

August 1997

Microprocessor-Compatible, Real-Time Clock

Features

- 8-Bit, μ P Bus Compatible
 - Multiplexed or Direct Addressing
- Regulated Oscillator Supply Ensures Frequency Stability and Low Power
- Time From 1/100 Seconds to 99 Years
- Software Selectable 12/24 Hour Format
- Latched Time Data Ensures No Roll Over During Read
- Full Calendar with Automatic Leap Year Correction
- On-Chip Battery Backup Switchover Circuit
- Access Time Less than 300ns
- 4 Programmable Crystal Oscillator Frequencies Over Industrial Temperature Range
- 3 Programmable Crystal Oscillator Frequencies Over Military Temperature Range
- On-Chip Alarm Comparator and RAM
- Interrupts from Alarm and 6 Selectable Periodic Intervals
- Standby Micro-Power Operation: 1.2 μ A Typical at 3.0V and 32kHz Crystal

Applications

- Portable and Personal Computers
- Data Logging
- Industrial Control Systems
- Point Of Sale

Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE	PKG. NO.
ICM7170IPG	-40 to 85	24 Ld PDIP	E24.6
ICM7170IDG	-40 to 85	24 Ld SBDIP	D24.6
ICM7170IBG	-40 to 85	24 Ld SOIC	M24.3
ICM7170MDG	-55 to 125	24 Ld SBDIP	D24.6
ICM7170AIPG	-40 to 85	24 Ld PDIP	E24.6
ICM7170AIDG	-40 to 85	24 Ld SBDIP	D24.6
ICM7170AIBG	-40 to 85	24 Ld SOIC	M24.3
ICM7170AMDG	-55 to 125	24 Ld SBDIP	D24.6

 NOTE: "A" Parts Screened to $5\mu\text{A}$ I_{STBY} at 32kHz.

Description

The ICM7170 real time clock is a microprocessor bus compatible peripheral, fabricated using Harris' silicon gate CMOS LSI process. An 8-bit bidirectional bus is used for the data I/O circuitry. The clock is set or read by accessing the 8 internal separately addressable and programmable counters from $1/100$ seconds to years. The counters are controlled by a pulse train divided down from a crystal oscillator circuit, and the frequency of the crystal is selectable with the on-chip command register. An extremely stable oscillator frequency is achieved through the use of an on-chip regulated power supply.

The device access time (t_{ACC}) of 300ns eliminates the need for wait states or software overhead with most microprocessors. Furthermore, an ALE (Address Latch Enable) input is provided for interfacing to microprocessors with a multiplexed address/data bus. With these two special features, the ICM7170 can be easily interfaced to any available microprocessor.

The ICM7170 generates two types of interrupts, periodic and alarm. The periodic interrupt (100Hz, 10Hz, etc.) can be programmed by the internal interrupt control register to provide 6 different output signals. The alarm interrupt is set by loading an on-chip 51-bit RAM that activates an interrupt output through a comparator. The alarm interrupt occurs when the real time counter and alarm RAM time are equal. A status register is available to indicate the interrupt source.

An on-chip Power Down Detector eliminates the need for external components to support the battery back-up function. When a power down or power failure occurs, internal logic switches the on-chip counters to battery back-up operation. Read/write functions become disabled and operation is limited to time-keeping and interrupt generation, resulting in low power consumption.

Internal latches prevent clock roll-over during a read cycle. Counter data is latched on the chip by reading the 100th-seconds counter and is held indefinitely until the counter is read again, assuring a stable and reliable time value.

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 SPECIAL
 PURPOSE