MSI STD BUS
Embedded Series

MSI-C851 80C51
Microcontroller Card

APPLICATIONS

♦ Ideal for low-power embedded applications requiring a single board computer (SBC) with multi-function capabilities requiring only +5V power.

♦ Real time monitoring and control operations in harsh industrial environments.

♦ RTU and SCADA systems.

♦ Test and measurement instruments.

DESCRIPTION

The MSI-C851 is designed specifically to offer economic solutions for embedded applications of low to medium complexity, particularly those employing DOS-based systems that often necessitate unused hardware and the use of multiple cards. The new design is very effective for use in RTU and SCADA systems, test and measurement instruments, and real time monitoring and control tasks requiring low power in harsh industrial environments. The card incorporates the popular 80C51-type CMOS microcontroller and operates at a clock frequency of 11.059 MHz from a single +5V supply. An STD BUS interface provides for addressing 256 I/O mapped input devices and 256 I/O mapped output devices using IOEXP. The unit is compatible with all STD BUS cards using 8-bit (0-0FFH) and 16-bit (0FF0-0FFFFH) I/O mapped addressing. The unit offers a selection of 8K, 32K or 64K Bytes of onboard PROM (types 27C64, 27C256 or 27C512) and 8K, 32K or 128K Bytes of onboard static RAM (types 5565, 55257 or 551001). An MC146818A provides a real time clock and calendar. Battery back-up circuitry is included for the static RAM and clock with battery power supplied via backplane pin 5.

A PC16550 CMOS UART (the IBM PC standard) and the UART of the 80C51 produce two fully programmable RS-232C serial I/O ports with BAUD rates from 110 to 19,200 via low-profile 10-pin connectors. The PC16550 provides

FEATURES

♦ 80C51 FA CMOS microcomputer.
♦ Up to 65,536 Bytes of onboard PROM.
♦ Up to 131,072 Bytes of onboard static RAM.
♦ MC146818A real time clock with calendar.
♦ Battery back-up circuitry for real time clock & RAM.
♦ Two RS-232C serial ports from 110 to 19,200 BAUD (1 with MODEM control & 1 full duplex). +32 parallel UL I/O lines (Selectable in groups of 8 as Input or Output).
♦ Six 16-bit programmable counter/timers.
♦ Seven source interrupt controller with two priority levels.
♦ 16-bit PCA with watchdog timer.
♦ Up to 5 pulse width modulator (PWM) outputs.
♦ Low power idle & power down modes.
♦ Single +5V supply at 175 mA typical @ 11 MHz.
♦ All IC's socketed & low-profile PCB connectors.
♦ Low power CMOS design using a standard size STD BUS 4-layer printed circuit board.
♦ 100% testing and 48-hour burn-in
♦ One-year warranty from date of shipment.

complete MODEM control and the 80C51 UART gives a full duplex capability with framing error detection and automatic address recognition. Three MAX232 devices provide the RS-232C interface from the bus +5V supply.

A total of six 16-bit programmable counters or timers are provided by an 82C54 programmable interval timer and three 80C51 counter/timers. The 82C54 offers three binary or BCD counters with six programmable counter modes. The 80C51 timers provide four operating modes for acting as timers or event counters. A 16-bit programmable timer/counter array (PCA) provides for up to five modules that are individually selectable as compare/capture timers, 16-bit software timers, high speed pulse outputs, or a watchdog timer with automatic processor reset on a timeout condition. A pair of NAND gates and an inverter are also available using wire wrap jumpers for onboard signal and I/O logic conditioning. The counter/timer and PCA input and output is supplied by two 10-pin low-profile connectors.

The interrupt controller of the 80C51 provides for seven interrupt sources having two priority levels. These interrupts are available for processing both onboard and external I/O events.

Thirty-two parallel TTL I/O lines, jumper selectable in groups of eight, are implemented using 74HCT245 devices with 10K pull-ups for inputs and 74HCT574 for latched outputs. The digital I/O is provided by four 10-pin low-profile connectors.

A low power idle mode and a power down mode are available for placing the unit in a low-power state for power sensitive applications. The unit resumes operation as the result of a user defined hardware interrupt for awakening the unit. The real time clock and PC16550 UART remain active in either of these modes.

A wide variety of hardware emulators and software assemblers and compilers are available for the 80C51 family of microcontrollers from numerous manufacturers.

For detailed information on the hardware structure, including complete schematic documentation, and software development methods, request the *MSI-C851 User Manual.*

SPECIFICATIONS

Microcomputer
Intel 80C51FA
Clock Frequency - 11.059 MHz

Onboard Memory

RAM Type	HEX Address
80C51FA	00-FF
5565	00100-0 1FFF
55257	00 100-07FFF
551001	00100- 1FFFF
PROM Type	HEX Address
27C64	0000- 1FFF
27C256	0000-7FFF
27C512	0000-FFFF

Interrupt Controller
80C51FA - 7 interrupt sources, 2 priority levels
Real Time Clock (RTC)
MC146818A - Time-of-day and calendar

Programmable Counter/Timers
80C51FA - Three 16-bit counter/timers
82C54 - Three 16-bit counter/timers

Programmable Counter Array (PCA)
80C51FA - 16-bit PCA with 5 modules for
compare/capture, software timer, high speed pulse output, pulse width modulation (PWM), and watchdog timer modes.

Parallel I/O Ports
Thirty-two TTL I/O lines selectable using
74HCT245 - 8 each TTL input lines
74HCT574 - 8 each TTL output lines

RS-232C Serial I/O Ports
80C51FA - TxD, RxD, CTS, and RTS
PC16550 - TxD, RxD, CTS, RTS, DCD, DTR and DSRor RI.
MAX232 - RS-232C interface buffers
BAUD rate - 110 to 19,200

Power Requirement
+5V @ 175 mA typical

Miscellaneous
Operating Temperature   -25° C to 85° C
Size   7.0" x 4.5"