IMS

Fraunhofer Institut
Mikroelektronische
Schaltungen und Systeme

High Temperature 8-bit Microcontroller IMS22HT05E1

250°C
HT Device

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The IMS22HT05E1 is a universal 8-bit microcontroller for a wide range of control applications in the high temperature domain. Its design is based on the IMS2205 core, a parametrisable and portable 8-bit core, functionally compatible to the well known industrial standard M68HC05 core.

Special HT Features

- Full function up to 250 °C

- Tungsten metallization for high reliability

- SOI CMOS technology reduces junction leakage current

Hardware Features

- 8-bit architecture

- Memory-mapped I/O

- Clock frequencies from DC to 4 MHz

- On chip oscillator

- Lower CPI (clock cycles per instruction) than M68HC05

- Extended 64 kByte address space

- Extended stack of up to 256 Byte

- Two 8-bit bidirectional parallel ports

- Two special 7-/8-bit parallel ports

- One 16-bit free running counter with following functions:

  - Two 16-bit timers, programmable as capture or compare unit

  - Internal watchdog unit

  - Pulse width modulator unit

- 8-/9-bit programmable asynchronous serial communication interface (SCI) with multiple error detection

- 8-bit synchronous serial peripheral communication interface (SPI), programmable both as master and as slave

- Four internal interrupt sources, two external interrupts

- Selectable nonmultiplexed and multiplexed bus modes

- Robust static CMOS-design

- Boundary scan for board test supported

- Hardware address and data breakpoints

Software Features

- 100% object code compatible with Motorola M68HC05

- Byte efficient instruction set with Bit Test and Branch instructions, Bit Manipulation and powerful indexed addressing

- Power saving STOP and WAIT modes.

- ILL-Interrupt is executed whenever undefined instructions are detected.

Debugging Environment

- Scan path debugger IMS ScanDebugger V3 running under MS-Windows provides access to all other controller registers.

- On-chip hardware address and data breakpoints support real-time program debugging under control of the IMS ScanDebugger.

Applications

The IMS22HT05E1 is fully functional up to 250 °C and can thus be used for measurement and control applications in high temperature environments.

Examples of applications are:

- Oil/gas production
- Downhole oil/gas well tools
- Industrial process control
- Internal combustion engine control
- Automotive applications
- Electric power conversion, fuel-cell control
- Aerospace

ASIC's based on the IMS2205 High Temperature Core

The high temperature version of the IMS2205 is an universal micro-controller core, suitable for many processor based control applications. By adding standard and full custom peripheral modules IMS can provide its customers with high temperature ASIC's based on the IMS SOI-HT CMOS technology.

Among the selectable options are:

- Variable number of interrupts
- User-definable power saving modes (stop, wait)
- Custom mix of peripherals (SPI, SCI, Timer, WD, CRC, PLM and others)
- Programmable clock stretching for external devices
- Selectable interrupt vector addresses
- Selectable stack size and location
- On-chip RAM and ROM options
- The IMS ASIC Emulator in combination with IMS ScanDebugger software provides full emulation and development system for IMS2205-based ASIC's.

Further Reading

- IMS High temperature datasheet
- IMS2205 Core datasheet
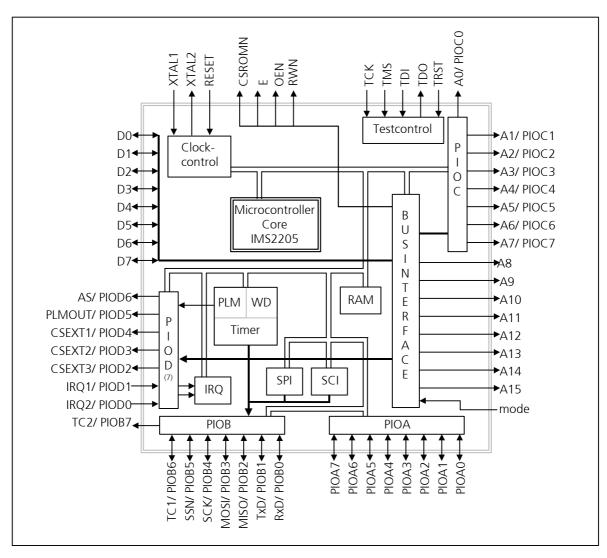- IMS2205 Instruction Set Manual
- IMS ScanDebugger V3
- IMS ASIC-Emulator

Fig. 1: Block Diagram of IMS22HT05E1