

Alaska Computer Society, PC Users Group (<http://www.acs-pcug.org>)

Build a PC presentation 12-04-2006, Presented by Robert Sprowl

Beginners Segment:

- Personal Computer Components (what's goes in the box)

- Case
 - AT
 - ATX
 - BTX
- Power Supply
 - AT vs. ATX
- Motherboard
 - ATX
 - CPU Socket
 - BIOS – Firmware, hardware controls
 - Award
 - Phoenix
 - Expansion Slots
 - ISA, PCI, AGP, PCI-Express
- CPU
 - Intel
 - AMD
- System RAM
- Video Adapter
 - Connectors;
 - VGA (15pin)
 - DVI
 - HD – Dual head, requires a splitter cable

- Floppy Drive 3.5/1.44MB
 - Internal – 34 pin ribbon cable
 - USB - external
- Optical Storage
 - CD
 - DVD
- Mass Storage (HDD)
 - IDE/E-IDE (PATA)
 - SATA/SATA2
 - SCSI
- External connections
 - PS/2 (Keyboard/Mouse)
 - Parallel (1284)
 - Serial
 - USB 2.0
 - Firewire (1394)
 - Audio
 - LAN (RJ-45 8 pin Ethernet)

Main Presentation

So you want to build a PERSONAL computer;

Choose your components:

- Choose your CPU first – this will determine main components requirements, such as Motherboard, RAM, and Power supply
 - Intel
 - Current Generation CPU's: Celeron D, P4 HT, P4 Core2 Duo, P4 Core2 Duo Extreme (Quad core!)
 - Socket types = 478/775
 - FC-LGA: <http://www.intel.com/support/processors/sb/CS-009863.htm>
 - Intel CPU Comparison: http://indigo.intel.com/compare_cpu/default.aspx?familyID=1&culture=en-US
 - AMD
 - Sempron, Athlon 64, Opteron, Athlon 64 X2 Dual-Core, Athlon 64 FX
 - L2 Cache Size: - 128KB, 256KB 512KB, 512KB x2 , 1MB, 1MB x2
 - Socket: 754, 939, 940 and AM2 FX
 - AMD Comparison; <http://www.amdcompare.com/us-en/desktop/Default.aspx#grid>
- Video card. Major impact on overall real/perceived performance and user satisfaction.
 - Can also influence Motherboard choice – such as NVIDIA dual SLI configuration for high performance gaming
 - Home PC
 - 3D Gaming
 - MS DirectX graphics support
 - ATI Crossfire technology: \$100 - \$500
 - <http://www.tigerdirect.com/applications/SearchTools/item-details.asp?EdpNo=2522361&CatId=0>
 - NVIDIA SLI technology: \$100 - \$800
 - <http://www.tigerdirect.com/applications/SearchTools/item-details.asp?EdpNo=2570717&CatId=0>
 - Business – CAD workstation:
 - OpenGL support
 - \$350 to >\$1600
 - ATI: FireGL http://ati.amd.com/products/workstation/FireGLvsRadeon_Datasheet.pdf
 - NVIDIA: Quadro series <http://www.nvidia.com/page/quadrofx.html>
 - On-board video
 - Low cost
 - Minimal performance

- Utilizes main system RAM
 - Expansion board types;
 - AGP; (8X) http://en.wikipedia.org/wiki/Accelerated_Graphics_Port
 - PCI-Exp; (16X) http://en.wikipedia.org/wiki/PCI_Express
 - RAM
 - DDR/DDR2
 - GDDR3 or 4; http://en.wikipedia.org/wiki/DDR2#The_GDDR_offshoot
 - Connectors;
 - VGA (15pin)
 - DVI
 - HD – Dual head, requires a splitter cable
- Motherboard
 - ATX form factor
 - CPU Socket, needs to match CPU
 - BIOS – Firmware, Hardware configuration/control
 - Award
 - Phoenix
 - Expansion Slots
 - PCI - http://en.wikipedia.org/wiki/Peripheral_Component_Interconnect
 - AGP 8X
 - PCI-Express 16X
 - Multiple slots on high performance motherboards
 - Support for NVIDIA SLI or ATI Crossfire technology
 - Peripheral connections
 - PS/2 (Keyboard/Mouse)
 - Parallel (1284)
 - Serial
 - USB 2.0
 - Firewire (1394) 400/800
 - Audio
 - LAN (RJ-45 8) Ethernet 10/100/1000
- System RAM
 - Match CPU FSB speed (Under clocking OK)
 - 1GB recommended minimum
 - Matched sets for Dual channel motherboard configurations (2X512 or 2X1024)
 - DDR (2X) 184 PIN 2.5v; http://en.wikipedia.org/wiki/DDR_SDRAM

- DDR-2 (4X) 240 PIN 1.8v; <http://en.wikipedia.org/wiki/DDR2>
 - Low latency: http://en.wikipedia.org/wiki/CAS_Latency
- Cooling system(s)
 - CPU
 - Video
 - Case ventilation
 - Liquid cooling systems
 - http://www.zalman.co.kr/eng/product/view_slide.asp?idx=231&idm=1
 - <http://www.sharkacomputers.com/index.html>
- Case
 - http://www.antec.com/us/pro_enclosures.html
 - ATX Form factor
 - BTX
 - Configuration (typical)
 - Desktop
 - Mini-tower
 - (2) 5.25" drive bays
 - (2) 3.5" drive bays
 - (2) 3.5" internal HDD mounts
 - Mid-tower: (Most common)
 - (3-4) 5.25" drive bays
 - (2) 3.5" drive bays
 - (4) 3.5" internal HDD mounts
 - Full size tower:
 - (5-6) 5.25 drive bays
 - Numerous internal drive mountings
 - Multimedia
 - Specialized for home media center operation/installation
 - Cooling
 - 120mm fans recommended
 - High volume air movement
 - Low RPM
 - Quiet
- Power Supply
 - ATX
 - High Efficiency; Better than 80% output/Input ratio

- Quiet
- Modular connectors
- Intel Core2 Duo CPU – requires 8 pin CPU power connector vs. 4 pin legacy connector
 - ATX12V v2.2 and EPS12V compliant
 - <http://www.antec.com/us/productDetails.php?ProdID=28500>
- NVIDIA dual SLI video 500+ watt PS recommended
- Mass Storage (HDD)
 - IDE/E-IDE (PATA) 40pin/80wire cables
 - Support is being phased out in favor of faster/cheaper SATA drives
 - SATA/SATA2 http://en.wikipedia.org/wiki/Serial_ATA
 - SATA2 = 300MBs transfer rates
 - Low cost per drive
 - Large capacity, single drives currently up to 750GB
 - SCSI:
 - High performance, 15K RPM drives available
 - Expensive per drive/GB cost
 - RAID
 - Combines multiple drives to improve performance, storage capacity and redundancy
 - Built into most motherboard chipsets
 - Minimum of (3) drives required for RAID 5 configuration
- Optical Storage
 - CD = 700MB
 - DVD 4.7/9.2GB
 - Blue-Ray
 - 25GB of storage
 - Very Expensive = \$750
- Floppy Drive 3.5/1.44MB (Optional)
 - Internal – 34 pin ribbon cable
 - USB – external
 - BIOS updates

Building the PC

<http://www.intel.com/personal/how-to/pc/pc-mod.htm>

- Prepare the case
 - Remove side panel(s)
 - Unwrap case wiring
 - Install motherboard mounting studs
 - Install rear connector bezel
 - Remove block off plates for 5.25" and 3.5" device installation
- Install Power supply (if not already installed)
- Install motherboard
 - Connect motherboard power connectors
- Install CPU
 - Install CPU cooling
 - Connect CPU fan power to motherboard header
- Install RAM
- Connect case wiring to Motherboard headers
- Connect case cooling fan(s) to power:
 - Motherboard header
 - Power Supply connector
- Install Video display card
- Install HDD(s) and cables
- Install Optical Storage drive(s) and cable
- Install floppy drive (optional) and cable
- Connect power cables to all drives
- Connect keyboard
- Connect mouse
- Connect Video display
- Connect main power cable
- Power system up
- Configure BIOS to boot from Operating system installation media
 - CD-ROM/DVD most common
 - Can be USB or Firewire

- Install Operating system
- Install system drivers: Chipset, Network card, Video, Audio

Home built systems – Pro’s and Con’s

- Totally customizable
 - You select/create details
 - You control the cost
 - Can be more expensive then name brand systems
 - Operating system license must be purchased +\$300

Component	Basic system	Price	Performance system	Price
CPU	AMD 3000+	\$159.00	Intel Core 2 Duo E6400	\$280.00
Motherboard	FoxConn 761GXK8MB	*****	BFG Nvidia nForce 680i SLI	\$330.00
RAM	1GB DDR PC3200 Matched	\$150.00	2GB DDR2 PC6400 RAM	\$420.00
Video	ATI Radeon 1300 PCI-E	\$129.00	BFG NVidia 7950OC 512MB	\$350.00
Case	Antec Case w/PS	\$89.00	Antec Super LanBoy (No PS)	\$89.00
Power Supply	380W	0.00	Antec NEO 550	\$150.00
HDD	WDC SATA 200GB/500GB	\$101.00	WDC SATA2 250GB/500GB	\$380.00
Optical storage	Sony DVD-R/RW	\$69.00	Sony DVD-R/RW	\$69.00
Total		\$538.00		\$2068.00

Home built alternatives

- Ready made hot-rods
 - Prices are complete systems
 - Includes Operating system
 - Totally customizable
 - http://www.slizone.com/object/slizone_sli_ready.html
 - Dell XPS systems: \$1000 - \$2000
 - Alienware: \$1400-\$6400
 - <http://www.alienware.com/>