

Manufacturing Project Management



 Infotek Systems



MPM is Manufacturing Project Management: a concept permitting

separate management of many different manufacturing projects sharing a single production facility. Using MPM/3000, each department in your manufacturing organization can use whichever management method—project or company-wide—is most appropriate. MPM keeps track of separate manufacturing projects *automatically*. Your organization runs efficiently, yet all reporting requirements will be satisfied.

The system maintains separate project inventories. The ability to trace lots is available and lots may be split across projects. The system maintains sub-projects for multi-activity tasks and shop orders can be written for single or combined sub-projects. Other features include actual-cost material valuation based on the lot tracking system, a purchasing clause library, and a full on-line parts history facility.

MPM and its companion Engineering Documentation System, (EDS), are designed to take advantage of state-of-the-art hardware and software technology. As such, MPM/3000 provides source data capture in both inventory control

and detailed job tracking, and a graphic planning facility unique in the industry. Both MPM and EDS optionally support the HP2680A laser printer to fulfill internal requirements for such items as shop orders and kit lists, as well as government reporting requirements such as data lists and provisioning parts lists.

The primary purpose of a computerized manufacturing system is dual; to accurately retain and categorize the company's information resources, and to permit sharing of those resources in the most efficient manner possible. MPM and EDS are designed with this in mind.





Customer Order

Engineering Data
EDS/3000

MPM Planning

New
Purchase Orders

Graphic Planning Aids

Project
Production
Plan

New Shop Orders

Data Capture
Shop Floor

MPM Tracking

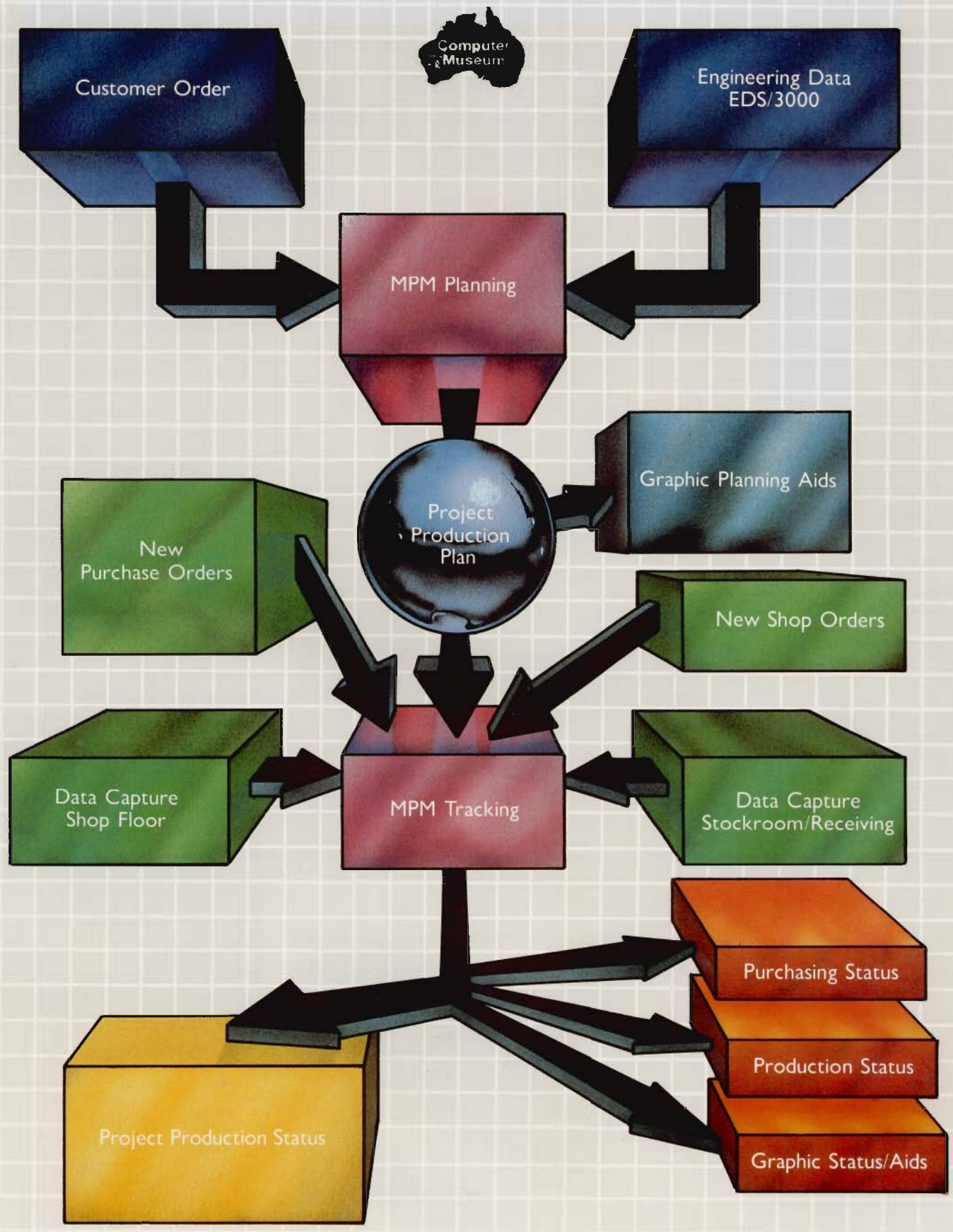
Data Capture
Stockroom/Receiving

Project Production Status

Purchasing Status

Production Status

Graphic Status/Aids



HP Computer Museum
www.hpmuseum.net

For research and education purposes only.

ENGINEERING DOCUMENTATION SYSTEM

A manufacturing company's existence is based on its engineering documentation. The essence of a manufacturing business—its products and processes—are described in detail by these documents, and indeed most trade secrets are contained in engineering documents. This information is used in some manner by virtually every department in the company, and must be shared efficiently and effortlessly to provide a smooth-running manufacturing operation. EDS/3000 manages this shared resource with a minimum of specialized effort on the part of either its originators—your engineers, or its users—your production departments.

THE PARTS CATALOG The description of your company's products begins with the parts they use.



Stored by EDS in your Master Parts Catalog, this descriptive information is standardized throughout your company. EDS retains specialized information such as reliability and provisioning data, automating the task of producing government-required engineering documents.

Unlike many automated manufacturing systems, EDS permits you to define usages and types for your parts. Later, this information is used by MPM to determine how parts should be purchased, stored, issued, and accounted for.



DRAWING CONTROL EDS/3000 will maintain your drawing and history lists, so that release and revision information is shared throughout the company. By supplementing written Engineering Change Orders, EDS insures that revision information is noted throughout the production cycle, substantially reducing your scrap and rework rates. And if the system administrator chooses, MPM will prohibit purchase or manufacture of any part currently being changed until that part is specifically released by your engineering or manufacturing engineering departments. Again, information sharing—communication—is the key.

BILL OF MATERIAL MANAGEMENT

The structure of the products you manufacture are described by bills of material, lists of material, or parts lists. EDS stores bills of material in their simplest form—single-level, describing a single assembly level—and permits you to synthesize all other bill of material analyses: summarized, for costing and purchasing; indented, for shop floor planning; exploded, for reference; and



provisioning. You do not have to maintain any of the documents separately, because EDS guarantees that they are always up-to-date and available to anyone who needs them.

Bills of material and their complements, where-used lists, are always handy on-line with the most up-to-the minute information. This is particularly important in the case of the where-used list, frequently needed for analyzing the effects of shortages or parts substitutions. Because this vital information is *always* available to an authorized user, your planning and purchasing departments operate rapidly and productively; eliminating most potential production problems and responding to them rapidly if they do arise.

PART PROVISIONING EDS/3000 provides engineering documentation in full compliance with MIL-STD-100 automatically upon request. By maintaining provisioning information on a continuing basis, costs of providing this contractually-required information can be reduced dramatically. Using the Hewlett-Packard 2680A laser printer, required forms are automatically created and used, reducing the need for special ADP forms.

DATA ENTRY AUDIT A complete engineering documentation system requires an audit trail to insure its integrity. At the command of the system administrator, EDS/3000 will record each change to your engineering data, together with the identity of the operator and terminal used to make the change, and the date and time of the change. This audit trail can be reviewed on a regular basis, or may simply be used to analyze the cause of an unexpected change in engineering data. It can be maintained for as long as the system administrator desires it.

INVENTORY MANAGEMENT

Traditionally, the first part of a manufacturing department to be automated is its inventory control section. This is because it is typically the easiest to computerize and the most difficult to track manually. MPM/3000 provides an inventory control facility geared to the needs of the contractor or job shop, and provides benefits far beyond traditional inventory control systems.

MULTIPLE STOCK ACCOUNTS

A contractor maintaining inventory for multiple projects needs multiple stock accounts. While many automated systems provide several stock accounts, MPM/3000 gears these accounts to the needs of the contractor, providing logical separation with a minimum of effort. With no practical limitation on the number of stock accounts, your inventory control department has maximum flexibility in purchasing, storing, and issuing inventory. Because this logical separation extends to manufactured as well as purchased parts, MPM/3000 will automatically select the proper inventory account to use during kit pulls and unplanned issues, freeing the stockroom personnel of this responsibility.



LOT TRACEABILITY MPM/3000

provides a full lot tracking facility: Any material may be assigned a lot number (or MPM/3000 will select the lot



number automatically when material is received), and this lot number follows the material regardless of its final destination. If desired, lots may be spread across inventory accounts to make for more economical purchase and inspection quantities. The assigned lot number allows you to cross-reference any part issued to any work order so that it can be traced back to its original purchase order. In addition to fulfilling quality requirements, this feature gives you the ability to determine actual costs from the work order level through the completed project.

The lot tracking feature provides an additional benefit to material control; maintaining fresh inventory. Kit lists or pick lists indicate the preferred lots to pick from based on the age of each lot. By using MPM's recommendations, stockroom personnel can guarantee that inventory is used on a FIFO basis.

CYCLE COUNT SYSTEM MPM/3000 provides cycle counting to assure inventory accuracy and help pinpoint the source of problems. Cycle count codes, maintained by your material control department, are used by MPM to create a daily cycle count list.

Results of the count are placed in the parts history to be used in variance reports and to maintain the integrity of the audit trail.



DATA CAPTURE FACILITY MPM's

inventory control feature can be accessed through the Data Capture subsystem; permitting stockroom personnel with little training to record material transactions at their source. Computerized records are most accurate when information is not recorded and re-recorded on its way to a keypunch operator. Additionally, recording transactions as they occur provides the most up-to-date inventory and shortage information vital to a busy stockroom and material control department.

SHORTAGE TRACKING Shortages detected by MPM/3000 during the kit pull process, or by stockroom or line personnel are recorded and referenced in all material control transactions. This means that stockroom personnel are reminded of the shortage upon receipt of any needed part. Daily review of the shortage list against a receipt list is unnecessary if stockroom procedures are set up to take advantage of this feature.

A shortage list is maintained both for work order shortages and line shortages. In addition, the list can be separated by project, permitting material control personnel to be assigned either by project or by functional area within your company's production departments.

SHOP FLOOR CONTROL



Keeping work moving smoothly through a busy production facility can be a difficult task without requiring a large amount of information. Most shop floor information is of little use to management in a well-run production facility because exceptions to the scheduled work flow do not stand out very well. Scheduling problems manifest themselves in line shortages, and a proliferation of red "HOT" tags. Using MPM/3000, your production control personnel can quickly sift through the large amount of status information to pinpoint potential problems before they turn into red tags.

STANDARD ROUTINGS MPM/3000 maintains standard routings and work instructions for your products. Using your computer to write and maintain

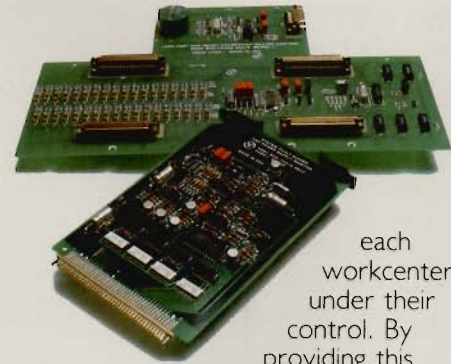


your master shop orders, MPM/3000 will generate a shop order package (including the shop order, parts list, and pick or kit list) using just a few keystrokes. Because the shop order is always copied from the master (maintained in the computer by your production control department), every shop order is always up-to-date.

ENGINEERING CHANGE CONTROL Before permitting a shop order release, MPM/3000 can check your engineering change information to make sure that no engineering changes are pending against the assembly you are about to build. In addition, MPM will verify the revision level of the assembly. By automating this important process, MPM/3000 will reduce your scrap and rework rates; obsolete assemblies simply will not be built unintentionally.

REWORK AND EXPENSE ORDERS For special projects or extensive rework, MPM/3000 provides a one-time routing for an assembly or for a rework shop order. Using this facility, your production control department can manage your shop floor without extra manual reports or special exceptions. You can specify shortages against rework and expense work orders as well.

WORKCENTER ACTIVITY Using MPM, each workcenter in your company is described to the system in terms of its location, capacity, and normal queue times. During the shop floor control process, your shop supervisors can be appraised of the current and forthcoming workloads at



each workcenter under their control. By providing this extra visibility,

MPM enables your supervisors and leads to allocate their resources more effectively, reducing manufacturing lead times and decreasing labor costs.

LABOR STATISTICS In addition to maintaining a simple workcenter master routing for each assembly, MPM can maintain labor standards by workcenter as well. These labor standards are used for labor and queue analysis, and may be used for standard labor computation. With Infotek's optional Labor Distribution module, your shop floor's performance to these standards can be tracked, and the actual-cost system afforded by MPM's lot tracking system can be extended to manufactured parts as well.

PROJECT PLANNING As part of its manufacturing project focus, MPM will provide your company with information based on whatever organization you choose for your production control department. Production control information—which can be recorded at data capture terminals placed on your shop floor—is sorted and presented according to project, individual controller assignment, due date, or simply by assembly number. This permits each shop floor controller to select the output format most appropriate to his or her particular production control task.

ORDER STATUS AND RECEIVING

The concept of information-sharing is particularly important to a company's purchasing department. Many other departments depend on purchasing personnel for information: accounting, for costing and accounts payable verification; material control, for order status information; production control, for information on shortage resolutions and outside processing or contract labor; and engineering, for information on discontinuation of vendors' standard parts and on pricing changes that may affect the company's product designs. MPM/3000 allows each of these departments to obtain purchasing information in the most effective way possible without additional purchasing department effort.

APPROVED VENDOR LIST MPM provides the purchasing and accounting departments with an approved vendor list. This vendor list contains standardized information about each vendor used by your company. Names, addresses, and telephone numbers of vendors, and names of vendor contacts are recorded by MPM to be published in easy-to-use book form for each of your buyers. In addition, the vendor's standard terms and shipping methods are kept to reduce data entry time and increase the accuracy of purchasing information.



PROJECT SEGREGATION Like all MPM/3000 features, the purchasing facility permits purchase orders to be issued to cover multiple projects. There is no restriction on the number of projects which can be charged to a single purchase order; each line item may have a different associated project. Purchasing reports can be obtained collectively for the entire company or individually by project, permitting a variety of organizations for the purchasing department.

Once entered into the system, purchase orders can be recalled by project, due date, or both. This means that purchasing expeditors can always concentrate on the most pressing



problems first. MPM's shortage list can be organized for the expediter as well as for the material controller; complete purchase order status is listed on the shortage report, as well as on the on-line displays. Searching among several reports, common to many other systems, is avoided.

OUTSIDE PROCESSING In concert with the shop floor control facility, MPM's purchasing system provides special tracking for outside processing. Outside processing purchase orders are tied to the shop orders requiring the process, permitting shop floor control personnel to monitor work orders even outside the plant. In addition, outside processing costs are automatically charged to the shop order, keeping MPM's actual cost system precise.



NOTES AND CLAUSES Special purchasing requirements can become a problem, particularly in a job shop or defense contracting environment. MPM/3000 provides a clause library, and space for notes on each individual purchase order line item. In addition, MPM will track tooling costs, tax, and freight as individual items, and provides for lot-pricing as well. This versatility makes it easy to use MPM's purchasing capabilities to the fullest so that purchasing information is complete and accurate.

SUMMARY AND FINANCIAL REPORTING Part of the task of an automated purchasing system is to assist the company's financial planning activities. MPM permits purchase order information to be obtained on a summary basis in a concise form for financial management. These purchasing commitment reports are useful for cash flow and billing projections, as well as for historical accounting projects and auditing.

ON-LINE INQUIRY MPM provides any authorized user with complete access to purchasing information in the form of a very versatile on-line display. The on-line facility permits the shop floor controller to determine which purchase orders have been placed to fill outside processing requirements, and provides purchasing and material control personnel with the complete purchasing and receiving status for every purchase order monitored by MPM. Tracing, preventing, and eliminating shortages is simple with MPM's on-line facilities.

PLANNING

MPM's data-gathering and low-level reporting facilities are tied together by its planning capabilities. Project segregation is strongest at the planning level, permitting true project management of manufacturing tasks.

MANUFACTURING ORDER ENTRY

The planning process begins with the master production schedule. Each project that MPM is to manage is described by planning personnel on the master production schedule. Each schedule item for a project can be treated separately, or combined with other items within that project to provide simultaneous or sequential deliveries of the company's products depending on contractual requirements. The master production schedule is the key input document for MPM's planning process.

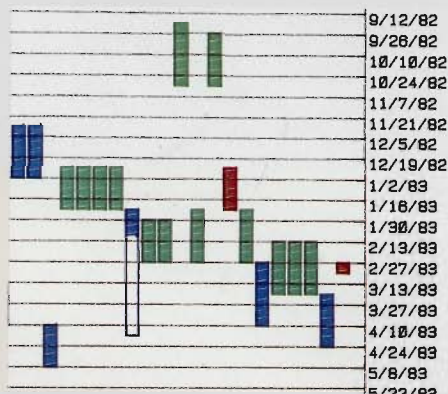


THE PRODUCTION PLAN MPM

analyzes your master production schedule to create a detailed production plan. This plan forms the basis for all of MPM's planning functions, and for all of the automatic aids MPM provides to smooth the production management task at all levels within the manufacturing organization. In addition, the production plan becomes the major status reporting vehicle, providing middle management with maximum project visibility in a compact and concise form. Throughout the life of an MPM project, this production plan becomes familiar to every department in the company. Work orders, shortages, inventory levels, and percent complete type status information is displayed on the production plan.

STATUS REPORTING MPM provides a wide range of analyses to various levels of management. Most of these analyses are presented in graphic form. The most detailed of these reports is the indented bar chart, usually run by the production control team. This document provides a picture of the completion status of the manufacturing project in graphic form, using filled-in bars for each assembly. By presenting this information in graphic form, MPM permits your manufacturing management to assess the impact of any individual change in status upon the plan as a whole.

MPM also provides line-of-balance type charts for tracking each project, and labor forecasts for each department or production controller, based on the routing or labor standard.



At the highest level, MPM furnishes a single-sheet summary of project completion status. This report simply supplies a line item completion count, in planned versus actual form, so that top management can see at a glance any potentially troublesome projects or departments.

PARTS HISTORY One of the functions of an automated inventory control system is to provide an auditable transaction history. In practice, an on-line parts history facility is used for far more than to provide an audit trail: a generalized parts history may be used for determining bill of material accuracy, scrap rates, and a host of other information usually determined by marginally-educated guesswork. Using MPM/3000's on-line part history, (maintained for as long as the system administrator requires it) stockroom and inventory control personnel can solve problems as they arise, rather than at some undetermined future time. The part history records and displays—on line—material receipts from purchasing and receiving, receiving inspection transactions, stock issues and returns, and material transfers. The history is maintained as a by-product of MPM's other operations and requires no special effort on the part of busy stockroom or material control personnel.

OPERATIONS

One of the key concerns of any company beginning to automate its manufacturing management system is that of taking on a new organization in the form of a data processing department, requiring new skills and presenting new management problems. MPM is designed to minimize the requirement for skilled data processing personnel and to provide its users with a maximum of flexibility and control over the system's operation. The key person in the installation and operation of MPM is in fact a manufacturing person: the system administrator.

CUSTOMIZABLE REPORTS MPM and EDS both utilize Infotek's flexible and powerful report writer, PRW/3000. Virtually every report in the system's extensive repertoire can be customized without any programming assistance. Changes in specialized documents such as shop orders can usually be made easily by manufacturing personnel with minimal data processing experience.



LASER PRINTER SUPPORT MPM and EDS, through PRW/3000, are designed to take full advantage of the features provided by the HP2680A Laser Printer. This is used to supply customized shop order and other forms, and may be used to provide

MIL-STD-100 engineering documentation as well, *with no special programming or intervention*. If your print volume or specialized needs do not justify the purchase of a laser printer, you can choose to take advantage of Infotek Systems' Laser Print Service to provide special documentation or high-volume printing.

RELIABILITY AND SUPPORT

FEATURES MPM and EDS use data reliability features inherent in Hewlett-Packard's IMAGE data base management system. All transactions are logged to a special journal tape at your site, providing up-to-the-minute backup in case of a system malfunction. MPM is designed to be self-repairing and self-diagnosing where possible, alerting you to possible problems with the care and use of your system.

DATA CAPTURE MONITOR Because of the high volume of volatile and critical transactions entered through the Data Capture system, MPM furnishes a data capture monitor to assure the continued availability of this system. Using the monitor, any data capture terminal can be given any subset of functions in MPM's repertoire. Backup for failing terminals is instantaneous, and intercommunication between terminals guarantees that a problem detected at one terminal will be properly reacted to by all other terminals. Data capture terminal users are kept informed of system status via screen messages, and critical status messages are sent to the operator's console to be logged by the Hewlett-Packard MPE operating system.

SYSTEM SECURITY Security and functional isolation are critical to the integrity of any shared information system. MPM and EDS provide this security and isolation at three different levels.



First, the MPE operating system controls basic access to the system. The MPM system administrator can permit or deny access to all functions of the system via MPE.

Second, using MPM's screen-level security, the system administrator can restrict any user to any subset of functions in the system. Each user receives a forms profile which details which forms or screens he or she may access. Failed access attempts can optionally be logged at the system console.

Finally, the system administrator can provide field-level security for any screen and any user by manipulating the screens with Hewlett-Packard's V/3000 forms utility. Access can be restricted to only one or two fields on a very complex form. This is useful, for example, in permitting shop floor personnel to change the "remarks" field on the shop order form without changing any others.



SUPPORT

Selecting, installing, and successfully operating a manufacturing system is a complex task requiring coordination between the vendor, company management, and the departments which will use the system. Infotek Systems addresses this need with several services to help assure your company's success in its automation project.

INITIAL CONSULTING Before your company selects its system, Infotek Systems will assist you and your managers in its initial major steps. These include defining your objectives concisely, identifying the major problems your system is intended to address, and identifying key personnel to be involved in system selection and later implementation.

IMPLEMENTATION PLAN If you choose to implement MPM/3000, Infotek will assist your staff in preparing an *implementation plan*. This is a detailed document which defines the responsibilities of key personnel both within your organization and within Infotek Systems. Infotek will assist your personnel in carrying out their tasks related to the implementation of your newly automated system. Some of these tasks include modifying the paperwork paths within your organization, identifying sources and destinations of information, preparing for computer installation, and setting up training schedules for each department involved with the computer.



Your company and the assigned Infotek Manufacturing System Specialist will agree on a schedule for each of these tasks, and the resulting plan will be monitored jointly by Infotek and your company's management.

TRAINING Successful implementation of any system, manual or automated, requires that participants in the system be thoroughly trained in its use. This means not only understanding



what must be put into the system, but

being familiar with what may be gained from the system as well. Infotek documentation and training manuals are designed to provide both kinds of familiarity. Classroom training programs are available either at your company or at an Infotek training site, permitting training to take place with a minimum of interruption of your company's routine business. It is important, however, that your key personnel be available for training, and the implementation plan spells out these requirements in detail.

Infotek training covers not only manufacturing and engineering personnel, but data processing personnel as well. Supplementing Hewlett-Packard classes, Infotek Systems provides training in those

areas of system operation particularly critical to the functioning of an automated manufacturing system.

TELEPHONE AND ON-SITE CONSULTATION After the system has been installed, Infotek support continues with several services. Telephone consultation may be made available as part of the software support program. This service is offered primarily to manufacturing personnel, but serves operations as well. If you elect this service, an Infotek Manufacturing Systems Specialist will be assigned to your company. The specialist's responsibility will be to keep abreast of developments at your company which may affect your use of Infotek manufacturing solutions, and to provide telephone and on-site assistance as needed.



In addition to phone-in support, Infotek can provide on-site consultation by both manufacturing systems specialists and by data processing professionals as well. This service will be particularly useful to you as you expand your use of the computer system.



Infotek Systems

1400 NORTH BAXTER STREET • ANAHEIM, CALIFORNIA • (714) 956-9300 • TELEX 182283