Kernel driver smsc47b397

Supported chips:

- SMSC LPC47B397-NC
- SMSC SCH5307-NS
- SMSC SCH5317

  Prefix: 'smsc47b397'

  Addresses scanned: none, address read from Super I/O config space

  Datasheet: In this file

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The following specification describes the SMSC LPC47B397-NC [1] sensor chip (for which there is no public datasheet available). This document was provided by Craig Kelly (In-Store Broadcast Network) and edited/corrected by Mark M. Hoffman <mhoffman@lightlink.com>.

[1] And SMSC SCH5307-NS and SCH5317, which have different device IDs but are otherwise compatible.

Methods for detecting the HP SIO and reading the thermal data on a dc7100

The thermal information on the dc7100 is contained in the SIO Hardware Monitor (HWM). The information is accessed through an index/data pair. The index/data pair is located at the HWM Base Address + 0 and the HWM Base Address + 1. The HWM Base address can be obtained from Logical Device 8, registers 0x60 (MSB) and 0x61 (LSB). Currently we are using 0x480 for the HWM Base Address and 0x480 and 0x481 for the index/data pair.

Reading temperature information. The temperature information is located in the following registers:

Temp1	0x25	(Currently, this reflects the CPU temp on all systems).
Temp2	0x26	
Temp3	0x27	
Temp4	0x80	

Programming Example The following is an example of how to read the HWM temperature registers:

```
MOV     DX,480H
MOV     AX,25H
OUT     DX,AL
MOV     DX,481H
IN      AL,DX
```

AL contains the data in hex, the temperature in Celsius is the decimal equivalent.

Ex: If AL contains 0x2A, the temperature is 42 degrees C.

Reading tach information. The fan speed information is located in the following registers:

Tach1	0x28	0x29	(Currently, this reflects the CPU fan speed on all systems).
Tach2	0x2A	0x2B	
Tach3	0x2C	0x2D	
Tach4	0x2E	0x2F	

Important

Reading the tach LSB locks the tach MSB. The LSB Must be read first.

How to convert the tach reading to RPM

The tach reading (TCount) is given by: (Tach MSB * 256) + (Tach LSB) The SIO counts the number of 90kHz (11.111us) pulses per revolution. RPM = 60/(TCount * 11.111us)

Example:

```
Reg 0x28 = 0x9B
Reg 0x29 = 0x08
```

TCount = 0x89B = 2203

RPM = 60 / (2203 * 11.11111 E-6) = 2451 RPM

Obtaining the SIO version.

Configuration Sequence

To program the configuration registers, the following sequence must be followed: 1. Enter Configuration Mode 2. Configure the Configuration Registers 3. Exit Configuration Mode.

Enter Configuration Mode

To place the chip into the Configuration State The config key (0x55) is written to the CONFIG PORT (0x2E).

Configuration Mode

In configuration mode, the INDEX PORT is located at the CONFIG PORT address and the DATA PORT is at INDEX PORT address + 1.

The desired configuration registers are accessed in two steps:

a. Write the index of the Logical Device Number Configuration Register (i.e., 0x07) to the INDEX PORT and then write the number of the desired logical device to the DATA PORT.
b. Write the address of the desired configuration register within the logical device to the INDEX PORT and then write or read the config- uration register through the DATA PORT.

Note:

If accessing the Global Configuration Registers, step (a) is not required.

Exit Configuration Mode

To exit the Configuration State the write 0xAA to the CONFIG PORT (0x2E). The chip returns to the RUN State. (This is important).

Programming Example

The following is an example of how to read the SIO Device ID located at 0x20:

; ENTER CONFIGURATION MODE MOV DX,02EH MOV AX,055H OUT DX,AL ; GLOBAL CONFIGURATION REGISTER MOV DX,02EH MOV AL,20H OUT DX,AL ; READ THE DATA MOV DX,02FH IN AL,DX ; EXIT CONFIGURATION MODE MOV DX,02EH MOV AX,0AAH OUT DX,AL

The registers of interest for identifying the SIO on the dc7100 are Device ID (0x20) and Device Rev (0x21).

The Device ID will read 0x6F (0x81 for SCH5307-NS, and 0x85 for SCH5317) The Device Rev currently reads 0x01

Obtaining the HWM Base Address

The following is an example of how to read the HWM Base Address located in Logical Device 8:

```
; ENTER CONFIGURATION MODE
MOV     DX,02EH
MOV     AX,055H
OUT     DX,AL
; CONFIGURE REGISTER CRE0,
; LOGICAL DEVICE 8
MOV     DX,02EH
MOV     AL,07H
OUT     DX,AL ;Point to LD# Config Reg
MOV     DX,02FH
MOV     AL, 08H
OUT     DX,AL;Point to Logical Device 8
;
MOV     DX,02EH
MOV     AL,60H
OUT     DX,AL   ; Point to HWM Base Addr MSB
MOV     DX,02FH
IN      AL,DX   ; Get MSB of HWM Base Addr
; EXIT CONFIGURATION MODE
MOV     DX,02EH
MOV     AX,0AAH
OUT     DX,AL
```