

TRABAJO PRACTICO FINAL

Reparación y Mantenimiento de PC con herramientas libres

LAB. GUGLER UADER

Año: 2019.

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Tema: Eficiencia de disipadores de calor.



Torre

VS



Stock

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- Introducción de tema a tratar

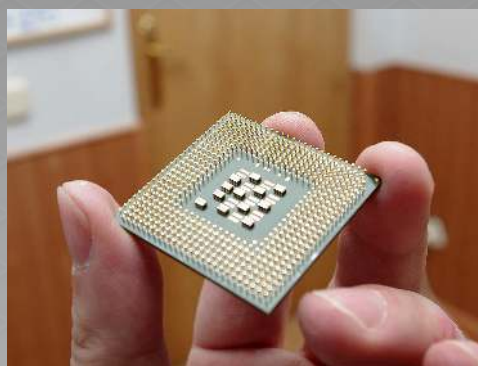
Mi trabajo practico trata sobre realizar un test de estrés a un microprocesador Intel para obtener las temperaturas que consigue siendo exigido al máximo utilizando el disipador de stock y luego realizar el mismo test utilizando un disipador de la marca ARCTIC. De esta manera conseguir los datos suficientes para hacer una comparación y mostrar la eficiencia de estos disipadores y cuanto logramos bajar las temperaturas para asegurarnos que el procesador no corra riesgo de dañarse por sobre calentamiento y alargar su vida útil.

El test fue realizado a un microprocesador Intel core i5 3570k a 3.40Ghz.

Antes de empezar con las pruebas vamos a explicar rápidamente lo que es un microprocesador y por que hay que darle un especial cuidado.

- ¿Que es un microprocesador?

El procesador es el cerebro del sistema, se encarga de realizar las operaciones lógicas y aritméticas para ejecutar los diversos programas y aplicaciones. Es por esto que se lo considera el componente mas importante de la pc.



- ¿Por que se calientan los procesadores?

Un microprocesador esta compuesto de un circuito integrado conformado por millones de transistores, a través de los cuales circula corriente eléctrica, lo que genera mucho calor debido a la resistividad de los conductores, ademas influye mucho la velocidad de reloj del mismo, cuando mayor sea esta, su temperatura también sera mayor.

- ¿Por que debemos mantener baja su temperatura?

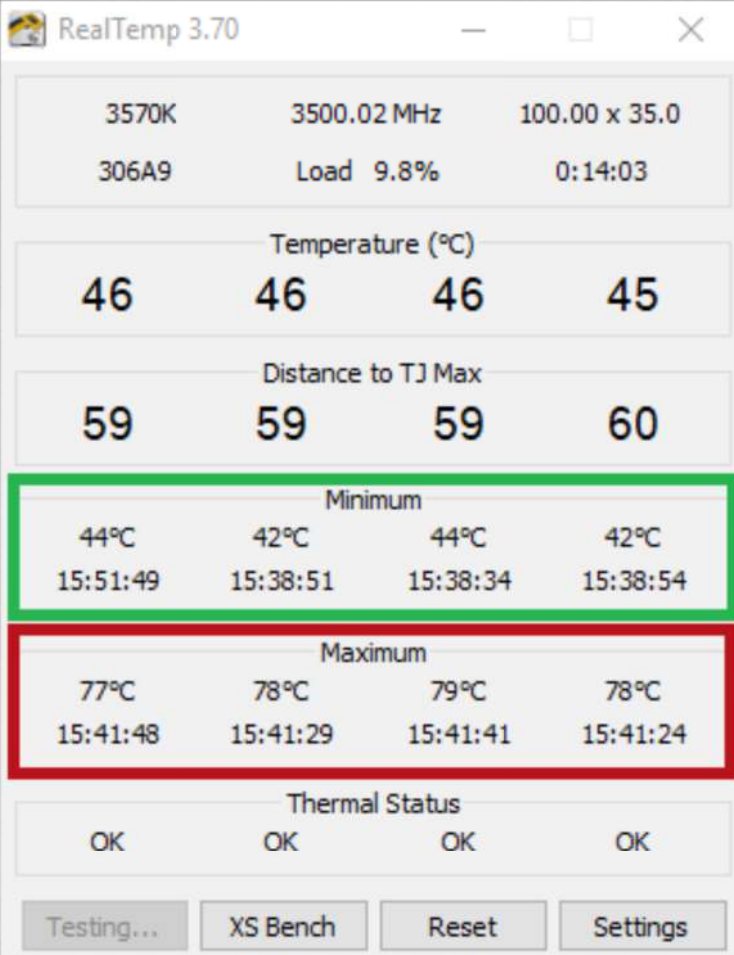
Básicamente este componente es una placa de silicio que si se ve sometida a demasiada temperatura puede verse muy afectada su vida útil o incluso dañarse permanentemente, de ahí la importancia de mantener su temperatura lo mas alejada del rango de peligro posible.

- Prueba con disipador de stock

Los resultados obtenidos en la prueba de estrés dieron una temperatura máxima en promedio de 78°C.

La temperatura mínima fue en promedio 43°C.

La temperatura promedio obtenida entre todos los resultados es de 60°C.



The screenshot shows the RealTemp 3.70 interface with the following data:

3570K	3500.02 MHz	100.00 x 35.0	
306A9	Load 9.8%	0:14:03	
Temperature (°C)			
46	46	46	45
Distance to TJ Max			
59	59	59	60
Minimum			
44°C	42°C	44°C	42°C
15:51:49	15:38:51	15:38:34	15:38:54
Maximum			
77°C	78°C	79°C	78°C
15:41:48	15:41:29	15:41:41	15:41:24
Thermal Status			
OK	OK	OK	OK
Testing...	XS Bench	Reset	Settings

Si bien el microprocesador esta preparado para soportar temperaturas que superen los 90°C, ese es muy cercano a su límite, y si se mantiene a esa temperatura durante un tiempo prolongado la vida útil del mismo se verá severamente reducida e incluso se corre peligro de quemar el componente.

Por esta razón queremos mostrar los resultados que obtenemos si reemplazamos el disipador de stock por uno de la marca ARCTIC, en este caso el modelo Freezer 13.

Este disipador de calor es muy capaz por un valor de alrededor de \$3100 y medidas que permiten su instalación en casi cualquier gabinete.

- Características de disipador ARCTIC

Cuenta con una base maciza de bronce, 4 heat pipes de bronce de 6mm de diámetro cada uno, un cuerpo de 45 aletas de aluminio y un ventilador de 92mm con rodamiento hidráulico, es decir, que no genera ruido ya que no hay fricción debido a que cuando el rotor gira se mantiene elevado por la presión de aceite que genera. Las velocidades del ventilador son de entre 600 hasta 2000 RPM dependiendo de la temperatura que tenga el procesador. El TDP máximo recomendado para usar este disipador es de 140 Watts. Además, es compatible con una gran cantidad de sockets:

Intel: 1151, 1150, 1155, 1156, 1366, 775.

AMD: AM4, AM3+, AM2+, FM2+, FM1.



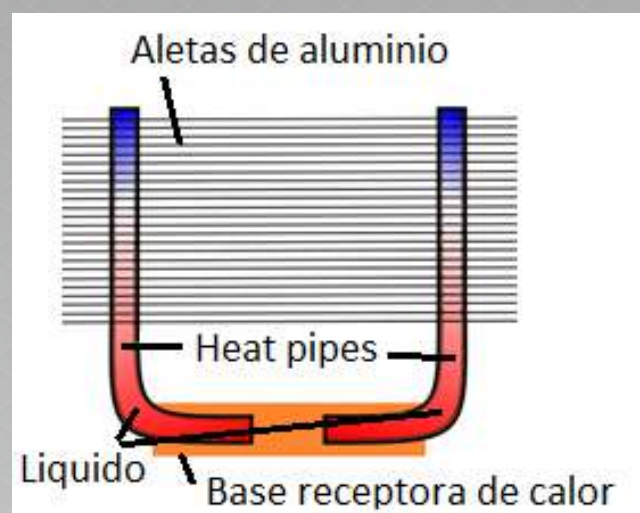
- **Heat pipes** (tubos de calor)

Los heat pipes son tubos que contienen en su interior una fina malla y un líquido de fácil evaporación que ayuda a mejorar el traslado del calor desde la base de bronce o aluminio que hace contacto con el microprocesador hacia la parte superior del radiador ayudando a la disipación del mismo a través de las aletas por las que circula aire forzado por un ventilador. En este caso el disipador cuenta con tubos de 6mm de diámetro, la medida de estos varía según el producto y a mayor diámetro mejorara su capacidad de transportar calor desde la base del disipador hacia las aletas para su rápida disipación. En algunos casos los disipadores se encuentran bañados en Níquel. Este es un elemento químico que ayuda a la conducción del calor y protege el disipador de la corrosión.



- **¿Como funcionan?**

El funcionamiento de los heat pipes es bastante simple, el líquido de fácil evaporación que contienen en su interior al verse sometido a las altas temperaturas que genera el procesador comienza a evaporarse llevado el calor de la base del disipador hacia la parte superior, a medida que sube por los tubos el viento que pasa por las aletas de aluminio lo van enfriando rápidamente, lo que provoca que el calor se libere y baje la temperatura del líquido. Al llegar a la parte superior ya se encuentra en estado líquido nuevamente por lo que vuelve a bajar a la base para repetir el mismo ciclo nuevamente.



-¿En que otros componentes son utilizados?

Generalmente podemos encontrarlos en disipadores para procesadores o también en los disipadores de las placas de video, e incluso hay motherboards que hacen uso de estos tubos para disipar el calor que generan los chipsets de la misma. Podemos encontrarlos en disipadores por aire y también pasivos. Estos últimos no cuentan con un ventilador que ayude a retirar el calor que se va acumulando en las aletas de aluminio.



Las siguientes imágenes son del disipador de una placa de video de la marca XFX. Podemos observar que cuenta con 4 heat pipes de 6mm de diámetro cada uno cubiertos por una fina capa de Níquel.



- Aletas de aluminio

Las aletas de aluminio son las encargadas de absorber el calor de los heat pipe y con la ayuda del ventilador expulsar este calor hacia afuera del cuerpo del disipador. Usualmente se utilizan aletas de aluminio ya que es un material con un gran poder de absorción de calor y a la vez de rápido enfriamiento con la ayuda de un ventilador. Cuando mas grande es el cuerpo de aletas de aluminio mayor sera el calor que podrá absorber de los heat pipe y cuando mas grande y potente sea el ventilador mas rápido se enfriaran las aletas, por lo que el disipador sera mucho mas eficiente.



- Prueba con disipador ARCTIC Freezer 13

Los resultados obtenidos dieron una temperatura máxima en promedio de 55°C.

La temperatura mínima fue en promedio 28°C.

La temperatura promedio obtenida entre todos los resultados es de 41°C.

The screenshot shows the RealTemp 3.70 interface with the following data:

System Information			
3570K	3500.02 MHz	100.00 x 35.0	
306A9	Load 3.3%	0:16:11	

Temperature (°C)			
33	25	25	33

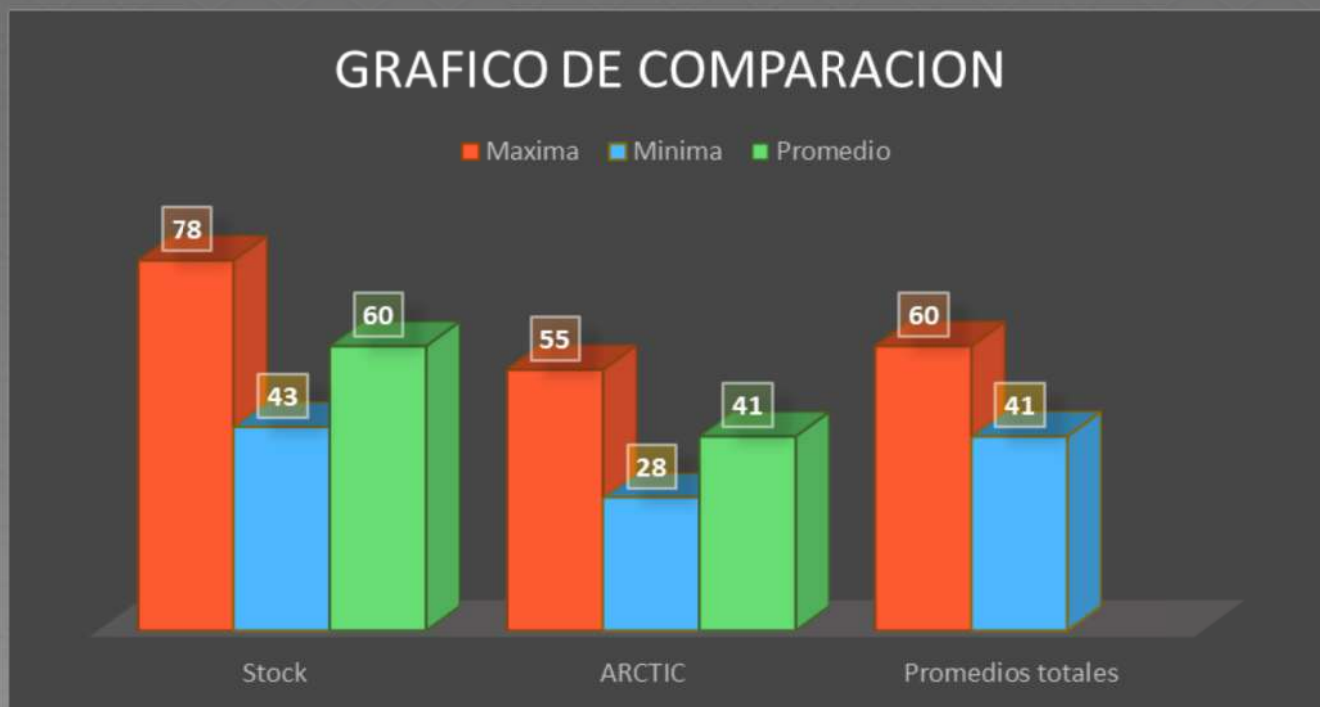
Distance to TJ Max			
72	80	80	72

Minimum			
32°C	24°C	24°C	31°C
01:39:42	01:37:12	01:51:26	01:39:49

Maximum			
55°C	54°C	55°C	57°C
01:42:23	01:42:30	01:42:43	01:42:31

Thermal Status			
OK	OK	OK	OK

Buttons: Testing..., XS Bench, Reset, Settings



- Conclusión

Con estos datos podemos decir que la temperatura máxima del microprocesador se vio reducida en un 30% aproximadamente. Estaríamos hablando de 23°C de diferencia lo cual a largo plazo puede hacer una gran diferencia en la vida útil del componente.

Teniendo en cuenta el costo del disipador y la temperatura que logramos reducir podemos concluir que es una muy buena inversión a largo plazo el adquirir un disipador como el utilizado en las pruebas ya que así nos aseguraremos que el procesador se mantendrá a temperaturas óptimas e incluso podremos permitirnos realizar overclock sin correr riesgo de quemar el componente.

- Referencias y bibliografía

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- Glosario

RealTemp 3.70: es una herramienta libre que se utiliza para realizar una serie de pruebas de rendimiento al procesador con el fin de obtener las temperaturas máximas y mínimas a las que se puede ver sometido el mismo.

Resistividad eléctrica: es la resistencia eléctrica específica de un determinado material.

Heat pipes: tubos de calor o tubo termosifón bifásico.

Operaciones lógicas y aritméticas: las operaciones aritméticas que realiza el procesador son suma, resta, multiplicación, etc. Las operaciones lógicas son (si, y, o, no) entre valores de los argumentos.

TDP: es la máxima potencia que es capaz de usar un dispositivo en Watts.

Motherboard: (tarjeta madre) es una placa donde se conectan los diversos componentes de la pc.

Socket: es la ranura en la placa madre donde va colocado el procesador, hay muchas versiones distintas del mismo, esta tiene que ser compatible con el procesador para poder funcionar.

Chipset: es un conjunto de chips o circuitos integrados, su función es realizar diversas funciones de hardware.

Hardware: son los elementos físicos que conforman la computadora o sistema informático.

Niquel: es un metal conductor de electricidad y calor muy maleable, por lo que es fácil de laminar, pulir y forjar.

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