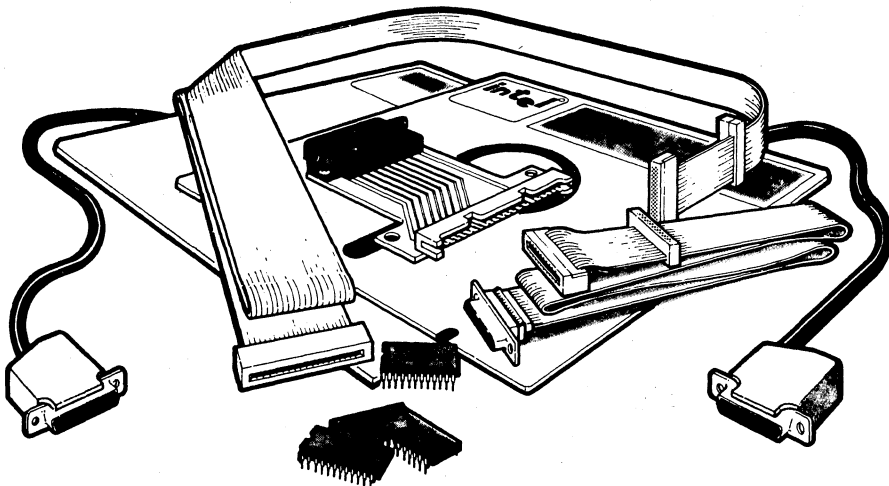




iSDM™ 86 SYSTEM DEBUG MONITOR

- Supports target system debugging for iSBC® /iAPX 86, 88, 186 and 188-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
- Contains configuration facilities which allow an applications bootstrap from iRMX™ 86 and 88 file compatible peripherals
- Modular to allow use from an Intellec® Development System or from a stand-alone terminal

The Intel iSDM™ 86 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, or iAPX 86, 88, 186 or 188 target system to an MDS 800, Series II, Series III, or Series IV Intellec® Microcomputer Development 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 88 Real-Time Multi-tasking Executive or a custom system for the target application system. OEM's may utilize any iRMX 86, 88 supported target system peripheral for a bootstrap of the application system or have full access to the ISIS-II files of the Intellect System.



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FUNCTIONAL DESCRIPTION

Overview

The iSDM 86 Monitor extends the software development capabilities of the Inteltec system so the user can effectively develop applications to ensure timely product availability.

The iSDM 86 package consists of four parts:

- The loader program
- The iSDM 86 Monitor
- The Command Extension Interface (CEI)
- The ISIS-II Interface

The user can use the iSDM 86 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 86 Monitor and the CEI in a stand-alone application, without the use of an Inteltec development system.

Powerful Debugging Commands

The iSDM 86 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 86 monitor commands.

Numeric Data Processor Support

Arithmetic applications utilizing the 8087 Numeric Processor Extension (NPX) are fully supported by the iSDM 86 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 86 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

Table 1. Monitor Commands

| Command | Function |
|---------|--|
| B | Bootstrap application program from target systems 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 Inteltec® 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 Inteltec® object file in target system memory |
| S | Display and (optionally) modify contents of memory. |
| T* | Transfer block of memory to an Inteltec® file |
| U,V,W | User defined custom commands extensions |
| X | Examine and (optionally) modify CPU and NPX registers |

* Commands require an attached Series II/Series III.

to the monitor without programming new EPROMs or changing the monitor's source code.

ISIS-II Interface

The ISIS-II interface consists of libraries which contain interfaces to ISIS-II I/O calls. A program running on an iAPX 86, 88, 186 or 188-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 86 loader allows the loading of iAPX 86, 88, 186 or 188-based programs into the target system. It executes on a Intellec Microcomputer Development System and communicates with the target system through a serial or a parallel load interface. If a Series II/ Series III/ Series IV system containing an Intel I/O expansion board is being used, the board can be used as a fast parallel load interface, freeing up the UPP port for application use.

Configuration Facility

The monitor contains a full set of configuration facilities which allow it to be carefully tailored to the requirements

of the target system. Pre-configured EPROM-resident monitors are supplied by Intel for the iSBC 86/05, 86/12A, 86/14, 86/30, 88/45, 186/03, 186/51, and 188/48 boards. The monitor must be configured by the user for the iSBC 88/25, 88/40 boards and for other iAPX 86, 88, 186, 188 applications. iRMX 86 and iRMX 88 system users may use the configuration facilities to include the iAPX 86, 88 Bootstrap Loader (V5.0 or newer) in the monitor.

Variety of Connections Available

The physical interface between the Intellec Microcomputer 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 fast parallel link requires the use of an iSBC 108(A), 116(A), 517 or 519 I/O expansion board in the Intellec system and is only available for connections with the Series II/ Series III/ Series IV systems. The cabling arrangement is different depending upon the development system being used. Figure 1 displays the cable connections needed between an Intellec Series III system and a target system for a serial interface.

The iSDM 86 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. Figure 1 also displays the cable connections needed for this arrangement.

Table 2. Routines for ISIS-II 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 ISIS-II file |
| DELETE | Deletes the specified ISIS-II file |
| DQ\$CFG | Returns information about monitor's communication link and type |
| ERROR | Displays an error message on the Intellec® console |
| EXIT | Exits to the target system monitor |
| LOAD | Loads target system memory with ISIS-II object code file |
| OPEN | Opens an ISIS-II file for access |
| READ | Reads up to 4096 bytes from an ISIS-II file to memory |
| RENAME | Renames an ISIS-II disk file |
| SEEK | Seeks to the specified ISIS-II file location |
| WRITE | Writes up to 4096 bytes from memory to an ISIS-II file |

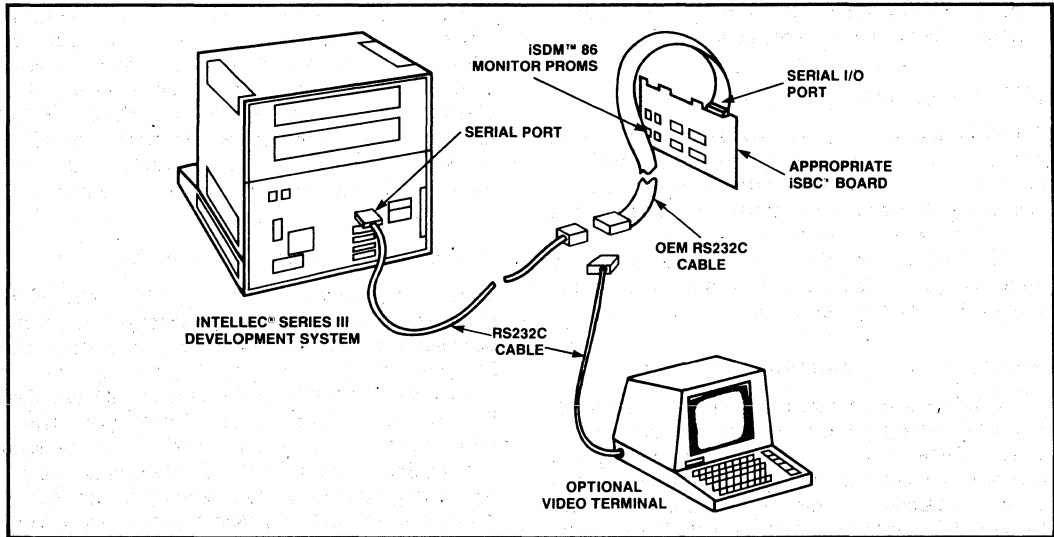


Figure 1. Typical iSDM™ 86 Serial Connection Environment

SPECIFICATIONS

Development System Environment

The Intellec Microcomputer Development System may be utilized for application program development and, if used, requires the following to support the iSDM 86 package:

- 48 Kbytes memory
- Double density or single density diskette subsystem
- ISIS-II Operating System and associated language translators

iAPX 86, 88, 186, 188 TARGET SYSTEM ENVIRONMENT

To support the iSDM 86 package, the target system must contain the following:

- 2K read-write memory beginning at location 0H
- 16K read-only memory beginning at location FC000H
- For Parallel link:
 - 8255A Programmable Peripheral Interface

- For Serial link:
 - 8251A USART or 8274 Multiprotocol Serial Controller, and 8253/4 or 80130 or iAPX 186/188 timer, or
 - 82530 Serial Communications Controller, including 82530 timer

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 186/03 | Single Board Computer |
| iSBC 186/51 | Single Board Computer |
| iSBC 188/48 | 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)
- 2 — RS232 Cables

Adaptors:

- 1 — Parallel Status Adaptor
- 1 — Parallel Adaptor

I/O Drivers and Terminators:

- 4 — Pull-up Resistor Packs
- 4 — Pull-up/down Resistor Packs
- 4 — Line Driver Packs

Interface and Execution Software Diskettes:

- 1 — Single Density, ISIS Compatible
- 1 — Double Density, ISIS Compatible

System Monitor EPROMs:

| Microcomputer | EPROM |
|---------------|-------------------|
| iSBC® 86/05 | Four 2732A EPROMs |
| iSBC® 86/12A | |
| iSBC® 86/14 | |
| iSBC® 86/30 | |
| iSBC® 88/45 | Two 2764 EPROMs |
| iSBC® 186/03 | Two 2764 EPROMs |
| iSBC® 186/51 | |
| iSBC® 188/48 | Two 2764 EPROMs |

Reference Manual (Supplied):

146165-001 — iSDM 86 System Debug Monitor Reference Manual

ORDERING INFORMATION
Part Number Description

| | |
|-------------|--|
| iSDM 86 | <p>Inteltec to target system interface and target system monitor, suitable for use on iSBC 86, 88, 186, 188 computers, or other iAPX 86, 88, 186, 188 microcomputers. Package includes cables, EPROMs, software and operator manual.</p> <p>The iSDM 86 package includes SPR Service for 90 days after shipment.</p> <p>As with all Intel Software, purchase of any of these options requires execution of a standard Intel Master Software License.</p> |
| iSDM 86 RO | Object Software |
| iSDM 86 BSR | Machine Readable Source |