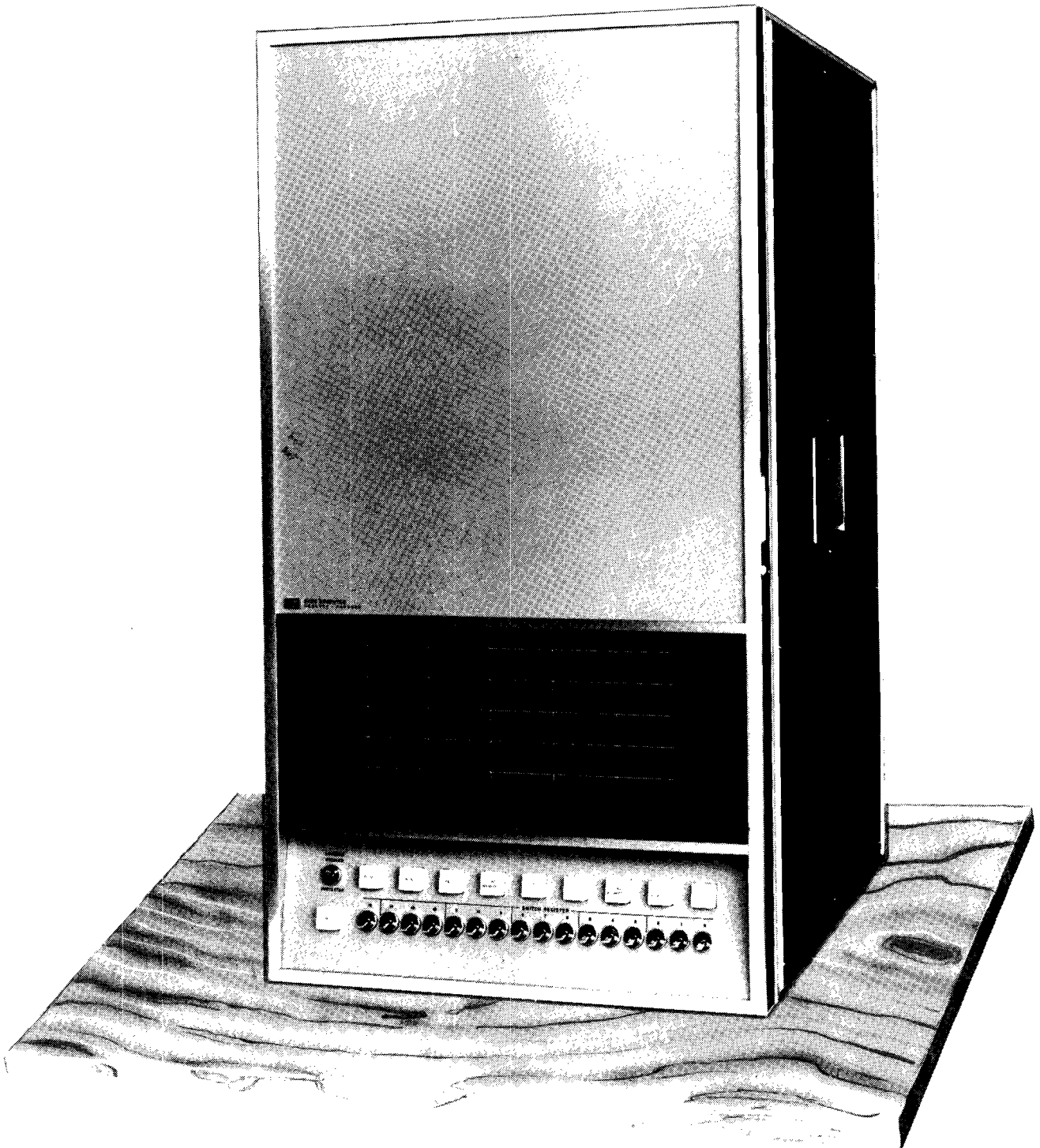


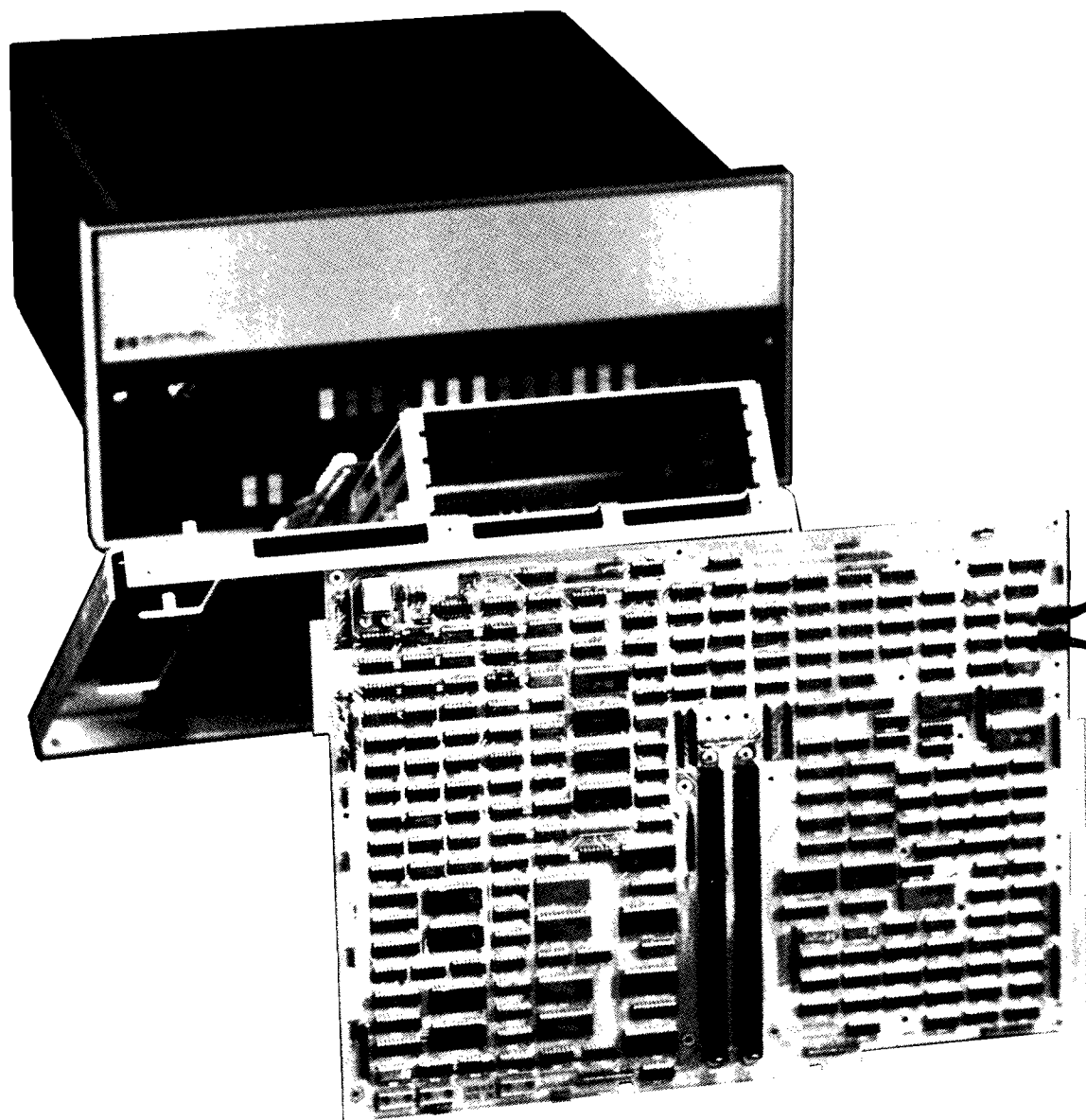
Is this Hewlett-Packard's first "Minicomputer on a Board"?



. . . . turn the page to find out.

NO!

...this is!



INTRODUCING...

2108 K Miniprocessor

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DATA SYSTEMS NEWSLETTER

SPECIAL EDITION

HEWLETT  PACKARD



ANNOUNCING THE 21MX-K SERIES COMPONENT PROCESSORS

By: *Bob Frankenberg*

HP announces its entry into the computer-on-a-board market with two processors in one and a host of companion component products. The 2108K Miniprocessor priced at \$1475 is a very high speed computer on a board intended for use in analysis, test, scientific, arithmetic, and data communications applications. When the new 2108K is combined with a new 12728E Instruction Set ROM it becomes a 21MX emulator priced at \$1825 complete with all 21MX instructions and support for all 21MX computer series products including languages, operating systems, I/O, and peripherals. This processor is intended for use in OEM system products that require full minicomputer system capabilities to create a turn key system. Applications include distributed processing, image analysis, telephone switching, lab and data acquisition systems. Other K Series products include the 12728A 8 Slot Card Cage at \$475, the 12728B 18 Slot Card Cage at \$625, and the 12728C Front Panel Assembly at \$325. These products provide the OEM with backplanes, power distribution, and a control panel if required. The 12728D Documentation Package at \$150 provides all schematics, theory of operation, assembly diagrams and instructions, parts lists, and power supply requirements for the 21MX-K Series.

21MX-K Series Components are the actual boards and accessory products used in 21MX M-Series processors. When we set out to design the K Series product offering, we thought that what we were doing was simply breaking down the 21MX and offering the components for sale. What we discovered, on closer inspection, was that we were really offering a whole new capability to the market. When viewed as a stand-alone processor, the 21MX microprocessor is a very fast board computer — faster than virtually all competitive board computer products. Its level of sophistication in terms of instruction set, I/O, bus structure, and other architectural features is far beyond the reach of today's chip microcomputers and it's these *limited* chip sets that competitors are putting on their board processors. When we looked at the competition for this product we saw a very large gap between LSI microcomputers on a board and the low end of the minicomputer market, a gap filled very nicely by the 2108K Miniprocessor.

When you look at the 2108K with the optional 21MX instruction set you see a computer-on-a-board that is fully compatible with a broad minicomputer product line. We aren't just *claiming* it's compatible, it truly *is* compatible because the same boards are used in this configuration as in the 21MX

family. This, too, is unique as most other board computers are only subset compatible and lack full software, operating system, or peripheral support. Even when the instruction sets are compatible, the micros are usually significantly slower than larger, more expensive members of the product line. Here again we found a competitive gap nicely filled by this combination of component products.

Competitively, HP commands an enviable position with 21MX-K Series Component Products. We occupy the high performance spectrum of the board microprocessor market almost exclusively. All of our competitors in this market offer bipolar chip sets with very restricted instruction sets, virtually no software or I/O, and a tremendous design effort to create a usable end product. Because of our higher prices we are not competitive in applications where high performance, high level software, peripherals, or I/O support are not critical.

As a component minicomputer we have much stronger competitors, but none who have the broad range of software, peripherals, interfaces, and processor accessories that one can pick from the 21MX product line. *LeRoy Nelson's* articles will acquaint you with these competitors as well as how to order K Series Component Products.

Orrin Mahoney's articles on customer qualification, contract changes, support and warranty will serve to acquaint you with the changes necessary for Component Product selling.

Also included in this issue is an article detailing important K Series features, as well as a look at K Series applications by *Cle Riggins*.

Announcement Plans

The 21MX-K Series will be shown for the first time at NCC in New York City. We'll have a demo package showing interesting features of the 21MX-K Series for any of your customers who'll be attending. *Jack Howard*, On-Line Factory Support Engineer for the 21MX-K Series, has put together a demo with cold load from a distributed system control and keyboard replacement of the front panel. The delivery is 2 weeks ARO. Another finished product from DSD.



K SERIES FEATURES — THE MINI-PROCESSOR WITH A SPLIT PERSONALITY

By: *Bob Frankenberg*

OEM's who face the arduous task of designing systems from components can now get a great deal of help from you and the new 21MX-K Series. For those OEM's who need more

performance than any other computer-on-a-board offers, there's the 2108K, a 24 bit processor with a blazing 325 nanosecond instruction execution time, 210 instructions, 16 general purpose registers, and instruction pipelining. On the other hand, for those OEM's who need support for a significant system's design instead of a pile of IC's or stand-alone board that doesn't fit into a supported systems environment, the addition of a set of Instruction ROM's (12728E) transforms the 2108K into a fully compatible member of the 21MX Computer Series complete with a full line of peripherals, processor options, memory systems, high level languages, and operating systems. For either OEM or the OEM who needs both, we offer HP support, HP quality, field proven reliability, common spares, low discountable prices, and much, much more. Let's take a more detailed look at the most important features of each processor level and at some of the interesting things they have in common.

WHAT ARE THE KEY FEATURES?

The hyperfast 2108K, with an instruction execution time of 325 NS (actually 324.3NS, but who's counting), 210 instructions, 16 general purpose registers, an 8 bit loop control counter, and 8 conditional branch flags, is the fastest systems-oriented microprocessor on the market. Further speed advantage is achieved by fetching the next instruction from memory while the fetch-current-instruction is being executed. This pipelining (or instruction prefetch) results in an effective doubling of processor performance. Pipelining is carried one step further by overlapping processor operations with main memory operations permitting the processor to continue unless another memory reference operation is encountered. Up to 6 of the 210 instructions can be combined and executed in one 325 NS instruction cycle. These instructions are grouped into 8 major categories: operation (15), special (32), ALU-Arithmetic (32), Conditional Jumps (32), Immediate modifier (3), Store-Destination (32), Reverse Jump Sense (32), and S-Bus - Source (32). The richness of this instruction set yields incredible flexibility for the systems programmer. He can design programs ranging from fast, simple I/O sequences to extremely complex mathematical algorithms for data accumulation, reduction, and control.

An important feature of the 2108K Miniprocessor architecture is its 3 MW transfer rate central bus — the S-Bus. This central bus fans out to subsidiary buses for I/O data, I/O address, and memory addresses. Bus transfers are controlled directly by the programmer for maximum flexibility. The I/O bus is a 16 bit parallel data bus with separate controls, vectored priority interrupt structure with programmable bulk memory vectors, and programmable interrupt rate testing on two levels for up to 64 devices. This powerful I/O structure frees the system designer from the need to define and build a custom I/O structure unlike many competitive computers on a board.

Local memory for the 2108K Miniprocessor includes both READ/WRITE and ROM. ROM (2K word UCS and 512 word WCS) has a 75NS access time, while R/W memory (256 word WCS) has a 110NS access time. Either memory type can be used with the 325NS cycle time. These local memories are designed for control program implementation and, as such, do not have the capability to modify themselves directly. Local R/W memory must be loaded from another source such as a program development 21MX, main memory, or a peripheral. The first configuration is only useful for debugging purposes but the other two can be used to advantage in an application with a dynamic overlay scheme. The second form

of memory for a 2108K is main memory which can be either a 2102A memory system or customer supplied. Unlike the local memory, main memory can be modified under program control. Access for up to 32K words of main memory is standard.

There are a number of other interesting features available to the system builder. The power-fail sequencer is programmable yielding an auto-load or auto-save capability. Loader ROM's on the processor board are a non-volatile bulk memory initialization storage area which can be directly accessed under program control. The connector for the front panel of the 21MX contains direct control and data lines, so it can be used to implement custom control panels under program control of the processor, dramatically decreasing system control panel costs. This feature can also be used to directly control an OEM's hardware at very high speeds. As a further aid to the system builder, the 21MX instruction set listings in the 21MX Microprogramming Guide serve as a source of macroinstructions for such high level functions as multiply, divide, floating point, etc., or as sample programs for control panel, bulk memory initialization, power-fail auto restart.

As the 2108K is a component, it does not support software generation in a stand-alone configuration. It requires a 21MX development system for program preparation. Software support for the 2108K includes an assembler, debug editor and PROM generation/verification routines. There are several software aids in the contributed library that OEMs will find useful including an Activity Profile Generator for performance testing macro level software. A complete manual including schematics, parts breakdown, assembly diagrams and theory of operation is also available by ordering the 12728D Documentation Package.

When the 2108K processor is transformed into a 21MX compatible processor by adding a 12728E Instruction Set ROM, the systems builder obtains many new benefits without losing microcode access to the speedy 2108K processor. This immediately provides access to all of HP's languages, operating systems, diagnostics, peripherals, and processor options. Taking the software first he has: FORTRAN IV, BASIC, ALGOL, ASSEMBLY, and Microassembly languages; BCS, DOS, RTE-B, RTE-C, RTE-II, RTE-III, and Access operating systems with a multitude of drivers and utilities; IMAGE, QUERY, TCS, HPIB and EDITOR Applications packages. He also gains access to all 21XX peripherals, a wide range of instruments via the new HP-IB interface, and a full range of GPIO cards. As this level of K Series processor is compatible with the 21MX Computer Series, an OEM can also use all 21MX accessories like DCPC, Memory Protect, Firmware packages, DMS, and 2102A memory. From this broad base of standard component products a system designer can pick only what he needs to implement anything from a simple controller to an expanded memory computer with a sophisticated operating system. If you contrast this to competitors' component computer offerings, they pale by comparison.

There's a totally new feature in this level of K series processor not available in the 21MX — Automatic Cold Load (ACL). Automatic Cold Load, provides for a custom system initialization sequence. When the processor is powered-up and the standard Front Panel Assembly is not connected, control will be passed to a user-written ROM program. The ROM program can "cold load" main memory, perform an initialization sequence particular to your application, and monitor your system control panel.

WHAT DO THESE FEATURES DO FOR THE CUSTOMER?

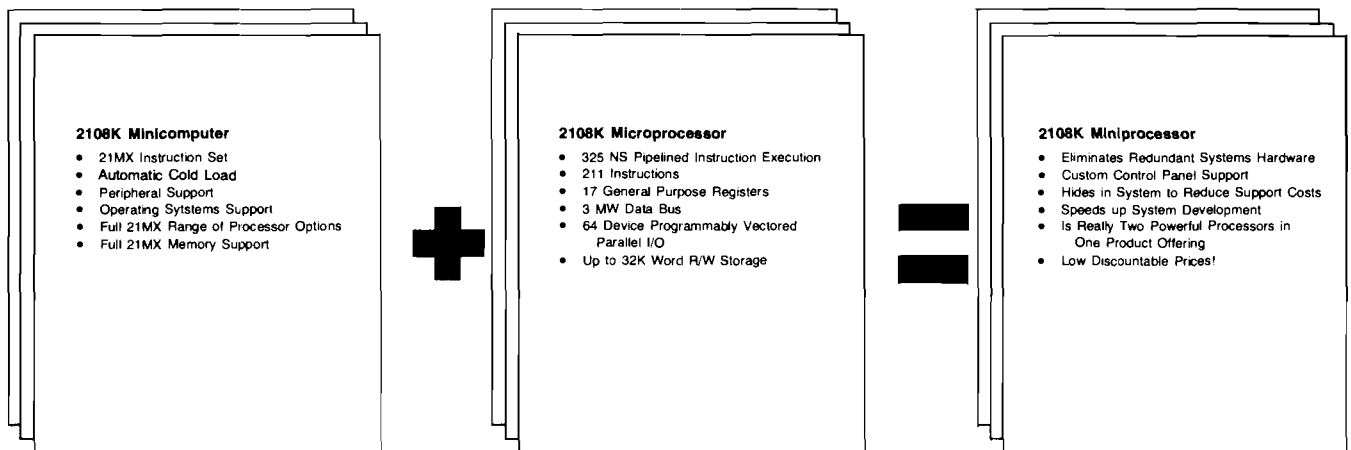
The two levels of the 21MX-K Series have many features in common. First, they allow the system designer to eliminate redundant, expensive hardware-like power supplies, fans, boxes, control panels, and wiring. As many systems have all of these for the OEM's own equipment, there is no reason to duplicate them in the processor — merely expand them to include the needs of the 2108K. The OEM system designer sees all of this as a decrease in system costs with a proportional increase in his value added. The ability to implement system control panels using the processor for sequencing makes it extremely easy to create custom panels for specific end-user requirements by merely changing control panel code and labels on the buttons. Systems built from both processor levels also benefit by the ability to bury the computer inside the end-user system — the OEM does not have to support programming on the computer because it is no

longer apparent to the end user that it's even there! In addition, his software investment is much more secure because it's not readily accessible to either users or competitors. There is still one more important benefit for an OEM — he can develop, test, and indeed demonstrate his application on a 21MX before completing the systems integration effort reducing both development time and investment prior to an assured sale of his system. And, finally, once he's made that sale his support costs are reduced with interchangeable spares and 90-day return warranty.

As you can see, the 21MX-K Series provides you with a whole new set of solutions to system builders' problems while capitalizing on HP's strengths. K Series system components let you say "yes" where no other manufacturer can, and that feels good.

GOOD SELLING!

Feature Summary



K SERIES COMPETITION

By: LeRoy Nelson

The major K SERIES competition will come from: DEC, Data General, Texas Instruments, and Computer Automation. HP's competitive position in the component market-place is higher performance and higher priced than the current LSI implemented processor boards. The price differential reflects the difference in technologies, as well as a difference in performance. The K SERIES is designed for those applications requiring true minicomputer features and performance.

Here is a brief description of the main competition for the K SERIES.

- **DEC** — DEC's LSI-11 is an LSI microcomputer with an instruction set compatible with the PDP-11/40. It is made available as separate components (board, card cage, etc.) or as a packaged product — PDP-11/03. LSI-11's must be purchased under their Components Master Agreement only and cannot be combined with other minicomputers (even the 11/03) to establish a quantity/price level.

- **Computer Automation** — CA's LSI 2/10 and 2/20 are full LSI minicomputers on boards and are probably the closest real competition for the K Series. The LSI 2/20 is the higher performance of the family and has performance close to the 21MX-K Series. CA's "naked mini" has been available since early '73 and used by many OEM customers as a system component. They have a wide product line with two processors and three memory types which are all compatible. The customer is free to choose the processor power and memory size and speed for his specific application. CA sells a packaged product only as a development system, their main business is OEM "naked" products.

- **Texas Instruments** — T.I.'s 990/04 microcomputer is an LSI-microcomputer compatible with T.I.'s 990/10 minicomputer. The 990/04 is slower than the 990/10 which contains discrete logic on two printed circuit boards. The 990/10 is not sold as a component.

The T.I. processors have been in development and pilot sales for several years. Today they have a very complete product line with processors, memory and accessories. They have a very low price on the parts while the software is very limited.

- **Data General**— DG's Micro NOVA is an LSI microcomputer compatible with the standard Nova instruction set. Available as a chip, board or full up microcomputer, including card cage, power supply and front panel.

DG's micro is the newest LSI processor of the group and its greatest strength is the extremely low price.

COMPETITIVE ADVANTAGES

- **DEC**
DEC LSI-11 Strengths — Low price, small size, choice of memories including RAM, ROM and core and a low-priced, floppy-based development system.
- **Computer Automation**
LSI 2/20 Strengths — Slightly lower cost in simple configurations, broad selection of memory, includes RAM,

core, PROM, and ROM, and good instruction set including stack instructions. C.A. has broad experience in the component market place with over 10,000 computer boards sold.

- **Texas Instruments**
T.I. - 990/04 Strengths — Very low price and floppy-based development system.
- **Data General**
DG - Micro NOVA Strengths — Very low price. Available in a chip-level or board-level processor.
- **HEWLETT-PACKARD**
The following table shows just some of the competitive advantages of the K SERIES vs. its main competition.

	21MX-K SERIES	LSI-11	MICRO-NOVA	990/04	LSI 2/20
Wide choice of peripherals	YES	NO	NO	NO	NO
Floating Point	YES	YES	NO	NO	NO
>32K Memory	YES	NO	NO	NO	YES
Microprogrammable	YES	NO	NO	NO	NO
Processing Speed	21MX	.2(21MX)	.6(21MX)	.6(21MX)	.8(21MX)
Price with 32K Memory	\$7100	\$6300	\$4700	\$4500	\$7200

More competitive information will be available shortly. Selling the K SERIES will be largely a matter of qualifying the application. If large memory, high speed processing, floating point calculations, a full line of operating software or 21MX com-

patibility are not important, let the competition fight it out. If any of these capabilities are important, you should have smooth sailing. **Good luck and SELL K SERIES!**



K SERIES SUPPORT — SOMETHING OLD, SOMETHING NEW

By: *Orrin Mahoney*

What's old is the tradition of comprehensive service and applications support supplied by Hewlett-Packard with their products. What's new are the detailed service and applications strategies which will be implemented for K Series products.

The K SERIES is the first of a class of products to be called Computer Systems Component Products with unique warranty and installation policies. There are two reasons why it makes sense to have a different support strategy for component products. First, component products are designed to be included as an integral part of a customer's system. Because they will be used with customer furnished power supplies, front panels, and even instruction sets, traditional support tools and diagnostics may not be valid. Also, we would prefer that our support people not "work" on the OEM's product. Second, the low price of these components means that typical on-site service is uneconomical. In some cases the price of one service call could exceed the price of the component. For the above reasons it was decided that a 90-day board-return warranty would be appropriate for the K SERIES. Each K SERIES component will be shipped with a Support Summary Sheet outlining the warranty policy and giving detailed instructions as to where and how to return any defective components. K Series boards will be 100% tested at the

factory before shipment and the processor itself is very reliable insuring low customer failure rates. For the same reasons mentioned above there will be no installation of K Series components.

For applications support we will have two main customer aids. First, there will be a Documentation Package, 12728D, that is designed to answer most of the questions the customer will have as he designs K SERIES components into his systems. The Documentation Package contains 21MX theory of operation, logic diagrams and parts list as well as special information for components such as assembly drawings and detailed mounting dimensions. This package will be available to K SERIES users for \$150 including a one-year update service which will provide timely information on any "improvements" that will be made on K Series boards.

If there are questions not covered in the Documentation Package, applications information will be available from *Jack Howard* who will be our K SERIES applications specialist. His number will also be in the K SERIES Support Summary Sheet.

In summary, we think that the K SERIES will keep up the HP tradition of well-designed products backed up by an excellent support package.



21MX-K SERIES SUPPORT SUMMARY SHEET

The HP 21MX-K Series is, in the Hewlett-Packard tradition, supported by a convenient repair plan. Refer to this summary sheet and the product update sheet associated with your processor for valuable repair, warranty and update information.

Hewlett-Packard maintains an applications and service staff to help you use and maintain the 21MX-K Series Processor Components. Applications information is available from the K Series applications engineer located at HP's factory in Cupertino, California, (408) 257-7000. Service and repair information are available through HP's Computer Service Repair Center in Mountain View, California (415) 968-9200.

The 21MX-K Series service plan is based on returning *repairable* boards to the Computer Systems Repair Center in Mountain View, California. The original shipping container is the recommended package for returning boards and should be retained for this purpose. All repairs will be performed in the shortest time possible and a two week maximum turn-around can usually be expected. You can help expedite repairs by:

1. Packaging boards in their original container.
2. Including information as to the nature of the failure.
3. Shipping packaged boards *prepaid* to:

Computer Systems Repair Center
333 Logue Avenue
Mountain View, California 94043
(415) 968-9200



Customers located outside the United States should contact their local HP Sales Office for the address of their appropriate Repair Center.

Repaired boards will automatically be upgraded to the latest revision unless specific instructions are included to maintain the old revision level.

WARRANTY

K SERIES products, are warranted against defects in materials and workmanship for 90 days from date of delivery. During the warranty period, Hewlett-Packard will repair or, at its option, replace products which prove to be defective, provided they are returned to a designated HP repair facility.

NO OTHER WARRANTY IS EXPRESSED OR IMPLIED. HEWLETT-PACKARD IS NOT LIABLE FOR CONSEQUENTIAL DAMAGES.

K SERIES — ORDERING INFORMATION

By: LeRoy Nelson

The K Series product line is designed for the OEM customer who will design the processor into his system and settle on a particular list of parts needed to produce his system or instrument. Once this is set up, repeat orders should follow a specified pattern.

Here are the inputs needed to start the customer on the road to ordering the K series products:

2108K — The actual processor board or "The heart of the product line."

12728A — The card cage for mounting the processor board with backplanes and card guides for 4 I/O cards, 2 memory modules, memory controller, and DCPC card. The printed circuit board and connectors for power connection to the top of the backplane cards is also included.

12728B — The mounting structure for the processor board just like 12728A, but a large number of card guides. This product contains card guides for 9 I/O cards, 5 memory modules, memory controller, DCPC card, memory protect card, and Dynamic Mapping card.

12728C — The basic printed circuit control card with switches and cable for fabricating a complete programmer's front panel like the 21MX.

12728D — This product is the reference documentation and logic diagrams for designing to and using the K series parts.

12728E — The ROM instruction set for the K series emulates the 21MX instruction set. This includes all the standard and extended instructions currently available in 21MX.

The K Series products will be in the July 1st Corporate Price List, but you can place an order today with a Heart override for these products:

PRODUCTS	PRICE
MINIPROCESSORS	
2108K Processor	\$1475
CARD CAGES	
12728A 8-Slot Card Cage	\$ 425
12728B 18-Slot Card Cage	\$ 625
CONTROL PANELS	
12728C Front Panel Assy.	\$ 325
INSTRUCTION SETS	
12728E 21MX Instruction ROM's	\$ 350
ENGINEERING AND REFERENCE INFORMATION	
12728D	\$ 150

Do not forget to include the following statement on all K-Series quotes:

Warranty for 2108K and its accessories is as stated except 2108K and its accessories must be returned to a designated repair facility for warranty repair or replacement.

Availability of all 21MX-K Series Component Products is two weeks ARO.



THE K SERIES — WHO DO YOU SELL IT TO???

By: *Orrin Mahoney*

The K SERIES miniprocessor is primarily an OEM product that requires significant design effort and commitment by the customer. Here are some pointers to help you to qualify the customer or seek out a new prospect.

The 2108K is a high-performance component processor with user microprogramming, large memory capacity and hardware and software compatibility with the 21MX.

The main component in the K SERIES is the 2108K processor board. It is expected that most customers will also purchase either the 8 slot or 18 slot card cage and backplane, as well as a memory controller and memory. Other accessories are available depending on the needs of the specific applications. The customer can go with the 21MX instruction set, design his own instruction set, or program solely in microcode. He can use our optional front panel assembly or integrate his own front panel controls.

The customer must supply the power supply to operate the

processor and any optional accessories that are to be included in his system. Usually he will utilize supplies that already exist to power the other parts of his system. Voltage levels required are +5 volt, -2 volt, and + and -12 volts.

The K SERIES is uniquely suited to the OEM or large end user customer who is designing a new system, wants the maximum value added in his system, and is willing to make the investment necessary by going with the components approach. The investment will vary depending on how many of our standard accessories he uses but there will be an investment in any case.

The K SERIES is not meant for the one-shot, do-it-yourselfer who wants a cheaper way of getting a 21MX. It is designed to satisfy a serious OEM or End-User who will use over 50 processors per year and has one or more of the following needs:

- Needs a custom front panel with special operator controls.
- Needs to bury the processor deep in the package.
- Needs a high-performance microprocessor for complex applications like pattern recognition or array processing.
- Has power and packaging available and wants to save money by not purchasing our power supply and packaging.
- Wants to deliver a completely integrated system and has specific expertise in a specialized field.
- Wants to hide the fact that there is a "computer" in his product for non-technical reasons or support considerations (He does not have to supply software support or let his customer modify the programs.)

The best case situation is a customer currently using the 21MX in systems who has software and hardware expertise in HP processors and is developing a new product or entering a new marketplace with an intelligent instrument or special system. For these customers, all the standard advantages of the K SERIES are valid (see K SERIES VS THE COMPETITION), plus the following considerations:

- Common software lets him use his existing software development tools and systems.
- Common spares minimize his inventory.
- No retraining of his personnel in the area of hardware or software support.
- Lets him aggregate functional units for larger discounts.
- Going with one supplier minimizes contract and administration expenses.

We at Data Systems feel that the K SERIES is a significant addition to the 21MX family of computers, software, and peripherals available to the OEM and large end-user. It is a new type of product for Data Systems with unique marketing and sales considerations. As always, we are counting on your judgement to sell the K SERIES into those applications beneficial for the customer and **Hewlett-Packard**.



K SERIES APPLICATIONS IDEAS

By: Cle Riggins

K Series Component Products open up a whole new range of applications for HP computers. The table below is certainly

not all-inclusive but it'll give you some ideas on where the "K" does the job well. I'm sure you'll see many other ways for your customers to use these versatile products. The applications are shown as a matrix of application areas and K Series features that are likely to be of interest in each application.

APPLICATIONS MATRIX

	ROM Control Store	High Speed	Low Cost	Environmental Specs	HP-IB	Large Memory	ACL	I/O and Peripheral Support	Software	Integrated In Systems
Medical Systems					x	x		x	x	x
Lab Systems		x	x		x	x		x	x	x
Process Control	x		x				x		x	x
NC Machine Control	x		x	x			x		x	x
Telephone Switching	x			x			x	x	x	x
Scientific Application		x			x	x		x	x	
Navigational Systems	x		x	x			x	x	x	x
Time Share	x		x			x	x	x	x	
Electronic Test	x	x	x		x		x	x	x	x
Arithmetic Processors	x	x				x	x	x	x	
Analysis Systems	x	x			x	x		x	x	x
Image Processing		x				x	x	x	x	x
Data Concentrator	x	x	x		x		x	x	x	
Remote Monitoring	x		x	x	x		x	x	x	x
Array Processing		x				x		x	x	
Distributed System			x		x	x	x	x	x	x
Complex Peripheral Control	x	x					x		x	x

Let's take a couple of applications from the matrix so you can see why we put check marks where we did, and didn't.

Electronic Test. When building an electronic test system you need ROM Control Store so that your system comes up ready to load a test program. High speed is useful to reduce test times and increase the range of tests you can perform, and low cost is vital, especially if you want to be competitive in the low end tester market. An HP-IB connection is, of course, essential in this application in order to take advantage of a catalog of HP test equipment for all measurement jobs. Automatic Cold Load makes the system much easier to use; while I/O and peripheral support reduce design time and allow you to add features like hard copy output, disc-based test programs, and CRT consoles, if needed. Full software support obviously makes the whole job easier. Finally, burying the computer alleviates the pain of providing software preparation support to the end user.

Analysis Systems. If you're building an analysis system, ROM Control Store is required for control algorithm storage, high speed is vital to perform a complex analysis routine in reasonable time, and an HP-IB connection gives you access to instruments needed to provide input data. Large memories allow manipulation of large data arrays very quickly. I/O and peripheral support provide a vital link to hard copy devices for reports on CRT terminals for quick feedback. Software, especially language support, yields access to a tremendous base of existing analysis programs written in high level languages. And, of course, burying the processor makes the analyzer a turn-key system providing only the applications you wanted it to perform, without general purpose computer support headaches.

From these examples you can see that the K Series has a very wide applicability in today's OEM market. It's not without its limitations. The K Series demands that the system provide power, adequate cooling, and appropriate packaging. This places some additional burden on the system designer. It's not that great a burden, given that the OEM has already addressed these problems for the hardware he's designed into his system. In my experience in creating in-house test systems the biggest part of the job was the special hardware and software required to perform the intended application, not the task of supplying power, cooling, or packaging. The 21MX-K Series with its access to 21MX software and Operating systems, puts the right kind of tools at the disposal of the systems builder to solve these major problems.

Good Selling!



K-SERIES AND THE CSG CONTRACTS AND QUOTES: SOME CHANGES

By: Orrin Mahoney

The Computer Systems Group Contracts and Quote Forms will be modified to accommodate the K SERIES Component Products. A new category, Type X, will be added. The 2108K Miniprocessor and its accessories will be the first entries in this category. Type X miniprocessors (the 2108K) will count as .5 functional units for each processor purchased with memory. Standard OEM and END-USER discounts will apply with half units not rounding up (example 7.5 units = 7 units). The other area of the Computer Systems Group Contracts that will be changed is the section referring to warranty. As

discussed in the article on K SERIES support elsewhere in this Newsletter, Computer Systems Component Products will have a 90-day, board-return warranty. This will be reflected in the new CSG contracts. A contract amendment will be distributed to cover customers with existing contracts as well as new customers who will want to sign up before the new CSG contract is available.

The warranty clause on the Computer Systems Group Quotation Sheet will also be changed to cover the Component Products warranty. Until new quotation forms are available, the following statement must appear on any K SERIES quote.

"WARRANTY FOR 2108K AND ITS ACCESSORIES IS AS STATED EXCEPT 2108K AND ITS ACCESSORIES MUST BE RETURNED TO A DESIGNATED REPAIR FACILITY FOR WARRANTY REPAIR OR REPLACEMENT"

Having the K SERIES on the same agreement as our other computers gives you a leg-up on the competition. DEC's LSI-11 must be purchased under their Components Master Agreement only, and cannot be combined with other minicomputers to establish a quantity/price level.

SELL K SERIES COMPONENTS.



K-SERIES MISCELLANEOUS

By: Orrin Mahoney

Here are the answers to some questions that may come up when selling K Series.

Q — What does HP supply, what must I provide?

A — The following table will give a quick guide to what is supplied with 21MX-K SERIES COMPONENTS.

HP Supplies	Customer Supplies
2108K miniprocessor board	Power
12728A - 8 slot Card Cage	Adequate Ventilation
12728B - 18 slot Card Cage	Power Control Signals to Processor
12728C - Front panel Assy.	Suitable Enclosure
12728D - Documentation Package	Software
12728E - 21MX Instruction ROM	

The K SERIES Data Sheet details the requirements for those things supplied by the customers.

Q — What about vibration and shock specs?

A — Since we cannot be responsible for the customers' mounting we can't spec shock and vibration on K SERIES components.

Q — What comes put together, what do I have to assemble?

A — The card cages (12728A and 12728B) must be assembled before adding on the 2108K processor board. The instruction ROM board is easily added just as it is today with the 21MX. The optional front panel assembly must be plugged onto the processor board.

Q — What software is available for the K SERIES?

A — No software is supplied with the K SERIES components. Software for the K SERIES will usually be produced on a program preparation station using a 21MX minicomputer and one of our standard operating systems. Programs written in a high level language or HP Assembly language require the 12728E 21MX Instruction Set. The 21MX Microassembler and Debug Editor are only supported in BCS and DOS environments.

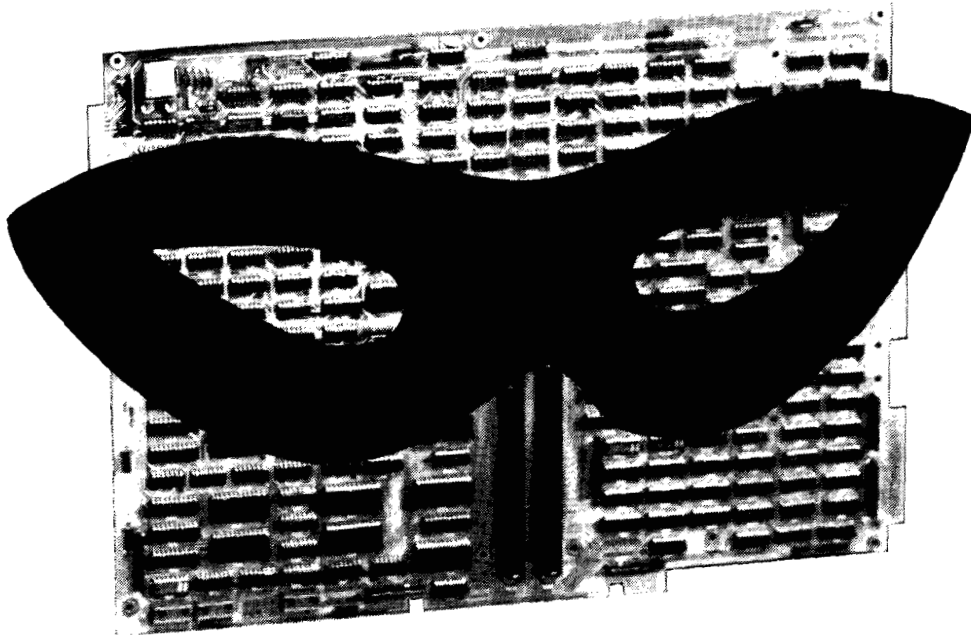


Here's what your customers can expect when they order 21MX-K Series components, as displayed by Linda Schefter, 21MX sales promotion coordinator. Linda has no option number that we know of.



Sylvia Cohen, secretary of your 21MX product marketing team; shows LeRoy, Bob, and Orrin how easy it is to assemble K SERIES' components.

THIS OEM ASKED US TO HIDE IN HIS SYSTEM



21MX-K SERIES MINIPROCESSOR COMPONENTS

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This Advertisement will first appear in the June 1 issue of the Data Systems Newsletter

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SELL 21MX SPECIAL "K"
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