

We're Delivering a Whole New Line of Data Acquisition Systems



HEWLETT  PACKARD

Systems that build on experience

For more than 30 years, we at Hewlett-Packard have been contributing state of the art advances to the fields of measurement and instrumentation. For more than 9 years we've been building automatic measuring systems, including more than 700 computer-controlled instrumentation systems, now at work in research and development and industrial tasks like those shown here.



Oceanography

Data reduction at sea by HP computer systems is helping scientists of the Woods Hole Oceanographic Institution to confirm the validity of data on location. This reduces the possibility of unknowingly returning home with faulty or insufficient data. HP computer systems were selected for this application because HP computers are specifically designed to interface with instruments, operate reliably under adverse environmental conditions, meet power requirements for shipboard use, and are backed by comprehensive software support.

Airframe Stress Testing

HP computer systems are performing a variety of data acquisition tasks at General Dynamics in Fort Worth, Texas. The excellent noise immunity provided by HP's guarded, integrating analog-to-digital measurement subsystems is particularly valuable in the aircraft wing stress test application shown here. In combination, HP's guarding and integration techniques preserve the accuracy of millivolt level signals from strain gages and other low-level transducers even in the presence of electrical noise from heavy machinery.



Systems with the capabilities and growth potential to satisfy

Your best assurance of continuing use and value from any system is the capability available when you have the ability to grow with your needs. HP 9600 systems provide this assurance because they are totally modular.

- from 8K to 32K of computer memory.
- from 14 to 45 computer I/O channels.
- from the one-program-at-a-time simplicity of HP's Basic Compiler to the sophisticated multiprogrammability of HP's Real Time Executive.
- from standard hardware multiply/divide to special hardware for floating point calculations.
- from 10 to 1000 analog input channels per analog-to-digital subsystem.
- from dc to ac, resistance, frequency, and time interval measurements.

PROGRAMMING LANGUAGES: FORTRAN, ALGOL, HP Assembler

OPERATING SYSTEMS: Real Time Executive, Data Acquisition and Control Executive, and Basic Compiler

Up to 240 11/12 Bit
Digital Input/Output
and analog output
channels per
computer I/O channel



DIGITAL INPUT/OUTPUT AND ANALOG OUTPUT

262K words



2.5 Million Words
Interchangeable disc

MASS STORAGE



Integrating
DC, AC, Resistance
Up to 1000 channels

12 bits, sample rates
to 44,000 chan/sec, $\pm 10V$ fs,
up to 1056 inputs

Frequencies to 550 MHz,
intervals 100 ns to 10^9 sec

ANALOG-TO-DIGITAL MEASUREMENTS

2100A Computer
14 I/O Channels
8K to 32K x 16 bit memory
Dual-Channel DMA, assignable
to any I/O channel



SYSTEM CONTROL

y your needs

urchase, combined with the system's
lar, designed for expansion . . .

ontrol System to
Executive.
are for ultra-fast
tal measurement
surements

- from 10 channels per second to 100,000 channels per second.
- from 15 to 240 12-bit digital input/output and analog output channels per computer I/O channel.
- from 10 char/sec teleprinter to 356 line/min, 80-col line printer and 200 char/sec keyboard-display terminal.
- from punched tape to magnetic tape, disc memory, and mark-sense or punched cards.
- from local, dedicated systems to much larger distributed systems having terminals up to 10,000 feet away from the central computer.

ontrol System



7/9 Track
200/556/800/1600 cpi
12.5/25/37.5/45 ips

ORAGE



2155A I/O Extender
adds 31 I/O Channels

AND I/O EXTENSION



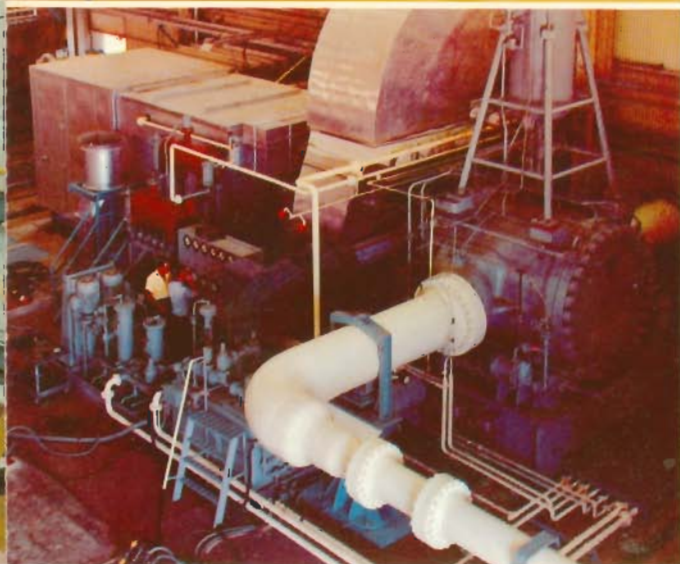
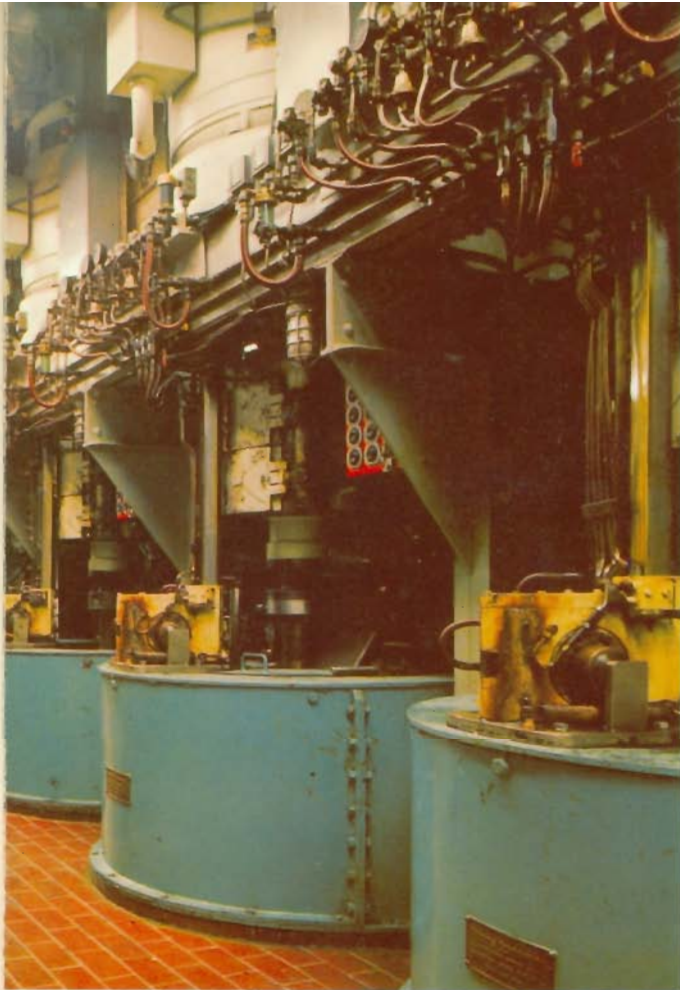
Reads
Punched cards
at 600 cards/min.

80 col
356 lines/min.

Reads punched tape
at 500 char/sec

Punches tape at
120 char/sec

OPERATOR COMMUNICATION, DATA LOGGING, AND DISPLAY



Sugar Refinery Process Control

At Redpath Sugar in Toronto, Canada, an HP computer system is on the job 24 hours a day, monitoring and controlling critical production points (such as the affination machines shown left). The system automatically adjusts throughput to eliminate surges that can occur with conventional controls. This keeps the plant running at more than 97% of maximum capacity around the clock, day after day.

Automobile Exhaust Emission Testing

Several manufacturers and testing services are using HP computer systems for analysis of automobile exhaust emissions. These computer systems provide programmed instructions to the operator, shown here driving the car during its test on a dynamometer. The systems automatically calibrate, average, and linearize the digitized analog outputs of the gas analyzer used to detect pollutants. The automatic test systems hold the test time to the duration of the test cycle itself, providing a test report as soon as the test cycle is completed.

Compressor Checkout

Automating checkout of huge natural gas compressors (right center in photo) with an HP computer system is helping Dresser Industries in Houston, Texas, to reduce test time and test costs. Very thorough testing of the complete turbine-driven compression system at the factory greatly reduces the potential of operating difficulties after the compressor is installed at the customer's site. This is particularly important when these compressors are installed, as they often are, in remote locations, such as California's Mojave Desert.

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