Kernel driver w83792d

Supported chips:

- Winbond W83792D

    Prefix: 'w83792d'

    Addresses scanned: I2C 0x2c - 0x2f

    Datasheet: http://www.winbond.com.tw

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Module Parameters

- init int

    (default 1)

    Use 'init=0' to bypass initializing the chip. Try this if your computer crashes when you load the module.

- force_subclients=bus,caddr,saddr,saddr
    This is used to force the i2c addresses for subclients of a certain chip. Example usage is
    force_subclients=0,0x2f,0x4a,0x4b to force the subclients of chip 0x2f on bus 0 to i2c addresses 0x4a and 0x4b.

Description

This driver implements support for the Winbond W83792AD/D.

Detection of the chip can sometimes be foiled because it can be in an internal state that allows no clean access (Bank with ID register is not currently selected). If you know the address of the chip, use a 'force' parameter; this will put it into a more well-behaved state first.

The driver implements three temperature sensors, seven fan rotation speed sensors, nine voltage sensors, and two automatic fan regulation strategies called: Smart Fan I (Thermal Cruise mode) and Smart Fan II.

The driver also implements up to seven fan control outputs: pwm1-7. Pwm1-7 can be configured to PWM output or Analogue DC output via their associated pwmX_mode. Outputs pwm4 through pwm7 may or may not be present depending on how the W83792AD/D was configured by the BIOS.

Automatic fan control mode is possible only for fan1-fan3.

For all pwmX outputs, a value of 0 means minimum fan speed and a value of 255 means maximum fan speed.

Temperatures are measured in degrees Celsius and measurement resolution is 1 degC for temp1 and 0.5 degC for temp2 and temp3. An alarm is triggered when the temperature gets higher than the Overtemperature Shutdown value; it stays on until the temperature falls below the Hysteresis value.

Fan rotation speeds are reported in RPM (rotations per minute). An alarm is triggered if the rotation speed has dropped below a programmable limit. Fan readings can be divided by a programmable divider (1, 2, 4, 8, 16, 32, 64 or 128) to give the readings more range or accuracy.

Voltage sensors (also known as IN sensors) report their values in millivolts. An alarm is triggered if the voltage has crossed a programmable minimum or maximum limit.

Alarms are provided as output from "realtime status register". Following bits are defined:

bit	alarm on
0	in0
1	in1
2	temp1
3	temp2
4	temp3
5	fan1
6	fan2
7	fan3
8	in2
9	in3
10	in4
11	in5
12	in6

bit	alarm on
13	VID change
14	chassis
15	fan7
16	tart1
17	tart2
18	tart3
19	in7
20	in8
21	fan4
22	fan5
23	fan6

Tart will be asserted while target temperature cannot be achieved after 3 minutes of full speed rotation of corresponding fan.

In addition to the alarms described above, there is a CHAS alarm on the chips which triggers if your computer case is open (This one is latched, contrary to realtime alarms).

The chips only update values each 3 seconds; reading them more often will do no harm, but will return 'old' values.

W83792D PROBLEMS

Known problems:
- This driver is only for Winbond W83792D C version device, there are also some motherboards with B version W83792D device. The calculation method to in6-in7(measured value, limits) is a little different between C and B version. C or B version can be identified by CR[0x49h].
- The function of vid and vrm has not been finished, because I'm NOT very familiar with them. Adding support is welcome.
- The function of chassis open detection needs more tests.
- If you have ASUS server board and chip was not found: Then you will need to upgrade to latest (or beta) BIOS. If it does not help please contact us.

Fan control

Manual mode

Works as expected. You just need to specify desired PWM/DC value (fan speed) in appropriate pwm# file.

Thermal cruise

In this mode, W83792D provides the Smart Fan system to automatically control fan speed to keep the temperatures of CPU and the system within specific range. At first a wanted temperature and interval must be set. This is done via thermal_cruise# file. The tolerance# file serves to create T +- tolerance interval. The fan speed will be lowered as long as the current temperature remains below the thermal_cruise# +- tolerance# value. Once the temperature exceeds the high limit (T+tolerance), the fan will be turned on with a specific speed set by pwm# and automatically controlled its PWM duty cycle with the temperature varying. Three conditions may occur:

(1) If the temperature still exceeds the high limit, PWM duty cycle will increase slowly.

(2) If the temperature goes below the high limit, but still above the low limit (T-tolerance), the fan speed will be fixed at the current speed because the temperature is in the target range.

(3) If the temperature goes below the low limit, PWM duty cycle will decrease slowly to 0 or a preset stop value until the temperature exceeds the low limit. (The preset stop value handling is not yet implemented in driver)

Smart Fan II

W83792D also provides a special mode for fan. Four temperature points are available. When related temperature sensors detects the temperature in preset temperature region (sf2_point@_fan# +- tolerance#) it will cause fans to run on programmed value from sf2_level@_fan#. You need to set four temperatures for each fan.

/sys files

pwm[1-7]
- this file stores PWM duty cycle or DC value (fan speed) in range:

    0 (stop) to 255 (full)

pwm[1-3]_enable

- this file controls mode of fan/temperature control:

    - 0 Disabled
    - 1 Manual mode
    - 2 Smart Fan II
    - 3 Thermal Cruise

pwm[1-7]_mode

- Select PWM or DC mode

    - 0 DC
    - 1 PWM

thermal_cruise[1-3]

- Selects the desired temperature for cruise (degC)

tolerance[1-3]

- Value in degrees of Celsius (degC) for +- T

sf2_point[1-4]_fan[1-3]

- four temperature points for each fan for Smart Fan II

sf2_level[1-3]_fan[1-3]

- three PWM/DC levels for each fan for Smart Fan II