



Custom Manufacturing Guide

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Table of Contents

1 Introduction	4
2 Why You Need Custom Manufacturing	6
3 Custom Manufacturing Sequence of Events	9
4 Advance Setup - Standard Processes	11
5 Advance Setup - Model BOMs	13
6 Phase 1 - Quote Entry	14
7 Phase 2 - One-Off BOM Customization	16
8 Phase 3 - Quote Conversion	17
9 Phase 4 - Job Generation and Processing	19
10 Repair Jobs	21
11 Remanufacturing	23
12 Disassembly	25
13 Rework	27
14 R & D	29
15 Custom Manufacturing Guidelines	31

1 Introduction

 [Video - Custom Manufacturing](#)

What does custom manufacturing do for you?

Custom manufacturing enables you to rapidly customize existing products or create custom products from scratch. This provides MRP with the specifications needed for job and PO generation within a coordinated master schedule. Custom manufacturing provides the following features and benefits:

- One-off BOMs can be generated from model BOMs and can then be customized as needed for each customer order.
- One-off BOMs can be generated from scratch and can be rapidly populated using the routing generator and component speed entry.
- A library of standard work center and subcontract processes can be created to enable rapid generation of custom routings.
- Phantom assemblies can be used to specify sets of components using a single parent component.
- The cost rollup calculates an estimated cost for each custom item broken out by material, setup, labor, subcontract services, and manufacturing overhead.
- Import utilities for stock items and BOM components can work with CAD programs for BOM creation.
- Quotes are used for pre-MRP planning and to communicate pricing and customization details to the customer.
- When one-off BOMs are finalized, pre-job lead days are automatically calculated and the job days inquiry calculates the estimated shop days allocated for production.
- When quotes are converted to live sales orders, required dates are updated and serve as target shipment dates and MRP demand dates.
- For custom to order items, MRP generates jobs directly from sales order lines in the exact quantity ordered.
- For remanufacturing and disassembly purposes, jobs can be customized while in process to reflect the actual inputs and outputs that are encountered.

Who is this guide for?

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

2 Why You Need Custom Manufacturing

What is custom manufacturing?

Custom manufacturing is the set of processes involved in making custom items. Custom items can be modified versions of model or standard items or can be created from scratch.

Custom manufacturing has a unique set of issues

Custom manufacturing requires all the same processes as standard manufacturing, but also has a unique set of issues that are covered in the next few sections.

Unique item IDs are required

Each custom item by definition is unique and needs its own item ID. Item IDs should be created with a standardized numbering convention and item category structure that sets them apart from standard items.

Custom BOMs are required

Custom items need their own bills of manufacturing. In addition to entering custom BOMs from scratch, custom BOMs should easily be created by copying standard or model item BOMs, which can then be modified to reflect each customer order's requirements.

Custom BOM entry or modification needs to be quick and easy

Custom BOM entry or modification needs to be quick and easy to cope with a steady volume of customer quotes. You should be able to copy in standard work center processes and rapidly select individual components or sets of associated components.

You must know your costs to establish a price

After BOM customization is completed, you need to calculate each custom item's estimated cost, which should include costs for material, labor, subcontract services, and manufacturing overhead. With an accurate estimated cost you can then add an appropriate margin to calculate a selling price that can be communicated to the customer.

You must be able to furnish a ship date

In addition to furnishing the customer with a selling price, you must also furnish an estimated ship date, so you need some sense as to when the custom job can be started and finished.

You must generate and process the custom job

You need the ability to generate the custom job, release it to production when it is due to be started, and then you must perform the job out on the shop floor or in coordination with any subcontract suppliers.

You must be able to modify custom job details

With custom jobs the need for detail changes is commonly discovered out on the shop floor. Therefore, you must be able to modify job processes and components at any time during the course of jobs.

Some custom jobs produce multiple outputs

Custom jobs cover a wide range of job types, including repair, remanufacturing, and disassembly jobs. Some of these job types produce multiple outputs instead of a single finished item, so your custom jobs need the ability to produce multiple finished items and costs.

Custom items need to be inactivated

After custom jobs are completed and items are shipped to customers, custom items and BOMs must be inactivated so that they are excluded from current lookups and screens.

DBA addresses all these custom manufacturing issues

DBA provides a formal set of processes that addresses all the custom manufacturing issues listed above.

- One-off items and BOMs are generated within quotes and can be optionally originated by copying model BOMs or standard item BOMs.
- One-off BOMs can be entered or modified by using the routing generator to rapidly select standard work center processes and the speed entry function to rapidly select components. Phantom assembly components are ideal for product options and are used to represent sets of associated components.
- The cost rollup calculates an accurate estimated cost that includes costs for material, labor, subcontract services, and manufacturing overhead. You can then apply a margin to the estimated cost to establish a selling price.
- When the quote is converted to a live sales order, the program calculates estimated lead days and job days to establish an estimated ship date.
- Custom jobs are generated by MRP directly from sales order lines and are released to production and processed in identical fashion as standard jobs.
- Job details can be modified at any time during the course of jobs to reflect needed changes discovered out on the shop floor.

- Custom jobs can produce multiple finished item outputs and costs and are thus suited for repair, remanufacturing, and disassembly.
- One-off items and BOMs are automatically inactivated when sales orders are closed.

3 Custom Manufacturing Sequence of Events

Custom manufacturing enables you to rapidly customize existing products or create custom products from scratch. This provides MRP with the specifications needed for job and PO generation within a coordinated master schedule. Custom manufacturing is performed with the following sequence of events.

 [Custom Manufacturing Screenshot Series](#)

Generate a one-off BOM within a quote

“One-off” items and BOMs are used for custom manufacturing. The one-off item is generated within a quote, using the *One-Off Item Generator*. A one-off item can be created by copying a “model” BOM, in which the one-off BOM inherits all the BOM specifications of the model item, or the one-off item can be created from scratch.

One-off items are used for custom manufacturing because the one-off BOM is unique for each customer order. Each one-off BOM has its own details, costing, and price. One-off items are originated in quotes because a quote is “pre-MRP” in the sense that it is not subject to MRP generation until the quote is converted into a sales order.

Customize the one-off BOM

After the one-off BOM has been generated, it is customized as needed for the particular customer order.

If the one-off BOM originated from a model BOM, the model specifications are modified by adding or deleting components and routing sequences as needed.

If the one-off BOM is being created from scratch, the routing generator is used to rapidly create the routing, which are the labor and subcontract processes to be performed, and speed entry can be used to rapidly generate a list of components. BOM components can also be imported from a CAD program.

Establish the one-off item’s Job Days allocation

After the one-off BOM details are finalized, the *Job Days Inquiry* can be run to calculate the estimated *Job Days* allocation, which is the number of shop days allocated by MRP for making the item.

Run a cost rollup and establish the price

The next step is to run a cost rollup to establish an estimated cost. A margin can then be applied to the estimated cost to arrive at a selling price. The selling price is added to the quote. If needed, the quote can be Emailed to the customer for order confirmation.

Convert the quote to a sales order

After the price has been established and the order is confirmed by the customer, the quote is converted into a live sales order. When the quote is converted, the line item required date is forward scheduled from the current date to reflect the one-off item's lead days and job days allocations. This establishes a realistic required date in the master schedule and serves as a target shipping date.

Use MRP to generate a CTO Job

The next step is to run MRP, which will generate a CTO (custom to order) job directly from the sales order line. MRP will also generate jobs for any subassemblies that may be needed and POs for raw materials and components.

Customize job details as needed for special job types

There are certain types of jobs such as repair jobs, disassembly jobs, or remanufacturing jobs where components and job outputs need to be added during the course of the job as actual requirements are discovered out on the shop floor. Any new demand for materials or components will be immediately reacted to in the next MRP run.

Use shop control to complete the job

Shop control is used to complete the custom job by its required date. The job is released to production in the *Job Control Panel* when all needed material is available. The job is then prioritized within work centers in the *Shop Control Panel* for optimum scheduling to meet the job required date.

4 Advance Setup - Standard Processes

The manufacturing processes that comprise your custom and standard manufactured items are defined in the *Routing* tab of the *Bills of Manufacturing* screen. Each routing process is assigned to the work center in which it is performed or to a subcontractor who performs the process outside your shop.

Most work center activities can be defined with standard processes

Most 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 can be created on the *Processes* tab within the *Work Centers* screen.

Most subcontractor activities can be defined with standard processes

Subcontractor processes such as painting, plating, and heat-treating can be defined as standard processes on the *Processes* tab within the *Subcontractors* screen.

The Routing Generator enables rapid selection from standard processes

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

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 purchase orders that enhance efficiency out on the shop floor and with your subcontract suppliers.

5 Advance Setup - Model BOMs

A “model” bill of manufacturing is a set of specifications that is a template for customization. The model BOM parent is not directly sold or manufactured. Instead, the model BOM is copied to a “one-off” BOM during quote entry and then the one-off BOM is customized for that particular customer order.

Why use a model BOM?

Many custom items are variations of a base product. Each customized version may differ in color, size, accessories, and so on, but the core product remains the same. So instead of creating a custom BOM entirely from scratch for each customer order, it is much easier to create a model BOM that is copied and modified to order.

Use the model routing for customization instructions

Use the model BOM’s routing for customization instructions. The *Traveler Notes* and *Task Notes* within each routing sequence provide for unlimited freeform text and are ideal for storing customization instructions.

For example, if a component assigned to a routing sequence can be swapped with another component (such as a different color), freeform notes can be used to indicate the available alternatives.

Use phantom assemblies for alternate sets of components

A routing sequence may be associated with optional sets of components rather than a single component. A set of components can be defined within a *Phantom* type BOM and is referred to as a “phantom assembly.” If a phantom assembly component assigned to a routing sequence can be swapped with another phantom assembly, freeform routing notes can be used to indicate the available alternatives.

Devise a customization methodology

BOM customization is not a formal, structured process. It is up to you to devise a customization methodology that suits your products, procedures, and personnel. Some products require little customization beyond swapping a few components, while other products require extensive customization that may involve phantom assemblies or importing sets of BOM components. Whatever your methodology is, use the model BOM as your customization template.

6 Phase 1 - Quote Entry

Custom manufacturing is done using “one-off” items and BOMs, which are generated during quote entry either through copying a “model” BOM or by creating a BOM from scratch.

One-Off Item Defaults

Enter the following default settings in the *One-Off Item Defaults* screen on the *Inventory Setup* menu:

- One-off item IDs are generated automatically by the program. Each ID consists of an alpha prefix and numeric suffix. Enter an *Item ID Prefix* and the *Next ID No* for the suffix.
- Select a default *Item Category* and a *UM*, both of which will be assigned to one-off items created from scratch.
- Select a *Lead Days* allocation. This is a default value that gets replaced by a calculated value when one-off BOM customization is completed.
- Finally, enter a *Job Days* allocation, which will be applied to one-off items created from scratch.

Generate one-off items within a quote

Always generate one-off items within a quote instead of a sales order. This enables the one-off BOM to be freely customized without affecting MRP job generation, which ignores demand from quotes. When the one-off BOM customization is completed, the quote is converted to a sales order to update the line item required date and drive MRP job generation.

Using the One-Off Item Generator

To generate a one-off item during quote entry, click the *NewLine* button. In the *Line Type* field, select the *One-Off* option, which launches the *One-Off Item Generator* screen.

- Select the *Generate From BOM Copy* option to generate a one-off item and BOM from a model BOM. The lookup is initially limited to BOM parents designated as CTO (custom to order) items. If you wish to create the one-off item and BOM from a standard item, select the *Include Standard Item BOMs* checkbox.
- Select the *Generate From Scratch* option if you wish to create a one-off item without a corresponding one-off BOM at this time. The one-off BOM can be created later in the *Bills of Manufacturing* screen as a separate step.

NOTE: It may be that your products are highly engineered to order and the person entering the quote does not have the authority to make copy from

decisions. In this case the *Generate From Scratch* option is used so that a qualified person can create the one-off BOM as desired outside of quote entry.

- The *One-Off Item ID* is assigned automatically by the program.
- The *Item Category* inherits the value from the copied from BOM parent. If the item is being created from scratch, the *Item Category* from the *One-Off Defaults* screen is assigned, but can be changed if desired.
- Enter the *Order Qty*.
- The *Lead Days* and *Job Days* allocations inherit the values from the copied from BOM parent. If the item is being created from scratch, the values from the *One-Off Defaults* screen are assigned, but can be changed if desired.

NOTE: The *Lead Days* will be recalculated automatically when one-off BOM details are finalized, so the value here is just a placeholder and does not need to be changed. The *Job Days* can be modified here, if desired, but is usually finalized when one-off BOM customization is completed.

- The item *Description* inherits the value from the copied from BOM, but can be edited, if desired. If the item is being created from scratch, enter the description manually.
- If a *Customer Part No* is cross-referenced to the BOM parent in the *Customers* sub-tab within the *Stock Items* screen, that part number is inserted into this field for cross-reference on the quote, acknowledgment, and invoice.

The one-off item record is created and, if *Generate From BOM Copy* is selected, a complete BOM record is created that is an identical copy of the indicated BOM.

Creating the one-off BOM manually

If you had selected the *Generate From Scratch* option, the one-off BOM record has not yet been created.

- To create a new BOM from scratch, empty of any detail, go to the *List* tab of the *Bills of Manufacturing* screen and click the + *Define New BOM* button. In the *BOM Parent* field, the lookup lists one-off items that do not yet have a BOM record. Select the one-off item and click *OK*.
- To create a new BOM from an existing BOM, go to the *List* tab in the *Bills of Manufacturing* screen, select the BOM you wish to copy, then click the *Copy BOM* button. In the *New BOM Parent* field, the lookup lists one-off items that do not yet have a BOM record. Select the one-off item and click *OK*.

7 Phase 2 - One-Off BOM Customization

After the one-off BOM has been generated (see previous chapter), it can then be customized for this particular customer order. The BOM is listed on the *List* tab of the *Bills of Manufacturing* screen where the *BOM Parent* is the one-off item and its *BOM Type* is 'One-Off'.

Customization Tips & Suggestions

Here are some tips and suggestions for one-off BOM customization:

- If you are creating BOM details from scratch, the first step is to use the *Routing Generator* to create the BOM routing. Go to the *Routing* tab and click the + *Routing Generator* button.
- Go to the *Components* tab and add components by clicking the + *Stock Item* or + *Speed Entry* option. Select phantom assembly components where applicable to represent a set of components with one phantom assembly component. Assign each component to the routing *Sequence* to which it is issued.
- You can also use the *BOM Components* import utility to import sets of components from a CAD program or website order. When you do so, use the *Stock Items* import first to create any new item records, then import the components into the BOM, assigning each to the routing *Sequence* to which it is issued.
- If you are using any stock items or descriptors as placeholder components for actual selections, click the – *Swap Current Component* option to swap a placeholder component with the actual component.
- If the routing originated from a model BOM and contains customization instructions, follow the instructions and perform the indicated modifications to the routing or component details. After doing so, delete any instructions that are not appropriate for printing on the job traveler.
- After the routing is finalized, you can click the *Resequence Routing* button if you wish to renumber routing sequence in increments of 10.
- After components are finalized, you can click the *Renumber Components* button if you wish to renumber components in increments of 10.

8 Phase 3 - Quote Conversion

After one-off BOM customization is completed (see previous chapter), the quote must be converted into a sales order in order to drive job generation. The following steps must be performed.

Finalize the Job Days allocation

If the one-off BOM routing was inherited from a model BOM and was not modified, you can skip this step. If the BOM routing was modified or created from scratch, the one-off item's *Job Days* allocation should be updated to reflect the routing details.

- Go to the *Routing* tab in the one-off BOM and click the *Job Days Inquiry* button. This will give you a *Calculated Job Days* derived from current routing and work center settings. Go to the *Stock Items* screen, *Detail* tab, *MRP* sub-tab, and update the one-off item's *Job Days* allocation.

Enter line notes if needed for custom manufacturing instructions

If you wish to transfer custom manufacturing instructions to the CTO job, go to the quote *Details* tab, select the one-off line item, click the *Notes* side-tab, then enter those instructions in the *Line Notes* panel. When a CTO job gets generated, those notes will be passed into the job header notes.

Enter invoice notes, if applicable

If you wish to add notes to the one-off line item for printing on the invoice, go to the quote *Details* tab, select the one-off line item, click the *Notes* side-tab, then enter freeform text in the *Invoice Notes* panel.

Finalize the selling price

The one-off item inherits the selling price of the model BOM parent. If the price is not subject to change, you can skip this step. Otherwise go to the *Cost Rollup* screen, select the one-off item, then click the *Single Rollup* button to perform a cost rollup.

Manually calculate an appropriate margin against the *Est Cost* to establish the desired selling price. Enter the selling price in the *Price* field within the quote against the one-off line item.

Confirm the price with the customer

If necessary, from within the *Quotes* screen, click the *Quote* button to Email the quote to the customer for order confirmation.

Convert the quote to a sales order

Once the order is confirmed by the customer, go to the *Quotes* screen, select the quote, and click the *Convert* button. When conversion is completed, you are asked if you wish to view the sales order. We suggest you examine the sales order for a final review prior to job conversion. The sales order line *Required* date was updated during conversion based on the *Required Date – To Order M Items* setting in the *Sales Order Defaults* screen.

9 Phase 4 - Job Generation and Processing

After the quote has been converted to a sales order (see previous chapter), the sales order line item is ready for CTO job generation.

Select the Job Receipts Cost Basis

On a one time basis, go to *Job Defaults* and select the *Job Receipts Cost Basis* of choice. Select the *Actual Job Cost* basis, Which is the appropriate cost basis for customizable jobs.

Run MRP to generate a CTO job

Upon its creation, the one-off item is flagged as a CTO (custom to order) item. The next step is to run MRP, which automatically generates planned jobs directly from CTO item sales order lines, in the exact quantity ordered. After the job is generated, the *CTO Job* field in the sales order line displays the job number and links the line with the job.

Process jobs in the normal fashion

At this point, the CTO job is in the master schedule and will be processed exactly the same as all other jobs. 'NEW' status jobs are released to production in the *Job Control Panel* when material becomes available, which changes the job status to 'RELEASED'. Once a job is released, you can issue material, enter setup and labor, and generate POs for subcontract services.

Modify job details as needed

If during production the need for further customization is encountered, you can freely modify job routing sequences, components, or outputs. This insures the accuracy of inventory transactions and job costing.

Receive finished items to inventory

As one-off items are completed, they are received to inventory in the *Job Receipts* screen. Make sure that the color indicators at the top of the screen are green, which means that labor, subcontract, and job issue transactions are accounted for. Always examine the *Unit Cost* to verify that it is a plausible value and does not reflect some obvious costing error.

Ship and invoice the sales order

When the one-off item is in inventory, it becomes visible in the *Shipment Planner* within the *Order Picking* screen and can be picked and shipped to the customer. The shipment is then converted into an invoice.

The one-off item is automatically inactivated

When the sales order is invoiced in full, the program automatically closes the sales order and inactivates the one-off item. Once inactivated, the one-off item will no longer be actively displayed in the *Stock Items* and *Bills of Manufacturing* screen. One-off item inactivation completes the custom manufacturing workflow.

10 Repair Jobs

“Repair jobs” are jobs used to track parts and labor for repairing defective items on behalf of customers.

Repairing an item is totally different than manufacturing it

Repairing a defective item is totally different than manufacturing it. Instead of a complete routing and set of components, some parts and labor will be applied and it may not be known what parts and how much labor is needed until the repair work is in progress. Instead of performing repair work using the standard item ID, a one-off item is used instead.

Quotes are used for RMA processing

If a customer indicates in advance that an item will be returned for repair, a quote can be used as an RMA (return merchandise authorization). You can create an ‘RMA’ *SO Type* for this purpose and assign it to a quote layout that uses ‘RMA’ as the form title instead of ‘Quotation’.

Do not use the standard item ID for the line item because the repair work cannot be performed using the standard item ID. Instead, generate a one-off item to represent the repair work that will ultimately be performed. The one-off item *Description* is used to identify the item to be repaired. *Line Notes* can be used to describe the problem or provide instructions on the work to be performed. These notes get passed into the job header notes. The *Price* value is used when a standard charge is applied, or it can be left blank if it will be determined later or the repair is being done under warranty.

The quote RMA can then be Emailed to the customer, who can reference the RMA number with the item when it is shipped back for repair. When the item is received, the RMA number is matched with the quote RMA and the repair job can be initiated.

One-off items can also be generated within a sales order

If you do not use formal RMAs, one-off items for repair work can be generated within sales orders instead of quotes. Unlike one-off manufactured items, which are generated within quotes for pre-MRP planning, one-off repair items can be generated within sales orders because there is no pre-MRP planning requirement.

Generate one-off items from a model BOM for standard repairs

If the repair work for an item involves a standard set of labor processes and components and perhaps a standard price, create a “model” BOM and generate the one-off item and BOM from the model BOM. The one-off item inherits the model item’s *Lead Days* and *Job Days* allocations that determine the line item *Required* date.

You can generate one-off items from scratch for unknown requirements

If the labor process and component requirements are unknown until the job is in progress, you can generate the one-off item from scratch. In this case a one-off BOM will not be created. MRP will generate a job empty of any detail, to which you can add routing sequences and components as needed during the course of the job.

When you generate the one-off item, make sure that the *Lead Days* and *Job Days* correctly reflect the typical days allocated for repair work.

Consider using model BOMs even for from-scratch repair work

Consider using model BOMs even for from-scratch repair work. Most repair work will originate in particular work centers, in which case model BOMs can represent different types of repair work with each given a routing sequence assigned to the appropriate work center. Model items can also be given *Lead Days* and *Job Days* allocations that reflect the type of repair work that gets performed.

Convert the quote to a sales order

If you are using a quote RMA, once the item has been received and is ready for repair, convert the quote to a sales order. The line item *Required* date will be updated and forward scheduled from today's date based on the one-off item's *Lead Days* and *Job Days* settings.

Generate a CTO job

On the next MRP run, a CTO job will be generated from the sales order line. This adds the repair job to the master schedule so that it can be released to the shop through the *Job Control Panel* and prioritized with other jobs in the *Shop Control Panel*. The finished item is received to inventory in the *Job Receipts* screen.

Finalize the price and ship and invoice the order

The job is now completed. Finalize the price, if needed, then ship the item back to the customer and generate an invoice. When the sales order is invoiced in full, the program automatically inactivates the one-off item. "Repair jobs" are jobs used to track parts and labor for repairing defective items on behalf of customers.

11 Remanufacturing

A “remanufactured” item is a used version of the item that has been refurbished for resale. Rebuilt engines, for example, are remanufactured items. A remanufactured item’s bill of material consists of the used version (“core”) as well as the parts needed for refurbishment. The routing is confined to the steps needed in the refurbishment process.

Remanufactured items need two additional item IDs

Remanufactured items need two additional item IDs

- A second item ID is needed to represent the used core item that gets returned from customers.
- A third item ID is needed to represent the remanufactured item, which is the refurbished version of the used core item.

Consider appending a suffix for parallel IDs

A common part numbering strategy is to append the standard item ID with a suffix to identify the used core and remanufactured versions. For example, all used core versions can be appended with an ‘X’ or ‘-X’, etc. and all remanufactured versions can be appended with an ‘R’ or ‘RM’ or ‘-RM’ etc. This way all three item IDs will be listed together on lookups, screens, and reports and will have consistent identification across all such items.

Make the used core version a P item

The used core version that gets returned from customers should be a P item because it can be purchased from customers and is a component in the remanufactured item’s bill of manufacturing. You may wish to create an *Item Category* for used core items so that they can be tracked separately on reports from their standard and remanufactured versions.

Make the remanufactured version an M item

The remanufactured version should be an M item because it will have its own bill of manufacturing. You may wish to create an *Item Category* for remanufactured items so that they can be tracked separately on reports from their standard and used core versions. A separate *Item Category* also enables you to assign unique Sales and COGS accounts by *Item Category* in the *Account Assignments* screen, if so desired.

Create a BOM for the remanufactured item

Create a BOM for the remanufactured item, using it as the BOM parent. Confine the routing sequences to the labor and subcontract processes required to refurbish the used

core item. The components will consist of the used core version and any other components needed for refurbishing the item.

Used parts can be outputs

If during the refurbishment process you replace some used parts with new parts and the used parts can be stocked for use elsewhere, the used items can be specified as BOM outputs. Make sure that used items are given a separate item ID to distinguish them from new versions. If you wish to give used items a cost, assign an appropriate *Cost Ratio*.

Check availability when taking an order

Unlike standard manufactured items where MRP automatically generates additional supply jobs as needed to replenish net demand, the supply of remanufactured items is constrained by the supply on hand, which can be the remanufactured item itself or used core versions that can be refurbished to order. If used core versions are not on hand, there may be no way to fulfill the order until additional supply materializes.

MRP generates remanufacturing jobs in the normal fashion

MRP generates jobs for remanufactured items as needed in the normal fashion. Remanufacturing jobs are added to the master schedule and are released to production when material becomes available.

Modify job details as needed during production

Remanufacturing jobs are subject to modification due to variations in condition among used core items. Some may require additional parts or processes. You can freely modify job details during production to account for extra components, outputs, or routing processes that may be needed.

12 Disassembly

The “disassembly” process is the opposite of “assembly.” This requires a reverse bill of material. A conventional BOM’s components are “inputs” that are consumed during the course of the job. With a disassembly BOM the components are “outputs” that are received to stock during the course of the job.

Bill of Manufacturing

A disassembly BOM, like any BOM, requires a parent item, which is considered the “primary” output. All other outputs are considered “secondary” outputs.

The most significant output should be the BOM parent

The output item you consider to be the most significant should be designated as the primary output and is used as the BOM parent item. Therefore, the primary output item must be set up as an M item.

The routing is confined to disassembly labor

The routing should be confined to the steps that are involved in the disassembly process.

The used core version is the primary component

The primary BOM component in a disassembly BOM is the used core version of the item. Make sure that the used core version has a different item ID than the standard version of the item. Typically, a suffix is appended to the standard item ID, such as an ‘X’ or ‘-X’, etc. to distinguish the used version from the standard version. You may wish to give the used version its own *Item Category* for separate tracking on reports.

Disassembled parts are outputs

The used parts that are disassembled from the core component are set up on the *Outputs* tab. Each output is given a percentage of the total job cost in the *Cost Ratio* field. The total job cost is a combination of the disassembly labor involved as well as the cost of the core component.

Use caution when defining standard items as outputs

You can add standard purchased items and manufactured items as secondary outputs. These are items that you can also purchase directly or manufacture. You can assign an appropriate *Cost Ratio* for each respective output. This may take some experimentation to get an estimated cost that approximates the Item Est Cost. Be aware that MRP will not generate Jobs for secondary output demand. MRP will only create Jobs based on demand for the primary output item.

Disassembly jobs are created manually

Unlike standard manufacturing jobs, which are generated by MRP in response to actual demand, disassembly jobs are created manually in the *Jobs* screen as needed.

Disassembly jobs are less standardized

Technically, a disassembly job is the same as a standard manufacturing job in the sense that you will apply labor to the job and you will issue the used core component to the job from stock.

The job itself tends to be less standardized. You can start out the job with a set of pre-determined outputs and a routing, but during the course of the job you may find that some of the outputs are unusable, or unexpected outputs are discovered, or unanticipated labor processes are required. You can freely modify job details as needed during the course of the job.

Job processing steps are the same

The actual job processing steps – creating the job, modifying job details, issuing the core component from stock, reporting labor – is the same with disassembly jobs as it is with regular manufacturing jobs.

Job receipts involve multiple outputs

A key difference between a disassembly job and a standard manufacturing job is that the disassembly job involves multiple outputs instead of a single output. When you process job receipts in the *Job Receipts* screen, you are presented with numerous output lines. As you process each line, its cost is determined by its *Cost Ratio*, which is its percentage share of the overall job cost.

13 Rework

“Rework” refers to additional job processing required to correct defective items. Sometimes defective items are detected while a job is still open. If the defects are relatively minor, rework can be done within the existing job. When defects are major, however, the job should be closed and the defective items corrected using a rework job. In cases where defects are discovered after a job is closed, they should always be corrected using a rework job.

Correcting defective items within an existing job

If defective items are discovered while a job is still open and can be easily corrected by issuing additional material or re-running processes, you can perform the rework within the existing job.

In the *Job Labor* screen, reopen any closed sequences that need additional processing by clicking the button in the *Status* field and answering yes to the reopen prompt. Enter a negative *Completed* quantity for the number of units to be reworked, then click *Update*. Entering the negative completion keeps the sequence open and listed within the *Shop Control Panel*.

Perform the rework against each rework sequence and issue additional material as required. When the rework is completed, update the *Completed* quantity, which will automatically close the sequence if completed in full, or manually close the sequence if the completed quantity is less than expected.

Receiving defective job items to stock for future rework

When defects are relatively major, it may not be practical to perform the rework in the existing job. Instead, the defective items can be stocked and accumulated over time until sufficient quantity exists to justify a rework job.

In this case, an item ID must be created to represent the defective version of the item, which can be done by appending a suffix to the standard item ID. In the job, go to the *Details* tab and select the *Outputs* option in the upper panel. Add a line for the defective item ID and an associated quantity. You can optionally enter a *Cost Ratio* if you wish to allocate a percentage share of overall job cost to the defective items.

When job outputs are received to inventory in the *Job Receipts* screen, the completed items will be received to stock against the standard item ID and the defective items will be received to stock against the defective item ID.

Creating a rework BOM

If rework is to be done using a rework job, you must create a rework bill of manufacturing. The item’s standard BOM cannot be used because reworking an item is completely different than manufacturing it.

A unique item ID is needed to represent the reworked version of the item, which can be done by appending a suffix to the standard item ID. Create a bill of manufacturing using the rework item ID as the BOM parent. If there are any standard rework-specific processes, add them to the routing. At a minimum, create one routing sequence associated with the work center where rework is initiated. This way the rework job gets listed for work center scheduling within the *Shop Control Panel*.

If the defective version of the item is in stock (see the previous section), add it as a BOM component as well as any other components that are known to be needed for rework purposes.

Create a manual rework job

When you are ready to perform the rework job, create it manually in the *Jobs* screen. A manual job is required because there is no net demand for the rework version of the item to drive MRP.

Modify job details as needed during the course of the job

Rework may require processes or components that cannot be anticipated in the rework BOM and can only be known out on the shop floor as rework takes place. Add appropriate processes and components as needed. Otherwise, job processing – job issues, job labor, job receipts – is the same as with standard manufacturing jobs.

Use a lateral stock adjustment to restore the standard item ID

Completed reworked items are received to stock in the *Job Receipts* screen against the rework item ID. These items are no longer defective and must be restored to the standard item ID so that they are available for jobs or shipment to customers. This is done by performing a lateral stock adjustment.

Go to the *Stock Adjustments* screen and deduct stock against the rework item ID. Take note of the unit *Cost*. Make a second transaction where stock is increased against the standard item ID. Apply the same *Cost* to this second transaction. The stock is now restored against the standard item ID.

14 R & D

Research and development (R & D) is not a manufacturing activity, but it is a common activity within manufacturing companies. It therefore deserves discussion in this guide because it sometimes gets confused with custom manufacturing. This chapter discusses why jobs should not be used for R & D or other non-manufacturing activities and what accounting processes should be used instead.

Jobs are designed for manufacturing physical items

Jobs in DBA are highly specialized for manufacturing physical items. A job requires at least, one output item, and that item is received to inventory for issue to other jobs or shipment to customers using a sales order. All job processes, general ledger posting, scheduling, and shop control activities are designed around this item-based inventory and sales architecture. Job costing in DBA only affects asset and contra-expense accounts and not the expense accounts associated with non-manufacturing activities.

Non-manufacturing hours distort shop rates

Attempting to use jobs for non-manufacturing labor tracking can compromise the integrity of your shop rates for labor and overhead. The calculations in the *Shop Rates* screen only work properly when setup and labor hours and associated costs are isolated to manufacturing activities. Mixing non-manufacturing hours and costs into these calculations distorts shop rates and adversely affects cost rollups and job costing.

Non-manufacturing activities distort the master schedule

Attempting to use jobs for non-manufacturing activities adversely affects the integrity and efficiency of the master schedule. All dates and job priorities in the master schedule screens – *PO Schedule*, *Job Schedule*, *Job Control Panel*, *Shop Control Panel* – are interconnected based on item, work center, and routing settings. None of these screens and processes is designed to include non-manufacturing activities.

R & D should be tracked through the general ledger

The proper way to account for R & D expenses in DBA is to set up an expense account for R & D or expense accounts for specific R & D projects. Labor hours can be allocated to specific expense accounts when you process payroll or you can post all hours to a general payroll account and then at period end allocate portions of that expense to R & D expense accounts using a journal entry.

Use inventory adjustments and journal entry to expense materials

If you use materials from inventory for R & D or any non-manufacturing purpose, use the *Inventory Adjustments* screen to deduct the items from inventory. The expense will be a debit to *Inventory Adjustments*. Next, take the total value of the transaction and make a

journal entry debit to the appropriate R & D account, with a credit offset to *Inventory Adjustments*.

15 Custom Manufacturing Guidelines

This chapter lists two basic guidelines that must be followed for custom manufacturing to work properly and provide good results.

1. Always create custom items in a quote

Always use the *One-Off Item Generator* for custom item creation within a quote instead of a sales order. Sales order lines are subject to MRP generation, whereas quote lines are not. During the quote stage you can customize the one-off BOM, establish the one-off item's *Job Days* allocation, and establish the selling price. When the quote is converted to a sales order, the line *Required* date is updated and a CTO job will be generated in the next MRP run.

2. Modify job details in real time when changes are made

Custom manufacturing job details are commonly changed out on the shop floor when actual requirements differ from planned requirements. Whenever a process or component is added, changed, or deleted, modify the job details immediately in real time and never after-the-fact. Real-time, accurate job details are an essential requirement for numerous processes, including job release material allocation, work center scheduling, job issues, job costing, and PO generation.