MCP7940N Real-Time Clock Commands

The MCP7940N.h include file provides both high- and low-level support for the MCP7940N real-time clock chip, two alarms with a backup battery, additional eeprom and a general purpose IO port. Insert the following directive in your code to make these new commands available:

*#include <MCP7940N.h>*

Here follows a list of the commands..

MCP7940N\_Enable(flag)  
enables the clock when flag is TRUE,  
disables the clock when flag is FALSE

MCP7940N\_ResetClock  
resets clock completely to manufacturer’s original condition,  
time to 00:00:00, day of the week to 01, date to 01/01/00,  
also sets 24-hour mode and enables the clock.

MCP7940\_BatteryBackup(flag)  
enables the battery backup functions when flag is TRUE,  
disables the battery backup functions when flag is FALSE

MCP7940N\_SetTime(hour, minute, second)  
sets the time only: hours, minutes, seconds,.  
also sets 24-hour mode and enables the clock.

MCP7940N\_SetDate(date, month, year)  
sets the date only: date, month, year,  
there is no error detection for out-of-range dates, (e.g., April 31)

MCP7940N\_SetClock(hour, minute, second, DOW, date, month, year)  
sets the entire clock: hours, minutes, seconds, day of week, date, month, year.  
there is no error detection for out-of-range dates, (e.g., April 31)  
also sets 24-hour mode and enables the clock.

MCP7940N\_ReadTime(hour, minute, second, flag)  
reads the time only: hours, minutes, seconds, a.m. or p.m.,  
flag = FALSE means a.m.,  
flag = TRUE means p.m.

MCP7940N\_ReadDate(date, month, year)  
reads the date only: date, month, year

MCP7940N\_ReadClock(hour, minute, second, flag, DOW, date, month, year)  
reads the entire clock: hours, minutes, seconds, flag, day of week, date, month, year  
flag = FALSE means a.m.,  
flag = TRUE means p.m.

MCP7940N\_SetHourMode(12|24)  
sets the hour mode,  
12 = 12-hour  
24 = 24-hour  
any other value defaults to 24-hour mode

MCP7940N\_ReadHourMode(value)  
returns the current hour mode,

MCP7940N\_SetSQW(rate)  
sets the square wave output pin mode:  
0 = disable square wave output  
1 = 1 Hz output  
4 = 4096 Hz  
8 = 8192 Hz  
32 = 32768 Hz  
any other value defaults to 1 Hz

MCP7940N\_Write(address, value)  
writes to the internal registers or RAM,  
registers: 0x00 to 0x07  
RAM: 0x08 to 0x3F  
writing beyond this wraps around to the register space again, so be careful with multibyte writes

MCP7940N\_Read(address, value)  
reads from the internal registers or RAM,  
see the notes, above.

MCP7940\_IsLeapYear ( flag )

Returns true or false if the current year is a leap year

MCP7940\_SetMFP(MFP\_Value)  
Sets Multifunction Pin status to the value of the variable MFP\_Value

MCP7940\_SetControl(MFP\_Value)  
Sets Control address status to the value of the variable MFP\_Value. The control - rtcc control register is at address 0x07. Direct access to the control register permits reading and writing of the controls.

Bits usage as below:  
7 OUT: Logic Level for General Purpose Output bit  
6 SQWEN: Square Wave Output Enable bit  
5 ALM1EN: Alarm 1 Module Enable bit  
4 ALM0EN: Alarm 0 Module Enable bit  
3 EXTOSC: External Oscillator Input bit  
2 CRSTRIM: Coarse Trim Mode Enable bit  
1 SQWFS<1:0>: Square Wave Clock Output Frequency Select bits  
0 See bit 1

See the datasheet for more information

MCP7940\_ReadControl  
This function returns the current value of the Control address. See MCP7940\_SetControl(for usage.

MCP7940\_SetAlarm ( Alarm#[0|1], Hour, Min, Sec, DOW, Date, Month )  
sets the alarm: hours, minutes, seconds, day of week, date, month..  
there is no error detection for out-of-range dates, (e.g., April 31)  
also sets 24-hour mode.

MCP7940\_SetAlarmMask (Alarm#[0|1], Value )  
sets the alarm where Value can be any of the following.

MCP7940\_AlarmAssertion\_Seconds  
MCP7940\_AlarmAssertion\_Minutes  
MCP7940\_AlarmAssertion\_Hours  
MCP7940\_AlarmAssertion\_DayofWeek  
MCP7940\_AlarmAssertion\_Date  
MCP7940\_AlarmAssertion\_All

The alarm can be set to go off if any of the following conditions are met: MCP7940\_AlarmAssertion\_Seconds 0x00 a match of the seconds  
MCP7940\_AlarmAssertion\_Minutes 0x01 a match of the minutes  
MCP7940\_AlarmAssertion\_Hours 0x02 a match of the hours  
MCP7940\_AlarmAssertion\_DayofWeek 0x03 a match of the day of the week  
MCP7940\_AlarmAssertion\_Date 0x04 a match of the date  
MCP7940\_AlarmAssertion\_All 0x07 a match of all parameters equals all seconds, minutes, hours, day of week, day and month match.   
  
A match of these assertions will raise the alarm.

MCP7940\_ReadAlarm (Alarm#[0|1], Hour, Min, Sec, DOW, Date, Month )  
Returns the current settings for a specific alarm.

MCP7940\_ClearAlarm ( Alarm#[0|1] )  
Clears a specific alarm after an alarm assertion.

MCP7940\_AlarmStatus ( Alarm#[0|1] )  
This is a function. Returns a specific alarm status.  
FALSE means the specific alarm has not met the assertion criteria  
TRUE means the specific alarm has met the assertion criteria

MCP7940\_SetAlarmPolarity ( Alarm#[0|1] , Value)  
Sets the general purpose port status.  
Value = 1 then the port with be normally high, low on assertion.  
Value = 0 then the port with be normally low, high on assertion.

MCP7940\_EnableAlarm ( Alarm#[0|1] )  
Enables a specific alarm.

MCP7940\_DisableAlarm ( Alarm#[0|1] )  
Disables a specific alarm.

MCP7940\_ClearPowerFail  
Clears the power failure status with the device. Required to be reset after each power failure.

MCP7940\_PowerFailStatus  
Returns the the power failure status with the device.

MCP7940\_ReadFailureClock( Alarm#[0|1] , Hour, Min, DOW, Date, Month)  
Reads the failure information of a specific failure event: hours, minutes, seconds, day of week, date and month.

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