

digital
The DEC 3000 M700 SERVER



INTRODUCTION:

This particular system is the gem of my collection. It's fairly new, as my computers go, (built in 1994) but it has every quality I appreciate in a "classic" computer. It has a fairly fast (225 MHz) ALPHA RISC processor, 128 Meg of main memory, a reasonable size disk (2 gigs), and a "real" operating system (NetBSD 4.0). Since, this system is probably the most capable overall computer I currently own, it's more of a production system than a museum piece. I use it for program development, text editing (including this

document), web access, email, FTP server, and database engine.

It's also the only machine I currently own (except for the VAX 6000) that can hold its own as a practical time-sharing system. Since the VAX has electrical and environmental requirements that exceed my modest financial resources, the VAX generally only gets powered up for brief demonstrations.

PROVENANCE:

I acquired the CPU and disk via an ebay auction in March of 2003, so I've had this system for just over five years. When purchased, it had a base install of OpenVMS, but no programming environment or layered products that would make it a useful system. The hard drive died shortly after I bought it, taking VMS with it, and I was forced to shelve the system for a time. In 2005, I acquired another (used) SCSI hard drive, but my VMS hobbyist license had lapsed and I was unable to renew my Encompass membership to obtain a new license.

After a series of "fun and games" getting the new hard drive to work with the system, I repaired the CD-ROM and installed NetBSD. Learning the use this particular variant of the UNIX operating system has been a challenge, but I'm slowly starting to get the hang of it. The system has been fairly stable of late (with the exception of Postfix and the Sendmail wrapper), so I guess that a three-year learning curve hasn't been excessive ☺

HISTORY OF THE DEC ALPHA:

Maybe the Alpha is still too new to have attracted much of a following of computer nerds willing to invest time or website storage in the creation of an appropriate online memorial. More likely, it is viewed as one of the last high-end workstations produced before Wintel PCs caught up (and surpassed) "real" computers in terms of processor throughput, memory, and disk storage. Whatever the cause, the story of the Alpha needs to be written. It may have been "too little, too late" to save Digital Equipment Corporation from the Goths and Vandals (Compaq and Hewlett-Packard) but it's a nice little box in its own right and deserves to be remembered.

<http://paleoferrosaurus.com/alpha.pdf>

The best online reference I've found to the overall history of the DEC Alpha was written by Paul V. Bolotoff and can be found online at:

http://www.alasir.com/articles/alpha_history/index.html

Bolotoff seems genuinely fond of both DEC and the Alpha and traces their development from the TX-2 at Lincoln Labs through the classic PDP series of minicomputers; to the VAX, Prism, and ultimately the Alpha. He also makes a point to trace the recent history of the Alpha since the acquisition of DEC by Compaq and HP. His analysis of the decline and fall of the DEC Empire is an interesting, if not necessarily unbiased, account of an American business tragedy.

Wikipedia has an article on the DEC 3000 AXP that I've contributed to. The current version is located at:

http://en.wikipedia.org/wiki/DEC_3000_AXP

Here is a copy of the text as it existed when this page was written:

DEC 3000 AXP was the name given to a series of computer workstations and servers, produced from 1992 to around 1995 by Digital Equipment Corporation. The DEC 3000 AXP series formed part of the first generation of computer systems based on the 64-bit Alpha AXP architecture. Supported operating systems for the DEC 3000 AXP series were OSF/1 AXP (later renamed Digital UNIX) and OpenVMS.

All DEC 3000 AXP models used the 21064 (EV4) or 21064A (EV45) processor and inherited various features from the earlier MIPS architecture-based DECstation models, particularly the TURBOchannel bus.

The DEC 3000 AXP series was superseded by the AlphaStation/AlphaServer line.

Models:

There were three DEC 3000 model families, codenamed Pelican, Sandpiper, and Flamingo. Within Digital, this led to the DEC 3000 series being affectionately referred to as "the seabirds".

<i>Model</i>	<i>Codename</i>	<i>CPU</i>	<i>CPU MHz</i>	<i>B-cache (L2)</i>	<i>Chassis</i>
<i>Model 300</i>	<i>Pelican</i>	<i>EV4</i>	<i>150</i>	<i>256 KB</i>	<i>desktop</i>
<i>Model 300L</i>	<i>Pelica</i>	<i>EV4</i>	<i>100</i>	<i>256 KB</i>	<i>desktop</i>
<i>Model 300X</i>	<i>Pelican+</i>	<i>EV4</i>	<i>175</i>	<i>256 KB</i>	<i>desktop</i>

Model 300LX Pelica+ EV4 125 256 KB desktop
Model 400 Sandpiper EV4 133 512 KB desktop
Model 500 Flamingo EV4 150 512 KB pedestal
Model 500X Hot Pink EV4 200 512 KB pedestal
Model 600 Sandpiper+ EV4 175 2 MB desktop
Model 700 Sandpiper45 EV45 225 2 MB desktop
Model 800 Flamingo II EV4 200 2 MB pedestal
Model 900 Flamingo45 EV45 275 2 MB pedestal

Some model numbers were also suffixed with 'W' or 'S' to indicate workstation or server configuration respectively.

Description

Memory

The Sandpiper and Flamingo used proprietary wide (64 bits plus parity) Fast Page Mode SIMMs of either 4 MB, 8 MB, 16 MB or 32 MB capacity. [1] These were eight-way interleaved, providing a 256-bit-wide bus to memory. The Sandpiper had two such eight-SIMM banks, for up to 512 MB total system RAM, while the Flamingo had four banks and supported up to 1 GB. In comparison, the Pelican was a budget architecture utilizing eight standard 72-pin Fast Page Mode parity SIMMs of either 8 MB or 32 MB capacity, for a total of up to 256 MB RAM. These were two-way interleaved, allowing a 64-bit-wide bus to memory.

Expansion slots

The DEC 3000 AXP series uses the 32-bit TURBOchannel bus running at various speeds, 12.5 MHz in the 300 models, 22.5 MHz in the 400 models and 25 MHz in models 500 to 900. The TURBOchannel bus is provided by an ASIC, which connected it to the SPLICE data path ASICs. The number of expansion slots also varied, the 300 models had two slots, except for the 300L, which had none. Models 400, 600 and 700 had three slots and models 500, 700 and 800 featured six.

I/O subsystem

The I/O subsystem, called 'JUNKIO' [sic], is implemented by the IOCTL ASIC, which also connects the subsystem to the TURBOchannel bus. The I/O subsystem features a Dallas Semiconductor DS12B7A real time clock, two Zilog Z85C30 UARTs for serial communications, an AMD 79C30A chip

<http://paleoferrosaurus.com/alpha.pdf>

that provides telephone-quality audio, and a AMD 7990 LANCE (Local Area Network Controller for Ethernet) chip that provided a BASE10-T or thickwire interface.

SCSI interface

The DEC 3000 AXP used a TCDS (TURBOchannel Dual SCSI) ASIC to provide an interface between the SCSI controllers and the TURBOchannel bus. Early systems used one (Model 300s) or two (Model 400 and 500) NCR 53C94 SCSI controllers, which provided one or two 5 MB/s [2] 8-bit single ended SCSI buses. Later and higher end systems such as the Model 600, 700, 800 and 900 also feature two SCSI controllers, but used the NCR 53CF94-2 instead, which provided faster 10 MB/s 8-bit single ended SCSI buses.

ONLINE REFERENCES:

1. http://en.wikipedia.org/wiki/DEC_3000_AXP
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