

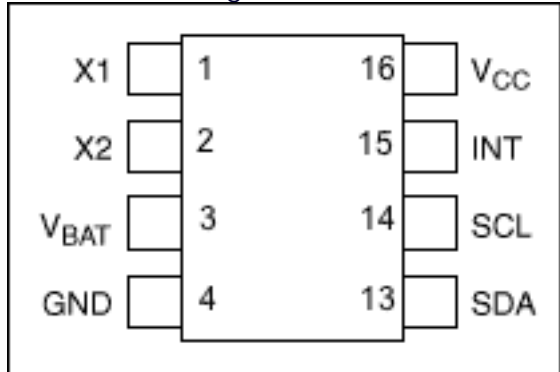


APPLICATION NOTE 3643

How to Use the DS1678 Real-Time Event Recorder

Abstract: This note demonstrates an application using the DS1678 real-time event recorder. The software example includes basic operating routines. A schematic of the application circuit is included.

DS1678 Pin Assignment



Description

This application note demonstrates how to use the [DS1678](#) real-time event recorder which logs events—level transitions on the **INT** input pin—into a 1024-word datalog memory array. The first event is recorded as a time stamp; subsequent events are recorded as elapsed time from the previous event. The time stamp and 1024-word datalog memory accommodate up to 1025 recorded events.

This example code includes functions for initiating a datalogging "mission." The user-selectable options are event resolution, trigger selection, and rollover (handling missions of more than 1025 events). The software also includes routines for ending a mission, for displaying the event datalog information, and for writing and reading the user RAM.

Operation

The program uses two general-purpose port pins (GPIOs) on a microcontroller to communicate with the DS1678 through the DS1678's I²C serial interface. An additional port pin is used to toggle the DS1678's **INT** input to drive events. In a typical application, the **INT** input would be connected to circuitry that conditions the signals from the event source, e.g., a thermostat in a HVAC system. This connection allows the DS1678 to record, for example, the start time and duration of each cooling or heating cycle.

This example uses an 8051-compatible microcontroller, the [DS2250](#). User inputs and data outputs from the program are passed through an RS-232 interface from a terminal emulator program on a PC to a UART on the microcontroller. The [Microcontroller Tool Kit](#) software utility can be used to program the DS2250 microcontroller.

The software is shown in **Figure 1**. A schematic of the circuit is shown in **Figure 2**.

```

/*-----*/
/* DS16C47A.C - This file is provided to show an example of communication */
/* routines for interfacing to the DS1678. These routines are provided */
/* for example only and are not supported by Maxim. */
/*-----*/
#include <stdio.h> /* Prototypes for I/O functions */
#include <DS16C47A.h> /* Register declarations for DS16C47A */

#define AVR 0
#define MCR 1
#define ADDR0 0x00 /* slave addresses */
#define m0 = 0x00 /* I2C pin definitions */
#define m1 = 0x01
#define m2 = 0x02
/* Function definitions */
void start();
void stop();
void I2Cwrite(uchar);
uchar I2Cread(uchar);
void readByte();
void writeByte();
void I2C_start();
void I2C_stop();
void I2C_write(uchar);
void I2C_read(uchar);
void I2C_start();
void I2C_stop();
void I2C_write(uchar);
void I2C_read(uchar);

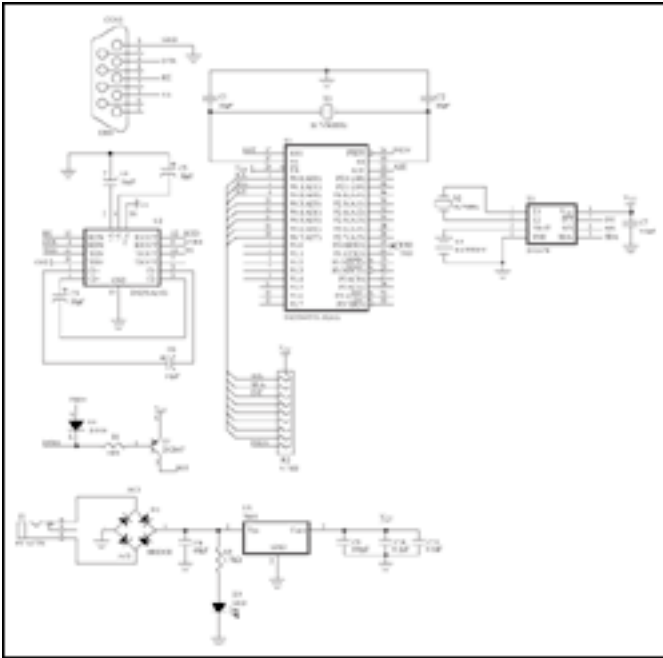
/* global variables */
void start() /* ----- I2C start ----- */
{
    m0 = 1; m1 = 1; /* initiate start condition */
    m0 = 0;
}
void stop() /* ----- I2C stop ----- */
{
    m0 = 0; m1 = 0; m2 = 0; /* initiate stop condition */
    m0 = 1; m1 = 1; m2 = 1;
}
void I2Cwrite(uchar d) /* ----- write one byte ----- */
{
    uchar i;

    m0 = 0;
    for (i = 1; i <= 8; i++)
    {
        m0 = (d >> 7);
        m1 = 1;
        d = d << 1;
        m1 = 0;
    }
    m0 = 1; /* Release the sda line */
    m0 = 0;
    m1 = 1;
    if (m0) printf("Ack bit missing. (ack=0), (sda=1)");
    m0 = 0;
}

```

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Figure 1. Program listing for interfacing a microcontroller to the DS1678.



[For Larger Image](#)

Figure 2. Schematic for the DS1678 demonstration board.

Application Note 3643: www.maxim-ic.com/an3643

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