AIMS/ERP Software Design Specifications – Modules and Contents

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Overview

We prepared this list of the AIMS/ERP design specifications to convey an idea of the scope and magnitude of the specifications and design for the full ERP system design, development and implementation project performed for Alesis Corporation. The total volume of the design specifications numbered over 1,300 pages by the end of the project. Printed out, this is more than 2 ½ reams of paper. It is a large set of design specifications.

As with most systems, some functions are relatively simple. In this case there are also a number with quite complex specifications, for sophisticated, advanced functionality and internal logic. Writing this kind of specification is a little like writing an algebra text; details matter greatly. For example, the production/material scheduling program specification (34 pages) became a set of 11 inter-linked programs.

Productivity and Speed

If one calculates an average number of days and hours worked during this project, then divides this value into the 1,300 pages, the result is an average of approximately 0.4 completed specification pages per hour for the duration of the project (28 months), including all other activities as well, such as user / management collaboration, managing the developer team, testing, implementation and project management and reporting.

We believe you will agree that this is a remarkable accomplishment, certainly in terms of creative output. And, you may want to leverage this creative resource in your own company's software development (hopefully accompanied by software design).

Development Impact of Clear Specifications

It is difficult to convey the impact on developer efficiency, elapsed time and other development project variables from having specifications that are completely worked out in great detail before coding starts. The following comments are an effort to summarize this impact:

- **Very Efficient Development -** Since all programming / developer activity was guided by these highly detailed specifications, including data base design, screen layouts, and interactions with already present functions, the developer team did not have to spend significant time in conversation, white-board meetings, or making big changes to already-written code.

- **Clean Code -** As a result, each programmer could plan out the code structure he was going to write for a new function, then for the most part, just key the specific code in, knowing where he is going. The result

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was extraordinarily "clean" code, since the original structure, subroutines, calls to external functions, data base handling, variable names and the like was already defined clearly.

- **No Revisions to Prior Code** – Since I planned the entire system out in detail at the start, no major changes to previously developed, already in use functions was required for the entire project, even though it took over 2 years to get all the functions built and into use at Alesis. Even after the system was licensed to AIMS Software and sold to other companies, adding numerous new functions and modules, almost no revisions to previous code were required.

- **Efficient, Accurate Testing** – testing of code is a LOT easier when you know, in detail, what it is supposed to do. As a result, this development team became known as the "module of the month" club, since a whole group of functions, i.e., a module, was rolled out for the start of live use at 6 to 8 week intervals for the 2 ½ year duration of the project.

Background

This project was performed over a twenty-eight month period in the early to mid-1990s. I (Paul Deis) wrote all of these, working with key users, managers, and others on the team in the process. I also concurrently managed the programming, testing, selected and managed the programmers, and oversaw the implementation and training process. Others on the team performed roles that were critical to the success of the project. The company nearly doubled in size while the system was being built.

In addition to the actual design specifications, we wrote additional specifications for many reports that are not included here, as well as all training aids and many of the written procedures written to support its successful implementation. Also, dozens of flow charts were generated to document how key functions work, and to support the specifications themselves. The specifications are designed to essentially serve multiple purposes:

- Communicate with key users what the programs functions were, and how they are intended to work before programming it.
- How one is to use the screen or report in the specifications.
- Direct the programmer in creating the new/modified functions.
- Guide testing and debugging of the new or modified functionality.
- Manage software changes through change notes in the specifications.

The system was developed by a small team of programmers using the Advanced Revelation toolset, at the time (and still is) the highest productivity development toolset we have ever worked with.

This system, which became known as AIMS/ERP, was eventually licensed by Alesis to AIMS Software, Inc, which further developed it in the process of selling licenses for its use to 10 customer companies before AIMS Software was closed in 2001. Newly designed functions, with hundreds more pages of specifications like these, were added in the same fashion described here, until shortly before the company was closed in 2001.

Document Contents

To prepare this document, we copied the actual table of contents from the specification document for each module in the system. These are listed below the name of each module in unedited form, after the Modules and Contents summary, which lists each major module.

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Comment on Reports - You may notice that there are few reports mentioned in the specifications. The programming toolset contained the fastest report generation tool ever created. A practiced user of it can create a simple report in about 15-20 seconds without knowing table or dictionary names. In addition, AIMS/ERP includes a Report Manager module (not specified here), which "wrapped around" this tool. As a result, most of the system's over 350 reports were not specified, however, but developed directly in the report writing tools, then managed by the Report Manager module, which manages, displays menus, and otherwise physically controls and generates the reports.

Modules and Contents

- Customers & Sales Maintenance
- Customer/Sales Orders Management
- Shipping Management
- Credit & Receivables Management
- Returns & Repair Orders
- Cost Management
- Engineering Management
- Inventory Management
- Work Order Management
- Purchasing Management
- Quality Management
- Production & Material Scheduling

Customers & Sales Maintenance

Customer Identification & Data Management.....
Sales Part Master Data Maintenance.....
Merchandise Price Maintenance.....
Spare Parts Price Table Maintenance.....
Spare Parts Catalog Build & Price Calculation.....
Codes & PopUp Window Data Maintenance.....
Services Master Maintenance.....
Merge Customer Data.....
Signature Password Initiation.....

Customer/Sales Orders Management

Order Header Entry/Maintenance - All Types.....
Order Entry Status Change Controls.....
Return/Repair Order Detail Entry/Maintenance.....
Spare Parts & Merchandise Order Type Detail Entry.....
Change Customer Order Status.....
Automatic Customer Order Release.....
Credit Override Approval of Unreleased Customer Orders.....
Reverse an Order Release.....

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Shipping Management

Picking & Issuing Functions.....
AIMS/ERP Pick, Staging, and Shipping Overview.....
Pick/Issue Order To Staging.....
Return From Staging to Inventory.....
Staged Unit ID/SN to Carton ID.....
Shipment Control & Authorization Functions.....
Ship Staged Orders.....
Ship Repair Order Units.....
COD Tag Print Subprogram.....

Credit & Receivables Management

AIMS/ERP Credit & Receivables Management Overview.....
Credit Management Data Definitions.....
Payment Application Logic.....
AIMS/ERP Credit Control Summary.....
Financial Master File Maintenance.....
Customer Financial Profile Data Maintenance.....
Age Group Maintenance.....
Financial Status Maintenance.....
Terms Maintenance.....
Transaction Entry Functions.....
Pre-Payment Entry.....
Direct Payment/Credit Entry & Application.....
Payment Reversal Entry & Application.....
Debit Memo Entry Window.....
Customer Open Financial Data Retrieval Subprogram.....
Open Account Invoice Generation.....
Reports & Inquiries.....
Aged Receivables Functions - Overview.....
Aged Accounts Receivables Report.....
Customer Financial Inquiry.....
Customer Credit Controls Report.....
Open Prepayments Required Report.....
Rejected Order Release Report.....
Repair Statement Printing.....
Full Statement Printing.....
Posted Payments Received Reports.....
Sales Invoice Register.....
Cost of Sales Reports.....
Customer Payments and Credits Report.....
Dealers & Stores Report.....
Invoice Printing Subprograms - Logic & Formats.....
Manual O/A Invoice Generation & Print.....
ProForma Export Invoice for Staged Products.....

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Returns & Repair Orders

Return & Repair Order Functions
Functional Requirements Summary
Receipt of Returned Unit
Unit Fault Analysis & Disposition Entry
Repair Order Move/Status Entry
Repair Order Issue from Inventory
Repair Order Return To Inventory
Exchange a Returned Unit
Repair Activity Entry to Repair Order
Repair Order - Prepare Charges & Complete
Change Unit ID on RO
RO Expiration Function Summary
RO Expiration Program
RO Expiration Reversal
Unit Exchange Functional Overview Notes
Repair Reports
Unreceived Return Authorizations
Repair Work In Process
Repaired Units to be Reviewed/Charged
Completed Repaired Units Awaiting Shipment
Repair Order Cost & Warranty Expense Detail
Repair Order Sales & Margin Analysis Detail
Repaired Units Activity Reporting - to be revised
RO Inquiry
Customer Unit Repair Report

Cost Management

Cost System Overview
Allocation Rate Table Maintenance
Part Master Cost Maintenance
Work Center Labor Rate Maintenance
Routing Master Cost Data Maintenance
Routing Cost Calculation
Set Cost Rollup Effectivity Date
Calculate Manufacturing Part Costs
Reset Low Level Codes
Copy Purchased Material Standard Costs
Calculate Total Material Costs
Rollup Lower Level Costs
Copy Calculated Costs
Convert Standard Costs
Single-Level Part Cost Report
Single-Level Part Cost Inquiry
Single Level Part Configuration - Direct Costs Only Report
Costed Stock Status By Warehouse, Part Number Report

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Costed Inventory Transactions Report.....
GL Interface - Overview .....
GL Interface - Perpetual Production Inventory at Material Standard Cost.....
GL Interface - Perpetual FG Inventory at Full Standard Standard Cost .....
GL Interface - Production Material Receiving/PPV Report.....
GL Interface - Outside Manufacturing Receiving/PPV Report.....
GL Interface - Expense Purchase Order Receiving Report.....
GL Interface - O/Mfg'd Subassy's WIP to Production Inv. at Mtl Std Cst .....
GL Interface - O/Mfg'd Fin Gds WIP to FG Inventory at Full Standard Cost....
GL Interface - Production Inv. to WIP Inventory Moves at Mat'l Std Cost.....
GL Interface - In-House Subassy's WIP to Production Inv. Mat'l Std Cost.....
GL Interface - In-House WIP Inv. to Fin. Goods Inv. at Full Std Cost .....
GL Interface - FG Sales/Shipments by Product Line at Full Standard Cost.....
GL Interface - Inventory to/from Dept. Expense at Full Standard Cost .....
GL Interface - Part Number Changes at Full Standard Cost.....
C/C & P/I System - Costed Tags by W/H & W/C Report .....
C/C & P/I System - Costed Capture Reports.....
C/C & P/I System - Costed Pro Forma Adjustment Transaction Report.....
WIP Material Net Cost Reports.....
Work Center Cost Report.....
Costed Routing Report.....
Costed Multi-Level Product Configuration Report - With W/S Subtotals .....
Costed Multi-Level Product Configuration Report - w/Vend Furn Costs .....
Foreign Currency Table Maintenance.....
Grouped Country of Origin Bill of Material Report.....
Ranked Projected Purchased Inventory Report .....
Inventory Cost Audit Download Program.....
Physical Inventory Tag Costing Data Download Program .....
Calculate Average Purchase Part Unit Cost .....
Imported Product Source & Cost Report .....

Engineering Management

Part Master File Maintenance.....
Manufacturing Calendar Maintenance.....
Work Center Master File Maintenance .....
Routing Master File Maintenance.....
Manufactured Part Configuration File Maintenance .....
Part Master Inquiry .....
Work Center Inquiry .....
Routing Master Inquiry .....
Manufacturing Part Configuration Inquiry.....
Single Level Where-Used Inquiry .....
Part Master Listing.....
Work Center Master Listing .....
Routing Master Listing.....
Manufactured Part Configuration Report - Summary.....
Manufactured Part Configuration Report - Detailed.....
Single-Level Mfg'd Part Configuration - Physical Inventory Support .....

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Multi-Level Product Configuration Report .....
Power Supply Assignment Screen .....
Grouped Product Bill of Material Report Family .....
Copy Product Configuration .....

Inventory Management

Inventory Transaction Codes .....
Receipt to Dock Transaction .....
Receiver Move to Stock Transaction .....
Location to Location Warehouse Move Transaction .....
Miscellaneous Receipt Transaction .....
Miscellaneous Issue Transaction .....
Work Order Pick List Print .....
Work Order Pick Complete Transaction .....
Work Order Shortage Issue Transaction .....
DMR - Work Order Transaction Changes .....
Work Order Completion & Move to Stock Transaction .....
DMR Return to Inventory Transaction .....
DMR Location-Location Move .....
DMR - Issue to Rework WO .....
Rework Return to DMR .....
DMR Return to Work Order Transaction .....
Receiving RTV/Scrap Transaction .....
DMR Inventory Scrap Transaction .....
Part Number Change Transaction .....
Inventory Status Inquiry .....
Sales Order Issue & Sale Transaction .....
Return to Vendor Transaction .....
Work Order Credit Back to Stock Transaction .....
Warehouse to Warehouse Transfer Capability .....
Warehouse to Warehouse Move/Receipt From Transfer List .....
Receipt to Dock Reversal Transaction .....
WO Completion & P/S Selection Sub-Program .....
Drop Ship Receipt & Issue Transaction .....
Part Number Standard Location Maintenance .....
Transaction Error Correction Procedures .....
Cycle Counting/Physical Inventory Subsystem - Overview .....
C/C & P/I System - Cutoff & Data Capture .....
C/C & P/I System - Tag Record Generation .....
C/C & P/I System - Tag Printing & Verification .....
C/C & P/I System - Tag Data Entry .....
C/C & P/I System - List Tag Batch .....
C/C & P/I System - Post Tag Batches .....
C/C & P/I System - Unused Tag Entry .....
C/C & P/I System - Capture vs Count Quantity Comparison Reports .....
C/C & P/I System - Tag Sequence Control Report .....
C/C & P/I System - Part Group Tolerance Factor Maintenance .....
C/C & P/I System - Pro Forma Adjustment Transaction Report .....

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C/C & P/I System - Adjustment Transaction Generation/Entry & Report .....

Work Order Management

Manual Work Order Entry.....
Rework Work Order Entry .....
Modify Work Order Material .....
Modify & Firm Work Order Routing.....
Firm WO Operation Date Window.....
Individual Work Order Routing Maintenance.....
Open Work Order Power Supply Mix Maintenance.....

Purchasing Management

Purchase Management Overview .....
PR/PO Screen Functions & Logic .....
Purchase Request Subsystem Summary.....
Automatic Purchase Request Generation - Overview.....
Generate O/Mfg Purch Req./PO Changes - subprogram .....
Generate Production Material Purch. Req./Changes - subprogram.....
Foreign Open Purchase Request Report.....
Foreign Purchase Request Maintenance .....
PO Changes Generated Report .....
Purchase Order Entry & Changes .....
PO Entry Change - Add Purchased Opn for O/M PO's .....
Outside Manufacturing Rework PO Type.....
Outside Manufacturing PO Planning Report.....
Outside Manufacturing PO Planning Inquiry.....
Open PO Inquiry .....
Purchase Order Print .....
Time-Phased PO $ Commitment Report.....
P/MRP Parameter Window .....
P/MRP Exception Codes Maintenance .....
Generate Purch Demand/Supply Table .....
InBound P/MRP Exception Reports .....
Drop Ship P/MRP Exception Reports.....
Drop Ship Purchased Part Demand & Supply Inquiry.....
In Bound Purchased Part Demand & Supply Inquiry .....
Open PO Status Reports.....
PO Line Items by Delivery Date.....
Purchased Material Demand & Supply Reports.....
Drop Shipped Demand & Supply Table Generation .....
Drop Shipped Demand & Supply Report.....
Purchased Material Requirements Planning Summary Report .....
Product Purchasing Data Maintenance .....
Outside Mfg Work Center Purchasing Data.....
Country Lookup Table Maintenance - .....
Product Country of Origin Data Maintenance.....

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Quality Management

DMR Functional Flow .....
Overview & Concepts Used .....
Receiving Inspection Cycle Overview .....
Receiving Inspection Acceptance Entry .....
Discrepant Material Report - Maintenance .....
Discrepant Material Reports .....
Open Discrepant Material Reports - Detailed .....
Undispositioned Discrepant Material Summary .....
MRB Action Report .....
Unmoved DMR Items Report .....
Quality Reports & Inquiries .....
Open Receiving Lots Report .....
DMR Subsystem Tables .....

Production & Material Scheduling

MPS - Sales Forecast Entry & Maintenance .....
Master Production Schedule Entry & Maintenance .....
Master Production Scheduling Work Bench .....
Running Scheduler - Preparatory Steps .....
Scheduling Program Major Functions - Summary .....
Scheduling Processing Steps .....
Detailed Program Functions .....
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2. Schedule Each Part Number .....
4. Regular Work Order Scheduling .....
5. Lower Assembly Level Demand .....
Scheduler Work Order Routing Data Modifications .....
Multiple Products/Power Supply Mix Capability Summary .....
Scheduler Functions for Multiple Products .....
Manufactured Part Demand & Schedule Table Generation .....
Manufacturing Calendar Maintenance .....
Planning Period Maintenance .....
Part Master File Planning Data Maintenance .....
Routing Scheduling Data Maintenance .....
Key Scheduling Data Tables .....
Sales Forecast .....
Manufacturing Calendar .....
Planning Period .....
Master Production Schedule .....

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