

BILL OF MATERIALS

ACCPAC[®] ADVANTAGE SERIES



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Bill of Materials

A **Bill of Materials** (BOM) lists all the items that go into a finished good or subassembly. The **Bill of Materials** can simply list only the Materials and Quantities being used to manufacture a finished good or sub assembly. Furthermore it can be structured in a manner indicating all the steps of assembly.

Simple put, the Bill of materials is the basest part of any production process. If you don't have a well defined list of ingredients you can't make the part. Of course in the real world a BOM (Bill of Materials) is much more then a listing of the parts which make up the items we manufacture.

- Often a finished good consists of parts which in them self's are finished parts. This is often referred to as an indented BOM.
- In many cases there are variations of the standard BOM which may be designated with different Revision numbers or are considered interchangeable with the standard BOM.
- Demand level inventory control would require the purchase or manufacture of parts in order to be able to fill the requirement for a higher level finished part.
- Mismanaged raw material can spell disaster to any production process.
 - If you have too little raw material and you stop the production line because of inventory shortages.
 - If you have too much raw material you run the risk of placing excessive strains on your financials and at worst case has to scrap material that exceeds its shelf life.

ACCPAC and Bill of Materials (BOM)

Inventory Control contains an assembly function designed for these situations. You can use the assembly function to assemble bills of material that you create.

You create a bill of material to define the component items and quantities, and the fixed and variable costs, required to assemble a specific number of units (build quantity) of a master item.

An assembly of a bill of material takes component items out of inventory and creates a supply of master items. If you allow negative inventory levels, you can assemble a master item even if its component items are not in stock. The costs of the components are transferred to the master item.

If you assemble the same master item from different components (for example, using alternate items), you must set up a separate bill of material for each version of the master item.

Bills of material

A bill of material specifies:

-
- The number of master items (called the *build quantity*) you want to produce from one assembly of the bill of material.
 - The component items to use, including the number of units of each item needed to produce the build quantity.
 - Fixed and variable costs associated with assembling the master items on the bill of material.

[Build quantity](#) (follow the link for more explanation)

The build quantity is the number of master items that one assembly of a bill of material produces. No fractional build quantities are allowed. For the build-quantity unit of measure, you can use any of the units of measure specified in the master item record.

Assigning numbers to identify bills of material

You assign each bill of material (BOM) a BOM number, up to six characters long, which uniquely identifies it. If you want to assemble the same master item with different components, you specify a different BOM number for the second bill of material. BOM numbers can contain uppercase letters and numbers.

[Fixed and variable costs](#) (follow the link for more explanation)

When you add a bill of material, you can specify fixed and variable costs associated with assembling the master item.

Rules for Bills of Material (in ACCPAC)

- Before you can set up a bill of material, you must add item records for the items you intend to use for the master item and component items in the bill of material.
- Before you can post an assembly transaction, the master item and all its component items must be stocked at the same Inventory Control location.
- Master items and component items can use any costing method except the user-specified costing method.
- You cannot delete an item from inventory if it is a master or component item in a bill of material.
- The component items in a bill of material are fixed (you cannot use alternative components). To build a master item using an alternative component item, you must create, and use, a separate bill of material.
- You can create a bill of material that uses the master item from a different bill of material as a component item. You must assemble as many units of the *component* master item as you need, prior to assembling the next level of master item.

Before adding bills of material

- Decide on the bill of material numbers (BOM numbers) you will use. BOM numbers can be up to six characters long.

- Add the item records for the master items you will create and for the component items you will use when you assemble those master items.

Before you can post assembly transactions, master items and all their component items must be stocked at the same Inventory Control location. If you did not select the Allow Items At All Locations option in the Options form, you must allow items to be stocked at each inventory location you want.

Bills of Material Form

This form lets you:

- Set up bills of material if you plan to assemble or repackage inventory items to create a supply of "master items" to sell.

In our [example](#) we will be building "Hunts 2500 Series Filing Cabinets". The I/C Bill of Materials will look like the following.

Component Item Number	Description	Quantity	Unit of Meas...	Unit Cost
A1-500/0	Hanging File Folder	10	Pkg.	
F2-100/L	Plastic Drawer Labels	4	Ea.	
F2-101/L	Hanging Folder Bars	4	Ea.	
F2-102/0	File Folder Labels	5	Box	
F2-103/0	File Folders	5	Box	
F2-120/L	Controlling Lock	1	Ea.	

Figure 1: I/C Bills of Material

Item Number (Bills of Material) -- Enter an item number or use the Finder to select the item number you want to use as the master item for the bill of material. This is the item that you are assembling from components.

BOM Number- Enter a number or code that will identify the bill of material you are creating. The code can be up to six characters long, and contain letters and numbers.

Fixed Cost -- Enter the setup cost for assembling the bill of material. The fixed cost is a one-time cost that is the same regardless of how many units you assemble of the master item. For example, the time required to prepare an assembly line is a fixed cost.

Variable Cost (per Build Qty.) -- Enter the cost for one assembly of the bill of material. One assembly produces the "build quantity" of master items.

Build Quantity- Enter the number of master items that one assembly of the bill of material produces.

Unit of Measure -- Enter the unit of measure or use the Finder to select the unit of measure you want to assign to the master items you create when you assemble the bill of material.

Comments -- Enter comments you want saved with the bill of material record.

Component Item Number -- Enter an item number or use the Finder to select each item number you require to assemble the master item.

Component Description -- This column displays the description for each item number you add to the bill of material.

Component Quantity -- Enter the quantity of each of the component items you require to assemble the number of master items you specified in the Build Quantity field.

Component Unit of Measure -- Enter a unit of measure or use the Finder to select the unit of measure to be used for each component item.

Unit Cost - Note: Though the I/C Bills of Material form shows a column for the unit cost but does not actually show a cost.

Fixed and Variable Costs

Before you can use cost/volume/profit analysis to help you evaluate your business's operations, you need to get a handle on the fixed costs of your business, as compared to your variable costs.

Virtually all of your business's costs will fall, more or less neatly, into one of two categories:

- **"Variable costs,"** which increase directly in proportion to the level of sales in dollars or units sold. Depending on your type of business, some examples would be cost of goods sold, sales commissions, shipping charges, delivery charges, and costs of direct materials or supplies, wages of part-time or temporary employees, and sales or production bonuses.
- **"Fixed costs,"** which remain the same regardless of your level of sales. Depending on your type of business, some typical examples would be rent, interest on debt, insurance, plant and equipment expenses, business licenses, and salary of permanent full-time workers.

Your accountant can help you determine which of your costs are fixed and which are variable, but here the key word is "help." In order to be accurate, the ultimate classification has to be done by someone who's intimately familiar with your business operations – which probably means you.

Combination costs. Some costs are a combination of fixed and variable: a certain minimum level will be incurred regardless of your sales levels, but the costs rise as your volume increases. As an analogy, think about your phone bill: you probably pay an access or line charge that is the same each month, and you probably also pay a charge based on the volume of calls you make. Strictly speaking, these costs should be separated into their fixed and variable components, but that may be more trouble than it's worth for a small business. To simplify things, just decide which type of cost (fixed or variable) is the most important for the particular item, and then classify the whole item according to the more important characteristic. For example, in a telemarketing business, if your phone call volume charges are normally greater than your line access charges, you'd classify the entire bill as variable.

Relevant range of activity. It's important to realize that fixed costs are "fixed" only within a certain range of activity or over a certain period of time. For example, your rent is a constant amount per month — until your landlord raises it at the end of the year — unless you go out of business completely, in which case it would drop to zero, or unless your sales increase to the point where you need to rent an additional workplace, in which case it might double. So CVP analysis is only valid within a certain range of sales (generally, this coincides with the range that could reasonably be expected for your business) — at the extreme high and extreme low ends of the range, or if enough time passes, all costs become variable.

Cost per unit or job. If you add up all your variable costs for the accounting period, and divide by the number of units sold, you will arrive at the cost per unit. This cost should remain constant, regardless of how few or how many units you sell. If yours is a service business, you may be able to divide your variable costs by the number of jobs performed (if the jobs are essentially similar) or by the hours spent on all jobs (if the jobs vary greatly in size).

Once you're comfortable with classifying costs as fixed or variable, you can apply this knowledge with two techniques: [contribution margin analysis](#) and [breakeven analysis](#).

Build Quantity - Example

Consider the following bill of material:

Master item = Hunts 2500 Series Filing Cabinet

Build quantity = 5 Cabinets

Components (per cabinet):

Component Description	QTY Used	UOM
Hanging File Folder	10	Pkg.
Plastic Drawer Labels	4	Ea.
Hanging Folder Bars	4	Ea.
File Folder Labels	5	Box
File Folders	5	Box
Controlling Lock	1	Ea.

Table 1: Components of BOM

Fixed and Variable Costs in ACCPAC

Fixed cost is the setup cost for preparing to assemble a bill of material one or more times. The fixed cost is a one-time cost which is the same regardless of the number of times you assemble the build quantity of the master item.

Variable cost is the cost of assembling the build quantity of a bill of material *exactly once*.

When you assemble a bill of material, the program multiplies the variable cost by the number of assemblies (not the number of master items produced). The cost of labor for an assembly is an example of a variable cost.

For example, consider the following bill of material:

Master item = Hunts 2500 Series Filing Cabinets

Build quantity = 1 Cabinet

Components: (see Table 1 above)

Fixed cost = \$25.00 (for setup/breakdown)

Variable cost = \$10.00 (for labor and 'uncounted' materials)

Assembling the preceding bill of material five times:

Produces five cabinets

Requires (5 * BOM Component List):

Component Description	QTY Used	UOM
Hanging File Folder	50	Pkg.
Plastic Drawer Labels	20	Ea.
Hanging Folder Bars	20	Ea.
File Folder Labels	25	Box
File Folders	25	Box
Controlling Lock	5	Ea.

Table 2: Actual number of components used

Incurs a fixed cost of \$25.00 (for setup/breakdown)
 Incurs a variable cost of \$50.00 (5 times \$10.00)

Item Master	Description	Build QTY	UOM	Fixed Cost	Var Cost	BOM #
F3(HUNTS-2500)T	Hunts-2500 Series Filing Cabinet and Extras	1	Ea.	25	10	1

Item Component	Component Description	QTY Used	UOM	Per Item		
				Average Cost	Most Recent Cost	Last Unit Cost
A1-500/0	Hanging File Folder	10	Pkg.	1.754804	1.757440	1.623500
F2-100/L	Plastic Drawer Labels	4	Ea.	0.378876	0.378877	0.350000
F2-101/L	Hanging Folder Bars	4	Ea.	0.487122	0.487120	0.450000
F2-102/0	File Folder Labels	5	Box	0.378876	0.378874	0.350000
F2-103/0	File Folders	5	Box	0.162378	0.162379	0.150000
F2-120/L	Controlling Lock	1	Ea.	1.331448	1.331467	1.230000
				25.049750	25.076120	23.165000
Fixed Cost = \$25/5 (count made)		25		5	5	5
Variable Cost		10		10	10	10
Cost per Unit Made				40.0498	40.0761	38.165

Cost per run of 5 Cablinets made						
Fixed Cost	25	25	25	25	25	25
Variable Cost	50	50				
Component cost			<u>125.2488</u>			
Total Cost of Run			<u>200.2488</u>			

Figure 2: Hand Calculation

A look at the Item Valuation report on the following page shows that indeed ACCPAC created the assembly ASS000001 (I took out a couple of 0's) that build us 5 cabinets at a total Actual Cost of \$200.25 US.

Item Valuation (ICVALU04)

Use [Transaction Costs]
 Select Transactions By [Fiscal Year/Period]
 From Year-Period [0000-0] To [2010-7]
 Print [Separate Locations] In [Detail]
 Print Transaction Detail [Yes]
 Include [All] Quantities
 Include [All] Costs
 From Account Set [] To [ZZZZZ]
 From Location [] To [ZZZZZ]
 From Item Number [F3(HUNTS-2500)T] To [F3(HUNTS-2500)T]

Item Number/ Document Number	Date	Year-Pd.	Quantity Unit	Total Quantity in Stocking Unit	Actual Cost	Most Recent Cost	Standard Cost	Price
F3(HUNTS-2500)T			Hunts 2500 Series Filing Cabinet					
	7/29/2003	2003-7	0.00 Ea.		0.00	0.00	0.00	0.00
ASS0000000000000000000001	6/30/2010	2010-6	5.00 Ea.		200.25	200.25	0.00	2,999.95
			Totals:	5.00	200.25	200.25	0.00	2,999.95
			Avg. Unit Value:	E a.	40.050000	40.050000	0.000000	599.99
			Unit:		E a.	E a.	E a.	E a.
1 item printed				Total:	200.25	200.25	0.00	2,999.95

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Addendum

Contribution Margins

One of the important, yet relatively simple, tools afforded by cost/volume/profit analysis is known as contribution margin analysis. Your company's contribution margin is simply the percentage of each sales dollar that remains after the [variable costs](#) are subtracted. When you know the contribution margin, you can make better decisions about whether to add or subtract a product line, about how to price your product or service, and about how to structure any sales commissions or bonuses.

How is your contribution margin computed? By using a special type of income statement that has been reformatted to group together your business's fixed and variable costs.

Here's an example of a contribution format income statement:

Beta Sales Company	
Contribution Format Income Statement	
For Year Ended December 31, 200X	
Sales	\$462,452
Less Variable Costs:	
Cost of Goods Sold	230,934
Sales Commissions	58,852
Delivery Charges	13,984
<i>Total Variable Costs</i>	\$303,770
Contribution Margin	\$158,682 34%
Less: Fixed Costs:	
Advertising	1,850
Depreciation	13,250
Insurance	5,400
Payroll Taxes	8,200
Rent	9,600
Utilities	17,801
Wages	40,000
<i>Total Fixed Costs</i>	\$96,101
Net Operating Income	\$62,581

You can tell at a glance that the Beta Company's contribution margin for the year was 34 percent. This means that, for every dollar of sales, after the costs that were directly related to the sales were subtracted, 34 cents remained to contribute toward paying for the direct costs and for profit.

Contribution format income statements can be drawn up with data from more than one year's income statements, if you're interested in tracking your contribution margins over time. Perhaps even more usefully, they can be drawn up for each product line or service you offer. Here's an example, showing a breakdown of Beta's three main product lines:

	Line A	Line B	Line C
Sales	\$120,400	\$202,050	\$140,002
Less Variable Costs:			
Cost of Goods Sold	70,030	100,900	60,004
Sales Commissions	18,802	40,050	0
Delivery Charges	900	8,084	5,000
<i>Total Variable Costs</i>	<i>\$ 89,732</i>	<i>\$149,034</i>	<i>\$ 65,004</i>
Contribution Margin	30,668 (25%)	53,016 (26%)	74,998 (54%)

Although we've only shown the top half of the contribution format income statement, it's immediately apparent that Product Line C is Beta's most profitable one, even though Beta gets more sales revenue from Line B. It appears that Beta would do well by emphasizing Line C in its product mix. Moreover, the statement indicates that perhaps prices for line A and line B products are too low. This is information that can't be gleaned from the regular income statements that your accountant routinely draws up each period.

Breakeven Analysis

A second tool for management decision making that has grown out of cost/volume/profit analysis is breakeven analysis.

Once you know what your [variable costs](#) are, as well as your overall [fixed costs](#) for the business, you can determine your breakeven point: the volume of sales needed to at least cover all your costs. You can also compute the new breakeven point that you'd need to meet if you decided to increase your fixed costs (for example, if you undertook a major expansion project or bought some new office equipment).

Your breakeven point can be determined by using the following formulas:

1. Sales Price per Unit – Variable Costs per Unit = Contribution Margin per Unit.
2. Contribution Margin per Unit divided by Sales Price per Unit = Contribution Margin Ratio.
3. Breakeven Sales Volume = Fixed Costs divided by Contribution Margin Ratio.



Assume that the financial statements for Lillian's Bakery reveal that the bakery's fixed costs are \$49,000, and its variable costs per unit of production (loaf of raisin coffee cake) are \$.30.

Further assume that its sales revenue is \$1.00 per loaf. From this information, it can be determined that, after the \$.30 per loaf variable costs are covered, each loaf sold can contribute \$.70 toward covering fixed costs.

Dividing fixed costs by the contribution to those costs per unit of sales tells Lillian's Bakery at what level of sales it will break even. In this case:
 $\$49,000 / \$.70 = 70,000$ loaves.

As sales exceed 70,000 loaves, Lillian's Bakery earns a profit. Sales of less than 70,000 loaves produce a loss.

Lillian's Bakery can see that a 10,000 loaf increase in sales over the breakeven point to 80,000 loaves will produce a \$7,000 profit, and a 30,000 loaf increase to 100,000 will produce a \$21,000 profit. On the other hand, a decline in sales of 10,000 loaves from breakeven to 60,000 loaves will produce a loss of \$7,000, and a 30,000 decrease from the 70,000 breakeven point produces a \$21,000 loss.