

CMOS 64 x 8 ADDRESS/DATA MULTIPLEXED TIMEKEEPER SRAM

ADVANCE DATA

- DROP-IN REPLACEMENT FOR PC AT COMPUTER CLOCK/CALENDAR
- EXTERNAL BATTERY AND CRYSTAL PINS
- COUNTS SECONDS, MINUTES, HOURS, DAYS, DAY OF THE WEEK, DATE, MONTH AND YEAR WITH LEAP YEAR COMPENSATION
- BINARY OR BCD REPRESENTATION OF TIME, CALENDAR AND ALARM
- 12 OR 24 HOUR CLOCK WITH AM AND PM IN 12 HOUR MODE
- SELECTABLE BUS TIMING
- MULTIPLEX BUS FOR PIN EFFICIENCY
- INTERFACED WITH SOFTWARE AS 64 RAM LOCATIONS:
 - 14 bytes of clock and control registers
 - 50 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 μ s to 500 ms
 - End of clock update cycle

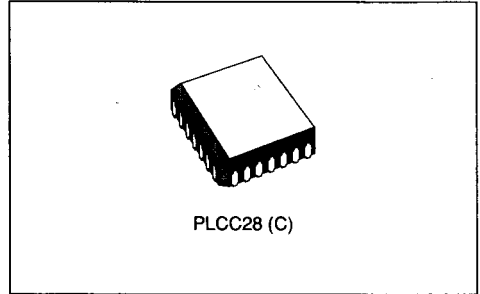
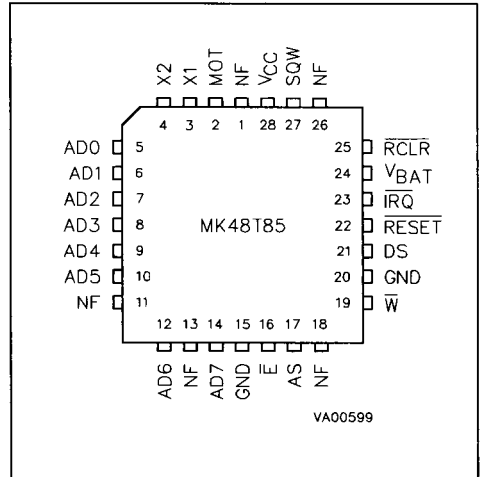


Figure 1. Pin Connection



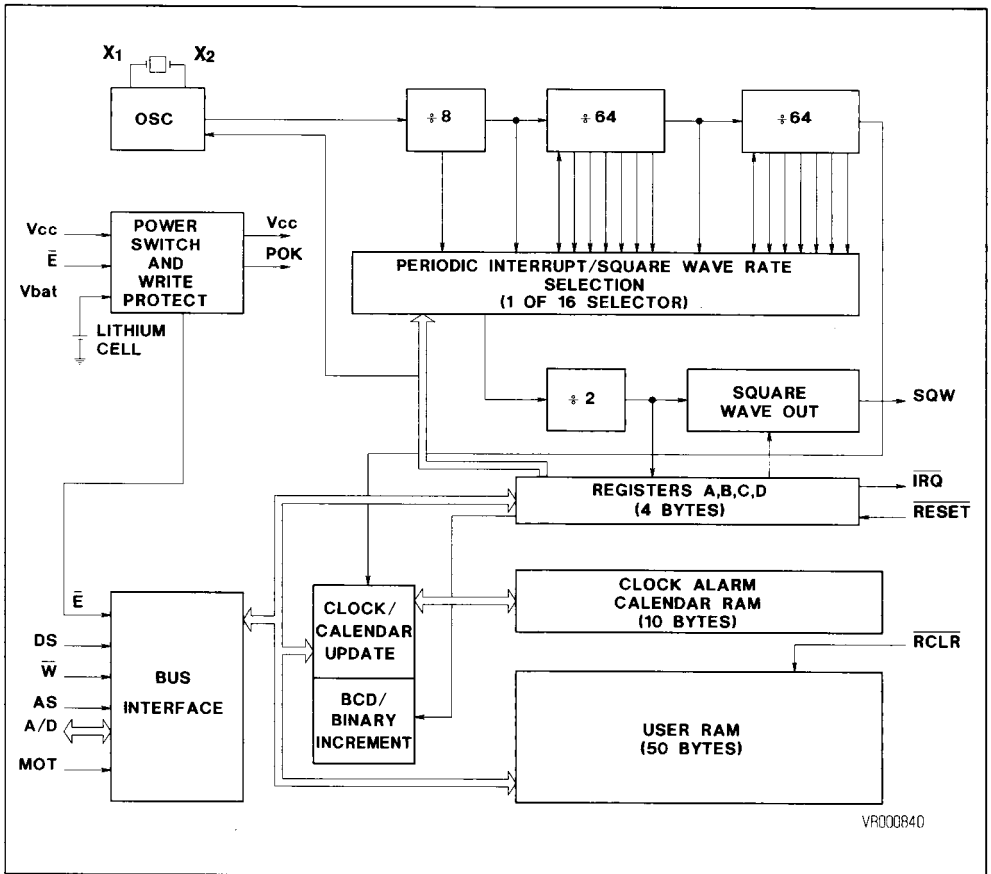
PIN NAMES

| | |
|----------------------|-----------------------|
| RESET | Reset |
| V _{CC} /GND | 5 Volts/Ground |
| \bar{E} | Chip Select |
| AS | Address Strobe |
| \bar{W} | Read/Write |
| DS | Data Strobe |
| IRQ | Interrupt Request |
| V _{BAT} | 3 Volts Battery Input |

| | |
|---------------------------------|--------------------|
| AD0-AD7 | Address / Data |
| NF | No Function |
| MOT | Bus Type Selection |
| SQW | Square Wave Out |
| RCLR | RAM Clear |
| X ₁ , X ₂ | 32,768 Hz Crystal |

NF pin serves no function and may be connected to other signals, within Absolute Maximum Ratings, without affecting device operation. The electrical characteristics are the same as the other inputs pins.

Figure 2. Block Diagram



DESCRIPTION

The MK48T85 TIMEKEEPER™ RAM is designed to be a functional replacement for the PC AT Computer clock/calendar. The functions available to the user include a time-of-day clock, an alarm, a one-hundred-year calendar, programmable interrupts, a square wave generator, and 50 bytes of static RAM. The MK48T85 provides connections for a battery and a 32,768 Hz crystal. The battery connection allows the user to back-up the RAM and clock functions in the absence of system voltage.

Automatic deselection of the device provides insurance that data integrity is not compromised should VCC fall below specified (V_{PF}) levels. The automatic deselection of the device remains in effect

upon power up for a period of 100ms after VCC rises above V_{PF}, provided the Real Time Clock is running and the count down chain is not in reset. This allows sufficient time for VCC to stabilize and gives the system clock a wake up period so that a valid system reset can be established.

OPERATION

The block diagram in Figure 2 shows the pin connections with the major functions of the MK48T85 (Real Time Clock/RAM). For a complete description of operating conditions, electrical characteristics, bus timing, and pin descriptions other than X1, X2, V_{BAT}, and RCLR, see the MK48T87 datasheet.

SIGNAL DESCRIPTION

X₁, X₂ - The X1 and X2 pins are the connections for a standard 32,768 Hz quartz crystal having a load capacitance of 6pF .

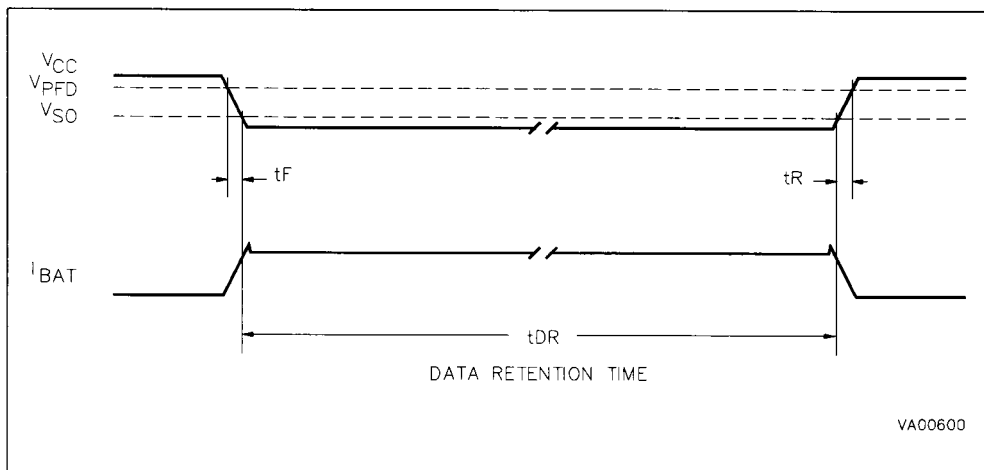
V_{BAT} - The V_{BAT} pin is the battery input for any standard 3V lithium cell or other energy source.

RCLR - The $\overline{\text{RCLR}}$ pin is used to clear (set to logic "1") all 50 bytes of the general purpose RAM associated with the Real Time Clock. In order to clear the RAM, $\overline{\text{RCLR}}$ must be forced to an input logic "0" (-0.3 to 0.8 volts) for a minimum of 100 ms when V_{CC} is applied.

DC ELECTRICAL CHARACTERISTICS (0°C ≤ T_A ≤ 70°C; V_{CC} min ≤ V_{CC} ≤ V_{CC} max)

| Symbol | Parameter | Min. | Max. | Unit |
|------------------|---|------|------|------|
| I _{CC1} | Average V _{CC} Power Supply Current | | 15 | mA |
| I _{MOT} | Input Current | -1 | 500 | μA |
| I _{IL} | Input Leakage Current | -1 | 1 | μA |
| I _{OL} | Output Leakage Current | -5 | 5 | μA |
| V _{OH} | Output Logic "1" Voltage (I _{OUT} = -1.0 mA) | 2.4 | | V |
| V _{OL} | Output Logic "0" Voltage (I _{OUT} = 4.0 mA) | | 0.4 | V |
| V _{BAT} | Battery Voltage | 2.4 | 3.5 | V |
| I _{BAT} | Battery Current (at V _{BAT} = 3.0V, T _A = 25°C) | | 455 | nA |

Figure 3. Power Up/Down Conditions



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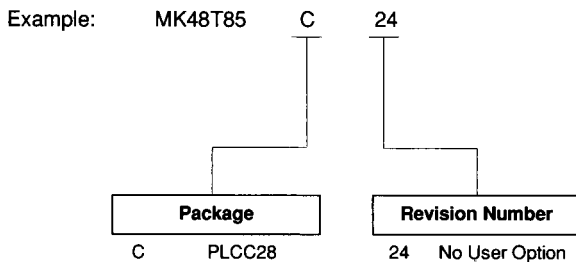
AC ELECTRICAL CHARACTERISTICS (Power Up/Down Timing)

| Symbol | Parameter | Min. | Max. | Unit |
|--------|---|------|------|---------|
| t_F | V_{PF} to V_{SO} V_{CC} Fall Time | 310 | | μs |
| t_R | V_{SO} to V_{PF} V_{CC} Rise Time | 100 | | μs |

DC ELECTRICAL CHARACTERISTICS (Power Up/Down Trip Points) ($0^\circ C \leq T_A \leq 70^\circ C$)

| Symbol | Parameter | Values | | | Unit |
|----------|------------------------------------|----------------|----------------|----------------|------|
| | | Min. | Typ. | Max. | |
| V_{PF} | Power-fail Deselect Voltage | $1.22 V_{BAT}$ | $1.25 V_{BAT}$ | $1.28 V_{BAT}$ | V |
| V_{SO} | Battery Back-up Switchover Voltage | | V_{BAT} | | V |

ORDERING INFORMATION



For a list of available options refer to the Selector Guide in this Data Book or the current Memory Shortform that will be periodically up-dated.

For further information or any aspect of this device, please contact our Sales Office nearest to you.