

# PC-12/7

## Interactive Computer System



**artronix**

INCORPORATED



# PC-12/7 SYSTEM

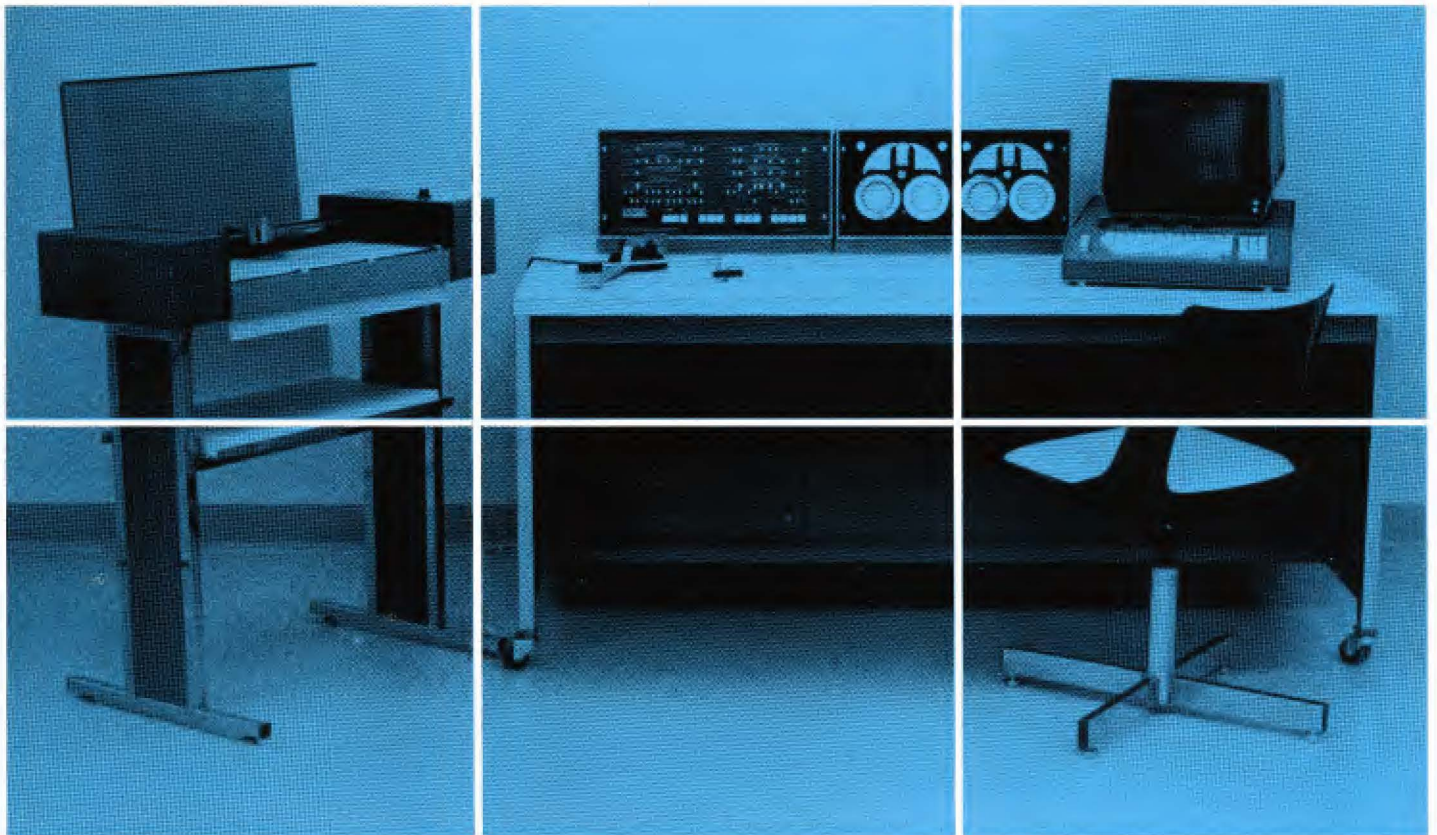
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A PC-12 Computer System combines the most modern and successful concepts in the minicomputer field: optimized system performance through total integration of software with complementary hardware, options and peripherals; modular bus structure permitting processor options to be plugged into any available slot location; and expandability of memory, processor, I/O bus and even the powerful instruction set.

The PC-12 interacts closely with its environment, communicating with both external equipment and its users by easy and natural means. Modularity of design allows the use of peripherals adapted to the

requirements of the task. Specialized peripherals assure that the system remains effective regardless of the job being performed.

Carefully designed hardware/software integration results in powerful and smoother systems performance and allows the system to be tailored to specific needs — from a small dedicated application to a large, multi-user system to handle effectively medium scale computing requirements. High performance is obtained through a careful combination of proven technologies with system requirements; and through integration of optional features, maximizing the cost effectiveness of services and solutions to be provided.



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**...designed for optimum  
system performance**

# HARDWARE

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## High Speed Performance

- High-speed parallel arithmetic unit and bus.
- Extremely fast, multi-register Floating Point Unit with 34 defined instructions, including reverse subtract, reverse divide and squaring.
- Block move instruction for high-speed transfer of data blocks between memory buffers.

## Powerful Instruction Set

- For highly efficient addressing even in minimum configurations: direct, image, relative positive and negative, indirect, indexed indirect, deferred operand, deferred address, n-deferred operand, n-deferred address.
- Indexed indirect addressing mode provides 64 incrementable index registers.
- A number of unused codes are available for creation of custom instructions on the I/O bus without alterations to the central processor.

## High Performance

### Memory Management Control

- For convenient memory expansion to 64K in 16K increments (up to 256K on special request).
- Addressing by origin register provides hardware relocation. Additional 64 incrementable index registers available with each different setting of an origin register; each program module may have a separate set of 64 index registers.

## Automatic Hardware Priority Interrupt

- Allows operation in simple or complex multi-level interrupt systems with very low software overhead. Separate hardware program registers for each program level provide unrestricted interrupt nesting and automatic priority resolution without polling. Extremely fast interrupt response independent of the number of devices or the complexity of the system.

## Direct Memory Access (DMA)

- For intermittent or burst data transfers on a true cycle-stealing basis at maximum memory speeds.
- Automatic hardware priority resolution for multiple DMA devices. Instructions created on the I/O bus can use DMA within their execution.

## Programmed I/O

- Data transferred to and from memory directly, leaving accumulator undisturbed. I/O transfer instruction offers both deferred and indirect addressing modes for restructuring I/O routines.

## Modular I/O Bus

- For ease of interfacing to peripheral devices. Interface modules plug into any available I/O bus slot.
- Program interrupt level and Direct Memory Access (DMA) determined by relative positions of interface modules on the I/O bus. Priority assignment is changed in seconds by reordering interface modules.

## Programmer's Console

- Offers unparalleled convenience for system operation and program debugging with functional grouping of console buttons and lights to increase user convenience and efficiency.
- Two switch registers for manual address and data entry. Six major registers and a large variety of status indications—all displayed simultaneously. "Live" EXAM mode memory continuously tracks setting of address switches.

## Hardware Bootstrap

- Loads core and then begins execution automatically. Since the bootstrap resides in a medium other than main store, the entire memory available for application software.

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**...a careful combination of  
proven technologies**



# SOFTWARE

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## LTOS

**LTOS** (LINCtape Operating System) provides the PC-12 User with a keyboard programming system which includes editing, assembling, and file handling capabilities. The program takes full advantage of the interactive capabilities of PC-12 computer hardware through its large CRT display and assists the user with the on-line preparation of programs for PC-12 Computer Systems with 4K of memory. LTOS is upward compatible to OS/PC, the PC-12 Operating System, and all programs are directly transferrable and may be run under OS/PC with the exception of program return to the operating system.

## OS/PC

**OS/PC** is an operating system designed to take full advantage of the hardware features of an expanded PC-12 computer system with LINCmass storage. It offers the PC-12 user the power and flexibility previously available only on large computers, but with interactive and graphic capabilities exceeding those of the specialized, intelligent terminals connected to very large computer systems.

Designed as a program-development Software System, OS/PC offers an ideal environment for both the traditional assembly language programming and for the higher level languages, such as FORTRAN. Also, OS/PC is a true operating system, allowing execution of applications programs with full access to the comprehensive systems library. Modularity of programs and relocatability of subroutines is achieved by means of the linking loader, making full use of the dynamic program relocatability inherent in the PC-12 expanded memory addressing.

The OS/PC system structure is modular, consisting of a Resident monitor, Command monitor, System index, Linking loader, and library subprograms. The OS/PC structure is flexible to the extent that the user can adapt the system to his specific needs by adding or deleting modules, including system commands and library subprograms.

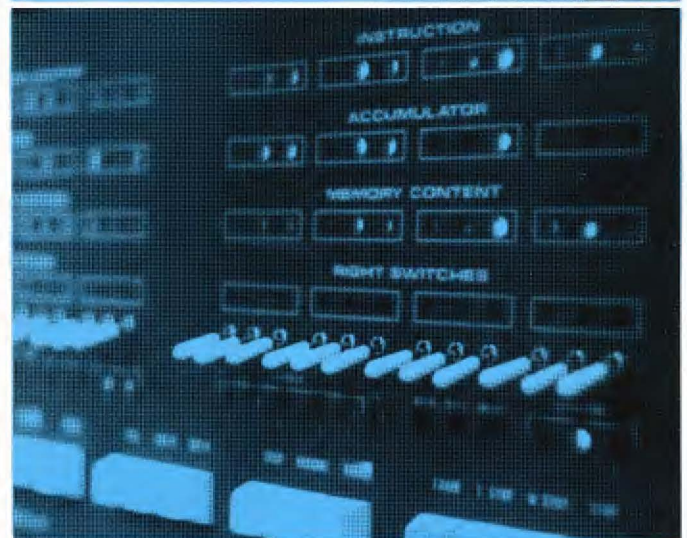
## DOS/PC

**DOS/PC** is the operating system for the largest PC-12 configurations. Based on the Disk Pack Mass Storage System, it offers all of the convenience and power of OS/PC along with the speed and capacity resulting from disk operation. Completely compatible with OS/PC in operation, DOS/PC also provides

logical unit device independence and total file interchangeability.

In normal usage, a single Disk Pack is divided into 125 logical volumes, each equivalent to one LINC mass storage unit. Each volume can then be independently accessed or protected. Other methods of disk space allocation can be easily utilized.

All functions of OS/PC are available under DOS/PC. In addition, specialized monitors allow multi-terminal and swapped multiprogramming operations.

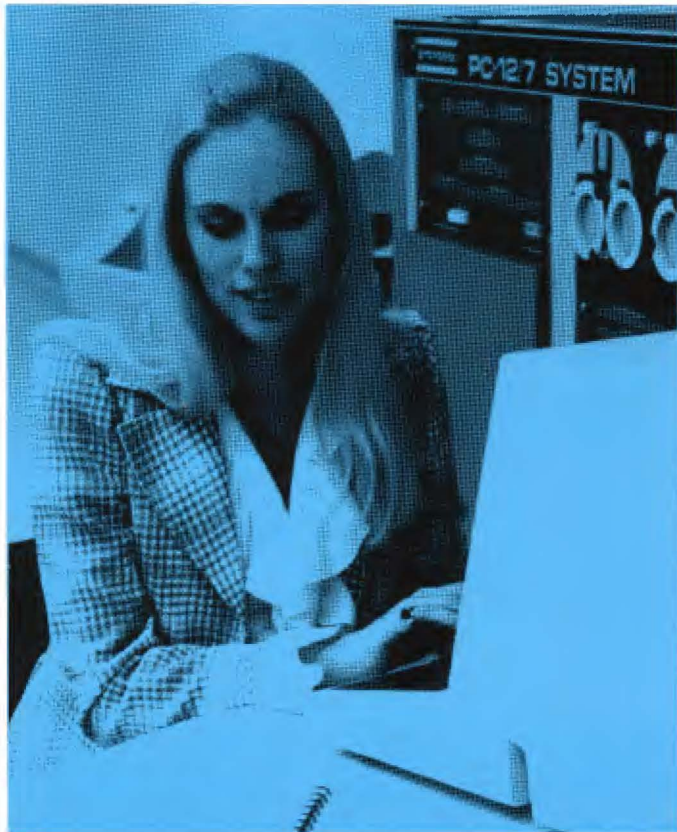




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## Extended MUMPS-PC Data Management System

Extended MUMPS-PC is a data management system designed to support 1 to 24 active users with a data base of up to 528 million characters (bytes). A high-level interpretive language, MUMPS supports variable length data strings stored without preformatting in hierarchically structured storage. The system offers the ability to handle extremely complex data structures with flexibility, speed and ease, supporting random updating and retrieval of individual files and data records. Information processing report generation and data reduction for both scientific and commercial applications is easily accomplished. The MUMPS operating system allows on-line data entry, batch processing, foreground/background tasking and system maintenance, and program development to be carried on concurrently in its multi-programming environment.



MUMPS-PC Data Management Systems are ideally suited for applications involving on-line data entry and collection, interactive data base inquiry and update, distributed data processing, and similar applications where communication of data and immediate access to a large pool of information is important.

Compared to the traditional data processing approach, a MUMPS based system, which costs considerably less, is implemented more quickly and simply, and provides a dramatically improved data access time. In addition, MUMPS systems are easily adapted to meet reprogramming and file conversion problems.

## Extended FORTRAN Compiler

The FORTRAN compiler is an extended version of the American National Standard Institute (ANSI) basic FORTRAN to permit full utilization of the interactive and graphic capabilities of the PC-12 Computer System. An extensive FORTRAN subroutine library and special compiler features further enhance this high level language system, giving the programmer access to practically all peripherals and options without having to leave the FORTRAN system.

A scientific-oriented language, FORTRAN enables the user to obtain solutions to complex mathematical problems by formalizing his program in simple English words and mathematical terms, without having to master or even be acquainted with the computer technology involved. However, through careful systems consideration and with in-depth computer understanding, complete, large application software systems can be developed quickly, utilizing the advantage of FORTRAN programming without loss in execution efficiency at run-time.

The FORTRAN system running under OS/PC requires a minimum of 8K of memory. Normally, a FORTRAN source program is prepared on-line by using the editor of the operating system. The compiler then translates the source program into standard PC Assembly language, which in turn is assembled into relocatable binary code. Using the linking loader, the binary program code is loaded, together with any required run-time subroutines, and is executed by the computer. The Load And Go option allows automatic execution of the compilation process by a single command without further intervention by the user.

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**...total integration of software with  
complementary hardware**

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## Commercial FORTRAN Compiler

The COMFORT compiler with its run-time routines and associated commercial subroutine package was designed to give the FORTRAN programmer a convenient tool to implement applications packages for business data processing. Running under OS/PC or DOS, this system provides wide range, precision decimal arithmetic, character manipulation and very efficient file access methods allowing bit, word, and record packing to maximize data storage and fast in-core data sorting, merging and editing. Several powerful I/O format specification statements together with the fast, random block oriented access method, allow both sequential and direct access to fixed-length records from 1 to 256 word length, facilitating optimal file structure for large data handling applications.

## Utility Library

A variety of utility software is available with the PC-12 computer.

- A Batch command job supervisor executes stacked jobs, with system direction through job control commands under OS/PC or DOS.
- A series of Fortran-callable routines for character generation, line drawing, axis rotation, and other functions using digital incremental plotters.
- The Real-Time Input/Output System is a Fortran-callable library to support analog-to-digital, digital-to-analog, and digital input/output interfaces.
- A series of Fortran-callable file access routines for sequential, random, relative logical access to various mass storage devices.

## Communications Software

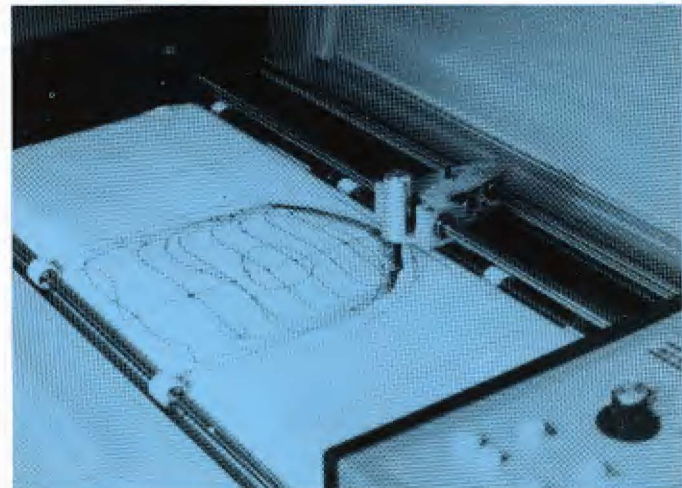
A library of communications software is available for operation under OS/PC, DOS and/or MUMPS-PC.

- Device-independent drivers for single and multi-line asynchronous interfaces, with full modem control.
- Fortran-callable driver routine for computer-to-computer communications.

- Fortran-callable Communications Channel routine, working through file buffer controlled by file access routine.
- Fortran-callable IBM Binary Synchronous Communication support package.
- Low speed ASCII communications program, allowing a PC-12 to function as a remote computer terminal in a time-share environment.

## 2780 Emulator

The BINARY SYNCHRONOUS COMMUNICATIONS SYSTEM (BSC) makes it possible for the PC-12 and its associated peripheral equipment to emulate an IBM 2780 remote batch terminal. The system's communications routines reside in the OS/PC environment to permit use of the Operating System's file handling and editing capabilities.





# CONFIGURATIONS

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PC-12/7 Series Computer Systems function as basic building blocks, enabling the user to select levels of

capability and add to those levels as required. All standard hardware can be field installed.

## PC-12/710

- Central Processor (CPU) & Power Supply
- Memory Control & 8K Core Memory
- Operator's Console
- Dual LINCtape Transport & Controller
- Graphics/Analog Control
- Chassis Configuration

## PC-12/730

- Central Processor (CPU) & Power Supply
- Memory Control & 16K Core Memory
- Operator's Console
- Dual LINCtape Transport & Controller
- Graphics/Analog Control and Display Unit
- Keyboard with Control Station
- Desk Configuration

## PC-12/750

- Central Processor (CPU) & Power Supply
- Memory Control & 32K Core Memory
- Floating Point Unit
- Realtime Clock
- Operator's Console
- Dual LINCmass Storage System  
(2 ea. tape & diskette)
- Rack Configuration

## PC-12/770

- Central Processor (CPU) & Power Supply
- Memory Management & Control
- 48K Core Memory
- Floating Point Unit
- Block Move Instruction
- 4 Level Priority Interrupt
- Realtime Clock
- I/O Bus Expander
- Operator's Console
- Dual LINCtape Transport & Controller
- Dual Double-Density Disk Pack
- Mass Storage System
- Rack Configuration

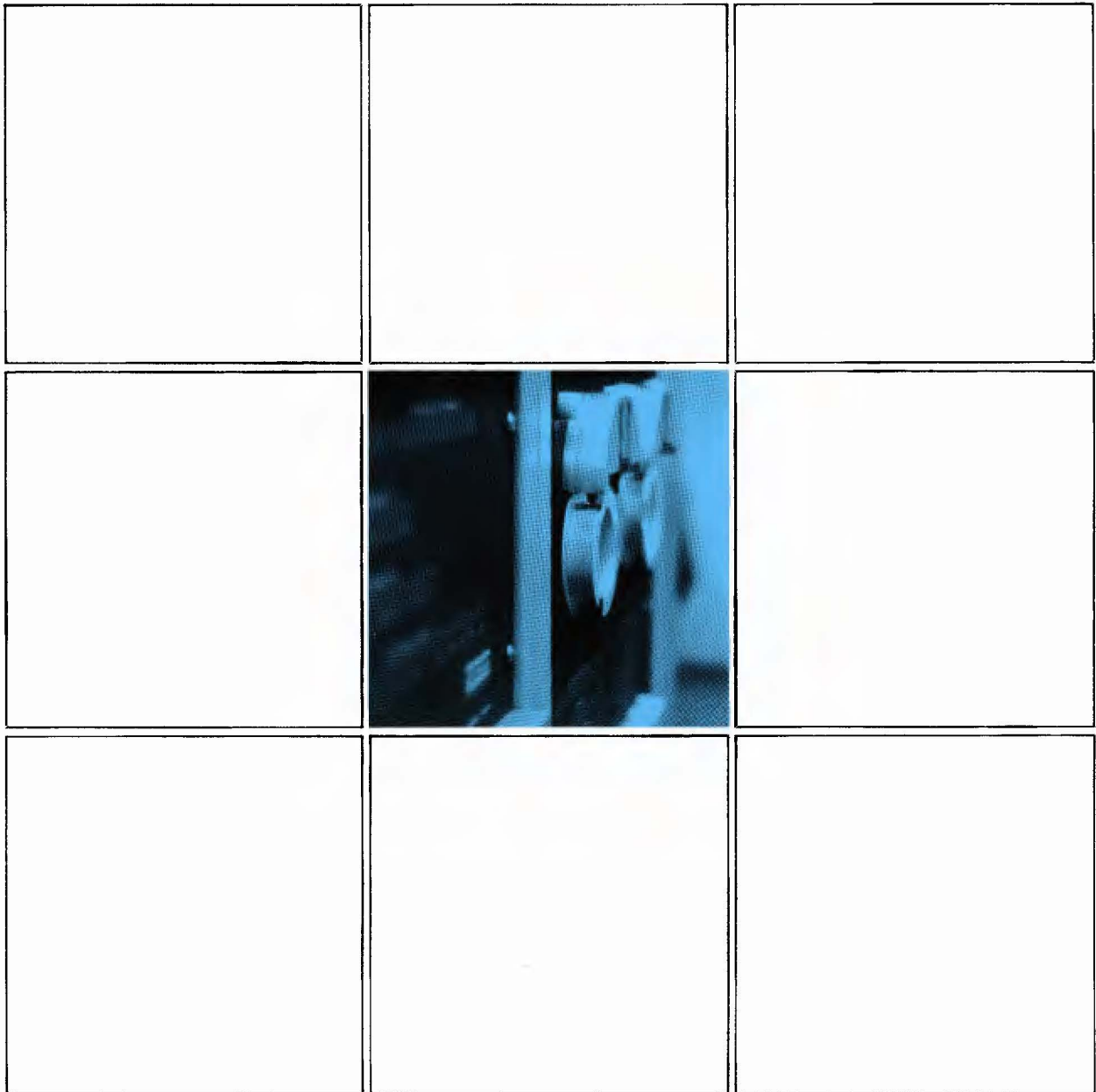
## PC-12/790

- Central Processor (CPU) & Power Supply
- Memory Management & Control
- 64K Core Memory
- Floating Point Unit
- Block Move Instruction
- 4 Level Priority Interrupt
- Realtime Clock
- Dual I/O Bus Expander
- Operator's Console
- Dual LINCtape Transport & Controller
- Dual Double-Density Disk Pack
- Mass Storage System
- Rack Configuration



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**...tailored to meet your  
specific needs**



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# PC-12/7

## Computer System

Please send further information on the PC-12/7 Computer System. My application is:

- |  |   |
|--|---|
| <input type="checkbox"/> Data Processing | <input type="checkbox"/> Graphics       |
| <input type="checkbox"/> Scientific      | <input type="checkbox"/> Communications |
| <input type="checkbox"/> Laboratory      | <input type="checkbox"/> Educational    |

Details of application: \_\_\_\_\_

I am particularly interested in these systems:

- |                                    |   |                                   |
|------------------------------------|---|-----------------------------------|
| <input type="checkbox"/> PC-12/710 | <input type="checkbox"/> LTOS                 | <input type="checkbox"/> MUMPS-PC |
| <input type="checkbox"/> PC-12/730 | <input type="checkbox"/> OS/PC                | <input type="checkbox"/> FORTRAN  |
| <input type="checkbox"/> PC-12/750 | <input type="checkbox"/> DOS/PC               | <input type="checkbox"/> COMFORT  |
| <input type="checkbox"/> PC-12/770 | <input type="checkbox"/> ASCII Communications |                                   |
| <input type="checkbox"/> PC-12/790 | <input type="checkbox"/> BSC Communications   |                                   |

- ☐ Please put me on your mailing list
- ☐ I would like a price quote
- ☐ I would like a system demonstration
- ☐ I have special device interface requirements, which are:

Current Computer Usage (Mfg. & Model): \_\_\_\_\_

- |   |  |
|---|--|
| <input type="checkbox"/> On-site          | <input type="checkbox"/> Data Processing |
| <input type="checkbox"/> Time-sharing     | <input type="checkbox"/> Scientific      |
| <input type="checkbox"/> Service Bureau   | <input type="checkbox"/> Laboratory      |
| <input type="checkbox"/> Remote Job Entry | <input type="checkbox"/> Graphics        |
- ☐ Own    ☐ Rent

Type of Company or Institution: \_\_\_\_\_

Name \_\_\_\_\_

Department \_\_\_\_\_

Company/Institution \_\_\_\_\_

Address \_\_\_\_\_

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Area Code / Phone \_\_\_\_\_

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