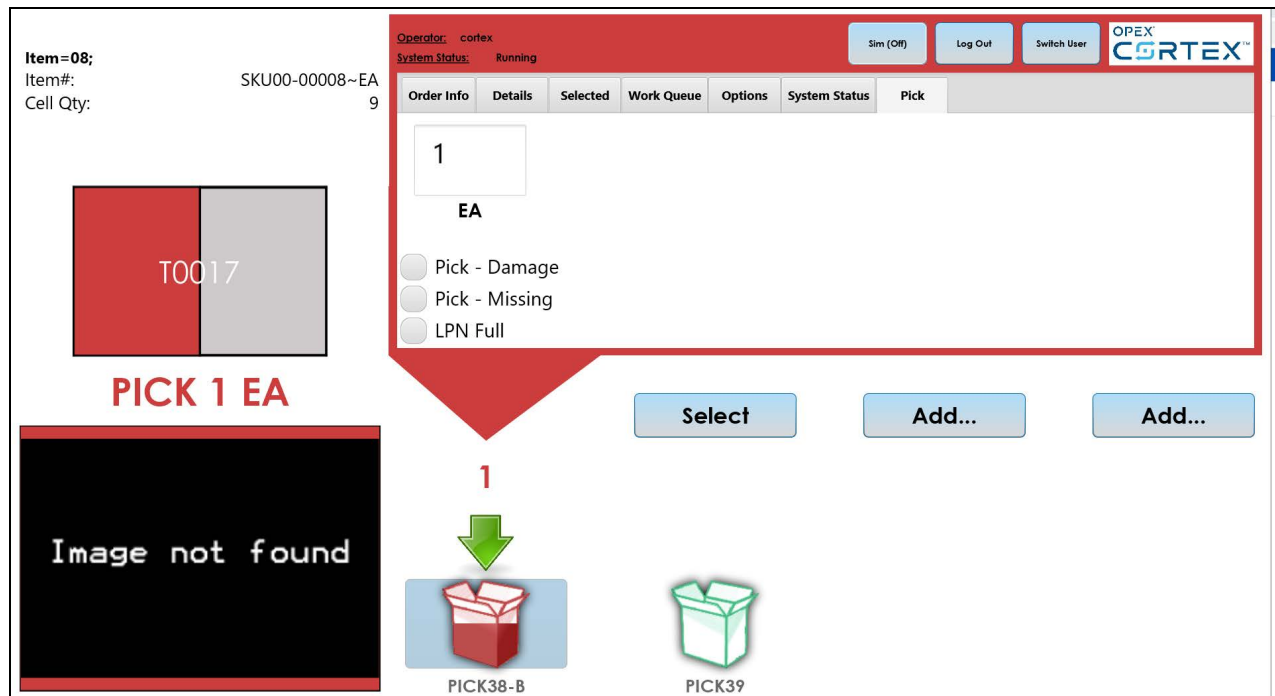
Figure 3-12: Manual table mode LPN

3.4.2 Mixed stock keeping unit details

Mixed SKU is a feature that an operator can use to store multiple items in a single cell in a tote. Mixing inventory is important because a client might want to store unique parcels, or the client's inventory is serialized. Mixing inventory allows for more storage in a cell up to a predefined limit of unique items. A client might also want to store items in a specified category together. Some of these items can include:

- Fragile items
- Hardware items that work with each other
- Slow movers

3.4.3 Dynamic put-away

In this mode, Cortex introduces mixed SKU inventory to the machine in a late-binding manner. This occurs during completion time for a cell with inventory items in it.

3.4.3.1 Creating dynamic put-aways

The operator scans in a barcode that represents the number of cells or unique totes to bring forward in the main WUI screen. Cortex looks for DPUT followed by the number of cells or unique totes to bring forward. If the operator wanted 5 cells, they would scan the barcode DPUT5.

After the scan, the WUI **Work Queue** tab changes to a red font as shown in the following image (Figure 3-13).
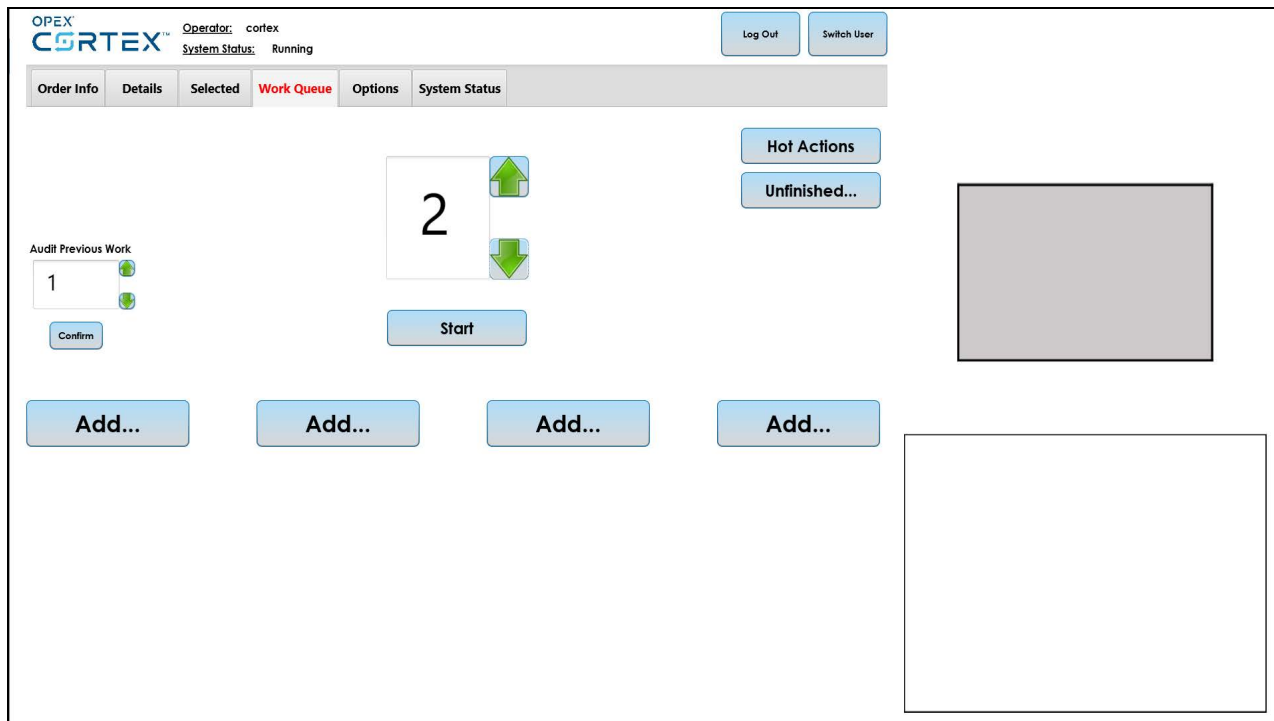
Figure 3-13: Work Queue tab

Pressing **Start** begins the process of adding dynamic put-aways to the WUI. The operator then sees the two dynamic put-aways.

The following window (Figure 3-14) opens when Cortex presents the first tote for dynamic put-away:
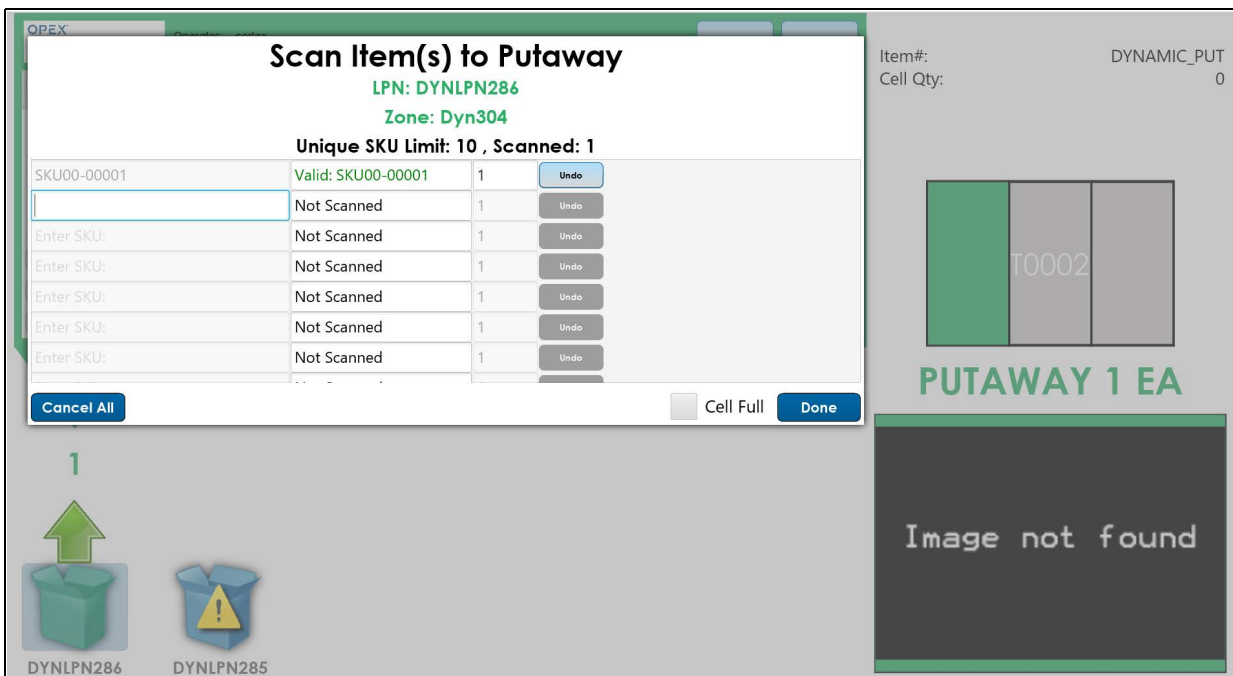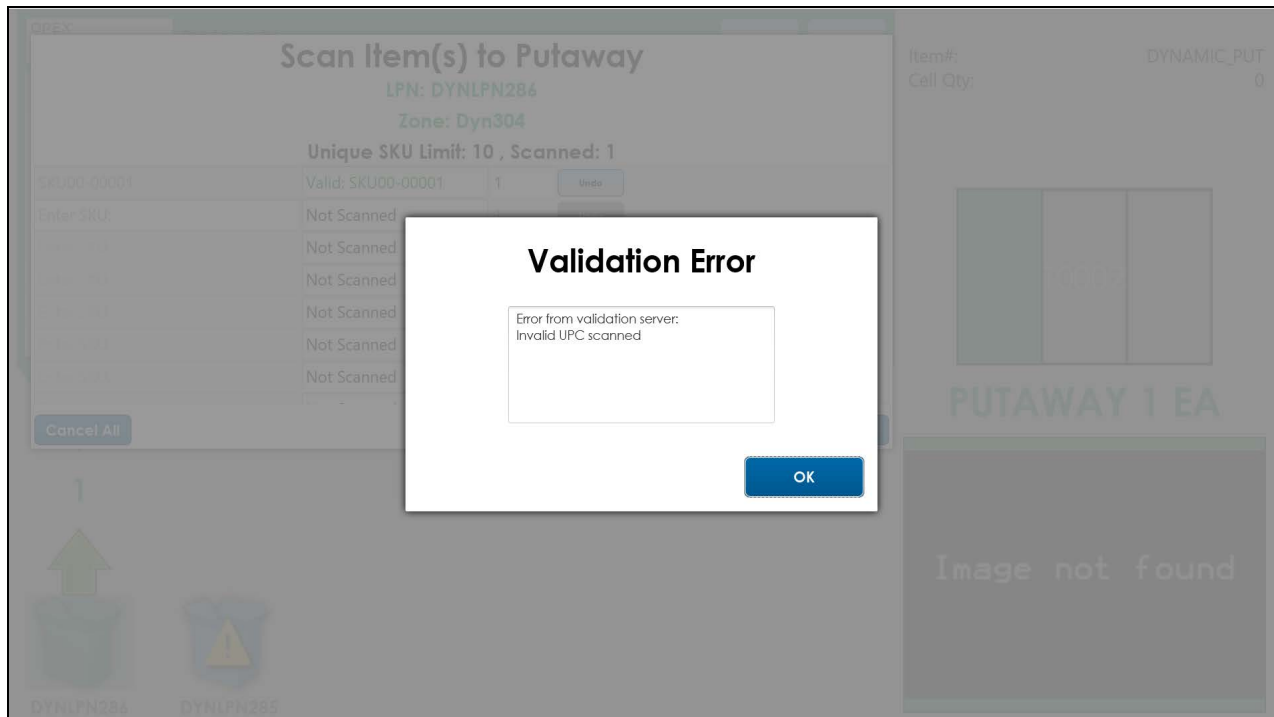
3.4.3.2 Processing dynamic put-aways

Figure 3-14: Scan Item(s) to Putaway window

When a scan occurs that does not exist in the system, the **Validation Error** dialog ([Figure 3-15](#)) opens.

Figure 3-15: Validation Error dialog

3.4.3.3 Changing the quantity

The operator can change the quantity for each SKU. The default value quantity is 1. If the scan is valid, the operator can edit the **Quantity** field. The following image ([Figure 3-16](#)) shows an edited quantity:
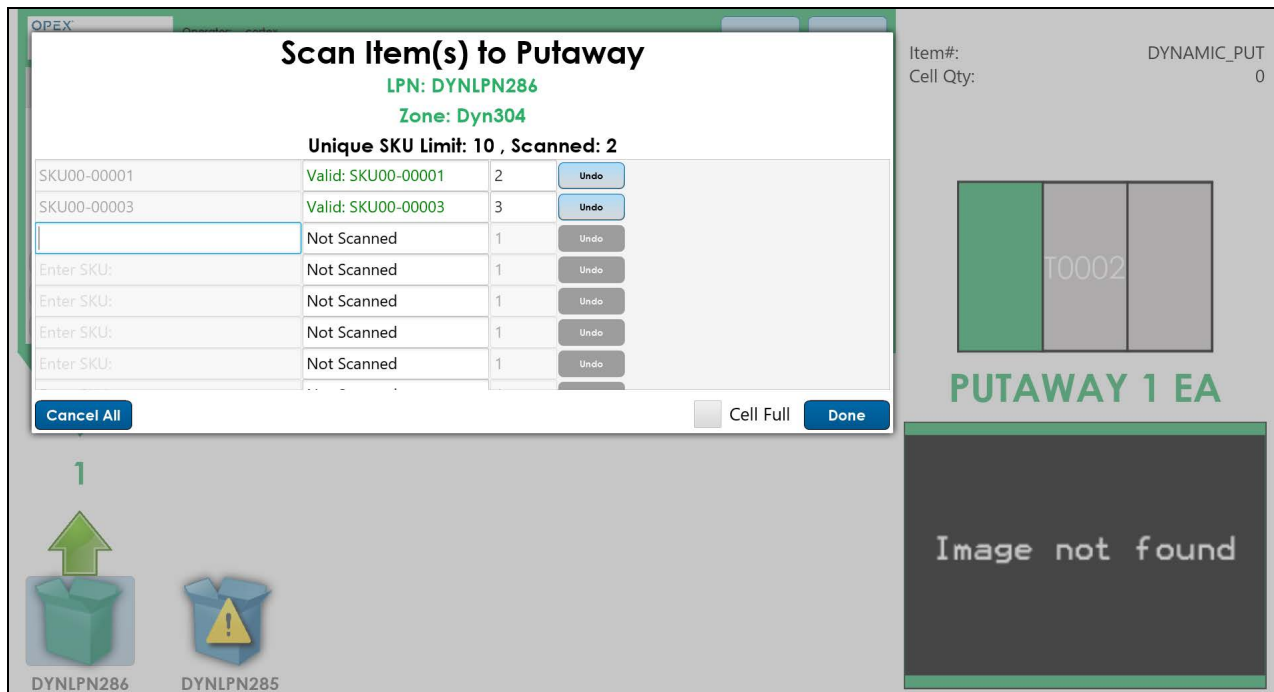
Figure 3-16: Changed quantity in the Scan Item(s) to Putaway window

When all dynamic puts are complete with the expected quantities and the physical inventory is in the cell, the operator presses **Done**. Cortex then releases the inventory tote.

When it is blank, the **Scan Item(s) to Putaway** window () displays a **Cancel** button. This cancels the put-away for the current cell.
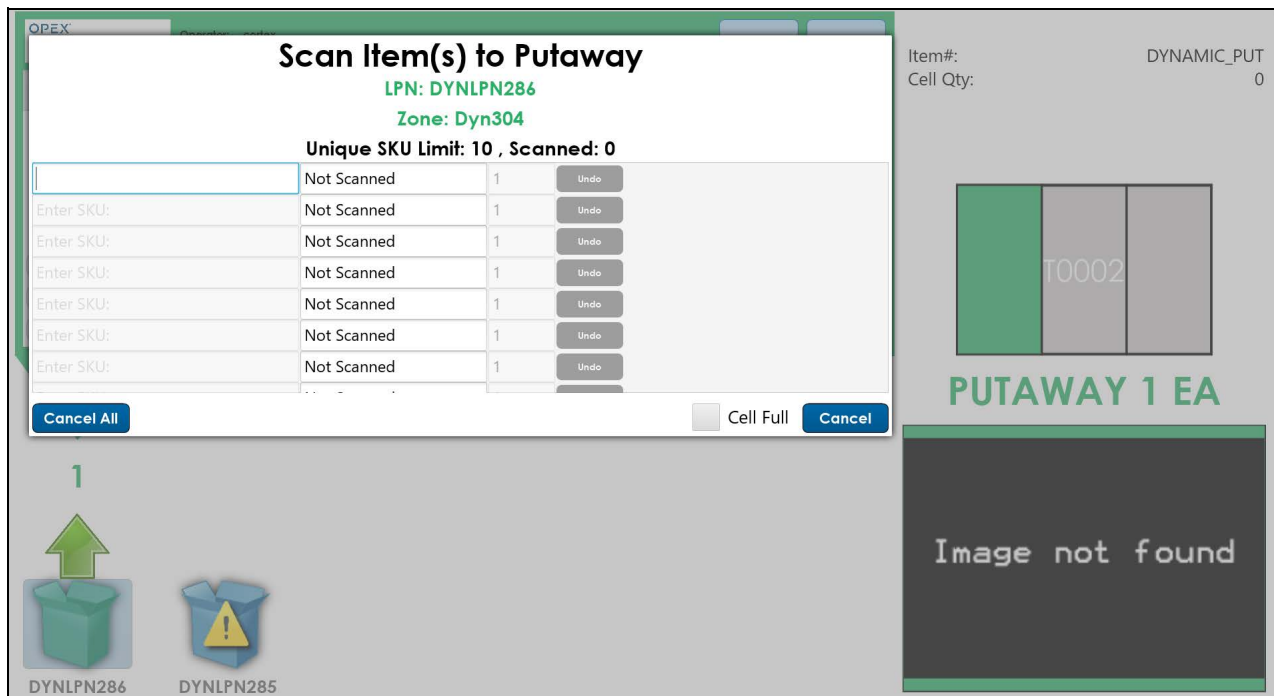

Figure 3-17: Canceling the put-away

The operator can press **Cancel All** to cancel all remaining dynamic puts, including ones to add to the WUI screen at a future date. The **Work Queue** tab changes back to a black font to indicate all the dynamic puts are canceled or complete. This also dismisses all the dynamic puts from the WUI screen.

3.4.3.4 Indicating a full cell

If the current cell is full, select the **Cell Full** checkbox (Figure 3-18) before pressing **Done**, so Cortex does not present the current cell anymore for dynamic puts.
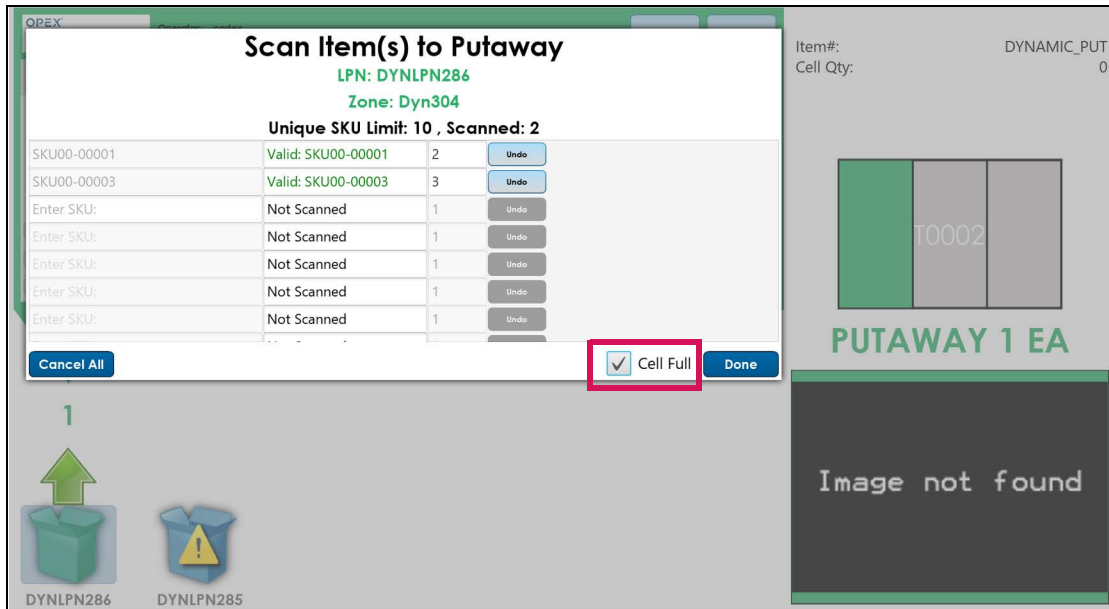
*Figure 3-18: Cell Full checkbox*

Expected dynamic put behavior

1. Scan a known barcode as input into the WorkstationUI. For example, DPUT1, DPUT2, DPUT5, DPUT10, and so on.

2. N totes present where N is the number that Cortex parses off of the dynamic put code DPUTN.

3. For each tote presentation, present an input scan screen on the WUI to capture dynamic put SKUs and quantities.

4. Capture SKUs and quantities. The number of captures available depends on the cell's configurable unique item limit. The default number is 10 unique items per cell. Item validation occurs on a per scan basis.

5. From the WUI input scan screen, press **Done**. After an operator presses **Done**, Cortex completes the work and closes the scan screen. Cortex also releases the tote.

Expected categorical mixed SKU behavior

*   The operator can only mix items with the matching categories.

*   The inventory cell must follow the unique item limit set on the cell template. The default unique item limit is 10.

3.4.4 Put-away

Put-away (also known as replenishment or restocking) is the movement of product from the workstation or conveyor to restock inventory in the system (Figure 3-19).
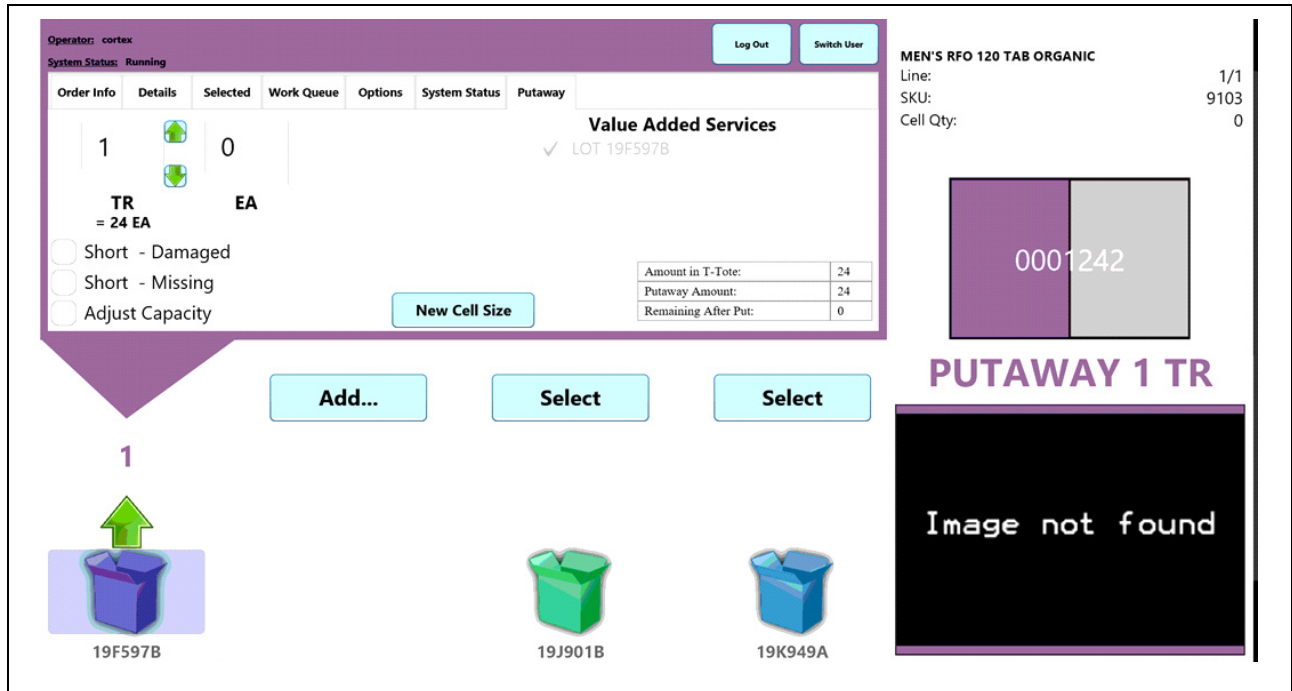
Figure 3-19: Put-away function

Although both terms accomplish the same goal, replenishment refers to inventory coming from another storage location on-site. Put-away items typically come from the receiving dock.
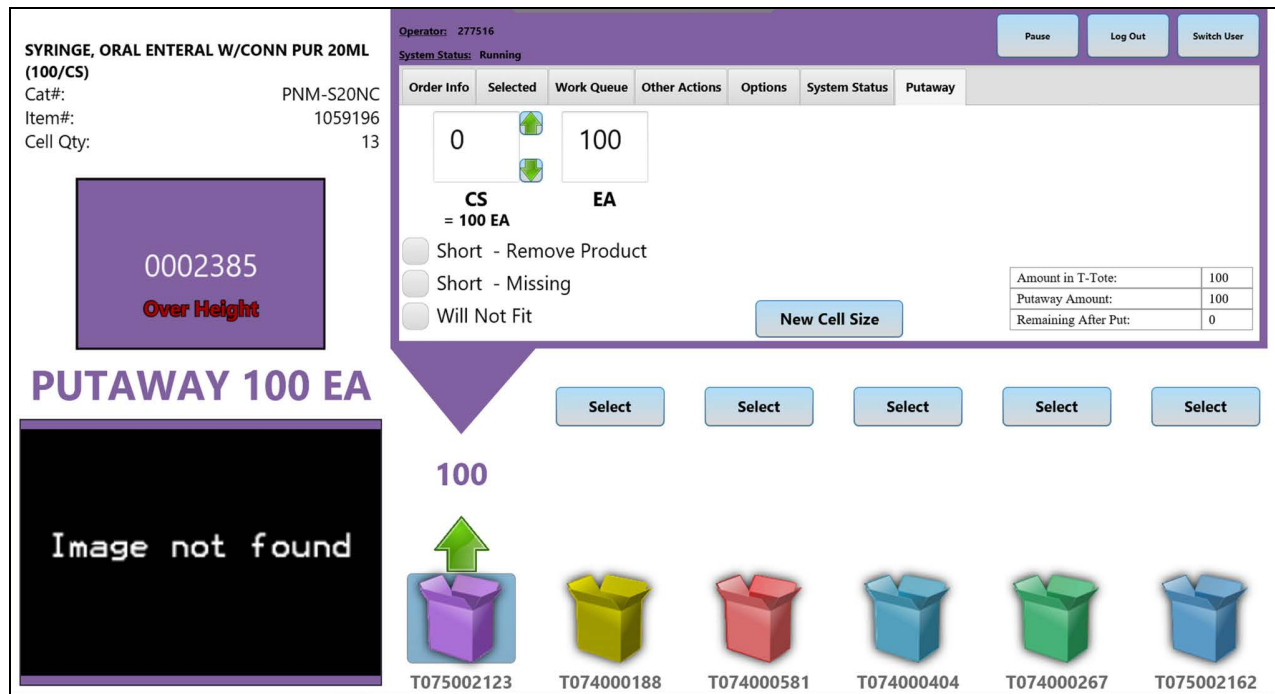
Figure 3-20: Cortex put-away screen

3.4.4.1 Fulfilling a put-away workflow

When an orderline calls for put-away, the system presents a tote to place items into. The workstation presents containers with the product that the operator needs to put-away.

Fill the amount requested into the tote in the pickstation.

When complete, press the corresponding PTL button on the workstation or the container icon on the WUI. Cortex takes the tote away for storage. Cortex removes any containers left on the workstation.

3.4.4.2 Replenishment exceptions

If the product to put away falls short of the order, or if the product does not fit into the tote, follow the procedures described for each exception in this section.

Short - Missing or Damaged

If Cortex presents missing or damaged products, select either the **Damaged** or **Missing** exception and input the amount of present, undamaged product put into the tote.

If Cortex picks **Short - Damaged**, a dialog shows the number of damaged items to remove from the order. Ensure that the operator removes and separates the items from other inventory at the pick station. When prompted, confirm that nothing is left in the cell.

Adjust capacity

If the product is bulging or likely to cause an overheight error, select **Will Not Fit** and input the number of items that enters the system.

Cubing values adjust if you select this option.

> **Note:** If the cubing value is set to 0, PICK/PUT is no longer available for the selected item.

3.4.5 Staged queue carts

Operators can use the Staged Queue Carts feature for buffer zones in manual table mode. They can also use this feature with normal cart picking for sites that use the PTL light frame. This feature ensures that the first cart is complete, and it keeps the task queue full.

Staged Queue Carts operates with:

- VirtualConveyor mode
- VirtualConveyorSpawnCTNs mode

VirtualConveyor mode tells the AC or Station Controller to spawn a thread that routes containers in locations to dismiss them when the work is complete. The VirtualConveyorSpawnCTNs mode tells the AC or Station Controller to create a contain at the last buffer location if it is available. The routing process is the same as the VirtualConveyor mode.

To operate VirtualConveyor mode:

1. From the **Pick** tab, the operator scans the cart or container into the first buffer location farthest away from the PTL locations. If any closer locations are available, the AC or Station Controller automatically routes the container to that location on the virtual conveyor. This frees up the farthest buffer location for the operator to scan in the next slug of work (Figure 3-21).
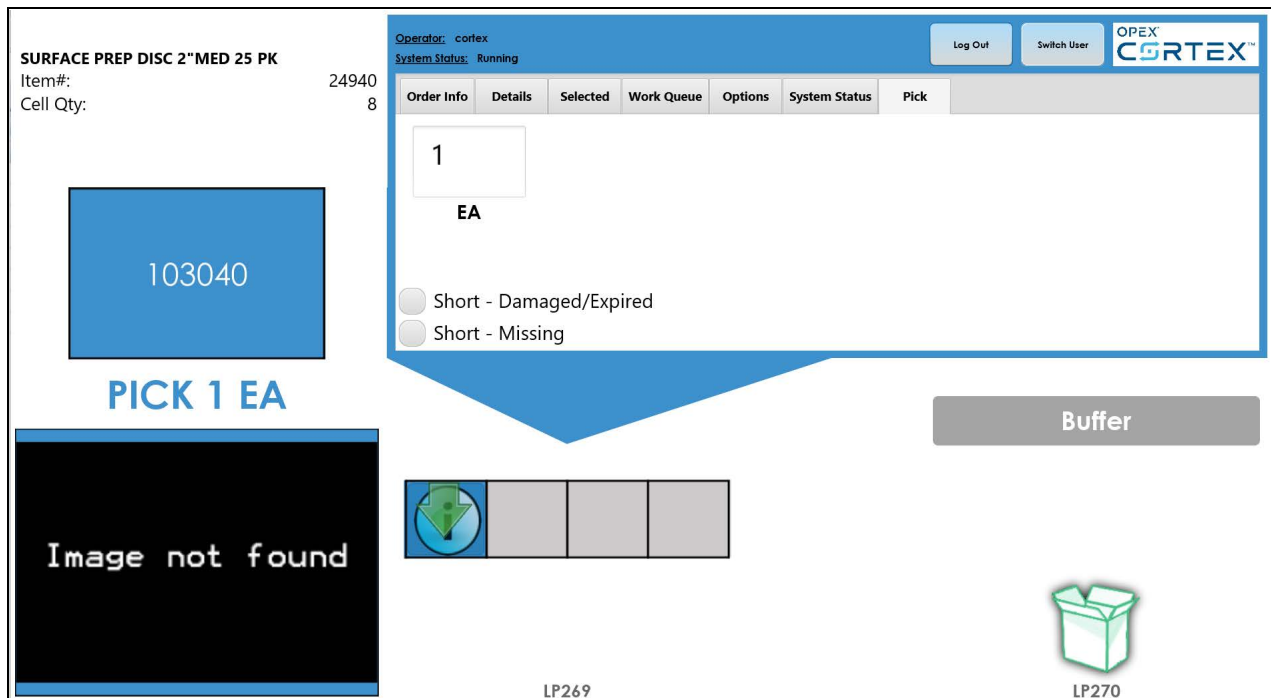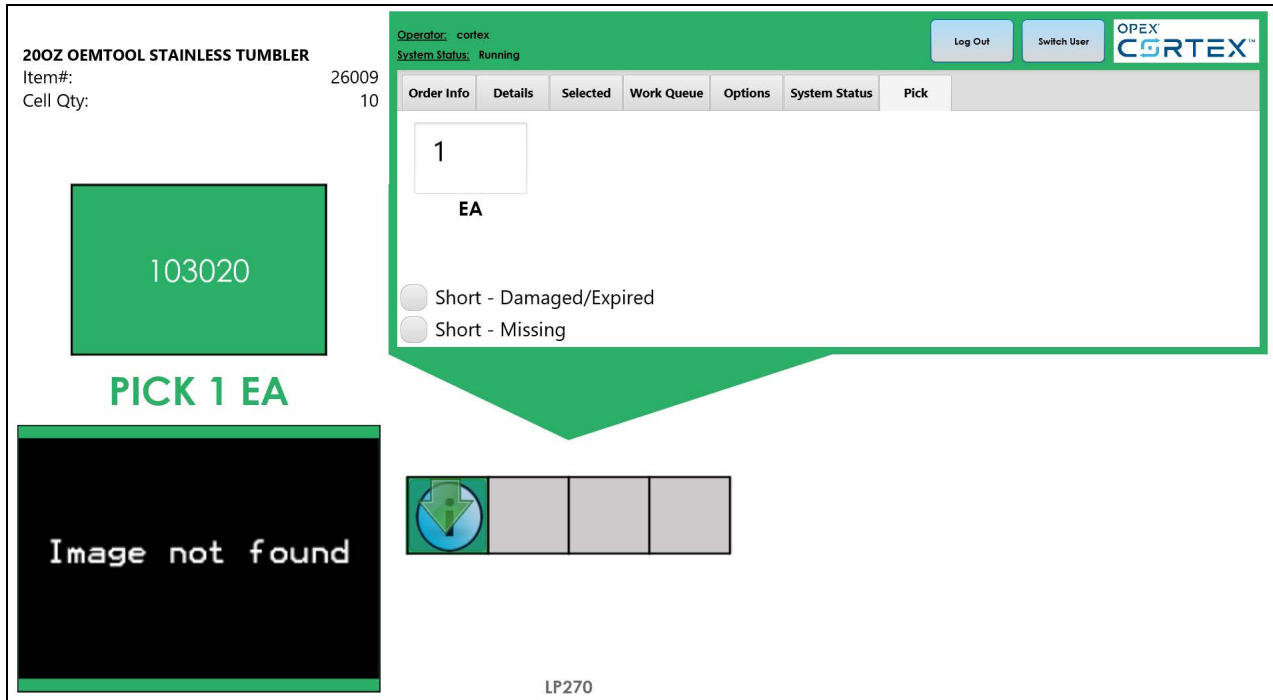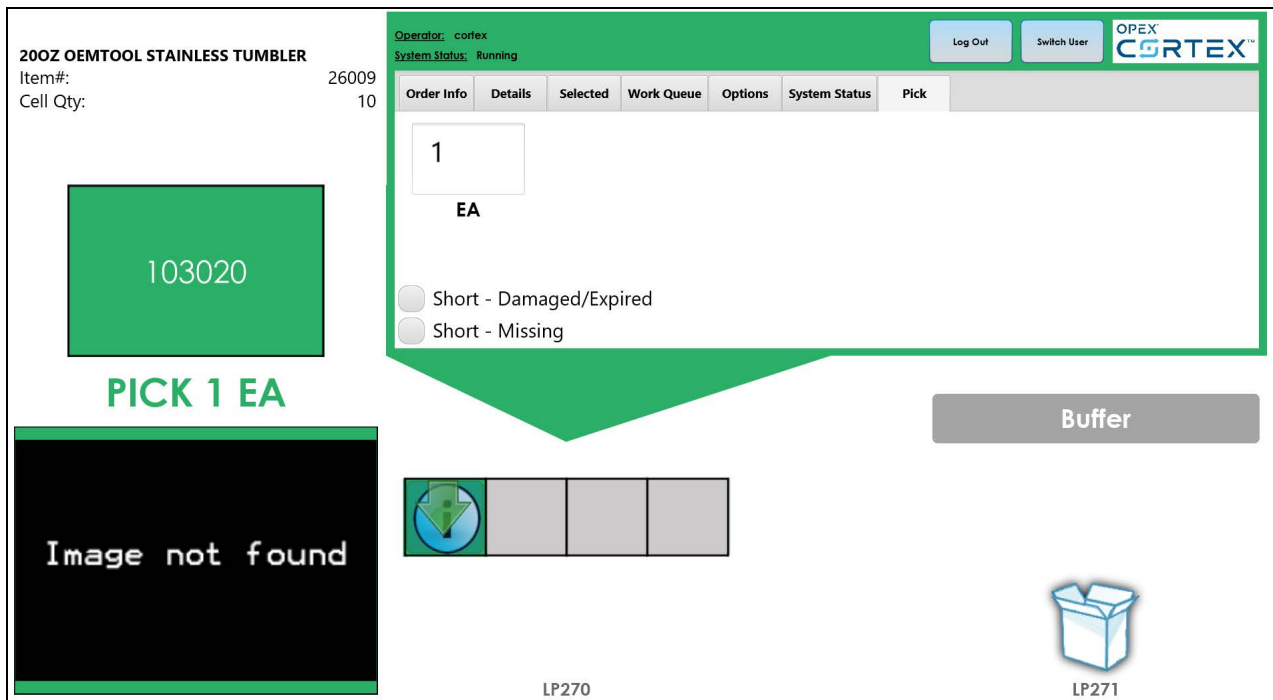

Figure 3-21: VirtualConveyor mode setup

2. After completing the pick process, the AC or Station Controller dismisses and completes the work when Cortex detects the next available location (Figure 3-22).
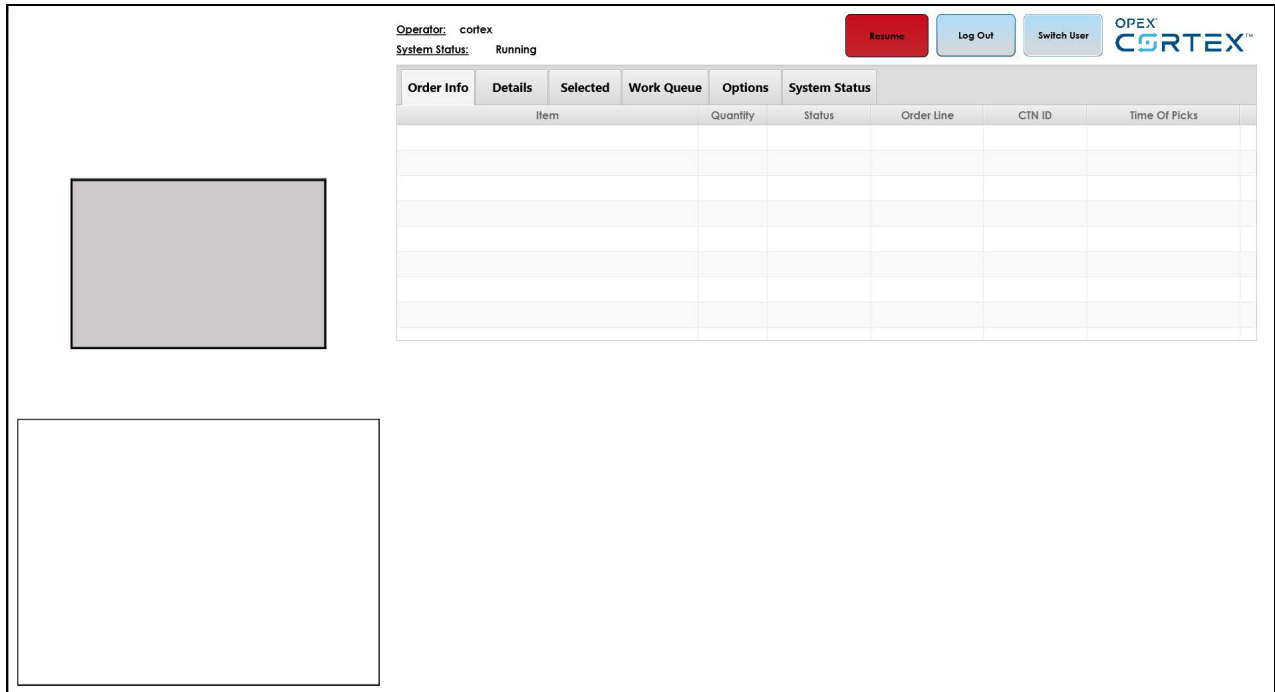

Figure 3-22: VirtualConveyor mode

3. The operator continues to scan in the next cart or container to the available buffer location. The operator repeats this process until they complete all their work (Figure 3-23).

Figure 3-23: VirtualConveyor mode buffer location

To operate the VirtualConveyorSpawnCTNs mode:

1. The AC or Station Controller creates or spawns the containers instead of the operators scanning them. The following image (Figure 3-24) shows the VirtualConveyorSpawnCTNs mode view in Cortex when the operator signs in.

Figure 3-24: VirtualConveyorSpawnCTNs mode

2. The operator can press **Resume** to turn on the virtual conveyor. After pressing **Resume**, the AC or Station Controller creates containers at the last buffer location and begins routing them. The **Resume** button (Figure 3-25) changes to **Pause**.
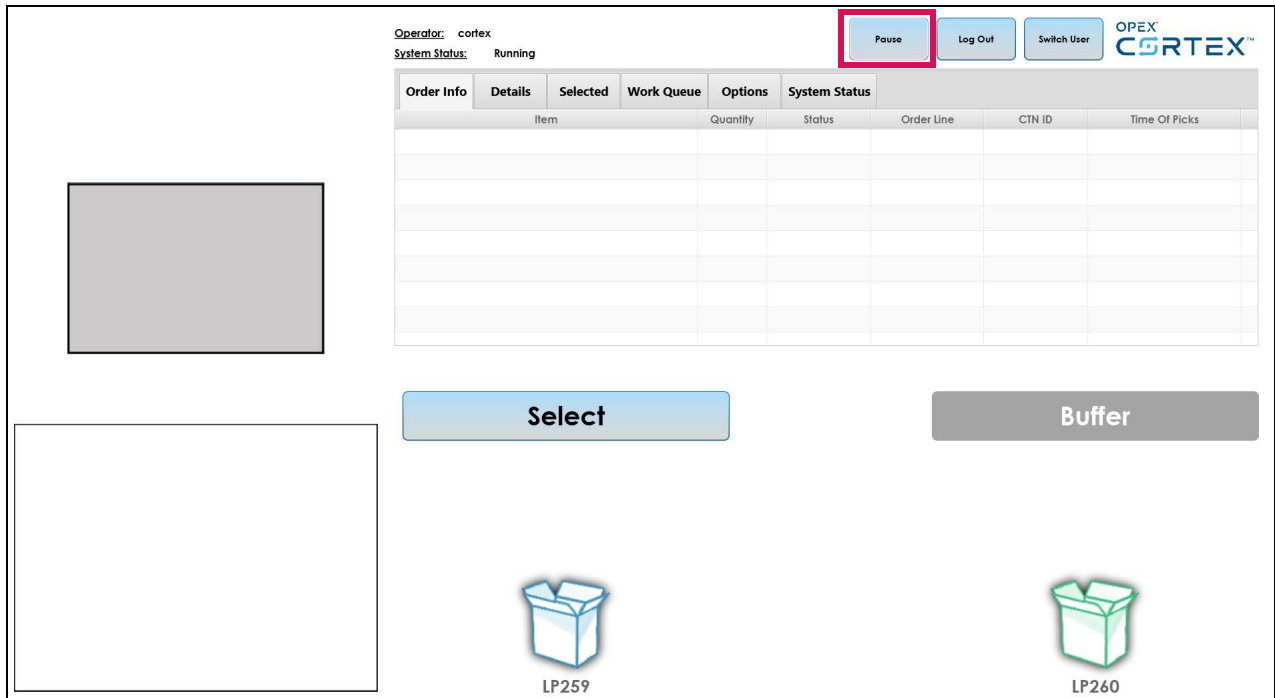
Figure 3-25: VirtualConveyorSpawnCTNs mode pause button

If an operator attempts to scan a container in this mode, the **Scanning Disabled** dialog (Figure 3-26) opens.
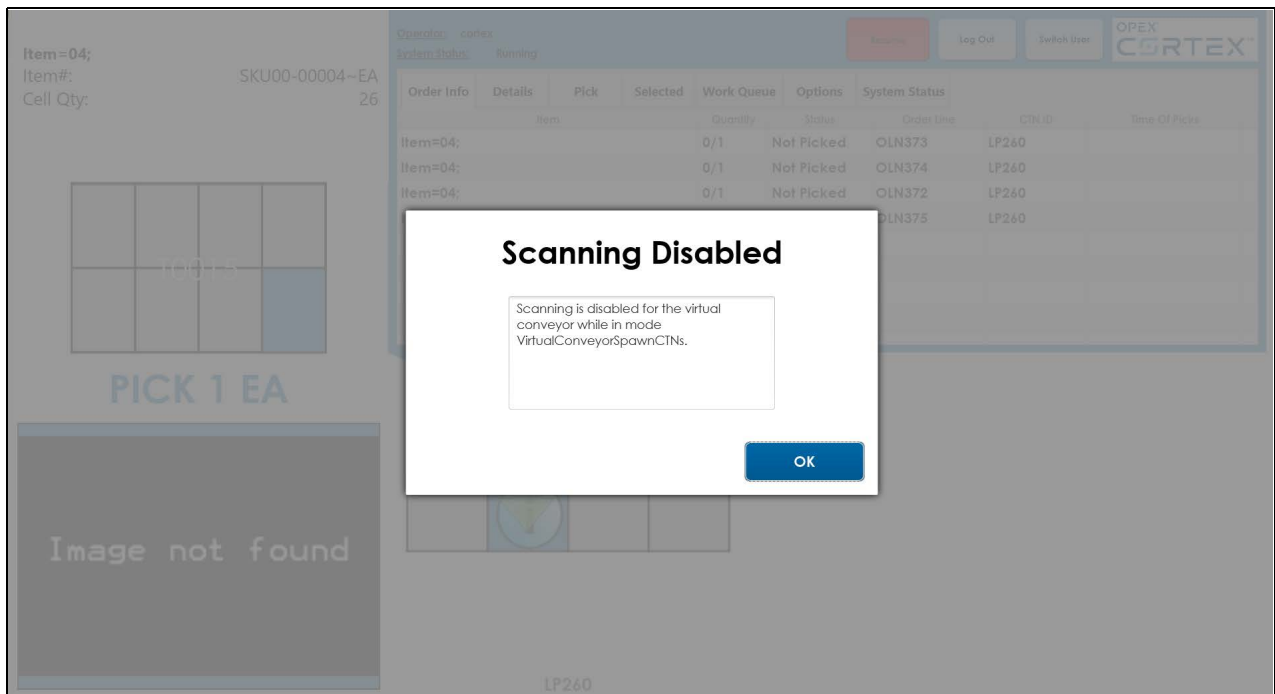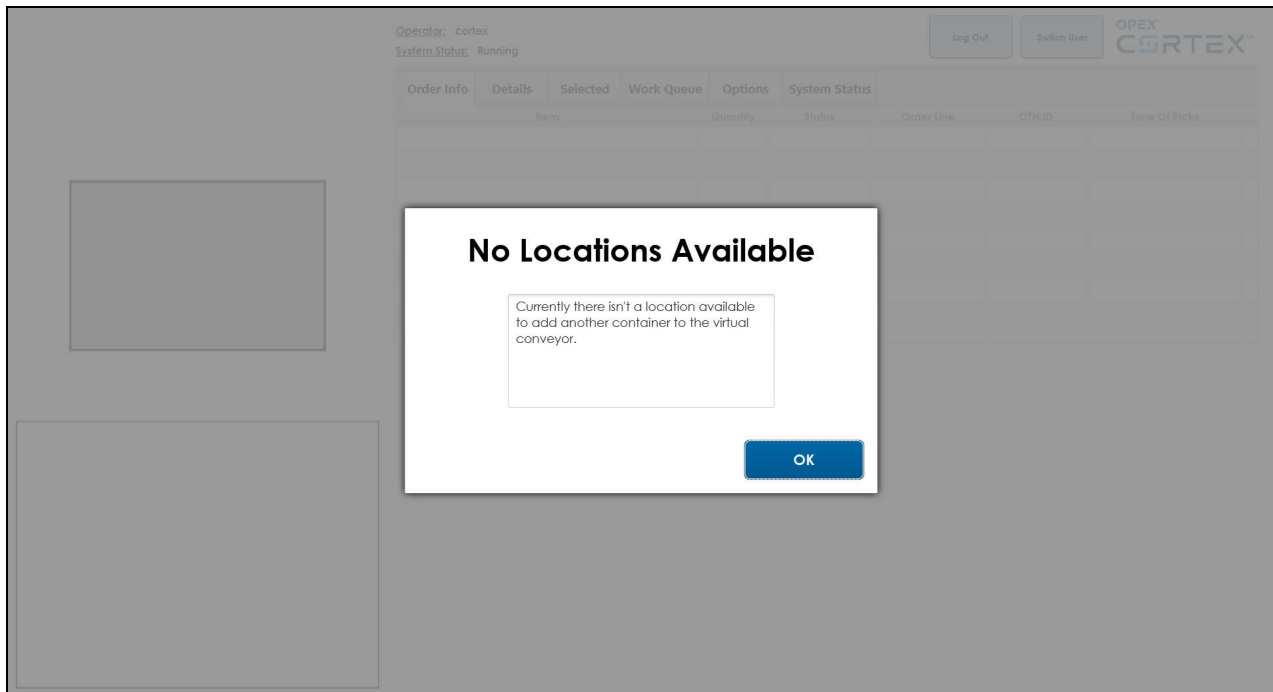

Figure 3-26: Scanning Disabled dialog

When a scan occurs at a site before there is a configured virtual location, the **No Locations Available** dialog (Figure 3-27) opens.
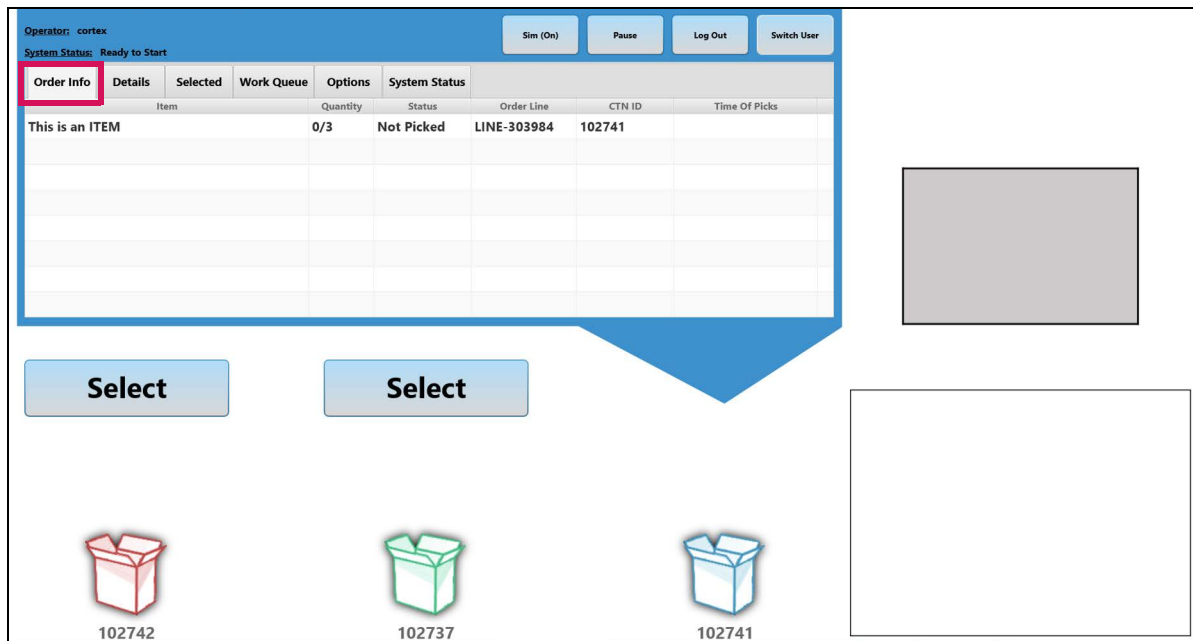

Figure 3-27: No Locations Available dialog

3.5 Workstation User Interface Tabs

The WUI has a series of tabs that contain different information and actions concerning the aisle and selected totes.

3.5.1 Order info

Figure 3-28: Order Info tab

Order Info is a configurable tab that can display the following for an order:

- Incoming conveyor
- Scanning solution
- Staging
- Workstation
- Cortex software
- Outgoing conveyor

This tab also contains multiple lines to describe what has processed in the order. Your site's configuration might include additional features.

3.5.2 Details

Details are currently not available. This tab displays a message to redirect the user to the **Selected** tab.

3.5.3 Selected
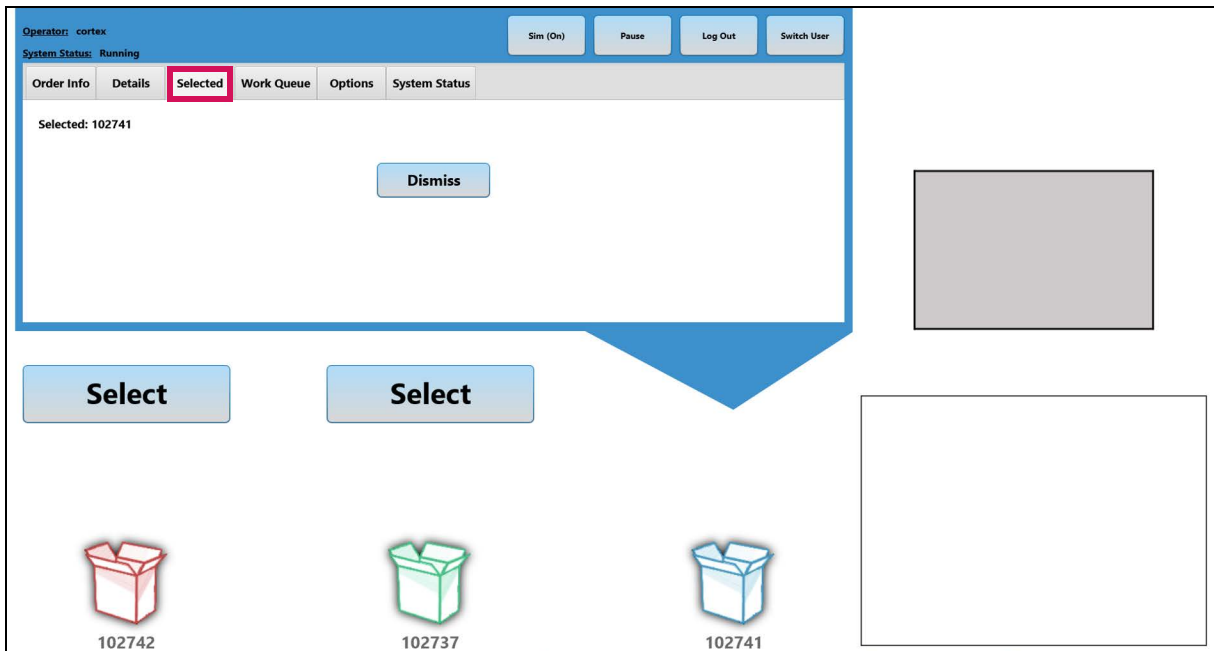
Figure 3-29: Selected tab

The operator can use the **Selected** tab to dismiss the orderline. Dismissing a single orderline suspends the order and returns the container to the system.
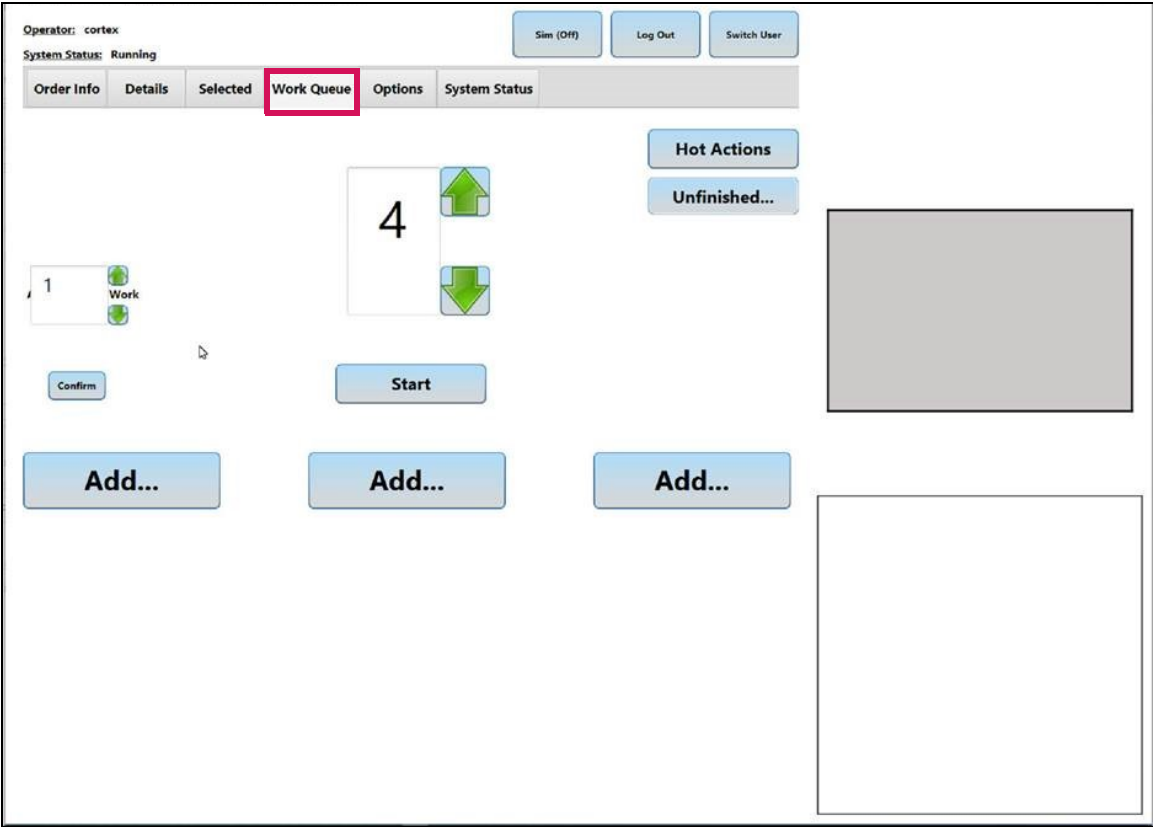
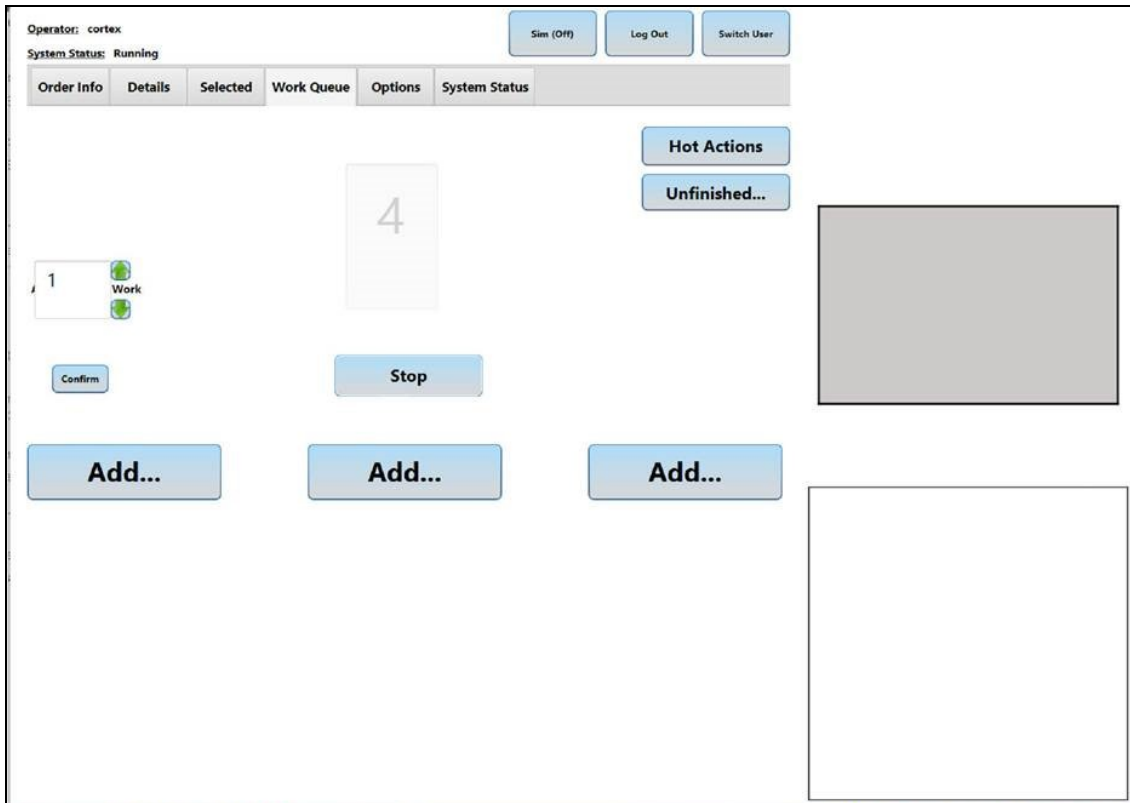# 3.5.4 Work queue

Figure 3-30: Work Queue tab - OFF mode

Figure 3-31: Work Queue tab - ON mode

NOTICE

Work Queue.

If the work queue is on, the dynamic locations open and can cause issues at manual sites.

▶ Ensure that the work queue is off.

The **Work Queue** tab shows cycle counts awaiting completion. The operator selects how many virtual locations are assigned to waiting work. The operator can also access **Hot Actions** from this tab.

Note: Cortex gives Work Queue tasks priority over automated work.
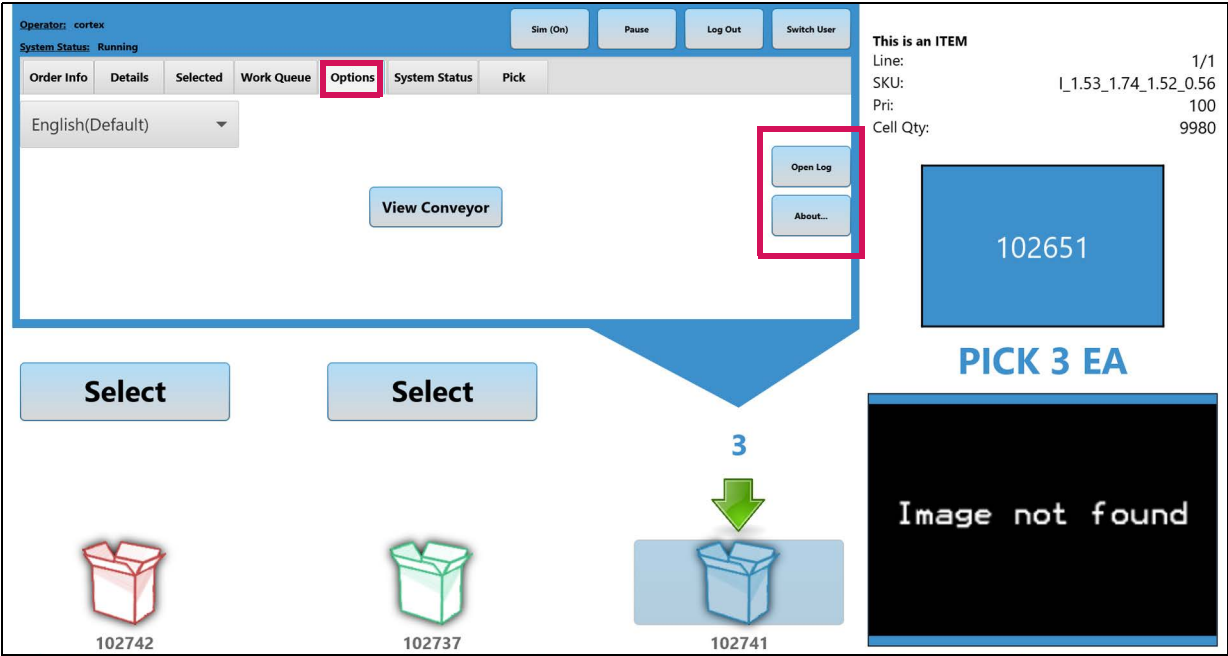
3.5.5 Options

Figure 3-32: Options tab

The operator can use the options to change the system language.

To view the Cortex log, press **Open Log**. To view the software version, press **About**.
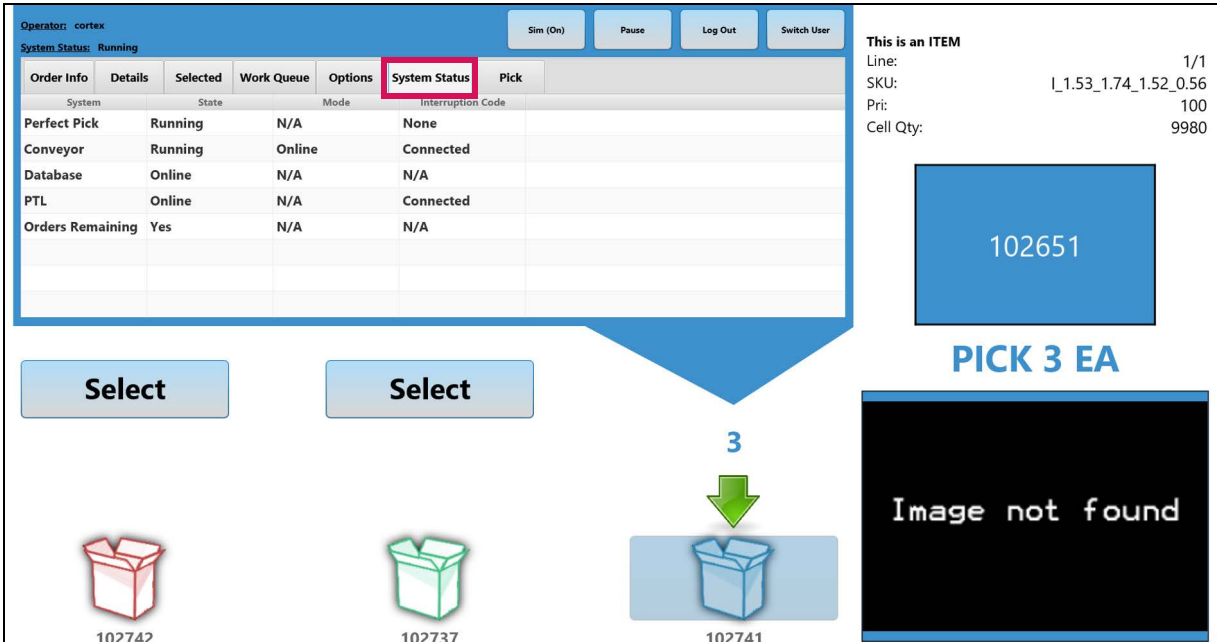
3.5.6 System status

Figure 3-33: System Status tab

The **System Status** tab shows the current status of all connected components. This tab also displays the orders remaining.

3.6 Hot Actions

Important! *Cycle Counts, Audit, and Consolidate retain their totes until complete. The operator must complete these actions.*

3.6.1 Cycle counts

The operator can use the Cycle Counts function to verify product quantities in a tote, and then enter that data into the WUI to update records in the WMS. The Cycle Counts function can complete this workflow independently.

3.6.1.1 Creating cycle counts

The operator can manually create Cycle Counts or through a Cycle Count order.

1. To create a cycle count manually, select the SKU for the item to check or a tote for a specific tote to check. The console populates with all units of measure.

2. Press **Create Cycle Count**. Press **OK** on the dialog that opens. The operator must close this dialog after manually creating a cycle count.

3.6.2 Audit

Audit functions similarly to a Cycle Count, but only checks the totes in relation to an LPN, order number, or a single item orderline. Operators can use Audits to correct orders efficiently, because they do not have to check every tote.

3.6.3 Consolidate

If the same item is scattered between different toes or cells, the operator can use the Consolidate function to move items into a cell or tote with more of those same items. This action frees up totes and cells for new items.

3.6.4 Cubing

The operator can use the Cubing function to correct items with incorrect quantities in a cell.

A remaining work error displays when an item has a bad Cubing quantity, indicating that there is no destination or room for the work.

Note: The minimum cubing value is 1. Do not set the value to 0.

To correct a bad cubing quantity:

1. To confirm the item number in the system, press the **Order Info** tab.

2. Enter the item number in the **Cubing** field, and then press **Edit** to show quantity settings.

3. Make any needed changes, and then press **Commit**.

4. Close the window.

5. To dismiss and remove the order from the queue, press **Dismiss**.

6. To recreate the PUTAWAY request, re-scan or re-enter the item. The item returns to ready for a PUTAWAY without error indicators.

3.6.5 Reprint

The operator can use the Reprint function to reprint labels at the pick station when the original label is unusable.

Reprint is only available at sites with installed labelers. When no labeler is available, Cortex dismisses the order with the **LPN Full** exception. Cortex then reports to the WMS that the product could not fit.

3.6.6 Reconfigure tote

The operator can use the Reconfigure Tote action to change the tote's cell configuration from one cell type to another. OPEX recommends using this at sites with more than two cell configurations.

3.6.7 Sequence

The operator can use the Sequence action allows to select site-specific storage. Changing storage affects the priority of the operator's orderlines.

Select the correct site before completing tasks to prevent induction into the wrong account.

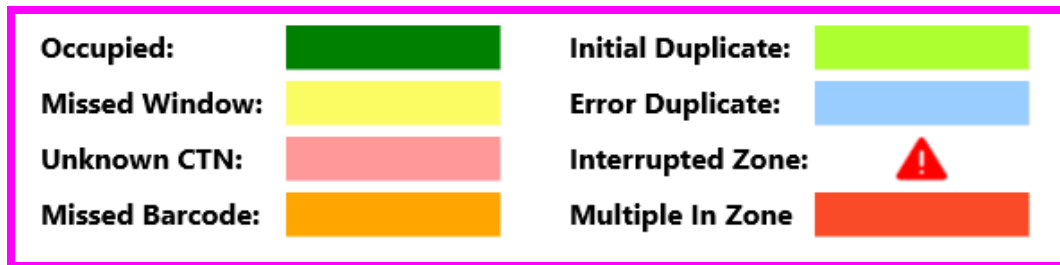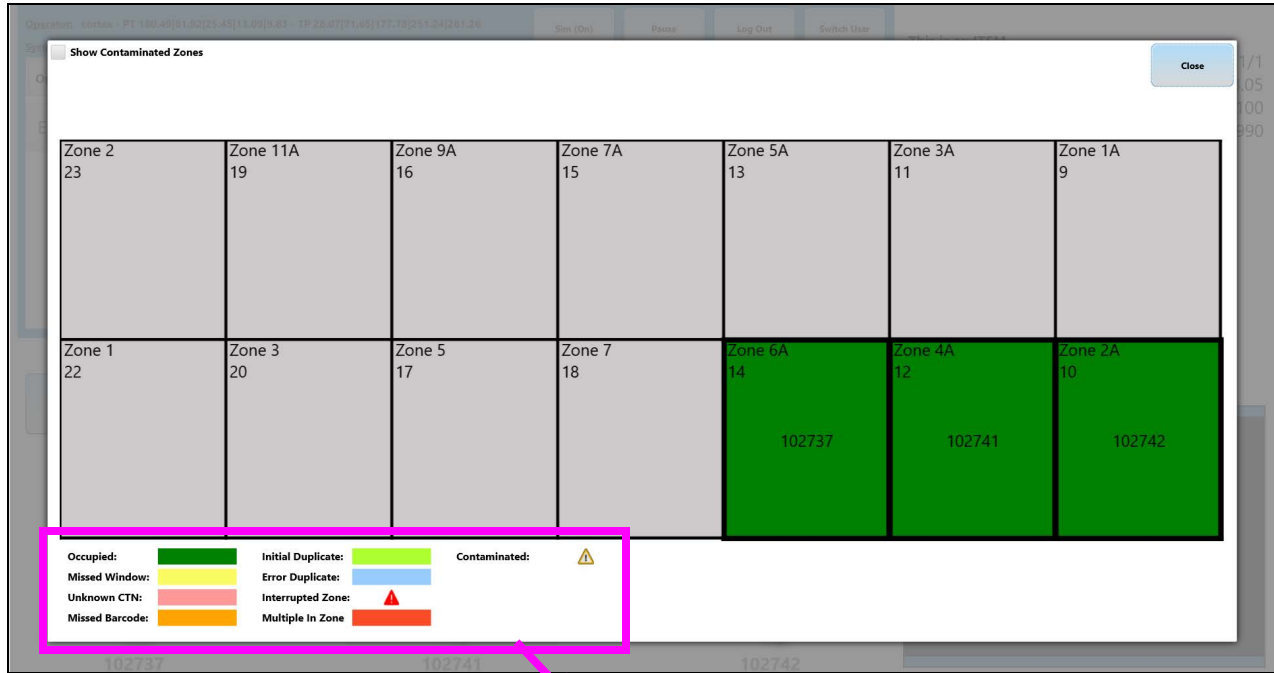**Important!** *Hot Actions take priority over WMS-generated work.*

4. Errors and Exceptions

Cortex®

User Manual

4.1 Overview

This chapter describes resolutions for the most common errors and interruptions that occur on the Cortex® system.

Figure 4-1: Workstation User Interface conveyor view

The operator can identify events with the Workstation User Interface (WUI) conveyor view. This view shows each zone and its status, making errors easy to locate.

4.2 Hardware Issues

4.2.1 Power cycling and wire disconnection

Do not power cycle or disconnect wires from the OPEX workstation or its conveyors. These actions disrupt communication between PLCs and may lead to more downtime, requiring an OPEX technician to fix the issue.

4.2.1.1 Restarting Cortex after power loss

To restart Cortex:

1. The operator can restart the Aisle Controller (AC).

2. The operator can also contact Cortex support or system administrators in case of loss of power.

4.2.2 Workstation conveyor interruption intervention

Workstations and conveyors have a **Stop** or **Start** button, usually located on the shelf. Operators can also use the **Start** button to clear all interrupted zones if all zones return a normal signal.

Light towers serve as a visual alert for changed conditions.

4.3 Workstation User Interface Errors

The WUI overlays an exclamation mark graphic over the pick or put-away with an error. The **Selected** tab provides an error description. The **Order Info** tab might provide details on the items that cause the error.
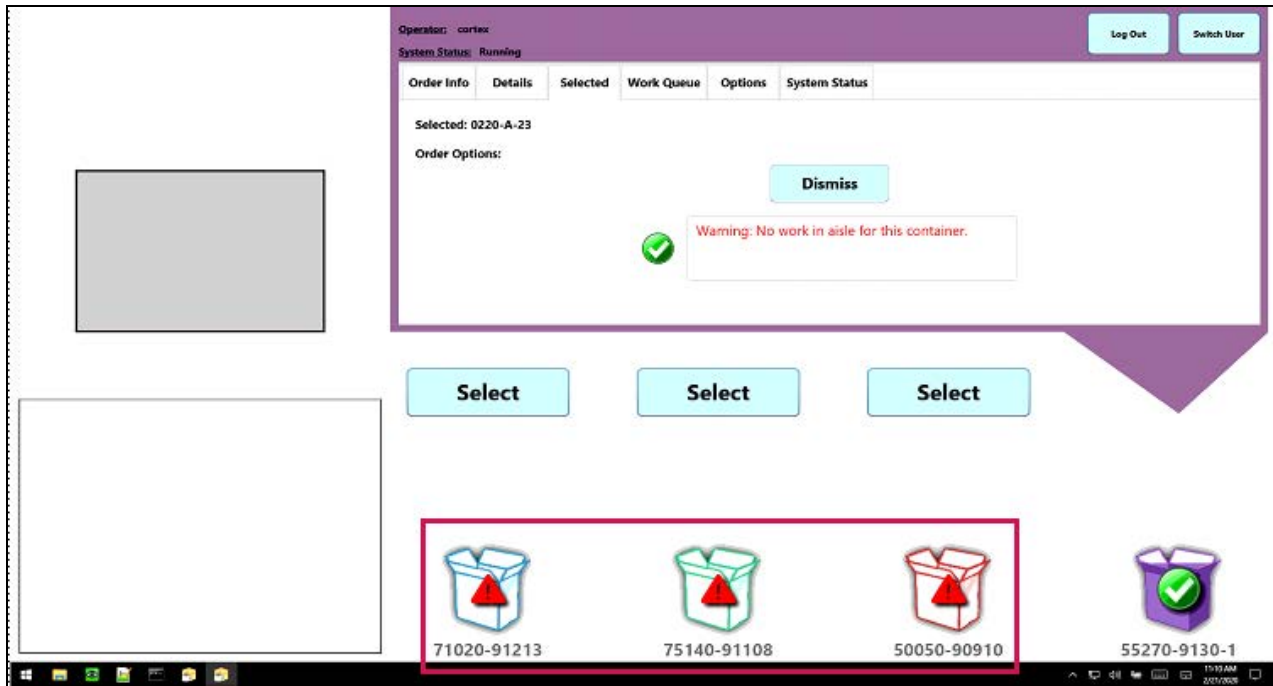

Figure 4-2: Selected tab error description

Table 4-1: Order container warnings and exceptions

Notification	Details
Target cell exists, but layout not found.	
Target cell not found.	
Target cell not found for tote presented.	
Can't complete pick. No inventory for remaining work.	
Can't complete put. No room in aisle for remaining work.	
Can't complete put. No weight for product.	
Can't complete put. No dimensions for product.	
Database error getting the order data.	
Order not found.	
Can't complete cycle count. No inventory for remaining work.	

*Table 4-1: Order container warnings and exceptions*

Notification	Details
All or nothing. Items will be put back in aisle. DO NOT DISMISS CONTAINER!	
Can't complete put-away. No inventory for remaining work.	
Shorted for remaining work.	
No work in aisle for this container.	
Work loading for order.	
Error: Invalid warning type:	Undefined warning should not happen.
No work left, 1 or more order lines SHORTED.	Checkbox.
No work at this station.	Container was not intended for this workstation. Checkbox.

Most of the errors that the user can resolve involve items on the conveyor and in the workstation. The following section below describes errors that only concern the conveyors.

4.4 Conveyor Errors

This section describes how each error displays on the workstation, along with solutions to resolve each error.

4.4.1 Interrupted zone
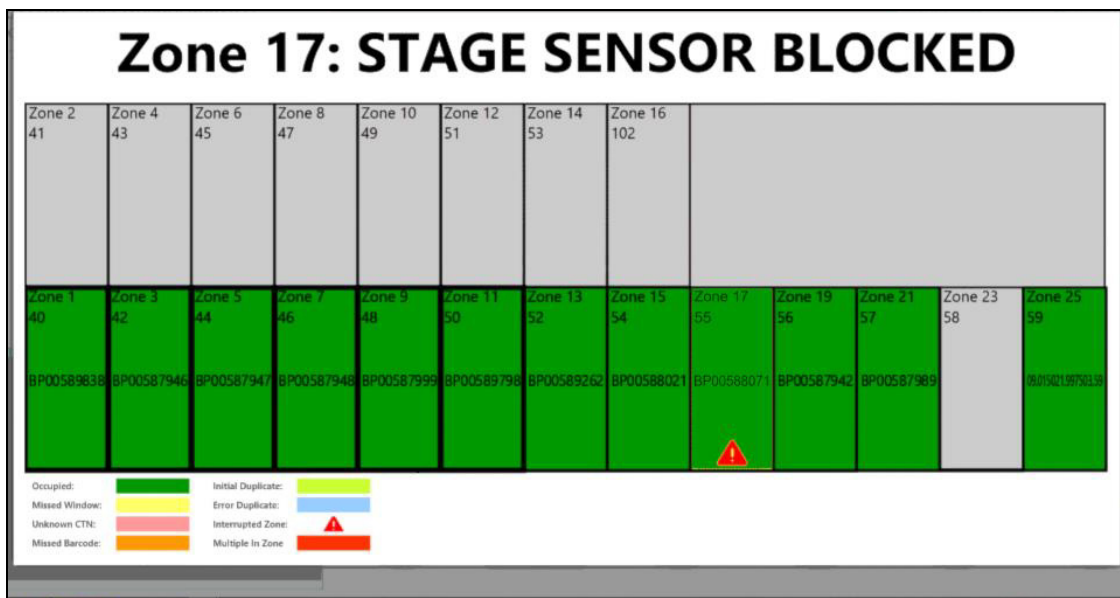

Figure 4-3: Zone stage sensor blocked indicator

An unexpected container is blocking a zone stage sensor. The workstation light tower lights up in red.

Note: If occupied zones surround an interrupted zone, make sure to center the containers in their respective zones around the interrupted zone.

To resolve an Interrupted Zone error:

1. Inspect the affected zone.

2. Make sure that the container is not blocking adjacent zones, and that adjacent zones do not have skewed containers.

3. Find and slide the skewed or misplaced container into the center of the interrupted zone.

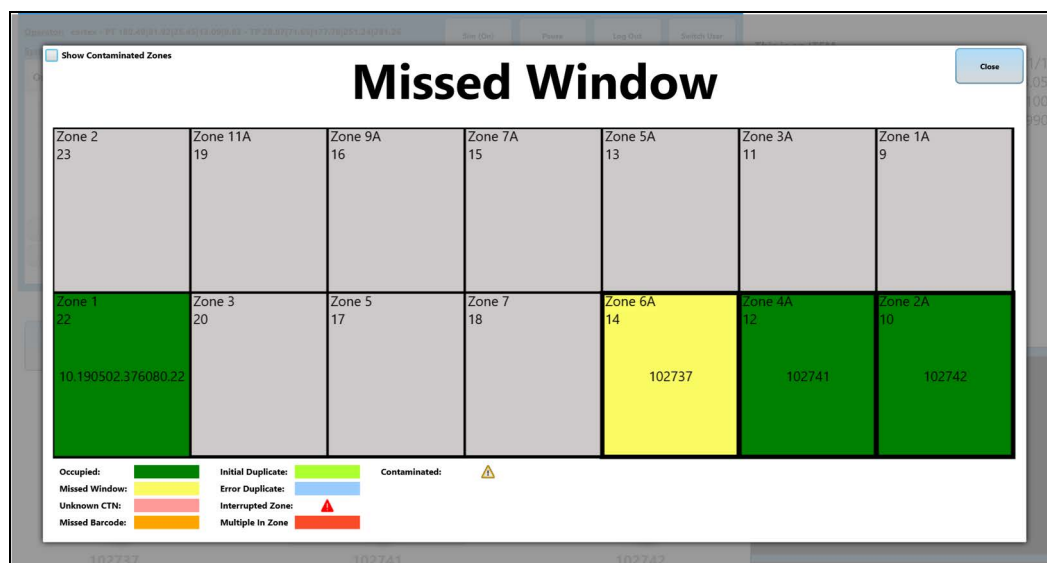4. Press **Start** on the OPEX Workstation or conveyor.

The light tower shows a solid green light after the system resolves the error. The WUI conveyor view then removes the interruption.
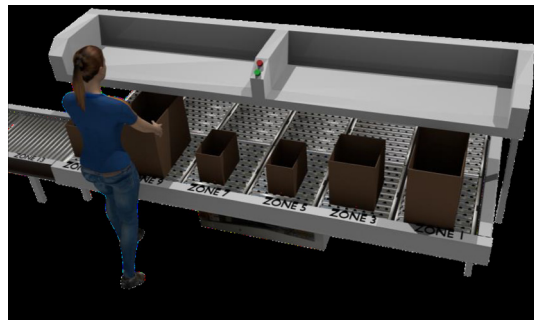
Figure 4-4: Containers on the workstation

4.4.2 Missed window

A sensor did not see the container it was expecting.

Figure 4-5: Missing container yellow zone

The highlighted yellow zone indicates the missing container.

When the system pauses, confirm that the container is in the right location.

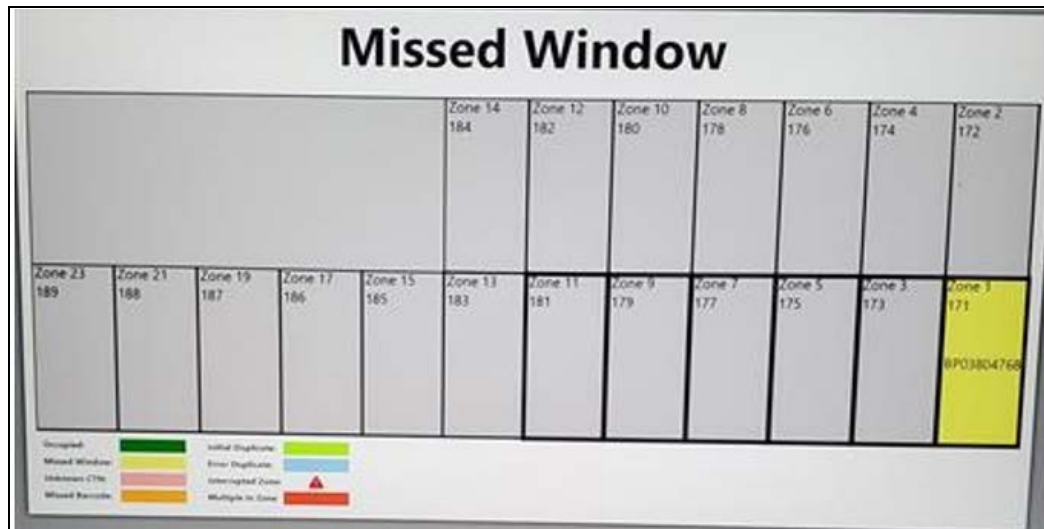## To resolve the missed window:

1. Find and inspect the missed barcode on the container's License Plate Number (LPN). Make sure this number matches the number in the zone on the screen.

2. If the container is in the right location, lift the container up for one second and center it back in the zone. If the workstation does not correct itself, proceed to step 3.
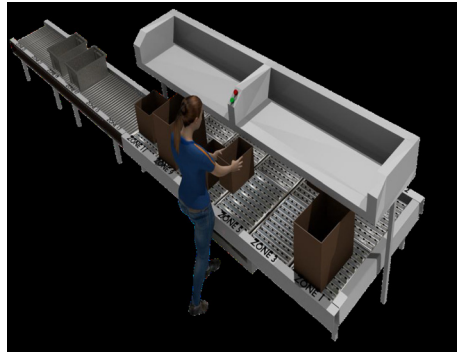
Figure 4-6: Containers in the workstation

3. Remove the container and make sure the zone is clear.

4. Press the missed window on the workstation monitor.

5. Confirm that you want to remove the box from the workstation.

6. Press **Dismiss**.

4.4.3 Interrupted zone with missed window

Figure 4-7: Interrupted zone

An interrupted zone occured alongside a missed window. The light tower displays blue and red.

To resolve this error:

1. Locate any skewed containers in or around the interrupted zone.

2. Lift the container presented in the missed window for one second.

3. Set the container back in the zone. The system auto-corrects and clear both errors.

Note: If Cortex displays a red triangle alert icon, press the Start button on the workstation.

4.4.4 Unknown container
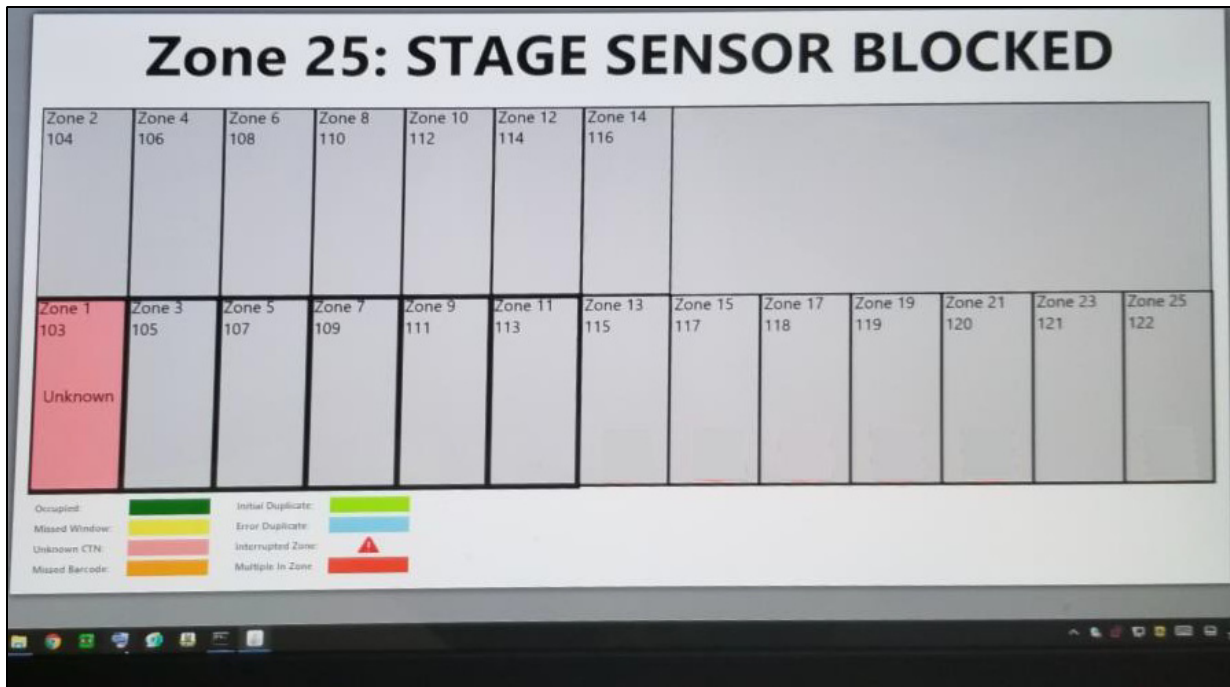
Figure 4-8: Stage sensor block indicator

An object is blocking a sensor, preventing the workstation or conveyor from confirming a zone's contents.

**To resolve this issue:**

1. Remove the container from the unknown zone.

2. Select the unknown container on the WUI.

3. Manually enter or scan the barcode of the container.

4. Set the container back into the zone.

5. Press **Keep**. The system returns to normal operation.

4.4.5 Collision with container

A container slipped and stopped too soon, or slid and stopped too late.

4.4.6 Interruption in scanning solution
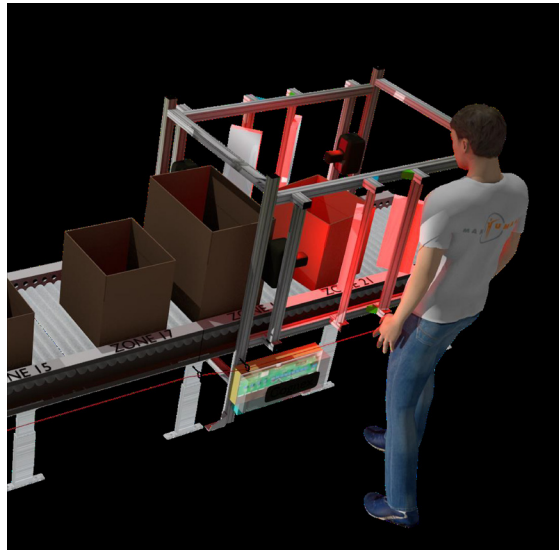
Figure 4-9: Interruption in scanning solution

An interruption occurred in the scanning solution. Remove the container, and then place it in the recirculation loop or back on the inbound conveyor. This allows the scanning solution to reread the barcode on the LPN.

4.4.7 Duplicate license plate number
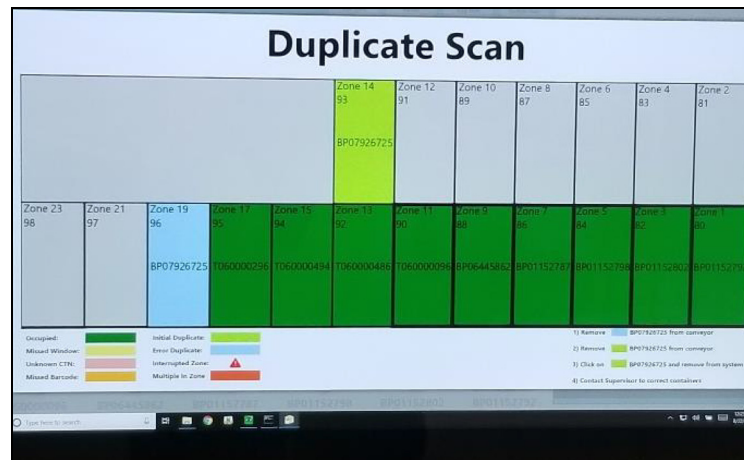
Figure 4-10: Duplicate scan indicator

Only one unique LPN can exist at a time. Duplicates happen when large orders are broken up into multiple containers. This error occurs when the system places the containers on the conveyors too soon and enter the workstation.

To resolve this issue, remove the duplicate light blue LPN on the screen, and then dismiss the container.

4.4.8 Missed barcode read
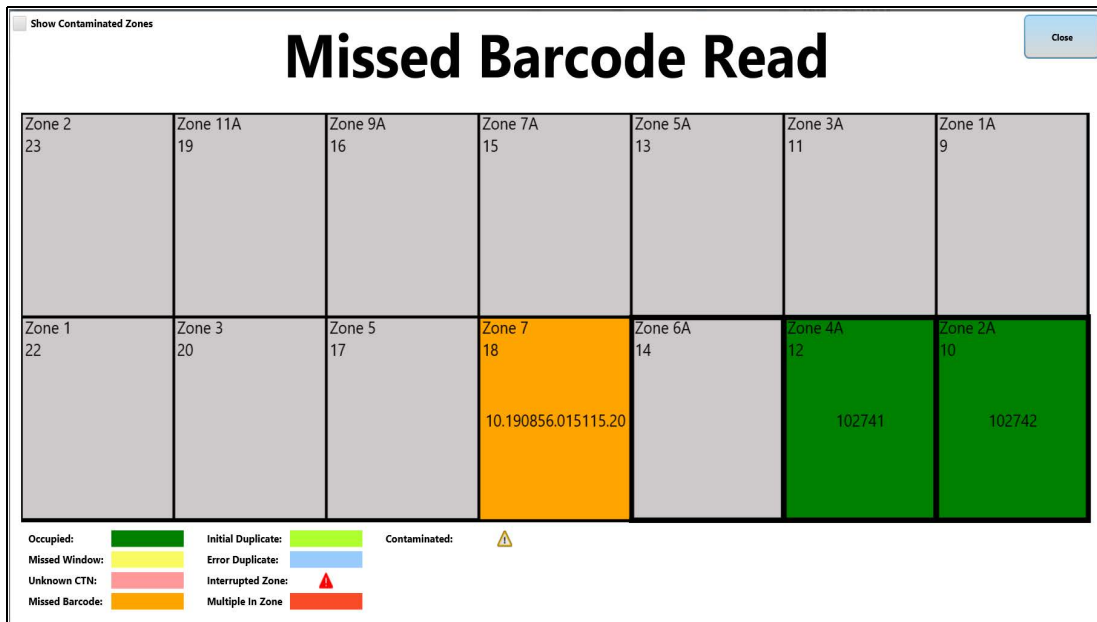
Figure 4-11: Missed barcode read indicator

The system failed to recognize the label on a container. Blemishes, dust, vibration, and bad angles can prevent the camera from scanning the barcode on the LPN.

To resolve this error:

1. From the orange zone on the WUI, select the missed barcode. The MISSED BARCODE READ window opens.

2. From the **Enter License Plate** field, scan or type the barcode label.
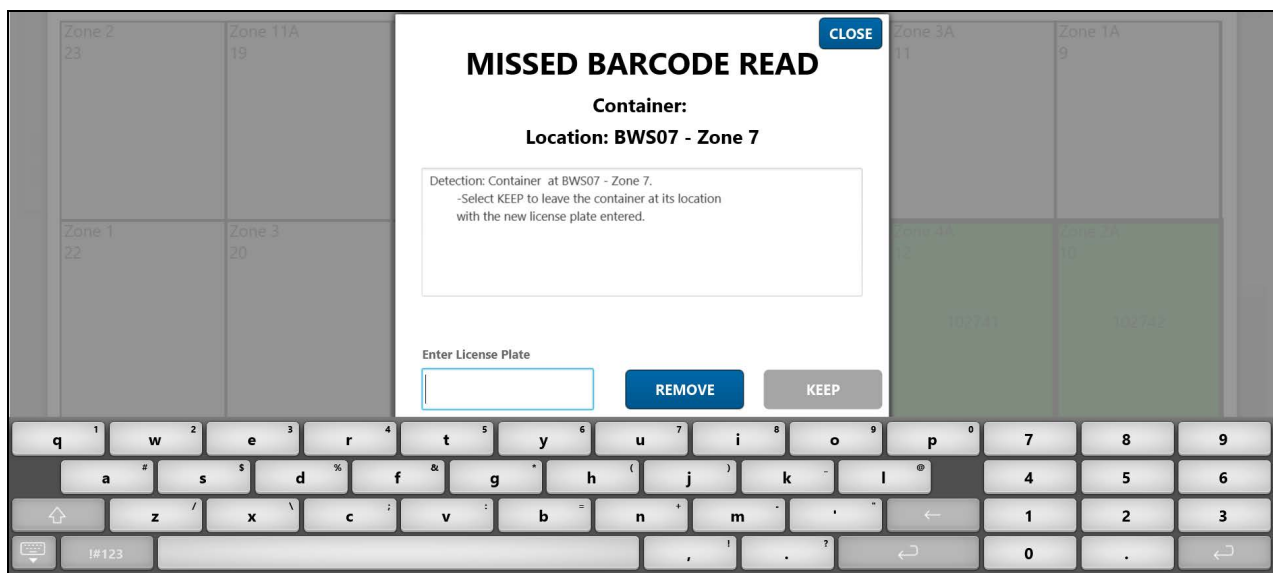
Figure 4-12: MISSED BARCODE READ window

3. Press **KEEP**.

4.4.9 Outbound zone interruptions

In general, the inbound and outbound zones handle all interruptions in the same method, except when containers physically move to the outbound side for correction.

Depending on container weight, you can press the **Start** button and slide the container into the next zone. The container then automatically continues to drive out, leaving a missed window to dismiss.

6. Glossary

Cortex®

User Manual

6.1 List of Acronyms and Terms

6.1.1 Acronyms

AC—Aisle Controller

API—Application Programming Interface

FEFO—First-expiry-first-out

FIFO—First-in-first-out

LPN—License Plate Number

OCI—Order Creation Interface

PTL—Pick-to-Light

UOM—Units of Measure

WAC—Warehouse Automation Configuration

WMS—Warehouse Management System

WRTC—Warehouse Real-Time Controller

WUI—Workstation User Interface

6.1.2 Terms

Automated workstation—where order containers are automatically brought and removed from the pick area

Barcode—bars that convert to numbers that can be associated with an orderline

Bin—subsections of a tote or container

Cell projector—An optional overhead projector that indicates, on the tote, where a product is located

Cycle Count—inspection of items in an aisle for inventory alignment and verification. Items are physically counted in a tote; discrepancies are noted in the WUI.

Daily Statistics Report—report that highlights key operation metrics for the system

Hot Actions—ad-hoc method to trigger or build up a work queue of manual picking or replenishment

iBOT—robot in the Perfect Pick system that retrieves totes and brings them to the operator

License Plate Number—unique identifier for a container into which items will be picked from or for which items will be replenished

Order Creation Interface—API used by customers to send orderlines to Cortex. Implemented via database-to-database message transfers

Orderline—fulfillment operation or inventory-verification operation for a quantity of a single SKU

Pick-to-Light—modules that visually indicate the location of a fulfillment container and the quantity of items to pick or put away. PTL will display the same colors as the WUI and cell projection lights.

Printer—device used to produce tags, LPNs, packing lists, and other documents. Setups can have printers that solely print labels.

Table Mode—allows manual work triggering via scanning to PTL locations when no Automated Workstation is present

Tote—box that stores content within the machine

Warehouse Configurator—tool to build and modify Cortex central configuration parameters

Warehouse Management System—customer's software system that manages its warehouse inventory and operations

Warehouse Real-Time Controller—software that drives automation components at a Cortex workstation, such as sensors, conveyors, PTL modules, and other devices

Work Queue—a queue of all work items to be completed at a workstation. Can include work associated with a physical LPN (picking and replenishing) and a logical LPN (cycle counts).

Workstation User Interface—graphical user interface shown on a Cortex workstation screen

About OPEX Corporation

OPEX® Corporation is more than a manufacturer of machines. We continuously reimagine technology to power the future for our customers.

With an innovative approach, we engineer unique automated solutions that support our customers so they can solve the most pressing business challenges for both today and tomorrow. Our scalable Warehouse, Document, and Mail Automation solutions improve workflow, accelerate change, and drive efficiencies in infrastructure.

We are a family-owned and operated organization with more than 1,200 committed employees who innovate, manufacture, install, and service products that are helping transform the industry every day. We listen to our customers, respect each other, and work together to help reimagine the future through automated solutions.

At OPEX, we are Next Generation Automation.

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