MDT 650...THE MICROCOMPUTER DEVELOPMENT TERMINAL

The MDT650 is a high level development tool for modeling new designs. New flexible modular techniques of system verification are provided the user prior to a "hard" finalized design commitment. Fully programmable user control is among the many outstanding features. Interactive design allows the user to assemble programs, debug software with on-line editing capability and, when the design is considered correct, program PROMS. The MDT can be interfaced through the integral keyboard/display or via a port for TTY or higher speed peripherals. The standard resident assembler, in conjunction with systemized option cards for interactive debugging, allow the user to engage this system as a total development tool for preproduction and final production systems.

GENERAL SYSTEM DESCRIPTION

The MDT650 series microcomputer development terminal evaluates and debugs the user's programs and system hardware. The unit can be configured to a wide range of design applications. Considerable development time and money may be saved through the unit's unique ability to allow user-system emulation. The MDT650 provides the user a completely separate processor and bus structure to configure his application without regard to memory or executive I/O functions. This eliminates executive overhead time during real time execution...particularly important for interrupt routines.

Two MCS650X series microprocessors are used to control all system functions. Interaction with the MDT650 is normally with the integral keyboard/display. A TTY or other terminal device can also be used. Expandable port configurations are TTL compatible.

The standard MDT650 system allows the user to assign up to 65K of memory as desired (with independent address and data bases). The ROM resident system monitor includes all necessary functions for program loading, debugging, and execution. A resident assembler may be used to assemble machine instructions. Interpretation of machine codes is language to original OP codes, labels and mnemonics. A resident editor provides source language editing capability.

HARDWARE FEATURES

Integral Keyboard with separate function keys for control.

Built-in 32 character display.

Terminal inputs for variety of terminals. Selectable BAUD rates of 110, 150, 300, 600, 1200, 2400, 4800 or 9600 are also provided.

Two address traps are provided to halt the user processor on: any address; instruction (operand fetch); read cycle or write cycle

Two scope syncs: address trap sync and instruction fetch (operand)cycle sync.

Single instruction mode with firmware enhancement.

HARDWARE FEATURES CONTINUED

Trace stack memory for storing the last 128 machine cycles. (Visually displayed using the disassembler firmware).

Seven board positions provided for user memory, bus light display, I/O or user options such as custom wire wrap boards.

Control firmware for the assembler, disassembler, and test editor that is independent of the user's 65K memory limit.

SOFTWARE SUPPORT

The MDT650 software consists basically of three straightforward and highly useful programs: the assembler, the disassembler and the text editor.

The MDT assembler is upwards compatible with the MCS650X Cross-Assembler. Features include:

  - Can assemble from source tape or user RAM... eliminates having to feed the source tape through the reader two times.

  - Six character labels and symbols.

  - Free-form entry of source statements.

  - Symbol table output.

  - Error flags on listing.

  - Assembled program is user memory ready for execution.

  - Paper tape output option - compatible with loader

The MDT disassembler commands include:

  Note: For maximum user control, most of the following commands have corresponding function keys provided on the integral keyboard. Additionally, the MDT has function keys to show register, program counter, accumulator, index and status registers, stack pointer, and either trap address; also provided are function keys to alter individual registers...display shows what register is being altered, and a selectable enable/disable switch for TTY printing.

  - Display address. 8 bytes are displayed and cursor is positioned at start of first byte to allow it to be altered. If you want to alter, just start typing. The display is automatically changed after each two input characters (one byte of memory) so multiple alters are easily made. (Function keys provide the capability of displaying forward by one or eight characters.)

  - Load interface file (symbols and code).

  - Go to address. Execute one instruction and automatically disassemble.

  - Run. Executes user program.

SOFTWARE SUPPORT CONTINUED

- Trap address and mode. Sets appropriate instruction.

- Forward one instruction from current location in stack.

- Backward one instruction.

- Show last/next cycle. Address, label at this address (if any), data, and decoded flags are displayed.

The MDT test editor program saves considerable money and frustration compared with trying to edit a paper tape by hand. The following capabilities are provided:

- Loads text buffer

- Insert or delete line

- Insert or delete character at current position in line

- Forward/backward one character

- Will step forward or backward to next blank (Very useful for jumping from label field to OP Code field, etc.)

- Goes to top or bottom of text

- Indexes up or down one line

- Search/find capability on first field

- Provides output text to printer/punch

STANDARD EQUIPMENT (BASE SYSTEM)

Dual Micro Processor Module
RAM Memory Module
Program trace and address trap board
  I/O board for Keyboard, Display and
  Peripherals
Resident Monitor ROM Module
Chassis with 14 Board Slots
Power Supplies
Finished Cabinet
Keyboard and Display
System Monitor
Assembler
Text Editor
User's Manual
MCS650 Assembly Language Programming Manual
MCS650 Assembly Language Reference Card

OPTIONS

PROM programmer available for 82S115, 2708 or 1702A.
Wire-wrap boards for custom designs.
Extender board module

Light display board to display address and data busses
4K RAM board
8K PROM board
2K RAM/4K PROM board
I/O board...allows interfacing system to various peripheral devices and terminals
Write protect available on user RAM
High speed ports for printer, card readers, etc. (and associated cables).
Floppy disc interface will be available at a later date
ICE (In-Circuit Emulator)
Source Listing

AVAILABILITY

The base system will be available in second quarter, 1976 with the various Hardware options becoming available in second and third quarters, 1976.

COST

$3,950.00 (Base System). Cost of options will be available at a later date.