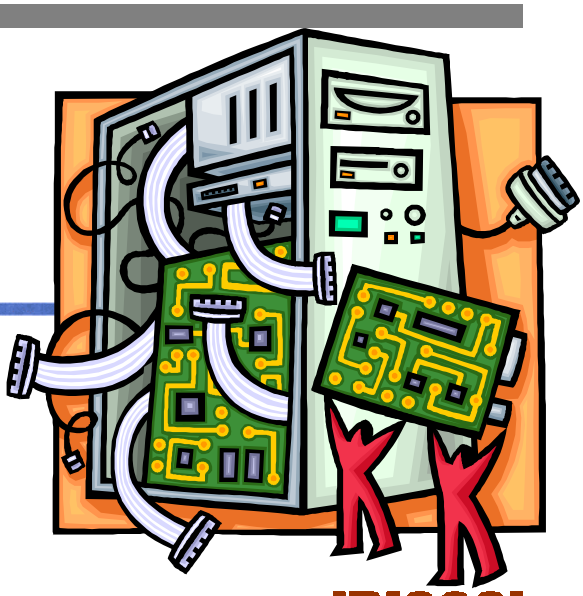
El núcleo del PC: Placa base, chipset y procesador

Adquisición y Configuración de Computadores Personales

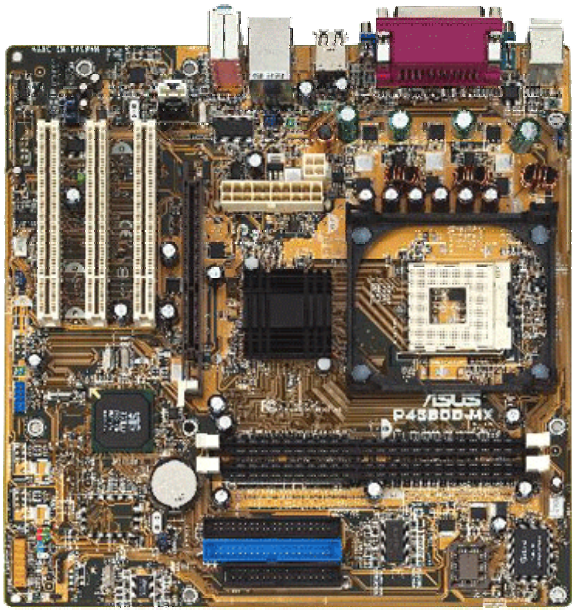
Objetivos

- Identificar las características propias de los componentes del núcleo de un PC
- Seleccionar componentes en base a distintos criterios
- Relacionar la interacción de cada uno de los componentes del núcleo del PC

Placa base

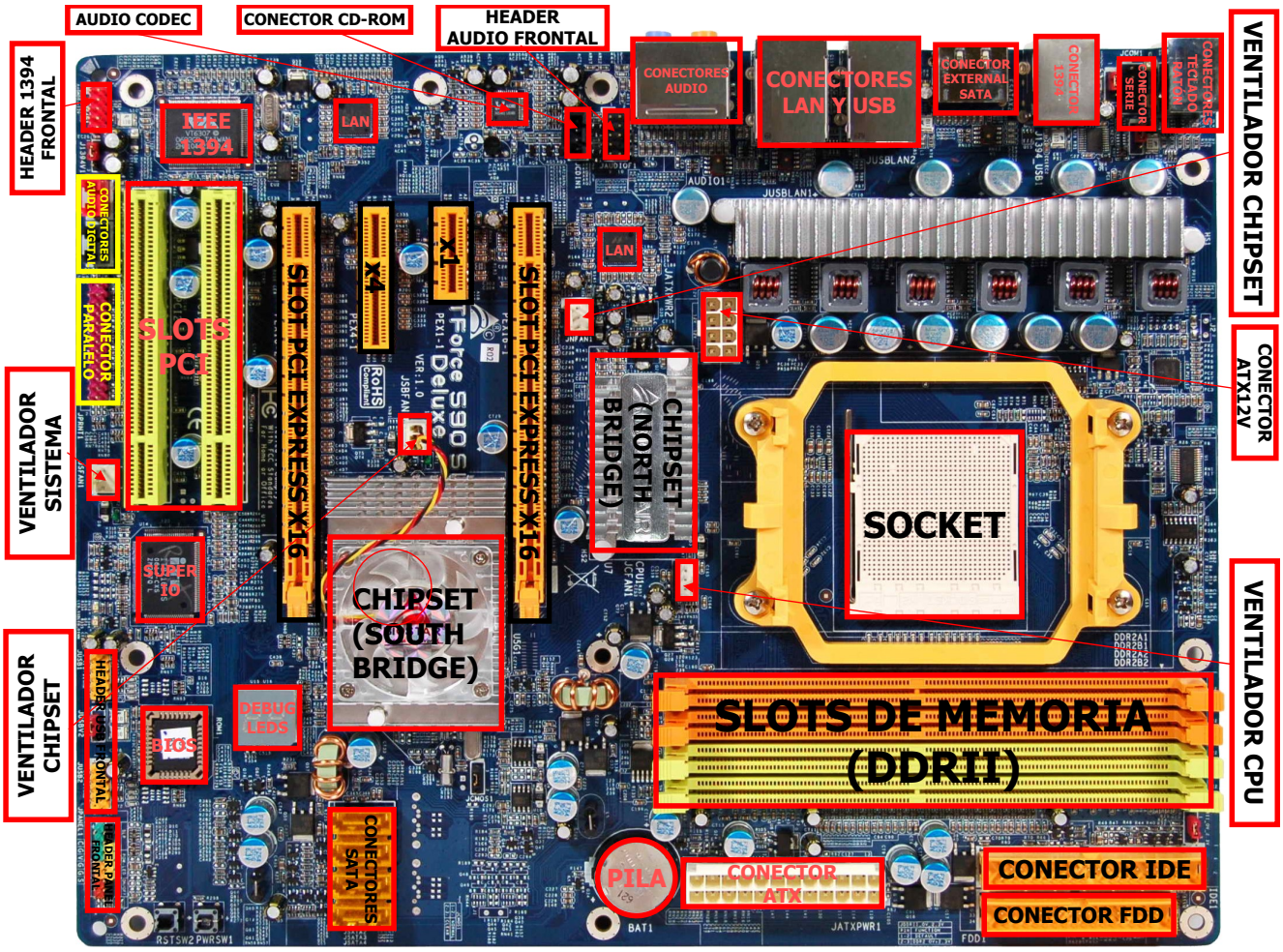


¿Qué es una placa base?



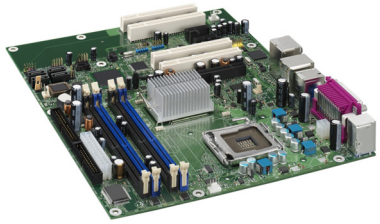
¿Qué es una placa base?

- The main circuit board in a computer
- Also known as the logic board, mainboard, or computerboard, the **motherboard** is the computer's main board and in most cases holds all CPU, memory, and I/O functions or has expansion slots for them
- The main printed circuit board in a computer that carries the system buses. It is equipped with sockets to which all processors, memory modules, plug-in cards, daughterboards, or peripheral devices are connected

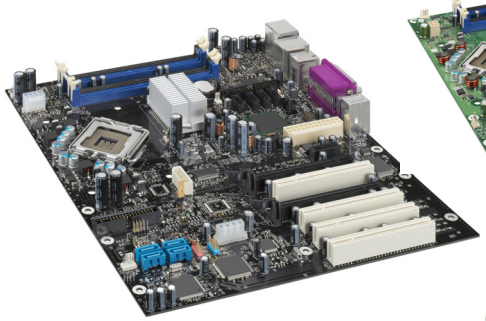


Form factor

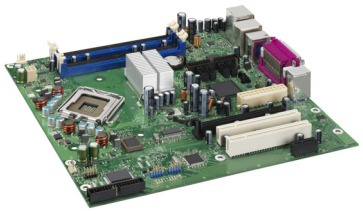
Intel X58 Roundup: Six $300+ Platforms Compared : Finally Ready For Prime Time?:
http://www.tomshardware.com/reviews/x58-motherboard-i7,2164.html
Enthusiast P55: Eight LGA 1156 Boards Between $150 And $200:
http://www.tomshardware.com/reviews/lga-1156-motherboard,2463.html



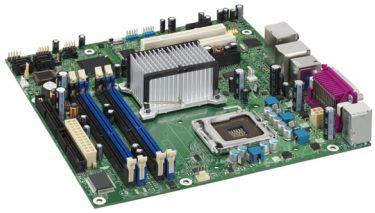
ATX (12” x 9.6”)



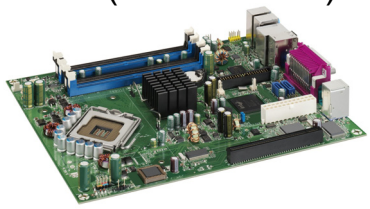
BTX (12.8” x 10.5”)



Micro-BTX (10.4” x 10.5”)



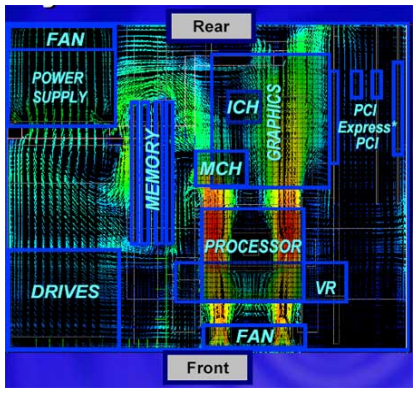
Micro-ATX (9.6” x 9.6”)



Pico-BTX (8” x 10.5”)

Form factor

- Balanced Technology eXtended (BTX)
  - Propuesta por Intel en 2003
    - Compatible con ATX solamente a nivel de fuente de alimentación
  - Mejor ventilación
  - Bajo nivel de ruido



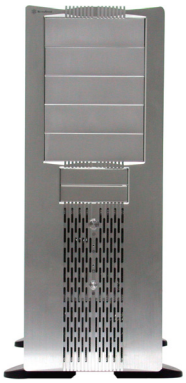
BTX: http://www.intel.com/go/btx/

Chasis

Torre
Full tower

Semi-torre
Mid- tower

Mini-torre
Mini- tower



ATX

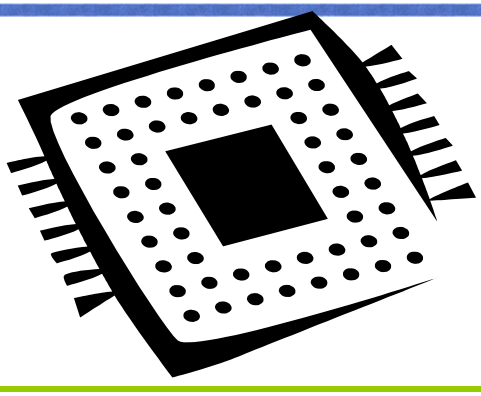
BTX

Sobremesa
Desktop

Sobremesa extraplano
Slimline desktop

Five Gaming Enclosures, Rounded Up: http://www.tomshardware.com/reviews/gaming-case-review,2420.html
Three Mainstream Home Theater PC Cases Compared: http://www.tomshardware.com/reviews/htpc-chassis-theater,2412.html

Chipset



¿Qué es el chipset?

- Two or more integrated circuits which together perform a complete processing function or functions
- A group of microchips that actually control the flow of information on your computer. They are the controllers for the memory, cache, harddrive, keyboard, etc. These groups of chips direct traffic along the bus and can allow devices to talk to each other without having to go through the CPU
- The chipset controls the system and its capabilities. All components communicate with the processor through the chipset - it is the hub of all data transfer. The chipset uses the DMA controller and the bus controller to organize the steady flow of data that it controls. The chipset is a series of chips attached directly to the motherboard, and is usually second in size only to the processor. Chipsets are integrated (soldered on to the motherboard) and are not upgradeable without a new motherboard

Chipset

- Consta de
  - NorthBridge
    (Memory Controller Hub [MCH] – Intel)
    - Realiza la comunicación entre la CPU (Front Side Bus – FSB), la memoria y la tarjeta gráfica
  - SouthBridge
    (I/O controller Hub [ICH] – Intel)
    - Realiza la comunicación entre la CPU y los discos duros, LAN, USB, …

SiSHyperStreaming:http://www.sis.com/hyperstreaming/###

Chipsets de Intel

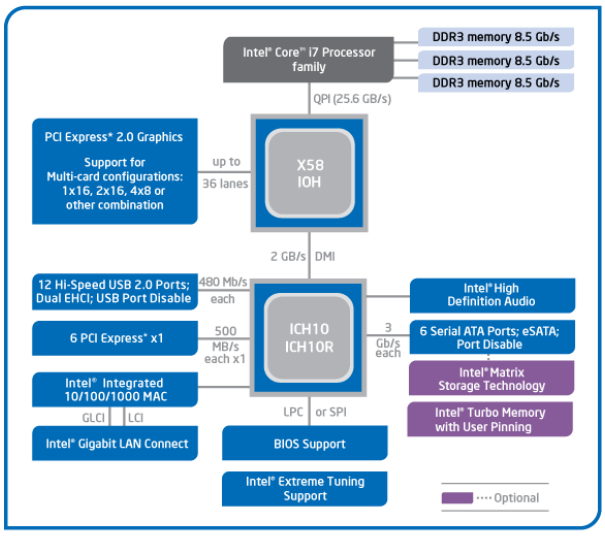
- Mainstream
  - Q45
  - Q43
  - P55
  - P45
  - P43
  - G45
  - G43
  - G41
  - G35
  - Q35
  - Q33
  - P35
  - P31
  - G33
  - G31
  - Q965
  - Q963
  - G965
  - P965
  - 946PL
  - 945G
  - 945P
  - 945PL
  - 945GT

- Performance
  - X58
  - X48
  - X38
  - 975X Express
  - 955X Express

Comparativa: http://ark.intel.com/

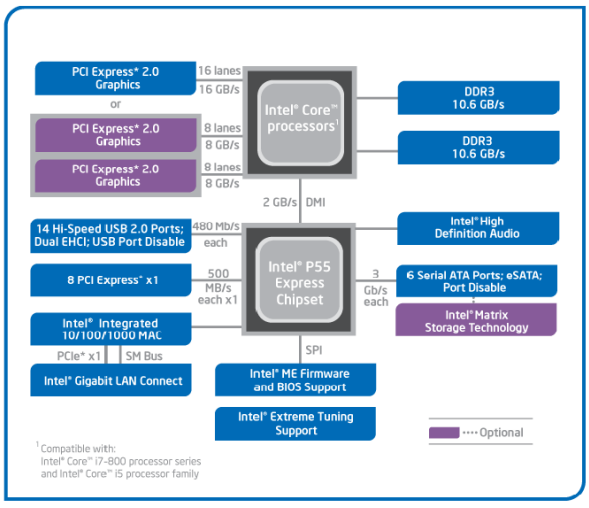
Chipsets de Intel

X58



Intel® X58 Express Chipset Block Diagram

P55



Intel® P55 Express Chipset Platform Block Diagram

Fuente: http://www.intel.com

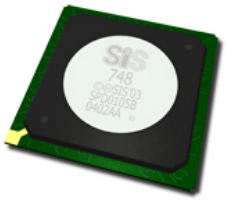
Chipsets de SiS (Silicon Integrated Systems)

- Intel Core 2 Duo
  - SiS672FX
  - SiS672
  - SiS671FX
  - SiS671
  - SiS671DX

- Intel Pentium 4
  - SiS656FX
  - SiS649FX
  - SiS649
  - SiS656
  - SiS655TX

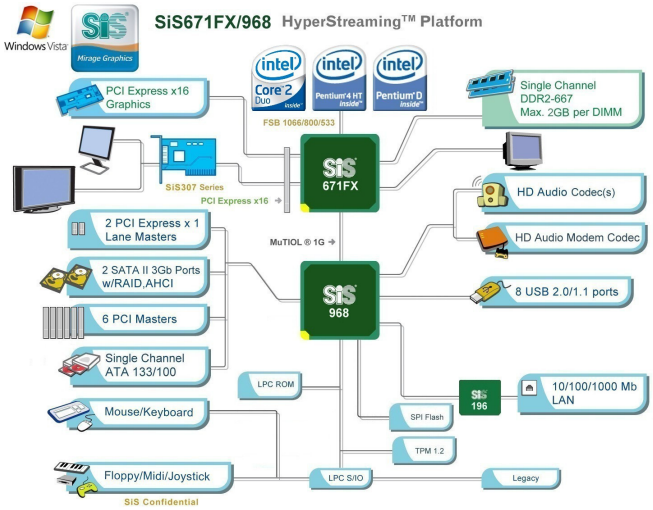
- AMD 64
  - SiS771
  - SiS761GX
  - SiS756
  - SiS755FX
  - SiS755

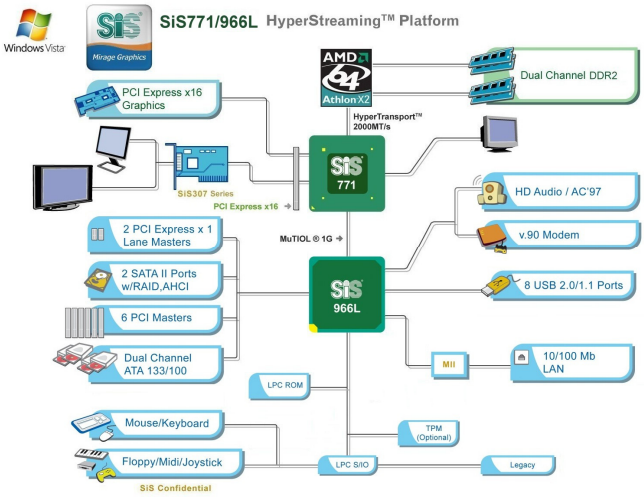
- AMD Athlon XP
  - SiS748
  - SiS741
  - SiS741GX



SiS Chipsets Comparison Charts: http://www.sis.com/support/support_compare.htm

Chipsets de SiS (Silicon Integrated Systems)





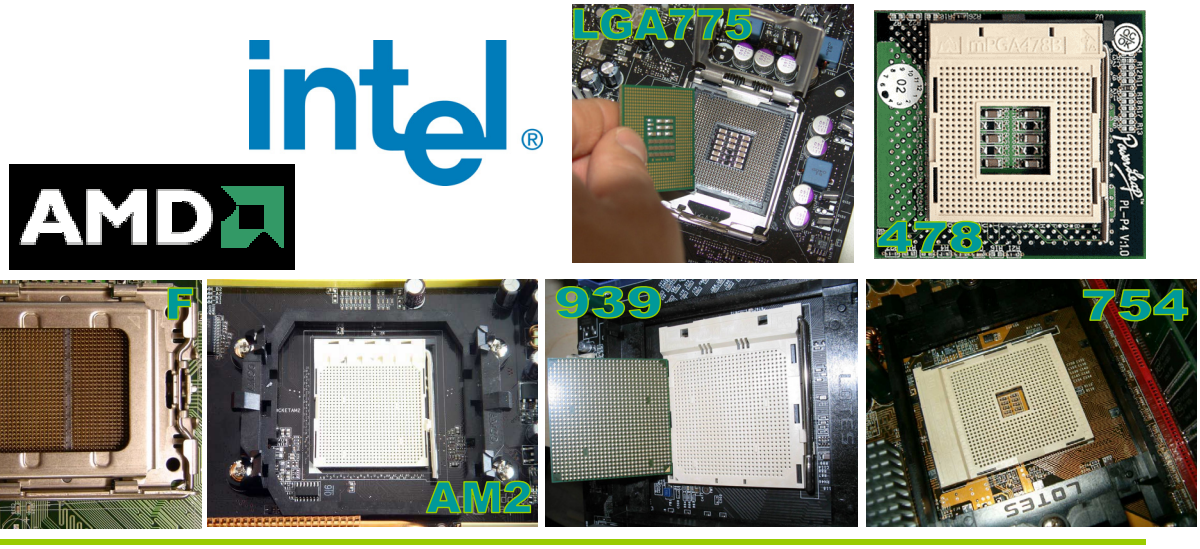
Fuente: http://www.sis.com

Fabricantes de chipsets

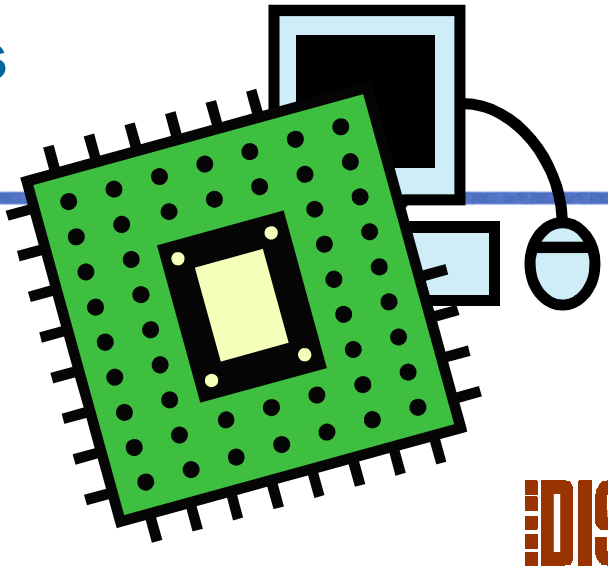
- Ali http://www.ali.com.tw
- ATI http://www.ati.com
- Intel http://www.intel.com
- nVidia http://www.nvidia.com
- OPTi http://www.opti-inc.com
- SiS http://www.sis.com
- VIA http://www.via.com.tw

Sockets

- Indican el tipo de procesador para el que se diseñó la placa



Procesadores



¿Qué es el procesador?

- The central processing unit (CPU)
- A hardware device that executes the commands in a stored program in the computer system
- The CPU is the brain of the computer because it performs most of the calculations to run programs and allows you to perform work on the machine. In terms of computing power, the CPU is the most important element of a computer system

- The processor (aka CPU or microprocessor) is the brain of your computer. It reads instructions from your software and tells your computer what to do. The speed at which the CPU processes information internally is measured in MegaHertz (MHz) and GigaHertz (GHz). 1GHz is equal to 1,000MHz. **Generally**, processors with higher MHz or GHz enhance your ability to run creative, entertainment, communication, and productivity applications [Intel]

Velocidad (Hz = ciclo/s)

- Múltiplo de la velocidad de la placa base

Intel Core 2 Duo E6300

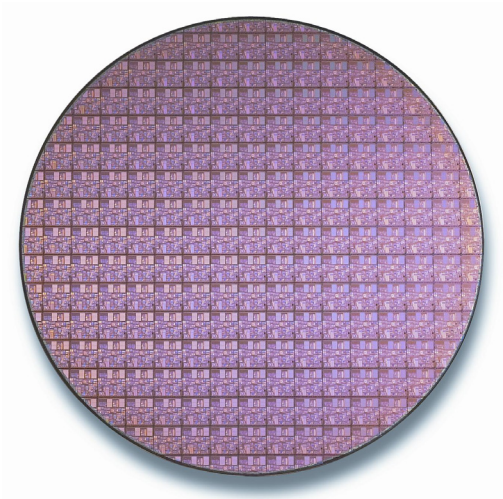
1.86 GHz = 7 x 266 MHz

AMD Athlon 64 X2 3800+

2 GHz = 10 x 200 MHz

Velocidad

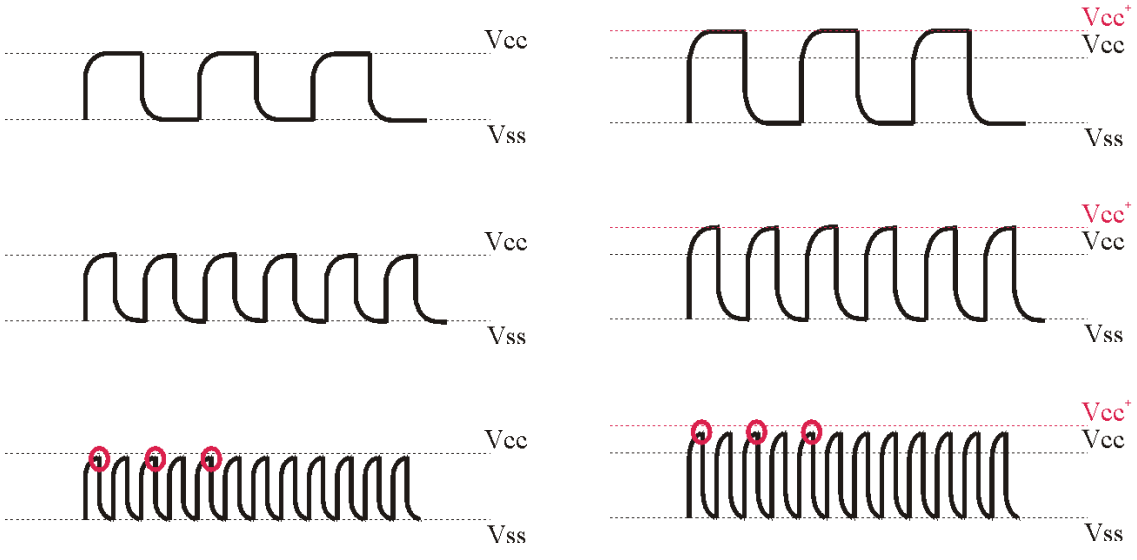
- Proceso de fabricación
  - NO es un proceso determinista
  - Conforme pasa el tiempo se mejora el proceso
  - Los chips se testean y se etiquetan
  - Ejemplo:
    - Los Pentium 4 2.0A, 2.2, 2.26, 2.4 y 2.53GHz son **EXACTAMENTE** el mismo chip



Overclocking

- Incrementar la velocidad del procesador por encima de la especificada
  - Dispone de un margen de seguridad
    - Modificar la frecuencia de la placa base
    - Modificar el voltaje aplicado
  - Puede resultar nocivo para el chip

Overclocking



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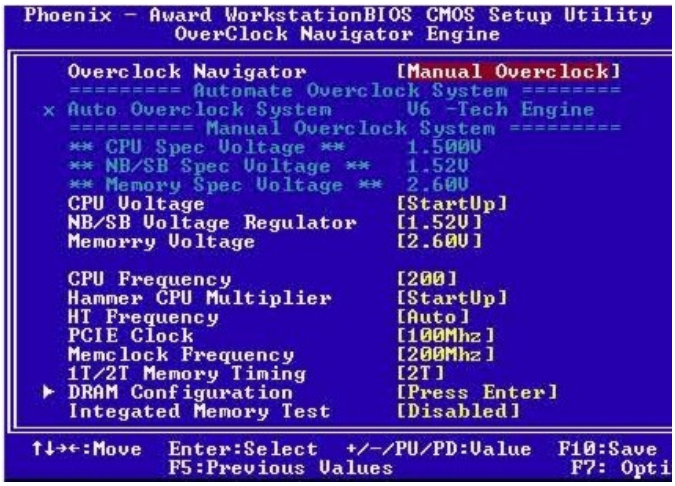
Overclocking



- CPU Voltage:
  - This function will increase CPU stability when overclocking. However, the CPU temperature will increase when CPU voltage is increased.
  - Choices: The range is from 1.2V to 1.725V, with an interval of 0.025V.
- CPU Frequency:
  - CPU Frequency is directly in proportion to system performance. To maintain the system stability, CPU voltage needs to be increased also when raising CPU frequency.
  - Choices: This range is from 200 to 450, with an interval of 1MHz.
- Hammer CPU Multiplier:
  - The MOS allows users to downgrade the CPU ratio when overclocking.
  - Choices: The lower limit is x4 (800MHz). The upper limit is decided by different CPU type. With an x1 (200MHz) interval.

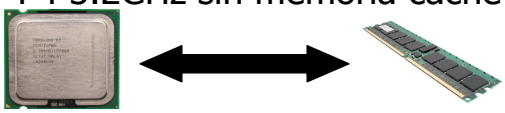
Overclocking the Pentium 4 520 2.8GHz to 3.57GHz:
http://techreport.com/reviews/2004q4/p4-overclock/index.x?pg=1
Overclocking the Athlon XP-M 2500+ processor:
http://techreport.com/reviews/2004q1/athlonxp-m-2500/index.x?pg=1

Memoria cache

- Búfer de memoria de alta velocidad que almacena temporalmente la información que necesita el procesador
- Permite aumentar la velocidad del procesador sin aumentar la velocidad de la memoria principal
- Es MUY cara

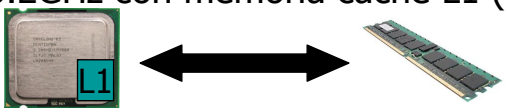
Memoria cache

P4 3.2GHz sin memoria cache



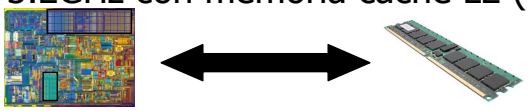
(3.2GHz = 0.3125ns por ciclo) (400MHz = 2.5ns por ciclo)
Obtener información de memoria = 8 ciclos de espera

P4 3.2GHz con memoria cache L1 (20KB)



Hit ratio L1 = 90%
10% de las veces debe esperar 8 ciclos

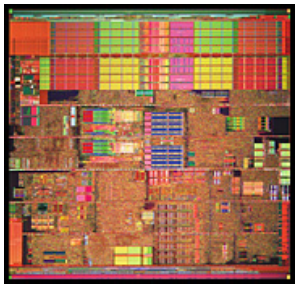
P4 3.2GHz con memoria cache L2 (512KB)



Hit ratio L1 (90%) y Hit ratio L2 (90%) = 99%
1% de las veces debe esperar 8 ciclos

Hyper-Threading Technology

- Convierte un procesador físico en dos procesadores lógicos
  - Duplica el conjunto de registros de propósito general y los registros de control
- Los procesadores lógicos comparten:
  - La misma cache
  - Las unidades de ejecución
  - Los buses

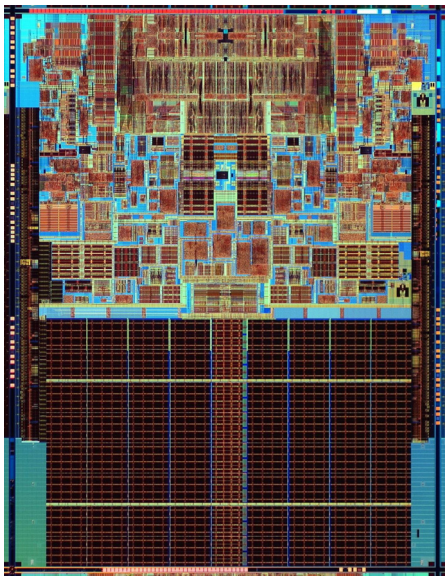


Introduction to Hyper-Threading Technology:
http://software.intel.com/en-us/articles/introduction-to-hyper-threading-technology/

Dual Core

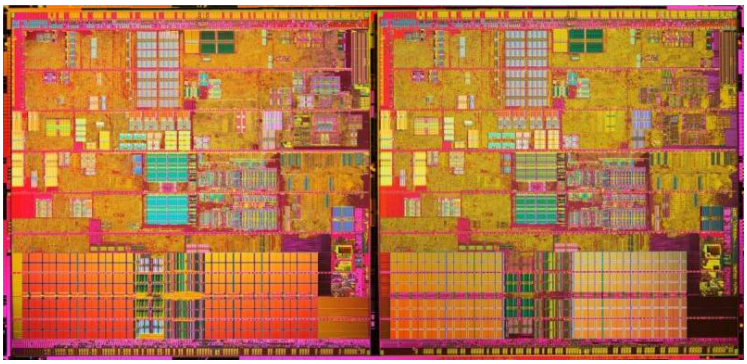
Core 2 Duo

(Dos *cores* en un único *die)*



Pentium D

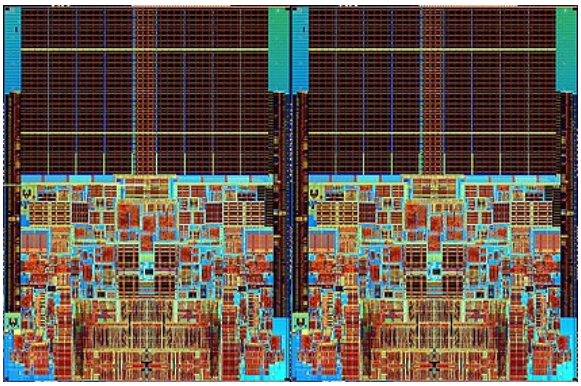
(Dos *dies* en un mismo encapsulado)

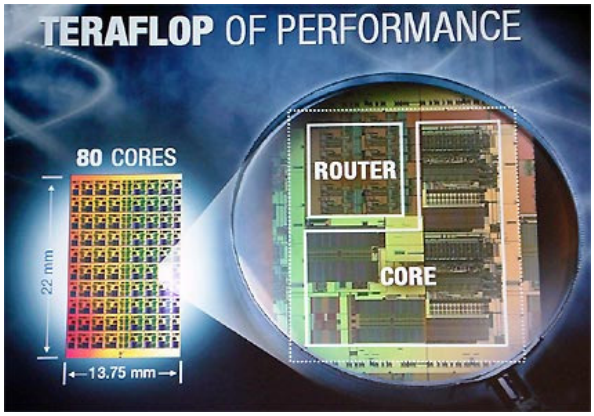


Quad Core

Core 2 Quad

(Dos *Core 2 Duo* (*dies*) en un mismo encapsulado)





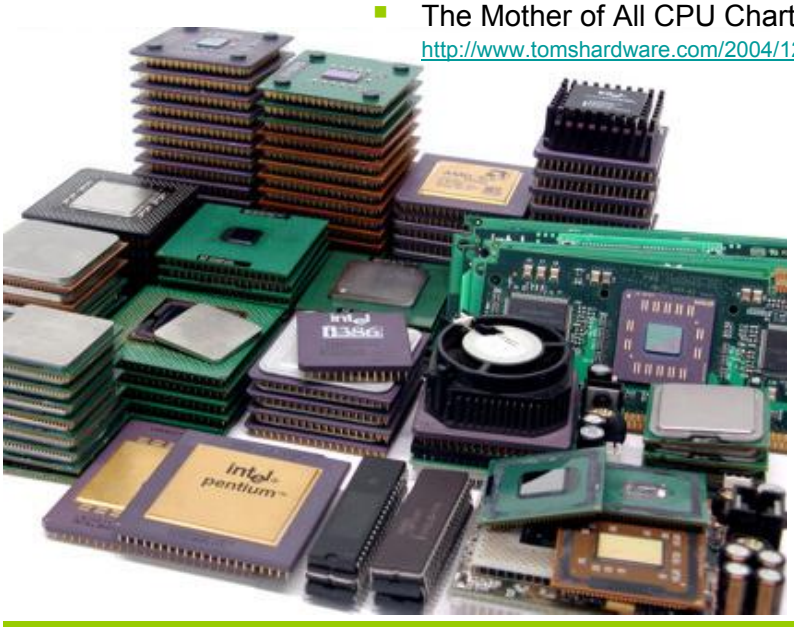
Teraflops Research Chip: http://techresearch.intel.com/articles/Tera-Scale/1449.htm

Modelos

Intel (www.intel.com)	AMD (www.amd.com)	Características
Core 2 Extreme Core 2 Quad	Phenom Athlon 64 FX	Muy alto rendimiento (Cuatro núcleos) Profesionales de procesamiento de vídeo y/o entornos multitarea de altas prestaciones, jugadores y entusiastas buscando rendimiento máximo
Core 2 Duo	Athlon 64 X2	Alto rendimiento (dos núcleos gama alta) Uso frecuente de aplicaciones de cómputo intensivo como Photoshop o software de edición de vídeo en entornos multitarea, jugadores entusiastas
Core 2 Duo Pentium D Pentium 4	Athlon 64 X2 Athlon 64	Rango medio (dos núcleos gama baja o un núcleo gama alta) Usuarios multitarea conmutando entre aplicaciones de moderado requerimiento como herramientas ofimáticas, acceso a Internet de alta velocidad, aplicaciones multimedia y gráficas ligeras (lectura y escasa edición)
Celeron D	Sempron	Bajo presupuesto (un núcleo y memoria cache reducida) Funciones básicas monotarea: herramientas ofimáticas, acceso a Internet, etc

2009 CPU Charts: http://www.tomshardware.com/charts/2009-desktop-cpu-charts/benchmarks,60.html

- The Mother of All CPU Charts Part 1 (1995/2005): http://www.tomshardware.com/2004/12/20/the_mother_of_all_cpu_charts_part_1/
- The Mother of All CPU Charts Part 2 (1995/2005): http://www.tomshardware.com/2004/12/21/the_mother_of_all_cpu_charts_part_2/

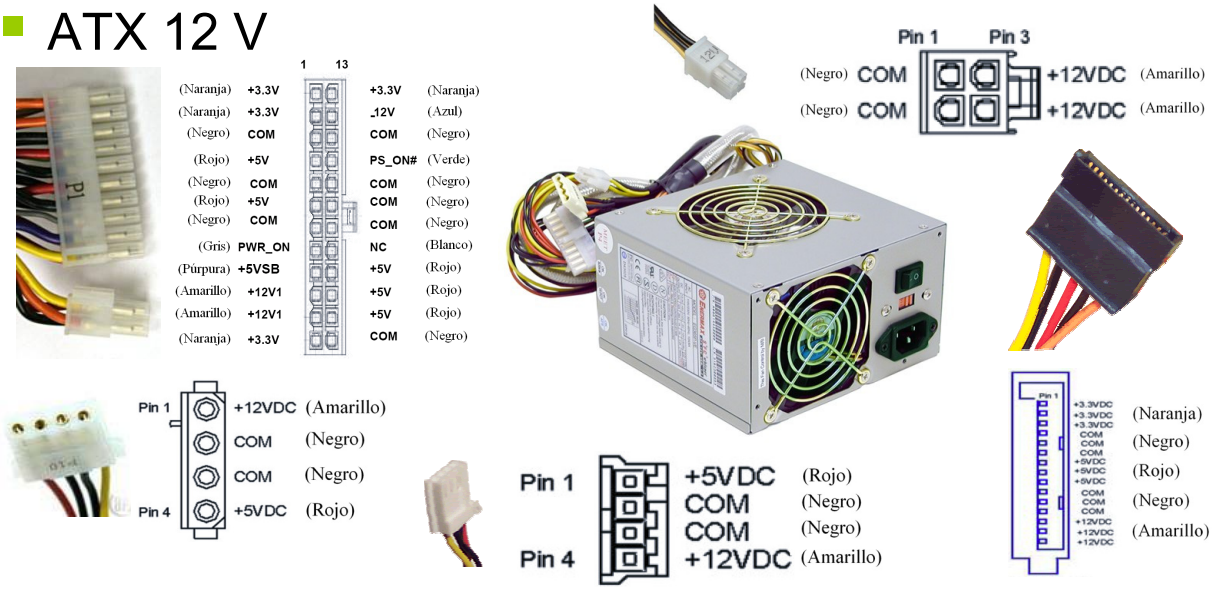


Fuente de alimentación

eXtreme Power Supply Calculatorv2.0: http://www.extreme.outervision.com/psucalculator.jsp

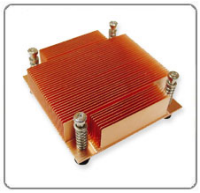
5 Power Supplies Get the Full Juice Treatment: http://www.tomshardware.com/reviews/5-power-supplies-full-juice-treatment,1216.html

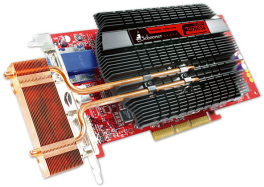
- ATX 12 V



Disipadores de calor pasivos

- Radiadores con aletas dorsales de aluminio
  - Montados sobre el procesador/chipset utilizando un material de interfaz térmica para mejorar la transferencia de calor
- Disipan el calor por convección
  - Precisan de un flujo de aire a través de las aletas
- 100% fiables
  - No tienen componentes mecánicos





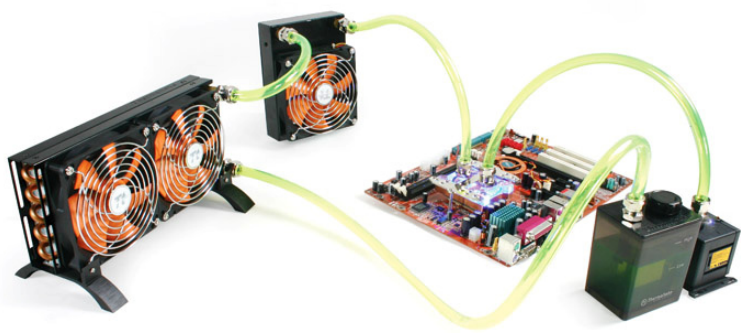
The Heatsink Guide: http://www.heatsink-guide.com/

Disipadores de calor activos

- Disponen de un ventilador para mantener el flujo de aire
- Precisan de alimentación eléctrica
- Los ventiladores no son muy fiables

ZALMAN, Cool Innovations: http://www.zalman.co.kr

Disipadores de calor por líquido



DIY Water Cooling 101: http://www.tomshardware.com/2005/06/09/diy_water_cooling_101/index.html

Strip Out The Fans, Add 8 Gallons of Cooking Oil:
http://www.tomshardware.com/reviews/strip-fans,1203.html

Resumen

- El chipset determina las posibilidades que ofrece el PC
  - Tipo y velocidad de CPU (¿Overclocking?)
  - Tipo y cantidad de memoria (Tema 3)
  - Dispositivos que puede controlar
- Dependiendo de las necesidades, determinar los dispositivos integrados que pueden sernos necesarios

Créditos

- **Autores:**
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  - Luis José Saiz Adalid (2009)