

### 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
  - 14 bytes of clock and control registers
  - 114 bytes of general-purpose RAM
- Programmable square-wave output signal
- Bus-compatible interrupt signals ( $\overline{\text{IRQ}}$ )
- Three interrupts are separately software-maskable and testable
  - Time-of-day alarm once/second to once/day
  - Periodic rates from 122 $\mu$ s to 500ms
  - End-of-clock update cycle

### PIN ASSIGNMENT

|     |    |    |                           |
|-----|----|----|---------------------------|
| MOT | 1  | 24 | $V_{CC}$                  |
| NC  | 2  | 23 | $\overline{\text{SQW}}$   |
| NC  | 3  | 22 | NC                        |
| AD0 | 4  | 21 | $\overline{\text{RCLR}}$  |
| AD1 | 5  | 20 | NC                        |
| AD2 | 6  | 19 | $\overline{\text{IRQ}}$   |
| AD3 | 7  | 18 | $\overline{\text{RESET}}$ |
| AD4 | 8  | 17 | DS                        |
| AD5 | 9  | 16 | NC                        |
| AD6 | 10 | 15 | $\overline{\text{R/W}}$   |
| AD7 | 11 | 14 | AS                        |
| GND | 12 | 13 | $\overline{\text{CS}}$    |

DS12887A  
24-Pin Encapsulated Package

### PIN DESCRIPTION

|                           |                                |
|---------------------------|--------------------------------|
| AD0–AD7                   | - Multiplexed Address/Data Bus |
| NC                        | - No Connection                |
| MOT                       | - Bus Type Selection           |
| $\overline{\text{CS}}$    | - Chip Select                  |
| AS                        | - Address Strobe               |
| $\overline{\text{R/W}}$   | - Read/Write Input             |
| DS                        | - Data Strobe                  |
| $\overline{\text{RESET}}$ | - Reset Input                  |
| $\overline{\text{IRQ}}$   | - Interrupt Request Output     |
| $\overline{\text{SQW}}$   | - Square-Wave Output           |
| $V_{CC}$                  | - +5V Supply                   |
| $\overline{\text{RCLR}}$  | - RAM Clear                    |
| GND                       | - Ground                       |

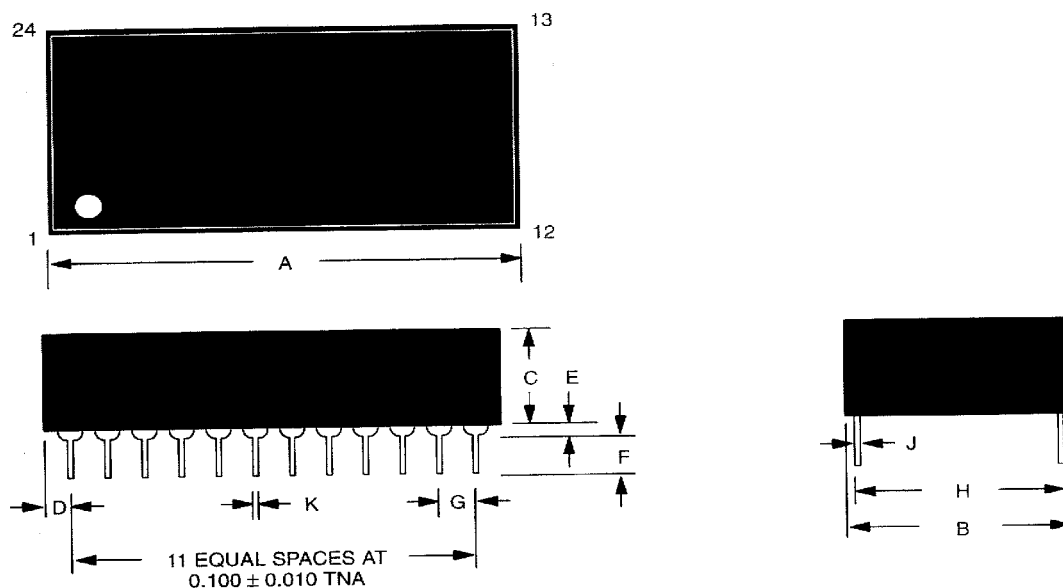
### DESCRIPTION

The DS12887A real-time clock plus RAM is designed to be a direct replacement for the DS1287A. The DS12887A is identical in form, fit, and function to the DS1287A, and includes 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  $\overline{\text{RCLR}}$  pin is used to clear (set to logic 1) all 114 bytes of general purpose RAM but does not affect the RAM associated with the real-time clock. In order to clear the RAM,  $\overline{\text{RCLR}}$  must be forced to an input logic 0 (-0.3V to +0.8V) during battery-backup mode

when  $V_{CC}$  is not applied. The  $\overline{RCLR}$  function is designed to be used via human interface (shorting to ground manually or by switch) and not to be driven with external buffers.

For a complete description of operating conditions, electrical characteristics, bus timing and pin descriptions other than  $\overline{RCLR}$ , see the DS12887 data sheet.

## DS12887A REAL-TIME CLOCK PLUS RAM



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

**Note:** Pins 2, 3, 16, 20, and 22 are missing by design. This device cannot be stored or shipped in conductive material that will give a continuity path between the RAM clear pin and ground.