Kernel driver lm73

Supported chips:

- Texas Instruments LM73

  Prefix: 'lm73'

  Addresses scanned: I2C 0x48, 0x49, 0x4a, 0x4c, 0x4d, and 0x4e

  Datasheet: Publicly available at the Texas Instruments website

    https://www.ti.com/product/lm73

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Description

The LM73 is a digital temperature sensor. All temperature values are given in degrees Celsius.

Measurement Resolution Support

The LM73 supports four resolutions, defined in terms of degrees C per LSB: 0.25, 0.125, 0.0625, and 0.3125. Changing the resolution mode affects the conversion time of the LM73's analog-to-digital converter. From userspace, the desired resolution can be specified as a function of conversion time via the 'update_interval' sysfs attribute for the device. This attribute will normalize ranges of input values to the maximum times defined for the resolution in the datasheet.

Resolution	**Conv. Time**	**Input Range**
(C/LSB)	**(msec)**	**(msec)**
0.25	14	0..14
0.125	28	15..28
0.0625	56	29..56
0.03125	112	57..infinity

The following examples show how the 'update_interval' attribute can be used to change the conversion time:

```
$ echo 0 > update_interval
$ cat update_interval
14
$ cat temp1_input
24250

$ echo 22 > update_interval
$ cat update_interval
28
$ cat temp1_input
24125

$ echo 56 > update_interval
$ cat update_interval
56
$ cat temp1_input
24062

$ echo 85 > update_interval
$ cat update_interval
112
$ cat temp1_input
24031
```

As shown here, the lm73 driver automatically adjusts any user input for 'update_interval' via a step function. Reading back the 'update_interval' value after a write operation will confirm the conversion time actively in use.

Mathematically, the resolution can be derived from the conversion time via the following function:

$$g(x) = 0.250 * [\log(x/14) / \log(2)]$$

where 'x' is the output from 'update_interval' and 'g(x)' is the resolution in degrees C per LSB.

Alarm Support

Alarm Support

The LM73 features a simple over-temperature alarm mechanism. This feature is exposed via the sysfs attributes.

The attributes 'temp1_max_alarm' and 'temp1_min_alarm' are flags provided by the LM73 that indicate whether the measured temperature has passed the 'temp1_max' and 'temp1_min' thresholds, respectively. These values _must_ be read to clear the registers on the LM73.