AIMS/ERP ™

Advanced ERP

Featuring
Synchronized Production & Material

Functional Overview

Paul Deis

Note: *This brochure describes the AIMS/ERP product, which was marketed from 1997 through 2000 by AIMS Software, Inc. which I led during this period. It is a full ERP system with many advanced features still not found in ERP systems, including even high-end systems costing millions of dollars. It was written in high productivity software platform that enabled a very small team to develop, field and support a large, complex system. We closed the company, still in the black, in early 2001 after concluding that it was not competitive.*

The purpose of this brochure is to show, in some detail, my ability to design, in detail, leading-edge software that materially assists a company in achieving higher levels of performance, as well as my ability to manage the development of a large-scale system. Although I have never written a program, I do know how various software tools work, and thus how to design software to them.

I wrote over 1600 pages of detailed specifications for AIMS/ERP. It was originally developed as a product to be marketed at Alesis Corporation, which had previously failed several ERP software effort due to poor fit. The Alesis business model featured extensive outsourcing, both on and off-shore of production using material they purchased and furnished to suppliers, as well as a sophisticated multi-channel sales model where certain products could only be sold through specific channels. AIMS/ERP contributed in a substantial way to the success and rapid growth of Alesis from $40 to about $80 million in revenue over a 1 to 2 year period. Some of these products were complex and very leading-edge, even difficult to make, but were world-wide successes. One, the ADAT, revolutionized the recording of music all over the world, putting true high-quality digital recording capability in the hands of an ordinary musician with dreams but little else, removing the costly recording studio from the process.

A major aspect of its design is that it allowed concurrent use of multiple business modes, such as project-driven with make to stock production, or standard cost along with actual cost production, including estimates to complete for projects. One simply used those functions as needed, without elaborate parameter setting or configuration. None are mutually exclusive of another business mode.

Material Requirements Planning (MRP) which has been relabeled MRP II, or ERP, is a 40 year old set of concepts that have not been essentially changed over the years. AIMS/ERP featured a powerful scheduling engine that eliminates most of the problems with MRP logic, and allows a far superior method of developing daily production scheduling that even integrate off-site, out-sourced production processes, with features such as "projected days late" reporting, and forward scheduling up the product structure.

The brochure was used as a sales brochure and so contains sales-oriented language in places.

Overview

This brochure provides an overview of the AIMS/ERP product via a series of major functional groups that highlight unique, powerful and highly integrated functions. AIMS/ERP has been designed specifically to enable management to achieve a very high degree of physical control of the business. The internal structure, functions and implicit business process model built into AIMS/ERP substantially supersedes the essentially 25 year old MRP model provided by virtually all ERP software vendors. In the process AIMS/ERP provides several distinct advantages:

- Mixed-Mode Operation - Combine multiple styles in the same process flow such as project-oriented, one-off production of engineered items with repetitvely produced standard items, all within the same procedural and system flow.
- Outside/Contract Manufacturing Management - AIMS/ERP has been built from the ground up to schedule off-site production and includes truly unique functions such as automatically scheduled purchases and shipments of drop shipped material separate from internally uses of the same item.
- Project/Job Management - full job management, from quote/estimating workbench through detailed costing with separate cost data for original estimate, current engineered budget and actual cost data, all in detail at the level of work order operations and part numbers of material estimated, engineered and actually used. Job/project management based production uses the same processes as repetitive production
- Dimensionable Material Support - AIMS/ERP has a truly unique function that eliminates part numbers for the hundreds or even thousands of pieces of sheet or linear stock from metal, wood, plastic or any other material that is purchased and cut as part of the production process.
- Sales Order-Based Assemble To Order - unique functions making assembly of even moderately complex products fit smoothly into the normal pick/pack/ship sequence of warehouse distribution.
- Closed Loop Ordering Cycle - sales forecast generation based on component-level demand or sales history date, with automatic re-ordering and all other steps in the cycle from sale of an item through replenishment.
- Synchronized Production & Material Processes - unique, integrated process dovetail into a smooth, highly automated overall process to dramatically increase the productivity of your material and production scheduling and coordination staff. All process combine to create a date linked set of actions that totally supports a single master production/project schedule visible and controllable by management.
- Integrated Return/Depot Repair Subsystem - fully integrated repair orders authorize the return of serial numbered or non-serial numbered product for either inspection and return to stock for resale (with audit trail verifying its condition), or repair and return to the customer, all linked to the warranty requirements for the product. Includes disposition control, fault analysis, repair actions taken, internal cost of repairs and warranty, and customer billing for repaired items.
- Discrepant Material Reporting Subsystem - Meet ISO-9000, FDA, and DoD material quarantine and control requirements via the AIMS/ERP Discrepant Material Reporting subsystem, which completely segregates rejected items and provides a detailed, complete tractability of disposition actions, including integration to reworking, inspection and all other steps.

We have included a number of charts to provide an overview of key, unique and powerful functions within AIMS/ERP. These are functions that are designed to improve the productivity of your indirect staff, i.e., customer service, production planners, schedulers, buyers and others. Along with these charts are brief bullet points and some explanatory text to aid you in grasping the power and uniqueness of these functions.
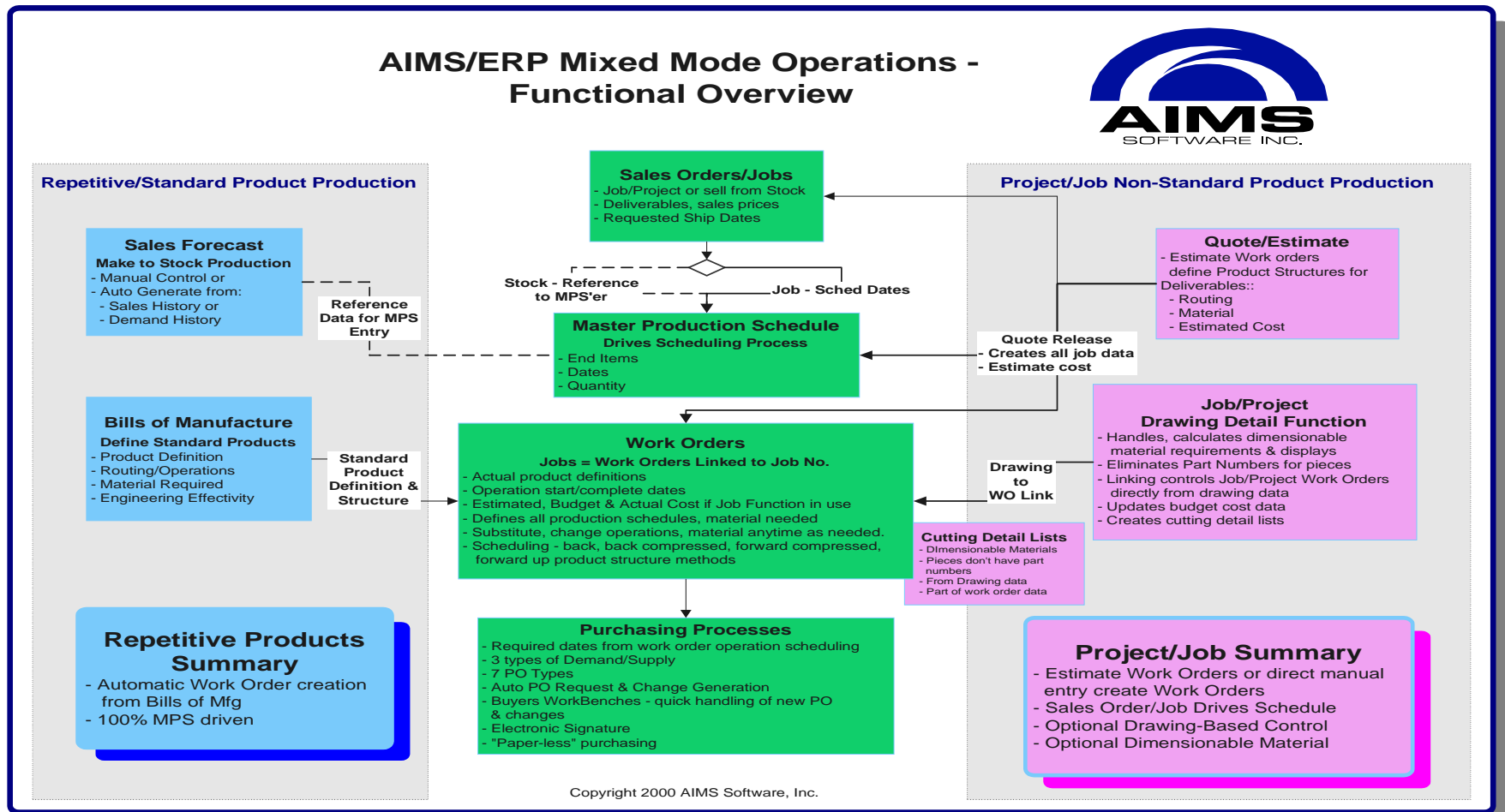
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Mixed-Mode Production Operations

Make any mixture of standard products, one-off projects, and modifications of either

- Unique architecture allows virtually unlimited flexibility as to what and how products are made.
- Retains engineering control over either standard products and/or project/jobs as separate processes.
- For project/job, dimensionable material tools to dramatically reduce engineering lead time, work required to define product for production, while streamlining production.

AIMS/ERP Mixed Mode Operations - Functional Overview

Repetitive/Standard Product Production

Sales Forecast
Make to Stock Production
- Manual Control or
- Auto Generate from:
  - Sales History or
  - Demand History

Reference Data for MPS Entry

Bills of Manufacture
Define Standard Products
- Product Definition
- Routing/Operations
- Material Required
- Engineering Effectivity

Standard Product Definition & Structure

Repetitive Products Summary
- Automatic Work Order creation from Bills of Mfg
- 100% MPS driven

Sales Orders/Jobs
- Job/Project or sell from Stock
- Deliverables, sales prices
- Requested Ship Dates

Stock - Reference to MPS'er   Job - Sched Dates

Master Production Schedule
Drives Scheduling Process
- End Items
- Dates
- Quantity

Work Orders
Jobs = Work Orders Linked to Job No.
- Actual product definitions
- Operation start/complete dates
- Estimated, Budget & Actual Cost if Job Function in use
- Defines all production schedules, material needed
- Substitute, change operations, material anytime as needed.
- Scheduling - back, back compressed, forward compressed, forward up product structure methods

Purchasing Processes
- Required dates from work order operation scheduling
- 3 types of Demand/Supply
- 7 PO Types
- Auto PO Request & Change Generation
- Buyers WorkBenches - quick handling of new PO & changes
- Electronic Signature
- "Paper-less" purchasing

Project/Job Non-Standard Product Production

Quote/Estimate
- Estimate Work orders define Product Structures for Deliverables::
  - Routing
  - Material
  - Estimated Cost

Quote Release
- Creates all job data
- Estimate cost

Job/Project Drawing Detail Function
- Handles, calculates dimensionable material requirements & displays
- Eliminates Part Numbers for pieces
- Linking controls Job/Project Work Orders directly from drawing data
- Updates budget cost data
- Creates cutting detail lists

Drawing to WO Link

Cutting Detail Lists
- DImensionable Materials
- Pieces don't have part numbers
- From Drawing data
- Part of work order data

Project/Job Summary
- Estimate Work Orders or direct manual entry create Work Orders
- Sales Order/Job Drives Schedule
- Optional Drawing-Based Control
- Optional Dimensionable Material

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Outside/Contract Manufacturing Management - The Virtual Factory

AIMS/ERP alone is designed SPECIFICALLY to proactively manage simple to complex production of products using material purchased directly at lowest possible prices coupled with actual production by contract manufacturing vendors in any mixture of internal production, shipments and contract manufacturing vendors. All needed tools are provided to manage production and to synchronize the flow of material regardless of the complexity of the logistical flow. Some highlights of these capabilities:

Scheduling of Production & Material For On and Off-Site Use

- Seamless flow of material between internal and external work centers
- Master schedule drives all detailed schedules, including all purchasing actions for:
  - Replenishment of internal stock inventory used to supply internal operations
  - Direct purchase and drop-ship to contract manufacturing vendors performing part or all of the work for a product.
  - Purchased Services for contract manufacturers
- System tools drive all dates into synchronization so material flow and work to be performed mesh correctly and reflect the same set of priorities.
- Automated, high-productivity purchasing tools allow maximum productivity and performance from your purchasing staff via:
  - Vendor quote based purchasing for both materials and services - prices are entered only once, system uses them automatically thereafter
  - Automatic generation of PO Request and Changes from schedule information that is valid and reflects correct relative priorities
  - High-productivity Buyer WorkBenches utilizing electronic "in-box" and a unique Electronic Signature method to manage procurement without requiring printed reports.
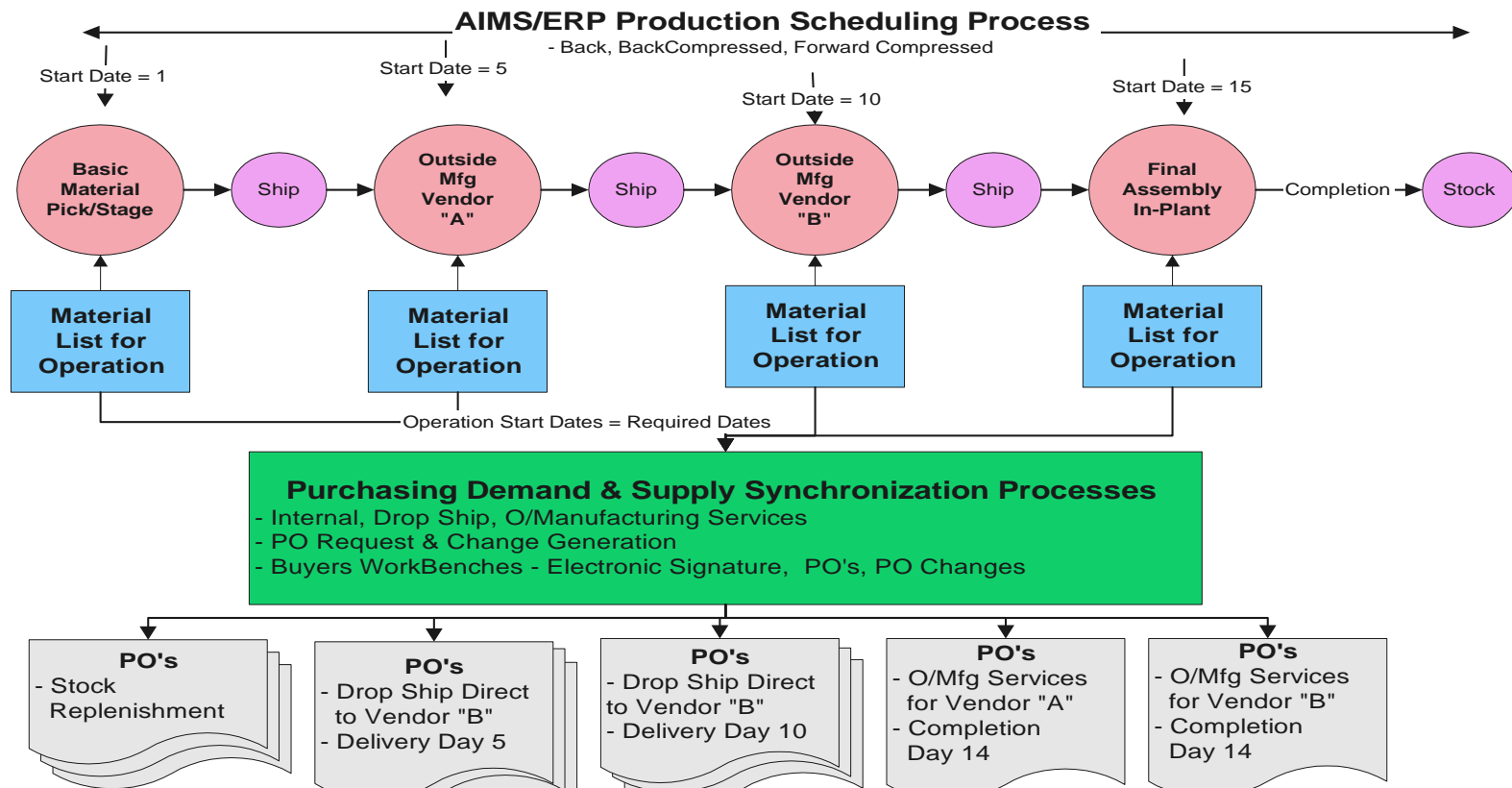
Cost Control & Visibility

- Purchased services are a direct cost element equivalent to, but separate from internal labor.
- Detailed receiving records created for all work completed by outside/contract manufacturing vendors.
- Utilize standard costs for accounting for simplicity, but with full actual cost detail for produced items and purchased material.

Controlling Consigned Inventory at Contract Vendors

- Two alternative material flows which may be mixed:
  - Direct (off-site) receipt to work order of material from PO. - material is assumed to be consumed when received.
  - Back-flush (post-deduct) of material used as vendor's operation is completed that is received to Work Center Inventory at Vendors (separate from internal/stock balances).

See diagram below for illustration of how AIMS/ERP schedules and synchronizes production and material flow with mixtures of multiple outside/contract manufacturing vendors and internal production operations, including purchasing actions managed by AIMS/ERP.

AIMS/ERP Outside/Contract Manufacturing Management Overview

AIMS/ERP Production Scheduling Process

— Back, BackCompressed, Forward Compressed

Start Date = 1   Start Date = 5   Start Date = 10   Start Date = 15

Basic Material Pick/Stage → Ship → **Outside Mfg Vendor "A"** → Ship → **Outside Mfg Vendor "B"** → Ship → **Final Assembly In-Plant** → Completion → Stock

Material List for Operation   **Material List for Operation**   **Material List for Operation**   **Material List for Operation**

Operation Start Dates = Required Dates

Purchasing Demand & Supply Synchronization Processes
- Internal, Drop Ship, O/Manufacturing Services
- PO Request & Change Generation
- Buyers WorkBenches - Electronic Signature, PO's, PO Changes

PO's
- Stock Replenishment

PO's
- Drop Ship Direct to Vendor "B"
- Delivery Day 5

PO's
- Drop Ship Direct to Vendor "B"
- Delivery Day 10

PO's
- O/Mfg Services for Vendor "A"
- Completion Day 14

PO's
- O/Mfg Services for Vendor "B"
- Completion Day 14

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Project/Job Management

AIMS/ERP provides a number of truly unique functions that allow actual management of a job, not just accounting for the cost after the fact. Aggressive, proactive management of jobs and projects is required to ensure their on-time and under-budget completion. This improved management style requires tools to rapidly:

- Calculate material and labor requirements and costs
- Project these costs at any point in the life cycle of the project, regardless of its complexity
- Schedule, reschedule, and re-re-re-schedule the project along with others that are underway in the same facilities and vendors
- Manage the flow of not only internal production, but also portions of a project performed by outside manufacturing vendors.
- For mixed environments, keep the production of jobs/projects from conflicting with repetitive production of standard products or vice versa.
- Learn from mistakes to improve estimating, improve engineering, and improve production.
- Dramatically reduce design and manufacturing engineering workloads (which cost), and the up-front lead time required to get jobs in production.

The AIMS/ERP Project/Job Management Environment provides tools to meet these needs and includes the following features:

Commingled Job & Non-Job Production

Job/Project engineering and production fully integrated with make to stock/repetitive production.

Full Quotation and Estimating Workbench
- Separate from "live" jobs, sales orders, work orders, etc.
- Part Numbers not required to define deliverables
- Create Estimate Work Orders to develop estimated cost.
- Automatic, on-screen cost rollups as estimate is created
- Estimate may be anything from "stubs" to fully detailed work order routes and bills of material
- Margin calculations on screen as job deliverable are estimated.

Quote Release;/Job Creation
Function automatically sets up production job, ready to schedule, engineer and work on.

Temporary Job Release

Function adds Quote job to live workload for load analysis, material availability, with subsequent un-release to remove. Temporary jobs cannot be transacted against, guarding against errors.

Detailed Cost Information

Each job has fully detailed cost data, i.e., in terms of part numbers required, quantities, labor operations, work centers, hours, hourly rates, for these categories:

- Estimate - created by Quote Release process
- Budget - initialized by Quote release process, updated by engineering changes to labor operations and material
- Actual - driven by timecards and material transactions
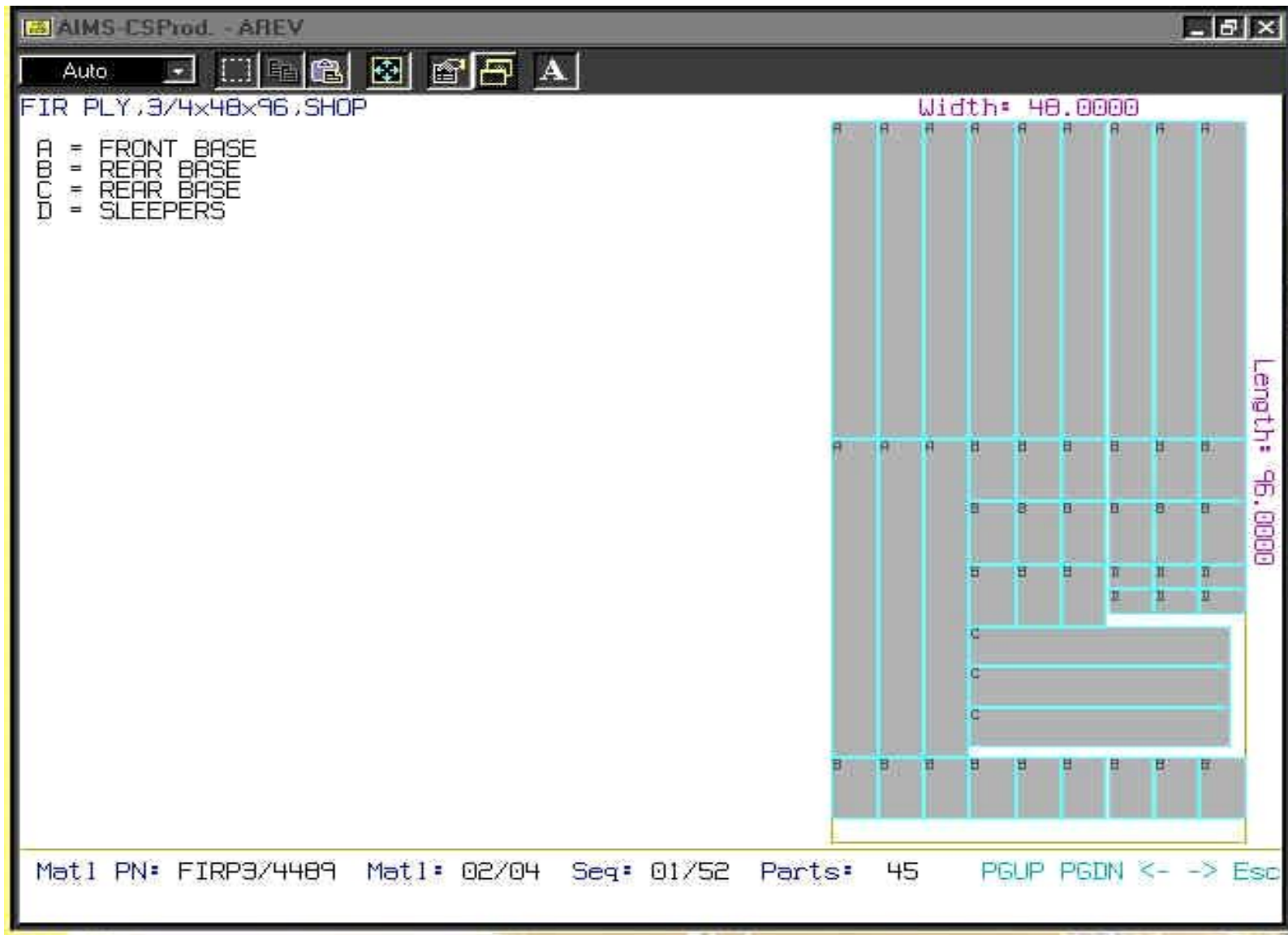- All cost data maintained in detail for variance analysis.

Dimensionable Material

KEY - Complexity of documenting one-time fabrication or cutting of materials for a project makes "Standard" systems not cost-effective. Instead, AIMS/ERP provides a very UNIQUE tool that performs the following to dramatically, and we mean DRAMATICALLY speed the engineering process for projects/jobs where a major portion is cut from raw material that is sheet or linear stock steel, wood, plastic, glass, or other materials. This capability:
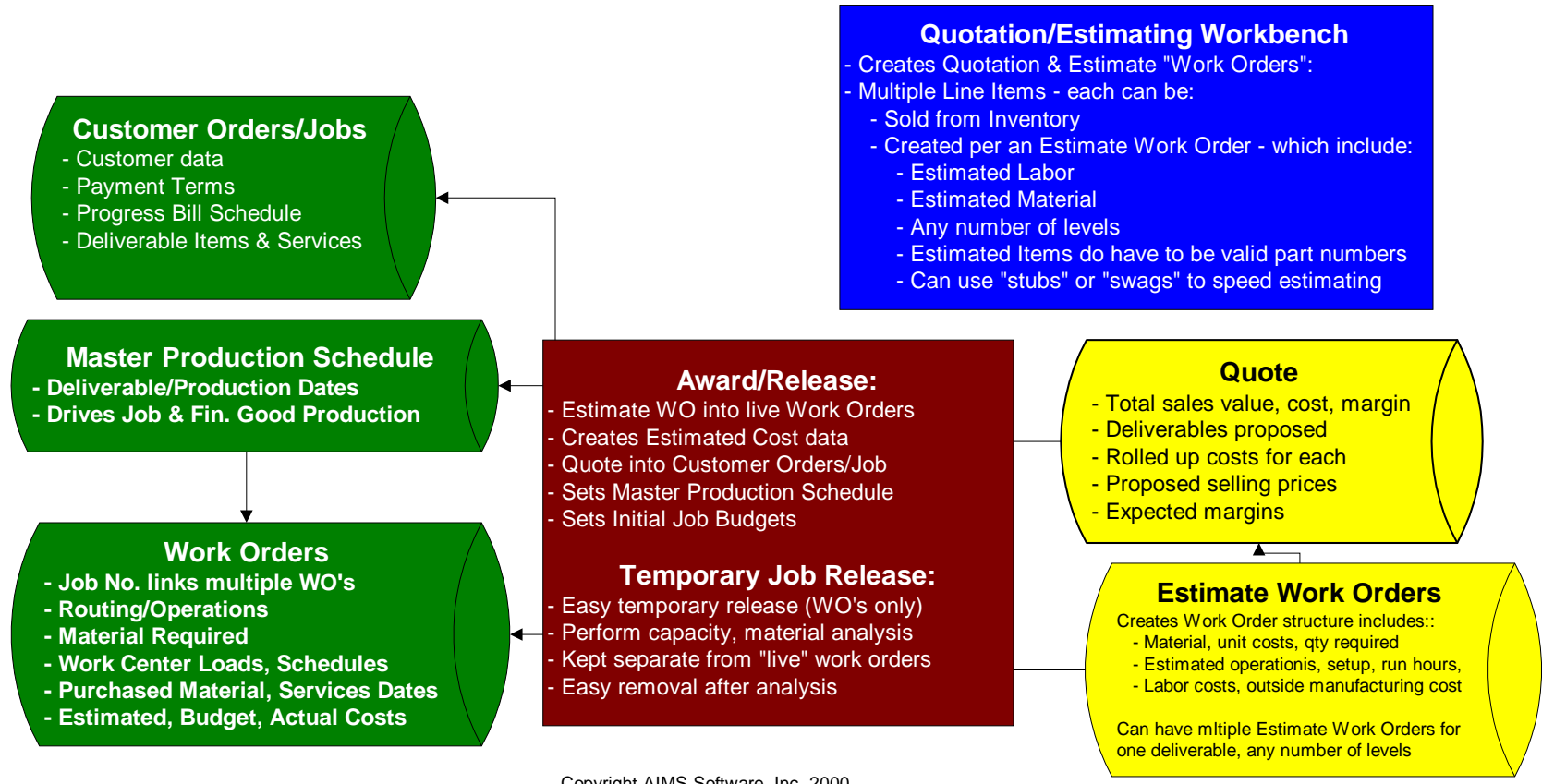
- Allows part numbers to be defined as dimensionable raw material, with the basic cutting rules for it
- Entry of the individual pieces to be cut directly from a production/fabrication drawing
- On-screen calculation of the quantity of the raw material required, including waste from unused portion ("drop-off", "offal", etc.) of the material, plus an expected attrition quantity for planning purposes.
- On-screen DISPLAY of the simulated cutting calculation results so you can review how the material is expected to be used.

Please refer to the AIMS/ERP screen shot below for an illustration of this powerful capability.

NOTE: this kind of capability is often found in the CAM software for specific CNC equipment, but not in ANY production ERP system in the world that we are aware of, at ANY price! This exciting capability is not machine specific, and may not reflect the exact cutting methods or nesting of complex shapes. However, it will calculate the material required with reasonable accuracy as soon as the drawing data is available. And, it will immediately update work order and budget cost data as soon as it is saved, making job data available for purchasing and cost management much earlier in the project cycle than ever before.

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```
A  =  FRONT BASE
B  =  REAR BASE
C  =  REAR BASE
D  =  SLEEPERS
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Matl PN: FIRP3/4489   Matl: 02/04   Seq: 01/52   Parts: 45   PGUP PGDN <- -> Esc

AIMS/ERP Quotation/Estimating & Job Management Interface Overview

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Quotation/Estimating Workbench
- Creates Quotation & Estimate "Work Orders":
- Multiple Line Items - each can be:
  - Sold from Inventory
  - Created per an Estimate Work Order - which include:
    - Estimated Labor
    - Estimated Material
    - Any number of levels
    - Estimated Items do have to be valid part numbers
    - Can use "stubs" or "swags" to speed estimating

Customer Orders/Jobs
- Customer data
- Payment Terms
- Progress Bill Schedule
- Deliverable Items & Services

Master Production Schedule
- **Deliverable/Production Dates**
- **Drives Job & Fin. Good Production**

Award/Release:
- Estimate WO into live Work Orders
- Creates Estimated Cost data
- Quote into Customer Orders/Job
- Sets Master Production Schedule
- Sets Initial Job Budgets

Temporary Job Release:
- Easy temporary release (WO's only)
- Perform capacity, material analysis
- Kept separate from "live" work orders
- Easy removal after analysis

Quote
- Total sales value, cost, margin
- Deliverables proposed
- Rolled up costs for each
- Proposed selling prices
- Expected margins

Work Orders
- **Job No. links multiple WO's**
- **Routing/Operations**
- **Material Required**
- **Work Center Loads, Schedules**
- **Purchased Material, Services Dates**
- **Estimated, Budget, Actual Costs**

Estimate Work Orders
Creates Work Order structure includes::
 - Material, unit costs, qty required
 - Estimated operationis, setup, run hours,
 - Labor costs, outside manufacturing cost

Can have mltiple Estimate Work Orders for one deliverable, any number of levels

Sales Order-Based Assemble to Order

The AIMS/ERP ATO function is unique and powerful. Most other ERP system require the use of a work order and it's accompanying transaction and data entry overhead, all of which increase the cost of the operation without adding any value. The AIMS/ERP approach is to integrate certain functions of the work order directly into the sales order, coupled with an 'in-shipping'' assembly process that treats the assembly process very similarly to the regular pick/pack/stage/ship cycle for completely finished products.

This approach allow running order entry and other customer interface for ATO items the same way as finished products, yet retain the inventory usage and flexibility of fulfilling customer orders where the finished products utilize a variety of pre-defined configurations, all built from the same common components.

Other unique AIMS/ERP features to the ATO functionality include:

- Component level sales history - history data is maintained for both the parent item and all of its components, for both actual sales and demand (what was ordered, how many, and when, whether it was actually shipped or not).

- Component level sales forecasting - sales forecasts are generated for not only the finished (parent) item for an ATO product, but its components as well, automatically accumulating the sale at a meaningful level for effective planning.

- Backflush component utilization - all components flow through the unique AIMS/ERP Work Center inventory functionality that supports efficient ATO operations via the following:

  - Discrete issue from controlled stock of high-value items - grouped on the ATO Component Picklist

  - Bulk-issue and movement from controlled stock on an as-needed basis (e.g., weekly) to refill bins of common components such as fasteners, knobs, levers, etc., that are used on many different products.

  - Automatic deduction of components when the assembled items is reported as completed and staged for shipment (one transaction).

- Order Release - Items on ATO orders are handled the same as finished items during the order release process, which performs the following:

  - Credit checking/review - makes sure the customer is current on payments, and has adequate credit remaining on his credit line

  - Commits component inventory - this function, which is optional, releases only the quantity of the ATO item that can be actually assembled based on available inventory of components, avoiding confusion.

- Serial Numbered products - once the ATO item has been assembled and staged, its product serial number can be scanned and associated with the staged shipment. These serial numbers appear on the packing list and invoice along with non-ATO items.

The diagram below provides an overview of the steps involved in the ATO process and how it integrates into the normal sales order release, pick, pack/stage and shipment cycle.

AIMS/ERP Assemble To Order - Functional Overview

AIMS
SOFTWARE INC.

Order Picking
Released Items -
- FG Items - for pick, ship
- ATO items - for ATO, ship

ATO Items :
- Ordered Item drives:
  - Component pick list &
  - Assembly List

Customer Order Entry
- Ordered Items
- ATO Items:
  - BOM retrieved, extended, saved
  - Checks Component Availability

FG Items

Serial Number Entry
- Optional
- Updates staged product data

Shipping
- Checks Financial Status - OK
- Builds Shipments record
- Prints Packing List

Order Release
- Current Ship Dates
- Credit Limit Check
- Overridable rejections
- Commits Inventory

ATO Produce & Stage Tx
- Qty Completed
- Order specific
- Backflushes components
- Stages item

ATO Items

Invoice Generation
- Finds unbilled Shipments
- Generates Invoice
- Stores prices, costs, sales detail

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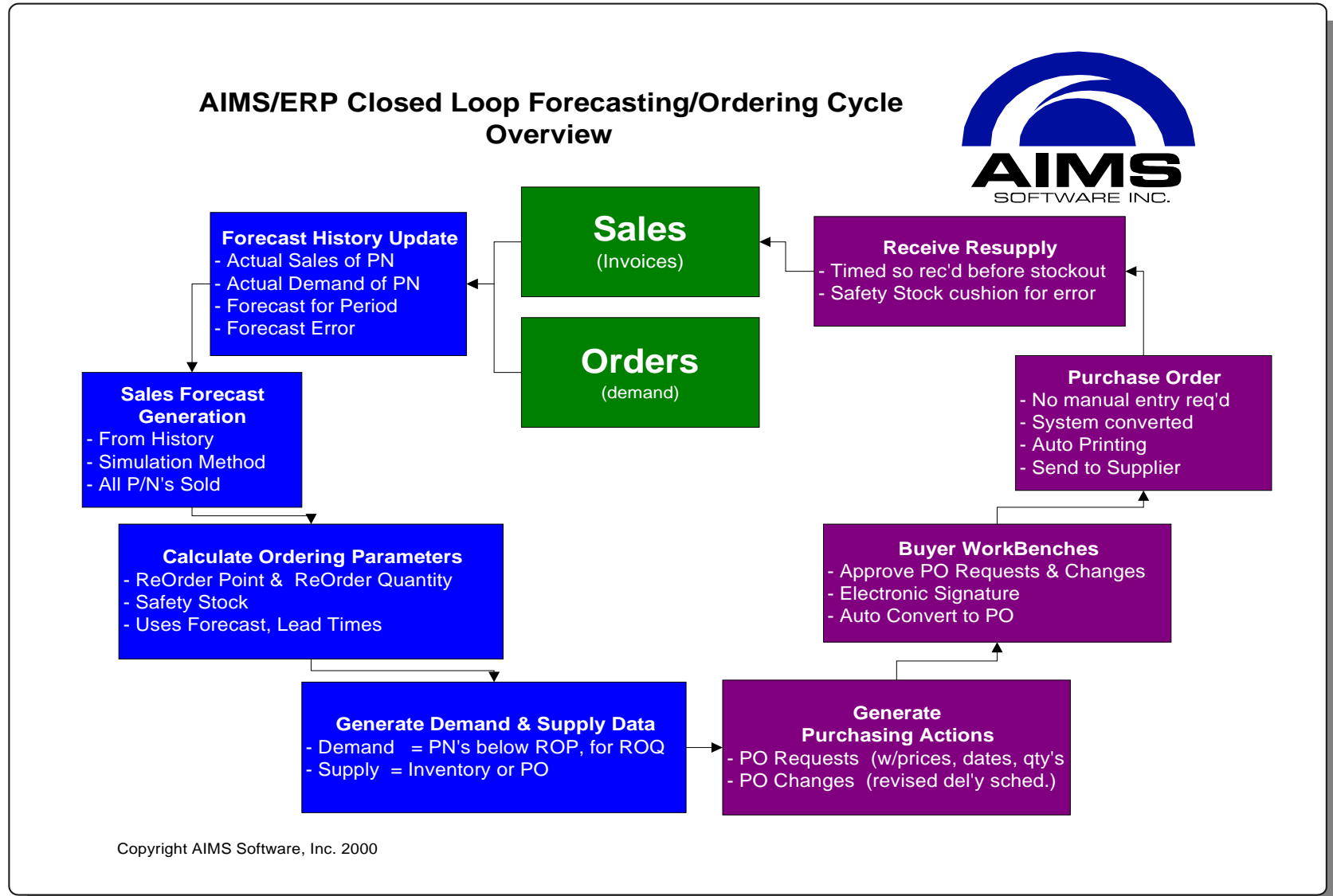
Closed Loop Ordering Cycle

When certain functions within AIMS/ERP are used in combination, the result is the "closed-loop" ordering cycle for purchased components. This provides a highly automated method of efficiently handling thousands of purchased items yet managing their inventory effectively. It is designed to work with the Assemble To Order method of operation by tying sale-derived demand to the forecasting and ordering processes.

The key is to move the control parameters from the individual part numbers up to a system-wide set of parameters and process utilizing a statistical, approach that has proven to be highly effective when correctly used. A single analyst can easily manage thousands of part numbers in this fashion.

Highlights include:

- Sales Forecasting - automatic generation of a sales forecast, via a simulation technique that utilizes either sales history, or order history to generate a new sales forecast for all items sold AND ATO component level items.
- Calculation of Ordering Parameters - a statistically based calculation of re-order points, safety stock levels, and re-order quantities, all using sales forecast data and product lead times.
- Lead time validation - a report shows actual vs. planned lead times for part numbers so these can be adjusted as needed. Lead time data for vendors is captured as part of the receiving process. Valid lead times are required for correct order parameter calculations.
- PO Request Generation - an automated process generates a demand for a re-order point managed part number, then a PO Request to fulfill it. A PO Request is generated until a PO is placed for the ROP item, not by simply listing items that are "below their re-order point" on a report. This is a *proactive* method that remains in the buyers queue until acted upon.
- History Updating - as orders are entered and products shipped, AIMS/ERP processes updates both sales and demand (order) history, capturing the sales forecast in effect at the time for the item, so forecast error can be tracked.

The diagram below summarizes the closed loop cycle, a powerful, proven, highly effective method for managing items purchased for sale.

AIMS/ERP Closed Loop Forecasting/Ordering Cycle Overview

Sales
(Invoices)

Orders
(demand)

Forecast History Update
- Actual Sales of PN
- Actual Demand of PN
- Forecast for Period
- Forecast Error

Sales Forecast Generation
- From History
- Simulation Method
- All P/N's Sold

Calculate Ordering Parameters
- ReOrder Point & ReOrder Quantity
- Safety Stock
- Uses Forecast, Lead Times

Generate Demand & Supply Data
- Demand = PN's below ROP, for ROQ
- Supply = Inventory or PO

Generate Purchasing Actions
- PO Requests (w/prices, dates, qty's
- PO Changes (revised del'y sched.)

Buyer WorkBenches
- Approve PO Requests & Changes
- Electronic Signature
- Auto Convert to PO

Purchase Order
- No manual entry req'd
- System converted
- Auto Printing
- Send to Supplier

Receive Resupply
- Timed so rec'd before stockout
- Safety Stock cushion for error

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Synchronized Production & Material Management

AIMS/ERP features a number of functions that when used together and correctly have the effect of driving all production and purchasing dates to synchronize properly. The highlights of the AIMS/ERP scheduling process ("Scheduler"), compared to the "standard" traditional MRP process used by virtually all ERP systems on the market today includes the following:

Customer/Production Schedule oriented	• The Production Scheduler synchronizes <u>all</u> manufacturing events, by when each occurs, and where (work center), internal or external, • All are tied back to the MPS's independent demand. • Unneeded WIP is scheduled out to either the date when it <u>is</u> needed, or to the end of the scheduling horizon if demand disappears completely.
"Release-less" Work Orders	• AIMS/ERP generates a population of fully functional work orders in its scheduling process. • There is no separate Planned Order table that may confuse some and require extra work. • Status code, automatically changed when the first material issue transaction is performed, indicates WIP or non-WIP status. • Eliminates MRP's Plan vs. Schedule reconciliation problem. • Eliminates labor-intensive work order release process • Production, including material picking, is started according to the schedule. All upcoming work can be easily identified on work center level schedules.
Material Tied to Production Schedule	• Material demand, linked to operations and thereby to work centers, can be identified at <u>exactly when</u> the production process needs it, and <u>where</u> it is needed.
Forward Scheduling	• Compression and forward scheduling algorithms, including <u>up</u> the product structure, keep all activities in synchronization, • Compresses planned lead time values to the absolute minimum, • Simulating expedited handling that late production receives.
"Crunch" Support	• The "crunch" is automatically handled; any uncompleted work is simply forward scheduled. • Both Demand and Scheduled Dates are always maintained. • Behind schedule is clear, simple (Scheduled Completion Date minus Demand Date = Days Late).
Work Order to Work Order Schedule Validity	• Dependencies between assembly levels are always maintained by the Scheduler, whether back or forward scheduled

	• Forward schedule includes <u>up</u> work order structure.
<u>WIP Activity Updates Material Needs</u>	• Purchased Demand & Supply logic is automatically tied to the production schedule, to WIP status, shop floor moves, etc. • Shortages are not only which work order, but where.
<u>Prioritized Purchasing</u>	• Priority Codes assigned to purchased items based on demand & supply analysis show Buyers where to start working, which parts are truly "hot" and which are not.
<u>PO Scheduling & Buyer WorkBenches</u>	• Purchasing can buy from demand and supply data directly, <u>OR</u> • PO Scheduler can calculate PO Changes and Requests. • PO Changes/Requests can be used or discarded as needed. • Each run recreates new PO Changes & Requests. • Use high-productivity Electronic Signature Buyer WorkBenches to approve new PO Requests and PO Changes • Automatic updating/creation of PO's from WorkBenches

MRP vs. AIMS/ERP Scheduling - Brief Overview

Appendix 1 contains a detailed comparison of the numerous problems inherent and which virtually always accompany the use of the 25-year old MRP and MRP II models in today's fast-moving businesses. Briefly, these center on the following:

• There is no real scheduling - only a lead time "setback" process that "plans" material separately from production.

• Production scheduling, such as it is, is applied only to "released" work orders, leaving one to wonder how to reconcile the "plan" with the "schedule."

• There is no real prioritization of work for buyers, no automatic rescheduling of uncompleted work, so the "schedule" data in an MRP system is essentially only as good as the schedule maintenance/calculation method performed outside the system, and then entered into the work order dates in the system. This is, to say the least, a lot of work, and in almost all places seen in recent years (last 15 years), never done.

The AIMS/ERP architecture was designed specifically to overcome these and other problems inherent in the MRP structure. It is important to understand that this structure is a non-trivial part of any system, and regardless of what eager, well meaning sales people may say, cannot be changed without major R&D. Adding an "Advanced Planning" tool, which is essentially an improved finite capacity modeling tool, into the mixture will not fix the architecture problem. This approach can, in some circumstances, develop a realistic schedule, but the advanced planning tool is not integrated to purchasing and inventory data, and there is no place to store its data for non-released work orders in the

MRP system, which the MRP logic leaves alone, giving the planner only "exception" messages to reschedule or cancel them. In this exact situation, AIMS/ERP's production scheduling tool automatically reschedules all work orders, regardless of status.

Please refer to our Executive Guide "Control Change and Increase Profit" for a discussion of the issue of change and how it impacts the business, and why controlling and managing it effective is a critical success factor.

Highlights of the Production and Material Synchronization Process

Each step in the process uses the data of the preceding step and works to complement and extend its reach. Master schedule dates maintained by the master scheduler, for example, are supported to the maximum extent possible by the detailed scheduling process. The operation start and complete dates are organized by the purchased demand and supply processes which in turn are analyzed by the PO Scheduling process that generates PO Change data and for new procurement actions, a PO Request.

The AIMS/ERP processes that support he synchronization of production and material are designed to be as "automatic" as possible, that is, to function with maximum output and results with an absolute minimum of human input. Our experience with these tools has been that one knowledgeable, properly trained master scheduler can manage an $80 Million/year sales volume electronics manufacturing company with complex products and logistics alone. And, he/she will still have time available to attend meetings, help work out vendor capacity issues, purchased material availability problems and other such issues.

This whole process, taken together tends to push purchasing dates to mesh and support the production schedule. Steps in the process include the following detailed functions:
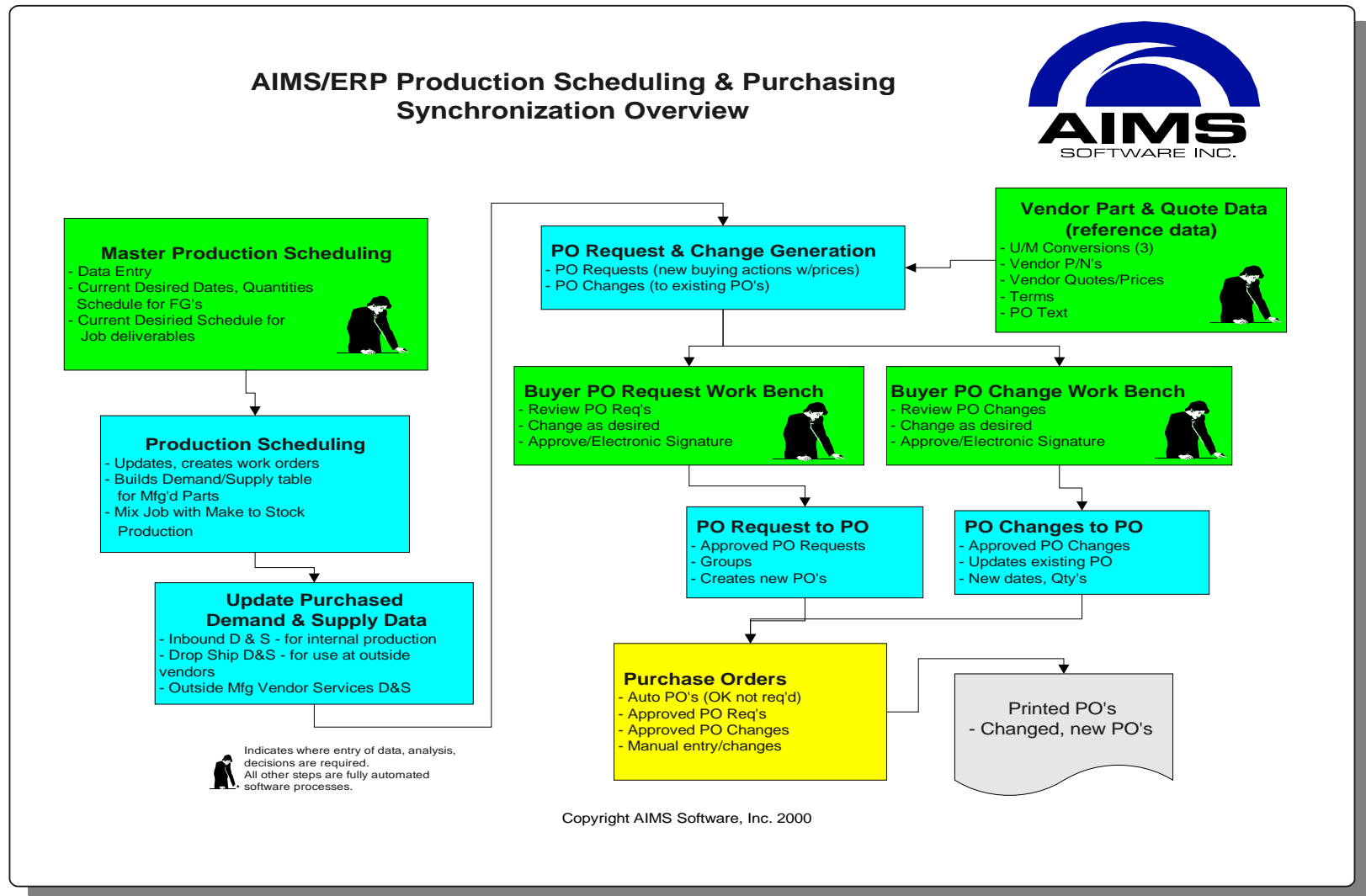
- Job to Master Production Schedule Interface – for sales orders that are Jobs, a function drives the Requested Shipment Dates from the deliverables on the job into the Master Production Schedule data. Regular sales orders are not interfaced in this way. This process allows synchronization of the MPS to the delivery schedule that is part of the job and is communicated to the customer.
- Master Production Schedule WorkBench – for non-job, repetitive, make to stock, or make to order from standard product definition data, this unique window brings together all information that impinges on the MPS, and features on-screen recalculation of Projected Inventory and Available to Promise data. The MPS defines the independent demand for each product.
- Multiple Product Option – this is a unique AIMS/ERP function that allows grouping any (reasonable) number of end products that are essentially the same basic product together and schedule their production as though it were a single product. In this case, the MPS data is organized so it appears to be a single part number, simplifying the Master Scheduler's task.
- Production Scheduler – this powerful program explodes Bills of Manufacture, i.e., both the operation list for each work order and the list of materials attached to one or more operations on the work order, calculates start and complete dates/times for each operation on all work orders, using back scheduling, back-compressed scheduling, single-level forward scheduling, and multi-level forward scheduling

processes, all in an attempt to keep the production schedule fitted between the current date and the MPS date at the top level. Uncompleted ("past due") production is automatically handled in this process via the compression logic or one of the forward schedule methods. Lower level demand is exploded at each level, similar to an MRP level by level explosion process.

- Demand and Supply Update – AIMS/ERP maintains detailed demand and supply tables, for immediate retrieval and viewing, for the following:
  - Purchased Material to be used internally, for stockroom replenishment, in-plant production
  - Purchased Material to be used off-site, at a contract manufacturing vendor
  - Purchased Services for contract manufacturing vendors
- PO Scheduling – this process analyzes all three demand and supply tables and creates an "ideal" supply plan to meet the demand, given the ordering rule and lead time for the part number. If there are existing PO's, it will generate any needed changes to delivery quantities and dates to support the demand (production schedule). If new delivery increments are needed, it will generate PO Request records for buyer approval and conversion into actual PO's.
- Buyer WorkBenches – these on-screen review processes allow a buyer to quickly review hundreds of procurement actions, quickly access any related data, such as quotes for the part number, demand supply data, and other information, and "sign" the action electronically. These actions are then automatically converted into PO's or updated existing PO's.
- Print and transmit PO's – the new and revised PO's are printed and sent to the vendors. The result is that vendor schedules support the production schedule to the maximum extent possible.

This process is summarized in the diagram below.

AIMS/ERP Production Scheduling & Purchasing Synchronization Overview

Master Production Scheduling
- Data Entry
- Current Desired Dates, Quantities
  Schedule for FG's
- Current Desiried Schedule for
  Job deliverables

Production Scheduling
- Updates, creates work orders
- Builds Demand/Supply table
  for Mfg'd Parts
- Mix Job with Make to Stock
  Production

**Update Purchased
Demand & Supply Data**
- Inbound D & S - for internal production
- Drop Ship D&S - for use at outside
  vendors
- Outside Mfg Vendor Services D&S

PO Request & Change Generation
- PO Requests (new buying actions w/prices)
- PO Changes (to existing PO's)

**Vendor Part & Quote Data
(reference data)**
- U/M Conversions (3)
- Vendor P/N's
- Vendor Quotes/Prices
- Terms
- PO Text

Buyer PO Request Work Bench
- Review PO Req's
- Change as desired
- Approve/Electronic Signature

Buyer PO Change Work Bench
- Review PO Changes
- Change as desired
- Approve/Electronic Signature

PO Request to PO
- Approved PO Requests
- Groups
- Creates new PO's

PO Changes to PO
- Approved PO Changes
- Updates existing PO
- New dates, Qty's

Purchase Orders
- Auto PO's (OK not req'd)
- Approved PO Req's
- Approved PO Changes
- Manual entry/changes

Printed PO's
- Changed, new PO's

Indicates where entry of data, analysis,
decisions are required.
All other steps are fully automated
software processes.

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Integrated Return/Repair Subsystem

AIMS/ERP includes a full-featured depot repair system. This subsystem is also used to handle returned items. The process is essentially the same whether the item is being return to credit and return to stock for resale, or will be repaired and then either returned to stock for resale or is returned to the customer. In either case, warranty status of the item is always visible to the customer service representative and the person billing for the repair.
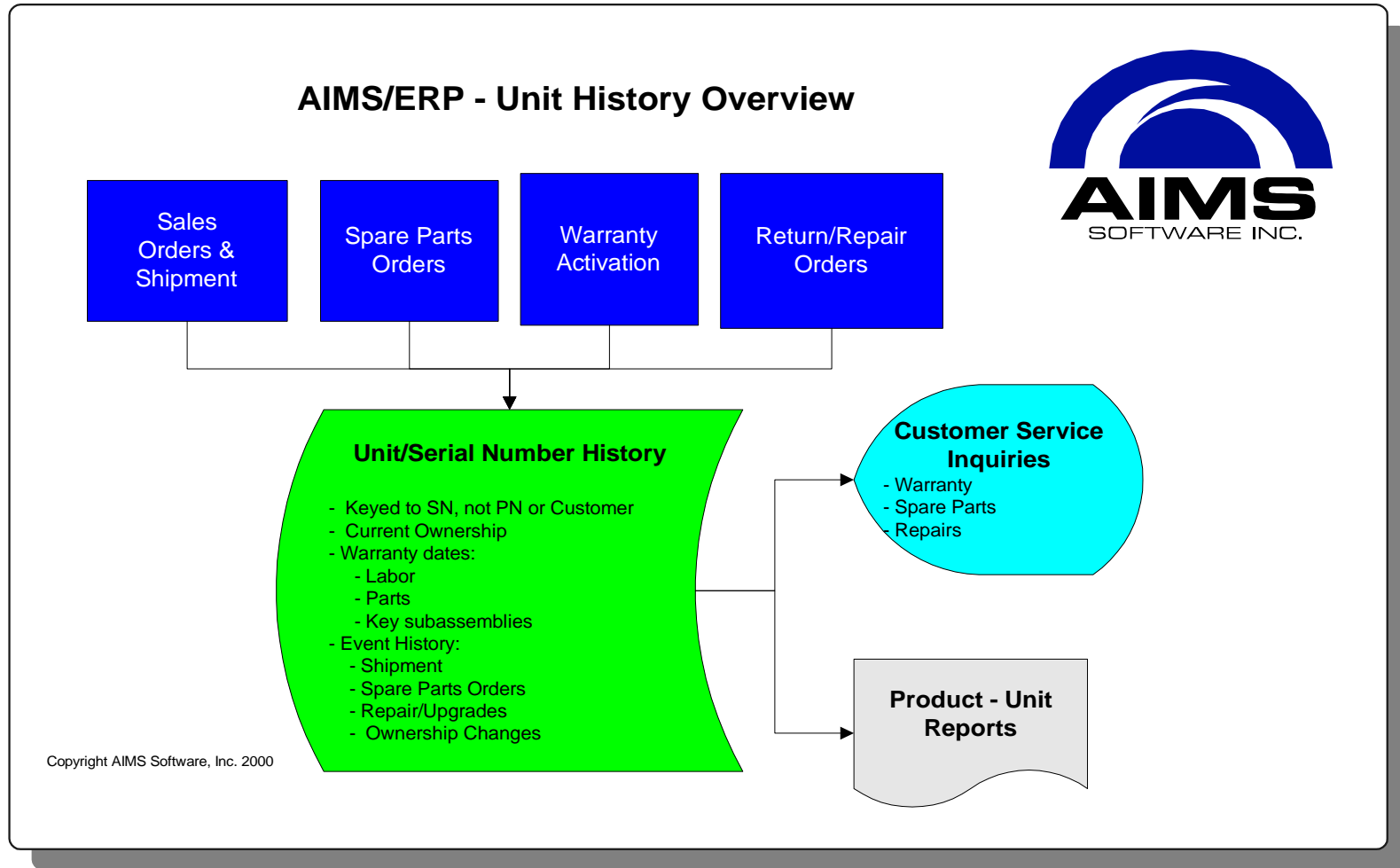
Unit/Serial Number History

AIMS/ERP includes a detailed product serial number history, tightly integrated with the Repair/Return Order subsystem. This function records all major events including original shipment, warranty registration, authorization of return/repair, repair completion, and shipment of the repair unit. Any number of return/repair orders such as those for upgrade, retrofit, etc., can appear in a unit's history data to provide a detailed field history of pieces of equipment. Ownership changes can be tracked as well.
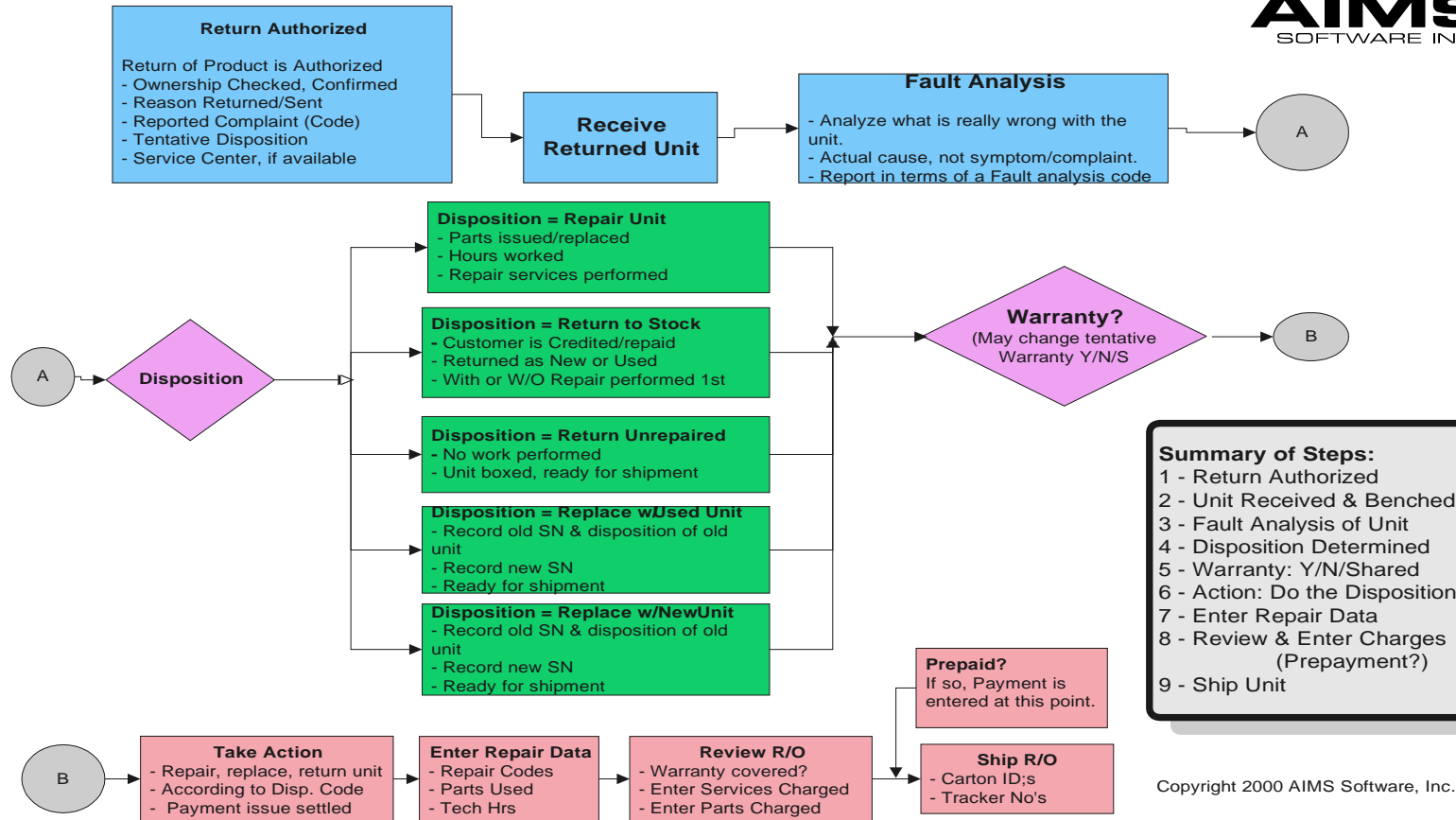
Highlights include:

- Authorization to return product - either to an in-house location, or an authorized service center.
- Estimating - a process is provided to enter the estimated cost of the repair prior to authorizing the return of the unit/items.
- Unique Return Number - the return authorization number identifies the return/repair order ("RO") setup to receive and process the unit/items.
- Separate Receiving Process - the RO subsystem has its own receiving process to validate itmes received with the unit/items and how it was shipped.
- RO Tracking - If the RO is received in-house, it has its own tracking process and routing that can utilize bar-coded scanning processes.
- Fault Analysis - the RO includes a specific "what's wrong with it" step, as identified by a technician or inspector, separate from what the customer didn't like. This information is standardized by product and designed to gather product feed-back for engineering, to drive product improvements.
- Cost of Repair - an easy to use screen enables the repair technician or inspector to identify materials used from a work bench stock, and the time spent working on the unit/items. This provides a concrete cost of warranty for units repaired under warranty.
- Review/Charging - a separate screen allows either the technician or a separate administrative analyst to review repaired/returned items and prepare charges for cases where the customer is to pay all or a portion (e.g., split warranty) of the cost of the repair. A Services Master table is used to standardize and speed pricing of services. A Spare Parts price table is used to price parts used in the repair, separate from finished goods products.
- Controlled Assemblies - separate issue transactions allow issuing of costly components or subassemblies from controlled stock room areas to the RO.
- Returns to Stock - a return to stock transaction is provided where the returned unit/items are to be returned to stock for resale. This closes the RO.
- Shipping - A separate window/process is provided to handle the shipping of repaired items.
- Customer Service - several specific functions are included to support efficient customer service response to customers calling about their returned unit:
    - Detailed visibility - through the entire RO cycle, all steps, actions, status, disposition data is fully available and visible.
    - Comments - time/stamped comments are enterable in any number for an RO for dialog between various parties involved in a more complex repair.
    - Serial Number searching - all windows in the RO process can be accessed either via the RO number or the unit's serial number.

Overviews of the RO process and the Unit History function are illustrated in the following diagrams.

AIMS/ERP - Unit History Overview

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Sales Orders & Shipment	Spare Parts Orders	Warranty Activation	Return/Repair Orders

Unit/Serial Number History

- Keyed to SN, not PN or Customer
- Current Ownership
- Warranty dates:
  - Labor
  - Parts
  - Key subassemblies
- Event History:
  - Shipment
  - Spare Parts Orders
  - Repair/Upgrades
  - Ownership Changes

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Customer Service Inquiries
- Warranty
- Spare Parts
- Repairs

Product - Unit Reports

AIMS/ERP Returned Product & Repair Flow

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Return Authorized

Return of Product is Authorized
- Ownership Checked, Confirmed
- Reason Returned/Sent
- Reported Complaint (Code)
- Tentative Disposition
- Service Center, if available

Receive Returned Unit

Fault Analysis
- Analyze what is really wrong with the unit.
- Actual cause, not symptom/complaint.
- Report in terms of a Fault analysis code

A

Disposition

A

Disposition = Repair Unit
- Parts issued/replaced
- Hours worked
- Repair services performed

Disposition = Return to Stock
- Customer is Credited/repaid
- Returned as New or Used
- With or W/O Repair performed 1st

Disposition = Return Unrepaired
- No work performed
- Unit boxed, ready for shipment

Disposition = Replace w/Used Unit
- Record old SN & disposition of old unit
- Record new SN
- Ready for shipment

Disposition = Replace w/NewUnit
- Record old SN & disposition of old unit
- Record new SN
- Ready for shipment

Warranty?
(May change tentative Warranty Y/N/S

B

Summary of Steps:
1 - Return Authorized
2 - Unit Received & Benched
3 - Fault Analysis of Unit
4 - Disposition Determined
5 - Warranty: Y/N/Shared
6 - Action: Do the Disposition
7 - Enter Repair Data
8 - Review & Enter Charges
        (Prepayment?)
9 - Ship Unit

Prepaid?
If so, Payment is entered at this point.

B

Take Action
- Repair, replace, return unit
- According to Disp. Code
- Payment issue settled

Enter Repair Data
- Repair Codes
- Parts Used
- Tech Hrs

Review R/O
- Warranty covered?
- Enter Services Charged
- Enter Parts Charged

Ship R/O
- Carton ID;s
- Tracker No's

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Integrated Discrepant Material Reporting Subsystem

AIMS/ERP includes a full-featured discrepant material reporting subsystem that completely segregates rejected material from known good material and rigorously follows the Material Review Board process, including documented disposition on a unit by unit basis for each rejected material grouping of material or individual unit.

Key Features - Discrepant Material Reporting ("DMR") subsystem's key features include:

- On-Screen Functions - All actions on screen, not controlled "outside the system."
- Real-World Process - records, approvals, all variations encountered in handling rejected material.
- Handles rejected material from anywhere:
- Standardized Process - Same for receiving inspection, WIP, perpetual rejections
- Quick Entry - Several field entry, creates full Discrepant Material Report,
- Printed Traveler - Accompanies, identifies discrepant material; reprintable any time.
- Fully Visible Material - DMR subsystem is part of inventory; yet separate from "good" material.
- Controlled Movement - DMR-specific transactions for movement of rejected material through cycle.
.

Full Material Review Board (MRB) Process - All steps in system; closed loop logic:
- Repeated MRP Dispositions - Actions entered on screen; (looks like a log sheet).
- Incremental Disposition - Don't have to disposition whole batch; can disposition individually
- Full Disposition Options/Unit - Use As-Is, Scrap, Rework, RTV (received items) for individual units.
- Unlimited Dispositions - Can take any number of dispositions (up to number of rejected units/items).
- Separated Movement - Approval of Disposition action controls separate movement transactions.
- Rework Integration - Rework Disposition tied to Rework Order subsystem.
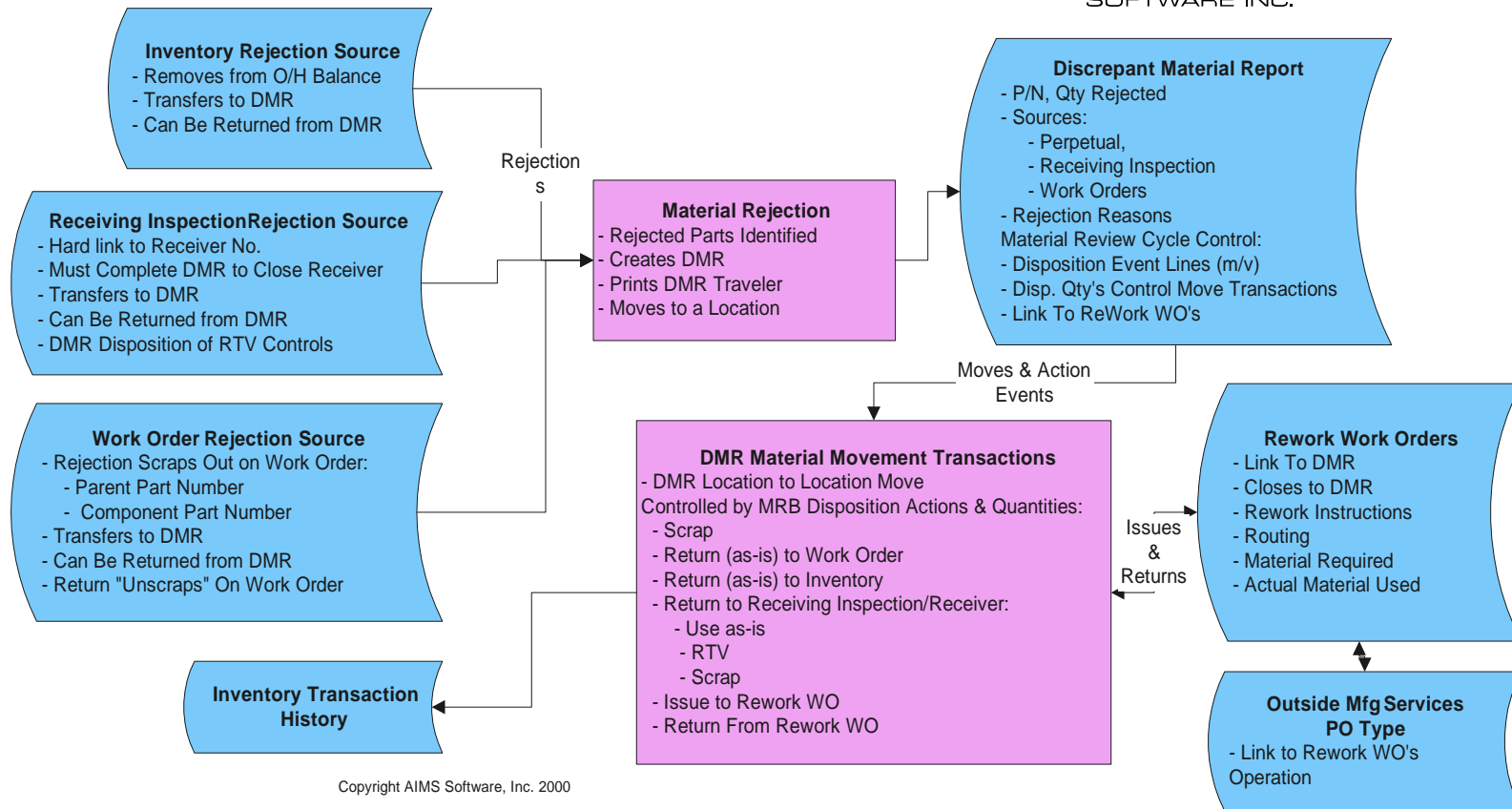- Reworked Items Inspected - Items back from rework must be inspected, OK to use on DMR.

Rework Subsystem - Rework is controlled, integrated:
- Disposition Controlled - Reworked items must be dispositioned for it on a DMR.
- Rework Instructions - Entered during MRB process, or separately; routing steps, materials.
- Rework Work Order Type - Linked, controlled by DMR.
- Rework PO Services Type - Special PO type, linked to rework order for cost, control, separation
- Full Rework Cost Visibility - Tracks cost, status of rework
- Audit Trail - All DMR movements, actual disposition of material in transaction history.

The chart below illustrates the DMR subsystem's interrelationships and functions.

AIMS/ERP Discrepant Material Reporting Subsystem Functional Overview

Inventory Rejection Source
- Removes from O/H Balance
- Transfers to DMR
- Can Be Returned from DMR

Receiving InspectionRejection Source
- Hard link to Receiver No.
- Must Complete DMR to Close Receiver
- Transfers to DMR
- Can Be Returned from DMR
- DMR Disposition of RTV Controls

Work Order Rejection Source
- Rejection Scraps Out on Work Order:
  - Parent Part Number
  - Component Part Number
- Transfers to DMR
- Can Be Returned from DMR
- Return "Unscraps" On Work Order

Rejections

Material Rejection
- Rejected Parts Identified
- Creates DMR
- Prints DMR Traveler
- Moves to a Location

Discrepant Material Report
- P/N, Qty Rejected
- Sources:
  - Perpetual,
  - Receiving Inspection
  - Work Orders
- Rejection Reasons
Material Review Cycle Control:
- Disposition Event Lines (m/v)
- Disp. Qty's Control Move Transactions
- Link To ReWork WO's

Moves & Action Events

DMR Material Movement Transactions
- DMR Location to Location Move
Controlled by MRB Disposition Actions & Quantities:
  - Scrap
  - Return (as-is) to Work Order
  - Return (as-is) to Inventory
  - Return to Receiving Inspection/Receiver:
    - Use as-is
    - RTV
    - Scrap
  - Issue to Rework WO
  - Return From Rework WO

Rework Work Orders
- Link To DMR
- Closes to DMR
- Rework Instructions
- Routing
- Material Required
- Actual Material Used

Issues & Returns

Inventory Transaction History

Outside Mfg Services PO Type
- Link to Rework WO's Operation

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Inventory/Warehouse Management

he AIMS/ERP Inventory and Warehouse Management tools provide a powerful, robust set of tools to that, coupled with the appropriate procedures and disciplines, enable management to achieve full physical control over inventory assets and the flow of material. Highlights include:

Warehouse Management - full featured warehouse module:
- Multiple Warehouses - any number of warehouses can be used
- Non-netted inventory - any warehouse can be flagged as non-available. Inventory remains visible, but is excluded from scheduling/netting
- Multiple Location Grids **-** each warehouse has its own location grid.
- Multiple Location Storage - each part number can be stored in any or all warehouses, in multiple locations within a warehouse.

Function Specific Transactions - each transaction does only one function:
- 5 minute training per action; only 2-4 fields per transactions.
- No complex programs to master; no transaction codes to memorize to use.
- Separate WIP material transactions don't impact perpetual stock records.
- Over 45 different material movement transactions

Warehouse-to-Warehouse Transfer Subsystem - transferred material is fully available in transit:
- Separate Issue to and Receive From Transfer Order/List at each end.
- Print Transfer Order Packing List for transportation control
- Reconciliation of differences is supported.

Work Center Inventory - separate set of functions to support backflushing and in-WIP short-term storage of material for immediate production use:
- Receive directly to work center option.
- Work Order operation completion can automatically subtract quantities consumed (backflush)
- Backflushed purchased material can be automatically costed to job work orders at moving average cost.
- Main decimal quantities in work in process at work center that allow usage of partial sheets of material.
- Keeps WIP inventory areas, which are inherently inaccurate and lack tight controls, separate from well-controlled stocking areas.

Detailed, Receiving Functionality - Unusual functions support today's complex production methods:
- PO to Work Order Integration **-** updates work order if Outside Manufacturing services PO.
- Detailed Receiving Lot History - captures, stores PO, Work Order, cost data.
- Interactive QA Inspection Approval, rejections, tracking, disposition, links to rework.
- Receiving Lot History records record multiple events against each received lot.
- Off-site receipts explicitly supported; doesn't generate false "inspection" requirement.

Discrepant Material Control/Segregation - separate, integrated sub-system for rejected material (all sources):
- Rejected, undispositioned material moves tied to Discrepant Material Report Number
- Provides clear, reliable quarantine control.

- Disposition actions separate, yet control physical movements from dispositions.
- Rework Integration - Between rejected material control, dispositions, rework orders, rework PO type.

Efficient, Flexible Stock Picking - increases material handling productivity:
- Reprintable Pick Lists - both sales and work orders
- Work Order Picking Schedule - Picking per schedule, not paperwork release
- Schedule-based Sales Order Picking - Only currently scheduled to ship items are released.
- Credit card Controls - Integrated with sales order picking/staging/ship module.
- Bar Coded Shipping & Staging Management - tags track items to Staging function

Powerful Transaction History - "main-frame" controls, data integrity, at PC data availability:
- Real-time, highly derailed transaction updating - engineered for thousands per day.
- Comment/text field, automatically stored user ID, date/time of transaction.
- Fast, on-screen transaction history - including perpetual/stock inventory, WIP movements, receipts, drop shipments, discrepant material and cycle count/physical inventory.

Distribution/Pick/Pack/Stage/Shipping Capabilities

Warehouse/Distribution Capabilities - powerful, robust architecture supports:
- Multiple Shipping Warehouses - ship from any warehouse; multiple shipments on same order.
- High volume, complex warehouse operations - designed to allow easy customization to meet even the most unusual material flow requirements.
- In-the-system procedural controls - reduces warehouse handler errors
- Commingled different kinds of products, picking, packing, staging methods without losing control
- Closely integrated with order, customer financial management, other functions for maximum efficiency AND control.

Schedule-Driven Order Picking - Order releasing per shipment schedule, not paperwork via a sophisticated, automated process that selects those items on orders that are due to be shipped.
- Optional firm inventory commitment to order function - ensures that all pick lists and ATO assembly schedules have material available to fulfill them.
- No picking or pick lists of future date shipments - future dated items not released for pick/pack/ship
- Flexible Picking - Pick by order, product, customer, date; printed or on screen; easily add other ways.

Staging Function - uses Bar-Coded Carton Tracking - picked items can have printed bar-coded tags when picked and staged:
- Staging function allows accumulation of large orders or shipments, such as containers, export.
- Picked/staged items are removed from inventory; "belong" to the order.
- Packing/Staging Tracking - Carton ID's ensure that picked, staged items aren't lost, overlooked.
- Pick to Staged Orders - Pick/pack to Staging function, before actual shipment.
- Multiple Picks - Pick items/orders in any sequence, still keep control of whole order/shipment
- Commingled Logistics - Robust architecture allows widely varying products, methods easily.

- Reconciled Shipping - Must account for all carton ID at shipping, prevents lost items, errors.

Automatic Financial Controls - All functions integrated to financial modules:
- Customer Financial Status - Key functions checked if OK before proceeding.
- Credit Card Handling - Picking/staging activity drives credit card payments, not order; payment is right every time.
- Shipment-Driven Open Account Invoicing - Automatic process invoices from shipments

Error-Proof Shipping Controls - Sophisticated controls "goof-proof" shipping:
- Bar-code driven - Scanned labels trigger shipment processes; no keyed data needed.
- Financial Status - Must be OK to ship anything.
- Multiple Carton Shipments - Must account for all cartons pick/pack/staged.
- Tracker Labels - Scan UPS/FedEx tracker labels; print on packing list
- Address Controls - No labels, documents unless shipment is OK to ship.
- Reprintable Documents - Reprint packing list, combination packlist/invoice anytime.
- Automatic COD Tags - Prints COD tags if applicable, (if printer attached).
- Easy Commingling - Intermix shipment of major products, spare parts, promotional items.
- Mixed Payment Terms - Intermix open account, COD, credit card paid shipments easily.
- Automatic generation of invoices for COD, prepaid shipments during shipment cycle; print combination packlist invoice format.
- Shipping Cost Tracking - Open account shipments can track estimated shipping cost with actual from carrier

Cycle Counting & Physical Inventory Subsystem

Highly detailed, full-featured module - Key Features/Functions:
- Perform physical inventory for Work Orders material as well as perpetual type balances
- Repeatedly used to perform world-wide inventory of "global WIP" with $20+ million in valuation.
- Rigorously used, enhanced, refined module
- Numerous small, detailed functions to enhance speed, ease of use, reliability, reporting.

Data Capture/Cutoff:
- Capture process stores all data related to items to be counted
- Creates capture/count/accuracy history for each part number
- Automatic selection of part numbers for counting
- Partial physical selection options.
- No disruptions; immediate resumption of work following cutoff/capture

Pro Forma Adjustments
- Adjustments automatically generated from captured and actual count data
- Generate adjustments at any time.

- See adjustment effect <u>before</u> applying (recount, etc.)

Bar-Coded Tags and Count Sheets
- System prints bar codes on counting tags and count sheets
- Super fast actual count data entry - simply scan tag number and enter actual count quantity.
- Generated Tags match tag data records
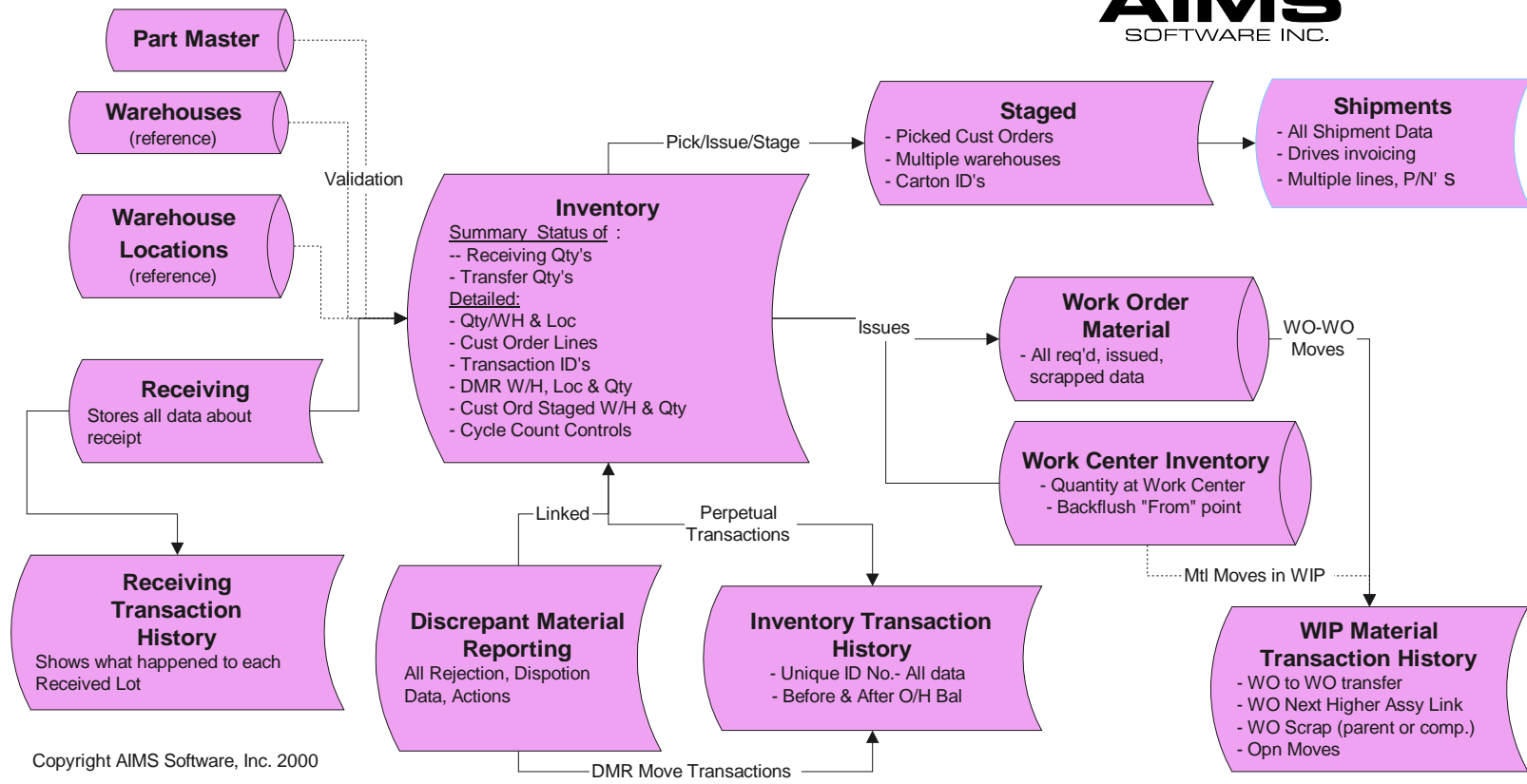
Rigorous Tag Accounting
- Auditor approved tag accountability
- Full tag generation/printing control, reconciliation
- Lost tag report/control
- Voided tag control
- Tag Correction control
- Batched tag entry and posting with hash totaling for highest accuracy controls

Extensive Reconciliation Reporting
- Valuation by selection from multiple standard cost sets
- Costed tags, adjustments, comparisons

The chart below illustrates the major inventory management functions and connections between and to other functions within AIMS/ERP.

AIMS/ERP Inventory Functional Overview
Data Stored & Relationships

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Part Master

Warehouses
(reference)

Warehouse Locations
(reference)

Validation

Inventory
Summary Status of :
-- Receiving Qty's
- Transfer Qty's
Detailed:
- Qty/WH & Loc
- Cust Order Lines
- Transaction ID's
- DMR W/H, Loc & Qty
- Cust Ord Staged W/H & Qty
- Cycle Count Controls

Pick/Issue/Stage

Staged
- Picked Cust Orders
- Multiple warehouses
- Carton ID's

Shipments
- All Shipment Data
- Drives invoicing
- Multiple lines, P/N' S

Issues

Work Order Material
- All req'd, issued, scrapped data

WO-WO Moves

Work Center Inventory
- Quantity at Work Center
- Backflush "From" point

Mtl Moves in WIP

Receiving
Stores all data about receipt

Receiving Transaction History
Shows what happened to each Received Lot

Linked

Perpetual Transactions

Discrepant Material Reporting
All Rejection, Dispotion Data, Actions

Inventory Transaction History
- Unique ID No.- All data
- Before & After O/H Bal

DMR Move Transactions

WIP Material Transaction History
- WO to WO transfer
- WO Next Higher Assy Link
- WO Scrap (parent or comp.)
- Opn Moves

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Product Costing

AIMS/ERP provides a robust, detailed cost capabilities providing a mixture of standard cost data, typically the most commonly used way to value inventory, and cost standard item production. Also available is detailed actual cost data for work orders for labor and material usage, all included in a robust, complete job management and costing subsystem.

• Job Management/Costing & Variances For:
  • Estimated (Original Quote/Estimate)
  • Budget (Engineered/Standard)
  • Actual (at standard & actual rates)
• Estimated To/At Completion Projected Costs
• Job Change Order Costs, Prices, Margins
• Standard Costs With Multiple Sets
• Standards vs Actual Variances for Material, Labor, Contract Services
• Commingle Stock/Standard & Job Production Costing
• Labor Costs Separate From Scheduling Variables (Setup, Run Times)

The illustration below shows the labor portion of an AIMS/ERP Job Cost report. It includes:

- Estimated hours and cost
- Budget hours and cost
- Actual hours at Work Center Standard rates.

This report is an example of the kind of report that can be produced easily from the richly detailed costing data structures maintained by AIMS/ERP functions, and that help management proactively management jobs/projects via:

- Automatically updated budget cost data that is revised in the background as routing data is updated or material defined.
- Early viewing of budget job cost as soon as the detailed engineering process is completed - not after the actual cost data is in and its too late!
- Basis for identifying areas for re-engineering to reduce cost before committing to purchasing or production.
- Estimate vs. budget vs. actual labor and material data.

```
5*1004                    A I M S / E R P   V e r s i o n   2 . 2              Page: 0001

                                   Job Management Summary by Work Center

                          Job No:        Line:          Customer:
                                 1997           ALL               Winter Construction
Labor Activity:
  WC       Work     Work Center                    Actual        Actual   Estimate      Estimate    Budget      Budget
  Type     Center   Description                   Lab. Hrs    Amt @WC Std  Lab. Hrs       Amount    Lab. Hrs     Amount

Inside     ENGR     Engineering(Dept.10,11,12)     520.90     $15,827.00    295.00    $12,022.50     818.00   $19,905.00
           MILL     Milling(Dept.20,21,24,25,28,29) 880.10    $24,842.80  1,080.50    $29,894.00     989.50   $27,148.00
           ASSY     Assembly(Dept.30,31,34,38,39) 1,871.30    $48,798.40  3,152.50    $88,270.00   2,900.50   $81,214.00
           HDW      Hardware(Dept.40,41,42,45,49)  571.80     $18,010.40    820.50    $17,374.00     839.50   $23,508.00
           FINISH   Finish(Dept.50)                540.90     $18,931.50    725.85    $25,397.75     889.85   $23,437.75
                    Subtotal
                           Inside                 4,185.00   $122,008.10  5,854.15   $172,758.25   5,995.15  $175,208.75
                           Burden                             $87,885.00              $135,780.95             $138,784.45
                    Overtime Hours:
                                         125.80
                    Doubletime Hours:
                                           .00

Outside    INST     Install(Dept.80,82,83,84,85,88,  41.00     $1,840.00  1,303.00    $58,835.00   1,303.00   $58,235.00
           INSTF    Install-Supervision(Dept. 81)   45.00     $1,980.00       .00         $.00         .00        $.00
           INSTTU   Install-Touch Up(Dept.51,52,58,   .00         $.00         .00         $.00         .00        $.00
           OTHER    * not used in totals           188.30         $.00         .00         $.00         .00        $.00
                    Subtotal
                           Outside                   88.00     $3,820.00  1,303.00    $58,835.00   1,303.00   $58,235.00
                           Burden                              $543.00                $8,795.25              $13,055.25
                    Overtime Hours:
                                           2.00
                    Doubletime Hours:
                                            .00

                    Total Labor        (a)       _____ _____ _____ _____ _____ _____
                                                  4,271.00   $214,058.10  7,157.15   $375,949.45   7,298.15  $383,283.45
```

Country of Origin Analysis - NAFTA Support

AIMS/ERP provides unique special data entry windows and reports to analyze the percentage of cost for products coming from domestic vs. foreign origin.

- Assign origins - special screen allows assigning country of origin for:
- Each purchased component or assembly
- Part Number or for usage within specific assembly/product

Reporting - Special Country of Origin Bill of Material report:

- Retrieves origin data for product
- Costs using selected standard cost set
- Calculated percentage for each country, foreign & domestic
- Summarizes content by country of origin

Multi-Channel Sales Order Entry & Customer Relationship Management

- Uses Contact/Customer Type codes and multiple sales order types to separate different selling channels, which may have different products, pricing rules, selling contractual rules or other variations.
- Puts most business/procedural/policy control rules <u>into the software</u> allowing much higher productivity, elimination of most "review" steps in order processing, and commingling of different types of business without losing control.
- Easy to add additional order types with additional rules to this robust platform.

Powerful, "Fortune 1000" Level Functionality - capabilities found only in much more costly systems:
- <u>Order Search/Inquiry Engine</u> - find sales orders via customer name, product, dates and other variables; quickly link to all other data, such as shipments, invoices, etc., via drill-down windows.
- <u>Order Type Specific Price Tables</u> - Each order type has its own product catalog and associated pricing.
- <u>Integrated Warranty Management</u> - product returns/repairs linked to product warranty; <u>automatically</u> <u>determining</u> whether return is eligible for warrant coverage.
- <u>Unit History</u> - Warranty data integrated to serial numbered unit history, return/repair module.
- <u>Automatic Credit Management</u> - orders can be entered immediately, regardless of credit status without losing control; order entry integrated with Credit Management module's automatic release process.
- Integrated to <u>sophisticated Pick/Pack/Stage/Ship</u> module - allows fast, high productivity handling of multiple types of business easily, even with widely varying product handling and shipment processes.
- <u>Integrated Credit Card Management</u> - entire order processing cycle fully integrated to Credit Card module; ready for automated payment processing; <u>automatic controls</u> prevent wrong payments, accidental shipment without processed payment.
- <u>Easy System Extension</u> - robust internal logic and design allows easily adding detailed functions for not-yet foreseen interfaces, logic, functions and logistics without altering main logic and flow.

Standardized Contact and Entry Flow - features ergonomically engineered contact/customer service interface process for all business channels and types, use with headsets for the highest productivity:
- Integrated with Contact Management module; single order/customer identification process.
- Mouse-driven pull-down pull-down menus provide fast access to all functions, inquiries.
- Once customer is identified, easily select from those order types this customer is OK'd for.
- Table linking customer and order types controls who can do what.
- All order types accessible, including return/repairs without leaving screen.

- Engineered for head-set type customer service interface; eliminates need for supporting printed catalogs, calculators, note pads, and other not-in-the-system devices.
- Can be easily interfaced to call sequencer.

Multiple Functional Order Types - each order type is linked to rules, providing easy management of multiple sales channels, each of which may have difficult products, prices, logic, or logistics. Currently supported are order types for:
- Finished Product - company's main product line and distribution channel.
- Spare Parts - secondary product line.
- Merchandise - third, for promotional merchandise programs
- Return/Repairs - integrated with Warranty module, Return/Repair subsystem; authorizes returns and/or repairs of product either on site or at field support service centers.

Credit Management

Automates most of the credit control/management process:

- Transfers control from individual orders to continual review and control of all credit-related events.
- Future-dated sales orders shipments aren't included in credit availability calculations.
- Allows automatic support of long-term customer contracts, schedule based relationships, rapidly changing environment of the 1990's and 21st Century.
- Manages overall credit relationship via a logical process,
- Electronic Signature - Automated, incremental override function to "extend" credit limit.
- Much more flexible than traditional order hold, review, release approach

Automatic Credit Checking and Order Release

Automatic, scheduled, unattended process, reviews, selects, releases items for pick/pack/stage/ship process from order backlog:

- Customer financial status OK.
- Determines Ship Window Date from user controlled variable.
- Selects only those items with Scheduled Ship Dates inside this window for each customer/order.
- Items on prepaid orders are released without invoice calculation, etc.
- Performs pro forma invoice calculations, ship charges, tax, etc., for released items
- Retrieves all item previously released, but uninvoiced and calculates pro forma invoice for these
- Retrieves aged open balance data.
- Totals and determines if new release would "bust" the customer's Credit Limit.
- If OK - places released items in the queue of items to be picked/packed/staged/shipped. .
- If not OK - places in Rejected Release Queue for Credit Manager to review, possibly override. (Rejected release queue is regenerated each cycle.
- Handles order payment terms or customer financial status change for partly released orders.

Electronic Signature Credit Override

Computer-based "signature" for Credit Manager:
- Releases items in rejected release queue from previous release cycle.
- Audit trail of person that approved the override.

- "Signature" function uses a personal, private, encrypted password separate from log-on.

Credit Card Processing

Handle credit card payments, closely integrated with other modules:
- Card data taken in Order entry process via explicit popup window designed for credit card
- Pick/pack/stage/ship process linked to credit card processing and controls.
- Can't ship until there is sufficient balance in the customer's account.
- Designed for automatic upload to card payment processing service and approved payment posting.

Prepayment/Credit Card records - system generates or updates special prepayment record:
- Designed for automated uploading to card payment processing service.
- Can be processed manually via hand keyed terminal.
- Pick/Pack/Stage process calculates prepayment actual amount needed, from actual items picked and staged, not what was ordered.
- Ensures that payment amount will <u>always</u> be for what the customer actually receives, even with backorders
- Multiple payments (i.e., for fulfilling backordered items); create separate payments at those times.

Shipment Credit Card Controls - scanning-bar coded label on cartons in Shipment function:
- Determines if needed credit card payment has been processed.
- If there is any remaining, unpaid balance (perhaps a backordered item will picked later, after a previous payment was made)
- Indicates to the shipping clerk that the order is or is not OK to be shipped.
- If it is, requires accounting for all carton ID's assigned to the picked/packed and staged order
- Accepts entry of UPS or other tracking label numbers via bar-code scan.
- Generates shipping address labels and shipping documents, including invoice

Contact Management – Prospects, Customers, Vendors, Others

Unique, Powerful Contact Management/Tools:
- Designed to manage names and address of all company contacts, prospects, friends, vendors, affiliates, as well as customers associated with different sales channels and interface rules.
- Engineered for huge data base - manages hundreds of thousands of names
- Fully integrated with all other functions - no stand-alone contact data base
- Achieve high level of name, address data integrity; provides centralized process to update names, addresses, phone numbers regardless of who comes in contact with the person.

Powerful Search Engine - designed for managing large contact, prospect, and customer tables,
- Search on 12 data to find and retrieve contact table records.
- Available anywhere customer identification is needed.
- Engineered for speed with very large data bases (hundreds of thousands of entries).
- Helps prevent duplicates.

Contact/Communication History With Follow-up -
- Characterize conversations with standardized type coding (you define types).
- Built-in, easy follow-up date, times, purposes.
- Contact history available in all other modules where contacts occur.
- Use Communication History to enable smooth hand-offs between customer service reps.
- Follow-up reports prevent overlooking needed actions, calls, helps sales cycle.

Functional Prospect/Customer Type codes - Codes provide, link to other functions for control:
- Only selected codes can have open account relationship.
- Additional data for each type in profile records, for marketing channel, direct mail or other purposes.
- Types link to multiple, functional sales order types for product, price controls.
- Some types can have multiple sub-entities, e.g., a dealer with multiple stores.

Extensive Name, Address, Phone Management - Manages all data pertaining to each contact:
- Multiple Alternate Addresses - alternate addresses have their own functional type codes
- Multiple Phone Numbers - any number of phone numbers for a contact.
- ZIP Code management - ties zip code to city and state. Speeds address data entry, reduces errors.

Contact Data Merge Capability - eliminates identified duplicates from data base:
- For active customers, (all types) - with orders, shipments, invoices, etc. carrying customer number.
- Retrieves, revises history to reflect common customer number.
- Archives all before merge data to allow for accident repair
- No history loss, no "orphan" records with old customer numbers.

Invoicing/Billing

Provides high productivity tools to improve staff productivity:

- No Separate Entries - all billing processes are automatic, driven by shipments.
- Hand Credit/Debit Memos - Manual entries for these exception events.
- Highly Integrated Processes - eliminates redundant work, controls closely
- Reduces Administrative Cost - automatic processes eliminate clerical tasks; approvals, reviews

Integrated Functions - Billing process driven by, linked to other processes:
- Product Sales/Shipments - order processing fully prices all items, shipments, tax, discounts, etc.
- Services - Repair of units; charges prepared by repair tech or administrator; invoice system generated
- Pricing - All prices come from closely controlled pricing tables; adjustments clearly visible
- Manual Invoice Entry – for situations where no shipment occurred
- Credit Memo – full product-oriented, detailed credit memo entry and printed format; includes credit for returned product as an offset in product sales history.

Printing Format Controls –
- Multiple invoice printing format options; easy to create, use custom invoice formats
- User control over number of copies, collation sequence.
- Standard text block function for export declarations, other uses.

Detailed Invoicing Data - Process stores all invoice data:
- Order - Linked to order generating items or services
- Shipment - Optional grouping of multiple shipments on one invoice
- Items Shipped/Billed - Part numbers, quantities, etc.
- Unit Prices - "Snapshot" from Order; invaluable if order's prices are changed later.
- Cost of Goods Sold - Invoicing saves cost of items with invoice; repeatable analysis even if costs change.

Financial Reporting & Control

AIMS/ERP features the aware-winning, highly regarded financial modules from Solomon Financial Software. Please refer to the accompanying literature from Solomon for additional information about these feature-rich management tools. AIMS/ERP transactions nd other data functions are integrated into the Solomon modules for a seamless operation that combines the best of financial reporting and control software with the uniquely powerful business/operations tools provided by AIMS/ERP.

Detailed sales history/analysis reporting concerning products, margins, discounts given, and other similar reports are maintained in detail for reporting by product, product classifications, customer and other valuable ways, as are all detailed inventory, procurement and other operational data.

The Solomon IV General Ledger, Accounts Payable, and Accounts Receivable modules provide easy to use, cost-effective financial management tools that function at an appropriate level of detail.

Appendix 1 - MRP vs. AIMS/ERP Detailed Comparison

You have no doubt read of the difficulties many ERP implementations run into, or how seldom they actually deliver the claimed benefits. This is due to the fact that almost all ERP systems are really 1970's MRP systems at their core, only with a "pretty face".

AIMS/ERP's design and processes incorporate revolutionary new, powerful logic to dramatically streamline and simplify the traditional MRP process as shown above, while eliminating MRP's <u>inherent</u> weaknesses, gaps, and labor intensive management. The table below illustrates in summary form a number of comparison points between MRP/MRP II and AIMS/ERP functionality, and illustrates how the AIMS/ERP approach to production and material management systems provides a <u>clearly superior architecture</u> to MRP II for companies that want to <u>be the competitive standard</u>.

We invite you to ask these questions of other ERP suppliers that you may be considering. Ask them to show you how their products (a few do), can resolve these issues in YOUR favor.

MRP Problem/Function	AIMS/ERP Solution
MPS - usually doesn't control all demand	MPS controls <u>all</u> independent and dependent demand, at all assembly levels; production is scheduled first; operations with material linked then have material required dates.
Few or no tools to handle changes inside lead time - where it is needed the most, except cumbersome "Demand/Plan Time Fence" discipline.	No time fences - MPS changes inside lead time, or behind schedule production is automatically handled; <u>separate</u> work order <u>demand </u>and current <u>schedule</u> dates are maintained; easy to identify differences, and effective expediting actions; inside lead time work orders are forward/compressed scheduled.
<u>Real</u> production schedule not in system (it's on spreadsheets).	AIMS/ERP produces a <u>ready-to-use, valid</u> production schedule for all operations on all work orders each run.
Material only "plan" separate from "schedule"; planned order table is difficult to reconcile to released/open work orders.	<u>Single work order</u> table; <u>stable work order numbers</u> for horizon; work orders simply change status; scheduling rules vary with status; planned status work orders quantities, dates, material required updated each schedule run.
"Schedule" Dates in the past.	Demand pegging linked (up product structure) forward scheduling logic eliminates meaningless dates in the past; keeps dependencies valid.
Action messages to guide manual work; if not done, MRP data is wrong.	No messages "suggesting" what a planner should do; software goes ahead and <u>does what planner would do</u>: • Work orders - rescheduled automatically. • Demand & Supply - Exception code method identifies part numbers needing action according to degree of urgency (priority). • Purchasing - PO Scheduler analyzes demand & supply data and generates PO change and PO Request records, ready to use.
Weak or no relationship between work orders or assembly levels during "scheduling"; extensive manual updating required.	Automatically <u>maintained at all times</u>; includes subassembly higher level assembly validity. Single, simple, global scheduling process; <u>no</u> manual updates. <u>All</u> schedule data is either in the MPS (independent demand) or derived from the Bill of Manufacture data structure.
Material usually assumed (during	Separate demand & supply data flows for internally used material and drop shipped; neither type of demand or

planning) to be issued from stock; no off-site (drop ship) scheduling support	supply are commingled.
Usually poor or no integration of outside processing; no scheduling, no planning of need for services, may not have direct cost standards	Outside manufacturing <u>fully integrated</u> into work center, routing, scheduling, and cost planning; separate demand & supply data flow for purchased manufacturing services (non-material PO's); can plan purchase of services to a planned work order months in advance.
Usually can't schedule alternate production sources well in advance.	Can <u>modify and freeze</u> routing for work orders in <u>planned</u> status, locking in alternate plans, still allowing changes in dates, quantities.
Usually can't lock in alternate or substitute material & still have automatic rescheduling.	Released Not Picked status locks in material required and lot size; dates continue to be (re) scheduled as needed. Planned is a Freeze Material function for Planned status which will lock in work order material, but allow extended quantities to vary per extended schedule requirements.
Difficult for planners, buyers to prioritize daily work flow.	Work order schedulers only need to review schedule; release work orders with material available; Buyers use Exception codes to prioritize work and/or use PO Scheduler.
Pegging - only single level readily available; must usually run a process to follow chain to end item.	Independent (MPS) demand & next higher assembly pegging data <u>is maintained in data fields</u> in work orders, PO change and PO Request records for instant, simple retrieval.
Difficult or cumbersome foundation for capacity management; tools workable only with significant on-going effort and discipline.	AIMS/ERP Scheduler synchronizes all production back to the MPS. Work Center schedules and loads are thus more useful. Continuous flow and finite capacity loading algorithms are planned developments for Scheduler.
Need for extensive education & training to "make system work"	Training still required - but for fewer people; training is quicker because logic is easier to grasp.
Material & WIP transactions that often don't match material flow; make sense only to an accountant.	Single function transactions simplify training, data entry, security control; match physical material flow.