Very Brief Personal Computer History

Concentrating

on

Operating Systems
and Memories

By: Michael Robinson 03-30-2006

Topics

- **This presentation relates to Personal Computers only.**

- **How Operating Systems, ram/rom memory, and permanent storage have changed.**

Some Operating Systems
CPM, CCPM, MP/M
TrsDos, NewDos/80, LS-Dos, Multidos, DosPlus
Xenix
MS-DOS, PC-DOS
Windows 1.0, 2.0, 3.1, 3.11, 95, 98, me, xp
Windows NT Workstation and Server
Windows Server
OS2
Novell Netware
Lantastic
Linux

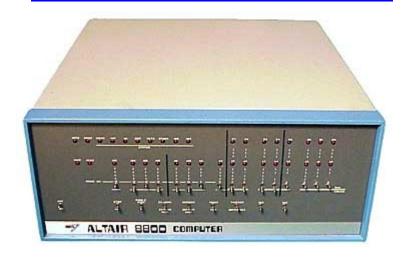| Ranges |
|---|
| Ram 4K – Gigabytes |
| Rom 4K – Megabytes |
| Tape Drives |
| Floppy Drives 128K – 1.4 Meg |
| Hard Drives 5Meg- TeraGytes |
| Flash Drives |

MITS Altair 8800
The First Personal Computer

Announced: March 1975

Price: US $395 as a kit

US $495 assembled

CPU: Intel 8080, 2.0 MHz

Display: front panel LEDs

Controls: front panel switches

Expansion: card-cage with 16 card slots

RAM: 256 bytes, 64K max

Storage: external Cassette or

8" floppy drive

OS: BASIC (MicroSoft)

The Altair 8800, from Micro Instrumentation Telemetry Systems (MITS) of Albuquerque, NM, was first featured in the January 1975 edition of Popular Electronics. **It is considered by many to be the first mass produced personal computer**, although they were called micro-computers in those days.

**IMSAI 8080
The First Clone**

IMSAI 8080

Announced: August 1975

How many: Around 20,000

Price: US $599 as a kit

US $931 assembled

CPU: Intel 8080A, 2.0 MHz

Display: front panel LEDs

Controls: front panel switches

Expansion: card-cage w/ S-100 bus

RAM: 64K max

Storage: optional cassette or floppy drive

OS: CP/M, BASIC

**IMSAI 8080, built by IMS Associates, Inc. of San Leandro, California
One of the first consumer computers available.**

IBM MODEL 5100

Introduced: September, 1975

Price: US $19,975 w/ 64K RAM

Weight: 55 pounds

CPU: IBM proprietary, 1.9MHz

Display: 5" monochrome monitor 64 X 16 text

RAM: 16K, 64K max

Storage: Internal 200K tape (DC300)

Ports: tape/printer I/O port

OS: APL and/or BASIC

With Similar Specifications

Apple I
Released: April 1976

Sol-20 Released: June 1976

Apple II
Released: April 1977

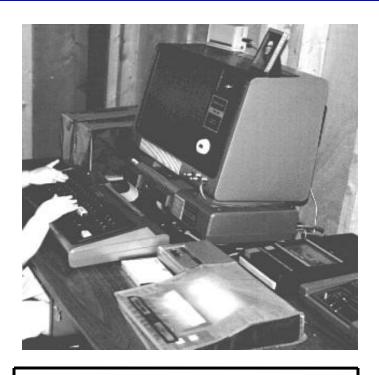**Commodore PET**
Released: June 1977

TANDY RS Model I   Model I Level II

Released: 8/3/1977 Radio Shack

Price: $599.

Keyboard

Black-and-white video display

Ram : 4KB RAM, ROM 4KB

Tape cassette

OS: TRSDOS

Released: 8/1978 Radio Shack

Price: $1099

Similar to model I but included

Two 360KB Floppy Drives

OS: TRSDOS

TRS-80 Model 3   TRS-80 Model 4

Introduced: July 1980

Price: US $699 base model
          US $2495 w/ 32K, dual Drives

CPU: Zilog Z-80, 2.03 MHz

Display: 12-inch B/W monitor: 64X16 text

RAM: 4K, 48K max.

Storage: 0, 1, or 2 internal 178K floppy drives
Ext cassette @500/1500baud

OS: BASIC in ROM, TRS-DOS on disk

Introduced: 5/1983

Price: About $1,999

RAM: 64K, expandable to 128K

Storage: 0, 1, or 2 internal 178K
floppy drives Ext cassette
@500/1500baud

OS: TRSDOS 6.0 and CP/M Plus.

Caught in the act

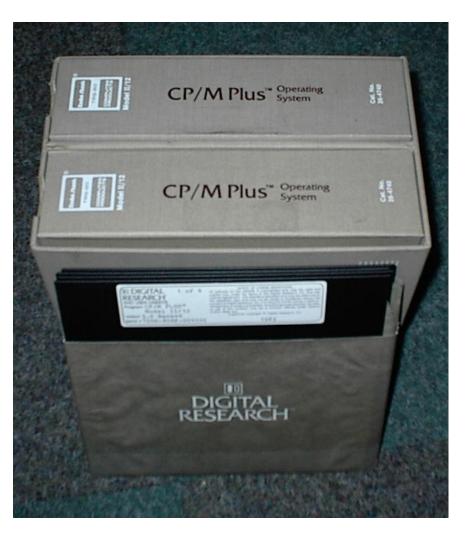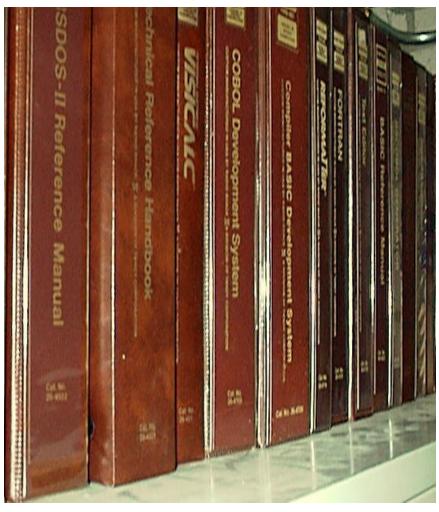My daughter Rosemarie (~1982)

OS Used with TRSDOS Computers

OS's , Languages and Applications

TRSDOS Business Computers
Model II   Model 12   Model 16

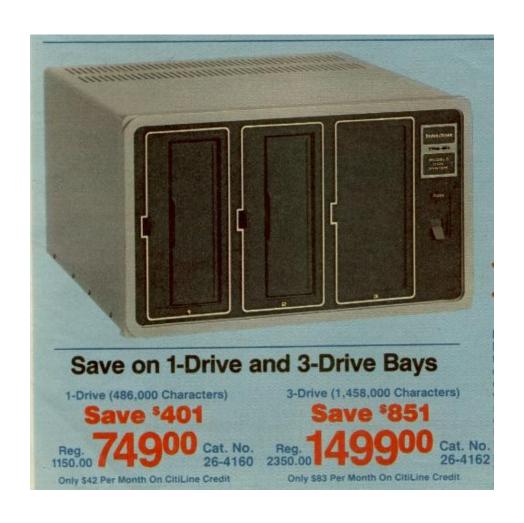|		
Released: October 1979 **Price:** $3450 / $3899 (64K RAM) **CPU:** Zilog Z-80A, 4 MHz **Ports: 2** serial, One parallel port **Display:** Built-in 12" monochrome monitor 40 X 24 or 80 X 24 text. **RAM:** 32K, 64K **Storage:** 1 500K 8" floppy drive. External Expansion w/ 3 floppy bays. **OS:** TRS-DOS, BASIC.	**Released:** Summer of 1983. Model 12 used new double sided floppies with <u>twice the capacity of the single sided ones in the Model II</u>. At 1.2 Megs per floppy, this allowed a 2 drive single unit 2 provide the storage capacity which previously required a 4 drive In the Model II.	**TRS-80 model 16**, follow on to the Model 12. It was UNIX based (it used Microsoft's Xenix) 16 bit system (68000 plus Z80).

Save on 1-Drive and 3-Drive Bays

1-Drive (486,000 Characters)

3-Drive (1,458,000 Characters)

Save $401

Save $851

Reg. 1150.00 **749⁰⁰** Cat. No. 26-4160

Reg. 2350.00 **1499⁰⁰** Cat. No. 26-4162

Only $42 Per Month On CitiLine Credit

Only $83 Per Month On CitiLine Credit

External Hard Disks for Radio Shack

Radio Shack 10 meg
External Hard Disk

Miniscribe 15 meg
External Hard Disk

Tandy RS MC-10 CoCo Color Computer

CPU: Motorola MC6803 8-bit
Video Generator: Motorola MC6847
Serial Interface: 4 pin DIN
Speed: 0.89 MHz
Memory: 4K RAM
Cassette Interface: 5 pin DIN
Operating System: BASIC

Tandy RS

Model 100   Model102

Model 200   Model 600

Model 100 Specifications

Introduced: 3/1983 at $800 for 8KB and $1,000 for 24KB

CPU: 2.4 MHz 80C85 CPU *(CMOS* Video: 2" x 7.5" LCD (not lit) with a maximum of 8 lines down, and 40 characters across

I/O: 1500 Baud Audio Cassette Port; Parallel Port; Serial Port; Bar Code Port; 300 Baud Modem; External

RAM: 8KB - 32KB (RAM also serves as a ram-drive)

Disk Drive *(optional)*

Software: Built in BASIC,Address Book, Scheduler, Text Editor, and Terminal Program

Power: 4 "AA" Batteries Model

Model 600

CPU MSM80C88 Clock3.07 MHz

RAM: 32K bytes - 224K bytes

ROM: 160K bytes - 160K bytes

FDD: drive Unformatted Capacity: 500K bytes

OS: Rom Basic

Atari 400

Atari 800

Released: November 1979

Price: US $549.95

CPU: MOS 6502,1.8MHz

Display: 24 X 40 text, 320 x 192 mono
            160 x 96 with 128 colors

RAM: 8K base, 48K max

Storage: Ext Cassette

OS: Atari OS

Released: November 1979

Price : US $999.95

CPU: MOS 6502,1.8MHz

Display: 24 X 40 text 320 x 192 mono
            160 x 96 with 128 colors

RAM: 8K base, 48K max

Storage: Ext 90K floppy drive, cassette

OS: Atari OS

Hewlett-Packard Model 85

Released: January, 1980

Price: US$3,250

Weight: 20 lbs

CPU: custom HP 8bit @ 0.613MHz

Display: built-in 5 inch monitor graphics
built-in 32 char thermal printer

Ports: four expansion ports

RAM: 8K, 64K max.

Storage: built-in DC100 217K tape drive

OS: HP BASIC in ROM

The Birth of MSDOS

- **IBM hires Paul Allen and Bill Gates to create an operating system for a new PC.**

- **The "Microsoft Disk Operating System" or MS-DOS was based on QDOS,**

- **The "Quick and Dirty Operating System" written by Tim Paterson of Seattle Computer Products, for their prototype Intel 8086 based computer.**

- **QDOS was based on Gary Kildall's CP/M, Paterson had bought a CP/M manual and used it as the basis to write his operating system in six weeks, QDOS was different enough from CP/M to be considered legal.**

- **Microsoft bought the rights to QDOS for $50,000, QDOS was renamed MSDOS and then MSDOS was licensed to IBM under the PCDOS name.**

- **Microsoft maintained the right to sub-license MSDOS to anybody else, Tim Paterson went to work for Microsoft, and the rest is history.**

First IBM PC (1981)

Model: 5150

Released: September 1981

Price: US $3000

CPU: Intel 8088, 4.77MHz

Display: 80 X 24 text

Ports: cassette & keyboard only internal expansion slots

RAM: 16K, 640K max

Storage: optional 160KB 5.25-inch disk drives

OS: IBM PC-DOS Version 1.0

Portable Computers

Introduced: April 1981

Price: US $1,795

Weight: 24.5 pounds

CPU: Zilog Z80 @ 4.0 MHz

Display: 5" monitor53 X 24 text

Ports: Parallel, modem/serial port

RAM: 64K RAM

Storage: 2 5-1/4 inch, 91K drives

OS: CP/M

Released: 1982

Price: US $1595.

Weight: 26 lbs

CPU: Zilog Z80, 2.5 MHz

Display: 9" green 24 X 80 text only

Ports: Serial port, Parallel port

RAM: 64K

Storage: 2 5-1/4"SS-DD 195K drives

OS: CP/M, SBASIC

Fujitsu Micro 16

YEAR: 1983

PRICE $3995 w/color monitor, CP/M-86, Wordstar and Supercalc²

CPU: Intel 8086, Zilog Z80-A (standard), Motorola 68000, Intel 80286, Zilog Z8000 boards

SPEEDS: 8 MHz (8086), 4 MHz (Z80)

COPROCESSOR: Motorola 6809, MOS 6845

TEXT MODES 80 chars. x 25 lines/GRAPHIC 640 x 200
COLORS 8

I/O PORTS Parallel, Serial, 4-A/D converter, RGB video, composite video, Light-pen

STORAGE: 1-4 320 KB 5.25" floppy drive, 5-20 MB hard dr

PERIPHERALS Ext 8" or 5.25" floppy and hard disc units

RAM: 128 KB up to 1152 KB

VRAM: 4 KB (Characters) + 48 KB (graphics)

ROM: 8 KB (boot loader, diagnostics)

OS: CCP/M-86 w/GSX graphic, MP/M-86, MS-DOS, Unix

Can I use this?

My son Mark (~1986)

IBM and Microsoft vs. The World (1980's)

- **Hardware**   **Operating Systems**
- **Tandy RS**   **Trsdos, NewDos, Multidos, Ldos**
-   **CP/M CCP/M MCCP/M, MP/M, Xenix**
- **Apple**   **Apple OS, CP/M**
- **Franklin**   **Apple OS, CP/M**
- **Xerox (Altos)**   **CP/M CCP/M MCCP/M, MP/M**
- **Kaypro**   **CP/M Sbasic**
- **Fujitsu**   **CP/M CCP/M MCCP/M, MP/M, MSDOS**
- **Commodore**   **CP/M, Commodore Dos**
- **Osborne**   **CP/M**
- **Zeus**   **MP/M**
- **HP**   **HP Basic in Rom**
- **Texas Instruments**   **Proprietary TI, UCSD-p**
- **And many others**
-
-                                      **VS**

- **IBM PC**   **MSDOS, CP/M**

Companies That Switch To MSDOS

- **IBM PC/XT**
- **Corona**
- **Columbia**
- **Compaq**
- **Data General**
- **Dec**
- **Unisys**
- **Dell**
- **Tandy Radio Shack**
- **Fujitsu**
- **Nec**
- **Panasonic**
- **Sony**
- **Many, many others**

Columbia Personal Computer

- **Marketed**: June 1982
- **Price:** US$2.995,00
- **CPU:** 80884.77 MHz 16 bit registers
- **Video:** 16 colors 320 x 200 CGAAudioSimple tones
- **Interface:** 2 x RS232, parallel, monitor, keyboard
- **RAM** 128KB 1MB max
- **Storage** 5.25" FDD
- **OS: MSDOS**, Cp/m-86, Mp/m-86, OASIS, XENIX

www.old-computers.com

First Compaq Computer (1983)

Released: March 1983

Price: US$3590 (two floppy system)

Weight: 28 pounds.

CPU: Intel 8088, 4.77MHz

Display: 9" mono 80 X 25 text Color graphic card

Ports: 2 parallel, 1 serial

RAM: 128K, 640K max

Storage: 2 320K 5-1/4" disk drives

OS: MS-DOS

Digital Equipment Rainbow 100

- **MANUFACTURER** Digital Equipment Corporation
- **TYPE** Professional Computer
- **ORIGIN** U.S.A.
- **YEAR** 1984

- **PRICE** £2300 (U.K., 1984)
- **CPU** Intel 8088 + Zilog Z80 A
- **SPEED** 4.81 MHz (8088) / 4 MHz (Z80)
- **TEXT MODES** 40 x 24 / 80 x 24 / 132 x 24
- **GRAPHIC MODES** 320 x 200 / 640 x 200 / 800 x 240
- **COLORS** 16 among 4096 (optional)
- **SOUND** Beeper
- **SIZE / WEIGHT** 48.3 (W) x 36.3 (D) x 16.5 (H) cm
- **I/O PORTS** 2 x RS-232, keyboard, monitor
- **POWER SUPPLY** Built-in switching power supply unit
- **PERIPHERALS** 3 expansion slots
- **RAM** 64 KB (up to 896 KB)
- **ROM** 24 KB (includes self-diagnostics)
- **STORAGE** Two 400 KB 5.25" disk-drives
- **OS** MS DOS + CP/M (+ CP/M 86 - Prologue)

www.old-computers.com

How does this work?

My youngest son Danny (~1993)

Multi-Tasking Multi-Users O.S.'s

- Windows 1.0, 2.0. 3.1, 3.11, 95, 98, me, xp
- MicroSoft Networking
- Windows NT Workstations
- Windows NT Server, Windows Server
- Novell Netware
- Lantastic
- Xenix
- OS2

OS Time Line 1975 - 1980

- BASIC (MicroSoft) released on March 1975 for the ALTAIR.

- CP/M for the IMSAI 8080 release on August 1975.

- The very first <u>graphical user interface</u> was developed by the Xerox Corporation at their Palo Alto Research Center (PARC) in the 1970s, but it was not until the 1980s when GUIs became widespread and popular.

- TRS-DOS version 1.0 released in August 3, 1977.

- TRS-DOS BASIC in ROM, TRS-DOS in July 1980.

-

OS Time Line 1980 - 1985

- MSDOS 1.0 was release on August 1981.
- SUN is incorporated in Feb 1982, with 4 employees.
- MSDOS 1.25 is released in 1982.
- MSDOS 2.0 was released March, 1983.
- TRSDOS 6.0 and CP/M Plus May 1983.
- IBM AT computer is introduced in 1984
- The 3.5-inch floppy diskette is introduced and later becomes an industry standard.
- Dell Computer is founded May 3, 1984 in Austin Texas.
- MSDOS 3.0 for the IBM PC/AT and MSDOS 3.1 for networks introduced in 1984
- The GNU manifesto is published by Dr. Dobb's Journal
- Microsoft and IBM begin collaboration on the next-generation OS/2.
- Windows 1.0 on November 20, 1985,
- IBM Top View was released in February 1985, as a DOS-based multitasking program manager without any GUI features.

OS Time Line 1986 - 1989

- <u>MS-DOS 3.2</u> was released April, 1986.
- Microsoft introduces <u>Windows 2.0</u> in December 9, 1987.
- Microsoft and IBM release <u>OS/2 1.0</u> in 1987.
- IBM introduces the <u>PS / 2 personal computer</u>, which has improved graphics, a 3.5-inch diskette drive, and proprietary bus to help prevent clone makers competition
- IBM sends clone manufacturers letters demanding retroactive licensing fees.
- <u>MS-DOS 3.3</u> was released in April 1987.
- IBM introduces <u>MCA</u> in1987.
- <u>EISA</u> is developed as an alternative to MCA in 1998.
- <u>MS-DOS 4.0</u> was released July, 1988.
- <u>MS-DOS 4.01</u> was released November, 1988.

OS Time Line 1990 - 1994

- Microsoft releases <u>Windows 3.0</u> a completely new version of Windows in1990
- Microsoft releases <u>DOS 4.01</u> for the Russian market in 1990.
- Microsoft and IBM <u>stop working together</u> to develop OS's in 1990.
- Linux is introduced by Linus Torvald in 1991.
- Microsoft changes the name of <u>OS/2</u> to <u>Windows NT</u> in 1991.
- <u>MS-DOS</u> 5.0 was released June, 1991.
- Microsoft introduces <u>Windows 3.1</u>. It sells more than 1 million copies within the first two months of its release 1992.
- Microsoft releases <u>Windows NT</u> and <u>MS-DOS</u> 6.0 in 1993.
- Microsoft releases <u>Windows NT 3.1</u> and <u>Windows for Workgroups 3.11</u> in1993
- IBM releases <u>OS/2 Warp</u> in 1994.
- <u>Red Hat Linux</u> is founded in1994
- <u>MS-DOS 6.22</u> was released April, 1994
- Microsoft releases <u>Windows 3.11</u> in 1994.

OS Time Line 1995 - 1999

- Microsoft Releases <u>Windows 95</u> on 1995.

- Microsoft releases <u>Windows CE</u> on 1996.

- Microsoft announces <u>Windows 98</u> on 1997.

- Microsoft <u>Windows CE 2.x</u> is released on 1997.

- Compaq Computer purchases Digital Equipment Corporation for $9.6 billion on January 26, 1998.

- Microsoft <u>Windows 98</u> is officially released on June 25, 1998.

- Microsoft releases <u>Windows CE 3.0</u> on 1999.

OS Time line 2000 ....

- <u>Microsoft Windows 2000</u> is released February of 2000.
- Microsoft releases <u>Windows ME</u> June 19, 2000.
- <u>Microsoft Windows XP</u> home and professional editions are released October 25, 2001.
- <u>Microsoft Windows Server 2003</u> is released March 28, 2003.
- IBM sells its computing division to <u>Lenovo Group</u> for $1.75 billion on December 08, 2004
- IBM officially announces on July 14, 2005 that all sales of <u>OS/2</u> will end on December 23, 2005 and that all support from IBM for OS/2 will end on December 16, 2005.

Storage and …1967 - 1972

- IBM creates the first <u>floppy disk</u> in 1967.
- <u>Intel</u> Corporation is founded by Robert Noyce and Gordon Moore in 1968.
- AT&T Bell Laboratories develop <u>Unix</u> in 1969.
- <u>AMD</u> is founded in 1969.
- <u>Western Digital</u> is founded in 1970.
- The Xerox Palo Alto Research Center (PARC) is established to perform basic computing and electronic research in 1970.
- The first 8" <u>floppy diskette drive</u> was introduced in 1971.
- The <u>compact disc</u> is invented in the United States, 1972.

Storage and … 1975 - 1985

- The first 5.25-inch <u>floppy disk</u> is invented in 1975
- <u>Apple</u> Computer Inc., <u>Radio Shack</u>, and <u>Commodore</u> all introduce mass-market computers. 1977
- <u>Seagate</u> is founded. 1979
- Novell Data System is established as an operating system developer. Later in 1983 the company becomes the <u>Novell</u> company.
- <u>Maxtor</u> is founded. 1982
- The <u>3.5-inch floppy diskette</u> is introduced and later becomes an industry standard in 1984.

Hard Drives

- Seagate 1980 5 meg hard disk 5 ½
- Rodime 3.5
- According to Disk/Trend, an industry-research organization in Mountain View, Calif., more than 230 disk-drive manufacturers have dropped out of the business, leaving only 22 still making hard drives in 1997. Disk/Trend's Jim Porter estimates that the highest-capacity 3.5-inch disks (the size most popular in 1997) would store 130 Gbytes by the year 2000 at 2 cents per Mbyte.

CPU AND MEMORIES 1978 - 1994

- **Intel 8086 (1978)** up to 1 MB of RAM.
- **Intel 8088 (1979)** Identical to the 8086., it is able to work with the 8087 math coprocessor chip.
- **NEC V20 and V30 (1981)** Clones of the 8088 and 8086. They are supposed to be about 30% faster than the Intel ones, though.
- **Intel 80186 (1980)** The 186 was a popular chip. Despite this, the 186 never found itself in a personal computer.
- **Intel 80286 (1982)** up to 16 MB of RAM. able to work with virtual memory, thereby allowing much for expandability.
- **Intel 386 (1985 - 1990)**The 32-bit address bus allowed the chip to work with a full 4 GB of RAM and a staggering 64 TB of virtual memory. In addition, the 386 was the first chip to use instruction pipelining, which allows the processor to start working on the next instruction before the previous one is complete.
- **Intel 486 (1989 - 1994)** It contained an integrated 8 KB on-die cache. they were actually 3X triplers, allowing a 33 MHz processor to operate internally at 100 MHz.

CPU AND MEMORIES 1994 - 1996

- **AM486DX Series (1994 - 1995)** It contained on-board cache. The chip found its way into many 486-compatibles.
- **AMD AM5x86 (1995)** This is the chip that put AMD onto the map as official Intel competition. The 5x86 performed better than a Pentium-75. The chip became the de facto upgrade for 486 users who did not want to ditch their 486-based PCs yet.
- **The Pentium (1993)** The two separate 8K caches (code cache and data cache) and the pipelined floating point unit increase its performance beyond the x86 chips.
- **The Pentium Pro (1995-1999)** Is a RISC chip with a 486 hardware emulator on it, running at 200 MHz or below. It has two separate 8K L1 cache (one for data and one for instructions), and up to 1 MB of onboard L2 cache in the same package.
- **Cyrix 6x86 Series (1995)** 16 KB of write-back cache. It used many of the same techniques internally as the Intel and AMD chips to increase performance.
- **AMD K5 (1996)** K5's ran from 75 MHz to 166 MHz (in P-ratings, that is). They contained 24KB of L1 cache.

CPU AND MEMORIES 1997

- **Pentium MMX (1997)** The dual 8K caches of the Pentium were doubled to 16 KB each, and went up to 233 MHz.
- **AMD K6 (1997)** It contained 64KB of L1 cache (32KB for data and 32KB for instructions). It was released in 166MHz to 300 MHz versions.
- **Cyrix 6x86MX (1997)** It took an increased 64KB cache and an increase in speed. The first M2's were 150 MHz chips. The fastest ones operated at 333 MHz, or PR-466.
- **Pentium II (1997)** Pentium II has 32KB of L1 cache (16KB each for data and instructions) and has a 512KB of L2 cache on package. The L2 cache runs at ½ the speed of the processor, not at full speed. Nonetheless, the fact that the L2 cache is not on the motherboard, but instead in the chip itself, boosts performance.

CPU AND MEMORIES 1998 - 2006

- **Celeron (1998)** With 512 KB of cache running at half speed. Slot 1 Celerons ranged from the original 233MHz up to 433 MHz, while Celerons 300MHz and up were available in Socket 370.
- **AMD K6-2 & K6-3 (1998)** The K6-3 processor was basically a K6-2 with 256 KB of on-die L2 cache.
- **Pentium III (1999)** In February of 1999, running at 450 MHz on a 100MHz bus. eventually 600 MHz
- **AMD Athlon (1999 - Present)**The original Athlon came at 500MHz. This bus operated at 200MHz, faster than anything Intel was using. The bus had a bandwidth capability of 1.6 GB/s. In June of 2000, AMD released the Athlon Thunderbird. full speed L2 cache
- In April of 2000, Intel released their Pentium III Coppermine. While Katmai had 512 KB of L2 cache, Coppermine had half that at only 256 KB. But, the cache was located directly on the CPU core. Coppermine eventually saw 1+ GHz.
- **Celeron II (2000)** The chip is available from 533 MHz to 1.1 GHz.
- AMD released Athlon "Palomino" (May 2001), also dubbed the Athlon 4. It allows the chip to change its voltage requirements and clock speed depending on the usage requirement of the time. This was excellent for making the chip appropriate for power-sensitive apps such as mobile systems.
- **Duron (2000 - Current)** In August of 2001, AMD released the Duron "Morgan". This chip broke out at 950 MHz but quickly moved past 1 GHz., but with 64 KB of L2 rather than 256 KB.
- **Pentium IV (2000 - Current)** First released in 2 GHz and 2.2 GHz versions, but the new design gives P4 room to move up to 3 GHz quite easily.

Other Topics Time Permitting

- IBM ps/2 micro channel With the introduction of its Personal System/2 (PS/2) range in April 1987, IBM also introduced a new system architecture.

- The PS/2 model 30 used the familiar AT style bus and the models 50, 60 and 80 used the new Micro Channel Architecture (MCA). Since then we have seen the model 30 286 using the AT style bus, and the model 50Z and 70 386 which use MCA.

My Conclusions

- Pricing, Marketing and Tech Support
- Monopolies
- GNU

Where are we going….?

My granddaughter Paula (2006)

References

http://oldcomputers.net

http://www.atarimagazines.com/creative/v9n10/24_TRS80_model_4_more_busi.php

http://www.islandnet.com/~kpolsson/comphist

http://www.kjsl.com/trs80/model4info.html

Still Under Construction