

**BellHawk Materials Tracking Software User Manual****Table of Contents**

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Introduction

This manual covers how to use the BellHawk Materials Tracking Software (MTS) features of the BellHawk Real-Time Operations Tracking Software (RT-OPS). These MTS features are also available as the BellHawk License-Plate Tracking Software (LP-MTS) which is a subset of RT-OPS.

This manual assumes that users have read the "Introduction to BellHawk" User Manual.

Overview

The BellHawk Materials Tracking Software (MTS) uses barcode scanning and mobile computing technology, combined with license-plate container tracking methods, to track materials in real-time. These materials may include raw, intermediate, and finished goods inventory in warehouses and stock rooms, work-in-process in manufacturing operations, and materials and assets at multiple geographic locations, as well as in vehicles.



MTS is designed for use in manufacturing, engineering, construction, laboratory, medical, and repair organizations as well as in industrial warehouses and distribution centers. MTS can also be used as part of food and pharmaceutical supply chain solutions where maintaining and reporting materials traceability records is of paramount importance.

One major benefit of MTS is that materials can be tracked in real-time at multiple geographic locations including in warehouses, stock rooms, construction sites, manufacturing plants, and field maintenance sites.

License-Plate Tracking of Materials

Unlike ERP or Accounting systems, BellHawk does not directly track inventory. Instead it tracks individual containers of material. It then can deduce the quantity of inventory in stock by adding up the quantities of materials in individual containers.

The benefit of this is that BellHawk can not only track the quantity of materials in each containers but also the lot number and expiration date of the materials plus its location, who supplied or made it, its rolled up cost and other data such as its Quality Control status as well as attributes such as color and size.

The concept behind license-plate tracking is that a unique tracking barcode is applied to each container and then all the information about the container is stored in a database, where it can quickly be accessed. Also data about that container, such as its location and the contents of the container, can quickly be changed by scanning the tracking barcode on the container.



This is similar to the way that delivery organizations such as FedEx or UPS track deliveries they make for organizations like Amazon. Here the "license-plate" tracking number is a string of letters and numbers, in a barcode, that is scanned whenever the container moves, so you can see exactly where your package is, until it is delivered to your organization or home.



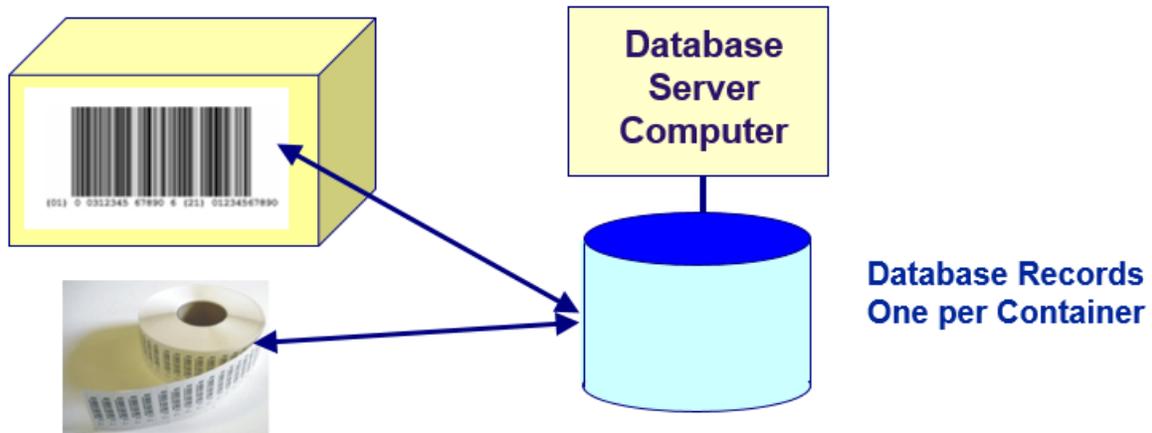
This concept of putting a unique barcode on each container or item that you wish to track is the Global Standards One (GS1) standard for tracking materials in the supply chain world-wide. This standard been adopted by agencies such as the Food and Drug Administration (FDA) and the Department of Defence (DoD) for supply chain tracking and materials traceability.



License plate tracking gets its name from what happens at the registry of motor vehicles when you go there to register a new car or truck. They hand you a license plate with a unique set of letters and numbers and the state of issue marked on the plate. The license plate number is unique but otherwise is just a random set of letters and numbers. All the data about your car or truck is stored in a database so that, when you get pulled over for speeding, the police officer simply reaches over to his on-board computer and types in your license plate number and is able to see all the information about your car or truck.

Note that the license-plate is not changed every-time there are new people or goods in the car or truck. The same applies to tracking containers of material. The license-plate stays the same until the container is discarded.

We use a similar principal for license-plate tracking of materials except that we put a unique tracking barcode or RFID tag on each container instead of an aluminum license plate. Note this is very different from using barcodes with data such as item number, quantity, and lot number on each container. With license-plate tracking all the data is kept in a database and the tracking barcode is simply a reference to the database record.



The benefit of this is that data such as location and container contents can be changed as-needed without replacing the barcode on the container.

The license-plate tracking barcode may be as complex as a GS1 composite barcode, printed on-demand, with a GTIN, Lot Number, and Serial number, for use in the Global supply chain, or as simple as a barcode taken from a pre-printed roll of serialized barcodes, such as that shown here., for internal use within the plant. The license-plate tracking barcode may also contain an RFID chip with the same tracking number or a separate ruggedized RFID tag may be used depending on the application.



GS1 compliant tracking barcodes are used for Serialized Shipping Container Code (SSCC) barcodes which uniquely identify the containers to which they are attached on a world-wide basis. This enables a shipper to record what materials were placed in on a pallet in China and send the information related to a warehouse in the USA in the form of an ASN (Advanced Shipment Notice). When the materials are received in the USA all that is necessary is to scan the SSCC license-plate barcode to receive the materials without first breaking down the pallet.

GS1 compliant DSCSA license-plate tracking barcodes are also used to track pharmaceuticals in the supply chain to help prevent counterfeit drugs.

As well as being placed on containers, license plate tracking barcodes are placed on items that are not in containers. Examples include large electric motors and other electro-mechanical assemblies which may need to be tracked independent of being in an external container. These individually barcoded items may also have serial numbers which may be used as their tracking barcodes or the serial numbers may be different.



The information about each container is kept within the Containers table in BellHawk, which is central to its ability to track materials. Each record contains the tracking barcode, the item number, the quantity in the container, the lot number, serial number, expiration date, location and many other data fields such as the type of container. Note that this is different from tracking the quantity of inventory at a location as BellHawk can track many different containers at many location.

Some types of container are obvious, such as boxes, pallets, and totes. Others are not so obvious, such as reels and rolls, which contain a quantity of an item. These can be treated as a container with so many feet, for example, of material, or as individually barcoded items where dimensions such as length, width, and thickness may be treated as attributes of the individually barcoded item.

BellHawk MTS also has the ability to track reusable containers, such as totes and carts, which typically have permanent metal tracking barcodes attached. BellHawk can track a succession of different materials placed in these containers, as they are emptied and reused, without the need to apply a new barcode.

BellHawk MTS can be used to track the movement of work-in-process (WIP) materials from work-center to work-center. Typically these WIP materials are tracked in reusable containers or have individual tracking barcodes attached.

BellHawk MTS can also track Assets which have a license-plate tracking barcode, and/or RFID tag attached. It can track the issuance of these assets to a person or to a location, and their return. This can include recording tools that are kept on field service vehicles.

What does MTS track?

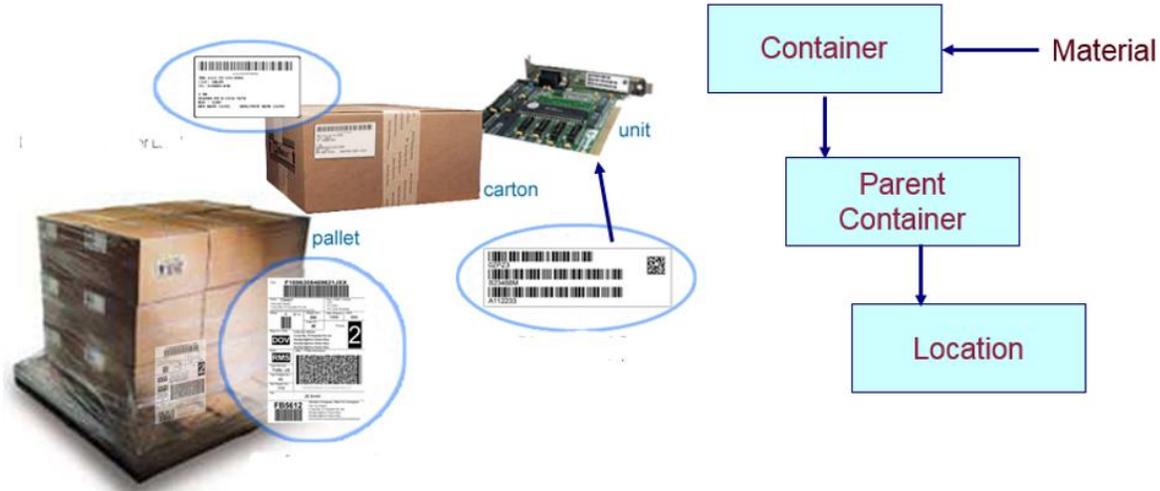
MTS tracks the following:

- Entry into inventory and withdrawal of materials by part number, lot number, serial number, and expiration date.
- Real-time tracking of the location and movement of materials, including the movement of materials between facilities and movement of materials to construction sites and return from site.
- Receipt and tracking of materials in barcoded bins or shelves, and in/on barcoded boxes, reels, rolls, barrels, and pallets.
- Receipt and tracking of serial numbered parts.
- Issuance of materials for production, assembly, or for installation and the return of unused materials to stock.
- Barcoded tracking of nested containers such as boxes on pallets.
- Shipping of materials to customers.
- Tracking the work-in-process status of serialized items as they travel through a sequence of manufacturing, repair, or test operations.



- Tracking of assets, such as tools, in stock rooms, on vehicles, as well as issued to departments or individual people.

How BellHawk MTS Tracks Materials



BellHawk MTS tracks inventory as containers of material at locations. Each container may have a unique license-plate tracking barcode and each location also has a unique location barcode or generic "name" location. This data is stored in the Containers table within BellHawk.

Examples of physical containers tracked by BellHawk include boxes, cartons, pallets, and barrels. They can also be rolls and reels of material. Containers can be:

1. Limited to hold material with a quantity of parts having a single item number and lot number – these are referred to as “Single Use” or “Type 1” containers. The container record also carry along the expiration date and QC status of materials in the container as well as special User Defined Item Configuration Parameters for the materials in the container such as dimensions and color.
2. Able to hold multiple different types of material with multiple lot numbers – these are referred to a “multi use” or Type 2 Containers. These containers have a tracking barcode and act as parent containers for other containers. The child container records carry along a reference to the parent container record (if there is one). It is always more efficient to use Type 1 containers when the container will have a tracking barcode and only hold a single type of material.
3. Virtual – these behave identically to Type 1 containers except that they do not have a tracking barcode. They are used to represent "loose" materials, or containers of material that do not have tracking barcodes, at a location or stored within a parent container. Virtual containers are tracked using an internal code rather than a physical barcode that can be scanned. As a result they have to be selected from a drop-down list rather than simply scanning their tracking barcode to identify the container.
4. Individually barcoded items. These have a unit quantity and normally have a serial number. Note that this is different from a barcoded roll or reel of material, which is

typically considered to be container with a given quantity of material that can change as material is removed from the roll or reel. These individually barcoded items are considered a special case of Type 1 containers.

Type 1 and virtual containers can be tracked inside Type 2 containers, which can be nested inside each other – moving the outermost container to a new location moves all containers nested within it. The location of the inner containers are their next outermost “parent” container.

As well as the item number and quantity, the data record for Type 1 and virtual containers can also carry along the lot number, the expiration date and the Quality Assurance status (if the QC module is being used) for the single material they contain.

BellHawk does not track the inventory of materials per se. Instead it tracks these containers of material and adds up the quantities of material if needed to determine the quantity of inventory of a specific item in stock.

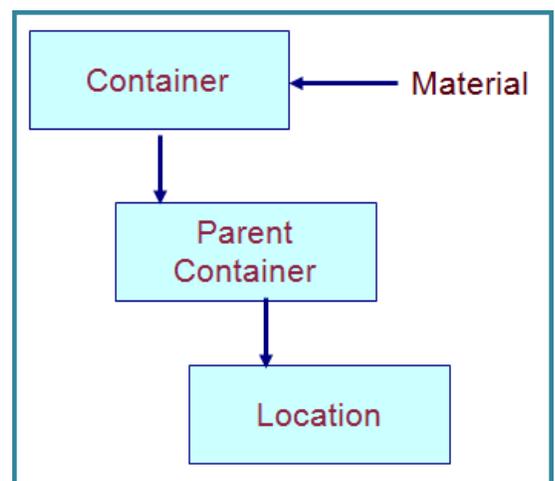
If a container contains material that is in-process within a work order it has its “WIP” flag set on “on”. As a result this material is not considered as part of standard inventory but is considered to be part of WIP inventory. This is so that WIP material can use the same item number as the finished item but will not be confused with finished goods inventory that is ready to use or ship.

Containers of material can be designated as customer owned material. These are treated just like any other containers but inventory transactions on the contents of these containers are not typically relayed to an accounting or ERP system, as they have no impact on the financial status of the company. This avoids the problem of trying to carry along materials as zero value inventory in an accounting system which falls apart when the same materials can both be customer owned and owned by the company.

Container types are setup as described in the setup section of this manual. This section also describes how to setup location barcodes as physical rack and floor locations as well as setting them up in BellHawk. This manual also describes how to setup generic locations such as “Receiving” and “Production” which are selected from a drop-down list rather than by scanning a location barcode.

BellHawk tracks its materials in a containers table. In this table:

1. Real or virtual Type 1 Containers occupy a single record with item number, quantity, location, and lot number, as well as expiration date and application specific parameters.
2. Type 2 Containers are a parent container record with the location and container type. Real or virtual Type 1 containers then each have a parent record pointer, pointing to the record for the parent container in which they are nested.



Virtual containers do not have a container type or tracking barcode. This makes these untagged materials harder to manipulate, as they have to be looked-up

from drop-down lists of materials after scanning their parent container barcode or location barcode. For this reason, wherever possible, it is recommended that barcoded Type 1 containers be used as these containers can be identified simply by scanning their tracking barcodes during transactional data entry.

The usual exceptions to this are totes containing kits of items for work orders and shipping containers, such as pallets, loaded with different items for shipment to a customer. These can be recorded as shipped to a customer by simply scanning the tracking barcode on the Type 2 container.

Location Barcodes

Location Barcodes are special license-plate tracking barcodes that are applied to physical locations rather than to movable containers. They have to be unique and different from the barcode labels used to track containers or individually barcoded items. For this reason, internally used rolls of container tracking barcodes have a barcode starting with # and GS1 barcodes as start with an FNC1 symbol so as to avoid confusion.

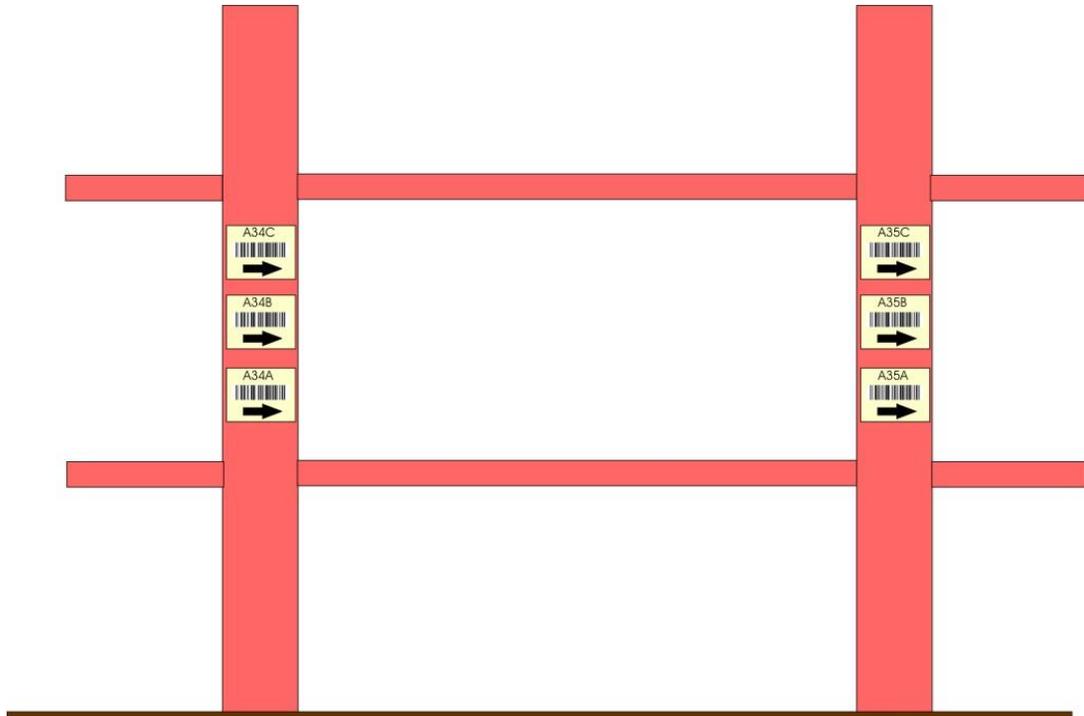
One of the major tasks in setting up a warehouse or stockroom tracking system is to put location barcodes on shelves and on floor marker posts, as well as possibly on large retro-reflective barcodes hung over floor locations. The locations should be given codes such as “A35C” (for aisle A row 35 shelf C) so that they are easy to remember.

Location barcodes used in stock rooms are typically at least 2 inches wide with at least a quarter inch of white space each side. They should be printed at 15 mil resolution for ease of scanning. These barcodes are typically placed in the middle of each shelf.

If bins are used within a stockroom then these can be given individual location barcodes. Alternately, if you have many different bins on a shelf, then it might be preferable to treat the bins as containers (with container tracking barcodes) at the shelf location. In this way, the bins can be moved around simply by scanning their move to another location. Also boxes and other containers in which materials are received can be used as temporary bins.



The barcodes used for shelf locations in warehouses should be at least 3 inches wide with three eighths of an inch of white space either side and have 20 mil resolution barcodes so they are easy to scan from a distance. They should be placed on the uprights of racking one above the other at about eye level, as shown below:



Do not attempt to place the barcodes on the warehouse shelves (as you would in a stock room) as they can be very hard to scan if they are 20 feet in the air. Material handlers are able to easily associate barcodes with shelves when placed as shown below. Also place the barcodes in a “picket fence” orientation as shown. If placed in a “ladder” orientation with the stripes running horizontally, the barcodes are ergonomically difficult to scan as they require twisting the scanner through a 90 degree angle.

For floor locations, barcodes may be hung over the floor locations. These are typically hung at the 20 foot level to allow pallets to be stacked. They are printed on a retro-reflective material and are typically 12 inches wide with a 100 mil resolution barcode. The material handlers need to be equipped with mobile computers that have scanners which are capable of scanning these barcodes at a range of at least 35 feet due to the angle at which these are scanned. These barcodes are typically placed on a plastic backing so they hang at about a 30 degree angle from the vertical, thus making them easier to scan.





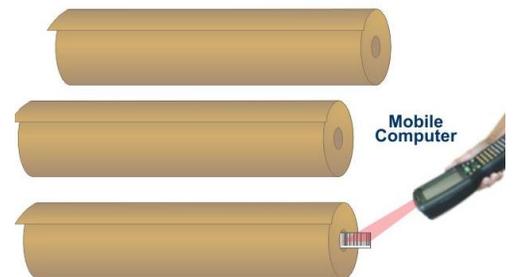
In yards and indoor floor storage locations, location barcodes can be placed on posts with heavy bases or on fiberglass whips (such as used for snow plow markers) such that they will not get damaged when the fork-lift truck drivers run into them. In this case, barcodes about the same size as used on warehouse racks work well. If used outside, they do however need to be printed on a plastic base with a UV resistant resin ribbon if they are to survive for a long time outdoors.

In general the use of floor marker posts is recommended as they are easier to scan than overhead barcodes and can be moved, if needed, if floor locations are changed in the warehouse due to changing storage requirements.

The easiest way to set up these location barcodes is to prepare an Excel spreadsheet with all the location codes and descriptions in a format suitable for doing an import into BellHawk (see section of this manual on importing data). This spreadsheet can then be used with a barcode label printing program to print out the labels. It can also be imported as an Excel file into BellHawk to set up all your locations.

Container Types

In order to use BellHawk MTS, you will need to setup Container types such as box, bag, barrel, can, tote, carton and pallet. These can be imported in Excel spreadsheet format or setup through user interface screens. Please note that rolls and reels are also considered to be containers, even though the material is on a core rather than inside the container.



Different container types can be setup to have different properties:

- Is Multi Use (Y/N) – can this type of container hold multiple different parts or parts from different lots or parts with different expiration dates.
- Discard When Empty (Y/N) – should the container be considered discarded when the quantity in or on the container goes to zero.

Please note that BellHawk supports single-use and multi-use containers. Single use containers can only contain material with a single part number, lot number, expiration date and quality control status. They are the preferred type of container for tracking lot controlled material as users are prevented from mixing materials that should be kept separate.

Multi-use containers are typically used for shipping cartons and pallets, where different parts may be mixed in/on the same container.

The major reason for tracking material in single-use-containers is that the part number and lot number can be entered once and associated with the tracking barcode on the container. Thereafter transactions on the container simply need to scan the tracking barcode to record all this information.

If, however, the material is placed in a mixed use container or location, with multiple parts and lots mixed together then the material with the correct part number and lot number have to be selected from a drop-down list if any action (such as a move) is to be recorded on that material. So it is preferable to use single-use containers wherever possible as they only require scanning a barcode on the container to select the correct material.

Item Master Records

Item Master Part records in BellHawk are used to describe:

- Raw Materials – Inventoried items (Category = RAW) that are purchased from suppliers or supplied by customers for your organization to process into finished goods. Some food processors add a Category = Ingredients for the produce they consume to make their products.
- Intermediate Materials – Inventoried items (Category = INTERMEDIATE) that you make from raw materials and that are further processed into finished goods by your company.
- Finished Goods – Inventory items (Category = FINISHED) that you make and/or distribute. They may be made in your manufacturing facility or simply received for distribution.
- Individually barcoded parts, typically with a serial number. These are items such as electro-mechanical components, sub-assemblies or assemblies that are tracked individually rather than by lot in a container. They may be given a category of raw, intermediate or finished as appropriate.
- Work-in-Process – here we typically use the intermediate or finished goods part number but set the WIP flag on for the individually barcoded parts or containers of material to indicate that the parts are being worked on and are not to be considered part of regular inventory.
- Scrap - Inventoried materials (Category = SCRAP) that are byproducts of normal production processes. These may or may not be tracked as inventoried items.

Each item master part has an alphanumeric part number, such as “ABC123”. This can be up to 20 alphanumeric characters in length. Part numbers cannot contain any punctuation or special characters except for the pound (#), dash(-) or underline (_) characters.

In the BellHawk software, we use the convention of using the “>” symbol to separate the revision number from the part number, as in “ABC123>5” for revision 5 of part ABC123. This then enables the MilramX automated-data-exchange-interface to easily communicate with ERP systems that identify parts by separate part and revision numbers.

Item Master parts can be marked as Inventoried or Non-Inventoried parts. Inventoried items are tracked by location and container. Non-inventory items are simply recoded as quantities in or out. These are typically used for scrap, where it is simply required to record the quantity out from an operation with no further tracking. They can also be used for other items, such as recording shipping and handling charges on a customer order.

Setting up the MTS Knowledge Base

BellHawk is based on the concept that there is a trade-off between how smart a system is and how easy it is for users to capture data as part of their operational activities. In BellHawk this "smarts" is in the form of its knowledge-base, which is setup using Excel imports and setup screens, depending on whether the data only changes slowly over time or needs to be updated more frequently.

In BellHawk data objects in its knowledge base are represented externally in the form of High Level Data Objects (HLDOs), which consist of a keyword, such as "CTYPE" and a set of name-value pairs, which have parameter names such as "ContainerType" and "ContainerDescription". This makes it easy to import and export this data in the form of Excel spreadsheets. It also provides a simple format in which data can be exchanged with other systems.

This document describes in detail how to setup different types of High Level Data Objects (HLDOs) including:

1. Locations where materials are stored and how they relate to manufacturing plants as well as facilities, such as warehouses, and work centers.
2. Facilities, which are used to group locations for reporting purposes.
3. Container types, such as bags, cans, reels and rolls, and their properties.
4. Units of measure and their measure types. BellHawk works with multiple units of measure and this data enables BellHawk to translate between them.
5. Item Categories and Material Types
6. Item Master Part Records.
7. Inventory adjustment reasons and scrap reasons.
8. Customers and suppliers.

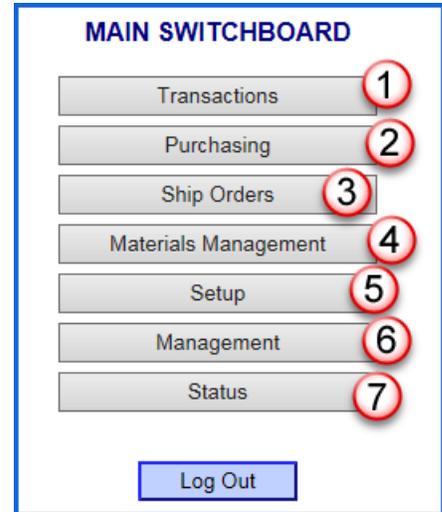
In order to setup the knowledge base, you will need to have the system administrator assign you setup privileges, in order to access the Setup Switchboard. The exceptions to this are the Customers and the Suppliers which can also be accessed by staff with Sales and Purchasing privileges.

This manual assumes the reader has previously read the Introduction to BellHawk User Manual as the material in that manual will not be repeated here. This includes how to import and export HLDO data using Excel spreadsheets.

Getting Started

After they login, a staff person or manager will see the Main Switchboard. On this screen they may see:

1. The Transactions button (1) if they are scan-enabled. If not then this will be hidden.
2. The Purchasing button (2) through which staff with a Purchasing role can setup vendors. If MTS is used with the optional PO Receiving module then this button will also allow entry/editing of purchase orders.
3. The Ship Orders button (3) through which a staff member with a Sales role can setup customers. If MTS is used with the optional Ship Order module then this can also be used to enter and manage Ship Orders.
4. The Materials Management button (4) which leads to the main screen through which the status of all materials can be seen and reports generated. This is for use by staff with a materials management role, who can also setup and edit Item Master records through this screen.
5. The Setup button (5), if they have a Setup role. This is the screen for general setup and editing of all HLDOs that are accessible to operational staff and managers.
6. A Management button (6), if they have a senior management role, which enables these managers to generate Excel exports and reports available to all other roles as well as to see sensitive reports which may be restricted to senior management.
7. A Status button (7) which provides access to data that can be seen by all staff/managers, all operators, and all view-only users. This data will vary with each of these sets of users and, in the case of view only users, which customer or supplier data they are allowed to see.

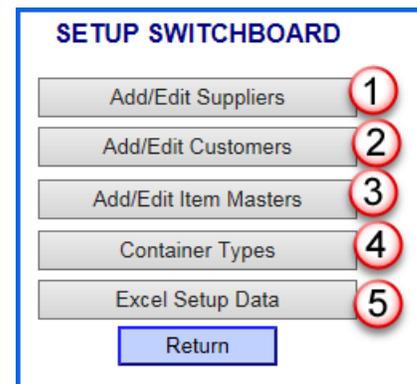


When the Setup button is selected the screen shown at right appears. On this screen, the setup screens for Suppliers (1), Customers (2), Item Master Parts (3), Route Templates (4) and Container Types (5) can be setup using interactive screens. Which of these is shown depends on the BellHawk base system being used.

Other setup data can be imported using the screens accessible through the Excel Setup Data button (6). The Excel Setup Data screen can also be used to export setup data and also to import supplier, customer and item master data.

Please note:

1. Customer and Supplier Addresses can only be setup through the Supplier (1) and Customer (2) buttons, if the SO and PO modules have been licensed, respectively. Their setup is explained in the User Manuals for these modules.



- The setup and use of Routes is explained in the Simple and Advanced Production Tracking User Manuals.

When you are finished with your setup, you can select the blue Return button to return to the prior screen.

Importing Locations and Facilities into BellHawk

Locations are where materials are stored, usually in containers.

BellHawk has a hierarchical view of locations. At the top level is the plant, which has its own database and web-browser interface. This is so that people or users accessing the software associated with each plant normally only see operations and materials associated with their plant.

Within each plant, all locations must have a unique code and an associated description. These locations may be associated with Facilities, such as warehouses.

The plant name associated with each BellHawk database is specified as part of the Company setup screen.

The FacilityCode entry is an optional attribute to a location. Facilities are setup using their own HLDO Excel import as shown below:

FACILITY	FacilityCode	FacilityDescription
	Production	Production
	Warehouse	Warehouse

Facility codes must be unique within a plant database.

Locations are typically marked with unique location barcodes but may also just be given names, when they are referred to as Generic location. Examples are “Receiving” and “Shipping”. These generic locations are not scanned but instead are selected from a drop-down list.

LOCATION	LocationCode	LocationDescription	FacilityCode	IsGeneric	IsReceiving
	#01504	Warehouse #01504	Warehouse	N	N
1	#01506	Warehouse #01506	Warehouse	N	N
	#01513	Warehouse #01513	Warehouse	N	N
	#01516	Warehouse #01516	Warehouse	N	N
	DockA	Dock A	Warehouse	Y	N
	DockB	Dock B	Warehouse	Y	N
	MRB	Material Review Area	Warehouse	Y	Y
	Production	Production	Production	Y	N
	QC	QC Dept	Production	Y	Y
	Receiving	Receiving Dock	Warehouse	Y	Y
	Shipping	Shipping Dock Area	Warehouse	Y	N

(1)The keyword for the data object is LOCATION (all Caps) and it requires, at a minimum to have the location code and description (which appears on reports) column values specified.

(2) The LocationCode may be a location barcode placed on shelves, racks or bins or hung over floor locations; or it may be a generic location, such as shipping or receiving. Only generic

locations are shown in drop-down lists of locations as there should only be a small number of generic locations whereas there might be a large number of barcoded locations, which are selected by scanning the location barcode.

- (3) The LocationDescription is used to describe where the location is code referring to.
- (4) The FacilityCode is typically used to subset the selection of locations, from which to choose, for a requested material move.
- (5) Setting the IsGeneric column to Y or N selects whether the location appears in a drop-down list or not. By default, locations are not generic.
- (6) The generic list can be further restricted for receiving operations by setting the IsReceiving column to N (the default). If IsReceiving is set to Y then this location can be accessed from a drop down list as the destination into which you can receive materials.

Material Handlers can receive materials to non-generic locations, but only by scanning the location barcode.

There are also some optional parameters for locations as shown below:

	G	H	I	J	K	L	M	N	O	P
1	IsShippingDock	IsQCLocation	IsMRBLocation	IsWithdrawalLocation	IsPicking	IsSubcontractorLocation	WorkCenterCode	SortCode	ERPCode	ProjectCode
2	N	N	N	N	N	N		Cut		
3	Y	N	N	N	N	N		Dock1		
4	N	N	N	N	N	N		Paint		
5	N	N	N	Y	N	N		Production		
6	N	N	N	N	N	N		Receiving		
7	N	N	N	N	Y	N		WH301		
8	N	N	N	N	Y	N		WH302		
9										

These are:

1. IsShippingDock (1): This is only used with the shipping dock option. These are special locations that, when containers are moved to that location (i.e. onto a truck or trailer at that location) using a Load Material or a Load Picked transaction, and the dock door is “closed”, then all the containers in that IsShippingDock location are considered as having been shipped. Do not use this for the general area around the shipping dock, which should be designated as not being a shipping dock location but instead designated as a Generic location, with a name such as “Shipping”.
2. IsQCLocation (2): Is used with the quality control module to determine whether the location is a quality control station. With the QC option, materials that have not passed QC inspection can only be moved to a QC location.
3. IsMRBLocation (3): Sets whether this is a Material Review Board location. Materials designated as having an MRB QC status can only be moved to an MRB location.
4. IsWithdrawalLocation (4): Any materials moved to this location are automatically withdrawn from inventory. This is useful if the materials go into an activity, such as production, not currently being tracked by BellHawk. This is useful when doing a phased implementation, where receiving and put-away is implemented before tracking of materials in production.

5. IsPicking (5): BellHawk recommends locations where the inventory can be found, either as the location of the oldest material on the pick sheet or on the screen showing available materials by location in age-first (FIFO) order. In making this selection BellHawk only considers materials at locations designated as IsPicking = Y. This enables materials in certain locations, such as QC locations, to be ignored in the recommended locations from which materials can be picked.
6. IsSubContractorLocation (6): Any materials sent to a subcontractor location in containers are assumed to be emptied out of their containers at that location and that those materials may be returned in any containers sent to the subcontractor location (or other containers).
7. WorkCenterCode (7): Typically used to associate a floor stock location with a designated work center.
8. SortCode (8): BellHawk has the ability to order entries on the Picking Sheet, for picking purposes, in alphabetical order by SortCode (which defaults to the location code). This can be used to ensure that picking occurs in a rational order, with parts in the same aisle and rack section, having the same sort code even if they have very different location codes. This field is also used as the Zone for the Zone Picking transaction.
9. ERPCode (9): When a move to this location is exported to an ERP system, the BellHawk location code for the destination location is translated to this ERP code. Many ERP systems will use much larger locations, such as “Warehouse A” than BellHawk, which may have hundreds of corresponding locations. This gives a convenient translation mechanism.
10. ProjectCode (10): This can be used to identify a location in which material for a certain project will be stored. Any common stock materials moved there are assumed to be assigned to the designated project. Also, the system will warn users if an attempt is made to move materials designated for a different project to a location with a different project code.

These optional fields relate to the use of MTS with other optional modules. They can be left blank unless they are needed for use with a specific module.

A big benefit of using spreadsheets for setting up locations, is that you can use the spreadsheet to print out all your location barcodes (and have them correspond exactly to the entries in BellHawk) using a barcode labeling program, such as BarTender. Alternately you can send the spreadsheet to a supplier such as a BellHawk partner who can make ruggedized location barcode labels for you based on the contents of the spreadsheet.

Importing Container Types

Most material in BellHawk is tracked in containers. Container Types have two ways to be input into the BellHawk software. The first is using Excel imports and the second is by selecting the Container Types button under the Setup Switchboard.

The Excel import is shown below:

CTYPE	ContainerType	ContainerDescription	IsMultiUse	IsReusable	UDP
	Box	Box	N	N	
	Can 1	Can 2	N 3	N 4	5
	Carton	Carton	N	N	
	Case	Case	N	N	
	Pallet	Pallet	N	N	
	Roll	Roll	N	N	
	ShipCarton	Shipping Carton	Y	N	
	ShipPallet	Shipping Pallet	Y	N	
	Tote	Tote	N	Y	

For each container you need to specify:

1. ContainerType code (1)
2. ContainerDescription (2)
3. IsMultiUse (3) should say “Y” if the container can be used to hold multiple different items (a Type 2 or multi-use container). The cell in this column should say “N” if the container can only be used for single item numbers (what we call a Type 1 or single-use container).
4. IsReusable (4) should say “Y” if the container is a tote or similar reusable container when it is retained for future use as an empty container with the same tracking barcode. If the container is automatically discarded when its contents are used or shipped then the cell in this column should be “N”.
5. UDP (5) is used with the User Defined Parameters module and allows the user to specify non-standard parameters to be associated with the container if the UDP feature is being used. Please see the separate User Defined Parameter User Manual for details.

Entering Container Types

As an alternative the user can select the Container Types button on the Setup switchboard which will bring up a page showing the current container types in the system:

Container Types List				
Type Code	Container Description	Is Multiple Use	Is Reusable	
Box	Box			Edit
Can	Can			Edit
Carton	Carton			Edit
Case	Case			Edit 2
Pallet	Pallet			Edit
Roll	Roll			Edit
ShipCarton	Shipping Carton	✓		Edit
ShipPallet	Shipping Pallet	✓		Edit
Tote	Tote		✓	Edit
	1	Show All ▾	Show All ▾	

Filter Add New Return

If the staff user wants to add other container types that are not part of the current container types list they can by selecting “Add New” (1). If the staff user wants to edit a current container type they can do so by selecting the “Edit” (2) button.

Once the “Add New” button is selected it will bring up this add container type page.

ADD CONTAINER TYPE

Type Code: **1**

Container Description: **2**

Sequence Number: **3**

Is Multiple Use: **4**

Is Reusable: **5**

Tare Weight Units: ▾

Tare Weight: **6**

As with all BellHawk data entry screens, start at the top and work your way down as the form may change depending on the selections made for prior entries. The entries are:

(1) The Type Code refers to what will show up in the drop down when the staff/device user looks at the container type drop down – such as box, bag, and pallet. This is used to associate the Type with the attributes of the container. Please note that the type “KanBan” has special properties as explained subsequently.

(2) This is the full description of the container instead of the shorter type code, which is used in drop-down lists

(3) Sequence Number is the sequence in which the containers will be sorted in drop down lists.

(4) The check box for Multiple Use is used to indicate that this is a Type 2 parent container that can contain multiple different types of untagged materials inside the container. If this is left unchecked then this is a Single Use Type 1 container that can only have a single part number with the same lot number, expiration date and user defined parameters in the container. Please see the Materials Tracking User Manual for more details about Type 1 and Type 2 containers.

(5) The check box of Reusable is used to determine whether the container can be reused or not. Reusable containers, such as totes, can be refilled with different materials over time. If a container, such as a box, is not marked as reusable then it is marked as deleted by the system when it becomes empty.

(6) Tare Weight is an optional entry that may be used in custom reports and exports. The “Tare Weight Units” is selected from the available WEIGHT type units of measure. The Tare Weight is weight of the empty container.

After entering the Container Type record into the database by selecting the [Add Container Type] button, the data can be subsequently edited by selecting the [Edit] button for the specific entry on the list of Container Types screen. This brings up the Edit Container Type screen. From here the information can be edited as needed by making changes on the Edit Container Type screen and then selecting the [Update Container Type] button as shown below:

EDIT CONTAINER TYPE

Type Code:

Container Description:

Sequence Number:

Is Multiple Use:

Is Reusable:

Tare Weight Units:

Tare Weight:

Importing Units of Measure and Measure Types

BellHawk uses the concept of universal measure types, such as COUNT, WEIGHT, LENGTH, FLUID, AREA and VOLUME measures, which can be defined within the BellHawk database.

Measure Types are used to group units of measure, such as inches and feet, so that the system knows how to convert between units of measure, within each measure type, across all parts. These are setup using an Excel import as shown below:

MEASURETYPE	MeasureTypeCode	MeasureType	IsCount	IsWeight
	COUNT	Count	Y	N
	LENGTH	Length	N	N
	LIQUID	Liquid	N	N
	WEIGHT	Weight	N	Y

The measure types are used to group units of measure so that BellHawk knows how to universally convert between, for example WEIGHT units of measure, without specifying these conversions for each specific item.

Within each measure type, users can setup units of measure, using an Excel spreadsheet import, in the format shown here.

UOM	UnitName	UnitNotation	MeasureTypeCode	ConversionFactor	IsPrimary
	Each	ea	COUNT	1	Y
	Fluid Ounces	fl oz	LIQUID	33.814	N
	Gallons	Gal	LIQUID	0.264172	N
	Liter	L	LIQUID	1	Y
	Pint	Pt	LIQUID	2.11338	N
	Grams	gr	WEIGHT	1000	N
	Kilograms	Kg	WEIGHT	1	Y
	Pounds	lb	WEIGHT	2.20462	Y
	Ounces	oz	WEIGHT	35.274	N

The keyword is UOM (all caps) and all the columns shown here are required.

BellHawk uses the Unit Notation as the key to reference the unit of measure (UOM). Each UOM entry must reference its related Measure Type Code through the Measure Type column.

The ea (Each) unit of measure is pre-defined and used by BellHawk and so it should not be changed or deleted. It is the primary unit of measure for the COUNT measure type.

The primary UOM for each measure type is indicated with IsPrimary being set to Y and the conversion factor being set to 1. For all other units of measure within the same measure type, the conversion factor is the number that you multiply the quantity in the primary unit of measure by to get the secondary unit of measure.

Materials can be entered or withdrawn in other secondary UOMs within a measure type provided that they are setup in this import. In the above example, we have used Kilograms and Liters as primary units of measure but we can receive or produce material in Pounds and Ounces or Gallons and Fluid Ounces respectively.

Please do not modify the COUNT measure type or the each unit of measure as these are used internally by BellHawk, as is the WEIGHT measure type. But, please note that WEIGHT does not have a default primary UOM, so you have to set one up, such as in pounds, ounces or kilograms.

All inventory counts in containers or locations are carried in the BellHawk database in the primary UOM for the parts in the container.

As we will see in setting up Item Master records, users can also specify a primary and secondary unit of measure for parts and a conversion factor between them. These units should be for different measure types, as the system already knows how to translate between different units of measure within the same measure type (given the above information). They also do not have to be primary UOMs in the above table, but their nomenclature does need to be in the above UOM table.

Note that the UOM nomenclatures have to be unique across all measure types. This enables the import of data from an ERP system that does not have the concept of measure types but simply has units of measure such as “kg” or “lbs” with no notion of a physical relationship between them.

Units of measure are typically not imported from ERP systems as most ERP systems do not have an equivalent to BellHawk’s universal UOM conversion capability within a measure type. In fact, most ERP systems typically only have a purchasing unit of measure, an inventory unit of measure, and a selling unit of measure.

Instead the UOMs corresponding to those in an ERP system are set up manually on a spread sheet and then imported into BellHawk through the Setup screen.

The units of measure used by BellHawk usually correspond to the inventory units of measure in an ERP system. The corresponding purchasing and selling units of measure and setup as part of the supplier and customer part number capability of the PO and SO modules.

Importing Item Master Part Categories and Material Types

A BellHawk system can have thousands of different part numbers. This can make it difficult to quickly lookup the part number you need. To speed lookup, BellHawk has two sort fields for each part; the part category and the material type.

Standard part categories for inventory tracking are as follows:

	A	B	C	D
1	CATEGORY	CategoryCode	CategoryDescription	SeqNo
2		DEFAULT	Default	2
3		FINISHED	Finished Goods	3
4		INTERMEDIATE	Intermediate Materials	4
5		RAW	Raw Materials	5
6		SCRAP	Scrap	6
7		WIP	WIP	7
8				

RAW, INTERMEDIATE and FINISHED goods are intended for use by real inventory that has part numbers that may be purchased or made by the company. Users may add other categories that are appropriate to their operations or delete those that are not appropriate.

As standard, BellHawk comes with a “DEFAULT”, a “SCRAP” and a WIP category. The “DEFAULT” category is assigned by default to item master parts which are imported with a blank part category.

The SCRAP category is reserved for use by materials that are being recycled. Thus we may process rolls of paper into a product and recycle the scrap paper, which has a separate part number.

The WIP category is useful for defining items that purely exist as work-in-process and are not Intermediate materials. Note these are different from materials that are essentially in finished form but need more operations, such as inspection or testing. In this latter case the parts have the finished product's item number but have a WIP flag set on to indicate that they are not yet completed.

The SCRAP, WIP, and DEFAULT categories are required and may not be substituted, as they are used internally by the BellHawk scan engine code.

18	MATERIAL	MaterialCode	MaterialName
19		Lettuce	Lettuce
20		Tomato	Tomato
21		SaladMix	Salad Mix
22		Packing	Packing Materials
23		Salad	Finished Salad

The Material Type can be any name by which we want to sort our item master records, as shown in this example here. These are used to reduce a long list of parts to a short subset, when selecting the item part number.

Entering Item Master Parts

When users click on the Add/Edit Item Masters button from the Setup Switchboard, the following screen appears:

Item Number	Item Description	Item Category	Material Type	
P101	200 foot 12 inch Paper Roll	Raw Materials	Rolls of Paper	Edit
P102	Green Coating Material	Raw Materials	Coatings	Edit
P103	6 inch Core	Raw Materials	Bumpers	Edit
GCR12	100 foot 12 inch Green Coated Roll	Work in Process	Coated Rolls	Edit
SGR6	100 foot 6 inch Green Coated Roll	Finished Goods	Coated Rolls	Edit
ScrapPaper	Scrap Paper	Scrap	Rolls of Paper	Edit
		--Show All--	--Show All--	

This shows a list of item master parts already defined in the BellHawk system. From here users can Add New item master part records (1) or edit existing records (2).

Add New Item Master

On the Add New Item screen the item number (1) must be unique.

The Universal Product Code (UPC) or Global Trade Item Number (GTIN) are optional (2). In many transactions these can be scanned as a way of selecting the item number.

The Item Description (3) is what appears on many screens and reports.

There are 3 check boxes (4):

- a. Is Inventoried: This box is normally checked as most materials are inventoried and in are also tracked by barcoded container or location. Items that are not specified as Is Inventoried (such as possibly scrap materials or shipping charges) are simply recorded as quantities and are not tracked as inventory. They do, however, appear in the transaction history log, which is used for reporting purposes.
- b. Is Individually Barcoded: Items which are tracked individually and have their own tracking barcode (as opposed to the tracking barcode being on a container that could contain a quantity of these items).
- c. Is Serialized: Items that carry serial numbers, which will be requested whenever these items are received or entered into inventory. These must be individually barcoded.

The Item Category (5), which is required, and the Material Type (6), which is optional, are used for filtering lists of materials. The item category is also used for controlling device specific scan actions. The Material Type (6) is used to distinguish what type of material the item is similar to.

The primary measure type and the unit of measure (7) are required. Users can also setup an optional secondary measure type and unit of measure (8). If these are entered then the system

The screenshot shows the 'ADD NEW ITEM MASTER' form with the following fields and callouts:

- 1: Item Number: P104
- 2: UPC/GTIN: Optional
- 3: Item Description: 18 inch steel stock
- 4: Is Inventoried:
- 5: Is Serialized:
- 6: Material Type: Stainless Steel
- 7: Measure Type: Weight
- 8: Secondary Measure Type: Length
- 9: Measures Conversion Ratio: 1 Feet = 12 Pounds
- 10: Item Type: Purchased
- 11: Unit Cost: 2.4
- 12: Min Inventory Qty: 0
- 13: Lot Control: Manual
- 14: Est. Prod. Life (days): 0
- 15: Default Location Code: (empty)
- 16: Replenishment Time: 0
- 17: Comments: (text area)

Buttons at the bottom: Add (green), Copy (grey), Return (blue), and Delete Item Master (red).

requests a conversion ratio (9). This enables item quantities to be entered in secondary unit of measure and automatically converted to the primary quantity.

Item Type (10) can be selected from Purchased or Made Here. Only Made Here materials can have a route and possibly route step resources specified for them, as described in the Advanced Production Tracking User Manual.

Users can specify a unit cost (11), which is used as the default unit cost in the primary unit of measure for determining the cost of material if it is not otherwise determined by a receiving transaction. They can also specify an optional unit price, which is the default value for customer orders, when entered.

Users can also specify a minimum inventory quantity (12), which is used to highlight entries on the inventory summary report that show less than the minimum required inventory on hand.

Users can specify lot control as Ignored, Automatic or Manual (13). If this is selected as ignored then BellHawk does not display or ask for a lot number for parts with this part number but it does assign an internal lot number for materials traceability purposes. If this is set to Automatic then an automatically generated lot number is displayed but may be overridden at time of material entry into the system. If it is specified as Manual, then the user has to enter or scan a lot number at time of entry of the material into inventory.

If the estimated product life is specified as zero (14) then this product is not tracked by expiration date. Otherwise this material must be tracked in a barcoded Type 1 or a virtual (untagged) container or be individually barcoded. Material cannot be used or shipped if it has passed its expiration date. This field is also used to select materials for inclusion in the expiration date report which reports materials that are approaching or have passed their expiration date.

Materials can have an optional default location (15). This appears by default when the material is being entered into inventory and gives an indication as to where the material handler should place the material, if there is room at that location. This field can be overridden at time of entry of materials into inventory.

Comments (16) are used by Materials Managers to make any special notes about the material or items.

Finally, selecting the green [Add] button will cause the item to be entered into the BellHawk database. From here the item can be edited, in a similar manner to suppliers and customers.

After entering an Item Master record into the database it will appear in the list of item master part records screen. From here, the [Edit] button on any record can be used to edit or delete the selected item master part record. The data for the selected item can then be edited or deleted as needed by making changes on the Edit Item Master screen, as seen below.

If the Item Master Item Number needs to be changed, BellHawk permits the change by clicking on the Change # button in the upper right corner of the Edit Item Master screen and recording the new item number on the Edit Item Number screen, as seen below:

EDIT ITEM NUMBER

Existing Item Number: P104

New Item Number:

EDIT ITEM MASTER

Item Number:

UPC/GTIN:

Item Description:

Is Inventoried:

Is Individually Barcoded:

Is Serialized:

Item Category:

Material Type:

Measure Type:

Unit of Measure:

Secondary Measure Type:

Secondary Unit of Measure:

Measures Conversion Ratio:
 Feet = Pounds

Item Type:

Unit Cost:

Unit Price:

Min Inventory Qty:

Lot Control:

Est. Prod. Life (days):

Default Location Code:

Replenishment Time:

Comments:

Importing Item Master Parts using Excel Spreadsheets

In most cases the Item Master List is input using the Item Master entry screen instead of the importing by using an Excel spreadsheet. Usually users use the import function when taking their information from an ERP system and importing it into BellHawk. Item Masters can also be exported in the form of an Excel spreadsheet as shown in the four images (for one set of records) shown below:

ITEM	ItemNumber	ItemDescription	Category
	GCR12	Intermediate Coated Roll	WIP
	P101	Paper Roll	RAW
	P1011	Paper Roll	RAW
	P102	Coating Material	RAW
	P103	Core	RAW
	SC	Shipping Charges	FINISHED
	ScrapPaper	Scrap Paper	SCRAP
	SGR6	Finished Coated Roll	FINISHED

Material	UOMType	UOM	UOM2Type	UOM2
CoatedRolls	Count	ea		
Rolls	Weight	lbs	Length	ft
Rolls	Weight	lbs	Length	ft
Coatings	Liquid	ga		
Cores	Count	ea		
	Count	ea		
Rolls	Weight	lbs		
CoatedRolls	Count	ea		

UOMConversionFactor	ToBeProduced	UnitCost	UnitPrice	MinInventoryQty	LotControl
	Y	16	0	0	1
100	N	0.75	0	0	2
100	N	0.75	0	0	2
0	N	12	0	0	0
0	N	0.5	0	0	0
	N	0	0	0	0
0	N	0.96	0	0	0
	Y	9	25	0	2

LotControl	EstProdLife	QCEvery	DefaultLocation	IsInventoried	IsIndividual	IsSerialized	IsDimensioned	AtomicBuildQty
1	0	1		Y	Y	N	N	1
2	0	1	#01504	Y	N	N	N	1
2	0	1	#01504	Y	N	N	N	1
0	180	1		Y	N	N	N	1
0	0	0		Y	N	N	N	1
0	0	0		N	N	N	N	1
0	0	0		N	N	N	N	1
2	0	0		Y	Y	N	N	2

These entries all follow the same convention as the screen data entry except Lot Number, for which 0=ignore, 1= automatic, and 2= manual.

Importing Inventory Reasons

INVREASON	ReasonCode	ReasonDescription	UseOnEnter	UseOnAdjust	UseOnWithdraw	UseOnReturn	DataName
	SCRAP	Scrap	N	Y	Y	Y	
	SETUP	Setup Inventory	Y	N	N	Y	
	ForProduction	For Production	N	N	Y	Y	
	FromProduction	From Production	Y	N	N	Y	

When an inventory Enter, Adjust, Withdraw, or Return transaction is performed the Reason Code is requested from a drop-down list, formed from the above entries. You can setup which combination of reason codes they are used for which transactions by appropriate “Y” (yes) or “N” (No) entries in the Use on Enter, Use on Adjust, and Use on Withdraw columns.

If a DataName is entered then an additional text entry field is requested with a label specified in the DataName column. These reason codes are stored in the Inventory Transaction History Table as part of the transaction record.

Importing Scrap Reasons

If the material recorded out from a step or operation is of Category SCRAP then a scrap reason is requested from a drop-down list setup from the following import.

SCRAPREASON	ReasonCode	ReasonDescription
	Damaged	Damaged Packaging
	Blighted	Blighted Product

These reason codes are stored in the Inventory and Production Transaction History Tables as part of the transaction records.

Entering Suppliers

Suppliers can be added by selecting Add/Edit Suppliers from the Setup Switchboard. This brings up the following screen: This screen shows a list of all suppliers. It can be filtered using the filter boxes and the Filter button, as explained in the Introductory User Manual.

Supplier List

Supplier Number	Supplier Name	Edit
V100	Vegatable Distributors Ltd.	2 Edit
V101	Lincoln Farms	Edit
V102	Wholesale Food Supplies	Edit
<input type="text"/>	<input type="text"/>	

Filter
1 Add New
Return

From this screen, users can add a new supplier using the Add New button (1). Users can also edit an existing entry by clicking on the Edit button (2) for a supplier.

When the Add New button is clicked the screen shown here appears.

ADD SUPPLIER

Supplier Number:

Supplier Name:

Add Supplier
Copy
Return

Delete Supplier

Users need to enter a unique identifier number each supplier and the supplier name and then press the green Add Supplier to add the supplier to list of suppliers in the BellHawk database.

Note that supplier addresses can be added from this screen, if the PO option has been licensed, as described in the PO User Manual.

Importing Suppliers

The supplier data can also be imported in the form of an Excel spread sheet as shown below:

	A	B	C	D
1	SUPPLIER	SupplierNumber	SupplierName	IsPlant
2		V101	Metal Wholesale Distributors	N
3		V102	Tri-State Metal	N

The IsPlant is only used when recording inter-plant transfers.

Entering Customers

Entering customers follows a very similar theme to entering suppliers.

Clicking on the Add/Edit Customers button from the Setup switchboard brings up the following screen:

Customer List

Customer Number	Customer Name		
MYCOMPANY	Paper Coating International	2	<input type="button" value="Edit"/>
C100	Friberg Distributing		<input type="button" value="Edit"/>

Filter
Add New 1
Return

This shows a list of customers currently in the system together with buttons to Add New customers (1) or to edit existing customer records (2).

Note that you should not delete the customer entry setup for your company, which uses the customer number MYCOMPANY. This is used as the company for whom products are made for stock.

Clicking on the Add New button brings up a screen on which a new customer can be added, as shown here.

The Customer Number (1) must be unique and the Customer Name (2) is what appears in drop-down lists to select customers.

Click on the green Add Customer button (3) to enter the customer number and name into the system.

Importing Customers

Customers can also be imported using an Excel spreadsheet in the following format:

CUSTOMER	CustomerNumber	CustomerName
	MYCOMPANY	ABC Company
	WM100	Wal-Mart Distribution
	WNH1	WellFleet Distributors

Commentary

When adding data to the knowledge base through Excel spreadsheets it is highly recommended that you just import the new records and do not keep re-importing existing records, especially those that can be modified directly in BellHawk.

You can delete any record from the knowledge base by importing an Excel spreadsheet with the entry for the record with a capital D in column A. Please note that this does not physically delete the record but simply marks it as inactive. This is to retain referential integrity in the BellHawk database, in case some other data object or history record was referencing the deleted record.

MTS Data Capture

Transactions

The following section describes how material handlers capture data using their mobile data collection devices.

The transactions are as follows:

Enter: enter material into inventory. Primarily used for initial inventory setup.

Withdraw: used to record the withdrawal of inventory such as if the material has been scrapped.

Zero Container: Used to empty reusable containers of their contents.

Adjust: adjust quantity of materials in a location or in a container.

Receive: similar to Enter except that the vendor and the PO number may be captured.

Ship: similar to Withdraw except that the customer and the Order Number may be captured.

Move: move material that is at a location or in a container to another location or container.

Pack: record movement of a set of type 1 containers or individually barcoded items into a type 2 container with assignment or printing of label after packing.

Flow: simplified move transaction used to record the flow of barcoded containers or items through a location using an "always open" transaction screen. This is typically used for tracking the flow of WIP (work-in-process) materials.

Return: return material that had previously been shipped or withdrawn from inventory.

Tag Container – records the tracking barcode on an empty multi-use container into which other materials can be moved.

Lookup Inventory by Source – looks up inventory by location or container barcode.

Please note that

1. The transactions used to record materials into and out of work order steps and operations are not covered here. These transactions, which are not available with LP-MTS, are covered in the Advanced Production Tracking User Manual.
2. Containers of materials that are withdrawn or shipped are not physically deleted from the database, they are simply marked as deleted, which means that they no longer show up in inventory. The Return transaction enables these containers to be reactivated in inventory.
3. When materials are withdrawn from a container then the quantity in the container is reduced. If the quantity of the contents falls to zero and the container type is not "reusable", then the container is withdrawn from inventory.
4. Sometimes a container will still have a residual quantity shown in the database, even though it is operationally all used up. In this case using the Adjust transaction to zero out the

quantity will cause the container to be marked as empty and may cause it to be discarded. Alternately the Zero contents transaction may be used.

5. BellHawk has a notion of Source and Destination. These can be a barcoded location or a container. All the user has to do is the scan or select the source or destination code and BellHawk works out whether this is a location or a container and whether this container is nested inside another container. They may be one of the following:
 - A location barcode or name for loose materials taken from or placed into a location
 - A type 1 container barcode from which materials are taken or placed into
 - A type 2 container from which loose (not having a tracking barcode) material is taken or placed into.
 - An individually barcoded item (but only as the source).

Note that a type 1 container can only contain a single type of material whereas locations and type 2 containers can hold multiple different types of material.

6. In performing transaction scanning, the barcode scanning device should be setup to automatically generate the equivalent of a keyboard Enter at the end of the barcode characters that it places in the device's keyboard buffer. This will cause scanning to progress from input field to input field without needing to hit the Enter key.
7. When the Destination is a Type 1 container, the system checks that you do not mix items with different:
 - a. Item numbers
 - b. Revisions
 - c. Lot numbers
 - d. Expiration dates
 - e. Quality control status (if the QC module is being used)
 - f. Project codes (if the Project module is being used)
 - g. Pick order numbers (if the Pick module is in effect).
 - h. User defined parameters such as size of color (if the UDP module is being used).

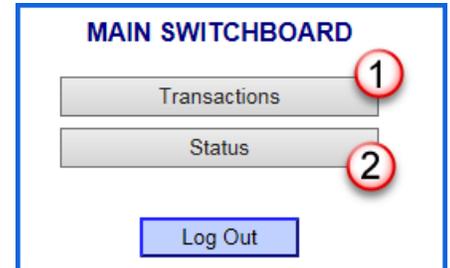
This can be a very useful safety check.

Getting Started

When a user logs in to BellHawk using a shared device, such as a mobile computer with an integral barcode scanner, the user will be presented with a Main Switchboard screen, as shown at right, through which they can access their user functions of BellHawk.

From this screen they can:

1. Select the Transactions button (1) to access the data entry screens.
2. Select the Status button (2) to see a number of reports relating to the status of inventory. See reports section at the end of this document.
3. Click on the Log Out button to end their session with BellHawk.

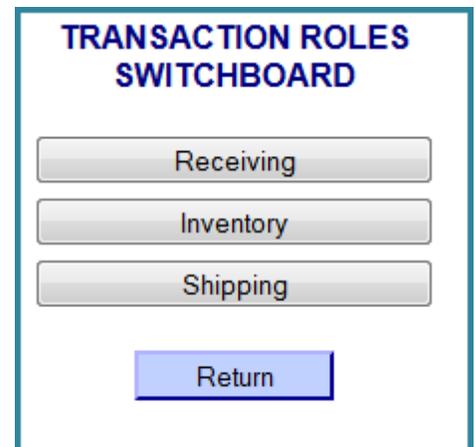


Clicking on the Transactions button from the Main Switchboard brings up the Transaction Roles Switchboard, as shown at right. This enables work users to select which role they are working in.

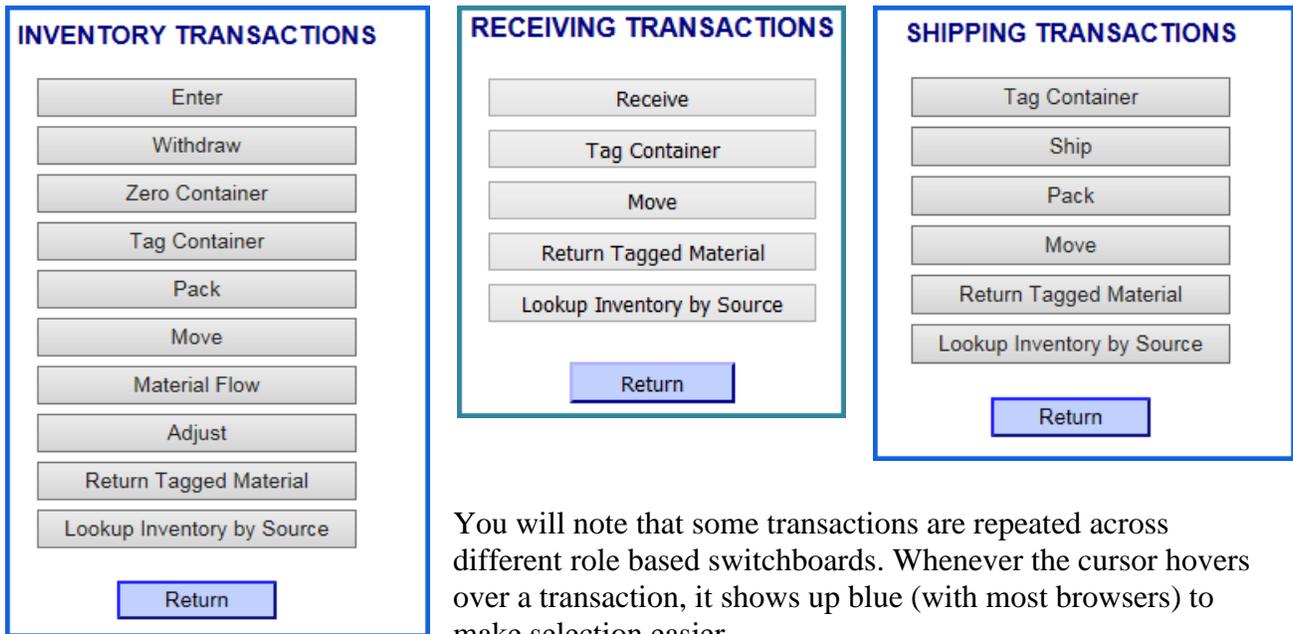
Rather than try to select from a long list of possible transactions, they simply see a list of transactions that are appropriate to the role they are performing.

You will note the blue Return button. This is used to return to the previous page in the hierarchy tree of pages. The “Back” button on your web-browser should be disabled, as using it will cause BellHawk to lose track of where it is in the hierarchy of pages and so it will not work properly. So please do not enable the Back button and, if it cannot be disabled on the device you are using, please do not use it. Please use the blue Return button, which appears on all pages except the top most Main Switchboard level, which has a blue Logout button.

Please note that Scan Enabled staff members also have access to the Transaction switchboard, in addition to other switchboards.



The three role screens for inventory are shown here:



You will note that some transactions are repeated across different role based switchboards. Whenever the cursor hovers over a transaction, it shows up blue (with most browsers) to make selection easier.

With BellHawk MTS, users can only perform simple ship and receive transactions. More complex interactions are available with the Purchase Order Receiving, Ship Order, Picking, and Shipping Dock options, which add additional buttons to the Receiving and Shipping Transaction role screens.

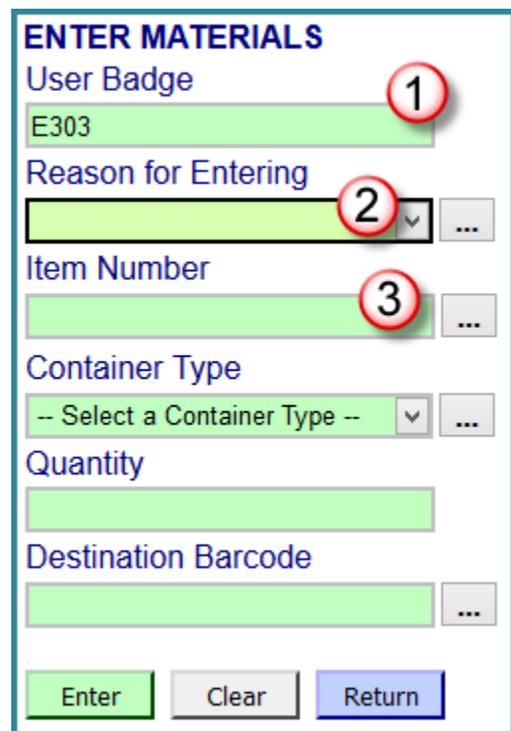
Enter Materials into Inventory

Usually the first step in using BellHawk is to enter existing inventory into BellHawk. This is done selecting the Enter transaction on the Inventory Transaction screen which brings up the Enter Materials screen shown here:

The first step is for the user to scan the barcode on their badge (1). This identifies who is doing the transaction, separate from the device login. If this device is designated as an assigned device it will remember the badge of the user as long as the user keeps using the device, within about a 20 minute window.

The next step is to select the reason for entering the material into inventory (2). This will select one of the reasons you setup as part of your initial Excel Inventory Reasons import, as described previously.

Normally “Setup Inventory” is always included in the initial setup. The ellipses [...] take the user to a listing of the reason codes which can be filtered for easy selection if needed.



The next step is to enter the Item Number (3). Normally these are selected using the ellipses [...], which in this case brings up a list of available item numbers and descriptions as shown below:

Please Select Item Number				
Item Number	Item Description	Item Category	Material Type	
KB150	Stainless Steel Knob	Finished Goods	Draw Pulls	View
SBS100	One inch diameter stainless bar stock	Raw Materials	Stainless Steel	View
SSScrap	Stainless Steel Scrap	Scrap	Stainless Steel	View
		--Show All--	--Show All--	

Buttons: Filter, Add New, Return

From this screen, the user can select an item number (1). They can also enter filter expressions (2) containing a % sign as the wild card and then click on the grey Filter button in the lower left corner of the screen to see just the Items that match a description such as %Steel%. Alternately the user can select the Item Category (3) or Material Type (4) to narrow their selection.

If the user is granted special permission, or this transaction is performed by the materials manager (more likely) then the user can Add New (5) items as described in the section of this manual on materials management. The user can also view details of the item using the View button (6) above. If the user is a materials manager with setup privileges for Materials Management then these buttons would read Edit rather than View.

Clicking on View brings up the screen shown here at right with details of the item master record.

If this were being used by a materials manager or a user who has been given permission to add or modify item master records then the user can change the details of the item (1) and the click on update (2) to change the item master record.

The ability to edit routes and associated resources or the delete item master records is reserved to the materials manager.

Details about the Item Master setup screen are given in the Setup section of this manual.

VIEW ITEM MASTER

Item Number: SBS100

UPC/GTIN: SBS100

Item Description: One inch diameter stainless bar stock

Is Inventoried:

Is Individually Barcoded:

Item Category: Raw Materials

Material Type: Stainless Steel

Measure Type: Length

Unit of Measure: Feet

Secondary Measure Type:

Secondary Unit of Measure:

Item Type: Purchased

Unit Cost: 0

Unit Price: 0

Min Inventory Qty: 0

Lot Control: Ignored

Est. Prod. Life (days): 0

Default Location Code:

Replenishment Time: 0

Comments:

Buttons: Update, Copy, Return, Delete Item Master

By selecting the Item Number in the first column of the List of Items as filtered, the Enter Materials screen is shown as on the right.

If the item Is Customer Owned (2) the box should be checked. This is how you can track customer owned items throughout the process. After selecting the Customer (3) who owns the Item the user can select the New Container checkbox (4).

Checking the New Container checkbox tells the system that the materials are in a Type 1 container. If the materials are in a Type 2 (mixed use) container or are untagged material at a location then do not check this box.

If the New Container checkbox is checked (4), then BellHawk will request the Container Type (5) from a drop-down list.

Please note that forms in BellHawk are not static, they are what we call “Magic Forms”. After each data entry, the web-browser checks back with BellHawk for errors and also adjusts the form to ask for just that information needed, given the information provided so far.

The next entry is the unit of measure (6). Alternate units of measure can be selected if they have been setup as universal conversions or product specific unit of measure conversions.

The quantity (7) is then entered in the selected unit of measure. This is followed by the entry or scanning of the lot number, if the item is manually lot controlled (not shown in this screen shot example).

The screenshot shows the 'ENTER MATERIALS' form with the following fields and callouts:

- 1**: Item Number (SBS100)
- 2**: Is Customer Owned checkbox (checked)
- 3**: Customer (CDEFurniture)
- 4**: New Container checkbox (checked)
- 5**: Container Type (Bar Stock)
- 6**: Unit Of Measure (Feet)
- 7**: Quantity (100)
- 8**: Destination Barcode (Receiving)
- 9**: New Tracking Barcode (#15025)
- 10**: Enter button
- 11**: Clear button
- 12**: Return button

If you are entering a new Type 1 container, which is the most common case, the Destination Barcode (8) will typically be the rack or floor location barcode, where the Type 1 container is located. A generic location, such as “receiving” could also be selected from a list of generic locations using the ellipses [...].

If this material was being stored as untagged material at a location then the user would not check the New Container barcode (4) and instead would simply scan or enter the location (8) where the materials are stored.

If the destination is a Type 2 Container then this needs to have been tagged ahead of time using the Tag Container transaction and then the barcode on this container would be scanned as the Destination (8).

If this is a new Type 1 container then BellHawk will request that the user place a tracking barcode on the container and scan it (9). This barcode can come from a pre-printed roll of unique tracking barcodes. Alternately, if the system has the BellHawk TAG module then the user will be able to print out a label on demand, in user specified format, on a barcode label printer, ready to be adhered to the container.

This is followed by a check box if the item number is a finished goods item number; this box can be checked if the material is in work-in-process status where the item needs more work to be done on it (not shown in this screen shot example) When the Work In Process box is checked, the system knows that the item is not ready for sale or to be shipped.

Once the label has been scanned or printed then the user can select the Enter button (10) to enter the selected items into inventory. If there is an error, then they will get a pop-up error message in and the data will not be entered into the BellHawk database.

After clicking OK on this screen, all the data previously entered on the Enter Materials screen is shown ready to enter more containers of material.

The user can then repeatedly scan different New Tracking Barcodes (9) on a sequence of containers and select Enter (10) after each one to enter other similar containers without the need to enter all the data again.

If needed, any data fields can be changed between each submission, including the item number, lot number and quantity. Also all the fields can be cleared, using the Clear button (11).

Finally the user can return to the Inventory Transaction switchboard using the Return button (12).

As an alternative to scanning a location barcode for the Destination Barcode (8) on the above Enter Materials screen, you can use the ellipses [...] to select from generic locations as shown here:

Please Select Location Code	
Location Code	Location Description
DockA	Dock A
DockB	Dock B
Receiving	Receiving Dock
Shipping	Shipping Dock Area

Filter Return

The locations can be selected by clicking on the Location Code. Users can also enter filtering values in the filter boxes using % wild cards and then select the Filter button to only see a limited subset of locations.

Selecting a location code will return you to the main transaction entry screen.

If the material users are entering has a non-zero expiration duration in the item master record, then an additional data entry box will show with a request for the Expiration Date. Users can type in the date or select the expiration date from the pop-up calendar.

Please note that the Back button on the browser is disabled when using BellHawk. Please use the blue Return button on the data entry form instead.

Receiving Materials

This transaction is sometimes referred to as “Simple Receive” to differentiate it from the “Receive against Supplier PO” option which enables you to create Purchase Orders (POs) and then receive against these POs. This latter action requires licensing the optional PO Receive module.

Simple Receive transaction is a variation on the Enter transaction. It will bring up the Receive Materials screen shown to the right:

Please note that some of the entries on this screen, such as the Container Type, will only be visible if the New Container checkbox is selected.

This transaction is a variant on the Enter transaction and adds two fields:

- (1) An optional Purchase Order Number. Please note that this is a text field unlike that used in the “Receive against Supplier PO” option, where this field must correspond to an existing PO number.
- (2) The Supplier Name, which must have previously been set up and is selected from a drop-down list.

This transaction does not have an entry reason code.

Transactions made with a Receive transaction show up on the receiving report whereas those made with the Enter transaction do not. But they both show up in the materials transaction report.

Note that this transaction requests an expiration date (3) as the item master specified that the item had a non-zero expiration date.

Please note that you can click on the ellipses at the end of the Destination Barcode entry field (4) to see the Generic locations (such as “Receiving”), rather than scanning a location barcode.

If you do this with a Receiving transaction, you will only see those locations that are designated as receiving locations rather than all the Generic locations as are shown for the Enter transaction. But you can scan any location barcode, irrespective of whether it is a receiving location or not.

As with the enter transaction, you select the [Receive] key to submit the transaction and Return to exit the screen and return to the transaction switchboard. The Return key will inform the user of the success or failure of the transaction submission in a pop-up message box and then leave all the previously entered data in place.

This is so that a user, receiving multiple containers of the same item can simply scan the tracking barcodes attached to those containers, adjust the quantity and lot number (if needed), and select the Receive button again.

Withdrawing Material from Inventory

The Withdraw transaction is selected from the Inventory Transactions Switchboard and brings up a screen which, as data is incrementally entered, expands to become the Withdraw Materials screen shown at right:

The first step is to scan your user badge (1) and then select the withdrawal reason (2). The inventory reasons for the Enter, Adjust and Withdraw transactions are set up as described in the BellHawk Setup Manual.

As part of these transactions, an additional text data entry field can be collected, which is then saved in the inventory transaction history table. For a Withdraw transaction with reason code Scrap, the setup specified the collection of a field with a label “Reason”, which we see here (3). This is part of BellHawk’s capability to collect additional user defined parameters.

The next step is to scan the Source Barcode (4), which can be:

- A tracking barcode on a single use container.
- A tracking barcode on a multi-use container.
- A location barcode.

Alternately users can select the ellipses at the end of the Source Barcode field (4) and view a screen from which to select a generic location.

When a user selects a Type 1 container (4) by scanning the barcode on the container, the fields shown above are displayed. Here we are treating a bar of steel as a container with a length of

WITHDRAW MATERIALS

User Badge 1
 E1008

Reason for Withdraw 2
 Scrap

Reason 3
 Damaged

Source Barcode 4
 #15025

Receiving Dock
 Withdraw Whole Container

Item Number: SBS100
 One inch diameter stainless bar
 stock
 100 ft available 5

Unit Of Measure 6
 Feet

Quantity 7
 25

8 Withdraw Clear Return

material contained within the bar. The user is able to select the withdrawal of the whole container or select the Unit of Measure (6) and the Quantity (7) to withdraw.

If the Source Barcode (1) is a location barcode (as shown at right) or a Type 2 container with only one uniquely identified set of items inside it, then these are selected and the Item Number is shown in the box (2) below with lot number and expiration date information, if applicable.

The user can then select the unit of measure (3) and the quantity of the untagged material (4) to withdraw.

If the Source Barcode (1) is a Type 2 container or location with non identical parts (in different virtual containers) as shown below for a Type 2 container then the user can elect to Withdraw the Whole Container by checking the checkbox (2) or the user can select the Item Identifier [>] button (3).

Selecting the Item Identifier button leads to a list of all the virtual containers in the Type 2 container or location selected, as shown below.

Select Untagged Material: #01500

Container Code	Item	Item Description	Quantity	Lot Number	Expiration Date
#01500>1	B100	Box of 100 Bandages	20 ea	GH7865	05/19/2016
#01500>2	C101	Carton of Skin Cream	12 ea	ZX4561	06/08/2016

The materials to be withdrawn can then be selected from this screen by selecting the corresponding Container Code (1).

Alternately, if a UPC or GTIN code has been setup for the Item Master, then this can be scanned into the Item Identifier field to identify the item to be selected from the type 2 container or location. A composite GS1 label with GTIN, lot number and optionally expiration data can also be scanned to identify the selected item. If these scans uniquely identify the selected item then there is no need to use the Item Identifier [>] button to select the item from the subsidiary screen.

Once the Items to be withdrawn have been selected the item number appears in (1) and a full description of the parts being withdrawn appears in the box (2). The user can then select the units of measure and quantity to be withdrawn and select the Withdraw button (4)

While BellHawk does incrementally check most data as it is entered, it is possible for users to edit data fields without resubmitting them for checking (which is usually triggered by pressing the Enter key on the keyboard). So, when the submit (Enter, Withdraw etc.) button is selected BellHawk does a final check of all data entries and returns an error message if an error is found (like an expiration date being before today). The user can then correct the data and select the submit button again.

After successfully submitting a withdraw transaction, users can then continue to withdraw more materials by changing the Source and then finally return to the Inventory Transactions switchboard by clicking on the Return button.

The screenshot shows the 'WITHDRAW MATERIALS' form with the following fields and callouts:

- User Badge:** E301
- Reason for Withdraw:** Scrap
- Source Barcode:** #01500
- Warehouse:** #01516
- Withdraw Whole Container:**
- Item Identifier:** C101 (Callout 1) with a '>' button.
- Item Details Box (Callout 2):**
 - Item Number: C101
 - Carton of Skin Cream
 - Lot: ZX4561
 - Expires: 06/08/2016
 - 12 ea available
- Unit Of Measure:** each (Callout 3)
- Quantity:** 1 (Callout 4)
- Buttons:** Withdraw, Clear, Return

Shipping Materials

The Ship transaction is similar to the Withdraw transaction except that it requests some additional parameters. It is selected from the Ship button on the Shipping Transaction switchboard.

This transaction is sometimes referred to as a “Simple Ship” transaction to differentiate it from the Picking and Shipping transactions used as part of the Ship Order option.

After scanning the user badge (1), the user can then select the customer (2) from a drop-down list or using the ellipses [...] to be able to filter the list of customers.

Then the user is requested to enter an optional Customer Order Number (3). Please note that this is a text field in contrast to that collected in a ship order ship transaction (available with the SO option) , which must match a previously entered ship order number.

The transaction then proceeds just like a withdraw transaction, with the scanning of the Source Barcode (4) and the selection of the Item and Lot Numbers, if needed.

In this case, the system knows the Item Number from the Source Barcode. We have also elected not to ship the whole container so the box is unchecked. The system therefore prompts us to select the units of measure from the drop down list (6) and enter the quantity (7).

Finally, this transaction requests the optional unit price (8), primarily to support exports to an accounting system and then the user can select the Ship button (9).

Please note that shipments show up in the shipment reports and exports as well as in the general inventory transaction log.

The screenshot shows the 'SHIP MATERIALS' form with the following fields and callouts:

- 1**: User Badge (E1008)
- 2**: Customer (CDEFurniture)
- 3**: Customer Order Number (SO12345)
- 4**: Source Barcode (#15025)
- 5**: Receiving Dock (Item Number: SBS100, One inch diameter stainless bar stock, 75 ft available)
- 6**: Unit Of Measure (Feet)
- 7**: Quantity (12)
- 8**: Unit Price (10)
- 9**: Ship button

Additional form elements include an unchecked checkbox for 'Ship Whole Container' and 'Clear' and 'Return' buttons at the bottom.

Tagging Containers

As we saw in the prior transactions, single-use containers with tracking barcodes can be entered into the system as the transactions are performed by selecting the "New Container" checkbox. But if a multi-use container is required, then it must be created ahead of an Enter, Receive or Move transaction, which will place material into this container. This entry of a multi-use container is performed using the Tag Container button.

This brings up the Tag Container screen shown here, with the following fields for the user to fill in:

- (1) Badge Number of User creating container record.
- (2) The Container Type, selected from a drop-down list of previously defined types.
- (3) The Destination Barcode. This can be a location or another multi-use container. Or use the ellipses to select a generic destination location.
- (4) Container Description
- (5) The tracking barcode attached to the container.

The screenshot shows the 'TAG CONTAINER' screen with the following fields and buttons:

- User Badge:** E301 (Callout 1)
- Container Type:** Picking Bin (Callout 2)
- Destination Barcode:** #01516 (Callout 3)
- Warehouse #01516**
- Container Description:** Picking Bin (Callout 4)
- New Tracking Barcode:** #01517 (Callout 5)
- Buttons:** Tag (Callout 6), Clear, Return

Then the user can select the Tag button (6) to submit the data for the container. The user can then cycle round, scanning and submitting more container tags, if needed.

Multi-use containers created this way can contain materials without tracking barcodes (in virtual containers) or material in containers with tracking barcodes, which can be single use or multi-use containers.

This transaction can also be used to tag Type 1 containers ahead of putting materials into them, where needed.

Moving Materials

Materials can be moved from containers or locations to other containers or locations through the use of the Move transaction. When this is selected from any of the three Transaction switchboards: Receiving Transactions, Inventory Transactions and Shipping Transactions, it brings up this screen:

After entering the User Badge (1), the user is requested to enter the Source Barcode (2) and the Destination Barcode (6). These behave like the source and destination barcode choices in the Withdraw and Enter transactions and can lead to many other choices.

This transaction follows essentially the same dialog as a Withdraw transaction followed by an Enter transaction.

For example, scanning a tracking barcode on a container as the Source can lead to the following:

Here the user can select the item, if the container is a multi-use container (not shown in this screen example), or can elect to move the whole container (3).

This dialog follows essentially the same format as was described for the Withdraw transaction and will not be repeated here.

The Destination Barcode (4) can be another container with a tracking barcode or can be a location barcode or a generic location can be selected from a drop-down list, as described in the Enter transaction.

If material is moved to a single use container, it must have the same item number and attributes as other material already in the container. If the material is lot controlled, then it must have the same lot number as the material in the destination container. If the material has an expiration date then it must have the same expiration date as the material already in the container.

These restrictions do not apply to multi-use containers as the destination. They do, however, apply to Enter and Receive transactions, when they have an existing single-use container as their Destination.

MOVE MATERIALS
 User Badge: E1008
 Source Barcode: [Empty]
 Destination Barcode: [Empty]
 Buttons: Move, Clear, Return

MOVE MATERIALS
 User Badge: E1008
 Source Barcode: #15025
 Receiving Dock:
 Move Whole Container
 Destination Barcode: #01513
 Stock Room Bin #01513
 Buttons: Move, Clear, Return

Pack Container

The Pack Transaction is designed to record the packing of containers with their own “license-plate” tracking barcode onto a pallet with its own “license-plate” tracking barcode.

The tracking barcodes on the cartons or items being packed may be:

1. Type 1 Container Barcodes already known to BellHawk
2. Individually barcoded items
3. Pre-printed labels for Type 1 Containers or individually barcoded items.

Pack is intended to be used with the optional TAG module but can be used with pre-printed “BellTag” barcode “license-plate” labels.

The transaction consists of the data entry fields:

1. Employee badge (1)
2. A checkbox (2) which is set by default. If unchecked, this enables packing materials into an existing Type 2 container.
3. A selector for the Parent Container Type (3) which must be Type 2 - multi-use. The container can be selected from a drop-down list or from a subsidiary screen, using the ellipses.
4. A multi-line text box (4) into which the barcodes on the cartons can be rapidly scanned without individual verification as to their correctness. Allows up to 48 type 1 containers or individually barcoded item but only 6 are visible at a time, with vertical scroll bars.
5. A [Carton Scan Complete] button (5) which will cause checking that the scanned containers or items exist (visible or pending) in the containers table and, if they do, that there are no duplicate scans, and that the cartons do not already have a parent container – otherwise, give an error. If OK then a pop-up will show the number of cartons scanned – this is a double check that the material handlers have not missed a carton.
6. A destination location input field with ellipses for generic locations (6).
7. A pallet barcode input field (with a [#] label printing button if TAG is being used to print labels on demand). This can either be a “BellTag” that is unknown to the system (not already assigned to a pallet) or a new container barcode will be assigned and printed on the pallet label using the [#] button to invoke TAG.
8. A [Submit] button (8)

PACK

User Badge
E301 ①

New Parent Container ②

Parent Container Type
Shipping Pallet ... ③

Child Container Barcodes
#02424
#01502
#02428 ④

Carton Scan Complete ⑤

Parent Container Location
Shipping ... ⑥

Shipping Dock

Parent Container Barcode
#01503 ⑦

Submit ⑧ Clear Return

The Submit button will

1. Check that type 1 containers exist (visible or pending) and, if they do, that there are no duplicate scans and that they do not already have a parent container – otherwise give an error.
2. Assign a pallet barcode or use the BellTag and create a parent container entry in the containers table.
3. If the pallet label is to be printed, put the label in the print queue
4. Mark all the type 1 carton entries in the containers table have the pallet as their parent and move them to the pallet location
5. Make all the cartons on the pallet visible (IsDeleted = 0, IsPending = 0) in inventory if pre-printed labels were used.

Operationally the material handler will scan the tracking barcodes on the cartons then shrink wrap the cartons and print out a pallet tracking label to be adhered to the outside of the shrink wrap. Note that the scanned container barcodes may use SSCC or DSCSA barcodes as the container barcode and the pallet may use SSCC barcodes as its license plate tracking barcode.

Adjust Inventory

This screen enables materials inventory qualified managers to compare the quantity of materials in a location or a container that is supposed to be in stock with what is actually in stock. They can then adjust quantities of each item in each location or container.

This is sometimes done as part of an inventory “cycle counting” operation, based on the frequency of items usage. But most BellHawk users simply verify different sections of their warehouse or stock room on a periodic basis, as this is quicker and easier.

This screen is only available to users who are marked as Inventory Qualified in the User setup table or if you are logged in as a Materials Manager (not as a device user) who is inventory qualified and has scanning privileges. This button is accessed from Adjust button on the Inventory Role transaction switchboard.

The dialog for this transaction is essentially the same as for a Withdraw transaction except that the quantity displayed (4) is the amount that is supposed to be in-stock. This can then be adjusted to the amount that is actually in stock (6).

The screenshot shows the 'ADJUST INVENTORY' dialog box with the following fields and callouts:

- 1**: User Badge (E1008)
- 2**: Reason for Adjust (Setup Inventory)
- 3**: Source Barcode (#15025)
- 4**: Receiving Dock (Item Number: SBS100, One inch diameter stainless bar stock, 75 ft available)
- 5**: Unit Of Measure (Feet)
- 6**: Quantity (70)
- 7**: Adjust button

Users can select (2) from the Inventory Adjustment reasons (which were previously setup as described in the Setup User Manual).

Users can then scan a location or container barcode or select a generic location as the Source Barcode (3) and then view all the items in that source location or container (4). The Unit of Measure (5) and the Quantity (6) will be shown.

The quantity (6) can then be physically compared with the inventory of the selected item and, if needed an adjusted quantity can be entered. The selected unit of measure (5) can also be adjusted if necessary. The data is submitted by selecting the Adjust button (7). Note that this is the quantity of the item in the selected container or location NOT the adjustment amount.

Please note that the Adjust function allows for immediate verification and adjustment of inventory. A more formal “blind” inventory auditing function is available with the optional Inventory Auditing Module.

Zero Container

The purpose of the "Zero Container" transaction is to declare that a container is empty, i.e. has zero quantity, and to withdraw and discard its contents.

This is to solve the problem with liquids (and other materials) where the container is physically empty but the system thinks that there is some residual inventory inside the container (typically due to liquid coating the walls of the container).

1. This applies to type 1 and type 2 containers. If this is a type 2 container then recursively withdraw all materials from the nested container(s).
2. This applies to reusable and non-reusable containers. Non re-usable containers will be discarded and reusable containers retained.
3. Reusable Kanban containers will retain their part number with zero quantity

Transaction Steps:

1. Scan employee badge barcode (1)
2. Select reason for withdrawing from list of inventory withdraw reason codes (2)
3. Scan container barcode (3)
4. Select [Submit] (4)
5. Confirm that User wishes to Zero out contents of container
6. Loop back to (3) until [Return] is selected.

ZERO CONTAINER
User Badge
E301 1
Reason for Withdraw
Scrap 2
Container Barcode
#01500 3
Zero 4 Return

Material Flow

This transaction is intended to provide a simple mechanism to use MTS to track serialized parts as they go through a sequence of assembly, repair, or test operations.

This tracking will be done as a sequence of moves to locations such as "cutting", "milling", and "QC". The serialized parts may be moved individually or on carts/trolleys that have their own tracking barcodes. These carts/trolleys may be type 1 or type 2 containers.

The assumption is that there will be a fixed station device, such as a PC, tablet, or kiosk equipped with a barcode scanner, at each of these work locations. These devices will stay at their location and not move from location to location with a material handler like a regular mobile computer.

The order of user inputs are:

1. Scan employee badge (1) - only done infrequently - such as once a day
2. Scan (destination) location (must be a physical location, not a container) or select from generic locations using ellipses (2) only done infrequently - such as once a day
3. Scan serialized part license-plate tracking barcode or barcode on type 1 or type 2 container (3). Unlike a move transaction, this transactions performs a "Submit" upon receiving a CRLF character string from the barcode scanner. It changes text box color from green to yellow upon submit and does regular error checking in back end, as if for a Move transaction, and warns if there is an error.
4. Loop back to step 3 for another data entry with the text box empty.

Upon scanning the serialized part or container tracking barcode, the system will move the barcoded item or container to the previously scanned location.

The issue here is that the web-browser page needs to be kept open for hours at a time, as steps 1 and 2 will be performed first thing in the users shift and then item barcodes will be scanned, as needed, throughout the day to record their movement to locations where operations take place.

In order to achieve this, a JavaScript routine has been added to the browser page to periodically perform a "post-back" to the BellHawk server from the browser page. This will do nothing more than refresh the browser page, retaining the employee and location entries and with the focus of attention on the serialized part barcode data entry textbox.

Without this routine, the web browser page would time out and the user would have to login again if more than a few minutes passed without activity.

At the end of the day, the [Return] button (4) should be used to free up the resources used by the web page before closing the browser session.

The screenshot shows a web form titled "MATERIAL FLOW" with the following fields and controls:

- User Badge:** A text input field containing "E301", highlighted with a green background and a red circle with the number "1" next to it.
- Location:** A text input field containing "QC", highlighted with a green background, followed by a grey button with three dots "...", highlighted with a red circle with the number "2" next to it.
- QC Dept:** A text input field, currently empty.
- Material Barcode:** A text input field, currently empty, highlighted with a green background and a red circle with the number "3" next to it.
- Return:** A blue button at the bottom left, highlighted with a red circle with the number "4" next to it.

Lookup Inventory by Source

This transaction enables a user to scan a location or container and to see what should be in that location. It brings up a screen that looks as shown here, once the source has been scanned or selected (1). Alternately the source can be selected from the list of generic locations using the ellipses.

This screen shows the contents of the container or location in the same nested tree-view format as shown here (2). This shows the containers and their contents.

More details about any container can then be seen by selecting any specific line in the tree view, as shown here:

Container Detail		
Barcode	#15025	
Part Number	SBS100	One inch diameter stainless bar stock
Lot Number	150221	
Quantity	75	Feet
Location	Receiving	Receiving Dock
Expiration Date	02/23/2017	
Work in Process		

Return

The details will vary depending on which type of container was selected. The details also depend on whether the material is lot controlled or has an expiration date.

Please note that all untagged materials in a location or multi-use containers are considered to be in virtual containers. This is so that materials with different item and lot numbers and expiration dates can be tracked in a common multi-use container.

A similar nested tree view screen is used to select items and lot numbers from amongst multiple materials in a Type 2 container or untagged at a location.

Return to Stock

The Return to Stock transaction is used to return material in containers with tracking barcodes that had previously been withdrawn from stock. This transaction functions in a similar way to an Enter transaction on which it is patterned.

This transaction applies to type 1 single use containers and to individually barcoded items but not to type 2 containers.

When containers of material are withdrawn from BellHawk inventory they are not physically deleted from the database but instead are simply marked as deleted so they no longer appear in inventory.

The Return transaction makes the container reappear in inventory and allows for adjustment of its contents.

To make the container or individually barcoded item reappear in the BellHawk database, the tracking barcode on the container or item is scanned (1).

The tracking barcode is looked up in the containers table in BellHawk and, if it is in the table but marked as being in a "deleted" non-reusable container then the container details are shown, as if they had been entered in an Enter transaction.

The user can then modify the details such as quantity or location (2) of the returned material and select the [Submit] button to make the container or item be shown again in inventory, with the modified parameters.

If loose material are returned to stock then an Enter transaction should be used to re-enter these materials. If a type 2 multi-use container is returned then its contents should be returned separately the physical parent container retagged for future use.

Please note that the Return to Stock transaction is not designed to handle RMAs (Return Material Authorizations) as RMAs are handled as a custom transaction for those users who have licensed the Ship Order module.

RETURN

User Badge
E301

Tracking Barcode
[Barcode Field] ← 1

Reason for Returning
[Dropdown Menu] ...

Item Number
[Text Field] ...

Quantity
[Text Field]

Destination Barcode
[Barcode Field] ← 2 ...

[Submit] [Clear] [Return]

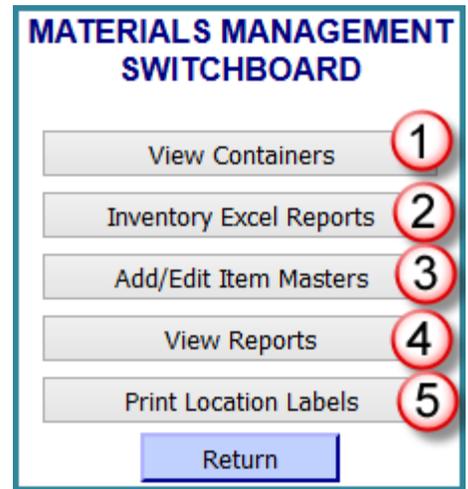
Materials Management

Materials Management Switchboard

The Material Management switchboard can be reached by selecting the Materials Management button on the Main Switchboard. This can only be accessed by a staff member with Materials Management role privileges setup by the systems administrator.

It provides access to five functions:

1. View and edit the contents of individual containers (1).
2. Perform Excel exports of Inventory data (2)
3. Add/Edit Item Master records (3)
4. View Inventory Reports (4)
5. Print location labels on “Avery” label sheets – useful for initial testing of the system.



View Edit Containers

The View Containers button on the Materials Management switchboard leads to the following screen (shown below in two successive half panels)

This screen shows the barcode on each container (1) along with an Edit button (2) and information about each container (3). When a container is a virtual container inside a Type 2 physical container, then the parent container barcode is shown but each virtual container has its own row.

In a typical organization there may be thousands of active containers. To specific containers enter descriptions in the filter row of boxes (4) using % as a wild card and then select Filter (5) to see just the filtered set.

To view or edit the data related to an individual container, select the Edit button (2) for that container.

List of Active Containers								
Barcode	2	Type	3	Item Number	Item Description	Quantity	UOM	Work Center
#01498	1 Edit	Bar Stock		SBS100	One inch diameter stainless bar stock	0	ft	
#01500	Edit	Tote		KB150	Stainless Steel Knob	0	ea	Production
#01503	Edit	Box		SSScrap	Stainless Steel Scrap	0.1	lbs	Production
#01517	Edit	Carton		KB150	Stainless Steel Knob	4	ea	
#20202	Edit	Case		KB150	Stainless Steel Knob	250	ea	Production
15021	Edit	Box		KB150	Stainless Steel Knob	0	ea	
#15022	Edit			KB150	Stainless Steel Knob	1	ea	Production
#15023	Edit			KB150	Stainless Steel Knob	1	ea	Production
#15024	Edit			KB150	Stainless Steel Knob	1	ea	
#15025	Edit	Bar Stock		SBS100	One inch diameter stainless bar stock	75	ft	
#02046	Edit	Bar Stock		SBS100	One inch diameter stainless bar stock	100	ft	
#015026	Edit	Bar Stock				0		
#10101	Edit	Pallet		SBS100	One inch diameter stainless bar stock	960	ft	
					4			

5 Filter **Return**

Please note that there are other columns to the right of those shown here. An Excel report with essentially the same information can be exported using the Inventory Excel Reports button on the Materials Management switchboard.

If the barcode is for a Type 2 parent container (1) then no Item Number is shown.

List of Active Containers										
Barcode		Type	Item Number	Item Description	Quantity	UOM	Work Center	Location, Parent Container	Lot Number	Exp Date
#01500	1 Edit	Picking Bin			0			Warehouse #01516		
#01500>1	2 Edit	Picking Bin	B100	Box of 100 Bandages	20	ea		Warehouse #01516 #01500	GH7865	May 19, 2016
#01500>2	2 Edit	Picking Bin	C101	Carton of Skin Cream	12	ea		Warehouse #01516 #01500	ZX4561	Jun 8, 2016
#01506>1	3 Edit		Rx329	Boxes of Antibiotic Pills	20	ea		Warehouse #01506	JKY7654	Mar 16, 2016

Filter **Return**

Untagged material in Virtual Containers are shown with their parent container barcode and the sequence number of the virtual container within the parent container as in #1500>2

If this is untagged material at a location (3) then the location barcode and the sequence number of the virtual container are used, as in #1506>1.

When the [Edit] button is selected an Edit Container Attributes screen appears as shown below.

EDIT CONTAINER ATTRIBUTES
This is a type 1 container.

Tracking Barcode: #15025

Container Type: Bar Stock ...

Item Number: SBS100

Item Description: One inch diameter stainless bar stock

Lot Number: 150221

Quantity: 75 ft

Location: Receiving Dock ...

Unit Cost: 0

Expiration Date: 02/23/2017

Owned By: CDEFurniture ...
CDE Furniture Manufacturers

For Customer: CDEFurniture ...
CDE Furniture Manufacturers

Order Number: [dropdown]

Save Changes Delete Return

The materials manager can edit any of the attributes of this container, including providing it with a new tracking barcode (1), or changing the lot number (2) and then Save the Changes (3).

This screen shows the type of container and will vary according to the type of container and its contents. If this is a Type 2 (multi-use) parent container then the screen shown below appears:

Users need to select the individual virtual containers for each item in the parent container from the containers list, in order to edit the contents of these virtual containers.

EDIT CONTAINER ATTRIBUTES
This is a Type 2 container. To edit the items contained within the container, you must select them from the container list.

Tracking Barcode: #02431

Container Type: Shipping Pallet ...

Save Changes Return

Handling KanBan Bins

A KanBan mechanism maintains inventory levels a signal is sent to have the container refilled with a specific material in order to be consumed again in the production run.

In order to setup a KanBan bin/container in BellHawk the staff user with the correct privileges will go to the Materials Management switchboard. Then the staff user will click on View Containers button in order to add a new container. The staff user needs to setup the new container with the code “KanBan” as the “Type Code” as seen in the Add Container Type screen on the right. The container box must be checked as “Is Reusable”. This enables the system to not close out the container when it becomes empty. The container will continue to keep the Item # and Item Description in association with that container in order to allow the material handlers or production workers to refill that container with the same items.

ADD CONTAINER TYPE

Type Code:

Container Description:

Sequence Number:

Is Multiple Use:

Is Reusable:

Tare Weight Units:

Tare Weight:

List of Active Containers													
Barcode		Type	Item Number	Item Description	Quantity	UOM	Work Center	Location	Lot Number	Exp Date	Owned By	For Customer	
331	Edit	Kan Ban Bin	P103	Core	0	ea		Warehouse #01504			Smith Industries	Smith Industries	

Filter

BellHawk Version 6.6

If the materials management staff user wanted to see the status of quantity in containers or which Kanban containers are empty the staff user would click on the Inventory Excel Reports or View Reports buttons on the Materials Management Switchboard. They can specifically choose to view KanBan’s under the Inventory Excel Report. With the View Report the user would have to pick the location they want to look up the containers.

Page 1 of 1 Pdf

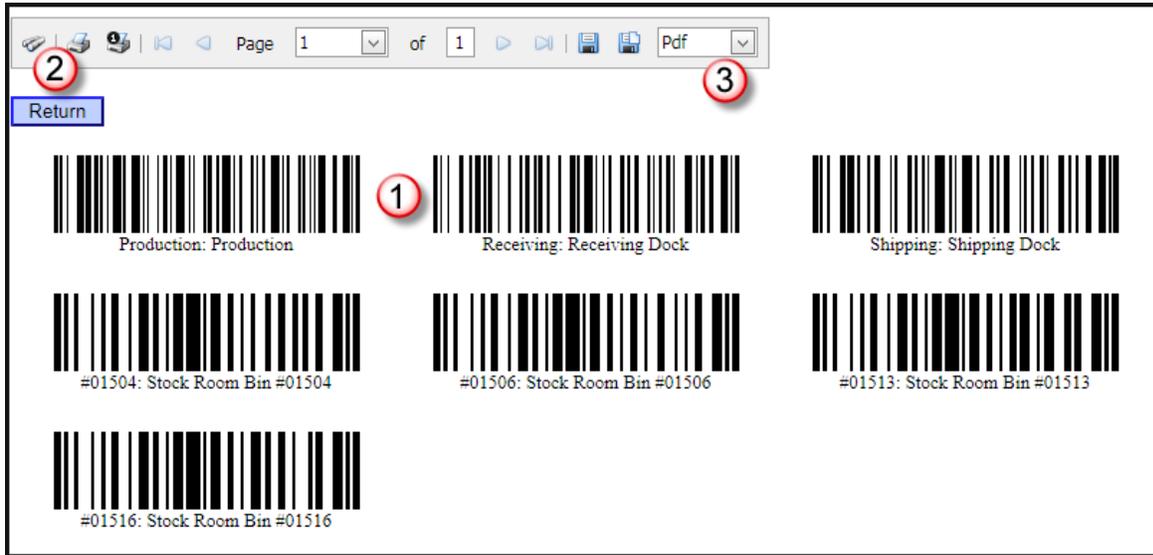
Items In Stock

All Item Numbers; All Item Categories; All Work Centers; All Facilities

Item Number: P103		Core			
Container Tag	Parent Tag	Location	Lot Number	Quantity	Units
331		Warehouse #01504		0	ea
<i>Total In Stock:</i>				0	ea
<i>Minimum Inventory Qty:</i>				0	ea

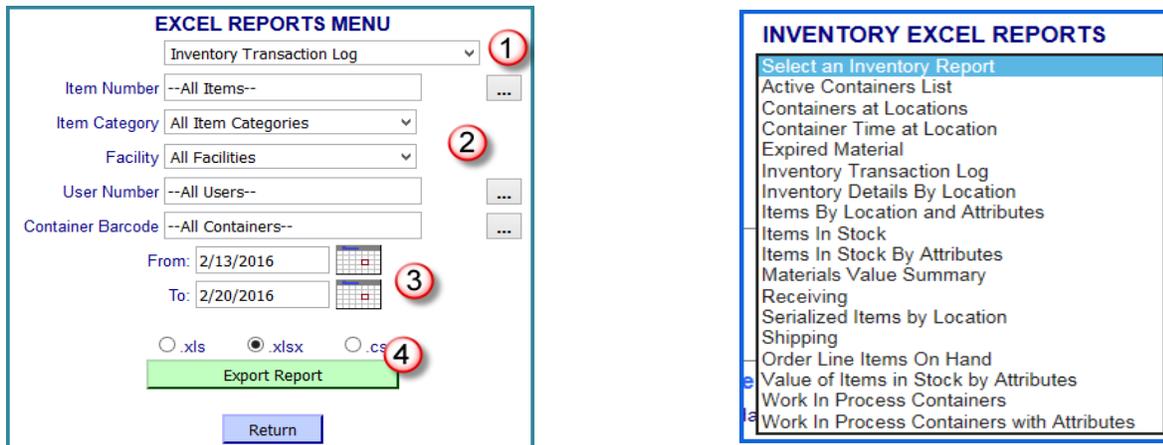
Print Location Labels

This is useful for initial software testing. It allows for printing out the location barcodes on a paper form. The screen is as shown below:



This screen has barcodes (1) for each location in BellHawk. These barcodes can be printed on an office printer (2) or saved in a PDF format file for subsequent printing (3). Please note that while these are in a layout suitable for printing on "Avery" label sheets we have found that getting the printer correctly aligned can be problematic. Also these labels are not durable enough for production use as they are easily damaged and easily fall off.

Excel Reports



The material manager has a variety of Excel exports available as shown here. Selecting an export (1) will bring up a subsidiary set of selector options as shown (2) above.

These may include inclusive date range selectors (3) and a choice of output format (4).

Selecting the Export Report button, will then bring up an Export, such as that shown below:

Inventory Transaction Log									
Date/Time	Action	Employee	Item Number	Quantity	UOM	Container Tag	Container Type	Source	Destination
8/3/2013 4:34:39 PM	Enter Material Into Inventory	Mixer, Mario	CS003	100	ea	#02427	Case		Stock Room Bin #01506
8/3/2013 5:25:21 PM	Enter Material Into Inventory	Mixer, Mario	SM101	100	lbs	#02430	Tote		Stock Room Bin #01516
8/3/2013 5:26:02 PM	Enter Material Into Inventory	Mixer, Mario	SM101	100	lbs	#97656	Tote		Stock Room Bin #01516
8/4/2013 5:28:16 AM	Receive	Mixer, Mario	L001	50	lbs	#02429	Carton	PO: PO2543	Receiving Dock
8/4/2013 5:52:58 AM	Withdraw Untagged Material	Mixer, Mario	L001	5	lbs			#02429	
8/4/2013 6:37:33 AM	Move Tagged Material	Green, Peter	FS001	15	ea			#01502	Shipping Dock
8/4/2013 6:40:06 AM	Ship Tagged Material	Green, Peter	FS001	15	ea			#01502	
8/4/2013 7:04:34 AM	Tag Container	Green, Peter		0		#02431	Shipping Pallet		Shipping Dock
8/4/2013 7:37:47 AM	Return Tagged Material	Green, Peter	FS001	15	ea			#01502	Shipping Dock
8/4/2013 9:50:15 AM	Edit Container	Green, Peter		0				#97656	#97656
8/4/2013 10:01:28 AM	Move Untagged Material	Green, Peter	CS003	15	ea			#01500	#02431

Reports

When the Reports button is selected from the Reports switchboard then a list of report categories are shown. From these categories the following reports can be selected:

Materials Management

- Materials Value Summary

Materials at Location

- Containers by Location
- Inventory Detail by Location

QC Inventory

- Expired Materials
- QA Restricted Materials - usually materials waiting for inspection

Production Material Management

- Inventory Transactions Log
- Production Materials
- Scrap

Ship Orders

- Ship Order Detail

Inventory Summary

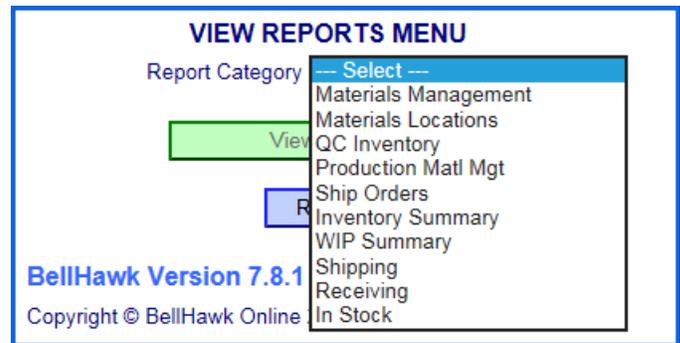
- Materials Summary

WIP Summary

- WIP Inventory

Shipping

- Shipping Report



Receiving

- Receiving Report

In Stock

- Items in Stock

When a report category (1) and report name (2) are selected then a set of selectors appear. If left blank then ALL is assumed. If not then the selectors are applied as filters.

Finally the [View Report] button (4) is selected.

<i>Item Number: KB150</i> <i>Stainless Steel Knob</i>					
<i>Container Tag</i>	<i>Parent Tag</i>	<i>Location</i>	<i>Lot Number</i>	<i>Quantity</i>	<i>Units</i>
#02424	#01503	Shipping Dock		6	ea
<i>Total In Stock:</i>				6	ea
<i>Minimum Inventory Qty:</i>				0	ea
<i>Item Number: MD203</i> <i>Medallion</i>					
<i>Container Tag</i>	<i>Parent Tag</i>	<i>Location</i>	<i>Lot Number</i>	<i>Quantity</i>	<i>Units</i>
#02428	#01503	Shipping Dock		1	ea
#01502	#01503	Shipping Dock		1	ea
<i>Total In Stock:</i>				2	ea
<i>Minimum Inventory Qty:</i>				0	ea

You will note that locations can be associated with specific Facilities, such as a warehouse, within a plant. This gives the ability to generate a report for just the selected facility.

Selecting the View Report button will bring up a report screen such as that shown below in a separate browser tab.

From this screen, users can create a printed copy of the report (1) on their local office printer or generate a PDF file containing the report (2) for Emailing to other people.

User Defined Item Configuration Parameters

When materials are entered into inventory with an Enter or Receive transaction then the user can define additional parameters to be collected, based on attributes of the Item being entered such as the Item Number, Category, or Material Type. These can include lengths and widths of material.

These user defined parameters are stored as part of the Container record for a type 1 or a virtual container or an individually barcoded part.

When performing a Return transaction, the attributes of the material in the container being returned are shown and may be modified.

Setting up these User Defined Parameters is described in the "BellHawk User Defined Parameter and Item Configuration User Manual". This capability is now included as an integral part of the BellHawk MTS software.

Commentary

The BellHawk Real-Time Operations Tracking Software (RT-OPS) and License-Plate Materials Tracking Software (LP-MTS) have a very comprehensive set of capabilities for tracking materials and work-in-process. For performing more complex operations tracking and management tasks these software editions may be supplemented with many optional modules including the Purchase Order Receiving, Ship Order, Picking, Inventory Auditing, and Shipping Dock options.