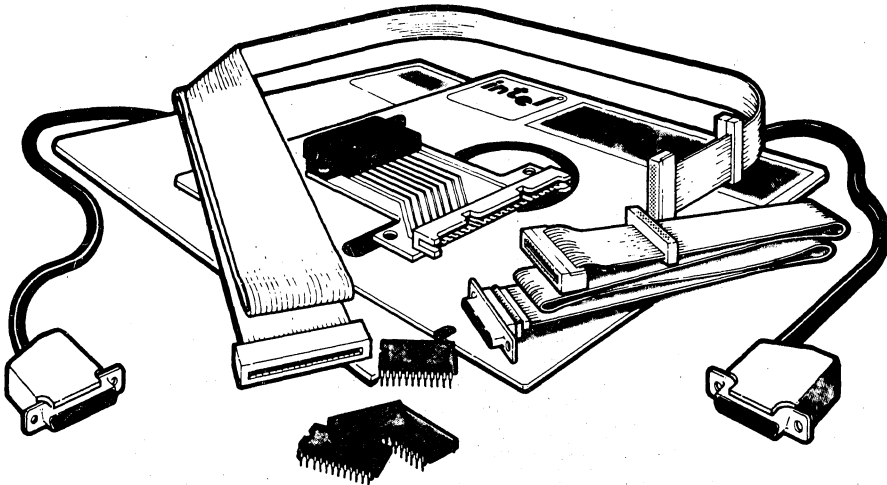# intel®

# iSDM™
# SYSTEM DEBUG MONITOR

- ■ Supports Target System Debugging for iSBC® 8086, 8088, 80186, 80188, 80286 and 80386 Based Applications
- ■ Provides Interactive Debugging Commands Including Single-Step Code Execution and Symbolic Displays of Results
- ■ Supports 8087 Numeric Processor Extension (NPX) for High-Speed Math Applications
- ■ Allows Building of Custom Commands Through the Command Extension Interface (CEI)

- ■ Supports Application Access to ISIS-II Files
- ■ Provides Program Load Capability from an Intellec® Development System and from iSBC 8086, 8088, 80186, 80188, 80286 and 80836 iRMX® 86 and 286 Development System
- ■ Contains Configuration Facilities which Allow an Applications Bootstrap from iRMX® File Compatible Peripherals
- ■ Modular to Allow Use from an Intellec® Development System, from a Stand-Alone Terminal or from iRMX 86 or iRMX 286 Based Systems

The Intel iSDM™ System Debug Monitor package contains the necessary hardware, software, cables, EPROMs and documentation required to interface, through a serial or parallel connection, an iSBC 86/05, 86/12A, 86/14, 86/30, 88/25, 88/40, 88/45, 186/03, 186/51, 188/48, 286/10, 286/10A, 286/12, 386/2X, or 8086, 8088, 80186 or 80188, 80286 and 80386 target system to an MDS 800, Series II, Series III, or Series IV Intellec® Microcomputer Development System or iRMX 86 or 286 Based System for execution and interactive debugging of applications software on the target system. The Monitor can: load programs into the target system; execute the programs instruction by instruction or at full speed; set breakpoints; and examine/modify CPU registers, memory content, and other crucial environmental details. Additional custom commands can be built using the Command Extension Interface (CEI). The Monitor supports the OEM's choice of the iRMX 86 Operating System, the iRMX 286 Operating System, the iRMX 88 Real-Time Multi-Tasking Executive or a custom system for the target application system. OEM's may utilize any iRMX supported target system peripheral for a bootstrap of the application system or have full access to the ISIS-II files of the Intellec System or the iRMX file system.



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# FUNCTIONAL DESCRIPTION

## Overview

The iSDM Monitor extends the software development capabilities of the Intellec system so the user can effectively develop applications to ensure timely product availability.

The iSDM package consists of four parts:

- The loader program
- The iSDM Monitor
- The Command Extension Interface (CEI)
- The ISIS-II Interface

The user can use the iSDM package to load programs into the target system from the development system, execute programs in an instruction-by-instruction manner, and add custom commands through the command extension interface. The user also has the option of using just the iSDM Monitor and the CEI in a stand-alone application, without the use of a development system.

## Powerful Debugging Commands

The iSDM Monitor contains a powerful set of commands to support the debugging process. Some of the features included are: bootstrap of application software; selective execution of program modules based on breakpoints or single stepping requests; examination, modification and movement of memory contents; examination and modification of CPU registers, including NPX registers. All results are displayed in clearly understandable formats. Refer to Table 1 for a more detailed list of the iSDM monitor commands.

## Numeric Data Processor Support

Arithmetic applications utilizing the 8087 or 80287 Numeric Processor Extension (NPX) are fully supported by the iSDM Monitor. In addition to executing applications with the full NPX performance, users may examine and modify the NPX's registers using decimal and real number format.

This feature allows the user to feel confident that correct and meaningful numbers are entered for the application without having to encode and decode complex real, integer, and BCD hexadecimal formats.

## Command Extension Interface (CEI)

The Command Extension Interface (CEI) allows the addition of custom commands to the iSDM Monitor commands. The CEI consists of various procedures that can be used to generate custom commands. Up to three custom commands (or sets of commands) can be added to the monitor without programming new EPROMs or changing the monitor's source code.

**Table 1. Monitor Commands**

| Command | Function |
|---|---|
| B | **Bootstrap** application program from target system peripheral device |
| C | **Compare** two memory blocks |
| D | **Display** contents of memory block |
| E* | **Exit** from loader program to ISIS-II Interface |
| F | **Find** specified constant in a memory block |
| G | **Execute** application program |
| I | **Input** and display data obtained from input port |
| L* | **Load** absolute object file into target system memory |
| M | **Move** contents of memory block to another location |
| N | **Display and execute** single instruction |
| O | **Output** data to output port |
| P | **Print** values of literals |
| R* | **Load and execute** absolute object file in target system memory |
| S | **Display and (optionally) modify** contents of memory |
| T* | **Transfer** block of memory to file |
| U, V, W | **User** defined custom commands extensions |
| X | **Examine and (optionally) modify** CPU and NPX registers |

*Commands require an attached development system.

## ISIS-II Interface

The ISIS-II interface consists of libraries which contain interfaces to ISIS-II I/O calls. A program running on an 8086, 8088, 80186, or 80188-based system can use the ISIS-II interface and access the individual ISIS-II I/O calls. The interface allows the inclusion of these calls into the program; however, most of the calls require a Series II/Series III system. Table 2 contains a summary of the major I/O calls and parameters.

## Program Load Capability

The iSDM loader allows the loading of 8086, 8088, 80186, 80188, 80286 or 80386-based programs into the target system. It executes on a development system and communicates with the target system through a serial or a parallel load interface.

## Configuration Facility

The monitor contains a full set of configuration facilities which allows it to be carefully tailored to the re-
quirements of the target system. Pre-configured EPROM-resident monitors are supplied by Intel for the iSBC 86/05A, 86/14, 86/30, 86/35, 88/25, 88/10A, 88/45, 186/03A, 186/51, 188/48, 188/56, 286/10A, 286/12, 286/100, 386/2X, and 386/100 boards. The monitor must be configured by the user for the iSBC 86/12A board and for other 8086, 8088, 80186, or 80188 applications. iRMX 86 and iRMX 286 system users may use the configuration facilities to include the Bootstrap Loader (V5.0 or newer) in the monitor.

## Variety of Connections Available

The physical interface between the development system and the target system can be established in one of three ways. The systems can be connected via a serial link, a parallel link or a fast parallel link. The cabling arrangement is different depending upon the development system being used.

The iSDM Monitor does not require the use of a development system. The monitor can be used by simply attaching a stand-alone terminal to the target system.

**Table 2. Routines for Services Available to Target System Applications**

| Routine | Target System Function |
|---------|------------------------|
| ATTRIB | Changes to ISIS-II file **attribute** |
| CI | Returns a character **input** from the **console** |
| CO | Transfers a character for **console output** |
| CLOSE | **Closes** an opened file |
| DELETE | **Deletes** the specified file |
| DQ$CFG | Returns information about monitor's communication link and type |
| ERROR | Displays an **error** message on the console |
| EXIT | **Exits** to the target system monitor |
| LOAD | **Loads** target system memory with object code file |
| OPEN | **Opens** a file for access |
| READ | **Reads** up to 4096 bytes from a file to memory |
| RENAME | **Renames** a disk file |
| SEEK | **Seeks** to the specified file location |
| WRITE | **Writes** up to 4096 bytes from memory to a file |

## SPECIFICATIONS

### Hardware
- Supported iSBC Microcomputers:
  - iSBC 86/05  Single Board Computer
  - iSBC 86/12A  Single Board Computer
  - iSBC 86/14  Single Board Computer
  - iSBC 86/30  Single Board Computer
  - iSBC 88/25  Single Board Computer
  - iSBC 88/40  Single Board Computer
  - iSBC 88/45  Single Board Computer
  - iSBC 186/30  Single Board Computer
  - iSBC 186/51  Single Board Computer
  - iSBC 188/48  Single Board Computer
  - iSBC 186/56  Single Board Computer
  - iSBC 86/35  Single Board Computer
  - iSBC 88/40A  Single Board Computer
  - iSBC 816/03A  Single Board Computer
  - iSBC 286/10A  Single Board Computer
  - iSBC 286/12  Single Board Computer
  - iSBC 286/100  Single Board Computer
  - iSBC 386/2X  Single Board Computer
  - iSBC 386/100  Single Board Computer
- Supported iSBX MULTIMODULE Boards:
  - iSBX 350 Parallel I/O MULTIMODULE Board
  - iSBX 351 Serial I/O MULTIMODULE Board

### iSDM™ 86 Package Contents

Cables:

1—Parallel I/O Cable (upload/download)
4—RS232 Cable Assemblies
Hardware package for the cable assemblies

Interface and Execution Software Diskettes:
2—SSIDD, ISIS 11-Format 8″
2—DSIDD, iRMX-Format 5¼″
2—SSIDD, iRMX—Format 8″

System Monitor EPROMs:

| Intel Board | EPROM Description |
|---|---|
| iSBC 86/05A<br>iSBC 86/14<br>iSBC 86/30<br>iSBC 86/35 | Two 27128 EPROMs |
| iSBC 86/12A* | SUBMIT Files on the<br>Release Diskette |

System Monitor EPROMs: (Continued)

| Intel Board | EPROM Description |
|---|---|
| iSBC 88/25 | Two 27128 EPROMs |
| iSBC 88/40A | Two 27128 EPROMs |
| iSBC 88/45 | Two 27128 EPROMs |
| iSBC 186/03A | Two 27128 EPROMs |
| iSBC 186/51 | Two 27128 EPROMs |
| iSBC 188/48<br>iSBC 188/56 | Two 27128 EPROMs |
| iSBC 286/10A<br>iSBC 286/12 | Two 27128 EPROMs |
| iSBC 286/100 | Two 27128 EPROMs |
| iSBC 386/2X | Two 27256 EPROMs |
| iSBC 386/100 | Two 27256 EPROMs |

### Reference Manual (Supplied):

iSDM System Debug Monitor Installation and Configuration

iSDM System Debug Monitor User's Guide

## ORDERING INFORMATION

**Part Number  Description**

iSDM RO  Object Software

Intellec to target system interface and target system monitor, suitable for use on iSBC 86, 88, 186, 188, 286, 386 computers, or other iAPX 86, 88, 186, 188, 286, 386 microcomputers. Package includes cables, EPROMs, software and reference manual.

The OEM license option listed here allows users to incorporate iSDM into their applications. Each use requires payment of an Incorporation Fee.

The iSDM package also includes 90 days of support services that include Software Program Report Services.

As with all Intel Software, purchase of any of these options requires execution of a standard Intel Software License Agreement.