Bill of Manufacturing Guide

Bill of Manufacturing Guide

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1   Introduction

🎥 Video - Bill of Manufacturing Overview

What does the bill of manufacturing do for you?

The bill of manufacturing (BOM) stores item manufacturing specifications and provides the following features and benefits:

- Unlike a bill of materials, which is limited to components, the bill of manufacturing encompasses all manufacturing specifications, including revisions, routing, components, and outputs.

- The bill of manufacturing fits almost any type of product, including standard items, subassemblies, batch type items, one-off custom items, byproducts, co-products, disassembled items, and remanufactured items.

- The bill of manufacturing provides all the specifications needed to drive MRP and shop control.

- Revisions provide engineering control and enable you to track specifications for current, pending, and past product versions.

- The routing lists all labor and subcontract service processes and associated details in sequential order and is the basis for product costing, work center scheduling, labor tracking, and job subcontracting.

- Multiple outputs accommodate byproducts, co-products, and disassembled items and are ideal for disassembly and remanufacturing jobs.

- Each BOM's multi-level product structure is displayed in indented and tree view formats.

- You can attach documents, files, or web links to BOM parents for automatic linking to jobs, which can be used for spec sheets, engineering drawings, images, safety data sheets, QC data collection sheets, training and safety compliance videos, CAD drawings, and website links

- Rapid BOM creation is facilitated by standard work center and subcontractor processes and the routing generator and speed entry functions.

- BOM components can be imported from CAD programs and other sources.

- The bill of manufacturing includes notes and task details within labor sequences that print on the shop traveler and provide process instructions out on the shop floor.

- Bills of manufacturing enable you to transfer process knowledge from key production employees to your database so that it is preserved and protected and can be accessed by anyone who needs it.

- The bill of manufacturing provides extensive process documentation, augmented with the ability to attach documents to items for automatic linking to jobs, which can help you comply with ISO-9000 and other documentation requirements.

Our design is optimized for small business

We've designed our bill of manufacturing so that it can be successfully used by companies of any size, especially small businesses, for these reasons:

- Many small businesses make complex products and need BOM capabilities that go beyond the simple component lists provided by light manufacturing systems.

- The bill of manufacturing drives our "Total Control" process workflow, which eliminates all manual processes and is the easiest and most efficient way to run the manufacturing side of your business, no matter how small it may be.

Who is this guide for?

This guide is for the benefit of managers, product engineers, production planners, and anyone who wants to learn how a bill of manufacturing works or is considering using DBA as a manufacturing solution.

2   Why You Need a Bill of Manufacturing

How is a bill of manufacturing different than a bill of materials?

Unlike a bill of materials, which is limited to a listing of the components that comprise an item, the bill of manufacturing encompasses all manufacturing specifications, including revisions, the routing, components, and outputs.

It goes beyond components

There is much more to a bill of manufacturing than a list of components. Revisions provide engineering control and enable you to track specifications for current, pending, and past product versions. The routing lists all labor and subcontract service processes and associated details in sequential order and is the basis for product costing, work center scheduling, labor tracking, and job subcontracting. Multiple outputs accommodate byproducts and co-products and are ideal for disassembly and remanufacturing jobs.

Can be used with virtually any product

The bill of manufacturing fits almost any type of product, including standard items, subassemblies, batch type items, one-off custom items, byproducts, co-products, disassembled items, and remanufactured items. It accommodates ultra-simple single-level items on up to highly complex multi-level product structures.

Drives MRP and shop control

The bill of manufacturing provides all the specifications needed to drive MRP and shop control. MRP uses parent and component requirements to compare net demand with stock on hand to generate jobs and POs when needed. Routing cycle times are used to calculate item *Job Days* settings that determine job start and finish dates in the master schedule. Routings are the basis for job sequence scheduling within work centers out on the shop floor.

Enables total control over all manufacturing processes

When you operate solely with a bill of materials, you are using a "light manufacturing" system that is limited to inventory processes and forces you to use manual processes to run the shop. With a bill of manufacturing, however, you now have total control over all manufacturing processes, including job release, work center scheduling, job labor tracking, and subcontract service processing.

Provides instructions to the shop floor

The bill of manufacturing enables you to define detailed notes and task details within each labor sequence. This information prints on the shop traveler and provides process instructions out on the shop floor, which improve quality and reduce errors.

Makes you less reliant on key employees for process knowledge

When process knowledge primarily resides with key employees, you are vulnerable when the one person who knows how to perform a critical process happens to be sick or on vacation or leaves the company. Bills of manufacturing enable you to transfer all this knowledge to your database so that it is protected and can be accessed by anyone who needs it.

Helps with ISO-9000 and other documentation requirements

The bill of manufacturing provides extensive process documentation, augmented with the ability to attach documents to items for automatic linking to jobs, which can help you comply with ISO-9000 and other documentation requirements.

3   Bill of Manufacturing Elements

The bill of manufacturing (BOM) is comprised of the following elements, each of which is described in detail over the next several chapters:

Stock Items

All BOM parents and components are first defined as stock items in the *Stock Items* screen.

Work Centers

Work centers are defined in the *Work Centers* screen and are used to organize the shop into work areas for job sequence scheduling. A work center can be a machine, a set of interchangeable machines, or an assembly area.

Subcontractors

Subcontractors are defined in the *Subcontractors* screen and are used for subcontract service processes such as plating, painting, and heat-treating.

Standard Processes

Standard processes can optionally be defined against work centers and subcontractors to create a library of processes that enable rapid routing creation with consistent cycle times and process documentation.

BOM Types

BOM parents are defined on the *List* tab in the *Bills of Manufacturing* screen. BOM types include standard BOMs, batch type BOMs, one –off BOMs for custom items, secondary output BOMs, and phantom assembly BOMs.

Revisions

Revisions provide engineering control and are defined on the *Revisions* tab in the *Bills of Manufacturing* screen. Each new version of a BOM parent can be given its own revision number. Complete BOM specifications are stored for current, pending, and archived revisions.

Routings

Routings are defined on the *Routing* tab in the *Bills of Manufacturing* screen. Each routing is a sequential list of the BOM parent's labor and subcontract service processes. Each labor process is designated for a specific work center and includes setup and cycle times, traveler notes, and tasks. Each subcontract process includes PO notes, the supplier price, and the number of days required to perform the service.

Components

BOM components are defined on the *Components* tab in the *Bills of Manufacturing* screen. Components can be subassemblies or purchase items. Each component is assigned to the routing sequence in which it is used.

Outputs

BOM outputs are defined on the *Outputs* tab in the *Bills of Manufacturing* screen. Each BOM has a primary output, which is the BOM parent, but can also have secondary outputs for byproducts, co-products, or disassembled items.

Multi-Level Views

The *Indented View* and *Tree View* tabs in the *Bills of Manufacturing* screen provide multi-level views of all lower levels in the BOM parent's product structure.

4   Stock Items

This chapter explains the role that stock items play within bills of manufacturing and how they are properly used and set up.

Each BOM parent is an M item

Each BOM parent must be first set up as an 'M' (manufactured) item in the *Stock Items* screen. A BOM parent can also be used as a component in another BOM, in which case it functions as a subassembly.

Each purchased item is a P item

Purchased items are used as BOM components and can be used across multiple BOMs. Each such item must be set up as a 'P' (purchased) item in the *Stock Items* screen.

Never use descriptors to substitute for stock items

Never use descriptors, which are non-stock items, to substitute for stock items. The manufacturing process workflow and product costing are not designed to accommodate descriptors. Manufacturing planning is driven by inventory, which requires that all BOM components be stock items.

> NOTE: A "stock" item does not literally mean that the item is intended to have stock on hand. It simply means that the item is <u>capable</u> of being stocked.

Item specifications drive sales, purchasing, and inventory control

Item specifications drive sales, purchasing, and inventory control.

- Item price and tax information flow through to sales order entry.

- Item sourcing information, including suppliers, supplier prices, and manufacturer part numbers, flow through to PO generation.

- Item locations and lot/serial numbers drive inventory control activities such as stock counts and stock transfers.

Item specificity is a key manufacturing principle

It is vitally important that <u>any variation</u> in any item must be represented by a unique item ID. This is an absolute requirement in order for product costing, inventory control, MRP, and job release to work properly. Here are some examples:

Raw vs. Processed Version

If a part can be raw or processed, such as plated or painted, the raw version and the processed version each require a unique item ID.

Purchase Item Revision

If a purchased item has different revisions, a unique item ID is required to distinguish one revision from another. Here is the basic guideline to follow:

- If using a particular revision for a component is an engineering requirement for a parent item, each revision must be represented with a unique item ID for specificity within the BOM.

- If different revisions are interchangeable, can be freely used in any BOM, do not need separate inventory tracking, and can be purchased based on best price and availability, only then should a single item ID be used.

Manufacturer Part No

If a purchased item must be sourced from a specific manufacturer part number as an engineering requirement, a unique item ID is required that corresponds solely with that one manufacturer part number.

NOTE: You should only assign multiple manufacturer part numbers to the same item when those part numbers are completely interchangeable and you can freely purchase whichever version has the best availability and price.

Blemished Item

It an item is blemished and needs reworking, the blemished version must be given a unique item ID to distinguish it from the pristine version.

Used Item

If a used item is returned from a customer, the used version must be given a unique ID to distinguish it from the pristine version.

Remanufactured Item

If a remanufactured version of an item is made, it must be given its own unique item ID to distinguish it from the original version.

Use one-off items for custom manufacturing

When manufactured items are customized for each sales order, either by copying and modifying a model BOM or creating a custom BOM from scratch, one-off item IDs are generated automatically during quote entry using the *One-Off Item Generator*. See the *Custom Manufacturing* guide for details.

Item ID Change

The *Utilities – ID Changes – Item ID Change* screen can be used to change an item ID across all tables where it is used. You can use this screen to reorganize your item ID numbering, if so desired. Keep the following points in mind.

- Item ID characters do not need significance as they might have in the past when item lookups were primitive and each character identified a particular attribute. It is better to incorporate attributes into the item description rather than the item ID.

- It is much easier to work with shorter ID's in general. Phone numbers, for example, are purposely limited to seven characters because research has shown that people can recognize numbers up to that length, but struggle remembering longer numbers.

- Alpha <u>prefixes</u> can be used to sort and group related items on lists and lookups.

- Use alpha <u>suffixes</u> to distinguish between different versions of the same item. For example, if you have a pristine version and a used version of a manufactured item, append a 'U' or some other character on the end to distinguish the used version from the pristine version. This way both versions get listed together on lookups and reports.

5   Work Centers & Machines

This chapter explains the roles that work centers and machines play within bills of manufacturing and how they are properly set up.

What is a work center?

A work center is a unique machine, a set of interchangeable machines, or an assembly work area.

Each labor sequence is assigned to a work center

Within the *Routing* tab in the *Bills of Manufacturing* screen, each labor sequence is assigned to the work center in which it is performed. This enables work center rates for labor and manufacturing overhead to be applied to routing setup and cycle times to calculate sequence labor and overhead costs. This also lists the sequence in the *Work Center Schedule* screen when a job for a BOM parent is released to production.

Work centers are machine-based or worker-based

Work centers are machine-based or worker-based and should be set up in the *Work Centers* screen as follows:

Machine-based work centers

This type of work center is a unique machine or a set of interchangeable machines. A unique punch press, for example, would be set up as a work center with one machine assigned to it. A group of three identical molding machines, each of which can perform the same processes using the same tooling, would be set up as one work center with three machines assigned to it.

Worker-based work centers

This type of work center is used to perform non-machine processes such as assembly, welding, packaging, and shipping. Usually, each such work center is a physical area of the shop that is designated for a particular type of work.

Hourly Rates

Hourly rates for setup, labor, and manufacturing overhead are derived from shop rates and can be factored up or down for exceptions on the *Detail* tab in the *Work Centers* screen. Product costing is covered in detail in the *WIP Accounting* guide.

Standard Processes

Standard processes for commonly performed operations can be entered in the *Processes* tab in the *Work Centers* screen. See chapter 8, *Standard Processes*, for details.

Assign machines when applicable

If a work center is machine-based, enter the associated machine or machines in the *Machines* screen and assign those machines to that work center. This enables particular machines to be assigned to job sequences in advance or when jobs are in production. It also tracks production history by machine, which can be helpful for maintenance planning.

6   Subcontractors

This chapter explains the role that subcontractors play within bills of manufacturing and how they are properly set up.

📹 [Video - Subcontracting Overview](#)

📹 [Subcontracting Screenshot Series](#)

What are subcontractors?

Subcontractors perform outside services such as painting, plating, and heat-treating that are performed during the course of jobs.

Each subcontract routing sequence is assigned to a subcontractor

A subcontract routing sequence is used when a process is performed on the outside instead of in-house within the shop. Each subcontract routing sequence is assigned to the subcontractor who performs the outside service.

Set up a subcontractor for each of your outside service suppliers

Set up a subcontractor for each of your outside service suppliers in the *Subcontractors* screen.

Standard Processes

Standard processes for commonly performed subcontract services can be entered in the *Processes* tab in the *Subcontractors* screen. See the chapter [Standard Processes](#) for details.

7   Standard Processes

This chapter explains the role that standard processes play within bills of manufacturing and how they are properly set up and used.

What is a standard process?

A standard process is a labor process that is commonly performed within a work center or it is an outside service that is commonly performed by a subcontractor. A standard process can apply to multiple routing sequences across multiple bills of manufacturing.

Each routing sequence is assigned to a standard process

Each routing sequence on the *Routing* tab in the *Bills of Manufacturing* screen is assigned to a standard process, which serves these purposes:

- It ties routing sequences back to a common originating process that facilitates mass updating when changes are made to cycle times, process details, or subcontract prices.

- Standard processes serve as templates that enable new routing sequences to be rapidly generated with complete details that can be modified as needed for particular items.

- Standard processes provide a consistency of style and details across all your routings that flow through to job travelers out on the shop floor.

Not every company needs to use standard processes

Not every company needs to use standard processes. Companies fall into two basic profiles:

- If your company makes items where each item has its own unique processes, there is no need for standard processes other than setting up one default process per work center. Companies with standard products often fit this profile.

- If your company makes items where common or similar processes are applied to many items, using standard processes can be highly beneficial, as explained below. Custom manufacturers and job shops often fit this profile.

Many work center activities can be defined with standard processes

Many work center activities can be defined as a set of standard processes. A machine, for example, is capable of performing various processes that can be applied to many different items. The same principle applies to assembly type work centers where common tasks can be applied to many different items. Standard processes are entered on the *Processes* tab in the *Work Centers* screen.

Many subcontractor activities can be defined with standard processes

Subcontractor processes such as painting, plating, and heat-treating often apply to multiple items and can be defined as standard processes within the *Processes* tab in the *Subcontractors* screen.

The Routing Generator enables rapid selection from standard processes

The *Routing Generator* accessed from the '+' button within the *Routing* tab in the *Bills of Manufacturing* screen enables rapid selection of standard processes from each work center or subcontractor used in the item's routing. So instead of painstakingly creating each routing process from scratch, standard processes are selected and then modified as needed to suit the item being made.

Use Process Categories to facilitate routing generation

You can create process categories and assign standard processes to them within the *Process Categories* screen. This enables you to filter standard processes by process category when using the *Routing Generator*.

Process categories provide a flexible alternative to process selection by work center. With user-defined process categories you can group sets of related processes. A set of related processes could be relevant to certain types of products or to a particular product line or individual product. An individual process can be assigned to multiple process categories, providing additional selection flexibility.

Alternate Processes

Some routing sequences have alternate processes. For example, you may normally perform a process in house, such as painting, but you also have the alternative of sending items out for painting. You can create a process category using the BOM parent's item ID as the category ID. During the course of a job, you can use the *Replace Sequence* option to replace the standard process with the alternate process. In the *Replace Sequence* selection screen, use the *Process Category* to quickly find the alternate process for this item.

Each standard process can be extensively documented

Standard processes enable you to extensively document production details, all of which eventually flow through to the job traveler for the benefit of workers out on the shop floor. Within work center processes you can define setup time, cycle time, job traveler notes, and you can break the process into discrete tasks. Within subcontractor processes you can maintain the supplier price, lead days, traveler notes, and PO notes that eventually flow through to the PO that gets generated in the *Job Subcontracting* screen.

Use standard processes to reflect machine cycle time variations

With some machines you can define a set of standard processes that reflect all the possible cycle times that vary according to material size or other characteristics.

Standard processes provide mass maintenance capabilities

Using standard processes enables you to compare and maintain identical or similar processes across multiple items. In the *Processes* tab within the *Work Centers* or *Subcontractors* screen, you can click the *Process Where Used* button to view all the items where a process is used. You can use the *Process Replace* screen to replace a process with another process across all items that use the process.

Standard processes provide consistency to your routings

Using standard processes helps impose a consistency to your process descriptions, task breakdowns, and job traveler notes.

Developing standard processes takes time now, but saves in the long run

Before you rush into creating item routings, spend as much time as possible developing a library of standard processes because it will save you a great deal of time in the long run with routing generation and maintenance. Not only will you save time, but you will have consistent and thoroughly detailed job travelers and subcontract POs that enhance efficiency out on the shop floor and with your subcontract suppliers.

Set up a default process against each work center and subcontractor

Whether you choose to use standard processes or not, at a minimum you must set up set up one default process within each work center and subcontractor. The default process serves as a placeholder and can have minimal detail. All new routing sequences will be assigned to the default process.

8   Product Structures (Subassemblies)

This chapter explains how to properly establish multi-level product structures using subassembly BOMs.

What is a product structure?

A product structure is a bill of manufacturing and all the lower level BOMs that contribute to it. The *Indented View* and *Tree View* tabs in the *Bills of Manufacturing* screen display each BOM's product structure.

Routings, not bills of material, determine product structures

In light manufacturing systems, the bill of material governs product structures and is often "flattened" out so that multiple levels can be represented within a single parent item. When you use routings, however, this is not possible or desirable. Each assembly has its own routing processes and therefore must be given its own BOM. The associated materials support the routing processes within which they are used. In a non-light manufacturing system, routings determine product structures, not bills of material.

What is a subassembly?

A subassembly is any BOM that is used as a component in another BOM. Subassemblies are commonly used as components in multiple BOMs, in which case they are members of multiple product structures.

Product structures occur automatically

Product structures occur automatically whenever you add a BOM parent component to another BOM as a subassembly. The use of subassemblies therefore is what creates product structures.

Shop control requires proper use of subassemblies

Shop control is dependent on the time-phased nature of the master schedule. Jobs are released to production in the correct order of multi-level assembly and job sequences are schedule to be performed in sequential order. For shop control to work properly, you must use subassembly BOMs when required.

When is a subassembly BOM required?

A subassembly should be given its own BOM when either of these two conditions is met:

When it is used in multiple BOMs

Whenever a subassembly is used as a component in more than one BOM, it must be defined with its own BOM. This enables MRP to generate jobs based on

interdependent demand, which results in fewer jobs with more efficient run sizes. It also enables the subassembly to be eligible for forecast and supply days planning. Subassembly maintenance benefits as well because any process or component changes are only applied to the one subassembly BOM instead of to each BOM within which it is used.

When its quantity differs from the parent quantity

Whenever a subassembly has a different quantity than the quantity of the parent item within which it is used, it must be defined with its own BOM. This is because the BOM routing is based on the parent quantity for scheduling and costing calculations.   If you mix subassembly sequences in with parent item sequences, the wrong quantity gets used, which makes scheduling and costing calculations nonsensical.

Subassembly BOMs are a necessity with MRP and shop control

Using subassembly BOMs is a necessity with MRP and shop control. They enable MRP to generate subassembly jobs when needed in response to interdependent demand. They enable jobs to be released in the correct order of multi-level assembly as subassembly jobs are finished. They enable each subassembly to get its own traveler and to have its routing sequences scheduled in sequential order within work centers.

Creating subassembly BOMs

If you are currently defining subassembly specifications within other BOMs and need to give them their own BOMs to conform to the above guidelines, take the following steps:

- Create a BOM parent item to represent the subassembly.

- Create a BOM header for the subassembly parent item, assigning it a BOM type of 'BOM'.

- In the new BOM, enter the subassembly routing sequences and components.

- In the BOMs within which the subassembly was previously defined, delete the routing sequences and components associated with the subassembly.

- In the BOMs within which the subassembly was previously defined, add the subassembly parent item as a component.

Do not use phantom assemblies as subassemblies

Phantom assemblies are sets of components that are typically used with custom manufacturing to represent product options. A phantom assembly does not have revision or routing specifications. Phantom assemblies are not suitable substitutes for subassemblies for these reasons.

- A phantom assembly does not have a routing and therefore any processes associated with the phantom must be incorporated into each parent BOM in which it is used.

- A phantom assembly can never be made on its own job or be stocked. This eliminates any possibility of using forecast and supply days planning with the phantom to reduce lead times for the BOMs in which it is used.

- A phantom assembly cannot be released to production in the correct order of assembly relative to higher level jobs because it is never made on its own job.

To change a phantom assembly to a subassembly, take the following steps:

- Change its *BOM Type* from 'Phantom' to 'BOM'.

Enter the routing sequences required to assemble the parent item.

9   BOM Types

This chapter explains the role that BOM types play within bills of manufacturing and how they are properly used.

What is a BOM type?

Whenever you create a new BOM in the *Bills of Manufacturing* screen, you must assign it to a BOM type. The BOM type determines the quantity basis and scope of BOM specifications.

Use the 'BOM' type to define a parent quantity of '1'

Use the 'BOM' type to define specifications against a parent quantity of '1'. When a job is generated, setup and labor hours and component usage quantities are multiplied by the job quantity to establish total job hours and component quantities.

The 'BOM' type is used for <u>discrete manufacturing</u> where distinct items are made in variable quantities. Virtually all assembled and fabricated items use this style of manufacturing.

Only use the 'Batch' type for true batch manufacturing

The 'Batch' type should only be used for <u>batch manufacturing</u> where products are made using a batch formula or recipe. Food, chemicals, plastics, and liquids typically use this style of manufacturing. See chapter 16, *Batch Manufacturing*, for details.

The 'One-Off' type is assigned automatically

The 'One-Off' type is assigned by the program when you create a BOM for a one-off item generated by the *One-Off Item Generator* during quote entry. This type of BOM is only used for custom specifications related to a single job and the BOM gets inactivated when the associated sales order gets closed. See the *Custom Manufacturing* guide for details.

The 'Secondary' type is used for secondary outputs

When an item is a secondary output, meaning a byproduct or co-product derived from jobs for other items, it is assigned the 'Secondary' type. Such items are never made on their own jobs and are not given routing, component, or output specifications. Their only use within BOMs is to be added as a secondary output on the *Outputs* tab within other BOMs. See chapter 14, *Outputs*, for details.

The 'Phantom' type is used for product options

Phantom assemblies are used to represent sets of components and are typically used with custom manufacturing as product options. A phantom assembly does not have revision or routing specifications. See the *Custom Manufacturing* guide for details.

WARNING: Phantom assemblies are not suitable substitutes for subassemblies. See the previous chapter for details.

10 Revisions

This chapter explains the role that revisions play within bills of manufacturing and how they are properly used.

What is a revision?

A revision is the BOM specifications associated with a particular engineering version of a manufactured item. Revisions provide an engineering history of each product.

The BOM stores current, pending, and archived revisions

Current, pending, and archived revisions for each parent item are stored on the *Revisions* tab in the *Bills of Manufacturing* screen. The current revision is used for job generation. The pending revision is used to prepare specifications for the next revision. Archived revisions are past versions of the item.

Why use revision control?

Whether you make your own products or products on behalf of other companies, using revisions to track BOM specification changes has several benefits:

- It enables you to track the evolution of a product over time.

- Past revisions can help with servicing older product versions out in the field.

- It provides a disciplined approach to product engineering that improves quality and reduces errors.

If you don't wish to use revisions

If you see no benefit in using revisions, simply maintain a single revision against which all future BOM changes are applied.

Revision Naming

It is advisable to set up a standard revision naming structure to apply consistency to revision naming across multiple products. Use the *Revision Names* screen on the *BOM Setup* menu to create a table of standard revision names (such as Revision-01, Revision-02, etc.) that can be applied each time a new revision is created.

After setting up your table of standard revision names, go to *BOM Setup* and designate a *BOM Revisions – Default Name* that will be applied to each new BOM that gets created.

How the revision Status works

Each revision *Status* works as follows:

Current

One revision must be designated as the "current" revision. The routing, component, and output specifications associated with the current revision are used by MRP for job and PO generation.

Pending

A "pending" revision will become the next current revision at a future date. A pending revision cannot be manufactured and is not available for MRP generation or selection in the *Jobs* screen.

- When creating a pending revision, it is usually originated by copying the current revision (using the *Copy Current Revision* option within the '+' button) and then editing it for any changes. A pending revision can also be created from scratch.

- To make the pending revision the current revision, click the button in the *Status* field and change the status to 'Current'. This automatically changes the previous version's status to 'Archived'.

Archived

This is an obsolete revision that cannot be manufactured and is not available for MRP generation or selection in the *Jobs* screen.

Never use revisions to represent different products or options

Revisions should only be used to represent versions of the <u>same</u> product. Never attempt to use revisions to represent different products or product options using a common BOM parent. This will not work and causes problems with costing, MRP, and inventory.

Engineering Change Order (ECO) Management

Revisions play a central role in ECO management and can be augmented with the following features:

Activity Notes

Activity notes can be entered against BOM parents to establish reminder dates for future events such as a scheduled revision change. To enter an activity note, go to the *Stock Items* screen and click the *Note* button. When you click *New* in the *Activity Notes* screen, the Item ID is inserted into the activity note *Reference* field.

Linked Documents

You can attach multiple documents to any item, including engineering diagrams and specifications. Engineering drawings can be coordinated to correspond with progressive BOM revisions. Drawings associated with the current revision can be

flagged for job linking, while drawings for pending and archived revisions can remain attached for reference, but not flagged for job linking. Consider using a drawing naming convention that coordinates drawing numbers with revision names. See the next chapter for details.

11   Attaching Documents and Web Links

This chapter explains how BOM specifications can be augmented with documents and web links attached to BOM parents for automatic linking to jobs.

What are document and web link attachments?

Against any item you have the ability to attach documents, files, or web links that can be designated for automatic linking to jobs. Once attachments are linked to jobs, they can be accessed as needed in the *Job Inquiry* screen.

Augments the bill of manufacturing

The bill of manufacturing stores all the specifications needed to drive MRP, shop control, and product costing, but it does not store every possible aspect of manufacturing that may apply to your specific products or industry. Document and web link attachments fill this gap and can be used for any number of purposes, including the following:

Documents

A variety of document types can play important roles in the production process.

Specification Sheets
Specification sheets can be used to describe the technical characteristics of products in full detail as needed.

Engineering Drawings
Engineering drawings can be coordinated to correspond with progressive BOM revisions as part of an Engineering Change Order (ECO) management system. Drawings associated with the current revision can be flagged for job linking, while drawings for pending and archived revisions can remain attached for reference, but not flagged for job linking. Consider using a drawing naming convention that coordinates drawing numbers with revision names.

Images
With complex images it is best to create documents containing needed images rather than use the tiny thumbnail images that can be stored against job parent and component items and printed on the job traveler. For viewing large images, consider using web links instead of documents.

Safety Data Sheets
Linking all required safety data sheets to jobs ensures that you stay in compliance with all safety regulations and practices.

Quality Control Data Collection Sheets

Many processes require specific quality control data (temperature, PH readings, etc.) that need to be entered against jobs. You can store a template data sheet against the BOM parent that gets linked to jobs. Workers can rename the template data sheet to make entries against the job and can then link the renamed document to the job for historical reference.

Web Links

Web links transcend the limitations of attached documents and offer innovative ways to augment the bill of manufacturing. You can host content on a web server (internal or public) and store a link against the BOM parent and flag it for linking to jobs. Web links provide a viable alternative when large file sizes make attached documents impractical. Hosted content also has the benefit of widespread distribution without the user access licensing that is often required with proprietary software programs. Here are some of the ways that web links can be used:

Training and Safety Compliance Videos
You can make videos and post them to a service like YouTube for free.

CAD Drawings and Large Files
You can use web links for accessing CAD drawings or large files that are not suited for the limitations of attached documents.

HD Images
High definition images accessed through web links provide superior clarity.

Website Links
You can provide web links to helpful websites that may be pertinent to particular job processes.

Making attachments to the BOM parent

In the *Stock Items* screen you can attach documents, files, and web links to a BOM parent on the *Documents* tab. Select the *Link to Job/SO* checkbox against an attachment when you want it to be automatically linked to jobs.

Attachments can optionally be embedded in the DBA database for backup purposes or can be defined as web links. Embedded documents are appropriate for moderate size files. Web links should be used for large file documents, images, and videos.

For complete setup details see *Appendix B – Document Linking* in the *DBA Screen Help*.

Use the Job Inquiry to access linked files

Files that are linked to jobs can be accessed from the *Documents* tab within the *Job Inquiry* screen. Click the hourglass icon to display or print the document or launch the web link.

Additional files can be manually linked to jobs

In addition to the BOM parent attachments that automatically get linked to jobs, you can manually link additional files to jobs. This is done in the *Jobs* screen on the *Additional* side-tab within the *Header* tab. For example, if workers enter quality control data on a spreadsheet, the spreadsheet can be attached to the job as a permanent reference.

ISO-9000 certification and compliance

ISO-9000 certification and compliance requires extensive process documentation and labeling throughout the system. DBA accommodates this with document and multi-media attachments as well as these features:

Bill of Manufacturing Notes
Within the bill of manufacturing you can enter unlimited freeform notes against the BOM parent, routing sequences, tasks within routing sequences, and components. All these notes flow through to jobs for optional printing on the job traveler.

Job Traveler Layouts
Customized layouts for various sets of print options can be created for job traveler printing. This enables specialized travelers to be created for different purposes, including specialized travelers for ISO compliance.

Documents Directory
The *Documents Directory*, located on the *Notes* menu, provides a means for organizing the storage and access of general documents that are not linked to specific items, customers, or suppliers. Such documents can include policy manuals, safety sheets, entry forms, etc. For security purposes, users are assigned to *Document Groups* and then each document is assigned a list of the groups that are given access permission.

Customizable Labels
Custom layouts can be created with an abundance of optional content for the following labels.

- Stock Item Label
- Job Receipt Label
- PO Receipt Label

Serial Number Tracking
M items can be flagged for serial number tracking, in which case serial numbers are assigned when finished items are received to inventory in the *Job Receipts* screen. Serial number tracking provides an audit trail that ties finished items back to specific jobs and revisions.

12 Routings

This chapter explains the role that routings play within bills of manufacturing and how they are properly set up and used.

What is a routing?

A routing is a sequential list of the labor and subcontract service processes, along with process details, that are performed to make an item.

How are routings used?

Routings provide the foundation for product costing and shop control and distinguish DBA from light manufacturing systems that only deal with bills of material. Routings are used for the following purposes:

- Work center hourly rates are applied to process setup hours and cycle times to calculate estimated and actual labor and manufacturing overhead costs.

- Subcontract supplier prices are translated into unit costs to calculate estimated and actual subcontract service costs.

- Routings provide detailed process instructions that print on the shop traveler for production guidance out on the shop floor.

- Routings provide detailed instructions to subcontract service suppliers that print on subcontract POs.

- Routings provide the estimated hours calculations that are used to establish item *Job Days* settings that drive MRP job generation and the master schedule.

- BOM routing specifications are copied to jobs as jobs get generated by MRP.

- Job routings group job sequences by work center within the *Work Center Schedule* screen to prioritize worker assignments.

- Job routing specifications are used to calculate estimated remaining job hours for job prioritization and job status metrics.

Routings, not bills of material, determine product structures

In light manufacturing systems, the bill of material governs product structures and is often "flattened" out so that multiple levels can be represented within a single parent item. When you use routings, however, this is not possible or desirable. Each assembly has its own routing processes and therefore must be given its own BOM. The associated materials support the routing processes within which they are used. In a non-light manufacturing system, routings determine product structures, not bills of material.

Create a routing sequence for each process

Within each BOM, create a routing sequence for each labor and subcontract process.

What is considered a process?

Each routing sequence should represent an actual production process. A process can consist of several tasks. Avoid creating sequences for tasks. A process should be defined with a routing sequence when it meets these criteria:

It must be measurable

Only processes that are capable of being underlined measured in terms of time per process should be set up as a routing sequence. Small steps that cannot easily be measured should be set up as tasks that are performed as part of a larger process. For example, in the sample company, assembling the wagon components is set up as a single routing sequence. There are many small steps involved in assembling the wagon, but it is not practical to measure how long each such minor step would take. On the other hand, the total time it takes to assemble a wagon is easily measurable and therefore can be considered a single process.

It must be schedulable

Only processes that are capable of being scheduled should be set up as a routing sequence. This means that it is appropriate for the routing sequence to be listed in the *Work Center Schedule* for worker assignments. Routine inspection, for example, may not be worthy of being listed on the work center schedule and is more appropriately defined as a task within a routing sequence.

Its hours must be reportable

Only processes that are capable of being tracked for setup and labor hours or completions reporting in the *Job Labor* screen should be set up as routing sequences. For example, you would not report labor for a minor task performed within a larger process.

It is a subcontract service

Any subcontract service (such as painting, plating, or heat-treating) performed by an outside supplier should be set up as a subcontract routing sequence.

Always enter a cycle time

Always make an entry in the *Hours/Process* or *Processes/Hour* field (each field updates the other) to establish the process cycle time. If you don't know the cycle time, make an educated guess. Over time you can refine your cycle times based on stopwatch observations or actual labor history. For costing and scheduling purposes, it is important that you enter a reasonable cycle time estimate.

Standard processes facilitate routing creation

Routing creation can be greatly facilitated by creating a library of standard work center and subcontractor processes in advance, which enables the use of the *Routing Generator* and applies a consistency and thoroughness across all your routings. See chapter 8, *Standard Processes*, for details.

Using standard or actual hours

The *Hours Type* field within each routing sequence can be set for standard or actual hours. This affects the way labor is updated in the *Job Labor* screen. See the *Shop Control* guide for details on using this setting.

Standard hours are recommended for improved throughput and costing

When the *Standard* hours type is used against job sequences, labor can be quickly updated in just a few clicks because standard setup and labor hours are applied instead of actual hours. Using standard hours eliminates all the mechanical processes that are required to collect and report actual labor hours. Our recommendation is to use Standard hour sequences and commit to reporting completions when sequences are finished.

Use Actual hours sparingly

When the *Actual* hours type is used against job sequences, actual labor hours are collected manually and entered as an alternative to standard hours. Actual hours are appropriately used in these situations:

- When a process is one-off, custom in nature and has high variance potential from the estimated cycle time.
- Job Shop environments that typically manufacture with a Job Quantity of 1

Special Warning Regarding Actual Hours

Our experience has shown that it is very difficult to perform actual hours in most manufacturing environments. The reality of most shops are that once an item is finished it is shipped out as soon as possible regardless of whether all of the costing information has been submitted. It is very easy to make errors or omissions in labor entry that can have a very consequential effect on your cost of sales accounts and make your income statement a challenge to interpret. Since the product is likely already out the door, there is not an opportunity to fix the costs after the fact. We strongly recommend Standard hours completions for most companies.

Actual Job labor tracking requires 100% participation

Shop control is totally dependent on timely labor updating to have any meaningful use. Like any complex system, it is only as good as its weakest link. Therefore, shop control requires 100% participation among all workers and supervisors in updating their own labor as sequences are finished with no tolerance for delay.

Labor updating as the final step in any process

Never get behind on labor updating because doing so destroys the effectiveness of shop control. The best way to avoid this is to instill the notion in all production personnel that a job sequence is not considered finished until the labor gets updated. Workers can easily be trained to use the *Job Labor* screen and make their own entries.

Subcontract prices are maintained in the routing sequence

Keep in mind that pricing for subcontract services is maintained directly within subcontract routing sequences. You enter the supplier price that prints on the subcontract PO and a multiplier is used to translate the supplier price into a unit cost for estimated cost calculations.

NOTE: If the subcontract price includes complexities such as setup fees and lot charges, enter the breakdown of these charges either in the *Traveler Notes* for internal reference or in the *PO Notes* for reference to the supplier. Enter a supplier price that encompasses or closely approximates the total price for all these charges

13 Components (Bill of Materials)

This chapter explains the role that components play within bills of manufacturing and how they are properly set up and used.

What are BOM components?

Components are the materials required by the various processes used to make the item. The list of components is referred to as the item's "bill of materials." Component types are as follows:

Subassemblies

A subassembly is a manufactured item that is used as a component within a higher level BOM. Each subassembly has its own BOM (revision, routing and components) and is manufactured separately on its own jobs. See chapter 8, *Product Structures (Subassemblies)*, for details.

Purchased Parts

These are parts that are purchased from an outside supplier to be assembled into the BOM parent.

Raw Materials

These are raw materials that will be processed in some fashion to be incorporated into the BOM parent.

Phantom Assemblies

Phantom assemblies are used to represent sets of components and are typically used with custom manufacturing as product options. A phantom assembly does not have revision or routing specifications. See the *Custom Manufacturing* guide for details.

Use Speed Entry to facilitate component entry

Components are entered within the *Components* tab in the *Bills of Manufacturing* screen. You can use the *Speed Entry* function to enable rapid selection of components for batch transfer to the main screen.

Assign components to associated routing sequences

Always assign components to the routing *Sequence* within which they are used. When a job gets generated, components print within associated sequences on the job traveler. Sequence assignment also enables job materials and components to be selectively issued by work center in the *Job Issues* screen.

You can import components from a CAD program or other source

You can use the *File – Data Import – BOM – BOM Components* utility to import components from a CAD program or other source. Keep in mind that the components themselves must exist as stock items and that you should when possible edit your source file to assign components to associated routing sequences.

Determining the sort order

The *Line No* field determines the sort order on the screen and on the job traveler. The program assigns a value in increments of 10 in the order that components are entered.

If you wish to alter the sort order, manually change the *Line No* value as needed. After the sort order is finalized, you can then click the *Renumber Components* icon to renumber the sort order in even increments of 10.

If you wish components to be sorted in item ID order or by description, click the associated column heading to change the sort order displayed in the grid. Then click the *Renumber Components* icon to preserve that sort order by renumbering the lines in even increments of 10.

The Usage Quantity depends on the BOM type

The component *Usage Qty* entry depends on the BOM type.

- If the BOM type is 'BOM', 'One-Off', or 'Phantom', enter the net quantity required to make <u>one unit</u> of the parent item.

- If the BOM type is 'Batch', enter the net quantity required to make the *Batch Size* specified in the upper panel.

Select the Fixed Qty when usage never varies with the job quantity

Select the *Fixed Qty* checkbox when the component usage quantity is always a fixed amount that never varies with the job quantity. For example, a tool or fixture may be used with each job on a one time basis and then disposed, in which case the *Fixed Qty* would be selected against a *Usage Qty* of '1'.

Use the Overage % when there is a scrap factor

Some materials have a scrap factor where additional material is required beyond the net quantity that goes into the finished item. You can use the *Overage %* field to specify a percentage over and above the net *Usage Qty* to account for anticipated scrap. The overage amount is included in costing calculations and is added to the component's total quantity when a job gets generated.

Using component References

You have the option of attaching multiple *References* to a component for printing on the job traveler. Circuit board manufacturers, for example, use references to designate component location coordinates.

Each reference consists of two fields. The *Reference* can be a location coordinate or drawing reference or it can be used for any table that has a one-to-many relationship with the component. The *Qty* is optional and represents the quantity relative to one unit of the BOM parent.

NOTE: Component references can be imported using the *File – Data Import – BOM – BOM References* screen.

Use component Job Notes as an alternative to References

Freeform *Job Notes* can be entered against any component and provide an informal alternative to using *References*.

Use the Component Replace screen for mass-maintenance

Whenever you wish to mass replace an existing component with another component across all BOMs where it is used, use the *Component Replace* screen to do this in a batch process.

14   Outputs

This chapter explains the role that outputs play within bills of manufacturing and how they are properly set up and used.

What are BOM outputs?

BOM outputs are the finished items derived from a bill of manufacturing. Each BOM has a primary output, which is the BOM parent, and can have multiple secondary outputs. Secondary outputs are used for these purposes:

Primary Output

This is the parent item that you are manufacturing and is the main driver of MRP Jobs. MRP only responds to the net demand associated with the primary output. When multiple outputs exist, it is imperative that you define the primary output as the Item ID that has the most sales/usage demand in the system.

Byproducts

A byproduct is one that is derived while producing the primary output. Usable scrap material, for example, is a byproduct from the virgin material that was incorporated into the BOM parent.

Co-Products

A co-product is made from a common BOM. A mold or tool, for example, may produce two separate items with each machine cycle.

Disassembled Items

If you disassemble used products, the parts that get disassembled from the parent item can be set up as secondary outputs.

> NOTE: If the disassembled items are known in advance and are expected to be derived from each disassembly job, they should be defined as secondary outputs in the BOM. If disassembled items are not known in advance, however, and can only be determined during the course of each job, outputs can be added as needed to job details.

Cut Pieces

You may set up a BOM where you cut a purchased material piece into several cut pieces. For example you may purchase a 10 foot PVC pipe that you cut into a 5 foot, 3 foot, and 2 foot piece. Each cut piece will have a unique item ID. You would choose the piece with the most usage demand to be the primary and the other two pieces would be secondary outputs.

Knowledge Base - Handling Cut to Size Materials

How to create a secondary output

A secondary output must first be created as an M item and then given a bill of manufacturing assigned to the 'Secondary' BOM type. A 'Secondary' type BOM has a BOM parent with no revisions, routing, components, or outputs of its own. Once the 'Secondary' BOM has been created, the secondary output item can be added on the *Outputs* tab to all the BOMs where it is an output item.

Secondary outputs are not subject to MRP generation

Secondary outputs are not subject to MRP generation. MRP only responds to the net demand associated with the primary output. So if you have two co-products that share the same BOM, use the one with the greatest demand as the primary output (BOM parent).

This means that you may have to apply manual planning to some secondary outputs. For example, you may wish to attach a review note in the *MRP Settings* screen to the primary output item that reminds you to check demand for its secondary outputs so that you can increase the planned job quantity if needed.

Use the Cost Ratio to establish the secondary output cost

Use the *Cost Ratio* to give each secondary output a proportionate share of the total estimated cost within each BOM for which it is an output. There is no useful formula to help with this entry, so it is a judgment call as to what you feel is an appropriate percentage share of total cost.

If a secondary output is used in multiple BOMs, keep in mind that the cost basis for each BOM may likely differ. The secondary output's estimated cost will be calculated based on whichever of its associated BOMs happens to be rolled up last. The secondary output's receipt cost and inventory value will likely vary somewhat from job to job.

15   Product Costing

See the Product Costing Guide

This guide is focused on bill of manufacturing specifications. The bill of manufacturing is also the basis for product costing, which is covered by the *Product Costing Guide*. See that guide for details on the following costing-related processes:

- Shop Rates
- Work Center Cost Factors
- P Item Estimated Costs
- Cost Rollup

16   Batch Manufacturing

This chapter explains how to use the bill of manufacturing for batch style manufacturing where products are made using a batch formula or recipe.

What is batch manufacturing?

Products such as food, chemicals, plastics, and liquids are made using a batch formula or recipe. This style of manufacturing is called "batch manufacturing."

The BOM is defined against a fixed batch size

Instead of defining BOM specifications against a parent quantity of '1', BOM specifications are defined against a fixed batch size that does not vary from job to job.

Use the 'Batch' BOM type

If you wish to define a BOM for batch manufacturing, assign the parent to the 'Batch BOM type on the *List* tab in the *Bills of Manufacturing* screen.

Specify the Batch Size against the current revision

On the *Revisions* tab, specify the *Batch Size* against the current revision.

The Batch Size is the default Items/Process against routing sequences

The *Batch Size* is inserted by default into the *Items/Process* field when the first routing sequence is created, which is then used as the default value when subsequent sequences get created.

> NOTE: The *Hours/Process* is divided by the *Items/Process* to determine the cycle time required to make one unit of the parent item.

Enter the batch formula or recipe on the Components tab

Enter the batch formula or recipe on the *Components* tab. The *Batch Size* is displayed in the upper panel. Each component's *Usage Qty* is the total amount required by each batch.

The order Multiple is made equal to the Batch Size

In the *MRP Settings* screen, the parent item is automatically assigned an order *Multiple* equal to the *Batch Size* so that MRP always generates planned jobs in a multiple of the batch size.

Using the Review Note for MRP generation

Entering a *Review Note* against the parent item in the *MRP Settings* screen can be used to prompt for manual intervention during MRP generation.

- If demand causes MRP to generates a job quantity multiple that is two or three times the batch size, the review note can instruct the planner to use the *Split Job* function to split the planned job into two or three jobs, each equal to the fixed batch size amount.

- If a component is subject to a custom quantity that can vary with each job, the review note can be used to specify the calculation formula that is to be applied to the component job quantity after the job is generated.

Avoid the 'Batch' type and use the 'BOM' type when possible

If you can define your item recipes or formulas against a parent quantity of '1' instead of the batch size, we advise doing so by using the 'BOM' BOM type in conjunction with the order *Multiple* and *Review Note* instead of using the 'Batch' BOM type. This will still result in jobs being generated in batch size multiples and is more compatible with the unit cost basis used by the estimated cost rollup, unit job cost, and item inventory cost.

17   Bill of Manufacturing Guidelines

This chapter lists five basic guidelines that should be followed so that bills of manufacturing can provide good results.

1. Always use a unique Item ID to represent any variation in an item

It is vitally important that any variation in any item must be represented by a unique item ID. This is an absolute requirement in order for product costing, inventory control, MRP, and job release to work properly.

2. Never use descriptors as substitutes for stock items

Never use descriptors as substitutes for stock items. Descriptors are not compatible with manufacturing costing, MRP generation, and job release, all of which are inventory-based.

3. Do not substitute phantom assemblies for subassemblies

Do not substitute phantom assemblies for subassemblies. The use of phantom assemblies should be limited to representing product options with custom manufacturing. A phantom assembly does not have a routing and can never be made on its own job or be stocked, which eliminates any possibility of using forecast and supply days planning, and they cannot be released to production in the correct order of multi-level assembly.

4. Never use revisions to represent different products or options

Revisions should only be used to represent versions of the same product. Never attempt to use revisions to represent different products or product options using a common BOM parent. This will not work and causes problems with costing, MRP, and inventory.

5. Give every BOM a routing

Every manufactured item has at least one process, so every BOM must be given a routing. This is essential for product costing, job days calculations, and shop control.

NOTE: This guideline does not apply to 'Secondary' and 'Phantom' BOM types, which do not have routings.

18   FAQs

Can I backflush a multi-level product structure?

"Backflushing" enables BOM components to be deducted from stock as finished items are completed, often for an entire product structure. Backflushing is not available in DBA because it is not compatible with an MRP and shop control system and it is the source of many inventory problems.

Light manufacturing systems, which focus solely on BOM components and do not have work centers and routings, often advocate "backflushing" because it reduces inventory updating down to a single step. While this may have superficial appeal, it is an inefficient and problematic process for these reasons.

- Backflushing degrades inventory accuracy because you never really know what is on hand for any given component, which also complicates stock counts.

- Backflushing is not compatible with multi-location environments or for components subject to lot/serial control.

- Backflushing is not compatible with an MRP system that generates jobs for subassemblies against interdependent demand instead of one "job chain" at a time.

- Backflushing is not compatible with a time-phased shop control system that releases jobs in correct multi-level order based on material availability.

The only efficient way to update inventory is to issue material to jobs in real time as needed within work centers. This insures accurate on hand quantities to properly drive MRP, job release, and stock counts.

Can I simplify my jobs by not using routings?

Ignoring routings in the BOM is not a viable or desirable option because it severely limits your overall efficiency potential and increases your workload. Without routings, you must run the shop manually, which is much more difficult than using the formal shop control that is afforded by routings.

Light manufacturing systems do not include work centers and routings and focus solely on BOM components. Without work centers and routings, light systems cannot handle product costing, MRP, or shop control. Routings distinguish DBA from light manufacturing systems and are used for the following purposes:

- Work center hourly rates are applied to process setup hours and cycle times to calculate estimated and actual labor and manufacturing overhead costs.

- Subcontract supplier prices are translated into unit costs to calculate estimated and actual subcontract service costs.

- Routings provide detailed process instructions that print on the shop traveler for production guidance out on the shop floor.

- Routings provide detailed instructions to subcontract service suppliers that print on subcontract POs.

- Routings provide the estimated hours calculations that are used to establish item *Job Days* settings that drive MRP job generation and the master schedule.

- BOM routing specifications are copied to jobs as jobs get generated by MRP.

- Job routings group job sequences by work center within the *Work Center Schedule* screen to prioritize worker assignments.

- Job routing specifications are used to calculate estimated remaining job hours for job prioritization and job status metrics.

Can I use descriptors for component labor in the BOM?

Never use descriptors as components to represent a BOM's labor content. DBA is not designed for this and it is not compatible with the cost rollup or actual job costing architecture.

The notion of component labor only exists because some light manufacturing systems advocate it as a work-around solution for their lack of routings. Even so, component labor is not viable in any form because it is not calculated from cycle times and has no ongoing maintenance capability and is not practical for widespread use.

Routing sequences, on the other hand, are ideally suited for labor and overhead costing because they are based on setup hours and cycle times that are automatically costed at work center hourly rates and added up through all your labor processes. Routings are based on settings that are practical to maintain on a widespread basis. Besides costing, routing sequences provide process documentation for guidance out on the shop floor and also provide the basis for work center scheduling.

Can I use descriptors for items I buy directly for the job and never stock?

No you cannot. Some light manufacturing systems allow the use of non-inventory parts to bypass receiving and issuing for items purchased directly for jobs. You cannot do anything like this with DBA, which is designed to exclusively use stock items for all workflow processes. Never use descriptors as substitutes for stock items because they are not compatible with manufacturing costing, MRP generation, and job release, all of which are inventory-based.

Can I use phantom assemblies to flatten my BOMs and reduce the number of jobs?

In light manufacturing systems, it is a common practice to "flatten" BOMs so that multiple levels can be represented within a single parent item. This creates "super jobs" where the entire component structure can be backflushed at job finish in a single transaction.

In general, avoid creating super jobs using phantom assemblies, which is counter-productive to the routing architecture that distinguishes DBA from light manufacturing systems. Routings enable each assembly in the product structure to be defined with its

own processes and materials in its own BOM. Separate BOMs enable jobs to be released to production in the correct order of assembly and for job sequences to be listed in work centers in correct processing order.

Avoid substituting phantom assemblies for subassemblies. The use of phantom assemblies should be limited to representing product options with custom manufacturing. A phantom assembly does not have a routing and can never be made on its own job or be stocked, which eliminates any possibility of using forecast and supply days planning, and they cannot be released to production in the correct order of multi-level assembly.

The only instance where a super job achieved with phantom assemblies might make sense is when both of these conditions are met:

- The entire product structure is made in a single chain where subassemblies have no interdependent demand with other jobs.

- The entire product structure is essentially all made at once with no staggering of start dates among its subassemblies.

Very few products meet both of these conditions, so in most cases you will avoid super jobs and use subassemblies to take full advantage of the time-phased nature of MRP and shop control.

Can the BOM accommodate drawings and documents?

Against any BOM parent you have the ability to attach documents, files, or web links that can be designated for automatic linking to jobs. Document and web link attachments can be used for any number of purposes, including the following:

- Specification Sheets
- Engineering Drawings
- Images
- Safety Data Sheets
- Quality Control Data Collection Sheets
- Training and Safety Compliance Videos
- CAD Drawings and Large Files
- HD Images
- Website Links

You can also attach documents and multi-media links to the following:

- Purchased Items
- Customers
- Sales Orders
- Jobs
- Suppliers

For details, see chapter 12, *Attaching Documents and Web Links*.

How does DBA handle Engineering Change Order (ECO) management?

DBA includes the following features that can be incorporated into your ECO management procedures.

Revision Control
Separate BOM specifications are stored against current, pending, and archived revisions so that you can plan and track significant product changes by revision. You can use a pending revision to plan for the next product version without affecting the current production version. Unlimited notes can be entered against each revision for documentation purposes. See chapter 11, *Revisions*, for details.

Activity Notes
Activity notes can be entered against BOM parents to establish reminder dates for future events such as a scheduled revision change. To enter an activity note, go to the *Stock Items* screen and click the *Note* button. When you click *New* in the *Activity Notes* screen, the Item ID is inserted into the activity note *Reference* field.

Linked Documents
You can attach multiple documents to any item, including engineering diagrams and specifications. Engineering drawings can be coordinated to correspond with progressive BOM revisions. Drawings associated with the current revision can be flagged for job linking, while drawings for pending and archived revisions can remain attached for reference, but not flagged for job linking. Consider using a drawing naming convention that coordinates drawing numbers with revision names. For details see chapter 12, *Attaching Documents and Web Links*.

How can DBA help with ISO-9000 certification?

ISO-9000 certification and compliance requires extensive process documentation and labeling throughout the system. DBA accommodates this with these features:

Bill of Manufacturing Notes
Within the bill of manufacturing you can enter unlimited freeform notes against the BOM parent, routing sequences, tasks within routing sequences, and components. All these notes flow through to jobs for optional printing on the job traveler.

Job Traveler Layouts
Customized layouts for various sets of print options can be created for job traveler printing. This enables specialized travelers to be created for different purposes, including specialized travelers for ISO compliance.

Document and Web Linking to Jobs

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For details, see chapter 12, *Attaching Documents and Web Links*.

Documents Directory

The *Documents Directory*, located on the *Notes* menu, provides a means for organizing the storage and access of general documents that are not linked to specific items, customers, or suppliers. Such documents can include policy manuals, safety sheets, entry forms, etc. For security purposes, users are assigned to *Document Groups* and then each document is assigned a list of the groups that are given access permission.

Customizable Labels

Custom layouts can be created with an abundance of optional content for the following labels.

- Stock Item Label
- Job Receipt Label
- PO Receipt Label

Serial Number Tracking

M items can be flagged for serial number tracking, in which case serial numbers are assigned when finished items are received to inventory in the *Job Receipts* screen. Serial number tracking provides an audit trail that ties finished items back to specific jobs and revisions.

How does the BOM handle reference designators?

Circuit board manufacturers use reference designators indicate component location coordinates on the job traveler. This can be achieved within the BOM by attaching multiple *References* to a component that print on the job traveler.

Each reference consists of two fields. The *Reference* can be a location coordinate or drawing reference or it can be used for any table that has a one-to-many relationship

with the component. The *Qty* is optional and represents the quantity relative to one unit of the BOM parent.

> NOTE: Component references can be imported using the *File – Data Import – BOM – BOM References* screen.

Freeform *Job Notes* can be entered against any component and provide an informal alternative to using *References*.

How are purchased item revisions handled?

An MRP system requires part number specificity to job component generation and therefore a unique item ID is required to distinguish one revision from another. Here is the basic guideline to follow:

- If using a particular revision for a component is an engineering requirement for a parent item, each revision must be represented with a unique item ID for specificity within the BOM.

- If different revisions are interchangeable, can be freely used in any BOM, do not need separate inventory tracking, and can be purchased based on best price and availability, only then should a single item ID be used.