SGS-THOMSON MICROELECTRONICS

MK48T85Q

ADDRESS / DATA MULTIPLEX TIMEKEEPER™ RAM

ADVANCE DATA

- DROP-IN REPLACEMENT FOR IBM AT COMPUTER CLOCK/CALENDAR
- PIN COMPATIBLE WITH THE DS1285Q
- 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 BETWEEN MOTOROLA AND INTEL BUS TIMING
- MULTIPLEX BUS FOR PIN EFFICIENCY
- INTERFACED WITH SOFTWARE AS 64 RAM LOCATIONS

  14 bytes of clock and control registers

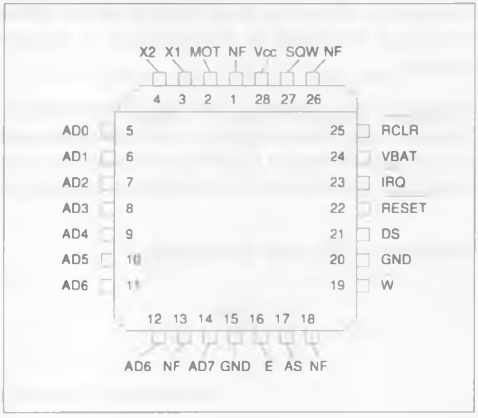
  50 bytes of general purpose ram
- PROGRAMMABLE SQUARE WAVE OUTPUT SIGNAL
- BUS COMPATIBLE INTERRUPT SIGNALS (IRQ)
- THREE INTERRUPTS ARE SEPARATELY SOFTWARE-MASKABLE AND TESTABLE

  Time-of-day alarm once/second to once/day

  Periodic rates from 122 us to 500 ms

  End of clock update cycle

PIN CONNECTIONS



PIN NAMES

A/D0 - A/D7	ADDRESS / DATA
MOT	BUS TYPE SELECTION
E	CHIP SELECT
AS	ADDRESS STROBE
W	READ / WRITE
SQW	SQUARE WAVE OUT
IRQ	INTERRUPT REQUEST
RESET	RESET
DS	DATA STROBE
V_{CC}	+5 VOLTS
GND	GROUND
RCLR	RAM CLEAR
X1, X2	32.768 KHz CRYSTAL
VBAT	+3 VOLT BATTERY INPUT
NF*	NO FUNCTION

* This pin serves no function and may be connected to other signals without affecting device operation. The electrical characteristics are the same as the other inputs pins.

DESCRIPTION

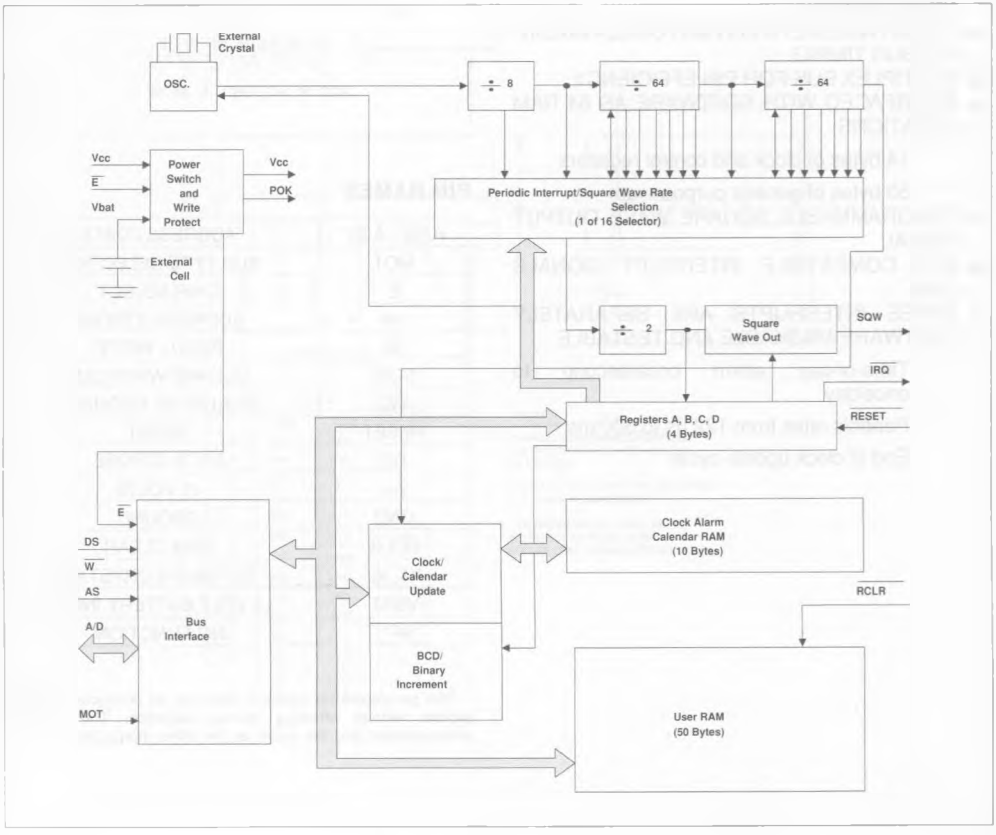
The MK48T85 RealTime Clock and RAM is designed to be a functional replacement for the DS1285. The functions available to the user include a time-of-day clock, an alarm, a one-hundred-year calendar, programmable interrupts, a square wave generator, and 50 bytes of static RAM. The MK48T85 provides connections for a battery and a 32.768 KHz 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 V_{CC} fall below specified (V_{PFD}) levels. The automatic deselection of the device remains in effect upon power up for a period of 100ms after V_{CC} rises above V_{PFD}, provided the Real Time Clock is running and the count down chain is not in reset, allowing sufficient time for V_{CC} to stabilize and giving the system clock a wake up period so that a valid system reset can be established.

OPERATION

The block diagram in Figure 1 shows the pin connection with the major functions of MK48T85 (Real Time Clock/RAM). For a complete description of operating conditions, electrical characteristics, bus timing, and pin descriptions other than X1, X2, VBAT, and $\overline{RCLR}$ see the MK48T87(B) datasheet.

FIGURE 1 . BLOCK DIAGRAM



SIGNAL DESCRIPTIONS

X1, X2 - The X1 and X2 pins are the connections for a standard 32.768 KHz quartz crystal.

VBAT - The VBAT pin is the battery input for any standard 3V lithium cell or other energy source.

RCLR - the $\overline{RCLR}$ 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, $\overline{RCLR}$ must be forced to an input logic "0" (-0.3 to 0.8 volts) for a minimun of 100 ms when VCC is applied

FOR COMPLETE DESCRIPTION OF OPERATING CONDITIONS, ELECTRICAL CHARACTERISTICS, BUS TIMING, PACKAGE DIMENSION, AND PIN DESCRIPTIONS, SEE THE MK48T87(B) DATASHEET. .

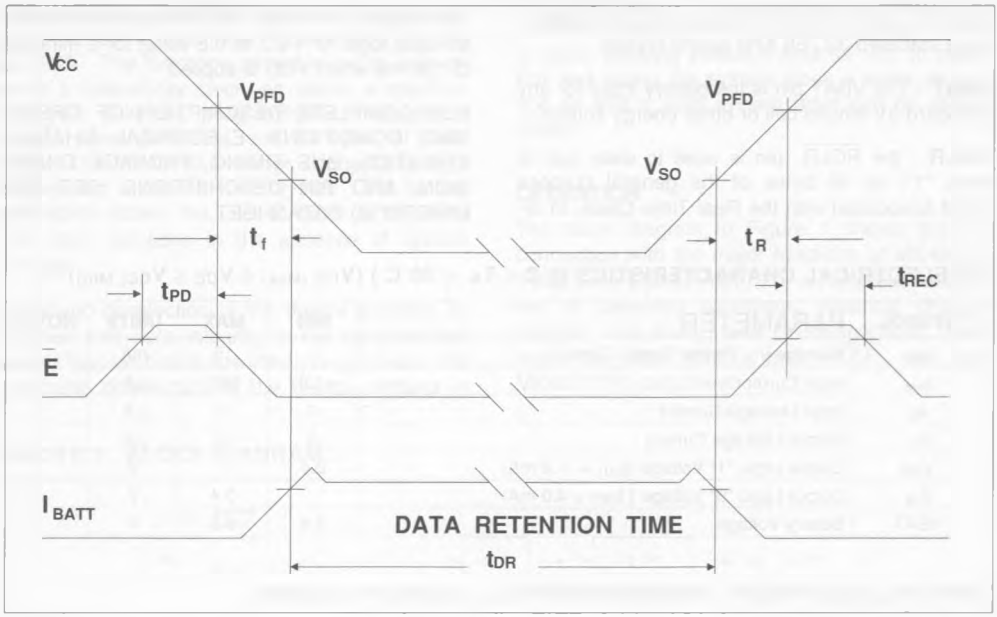
DC ELECTRICAL CHARACTERISTICS ($0°C \leq T_A \leq 70°C$) ($V_{CC\,(Max)} \leq V_{CC} \leq V_{CC(\,Min)}$)

SYMBOL	PARAMETER	MIN	MAX	UNITS	NOTES
I_{CC1}	Average V_{CC} Power Supply Current		15	mA	
I_{mot}	Input Current	-1.0	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	
VBAT	Battery Voltage	2.4	3.5	V	

CRYSTAL ELECTRICAL CHARACTERISTICS (externally supplied)

SYMBOL	PARAMETER	TEST CONDITIONS	VALUES			UNITS
			MIN	TYP	MAX	
f_O	Resonant Frequancy			32.768		KHz
r_S	Series Resistance				30	KΩ
c_L	load Capacitance		12.5			pf

FIGURE 2 . POWER-UP / POWER-DOWN CONDITIONS



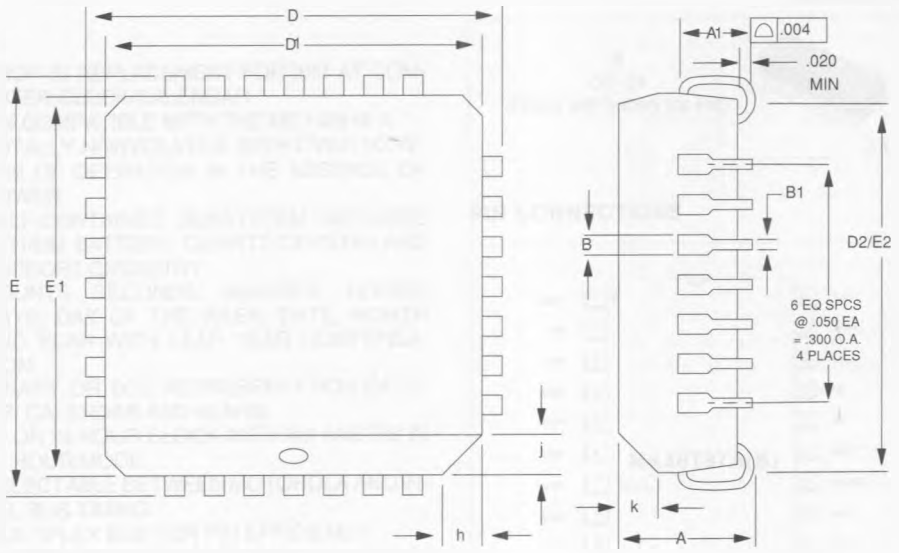
AC ELECTRICAL CHARACTERISTICS (POWER-UP / DOWN TIMING)

SYMBOL	PARAMETER	MIN	MAX	UNITS	NOTES
t_{PD}	E or W at V_{IH} Before Power Down	0		ns	
t_F	V_{PFD} to V_{SO} V_{CC} Fall Time	310		µs	
t_R	V_{SO} to V_{PFD} V_{CC} Rise Time	100		µs	

DC ELECTRICAL CHARACTERISTICS (POWER-UP/ DOWN TRIP POINTS)(0 °C ≤ T_A ≤ 70 °C)

SYMBOL	PARAMETER	MIN	TYP	MAX	UNITS	NOTES
V_{PFD}	Power-fail Deselect Voltage		1.29 V_{BAT}		V	
V_{SO}	Battery Back-up Swithover Voltage		V_{BAT}		V	

FIGURE 3 . PACKAGE DESCRIPTION 28 PIN PLCC



DIM	INCHES		NOTES
	MIN	MAX	
A	0.165	0.185	2
A1	0.090	0.120	2
B	0.026	0.032	2
B1	0.013	0.021	2
D	0.485	0.495	
D1	0.450	0.456	
D2	0.390	0.430	
E	0.485	0.495	
E1	0.450	0.456	
E2	0.390	0.430	
h	0.042	0.060	
j	0.042	0.060	
k	0.042	0.056	

NOTES:

1. Lead finish to be solder dip or tin/lead plate.

2. The maximun limit shall be increased by 0.003 inche when solder lead finish is specified.