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.