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A HW+SW MECHANISM TO DELIVER PERMANENT CPU OVERCLOCKING

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A HW+SW mechanism to deliver permanent CPU overclocking

Abstract

Core-i Gen11th CPU provides a feature to adjust the core power value to drive the core speed and permanent overclocking (OC). A higher core speed means higher CPU performance. Therefore, the 65w CPU could operate a higher base frequency if receives more power. However, more core power means higher Tj and

- CPU might reach throttling
- Worse reliability in CPU/CPU cooler

Could we solve the problem, the answer is in the disclosure.

Problems Solved

Incorporate SW and HW (CPU cooler) to higher CPU performance (Fig. 1).

Concept

1. Adjust $PL1 \geq TDP$ become feasible in intel Gen 11th CPU and make higher operation frequency.
2. Higher CPU cooler could dissipate more heat from CPU.
3. Cooler ID for management.
4. Automat to allocate the best PL1 parameter via cooler ID.

Operation

While system boot before into OS. SIO (A/D) does read cooler_ID and then decides which PL1 value should be rolled into BIOS as in figure (Fig. 2 & 3). Once into OS, the CPU could deliver the desired CPU performance automatically and permanently. Therefore, expecting to use a 65w CPU with a 125w cooler could deliver higher CPU performance.

Conclusion

The idea has been proofed in our lab and has met the concept.

Reference

1. <https://www.intel.com/content/www/us/en/support/articles/000057813/graphics/graphics-for-11th-generation-intel-processors.html>
2. <https://www.intel.com/content/www/us/en/support/articles/000007359/processors/intel-core-processors.html>

Figure list

	CR20 (score)	Intel TAT Stress CPU Frequency (Hz)	TAT Stress TJ (° C)
PL1@65w 65w cooler	3680	2840	77
PL1@95w 65w cooler	4500	3425	90
PL1@95w 125w cooler	4550	3510	73

Fig. 1 CPU power level with differ cooler test result

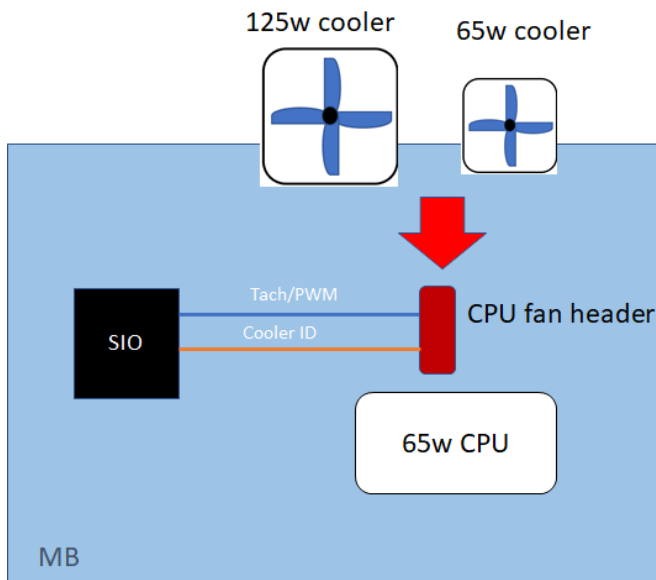


Fig. 2 The operation diagram

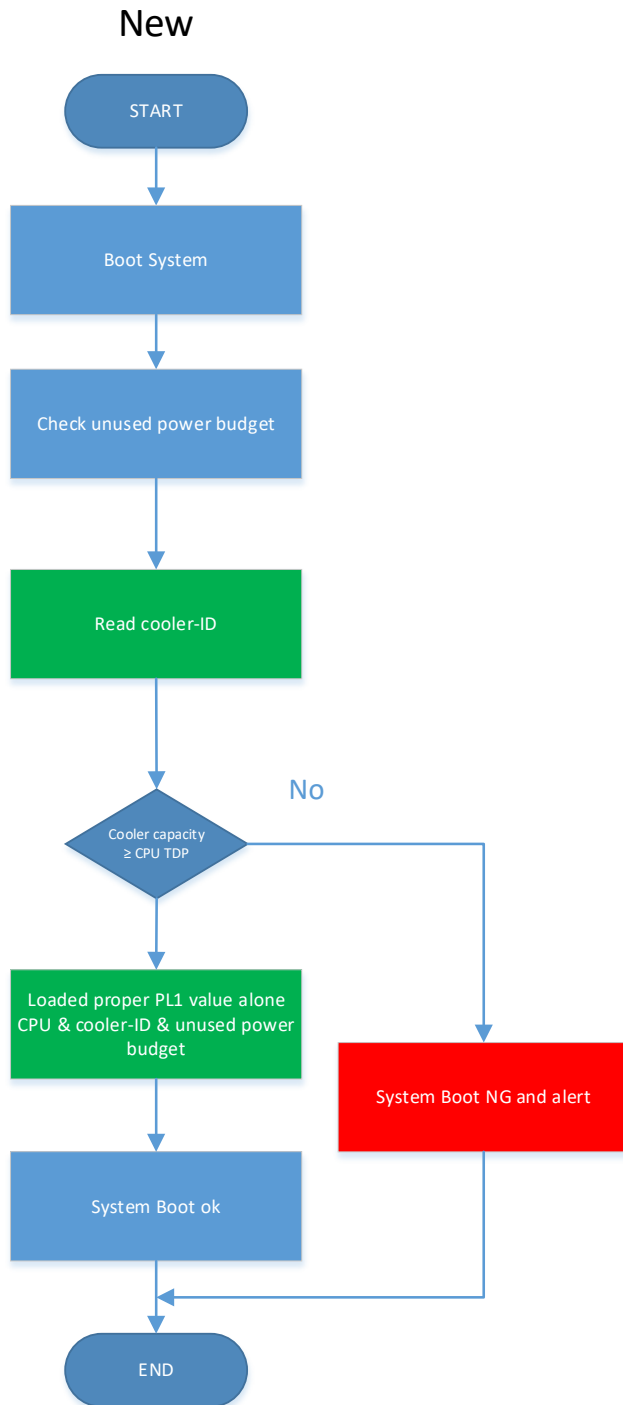


Fig. 3 Operation flow chart

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