The   F2
A New, Flexible Alternative

The new Foonly F2 is a powerful mainframe computer at a minicomputer price. It offers cost-effective performance, a large software library, a wide range of peripherals, and advanced features such as extended addressing, user micro-programming, and high resolution graphics.

The Foonly F2 processor is a microprogrammed computing engine which emulates Digital Equipment Corporation's DECSYSTEM-10/20 computer family. However, the F2 offers a significant price/performance improvement—it costs less than a DEC 2020*, yet it runs most programs faster. The F2 is also more reliable, easier to maintain, and more adaptable to specific applications. The F2 system includes complete hardware documentation, microcode, and operating system sources at no extra charge.

Central Processor

The F2 processor is a microprogrammed CPU which, although generalized, includes elements to speed PDP-10 instruction execution, such as dedicated registers, a 36-bit static rotator, and a byte extractor.

Built of TTL-integrated circuits, the F2 comes with up to one million 36-bit words of MOS memory, with single-bit error correction and double-bit error detection. The memory subsystem, housed in the same 19-inch cabinet as the CPU, includes paging capabilities for translating virtual to physical memory addresses.

The cabinet also contains all the I/O controllers, the power supplies, and the control/maintenance panel. For ease of maintenance, all integrated circuits are mounted on plug-in cards.

Most functions of the F2 system are controlled by execution of a microprogram in the bipolar CPU. The microprogram controls instruction interpretation, software fault handling, and I/O device interrupt requests. Under control of the standard microprogram, the F2 emulates the PDP-10 instruction set with an average execution speed about 25% of that of the DECSYSTEM-2060.

Basic Peripherals

The internal mass storage controller supports up to eight disk drives using the industry-standard SMD protocol; additional controllers are optional. The system uses 160-megabyte Winchester disk drives as standard equipment. You may select from a wide range of drives made by CDC, Cal-Comp, Ampex, and others.

An internal tape controller accommodates from one to four medium-performance 9-track tape drives. Controllers for higher performance drives (6250 BPI, 125 IPS) are optional.

The FooVision family of bit-mapped graphics terminals consists of one per-system control board and up to eight per-display boards. The per-display boards feed via coax to either standard 525 line R/G/B color monitors or high resolution B/W monitors. Per-display boards support Color/Grey level, Grey level only, or Binary format. Features include full anti-aliasing, gamma correction, sub-pixeling, and pseudo-random dithering. Local display memories are R/W and screen images may be printed or plotted on raster devices.

Other standard peripherals include a data line scanner which interfaces 16 to 64 terminals. Interfaces to various types of printers and plotters are provided as options.

A high bandwidth local network controller will be available in the fall of 1980.

Customizing the F2 System

The F2 uses a general-purpose I/O interface designed by Foonly called the FBUS, which provides simple and efficient connection of custom hardware devices of all kinds. The FBUS connects the processor, memory, and system peripherals.

Because Foonly controllers interface with standard device buses, customers can use disk and tape drives manufactured by virtually any major supplier. These machines can be ordered through Foonly or directly from the manufacturer. Thus you can purchase an F2 either as a completely integrated system or as processor and device controllers alone.

Foonly can interface photocomposers, hand and eye equipment, plotters, tape readers—virtually any device that can benefit from computer control. In addition, Foonly provides consulting services for the design or construction of special devices.

Operating System and Application Software

The Foonly F2 uses the FOONEX timesharing monitor, an enhanced version of the multiuser, virtual memory Tenex operating system that has been modified to take advantage of the F2's performance-oriented microcoding.

The Foonly "Tenex" improves upon not only the original but also other enhanced versions, such as the TOPS-20* monitor, in many areas, including:

- Improved virtual memory management
- Support for Winchester-technology disk drives
- Improved file system reliability and performance
- Support for a wide variety of other peripherals
- Other hardware and firmware enhancements for improved system performance

FOONEX is undergoing intensive development in order to bring advanced functionality to the PDP-10 user:
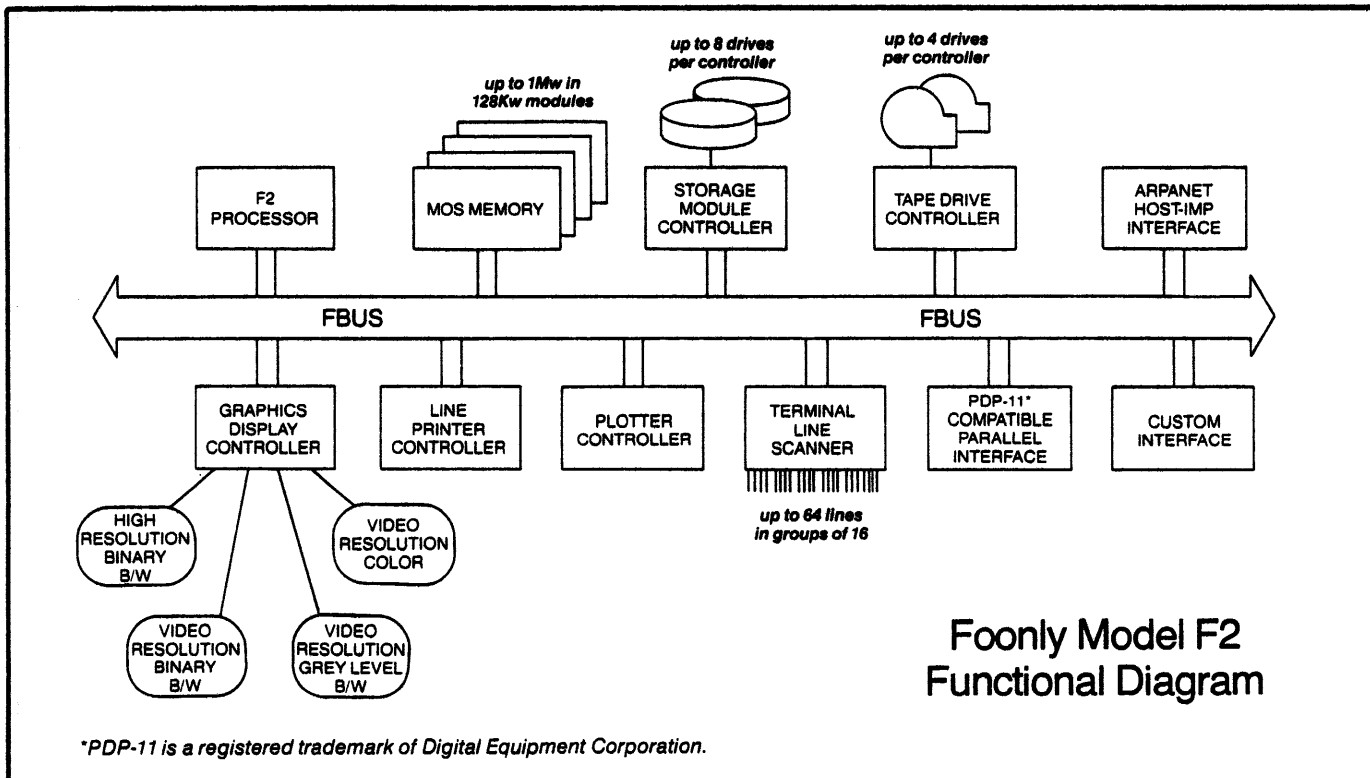
- TOPS-20 user mode compatibility
- Virtual display service
- Support for bit-mapped color graphics
- Support for broad band local networks
- More microcoded operating system features
- Better reliability and maintainability

Under this enhanced Tenex operating system, the F2:

- Supports a large library of software developed for the popular PDP-10 architecture. In addition, Tenex runs most TOPS-20 programs, and includes a TOPS-10* compatibility package.
- Makes available standard programming languages such as FORTRAN, LISP, PASCAL, SAIL, BASIC, C, SIMULA, and many others.
- Provides access to application packages in almost every area of interest: data base management, financial modeling, computer-aided design, interactive graphics, statistical analysis, artificial intelligence, electronic mail, and word processing.

Because of the F2 compatibility with the DECSYSTEM-10/20 instruction set, you can take advantage of your investment in existing software programs and application packages. Also, the extensive use of Tenex in publicly supported projects at universities and in industry means that much existing software is immediately available to Foonly customers at nominal expense.

FOONEX represents Foonly's commitment that the F2 is not a static computer. It provides a solid bridge between the past and the future.

Foonly Model F2 Functional Diagram

*PDP-11 is a registered trademark of Digital Equipment Corporation.

Microcoding for Speed and Versatility

By modifying and adding to the standard microprogram, the F2 can be adapted to your special needs, such as efficient execution of "inner loop" software routines, control of custom devices, or emulation of other architectures. The basic F2 package includes microcode sources, assembler, and documentation. Foonly will train customers to modify or add to the standard microcode program, or will perform such modifications on a consulting basis.

Right: The F2 Computer Provides Mainframe Performance in a Small Space.
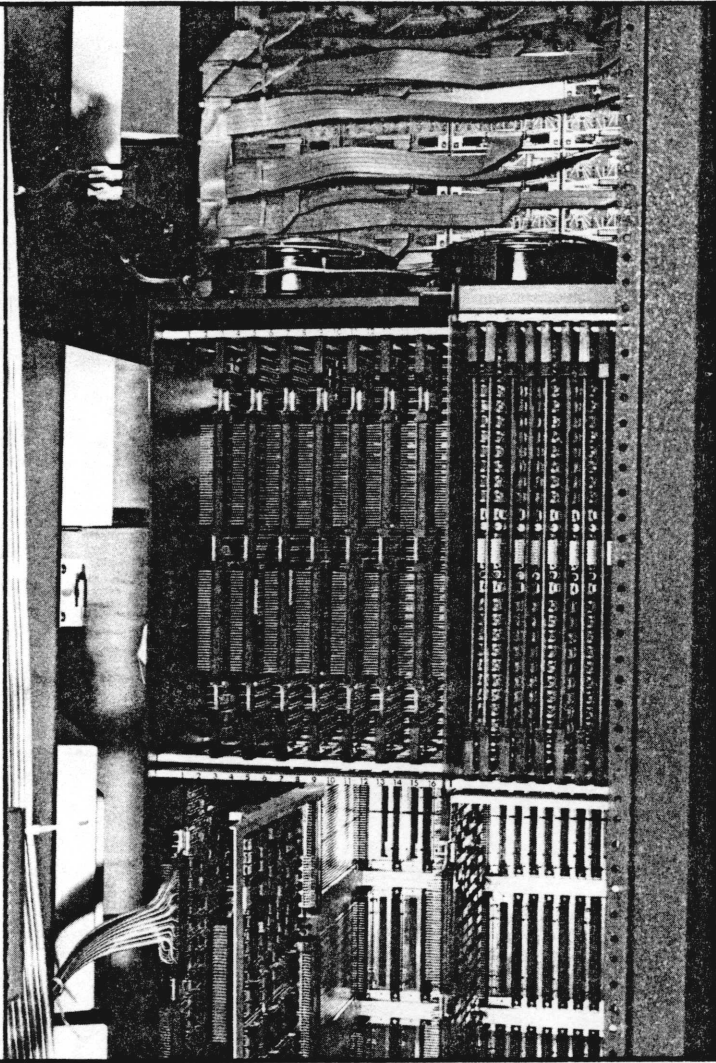
Documentation

Because Foonly's computer-aided product design and construction generates its own hardware documentation, a complete set of block diagrams, logic diagrams, and wire lists is supplied with the F2 computer.

All software, including the Tenex operating system, comes with complete program source listings and all other available documentation, at no additional cost.

Maintenance

The F2 system reliability is very good, with an extremely high mean time to failure in installed machines.

The modular construction of the F2, and board and IC level diagnostics, reduce downtime and maintenance costs.

Maintenance service for the F2 is available for customers from local or national organizations whose personnel receive factory training by Foonly hardware experts. Customers can also have their own technicians trained by Foonly.

Software Support

The F2 gives you access to the huge domain of PDP-10 software. Much of this software is not formally supported by the author(s). Therefore, in addition to periodic releases of FOONEX, Foonly offers support for other PDP-10 software on a contractual basis.

Delivery and Installation

Foonly will normally deliver and install a complete F2 computer system, assembled and debugged, within 90 days after you place your order. Even faster delivery schedules are sometimes possible; call Foonly to discuss your organization's particular needs.

A Background of Success

Foonly Incorporated specializes in the design and development of high-technology computer systems with superior performance and the opportunity for user customization. Currently Foonly is producing a flexible and cost-effective alternative to the DECSYS-TEM-10/20* family.

Foonly grew out of a Stanford University Artificial Intelligence Laboratory project to design a large general-purpose computer more efficient than existing PDP-10* machines. This "Super-Foonly" computer, as it was called, was the precursor of Digital Equipment Corporation's KL-10*.

Three of the scientists on that project went on to establish Foonly Incorporated in 1976. The average experience of the company's key personnel includes ten years or more of designing and implementing advanced computer hardware and software.

The first Foonly model, the F1 processor, has been in heavy use since 1978. The F1 exceeded its own performance specifications, and processes information two to four times faster than the DEC KL-10. Moreover, the F1 has proven extremely reliable, with fewer than six hardware failures in the past three years.

The F1 led to the development of the F2 computer, a machine whose advanced hardware and software functionality, flexible configuration, and cost effectiveness make it attractive for research, engineering, and educational time-sharing purposes as well as special-purpose applications. The F2 supports the large library of software developed for the PDP-10, and is designed to execute a PDP-10 instruction set more efficiently and at less cost than the machine it emulates.

Foonly's flexible licensing and discount policy makes the F2 an attractive alternative for OEMs and system houses.

Foonly's manufacturing capabilities are based on design and production techniques that are not often found outside research environments.

To develop or modify a hardware design, Foonly engineers employ advanced computerized design aids, such as the Stanford University CAD system (SUDS). These aids increase both the efficiency and accuracy of the design process. Equally important, CAD eliminates many labor-intensive and error-prone manual procedures, including drafting and wire listing. Foonly can therefore carry out design projects more rapidly and much less expensively than most companies.

Hardware construction is either automated or consigned to subcontractors. For example, wiring is done using automated machinery controlled by output tapes from the computer-aided design system. Only the final stages of assembly and testing (shown on the cover photo) are performed by Foonly personnel. The result is high quality and accuracy of fabrication, with very low capital and manpower requirements for Foonly. This savings is passed on to customers in the low cost and advanced functionality of Foonly computers.

In an industry where many of the giants are no longer responsive to individual needs, Foonly stands out as a company that cares about its customers.

*Registered Trademarks of Digital Equipment Corporation

The Bottom Line

The Foonly Model F2 system is faster and less expensive than its competition. The FOONEX operating system provides access to a large library of time-tested software. Foonly will continue to bring state-of-the-art performance and functionality to the PDP-10 community. Because Foonly is a small company, we will work closely with you to make the F2 system the most effective choice available today.