

IMSAI 8080 System Introduction

INTRODUCTION

The documentation for the IMSAI 8080 Microcomputer System consists of several books. This volume, the IMSAI 8080 Microcomputer System User Manual, contains a detailed description of the features and configuration of the computer as a complete system. It also describes the printed circuit boards that form the system building blocks. The chapter format begins with a functional description of the system or board, including brief notes about all the features. The actual operation of the system or board is then described in a theory of operations section. The physical and electronic arrangement of the system or board are next shown with a photograph and a schematic. Assembly of the board from a kit is described by assembly drawings or photos, a complete parts list, and assembly instructions in each chapter. Finally, the information that tells the user how to use the design features of the board to implement various functional options is contained in a user guide section for each board.

Operation of the computer as a system is documented in the IMSAI 8080 Microcomputer System User Manual in the chapter General Assembly and Test Instructions and also in the chapter on the CP-A (Front Panel Control Board). The software supplied with the basic unit, consisting of a resident monitor, assembler and text editor is described in the last chapter of the IMSAI 8080 Microcomputer System User Manual. This chapter includes both a description of the software and a complete object listing.

Supporting documentation is provided by a copy of the Intel 8080 Microcomputer System Users Manual, supplied in every system kit to give IMSAI users the primary source of detailed information about the function and instruction set of the logic implemented by the intergrated circuit chip set used in the IMSAI 8080. A handy reference card, the Intel 8080 Assembly Language Reference Card, is supplied to summarize much useful information from this manual.

To assist users in gaining a full perspective on the design and use of microprocessor-based computer systems, IMSAI includes a basic text, An Introduction to Microcomputers.

IMSAI is currently working intensively on both additional hardware (more peripheral systems, the Shared Memory Facility, etc.) and system software. Full documentation of these additions will be made available to IMSAI owners as it is produced; the charge will be a nominal fee to cover the cost of reproduction.

System Features

IMSAI 8080 MICROCOMPUTER SYSTEM FEATURES

The IMSAI 8080 is a high quality microprocessor based computer system offering outstanding capability and flexibility at low cost.

Designed to facilitate simple modular expansion, the system has both the power and the versatility to handle a broad range of data processing needs.

The IMSAI 8080 is currently supported by a broad range of peripheral devices and interfaces, and comes with a basic resident monitor, assembler, and text editor, free of charge. A broad range of high level system software is now under development, and will be available soon in both source and object form to registered IMSAI 8080 owners at the cost of reproduction and handling.

The IMSAI 8080 is available in kit or assembled form. While primarily designed as a commercial computer, the unit is configured to facilitate construction by any careful assembler. High grade industrial quality design and components are used in both kits and assembled units.

Complete documentation is provided with each system, including:

IMSAI 8080 Microcomputer System User Manual (this book).

Intel 8080 Microcomputer Systems User's Manual, completely describing the integrated circuits used, and the instruction set.

An Introduction to Microcomputers, a fundamental textbook on the use of microcomputer systems.

a 90 day warranty on the system is provided. Full factory service is available at a cost commensurate with the work required.

SYSTEM FUNCTIONAL DESCRIPTION

The IMSAI 8080 Microcomputer System is a full-scale general purpose digital computer. Although small in size and low in cost, the system is exceedingly versatile and capable of data processing in the complete spectrum of practical applications.

The IMSAI 8080 used an 8080A microprocessor LSI chip to perform the central processing function. The instruction set provided by the 8080A is described fully in Chapter 4 of 8080 Microcomputer System User's Manual, provided as part of the IMSAI 8080 documentation package.

The IMSAI 8080 system is capable of unlimited expansion, due to the bus structure and IMSAI's exclusive shared memory facility, which permits parallel processing. The computing power that can be made available with the IMSAI 8080 system building blocks exceeds that of any currently available minicomputer.

The operation of the IMSAI 8080 is described in the manual chapters titled "General Assembly and Test Instructions" and in the CP-A Front Panel Control Board chapter. Input/output features are described in the I/O board chapters including SIO (Serial Input/Output board), PIO (Parallel Input/Output board) and UCRI (Cassette Recorder Interface board).

IMSAI 8080 SOFTWARE FEATURES

Basic system software (resident monitor, text editor and assembler) distributed in object form, with listing, and free of charge.

Future software releases are:

4K BASIC - upward compatible to DEC standard SUPER-BASIC

8K BASIC - Upward compatible to DEC standard SUPER-BASIC

12K BASIC - DEC standard SUPER-BASIC compatible

Floppy Disk Operating System

Linkage Editor

Macro-Assembler with relocatable code generation

12K FORTRAN compiler

IMSAI 8080 System
Hardware Features

IMSAI 8080 HARDWARE FEATURES

Flat cable interconnection used throughout.
Absolute minimum point-to-point wiring.
Front panel has programmed output port with LED indicators.
Front panel has large easy-to-use paddle handle switches.
Front panel legends are produced photographically and mounted behind acrylic panel for protection.
Front panel has filler to increase contrast of LED indicators.
Long-life LEDs used throughout.
Front panel circuit designed so that one-shot timing links are non-critical.
No point-to-point wiring to connect or disconnect front panel to or from system.
Attractive custom designed cabinet and panel.
Rackmount cabinet available as special option.
Cabinet designed to facilitate customizing front panel.
Sturdy card cage construction.
Room for 22 cards.
Power supply subchassis with high-current transformer and computer-grade electrolytic capacitors.
Heavy duty power supply supplies power sufficient for a full complement of cards (28 amps, up to 500 watts).
Straight-through back plane wiring. No special purpose slots.
Front panel plugs into any slot to operate machine.
Double-sided printed circuit boards with plated-through holes and solder mask.
All board contact fingers are gold-plated over nickel.
PC board material is glass-fiber-reinforced epoxy laminate.
On-board power regulation. Power is regulated by integrated circuit regulators with thermal current limits.
Tantalum board decoupling capacitors. Ample .1uf disk ceramic power decoupling capacitors.
Designed with latest LSI and MSI components. Package count minimized.
Heavy current tri-state bus drivers used throughout the system.
System designed from initial concept for multi-processor, shared memory options.

IMSAI 8080
Microcomputer System
Specifications

MICROCOMPUTER SYSTEM SPECIFICATIONS

Processor: 8080A microcomputer chip

Directly Accessible Memory: 65,536 words
Word Size: 1 byte (8 bits)
Register Instruction Cycle Time: 2 microseconds
Basic Machine Cycle Time: 0.5 microseconds
Directly Accessible Input and Output Ports: 256
Machine Instruction Set Size: 78 basic instructions
(181 instructions with variants)
Nested Subroutine Call Capability: Limited only by memory
size
Interrupt Capability: 8 hardware levels
Registers: 6, plus stack pointer, program counter and
accumulator

Memory Type: Semiconductor (1024x1 format chips)

Cabinet: Custom aluminum case with acrylic front panel

Dimensions: 19½" x 17" x 7"
Weight: 40 pounds
Front Panel Switch Type: Paddle
Color: IBM blue and grey

Power: 28 amp unregulated power supply with onboard regulators

Power Requirement: Under 50 watts for basic system
Maximum Power Capability: Up to 500 watts
Power Type: 115 VAC, 60 hz. single phase

Connections: Mounting space for 10 EIA-type 25-pin connectors
on the back panel. Opening and cable clamp provided for
flat cables to exit from the cabinet. 3M flat cable
system used throughout.