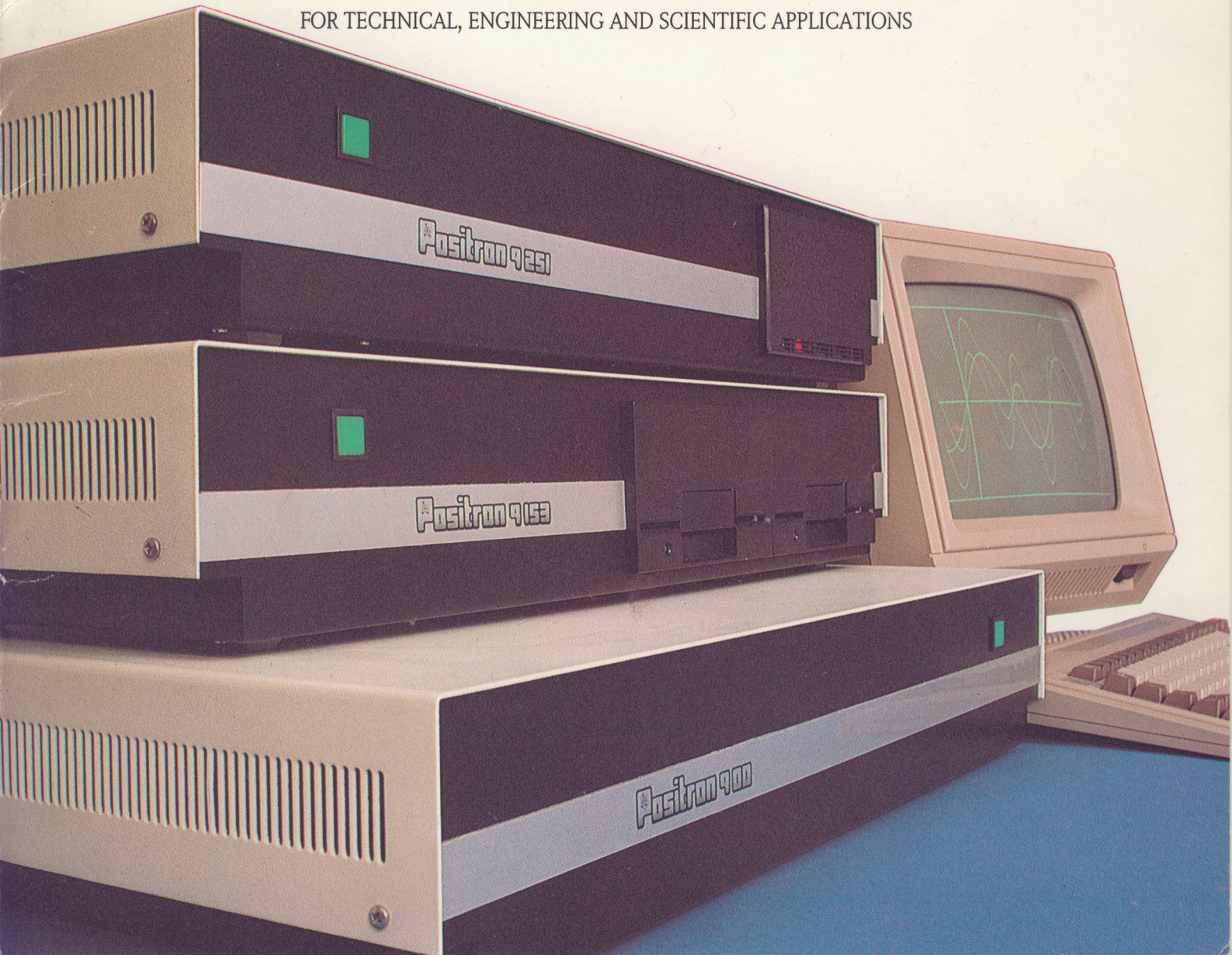
Positron

SINGLE AND MULTI-USER

TECHNICAL COMPUTER

FOR TECHNICAL, ENGINEERING AND SCIENTIFIC APPLICATIONS



POWERFUL MULTI-TASKING MULTI-USER FACILITIES FOR LABORATORIES OR WORKSHOP

The Positron Technical Computer is an advanced high performance computer specially designed for technical, engineering, and scientific applications.

The system comes as standard with a built-in UNIX-like Operating System OS-9, and an advanced structured programming language and built-in IEEE-488 (Hewlett Packard Interface Bus) interface for instrument control applications.

The Positron Single and Multi-user TECHNICAL COMPUTER is of Multi-Processor design, based on dual Motorola 68B09E processors with 500 ns cycle time.

Other features include:
Large memory ranging from RAM of 64 Kilobytes to 512 Kilobytes and ROM up to 256 Kilobytes, Eight DAT Memory Management Unit providing multi-tasking and multi-user capability, built-in IEEE-488 (Hewlett Packard Interface Bus) Interface, Four Serial RS232C Ports, high speed I/O Processor Interface, Dual channel DMA Controller, General Purpose Programmable Timer, Time of Day Clock, General Purpose Switch Block, one, two or three Graphics VDUs each with a resolution of 640 x 400 pixels.

The Technical Computer can have up to four floppy disk drives each of 720 Kilobytes per drive and up to four 10 Megabyte Winchesters.
The Technical Computer puts, in YOUR laboratory or workshop, a powerful multi-tasking, multi-user computer with operating system facilities similar to those found on mainframes.

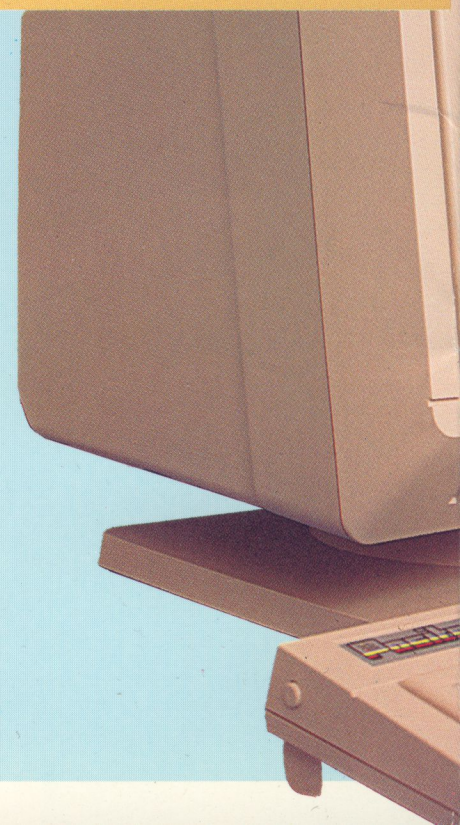
BASIC09

BASIC09 is an enhanced and structured BASIC language programming system. In addition to the standard BASIC language statements and functions, BASIC09 also includes many of the most useful elements of the Pascal programming language so that programs can be modular, well-structured and use sophisticated data structures based upon combinations of the five basic types (byte, integer, real, boolean and string).

BASIC09 is unusual in that it is an interactive compiler that has the best of both kinds of language system – it gives the fast execution speed typical of compiler languages plus the ease of use and memory space efficiency typical of interpreter languages, BASIC09 is a complete programming system that includes a powerful text editor, multipass compiler, run-time interpreter, high-level interactive debugger, and a system executive.

The two versions of the bubble sort program shown overleaf can both be run by BASIC09 without change. The first is unstructured and difficult to understand, but it is traditional BASIC; the second program is well structured and easy to follow by use of the PASCAL-like control structures.

With BASIC09 it is possible to program either way, or mix the best of both.



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TECHNICAL COMPUTER

MULTI-USER CAPABILITY

It is seldom possible for one engineer to handle all technical computing tasks single-handed. The Positron TC supports up to 3 users, each with Graphics Workstations.

MULTI-TASKING

Permits several background operations such as printing, plotting and instrument control to be performed concurrently, while the Workstations continue to operate interactively.

REAL TIME

The advanced OS-9 Operating System combines the benefits of a UNIX-like environment with Real Time performance.

This means that the system is fast enough to receive, process, and respond to data from external sources.

OS-9

The OS-9 Operating System, written in assembler, offers highly efficient data handling, short processing times and rapid response, ensuring users are not left idle, waiting for results. OS-9 executive control also takes care of multi-user software development through a range of access rights, together with record locking, within tree structured directories. Libraries of proven routines can be built up for common use, without fear of corruption and in the knowledge of their reliability. A spooling capability aids the ready production of hardcopy documentation, for easier debugging.

These facilities mean that full control of the project can be maintained throughout its lifetime.

INTERFACES

The basic system provides four RS232 ports and an IEEE-488 port. The IEEE-488 interface is to full talker, listener and controller specification and operates with a full supporting software package. This provides an interface to the wide range of IEEE-488 instrumentation including Hewlett Packard products. (IEEE-488 is also known as the Hewlett Packard Interface Bus).

PLOTTING

The Graphics Plotter provides hardcopy computer graphics for technical engineering and scientific applications. Excellent for summarising data, time lines, PERT charts, schematics, engineering drawings and many other applications requiring visual detail.

GRAPHICS VDUs

The Positron VDU is a very high performance microprocessor-based Video Display Terminal. It has a screen in the form of 24 lines of 80 characters, with a 25th user/status line. The Graphics resolution is 640 x 400 dots, with a drawing speed of 800n S/dot.

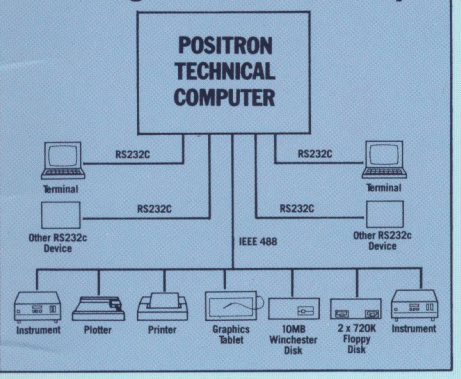
GRAPHICS TABLET

With the Graphic Tablet's cursor moving capability, the user can bypass the keyboard and interact directly with the CRT display. The Tablet can be used in single-point or continuous digitizing modes to create designs, to enter graphic data from source documents, or select information from a customised menu.

LANGUAGES

The advanced structured programming language BASIC09 is supplied as standard with the Technical Computer. "C", Pascal and FORTRAN are also available.

Configuration Flexibility



TECHNICAL SPECIFICATION

PROCESSOR

- Dual processor system with memory management units provide 1M byte address space with write protection
- RAM 256K bytes or 512 K bytes
- ROM 256K bytes (40K bytes operating system software)
- Dual channel DMA controller – supporting memory to memory block moves
- Time of day battery backed-up clock
- Three general purpose timers
- High speed I/O processor interface with 8K byte dual port RAM
- Four RS232 ports, 75bps-9600bps Software programmable baud rates with hardware flow control
- IEEE488 interface, full talker, listener and controller specification with full supporting software package
- Standard software: OS-9 level II operating system
  BASIC09 structured BASIC
  Positron Full Screen Program
  Editor ("E")

FLOPPY DISK SUBSYSTEM

- Dual double-sided disk drives – 720 Kilobytes/drive formatted
- Intelligent disk controller

WINCHESTER DISK SUBSYSTEM

- 10 Megabytes formatted
- Intelligent disk controller

OS-9 OPERATING SYSTEM

- Multiuser/multitasking
- Language independent modules
- Device/file independent I/O
- Piping
- Tree structured directories
- Password protection
- File access rights
- Record locking
- ROMable applications software

BASIC09

- Structured, recursive BASIC with upward-compatible syntax
- Multiple, independent, named procedures
- Procedure call by name with parameters
- Multi-character, upper or lower case identifiers
- Variables and line numbers local to procedures
- Line number options
- Automatic linkage to ROMed library procedures
- Pack command reduces program size and provides security
- PRINT USING with FORTRAN-like format specifications
- 5 atomic data types: byte, integer, real, boolean and string
- One, two or three dimensional arrays
- User defined complex structures and data types
- Complex structures may be passed as parameters
- Complex structures may be assigned, stored and loaded as single entities
- Extended Control Structures
  IF...THEN...ELSE...ENDIF
  FOR...TO...STEP...NEXT
  REPEAT...UNTIL
  WHILE...DO...ENDWHILE
  LOOP...EXITIF...ENDLOOP
  EXITIF...THEN...ENDEXIT
- Powerful Interactive debugging and editing features
  Integral full feature text editor
  Syntax error check upon line entry and procedure compile
  Trace Mode reproduces original source statements
- High speed, high accuracy mathematics
  9 decimal digit, 40 bit binary floating point
  Full set of transcendentals

Example of conventional BASIC program

```
10 DIM A(5)
20 LET I=5
30 IF I=1 THEN 120
40 FOR J=1 TO I-1
50 IF A(J)<=A(J+1) THEN 90
60 T=A(J+1)
70 A(J+1)=A(J)
80 A(J)=T
90 NEXT J
100 GOTO 30
120 RETURN
```

Example of BASIC09 program

```
(*Bubble Sort*)
DIM Array (5)
Outer:=5
WHILE outer>1 DO
  outer:=outer-1
    FOR inner=1 TO outer
      IF array (inner)>=
        array (inner+1) THEN
        temp:=array (inner+1)
        array (inner+1):=array (inner)
      array (inner):=temp
    ENDIF
  NEXT inner
ENWHILE
RETURN
```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