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Wayne W. Wakeland
Portland State University, wakeland@pdx.edu

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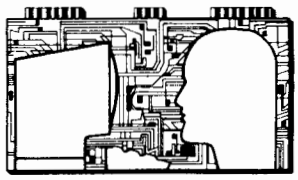


Microcomputer MRP In Three Months: Photon Kinetics

by Wayne Wakeland, CPIM*

"If we can just resolve these last three shortages and expedite the parts that are out being painted, I think we'll be able to make this week's shipment! I haven't had time to worry about next week, yet, but I don't think it looks too bad." Sound familiar? That's how it was, week after week, before Photon Kinetics installed an MRP system.

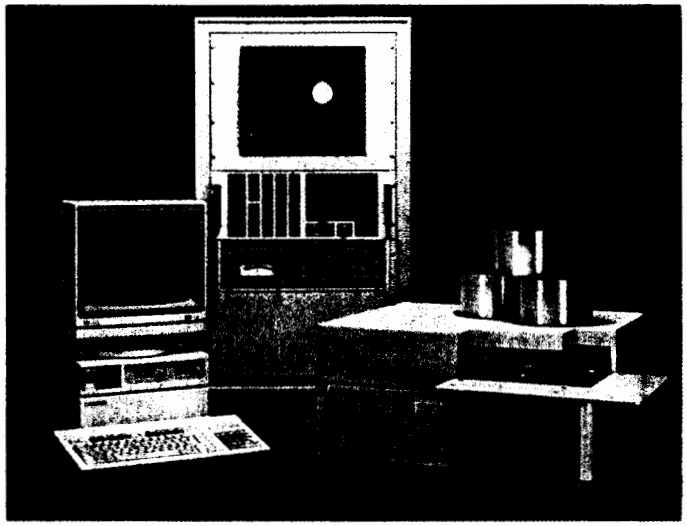
Photon Kinetics is a small, privately-held manufacturer of fiber optics test equipment, located in Beaverton, Oregon. About nine months prior to implementing MRP, the company had begun the process of bringing into production a major new product line. Several experienced assemblers and technicians had been hired, as well as two buyers and an inventory control person.

Parts were purchased in "batches" from a master parts list according to an informal production plan. A handwritten bill of material had been prepared, showing the various sub-assemblies. All parts had been assigned part numbers; stock shelves and bins had been set up. Kits were pulled using the handwritten bills of material. Scheduling was done manually by the production manager, based on the informal production plan.

The product contained approximately 900 parts, including 60 subassemblies, and a total of 2,300 bill of material links. There were about 800 open purchase order line items. Leadtimes for purchased parts varied from a few weeks to six months. At any given time, there were approximately 30 jobs in process out on the production floor.

Purchasing spent virtually all of its time expediting and trying to find parts needed, yesterday. The production manager made almost daily trips to various vendors rounding up shortage material. Scheduling jobs out on the floor and deciding what to start next was almost impossible. As one might expect–output was way behind schedule.

The company was able to solve most of its manufacturing problems in just a few months. Not only did they get back on schedule, they also brought their inventories under control and were able to establish and maintain valid priorities in Production and Purchasing. The solution was to install a microcomputer-based MRP system.



Trying to control the manufacturing of fiber optic test equipment, and also bring in a new product line can prove trying. Especially when the product contains 900 parts, 2,300 bill of material links, 800 purchase order line items and approximately 30 jobs in process out on the production floor. The solution... implement a microcomputer-based MRP system.

Implementing Solutions

The hardware used to implement the system was an IBM PC/XT with 320K RAM and a 10MB hard disk. The software, purchased from Eastmann Microsystems in West Bountiful, Utah, was designed for the micro and came with the following modules:

- Item master and stock status
- Bills of material
- Master schedule
- MRP
- Capacity planning
- Shop floor control and pick list
- Purchase order control
- Costing

Each of these modules is menu-driven using function keys. New users could be trained in a matter of weeks, and reports displayed on the screen or printed. The MRP run regenerates requirements for all parts, and MRP exception reports may be printed in their entirety or by individual part numbers or message-types.

Implementation started on the day the software arrived. It took about an hour to load the programs into the computer. Data entry began that same day.

Continued

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WEEK 1:

- Enter part numbers and leadtimes.
- Put "stock status" cards in each stock bin.
- Develop list of "floorstock items."

WEEK 2:

- Enter bills of material for manufactured parts (exclude floorstock from bills).
- Enter open purchase order items.

WEEK 3:

- Enter on-hand balances and shortages to production.

WEEK 4:

- Enter work-in-process
- Enter planning bills and master schedule.
- Enter spares forecast and safety stock.
- Run MRP for the first time.

WEEK 5:

- Respond to action messages, fix problems, etc.
- Start pulling kits using system.

WEEK 6:

- Document procedures as activities are carried out.
- Set up "two-bin" system for replenishing floorstock (using the MRP system).

WEEK 7:

- Begin cycle-counting daily.
- Begin auditing bills, PO's, WIP, MPS regularly.

Most of these activities were done by inventory control with help from a temporary employee hired to enter data, count stock, etc. Production provided the information on floorstock, shortages, and work-in-process.

Inventory control also loaded the purchasing data because purchasing was too busy expediting to help much with the implementation.

The planning bills, master schedule, spares forecast, and safety stock were prepared and loaded by the master scheduler. In order to master schedule effectively, a two-level approach was employed. Final assembly bills were used for the first four months, and modular planning bills were used for the time period from five to 14 months in the future. A total of 50 master schedule entries were required.

Philosophy And Use

Initially, MRP was run every Monday morning. It took the computer 35 minutes to process the 800 parts. MRP exception reports for manufactured parts were given directly to the production manager. Purchased part exception reports were given directly to the buyers. Running MRP more often did not seem necessary.

However, within a few weeks, it became apparent that shortage expediting was not receiving the immediate attention it demanded. Consequently, the procedure was changed.

MRP is now run twice a week. The first run is done on Friday afternoon after the receiving for the week has been completed. MRP exception reports are requested Monday morning for all parts that require expediting. The second run is usually done on Tuesday, after all the purchasing updates are entered from the previous week. After this second run, another set of exception reports is requested, but this time the focus is on parts that need to be purchased rather than expedited.

Production uses the MRP exception reports to maintain valid due dates on open work orders and to decide when to release new work orders. Prior to releasing new work orders, production screens them for availability of parts. Updated dispatch lists are requested daily in order to maintain valid priorities on the production floor.

Stockroom access is not controlled via locked doors. Anyone who needs a part takes the part and fills out a stock requisition indicating name, date, part number, quantity, and what the part was needed for.

Procedures for inventory control have been developed and documented, and are used on a day-to-day basis. The procedures deal with both routine activities and special situations.

Routine inventory control includes activities such as receiving, pulling kits, processing stock requisitions, cycle-counting, and shipping. Examples of special procedures include sending parts out for repair, sending customer-supplied material to a vendor, and processing engineering changes.

Special procedures must be followed carefully in order to avoid excess "MRP nervousness." For instance, if an item is sent out for repair without loading a supply order to show when it will come back, then purchasing will be triggered to order a replacement. In this case, when the item returns from being repaired, it would be an unplanned receipt. MRP would then tell purchasing to cancel or reschedule the order they just placed.

Having Valid Priorities

The main benefit of installing the MRP system was the establishment of valid priorities–both in Production and Purchasing. By having valid priorities, shortages were reduced within two months from dozens of parts per week to only one or two parts per week. The percentage of past due work orders dropped from 70 percent to 15 percent.

Inventory record accuracy improved from 75 percent when cycle-counting began, to 96 percent two months later. Initial audits of the accuracy of the bills of material, work-in-process, open purchase orders, and the master schedule showed them all to be 95-100 percent accurate.

Approximately 30 percent of the purchased parts are triggered for review each week by MRP. Many of these are either "excess" or "order-early" conditions that are minor and can be ignored unless the part is very expensive. The number of parts that require purchasing attention in a given week has been averaging 100 to 200 parts. For most of these parts, purchasing has time to place orders at the vendor's stated leadtime. However, there are still a number of "surprise" parts that look fine one week, but need attention the next. Sometimes the cause of the surprise is a rejected part. Sometimes it is due to human error. The goal, of course, is to minimize errors and maximize vendor quality.

The company recently put a second major new product

line into production on a very tight time schedule, using the MRP system to control purchasing and scheduling. About 800 new parts were added, as well as 1,800 additional bill of material links, 100 new MPS entries, 600 additional open purchase order line items, and 30 additional work orders in process. MRP regeneration time doubled. The new product introduction went extremely well. One of the reasons for this success was the use of the MRP system to control priorities from the very beginning.

In order to improve access to the system, the company installed a four-station, local-area network. The performance of the network is excellent: Each user "appears" to have his own dedicated system.

One unexpected benefit of the network is that MRP regeneration time has been cut in half (back to 35 minutes). Also, spooling of long reports has increased the percentage of time that workstations are available for data entry and research. □

About The Author

Wayne Wakeland, CPIM*, is the Materials and Information Systems Manager at Photon Kinetics in Beaverton, Oregon. His responsibilities include purchasing, inventory control, and master scheduling. He also coordinates information systems and facilities. Previously, Wayne held several positions in materials management at Tektronix in Beaverton.

Wayne has a PhD. in Systems Science from Portland State University, Oregon, and an M.E. and B.S. in Engineering from Harvey Mudd College, Claremont, CA. The author wishes to acknowledge the expert assistance of Nadine Skjeraa and Mary Roberts.