FAIRCHILD
A Schlumberger Company

FS-I
Fairchild System-I

Description

The Fairchild System-I (FS-I) is a versatile, multi-user development system designed to support software development and hardware prototyping for applications using Fairchild microprocessors, including the F8, F3870, F6800, F6809, F9445, F16000, and such upcoming microprocessors as the F9450.

Three principal versions of the FS-I are available: The FS-I Standard System, the FS-I Multi-User System, and the FS-I Entry-Level System. Numerous software and hardware options are available that operate under Fairchild's Interactive Multi-User Disk Operating System (IMDOS). The FS-I also supports the in-circuit emulation and tracing (EMUTRAC™) system for the F3870, the F6800, F6809, and the F9445 microprocessors. (For a description of the EMUTRAC system, see *EMUTRAC Advance Product Information.*)

Standard System

System features include:

- CPU with 128K-Byte RAM and F9445 Instruction Set.
- A Winchester and a Double-Density Floppy Drive Provide Approximately 10M-Byte of Mass Storage.
- I/O Controller Board Provides Winchester/Floppy Disk Controller Interface.
- Nine Asynchronous Serial RS-232C Ports (Up to 19.2K Baud) Provide Support for CRT Terminal, Optional Letter-Quality Printer, Modem, and Other Serial Devices.
- One Synchronous Serial RS-232C Port (Up to 19.2K Baud) and Selectable Protocols, such as BISYNC, DDCMP, SDLC, and HDLC.
- PROM Programmer Port to Interface to the Optional Fairchild PROM Programmer Unit.
- Parallel Printer Port (Centronics-Compatible Interface).
- Programmable Real-Time Clock.
- One CRT Terminal.
- Single-User Version of IMDOS, System Processors, and System Utility Programs (see "System Software").
- BASIC Language Interpreter with Interface to Custom F9445 Assembly Language Programs.
- FS-I Diagnostic Programs.
- Provides Full Support for the F9445 and for the PEP 45 Microcomputer System.
- Hardware and Software Upgradable to Multi-User System.
- EMUTRAC Can Be Added to the Standard System.

Multi-User System

System features include:

- Fully Equipped for Four Timesharing Users (Expandable to Eight Simultaneous Users with Additional Terminals and Cables).
- A 16-Bit CPU with 128K-Byte RAM and F9445 Instruction Set.
- A Winchester and a Double-Density Floppy Drive Provide Approximately 10M-Byte of Mass Storage.
- Memory Management and Protection Unit (MMPU) Board with 384K Bytes of RAM (Gives the System 512K Words of RAM).
- I/O Controller Board Provides Winchester/Floppy Disk Controller Interface.
- Nine Asynchronous Serial RS-232C Ports (Up to 19.2K Baud) Provide Support for CRT Terminals, Optional Letter-Quality Printer, Modem, and Other Serial Devices.
- One Synchronous Serial RS-232C Port (Up to 19.2K Baud) and Selectable Protocols, such as BISYNC, DDCMP, SDLC, and HDLC.
- PROM Programmer Port to Interface to the Optional Fairchild PROM Programmer Unit.
- Parallel Printer Port (Centronics-Compatible Interface).
- Programmable Real-Time Clock.
- Four CRT Terminals.
- Multi-User Version of IMDOS, System Processors, and System Utility Programs (see "System Software").
- BASIC Language Interpreter with Interface to Custom F9445 Assembly Language Programs.
- FS-I Diagnostic Programs.
- Provides Full Support for the F9445 and for the PEP 45 Microcomputer System.
- EMUTRAC Can Easily Be Added to the Multi-User System.

Entry-Level System

System features include:

- A 16-Bit CPU with 128K-Byte RAM and F9445 Instruction Set.
- Two Double-Density Floppy Disk Drives Provide Approximately 1M-Byte of Mass Storage.
- I/O Controller Board Provides Floppy Disk Controller Interface.
- Nine Asynchronous Serial RS-232C Ports (Up to 19.2K Baud) Provide Support for CRT Terminal, Optional Letter-Quality Printer, Modem, and Other Serial Devices.

- One Synchronous Serial RS-232C Port (Up to 19.2K Baud) and Selectable Protocols, such as BISYNC, DDCMP, SDLC, and HDLC.
- PROM Programmer Port to Interface to the Optional Fairchild PROM Programmer Unit.
- Parallel Printer Port (Centronics-Compatible Interface).
- Programmable Real-Time Clock.
- One CRT Terminal.
- Single-User Version of IMDOS, System Processors, and System Utility Programs (see "System Software").
- BASIC Language Interpreter with Interface to Custom F9445 Assembly Language Programs.
- FS-I Diagnostic Programs.
- Full Support for the F9445 and for the PEP 45 Microcomputer System.
- Hardware and Software Factory-Upgradeable to Standard or Multi-User System.
- EMUTRAC and MMPU Can Be Added to System.

System Hardware

The hardware comprising the FS-I development system is housed in a single enclosure that contains the mainframe CPU, I/O board, optional boards, and disk drives.

The mainframe consists of:

- Single-Board 16-Bit CPU with 128K Bytes of RAM, 4K-Byte PEPBUG45 PROMs for Bootstrapping the System, Real-Time Clock, an RS-232C-Compatible Port, and a Centronics-Parallel Compatible Port.
- Power Supplies.
- I/O Controller Board with the Following:
  - Eight Asynchronous Serial RS-232C Ports, with Four Ports Having Full Modem Control and All Ports Having Data Rate Selectable Up to 19.2K Baud, that Allow Timesharing by Up to Eight Concurrent Users on Systems Equipped with MMPU Board and Multi-User Operating System Software.
  - One Synchronous Serial RS-232C Port (Up to 19.2K Baud) and Selectable Protocols, such as BISYNC, DDCMP, SDLC, and HDLC.
  - A Parallel Data Channel Interface Compatible with Shugart Associates System Interface for Communicating with Disk Units.
  - 8-Bit Parallel Port to Interface with Optional Fairchild PROM Programmer.
- A Total of Nine Asynchronous Serial Ports (RS-232C-Compatible, DB25-Pin Female Connectors).
- One Parallel Printer Port (Centronics-Compatible Interface, DB25-Pin Connector).

- Expansion Slots for Fairchild's Optional I/O Controller Boards, Optional EMUTRAC Controller Board, Memory Expansion Boards, MMPU Board, and Industry-Standard, Nova® I/O-Compatible Interface Boards.
- Depending Upon System Configuration, the Mainframe Contains a Single 10M-Byte Winchester and a Single 0.5M-Byte Double-Density Floppy Disk Drive or Two 0.5M-Byte Double-Density Floppy Disk Drives.

The MMPU board expands the physical address space of the FS-I to 4M words by performing logical-to-physical address translation. This board is required for multi-user system software. With its 384K bytes of RAM, the MMPU board extends the FS-I memory to 256K words.

Hardware Options

The FS-I systems support the following Fairchild-supplied hardware options:

- Additional I/O Controller Boards that Provide Asynchronous RS-232C Ports (Up to 19.2K Baud) in Sets of Eight, a Synchronous RS-232C Port for each I/O Controller Board, Data Channel Interface to Disk Units, and a PROM Programmer Port for each I/O Controller Board.
- Fairchild's PROM Programmer Unit.
- MMPU Board that Provides Memory Mapping and Protection Expansion in Increments of 384K Bytes, Optional Multi-User Software Allows the MMPU Board to Support Eight Simultaneous Users.
- Memory Expansion Board that Provides 384K Bytes of Additional RAM (Requires an MMPU Board in the Chassis).
- EMUTRAC System Controller Board that Provides the Hardware Interface Between the CPU Board in the FS-I and Processor-Specific EMUTRAC Modules.
- EMUTRAC Modules and EMUTRAC Control Software that Support the F3870, the F6800, the F6809, and the F9445 Microprocessors.
- Additional CRT Terminals.
- Dot Matrix Printer—Texas Instruments Model 810 Basic RO Terminal (150 CPS), Centronics Parallel Interface, and Cable.
- Daisywheel Letter-Quality Printer—Qume Model Sprint 9145 with Bidirectional Forms Tractor (45 CPS), Serial Interface, and Cable.

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This powerful software package, which is included with the standard, multi-user, and entry-level systems, offers advanced capabilities that the user would normally expect from a much larger system, such as:

● **Multi-User Timesharing**
● **System Executive, Including File Management System with Version Numbers for Automatic Backup**
● **Memory Management and Protection by Memory Mapping**
● **Password Protection**
● **Interactive Command Language and Command Files**
● **Multiple Directory Devices**
● **Device-Independent I/O**
● **Hard Disk, Magnetic Tape, Modem, and Real-Time Clock Support**
● **Documentation Aids**
● **Concurrent Processing and Spooling**

System Software

The interactive multi-user disk operating system (IMDOS) is the principal operating system for the FS-I. In addition to being an operating system, the IMDOS includes the following features that are useful for developing F9445-based systems:

IMDOS	Single-User Supervisor—The supervisor manages the FS-I resources and controls the I/O.
IMDOS	Multi-User Supervisor—The supervisor manages the FS-I resources for up to eight simultaneous users, controls the I/O, and interfaces transparently to the MMPU board (included only with the multi-user system).
IMDOS	Executive—The executive provides the command language interface between the user and the supervisor.
EDIT	The EDIT program provides the ability to create and modify text files.
MACRO	The MACRO program is the macroassembler for F9445 macro assembly language.
RELOAD	The RELOAD program is used to link relocatable macro assembly language programs to create executable F9445 absolute assembly language programs.

PEPBUG45	The PEPBUG45 program is a virtual console and debugging tool for F9445 absolute assembly language programs. The PEPBUG45 program is also available in PROM.
PEPLINK45	Provides capability to download programs from the FS-I to PROM or RAM on the PEP 45 microcomputer system.
Utility Library	Implements the utility functions listed in the IMDOS and utility library users guides.
PHONE	The PHONE program establishes communication between the FS-I and a modem or telephone line. Software switches govern communication protocols.
SCRIPT	The SCRIPT program processes a text file that contains SCRIPT commands to produce an aesthetically pleasing document.
TYPESET	The TYPESET program processes a text file that contains TYPESET commands to produce an aesthetically pleasing document.
DEBUG	The DEBUG program is a debugger for F9445 macro assembly language programs.
DIAGNOSTICS	A series of programs that test the FS-I hardware. The diagnostic programs are available on diskette in a version suitable for downloading to an F9445-based system.
BASIC	Language interpreter with interface to custom F9445 assembly language programs.

Software Options

F9445 MICROFORTRAN	An extended subset of FORTRAN66 that interfaces with custom F9445 assembly language subroutines. MICROFORTRAN produces "ROMable" F9445 code and can be operated under the real-time executive (REX).
F9445 PASCAL	A Jensen and Wirth-compatible PASCAL. The F9445 PASCAL compiler generates F9445 code and interfaces with custom F9445 assembly language subroutines.
FS-I/PEP 38 System Software	Includes F8/F3870 cross assembler and program for downloading to the PEP 38 system.
FS-I/PEP 68 System Software	Includes F6800 cross assembler, F6809 cross assembler, F6800-to-F6809 translator program, and program for downloading to the PEP 68 system.
F16000 Cross Software	Assembler, debugger, and downloader allow the FS-I to generate 16000 code that can be downloaded to an F16000-based system.
F9445 REX	A real-time executive for F9445-based systems. The REX system allows creation of custom REX programs, linkable using RELOAD.
F9445 PEPBASIC	A diskette version of PEPBASIC (supplied on PROM with the PEP 45 system). A 2K-word subset of BASIC, which accepts abbreviations, that is extendable with custom F9445 assembly language subroutines.
EMUTRAC Control Software	Optional EMUTRAC control software packages provide support for each processor-specific EMUTRAC module. (Refer to *EMUTRAC Advance Product Information*.)

In addition, all Fairchild software for the FS-I is independently available without system purchase under an appropriate software license agreement.

Dimensions and Power Requirements

The FS-I standard mainframe enclosure measures only 26 inches long by 19 inches wide by 13 inches high. It requires a 115 V, 60 Hz ac power source. A 50 Hz system is also available.