ED-Pi5PCOOLER Cooling Performance Testing

1 Overview

This chapter introduces the Test device, Test purpose, Required Test Peripherals, and Test Program.

1.1 Product Overview

ED-Pi5PCOOLER is a passive cooler for Raspberry Pi 5, which provides excellent cooling performance for Raspberry Pi 5.



1.2 Test Purpose

Test the cooling performance of ED-Pi5PCOOLER.

1.3 Test Overview

By reading the temperature and frequency of Raspberry Pi 5 CPU, the cooling performance of ED-Pi5PCOOLER can be judged.

At the same ambient temperature, the lower temperature of Raspberry Pi 5 CPU and the higher the frequency indicates the better cooling performance.

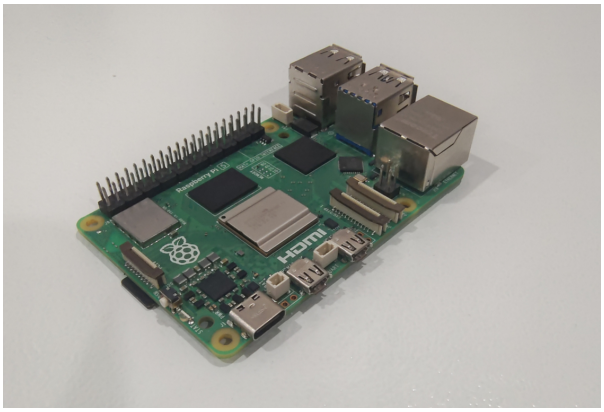
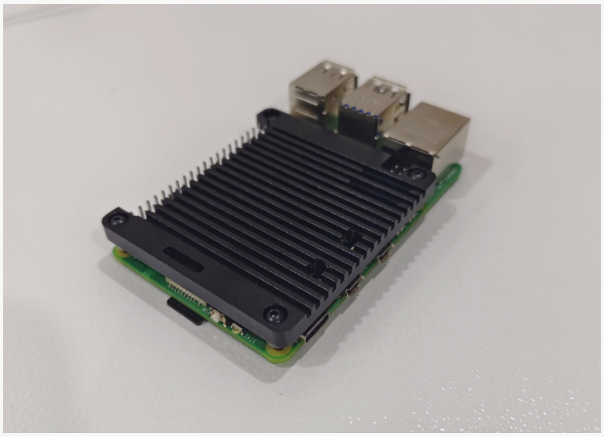
Test Content	Data Source
Cooling test of ED-Pi5PCOOLER on Raspberry Pi 5	The temperature of Raspberry Pi 5 CPU

2 Cooling Performance Testing

2.1 Device Under Test

2.1.1 Hardware Configuration

The following two groups of equipment were configured to test and compare the cooling effect of ED-Pi5PCOOLER.

Group	Configuration	
A	Raspberry Pi 5	
B	Raspberry Pi 5 + **ED-Pi5PCOOLER**	

2.1.2 Software Configuration

Operation System: 2024-07-04-raspios-bookworm-arm64.img

2.2 Test Equipment and Environment

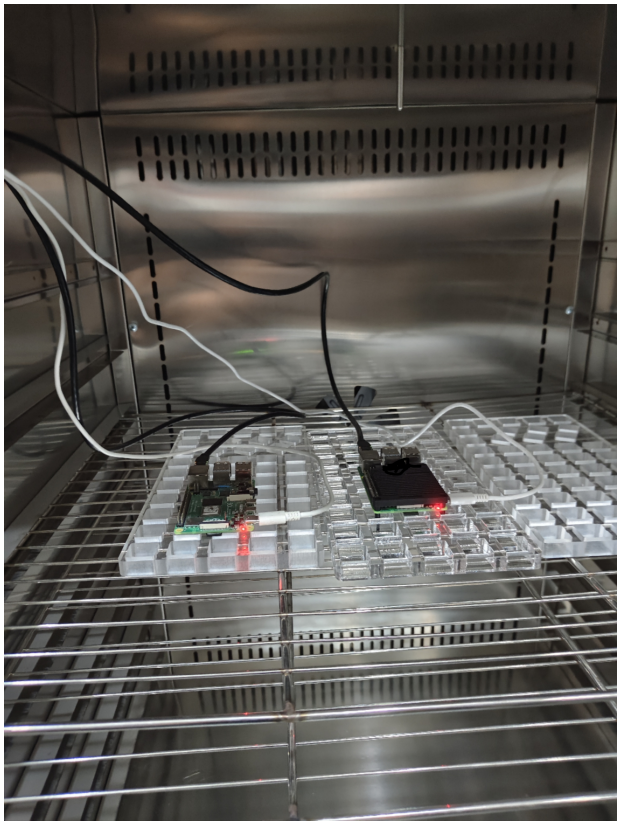
2.2.1 Test Equipment

Test Equipment	Quantity
Raspberry Pi 5 8GB	2
Raspberry Pi 27W USB-C Power Supply	2
ED-Pi5PCOOLER	1
Thermostat	1
Network Cable	2

2.2.2 Test Environment

Temperature: Constant temperature (25℃)

Humidity: 20%



2.2.3 Test Software

This script is used to make the Raspberry Pi 5 CPU 4 core run at full load, record the temperature data of Raspberry Pi 5 CPU every 5s, save it in a ".csv" file and print it to the terminal.

```
#!/bin/bash
#

PID_BENCH=

FILE=./temp$1-bench.csv
```

```
[ "$(whoami)" == "root" ] || { echo "Must be run as sudo!"; exit 1; }

if [ ! `which sysbench` ]; then
    apt-get update -y
    apt-get install -y sysbench
fi

trap ctrl_c INT

ctrl_c() {
    echo "** CTRL-C Detected"
    echo "** Kill Bench and Exit"
    kill $PID_BENCH >/dev/null 2>&1
    exit 0
}

bench() {
    while true ; do
        sysbench --test=cpu --cpu-max-prime=20000 --num-threads=4 run > /dev/null
2>&1
        # sleep 1
    done
}

monitor() {
    Counter=14
    DisplayHeader="Time      Temp    CPU         Throttle       Vcore"
    echo "Time,      Temp,    CPU,         Throttle,       Vcore" >> ${FILE}
    while true ; do
        let ++Counter
        if [ ${Counter} -eq 15 ]; then
            echo -e "${DisplayHeader}"
            Counter=0
        fi
        Health=$(perl -e "printf \"%19b\n\", $(vcgencmd get_throttled | cut -f2 -
d=)")
        Temp=$(vcgencmd measure_temp | cut -f2 -d=)
        Clockspeed=$(vcgencmd measure_clock arm | awk -F"=" '{printf
("%0.0f",$2/1000000); }' )
        CoreVolt=$(vcgencmd measure_volts | cut -f2 -d= | sed 's/000//')
        echo -e "$(date '+%H:%M:%S'), ${Temp}, $(printf '%4s' ${Clockspeed})MHz,
$(printf '%020u' ${Health}), ${CoreVolt}" | tee -a ${FILE}
        sleep 5
    done
}

echo "********** Raspberry Pi Benchmark **********"
echo ""
echo "           Press 'CRTL + C' to Exit         "
echo ""
echo "******************************************"
echo ""

touch ${FILE}
```

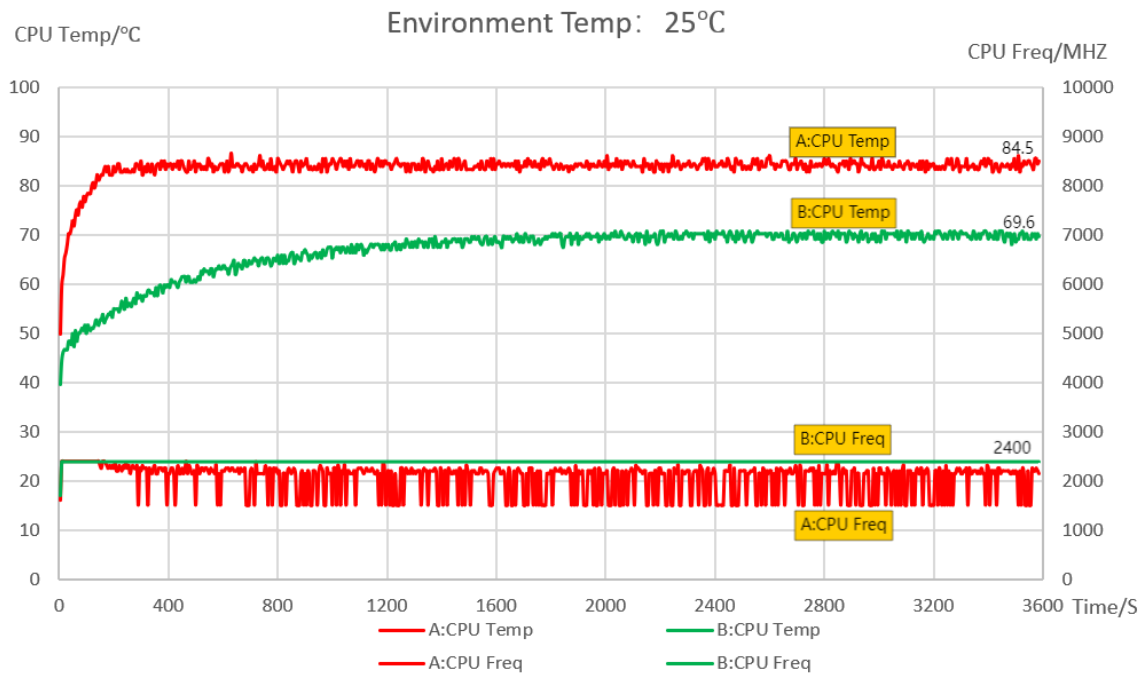
```
bench &
PID_BENCH=$!

monitor
```

2.3 Test Steps

1. Flashing the **2024-07-04-raspios-bookworm-arm64.img** image to two groups of devices, connect them with ssh, and update them using the following commands in turn `sudo apt updae` and `sudo apt upgrade` commands.
2. Assign configurations A and B for simultaneous testing of two groups of devices for one hour.
3. Run the script in the test software to set the Raspberry Pi 5 CPU to run at full load with 4 cores and read the CPU temperature and frequency data.
4. Evaluate the cooling effect of ED-Pi5PCOOLER by comparing the temperature and frequency data of the Raspberry Pi 5 CPU of the two groups of devices; the lower the temperature of the Raspberry Pi 5 CPU and the higher the frequency of the device when it is running stably under the same ambient temperature, the better cooling effect will be.

2.4 Test Result and Analysis



1. The following table shows the average temperature of the Raspberry Pi 5 CPU during stable operation of the two groups of devices

Group	Configuration	Stable running temperature of CPU (℃)
A	Raspberry Pi 5	84.5
B	Raspberry Pi 5 + **ED-Pi5PCOOLER**	69.6

2. When the device is running at a steady state in a 25°C environment, the **ED-Pi5PCOOLER** can reduce the temperature of the Raspberry Pi 5 CPU by approximately 15°C, allowing the Raspberry Pi 5 CPU to run continuously at its maximum mains frequency (2400MHZ).