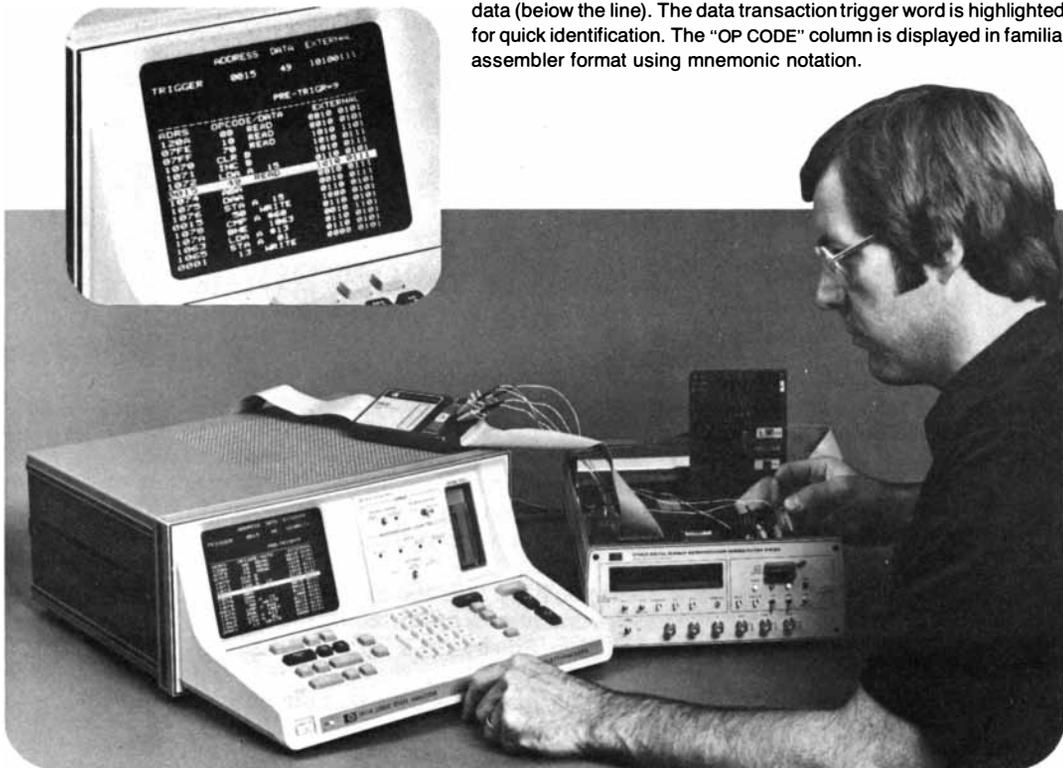


Triggering parameters entered through the keyboard are displayed in alphanumeric format (above the dashed line) along with the collected data (below the line). The data transaction trigger word is highlighted for quick identification. The "OP CODE" column is displayed in familiar assembler format using mnemonic notation.



Keyboard control lets you set the terms for tracking a microprocessor's activity—in its own mnemonic language.

Designed specifically for debugging and troubleshooting microprocessor systems of the 8080 and 6800 families, HP's new 1611A Logic State Analyzer lets you pinpoint virtually any event or sequence in the execution of a program; it directly measures execution time between two keyboard-selected program points; and it easily performs analyses within other parameters that have been difficult—if not impossible—to achieve in the past.

As new applications for microprocessor-based systems proliferate, troubleshooting and program debugging are tasks that confront systems designers with increasing frequency. The 1611A greatly speeds and simplifies these tasks. A keyboard-controlled logic state analyzer, itself microprocessor-based, the 1611A has a "personality module"—special circuitry and microprocessor probe—that dedicates it to a particular microprocessor family.

The 1611A's triggering capability and alphanumeric

CRT display let you look at nested loops, pinpoint I/O, ROM, or RAM activity, and find where a system went astray. You can limit the acquisition of data precisely to what interests you, and eliminate extraneous data. Furthermore, only the selected triggering parameters entered through the keyboard in either octal or hexadecimal format are displayed on the CRT—there is no need to look at a profusion of controls to determine test conditions.

Besides making the 1611A easy to use, its internal microprocessor permits the results of its measurements to be displayed in several formats. The contents of the address and data buses of the microprocessor system under test are captured in *real time*, and may be displayed in either octal or hexadecimal number base. The 1611A decodes the data bus contents into the mnemonic set of the microprocessor in the system under test, to provide a flow of information useful to the software writer who may not be familiar with octal or hexadecimal displays of his code. Or the display can be switched to an absolute format for step-by-step examination of program execution.

If you'd like a complete account of the 1611A's capabilities, write for our literature. The 1611A, configured for either 8080 or 6800 microprocessor-based systems, costs \$5000 (domestic U.S. price only). Personality modules for other microprocessor families will be available soon.

Hewlett-Packard offers for the first time (ever) full-power APL on a relatively small general purpose computer.

The recently introduced HP 3000 Series II computer, whose powerful data entry and data base management signaled a price/performance advance in data processing, now adds APL to its language repertoire, accompanied by a new CRT terminal especially designed to operate with APL.

The advantages of APL among computer languages are becoming increasingly apparent. APL is a general purpose programming language, rich in primitive operators and formal identities, that uses powerful symbols in shorthand fashion to define complete functions in very few statements or characters.

APL offers highly beneficial shortcuts to data manipulation in scientific and engineering applications, where it can bring to bear its ability to express complex calculations in a concise way, and to operate on groups of numbers as easily as on single ones. Because APL normally operates directly on data without special commands, the novice can do useful work at once, freed from the necessity of learning complicated procedures that stymie nonspecialists.

By making an unabridged and enriched APL available on a relatively small computer, HP fills a price/performance gap that has frustrated potential APL users in the past: the full power of APL was available only on a massive computer or through costly service bureau time—or one settled for the limited APL capability of a “portable” computer.

Hewlett-Packard’s enriched version of the language, APL/3000, actually broadens APL’s capability to include the handling of large data bases, file manipulation, and production of reports in desired formats—placing APL squarely in the decision-maker’s realm. And since the 3000 Series II computer treats APL/3000 as a standard language subsystem, any of its five other programming languages (FORTRAN, COBOL, RPG, BASIC, and SPL) can be used concurrently with APL in batch or interactive modes on up to 12 terminals.

Hewlett-Packard has developed a CRT terminal especially designed to handle APL symbols: the new HP 2641. Its versatile keyboard carries full APL and



standard ASCII character sets. Additional special function keys can be programmed to speed data entry and reduce opportunities for error. Optional minicartridge tape transports provide storage that allows the user to prepare data off-line, transmit it rapidly to the computer in batch, and keep or transfer development programs on the pocket-sized cartridges.

APL/3000 software and firmware can be purchased outright for \$15,000. The 2641 terminal with 4 Kbytes of memory costs \$4100; with tape transports it costs \$5700. The 3000 Series II computer system, which makes it all possible, costs from \$2350 to \$7500 per month on a five-year payout lease, or \$110,000 to \$350,000 by direct purchase (domestic U.S. prices only, maintenance not included). We’d like to tell you more.



1503 Page Mill Road, Palo Alto, California 94304

For assistance call: Washington (301) 948-6370, Chicago (312) 677-0400, Atlanta (404) 434-4000, Los Angeles (213) 877-1282.

Mail to: Hewlett-Packard, 1503 Page Mill Road, Palo Alto, CA 94304. Please send me further information on

- HP 1611A logic state analyzer
- HP 3000 Series II computer system and APL/3000

Name _____
 Company _____
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