Introducing Advanced Manufacturing Applications

General Information

IBM System/36 Manufacturing Accounting and Production Information Control System Version 2.

IBM

Information Programming Services

Introducing Advanced Manufacturing Applications

IBM System/36
Manufacturing Accounting and Production Information Control System Version 2 (MAPICS II)

General Information Manual

Program Numbers:
5727-M7A Data Collection System Support
5727-M7B Material Requirements Planning
5727-M7G Capacity Requirements Planning
5727-M7J Master Production Schedule Planning
5727-M7K Purchasing
5727-M7L Forecasting
5727-M7P Location/Lot Management
5727-M71 Production Control and Costing
5727-M75 Inventory Management
5727-M76 Product Data Management

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This edition applies to all applications of the IBM System/36 Manufacturing Accounting and Production Information Control System Version 2 (MAPICS II). Changes are made periodically to the information herein; any such changes will be reported in subsequent revisions. Please review this manual in its entirety.

This document contains examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples contain the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

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To the reader

This publication discusses the manufacturing and data collection applications of the Manufacturing Accounting and Production Information Control System Version 2 (MAPICS II). Throughout this publication, all references to MAPICS apply to MAPICS II. MAPICS consists of 19 interrelated applications designed for the manufacturing and related process industries. Those applications are:

Accounts Payable
Accounts Receivable
Capacity Requirements Planning
Cross Application Support
Data Collection System Support
Financial Analysis
Forecasting
General Ledger
Inventory Management
Inventory Management for Process
Location/Lot Management
Master Production Schedule Planning
Material Requirements Planning
Order Entry and Invoicing
Payroll
Product Data Management
Production Control and Costing
Purchasing
Sales Analysis

Ten applications—Inventory Management, Product Data Management, Master Production Schedule Planning, Material Requirements Planning, Production Control and Costing, Capacity Requirements Planning, Data Collection System Support, Purchasing, Forecasting, and Location/Lot Management—are discussed in this publication. For information on the other applications in MAPICS, see the following publications:

- *Introducing Order Processing Applications* (GH30-9005) for the Order Entry and Invoicing, Inventory Management, Location/Lot Management, Accounts Receivable, Sales Analysis, and Purchasing applications
- *Introducing Financial Applications* (GH30-9004) for the General Ledger, Accounts Payable, Payroll, Data Collection System Support, and Financial Analysis applications
- *Introducing Process Applications* (GH30-9008) for the Inventory Management for Process, Product Data Management, Master Production Schedule Planning, Material Requirements Planning, Production Control and Costing, Capacity Requirements Planning, Purchasing, and Forecasting applications.

How this book is organized

This book is divided into three sections. In the first section, which contains general information about the System/36 and ten applications, you will find a brief overview of what the applications are and what they can do for you. The second section of the book contains more detailed information about the applications. The third section contains miscellaneous detailed information and a glossary of terms used with System/36 MAPICS application programs.

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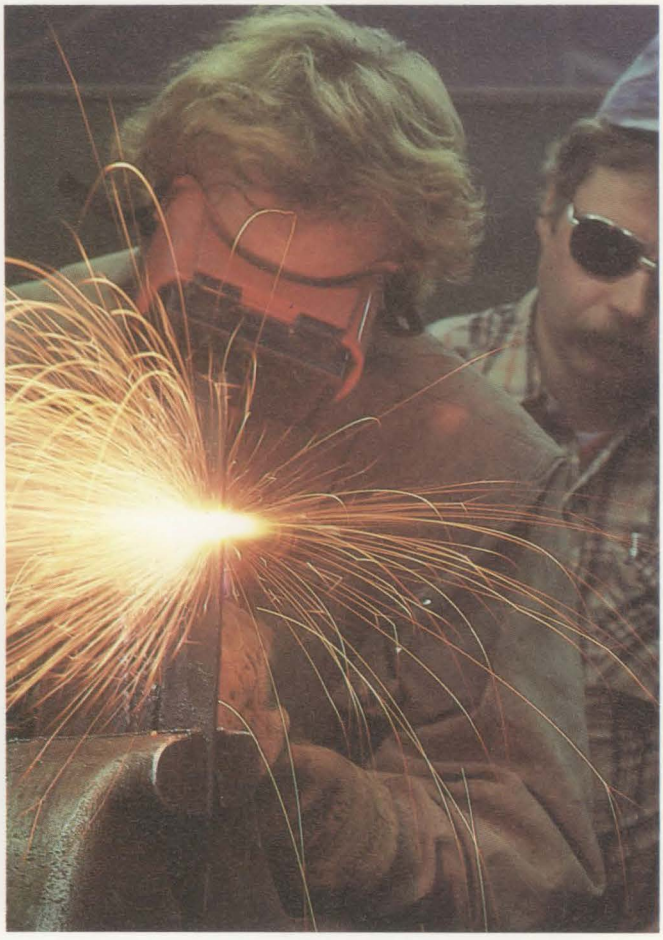


Section 1. Overview

IBM System/36 applications can help you find solutions

Much has been written about ways manufacturing companies can dramatically increase profit by using a computerized manufacturing planning and control system. Some of the key benefits reaped by many companies using computerized manufacturing systems are:

- Reduction of component and work-in-process inventories
- Increased manufacturing productivity
- Reduction in late shipments to customers
- Decreased indirect labor costs spent for activities such as expediting and material handling.

The use of computerized manufacturing planning and control systems has become commonplace for large and small companies alike. Today's highly complex and competitive business environment has made it necessary for companies to implement this type of system.

Surveys of companies using computerized manufacturing systems show that the benefits are directly proportional to the amount of management involvement in the project. This involvement includes outlining and monitoring the steps of the project's implementation, such as:

- Justifying the financial commitment
- Educating all the people who will use or be affected by the system
- Ensuring a full commitment of everyone involved
- Setting objectives and schedules
- Allocating time and resources
- Tracking the project to make sure that the objectives and schedules are met.

System/36 components

The System/36 is made up of components you select and put together to meet your specific needs.

The **processing unit** can have 128K, 256K, 384K, 512K, 768K, or 1024K of main storage (K means 1024 characters). Disk storage is available in the following sizes:

29.1 million characters
60.0 million characters
90.8 million characters
121.7 million characters
198.5 million characters
398.7 million characters
598.9 million characters
799.1 million characters

A **magnetic tape unit** allows you to save data from disk as permanent offline storage for archiving or backup. It can also be used to restore data to the disk for online processing.

Work stations have a 1920-character monochrome or color display, an 83-key conventional keyboard with function control keys, and a 10-key numeric pad.

The **system printer** can be either a line printer that prints up to 650 lines per minute, or a serial printer that prints 40 characters per second to 560 lines per minute.

Work station printers are serial printers that can print from 40 characters per second to 560 lines per minute.

Diskettes can be one-sided (with capacity for storing either 246,272 or 303,104 data characters) or two-sided (with capacity for storing either 985,088 or 1,212,416 data characters).

Up to 36 work stations and work station printers can be directly connected to the 5360 system unit. Up to 22 work stations and work station printers can be connected to the 5362 system unit. One work station must be within 20 feet of the processing unit and designated as the system console.

A **communications adapter** allows remote attachment of up to 64 additional work stations.

See "System requirements" in Section 3 for the minimum configuration required for the applications discussed in this book.

System/36 program products and applications

The System/36 hardware components plus IBM-supplied program products equal a total solution.

System/36 program products that include:

- The System Support Program (SSP) program product that controls and monitors the internal activities of the System/36 and allows multiple jobs to operate concurrently
- The Utilities program product used by the applications described in this book.

System/36 applications that consist of:

- Programs that allow you to select options to tailor your applications to your needs (system tailoring)
- Files of data that contain your business information
- Programs that process the data you enter and print reports
- File maintenance procedures to help you keep the data in your files current and accurate
- Inquiry procedures that let you display your current business information.

The work station approach

In a work station system, the emphasis is on accuracy of input data, availability of up-to-the-minute information, and the ability to inquire into data within the system.

When you use any of the applications described in this manual, you can use work stations to enter data, to display information, and to begin a job—three important data processing functions.

Data input at the source

With work stations, the person who uses the information can enter the data directly into the computer. Displays guide the operator through data entry for each item of information, displaying the results of processing for verification. The system edits the data for errors and displays error messages on the screen.

Errors can be corrected as they are discovered, by the people most qualified to correct them—the users themselves.

Up-to-the-minute information in the files

In a multiple work station system where the files are kept current, information is available to be displayed as needed. Information need not be manually transferred between departments, because the most current information is available in the system, where everyone can use it.

Inquiry into the data system

Inquiries can be made into the system for information such as material or product data. Since these inquiries need not occur from the work station where the information was originally entered, an executive who has his own work station can inquire into information stored in the System/36 without leaving the office.

Processing methods

The System/36 uses interactive processing, batch processing, or a combination of both to process your information.

Interactive processing

When the System/36 processes transactions or records as the operator enters data, it is operating in ***interactive*** mode. Each transaction is processed individually. The system processes the data and returns the results rapidly to the operator at the work station.

The interactive mode is used when data requires immediate processing. Examples of interactive processing are:

- Data entry and edit
- File maintenance
- Inquiries.

Batch processing

When the System/36 processes transactions or records together as a group, it is operating in ***batch*** mode. Batch processing is usually more efficient for data that does not require immediate processing and for printing reports.

Using the batch processing method, applications described in this manual can accept input data entered through a keyboard at a work station, data entered from diskettes prepared on an offline diskette entry system, or data collected by the IBM 5230 Data Collection System.

Examples of batch processing are:

- Updating master files with transaction data
- Printing inventory stock status reports
- Replanning material requirements.

Multiprogramming

In the System/36, more than one job can run at the same time. This is called ***multiprogramming.*** Because of multiprogramming, the System/36 can support multiple work stations operating concurrently on different jobs.

With this feature, multiple programs share the System/36. For example, while one program waits for an input or output operation to be completed, another program can be executing instructions. As a result, the computer is used more efficiently and the total work load is completed faster than if the programs were executed one following the other.

Spooling

A facility that can increase the System/36's operating efficiency is spooling of print data. Data to be printed is stored on internal disk (spooled) and printed later. This allows you to concurrently run two or more jobs that generate printed output, because the output is stored on disk and is printed later.

Your system console operator controls spooling operations through System/36 operating commands.

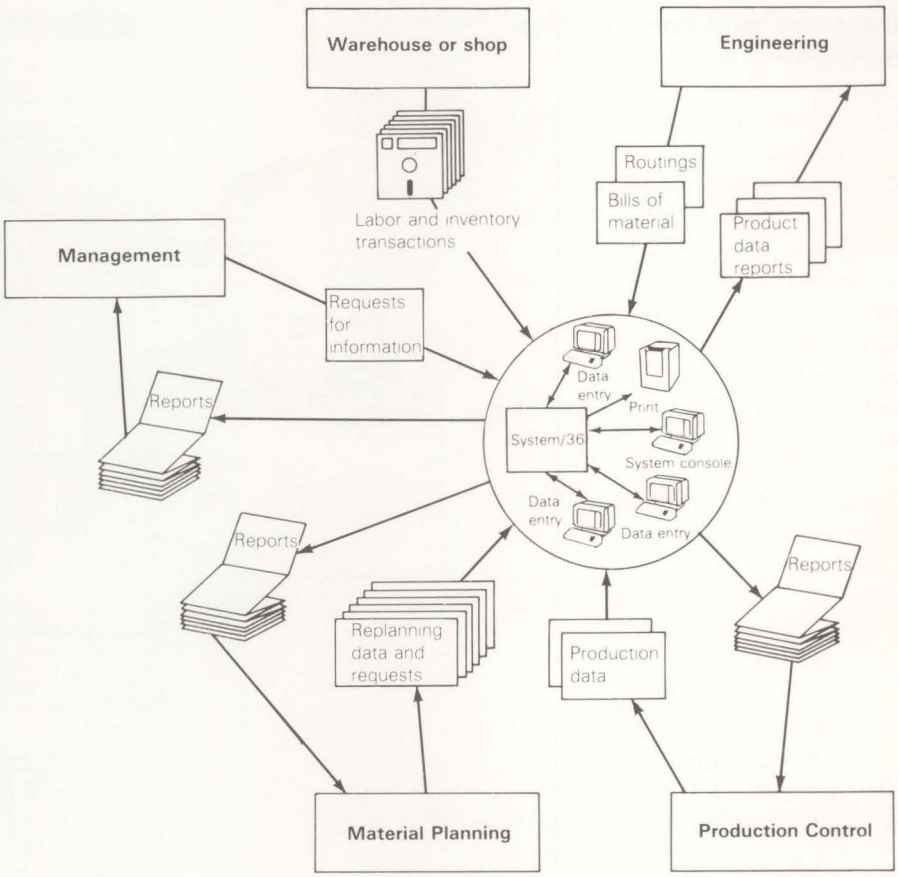
Note: For more information on any of these processing methods, see *Presenting the System/36 Family*, GC21-9016.

Centralized environment

In a centralized environment, all System/36 equipment and operators are in one location. All input to the system is submitted to the central processing area and the results are delivered back to the submitting departments.

Advantages of this type of environment are:

- Control and scheduling of data processing activities are easier.
- Only the people in the central processing area need to know how to operate the System/36 and its work stations.

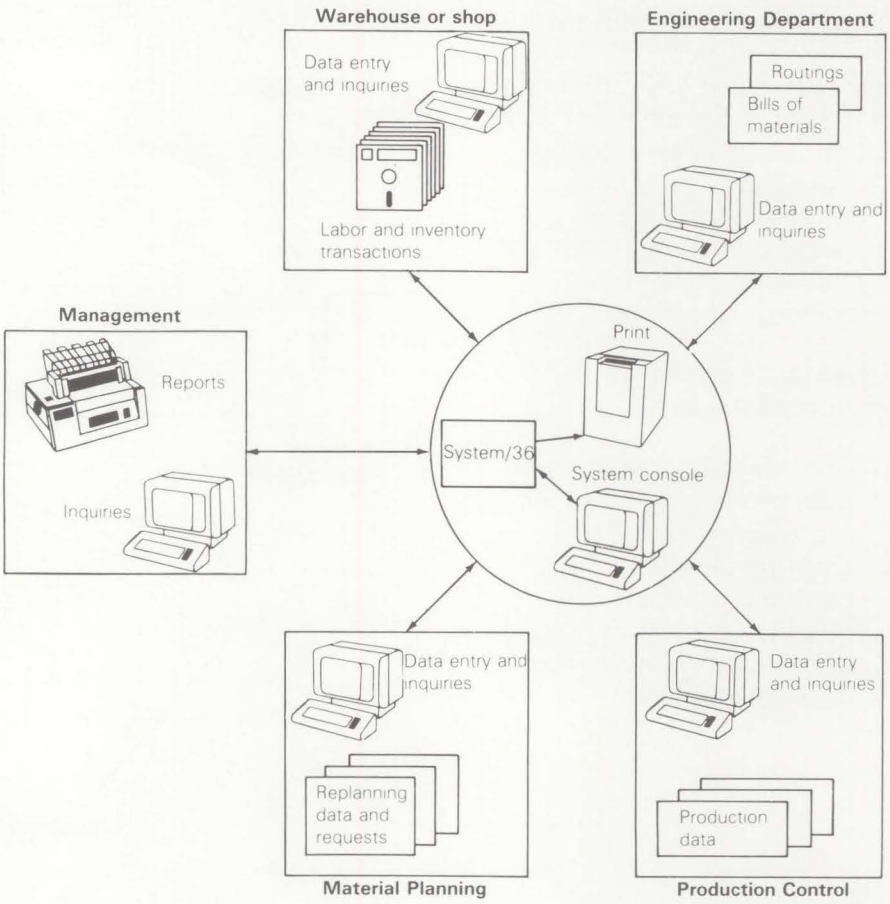


Decentralized work station environment

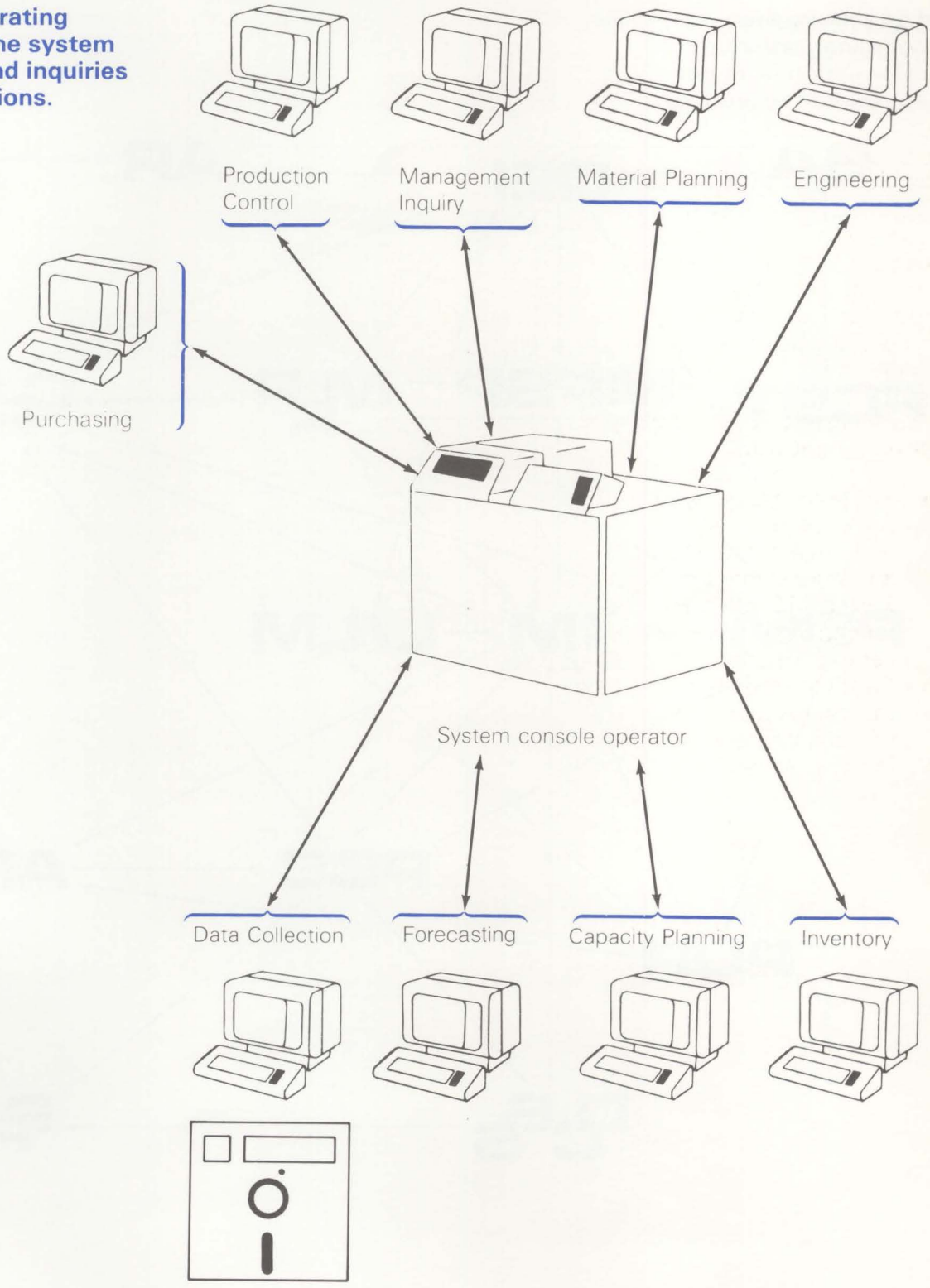
In a decentralized environment, one or more work stations and operators are located away from the main system. Local work stations can be as far away from the processing unit as 5000 feet. Also, remote work stations could communicate with the processing unit from anywhere in the world.

Advantages of this type of environment are:

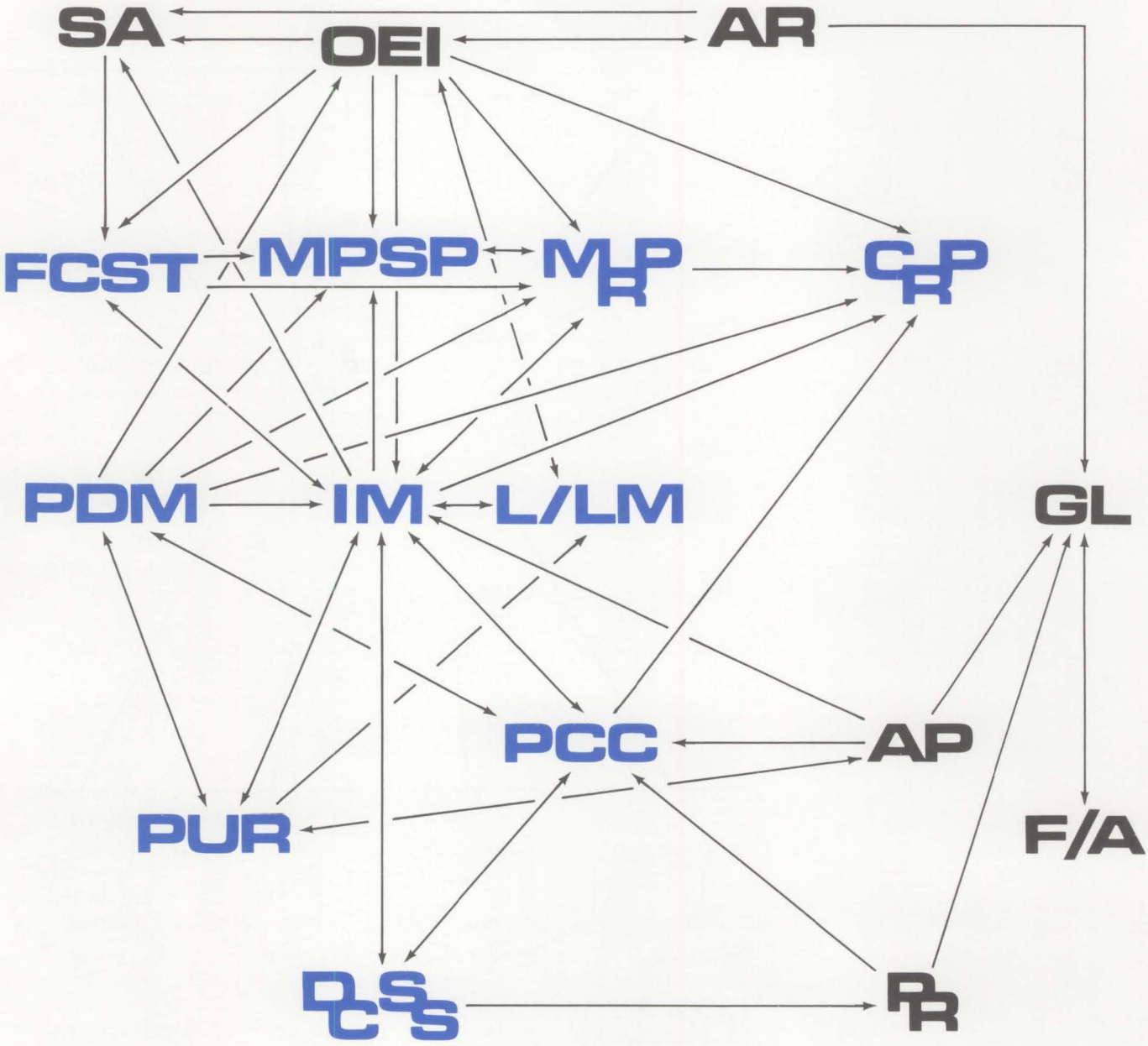
- Processing is generally faster because each department enters information into the System/36 instead of forwarding it to a centralized area.
- Errors are reduced because the people most familiar with the information enter it into the System/36.



In a typical operating environment, the system accepts data and inquiries from work stations.



The system then coordinates the flow of information from one application to another.



Built-in control features

The System/36 and its applications have many built-in features that help you control both the accuracy of the information stored in the System/36 and the access people have to it.

General controls

A program monitors the sequence of certain procedures used by the operator. This ensures that these procedures are executed in the proper order.

All transactions are edited for validity. The operator must correct errors before files can be updated.

Through a set of tailoring questions, you can specify the sizes of your master files (number of vendors, number of items, and so on) and select application options. If a master file becomes nearly full (because you add new vendors or new items), the application displays a message to notify you. You can then enlarge the master file by giving new answers to the appropriate file size questions. Further, you can change application options by reanswering application questions.

Accounting controls and audit trails

The applications generate control totals for each batch of information and show them on the display. The operator can balance these totals to manually derived control totals.

As the batch of data is processed by the applications, the same control totals are derived at each step for balancing back to the original control totals. This function provides your audit trail.

System security

Because work stations increase the number of people who have access to your system, you may want to restrict access to your information. You can do this in the following ways:

- Order a keylock feature on your work stations. This feature allows you to lock a work station so that no one can use it without a key.
- Use the SSP-provided password security system, which restricts access to work stations.
- Use the password security system that is provided with the application. This system restricts access to certain procedures and functions within an application.

Save and restore procedures

To help protect your installation against accounting and system errors that can occur in even the most carefully managed operation, a set of programs and procedures is provided to assist you. These procedures, implemented at your option, include:

- Periodically saving your master files on diskettes (backup)
- Retaining all transactions on disk between saves of master files.

Should you encounter system problems, such as a power failure, a procedure analyzes the status of your system to determine whether you can safely restart any programs that were being run when the problem occurred. If restart cannot take place, the system tells the operator what steps to take.

Should you need to reprocess transactions, you can load the master files you saved on diskette and reprocess the transactions without rekeying them.

Inventory Management (IM)

The Inventory Management application is designed to assist in improving the control of inventory, which is a major asset of a manufacturer. The objectives of Inventory Management are to provide up-to-date information for improving your decision-making and reducing inventory, and to maintain tight operating and audit controls. These objectives will help you establish efficient allocation of inventory dollars while maintaining satisfactory customer service levels, thereby maximizing the return on inventory investment.

The Inventory Management application can be subdivided into three major areas. The first area provides the perpetual inventory functions which maintain inventory balances by processing related transactions (receipts, issues, adjustments, and so on). The second area provides management with the dollar values and analyses required for sound inventory decisions. The third area provides the ability to effectively release and track manufacturing and purchase orders (if Purchasing is not installed), allowing inventory managers to manage both on-hand and on-order positions of inventory items.

Operating personnel in the purchasing department, the stockroom, or at the receiving dock can enter receipts, issues, adjustments, and other transactions through the work station on an item-by-item basis. The system edits each transaction for validity (item number, warehouse) and, if the transaction passes all edits, the master file is updated. An inventory transaction register, printed periodically, shows the transactions processed.

Features

- Interactive entry, edit, and correction of inventory transactions, including:
  - Immediate update
  - Multiple transactions per display
  - Shortage checking for entered receipts
  - Ease-of-use capability for complex issue transactions (pick complete exceptions, for example)
- Immediate processing of transactions
- Online master file maintenance
- Exception flagging
- Cycle count and regular physical inventory
- Multiple warehouse support
- Perpetual inventory record keeping
- Item costing (average, last and standard)
- LIFO/FIFO valuations
- Order release for purchase and manufacturing orders
- Blanket order support for purchase orders
- Sets "replan" flag for use by Material Requirements Planning (if installed)
- Component backflushing upon production receipt
- Calculated average lead time
- Online component availability checking for manufacturing orders
- Passes Material Requirements Planning planned purchase orders to Purchasing (if installed).

Notes:

1. When the Purchasing application is installed, expanded capabilities are available in the areas of purchase order entry and receiving.
2. If your company is in a process-related business that produces a product in quantities other than one each and needs extended decimal precision capability, refer to ***Introducing Process Applications***.

Major reports

- The **Stock Transaction Register** is a record of all transaction data accepted by the application.
- The **Stock Status Report** shows the condition of items in inventory at month end or year-end.
- The **Stock Status Review** is available on request and shows the status of all or selected items in inventory.
- **Inventory Analysis reports** show the financial and stock movement aspects of items in inventory.
- The **Physical Inventory List** is printed in various sequences for all or selected groups of items to simplify periodic inventory counts. The same reports are used for cycle-count items.
- **LIFO/FIFO reports** show the value of on-hand inventory by using the individual receipt transactions.
- **Material Shortage reports** show the material not available to meet released production order needs.

Inquiries

- Item master
- Item allocation
- Item balance history
- Open orders
- Item availability.

Product Data Management (PDM)

The Product Data Management application lets you build and maintain ***one*** set of product data files (called a data base) in the System/36. Keeping records manually on your basic product data can be costly and time-consuming.

Product data consists of:

- Bills of material (parts lists or formulas) that describe the materials and components which are used in the manufacture of a product or assembly
- Manufacturing routings or process sheets that describe the sequence of operations and processes required to produce the assemblies or fabricated items
- Work Center information that describes machines and manufacturing facilities where production occurs
- Item master data that contains such information as item number, description, standard costs, drawing number, and item type.

Frequently, each department, such as engineering, production, production control, or accounting, keeps its own files of product data. Keeping all these individual files current is time-consuming and increases the chances for costly errors. The alternative of maintaining one common set of product data can reduce both the effort and number of errors. Redundancy is further reduced by maintaining only one bill of material for each assembly, regardless of the number of products an assembly appears in.

The system can also build up costs for an item by using the bill of material to determine costs of components and by using routings to determine manufacturing costs. Costs can be recalculated when changes occur or to simulate projected changes. Using a work station, each department can quickly display, print, and use the up-to-date information in a wide range of formats.

Key information in this data base (bills of material, lead times, and so on) is used by the Material Requirements Planning application. Product Data Management also supplies data to the following applications: Order Entry and Invoicing, Inventory Management, Production Control and Costing, Capacity Requirements Planning, Master Production Schedule Planning, and Purchasing.

Features

- Online entry and editing of file maintenance transactions.
- Defining standard options for products.
- Maintaining pending bill of material changes by using effectivity dates.
- Same-as-except—creates a bill of material or routing for a new product by copying an existing bill of material or routing and incorporating the differences between the new product and the existing product.
- Mass replace—replaces one component with another in every bill of material that uses the original component.
- Mass delete—deletes a component from every bill of material that uses the component.
- Automatic notification to the Material Requirements Planning application so that bill of material changes can be reflected in the material plan.
- The bills of material are available in numerous formats through either reports or inquiry displays. The format selection shows costed or uncosted information; the type of costs; single level, indented, or summarized bills; and the absence or presence of specific standard option configurations for a product.
- Selective costing to cost a new item or items with incomplete costs.
- Standard Batch Quantity allows structuring of a bill of material on a batch quantity basis, rather than for a parent item quantity of one.
- Operation Yield allows the system to plan for yield loss at the operation level.

Major displays and reports

The **Bill of Material** shows the components which go into products or assemblies. Formats include single level, indented, summarized, uncosted, or costed at current or standard costs. For products with options, you can retrieve bills of materials for specific sets of options.

The **Item Where-Used display and report** shows all the assemblies or products using a particular component. Formats include single level or end item.

The **Costing Reports** show actual or simulated cost buildup at current and standard costs with indication of items with missing or incomplete costs.

The **Product Feature/Options display and report** shows all the options for all the features available for a product.

The **Routing Reports** show uncosted or costed routings for an item at either current or standard costs. You can also print a list by work center which shows the operation for each item processed in the work center.

When you perform maintenance, you can print **Audit Reports** to document the changes you have made.

Master Production Schedule Planning (MPSP)

The Master Production Schedule Planning application shows a company how it can plan its future production and how much resource the production plan will require. With this information, a company can meet its production schedule economically, efficiently, and dependably.

The application is designed to help you create production plans that support company policies and business goals. Starting with plans for groups of related items (production families), you can do high-level strategic planning by setting family production and inventory levels based on demand and on management's goals. Next, you can test to determine the resources needed for your production levels for up to three years. If adequate resources are available, you can set production levels for the end items in each family. Then you can monitor how well the item plans support your production goals as time passes.

The application creates master production schedules using demand information from any of the following sources:

- Item production plans (from this application or from a user interface)
- Forecasts (from the Forecasting application or from a user interface)
- Customer order backlog (from the Order Entry and Invoicing application or from a user interface)
- A blend of forecasts and customer orders

You can create (generate) master production schedules for all or for selected master scheduled items. After you generate master production schedules, you can use inquiry/maintenance screens and the Master Schedule Planning Report to see scheduled orders, demand, and a projected inventory balance for each item by period.

You can also review and change master production schedules online. If you make extensive changes, you can generate your master production schedules again to see how your changes affected lower-level master scheduled items.

After you create and review the master production schedules, you can do "rough-cut capacity planning" to find out how much of certain critical resources you will need to complete the scheduled orders. Checking at the master schedule level can show you potential scheduling problems and give you time to plan around them.

Features

- Allows you to group end items that use similar resources into production families. Helps you in assigning an end item to a production family by ranking the top five critical resources used by an end item.
- Aggregates (adds up) item production plans, sales demand, and inventory status into family-level production plans. The family plans let you perform high-level strategic planning over a three-year horizon.
- Generates family-level production targets from forecasts and customer orders to maintain specified inventory levels.
- Calculates and displays family production information in costs or units.
- Allows you to enter and display production quantities in a shortened form (quantity significance) if you are working with large quantities.
- Tests family production plans (targets) to identify the critical resources required to meet each family's production plan. Allows online review of the resources required by period and shows the items that use each resource.
- Automatically produces item and family resource profiles based on critical resources that you select.
- Allows you to save a family production plan as a reference point (base plan) for tracking the long-range achievement of the company's production, inventory, and sales projections.
- Compares the aggregated current item production plans and master production schedules for a production family against the family's production targets to show how well scheduling supports the family plan over time.
- Allows you to create master production schedules using demand from item production plans, forecasts, customer orders, a blend of forecast and customer orders, or manually-entered firm planned orders.
- Retrieves real-time information about customer orders, purchase orders, and manufacturing orders for use in the planning displays.
- Allows you to enter and change firm planned orders.
- Uses the following master scheduling zones: frozen, firm, and free.
- Allows rough-cut capacity testing of master production schedules with online review of resources.
- Provides review of item production plans, master production schedules, and resource profiles by item number, planner, or production family.
- Provides master production schedules to Material Requirements Planning for component planning and the release of orders.
- Provides "Available to Promise" displays for up-to-the-minute online information about the planned availability of items.

Major displays and reports

The **Display/Maintain Production Families** display lets you assign master scheduled end items to production families. Production families are groups of end items that have similar production resource requirements. You can use production families to create high-level production targets or test family-level plans for required resources. You can also review master production schedules by family.

The **Display/Maintain Family Operating Plans** display lets you review and change a family's production targets. A production target shows the level of production that a company wants to reach for a planning period. The production targets you set on this display become the production plan for a family.

The **Display/Maintain Item Trial Plans** display helps you set and adjust production levels for the items in each family. If family targets or customer demand changes, the display suggests appropriate changes for the item's production levels.

Family Plan Inquiry displays help you evaluate your family production plans. You can compare current information about demand, production quantities, and inventory levels with the information in your family plans to see whether your projections and production decisions are still valid. You see the information for each period for up to three years, and you can see the quantities expressed in either units or costs.

On the **Resource Requirements Analysis** display, you can check the quantities and dollar values of critical resources that you will need for each planning period of your family production plans or master production schedules. This display helps you do resource planning at the family or item levels.

The **Display/Maintain Master Schedule** display lets you look at and change the master production schedule for any master scheduled item. The display also shows sources of demand and projected inventory by period for the item. A related display shows you details about forecasts and customer orders for the item.

The **Available to Promise** display calculates and shows you current information about the quantities of an item that will be available for sales or other commitments in each planning period.

Material Requirements Planning (MRP)

The Material Requirements Planning application converts master production schedules and item requirements into a material plan. This plan shows when and how many subassemblies or component material items are needed. This action is key to improving customer service while minimizing component inventories and production inefficiencies, because the information needed to meet those goals is the "when and how much" to produce.

If the Master Production Schedule Planning (MPSP) application is installed, MRP develops master production schedules for master scheduled items. MPSP can use various sources of demand to generate the schedules, including production family targets or item-level forecasts, customer orders, and blended demand. If MPSP is not installed, MRP develops master production schedules based on planner-entered or propagated requirements for Master Level Items (MLI). The planner ensures that these schedules match anticipated and actual customer sales (forecasts and customer orders).

The bills of material are used to calculate the total requirements (date and quantity) for each subassembly and component item. The total requirements for an item are then matched (netted) against the available quantity on hand and the scheduled receipts (open purchase/production orders) to determine if any planned orders should be added, rescheduled, or canceled, and if any order release action should be taken. The application allows you to revise your material plan and communicate the plan to inventory management, purchasing, and production.

Features

- Online review and update of planning information.
- If MPSP is installed, lets you use MPSP's expanded master scheduling techniques to plan orders for master scheduled items.
- If Forecasting is installed, lets you convert forecasts into requirements to meet sales demand, greatly reducing the amount of manual requirements and forecasts that you must enter.
- Generates requirements for standard product feature/options from ratios in the bill of material.
- Compares forecasts and the backlog of customer orders against the requirements in the master production schedule.
- Uses six-digit calendar dates for all input and output.
- Plans detailed requirements by day for up to five years.
- Incorporates current and planned changes to bills of material into the material plan.
- Uses two modes for planning:
  - Generation—all items are planned
  - Net change—replan only those items that have had changes affecting their plan.
- Prints replanning and order recommendation reports during the planning run or later. You can choose to print by detail or by summary the requirements plan for only those items with exceptions (order recommendations), only those items that have been replanned, or all items.
- Allows you to override the application's normal order planning if you designate the dates or quantities (or both) for planned orders, making them firm planned orders.
- Traces material requirements to the orders which required them (pegging).
- Projects resource requirements and cash flow analysis for 12 monthly periods.
- If Purchasing is installed, lets you release purchase requisitions and orders based on MRP's planned and firm planned orders.
- Tests component availability before a manufacturing order is authorized for release (simulated staging).
- If MPSP and OE & I are installed, lets you release manufacturing orders matched to customer orders for items using features and options.
- Provides a number of order quantity formulas from which to choose for your order planning.
- Allows you to time-phase allocations.
- Allows you to use a standard lead time or a quantity based lead time.
- Allows you to select data by planner or items (all, active, or exception items) and offers the option to bypass reviewed and exception items.

Major displays and reports

The **Master Level Item Requirements vs Forecast Customer Orders** is a display that lets you see how the requirements for master level items that you entered in your master production schedule match with sales demand. You can update the requirements for master level items using this display.

The **Material Requirements Plan display or report** helps the material planner examine the planned orders and exception messages produced by the application. The "pegging" trace is shown on the "peg to" display format and in the detailed report.

The **Order Recommendation Display** shows the planner which orders should be released, rescheduled, or canceled. The planner can then take the appropriate action.

The **Purchase Planning Report** projects material needs into the future for all items purchased from a vendor and shows totals by vendor in terms of stocking unit of measure (for example, square foot) as well as purchase conversion units (for example, tons). It provides information that helps in making decisions about price breaks, carload lots, or reorders for related items.

The **Manufacturing Cash Flow Analysis Report** projects sales income and expenditures for material, labor, and overhead, as well as net movement for a 12-month period. This report uses manually entered requirements in its calculations. If MPSP is installed, you no longer enter requirements. As a result, this report becomes inaccurate and is no longer useful.

Production Control and Costing (PC&C)

The Production Control and Costing application can help you plan and control your production. Rising labor costs, limited availability of material, the high cost of capital equipment, and the increasingly complex products in today's business environment demand better planning and control of production.

When manufacturing orders are released, the shop packet can be printed with component material lists or routings or both. Detail records for open orders and the manufacturing operations, component materials, and miscellaneous costs for each open order are stored in the computer. When shop activity is reported, it is edited against and posted to these records. These records, therefore, become the basis for determining the status and actual cost of an order as it is manufactured. The status will show you if a job is falling behind schedule. Actual versus standard cost variance reporting indicates potential areas requiring management attention. The application can measure the value of work in process and list by priority the daily work for each work center. You can analyze work queues to determine if a work center is running out of work or is overloaded.

Features

- Provides work station data entry with immediate editing for errors
- Monitors and tracks detailed costs of production scrap
- Provides splitting of routing for split orders
- Allows additions, deletions, and modifications to operations and miscellaneous costs
- Calculates average times for each operation to build standard routings or to compare to standard routings
- Reports the status of orders showing overdue conditions and variances from plan
- Calculates current work load at each work center
- Monitors work queues at each work center and compares current to planned queue size
- Analyzes work center efficiency
- Handles outside operation costs as purchase costs
- Allows either forward scheduling or backward scheduling of manufacturing orders
- Operation Yield allows the system to plan for yield loss at the operation level.

Major displays and reports

The **Shop Packet** contains the component material list, the manufacturing routing, and miscellaneous costs.

The **displays for transaction entry, edit, and update** guide the operator through data entry. The operator can choose to print an audit trail of all updated files.

The **Order Status Report** helps identify situations which may need management attention and helps answer questions such as where is the order, when will it arrive at each work center, and when will it be completed.

The **Work Center Status display or report** shows the open orders at the work center and those coming into the work center.

The **Critical Orders List** identifies orders which may need special attention; for example, expediting to meet due dates.

The **Work List (dispatch list)** shows orders, in sequence by priority, for each work center.

The **Current Value of Work In Process Report** shows the total value to date and the movement of Work In Process for the current period. It itemizes costs (setup, labor, overhead, material, miscellaneous, and scrap) and receipts (relief of work in process).

The **Work Center Analysis Report** summarizes information on utilization, efficiency, queue size, and output for each work center.

Capacity Requirements Planning (CRP)

Capacity Requirements Planning is an application designed to analyze a company's manufacturing plan in terms of its plant capacity. This is a useful tool for a company that wants to identify those work centers and time periods when overload or underload conditions may develop. This application allows the production manager to meet the short-term overload or underload condition by entering a temporary increase or decrease in work center capacity for a specified time period in the future.

Analysis of the results of the Capacity Requirements Planning run can help a company distinguish between scheduling problems and capacity problems that may require changes to the base capacity of a work center or a change to the manufacturing plan.

The manufacturing plan used by the application is based on capacity requirements from several sources: open orders, planned orders, firm planned orders, and under some conditions, customer orders. Start dates and operation durations are needed for each manufacturing operation, whether these operations come from Production Control and Costing order routings or from the item routings in Product Data Management.

When the manufacturing plan and plant capacity have both been defined, Capacity Requirements Planning is ready to schedule and accumulate the work load by time period. This process will produce analysis files for work station inquiry or reports to help the user tune his plant capacity to the current manufacturing plan.

A summary bar chart, which distinguishes committed load (open orders) from tentative schedules (planned orders), is provided for each work center.

Features

- Work load can be generated from any order: open, planned, firm planned, or customer.
- Work-in-process for loading actual time remaining for started operations is considered.
- Online review and update of planning parameters.
- Online review and update of up to 36 variable length load periods.
- Loads for planned and open orders are separated.
- Firm planned orders can be accumulated as either planned or open order load.
- Work center capacity can be varied for a given day or range of days.
- Backward scheduling of open manufacturing orders
- Option to adjust queues for orders ahead or behind schedule
- Online inquiry of load detail information.

Major displays and reports

The **Work Center Load Analysis Report** shows each work center's accumulated work load by period. The available capacity is compared to the projected load hours. This information is displayed both numerically and in a bar chart format.

The **Work Center Load Analysis Detail display or report** shows the planner the operations that have contributed to the work center overload or underload.

The **Work Load Exception Report** can optionally show the planner the load detail of the past due orders. This can help in rescheduling.

The **Work Center Variable Capacity display or report** helps the manufacturing planner control the temporary capacity changes in his facility.

Data Collection System Support (DCSS)

Because you want to ship your products on time, as well as keep costs down, you must control labor and material cost reporting. This can prove difficult for various reasons—for example, large volumes of paperwork slow you down. Or you receive information days ahead of when you need it. Or you do not receive it until weeks after you wanted it. What is the answer? A data collection system, dedicated to doing specialized tasks.

The IBM 5230 Data Collection System, used with IBM System/36 Data Collection System Support, is such a system. Together, they provide a simple and convenient way for an employee to enter data at the place and time of an action. This data is used to update your inventory, payroll, and production control files.

The IBM 5230 Data Collection System is made up of two parts—entry stations and a controller. The entry stations are located as near as possible to the place where the data is collected. The data is entered into the IBM 5230 system in three ways:

- By badge
- By card
- By numeric keys.

Your employees can quickly report inventory information, the current status of jobs, and the current location of material to a central location from a number of points in the warehouse or on the plant floor. The records generated by the IBM 5230 Data Collection System are written to diskette. The diskettes are read into the System/36, where the data is processed by the Data Collection System Support application. The data is edited and split into categories—labor data, shop order data, and inventory data—and elapsed time is calculated. This information is then used as input to applications such as inventory, payroll, and production control and costing.

As an alternative, System/36 Data Collection System Support can be used on a stand-alone basis without the 5230 Data Collection System. In this environment, plant and warehouse personnel manually record their actions, which are later entered at a System/36 work station. The Data Collection System Support application processes these records as if they had come from the IBM 5230 Data Collection System.

The System/36 Data Collection System Support is programmed to use the data on shop packets created by the Production Control and Costing application. It is also programmed to reformat data for input to the Production Control and Costing application.

Features

- Reporting and updating by company for up to 20 companies
- Warehouse and shop transactions that you define for your company
- Disk turnaround records
- Elapsed-time calculations
- Data entry from an IBM 5230 Data Collection System or directly through a work station
- Data reformatted to pass to inventory, payroll, and production control applications.

Major reports

The **Labor Exception Report** shows all labor actions that have errors, so that they may be corrected.

The **Labor Corrections Audit Report** shows all labor actions that have been added, deleted, or updated.

The **Labor Report** shows, by foreman, each employee's labor records with time-and-attendance, break, and job information.

The **Attendance/Absentee Reports** show, on demand by shift, which employees have or have not reported for work.

Purchasing (PUR)

The Purchasing application can greatly increase the productivity of personnel in the purchasing department and the dock-to-stock area of a company. This improved productivity and control result from the following benefits:

- Reduced clerical effort required to print purchase orders, purchase order revisions, debit memos, requests for quotes, and order close acknowledgments.

  With key information, such as vendor number, item number, due date, and quantity, the application retrieves additional information needed to complete the purchase order; for example, vendor name and address, terms and conditions, item descriptions, and standard messages.

- Reduced time between creating the purchase requisition and printing the purchase order.

  Purchasing eliminates paperwork transfers between the purchasing department and the data processing department. The application also controls priority purchase requisitions so that the most important purchase orders receive immediate attention.

- Improved communication with the vendor and dock-to-stock personnel eliminates costly mistakes.

  More complete communication with vendors is achieved by automatically printing standard messages and terms on a purchase order. You can flag special messages to vendors or to your own personnel.

- Improved control of purchasing activities.

  Purchasing controls all purchase order activities from the time the purchase requisition is created until the invoice is paid. Benefits of this improved control include preventing overpayments, highlighting early shipments, and evaluating vendor performance.

- Improved productivity in receiving. Purchasing handles dock-to-stock activities by:

  - Identifying receipts that have incomplete documentation.
  - Preparing a preprinted traveler to help identify each receipt as it moves from the loading dock to a stock location.
  - Allowing dock-to-stock personnel to correct transaction errors as they occur.
  - Listing detailed instructions on the purchase traveler. These instructions reduce or eliminate the problem of locating and maintaining separate documentation.
  - Detecting bottlenecks.

Purchasing also helps your buyers find reliable vendors that have high quality materials at the best possible cost. This is accomplished by:

- Producing quotation requests
- Rating each purchase order on vendor performance, price, delivery, quality, and lead time.

Features

- Requisition entry and control
- Purchase order history reporting
- Purchase order revision printing
- Extensive dock-to-stock transaction editing
- Validation of vendor and freight invoices
- Debit memos
- Purchase order status reporting and inquiry
- Purchased item receiving routing
- Prioritized dock-to-stock work lists
- Quotation control system
- Vendor analysis
- On-demand cash requirements analysis.

Major reports

The **Open Requisition Analysis Report** shows backlogs and helps you determine purchasing overload and buying bottlenecks.

The **Dock-to-Stock Transaction Audit** shows all the transaction activity against a particular purchase order accepted by the system.

The **Purchase Order Status Report** is available on demand and can give you the current status of any purchase order in the system.

The **Prioritized Dock-to-Stock Work List** tracks the progress of purchase order receiving activities in your warehouse.

The **Buyer Worksheet Report** can be printed on demand. To simplify analysis, this report shows all the data on quotations and purchase order history for a specific item.

Inquiries

- Purchase order inquiry for individual or multiple releases
- All open purchase orders for an item
- Open purchase orders for a vendor
- Open quotes for an item
- Open quotes for a vendor
- Purchase order history (order summary or detail)
- Open purchase requisitions
- Vendor master file information.

Forecasting (FCST)

Forecasting uses unique statistical techniques to maintain demand forecasts for both selling warehouses and the total company. These forecasts assist in the production planning, master scheduling, and inventory management activities of a company.

Forecasting maintains total company sales forecasts for individual end items and service parts. Forecasting also maintains selling warehouse (distribution point) forecasts. Selling warehouse forecasts and related inventory parameters are used to plan and control distribution activities.

Forecasting supplements the capabilities of other MAPICS applications by providing a detailed production planning and master scheduling method. The application provides operation and inquiry for all data.

Forecasting receives demand data from the Order Entry and Invoicing application, if it is installed, for use in the periodic recalculation of demand forecasts. The Forecasting data base is automatically maintained to ensure consistency with the item data base and to eliminate the need for duplicate user maintenance.

Forecasting can optionally provide forecasts to the Material Requirements Planning application to create a preliminary master schedule. Forecasting provides substantial aggregate level forecast information in both units and standard cost, which is valuable in the production planning process. Forecasting can optionally calculate safety stock and reorder point and provide them to the Inventory Management application.

Forecasting can optionally calculate a projection up to three years into the future based upon life cycles that are user defined.

Forecasting includes two major areas. The first area periodically recalculates forecasts, safety stock, and reorder point based on customer demand. The second area, annual seasonal analysis, provides seasonality parameters for use in forecasting.

Features

- Variable reporting frequency, 12 or 13 times per year
- Advanced statistical forecasting methodology
- User forecast override
- Monitor forecast model
- Forecast error measurement
- Inventory parameter calculation
- Multiple selling warehouse (distribution point) support
- Group seasonality
- Automatic file maintenance
- Mass parameter maintenance
- Flexible reporting
- System internal controls
- Strategic forecasting
- Life cycles.

Major reports

The **Forecast Detail Report** shows forecast performance data and one-year forecasts in units for individual items.

The **Forecast Summary Report** shows aggregate forecasts in units and standard cost for each product line or value class.

The **Inventory Summary Report** shows a summary of the cost associated with the calculated safety stock and reorder point.

The **Seasonal Profile Report** details group and item seasonal parameters and graphically shows them for visual evaluation of seasonal patterns.

The **Life Cycle Profile Report** details life cycle parameters and graphically shows them for visual evaluation of life cycle patterns.

The **Projection Detail Report** shows projections for individual items over years two and three.

The **Projection Summary Report** shows aggregate projections over years two and three in units and standard cost for each product line, value class, or life cycle code.

Inquiries

- Forecast master
- Seasonal parameters
- Life cycle parameters
- Forecast control data.

Location/Lot Management (L/LM)

The Location/Lot Management application provides for the stocking and control of items in multiple warehouses and multiple locations within a warehouse. The identification and tracking of batch/lots, the control of shelf life for materials and products, quality control tracking and recording, and history reporting are all features of L/LM that aid in warehouse inventory regulation. For instance, the L/LM application allows for the stocking of items in multiple locations within a warehouse. In this way, inventory can be more easily controlled, simplifying dock-to-stock transactions.

An important feature of L/LM is the ability to monitor quality control status items, regardless of their location in the warehouse. A bulk quality control area can also be maintained if required. The flexibility of warehouse design allows for efficient use of storage capability.

The management features offered by the L/LM application are significant in the maintenance of inventory for manufacturers and suppliers of all types of materials and products requiring multiple location stock control. Reports of empty locations can be obtained to aid in better management of storage space. The allocation function of L/LM allows the designation of items from a specific location within a warehouse or from a particular batch of material to be allotted for manufacturing, customer order processing, or similar purposes. Once Inventory Management has been installed, L/LM can interface to Inventory Management and Order Entry and Invoicing for updating with stock transactions, cycle counting by location, and picking lists by location and/or lot.

The Location/Lot Management application provides the following major functional capabilities:

- The ability to stock and control items in multiple locations within a warehouse
- Lot or batch identification and tracking to purchase and manufacturing orders, sales invoices, and from dock to stock
- Control of shelf life and first in/first out (FIFO) usage of material
- Quality control tracking and recording for manufactured and purchased items, and quality status of items subject to shelf life
- Tracking and audit of goods received notes against shipments and vendor invoices
- History of inventory transactions, with user selected reporting
- Ability to record transactions for non-inventory and service items
- Ability to maintain multiple items in a given stock location
- Ability to allocate a specific inventory stock item from a warehouse location or material lot
- Ability to trace a batch of raw material from receipt to finished goods to customer order, and vice versa.

These capabilities are of significant value to manufacturers of food, pharmaceuticals, and chemicals, as well as medical, nuclear, aerospace, and defense equipment. For these industries, government regulations (such as FDA) usually require product recallability through lot tracking.

Features

Major features of L/LM include the following:

- Flexibility to adapt the physical layout of individual warehouses to the location numbering system.
- Recording and control of stock by multiple locations within a warehouse.
- Batch/lot identification and tracking where necessary.
- History files to provide details by order, item, or specific lot number.
- Accommodation of up to 99 bulk storage areas.
- Reports of empty locations or bulk store areas, to help in better management of storage space.
- Quality control (QC) status monitoring, regardless of the location of a shipment. A specific QC area is available if required.
- Information on unapproved stock which is not available to stockroom personnel, preventing unauthorized use.
- Online audit trail of inventory transactions.
- Stock transfer transactions available for both interwarehouse and interlocation movements.
- Transaction history maintained online for selective analysis of inventory transactions.
- The goods received note (GRN) system provides a full audit trail of receipts entered against purchase orders and invoices.
- The interface to Inventory Management provides for:
  - updating with stock transactions
  - cycle counting by location
  - picking lists by location
  - allocation by location and/or lot.

Major reports

Physical/Cycle Count Report

The physical/cycle counting feature provides a physical inventory of stock items on a cyclic basis. The frequency of this report (such as weekly, monthly, or quarterly) is determined by your individual needs.

The physical/cycle counting application allows you to simplify the task of reconciling your inventory records with the quantities in the warehouse. With this report, you can quickly check for discrepancies between the report quantity and the actual warehouse count. It can also help in analyzing or determining the reason(s) for the discrepancies, so steps can be taken to avoid a recurrence.

Stock Status Report

The Stock Status Report lists detail or summary information of items normally held in stock at the warehouse(s) specified. All items are included in the report, and items not in stock are highlighted with the message **NONE IN STOCK**. The report prints information such as total stock, available stock, and the stock percentage total available. Quality control information, including the number waiting QC, the number with cyclic QC overdue, and the number that are QC rejected, will also print.

The report aids in determining the available stock for a warehouse and the status of that stock in regard to quality control. It is usually printed at month end when the month-to-date totals are reset, and may be distributed to warehouse staff for bay checks.

Transaction Analysis/Batch-Lot Review Report

Two types of reports are produced with this option, an Analysis report and a Review report. The Analysis report values each transaction using the old unit cost and the new unit costs. Because an item may have several different costs during the period, all transactions are valued as they take place, using the current cost default. The report lists each inventory transaction separately by item and prints both the old and new unit cost figures. In addition, the new total inventory value (closing value) is calculated by adjusting a supplied open balance with a net value of transactions. Two values are given based on the old and new costs, and a summary is provided. The Review report details all transactions or batch/lots within a specified date range. If an item is subject to recall, this report can be used to show every order where that item was used, or where a particular batch of material was used.

Inventory Valuation Report

The Inventory Valuation Report lists the value of your inventory either by standard or current cost, including on-hand items and those waiting quality control. The report is selected by a single location or item type (such as assembled, purchased, or fabricated), but may be printed for all locations and item types.

Items Waiting Inspection Report

This feature of L/LM provides three reports that allow greater control over inventory items requiring quality control inspection. Each report targets a specific manufacturing concern and identifies it by location.

The first report provides an account of all manufactured items that are waiting QC inspection at a given warehouse. The second furnishes similar information for purchased items. The third report lists all cyclic items that are due or overdue for reinspection during their shelf life.

Goods Received Notes Report

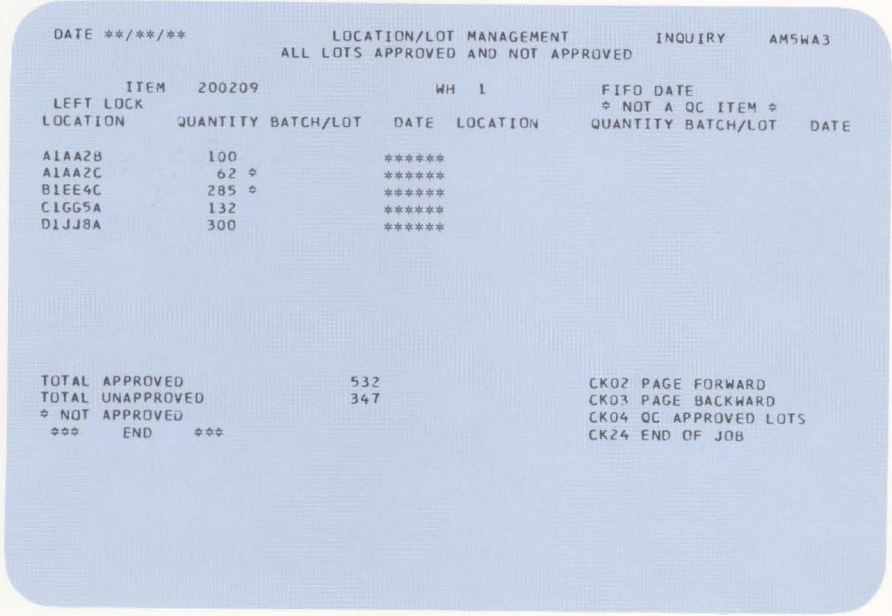
Goods received notes (GRN) are similar to receipt tickets. These internal plant documents are used to audit the receipt of materials, track rejects, and provide an eventual matching to supplier invoices. L/LM offers two types of GRN reports to provide you with complete control over inventory movement. The first report traces GRNs for items that have completed quality control inspection, all outstanding GRNs by vendor, and all outstanding GRNs in the system. The second report lists those GRNs that have been matched to an invoice since the last time the report was selected or GRNs tagged with invoices for a given period.

Inquiries

L/LM allows you to inquire into the location status of items as stored in the master files. Five inquiry options are available.

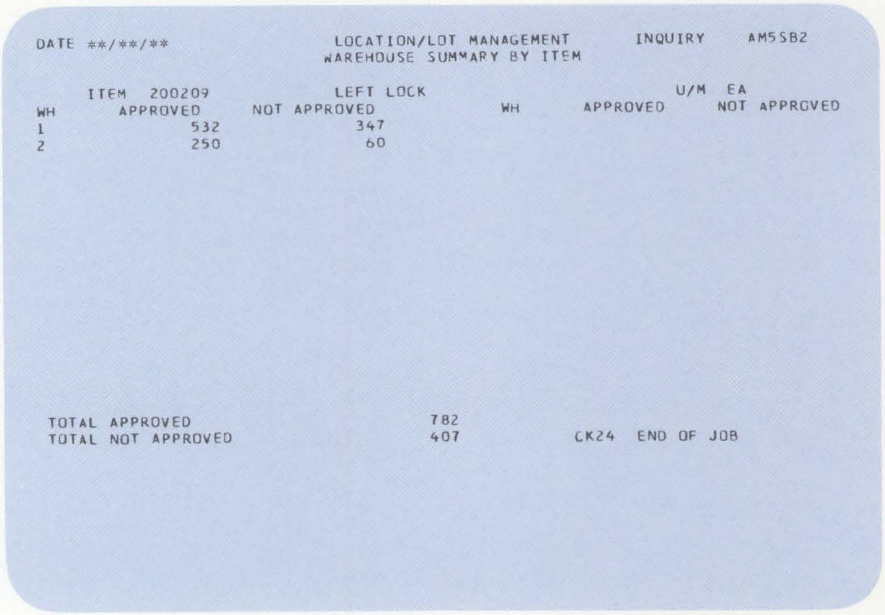
Location Detail

This inquiry shows location information by item/warehouse. It includes the item quantity, batch/lot number, and FIFO date. The inquiry can be used to see all lots or only QC approved lots.



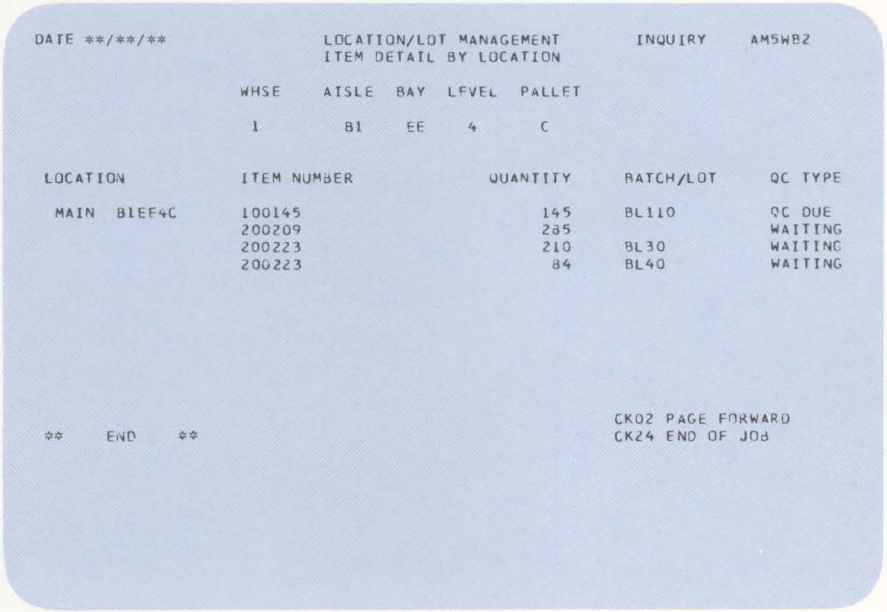
Warehouse Summary

This inquiry will display quality control summary information for a given item in all warehouses. Information such as the quantity of the item that has been approved through quality control, the total quantity of the item that requires inspection but has not yet been approved, and the sum of all items that are either approved or not approved is displayed.



Item Detail

This inquiry shows item detail information by stock location. The main location is displayed, followed by any subdivisions for that location. The item number(s), location status (full/empty), quantity, batch/lot number(s), and QC type are all listed.



Transaction History

This inquiry shows history information from the Location History file by item number or order number. It includes transaction type(s) from a list of 23, FIFO date, stock location(s), quantity, and batch/lot number(s). You may also choose to access history that has been previously added and restored on diskette and to delete the work file after your inquiry.

Allocations

This inquiry allows you to inquire into the Allocation file to determine the allocations of an item, batch/lot, or an order. If you are inquiring by item or batch/lot, you will see what has been allocated to customer and/or manufacturing orders and the quantity not allocated. If you are inquiring by order, you will see all items on an order which have had material allocated from a specific location or batch/lot.

Inventory Management	IM
Product Data Management	PDM
Master Production Schedule Planning	MPS
Material Requirements Planning	MRP
Production Control and Costing	PCC
Capacity Requirements Planning	CRP
Data Collection System Support	DCSS
Purchasing	PUR
Forecasting	FCST
Location/Lot Management	L/LM

Section 2. Detailed information

Inventory Management

Information flow

Figure 2-1 shows how information flows through the Inventory Management application. The numbers in the following discussion refer to that figure.

In the Inventory Management transaction and order release processing cycles, shipments, receipts, adjustments, and orders are entered into the system 1, and the inventory transaction register, released order audit lists, and shortage reports are printed 2.

At month end, month-to-date totals are reset, and the stock status report can be printed 3. At year-end, year-to-date totals are reset.

On request, the item price list, stock status review, inventory analysis reports, physical inventory reports, LIFO/FIFO reports, reorder reports, order status reports, and the ABC analysis can be printed 4.

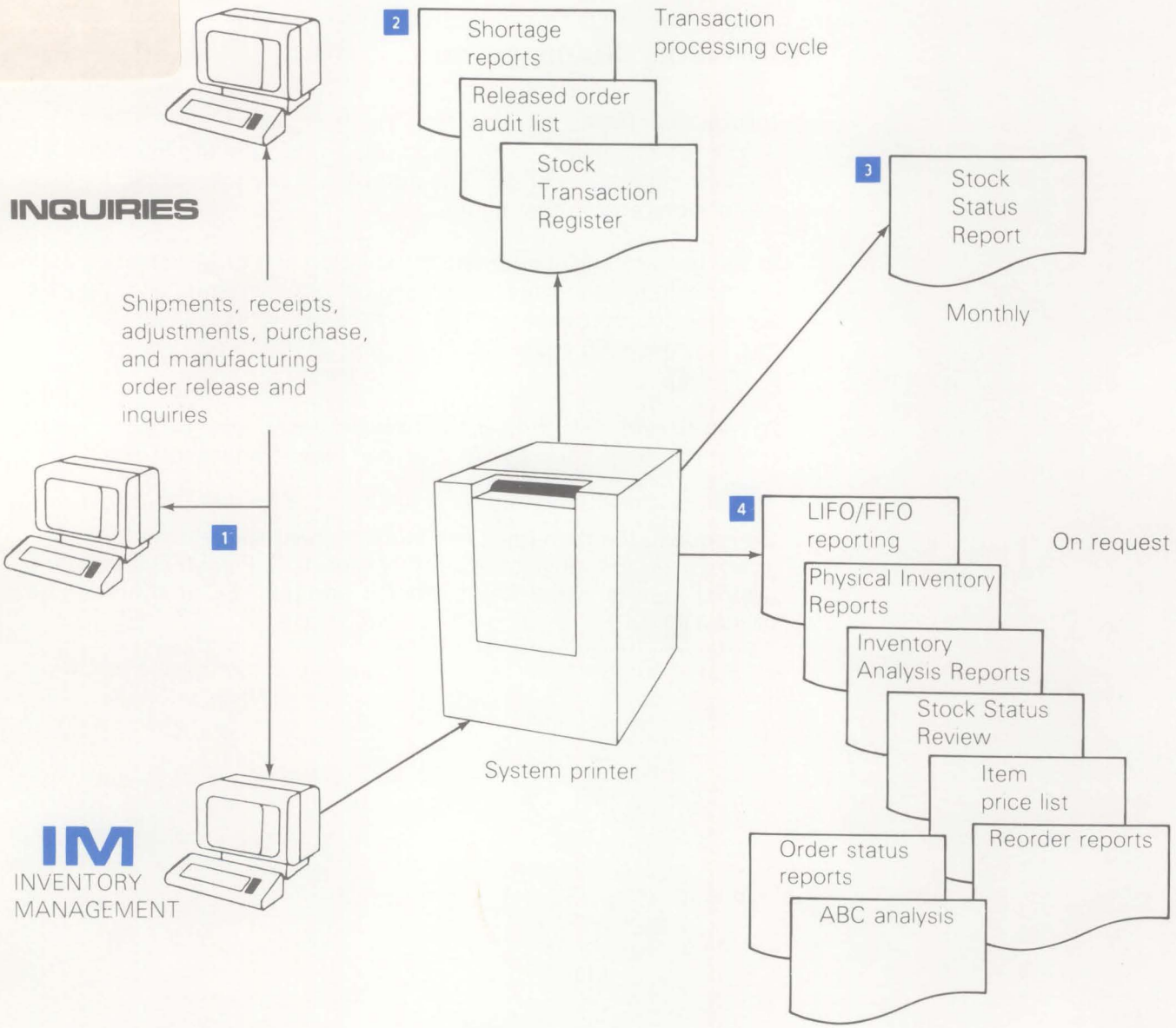


Figure 2-1. Inventory Management information flow

Application functions

Transaction processing

The Inventory Management application supports the processing of many types of inventory transactions. The transaction types and their uses are as follows:

- Cost adjustment. Recalculates the average unit cost and replaces the last unit cost.
- Average cost replace. Changes the previous average unit cost.
- Standard cost replace. Changes the standard unit cost.
- Inventory adjustment. Adjusts the quantity on hand.
- Planned issue. Processes individual component issues to manufacturing orders.
- Miscellaneous issue. Processes item issues not related to orders.
- Unplanned component issue. Simultaneously adds a component item to a manufacturing order and records the issue.
- Interwarehouse transfer. Processes the movement of items from one warehouse to another.
- Pick complete by item. Processes the issue of an item to multiple manufacturing orders.
- Pick complete by order. Processes component issue in full or in sets to a manufacturing order and records exceptions.
- Miscellaneous receipt. Processes receipts for items that do not have an open order.
- Purchase receipt to dock. Processes purchased items received at the dock.
- Purchase receipt to inspection. Processes purchased items received at inspection.
- Purchase receipt to stock. Processes purchased items received to stock.
- Production receipt. Processes end items received from production.
- Component return to stock. Processes component returns from production to stock.
- Sales shipment. Processes sales shipments if OE & I is not installed and interfacing.
- Manufacturing component scrap. Processes component items that have been scrapped on a manufacturing order.
- Manufacturing order scrap. Processes parent items that have been scrapped.
- Purchase order scrap. Processes items that have been scrapped on a purchase.
- Scrap from stock. Processes items that have been scrapped from stock.

These transactions are entered and edited individually, and when error free, the data immediately updates the inventory master files, or the update can be performed later in batch mode. A register is printed to show the transactions entered.

If an operator enters a transaction and an error is displayed which cannot be resolved immediately, the operator can allow this transaction to be entered into the system for error reporting on the transaction register. These transactions can be reentered after the errors are resolved.

Notes:

1. If the Purchasing application is installed, all purchase order related transactions will be entered, edited, and the appropriate files updated.
2. If the Location/Lot Management application is installed, location and/or batch/lot data will be required information on transactions where appropriate.

Blanket order support for purchase orders

The purchase order tracking function, associated with order release, can track blanket purchase orders. One control record is entered showing total quantity ordered, then individual release records are entered which show scheduled quantities and dates.

Item costing

The Inventory Management application supports a variety of costing methods for inventory reporting. One method is standard unit costs, which are user-entered and maintained. These standards can be associated with the item master record (establishing a single standard cost for that item for all warehouses), or if you prefer, an override standard cost can be associated with each item/warehouse combination.

The average cost field is automatically recalculated when a costed receipt transaction is processed.

The system also retains the last cost incurred on an item. This provides the replacement cost based on the latest activity for that item. The cost is automatically updated by each costed receipt transaction processed.

If the cost is not known or not entered at the time an inventory receipt transaction is processed, transactions are available to allow adjustments to the average and last costs. The Accounts Payable application can create these transactions from vendor invoice data.

Although all three cost fields are available for each item, you are asked to specify which costing technique (standard, average, or last) is to be used for your inventory. The selected technique is used for costing of issue, sale, and other transactions, and for reports showing costs.

Note: If the Order Entry and Invoicing application is installed, it also uses the selected primary method for costing of invoice sales items. Regardless of the selected method, the other techniques are maintained as secondary or comparative costs.

Inventory valuation

You can elect during system tailoring to support LIFO, FIFO, or both methods to value your inventory. If you select these options, the application saves all receipt and cost adjustment transactions. You can purge transactions based on your individual requirements (for example, if on annualized LIFO, purge once a year).

The transaction files are sequenced by item number, warehouse, and either ascending (LIFO) or descending (FIFO) date sequence. Transaction quantities are matched against the on-hand balance of the item record. The value is determined by adding the transaction amounts for all receipt transactions whose quantities are part of the current quantity on-hand balance. You may list transaction quantities which are to be purged from the file.

You should consult with your auditor on the use of this LIFO/FIFO method to determine whether it satisfies the requirements of all applicable taxing authorities.

Multiple warehouse support

The Inventory Management application tracks inventory stock in up to 35 warehouses. Descriptive item data, such as item descriptions, prices, and tax codes, is in the item master record, and there is one item balance record for each unique item number/warehouse number combination. The number of warehouses may vary by item.

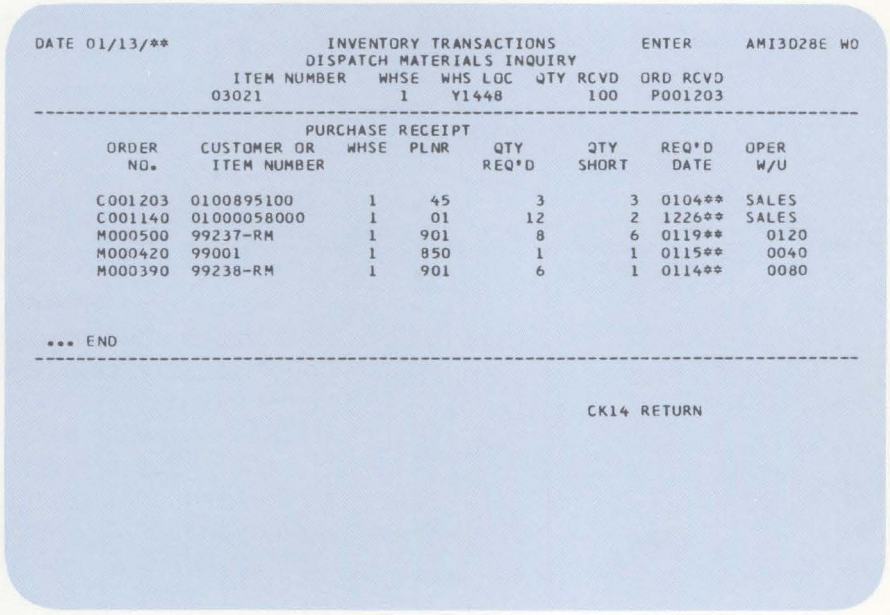
In addition, you can specify one warehouse as the "central" warehouse for use with Material Requirements Planning and Master Production Schedule Planning. The central warehouse contains the balances used by the Material Requirements Planning and the Master Production Schedule Planning applications.

Note: MRP and MPSP use the inventory balances from the "central" warehouse, ignoring balances in other warehouses.

Shortage checking

If desired, shortage checking can be performed at the time inventory receipt transactions are entered. Open customer orders and manufacturing orders using the received item are displayed.

The operation where the item is first used is shown to help in dispatching the item where it is needed.



```
DATE 01/13/**                INVENTORY TRANSACTIONS          ENTER      AMI3028E WO
                          DISPATCH MATERIALS INQUIRY
                ITEM NUMBER    WHSE  WHS LOC  QTY RCVD  ORD RCVD
                03021             1   Y1448       100   P001203
-------------------------------------------------------------------------------
                          PURCHASE RECEIPT
      ORDER    CUSTOMER OR   WHSE  PLNR    QTY      QTY    REQ'D   OPER
        NO.     ITEM NUMBER                REQ'D    SHORT   DATE    W/U

      C001203  0100895100       1    45        3        3  0104**  SALES
      C001140  01000058000      1    01       12        2  1226**  SALES
      M000500  99237-RM         1   901        8        6  0119**    0120
      M000420  99001            1   850        1        1  0115**    0040
      M000390  99238-RM         1   901        6        1  0114**    0080


 ... END
-------------------------------------------------------------------------------

                                                    CK14 RETURN
```

Physical inventory

Physical inventory is usually taken periodically. On request, the Inventory Management application prints a physical inventory list that serves as a turnaround document for warehouse personnel to record the actual counts. The list includes item number, warehouse, warehouse location, item description, unit of measure and, if desired, the current on-hand balance.

Several methods are available for selecting the items to be counted:

- All items or a range of item numbers
- By item class
- By warehouse
- By processing logic which occurs in one of four ways:
  - By a code in the item balance record that implies cycle count based on time (1 = monthly, 2 = quarterly, 3 = semiannually)
  - By detecting when a transaction causes a negative on-hand condition. The item is flagged for cycle counting.
  - By comparing the count of inventory transactions for an item to a manually entered number (for example, count after every 100 transactions)
  - By a scheduled "Date of Next Count" field in the item balance record. When a purchase or manufacturing order is placed for an item, the order due date is placed in this field. Physical counts can thus be taken prior to order receipt; therefore, counts should take place when the quantity on hand is at a low level. The date field can also be manually entered and maintained.

From the turnaround documents, the operator can enter the actual count data into the system. A report is printed showing the variance between the counted quantity and the quantity stored in the computer file. After verifying the counts, the operator can modify the entries at a work station. A register is printed providing an audit trail of all adjustments to the on-hand balance.

Purchase and manufacturing order release

This function records both purchase orders and manufacturing orders. The purchase orders released are available for tracking to help you stay aware of your current outstanding orders. Control of these orders aids you in preventing overdue situations which can cause component shortages on manufacturing orders. If the Purchasing application is installed, purchase order release information is passed to Inventory Management.

Note: Purchase order forms are printed by the Purchasing application.

During the release of manufacturing orders, order shortage and item shortage reports can be printed showing the items for which insufficient material is available to fill the order. An "order set" of system data records is created to be used to edit order transactions and track order status. If Location/Lot Management is installed, allocation to location or batch/lot can be done anytime before pick lists are printed. Shop packets (including picking lists) can be printed for released orders.

During entry of manufacturing orders, component availability can be checked as the order is entered. The order quantity can be changed and component availability redisplayed.

Note: If Location/Lot Management is installed, once an order has been released, the Location/Lot Management allocation system can be used to allocate material at a particular location, specific material lots, or a combination to a manufacturing order.

Offline diskette support

The Inventory Management application is designed to operate in an interactive mode for transaction processing. However, during peak load requirements or to provide for maintenance of off-site inventories, transactions can be recorded offline on a diskette.

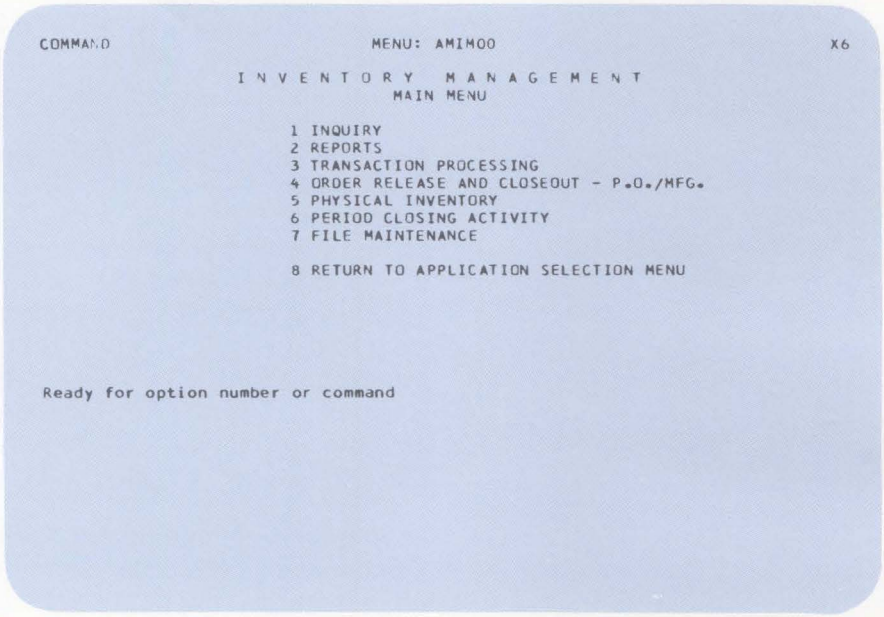
Transactions entered from diskette are processed in a batch environment. The diskette data is transferred to the IBM System/36 and a batch edit is performed. Error correction can be handled either offline or through a work station. The batch of transactions can then be released for updating the master files.

The diskette entry function provides the same transaction capability as the interactive transaction processing with two exceptions: no provision is made for entering the pick complete by item transactions or those transactions associated with the Purchase and Manufacturing Order Release function, and master file maintenance must be carried out at a work station terminal.

Operations

All operations for the Inventory Management application start with the Main Menu. This menu approach provides considerable flexibility in selecting the job to be performed.

Because of the number of functions performed by Inventory Management, second-level menus are used. For example, the operator selects reports from the Main Menu, and a second-level menu appears so the operator can select the desired report.



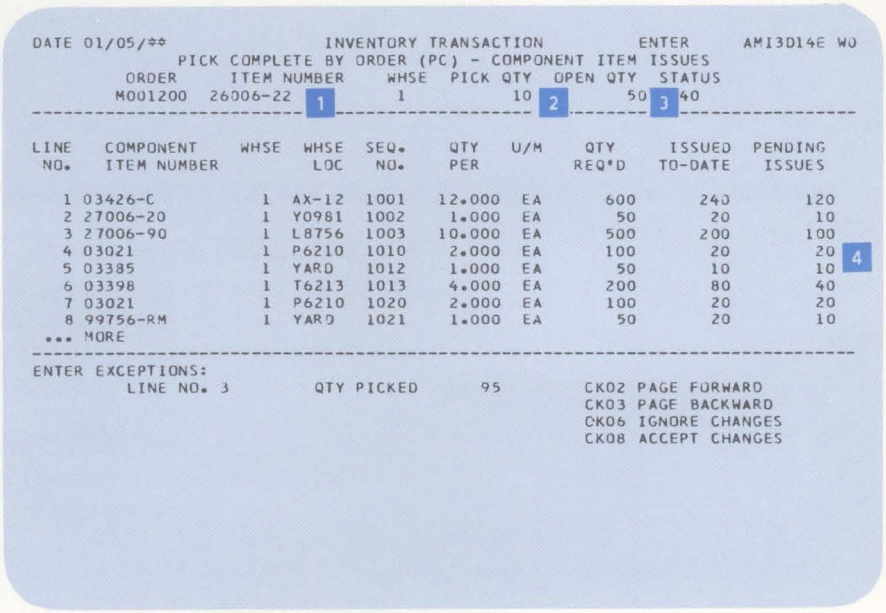
The optional security code feature interacts with the menu and subsequent operations to ensure only those individuals designated to have access to specific data and operations are permitted to continue processing.

Entering transactions and updating the inventory files

The Inventory Management application processes many types of transactions. Transactions entered are edited against the master files, and if no errors are found, the master files can be updated immediately to reflect the latest transactions. If an operator enters a transaction which is determined to be invalid (for example, the item number is not on the file), the error is displayed immediately. If the operator cannot correct the error, the system can save the erroneous transaction for later printing on an error log, thus ensuring that all transactions are recorded and processed. This method of entry allows the operator to efficiently enter large volumes of transactions, while master files reflect the most current activity.

For most transactions, up to four of the same type can be entered on a single display to provide operator efficiency.

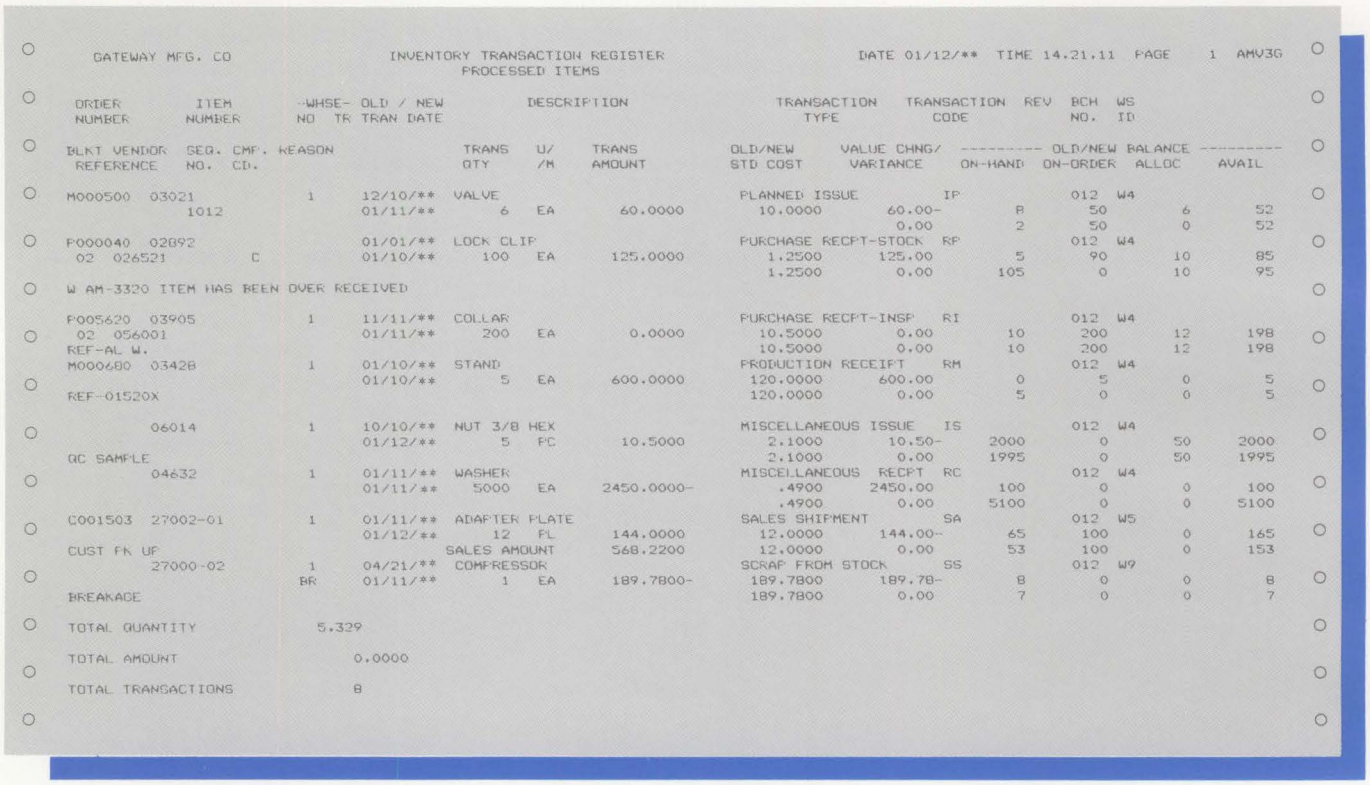
Ease of use has also been designed into complex transactions. For example, entry by exception is incorporated into several transaction types. The following display shows how component planned issue transactions can be entered. The display allows the operator to view the required components for the manufacturing order and enter exception quantities when the actual picked quantity differs from the expected pick quantity (pending issues).



1. End item being manufactured.
2. Pick extension quantity. Used if the components are picked in sets; that is, the pick is made for one day's production, not for the entire order quantity.
3. Quantity of end item yet to be completed on the order.
4. Calculated issue quantity (pick quantity x quantity per). Can be changed by the operator.

Printing the inventory transaction register

The Inventory Transaction Register is an audit trail of those transactions posted to the master files. It can be run at any time and prints the transactions from all data entry batches not previously printed. Exception conditions, such as over receipt of an item, are flagged.



```
GATEWAY MFG. CO                INVENTORY TRANSACTION REGISTER                DATE 01/12/**  TIME 14.21.11  PAGE    1  AMV3G
                                    PROCESSED ITEMS

 ORDER        ITEM        -WHSE- OLD / NEW          DESCRIPTION          TRANSACTION   TRANSACTION  REV  BCH  WS
 NUMBER       NUMBER      NO  TR TRAN DATE                                   TYPE          CODE           NO.  ID

 BLKT VENDOR  SEQ. CMF. REASON                TRANS   U/    TRANS      OLD/NEW     VALUE CHNG/  ---------- OLD/NEW BALANCE ----------
  REFERENCE   NO.  CD.                        QTY     /M    AMOUNT     STD COST     VARIANCE    ON-HAND  ON-ORDER  ALLOC    AVAIL

 M000500  03021          1     12/10/**  VALVE                          PLANNED ISSUE          IP              012  W4
             1012              01/11/**      6   EA        60.0000       10.0000      60.00-     8       50        6       52
                                                                                      0.00      2       50        0       52
 P000040  02092                01/01/**  LOCK CLIP                      PURCHASE RECPT-STOCK   RP              012  W4
  02  026521          C        01/10/**    100   EA       125.0000        1.2500     125.00      5       90       10       85
                                                                          1.2500       0.00    105        0       10       95
 W AM-3320 ITEM HAS BEEN OVER RECEIVED

 P005620  03905          1     11/11/**  COLLAR                         PURCHASE RECPT-INSP    RI              012  W4
  02  056001              01/11/**    200   EA         0.0000          10.5000       0.00     10      200       12      198
 REF-AL W.                                                                10.5000       0.00     10      200       12      198
 M000680  03428          1     01/10/**  STAND                          PRODUCTION RECEIPT     RM              012  W4
                             01/10/**      5   EA       600.0000       120.0000     600.00      0        5        0        5
 REF-01520X                                                              120.0000       0.00      5        0        0        5

          06014          1     10/10/**  NUT 3/8 HEX                    MISCELLANEOUS ISSUE    IS              012  W4
                             01/12/**      5   PC        10.5000         2.1000      10.50-   2000        0       50     2000
 QC SAMPLE                                                                2.1000       0.00   1995        0       50     1995
          04632          1     01/11/**  WASHER                         MISCELLANEOUS  RECPT   RC              012  W4
                             01/11/**   5000   EA     2450.0000-          .4900    2450.00     100        0        0      100
                                                                          .4900       0.00    5100        0        0     5100
 C001503  27002-01        1     01/11/**  ADAPTER PLATE                  SALES SHIPMENT         SA              012  W5
                             01/12/**     12   FL       144.0000        12.0000     144.00-     65      100        0      165
 CUST FR UP                          SALES AMOUNT       568.2200        12.0000       0.00      53      100        0      153
          27000-02          1     04/21/**  COMPRESSOR                     SCRAP FROM STOCK       SS              012  W9
                            BR     01/11/**      1   EA       189.7800-   189.7800     189.78-     8        0        0        8
 BREAKAGE                                                                189.7800       0.00      7        0        0        7

 TOTAL QUANTITY              5.329

 TOTAL AMOUNT                    0.0000

 TOTAL TRANSACTIONS              8
```

Purchasing and manufacturing order entry/release

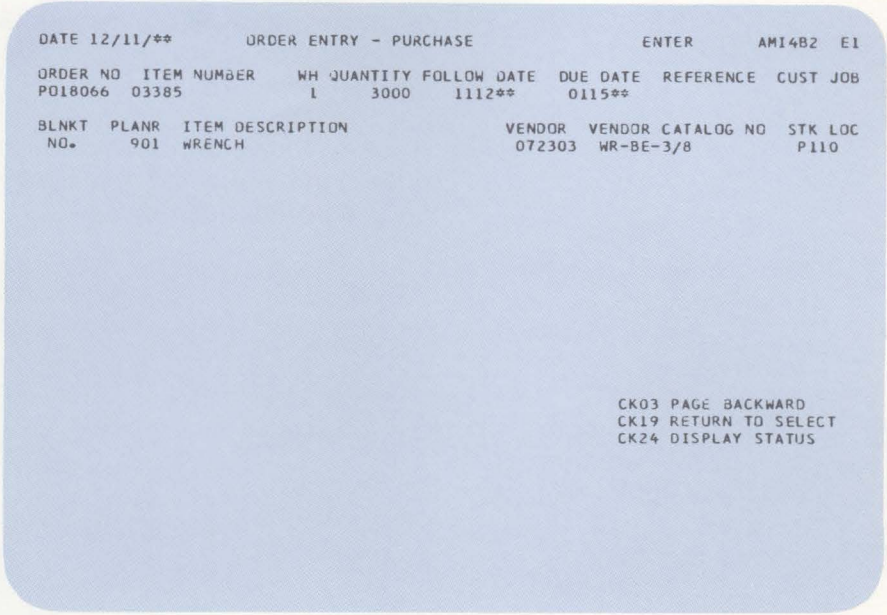
This function allows user departments to enter order information into the Inventory Management application for manufacturing and purchase orders. On-order quantities are reflected in the calculation of available inventory. Although the actual purchase order forms are not printed by Inventory Management, an audit trail showing release date, due date, vendor, item number, and quantity is produced. Blanket purchase orders (standing orders with multiple release dates) are handled, as well as single purchase orders.

For manufacturing orders, the procedure varies somewhat. The audit trail still shows the item number, due date, and quantity. Also, component shortages are identified and printed. A material picking list is produced showing the necessary components.

Purchase order release

Purchase order tracking is accomplished by using the display shown here for entering the order information.

Note: Inventory Management tracks purchase orders. The Purchasing application performs additional purchasing-related functions, including the actual creation and printing of the purchase order.



Blanket purchase orders can be entered, with all or a portion of the detail about releases against the order. The additional release information can be entered later, as release dates and quantities become firm. The system creates records in the open order files, so it can edit future transactions and track the status of each phased release.

If the Material Requirements Planning application is installed, order release may be started using displays in the Material Requirements Planning application, and the same records are created and the same audit listing produced as if Inventory Management were used alone.

Manufacturing order entry: For manufacturing orders, the user may want to enter the component materials to be used to make this order. If the Product Data Management application is installed, this information can be automatically copied from the product structure file.

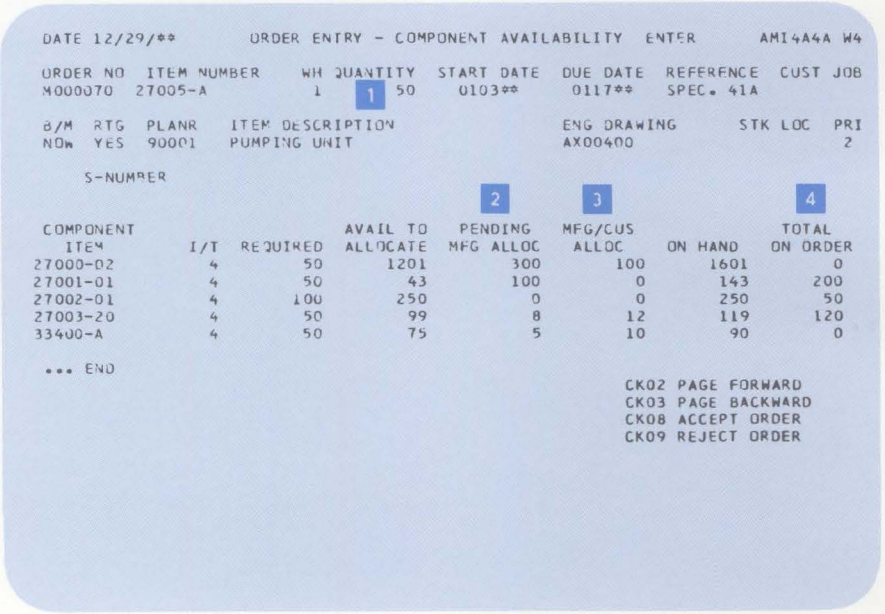
A pre-release component availability check can be made. The order can be rejected, released with shortages, or released with a reduced order quantity.

1 Order quantity can be changed and component availability redisplayed.

2 Shows components already allocated for orders ready for release.

3 Shows components allocated to released manufacturing orders and open customer orders.

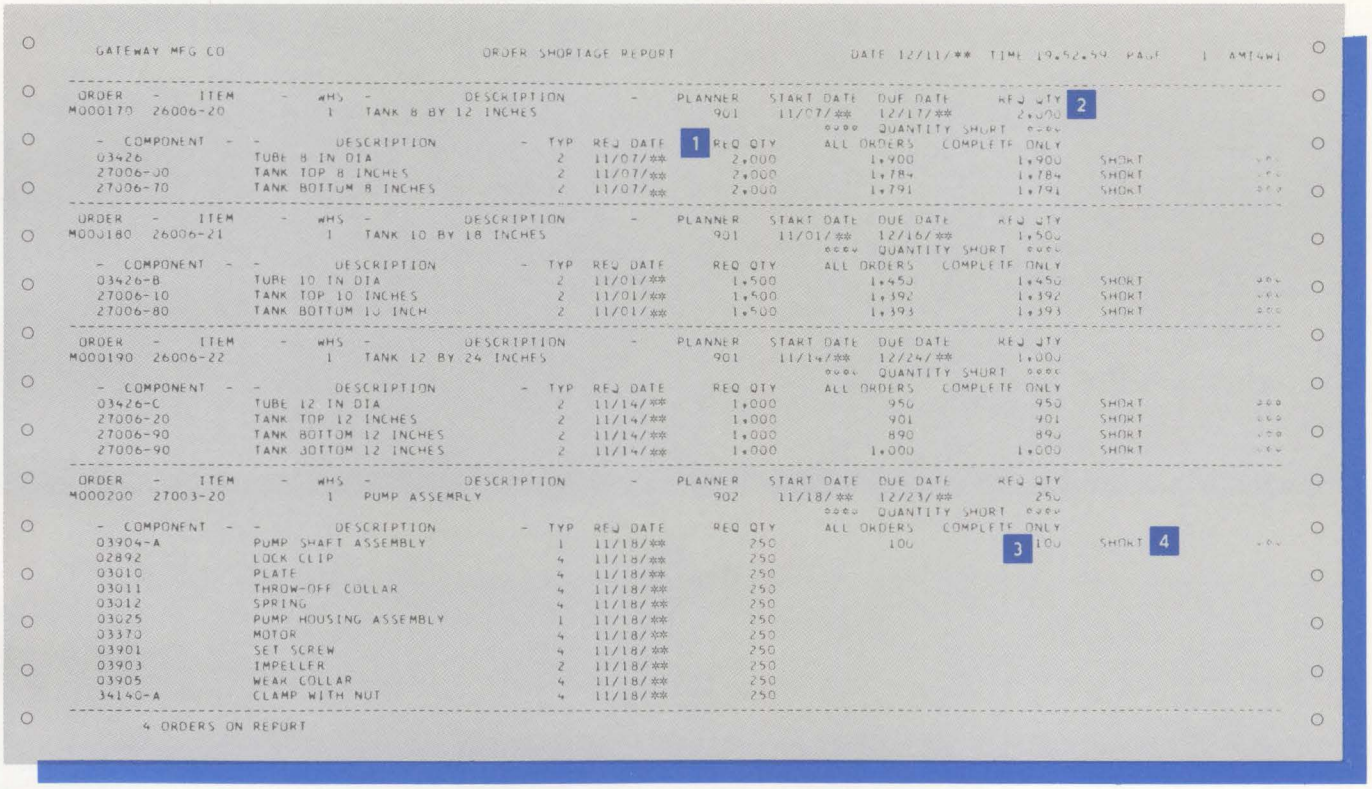
4 Component shortages are highlighted.



```
DATE 12/29/**        ORDER ENTRY - COMPONENT AVAILABILITY  ENTER       AMI4A4A W4

ORDER NO  ITEM NUMBER     WH QUANTITY  START DATE  DUE DATE  REFERENCE  CUST JOB
M000070  27005-A          1    1 50     0103**      0117**   SPEC. 41A

B/M  RTG  PLANR   ITEM DESCRIPTION                ENG DRAWING      STK LOC  PRI
NOW  YES  90001   PUMPING UNIT                    AX00400                    2

    S-NUMBER

                                                  2        3              4
COMPONENT                        AVAIL TO   PENDING   MFG/CUS              TOTAL
  ITEM        I/T  REQUIRED      ALLOCATE   MFG ALLOC  ALLOC    ON HAND   ON ORDER
27000-02       4       50          1201         300      100        1601          0
27001-01       4       50            43         100        0         143        200
27002-01       4      100           250           0        0         250         50
27003-20       4       50            99           8       12         119        120
33400-A        4       50            75           5       10          90          0

... END

                                                  CK02 PAGE FORWARD
                                                  CK03 PAGE BACKWARD
                                                  CK08 ACCEPT ORDER
                                                  CK09 REJECT ORDER
```

Manufacturing order release: The system creates material allocation records in the Open Order Material Detail file, which is used to allocate material for each released shop order. This feature is important, because it ensures that material requirements are known and identified until the components are withdrawn from stock. The total quantity allocated is stored in the balance record for each component item.

Orders which have shortages can be printed on the Order Shortage Report.

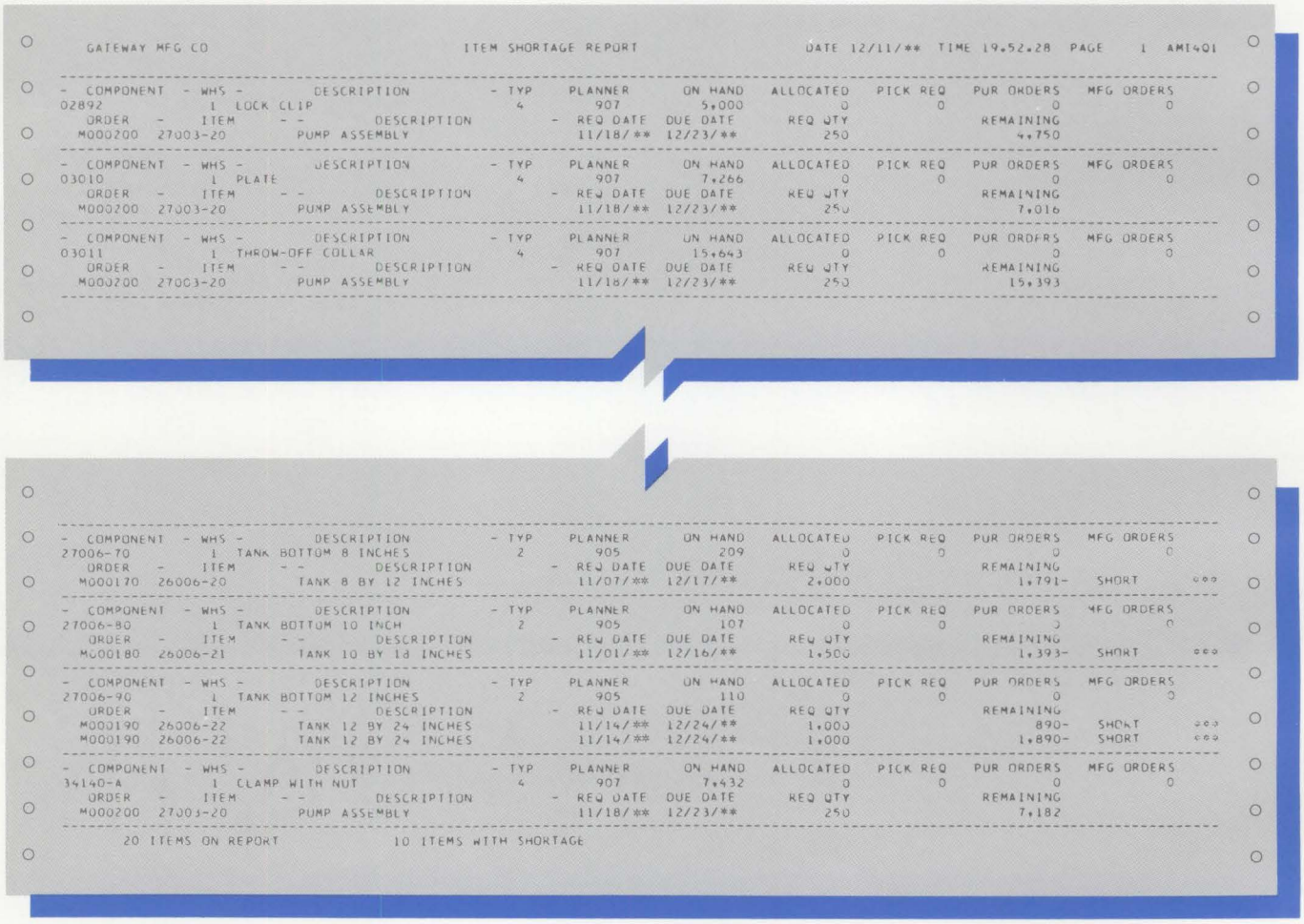


```
GATEWAY MFG CO                          ORDER SHORTAGE REPORT                    DATE 12/11/**  TIME 19.52.59  PAGE    1  AMTGR1

 ORDER    -   ITEM       -  WHS  -          DESCRIPTION          -   PLANNER   START DATE  DUE DATE     REQ QTY  2
M000170  26006-20            1   TANK 8 BY 12 INCHES                 901     11/07/**   12/17/**       2,000
                                                                                ****  QUANTITY SHORT  ****
   -  COMPONENT  -  -          DESCRIPTION          -  TYP  REQ DATE  1  REQ QTY    ALL ORDERS    COMPLETE ONLY
   03426            TUBE 8 IN DIA                      2   11/07/**      2,000         1,900          1,900    SHORT      ***
   27006-30         TANK TOP 8 INCHES                  2   11/07/**      2,000         1,784          1,784    SHORT      ***
   27006-70         TANK BOTTOM 8 INCHES               2   11/07/**      2,000         1,791          1,791    SHORT      ***

 ORDER    -   ITEM       -  WHS  -          DESCRIPTION          -   PLANNER   START DATE  DUE DATE     REQ QTY
M000180  26006-21            1   TANK 10 BY 18 INCHES                901     11/01/**   12/16/**       1,500
                                                                                ****  QUANTITY SHORT  ****
   -  COMPONENT  -  -          DESCRIPTION          -  TYP  REQ DATE     REQ QTY    ALL ORDERS    COMPLETE ONLY
   03426-B          TUBE 10 IN DIA                     2   11/01/**      1,500         1,450          1,450    SHORT      ***
   27006-10         TANK TOP 10 INCHES                 2   11/01/**      1,500         1,392          1,392    SHORT      ***
   27006-80         TANK BOTTOM 10 INCH                2   11/01/**      1,500         1,393          1,393    SHORT      ***

 ORDER    -   ITEM       -  WHS  -          DESCRIPTION          -   PLANNER   START DATE  DUE DATE     REQ QTY
M000190  26006-22            1   TANK 12 BY 24 INCHES                901     11/14/**   12/24/**       1,000
                                                                                ****  QUANTITY SHORT  ****
   -  COMPONENT  -  -          DESCRIPTION          -  TYP  REQ DATE     REQ QTY    ALL ORDERS    COMPLETE ONLY
   03426-C          TUBE 12 IN DIA                     2   11/14/**      1,000           950            950    SHORT      ***
   27006-20         TANK TOP 12 INCHES                 2   11/14/**      1,000           901            901    SHORT      ***
   27006-90         TANK BOTTOM 12 INCHES              2   11/14/**      1,000           890            890    SHORT      ***
   27006-90         TANK BOTTOM 12 INCHES              2   11/14/**      1,000         1,000          1,000    SHORT      ***

 ORDER    -   ITEM       -  WHS  -          DESCRIPTION          -   PLANNER   START DATE  DUE DATE     REQ QTY
M000200  27003-20            1   PUMP ASSEMBLY                       902     11/18/**   12/23/**         250
                                                                                ****  QUANTITY SHORT  ****
   -  COMPONENT  -  -          DESCRIPTION          -  TYP  REQ DATE     REQ QTY    ALL ORDERS    COMPLETE ONLY
   03904-A          PUMP SHAFT ASSEMBLY                1   11/18/**        250           100        3  100    SHORT  4   ***
   02892            LOCK CLIP                          4   11/18/**        250
   03010            PLATE                              4   11/18/**        250
   03011            THROW-OFF COLLAR                   4   11/18/**        250
   03012            SPRING                             4   11/18/**        250
   03025            PUMP HOUSING ASSEMBLY              1   11/18/**        250
   03370            MOTOR                              4   11/18/**        250
   03901            SET SCREW                          4   11/18/**        250
   03903            IMPELLER                           2   11/18/**        250
   03905            WEAR COLLAR                        4   11/18/**        250
   34140-A          CLAMP WITH NUT                     4   11/18/**        250

      4 ORDERS ON REPORT
```

1. Component requirements
2. Order quantity
3. Quantity on hand minus manufacturing and customer allocations (manufacturing allocations include the required quantity for this order)
4. Allocated quantity exceeds on-hand quantity.

Item shortage report: A material shortage report can also be printed showing each component item that is short and all orders affected by the shortage. This report is especially useful in helping a material planner resolve conflicting shortages.

If the Production Control and Costing application is installed, the manufacturing routing and miscellaneous cost records can be entered through the work station. If Product Data Management is also installed, the routing records can be automatically copied from the Routing file. The shop packets, containing the picking lists, and if Production Control and Costing is installed, the manufacturing operations sheets (routings), may be printed either at order release or at a later time.



```
GATEWAY MFG CO                          ITEM SHORTAGE REPORT                    DATE 12/11/**  TIME 19.52.28  PAGE    1  AMI401

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
02892           1  LOCK CLIP                       4        907        5,000            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000200  27003-20        PUMP ASSEMBLY               11/18/**  12/23/**          250                     4,750

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
03010           1  PLATE                           4        907        7,266            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000200  27003-20        PUMP ASSEMBLY               11/18/**  12/23/**          250                     7,016

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
03011           1  THROW-OFF COLLAR                4        907       15,643            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000200  27003-20        PUMP ASSEMBLY               11/18/**  12/23/**          250                    15,393

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
27006-70        1  TANK BOTTOM 8 INCHES            2        905          209            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000170  26006-20        TANK 8 BY 12 INCHES         11/07/**  12/17/**        2,000                     1,791-   SHORT      ***

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
27006-80        1  TANK BOTTOM 10 INCH             2        905          107            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000180  26006-21        TANK 10 BY 18 INCHES        11/01/**  12/16/**        1,500                     1,393-   SHORT      ***

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
27006-90        1  TANK BOTTOM 12 INCHES           2        905          110            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000190  26006-22        TANK 12 BY 24 INCHES        11/14/**  12/24/**        1,000                       890-   SHORT      ***
  M000190  26006-22        TANK 12 BY 24 INCHES        11/14/**  12/24/**        1,000                     1,890-   SHORT      ***

- COMPONENT  - WHS -        DESCRIPTION          - TYP    PLANNER      ON HAND    ALLOCATED   PICK REQ   PUR ORDERS   MFG ORDERS
34140-A         1  CLAMP WITH NUT                  4        907        7,432            0          0            0            0
   ORDER    -   ITEM     - -        DESCRIPTION        -  REQ DATE   DUE DATE     REQ QTY                 REMAINING
  M000200  27003-20        PUMP ASSEMBLY               11/18/**  12/23/**          250                     7,182

      20 ITEMS ON REPORT                10 ITEMS WITH SHORTAGE
```

Final assembly order release: This release is similar to normal order release with the following exceptions. It is used to release final assembly manufacturing orders for products which have standard options. The Product Data Management application must be installed before this function can be used. In addition to the data entered in the first step of normal order release, the user enters the "S-number" to select the product options. The system then uses the bill of material to generate material allocation records and prints picking lists according to the set of options specified by the "S-number."

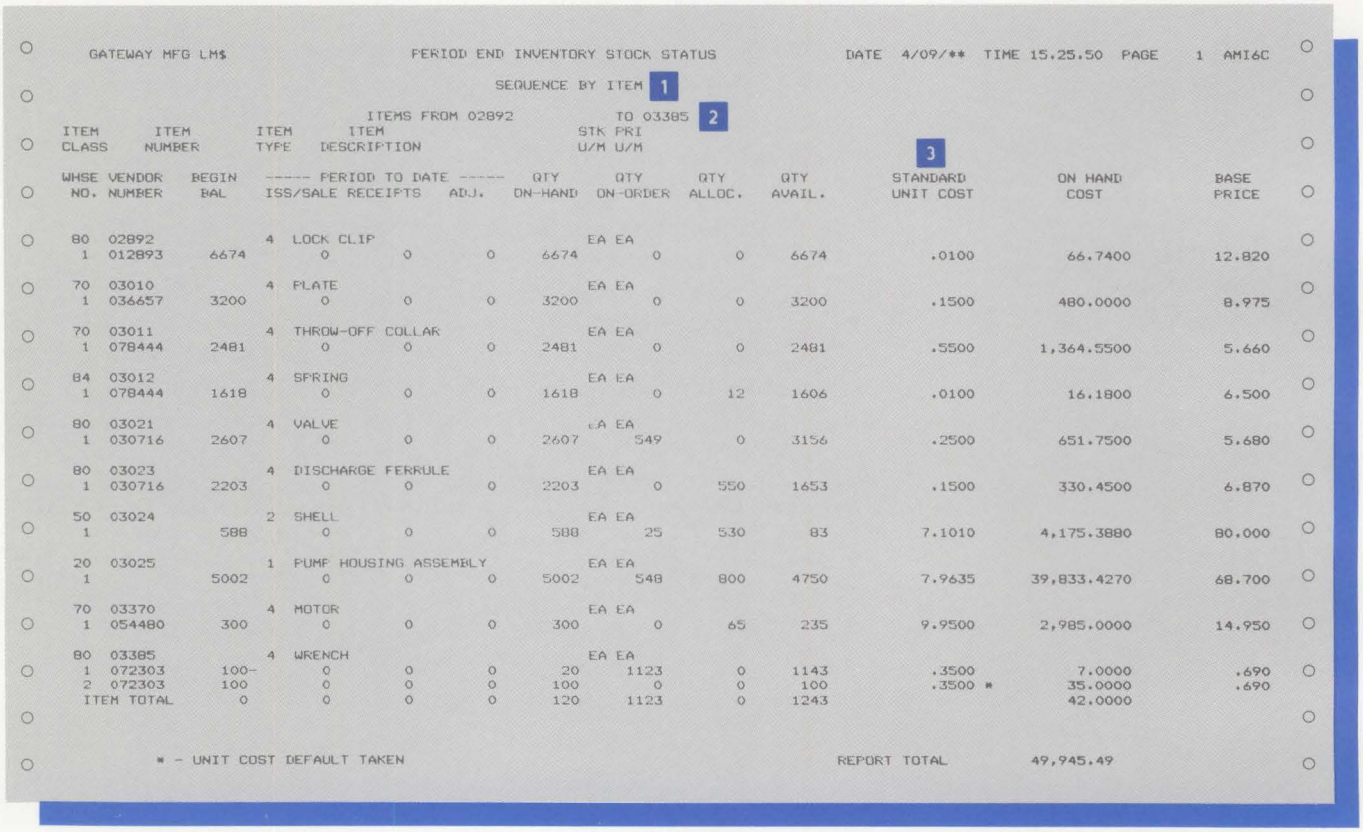
If the Order Entry and Invoicing application is installed, the user can enter the sales order number, and the system generates a final assembly order for each line item in that sales order which has an option selection number.

Data Collection System Support considerations: If the Data Collection System Support application is installed and if you elected to use the turnaround file, the system creates turnaround records for materials and operations. These detailed records contain a unique eight-digit number, which is system-generated, that relates the turnaround record to the material and operation detail records in the open order files. These turnaround numbers are printed in the shop packet to simplify entry of transactions through the IBM 5230 Data Collection System.

Printing the stock status report

You can print the stock status report during the period-end closing cycle or the stock status review any time during the period. The stock status reports are a summary of inventory activity for the period, sequenced by item number or item number within item class.

The report can be printed showing all or selected warehouses, items, or item classes.



GATEWAY MFG LM$ PERIOD END INVENTORY STOCK STATUS DATE 4/09/** TIME 15.25.50 PAGE 1 AMI6C

SEQUENCE BY ITEM 1

ITEMS FROM 02892 TO 03385 2

ITEM CLASS	ITEM NUMBER	ITEM TYPE	ITEM DESCRIPTION	STK U/M	PRI U/M	WHSE NO.	VENDOR NUMBER	BEGIN BAL	PERIOD TO DATE ISS/SALE	PERIOD TO DATE RECEIPTS	PERIOD TO DATE ADJ.	QTY ON-HAND	QTY ON-ORDER	QTY ALLOC.	QTY AVAIL.	STANDARD UNIT COST 3		ON HAND COST	BASE PRICE
80	02892	4	LOCK CLIP	EA	EA														
						1	012893	6674	0	0	0	6674	0	0	6674	.0100		66.7400	12.820
70	03010	4	PLATE	EA	EA														
						1	036657	3200	0	0	0	3200	0	0	3200	.1500		480.0000	8.975
70	03011	4	THROW-OFF COLLAR	EA	EA														
						1	078444	2481	0	0	0	2481	0	0	2481	.5500		1,364.5500	5.660
84	03012	4	SPRING	EA	EA														
						1	078444	1618	0	0	0	1618	0	12	1606	.0100		16.1800	6.500
80	03021	4	VALVE	EA	EA														
						1	030716	2607	0	0	0	2607	549	0	3156	.2500		651.7500	5.680
80	03023	4	DISCHARGE FERRULE	EA	EA														
						1	030716	2203	0	0	0	2203	0	550	1653	.1500		330.4500	6.870
50	03024	2	SHELL	EA	EA														
						1		588	0	0	0	588	25	530	83	7.1010		4,175.3880	80.000
20	03025	1	PUMP HOUSING ASSEMBLY	EA	EA														
						1		5002	0	0	0	5002	548	800	4750	7.9635		39,833.4270	68.700
70	03370	4	MOTOR	EA	EA														
						1	054480	300	0	0	0	300	0	65	235	9.9500		2,985.0000	14.950
80	03385	4	WRENCH	EA	EA														
						1	072303	100-	0	0	0	20	1123	0	1143	.3500		7.0000	.690
						2	072303	100	0	0	0	100	0	0	100	.3500	*	35.0000	.690
						ITEM TOTAL		0	0	0	0	120	1123	0	1243			42.0000	

* - UNIT COST DEFAULT TAKEN

REPORT TOTAL 49,945.49

1 Report sequence selection

2 Report content selection

3 Can be standard, average, or last cost.

Month-end closing activity

At month-end closing, current-period fields in the master files are set to zero for the start of a new period. A stock status report should be run as part of closing activity, so that an audit trail is available reflecting current-period activity.

Printing key management reports

The inventory analysis report can be run in several sequences and in two formats to provide inventory and financial information. The following fields can be used both to sequence the report and to select items to be printed.

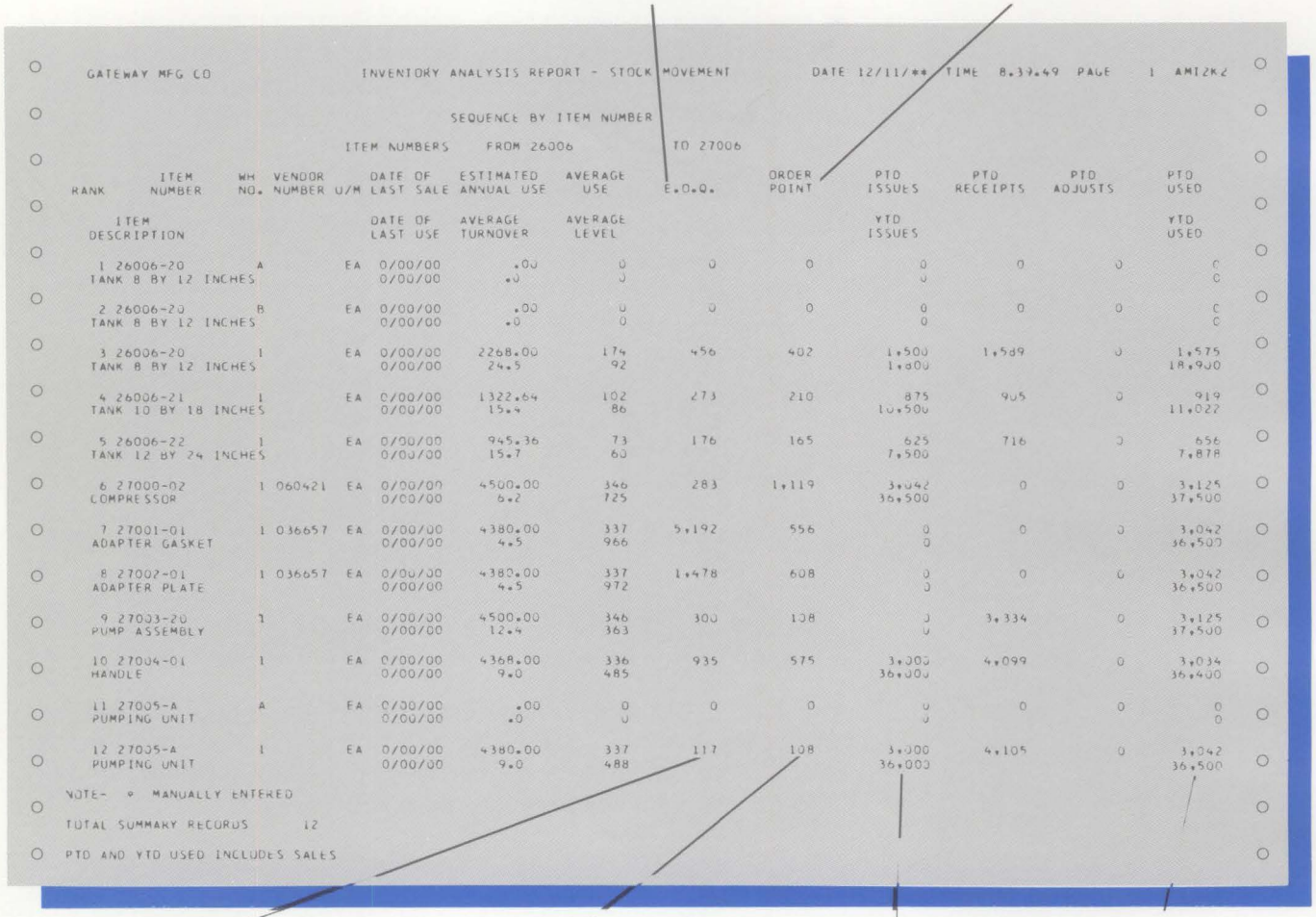
Item number
Vendor number
Date of last use
Profit amount
Profit percent
On-hand cost

In addition to the various sequences available, the operating personnel can request the information in either financial format (dollar values) or stock movement format (quantity values).

Analysis of your high-investment items in terms of stock and dollar flow can lead to reduced handling and better use of storage space. Obsolescence costs can be reduced by spotting trends before large supplies of an item are accumulated.

How much to order

When to order



GATEWAY MFG CO INVENTORY ANALYSIS REPORT - STOCK MOVEMENT DATE 12/11/** TIME 8.37.49 PAGE 1 AMIZK2

SEQUENCE BY ITEM NUMBER

ITEM NUMBERS FROM 26006 TO 27006

RANK	ITEM NUMBER / ITEM DESCRIPTION	WH NO.	VENDOR NUMBER	U/M	DATE OF LAST SALE / DATE OF LAST USE	ESTIMATED ANNUAL USE / AVERAGE TURNOVER	AVERAGE USE / AVERAGE LEVEL	E.O.Q.	ORDER POINT	PTD ISSUES / YTD ISSUES	PTD RECEIPTS	PTD ADJUSTS	PTD USED / YTD USED
1	26006-20 TANK 8 BY 12 INCHES	A		EA	0/00/00 0/00/00	.00 .0	0 0	0	0	0 0	0	0	0 0
2	26006-20 TANK 8 BY 12 INCHES	B		EA	0/00/00 0/00/00	.00 .0	0 0	0	0	0 0	0	0	0 0
3	26006-20 TANK 8 BY 12 INCHES	1		EA	0/00/00 0/00/00	2268.00 24.5	174 92	456	402	1,500 1,800	1,589	0	1,575 18,900
4	26006-21 TANK 10 BY 18 INCHES	1		EA	0/00/00 0/00/00	1322.64 15.4	102 86	273	210	875 10,500	905	0	919 11,022
5	26006-22 TANK 12 BY 24 INCHES	1		EA	0/00/00 0/00/00	945.36 15.7	73 60	176	165	625 7,500	716	0	656 7,878
6	27000-02 COMPRESSOR	1	060421	EA	0/00/00 0/00/00	4500.00 6.2	346 725	283	1,119	3,042 36,500	0	0	3,125 37,500
7	27001-01 ADAPTER GASKET	1	036657	EA	0/00/00 0/00/00	4380.00 4.5	337 966	5,192	556	0 0	0	0	3,042 36,500
8	27002-01 ADAPTER PLATE	1	036657	EA	0/00/00 0/00/00	4380.00 4.5	337 972	1,478	608	0 0	0	0	3,042 36,500
9	27003-20 PUMP ASSEMBLY	1		EA	0/00/00 0/00/00	4500.00 12.4	346 363	300	108	0 0	3,334	0	3,125 37,500
10	27004-01 HANDLE	1		EA	0/00/00 0/00/00	4368.00 9.0	336 485	935	575	3,000 36,000	4,099	0	3,034 36,400
11	27005-A PUMPING UNIT	A		EA	0/00/00 0/00/00	.00 .0	0 0	0	0	0 0	0	0	0 0
12	27005-A PUMPING UNIT	1		EA	0/00/00 0/00/00	4380.00 9.0	337 488	117	108	3,000 36,000	4,105	0	3,042 36,500

NOTE- * MANUALLY ENTERED

TOTAL SUMMARY RECORDS 12

PTD AND YTD USED INCLUDES SALES

Calculates EOQs by the following formula:

$$EOQ = \sqrt{\frac{2AS}{I}}$$

S = cost of setup and order writing in dollars

A = annual usage

I = cost of carrying one unit in stock for one year (unit cost x carrying rate)

Calculates order points by the following formula:

$$OP = \frac{XY}{Z} + \text{safety stock}$$

X = estimated annual usage

Y = lead time in days

Z = number of business days in year

Includes manufacturing and miscellaneous issues

Represents all usage, including customer sales

Printing the physical inventory reports

Inventory is a major company asset. Therefore, you need to periodically reconcile your computer records with the quantities you have in the stockroom or warehouse. Procedures are supplied in this application which can simplify the task of reconciliation. With the valuation and variance report, you can quickly and easily spot all discrepancies and adjust inventory levels accordingly. More important, this cycle counting can help you analyze (or determine) the reasons for discrepancies and take steps to avoid recurrence.

The cycle-counting feature provides the same reports for items that are to be cycle counted.

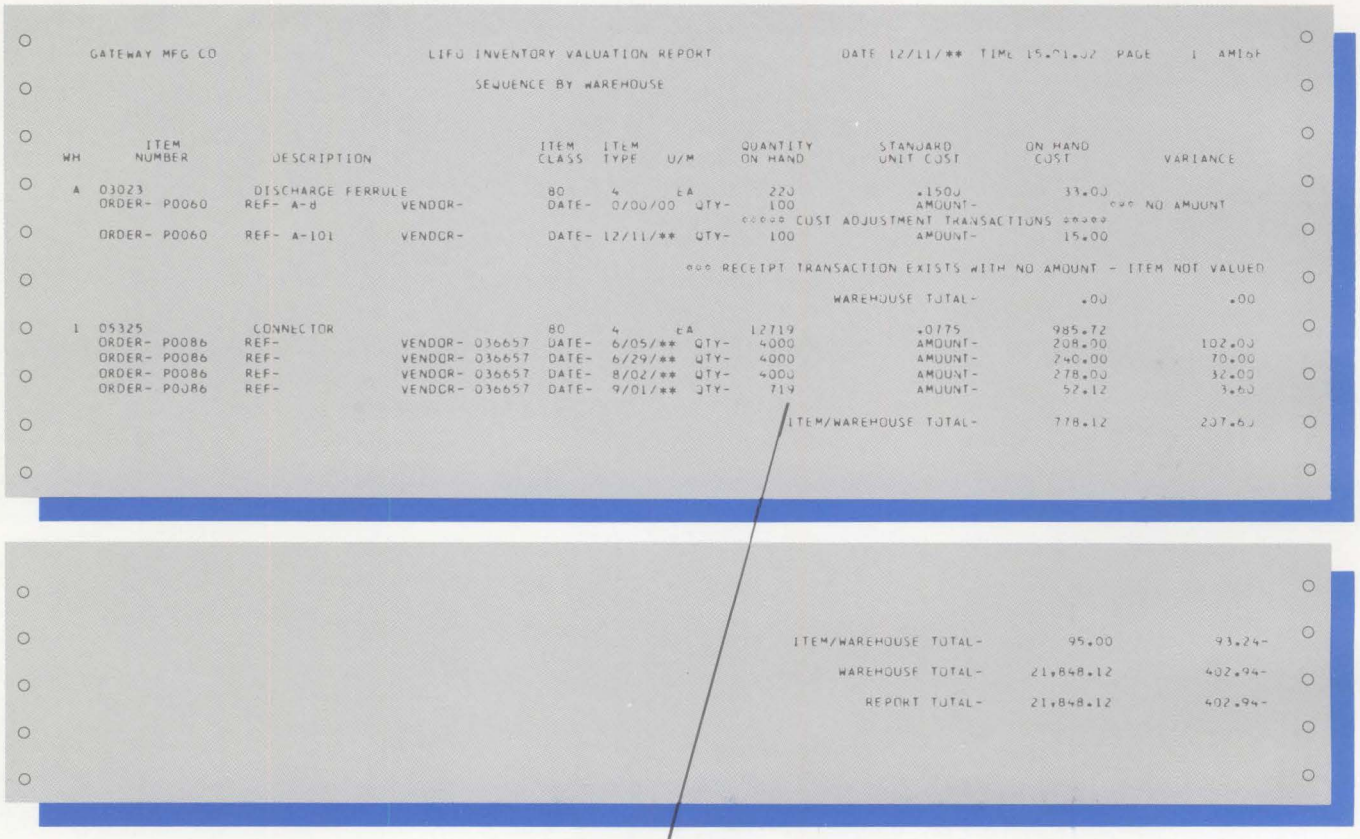
In order to take a physical inventory, whether through cycle count or physical count, a report is printed in item number within warehouse location within warehouse number sequence. This list provides a turnaround document for warehouse personnel to record actual counts.

The quantity on hand of each item can be listed, but is usually omitted from the copy sent to the counters, so it does not influence the resulting counts. All inventory items can be listed, or a group of items can be selected in one or all warehouses, and/or a range of item numbers or locations can be selected within one warehouse.

Printing LIFO/FIFO reports

Two reports are associated with maintaining either LIFO or FIFO inventory values. The first is the purge report, which is run as needed. It provides an audit trail of the transactions no longer part of the on-hand quantity of an item, and which are therefore removed from the LIFO/FIFO file. If you use an annualized LIFO system, all receipt transactions for the year will be saved and should be purged only prior to doing the actual inventory valuation.

The second report is the actual valuation report.



```
GATEWAY MFG CO                    LIFO INVENTORY VALUATION REPORT          DATE 12/11/**  TIME 15.01.32  PAGE    1  AMI6F
                                  SEQUENCE BY WAREHOUSE

WH   ITEM NUMBER      DESCRIPTION                ITEM CLASS  ITEM TYPE  U/M   QUANTITY ON HAND  STANDARD UNIT COST  ON HAND COST  VARIANCE
 A   03023            DISCHARGE FERRULE          80          4          EA          220           .1500              33.00
     ORDER- P0060     REF- A-8          VENDOR-  DATE- 0/00/00  QTY-   100          AMOUNT-                  *** NO AMOUNT
                                                                  ***** COST ADJUSTMENT TRANSACTIONS *****
     ORDER- P0060     REF- A-101        VENDOR-  DATE- 12/11/**  QTY-   100          AMOUNT-            15.00

                                                  *** RECEIPT TRANSACTION EXISTS WITH NO AMOUNT - ITEM NOT VALUED

                                                                  WAREHOUSE TOTAL-                      .00              .00

 1   05325            CONNECTOR                  80          4          EA         12719           .0775          985.72
     ORDER- P0086     REF-              VENDOR- 036657  DATE- 6/05/**  QTY-  4000          AMOUNT-            208.00          102.00
     ORDER- P0086     REF-              VENDOR- 036657  DATE- 6/29/**  QTY-  4000          AMOUNT-            240.00           70.00
     ORDER- P0086     REF-              VENDOR- 036657  DATE- 8/02/**  QTY-  4000          AMOUNT-            278.00           32.00
     ORDER- P0J86     REF-              VENDOR- 036657  DATE- 9/01/**  QTY-   719          AMOUNT-             52.12            3.60

                                                                  ITEM/WAREHOUSE TOTAL-                 778.12           207.60

                                                                  ITEM/WAREHOUSE TOTAL-                  95.00            93.24-

                                                                  WAREHOUSE TOTAL-                   21,848.12           402.94-

                                                                  REPORT TOTAL-                      21,848.12           402.94-
```

Last transaction is adjusted so that sum of saved transactions equals quantity on hand

This report can be prepared in item type, item class, or warehouse sequence. After this report is run, only the LIFO or FIFO transactions which print are saved for the start of the next accounting cycle.

You should consult with your auditor on the use of this LIFO/FIFO method to determine whether it satisfies the requirements of all applicable taxing authorities.

Printing the ABC analysis report

This report is designed to highlight inventory items which represent the largest dollar investments. It lists items by annual usage expressed in dollars, with the higher value items shown first. In most inventories, a few items account for most of the dollar value of annual usage. Knowledge of those items can influence your decisions about order quantity, order point, safety stock, or cycle-count frequency.

The report may be printed for all or one warehouse and all or one item class.

GATEWAY MFG LM$ A-B-C ANALYSIS REPORT DATE 4/09/** TIME 16.28.33 PAGE 1 AMI2H

WAREHOUSE- 1

WH NO	ITEM NUMBER	ITEM TYPE	ITEM DESCRIPTION	STK U/M	PRI U/M	ITEM COUNT	CUM % ITEMS	ESTIMATED ANNUAL USE	PRIMARY CALCULATION STANDARD UNIT COST	PRIMARY CALCULATION ANNUAL USAGE AMT	PRIMARY CALCULATION CUMULATIVE USAGE AMT	PRIMARY CALCULATION CUM % USAGE	SEC CALC ANNUAL USE AT PRICE	SEC CALC CUM % PRICE
						116	100.0				692,181	100.0	1,319,366	100.0
1	99001	1	SPRAY UNIT	EA	EA	1	.9	1215.00	84.9622	103229	103229	14.9	182250	13.8
1	27005-A	1	PUMPING UNIT	EA	EA	2	1.7	2463.75	37.7368	92974	196203	28.3	184781	27.8
1	27003-20	1	PUMP ASSEMBLY	EA	EA	3	2.6	2531.25	27.3337	69188	265391	38.3	124031	37.2
1	03370	4	MOTOR	EA	EA	4	3.4	3015.00	9.9500	29999	295390	42.7	45074	40.6
1	03424	1	TREADLE ASSEMBLY	EA	EA	5	4.3	2463.75	10.6290	26187	321577	46.5	51739	44.6
1	03025	1	PUMP HOUSING ASSEMBLY	EA	EA	6	5.2	2868.75	7.9635	22845	344422	49.8	197083	59.5
1	27007-A1	1	BASE ASSEMBLY	EA	EA	7	6.0	2430.00	8.2675	20090	364512	52.7	0	59.5
1	03024	2	SHELL	EA	EA	8	6.9	2576.25	7.1010	18294	382806	55.3	206100	75.1
1	27000-02	4	COMPRESSOR	EA	EA	9	7.8	2531.25	6.8500	17339	400145	57.8	30248	77.4
1	99750-RM	3	1/8 SHEET METAL	SF	SF	10	8.6	18299.14	.9000	16469	416614	60.2	0	77.4
1	27007-20	2	FRAME	EA	EA	11	9.5	3001.50	4.5600	13687	430301	62.2	0	77.4
1	99910-RM	3	IRON PLATE 1/4 IN - HRS	LB	LB	12	10.3	13945.64	.9500	13248	443549	64.1	0	77.4
1	03443	2	MOTOR SUPPORT	EA	EA	13	11.2	2430.00	5.1417	12494	456043	65.9	0	77.4
1	99465-RM	3	ANGLE IRON 1 X 1 X 3/16	FT	FT	14	12.1	25110.00	.4675	11739	467782	67.6	0	77.4
1	26006-22	1	TANK 12 BY 24 INCHES	EA	EA	15	12.9	531.77	20.9960	11165	478947	69.2	21244	79.0
1	99001-1	1	SPRAY UNIT - PVT LABEL	EA	EA	16	13.8	121.50	85.2296	10355	489302	70.7	21263	80.6
1	03422	2	LEVER ARM	EA	EA	17	14.7	4927.50	2.0822	10260	499562	72.2	0	80.6
1	03903	2	IMPELLER	EA	EA	18	15.5	2868.75	3.5414	10159	509721	73.6	0	80.6
1	26006-20	1	TANK 8 BY 12 INCHES	EA	EA	19	16.4	1275.75	7.9079	10089	519810	75.1	18498	82.0
1	34250-A	1	TANK COVER ASSM	EA	EA	20	17.2	2565.00	3.8723	9932	529742	76.5	28215	84.2
1	26006-21	1	TANK 10 BY 18 INCHES	EA	EA	21	18.1	743.99	12.9386	9626	539368	77.9	18414	85.6
1	03426-B	2	TUBE 10 IN DIA	EA	EA	22	19.0	1452.74	6.3412	9212	548580	79.3	0	85.6
1	03428	2	STAND	EA	EA	23	19.8	2430.00	3.6341	8831	557411	80.5	0	85.6
1	03423	2	TREADLE	EA	EA	24	20.7	2531.25	3.1720	8029	565440	81.7	16453	86.8
1	99990-RM	3	CASTING	EA	EA	25	21.6	2607.19	2.9557	7706	573146	82.8	0	86.8
1	27004-01	2	HANDLE	EA	EA	26	22.4	3028.50	2.5175	7624	580770	83.9	18928	88.2
1	03594	2	LUG	EA	EA	27	23.3	3127.50	2.3737	7424	588194	85.0	0	88.2
1	03904-A	1	PUMP SHAFT ASSEMBLY	EA	EA	28	24.1	2868.75	2.5238	7240	595434	86.0	0	88.2
1	03595	1	LUG SUB-ASSEMBLY	EA	EA	29	25.0	2565.00	2.6567	6814	602248	87.0	0	88.2
1	27006-00	2	TANK TOP 8 INCHES	EA	EA	30	25.9	2702.25	2.4316	6571	608819	88.0	0	88.2
1	03426-C	2	TUBE 12 IN DIA	EA	EA	31	26.7	531.77	11.1474	5928	614747	88.8	0	88.2
1	03904-C	2	PUMP SHAFT	EA	EA	32	27.6	2531.25	2.2300	5645	620392	89.6	0	88.2
1	03421	2	HINGE ARM	EA	EA	33	28.4	2688.75	2.0822	5599	625991	90.4	0	88.2
1	99239-RM	3	PLATED CYLINDER 12 IN	EA	EA	34	29.3	553.03	9.9411	5498	631489	91.2	0	88.2
1	27006-10	2	TANK TOP 10 INCHES	EA	EA	35	30.2	1452.74	3.2104	4664	636153	91.9	0	88.2
1	33480-A	4	CONTROL BOX	EA	EA	36	31.0	2497.50	1.8500	4620	640773	92.6	7368	88.8
1	99238-RM	3	PLATED CYLINDER 10 IN	EA	EA	37	31.9	773.76	5.3336	4127	644900	93.2	0	88.8
1	27006-70	2	TANK BOTTOM 8 INCHES	EA	EA	38	32.8	2702.25	1.5103	4081	648981	93.8	0	88.8
1	99950-RM	3	BAR STOCK 1 X 3/8 - CRS	FT	FT	39	33.6	6779.70	.4970	3370	652351	94.2	0	88.8
1	99756-RM	3	1/16 SHEET METAL	SF	SF	40	34.5	4290.98	.7000	3004	655355	94.7	0	88.8
1	27006-80	2	TANK BOTTOM 10 INCH	EA	EA	41	35.3	1452.74	2.0120	2923	658278	95.1	0	88.8
1	99544-RM	3	ROUND STOCK 5/8 DIA - CR	FT	FT	42	36.2	5205.33	.5000	2603	660881	95.5	0	88.8
1	99237-RM	3	PLATED CYLINDER 8 IN	EA	EA	43	37.1	1326.78	1.9569	2596	663477	95.9	0	88.8
1	27006-20	2	TANK TOP 12 INCHES	EA	EA	44	37.9	531.77	4.7531	2528	666005	96.2	0	88.8
1	03425	2	COVER	EA	EA	45	38.8	2632.50	.9426	2481	668486	96.6	5002	89.2
1	03415-1	4	SPRAY NOZZLE	EA	EA	46	39.7	2551.50	.9500	2424	670910	96.9	4822	89.6

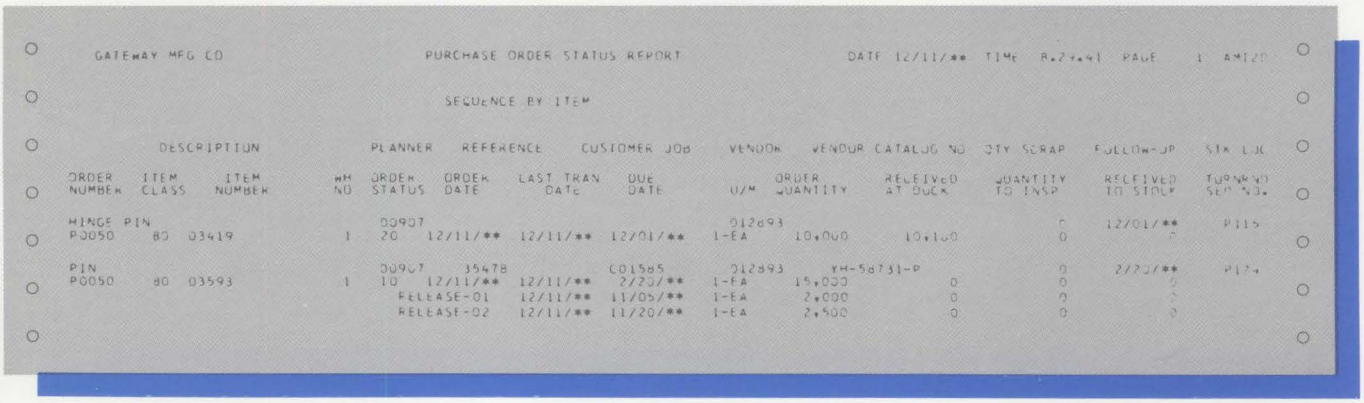
1 Report sequence, descending, calculated by annual units times primary unit cost.

2 Annual use at price is the estimated annual usage multiplied by the price.

Printing order status reports

Two reports are available to reflect current status of either purchase orders or manufacturing orders. The report shown here is the purchase order status report. The reports are used to assist in planning receipt activity from either outside vendors or the shop floor.

Either report can be printed in due-date, start-date, or item sequence. The purchase report can also be run in vendor sequence. By selecting orders within ranges of due dates or follow-up dates, you can identify orders where action might be needed.



GATEWAY MFG CO PURCHASE ORDER STATUS REPORT DATE 12/11/** TIME 8.27.41 PAGE 1 AM120

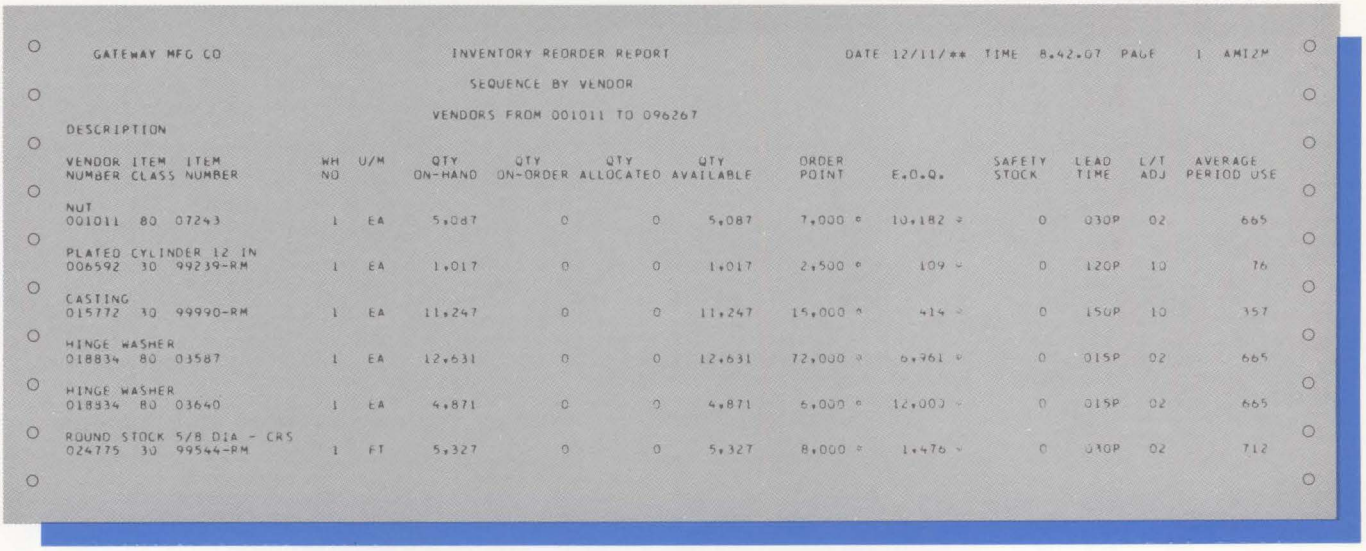
SEQUENCE BY ITEM

ORDER NUMBER	ITEM CLASS	ITEM NUMBER	DESCRIPTION / PLANNER	WH NO	ORDER STATUS	ORDER DATE	LAST TRAN DATE	DUE DATE	REFERENCE / CUSTOMER JOB	VENDOR / U/M	VENDOR CATALOG NO / ORDER QUANTITY	RECEIVED AT DOCK	QUANTITY TO INSP	FOLLOW-UP / RECEIVED TO STOCK	STK LOC / TURNAROUND SEQ NO.
HINGE PIN			00907							012d93					
P0050	80	03419		1	20	12/11/**	12/11/**	12/01/**		1-EA	10,000	10,100	0	12/01/**	P115
PIN			00907						C01585	012893	YM-58731-P				
P0050	80	03593	35478	1	10	12/11/**	12/11/**	2/20/**		1-EA	15,000	0	0	2/20/**	P124
			RELEASE-01			12/11/**	11/05/**			1-EA	2,000	0	0		
			RELEASE-02			12/11/**	11/20/**			1-EA	2,500	0	0		

Printing reorder reports

Supply levels of many items can change weekly, but only a few may be significant to you. On request, you can get a reorder exception report, with reorder data that includes detail stock data and order quantities in both purchasing and stocking unit of measure, where different.

You can review one or all of your warehouses, a range of vendors, or a range of item classes. With this report, you can see items which require action based on current availability. Lead times, average usage, order point, and order quantities are shown.



GATEWAY MFG CO — INVENTORY REORDER REPORT — DATE 12/11/** TIME 8.42.07 PAGE 1 AMI2M

SEQUENCE BY VENDOR

VENDORS FROM 001011 TO 096267

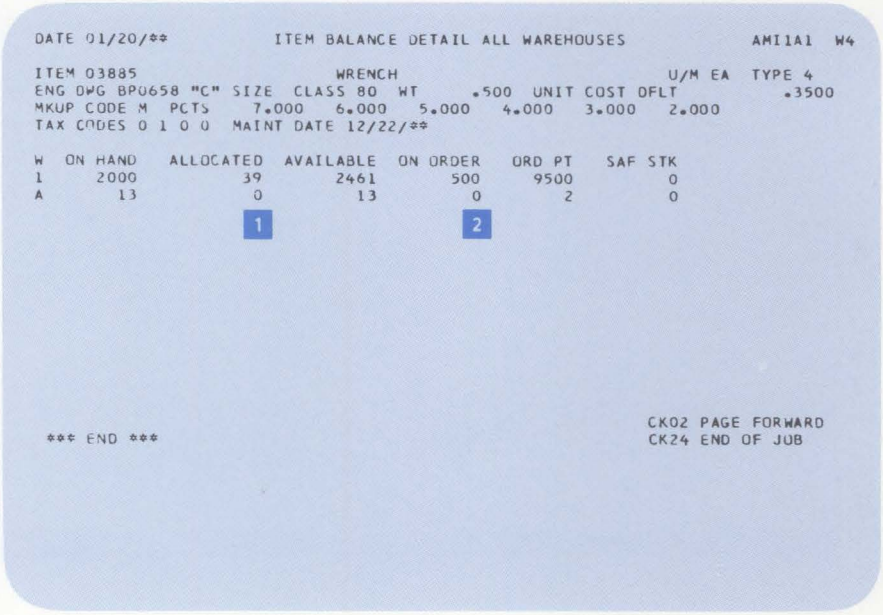
VENDOR ITEM NUMBER / DESCRIPTION	ITEM CLASS	ITEM NUMBER	WH NO	U/M	QTY ON-HAND	QTY ON-ORDER	QTY ALLOCATED	QTY AVAILABLE	ORDER POINT	E.O.Q.	SAFETY STOCK	LEAD TIME	L/T ADJ	AVERAGE PERIOD USE
001011 NUT	80	07243	1	EA	5,087	0	0	5,087	7,000 *	10,182 *	0	030P	02	665
006592 PLATED CYLINDER 12 IN	30	99239-RM	1	EA	1,017	0	0	1,017	2,500 *	109 *	0	120P	10	76
015772 CASTING	30	99990-RM	1	EA	11,247	0	0	11,247	15,000 *	414 *	0	150P	10	357
018834 HINGE WASHER	80	03587	1	EA	12,631	0	0	12,631	72,000 *	6,961 *	0	015P	02	665
018834 HINGE WASHER	80	03640	1	EA	4,871	0	0	4,871	6,000 *	12,000 *	0	015P	02	665
024775 ROUND STOCK 5/8 DIA - CRS	30	99544-RM	1	FT	5,327	0	0	5,327	8,000 *	1,476 *	0	030P	02	712

Inquiries

The Inventory Management application allows you to inquire into the status of items and orders that are in the master files, even while running another procedure. Five basic inquiries are available.

Item balance

This inquiry displays some relatively static information about the item, then details quantity information about the warehouses containing the item.



1 Sum of manufacturing and customer requirements.

2 Sum of manufacturing and purchase orders outstanding.

Item allocation

This inquiry shows the manufacturing allocations against the requested item. It also shows the current status of those allocations.

```
DATE 01/15/**        ITEM BALANCE INQUIRY - MFG ALLOCATIONS            AMI1B1 WO

ITEM 27003-20          WHSE 1  PUMP ASSEMBLY                    U/M EA  TYPE 1
ENG DWG AX00390              CLASS 20  WT   10.0  STND COST        28.3307
QTY ON HAND       300 MFG ALLOC       325 CUST ALLOC        9 NET AVAIL      716
QTY ON ORDER      750 MAINT DATE 12/30/**  MRP FLAG 1  FLOOR STOCK CODE C

  ORDER NO  QTY REQ'D  ISS QTY  UNISSUED  REQ DATE  LAST ISS  CUST/JOB
  M000220        225         0       225  01/20/**  00/00/**   C000014
  M000150        100         0         0  01/16/**  00/00/**

                                                          CK02 PAGE FORWARD
*** END ***                                               CK24 END OF JOB
```

Item balance history

This inquiry displays the current quantity information regarding the selected item and also displays sales and use activity against the item and lead times.

```
DATE 01/12/**          ITEM BALANCE INQUIRY   - SALES HISTORY          AMI1C1  W7

ITEM 03590             WHSE 1  AUTO SWITCH                    U/M EA  TYPE 1
CLASS 12  WHSE STOCK LOC G1260  PACKING CODE SK  PLANNER   901
DISC CODE D  PCTS   10.00   15.00        0       0       0       0

  BASE PRICE  STND UNIT COST  TAX CODES  WEIGHT     D A T E   O F   L A S T
      14.500          6.0000   1 0 0 0     1.5  SALE 12/01/**  USAGE 12/01/**

ON HAND   PENDING  ALLOCATED  AVAILABLE  ON ORDER   ORD PT  SAF STK
     500        0         50        450         0       80       20

       SALES QTY     SALES AMT   AVG MONTHLY SALES  EST ANNUAL USAGE QTY USED
M-T-D         20        290.00             1125.63                        20
Y-T-D       1051      14561.26                            15523.66      1051

*------------ LEAD TIME ------------*      VENDOR          COST DEV CODE
             CODE  *                      IN-HSE
          STD   VAR   ADJ   AVG   CUM
MFG        20     5     1    24    70
PUR         0           0     0
MAT*L                              119
                                          CK02 PAGE FORWARD
                                          CK24 END OF JOB
```

Open orders

This inquiry provides up-to-date information regarding current status of all outstanding orders for the requested item.

1. Code 40 = activity has been reported against this order.
2. Used for manufactured items.

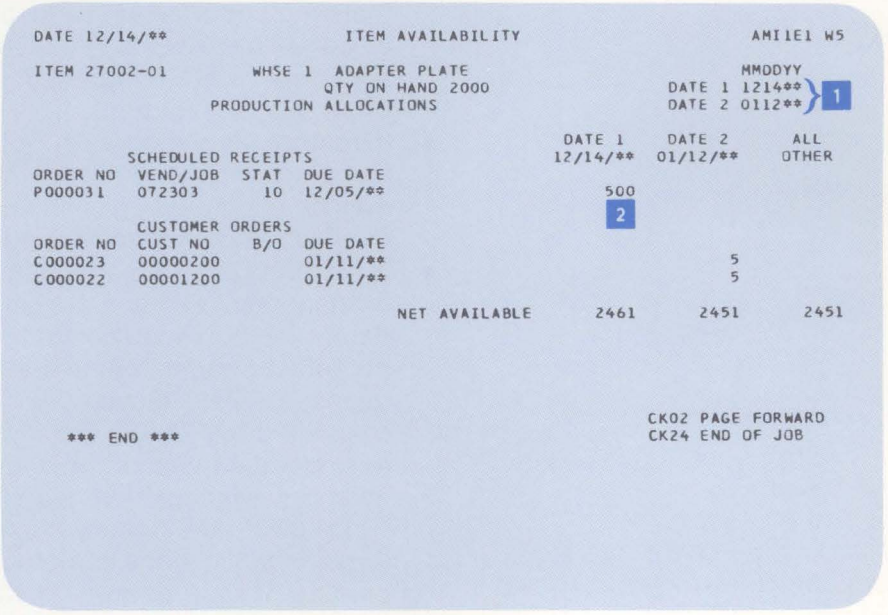
```
DATE 01/06/**                OPEN ORDERS INQUIRY                  AMI1D1 W2

ITEM 33480-A           WHSE 1  CONTROL BOX                  U/M  EA  TYPE 1
ENG DWG PX504              CLASS 20  WT   21.6  STND COST     312.0000
QTY ON HAND      100 MFG ALLOC       10 CUST ALLOC        5 NET AVAIL      135
QTY ON ORDER      50 MAINT DATE 11/30/**  MRP FLAG 1
                                                          CURRENT
  ORDER NO  VEND/JOB  STAT  ORD QTY   QTY OPEN  DUE DATE  HOURS REM  OPER  W/C
  M000020   C000152   40         55         50  01/10/**      32.50  0040   18
                       1                                                  2

                                          CK02 PAGE FORWARD
*** END ***                               CK24 END OF JOB
```

Item availability

This inquiry allows the operator to see current and future requirements against an item, as well as all open purchase and production orders. Operator-entered date parameters add the element of time-phasing both demands and receipts. For example, purchase orders due more than six months from today are not pertinent when you are considering next week's shipping schedule. When used with Order Entry and Invoicing, this inquiry allows an operator to respond to telephone inquiries regarding availability of an item.

1 Operator enters the date parameters.

2 Item availability between date of inquiry and DATE 1 parameter.



Interfaces

The Inventory Management application supports the following MAPICS applications, if they are installed:

- The Order Entry and Invoicing application updates the inventory records of shipped or returned goods during invoicing. It also associates individual item orders to the appropriate inventory record.
- The Sales Analysis application receives sales transactions from Inventory Management.
- Inventory Management supplies Material Requirements Planning and Master Production Schedule Planning with inventory balances and the status of released orders. It can also work with Material Requirements Planning to perform the order release function.
- Inventory Management supplies Capacity Requirements Planning with related order information so that the work load may be measured against work center capacity to identify overload and underload conditions.
- If Product Data Management is installed, Inventory Management can use the bill of material for an item to determine how many of what components are needed to manufacture that item and allocate them as an order is released. Also, if inventory is valued at standard cost, the cost calculated by Product Data Management can be used as the new standard cost at the end of an accounting period.
- Inventory Management supplies Production Control and Costing with the materials used in manufacturing orders, and the two applications work together to handle order release, the printing of shop packets, material scrap, and order closeout.
- Inventory Management works with Data Collection System Support to handle inventory transaction reporting via the IBM 5230 Data Collection System.
- Accounts Payable can generate cost adjustment transactions from vendor invoices.
- Purchasing provides Inventory Management with current purchase order status information and receiving activity.
- Forecasting can (optionally) calculate order point and safety stock and replace the old values in Inventory Management.
- Inventory Management provides Item Master and Item Balance records which Location/Lot Management updates with location, lot, and quality control information.

Product Data Management

Information flow

Figure 2-2 shows how information flows through the Product Data Management application. The numbers in the following discussion refer to that figure.

Records can be loaded to the files from diskette or can be added, deleted, or changed through the work stations 1. Cost buildup reports 2 are printed, and cost fields in the master files are updated. Reports are retrieved 3 from the centralized data base files.

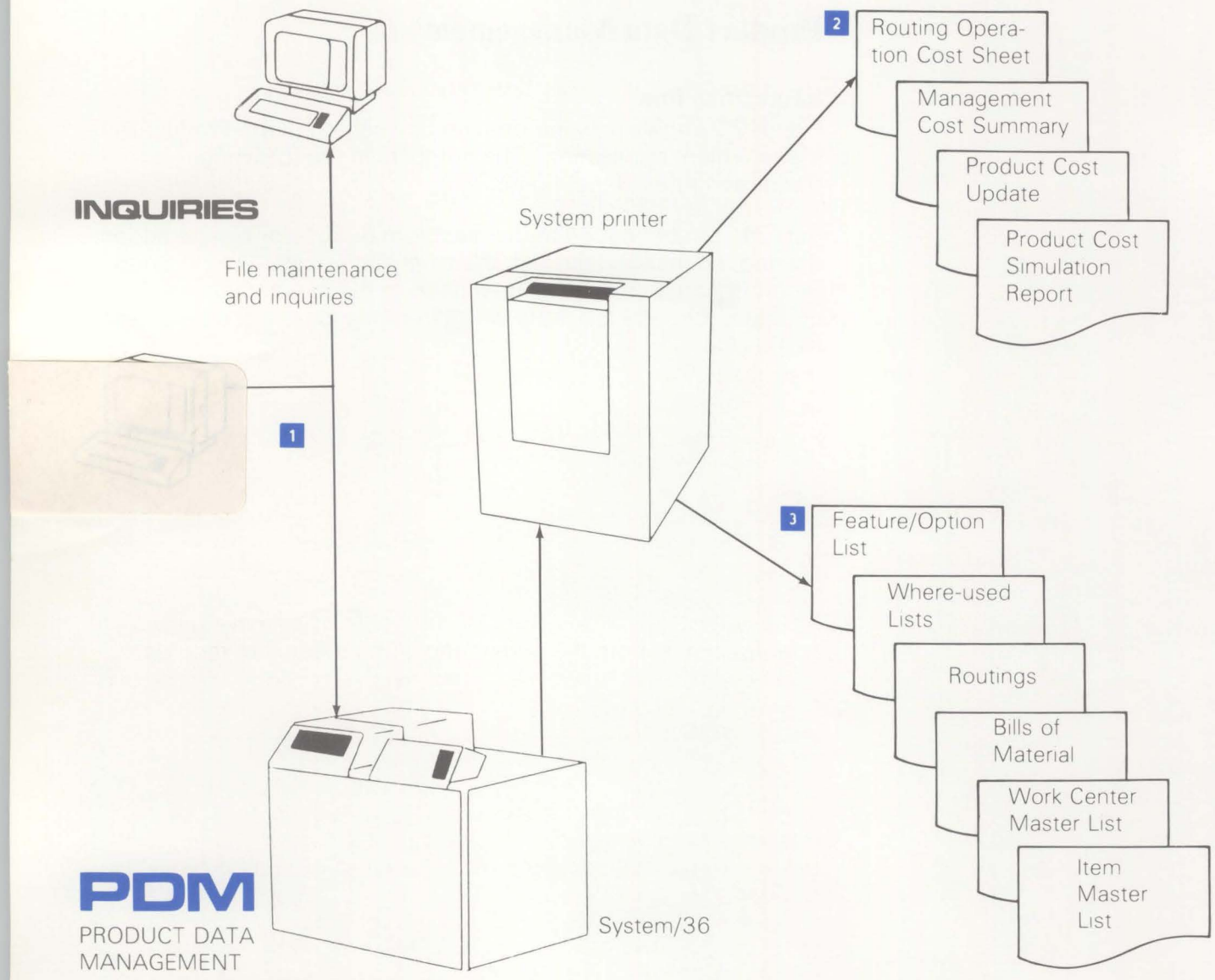


Figure 2-2. Product Data Management information flow

Application functions

Centralized data base files and extensive inquiries

People throughout a manufacturing company need access to basic information about inventory items, bills of material, production facilities, and routings. Product Data Management allows you to maintain one set of this basic information which is easily accessed by using the work stations. Everyone requesting the same information receives the same answer. This might not be the case where information is duplicated and stored in files scattered among different departments.

Basic maintenance of product data

You can add, delete, or change item or work center records online. These records carry basic descriptive information. The item record has information such as item number, engineering drawing number, unit of measure, and unit cost for items. The work center record has information such as work center number, foreman number, location, number of machines, planned queue, and overhead rate for work centers.

The item records serve as the basis, or building blocks, for bills of material; that is, both the parent and component item records must be present before a bill of material can be loaded. The bill of material for an assembly is stored as a simple list of the quantities of all components (subassemblies, parts, or materials) that are used directly in the manufacture of that assembly. Bill of material retrievals are supplied that can retrieve all the levels of a product, right down to the basis materials. This approach offers the advantage of maintaining a single copy of the bill of material for each assembly and subassembly, regardless of the number of products they are used in.

The manufacturing routing for an item is a series of operation records that provide a chain or connection between the item and the appropriate work center for each operation in the routing. This means that the information for each work center can be maintained in a single record but referenced by all manufacturing operations performed in a particular work center.

The reverse relationships to bills of materials and routings, "component where used" and "work center where used," are automatically maintained whenever transactions are processed that maintain the bills of material and routings. Retrievals are supplied that can generate where-used reports for the components or work centers you specify.

Effectivity dates for bill of material changes

You may not want some bill of material changes to go into effect immediately. For example, you may want to use the components and assemblies you have on hand. You can control when a change is to become effective by using "effectivity" dates for the components of a bill of material.

Multiple action maintenance transactions

You can use add, change, or delete maintenance transactions for each operation in a routing and each parent-to-component relationship in a bill of material. For some types of maintenance, using these individual maintenance transactions can be very time-consuming.

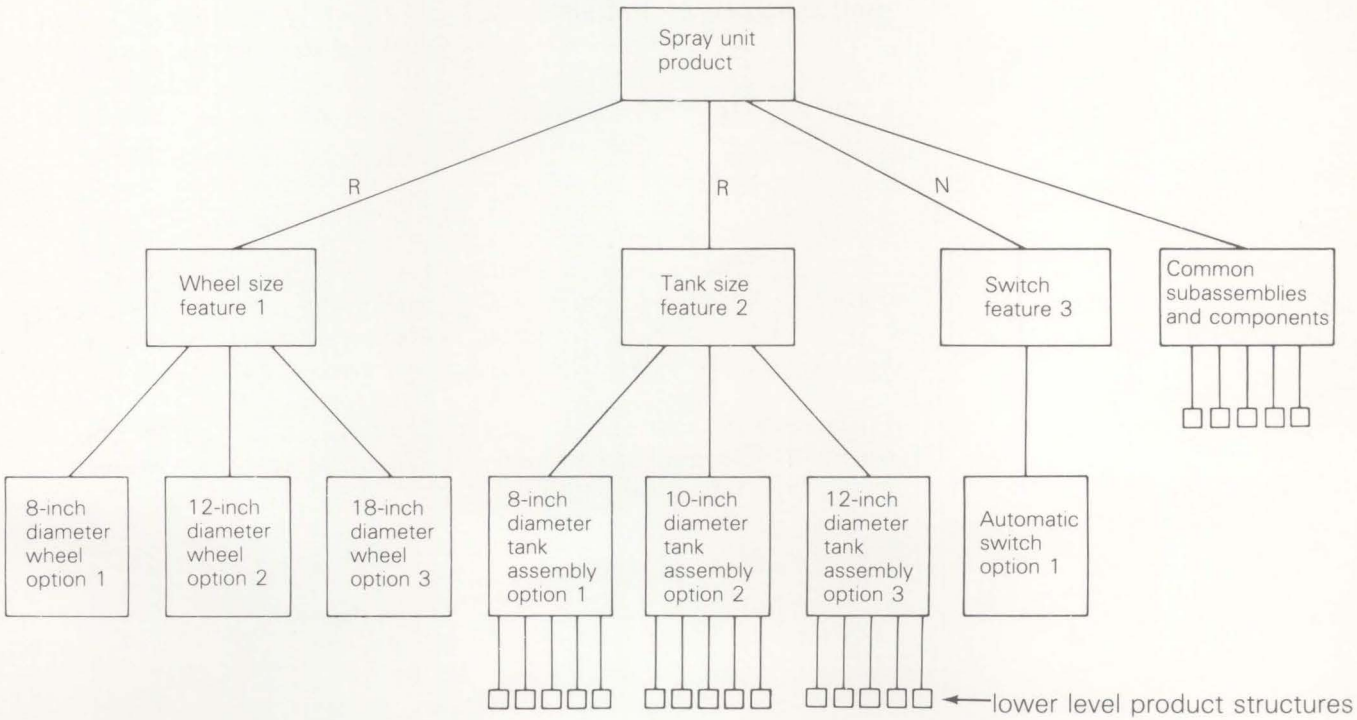
When you want to add a bill of material structure or routing that is similar to an existing one, you can use the ***same-as-except*** transaction. The Product Structure same-as-except transaction copies an existing bill of material and uses it as the basis for the new assembly item. The Routing same-as-except transaction works the same way. An existing routing is copied and used as the basis for a new routing. You can then add, change, or delete any components or operations that are different for the new assembly item. If you make extensive use of the ***same-as-except*** transaction to handle products with standard options, you should consider using the feature/option capability described in the next section.

The ***delete structure*** transaction deletes an entire single-level bill of material structure. The ***mass replace*** transaction replaces one component with another in every bill of material where the original component was used. The ***mass delete*** transaction deletes a component from every bill of material in which it is used.

These multiple action transactions can save considerable time; however, they should be used with care, because one careless error could take a long time to fix.

Designation of standard options for products

If you have products with standard options, this function of the Product Data Management application can be very useful. Consider a simple example of a spray unit with or without an automatic shutoff switch, with three tank sizes, and three wheel sizes. This product has 18 (3 x 3 x 2) possible combinations. Some products have thousands of possible combinations. It would be prohibitively expensive to maintain a separate bill of material for each configuration of such a product. The following illustration shows how the bill of material would be structured to describe the standard product options for the spray unit in this example. The boxes represent the item master records for the product, features, options, and common components. The connecting lines represent the bill of material (product structure) records. The feature/option code in the product structure record identifies three possible types of features: R identifies a required feature (variant), N identifies a feature that is not required, and the absence of the code indicates a normal bill of material component.



The system allows you to use a 20-digit S-number (option selection number) to specify a particular set of standard options. A product may have 20 one-digit features, each with up to 9 options, or have 10 two-digit features, each with up to 99 options, or any combination of features that does not require more than 20 digits to identify the options for all features. (Two digits are required if more than 9 options are allowed for any feature). You specify the format, feature by feature, that you want to use for your S-numbers. One format must serve for all products.

In this example, if you use one-digit features, S-number 321 is the spray unit with 18-inch wheels, 10-inch diameter tank, and automatic shutoff switch. For S-number 13, the spray unit has 8-inch wheels, 12-inch diameter tank, and no automatic shutoff switch. If you were using two-digit features, the spray unit with S-number 020301 would have 12-inch wheels, 12-inch diameter tank, and automatic shutoff switch.

Using product options can save you time in order entry, in releasing final assembly manufacturing orders, and in maintaining and filing bills of material.

Cost buildup and simulation

In order to price your products to sell at a profit, you need to have an accurate picture of the costs. The labor, purchase, and overhead costs for a product are built up by this application using the cost values of each component in the product as the basis. The labor, purchase, and overhead costs are "rolled up" through each level of the bill of material. Routings and work centers can be used to determine labor and overhead costs, or the costs can be assigned directly to each manufactured item. The costs incurred at a specific level of manufacture are identified, as well as the costs for lower or previous levels.

You can do full or selective costing. Full costing costs all items. Selective costing costs an individual item, items that have been entered in the Item Master file after the last full costing run, or items with incomplete costs. Using selective costing, you can choose the items you want to cost without changing the current or standard costs of items whose costs have already been established.

The product costs are available for both current costs and standard costs. Each is derived from the appropriate (current or standard) cost values of its components. Variance analyses are provided to show you the differences between your current and standard costs.

Simulation lets you deal with potential or future cost changes. When you run simulation, you can enter a "what if" change in the price of certain raw material, for example, or a new labor contract, and see the results projected throughout your product data base.

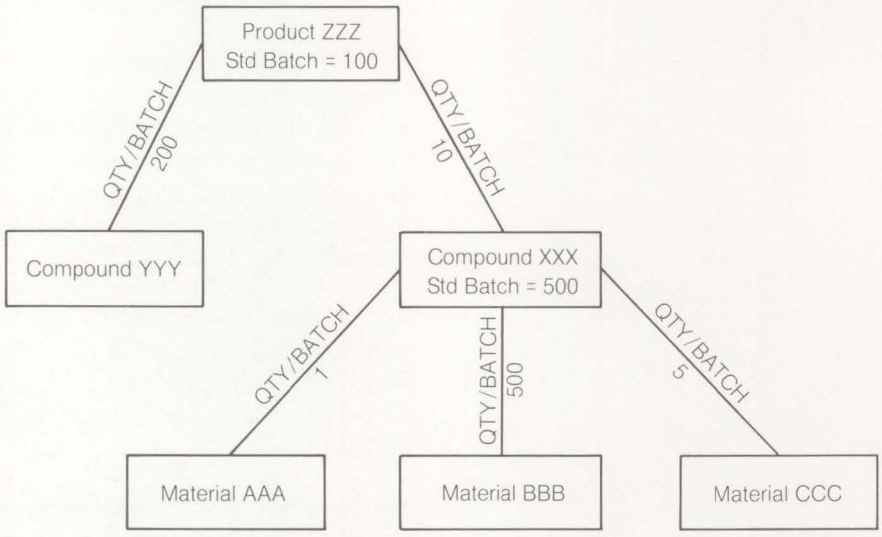
If your products have standard options, you can have Product Data Management calculate the cost of any specific configuration before agreeing on price. You can also indicate a usage percentage or factor for each option of a product for purposes of product cost planning and material requirements planning.

Identification of bill of material changes to Material Requirements Planning

The Product Data Management application notifies Material Requirements Planning of any components affected by a bill of material change so that the material plan will be kept valid.

Standard batch quantity

In the process industry (for example, pharmaceutical, paint, chemical, cosmetic, food and beverage, semi-conductors, or plastics), it is common to structure the bill of material according to a standard batch quantity. The bills of material or product formulations contain the quantity of component materials necessary to produce a standard batch of the parent item. This is usually done because the item being produced contains very small quantities of some materials or ingredients. A pictorial representation is shown here:



This technique can be particularly useful when determining the cost of a small batch requested by a customer, or for producing an assay quantity. Bill of material explosions can be performed and the correct quantity of each component calculated at each level.

Operation yield

This function is primarily used by process industries where scrap or other loss is encountered as a product moves through each stage or operation, and material usage is affected. The yield at an operation level has a cumulative effect as the product moves through subsequent operations. It has an effect on the planned operation times as the batch gets smaller in size. It also has an effect on the component or ingredient requirements as they are introduced at future operations. The operation times are also reduced as the batch gets smaller.

For example, the following manufactured product "A" has these characteristics:

- Standard batch quantity of 700 kilograms
- The product structure (assuming 100% yield) is:

  Material B 300 kg used at Operation 10
  Material C 300 kg used at Operation 20
  Material D 300 kg used at Operation 30

- The end-of-process yield is 40%, with the following yield figures by operation or stage:

	OPERATION YIELD	CUM THRU PREV OPERATION
Operation 10	100%	100%
Operation 20	80%	100%
Operation 30	50%	80%
Operation 40	100%	40%

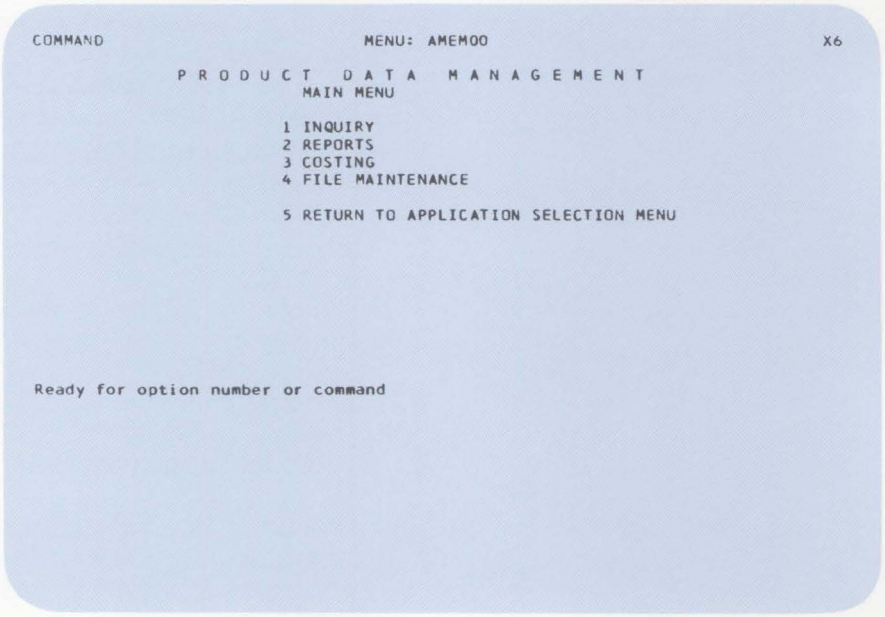
  As a result, if an order is released so that a quantity of 1400 kg is to be produced, then the true material requirements would be calculated as:

  Material B 1500 kg
  Material C 1500 kg
  Material D 1500 kg

Yield values are also used when performing cost buildup or product cost simulations.

Operations

The work station displays assist the user through the operational steps. Daily operation of the Product Data Management application usually begins with the Main Menu. You select the task you want performed by entering the appropriate number. Second-level menus provide a more specific selection of the task. When the task is completed, you can return to the Main Menu to select your next task.



Maintaining files

You can select the file on which you want to perform maintenance by entering the appropriate number on this menu.

```
COMMAND                          MENU: AMEM05                          X6

                P R O D U C T   D A T A   M A N A G E M E N T
                          FILE MAINTENANCE

                        1 ITEM MASTER
                        2 PRODUCT STRUCTURE
                        3 WORK CENTER MASTER
                        4 ROUTING
                        5 RETURN TO MAIN MENU




Ready for option number or command
```

Example: Master File Maintenance

The user enters the action code and the item number.

```
DATE 08/30/**          ITEM MASTER FILE MAINTENANCE      SELECT     AMVT00  A2




                                ENTER--
                                     ITEM    27007-A1
                                     ACTION  C
SELECT ONE OF THESE ACTIONS
A ADD
C CHANGE
D DELETE
P PERCENT CHANGE OF PURCHASE CONTENT (BY ITEM CLASS)
X CHANGE B-RECORD


                                                    CK23 STATUS
                                                    CK24 END OF JOB
```

For example, the changes to data fields in a "B" record in the Item Master file would be entered on this display.

Then you could add, change, or delete other records in the Item Master file or end the job.

```
DATE 08/30/**          ITEM MASTER FILE B-RECORD        CHANGE     AMVT07  A2

ITEM        27007-A1          DESCRIPTION  BASE ASSEMBLY

     QUANTITIES              COST TECHNIQUE CODE   R          FORECAST
STD LOT SIZE      420       CUR LABOR RATE CODE              QUANTITY
MINIMUM QTY                 CUR OVERHEAD CODE                NO OF PERIODS
MULTIPLE QTY                STD LABOR RATE CODE              DAYS/PERIOD
MAXIMUM QTY                 STD OVERHEAD CODE                MSTR LEVEL CODE  0
                            LABOR HRS(4)                     MAX# LINES/ITEM


                       PURCHASE CONTENT   LABOR CONTENT  OVERHD CONTENT
CURRENT THIS LEVEL(4)              2820            6067            3033
STANDARD THIS LEVEL (4)            2820            6067            3033

                                                  CK18 REFRESH SCREEN
                                                  CK19 RETURN TO SELECT
```

Costing

With this menu, you can select the costing function you want to perform.

```
COMMAND                          MENU: AMEM04                              X6

              P R O D U C T   D A T A   M A N A G E M E N T
                          COSTING

                    1 PRODUCT COSTING-CURRENT
                    2 PRODUCT COSTING-STANDARD
                    3 PRODUCT COSTING-BOTH
                    4 SIMULATE PRODUCT COST-CURRENT
                    5 SIMULATE PRODUCT COST-STANDARD
                    6 SIMULATE PRODUCT COST-BOTH
                    7 CHANGE L/O COSTING TABLE
                    8 CHANGE L/O SIMULATION COSTING TABLE
                    9 RETURN TO MAIN MENU


Ready for option number or command
```

After you have selected one of the product costing functions, you are free to do other tasks. Meanwhile, the computer continues to build the cost for the product, update the cost fields in the Item Master file, and print the Product Cost Update Report shown here.

```
      NORTHCREEK IND.                    PRODUCT COST UPDATE REPORT                    DATE  4/03/**  TIME 11.09.18  PAGE  61   AMEJ10
     SELECT DATE  4/03/**                     CURRENT COSTS
   LAST CURRENT  4/03/**
              RCST  U/   I I/ COST
ITEM NUMBER     FLAG  /M   T /C TECH          -------THIS LEVEL-------  --------LOWER LEVELS--------     -----UNIT COSTS------   VAR
    DESCRIPTION                                                                                                                   PCT

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
90FENDER                EA  2 05      PURCHASE      .0000        .0030      .000000      .000000
    FENDER, 90 DEGREE, STAINLESS      LABOR      321.6565        .0000      .000000      .000000   1047.6137        .0000  100.0-
CUR COST STATUS CODE-T                OVERHEAD   725.9572        .0000      .000000      .000000
                                      W AM-4866 COST STATUS FOR A LL COMP IS NOT BLANK
                                      W AM-4874 THIS LEVEL OVERHEAD IS ZERO OR NEGATIVE
                                      W AM-4875 THIS-LEVEL LABOR IS ZERO OR NEGATIVE

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
98908                   EA  4 80      PURCHASE      .0000        .0051      .000000      .000000
    WASHER                            LABOR      321.6565        .0000      .000000      .000000   1047.6137        .0051   99.9-
CUR COST STATUS CODE-                 OVERHEAD   725.9572        .0000      .000000      .000000

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
99001           B       EA  1 10   R  PURCHASE      .0000        .0000      .000000    47.950715
    SPRAY UNIT                        LABOR      321.6565      2.1468       .000000    10.562325   1047.6137       76.7404   92.6-
CUR COST STATUS CODE-L                OVERHEAD   725.9572      6.1062       .000000     9.974385
                                      W AM-4866 COST STATUS FOR A LL COMP IS NOT BLANK

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
99001-1         B       EA  1 10   R  PURCHASE      .0000        .0000      .000000    48.102715
    SPRAY UNIT - PVT LABEL            LABOR      321.6565      2.3435       .000000    10.562325   1047.6137       77.0791   92.5-
CUR COST STATUS CODE-L                OVERHEAD   725.9572      6.6962       .000000     9.974385
                                      W AM-4866 COST STATUS FOR A LL COMP IS NOT BLANK

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
99237-RM                EA  3 30      PURCHASE      .0000       1.9569      .000000      .000000
    PLATED CYLINDER 8 IN              LABOR      321.6565        .0000      .000000      .000000   1047.6137        1.9569   99.8-
CUR COST STATUS CODE-                 OVERHEAD   725.9572        .0000      .000000      .000000

                                                CURR OLD     CURR NEW     CURR OLD     CURR NEW     CURR OLD     CURR NEW
99238-RM                EA  3 30      PURCHASE      .0000       5.3336      .000000      .000000
    PLATED CYLINDER 10 IN             LABOR      321.6565        .0000      .000000      .000000   1047.6137        5.3336   99.4-
CUR COST STATUS CODE-                 OVERHEAD   725.9572        .0000      .000000      .000000
```

You can simulate the impact on the cost of the item in your product line from anticipated changes, such as new labor contract negotiations or a raw material purchase price change. A series of displays assist you in entering the anticipated cost changes, one of which is shown here.

```
DATE 12/12/**                PRODUCT COSTING                SELECT     AMEJ70  **
                               SIMULATION

              MAKE ONE OF THE FOLLOWING CHANGES PRIOR TO SIMULATION

              1 - CHANGE BY ITEM
                     PURCHASE CONTENT THIS LEVEL
              2 - CHANGE BY WORK CENTER
                     MACHINE, RUN LABOR, SETUP LABOR, OR OVERHEAD
              3 - CHANGE BY PERCENT
                     PURCHASE CONTENT THIS LEVEL - I/M
                     MACHINE, RUN LABOR, SETUP LABOR, OR OVERHEAD - W/C
              4 - NONE OF THE ABOVE

              ENTER SELECTION FOR SIMULATION  4

              ENTER COSTING DATE




                                                        CK24 CANCEL
```

After anticipated changes are entered, a Product Cost Simulation Report is printed which is similar to the Product Cost Update Report. You can go through the simulation process again using a different set of anticipated cost changes.

Inquiries

You select the inquiry from the menu shown here.

```
COMMAND                          MENU: AMEM02                          X6

                  P R O D U C T   D A T A   M A N A G E M E N T
                                 INQUIRY

                          1 ITEM MASTER
                          2 PRODUCT STRUCTURE RETRIEVALS
                          3 SINGLE LEVEL COSTED
                          4 ROUTING
                          5 WORK CENTER MASTER
                          6 FEATURE/OPTIONS
                          7 FEATURE/OPTIONS WITH S-NUMBER BUILD
                          8 RETURN TO MAIN MENU



Ready for option number or command
```

Example: Single-level bill of material

Note that the user should enter the S-number to retrieve a bill of material for a product with standard options. If a quantity is entered, the extended quantity of each component required is calculated. Otherwise, the component quantity shown is for one assembly. If an entire bill of material is too large to fit on one display, the paging function can be used to display the remainder.

```
DATE 08/30/**      SINGLE LEVEL BILL WITH BLOW-THRU        INQUIRY    AMEC74  A1

 ITEM 99001           QTY      8  UM EA  I/T 1   SPRAY UNIT
 LLC 00               S-NO. 20301              ENGR DRAWING
LLC SEQ  COMPONENT        QTY      UM I/T   FROM    TO     ENGR DRAWING     OPER
         DESCRIPTION                                      CD-NO   C-FCTR  P-FCTR
01       03590-F3             8.000 EA F                          N-03
         SWITCH FEATURE                                    N-03
02       03590                8.000 EA 4                          0-01    .6000   .6000
         AUTO SWITCH                                       0-01
01       03591-F1             8.000 EA F                          R-01
         WHEEL FEATURE                                     R-01
02       03591-10            10.000 EA 4                          0-2     .4000   .4000
         WHEEL 12 IN DIA                                   0-2                     0010
01       27006-F2             8.000 EA F                          R-2
         TANK SIZE FEATURE                                 R-2
02       26006-22             8.000 EA 1                          A8500004
         TANK 12 BY 24 INCHES                              0-03    .4500   .4500
01       27009-P              8.000 EA 0
         FINAL ASSEMBLY GROUP          **PHANTOM**
02       03021                8.000 EA 4                                          0010
         VALVE
** CONTINUED **                    CK02 PAGE FORWARD   CK12 DISPLAY SELECT
                                                      CK24 END OF JOB
```

Example: Features/Options

This display shows all features and options for a product. This display can be used by the sales order department or others who would want to see all the available options and to know how to specify the appropriate S-number. The cost factor can be used to build up an end-product cost based on the specified mix of options sold. The planning factor can be used by the Material Requirements Planning application to plan requirements for option components based on the specified mix of options sold.

```
DATE 08/30/**                    FEATURE/OPTIONS                  INQUIRY    AMED81 A2
                                                                  S-NO. TEMPLATE NO. 1
 END-ITEM 99001                  SPRAY UNIT                       12222222221000000000
                                                                        COST
S-NO.                                                                   ROLL    PLANNING
 POS    F/O    ITEM              DESCRIPTION-TRUNCATED      QUANTITY    FACTOR  FACTOR

04-05   03   03590-F3           SWITCH FEATURE                        NON-REQD
          01 03590              AUTO SWITCH                  1.000     .6000   .6000
01-01   01   03591-F1           WHEEL FEATURE                         REQUIRED
            1 03591-08           WHEEL 8 IN DIA             2.000     .2500   .2500
            2 03591-10           WHEEL 12 IN DIA            2.000     .4000   .4000
            3 03591-12           WHEEL 18 IN DIA            2.000     .3500   .3500
02-03   02   27006-F2           TANK SIZE FEATURE                     REQUIRED
          01 26006-21           TANK 8 BY 12 INCHES          1.000     .3000   .3000
          02 26006-22           TANK 11 BY 18 INCHES         1.000     .2500   .2500
          03 26006-23           TANK 12 BY 24 INCHES         1.000     .4500   .4500



   ****  END  ****                                    CK02 PAGE FORWARD
                                                      CK24 END OF JOB
```

Example: Single-level where used

This display includes every product or assembly in which a component is used. It can be used to see which products or assemblies would be affected by a contemplated design change or material substitution. It can also be useful in deciding what to do in case of a material shortage.

```
DATE ********          SINGLE LEVEL WHERE-USED              INQUIRY    AMEC73 A2

 ITEM 04632                        UM EA  I/T 4    WASHER
 LLC 04                                            ENGR DRAWING
LLC     PARENT                QUANTITY UM I/T   FROM      TO      1ST OPER    SEQ
        DESCRIPTION                                       ENGR DRAWING
00       79210                 1.000 EA  1                            0030
        PUMPING UNIT
00       42968                 5.000 EA  1    02/01/**  11/30/**    0040
        MOTOR SUPPORT 4HP                                 74210P
03       27003-20              2.000 EA  1                            0010
        PUMP ASSEMBLY                                     AX00390
02       27007-A1              4.000 EA  1                            0010
        BASE ASSEMBLY                                     AX00420
01       27009-P               2.000 EA  0                            0010
        FINAL ASSEMBLY                  **PHANTOM**



                          CK02 PAGE FORWARD   CK12 DISPLAY SELECT
                                              CK24 END OF JOB
```

Reports

You select the report you want from the menu shown here.

```
COMMAND                          MENU: AMEM03                          X6

                    P R O D U C T   D A T A   M A N A G E M E N T
                                  REPORTS

                          1 ITEM MASTER SELECTIONS
                          2 WORK CENTER REPORT - BY W/C
                          3 WORK CENTER REPORT - BY DEPT
                          4 FEATURE/OPTIONS REPORT
                          5 RETRIEVAL SELECTIONS - REGULAR
                          6 RETRIEVAL SELECTIONS - COSTED
                          7 RETURN TO MAIN MENU




Ready for option number or command
```

Subsequent displays assist you through the selection of run options, such as which records to print, the sequence of records on the report, and which report format to use.

Example: Retrieval selections

With this display, you can select the type of report and the item you want printed.

```
DATE 03/14/**        R E T R I E V A L   R E P O R T S    SELECT     AMEF41  A2
                           --SINGLE LIST--


                                                              APPLIES
                      ENTER--                                 TO--
                           RUN OPTION  1
                           ITEM        27005-A               1-6,8 (REQD)
                           QUANTITY      30                  1-3,8
                           S-NUMBER    010301                1,2,8
                           WORK CTR ID                       7 (REQD)
RUN OPTIONS--              EFFEC DATE  0414**                1-5,8

1 SINGLE LEVEL BILL WITH BLOW-THRU
2 INDENTED BILL
3 SUMMARIZED BILL
4 SINGLE LEVEL WHERE-USED
5 END-ITEM WHERE-USED
6 ROUTING
7 WORK CENTER WHERE-USED
8 ROUTING & SINGLE LEVEL WITH BLOW-THRU

                                                  CK02 MULTI-LIST OPTIONS
                                                  CK24 END OF JOB
```

Indented item list: The indented bill of material (item list) shows the entire structure of a product down through all levels to purchased items and raw materials.

The single-level bill of material shows all the components and subassemblies used directly to make a product or assembly. It could be used as a picking list for manufacturing orders.

```
NORTHCREEK IND.          SINGLE LEVEL BILL WITH BLOW-THRU                    DATE  4/03/**  TIME 10.32.54  PAGE   1   AMEF71

PARENT ITEM NO.          DESCRIPTION SPRAY UNIT                              BATCH QTY    1   ITEM TYPE  1   LOW LEVEL  00
99001                    ENGR DRAW                                                            UNIT MEAS EA   PLANNER   901
                         S-NO. 0/00/00/00/00/00/00/00/00/00/0/

     LL SEQ  COMPONENT                                ENGINEERING                          ITEM   OPT  FIRST  LT  EFFECTIVE DATES
     CO NO.  ITEM NO.      DESCRIPTION                DRAWING NUMBER     QUANTITY  UM TYP NO. OP SEQ  ADJ  FROM       TO

     01 0000 03590-F3      SWITCH FEATURE             FEATURE  3         NON-REQD      F
     02 0000 03590         AUTO SWITCH                                    1.000  EA  4    01
     01 0000 03591-F1      WHEEL FEATURE              FEATURE  1         REQUIRED      F
     02 0000 03591-08      WHEEL 8 IN DIA                                 2.000  EA  4     1
     02 0000 03591-10      WHEEL 12 IN DIA                                2.000  EA  4     2
     02 0000 03591-12      WHEEL 18 IN DIA                                2.000  EA  4     3
     01 0000 27006-F2      TANK SIZE FEATURE          FEATURE  2         REQUIRED      F          0010
     02 0000 26006-20      TANK 8 BY 12 INCHES        A8300004           1.000  EA  1    01
     02 0000 26006-21      TANK 10 BY 18 INCHES       A8400004           1.000  EA  1    02
     02 0000 26006-22      TANK 12 BY 24 INCHES       A8500004           1.000  EA  1    03
     01 0000 27009-P       FINAL ASSEMBLY GROUP                          1.000  EA  0
     02 0000 03021         VALVE                                         1.000  EA  4          0010
     02 0000 03385         WRENCH                                        1.000  EA  4          0010
     02 0000 03398         CORD BRACKET                                  1.000  EA  4          0010
     02 0000 03410         BRACKET                                       1.000  EA  4          0010
     02 0000 03415-1       SPRAY NOZZLE                                  1.000  EA  4          0010
     02 0000 03419         HINGE PIN                                     1.000  EA  4          0010
```

The Routing List shows the sequence of processing required to manufacture an item. It could be used as the shop paper to manufacture an item.

Standard run times

Work center

Tool number required for this operation

THE PDM FIRM ROUTING LIST DATE 8/30/** TIME 19.39.33 PAGE 1 AMEG11
OPER DAW

ITEM NO. 27643 FRAME U/M EA I/T 2 ENGR DRAW

---OPERATION---- SEQ	DESCRIPTION	TIME BASIS	----RUN---- MACHINE	LABOR	---SETUP--- HOURS	CREW	W/C ID DESCRIPTION	QUEUE DAYS	MOVE DAYS	OPERATION STATUS	TOOL NO.	---REPORTED---- TIMES LAST DATE	DATE LAST MAINTAINED
10	DRILL - STAMP	2	1.00	1.00	.50	1	DR045	4.00	.10	ACTIVE	5265		8/30/**
		AVERAGE	.00	.00	.00		DRILLS					PROCESS- 135	
20	DRILL 2 IN.	2	1.00	1.00	.50	1	DR045	4.00	.50	ACTIVE	190		8/30/**
		AVERAGE	.00	.00	.00		DRILLS						
30	SHAPE INSERT	2	5.00	5.00	1.00	1	LA035	5.00	.50	INACTIVE	126S		8/30/**
		AVERAGE	.00	.00	.00		LATHES						
90	INSPECT	2	2.00	2.00	.00	1	IN040	2.00	.50	ACTIVE			8/30/**
		AVERAGE	.00	.00	.00		INSPECTION						

Run time modifier
- 0–hours per unit
- 1–hours per 10 units
- 2–hours per 100 units
- 3–hours per 1,000 units
- 4–hours per 10,000 units
- P–units per hour
- H–hours per lot
- C–cost of outside operation

Costed reports: You select the report and item you want from this display.

```
DATE 03/14/**          C O S T E D   R E P O R T S          SELECT     AMEF43  A2
                            --SINGLE LIST--


                                                                    APPLIES
                                ENTER--                             TO--
                                     RUN OPTION  1
                                     ITEM        27005-A            ALL (REQD)
                                     QUANTITY                       5,6
                                     EFFEC DATE  0414**             ALL
                                     S-NUMBER    010301             1,2,5,6
RUN OPTIONS--

1 SINGLE LEVEL CURRENT
2 SINGLE LEVEL STANDARD
3 INDENTED CURRENT
4 INDENTED STANDARD
5 OPERATIONS COST SHEET CURRENT
6 OPERATIONS COST SHEET STANDARD

                                                  CK04 MULTI-LIST OPTIONS
                                                  CK24 END OF JOB
```

The **Single-Level Cost Sheet** shows the breakdown of cost content for purchase, labor, and overhead costs added at the item level, as well as from lower levels. This report and the next report illustrated should be a valuable aid in detailed cost analysis.

```
NORTHCREEK IND.        SINGLE LEVEL COST SHEET-CURRENT          DATE **/**/**  TIME 13.03.52  PAGE   1  AMEG71

                                                          ----------U N I T   C O N T E N T----------   UNIT COST
PARENT ITEM NO. 99001          SPRAY UNIT                 LEVEL   PURCHASE      LABOR      OVERHEAD
ENGR DRAW            COST TECH R   I/T  1   LOW LEVEL  00
LAST COSTED **/**/**    EFFEC **/**/**  U/M EA   PLANNER   901   THIS      $.0000     $2.1468     $6.1062     $73.6306
RECOST FLAG      COST STATUS                                    LOWER     $46.0807    $9.3225     $9.9744
S-NO. 2/03/01/  /  /  /  /  /  /  /
SEQ  COMPONENT                          COST I   QUANTITY
NO.  ITEM NO.        DESCRIPTION        TECH T     PER   U/M

0000 03590-F3        SWITCH FEATURE          F     NON-REQD FEATURE  3
0000 03590           AUTO SWITCH             4     1.000 EA THIS      $1.2500     $.0000      $.0000      $1.2500
  LLC 02       OPTION-01                                   LOWER      $.0000      $.0000      $.0000

0000 03591-F1        WHEEL FEATURE           F     REQUIRED FEATURE  1
0000 03591-10        WHEEL 12 IN DIA         4     2.000 EA THIS      $2.0000     $.0000      $.0000      $2.0000
  LLC 02       OPTION-2                                    LOWER      $.0000      $.0000      $.0000

0000 27006-F2        TANK SIZE FEATURE       F     REQUIRED FEATURE  2
0000 26006-22        TANK 12 BY 24 INCHES  R 1     1.000 EA THIS      $.0000      $3.3439     $10.0378    $25.2478
  LLC 02       OPTION-03                                   LOWER     $11.8661     $.0000      $.0000

0000 27009-P         FINAL ASSEMBLY GROUP    0     1.000 EA THIS      $2.7677     $.0000      $.0000      $43.0644
  LLC 01                                                  LOWER     $32.6860     $6.4007     $1.2100

                                        COMPONENT TOTAL    $50.5698    $9.7446     $11.2478    $71.5622

                                                    ITEM LABOR & OVERHEAD                                  $8.2530
                                                        THIS LEVEL
                                                    OUTSIDE OPERATION COST                                 $.0000
                                                        THIS LEVEL

                                                    ITEM UNIT COST                                         $79.8152
```

The **Routing operation cost sheet** shows the costs for material, as well as the detailed labor and overhead costs added at each operation in the manufacturing process.

```
NORTHCREEK IND.     ROUTING OPERATION AND SINGLE LEVEL COST SHEET - CURRENT      DATE  4/03/**  TIME 10.56.52  PAGE    1  AMEH41

                                                                                COST TECHNIQUE CODE R
PARENT ITEM NO. 99001              SPRAY UNIT                                   BATCH QTY          1  LOT SIZE       700
ENGR DRAWING                       S-NO. 3/03/01/  /  /  /  /  /  /  /  /     LAST COSTED  4/03/**  UNIT MEAS      EA
RECOST FLAG S     COST STATUS L

 SEQ COMPONENT       DESCRIPTION                  RECOST  COST   QUANTITY                    OPTION     EFFECTIVE   DATES      EXTENDED
 NO. ITEM NO.                                      FLAG  STATUS          COMPONENT COST     NUMBER       FROM        TO         COST

0000 03590-F3        SWITCH FEATURE                          FEATURE 03                    NON-REQD
0000 03590           AUTO SWITCH                                 1.000        1.2500         01                                  $1.250
0000 03591-F1        WHEEL FEATURE                           FEATURE 01                    REQUIRED
0000 03591-12        WHEEL 18 IN DIA                             2.000        1.2500          3                                  $2.500
0000 27006-F2        TANK SIZE FEATURE                   L   FEATURE 02                    REQUIRED
0000 26006-22        TANK 12 BY 24 INCHES            S   L       1.000       25.2478         03                                 $25.248
0000 27009-P         FINAL ASSEMBLY GROUP                L       1.000       46.1742                                            $46.174

 WORK   --------OPERATION--------    --RUN/SETUP LABOR CONTENT--  -RUN/SETUP MACHINE CONTENT--  ------OVERHEAD-------
CENTER  SEQ  DESCRIPTION                 TRC  RATE   RUN LABOR          RATE   RUN MACHINE   RATE CODE      CONTENT
                          W/C EFF              RATE SETUP LABOR   CREW        SETUP MACHINE

AS099   0010 AFINAL UNIT ASSEMBLY R   3.00 P  3.540    1.311110   .00   .00      .000000 300.00   B        3.9333        $5.244
                              .90  S    .00    4.500    .000000     1            .000000
IN040   0020 TEST & INSPECT        R   7.00 P  5.350     .835713   .00  3.00      .000000 260.00   B        2.1729        $3.009
                             1.00  S    .00    4.500    .000000     1            .000000

                                                                          TOTAL ACTIVE EXTENDED COST                      $83.425
```

Master Production Schedule Planning

Information flow

Figure 2-3 shows how information flows through the Master Production Schedule Planning application. The numbers and letters in the following discussion refer to that figure. As the figure suggests, you can complete all phases of Master Production Schedule Planning from a work station.

Master scheduling can start from item production plans, forecasts, customer orders, or manually entered firm planned orders. These sources of data express the demand for master scheduled items.

If you want to use item production plans for master scheduling, the first step is to aggregate (add up) demand and inventory information about separate items into information about production families 1. Production families are groups of master scheduled end items that use similar production resources. You can assign items to production families or reassign them online before you aggregate your item-level information.

After you aggregate the item-level information, the next step is to create or maintain family-level production targets based on forecasted demand and desired ending inventory levels 2. These targets are the basis for family-level production plans (family operating plans).

Before you use the family production plans to create item-level production schedules, you may want to test the family plans for resources needed 3. Testing resources tells you which resources will be needed to meet each family's production plan, when the resources will be needed, and how much will be required.

The next step 4 is to create item production plans by assigning family production levels to items in the family, or by adjusting existing item production plans to reflect family changes. These item production quotas remain as "trial plans" until you confirm them for use in master production scheduling.

After you aggregate the new item production plans, you can use inquiry displays 5 to compare family plans with current item production plans and current scheduled orders (master production schedules). You can track current scheduling against long-range plans.

From your item production plans or other sources of demand, you can create master production schedules 6. The scheduling process plans orders to meet demand for the end items and component items that you have chosen for master scheduling. You can review and adjust the planned orders online. You can also print a Master Schedule Planning Report (A) as a worksheet for a more permanent record of the orders and related messages.

You can test the master production schedules 7 for resources needed. If you are still within your facility and resource limits, you can expect to produce the orders as scheduled.

After you have created and made the necessary changes to the master production schedules, the Material Requirements Planning application 8 uses the master scheduled orders to plan the component orders needed to meet the master schedules.

At intervals you will want to update your resource profiles 9. A resource profile identifies which critical resources a master scheduled item uses. It also calculates how much of each resource a standard lot or batch of the item requires and the point in the production routing when each resource is needed. Resource profiles are the basis for resource testing and resource planning.

The Resource Profile Exception Report (B) prints when you create resource profiles. It can alert you to potential problems in the lead times and lot or batch sizes that you are using to plan orders, schedule production, and estimate resource needs.

At any time, you can use the Available to Promise display 10 to get real-time information about the quantities of an item that can be committed to sales or other uses in any planning period. The information can be available to order entry personnel, as well as to planners.

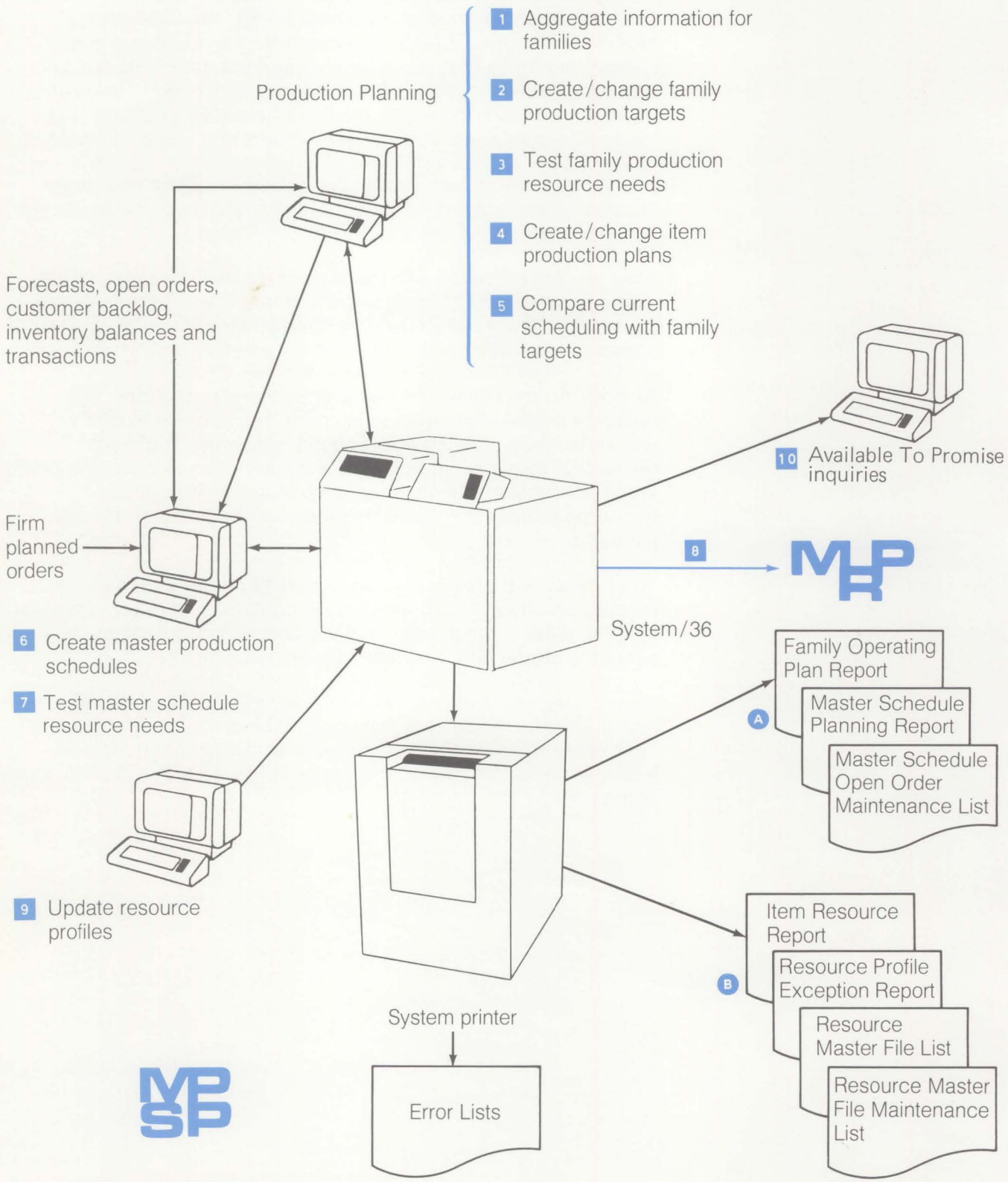


Figure 2-3. Master Production Schedule Planning information flow

Application functions

Note: The Inventory Management, Product Data Management, and Material Requirements Planning applications are required for the Master Production Schedule Planning application. The Forecasting and Order Entry and Invoicing applications are highly recommended, though not required. These applications provide timely forecasts and current customer order backlog information; they greatly reduce the manual effort needed to supply information for master scheduling.

Production planning

Production planning is an important preliminary step for successful master scheduling. Production plans present goals that have been agreed to by upper-level management and by representatives of sales, finance, production control, and materials control. Production plans balance high-level goals against realistic limits and help ensure that long-range production schedules will continue to meet the requirements of all parts of the company.

Production Targets: Production planning begins when you set family production targets for each period based on forecasted demand and the inventory levels you want to maintain. These targets become the production plan (operating plan) for the family. You can store the operating plan in the system as a base plan so that you can compare changing sales and inventory conditions against it.

Family operating plans: Each time you aggregate (add up) current demand and inventory information (usually once per period), you replace the current operating plan with a revised operating plan. The revised operating plan is the working version of the base plan; you adjust it to reflect current information about actual customer orders, forecasts, and production changes. Whenever you revise the operating plan, you can check the resource requirements for the revised plan to be sure that your production targets are still feasible.

To help you set and maintain realistic goals for production and inventory levels, the application lets you compare the base and operating plans to current information and to each other. For example, you can compare demand, production, and inventory information in the base plan to current demand, production, and inventory quantities. The system calculates variances for you. It also displays the quantities in your choice of units or costs.

Item production plans: To create item production plans, you distribute family production levels among the items in the family. To help you set or adjust item production levels, you can see an "item trial plan" and supporting information for the item. For each period, the item trial plan shows:

- Net blended demand for the item
- Any adjustments you have made to shift production between periods.

You can also see reference information, such as:

- The existing production plan for the item (the plan being used for master scheduling)
- How the sum of all item trial plans for the family compares to the family target for the period.
- Retained ("held") inventory that would result from adjustments in the trial plan.

You can change and recalculate production levels for the item until you are ready to finalize the adjusted quantities as the item's production plan. Then the system can use the plan to generate a master production schedule for the item.

Master Schedule Planning

Master production schedules are the most important output of this application. They show the firm planned and planned orders that you will need to meet the demand from item production plans, forecasts, customer order backlogs, or a blending of forecasts and customer orders.

Master schedule planning plans orders only for master scheduled items that you identify. These items can be end items or major component items. The scheduling is based on lead times, lot or batch sizes, and order policy codes recorded in the Product Data Management and Material Requirements Planning files. The application also uses current inventory balances, customer orders, and scheduled receipts from Inventory Management.

Master schedule planning occurs between a current date and a cut-off date that you set. You also decide on which day of the week the planning periods begin. In a planning run, the system schedules orders for each item by period, with attention to existing firm planned orders and time fences. The system generates planned orders; only the master scheduler can create or reschedule firm planned orders.

If demand changes, the application suggests how the master scheduler (planner) can adjust firm planned and open orders to meet the changed demand. It adjusts planned orders automatically.

The relation between scheduling and demand is dynamic. Scheduled orders, inventory shipments, and inventory receipts automatically consume (account for) demand from forecasts, customer orders, or item production plans. The interaction between scheduling and demand reduces the risk of duplicate orders or overproduction.

Run-time options for master schedule planning: The application provides you a run-time option for selecting the lowest product structure level to plan to in a planning run. You can start by planning orders for level 0 master scheduled items. When you have reviewed and adjusted those schedules, you can generate schedules again to include level 1 master scheduled items. You can proceed step by step through the lowest product structure level where master scheduled items occur.

You can also choose whether to get current demand and inventory information each time you generate schedules. To save time, you can get demand and inventory information once for all levels and then plan each level using the same information.

Time fences: Master schedule planning uses time fences to mark the major zones (sections) of each schedule. The zones correspond to the frozen, firm, and free periods in a manufacturing schedule.

The DEMAND TIME FENCE marks the end of the frozen zone of the schedule. Between the current date and the DEMAND TIME FENCE, which you specify for each item, the system ignores forecasts; it plans orders only to meet production plans or customer orders. You can use this zone as the final assembly lead time for an item.

The CMLT (Cumulative Material Lead Time) TIME FENCE or the last firm planned order, whichever is later, marks the end of the firm zone of the schedule. If the application plans an order within the firm zone, it generates an exception message to alert you.

Outside the CMLT TIME FENCE or the last firm planned order is the free zone. In the free zone, the application can generate or reschedule orders without causing exception messages.

Adding firm planned orders: In master schedule planning, you can add firm planned orders or change existing ones. You as the planner have direct control over all orders, regardless of the time fences and zones.

Resource planning

You can use the application to assess the present and future resource needs of your manufacturing operation.

Family production plans (production targets) can be the basis for long-range resource planning up to three years. You can check family production targets against critical resources that you specify. If any resources are inadequate, management can revise production goals or plan how to provide the resources by the time they are needed. This long-range testing of family production plans is known as resource requirements planning.

You can also check your master production schedules for their use of critical resources over the scheduling horizon. This testing, known as rough-cut capacity planning, provides another check on resources required before the master scheduled orders are released and exploded into component orders.

Resource profile generation

This application can create resource profiles automatically to help you do resource testing and planning. When the system creates (generates) a resource profile for a master scheduled item, it calculates:

- Which critical resources the item uses
- The number of days before completion of the item that each resource will be expended
- How much of each resource will be needed to produce a standard lot or batch of the item
- The dollar value of the resource needed to produce a standard lot or batch.

The application can create composite resource profiles for production families to allow you to check resources at the family level. It can also use resource profiles that you create and enter.

Using forecasts

You can use forecasts from the Forecasting application or from a user-entered interface file to provide demand for production planning and for master scheduling. Forecasted demand can be used alone, or it can be blended with customer orders so that master scheduling uses whichever is greater for each planning period.

For production planning, you can enter forecasts for up to three years. For master scheduling, the forecasts should cover a period at least equal to the longest CMLT of any master scheduled item. However, you can enter forecasts covering up to 52 weekly planning periods and up to 24 monthly planning periods. With the forecasts to approximate demand, you can do long-range, strategic resource testing and planning while adjusting short- and medium-range production goals to meet actual customer orders.

Interfaces with Material Requirements Planning

Master Production Schedule Planning and Material Requirements Planning are closely related.

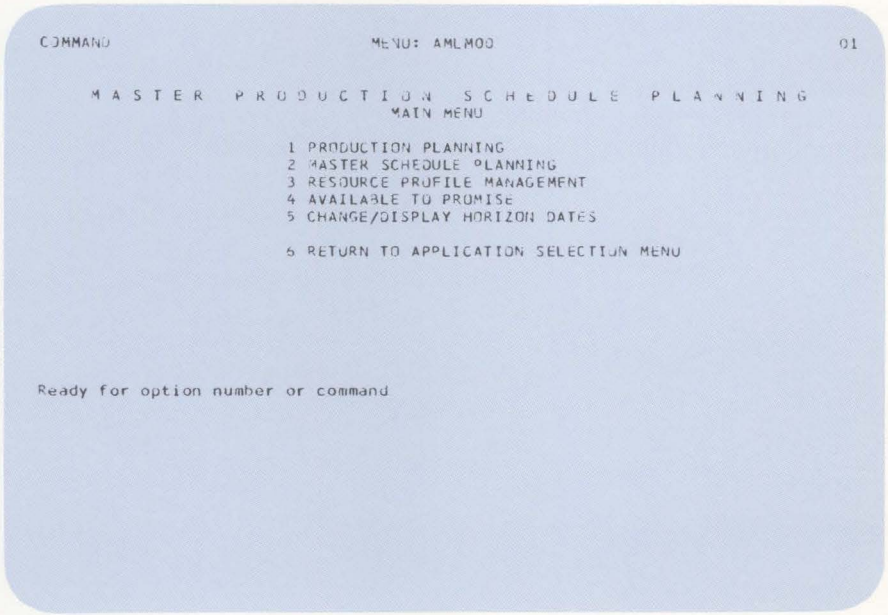
Master Production Schedule Planning uses information from the Material Requirements Planning application, but does not send any information automatically. Material Requirements Planning retrieves the master production schedules for each net change or full generation planning run. However, if you are developing new master schedules, the Material Requirements Planning runs can continue to work from the existing master schedules until the new schedules are approved and ready.

Master Production Schedule Planning depends on the Material Requirements Planning application to:

- Release all manufacturing and purchase orders
- Provide pegging information about sources of demand for master scheduled component items
- Do all planning for items that are not master scheduled items.

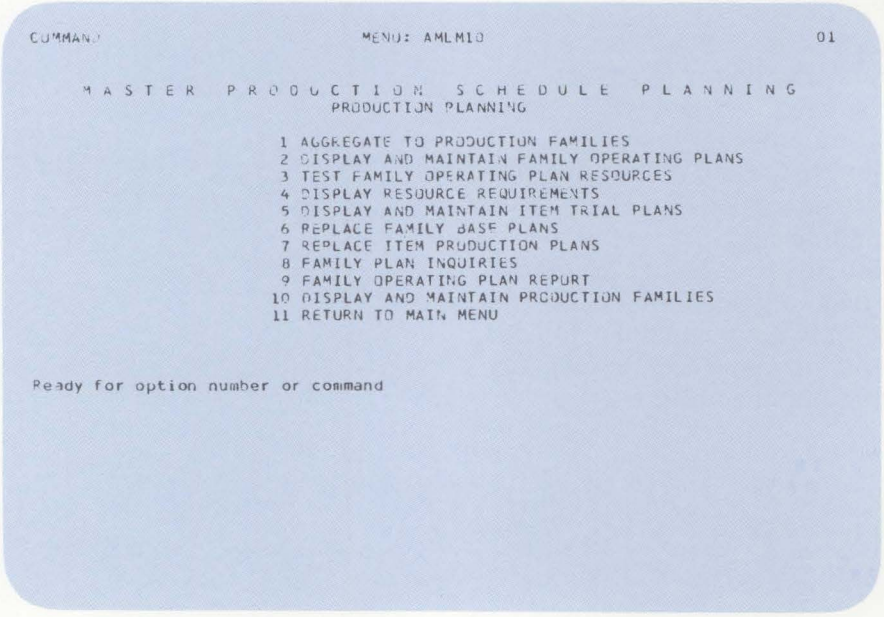
Operations

Production planning, master production scheduling, and resource planning start from this menu. When you enter the number for one of the activities listed, the application begins to guide you step by step through the necessary actions. Options 1, 2, and 3 bring secondary menus for you to make more specific choices; options 4 and 5 bring displays that begin activities.



Production planning

This menu appears when you choose option 1 on the Main Menu. Production planning is usually the first step in master production scheduling.



From this menu you can:

- Aggregate item production plans for the production families that you have defined
- Create and adjust family production targets
- Create and adjust item production plans
- Check the amounts of critical resources needed to meet your production plans
- Monitor how well current production, demand, and inventory levels match the base plan
- Monitor how well the present item production plans and master production schedules are meeting your production targets
- Assign or reassign end items to production families.

Using production families

Production families are groups of master scheduled items that use similar manufacturing resources (for example, tools, supplies, or machines). Grouping items into production families allows clearer high-level production and resource planning.

The Display/Maintain Production Families display shows you which items have been assigned to a production family, what percentage of the total family's forecasted demand each item represents, and the period of time the item is included in planning and scheduling. From this display you can change your production families to reflect changes in production facilities or supply patterns.

```
DATE  3/05/**        DISPLAY/MAINTAIN PRODUCTION FAMILIES              AML361  01
  PROD FAMILY NUMBER  90DF                          SIGNIFICANCE     (       )
  DESCRIPTION  SHEET METAL PRODUCTS                 RATE/DAY                900
          ITEM                                                  SCHEDULED
SEQ       NUMBER              DESCRIPTION            PCT  P     FROM        TO
 01  933              INDUSTRIAL BUCKET 12"           49  A
 02  935              INDUSTRIAL BUCKET 15"           19  A
 03  931              INDUSTRIAL BUCKET  9"           15  A  01/01/**
 04  911              PORTABLE H. D. GARDEN SPRAYER    4     02/12/**
 05  922              GARDEN SPRAY UNIT               14


                              INQUIRY   CK04 ADD           CK11 DELETE FAMILY
END                                     CK05 CHG/DELETE    CK19 RETURN TO SELECT
                                        CK10 CHG RATE/SIG  CK24 END OF JOB
```

To help you decide how to assign items to production families, you can print a report that shows the top five critical resources needed for each master scheduled item.

Creating Production Plans

You begin developing production plans by adding up (aggregating) item-level information to a family level to set family production targets and create a family operating plan. Upper-level management can use the family operating plans to set their goals for sales, production, and inventory.

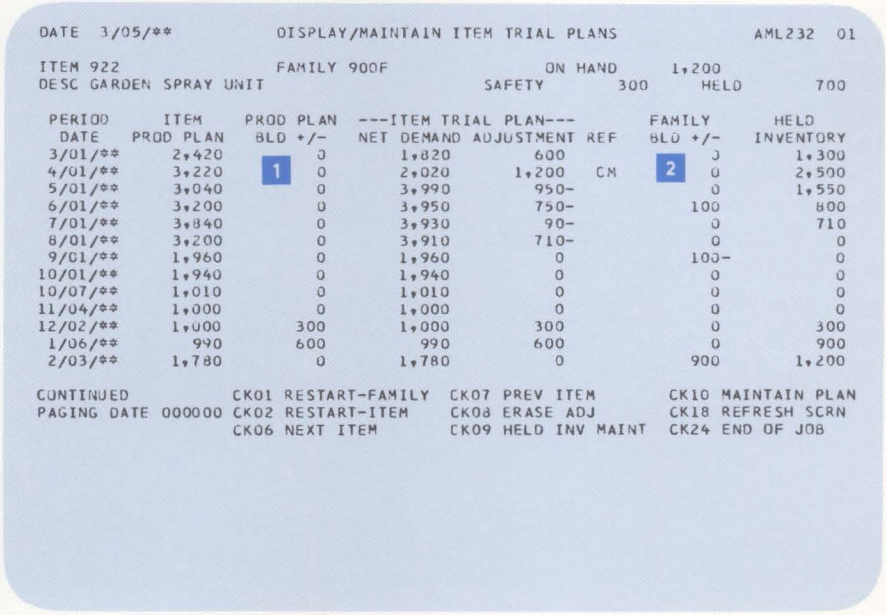
You use the Display/Maintain Family Operating Plans display to review and adjust a family's production targets based on current demand and inventory conditions.

```
DATE  3/05/**          DISPLAY/MAINTAIN FAMILY OPERATING PLANS          AML202  01

FAMILY 900F                                                              UNITS
DESC SHEET METAL PRODUCTS              ON HAND     7,000   SIGNIFICANCE (      )

  PERIOD     PRODUCTION    BLENDED    PROJECTED      NET     CUMULATIVE 1   MAX 2
   DATE       TARGET       DEMAND     INVENTORY     DEMAND     CHECK      TARGET
  3/01/**      17,300       18,300       6,000       11,300      6,000      18,000
  4/01/**      21,600       18,100       9,500       18,100      9,500      22,500
  5/01/**      16,400       19,400       6,500       19,400      6,500      17,100
  6/01/**      17,300       20,200       3,600       20,200      3,600      18,000
  7/01/**      20,700       20,000       4,300       20,000      4,300      21,600
  8/01/**      17,300       19,800       1,800       19,800      1,800      18,000
  9/01/**      16,800       17,100       1,500       17,100      1,500      17,100
 10/01/**      21,600       17,100       6,000       17,100      6,000      22,500
 11/01/**      15,500       17,600       3,900       17,600      3,900      16,200
 12/01/**      19,000       17,500       5,400       17,500      5,400      19,800
  1/01/**      17,300       17,300       5,400       17,300      5,400      18,000
  2/01/**      17,300       17,100       5,600       17,100      5,600      18,000
  3/01/**      17,300       16,200       6,700       16,200      6,700      18,000

CONTINUED            CK04 DSP DETAIL   CK07 COSTS/UNITS   CK18 REFRESH SCREEN
PAGING DATE  000000  CK06 NEXT FAMILY  CK09 CALC TARGETS  CK19 RETURN TO SELECT
                                       CK10 MAINT TARGET  CK24 END OF JOB
```

1 The CUMULATIVE CHECK column shows you whether cumulative production is meeting cumulative demand. A negative quantity for a period means that you need to increase production before that period to meet demand.

2 The MAX TARGET (Maximum Target) column shows you the maximum or desired production levels you can set for a family in a period.

Use the Display/Maintain Item Trial Plans display to change production levels for items.

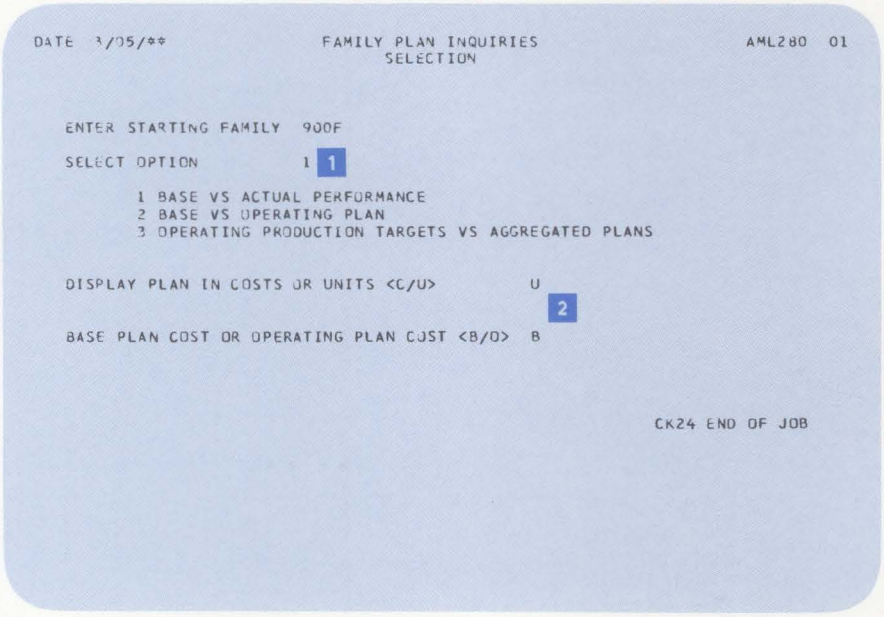


```
DATE  3/05/**          DISPLAY/MAINTAIN ITEM TRIAL PLANS                AML232  01

ITEM 922                    FAMILY 900F                    ON HAND     1,200
DESC GARDEN SPRAY UNIT                                     SAFETY        300     HELD        700

 PERIOD      ITEM     PROD PLAN   ---ITEM TRIAL PLAN---          FAMILY      HELD
  DATE    PROD PLAN   BLD +/-   NET DEMAND ADJUSTMENT REF      BLD +/-    INVENTORY
 3/01/**      2,420         0        1,820        600                0        1,300
 4/01/**      3,220         0        2,020      1,200   CM            0        2,500
 5/01/**      3,040         0        3,990        950-                0        1,550
 6/01/**      3,200         0        3,950        750-              100          800
 7/01/**      3,840         0        3,930         90-                0          710
 8/01/**      3,200         0        3,910        710-                0            0
 9/01/**      1,960         0        1,960          0              100-           0
10/01/**      1,940         0        1,940          0                0            0
10/07/**      1,010         0        1,010          0                0            0
11/04/**      1,000         0        1,000          0                0            0
12/02/**      1,000       300        1,000        300                0          300
 1/06/**        990       600          990        600                0          900
 2/03/**      1,780         0        1,780          0              900        1,200

CONTINUED          CK01 RESTART-FAMILY  CK07 PREV ITEM       CK10 MAINTAIN PLAN
PAGING DATE 000000 CK02 RESTART-ITEM    CK08 ERASE ADJ       CK18 REFRESH SCRN
                   CK06 NEXT ITEM       CK09 HELD INV MAINT  CK24 END OF JOB
```

1 The PROD PLAN BLD +/- (Production Plan Build) column shows you how you affect the master schedules when you change an item's trial plan.

2 The FAMILY BLD +/- (Family Build) column shows how much the item trial plans vary from the production target for a family.

Family plan inquiry displays help you review and evaluate your family base and operating plans. The Family Plan Inquiries Selection display lets you choose the kind of plan and the kind of information (such as production, demand, or inventory) you want to compare.

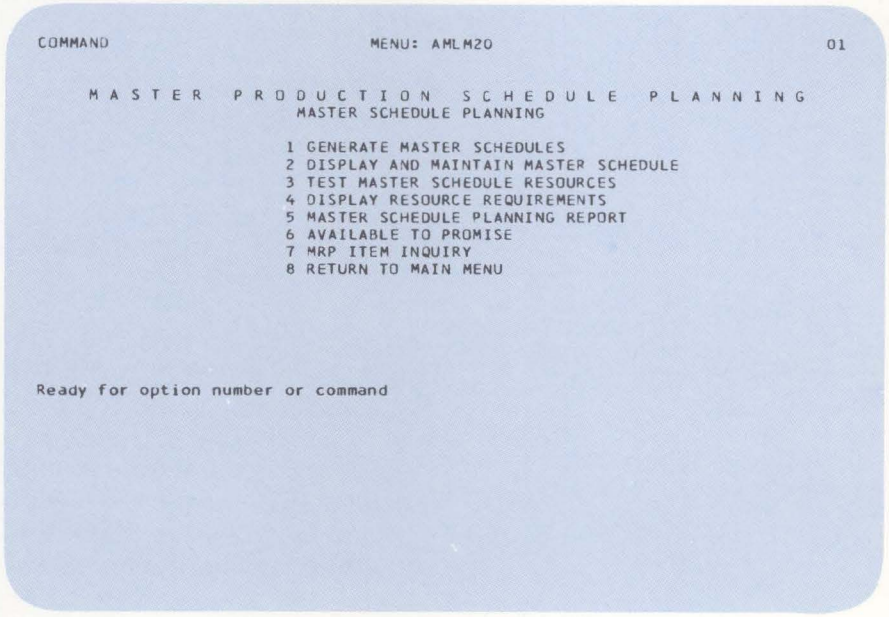


1 You can select various combinations of base plan, operating plan, and aggregated item production plans or master schedules for comparison.

2 You can also choose to see the information expressed in costs or units, and whether the costs should be current costs or the costs when you established the base plan.

Master Schedule Planning

Master scheduling activities begin from this menu.



You can:

- Generate and adjust the orders in your master production schedules
- Test your master production schedules for resources needed
- Print the Master Schedule Planning Report
- Use the Available to Promise inquiry display
- Do MRP item inquiry for peg-to information about master scheduled component items.

Varied Sources of Demand

You can generate master production schedules from many kinds of demand:

- Forecasts
- Customer orders
- A blend of forecasts and customer orders, using whichever is greater by period
- Item production plans
- Manually entered firm planned orders for master scheduled items.

You decide which type of demand to use for each master scheduled item. You can use the same type for all items, or you can use a variety, matching the demand type to the item.

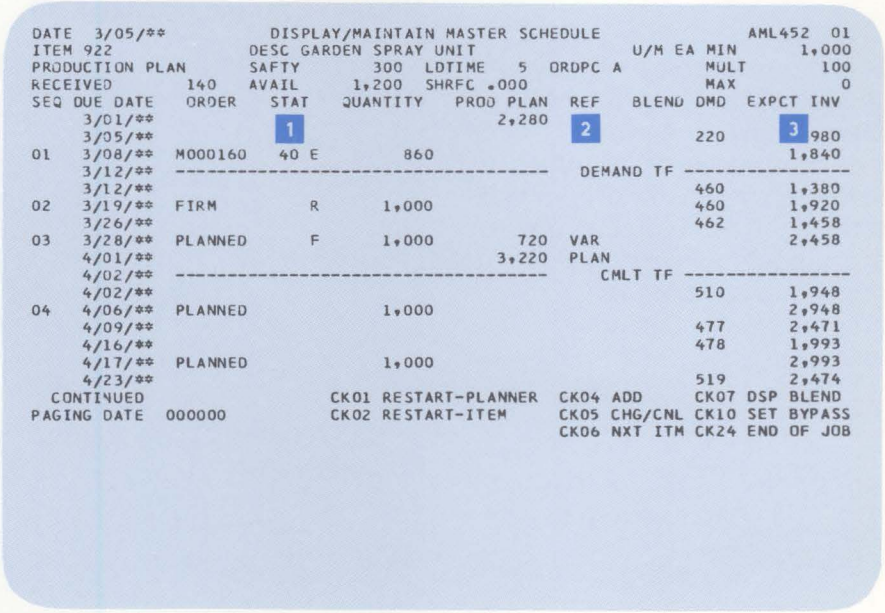
If you want to see details about demand in relation to orders for a master scheduled item, a blended demand display shows the demand by order due date. This display is available to you while you are reviewing or maintaining your master schedules.

Managing the Master Schedule

Two essential displays enable you to review and adjust your master production schedules before they become the basis for material requirements planning. These Display/Maintain Master Schedule displays show:

- The firm planned and planned orders that have been generated and any open orders
- The production and scheduling status for each order
- The demand that was the basis for the orders
- Expected levels of inventory
- Demand and CMLT time fences
- Basic reference information about the item being ordered.

On these displays, you can review and change orders to correct imbalances and shortages. For greater clarity, the application provides one version of the display for end items and another version for component items.



1 The STAT (Status) column identifies blanket orders, the production status of each order, and any scheduling problems (exceptions) for that order.

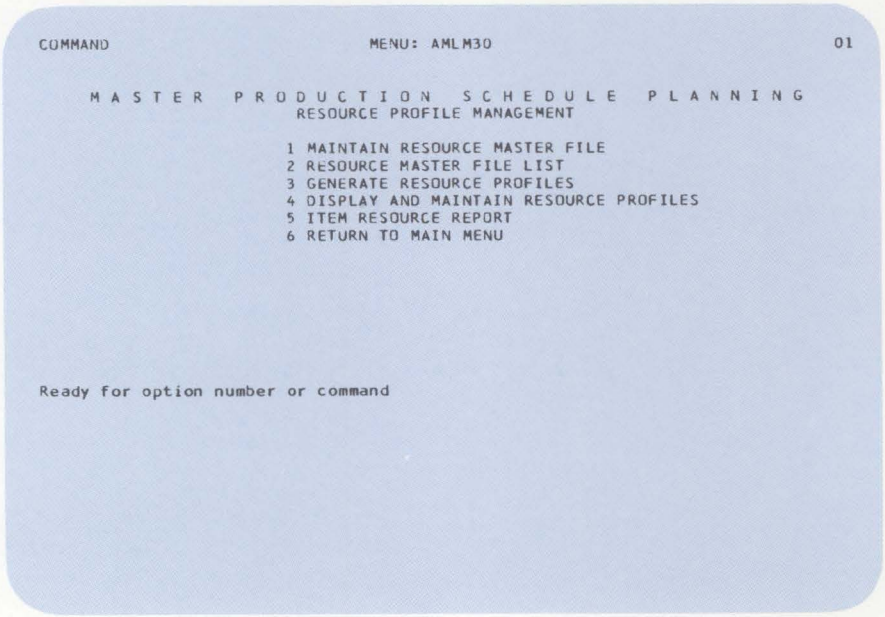
2 The REF (Reference) column describes the demand shown in the PROD PLAN column and signals any variance between the production plan and the master production schedule. On the component item version of this display, DEP DMD (Dependent Demand) appears instead of PROD PLAN, and the REF column identifies demand sources such as safety stock, generated demand, and future allocations.

3 The EXPCT INV (Expected Inventory) column gives a running calculation of predicted inventory levels, starting from the AVAIL (Available) quantity in the heading. Exceptions, such as expected negative inventory balances, are highlighted to help you identify potential problems.

From the Display/Maintain Master Schedule displays, you can also see a Blended Demand display for details about the demand related to each firm planned or planned order.

Resource profile management

This menu appears when you choose option 3 on the Main Menu. Resource profile management is usually the third step in master production scheduling, but you can create or change your resource profiles at any time as preparation for testing resources.



From this menu you can:

- Identify and describe critical production resources for use in testing resources
- List all of the critical resources you have defined
- Create resource profiles automatically for use in testing resources
- Create or change resource profiles manually
- Print a report that lists the top five resources used by each master scheduled item.

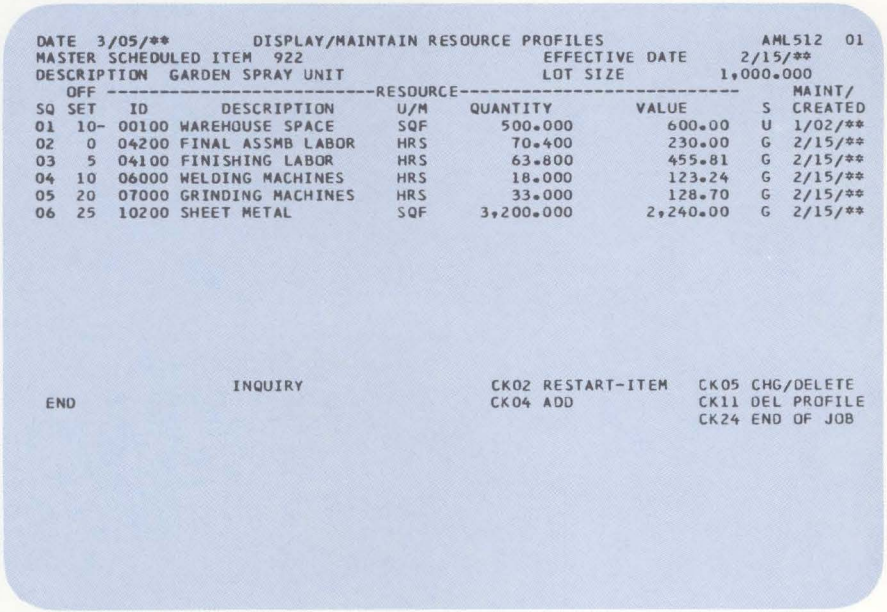
Resource requirements planning

Before you begin using production plans or master production schedules, you want to know that you have the resources needed to meet the plans. Resource planning for family production plans and master production schedules can give you that information.

First, you must identify your critical resources and enter information about them. Critical resources can be standard manufacturing limits, like work center capacity, or specialized factors, like advertising costs or the availability of strategic purchased items.

Next, you must generate the resource profiles, which are calculated from routings and product structure information in your files.

Then you can use the Display/Maintain Resource Profiles display to see the exact resource needs (quantity, timing, and amounts) for any production family or master scheduled item with a resource profile.



```
DATE  3/05/**        DISPLAY/MAINTAIN RESOURCE PROFILES                AML512  01
MASTER SCHEDULED ITEM  922                        EFFECTIVE DATE     2/15/**
DESCRIPTION  GARDEN SPRAY UNIT                    LOT SIZE         1,000.000
   OFF ------------------------RESOURCE----------------------------      MAINT/
SQ SET   ID       DESCRIPTION       U/M    QUANTITY        VALUE       S  CREATED
01  10- 00100 WAREHOUSE SPACE       SQF       500.000         600.00   U  1/02/**
02   0  04200 FINAL ASSMB LABOR      HRS        70.400         230.00   G  2/15/**
03   5  04100 FINISHING LABOR        HRS        63.800         455.81   G  2/15/**
04  10  06000 WELDING MACHINES       HRS        18.000         123.24   G  2/15/**
05  20  07000 GRINDING MACHINES      HRS        33.000         128.70   G  2/15/**
06  25  10200 SHEET METAL            SQF     3,200.000       2,240.00   G  2/15/**

                    INQUIRY                  CK02 RESTART-ITEM   CK05 CHG/DELETE
END                                          CK04 ADD            CK11 DEL PROFILE
                                                                 CK24 END OF JOB
```

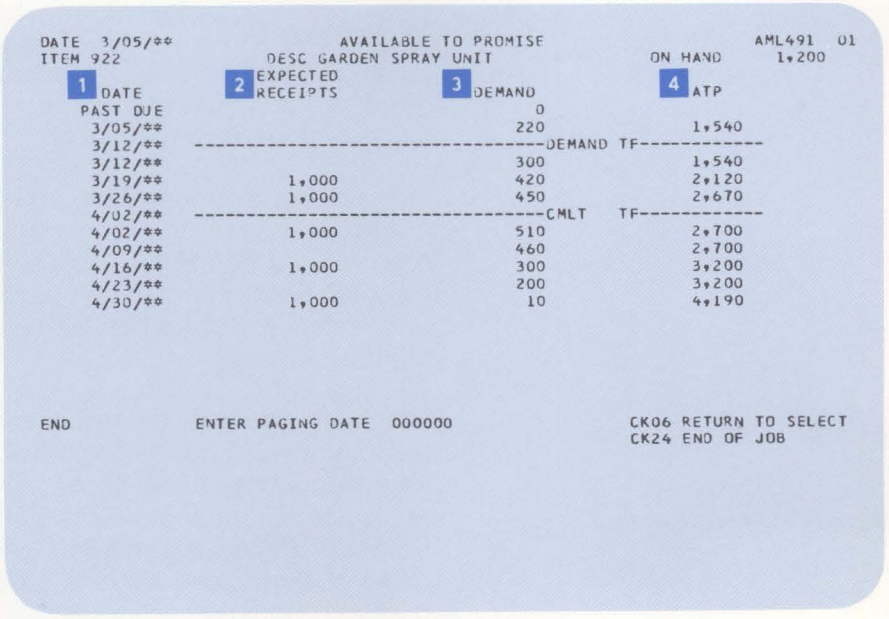
For more resource information, you can test your family production plans or master production schedules for the resources they need. The Resource Requirements Analysis display can show you how much of any specified resource you will need in each period to meet the scheduled orders.

```
DATE  3/05/**          RESOURCE REQUIREMENTS ANALYSIS                AML532  01
RESOURCE NUMBER  04100          MASTER SCHEDULE          U/M  HRS
DESCRIPTION  FINISHING LABOR          RESOURCE/DAY          10 0
     PERIOD          RESOURCE          RESOURCE          RESOURCE
      DATE           QUANTITY           VALUE          AVAILABLE
     3/01/**          1,700.0           12,145            1,900
     4/01/**          1,900.2           13,575            2,000
     5/01/**          2,350.0           16,788            2,400
     6/01/**          1,950.5           13,934            2,000
     7/01/**          1,700.1           12,146            1,900
     8/01/**          2,200.0           15,717            2,500
     9/01/**          1,700.3           12,147            1,800
     0/01/**          1,960.0           14,002            1,800
     1/01/**          2,280.9           16,295            2,400
     2/01/**          1,900.0           13,574            2,000
     1/01/**          2,001.8           14,301            2,000
     2/01/**          2,200.5           15,720            2,000
     3/01/**          2,100.9           15,009            2,200
     4/01/**          2,200.0           15,717            2,400
     5/01/**          1,950.0           13,931            2,000
     6/01/**          1,999.1           14,282            1,900

 END          ENTER DATE FOR DETAIL  000000          CK19 RETURN TO SELECT
                                                     CK24 END OF JOB
```

From this display, you can use the Resource Requirements Detail display to find out exactly which items require that resource in the period you are reviewing.

Available to Promise Inquiries

This display shows the quantity of an item that will be available for customer orders or other commitments in any period within the master schedule planning horizon. The quantity is calculated at the time of inquiry using current production schedules and the current customer order backlog.



1 The DATE column shows the beginning date for each planning period.

2 EXPECTED RECEIPTS is the total of all orders (manufacturing, purchase, firm planned, and planned) for the period.

3 DEMAND totals all customer orders for the period, using information from OE & I (if it is installed) or a user-maintained demand file.

4 The AVAILABLE TO PROMISE column lists the amounts remaining after customer demand for the period and on-hand inventory required for the next period have been subtracted from the beginning on-hand balance and scheduled receipts for the period.

You can select this display from the Main Menu or from the Master Schedule Planning menu. Order entry personnel may also find the information useful.

Material Requirements Planning

Information flow

Figure 2-4 shows how information flows through the Material Requirements Planning application. The numbers in the following discussion refer to that figure.

You can manage forecasts, end-item requirements, firm planned orders, and open orders through the work station. Requirements and planned orders for subassemblies, parts, and materials are established by the planning runs. You can also start planning runs, release stock replenishment orders, and make inquiries into the data base 1.

You have extensive control over the frequency and nature of the planning cycle and the format of the planning reports. The following explains one of the ways you might operate. After you complete the planning cycle, you can request that the MLI versus Forecast/Orders report 2 be printed. You can review this report, make changes, and rerun this step until you are satisfied with your master production schedule.

When you are satisfied with the master production schedule, you can start a full planning run to establish the plan for the subassemblies, parts, and materials. The application prints (on request) the Requirements Planning Report or Master Items Planning Report, Purchase Planning Report, and the Order Recommendation Report 3, which describe the recommended actions to be taken as a result of the planning run.

You can determine the course of action to follow by reviewing these reports. By creating firm planned orders, releasing orders, and changing open orders or substituting materials where required, you are able to make the adjustments needed to ensure that the production schedule is met.

The application prints on the system printer the Order Shortage Report, the Item Shortage Report, and the Order Action Detail 4, which serve as guides to order release actions. Management reports including MLI Resource Report and Manufacturing Cash Flow Analysis 5 are printed on request.

System reports are also printed as audits and controls. The Planning Run Exception Report, Requirements Status, Planned Order Status, Order Review Status, Order Action Summary, and the Planned Order Error List 6 are automatically printed as various application functions are run.

Most of the information on the reports mentioned above is available from inquiries through the work stations. Therefore, much of the printing and use of reports can be reduced as you become familiar with the application.

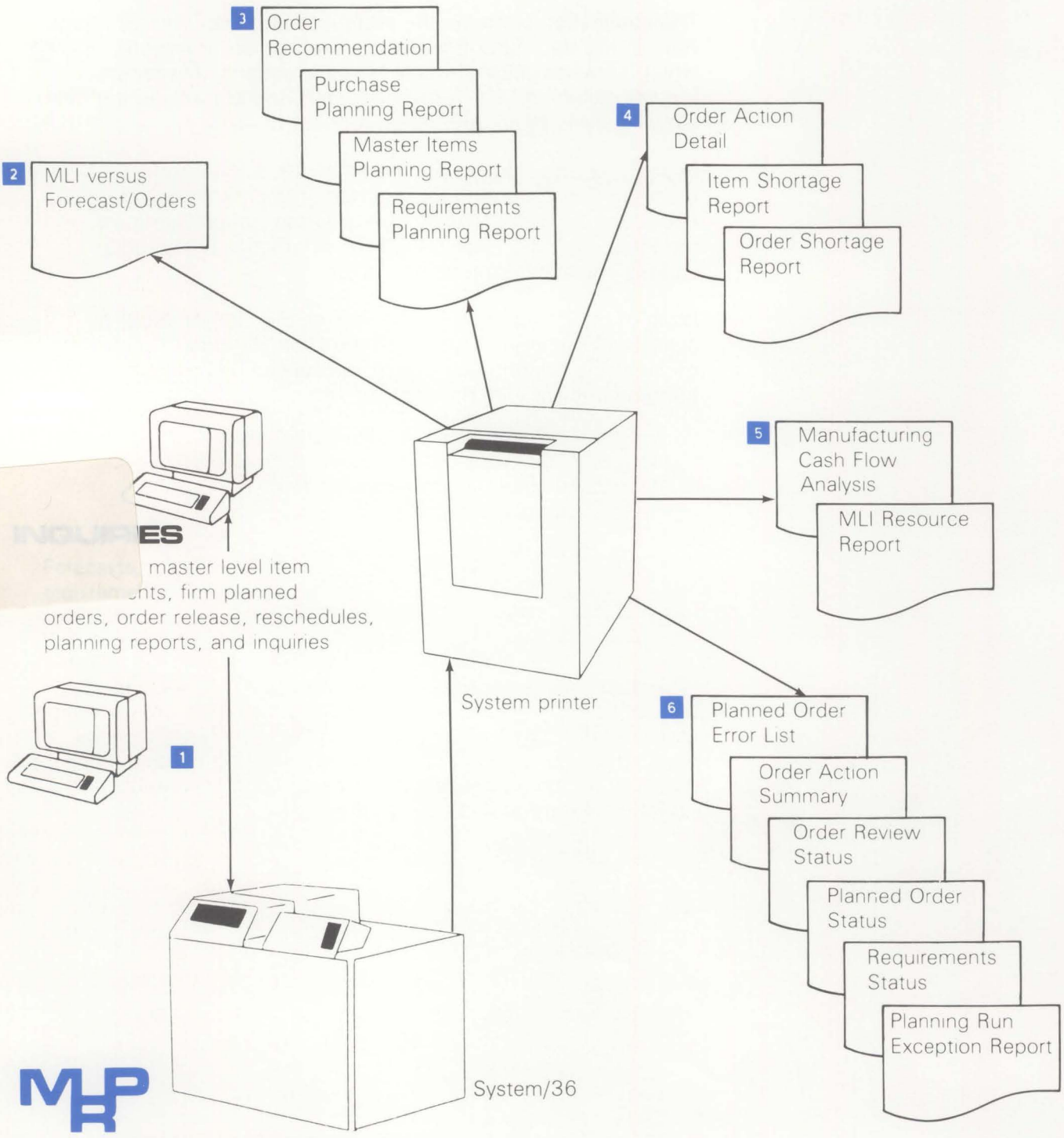


Figure 2-4. Material Requirements Planning information flow

Application functions

Note: The Inventory Management and Product Data Management applications are required for Material Requirements Planning.

Master schedule planning

You can enter a master production schedule using the Material Requirements Planning, Master Production Schedule Planning, and/or Forecasting application(s). The master production schedule is one of the three critical inputs to a material requirements planning system. The other two critical inputs are bills of material that are an accurate representation of the material needed to produce an item and a comprehensive and accurate statement of inventory balances and open order positions. If the master production schedule plan is not coordinated with customer order commitments, or if it exceeds the maximum production capacity to meet those commitments, there will be excess inventory, and customer commitments and production efficiency will suffer.

You can use the interactive displays to review and update item forecasts in comparison to average sales and customer order backlog. The forecast can be used to propagate requirements for items such as spare parts. Then another display lets you review and update the requirements input to your master production schedule. This display provides information to analyze the coverage of sales demand expressed by customer order backlog and forecast. The Master Level Item Planning run calculates planned orders and order recommendations. It prints a planning report with total dollars to aid in arriving at an acceptable and realistic master production schedule.

Notes:

1. Customer order backlog data is available only if the Order Entry and Invoicing application is installed.
2. If Master Production Schedule Planning is installed, you can:
   - Release manufacturing orders matched with customer orders in MRP for items using features and options.
   - Develop master production schedules within MPSP using advanced planning techniques. This function replaces MRP's MLI maintenance functions for those items that are designated as master scheduled items. MPSP can derive master production schedules from family production targets (item production plans), customer orders, forecasts, a blending of customer orders and forecasts, or manually entered schedules.
   - Extract firm master production schedules from MPSP to determine component requirements in MRP.
3. If Forecasting is installed, you can pass forecasts and requirements to MRP based on planning zones (frozen, firm, free) defined within the Forecasting application.

Planning requirements of standard product options

The system calculates requirements for standard product options by using the planning factors designated in the bill of material of each product. For example, to plan for 20% of a product to be sold with a particular option, you would designate a planning factor of .20 in the product structure record which indicates that option as a component of the product.

Future dated bill of material changes

As component requirements are being calculated, the bill of material "effectivity" dates are used so that requirements (which are always specified for a particular date) are calculated for the correct components. When the component requirements are calculated, the "from" and "to" effective dates in the product structure records are referenced to determine which components are required for each planned production order. For example, if part 1 is a component of assembly A from November 1, only production orders for assembly A that will be released on or after that date require part 1.

Time-phased allocations

You can use time-phasing to project future allocations for specific dates. When you use time-phased allocations, MRP assigns components for the date needed, instead of assigning all components on the current date.

Planning via net change or regeneration

In the regeneration mode, the material plan for every item is completely recalculated. Because this type of run is typically time consuming, it is undesirable to perform planning by regeneration very frequently. The net change mode of planning recalculates changes that could potentially affect the balance of their plan. Net change normally takes less time to run than regeneration. Therefore, it is practical to run it more frequently, keeping the material plan more up-to-date. This timeliness alerts you earlier to potential material problems, providing you with more time for resolution.

Bill of material maintenance interface for net change

It is important that the component requirements accurately reflect the current and pending bills of material. Material Requirements Planning is notified when any item is affected by a bill-of-material change so that the material plan will be kept valid.

Calendar dates

To simplify data entry and make the reports easy to read, all dates are entered, displayed, and printed using a six-digit calendar date. The application uses a file that carries a calendar for up to a five-year time span.

Material requirements stored by date

The system can store individual material requirements by date and source for up to five years. Optionally, requirements for the same item in a user-designated time interval can be combined to save storage space. Requirements may also be combined solely for printing purposes if you wish to maintain the detailed information available for inquiry at a work station.

Firm planned orders

For the plan to properly reflect the constraints of the business, it is sometimes necessary to override the application's normal planning logic. For example, it may be necessary to compress the lead time of an order to ensure its on-time availability. This condition may be indicated in the schedule by designating a special type of planned order, called a firm planned order, for which you can specify dates and quantities. The dates or quantities for firm planned orders are not subject to change by the planning logic of the Material Requirements Planning application, but are adjusted only under direction of an individual.

Lot sizing formulas

Several formulas are included to calculate planned order lot sizes. The order policy code designated for an item indicates which formula to select for that particular item. The order policy alternatives are:

Discrete—The requirements for each date result in a separate order.

Fixed quantity—A fixed quantity in the item master record designates the order quantity.

Part period balancing—The orders are calculated to minimize the total of carrying cost plus reordering cost—each order can be for a different quantity.

Time period supply—Combines the requirements for a fixed period length (time span) indicated in the item master record.

Discrete above a minimum—Requirements are accumulated until a specified minimum is reached; then a discrete order is placed for the quantity required.

The lot size overrides that may be applied if present are:

Minimum—Order quantity will not be less than this quantity.

Multiple—Round the order quantity upward to an even multiple of this quantity.

Maximum—A warning is issued if order quantity exceeds this quantity.

Standard and quantity-based lead times

Standard lead time is based on the lot size of material. Quantity-based lead time is based on the order quantity to be produced. When the order quantity affects the lead time significantly, quantity-based lead time helps you find more accurately when the material is required.

Interactive planning

The application is designed so that the planner can perform most functions at a work station with little or no reference to printed reports. MRP offers features such as planner-oriented item review, online pegging, direct requirements inquiry from other displays in the application, online updating of files during forecasting, master scheduling, and order release functions (see "Component availability check" in this section). Although the requirements planning generation (in regeneration or net change mode) is a batch run, the application is very interactive in operation and is very responsive to the dynamic needs of materials management.

MRP also offers the following interactive features:

- The option to flag those items that have already been acted upon. This allows future review sessions to include only items that still require attention.
- The option to reduce the number of items a planner will have to review by specifying a significant amount of days an order is to be rescheduled before it is considered an exception. Significant days to reschedule is specified by review session.

Pegged requirements

The detailed requirements planning report and an inquiry display enable the planner to trace (peg) material requirements back to the orders for which they are required. This information is often needed to determine what action should be taken to resolve material shortages.

Component availability check

A component availability check may be performed on the orders being considered for release. This test compares the component requirements for these orders against the available inventory of those components.

This checking may be performed on a batch of orders—those recommended for release by MRP or selected for release by planners. Order shortage and item shortage reports allow thorough analysis of all components required for orders to be released. A feature of the order shortage report is that two component availability figures are shown for each component. One is based on all orders in the batch being released, and the second is based on releasing only orders that can be released with no shortages. The second figure includes components from short orders as they are made available for other orders.

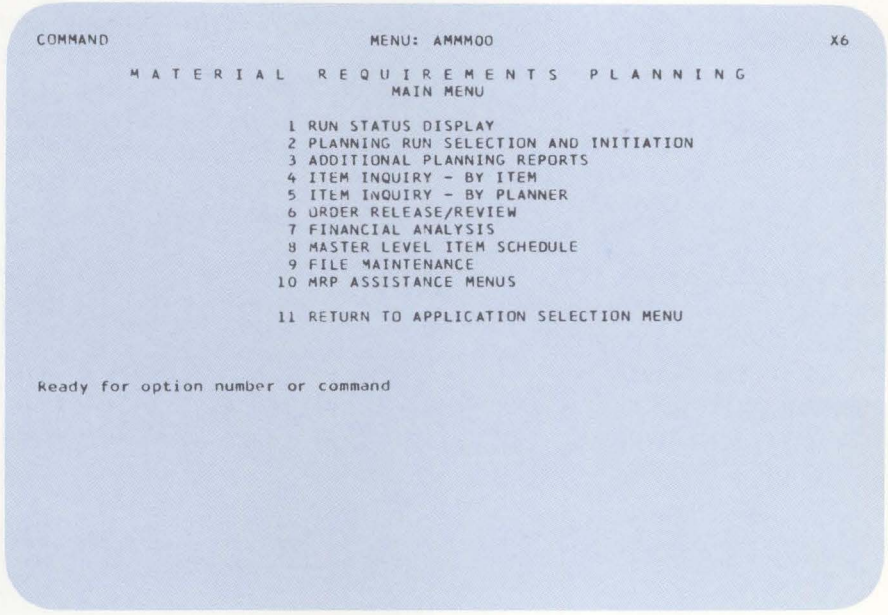
This checking may also be done one order at a time, interactively at a work station. The order quantity may be changed to allow for shortages. Temporary reservations are used to accumulate order release activity until a batch of orders is released, at which time Inventory Management permanently allocates the components for each order. The temporary reservations provide an accurate picture of available inventory for further interactive analysis, even though the orders have not been released.

Flexible reporting and inquiry displays

A variety of report options and inquiry displays are available to present information in a way that serves the unique needs of each department.

Operations

Performance of material planning functions normally begins with this menu. You enter the number corresponding to the task you want to perform.



Forecast review and maintenance

You can enter or propagate forecast requirements in the Material Requirements Planning application.

For some types of items, such as service parts or items which have a relatively constant demand, you would probably want to use the average monthly sales as the forecasted requirements input to the planning run. You can use this display to periodically check the average monthly sales against the forecast.

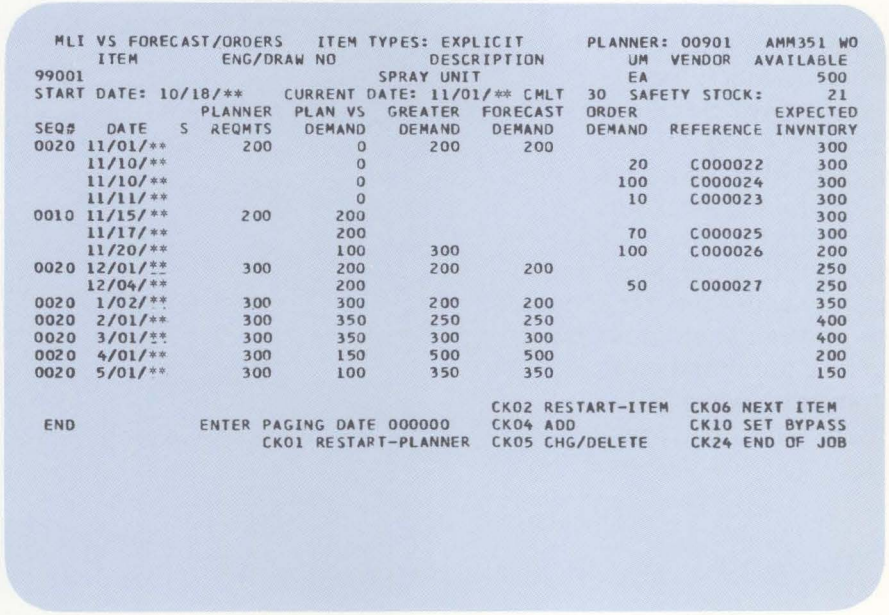
For some other items, you might want to use this display to review how closely your forecast matches with customer order backlog (if the Order Entry and Invoicing application is installed).

```
 MAINT: REVIEW FORECAST   ITEM TYPES: EXPLICIT      PLANNER: 00901   AMM451 WO
     ITEM        ENG/DRAW NO         DESCRIPTION        UM  VENDOR  AVAILABLE
99001                            SPRAY UNIT             EA                500
CURRENT DATE   AVG MONTHLY SALES   FORECAST QTY  FCST PERIODS   DAYS PER PERIOD
  11/01/**           197.00            200          15              22
                                  ANTICIPATED DEMAND
             SEQ#   DATE     GREATER FORECAST  S BACKLOG REFERENCE
             0010 11/01/**       200     200   M
                  11/10/**                          20   C000022
                  11/10/**                         100   C000024
                  11/11/**                          10   C000023
                  11/17/**                          70   C000025
                  11/20/**       300                100   C000026
             0010 12/01/**       200     200   M
                  12/04/**                          50   C000027
             0010  1/02/**       200     200   M
             0010  2/01/**       250     250   M
             0010  3/01/**       300     300   M
             0010  4/01/**       500     500   M
             0010  5/01/**       350     350   M

                                          CK01 RESTART-PLANNER CK05 CHG/DELETE
END            ENTER PAGING DATE 000000   CK02 RESTART-ITEM    CK06 NEXT ITEM
                                          CK04 ADD             CK24 END OF JOB
```

The GREATER column indicates the greater of forecast or customer orders for each forecasting interval, thus representing anticipated sales demand for that period. This column highlights any forecasting period in which customer orders exceed the forecast. You can also use this display to modify the forecast to allow for situations such as a planned sales promotion or expected competitive activity.

Master level item requirements review and maintenance

This display is a major tool for master production schedule planning.

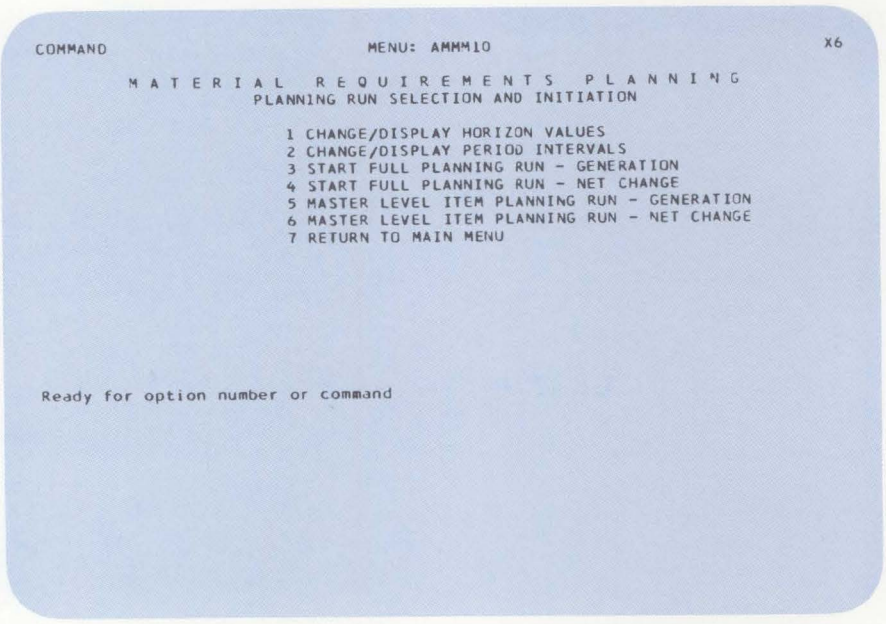


```
 MLI VS FORECAST/ORDERS   ITEM TYPES: EXPLICIT      PLANNER: 00901   AMM351 WO
      ITEM        ENG/DRAW NO        DESCRIPTION       UM  VENDOR  AVAILABLE
99001                                SPRAY UNIT        EA                 500
START DATE: 10/18/**    CURRENT DATE: 11/01/** CMLT 30  SAFETY STOCK:     21
                PLANNER  PLAN VS  GREATER  FORECAST  ORDER              EXPECTED
SEQ#   DATE   S REQMTS   DEMAND   DEMAND   DEMAND   DEMAND  REFERENCE INVNTORY
0020 11/01/**      200         0      200      200                         300
     11/10/**                  0                        20  C000022       300
     11/10/**                  0                       100  C000024       300
     11/11/**                  0                        10  C000023       300
0010 11/15/**      200       200                                           300
     11/17/**                200                        70  C000025       300
     11/20/**                100      300               100  C000026       200
0020 12/01/**      300       200      200      200                         250
     12/04/**                200                        50  C000027       250
0020  1/02/**      300       300      200      200                         350
0020  2/01/**      300       350      250      250                         400
0020  3/01/**      300       350      300      300                         400
0020  4/01/**      300       150      500      500                         200
0020  5/01/**      300       100      350      350                         150

                                          CK02 RESTART-ITEM  CK06 NEXT ITEM
 END          ENTER PAGING DATE 000000    CK04 ADD           CK10 SET BYPASS
              CK01 RESTART-PLANNER        CK05 CHG/DELETE    CK24 END OF JOB
```

With this display, you can review and update the requirements used by your master production schedule. If the Order Entry and Invoicing application is installed, customer order backlog is displayed with the forecast and master level requirements. The GREATER column indicates the anticipated sales demand, as it did on the preceding forecast display. The EXPECTED INVENTORY column projects inventory status into the future, starting with available inventory, subtracting anticipated sales demand, and adding scheduled receipts (open purchase or manufacturing orders, not shown on the display). A negative number indicates that sales demand exceeds the committed manufacturing schedule (on hand plus on order). On the left side of the display, the requirement quantity (QTY) is the planner input to the materials planning system (independent demand), and the VS. DEMAND column matches the requirements plan to the sales demand. For example, this column is positive if you plan to build up stock in anticipation of a seasonal sales surge or a plant shutdown. This column is negative if you are not planning to address all the sales demand.

Planning selection and initiation

This menu lets you establish parameters and select the mode in which requirements planning will be performed. Options 1 and 2 let you set such guidelines as how many days ahead will orders be recommended for release. Options 5 and 6 allow you to plan only the master schedule, should you wish to review it before running a complete materials plan.



As you can see, both the master schedule (MLI planning-master level item planning) and full planning for all items (options 3 and 4) may be run either in regeneration or net change mode.

Requirements planning report

This report shows the time-phased materials plan for each item, and can be printed for all items, for only those items which were included in a planning run, or for only those items which have exceptions (recommended actions). It can be printed in detail, showing the pegging information for dependent requirements. You may limit the number of detailed pages printed for an item to reduce the printing time. The information can be summarized by one of three sets of 24 user-specified time intervals, so that the planner can see the entire plan summarized for an item on one printed page. The report can be printed during the planning run or later on request.

For example, during a net change planning run, you might print the summary report for all items which were included in that run. Then if you needed to do a detailed analysis of an item plan, you could display the detailed information on a work station. If a work station is not available to the planner, the detailed report can be printed on request.

```
   GATEWAY MFG CO     NJ 01              REQUIREMENTS PLANNING REPORT              DATE  3/21/**  TIME 15.57.19  PAGE    4  AMM3A1
REQUIREMENTS SELECTED- ALL ACTIVE          DATE INTERVAL- ITEM DESIGNATED           START DATE 10/18/**   CURRENT DATE 11/01/**
-    ITEM     - -ENG/DRAW NO  - -        DESCRIPTION          -  UM  LV PLANNER   VENDOR                                  AVAILABLE
26006-20         A8300004          TANK 8 BY 12 INCHES           EA  02  00901                                              200
                                                                                                                 AVG. SALES        .00
-  ITEM CODES  -      - LOTSIZE  -     LEADTIME  -      COST      -       -       ITEM CHARACTERISTICS      -  -  FORECAST  -
REPLAN 2 PRINT          MIN        200   TYPE   M   UNIT          7.1143      WEIGHT      8.000      LOCATION        QTY          40
TYPE   1 FORCAST 1      MAX          0   PUR    0   SETUP          .000      SAFETY        50       SHRINK    .010  NBR PER      15
ORD QL A COMBINE 0      MULT         0   MFG    9         PRICE             CARRY         .200      CLASS      50  PER SIZ      22
MLI    S MAXLN          FOQ          0   VAR    2   UNIT         14.500     PRBKCNV       .0000     PUM
          -  PERIOD BALANCES  -      -   CMLT  20   -                          CURRENT BALANCES                                    -
ISSUE          0  RECPT           0  ADJST          0    ONHAND       200   ON ORDER        0   ALLOC          0   ACTIVITY          0
-----------------------------------------------------------------------------------------------------------------------------------
- - - - -  R E Q U I R E M E N T S  - - - -          - - -  O R D E R S  - - -
PLANNING     REQUIRED                                    START     ORDER                    ORDER     DUE          PROJECTED    EXCEPTION
  DATE       QUANTITY          TYPE          PEG TO/PLANNER      DATE     QUANTITY   STATUS   NUMBER    DATE         BALANCE    CD  DESCR

 11/01/**      200.000  MANUAL                        /                                                 11/01/**        .000
               100.000  ** GEN **   99333             /                                                 11/01/**        .000
 11/14/**        1.000  SHRINKAGE                                   11/02/**       200  MFG FIRM        11/14/**     199.000   51  RLEASE
                50.000  SAFETY STK                                                                      11/14/**     199.000
 11/18/**       20.000  ** GEN **   27006-F2          /                                                 11/18/**     199.000
 11/21/**       50.000  ** GEN **   27006-F2          /                                                 11/21/**     199.000
 12/20/**      200.000  MANUAL                        /                                                 12/20/**       1.000-
               60.000  ** GEN **   27006-F2          /                                                 12/20/**       1.000-
 12/23/**        1.000  SHRINKAGE                                   12/12/**       200  MFG FIRM        12/23/**     197.000   42  RESCHD
               20.000  ** GEN **   27006-F2          /                                                 12/23/**     198.000
 12/29/**      100.000  ** GEN **   99333             /                                                 12/29/**     198.000
 12/30/**        2.000  SHRINKAGE                                   12/19/**       200  PLANNED         12/30/**     396.000
  1/02/**      200.000  MANUAL                        /                                                  1/02/**     196.000
  1/23/**       60.000  ** GEN **   27006-F2          /                                                  1/23/**     196.000
  2/21/**       60.000  ** GEN **   27006-F2          /                                                  2/21/**     196.000
  3/21/**        2.000  SHRINKAGE                                    3/09/**       200  PLANNED         3/21/**     394.000
               200.000  MANUAL                        /                                                 3/21/**     194.000
               60.000  ** GEN **   27006-F2          /                                                 3/21/**     194.000
  4/20/**       60.000  ** GEN **   27006-F2          /                                                 4/20/**     194.000
  5/11/**        2.000  SHRINKAGE                                    5/01/**       200  PLANNED         5/11/**     392.000
               200.000  MANUAL                        /                                                 5/11/**     192.000
  5/22/**       60.000  ** GEN **   27006-F2          /                                                 5/22/**     192.000
  6/25/**       40.000  ** GEN **   27006-F2          /                                                 6/25/**     192.000
 11/02/**        2.000  SHRINKAGE                                   10/23/**       200  PLANNED        11/02/**     390.000
               200.000  MANUAL                        /                                                11/02/**     190.000
 11/30/**        2.000  SHRINKAGE                                   11/19/**       200  PLANNED        11/30/**     388.000
 12/02/**      200.000  MANUAL                        /                                                12/02/**     188.000
```

Requirements peg-to inquiry

This is one of the displays you can use to perform detailed analysis, as previously mentioned.

```
 REQUIREMENTS - PEG TO   ITEM TYPES: EXPLICIT       PLANNER: 00901   AMM512  WO
      ITEM        ENG/DRAW NO         DESCRIPTION        UM  VENDOR  AVAILABLE
26006-20        A8300004         TANK 8 BY 12 INCHES     EA                 200
     GENERATED REQUIREMENTS              PARENT ITEMS
 SEQ# DUE DATE      QUANTITY    ITEM NUMBER          DESCRIPTION          LOLEV
  01  11/01/**       100.000   99333          LAWN AND GARDEN SPRAY UNIT     00
  02  11/18/**        20.000   27006-F2       TANK SIZE FEATURE              01
  03  11/21/**        50.000   27006-F2       TANK SIZE FEATURE              01
  04  12/20/**        60.000   27006-F2       TANK SIZE FEATURE              01
  05  12/23/**        20.000   27006-F2       TANK SIZE FEATURE              01
  06  12/29/**       100.000   99333          LAWN AND GARDEN SPRAY UNIT     00
  07   1/23/**        60.000   27006-F2       TANK SIZE FEATURE              01
  08   2/21/**        60.000   27006-F2       TANK SIZE FEATURE              01
  09   3/21/**        60.000   27006-F2       TANK SIZE FEATURE              01
  10   4/20/**        60.000   27006-F2       TANK SIZE FEATURE              01
  11   5/22/**        60.000   27006-F2       TANK SIZE FEATURE              01
  12   6/25/**        40.000   27006-F2       TANK SIZE FEATURE              01


 END          ENTER SEQUENCE NUMBER 00                          CK03 RESUME INQ
               OR ENTER PAGING DATE 000000 CK01 RESTART-PLANNER CK05 ITEM DETAIL
                                           CK02 RESTART-ITEM    CK24 END OF JOB
```

For example, if a recommendation was generated to expedite a released order three weeks, but you have investigated and found that the order delivery can be improved by only one week, you can use the peg-to inquiry to see which assembly or product schedules would be affected. You might look for an assembly whose release date can be delayed by two weeks and make up the difference by expediting that assembly.

You can set up a firm planned order reflecting this plan. The next planning run realigns the schedules for all related components for that assembly.

Order recommendation report

This report can also be printed during the planning run or later on request. One message is printed for each exception identified during the planning run.

```
GATEWAY MFG CO    NO. 01     ORDER RECOMMENDATION BY ITEM      PLANNER   901    DATE  3/21/**  TIME 15.57.51  PAGE    1  AMM3C1

VENDOR -    ITEM      - - ENG/DRAW NO - -        DESCRIPTION      PM LV ST STRT DATE DUE DATE  ORDER   QUANTITY  UM   EXCEPTION

        03423          PX00080          TREADLE                    M 03     10/25/** 11/09/**            1,186  EA 31 EXPEDITE
        03425          FC-6910          COVER                      M 03     12/09/** 12/27/**            2,900  EA 53 MAXIMUM
        26006-20       A8300004         TANK 8 BY 12 INCHES        M 02     11/02/** 11/14/** M-FIRM       200  EA 51 RELEASE
                                                                   M 02     12/12/** 12/23/** M-FIRM       200  EA 42 RESCHEDULE
                                                                RECOMMENDED 12/07/** 12/20/**                    3 DAYS
        26006-21       A8400004         TANK 10 BY 18 INCHES       M 02 10  10/21/** 12/19/** M000100      140  EA 14 DATELO
                                                                   M 02 10  11/03/**  1/03/** M000110      200  EA 62 DEFER
                                                                RECOMMENDED  1/25/**  3/21/**                56 DAYS
                                                                   M 02     11/22/**  1/20/** M-FIRM       250  EA 61 DEFER
                                                                RECOMMENDED  3/27/**  5/22/**                87 DAYS
        33480-A        PPS024           CONTROL BOX                P 03      9/20/** 12/21/**            500  EA 31 EXPEDITE
                                                                   P 03     11/01/**  2/03/**            500  EA 51 RELEASE
090326  03591-10                        WHEEL 12 IN DIA            P 02     11/10/** 11/10/**          1,398  EA 51 RELEASE
```

Order release/review

This display lets you review all items or master level items only. You can also approve to release all orders recommended for release for a planner during the planning run.

You control the amount of items displayed, since you can bypass items that have already been acted upon. You can also bypass items that have only insignificant "days to reschedule" exception messages.

```
DATE **/**/**                                                          AMM621 X1
                        O R D E R   R E L E A S E / R E V I E W

                          ITEMS DISPLAYED IN PLANNER SEQUENCE


 ENTER PLANNER NUMBER   22222

 ITEM TYPES -
 SELECT:  2                    1.  ALL
                               2.  EXCEPTIONS ONLY
 BYPASS EXCEPTIONS WITH        3.  RECOMMENDED FOR RELEASE ONLY
 DAYS LESS THAN:     5         4.  APPROVE RECOMMENDED FOR RELEASE

 BYPASS REVIEWED
 ITEMS <Y/N>:   Y


 ENTER STARTING VENDOR AND ITEM NUMBERS -
 (OPTIONAL)     VENDOR:

                  ITEM:
                                                        CK02 RESTART-ITEM
                                                        CK24 END OF JOB
```

Order release

This is the primary display a planner uses to release orders for items needing action. Supplementary displays are provided to allow entry of job number, reference number, etc. for orders being released, if necessary. As you can see, other actions are performed using this display, including firming up a planned order, changing or canceling planned or firm planned orders, and performing a component availability check on an order pending release.

```
 ORDER RELEASE/REVIEW     ITEM TYPES: EXPLICIT      PLANNER: 00901   AMM622 WO
     ITEM        ENG/DRAW NO          DESCRIPTION       LV  VENDOR  AVAILABLE
26006-20        A8300004        TANK 8 BY 12 INCHES      02                200
SEQNO ACTION    TYPE   START DATE  DUE DATE  P/M ORDER NO  QUANTITY   EXCEPTION
  01     ?     FIRM    11/02/**   11/14/**   M                 200   51 RLEASE
  02     ?     FIRM    12/12/**   12/23/**   M                 200   42 RESCHD
  03           PLANNED 12/19/**   12/30/**   M                 200


ACTION CODES: *R*-RELEASE  *F*-FIRM  *C*-CHANGE  *X*-CANCEL  *A*-AVAILABILITY
      ENTER: SEQUENCE NUMBER    ACTION                      CK06 NEXT-ITEM
END                                        CK01 RESTART-PLANNER CK10 SET BYPASS
                                           CK02 RESTART-ITEM    CK24 END OF JOB
```

Component availability check

This display allows you to review an order's material status before it is released. This action ensures that material is available prior to releasing an order.

```
 ORDER RELEASE/REVIEW     ITEM TYPES: EXPLICIT      PLANNER: 00901   AMM626 WO
     ITEM        ENG/DRAW NO          DESCRIPTION       UM  VENDOR  AVAILABLE
26006-20        A8300004        TANK 8 BY 12 INCHES      EA                200

     ACTION    TYPE   START DATE  DUE DATE  P/M ORDER NO.  QUANTITY   EXCEPTION
        ?     FIRM    11/02/**   11/14/**   M                 200   51 RLEASE
 COMPONENT STATUS          AVAIL TO   PENDING   MFG & CUS              TOTAL
    ITEM        REQUIRED   ALLOCATE  MFG ALLOC  ALLOCATED   ON HAND   ON ORDER
03426               200      5,100          0          0     5,100          0
27006-00            200      1,000          0          0     1,000          0
27006-70            200      1,200          0          0     1,200          0


      END                              CK03 RESUME INQ      CK04 RESUME ORDER
                                                            CK24 END OF JOB
```

Purchase planning report

This report can be printed during the planning run or later on request. This report is an excellent tool for purchasing to use in negotiating prices and schedules, in placing orders for related items, and in reducing shipping costs.

```
   GATEWAY MFG CO     NO. 01      PURCHASE PLANNING REPORT   PLANNER 00901          DATE  9/14/**  TIME 17.48.57  PAGE    1  AMM3B1

                                  PURCHASE     COMBINE   ------------------------           REQUIRED DATES      ------------------------
VENDOR -     ITEM      - UM     CONVERSION PUM  CODE     11/10/**  11/17/**  11/27/**  12/04/**  12/11/**  12/18/**  12/26/**   1/03/**
090326 WHEEL 12 IN DIA
       03591-10         EA           .1250 LB    6                                                  273
                                                 6                                                                                  80
090326 WHEEL 18 IN DIA
       03591-12         EA           .0833 LB    6                 START---  --------  --------     704
                                                 6                                              START---  --------  --------        70
                                                 ----------------------------------------------------------------------------------------

     COMBINE CODE - 6          TOTALS BY PERIOD                                                  10,635                         1,480
            UNITS - POUNDS    ACCRUED BY PERIOD                                                  10,635    10,635    10,635    12,116
---------------------------------------------------------------------------------------------------------------------------------------

024775 ANGLE IRON 1 X 1 X 3/16 - CRS
       99465-RM         FT        86.2070 CW     5        3,370
                                                 5     START---  --------  --------  --------  --------     5,110
024775 BAR STOCK 1 X 3/8 - CRS
       99950-RM         FT        78.1250 CW     5        1,015
                                                 5          300
                                                 5                    300
                                                 5     START---  --------       300
                                                 5     START---  --------  --------       450
                                                 5     START---  --------  --------  --------       300
                                                 5     START---  --------  --------  --------  --------       150
                                                 ----------------------------------------------------------------------------------------

     COMBINE CODE - 5          TOTALS BY PERIOD          56         4         4         6         4        61
            UNITS - CWT       ACCRUED BY PERIOD          56        60        64        69        73       134       134       134
---------------------------------------------------------------------------------------------------------------------------------------
```

When you need to place a replenishment order, the system retrieves any other items purchased from that vendor. Unfilled requirements for each item are summarized into eight user-specified time periods. Quantities are converted to the purchase unit, if applicable (for example, tons or liters), and a total is printed for each vendor by each time period.

Production Control and Costing

Information flow

Figure 2-5 shows how the information flows through the Production Control and Costing application. The numbers in the following discussion refer to that figure.

Released orders, material costs, miscellaneous costs, move transactions, labor transactions, status changes, schedule changes, inventory receipts, file maintenance, and closed orders come from other MAPICS applications or are entered at the work station 1.

Orders are released and shop packets are created. The system creates the records to be used later to edit transactions and to track order status. The shop packet summary list, shop packet worksheets, and shop packet labor tickets are printed 2.

As file maintenance is performed and the transactions are processed, the system prints the Maintenance Audit lists, Shop Activity Edit list, and Shop Activity Update Audit lists 3.

When requested, the Exception Analysis, Production and Accounting summaries, Work-in-Process Totals, Production and Accounting Order Status Detail, Critical Orders list, Work (dispatch) list, and Work Center Analysis reports are printed 4.

When orders are closed out, the Order Closeout Selection audit list, Order Closeout Production Report, Order Closeout Accounting Report, Work Center Analysis, and Current Period Work-in-Process totals reports are printed 5.

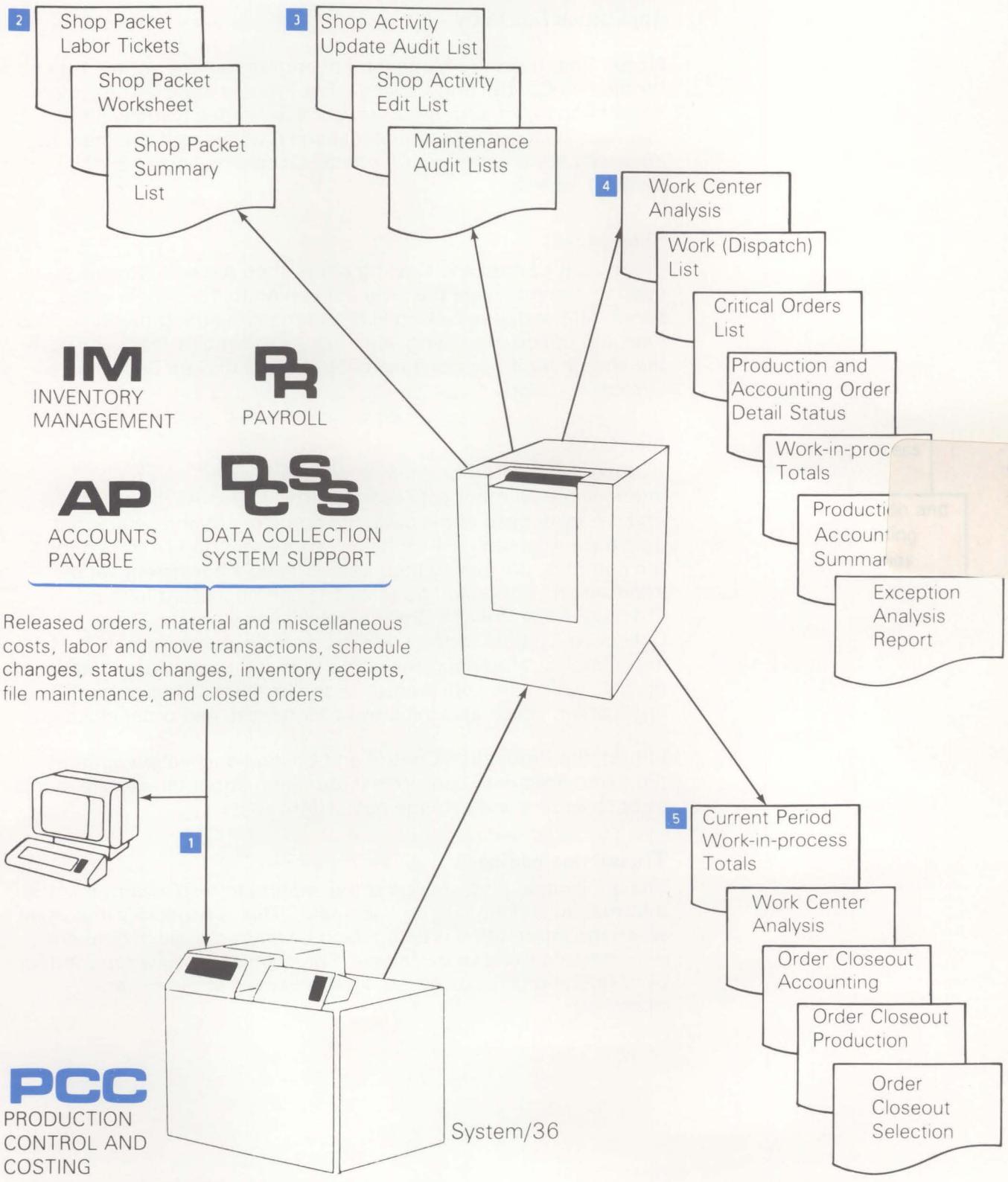


Figure 2-5. Production Control and Costing information flow

Application functions

Note: The Inventory Management application is a prerequisite for Production Control and Costing. The Product Data Management application is not a prerequisite, but it is needed if you wish to maintain standard bills of material and routings and use them to automatically create the order detail (allocation and operation) tracking records.

Shop packet

Production Control and Costing prints shop packets which can be used to communicate the production plan to the people in the shop. This includes picking lists and manufacturing routings. You have the option of printing labor tickets to simplify feedback from the shop floor if you don't have the IBM 5230 Data Collection System installed.

Interfaces

Redundant handling or entering of data is eliminated by interfacing with other applications. This improves the accuracy and completeness of the data. It complements the centralized data base approach, which helps ensure that people throughout the company are basing their decisions on a consistent set of information. Pre-edited transactions can be passed to the Production Control and Costing application from the Data Collection System Support, Payroll, and Accounts Payable applications. Material costs come from the open order material records which are kept current by the Inventory Management application, which also initiates order release and order closeout.

In turn, the Production Control and Costing application updates the centralized data base with information about the current status of open orders and average actual item costs.

Transaction editing

The application performs extensive editing to help ensure that the information is complete and accurate. This is especially important when the information is being used by many people in different departments to make decisions. For example, activity reported for prior operations is compared against activity at the current operation.

Production order status

Because this application tracks order progress, it can help prevent missed shipping schedules and can be an aid in making informed decisions when changes occur. Answers to questions, such as where is the order and when will it be completed, can be retrieved from the data base.

Operation hours, cost, yield, and efficiency

The application tracks the actual hours, cost, yield, and efficiency for each production operation. It treats the cost of outside operations as purchase content. This helps you build standard routings from historical information. It can also help you identify unrealistic standards, a need for additional training or supervision for production workers, or a need to repair or replace equipment.

Production scrap

Scrap can be monitored and valued at each operation. The actual value of the scrap is calculated at the time that it occurs. This helps you to identify faulty material, to decide if the scrap is salvageable, to indicate need for additional training for production workers, to change manufacturing methods, to change quality control procedures, or to repair or replace equipment.

Split orders and alternate routings

Sometimes it is necessary to make changes. A machine breakdown or overload may make it necessary to use an alternate routing. Orders may have to be split to meet schedules. These events can be tracked by the application. This helps you see what actually occurred and how much additional cost was incurred because of the changes.

Daily work (dispatch) list

This feature helps answer the question of which order should be run next at this work center. The work center supervisor can see in prioritized sequence all the orders currently in the queue, as well as which orders will be arriving and at what operation those orders currently are. Can a long-run job be set up now or would it be bumped by a critical order which is about to arrive? Are there orders for similar items which should be run consecutively to save setup time? What is the relative priority of the orders available to be worked on? Guidance to these types of questions can be gained from the daily work list.

Forward or backward scheduling

MAPICS allows you to choose how you want to calculate the operation dates for open manufacturing orders. Production Control and Costing uses scheduled dates to determine priorities.

Forward scheduling uses the current date as the basis for calculating dates; backward scheduling uses the order due date as the basis. Both methods produce the same results in terms of critical ratio, slack time, and days off schedule if these priority techniques are used. Backward scheduling offers you the use of operation dates as an additional priority basis.

Work center load

The application monitors the current and average work load hours for each work center, as well as the total for the plant. The current work load hours are obtained from orders released for production. The average daily work load hours are derived from periodic measurements of the current value. This helps identify an overloaded work center—a bottleneck clogging the flow of work in process, expanding lead times, and causing schedules to be missed. Perhaps another work center is underutilized, and workers could be moved to an overloaded work center.

Work-in-process value

The total value of work in process is assessed periodically and on demand, using the latest status of every order. This can save cost-accounting time and provide management with a broad view of how well work is flowing through the shop.

Work center queues, utilization, and efficiency analysis

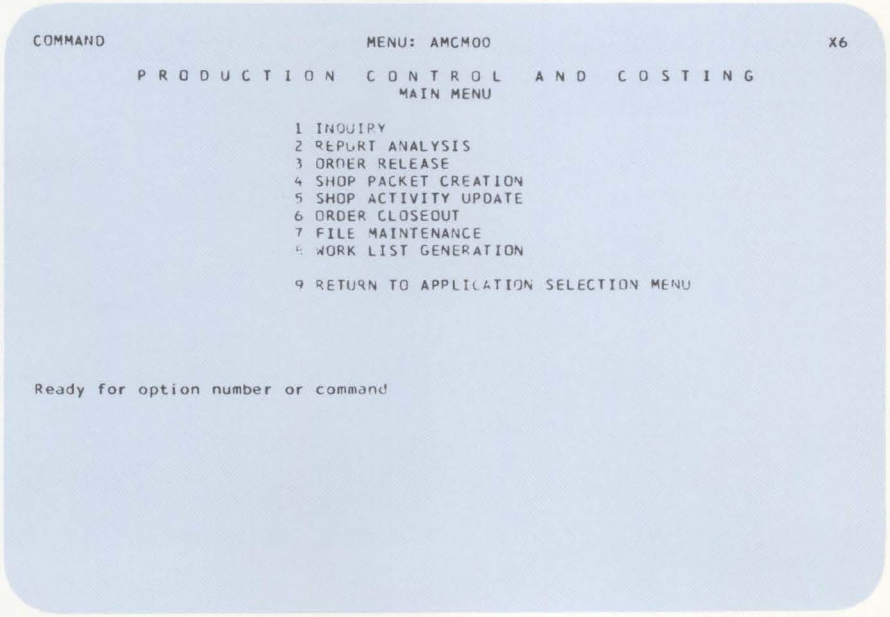
The performance at each work center can be measured against these three parameters to assist you in planning and controlling your production activities.

The queues at a work center are evaluated in three ways: planned, average, and current. Since queues significantly impact production lead times, this information is useful in assessing the reasonableness of your planning lead times, in signalling the need for special action to ensure on-time production, or to hold back or release additional work.

The analyses on utilization and efficiency provide a comparison of stated capacity versus actual output. You predict actual output capability from capacity.

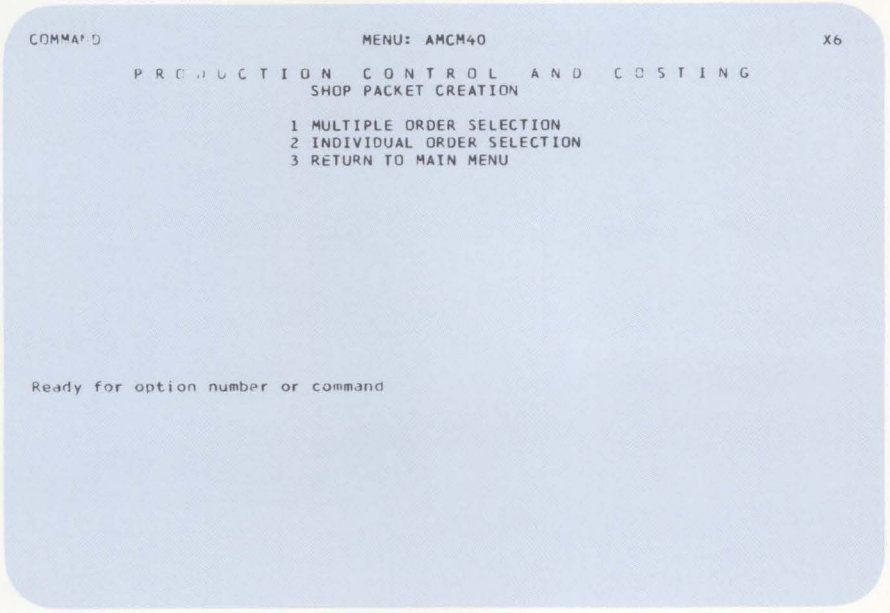
Operations

You can choose the task you want to do from this menu. The application guides you through each step of the chosen task as described below.



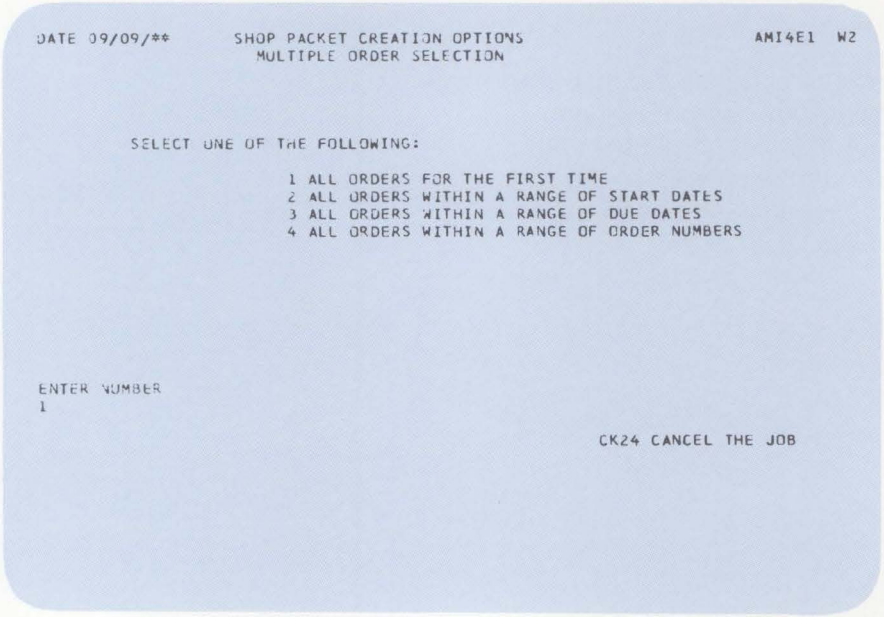
Shop packet creation

You can choose to print shop packets for multiple orders or for individual orders. In addition to printing shop packets for new orders, you can reprint shop packets for those orders with changes.



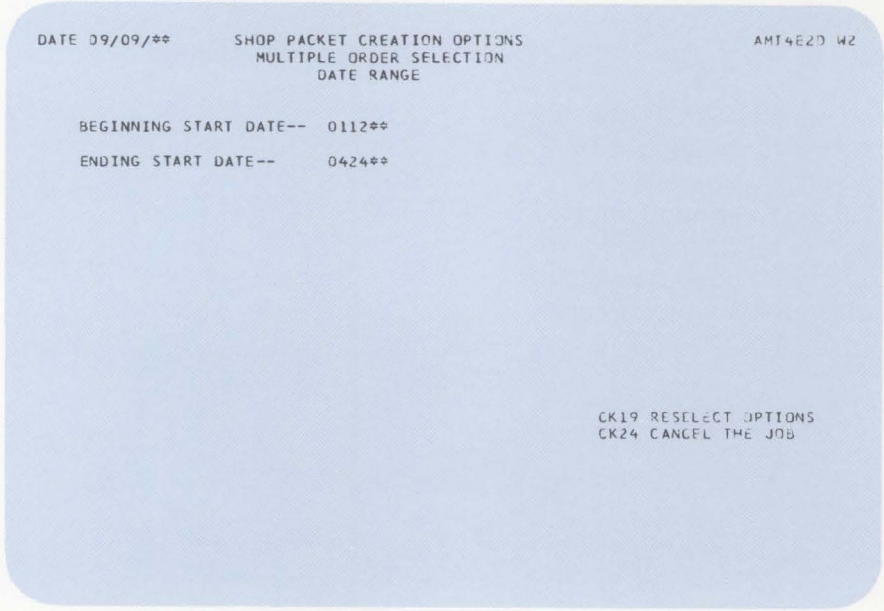
Example: Multiple order selection

If you want to select multiple orders, you choose the group of orders from this display.



Example: Selecting by range of dates

If you want to select a range of start dates, you choose the beginning and ending start date from this display.



Example: Changing run options

For each batch of shop packets, you can use a standard set of run options or change the run options by using the display shown here.

```
DATE 09/09/**      SHOP PACKET OPTIONS - MULTIPLE ORDERS              AMT4E3  W2

(ALWAYS INCLUDES A SUMMARY LIST)
TURNAROUND FILE ADDITION--      YES       ISSUES INCLUDED--                 YES
                                          OPERATION DETAIL INCLUDED--       YES
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
WORKSHEETS--                    YES       STANDARD COSTS--                  YES
                                          ORDER TRACKING DATES--            YES
        MATERIAL DETAIL--       YES       / 1 ITEM NUMBER           \
             SEQUENCE(1,2,3)--    2 <----(  2 WAREHOUSE LOCATION     )
                                          \ 3 USER SEQUENCE NUMBER /
        OPERATION DETAIL--      YES       INACTIVE OPS INCLUDED--
                                          ADDL DESC--                       YES
                                          STANDARD TIMES--                  YES
        MISCELLANEOUS DETAIL-- YES
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
SEPARATE WAREHOUSE PICK LIST--  NO        CONSOLIDATED FOR BULK PICK--      NO
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -
PAPER LABOR TICKETS--           YES       PREPRINTED--                      NO
                                          MINIMUM PER OPERATION--            4
                                          MAXIMUM PER OPERATION--           20

                                                CK19 RESELECT OPTIONS
                                                CK24 CANCEL THE JOB
```

Shop packet worksheet

An example of a shop packet worksheet is shown here.

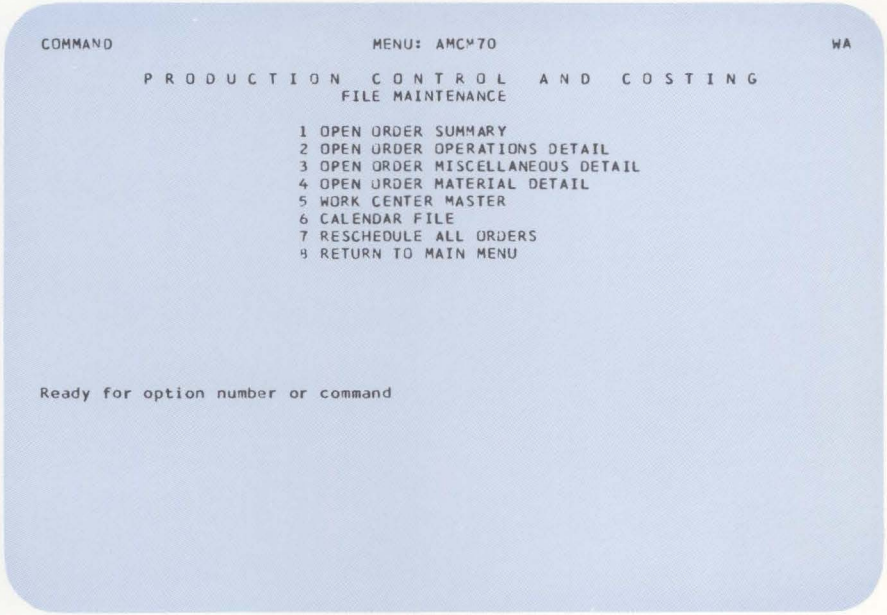
This document communicates plans to the shop and gives the shop people information needed to report activity. If a cardless data collection system is being used, a turnaround number (not shown on this sample report) is printed. This number is used for reporting shop activity through the Data Collection System Support application.

```
   NORTHCREEK IND. NO. 01              SHOP PACKET WORKSHEET                DATE  4/08/**  TIME 16.31.36  PAGE    1  AMI411
                                                                                          PAGE IN ORDER    1

ORDER                                                    ORDER      START  LAST TRANS   DUE                    STANDARD
NUMBER  ITEM NUMBER    WH DESCRIPTION                    QUANTITY   DATE     DATE       DATE      UNIT COST      COST        SPLIT
                                                                                                                 ORDER
M000391 03024           1 SHELL                             500   9/15/**  0/00/00    9/28/**      3.8821     1,941.05

CUSTOMER    WAREHOUSE  ENGINEERING      MULTI-ORD                                  D E T A I L  R E C O R D  C O U N T S  TURNAROUND
JOB NUMBER  STOCK LOC  DRAWING NUMBER   REFERENCE   PLANNER  DEPARTMENT    OPERATIONS  MATERIAL  MISCELLANEOUS     NUMBER

                M111   PX00010                      905      DP20               1          0           0            1368

W AM-5510 NO COMPONENTS EXIST FOR THIS ORDER

DETAILED OPERATIONS LIST

OPER      WORK  OPERATION          PROCESS          MOVE    QUEUE    START    CMPLTN     SETUP     RUN      OPERATION  TURNAROUND  STAT
NO   DEPT CTR   DESCRIPTION         SHEET  TOOL     TIME    TIME     DATE     DATE       TIME      TIME       COST       NUMBER    CODE

0050 DP20 SF055 DEBURR-FINISH                      .00     3.00   10/22/** 10/24/**       .00     16.66      340.47       1376    10

W AM-5512 NO CHARGES EXIST FOR THIS ORDER
```

File maintenance

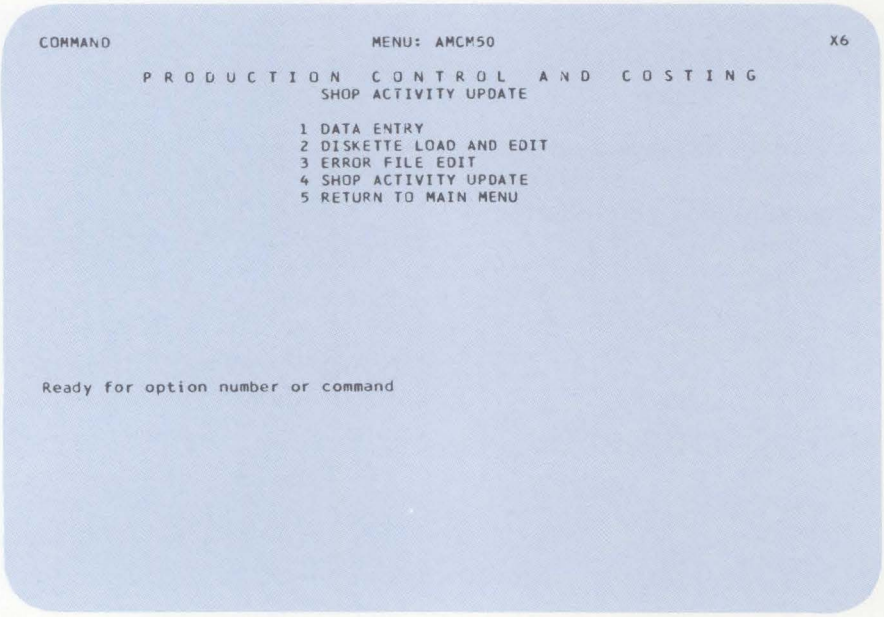
You can select the file you want to maintain from this menu.

Subsequent displays guide you through the activity of adding, changing, or deleting records.



Shop activity update

With this display, you can select the function you want performed.



Shop activity transactions can be entered from diskette, passed from other applications, or entered and corrected through the work stations. A thorough edit is performed, and a transaction edit report with control totals is printed. Errors can be corrected before a group of transactions are processed to update files, or errors will be saved in an error file to be resolved, corrected, and processed later. When transactions are processed to update files, an audit list can be printed.

Order status inquiry displays

The order status inquiry is actually a group of displays. This display shows summary information for the order.

```
DATE 09/09/**      ORDER STATUS INQUIRY - SUMMARY                    AMC020  W2

ORDER NUMBER    M020470                          002 OPERATION RECORDS
ITEM NUMBER     99001                            000 OPERATIONS COMPLETE
WAREHOUSE NO    1                                034 MATERIAL RECORDS
DESCRIPTION     S-NUMBER  010301                 001 MISCELLANEOUS RECORDS
DEPARTMENT      DP99                             000 INACTIVE OPERATIONS
JOB NUMBER                                                      COSTS
PLANNER          901                             UNIT                .0101
MULTI-ORD REF   REF-02              * CURRENT    STANDARD           1.01
STATUS CODE     10          OPERATION
HOURS REMAINING       52.90 WORK CTR            SETUP               .00
CRITICAL RATIO         2.09 LOCATION            LABOR               .00
DAYS OFF SCHED              QUANTITY         0   OVERHEAD            .00
OVERLAPPED OPS *                                 PURCHASE            .00
* THIS IS A SPLIT ORDER *          * QUANTITY    MISCELLANEOUS       .00
                * DATES     ORDER          100   TOTAL ACTUAL        .00
START           09/09/**    IN SPLIT         0
ACTUAL START    00/00/**    SCRAPPED         0   RECEIPTS            .00
LAST TRANS      09/19/**    DEVIATION        0   DIFFERENCE          .00
DUE             10/12/**    OPEN           100       CK02 PAGE FORWARD DETAIL
COMPLETION      09/26/**    COMPLETED        0       CK06 OPERATIONS DETAIL
                                                     CK07 MISCELLANEOUS DETAIL
                                                     CK24 END OF JOB
```

Each detail display may be either in accounting format, which shows dollars, or in production format, which shows hours and quantities.

Example: Material detail display

You may wish to examine information on the material quantities (production format).

```
DATE 09/09/**      ORDER STATUS INQUIRY - MATERIAL                   AMC021  W2

ORDER #  FINISHED ITEM WH SC START DT QTY OPEN HOURS REM  RATIO CUR  DUE DATE
M020470 99001           1 10 09/09/**      100     52.90   2.09      10/12/**
                                        U/ STANDARD QUANTITY   DATE   DATE OF
 ITEM NUMBER     WH  ITEM DESCRIPTION    /M QUANTITY  ISSUED  REQUIRED LAST ISS
03021             1 VALVE                EA      100       0 09/09/** 00/00/**
03385             1 WRENCH               EA      100       0 09/09/** 00/00/**
03398             1 CORD BRACKET         EA      100       0 09/09/** 00/00/**
03410             1 BRACKET              EA      100       0 09/09/** 00/00/**
03415-1           1 SPRAY NOZZLE         EA      100       0 09/09/** 00/00/**
03419             1 HINGE PIN            EA      100       0 09/09/** 00/00/**
03424             1 TREADLE ASSEMBLY     EA      100       0 09/09/** 00/00/**
03428             1 STAND                EA      100       0 09/09/** 00/00/**
03443             1 MOTOR SUPPORT        EA      100       0 09/09/** 00/00/**
03578             1 TREADLE SPACER       EA      200       0 09/09/** 00/00/**
03587             1 HINGE WASHER         EA      200       0 09/09/** 00/00/**
03590             1 AUTO SWITCH          EA      100       0 09/09/** 00/00/**
03591-08          1 WHEEL 6 IN DIA       EA      200       0 10/10/** 00/00/**
03640             1 HINGE WASHER         EA      200       0 09/09/** 00/00/**
04632             1 WASHER               EA      200       0 09/09/** 00/00/**
                                                     CK02 PAGE FORWARD DETAIL
                                                     CK07 MISCELLANEOUS DETAIL
                                                     CK24 END OF JOB
```

Example: Operations details

This display shows details on operation hours and quantities (production format).

```
DATE 09/09/**       ORDER STATUS INQUIRY - OPERATIONS                AMC022  W2

ORDER # FINISHED ITEM  WH SC START DT QTY OPEN HOURS REM  RATIO CUR  DUE DATE
M020470 99001           1 10 09/09/**      100      52.90    2.09      10/12/**
OP   WORK  OPERATION                  OP OLAP      SETUP HRS  QTY COMP  START DT
NO  CENTER DESCRIPTION    DEPT  TOOL  ST OP  REWK RUN HOURS  QTY SCRP  COMP DT
0010 AS099 AFINAL UNIT AS DP99        10      0          .00         0  09/13/**
                                                        .00         0  09/19/**
0020 IN040 FINAL UNIT INS DP60        10      0          .00         0  09/22/**
                                                        .00         0  09/26/**




                                                  CK02 PAGE FORWARD DETAIL
                                                  CK05 MATERIAL DETAIL
                                                  CK10 TIME BASIS CODE
W AM-5509 NO MORE OPERATIONS EXIST FOR THIS ORDER  CK24 END OF JOB
```

Example: Miscellaneous cost details

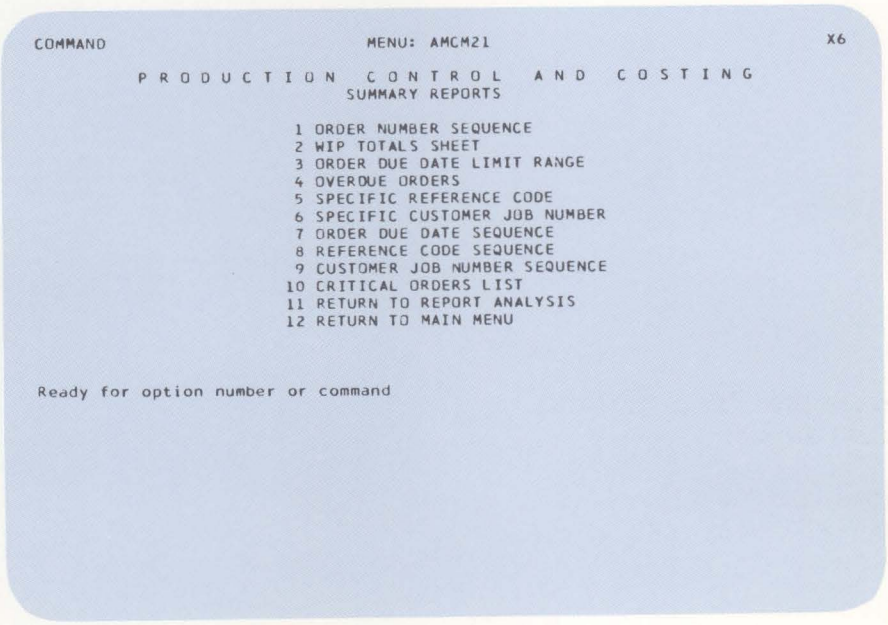
Here is the display for miscellaneous costs (production format).

```
DATE 09/09/**       ORDER STATUS INQUIRY - MISCELLANEOUS             AMC023  W2

ORDER # FINISHED ITEM  WH SC START DT QTY OPEN HOURS REM  RATIO CUR  DUE DATE
M020470 99001           1 10 09/09/**      100      52.90    2.09      10/12/**
MISCELLANEOUS                          STANDARD   ACTUAL   DATE OF
 NUMBER          DESCRIPTION           QUANTITY  QUANTITY  LAST TRANS
99001            OUTSIDE SERVICE            100         0  09/09/**




                                                  CK02 PAGE FORWARD DETAIL
                                                  CK05 MATERIAL DETAIL
                                                  CK06 OPERATIONS DETAIL
W AM-5513 NO MORE CHARGES EXIST FOR THIS ORDER    CK24 END OF JOB
```

Order status reports

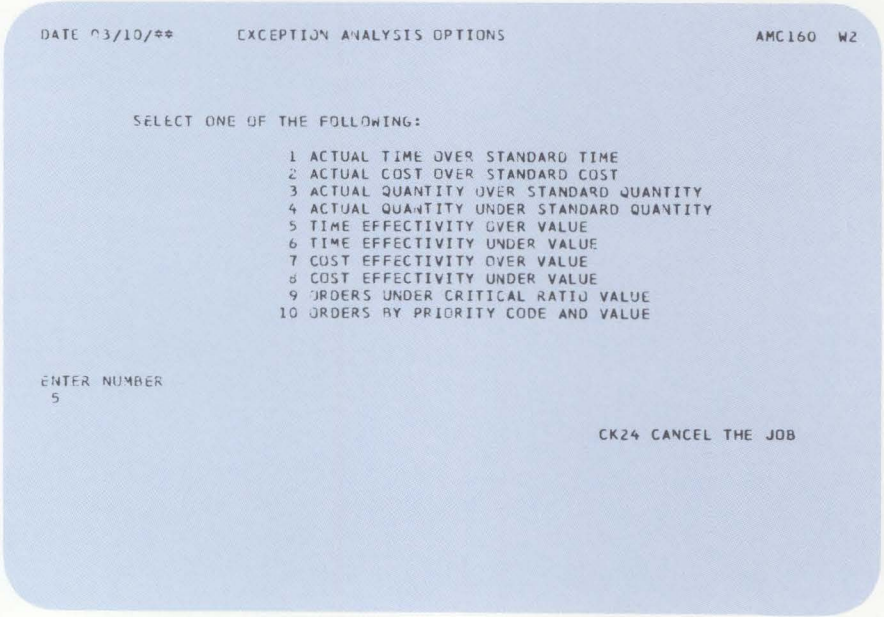
Order status reports show more detailed information than the order status inquiry.

You can choose to print summary or detail format and production or accounting format. Several options control which orders print or what sequence to print, as can be seen, for example, from the summary reports menu shown here.



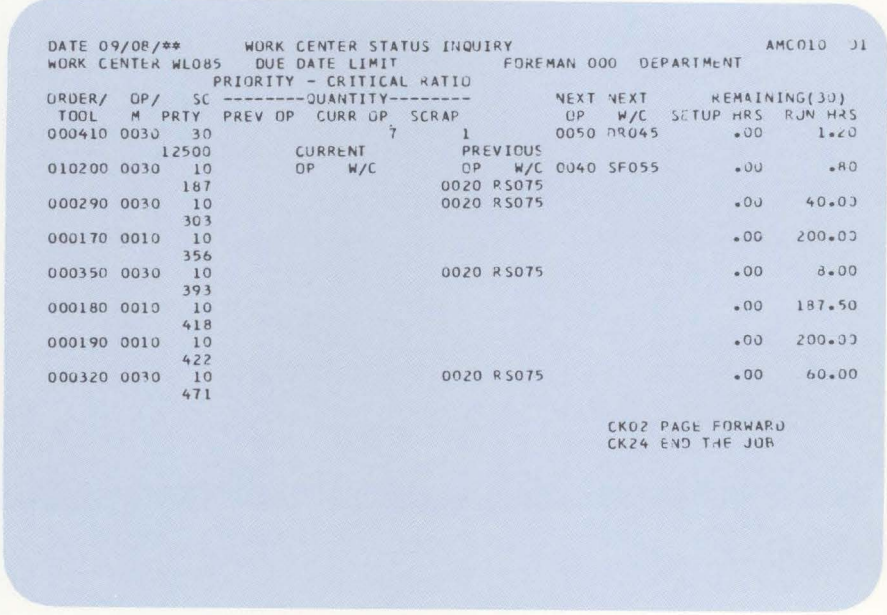
Exception analysis report

From this display, you can choose to print detailed reports to analyze orders which are behind schedule or which have actual-versus-standard variance beyond an acceptable range.



Work center status inquiries

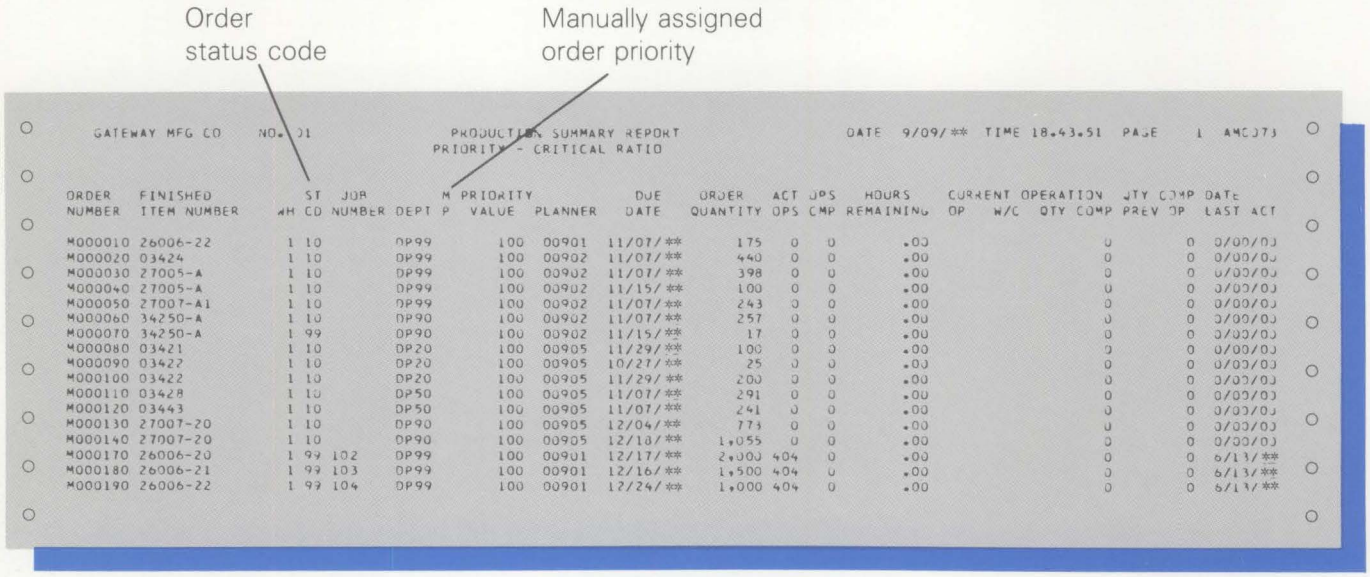
This display shows, in priority sequence, each operation for each open order in the work center and those operations to arrive at the work center. This information is helpful in deciding which order should be worked on next, so that overall due dates can be most efficiently met.



```
DATE 09/08/**       WORK CENTER STATUS INQUIRY                          AMC010  01
WORK CENTER WL085    DUE DATE LIMIT          FOREMAN 000  DEPARTMENT
                  PRIORITY - CRITICAL RATIO
ORDER/   OP/    SC --------QUANTITY--------          NEXT NEXT       REMAINING(3D)
 TOOL    M  PRTY  PREV OP  CURR OP  SCRAP             OP   W/C  SETUP HRS  RUN HRS
000410 0030   30                 7       1          0050 DR045        .00      1.20
           12500        CURRENT          PREVIOUS
010200 0030   10        OP   W/C         OP   W/C 0040 SF055        .00       .80
             187                      0020 RS075
000290 0030   10                       0020 RS075                    .00     40.00
             303
000170 0010   10                                                     .00    200.00
             356
000350 0030   10                       0020 RS075                    .00      8.00
             393
000180 0010   10                                                     .00    187.50
             418
000190 0010   10                                                     .00    200.00
             422
000320 0030   10                       0020 RS075                    .00     60.00
             471

                                                    CK02 PAGE FORWARD
                                                    CK24 END THE JOB
```

Critical orders list

This report can be printed during the work list generation run to help you identify the most critical orders to be expedited.



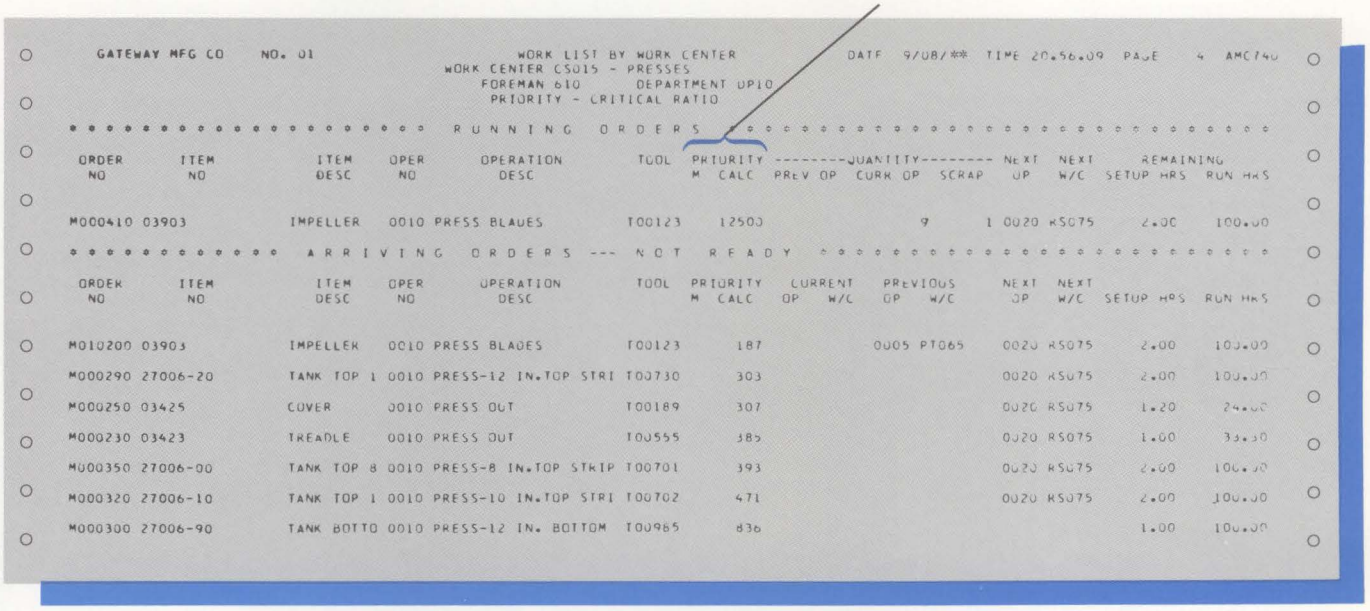
GATEWAY MFG CO NO. 01 PRODUCTION SUMMARY REPORT DATE 9/09/** TIME 18.43.51 PAGE 1 AMCJ73
PRIORITY - CRITICAL RATIO

ORDER NUMBER	FINISHED ITEM NUMBER	ST WH	CO	JOB NUMBER	DEPT	M P	PRIORITY VALUE	PLANNER	DUE DATE	ORDER QUANTITY	ACT OPS	OPS CMP	HOURS REMAINING	CURRENT OPERATION OP	W/C	QTY COMP	QTY COMP PREV OP	DATE LAST ACT
M000010	26006-22	1	10		DP99		100	00901	11/07/**	175	0	0	.00			0	0	0/00/00
M000020	03424	1	10		DP99		100	00902	11/07/**	440	0	0	.00			0	0	0/00/00
M000030	27005-A	1	10		DP99		100	00902	11/07/**	398	0	0	.00			0	0	0/00/00
M000040	27005-A	1	10		DP99		100	00902	11/15/**	100	0	0	.00			0	0	0/00/00
M000050	27007-A1	1	10		DP99		100	00902	11/07/**	243	0	0	.00			0	0	0/00/00
M000060	34250-A	1	10		DP90		100	00902	11/07/**	257	0	0	.00			0	0	0/00/00
M000070	34250-A	1	99		DP90		100	00902	11/15/**	17	0	0	.00			0	0	0/00/00
M000080	03421	1	10		DP20		100	00905	11/29/**	100	0	0	.00			0	0	0/00/00
M000090	03422	1	10		DP20		100	00905	10/27/**	25	0	0	.00			0	0	0/00/00
M000100	03422	1	10		DP20		100	00905	11/29/**	200	0	0	.00			0	0	0/00/00
M000110	03428	1	10		DP50		100	00905	11/07/**	291	0	0	.00			0	0	0/00/00
M000120	03443	1	10		DP50		100	00905	11/07/**	241	0	0	.00			0	0	0/00/00
M000130	27007-20	1	10		DP90		100	00905	12/04/**	773	0	0	.00			0	0	0/00/00
M000140	27007-20	1	10		DP90		100	00905	12/18/**	1,055	0	0	.00			0	0	0/00/00
M000170	26006-20	1	99	102	DP99		100	00901	12/17/**	2,000	404	0	.00			0	0	6/13/**
M000180	26006-21	1	99	103	DP99		100	00901	12/16/**	1,500	404	0	.00			0	0	6/13/**
M000190	26006-22	1	99	104	DP99		100	00901	12/24/**	1,000	404	0	.00			0	0	6/13/**

Work list

The operations are listed in sequence by calculated priority to help you make scheduling decisions.

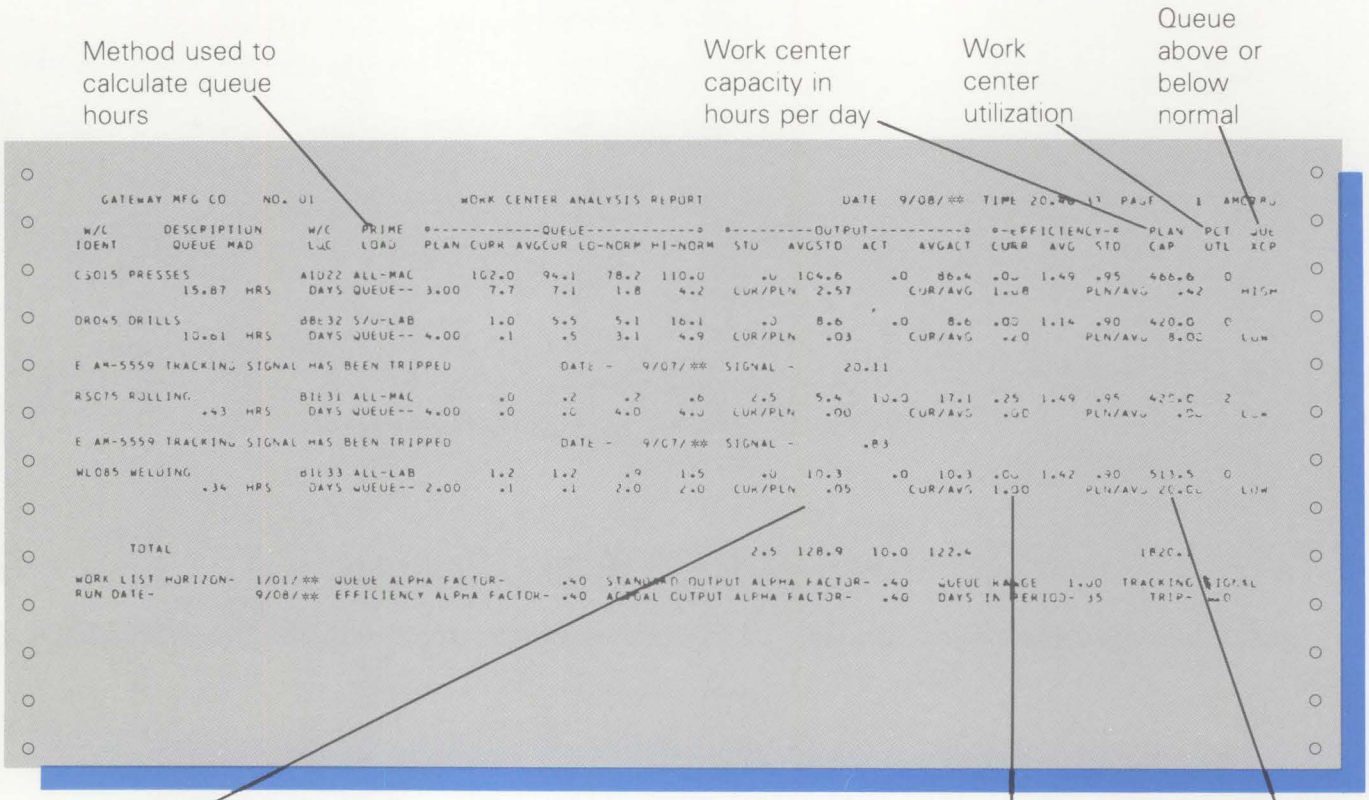
Priority can be by slack time per operation, critical ratio, or order due date, and can be overridden by a manually assigned priority.



```
GATEWAY MFG CO    NO. 01                  WORK LIST BY WORK CENTER          DATE  9/08/**  TIME 20.56.09  PAGE    4  AMC740
                                    WORK CENTER CS015 - PRESSES
                                       FOREMAN 610      DEPARTMENT DP10
                                       PRIORITY - CRITICAL RATIO

* * * * * * * * * * * * * * * * * * * * *  R U N N I N G   O R D E R S  * * * * * * * * * * * * * * * * * * * * * * * * * * * *

 ORDER      ITEM          ITEM    OPER    OPERATION          TOOL  PRIORITY --------QUANTITY-------- NEXT  NEXT      REMAINING
  NO        NO            DESC    NO      DESC                     M  CALC  PREV OP  CURR OP  SCRAP   OP   W/C  SETUP HRS  RUN HRS

M000410 03903           IMPELLER  0010 PRESS BLADES        T00123    12500                 9       1 0020 RS075      2.00     100.00

* * * * * * * * * * * * *  A R R I V I N G   O R D E R S  ---  N O T   R E A D Y  * * * * * * * * * * * * * * * * * * * * * *

 ORDER      ITEM          ITEM    OPER    OPERATION          TOOL  PRIORITY   CURRENT   PREVIOUS     NEXT  NEXT
  NO        NO            DESC    NO      DESC                     M  CALC   OP   W/C   OP   W/C      OP   W/C  SETUP HRS  RUN HRS

M010200 03903           IMPELLER  0010 PRESS BLADES        T00123      187              0005 PT065  0020 RS075      2.00     100.00
M000290 27006-20        TANK TOP 1 0010 PRESS-12 IN.TOP STRI T00730      303                          0020 RS075      2.00     100.00
M000250 03425           COVER     0010 PRESS OUT           T00189      307                          0020 RS075      1.20      24.00
M000230 03423           TREADLE   0010 PRESS OUT           T00555      385                          0020 RS075      1.00      33.30
M000350 27006-00        TANK TOP 8 0010 PRESS-8 IN.TOP STRIP T00701      393                          0020 RS075      2.00     100.00
M000320 27006-10        TANK TOP 1 0010 PRESS-10 IN.TOP STRI T00702      471                          0020 RS075      2.00     100.00
M000300 27006-90        TANK BOTTO 0010 PRESS-12 IN. BOTTOM  T00985      836                                          1.00     100.00
```

Work center analysis report

You can print this report as part of the work list generation run or as part of the period-end reporting and purge run. This report provides information to analyze work center queues, efficiency, and utilization.



Period end reporting and purge

This run prints detailed reports showing the final status of closed orders before they are removed from the files. The report shown here is printed showing the total work-in-process values at period end.

During this run, averages are calculated to update the work center master file and the item master files.

NORTHCREEK IND. NO. 01 PERIOD ANALYSIS COST SUMMARY DATE 4/08/** TIME 16.39.31 PAGE 1 AMC700

C O S T S	CURRENT PERIOD ACTIVITY	CURRENT STATUS
SETUP	.00	103.77
LABOR	.00	7,489.74
OVERHEAD	.00	34,009.46
MATL & PUR	20.01	40,573.70
MISCELLANEOUS	.00	1,009.00
TOTAL ACTUAL	20.01	83,185.67
MINUS RECEIPTS	.00	6,777.66
WORK IN PROCESS	20.01	76,408.01

VALUATION OF SCRAP INCLUDED IN TOTAL ACTUAL COSTS 374.02

Capacity Requirements Planning

Information flow

Figure 2-6 shows how information flows through the Capacity Requirements Planning application. The numbers in the following discussion refer to that figure.

Before you start a Capacity Requirements Planning run, you should have completed an MRP planning run to create planned orders (if MRP is installed), an Inventory Management order release to create open orders for use as work load during the following steps, and a PC & C work list generation run so open order schedules are up-to-date (if PC & C is installed).

First, you enter or review the planning parameters (such as horizon start date or period length) to be used during the Capacity Requirements Planning run. The parameters that you decide to use are printed on the Planning Parameter Definition report 1.

You then select the types of orders (open, planned, firm planned, or customer) to be used as work load during the Capacity Requirements Planning run and start Work Load Extract.

Note: If Order Entry and Invoicing is installed and interfacing with Capacity Requirements Planning, customer orders can also be selected for use as work load. However, you should be aware of the possibility of introducing "double loading" from both a customer order and its supporting open or planned order.

Those orders for which no operation records exist will be printed on the Work Load Routing Exception report 2. If you determine that these items are required for the Capacity Requirements Planning run, you can use file maintenance to add in these operations and rerun Work Load Extract.

When you are satisfied with the planning parameters and work load, you are ready to start the Capacity Requirements Planning run and to analyze the results using the inquiries and reports provided 3.

Any orders with a work load that falls partially or entirely before the horizon start date will be printed on the Work Load Exception Report.

If needed, you can make any necessary adjustments 4 and repeat the Capacity Requirements Planning run.

Note: If selected during system tailoring, before and after images of any modified ("adjusted") base and variable capacity records will be printed for use as an audit trail.

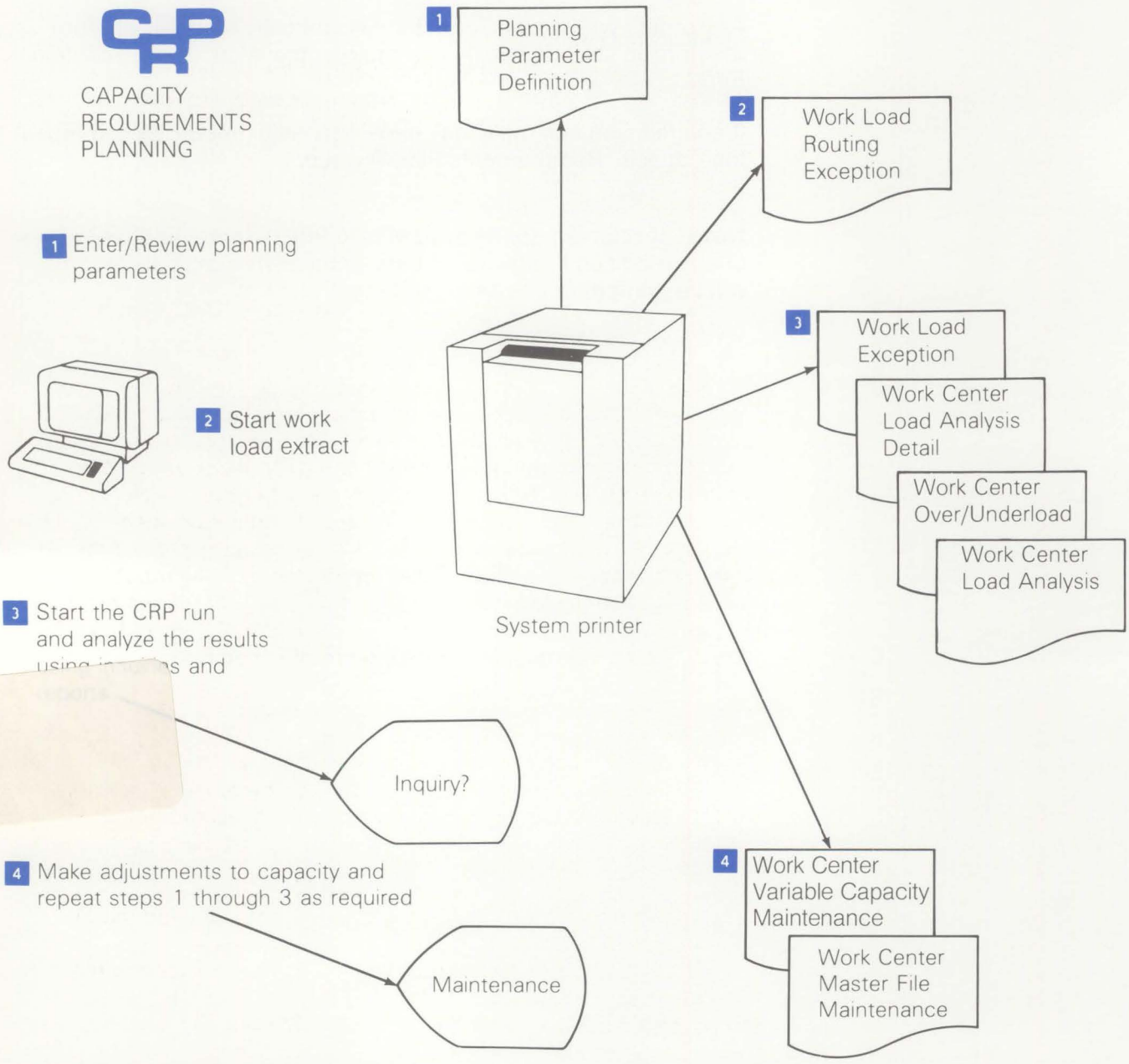


Figure 2-6. Capacity Requirements Planning information flow

Application functions

Capacity Requirements Planning (CRP) is dependent on other applications. It requires orders (open, planned, firm planned, or customer) and specifications (routing and/or open operations). At least one of the following combinations of MAPICS applications is required to support CRP:

1. Inventory Management (IM) and Product Data Management (PDM).

2. Inventory Management (IM) and Production Control and Costing (PC & C).

Material Requirements Planning (MRP), while not required, is an important application to a capacity planning system. The MRP application schedules orders at all levels. Each planned order is assigned the appropriate start date and quantity to be produced. Without MRP, planned orders cannot be scheduled. Also, Production Control and Costing (PC & C) is recommended because it provides a current picture of work in process. Product Data Management (PDM) is also recommended. Without PDM, data must be entered manually into the Open Operations file if PC & C is installed. Therefore, including MRP, PC & C and PDM data will give the most accurate picture of capacity versus load.

Also, customer orders can be included if Order Entry and Invoicing is installed. This may prove useful for customers that have no formal tracking and scheduling system (PC & C/MRP). Be careful when you use this option, however, because of possible duplicate loading of customer and open/planned orders.

Orders may be extracted as follows:

- Open orders (from Inventory Management and Production Control and Costing)
- Planned and firm planned orders (if Material Requirements Planning is installed)
- Customer orders (if Order Entry and Invoicing is installed).

Specifications will be used as follows:

- Order routings for Open Orders (if Production Control and Costing is used)
- Item routings (from Product Data Management).

Enter/review planning parameters

Prior to your initial planning run, you define the parameters to be used by the application during the Capacity Requirements Planning run. You then have the option to review and change these parameters prior to subsequent planning runs. Once entered, these parameters are saved by the application for use when you initiate the planning run.

Variable capacity definition

Within a manufacturing facility, many factors may influence the planned or desired available capacity. For example, machine downtime, preventive maintenance, and vacations decrease capacity, while sales promotions and overloads create a need for increased capacity. The application allows you to enter changes to the base capacity to compensate for these factors.

Capacity loading

Capacity loading can be divided into two phases: work load extract and schedule and accumulate load.

The work load extract phase provides a display from which the planner can select which orders (open, planned, firm planned, or customer) will be extracted for use during the schedule and accumulate load phase.

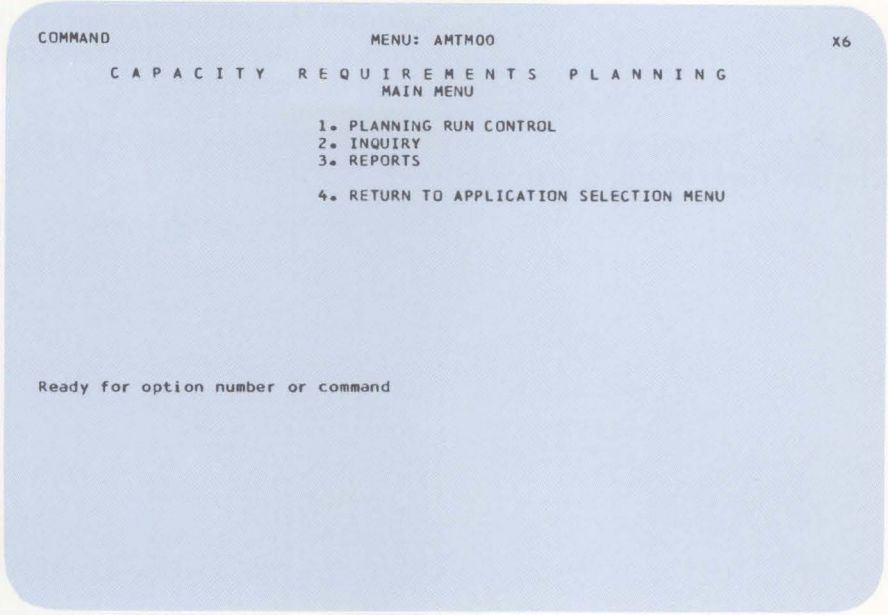
The schedule and accumulate load phase uses these orders, along with the respective specifications (item routing or order routing), to generate data for load analysis. Planned, firm planned, and customer orders are scheduled forward from the planned start date of the order. Open manufacturing orders are scheduled backward from the order due date. You can choose a scheduling option that adjusts an open order's lead time so that the generated load falls within the remaining lead time.

Load analysis

After the load has been accumulated, a summarized report is printed in either work center or department sequence. This report shows which periods need to be further analyzed (using the detail analysis inquiry or report) to determine the cause of any overloads and/or underloads. These analysis tools give the operation hours by order for each period. Using this detail as a guide, the planner can "smooth" the work load by entering base capacity changes through the Variable Capacity maintenance displays. Executing the schedule and accumulate load phase after variable capacity changes have been entered compares the load profile to the revised capacity profile. The planner can then see the effect of any variable capacity modifications.

Operations

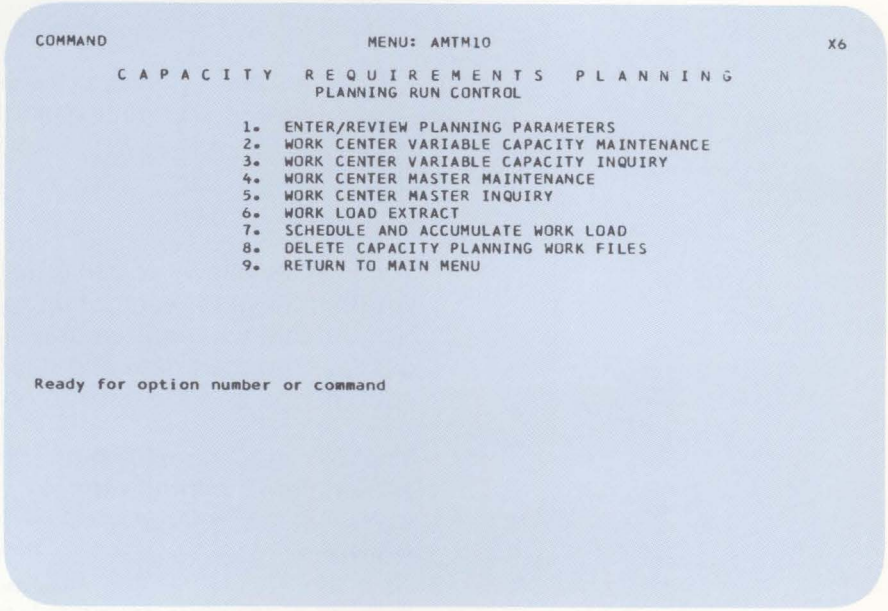
Capacity Requirements Planning functions normally begin with the Main Menu. You enter the number corresponding to the task you want to perform.



Planning run control

Using the options on this menu, you control the following major functions of the Capacity Requirements Planning application:

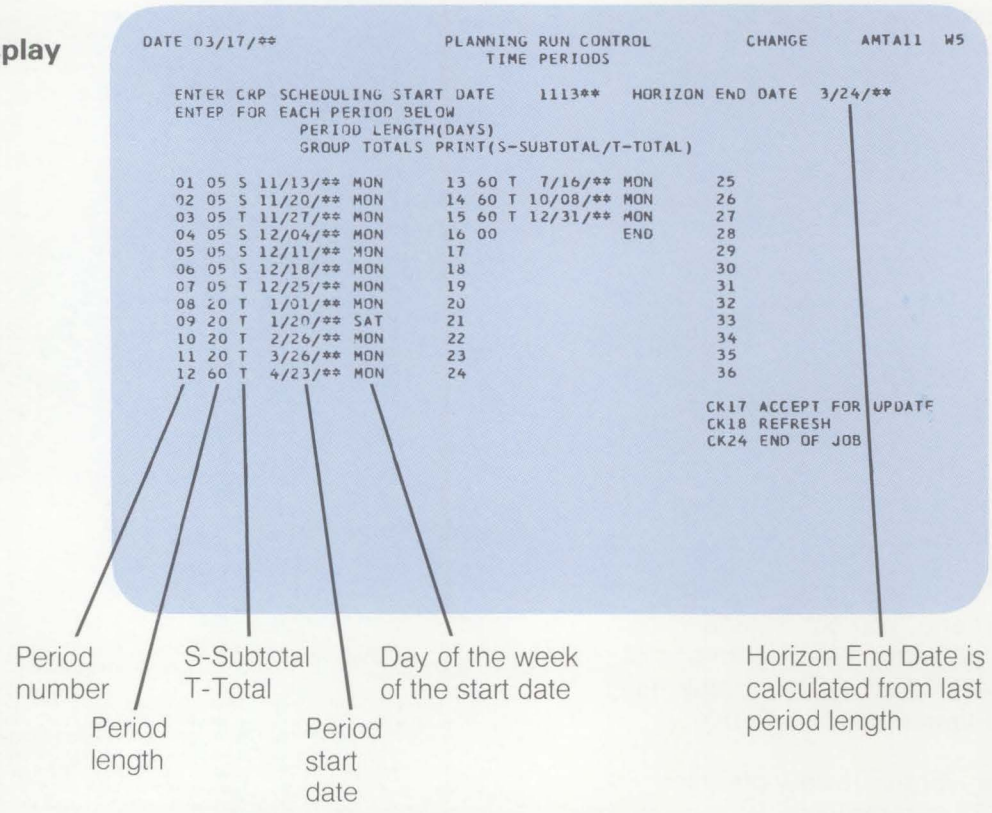
- Enter/review planning parameters
- Variable capacity maintenance and inquiry
- Work load selection
- Schedule and accumulate work load.



Enter/review planning parameters

The planning parameters used by the application during the planning run are defined using the displays provided by this option. The planning parameters fall into two groups: Time Periods and Options.

Example: Planning Run Control Time Periods display



This display allows you to enter your horizon start date and the length in days for each of up to 36 periods. Using the period lengths that you entered, the application then calculates and displays the start date and day of the week on which it falls for each period and the horizon end date.

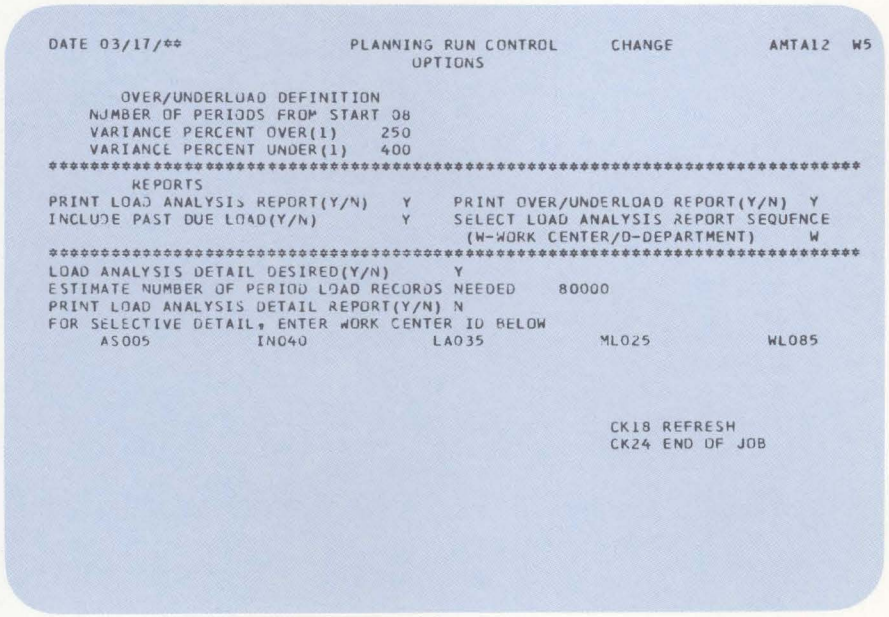
You can also choose whether the capacity for a period should be accumulated without printing; accumulated and printed; or accumulated, printed, and zeroed out (begins accumulating again from zero).

A blank means the capacity for this period is accumulated without printing. An S means the cumulative capacity through this period is printed and accumulated into the next period. A T means the cumulative capacity for this period is printed, but not accumulated into the next period.

These capacity groupings are printed on the Work Center Load Analysis report following the completion of the Capacity Requirements Planning run.

Example: Planning Run Control Options display

This display allows you to set up parameters for overload and underload reports, and load analysis detail. You can select up to 20 work centers for selective load analysis detail. If no work centers are entered, load analysis detail is generated for all work centers.



Planning Parameter Definition report

This report is printed after you have completed defining your planning parameters. It can be kept as an historical audit of the planning parameters in place during previous planning runs.

```
NORTHCREEK IND.                    CAPACITY REQUIREMENTS PLANNING          DATE  4/08/**  TIME 16.40.54  PAGE   1   AMTAI

                                   PLANNING PARAMETER DEFINITION           OPER

----------TIME PERIOD DEFINITION----------      ------OVERLOAD DEFINITION------      -----SCHEDULING OPTIONS-----

 PERIOD   PERIOD    START                       VARIANCE PERCENT OVER      10.0%    ADJUST QUEUE TIMES      YES
 NUMBER   LENGTH     DATE    DAY  GROUPING      VARIANCE PERCENT UNDER     10.0%    DELAY OPERATION START   YES
                                                NUMBER OF OVERLOAD PERIODS   25
   01        05   12/01/**   MON       S       ----------------------------REPORTS-----------------------------
   02        05   12/08/**   MON       S
   03        05   12/15/**   MON       S       PRINT LOAD ANALYSIS REPORT  Y    PRINT OVER/UNDERLOAD REPORT   Y
   04        05   12/22/**   MON       S       INCLUDE PAST DUE LOAD       Y    LOAD ANALYSIS REPORT SEQUENCE W
   05        02   12/31/**   WED       S       ----------------------LOAD ANALYSIS DETAIL----------------------
   06        05    1/05/**   MON       S
   07        05    1/12/**   MON       S       LOAD ANALYSIS DETAIL DESIRED Y
   08        05    1/19/**   MON       S       ESTIMATE NUMBER OF RECORDS NEEDED    10000
   09        05    1/26/**   MON       S       PRINT LOAD ANALYSIS DETAIL   Y
   10        05    2/02/**   MON       S
   11        05    2/09/**   MON       S       WORK CENTERS SELECTED FOR DETAIL
   12        05    2/16/**   MON       S
   13        05    2/23/**   MON       S
   14        05    3/02/**   MON       S
   15        05    3/09/**   MON       S
   16        05    3/16/**   MON       S
   17        05    3/23/**   MON       S
   18        05    3/30/**   MON       S
   19        05    4/06/**   MON       S
   20        05    4/13/**   MON       S
   21        05    4/20/**   MON       S
   22        05    4/27/**   MON       S
   23        05    5/04/**   MON       S
   24        05    5/11/**   MON       S
   25        04    5/18/**   MON       S
   26        05    5/22/**   FRI       S
   27        05    6/01/**   MON       S
   28        05    6/08/**   MON       S
   29        05    6/15/**   MON       S
   30        05    6/22/**   MON       S
   31        05    6/29/**   MON       S
   32        05    7/07/**   TUE       S
   33        05    7/14/**   TUE       S
   34        05    7/21/**   TUE       S
   35        05    7/28/**   TUE       S
   36        05    8/04/**   TUE       S
             --    8/10/**   HORIZON END DATE

  *NOTE-ALSO CRP SCHEDULING START DATE
```

Variable capacity maintenance and inquiry

You can add to or subtract from the base capacity of any of your work centers using variable capacity maintenance. Using this option, you can add, change, or delete an individual variable capacity record. In addition, you can delete all of the variable capacity records for a work center.

You can inquire into both the base and the totaled variable capacity that currently exists for a specific work center.

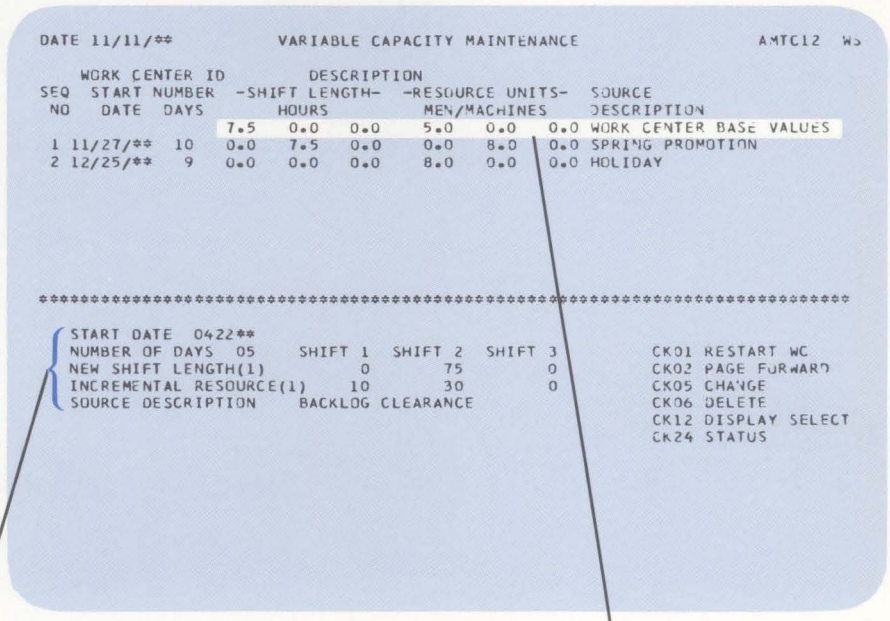
The same information shown on the inquiry display can be printed by selecting the Work Center Capacity report from the Reports menu.

Following are examples of the Variable Capacity Maintenance (Add) and Inquiry displays.

Example: Adding variable capacity to a work center

In this example, extra resource is required to handle the existing backlog.

One new resource unit (workers or machines) is being added to shift 1, and three new resource units are being added to a new second shift of 7.5 hours duration. These events are to begin on the date shown in the START DATE field and continue for five days.



Example: Variable capacity inquiry display

This display shows the total base capacity plus a 36 period profile of all variable capacity available by period.

If the variable capacity does not span a complete period, detail lines will be printed, along with a total line for the period.

```
DATE 11/11/**          WORK CENTER VARIABLE CAPACITY      INQUIRY    AMTD11  WS

WORK CENTER ID AS005   DESCRIPTION PUMP ASSEMBLY
  DEPARTMENT     ASSY  AVG EFFICIENCY     0.72   AVG ACTUAL OUTPUT        38.29
  FOREMAN         CFB  STD EFFICIENCY     0.78   AVG STANDARD OUTPUT      27.57
  PRIME LOAD CODE  4   RUN LABOR HOURS
  LOCATION       P8N88                                  AVERAGE  AVERAGE  PLANNED
          START  --SHIFT LENGTH--  -RESOURCE UNITS-      DAILY    DAILY    PERIOD
PER DAYS  DATE    1    2    3     1    2    3  CAPACITY     SCHED CAPACITY
                 7.5  0.0  0.0   5.0  0.0  0.0 BASE VALUES
 01 05 11/13/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5      188
 02 05 11/20/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5      188
 03 05 11/27/**  7.5  7.5  0.0   5.0  3.0  0.0    60.0        7.5      300
 04 05 12/04/**  7.5  7.5  0.0   5.0  3.0  0.0    60.0       12.0      300
 05 05 12/11/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5      188
 06 05 12/18/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5      186
 07 05 12/25/**  7.5  0.0  0.0   2.0  0.0  0.0    15.0        7.5       75
 08 04 01/01/**  7.5  0.0  0.0   2.0  0.0  0.0    15.0        7.5
 08 16 01/05/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5
 08 20 01/01/**                                    33.0        7.5      660
 09 20 01/20/**  7.5  0.0  0.0   5.0  0.0  0.0    37.5        7.5      750

                                                CK02 PAGE FORWARD
                                                CK24 END OF JOB
```

Work center base values

Capacity varies within a period

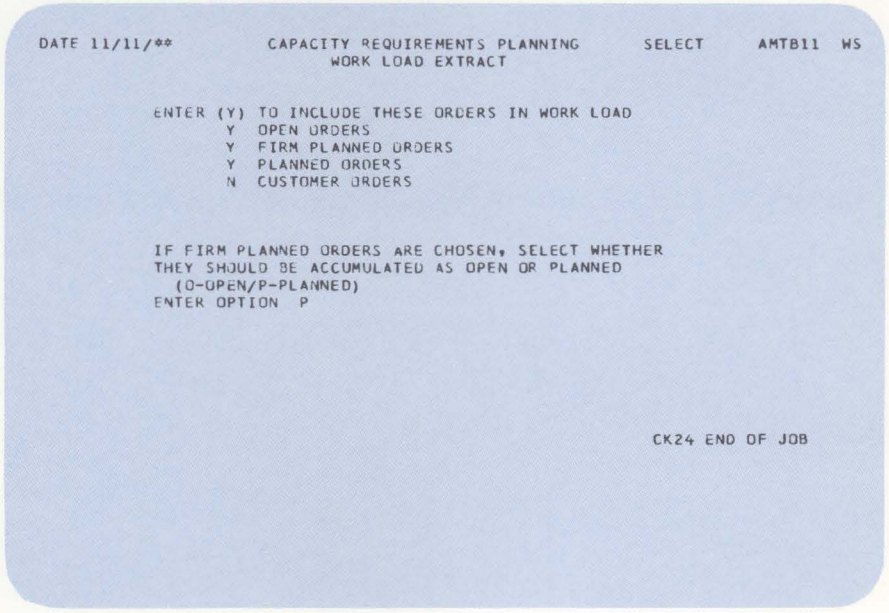
Work load selection

With this display, you can select the orders you want to use during the schedule and accumulate load phase. If the Material Requirements Planning application is installed, planned and firm planned orders can be included.

If firm planned orders are selected, you can accumulate them as either open or planned orders.

If the Order Entry and Invoicing and Product Data Management applications are installed, customer orders can be selected.

Be careful when using customer orders because of the possibility of introducing "double loading" from both a customer order and its supporting open or planned order during the schedule and accumulate load phase.

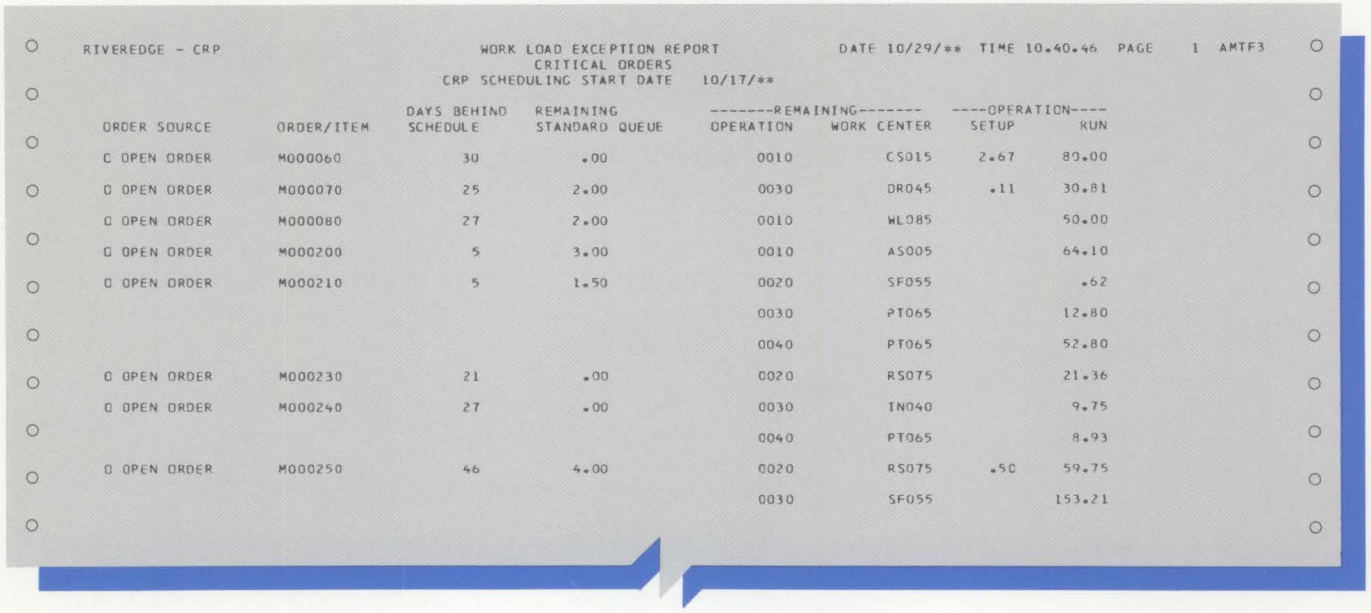


Schedule and accumulate work load

This option has no associated displays. It initiates the Capacity Requirements Planning run. At the end of the run, you can use the inquiry display and reports provided to determine which, if any, of your work centers require changes in capacity.

Following are examples of the reports available to you at the end of the run.

Work Load Exception Report: This report, which can be used as a past due load report if queue adjustment is not selected, shows orders that are or may become past due (that is, days behind schedule exceeds remaining or scheduled queue).



RIVEREDGE - CRP WORK LOAD EXCEPTION REPORT DATE 10/29/** TIME 10.40.46 PAGE 1 AMTF3

CRITICAL ORDERS

CRP SCHEDULING START DATE 10/17/**

ORDER SOURCE	ORDER/ITEM	DAYS BEHIND SCHEDULE	REMAINING STANDARD QUEUE	-------REMAINING------- OPERATION	WORK CENTER	----OPERATION---- SETUP	RUN
C OPEN ORDER	M000060	30	.00	0010	CS015	2.67	80.00
O OPEN ORDER	M000070	25	2.00	0030	DR045	.11	30.81
O OPEN ORDER	M000080	27	2.00	0010	WL085		50.00
O OPEN ORDER	M000200	5	3.00	0010	AS005		64.10
O OPEN ORDER	M000210	5	1.50	0020	SF055		.62
				0030	PT065		12.80
				0040	PT065		52.80
O OPEN ORDER	M000230	21	.00	0020	RS075		21.36
O OPEN ORDER	M000240	27	.00	0030	IN040		9.75
				0040	PT065		8.93
O OPEN ORDER	M000250	46	4.00	0020	RS075	.50	59.75
				0030	SF055		153.21

Work Center Load Analysis report: This report shows the results of the Schedule and Accumulate Work Load phase. The planned capacity is compared to the generated prime load hours for each period.

```
NORTHCREEK IND.                    WORK CENTER LOAD ANALYSIS              DATE  4/08/**  TIME 16.53.04  PAGE    5  AMTH2A
                                   SEQUENCED BY WORK CENTER

 WORK CENTER ID CS015    DESCRIPTION PRESSES

          DEPARTMENT   DP10   AVG EFFICIENCY 1.40    AVERAGE QUEUE(DAYS)      2.38   AVG ACTUAL OUTPU"      83.69
          FOREMAN       RJC   STD EFFICIENCY  .75    PLANNED QUEUE(DAYS)      8.75   AVG STD OUTPUT         66.20
          PRIME LOAD CODE 3 - (SETUP LABOR/SCS) AND RUN MACHINE HOURS                 STANDARD TIMES USED
          LOCATION    A2042                          QUEUE ADJUSTMENT YES           DELAY START YES

 ------PERIOD------  -CAPACITY/PERIOD-    PRIMARY  -------------PERIOD TOTALS-------------   -------------GROUP TOTALS--------------
 NUMBER       START  PLANNED   MAXIMUM       LOAD  AVAILABLE  PER%  LOAD TO CAPACITY RATIO   AVAILABLE  GRP%  LOAD TO CAPACITY RATIO
      LENGTH         HOURS     HOURS      HOURS   CAPACITY  LOAD  0       100%      200%    CAPACITY  LOAD  0       100%      200%
                                                                    .   .   .   .   .                          .   .   .   .   .
      1    5  12/01/**   113       180        .00     113.00     0  .                        S     113.00     0  .
      2    5  12/08/**   113       180      26.27      86.73    23  .00                      S     199.73    12  .0
      3    5  12/15/**   113       180     150.00      37.00-  133  .OOOOOOOOOOOOO           S     162.73    52  .00000
      4    5  12/22/**   113       180     148.29      35.29-  131  .OOOOOOOOOOOOO           S     127.44    72  .0000000
      5    2  12/31/**    45        72      45.00        .00   100  .OOOOOOOOOO              S     127.44    74  .0000000
      6    5   1/05/**   113       180     112.50        .50   100  .OOOOOOOOOO              S     127.94    79  .00000000
      7    5   1/12/**   113       180       4.59    108.41     4  .                        S     236.35    67  .0000000
      8    5   1/19/**   113       180        .00     113.00     0  .                        S     349.35    58  .000000
      9    5   1/26/**   113       180        .00     113.00     0  .                        S     462.35    51  .00000
     10    5   2/02/**   113       180        .00     113.00     0  .                        S     575.35    46  .00000
     11    5   2/09/**   113       180        .00     113.00     0  .                        S     688.35    41  .0000
     12    5   2/16/**   113       180        .00     113.00     0  .                        S     801.35    38  .0000
     13    5   2/23/**   113       180        .00     113.00     0  .                        S     914.35    35  .0000
     14    5   3/02/**   113       180        .00     113.00     0  .                        S    1027.35    32  .000
```

The results of the comparison are printed both numerically and in a bar chart format. The O's and P's in the bar chart represent open orders and planned orders, respectively.

For period 1 in this example, there are 188 hours of planned capacity and 136.8 hours of primary load. The difference means an available capacity of 51.2 hours. The report shows that 73% of the planned capacity within the work center is being utilized. The O's mean all of the load hours are made up of open orders (and firm planned orders if you elected to have them accumulated as part of open load).

Work Center Load Analysis Detail report: This report shows which operations or partial operations are causing the overloaded and/or underloaded work center condition. Using this detail, you can make the necessary adjustments to correct the situation.

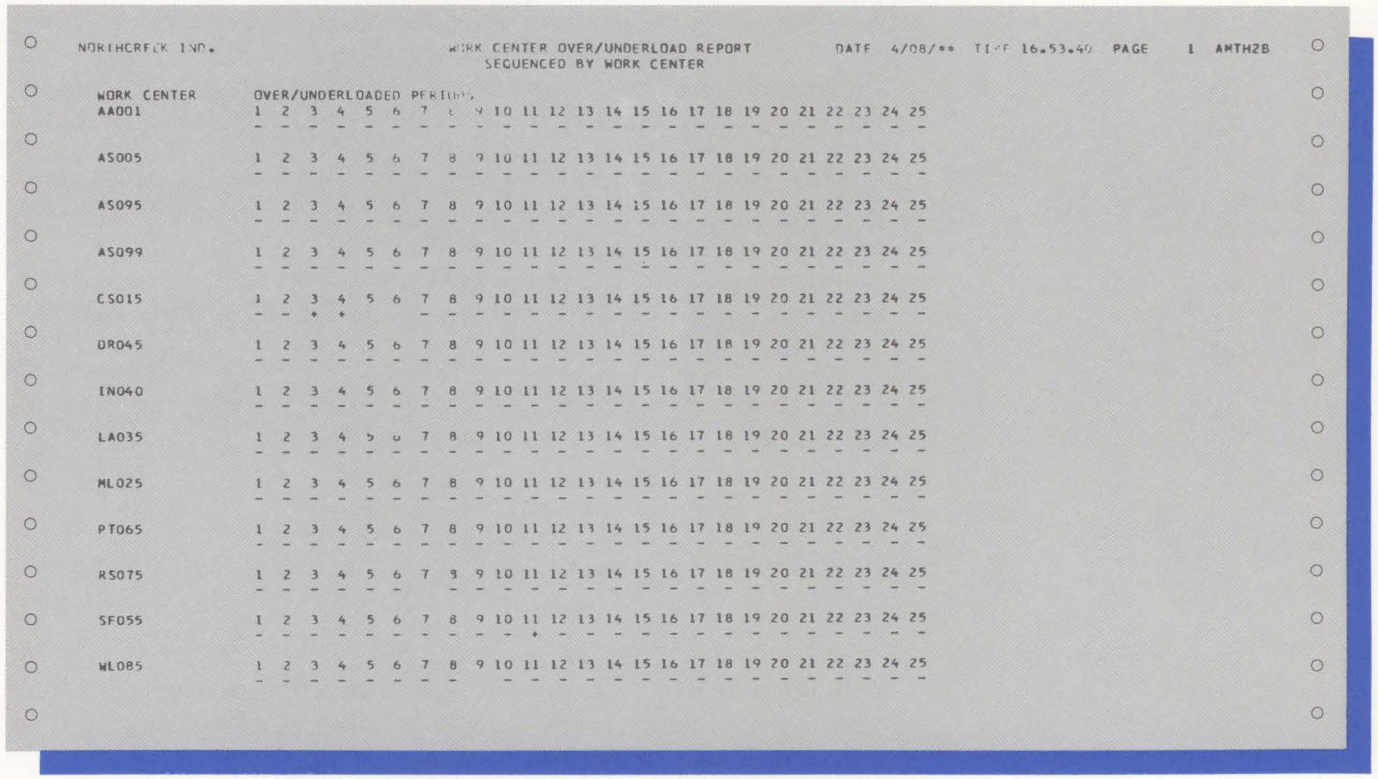
```
NORTHCREEK IND.                    WORK CENTER LOAD ANALYSIS DETAIL        DATE  4/08/**  TIME 16.54.00  PAGE    7  AMTH3

 WORK CENTER ID CS015   DESCRIPTION PRESSES                                QUEUE ADJUSTMENT YES     DELAY START YES

 PERIOD   OPER    ITEM/ORDER        ----------OPERATION----------   ----PERIOD----   ---OPERATION---    ---QUANTITY---    NEXT
 NUMBER   START                TYPE SEQ STATUS DESCRIPTION          SETUP     RUN    SETUP     RUN      OPEN  ORDERED     WC

    00  9/15/**          M000250 O 0010   30  PRESS                   .00     .13      .00     .13         5     1200   RS075
    00 11/04/**  03423          F 0010       PRESS OUT               .67   34.84      .67   34.84       784      784   RS075

 PERIOD TOTAL                              CAPACITY       5,243 HRS   .67   34.97       TOTAL       35.64      99%(UNDER)

    02 12/11/**          M000060 O 0010   10  PRESS OUT              2.67    6.71     2.67   80.00      1200     1200
    02 12/12/**          M001650 O 0010   10  PRESS BLADES           1.33    4.30     1.33  133.33       600      600   RS075
    02 12/12/**          M001670 O 0010   10  PRESS BLADES           1.33    4.30     1.33  133.33       500      500   RS075
    02 12/12/**          M001660 O 0010       PRESS BLADES           1.33    4.30     1.33  133.33       700      700   RS075

 PERIOD TOTAL                              CAPACITY         113 HRS  6.66   19.61       TOTAL       26.27      77%(UNDER)

    03 12/11/**          M000060 O 0010   10  PRESS OUT               .00   37.50     2.67   80.00      1200     1200
    03 12/12/**          M001650 O 0010   10  PRESS BLADES            .00   37.50     1.33  133.33       600      600   RS075
    03 12/12/**          M001670 O 0010   10  PRESS BLADES            .00   37.50     1.33  133.33       500      500   RS075
    03 12/12/**          M001660 O 0010       PRESS BLADES            .00   37.50     1.33  133.33       700      700   RS075

 PERIOD TOTAL                              CAPACITY         113 HRS   .00  150.00       TOTAL      150.00      33%(OVER)
```

In this example, period 1 is shown as being 27% underloaded. This corresponds to the previous example given for period 1 on the Work Center Load Analysis report.

Note: This same information can be presented on the Work Center Load Analysis Detail Inquiry display.

Work Center Over/Underload report: This exception report lists each work center in which an overload or underload outside the variance percentages (established during Planning Parameter Definition) exists.

You can use this report to identify those work centers requiring your further attention.



NORTHCREEK INC. WORK CENTER OVER/UNDERLOAD REPORT DATE 4/08/** TIME 16.53.40 PAGE 1 AMTH2B
SEQUENCED BY WORK CENTER

WORK CENTER	OVER/UNDERLOADED PERIODS																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
AA001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AS005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AS095	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AS099	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CS015	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DR045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IN040	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LA035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ML025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PT065	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RS075	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SF055	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WL085	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Data Collection System Support

Information flow

Figure 2-7 shows how information flows through the Data Collection System Support application. The numbers in the following discussion refer to that figure.

The flow of information begins in a warehouse or shop with an IBM 5230 Data Collection System 1. This system gives an employee a simple and convenient way to enter data at the ***place*** of the action, at the ***time*** of the action, in a form that the computer can read.

The IBM 5230 Data Collection System is made up of two parts—entry stations and a controller. The entry stations are located as near as possible to the place where the data is collected. The data is entered into the IBM 5230 system in three ways:

- By badge
- By card
- By numeric keys.

Your employees can quickly report inventory information, the current status of jobs, and the current location of material to a central location from a number of points in the warehouse or on the plant floor.

Entering data at a 5230 entry station is called an ***action.*** An action can be one single entry or any combination of the three types of entry. When an action is completed, the 5230 controller creates an output record from the stored data. You specify the format of this record at the time the application is installed. The records generated by the IBM 5230 Data Collection System are written to diskette 2. When the diskette is read into the System/36, the Data Collection System Support application splits it into categories—labor data, move data, or inventory data.

For labor data, the Data Collection System Support application checks that labor records are complete, and creates elapsed-time records for each employee by job. These records are then printed 3 for each employee, with totals by job, break, time lost between jobs, and time-and-attendance. If errors occur in the labor data, the operator can correct the records, reenter them with the correct data, and finish the run 4.

New records can also be entered at this point. If the Data Collection System Support is being run without the IBM 5230, all records are keyed into the application here.

The application checks the move and inventory records for reasonableness and creates output records.

Data Collection System Support creates two types of output records 5— employee time-and-attendance (suitable for use in a payroll application), and operation, move, issue, and receipt records (suitable for use with your inventory and production control system). The records created by the Data Collection System Support application can be passed to Payroll, Inventory Management, or Production Control and Costing.

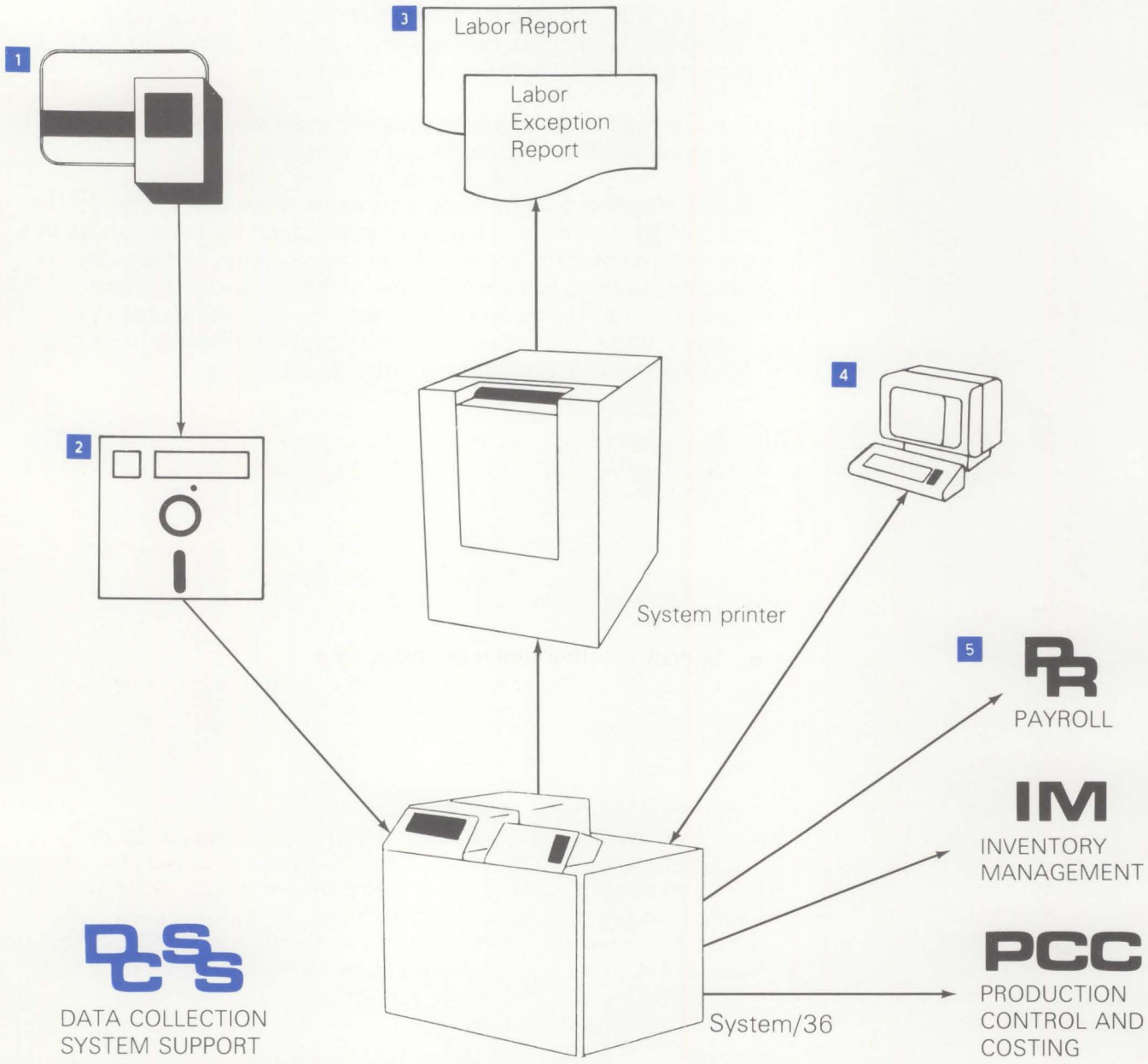


Figure 2-7. Data Collection System Support information flow

Application functions

Online data entry and edit

If you choose, all data records can be entered through a work station rather than through the IBM 5230 Data Collection System. To ensure accuracy, online data entry and editing are used for records entered through the work station. Operator guidance is provided for each field. Each record is edited as it is entered. If errors are found, the operator is notified immediately by error messages displayed at the bottom of the data entry screen. These messages tell the operator what the specific errors are. Only when the data is error-free is it accepted by the application.

Personalizing the application

You can specify the actions you want to enter on the IBM 5230 Data Collection System and the contents of the output records the system will create. At your option, you can:

- Enter time-and-attendance records, job records, inventory records, or any combination of the three
- Adjust employee clock time to shift start and stop times
- Deduct breaks
- Specify whether lunch period is paid
- Apportion the time spent on overlapping operations between jobs
- Resolve work shift to pay shift.

Turnaround records

The Inventory Management or Production Control and Costing applications create shop orders and turnaround records for use in Data Collection System Support. These turnaround records contain information about the operations on the shop order. When an employee clocks on or off a job, the system combines information in the turnaround records with information entered by the employee to create a complete transaction record.

Because less information has to be entered manually when turnaround records are used, the employees can be more productive, as well as less likely to make errors.

These turnaround records are retained on disk. Your shop packet will contain a six-digit number that the employee enters into the IBM 5230 to extract the needed operation data.

Elapsed-time calculations

The Data Collection System Support application calculates elapsed time spent on specific jobs from job-on and job-off records. First, it retrieves the employee's shift worked, shift paid, and company number from the badge master record. You can specify up to 99 work shifts and up to three pay shifts. ("Shift worked" is a term used to specify the normal working period for a group of employees. "Shift paid" is a term used to indicate to Payroll how employees are paid. For example, if Employee A works from 7:00 A.M. to 3:00 P.M. and Employee B works from 8:00 A.M. to 4:00 P.M., these two employees would be on separate ***work*** shifts for Data Collection System Support purposes, but they would probably both be on the same ***pay*** shift for Payroll purposes.)

Next, the application adjusts the employee clock times to shift start and stop times (within limits that you specify in the tailoring procedure). If employees do not punch in and out for lunch, you can specify an amount of lunch time to be extracted from the time-and-attendance totals. You can also specify up to five extraction periods per shift and use them to extract time from labor records. For example, the five periods per shift can include breaks, cleanup periods, and lunch. For the elapsed-time records that span or partially span lunch or breaks, the application removes the lunch/break or portion of lunch/break time from adjusted elapsed time.

The application also apportions time for overlapped labor records. Overlapped labor records are job-on and job-off records (other than time-and-attendance) whose elapsed time occupies, in whole or in part, the same time frame. The elapsed time is apportioned among the overlapping records by sharing the elapsed time equally among those records. For example, for an employee with two labor records for the period from 1:00 P.M. to 2:00 P.M., the hour is apportioned as a half-hour of elapsed time to each record.

Reformatting and passing data

Data Collection System Support reformats data and passes it to the Payroll, Inventory Management, and Production Control and Costing applications, if they are installed. If these applications are not installed, you can modify the programs to format the Data Collection System Support output records to interface to other inventory, production control, and payroll applications.

The Payroll application receives employee time-and-attendance and job-time data records.

The Inventory Management application receives the following kinds of transactions:

- Receipts (production, purchase, and miscellaneous)
- Issues (production and miscellaneous)
- Pick complete
- Return to stock.

The Production Control and Costing application receives move transactions and labor transactions if Payroll is not installed.

Operations

Personalization

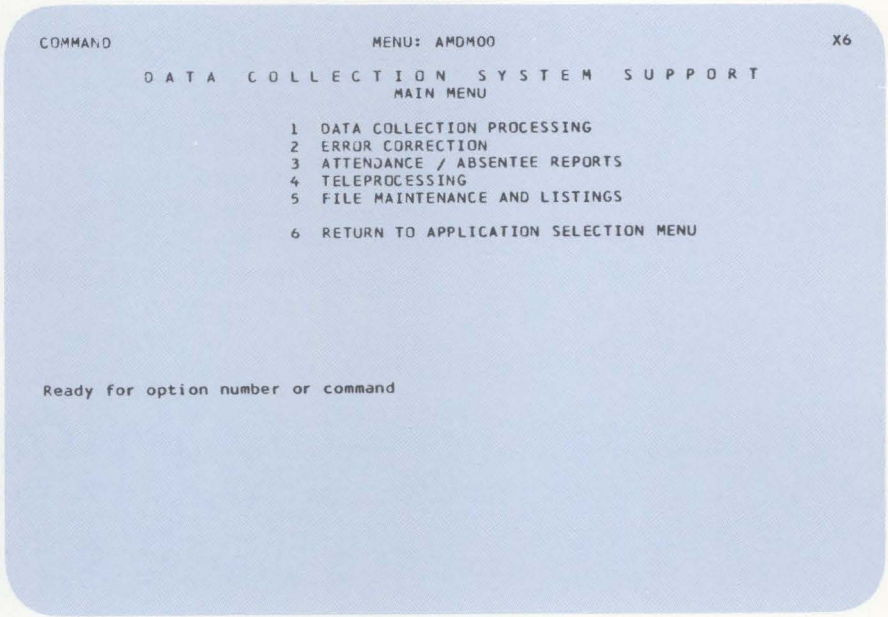
To initialize the Data Collection System Support application, you must perform "personalization," which consists of defining actions for the IBM 5230 Data Collection System. Personalization creates records that tell the IBM 5230 the actions it will receive from each data entry unit. You define the transaction codes and their meanings. You also specify any data fields that can be entered for each transaction. You specify such things as pay options, shift and break times, and clock adjustment times.

Entering data on an IBM 5230 Data Collection System

As employees have actions to report, they enter them through one of the data entry units of the IBM 5230 Data Collection System. The 5230 then formats these actions and stores them on diskette. At an appropriate time (end of day or end of shift), the diskette is transferred to the System/36.

Processing the input on System/36

Processing the Data Collection System Support application on the System/36 begins with the application's main menu. Using this screen, the work station operator selects the particular operation to be performed. As each operation is completed, the system will return to this screen and the operator can select the next operation.



The Data Collection System Support application reads all the employee records for a work period and separates the records into inventory, move, and labor records. The inventory and move records, after editing for reasonableness, are listed, reformatted, and stored as input to your Inventory and Production Control system.

The application reformats any labor records that contain multiple badge entries into single records for each badge entry. Then it checks each employee's labor records. If there is not a job-off for each job-on record, or time-and-attendance records, the employee's records are written to a labor exception file. The application prints a Labor Exception Report with appropriate error messages.

```
NORTHCREEK IND.   CO. 01              LABOR EXCEPTION REPORT                    DATE 11/15/**  TIME 09.13.42  PAGE    1  AMD30
FOREMAN --- MK                                                                                 OPER DAN       BATCH   6

 RECORD    CODE     DESCRIPTION   BADGE  DAY   DATE      --SHIFT--   TIME   ORDER    OPER   WORK   DEPT    1ST KEY     2ND KEY     3RD KEY
 NUMBER    MX  AC                                        WORK PAID          NO.      SEQ    CTR            ENTRY       ENTRY       ENTRY

-----------------------------------------
DAN HANVILLE                EMP NO - 00210
-----------------------------------------

     1    01  01  TIME/ATT      10012   2  11/14/**  01   1    8:07

     2    01  01  TIME/ATT      10012   2  11/14/**  01   1   11:56

     3    01  01  TIME/ATT      10012   2  11/14/**  01   1   12:30

     4    01  01  TIME/ATT      10012   2  11/14/**  01   1   16:33

     5    38  10  PROD-ON       10012   2  11/14/**  01   1    8:10  M000390  0010  ML025  DP20

     6    11  15  PROD-OFF      10012   2  11/14/**  01   1   13:42  M000390  0010  ML025  DP20  00000004  00000000  00000001
         TRAN QTY  0004     SCRAP QTY 0000      COMP CODE 1

     7    11  15  PROD-OFF      10012   2  11/14/**  01   1   13:42  M000390  0030  DR045  DP20  00000000  00000000  00000001
         TRAN QTY  0000     SCRAP QTY 0000      COMP CODE 1
 7 ****          E AM-6317 ON RECORD MISSING

     8    12  15  PROD-OFF      10012   2  11/14/**  01   1   16:33  M000390  0030  DR045  DP20  00000002  00000000  00000000
         TRAN QTY  0002     SCRAP QTY 0000      COMP CODE 0
 8 ****          E AM-6317 ON RECORD MISSING

-----------------------------------------
CAROL HARRIS                EMP NO - 00220
-----------------------------------------

     9    01  01  TIME/ATT      10063   2  11/14/**  01   1    7:55

    10    01  01  TIME/ATT      10063   2  11/14/**  01   1   11:58

    11    01  01  TIME/ATT      10063   2  11/14/**  01   1   12:29

    12    28  14  INDIR-ON/OFF  10063   2  11/14/**  01   1    7:55  M000390  0010  ML025  DP20

    13    28  14  INDIR-ON/OFF  10063   2  11/14/**  01   1   16:27  M000390  0010  ML025  DP20
              E AM-6271 T/A RECORD MISSING
```

Correcting errors and keying labor records

You use maintenance procedures to correct any errors in the data. These procedures let you add to, delete, or update an employee's records. The display used to enter changes to an employee's time records is shown here. If you are running the Data Collection System Support application independently of the IBM 5230 Data Collection System, you can enter all the records for all your employees at this point, using a work station.

```
DATE 11/15/**          LABOR ENTRY/CORRECTIONS        CHANGE    AMD442   T2

    RECORD NUMBER          7        ACTION CODE    15
    MATRIX CODE           11        ACTION DESC.   PROD-OFF
-------------------------------------------------------------------------------
    EMPLOYEE NUMBER       210       EMPLOYEE NAME  DAN HANVILLE
    COMPANY NUMBER          1       FOREMAN        MK
    SHIFT WORKED            1       SHIFT PAID     1
    BADGE NUMBER        10012
    DAY NUMBER              2       DATE (MMDDYY)  1114**
    TIME  (HHMM)         1342
-------------------------------------------------------------------------------
    ORDER NO. M000390   OPER  0030   WORK CTR  DR045   DEPT  DP20

      KEY FIELD TYPE   LGTH   VALUE      KEY FIELD TYPE   LGTH   VALUE
    TRANS/COMPL QTY.     4    0000    SCRAP QTY.            4    0000
    COMPLETION CODE      1       1

                                  USER DATA

                                                  CK18 REFRESH SCREEN
                                                  CK19 RETURN TO SELECT
```

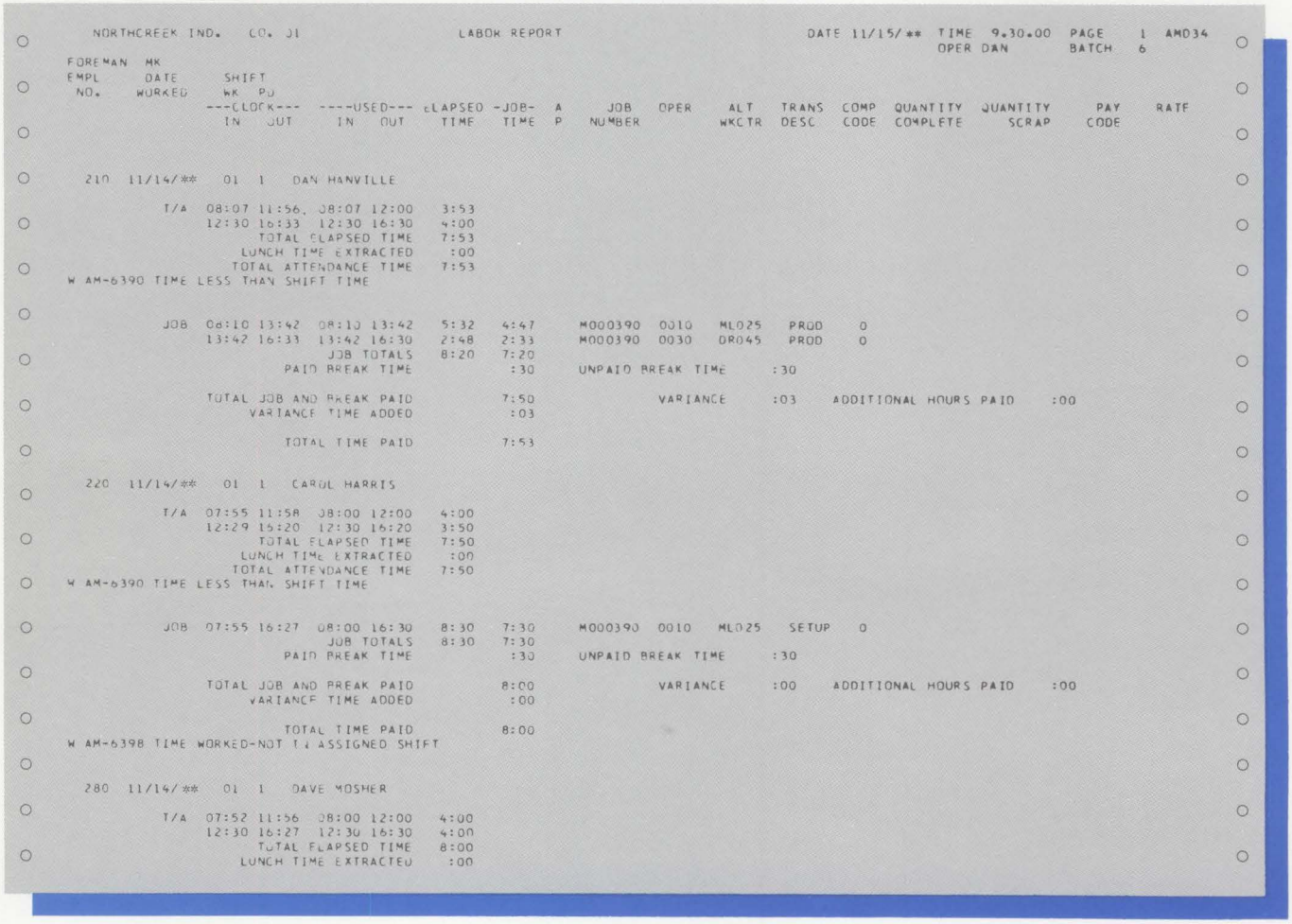
After all corrections have been entered, the system prints the Labor Corrections Audit Report, showing added, deleted, or updated records. You can use this report to verify that the proper corrections were made and that new records were added correctly.

Printing the Labor Report

Finally, the system produces a Labor Report that gives, by company number and foreman code, all of an employee's labor records, including:

- Time and attendance
- Jobs
- Break total
- Variance total (the time lost between successive job-off and job-on transactions)
- Warning messages for excessive variance time and for time totals that are less or greater than shift length.

At this point, payroll information is available for processing by your Payroll application.



```
     NORTHCREEK IND.   CO. 01                    LABOR REPORT                              DATE 11/15/**  TIME  9.30.00  PAGE    1  AMD34
                                                                                                 OPER DAN       BATCH   6
FOREMAN  MK
EMPL      DATE      SHIFT
 NO.     WORKED     WK  PU
                  ---CLOCK---   ----USED---  ELAPSED -JOB-  A     JOB    OPER    ALT   TRANS  COMP  QUANTITY  QUANTITY     PAY     RATE
                    IN   OUT     IN   OUT     TIME   TIME  P   NUMBER          WKCTR  DESC   CODE  COMPLETE     SCRAP    CODE

  210  11/14/**   01  1   DAN HANVILLE

            T/A  08:07 11:56  08:07 12:00    3:53
                 12:30 16:33  12:30 16:30    4:00
                         TOTAL ELAPSED TIME   7:53
                    LUNCH TIME EXTRACTED      :00
                  TOTAL ATTENDANCE TIME       7:53
W AM-6390 TIME LESS THAN SHIFT TIME

            JOB  08:10 13:42  08:10 13:42    5:32   4:47     M000390  0010   ML025   PROD    0
                 13:42 16:33  13:42 16:30    2:48   2:33     M000390  0030   DR045   PROD    0
                                 JOB TOTALS   8:20   7:20
                           PAID BREAK TIME             :30    UNPAID BREAK TIME      :30

                 TOTAL JOB AND BREAK PAID              7:50              VARIANCE      :03    ADDITIONAL HOURS PAID     :00
                      VARIANCE TIME ADDED              :03

                           TOTAL TIME PAID             7:53

  220  11/14/**   01  1   CAROL HARRIS

            T/A  07:55 11:58  08:00 12:00    4:00
                 12:29 15:20  12:30 16:20    3:50
                         TOTAL ELAPSED TIME   7:50
                    LUNCH TIME EXTRACTED      :00
                  TOTAL ATTENDANCE TIME       7:50
W AM-6390 TIME LESS THAN SHIFT TIME

            JOB  07:55 16:27  08:00 16:30    8:30   7:30     M000390  0010   ML025   SETUP   0
                                 JOB TOTALS   8:30   7:30
                           PAID BREAK TIME             :30    UNPAID BREAK TIME      :30

                 TOTAL JOB AND BREAK PAID              8:00              VARIANCE      :00    ADDITIONAL HOURS PAID     :00
                      VARIANCE TIME ADDED              :00

                           TOTAL TIME PAID             8:00
W AM-6398 TIME WORKED-NOT IN ASSIGNED SHIFT

  280  11/14/**   01  1   DAVE MOSHER

            T/A  07:52 11:56  08:00 12:00    4:00
                 12:30 16:27  12:30 16:30    4:00
                         TOTAL ELAPSED TIME   8:00
                    LUNCH TIME EXTRACTED      :00
```

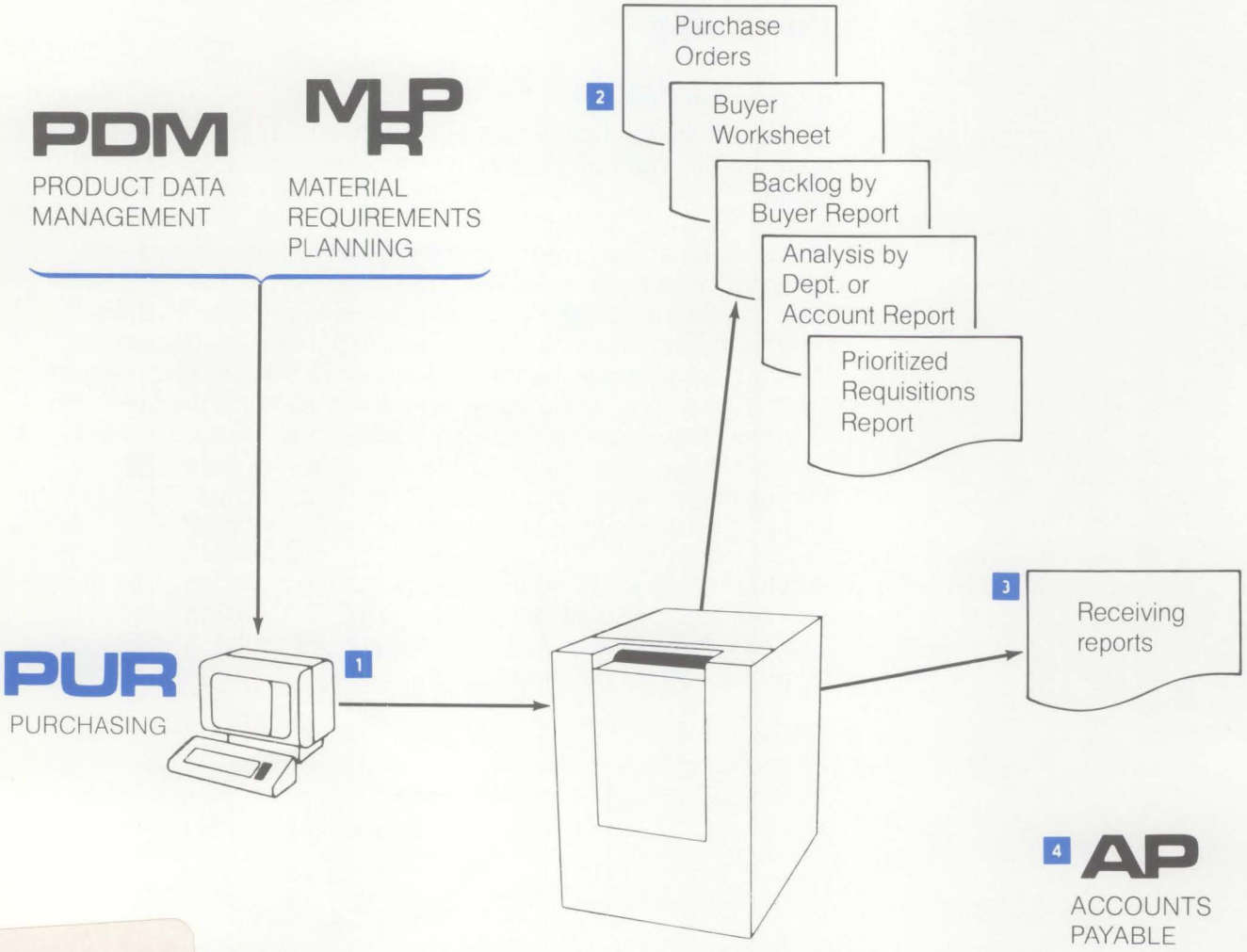
Purchasing

Information flow

Figure 2-8 shows how information flows through the Purchasing application. The numbers in the following discussion refer to that figure.

Requisitions are entered at a work station or are created with information from Material Requirements Planning and Product Data Management 1. Purchasing prints requisition analysis reports to help you make and prioritize purchasing decisions. Purchase orders may be entered at a work station, be drawn from open requisitions, or be taken from the planned order file in the Material Requirements Planning application. These purchase orders can be either single or blanket purchase orders 2. Purchasing accepts routing data from Product Data Management and also retrieves standard purchase order routings.

Purchasing tracks all outstanding purchase orders and, as orders are received, prints receiving reports 3. Purchasing passes invoice information to Accounts Payable 4 so that invoices can be processed for payment.



information flow

Application functions

Requisition entry and maintenance

Requisitions are created automatically by the Material Requirements Planning (MRP) release function or manually at any work station. Production items, capital items, supplies, services, and so on can be handled on the same system.

On an individual item basis, the application allows for input of the time-phased schedule from MRP as a blanket release. Three-time fences control the level of commitment to the vendor.

Automatic printing of the purchase order will allow bypassing of the requisition entry and control steps.

A detailed list of all open requisitions, with a cash summary for each requesting account or department, aids in the commitment of financial resources.

To control the purchase order release process, analysis of buyer backlog versus demonstrated output detects purchasing bottlenecks. A prioritized daily list of open requisitions determines the most critical situations.

Purchase order inquiry

Status information on quantities which have cleared the dock, quality control, and the stockroom is available through inquiries. Fast retrieval is provided for:

- All open purchase orders for a specific item
- All open purchase orders for a specific vendor.

Reports are prepared to highlight overdue acknowledgments and purchase orders. Special inquiries help receiving personnel identify purchase orders:

- Alpha search on a portion of vendor name to help identify a vendor number
- Alpha search on a portion of item description to help identify an item number.

Print formats

Three print formats are available for individual purchase orders:

- Standard
- Blanket
- Drop-ship.

Purchase orders are released from any work station by completing an open requisition or by entering data if no requisition exists. Automatic entry through MRP is also available.

Purchase order revision printing

Purchase order revisions are accomplished by changing the order data from a work station. This starts the printing of a completely revised purchase order with all changes highlighted. Changes are maintained in the purchase order status and history files.

Purchase order tracking

A purchase routing can be assigned to any individual item, with each routing specific to the item. To reduce file storage requirements, a standard routing can be assigned to each item at the time of order release. The standard routing selected is based on an item number stored in the Purchase Item Master record.

Both a purchasing and a manufacturing routing can be assigned for each item. An extended operation description capability is used for detailed dock-to-stock instructions. The variable routing capability allows an item to:

- Be directly routed to the production area
- Bypass inspection on the way to the stockroom
- Be held for quarantine
- Have multiple inspection/testing steps assigned.

Purchase order history

To assist in purchasing decisions, a history of recent purchases is maintained and is available through reports and inquiries. The history contains price, delivery, performance, quality, and other optional data accumulated during the life of the purchase order.

Extended message capability

Clerical effort associated with preparing a purchase order and communicating with the vendor and receiving personnel has been reduced with the following capabilities:

- An 80-character item description, in addition to the 30-character item description carried in Inventory Management.
- Standard variable length messages can be printed on each purchase order; for example, notification of a plant shutdown period.
- Special messages can be entered at time of order entry to be printed on the purchase order or aimed at receiving personnel to show specific routings, handling, or storage.

Special messages can be associated with any item and automatically printed on all purchase order revisions and requests for quotation.

Quotation entry and maintenance

This function is used to enter requests for quotation. Up to five price/quantity quotes are accommodated, along with quotes on lead time, payment terms, FOB point, and estimated shipping charges. Overdue quotation feedback is detected. Requests for new quotes are automatically generated as the expiration date of an existing quotation approaches.

Transaction entry and update

All transactions from the dock-to-stock area update the order status as they are entered. Transactions can contain the vendor number to help monitor performance.

Editing of each transaction is extensive and includes:

- A check for over, under, late, or early shipment and high percentage rejection rate
- Quantity discrepancies from previously reported operations.

Prioritized dock-to-stock work lists

Purchasing provides the following functions:

- Prioritized work sequence report for making work assignments
- Work center analysis report for detecting bottlenecks and monitoring the performance of dock-to-stock work centers.

Lead time enhancements

A "to dock" due date can be carried separately from the "to stock" due date. To control lead times, four separate elements are provided:

- Review and order placement lead time
- Vendor quoted lead time
- Safety lead time
- Dock-to-stock lead time.

Validation of vendor and freight invoices

Entries can be automatically checked against the Purchase Order Status file. A report is prepared, highlighting discrepancies in quantity, invoice amount, terms, ship via, and FOB point.

Debit memos

The printing of debit memos is initiated at a work station. The transaction detail is posted to the Purchase Order Status file and held until the credit memo is entered.

Cash requirements

A time-phased analysis of cash requirements, adjusted for vendor quoted payment terms, is available.

Assignment of vendor item numbers

The application is able to automatically print the vendor's item number on all purchase orders, revisions, and quotation requests.

Vendor analysis

At order close, information on vendor price, delivery, and quality are updated. These ratings are maintained for each vendor/item. A composite vendor rating reflects all purchase order activity for vendor items.

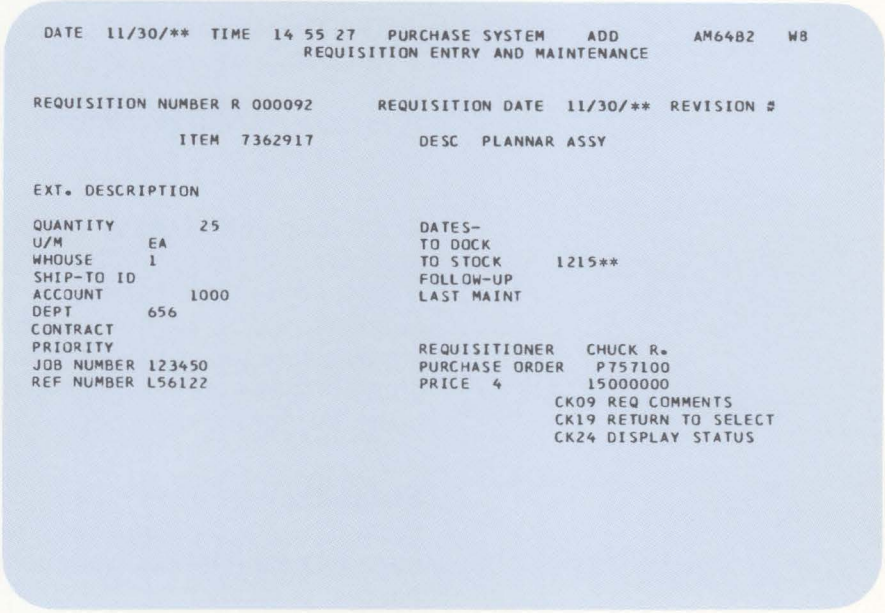
Purchase order acknowledgment

This acknowledgment validates the closing of an order and can be prepared for selected items at the user's option.

Operations

Requisition entry

You can enter requisitions manually or automatically. Manual entry occurs at any work station. All data is specified on the Requisition Entry display. The requisition layout is similar to that of a purchase order, preventing the need for duplicate entry. Additionally, any data not known at the original entry stage can be added later to either the requisition or the purchase order. The system automatically edits the requisition for valid field entries.



Automatic entry occurs through the Material Requirements Planning release function. This option automatically creates open requisitions for review and approval. The result is a substantial reduction in clerical effort.

Maintenance options: The following maintenance options are available:

A = Add new records
C = Change existing records
D = Delete existing records
R = Reactivate previously deleted records

These are standard options throughout the application. They allow for efficient record maintenance and control.

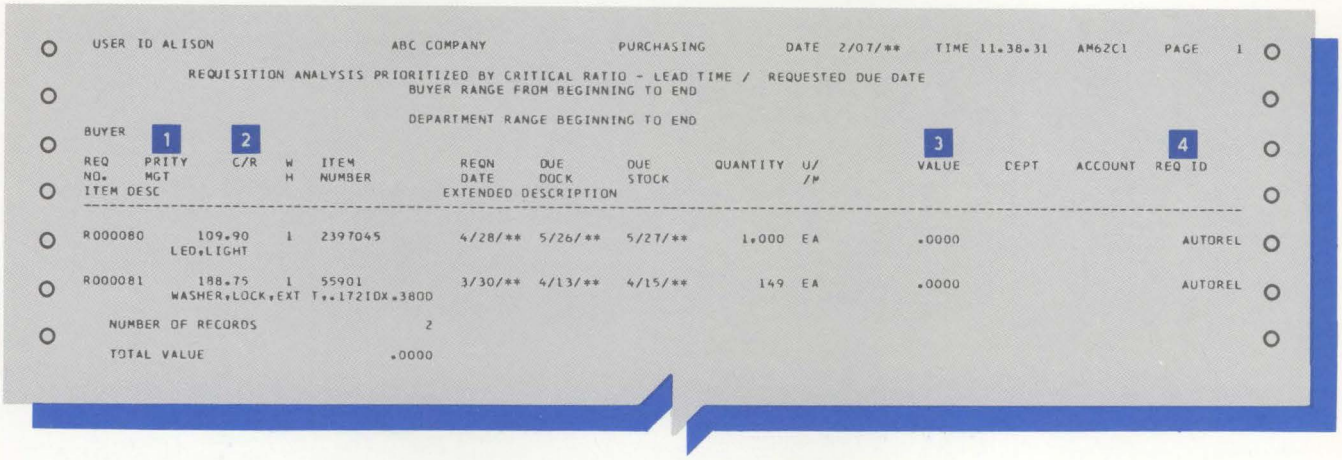
Requisition entry bypass: Where orders are preplanned and approved, requisition entry can be bypassed. Through MRP, planned orders are fed directly to the Purchasing system, and purchase orders are automatically printed. The purchase orders are available for review, with any necessary changes being made on a purchase order update display. This function is normally used only for minor, repetitive items.

Status display: Following entry and maintenance of records, the system displays file and session status. This standard feature of the application is especially helpful as a double check of hand-kept totals.

Reports: The application generates three requisition analysis reports that help make and prioritize purchasing decisions:

- Prioritized Requisitions
- Backlog by Buyer
- Analysis by Department or Account.

Prioritized Requisitions report



```
USER ID ALISON                    ABC COMPANY              PURCHASING        DATE 2/07/**   TIME 11.38.31   AM62C1    PAGE    1
          REQUISITION ANALYSIS PRIORITIZED BY CRITICAL RATIO - LEAD TIME / REQUESTED DUE DATE
                                   BUYER RANGE FROM BEGINNING TO END
                                   DEPARTMENT RANGE BEGINNING TO END
BUYER
REQ      PRITY      C/R   W   ITEM          REQN      DUE       DUE        QUANTITY  U/          VALUE     DEPT    ACCOUNT  REQ ID
NO.      MGT            H   NUMBER        DATE      DOCK      STOCK                /P
ITEM DESC                                EXTENDED DESCRIPTION
-------------------------------------------------------------------------------------------------------------------------------
R000080      109.90     1   2397045       4/28/**   5/26/**   5/27/**      1.000  EA          .0000                        AUTOREL
             LED.LIGHT
R000081      188.75     1   55901         3/30/**   4/13/**   4/15/**        149  EA          .0000                        AUTOREL
             WASHER.LOCK.EXT T..172IDX.380D
   NUMBER OF RECORDS                  2
   TOTAL VALUE                    .0000
```

1 Priority management—Priority override code assigned by the requisitioner.

2 Critical ratio—Automatically calculated, the critical ratio is the number of days to due date divided by the remaining dock-to-stock lead time. The smaller the ratio, the more critical the job.

3 Value—Extended cost of item(s) requested.

4 Requisition identification—The name or initials of the requisitioner or AUTO/REL for automatic release.

Backlog by Buyer report

This summary report lists the total of open requisitions and pending dollar commitments for each buyer.

Analysis by Department or Account report

This summary report lists all open requisitions and pending dollar commitments for each department or account.

Requisition entry inquiries: At all stages, the application provides records and file status information by inquiries. Requisition inquiry occurs in one of two ways:

- By requisition number
- By item number.

This inquiry display shows combined information from the requisition itself and the Purchase Item Master file.

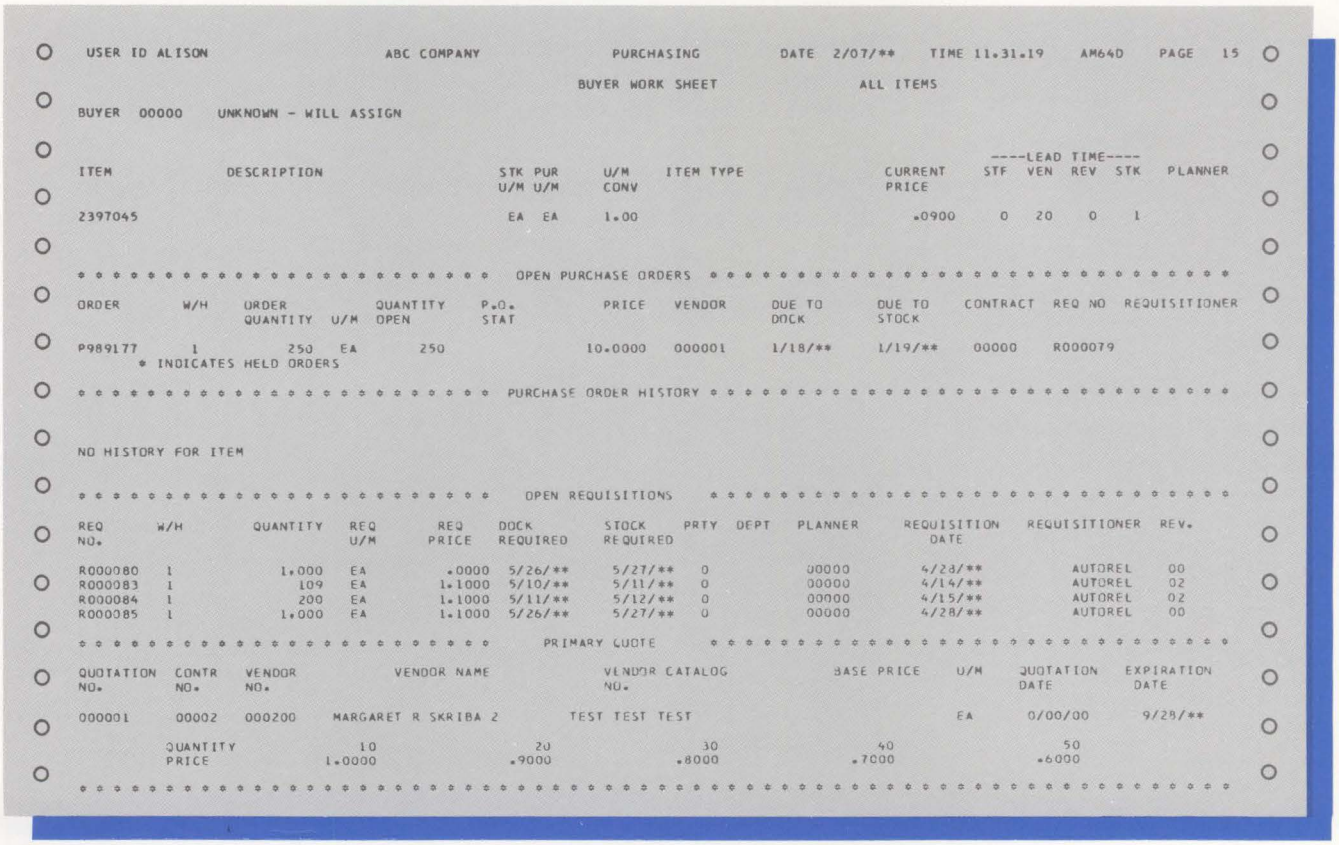
```
DATE   2/07/**                    PURCHASING                    INQUIRY    AM61E2  W8

                        REQUISITION INQUIRY - BY REQUISITION

REQUISITION #  R 000102      STATUS  OPEN   ORDER

ITEM # 9486340              DESCRIPTION  PLASTIC PELLETS                      REV
EXT. DESCRIPTION


QUANTITIY            75          LEAD TIMES              DATES
U/M          LB                  VENDOR        25        REQUISITION       12/09/**
WHOUSE       1                   DOCK/STOCK     5        DOCK REQUIRED     12/19/**
SHIP-TO ID   000                 REVIEW                  STOCK REQUIRED    12/22/**
ACCOUNT                          SAFETY                  FOLLOW-UP
DEPT                                                     LAST MAINTENANCE  12/09/**
CONTRACT                         BUYER      00100
PRIORITY                         PLANNER    00100       JOB NUMBER
ITEM CLASS   RM                                         REF NUMBER
COMMODITY                        REQUISITIONER  BURNIE

UNIT PRICE   LB            .0175                              CK09  DISPLAY COMMENTS
VALUE                     1.3125                              CK19  RETURN TO SELECT
                                                              CK24  END OF JOB
```

This inquiry display lists all requisitions for a specific item.

```
DATE   2/07/**                    PURCHASING                    INQUIRY    AM61F2  W8

                        REQUISITION INQUIRY - BY ITEM

     ITEM #  1940                WASHER,FLAT,#10X9/160DX3/64THK
                                          REQTO
                                          DOCK          PRICE
REQ #       QUANTITY      U/M  DATE      STOCK         VALUE        UM REQUISITIONER

RTEST              100    EA   4/29/** 12/30/**          .0150  EA     VAMBO
                                        12/30/**        1.5000

R00123A      1,000,000    EA   4/29/**  5/23/**          .0150  EA     HL
                                         6/01/**   15,000.0000       ORDER P989178

R00123B             10    EA   4/29/**  5/23/**          .0150  EA     HL
                                         6/01/**          .1500       ORDER P989094

R00123C             10    EA   4/29/**  5/23/**          .0150  EA     HL
                                         6/01/**          .1500

                                                          CK02  PAGE FORWARD
                                                          CK19  RETURN TO SELECT
       MORE REQUISITIONS TO DISPLAY                       CK24  END OF JOB
```

Buyer Worksheet

The Buyer Worksheet is a powerful decision-making tool provided by the system. Especially an automated buy card, this report summarizes all information needed to make a purchasing decision. You can select information by a range of items and/or buyers, and include all requisitions, purchase orders, valid quotes, and online history. The worksheet is generally used as a detail report with items selected from the prioritized requisition report. A sample Buyer Worksheet is shown here.



```
USER ID ALISON                    ABC COMPANY              PURCHASING        DATE 2/07/**   TIME 11.31.19   AM64D   PAGE   15
                                                       BUYER WORK SHEET              ALL ITEMS

BUYER  00000    UNKNOWN - WILL ASSIGN

                                                                                                  ----LEAD TIME----
ITEM              DESCRIPTION                    STK PUR    U/M     ITEM TYPE          CURRENT    STF  VEN  REV  STK   PLANNER
                                                 U/M U/M    CONV                       PRICE

2397045                                           EA  EA     1.00                         .0900     0   20    0    1

* * * * * * * * * * * * * * * * * * * * * * * * * * * * OPEN PURCHASE ORDERS * * * * * * * * * * * * * * * * * * * * * * * * * * * *

ORDER       W/H    ORDER          QUANTITY     P.O.          PRICE    VENDOR     DUE TO      DUE TO      CONTRACT  REQ NO  REQUISITIONER
                   QUANTITY  U/M  OPEN         STAT                              DOCK        STOCK

P989177      1         250  EA       250                  10.0000    000001     1/18/**     1/19/**     00000     R000079
      * INDICATES HELD ORDERS

* * * * * * * * * * * * * * * * * * * * * * * * * * * PURCHASE ORDER HISTORY * * * * * * * * * * * * * * * * * * * * * * * * * * *

NO HISTORY FOR ITEM

* * * * * * * * * * * * * * * * * * * * * * * * * * * OPEN REQUISITIONS * * * * * * * * * * * * * * * * * * * * * * * * * * * *

REQ         W/H          QUANTITY   REQ      REQ      DOCK        STOCK      PRTY  DEPT   PLANNER      REQUISITION    REQUISITIONER  REV.
NO.                                 U/M      PRICE    REQUIRED    REQUIRED                              DATE

R000080      1             1.000   EA         .0000   5/26/**     5/27/**    0             00000        4/28/**          AUTOREL    00
R000083      1               109   EA       1.1000    5/10/**     5/11/**    0             00000        4/14/**          AUTOREL    02
R000084      1               200   EA       1.1000    5/11/**     5/12/**    0             00000        4/15/**          AUTOREL    02
R000085      1             1.000   EA       1.1000    5/26/**     5/27/**    0             00000        4/28/**          AUTOREL    00

* * * * * * * * * * * * * * * * * * * * * * * * * * * PRIMARY QUOTE * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

QUOTATION   CONTR    VENDOR          VENDOR NAME              VENDOR CATALOG          BASE PRICE    U/M    QUOTATION    EXPIRATION
NO.         NO.      NO.                                      NO.                                          DATE         DATE

000001      00002    000200    MARGARET R SKRIBA 2        TEST TEST TEST                                  EA     0/00/00      9/28/**

          QUANTITY                10                20                30                40                50
          PRICE                 1.0000             .9000             .8000             .7000             .6000

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
```

Purchase order entry

You can enter purchase orders manually or automatically.

Manual entry occurs at any work station in one of two ways:

- By completing an existing requisition
- By entering data if no requisition exists.

Automatic entry occurs with an interface to MRP. Automatic release is controlled by codes in the Purchase Item Master file.

Purchase order maintenance options: Standard maintenance options (add, change, delete, and reactivate) are available to handle revisions throughout the life of the purchase order.

Purchase order entry inquiries: Purchase order inquiry occurs in one of two ways:

- By purchase order number
- By item number.

This display provides all available information on a specific purchase order.

```
DATE  2/07/**                      PURCHASING              INQUIRY     AM61A3  Y2

                    PURCHASE ORDER INQUIRY - P.O. DETAIL

ORDER P989060  STATUS 20 CONTRACT       ITEM CLASS  5X CMDITY CODE

 ITEM 1940                  WH 1 WASHER,FLAT,#10X9/16ODX3/64THK PLANNER 00300
THIS ITEM QUANTITY WAS CHANGED -       WAS 00000000150, CHANGED 042983
 STOCK UM EA          PURCH UM DZ          CONV FACT     12.00

 WHOUSE LOCATION      J2111  DEPARTMENT           TYPE 01 STANDARD ITEM BLANKET
 QUANTITY -                  DATES -
 ORDERED                150  ORDERED         4/29/** UNIT COST            .0150
 DEVIATION                   DUE TO DOCK             EXTND COST          1.5000
 AT DOCK                     DUE TO STOCK            RWORK COST
 INSPECT                     FIRST DELIVERY
 SCRAPPED                                                CK05  ITEM DETAIL
 REWORKED                    LAST ACTIVITY               CK06  MULTIPLE RELEASE
 RETRN/VNDR                  LAST MAINTAIN   4/29/**     CK07  OPERATIONS
 IN STOCK                                                CK09  ITEM COMMENTS
                                                         CK10  ALTERNATE U/M
 REQN #                                                  CK13  ORDER SUMMARY
                                                         CK19  RETURN TO SELECT
                                                         CK24  END OF JOB
```

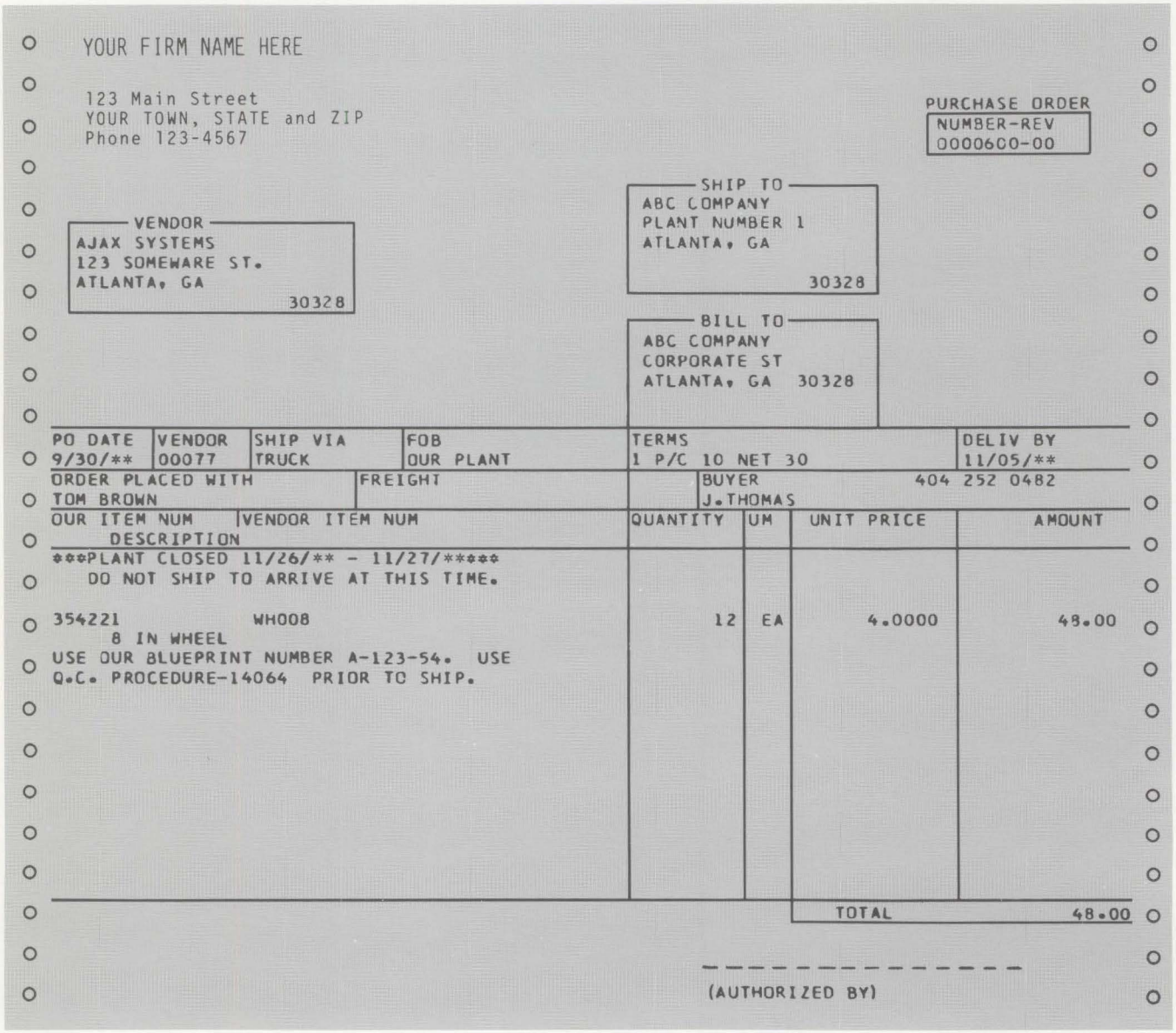
This display lists all open purchase orders for a specific item.

```
DATE  11/30/**  TIME  15 30 59  PURCHASING        INQUIRY       AM6192      W8

                          ALL OPEN ORDERS FOR AN ITEM

ITEM  7362917       WH  1    PLANNAR ASSY

ORDER     DUE          QUANTITY          QUANTITY   UM  BL MULT RCVD ORDER REQN
          DATE         ORDERED             OPEN             SHIP STAT STAT  NO.

P989149 12/15/**          30                 30      EA  N              10   R000090
P989150  1/04/**          30                 30      EA  N              20   R000091


  END OF DATA                                                CK02  PAGE FORWARD
                                                             CK19  RETURN TO SELECT
                                                             CK24  END JOB
```

Purchase order print formats: The application generates three purchase order print formats which incorporate item, due date, and drop-shipment location information:

- Standard
- Blanket
- Drop-ship.

Standard purchase order format



YOUR FIRM NAME HERE

123 Main Street
YOUR TOWN, STATE and ZIP
Phone 123-4567

PURCHASE ORDER
NUMBER-REV
0000600-00

VENDOR
AJAX SYSTEMS
123 SOMEWARE ST.
ATLANTA, GA
30328

SHIP TO
ABC COMPANY
PLANT NUMBER 1
ATLANTA, GA
30328

BILL TO
ABC COMPANY
CORPORATE ST
ATLANTA, GA 30328

PO DATE	VENDOR	SHIP VIA	FOB	TERMS	DELIV BY
9/30/**	00077	TRUCK	OUR PLANT	1 P/C 10 NET 30	11/05/**

ORDER PLACED WITH	FREIGHT	BUYER	
TOM BROWN		J.THOMAS	404 252 0482

OUR ITEM NUM / DESCRIPTION	VENDOR ITEM NUM	QUANTITY	UM	UNIT PRICE	AMOUNT
PLANT CLOSED 11/26/** - 11/27/** DO NOT SHIP TO ARRIVE AT THIS TIME.					
354221 8 IN WHEEL	WH008	12	EA	4.0000	48.00
USE OUR BLUEPRINT NUMBER A-123-54. USE Q.C. PROCEDURE-14064 PRIOR TO SHIP.					
				TOTAL	48.00

(AUTHORIZED BY)

Drop shipment purchase order format

YOUR FIRM NAME HERE

123 Main Street
YOUR TOWN, STATE and ZIP
Phone 123-4567

PURCHASE ORDER
NUMBER-REV
0000600-00

VENDOR
AJAX SYSTEMS
123 SOMEWARE ST.
ATLANTA, GA
30328

SHIP TO
ABC COMPANY
PLANT NUMBER 1
ATLANTA, GA
30328

BILL TO
ABC COMPANY
CORPORATE ST
ATLANTA, GA 30328

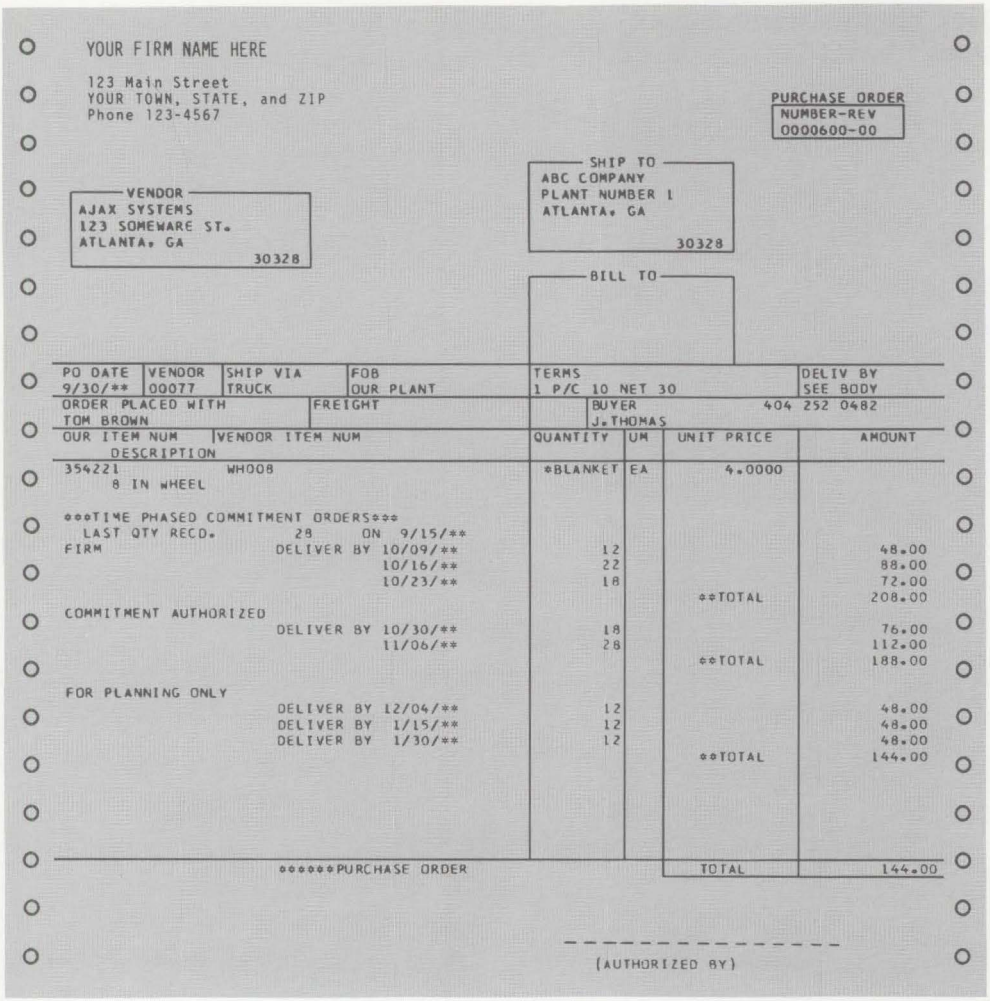
PO DATE	VENDOR	SHIP VIA	FOB	TERMS	DELIV BY
9/30/**	00077	TRUCK	OUR PLANT	1 P/C 10 NET 30	SEE DESC

ORDER PLACED WITH	FREIGHT	BUYER	
TOM BROWN		J.THOMAS	404 252 0482

OUR ITEM NUM / DESCRIPTION	VENDOR ITEM NUM	QUANTITY	UM	UNIT PRICE	AMOUNT
75219 VALVE	22715 DATE 11/05/**	20	EA	8.0000	160.00
43602 FASTENER LAST QTY RECD. 1000 ON 10/05/**	F00010	*BLANKET	EA	.0750	
DROP SHIPMENT DELIVER BY 11/01/** TO ABC COMPANY PLANT NUMBER 4 ATLANTA, GA 30328		1000			75.00
DROP SHIPMENT DELIVER BY 11/15/** TO ABC COMPANY PLANT NUMBER 9 ATLANTA, GA 30328		1000			75.00
354221 9 IN WHEEL	WH008 DATE 11/05/**	40	EA	4.0000	160.00
				TOTAL	48.00

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _
(AUTHORIZED BY)

Blanket purchase order format



YOUR FIRM NAME HERE

123 Main Street
YOUR TOWN, STATE, and ZIP
Phone 123-4567

PURCHASE ORDER
NUMBER-REV
0000600-00

VENDOR
AJAX SYSTEMS
123 SOMEWARE ST.
ATLANTA, GA
30328

SHIP TO
ABC COMPANY
PLANT NUMBER 1
ATLANTA, GA
30328

BILL TO

PO DATE	VENDOR	SHIP VIA	FOB	TERMS	DELIV BY
9/30/**	00077	TRUCK	OUR PLANT	1 P/C 10 NET 30	SEE BODY

ORDER PLACED WITH: TOM BROWN | FREIGHT | BUYER: J.THOMAS 404 252 0482

OUR ITEM NUM / DESCRIPTION	VENDOR ITEM NUM	QUANTITY	UM	UNIT PRICE	AMOUNT
354221	WH008	*BLANKET	EA	4.0000	
8 IN WHEEL					
TIME PHASED COMMITMENT ORDERS					
LAST QTY RECD. 28 ON 9/15/**					
FIRM	DELIVER BY 10/09/**	12			48.00
	10/16/**	22			88.00
	10/23/**	18			72.00
				**TOTAL	208.00
COMMITMENT AUTHORIZED					
	DELIVER BY 10/30/**	18			76.00
	11/06/**	28			112.00
				**TOTAL	188.00
FOR PLANNING ONLY					
	DELIVER BY 12/04/**	12			48.00
	DELIVER BY 1/15/**	12			48.00
	DELIVER BY 1/30/**	12			48.00
				**TOTAL	144.00
******PURCHASE ORDER				TOTAL	144.00

(AUTHORIZED BY)

The data on a given purchase order can be combined as follows:

- **Standard purchase orders**
  - Single item, single date, single ship-to
  - Multiple item, multiple date, single ship-to
  - Multiple item, single date, single ship-to.
- **Blanket purchase orders**
  - Single item, multiple date, single ship-to.
- **Drop-ship purchase orders**
  - Single item, single date, multiple ship-to
  - Multiple item, single date, multiple ship-to.
- **Drop-ship with blanket purchase orders**
  - Single item, multiple date, multiple ship-to
  - Multiple item, multiple date, multiple ship-to.

Time fences: On an item basis, Purchasing allows for three time parameters which define the level of order commitment. This option occurs with an interface to MRP and is only available through the automatic release function. The time fences are printed on blanket purchase orders and show order status to the vendor.

This simplifies communication with the vendor, allowing improved vendor planning and greater ability to deliver on time.

Time fence	Order status	Definition
1st	Firm	Orders are placed; purchase is committed.
2nd	Authorized	Orders are intended; payment for vendor raw materials is committed.
3rd	Planned	Orders are planned; no commitment (for vendor planning purposes only).

Message handling: The application provides two forms of messages—standard and optional—that may be included on a purchase order. These messages may be used internally or externally to improve vendor and receiving communication.

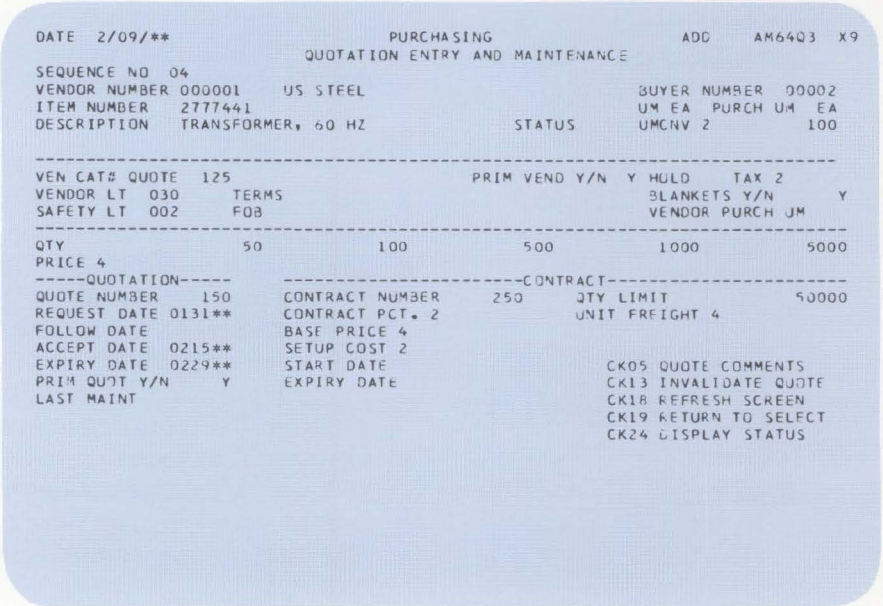
The available messages are:

- Item descriptions up to 80 characters, in addition to the 30 characters in the Item Master file record.
- Standard messages exist up to 80 characters per line on all printed purchase orders and revisions. Each message is controlled by effective dates specified in the message header.
- Any dock-to-stock transaction up to 80 characters is retained in the Purchase Order Status file; for example, the routing on an order (receipt) to a specific work station.
- Optional messages up to 80 characters are used at order release. Messages are printed on the top of the purchase order.
- Optional messages are used for special routings, handling, or storage.

Selective print: The print option allows selective printing of purchase orders and revisions. This saves time and eliminates duplicate or unnecessary printing. The selections available are:

- All purchase orders
- All revisions
- All purchase orders and revisions
- Range of buyers
- Range of warehouses
- Single purchase orders.

Quotation entry and maintenance: The quotation option simplifies the maintenance of current price information and protects the purchaser from unexpected price changes. Quotation status is maintained in the Vendor/Item file. The file allows up to 99 quotes per vendor/item and up to five price/quantity breaks per quote. For each vendor/item, the system also maintains contract, vendor performance, and descriptive information. This information assists in price tracking and control procedures. In addition, vendor performance data is used at order close to compile the vendor performance rating. A Quotation Entry and Maintenance display is shown here.



Receiving activities

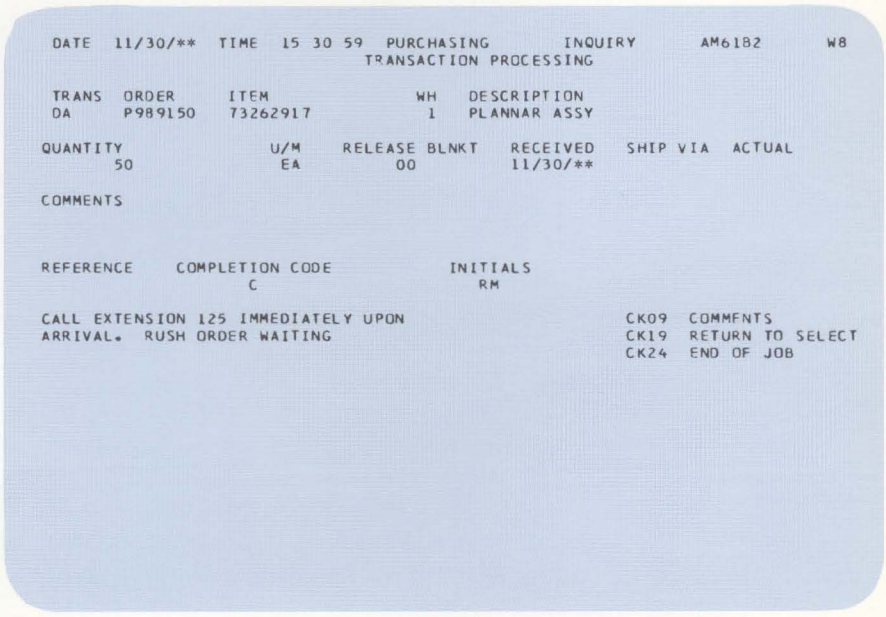
Transaction entry: The system provides transaction codes to permit immediate dock-to-stock control and tracking. This permits management to:

- Schedule dock-to-stock activity (work load)
- Identify dock-to-stock transfer costs
- Identify existing or potential bottlenecks
- Identify transaction errors.

The available transaction codes are:

Code	Translation	Definition
VA	Vendor accept	Vendor has accepted terms.
DA	Dock	Item has been received without count acknowledgment.
CT	Count	Item has been received and counted.
RI	Received in	Item has been received for inspection.
PQ	Quality control	Item has passed quality control complete.
RP	Received to stock	Item has been received in stock without count.

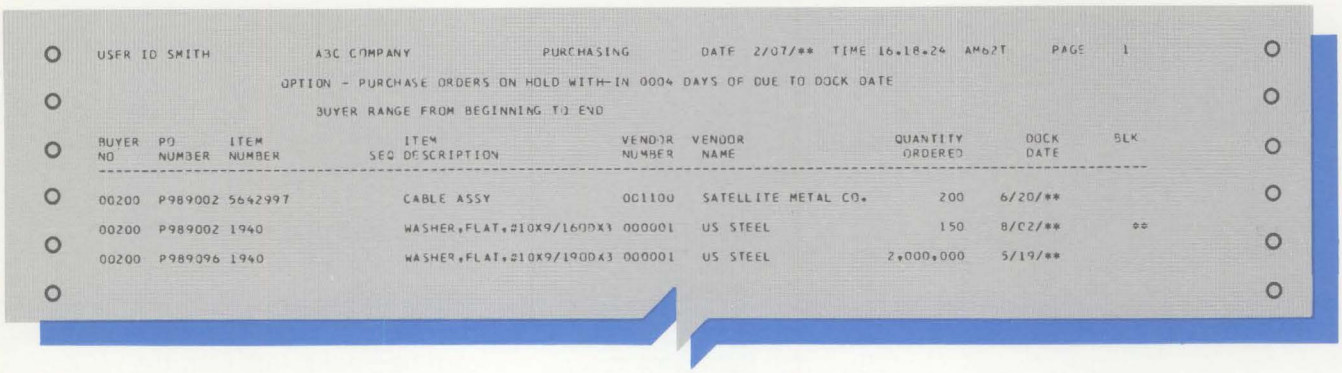
Any combination or number of codes may be selected for a given purchase. This allows flexible stock tracking and routing on a company or individual order basis.



Transaction reports: Transaction reports ease the handling and routing of orders by allowing management and the receiving department to monitor and anticipate work loads.

The application provides three reports:

- Partially-filled orders
- Travelers for expected orders on a multiple or individual basis
- Expected orders due in a given time period.



USER ID SMITH A3C COMPANY PURCHASING DATE 2/07/** TIME 16.18.24 AM62T PAGE 1

OPTION - PURCHASE ORDERS ON HOLD WITH-IN 0004 DAYS OF DUE TO DOCK DATE

BUYER RANGE FROM BEGINNING TO END

BUYER NO	PO NUMBER	ITEM NUMBER	ITEM SEQ	DESCRIPTION	VENDOR NUMBER	VENDOR NAME	QUANTITY ORDERED	DOCK DATE	BLK
00200	P989002	5642997		CABLE ASSY	001100	SATELLITE METAL CO.	200	6/20/**	
00200	P989002	1940		WASHER,FLAT,#10X9/1600X3	000001	US STEEL	150	8/02/**	**
00200	P989096	1940		WASHER,FLAT,#10X9/1900X3	000001	US STEEL	2,000,000	5/19/**	

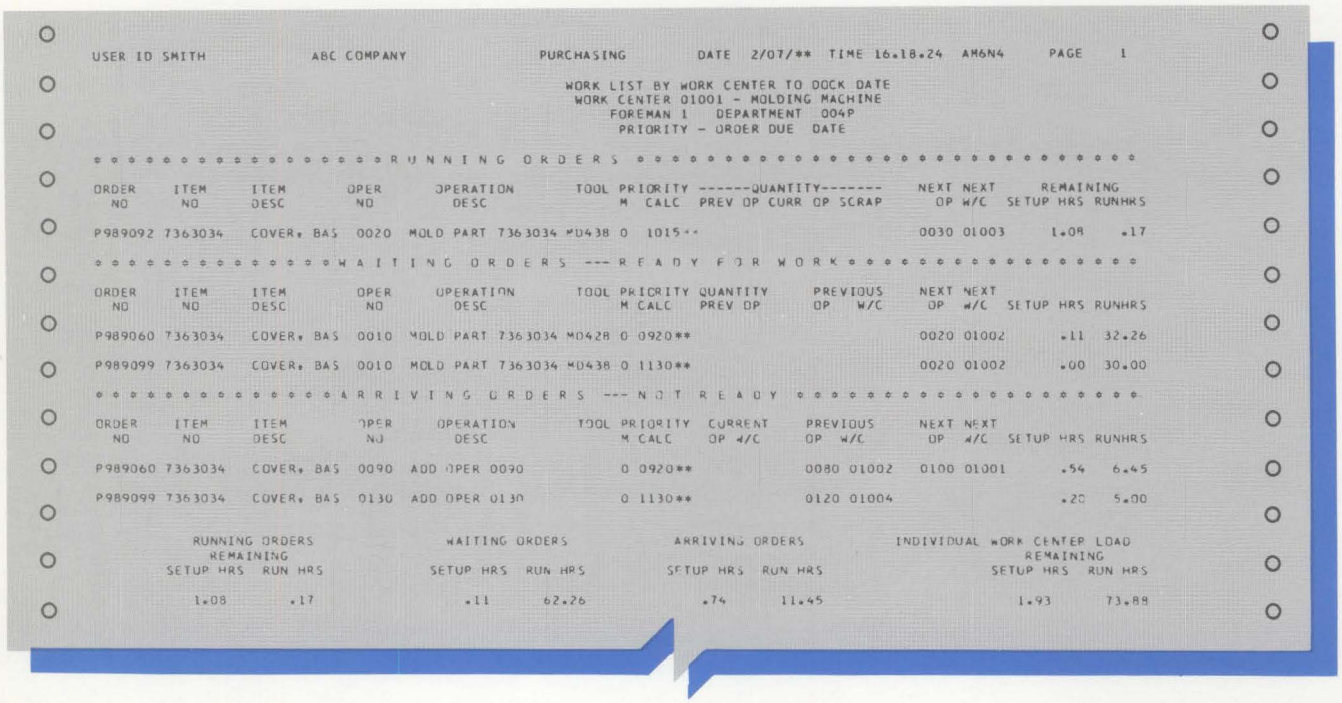
Receiving inquiries: Receiving inquiry occurs in one of three ways:

- By item number—displays all purchase orders for a given item as a cross-reference to the purchase order.
- By vendor number—displays all purchase orders for a given vendor as a cross-reference to the purchase order.
- By purchase order number—displays all available information on a specific purchase order.

Cross-referencing provides the purchasing, receiving, and accounting departments with improved transaction control. The matching and tracking of receipts assures:

- Items received match items ordered.
- Items received are either ahead or behind due dates.
- Items received are tracked to proper locations.
- Items rejected do not exceed company standards.

The application provides a prioritized work list for each work center. This permits personnel to schedule work assignments on the most critical items first.



```
USER ID SMITH          ABC COMPANY          PURCHASING      DATE  2/07/**  TIME 16.18.24  AM6N4     PAGE    1

                                  WORK LIST BY WORK CENTER TO DOCK DATE
                                  WORK CENTER 01001 - MOLDING MACHINE
                                     FOREMAN 1    DEPARTMENT  004P
                                     PRIORITY - ORDER DUE  DATE

* * * * * * * * * * * * * * * * * * R U N N I N G   O R D E R S * * * * * * * * * * * * * * * * * * * * * * * * *

ORDER    ITEM      ITEM          OPER     OPERATION          TOOL PRIORITY ------QUANTITY-------    NEXT NEXT      REMAINING
 NO       NO       DESC           NO       DESC                M  CALC  PREV OP CURR OP SCRAP      OP  W/C  SETUP HRS RUNHRS

P989092 7363034   COVER, BAS     0020   MOLD PART 7363034 MD438 O  1015**                         0030 01003      1.08   .17

* * * * * * * * * * * * * * * * W A I T I N G   O R D E R S  ---  R E A D Y   F O R   W O R K * * * * * * * * * * * * * * * *

ORDER    ITEM      ITEM          OPER     OPERATION          TOOL PRIORITY QUANTITY      PREVIOUS     NEXT NEXT
 NO       NO       DESC           NO       DESC                M  CALC  PREV OP       OP   W/C     OP  W/C  SETUP HRS RUNHRS

P989060 7363034   COVER, BAS     0010   MOLD PART 7363034 MD428 O  0920**                         0020 01002      .11  32.26

P989099 7363034   COVER, BAS     0010   MOLD PART 7363034 MD438 O  1130**                         0020 01002      .00  30.00

* * * * * * * * * * * * * * * * A R R I V I N G   O R D E R S  ---  N O T   R E A D Y * * * * * * * * * * * * * * * * * *

ORDER    ITEM      ITEM          OPER     OPERATION          TOOL PRIORITY  CURRENT     PREVIOUS     NEXT NEXT
 NO       NO       DESC           NO       DESC                M  CALC   OP  W/C      OP  W/C      OP  W/C  SETUP HRS RUNHRS

P989060 7363034   COVER, BAS     0090   ADD OPER 0090           O  0920**              0080 01002  0100 01001      .54   6.45

P989099 7363034   COVER, BAS     0130   ADD OPER 0130           O  1130**              0120 01004                  .20   5.00

          RUNNING ORDERS              WAITING ORDERS          ARRIVING ORDERS          INDIVIDUAL WORK CENTER LOAD
            REMAINING                                                                      REMAINING
        SETUP HRS  RUN HRS          SETUP HRS  RUN HRS       SETUP HRS  RUN HRS          SETUP HRS  RUN HRS

            1.08      .17               .11     62.26            .74      11.45              1.93      73.88
```

Operations are listed in sequence by a calculated priority to aid in scheduling decisions; for example, running, waiting, or arriving orders. Priority may be calculated by slack time per operation, critical ratio, or order due date. The application also permits priority manual override.

Accounts Payable reports: The application provides three types of invoice reports:

- Purchase orders for nonreceipt (service) items; for example, having a building painted
- Purchase orders for items received but not invoiced
- Invoices with quantities greater than receipt quantity.

Accounts Payable processing

Invoice entry and maintenance: Purchasing increases accounting productivity, because fewer clerical hours are required to do invoice entry and maintenance operations. A general ledger account number may be assigned at the time of purchase order entry. Also, any accounts payable information on the purchase order does not have to be rekeyed by the accounting department. This eliminates the need for duplicate entries.

The application provides entry and validation for both vendor and freight invoices. Because vendor invoice amounts are held separately, this simplifies price analysis for both categories.

The application verifies that the invoiced items were actually:

- Ordered
- Received as ordered
- Priced as expected
- Shipped as expected.

Error editing and invoice updating are done online.

In addition, the application provides an edit report for all invoice entries. Discrepancies are highlighted by field. Matching invoices and receipts are automatically entered into Accounts Payable and designated with a no halt code. Invoices that do not match are given a halt code (08). If no purchase order is found, a halt code (09) is assigned. Accounts Payable, assisted by the proper department, may then approve nonmatching invoices.

A noninvoiced receipts report is shown here.

```
ABC COMPANY   NO 01     PURCHASE ORDERS WITH RECEIPTS NOT YET INVOICED   DATE 11/23/** TIME 16.24.10   AM6R3  PAGE 1
                                  DETAIL
                          SEQUENCE  VENDOR/PURCHASE ORDER            VENDOR          000001 TO 000002
                                                                     BUYER            START TO END
                                                                     DATE RECEIPT     START TO END
                                                                     ITEM           1252732 TO 1940
                                                                     VARIANCE         START TO END
VENDOR 000001

                                                                                                        $ DIFF T/O  DIF
VENDOR VENDOR NAME              BUYER    PURCH NBR  WH ORD STS  INV CO RECEIVABLE VALUE  INVOICE VALUE  VARIANCE    VAR%
       ITEM NUMBER    SEQ       DESCRIPTION
          REL STS IN LAST REC LAST INV  DOCK QTY  ORD QTY  RECVD QTY INVCD QTY  RECEIVED AMT INVOICE AMT $DIFF DIF%

000001 USA STEEL                00100    PCJ0220     1   40              25.000.7500                .00   25.000.75   100%
       1252732                    KEYBOARD  JAPAN/KATAKANA
            1  50    6/27/**     0/00/00          0       50        50          0     12.500.0000    .00  12.500.00100%
       1252732                    KEYBOARD  JAPAN/KATAKANA
            2  50    6/29/**     0/00/00          0       50        50          0     12.500.0000    .00  12.500.00100%
          1940                    WASHER.FLAT.#10X9/160DX3/64THK
               50    6/29/**     0/00/00          0       50        50          0         .7500      .00       .75100%

                                                  VENDOR TOTAL 000100    25.000.7500       .00     25.000.75     100%*
```

```
ABC COMPANY   NO 01     PURCHASE ORDERS WITH RECEIPTS NOT YET INVOICED   DATE 11/23/** TIME 16.24.10   AM6R3  PAGE 2
                                  DETAIL
                          SEQUENCE  VENDOR/PURCHASE ORDER            VENDOR          000001 TO 000002
                                                                     BUYER            START TO END
                                                                     DATE RECEIPT     START TO END
                                                                     ITEM           1252732 TO 1940
                                                                     VARIANCE         START TO END
VENDOR 000002

                                                                                                        $ DIFF T/O  DIF
VENDOR VENDOR NAME              BUYER    PURCH NBR  WH ORD STS  INV CO RECEIVABLE VALUE  INVOICE VALUE  VARIANCE    VAR%
       ITEM NUMBER    SEQ       DESCRIPTION
          REL STS IN LAST REC LAST INV  DOCK QTY  ORD QTY  RECVD QTY INVCD QTY  RECEIVED AMT INVOICE AMT $DIFF DIF%

000002 ALPHA CORPORATION        00200    P989106     1   40              15.000.0000                .00   15.000.75   100%
       1752657                    KEYBOARD  BELGIUM
               50    9/23/**     0/00/00          0      125       125          0     15.000.0000    .00  15.000.00100%

                                  00200    P989107     1   40              12.000.1500                .00   12.000.15   100%
       1752656                    KEYBOARD  USA
            1  50    9/23/**     0/00/00          0       50        50          0      6.000.0000    .00   6.000.00100%
       1752656                    KEYBOARD  USA
            2  50    9/23/**     0/00/00          0       50        50          0      6.000.0000    .00   6.000.00100%
          1940                    WASHER.FLAT.#10X9/160DX3/64THK
               50    9/23/**     0/00/00          0       10        10          0         .1500      .00       .15100%

                                                  VENDOR TOTAL 000002    27.000.1500       .00     27.000.15     100%*

                                                  REPORT TOTAL           52.000.9000       .00     52.000.90     100%
```

The report allows a comparison between date last received and date last invoiced. Further comparison is shown for dock, received, and invoiced quantity. Additional information is provided by comparing the received amount, invoiced amount, and the dollar difference to date.

Accounts payable debit memos: The application provides debit memo entry and maintenance, reports, and printing. Each debit transaction is entered on the Order Detail file and is included in the Purchase Order History file. Miscellaneous debits for taxes, rework, transportation charges, and so on are also possible. Optional messages may be added at the time the debit change is initiated.

Purchase order closeout

All purchase orders to be closed must be manually removed from the Purchase Order Status file and placed in the Purchase Order History file. The amount of history retained is at the user's discretion. The Purchase Order History file becomes the basis for vendor performance analysis.

An Orders Selected for Closeout Audit List is shown here.

```
USER ID  SMITH  CO. NAME  ABC COMPANY            PURCHASING          DATE 11/30/**      TIME 16.24.10   AM64I  PAGE 1

                                ORDERS SELECTED FOR CLOSE OUT AUDIT LIST
-------------------------------------------------------------------------------------------------------------------------

ORDER P989150
              VENDOR 000300   CITADEL MFG. CO.      BUYER 00015 J. THOMAS                    CONTACT ROGER ALLENSON

              WAREHOUSE 1 REVISION 00  CONTRACT      ORIGIN P  CLOSE TYPE C  HISTORY  PRIORITY 0
EXPECTED ORDER VALUE   46300.00   ---------------ORDER DATES---------------    FOB      00
ORDER INVOICED VALUE     463.00   ORDER       11/30/** FIRST PRINT   11/30/**  TERMS    00
EXPECTED FREIGHT                  FOLLOW-UP             LAST REVISION          SHIP VIA 00
ACTUAL FREIGHT                    CONFIRMED             REVISION PRINT         ACTUAL SHIP VIA 00 SHIP-TO ID 000
TAX AMOUNT                .00                         LAST ACTIVITY 11/30/**  SHIP-TO NAME   GATEWAY MFG. CO.
                                  CLOSED      11/30/** LAST INVOICE  11/30/**         ADDRESS 1 381 N. 3ARFIELD RD
                                  CLOSED CONF          LAST MAINT.   11/30/**         ADDRESS 2 ATLANTA  ZIP  30328

*ITEM DETAILS
 ITEM NO  7362917     DESCRIPTION PLANNAR ASSY                VENDOR ITEM NUMBER

DEPT                  --------DATES---------  -----QUANTITIES---  --------$-AMOUNTS----------   DCK/STK L/T   3
PLANNER        00100  LAST ACTIVITY 11/30/**  DOCK          30    CURRENT UNIT      1500.0000   REVIEW  L/T   5
CONTRACT              LAST MAINTAIN 11/30/**  INSPECTION          EXTENDED PRICE   45000.0000   PURCH   L/T  10
REFERENCE             FIRST RECEIPT 11/30/**  SCRAPPED            REWORK COST                  SAFETY  L/T   2
JOB NO                TO STOCK                STOCK         30    ACTUAL PRICE      1500.0000
LOCATION       R4113  PROMISE       12/23/**  DEVIATION           ACTUAL FREIGHT               DAYS EARLY   23
ACCOUNT        1000   DUE TO DOCK   12/23/**  REWORKED                                         DAYS LATE
MAPICS ORD     P989150 DUE TO STOCK  1/04/**  ORDERED       30
REQUISITION    R000091 COMPLETION    11/30/**  RETURNED                                         STOCK U/M    EA
COMMODITY             LAST RECEIPT  11/30/**  LAST RECEIPT  30                                 ORDER U/M    EA
ITEM CLASS     3A                                                                             PURCH U/M    EA
TAX %                                                                                         CONV FACT 1.00

*REQUISITION DETAILS
   REQUISITION  R000091  ITEM NO 7362917     ACCOUNT    1000  REQ NAME  BILL G.    REVISION 00 CONTRACT     PRIORITY 0

REFERENCE          DEPT            ORDERED   30                          FOLLOW-UP          LAST MAINT. 11/30/**
DAY SINCE REL      JOB NO          REQ U/M   EA    DUE TO STOCK 1/04/**  REQ DATE 11/30/**  DUE TO DOCK 12/29/**
*ITEM COMMENT MSG    REV   FL  DATE      CALL EXTENSION 125 IMMEDIATELY UPON ARRIVAL. RUSH ORDER AWAITING

*ITEM DETAILS
 ITEM NO  2777441          DESCRIPTION TRANSFORMER, 60 HZ          VENDOR ITEM NUMBER

DEPT                  --------DATES---------  ----QUANTITIES---  --------$-AMOUNTS----------   DCK/STK L/T   2
PLANNER        00100  LAST ACTIVITY 11/30/**  DOCK          20    CURRENT UNIT        65.0000   REVIEW  L/T   5
CONTRACT              LAST MAINTAIN 11/30/**  INSPECTION          EXTENDED PRICE    1300.0000   PURCH   L/T  30
REFERENCE             FIRST RECEIPT 11/30/**  SCRAPPED            REWORK COST                   SAFETY  L/T   2
JOB NO                TO STOCK                STOCK         20    ACTUAL PRICE        65.0000
LOCATION       K4113  PROMISE       12/07/**  DEVIATION           ACTUAL FREIGHT                DAYS EARLY    7
ACCOUNT        1000   DUE TO DOCK   12/07/**  REWORKED                                          DAYS LATE
MAPICS ORD     P999150 DUE TO STOCK  12/15/**  ORDERED       20
REQUISITION    R000096 COMPLETION    11/30/**  RETURNED                                          STOCK U/M    EA
COMMODITY             LAST RECEIPT  11/30/**  LAST RECEIPT  20                                  ORDER U/M    EA
ITEM CLASS     3A                                                                              PURCH U/M    EA
TAX %                                                                                          CONV FACT  1.00
```

```
USER ID  SMITH  CO. NAME  ABC COMPANY            PURCHASING          DATE 11/30/**      TIME 16.24.10   AM64I  PAGE 2

                                ORDERS SELECTED FOR CLOSE OUT AUDIT LIST
-------------------------------------------------------------------------------------------------------------------------

ORDER P989150

*REQUISITION DETAILS
   REQUISITION  R000086  ITEM NO 2777441     ACCOUNT    1000  REQ NAME  CHUCK R.   REVISION 00 CONTRACT     PRIORITY 0

REFERENCE          DEPT            ORDERED   20                          FOLLOW-UP          LAST MAINT. 11/30/**
DAY SINCE REL      JOB NO          REQ U/M   EA    DUE TO STOCK 12/15/**  REQ DATE 11/30/**  DUE TO DOCK 12/12/**

*INVOICE DETAILS
  INVOICE-15678     SEQ-1   INV DESC-                    GROSS AMOUNT- 46300.00  LINE ITEM GROSS  46300.00 DUE DATE-
      CRED NOTE-    ASSIGNEE-          G/L  AP-  2000    DISC AMT                LINE DISC TOTAL          11/30/**
      INV TYPE-     VOUCHER-  00000    G/L CASH- 1050    FREIGHT                 DISC-00% CHECK-000000 INV DATE-
      COMP CD-  C   COMPANY-    01     G/L DISC- 4120                FOB-00 SHIP VIA-00  TERMS-00              11/30/**
                                                                                                            MAINT-
 ITEM#/DESC-7362917     REL NO-00     GROSS AMOUNT-  45000.00  FREIGHT        QTY-          MISC NO-                  B
       G/L #-0001000  DISC%-  .00%    SUBJ DISC-              DISC AMT-      MAINT- 4/29/** MANUF ORD-      FORCE-

 ITEM#/DESC-2777441     REL NO-00     GROSS AMOUNT-   1300.00  FREIGHT        QTY-          MISC NO-
       G/L #-0001000  DISC%-  .00%    SUBJ DISC-              DISC AMT-      MAINT- 4/29/** MANUF ORD-      FORCE-


                                  ***** END OF PRINT *****
```

Vendor performance data is maintained in the Vendor/Item file, the Extended Vendor Master file, and the Order History file. Analysis data is presented independently for each item supplied by a vendor, as well as a composite rating for all items supplied.

The ratings maintained for each vendor-supplied item are weighted moving averages per order and include:

- Number of dollar days early and late
- Overshipment dollars
- Undershipment dollars
- Freight/item
- Reject/review percentage.

The composite rating is an exponentially smoothed average of all orders received by this vendor.

Forecasting

Information flow

There are two major processing cycles within the Forecasting application. The first is the periodic recalculation of forecasts, projections, and inventory parameters. The second is the annual update of the demand history data base and the recalculation of seasonal parameters.

Figure 2-9 shows how data flows within Forecasting. The calculation of forecasts, projections, and inventory parameters begins by extracting and summarizing order data (product demand) from the Order Entry and Invoicing application, if it is installed 1. To ensure consistency and to eliminate the need for duplicate maintenance, the Forecasting Forecast Master file is compared with the Item Master and Item Balance files and automatically updated before new forecasts are calculated.

The user reviews the results of the forecast, projection, and inventory parameter calculations 2 before the results are loaded to the master schedule 3.

At the end of each year, an additional year of history data is added to the Demand History file. New seasonal profiles are calculated based on this new data 4.

All Forecasting functions are initiated from a work station based on simple menu selections. The results of inquiries into all major files are displayed, and all file maintenance is performed interactively 5.

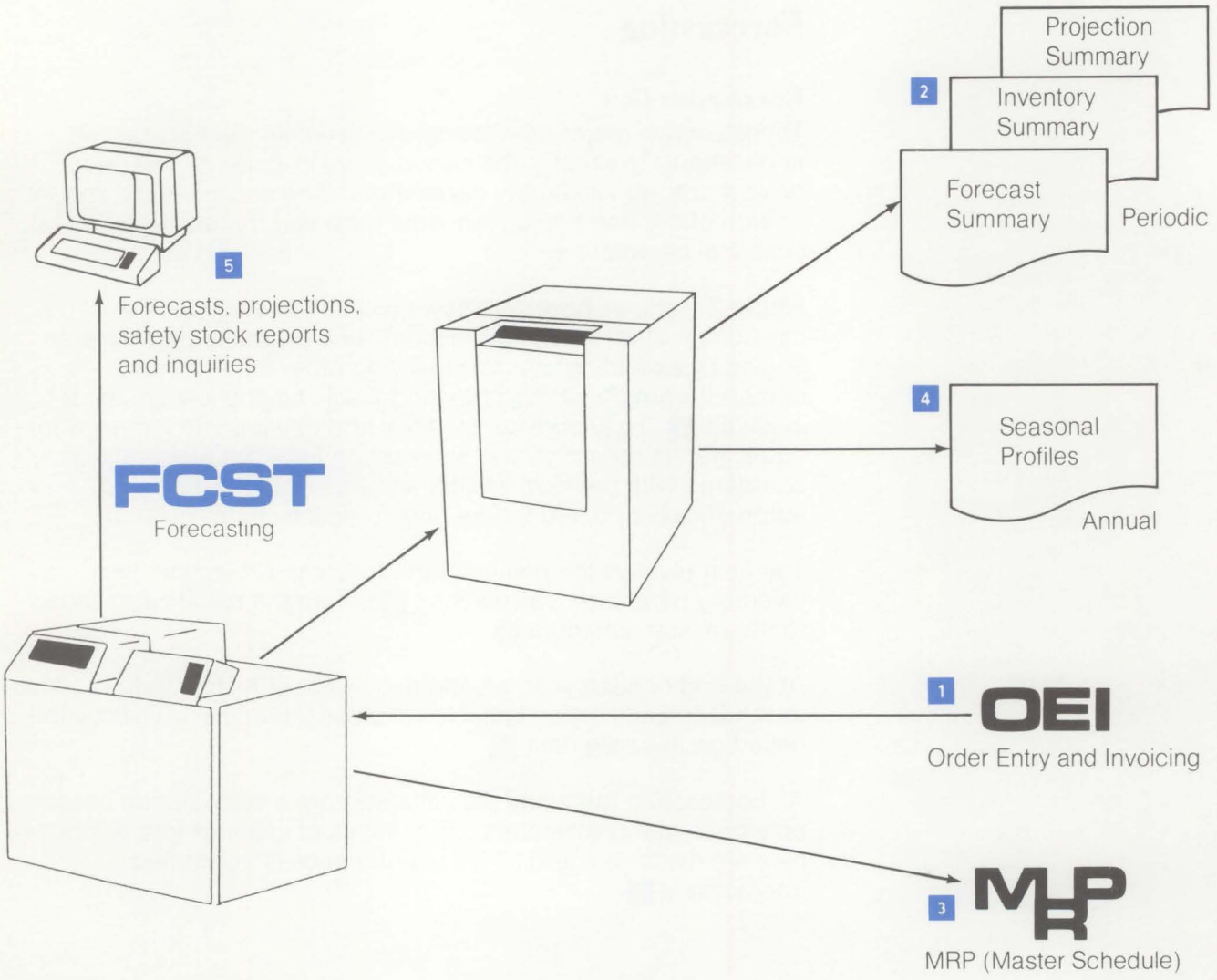


Figure 2-9. Forecasting information flow

Application functions

Variable reporting frequency

Forecasting allows for two reporting frequencies—monthly or 13 times per year. These choices correspond to the basic options of other MAPICS applications.

Advanced statistical forecasting methodology

The statistical forecasting technique used within Forecasting is known as "experiential roughing." This technique is in the class of adaptive forecasting models. Experiential roughing has been shown to be one of the more accurate forecasting methods.

User forecast override

Forecasting provides the user complete forecast override capabilities. The annual rate of demand may be adjusted, or a specific period forecast (month or four-week interval) may be controlled. A historical record of forecast overrides is maintained for reference purposes.

Monitor forecast model

To monitor the effectiveness of user overrides, a monitor forecast model is maintained. The monitor model is not subject to user control. Each period, the performance of the user-controlled model is compared to the monitor model. Exceptions are highlighted for user review.

Forecast error measurement

Forecasting carefully tracks forecast performance by measuring the forecast error. This measurement is used to adjust the sensitivity of the experiential roughing model, to report exceptions to the user, and to calculate safety stock requirements.

Inventory parameter calculation and master scheduling interface

Forecasting can compute two basic inventory parameters—safety stock and reorder point. The safety stock calculation is based upon historical forecast error and the level of customer service specified. The reorder point is the sum of the demand over the lead time plus safety stock. These parameters are necessary to use the "time phased order point" master scheduling technique.

Multiple selling warehouses (distribution points)

Forecasting maintains a demand forecast for each selling warehouse and an overall system forecast. These individual selling warehouse forecasts are very useful in finished goods distribution planning. The system forecast is generally used in preparing the master schedule.

Group seasonality

Forecasting analyzes seasonal patterns of individual items and seasonal groups. The group seasonality approach has been very successful in identifying seasonal parameters that are accurate and useful for forecasting. Group seasonality permits seasonal forecasts for items with little or no history.

Automatic file maintenance

At the start of each forecast cycle, the Forecasting Forecast Master file is synchronized with the Item Master and Item Balance files so that basic item maintenance need not be entered twice. Forecasting provides a list of all items added and deleted during the synchronization.

Mass parameter maintenance

To assist the user in maintaining forecast parameters, a powerful mass maintenance capability exists in Forecasting. The function applies maintenance of several different fields to items that meet a user-defined selection criteria. The selection criteria specified is based on any combination of five key identification fields.

Flexible reporting

The key forecast report can be printed in two different sequences, and the appropriate level of detail may be specified by the user. The amount of detail presented on the seasonal parameter reports is user controlled. Seasonal parameters are also presented in graphic format to aid in pattern analysis.

System internal controls

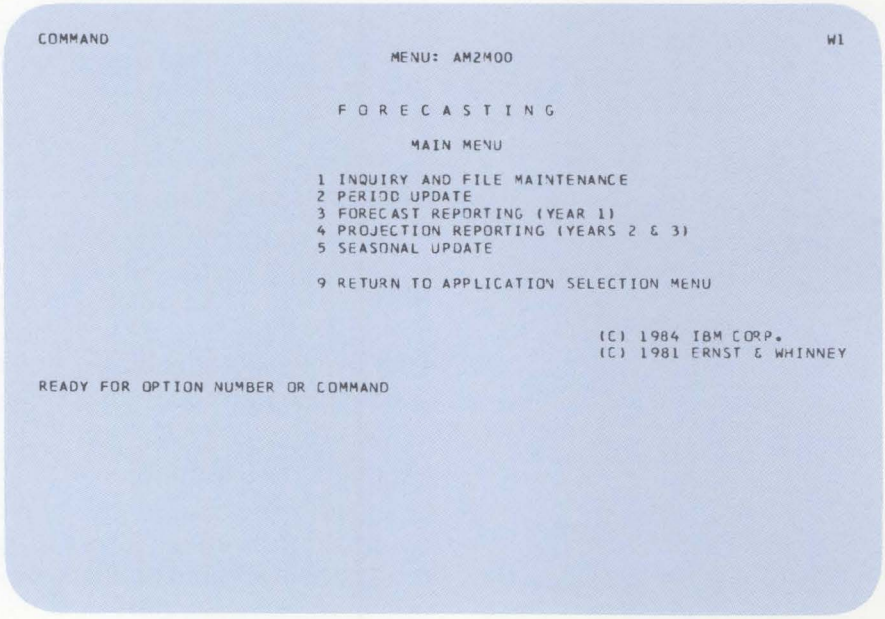
Forecasting monitors processing results and sequence of processing through the System Control file that is common to MAPICS. This feature allows Forecasting to alert the user to improper processing procedures and to prevent loss of key data. Effective dating of all major Forecasting reports can be accomplished through the System Control file.

Strategic forecasting

Strategic forecasting is based on many business planning factors. As an aid to strategic forecasting, Forecasting produces a projection over an extended horizon. Forecasting provides the option to calculate a projection up to three years into the future based upon a life cycle. The life cycle is user specified. Life cycle curves can be specified for each item or for a group of items. Life cycle coefficients are presented in graphic format to aid in life cycle curve analysis.

Operations

All Forecasting functions are initiated from menus. Selection of one of five general functions of the application can be made from the Main Menu. Selection of a Main Menu option produces a second-level menu from which the specific task to be performed can be selected.



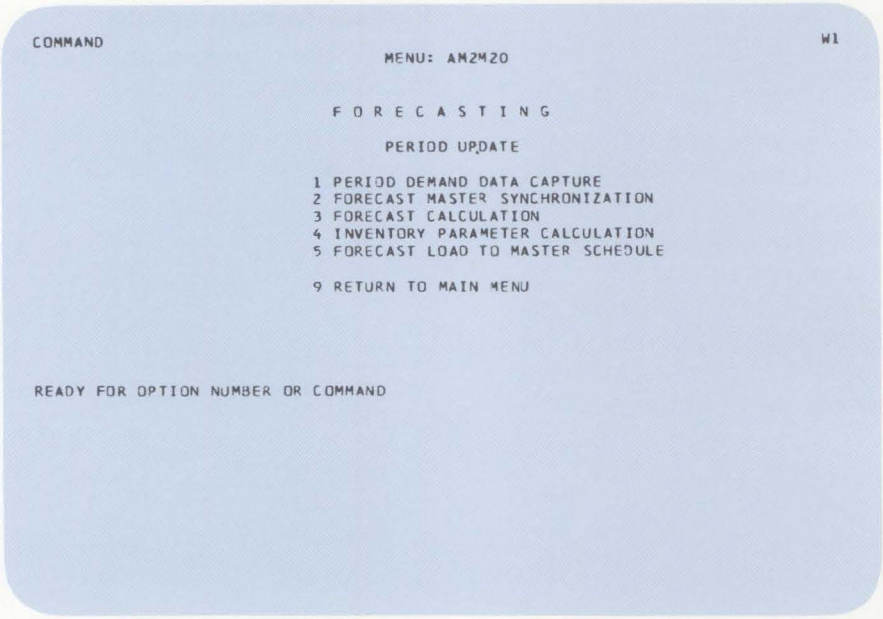
Periodic forecast update

The periodic forecast cycle begins with the review and update of the forecast control data.

Maintenance of the forecast control record is performed using the Forecast Control Inquiry/Maintenance display. At a minimum, the effective ending date for the most recent demand period is modified in preparation for calculation of the forecasts.

```
DATE **/**/**          FORECAST CONTROL INQUIRY/MAINTENANCE          A42001  W1

COMPANY NAME.......... GATEWAY MFG. CO          CURRENT FORECAST CYCLE...  5
                                                CURRENT FORECAST YEAR.... **

 LAST USER REVISION.........  6/01/**          REPORTING EFFECTIVE DATE:
 LAST FORECAST UPDATE.......  6/01/**            FORECAST UPDATE....  6/01/**
 PRIOR FORECAST UPDATE......  5/04/**            SEASONAL UPDATE....  6/01/**

SEASONAL PROFILE CALCULATION:                   FORECAST REPORTING:
 USE WRH DEMAND HISTORY (Y OR N).... Y            PRINT WRH DATA (Y OR N)... Y
 SINGLE YEAR TO PROCESS............. **           WRH PERCENT/AMOUNT(P OR A) A

FORECAST LOAD TO MASTER SCHEDULE:               PROJECTION REPORTING:
 MRP CURRENT DATE             6/01/**            PRINT WRH DATA (Y OR N)... Y
 FROZEN PERIOD DAYS....   3   6/06/**
 FIRM PERIOD DAYS......   7   6/12/**
 FREE PERIOD DAYS......  10   6/15/**

                                          ENTER  EDIT ONLY
                                          CK08   EDIT & UPDATE
                                          CK18   REFRESH DISPLAY
                                          CK24   END OF JOB
```

The Period Update menu is used to perform the final two steps necessary to prepare for the forecast update.

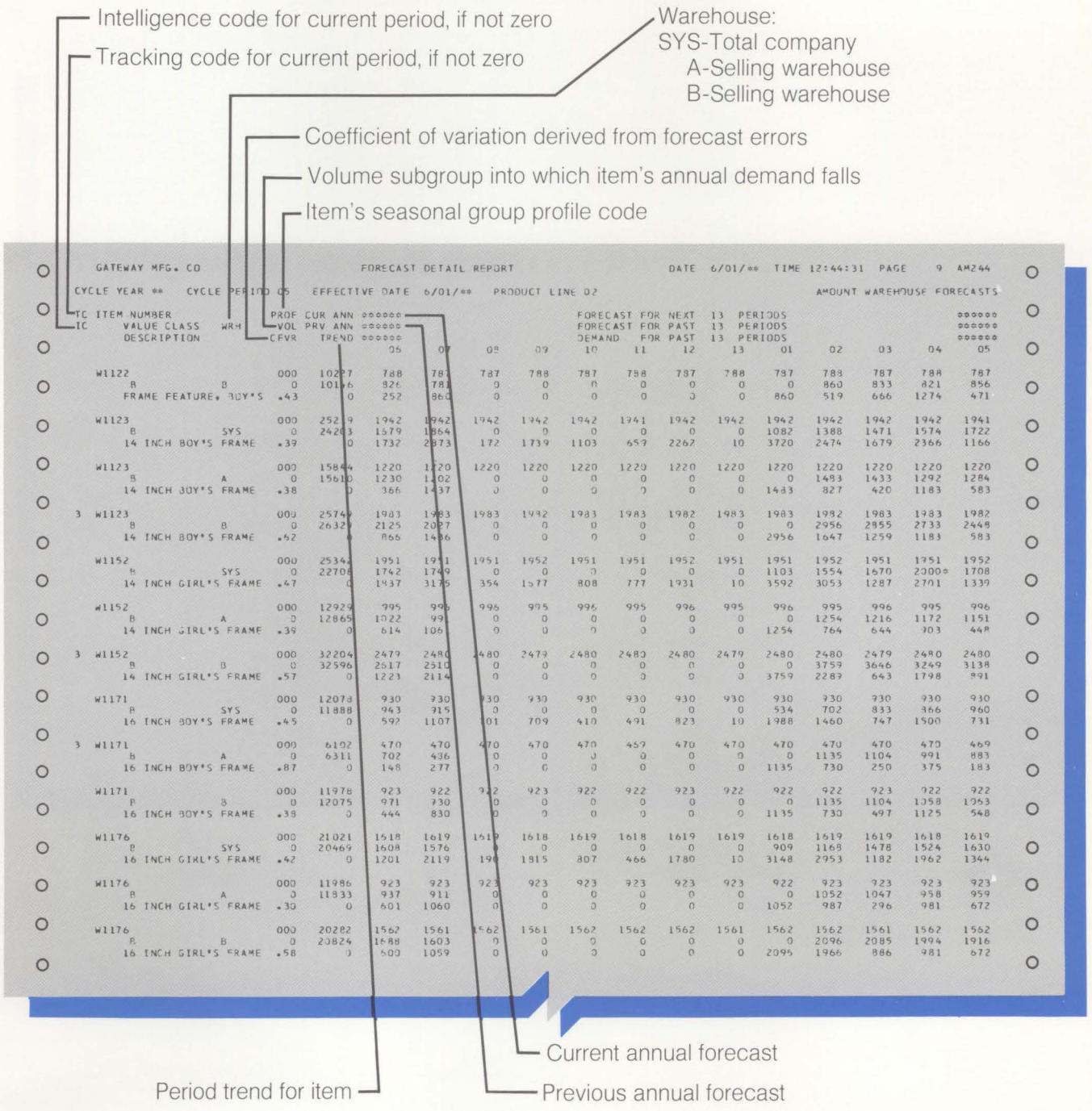


First, the demand data is extracted from the order entry system and summarized at the item number/selling warehouse level by customer promise date. Second, the Forecast Master file is automatically synchronized to the Item Master and Item Balance files.

Forecast calculation and review

Once all preparations are completed, Forecasting calculates the forecasts.

The Forecast Reporting menu is used to create the Forecast Detail report, which is used for review.



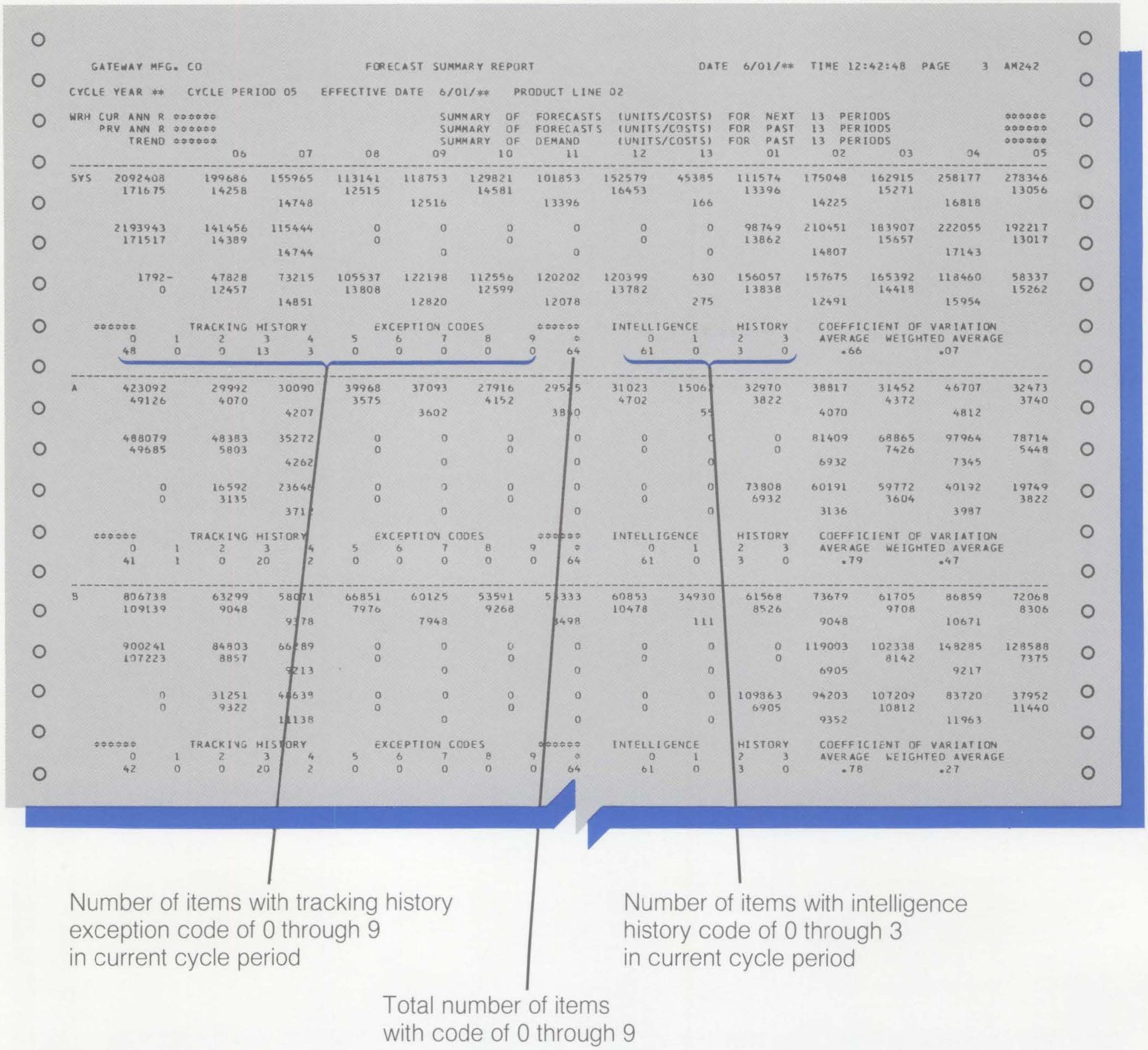
GATEWAY MFG. CO — FORECAST DETAIL REPORT — DATE 6/01/** TIME 12:44:31 PAGE 9 AM244

CYCLE YEAR ** CYCLE PERIOD 05 EFFECTIVE DATE 6/01/** PRODUCT LINE 02 — AMOUNT WAREHOUSE FORECASTS

IC	TC	ITEM NUMBER / VALUE CLASS / DESCRIPTION	WRH	PROF / VOL / CFVR	CUR ANN ****** / PRV ANN ****** / TREND ******	FORECAST FOR NEXT 13 PERIODS / FORECAST FOR PAST 13 PERIODS / DEMAND FOR PAST 13 PERIODS												****** / ****** / ******
						06	07	08	09	10	11	12	13	01	02	03	04	05
		W1122		000	10227	788	787	787	788	787	788	787	788	787	788	787	788	787
		B	B	0	10146	826	781	0	0	0	0	0	0	0	860	833	821	856
		FRAME FEATURE, BOY'S		.43	0	252	860	0	0	0	0	0	0	860	519	666	1274	471
		W1123		000	25219	1942	1942	1942	1942	1942	1941	1942	1942	1942	1942	1942	1942	1941
		B	SYS	0	24203	1579	1864	0	0	0	0	0	0	1082	1388	1471	1574	1722
		14 INCH BOY'S FRAME		.39	0	1732	2873	172	1739	1103	659	2267	10	3720	2474	1679	2366	1166
		W1123		000	15844	1220	1220	1220	1220	1220	1220	1220	1220	1220	1220	1220	1220	1220
		B	A	0	15610	1230	1202	0	0	0	0	0	0	0	1483	1433	1292	1284
		14 INCH BOY'S FRAME		.38	0	366	1437	0	0	0	0	0	0	1483	827	420	1183	583
	3	W1123		000	25749	1983	1983	1983	1992	1983	1983	1982	1983	1983	1982	1983	1983	1982
		B	B	0	26329	2125	2027	0	0	0	0	0	0	2956	2855	2733	2448	
		14 INCH BOY'S FRAME		.62	0	866	1436	0	0	0	0	0	0	2956	1647	1259	1183	583
		W1152		000	25342	1951	1951	1951	1952	1951	1951	1952	1951	1951	1952	1951	1951	1952
		B	SYS	0	22708	1742	1749	0	0	0	0	0	0	1103	1554	1670	2000*	1708
		14 INCH GIRL'S FRAME		.47	0	1437	3175	354	1577	808	777	1931	10	3592	3053	1287	2701	1339
		W1152		000	12929	995	995	995	995	995	995	995	995	995	995	995	995	995
		B	A	0	12865	1022	991	0	0	0	0	0	0	1254	1216	1172	1151	
		14 INCH GIRL'S FRAME		.39	0	614	1061	0	0	0	0	0	0	1254	764	644	903	448
	3	W1152		000	32204	2479	2480	2480	2479	2480	2480	2480	2479	2480	2480	2479	2480	2480
		B	B	0	32596	2617	2510	0	0	0	0	0	0	3759	3646	3249	3138	
		14 INCH GIRL'S FRAME		.57	0	1223	2114	0	0	0	0	0	0	3759	2287	643	1798	991
		W1171		000	12073	930	930	930	930	930	930	930	930	930	930	930	930	930
		B	SYS	0	11888	943	915	0	0	0	0	0	0	534	702	833	866	960
		16 INCH BOY'S FRAME		.45	0	592	1107	101	709	410	491	823	10	1988	1460	747	1500	731
	3	W1171		000	6102	470	470	470	470	470	469	470	470	470	470	470	470	469
		B	A	0	6311	702	436	0	0	0	0	0	0	1135	1104	991	883	
		16 INCH BOY'S FRAME		.87	0	148	277	0	0	0	0	0	0	1135	730	250	375	183
		W1171		000	11978	923	922	922	923	922	922	923	922	922	922	923	922	922
		B	B	0	12075	971	730	0	0	0	0	0	0	0	1135	1104	1058	1053
		16 INCH BOY'S FRAME		.38	0	444	830	0	0	0	0	0	0	1135	730	497	1125	548
		W1176		000	21021	1618	1619	1619	1618	1619	1618	1619	1619	1618	1619	1619	1618	1619
		B	SYS	0	20469	1608	1576	0	0	0	0	0	0	909	1168	1478	1524	1630
		16 INCH GIRL'S FRAME		.42	0	1201	2119	190	1815	807	466	1780	10	3148	2953	1182	1962	1344
		W1176		000	11986	923	923	923	923	923	923	923	923	922	923	923	923	923
		B	A	0	11833	937	911	0	0	0	0	0	0	0	1052	1047	958	959
		16 INCH GIRL'S FRAME		.30	0	601	1060	0	0	0	0	0	0	1052	987	296	981	672
		W1176		000	20282	1562	1561	1562	1561	1562	1562	1562	1561	1562	1562	1561	1562	1562
		B	B	0	20824	1688	1603	0	0	0	0	0	0	0	2096	2085	1994	1916
		16 INCH GIRL'S FRAME		.58	0	600	1059	0	0	0	0	0	0	2095	1966	886	981	672

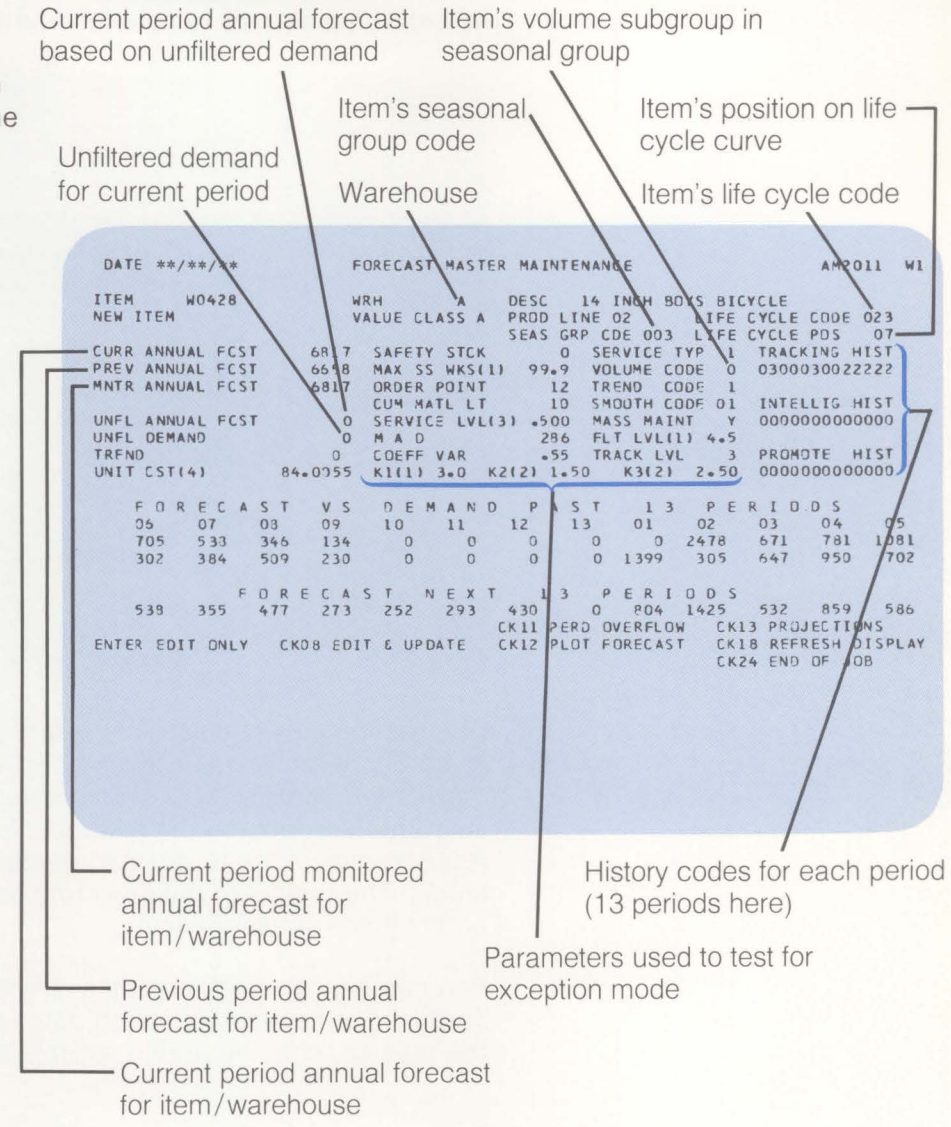
The Forecast Detail report may be printed in value class or product line sequence. Selling warehouse forecast data is optional and may be shown as amounts or percentages.

Forecasting produces a Forecast Summary report. This report shows aggregate data by value class (or product line) in both units and standard cost. A total company report is also produced. The summary reports contain key performance data which is used to monitor overall application performance.

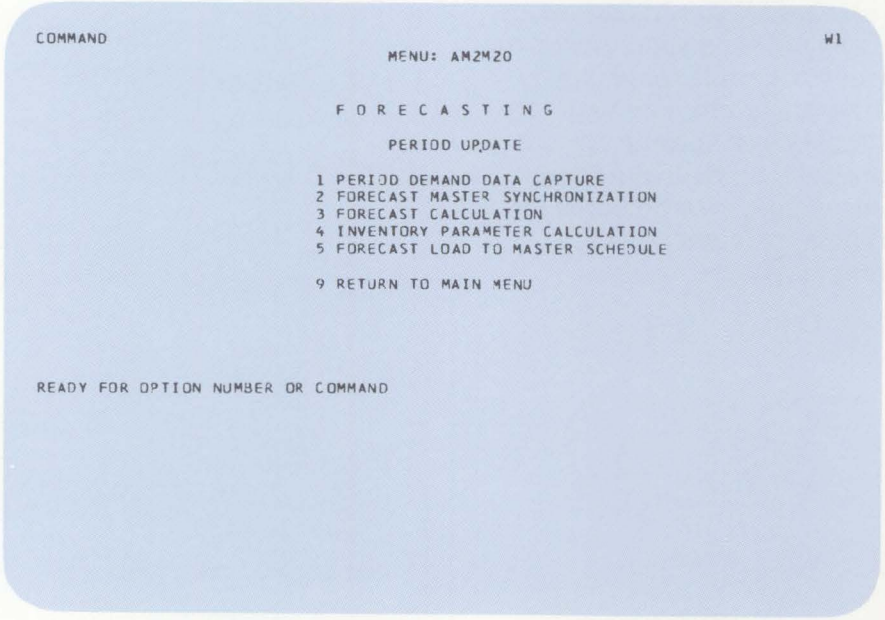


```
GATEWAY MFG. CO                    FORECAST SUMMARY REPORT                    DATE  6/01/**  TIME 12:42:48  PAGE    3  AM242
CYCLE YEAR **   CYCLE PERIOD 05   EFFECTIVE DATE  6/01/**   PRODUCT LINE 02
WRH CUR ANN R ******                     SUMMARY  OF  FORECASTS  (UNITS/COSTS)  FOR  NEXT  13  PERIODS                ******
    PRV ANN R ******                     SUMMARY  OF  FORECASTS  (UNITS/COSTS)  FOR  PAST  13  PERIODS                ******
      TREND ******                       SUMMARY  OF  DEMAND     (UNITS/COSTS)  FOR  PAST  13  PERIODS                ******
                     06       07       08       09       10       11       12       13       01       02       03       04       05
---------------------------------------------------------------------------------------------------------------------------------
SYS  2092408     199686   155965   113141   118753   129821   101853   152579    45385   111574   175048   162915   258177   278346
      171675      14258             12515             14581             16453             13396             15271             13056
                           14748             12516             13396              166              14225             16818

     2193943     141456   115444        0        0        0        0        0        0    98749   210451   183907   222055   192217
      171517      14389                 0                 0                 0             13862             15657             13017
                           14744                 0                 0                 0              14807             17143

       1792-      47828    73215   105537   122198   112556   120202   120399      630   156057   157675   165392   118460    58337
           0      12457             13808             12599             13782             13838             14418             15262
                           14851             12820             12078              275              12491             15954

  ******        TRACKING HISTORY        EXCEPTION CODES        ******     INTELLIGENCE     HISTORY    COEFFICIENT OF VARIATION
     0     1     2     3     4     5     6     7     8     9     *          0     1     2     3      AVERAGE  WEIGHTED AVERAGE
    48     0     0    13     3     0     0     0     0     0    64         61     0     3     0        .66          .07
---------------------------------------------------------------------------------------------------------------------------------
A     423092      29992    30090    39968    37093    27916    295[illegible]5    31023    1506[illegible]    32970    38817    31452    46707    32473
       49126       4070              3575              4152              4702              3822              4372              3740
                            4207              3602              38[illegible]0               5[illegible]               4070              4812

      488079      48383    35272        0        0        0        0        0        0        0    81409    68865    97964    78714
       49685       5803                 0                 0                 0                 0              7426              5448
                            4262                 0                 0                 0               6932              7345

           0      16592    2364[illegible]        0        0        0        0        0        0    73808    60191    59772    40192    19749
           0       3135                 0                 0                 0              6932              3604              3822
                            371[illegible]                 0                 0                 0               3136              3987

  ******        TRACKING HISTORY        EXCEPTION CODES        ******     INTELLIGENCE     HISTORY    COEFFICIENT OF VARIATION
     0     1     2     3     4     5     6     7     8     9     *          0     1     2     3      AVERAGE  WEIGHTED AVERAGE
    41     1     0    20     2     0     0     0     0     0    64         61     0     3     0        .79          .47
---------------------------------------------------------------------------------------------------------------------------------
B     806738      63299    580[illegible]1    66851    60125    53591    5[illegible]333    60853    34930    61568    73679    61705    86859    72068
      109139       9048              7976              9268             10478              8526              9708              8306
                            9[illegible]78              7948              [illegible]498               111               9048             10671

      900241      84803    66[illegible]89        0        0        0        0        0        0        0   119003   102338   148285   128588
      107223       8857                 0                 0                 0                 0              8142              7375
                            [illegible]213                 0                 0                 0               6905              9217

           0      31251    4[illegible]639        0        0        0        0        0        0   109863    94203   107209    83720    37952
           0       9322                 0                 0                 0              6905             10812             11440
                           1[illegible]138                 0                 0                 0               9352             11963

  ******        TRACKING HISTORY        EXCEPTION CODES        ******     INTELLIGENCE     HISTORY    COEFFICIENT OF VARIATION
     0     1     2     3     4     5     6     7     8     9     *          0     1     2     3      AVERAGE  WEIGHTED AVERAGE
    42     0     0    20     2     0     0     0     0     0    64         61     0     3     0        .78          .27
```

The user responds to forecast exceptions by using the Forecast Master Maintenance display. This display allows the user to override forecasts. Either the current annual forecast or a specific period forecast can be overridden. This display also provides for routine maintenance of forecast master fields.



Inventory parameter calculation and master scheduling interface

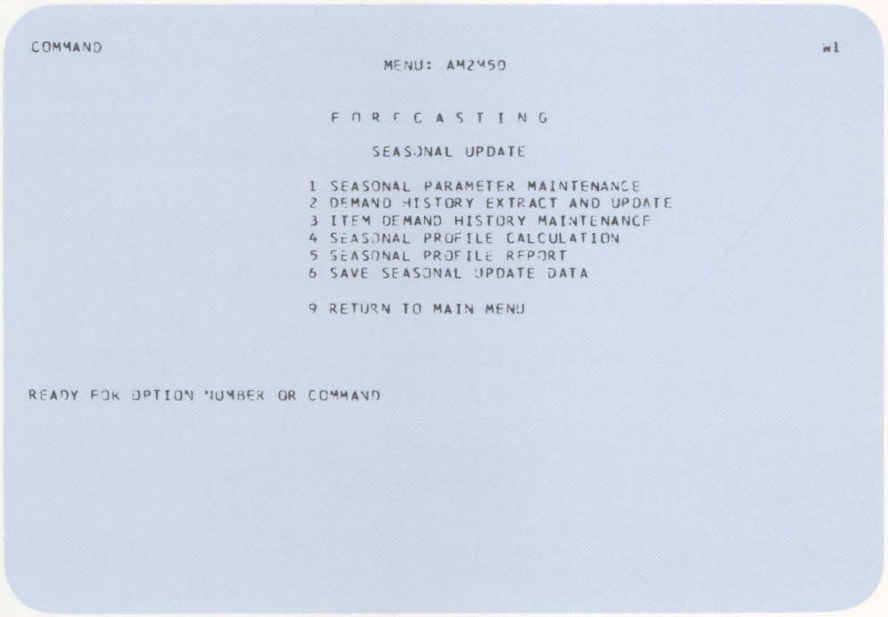


Forecasting can calculate the safety stock and reorder point inventory parameters for each item/location maintained by the application. Safety stock is a function of the specified level of customer service and the historical forecast accuracy. The reorder point is the forecasted demand over lead time plus safety stock. The results of the inventory calculation are summarized and costed for user review.

Forecasting can load forecasts directly to the master schedule. The user can specify planning dates that protect the stability of the master schedule during appropriate time intervals.

Demand history update

At the end of each calendar year, the demand history, which is accumulated in the Forecast Master file, must be extracted and added to the Demand History file. This is accomplished by using the Seasonal Update menu.



This menu is also used to prepare for seasonal profile calculation. The seasonal parameter maintenance option initializes the file that defines seasonal groups and key related calculation parameters. The Demand History file can also be maintained in preparation for seasonal profile calculation.

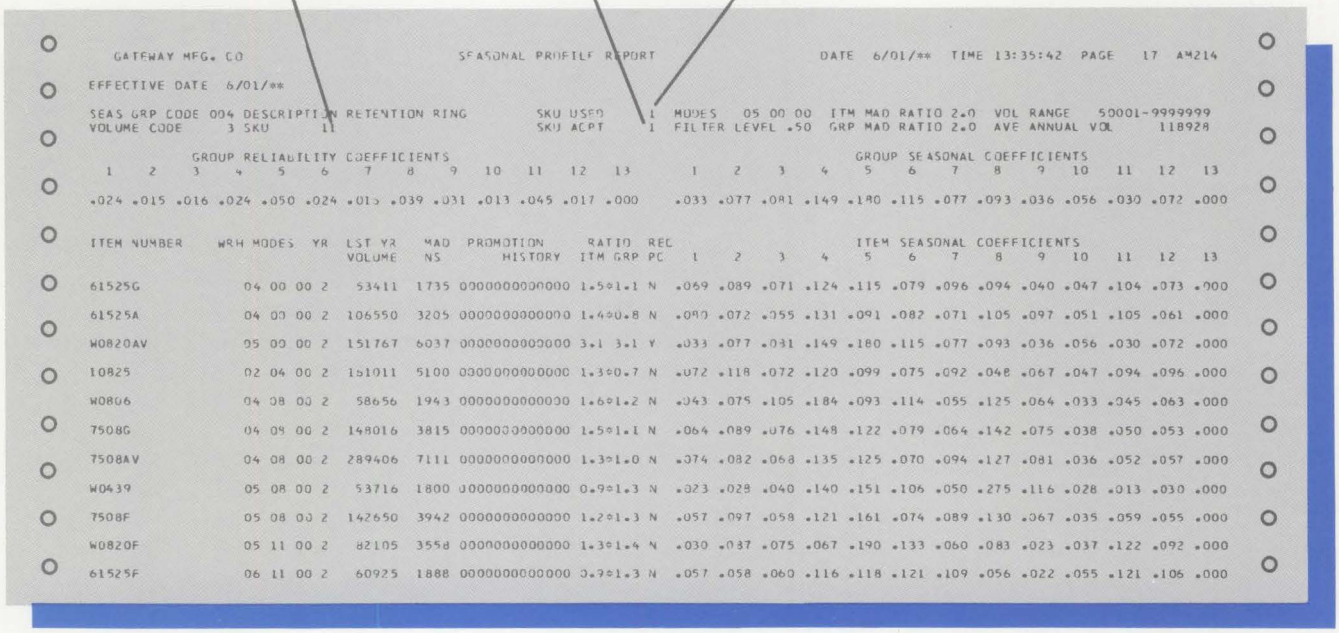
Seasonal parameters calculation and review

Forecasting produces the Seasonal Profile report, which shows calculated seasonal parameters. The report shows the group seasonal parameters and related statistics for each volume subgroup within the seasonal group. The seasonality of individual items is also shown, together with statistics that indicate the degree of seasonality and the goodness of fit to the group seasonal parameters.

Number of items belonging to calculated seasonal group

Number of items used to calculate group seasonal coefficients

Number of items comprising this volume subgroup



```
   GATEWAY MFG. CO                          SEASONAL PROFILE REPORT                    DATE  6/01/**  TIME 13:35:42  PAGE   17  AM214

EFFECTIVE DATE  6/01/**

SEAS GRP CODE 004 DESCRIPTION RETENTION RING          SKU USED     1  MODES   05 00 00  ITM MAD RATIO 2.0  VOL RANGE   50001-9999999
VOLUME CODE     3 SKU      11                         SKU ACPT     1  FILTER LEVEL .50  GRP MAD RATIO 2.0  AVE ANNUAL VOL      118928

          GROUP RELIABILITY COEFFICIENTS                                                GROUP SEASONAL COEFFICIENTS
  1    2    3    4    5    6    7    8    9   10   11   12   13        1    2    3    4    5    6    7    8    9   10   11   12   13
.024 .015 .016 .024 .050 .024 .015 .039 .031 .013 .045 .017 .000     .033 .077 .081 .149 .180 .115 .077 .093 .036 .056 .030 .072 .000

ITEM NUMBER     WRH MODES  YR  LST YR   MAD  PROMOTION      RATIO  REC                    ITEM SEASONAL COEFFICIENTS
                           VOLUME   NS        HISTORY   ITM GRP PC   1    2    3    4    5    6    7    8    9   10   11   12   13
61525G            04 00 00 2   53411  1735 0000000000000 1.5#1.1 N  .069 .089 .071 .124 .115 .079 .096 .094 .040 .047 .104 .073 .000
61525A            04 00 00 2  106550  3205 0000000000000 1.4#0.8 N  .090 .072 .055 .131 .091 .082 .071 .105 .097 .051 .105 .061 .000
W0820AV           05 00 00 2  151767  6037 0000000000000 3.1 3.1 Y  .033 .077 .081 .149 .180 .115 .077 .093 .036 .056 .030 .072 .000
10825             02 04 00 2  151011  5100 0000000000000 1.3#0.7 N  .072 .118 .072 .120 .099 .075 .092 .048 .067 .047 .094 .096 .000
W0806             04 08 00 2   58656  1943 0000000000000 1.6#1.2 N  .043 .075 .105 .184 .093 .114 .055 .125 .064 .033 .045 .063 .000
7508G             04 09 00 2  148016  3815 0000000000000 1.5#1.1 N  .064 .089 .076 .148 .122 .079 .064 .142 .075 .038 .050 .053 .000
7508AV            04 08 00 2  289406  7111 0000000000000 1.3#1.0 N  .074 .082 .068 .135 .125 .070 .094 .127 .081 .036 .052 .057 .000
W0439             05 08 00 2   53716  1800 0000000000000 0.9#1.3 N  .023 .028 .040 .140 .151 .106 .050 .275 .116 .028 .013 .030 .000
7508F             05 08 00 2  142650  3942 0000000000000 1.2#1.3 N  .057 .097 .058 .121 .161 .074 .089 .130 .067 .035 .059 .055 .000
W0820F            05 11 00 2   82105  3558 0000000000000 1.3#1.4 N  .030 .037 .075 .067 .190 .133 .060 .083 .023 .037 .122 .092 .000
61525F            06 11 00 2   60925  1888 0000000000000 0.9#1.3 N  .057 .058 .060 .116 .118 .121 .109 .056 .022 .055 .121 .106 .000
```

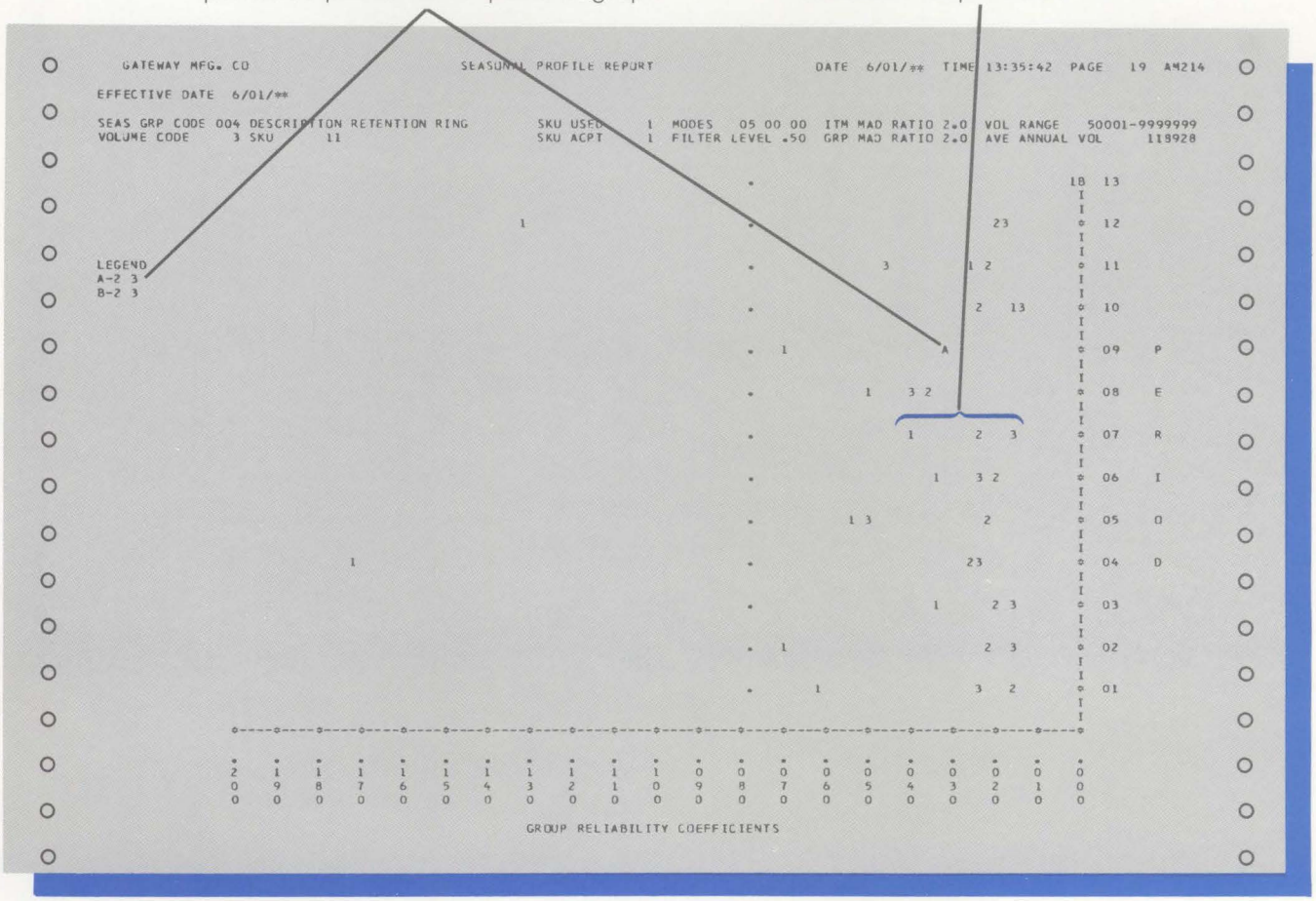
The results of the seasonal parameters calculation are also printed in graphic form. Each graph plots the group seasonal parameters for each volume subgroup.

This presentation format allows the user to visually review and assess the results of the calculations.

The user can make revisions to the seasonal parameters through the Inquiry and File Maintenance menu.

A, from legend, means that volume subgroups 2 and 3 coefficients for period 09 plot on same point on graph

Volume subgroups 1, 2, 3 coefficients for seasonal group code 004 for period 07



Strategic forecasting

If you select to calculate projections for years two and three into the future, Forecasting calculates these projections every forecast cycle. The Projection Reporting menu is used to create the Projection Detail report. This report may be printed in value class, product line, or life cycle code sequence. Selling warehouse projection data is optional.

Item's life cycle profile code

Item's position on life cycle curve

GATEWAY MFG. CO PROJECTION DETAIL REPORT DATE 6/01/** TIME 13:54:55 PAGE 9 AM252

CYCLE YEAR ** CYCLE PERIOD 05 EFFECTIVE DATE 6/01/** VALUE CLASS B

ITEM NUMBER / DESCRIPTION	WRH	CDE	POS	****** ****** 06	07	08	09	10	PROJECTIONS FOR YEAR 2 PROJECTIONS FOR YEAR 3 11	12	13	01	02	03	04	****** ****** 05
W5442	SYS	000	00	631	588	1024	583	541	924	1354	0	738	1307	487	1006	687
LEFT PETAL, SIZE 3				285	438	749	427	395	750	1100	0	597	1058	395	774	528
W5442	A	000	00	239	201	452	872	47	638	1042	13	495	469	324	1000	239
LEFT PETAL, SIZE 3				263	193	407	784	42	517	844	10	647	617	427	1100	263
W5442	B	000	00	239	201	452	872	47	638	1042	13	495	469	324	1000	239
LEFT PETAL, SIZE 3				263	193	407	784	42	517	844	10	647	617	427	1100	263
W5455	SYS	000	00	239	201	452	872	47	638	1042	13	495	469	324	1000	239
BLACK SHINY METALLIC				263	193	407	784	42	517	844	10	647	617	427	1100	263
W5455	A	000	00	7311	7676	8042	8042	8042	9365	9365	9365	7095	7095	7095	7311	7311
BLACK SHINY METALLIC				8042	7640	7238	7238	7238	7586	7586	7586	9365	9365	9365	8042	8042
W5455	B	000	00	7311	7676	8042	8042	8042	9365	9365	9365	7095	7095	7095	7311	7311
BLACK SHINY METALLIC				8042	7640	7238	7238	7238	7586	7586	7586	9365	9365	9365	8042	8042
W6100G	SYS	000	00	7311	7676	8042	8042	8042	9365	9365	9365	7095	7095	7095	7311	7311
ORANGE METALLIC PAIN				8042	7640	7238	7238	7238	7586	7586	7586	9365	9365	9365	8042	8042
W6100G	A	000	00	33634	35315	36997	36997	36997	43084	43084	43084	32639	32639	32639	33634	33634
ORANGE METALLIC PAIN				36997	35147	33298	33298	33298	34898	34898	34898	43084	43084	43084	36997	36997
W6100G	B	000	00	33634	35315	36997	36997	36997	43084	43084	43084	32639	32639	32639	33634	33634
ORANGE METALLIC PAIN				36997	35147	33298	33298	33298	34898	34898	34898	43084	43084	43084	36997	36997
0036	SYS	000	00	33634	35315	36997	36997	36997	43084	43084	43084	32639	32639	32639	33634	33634
NINE INCH RIGHT BRAC				36997	35147	33298	33298	33298	34898	34893	34898	43084	43084	43084	36997	36997
0036	A	000	00	446	446	446	446	446	468	468	468	519	519	519	446	446
NINE INCH RIGHT BRAC				343	334	326	326	326	380	380	380	421	421	421	343	343
0036	B	000	00	446	446	446	446	446	468	468	468	519	519	519	446	446
NINE INCH RIGHT BRAC				343	334	326	326	326	380	380	380	421	421	421	343	343

Forecasting produces a Projection Summary report. This report shows aggregate data by value class, product line, or life cycle code in both units and standard cost. A total company report is also produced.

GATEWAY MFG. CO PROJECTION SUMMARY REPORT DATE 6/01/** TIME 12:34:30 PAGE 1 AM251

CYCLE YEAR ** CYCLE PERIOD 05 EFFECTIVE DATE 6/01/** VALUE CLASS A

WRH	****** ****** 06	07	08	SUMMARY OF PROJECTIONS (UNITS/COSTS) FOR YEAR 2 PERIODS 09	10	11	12	SUMMARY OF PROJECTIONS (UNITS/COSTS) FOR YEAR 3 PERIODS 13	01	02	03	04	****** ****** 05
SYS	6000	6000	7000	7000	8000	8000	9000	9000	5000	5000	5500	5500	5500
	23700		27650		31600		35550		19750		21725		21725
		23700		27650		31600		35550		19750		21725	
	700	800	10000	15000	16000	17000	18	0	880	700	700	600	600
	2765		39500		63200		71		3476		2765		2370
		3160		59250		67150		0		2765		2370	
A	737940	399590	334875	111979	285335	388412	387681	340309	308079	17630	33617	20946	38053
	8967139		82616439		82731047		83204326		7413475		178121		8206127
		83266161		818661		83088286		77386466		680505		615691	
	520672	31649	199219	137645	1693564	187241	1185965	358838	334767	837075	183381	363733	36150
	81806907		8147662		1151298		328120503		82614879		78127596		8094201
		647168		8209539		209492		8966574		83383333		9049396	
B	8160	8330	8350	8360	9400	9410	9620	9630	1390	9320	9410	6040	8150
	30270		30942		35010		35800		3726		35326		30270
		30902		30942		35010		35800		35010		21975	
	10810	10840	10870	10900	10930	10979	1960	10970	9640	10710	10730	10755	10780
	39513		39592		39671		4200		35800		39434		39473
		39552		39631		39750		39750		39394		39453	

The Projection Maintenance display allows the user to override specific projections for periods in years two and three.

DATE **/**/** PROJECTION MAINTENANCE AM2041 W1

ITEM W1122 WRH A DESC FRAME FEATURE, BOY'S
VALUE CLASS B PROD LINE 02 LIFE CYCLE CODE 004
CURR ANNUAL FCST 6333 SEAS GRP CDE 012 LIFE CYCLE POS 05

PERIOD	FORECAST	YR 2 PROJ	YR 3 PROJ
6	488	892	686
7	487	892	669
8	488	892	652
9	487	892	652
10	488	892	652
11	488	935	759
12	487	935	759
13	488	935	759
1	487	1039	941
2	488	1039	841
3	489	1039	841
4	487	892	686
5	488	892	686

ENTER EDIT ONLY CK08 EDIT & UPDATE CK12 PLOT PROJECTION CK18 REFRESH DISPLAY
CK19 RETURN TO SELECT

Life cycle coefficients

The user defines the life cycle curves by entering life cycle coefficients using the Life Cycle Profile Inquiry/Maintenance display. The coefficients define the increases and decreases in the demand rate from one quarter to the next quarter over time. The life cycle curve can define the profile for one item or a group of items.

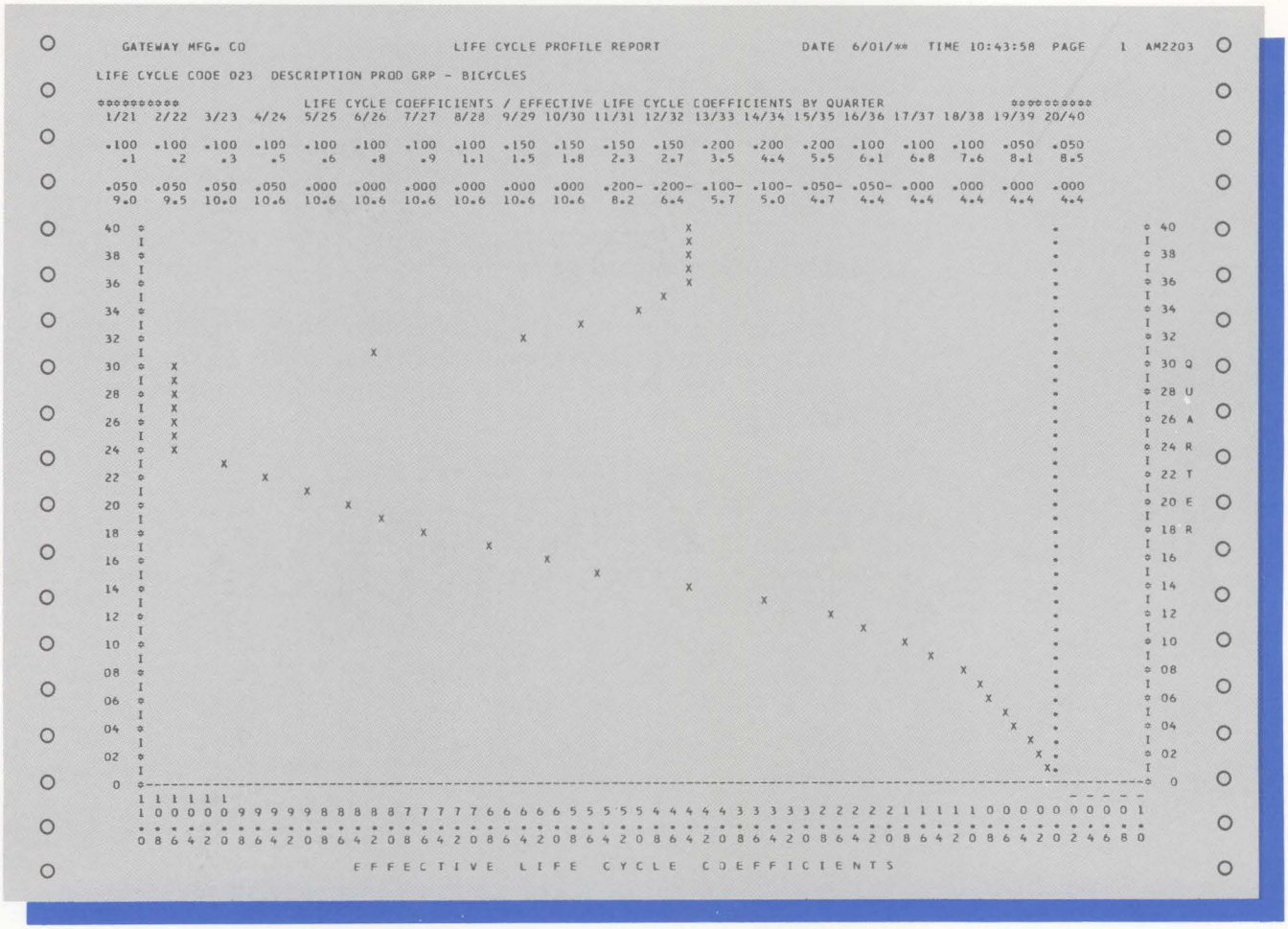
In addition to assigning an item to a life cycle profile code, the user can assign a life cycle position which defines the relative location on the time horizon for that item.

```
DATE **/**/**    LIFE CYCLE PROFILE INQUIRY/MAINTENANCE                AM2201  W1

 LIFE CYCLE CODE 023    DESCRIPTION PROD GRP - BICYCLES

   *****          Q U A R T E R L Y   C O E F F I C I E N T S  (3)    *****
     1       2       3       4       5       6       7       8
   .100    .100    .100    .100    .100    .100    .100    .100

     9      10      11      12      13      14      15      16
   .150    .150    .150    .150    .200    .200    .200    .100

    17      18      19      20      21      22      23      24
   .100    .100    .050    .050    .050    .050    .050    .050

    25      26      27      28      29      30      31      32
   .000    .000    .000    .000    .000    .000    .200-   .200-

    33      34      35      36      37      38      39      40
   .100-   .100-   .050-   .050-   .000    .000    .000    .000

                          ENTER EDIT ONLY      CK12  PLOT LIFE COEFF
                          CK08  EDIT & UPDATE  CK13  PRINT LIFE CURVE
                                               CK18  REFRESH DISPLAY
                                               CK24  END OF JOB
```

Forecasting produces the Life Cycle Coefficient Plot display, which graphically shows the life cycle coefficients.

```
DATE **/**/**     LIFE CYCLE COEFFICIENT PLOT                          AM2202  W1

          .200  |             XXX
          .184  |
          .160  |          XXXX
      C   .136  |
      O   .112  | XXXXXXXX        XXX
      E   .088  |
      F   .064  |                    XXXXXX
      F   .040  |
      I   .000  | ------------------------XXXXXX------XXXX
      C   .008- |
      I   .032- |                                    XX
      E   .056- |
      N   .080- |                                   XX
      T   .104- |
          .128- |
          .152- |
          .176- |
          .200- |                                 XX
                  0         1         2         3         4
                  0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0 2 4 6 8 0
                                QUARTER
 LIFE CYCLE CODE 023   DESCRIPTION  PROD GRP - BICYCLES    CK19 RETURN TO SELECT
```

The effective life cycle coefficients, which indicate the compound change in demand from quarter to quarter, are printed in graphic form. This presentation format allows the user to visually review and evaluate the life cycle curves. The user can make revisions to the life cycle coefficients through the Inquiry and File Maintenance menu.



```
   GATEWAY MFG. CO                          LIFE CYCLE PROFILE REPORT                    DATE  6/01/**  TIME 10:43:58  PAGE    1  AM2203

LIFE CYCLE CODE 023  DESCRIPTION PROD GRP - BICYCLES

**********                LIFE CYCLE COEFFICIENTS / EFFECTIVE LIFE CYCLE COEFFICIENTS BY QUARTER                **********
 1/21  2/22  3/23  4/24  5/25  6/26  7/27  8/28  9/29 10/30 11/31 12/32 13/33 14/34 15/35 16/36 17/37 18/38 19/39 20/40

 .100  .100  .100  .100  .100  .100  .100  .100  .150  .150  .150  .150  .200  .200  .200  .100  .100  .100  .050  .050
   .1    .2    .3    .5    .6    .8    .9   1.1   1.5   1.8   2.3   2.7   3.5   4.4   5.5   6.1   6.8   7.6   8.1   8.5

 .050  .050  .050  .050  .000  .000  .000  .000  .000  .000  .200- .200- .100- .100- .050- .050- .000  .000  .000  .000
  9.0   9.5  10.0  10.6  10.6  10.6  10.6  10.6  10.6  10.6   8.2   6.4   5.7   5.0   4.7   4.4   4.4   4.4   4.4   4.4

40 ÷                                                                                                                  ÷ 40
   I                                                                                                                  I
38 ÷                                                                                                                  ÷ 38
   I                                                                                                                  I
36 ÷                                                                                                                  ÷ 36
   I                                                                                                                  I
34 ÷                                                                                                                  ÷ 34
   I                                                                                                                  I
32 ÷                                                                                                                  ÷ 32
   I                                                                                                                  I
30 ÷   X                                                                                                              ÷ 30 Q
   I   X                                                                                                              I
28 ÷   X                                                                                                              ÷ 28 U
   I   X                                                                                                              I
26 ÷   X                                                                                                              ÷ 26 A
   I   X                                                                                                              I
24 ÷   X                                                                                                              ÷ 24 R
   I       X                                                                                                          I
22 ÷           X                                                                                                      ÷ 22 T
   I               X                                                                                                  I
20 ÷                   X                                                                                              ÷ 20 E
   I                       X                                                                                          I
18 ÷                           X                                                                                      ÷ 18 R
   I                               X                                                                                  I
16 ÷                                   X                                                                              ÷ 16
   I                                       X                                                                          I
14 ÷                                           X                                                                      ÷ 14
   I                                               X                                                                  I
12 ÷                                                   X                                                              ÷ 12
   I                                                       X                                                          I
10 ÷                                                           X                                                      ÷ 10
   I                                                               X                                                  I
08 ÷                                                                   X                                          ÷ 08
   I                                                                       X                                      I
06 ÷                                                                           X                                  ÷ 06
   I                                                                               X                              I
04 ÷                                                                                   X                          ÷ 04
   I                                                                                       X                      I
02 ÷                                                                                           X                  ÷ 02
   I                                                                                               X              I
 0 ÷---------------------------------------------------------------------------------------------------X----------÷ 0
   1 1 1 1 1 1                                                                                                    1
   1 0 0 0 0 0 9 9 9 9 9 8 8 8 8 8 7 7 7 7 7 6 6 6 6 6 5 5 5 5 5 4 4 4 4 4 3 3 3 3 3 2 2 2 2 2 1 1 1 1 1 0 0 0 0 0 0 0 0 0 1
   . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . . .
   0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 8 6 4 2 0 2 4 6 8 0

                                                EFFECTIVE LIFE CYCLE COEFFICIENTS
```

Location/Lot Management

Information flow

Figure 2-10 shows how information flows through the Location/Lot Management application. The numbers in the following discussion refer to that figure.

In the Location/Lot Management transaction and allocation processing cycles, order allocations, quality control and non-inventory transactions, and goods received notes data are entered into the system 1. The associated transaction registers and audit lists are printed 2. Once items are assigned to locations, inquiries may be done from the four inquiry options 3. At month end, month-to-date totals are reset and the stock status report can be printed 4.

On request, the items waiting inspection report, physical/cycle count lists, transaction analysis/batch-lot review report, goods received notes report, and the inventory valuation report can be printed 5.

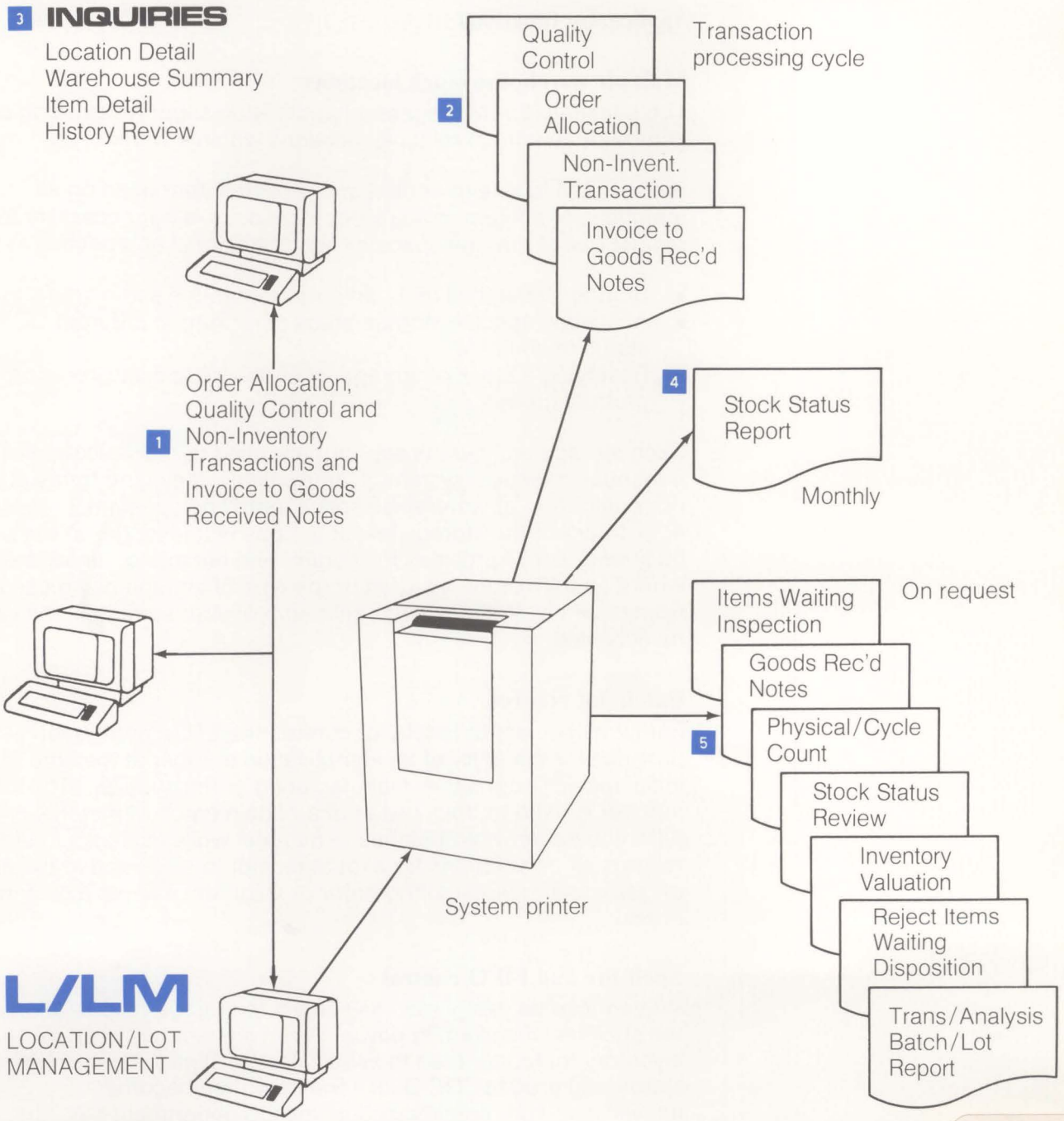


Figure 2-10. Location/Lot Management information flow

Application functions

Multiple warehouse stock locations

The Location/Lot Management application supports stocking and control of an item in multiple locations within a warehouse.

Since L/LM is able to control and provide information on all quantities of an item in any stock location, it is not necessary to restrict use of storage space by such traditional approaches as:

- Storing all batches of a particular item in the same area
- Allocating specific storage areas or racking to different QC status or shelf life
- Reserving a block of storage locations for specific items or product groups.

Such storage techniques are normally used to maintain control in a manual or clerical system. Unfortunately, they tend to result in poor utilization of warehouse space, requiring constant adjustment of the storage layout to cope with changes in the business. L/LM provides full control and recording, regardless of where an item or lot is stored or the type of storage being used. Consequently, the maximum utilization of your storage areas can be achieved.

Batch/lot control

For items subject to batch/lot control, the L/LM application provides for the entry of an identification number at the time of initial receipt from either manufacturing or the supplier. The lot number is used to track usage of a certain batch of material or to differentiate between batches of material while in stock. L/LM records all transactions for a lot at receipt to stock and at the time of issue to a manufacturing order or shipment against a customer order.

Shelf life and FIFO control

An item can be designated as subject to storage deterioration and the shelf life specified (in days). When an item has been in inventory for longer than the shelf life, the Quality Control (QC) status is altered to "QC Due." The item then becomes unavailable, and remains so until the QC department has reinspected the item or taken other action.

Quality control tracking

Quality Control is established to provide physical control of inspection or test processes before receipt in stock. The QC area is regarded as an area within the warehouse which is reserved for stock which requires some form of QC inspection. This area is most often used as a quarantine area for stock which has been received from a supplier, but which has not yet been sampled and inspected by the QC department. You can create up to 99 QC areas per warehouse with up to 999 batch/lots per area.

At installation, you are asked whether you want quality control. If you answer "Yes," any item in your system can be defined to have a shelf life and requires inspection when the shelf life has expired. If QC control is selected, batch/lot is automatically selected. However, if QC control is not selected, batch/lot control may still be selected. Whether or not QC control or batch/lot control are selected, any item in the system can require QC inspection on receipt from the supplier or manufacturing. The QC status types are as follows:

- Cyclic shelf life check applicable/not applicable
- Inspect on purchase or manufacturing receipt required/not required
- Batch/lot control required/not required.

Bulk store areas

L/LM provides for establishing bulk store areas which need not be delineated by physical boundaries. They are regarded as areas within the warehouse reserved for items which are not QC, batch/lot, or FIFO date controlled. A total of 99 bulk store areas, including one for work-in-process, are allowed for each warehouse.

Stock recording for non-inventory items

The recording of non-inventory items is a convenient feature, aiding in the recording of issues, receipts, and balances of items such as stationery, furniture, and other supplies.

Operations

The Location/Lot Management plan

L/LM provides flexibility in specifying locations within a warehouse, so that most physical layout systems can be accommodated. The basic layout shown in Figure 2-11 provides for:

Aisles — two-character field, representing the rows of stock locations

Bays — two-character field, representing the vertical location within an aisle

Levels — one-character field, representing the horizontal location within a bay

Pallets — the lowest division within an individual bay/level combination, a one-character field

Subdivisions — the lowest division within an individual pallet, a one-character/digit field.

The above designations will appear as field headings on all reports and inquiries. It is not necessary, however, to change already established internal codes. Codes such as building, room, and floor can easily be related to the aisle, bay, or level designations used by L/LM.

L/LM is able to provide detailed location control on all items. However, for items where this degree of control is unnecessary, the bulk store areas can be used. Up to 99 bulk store areas may be established.

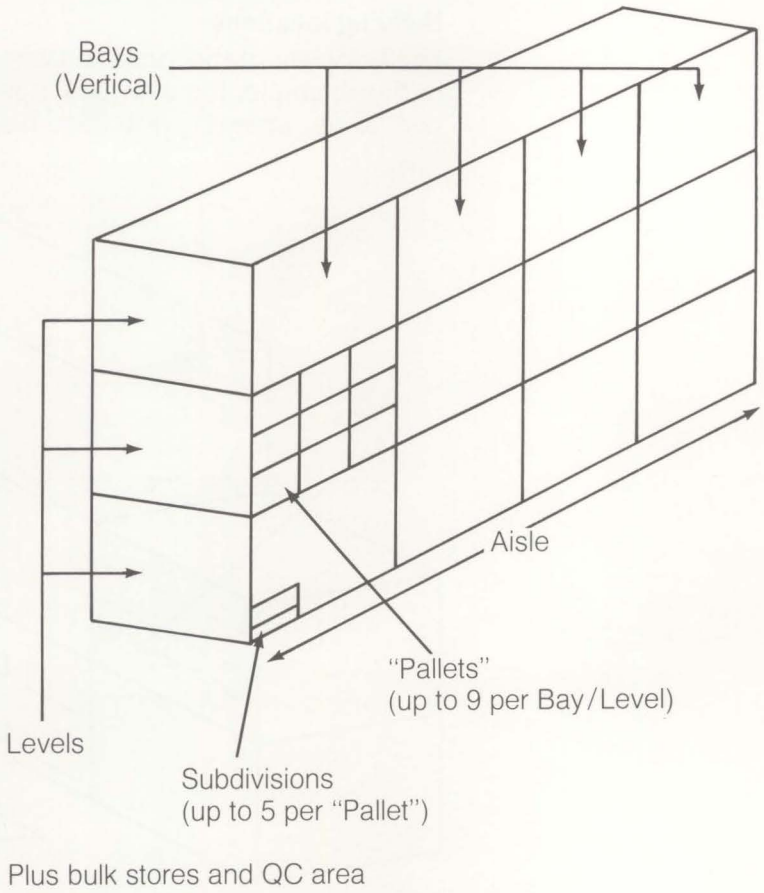
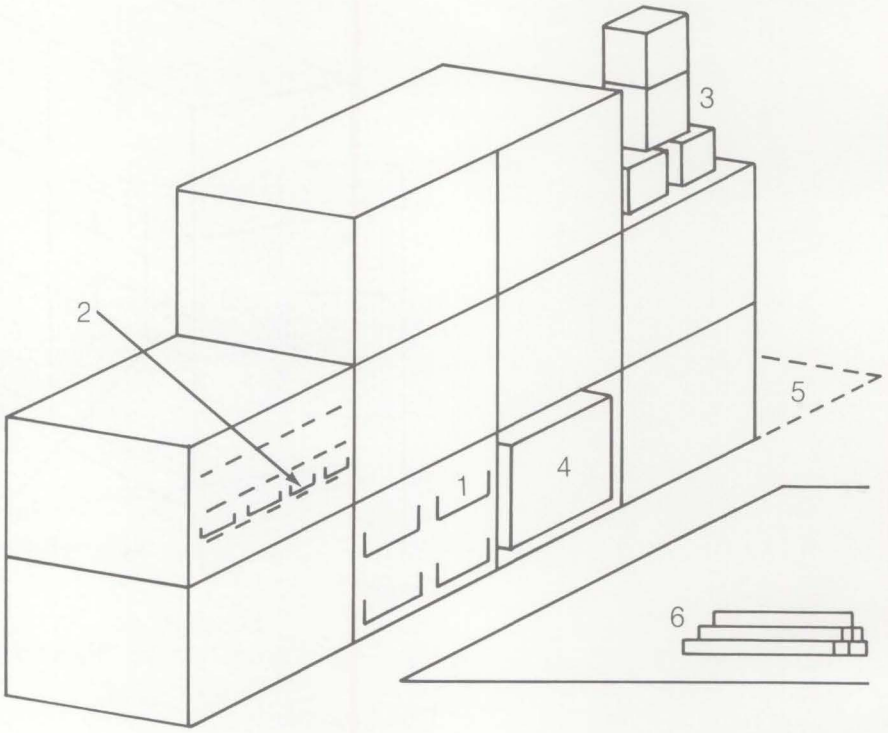


Figure 2-11. The Location System

Building locations

The flexibility of the location system is illustrated in Figure 2-12 . In this example, the aisle (A4) has five bays. The first bay has only two levels, while the fifth (last) bay is a single level.



	1	2	3	4	5
AA-Aisle	A4	A4	A4	A4	A4
NN-Bay	27	26	29	28	30
A-Level	1	2	2	1	1
N-Pallet	2	2	–	–	–
A-Sub-Div	–	3	–	–	–

6. Bulk Store (up to 99)
   or QC Area (99)

Figure 2-12. Location flexibility

Within a bay level, the user can designate up to nine pallets as the next category of location size. Within a pallet, there can be up to five subdivisions. The minimum location designation is aisle, level, with a single bay, as illustrated in the example, column 5.

It is possible, therefore, to use L/LM with:

- racking locations
- storage cabinets
- separate storerooms with shelving
- skid storage without racking.

```
DATE **/**/**              LOCATION/LOT MANAGEMENT          SELECT     AM5CB1

                              LOCATION DETAIL
                            MULTIPLE LOCATIONS

                    WAREHOUSE  1                AISLE  BP

          RANGES    BAYS             FROM   11   TO   12
                    LEVELS           FROM    1   TO    4

                    PALLETS          FROM         TO
                    SUBDIVISIONS     FROM         TO

                           ACTION  A

                                   A-ADD
                                   D-DELETE
                                   R-REACTIVATE
LAST LOCATION UPDATED

                                                  CK19 RETURN TO SELECT
                                                  CK24 DISPLAY STATUS
```

Location Master file information can be used to list the empty locations, which will help in the disposition of incoming stock and the management of warehouse space.

```
                                ABC COMPANY      LOCATION/LOT MANAGEMENT     DATE **/**/**    TIME 15.59.38    AMSWD    PAGE    3

                                        EMPTY LOCATIONS IN WAREHOUSE 2

                                        LOCATION FROM BEGINNING TO END

          MULTIPLE                  MULTIPLE                  MULTIPLE                  MULTIPLE                  MULTIPLE                  MULTIPLE
LOCATION ITEMS/LOTS       LOCATION ITEMS/LOTS       LOCATION ITEMS/LOTS       LOCATION ITEMS/LOTS       LOCATION ITEMS/LOTS       LOCATION ITEMS/LOTS

K3010Z   Y    Y           K30103   Y    Y           K30104   Y    Y           K30105   Y    Y           K3010G   Y    Y           K30107   Y    Y
K3010B   Y    Y           K30109   Y    Y           Q1AA3C   N    N           Q1AA3D   N    N           Q1AA3E   N    N           Q1AA3G   N    N
Q1AA3H   N    N           Q1AA3I   N    N           R2AAC1   N    Y           R2AAC2   N    Y           R2AAC3   N    Y           R2AAC4   N    Y
R2AAC5   N    Y           R2AAC6   N    Y           R2AAC7   N    Y           R2AAC8   N    Y           R2AAC9   N    Y           T4025B   Y    N
T4025C   Y    N           T4025D   Y    N           T4025E   Y    N           T4025F   Y    N           T4025G   Y    N           T4025H   Y    N
T4025I   Y    N

                        TOTAL NUMBER OF EMPTY LOCATIONS          31


                                                *** END OF PRINT ***
```

When a location is deleted, it is flagged for deletion. If empty, the location will be deleted when the file is next reorganized. If stock is still recorded as being in the location, the deletion will only take place once the stock is removed. A list of deleted locations containing stock can be used to aid in control.

```
                              ABC COMPANY     LOCATION/LOT MANAGEMENT     DATE **/**/**     TIME 15.57.14     AMSCR     PAGE     1

                                              LOCATIONS MARKED FOR DELETION

    WHSE    LOCATION        STATUS                          ITEM NUMBER          QUANTITY          BATCH/LOT      QC TYPE

      2       BB01AAA       FOR DELETION ON NEXT RUN
      2       BB01AAB       FOR DELETION ON NEXT RUN
      2       BB01AAC       FOR DELETION ON NEXT RUN
      2       DD01AAA       FOR DELETION ON NEXT RUN
      2       DD01AAB       FOR DELETION ON NEXT RUN
      2       DD01AAC       FOR DELETION ON NEXT RUN
      2       DD01AAD       FOR DELETION ON NEXT RUN
      2       DD02AAA       FOR DELETION ON NEXT RUN
      2       DD02AAB       FOR DELETION ON NEXT RUN
      2       DD02AAC       FOR DELETION ON NEXT RUN


                                          *** END OF PRINT ***
```

Transaction processing

Order allocation

The order allocation feature updates the batch/lot location files with the quantities allocated from each location. This allows a specific number of inventory stock items within a warehouse location or batch of material to be allocated for manufacturing, customer order processing, or similar purposes. The register that is printed will list the quantities allocated by location, along with FIFO date, batch/lot, and QC status.

Non-inventory transactions

The non-inventory transaction option is used to move non-inventory items in or out of stock. You may specify the item number, quantity, and location.

Quality control transactions

This option is used to change the quality control status of an item. You may enter a new status, quality control date, and FIFO date. Items can be given shelf life control, or shelf life control may be removed from an item. This option gives you another means of monitoring your quality control items.

Interfaces

The Location/Lot Management application supports the following MAPICS applications:

- Location/Lot Management supplies and updates the Inventory Management Item Master file with these additional fields: Inspection Flag for Purchased or Manufactured Items, Batch/Lot Control Indicator, Shelf Life in Days, Cumulative Yield through all operations, and Standard Batch Quantity, and updates the Item Balance quantity fields. Allocation information is supplied before pick lists are printed.
- Location/Lot Management supplies Order Entry and Invoicing with allocation and pick list information before order shipment.
- Location/Lot Management enhances Purchasing by adding batch/lot and location fields to the receiving transaction processor: location, batch/lot number, GRN number, and reject location.

Section 3. Miscellaneous information

System requirements

The minimum system configuration for the applications discussed in this book is an IBM System/36 with:

- 29.1 million characters of disk storage (single disk)
- One system printer, which can be either a line printer or a serial printer
- One work station
- 128K bytes of main storage.

Although there is nothing inherent in the design of MAPICS to prevent the use of the minimum system configuration stated above, the system configuration for a particular customer must be able to accommodate the expected business volumes, data base size, and operating requirements.

Consult your IBM representative for guidance. Refer to "Performance considerations" later in this section for more details.

Programming systems

This System/36 program product is required:

- The System Support Program program product (5727-SS1 or 5727-SS2).

The application programs are written in the System/36 RPG II programming language. Therefore, if you want to make modifications to the application programs, you must also have the RPG II compiler (5727-RG1) and the Utilities program product (5727-UT1) available.

Performance considerations

The features described in this section impact System/36 operational performance. If you plan to install several applications, you may need more than the minimum system configuration.

Main storage

Each application program is designed to execute within a particular minimum main storage size. (The minimum configuration is listed under "System requirements" in this section.)

In some instances, a main storage capacity greater than the minimum required will improve performance. For example, performance can be affected by:

- The number of jobs operating concurrently
- The number of work stations the system allows to be operating concurrently on the same job
- The number of work stations concurrently on the same or different applications.

Disk storage

The larger your disk storage, the more information you can store in the system. If you plan to store large volumes of data, you will need a disk storage capacity larger than the minimum required. Then you will be able to expand your files as your business increases.

Printer speeds

A line printer produces reports and listings at a significantly greater speed than a serial printer. If you anticipate heavy printing volumes, you will need a line printer to be used as your system printer. Selecting a printer speed higher than the minimum may also help increase performance. Keep in mind that all work station printers are serial printers.

Accordingly, consult your IBM representative for assistance in determining the optimum main storage capacity, as well as disk and printer selection, for your particular combination of applications and their related volumes.

Offline diskette entry system

If you have departments that need to enter source data, but they are located off the premises (such as across a public thoroughfare), you might consider the addition of an offline diskette entry system. This system allows a user department to enter information offline onto diskettes. The diskettes can then be delivered to your system console operator for processing in batch mode.

IBM's educational programs

To prepare you to use the applications, education is offered for installation managers, operators, and users of manufacturing applications.

For the installation manager

- *Computer Concepts*—Introduces the manager to computer concepts, controls, and procedures. This course lays the foundation for the transition from your present approach to a data processing system. This course is offered through the Guided Learning Center.
- *Installation Planning and Management*—To be taken after Computer Concepts. The basic planning tasks involved in preparing for a computer installation are discussed, as well as day-to-day system operations. This course is offered through the Guided Learning Center.

For work station (or display station) operators

- *System/36 Display Station Operator Training*—This self-study course introduces the work station operator to the operating tasks of a work station. Exercises are included that demonstrate sign-on and sign-off procedures, selecting jobs, and entering data into the system.

For system operators

- *System/36 System Operations*—Introduces the system operator to the operating characteristics of a System/36 console. Exercises are included that demonstrate the use of spooling, multiprogramming, and system utilities. This course is offered through the Guided Learning Center.

Check with your IBM marketing representative for a complete list of Guided Learning Center courses. Your marketing representative can also provide a list of seminars conducted at the IBM Customer Center.

Application education

Check with your IBM marketing representative for a list of specific application education courses taught by the Manufacturing Industry Support Center.

- *MAST (Modular Application System Training)*—Separate self-study modules covering all of the manufacturing applications from general executive overviews and concepts to the detail of implementation.
- *MAPICS Operator Training*—Included with each of the MAPICS applications is hands-on self-study operator training for both the work station operator and the system operator.

IBM's installation guidance

An Installation Made Easy workbook and an application reference manual that describe planning and installation activities in detail will be available to you. Here is a brief description of the process.

Installation considerations

With complete understanding of the responsibilities of each participant in the installation process, installation planning can help make the installation and operation of your IBM applications smooth and successful. The system is designed to relieve you of many of the tasks normally associated with installing a data processing system.

You can receive installation guidance from IBM. However, certain tasks are your responsibility, such as the accurate and timely conversion of your present data to the format required for your application. Paying close attention to these responsibilities is the key to a successful installation.

Installation and conversion aids

To make it easier to install your system and convert your present data into the machine-readable form required by the IBM System/36, the application includes these aids:

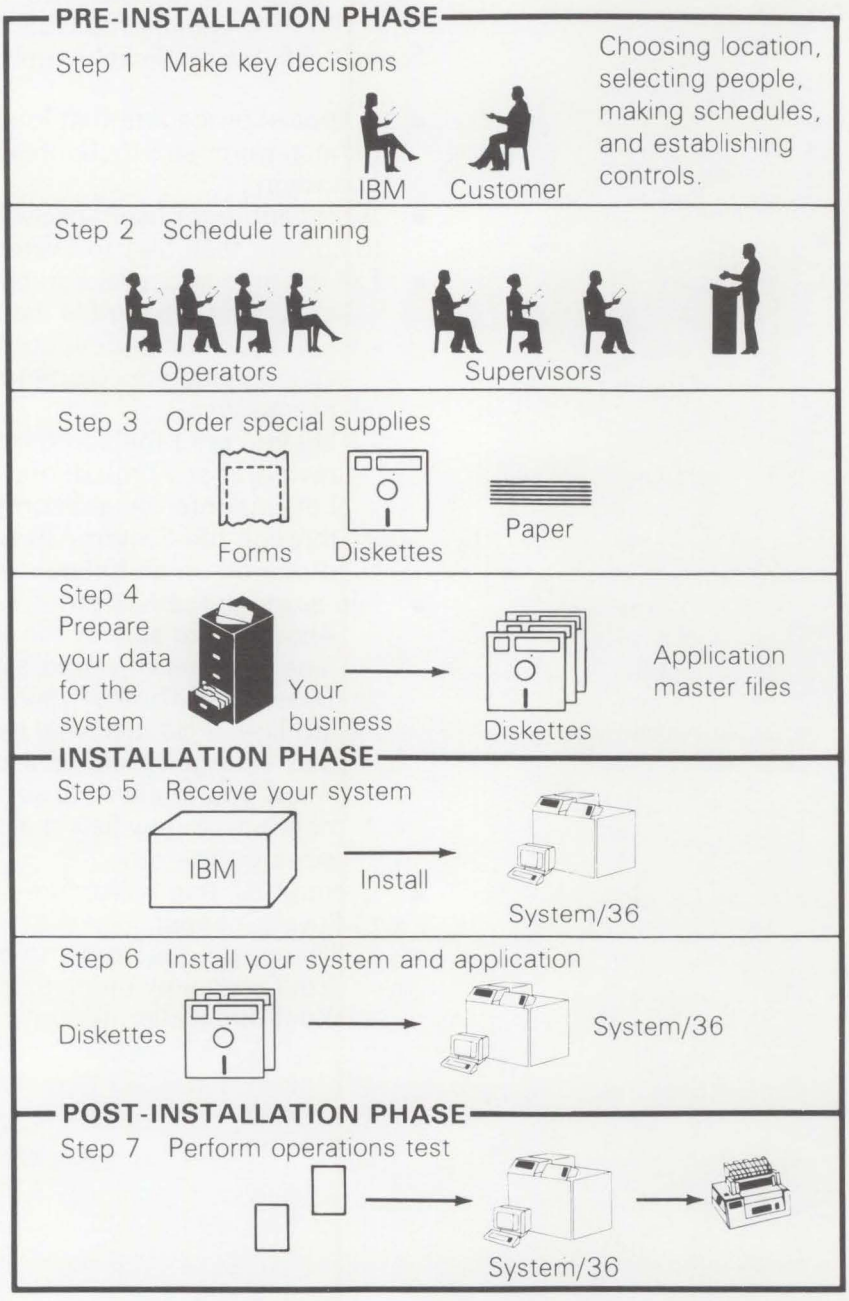
- A special procedure that loads into the System/36 the general-purpose procedures necessary for regular processing operations.
- A procedure for users of System/34 and System/36 MAPICS to convert their files to System/36 MAPICS II.
- File maintenance procedures that:
  - Load your master file data into the System/36.
  - Edit the master file records and delete any erroneous ones. When editing is complete, the master files are available for processing.
  - Let you print the contents of the master file records for review at any time during the loading process.
  - Let you enter data records into your system either directly through the System/36 work station or from diskettes prepared on an offline diskette data entry system.
- File-sizing procedures that:
  - Allow you to specify the number of records in your master files (number of vendors, items, orders, and so forth).
  - Determine whether your files will fit in available disk storage. You receive a listing that shows how the available disk storage would be allocated if these sizes were used.
  - Allow you to alter the sizes of the master files whenever needed. A new listing is printed each time a new set of sizes is entered.
- System tailoring procedures that let you tailor the applications to fit your needs:
  - The costing factors and methods you want to use.
  - Your company name to print in report headings.
  - Your application security codes.

Installation activities

System installation is divided into three phases: pre-installation, installation, and post-installation. Pre-installation consists of activity that must be done before your System/36 and the application(s) are installed. Key decisions must be made as to where to place the computer and work stations, who will operate them, who will provide the information for processing, and who will use the reports produced. Training must be scheduled for the operators, as well as for other people you will work with, so that the system will be used effectively. Supplies necessary for running the System/36 and your application must be ordered. Data must be collected and prepared for entry into the system.

The installation phase begins when the System/36 and the first applications are delivered, and ends when the last application is operational.

Post-installation consists of performing operations tests. When the testing is completed and you have shown that the system works in your operating environment, you can change over to total use of the new system.



Customer responsibilities

As an IBM customer, you can receive technical guidance both during and after installation of your system, but *you* are responsible for these activities:

- **Select and train system-related personnel**—You need to select and train someone who will be responsible for coordinating all System/36 operations and the people who will operate the system on a day-to-day basis.
- **Select applications and plan for implementation of optional features**—You must choose which applications to implement, and you determine the sequence of their installation. For example, you might decide to install Inventory Management at the beginning of a new year or Material Requirements Planning before a seasonal surge in production. You must also select which optional features to use with the applications (system tailoring) and understand the interaction between applications. For example, Material Requirements Planning requires that Inventory Management and Product Data Management be installed.

- **Develop installation schedule and checklist**—Once you have decided what must be done, it is a good idea to work out a schedule for starting and completing each installation activity. This schedule is useful in assigning tasks to individuals in your company.

- **Order special supplies**—You will need to obtain special supplies for your System/36: report binders, diskettes, ribbons, preprinted input (source) documents, stock paper, preprinted (output) forms for picking lists, invoices, acknowledgments, statements, and other miscellaneous items.

- **Train user departments**—It is important to educate the personnel in your company who will be affected by the system, particularly those who will be entering data for processing and those who need to understand and use the reports that are produced.

- **Prepare the physical site for the computer**—You will need to prepare space for the System/36, the work stations and system console, as well as provide storage space for computer output, a diskette library, and computer supplies.

- **Gather data for the master files required for your applications**—Gathering the data can include establishing employee or vendor numbers and preparing other master data for each master record required by the applications being installed. Be sure to check all data for completeness, accuracy, and correct formats.

  If you intend to load the master file data into the System/36 using data entry diskettes prepared on an offline diskette entry system, you need to make plans for such diskette preparation prior to system installation. If you intend to enter the master file data at the System/36 work station, have all the data input forms ready when the system arrives.

- **Plan for parallel or pilot operation**—You should plan to conduct either a parallel or pilot run of your new system. In a parallel operation, both systems process current data. In a pilot operation, the System/36 processes data from a previous period while current data is being processed using the old system. In both methods, you compare the results against the controls for the appropriate processing period.

- **Direct all system operations**—Both before and after the System/36 is installed, you will need to supervise all system operations, including reviewing input documents and directing your operators in their daily tasks—taking control totals, running the System/36, running the application procedures, verifying results against control totals, and distributing system output.

- **Coordinate conversion and perform system test operations**—After the system is installed, you should supervise the loading of master files, testing of system operations, and verification of processing results.

File loading and file maintenance operations

File loading and file maintenance are two separate and distinct functions that use the same procedures and facilities.

File loading, done initially when the system is installed and periodically as needed, lets you enter records into the master files.

File maintenance, done whenever necessary to change information in existing master files, lets you enter or change individual fields within records or add new master records.

Figure 3-1 shows how information flows through file loading and file maintenance operations. The numbers in the following discussion refer to that figure.

You load files in one of two ways. The first way 1 involves keying the records onto diskette using an offline diskette entry system, then processing the diskette on the System/36. The second way 2 involves entering the records through a work station. In the second method, file loading occurs online. As records are entered and edited, they are immediately added to the master files and made available for use by other jobs.

File maintenance (changing the files) is always performed using data entry at a work station.

If you desire, listings can be printed 3 showing a "before" and "after" version of each record changed.

On request, the system can print file lists 4 that you can use to make certain that the information in the master files is accurate and up-to-date.

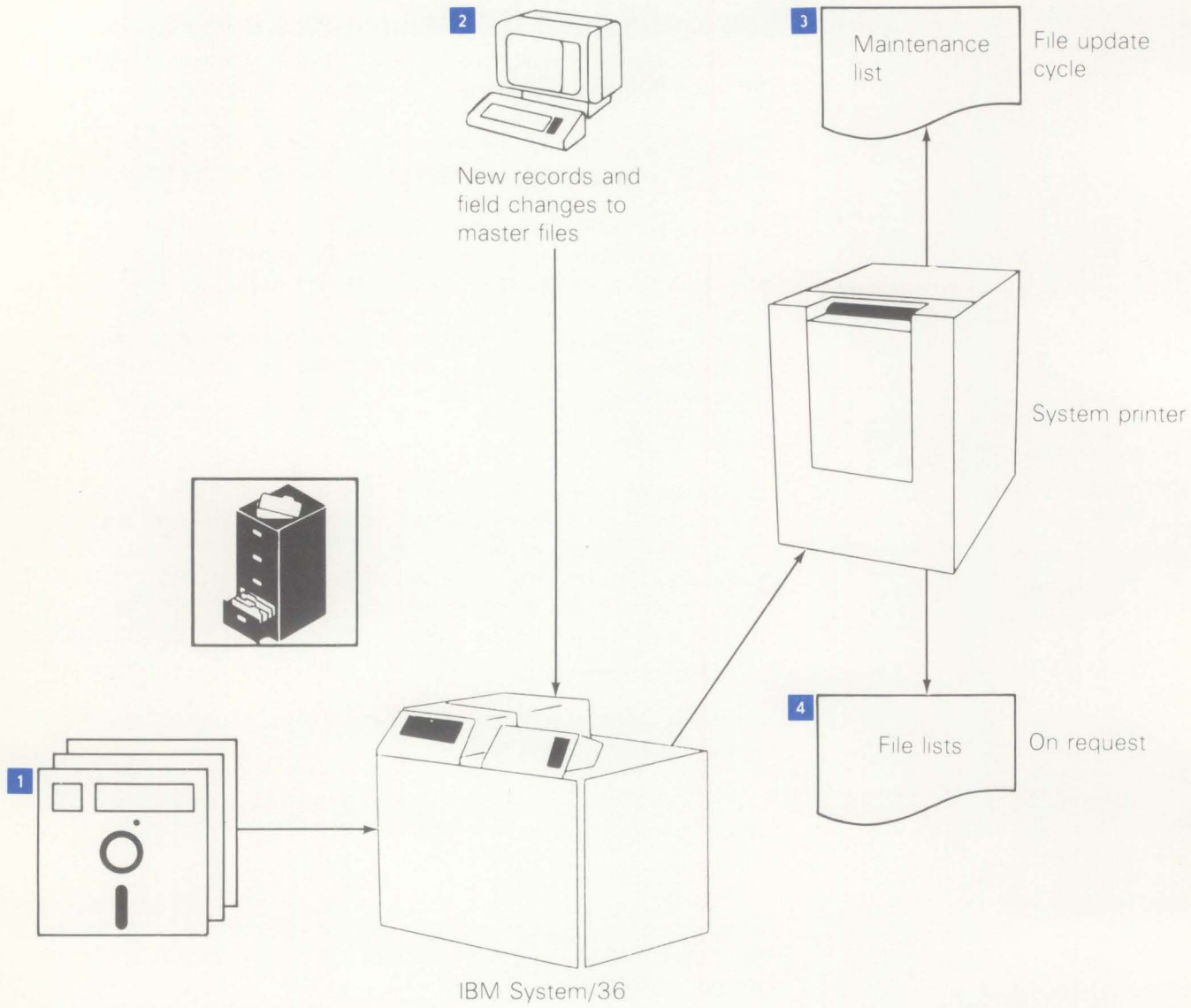


Figure 3-1. File loading and file maintenance information flow

The data base

An application system maintains and uses a number of system- and application-oriented files and records.

In this section, references are made to ***fields***, ***records***, and ***files***. If you are unfamiliar with these terms, a brief explanation at this point might help:

Field A place to store a discrete piece of information, such as a name, a code, or a rate. For example,

R. A. HALL

is the contents of a name field in an employee record.

Record A group of related fields that contain data pertaining to one employee, one vendor, or one inventory item. For example, an employee record may contain:

R. A. HALL 47 PLEASANT RD ATLANTA, GA
and so on.

File A group of one or more records of a similar type. For example, the employee file might contain master records for:

M. A. BUCKO
W. D. EAGER
R. A. HALL

Master files

Each application uses various master files. Figure 3-2 shows the major required files in the data base:

Permanent File	Inventory Management	Product Data Management	Master Production Schedule Planning	Material Requirements Planning	Production Control and Costing	Capacity Requirements Planning	Data Collection System Support	Forecasting	Purchasing	Location/Lot Management	Order Entry and Invoicing	Accounts Receivable	Sales Analysis	Payroll	Accounts Payable	General Ledger
System control	R	R	R	R	R	R	R	R	R		R	R	R	R	R	R
Security control	R	R	R	R	R	R	R	R	R		R	R	R	R	R	R
Item master	R	R	R	R	R	X	X	R	R	R	R		X			
Item balance	R		R	R	R	X		X	R	R	X					
Work center master		X	X		R	R	X		X					X		
Product structure	X	X	R	R					X		X					
Routing		X	X		X	X			X							
Calendar	X		R	R	R	R		X	R							
Employee master					X		X							R		
Customer order summary	X			X		X					R					
Manufacturing order summary	X		R	R	R	X	X									
Purchase order summary	X		R	R			X		R							
Open order material	R		R	R	R		X		R		R					
Open order operations					R	X	X									
Open order misc costs					R										X	
Turnaround (data collection)	X				X		X							X		
Requirements			R	R				X								
Planned orders			R	R		X										
Badge master							R									
Transaction format							R									
Variable capacity						X										
Forecast Master								R								
Buyer Master									R							
Vendor Master									R						R	
Purchase Item									R							
Warehouse Ship To									X							
Standard Message									X							
Extended Vendor									R							
Resource Master			R													

X = May be used
R = Required

Manufacturing applications

Other MAPICS applications

Figure 3-2. Major required master files in data base

The Item Master file contains one record for each unique item number. Each record includes descriptive data about the item, such as description, current unit cost, list price, drawing number, vendor number, and unit of measure.

The Item Balance file contains one record for each unique item number per warehouse. Each record includes data for managing inventory, such as quantity on hand, quantity on order, historical usage, and lead time.

The Work Center Master file contains one record per work center. Each record includes information about a manufacturing facility, such as description, foreman, standard and current cost rates, shift length, capacity, queue, efficiency, and output rate.

The Product Structure file contains one record per item/component relationship in bills of materials. Each record includes information such as the quantity of the component required to produce one item and engineering-change-effectivity dates.

The Routing file contains one record per operation of each manufacturing routing. Each record includes information such as the operation description standard and average setup and run times, work center number, tool number, and process sheet number.

The Calendar file contains one record per work day in a five-year span of time.

The Employee Master file contains one record per employee. Each record includes employee number, employee name, address, occupation, and payroll data.

The three Open Order Summary files contain one record per open purchase order, line items, manufacturing order, and sales order. Each record includes information such as order number, schedule dates, status scrap, and total costs.

The Open Order Material file contains one record per open blanket purchase release, manufacturing component, and sales order line. Each record includes information such as item number, description, quantity, and schedule date.

The Open Order Operations file contains one record per operation in each open manufacturing order. Each record includes information from the routing file, plus schedule dates and hours, and costs expended to date on the operation.

The Open Order Miscellaneous Costs file contains one record per miscellaneous cost in open manufacturing orders. Each record includes quantity and cost for expenditures such as outside services.

The Turnaround file contains one record per preplanned shop activity to be reported through the Data Collection System Support application.

The Requirements file contains one record per item requirement for Material Requirements Planning. Each record includes date required, quantity required, and a code identifying the source of the requirement.

The Planned Order file contains one record per open order and order planned by Material Requirements Planning. Each record includes schedule dates, quantity, and a code identifying the source of the planned order.

The Badge Master file contains one record per employee. Each record includes badge number, employee number, foreman number, company number, shift worked, and shift paid.

The Transaction Format file contains one record for each action defined for the IBM 5230 Data Collection System. Each record includes a transaction code and a description of data fields entered through the IBM 5230 Data Collection System.

The Variable Capacity file contains one record for each change to the work center capacity.

The Forecast Master file contains one record for each unique item number and one record for each unique item number per selling warehouse. Each record contains forecast parameters, the actual demand, and previous and future period forecasts.

The Buyer Master file contains one record per buyers. Each record includes information such as name, department, phone number, days early or late, items under or over shipped, average orders per day, and vendor rating.

The Vendor Master file contains one record per vendor. Each record includes name, name abbreviation, address, telephone number, contact person, accounts payable amount calculations, discounts, and last payment date.

The Purchase Item Master file contains one record per item. Each record includes information such as buyer number, commodity code, ship via code, automatic release information, tolerance percentages, weighted averages, lead times, and item class.

The Warehouse Ship-to file contains one record per warehouse and ship-to ID combination. Each record includes ship-to information such as name, address, telephone number, name abbreviation, and contact person's name.

The Standard Message file contains one record per message number. Each record includes sequence number, message text, and effectivity starting and ending dates.

The Extended Vendor file contains one record per vendor. Each record includes detailed information such as terms code and description, average vendor rating, last vendor rating, as well as multiple ship-to blanket order and multiple lines on purchase order flags.

The Location Quantity file contains one record for each location/item/lot/FIFO date combination. It contains the total quantity of a unique item/batch/lot at a unique location.

The Location Item Master file contains one record per item (inventory and non-inventory). The records are "linked" to location detail information.

The Location Detail file contains one record per warehouse/location combination. The records are "linked" to Location Item Master and Location Quantity files. The file controls location environment (multiple batch/lots and/or multiple items).

The Transaction History file contains one record for every transaction that affects quantity on hand or quantity control status. It contains information that allows follow-up on any order, item, or batch/lot.

The Goods Received Notes file contains one record for each Goods Received Note. It contains receipt date, invoice date, and invoice number.

The Allocation file contains one record for each item/batch/lot that has been allocated. It contains quantity of this item/batch/lot that has been allocated to a specific customer or manufacturing order.

System Control file

The System Control file provides a special place to store relatively unchanging information that is used by more than one procedure or program. This arrangement permits you to change such information as tax percentages or reorder costs.

Among the important contents of the System Control file are:

- Internal control information needed to run your application system (ranges, dates, limits, percentages, and so on)
- User-selected system tailoring options
- File-sizing data.

Other files

You will use several transaction files for daily processing of data, and backup files to retain all master files on diskette for storage in a safe place.

Many other files and records are for internal system use only (work and summary files, sort files). These are not described here.

Permanent and temporary files required for an application procedure must be stored on the System/36 disk before that procedure can run. All master files and application files are part of the permanent disk storage area. The remaining disk storage is then allocated for temporary areas.

Major field sizes

The following is a list of the major data fields used in the applications discussed in this book. For each field, its maximum size is indicated, as well as whether it is restricted to numeric information or may contain alphameric information. The number of decimal positions is shown for numeric fields. You can use this list to help determine whether these applications meet your data field requirements.

	Size (including decimals)	Alphameric/ numeric	Decimals
Item number	15	A	–
Quantity on hand	7	N	0
Item unit cost	11	N	4
Annual usage quantity	9	N	0
Vendor number	6	A	–
Order number	7	A	–
Order quantity	7	N	0
Bill of material quantity-per field	7	N	3
Employee number	5	N	0
Period forecast	7	N	0
Buyer number	5	A	–
Location number	10	A	–
Batch/lot number	10	A	–

Glossary

ISO definitions courtesy of International Organization for Standardization. ANSI definitions courtesy of American National Standards Institute, Inc.

alphameric
A term encompassing alphabetic characters, numeric digits, or special characters. See ***numeric, special character.***

audit trail
A hard copy of transactions and status which allows tracing of activity if required. For example, a large inventory error might result in a check of the transaction audit trail to detect the erroneous entry.

configuration
The group of machines, devices, and programs that make up a data processing system.

data
(ANSI definition) A representative of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by humans or automatic means.

diskette
A thin, flexible magnetic disk permanently enclosed in a semi-rigid protective jacket.

display
(1) (ISO definition-noun) A visual presentation of data. (2) (Noun) When a display screen format is executed, all of the information on the display screen. (3) (Verb) To present an image on a display screen.

inquiry
The requesting of specific information from the System/36 via a display station. To make the request, the operator enters data that identifies the information. For example, an employee number is used to request the information contained in a person's Employee Master record.

numeric
Pertains to digits 0—9. See ***alphameric, special character.***

paging
Displaying the records in a file in sequence on a display station. Using this facility, an operator can read through an entire file rather than just seeing one set of information, as is done when inquiry is used.

program
(1) A sequence of instructions to a computer, written in a special form the computer can interpret. A program tells the system where to get input, how to process it, and where to put the results. (2) A set of instructions that tells the system which operations are to be done and how to do them.

special character
A character other than alphabetic or numeric; for example, * + % are special characters.

spooling
A part of the system support program product that provides temporary storage of print data on disk, and allows printing to take place concurrently with other tasks.

system console
A display station that performs as a work station at the central processing area, and is designated to activate certain system functions, and control and monitor system operations and other work station operations.

system printer
A printer, either line or serial type, designated when the system is installed, that is used to print output, unless the output is specifically directed to a work station printer. Contrast with ***work station printer.***

system tailoring
The process of selecting from available program options to satisfy the specific needs of your company.

transaction
An item of business. Customer orders and customer invoices are examples of transactions. Transactions saved in a transaction file are usually processed along with a master file by RPG II, WSU, or DFU programs. For example, in a payroll application, a transaction file could indicate the number of hours worked by each employee and the master file could indicate each employee's name and pay rate.

work station
A device or component that allows communication between the user and the computer—a display station, a serial printer, or a combination of both constitutes a work station.

work station printer
A serial printer, designated when the system is installed, that is used to print work station output. Contrast with ***system printer.***

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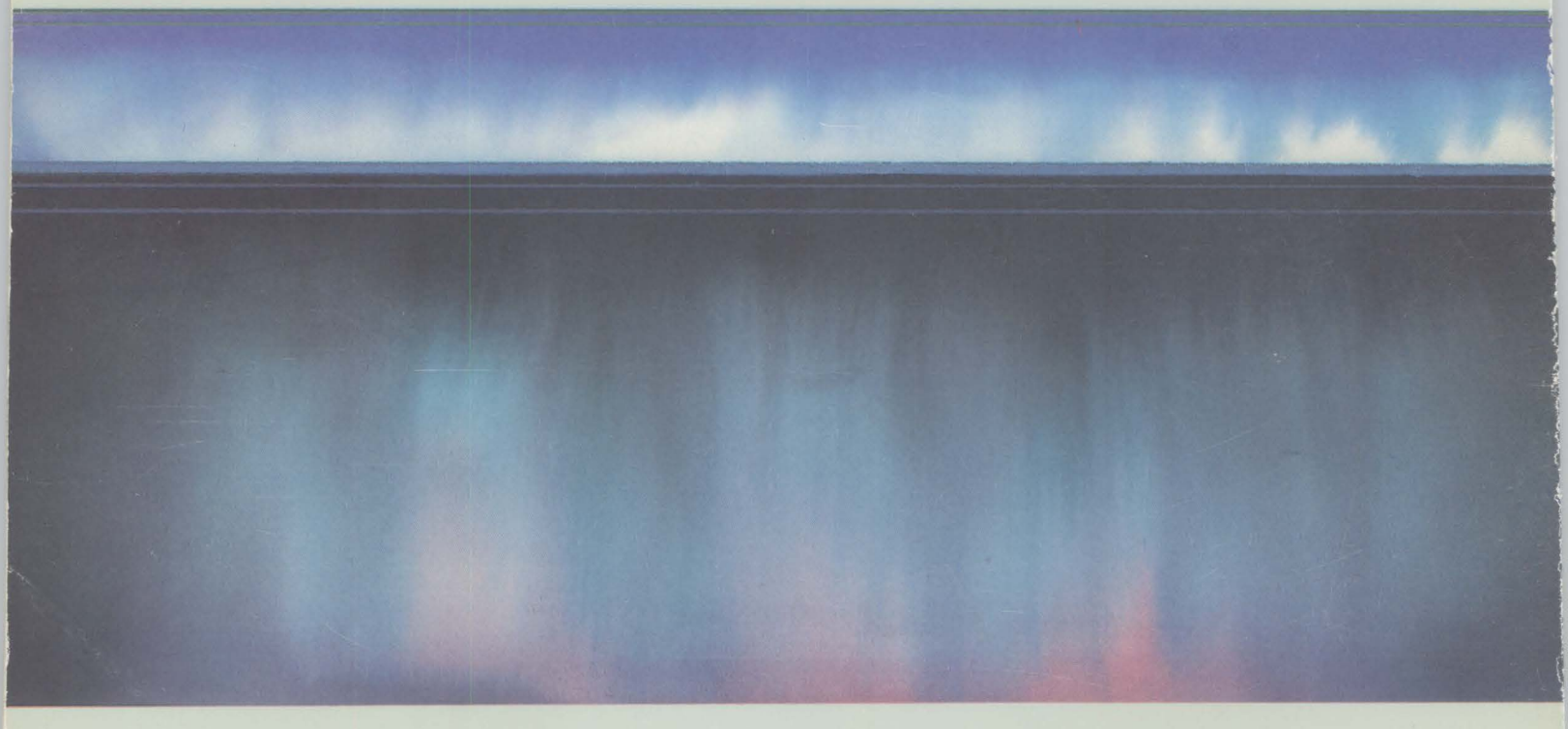

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