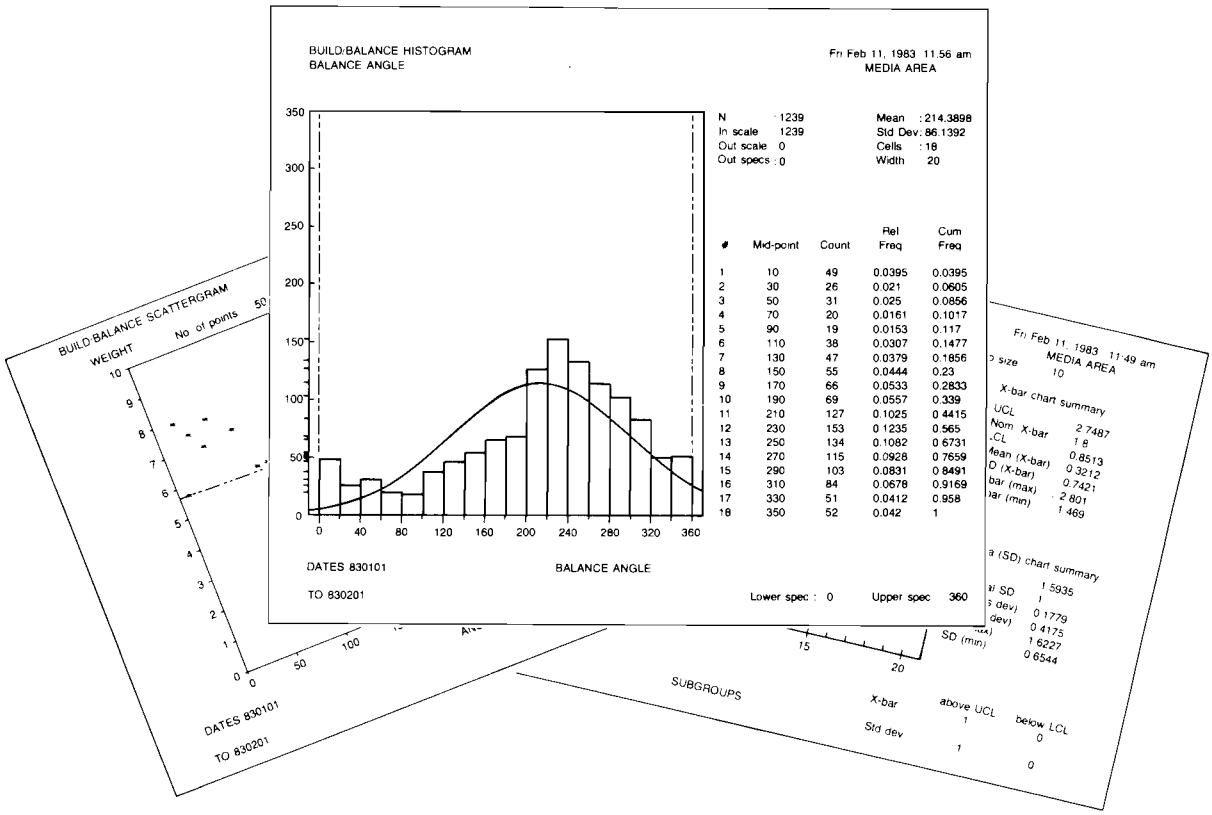
HP Quality Decision Management/1000

HEWLETT PACKARD

Manufacturing Productivity Division
Software for HP 1000 Computer Systems



HP Quality Decision Management/1000 is an applications software package for analyzing manufacturing processes and product quality. The package provides control charts and Pareto charts that help production and quality assurance engineers identify and prioritize statistically significant product defects and manufacturing process problems. Engineering departments can use data collected on-line to generate scattergrams, histograms, and tabular reports. These outputs identify the manufacturing process causes of product quality deviations.

A menu and prompt/response approach allows engineers without programming experience to configure data collection transactions, specify report and graph formats, archive data, and perform system maintenance functions. Extensive "hooks" for user programs provide additional data input, output, and analysis flexibility.

Features

- Powerful report/graph writer for precise selection and analysis of collected data.
- Menu or prompt/response driven user interface for easy configuration, modification and system use by non-programmers.
- Controlled access via password assignments.
- Pre-defined data base for simplifying system design efforts.
- User-defined data collection prompts for system customization to specific application requirements.
- Extensive user-defined data validation for parametric (numerical) and attribute (descriptive) data.
- Data collection supported from CRTs and HP Desktop Computers.

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The following example illustrates the distinction between the three types of data. Assume a spray painting operation. A workorder, A234-22, for five 0142-2009 parts is being painted by Joe Worker at spray station 2. The individual parts have unique serial numbers: 1, 2, 3, 4, and 5. The parts are spray painted different colors and then placed in a 500-degree F drying oven for 20 minutes.

User Configurable Prompt		Operator Response
Transaction Data (identifies the transaction)		
Workstation	?	: Spray station 2
Part number	?	: 0142-2009
Operation	?	: Paint
Operator	?	: Joe Worker
Unit ID No.	?	: 1,2,3,4,5
Workorder No.	?	: A234-22
Process Common Data (all parts)		
Drying temperature	?	500 degrees F
Drying time	?	20 minutes

Unit Specific Data (unique to unit ID number)

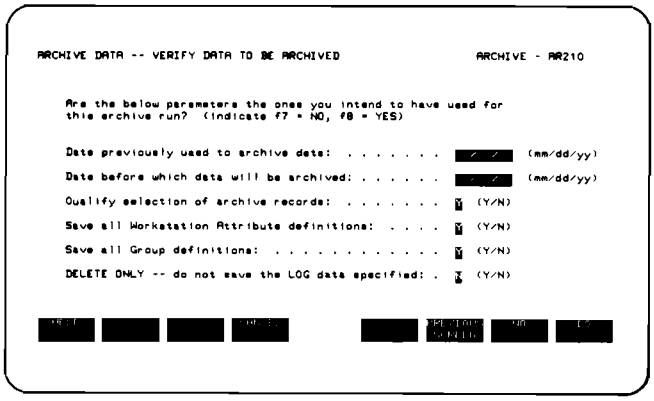
Unit 1	Color	?	Blue
Unit 2	Color	?	Red
Unit 3	Color	?	Green
Unit 4	Color	?	Yellow
Unit 5	Color	?	Vermillion

This example includes just one workstation. An actual application would have multiple workstations, such as Receiving/Incoming Inspection, Final Test, Fabrication, Assembly, etc.

Using HP Quality Decision Management/1000

This matrix indicates some of the key application areas for HP Quality Decision Management/1000 and the product features and benefits of each area.

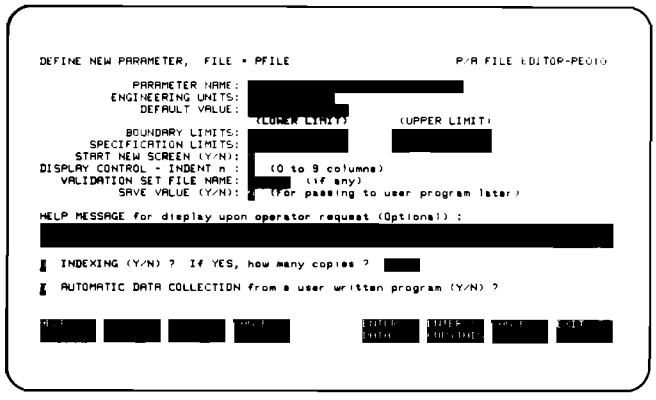
APPLICATION AREA	FEATURES	BENEFITS
Incoming Inspection	Displays inspection instructions, generates vendor rating reports, control charts of defect rates, vendor quality.	Prioritize vendors, reduce number of vendors, and increase vendor responsiveness to your quality demands.
Product Test: Electronic, electro-mechanical, final, in-process, component	Manual and automatic on-line data collection, test procedure display. Provides statistical monitoring of defect levels and decision support graphics and reports.	■ Optimize test process, schedule calibrations, determine minimum number of readings necessary, identify tester vs product defects. ■ Reaction to statistically significant defect rates. ■ Production defect data available for correlation to manufacturing process data, identification of causes of quality problems.
History Tracking/Audit Trail	On-line data collection of pertinent traceability facts, archived but available for recall to satisfy regulatory requirements.	■ Respond to regulatory requirements.
Statistical process/product monitoring	On-line data collection from incoming inspection, manufacturing process, and test areas. Statistical graphs/reports to monitor manufacturing process quality and product defect rates. Correlation between product defect data and defect cause data allows identification of specific defect causes: ■ poor workmanship ■ faulty material ■ weak manufacturing process execution ■ wrong manufacturing process definition ■ faulty product design	■ High, predictable yields ■ Lower production costs ■ Reduced rework costs ■ Lower scrap levels ■ Reduced labor content ■ Accurate vendor quality feedback-correlation. ■ Reduced cycle times and inventory levels



- **Device Status**: Provides "snapshot" of who is using the system.
- **Command Interpreter**: Allows access to operating system for system maintenance, data base maintenance, or direct use of HP 1000 utilities and capabilities.
- **Pfile/Afile Definition**: Defines validation criteria and prompts for parameters and attributes in the Process Common and Unit Specific portions of the data collection transaction.

Parametric Data
Units: degrees F, lbs, cm, etc.
Default value
Upper and lower bounds
Upper and lower specifications
Validation set (user-defined table lookup)
160-character help message

Attribute Data
Format
Default value
Validation set (user-defined table lookup)
160-character help message



- **Pfile/Afile Dictionary**: Lists names of parameters and attributes in any PFILE or AFILE.
- **Data-base Maintenance**: access to Image/1000-II data base subsystem utilities.

USER EXTENSIONS, or hooks, for extending system capabilities to precisely meet user requirements.

Data Input Auto Schedule. Parametric and attribute data collected in both manual and automatic transactions can trigger user-written programs. These user-written programs can be used in several ways:

- Data can be collected by a program, thus eliminating the need for manual keyboard entry.
- Both manual and automatic transactions can start a program that manipulates or reduces raw data. For example, an alarm capability can be implemented by passing data to a program that compares the data to a limit. Exceeding the limit could generate an alarm.
- Data can be pre-processed by having a program calculate summary statistics of certain parameters prior to being added to the data base. This reduces the number of records that have to be searched to generate a report.
- Data can be diverted before it is added to the application data base. Data of interest to other MIS/EDP departments, such as WIP, labor vouchering and production sequence data can be "stripped out" of transactions for transfer to another MIS/EDP system.

Other Front Ends. Any device with file transfer and data formatting ability that can be interfaced to an HP 1000 computer is a potential system front end data collection device. The system validates the transaction prior to processing the data.

User-defined Output. The Report Output function generates a specially formatted data file, according to user-specified search criteria and analysis. A graphing module is auto-scheduled for creation of the graphical output. Two programmatic extensions are:

- Data file. Instead of graphing the data file, it can be given a name. Specialized analysis and display programs then can be written to manipulate it.
- Graphing user-specified data files. If file data is properly formatted, the graphing module will create a graph of data from the user's file.

Specifications

Number of devices:

CRT, Desktop Computer
Maximum: 79 MUX, card cage constrained.

NOTE: Concurrent activity is bounded by transaction frequency.

Memory Requirements:

A600, A700: 2 megabytes
A900: 3 megabytes

Performance:

Report/graph typical search response time:
Direct search: 1 to 10 min
Relational search: minimum 10 min

NOTE: Once a search has been completed, the time required for actual hard copy graph generation is a function of the speed of the graphics device and the volume of data.

7. Interface cards:
   a. One 12009A HP-IB card for plotter interface

      AND/OR

   b. One Multiplexer Interface for every 8 devices
      - 12040B Multiplexer card

      AND/OR

   c. One Factory Data Link
      - One 12092A Data Link Master
      - 91732A Multipoint/Data Link software
      - One 3074A/M Data Link adaptor
      - Appropriate Data Link connection accessories (Refer to the Data Link Manager's Manual, 91730-90006, for details.)
8. Magnetic Tape Subsystem, for data base backup and logging. Must specify cabinet option, selected from the following:
   a. 7914TD Opt 240 which combines a 7914R disc with a 7970E tape unit in one cabinet

      OR

   b. 7971A with appropriate option

      OR

   c. 7970E with appropriate option
9. Assorted manual and automatic data collection and output devices. See section on Data Input/Output Devices.

Data Input/Output Devices

HP Quality Decision Management/1000 supports a wide variety of input/output manual and automatic devices that are supported on the 8-channel Multiplexer Card, the Data Link, or both. The following tables summarize the offering.

BLOCK MODE CRTs

PRODUCT NUMBER	MUX SUPPORT	DATA LINK SUPPORT
2382A*	YES	NO
2622A	YES	NO
2623A	YES	NO
2624B	YES	YES
2626A	YES	YES
2627A	YES	NO
2647A/48A	YES	NO

** NOTE: The 2382A terminal is not EMC qualified.*

Optional bar code reader for 262X CRT terminals is 92911A.

AUTOMATIC INPUT DEVICES

PRODUCT NUMBER	DATA LINK SUPPORT	92131A SUPPORT
9816/26/36	YES	YES*
9835	YES	REQUIRES USER PROGRAMS
9845	YES	REQUIRES USER PROGRAMS
SERIES 80	YES	REQUIRES USER PROGRAMS

**Desktop Subroutines written in Rev 2.0 BASIC.*
"B" revision 98628 data comm card required on desktops.

All CRTs provide tabular output display capabilities.

OUTPUT DEVICES

Graphical Softcopy Display	Graphical Hardcopy	Tabular Only Hardcopy
2623A	2623A OPT 050	2608S
2627A	2631G & 2647/8A	2623A OPT 050
2647A	7470A	2624B OPT 050**
2648A	9872C/T & 7580B/85B	2631B

***Data Link supported.*

Ordering Information

92131A HP Quality Decision Management/1000 Software

The 92131A product includes:

1. 92131A relocatable software package. Media option must be selected from the following:
   022: 7911/12/14 compatible cartridge tape
   051: 1600 bpi magnetic tape
2. HP Quality Decision Management/1000 User Reference Manual (92131-90001)
3. HP Quality Decision Management/1000 System Manager Manual (92131-90002)
4. HP Quality Decision Management/1000 Installation Guide (92131-90003)

92131M Right to Copy HP Quality Decision Management/1000 For Use on One Additional Computer System Without Right to Sub-license.

92131M Right to Copy product is available only to end-user customers who have purchased the 92131A product.

92131M consists of:

1. A license to make one copy of software purchased with 92131A for use on one additional computer system.
2. HP Quality Decision Management/1000 Manual Set as supplied with 92131A.
   a. User Reference Manual
   b. System Manager Manual
   c. Installation Guide