

INTISARI

Sistem pendingin komputer dibutuhkan agar komponen-komponen komputer dapat melepaskan energi panas yang terbentuk pada saat komponen tersebut bekerja. Pada penelitian ini, dibuat sebuah sistem pendingin komputer berbasis *hybrid cooling engine* yang merupakan pengembangan dari sistem pendingin berbasis air. Sistem pendingin ini memiliki radiator untuk melepas energi panas pada saat komputer diberi beban penuh. Selain radiator, terdapat modul pendingin termoelektrik yang berguna untuk mendapatkan temperatur air serendah mungkin. Kemudian terdapat sebuah sistem kendali temperatur air yang berbasis mikrokontroler Arduino Mega 2560 *Embedded*. Proses pembuatan alat meliputi perakitan mesin pendingin, *wiring* sistem kendali temperatur dan pembuatan algoritma program. Hasil dari pengujian *benchmarking* dengan program Cinebench R15, didapatkan adanya peningkatan kinerja *multi core rendering* sebesar 0,295% tanpa perubahan pengaturan pada BIOS dan temperatur kartu grafis turun sebesar 20,02°C. Selain itu, temperatur air terendah pada sistem pendingin sama dengan temperatur ruangan sehingga sistem pendingin sudah dapat dikatakan memiliki kemampuan di antara sistem pendingin *phase change* dan sistem pendingin berbasis air konvensional.

Kata Kunci: komputer, termoelektrik, radiator, mikrokontroler, Arduino

ABSTRACT

Computer cooling system is needed in order for the computer components can release heat energy that is formed during its operations. In this study, a computer cooling system based on hybrid cooling engine was developed which is an improved version of a conventional water-based cooling system. This cooling system has a radiator to release heat energy when the computer was given a full load. In addition to radiators, there is a thermoelectric cooling module that is used to get the water temperature as low as possible. Then there is a water temperature control system based on the Arduino Mega 2560 Embedded microcontroller. This study includes assembly of cooling machines, temperature control system and software development. The benchmarking test result with the Cinebench R15, there was an increase in the performance of multi core rendering of 0.295% without changes in BIOS settings and the graphics card temperature dropped by 20.02°C. In addition, the lowest water temperature in the cooling system is the same as room temperature so that the cooling system have capabilities between phase change cooling systems and conventional water-based cooling systems.

Keyword: *computer, thermoelectric, radiator, microcontroller, Arduino*