DALLAS
SEMICONDUCTOR

DS1407
Timed Authorization Module

FEATURES

- Real-time clock for monitoring software evaluations, leases and maintenance agreements

- Programmable alarms generate interrupts for calendar time and elapsed run time

- Compatible with ISA, EISA, and MCA personal computers

- Supports DOS, Extended DOS and Windows 3.1

- Self powered to operate with desk top as well as notebook computers

- Guaranteed unique 48-bit serial number for authentication and traceability

- 4096 bits of nonvolatile read/write memory

- Tamper-proof lock bits prevent alteration of timers

- Quartz accuracy of ±2 minute per month

- Access timing automatically scales to variable computer clock rates

- A time-based counterpart of the secure DS1405 Authorization Module

PACKAGE OUTLINE

▲ COMPUTER

DALLAS

**DS1407
TIMED
SOFTWARE
AUTHORIZATION**

DESCRIPTION

The DS1407 Timed Authorization Module is a hardware-based, software protection system which consists of a unique micro chip "key" and special access software. In conjunction with embedded "locks" in a software developer's application, it protects intellectual property by controlling the right to execute rather than the right to copy the software. In addition, the device allows developers to accurately time the use of their application independently of the host computer's system clock. This assures integrity in software trials and leasing arrangements.

The guaranteed unique, 48-bit serial number provides the system identification lacking in IBM personal computer architecture. The developer can lock an applica-

tion to the number, serialize media and absolutely trace field units. The 4096 bits of read/write memory are organized in 16 pages of 256 bits each. An additional scratch page is provided to assure data integrity before any writes to nonvolatile memory take place.

FUNCTIONAL OVERVIEW

The DS1407 Timed Authorization Module provides software developers with a unique serial number, multiple timers, and a large read/write memory to secure intellectual property and monitor its use. The features of the DS1407 are accessible to the developer through low-level interface software called the Access System, which is common to all Dallas Semiconductor DS14xx

security products. The Access System uses the unique serial number to transparently address and manage multiple DS14xx products on the parallel port of the host computer.

In addition to I/O functions and reading the unique serial number, there are four function commands to address the memory in the DS1407. Three are commands used to read, write or copy data to memory in the scratch page. All data is written to the scratch page, verified and then copied to the target memory address.

The fourth command is used to gain access to the read/write memory, clock, elapsed timer, the alarm registers and the configuration/status registers. Figure 1 provides a memory map of the security device.

MEMORY MAP Figure 1

0000h 01FFh	512 BYTES NV SRAM 16 PAGES 32 BYTES PER PAGE
0200h 0201h	CONFIGURATION AND STATUS REGISTERS
0202h 0206h	REAL TIME CLOCK
0207h 020Bh	ELAPSE TIMER
020Ch 020Fh	RESERVED
0210h 0214h	RTC ALARM
0215h 0219h	ELAPSE TIME ALARM
021Ah 021Dh	RESERVED

The real-time clock keeps time in 1/256 second increments. The developer can select a date represented as the reference seconds/minutes/hour/day/month/year. A read of the clock will return the number of seconds after the reference date. The elapsed timer can be started and stopped based on the configuration registers that are set.

The configuration and status registers in the DS1407 allow the operating mode of the part to be specified. The developer can set alarms and enable/disable interrupts for the clock and elapsed timer. Additional registers are present for clock oscillator control, elapsed timer triggers and write protection of various memory locations.

PARALLEL PORT INTERFACE (PPI)
The DS1407 Timed Authorization Module uses a hardware fixture to interface to the host's parallel port. In conjunction with the Access System software, the PPI transparently provides a reliable connection. The same PPI and Access System software are also used in the DS1405 Authorization Module. A subset of PPI functionality follows.

- Supports uni- and bi-directional ports

- Access timing scales to the host computer and can be continuously recalibrated

- RFI filter compensation

- All lines of the DB-25 connector are passed through to support "cascading" with other devices

- Resolution of port conflict with print spoolers and Windows 3.1 applications

POWER REQUIREMENTS

The DS1407 Timed Authorization Module is permanently powered by an onboard lithium source. This allows the security device to function on a wider range of parallel ports than would be possible if the device had to borrow power from the host. The lithium source used will power the part for at least 10 years.

INSTALLATION AND OPERATION

The DS1407 is attached to IBM or compatible personal computers by the parallel printer port. If a printer is configured in the system, the Module resides between the printer cable and the PC. An attached printer is not required. However, if a printer is attached, it should be powered up and on-line. The DS1407 Timed Authorization Module can be used in conjunction with multiple Dallas Semiconductor and/or other parallel port-resident products.

SOFTWARE

Software support is available through the DS1410K Developer's Kit.