

**Co-Products Manufacturing
Fourth Shift Release 8.00**

Fourth Shift Help
Release 8.00

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Contents

- Co-Products Manufacturing Module 4**
 - Module Prerequisites 4
- Setting Up the Co-Products Manufacturing Module 5**
 - Before You Implement the Module 5
 - Preparing Your Data for Loading 5
 - Loading Your Data 7
 - Suggestions for Using the Module 8

Co-Products Manufacturing Module

The Co-Products Manufacturing Module extends the functionality of the system so that co-products can be managed for scheduling and costing purposes.

This functionality handles the circular relationship of co-products—the production of any of several co-products results in the production of the others. In Fourth Shift, co-products can alternatively be treated as normal material items that are scheduled independently.

Co-Product scheduling and costing is necessary when:

- refining, grading, or sorting operations are involved in the manufacturing process
- an item is disassembled, salvaged, or cut to produce multiple products

These processes involving co-products are common to many manufacturers. Among them are integrated circuit chip makers, meat cutters, petroleum refineries, lumber mills, and textile manufacturers.

Module Prerequisites

The Co-Products Manufacturing Module has the following prerequisites:

- SYSM (System Control)
- INVM (Inventory Control)
- BILM (Bill of Material)
- MOMM (Manufacturing Order Management)
- MRPM (Material Requirements Planning)

The following modules are not prerequisite modules, but each greatly enhances the functionality of the COPM Module:

- PURM (Purchasing)

Setting Up the Co-Products Manufacturing Module

Setting Up the Co-Products Manufacturing Module provides an overview of how to implement the module. It covers:

- guidelines to consider before you implement the module
- how to prepare your data for loading
- suggested procedures for loading your data
- suggestions for using the module

Before You Implement the Module

An implementation plan should be developed for this module. The following are some areas you should consider.

Inventory and Bills of Material

- Guidelines should be established for maintaining co-product planning parameters.
- Review your manual bills of material to ensure that they accurately reflect how your co-products are planned and built.

Orders and Scheduled Receipts

Establish physical and procedural controls for stockroom and receiving transactions related to co-product orders, and for collecting and entering these transactions into the computer.

Master Production Schedule

- Establish guidelines to evaluate and implement changes to the master schedule.
- Establish a planning horizon equal to or greater than the total lead time required to manufacture the master-scheduled items including multi-level component lead time.

Preparing Your Data for Loading

Co-product Identification

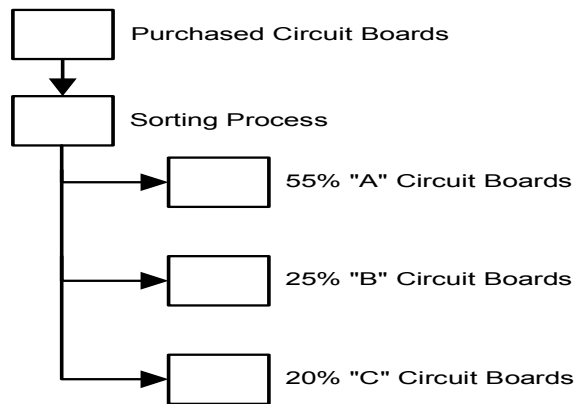
Enter co-products as components in a bill of material using **CT** (component type) = C. If you need to change the **CT** field, delete the component and then add the component back onto the bill of material. The **CT** field cannot be changed to or from "C."

Pay particular attention to the calculation of co-product component quantities as they relate to each co-product parent item.

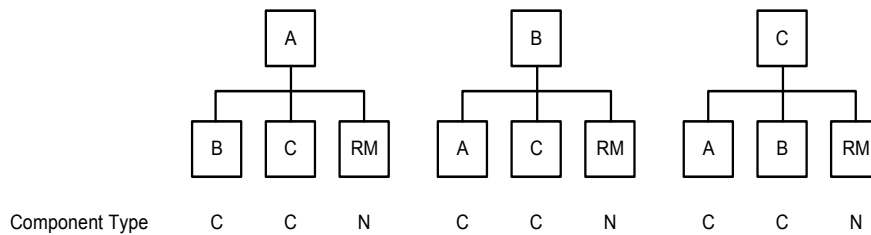
For example, suppose a company purchases circuit boards (Item RM) and then sorts the boards into "A", "B" and "C" classifications according to a specific characteristic. Each of the sorted circuit boards is a co-product. The co-products are salable end items and are forecasted. Historically, the sorting process results in:

- 55 percent "A" circuit boards (Item A)
- 25 percent "B" circuit boards (Item B)
- 20 percent "C" circuit boards (Item C)

as shown below.



The bill of material structure for each co-product can be represented as follows:



Component Type	C	C	N	C	C	N	C	C	N
Component Quantity	.455	.364	1.82	2.2	.8	4	2.75	1.25	5

To calculate the quantities for the components of Item C, the following relationships were used:

- For Item A, divide the expected % of co-product resulting from producing the parent by the expected % of parent produced during the sorting process. Using the example above, divide .55 by .20. The result is a quotient of 2.75.
- Use the same calculation for Item B. In the example above, divide .25 by .20. The result is a quotient of 1.25.
- For Item RM, divide the component quantity required to manufacture the parent and component products by the expected % of parent produced during the sorting process. Using the example above, divide 1 by .20. The result is a quotient of 5.

The bill of material for Parent Item C, as input on the BILL screen and shown on the MBIL (Multi-Level Bill Inquiry) screen, includes the following:

Seqn	Component	CT	Desc	Qty
001	A	C	"A" Circuit	2.75
002	B	C	"B" Circuit	1.25
003	RM	N	Circuit	5

Co-product Costing

Costs for a parent item with one or more co-product components must be manually maintained. An attempt to perform an automatic cost roll-up calculation would result in a never-ending cost calculation.

- Identify at-this-level costs for each co-product using a **Cost Code = 0** for **Cost Type = 0**.
- Identify the total rolled costs for each co-product considering the costs of its components, co-products and at-this-level costs.

Loading Your Data

Once your data has been prepared for entry, use this section to load your data into the Co-Products Manufacturing module.

A **validation tool** is identified for each screen or task listed in this section. Use the validation tool to double-check the accuracy of the data you have entered. Validation tools include:

- **Screen reports.** Create these reports by choosing **Print** from the **File** menu. For more information, see "Screen Reports" in the Fourth Shift Basics manual.
- **Print screens.** When other report options are not available, you can capture an image of your screen and use it to validate your data entry. For more information, see "Using the Print Screen Key" in the Fourth Shift Basics manual.

Other validation tools, such as batch processes and data extracts, may also be listed.

1. Verify Co-Product Items

Screen/Task	Module	Description	Validation Tool
ITMB	INVM	Verification: each co-product is a normal material item (Item Type = N)	screen report

2. Structure Bills of Material

Screen/Task	Module	Description	Validation Tool
BILL	BILM	bill of material for each co-product as the parent item	screen report
Bill of Material Detail	BILM	component text and detail information	print screen

3. Identify Costs

Screen/Task	Module	Description	Validation Tool
ITMC	INVM	at-this-level costs for each co-product using a Cost Code = 0 for Cost Type = 0	screen report
ITMC or ITCB	INVM	total rolled costs for each co-product	screen report

Suggestions for Using the Module

The functionality provided by the Co-Products Manufacturing Module allows you to enter manufacturing orders for co-products and have the PLNG (MRP Planning) task plan the material requirements for all component items, including co-products and raw materials.

The Manufacturing Order

As you create a co-product line item, an order-dependent bill of material is immediately created and attached to the line item.

When an order-dependent bill of material has co-products (**Component Type = C**) as components, line items for the co-products are automatically created as supply orders. Since the co-products are dependent on the parent item, these line items are identified on the manufacturing order using the same line number as the parent item and have a **Ln# Typ = B** (by-product).

For example, a released manufacturing order for 50 units of Item C includes line items for Items A and B, the co-products that result in the process of producing Item C. Items A and B appear as by-product line items, as illustrated in the following example.

Ln#	Order Qty	UM	Ln# Sta	Ln# Typ	Item	Description
001	50	EA	4	M	C	"C" Circuit
001	138	EA	3	B	A	"A" Circuit
001	63	EA	3	B	B	"B" Circuit

The system does not release co-product supply orders automatically. You must manually release these line items.

Supply/Demand Analysis

The SDAL (Supply/Demand Analysis) screen shows the supplies and demands generated by the PLNG (MRP Planning) task for the related co-products and raw material components.

Item C, the ordered co-product, is planned as follows:

Date	Gross Rqmt	Sched Recpt	Proj Avail	Plan Order	Pegging Type
*011587		50.00	50.00		Released Order
*011587	50.0		.0		Forecast Type #1
*021387			50.0	50.0	Planned Order
021587	50.0		.0		Forecast Type #1
*031387			50.00	50.0	Planned Order
031587	50.0		.0		Forecast Type #1

The scheduled receipt of each co-product component line item is identified on the SDAL screen with a by-product **Pegging Type**. Based on the scheduled receipt of the ordered co-product, the co-product component line item is a planned, firm-planned, open or released by-product.

For example, Item A, one of the co-products of Item C, is identified as follows:

Date	Gross Rqmt	Sched Recpt	Proj Avail	Plan Order	Pegging Type
*011587		137.5	137.5		Open Byproduct
011587	100.0		37.5		Forecast Type #1
*021387			175.0	137.5	Plnd Byproduct
021587	100.0		75.0		Forecast Type #1
*031387			212.5	137.5	Plnd Byproduct
031587	100.0		112.5		Forecast Type #1

The scheduled receipt of all the co-products is used in material planning to minimize raw material inventory.

In this example, the purchased circuit boards (**Item** = RM) are planned to meet the demand generated by the production of all the co-products: Items A, B and C:

Date	Gross Rqmt	Sched Recpt	Proj Avail	Plan Order	Pegging Type
*011387			250.0	250.0	Planned Order
*011387	250.0		.0		Allocation
*021187			250.0	250.0	Planned Order
021187	250.0		.0		Planned Reqmnt
*031187			250.0	250.0	Planned Order
031187	250.0		.0		Planned Reqmnt