

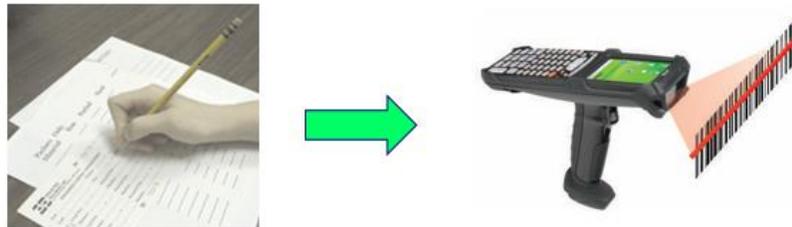
## KnarrTek Data Sheet Job and Materials Tracking System (JMTS)



### Introduction

The KnarrTek Real-Time Job and Materials Tracking System (JMTS) is manufacturing software that enables operations managers and their staff to track their inventory and manufacturing operations in real-time in one integrated system.

JMTS is used by a wide-variety of manufacturers, with a special emphasis on those organizations doing short-run, custom or semi-custom, quick-turn production runs. JMTS is used by food, pharmaceutical, and medical device manufacturers, as well as by engineer-to-order organizations in the construction and defense industries. It is also used by repair and maintenance organizations as well as by industrial distributors who do secondary operations such as kitting and assembly.

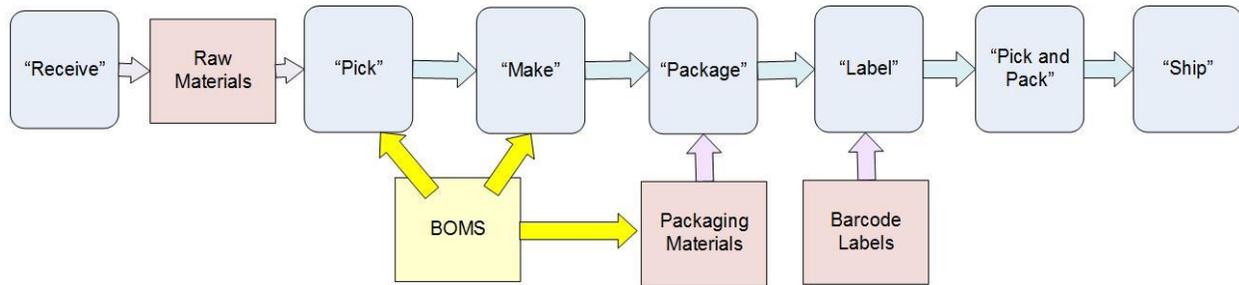


JMTS enables manufacturing and industrial distribution organizations to transition from using paper forms and manual keyboard data entry to track their operations and inventory to using technologies such as barcode scanning and mobile computing for real-time data capture.

KnarrTek JMTS also:

- Provides a real-time view of the status of inventory and production operations
- Integrates full industrial warehouse management capabilities
- Tracks materials by lot and serial number and expiration date and tracks customer owned materials as well as project inventory and assets.
- Tracks WIP materials as they flow from work-center-to-work-center
- Helps prevent mistakes such as using or shipping the wrong materials
- Accurately captures the cost of making each batch of product
- Captures traceability history data as to what materials and parts were used to make each product and who the products were shipped to.

## Overview



JMTS tracks the receipt and put-away of raw materials, their transformation through a sequence of production operations into intermediate and then finished products, and then their packing and shipping to customers. This enables manufacturing organizations ensure that customer orders get delivered on-time and that they have adequate materials on-hand to make those orders.

JMTS integrates industrial warehouse management capabilities, based on the use of license-plate-number (LPN) container tracking principles, with real-time tracking of work-in-process materials as they flow from manufacturing operation to operation, in real-time.

JMTS is based on the BellHawk Real-Time Work-in-Process, Job and Materials Tracking software platform and the MilramX automated information exchange software platform. It integrates the capabilities of the JMTS Job Tracking System and MTS Materials Tracking System products and adds many capabilities, including the ability to store Bills-of-Materials (BOMs) and routes to make products. These BOMs and routes can be directly entered into JMTS or can be imported from ERP or similar system.

JMTS uses these BOMs and routes to generate work orders to make a specified quantity of product. These work orders can then be used to record the materials used at each stage of manufacture of the products, to track WIP materials produced and consumed by the manufacturing operations, as well as tracking the finished products. This enable JMTS to track the cost of manufacturing each batch of products as well as capturing its materials traceability history.

In JMTS, BOMs can also be used to generate Pick Orders to pick the materials for each manufacturing operation. They are also used to warn employees if they attempt to use the wrong materials to make a product and/or to pick the wrong products from a warehouse or stockroom.

JMTS not only tracks raw, intermediate, and finished goods inventory but it also tracks predicted future inventory levels. It does this in real-time by taking the physical inventory level of each part, adding the quantities on-order on purchase orders or scheduled to me made by manufacturing jobs, and subtracts materials to be consumed on planned manufacturing jobs and/or on ship orders to customers. This results in a time-phased prediction that can be used as the basis of manual or automated reordering of more parts.

## JMTS Technology



The JMTS software consists of a specialized website and a SQL server database, which run on a Windows Server computer. This software can be installed at a client's own data center or used on servers managed by KnarrTek at secure data centers in the USA through its BellHawk Online service.

Each organization gets their own private website and database. This ensures privacy of data for long-term users of JMTS through BellHawk Online. It also enables clients to quickly start out using JMTS using BellHawk Online and then to easily transition to installing the software on their own server.

With JMTS, data can be collected using any web-browser based device with an integral or attached barcode scanner. No special software is required to be installed. Just point the device's web-browser to the URL of the client's JMTS website and start collecting data.

Information collected in the SQL Server database can then be viewed from any web-browser based device, including mobile phones, over a secure encrypted data link, anywhere a user has an Internet or Intranet connection.

The JMTS software is based on a rules-based expert-systems engine that enables the JMTS system to be readily configured and customized for a wide-variety of applications by clients importing rules in the form of Excel spreadsheets.

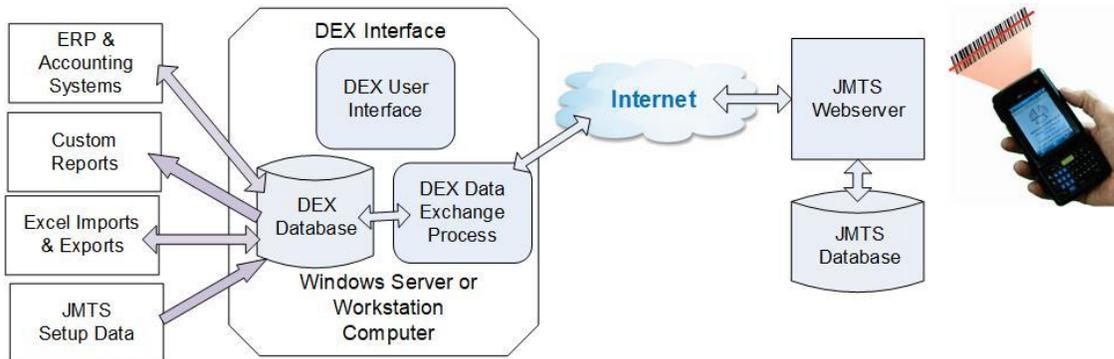
JMTS does not need the use of a barcode label printer as barcoded work orders and pick sheets can be printed out using an office laser printer. JMTS can also use preprinted rolls of LPN tracking barcodes to track containers of material.



The optional DEX interface provides a local "mirror" of the JMTS database.

Writing data to tables in this local database automatically causes the corresponding tables in the JMTS database, which may be running at a remote data center, to be automatically updated. Also, all the transactional data captured by JMTS is automatically mirrored into the local DEX database.

The DEX interface can be used to implement automated data exchange data with ERP, accounting, and CAD systems. Also, software, such as Access and Excel, or other report generation software, can be linked to the DEX database and used to produce custom reports.



DEX comes in two versions:

1. DEX2 – which is a computer program which can be installed on a user’s PC to exchange data between a local SQL Server Express DEX database and JMTS. This can be used to send data to JMTS and to create ad-hoc reports and Excel exports.
2. MDEX – which runs as a service on a client’s Windows Server and has a web-browser user interface. This is used for implementing automated interfaces with ERP, accounting, and other systems, as well as creating custom reports that will be used repeatedly.

JMTS uses License-Plate-Number Container Tracking Methods and integrates a full industrial warehouse management system (WMS) based on these methods. Please see the separate data sheets for License Plate Number Materials Tracking Methods and for the KnarrTek Materials Tracking System (MTS) for details.

Also please see separate data sheets for the KnarrTek Job Tracking System (JMTS) and on JMTS Bills of Materials (BOMS) for details on how JMTS uses work orders and BOMs to track manufacturing operations.

### **JMTS Benefits**

1. JMTS is manufacturing software that integrates real-time production and inventory tracking with a full-range of industrial warehouse management capabilities. This eliminates the need to try to integrate separate job tracking and warehouse management systems.
2. JMTS can work stand-alone or with a wide-range of different ERP and accounting systems. It can be used on an affordable subscription basis, in the Cloud, or can be installed on each client’s own computers.
3. JMTS can save the labor of between one and three Full-Time-Equivalent people at a loaded labor cost of \$5,000/month each for a subscription fee of under \$1,500/month by eliminating the use of paper forms and manual keyboard data entry.
4. JMTS makes it easy for material handlers and equipment operators with limited computer skills or for whom English is a second language to accurately capture production and inventory data by using technologies such as barcode scanning.

5. JMTS provides real-time status information on the progress of customer orders and can provide scheduling guidance to help ensure that customer orders get shipped on time.
6. JMTS enables manufacturers to avoid unnecessary overtime costs, expedited shipping costs, late delivery fees and lost customers due to poor scheduling of work.
7. JMTS provides real-time status of available inventory to enable the use of Lean inventory practices, while avoiding stock-outs and making or buying excess inventory.
8. JMTS helps prevent mistakes such as picking, using, or shipping the wrong materials or materials that have not passed QC inspection or have passed their expiration date.
9. JMTS can track pallets with many different materials, including those with different lot and serial number, loaded onto each pallet. It can then make sure that each pallet gets loaded onto the correct truck for delivery to customers or distribution centers.
10. JMTS uses License-Plate-Number (LPN) container tracking methods which are required for supply-chain integration as well as compliance with Government agency and standards requirements for tracking materials.
11. JMTS tracks performance data, such as how long operations take, as well as test, scrap and rework data. It also tracks QC Test failures including reason codes. This can be used as the basis of Kaizen performance improvement activities.
12. JMTS accurately captures materials traceability history data to enable rapid detection of the source of defects and minimizes the scope and cost of resultant recalls.
13. JMTS is a CFR 21 Part 11 compliant barcode data capture system for tracking materials. This enables validation to meet FDA requirements for Pharmaceutical and Medical manufacturing applications without paying a million dollars or more for Part 11 compliant software.
14. JMTS can track materials at multiple geographic locations, including in multiple warehouses and stock rooms, on multiple production floors, in-transit on vehicles, and on construction and other field sites.

## **Commentary**

The KnarrTek JMTS Job and Materials Tracking System is based on the BellHawk<sup>®</sup> real-time work-in-process, job and material tracking software platform, which is licensed by KnarrTek from Milramco LLC. For more details about the BellHawk software platform, please see the “BellHawk Software Handbook”, which describes this software in great detail. The DEX interface is based on the MilramX<sup>™</sup> automated information exchange software platform which is also licensed by KnarrTek from Milramco LLC.

## **For more information**

Please send an Email to [Sales@KnarrTek.com](mailto:Sales@KnarrTek.com) or see [www.KnarrTek.com](http://www.KnarrTek.com) for more details.