망고 520 CPU 온도 체크

http://www.mangoboard.com/
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Document History

Revision	Date	Change note

1. 포팅하기

Datasheet를 보면 , Table이 있습니다.
"Thermal Management Unit" Chapter에 보면

Table 60-1 8-Bit Code Map to Temperature

8-bit Code	Temp. (°C)	8-bit Code	Temp. (°C)	8-bit Code	Temp. (°C)
00110010	25	01010110	61	01111010	97
00110011	26	01010111	62	01111011	98
00110100	27	01011000	63	01111100	99
00110101	28	01011001	64	01111101	100
00110110	29	01011010	65	01111110	101
00110111	30	01011011	66	01111111	102
00111000	31	01011100	67	10000000	103
00111001	32	01011101	68	10000001	104
00111010	33	01011110	69	10000010	105
00111011	34	01011111	70	10000011	106
00111100	35	01100000	71	10000100	107
00111101	36	01100001	72	10000101	108
00111110	37	01100010	73	10000110	109
00111111	38	01100011	74	10000111	110
01000000	39	01100100	75	10001000	111
01000001	40	01100101	76	10001001	112
01000010	41	01100110	77	10001010	113
01000011	42	01100111	78	10001011	114
01000100	43	01101000	79	10001100	115
01000101	44	01101001	80	10001101	116
01000110	45	01101010	81	10001110	117
01000111	46	01101011	82	10001111	118
01001000	47	01101100	83	10010000	119
01001001	48	01101101	84	10010001	120
01001010	49	01101110	85	10010010	121
01001011	50	01101111	86	10010011	122
01001100	51	01110000	87	10010100	123
01001101	52	01110001	88	10010101	124
01001110	53	01110010	89	10010110	125
01001111	54	01110011	90	–	–
01010000	55	01110100	91	–	–
01010001	56	01110101	92	–	–
01010010	57	01110110	93	–	–

레지스터는

60.5.1.8 CURRENT_TEMP

- Base Address: 0x1006_0000
- Address = Base Address + 0x0040, Reset Value = 0x0000_0000

Name	Bit	Type	Description	Reset Value
RSVD	[31:8]	–	Reserved	0x0
CURRENT_TEMP	[7:0]	R	Current Temperature Refer to *Table 60-1* for more information.	0x0

입니다.

1.1. 커널 3.0.31 configuration

커널 버전은 3.0.31을 기준으로 설명합니다.
소스는 http://crztech.iptime.org:8080/Release/mango520-exynos5250/android/jellybean-4.1.1/20140613/mango520-kernel3031-20140613.tar.gz

```
$ ./build_kernel config
```

명령 실행 후

```
System Type  --->
[*] Use thermal management
```

선택 후
컴파일 하여 , 커널 이미지를 다시 Write하면 됩니다.

관련 드라이버 소스는

```
arch/arm/mach-exynos/tmu-exynos.c
```

에 있습니다.

관련 코드는 아래와 같습니다.

```
static int get_cur_temp(struct tmu_info *info)
{
	int curr_temp;
	int temperature;

	/* After reading temperature code from register, compensating
	 * its value and calculating celsius temperatue,
	 * get current temperatue.
	 */
	curr_temp = __raw_readl(info->tmu_base + CURRENT_TEMP) & 0xff;

	/* compensate and calculate current temperature */
	temperature = curr_temp - info->te1 + TMU_DC_VALUE;
	if (temperature < 10) {
		/* temperature code range are between min 10 and 125 */
		pr_alert("Current temperature is in inaccurate range->"
			" check if vdd_18_ts is on or room temperature.₩n");
	}

	return temperature;
}
```

1.2. Kernel 3.0.31 CPU 온도 읽기

```
[root@Mango520 ~]# cat /sys/devices/platform/tmu/temperature
53
```

섭씨 53도 임을 알수 있습니다.

1.3. 커널 3.4.35 configuration

```
System Type  --->
SAMSUNG EXYNOS SoCs Support  --->
[*] Use thermal management
```

1.4. Kernel 3.4.35 CPU 온도 읽기

드라이버 소스에서

```
tmu_debugfs =
                    debugfs_create_file("tmu_dev_status",
                                        S_IRUGO, NULL, info, &tmu_dev_status_fops);
```

"debugfs" 파일을 생성하게 되어 있습니다.

```
[root@Mango520 debug]# mount -t debugfs none /sys/kernel/debug
[root@Mango520 debug]# ls /sys/kernel/debug/
asoc/                                memblock/
bdi/                                 mmc0/
binder/                              mmc1/
bluetooth/                           mmc2/
clock/                               pm_qos
dynamic_debug/                       regmap/
extfrag/                             s3c-fb
exynos5_bus                          sched_features
exynos5_devfreq_int_time_in_state    shrinker
exynos5_devfreq_mif_time_in_state    suspend_stats
gpio                                 suspend_time*
hid/                                 sync
ieee80211/                           tmu_dev_status
ion/                                 tracing/
kbase_carveout                       usb/
lpa_cdev_status                      wakeup_sources
mem_usage/
[root@Mango520 debug]# cat /sys/kernel/debug/tmu_dev_status
Current Temperature : 47
```

```
Current TMU State : TMU_STATUS_NORMAL
Memory Throttling : unthrottled
Memory throttle auto refresh time : 1937 ns
Normal auto refresh time : 3875 ns
TMU monitoring sample rate : 200 ms
[root@Mango520 debug]# cat /sys/kernel/debug/tmu_dev_status
Current Temperature : 47
Current TMU State : TMU_STATUS_NORMAL
Memory Throttling : unthrottled
Memory throttle auto refresh time : 1937 ns
Normal auto refresh time : 3875 ns
TMU monitoring sample rate : 200 ms
```