



ProfitTool Inventory Management System

Item Demand Forecasting & Automated Purchasing

A White Paper on the Key Functions





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[ProfitTool Inventory Management](#)

General Data Systems has developed the ProfitTool Inventory Management utilities as part of an overall suite of utilities that not only include Inventory Management, but a host of Customer Service Inquires and Sales and Inventory Reporting utilities. This White Paper addresses the Inventory Management aspects of ProfitTool.

[Inventory Management Defined](#)

Inventory for Wholesalers and Distributors is likely their largest asset (not counting personnel of course)! We must begin to view inventory as though it was dollars sitting on the warehouse shelf.

Inventory Tracking is simply recording all transactions, changing stock balances up and down, and tracking Y-T-D and M-T-D sales. No attempt is made to calculate "When to Order" or "How Much to Order". Proponents of inventory tracking use a good deal of "swag" when putting together purchase orders.

Inventory Management is continually capturing data and using it to re-set important replenishment controls such as reorder point and usage every month where unusual conditions are not present in sales history. Inventory Management guides buyers to meet specific conditions or meet supplier total order requirements all under restraint of customer service and turns goals.

The object is to provide the best possible customer service with the lowest possible inventory investment.

Experts specializing in the field of Inventory Management differ in the specific process and calculations used to build restocking orders. They do seem to agree on a few key points.

- § Many "common sense" rules lay outside your computer system.
- § Statistical analysis combined with your knowledge of unique customer/vendor conditions can significantly reduce stock inventory levels while increasing order fill rates.
- § The best suggested ordering software includes some method of: forecasting which is "forward projection of past history including a smoothing technique", identifying seasonal items and adjusting the forecast accordingly, rounding suggested quantities to a specified purchase factor when applicable, storing vendor minimum information, and centralized purchasing.



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[Inventory Management – Understanding New Terminology](#)

The ProfitTool Inventory Management technology follows many of the inventory management principles outlined by Mr. Gordon Graham (Automated Inventory Management) and Mr. Jon Schreibfeder (Achieving Effective Inventory Management). Both these gentlemen have significantly contributed solid methodology regarding inventory management and automated purchasing. GDS' intent is to utilize their reference material as a guide in the development of the ProfitTool Inventory Management logic.

GDS has not contracted with or paid any fees to either of these gentlemen or their affiliated organizations and does not represent the ProfitTool Inventory Management logic to be an exact duplication of their methodology.

There are numerous terms used in defining the many parts on inventory management. These terms are contained in the item record or vendor record and are important parts of the formulation. As a quick reference, they are listed below under the area in which you will find them. More complete explanations on those terms can be found in reference material of Mr. Graham and Mr. Schreibfeder.

Item Record

Average Monthly Usage
Date Average Monthly Usage Updated
Reorder Point
Update Reorder Point Check Box
Reorder Method (See Page 5 for Details)
Fixed Order Quantity
Safety Stock %
Maximum On Hand
Update Maximum On Hand Check Box
Seasonal/Non-Seasonal Flag
Item Last Cost (Vendor Specific)
Minimum PO Order Quantity
Item Purchase & Sell Factors
Weight
Lead Time Days

Vendor Record

Vendor PO Minimum (Dollars – Weight - Cube)
Vendor PO Minimum Freight Allowance (Dollars – Weight - Cube)
Default Lead Time
Auto Create PO

EOQ Calculation Variables

Cost of Carrying Inventory Percent
Cost of Ordering Dollar Amount



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Average Monthly Usage – The Most Important Element

Invoiced Sales Order transactions processed through Sales Journal Update are the base component in calculating the Average Monthly Usage of a Stocking Item. Once the Sales Journal Update is run for invoiced sales orders, the software uses the quantity ordered of each item...not the quantity shipped to calculate Average Monthly Usage.

Individual sales order lines can be marked to not be included in the average monthly usage calculation. This "smoothing technique" allows flexibility to omit any unusual spikes in demand that are not likely to reoccur from the average monthly usage calculation.

ProfitTool provides a "User Driven" series of Item Demand Reporting criteria, which is used to determine the base calculation of an Item's "Average Monthly Usage". At run time, the operator selects 12 contiguous months beginning with the month and year of their choice. (The 12 period start and end numbers correlate to your fiscal calendar. Period 1 would be January if your fiscal year begins in January. Period 1 would be July if your fiscal year begins in July.) Then the operator chooses the specific column numbers, from the previously selected 12 months, to use when calculating the new average monthly usage. The operator may choose to include any number of months from 1 to all 12 months.

Example 1 - Fiscal Year Begins in January: Operator selects 12 periods beginning with 01 of 2007 and ending with period 12 of 2007. The operator then chooses to include only columns 6 through 12 of the 12 periods selected above to calculate new average monthly usage. With your fiscal year beginning on January 1, columns 6 through 12 would represent July – December of 2007. (Operator could choose to use columns 1 through 12 of the periods selected to calculate average monthly usage based on 12 months instead of only the last 6 months of 2007.)

Example 2 – Fiscal Year Begins in July: Operator selects 12 periods beginning with 07 of 2006 and ending with period 06 of 2007. Then the operator chooses to use only columns 6 through 12 of the previously selected 12 months to calculate new average monthly usage. With your fiscal year beginning on July 1, columns 6 through 12 would represent January 2005 through June 2005. (Operator could choose to use columns 1 through 12 of the periods selected to calculate average monthly usage based on 12 months comprised of July 2006 through June 2007.)

Average monthly usage, reorder points, and/or maximum on hand quantities can be calculated at any time you wish using the Item Demand Report found on the Sales Order Module.

The ProfitTool Item Demand Reporting Run-Time Variables:

- Starting – Ending Item Number
- Starting – Ending Product Line
- Starting – Ending Warehouse
- Starting – Ending Vendor



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Seasonal or Non –Seasonal Items
12 Month Period Starting – Month and Year
12 Month Period Ending – Month and Year
Compute Average Starting Column
Compute Average Ending Column
Average Monthly Usage Multiplier for Maximum
Reorder Point Update Check Box
Maximum Level Update Check Box
Average Monthly Usage Check Box

Once criteria are selected, the system will evaluate the invoiced sales order transaction records that have processed through Sales Journal Update to arrive at "Average Monthly Usage" for each Item that falls within the selected variables if the "Date Entered" of the Item is prior to the Compute Average Beginning Period. If the item's "Date Entered" is after the Compute Average Beginning Period, the item will be skipped in the Average Monthly Usage calculation routine.

[Lead-Time Days](#)

Lead-time is the total amount of time between the date you recognize the need to reorder an item and the date replenishment merchandise is on the shelf, recorded in the computer, and available for sale. ProfitTool allows a default lead-time to be entered for each Vendor Master record and each Item at warehouse record. Lead time is manually entered and updated. The system will use the lead time from the default Vendor, unless there is a specific lead time in the Item at warehouse record. If the lead time field in the vendor record and/or item at warehouse record is blank or zero, the software considers it as a 1 when calculating Reorder Point. (This safeguard prevents reorder point from accidentally be set to zero due to lead time field being left blank or at zero during item at warehouse entry.)

[Safety Stock](#)

Safety stock protects you from variations in the usage rate or in the lead time. It is expressed as a percentage of the average monthly usage. Usage rate and lead-time are predictions of past history, which is why you need the safety stock percentage.

ProfitTool stores the safety stock percentage in each item at warehouse record. Safety stock defaults to 50%, but can be manually edited.



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Reorder Point

Reorder point is a service control and it maintains continuity of stock. Reorder points answer the When to Order question. Reorder point is the amount of material below which you shouldn't go without starting the replenishment process if procuring from a source outside the company.

The reorder point consists of enough material (average monthly usage) to take care of customers during the time required to get more stock (lead-time) plus a measured amount of pad (safety stock).

ProfitTool updates the reorder point as part of Item Demand Reporting. Reorder point can also be manually edited.

Reorder Point = (average monthly usage X lead-time) + safety stock percentage

Inventory Reorder Report

The software routines in the ProfitTool Inventory Reorder Report are designed to create suggested purchase order quantities based on run time selections coupled with characteristics in the item at warehouse records. (The Inventory Reorder Report is found on the Inventory Management Module, Reports, Inventory Reorder Report.)

Two decisions are made when using the ProfitTool Inventory Reorder Report. The software first must determine "*Is It Time To Order?*" If it is time to order, it then must determine "*How Much To Order?*".

There are two basic options within the automatic purchasing programs.

Option I executes only on those items having a negative availability and is used to cover only open customer sales orders.

Option II uses one of the Reorder Methods described below to determine suggested order quantity:

Reorder Method	Description
E	EOQ - Calculates Economic Order Quantity
M	Reorder Up To Max Point
R	Reorder Up to Reorder Point
F	Reorder a Fixed Quantity
N	Not Included

The applicable method is determined by the setting in the Reorder Method field in each item at warehouse record. Only one method may be used on each item at each warehouse, but you can use a combination of all methods in your inventory management plan. For example, the same item could have a different Reorder Method at different warehouses. The Reorder Method at a central warehouse that



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supplies remote warehouses could be set for M – order up to maximum point. The Reorder Method for the same item at a small, remote warehouse could be F for Fixed Quantity.

NOTE: If you check the “accumulate warehouse” option on the Inventory Reorder Report and specify the central warehouse as the ordering warehouse in the above example, the software adds up the maximum quantity from both warehouses to determine how much to order. (The fixed setting in the remote warehouse is ignored.) You can enter a maximum on hand quantity on items set for F – Fixed Reorder Method. Maximum on hand quantity would be used if you choose to sometimes accumulate warehouses to do centralize purchasing for the item. However when running an Inventory Reorder Report for only the remote warehouse and not accumulating warehouses, the Fixed Reorder Method and fixed reorder quantity would be used to determine how much to order. Remember, the Reorder Method set on the “central” warehouse is used to determine how much to order when using the “accumulate warehouse” option.

Option I

This option is based on Backorders Only. The Suggested Order Qty = (Qty in Stock + Quantity on P.O. – Quantity on S.O.).

Option II

This option allows you to look at item records by warehouse by vendor to determine what items qualify for purchasing and how much should be purchased. It contains run time options for:

- § Starting – Ending Item Number
- § Starting – Ending Product Line
- § Starting – Ending Warehouse
- § Starting – Ending Vendor
- § Accumulate Warehouses – Y/N
- § Include Sales History
- § Percent Allowable from Reorder Point
- § Cost of Carrying Inventory Percentage
- § Cost of Ordering Dollars Per Purchase Order Line Item

Is It Time To Order? The product qualifies to be purchased based on establishment of a value (X) which is equal to the Reorder point (Reorder point * the percentage allowed from Reorder point).

This value, (X) is then compared to the result of the following calculation. (If Qty on Hand + Quantity on P.O. – Quantity on S.O.) is *less than* the value (X) established above, then the item qualifies to be purchased and it is time to order!

If the ProfitTool BOM Work Order module is installed, the “Committed To” and “Due From” values are introduced into this formula.



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How Much To Order?

One of the following three methods is used to calculate suggested order quantity when the Product Reorder Report is done using Option II.

Economic Order Quantity Method (EOQ):

If the item record's reorder method is an "E", the software will use the Economic Order Quantity (EOQ) formula to determine Suggested Order Quantity. Two important components of this formula: cost of ordering and cost of carrying inventory, are entered at run time. The formula is as follows:

$$EOQ = \text{Sq. Root of } \frac{24 * \text{cost of ordering} * \text{item average monthly usage}}{\text{cost of carrying inventory} * (\text{item last cost/purchase factor})}$$

EOQ recommends a quantity to buy related to how much money moves through inventory each month and year. On expensive items, a lower number of month's supply is suggested which produces higher turns per year. Buy a higher number of month's supply on less costly items and be satisfied with lower turns.

Need Extra Added to EOQ to Cover Customer Commitments?

If (Qty on Hand + Quantity on P.O. – Quantity on S. O.) is less than zero, then the positive value is added to EOQ to cover the extra customer commitments.

EOQ balances out the incremental cost of holding an item in stock with the cost of replenishment activities. EOQ offers cost effective ordering quantities and causes about 65% of stock items to be reordered once or twice a year. The other 35% will turn much faster! Goal is 5 or 6 turns on total inventory.

EOQ Rounding – ProfitTool rounds EOQ to meet the minimum order quantity. EOQ must not be less than a two week supply and no greater than a one-year supply. If it is, then EOQ is rounded up to a two-week supply or down to a one-year supply.

Reorder Point/Maximum Level Method:

If the item record's reorder method is an "M", the following calculation is made.

$$\text{Sug. Ord. Qty} = \text{Max. on Hand} - (\text{Qty on Hand} + \text{Qty on P.O.} - \text{Qty on S.O.})$$

If the result of the portion in parenthesis is negative, the positive value is added to the maximum level to cover extra customer commitments. If the Suggested Order Quantity is less than or equal to zero, nothing is ordered. If the Suggested Order Quantity is greater than zero, that quantity is ordered.



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Reorder Point/Reorder Point Method:

If the item record's reorder method is an "R", the following calculation is made.

$$\text{Sug. Ord. Qty} = \text{Reorder} - (\text{Qty on Hand} + \text{Qty on P.O.} - \text{Qty on S.O.})$$

If the result of the portion in parenthesis is negative, the positive value is added to the Reorder point to cover extra customer commitments. If the Suggested Order Quantity is less than or equal to zero, nothing is ordered. If the Suggested Order Quantity is greater than zero, that quantity is ordered.

Fixed Reorder Quantity Method

If the item records reorder method is an "F", and then the quantity entered in the Fixed Order Quantity field will be the suggested quantity to order.

Quantity Ordered Rounding - All Ordering Methods

The system will use the "Minimum PO Order Quantity" field in the rounding formula. If the calculated quantity to be ordered is less than the Minimum PO Order Quantity, the system will round up to the Minimum PO Order Quantity. Once the Minimum PO Order Quantity is met, the system then orders the exact quantity calculated using the above described methods.

Not Included

If the item record's reorder method is an "N", then the Item does not qualify for any reordering purchasing routines unless the item has a negative availability and there is not enough quantity on purchase order to cover the commitment.

BOM Work Order Integration

If the ProfitTool BOM Work Order module is installed, the "Committed To" and "Due From" values are introduced into the above formulations.

[Auto Purchase Orders](#)

The Automatic Purchase Routine located in Inventory Management Module, Auto Purchase, Create Reorder Recommendations executes the same logic as does the Inventory Reorder Report found in Inventory Management Module, Reports, Inventory Reorder Report. You can build the actual purchase order for the vendor using the same ProfitTool logic described in this document using either program. When using the later report, once the Suggested Reorder Report displays, the operator is given an opportunity to "create" auto purchase orders from the recommended reorders.

When the "Creating Purchase Recommendations" box display, you see a message stating Previous Recommendations will be cleared. The operator is then provided a choice among 4 options from which to associate item costs to the purchase order(s). These 4 options are:



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1. Standard cost/last cost
2. Last Cost/standard cost
3. Vendor cost/standard cost
4. Vendor last cost/last cost

If standard cost/last cost is selected, the software looks to see if there is a standard cost on the item. If standard cost is found, it is used. If there is no standard cost, then it uses last cost of the item.

If last cost is selected, the software looks to see if there is an item last cost and if one is found, uses it. If no last cost is found, it looks for the item standard cost and uses it.

If vendor cost/standard cost is selected, the software looks for the cost on the item's vendor tab for the vendor designated as the primary vendor and uses it. If no cost is found on the item vendor tab for the primary vendor, software uses the item standard cost.

If vendor cost/last cost is selected, the software looks for the cost on the item's vendor tab for the vendor designated as the primary vendor and uses it. If not cost is found on the item vendor tab for the primary vendor, software uses the item last cost.

NOTE: The Purchase Order Module, Auto Purchase, Create Purchase Recommendations program does not use the same logic described in this document. It only creates purchase orders for items on sales orders with a backordered quantity. If the auto create p.o. check box in the vendor record is not checked, you cannot create auto purchase orders for items assigned to this vendor using the Purchase Order Module auto purchase routines.

[Wrap Up](#)

Thank you for taking your time to review this material. This White Paper only begins to scratch the surface on this intricate subject. The experienced staff at GDS would be more than pleased to discuss your specific set of Inventory Management problems and work with you in bringing about a solution to those problems.