IMSAI

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Microcomputer Systems.

IMDOS

IMSAI Multi-Disk Operating System
Version 2.05

SYSTEM FEATURES

Video/Context Editor
Powerful Debugging Utility
8080/85 Assembler
Disk and RAM Diagnostics
Data Management Facilities
Dynamic File Space Allocation
Random or Sequential Access
Scientific BASIC
CP/M* Compatible

IMDOS, the IMSAI Multi-Disk Operating System, is a powerful, user-oriented, multi-floppy disk based operating system compatible with CP/M. IMDOS can be used to simultaneously operate various IMSAI standard and mini disk drives utilizing a number of formats, such as various sector sizes, single and double density, and standard and double track.

IMDOS contains over twenty utilities, including a video/context editor, assembler, dynamic debugging tool, disk and memory testing program, as well as facilities for data management. Under IMDOS, the user may vary the system disk format and sector skewing for increased file access speed, and extend or decrease the number of directory entries. An error control option allows user selection of error handling. Volume names provide data security and diskette identification.

In addition to the IMDOS operating system, Scientific BASIC is supplied. This high level language program has all the usual disk-interactive BASIC features, including real numbers, trigonometric functions and string handling functions. Scientific BASIC also has these extra features: INPut and OUTput of data directly to I/O ports, FREe available memory space, and special file I/O commands, FILE, PRINT, READ, CLOSE and IF END.

IMDOS is compatible with all IMSAI floppy disk software, including ANSI Level 2 FORTRAN IV, a linking loader and three other kinds of BASIC -- Microsoft, Commercial and 8K.

DATA MANAGEMENT FACILITIES

File Management functions include the creation, renaming, modification, transfer and deletion of files under user program control. Job Management provides a user-extendable command language with provisions for "batching" together system operating commands for automatic processing. Storage Management routines in IMDOS control disk space allocation and re-allocation.

ADDING CUSTOMIZED DRIVERS

Adding customized drivers is important to the application programmer who wishes to mix peripherals. IMDOS includes the source for the I/O drivers. The user can edit BIOS (Basic Input/Output System) to contain the new driver software and then incorporate the new BIOS into the system using the M80 Relocating Assembler and Genesys. Genesys automatically takes care of any changed length of the I/O driver. The modified source code is assembled with the M80 Relocating Assembler, available as part of IMSAI's FORTRAN IV.

*CP/M is a trademark of Digital Research Corporation.
IMDOS is compatible with CP/M Rev. 1.33.

FILE ACCESS METHODS

Sequential and random access to records in files support the sophisticated file capabilities of high level languages. When initially formatting a disk, the user may relocate the directory on the diskette to increase file access speed. Under IMDOS, the user may vary the length of records within a file. Disk space is allocated in 1K or 2K increments, and a file can be just 1K or any length up to the storage capacity of the diskette.

DISK ADDRESSING

IMDOS is capable of addressing multiple disk interfaces on-line concurrently. Based upon the number and type of drives utilized, each drive is assigned a physical address from 1 through 95. Logical device names, under program or operator control and represented by the letters A through W, may be assigned to any physical device.

SYSTEM FEATURES

The console command processor and system utilities, contained as individual program files on the IMDOS diskette, provide a complete repertoire of console commands from which all program initialization, operation, revision and storage is controlled. The command processor accepts two classes of commands, resident and transient.

Resident commands may be executed when IMDOS has been loaded into RAM memory. These commands are evoked from the console keyboard and do not appear in the file directory as do transient commands and programs.

Any file on the diskette with filetype extension ".COM" may be loaded by the console command processor into the transient program area and executed. These transient programs may be either system utilities or user-generated programs.

IMDOS RESIDENT COMMANDS

DIR -- The DIRectory command outputs the volume name of the diskette and all the files on the diskette, or all of the files of a particular generic grouping, onto the current console device (CRT or TTY) as specified by the user.

TYPE -- The TYPE command prints the contents of a specific program file on the current console device.

ERA -- The ERAse command deletes the specified program file(s) and frees the space previously occupied for new files.

SAVE -- The SAVE command places a specified number of pages from the transient area of memory into a file with a name specified by the user.

VER -- This command causes the system sign-on message to be displayed. This allows the user to check the VERsion and memory size of the running system without reloading IMDOS into RAM.

GO -- Runs whatever is in the transient program area.

REN -- The REName command allows the user to re-name files on disk.

IMDOS TRANSIENT PROGRAMS

SYSMOV -- SYSMOV copies the IMDOS system image to another diskette.

STAT -- The STAT function performs several operations:

displays amount of storage on the diskette.

displays storage bytes and number of records allocated to a file or files.

switches between single and double density format.

displays possible device assignments.

displays device name assignments (the logical name assigned to each physical device).

alters disk and device name assignments.

DISKCOPY -- DISKCOPY allows an entire disk to be copied at one time without using PIP. DISKCOPY formats the new disk and verifies the correct transfer of disk files.

PIP -- The Peripheral Interchange Program, PIP, provides a general purpose data transfer capability from file-to-file, device-to-device, file-to-device and device-to-file. The PIP command statement permits the user to merge

many files into a single file, to transfer files from one disk to another, and to specify the copying of many files by generic groupings. PIP options include file verification - reading and checking the destination file following a copying operation - as well as character-string testing for start/stop delimiters.

GENESYS -- The GENESYS utility performs several important functions. The user can:

> relocate the IMDOS system image for any particular memory size.
>
> set up the number of file buffers.
>
> set up the length of buffers (128, 256 or 1024 bytes).
>
> select a cold boot command. This allows the user to set up a disk so that, when the operator hits RESET, a specific message will be displayed or a specific program will be executed.
>
> customize the memory partitioning under IMDOS to the user's own special needs by choosing the amount of space to be taken by buffers, the transient program area and free space.
>
> modify drivers to add customized I/O.*

NED -- A very powerful component of IMSAI IMDOS is the NED Video/Context Editor. NED allows a complete range of video cursor editing as well as editing based on character pointer position or contextual string-matching.

Using video cursor editing with a CRT or video monitor, the control keys are defined in a special way for NED and allow powerful sub-editing commands as well as character, word and sentence insertion for creating source programs or text. Video cursor editing will work with any IMSAI VIO video interface-based system (i.e. VDP or PCS series) and some CRT terminals.

Editing based on character pointer position or contexual string-matching enables single, multiple or global string-substitution; character or string deletion by context or count, etc. Editing operations may be entered as a string of commands enabling a trained operator to specify complex operations, such as replacing paragraphs, changing letters and deleting sentences, all in one command. Macro-operations can be specified for repetitive operations. Segments of a file may be placed in a buffer to be relocated in another place within the file. Commands may be placed in a buffer for later execution.

*Requires the use of the M80 Relocating Assembler, which may be acquired by purchasing IMSAI's FORTRAN IV.

DIABLO -- DIABLO copies files to a HyType II 132-column character printer.

LOAD -- LOAD reads the assembler object file "name.HEX" and creates the file "name.COM" containing the same program in binary machine-executable form.

SHAKDOWN -- SHAKDOWN is a diagnostic that thoroughly tests the disk and memory. SHAKDOWN helps you locate any hardware problems in the system or verify that the system is operating properly.

BASIC-E, RUN-E -- Included with IMDOS is BASIC-E, an extended disk BASIC compiler, and RUN-E, the BASIC-E run time monitor. These programs respectively compile and execute programs written in Scientific BASIC.

FORMAT -- FORMAT initializes a diskette for use with the operating system to allow the hardware to locate tracks and sectors written on the diskette, creates an empty directory of user-selectable size, and writes a VOLUME CONTROL BLOCK (VCB) on the diskette. The VCB contains the diskette's physical characteristics and file structure. The user can select where to place the directory on the diskette to optimize seek times.

SUBMIT -- Using SUBMIT, IMDOS commands can be batched together in a single file for automatic processing and executed as though they were entered individually at the console. Thus, the user can maintain a procedure library of specific command sequences using SUBMIT. In addition, a SUBMIT file can contain SUBMITs, allowing the chaining of SUBMIT commands. "Parameter substitution" permits IMDOS utilities to be batched together to automatically process a file through a sequence of operations, such as NED, ASM and DDT.

LIST -- The LIST command copies a disk file, or all of the files of a particular type, to the current list device (e.g., line printer or CRT), inserting page headings and page numbers.

DUMP -- The DUMP command causes the disk file indicated to be displayed on the current console device in hexadecimal form.

DDT -- The Dynamic Debugging Tool (DDT) has extensive facilities for debugging programs. Utility functions of DDT allow disk file patching and file back-up or transfer in a single disk system. Also included in the debugging facilities are a disassembler, a combination hexadecimal/ASCII DUMP command, an 8080/85 op/code assembler, break-point set/reset capability, and single and multiple instruction-execution tracing facilities.

ASM -- The IMDOS assembler reads assembly language source files created with NED and produces executable 8080/85 machine language programs in Intel HEX format. The IMSAI IMDOS assembler is compatible with the Intel standard, including conditional assembly instructions, but not including macro-instructions. Several useful enhancements are provided in ASM for increased utility and ease of programming, including 16-character labels with embedded $ signs (this is useful primarily as a documentation aide), multiple statements per line and the 8085 SIM and RIM instructions for handling interrupts.

HARDWARE REQUIREMENTS

IMDOS requires the following system hardware components:

IMSAI Mainframe:

I-8080 or any IMSAI VDP or PCS computer system.

RAM Memory:

A minimum of 16K bytes of RAM memory; amount depends on application. NED, BASIC-E, RUN-E or a system configured to handle sectors long than 128 bytes (such as double density formats) take 20K minimum. A 32K or larger system is recommended for extensive development work.

Mass Storage:

One or more IMSAI floppy disk drives with controller interface, such as PCS-80/22A or C, PCS-80/25, VDP or PCS system (including mainframe).

Peripheral Devices:

At least one input/output device, such as an IMSAI keyboard with monitor, Lear-Sigler ADM-3A CRT Terminal, DecWriter, Diablo HiTerm, etc.

OPTIONAL HARDWARE SUPPORTED

Line Printer - Teletype Model 40 300-lpm Printer
Character Printer - Diablo Hytypes and HiTerms
IMSAI's Expansion Standard Disk Drives

As supplied, IMDOS is ready-to-run with all standard IMSAI peripherals. However, for the convenience of users wishing to modify IMDOS for use with other types of consoles or printers, IMDOS includes source code for device drivers. The modified code is assembled with the M80 Relocating Assembler, available as part of IMSAI's FORTRAN IV.

SOFTWARE MEDIA

IMDOS software is furnished on a single 8" diskette for standard drives, three 5¼" diskettes for 35 or 40-track mini-drives and one 5¼" diskette for 77-track mini-drives.

DOCUMENTATION

IMSAI furnishes a user manual describing installation, programming and operating instructions, as well as detailed information on system modification to suit specialized needs of individual users.

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