

## FEATURES

- Drop-in replacement for IBM AT computer clock/calendar
- Pin compatible with the MC146818B and DS1287A
- Totally nonvolatile with over 10 years of operation in the absence of power
- Self-contained subsystem includes lithium, quartz, and support circuitry.
- Counts seconds, minutes, hours, days, day of the week, date, month, and year with leap year compensation valid up to 2100
- Binary or BCD representation of time, calendar, and alarm
- 12- or 24-hour clock with AM and PM in 12-hour mode
- Daylight Savings Time option
- Selectable between Motorola and Intel bus timing
- Multiplex bus for pin efficiency
- Interfaced with software as 128 RAM locations
  - 15 bytes of clock and control registers
  - 113 bytes of general purpose RAM
- Programmable square wave output signal
- Bus-compatible interrupt signals (IRQ)
- Three interrupts are separately software maskable and testable
  - Time-of-day alarm once/second to once/day
  - Periodic rates from 122  $\mu$ s to 500 ms
  - End of clock update cycle
- Century register

## DESCRIPTION

The DS12C887A Real Time Clock plus RAM is designed to be a direct upgrade replacement for the DS1287A in existing IBM compatible personal computers to add hardware year 2000 compliance. A century byte was added to memory location 50, 32h, as called out by the PC AT specification. The DS12C887A is identical in form, fit, and function to the DS1287A, and has an additional 64 bytes of general purpose RAM. Access to this additional RAM space is determined by the logic level presented on AD6 during the address portion of an access cycle. The RCLR pin is used to clear (set to logic 1) all 113 bytes of general purpose RAM but does not affect the RAM associated with the real time clock. In order

## PIN ASSIGNMENT

MOT	1	24	V <sub>CC</sub>
NC	2	23	SQW
NC	3	22	NC
AD0	4	21	RCLR
AD1	5	20	NC
AD2	6	19	IRQ
AD3	7	18	RESET
AD4	8	17	DS
AD5	9	16	NC
AD6	10	15	R/W
AD7	11	14	AS
GND	12	13	CS

DS12C887A 24-Pin  
ENCAPSULATED PACKAGE

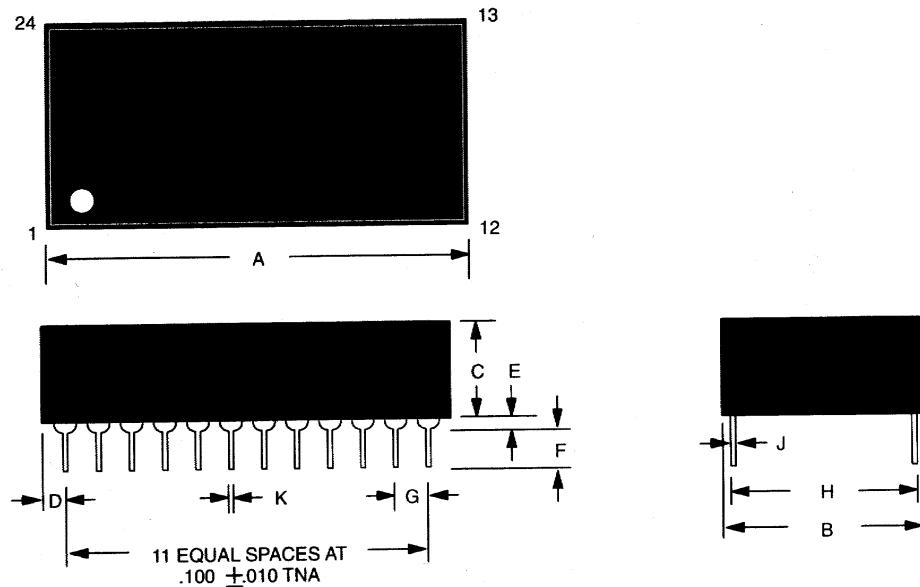
## PIN DESCRIPTION

AD0-AD7	- Multiplexed Address/Data Bus
NC	- No Connect
MOT	- Bus Type Selection
CS	- RTC Chip Select Input
AS	- Address Strobe
R/W	- Read/Write Input
DS	- Data Strobe
RESET	- Reset Input
IRQ	- Interrupt Request Output
SQW	- Square Wave Output
V <sub>CC</sub>	- +5 Volt Main Supply
RCLR	- RAM Clear
GND	- Ground

to clear the RAM, RCLR must be forced to an input logic “0” (−0.3 to +0.8 volts) during battery back-up mode when V CC is not applied.

The RCLR function is designed to be used via human interface (shorting to ground manually or by switch) and not to be driven with external buffers. All other operation, description and specification is identical to the DS12C887.

## DS12C887 REAL TIME CLOCK PLUS RAM



PKG	24-PIN	
DIM	MIN	MAX
<b>A IN</b>	1.320	1.335
<b>MM</b>	33.53	33.91
<b>B IN</b>	0.675	0.700
<b>MM</b>	17.15	17.78
<b>C IN</b>	0.345	0.370
<b>MM</b>	8.76	9.40
<b>D IN</b>	0.100	0.130
<b>MM</b>	2.54	3.30
<b>E IN</b>	0.015	0.030
<b>MM</b>	0.38	0.76
<b>F IN</b>	0.110	0.140
<b>MM</b>	2.79	3.56
<b>G IN</b>	0.090	0.110
<b>MM</b>	2.29	2.79
<b>H IN</b>	0.590	0.630
<b>MM</b>	14.99	16.00
<b>J IN</b>	0.008	0.012
<b>MM</b>	0.20	0.30
<b>K IN</b>	0.015	0.021
<b>MM</b>	0.38	0.53

**NOTE:** Pins 2, 3, 16, 20 and 22 are missing by design

**NOTE:** This device cannot be stored or shipped in conductive material which will give a continuity path between the RAM Clear pin and ground.